

# **Oracle® Key Manager 3**

Administration Guide

Release 3.0

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# Preface

This guide provides configuration and administration information for the Oracle Key Manager (OKM) software. The Administration Guide is intended for storage administrators, system programmers and operators responsible for configuring and maintaining the OKM software at their site.

## Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at

<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

### Access to Oracle Support

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# What's New

This publication includes information about the following OKM enhancements.

## Revision 01

- Support for the Netra SPARC T4-1 server.
- Support for the T10000D drive.
- The Windows installer of the Oracle Key Manager GUI and CLI displays a screen warning users they must have elevated privileges.

See ["Starting the OKM Installation"](#).

- The QuickStart Program and the OKM Console displays these changes:
  - KMAs now perform initial configuration steps after they are first booted.
  - KMAs now enforce more restrictive access via SSH when the technical support account is enabled.
  - The password rules for the support user have changed.
  - The use of the term "Passphrase" has been changed to "support account" when displaying text about maximum age during enabling of technical support.
  - During QuickStart, if the user selects to use DHCP for the management or service network, any hostname information provided by the DHCP server will be ignored. In the Set DNS Configuration step, the KMA displays any DNS settings from a DHCP server on the management network.
  - During QuickStart, the user provides the KMA name. This KMA name is now used as the hostname for the KMA.
  - During QuickStart of the first KMA in a Cluster, the user is prompted for the IP address of an external NTP server.
  - After a reboot, reset, initial installation, or upgrade, a new message will appear if the SCA card is being initialized or having its firmware upgraded, and the console will be disabled until it is complete.
  - The prompt for zeroize has been removed. The KMA is now always zeroized.
  - When configuring "gateways" (routers) for network routes from the OKM Console, the dialog displayed for entering the subnet mask has changed to reflect that this field is optional. If not specified, the system determines an appropriate value for the netmask.

See ["Running the QuickStart Program"](#) and ["Using the OKM Console"](#).

- In the System Time screen, the Security Officer can provide an IPv6 address for an external NTP server.  
See "[System Time Menu](#)".
- In the SNMP Manager List panel, the Security Officer can provide an IPv6 address when creating or modifying an SNMP Manager.  
See "[SNMP Manager List Menu](#)".
- The KMA List and Software Upgrade screens display the version strings for KMAs running OKM 3.0 in a different format.
- The KMA List and Software Upgrade screens display the version strings for KMAs running OKM 3.0 in a different format. For OKM 3.0 KMAs, the version string has the following format: <OKM release>-5.11-<OKM build>  
See "[KMA List Menu](#)" and "[Software Upgrade](#)".
- The Software Upgrade screen includes a number of OKM 3.0-related changes:
  - OKM 2.x KMAs cannot be upgraded to OKM 3.0. Users should not attempt to upload and apply an OKM 3.0 upgrade package onto an OKM 2.x KMA.
  - Users must install and use an Oracle Key Manager 3.0 GUI before uploading or activating a software version on an OKM 3.0 KMA. Oracle Key Manager 2.x GUIs cannot activate a software version on an OKM 3.0 KMA.
  - KMAs running OKM 3.0 can display up to three software versions in the Software Upgrade panel.
  - Do not attempt to upload an OKM upgrade package that requires a down-level Solaris installation. The KMA will reject this upload.
 See "[Software Upgrade](#)".
- When the Oracle Key Manager GUI is connected to an OKM 3.0 KMA, the Network Configuration screen does not show the DNS Configured by DHCP checkbox. This checkbox is displayed for OKM 2.x KMAs.  
See "[Displaying the Network Configuration](#)".
- All roles can access the KMA List screen and view the key pool size.  
See "[KMA List Menu](#)".
- OKM 3.0 KMAs do not support the Auto Service Request feature and do not send telemetry data. The OKM GUI continues to display the Auto Service Request screen when it is connected to a KMA running OKM 2.4.x or 2.5.x.
- The OKM GUI includes a new Key List panel. From this panel, Operators and Compliance Officers can query keys directly without having to query data units and then query the keys associated with a particular data unit.  
Compliance Officers and Operators can select a key and click the Details button to display more information about that key.  
See "[Key List Menu](#)".
- The OKM GUI displays a new Agent Performance List panel. From this panel, Operators and Compliance Officers can query agent performance information.  
Compliance Officers and Operators can select an agent and click the Details button (or double-click on an agent) to display more information about that agent.  
"[Agent Performance List Menu](#)".

- The OKM GUI contains a new KMA Performance List panel. From this panel, users with any role can query KMA performance information about KMAs in this OKM cluster.

Users with any role can select a KMA and click the Details button to display more information about that KMA.

See "[KMA Performance List Menu](#)".

- The OKM GUI includes a new Current Load panel. From this panel, users with any role can query load information about the KMA to which the GUI is connected.

See "[Current Load Menu](#)".

- The Data Unit List panel displays a new Key Counts button. By clicking this button, you can list the data units that have associated keys and the number of keys associated with each data unit.

See "[Data Unit List Menu](#)".

- The OKM Command Line Interface (CLI) adds the following new subcommands:
  - currload
  - listagentperformance
  - listdukeycount
  - listkeys
  - listkmaperformance

The OKM user must have the Operator or Compliance Officer role to be able to list agent performance, list keys, or list data unit key counts. The OKM user must have any role to be able to get current load or list KMA performance.

See "[Using the OKM Console](#)".

## Revision 02

Minor document corrections.





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# Introduction

The Oracle Key Manager (OKM) creates, stores, and manages encryption keys. It consists of the following components:

- **Key Management Appliance (KMA)** – A security-hardened box that delivers policy-based Lifecycle Key Management, authentication, access control, and key provisioning services. As a trust authority for storage networks, the KMA ensures that all storage devices are registered and authenticated, and that all encryption key creation, provisioning and deletion is in accordance with prescribed policies.
- **OKM GUI** – A Graphical User Interface that is executed on a workstation and communicates with the KMA over an IP network to configure and manage the OKM. The OKM Manager GUI must be installed on a customer-provided workstation.
- **OKM CLIs** – Two command line interface (CLI) utilities that support a subset of the same functions as the OKM Manager GUI. These CLIs allow automation of various tasks such as backup, key export, and audit reporting.
- **OKM Cluster** – The full set of KMAs in the system. All of these KMAs are aware of each other and replicate information to each other.
- **Agent** – A device or software that performs encryption, using keys managed by the OKM Cluster. These include Oracle's StorageTek encrypting tape drives and Oracle database servers with Transparent Data Encryption (TDE).

Agents communicate with KMAs via the Agent API. The Agent API is a set of software interfaces that are incorporated into the agent hardware or software.

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**Note:** See [Appendix B, "Using OKM with Advanced Security Transparent Data Encryption \(TDE\)"](#) for information about using OKM with TDE.

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## OKM Concepts

The following OKM concepts are discussed:

- OKM Clusters
- Agents
- Network Connections
- Initial Setup - Direct Connection or Remote Console
- Initial Setup - QuickStart Program
- Key Lifecycle

- State Transition
- OKM Key States and Transitions
- Users and Role-based Access Control
- Data Units, Keys, Key Groups, and Key Policies

## OKM Clusters

OKM supports clustering of multiple KMAs, which provides load balancing and failover. All KMAs in a OKM Cluster act in an active/active manner. All KMAs can provide all capabilities to any agent. Actions performed on one KMA are quickly replicated to all other KMAs in the Cluster.

## Agents

Agents perform cryptographic operations, specifically, encrypting data as it is written and decrypting data as it is read. Agents contact the OKM Cluster in order to create and retrieve keys used to perform the cryptography.

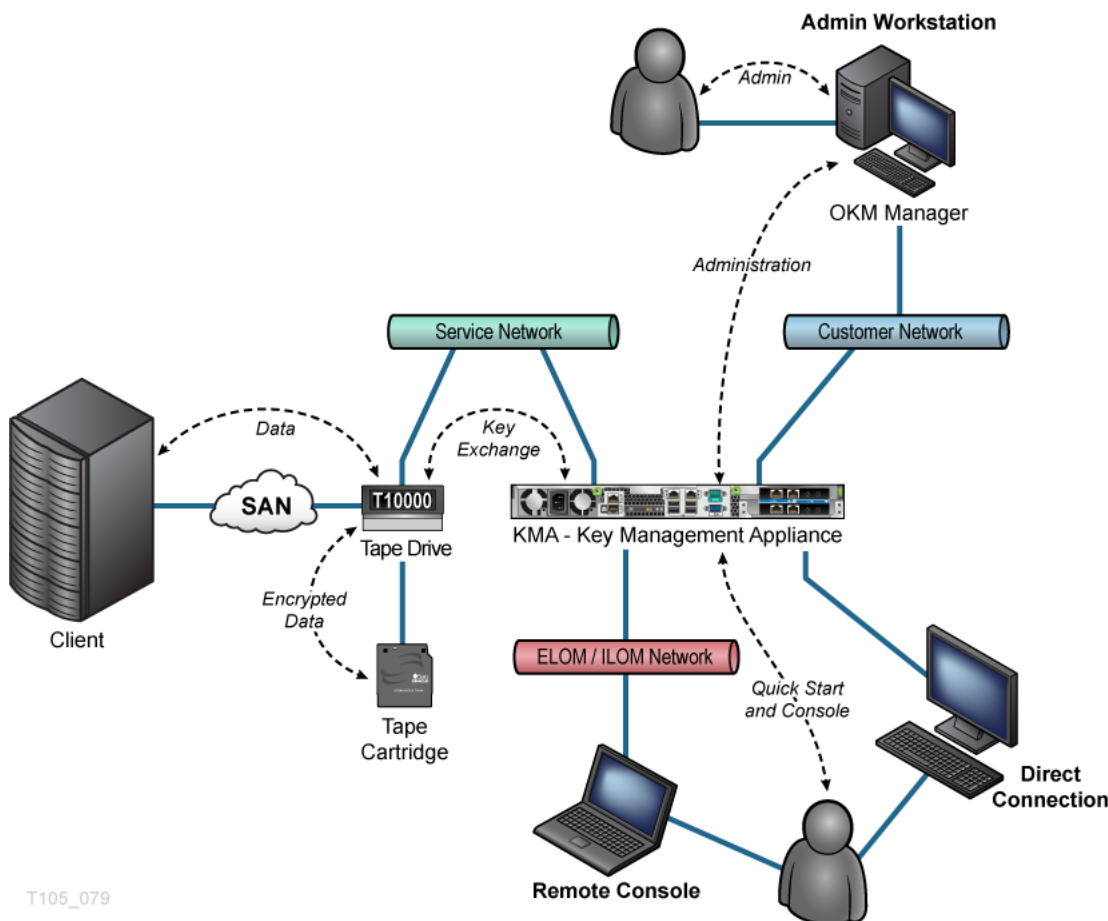
## Network Connections

The OKM uses TCP/IP networking for the connections between KMAs, Agents, and machines where the OKM Manager GUI is running. In order to provide flexible network connections, two interfaces are provided for network connections on the KMA:

- The management connection, intended for connection to the customer network
- The service connection, intended for connection to the tape drives.

With production KMA installation, library-specific accessory kits are available that include switches and cables for connecting to the drives and the KMA. This is shown in [Figure 1-1](#).

Figure 1–1 Connections to the KMA



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## Initial Setup - Direct Connection or Remote Console

KMA initial setup is performed through the console connection. This can be done by using a monitor and keyboard connected directly to the KMA or by the remote console function in the Embedded Lights Out Manager (ELOM) or Integrated Lights Out Manager (ILOM). The ELOM or ILOM provides a remote connection to the console allowing you to perform server functions.

The ELOM/ILOM remote console function requires a third network connection, labeled the "ELOM/ILOM Network" in Figure 1–1. The ELOM's or ILOM's IP address must be configured as described in ["Accessing the KMA Through the Service Processor"](#) on page 2-1 in order to use the remote console function.

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**Note:** Most commonly, the ELOM/ILOM Network is actually the same network as the customer network.

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## Initial Setup - QuickStart Program

When a KMA in the factory default state is powered on, a wizard function called QuickStart runs on the console to perform the initial setup. Once complete, most other functions can be done from the OKM manager GUI. A limited function console interface remains active for a small set of functions.

## Key Lifecycle

Keys undergo a lifecycle based on the key policy. The lifecycle imposed by the OKM is based on the NIST 800-57 guidelines. A few additional states are added to deal with nuances of the OKM.

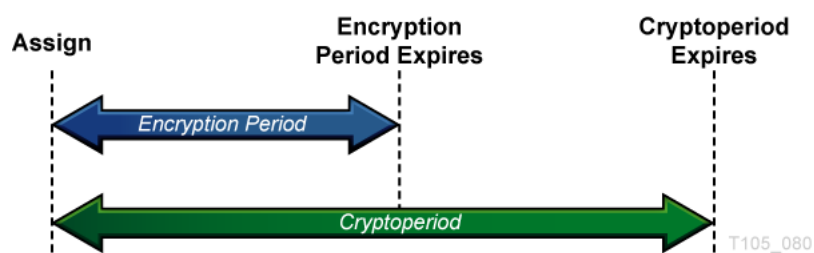
The key lifecycle is based on two time periods defined in the key policies:

- Encryption period
- Cryptoperiod

The encryption period is the period after a key is assigned that can be used to encrypt data. The cryptoperiod is the period that can be used for decryption. The two periods start at the same time when the key is assigned.

Figure 1–2 shows the time periods in a key lifecycle.

**Figure 1–2 Key Lifecycle Periods**



## State Transition

The encryption period and cryptoperiod, combined with other functions of the OKM, define a state transition for keys.

Figure 1–3 shows the state transitions. States and transitions shown in blue are defined by NIST 800-57.



**Generated** A generated state indicates a key that has been created on one KMA in a OKM Cluster. It remains generated until it has been replicated to at least one other KMA in a multi-OKM Cluster. In a Cluster with only a single KMA, a key must be recorded in at least one backup to transition out of the generated state.

**Ready** A ready state indicates that the key has been protected against loss by replication or a backup. A ready key is available for assignment. The “replicated” transition occurs when the key is replicated or (for a single OKM Cluster) backed up.

### **Active**

This state indicates that the key may be used to protect information (encrypt) or to process previously protected information (decrypt) NIST states that an active key may be designated to protect only, process only, or protect and process. Further, it specifically states that for symmetric data encryption keys, a key may be used for some time period to protect and process information and once this time period expires, the key may continue to be used for processing only.

Within the active state, the OKM adds two substates. These states are described in NIST, but are not specifically identified as states.

**Protect-and-process** A key in this state can be used for both encryption and decryption. A key is placed into this state when it is assigned. The assignment is done when an encryption agent requests a new key to be created.

**Process only** A key in this state can be used for decryption but not encryption. When an agent determines that none of the keys available to it for a specific data unit that is being read or written are in the protect-and-process state, it should create a new key.

Keys move from the protect-and-process state to the process only state when the encryption period for the key expires.

### **Deactivated**

This state indicates that the key has passed its cryptoperiod but may still be needed to process (decrypt) information. NIST specifically states that keys in this state may be used to process data.

The NIST guidelines state that if post-operational keys, including deactivated and compromised keys, need to remain accessible, they should be archived. This is a key recovery process that allows keys to be recalled from an archive and made available for use.

The OKM provides archives in the form of KMA backups but cannot recall a single key from a backup. Therefore, the OKM retains post-operational phase keys in the OKM Cluster and delivers them upon request from an agent.

### **Compromised**

Keys are in the compromised state when they are released to or discovered by an unauthorized entity. Compromised keys should not be used to protect information, but may be used to process information.

### **Destroyed/Destroyed Compromised**

Destroyed and Destroyed Compromised keys (keys that are compromised before or after destruction) no longer exist. However, information about the key may be retained. Key material from destroyed keys is removed from the OKM Cluster. Destroyed keys will not be delivered to an agent.

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**Note:** The only way to destroy a key is through the GUI or the management API.

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The NIST guidelines do not provide any basis for destroying keys based on time.

Within the Destroyed and Destroyed Compromised states, the OKM defines two substates, incomplete and complete. These states are created because the OKM does not control the backups that it creates. A customer administrator must inform the OKM when a backup has been destroyed. Only after all backups have been destroyed can a key be considered truly destroyed.

**Incomplete** This substate indicates that at least one backup still exists that contains the destroyed key. In this substate, the key does not exist in any KMA in the OKM Cluster. Keys in this state cannot be delivered to agents.

**Complete** This substate indicates that all backups containing the key have been destroyed. The key does not exist in any KMA, nor in any backup. Strictly speaking, backups that contain the key may well still exist. Although the OKM identifies the backups as destroyed, it is the responsibility of the user to ensure these backups have actually been destroyed.

It is worth noting again that the “destroyed” transition occurs only as the result of an administrative command. Further, keys may still be delivered to an encryption agent when the key is in the post-operational phase (Deactivated and Compromised states.) This interpretation is consistent with NIST’s descriptions for the post-operational phase. The NIST guidelines specify that a post-operational key should be destroyed when it is “no longer needed.” We believe that only you can determine when a key is “no longer needed,” so only an external entity can initiate the destroyed transition.

## Users and Role-based Access Control

The OKM provides the ability to define multiple users, each with a user ID and passphrase. Each user is given one or more pre-defined roles. These roles are:

- **Security Officer** – performs OKM setup and management
- **Operator** – performs agent setup and day-to-day operations
- **Compliance Officer** – defines Key Groups and controls agent access to Key Groups
- **Backup Operator** – performs backup operations
- **Auditor** – can view system audit trails
- **Quorum Member** – views and approves pending quorum operations.

A Security Officer is defined during the QuickStart process. Additional users may be defined using the OKM Manager GUI after QuickStart is complete.

### Allowed Operations for Each Role

[Table 1–3](#) lists the functions for each role. It displays only the allowed operations for the GUI and the console. Although you may see an operation, it may fail when you attempt it. This can occur if roles are removed from a user between the time of display and when the operation is attempted.

All roles except the Auditor’s must create a functioning encryption system. A user can have one or multiple roles.

### Quorum Protection

The OKM also provides quorum protection for certain operations. You can define a quorum of up to 10 users and a threshold from one to the number of quorum users. This information is called the Key Split Credentials (see ["Entering Key Split Credentials"](#) on page 2-14).

The user IDs and passphrases are different from the user IDs and passphrases used to log into the system. When you attempt an operation that requires quorum approval, a screen is displayed that allows all quorum users to input their userid and passphrase. At a minimum, you must supply the specified threshold of userids and passphrases for the operation to be allowed.

### Data Units, Keys, Key Groups, and Key Policies

Data units are used to represent data that is encrypted by agents. For tape drives, a data unit is a tape cartridge, and data units are always present. This is not a fundamental requirement, and future agents may operate without defining data units.

Keys are the actual key values (key material) and their associated metadata.

Key policies define parameters that govern keys. This includes lifecycle parameters (such as encryption period and cryptoperiod) and export/import parameters (for example, import allowed, export allowed.)

Key Groups associate keys and key policies. Key Groups have a specific key policy and are assigned to agents. Each agent has a list of allowed Key Groups. Agents are allowed to retrieve only the keys that are assigned to one of the agent's allowed Key Groups. Agents also have a default Key Group. When an agent creates a key (more specifically, assigns it to a data unit), the key is placed into the agent's default Key Group. There is functionality in place to allow more sophisticated control of Key Groups by agents. However, existing agents cannot leverage this functionality.

In order for the system to function, at least one key policy and one Key Group must be defined. That Key Group must be assigned as the default Key Group for all agents.

### TCP/IP Connections and the KMA

If a firewall exists between the entities (OKM Manager, Agents, and other KMAs in the same Cluster) and the KMA, the firewall must allow the entity to establish TCP/IP connections with the KMA on the following ports:

- OKM Manager-to-KMA communication requires ports 3331, 3332, 3333, 3335.
- Agent-to-KMA communication requires ports 3331, 3332, 3334, 3335.
- KMA-to-KMA communication requires ports 3331, 3332, 3336.

---

**Note:** For users who configure their KMAs to use IPv6 addresses, configure IPv4-based edge firewalls to drop all outbound IPv4 protocol 41 packets and UDP port 3544 packets to prevent internet hosts from using any IPv6-over-IPv4 tunnelled traffic to reach internal hosts.

Refer to your firewall configuration documentation for details. [Table 1-1](#) lists ports KMAs explicitly use or ports at which KMAs provide services.

---



**Table 1–1 KMA Port Connections**

Port Number	Protocol	Direction	Description
22	TCP	Listening	SSH (only when Technical Support is enabled)
123	TCP/UDP	Listening	NTP
3331	TCP	Listening	OKM CA Service
3332	TCP	Listening	OKM Certificate Service
3333	TCP	Listening	OKM Management Service
3334	TCP	Listening	OKM Agent Service
3335	TCP	Listening	OKM Discovery Service
3336	TCP	Listening	OKM Replication Service

Table 1–2 shows other services listening at ports that might not be used.

**Table 1–2 Other Services**

Port Number	Protocol	Direction	Description
53	TCP/UDP	Connecting	DNS (only when KMA is configured to use DNS)
68	UDP	Connecting	DHCP (only when KMA is configured to use DHCP)
111	TCP/UDP	Listening	RPC (KMAs respond to rpcinfo queries). This port is open to external requests only on KMS 2.1 and earlier
161	UDP	Connecting	SNMP (only when SNMP Managers are defined)
546	UDP	Connecting	DHCPv6 (only when KMA is configured to use DHCP and IPv6)
4045	TCP/UDP	Listening	NFS lock daemon (KMS 2.0 only)

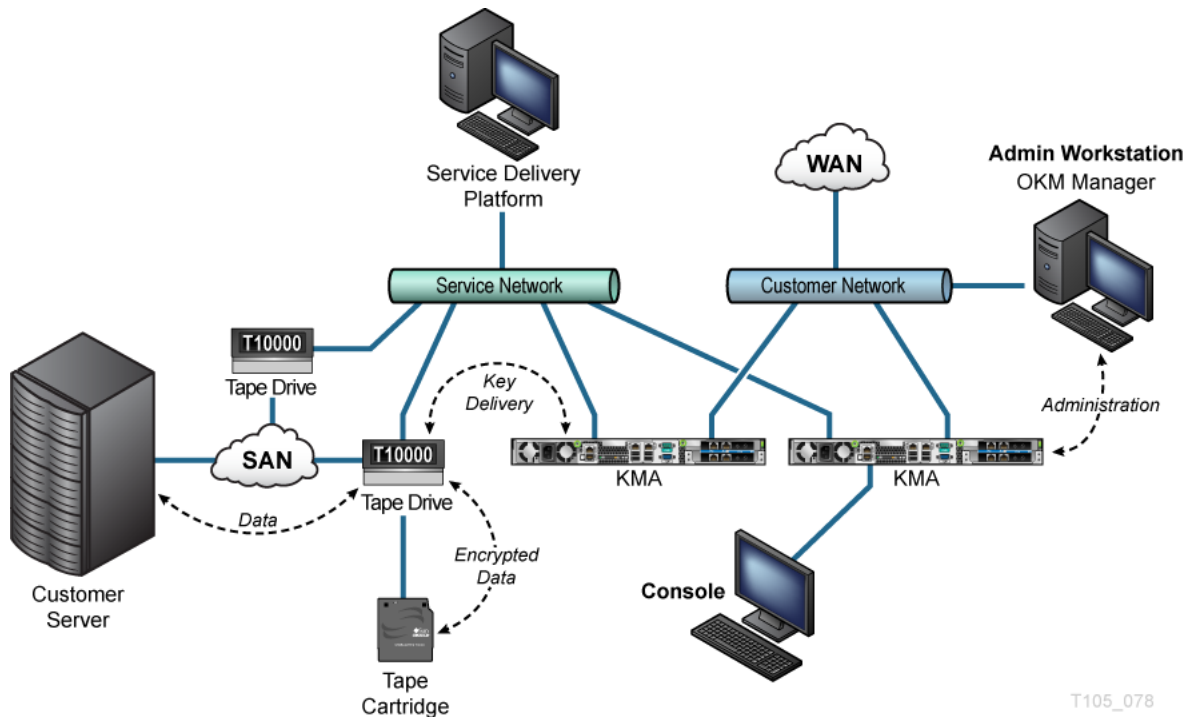
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**Note:** Port 443 must be open to enable customers to access the Service Processor web interface and the OKM Console through the firewall. Refer to the *Oracle Key Manager Installation and Service Manual* to see ELOM and ILOM ports.

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## OKM in the Network

Figure 1–4 shows a typical deployment of the OKM solution.

**Figure 1–4 Typical Deployment of OKM Solution**

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## OKM Manager Software Requirements

To run the OKM Manager, you need a workstation that runs one of the following:

- Solaris 10 10/09 (Update 8) x86
- Solaris 10 9/10 (Update 9) SPARC
- Solaris 10 9/10 (Update 9) x86
- Microsoft Windows 7 Business
- Microsoft Windows 7 Enterprise
- Microsoft Windows Vista Business
- Microsoft Windows XP Professional Version 2002
- Microsoft Windows XP Professional
- Microsoft Windows Server 2008 Version 6.0
- Microsoft Windows Server 2003 R2 Standard Edition
- Microsoft Windows Server 2003

You do not need to have Administrator (on Windows) or root (on Solaris) privileges to install and invoke the GUI.

## Using Online Help

The OKM Manager includes comprehensive online help. To display help on any OKM Manager screen,

- Click the **Help** button that is located at the top of the panel for general help.

or

- Navigate to a panel by either pressing the **Tab** key or by clicking somewhere within the panel. Then, click **F1** to view context-sensitive help.

## Role-Based Access Control

OKM defines the following roles:

- **Security Officer** – manages security settings, users, sites, and Transfer Partners
- **Compliance Officer** – manages key policies and Key Groups and determines which agents and Transfer Partners can use Key Groups
- **Operator** – manages agents, data units, and keys
- **Backup Operator** – performs backups
- **Auditor** – views information about the OKM Cluster
- **Quorum Member** – views and approves pending quorum operations.

A single KMA user account may be assigned membership to one or more roles. The KMA verifies that the requesting user entity has permission to execute an operation based on the user's role(s). For more information on the roles, refer to ["Logging into the KMA"](#) on page 11-1.

## Role-Based Operations

[Table 1–3](#) shows the system operations that each user role can perform. In the “Roles” columns, the entries mean the following:

- **Yes** – the role is allowed to perform the operation.
- **Quorum** – the role is allowed to perform the operation but must also provide a quorum.
- **N/A** – means the role is not allowed to perform the operation.

**Table 1–3 System Operations/User Roles**

		Roles					
		Security Officer	Compliance Officer	Operator	Backup Operator	Auditor	Quorum Member
Entity	Operation						
Console							
	Log In	Yes	Yes	Yes	Yes	Yes	Yes
	Set KMA Locale	Yes	N/A	N/A	N/A	N/A	N/A
	Set KMA IP Address	Yes	N/A	N/A	N/A	N/A	N/A
	Enable Tech Support	Yes	N/A	N/A	N/A	N/A	N/A
	Disable Tech Support	Yes	N/A	Yes	N/A	N/A	N/A
	Enable Primary Administrator	Yes	N/A	N/A	N/A	N/A	N/A
	Disable Primary Administrator	Yes	N/A	Yes	N/A	N/A	N/A
	Restart KMA	N/A	N/A	Yes	N/A	N/A	N/A
	Shutdown KMA	N/A	N/A	Yes	N/A	N/A	N/A

**Table 1–3 (Cont.) System Operations/User Roles**

Entity	Operation	Roles					
		Security Officer	Compliance Officer	Operator	Backup Operator	Auditor	Quorum Member
	Log OKM into Cluster	Quorum	N/A	N/A	N/A	N/A	N/A
	Set User's Passphrase	Yes	N/A	N/A	N/A	N/A	N/A
	Reset KMA	Yes	N/A	N/A	N/A	N/A	N/A
	Logout	Yes	Yes	Yes	Yes	Yes	Yes
Connect							
	Log In	Yes	Yes	Yes	Yes	Yes	Yes
	Create Profile	Yes	Yes	Yes	Yes	Yes	Yes
	Delete Profile	Yes	Yes	Yes	Yes	Yes	Yes
	Set Config Settings	Yes	Yes	Yes	Yes	Yes	Yes
	Disconnect	Yes	Yes	Yes	Yes	Yes	Yes
Key Split Credentials							
	List	Yes	N/A	N/A	N/A	N/A	N/A
	Modify	Quorum	N/A	N/A	N/A	N/A	N/A
Autonomous Unlock							
	List	Yes	N/A	N/A	N/A	N/A	N/A
	Modify	Quorum	N/A	N/A	N/A	N/A	N/A
Lock/Unlock KMA							
	List Status	Yes	Yes	Yes	Yes	Yes	N/A
	Lock	Yes	N/A	N/A	N/A	N/A	N/A
	Unlock	Quorum	N/A	N/A	N/A	N/A	N/A
Site							
	Create	Yes	N/A	N/A	N/A	N/A	N/A
	List	Yes	N/A	Yes	N/A	N/A	N/A
	Modify	Yes	N/A	N/A	N/A	N/A	N/A
	Delete	Yes	N/A	N/A	N/A	N/A	N/A
Security Parameters							
	List	Yes	Yes	Yes	Yes	Yes	N/A
	Modify	Yes	N/A	N/A	N/A	N/A	N/A
KMA							
	Create	Quorum	N/A	N/A	N/A	N/A	N/A
	List	Yes	N/A	Yes	N/A	N/A	N/A
	Modify	Quorum	N/A	N/A	N/A	N/A	N/A
	Delete	Yes	N/A	N/A	N/A	N/A	N/A
User							

**Table 1–3 (Cont.) System Operations/User Roles**

Entity	Operation	Roles					
		Security Officer	Compliance Officer	Operator	Backup Operator	Auditor	Quorum Member
	Create	Quorum	N/A	N/A	N/A	N/A	N/A
	List	Yes	N/A	N/A	N/A	N/A	N/A
	Modify	Yes	N/A	N/A	N/A	N/A	N/A
	Modify Passphrase	Quorum	N/A	N/A	N/A	N/A	N/A
	Delete	Yes	N/A	N/A	N/A	N/A	N/A
Role							
	Add	Quorum	N/A	N/A	N/A	N/A	N/A
	List	Yes	N/A	N/A	N/A	N/A	N/A
Key Policy							
	Create	N/A	Yes	N/A	N/A	N/A	N/A
	List	N/A	Yes	N/A	N/A	N/A	N/A
	Modify	N/A	Yes	N/A	N/A	N/A	N/A
	Delete	N/A	Yes	N/A	N/A	N/A	N/A
Key Group							
	Create	N/A	Yes	N/A	N/A	N/A	N/A
	List	N/A	Yes	Yes	N/A	N/A	N/A
	List Data Units	N/A	Yes	Yes	N/A	N/A	N/A
	List Agents	N/A	Yes	Yes	N/A	N/A	N/A
	Modify	N/A	Yes	N/A	N/A	N/A	N/A
	Delete	N/A	Yes	N/A	N/A	N/A	N/A
Agent							
	Create	N/A	N/A	Yes	N/A	N/A	N/A
	List	N/A	Yes	Yes	N/A	N/A	N/A
	Modify	N/A	N/A	Yes	N/A	N/A	N/A
	Modify Passphrase	N/A	N/A	Yes	N/A	N/A	N/A
	Delete	N/A	N/A	Yes	N/A	N/A	N/A
Agent/Key Group Assignment							
	List	N/A	Yes	Yes	N/A	N/A	N/A
	Modify	N/A	Yes	N/A	N/A	N/A	N/A
Data Unit							
	Create	N/A	N/A	N/A	N/A	N/A	N/A
	List	N/A	Yes	Yes	N/A	N/A	N/A
	Modify	N/A	N/A	Yes	N/A	N/A	N/A
	Modify Key Group	N/A	Yes	N/A	N/A	N/A	N/A
	Delete	N/A	N/A	N/A	N/A	N/A	N/A

**Table 1–3 (Cont.) System Operations/User Roles**

		Roles					
Entity	Operation	Security Officer	Compliance Officer	Operator	Backup Operator	Auditor	Quorum Member
Keys							
	List Data Unit Keys	N/A	Yes	Yes	N/A	N/A	N/A
	Destroy	N/A	N/A	Yes	N/A	N/A	N/A
	Compromise	N/A	Yes	N/A	N/A	N/A	N/A
Transfer Partners							
	Configure	Quorum	N/A	N/A	N/A	N/A	N/A
	List	Yes	Yes	Yes	N/A	N/A	N/A
	Modify	Quorum	N/A	N/A	N/A	N/A	N/A
	Delete	Yes	N/A	N/A	N/A	N/A	N/A
Key Transfer Keys							
	List	Yes	N/A	N/A	N/A	N/A	N/A
	Update	Yes	N/A	N/A	N/A	N/A	N/A
Transfer Partner Key Group Assignments							
	List	N/A	Yes	Yes	N/A	N/A	N/A
	Modify	N/A	Yes	N/A	N/A	N/A	N/A
Backup							
	Create	N/A	N/A	N/A	Yes	N/A	N/A
	List	Yes	Yes	Yes	Yes	N/A	N/A
	List Backups with Destroyed Keys	N/A	Yes	Yes	N/A	N/A	N/A
	Restore	Quorum	N/A	N/A	N/A	N/A	N/A
	Confirm Destruction	N/A	N/A	N/A	Yes	N/A	N/A
Core Security Backup							
	Create	Yes	N/A	N/A	N/A	N/A	N/A
SNMP Manager							
	Create	Yes	N/A	N/A	N/A	N/A	N/A
	List	Yes	N/A	Yes	N/A	N/A	N/A
	Modify	Yes	N/A	N/A	N/A	N/A	N/A
	Delete	Yes	N/A	N/A	N/A	N/A	N/A
Audit Event							
	View	Yes	Yes	Yes	Yes	Yes	N/A
	View Agent History	N/A	Yes	Yes	N/A	N/A	N/A
	View Data Unit History	N/A	Yes	Yes	N/A	N/A	N/A
	View Data Unit Key History	N/A	Yes	Yes	N/A	N/A	N/A
System Dump							

**Table 1–3 (Cont.) System Operations/User Roles**

Entity	Operation	Roles					
		Security Officer	Compliance Officer	Operator	Backup Operator	Auditor	Quorum Member
System Time	Create	Yes	N/A	Yes	N/A	N/A	N/A
	List	Yes	Yes	Yes	Yes	Yes	N/A
	Modify	Yes	N/A	N/A	N/A	N/A	N/A
NTP Server							
	List	Yes	Yes	Yes	Yes	Yes	N/A
	Modify	Yes	N/A	N/A	N/A	N/A	N/A
Software Version							
	List	Yes	Yes	Yes	Yes	Yes	N/A
	Upgrade	N/A	N/A	Quorum	N/A	N/A	N/A
Network Configuration							
	Display	Yes	Yes	Yes	Yes	Yes	N/A
Pending Quorum Operation							
	Approve	N/A	N/A	N/A	N/A	N/A	Quorum
	Delete	Yes	N/A	N/A	N/A	N/A	N/A
Key List							
	Query	N/A	Yes	Yes	N/A	N/A	N/A
	List Activity History	N/A	Yes	Yes	N/A	N/A	N/A
Agent Performance List							
	Query	N/A	Yes	Yes	N/A	N/A	N/A
KMA Performance List							
	Query	Yes	Yes	Yes	Yes	Yes	Yes
Current Load							
	Query	Yes	Yes	Yes	Yes	Yes	Yes

## Setting Up and Managing the Key Management Appliance

For procedures on getting your OKM solution installed and configured, refer to the *OKM Installation and Service Manual*.





---

## Getting Started

This chapter describes the following topics:

- Accessing the KMA Through the Service Processor – the Embedded Lights Out Manager (ELOM) and Integrated Lights Out Manager (ILOM) provide a remote connection to the console (see ["Accessing the KMA Through the Service Processor"](#) on page 2-1)

---

**Note:** Additional Service Processor procedures can be found in [Appendix D, "Service Processor Procedures"](#) on page D-1.

---

- Running the QuickStart program – QuickStart is a utility that a customer (Security Officer or qualified representative) can use to configure a new KMA (see ["Running the QuickStart Program"](#) on page 2-8).

---

**Note:** A service representative can also run QuickStart, however, since this program establishes critical security parameters, customers may prefer to do it themselves, following their corporate security policies.

---

### Accessing the KMA Through the Service Processor

The Embedded Lights Out Manager (ELOM) and Integrated Lights Out Manager (ILOM) contain a separate Service Processor from the main server. These Service Processors provide a remote connection to the KMA, allowing you to perform server functions, such as the *QuickStart* program.

---

**Note:** KMAs that are Sun Fire X2100 M2 or X2200 M2 servers use an ELOM as the Service Processor, whereas KMAs that are Sun Fire X4170 M2 servers employ an ILOM as their service processor.

Refer to the *Embedded Lights Out Manager Administration Guide* or the *Integrated Lights Out Manager Web Interface Procedures Guide* for configuration information.

---

### Connecting to the KMA through the ELOM/ILOM

Connect to the KMA through the ELOM or ILOM using either:

- The network connection, LAN 1 NET MGT ELOM or ILOM interface (suggested),  
or

- The keyboard and monitor attached to the KMAs.

---

**Note:** **Popup blockers** prevent Windows from launching in the following procedures. Disable the popup blockers before beginning. If the window appears, but a console window does not, the Web browser or Java version is incompatible with the Service Processor. Upgrade to the latest versions of the browser and Java. See [Table 2–1](#) for a list of compatible versions.

---

**Table 2–1 Supported ELOM Compatible Web Browsers and Java Versions**

Client OS	Supports These Web Browsers	Java Runtime Environment Including Java Web Start
<ul style="list-style-type: none"> <li>■ Microsoft Windows XP</li> <li>■ Microsoft Windows 2003</li> <li>■ Microsoft Windows Vista</li> </ul>	<ul style="list-style-type: none"> <li>■ Internet Explorer 6.0 and later</li> <li>■ Mozilla 1.7.5 or later</li> <li>■ Mozilla Firefox 1.0</li> </ul>	JRE 1.5 (Java 5.0 Update 7 or later)
<ul style="list-style-type: none"> <li>■ Red Hat Linux 3.0 and 4.0</li> </ul>	<ul style="list-style-type: none"> <li>■ Mozilla 1.7.5 or later</li> <li>■ Mozilla Firefox 1.0</li> </ul>	
<ul style="list-style-type: none"> <li>■ Solaris 9</li> <li>■ Solaris 10</li> <li>■ Solaris Sparc</li> <li>■ SUSE Linux 9.2</li> </ul>	<ul style="list-style-type: none"> <li>■ Mozilla 1.7.5</li> </ul>	

You can download the Java 1.5 runtime environment at: <http://java.com>

The current version of the ELOM guide is available at:

<http://docs.oracle.com/cd/E19121-01/sf.x2200m2/819-6588-14/819-6588-14.pdf>

**Table 2–2 Supported ILOM Compatible Web Browsers and Java Versions**

Client OS	Supports These Web Browsers	Java Runtime Environment Including Java Web Start
<ul style="list-style-type: none"> <li>■ Microsoft Windows 98</li> <li>■ Microsoft Windows 2000</li> <li>■ Microsoft Windows XP</li> <li>■ Microsoft Windows Vista</li> </ul>	<ul style="list-style-type: none"> <li>■ Internet Explorer 6.0 and later</li> <li>■ Mozilla 1.7.5 or later</li> <li>■ Mozilla Firefox 1.0 or later</li> <li>■ Opera 6.x or later</li> </ul>	JRE 1.5 (Java 5.0 Update 7 or later)
<ul style="list-style-type: none"> <li>■ Linux (Red Hat, SuSE, Ubuntu)</li> </ul>	<ul style="list-style-type: none"> <li>■ Mozilla 1.7.5 or later</li> <li>■ Mozilla Firefox 1.0 or later</li> <li>■ Opera 6.x or later</li> </ul>	
<ul style="list-style-type: none"> <li>■ Solaris 9</li> <li>■ Solaris 10</li> </ul>	<ul style="list-style-type: none"> <li>■ Mozilla 1.7.5 or later</li> <li>■ Firefox 1.0 or later</li> </ul>	

You can download the Java 1.5 runtime environment at: <http://java.com>

The current version of the ILOM guide is available at:

<http://download.oracle.com/docs/cd/E19860-01/index.html>

## Using a Network Connection - ELOM

1. Using another workstation on the network, launch a Web browser.

2. Connect to the KMA ELOM using the IP Address or hostname of LAN 1 (NET MGT), which is the address just configured.

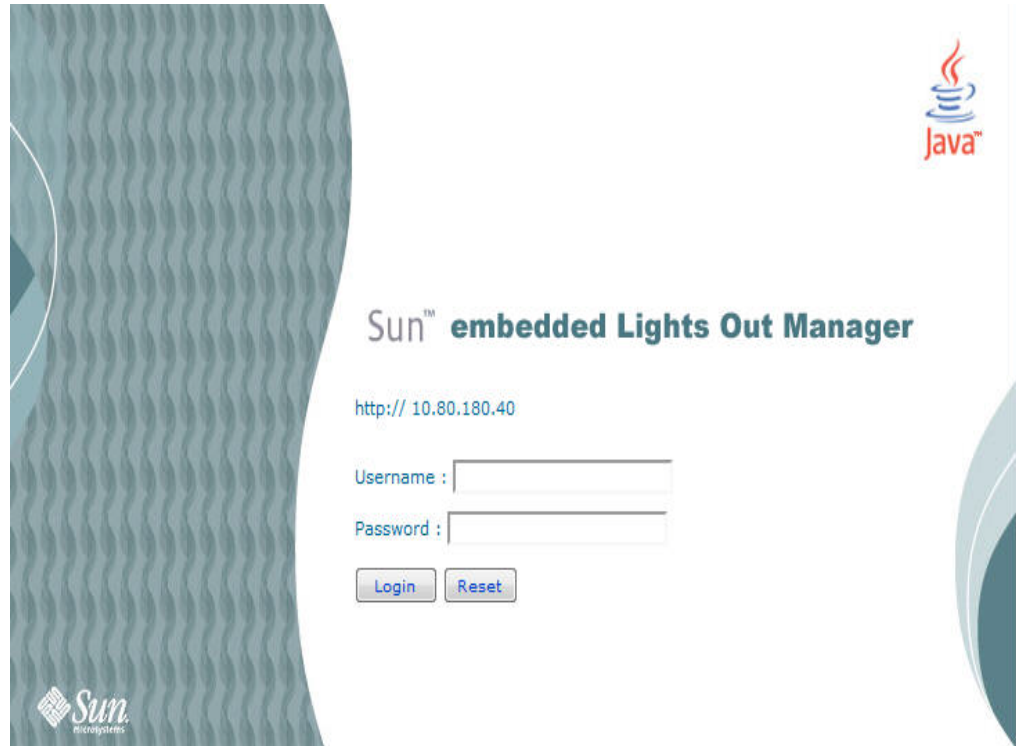
---

**Note:** Because the certificate in the ELOM will not match the assigned name or IP, you will receive one or more warnings from your web browser.

---

3. Click **OK** or **Yes** to bypass these warnings.

Once past the warnings, you receive the ELOM login prompt.



4. Log in using:

Userid = root

Password = changeme

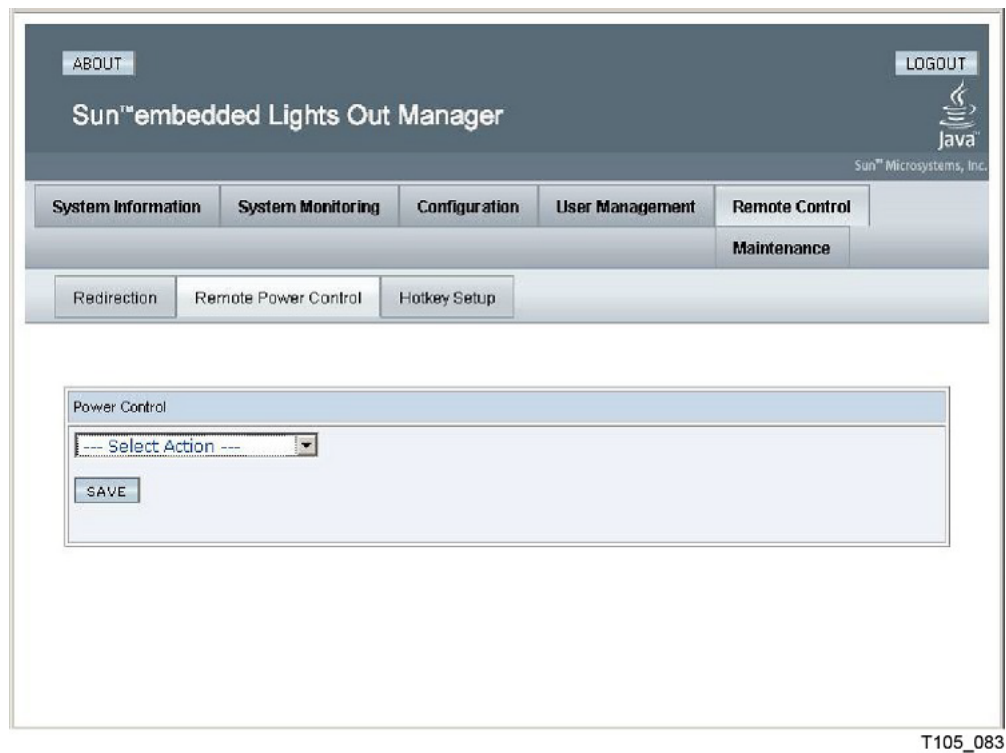
The next screen is the Manager Screen. If the server has just been connected to power, and it has not been powered on, it will not have completed a system boot.

KMAs are configured to boot up automatically when initially powered on and should boot up to the QuickStart prompt within a few minutes of being powered on.

5. Check the power status by clicking on the **System Monitoring** tab.

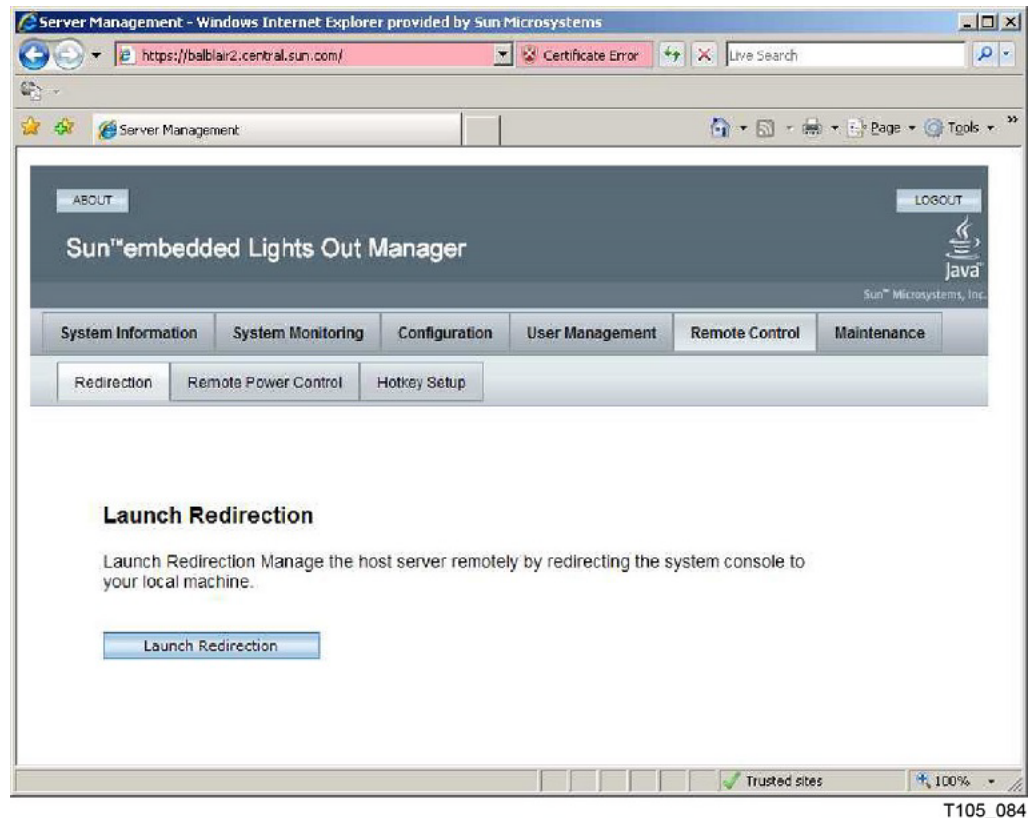
If the Power Status shows “power off,” click the **Remote Control** tab to the far right of the upper row of tabs.

6. Click the **Remote Power Control** tab in the second row of tabs.
7. In the Select Action drop-down, choose **Power On** and click the **Save** button.
8. The KMA begins powering up. This takes a few minutes; however, you can continue with the KMA configuration.



9. Click the **Remote Control** tab in the first row of tabs.
10. Click the **Redirection** tab in the second row of tabs.
11. Click the **Launch Redirection** button.

A java applet is downloaded before starting the remote console window.



T105\_084

This launches the remote console screen in a new window.

12. Save the javaRKVM.jnlp file when requested, then open it to start the remote console. Click past any warnings that may be displayed.
13. Go to ["Launching the OKM Console"](#) on page 2-7 for the next steps in the process.

## Using a Network Connection - ILOM

1. Using another workstation on the network, launch a Web browser.
2. Connect to the KMA ILOM using the IP Address or hostname of LAN 1 (NET MGT), which is the address just configured.

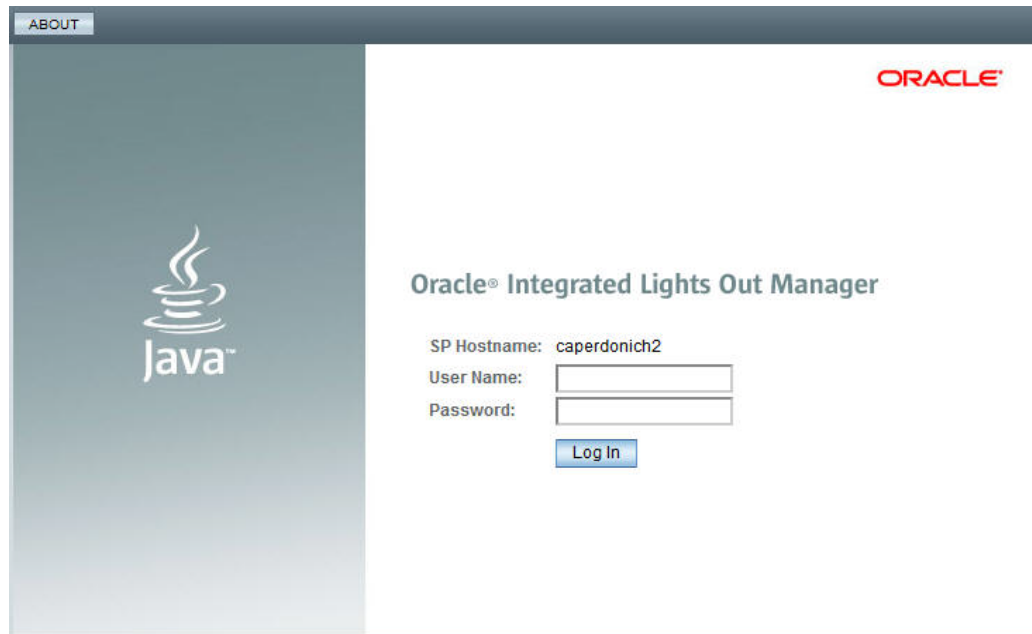
---

**Note:** Because the certificate in the ILOM does not match the assigned name or IP, you receive one or more warnings from your web browser.

---

3. Click **OK** or **Yes** to bypass these warnings.

Once past the warnings, you receive the ILOM login prompt.



ABOUT

ORACLE

Java™

Oracle® Integrated Lights Out Manager

SP Hostname: caperdonich2

User Name:

Password:

Log In

4. Log in using:

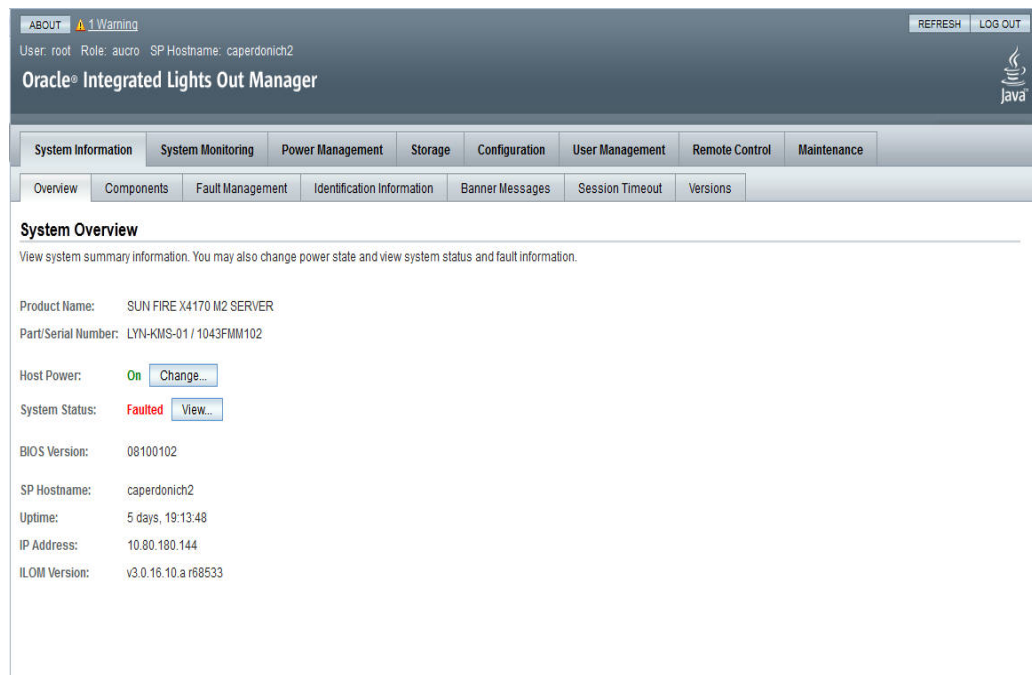
Userid = root

Password = changeme

The next screen is the Manager Screen. If the server has just been connected to power, and it has not been powered on, it will not have completed a system boot.

KMAs are configured to boot up automatically when initially powered on and should boot up to the QuickStart prompt within a few minutes of being powered on.

5. Check the power status shown next to Host Power.



ABOUT 1 Warning REFRESH LOG OUT

User: root Role: auro SP Hostname: caperdonich2

Oracle® Integrated Lights Out Manager

System Information System Monitoring Power Management Storage Configuration User Management Remote Control Maintenance

Overview Components Fault Management Identification Information Banner Messages Session Timeout Versions

**System Overview**

View system summary information. You may also change power state and view system status and fault information.

Product Name: SUN FIRE X4170 M2 SERVER

Part/Serial Number: LYN-KMS-01 / 1043FMM102

Host Power: On Change...

System Status: Faulted View...

BIOS Version: 08100102

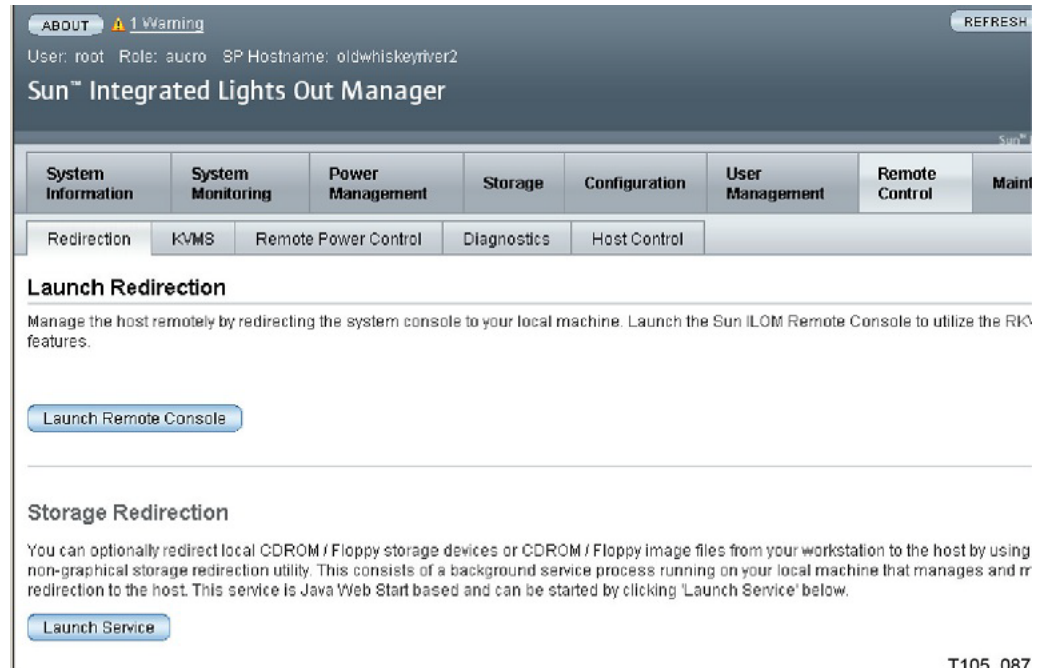
SP Hostname: caperdonich2

Uptime: 5 days, 19:13:48

IP Address: 10.80.180.144

ILOM Version: v3.0.16.10.a.r68533

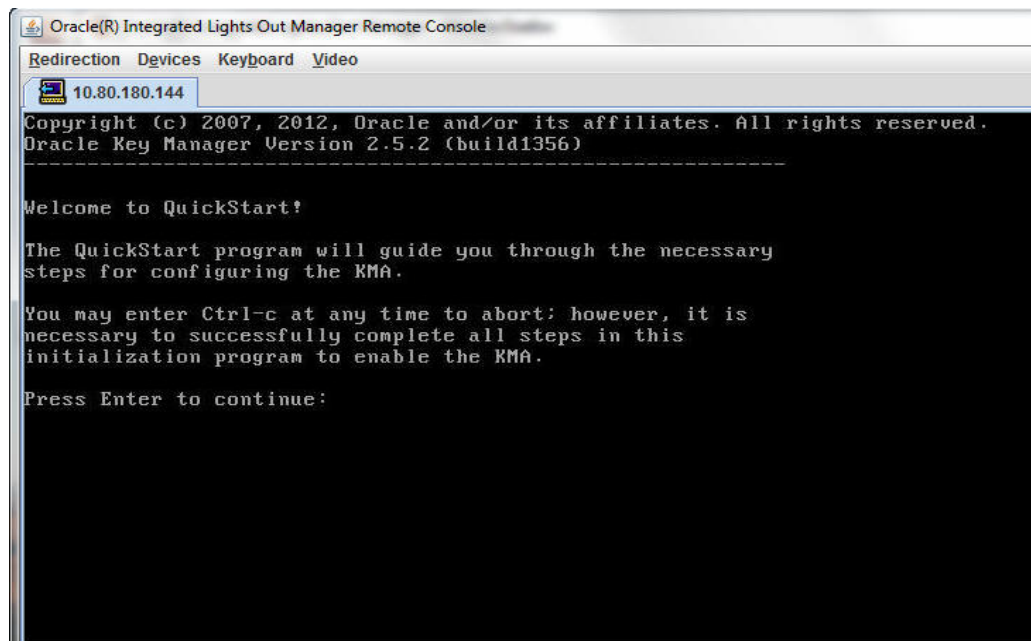
6. If Host Power shows that the power is off, click the **Change** drop-down.
7. In the Select Action drop-down, choose **Power On** and click the **Save** button.  
The KMA begins powering up. This will take a few minutes; however, you can continue with the KMA configuration.
8. Click the **Remote Control** tab in the first row of tabs.
9. Click the Redirection tab in the second row of tabs.



10. Click the **Launch Remote Console** button.  
A java applet is downloaded before starting the remote console window. This launches the remote console screen in a new window.
11. Save the javaRKVM.jnlp file when requested, then open it to start the remote console. Click past any warnings that may be displayed.
12. Go to "[Launching the OKM Console](#)" on page 2-7 for the next steps in the process.

## Launching the OKM Console

1. Press any key and press <Enter> to continue. The KMA checks the SCA 6000 card and reports its status.



After a reboot, reset, or initial installation, a new message is displayed if the SCA 6000 card is being initialized or upgrading its firmware. The console is disabled until it is complete.

Console unavailable while KMA Maintenance is in progress...

2. Press <Enter>.

You now proceed to the QuickStart program prompt described in "[Starting QuickStart](#)" on page 2-8.

## Additional Service Processor Procedures

See [Appendix D "Service Processor Procedures"](#) on page D-1 for procedures to configure and upgrade the ELOM and ILOM.

## Running the QuickStart Program

When a KMA in the factory default state is powered on, a special mode of the KMA Configuration Menu called QuickStart is automatically executed. QuickStart collects the minimal configuration information required for initializing the KMA. Once the QuickStart program has been successfully completed, it cannot be re-executed. The only way to access the QuickStart program again is to reset the KMA to its factory default state (refer to "[Resetting the KMA to the Factory Default](#)" on page 11-14.)

---

**Note:** In the following screen examples, entries in bold represent areas where you respond.

---

### Starting QuickStart

To run the QuickStart Program:



1. Power on the KMA. When you power up the KMA for the first time, QuickStart is executed, and the Welcome to QuickStart! screen is displayed.

KMAs perform initial configuration steps after they are first booted. These steps can take a few minutes to complete. KMAs display messages that indicate the initial configuration is occurring.

If you press Ctrl-c, the QuickStart program resets and the Welcome to QuickStart! screen is redisplayed.

Copyright (c) 2007, 2013, Oracle and/or its affiliates. All rights reserved.  
Oracle Key Manager Version 3.0.0 (build2020) SO on Strathclyde

Welcome to QuickStart!

Authorized users only. All activity may be monitored and reported.

Performing initial configuration of this KMA - Please wait

Initial configuration of this KMA completed

The QuickStart program will guide you through the necessary steps for configuring the KMA. You may enter Ctrl-c at any time to abort; however, it is necessary to successfully complete all steps in this initialization program to enable the KMA.

Press Enter to continue:

Set Keyboard Layout

Press Ctrl-c to abort.

You may change the keyboard layout here.

Available keyboard layouts:

( 1) Arabic	( 2) Belgian	( 3) Brazilian
( 4) Canadian-Bilingual	( 5) Canadian-French	( 6) Danish
( 7) Dutch	( 8) Dvorak	( 9) Finnish
(10) French	(11) German	(12) Italian
(13) Japanese-type6	(14) Japanese	(15) Korean
(16) Latin-American	(17) Norwegian	(18) Portuguese
(19) Russian	(20) Spanish	(21) Swedish
(22) Swiss-French	(23) Swiss-German	(24) Traditional-Chinese
(25) TurkishQ	(26) UK-English	(27) US-English

The current layout is US-English

Please enter the number for the keyboard layout [27] :

The keyboard layout has been applied successfully.

Press Enter to continue

## Specifying the Network Configuration

The following procedures allow you to establish the network configuration.

### Setting the KMA Management IP Addresses

To set the KMA Management IP addresses:

1. Press <Enter> to continue. The following information is displayed.

```
Set KMA Management IP Addresses
-----
Press Ctrl-c to abort.
An IP Address configuration must be defined in order for the
KMA to communicate with other KMAs or Users in your system.
Do you want to configure the Management Network interface to have an IPv6
address? [y/n]:
Do you want to use DHCP to configure the Management Network IPv4 interface?
[y/n]:
Please enter the Management Network IP Address [10.172.180.39]:
Please enter the Management Network Subnet Mask [255.255.254.0]:
```

2. At the Please enter your choice: prompt on the main menu, type **3** and press <Enter>.
3. Type either **n** or **y** at the Do you want to configure the Management Network interface to have an IPv6 address prompt.
4. Type either **n** or **y** at the Do you want to use DHCP to configure the Management Network IPv4 interface prompt. If you type **n**, go to Step 5. If you type **y**, you go to the procedure ["Setting the KMA Service IP Addresses"](#) on page 2-11.

---

**Note:** If you elect to use DHCP, any hostname information provided by the DHCP server is ignored. Any DNS information provided by the DHCP server is presented in ["Specifying the DNS Settings"](#) on page 2-12.

---

5. At the prompt, type the Management Network IP address and press <Enter>.
6. At the Please enter the Management Network Subnet Mask: prompt, type the subnet mask address, (for example 255.255.254.0) and press <Enter>.

## Enabling the Technical Support Account

To enable the Technical Support account:

1. Press <Enter> to continue. The following information is displayed.

```
To assist in troubleshooting your network configuration,
you might want to enable the technical support account for the
network configuration steps of the QuickStart process.
Do you want to enable this support account for the network
configuration steps of the QuickStart process? [y/n]: y
Press Enter to continue:
```

2. If you want to enable the technical support account in QuickStart, type **y** at the Do you want to enable this support account for the network configuration steps of the QuickStart process? prompt. Otherwise, type **n**, and you proceed to Step 3.

---

**Note:** If you type **y**, you see the same prompts that are described in ["Enabling the Technical Support Account"](#) on page 11-15. After answering these prompts, you move to Step 3.

---

3. Press <Enter> to continue.

If you have enabled the Technical Support account, QuickStart disables it after you complete the ["Specifying the DNS Settings"](#) process. The following screen is displayed.

The support account is now being disabled.  
 Technical Support configuration changes have been completed.  
 Press Enter to continue:

## Setting the KMA Service IP Addresses

To set the KMA Service IP addresses:

1. Press <Enter> to continue. The following information is displayed.

```
Set KMA Service IP Addresses
-----
Press Ctrl-c to abort.
An IP Address configuration must be defined in order for the
KMA to communicate with other Agents in your system.
Do you want to configure the Service Network interface to have an IPv6 address?
[y/n]: y
Do you want to use DHCP to configure the Service Network IPv4 interface? [y/n]:
n
Please enter the Service Network IP Address [192.168.1.39]:
Please enter the Service Network Subnet Mask [255.255.255.0]:
```

2. At the Please enter your choice: prompt on the main menu, type 4 and press <Enter>.
3. Type either **n** or **y** at the Do you want to configure the Service Network interface to have an IPv6 address prompt.
4. Type either **n** or **y** at the Do you want to use DHCP to configure the Service Network IPv4 interface prompt. If you type **n**, go to Step 5. If you type **y**, you go to the procedure ["Viewing/Adding/Deleting Gateways"](#) on page 2-11.
5. At the prompt, type the Service Network IP address and press <Enter>.
6. At the Please enter the Service Network Subnet Mask: prompt, type the subnet mask address, (for example 255.255.255.0) and press <Enter>.

## Viewing/Adding/Deleting Gateways

This menu option shows the current gateway settings (five to a page) on the Management (M) and Service (S) interfaces.

1. Press <Enter> to continue. The following information is displayed, indicating that you can add a gateway, remove a gateway, or accept the current gateway configuration.

```
Modify Gateway Settings
-----
Press Ctrl-c to abort.
Gateways that are configured automatically are not modifiable, and are
indicated with an asterisk (*). Management routes are indicated with an 'M',
and service routes with an 'S'.
```

#	Destination	Gateway	Netmask	IF
1	default	10.172.181.254	0.0.0.0	M
2	default	10.172.181.21	0.0.0.0	M
3	default	192.168.1.119	0.0.0.0	S
4	10.0.0.0	10.172.180.25	255.255.254.0	M
* 5	10.172.180.0	10.172.180.39	255.255.254.0	M

Press Enter to continue:

## Modify Gateway Settings

Press Ctrl-c to abort.

Gateways that are configured automatically are not modifiable, and are indicated with an asterisk (\*). Management routes are indicated with an 'M', and service routes with an 'S'.

#	Destination	Gateway	Netmask	IF
* 6	192.168.1.0	192.168.1.39	255.255.255.0	S
7	192.168.25.0	10.172.180.25	255.255.255.0	M
8	192.168.26.0	10.172.180.25	255.255.255.0	M
* 9	127.0.0.1	127.0.0.1	255.255.255.255	
* 10	fe80::	2001:db8::/32	10	M

(1) Continue

(2) Back

1

## Modify Gateway Settings

Press Ctrl-c to abort.

Gateways that are configured automatically are not modifiable, and are indicated with an asterisk (\*). Management routes are indicated with an 'M', and service routes with an 'S'.

#	Destination	Gateway	Netmask	IF
---	-------------	---------	---------	----

\* 11 fe80:: fe80::216:36ff:feca:15b9 10 S

You can add a route, delete a route, or exit the gateway configuration.

Please choose one of the following:

(1) Add a gateway

(2) Remove a configured gateway (only if modifiable)

(3) Exit gateway configuration

(4) Display again

3

- At the Please enter your choice: prompt on the main menu, type 5 and press <Enter>.
- At the (1) Continue (2) Back prompt, type 1 to display the next gateway setting or 2 to return to the previous gateway setting.
- At the Please choose one of the following: prompt, type 1, 2, 3, or 4 and press <Enter>.

---

**Note:** If at any time you press Ctrl+c, no changes are saved and you are returned to the main menu.

---

## Specifying the DNS Settings

This menu option shows the DNS settings, and prompts you for a new DNS domain (if you want to configure one) and the DNS server IP addresses.

---

**Note:** If you chose to use DHCP on the management network in ["Setting the KMA Management IP Addresses"](#) on page 2-9, the KMA displays any DNS settings from a DHCP server on the management network. You can enter information to override these DNS settings.

---

1. Press <Enter> to continue. The following information is displayed.

```
Set DNS Configuration
```

```
-----
```

```
Press Ctrl-c to abort.
```

```
DNS configuration is optional, but necessary if this KMA will be configured
using hostnames instead of IP addresses.
```

```
Current DNS configuration:
```

```
Domain:
```

```
Nameservers:
```

```
Please enter the DNS Domain (blank to unconfigure DNS): example.com
```

```
Up to 3 DNS Name Servers can be entered. Enter each name server separately, and
enter a blank name to finish.
```

```
Please enter DNS Server IP Address #1: 10.172.0.5
```

```
Please enter DNS Server IP Address #2:
```

2. At the Please enter your choice: prompt on the main menu, type 6 and press <Enter>.
3. Enter the DNS domain name at the Please enter the DNS Domain (blank to unconfigure DNS): prompt.
4. Enter the DNS server IP address at the Please enter DNS Server IP address prompt. You can enter up to three IP addresses.
5. Press <Enter>, without specifying an IP address, to finish.

## Initializing the KMA

1. Press <Enter> to continue. The following information is displayed.

```
The KMA Name is a unique identifier for your KMA. This name should not be
the same as the KMA Name for any other KMA in your cluster. It also should
not be the same as any User Names or Agent IDs in your system.
```

```
Please enter the KMA Name: KMA-1
```

```
Press Enter to continue:
```

2. At the prompt, type a unique identifier for the KMA.

---

**Note:** A KMA Name cannot be altered once it is set using the QuickStart program. It can only be changed by resetting the KMA to the factory default and running QuickStart again.

This KMA name is used as the hostname for the KMA.

---

## Configuring the Cluster

1. At the prompt, press <Enter>. The following information is displayed, indicating that you can use this KMA to create a new Cluster, join an existing Cluster, or restore a Cluster from a backup of this KMA.

```
You can now use this KMA to create a new Cluster, or you can have this KMA
join an existing Cluster. You can also restore a backup to this KMA or
change the KMA version.
```

```
Please choose one of the following:
```

- (1) Create New Cluster
- (2) Join Existing Cluster
- (3) Restore Cluster from Backup

Please enter your choice: **1**

Create New Cluster

2. At the prompt, type **1**, **2**, or **3** and press <Enter>.

If you type 1, go to ["Entering Key Split Credentials"](#) on page 2-14.

If you type 2, go to ["Joining an Existing Cluster"](#) on page 2-18.

If you type 3, go to ["Restoring a Cluster From a Backup"](#) on page 2-21.

## Entering Key Split Credentials

Key Split Credentials user IDs and passphrases should be entered by the individual who owns that user ID and passphrase. Using one person to collect and enter this information defeats the purpose of having the Key Split Credentials.

If it is impractical for all members of the Key Split Credentials to enter this information at this time, enter a simple set of credentials now, and then enter the full credentials later in the OKM Manager.

However, doing this creates a security risk. If a Core Security backup is created with simple Key Split Credentials, it can then be used to restore a backup.

1. At the Please enter your choice: prompt, type 1. The following information is displayed.

The Key Split credentials are used to wrap splits of the Core Security Key Material which protects Data Unit Keys.

When Autonomous Unlocking is not enabled, a quorum of Key Splits must be entered in order to unlock the KMA and allow access to Data Unit Keys.

A Key Split credential, consisting of a unique User Name and Passphrase, is required for each Key Split.

The Key Split Size is the total number of splits that will be generated. This number must be greater than 0 and can be at most 10.

Please enter the Key Split Size: **2**

The Key Split Threshold is the number of Key Splits required to obtain a quorum.

Please enter the Key Split Threshold: **1**

Please enter the Key Split User Name #1: user1

Passphrases must be at least 8 characters and at most 64 characters in length.

Passphrases must not contain the User's User Name.

Passphrases must contain characters from 3 of 4 character classes (uppercase, lowercase, numeric, other).

Please enter Key Split Passphrase #1: \*\*\*\*\*

Please re-enter Key Split Passphrase #1: \*\*\*\*\*

Press Enter to continue:

Press Ctrl-c to abort.

---

**Note:** The Key Split Size and Key Split Threshold can be changed using ["Modifying the Key Split Configuration"](#) on page 5-80. The Key Split Threshold must be less than or equal to the Key Split Size.

User IDs and passphrases should be entered only by an authorized user to keep them secure. These items also can be changed after running the QuickStart program.

---

2. At the Please enter the Key Split Size: prompt, type the number of key splits to be generated and press <Enter>.
3. At the Please enter the Key Split Threshold: prompt, type the number of required keys splits to obtain a quorum and press <Enter>.
4. At the Please enter the Key Split User Name #1: prompt, type the user name for the first Key Split user and press <Enter>.
5. At the Please enter Key Split Passphrase #1: prompt, type the passphrase for the first Key Split user and press <Enter>.
6. At the Please re-enter Key Split Passphrase #1: prompt, type the same passphrase that you previously entered and press <Enter>.
7. Repeat Steps 4 through 6 until all user names and passphrases have been entered for the selected Key Split size.

---

**Note:** The Key Split user names and passphrases are independent of other user accounts that are established for KMA administration. Oracle recommends that key split user names be different from KMA user names.

---

### Entering Initial Security Officer User Credentials

1. At the Press Enter to continue: prompt, press <Enter>. The following information is displayed.

The initial Security Officer User is the first User that can connect to the KMA via the Oracle Key Manager GUI. This User can subsequently create additional Users and administer the system.

Please enter a Security Officer User Name: SecOfficer

A Passphrase is used to authenticate to the KMA when a connection is made via the Oracle Key Manager GUI.

Passphrases must be at least 8 characters and at most 64 characters in length. Passphrases must not contain the User's User Name. Passphrases must contain characters from 3 of 4 character classes (uppercase, lowercase, numeric, other).

Please enter the Security Officer Passphrase: \*\*\*\*\*

Please re-enter the Security Officer Passphrase: \*\*\*\*\*

Press Enter to continue:

Press Ctrl-c to abort.

---

**Note:** This initial Security Officer user account is used to logon to the KMA using the OKM Manager.

---

2. At the prompt, type the Security Officer's user name and press <Enter>. The following information is displayed.
3. At the prompt, type the Security Officer's passphrase and press <Enter>.
4. At the Please re-enter the Security Officer Passphrase: prompt, re-type the same passphrase and press <Enter>.

**Important** – All KMAs have their own passphrases that are independent of passphrases assigned to users and Agents. The first KMA in a Cluster is assigned a random passphrase. If this KMA's certificate expires, and you want to retrieve its entity certificate from another KMA in the Cluster, you would have to use the OKM Manager to set the passphrase to a known value. For procedures, refer to ["Setting a KMA Passphrase"](#) on page 5-14.

## Specifying the Autonomous Unlocking Preference

---

**Caution:** While it is more convenient and increases the availability of the OKM Cluster, enabling autonomous unlocking creates security risks. When autonomous unlocking is enabled, a powered-off KMA must retain sufficient information to boot up fully and begin decrypting stored keys.

This means a stolen KMA can be powered up, and an attacker can begin extracting keys for the KMA. While it is not easy to extract keys, a knowledgeable attacker will be able to dump all keys off the KMA. No cryptographic attacks are needed.

If autonomous unlocking is disabled, cryptographic attacks are required to extract keys from a stolen KMA.

You should carefully consider potential attacks and security concerns before choosing to enable autonomous unlocking.

---

1. At the Press Enter to continue: prompt, press <Enter>. The following information is displayed.

```
When Autonomous Unlocking is DISABLED, it is necessary to UNLOCK the KMA using
a quorum of Key Split Credentials EACH TIME the KMA starts before normal
operation of the system can continue. Agents may NOT register Data Units with
or retrieve Data Unit Keys from a locked KMA.
```

```
When Autonomous Unlocking is ENABLED, the KMA will
automatically enter the UNLOCKED state each time the
KMA starts, allowing it to immediately service Agent requests.
Do you wish to enable Autonomous Unlocking? [y/n]: y
```

---

**Note:** The Autonomous Unlocking feature allows the KMA to enter a fully operational state after a hard or soft reset without requiring the entry of a quorum of passphrases using the OKM Manager. You can change this option from the OKM Manager at a later time.

---

2. At the prompt, type **y** or **n** and press <Enter>.

## Setting the Key Pool Size

1. At the Press Enter to continue: prompt, press <Enter>. The following information is displayed.

```
Enter Key Pool Size
-----
Press Ctrl-c to abort.
```

Each KMA pre-generates and maintains a pool of keys. These pre-operational keys must be backed up or replicated before a KMA will provide them to an Agent for



use in protecting data. This helps to ensure that a key will never be permanently lost, even in disaster scenarios. A smaller key pool size prevents unnecessary initial database (and backup) size, but requires frequent backups or a reliable network to ensure that activation-ready keys are always available. Conversely, a large key pool size is more tolerant of infrequent backups or unreliable network connections between KMAs, but the large number of pre-generated keys causes the database (and backups) to be quite large.

Please select the key pool size (1000 - 200000):

2. At the prompt, enter the key pool size. The value entered determines the initial size that the new KMA generates and maintains.

## Synchronizing KMA Time

KMAs in a Cluster **must** keep their clocks synchronized. Internally, all KMAs use UTC time (Coordinated Universal Time).

You can also use the OKM Manager to adjust date and time settings to local time.

KMAs in a Cluster must keep their clocks synchronized. Specify an NTP server if one is available in your network. Otherwise, specify the date and time to which the local clock should be set.

Please enter the NTP Server Hostname or IP Address (optional): ntp.example.com

Press Enter to continue:

Initializing new cluster...

New cluster has been created.

Press Enter to continue:

Oracle Key Manager Version 3.0.0 (Build2020)

---

KMA initialization complete!

You may now connect to the KMA via the Oracle Key Manager GUI in order to continue with Cluster configuration.

Press Enter to exit:

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Oracle Key Manager Version 3.0.0 (Build2020)

---

Please enter your User Name:

1. If an NTP server is available in your network environment, at the Please enter the NTP Server Hostname or IP Address (optional): prompt, enter the NTP server hostname or IP address.

---

**Note:** You can provide an IPv6 address for this NTP server. This IPv6 address must not include square brackets or a prefix length.

---

2. If an NTP server is not available, press <Enter>. Then, at the Please enter the date and time for this KMA prompt, enter the date and time in one of the specified formats, or press <Enter> to use the displayed date and time.

3. At the prompt, press <Enter>. KMA initialization is complete.
4. Press <Enter> to exit. The QuickStart program terminates and a login prompt is displayed (refer to ["Logging into the KMA"](#) on page 11-1). The KMA now has the minimum system configuration that is required to communicate with the OKM Manager.
5. Your next step is to use the OKM Manager to connect to the Cluster. For procedures, refer to ["Connecting to the Cluster"](#) on page 4-1.

## Joining an Existing Cluster

### Important

- Before performing this task, the Security Officer must first log into the OKM Cluster using the OKM Manager and create a KMA.

See ["Creating a KMA"](#) on page 5-8. The KMA Name specified in the KMA initialization process (see ["Initializing the KMA"](#) on page 2-13) must match the KMA name you enter when you create the KMA.

- When you add a new KMA to an existing OKM Cluster, the OKM Cluster begins to propagate Cluster information to the new KMA. It takes time for the Cluster to finish circulating this information to the new KMA, and as a result, the Cluster becomes busy during this time period.

Add KMAs to the Cluster during times of light loads so that this propagation activity does not interfere with normal operations. To avoid problems caused by Agents attempting to use the new KMA during the synchronization period, the KMA remains locked after it has been added to the Cluster. Wait until the KMA has been synchronized (that is, until it has “caught up” with other KMAs in the Cluster) before you unlock it.

- In earlier KMS releases, if the release running on a new KMA was different from an existing KMA in the Cluster, then the new KMA was automatically upgraded or downgraded to the release of the existing KMA when the new KMA joined the Cluster. For OKM 2.3 and later, if the new KMA runs OKM 2.3 and later and the existing KMA runs an earlier KMS release, then the new KMA can join the Cluster without downgrading to the earlier release.
- If you are running OKM 2.3 or later, before you add a KMA to the Cluster, the replication version must be set to the highest value supported by all KMAs in the Cluster. Refer to ["Switching the Replication Version"](#) on page 5-92.

To join a new KMA to an existing Cluster:

1. When you complete the KMA initialization process (see ["Initializing the KMA"](#) on page 2-13), at the prompt, press <Enter>.

The following information is displayed, indicating that you can use this KMA to create a new Cluster, join an existing Cluster, or restore a Cluster from a backup of this KMA.

You can now use this KMA to create a new Cluster, or you can have this KMA join an existing Cluster. You can also restore a backup to this KMA or change the KMA Version.

Please choose one of the following:

- (1) Create New Cluster
- (2) Join Existing Cluster
- (3) Restore Cluster from Backup

Please enter your choice: 2

2. At the Please enter your choice: prompt, type 2. The following information is displayed.

Join Existing Cluster

Press Ctrl-c to abort.

In order to join a Cluster, the KMA must contact another KMA which is already in the Cluster.

Please enter the Management Network IP Address or Host Name of an existing KMA in the cluster: 10.172.60.172

Please enter this KMA's Passphrase:\*\*\*\*\*

Press Enter to continue:

This command requires authorization by a quorum of Key Split Users. Enter sufficient Key Split credentials to form a quorum. Enter a blank name to finish.

Press Ctrl-c to abort.

Please enter Key Split User Name #1: **user1**

Please enter Key Split Passphrase #1: \*\*\*\*\*

Press Enter to continue:

Joining cluster...

This KMA has joined the Cluster.

Press Enter to continue:

Oracle Key Manager Version 2.3 (Build1036)

KMA initialization complete!

You may now connect to the KMA via the Oracle Key Manager GUI in order to continue with Cluster configuration.

Press Enter to exit:

---

**Note:** Before this new KMA can communicate with an existing KMA in the Cluster, you must use the OKM Manager to create an entry for this KMA in the existing KMA's database. For procedures, refer to ["Creating a KMA"](#) on page 5-8.

---

3. At the prompt, type the network address of one KMA in the existing Cluster and press <Enter>.
4. At the prompt, type the passphrase for the KMA and press <Enter>.
5. Enter the first Key Split user name for the first KMA.
6. Type the passphrase for the Key Split user, and press <Enter>.

**Important** – Enter Key Split user names and passphrases carefully. Any errors cause this process to fail with a non-specific error message. To limit information exposed to an attacker, no feedback is given as to which Key Split user name or passphrase is incorrect.

7. Repeat Steps 5 and 6 until you have entered a sufficient number of Key Split user names and passphrases to form a quorum.
8. At the next Please enter Key Split User Name prompt, press <Enter>. Enter a blank name to finish.

The initialization is complete.

At the end of a successful Join Cluster session, QuickStart displays the following prompt if the Cluster's replication version is at least 12.

It might take some time for this KMA to be updated with information from other

To accelerate these initial updates (that is, to catch up now), you can choose now to download a backup from another KMA in the Cluster and then restore from it. There will not be an opportunity to accelerate these updates later.

**9.** Type **y** to accelerate initial updates. Otherwise, type **n** to go to Step 10.

The KMA you specified identifies another KMA that has the largest cached backup in this Cluster, downloads that backup, and then applies it to its local database. This process is equivalent to replicating the data but at a much faster rate. Informational messages appear during this process.

```
Waiting 10 seconds for the join to propagate to Peer KMAs...
Querying Peer KMAs to find the active ones...
Querying active Peer KMAs to find cached backup sizes...
Peer KMA at IP Address 10.172.180.39 has a cached backup size of 729136 bytes.
Downloading the cached backup from this Peer KMA...
Downloaded the cached backup from this Peer KMA.
Initialized the Key Store.
Performed maintenance on the Key Store.
Applying the cached backup to the local database...
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
Applied the cached backup to the local database.
Successfully accelerated initial updates on this KMA.
```

If an error occurs during this process, QuickStart displays the above prompt again (in case the error is due to a temporary condition). QuickStart also displays the above prompt again if the KMA cannot find a peer KMA that has a cached backup.

Failed to accelerate initial updates on this KMA after 300 seconds.  
This KMA will gradually be updated with information from other KMAs.  
Regardless of whether you typed **y** or **n** at Step 9, or even if the process timed out, these messages appear:

This KMA has joined the Cluster.  
Press Enter to continue:

10. Press <Enter> to exit. The QuickStart program terminates and a login prompt is displayed (refer to ["Logging into the KMA"](#) on page 11-1). The KMA now has the minimum system configuration that is required to communicate with the OKM Manager.
11. Your next step is to use the OKM Manager to connect to the Cluster. For procedures, refer to ["Connecting to the Cluster"](#) on page 4-1.
12. The OKM Cluster begins to propagate information to the newly added KMA. This causes the new KMA to be very busy until it has caught up with the existing KMAs in the Cluster. The other KMAs are also busy. You can observe this activity from the OKM Manager by viewing the KMAs as described by ["Viewing KMAs"](#) on page 5-2.
13. Observe the Replication Lag Size value of the new KMA. Initially, this value is high. Periodically refresh the information displayed in this panel by pulling down the View menu and selecting Refresh or by pressing the **F5** key. Once the Replication Lag Size value of this KMA drops to a similar value of other KMAs in the Cluster, then you can unlock the KMA as described by ["Unlocking the KMA"](#) on page 5-86.

## Restoring a Cluster From a Backup

This option allows you to create a Security Officer account that can be used to restore the Backup image to the KMA using the OKM Manager. You can use a Backup to restore a KMA's configuration in the event a KMA experiences a failure (for example, hard disk damage). This, however, is not typically required since a KMA that is restored to the factory default state can readily join an existing Cluster and build up its database by receiving replication updates from Cluster peers. Restoring a KMA from a Backup is still useful in the event that all KMAs in a Cluster have failed.

---

**Note:** You first must create a Backup. For procedures on creating Backups using the OKM Manager, refer to ["Creating a Backup"](#) on page 8-3.

Oracle recommends you specify a new Security Officer name that did not exist in the OKM Cluster when the last backup was performed.

If you specify an existing Security Officer name and provide a different passphrase, the old passphrase is overwritten. If you specify an existing Security Officer name and other roles were added to that user before the last backup was performed, these other roles are no longer assigned to this User.

---

To restore the backup image:

1. When you complete the KMA initialization process (see ["Initializing the KMA"](#) on page 2-13), at the prompt, press <Enter>.

The following information is displayed, indicating that you can use this KMA to create a new Cluster, join an existing Cluster, or restore a Cluster from a backup of this KMA.

```
You can now use this KMA to create a new Cluster, or you can have this KMA join
an existing Cluster. You can also restore a backup to this KMA or change the
KMA Version.
```

```
Please choose one of the following:
```

```
(1) Create New Cluster
(2) Join Existing Cluster
(3) Restore Cluster from Backup
Please enter your choice: 3
Restore Cluster from Backup
```

2. At the Please enter your choice: prompt, type 3. The following information is displayed.

```
Initial Restore Cluster From Backup
Enter Initial Security Officer User Credentials
-----
```

Press Ctrl-c to abort.

The initial Security Officer User is the first User that can connect to the KMA via the Oracle Key Manager GUI. This User can subsequently create additional Users and administer the system. Please enter a Security Officer User ID: S01A  
Passphrase is used to authenticate to the KMA when a connection is made via the KMS Manager.

Passphrases must be at least 8 characters and at most 64 characters in length.

3. At the prompt, type the Security Officer's user name and press <Enter>.

**Best Practice:** Enter a temporary restore Security Officer user ID (for example, RestoreSO) instead of the Security Officer user ID that existed prior to the restore.

4. At the prompt, type the Security Officer's passphrase and press <Enter>.

Steps 5 through 7 are optional.

If you choose to define initial quorum user credentials in QuickStart, you can enter a quorum login name and passphrase at this time so that the restore operation from the OKM Manager GUI (Step 13) is pended.

Quorum members can then use this login and passphrase later to log in to the OKM Manager GUI and enter their credentials to approve the restore (see ["Restoring a Backup"](#) on page 5-68).

If you do not enter a quorum login user ID here, the only user that exists at the end of QuickStart is the Security Officer created in Step 3. In this case, all Key Split Credentials must be entered at once for the restore to occur ().

The following information is displayed:

```
Enter Initial Quorum Login User Credentials
-----
```

Press Ctrl-c to abort.

The initial Quorum Login User is an optional user that will allow the restore operation to be pended until quorum members can connect to the KMA via the Oracle Key Manager GUI and enter their credentials. If this user is not created here, then a quorum of credentials must be entered at the time the restore operation is requested.

Please enter a Quorum Login User ID (optional): Q

Passphrases must be at least 8 characters and at most 64 characters in length.

Passphrases must not contain the User's User ID.

Passphrases must contain characters from 3 of 4 character classes (uppercase, lowercase, numeric, other).

Please enter the Quorum Login Passphrase:

Please re-enter the Quorum Login Passphrase:

5. At the prompt, either press <Enter> or type the quorum login user ID and press <Enter>.

6. At the prompt, either press <Enter> or type the quorum login passphrase and press <Enter>.

7. At the Please re-enter the Quorum Login Passphrase: prompt, either press <Enter> or re-type the same passphrase and press <Enter>.
8. At the Please re-enter the Security Officer's Passphrase: prompt, retype the passphrase you entered in Step 4 and press <Enter>.

Set Time Information

-----  
Press Ctrl-c to abort.

KMAs in a Cluster must keep their clocks synchronized. Specify an NTP server if one is available in your network. Otherwise, specify the date and time to which the local clock should be set.

Please enter the NTP Server Hostname or IP Address (optional):

The date and time for this KMA must be specified in ISO 8601 format including a time zone. Here are some valid ISO 8601 format patterns:

YYYY-MM-DDThh:mm:ssZ

YYYY-MM-DD hh:mm:ssZ

YYYY-MM-DDThh:mm:ss-0600

YYYY-MM-DD hh:mm:ss-0600

YYYY-MM-DDThh:mm:ss+02:00

YYYY-MM-DD hh:mm:ss+02:00

Please enter the date and time for this KMA [2007-09-17 22:32:53.698Z]:

2007-09-17 22:33:00-0600

Press Enter to continue:

The KMA is now ready to be restored.

Press Enter to continue:

9. If an NTP server is available in your network environment, at the Please enter the NTP Server Hostname or IP Address (optional): prompt, enter the NTP server hostname or IP address.
10. If an NTP server is not available, press <Enter>. Then, at the Please enter the date and time for this KMA prompt, enter the date and time in one of the specified formats, or press <Enter> to use the displayed date and time.  
  
Ensure the date and time are accurate. Key lifecycles are based on time intervals, and the original creation times for the keys are contained in the backup. An accurate time setting on the replacement KMA is essential to preserve the expected key lifecycles.
11. At the prompt, press <Enter>. The following information is displayed, indicating that initialization is complete.

```
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
Serial Number 1251BD0E48
```

```
OpenBoot PROM Version OBP 4.34.3 2013/02/06 11:46
```

-----  
KMA initialization complete!

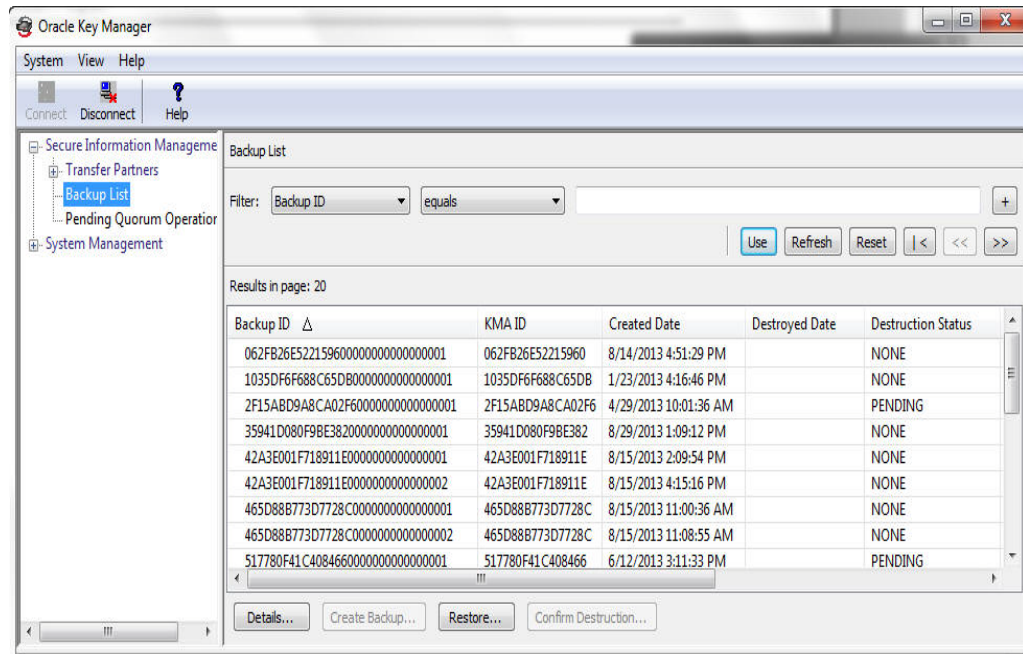
You may now connect to the KMA via the Oracle Key Manager GUI in order to continue with Cluster configuration.

Press Enter to exit:

12. Press <Enter> to exit. The QuickStart program terminates and a login prompt is displayed.

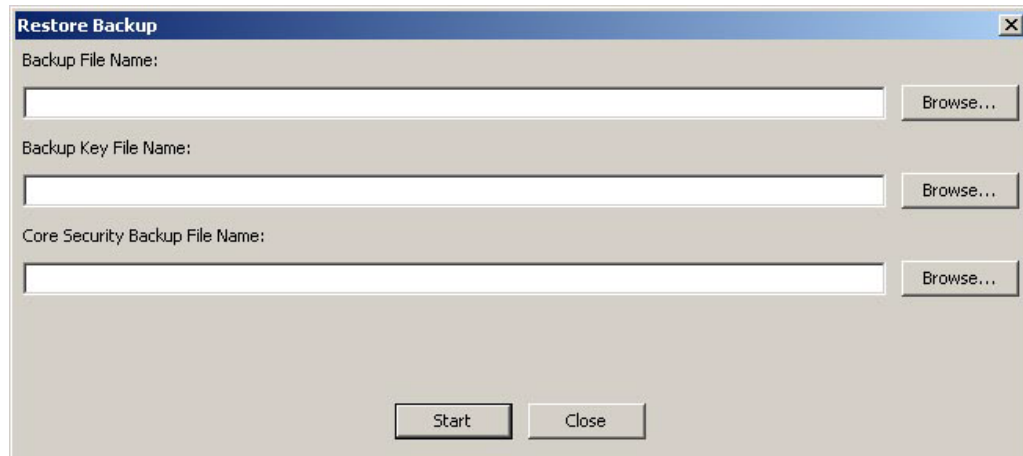
**Best Practice:** Log in to the OKM Manager GUI as the temporary restore Security Officer user ID you established in Step 3.

13. Login as the Security Officer on the OKM Manager and select **Backup List**. From the Backup List screen, click the **Restore** button to upload and restore the backup to the KMA.



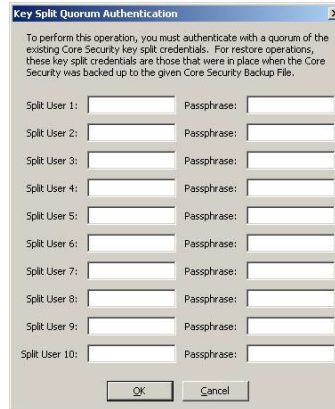
14. To complete the restore operation, the OKM Manager prompts for a Backup File that corresponds to the Backup Key file, a Backup Key file, and a Core Security backup file.

The Backup Key file and Backup file must match, but any Core Security Backup file can be used.



15. The OKM Manager then prompts for a quorum of Key Split users. These must be Key Split Credential users that were in effect when the Core Security Backup was performed.





The dialog box is titled "Key Split Quorum Authentication". It contains a message: "To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File." Below the message are ten rows, each with a label "Split User 1:" through "Split User 10:" and a corresponding "Passphrase:" label. Each label is followed by a text input field. At the bottom of the dialog are "OK" and "Cancel" buttons.

Once the restore is complete, the Key Split Credentials that were in effect when the backup (not the Core Security Backup) was completed, will be restored.

**Important** – Enter Key Split user names and passphrases carefully. Any errors cause this process to fail with a non-specific error message. To limit information exposed to an attacker, no feedback is given as to which Key Split user name or passphrase is incorrect.

16. When the restore process is completed, a new Cluster is created.

**Best Practice:** Log in to the OKM Manager GUI using the original Security Officer user ID (the one that existed prior to the restore), and delete the temporary restore Security Officer user ID as a cleanup step. Refer to ["Deleting Users"](#) on page 5-29.

## Adding Agents and Enrolling Tape Drives

After you set up the KMA, you can add agents and enroll tape drives to use that KMA:

1. Log into the OKM Manager GUI as an Operator and create an agent (refer to ["Creating an Agent"](#) on page 7-6).
2. Using the Virtual Operator Panel (VOP), perform the following operations. Refer to the VOP documentation if you do not know how to connect to and use the VOP.
  - a. Ask the service representative to license the tape drive(s) (refer to "License the Tape Drives" in chapter 3 of the *OKM Installation and Service Manual*). Use the Virtual Operator Panel (VOP) to perform this function.
  - b. With guidance from the service representative, enroll the tape drive(s) (refer to "Enroll the Tape Drives" in chapter 3 of the *OKM Installation and Service Manual*).

You must supply this information:

- Is the drive going to use a permanently encrypting tape drive?
  - What is the agent ID, passphrase, and OKM IP address of the appliance?
3. Log into the OKM Manager GUI as a Compliance Officer, create at least one Key Group (refer to ["Creating a Key Group"](#) on page 6-12), and assign the tape drives (agents) to this Key Group (refer to ["Assigning a Key Group to an Agent"](#) on page 6-20 and to "Enroll the Tape Drives" in the *OKM Installation and Service Manual*).

You must assign this Key Group as the default or the drive cannot write. If you do not specify a default, the drive is read-only for the assigned group(s).



---

## Using the OKM Manager

This chapter describes the OKM Manager and explains procedures for:

- Installing the OKM Manager software (see "[Installing the OKM Manager Software](#)" on page 3-1)
- Invoking the OKM Manager (see "[Invoking the OKM Manager](#)" on page 3-6)
- Uninstalling the OKM Manager software (see "[Uninstalling the OKM Manager Software](#)" on page 3-15).

The chapter also provides a brief description of the menus and panes.

### What is the OKM Manager?

The OKM Manager is an application that serves as a client to the KMA. It can be used to configure, control, and monitor the KMA. Depending on the assigned user roles, users can perform different operations.

### Installing the OKM Manager Software

To download the installer for the OKM Manager software:

1. Log in to the My Oracle Support (MOS) website at the following location:  
<https://support.oracle.com/>
2. Open the **Patches & Updates** tab (near the top of the window).
3. In the **Patch Search** pane, with the Search tab open, click **Product or Family(Advanced)**.
4. Select the box for **Include all products in a family**.
5. In the Product field, type **OKM** or **key** and select Oracle Key Manager (OKM) from the pull-down list.
6. In the Release field drop-down, select **Oracle Key Manager (OKM) 3.0**.
7. Close the Release drop-down window and click the **Search** button.

### Starting the OKM Installation

**Important** – Uninstall any previous OKM Manager version before installing the new OKM Manager. Install and use the OKM 3.0 Oracle Key Manager GUI before connecting to an OKM 3.0 KMA. Do not use an OKM 2.5.x GUI to connect to an OKM 3.0 KMA.

1. Depending on whether you are running a Windows or Solaris system, select the applicable process to invoke the installer program.
  - For Windows, double-click the shortcut to start the installer program.
  - For Solaris,
    - a. Set your DISPLAY environment to identify the system to which this installer should be displayed.
      - \* If you start the installer program on the local Solaris system, set your DISPLAY environment variable to “:0.0.”
      - \* Navigate to the directory where you downloaded the installer.
    - b. Invoke the installer.

For example, if you downloaded the installer to the /tmp directory, and you plan to invoke it on your local Solaris system, you start the installer by entering the following commands at a shell prompt:

```
DISPLAY=:0.0
export DISPLAY
cd /tmp
ls install.bin
sh ./install.bin
```

---

**Note:** If you invoke the installer on one Solaris system and want it to be displayed on another Solaris system, set your DISPLAY environment variable to identify the system on which it should be displayed.

On the display system, first run the xhost(1) utility to allow access from the system from which you invoke the installer.

For example, on the system (named “hosta”) where you wish to display the installer, enter:

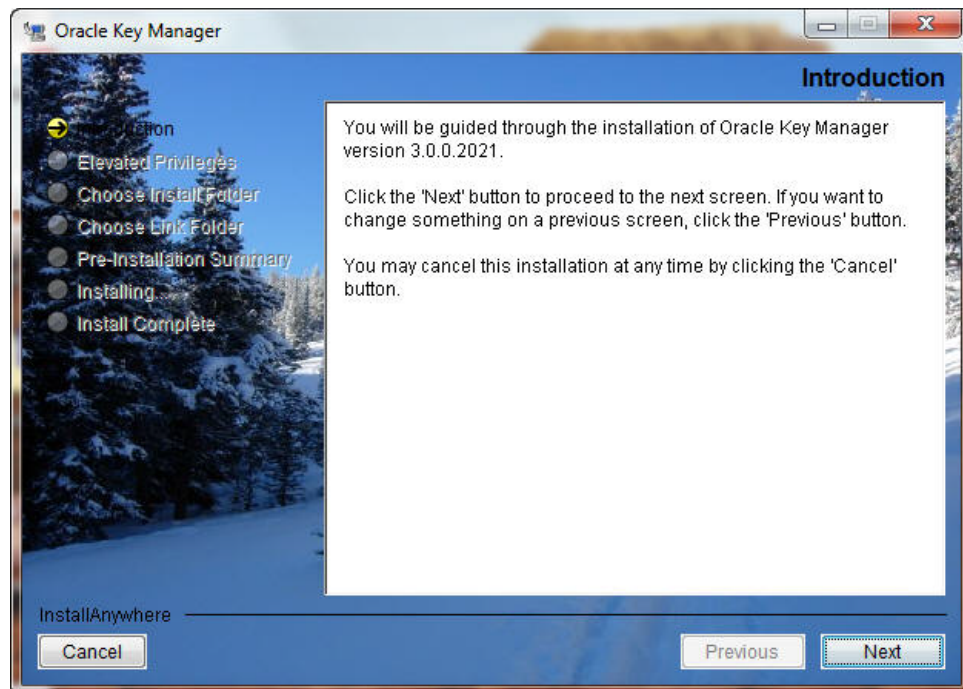
---

```
xhost +
```

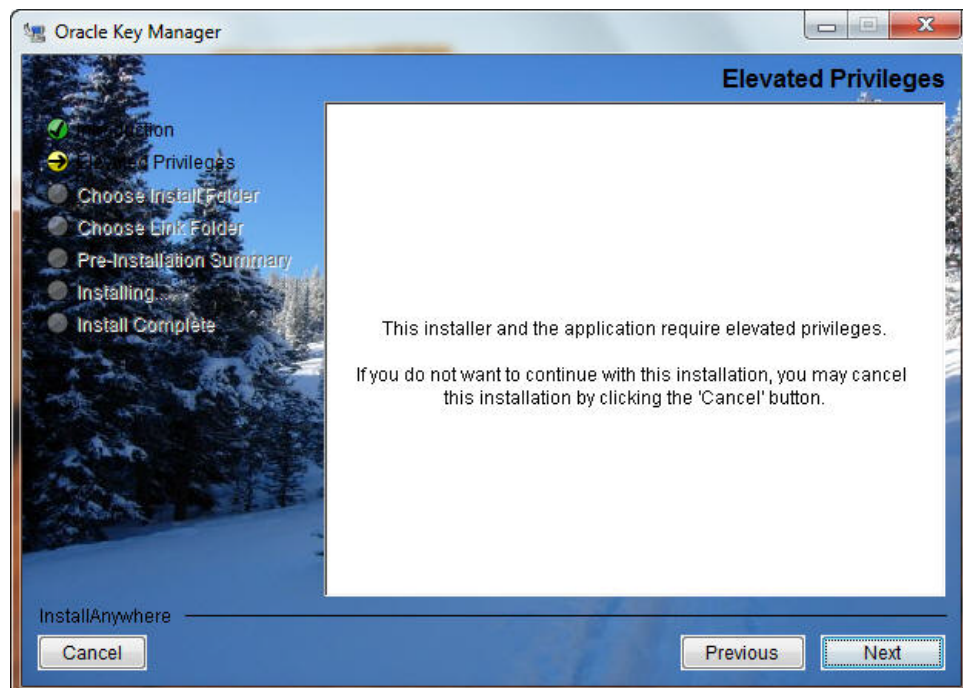
On the system where you start the installer, enter:

```
ping hosta
DISPLAY=hosta:0.0
export DISPLAY
cd /tmp
ls install.bin
sh ./install.bin
```

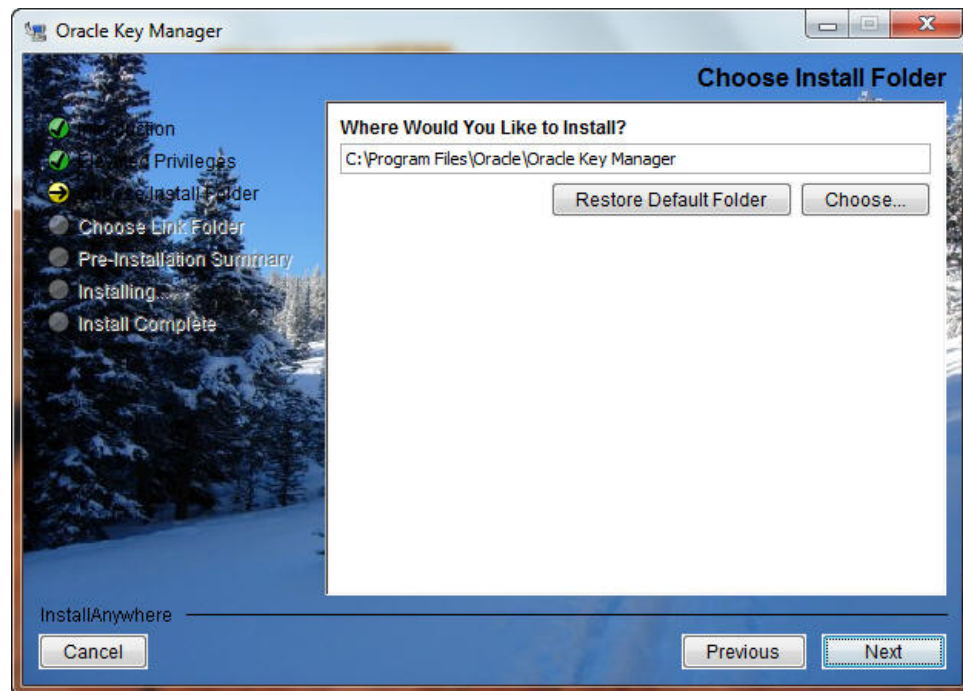
The Introduction window is displayed. The following screen examples are for a Windows system.



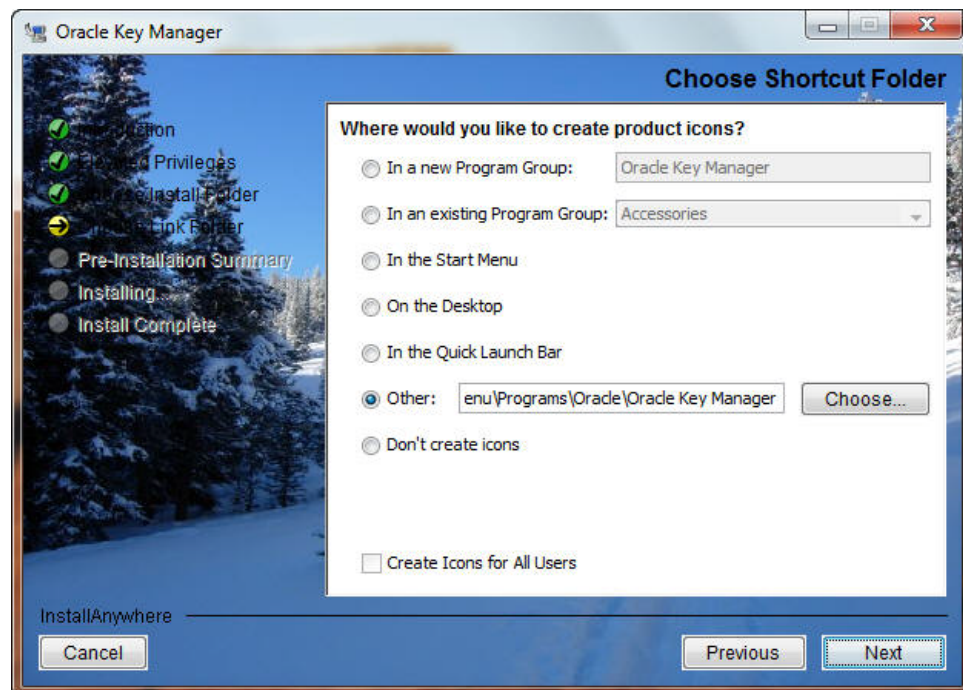
2. Select Next.
3. The Elevated Privileges window is displayed, telling you that you need elevated privileges to complete the installation. This screen does not appear on the Solaris installer.



4. The Choose Install Folder window is displayed.

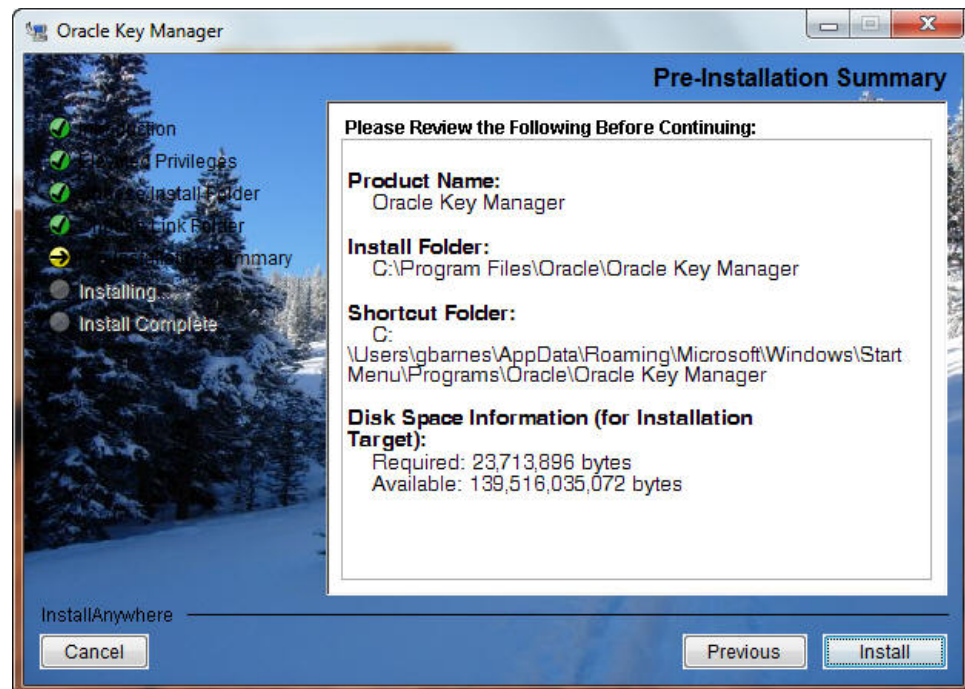


5. To select the default folder, select Next, or supply your own installation folder, and select Next.
6. The Choose Shortcut Folder window is displayed, allowing you to create the product icons where you desire.

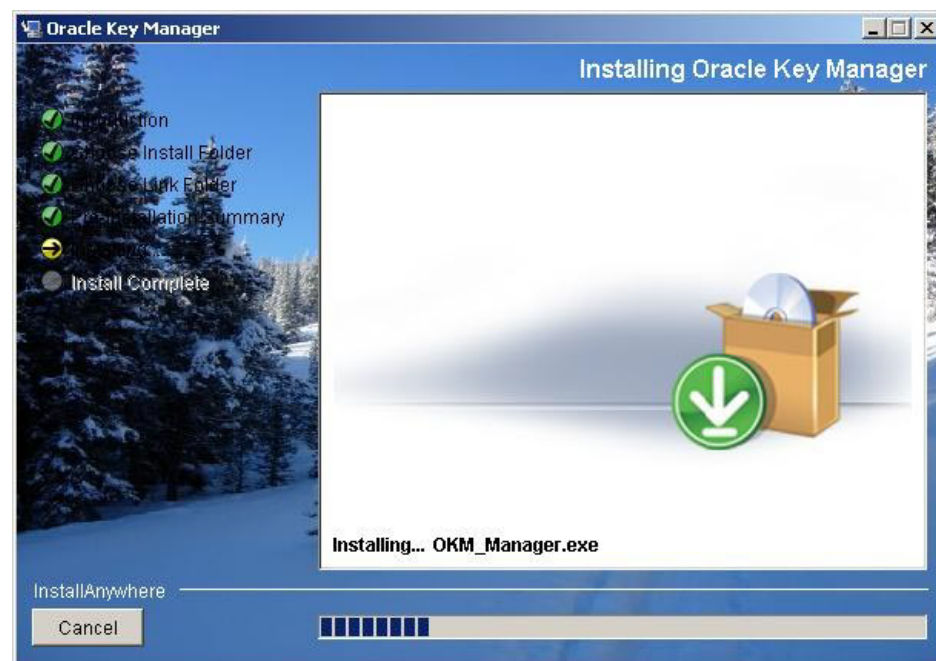


7. Select Next after you make your choice.
8. The Pre-Installation summary screen is displayed.

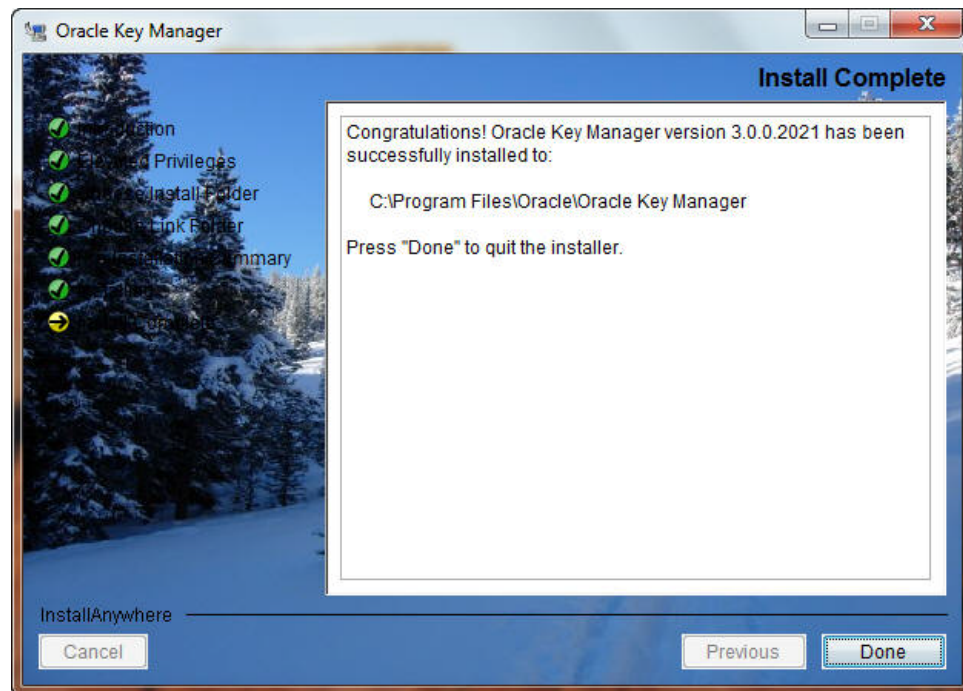




9. Select Install to install the OKM Manager, or select Previous to revise your setup.



10. The installation process is now complete. Select Done to exit.



## Invoking the OKM Manager

Two methods can be used to invoke the OKM Manager, depending on your environment:

- Startup with Windows
- Startup with Solaris.

### Starting the OKM Manager with Windows

If you instructed the installation program to create a shortcut, double-click it to launch the OKM Manager application.



Otherwise, launch Windows Explorer, navigate to where you installed the OKM Manager, and invoke OKM\_Manager.exe.

### Starting the OKM Manager with Solaris

As with Windows, you can direct the installation program to create a shortcut. For example, if you create the shortcut in your home directory, you can invoke it at a shell prompt by entering:

```
~/OKM_Manager
```

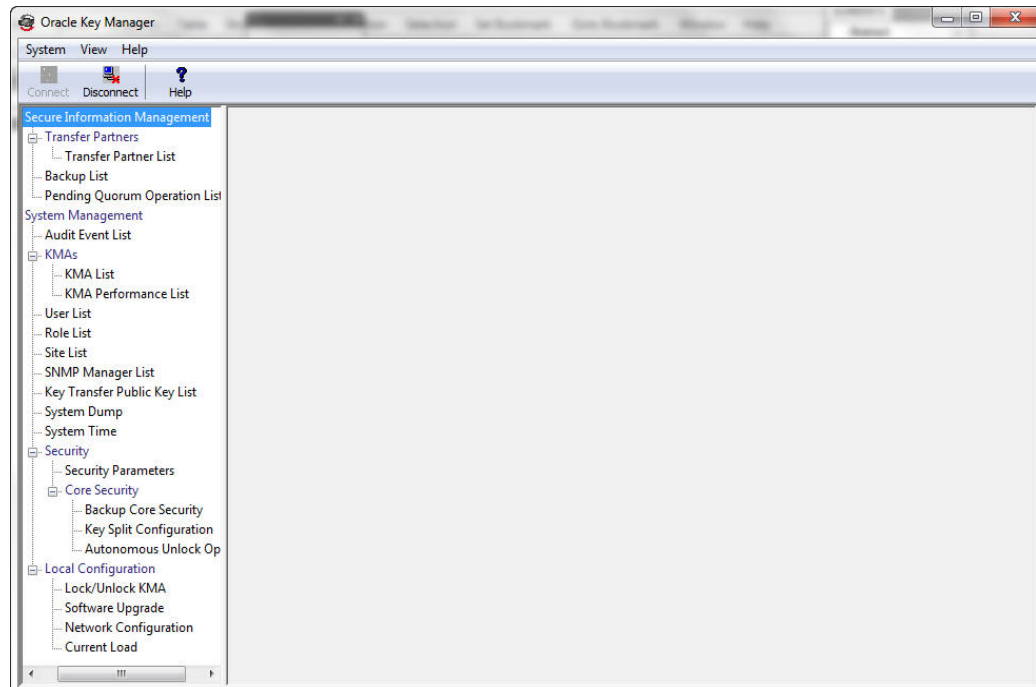
Alternatively, you can navigate to where you installed the OKM Manager and invoke it by entering:

```
./OKM_Manager
```

## OKM Manager GUI Overview

The OKM Manager GUI is shown below with a sample menu.

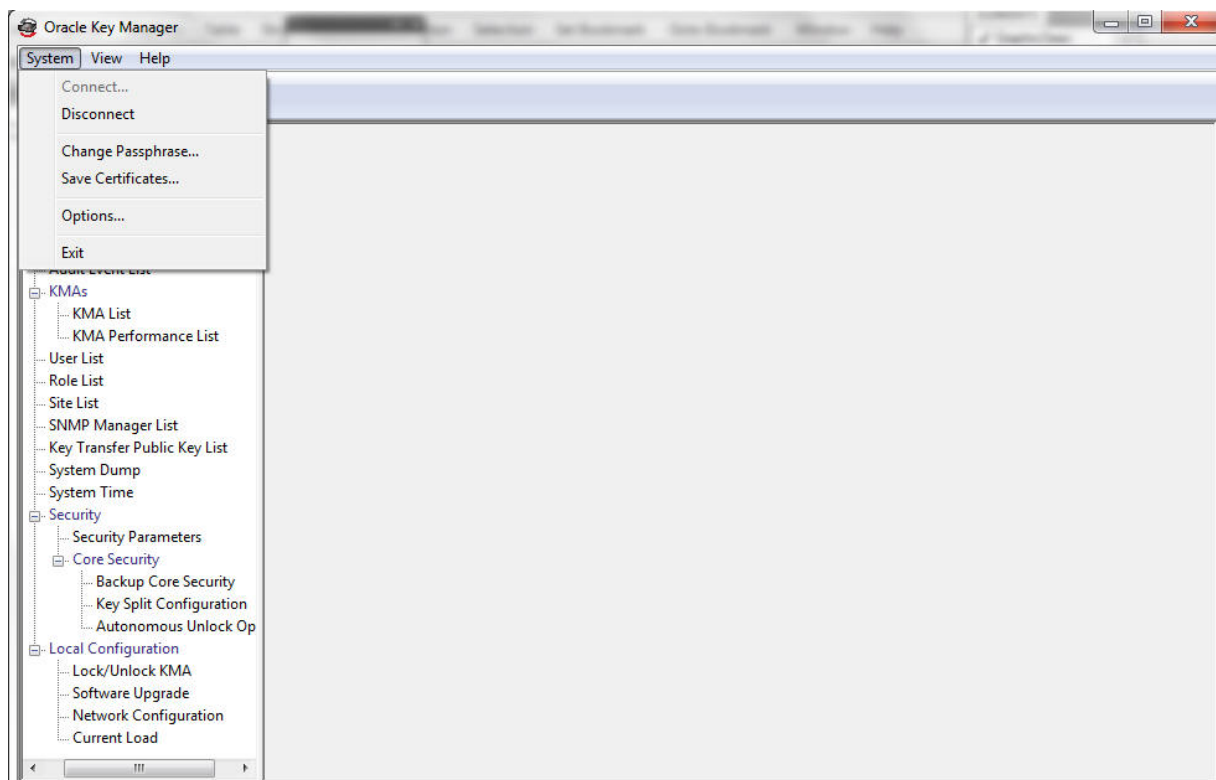




The OKM Manager GUI contains a System menu, View menu, and Help menu. Click the appropriate action bar item to display a menu and then select a menu item.

Toolbar buttons provide shortcuts to several menu options.

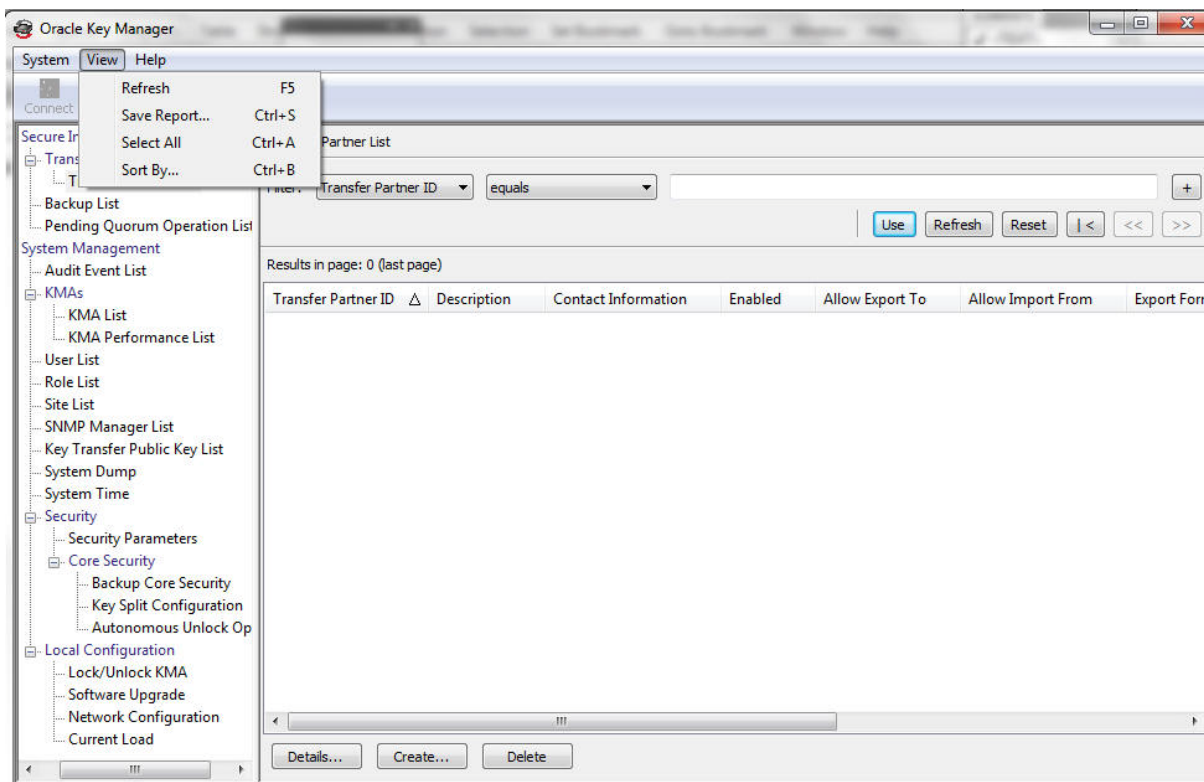
## System Menu



## System Menu Options

- **Connect:** Displays the Connect to Cluster dialog box that allows you to connect to a pre-existing Cluster using a Profile or to create a new Cluster profile.
- **Disconnect:** Displays the Disconnect from KMA dialog box that disconnects you from the KMA.
- **Change Passphrase:** Displays the Change passphrase dialog box that lets you modify the passphrase.
- **Save Certificates:** Displays the Save Certificates dialog box that permits you to edit the CA Certificate and Client Certificate file names.
- **Options:** Displays the Options dialog box that is used to specify various configuration settings.
- **Exit:** Closes the OKM Manager GUI.

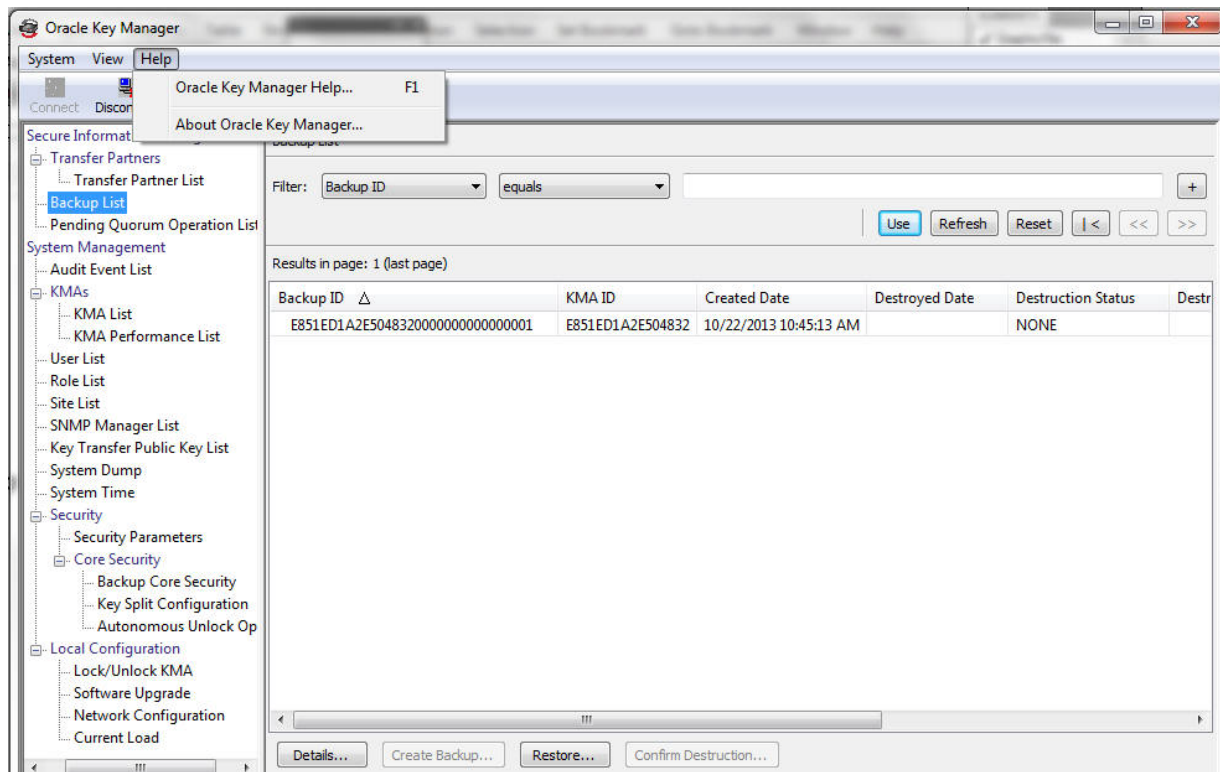
## View Menu



## View Menu Options

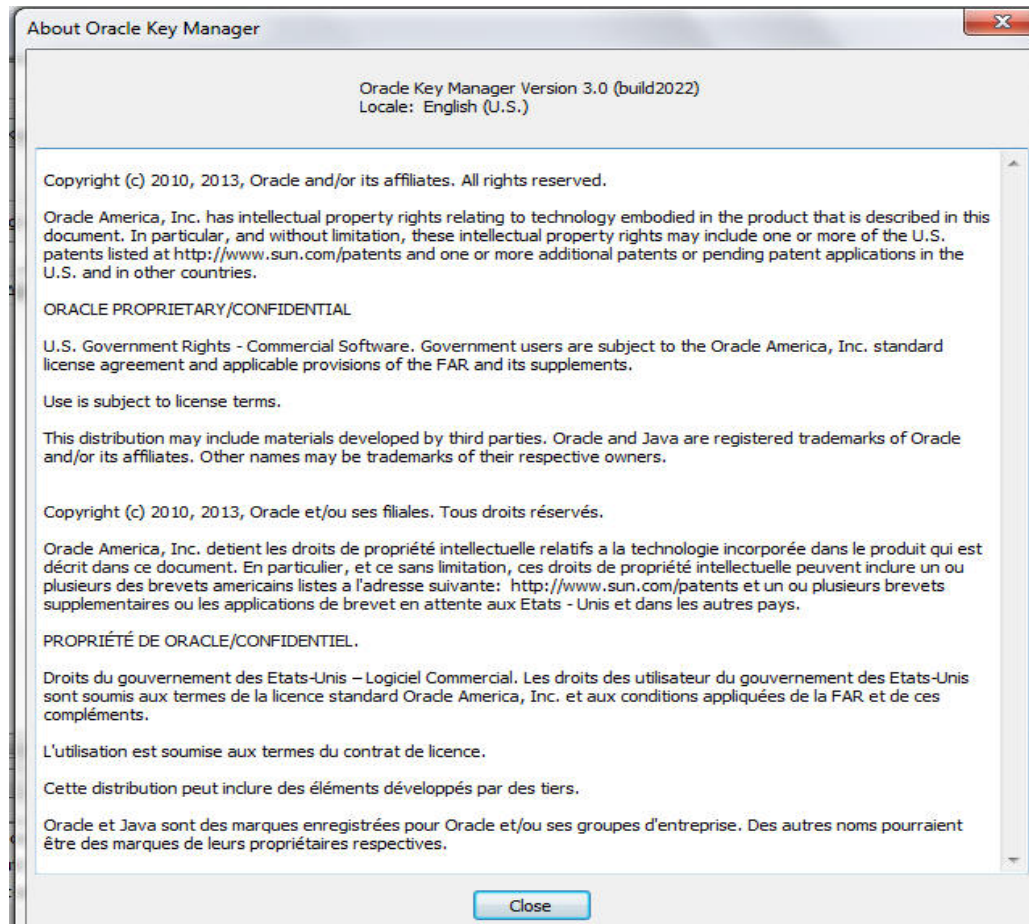
- **Refresh:** Refreshes the screen.
- **Save Report:** Save Report allows you to download the contents of any List screen. to a text file on the system where the OKM Manager is running.
- **Select All:** Select All selects all items on a List screen.
- **Sort By:** Sorts a list of items on a List screen. This is equivalent to clicking on column headings in a list.

## Help Menu



### Help Menu Options

- **OKM Manager Help:** Displays the online help index and table of contents for OKM Manager.
- **About OKM Manager:** Displays the version and copyright information about OKM Manager. Click the Close button to close this dialog box.



## Toolbar Buttons

The table below describes the Toolbar buttons on the OKM.

Button	Description
Connect	Displays the Connect to KMA dialog box that allows you to connect to a KMA by selecting a profile.
Disconnect	Displays the Disconnect from KMA dialog box that allows you to disconnect from the KMA.
Help	Displays the online help index and table of contents for OKM.

## Shortcut Keys

Shortcut keys allows you to choose commands in a single step. The following shortcut keys are used:

Description	Shortcut Keys
Cuts the current selection	Ctrl+X
Copies the current selection	Ctrl+C

Description	Shortcut Keys
<b>Cuts the current selection</b>	<b>Ctrl+X</b>
Copies the contents from the Clipboard to the current selection point	Ctrl+V
Brings up a dialog box to save a report to a local site	Ctrl+S

## Menu Accelerator Keys

Menu accelerator keys are supported for all menu items. Hold down the “Alt” key to display the accelerator keys.

## Using Online Help

You can use online help for complete information about the OKM. Online help is easy to use. You are able to view topics in various ways. You can:

- Browse a table of contents
- Search for keywords
- Use an index
- Navigate backward
- Print topics.

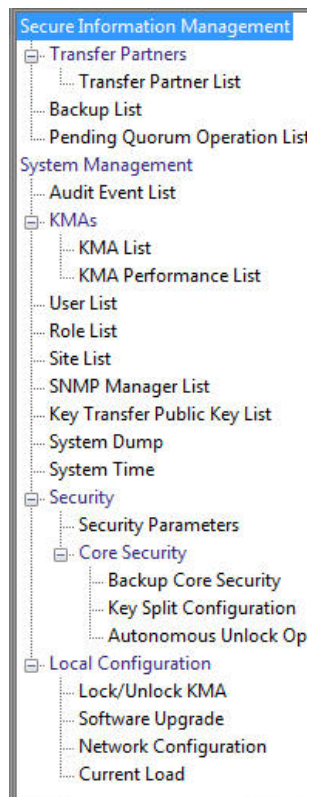
## OKM Manager GUI Panes

The OKM Manager GUI includes three panes:

- OKM Management Operations Tree
- OKM Management Operation Details
- Session Audit Log.

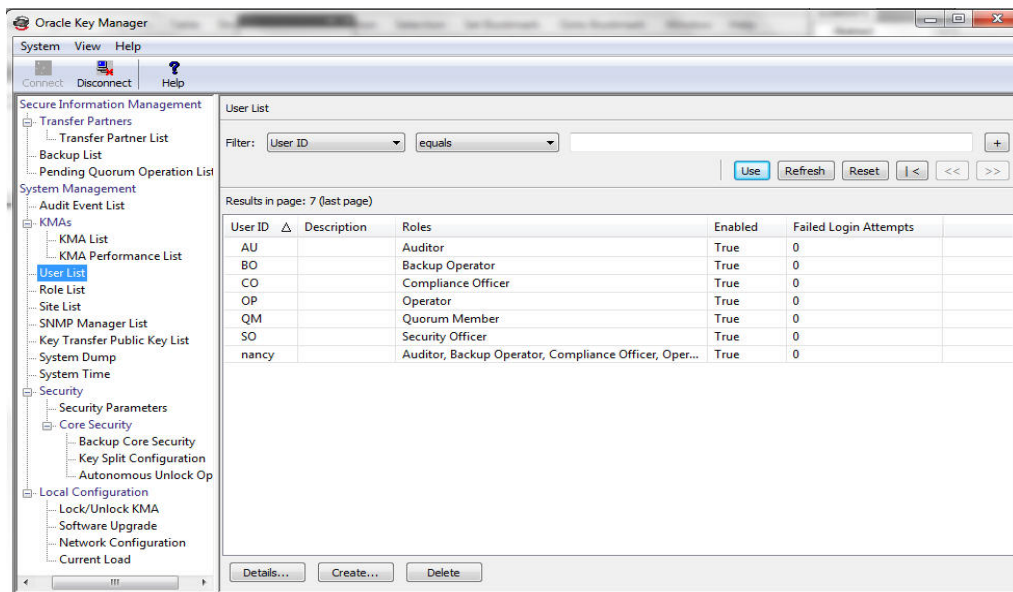
## OKM Management Operations Tree Pane

The OKM Management Operations Tree pane, located on the left-side of the screen, displays all operational functions of the OKM. Depending on your assigned role(s), the options on this tree pane differ. The example below shows the operations that a Security Officer can perform.



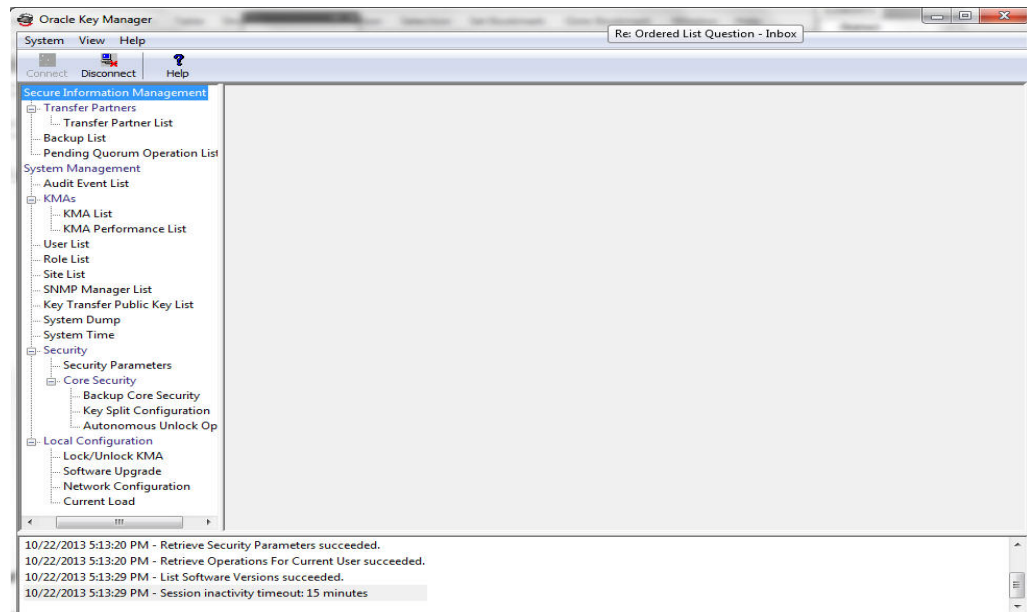
## OKM Management Operation Details Pane

When an operation is selected, the OKM Manager Operation Details pane, to the right of the Operations Tree Pane, displays the required components for the selected operations. You can apply filters on the items that are displayed in list panels. The example below shows the User List, when the User List menu option was selected from the System Management menu in the Operations Tree pane.



## Session Audit Log Pane

The Session Audit Log pane, below the Operations Tree Pane and the Operations Details Pane, provides a scrollable list of the most recent session events.

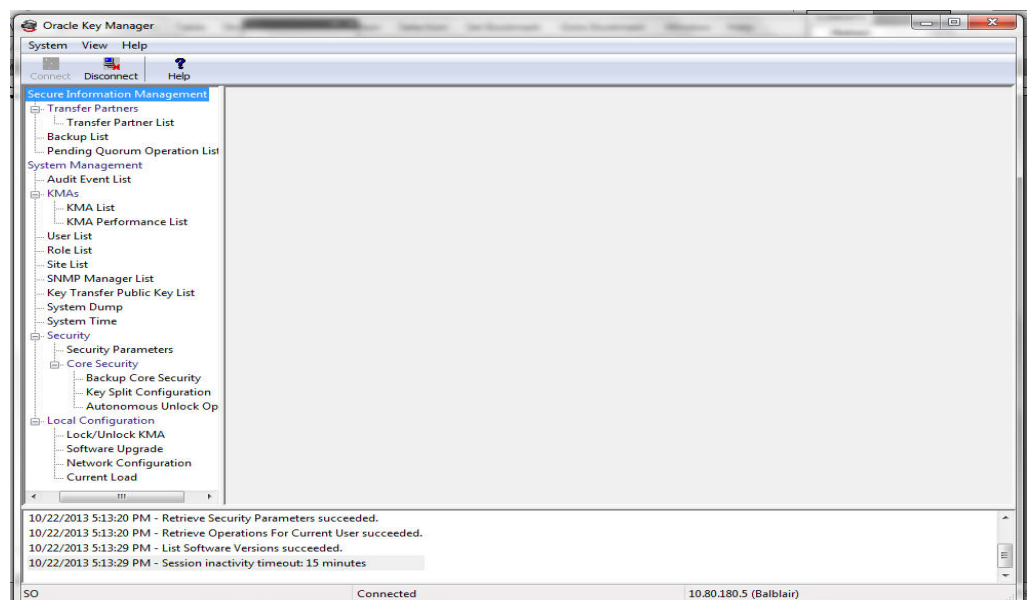


## Status Bar

The Status Bar, at the bottom of the screen, is comprised of the following fields:

- **User Name:** Displays the user name of the currently logged-in user. In the screen below, the Security Officer (SO) is logged in.
- **Connection Status:** Displays the state of the current connection, that is, Connected
- **KMA IP Address:** Displays the Management Network IP address and Name of the target KMA.

If there is no connection to the KMA, the Status fields are blank.





## Panels

There are common panel components in the OKM Manager screens. These are described below:

### Title

Displays the title of the screen.

### Filter

Allows you to filter the database by specific keys. It contains the following components:

**Table label:** Specifies the table to which the filtering applies

**Filter Attribute combo box:** Indicates the fields to filter

**Filter Operator 1 combo box:** Provides the filter operators that are applied to Filter Value 1. The filter operations are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~
- Empty
- Not Empty

**Filter Value 1 control:** Used as a single value or the starting value of the filter key range

**Filter Value 2 control:** Used as a single value or the ending value of the filter key range

**Use button:** Applies the filter to the displayed list.

### Refresh:

Click this button to refresh the displayed list. This does not apply filters selected since the last Use or Reset, and does not change the page of the list.

### Reset:

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.



**Results in Page:**



Displays the number of items that can be displayed on the current page. Appends “(last page)” if you are at the end of the list. The maximum number of items displayed on a page is defined by the Query Page Size value on the Options dialog.

---

**Note:** If the number of records output is greater than the Query Page Size, multiple pages are displayed. Click the buttons below the filters to move between pages.

---

#### Sorting:

Click a column heading to sort the list by that field. If the output requires multiple pages, the complete set of results is sorted, then the corresponding page is returned.

#### Message

Displays messages that are related to database queries. It works in conjunction with the Database View list. It contains the following components:

- Static text label: Displays error messages, such as:  
     Result limit exceeded. 10,000 results returned. Use a filter to reduce the filter size.

## Uninstalling the OKM Manager Software

Two options are available to begin to uninstall the OKM software:

- Navigate to the directory where the uninstall program resides and launch the executable file from there
- For Windows users only, launch the Add or Remove Programs process

In both cases, the Preparing Setup window is displayed after you finish these procedures. See ["Completing the Uninstall Process"](#) on page 3-16.

### Invoking the Executable File

To uninstall the OKM Manager software:

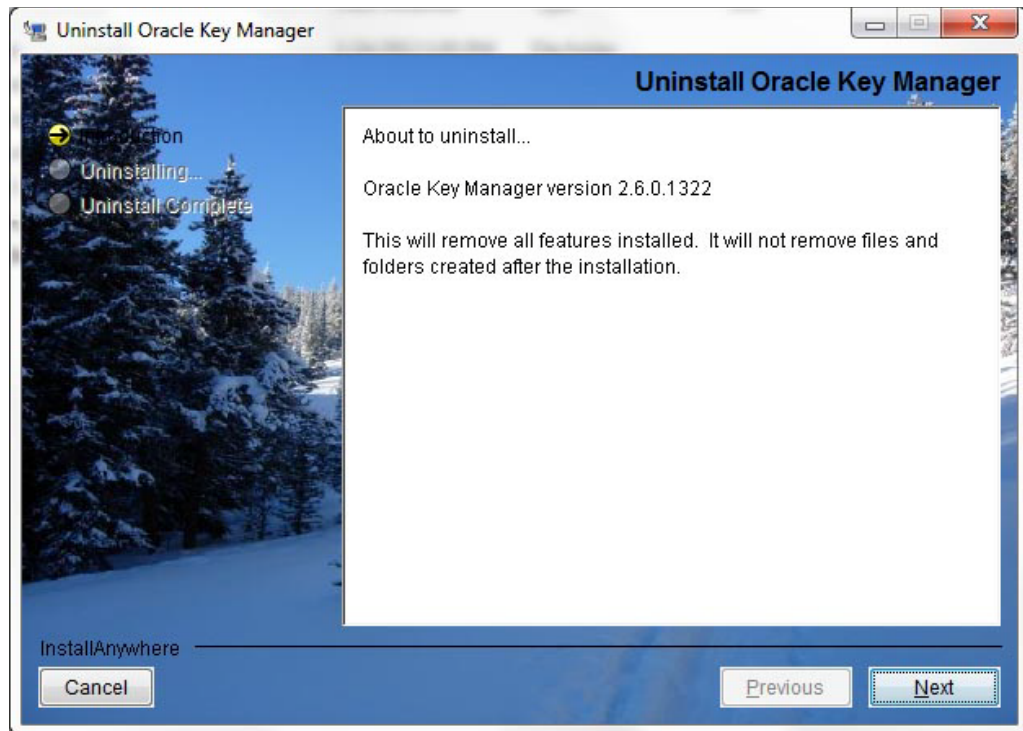
1. Navigate to the “Uninstall\_Oracle\_Key\_Manager” directory, which resides under the directory where the OKM Manager was installed.
2. Invoke the “Uninstall\_Oracle\_Key\_Manager.exe” (Windows) or “Uninstall\_Oracle\_Key\_Manager” (Solaris) executable to launch the uninstall process.
3. The Preparing Setup window is displayed, while the install/uninstall program prepares for the uninstall process.

### Invoking Add/Remove Programs (Windows Only)

1. Click **Start**, select **Settings**, **Control Panel**, double-click **Add or Remove Programs**. The Add or Remove Programs window is displayed. Scroll down the list (if the software is not visible), select Sun KMS Manager, then click the Change/Remove button.
2. The Preparing Setup window is displayed, while the install/uninstall program prepares for the uninstall process.

## Completing the Uninstall Process

The OKM uninstall dialog box is displayed, prompting you to confirm that you want to remove the selected application and all its features.



1. Click the Next button to continue or click the Cancel button to stop the process and return to the Add or Remove Program window (Windows) or shell prompt (Solaris).

---

**Note:** Your connection profiles will not be removed.

---

2. When the uninstall process is completed, the Uninstall Complete window is displayed. Click the Finish button to close this window. Close this window to return to the Add or Remove Program window (Windows) or shell prompt (Solaris).

---

## Using the System Menu

This chapter gives detailed instructions for connecting to the KMA using the OKM Manager. It also gives instructions for using the other options on the System menu.

### Connecting to the Cluster

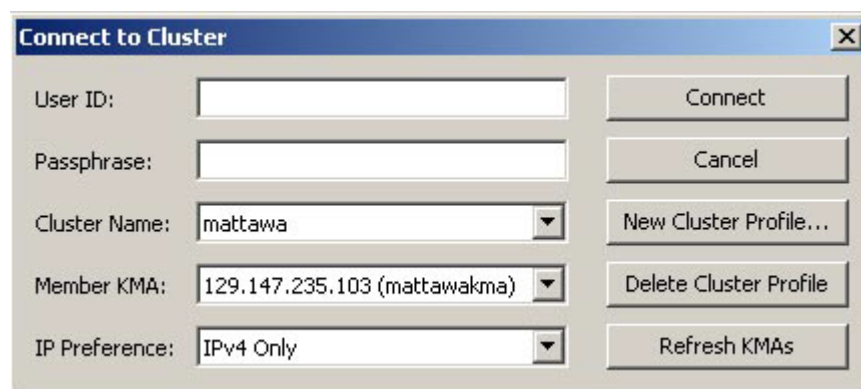
**Important** – Before connecting to a KMA, at least one Cluster profile must exist and a user must be created and enabled on the KMA.

This section gives procedures for connecting to the KMA using the OKM Manager. If this is the first time that you are connecting to the KMA, you must first define a Cluster profile. On subsequent occasions, you can connect to the KMA using the Cluster profile that you created. The OKM Manager uses the Cluster profile information to initiate communications with a Cluster (the KMA IP address).

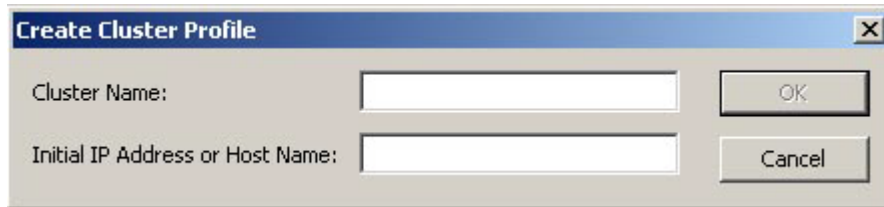
### Creating a Cluster Profile

To create a Cluster profile:

1. From the System menu, select **Connect** or from the Tool bar, click the Connect button. The Connect to Cluster dialog box is displayed. If you have pre-existing profile, the Cluster profile name and its IP address is displayed in the Cluster Name and IP Address fields respectively.

The image shows a 'Connect to Cluster' dialog box with a blue title bar and a close button (X) in the top right corner. The dialog contains five input fields on the left and five buttons on the right. The input fields are: 'User ID:' (text box), 'Passphrase:' (text box), 'Cluster Name:' (dropdown menu showing 'mattawa'), 'Member KMA:' (dropdown menu showing '129.147.235.103 (mattawakma)'), and 'IP Preference:' (dropdown menu showing 'IPv4 Only'). The buttons are: 'Connect', 'Cancel', 'New Cluster Profile...', 'Delete Cluster Profile', and 'Refresh KMAs'.

2. Click the **New Cluster Profile** button. The Create Cluster Profile dialog box is displayed.



The 'Create Cluster Profile' dialog box has a title bar with a close button. It contains two text input fields: 'Cluster Name:' and 'Initial IP Address or Host Name:'. To the right of these fields are two buttons: 'OK' and 'Cancel'.

- Complete the following parameters:

**Cluster Name**

Type a value that uniquely identifies the Cluster profile name.

**Initial IP Address or Host Name**

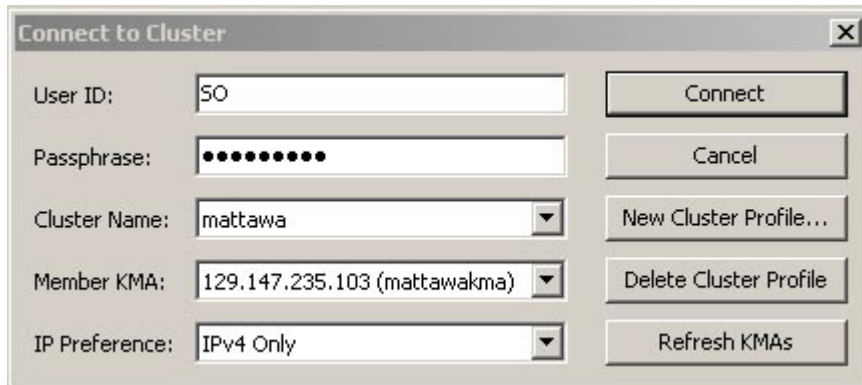
Type the Service Network IP address or Host Name of the initial KMA in this Cluster to connect to. The choice of which network to connect to depends on what network the computer system where the OKM Manager is running is connected to.

---

**Note:** You only have to create a single Cluster profile because covers the entire Cluster and can be used by any user (of the Agent). The only reason that you would want to create another Cluster profile is if you want to establish a second Cluster or you have changed the IP addresses of all KMAs in the current Cluster.

---

- Click the **OK** button. The Connect to Cluster dialog box is displayed with the Cluster profile information you created.



The 'Connect to Cluster' dialog box has a title bar with a close button. It contains several fields and buttons. On the left, there are five rows of labels and input fields: 'User ID:' with a text box containing 'SO', 'Passphrase:' with a masked text box (dots), 'Cluster Name:' with a dropdown menu showing 'mattawa', 'Member KMA:' with a dropdown menu showing '129.147.235.103 (mattawakma)', and 'IP Preference:' with a dropdown menu showing 'IPv4 Only'. On the right, there are five buttons: 'Connect', 'Cancel', 'New Cluster Profile...', 'Delete Cluster Profile', and 'Refresh KMAs'.

- Complete the following parameters and click the **Connect** button:

**User ID**

Type the name of the user who will connect to specified KMA, or if this is the first time that you are connecting to the KMA after performing the initial QuickStart process, type the name of the Security Officer created during the QuickStart.

**Passphrase**

Type the passphrase for the selected user.

**Cluster Name**

Select the Cluster to connect to.

**Member KMAs**

Select the KMA to connect to within that Cluster.

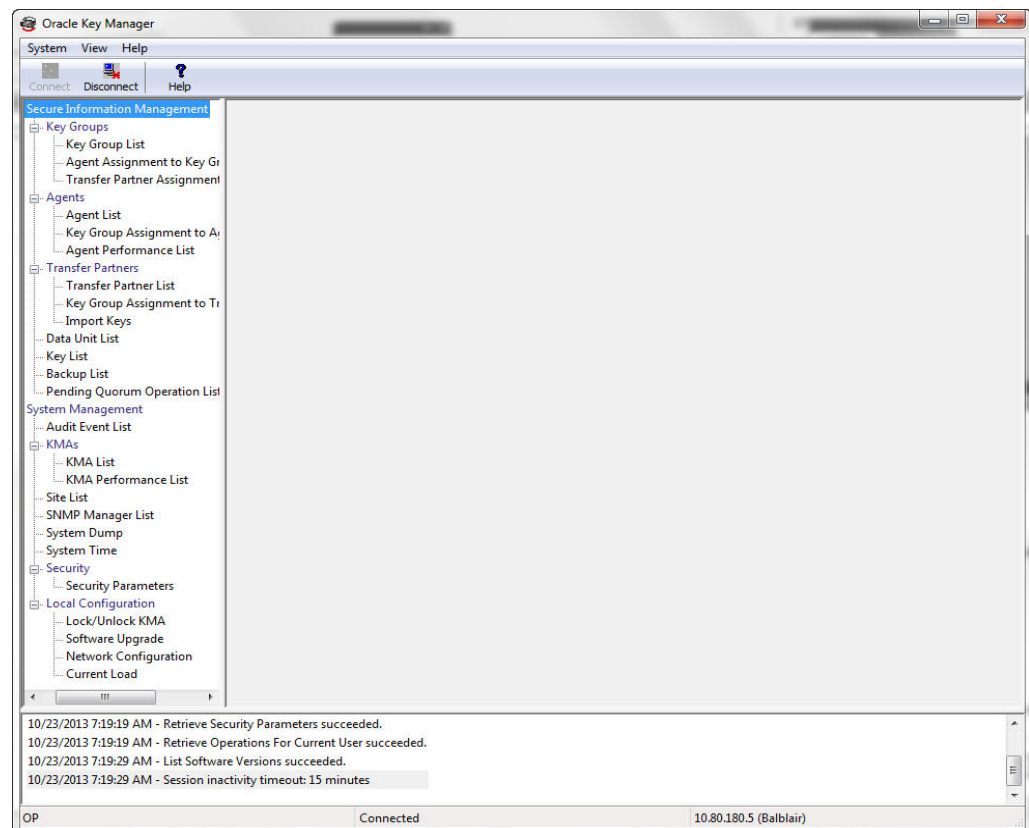
### IP Preference

Select the Internet Protocol version you want, IPv4 only, IPv6 only, or IPv6 preferred.

If a KMA has joined the Cluster after you have connected to that Cluster, that KMA does not appear in the Member KMAs list. To update the list, enter the user name and passphrase, choose a Cluster profile, and click the Refresh KMAs button.

**Important** – The KMA authenticates the user ID and passphrase. The returned list of KMA IP addresses is used to populate the Cluster profile and is stored on the host. The next time you connect to the KMA, you can enter the user name and passphrase, choose a Cluster profile, and select a KMA.

6. If the connection is successful, the Status bar of the OKM Manager GUI displays the user name and alias, the KMA's connection status (**Connected**), the KMA's IP address.



7. You can now use the OKM Manager to perform various operations. See [Chapter 5](#) through [Chapter 9](#) for the operations that various user roles can perform.

---

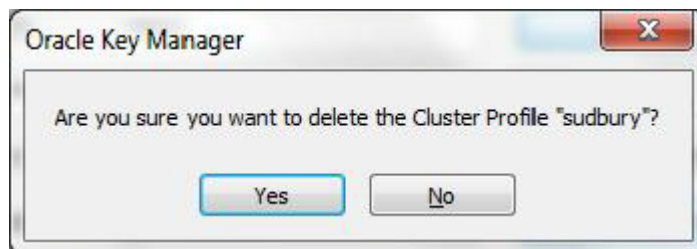
**Note:** Depending on the role assignment, the tasks in the KMA Management Operations Tree pane differ.

---

## Deleting a Cluster Profile

To delete a Cluster profile:

1. From the Connect to Cluster dialog box, click the down-arrow beside the Cluster Name field, highlight the Cluster profile that you want to delete and click the Delete Cluster Profile button. The Delete Cluster Profile dialog box is displayed, prompting you to confirm that you want to delete the selected Cluster profile.



2. Click the **Yes** button to delete the Profile. The Cluster Profile is deleted and you are returned to the Connect to Cluster dialog box.

## Disconnecting from the KMA

To disconnect from the KMA:

From the System menu, select **Disconnect** or from the Tool bar, click Disconnect. You are immediately disconnected from the KMA and the OKM Cluster. The session Audit Log pane indicates the date and time when you disconnected from the KMA.

## Changing the Passphrase

---

**Note:** This menu option is only enabled if you are connected to a KMA using a profile.

---

This function allows users to change their own passphrases. This function does not invalidate a user's current certificate.

To change a connected user's passphrase:

1. From the System menu, select **Change Passphrase....** The Change Passphrase dialog box is displayed.



2. Complete the following parameters and click the OK button:

### Old Passphrase

Type the user's old passphrase.

### New Passphrase

Type the user's new passphrase.

### Confirm New Passphrase

Retype the same passphrase.

3. The following message is displayed in the session Audit Log pane, indicating the date and time when you changed the user's passphrase.

## Saving Certificates

This function allows you to export certificates that can be used by the OKM Command Line utility (refer to "[OKM Command Line Utility](#)" on page 12-1).

The Root CA Certificate is a public certificate saved in PEM format and can be used for Command Line Interface (CLI) operations as a PEM file.

The Client Certificate can be saved in either PEM format or PKCS#12 format. The PEM format contains the certificate and the unencrypted private key. A Client Certificate saved in this format can be used for CLI operations as a PEM file.

The PKCS#12 format is encrypted. A Client Certificate saved in this format must be converted to PEM format before being used for CLI operations (see "[Converting PKCS#12 Format to PEM Format](#)" on page 4-6). A password to use for encryption is required to save a Client Certificate in PKCS#12 format. This password must contain at least 8 characters.

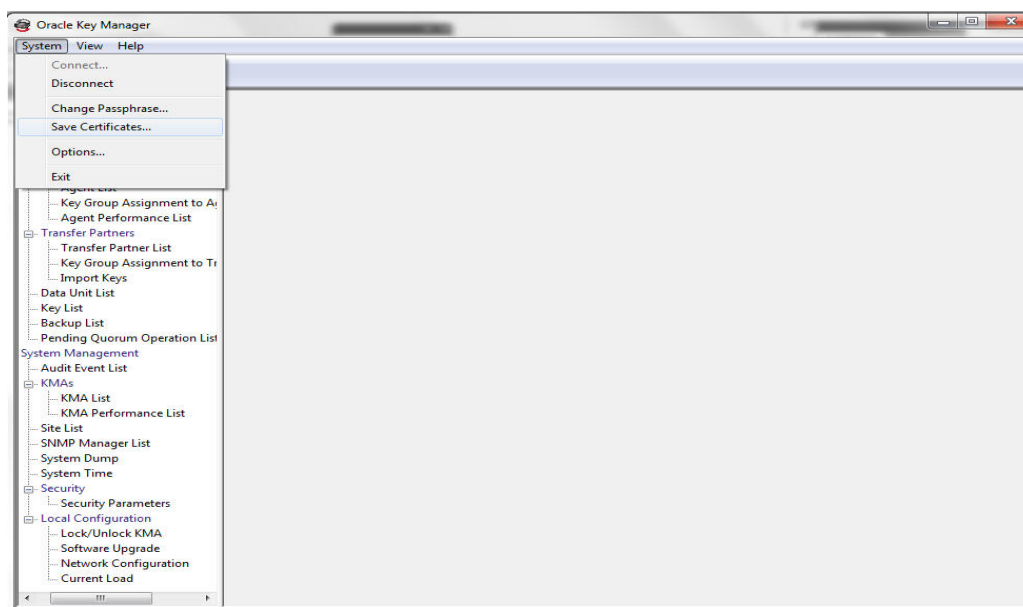
---

**Note:** You should store these certificate files in a secure location with sufficient permissions to restrict access by other users. **If you save the Client Certificate in PKCS#12 format, then you must retain the password.**

---

To save the certificates:

1. From the System menu, select **Save Certificates**.

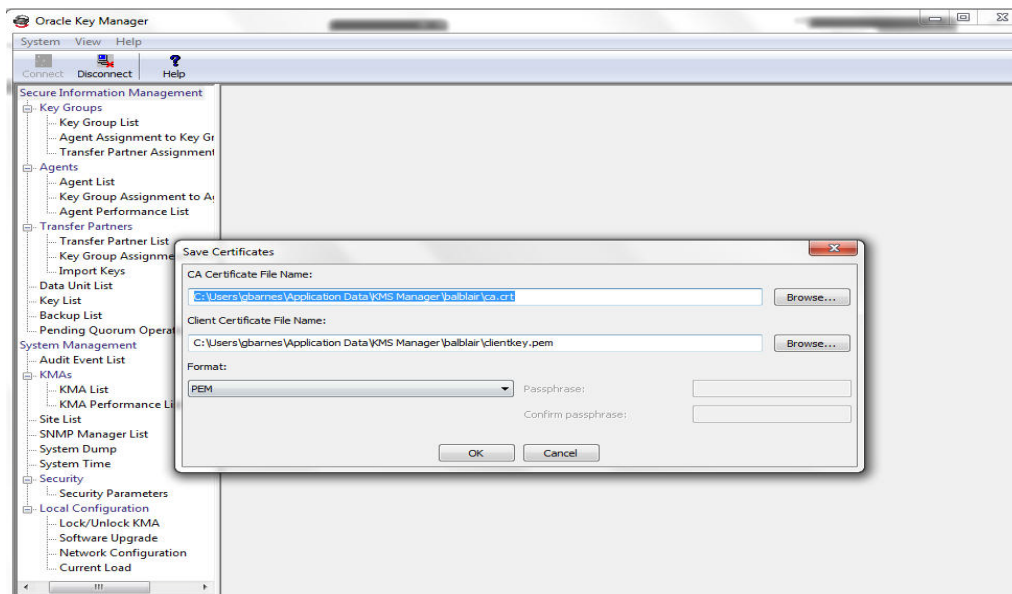


---

**Note:** The Save Certificates menu option is enabled only if the user is connected to a KMA.

---

The Save Certificates dialog is displayed, with automatically-generated filenames for the Root CA Certificate and the Client Certificates.



You can edit these filenames directly or click Browse to select a different destination path or edit the filenames.

2. In the Format field, select the format that the Client Certificate should be in when it is exported.
3. If you selected the PKCS#12 format, type a passphrase in the Passphrase field and retype this passphrase in the Confirm Passphrase field.
4. Click OK to export these certificates. When these certificates have been exported, a message is displayed, indicating the locations of these files.
5. Click Cancel to close this dialog and return to the previous screen.

## Converting PKCS#12 Format to PEM Format

If you saved the Client Certificate in PKCS#12 format, then you must convert it to PEM format before you can use it with the OKM Command Line utility. Use the `openssl` utility to convert it.

The `openssl` utility appears in the OpenSSL directory under the directory where the OKM Manager GUI and the OKM Command Line utility are installed.

The syntax is:

```
openssl pkcs12 -in PKCS12file -out PEMfile -nodes
```

For example:

```
openssl pkcs12 -in KeyTransferOperator.p12 \
-out KeyTransferOperator.pem -nodes
Enter Import Password:
```



The `-nodes` argument is necessary to export the private key. Since the private key is not password protected, you should appropriately manage this file.

---

**Note:** The Import Password can optionally be specified on the command line using the `-passin` parameter, if required.

---

## Specifying the Configuration Settings

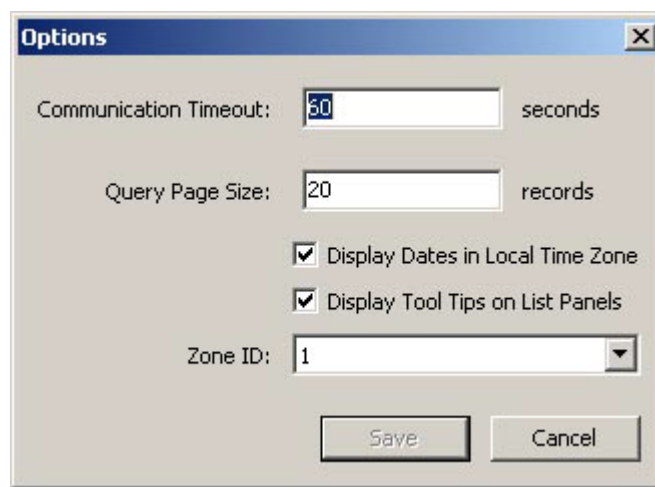
To specify the configuration settings:

1. From the System menu, select **Options....** The Options dialog box is displayed, showing the current configuration settings.

---

**Note:** The options selected are stored in the Windows Registry or in “~/.KMS Manager” for other platforms (where ~ is the user’s home directory). The Windows Registry key for these values is “My Computer\HKEY\_CURRENT\_USER\Software\Sun Microsystems\KMS Manager.”

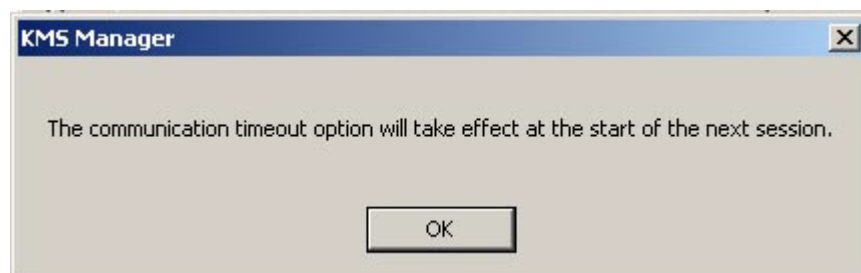
---



2. Modify the following parameters, as required and click the **Save** button:

### Communication Timeout

Type a timeout period (in seconds) for communications with the connected KMA. If the KMA does not respond within the timeout value, the OKM Manager gives up on the communication. The minimum value is 1; the maximum value is 60. The default is 15.



### Query Page Size

Type the maximum number of items to display on a screen, dialog, or tab on a dialog that displays a list of items. Paging can be used to view a list longer than this limit. The minimum value is 1; the maximum value is 1000. The default is 20.

#### **Display Dates in Local Time Zone**

Select this check box to display all dates and times in the local machine's time zone (i.e., where the OKM Manager is running), rather than UTC. The default is selected. The following confirmation message is displayed.

#### **Display Tool Tips on List Panels**

Select this check box if you want to see a tool tip when you position the cursor over an item. This is the default.

#### **Zone ID**

If your KMAs are configured to have IPv6 addresses and if you want to connect to one of them using an IPv6 link-local address (that is, one that begins with "fe80"), then select a Zone ID to use when connecting to that link-local address.

See ["IPv6 Addresses with Zone IDs"](#) on page 4-8 for more information.

## **IPv6 Addresses with Zone IDs**

For Windows system users, the OKM Manager GUI and the Backup and OKM Command Line utilities (see ["Command Line Utilities"](#) on page 12-1) allow you to enter link-local IPv6 addresses, however, you must perform some initial setup first.

---

---

**Note:** You must enter a Zone ID whenever you specify a link-local address (that is, an IPv6 address that begins with "fe80"). You can specify a Zone ID by appending it to the end of an IPv6 address, following a percent sign (%).

---

---

1. Display a command prompt window and determine which Zone IDs are available on your Windows system.

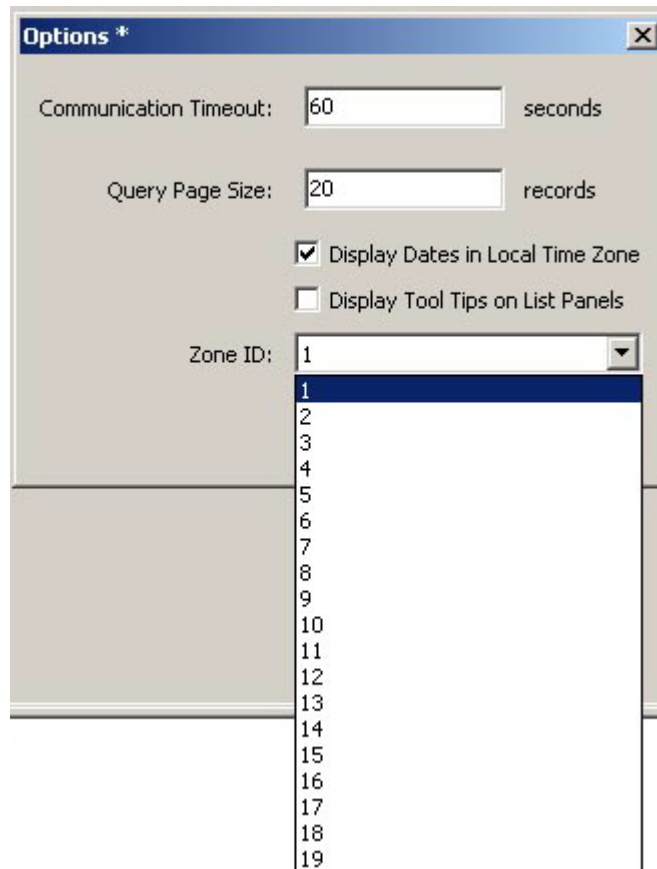
```
netsh interface ipv6 show interface
```

The Zone IDs appear in the Idx column in the output of this command. Look for entries that show a State of "Connected."

2. Use the ping command to confirm network connectivity using one of these Zone IDs. For example:

```
ping fe80::216:36ff:fed5:fba2%4
```

3. Before you bring up the Connect dialog in the OKM Manager GUI, display the Options dialog and select the appropriate Zone ID.



4. Click the **Save** button.

## Exiting from the OKM Manager

To exit from the OKM Manager:

1. From the System menu, select **Exit** or from the Title bar, click the X button. The OKM Manager closes and you are returned to the Windows desktop.
2. The OKM Manager immediately disconnects if connected and closes.



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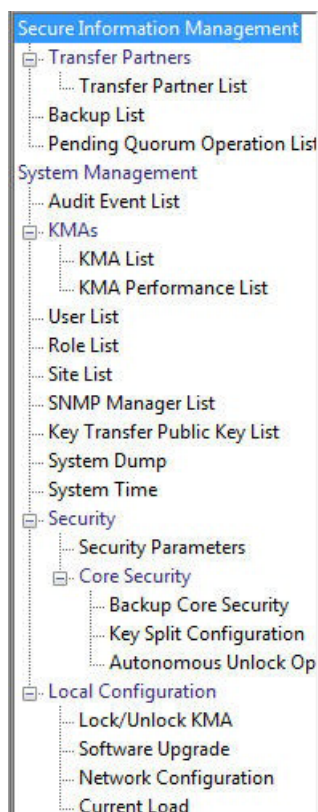
## Security Officer Operations

A Security Officer manages security settings, users, sites, and Transfer Partners. This chapter describes the following:

- Operations that a user who has been given a Security Officer role can perform. If you have been assigned multiple roles, refer to the appropriate chapter for instructions on performing the specific role.
- Procedures for enabling and disabling a technical support account.

### Security Officer Role

As a Security Officer, you can manage the entities (KMAs, users, sites, Transfer Partners) as well as various security aspects of the system.



## KMA List Menu

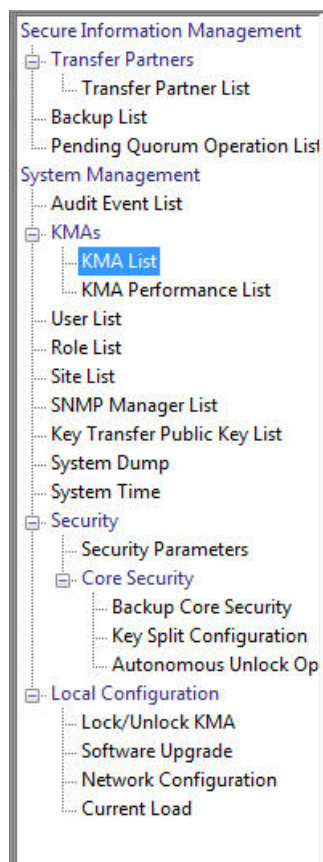
The KMA List menu option allows you to:

- View KMAs
- Create a KMA
- Modify a KMA's information
- Delete a KMA
- Modify a Key Pool size (refer to "[Modifying a Key Pool Size](#)" on page 8-5). This is a Backup Operator function.

---

**Note:** All six roles can now access the KMA List panel and view the key pool size.

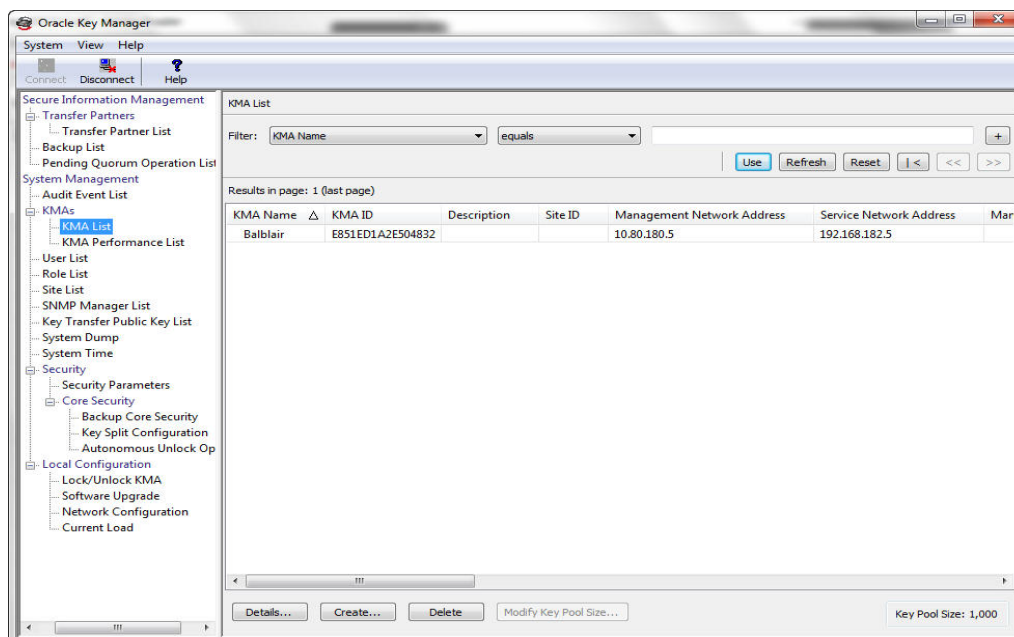
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## Viewing KMAs

To view KMAs:

From the System Management menu, select **KMA List**. The KMA List screen is displayed.



You can also scroll through the database and filter the KMA list by any of the following keys:

- KMA Name
- Description
- Site ID
- Management Network Address
- Service Network Address
- Management Network Address (IPv6)
- Service Network Address (IPv6)
- Version
- Failed Login Attempts
- Enrolled

The **Use** button applies the filter to the displayed list for the KMA.

The fields and their descriptions are as follows:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- KMA Name
- Description
- Site ID
- Management Network Address
- Service Network Address
- Management Network Address (IPv6)
- Service Network Address (IPv6)

- Version
- Failed Login Attempts
- Enrolled

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~
- Empty
- Not empty

**Filter Value 1 box:**

If you selected one of the date filters, click **Set Date** to specify start date and time. The value appears as a starting value of the filter key range. If you selected any other filter, type a value in this field.

**Filter Value 2 box:**

If you selected one of the date filters, click **Set Date** to select an end date and time. The value appears as an ending value of the filter key range.

**Use:**

Click this button to apply the filter to the displayed list.

**Refresh:**

Click this button to refresh the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.



Click this button to go to the next page.

**Results in Page:**



Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**KMA Name**

Displays the user-supplied identifier that distinguishes each KMA in a Cluster.

**KMA ID**

Displays a system-generated unique identifier that identifies the KMA.

**Description**

Describes the KMA.

**Site ID**

Describes the site to which the KMA belongs.

**Management Network Address**

Displays the IP address of the KMA on the management network.

**Service Network Address**

Displays the IP address of the KMA on the service network.

**Management Network Address (IPv6)**

Displays the IPv6 address (if any) of the KMA on the management network.

**Service Network Address (IPv6)**

Displays the IPv6 address (if any) of the KMA on the service network.

**Version**

Displays the version number of the KMA software. For OKM 3.0 KMAs, the version string shows the following format: <OKM release>-5.11-<OKM build>. For example, 3.0.0-5.11-2012.

**Failed Login Attempts**

Displays the number of times that an attempted logon has failed.

**Responding**

Indicates whether the KMA is running. Possible values are True or False.

- **True** indicates that the KMA is responding to requests from the KMA to which this OKM is connected (that is, the local KMA). While this status applies between every pair of KMAs in the Cluster, the values shown indicate whether each of the KMAs listed (that is, the remote KMAs) are responding to requests from the local KMA.
- **False** indicates that the remote KMA is not responding to requests, perhaps because the remote KMA is down or the communications link to the remote KMA is down.

**Responding on Service Network**

Indicates whether or not the KMA is responding on the service network. Possible values are "Responding," "Not Responding," or "Not Accessible."

- **Responding** indicates the KMA is responding to requests from the KMA this OKM is connected to (that is, the local KMA). While this status applies between every pair of KMAs in the Cluster, the values shown indicate whether each of the KMAs listed (that is, the remote KMAs) are responding to requests from the local KMA.

- **Not Responding** indicates the remote KMA is not responding to requests, perhaps because the remote KMA is down or the communications link to the remote KMA is down.
- **Not Accessible** indicates the remote KMA is not accessible to the local KMA, perhaps because the service network configuration does not provide a default or static route to that KMA.

---

**Note:** If the local KMA has configured a default route, then it is considered to have a route to remote KMAs. Other KMAs are shown as “Not Responding” if they do not respond on the service network.

If a default or static route is not defined, then other KMAs may be shown as “Not Accessible.” Older KMAs (OKM 2.3.x or earlier) are shown as “Responding.”

---

### **Response Time**

Displays the time (in milliseconds) that the KMA takes to respond to a request on its management network. This value is typically a few hundred milliseconds. It can be larger if a WAN connection exists between the local KMA and a remote KMA. It can also be larger if the communications link between KMAs is busy.

### **Replication Lag Size**

Displays the number of updates before replication takes place. This number should be zero or a small value. Larger values indicate that replications are not getting completed in a timely manner, the communications link between KMAs is down or busy, or a remote KMA is down. This value will also be very large when a new KMA has just been added to the Cluster.

### **Key Pool Ready**

Displays the percentage of unallocated keys that are ready.

### **Key Pool Backed Up**

Displays the percentage of the Key Pool that has been backed up.

---

**Note:** N/A indicates that the KMA cannot determine this value, because either the KMA runs down-level software or it is currently using a lower Replication Version.

---

### **Locked**

Indicates whether or not the KMA is locked.

---

**Note:** N/A indicates that the KMA cannot determine this value, because either the KMA runs down-level software or it is currently using a lower Replication Version.

---

### **Enrolled**

Indicates whether the KMA has been added or logged into the Cluster successfully. Possible values are True or False.

**True** indicates that the KMA has successfully been added or logged into the Cluster.

This value is **False** when the KMA is first created and will change to True once the KMA has logged into the Cluster. It can also be False when the KMA's passphrase is changed. Once a KMA has logged in, the passphrase used to log in can no longer be used. The passphrase must be changed before the KMA can log into the Cluster again.

### **HSM Status**

Indicates the status of the Hardware Security Module (HSM). Possible values are Unknown, Inactive, Software, Hardware, SW Error, HW Error, or Not Present.

#### **Unknown**

The KMA is running a software release older than KMS 2.2.

#### **Inactive**

The KMA currently does not need to use the HSM, typically because the KMA is locked.

#### **Software**

The HSM is not functional, and the KMA is using the software provider to generate Keys.

#### **Hardware**

The HSM is functional, and the KMA is using it to generate Keys.

#### **SW Error/HW Error**

The KMA encountered an error when it tried to query the status of the software provider (SW Error) or the HSM (HW Error).

---

**Note:** Normally, the HSM is functional (Hardware). However, if the HSM becomes non-functional (Software) and the FIPS Mode Only security parameter is set to Off (see ["Retrieving the Security Parameters"](#) on page 5-74), then the KMA switches to using the software provider to generate Keys.

---

If the HSM becomes non-functional and the FIPS Mode Only security parameter is set to On, then the KMA cannot generate Keys or return AES wrapped key material to Agents.

If the value is Software, SW Error, or HW Error, check the Sun Crypto Accelerator (SCA) 6000 card on this KMA (see ["Checking the SCA 6000 Card"](#)).

#### **Not Present**

The HSM is not present and the KMA is using the software provider to generate keys.

## **Checking the SCA 6000 Card**

It is possible that an existing KMA in a Cluster may contain a failed SCA 6000 card. To identify a failed card, examine the rear of the KMA server and check the LEDs on the card.

A functional SCA 6000 card on a KMS 2.1, 2.2, or OKM 2.3 and later KMA that has been initialized through the QuickStart program displays a flashing green Status LED (identified with an S) and solid green FIPS (F) and Initialized (I) LEDs.

If the Status LED is not flashing green and the FIPS and Initialized LEDs are not solid green, then the KMA has a faulty SCA 6000 card, and the KMA must be replaced if FIPS mode is required.

See the SCA 6000 User Guide for a description of the LEDs on an SCA 6000 card.

If you want to create a KMA, click the Create button. For more information, refer to ["Creating a KMA"](#) on page 5-8 below.

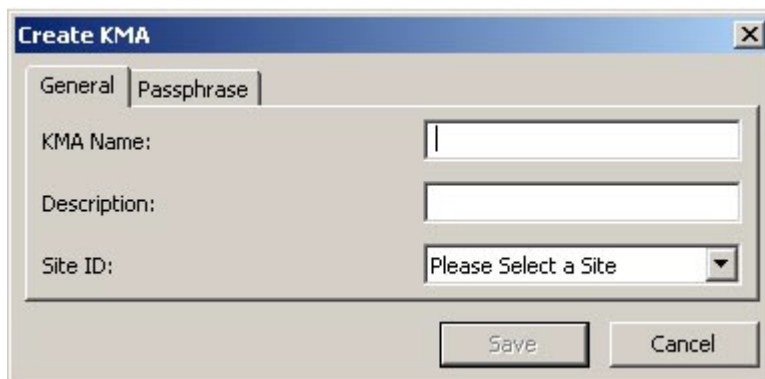
If you want to view / modify a KMA's details, highlight the KMA and click the Details button. For more information, refer to ["Viewing/Modifying a KMA's Details"](#) on page 5-11.

If you want to delete a KMA, click the Delete button. For more information, refer to ["Deleting a KMA"](#) on page 5-16.

## Creating a KMA

To create a KMA:

1. From the KMA List screen, click the **Create** button. The Create KMA dialog box is displayed, with the General tab active.

The image shows a 'Create KMA' dialog box with a title bar containing a close button (X). It has two tabs: 'General' (selected) and 'Passphrase'. The 'General' tab contains three input fields: 'KMA Name:' with a text box, 'Description:' with a text box, and 'Site ID:' with a dropdown menu showing 'Please Select a Site'. At the bottom right are 'Save' and 'Cancel' buttons.

2. Complete the following parameters:

On the General tab, supply the following information if required:

### **KMA Name**

Type a value that uniquely identifies the KMA in a Cluster. This value can be between 1 and 64 (inclusive) characters.

### **Description**

Type a value that uniquely describes the KMA. This value can be between 1 and 64 (inclusive) characters.

### **Site ID**

Click the down-arrow and select the site to which the KMA belongs. This field is optional.

3. Open the Passphrase tab.

The screenshot shows a 'Create KMA' dialog box with a 'Passphrase' tab selected. It contains two text input fields labeled 'Enter Passphrase:' and 'Confirm Passphrase:'. Below the fields are 'Save' and 'Cancel' buttons.

4. Complete the following parameters and click the **Save** button.

#### **Enter Passphrase**

Type the passphrase for this user. The minimum value is 8 characters; the maximum value is 64 characters. The default value is 8.

Passphrase requirements:

- A passphrase must not contain the user's KMA Name.
- A passphrase must contain three of the four character classes: uppercase, lowercase, numeric, or special characters.
- The following special characters are allowed:  
~ ! @ # \$ % ^ & \* ( ) - \_ = + [ ] { } \ | ; : ' " < > , . / ?
- Control characters, including tabs and linefeeds, are not allowed.

---

**Note:** To modify the minimum length requirement for passphrases, see "[Modifying the Security Parameters](#)" on page 5-77.

---

#### **Confirm Passphrase**

Type the same value that you entered in the **Enter Passphrase** field.

5. The KMA record is added to the database and the entry is displayed in the KMA List screen.

The screenshot shows the 'KMA List' window. At the top, there is a filter section with 'KMA Name' selected, an equals sign, and an empty text box. Below this are buttons for 'Use', 'Refresh', 'Reset', and navigation arrows. The main area displays a table with the following data:

KMA Name	KMA ID	Description	Site ID	Management Network Address	Service Network Address	Version
sudburykms	372FC5113E67F069			129.80.60.163	129.80.60.163	Build2

Below the table, a 'Create KMA' dialog box is open. It has two tabs: 'General' and 'Passphrase'. The 'General' tab is active, showing fields for 'KMA Name' (value: stkkms), 'Description' (empty), and 'Site ID' (value: Louisville). There are 'Save' and 'Cancel' buttons at the bottom of the dialog.

- The Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.

The screenshot shows the 'Key Split Quorum Authentication' dialog box. It contains a message: "To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File." Below the message are ten rows of input fields, each labeled 'Split User' followed by a number (1 through 10). Each row has a 'Passphrase' label and a corresponding text box. At the bottom of the dialog are 'OK' and 'Cancel' buttons.

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the Save button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

7. You must now run the QuickStart program on the KMA(s) you created so that they can join the Cluster. For procedures on joining a Cluster, refer to ["Joining an Existing Cluster"](#) on page 2-18.

## Viewing/Modifying a KMA's Details

**Note:** If you are not a Security Officer, when you view a KMA's detailed information, all fields, including the Save button are disabled.

To modify a KMA's details:

1. From the KMAs List screen, double-click a KMA entry for which you want more detailed information or highlight a KMA entry and click the **Details** button. The KMA Details dialog box is displayed.

**KMA Details**

General | Network Configuration | Key Pool Info | Passphrase

KMA ID: 2F57EC38FE33944D

KMA Name: Rosebank

Description:

Site ID:

Version: 2.4 (Build1138)

Failed Login Attempts: 0

Replication Lag Size: 0

Locked: True

Enrolled: True

Hardware Security Module Status: Inactive

Save Cancel

2. On the General tab, change the following fields:
  - Description
  - Site ID.
3. On the Network Configuration tab, change the following fields:
  - Management Network Address
  - Service Network Address.

The screenshot shows the 'KMA Details' dialog box with the 'Network Configuration' tab selected. The dialog has four tabs: 'General', 'Network Configuration', 'Key Pool Info', and 'Passphrase'. The 'Network Configuration' tab contains the following fields:

Management Network Address:	10.80.181.143
Service Network Address:	192.186.183.143
Management Network Address (IPv6):	fe80::21e:68ff:fe37:b9bf/10
Service Network Address (IPv6):	2182::21e:68ff:fe37:b9c2/64
Responding:	True
Responding on Service Network:	Not Responding
Response Time:	79 milliseconds

At the bottom right of the dialog are 'Save' and 'Cancel' buttons.

4. On the Key Pool Info tab, the following display-only fields appear:

#### **Ready Keys**

Displays the number of Keys that have been generated on this KMA and that have been backed up (for a single-node Cluster) or replicated to other KMAs (for a multi-node Cluster), but have not yet been given out to Agents for encryption.

#### **Backup-Up Ready Keys**

Displays the number of Ready Keys in the Key Pool that have been backed up. N/A means that the KMA cannot determine this value, because either the KMA runs down-level software or it is currently using a lower replication version.

#### **Generated Keys**

Displays the number of Keys that have been generated on this KMA but have not been backed up (for a single-node Cluster) or replicated to other KMAs (for a multi-node Cluster).

#### **Key Pool Ready**

Displays the percentage of Keys in the Key Pool that are ready to be used.

#### **Key Pool Backed Up**

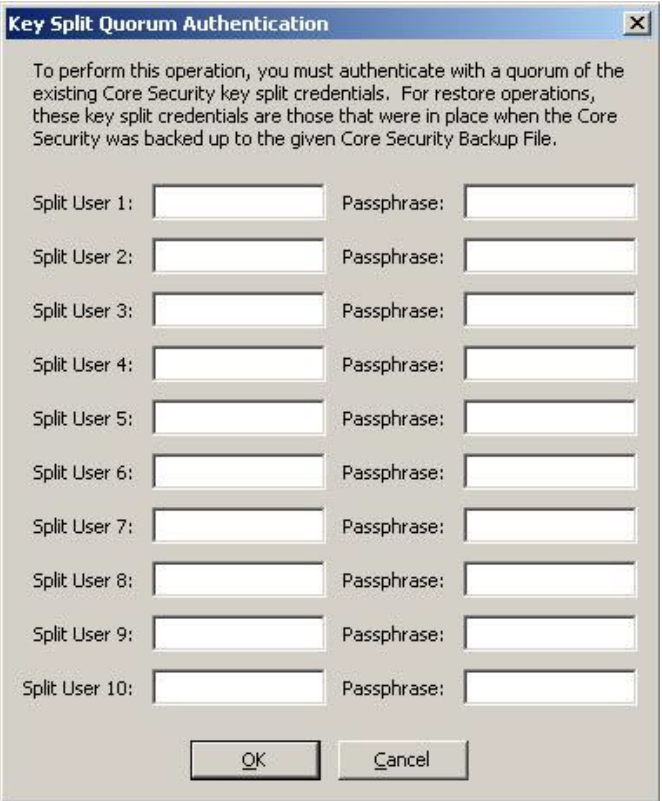


Displays the percentage of Ready Keys in the Key Pool that have been backed up. N/A means that the KMA cannot determine this value, because either the KMA runs down-level software or it is currently using a lower replication version.

The image shows a Windows-style dialog box titled "KMA Details". It has three tabs: "General", "Key Pool Info", and "Passphrase". The "Key Pool Info" tab is currently selected. Inside this tab, there are five rows of data, each with a label on the left and a text input field on the right. The values in the input fields are: "Ready Keys:" (1,000), "Backed-up Ready Keys:" (1,000), "Generated Keys:" (0), "Key Pool Ready:" (100), and "Key Pool Backed Up:" (100). The last two rows also have a "%" symbol to the right of the input field. At the bottom right of the dialog box, there are two buttons: "Save" and "Cancel".

Label	Value	Unit
Ready Keys:	1,000	
Backed-up Ready Keys:	1,000	
Generated Keys:	0	
Key Pool Ready:	100	%
Key Pool Backed Up:	100	%

5. Open the Passphrase tab and modify the following parameters:
  - Passphrase
  - Confirm Passphrase (retype the same passphrase).
6. When you are finished, click the **Save** button. The KMA record in the database is modified.
7. The Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.

A screenshot of a Windows-style dialog box titled "Key Split Quorum Authentication". The dialog has a blue title bar with a close button (X) in the top right corner. Below the title bar, there is a text area with the following text: "To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File." Below this text, there are ten rows of input fields. Each row is labeled "Split User 1:" through "Split User 10:" on the left, followed by a text input field, then the label "Passphrase:" followed by another text input field. At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

Replication Version:	Result
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

### Setting a KMA Passphrase

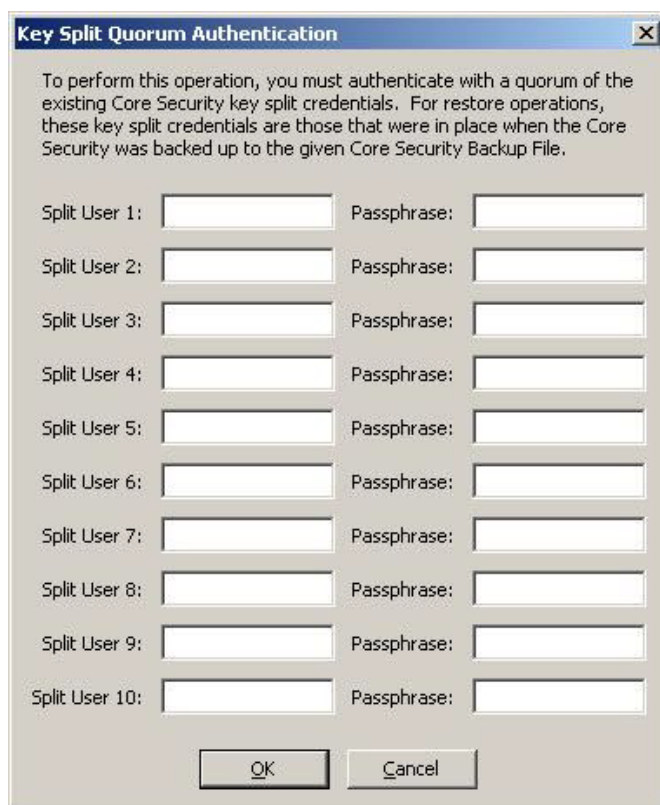
**Note:** You can change a KMA's passphrase, provided you are not connected to it.

When you are creating a new Cluster, a random passphrase is automatically assigned to the KMA that is used to create the new Cluster. If the KMA wants to retrieve an

entity's certificate from another KMA in the Cluster because its certificate has expired, then you would have to use this function to set the passphrase to a known value.

To set a KMA's passphrase:

1. From the KMA List screen, double-click the KMA entry or highlight a KMA entry and click the **Details** button. The KMA Details dialog box is displayed, with the General tab active.
2. Open the Passphrase tab and modify the following parameters:
  - Passphrase
  - Confirm Passphrase (retype the same passphrase).
3. Click the **Save** button to save the changes. The database entry for the KMA is changed.
4. The Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.



The dialog box is titled "Key Split Quorum Authentication". It contains a message: "To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File." Below the message are ten rows, each with a label "Split User 1:" through "Split User 10:" followed by a text input field, and a label "Passphrase:" followed by a text input field. At the bottom are "OK" and "Cancel" buttons.

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the Save button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.

Replication Version:	Result:
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

Using the Console, on the KMA where the passphrase has been changed, select the function to log the KMA into the Cluster. The KMA is not able to communicate with the Cluster until it is logged back in.

---

**Note:** If the KMA has been logged out of the cluster for at least a few hours, then lock the KMA before logging the KMA back into the cluster. After recent updates have been propagated to this KMA, as shown by the Replication Lag Size in the KMA List panel, unlock the KMA.

Refer to the following topics for detailed information:

---

- ["Lock/Unlock KMA"](#) on page 5-85
- ["KMA List Menu"](#) on page 5-2
- ["Logging the KMA Back into the Cluster"](#) on page 11-8.

## Deleting a KMA

**Important** – Before you delete a KMA, you should take it off-line using the Console “Shutdown KMA” function. If you fail to do this, the KMA continues to function outside of the Cluster and sends “stale information” to Agents and users.

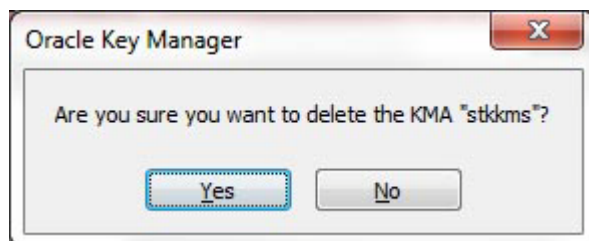
Normally, this command is only used to delete a failed KMA from the Cluster. However, it may also be used to remove a KMA that is being decommissioned.

If you want a deleted KMA to rejoin a Cluster, you must reset the KMA to the factory default and select option 2 from the QuickStart program.

This option gives the Security Officer the ability to delete a KMA that is no longer in service.

To delete a KMA:

1. From the KMAs List screen, highlight the KMA you want to delete and click the **Delete** button. The following dialog box is displayed, prompting you to confirm that you want to delete the selected KMA.



2. Click the **Yes** button to delete the KMA. The currently selected KMA is deleted and you are returned to the KMAs List screen. The system also removes any entries that are associated with the KMA and not used by any other entity.

## KMA Performance List Menu

The KMA Performance List menu allows users with any role to query KMA performance information about KMAs in this OKM cluster.

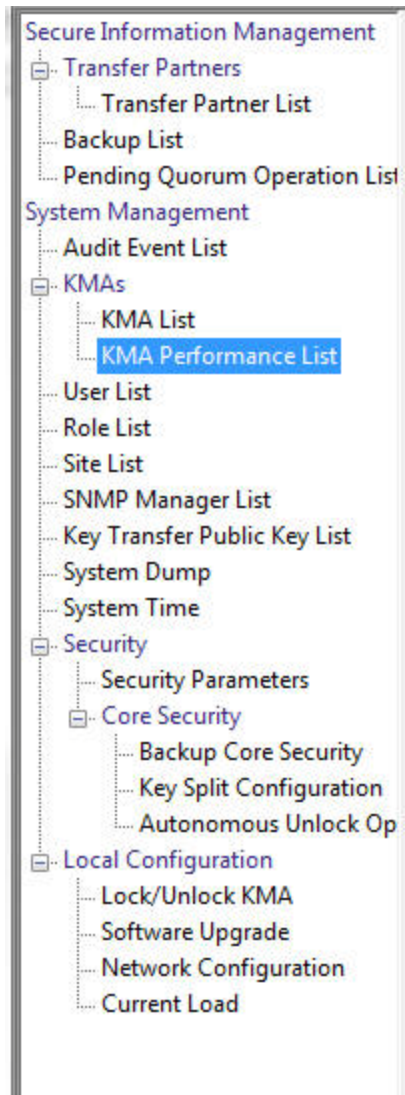
This panel displays performance information about the key requests, replication requests, user requests, and Server Busy conditions that have been issued by each KMA. This information includes rate or count values and processing times.

Rate values represent the rate at which this KMA processed these requests within the selected time period. They are expressed as the average rate of these requests extrapolated over the selected rate display interval unit of time (for example, extrapolated average number of key requests per day). If you set the rate display interval to "entire time period," then the panel instead displays the count of requests this KMA processed within the selected time period.

Processing times represent the average time in milliseconds this KMA has taken to process the requests issued within the selected time period. These processing times are from the perspective of the KMA and describe the amount of time required to process requests internally. They do not include transmission times over the network or the amount of time required to establish an SSL connection.

This panel displays information about Server Busy conditions that the local KMA encountered within the selected time period. This condition indicates that other OKM threads are currently accessing OKM information in a local database and can occur during long-running OKM operations (such as OKM backups).

The OKM cluster must use replication version 15 or later before request processing times are available.



## Querying a KMA

1. From the System Management menu, select KMA Performance. The following panel is displayed.

KMA Performance List

Time period of requests:  Start Date to  End Date

Rate display interval: day  
 second  
 minute  
 hour  
 day  
 week  
 month  
 year  
 entire time period

Filter: KMA Name equals  +

Use Refresh Reset | < << >> >

Results in page: 1 (last page)

KMA Name	Key Request Count	Key Request Processing Time	Replication Request Count	Replication Request Processing Time
Balblair	263	2	0	0

Details...

Requests processed between 10/22/2013 9:38:24 AM and 10/23/2013 7:57:16 AM

- Click the Details button (or double-click on a KMA) to display more information about that KMA. A KMA Performance Details dialog appears.

KMA Performance Details

Requests processed between 10/22/2013 9:38:24 AM and 10/23/2013 8:08:48 AM

KMA Name: Balblair

Key Request Rate: 280.5 per day

Key Request Processing Time: 2 milliseconds

Replication Request Rate: 0 per day

Replication Request Processing Time: 0 milliseconds

User Request Rate: 3100 per day

User Request Processing Time: 0 milliseconds

Server Busy Condition Rate: 0 per day

Server Busy Condition Processing Time: 0 milliseconds

Site ID:

KMA ID: E851ED1A2E504832

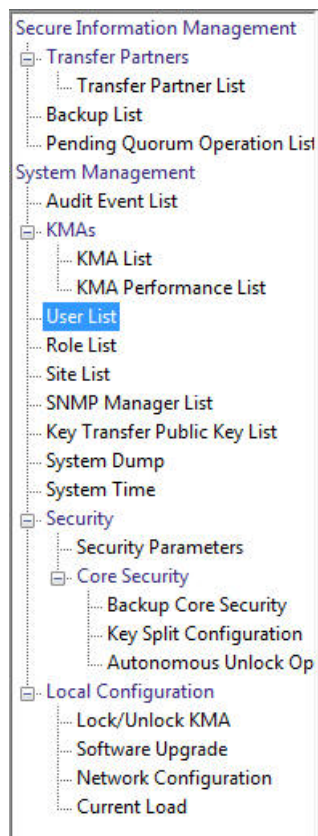
Close

## User List Menu

The User List menu option allows you to:

- View users

- Create a user
- Modify existing user information
- Delete an existing user.



## Viewing Users

To view users:

From the System Management menu, select **User List**. The User List screen is displayed.



User List

Filter:

Results in page: 8 (last page)

User ID	Description	Roles	Enabled	Failed Login Attempts
AUD	Test User	Auditor	True	0
All	Test User	Backup Operator, Compliance Officer, Operator, Security...	True	0
BO	test User	Backup Operator	True	0
CO	Test User	Compliance Officer	True	0
OP	Test User	Operator	True	0
SO		Backup Operator, Compliance Officer, Operator, Security...	True	0
nancy		Auditor	True	0
wally	night shift janitor	Security Officer	True	0

You can also scroll through the database and filter the User list by any of the following keys:

- User ID
- Description
- Roles
- Enabled
- Failed Login Attempts.

The **Use** button applies the filter to the displayed list for the user.

The fields and their descriptions are given below:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- User ID
- Description
- Enabled
- Failed Login Attempts

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>

- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~
- Empty
- Not Empty

**Filter Value 1 box:**

Type a value in this field.

**Use:**

Click this button to apply the filter to the displayed list.

**Refresh:**

Click this button to refresh the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.



**Results in Page:**

Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**User ID**

Displays a unique identifier, commonly referred to as “User Name” that distinguishes each user in a Cluster.

**Description**

Describes the user.

**Roles**

Displays the list of security roles for a user. The roles allow the user to perform various operations.

**Enabled**

Indicates the status of the user. Possible values are True or False.

**Failed Login Attempts**

Indicates the number of failed login attempts.

If you want to create a user, click the Create button. For more information, refer to ["Creating a User"](#) on page 5-23.

If you want to modify a user's details, highlight the user and click the Details button. For more information, refer to ["Viewing/Modifying a User's Details"](#) on page 5-26.

If you want to delete a user, click the Delete button. For more information, refer to ["Deleting Users"](#) on page 5-29.

A Security Officer can set a user's passphrase if the user's passphrase and/or certificate has been compromised. For procedures on setting a user's passphrase, refer to ["Setting a User's Passphrase"](#) on page 5-28.

Users can also change their own passphrase. For procedures, refer to ["Changing the Passphrase"](#) on page 4-4.

## Creating a User

To create a user:

1. From the User List screen, click the **Create** button. The Create User dialog box is displayed, with the General tab open.

The screenshot shows a 'Create User' dialog box with a title bar containing a close button. It has two tabs: 'General' and 'Passphrase'. The 'General' tab is selected and contains the following elements:

- User ID:** A text input field.
- Description:** A text input field.
- Roles:** A list of roles, each with an unchecked checkbox:
  - Auditor
  - Backup Operator
  - Compliance Officer
  - Operator
  - Security Officer
  - Quorum Member
- Buttons:** 'Save' and 'Cancel' buttons at the bottom right.

2. Complete the following parameters:

On the General tab:

### User ID

Type a value that uniquely identifies the user. This value can be between 1 and 64 (inclusive) characters.

### Description

Type a value that describes the user. This value can be between 1 and 64 (inclusive) characters.

### Roles

Select the check boxes beside the roles you want the user to perform.

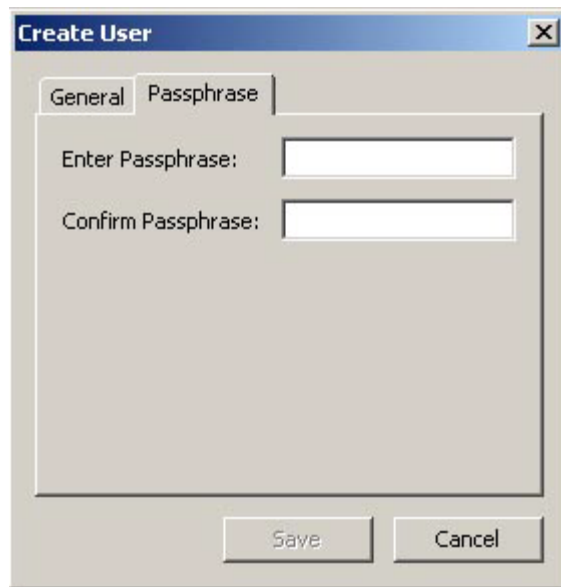
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**Note:** The Quorum Member check box is disabled (grayed out) if the KMA currently runs KMS software version 2.1 or earlier or if the replication version of the OKM Cluster is currently set to 10 or lower.

---

On the Passphrase tab:

3. Open the Passphrase tab.



4. Complete the following parameters:

#### Passphrase

Type the passphrase for this user. The minimum value is 8 characters; the maximum value is 64 characters. The default value is 8.

Passphrase requirements:

- A passphrase must not contain the user's User ID.
- A passphrase must contain three of the four character classes: uppercase, lowercase, numeric, or special characters.
- The following special characters are allowed:  
 ~ ! @ # \$ % ^ & \* ( ) - \_ = + [ ] { } \ | ; : ' " < > , . / ?
- Control characters, including tabs and linefeeds, are not allowed.

---

**Note:** To modify the minimum length requirement for passphrases, see ["Modifying the Security Parameters"](#) on page 5-77.

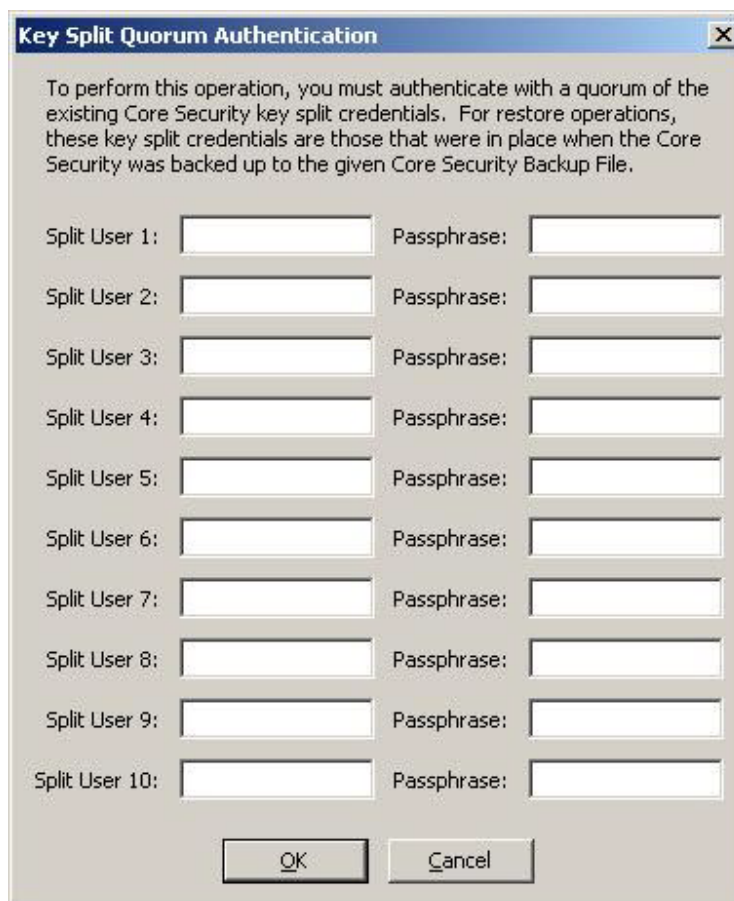
---

#### Confirm Passphrase

Type the same value that you entered in the Enter Passphrase field.

5. Click the **Save** button. The user record is added to the database. The new user is displayed in the User List.

6. The Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.



The dialog box is titled "Key Split Quorum Authentication" and contains the following text: "To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File."

Below the text, there are ten rows of input fields, each labeled "Split User 1:" through "Split User 10:". Each row has a text box for the user name and a text box for the passphrase, both preceded by a label "Passphrase:". At the bottom of the dialog box are two buttons: "OK" and "Cancel".

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the Save button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

## Viewing/Modifying a User's Details


---

**Note:** The currently logged-in Security Officers cannot modify their records.

---

To modify user information:

1. From the Users List screen, double-click a user for which you want more information or highlight a user record and click the **Details** button. The User Details dialog box is displayed, where all fields, including the **Save** button, are disabled.



The image shows a 'User Details' dialog box with two tabs: 'General' and 'Passphrase'. The 'General' tab is active. It contains the following fields and controls:

- User ID:** A text field containing the value 'nancy'.
- Description:** An empty text field.
- Roles:** A list of roles with checkboxes:
  - ☐ Auditor
  - ☐ Backup Operator
  - ☐ Compliance Officer
  - ☐ Operator
  - ☐ Security Officer
  - ☐ Quorum Member
- Flags:** A checkbox labeled 'Enabled' which is checked (☒).
- Failed Login Attempts:** A text field containing the value '0'.

At the bottom of the dialog box are two buttons: 'Save' and 'Cancel'.

2. On the General tab, modify the following parameters:

- Description
- Roles
- Flags - Enabled.

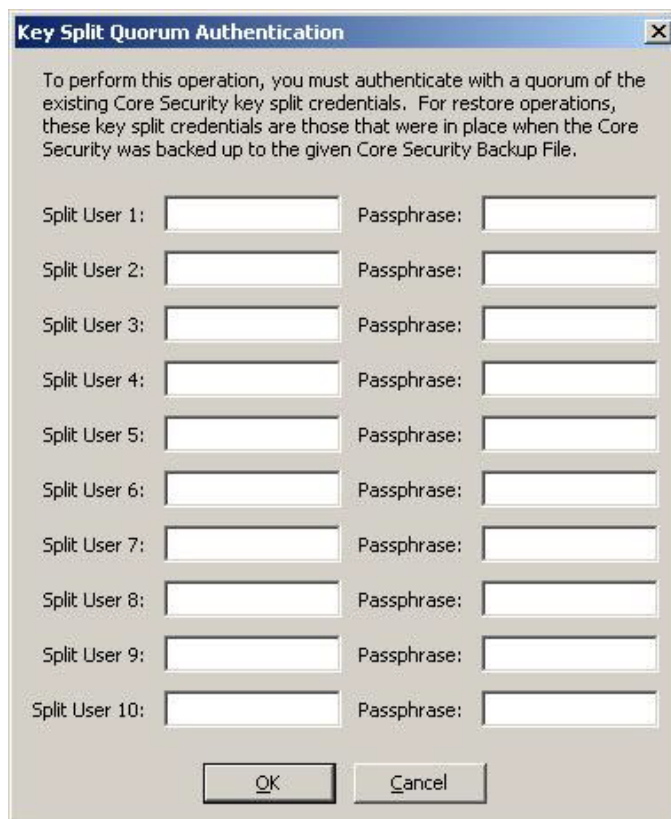
The Failed Login Attempts field displays the number of times that a login attempt has failed.

3. On the Passphrase tab, if you want to set the user's passphrase, see "[Setting a User's Passphrase](#)" on page 5-28.
4. When you are finished, click the **Save** button.
5. If user roles have been added, the Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.

---

**Note:** If user roles have not been added, user information is updated in the OKM Cluster after you click the **Save** button, and the Key Split Quorum Authentication dialog box is not displayed.

---



The dialog box is titled "Key Split Quorum Authentication" and contains the following text: "To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File."

Below the text are ten rows of input fields, each labeled "Split User X:" followed by a text box and "Passphrase:" followed by a password box. The rows are numbered 1 through 10.

At the bottom of the dialog box are two buttons: "OK" and "Cancel".

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the Save button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

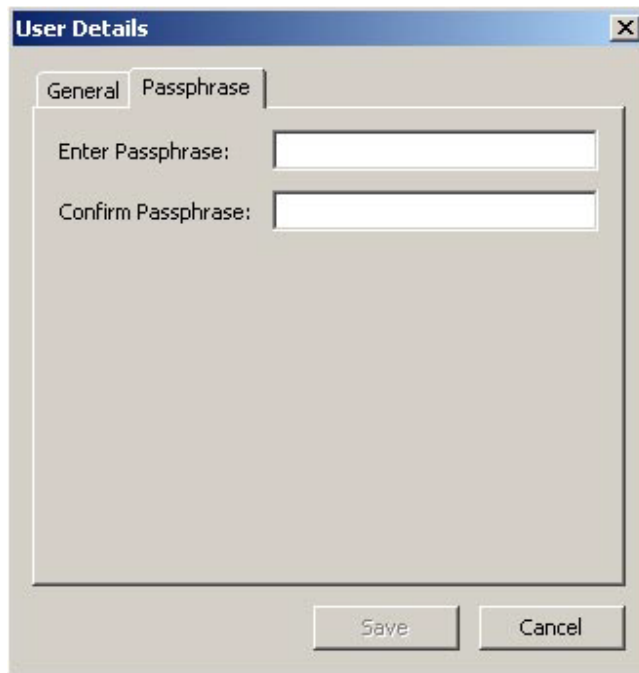
Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

## Setting a User's Passphrase

As the Security Officer, you can set a user's passphrase if you believe that the user's passphrase and/or certificate has been compromised. A new certificate is generated when the user uses the new passphrase to logon to the KMA.

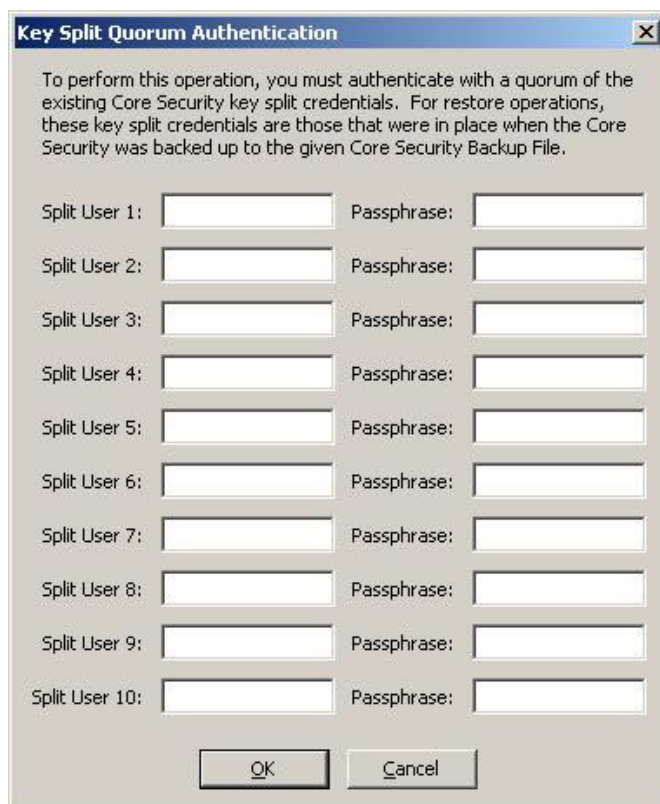
To set a user's passphrase:

1. From the User List screen, double-click the user whose passphrase you want to select or highlight the user and click the **Details** button.
2. The User Details dialog box is displayed. Open the Passphrase tab.

The image shows a 'User Details' dialog box with a blue title bar and a close button. It has two tabs: 'General' and 'Passphrase'. The 'Passphrase' tab is selected. Inside the dialog, there are two text input fields. The first is labeled 'Enter Passphrase:' and the second is labeled 'Confirm Passphrase:'. At the bottom of the dialog, there are two buttons: 'Save' and 'Cancel'.

3. In the **Enter Passphrase** field, type the passphrase that was assigned by the Security Officer when the user account was created.
4. In the **Confirm Passphrase** field, type the same value you entered in the previous step. The new passphrase for the user record is saved.
5. The Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.





**Key Split Quorum Authentication**

To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File.

Split User 1:  Passphrase:

Split User 2:  Passphrase:

Split User 3:  Passphrase:

Split User 4:  Passphrase:

Split User 5:  Passphrase:

Split User 6:  Passphrase:

Split User 7:  Passphrase:

Split User 8:  Passphrase:

Split User 9:  Passphrase:

Split User 10:  Passphrase:

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

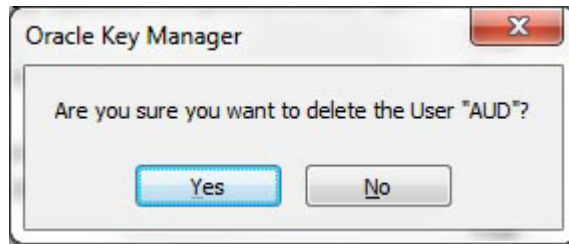
Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

## Deleting Users

Users cannot delete themselves.

To delete a user:

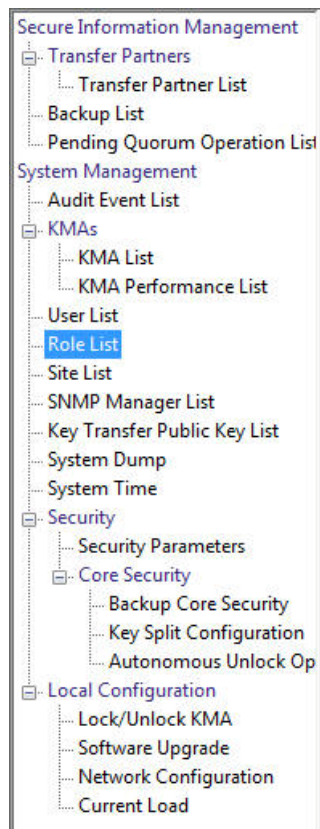
1. From the Users List screen, select the user you want to delete and click the **Delete** button. The following dialog box is displayed, prompting you to confirm that you want to delete the selected user.



2. Click the **Yes** button to delete the user. The currently selected user is deleted and you are returned to the User List screen, where the deleted user is no longer in the User List.

## Role List Menu

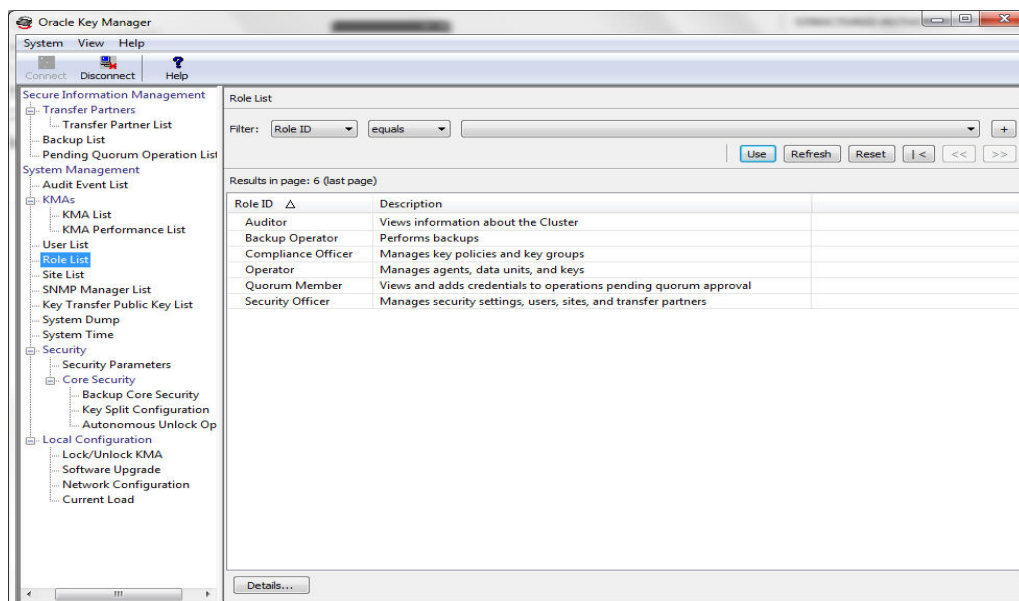
The Role List menu option allows gives you the ability to view user roles. Roles are fixed logical groupings of various system operations that a user can perform. A user can have more than one role.



## Viewing Roles

To view roles:

From the System Management menu, select **Role List**. The Role List screen is displayed.



You can also scroll through the database and filter the Roles list by either of the following keys:

- Role ID
- Description.

The Use button applies the filter to the displayed list.

The fields and their descriptions are given below:

#### Filter:

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- Role ID
- Description

#### Filter Operator box:

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>
- Empty
- Not Empty

#### Filter Value 1 box:

Type a value in this field.

#### Refresh:

Click this button to refresh the list.

#### Reset:

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.

**Results in Page:**

Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**Role ID**

Displays the unique identifier that distinguishes each security role.

**Description**

Describes the role.

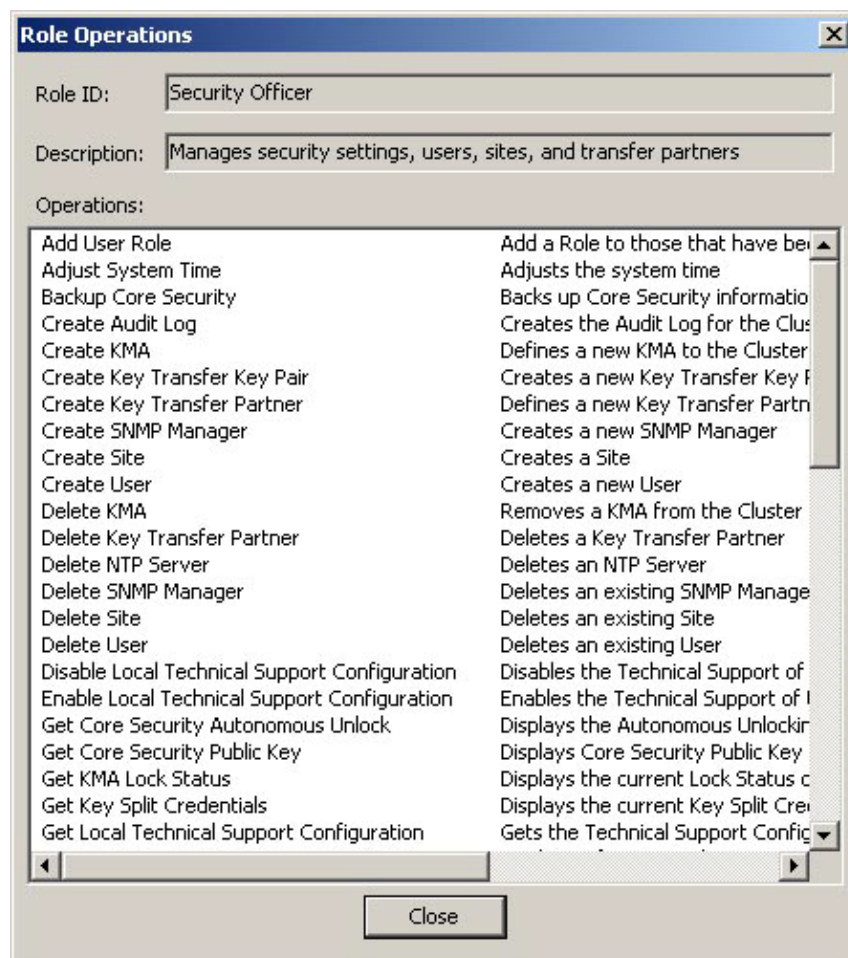
If you want more detailed information on a role, highlight a role entry and click the **Details** button. For more information, refer to ["Viewing Operations for a Role"](#) on page 5-32.

## Viewing Operations for a Role

The Role Operations dialog box allows the you to view a role and its permitted operations.

To view the operations for a specific role:

1. From the Role List screen, highlight a role and click the **Details** button. The Role Operations dialog box is displayed, indicating the operations for the selected role.



2. Click the **Close** button to close this dialog box. You are returned to the Role List screen.

## Site List Menu

A Site is a physical location with at least one KMA, to which several Agents (Hosts and OKM Cluster) connect. Sites allows Agents to respond to KMA failures or load balancing more effectively by connecting to another KMA in the local Site rather than a remote one

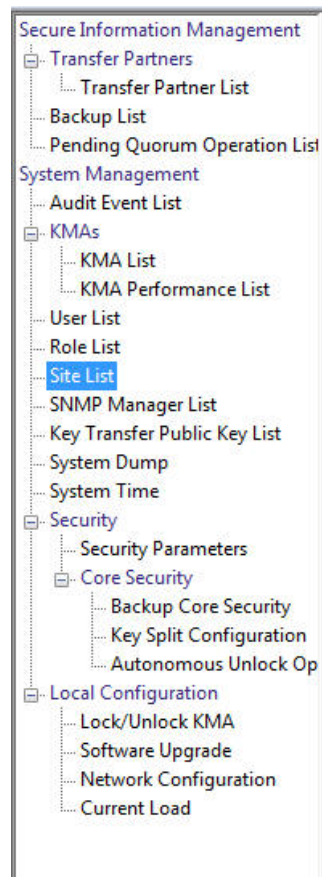
The Site List menu option gives you the ability to:

- View sites
- Create a site
- Modify an site's information
- Delete a site.

---

**Note:** An Operator can view sites only. A Security Officer can manage the sites.

---



## Viewing Sites

To view sites:

From the System Management menu, select **Site List**. The Site List screen is displayed.

Site List

Filter: Site ID =  +

Use Refresh Reset | < << >> >

Results in page: 4 (last page)

Site ID	Description
LaBarge	This is a site in Wyoming
Louisville	another site
Sitenumba1	This is a site
Toronto	Yada is a site

Details... Create... Delete

You can also scroll through the database and filter the Sites list by any of the following keys:

- Site ID
- Description.

The **Use** button applies the filter to the displayed list for the Site.

The fields and their descriptions are given below:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- Site ID
- Description

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~

**Filter Value 1 box:**

Type a value in this field.

**Use:**

Click this button to apply the filter to the displayed list.

**Refresh:**

Click this button to refresh the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.



**Results in Page:**

Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**Site ID**

Uniquely identifies the site.

**Description**

Describes the site.

Click the Create button to create a Site. For more information, refer to ["Creating a Site"](#) on page 5-36.

If you want to view / modify a Site's detailed information, highlight the Site and click the Details button. For more information, refer to ["Viewing/Modifying a Site's Details"](#) on page 5-38.

Click the Delete button to delete a selected Site. For more information, refer to ["Deleting a Site"](#) on page 5-38.

## Creating a Site

To create a site:

1. From the Site List screen, click the **Create** button. The Create Site dialog box is displayed.



A screenshot of a 'Create Site' dialog box. It has a title bar with 'Create Site' and a close button. Inside, there are two text input fields: 'Site ID:' and 'Description:'. Below the fields are two buttons: 'Save' and 'Cancel'.

2. Complete the following parameters:

**Site ID**

Type a value that uniquely identifies the site. This value can be between 1 and 64 (inclusive) characters.

**Description**

Type a value that uniquely describes the site. This value can be between 1 and 64 (inclusive) characters.

An example of a completed dialog box is shown below.

A screenshot of the 'Create Site' dialog box, now titled 'Create Site \*'. The 'Site ID' field contains the text 'Denver' and the 'Description' field contains the text 'Colorado Site'. The 'Save' and 'Cancel' buttons are still present at the bottom.

3. Click the **Save** button. The new Site is saved and stored in the database and is displayed in the Site List.

Site ID	Description
Denver	Colorado Site
LaBarge	This is a site in Wyoming
Louisville	another site
Sitenumba1	This is a site
Toronto	Yada is a site

## Viewing/Modifying a Site's Details

---

**Note:** If you are not a Security Officer, when you view a site's detailed information, all fields, including the Save button are disabled.

---

To modify a Site's details:

1. From the Site List screen, click the **Details** button. The Site Details dialog box is displayed.

2. Change the Description field and click the **Save** button. The Site details are modified and stored in the database.

## Deleting a Site

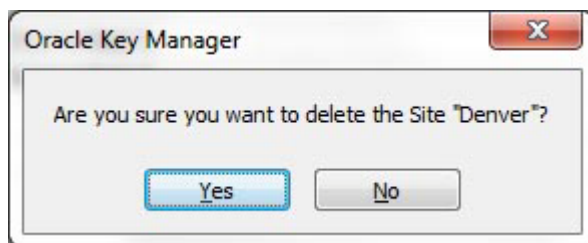
---

**Note:** If the site is in use, that is, agents or KMAs are specified to be at the site, they must first be deleted or changed to a different site before you can delete it.

---

To delete a site:

1. From the Site List screen, highlight the Site you want to delete and click the **Delete** button. The following dialog box is displayed, prompting you to confirm your actions



2. Click the **Yes** button to delete the Site. The currently selected Site is deleted and you are returned to the Site List screen.

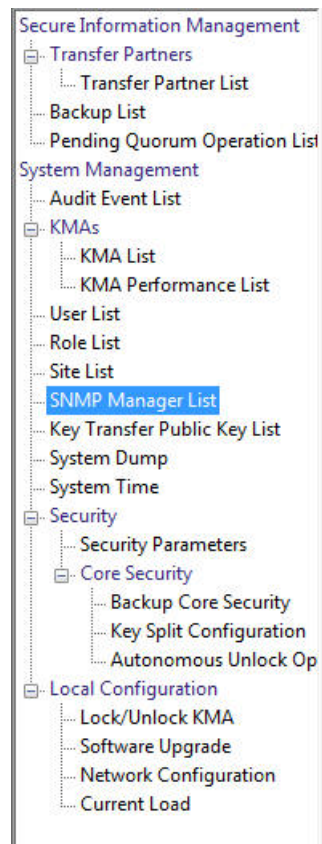
## SNMP Manager List Menu

The following menus discuss viewing, creating, and modifying SNMP Managers.

Additionally, SNMP information is generated for users who have configured an SNMP Agent in their network and defined SNMP Managers in the OKM Manager GUI. When at least one SNMP Manager is defined in the OKM Manager GUI, the KMAs sends SNMP Informs to the IP address of that SNMP Manager(s).

You can provide an IPv6 address when creating or modifying an SNMP Manager.

Refer to [Appendix A, "SNMP Management Information Base \(MIB\) Data"](#) for more details about the information that KMAs send in their SNMP Inform packets.



## Viewing a KMA's SNMP Managers

To view the SNMP Managers:

From the System Management menu, select **SNMP Manager List**. The SNMP Manager List screen is displayed.

The screenshot shows the 'SNMP Manager List' screen. It includes a filter section at the top with a dropdown for 'SNMP Manager ID', an equals sign, another dropdown, and a text input field. Below the filter are buttons for 'Use', 'Refresh', 'Reset', and navigation arrows. The main area displays a table with the following columns: 'SNMP Manager ID', 'Description', 'Network Address', 'Enabled', 'User Name', and 'Protocol Version'. The table is currently empty. At the bottom are buttons for 'Details...', 'Create...', and 'Delete'.

SNMP Manager ID	Description	Network Address	Enabled	User Name	Protocol Version
-----------------	-------------	-----------------	---------	-----------	------------------

You can also scroll through the database and filter the SNMP Manager List by any of the following keys:

- SNMP Manager ID
- Description
- Network Address
- Enabled
- User Name.

The **Use** button applies the filter to the displayed list for the SNMP Manager.

The fields and their descriptions are given below:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- SNMP Manager ID
- Description
- Network Address
- Enabled
- User Name.

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~
- Empty
- Not empty

**Filter Value 1 box:**

Type a value in this field.

**Use:**

Click this button to apply the filter to the displayed list.

**Refresh:**

Click this button to refresh the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.

**Results in Page:**

Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**SNMP Manager ID**

Displays the user-defined unique identifier for the SNMP Manager.

**Description**

Displays a description for the SNMP Manager. This field is optional.

**Network Address**

Displays the network address that is used when sending an SNMP trap.

**Enabled**

Indicates whether this SNMP Manager is enabled or not.

**User Name**

Displays the user name that was used to establish a secure, trusted SNMPv3 connection to this SNMP Manager.

**Protocol Version**

Indicates the SNMP protocol version, either SNMPv3 (Version 3) or SNMPv2 (Version 2).

SNMP protocol Version 3 (SNMPv3) supports authentication, using user names and passphrases. SNMP protocol Version 2 (SNMPv2) does not support authentication and does not use user names and passphrases. You can configure an SNMP Manager to use either SNMPv3 or SNMPv2. KMAs do not send SNMP informs to SNMP Managers configured to use SNMPv2 if the replication version of the OKM Cluster is currently set to 10 or lower.

Click the **Create** button to create a new SNMP Manager. For more information, refer to ["Creating a New SNMP Manager"](#) on page 5-42below.

If you want to view/modify a SNMP Manager detailed information, highlight the entry and click the **Details** button. For more information, refer to ["Viewing/Modifying an SNMP Manager's Details"](#) on page 5-44.

Click the **Delete** button to delete the selected SNMP Manager. For more information, refer to ["Deleting an SNMP Manager"](#) on page 5-45.

## Creating a New SNMP Manager

If your SNMP agent is configured to use SNMP protocol Version 3, ensure that you have created an SNMP protocol Version 3 user before you create an SNMP manager in your OKM Cluster. This SNMP user should use SHA (not MD5) as the authentication

protocol and DES as the privacy protocol. Refer to your SNMP Agent documentation for more information about creating SNMP Version 3 users.

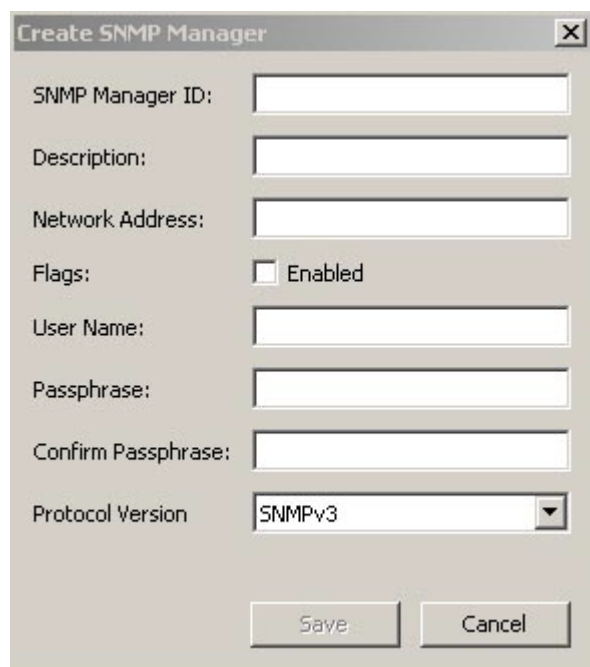
Also, if the SNMP user has a passphrase, then the KMA uses this passphrase for both the Authentication Passphrase and the Encryption Passphrase for that SNMP user. Thus, these passphrases must have the same value for this SNMP user in the SNMP Agent. If the SNMP user does not have a passphrase, then the KMA uses a security level of “noAuthNoPriv” when it sends SNMP informs to the SNMP Agent.

If your SNMP agent is configured to use SNMP protocol Version 2, then you do not need to configure an authentication protocol or create an SNMP user. Currently, OKM supports only the “public” community for Version 2.

Consult your SNMP Agent documentation for more information about creating SNMP Users. For example, refer to the *Solaris System Management Agent Administration Guide* (<http://docs.oracle.com/cd/E19253-01/817-3000/index.html>) for more information about configuring the System Management Agent on a Solaris system. Also, refer to <http://www.net-snmp.org/FAQ.html> for more general information about Net-SNMP.

1. From the SNMP Managers List screen, click the **Create** button.

The Create SNMP Manager dialog box is displayed.

A screenshot of the 'Create SNMP Manager' dialog box. It has a title bar with a close button (X). The dialog contains several input fields: 'SNMP Manager ID:', 'Description:', 'Network Address:', 'User Name:', 'Passphrase:', 'Confirm Passphrase:', and 'Protocol Version'. The 'Flags:' section has a checkbox labeled 'Enabled' which is currently unchecked. At the bottom, there are 'Save' and 'Cancel' buttons. The 'Protocol Version' dropdown menu is set to 'SNMPv3'.

2. Complete the following parameters:

**SNMP Manager ID**

Type a value that uniquely identifies the SNMP Manager. This value can be between 1 and 64 (inclusive) characters.

**Description**

Type a value that describes the SNMP Manager. This value can be between 1 and 64 (inclusive) characters.

**Network Address**

Type the SNMP Manager's network address.

**Flags - Enabled**

Select this check box to indicate whether SNMP is enabled or not.

**User Name**

Type the user name that is used to authenticate the SNMP Manager.

**Passphrase**

Type the passphrase that is used to authenticate the SNMP Manager.

**Confirm Passphrase**

Type the same passphrase that was entered in the Passphrase field.

**Protocol Version**

Select the SNMP protocol version that this SNMP Manager should use. A value of SNMPV3 means that it is using SNMP protocol Version 3. A value of SNMPV2 means that it is using SNMP protocol Version 2.

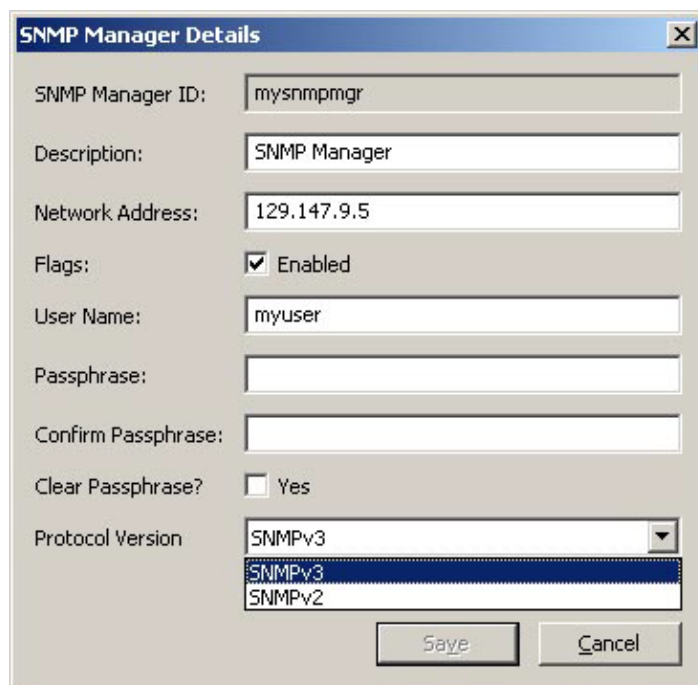
SNMP protocol Version 3 (SNMPv3) supports authentication, using user names and passphrases. SNMP protocol Version 2 (SNMPv2) does not support authentication and does not use user names and passphrases. You can configure an SNMP Manager to use either SNMPv3 or SNMPv2. KMAs do not send SNMP informs to SNMP Managers configured to use SNMPv2 if the replication version of the OKM Cluster is currently set to 10 or lower.

3. When you are finished, click the **Save** button to save the information. The new SNMP Manager entry and its associated profile is stored in the database.

## Viewing/Modifying an SNMP Manager's Details

To view / modify an SNMP Manager's details:

1. From the SNMP Managers List screen, double-click an SNMP Manager entry for which you want more information and click the **Details** button. The SNMP Manager Details dialog box is displayed.



The image shows a dialog box titled "SNMP Manager Details". It contains several fields for configuration:

- SNMP Manager ID: mysnmpmgr
- Description: SNMP Manager
- Network Address: 129.147.9.5
- Flags: ☒ Enabled
- User Name: myuser
- Passphrase: (empty field)
- Confirm Passphrase: (empty field)
- Clear Passphrase?: ☐ Yes
- Protocol Version: A dropdown menu showing "SNMPv3" selected, with "SNMPv3" and "SNMPv2" as options.

At the bottom right, there are "Save" and "Cancel" buttons.



2. Change the parameters, as required.
3. When you are finished, click the **Save** button to save the changes.

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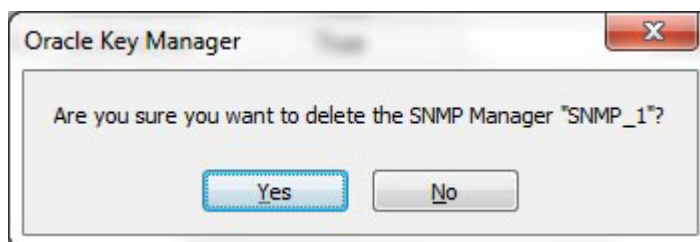
**Note:** Every time you modify a SNMP Manager's details, you have to re-specify the passphrase.

---

## Deleting an SNMP Manager

To delete an SNMP Manager:

1. From the SNMP Managers List screen, highlight the SNMP Manager you want to delete and click the **Delete** button. The SNMP Manager Confirm Delete dialog box is displayed.



2. Click the **Yes** button to delete the SNMP Manager. The currently selected SNMP Manager is deleted and you are returned to the SNMP Managers List screen.

## Key Transfer

Key Transfer, also called Key Sharing, allows keys and associated data units to be securely exchanged between Partners and is required to exchange encrypted media. This process requires each party in the transfer establish a public/private key pair and then provide the public key to the other party.

Each party enters the other party's public key into their own OKM Cluster. Once this initial configuration is complete, the sending party uses Export Keys to generate a transfer file, which is sent from the sending party to the receiving party. The receiving party then uses Import Keys to import the keys and their associated data units into their OKM Cluster.

The transfer file is signed using the sending party's private key and encrypted using the receiving party's public key. This allows only the receiving party to decrypt the transfer file using their own private key. The receiving party can verify the file was in fact produced by the expected sender by using the sender's public key.

## Key Transfer Partners Feature

The Key Transfer Partners feature allows keys to be moved from one OKM Cluster to another. Typically, this feature can be used to exchange tapes between companies or within a company if multiple Clusters are configured to deal with large numbers of sites.

The Key Transfer process involves these steps:

- Each OKM Cluster configures the other Cluster as a Transfer Partner. This is usually done once.

- The user exports keys from one OKM Cluster and imports them into the other. This step can be done many times.

## Key Transfer Process

Within the OKM, you must perform a number of tasks in a specific order. Since these tasks involve more than one user role, the actual procedures reside in different chapters in this document.

## Configuring Key Transfer Partners

To move keys, you must configure a key transfer partner for both OKM Clusters participating in key movement.

**In the following procedure, “C1” refers to the first OKM Cluster, “C2” to the second.**

**Administrator (Security Officer role):**

**C1 Administrator (Security Officer Role):**

1. Acquire the Public Key information for C1 (your Cluster). To do this, go to the Key Transfer Public Key List Menu. See ["Viewing the Key Transfer Public Key List"](#) on page 5-60 and ["Viewing the Key Transfer Public Key Details"](#) on page 5-63.
2. Cut and paste the Public Key ID and Public Key into an e-mail or other agreed-upon form of communication. Send this information to the C2 administrator.

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**Note:** The exact communication method should be sufficiently secure that when C2 receives the information, it can be confident it actually came from C1. There is a mechanism, the fingerprint, to prevent modification of this information in transit.

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**C2 Administrator (Security Officer role):**

1. C2 Administrator: Enter the Public Key information from C1 into the OKM Cluster by accessing the Transfer Partner List menu. See ["Key Transfer Public Key List Menu"](#).
2. Click the **Create...** button. Fill in a name for the Transfer Partner, a description, and contact information. Determine what you want to do with this Partner. See ["Creating a Transfer Partner"](#) on page 5-52.
3. Select the Public Keys tab. Fill in the Public Key ID and Public Key from the information supplied by C1.

As the Public Key is entered, the system computes the fingerprint. The C1 and C2 administrators should be communicating with each other using a different mechanism than was used for the transfer of the key itself.

Both administrators should look at their OKM and verify the fingerprint matches. A mismatch indicates the key has been damaged or modified during the transfer.

4. If the fingerprint is correct, click **Save**. The system prompts for a quorum. This is because the key export operations that are enabled by this step could be used to extract valid keys from a OKM Cluster. C1 is now configured as a Transfer Partner in the C2 OKM Cluster.

**C2 Administrator (Security Officer role):**

1. Repeat Step 1 and Step 2, this time for the C2 OKM Cluster.

**C1 Administrator (Security Officer role):**

1. Repeat Step 1 through Step 4 to add C2's Public Key to C1.

**C1 Administrator (Compliance Officer Role):**

1. C1 must configure Key Groups that can be sent to C2. See ["Viewing Key Group Assignments"](#) on page 6-24.

**C2 Administrator (Compliance Officer Role):**

1. C2 must configure Key Groups that can receive keys from C1. See ["Viewing Key Group Assignments"](#) on page 6-24.
2. Select the desired Transfer Partner.
3. Select one or more disallowed Key Groups, and click the Move to back-arrow button to add them to the Key Group list. See ["Adding a Key Group to a Transfer Partner"](#) on page 6-24.

## Exporting/Importing Keys

Before you export keys, keys must meet all of the following criteria. Keys that do not are not exported when an Operator issues an Export Keys request.

- Keys must belong to a Key Group associated with a Key Policy that has its Allow Export From flag set to "True." See ["Viewing/Modifying Data Unit Details"](#) on page 7-20 and ["Viewing Key Groups"](#) on page 6-9.

To set the flag, refer to ["Viewing/Modifying a Key Policy"](#) on page 6-7.

- The destination key transfer partner must have its Enabled and Allow Export To flags set to "True." See ["Viewing/Modifying Transfer Partner Details"](#) on page 5-56.

To set the flag, refer to ["Viewing/Modifying a Key Policy"](#) on page 6-7.

- The destination key transfer partner must be associated with the Key Group of the selected key. See ["Adding a Key Group to a Transfer Partner"](#) on page 6-24.
- Keys must be in Protect and Process, Process Only, Deactivated, or Compromised state. See ["Viewing/Modifying Data Unit Details"](#) on page 7-20.

In addition, the Export Format setting of the destination transfer partner (see ["Transfer Partner List"](#) on page 5-49) must match:

- The software version (see ["Uploading and Applying Software Upgrades"](#) on page 7-29) on the KMA where the keys are to be imported and
- The FIPS Mode Only security parameter values (see ["Retrieving the Security Parameters"](#) on page 5-74) on the OKM Clusters where the keys are to be exported and imported.

[Table 5-1](#) summarizes the relationship between these settings.

**Table 5-1 Export Format Settings**

Software Version - Importing KMA	FIPS Mode Only - Exporting OKM Cluster	FIPS Mode Only - Importing OKM Cluster	Export Format
2.0.2 or lower	Off	N/A	v2.0 or Default
2.0.2 or lower	On	N/A	v2.0
2.1 or higher	Off	Off	v2.0 or Default

**Table 5–1 (Cont.) Export Format Settings**

Software Version - Importing KMA	FIPS Mode Only - Exporting OKM Cluster	FIPS Mode Only - Importing OKM Cluster	Export Format
2.1 or higher	On	Off	v2.0
2.1 or higher	Off	On	v2.1 (FIPS)
2.1 or higher	On	On	v2.1 (FIPS) or Default

The following procedure is used to export keys from one OKM Cluster and import them into another. This can be done many times.

**In this procedure, “C1” refers to the first OKM Cluster, “C2” to the second. These instructions are written to allow C2 to export keys that are then imported into C1.**

**C2 Administrator (Operator Role):**

1. To exchange keys, go to the Data Unit List screen. See ["Viewing Data Units"](#) on page 7-16.
2. Select one or more Data Units (tapes) to be sent from C2 to C1. The External Tag is the barcode on the tapes.

Keys associated with the selected Data Units must belong to Key Groups associated with Key Policies that have their `Allow Export From` flag set to “True.” These keys must also be activated (their Activation Date is not empty) and not destroyed (their Destroyed Date is empty). See ["Viewing/Modifying Data Unit Details"](#) on page 7-20.

3. Click the **Export Keys** button to display the dialog box.
4. Select the destination Transfer Partner, select the Export Keys file name if necessary, and click **Start**. The Transfer File is created.

Only the Keys belonging to the Key Groups that are allowed to be exported to C1 are exported.

The selected destination Transfer Partner must be assigned to the Key Group to which these keys belong. See ["Transfer Partner Assignment to Key Groups Menu"](#) on page 6-26.

5. Send the Transfer File to the C1 administrator by email or another agreed-upon form of communication or mechanism to move files.

**C1 Administrator (Operator Role):**

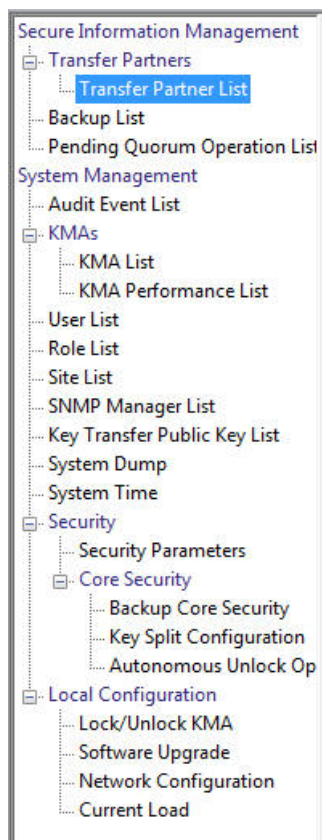
1. Select the Import Keys screen. See ["Import Keys Menu"](#) on page 7-14.
2. Supply the Destination Key Group the keys are to be imported to, the Sending Transfer Partner (C2, in this case) that exported these keys, and the Key Transfer file name. The selected Key Group must be a Key Group that is configured to receive keys from C2.

That is, the Key Policy associated with the selected Key Group must have its `Allow Import To` flag set to “True.” Also, the selected Transfer Partner must have its `Enabled` and `Allow Import From` flags set to “True,” and its `Export Format` value set as described above. The selected Transfer Partner must be assigned to the selected Key Group. See ["Transfer Partner Assignment to Key Groups Menu"](#) on page 6-26.

3. Click **Start**.

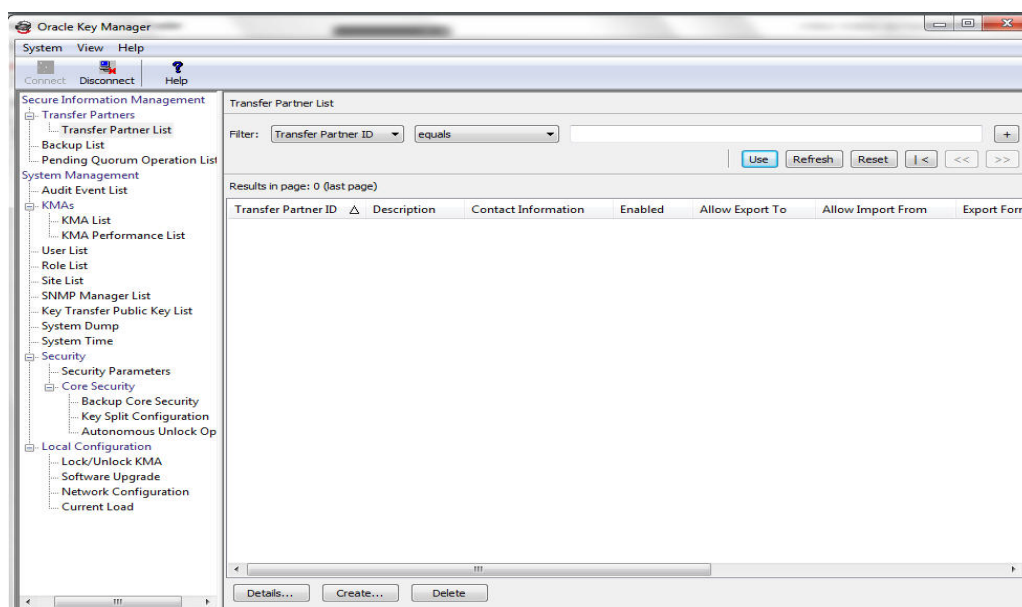
## Transfer Partners Menu

The Key Transfer Partners feature allows keys to be moved from one OKM Cluster to another.



## Transfer Partner List

From the Secure Information Management menu, select **Transfer Partner List**.



You can also scroll through the database and filter the Transfer Partner list by any of the following keys:

- Transfer Partner ID
- Description
- Contact Information
- Enabled
- Allow Export To
- Allow Import From

The **Use** button applies the filter to the displayed list for the Transfer Partner.

The fields and their descriptions are given below:

**Filter:**

Select filter options to filter the displayed list of Transfer Partners. Only Transfer Partners that satisfy all filters are displayed.

**Filter Attribute combo box:**

Click the down-arrow and select an attribute to filter by. Possible values are:

- Transfer Partner ID
- Description
- Contact Information
- Enabled
- Allow Export To
- Allow Import From

**Filter Operator combo box:**

Click the down-arrow and select the filter operation to apply to the selected attribute. This filter option is not displayed for all filter attributes. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~
- Empty
- Not empty

**Filter Value text box:**

Type a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

**Filter Value combo box:**

Click the down-arrow and select a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

Click the plus button to add additional filters.

Click the minus button to remove a filter. This button is only displayed if there is more than one filter shown.

**Use:**

Click this button to apply the selected filters to the displayed list and go to the first page.

**Refresh:**

Click this button to refresh the displayed list. This does not apply filters selected since the last Use or Reset, and does not change the page of the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.



**Results in Page:**

Displays the number of items that can be displayed on the current page. Appends "(last page)" to the number of items if you are at the end of the list. The maximum number of items displayed on a page is defined by the Query Page Size value on the Options dialog.

**Transfer Partner ID:**

Displays the unique identifier that distinguishes each Transfer Partner. This value can be between 1 and 64 (inclusive) characters. Click this Column Name to sort by this attribute.

**Description:**

Describes the Transfer Partner. This value can be between 1 and 64 (inclusive) characters. Click this Column Name to sort by this attribute.

**Contact Information:**

Displays contact information about the Transfer Partner. Click this Column Name to sort by this attribute.

**Enabled:**

Indicates whether the Transfer Partner is allowed to share keys. Possible values are True or False. If this field is False, the Transfer Partner cannot share keys. Click this Column Name to sort by this attribute.

**Allow Export To:**

Indicates whether the Transfer Partner is allowed to export keys. Possible values are True or False. If this field is False, the Transfer Partner cannot export keys. Click this Column Name to sort by this attribute.

**Allow Import From:**

Indicates whether keys can be imported from this Transfer Partner. Possible values are True or False. If this field is False, keys cannot be imported from this Transfer Partner. Click this Column Name to sort by this attribute.

**Export Format:**

Indicates whether keys can be wrapped (wrap keys encrypt the media key on the LAN and the token.)

In the Export Format column, a "v2.0" value means that this Transfer Partner does not wrap keys when it exports them.

A "v2.1 (FIPS)" value means that this Transfer Partner wraps keys when it exports them.

An "N/A" value signifies that the connected KMA runs 2.0.x OKM software, and thus does not allow the user to select this setting.

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**Note:** To exchange keys with a Cluster running KMS 2.0, the Security Officer should create a Transfer Partner that has an Export Format value of "v2.0."

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Refer to the `FIPS Mode Only` parameter in ["Retrieving the Security Parameters"](#) on page 5-74 for more information.

**Public Key ID**

Displays the unique identifier that distinguishes each Public Key. This value can be between 1 and 64 (inclusive) characters. Click this Column Name to sort by this attribute.

**Public Key Fingerprint**

Shows the fingerprint, or hash value, of the Public Key.

**Entry Date**

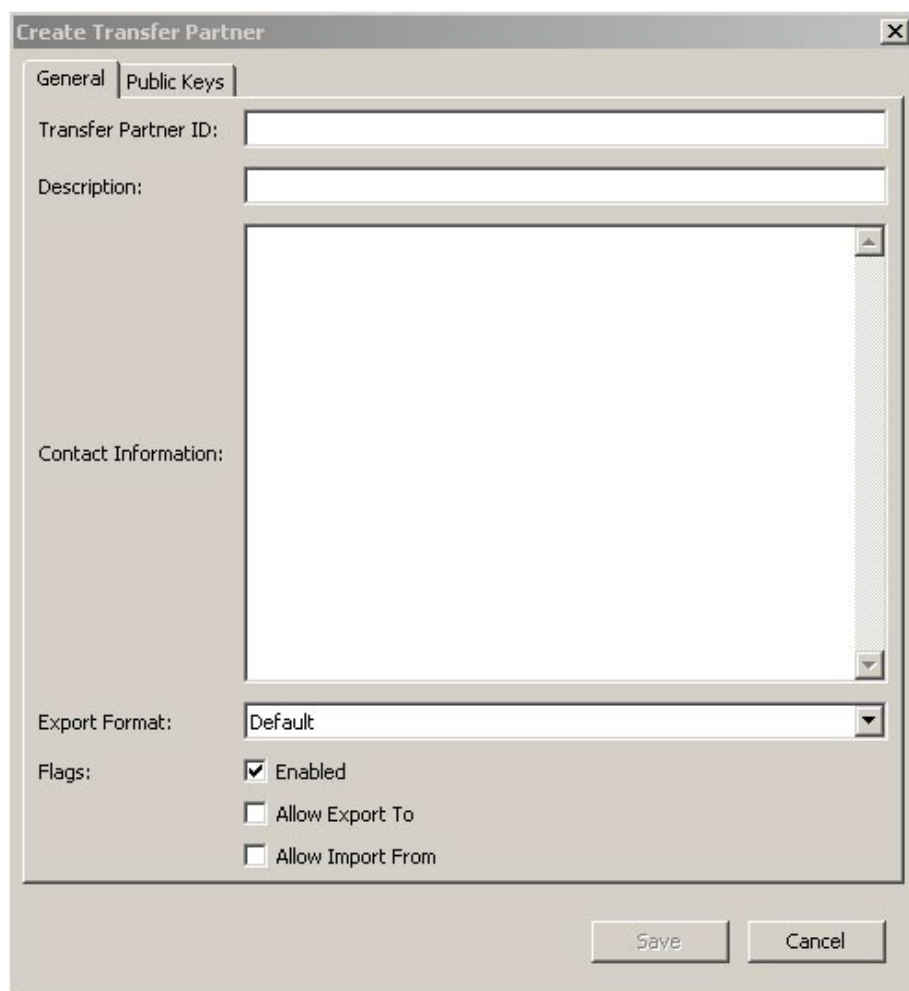
Displays the date the Public Key was entered into the OKM Cluster.

## Creating a Transfer Partner

To create a Transfer Partner:

1. From the Transfer Partner List screen, click the **Create** button. The Create Transfer Partner dialog box is displayed, with the General tab active.



The image shows a 'Create Transfer Partner' dialog box with two tabs: 'General' and 'Public Keys'. The 'General' tab is active. It contains several fields: 'Transfer Partner ID' (a single-line text box), 'Description' (a single-line text box), and 'Contact Information' (a large multi-line text area). Below these is an 'Export Format' dropdown menu currently set to 'Default'. At the bottom of the tab are three checkboxes under the 'Flags' label: 'Enabled' (checked), 'Allow Export To' (unchecked), and 'Allow Import From' (unchecked). 'Save' and 'Cancel' buttons are at the bottom right of the dialog.

2. Complete the following parameters:

On the General tab:

**Transfer Partner ID**

Uniquely identifies the Transfer Partner.

**Description**

Type a value that uniquely describes the Transfer Partner. This value can be between 1 and 64 (inclusive) characters. This field can be left blank.

**Contact Information**

Type a value that identifies contact information about the Transfer Partner. This field can be left blank.

**Export Format**

Select either the default, v2.0, or v2.1 (FIPS) to determine the export format.

A “v2.0” value means this Transfer Partner does not wrap keys when it exports them.

A “v2.1 (FIPS)” value means this Transfer Partner wraps keys when it exports them.

A "Default" value means when you are exporting a key transfer file for this Transfer Partner, the format depends on the setting of the FIPS Mode Only security parameter (see ["Retrieving the Security Parameters"](#) on page 5-74).

If FIPS Mode Only is "Off," the format is v2.0. If FIPS Mode Only is "On," the format is v2.1 (FIPS).

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**Note:** An advantage of setting a Transfer Partner's Export Format to "Default" is that it allows you to alter the format of the Transfer Partner's transfer files simply by changing the FIPS Mode Only security parameter, instead of editing the Transfer Partner's Export Format setting directly, which requires a quorum to authenticate the change.

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#### **Flags - Enabled**

Select this box to allow this Transfer Partner to share keys. If the field is not selected, the Transfer Partner cannot share keys.

#### **Allow Export To**

Select this box to allow keys to be exported to the Transfer Partner. If this field is not selected, the Transfer Partner will not be available for the export keys operation.

#### **Allow Import From**

Select this box to indicate whether keys can be imported from this Transfer Partner. If this field is not selected, keys cannot be imported from this Transfer Partner.

3. Open the Public Keys tab.

The image shows a Windows-style dialog box titled "Create Transfer Partner". It has two tabs: "General" and "Public Keys", with "Public Keys" currently selected. The dialog contains three input fields: "New Public Key ID:" (a single-line text box), "New Public Key:" (a large multi-line text area), and "New Public Key Fingerprint:" (a read-only multi-line text area). At the bottom right, there are "Save" and "Cancel" buttons.

On the Public Keys tab, you can enter the following information:

**New Public Key ID**

Enter the Public Key ID provided to you by the Transfer Partner.

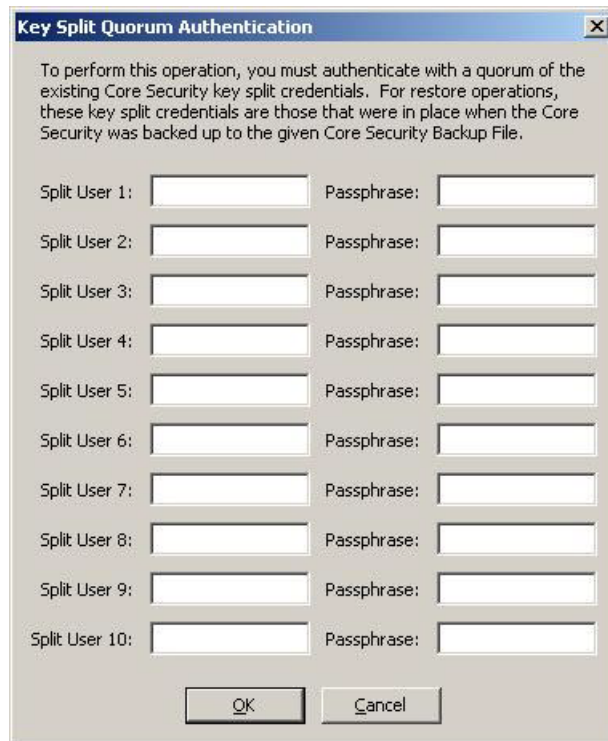
**New Public Key**

Enter the Public Key provided to you by the Transfer Partner.

**New Public Key Fingerprint**

This read-only field shows the fingerprint, or hash value, of the new Public Key. Verify this fingerprint with the Partner to ensure the Public Key has not been tampered with, accidentally or deliberately, during transmission.

4. When you are finished, click the **Save** button.
5. The Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.



**Key Split Quorum Authentication**

To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File.

Split User 1:  Passphrase:

Split User 2:  Passphrase:

Split User 3:  Passphrase:

Split User 4:  Passphrase:

Split User 5:  Passphrase:

Split User 6:  Passphrase:

Split User 7:  Passphrase:

Split User 8:  Passphrase:

Split User 9:  Passphrase:

Split User 10:  Passphrase:

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

## Viewing/Modifying Transfer Partner Details

The Transfer Partner Details dialog box allows you to view detailed information about a specific Transfer Partner.

To view these details:

1. From the Transfer Partner List screen, highlight a Transfer Partner ID and click the **Details** button. The Transfer Partner Details dialog box is displayed.

The screenshot shows a dialog box titled "Transfer Partner Details" with a close button (X) in the top right corner. It has two tabs: "General" (selected) and "Public Keys".

Under the "General" tab, the fields are as follows:

- Transfer Partner ID:** A text field containing "mytp".
- Description:** A text area.
- Contact Information:** A large text area.
- Export Format:** A dropdown menu showing "v2.0".
- Flags:** A group of three checkboxes:
  - ☒ Enabled
  - ☐ Allow Export To
  - ☐ Allow Import From

At the bottom right, there are two buttons: "Save" and "Cancel".

2. On the General tab, you can change the following fields:

- Description
- Contact Information
- Export Format
- Flags Enabled
- AllowExport To
- Allow Import From

The Transfer Partner ID field is read-only.

3. When you are finished, click the **Save** button. The Transfer Partners record in the database is modified.

4. Open the Public Keys tab.

**Transfer Partner Details \***

General Public Keys

New Public Key ID:

New Public Key:

New Public Key Fingerprint:

Existing Public Keys:

Public Key ID	Public Key
23F3156AA4864460DF9FB777F1AD7...	0201018EFD5E3DBE8972DD357B24815202302FF8f

Save Cancel

- On the Public Keys tabs, you can change the following fields:

**New Public Key ID**

Enter the new Public Key ID provided to you by the Transfer Partner.

**New Public Key**

Enter the new Public Key provided to you by the Transfer Partner.

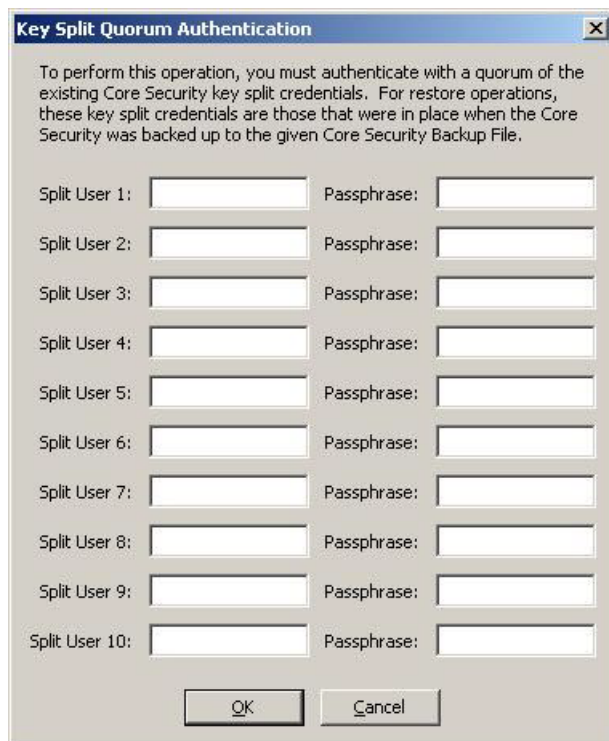
**New Public Key Fingerprint**

This read-only field shows the fingerprint, or hash value, of the new Public Key. Verify this key with the sending Transfer Partner.

**Existing Public Keys**

This list displays Public Keys associated with this Transfer Partner.

- When you are finished, click the **Save** button.
- The Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.



**Key Split Quorum Authentication**

To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File.

Split User 1:  Passphrase:

Split User 2:  Passphrase:

Split User 3:  Passphrase:

Split User 4:  Passphrase:

Split User 5:  Passphrase:

Split User 6:  Passphrase:

Split User 7:  Passphrase:

Split User 8:  Passphrase:

Split User 9:  Passphrase:

Split User 10:  Passphrase:

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

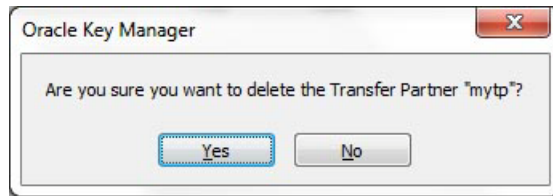
Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

## Deleting a Transfer Partner

This option gives the Security Officer the ability to delete a Transfer Partner.

To delete a Transfer Partner:

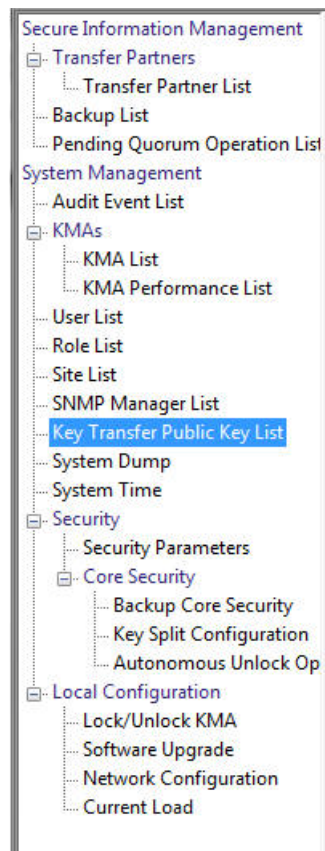
1. From the Transfer Partner List screen, highlight the Transfer Partner ID you want to delete and click the **Delete** button. The Transfer Partner Confirm Delete dialog box is displayed.



2. Click the **Yes** button to delete the Transfer Partner. The currently selected Transfer Partner is deleted, and you are returned to the Transfer Partner List screen.

## Key Transfer Public Key List Menu

To share keys between Transfer Partners, Security Officers first must access Public Key information for their OKM Cluster. This menu provides public key information. The Public Key and Public Key ID displayed by this command must be sent to the Transfer Partner.



## Viewing the Key Transfer Public Key List

To view the Key Transfer Public Key List:

1. From the System Management menu, select **Key Transfer Public Key List**.



Key Transfer Public Key List

Filter: Public Key ID =  +

Use Refresh Reset < << >> +

Results in page: 2 (last page)

Public Key ID	Created Date ▾	Public Key	Public Key Fingerprint
9CE46A4BB276A9FB4A22A5AC51A22627	1/7/2008 10:44:16 AM	02010190E4D77B563DB885A7F856BB38F0A69E941D535...	rare tease goofy rox
9CE46A4BB276A9FB6AE492172EA4C999	1/7/2008 10:32:14 AM	02010183D788368911AE2E18D965152CE3120E39325EC...	jilt equal gallop vinyl

Details... Create

You can also scroll through the database and filter the Key Transfer Public Key List by any of the following keys:

- Public Key ID
- Created Date
- Public Key

The **Use** button applies the filter to the displayed list for the Key Transfer Public Key List.

The fields and their descriptions are given below:

#### Filter:

Select filter options to filter the displayed list of Public Keys. Only Public Keys that satisfy all filters are displayed.

#### Filter Attribute combo box:

Click the down-arrow and select an attribute to filter by. Possible values are:

- Public Key ID
- Created Date
- Public Key

#### Filter Operator combo box:

Click the down-arrow and select the filter operation to apply to the selected attribute. This filter option is not displayed for all filter attributes. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=

- Less than or equals <=
- Starts with ~
- Empty
- Not empty

**Filter Value text box:**

Type a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

**Filter Value combo box:**

Click the down-arrow and select a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

**Filter Value combo box:**

Click the down-arrow and select a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

Click the plus button to add additional filters.

Click the minus button to remove a filter. This button is only displayed if there is more than one filter shown.

**Use:**

Click this button to apply the selected filters to the displayed list and go to the first page.

**Refresh:**

Click this button to refresh the displayed list. This does not apply filters selected since the last Use or Reset, and does not change the page of the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.

**Results in Page:**

Displays the number of items that can be displayed on the current page. Appends "(last page)" to the number of items if you are at the end of the list. The maximum number of items displayed on a page is defined by the Query Page Size value on the Options dialog.

**Public Key ID:**

Displays the unique identifier that distinguishes each Public Key. This value can be between 1 and 64 (inclusive) characters. Click this Column Name to sort by this attribute.

**Created Date:**

Displays the date and time when this Public Key was created. Click this Column Name to sort by this attribute.

The private key corresponding to the most recently created public key is used to sign all exported Key Transfer files.

**Public Key:**

Displays the Public Key used to perform key transfers between Transfer partners. This value is shown in base 64. Click this Column Name to sort by this attribute.

**Public Key Fingerprint:**

The hash of the Public Key. This value is used to verify the Public Key is correctly transmitted, and it is shown in base 64.

## Viewing the Key Transfer Public Key Details

To view the Key Transfer Public Key details screen:

1. Select a Public Key and click the **Details** button.

The Key Transfer Public Key Details dialog box is displayed.



## Creating a Key Transfer Public Key

To create a Key Transfer Public Key:

1. Click the **Create** button.
2. Provide the new key to all existing Transfer Partners.

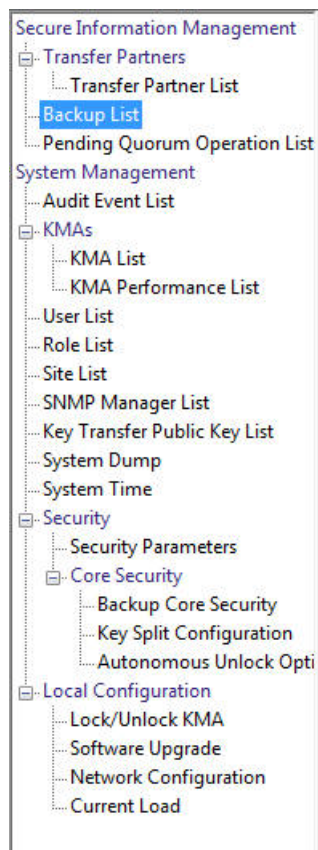
Since any Key Transfer files created after the new Key Transfer Public Key is created are signed with the new Key Transfer Public Key, partners must be provided with the new Key Transfer Public Key before they can import the new Key Transfer files.

Key Transfer Public Key List		
Filter:	Public Key ID	=
Results in page: 3 (last page)		
Public Key ID	Created Date	Pub
9CE46A4BB276A9FB8FE99E7C3E203F8	1/15/2008 6:11:00 PM	020
9CE46A4BB276A9FB4A22A5AC51A22627	1/7/2008 10:44:16 AM	020
9CE46A4BB276A9FB6AE492172EA4C999	1/7/2008 10:32:14 AM	020

## Backup List Menu

The Backups List menu option allows the Security Officer to:

- View the history of the Backups
- View details of a Backup file
- Restore Backups.



## Viewing Backup Files History

To view Backup files history:

From the Secure Information Management menu, select **Backup List**. The Backup List screen is displayed.

Backup List

Filter: Backup ID ▾ = ▾  +

Use Refresh Reset | < << >> >

Results in page: 2 (last page)

Backup ID ▴	KMA ID	Created Date	Destroyed Date	Destruction
FDAC7620B1491D500000000000000001	FDAC7620B1491D50	12/4/2007 8:26:49 AM		PENDING
FDAC7620B1491D500000000000000002	FDAC7620B1491D50	12/4/2007 8:30:18 AM		PENDING

Details... Create Backup... Restore... Confirm Destruction...

You can also scroll through the database and filter the Backup Files by any of the following keys:

- Backup ID
- KMA ID
- Created Date
- Destroyed Date
- Destruction Status
- Destruction Comment.

The + button applies the filter to the displayed list for the Backup file.

The fields and their descriptions are given below:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- Backup ID
- Created Date
- Destroyed Date
- Destruction Status
- Destruction Comment.

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~

**Filter Value 1 box:**

If you selected a date filter, click **Set Date** to specify start date and time. The value appears as a starting value of the filter key range. If you selected any other filter, type a value in this field.

**Filter Value 2 box:**

If you selected a date filter, click **Set Date** to select an end date and time. The value appears as a ending value of the filter key range.

**Use:**

Click this button to apply the filter to the displayed list.

**Refresh:**

Click this button to refresh the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.

**Results in Page:**

Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**Backup ID**

Displays a system-generated unique identifier that distinguishes each Backup file.

**KMA ID**

Displays the KMA for which the Backup file was generated.

**Created Date**

Displays the date when the backup was created.

**Destroyed Date**

Displays the date that the Backup file was marked as being manually destroyed.

**Destruction Status**

Indicates the status of the backup with respect to its destruction. Possible values are:

**NONE**

The Backup file has not been destroyed and does not contain Data Unit keys that have been destroyed.

**PENDING**

The Backup file has not yet been manually destroyed and contains copies of Data Unit keys that have been destroyed.

**DESTROYED**

The Backup file has been manually destroyed.

**Destruction Comment**

Displays user-supplied information on the Backup file's destruction.

**Details:**

Click this button to view more detailed information on a Backup.

**Create Backup:**

Click this button to create a Backup. This button is not enabled if you are a Security Officer.

**Restore:**

Click this button to restore a Backup.

**Confirm Destruction:**

Click this button to confirm the destruction of a Backup. This button is not enabled if you are a Security Officer.

If you want more detailed information on a backup, highlight the backup and click the **Details** button. For more information, refer to "[Viewing Backup Details](#)" on page 5-67.

Click the **Restore** button to restore the currently selected backup. For more information, refer to "[Restoring a Backup](#)" on page 5-68.

## Viewing Backup Details

The Backup Details dialog box is used to view the details of a Backup file.

---

---

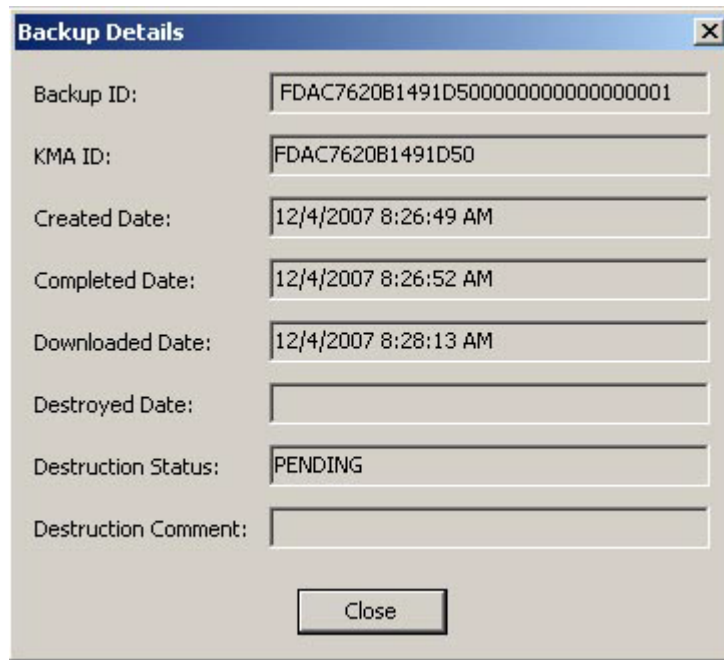
**Note:** Backup files are created and restored on the KMA.

---

---

To view the details of a Backup file:

1. From the Backups List screen, double-click the Backup entry for which you want more information or highlight the Backup entry and click the **Details** button. The Backup Details dialog box is displayed, with all fields read-only.

A screenshot of a 'Backup Details' dialog box. The dialog has a title bar with the text 'Backup Details' and a close button (X). Inside, there are several text input fields with labels to their left: 'Backup ID:' with the value 'FDAC7620B1491D500000000000000001', 'KMA ID:' with 'FDAC7620B1491D50', 'Created Date:' with '12/4/2007 8:26:49 AM', 'Completed Date:' with '12/4/2007 8:26:52 AM', 'Downloaded Date:' with '12/4/2007 8:28:13 AM', 'Destroyed Date:' which is empty, 'Destruction Status:' with 'PENDING', and 'Destruction Comment:' which is empty. At the bottom center is a 'Close' button.

Backup ID:	FDAC7620B1491D500000000000000001
KMA ID:	FDAC7620B1491D50
Created Date:	12/4/2007 8:26:49 AM
Completed Date:	12/4/2007 8:26:52 AM
Downloaded Date:	12/4/2007 8:28:13 AM
Destroyed Date:	
Destruction Status:	PENDING
Destruction Comment:	

- The fields and their descriptions are given below:

**Backup ID**

Displays a system-generated unique identifier that distinguishes each Backup file.

**KMA ID**

Displays the KMA on which this Backup file is generated.

**Created Date**

Displays the date and time when the Backup file was created.

**Completed Date**

Displays the date and time when the Backup file was completed.

**Downloaded Date**

Displays the date and time when the Backup file was downloaded.

**Destroyed Date**

Displays the date when the Backup file was destroyed.

**Destruction Status**

Indicates the status of the backup with respect to its destruction.

**Destruction Comment**

Displays user-supplied information on the Backup file's destruction.

- Click the **Close** button to close this dialog box.

## Restoring a Backup

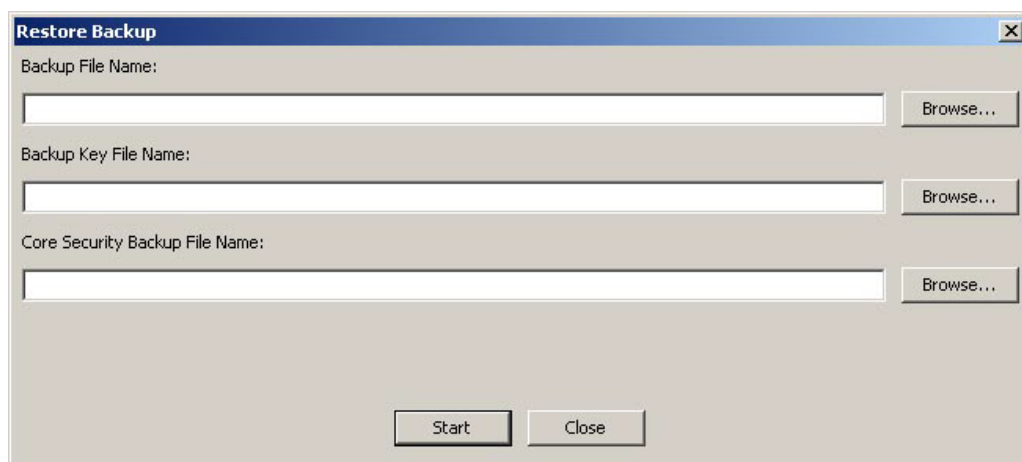
This function gives you the ability to upload and restore a backup that consists of a Backup file and a Backup key file to the KMA. Before you restore a Backup file to a KMA, ensure that you have the quorum for authentication.



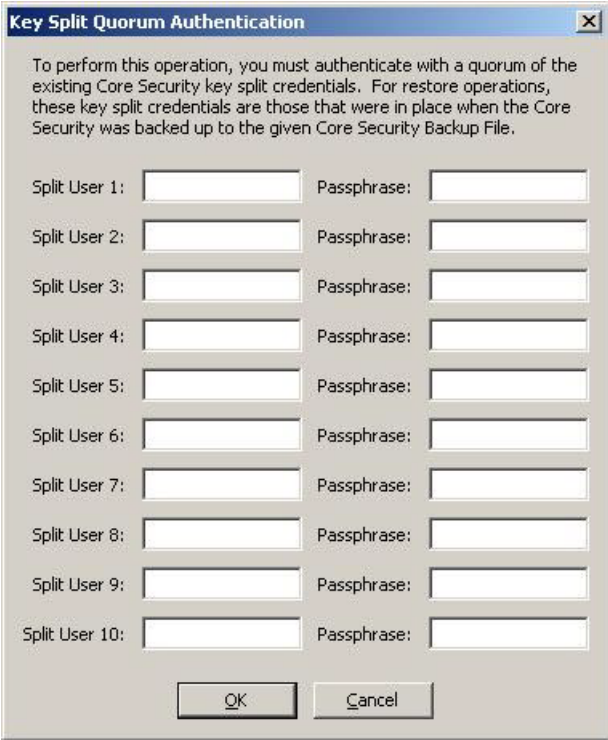
**Important** – Before you start this procedure, you must perform the procedure ["Restoring a Cluster From a Backup"](#) on page 2-21.

To restore a backup:

1. From the Backup List screen, highlight the Backup you want to restore and click the **Restore** button. The Restore Backup dialog box is displayed.
2. Select the desired Core Security backup, backup key file, and backup file. The backup key file and the backup must match, that is, they must have been created at the same time. The Core Security backup can be older or newer than the backup key file and backup file. Any Core Security backup file can be used with any backup key file and backup file.
3. Click the **Start** button.

The image shows a Windows-style dialog box titled "Restore Backup". It has a standard title bar with a close button (X). The dialog contains three labeled text input fields: "Backup File Name:", "Backup Key File Name:", and "Core Security Backup File Name:". To the right of each input field is a "Browse..." button. At the bottom of the dialog, there are two buttons: "Start" and "Close".

4. When the upload process is completed, it is indicated on the Restore Backup dialog box and the Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.

A screenshot of a Windows-style dialog box titled "Key Split Quorum Authentication". The dialog box has a blue title bar with a close button (X) in the top right corner. Below the title bar, there is a paragraph of text: "To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File." Below this text, there are ten rows of input fields. Each row is labeled "Split User 1:" through "Split User 10:" on the left, followed by a text input field, then the label "Passphrase:" followed by another text input field. At the bottom of the dialog box, there are two buttons: "OK" and "Cancel".

**Note:** The Security Officer must provide a sufficient quorum of Key Split Credentials. You initially set the Key Split Threshold value, which determines the quorum size, through the process shown in ["Entering Key Split Credentials"](#) on page 2-14. The quorum value can be changed as discussed in ["Modifying the Key Split Configuration"](#) on page 5-80.

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

5. The Restore Backup dialog box is displayed, indicating the status of the restore process.

6. The fields and their descriptions are given below:

**Backup File Name**

Name of the backup file.

**Backup Wrapping Key File Name**

Displays the name of the Backup Key File.

**Core Security Backup File Name**

Name of the backup file containing Core Security Key material.

7. When the restore is completed, a message indicating this is displayed. Click the **Close** button to close this dialog box. The database and the Secure Key Store are restored to the KMA.

---

**Note:** After you successfully restore a backup, you need to update the IP address settings for the KMA. Network settings are not backed up, and thus are not restored. Refer to "[Setting the KMA Management IP Address](#)" on page 11-10 and "[Setting the KMA Service IP Addresses](#)" on page 11-11.

---

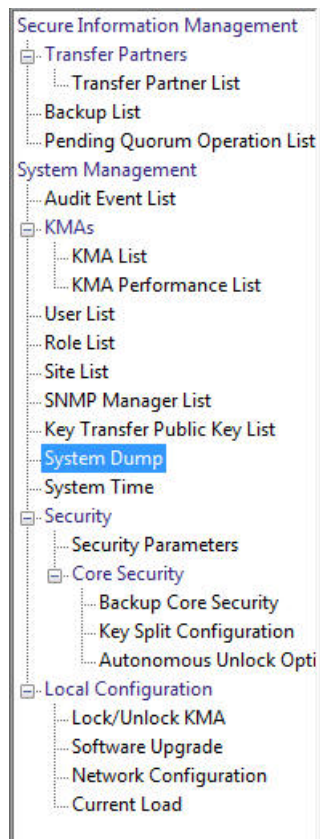
## System Dump Menu

The System Dump menu creates a system dump for problem resolution and downloads it to a compressed file on the system where the OKM Manager is running. The downloaded file is in a format that can be opened with compression utilities.

---

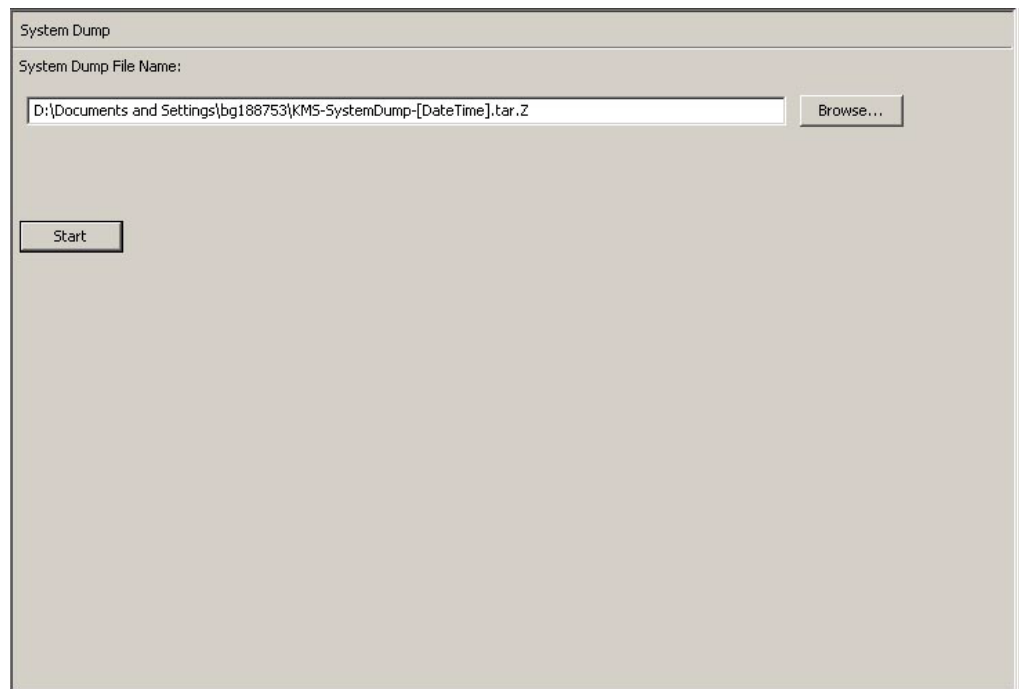
**Note:** The dump does not include any key material or information from which keys can be inferred.

---



## Creating a System Dump

1. To create a system dump, from the System Management menu, select **System Dump**. The screen is displayed and shows an automatically-generated \*.tar.Z file. If desired, you can click Browse to select a destination path.
2. Click the **Start** button to begin the download. The system displays messages indicating the amount of system dump information that is being downloaded in real-time and tells you when the process is complete.
3. Go to the destination path and open the \*.tar.Z file to view the system dump information.

The image shows a Windows-style dialog box titled "System Dump". Inside the dialog, there is a label "System Dump File Name:" followed by a text input field. The input field contains the text "D:\Documents and Settings\bg188753\KMS-SystemDump-[DateTime].tar.Z". To the right of the input field is a button labeled "Browse...". Below the input field and button, there is a "Start" button. The dialog box has a standard Windows appearance with a title bar and a light gray background.

The fields and their descriptions are given below:

**File Name:**

Displays an automatically-generated \*.tar.gz file.

**Browse:**

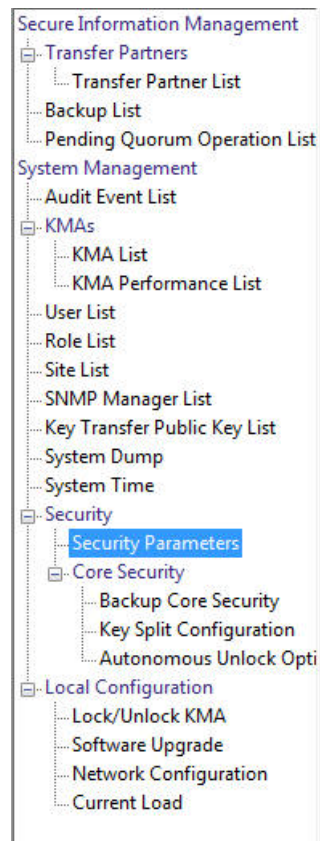
Click this button to specify a location for this file.

**Start:**

Click this button to initiate the download process.

## Security Parameters Menu

The Security menu gives the Security Officer the ability to view and modify the KMA's security parameters.



## Retrieving the Security Parameters

---

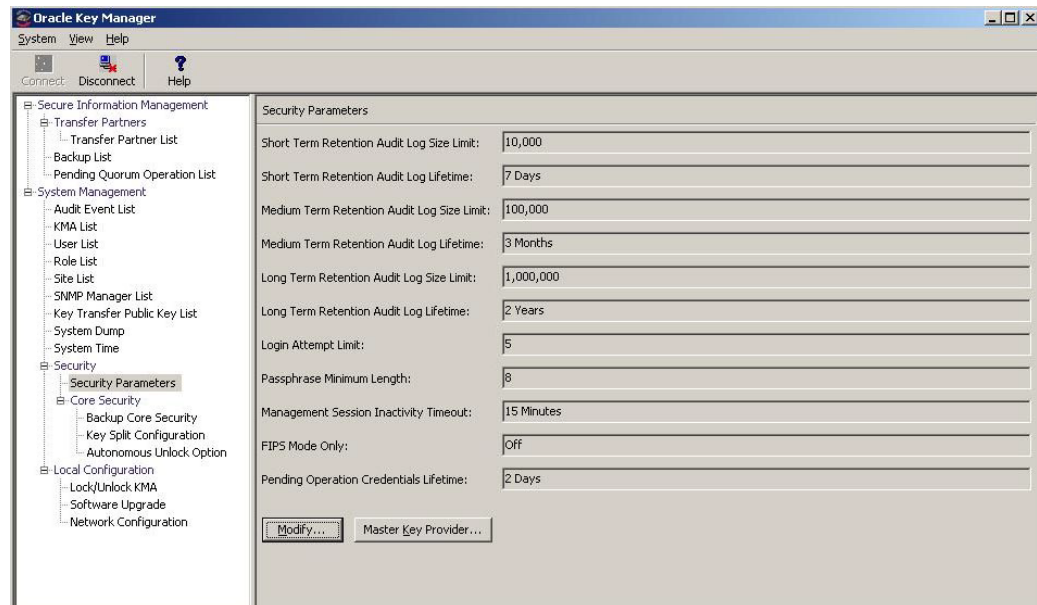
**Note:** The **Master Key Provider** button is used only if you want the OKM Cluster to obtain master keys from an IBM mainframe. The button is enabled only when the replication version of the OKM Cluster is currently set to 11 or higher and the FIPS Mode Only value is “Off.”

See the OKM-ICSF Integration Guide for details.

---

To retrieve the security parameters:

From the Security menu, select **Security Parameters**. The Security Parameters screen is displayed in read-only mode.



The fields and their descriptions are given below:

---

**Note:** For the following six Retention-related fields, there is just one audit log, and it resides in the largest file system in the KMA.

The main reason for adjusting these parameters is to control how many audit log entries are returned in queries you issue from the Audit Event List menu (see ["Viewing Audit Logs"](#) on page 6-30).

Entries in the audit log can show a short, medium, or long retention term. The KMA truncates (removes) old audit log entries based on the limit and lifetime of their retention term.

For example, Short Term Audit Log entries are typically truncated more frequently than Medium Term Audit Log entries; Medium Term Audit Log entries are truncated more frequently than Long Term Audit Log entries.

The Security Officer can define these retention term limits and lifetimes to control how frequently old audit log entries are removed.

---

### Short Term Retention Audit Log Size Limit

Displays the number of Short Term Audit Log entries that are retained before they are truncated. The default is 10,000. The minimum value is 1000; maximum value is 1,000,000.

### Short Term Retention Audit Log Lifetime

Displays the amount of time (in days) that Short Term Audit Log entries are retained before they are truncated. The default is 7 days. The minimum value is 7 days; maximum value is 25,185 days (approximately 69 years).

### Medium Term Retention Audit Log Size Limit

Displays the number of Medium Term Audit Log entries that are retained before they are truncated. The default is 100,000. The minimum value is 1000; maximum value is 1,000,000.

**Medium Term Retention Audit Log Lifetime**

Displays the amount of time (in days) that Medium Term Audit Log entries are retained before they are truncated. The default is 90 days. The minimum value is 7 days; maximum value is 25,185 days.

**Long Term Retention Audit Log Size Limit**

Displays the number of Long Term Audit Log entries that are retained before they are truncated. The default is 1,000,000. The minimum value is 1000; maximum value is 1,000,000.

**Long Term Retention Audit Log Lifetime**

Displays the amount of time (in days) that Long Term Audit Log entries are retained before they are truncated. The default is 730 days. The minimum value is 7 days; maximum value is 25,185 days.

**Login Attempt Limit**

Indicates the number of failed login attempts before an entity is disabled. The default is 5. The minimum value is 1; maximum value is 1000.

**Passphrase Minimum Length**

Displays the minimum length of the passphrase. The default is 8 characters. The minimum value is 8 characters; the maximum value is 64 characters.

**Management Session Inactivity Timeout**

Displays the maximum length of time (in minutes) a OKM Manager or Console login session can be left idle before being automatically logged out. Changing this value has no effect on sessions that are already in progress. The default is 15 minutes. The minimum value is 0, meaning no time is used; the maximum value is 60 minutes.

**FIPS Mode Only**

Displays the import key and format transfer file settings.

An "Off" value specifies that KMAs wrap keys whenever communicating with agents that support AES key wrap. Most customers should be running tape drive firmware that supports AES key wrap with the OKM agent service.

All PKCS#11 providers that support OKM include support for AES key wrap. You can confirm this by viewing the OKM audit log and noting that agents are using the agent service operations listed below. Specify an audit filter for Operation and choose any of the following specific operations from the pull down list:

- Create Key v2
- Retrieve key v2
- Retrieve Keys v2
- Retrieve Protect and Process Key v2

Any audit events in the resulting list confirm that the specified agent is using AES key wrap with OKM.

An "On" value specifies that KMAs in this Cluster wrap Keys with an Advanced Encryption Standard (AES) wrapping key before sending them to Agents (tape drives). The KMA cannot import 1.0 keys and allows export and import of v2.1 (FIPS) format transfer files only.

The "On" value can be set only if the current Replication Version is at least 10.



See the Export Format parameter in "[Transfer Partner List](#)" on page 5-49 for more information.

#### Pending Operation Credentials Lifetime:

The amount of time (in days) that Key Split Credentials are retained as having approved a pending quorum operation. If an insufficient number of Key Split Credentials approve the pending quorum operation before this lifetime is reached, then these credentials expire. After they expire, Quorum Members must reapprove the pending quorum operation. The default is 2 days. This value is used only when the Replication Version is at least 11.

If you want to change the Security Parameters, click the Modify button. For more information, refer to "[Modifying the Security Parameters](#)" on page 5-77.

## Modifying the Security Parameters

To modify security parameters:

1. From the Security Parameters List screen, click the **Modify** button. The Modify Security Parameters screen is displayed.

Short Term Retention Audit Log Size Limit:	10,000
Short Term Retention Audit Log Lifetime:	7 Day(s)
Medium Term Retention Audit Log Size Limit:	100,000
Medium Term Retention Audit Log Lifetime:	3 Month(s)
Long Term Retention Audit Log Size Limit:	1,000,000
Long Term Retention Audit Log Lifetime:	2 Year(s)
Login Attempt Limit:	5
Passphrase Minimum Length:	8
Management Session Inactivity Timeout:	15 Minutes
FIPS Mode Only:	Off
Pending Operation Credentials Lifetime:	2 Day(s)

Save Cancel

The fields are described in "[Short Term Retention Audit Log Size Limit](#)" on page 5-75.

2. Modify the security parameters, as required. When you are finished, click the **Save** button. The changes are saved in the KMA database.

## Core Security

The primary element of the Core Security component is the Root Key Material. It is key material that is generated when a Cluster is initialized. The Root Key Material protects the Master Key. The Master Key is a symmetric key that protects the Data Unit Keys stored on the KMA.

Core Security is protected with a key split scheme that requires a quorum of users defined in the Key Split Credentials to provide their user names and passphrases to unwrap the Root Key Material.

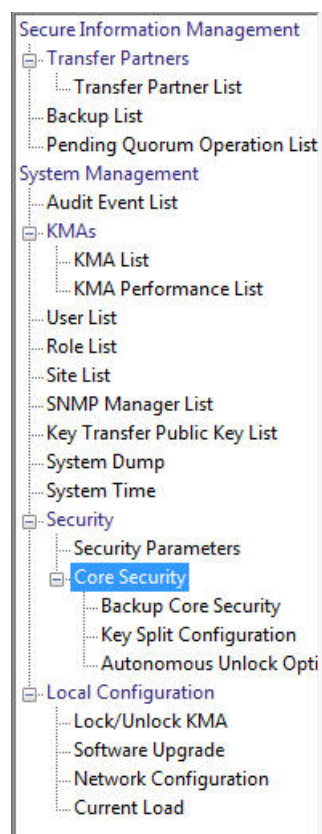
This security mechanism enables two operational states for the KMA: *locked* and *unlocked*.

A KMA in the *locked* state is not able to unwrap the Root Key Material, and thus is unable to access the Data Unit Keys. As a result, the KMA is unable to service Agent requests to register new Data Units or retrieve Data Unit Keys for existing Data Units.

A KMA in the *unlocked* state is able to use the Root Key Material to access the Data Unit Keys and service Agent requests for Data Unit Keys.

## Core Security Management Menu

The Core Security menu contains the following menu options:



It allows the Security Officer to:

- Create a Core Security backup
- View/Modify Key Split Credentials
- Enable/Disable the Autonomous Unlock Option.

## Backup Core Security

The Backup Core Security option allows the Security Officer to back up Core Security Key material and download it to a file on the local system.

---

**Caution:** Core security backup files should be carefully protected. Because any Core Security backup file can be used with any backup file/backup key file pair, even old Core Security backup files remain useful.

---

### Creating a Core Security Backup

A new core security backup needs to be performed after the Key Split Credentials are modified.

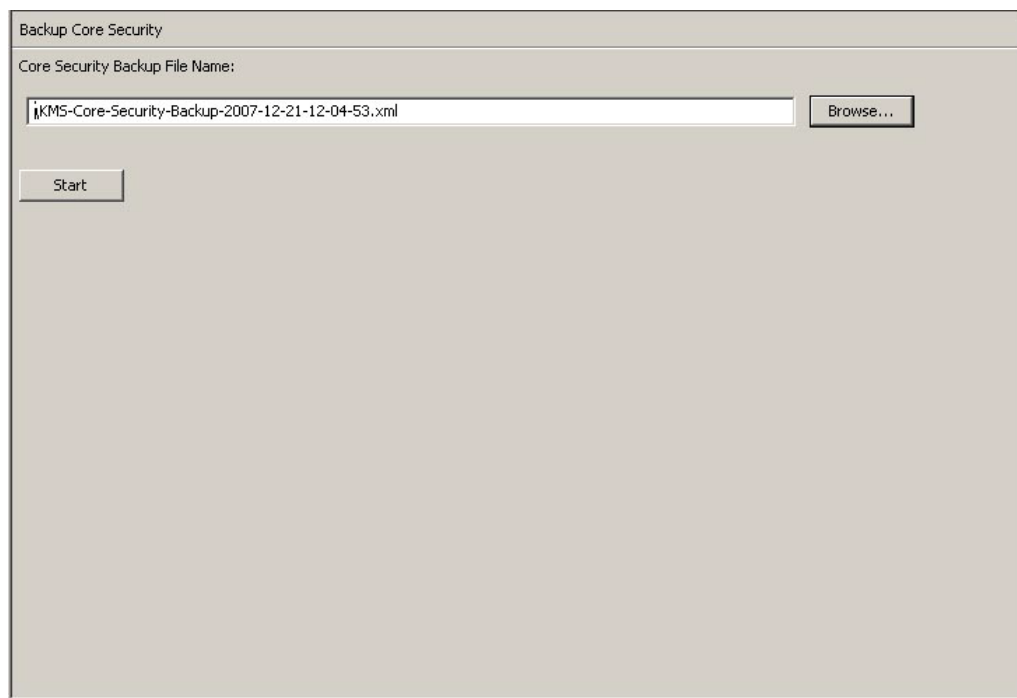
**Important** – The Security Officer must back up Core Security Key material before the Backup Officer can create a backup. See ["Creating a Backup"](#) on page 8-3.

1. From the Core Security menu, select Backup Core Security. The Backup Core Security dialog box is displayed.

---

**Note:** The Core Security Backup File names are automatically generated. However, you can edit the names, and you can also click the Browse button to select a destination path.

---



2. Click the **Start** button to create the Core Security Backup file and download it to the user-specified destination.
3. When the backup is completed, a message is displayed. Click the **Close** button to close this dialog box.
4. You are returned to the Backup Core Security screen.

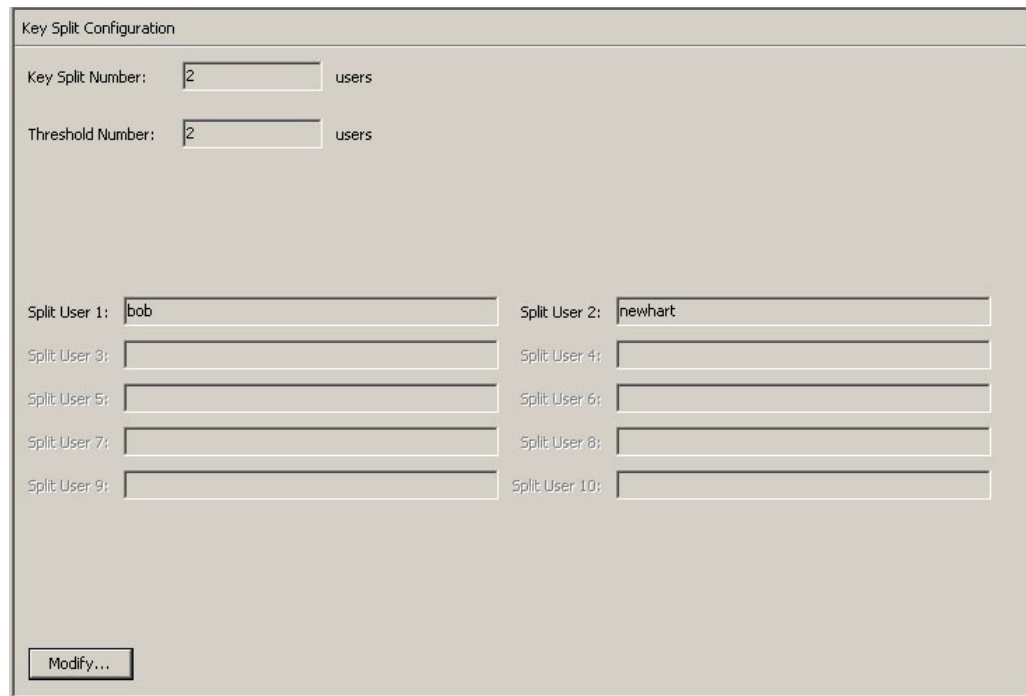
## Key Split Configuration

The Key Split Configuration menu option gives the Security Officer the ability to view and modify the Key Split Credentials for the KMA.

### Viewing the Key Split Configuration

To view the Key Split Configuration:

1. From the Core Security menu, select **Key Split Configuration**. The Key Split Configuration dialog box is displayed.

The image shows a 'Key Split Configuration' dialog box. At the top, it has a title bar. Below the title bar, there are two input fields: 'Key Split Number:' with the value '2' and 'users' to its right, and 'Threshold Number:' with the value '2' and 'users' to its right. Below these, there are ten input fields for 'Split User' names, arranged in two columns of five. The first field in the first column contains 'bob', and the first field in the second column contains 'newhart'. The remaining eight fields are empty. At the bottom left of the dialog box, there is a button labeled 'Modify...'.

Key Split Number:	users
2	

Threshold Number:	users
2	

Split User 1:	Split User 2:
bob	newhart

Modify...

The fields and their descriptions are given below:

#### Key Split Number

Displays the number of key splits. The maximum is 10.

#### Threshold Number

Displays the number of users that are necessary to authenticate a quorum.

#### Split User (1-10)

Displays the user names of the existing split.

If you want to modify the Key Split user names, passphrases, and threshold number, click the **Modify** button. For more information, refer to "[Modifying the Key Split Configuration](#)" on page 5-80.

### Modifying the Key Split Configuration

To modify the Key Split configuration:

1. From the Key Split Configuration screen, click the **Modify** button. The Modify Key Split Configuration dialog box is displayed.

Modify Key Split Configuration

Key Split Number:  users

Threshold Number:  users

Please enter your username and passphrase:

Split User 1: <input type="text" value="bob"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>
Split User 2: <input type="text" value="newhart"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>
Split User 3: <input type="text"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>
Split User 4: <input type="text"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>
Split User 5: <input type="text"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>
Split User 6: <input type="text"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>
Split User 7: <input type="text"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>
Split User 8: <input type="text"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>
Split User 9: <input type="text"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>
Split User 10: <input type="text"/>	Passphrase: <input type="text"/>	Confirm Passphrase: <input type="text"/>

- Complete the following parameters and click the **OK** button:

**Key Split Number**

Type a new value for the number of key splits. The maximum number is 10.

**Threshold Number**

Type a new value for the number of users that are required to form a quorum.

**Split User x**

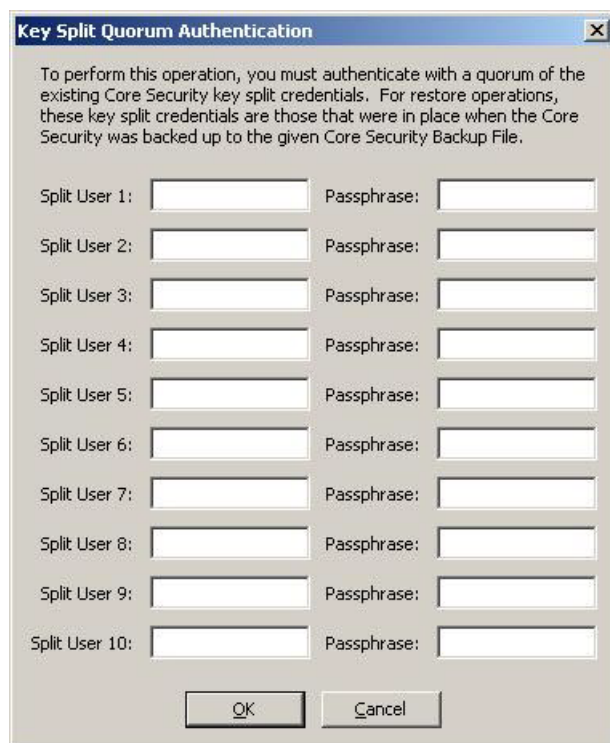
Type the new user name. For each Split User, complete its associated Passphrase and Confirm Passphrase fields.

---

**Note:** The number of Split User fields that are enabled is dependent on the value that you entered in the Key Split Number field.

---

- Click the **Save** button after the last user name and passphrase is entered.
- The Key Split Quorum Authentication dialog box is displayed after the new Key Split credentials are entered. Type the user name and passphrase for the existing quorum credentials and click the **OK** button. This is required to set “new” credentials set in Step 2 and Step 3.



**Key Split Quorum Authentication**

To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File.

Split User 1:  Passphrase:

Split User 2:  Passphrase:

Split User 3:  Passphrase:

Split User 4:  Passphrase:

Split User 5:  Passphrase:

Split User 6:  Passphrase:

Split User 7:  Passphrase:

Split User 8:  Passphrase:

Split User 9:  Passphrase:

Split User 10:  Passphrase:

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

- The system updates the old configuration information with the new configuration in the database. The new configuration is displayed in the Key Split Credentials screen.

---

**Note:** The Core Security Key material is re-wrapped using the updated Key Split credentials.

---

- Create a new Core Security backup (see ["Creating a Core Security Backup"](#) on page 5-79).

---

**Note:** Destroy all old Core Security backup files to ensure that the previous Key Split Credentials cannot be used to destroy a backup.

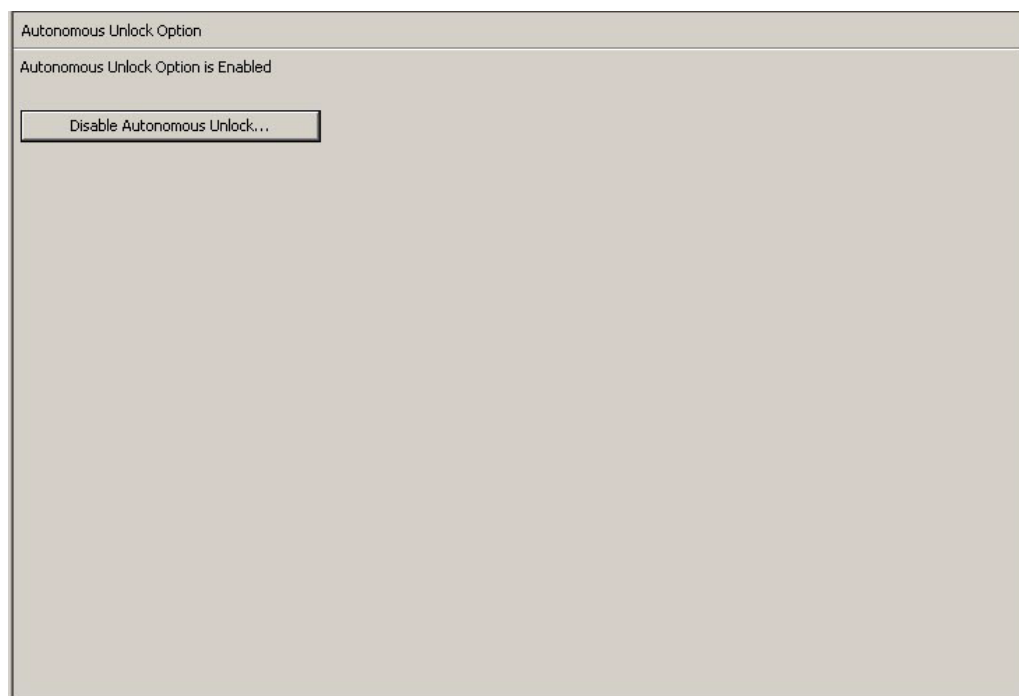
---

## Autonomous Unlock Option

The Autonomous Unlock Option menu option gives the Security Officer the ability to enable or disable the autonomous option for the KMA.

To enable or disable the Autonomous Unlock option:

1. From the Core Security menu, select **Autonomous Unlock Option**. The Autonomous Unlock Option screen is displayed, indicating the current autonomous status.



2. Depending on the current autonomous boot status, click the **Enable Autonomous Unlock** to enable this option or click the Disable Autonomous Unlock to disable the option.

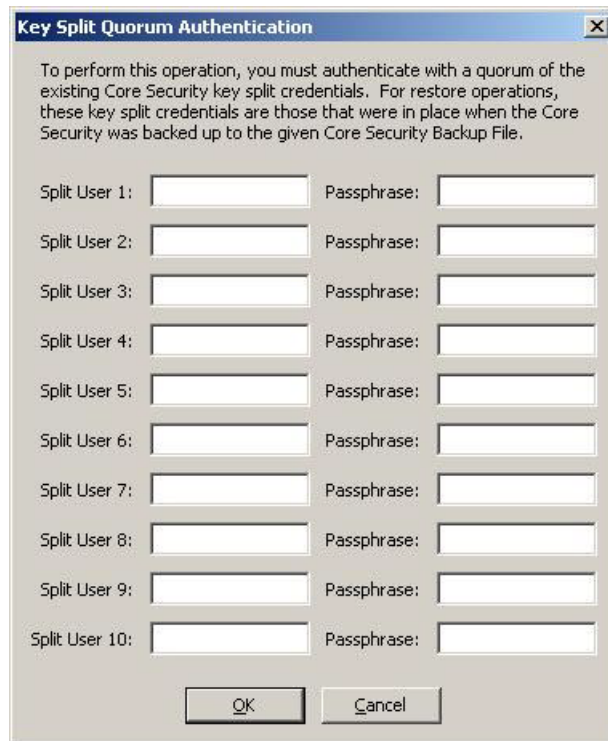
---

**Note:** The **Lock/Unlock** button toggles between states and sets the KMA locked state opposite to the current state.

---

You must provide a quorum to enable or disable the Autonomous Unlock Option.

3. The Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.



**Key Split Quorum Authentication**

To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File.

Split User 1:  Passphrase:

Split User 2:  Passphrase:

Split User 3:  Passphrase:

Split User 4:  Passphrase:

Split User 5:  Passphrase:

Split User 6:  Passphrase:

Split User 7:  Passphrase:

Split User 8:  Passphrase:

Split User 9:  Passphrase:

Split User 10:  Passphrase:

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

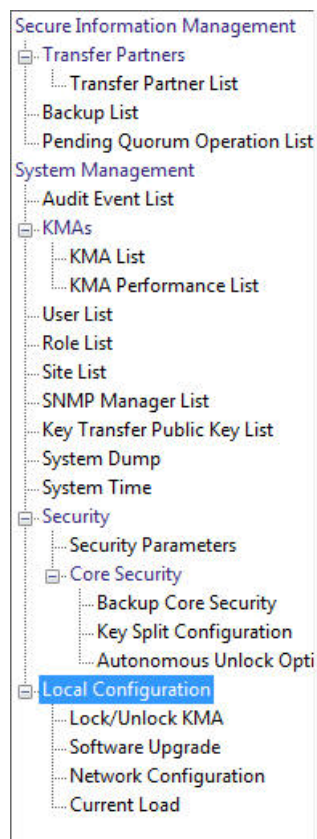
Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

## Local Configuration Menu

The Local Configuration menu includes the following options:

- Lock/Unlock the KMA
- Upgrade the software (see ["Software Upgrade Menu"](#) on page 7-27)
- Network configuration information
- Auto Service Request.





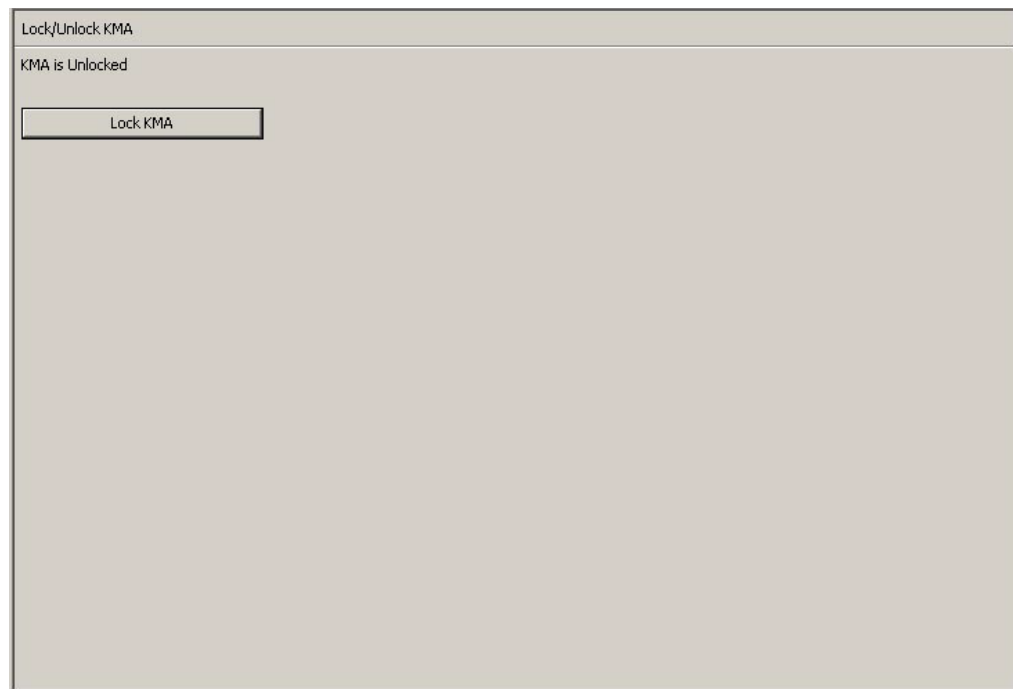
## Lock/Unlock KMA

The Lock/Unlock KMA menu option gives the Security Officer the ability to lock and unlock the KMA's Core Security. See "[Core Security](#)" on page 5-78 for details on Core Security and the behavior of the KMA when Core Security is locked and unlocked.

### Locking the KMA

To lock the KMA:

1. From the Local Configuration menu, select **Lock/Unlock KMA**. The Lock/Unlock KMA screen is displayed, indicating the state of the KMA. In this example, it is "Unlocked."



2. Click the **Lock KMA** button to lock the KMA. Once the button is pressed, it changes to **Unlock KMA**, indicating the new lock state and the allowed operation. The KMA is now locked.

---

---

**Note:** The **Lock KMA/Unlock KMA** button toggles between states and sets the KMA locked state opposite to the current state. Once a button is pressed, the text label and button label change to indicate the new lock state and the allowed operation.

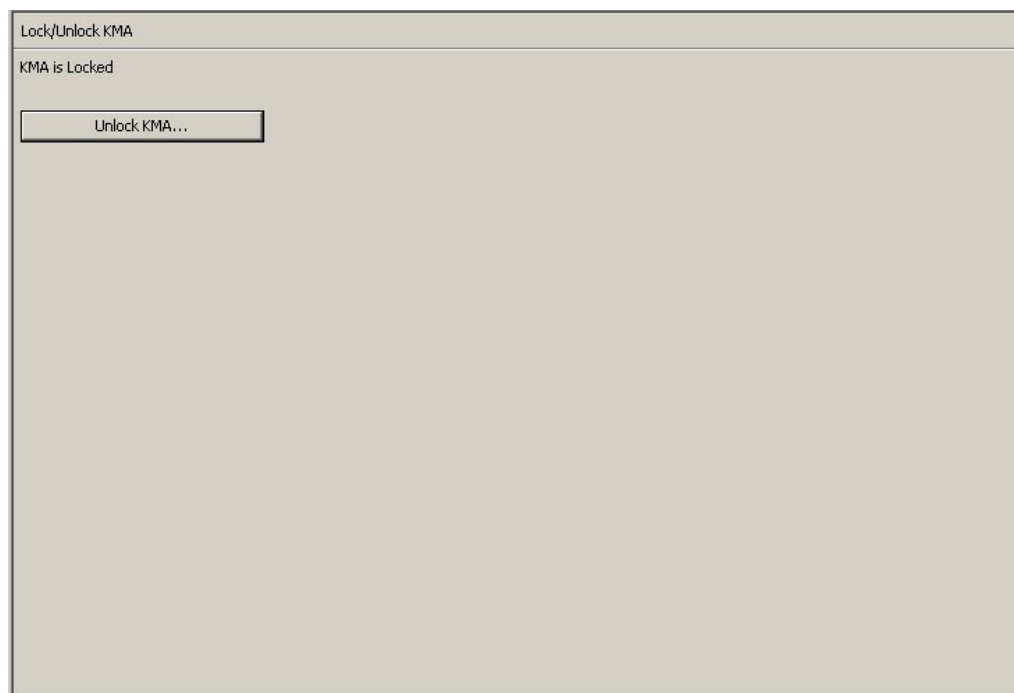
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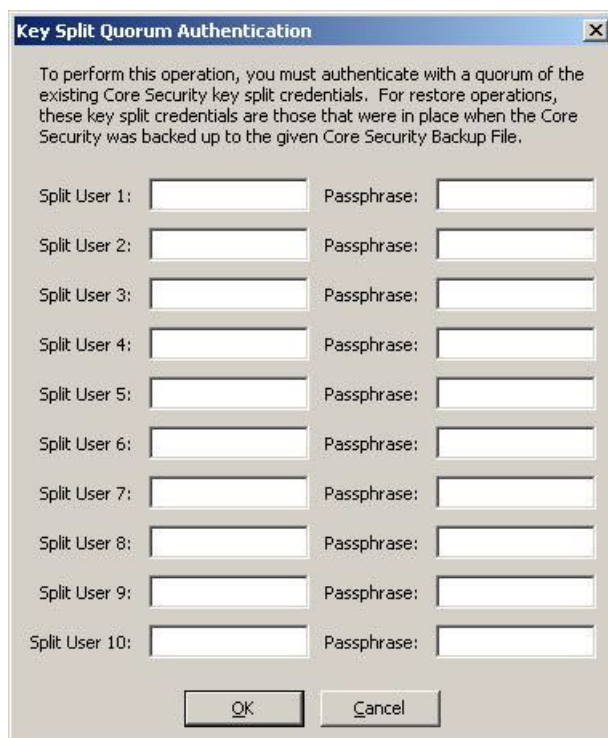
## Unlocking the KMA

To unlock the KMA:

1. From the Lock/Unlock KMA screen, click the **Unlock KMA** button.



2. The Key Split Quorum Authentication dialog box is displayed. The quorum must type their user names and passphrases to authenticate the operation.

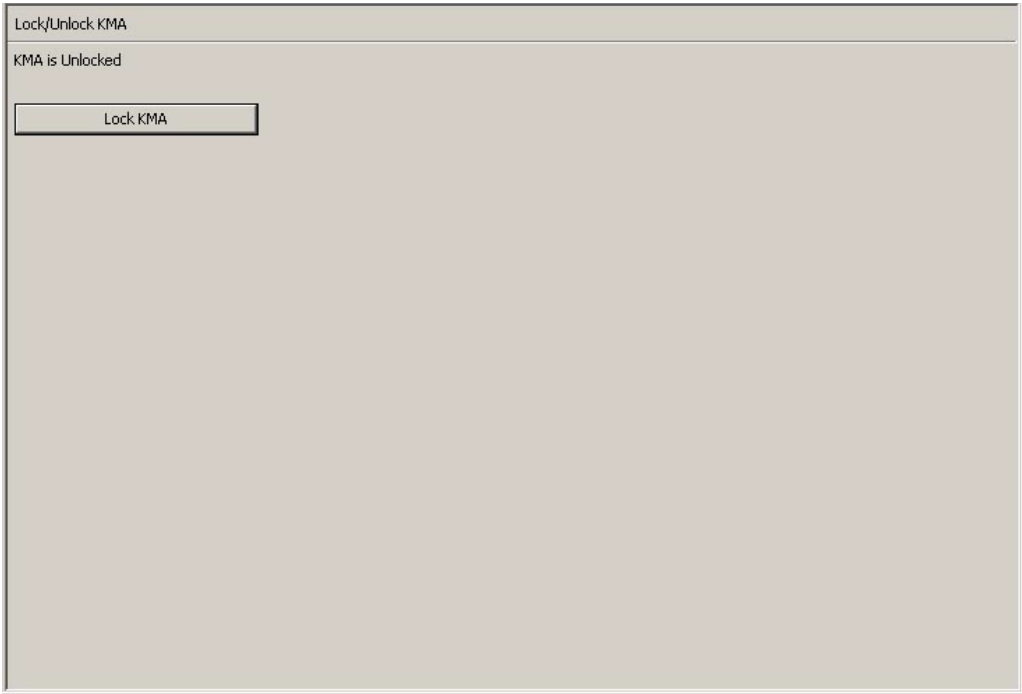


If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

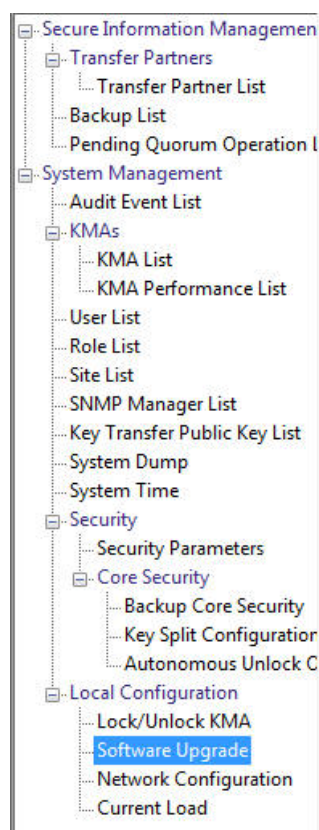
3. If the authentication is successful, the Key Split Quorum Authentication dialog box closes and the KMA is unlocked.



Software Upgrade

The Software Upgrade menu option allows you to apply software upgrades; however, this requires two separate phases:

- The Operator uploads a software upgrade file to the KMA and immediately applies the upgrade. See ["Uploading and Applying Software Upgrades"](#) on page 7-29 for detailed information.
- The Security Officer activates the inactive software version the Operator uploaded and applied.



Software updates are signed by Oracle and verified by the KMA before they are applied.

## Guidelines for Implementing Software Upgrades

- Before you execute this function, back up your system. For procedures, refer to ["Creating a Backup"](#) on page 8-3.
- Use an OKM Manager GUI release that matches the upgrade version you want to load on the KMA(s).
- KMAs running OKM 3.0 can display up to three software versions in the Software Upgrade screen. OKM 2.x GUIs cannot activate a software version on an OKM 3.0 KMA. Install and use an Oracle Key Manager 3.0 GUI before uploading or activating a software version on an OKM 3.0 KMA.
- For OKM 3.0 KMAs, the Software Upgrade screen displays software versions in reverse chronological order. That is, the newest version appears at the top of the list. Check the Active column to see which version is active.
- OKM 2.x KMAs **cannot** be upgraded to OKM 3.0. Do not attempt to upload and apply an OKM 3.0 upgrade package onto an OKM 2.x KMA.
- KMAs running KMS 2.1 or earlier must be upgraded to KMS 2.2 before they can be upgraded to OKM 2.3 and later.
- The upload and apply process can be lengthy if the OKM Manager is remotely connected to the KMA or if the connection between the OKM Manager and KMA is slow. To mitigate this, the software upgrade file can be downloaded to a laptop or workstation that has the OKM Manager installed and the laptop or workstation

connected to the same subnet as the KMA. The presence of a router between the OKM Manager and the KMA may slow down the upgrade process.

- The upload and apply processes, with a good connection between the OKM Manager and the KMA, optimally take about 30 minutes. The activate process optimally takes about 5 to 15 minutes. If the uploading process is very slow, try connecting to the same subnet as the KMA.
- Upload and apply the software upgrade file on each KMA one at a time (to help to spread out the network load), and then activate the software upgrade on each KMA one at a time (to minimize the number of KMAs that are offline concurrently).
- If any of the upgrade processes fail (upload, verify, apply, activate, switch replication version), the OKM Manager generates audit messages describing the reason for the failure and a suggested solution.
- The Technical Support account is disabled on the upgraded KMAs, and the accounts must be re-enabled if needed.

## Activating a Software Version

After the Operator uploads and applies the software upgrade, the Security Officer activates the inactive software version that the Operator uploaded and applied.

1. From the Local Configuration menu, select **Software Upgrade**. The Software Upgrade screen is displayed.

The active version of the software is highlighted, and the Active column is set to True. Any inactive versions are also shown. For OKM 3.0 KMAs, the version string has the following format: <OKM release>-5.11-<OKM build>. For example, 3.0.0-5.11-2012.

Software Upgrade

Available Software Versions:

Version	Install Date	Active	Current Replication Version	Supported Replication Versions
3.0.0-5.11-2022	2013-10-23T19:37	True	15	8,9,10,11,12,13,14,15

Software Upgrade File Name:

The buttons appearing on this screen include:

**Activate**

Select an inactive software version and then click this button to activate the selected software version. Messages are displayed, indicating when this software version is activated and the KMA reboots.

#### **Switch Replication Version**

Select the active software version and then click this button to switch the current replication version.

#### **Software Upgrade File Name**

The Operator can type the name of the software upgrade file.

#### **Browse**

The Operator can click this button to locate the software upgrade file on your local system.

2. Make sure there is a current backup of the OKM Cluster.

To activate the upgrade file, select the new version from the list of available versions at the top of the screen and click the **Activate** button. Until activated, the new version remains inactive on the system.

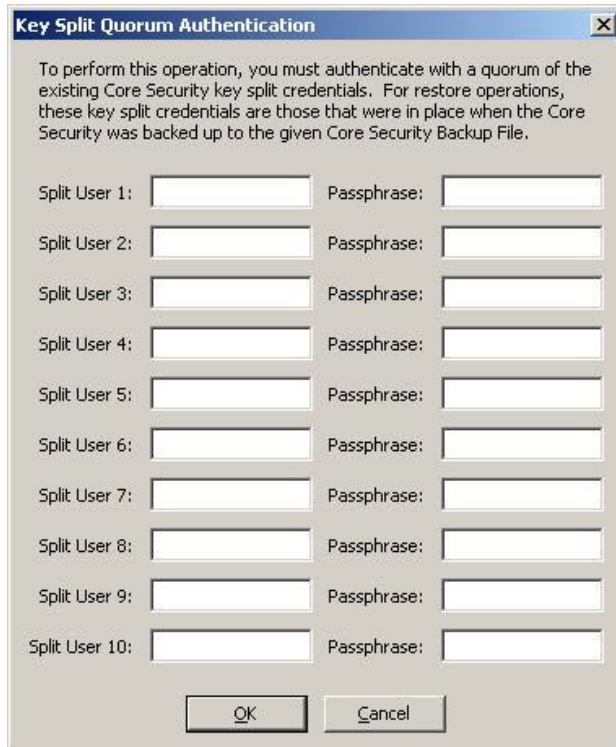
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**Note:** The KMA reboots as part of the activate process. Since the KMA is offline while it reboots, you may not want to activate KMAs simultaneously in a Cluster.

---

Users remain connected until you reboot the KMA. When you access the Software Upgrade screen again, the new uploaded software version is shown as the active version.

3. The Key Split Quorum Authentication dialog box is displayed. Users who have the quorum role must type their user names and passphrases to authenticate the operation.



**Key Split Quorum Authentication**

To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File.

Split User 1:  Passphrase:

Split User 2:  Passphrase:

Split User 3:  Passphrase:

Split User 4:  Passphrase:

Split User 5:  Passphrase:

Split User 6:  Passphrase:

Split User 7:  Passphrase:

Split User 8:  Passphrase:

Split User 9:  Passphrase:

Split User 10:  Passphrase:

If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

- The new software version may include new features available only when the OKM Cluster replication version is changed to a higher value.
- The OKM Cluster must be switched to the new replication version to enable all new features in the new software version.

Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

## Switching the Replication Version

Some features in the current software version are available only when the OKM Cluster replication version is set to the highest value supported by that software version.



The Security Officer manually sets the Replication Version. It is never changed automatically.

1. Log in to a KMA that has been activated and navigate to the Software Upgrade screen. If the Supported Replication Versions column includes a higher version than the Current Replication Version column, click the **Switch Replication Version** button.



2. Select a new replication version and click the **OK** button.

The Current Replication Version now displays the higher version, and the successful replication switch is sent to all other KMAs in the OKM Cluster.

---

**Note:** All KMAs in the Cluster should be responding and all KMAs must run a KMS or OKM version that supports the replication version that the Security Officer wants to set.

---

Table 5–2 summarizes the features that require a particular replication version (or higher) across the KMS and OKM releases.

**Table 5–2 Replication Versions/Features**

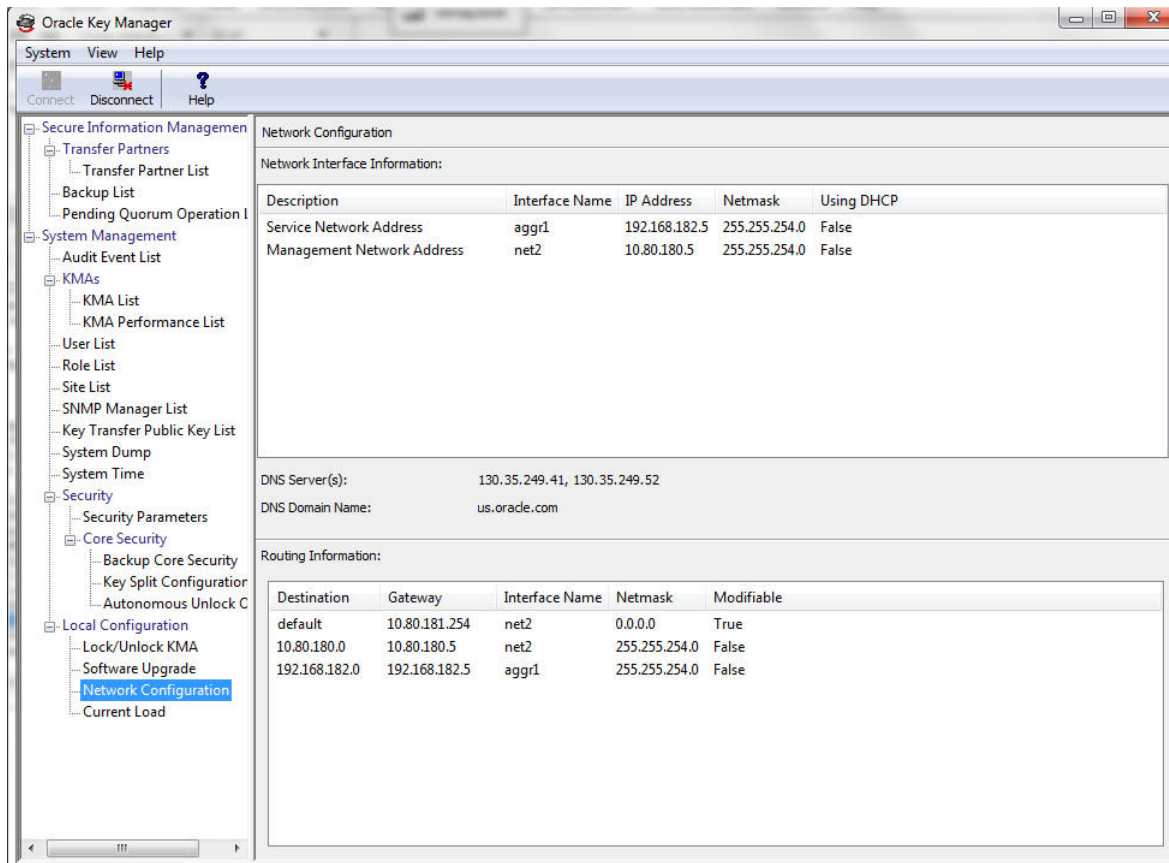
Replication Version	KMS/OKM Version	Features Enabled
8	2.0	Everything related to initial release
9	2.0.2	Keys In Backup (ready keys appear in backups)
10	2.1	IPv6 addresses AES Key Wrap (FIPS Mode)
11	2.2	ICSF integration Distributed Quorum SNMP Protocol version 2c
12	2.3	Accelerate initial updates
13	2.4	Agent Roaming
14	2.5.2	Allow Agents to revoke keys
15	3.0	Processing times available in performance reports

## Network Configuration Information

The Network Configuration menu option shows network configuration settings for the KMA to which you are currently connected. These settings are established in the configuration screens described in "Using the OKM Console" on page 11-1.

## Displaying the Network Configuration

To display the network configuration, from the Local Configuration menu, select **Network Configuration**. The Network Configuration screen is displayed.



The fields are described below:

### Description

Displays whether the related information applies to the Management or Service Network Address.

### Interface Name

The Management or Service Network Hostname established in the QuickStart program.

### IP Address

The IP address of the Management or Service Network.

### Netmask

The Subnet Mask address for the Management or Service Network.

### DNS Server(s)

One or more DNS name servers (if any) used by this KMA.

### DNS Domain Name

The DNS domain (if any) used by this KMA.

### DNS Configured by DHCP

An indication whether these DNS settings were configured implicitly by DHCP.

---

**Note:** When the Oracle Key Manager GUI is connected to an OKM 3.0 KMA, the Network Configuration Panel does not show the **DNS Configured by DHCP** checkbox. QuickStart displays DNS information acquired by DHCP, but the user must enter static DNS information or disable it entirely, as described in "[Specifying the DNS Settings](#)" on page 2-12. Thus, the **DNS Configured by DHCP** checkbox does not appear.

---

### Using DHCP

Indicates whether or not the Management or Service Network uses DHCP.

### Destination

The subnet that network traffic goes to from this KMA.

### Gateway

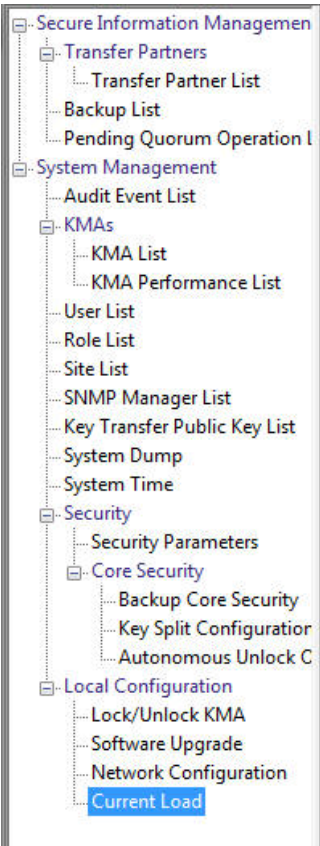
The Gateway IP address that network traffic is routed to for the Management or Service Network.

### Modifiable

Indicates whether or not the Gateway configuration is modifiable. Gateways that are configured automatically are not modifiable.

## Current Load Menu

This menu allows you to query load information about the KMA the GUI is connected to. All user roles can access this information.



## Displaying Current Load

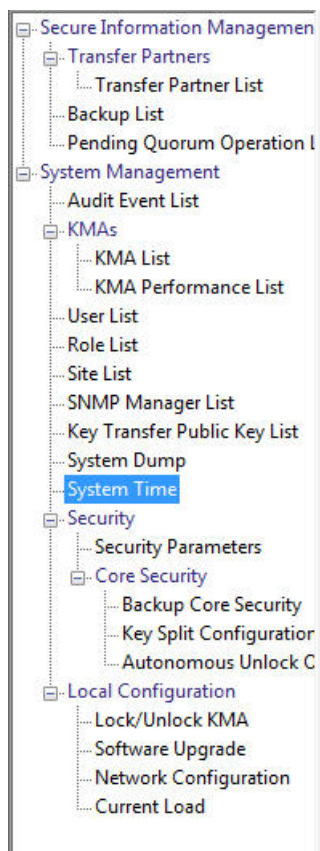
To display the current load, click Current Load on the Local Configuration menu.

Current Load	
KMA Uptime:	7:11 HH:MM
OKM process up since:	04:12:49 UTC
Long-running operation(s) in progress:	None
OKM process resource usage:	
Virtual memory (KB):	36,276
Resident set size (KB):	13,248
Number of threads (total):	32
Number of port listener threads:	6
Number of open files:	81
TCP socket count by state:	
Listen:	6
Established:	1
Time-wait:	11
Close-wait:	0

## System Time Menu

The System Time menu option gives you the ability to set the system clock to which you are connected. To ensure the correct operation of the OKM solution, it is very

important to maintain the times reported by each KMA in a Cluster within five minutes of each other. You can provide an IPv6 address for an external NTP server.



## Retrieving the Local Clock Information

To retrieve the local clock information:

From the System Management menu, select **System Time**. The System Time screen is displayed.

The screenshot shows a web-based interface titled "System Time". It contains two text input fields: "Current System Time:" with the value "12/21/2007 10:52:07 AM" and "System Time Retrieved at:" with the value "12/21/2007 10:51:30 AM". Below these fields is a button labeled "Adjust Time...". Further down, there is an "NTP Server:" label followed by an empty text input field, and a button labeled "Specify NTP Server".

The fields and their descriptions are given below:

**Current System Time**

Displays the current system time.

**System Time Retrieved At**

Displays the local Client time when the KMA's system time was retrieved.

**Adjust Time**

Click this button to modify the system time.

If you want to modify the KMA's clock, click the Adjust Time button. For more information, refer to "[Adjusting the KMA's Local Clock](#)" on page 5-98 below.

**NTP Server**

Displays the NTP server that this KMA uses (if any). The Security Officer can provide an IPv6 address for an external NTP server. This IPv6 address must not include square brackets or a prefix length.

**Specify NTP Server**

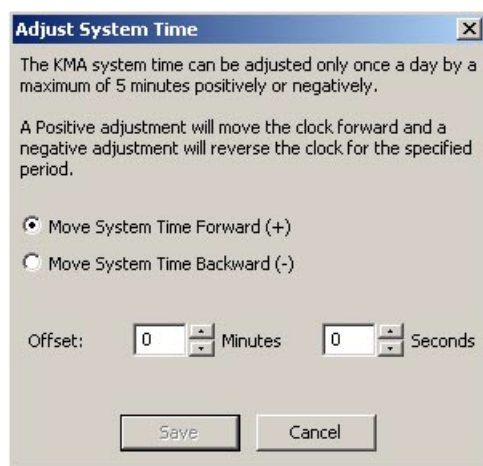
Click this button to specify the NTP server to be used by this KMA.

## Adjusting the KMA's Local Clock

You can only adjust a KMA's clock once a day by a maximum of plus or minus 5 minutes. A positive (+) adjustment slowly moves the clock forward, whereas a negative (-) slowly moves the clock backward.

To adjust the KMA's local time:

1. From the System Time menu, click the **Adjust Time** button. The Adjust System Time dialog box is displayed.



2. Select the "Move System Time Forward (+)" radio button if you want to apply a positive adjustment to the clock. Otherwise, select the "Move System Time Backward(-)" radio button if you want to apply a negative adjustment to the clock.
3. In the Offset Minutes text box, select a numeric value.
4. In the Offset Seconds text box, select a numeric value.

---

**Note:** If the specified offset is too large, an Error message is displayed, prompting you to type a smaller value. Click the **OK** button to close this dialog box and type a new value.

---

5. Click the **Save** button to accept the changes. The System clock is adjusted.





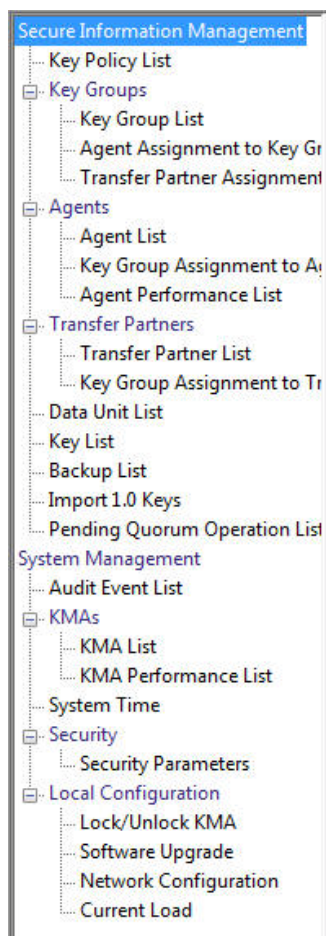
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## Compliance Officer Operations

This chapter describes the operations that a user who has been given a Compliance Officer role can perform. If you have been assigned multiple roles, refer to the appropriate chapter for instructions on performing the specific role.

### Compliance Officer Role

The Compliance Officer manages the flow of data through your organization and has the ability to define and deploy data contexts (Key Groups) and rules that determine how data is protected and ultimately destroyed (Key Policies). The menus that provide these functions are shown below.



## Key Policies

Key Policies provide guidance for managing data. The OKM Manager uses Key Policies to determine how data is protected and destroyed. Key Policies must be created before keys can be created and delivered to agents.

Only a Compliance Officer can create and modify Key Policies. This ensures that the data complies with a policy throughout the data's lifetime.

## Key Policy List Menu

The Key Policies List menu allows you to manage the Key Policies in your organizations.

The Key Policy List menu option gives you the ability to:

- View Key Policies
- View/Modify a Key Policy's Details
- Create a Key Policy
- Delete existing Key Policies.

## Viewing Key Policies

To view Key Policies:

1. From the Secure Information Management menu, select **Key Policy List**. The Key Policy List screen is displayed.

The screenshot shows the 'Key Policy List' window. At the top, there is a filter section with 'Filter: Key Policy ID' and a dropdown menu set to 'equals'. Below this is a search bar and a '+' button. To the right of the search bar are buttons for 'Use', 'Refresh', 'Reset', and navigation arrows. Below the search bar, it says 'Results in page: 1 (last page)'. The main area contains a table with the following data:

Key Polic...	Description	Key Type	Encryption Period	Cryptoperiod	Allow Export From	Allow Import To	Allow Agents To Revoke Keys
MyKeyPolicy		AES-256	1 Year	2 Years	True	True	True

At the bottom of the window, there are buttons for 'Details...', 'Create...', and 'Delete'.

You can also scroll through the database and filter the Key Policy list by any of the following keys:

- Key Policy ID
- Description
- Key Type
- Encryption Period
- Cryptoperiod
- Allow Export From
- Allow Import To

- Allow Agents To Revoke Keys.

The **Use** button applies the filter to the displayed list for the Key Policy.

The fields and their descriptions are given below:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA.

Possible values are:

- Key Policy ID
- Description
- Key Type
- Encryption Period
- Cryptoperiod
- Allow Export From
- Allow Import To

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~
- Empty
- Not empty

**Filter Value text box:**

Type a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

**Filter Value combo box:**

Click the down-arrow and select a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

Click the plus button to add additional filters.

Click the minus button to remove a filter. This button is only displayed if there is more than one filter shown.

**Use:**

Click this button to apply the selected filters to the displayed list and go to the first page.

**Refresh:**

Click this button to refresh the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.

**Results in Page:**

Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**Key Policy ID**

Displays the unique identifier that distinguishes each Key Policy. This value can be between 1 and 64 (inclusive) characters. Key Policy IDs cannot be changed once they are created.

**Description**

Describes the Key Policy. This value can be between 1 and 64 (inclusive) characters.

**Key Type**

Indicates the type of encryption algorithm that Keys associated with this Key Policy use. The only possible value is AES-256.

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**Note:** Encryption Period and Cryptoperiod begin when the key is first given to an Agent. Encryption period and Cryptoperiod cannot be changed for a policy. This is to avoid a change in the Key Policy from affecting large numbers of keys.

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**Encryption Period**

Displays how long keys associated with this Key Policy can be used to encrypt or decrypt data. The time interval units are: minutes, hours, days, week, months, or years.

**Cryptoperiod**

Displays how long keys associated with this Key Policy can be used to decrypt (but not encrypt) data. The time interval units are: minutes, hours, days, week, months, or years.

**Allow Export From**

Indicates whether Data Unit keys associated with this Key Policy can be exported. Possible values are True or False.

**Allow Import To**

Indicates whether Data Unit keys associated with this Key Policy can be imported. Possible values are True or False.

If you want to create a Key Policy, click the **Create** button. For more information, refer to ["Creating a Key Policy"](#) on page 6-5.

If you want to view / modify a Key Policy, highlight the Key Policy and click the **Details** button. For more information, refer to ["Viewing/Modifying a Key Policy"](#) on page 6-7.

If you want to delete a Key Policy, click the **Delete** button. For more information, refer to ["Deleting a Key Policy"](#) on page 6-7.

### Allow Agents To Revoke Keys

Allows agents using a Key Group that specifies this key policy to deactivate (revoke) the keys associated with them, even if the keys are in an operational state such as protect-and-process.

Select the **Allow Agents To Revoke Keys** check box to set the attribute to **True** (deactivate). Deselect the check box to set the attribute to **False**, disallowing agents from revoking keys that are in an operational state. **False** is the default.

The OKM Cluster must use Replication Version 14 or later before this attribute can be set to **True**.

Tape drive agents should use the default value (**False**).

Applications using a pkcs11\_kms provider (see ["OKM's PKCS#11 Provider"](#) on page B-2) should be configured to use an agent with a default key policy set to **True** if they want to call to revoke a key they will no longer use, such as in a re-key operation. ZFS encryption is an example of a pkcs11\_kms application.

## Creating a Key Policy

To create a Key Policy:

1. From the Key Policy List screen, click the **Create** button. The Create Key Policy dialog box is displayed.

2. Complete the following parameters:

#### Key Policy ID

Type a value that identifies the policy. This value can be between 1 and 64 (inclusive) characters.

#### Description

Type a value that describes the policy. This value can be between 1 and 64 (inclusive) characters. This field can be blank.

### Encryption Period

Displays how long keys associated with this Key Policy can be used to encrypt or decrypt data. The time interval units are: minutes, hours, days, week, months, or years.

### Cryptoperiod

Displays how long keys associated with this Key Policy can be used to decrypt (but not encrypt) data. The time interval units are: minutes, hours, days, week, months, or years.

### Flags

#### Allow Export From

Indicates whether Data Unit keys associated with this Key Policy can be exported. Possible values are True or False.

#### Allow Import To

Indicates whether Data Unit keys associated with this Key Policy can be imported. Possible values are True or False.

#### Allow Agents To Revoke Keys

Allows agents using a Key Group that specifies this key policy to deactivate (revoke) or activate the keys associated with them, even if the keys are in an operational state such as protect-and-process.

Select the **Allow Agents To Revoke Keys** check box to set the attribute to True (deactivate). Deselect the check box to set the attribute to False (activate). False is the default.

- Click the **Save** button to save the Key Policy. The new Key Policy is displayed in the Key Policy List screen. It can now be used by Key Groups.

The screenshot shows the 'Key Policy List' window. At the top, there is a filter section with a dropdown menu set to 'Key Policy ID', an equals sign, and a text input field. Below this are buttons for 'Use', 'Refresh', 'Reset', and navigation arrows. The main area displays a table with the following data:

Key Policy ID	Description	Key Type	Encryption Period	Cryptoperiod	Allow Export From	Allow Import To
AnotherPolicy	Just a test	AE5-256	1 Year	1 Year	True	True
MyKeyPolicy	The desc	AE5-256	1 Year	2 Years	True	True

At the bottom of the window are buttons for 'Details...', 'Create...', and 'Delete'.

## Viewing/Modifying a Key Policy

---

**Note:** Only a Compliance Officer can view a Key Policy's detailed information.

---

To modify a Key Policy's details:

1. From the Key Policy List screen, double-click a Key Policy for which you want more information or highlight a Key Policy and click the **Details** button. The Key Policy Details dialog box is displayed.



The 'Key Policy Details' dialog box is shown. It contains the following fields and options:

- Key Policy ID:** MyKeyPolicy
- Description:** (empty text box)
- Encryption Period:** 1 Year(s)
- Cryptoperiod:** 2 Year(s)
- Flags:**
  - ☒ Allow Export From
  - ☒ Allow Import To
  - ☒ Allow Agents To Revoke Keys
- Key Type:** AES-256
- Buttons:** Save, Cancel

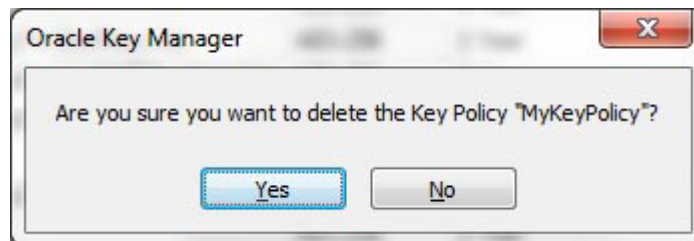
2. You can change the Description, Allow Export From, Allow Import To, and Allow Agents To Revoke Keys check boxes, as required. When you are finished, click the **Save** button to save the changes. After the system verifies and validates the new Key Policy, the Key Group is associated with the new Key Policy.
3. If you click the **Cancel** button, your changes are not saved and the dialog box closes.

## Deleting a Key Policy

A key policy can only be deleted if it is not used by any Key Group or key.

To delete a Key Policy:

1. From the Key Policy List screen, highlight the Key Policy you want to delete and click the **Delete** button. The following dialog box is displayed, prompting you to confirm that you want to delete the specific Key Policy.



The 'Oracle Key Manager' confirmation dialog box is shown. It contains the following text and buttons:

- Title:** Oracle Key Manager
- Message:** Are you sure you want to delete the Key Policy "MyKeyPolicy"?
- Buttons:** Yes, No

- Click the **Yes** button to delete the Key Policy. The Key Policy is removed from the database. You are returned to the Key Policy List screen, where the Key Policy is removed from the list.

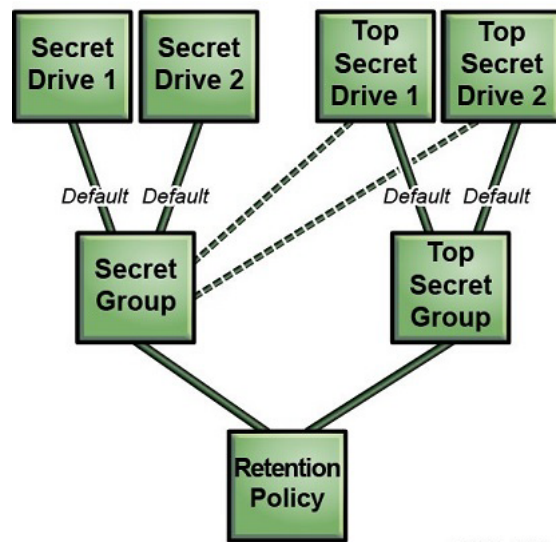
## Key Groups

A Key Group represents a data context that determines the Key Policy to which it applies and the Agents that can access it. When a Key is assigned to an agent and is first used for a Data Unit, it is associated with a Key Group. When you create a Key Group, you must select a Key Policy. The selected Key Policy is applied to Keys in that Key Group.

Agents are associated with Key Groups. An Agent has one or more keys groups that it is allowed to access. An Agent can only retrieve keys belonging to Key Groups it is allowed to access. An Agent may also have a default Key Group. When an agent allocates a new key, the key is placed in the agents default Key Group. An agent can only allocate new keys if it has a default Key Group.

Figure 6–1 shows the relationship between Key Groups, Key Policies, Agents, and Data Units.

**Figure 6–1 Key Group Relationship with Key Policies, Agents, Data Units**

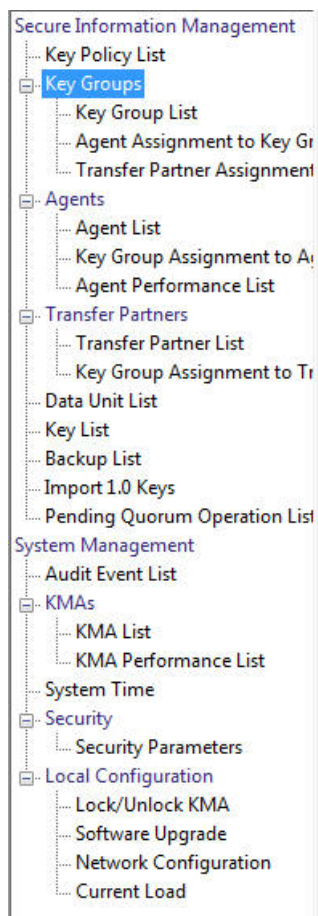


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## Key Groups Menu

The Key Groups menu includes the Key Group List menu option, which allows the Compliance Officer to manage Key Groups.





## Key Group List Menu

The Key Group List menu option gives you the ability to:

- View Key Groups
- Create a Key Group
- Modify existing Key Groups
- Delete existing Key Groups.

## Viewing Key Groups

To view all Key Groups:

From the Key Groups menu, select **Key Group List**. The Key Group List screen is displayed.

Key Group List

Filter: Key Group ID =

Use Refresh Reset | < << >> >

Results in page: 2 (last page)

Key Group ID	Description	Key Policy ID
Key Group 1	This is the first Key Group	MyKeyPolicy
MyKeyGroup	This is a key group	MyKeyPolicy

Details... Create... Delete

You can scroll through the database and filter through the Key Group list by any of the following keys:

- Key Group ID
- Description
- Key Policy ID.

The **Use** button applies the filter to the displayed list for the Key Group.

The fields and their descriptions are given below:

**Filter:**

Select filter options to filter the displayed list of Key Groups. Only Key Groups that satisfy all filters are displayed.

**Filter Attribute combo box:**

Click the down-arrow and select an attribute to filter by. Possible values are:

- Key Group ID
- Description
- Key Policy ID.

**Filter Operator box:**

Click the down-arrow and select the filter operation to apply to the selected attribute. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=

- Less than or equals <=
- Starts with ~
- Empty
- Not empty.

**Filter Value text box:**

Type a value to filter the selected attribute by.

**Filter Value combo box:**

Click the down-arrow and select a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

Click the plus button to add additional filters.

Click the minus button to remove a filter. This button is only displayed if there is more than one filter shown.

**Use:**

Click this button to apply the selected filters to the displayed list and go to the first page.

**Refresh:**

Click this button to refresh the displayed list. This does not apply filters selected since the last Use or Reset, and does not change the page of the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.

**Results in Page:**

Displays the number of items that can be displayed on the current page. Appends "(last page)" to the number of items if you are at the end of the list. The maximum number of items displayed on a page is defined by the Query Page Size value on the Options dialog.

**Key Group ID**

Displays the unique identifier that distinguishes each Key Group. This value can be between 1 and 64 (inclusive) characters. The Key Group ID cannot be changed once it is defined.

**Description**

Describes the Key Group. This value can be between 1 and 64 (inclusive) characters.

**Key Policy ID**

Displays a unique identifier for an existing Key Policy that applies for every Data Unit in the Key Group.

The Key Policy ID for an existing Key Group cannot be changed. This is to avoid a change affecting a large number of keys.

If you want to create a Key Group, click the **Create** button. For more information, refer to ["Creating a Key Group"](#) on page 6-12.

If you want to view/modify a Key Group, highlight the Key Group and click the **Details** button. For more information, refer to ["Viewing/Modifying a Key Group's Details"](#) on page 6-13.

If you want to delete a Key Group, click the **Delete** button. For more information, refer to ["Deleting a Key Group"](#) on page 6-14.

## Creating a Key Group

To create a new Key Group:

1. From the Key Group List screen, click the **Create** button. The Create Key Group dialog box is displayed.

A screenshot of the 'Create Key Group' dialog box. The dialog has a title bar with the text 'Create Key Group' and a close button (X). Inside the dialog, there are three input fields: 'Key Group ID:' with a text box, 'Description:' with a text box, and 'Key Policy ID:' with a dropdown menu showing 'Please Select a Key Policy'. At the bottom of the dialog are two buttons: 'Save' and 'Cancel'.

2. Complete the following parameters:

### Key Group ID

Type a value that identifies the Key Group. This value can be between 1 and 64 (inclusive) characters.

### Description

Type a value that describes the Key Group. This value can be between 1 and 64 (inclusive) characters.

### Key Policy ID

Click the down-arrow and select the Key Policy with which you want to associate this Key Group. When creating a new Key Group, existing Key Policies are displayed.

3. Click the **Save** button. The new Key Group is created and saved in the database and is displayed in the Key Group List screen. It can now be used by Data Units, Agents, and so forth.

Key Group List

Filter: Key Group ID =  +

Use Refresh Reset | < << >> >

Results in page: 3 (last page)

Key Group ID	Description	Key Policy ID
Customer Rec...	Evaluation Lists	MyKeyPolicy
Key Group 1	This is the first Key Group	MyKeyPolicy
MyKeyGroup	This is a key group	MyKeyPolicy

Details... Create... Delete

## Viewing/Modifying a Key Group's Details

**Note:** If you are not a Compliance Officer, when you view a Key Group's detailed information, all fields, including the Save button are disabled.

To modify a Key Group:

1. From the Key Group List screen, double-click a Key Group entry for which you want more information or highlight a Key Group entry and click the **Details** button. The Key Group Details dialog box is displayed.

Key Group Details

Key Group ID: Customer Records

Description: Evaluation Lists

Key Policy ID: MyKeyPolicy

Save Cancel

The following parameters are displayed:

**Key Group ID:**

Uniquely identifies the Key Group. This field is read-only.

**Description:**

Type a value that describes the Key Group. This value can be between 1 and 64 (inclusive) characters. This field can be blank.

**Key Policy ID:**

Displays a unique identifier for an existing Key Policy that is associated with the Key Group and all the Keys in the Key Group. This field is read-only.

2. The Description field is the only field that can be modified. When you are finished, click the **Save** button to save the changes. You are returned to the Key Group List screen.

## Deleting a Key Group

---

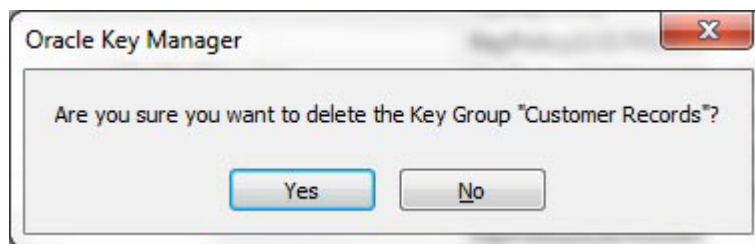
**Note:** You cannot delete a Key Group if it is active, that is, to which Agents or Data Units are assigned.

---

To delete a Key Group:

1. From the Key Groups List screen, highlight the Key Group you want to delete and click the **Delete** button. The following Confirmation dialog box is displayed, prompting you to confirm that you want to delete the selected Key Group.

A Key Group can only be deleted if it is not used by any key and is not associated with any Agent.

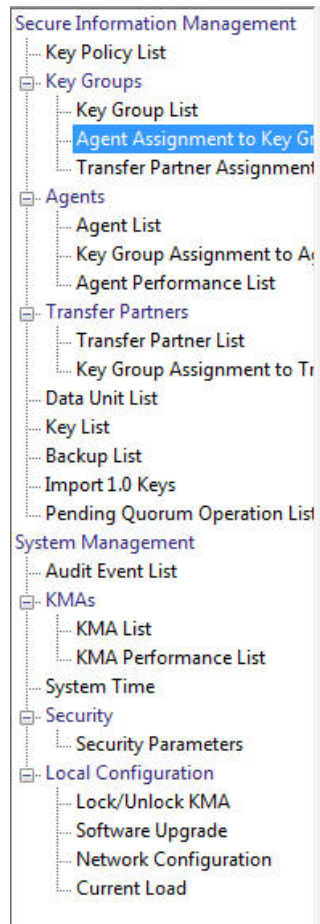


2. Click the **Yes** button to delete the Key Group. The Key Group and its associated entries are deleted from the database. You are returned to the Key Groups List screen, where the Key Group is no longer listed.

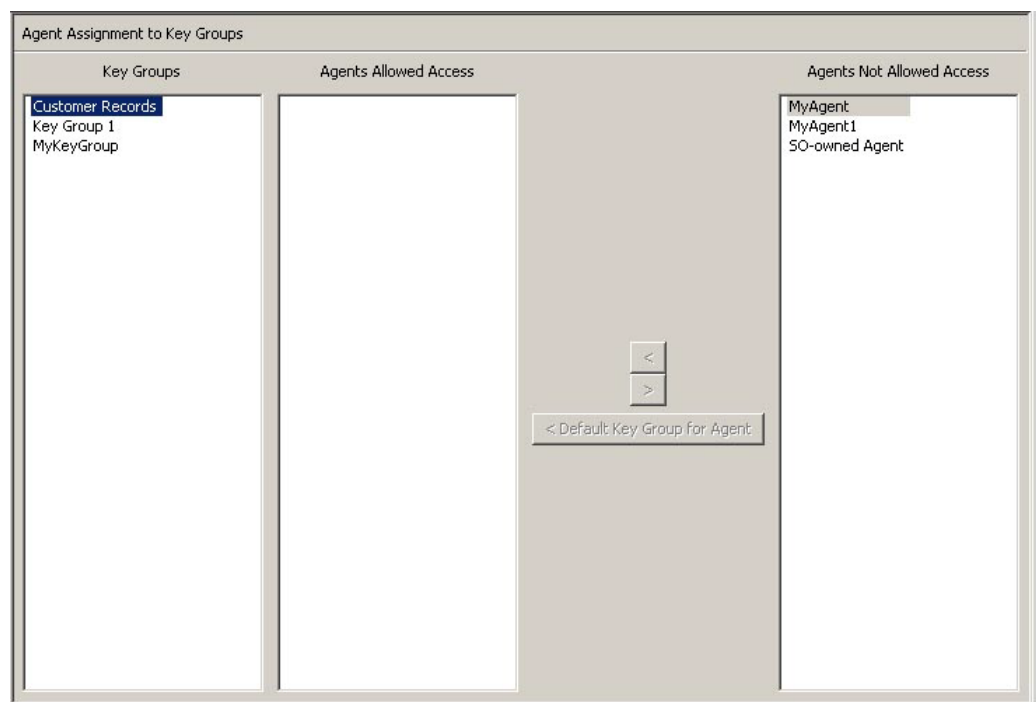
## Agent Assignment to Key Groups Menu

The Agent Assignment to Key Groups menu option gives you the ability to assign Agents to Key Groups. When you assign Agents to Key Groups, it determines the storage devices that the Agent can access. It is the converse of the Key Group Assignment menu option under the Agents menu, both accomplishing the same result.

**Important** – You must set a default Key Group for an Agent before that Agent can allocate keys.



To view Agents assignments, from the Key Groups menu, select **Agent Assignment to Key Groups**. The Agent Assignment to Key Groups screen is displayed.

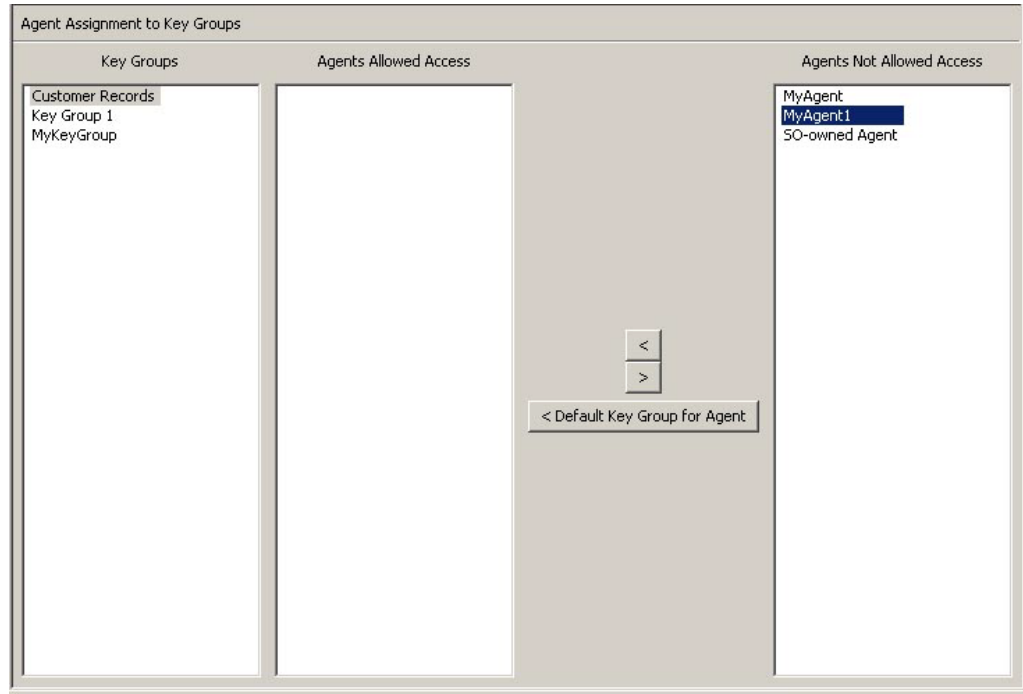


The Key Groups column lists the Key Groups. The Agents Allowed Access column lists the Agents that are assigned to the selected Key Group(s). The Agents Not Allowed Access column lists the Agents that are not assigned to the selected Key Group(s).

## Assigning an Agent to a Key Group

To assign an Agent to a Key Group:

1. In the Key Groups column, highlight the Key Group you want. In the Agents Not Allowed Access column, highlight the Agent you want to add and click the Move to back-arrow button.



2. The selected Agent is moved to the Agents Allowed Access column, indicating that the Agent is successfully added to the selected Key Group's Agent list.



Agent Assignment to Key Groups

Key Groups	Agents Allowed Access	Agents Not Allowed Access
Customer Records	MyAgent1	MyAgent
Key Group 1		SO-owned Agent
MyKeyGroup		

< >

< Default Key Group for Agent

To assign Agents to a Key Group and set the Default Key Group:

1. From the Agent Assignment to Key Groups screen, select the Key Group you want in the Key Groups list.
2. In the Agents Not Allowed Access list, select one or more Agents you want to add and set the Default Key Group for.
3. Click the **Default Key Group for Agent** button. The selected Agents are moved to the Agents Allowed Access list and their Default Key Group is set to the Key Group. The Agents are now allowed access to the Key Group.

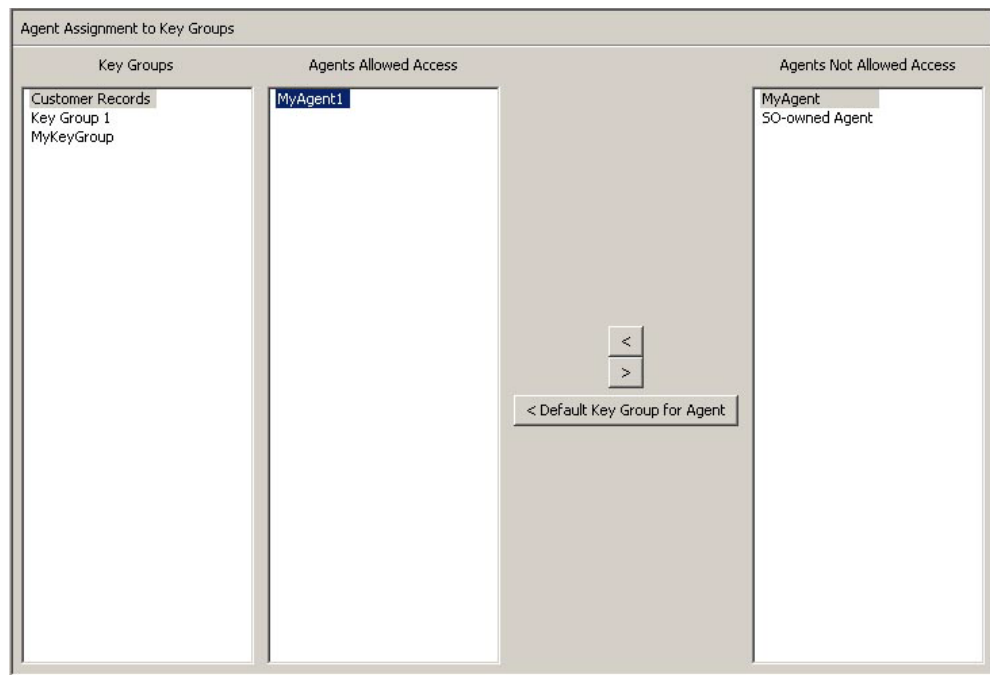
To set the Default Key Group for already assigned Agents:

1. From the Agent Assignment to Key Groups screen, select the Key Group you want in the Key Groups list.
2. In the Agents Allowed Access list, select one or more Agents that do not have the selected Key Group as their Default Key Group.
3. Click the **Default Key Group for Agent** button. The selected Agents' Default Key Group is set to the Key Group.

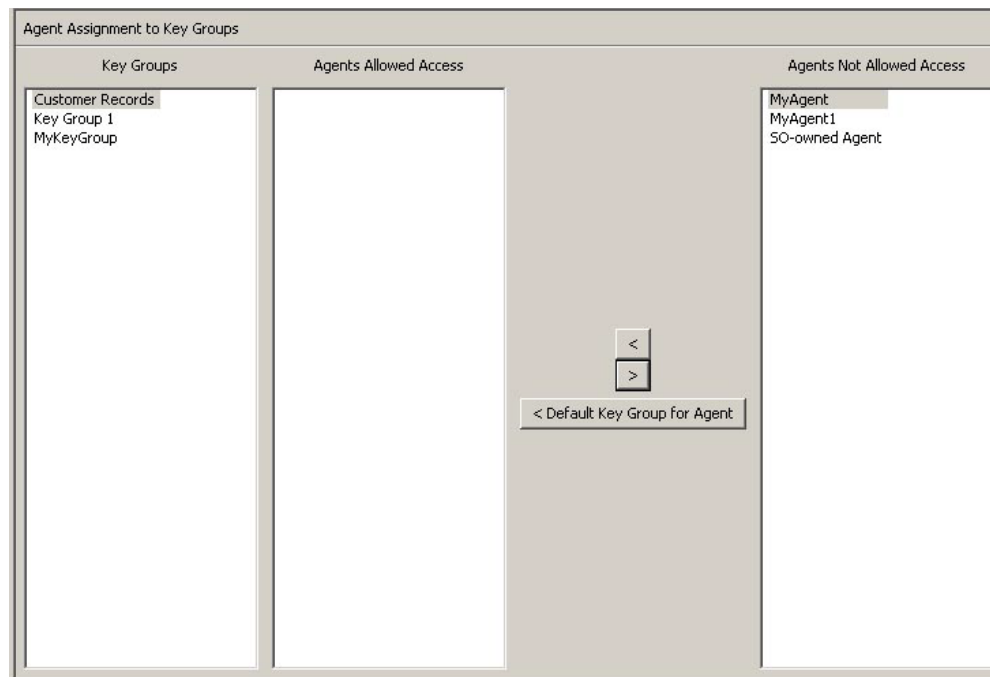
## Removing an Agent from a Key Group

To remove an Agent from a Key Group's Agent list:

1. In the Key Groups column, highlight the Key Group you want. In the Agents Allowed Access column, highlight the Agent you want to remove, and click the Move from forward-arrow button.

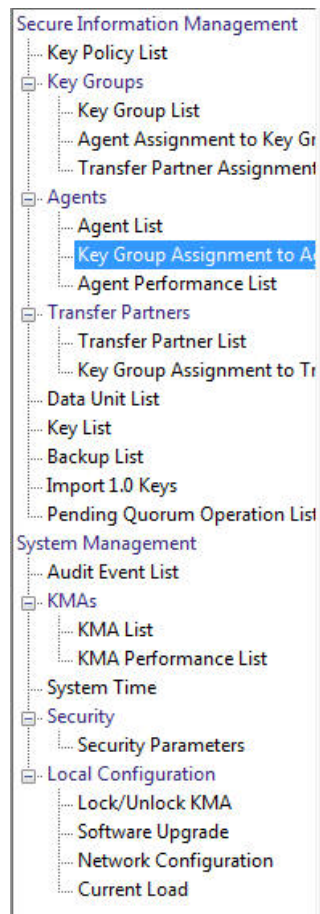


2. The selected entry is removed from the Agents Allowed Access column and is listed in the Agents Not Allowed Access column. It is no longer assigned to the selected Key Group.



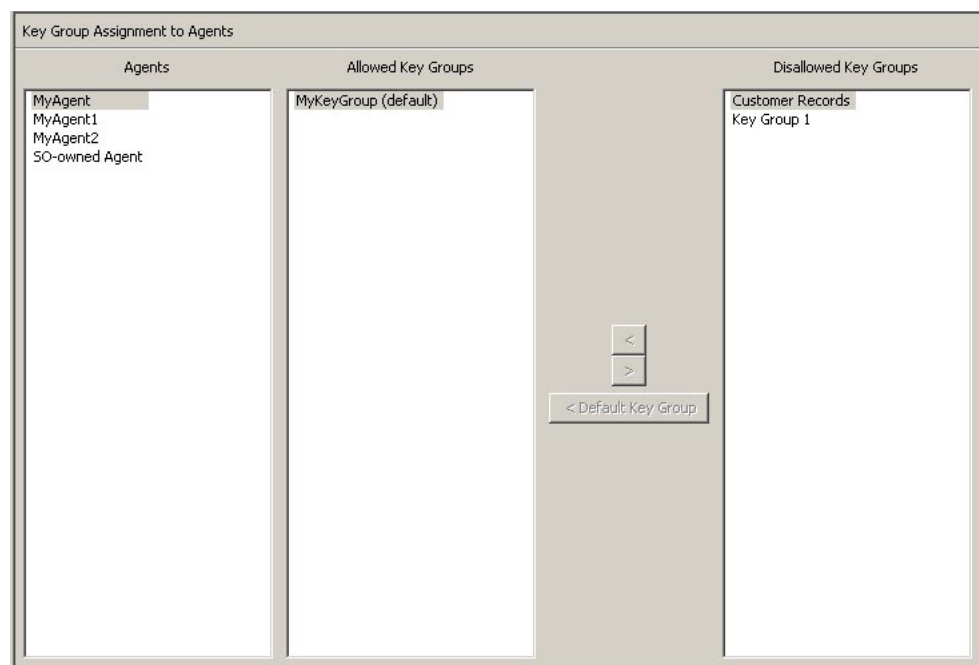
## Key Group Assignment to Agents Menu

The Key Group Assignment to Agents menu option allows you to assign Key Groups to Agents. It is the converse of the Agent Assignment to Key Groups menu option, both accomplishing the same result.



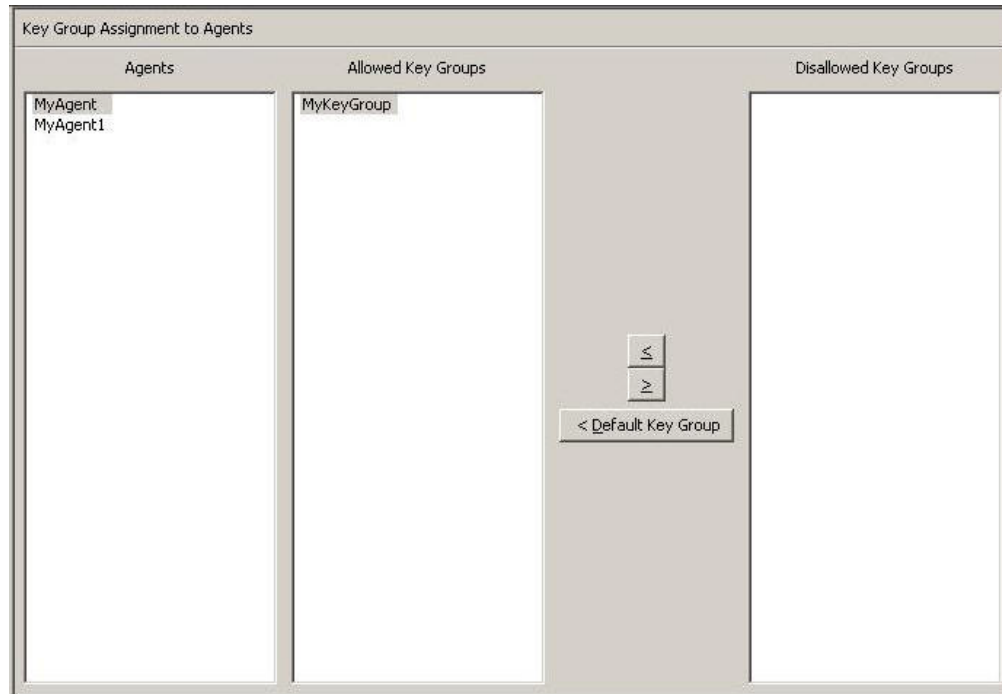
To view the Key Groups:

1. From the Agents menu, select **Key Group Assignment**. The Key Group Assignment to Agents screen is displayed.



The Agents column lists the Agents in the database. The Allowed Key Groups column lists the Key Groups which the Agent can access. The Disallowed Key Groups column lists the Key Groups which the Agent cannot access.

2. Clicking an Agent entry displays the Key Group that are members or non-members of the selected Agent.



## Assigning a Key Group to an Agent

To assign a Key Group to an Agent:

1. From the Key Group Assignment to Agents screen, in the Agents column, highlight the Agent you want. In the Disallowed Key Groups column, highlight the Key Group you want to add and click the Move to back-arrow button.

Key Group Assignment to Agents

Agents	Allowed Key Groups	Disallowed Key Groups
MyAgent MyAgent1 MyAgent2 SO-owned Agent	MyKeyGroup (default)	Customer Records Key Group 1

< >

< Default Key Group

2. The selected entry is moved to the Allowed Key Groups column and the Key Group is successfully added to the selected Agent.

Key Group Assignment to Agents

Agents	Allowed Key Groups	Disallowed Key Groups
MyAgent MyAgent1 MyAgent2 SO-owned Agent	Customer Records MyKeyGroup (default)	Key Group 1

< >

< Default Key Group

To assign a Key Group to an Agent as the Default Key Group:

1. From the Key Group Assignment to Agents screen, select the Agent you want in the Agents list.
2. In the Disallowed Key Groups list, select one Key Group you want to add and set the Default Key Group for.

3. Click the **Default Key Group** button. The selected Key Group is moved to the Allowed Key Groups list and is set as the Default Key Group for the Agent. The Agent is now allowed access to the Key Group.

To set an already assigned Key Group to the Default Key Group:

1. From the Key Group Assignment to Agents screen, select the Agent you want in the Agents list.
2. In the Allowed Key Groups list, select one Key Group that is not the Default Key Group for the Agent.

Click the **Default Key Group** button. The Agent's Default Key Group is set to the selected Key Group.

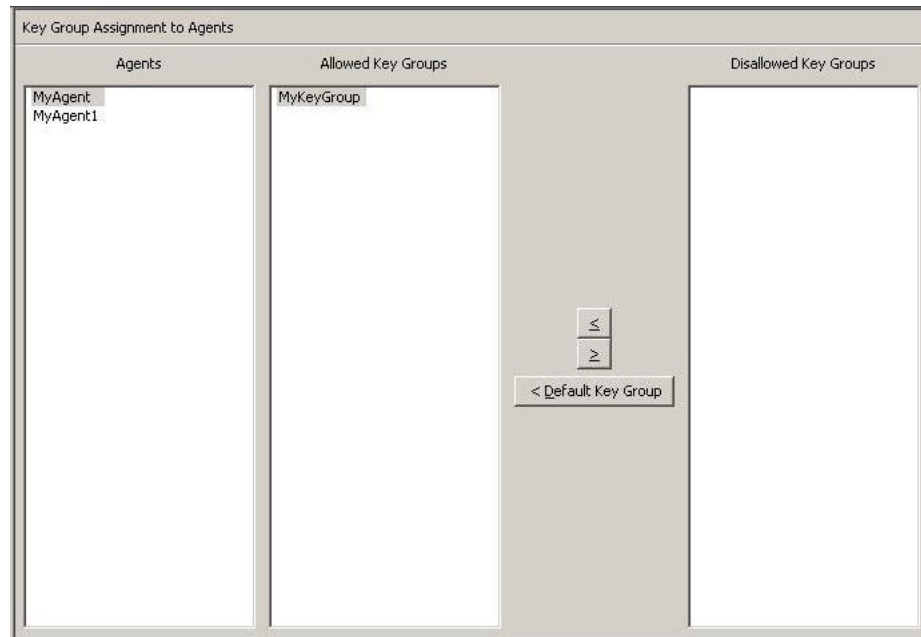
## Removing a Key Group from an Agent

To remove a Key Group to an Agent:

1. From the Key Group Assignment to Agents screen, in the Agents column, highlight the Agent you want. In the Allowed Key Groups column, highlight the Key Group you want to remove and click the Move from forward-arrow button.

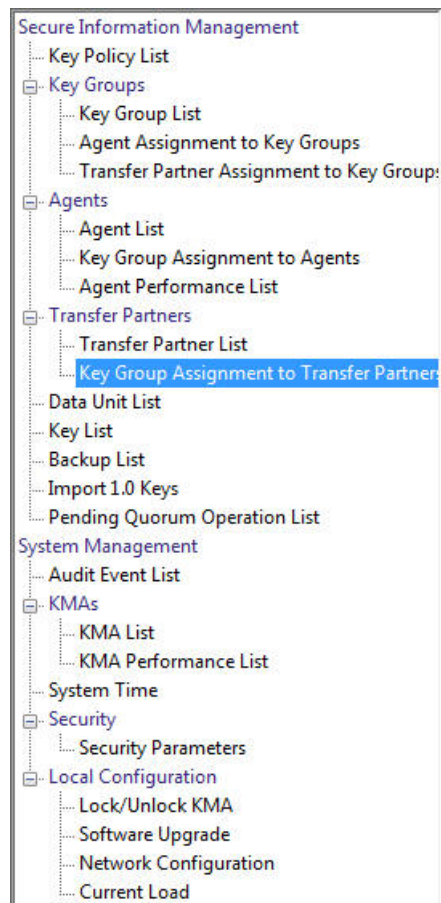
The screenshot shows the 'Key Group Assignment to Agents' interface. It has three main columns: 'Agents', 'Allowed Key Groups', and 'Disallowed Key Groups'. The 'Agents' column contains a list with 'MyAgent' selected. The 'Allowed Key Groups' column contains 'MyKeyGroup (default)'. The 'Disallowed Key Groups' column contains 'Customer Records' and 'Key Group 1'. Between the 'Allowed Key Groups' and 'Disallowed Key Groups' columns, there are two buttons: a 'Move from' button with a right-pointing arrow and a '< Default Key Group' button.

2. The selected entry is removed from the Allowed Key Groups column to the Non-member of Info. Groups column and is no longer assigned to the Agent.



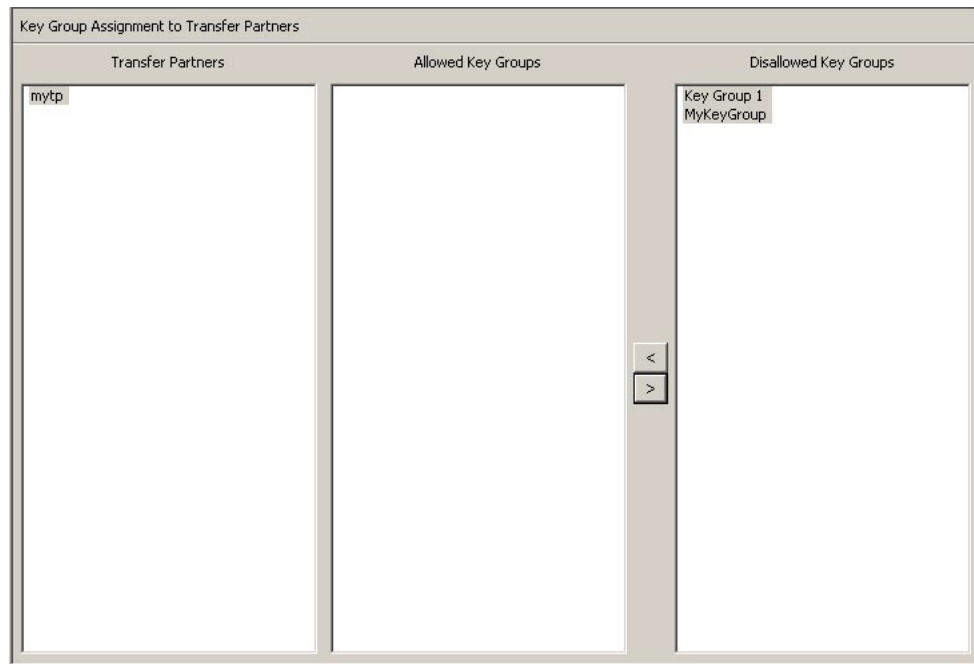
## Key Group Assignment to Transfer Partners Menu

The Key Group Assignment to Transfer Partners menu option allows you to assign Key Groups to Transfer Partners.



## Viewing Key Group Assignments

To view Key Group assignments, from the Transfer Partners menu, select **Key Group Assignment to Transfer Partners**. The following screen is displayed.



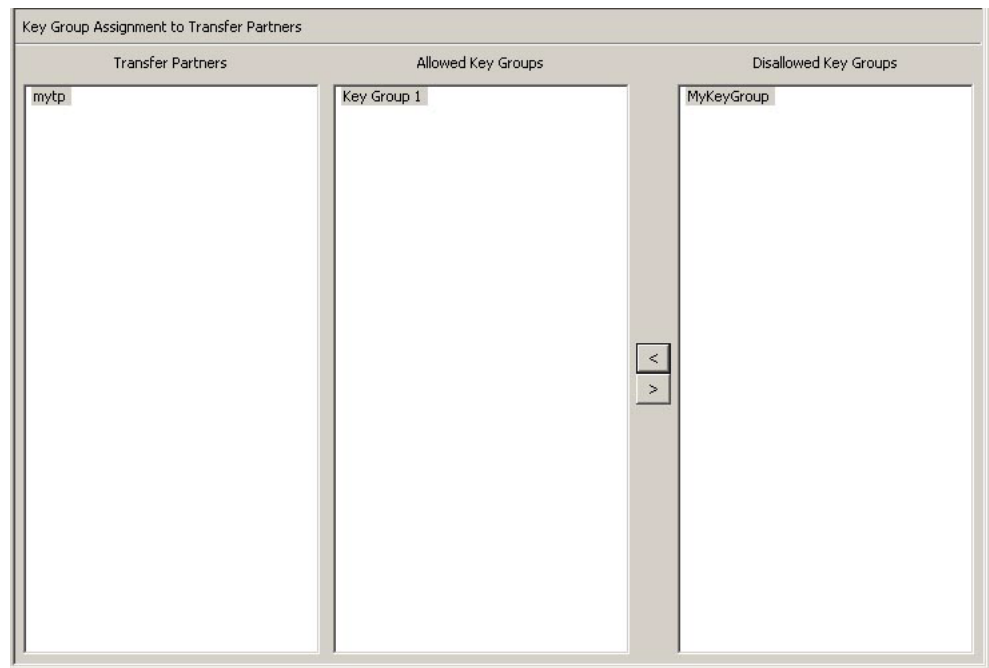
The screen shows the Key Groups that can access a Transfer Partner. The Allowed Key Groups column lists the Key Groups assigned to the selected Transfer Partner. The Disallowed Key Groups column displays the Key Groups not assigned to the Transfer Partner.

## Adding a Key Group to a Transfer Partner

To add a Key Group to a Transfer Partner list:

1. In the Transfer Partners column, highlight the Transfer Partner you want to affect. In the Disallowed Key Groups column, highlight the Key Group you want to add and click the Move to back-arrow button.



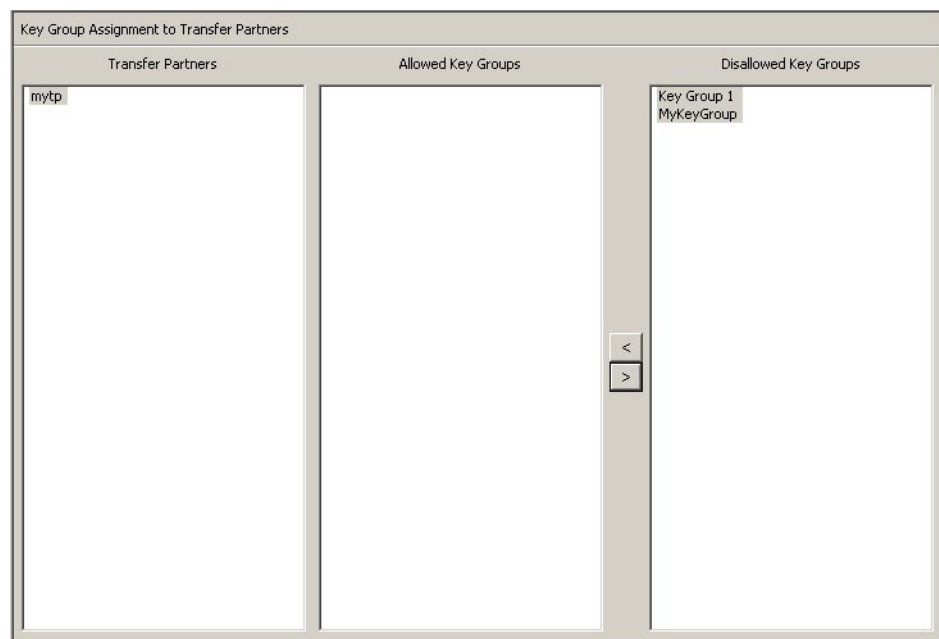


2. The selected Key Group is moved to the Allowed Key Groups column, indicating that the Transfer Partner can now access that Key Group.

## Removing a Key Group from a Transfer Partner

To remove a Key Group list from a Transfer Partner:

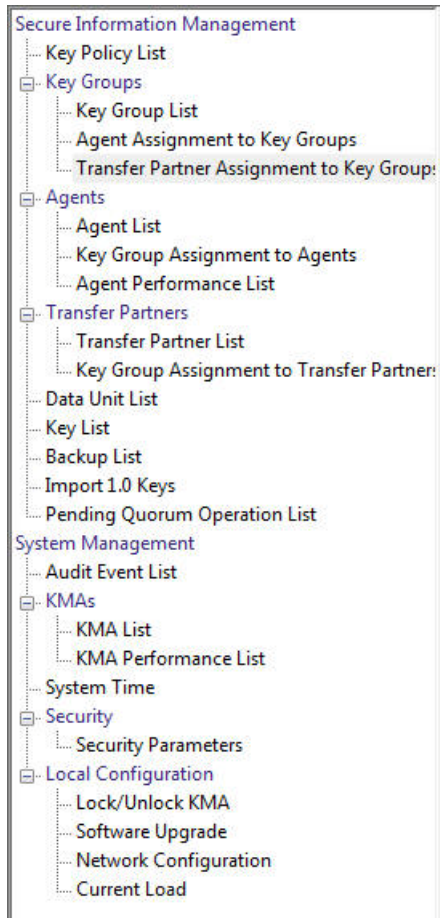
1. In the Transfer Partners column, highlight the Transfer Partner you want to affect. In the Allowed Key Groups column, highlight the Key Group you want to remove and click the Move from forward-arrow button.



2. The selected Key Group is moved to the Disallowed Key Groups column, indicating that the Transfer Partner cannot access that Key Group.

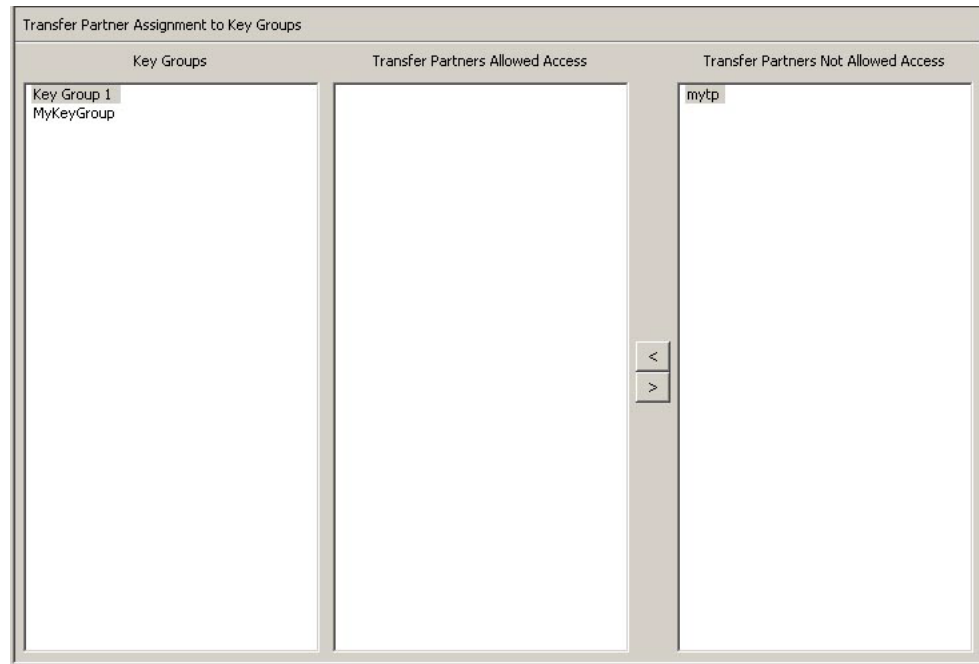
## Transfer Partner Assignment to Key Groups Menu

The Transfer Partner Assignment to Key Groups menu allows you to add a key Transfer Partner to the set of Key Transfer Partners that are permitted access to a specific Key Group.



## Viewing Transfer Group Assignments

To view Transfer Group assignments, from the Key Groups menu, select Transfer Partner Assignment to Key Groups. The following screen is displayed.

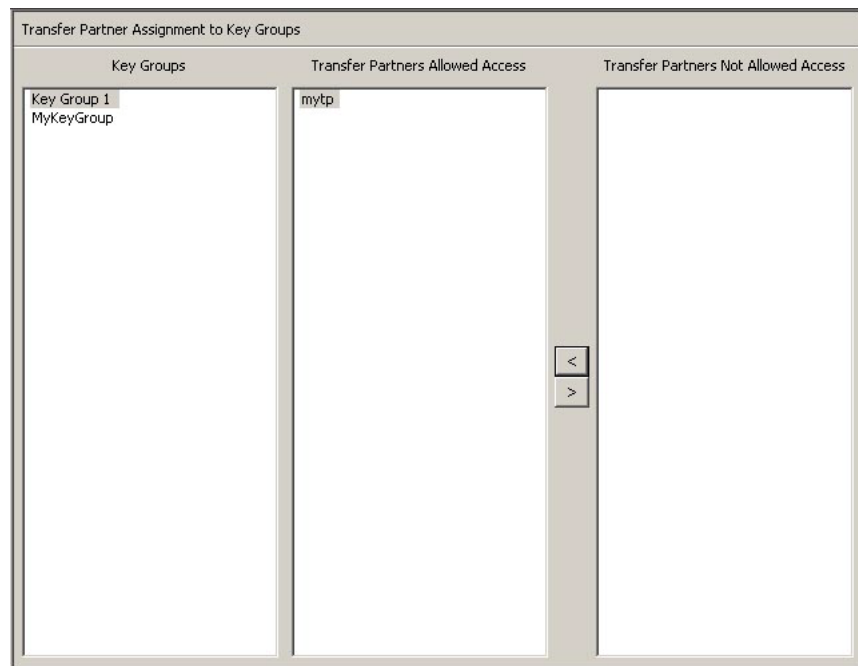


The screen shows the Transfer Partners that can access a Key Group. The Transfer Partners Allowed Access column lists the Transfer Partners assigned to the Key Group. The Transfer Partners Not Allowed Access column displays the Transfer Partners not assigned to the Key Group.

## Adding a Transfer Partner to a Key Group

To add a Transfer Partner to a Key Group:

1. In the Key Groups column, highlight the Key Group you want to affect. In the Transfer Partners Allowed Access column, highlight the Key Group you want to add and click the Move to back-arrow button.

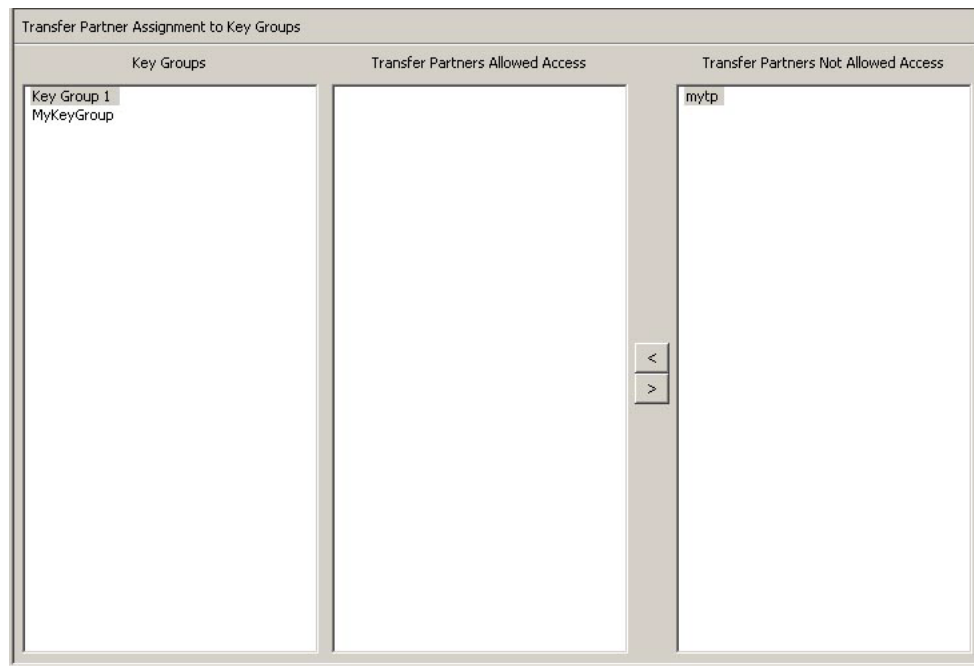


2. The selected Transfer Partner is moved to the Transfer Partners Allowed Access column, indicating that the Key Group can now access that Transfer Partner.

## Removing a Transfer Partner from a Key Group

To remove a Transfer Partner from a Key Group:

1. In the Key Groups column, highlight the Key Group you want to affect. In the Transfer Partners Allowed Access column, highlight the Transfer Partner you want to remove and click the Move from forward-arrow button.

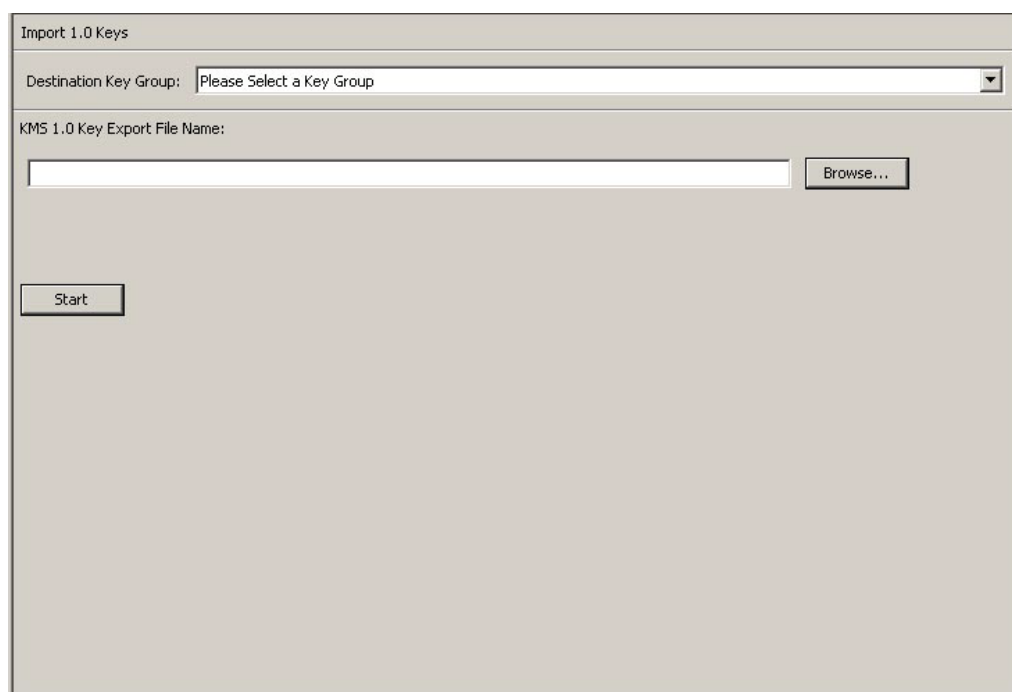


2. The selected Transfer Partner is moved to the Transfer Partners Not Allowed Access column, indicating that the Key Group cannot access that Transfer Partner.

## Importing a KMS 1.0 Key Export File

To import a KMS 1.0 Key Export file to the KMA and to create a new Key for each Key in this file:

1. Go to the KMS 1.2 system and export the keys into a file. Only keys exported from KMS 1.2 systems can be imported. KMS 1.0 and 1.1 systems must be upgraded to 1.2 before exporting keys.
2. From the Secure Information Management menu, select Import 1.0 Keys.



Import 1.0 Keys

Destination Key Group: Please Select a Key Group

KMS 1.0 Key Export File Name:

Browse...

Start

3. Complete the following parameters:

**Destination Key Group**

Select the Destination Key Group into which these keys will be imported.

**KMS 1.0 Key Export File Name**

Type the name of the KMS 1.0 Key Export file.

**Browse**

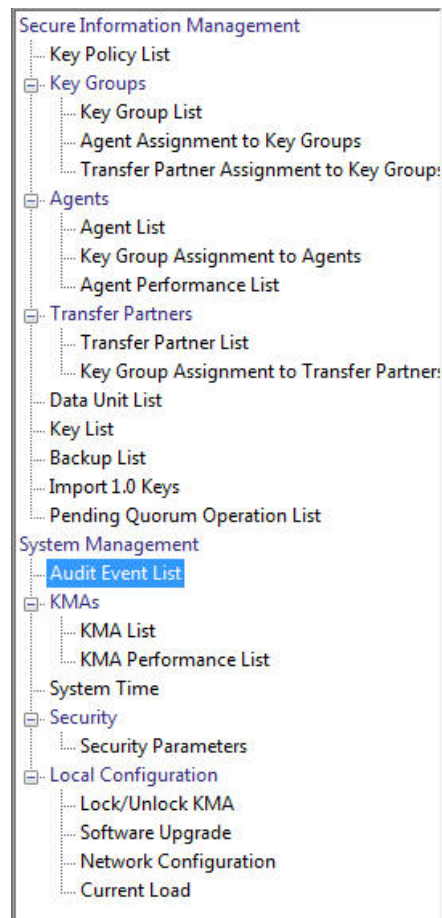
Click this button to locate the file.

**Start**

Click this button to begin to upload the KMS 1.0 keys file to the KMA, and a new Key is created for each Key it contains. Each new Key is associated with the Key Group you selected. Messages are displayed indicating when the file is uploaded and applied.

## Audit Event List Menu

The Audit Event List menu gives you the ability to view the Audit Log events.



## Viewing Audit Logs

To view the Audit Log events:

From the System Management menu, select **Audit Event List**. The Audit Event List screen is displayed.

Audit Event List

Filter: Created Date [v] [v] [v] Set Date to [v] Set Date [v]

Don't Show Short Term [v] Use Refresh Reset | < << >> >

Results in page: 20

Created Date	Operation	Severity	Condition	Message Values
1/5/2008 1:38:29 PM	Retrieve Entity Certificate	Success	Success	Certificate Serial Number = 151C5F81291373F000000000...
1/5/2008 1:38:23 PM	Retrieve Root CA Certificate	Success	Success	
1/5/2008 1:38:15 PM	Retrieve Entity Certificate	Error	Invalid Challenge response	
1/5/2008 1:38:09 PM	Retrieve Root CA Certificate	Success	Success	
1/4/2008 4:44:25 PM	Retrieve Entity Certificate	Success	Success	Certificate Serial Number = 151C5F81291373F000000000...
1/4/2008 4:44:25 PM	Retrieve Root CA Certificate	Success	Success	
1/4/2008 2:48:39 PM	List Key Transfer Public Keys	Success	Success	
1/4/2008 2:48:28 PM	Create Key Transfer Key Pair	Success	Success	
1/4/2008 2:43:29 PM	List Key Transfer Public Keys	Success	Success	
1/4/2008 2:42:56 PM	Create Key Transfer Key Pair	Success	Success	
1/4/2008 2:42:29 PM	List Key Transfer Public Keys	Success	Success	
1/4/2008 2:41:35 PM	List Key Transfer Public Keys	Success	Success	
1/4/2008 2:41:18 PM	Create Key Transfer Key Pair	Success	Success	
1/4/2008 2:40:12 PM	List Key Transfer Public Keys	Success	Success	
1/4/2008 2:38:52 PM	Retrieve Entity Certificate	Success	Success	Certificate Serial Number = 151C5F81291373F000000000...
1/4/2008 2:38:52 PM	Retrieve Root CA Certificate	Success	Success	
1/4/2008 2:28:03 PM	List Key Transfer Public Keys	Success	Success	
1/4/2008 2:27:59 PM	Create Transfer Partner	Success	Success	Transfer Partner ID = mytp, Description = a descr, Cont...
1/4/2008 2:27:38 PM	Create Transfer Partner	Error	Public Key ID already exists	Transfer Partner ID = mytp, Description = a descr, Cont...
1/4/2008 2:26:22 PM	Retrieve Entity Certificate	Success	Success	Certificate Serial Number = 151C5F81291373F000000000...

Details...

You can also scroll through the database and filter the Audit Event list by any of the following keys:

- Created Date
- Operation
- Severity
- Condition
- Entity ID
- Entity Network Address
- KMA ID
- KMA Name
- Class
- Retention Term
- Audit Log ID.

The **Use** button applies the filter to the displayed list for the Audit Log.

The fields and their descriptions are given below:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- Created Date
- Operation
- Severity
- Condition
- Entity ID
- Entity Network Address

- KMA Name
- Class
- Retention Term
- Audit Log ID.

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Empty
- Not empty

**Filter Value 1 box:**

If you selected the Date filter, click **Set Date** to specify start date and time. The value appears as a starting value of the filter key range. If you selected any other filter, type a value in this field.

**Filter Value 2 box:**

If you selected the Date filter, click **Set Date** to select an end date and time. The value appears as a ending value of the filter key range.

**Filter Value 3 box:**

Click the down-arrow and select one of the following filters:

- Don't Show Short Term
- Show All Retentions.

**Created Date**

Displays the date and time that the Audit Event was created.

**Operation**

Displays the operation that resulted in the creation of the Audit Event record.

**Severity**

Indicates the severity of the condition if the operation was not successful. Possible values are Success (no error), Warning, or Error.

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**Note:** If the Severity value is Error, the KMA that generated the event also issues an SNMP inform message with the event details.

---

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**Condition**

Indicates whether the operation was successful or not.

---

---

**Note:** Errors are highlighted in red; Warnings are highlighted in yellow. If you hover the cursor over an error message, a more detailed description of the error is displayed.

If the Condition value is Server Busy, the KMA that generated the event also issues an SNMP inform message with the event details.

---

---

**Event Message**

Displays detailed information of the Audit Event entry.



**Entity ID**

If this Audit Event is generated in response to an operation requested by a user, Agent, or peer KMA, then this field displays the user-specified identifier of that entity. Otherwise, this field is blank.

**Entity Network Address**

If this Audit Event is generated in response to an operation requested by a user, Agent, or peer KMA, then this field displays the network address of that entity. Otherwise, this field is blank.

**KMA ID**

Displays the name of the KMA that generated this audit event. This KMA name is the user-supplied identifier that distinguishes each KMA in a Cluster.

**KMA Name**

Displays the user-supplied identifier that distinguishes each Appliance in a Cluster.

**Class**

Identifies the class of operations to which the Audit Event entry belongs.

---

---

**Note:** If the Class value is Security Violation, the KMA that generated the event also issues an SNMP inform message with the event details.

---

---

Possible values are:

- Agent Access Control Management Operations
- Agent Client Generated Audits
- Agent Management Operations
- Appliance Management Operations
- Audit Log Agent Operations
- Audit Log Management Operations
- Audit Log Operations
- Backup Management Operations
- CA Operations
- Cluster Client Communication
- Cluster Operations
- Communication and Authentication
- Console Security Management Operations
- Data Unit Agent Operations
- Data Unit Management Operations
- Discovery Operations
- Key Group Agent Operations
- Key Group Management Operations
- Key Policy Management Operations

- License Key Management Operations
- Local Management Operations
- Management Client Generated Audits
- Passphrase Agent Operations
- Replication Operations
- Retrieve Certificate Operations
- Role Management Operations
- SNMP Management Operations
- Security Management Operations
- Security Parameter Management Operations
- Security Violation
- Site Management Operations
- System Messages
- User Management Operations.

#### **Retention Term**

Displays the defined length of time that the Audit Event record is retained. Possible values are Long Term, Medium Term, and Short Term.

#### **Long Term**

Event records that must be stored for a lengthy period of time.

#### **Medium Term**

Event records that must be stored for a medium length period of time.

#### **Short Term**

Event records that must be stored for a short period of time.

#### **Audit Log Entry ID**

Displays a system-generated unique identifier that distinguishes each type of Audit Event entry.

#### **Audit Log ID**

Displays a system-generated unique identifier that distinguishes each Audit Event entry.

If you want more detailed information on an Audit Log, highlight the Audit Log and click the **Details** button. For more information, refer to "[Viewing Audit Log Details](#)" below.

Click the **Export** button to export the Audit Log. For more information, refer to "[Exporting an Audit Log](#)" on page 6-35.

## **Viewing Audit Log Details**

To view Audit Log details:

1. From the Audit Event List screen, select the Audit Log entry on which you want more information and click the **Details** button or double-click the entry. The Audit

Event Details dialog box is displayed, where all fields are disabled, except for the **Previous**, **Close**, and **Next** buttons.

**Audit Event Details**

Audit Log ID: A97AE3858F84A6B10000000000000474

KMA ID: A97AE3858F84A6B1

KMA Name: Drumguish

Audit Log Entry ID: 000001000000

Class: System Messages

Retention Term: Medium Term

Operation: Start Database

Severity: Success

Condition: Success

Created Date: 10/7/2008 2:21:21 PM

Entity ID:

Entity Network Address:

Message Values:

Solution: No recommended action

Previous Close Next

2. Click the **Previous** or **Next** buttons to access the previous or next Audit Event, or the **Close** button to return to the Audit Event List screen.

## Exporting an Audit Log

The Export function allows you to export all or specific Audit Log entries to a text file on your workstation. You can then bring up the file in a spreadsheet application.

To export an Audit Log:

1. From the Audit Event List screen, either select **Save Report...** from the View menu or press Ctrl-S.
2. When you are finished, click the **Start** button to initiate the export process. If you have filtered the entries in the Audit Event List screen, only those entries are exported. Otherwise, all audit events are exported.
3. When the export process is completed, the number of Audit Logs that have been exported is shown at the bottom of the dialog box.
4. Click the **Close** button to close this dialog box and return to the Audit Event List screen.

## Data Unit List Menu

The Data Unit List menu allows you to:

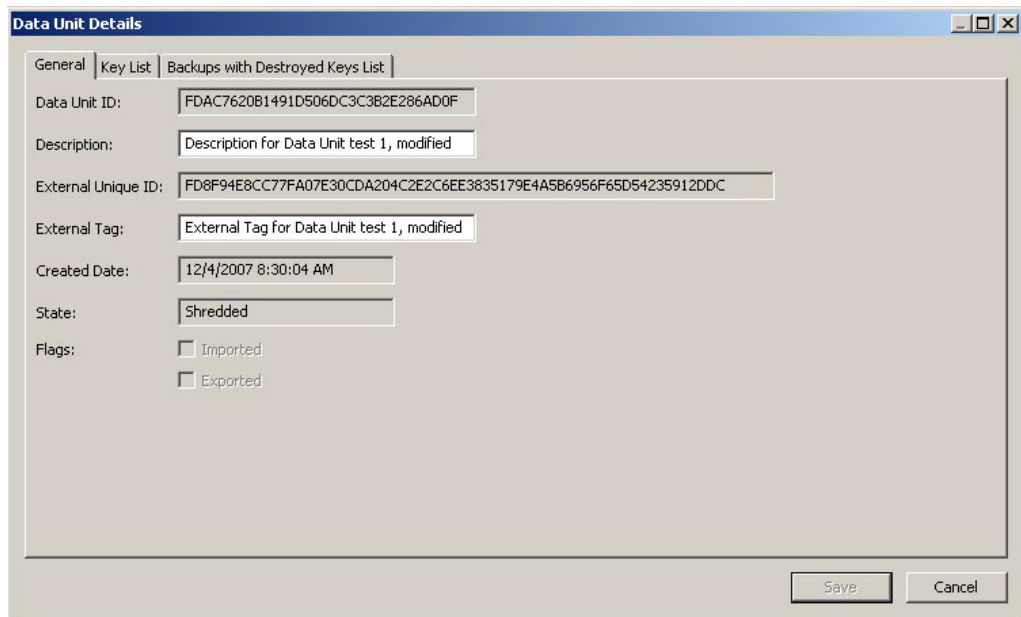
- View Data Units
- View/Modify Data Unit details
- View the activity history for a Data Unit
- Destroy post-operational keys for a Data Unit.

For procedures on using the Data Units menu, refer to ["Data Unit List Menu"](#) on page 7-16.

## Compromising Keys

Compliance Officers are authorized to compromise keys.

1. From the Data Unit List screen, select the Data Unit you want to modify and click the **Details** button. The Data Unit Details dialog box is displayed.

The image shows a 'Data Unit Details' dialog box with three tabs: 'General', 'Key List', and 'Backups with Destroyed Keys List'. The 'General' tab is active. It contains several text input fields: 'Data Unit ID' with the value 'FDAC7620B1491D506DC3C3B2E286AD0F', 'Description' with 'Description for Data Unit test 1, modified', 'External Unique ID' with a long alphanumeric string, 'External Tag' with 'External Tag for Data Unit test 1, modified', 'Created Date' with '12/4/2007 8:30:04 AM', and 'State' with 'Shredded'. There are also two checkboxes under 'Flags': 'Imported' and 'Exported', both of which are unchecked. At the bottom right, there are 'Save' and 'Cancel' buttons.

2. Click the Key List tab to view the key(s) associated with this Data Unit.

**Data Unit Details**

General | **Key List** | Backups with Destroyed Keys List

Data Unit ID: 4F0FD8B884D08024000412261D77B2A3

External Tag:

Key List

Filter: Key ID = [ ] +

Use Refresh Reset |< << >> >

Results in page: 1 (last page)

Key ID	Key Type	Created Date	Activation Date ▾	Destroyed Date
4F0FD8B884D08024B5AD29100A99021F5DC7A3C9A2B...	AES-256	11/3/2008 8:56:43 AM	11/3/2008 10:13:22 AM	

Details... Compromise... Activity History... Save Report...

Save Cancel

3. Select the key(s) you want to compromise and click the **Compromise** button. A dialog box is displayed confirming the compromise of the key(s).
4. Click the **Yes** button. The following dialog box is displayed, prompting you to enter a comment.

**Compromise Keys**

Key ID to Compromise: 4F0FD8B884D080249E53279FED66302C8FFC9D50E5928981E17ECCC4D5A9

Compromise Comment: [ ]

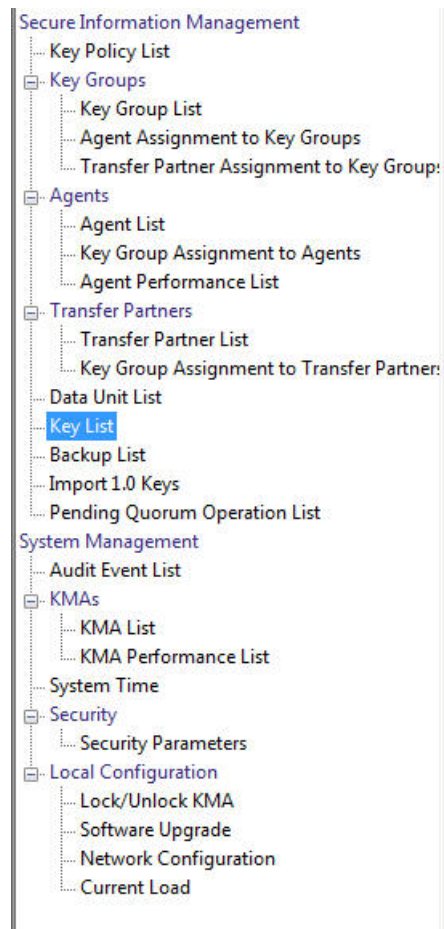
Compromise Cancel

5. Type a comment about the compromise of the selected key(s). If you click the **Compromise** button, another dialog box is displayed confirming the compromise of the key(s).
6. Click the **Yes** button. A dialog box is displayed showing the number of keys that have been compromised.

## Key List Menu

The Key List menu allows you to:

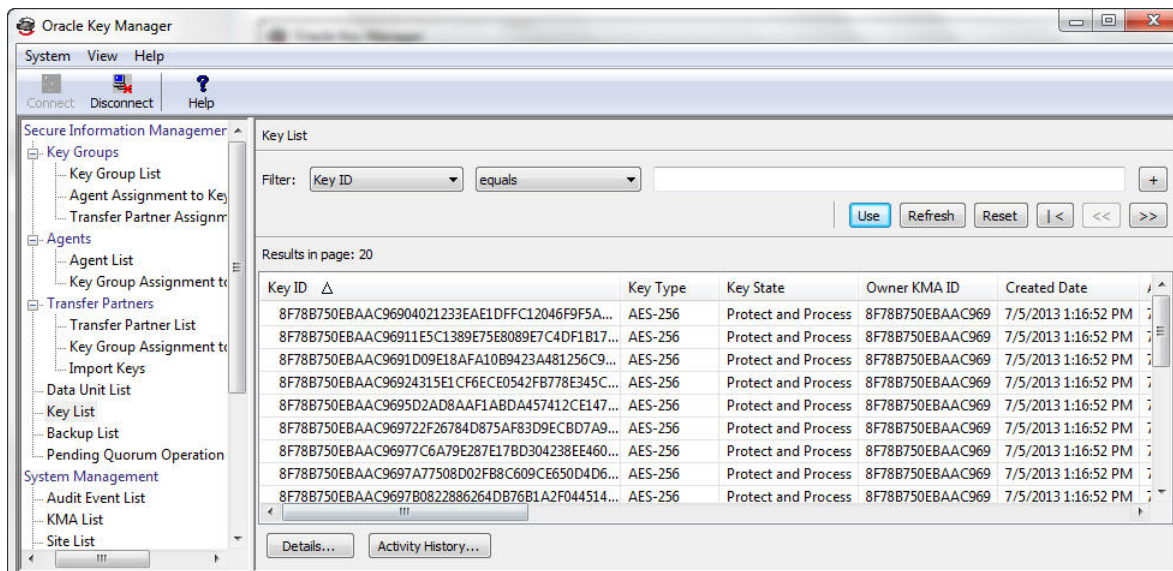
- query keys directly without having to query data units
- query the keys associated with a particular data unit.



## Querying Keys

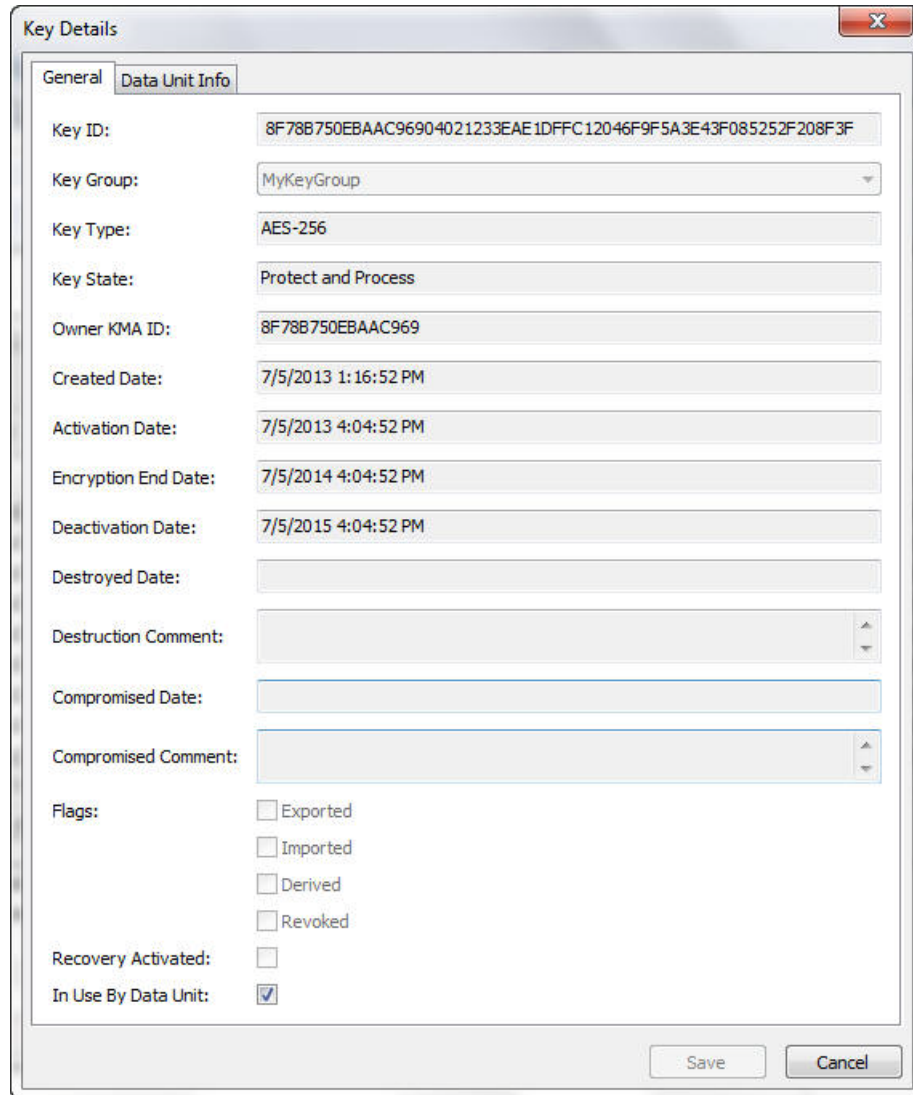
To query keys directly:

1. From the System Management menu, select Key List. The Key List screen is displayed.



2. Click the Details button (or double-click on a key) to display more information about that key. The Key Details dialog appears.

A Compliance Officer can change the key group this key is associated with. An Operator can change the In Use By Data Unit flag, which indicates whether or not this key is associated with a data unit.

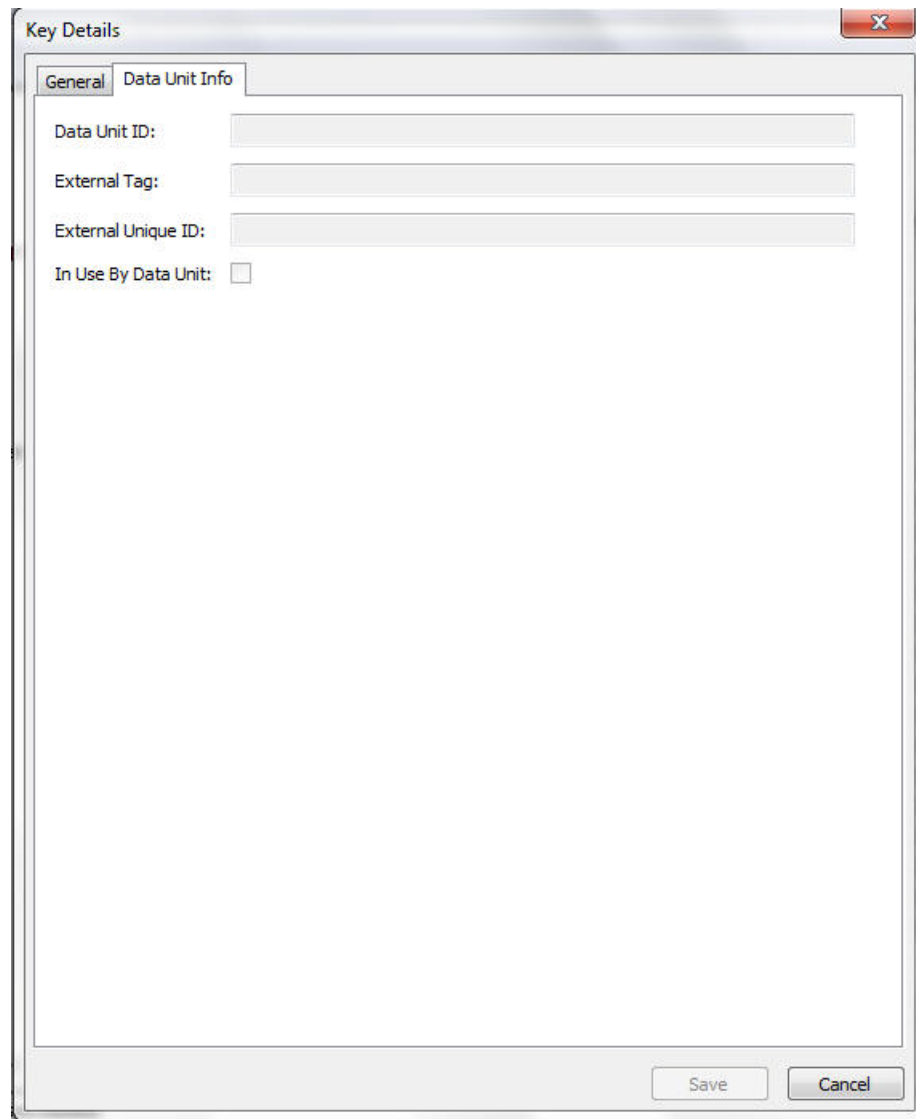


The Key Details dialog box is shown with the 'Data Unit Info' tab selected. It contains the following fields and controls:

- Key ID:** 8F78B750EBAAC96904021233EAE1DFFC12046F9F5A3E43F085252F208F3F
- Key Group:** MyKeyGroup (dropdown menu)
- Key Type:** AES-256
- Key State:** Protect and Process
- Owner KMA ID:** 8F78B750EBAAC969
- Created Date:** 7/5/2013 1:16:52 PM
- Activation Date:** 7/5/2013 4:04:52 PM
- Encryption End Date:** 7/5/2014 4:04:52 PM
- Deactivation Date:** 7/5/2015 4:04:52 PM
- Destroyed Date:** (empty text box)
- Destruction Comment:** (empty text box with scrollbars)
- Compromised Date:** (empty text box)
- Compromised Comment:** (empty text box with scrollbars)
- Flags:**
  - ☐ Exported
  - ☐ Imported
  - ☐ Derived
  - ☐ Revoked
- Recovery Activated:** ☐
- In Use By Data Unit:** ☒

At the bottom right are 'Save' and 'Cancel' buttons.

3. Click the Data Unit Info tab to display information about the data unit that is associated with this key (if any).

A screenshot of a 'Key Details' dialog box. The dialog has a title bar with a close button (X). Inside, there are two tabs: 'General' and 'Data Unit Info'. The 'Data Unit Info' tab is selected. It contains four input fields: 'Data Unit ID:', 'External Tag:', 'External Unique ID:', and 'In Use By Data Unit:'. The first three are text boxes, and the last one is a checkbox. At the bottom right, there are 'Save' and 'Cancel' buttons.

Key Details

General Data Unit Info

Data Unit ID:

External Tag:

External Unique ID:

In Use By Data Unit: ☐

Save Cancel

## Other Functions

A Compliance Officer can also:

- View the Audit Event List
- View the System Time
- Lock/Unlock KMA status
- Access the KMA List screen.
- Query KMA performance information about KMAs in this OKM cluster.
- Query load information about the KMA the GUI is connected to.
- Query agent performance information.
- Query data unit list key counts.

For procedures on viewing the these functions, refer to [Chapter 5, "Security Officer Operations"](#).



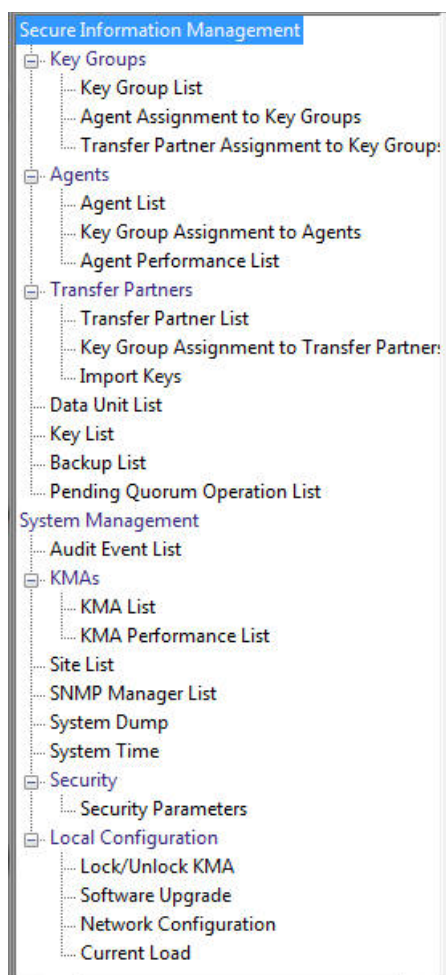
---

## Operator Operations

This chapter describes the operations that a user who has been given an Operator role can perform. If you have been assigned multiple roles, refer to the appropriate chapter for instructions on performing the specific role.

### Operator Role

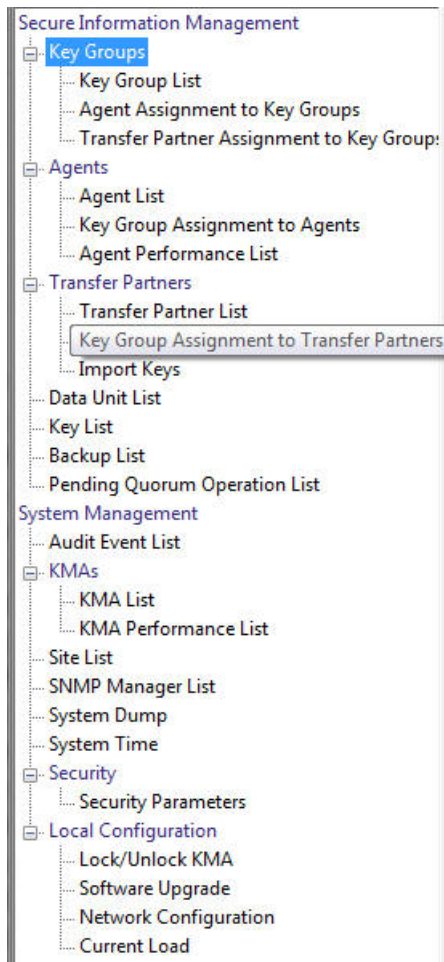
As the Operator, you are responsible for managing the day-to-day operations of the system.



## Key Groups Menu

The Key Groups menu allows you to:

- View a list of Key Groups
- View Agent to Key Group Assignments
- View Transfer Partner to Key Group Assignments.



### Key Group List

The Key Group List menu option gives you the ability to manage your Key Group. For procedures, refer to "[Key Group List Menu](#)" on page 6-9.

### Agent Assignment to Key Groups

The Agent Assignment to Key Groups menu option gives you the ability to view Agents to Key Groups. For procedures, refer to "[Agent Assignment to Key Groups Menu](#)".

### Transfer Partner Assignment to Key Groups

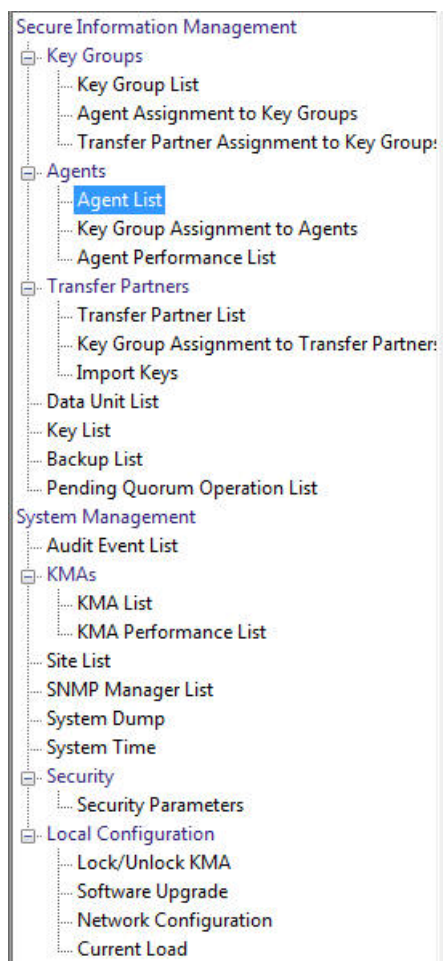
The Transfer Partner Assignment to Key Groups option allows you to view a Key Transfer Partner to the set of Key Transfer Partners that are allowed access to a specific

Key Group. For procedures, refer to "[Transfer Partner Assignment to Key Groups Menu](#)".

## Agent List Menu

The Agent List menu option allows you to:

- View Agents
- Create Agents
- View/Modify an Agent
- Delete existing Agents.



## Viewing the Agent List

The Agent List menu option allows you to view all Agents associated with a specific Key Group.

To view this screen:

1. From the Agents menu, select **Agent List**. The Agent List screen is displayed.
2. Click the down-arrow beside the Key Group field and select a Key Group. The Agents that are associated with the Key Group are displayed.

Agent List

Filter:

Results in page: 20

Agent ID	Description	Site ID	Default Key Group	Enabled	Failed Login Attempts	Enrolled	One Time
Drive000		Aurora	KeyGroupPT1H	True	0	True	True
Drive001		Aurora	KeyGroupPT1H	True	0	True	True
Drive002		Aurora	KeyGroupPT1H	True	0	True	True
Drive003		Aurora	KeyGroupPT1H	True	0	True	True
Drive004		Aurora	KeyGroupPT1H	True	0	True	True
Drive005		Aurora	KeyGroupPT1H	True	0	True	True
Drive006		Aurora	KeyGroupPT1H	True	0	True	True
Drive007		Aurora	KeyGroupPT1H	True	0	True	True
Drive008		Aurora	KeyGroupPT1H	True	0	True	True
Drive009		Aurora	KeyGroupPT1H	True	0	True	True
Drive010		Aurora	KeyGroupPT1H	True	0	True	True
Drive011		Aurora	KeyGroupPT1H	True	0	True	True
Drive012		Aurora	KeyGroupPT1H	True	0	True	True
Drive013		Aurora	KeyGroupPT1H	True	0	True	True
Drive014		Aurora	KeyGroupPT1H	True	0	True	True
Drive015		Aurora	KeyGroupPT1H	True	0	True	True
Drive016		Aurora	KeyGroupPT1H	True	0	True	True
Drive017		Aurora	KeyGroupPT1H	True	0	True	True
Drive018		Aurora	KeyGroupPT1H	True	0	True	True
Drive019		Aurora	KeyGroupPT1H	True	0	True	True

You can also scroll through the lists and filter the Agents lists by any of the following keys:

- Agent ID
- Description
- Site
- Default Key Group
- Enabled
- Failed Login Attempts
- Enrolled
- One Time Passphrase.

The **Use** button applies the filter to the displayed list for the Agent.

The fields and their descriptions are given below:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- Agent ID

- Description
- Site
- Default Key Group
- Enabled
- Failed Login Attempts
- Enrolled.

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~
- Empty
- Not empty.

**Filter Value text box:**

Type a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

**Filter Value combo box:**

Click the down-arrow and select a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

Click the plus button to add additional filters.

Click the minus button to remove a filter. This button is only displayed if there is more than one filter shown.

**Use:**

Click this button to apply the selected filters to the displayed list and go to the first page.

**Refresh:**

Click this button to refresh the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.

**Results in Page:**

Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**Agent ID**

Displays the user-specified unique identifier that distinguishes each Agent.

**Description**

Describes the Agent.

**Site**

Displays a unique identifier that indicates the Site to which the Agent belongs.

**Default Key Group**

The Key Group associated with all keys created by this agent if the agent does not explicitly specify a different Key Group.

**Enabled**

Indicates the status of the Agent. Possible values are True or False. If this field is False, the Agent cannot establish a session with the KMA.

**Failed Login Attempts**

Displays the number of times that an attempted logon has failed

**Enrolled**

Indicates whether the Agent has enrolled successfully with the OKM Cluster. Possible values are True or False. This field is False if the Agent is the first created or if the Agent's passphrase is changed.

## Creating an Agent

To create an Agent:

1. From the Agents List screen, click the **Create** button. The Create Agent dialog box is displayed with the General tab open.

The screenshot shows a 'Create Agent' window with a blue title bar and standard Windows window controls. It has two tabs: 'General' and 'Passphrase'. The 'General' tab is active. It contains five input fields: 'Agent ID' (a text box), 'Description' (a text box), 'Site ID' (a dropdown menu with 'Please Select a Site'), 'Flags' (a checkbox labeled 'One Time Passphrase' which is checked), and 'Default Key Group ID' (a dropdown menu with 'Please Select a Default Key Group'). At the bottom right are 'Save' and 'Cancel' buttons.

2. Complete the following parameters:

#### **Agent ID**

Type a value that uniquely identifies the Agent. This value can be between 1 and 64 (inclusive) characters.

#### **Description**

Type a value that describes the Agent. This value can be between 1 and 64 (inclusive) characters.

#### **Site ID**

Click the down-arrow and highlight the Site to which the Agent belongs. This field is optional.

#### **Flags**

Select **One Time Passphrase** so that the Agent cannot retrieve its X.509 certificate without resetting its passphrase and re-enrolling with its agent ID and new passphrase. This is the default.

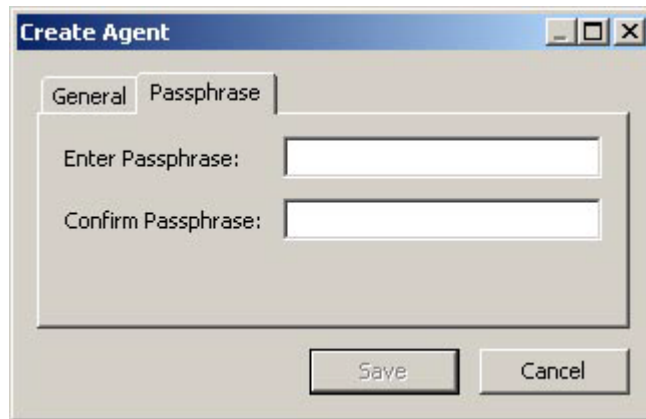
If you do not select **One Time Passphrase**, then the Agent can retrieve its X.509 certificate at any time, use CA and certificate services, and successfully authenticate through its agent ID and passphrase.

Tape drive agents should specify the default value. PKCS#11-type Agents will find this setting to be more convenient, especially in cluster configurations where users may authenticate to the OKM from multiple nodes.

#### **Default Key Group ID**

If you also have Compliance Officer privileges, click the down-arrow and highlight the default Key Group.

3. Open the Passphrase tab.



The image shows a 'Create Agent' dialog box with the 'Passphrase' tab selected. It contains two text input fields: 'Enter Passphrase:' and 'Confirm Passphrase:'. At the bottom, there are 'Save' and 'Cancel' buttons.

4. Complete the following parameters:

#### Passphrase

Type the passphrase for this user. The minimum value is 8 characters; the maximum value is 64 characters. The default value is 8.

Passphrase requirements:

- A passphrase must not contain the user's Agent ID.
- A passphrase must contain three of the four character classes: uppercase, lowercase, numeric, or special characters.
- The following special characters are allowed:  
~ ! @ # \$ % ^ & \* ( ) - \_ = + [ ] { } \ | ; : ' " < > , . / ?
- Control characters, including tabs and linefeeds, are not allowed.

---

**Note:** To modify the minimum length requirement for passphrases, see ["Modifying the Security Parameters"](#) on page 5-77.

---

#### Confirm Passphrase

Type the same value that you entered in the Enter Passphrase field.

An example of a completed Create Agent dialog box is shown below.



The image shows the 'Create Agent' dialog box with the 'General' tab selected. The fields are filled with: 'Agent ID: MyAgent2', 'Description: agentdesc for MyAgent', and 'Site ID: Louisville' (selected from a dropdown menu). 'Save' and 'Cancel' buttons are at the bottom.

5. Click the **Save** button. The Agent record is added to the database and is displayed in the Agent List screen.



- Complete the agent-specific enrollment procedure using the agent-specific interface. For example, for StorageTek drives, the VOP (Virtual Operator Panel) must be used to complete the enrollment procedure.

Agent List

Filter: Agent ID = [ ] +

Key Group 1 [ ] Use Refresh Reset | < << >> >

Results in page: 4 (last page)

Agent ID	Description	Site	Default Key Group	Enabled	Failed Login Attempts	Enrolled
MyAgent	agentdesc for MyAgent		MyKeyGroup	True	0	True
MyAgent1	agentdesc for MyAgent		MyKeyGroup	True	0	False
MyAgent2	agentdesc for MyAgent	Louis...		True	0	False
SO-owned Agent	agent for testing.	Toronto		True	0	False

Details... Create... Delete Activity History...

## Viewing/Modifying an Agent

To modify an Agent's details:

- From the Agents List screen, double-click an Agent entry for which you want more information or highlight an Agent entry and click the **Details** button. The Agents Details dialog box is displayed.

Agent Details

General | Passphrase

Agent ID: MyAgent2

Description: [ ]

Site ID: [ ]

Flags: ☒ Enabled ☒ Enrolled ☒ One Time Passphrase

Default Key Group ID: MyKeyGroup

Failed Login Attempts: 0

Save Cancel

2. Open the General tab and modify the following fields, as required:
  - Description
  - Site ID
  - Flags
    - \* Enabled - Select this check box if you want to allow this Agent to communicate with the Cluster.
    - \* Enrolled - Indicates whether the Agent has successfully enrolled with the Cluster. This field is read-only.
    - \* One Time Passphrase - Select this check box so that the Agent cannot retrieve its X.509 certificate without resetting its passphrase and re-enrolling with its agent ID and new passphrase. This is the default.
  - If you do not select **One Time Passphrase**, then the Agent can retrieve its X.509 certificate at any time, use CA and certificate services, and successfully authenticate through its agent ID and passphrase.
  - Tape drive agents should specify the default value. PKCS#11-type Agents find this setting to be more convenient, especially in cluster configurations where users may authenticate to the OKM from multiple nodes.
  - Default Key Group ID - If you also have Compliance Officer privileges, click the down-arrow and highlight the default Key Group.
3. When you are finished, click the **Save** button. The changes are made to the OKM Manager database and you are returned to the Agents List screen.

---

**Note:** You should only change the Agent's passphrase if you believe that the passphrase has been compromised. For procedures, refer to ["Setting an Agent's Passphrase"](#) on page 7-10.

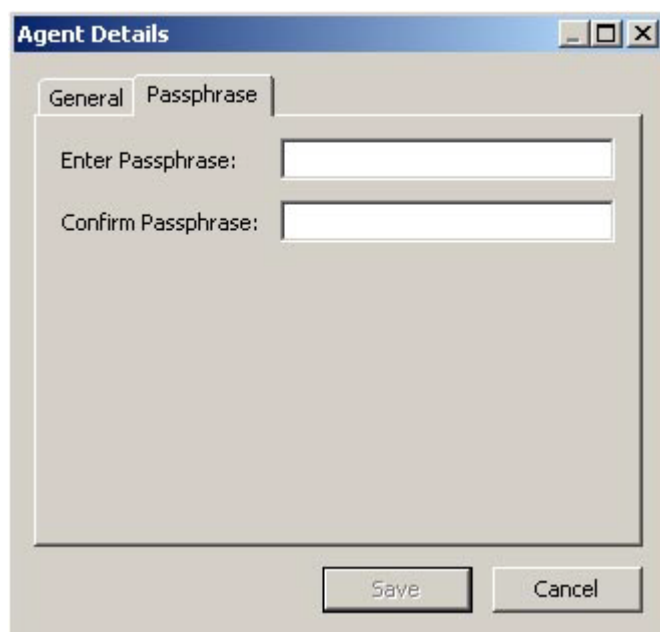
---

## Setting an Agent's Passphrase

When you set an Agent's passphrase, you are effectively revoking the Agent certificate that enables the Agent to authenticate itself with the KMA. As the Operator, you may want to set an Agent's passphrase certificate if you believe that the Agent certificate and/or passphrase has been compromised.

To set an Agent's passphrase:

1. From the Agents List screen, double-click the Agent entry whose passphrase you want to set or highlight the Agent entry and click the **Details** button. The Agent Details dialog box is displayed. Open the Passphrase tab.

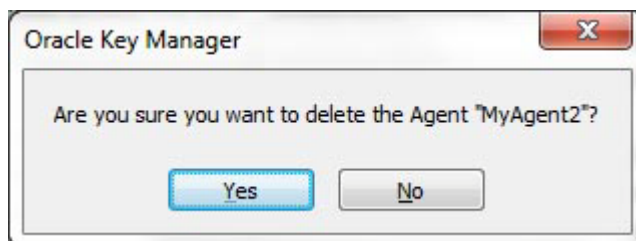
The image shows a dialog box titled "Agent Details". It has two tabs: "General" and "Passphrase". The "Passphrase" tab is selected. Inside the tab, there are two text input fields. The first is labeled "Enter Passphrase:" and the second is labeled "Confirm Passphrase:". At the bottom of the dialog box, there are two buttons: "Save" and "Cancel".

2. Modify the following fields and click the Save button:
  - Enter Passphrase
  - Confirm Passphrase.
3. The changes are made to the database and you are returned to the Agents List screen.
4. Re-enroll the Agent using the agent-specific procedure. For example, for StorageTek tape drives, the VOP (Virtual Operator Panel) must be used to re-enroll the Agent with the OKM Cluster. After changing an Agent's passphrase, the Agent is not able to make requests to the OKM Cluster until it is re-enrolled.

## Deleting Agents

To delete an Agent:

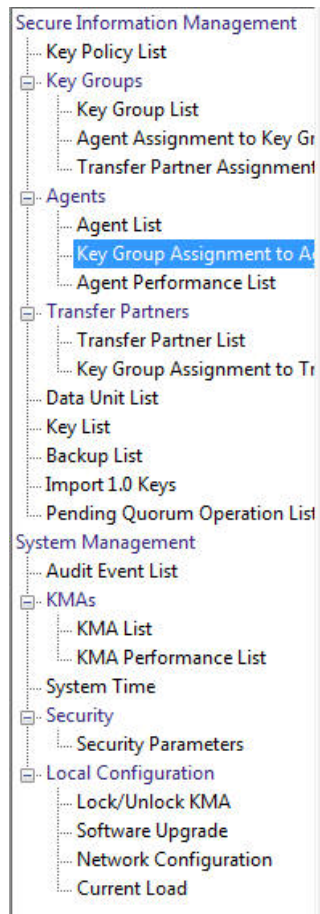
1. From the Agents List screen, highlight the Agent you want to delete. The following dialog box is displayed, prompting you to confirm that you want to delete the selected Agent.

The image shows a confirmation dialog box from Oracle Key Manager. The title bar says "Oracle Key Manager". The main text inside the dialog asks, "Are you sure you want to delete the Agent 'MyAgent2'?". At the bottom, there are two buttons: "Yes" and "No".

2. Click the **Yes** button to delete the Agent. The Agent is removed from the database and you are returned to the Agents List screen, where the deleted Agent is no longer listed.

## Key Group Assignment to Agents Menu

The Key Group Assignment to Agents menu option allows you to view Key Groups assigned to Agents. For procedures, refer to ["Key Group Assignment to Agents Menu"](#) on page 6-18.



## Agent Performance List Menu

This menu option allows you to query agent performance information.

This panel displays performance information about the create key, retrieve key, and register key-wrapping-key requests that have been issued by each Agent. This information includes rate or count values and processing times. Import key requests are not included in these values.

---

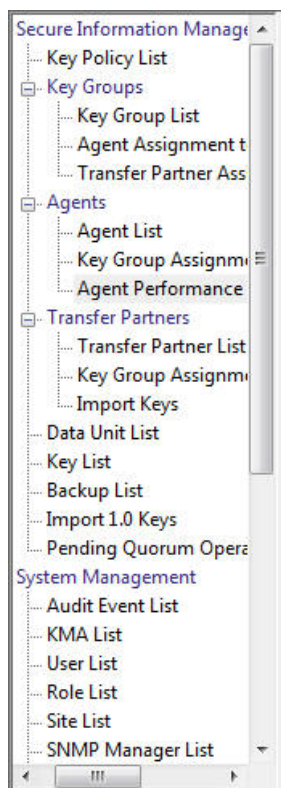
**Note:** HP and IBM LTO tape drives do not issue create key requests. They issue retrieve key requests instead.

---

Rate values represent the rate at which this Agent issued these requests within the selected time period. They are expressed as the average rate of these requests extrapolated over the selected rate display interval unit of time (for example, extrapolated average number of Create Key requests per day). If you set the rate display interval to "entire time period," then this panel instead displays the count of requests this Agent issued within the selected time period.

Processing times represent the average time in milliseconds taken to process the requests that this Agent has issued within the selected time period. These processing times are from the perspective of the KMA and describe the amount of time required to process requests internally. They do not include transmission times over the network or the amount of time required to establish an SSL connection.

The OKM cluster must use replication version 15 or later before request processing times are available.



To query agent performance:

1. From the Agents menu, select Agent Performance List.

Agent Performance List

Time period of requests:  Start Date to  End Date

Rate interval of requests: day  
 second  
 minute  
 hour  
 day  
 month  
 year  
 entire time period

Filter: Agent ID  +

Use Refresh Reset |< << >> >

Results in page: 10 (last page)

Agent ID	Create Key Rate	Create Key Processing Time	Retrieve Key Rate	Retrieve Key Processing Time	Register KWK Rate
MyAgent01	0	0	0	0	0
MyAgent02	42	5	16	8	14
MyAgent03	0	0	0	0	0
MyAgent04	0	0	0	0	0
MyAgent05	0	0	0	0	0
MyAgent06	0	0	0	0	0
MyAgent07	21	0	8	0	7
MyAgent08	0	0	0	0	0
MyAgent09	0	0	0	0	0
MyAgent10	0	0	0	0	0

Details...

Time period reported from 7/24/2013 8:05:54 PM to 7/26/2013 10:15:02 PM

- To display more information about an agent, select an agent and click the Details button (or double-click on an agent). The Agent Performance Details dialog is displayed.

Agent Performance Details

Requests processed between 10/10/2012 4:18:19 PM and 10/1/2013 5:21:47 PM

Agent ID:

Create Key Count:  within entire time period

Create Key Processing Time:  milliseconds

Retrieve Key Count:  within entire time period

Retrieve Key Processing Time:  milliseconds

Register KWK Count:  within entire time period

Register KWK Processing Time:  milliseconds

Site ID:

Default Key Group ID:

Close

## Import Keys Menu

This menu option imports keys and data units into a OKM Cluster. The keys and data unit information are contained in a key transfer file received from a Key Transfer Partner.

---

**Note:** Use this screen to upload and import keys to the OKM Cluster. These keys are exported from another OKM Cluster.

---

To import keys:

1. From the Transfer Partners menu, select **Import Keys**. The Import Keys screen is displayed.

2. Complete the following parameters:

**Destination Key Group:**

Select the Destination Key Group into which these keys will be imported.

The “Allow Imports” flag for this Key Group's key policy must be selected. This Key Group must be an allowed Key Group for the selected sending Transfer Partner.

**Sending Transfer Partner:**

Select the Sending Transfer Partner which exported these keys.

**Key Transfer File:**

Type the name of the Key Transfer file. You can also click **Browse** to select a destination path.

3. Click the **Start** button to begin the upload and key import process. Messages are displayed, indicating when the file is uploaded and applied.

## Data Units

Data Units are logical storage devices, such as disks, tapes, objects. Data Units are secured by valid Key Policies that are associated with their Key Groups. Agent must have access to the selected Data Unit.

---

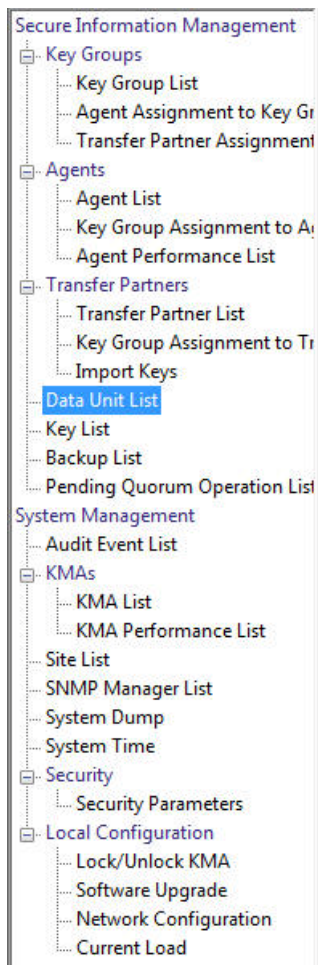
**Note:** An Operator can perform all functions, except modify a Data Unit's Key Group. Only a Compliance Officer can modify a Data Unit's Key Group.

---

## Data Unit List Menu

The Data Unit List menu allows you to:

- View Data Units
- View/Modify Data Unit details
- View the activity history for a Data Unit
- Destroy post-operational keys for a Data Unit
- View key counts.



### Viewing Data Units

To view Data Units, from the Data Units menu, select Data Unit List. The Data Unit List screen is displayed.



Data Unit List

Filter: Data Unit ID equals  +

Show Data Units in any Key Group Use Refresh Reset | < << >>

Results in page: 16 (last page)

Data Unit ID	External Tag	Description	External Unique ID
8F78B750EBAA969048677CD7B3CB2FF	ABCDEF		27966BAB3FBDEC
8F78B750EBAA969076D06453EF739C1	ABCDEF		D6B9D69CF6CC8
8F78B750EBAA9694D161B49F0947077	ABCDEF		CFDD287D9397A6
8F78B750EBAA9694E646AC0F4B10107	ABCDEF		243B4431FFB8960
8F78B750EBAA969631E2F4F45994A34			
8F78B750EBAA969645E1CE9D127F462	ABCDEF		088092EC08329E3
8F78B750EBAA96978B32DE48732CF23	ABCDEF		ADB6A32A6ED07
8F78B750EBAA9697AAD16251E3ECB7	ABCDEF		13573D9094570A
8F78B750EBAA9699D60DA5298DBF2A9	1234567890123456789012345678901234567890123456...		917E4D0364B999

Details... Activity History... Destroy Keys... Modify Key Group... Export Keys... Key Counts...

You can also scroll through the database and filter the Data Unit list by any of the following keys:

- Data Unit ID
- External Unique ID
- Description
- External Tag
- Created Date
- Exported
- Imported
- State.

The **Use** button applies the filter to the displayed list for the Data Unit.

The fields and their descriptions are given below:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- Data Unit ID
- External Unique ID
- Description
- External Tag
- Created Date
- Imported
- Exported
- State.

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>
- Greater than >
- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~
- Empty
- Not empty.

**Show Data Units in Any Key Group. Use:**

Click this button to apply the filter to the displayed list.

**Refresh:**

Click this button to refresh the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.

**Results in Page:**

Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**Data Unit ID**

Displays a system-generated unique identifier that distinguishes each Data Unit.

**External Unique ID**

Displays a unique external identifier for the Data Unit.

This value is sent to the OKM by the Agent and may not be externally visible to an end user. For LTO Gen 4 and Gen 5 tapes, this is the cartridge serial number burned into the cartridge when it is manufactured. Do not confuse this value with a volser on an optical barcode or in an ANSI tape label. This value is not used for StorageTek tape drives.

**Description**

Describes the Data Unit.

**External Tag**

Describes a unique external tag for the Data Unit.

For tapes that are in a StorageTek tape library, or tapes that have ANSI standard labels, this field is the volser. If the tape is in a library and has an ANSI label, the library volser (i.e., optical bar code) is used if it differs from the volser contained in the ANSI label. For tapes written in stand-alone drives without ANSI labels, this field is blank.

---

**Note:** For Data Units written by LTO Gen 4 and Gen 5 tape drives, this field is padded on the right with blanks to fill in 32 characters. It may be more convenient for you to use the "Starts With ~" filter operator instead of the "Equals =" filter operator, so that you do not have to add the blanks to pad the External Tag. For example, if you use the "Starts With" filter, you could enter: "External Tag" ~ "ABCDEF". If you use the "Equals" filter for the same example, you would need to enter: "External Tag" = "ABCDEF " (padded to fill 32 characters)

---

### Created Date

Indicates the date and time when the Data Unit was created/registered.

### Exported

Indicates whether the keys associated with this Data Unit have been exported.

### Imported

Indicates whether the keys associated with this Data Unit have been imported.

### State

Indicates the state of the Data Unit. Possible values are:

- **No Key:** Set when the Data Unit has been created, but has not yet had any keys created.
- **Readable:** Set when the Data Unit has keys that allow at least some parts of the Data Unit to be decrypted (read).
- **Normal:** Set when the Data Unit has keys that allow at least some parts of the Data Unit to be decrypted (read). In addition, the Data Unit has at least one protect-and-process state key that can be used to encrypt data. The Data Unit is therefore writable.
- **Needs Re-key:** Set when the Data Unit does not have at least one protect-and-process state key. Data should not be encrypted and written to this Data Unit until the Data Unit is rekeyed and a new, active key is assigned to it. It is the responsibility of the agent to avoid using a key that is not in protect-and-process state for encryption. The data unit may have keys that are in process only, deactivated, or compromised state. A key in any of these three states can be used for decryption.
- **Shredded:** Set when all of the keys for this Data Unit are destroyed. The Data Unit cannot be read or written. However, a new key can be created for this Data Unit, moving its state back to Normal.

## Viewing/Modifying Data Unit Details

**Note:** If you are not an Operator, when you view a Data Unit's detailed information, all fields, including the **Save** button, are disabled. If you are a Compliance Officer, the Key Group field is enabled. Under the Key List tab, the **Compromise** button is enabled if you are a Compliance Officer; otherwise, it is disabled.

To modify a Data Unit's information:

1. From the Data Unit List screen, select the Data Unit you want to modify and click the **Details** button. The Data Unit Details dialog box is displayed.

2. You can modify the following parameters:

### Description

Type a new value. The original information is provided by the Software Encryption Driver during registration. This value can be between 1 and 64 (inclusive) characters or blank.

**Important** – If the Description field contains the string “PKCS#11v2.20,” this represents a special key used for Oracle Database Transparent Data Encryption (TDE). Do not change this field. Doing so can alter the way OKM interacts with TDE.

### External Tag

Type a unique external identifier for the Data Unit. This value can be between 1 and 64 (inclusive) characters or blank. This field typically contains the label or barcode of the tape cartridge.

3. Click the **Save** button to save your changes.

The following are non-editable fields:

### General Tab

Data Unit ID

External Unique ID

Created Date

State

Flags Imported/Exported

### Key List Tab

**Data Unit Details**

General **Key List** Backups with Destroyed Keys List

Data Unit ID: A73570DEEB72D0E334C8F381A9545A99

External Tag: newkeyOct11

Key List

Filter: Key ID equals

Use Refresh Reset | < << >>

Results in page: 1 (last page)

Activation Date	Destroyed Date	Destruction Comment	Exported	Imported	Derived	Revoked
10/11/2012 2:43:19 PM	10/16/2012 9:06:17 AM	Destroy keys on newkeyOct11	False	False	False	False

Details... Compromise... Activity History... Save Report...

Save Cancel

### Data Unit ID

Uniquely identifies the Data Unit.

### Data Unit Description

Describes the Data Unit.

### Key ID

Displays the key information for the Data Unit.

### Key Type

Indicates the type of encryption algorithm that this key uses. The only possible value is AES-256.

### Created Date

Displays the date and time when the key was created.

### Activation Date

Displays the date and time when the key was activated. This is the date and time when the key was first given to an Agent. It is the starting date and time for the key's encryption period and cryptoperiod.

### Destroyed Date

Displays the date when the key was destroyed. If the field is blank, then the key is not destroyed.

### Destruction Comment

Displays any user-supplied information about the destruction of the key. If the field is blank, then the key is not destroyed.

**Exported**

Indicates whether the Data Unit has been exported.

**Imported**

Indicates whether the Data Unit has been imported.

**Derived**

Indicates whether the Key has been derived from a Master Key generated by the Master Key Provider. Refer to the *OKM-ICSF Integration Guide* for detailed information.

**Revoked**

Indicates whether the key(s) associated with the Data Unit has been revoked by an Agent. See ["Viewing/Modifying a Key Policy"](#) on page 6-7.

If the KMA to which the OKM GUI is connected runs OKM 2.5.2 or greater but the OKM cluster currently uses Replication Version 13 or earlier, then this attribute is shown as "(Unknown)."

**Key Group**

Displays the Key Group associated with the Data Unit.

**Encryption End Date**

Displays the date and time when the key will no longer be used or was stopped from being used for encrypting data.

**Deactivation Date**

Displays the date and time when the key will be or was deactivated.

**Compromised Date**

Displays the date when the key was compromised. If the field is blank, then the key is not compromised.

**Compromised Comment**

Displays any user-supplied information about compromising the key. If the field is blank, then the key is not compromised.

**Key State**

Indicates the Data Unit's key state. Possible values are:

**Generated**

Set when the Key has been created on one KMA in a OKM Cluster. It remains generated until it has been replicated to at least one other KMA in a multi-OKM Cluster. In a Cluster with only a single KMA, the Key remains generated until it has been recorded in at least one backup.

**Ready**

Set when the Key has been protected against loss by replication or a backup. A ready Key is available for assignment.

**Protect and Process**

Set when the Key has been assigned when an encryption agent requests a new key be created. A Key in this state can be used for both encryption and decryption.

**Process Only**

Set when the Key has been assigned but its encryption period has expired. A Key in this state can be used for decryption but not for encryption.

**Deactivated**

Set when the Key has passed its cryptoperiod but may still be needed to process (decrypt) information.

**Compromised**

Set when the Key has been released to or discovered by an unauthorized entity. A Key in this state can be used for decryption but not for encryption.

**Incompletely Destroyed**

Set when the Key has been destroyed but it still appears in at least one backup.

**Completely Destroyed**

Set when all of the backups in which the destroyed Key appears have been destroyed.

**Compromised and Incompletely Destroyed**

Set when the compromised Key still appears in at least one backup.

**Compromised and Completely Destroyed**

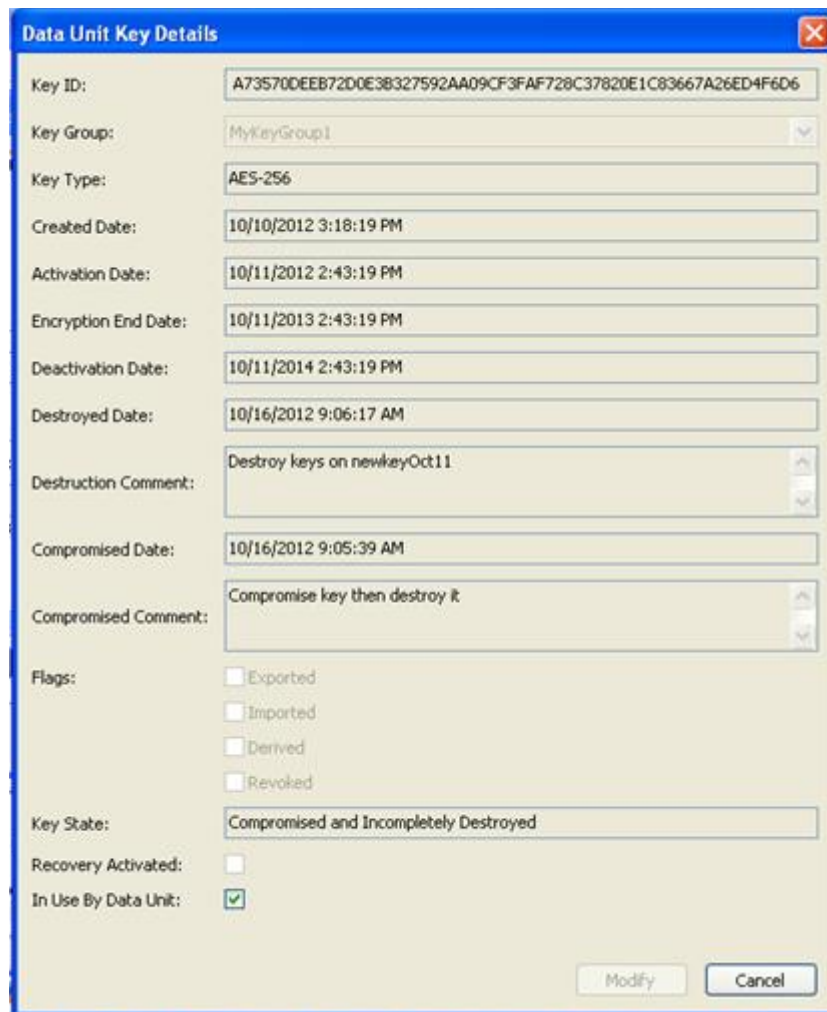
Set when all of the backups in which the compromised Key appears have been destroyed.

**Recovery Activated**

Indicates whether the Key has been linked to the data unit by a recovery action. This condition occurs when a Key is used for a Data Unit by one KMA in a OKM Cluster and then, due to a failure, the Key is later requested for the Data Unit from a different KMA. If the failure (such as a network outage) has prevented the allocation of the Key to the data from being propagated to the second KMA, the second KMA creates the linkage to the data unit. Such a Key is "recovery activated," and an administrator may want to evaluate the system for KMA or network outages. Possible values are True and False.

**Data Unit Key Details**

From the Data Unit Details screen, select the key you want to display details for and click the **Details** button. The following screen appears.



The image shows a 'Data Unit Key Details' dialog box with a blue title bar and a close button. It contains several fields for key information:

- Key ID:** A73570DEEB72D0E3B327592AA09CF3FAF728C37820E1C83667A26ED4F6D6
- Key Group:** MyKeyGroup1 (dropdown menu)
- Key Type:** AES-256
- Created Date:** 10/10/2012 3:18:19 PM
- Activation Date:** 10/11/2012 2:43:19 PM
- Encryption End Date:** 10/11/2013 2:43:19 PM
- Deactivation Date:** 10/11/2014 2:43:19 PM
- Destroyed Date:** 10/16/2012 9:06:17 AM
- Destruction Comment:** Destroy keys on newkeyOct11 (text area)
- Compromised Date:** 10/16/2012 9:05:39 AM
- Compromised Comment:** Compromise key then destroy it (text area)
- Flags:** Four checkboxes: Exported, Imported, Derived, and Revoked (all are unchecked).
- Key State:** Compromised and Incompletely Destroyed
- Recovery Activated:** Unchecked checkbox
- In Use By Data Unit:** Checked checkbox (indicated by a green checkmark)

At the bottom right, there are 'Modify' and 'Cancel' buttons.

### In Use By Data Unit

If the Replication Version is at least 14, the Operator can change the **In Use By Data Unit** check box that indicates the relationship between this key and its associated data unit. Selecting this check box can help when a key policy that is used by tape drive agents is inadvertently updated to enable its **Allow Agents To Revoke Keys** attribute. See "[Viewing Key Policies](#)" on page 6-2 for a description of this attribute.



## Backups with Destroyed Keys List Tab

**Data Unit Details**

General | Key List | **Backups with Destroyed Keys List**

Data Unit ID: FDAC7620B1491D506DC3C3B2E286AD0F

Data Unit Description: Description for Data Unit test 1, modified

Backup List

Filter: Backup ID = [ ] +

Use Refresh Reset | < << >> >

Results in page: 2 (last page)

Backup ID	Created Date ▾	Destroyed Date	Pending	Completed Date	Download
FDAC7620B1491D50000000000000000002	12/4/2007 8:30:18 AM		True	12/4/2007 8:30:22 AM	12/4/2007
FDAC7620B1491D50000000000000000001	12/4/2007 8:26:49 AM		True	12/4/2007 8:26:52 AM	12/4/2007

Details... Save Report...

Save Cancel

A Data Unit cannot be considered “completely destroyed” until all Backups containing the Data Unit Key(s) have been destroyed.

The Backups with Destroyed Keys List tab of the Data Unit Details dialog helps you identify those Backups that contain Data Unit Key(s) for the selected Data Unit and the destruction status of those Backups.

The logic for determining if a Backup does contain a particular Data Unit Key is as follows:

*A Backup contains a Data Unit Key if the Backup was created after the Data Unit Key was created and the Data Unit Key has not been destroyed, or if it has been destroyed and its destruction took place after the Backup was created.*

However, the date-time comparison needs to take into consideration that the clocks of the various KMAs in a Cluster might not be synchronized automatically (if an NTP server is not specified) and hence may be reporting different times. To account for the possibility of time discrepancies among KMAs, a Backup Time Window is used in the comparison. The Backup Time Window is fixed at five minutes. Using the Backup Time Window, the comparison check behaves as follows:

*A Backup contains a Data Unit Key if the Backup was created within five minutes of the backup creation or later and the Data Unit Key was destroyed within five minutes of the Backup creation or later.*

The Backup Time Window is used to minimize the likelihood of falsely reporting that a Data Unit does not exist in a particular backup when in fact it does. Such a case is known as a “false negative” and seriously undermines compliance requirements for data destruction. Utilization of the Backup Time Window does, however, increase the likelihood of falsely reporting that a Data Unit Key does belong in a Backup when in fact it does not. Unlike “false negatives,” “false positives” do not undermine compliance requirements for data destruction.

### Data Unit ID

Uniquely identifies the Data Unit.

### Data Unit Description

Describes the Data Unit.

**Data Unit Destruction Status**

Indicates the Destruction status of the Data Unit.

**Backup ID**

Identifies the backup.

**Created Date**

Displays when the date and time when the backup file was created (that is, when the backup started).

**Destroyed Date**

Displays the date and time when the backup file was destroyed.

**Pending:**

Indicates whether the backup is still pending. Possible values are True or False.

**Completed Date:**

Displays the date and time when the backup file was completed.

**Downloaded Date:**

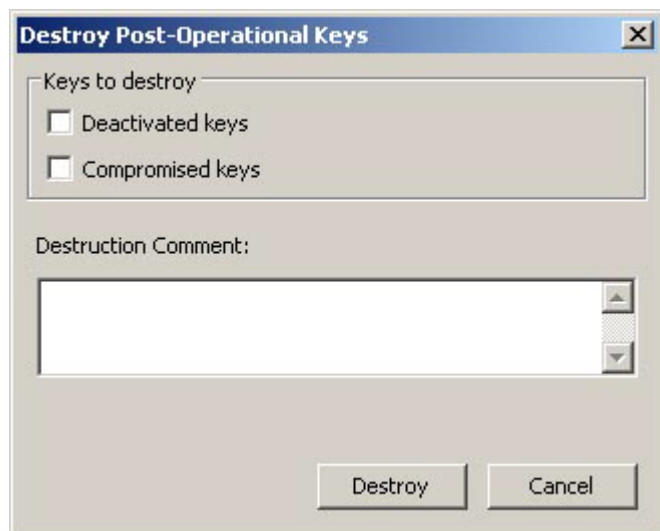
Displays the date and time when the backup file was downloaded.

1. Click the **Save** button to save your changes.

## Destroying Post-operational Keys

To destroy post-operational keys associated with a data unit:

1. From the Data Unit List screen, highlight the Data Unit you want to destroy and click the **Destroy Keys** button.
2. The following dialog box is displayed, prompting you to specify the keys to destroy.

**Deactivated keys**

Select this checkbox if you want to destroy the keys that have passed their cryptoperiod but still may be needed to process (decrypt) data information.

### Compromised keys

Select this checkbox if you want to destroy the keys that have been released to or discovered by an unauthorized entity.

Type a comment about the destruction of these keys.

### Destruction Comment

3. If you click the **Destroy** button, another dialog box is displayed confirming the destruction of these keys.
4. Click the **Yes** button. Another dialog box is displayed showing the number of Keys that have been destroyed.

## Viewing Key Counts

You can list data units that have associated keys and the number of keys associated with each data unit. To view key counts:

1. From the Data Unit List screen, click the Key Counts button.
2. The following dialog box is displayed.

Filter: Data Unit ID equals

Results in page: 4 (last page)

Data Unit ID	External Tag	Key Count
0235E3C52AFD092F4BB61DCC27D15D69	ABCDEF	5
0235E3C52AFD092FB6A8F3081AAC1444	ABCDEF	5
0235E3C52AFD092F54662A93FDC02D14	ABCDEF	5
0235E3C52AFD092FAF1726DBF2C7BD00	ABCDEF	5

Save Report... Close

## Software Upgrade Menu

The Software Upgrade menu option allows the Operator to perform the first phase of the software upgrade process:

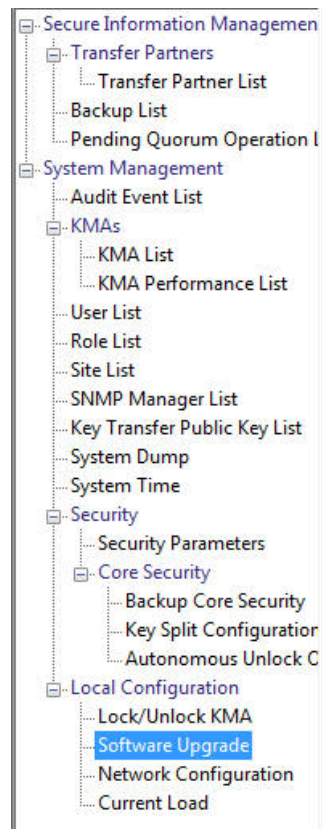
- Uploading a software upgrade file to the KMA
- Immediately applying the upgrade.

---

**Note:** The second phase of the process, activating a software version, must be done by the Security Officer. See ["Software Upgrade" on page 5-88](#) for detailed information.

---

Software updates are signed by Oracle and verified by the KMA before they are applied.



## Guidelines for Implementing Software Upgrades

- Before you execute this function, back up your system. For procedures, refer to ["Creating a Backup"](#) on page 8-3.
- Use an OKM Manager GUI release that matches the upgrade version you want to load on the KMA(s).
- KMAs running KMS 2.1 or earlier must be upgraded to KMS 2.2 before they can be upgraded to OKM 2.3 and later.
- The upload and apply process can be lengthy if the OKM Manager is remotely connected to the KMA or if the connection between the OKM Manager and KMA is slow. To mitigate this, the software upgrade file can be downloaded to a laptop or workstation that has the OKM Manager installed and the laptop or workstation connected to the same subnet as the KMA. The presence of a router between the OKM Manager and the KMA may slow down the upgrade process.
- The upload and apply processes, with a good connection between the OKM Manager and the KMA, optimally take about 30 minutes. The activate process optimally takes about 5 to 15 minutes. If the uploading process is very slow, try connecting to the same subnet as the KMA.
- Upload and apply the software upgrade file on each KMA one at a time (to help to spread out the network load), and then activate the software upgrade on each KMA one at a time (to minimize the number of KMAs that are offline concurrently).
- If any of the upgrade processes fail (upload, verify, apply, activate, switch replication version), the OKM Manager generates audit messages describing the reason for the failure and a suggested solution.

- The Technical Support account is disabled on the upgraded KMAs, and the accounts must be re-enabled if needed.

## Uploading and Applying Software Upgrades

The first phase of the software upgrade process is to upload and apply the software upgrade file.

1. Download the software upgrade file to your PC or workstation from the delivery location. The version is visible in the file name.

---

**Note:** Save the file to a location where you can navigate from the OKM Manager GUI.

---

2. From the Local Configuration menu, select **Software Upgrade**. The Software Upgrade screen is displayed.

The active version of the software is highlighted, the Active column is set to True, and an inactive version is shown.

Software Upgrade

Available Software Versions:

Version	Install Date	Active	Current Replication Version	Supported Replication Versions
3.0.0-5.11-2022	2013-10-23T19:37	True	15	8,9,10,11,12,13,14,15

Activate Switch Replication Version...

Software Upgrade File Name:

Browse...

Upload and Apply

The buttons appearing on this screen include:

### Activate

The Security Officer can select an inactive software version and then click this button to activate the selected software version. Messages are displayed, indicating when this software version is activated and the KMA reboots.

### Switch Replication Version

The Security Officer can select the active software version and then click this button to switch the current replication version.

### Software Upgrade File Name

Type the name of the software upgrade file.

### Browse

Click this button to locate the software upgrade file on your local system.

### **Upload and Apply**

Click this button to begin the upload and apply process. Messages are displayed, indicating when the software upgrade file is uploaded and applied.

3. In the Software Upgrade File Name field, type the name of the software upgrade file. You can also select the **Browse** button to locate the file. Click the **Upload and Apply** button.

The OKM starts the upload, verify, and apply process and displays a progress indicator showing which step the process is at.

---

**Note:** Since the upload process adds some traffic to the network, you may not want to upload KMAs simultaneously in a busy Cluster.

---

## **Activating a Software Version**

The second phase of the software upgrade process is to activate the inactive software version you uploaded and applied. The Security Officer must implement this, refer to "[Software Upgrade](#)" on [page 5-88](#) for detailed information.

## **Other Functions**

An Operator can also access the following menus:

- For procedures on viewing a Backup file's detailed information, refer to "[Backup List Menu](#)" on page 8-1.
- For procedures to view an audit event list, refer to "[Audit Event List Menu](#)" on page 6-29.
- For procedures to view the list of KMAs, refer to "[KMA List Menu](#)" on page 5-2.
- For procedures to view a list of sites, refer to "[Site List Menu](#)" on page 5-33.
- For procedures to view the list of SNMP managers, refer to "[SNMP Manager List Menu](#)" on page 5-39.
- For procedures on viewing the KMA locking status, refer to "[Lock/Unlock KMA](#)" on page 5-85.
- Access the KMA List menu, refer to "[KMA List Menu](#)" on page 5-2.
- Query KMA performance information about KMAs in this OKM cluster, refer to "[KMA Performance List Menu](#)" on page 5-17.
- Query load information about the KMA the GUI is connected to, refer to "[Current Load Menu](#)" on page 5-95.
- Query keys directly without querying data units, refer to the "[Key List Menu](#)" on page 6-37.

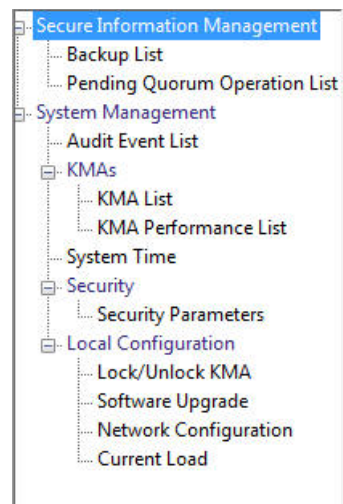
---

# Backup Operator Operations

This chapter describes the operations that a user who has been given a Backup Operator role can perform. If you have been assigned other roles, refer to the appropriate chapter for instructions on performing the specific role.

## Backup Operator Role

As the Backup Operator, you are responsible for securing and storing data and their keys.



## Backup List Menu

The Backups List menu option allows the Backup Operator to:

- View the history of the Backups and confirm their destruction status
- Create Backups.

## Viewing Backup Files History

To view Backup files history:

From the Backups menu, select **Backup List**. The Backup List screen is displayed.

Backup List

Filter: Backup ID = [ ] +

Use Refresh Reset | < << >>

Results in page: 2 (last page)

Backup ID	KMA ID	Created Date	Destroyed Date	Destruction Status	Destr
9CE46A4BB276A9FB00000000000000001	9CE46A4BB276A9FB	1/7/2008 10:33:15 AM		PENDING	
9CE46A4BB276A9FB00000000000000002	9CE46A4BB276A9FB	1/7/2008 10:39:37 AM		PENDING	

Details... Create Backup... Restore... Confirm Destruction...

If you want more detailed information on a Backup, highlight the Backup and click the **Details** button. For more information, refer to ["Viewing Backup Details"](#) on page 8-2.

Click the **Create Backup** button to create a Backup. For more information, refer to ["Creating a Backup"](#) on page 8-3.

Click the **Confirm Destruction** button to confirm the destruction of a Backup. For more information, refer to ["Confirming a Backup's Destruction"](#) on page 8-4.

## Viewing Backup Details

The Backup Details dialog box is used to view the details of a Backup file.

---

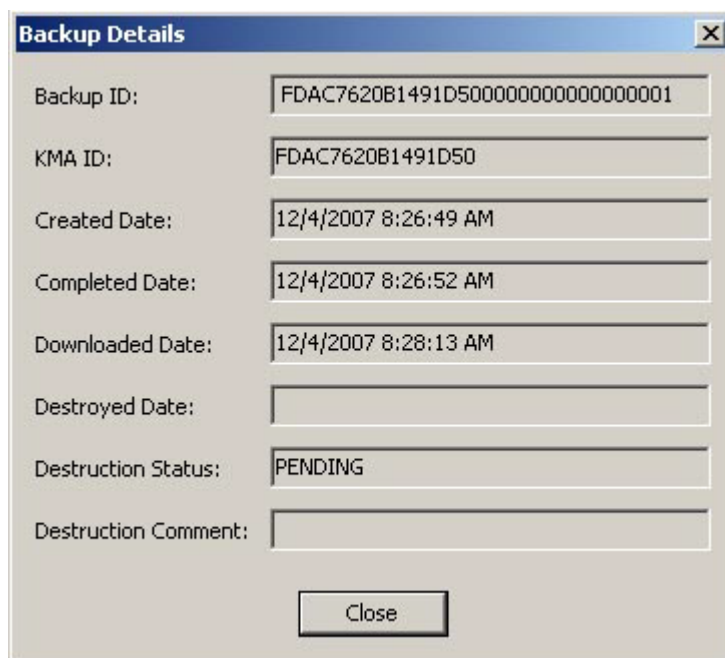
**Note:** Backup files are downloaded to the machine where the OKM Manager is running when the backup is created.

---

To view the details of a Backup file:

1. From the Backups List screen, double-click the Backup entry for which you want more information or highlight the Backup entry and click the **Details** button. The Backup Details dialog box is displayed, with all fields disabled.





Backup ID:	FDAC7620B1491D500000000000000001
KMA ID:	FDAC7620B1491D50
Created Date:	12/4/2007 8:26:49 AM
Completed Date:	12/4/2007 8:26:52 AM
Downloaded Date:	12/4/2007 8:28:13 AM
Destroyed Date:	
Destruction Status:	PENDING
Destruction Comment:	

Close

2. The fields and their descriptions are given below:

**Backup ID**

Displays a system-generated unique identifier that distinguishes each Backup file.

**KMA ID**

Displays the KMA on which this Backup file is generated.

**Created Date**

Displays the date and time when the Backup file was created.

**Completed Date**

Displays the date and time when the Backup file was completed.

**Downloaded Date**

Displays the date and time the Backup file was downloaded.

**Destroyed Date**

Displays the date when the Backup file was destroyed.

**Destruction Status**

Indicates the status of the backup with respect to its destruction.

**Destruction Comment**

Displays user-supplied information on the Backup file's destruction.

3. Click the **Close** button to close this dialog box.

## Creating a Backup

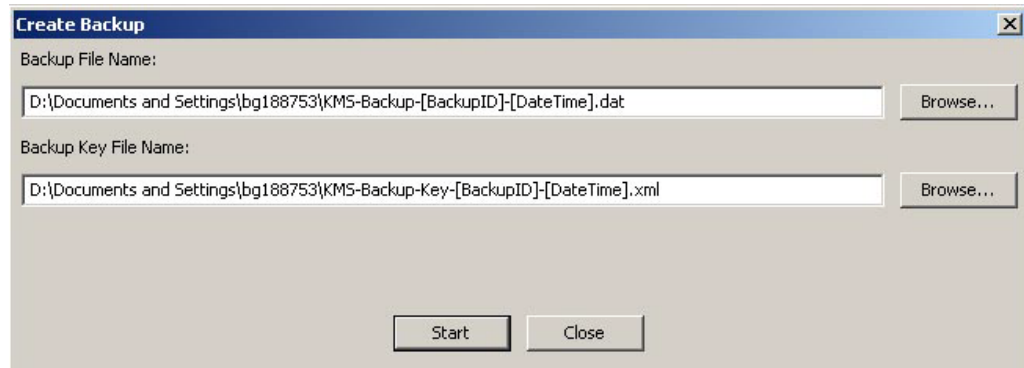
**Important** – The Security Officer must back up Core Security Key material before the Backup Officer can create a backup. See ["Creating a Core Security Backup"](#) on page 5-79.

At any given time, there is only one Backup file and one Restore file on a KMA.

This option gives you the ability to create a Backup that consists of two files: a Backup file and a Backup key file.

To create a Backup:

1. From the Backup List screen, click the **Create Backup** button. The Create Backup dialog box is displayed.



---

**Note:** Backup File and Backup Key File names are automatically generated. You can, however, edit the names. You can also click the Browse button to select a destination path.

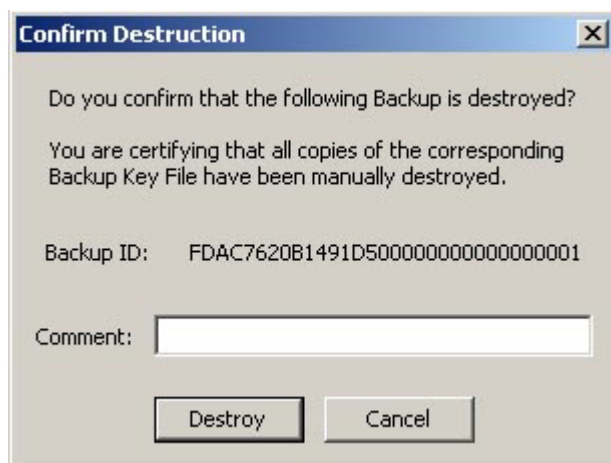
---

2. Click the **Start** button to create the Backup file and download the Backup key file to the user-specified destination.
3. When the Backup is completed, a message indicating this is displayed. Click the **Close** button to close this dialog box.
4. You are returned to the Backup List screen, where the new created Backup File is displayed.

## Confirming a Backup's Destruction

To confirm a backup's destruction:

1. From the Backup List screen, highlight the Backup you want to destroy and click the **Confirm Destruction** button. The following dialog box is displayed, confirming that you want to update the destruction status for the selected Backup. Before proceeding, ensure that all copies of the corresponding Backup Key file have been manually destroyed.



2. If you are certain that all copies of the corresponding backup key file have been manually destroyed, click the **Yes** button. Otherwise, click the **No** button to stop the process.
3. If you chose the **Yes** button, the backup and the Data Units that were associated with it are completely destroyed.

## KMA List Menu

The KMA List menu option allows you to:

- View KMAs (refer to "[Viewing KMAs](#)" on page 5-2)
- Create a KMA (refer to "[Creating a KMA](#)" on page 5-8)
- Modify a KMA's information (refer to "[Viewing/Modifying a KMA's Details](#)" on page 5-11)
- Delete a KMA (refer to "[Logging the KMA Back into the Cluster](#)" on page 11-8)
- Modify a Key Pool size

---

**Note:** Backup Operators can view KMA details and modify Key Pool sizes.

---

## Modifying a Key Pool Size

To modify a Key Pool size:

1. From the System Management menu, select **KMA List**. The right side of the KMA List screen is displayed below.

KMA List

Filter:

Results in page: 6 (last page)

KMA Name	KMA ID	Description	Site ID	Management Network Address	Service Network Address	Manag
Balblair	72BFADE9C3733B83			10.80.180.5	192.168.182.5	
Bunnahabhain	0000000000000000	X2100 SCA: 1.3.50	Arvada			N/A
Eaglerare	0000000000000000	X2100 SCA: 0.0.00				N/A
Homebrew	0000000000000000	X2100 SCA: 1.3.56	Aurora			N/A
Jimbeam	0000000000000000	X2200 SCA: 1.5.50	Aurora			N/A
Strathclyde	87B136C6969C64C8			10.80.180.241	192.168.180.241	

Key Pool Size: 1,000

2. Click **Modify Key Pool Size**. The following screen is displayed.

KMA List

Filter:

Results in page: 6 (last page)

KMA Name	KMA ID	Description	Site ID	Management Network Address	Service Network Address	Manag
Balblair	72BFADE9C3733B83			10.80.180.5	192.168.182.5	
Bunnahabhain	0000000000000000	X2100 SCA: 1.3.50	Arvada			N/A
Eaglerare	0000000000000000	X2100 SCA: 0.0.00				N/A
Homebrew	0000000000000000	X2100 SCA: 1.3.56	Aurora			N/A
Jimbeam	0000000000000000	X2200 SCA: 1.5.50	Aurora			N/A
Strathclyde	87B136C6969C64C8			10.80.180.241	192.168.180.241	

Modify Key Pool Size

Current Key Pool Size: 1000

New Key Pool Size:

Key Pool Size: 1,000

3. Supply the new Key Pool size.

## Other Functions

A Backup Operator can also:

- View Audit Event List
- View the System time
- View the KMA locking status
- Access the KMA List screen.

For procedures on viewing the Audit Log, refer to ["Audit Event List Menu"](#) on page 6-29.

For procedures on viewing the KMA locking status, refer to ["Lock/Unlock KMA"](#) on page 5-85.

For procedures on using the KMA List information, refer to ["KMA List Menu"](#) on page 5-2.

For procedures on querying KMA performance information about KMAs in this OKM cluster, refer to ["KMA Performance List Menu"](#) on page 5-17.

For procedures on querying load information about the KMA the GUI is connected to, refer to ["Current Load Menu"](#) on page 5-95.



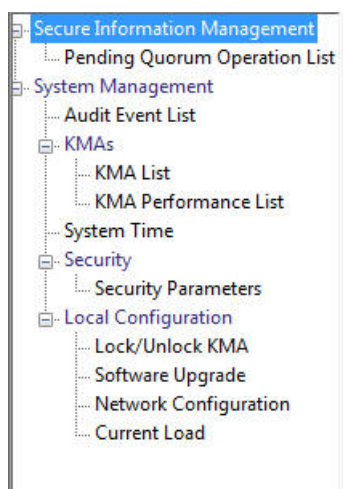
---

## Auditor Operations

This chapter describes the operations that a user who has been given an Auditor role can perform. If you have been assigned other roles, refer to the appropriate chapter for instructions on performing the specific role.

### Auditor Role

As the Auditor, you can view the Audit List events and the KMA.



### Audit List Menu

For procedures on using the Audit List menu, refer to ["Audit Event List Menu"](#) on page 6-29.

### Security Parameters Menu

The Security Parameters List menu gives the Auditor the ability to view the KMA's security parameters. For procedures on using the Security Parameters menu, refer to ["Security Parameters Menu"](#) on page 5-73.

### Other Functions

An Auditor can also:

- View the Lock/Unlock the KMA status.

- View the system time
- Access KMA List information.

For procedures on viewing the lock/unlock KMA status, refer to ["Lock/Unlock KMA"](#) on page 5-85.

For procedures on viewing the installed software versions, refer to ["Software Upgrade Menu"](#) on page 7-27.

For procedures on using the KMA List information, refer to ["KMA List Menu"](#) on page 5-2.

For procedures on querying KMA performance information about KMAs in this OKM cluster, refer to ["KMA Performance List Menu"](#) on page 5-17.

For procedures on querying load information about the KMA the GUI is connected to, refer to ["Current Load Menu"](#) on page 5-95.



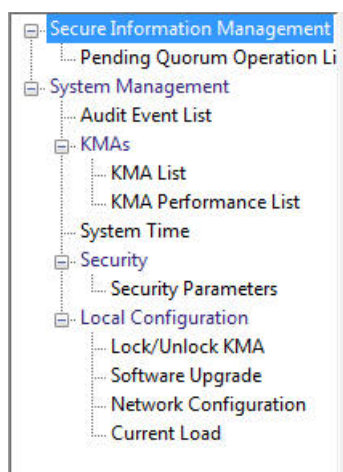
---

## Quorum Member Operations

This chapter describes the operations that a user who has been given a Quorum Member role can perform. If you have been assigned other roles, refer to the appropriate chapter for instructions on performing the specific role.

### Quorum Member Role

The Quorum Member Role views and approves pending quorum operations.



A user who has been assigned the Security Operator role must first log into the OKM Manager GUI, create one or more users, and assign them the Quorum Member role (see ["Creating a User"](#) on page 5-23).

When you create a user with the Quorum Member role, the Security Officer must provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog, since not all Quorum Member Users have been created yet.

### Pending Quorum Operation List Menu

The Pending Quorum Operation List menu shows any pending operations that require the approval of a quorum of Key Split Credentials before the system performs them. This menu appears when the user has the Quorum Member or Security Officer role.

The Pending Quorum Operation List menu includes the following options:

- View the Pending Operation list details
- Approve a pending operation

- Delete a pending operation.

Pending Operation List

Filter: Pending Operation ID =

Use Refresh Reset | < << >> >

Results in page: 2 (last page)

Pending Operation ID	KMA Name	Operation Type	Submitted Date	Last Updated	Credentials
6EB8526D4B7CE3D80000000000000001	mattawakma	Add User Role	8/27/2009 10:12:38 AM	8/27/2009 10:12:38 AM	
6EB8526D4B7CE3D80000000000000002	mattawakma	Add User Role	8/27/2009 10:12:39 AM	8/27/2009 10:12:39 AM	

Details... Approve Pending Operation... Delete

You can filter the Pending Operations lists by any of the following keys:

- Pending Operation ID
- KMA Name
- Operation Type
- Submitted Date
- Last Updated.

The **Use** button applies the filter to the displayed list for the pending operation.

The fields and their descriptions are given below:

**Filter:**

Displays the fields that you can use to filter the results of queries made to the KMA. Possible values are:

- Pending Operation ID
- KMA Name
- Operation Type
- Submitted Date
- Last Updated

**Filter Operator box:**

Click the down-arrow and select the filter operation you want. Possible values are:

- Equals =
- Not equal <>
- Greater than >

- Less than <
- Greater than or equals >=
- Less than or equals <=
- Starts with ~
- Empty
- Not empty

**Filter Value text box:**

Type a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

**Filter Value combo box:**

Click the down-arrow and select a value to filter the selected attribute by. This filter option is not displayed for all filter attributes.

Click the plus button to add additional filters.

Click the minus button to remove a filter. This button is only displayed if there is more than one filter shown.

**Use:**

Click this button to apply the selected filters to the displayed list and go to the first page.

**Refresh:**

Click this button to refresh the list.

**Reset:**

Click this button to remove all filters and reset the displayed list to the first page.

Click this button to go to the first page of the list.



Click this button to go to the previous page.



Click this button to go to the next page.

**Results in Page:**

Displays the number of records per page that were configured in the Query Page Size field in the Options dialog box.

**Pending Operation ID:**

Uniquely identifies the pending quorum operation.

**KMA Name:**

The name of the KMA from which this operation was submitted.

**Operation Type:**

The type of quorum operation.

**Submitted Date:**

The date when the pending quorum operation was submitted.

**Last Updated:**

The date when the quorum was last updated on this operation. The quorum on a particular pending quorum operation is updated whenever another Quorum Member provides key split user names to approve it. The pending quorum operation expires when not enough key split users approve this operation within the Pending Operation Credentials Lifetime. This date is initially set to be the same as the submitted date when the pending quorum operation is submitted.

**Credentials:**

A list of key split user names that have already approved this pending quorum operation.

**Details:**

Click this button to view detailed information about a pending quorum operation.

**Approve Pending Operation:**

Click this button to approve a pending quorum operation. You must be in the Quorum Member role to do this.

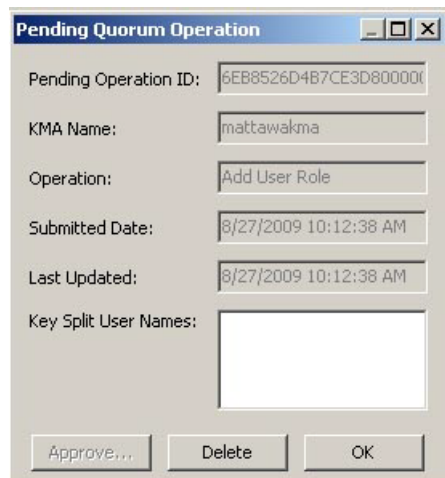
**Delete:**

Click this button to delete a selected pending quorum operation. You must be in the Security Officer role to do this.

## Viewing Pending Operations Details

To view pending operations details:

From the Pending Operation List screen, click the **Details** button. The Pending Quorum Operation dialog box is displayed.

The image shows a screenshot of a software dialog box titled "Pending Quorum Operation". The dialog box has a standard Windows-style title bar with minimize, maximize, and close buttons. Inside the dialog, there are several labeled text fields: "Pending Operation ID:" with the value "6EB8526D4B7CE3D80000", "KMA Name:" with the value "mattawakma", "Operation:" with the value "Add User Role", "Submitted Date:" with the value "8/27/2009 10:12:38 AM", and "Last Updated:" with the value "8/27/2009 10:12:38 AM". Below these fields is a larger, empty text area labeled "Key Split User Names:". At the bottom of the dialog, there are three buttons: "Approve...", "Delete", and "OK".

The Key Split User Names field lists Key Split Users, if any, who have already approved this operation.

To get more information about this particular pending quorum operation, you can filter audit events displayed in the Audit Event List panel (see ["Viewing Audit Logs"](#) on page 6-30).

1. Navigate to the Audit Event List panel.
2. Define a filter with the Operation filter set to Add Pending Quorum Operation. If you have several pending quorum operations, you may want to define another filter with Created Date specifying a time period around the Submitted Date of this particular pending quorum operation.
3. Click the **Use** button to display those audit events that match this filter. The Message Values field of the filtered audit event should contain more information about the pending quorum operation.

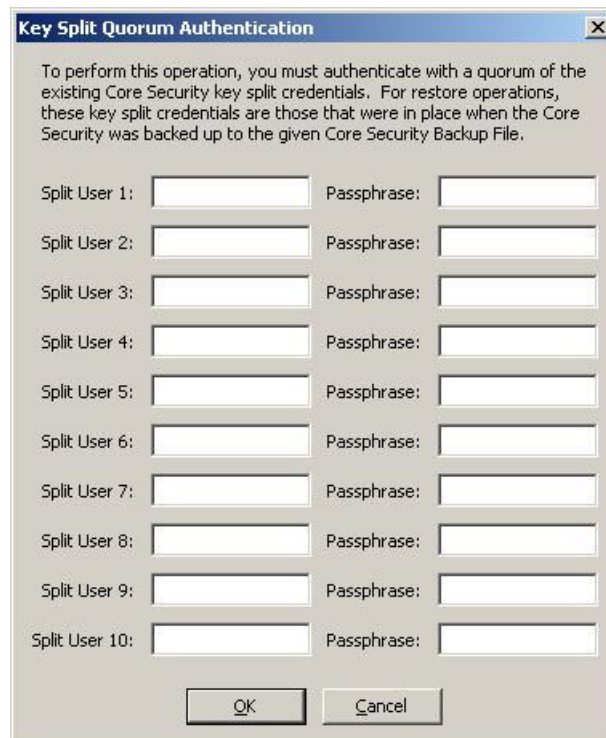
## Approving Pending Quorum Operations

To approve a pending operation, you must log into the OKM Manager GUI in the Quorum Member role; otherwise, the **Approve** button is disabled.

Other users who have the Quorum Member role can also log in separately and approve a pending quorum operation. When a sufficient quorum of Key Split Credentials approves the pending quorum operation, then the OKM Cluster performs the operation.

To approve pending quorum operations:

1. From the Pending Operation List screen, click the **Approve Pending Operation** button.
2. The Key Split Quorum Authentication dialog box is displayed.



The dialog box is titled "Key Split Quorum Authentication" and contains the following text: "To perform this operation, you must authenticate with a quorum of the existing Core Security key split credentials. For restore operations, these key split credentials are those that were in place when the Core Security was backed up to the given Core Security Backup File."

Below the text, there are ten rows of input fields, each labeled "Split User" followed by a number (1 through 10). Each row has two fields: "Split User" and "Passphrase".

At the bottom of the dialog box, there are two buttons: "OK" and "Cancel".

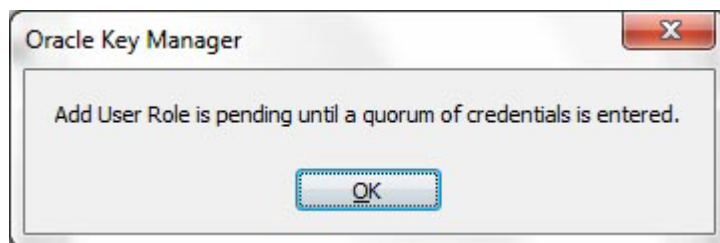
If you provide a sufficient quorum of Key Split Credentials in the Key Split Quorum Authentication dialog box, then information is updated in the OKM Cluster after you provide a quorum, not when you click the **Save** button.

If you do not provide a sufficient quorum in the Key Split Quorum Authentication dialog box, two different outcomes can occur depending on the replication version:

Replication Version:	Result:
10 or lower	The operation fails and no information is updated in the OKM Cluster.
11 or higher	<p>The operation becomes pending. That is, the system adds the operation to a list of pending quorum operations (see <a href="#">"Pending Quorum Operation List Menu"</a> on page 10-1). A popup message appears when the operation is added to this list.</p> <p>No information is updated in the OKM Cluster until users with the Quorum Member role (Quorum Member users) log in and provide a sufficient quorum.</p>

3. Enter the quorum user names and passphrases to authenticate the operation.

If you do not immediately provide a sufficient quorum of Key Split Credentials, the system adds the operation to a list of pending quorum operations and generates the following dialog box.



When you click **OK**, you then see this operation in the Pending Quorum Operation List screen (refer to the sample screen shown in ["Pending Quorum Operation List Menu"](#) on page 10-1).

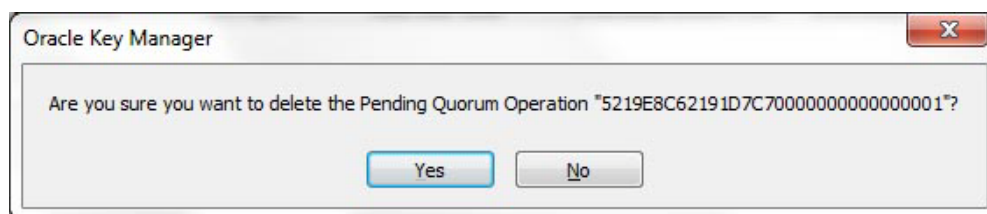
## Deleting Pending Quorum Operations

To delete a pending operation, you must log into the OKM Manager GUI in the Security Officer role; otherwise, the **Delete** button is disabled.

To delete pending operations:

1. From the Pending Operation List screen, highlight the pending operation you want to delete and click the **Delete** button.

The following dialog box is displayed, prompting you to confirm that you want to delete the selected pending operation.



2. Click the **Yes** button to delete the pending operation. The currently selected pending operation is deleted and you are returned to the Pending Operation List

screen. The system also removes any entries that are associated with the pending operation.

## Other Functions

The following operations require a quorum of Key Split Credentials:

- ["Creating a KMA" on page 5-8](#)
- ["Setting a KMA Passphrase" on page 5-14](#)
- ["Creating a User" on page 5-23](#)
- ["Viewing/Modifying a User's Details" on page 5-26](#)
- ["Setting a User's Passphrase" on page 5-28](#)
- ["Creating a Transfer Partner" on page 5-52](#)
- ["Viewing/Modifying Transfer Partner Details" on page 5-56](#)
- ["Restoring a Backup" on page 5-68](#)
- ["Autonomous Unlock Option" on page 5-83](#)
- ["Lock/Unlock KMA" on page 5-85](#)
- ["Uploading and Applying Software Upgrades" on page 7-29](#)





## Using the OKM Console

This chapter describes the options in the OKM Console.

### What is the OKM Console?

The OKM Console is a terminal text-based interface that allows you to configure basic functions of the KMA. It is accessed by physically connecting a video monitor and keyboard to the KMA or by the “remote console” function in the ELOM web browser interface (see ["Accessing the KMA Through the Service Processor"](#) on page 2-1).

The OKM Console is automatically launched by the operating system when the KMA boots up and cannot be terminated by a user. Depending on the roles that a user is assigned, the options in the OKM Console differ.

Before you can login to the OKM Console, the user accounts must be created in the OKM Manager. You must use the same user name/passphrase that was used for authentication in the OKM to login to the OKM Console.

---

**Note:** Only the first Security Officer account is created when the QuickStart program is launched.

---

### Logging into the KMA

After the KMA boots up, the following information is displayed.

```
Copyright (c) 2007, 2013, Oracle and/or its affiliates. All rights reserved.
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
-----
Please enter your User ID:
```

1. At the prompt, type your user name and press <Enter>.
2. At the Please enter your Passphrase: prompt, type your passphrase and press <Enter>. Depending on the role(s) the user is assigned, the options on the OKM Console differ. The menu shows the version of the KMA and the logged on user.

User role operations are discussed on the following pages. They include:

- Operator (see ["Operator Role Functions"](#) on page 11-3)
- Security Officer (see ["Security Officer Role Functions"](#) on page 11-7)
- Other Roles (see ["Other Role Functions"](#) on page 11-19).

## Operator

The following menu illustrates the options for an Operator role.

```
Oracle Key Manager Version 3.0.0 (build2020) -- OP on Strathclyde
-----
Please enter your User ID: OP
Please enter your Passphrase:

Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
Serial Number 1251BD0E48

OpenBoot PROM Version OBP 4.34.3 2013/02/06 11:46
-----
(1) Reboot KMA
(2) Shutdown KMA
(3) Technical Support
(4) Primary Administrator
(5) Set Keyboard Layout
(0) Logout
-----
Please enter your choice:
```

## Security Officer

The following menu illustrates the options for an Security Officer role.

```
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
-----
Please enter your User ID: SO
Please enter your Passphrase:

Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
Serial Number 1251BD0E48

OpenBoot PROM Version OBP 4.34.3 2013/02/06 11:46
-----
(1) Log KMA Back into Cluster
(2) Set User's Passphrase
(3) Set KMA Management IP Addresses
(4) Set KMA Service IP Addresses
(5) Modify Gateway Settings
(6) Set DNS Settings
(7) Reset to Factory Default State
(8) Technical Support
(9) Primary Administrator
(10) Set Keyboard Layout
(0) Logout
-----
Please enter your choice:
```

---

---

**Note:** If the user has been assigned both Operator and Security roles, then the menu options are combined as follows:

---

---

```
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
-----
Please enter your User ID: SO
Please enter your Passphrase:
```

```
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
Serial Number 1251BD0E48
```

```
OpenBoot PROM Version OBP 4.34.3 2013/02/06 11:46
```

```
-----
(1)   Log KMA Back into Cluster
(2)   Set User's Passphrase
(3)   Set KMA Management IP Addresses
(4)   Set KMA Service IP Addresses
(5)   Modify Gateway Settings
(6)   Set DNS Settings
(7)   Reset to Factory Default State
(8)   Technical Support
(9)   Primary Administrator
(10)  Set Keyboard Layout
(0)   Logout
-----
```

```
Please enter your choice:
```

## Other Roles

For all other roles, that is, Backup Operator, Compliance Officer, Auditor, and Quorum Member, a menu that is similar to the following is displayed. The only options available are to logout from the KMA and to set the keyboard layout.

```
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
```

```
-----
(1)  Set Keyboard Layout
(0)  Logout
-----
```

```
Please enter your choice:
```

## Operator Role Functions

This section describes the functions that an Operator can perform. They are:

- Rebooting the KMA ("[Rebooting the KMA](#)" on page 11-4)
- Shutting down the KMA ("[Shutting Down the KMA](#)" on page 11-4)
- Disabling Technical Support ("[Disabling the Technical Support Account](#)" on page 11-5)
- Disabling the Primary Administrator ("[Disabling the Primary Administrator](#)" on page 11-5)
- Setting the keyboard layout ("[Setting the Keyboard Layout](#)" on page 11-6)
- Logging out of the KMA ("[Logging Out](#)" on page 11-6).

The Operator's menu is shown below.

```
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
```

```
-----
Please enter your User ID: SO
Please enter your Passphrase:
```

```
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
Serial Number 1251BD0E48
```

```
OpenBoot PROM Version OBP 4.34.3 2013/02/06 11:46
```

- (1) Reboot KMA
- (2) Shutdown KMA
- (3) Technical Support
- (4) Primary Administrator
- (5) Set Keyboard Layout
- (0) Logout

-----  
Please enter your choice:

---

**Note:** The Technical Support and Primary Administrator menu items appear only when their settings are currently enabled.

---

## Rebooting the KMA

The Reboot KMA menu option allows an operator to stop and restart the KMA and reboot the operating system. This function is for troubleshooting purposes only.

To reboot the KMA:

1. At the Please enter your choice: prompt on the main menu, type **1** and press <Enter>. The following information is displayed, indicating that the support account is enabled.

```
Reboot KMA
```

```
-----  
Press Ctrl-c to abort.
```

```
Are you sure that you want to reboot the KMA? [y/n]: y
```

2. At the prompt, type **y** and press <Enter>. The current OKM Console session terminates as the KMA starts to reboot. After the KMA reboots, the OKM Console login prompt is displayed.

## Shutting Down the KMA

This option allows you to terminate (shut down) all services on the KMA and to physically shut down the KMA itself.

---

**Note:** If the KMA has been shut down for at least a few hours and the Autonomous Unlock option is enabled, lock the KMA before rebooting the KMA. After recent updates have been propagated to this KMA, as shown by the Replication Lag Size in the KMA List panel, unlock the KMA. Refer to the following topics for detailed information: "[Autonomous Unlock Option](#)" on page 5-83, "[Lock/Unlock KMA](#)" on page 5-85, and "[KMA List Menu](#)" on page 5-2.

---

To shut down the KMA:

1. At the Please enter your choice: prompt on the main menu, type **2** and press <Enter>. The following information is displayed, indicating that the support account is enabled.

```
Shutdown KMA
```

```
-----  
Press Ctrl-c to abort
```

```
Are you sure that you want to shut down the KMA? [y/n]: y
```

2. At the prompt, type **y** and press <Enter>. The following information is displayed, indicating that the system is shutting down.

- Shutting down...
3. The shutdown sequence is displayed. When it is finished, the following information is displayed.

Power down

  - 4. The KMA is now powered off. The KMA can be powered on using either the power button or the ELOM remote power control function.

## Disabling the Technical Support Account

---

**Note:** This task can be enabled only by the Security Officer; it can be disabled by either an Operator or a Security Officer.

---

To disable the Technical Support account:

1. At the Please enter your choice: prompt on the main menu, type 3 and press <Enter>. The following information is displayed, indicating that the support account is enabled.

```
Technical Support
-----
Press Ctrl-c to abort.
The support account is currently ENABLED.
Would you like to DISABLE the support account? [y/n]: y
```

2. At the prompt, type y to disable the account and press <Enter>.
  3. The following information is displayed, prompting you to confirm the change.
- ```
Are you sure that you want to DISABLE the support account?
[y/n]:
```
4. At the prompt, type y and press <Enter>. The SSH service automatically stops.

## Disabling the Primary Administrator

The Primary Administrator menu option allows you to enable/disable Primary Administrator access on the KMA.

---

**Note:** This task can be enabled only by the Security Officer; it can be disabled by either an Operator or a Security Officer.

---

Disabling Primary Administrator access takes place immediately. If someone is connected as a Primary Administrator, and then this access is disabled, the next command they attempt fails.

1. To disable Primary Administrator access:

At the Please enter your choice: prompt on the main menu, type 4 and press <Enter>. The following information is displayed, indicating that the access is enabled.

```
Primary Administrator
-----
Press Ctrl-c to abort.
The Primary Administrator role is currently ENABLED.
Would you like to DISABLE Primary Administrator privileges for the support
account? [y/n]: y
Are you sure that you want to DISABLE these privileges for the support account?
```

```
[y/n]: y
Primary Administrator configuration changes have been completed.
Press Enter to continue:
```

2. At the prompt, type **y** to disable the account and press <Enter>.
3. The following information is displayed, prompting you to confirm the change.  

```
Are you sure that you want to DISABLE these privileges for the support account?
[y/n]:
```
4. At the prompt, type **y** and press <Enter>. The Primary Administrator access has been disabled.

## Setting the Keyboard Layout

This option allows you to change the keyboard layout from English to a variety of languages.

---

---

**Note:** The keyboard layout should be set to match the layout of the keyboard attached to the KMA in order for the KMA to correctly interpret key presses.

---

---

To set the keyboard layout:

1. At the Please enter your choice: prompt on the main menu, type **5** and press <Enter>. The following keyboard layouts are displayed.

```
Set Keyboard Layout
-----
Press Ctrl-c to abort.
You may change the keyboard layout here.
Available keyboard layouts:
( 1) Arabic           ( 2) Belgian          ( 3) Brazilian
( 4) Canadian-Bilingual ( 5) Canadian-French   ( 6) Danish
( 7) Dutch            ( 8) Dvorak            ( 9) Finnish
(10) French           (11) German            (12) Italian
(13) Japanese-type6   (14) Japanese          (15) Korean
(16) Latin-American   (17) Norwegian         (18) Portuguese
(19) Russian          (20) Spanish            (21) Swedish
(22) Swiss-French     (23) Swiss-German       (24) Traditional-Chinese
(25) TurkishQ         (26) UK-English        (27) US-English

The current layout is US-English
Please enter the number for the keyboard layout [27] :

The keyboard layout has been applied successfully.
Press Enter to continue:
```

2. At the Please enter the number for the keyboard layout: prompt, enter the number you want to change the keyboard layout to. The new keyboard layout is applied.
3. The following information is displayed. Press <Enter> to continue.

## Logging Out

To log out of the current OKM Console session:

1. At the Please enter your choice: prompt on the main menu, type 0 and press <Enter>.
2. The current session terminates and the login prompt is displayed allowing the user to re-enter the OKM Console.

## Security Officer Role Functions

This section describes the functions that a Security Officer can perform. They are:

- Logging the KMA into the Cluster ("[Logging the KMA Back into the Cluster](#)" on page 11-8)
- Setting a User's Passphrase ("[Setting a User's Passphrase](#)" on page 11-9)
- Setting the KMA Management IP addresses ("[Setting the KMA Management IP Address](#)" on page 11-10)
- Setting the KMA Service IP addresses ("[Setting the KMA Service IP Addresses](#)" on page 11-11)
- Modifying the Gateway settings ("[Viewing/Adding/Deleting Gateways](#)" on page 11-13)
- Specifying the DNS settings ("[Specifying the DNS Settings](#)" on page 11-14)
- Resetting the KMA to the Factory Default State ("[Resetting the KMA to the Factory Default](#)" on page 11-14)
- Enabling/Disabling Technical Support ("[Enabling the Technical Support Account](#)" on page 11-15)
- Enabling/Disabling the Primary Administrator ("[Enabling the Primary Administrator](#)" on page 11-17)
- Setting the keyboard layout ("[Setting the Keyboard Layout](#)" on page 11-18)
- Logging out of the KMA ("[Logging Out](#)" on page 11-19).

The Security Officer's menu is shown below.

```
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
```

```
-----
Please enter your User ID: SO
```

```
Please enter your Passphrase:
```

```
Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde
Serial Number 1251BD0E48
```

```
OpenBoot PROM Version OBP 4.34.3 2013/02/06 11:46
```

```
-----
(1)    Log KMA Back into Cluster
(2)    Set User's Passphrase
(3)    Set KMA Management IP Addresses
(4)    Set KMA Service IP Addresses
(5)    Modify Gateway Settings
(6)    Set DNS Settings
(7)    Reset to Factory Default State
(8)    Technical Support
(9)    Primary Administrator
(10)   Set Keyboard Layout
(0)    Logout
-----
```

```
Please enter your choice:
```

## Logging the KMA Back into the Cluster

This menu option allows a Security Officer to log the KMA back into the Cluster after its passphrase has been changed.

---

**Note:** If the KMA has been logged out of the cluster for at least a few hours, then lock the KMA before logging the KMA back into the cluster. After recent updates have been propagated to this KMA, as shown by the Replication Lag Size in the KMA List panel, unlock the KMA. Refer to the following topics for detailed information: ["Lock/Unlock KMA"](#) on page 5-85, and ["KMA List Menu"](#) on page 5-2.

---

Before you can perform this task:

1. Bring up the OKM Manager.
2. Log in to an existing KMA as a Security Officer.
3. Navigate to the KMA List panel.
4. Create a KMA entry.

To log the KMA into the Cluster:

5. At the Please enter your choice: prompt on the main menu, type **1** and press <Enter>. The following information is displayed.

```
Log KMA Back into Cluster
```

```
-----  
Press Ctrl-c to abort.
```

```
Please enter the Management Network IP Address of an existing KMA in the  
cluster:
```

```
The KMA Passphrase is a Passphrase that you have previously configured for this  
KMA to join a Cluster.
```

```
Please enter this KMA's Passphrase:
```

6. Log in to an existing KMA as a Security Officer.
7. At the prompt, type the passphrase that was originally configured for the KMA, to join the Cluster and press <Enter>.

```
This command requires authorization by a quorum of Key Split Users.
```

```
Enter sufficient Key Split credentials to form a quorum.
```

```
Enter a blank name to finish.
```

```
Press Ctrl-c to abort.
```

```
Please enter Key Split User Name #1:
```

```
Please enter Key Split Passphrase #1:
```

```
Press Enter to continue:
```

8. Enter the first Key Split user name established during QuickStart for the first KMA in the OKM Manager Modify Key Split Credentials function (refer to ["Modifying the Key Split Configuration"](#) on page 5-80).

---

**Note:** The Security Officer needs to know how many Key Split users to enter, that is, what the Key Split Threshold is. In this example, the Key Split Threshold is 2.

---

9. Type the passphrase for the Key Split user, and press <Enter>.



This command requires authorization by a quorum of Key Split Users.  
 Enter sufficient Key Split credentials to form a quorum.  
 Enter a blank name to finish.  
 Press Ctrl-c to abort.  
 Please enter Key Split User Name #2:  
 Please enter Key Split Passphrase #2:  
 Press Enter to continue:

10. Enter the second Key Split user name.

11. Type the passphrase for the Key Split user, and press <Enter>.

This command requires authorization by a quorum of Key Split Users.  
 Enter sufficient Key Split credentials to form a quorum.  
 Enter a blank name to finish.  
 Press Ctrl-c to abort.  
 Please enter Key Split User Name #3:  
 Are you sure that you want to log the KMA back into the Cluster?  
 [y/n]: **n**  
 Press Enter to continue:

12. Press <Enter> next to Key Split User Name #3 to end Key Split user authorization.

13. Type **n**, and press <Enter>.

## Setting a User's Passphrase

This menu option allows a Security Officer to set the passphrase for any user, including the Security Officer.

To set a user's passphrase:

1. At the Please enter your choice: prompt on the main menu, type **2** and press <Enter>. The following information is displayed.

```
Set User's Passphrase
-----
Press Ctrl-c to abort.
Please enter the User Name:
```

2. At the prompt, type the name of the user and press <Enter>. The following information is displayed.

```
Passphrases must be at least 8 characters and at most 64 characters in length.
Passphrases must not contain the User's User Name.
Passphrases must contain characters from 3 of 4 character classes (uppercase,
lowercase, numeric, other).
Please enter the desired Passphrase:
Please re-enter the desired Passphrase:
Press Enter to continue:
```

3. At the prompt, type the passphrase and press <Enter>.

4. At the Please re-enter the desired Passphrase: prompt, type the same passphrase and press <Enter>. The following information is displayed, indicating that the passphrase is set.

```
Press Enter to continue:
```

If you tried to change the passphrase of another user, the following information is displayed:

```
This command requires authorization by a quorum of Key
```

Split Users. Enter sufficient Key Split credentials to form a quorum. Enter a blank name to finish.

-----  
Press Ctrl-c to abort.

Please enter Key Split User Name #1:

5. Enter the first Key Split user name and press <Enter>.

Please enter Key Split Passphrase #1:

Press Enter to continue:

6. Enter the first Key Split passphrase and press <Enter>.
7. Repeat Step 5 and Step 6 until you have entered a sufficient number of Key Split user names to form a quorum.
8. Press <Enter> next to the Key Split User Name prompt to end Key Split user authorization.

---

---

**Note:** If you do not enter a sufficient quorum of Key Split credentials, the Setting a User's Passphrase process becomes a pending quorum operation. See ["Pending Quorum Operation List Menu"](#) on page 10-1 for more information.

---

---

9. Press <Enter> to return to the main menu.

## Setting the KMA Management IP Address

This option modifies the Management address settings for the KMA. Initially, this information is set in the QuickStart program (see ["Specifying the Network Configuration"](#) on page 2-9), and can be changed here.

In a large, multi-site Cluster, drives can connect only to a subset of all the KMAs in the Cluster. The following caution applies to the set of KMAs the drive can connect to.

---

---

**Caution:** This function should be used carefully. If you change the information for one KMA, all the other KMAs receive the updates immediately, assuming they are connected. If the KMA is disconnected, it updates the other KMAs when it is able to reconnect. However, if for example you have two KMAs that are not connected to each other (network outage), and you change both IP addresses, they will not be able to reconnect when the network is repaired. In this case, you must use the procedure for ["Logging the KMA Back into the Cluster"](#) on page 11-8 on one KMA to reconnect it with the other, and the Passphrase must be updated first. For example, if KMAs A and B are disconnected, and you change both IP addresses, then you must log into A and change B's passphrase. Then log into B's console and use the procedure for ["Logging the KMA Back into the Cluster"](#) on page 11-8 to re-attach it to A. Care must also be taken with tape drives. Tape drives do not automatically receive the updated IP information; they only get updated IP information when a tape is mounted. Thus, if you are in a typical environment where tape jobs only run at night, and you change all the KMA's IP addresses during the day, the drives will not be able to communicate with any KMA. If this happens, the drives must be re-enrolled with the OKM Cluster. To avoid this, change KMA IP addresses one at a time, wait for all drives to receive the change, then change the next.

---

---

To set the KMA Management IP addresses:

1. At the Please enter your choice: prompt on the main menu, type **3** and press <Enter>.

The current KMA Management IP address settings are displayed. The IPv6 address fields are blank when the KMA is not configured to use IPv6 addresses.

```
Set KMA Management IP Addresses
```

```
-----
```

```
Press Ctrl-c to abort.
```

```
An IP Address configuration must be defined in order for the KMA to communicate
with other KMAs or Users in your system.
```

```
Current settings:
```

```
Management Configuration : Static
Management IP Address     : 10.172.180.39
Management Subnet Mask    : 255.255.254.0
Management IPv6 Addresses: 2001:DB8::/32
```

```
Do you want to configure the Management Network interface to have an IPv6
address? [y/n]:
```

```
Do you want to use DHCP to configure the Management Network IPv4 interface?
[y/n]:
```

```
Please enter the Management Network IP Address [10.172.180.39]:
```

```
Please enter the Management Network Subnet Mask [255.255.254.0]:
```

```
Are you sure that you want to commit these changes? [y/n]: y
```

2. Type either **n** or **y** at the Do you want to configure the Management Network interface to have an IPv6 address prompt.
3. Type either **n** or **y** at the Do you want to use DHCP to configure the Management Network IPv4 interface prompt. If you type **n**, go to Step 4. If you type **y**, go to Step 6.
4. At the prompt, type the Management Network IP address and press <Enter>.
5. At the Please enter the Management Network Subnet Mask: prompt, type the subnet mask address, (for example 255.255.254.0) and press <Enter>.
6. Type **y** at the Are you sure that you want to commit these changes? [y/n]: prompt.

## Setting the KMA Service IP Addresses

This option modifies the Service address settings for the KMA. Initially, this information is set in the QuickStart program (see ["Specifying the Network Configuration"](#) on page 2-9), and can be changed here.

In a large, multi-site Cluster, drives may only have connections to a subset of all the KMAs in the Cluster. This caution applies to the set of KMAs the drive can connect to.

---

**Caution:** This function should be used carefully. If you change the information for one KMA, all the other KMAs receive the updates immediately, assuming they are connected. If the KMA is disconnected, it updates the other KMAs when it is able to reconnect. However, if for example you have two KMAs that are not connected to each other (network outage), and you change both IP addresses, they will not be able to reconnect when the network is repaired. In this case, you must use the procedure for ["Logging the KMA Back into the Cluster"](#) on page 11-8 on one KMA to reconnect it with the other, and the Passphrase must be updated first. For example, if KMAs A and B are disconnected, and you change both IP addresses, then you must log into A and change B's passphrase. Then log into B's console and use the procedure for ["Logging the KMA Back into the Cluster"](#) on page 11-8 to re-attach it to A. Care must also be taken with tape drives. Tape drives do not automatically receive the updated IP information; they only get updated IP information when a tape is mounted. Thus, if you are in a typical environment where tape jobs only run at night, and you change all the KMA's IP addresses during the day, the drives will not be able to communicate with any KMA. If this happens, the drives must be re-enrolled with the OKM Cluster. To avoid this, change KMA IP addresses one at a time, wait for all drives to receive the change, then change the next.

---

The current KMA Service IP address settings are displayed. The IPv6 address fields are blank when the KMA is not configured to use IPv6 addresses.

Set KMA Service IP Addresses

-----  
Press Ctrl-c to abort.

An IP Address configuration must be defined in order for the KMA to communicate with other Agents in your system.

Current settings:

Service Configuration : Static  
Service IP Address : 192.168.1.39  
Service Subnet Mask : 255.255.255.0  
Service IPv6 Addresses: 2001:DB8::/32

Do you want to configure the Service Network interface to have an IPv6 address?  
[y/n]:

Do you want to use DHCP to configure the Service Network IPv4 interface? [y/n]:

Please enter the Service Network IP Address [192.168.1.39]:

Please enter the Service Network Subnet Mask [255.255.255.0]:

Are you sure that you want to commit these changes? [y/n]: **y**

1. At the Please enter your choice: prompt on the main menu, type **4** and press <Enter>.
2. Type either **n** or **y** at the Do you want to configure the Service Network interface to have an IPv6 address prompt.
3. Type either **n** or **y** at the Do you want to use DHCP to configure the Service Network IPv4 interface prompt. If you type **n**, go to Step 4. If you type **y**, go to Step 6.
4. At the prompt, type the Service Network IP address and press <Enter>.
5. At the Please enter the Service Network Subnet Mask: prompt, type the subnet mask address, (for example 255.255.255.0) and press <Enter>.

6. Type **y** at the Are you sure that you want to commit these changes? [y/n]: prompt.

## Viewing/Adding/Deleting Gateways

This menu option shows the current gateway settings (five gateways to a page) on the Management (M) and Service (S) network interfaces and asks the user to add a gateway, remove a gateway, or accept the current gateway configuration.

Modify Gateway Settings

Press Ctrl-c to abort.

Gateways that are configured automatically are not modifiable, and are indicated with an asterisk (\*).

Management routes are indicated with an 'M', and service routes with an 'S'.

| #   | Destination | Gateway        | Netmask       | IF |
|-----|-------------|----------------|---------------|----|
| 1   | default     | 10.172.181.254 | 0.0.0.0       | M  |
| 2   | default     | 10.172.181.21  | 0.0.0.0       | M  |
| 3   | default     | 192.168.1.119  | 0.0.0.0       | S  |
| 4   | 10.0.0.0    | 10.172.180.25  | 255.255.254.0 | M  |
| * 5 | 10.80.180.0 | 10.172.180.39  | 255.255.254.0 | M  |

Press Enter to continue:

Modify Gateway Settings

Press Ctrl-c to abort.

Gateways that are configured automatically are not modifiable, and are indicated with an asterisk (\*).

Management routes are indicated with an 'M', and service routes with an 'S'.

| #    | Destination  | Gateway       | Netmask         | IF |
|------|--------------|---------------|-----------------|----|
| * 6  | 192.168.1.0  | 192.168.1.39  | 255.255.255.0   | S  |
| 7    | 192.168.25.0 | 10.172.180.25 | 255.255.255.0   | M  |
| 8    | 192.168.26.0 | 10.172.180.25 | 255.255.255.0   | M  |
| * 9  | 127.0.0.1    | 127.0.0.1     | 255.255.255.255 |    |
| * 10 | fe80::       | 2001:db8::/32 | 10              | M  |

(1) Continue

(2) Back

1

Modify Gateway Settings

Press Ctrl-c to abort.

Gateways that are configured automatically are not modifiable, and are indicated with an asterisk (\*). Management routes are indicated with an 'M', and service routes with an 'S'.

| #    | Destination | Gateway                  | Netmask | IF |
|------|-------------|--------------------------|---------|----|
| * 11 | fe80::      | fe80::216:36ff:feca:15b9 | 10      | S  |

You can add a route, delete a route, or exit the gateway configuration.

Please choose one of the following:

(1) Add a gateway

(2) Remove a configured gateway (only if modifiable)

(3) Exit gateway configuration

(4) Display again

3

1. At the Please enter your choice: prompt on the main menu, type **5** and press <Enter>.

2. At the (1)Continue (2)Back prompt, type 1 to display the next few gateways or 2 to display the previous few gateways.
3. When the last gateways are displayed, at the Please choose one of the following: prompt, type 1, 2, 3, or 4 and press <Enter>.

---

**Note:** If at any time the user presses Ctrl+c, no changes are saved and the user is returned to the main menu.

---

## Specifying the DNS Settings

This menu option shows the DNS settings, and prompts the user for a new DNS domain (if you want to configure one) and the DNS server IP addresses.

```
Set DNS Configuration
-----
Press Ctrl-c to abort.
DNS configuration is optional, but necessary if this KMA
will be configured using hostnames instead of IP addresses.
Current DNS configuration:
Domain: example.com
Nameservers: 10.172.0.5
Please enter the DNS Domain (blank to unconfigure DNS): example.com
Up to 3 DNS Name Servers can be entered. Enter each name
server separately, and enter a blank name to finish.
Please enter DNS Server IP Address #1: 10.172.0.5
Please enter DNS Server IP Address #2:
```

1. At the Please enter your choice: prompt on the main menu, type 6 and press <Enter>.
2. Enter the DNS domain name at the Please enter the DNS Domain (blank to unconfigure DNS): prompt.
3. Enter the DNS server IP address at the Please enter DNS Server IP address prompt. You can enter up to three IP addresses.
4. Press <Enter>, without specifying an IP address, to finish.

## Resetting the KMA to the Factory Default

This menu option allows a Security Officer to reset the KMA to its factory default state.

---

**WARNING:** The reset is not recoverable; the information on the KMA is gone.

---

This is a destructive process that results in the loss of all data that is stored on the hard disk. The system is forced to reboot and the file systems are reformatted and prepared to use the new encryption keys.

To reset the KMA to the factory default:

1. At the Please enter your choice: prompt on the main menu, type 7 and press <Enter>. The following information is displayed.

```
Reset to Factory Default State
-----
Press Ctrl-c to abort.
```

**WARNING:**

All information stored on this KMA will be destroyed!  
 Access to all protected data will be lost unless a backup  
 of the Cluster data has been created or Cluster Peer KMAs  
 are present.  
 Please consult the OKM Administration Guide before proceeding  
 with this operation. The system will be rebooted after the KMA is reset.  
 Are you sure that you want to reset the KMA to the  
 Factory Default State?

Type RESET to confirm:

2. At the Type RESET to confirm prompt, type **RESET** and press <Enter>. The following information is displayed, indicating that the KMA is resetting.

Resetting...

3. Once the authentication is completed, you are returned to QuickStart. See ["Running the QuickStart Program"](#) on page 2-8.

## Enabling the Technical Support Account

The Technical Support menu option allows an operator to enable/disable the Operating System's support account and SSH access for that account. By default, both the Technical Support account and SSH access are disabled. Since an operator defines the passphrase for the support account, enabling the support account grants the OKM Console user limited access to the KMA.

1. To enable the Technical Support account:

At the Please enter your choice: prompt on the main menu, type 8 and press <Enter>. The following information is displayed, indicating that the support account is disabled.

Technical Support

```
-----
Press Ctrl-c to abort.
The support account is currently DISABLED.
***** WARNING *****
Enabling the support account and SSH access is a SECURITY RISK.
These settings should not be left enabled unless required for
troubleshooting purposes.
Ensure that this account is disabled when not required.
*****
Would you like to ENABLE the support account? [y/n]: y
```

2. At the Are you sure that you want to ENABLE the support account and assume this security risk? [y/n] prompt, type **y** to enable the account and press <Enter>. Enabling SSH access allows Technical Support to diagnose a problem remotely.
3. At the prompt, type **y** and press <Enter>. The following information is displayed, indicating the purpose of SSH Host keys.

When a Technical Support representative connects to the KMA using SSH, SSH host keys must be verified via an alternative secure communication channel in order to detect a potential "man-in-the-middle" attack. Please record and store these SSH host keys securely. SSH host keys are generated when SSH is enabled for the first time. They may be subsequently regenerated to invalidate the existing SSH host keys.

The following screen asks you to regenerate the SSH keys and provide a passphrase for the support account.

```
Ensure that this account is disabled when not required.
*****
Would you like to ENABLE the support account? [y/n]: y
Are you sure that you want to ENABLE the support account and
assume this security risk? [y/n]: y
```

When someone connects to the KMA using SSH, the KMA verifies SSH host keys via an alternative secure communication channel in order to detect a potential "man-in-the-middle" attack.

SSH host keys are generated the first time you enable the support account. They may be regenerated later in order to invalidate the existing SSH host keys.

```
Would you like to regenerate the SSH host keys? [y/n]: y
```

A Passphrase for the support account must be at least 8 characters and at most 64 characters in length. It must have at least 2 alphanumeric characters (1 upper and 1 lower) and at least 1 non-alphanumeric characters.

A Passphrase may contain white space. Passwords must be unique within the last 10 settings, and may not contain the account name (support).

Please enter a Passphrase for the support account:

The maximum age of the Passphrase of the support account is the maximum number of days that this Passphrase is valid. When this age has been reached, then the support account is disabled. This number must be greater than 0 and no more than 7. Please enter the maximum age of this Passphrase: 2

4. At the Would you like to regenerate the SSH host keys? prompt, type y and press <Enter>.
5. Enter a passphrase at the Please enter a Passphrase for the support account: prompt.

---

---

**Note:** The passphrase must be at least as long as the passphrase minimum length security parameter. This value is set to 8 during the QuickStart program, but you can change it later in the OKM Manager GUI. See "[Modifying the Security Parameters](#)" on page 5-77.

---

---

6. Enter the maximum number of days the passphrase is valid.
7. Press <Enter> to return to the main menu.

Press Enter to continue:

## Disabling the Technical Support Account

---

---

**Note:** This task can be enabled only by the Security Officer; it can be disabled by either an Operator or a Security Officer.

---

---



To disable the Technical Support account:

1. At the Please enter your choice: prompt on the main menu, type 8 and press <Enter>. The following information is displayed, indicating that the support account is enabled.

```
Technical Support
-----
Press Ctrl-c to abort.
The support account is currently ENABLED.
Would you like to DISABLE the support account? [y/n]: y
```

2. At the prompt, type y to disable the account and press <Enter>.
  3. The following information is displayed, prompting you to confirm the change.
- ```
Are you sure that you want to DISABLE the support account? [y/n]:
```
4. At the prompt, type y and press <Enter>. The SSH service automatically stops.

## Enabling the Primary Administrator

The Primary Administrator menu option allows you to enable/disable Primary Administrator access on the KMA.

- To enable Primary Administrator access, you must first enable Technical Support (option 8).
- This task can be enabled only by the Security Officer; it can be disabled by either an Operator or a Security Officer.

---

**Caution:** The Primary Administrator function allows someone logged in as Technical Support to gain Primary Administrator access, equivalent to root access. Since the passphrase for the Primary Administrator is known only by Oracle Support, only someone from Oracle Support can gain Primary Administrator access. While dangerous, this may be necessary in some situations to recover the system from a problem, however, you may need direct guidance from back line support or engineering.

---

1. To enable Primary Administrator access:

At the Please enter your choice: prompt on the main menu, type 9 and press <Enter>. The following information is displayed, indicating that the access is disabled.

```
Primary Administrator
-----
Press Ctrl-c to abort.
The Primary Administrator role is currently DISABLED.
***** WARNING *****
Providing the support account with Primary Administrator privileges is a
SECURITY RISK. This setting should not be left enabled unless required for
troubleshooting purposes.
Ensure that these privileges are disabled when not required.
*****
Would you like to ENABLE Primary Administrator privileges for the support
account? [y/n]: y
Are you sure that you want to ENABLE these privileges for the support account,
assuming this security risk? [y/n]: y
Primary Administrator configuration changes have been completed.
```

Press Enter to continue:

2. At the prompt, type **y** to enable the account and press <Enter>.
3. The following information is displayed, prompting you to confirm the change.  
  
Are you sure that you want to ENABLE these privileges for the support account, assuming this security risk? [y/n]:
4. At the prompt, type **y** and press <Enter>. The Primary Administrator access has been enabled.

## Disabling the Primary Administrator

The Primary Administrator menu option allows you to enable/disable Primary Administrator access on the KMA.

---

**Note:** This task can be enabled only by the Security Officer; it can be disabled by either an Operator or a Security Officer.

---

Disabling Primary Administrator access takes place immediately. If someone is connected as a Primary Administrator, and then this access is disabled, the next command attempted fails.

1. To disable Primary Administrator access:

At the Please enter your choice: prompt on the main menu, type **9** and press <Enter>. The following information is displayed, indicating that the access is enabled.

Primary Administrator

-----

Press Ctrl-c to abort.

The Primary Administrator role is currently ENABLED.

Would you like to DISABLE Primary Administrator privileges for the support account? [y/n]: **y**

Are you sure that you want to DISABLE these privileges for the support account? [y/n]: **y**

Primary Administrator configuration changes have been completed.

Press Enter to continue:

2. At the prompt, type **y** to disable the account and press <Enter>.
3. The following information is displayed, prompting you to confirm the change.  
  
Are you sure that you want to DISABLE these privileges for the support account? [y/n]:
4. At the prompt, type **y** and press <Enter>. The Primary Administrator access has been disabled.

## Setting the Keyboard Layout

This option allows you to change the keyboard layout from English to a variety of languages.

---

**Note:** The keyboard layout should be set to match the layout of the keyboard attached to the KMA in order for the KMA to correctly interpret key presses.

---

To set the keyboard layout:

1. At the Please enter your choice: prompt on the main menu, type **7** and press <Enter>. The following keyboard layouts are displayed.

```
Set Keyboard Layout
```

```
-----
```

```
Press Ctrl-c to abort.
```

```
You may change the keyboard layout here.
```

```
Available keyboard layouts:
```

```
( 1) Arabic           ( 2) Belgian           ( 3) Brazilian
( 4) Canadian-Bilingual ( 5) Canadian-French    ( 6) Danish
( 7) Dutch            ( 8) Dvorak             ( 9) Finnish
(10) French           (11) German             (12) Italian
(13) Japanese-type6   (14) Japanese           (15) Korean
(16) Latin-American   (17) Norwegian          (18) Portuguese
(19) Russian          (20) Spanish            (21) Swedish
(22) Swiss-French     (23) Swiss-German       (24) Traditional-Chinese
(25) TurkishQ         (26) UK-English         (27) US-English
```

```
The current layout is US-English
```

```
Please enter the number for the keyboard layout [27] :
```

```
The keyboard layout has been applied successfully.
```

```
Press Enter to continue:
```

2. At the Please enter the keyboard layout [US-English]: prompt, enter the language to want to change the keyboard layout to.
3. At the prompt, type **y** and press <Enter>. The following information is displayed, indicating that the change has been made. Press <Enter> to return to the main menu.

```
The keyboard layout has been applied successfully.
```

```
Press Enter to continue:
```

## Logging Out

To log out of the current OKM Console session:

1. At the Please enter your choice: prompt on the main menu, type **0** and press <Enter>.
2. The current session terminates and the login prompt is displayed allowing the user to re-enter the OKM Console.

## Other Role Functions

This section describes the functions the other roles (Compliance Officer, Backup Operator, Auditor, Quorum Member) can perform. They are:

- Setting the keyboard layout ("[Setting the Keyboard Layout](#)")
- Logging out of the KMA ("[Logging Out](#)").

Oracle Key Manager Version 3.0.0 (build2020) -- SO on Strathclyde

```
Serial Number 1251BD0E48
OpenBoot PROM Version OBP 4.34.3 2013/02/06 11:46
-----
(1) Set Keyboard Layout
(0) Logout
-----
Please enter your choice:
```

## Setting the Keyboard Layout

This option allows you to change the keyboard layout from English to a variety of languages.

---

---

**Note:** The keyboard layout should be set to match the layout of the keyboard attached to the KMA in order for the KMA to correctly interpret key presses.

---

---

To set the keyboard layout:

1. At the Please enter your choice: prompt on the main menu, type **1** and press <Enter>. The following keyboard layouts are displayed.

```
Set Keyboard Layout
-----
Press Ctrl-c to abort.
You may change the keyboard layout here.
Available keyboard layouts:
( 1) Arabic           ( 2) Belgian          ( 3) Brazilian
( 4) Canadian-Bilingual ( 5) Canadian-French   ( 6) Danish
( 7) Dutch            ( 8) Dvorak            ( 9) Finnish
(10) French           (11) German            (12) Italian
(13) Japanese-type6   (14) Japanese          (15) Korean
(16) Latin-American   (17) Norwegian         (18) Portuguese
(19) Russian           (20) Spanish            (21) Swedish
(22) Swiss-French     (23) Swiss-German       (24) Traditional-Chinese
(25) TurkishQ         (26) UK-English         (27) US-English

The current layout is US-English
Please enter the number for the keyboard layout [27] :
The keyboard layout has been applied successfully.
Press Enter to continue:
```

2. At the Please enter the keyboard layout [US-English]: prompt, enter the language to want to change the keyboard layout to.
3. At the prompt, type **y** and press <Enter>. The following information is displayed, indicating that the change has been made. Press <Enter> to return to the main menu.

```
The keyboard layout has been applied successfully.
Press Enter to continue:
```

## Logging Out

To log out of the current OKM Console session:

1. At the Please enter your choice: prompt on the main menu, type **0** and press <Enter>.

2. The current session terminates and the login prompt is displayed allowing the user to re-enter the OKM Console.



---

## Command Line Utilities

This chapter describes command line utilities that allow users to launch backups, export keys, import keys, and list data units from the command line instead of from the OKM Manager GUI.

The following command line utilities are available:

- ["OKM Command Line Utility"](#) on page 12-1
- ["Backup Command Line Utility"](#) on page 12-16.

---

**Note:** The OKM Command Line utility supersedes the Backup Command Line utility. Oracle recommends you use the OKM Command Line utility whenever possible.

---

### OKM Command Line Utility

The OKM Command Line utility allows you to:

- Schedule automated backups
- Back up OKM core security
- Import and export keys
- Destroy keys
- List audit events
- List data units
- Create or modify multiple agents.

Unlike the Backup Command Line utility, this utility can use X.509 certificates to authenticate itself as a valid OKM user instead of a username and passphrase, so you are not required to enter a passphrase on the command line.

The following table details the roles that can perform these functions:

**Table 12-1** OKM Command Line Utility - User Role Access

Action:	Role:
Backup	Backup Operator
Back up OKM Core Security	Security Officer
Import/Export Keys	Operator
Destroy Keys	Operator

**Table 12–1 (Cont.) OKM Command Line Utility - User Role Access**

Action:	Role:
List Audit Events	All Roles <sup>1</sup>
List Data Units	Operator/Compliance Officer
Create Agents	Operator
Set/Change Agent Default Key Group	Compliance Officer
Change Agent Properties	Operator
List Agents	Operator/Compliance Officer

<sup>1</sup> If you specify agent IDs, data unit IDs, or key IDs, you must have the Operator or Compliance Officer role.

This utility is installed with the OKM Manager GUI using the same installer.

**Note:** If you want to enter link-local IPv6 addresses, invoke the OKM Command Line Utility and specify the link-local IPv6 address. Include the Zone ID (for example, "%4") at the end of the address. Refer to ["IPv6 Addresses with Zone IDs"](#) on page 4-8 to see what steps you must follow for the initial setup.

If you are using Solaris, and wish to specify or display characters that cannot be represented in ASCII, then ensure that the appropriate Solaris locale has been installed on your Solaris system and then your environment has been configured to use this locale. Refer to the Solaris locale(1) and localeadm(1M) man pages for more information.

## Solaris/Windows1 Syntax

```
okm -v | --version | --help | -h
okm backup [ [ [ --cacert=filename ] [ --usercert=filename ] ]
            [ --directory=dirname ] | --oper=username
            [ --retries=retries ] [ --timeout=timeout ]
            [ --verbose=boolean ]
            --kma=networkaddress
            --output=dirname
okm backupcs [ [ [ --cacert=filename ] [ --usercert=filename ] ]
              [ --directory=dirname ] | --oper=username
              [ --retries=retries ] [ --timeout=timeout ]
              [ --verbose=boolean ]
              --kma=networkaddress
okm createagent [ [ [ --cacert=filename ] [ --usercert=filename ] ]
                 [ --directory=dirname ] | --oper=username
                 [ --retries=retries ] [ --timeout=timeout ]
                 [ --verbose=boolean ]
                 [ --description=description ]
                 [ --site=siteid ]
                 [ --keygroup=defaultkeygroupid ]
                 [ --onetimepassphrase=boolean ]
                 --kma=networkaddress
                 --agent=agentid
                 --passphrase=agentpassphrase
okm currload [ [ [ --cacert=filename ] [ --usercert=filename ] ]
              [ --directory=dirname ] | --oper=username
              [ --retries=retries ] [ --timeout=timeout ]
```



```

[ --verbose=boolean ]
  --output=filename
  --kma=networkaddress
okm destroykeys [ [ [ --cacert=filename ] [ --usercert=filename ] ]
  [ --directory=dirname ] | --oper=username ]
  [ --retries=retries ] [ --timeout=timeout ]
  [ --verbose=boolean ]
  --kma=networkaddress
  --duids=filename | --all=true
  --keystate=keystate
  --comment="text"
okm export [ [ [ --cacert=filename ] [ --usercert=filename ] ]
  [ --directory=dirname ] | --oper=username ]
  [ --retries=retries ] [ --timeout=timeout ]
  [ --listwait=waittime ] [ --verbose=boolean ]
  --filter=filter | --duids=filename
  --kma=networkaddress
  --output=filename
  --partner=transferpartnerid
okm import [ [ [ --cacert=filename ] [ --usercert=filename ] ]
  [ --directory=dirname ] | --oper=username ]
  [ --retries=retries ] [ --timeout=timeout ]
  [ --verbose=boolean ]
  [ --overrideuiconflict=boolean ]
  --kma=networkaddress
  --input=filename
  --partner=transferpartnerid
  --keygroup=keygroupid
okm listagentperformance [ [ [ --cacert=filename ] [ --usercert=filename ] ]
  [ --directory=dirname ] | --oper=username ]
  [ --filter=filter ]
  [ --retries=retries ] [ --timeout=timeout ]
  [ --listwait=waittime ] [ --verbose=boolean ]
  [ --output=filename ]
  [ --startdate=date ] [ --enddate=date ]
  [ --localtimezone=boolean ]
  [ --rateinterval=rateinterval ]
  --kma=networkaddress
okm listagents [ [ [ --cacert=filename ] [ --usercert=filename ] ]
  [ --directory=dirname ] | --oper=username ]
  [ --retries=retries ] [ --timeout=timeout ]
  [ --listwait=waittime ] [ --verbose=boolean ]
  [ --filter=filter ] [ --output=filename ]
  --kma=networkaddress
okm listauditevents [ [ [ --cacert=filename ]
  [ --usercert=filename ] ]
  [ --directory=dirname ] |
  [ --oper=username ]
  [ --filter=filter ]
  [ --localtimezone=boolean ]
  [ --maxcount=count ]
  [ --retries=retries ]
  [ --timeout=timeout ]
  [ --verbose=boolean ]
  [ --output=filename ]
  [ --agentids=agentids |
  --dataunitids=dataunitids |
  --keyids=keyids ]
  --kma=networkaddress
okm listdu [ [ [ --cacert=filename ] [ --usercert=filename ] ]

```

```
[ --directory=dirname ] ] | --oper=username
[ --filter=filter ]
[ --retries=retries ] [ --timeout=timeout ]
[ --listwait=waittime ] [ --verbose=boolean ]
[ --output=filename ]
--kma=networkaddress
okm listdukeycount [ [ [ --cacert=filename ] [ --usercert=filename ] ]
[ --directory=dirname ] | --oper=username ]
[ --filter=filter ]
[ --retries=retries ] [ --timeout=timeout ]
[ --listwait=waittime ] [ --verbose=boolean ]
[ --output=filename ]
--kma=networkaddress
--duids=filename | --all=true
okm listkeys [ [ [ --cacert=filename ] [ --usercert=filename ] ]
[ --directory=dirname ] | --oper=username ]
[ --filter=filter ]
[ --retries=retries ] [ --timeout=timeout ]
[ --listwait=waittime ] [ --verbose=boolean ]
[ --output=filename ]
--kma=networkaddress
okm listkmaperformance [ [ [ --cacert=filename ] [ --usercert=filename ] ]
[ --directory=dirname ] | --oper=username ]
[ --filter=filter ]
[ --retries=retries ] [ --timeout=timeout ]
[ --listwait=waittime ] [ --verbose=boolean ]
[ --output=filename ]
[ --startdate=date ] [ --enddate=date ]
[ --localtimezone=boolean ]
[ --rateinterval=rateinterval ]
--kma=networkaddress
okm modifyagent [ [ [ --cacert=filename ] [ --usercert=filename ] ]
[ --directory=dirname ] | --oper=username ]
[ --retries=retries ] [ --timeout=timeout ]
[ --verbose=boolean ]
[ --description=description ] |
[ --site=siteid ] |
[ --keygroup=defaultkeygroupid ] |
[ --passphrase=agentpassphrase ] |
[ --enabled=boolean ] |
[ --onetimepassphrase=boolean ]
--kma=networkaddress
--agent=agentid
```

## Parameter Descriptions

The following are OKM Command Line Utility subcommands.

### Subcommands

#### backup

The backup subcommand generates a backup of the OKM data and downloads this backup to a backup data file and a backup key file in the specified output directory.

#### backups

The backups subcommand generates a backup of the OKM core security and stores this backup in an output file.

#### createagent

The `createagent` subcommand creates a new agent.

### **destroykeys**

The `destroykeys` subcommand destroys deactivated or compromised keys.

### **export**

The `export` subcommand creates a secure key file for a Transfer Partner that has been established with the OKM. All keys associated with a list of data units are exported using this key file and are protected using an AES-256-bit key that signs the key file. This list of data units is the result of the given filter string or file name. This key file can then be used to import the keys into the Transfer Partner's OKM using the `import` subcommand. Up to 1,000 Data Units can be exported on a single invocation of the `kms` command.

### **import**

The `import` subcommand reads a secure key file for a Transfer Partner that has been established with the OKM. Keys and their associated data units are imported using this key file. The key transfer private key of the importing OKM is used to validate the key file. This file must be one that was previously exported from another OKM using the `export` subcommand.

### **listagents**

The `listagents` subcommand produces a list of agents and their properties. The list may be filtered to produce a specific report containing just a subset of the agents.

### **listauditevents**

The `listauditevents` subcommand lists audit events.

### **listdu**

The `listdu` subcommand lists data units and their properties. This subcommand can be invoked prior to executing the `export` subcommand to determine the data units that are exported using the specified filter (if any).

### **modifyagent**

The `modifyagent` subcommand changes properties of an existing agent, including its default Key Group. At least one of the following options must also be specified:

- `--enabled`
- `--site`
- `--description`
- `--keygroup`
- `--passphrase`
- `--onetimepassphrase`

### **Options**

The lists of options below show the long and short option name. A long option name is separated from its value by an equals sign (=); a short option name is separated from its value by a space.

The following options are used for user authentication.

---

---

**Note:** Users must first export the Root CA and user X.509 certificates from the OKM Manager GUI before invoking this utility with the `--cacert`, `--directory`, and `--usercert` options.

---

---

`--agent=agentid`

**Short name: -B**

Specifies an agent ID to be created or modified. This agent ID must be between 1 and 64 characters in length, inclusive.

`--cacert=filename`

**Short name: -a**

Specifies a OKM Root CA X.509 certificate PEM file for this utility to use to authenticate itself with the OKM. If not specified, then the utility looks for a `ca.crt` file in the directory specified by the `--directory` option. This option is mutually exclusive with the `--oper` option.

`--description=description`

**Short name: -R**

Specifies a description of the agent being created or modified. The description must be between 1 and 64 characters in length, inclusive.

`--directory=dirname`

**Short name: -d**

Specifies a directory in which to search for a PEM file containing a OKM Root CA X.509 certificate and a PEM file containing a OKM user X.509 certificate. If not specified, then this utility looks for the certificate files in the current working directory. This option is mutually exclusive with the `--oper` option.

`--enddate`

**Short name: -e**

Specifies the end date and time of a performance query in the format: `YYYY-MM-DD hh:mm:ss`, representing a value in universal coordinated time (UTC) or local time if the `localtimezone` option is true. The default value is the present.

`--localtimezone`

**Short name: -L**

Specifies a boolean value to determine whether input and output times are in the local time zone instead of in Universal Coordinated Time (UTC). This affects the interpretation of input values such as start and end dates and the display of audit event timestamps. The boolean value can be "true" or "false."

`--oper=username`

**Short name: -b**

Specifies the OKM User ID for this utility to use to authenticate itself with the OKM. If specified, it prompts for the user's passphrase since certificates are not being used. This option is mutually exclusive with the `--cacert`, `--usercert`, and `--directory` options.

`--rateinterval`

**Short name: -I**

Specifies the rate display interval. Request rates will be extrapolated over the selected rate display interval and displayed as the average number of requests per that selected interval (for example, extrapolated average number of Create Key requests per day). Possible values are "second," "minute," "hour," "day," "week," "month," "year," or "entire." Selecting "entire" causes the counts of each request type to be displayed instead of their rates. The default value is "entire."

**--startdate**

**Short name: -s**

Specifies the start date and time of a performance query in the format: YYYY-MM-DD hh:mm:ss, representing a value in universal coordinated time (UTC) or local time if the localtimezone option is true. The default value is the beginning of data collection.

**--usercert=filename**

**Short name: -u**

Specifies a OKM user's X.509 certificate PEM file for this utility to use to authenticate itself with the OKM. This certificate file must also contain the user's private key. If not specified, then the utility looks for a `clientkey.pem` file in the directory specified by the `--directory` option. This option is mutually exclusive with the `--oper` option.

The following list shows additional options.

**--agentids=agentids**

**Short name: -A**

Specifies a comma-separated list of agent IDs for associated audit events. Each agent ID must be between 1 and 64 characters in length. The OKM user must have the Operator or Compliance Officer role to be able to specify this option. This option is mutually exclusive with the `--dataunitids` and `--keyids` options.

**--all=true**

**Short name: -l**

Indicates that this utility destroys all deactivated or compromised keys, as indicated by the `--keystate` option, for all data units. This option is mutually exclusive with the `--duids` option.

**--comment="text"**

**Short name: -C**

Specifies a comment describing the key destruction. This comment must be between 1 and 64 characters in length.

**--dataunitids=dataunitids**

**Short name: -D**

Specifies a comma-separated list of data unit IDs for associated audit events. Each data unit ID must be 32 hexadecimal characters. The OKM user must have the Operator or Compliance Officer role to be able to specify this option. This option is mutually exclusive with the `--agentids` and `--keyids` options.

**--duids=filename**

**Short name: -i**

For key export or destruction, this option specifies a filename containing a set of data unit IDs, one per line, newline delimited. Each data unit ID must be 32 hexadecimal characters. On the `destroykeys` subcommand, if a particular data unit does not have

any deactivated or compromised keys, then that data unit is ignored. If the specified file is empty, then the `destroykeys` subcommand destroys all deactivated or compromised keys for all data units (see the `--all` option). This option is mutually exclusive with the `--filter` and `--all` options.

**--filter=filter**

**Short name: -f**

Specifies a filter string that is processed to generate either a list of data unit IDs to display or export or a list of audit events to display. The string must be enclosed in quotes (double quotes on Windows) if it contains white space (see ["Examples"](#) on page 12-13).

Exporting takes time proportional to the number of data units and keys, so typically you should specify a filter that reduces the set of data units.

On the export subcommand, this option is mutually exclusive with the `--duids` option.

On the export and `listdu` subcommands, the syntax of this filter string is:

```
DUState=state[, Exported=boolean ][, Imported=boolean]
```

```
[, DataUnitID=duid][, ExternalTag=tag]
```

```
[, ExternalUniqueID=euid]
```

```
DUState=state
```

Where *state* can be "normal," "needs-rekey," or "normal+needs-rekey." If the *DUState* filter is not specified, then the default is "DUState=normal+needs-rekey."

```
Exported=boolean
```

Where *boolean* can be "true" or "false." If the *Exported* filter condition is not specified, then data unit selection does not consider the exported state, so both exported data units and data units that have not been exported yet are eligible for selection.

```
Imported=boolean
```

Where *boolean* can be "true" or "false." If the *Imported* filter condition is not specified, then data unit selection does not consider the imported state, so both imported data units and data units that have not been imported yet are eligible for selection.

```
DataUnitID=duid
```

Where *duid* is a Data Unit ID.

```
ExternalTag=tag
```

Where *tag* is an External Tag (must be padded to 32 characters with spaces for Data Units created for LTO tape drives).

```
ExternalUniqueID=euid
```

Where *euid* is an External Unique ID.

On the `listagentperformance` subcommand, the syntax of this filter string is:

```
AgentID=agentid[, SiteID=siteid][, DefaultKeyGroupID=kgid]
```

```
AgentID=agentid
```

Where *agentid* is an agent name. The CLI uses the "starts with" operator (instead of equality) when matching on this field as some agents supply trailing blanks to the value for this field.

SiteID=siteid

Where *siteid* is a Site ID.

DefaultKeyGroupID=kgid

Where *kgid* is a Key Group ID.

On the `listauditevents` subcommand, the syntax of this filter string is:

StartDate=*date* [, EndDate=*date* ] [, Severity=*text*]

[ , Operation=*text* ] [, Condition=*text* ] [, Class=*text*]

[ , RetentionTerm=*text* ] [, KMAName=*kmaname*]

[ , EntityID=*entityid* ] [, EntityNetworkAddress=*netaddress*]

[ , SortOrder=*order* ] [, ShowShortTerm=*boolean*]

StartDate=*date*

Where *date* has the format: *YYYY-MM-DD hh:mm:ss* and represents UTC time.

EndDate=*date*

Where *date* has the format: *YYYY-MM-DD hh:mm:ss* and represents UTC time.

Severity=*text*

Where *text* is an audit severity string (e.g., "Error").

Operation=*text*

Where *text* is an audit operation string (e.g., "Retrieve Root CA Certificate").

Condition=*text*

Where *text* is an audit condition string (e.g., "Success").

Class=*text*

Where *text* is an audit class string (e.g., "Security Violation").

RetentionTerm=*text*

Where *text* is an audit retention term string (e.g., "MEDIUM TERM RETENTION").

KMAName=*kmaname*

Where *kmaname* is a KMA name.

EntityID=*entityid*

Where *entityid* is an Entity ID.

EntityNetworkAddress=*netaddress*

Where *netaddress* is an IP address or host name.

SortOrder=*order*

Where *order* can be "asc" or "desc." By default, audit events are displayed in descending order by Created Date.

ShowShortTerm=*boolean*

Where `boolean` can be "true" or "false." By default, audit events that have a short term retention are not displayed.

On the `listkeys` subcommand, the syntax of this filter string is:

```
KeyState=state[, KeyID=keyid][, KeyGroupID=kgid]
    [, Exported=boolean][, Imported=boolean]
    [, Revoked=boolean]
```

`KeyState=state`

Where `state` can be one of the following: `gen`, `ready`, `pnp`, `proc`, `deact`, `comp`, `dest`

`KeyID=keyid`

Where `keyid` is a Key ID.

`KeyGroupID=kgid`

Where `kgid` is a Key Group ID.

`Exported=boolean`

Where `boolean` can be "true" or "false".

`Imported=boolean`

Where `boolean` can be "true" or "false".

`Revoked=boolean`

Where `boolean` can be "true" or "false".

On the `listkmaperformance` subcommand, the syntax of this filter string is:

```
KMAName=kmaname[, SiteID=siteid]
```

`KMAName=kmaname`

Where `kmaname` is a KMA name.

`SiteID=siteid`

Where `siteid` is a Site ID.

## **--help**

**Short name: -h**

Displays help information.

## **--input=filename**

**Short name: -i**

Specifies the file name from which data units and keys are to be imported. This file is also known as the key transfer file.

## **--keygroup=keygroupid**

**Short name: -g**

Specifies the ID of a Key Group that is defined to the OKM.

## **--keyids=keyids**



**Short name: -K**

Specifies a comma-separated list of key IDs for associated audit events. The OKM user must have the Operator or Compliance Officer role to be able to specify this option. This option is mutually exclusive with the `--agentids` and `--dataunitids` options.

**--keystate=keystate****Short name: -s**

Specifies the state of keys to be destroyed. The keystate value can be "deact" for deactivated keys, "comp" for compromised keys, or "deact+comp" for deactivated or compromised keys.

**--kma=networkaddress****Short name: -k**

Specifies the network address of the KMA to issue the request. The network address can be a host name, an IPv4 address, or an IPv6 address.

**--listwait=waittime****Short name: -w**

Specifies the number of seconds between List Data Units requests issued by the `export` and `listdu` subcommands. The default value is 2.

**--localtimezone=boolean****Short name: -L**

Displays timestamps of audit events in the local time zone instead of in universal coordinated time (UTC). Also, the `StartDate` and `EndDate` filters are interpreted to be in local time.

**--maxcount=count****Short name: -c**

Specifies the maximum number of audit events to list. The default value is 20,000.

**--onetimepassphrase=boolean****Short name: -O**

Specifies a boolean value to determine whether the enrollment passphrase may be used only once for authentication. The boolean value can be "true" or "false".

**--output=filename or dirname****Short name: -o**

Specifies the file name where the results are stored. These results are the backup on `backup` and `backupcs` requests, the key transfer file on `export` requests, a listing of the data units and their properties on `listdu` requests, and a listing of audit events on `listauditevents` requests. On `listdu` and `listauditevents` requests, "-" may be specified for `stdout`, which is also the default. On `backup` requests, this option specifies the directory where the backup data file and backup key file are downloaded.

**--overrideeuiconflict=boolean****Short name: -O**

Specifies a boolean value to determine whether to override a conflict where an existing data unit has the same external unique ID as a data unit being imported. If this value is "true," then the existing data unit is updated to clear its external unique ID and the

importing data unit retains its external unique ID. Otherwise, the import request fails. The boolean value can be "true" or "false."

**--partner=transferpartnerid**

**Short name: -p**

Specifies the ID of the Transfer Partner that is defined to the OKM and that is eligible to send or receive exported keys.

**--passphrase=passphrase**

**Short name: -P**

Specifies a passphrase for the agent being created or modified. Passphrases can be from 8 to 64 characters in length, inclusive. Passphrases must follow OKM passphrase rules.

**--rclientcert=filename**

**Short name: -C**

Specifies an X.509 certificate PEM file that has been issued by a Certificate Authority for this KMA.

**--rclientkey=filename**

**Short name: -K**

Specifies a private key file that accompanies the client certificate file.

**--rclientpassword=password**

**Short name: -P**

Specifies a password (if any) that protects the private key.

**--retries=retries**

**Short name: -r**

Specifies the number of times that this utility tries to connect to the KMA, if the KMA is busy. The default value is 60.

**--server=networkaddress**

**Short name: -S**

Specify the network address (IP address or, if DNS is configured, host name) of the remote syslog system.

**--site=siteid**

**Short name: -S**

Specifies the site ID for the agent being created or modified. This site ID must be between 1 and 64 characters in length, inclusive.

**--timeout=timeout**

**Short name: -t**

Specifies the timeout value in seconds between these retries. The default value is 60.

**--verbose=boolean**

**Short name: -n**

Indicates that this utility generates verbose output, including progress status during the processing of the request. The boolean value can be "true" or "false."

**--version****Short name: -v**

Displays command-line usage.

## Examples

These examples show a single command line. In some cases, the command line appears on multiple lines for readability. In Solaris examples, backslashes denote the continuation of a command line.

The following examples generate a backup using certificates in the ca.crt and clientkey.pem files in the given directory for authentication.

Solaris:

```
okm backup --kma=mykma1 \
--directory/export/home/Joe/.sunw/kms/BackupOperatorCertificates \
--output=/export/home/KMSBackups
```

Windows:

```
okm backup --kma=mykma1
--directory=D:\KMS\Joe\BackupOperatorCertificates
--output=D:\KMS\KMSBackups
```

The following examples generate a backup using the user ID and passphrase of a OKM user for authentication.

Solaris:

```
okm backup -k mykma1 -o /export/home/KMSBackups -b Joe
```

Windows:

```
okm backup -k mykma1 -o D:\KMS\KMSBackups -b Joe
```

The following examples export keys using certificates in the ca.pem and op.pem files in the current working directory for authentication.

Solaris:

```
okm export -k 10.172.88.88 -d "." -a ca.pem -u op.pem \
-f "DUState = normal+needs-rekey, Exported = false" \
-o Partner.dat -p Partner
```

Windows:

```
okm export -k 10.172.88.88 -d "." -a ca.pem -u op.pem
-f "DUState = normal+needs-rekey, Exported = false"
-o Partner.dat -p Partner
```

The following examples export keys using the user ID and passphrase of a OKM user for authentication.

Solaris:

```
okm export --kma=mykma1 --oper=tpFreddy \
--filter="Exported = false" --output=Partner.dat \
--partner=Partner
```

Windows:

```
okm export --kma=mykma1 --oper=tpFreddy
--filter="Exported = false" --output=Partner.dat
--partner=Partner
```

The following examples import keys using certificates in the ca.crt and clientkey.pem files in the current working directory for authentication.

Solaris:

```
okm import --kma=10.172.88.88 --directory="." \  
--input=DRKeys.dat --partner=Partner \  
--keygroup=OpenSysBackupKeyGroup
```

Windows:

```
okm import --kma=10.172.88.88 --directory="." \  
--input=DRKeys.dat --partner=Partner \  
--keygroup=OpenSysBackupKeyGroup
```

The following examples import keys using the user ID and passphrase of a OKM user for authentication.

Solaris:

```
okm import --kma=mykma1 --oper=Joe --input=DRKeys.dat \  
--partner=Partner --keygroup=OpenSysBackupKeyGroup
```

Windows:

```
okm import --kma=mykma1 --oper=Joe --input=DRKeys.dat \  
--partner=Partner --keygroup=OpenSysBackupKeyGroup
```

The following examples list data units using certificates in the ca.crt and clientkey.pem files in the given directory for authentication.

Solaris:

```
okm listdu --kma=10.172.88.88 \  
--directory=/export/home/Joe/.sunw/kms/OperatorCertificates \  
--output=/export/home/KMSDataUnits
```

Windows:

```
okm listdu --kma=10.172.88.88 \  
--directory=D:\KMS\Joe\OperatorCertificates \  
--output=D:\KMS\KMSDataUnits
```

The following examples list data units using the user ID and passphrase of a OKM user for authentication.

Solaris:

```
okm listdu -k mykma1 -b Joe -f "Exported=false" \  
--output=/export/home/KMSDataUnits
```

Windows:

```
okm listdu -k mykma1 -b Joe -f "Exported=false" \  
--output=D:\KMS\KMSDataUnits
```

The following examples list audit events using certificates in the ca.crt and clientkey.pem files in the given directory for authentication.

Solaris:

```
okm listauditevents --kma=10.172.88.88 \  
--directory=/export/home/Joe/.sunw/kms/OperatorCertificates \  
--filter=Severity=Error \  
--output=/export/home/KMSAuditEvents
```

Windows:

```
okm listauditevents --kma=10.172.88.88 \  
--directory=D:\KMS\Joe\OperatorCertificates \  
--filter=Severity=Error \  
--output=D:\KMS\KMSAuditEvents
```

The following examples list audit events using the user ID and passphrase of a OKM user for authentication.

Solaris:

```
okm listauditevents -k mykma1 -b Joe -f "Severity=Error" \  
--output=/export/home/KMSAuditEvents
```

**Windows:**

```
okm listaudit events -k mykma1 -b Joe -f "Severity=Error"
--output=D:\KMS\KMSAuditEvents
```

The following examples destroy all compromised keys using certificates in the ca.crt and clientkey.pem files in the given directory for authentication.

**Solaris:**

```
okm destroykeys --kma=10.172.88.88 \
--directory=/export/home/Joe/.sunw/kms/OperatorCertificates \
--all=true --keystate=comp \
--comment="Joe destroyed compromised keys"
```

**Windows:**

```
okm destroykeys --kma=10.172.88.88
--directory=D:\KMS\Joe\OperatorCertificates
--all=true --keystate=comp
--comment="Joe destroyed compromised keys"
```

The following examples destroy deactivated keys associated with a list of data unit IDs using the user ID and passphrase of a OKM user for authentication.

**Solaris:**

```
okm destroykeys -k mykma1 -b Joe -i DeactivatedDUIDs.txt \
-s deact -C "Joe destroyed deactivated keys"
```

**Windows:**

```
okm destroykeys -k mykma1 -b Joe -i DeactivatedDUIDs.txt
-s deact -C "Joe destroyed deactivated keys"
```

The following examples back up core security using certificates in the ca.crt and clientkey.pem files in the given directory for authentication.

**Solaris:**

```
okm backupcs --kma=10.172.88.88 \
--directory=/export/home/Joe/.sunw/kms/SecurityOfficerCertificates \
--output=/export/home/KMSCoreSecurity.xml
```

**Windows:**

```
okm backupcs --kma=10.172.88.88
--directory=D:\KMS\Joe\SecurityOfficerCertificates
--output=D:\KMS\KMSCoreSecurity.xml
```

The following examples back up core security using the user ID and passphrase of a OKM user for authentication.

**Solaris:**

```
okm backupcs -k mykma1 -b Joe -o /export/home/KMSCoreSecurity.xml
```

**Windows:**

```
okm backupcs -k mykma1 -b Joe -o D:\KMS\KMSCoreSecurity.xml
```

## Exit Values

The following exit values are returned:

```
0    Successful completion
>0   An error occurred
```

## Sample Perl Scripts

The following are some basic perl scripts that can be customized and run on either Solaris or Windows. These examples all use certificate-based authentication and

require that the Root CA certificate and user's certificate reside in the current working directory.

---

**Note:** The perl scripts are not installed with the OKM Command Line utility. If you want to invoke the OKM Command Line utility from a perl script, use a text editor to create one that looks similar to one of the perl scripts shown here.

---

- `listdu.pl`

```
#!/opt/csw/bin/perl
## the kms CLI utility must be in your path
$cmd="okm";
$KMA="kma1.example.com";
$FILTER="--filter=Exported=false";
$DIRECTORY=".";
$OUTPUT="listdu.txt";
system("$cmd listdu --verbose=true --directory=$DIRECTORY --kma=$KMA $FILTER
      --output=$OUTPUT")
```
- `export.pl`

```
#!/opt/csw/bin/perl
## the kms CLI utility must be in your path
$cmd="okm";
$KMA="kma1.example.com";
$TP="DestinationPartner";
$FILTER="Exported=false";
$OUTPUT="$TP.dat";
system("$cmd export --verbose=true --kma=$KMA --directory=. --filter=$FILTER
      --partner=$TP --output=$OUTPUT");
```
- `import.pl`

```
#!/opt/csw/bin/perl
## the kms CLI utility must be in your path
$cmd="okm";
$KMA="kma1.example.com";
$TP="SourceTransferPartner";
$KEYGROUP="MyKeyGroup";
$INPUT="..../aberrfeldy/KeyBundle.dat";
system("$cmd import --verbose=true --kma=$KMA --directory=. --partner=$TP
      --keygroup=$KEYGROUP --input=$INPUT");
```
- `backup.pl`

```
#!/opt/csw/bin/perl
## the following must be in your path
$cmd="okm";
$KMA="kma1.example.com";
$DIRECTORY=".";
$OUTPUT=".";
system("$cmd backup --verbose=true --directory=$DIRECTORY --kma=$KMA
      --output=$OUTPUT")
```

## Backup Command Line Utility

The Backup Command Line utility allows you to launch a backup from the command line instead of from the Backup List menu. You can also schedule automated backups.

This utility is installed with the OKM Manager GUI using the same installer.

---

**Note:** If you want to enter link-local IPv6 addresses, invoke the Backup Utility and specify the link-local IPv6 address. Include the Zone ID (for example, "%4") at the end of the address.

Refer to ["IPv6 Addresses with Zone IDs"](#) on page 4-8 to see what steps you must follow for the initial setup.

---

## Solaris Syntax

```
OKM_Backup [-UserID userid] [-Passphrase passphrase]
           -KMAIPAddress IPaddress -BackupFilePath pathname
           [-Retries retries] [-Timeout timeout]
```

## Windows Syntax

```
OKMBackupUtility [-UserID userid] [-Passphrase passphrase]
                -KMAIPAddress IPaddress -BackupFilePath pathname
                [-Retries retries] [-Timeout timeout]
```

## Parameter Descriptions

*userid*

The Backup Operator user ID. This must be a Backup Operator.

*passphrase*

The passphrase for the user ID.

If the *userid* or *passphrase* value is not specified, the utility prompts you for these values.

*IPaddress*

The KMA Management Network Address on which to launch the backup.

*pathname*

The location where the Backup File and Backup Key File should be downloaded on your system.

*retries*

The number of times that this utility tries to connect to the KMA, if the KMA is busy. The default is 60.

*timeout*

The timeout value in seconds between these entries. The default is 60.

## Example

The following example creates a Backup File (format: OKM-Backup-backupid-timestamp.dat) and a Backup Key File (format: OKM-BackupKey-backupid-timestamp.xml).

```
OKM_Backup -UserID MyBackupOperator \
           -KMAIPAddress 10.0.60.172 \
           -BackupFilePath /tmp/MyKMSDownloads
OKM Backup Utility Version 3.0.0 (build2020)
Copyright (c) 2007, 2013, Oracle and/or its affiliates. All Rights Reserved.
Enter Passphrase:
```

---

---

**Note:** The passphrase can optionally be specified on the command line using the -Passphrase parameter.

---

---



---

## SNMP Management Information Base (MIB) Data

This appendix describes SNMP information for users who have configured an SNMP Agent in their network and have defined SNMP Managers in the OKM Manager GUI. When at least one SNMP Manager is defined in the OKM Manager GUI, the KMAs send SNMP Informs to the IP address of that SNMP Manager(s).

The KMAs use Object Identifiers (OIDs) to send the following information:

**Table A-1** KMA Object Identifiers

OID Value	Type	Description
1.3.6.1.4.1.42.2.22.99.109.1	----	Generic trap
1.3.6.1.4.1.42.2.22.99.1	string	Date/time
1.3.6.1.4.1.42.2.22.99.2	string	Audit event class
1.3.6.1.4.1.42.2.22.99.3	string	Audit event operation
1.3.6.1.4.1.42.2.22.99.4	string	Audit event condition
1.3.6.1.4.1.42.2.22.99.5	string	Audit event severity
1.3.6.1.4.1.42.2.22.99.6	string	Entity ID
1.3.6.1.4.1.42.2.22.99.7	string	Network address
1.3.6.1.4.1.42.2.22.99.8	string	Message
1.3.6.1.4.1.42.2.22.99.9	string	Audit event solution

Refer to ["SNMP Manager List Menu"](#) on page 5-39 for details on viewing, creating, and modifying SNMP managers.



---

## Using OKM with Advanced Security Transparent Data Encryption (TDE)

This appendix describes the use of OKM with Transparent Data Encryption (TDE) to manage encryption or decryption of sensitive database information. This solution allows you to manage encryption keys for the Oracle database using the same encryption technology used in Oracle StorageTek tape drives.

Transparent Data Encryption, a feature of Oracle Database 11gR2, provides database encryption and decryption services for:

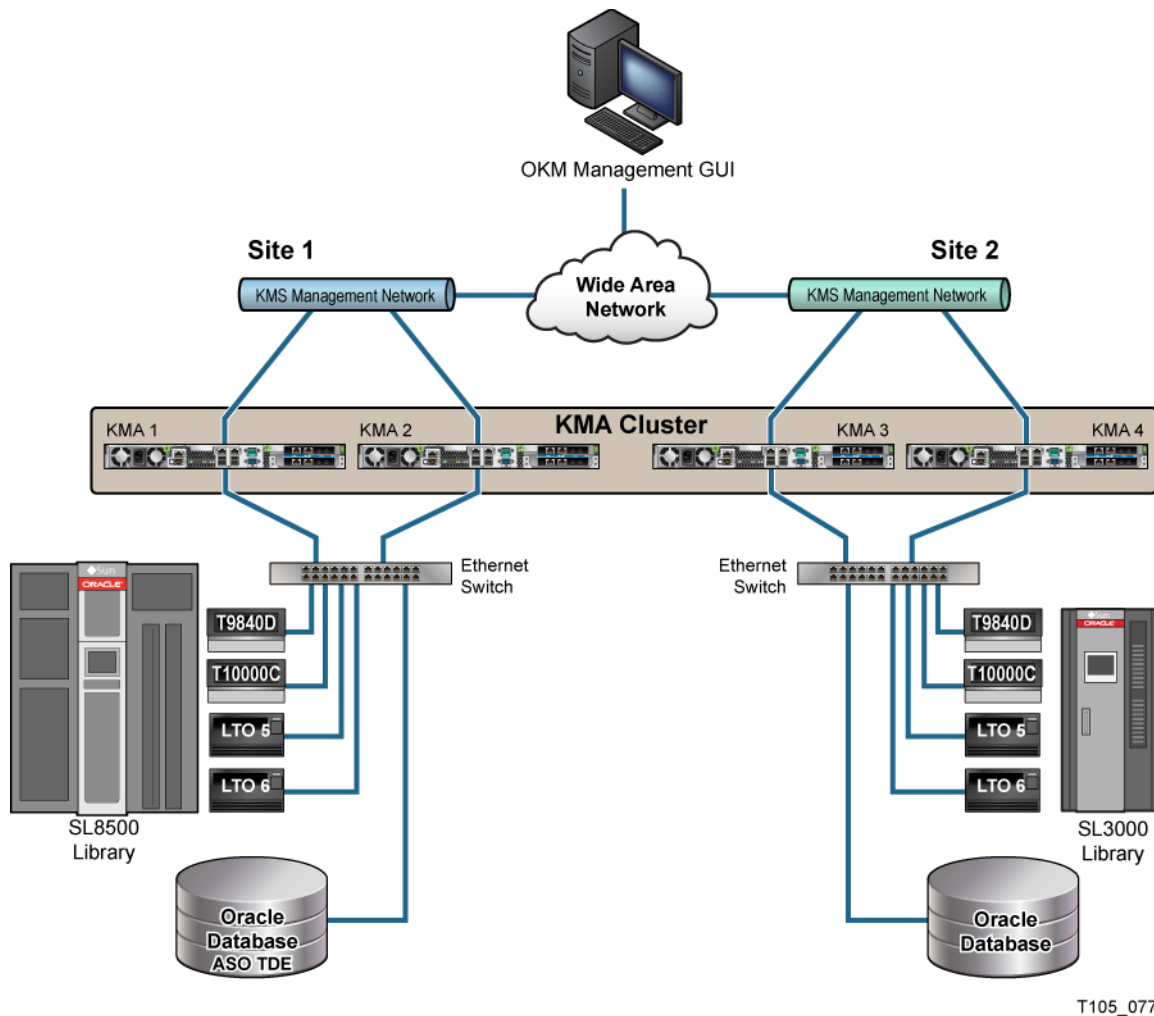
- Oracle Database products
- Oracle Real Application Clusters (Oracle RAC)
- Oracle Data Guard
- Oracle Exadata Database Machine
- Oracle Recovery Manager (RMAN)
- Oracle Data Pump

This appendix assumes familiarity with TDE. Refer to the document *Oracle Advanced Security Transparent Data Encryption Best Practices*, available at the following URL:

<http://www.oracle.com/us/products/database/twp-transparent-data-encryption-bes-130696.pdf>

### Overview of Transparent Data Encryption (TDE)

[Figure B-1](#) shows an OKM cluster featuring Oracle databases with Transparent Data Encryption (TDE). See [Chapter 1, "Introduction"](#) for more information about the basic components of the OKM cluster.

**Figure B-1 OKM Cluster with TDE**

TDE provides encryption services using a two-tiered key approach for TDE column encryption and TDE tablespace encryption. A master encryption key is used in the first tier to encrypt the second tier table or tablespace data encryption keys that are stored within the database.

TDE stores the master encryption key in an external security module (Oracle Wallet or HSM). This is a recommended security practice and is crucial to maintaining the highest level of security from various threats. Use of OKM for the secure storage of the TDE master encryption keys is the recommended approach.

With TDE configured to use OKM, OKM creates and safely protects the AES256 master encryption key. OKM protects keys through replication (multiple copies across the cluster) and through backups of OKM itself.

Refer to the *OKM Disaster Recovery Guide* for information about disaster recovery planning.

## OKM's PKCS#11 Provider

A PKCS#11 provider is available for Oracle Solaris and Oracle Linux and has been certified to interface TDE with OKM. This provider is called "pkcs11\_kms." TDE can

be configured to utilize the pkcs11\_kms provider through its built-in support for Hardware Security Modules (HSMs).

The pkcs11\_kms provider interacts with OKM for key creation and key retrieval operations. PKCS#11 consumer applications, such as TDE, can use the pkcs11\_kms provider in order to acquire keys to use for encryption and decryption functions. These applications identify key objects using a label that they define. TDE generates this label when the master key is created. The pkcs11\_kms provider passes this label to OKM where it is maintained as meta-data on the data unit. In OKM, keys are associated with data units and for the pkcs11\_kms provider, this relationship is always 1:1. Each time a new master key is created, a data unit with the key's label is created along with the corresponding key object.

See ["Locating TDE Master Keys in OKM"](#) on page B-17 for more information.

## TDE Authentication with OKM

Any entity that interacts with OKM must authenticate, whether it be an administrative user logging in, a tape drive retrieving key material, or a PKCS#11 consumer such as Oracle TDE.

TDE authenticates with OKM through the specific token configured to utilize the pkcs11\_kms provider. This token uses password-based authentication and X.509 certificates for mutual authentication of each party in the session, specifically the Oracle database instance and the OKM cluster node. You must configure TDE to properly pass these credentials to the PKCS#11 token.

For configuration instructions, refer to the document *Oracle Advanced Security Transparent Data Encryption Best Practices*, referenced at the beginning of this appendix.

## Managing Authentication Credentials

OKM allows you to manage authentication credentials for agents using the pkcs11\_kms provider. You can reset agent passphrases, and enable, disable or delete agents as your policies dictate.

If a security breach is detected, you may disable the specific agent so that key retrievals are denied, while allowing other agents servicing other applications or devices to maintain their access.

If you reset an agent passphrase, then remove the profile directory in the directory where the pkcs11\_kms provider stores its slot configuration (for example, the location identified by the KMSTOKEN\_DIR directory).

## Load Balancing and Failover

The pkcs11\_kms provider is aware of the OKM cluster through use of OKM cluster services, a load balancer and cluster failover logic. The pkcs11\_kms provider transparently maintains client-side awareness of the OKM cluster by periodically issuing cluster discovery operations. Network changes and changes in the OKM cluster or KMA availability are handled by the agent on behalf of the pkcs11\_kms provider and TDE. PKCS#11 key generation and key retrieval operations are load balanced across KMAs in the OKM cluster.

To further optimize key retrieval performance, agents may be configured to be associated with KMAs through use of OKM sites. This feature allows definition of sites according to network topology. Typically, KMAs and agents within a site would have low network latency as opposed to member KMAs and agents across a WAN.

When a network segment or KMA is unavailable, the failover logic within the agent chooses another KMA to complete the operation. TDE is unaware of any failovers, so key management operations are very reliable. Failover preferences KMAs within the same site as the agent.

You can use the `kmscfg(1M)` utility to tune the discovery frequency and the failover properties of the agent. See the `kmscfg` man page for more information.

## Planning Considerations

The following discuss a variety of planning topics:

- Oracle Database Considerations
- OKM Performance and Availability Considerations
- Disaster Recovery Planning
- Network Planning
- Key Management Planning.

### Oracle Database Considerations

OKM is compatible with any of the following Oracle Database configurations:

- Single Instance, Oracle RAC One Node
- Oracle Database High Availability Architectures
  - Oracle RAC
 

Oracle Database with Oracle Real Application Clusters (Oracle RAC) is certified with OKM. Each node of the Oracle RAC system requires a configured `pkcs11_kms` provider for TDE to use. All nodes must share the same OKM agent ID for authentication. With Oracle RAC, the network topology utilizes a public and private network. The private network used for Oracle RAC node-node traffic may be shared with the OKM service network for better isolation of key retrieval traffic. Depending on how this private network is configured, this likely precludes agent failover to KMAs outside the private network such as KMAs in a remote site.

See ["Integrating OKM and TDE"](#) on page B-7 for shared storage requirements with Oracle RAC and the `pkcs11_kms` provider configuration files.
  - Oracle RAC Extended Cluster
 

In this configuration, KMAs within the OKM cluster must be co-located in the network with Oracle RAC nodes in order to minimize retrieval time.
  - Oracle Exadata Database Machine
 

See ["Oracle RAC"](#) above.
- Oracle Data Guard
 

All secondary databases access the same OKM cluster used by the primary database.
- Multiple Database Instances
 

When running multiple independent database instances on a host, a `PKCS#11` token must be configured for each instance. This amounts to creating an OKM

agent for each database instance, and authenticating the agent to OKM via the token. Use the kmscfg tool to complete this task.

When running multiple database instances under the same O/S user, but using different OKM agents, you must set the KMSTOKEN\_DIR environment variable to a different location each time you invoke the kmscfg utility. See "[Configuring OKM for TDE](#)" on page B-9 for more information about the kmscfg utility.

For more information about running multiple databases on the same host, refer to the document *Oracle Advanced Security Transparent Data Encryption Best Practices*, referenced at the beginning of this appendix.

- Oracle RMAN
- Oracle Data Pump

## OKM Performance and Availability Considerations

Key retrievals for TDE through the pkcs11\_kms token typically take 100-200 milliseconds per KMA access. When failovers occur, the response time is a multiple of the number of failover attempts.

OKM backup and key transfer operations are resource-intensive activities that can impact OKM database performance. Plan carefully to determine when and where to perform OKM backups.

Since OKM backups are cluster-wide, they can be performed on KMAs that are not servicing Oracle Database instances. Similarly, key transfer operations are also cluster-wide operations and can be performed on any KMA. Therefore, it is recommended that you choose a KMA that is not servicing busy Oracle Database instances.

## Disaster Recovery Planning

For detailed information about OKM disaster recovery planning, refer to the *OKM Disaster Recovery Guide*, along with the Oracle database publications.

Disaster Recovery planning decisions influence the network planning exercise. The pkcs11 provider's configuration directory is a new consideration for disaster recovery planning. Consider recovery scenarios for this storage area to avoid the need to reconfigure a pkcs11\_kms token, especially when it is shared between nodes of an Oracle RAC.

## Network Planning

OKM cluster configuration must be planned in accordance with the Oracle Database servers and the enterprise's disaster recovery strategy. OKM networking options are very flexible and include multi-homed interfaces used by the OKM management and service network. Refer to the *OKM System Assurance Guide* for more information.

## Key Management Planning

Key management planning must address the key lifecycle and security policies of the enterprise. These considerations will naturally lead to discussions on data retention.

- See "[State Transition](#)" on page 1-4 for information about NIST SP-800 key management phases and corresponding OKM key states.

- See ["Re-Key Due to OKM Policy Based Key Expiration"](#) on page B-15 for information about an issue that can occur when a key policy is not set to a long enough period of time.

### Key Policy Considerations

All TDE master keys are AES 256 bits generated by OKM. KMAs may contain a Sun Crypto Accelerator 6000 PCIe Card, a FIPS 140-2 Level 3 certified HSM. When KMAs have this Hardware Security Module, their keys are created by the HSM. Otherwise, cryptographic operations utilize the Solaris Crypto Framework's software token provider. See ["Key Policies"](#) on page 6-2 for more information.

**Key Lifecycle** The key lifecycle is the primary configuration item with respect to key policy planning decisions. The periods for the operational phase of the key's lifecycle should be chosen based upon data retention needs and the frequency with which TDE master keys will be re-keyed. See ["Key Lifecycle"](#) on page 1-4 for more information.

---

**Note:** TDE's DDL supports specification of various key sizes for the master key as does the schema encryption dialogs within OKM. Only AES 256 bit keys can be used with OKM.

---

**Key Policy Encryption Period** The key policy encryption period defines the length of time for the key to be used in the protect and process (encrypt and decrypt) state of the lifecycle. This period should correspond to the time period for use of the master key before it should be re-keyed (for example, maximum one year for PCI).

**Key Policy Cryptoperiod** The key policy cryptoperiod is the remaining time allotted for use of the master key to decrypt data during the process only (decrypt only) state of the key lifecycle. The length of this period should conform to the data retention requirements for the data protected by the TDE master key. Typically this value is a number of years corresponding to the enterprise policy for data retention (e.g., a seven year retention period for US tax records).

The rate at which new keys will be generated should not be a concern with TDE as re-key operations will likely be infrequent. However, if this becomes a concern, then consider lengthening the encryption period on the key policy and re-keying less frequently. You can also increase the OKM key pool size configuration parameter to direct the KMAs to maintain a larger pool of available keys.

Multiple key policies may be defined for use with different types of databases as needs dictate.

### Key Access Control Through Key Groups

It may be necessary to control access to keys managed by OKM when multiple database instances or multiple agents are accessing the OKM cluster for various purposes.

All OKM agents are assigned to at least one Key Group (a default Key Group assignment is required), which authorizes them to have access to the keys within those groups. The agent's default Key Group is the only Key Group within which a pkcs11\_kms provider's agent will create keys.

Consider using multiple Key Groups when master keys do not need to be shared across database instances or hosts. An example might be to use one Key Group for production database instances and another Key Group for development/test databases, so that isolation is assured. Agents in the test database Key Group would



then be blocked by OKM if they attempt to use a master key for a production database. Such an attempt would also be flagged in the OKM audit log and may be an indicator of a configuration error that could disrupt a production database.

TDE also provides isolation of master keys through their key label naming convention. In the PKCS#11 specification, key labels are not required to be unique. However, OKM enforces unique labels, regardless of Key Group, so that the scope of the label name space is global for an OKM cluster. If a label conflict occurs between different master keys for different database instances, the first label created is always returned. Any agent attempting to access a key that shares an identical label belonging to another Key Group will be denied by OKM. This is detected during a re-key operation, and the work around is to re-key until another, non-conflicting, label is generated.

### Key and Data Destruction Considerations

Destruction of data to conform to data retention requirements can begin with the destruction of TDE master keys. How and when these keys should be destroyed is an important planning item. OKM provides for this and for tracking of OKM backups, which include these keys. Management of OKM backups is both a Disaster Recovery planning item and key destruction planning item.

## Integrating OKM and TDE

This section describes how to install and configure `pkcs11_kms` and the OKM cluster for use with TDE.

### System Requirements

The following minimum versions are supported when using OKM with TDE:

#### Oracle Key Manager

Oracle Key Manager 2.4.1 operating with Replication Schema version 13

Supported OKM management platforms for the GUI and CLI are documented in the OKM product release notes, which include specific considerations for Oracle Solaris and Microsoft Windows platforms.

#### `pkcs11_kms`

- Oracle Solaris 11 Express with SRU 12
- Oracle Solaris 11 `pkcs11_kms`, x86 or SPARC, 32 bit or 64 bit
- Oracle Solaris 10 Update 10 `pkcs11_kms` patch 147441-03 for x86 or patch 147159-02 for SPARC, 32 bit or 64 bit
- Oracle Enterprise Linux (OEL) release 5.5.
- Oracle Database 11.2.0.2 on a supported `pkcs11_kms` platform and mandatory patch 12626642.

### Installing OKM

The OKM cluster installation process is described in the *OKM Installation Guide*. Typically, OKM installation involves engagement with Oracle Professional Services, to aid in planning, installation, and configuration service choices. Additionally, it is recommended that your security team be involved in the planning process.

After you establish a working OKM cluster, follow the OKM administration steps described in the configuration sections of this appendix.

## Installing pkcs11\_kms

You must install and configure OKM's PKCS#11 Provider, `pkcs11_kms`, on the Oracle database server(s). A `pkcs11_kms` distribution is available for each of following platforms:

- Oracle Solaris 11 or Solaris 11 Express
- Oracle Solaris 10 Update 10
- Oracle Enterprise Linux

### Installing pkcs11\_kms for Oracle Solaris 11 or Solaris 11 Express

Perform the following steps to install `pkcs11_kms`:

1. Display the version of the `pkcs_kms` package:

```
#> pkg info -r pkcs11_kms
```

Verify the output of this command.

2. For Solaris 11, enter the following command:

```
#> pkg install system/library/security/pkcs11_kms
```

For Solaris 11 Express, enter the following command:

```
#> pkg install system/library/security/crypto/pkcs11_kms
```

3. Install the provider into the Solaris Crypto Framework.

```
# cryptoadm install provider='/usr/lib/security/$ISA/pkcs11_kms.so.1'
```

---

---

**Note:** The single quotes are significant. see `cryptoadm(1M)`.

---

---

4. Enter the following sequence of commands to verify the installation:

```
# cryptoadm list -m -v \
provider='/usr/lib/security/$ISA/pkcs11_kms.so.1'
```

---

---

**Note:** This displays message : 'no slots presented' until `kmscfg` is run.

---

---

### Installing pkcs11\_kms for Oracle Solaris 10 Update 10

The `pkcs` distribution is installed as "SUNWpkcs11kms" in Solaris 10 Update 10 installations.

- SPARC systems require Solaris patch 147159-03 or later.
- x86 systems require Solaris patch 147441-03 or later.

To download Solaris patches, visit the following URL:

<https://patchstatus.us.oracle.com/patchstatus/>

Perform the following steps to install `pkcs11_kms`:

1. Enter the following command to install the `pkcs11_kms` package for the hardware platform:

```
# pkgadd [-d path to parent dir of package] SUNWpkcs11kms
```

2. Install the provider into the Solaris Crypto Framework.

```
# cryptoadm install provider='/usr/lib/security/$ISA/pkcs11_kms.so.1'
```

---

**Note:** The single quotes are significant. see cryptoadm(1M).

---

### Installing pkcs11\_kms for Oracle Enterprise Linux

pkcs11\_kms is distributed as "patch" 13245560 on the My Oracle Support site, at the following URL:

<http://www.myoraclesupport.com>

Log in and click the **Patches & Updates** tab. Then either search for this specific patch ID directly, or search the Oracle Key Manager product and the Oracle Key Manager 2.5 release.

pkcs11\_kms is distributed as an RPM package. Use RPM package manager commands to install this software.

For example:

```
# rpm -i pkcs11kms-1.0.0-1.x86_64.rpm
```

## Uninstalling pkcs11\_kms

The following commands uninstall pkcs11\_kms.

### Uninstalling pkcs11\_kms for Oracle Solaris 11

To uninstall pkcs11\_kms, enter the following commands:

```
# cryptoadm uninstall \
provider='/usr/lib/security/$ISA/pkcs11_kms.so.1'
# pkg uninstall system/library/security/pkcs11_kms
```

### Uninstalling pkcs11\_kms for Oracle Solaris 10 Update 10

To uninstall pkcs11\_kms, enter the following command:

```
# pkgrm SUNWpkcs11kms
```

### Uninstalling pkcs11\_kms for Oracle Enterprise Linux

When packaged with Oracle Database, the pkcs11\_kms provider will be uninstalled through the steps used to uninstall the Oracle Database product. If installed through another means, then follow the inverse procedures of the install using rpm.

For example:

```
# rpm -e pkcs11kms-1.0.0-1.x86_64.rpm
```

## Configuring OKM for TDE

The following section discusses TDE configuration.

### Oracle Database TDE Configuration

Each Oracle database server must be running 11.2.0.2 or later on a supported pkcs11\_kms platform. Mandatory patch 12626642 must be installed. This patch is available at the following URL:

<https://updates.oracle.com/download/12626642.html>

Once installed, the shared library file (pkcs\_kms.so) must be configured for TDE access. The library path is OS-specific:

- /usr/lib/security/pkcs11\_kms.so.1 (Solaris only, 32-bit)
- /usr/lib/security/amd64/pkcs11\_kms.so.1 (Solaris only, 64-bit)
- /usr/lib64/pkcs11\_kms.so.1 (Linux only, 64-bit)

### Configuring the OKM Cluster for TDE

The following list summarizes the tasks required to configure the OKM cluster for TDE:

- These tasks assume a functioning OKM cluster configured with appropriate administrative users and roles.
  - All KMAs in the OKM Cluster must be running a minimum of OKM 2.4.1 and Replication Version 13.
1. Define the key policy.  
See:
    - ["Key Policies"](#) on page 6-2
    - ["Key Policy Considerations"](#) on page B-6.
  2. Define the group definition.  
Assign the key policy to the Key Group and a handy name for the group.  
See:
    - ["Key Groups"](#) on page 6-8
    - ["Key Access Control Through Key Groups"](#) on page B-6
  3. Configure agent(s).  
See:
    - ["OKM's PKCS#11 Provider"](#) on page B-2.
    - ["Agent List Menu"](#) on page 7-3
  4. Associate each agent with a default Key Group.  
See ["Key Group Assignment to Agents Menu"](#) on page 6-18.

**Agent ID** The agent ID can be anything meaningful to the configuration, and should correspond to the Oracle user for the database instance to be associated with the agent.

**Passphrase** Choose a strong passphrase as this passphrase will also be configured on the Oracle host for authenticating with OKM through the DDL statements that open the wallet (for example, the pkcs11\_kms token). See ["Creating an Agent"](#) on page 7-6 for information about passphrase requirements.

OneTimePassphrase flag should be set to "false" to allow password based authentication any time the TDE "wallet" needs to be opened, as well as from multiple Oracle RAC nodes sharing a common agent ID. For maximum security this can be set to the default value of "true," but will only work in a single node Oracle Database configuration and not in Oracle RAC. When OneTimePassphrase is true, the agent's X.509 certificate is returned only when the agent successfully authenticates the first time. The pkcs11\_kms provider securely stores the X.509 certificate's private key in a

PKCS#12 file that is protected by a passphrase. The X.509 certificate and corresponding private key are then used for agent transactions with OKM. See `kmscfg(1M)` for other information that the `pkcs11_kms` provider stores.

**Key Group** Assign the agent to the Key Group(s) defined for TDE. The `pkcs11_kms` provider only supports the default Key Group for key creation operations, including re-key operations. Any additional, non-default Key Groups associated with the agent will only allow key retrievals from keys in those groups. This capability could be leveraged in read-only/decryption-only database scenarios such as in support of a secondary database that will never generate a master key, but only needs the ability to access the master keys.

## Configuring `pkcs11_kms` for TDE

The `pkcs11_kms` provider must be configured on the Oracle Database nodes that will require TDE master keys. Perform the following steps to configure the `pkcs11_kms` provider:

### 1. O/S User Considerations:

Configure the agent and `pkcs11_kms` provider using the Oracle Database user account. This does not require special privileges for the O/S user. When a host supports "Multiple Oracle Homes," then the `pkcs11_kms` token configuration must be in accordance with each Oracle Database software owner's user account. Refer to the *Oracle Database Installation Guide 11g Release 2* for more information.

### 2. The `kmscfg` utility creates one slot configuration per user at a time. It is possible to define additional slot configurations for an individual user, but only one will be active per process.

---

**Caution:** The default location of the slot configuration directory for the KMS PKCS#11 provider is `/var/kms/$USER` on Solaris 11 Express and is `/var/user/$USER/kms` on Solaris 11 SRU5. If you plan to upgrade your Solaris 11 Express system to Solaris 11 SRU5, then you should first save your slot configuration elsewhere.

For example:

```
# cd /var/kms/$USER
# tar cvf ~/save_my_okm_config.tar .
```

After the upgrade, restore your slot configuration to the new location. For example:

```
# mkdir -p /var/user/$USER/kms
# cd /var/user/$USER/kms
# tar xvf ~/save_my_okm_config.tar
```

**If you do not back up `pkcs11_kms` data before you upgrade, your data will be lost and the master key used by the Oracle data base for encrypted data will not be available.**

---

The `kmscfg` utility stores configuration and runtime data in a KMS configuration directory at one of the following paths:

- `/var/user/$USER/kms` (Solaris 11)
- `/var/kms/$USER` (Solaris 10u10 and Solaris 11 Express)

- /var/opt/kms/\$USER (Oracle Enterprise Linux)

This directory is overridden by the \$KMSTOKEN\_DIR environment variable to the location of the customer's choosing.

When kmscfg runs, a “profile” name is provided. This name is used for the agent-specific runtime subdirectory created within the configuration directory described above.

3. Refer to the kmscfg man page for the default location of its slot configurations. Slot configurations may be controlled using the KMSTOKEN\_DIR environment variable to define an alternate slot configuration and file system location.

For Oracle RAC, where the agent profile must be shared between Oracle RAC nodes, use the KMSTOKEN\_DIR environment variable to direct kmscfg to create the profile using the appropriate shared filesystem path. If the KMSTOKEN\_DIR environment variable is set, it must be set persistently for the shell in a shell configuration file (such as .bashrc) so that it is always set prior to the database performing any PKCS#11 operations.

4. Allocate file system storage space for the slot's configuration and runtime information. If you plan to use Oracle RAC, define the profile in a shared file system location with permissions that are readable and writable by each of the Oracle RAC node users.
5. Allocate space requirements to allow for growth in each agent log. The log file is automatically created and is a helpful troubleshooting tool. The space consumed by the KMSAgentLog.log file can be managed using a tool like logadm(1M) on Solaris or logrotate(8) on Oracle Enterprise Linux. Allocating 10MB for each agent's profile directory is adequate for most configurations.
6. Initialize a pkcs11\_kms provider using the kmscfg utility. In this step, you define a profile for the OKM agent that will later be associated with a pkcs11\_kms token.

```
# kmscfg
Profile Name: oracle
Agent ID: oracle
KMA IP Address: kma1
```

At this point, you have defined a pkcs11 slot and you can verify authentication with OKM.

- a. On Solaris systems, verify authentication using the cryptoadm(1M) command. Note that the flag field shows CKF\_LOGIN\_REQUIRED in the following example, indicating that the slot is not yet configured with an authenticated token.

```
solaris> cryptoadm list -v \
provider='/usr/lib/security/$ISA/pkcs11_kms.so.1'
Provider: /usr/lib/security/$ISA/pkcs11_kms.so.1
Number of slots: 1
Slot #1
Description: Oracle Key Management System
Manufacturer: Oracle Corporation
PKCS#11 Version: 2.20
Hardware Version: 0.0
Firmware Version: 0.0
Token Present: True
Slot Flags: CKF_TOKEN_PRESENT
Token Label: KMS
Manufacturer ID: Oracle Corporation
Model:
```

```

Serial Number:
Hardware Version: 0.0
Firmware Version: 0.0
UTC Time:
PIN Min Length: 1
PIN Max Length: 256
Flags: CKF_LOGIN_REQUIRED

```

- b.** Verify that the pkcs11\_kms token can authenticate with the OKM Cluster.

This example uses Oracle Solaris pktool(1), a utility that is not available for Linux platforms.

```

solaris> pktool inittoken currlabel=KMS
Enter SO PIN:
Token KMS initialized.

```

The SO (PKCS#11 abbreviation for a security officer) prompt is for the agent's secret passphrase as established in a previous step by the OKM administrator who created the agent.

- c.** On Solaris systems, verify that the token is initialized by using the Solaris Crypto Framework cryptoadm(1M) command or the pktool(1) utility. Note that the token's flag shown by output from cryptoadm is now CKF\_TOKEN\_INITIALIZED:

```

solaris> cryptoadm list -v \
provider='/usr/lib/security/$ISA/pkcs11_kms.so.1'
Provider: /usr/lib/security/$ISA/pkcs11_kms.so.1
Number of slots: 1
Slot #1
Description: Oracle Key Management System
Manufacturer: Oracle Corporation
PKCS#11 Version: 2.20
Hardware Version: 0.0
Firmware Version: 0.0
Token Present: True
Slot Flags: CKF_TOKEN_PRESENT
Token Label: KMS
Manufacturer ID: Oracle Corporation
Model:
Serial Number:
Hardware Version: 0.0
Firmware Version: 0.0
UTC Time:
PIN Min Length: 1
PIN Max Length: 256
Flags: CKF_LOGIN_REQUIRED CKF_TOKEN_INITIALIZED

```

- d.** On Solaris systems, use the pktool(1) utility to verify the status of PKCS#11 visible tokens:

```

glengoyne> pktool tokens
Flags: L=Login required I=Initialized X=User PIN expired S=SO PIN
expired
Slot ID  Slot Name      Token Name      Flags
-----  -
1        Sun Crypto      Softtoken      Sun Software PKCS#11 softtoken
2        Oracle Key Management System      KMS L
glengoyne>

```

This shows that Login to the token is still required. The meaning of the Flags in the pktool output can be shown as follows:

```
glengoyne> pktool tokens -h
Usage:
  pktool -?      (help and usage)
  pktool -f option_file
  pktool subcommand [options...]
```

where subcommands may be:

```
tokens
* flags shown as: L=Login required  I=Initialized
                  E=User PIN expired  S=SO PIN expired
glengoyne>
```

- e. On Solaris systems, use the pktool(1) utility to log in to the token and authenticate with the OKM cluster's KMA specified in the kmscfg(1) step and the passphrase created by an OKM administrator for the agent. This passphrase is supplied with the SO PIN prompt:

```
glengoyne> pktool inittoken currlabel=KMS
Enter SO PIN:
Token KMS initialized.
```

- f. On Solaris systems, use the pktool(1) utility to verify the tokens status and that it is now initialized:

```
glengoyne> pktool tokens
Flags: L=Login required  I=Initialized  X=User PIN expired  S=SO PIN
expired
Slot ID  Slot Name  Token Name  Flags
-----  -
1        Sun Crypto  Softtoken   Sun Software PKCS#11 softtoken
2        Oracle Key Management System  KMS  LI
```

- g. On Solaris systems, use the cryptoadm(1M) command to verify that the pkcs11\_kms token is initialized by requesting to see the mechanisms that it supports:

```
glengoyne> cryptoadm list -m -p provider=/usr/lib/security/'$ISA'/pkcs11_
kms.so.1
Mechanisms:
CKM_AES_KEY_GEN
CKM_AES_CBC
CKM_AES_CBC_PAD
glengoyne>
```

On Solaris systems, use the pktool(1) utility to create and list keys through the pkcs11\_kms provider as follows:

```
# pktool genkey token=KMS keytype=aes keylen=256
label=MyKey-test1
# pktool list token=KMS objtype=key
# pktool list token=KMS objtype=key label=MyKey-test1
```

You can see the keys in the OKM system through the OKM Manager GUI or OKM CLI.



---

**Note:** For Solaris, kmscfg(1) by default creates just one slot configuration per user at a time.

You can define additional slot configurations, but only one will be active per process. You can do this by using the KMSTOKEN\_DIR variable to define an alternate slot configuration and file system location.

The Solaris 11 default is /var/user/\$USERNAME/kms, but you can create your own naming schemes. A best practice might be

```
/var/user/$USERNAME/$AGENTID-$CLUSTER/
```

This naming convention allows Solaris to have multiple slot-agent-cluster combinations based on various usage scenarios.

For some PKCS#11 configurations, an alternate location is recommended, for example, TDE with Oracle RAC (see the TDE configuration section above), so that each node shares the pkcs11\_kms provider's metadata ).

---

7. To configure TDE to use auto-open wallets, follow the instructions described in the document *Oracle Advanced Security Transparent Data Encryption Best Practices*, referenced at the beginning of this appendix.

## Ongoing Operations

The following sections describe recurring OKM and TDE operational tasks.

### Migration of Master Keys from the Oracle Wallet

The old wallet must be retained and a new master key will be generated by OKM and safely protected by the key management system.

Refer to the document *Oracle Advanced Security Transparent Data Encryption Best Practices*, referenced at the beginning of this appendix.

TDE generates a unique key label that identifies each master key. The actual key values are never exposed in plain text until they are passed from the pkcs11\_kms token to TDE. The "created" key will be pulled from a pool of AES 256 bit keys in the activate state (safely replicated to multiple KMAs). This key will then be associated with an OKM key policy in accordance with the specific agent used by the PKCS#11 token. OKM will then manage the key in accordance with the key lifecycle dictated by the policy.

#### Re-Key Operation

The Oracle Database Administrator must perform re-key operations before the key's lifecycle dictates. Otherwise, the database will not start.

Refer to the various Oracle Database and TDE documents for the DDL used to perform this operation. Re-keying may also be performed using Oracle Enterprise Manager.

#### Re-Key Due to OKM Policy Based Key Expiration

Once a key reaches the post-operational state, each key retrieval by TDE will trigger a warning in the OKM audit logs indicating that a post-operational key has been retrieved. Presence of these audit messages is an indication that it is time to re-key the

database instance's master encryption key. The OKM audit message identifies the specific agent and key that is being retrieved in order to facilitate identification of the Oracle Database instance and master encryption key that has reached the post-operational state. Notification via SNMP v3 informs or SNMP v2 traps may be configured in OKM to support automation of this process.

The `pkcs11_kms` provider will attempt to inform its PKCS#11 consumers that the key has reached the post-operational state. This is done by setting the PKCS#11 "CKA\_ENCRYPT" attribute to false for the master key.

Oracle Database 11gR2 currently continues to use a key to encrypt data after its encryption period has expired. You can see this behavior when the following error appears in the alert log:

```
HSM heartbeat died. Likely the connection has been lost. PKCS11 function C_
EncryptInit returned
PKCS11 error code: 104
HSM connection lost, closing wallet
```

If this error is encountered, the Database Administrator must perform the following actions:

1. Set the following environment variable for the user associated with the `pkcs11_kms` token (typically the Oracle user's profile):  

```
# export PKCS11_KMS_ALLOW_ENCRYPT_WITH_DEACTIVATED_KEYS=1
```
2. Restart the database.
3. Re-key the master key for the database instance.

To avoid the error described above, it is recommended that you use a very long encryption period on the OKM key policy associated with Oracle Database agents. Alternatively, you can alter the behavior of the `pkcs11_kms` provider to disable key state checking. To do this, set the environment variable described in Step 1, above. Once this variable is set, the HSM can be opened.

In spite of this, TDE will continue to use the key and not perform an automatic re-key operation. OKM administrators observing the post-operational key retrieval audit warnings must inform a Database Administrator that it is time to re-key their database instance's master key.

## Converting from Another HSM Solution

Contact Oracle technical support for specific steps required to convert from another vendor's HSM solution to OKM.

## Key Destruction

Prior to destroying keys that have reached the post-operational phase, the OKM administrator must verify that the key is no longer being used.

OKM administrators are responsible for the regular destruction of keys in the post-operational phase. Deletion of keys through the `pkcs11_kms` provider is not supported with OKM and is a restricted operation reserved for OKM users that have been assigned the role of Operator. Once a key has been destroyed, any attempt to retrieve it will fail, including PKCS#11 `C_FindObjects` requests.

## Key Transfer in Support of Oracle RMAN and/or Oracle Data Pump

Use of Oracle RMAN and/or Oracle Data Pump may require the ability to supply the master key to another OKM cluster, perhaps at a disaster recovery site or with a partner. OKM key transfer operations readily support this using the secure key export and key import services. See ["Key Transfer"](#) on page 5-45 for more information.

Perform the following steps:

1. Establish Key Transfer Partners between the source and destination OKM clusters.
2. Identify the TDE master keys to be exported in support of Oracle RMAN backups or encrypted data exported using Oracle Data Pump.
3. Export the keys from the source OKM cluster. This will create a secure key export file.
4. Transmit the exported key file to the transfer partner.
5. The destination transfer partner imports the keys into their OKM cluster.

Run Oracle RMAN restore or Oracle Data Pump import to re-create the database instance that requires the keys. This requires the configuration steps necessary to use TDE with OKM at the importing location. The restore or import operation then accesses the OKM for the universal master keys required to decrypt the column or tablespace keys used by the database instance.

## Management

Once the system is active, use the following guidelines to effectively manage and monitor the solution.

### Attestation, Auditing, and Monitoring

Oracle recommends the following:

- Review and monitor the OKM active history of the TDE agent to help detect problems.
- Auditors can use OKM audit events to attest that TDE is accessing its master keys from the OKM cluster.
- Configure an SNMP manager for OKM.
- Explore the use of OKM CLI to generate enterprise specific reports.

### Locating TDE Master Keys in OKM

You can locate the TDE master keys within OKM using either the GUI management tool or the CLI. TDE generates the master key labels and OKM uses a data unit's External Tag attribute to store this value. TDE master key generation (including re-key operations) always creates a new data unit object and Key object within the OKM cluster.

To locate a TDE master key, do the following:

1. Perform a query on the OKM data units and filter the list using an ExternalTag filter: "ExternalTag" begins with "ORACLE.TDE". All TDE key labels begin with this string so this will generate a list of OKM data units that were created by TDE. Each OKM data unit will have a single TDE master key associated with it. These keys can be viewed using the OKM GUI to examine their lifecycle state and other properties, such as Key Group, export/import status, and which OKM backups

contain destroyed keys. These keys can also be viewed using the OKM CLI. For example:

```
>okm listdu --kma=acme1 --user=joe \
--filter="ExternalTag=ORACLE.TDE"
```

2. When multiple Oracle Database instances share an OKM cluster, an OKM administrator can identify which keys correspond to a particular database by using a query against the audit events for the agent that corresponds to that database instance. These audit events can be viewed using the Oracle GUI. Filter the agent's audit history using the filter: "Operation equals CreateDataUnit". This produces a list of the audit events corresponding to TDE master key creations. The audit event details provide the necessary information to identify the specific data units for the master keys. These audit events can also be viewed using the OKM CLI. For example:

```
>okm listauditevents --kma=acme1 --user=joe \
--filter="Operation=CreateDataUnit"
```

## Troubleshooting

This section describes error conditions that may be encountered when using OKM with TDE.

### Cannot Retrieve the Master Key

The Oracle Database reports one of the following errors when the master key cannot be retrieved:

- ORA-28362
- ORA-06512

If these errors are encountered, perform the following diagnostic steps to identify the issue:

1. Examine the \$ORACLE\_BASE/diag/rdbms/\$SID/\$SID/trace/alert\_\$SID.log file. This file logs success/fail messages related to "alter" DDL statements used to access the encryption wallet.
2. Examine the KMSAgentLog.log file in the pkcs11\_kms configuration directory (\$KMSTOKEN\_DIR/KMSAgentLog.log).
3. Verify the general status of OKM. Check the following:
  - Are KMAs active?
  - Are KMAs locked?
  - Is the key pool depleted?
  - KMA ILOM/ELOM faults
  - KMA console messages
4. Verify the status of the pkcs11\_kms token as demonstrated earlier.
5. Verify the status of the agent by examining OKM audit events for that agent to ensure that it enrolled and is enabled.
6. Verify network connectivity from the Oracle Database host to OKM nodes.
7. Contact Oracle Technical Support. You may be asked to provide one or more KMA System Dumps.

## Loss of the pkcs11\_kms Configuration Directory

Use the following procedure to recover a lost or corrupted pkcs11\_kms token profile:

1. Perform the configuration steps described in ["Configuring OKM for TDE"](#) on page B-9.
2. **Solaris Only** - Repopulate the token's metadata, using the following data unit filter with the OKM: "ExternalTag" begins with "ORACLE.TDE".
3. **Solaris Only** - Save the results of this listing to a file (e.g. "du.lst") and then execute the following shell script:

```
for label in `awk '{print $2}' < du.lst`
do
pktool list token=KMS objtype=key label="${label}"
done
```

## No Slots Available Error

The client gets "No Slots Available" errors when issuing any PKCS#11 operation.

1. Ensure that the kmscfg utility has run successfully.
2. Ensure that the pkcs11\_kms provider has been properly installed and configured.

## CKA\_GENERAL\_ERROR Error

The client gets the CKA\_GENERAL\_ERROR error when trying to retrieve keys.

1. Verify that the agent has a default Key Group in the OKM cluster.
2. Review the \$KMSTOKEN\_DIR/KMSAgentLog.log file for more information.

## Could Not Open PKCS#12 File Error

The "Could not open PKCS#12 file" error appears in the \$KMSTOKEN\_DIR/KMSAgentLog.log file.

1. Select audit events in the OKM cluster to determine whether the agent passphrase has recently changed.
2. Remove the <profile-name> directory under \$KMSTOKEN\_DIR.



---

## Using OKM with Solaris ZFS Encryption

This appendix describes the use of OKM with Oracle Solaris 11 ZFS to manage encryption and decryption of files in ZFS storage pools. This solution allows you to manage encryption keys for ZFS storage pools using the same encryption technology used in Oracle StorageTek tape drives.

This appendix assumes familiarity with Solaris 11 and Oracle Solaris ZFS.

- Refer to the Oracle Solaris 11 publications for more information about Oracle Solaris 11.
- Refer to the publication *Oracle Solaris Administration: ZFS File Systems* for more information about Oracle Solaris ZFS.

ZFS can be configured to use OKM's PKCS#11 provider, `pkcs11_kms`, in order to retrieve encryption keys from an OKM cluster. This requires a configured OKM cluster and a Solaris 11 system with established connectivity to KMAs in this OKM cluster.

Once a Solaris 11 administrator installs and configures `pkcs11_kms`, the administrator can request that `pkcs11_kms` create a key, and then direct ZFS to use it.

`pkcs11_kms` is introduced in Appendix B. For more information, see the following:

- ["OKM's PKCS#11 Provider"](#) on page B-2
- ["Managing Authentication Credentials"](#) on page B-3
- ["Load Balancing and Failover"](#) on page B-3

### Planning Considerations

See the following sections for considerations that may apply as you plan for this integration:

- ["OKM Performance and Availability Considerations"](#) on page B-5
- ["Disaster Recovery Planning"](#) on page B-5
- ["Network Planning"](#) on page B-5
- ["Key Management Planning"](#) on page B-5

### Integrating OKM and ZFS

The following tasks are required to integrate OKM with ZFS:

- Configuring the OKM Cluster for ZFS
- Installing `pkcs11_kms` on the Solaris 11 system

- Configuring pkcs11\_kms for use by ZFS
- Configuring ZFS to use pkcs11\_kms

These tasks are described in the following sections.

---

**Note:** Much of the information for these tasks also applies in OKM configurations using Transparent Data Encryption (TDE). Where appropriate, the following sections include references to additional information described in Appendix B.

---

## Configuring the OKM Cluster for ZFS

To configure the OKM cluster for use with ZFS, perform the following steps:

1. Ensure that all KMAs in the OKM cluster are running Oracle Key Manager 2.4.1 or later and that the OKM cluster uses Replication Schema version 13.

Supported OKM management platforms for the GUI and CLI are documented in the OKM product release notes, which include specific considerations for Oracle Solaris and Microsoft Windows platforms.

2. Create a key policy and Key Group, configure an agent, and associate that agent with the Key Group as its default Key Group. For more information, see ["Configuring the OKM Cluster for TDE"](#) on page B-10.

---

**Note:** The agent should be configured to disable the **One Time Passphrase** property. See ["Creating an Agent"](#) on page 7-6 or ["Viewing/Modifying an Agent"](#) on page 7-9.

---

## Installing pkcs11\_kms on Solaris 11

To install Oracle's PKCS#11 provider, pkcs11\_kms, on the Solaris 11 system, perform the steps described in ["Installing pkcs11\\_kms for Oracle Solaris 11 or Solaris 11 Express"](#) on page B-8.

## Configuring pkcs11\_kms

To configure pkcs11\_kms on the Solaris 11 system, perform Steps 2 and 3, as described in ["Configuring pkcs11\\_kms for TDE"](#) on page B-11.

---

**Note:** Disregard references to Oracle RAC, as they do not apply in an OKM/ZFS integration.

---

## Configuring ZFS to Use pkcs11\_kms

Once the pkcs11\_kms provider is installed and configured, perform the following steps to generate a key in the pkcs11\_kms provider and configure ZFS to use this key when encrypting files in file systems contained in a particular ZFS pool.

Use the Solaris pktool genkey command to create an AES 256-bit key.

1. At the "Enter PIN for KMS" prompts, enter the passphrase of the agent that was provided to the kmscfg utility when you configured pkcs11\_kms.

For example:

```
# pktool list token=KMS objtype=key
```



```

Enter PIN for KMS:
# pktool genkey keystore=pkcs11 token=KMS keytype=aes keylen=256
label=zfscrypto_key_256
Enter PIN for KMS:
# pktool list token=KMS objtype=key label=zfscrypto_key_256
Enter PIN for KMS:

```

2. Use the **zfs create** command to configure ZFS to use this key.

In the "keysource" argument of the **zfs create** command, specify the label of key that you generated in Step 1.

At the "Enter 'KMS' PKCS#11 token PIN" prompts, enter the passphrase of the agent.

For example:

```

# zfs create -o encryption=aes-256-ccm -o
keysource="raw,pkcs11:token=KMS;object=zfscrypto_key_256" cpool_nd/cfs
Enter 'KMS' PKCS#11 token PIN for 'cpool_nd/cfs':

```

## Troubleshooting

See "[Troubleshooting](#)" on page B-18 for troubleshooting information.



---

## Service Processor Procedures

This appendix describes functions that you can perform on the Service Processor of your KMA. The Service Processor on a Sun Fire X2100 M2 or Sun Fire X2200 M2 system is an Embedded Lights Out Manager (ELOM). The Service Processor on a Netra SPARC T4-1 system or Sun Fire X4170 M2 system is an Integrated Lights Out Manager (ILOM).

The following Server Processor procedures and topics are addressed:

- Configuring ELOM – X2100 M2 or X2200 M2 Servers ("[Configuring ELOM – X2100 M2 or X2200 M2 Servers](#)" on page D-2)
- Verifying ELOM and BIOS levels ("[Verifying ELOM and BIOS Levels](#)" on page D-6)
- Upgrading the ELOM server firmware ("[Upgrading the ELOM Server Firmware](#)" on page D-6)
- Launching the BIOS Setup Utility from the ELOM ("[Launching the BIOS Setup Utility from the ELOM](#)" on page D-7)
- Configuring ILOM – Netra SPARC T4-1 and X4170 M2 Servers ("[Configuring ILOM – Netra SPARC T4-1 and X4170 M2 Servers](#)" on page D-11)
- Verifying ILOM and BIOS levels ("[Verifying ILOM and BIOS Levels - X4170 M2 Only](#)" on page D-15)
- Upgrading the ILOM 3.0 server firmware ("[Upgrading the ILOM 3.0 Server Firmware](#)" on page D-16)
- Upgrading the ILOM 3.2 server firmware ("[Upgrading the ILOM 3.2 Server Firmware](#)" on page D-17)
- Launching the BIOS Setup Utility from the ILOM ("[Launching the BIOS Setup Utility from the ILOM - X4170 M2 Only](#)" on page D-18)
- ILOM security hardening ("[ILOM Security Hardening](#)" on page D-18)
- Configuring the BIOS ("[Configuring the BIOS - X4170 M2 Only](#)" on page D-22)
- Keyboard and monitor attachment to the KMA ("[Keyboard and Monitor Attachment to the KMA](#)" on page D-24).

### ELOM Procedures

The following sections discuss these procedures:

- "[Configuring ELOM – X2100 M2 or X2200 M2 Servers](#)" on page D-2
- "[Verifying ELOM and BIOS Levels](#)" on page D-6

- ["Upgrading the ELOM Server Firmware"](#) on page D-6
- ["Launching the BIOS Setup Utility from the ELOM"](#) on page D-7.

## ELOM Upgrade Overview

Sun Fire X2100 M2 or X2200 M2 server-based KMAs were manufactured for earlier KMS releases with the latest BIOS and ELOM firmware levels that were available at the time. When they were manufactured, some BIOS settings were defined in order to limit access to them. From time to time, newer Sun Fire server firmware is released and upgrades are recommended.

This appendix describes the procedures that should be used in conjunction with the firmware upgrades documented in *Embedded Lights Out Manager (ELOM) Administration Guide for the Sun Fire™ X2200 M2 and Sun Fire X2100 M2 Servers*.

KMAs have specific, non-default, BIOS settings that prevent changes to the BIOS that may compromise security. These settings are saved in the Complementary metal-oxide semiconductor (CMOS). In a default CMOS configuration, a remote user can use the ELOM to change BIOS settings and then boot the KMA from a network device. To minimize this security risk, access to the BIOS settings must be limited. Following the procedures in this document ensures that these settings are retained.

This appendix assumes familiarity with the Oracle Key Manager solution, in particular, the ["Shutting Down the KMA"](#) procedure, and with the ELOM web-based interface and the BIOS Setup Utility.

## Related Documentation

*Embedded Lights Out Manager Administration Guide For the Sun Fire™ X2200 M2 and Sun Fire X2100 M2 Server*

<http://docs.oracle.com/cd/E19121-01/sf.x2200m2/819-6588-14/819-6588-14.pdf>

*Sun Fire™ X2200 M2 Server Product Notes*

<http://docs.oracle.com/cd/E19121-01/sf.x2200m2/819-6601-22/819-6601-22.pdf>

*Sun Fire™ X2100 M2 Server Product Notes*

<http://docs.oracle.com/cd/E19121-01/sf.x2100m2/819-6594-17/819-6594-17.pdf>

## Configuring ELOM – X2100 M2 or X2200 M2 Servers

ELOM for X2100 M2 and X2200 M2 servers contains a separate processor from the main server. As soon as power is applied—by plugging the server in to the power source—and after a one or two minute boot period, the ELOM provides a remote connection to the console.

---

---

**Note:** This section has some basic ELOM commands to configure the server. Refer to the *Embedded Lights Out Manager Administration Guide*, PN: 819-6588-xx, for more information.

---

---

Connect to the KMA through the Embedded Lights Out Manager using either:

- Network connection—LAN 1 NET MGT ELOM interface—(recommended). See ["Using a Network Connection - ELOM"](#) on page 2-2.
- Keyboard and monitor attached to the KMA. See ["Keyboard and Monitor Attachment to the KMA"](#) on page D-24.

---

---

**Note:** Pop-ups prevent windows from launching in the following procedures. Disable the popup blockers before continuing.

---

---

If the window appears, but a console window does not, the Web browser or Java version is incompatible. Upgrade to the latest versions of the browser and Java.

### ELOM Configuration Process

To configure the ELOM for the key management appliance (KMA):

1. Obtain the IP address for LAN 1:

**Important:** Do not connect the power cord. Wait until instructed in Step 7.

2. Using Table D-1 as a reference, connect all cables as required.

**Table D-1 KMA Network Connections - Sun Fire X2100 M2 and X2200 M2 Servers**

Port	Description
LAN 0	<p>This is a <i>required</i> connection.</p> <p>This network is called the “Management Network” and connects to the Oracle Key Manager (OKM), graphical user interface (GUI), to the KMAs in the cluster. This network can be local, remote, or a combination of both.</p> <p><b>Note</b> – Customers are expected to provide the management network.</p>
LAN 1*	This is the network connection for the ELOM.
LAN 2	<p>This is normally a <i>required</i> connection for the tape drives.</p> <p>This network is called the “Service Network” and connects to the tape drives, either directly or through Ethernet switches to create the network.</p>
LAN 3	<p>This is an <i>optional</i> connection with the Oracle Key Manager.</p> <p>This is the “Aggregated Network” connection with NET 2 or LAN 2.</p> <p>Aggregation or IEEE 802.1AX-2008, is a networking term that describes the use of multiple network cables and ports in parallel to increase the link speed and redundancy for higher availability.</p>

---

---

**Note:** The ELOM IP address is most easily configured using a serial connection.

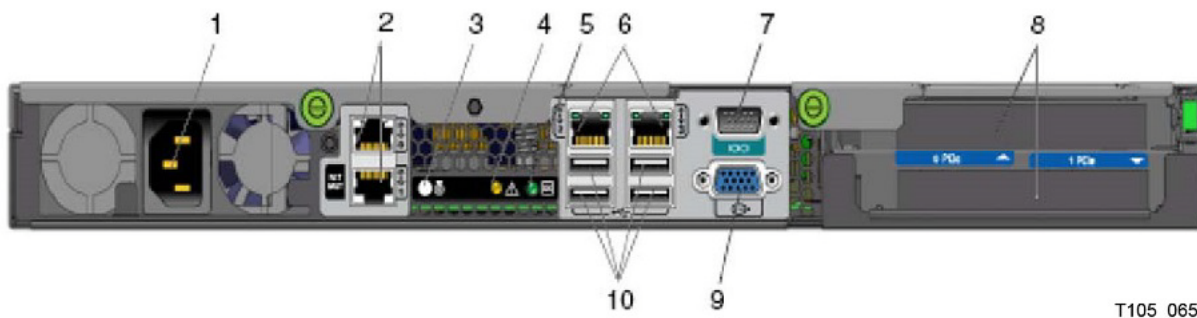
Connect a DB9-to-DB9 serial null modem cable from a laptop PC serial port to the serial port on the server. This is a one time connection for the initial configuration.

---

---

3. Connect a null modem, serial cable to the DB-9 connector (callout 7). Connect the other end to a laptop PC serial port.

**Figure D-1 X2100 M2/X2200 M2 Appliance - Rear Panel**



T105\_065

- 1 - Power connector
  - 2 - Ethernet connectors (2) Upper = Management Network (LAN 0) Lower = ELOM (LAN 1)
  - 3 - System Identification LED
  - 4 - Fault LED
  - 5 - Power LED
  - 6 - Ethernet connections (2) Left = Service Network (LAN 2) Right = Aggregated Network (LAN 3)
  - 7 - Serial port (DB9, RS232)
  - 8 - PCIe slots Top = SCA 6000 card (not shown) Bottom = Blank (empty)
  - 9 - VGA connector
  - 10 - USB 2.0 ports (4)
4. Start a HyperTerminal session on the laptop. This allows you to watch the boot process.
  5. Verify the default settings are:
    - 8-bits
    - No Parity
    - 1 stop-bit
    - 9600 baud rate
  6. Disable both hardware (CTS/RTS) and software (XON/XOFF) flow control.
  7. Connect the server power cord to the power source.  
Important: Do not power-on the server.  
The ELOM starts as soon as power is connected, even if the server is powered-off. This is the reason for preparing and connecting the PC before applying power.
  8. Once the boot completes, the ELOM login prompt will be displayed.
    - a. Press [Enter] a few times to get the ELOM login prompt.
    - b. Log in using:
      - Userid = root
      - Password = changeme
  9. Using the following table as a reference, configure the ELOM IP address.

Description	First KMA			Second KMA		
	Hostname	IP Address / Netmask	DHCP? <sup>1</sup>	Hostname	IP Address / Netmask	DHCP? <sup>1</sup>
LAN 0 / NET 0 = Management			Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>
LAN 1 / NET MGT = ELOM / ILOM			Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>
LAN 2 / NET 2 = Service			Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>
LAN 3 / NET 3 = Aggregated			Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>
Using IPv6 Addressing	Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>		
KMA Name						
Gateway						
DNS Server	Hostname: IP address:			Hostname: IP address:		
Security Officer	Login: Passphrase:			Login: Passphrase:		
Root account Passphrase	Login: Passphrase:			Login: Passphrase:		
ELOM / ILOM Passphrase	Login: Passphrase:			Login: Passphrase:		
Key Split Credentials <sup>2</sup>						
Autonomous Unlocking <sup>3</sup>						
Keyboard Type						
<p>1. Addresses assigned using DHCP <b>must be static</b>. The system cannot handle DHCP server changing the IP addresses once assigned.</p> <p>2. Configuration: M of N, where M is minimum threshold and N is the size of key split configuration (at least 2). List key split users (and passphrases).</p> <p>3. Autonomous Unlocking allows the KMA to enter a fully operational state after a hard or soft reset without requiring the entry of a quorum of passphrases using the OKM Manager. This information should not be written down and should be entered by the person to which they belong. These entries can be changed; so it may be desirable to enter something simple during the configuration, then change it later using the GUI immediately after the KMA is configured.</p>						

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10. Enter the following commands.

**Note:** These commands are case sensitive.

```
set /SP/AgentInfo DhcpConfigured=disable
set /SP/AgentInfo IpAddress=ipaddress
set /SP/AgentInfo NetMask=netmask
set /SP/AgentInfo Gateway=gateway
reset
```

An informational command you can use is: show /SP/SystemInfo/CtrlInfo.

11. Log off of the ELOM and exit.

12. Go to "Using a Network Connection - ELOM" on page 2-2 to continue the installation.

## Verifying ELOM and BIOS Levels

Log in to the ELOM and verify the type of KMA you have and that the levels match the latest levels documented for your server type. The various ELOM Service Processor and BIOS firmware levels are documented in the Server Product Notes for each server type. ELOM and BIOS firmware are packaged together as “server software.”

The firmware versions shown in [Table D-2](#) can be used to determine what type of KMA server you're connected to using the ELOM. To check the firmware levels on the ELOM Web-based interface, select System Information > Version > SP Board Information > Server Board Information.

**Table D-2 ELOM/BIOS Firmware Levels**

Server Type	Server Software	BIOS Level	ELOM Level	Product Notes
X2100 M2	1.8	3A21	3.24	Sun Fire X2100 M2 Product Notes
X2200 M2	2.2.1	3D16	3.23	Sun Fire X2200 M2 Product Notes

Note: Product Notes can be found on <http://docs.oracle.com/cd/E19121-01/index.html> and server software can be downloaded from the My Oracle Support site (<http://support.oracle.com>).

If firmware levels are correct, then there is nothing to do. Proceed with the following instructions if the firmware is down level, an upgrade is recommended.

**TIP:** The firmware file you need for the upgrade can be found at the above URL in the remoteflash\_x.y.zip file, where x.y refers to the Tools and Drives release number as documented in the appropriate Product Notes.

## Upgrading the ELOM Server Firmware

The following procedure takes about 10 minutes to complete and should be scheduled appropriately because the KMA being upgraded need to be disconnected from the cluster.

1. Login into the ELOM using the Web-based interface. You must have administrator privileges to perform the firmware upgrades.
2. To avoid trouble with Service Processors that may be in an error state begin by resetting the service processor.
  - a. Click on the “Maintenance” tab, then the “Reset SP” tab and then the “Reset SP” button.
  - b. Log out and then log back into the ELOM Web-based interface. If necessary, the reset can be performed using the serial interface and CLI to the ELOM, then log back into the ELOM Web based interface.
3. Disable Session Time-out (System Information tab > Session Time-Out tab).
4. For new installs, or FRU situations, prior to QuickStart you should power down using the ELOM Web Interface's Remote Control tab,
5. Select the Remote Power Control tab and then choose the action to Graceful Shutdown. Save this choice to have the server shutdown.
6. For KMAs that have already been configured (QuickStart procedure), log into the OKM Console as an Operator and select the "Shutdown KMA" menu option to shutdown the KMA.



Follow the *ELOM Administration Guide* procedures for the Web-based interface for Firmware Upgrade and Select Option B in Step 4.

Do not use the CLI procedures documented in the *ELOM Administration Guide* as Option A is used by default and your BIOS settings will revert to defaults, exposing the KMA to BIOS related attacks.

**Important:**

The following has been extracted from the Server Product Notes. Failure to observe these warnings can corrupt the BIOS:

The SP/BIOS flash process includes a "Update Successful" message when the SP flash process ends. This message signals the end of the SP flash activity only. At this point in the process the BIOS is not flashed, and interrupting the process might corrupt the BIOS.

To avoid corrupting the BIOS review the flash sequence below:

- SP begins the flash process.
  - SP completes the flash process.
  - CLI returns an Update Successful message.
  - The system reboots and the BIOS begins the flash process.
7. Logout from the ELOM and log back in and verify that the SP and BIOS firmware levels are at the correct level (System Information tab > Version tab).

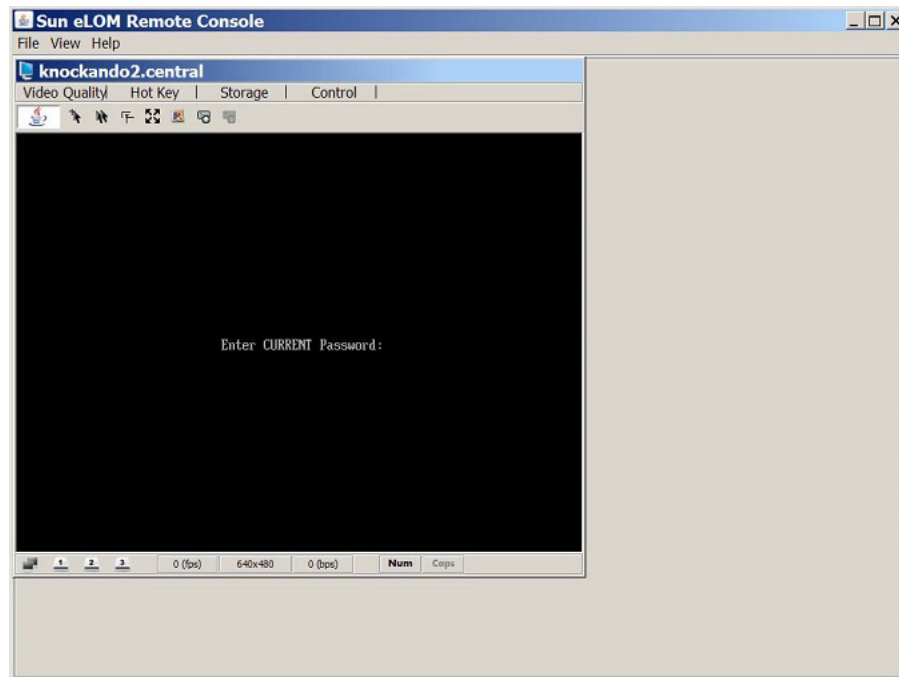
BIOS settings revert to default values when the ELOM firmware is upgraded. You should limit access to the KMA by launching the BIOS Setup Utility and changing some of the BIOS settings. See "[Launching the BIOS Setup Utility from the ELOM](#)" on page D-7 and "[ILOM Configuration and Security Hardening](#)" on page D-18.

## Launching the BIOS Setup Utility from the ELOM

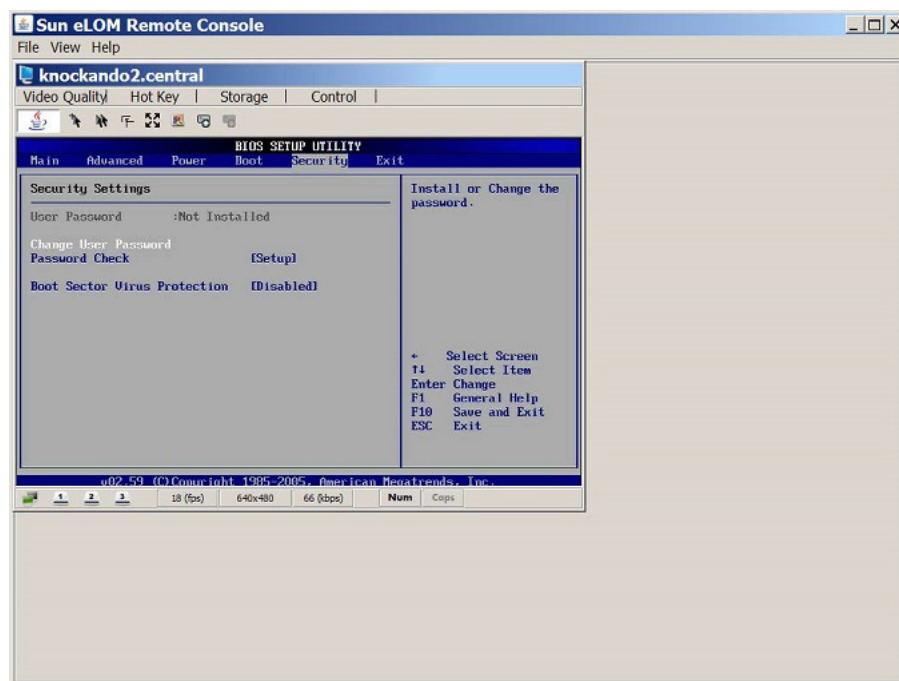
1. Log into the ELOM web-based interface and navigate as follows:

Remote Control tab > Remote Power Control tab >  
Boot option: BIOS Setup

2. Save this choice to have the server booted. During the boot, the normal boot message appears on the console followed by the launch of the BIOS Setup Utility. Proceed to "[Configuring the BIOS - X4170 M2 Only](#)" on page D-22 to verify and update BIOS settings.

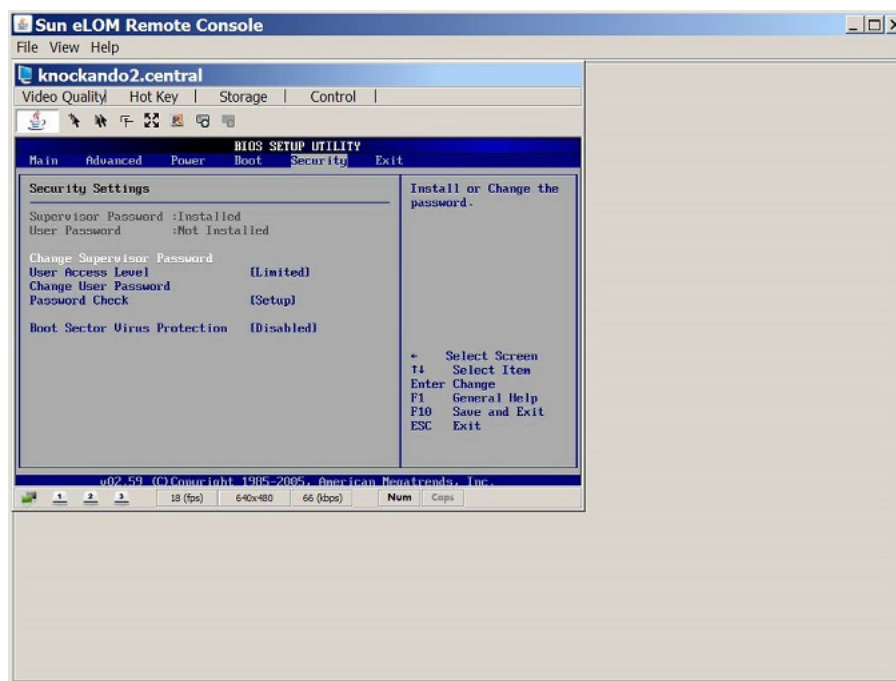


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If the ability to change the supervisor password is displayed, as shown below, then the BIOS default settings are in effect and you should follow the troubleshooting procedure below.



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## ILOM Procedures

The following sections discuss these procedures:

- ["Configuring ILOM – Netra SPARC T4-1 and X4170 M2 Servers"](#) on page D-11
- ["Verifying ILOM and BIOS Levels - X4170 M2 Only"](#) on page D-15
- ["Upgrading the ILOM 3.0 Server Firmware"](#) on page D-16
- ["Launching the BIOS Setup Utility from the ILOM - X4170 M2 Only"](#) on page D-18
- ["ILOM Security Hardening"](#) on page D-18.

## ILOM Upgrade Overview

Netra SPARC T4-1 and Sun Fire X4170 M2 server-based KMAs have been manufactured with the latest ILOM firmware level that was available at the time. From time to time, newer Sun Fire server firmware is released and upgrades are recommended.

---

**Note:** X4170 M2 KMAs run ILOM 3.0 or later, while Netra SPARC T4-1 KMAs run ILOM 3.2 or later. ILOM 3.2 is included in server firmware 8.3 or later. You can view the current server firmware from the ILOM.

---

Check the server firmware level an OKM 3.0 KMA when it is first delivered. If it is not at 8.3 or later, upgrade it to 8.3 before powering up the system.

---

This information describes the procedures that should be used in conjunction with the firmware upgrade procedures documented in:

- For the X4170 M2 server: *Oracle Integrated Lights Out Manager (ILOM) 3.0 Maintenance and Diagnostics – CLI and Web Guide*.
- For the Netra SPARC T4-1 server: *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 3.2*

The KMA has specific, non-default, BIOS settings that prevent changes to the BIOS that may compromise security. These settings are saved in the CMOS. In a default CMOS configuration, a remote user can use the ILOM to change BIOS settings and then boot the KMA from a network device. To minimize this security risk, access to the BIOS settings must be limited. Following the procedures in this document will ensure that these settings are retained.

---

**Note:** Netra SPARC T4-1 servers do not include a BIOS; there are no BIOS procedures for users to follow.

---

This appendix assumes familiarity with the Oracle Key Manager solution, in particular, the "[Shutting Down the KMA](#)" procedure, and with the ILOM web-based interface and the BIOS Setup Utility.

## Related Documentation

These documents pertain to ILOM versions required for the Netra SPARC T4-1 server (ILOM 3.2) or the Sun Fire X4170 M2 server (ILOM 3.0).

### ILOM 3.0

*Oracle Integrated Lights Out Manager (ILOM) 3.0 Maintenance and Diagnostics – CLI and Web Guide*

<http://docs.oracle.com/cd/E19860-01/E21449/E21449.pdf>

### ILOM 3.2

*Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 3.2*

[http://docs.oracle.com/cd/E37444\\_01/pdf/E37446.pdf](http://docs.oracle.com/cd/E37444_01/pdf/E37446.pdf)

*Oracle ILOM User's Guide for System Monitoring and Diagnostics Firmware Release 3.2.1*

[http://docs.oracle.com/cd/E37444\\_01/pdf/E37447.pdf](http://docs.oracle.com/cd/E37444_01/pdf/E37447.pdf)

*Oracle ILOM Quick Reference for CLI Commands Firmware Release 3.2.1*

[http://docs.oracle.com/cd/E37444\\_01/pdf/E37448.pdf](http://docs.oracle.com/cd/E37444_01/pdf/E37448.pdf)

### Netra SPARC T4-1

*Oracle ILOM Feature Updates and Release Notes Firmware Release 3.2*

[http://docs.oracle.com/cd/E37444\\_01/pdf/E37450.pdf](http://docs.oracle.com/cd/E37444_01/pdf/E37450.pdf)

*Oracle Netra SPARC T4-1 Server Product Notes*

[http://docs.oracle.com/cd/E23203\\_01/pdf/E23208.pdf](http://docs.oracle.com/cd/E23203_01/pdf/E23208.pdf)

*Oracle Netra SPARC T4-1 Server Installation Guide*

[http://docs.oracle.com/cd/E23203\\_01/pdf/E23205.pdf](http://docs.oracle.com/cd/E23203_01/pdf/E23205.pdf)

## Sun Fire X4170 M2

*Sun Fire™ X4170 M2 and X4270 M2 Servers Product Notes*

<http://docs.oracle.com/cd/E19762-01/E22382/E22382.pdf>

*Sun Fire™ X4170, X4270, and X4275 Servers Service Manual*

<http://docs.oracle.com/cd/E19477-01/820-5830-13/820-5830-13.pdf>

## Configuring ILOM – Netra SPARC T4-1 and X4170 M2 Servers

ILOM for the Netra SPARC T4-1 and X4170 M2 servers contains a separate processor from the main server. As soon as power is applied—by plugging the server in to the power source—and after a one or two minute boot period, the ILOM provides a remote connection to the console.

---

---

**Note:** This section has some basic ILOM commands to configure the server. Refer to the Integrated Lights Out Manager Administration Guide, PN: 820-0280-12, for more information.

---

---

Connect to the KMA through the Integrated Lights Out Manager using either:

- Network connection—NET MGT ILOM interface—(recommended). See ["Using a Network Connection - ILOM"](#) on page 2-5.
- Keyboard and monitor attached to the KMA. See ["Keyboard and Monitor Attachment to the KMA"](#) on page D-24.

---

---

**Note:** Pop-ups prevent windows from launching in the following procedures. Disable the popup blockers before continuing.

---

---

If the window appears, but a console window does not, the Web browser or Java version is incompatible. Upgrade to the latest versions of the browser and Java.

### ILOM Configuration Process

To configure the ILOM for the key management appliance (KMA):

1. Obtain the IP address for the ILOM.
2. Using the following table, connect all cables as required. **Important: Do not connect the power cord. Wait until instructed in Step 6.**

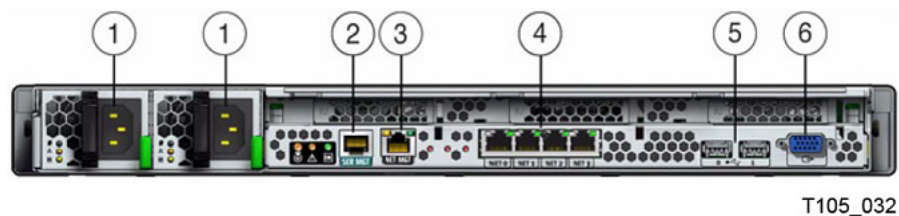
**Table D–3 KMA Network Connections -- Netra SPARC T4-1 and Sun Fire X4170 M2 Servers**

Port	Description
SER MGT	The SER MGT RJ-45 port provides a serial connection to the ILOM. The ILOM IP address is most easily configured using this serial connection.
NET MGT	The NET MGT RJ-45 port provides an optional Ethernet connection to the ILOM. This port is not available until you configure the ILOM IP address.
NET 0	The NET 0 RJ-45 port is a required connection to the Management Network. This network connects the server to the Oracle Key Manager GUI as well as to other KMAs in the cluster. The Management Network can be local, remote, or a combination of both.  <b>Note</b> – Customers are expected to provide the management network.

**Table D-3 (Cont.) KMA Network Connections -- Netra SPARC T4-1 and Sun Fire X4170 M2 Servers**

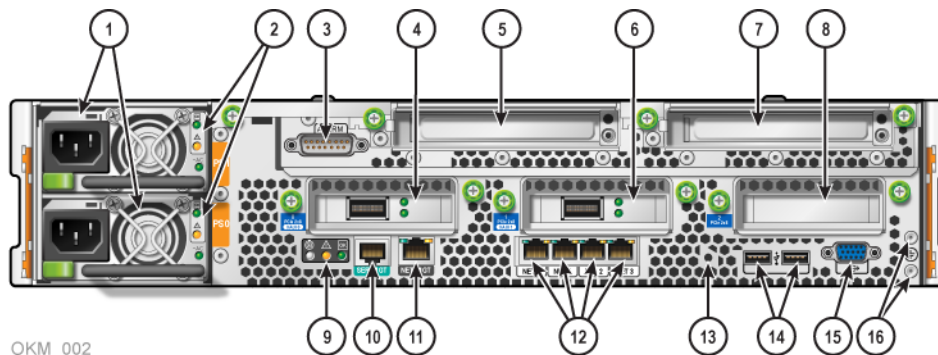
Port	Description
NET 2	The NET 2 RJ-45 port is a required connection to the Service Network. This network connects the server to the tape drives, either directly or through Ethernet switches, to create the network.
NET 3	The NET 3 RJ-45 port is an optional connection to the Aggregated Network and provides aggregation with NET 2.  Aggregation, or IEEE 802.1AX-2008, is a networking term that describes using multiple network cables and ports in parallel to increase the link speed and redundancy for higher availability.

3. Connect a null modem, serial cable to the SER MGT port (callout 2 for the Sun Fire X4170 M2 server, callout 10 for the Netra SPARC T4-1 server). Connect the other end to a laptop PC serial port.

**Figure D-2 X4170 M2 Server Rear Panel**

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- 1 - AC Power connectors
- 2 - Serial Management (SER MGT) RJ-45 serial port
- 3 - Service processor (NET MGT) port (also known as the ILOM and corresponds to LAN1 on the SunFire X2100 or X2200 servers)
- 4 - Ethernet ports (0, 1, 2, 3), labeled Net0 through Net3, from left to right
- 5 - USB ports (0, 1)
- 6 - Video connector (VGA)

**Figure D-3 Netra SPARC T4-1 Server Rear Panel**

OKM\_002

- 1 - Power supplies (PS1 - PS0 top to bottom) (AC supplies shown)
- 2 - Power supply status LEDs:
  - OK (output): green

- Service Action Required: amber
- AC or DC (input power): green
- 3 - Alarm port
- 4 - Expansion slot 0 (PCIe 2.0 x8 or XAUI)
- 5 - Expansion slot 3 (PCIe 2.0 x8)
- 6 - Expansion slot 1 (PCIe 2.0 x8 or XAUI)
- 7 - Expansion slot 4 (PCIe 2.0 x8)
- 8 - Expansion slot 2 (PCIe 2.0 x8)
- 9 - Service LEDs:
  - Locator LED/Locator button: white
  - Service Action Required LED: amber
  - Main Power/OK LED: green
- 10 - SER MGT RJ-45 serial port
- 11 - NET MGT RJ-45 network port
- 12 - Network 10/100/1000 ports (NET0 to NET3) for host
- 13 - Physical Presence button access hole
- 14 - USB 2.0 ports (USB 0, USB 1)
- 15 - Video connector (HD-15)
- 16 - Grounding studs

---

**Note:** A connection to the NET MGT interface is required to initially configure the server.

---

4. Start a HyperTerminal session on the laptop. This allows you to watch the boot process.
5. Verify the default settings are:
  - 8-bits
  - No Parity
  - 1 stop-bit
  - 9600 baud rate
  - Disable both hardware (CTS/RTS) and software (XON/XOFF) flow control
6. Connect the server power cord to the power source.  
 Important: Do not power-on the server.  
 The ILOM starts as soon as power is connected, even if the server is powered-off. This is the reason for preparing and connecting the PC before applying power.
7. Once the boot completes, the ILOM login prompt will be displayed.
  - a. Press [Enter] a few times to get the ILOM login prompt.
  - b. Log in using:

- Userid = root
  - Password = changeme
8. Using [Figure D-4, "ILOM Initial Configuration Settings"](#) as a reference, configure the ILOM IP address.

**Figure D-4 ILOM Initial Configuration Settings**

Description	First KMA			Second KMA								
	Hostname	IP Address / Netmask	DHCP? <sup>1</sup>	Hostname	IP Address / Netmask	DHCP? <sup>1</sup>						
LAN 0 / NET 0 = Management			Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>						
LAN 1 / NET MGT = ELOM / ILOM			Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>						
LAN 2 / NET 2 = Service			Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>						
LAN 3 / NET 3 = Aggregated			Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>						
Using IPv6 Addressing	Yes <input type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>								
KMA Name												
Gateway												
DNS Server	Hostname: IP address:			Hostname: IP address:								
Security Officer	Login: Passphrase:			Login: Passphrase:								
Root account Passphrase	Login: Passphrase:			Login: Passphrase:								
ELOM / ILOM Passphrase	Login: Passphrase:			Login: Passphrase:								
Key Split Credentials <sup>2</sup>												
Autonomous Unlocking <sup>3</sup>												
Keyboard Type												
1. Addresses assigned using DHCP <b>must be static</b> . The system cannot handle DHCP server changing the IP addresses once assigned.												
2. Configuration: M of N, where M is minimum threshold and N is the size of key split configuration (at least 2). List key split users (and passphrases).												
3. Autonomous Unlocking allows the KMA to enter a fully operational state after a hard or soft reset without requiring the entry of a quorum of passphrases using the OKM Manager. This information should not be written down and should be entered by the person to which they belong. These entries can be changed; so it may be desirable to enter something simple during the configuration, then change it later using the GUI immediately after the KMA is configured.												

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9. Enter the following commands.

---

**Note:** These commands are case sensitive.

---

```
show /SP/network
set /SP/network/ pendingipdiscovery=static
set /SP/network/ pendingipaddress=ipaddress
set /SP/network/ pendingipnetmask=netmask
set /SP/network/ pendingipgateway=gateway
set /SP/network/ commitpending=true
```



10. On a Netra SPARC T4-1 server, enter the following commands to set the auto-boot property:

---

**Note:** In the following example, there is a space after the question mark but not before it. These commands are case sensitive.

---

```
show /HOST/bootmode
set /HOST/bootmode script="setenv auto-boot? true"
show /HOST/bootmode
```

11. Log off of the ILOM and exit.
12. Go to ["Using a Network Connection - ILOM"](#) on page 2-5 to continue the installation.

## Verifying ILOM and BIOS Levels - X4170 M2 Only

Log into the ILOM and verify the type of KMA you have and the levels match the latest levels documented for your server type. These firmware versions can be used to determine what type of KMA server you're connected to through the ILOM. To check the firmware levels on the ILOM Web Based Interface, select System Information > Overview.

---

**Note:** Netra SPARC T4-1 servers do not have a BIOS; there are no BIOS procedures for users to follow.

---

The expected ILOM and BIOS firmware levels vary across OKM releases, as shown in the following table.

**Table D-4 ILOM/BIOS Firmware Levels**

Server Firmware	ILOM Firmware Level	BIOS Firmware Level	OKM Release
8.3.0.c (Netra SPARC T4-1)	3.2.1.1.c (Netra SPARC T4-1)	NA	3.0
1.7.1 (X4170 M2)	3.1.2.20.a (X4170 M2)	08.14.01.03 (X4170 M2 only)	
1.6.1	3.0.16.10.d	08.12.01.04	2.5.x
1.3	3.0.14.11.a	08.06.01.08	2.3.1, 2.4, 2.5
1.2	3.0.9.27	08.04.01.10	2.3

If the ILOM and BIOS firmware levels are correct (for example, those for server firmware 1.6.1 with OKM 2.5.x), then you do not have to do anything. If not, proceed with the following instructions if the firmware is down level and you need to upgrade.

Follow this procedure to download both Netra SPARC T4-1 and Sun Fire X4170 M2 firmware from My Oracle Support:

1. Go to My Oracle Support at: <http://support.oracle.com> and sign in.
2. Click the Patches & Updates tab.
3. Click Product or Family (Advanced).

4. In the Start Typing... field, type in the product information (for example, "Netra" or "X4170"), and click Search to see the latest firmware for each release.

The firmware distribution is packaged as a .zip file. After you download this file, extract it and then extract the firmware package.zip file that it contains (if any). The firmware package is in a .pkg file. You upload this file during the upgrade procedure outlined below.

## Upgrading the ILOM 3.0 Server Firmware

The following procedure takes about 10 minutes to complete and should be scheduled appropriately since the KMA being upgraded will be disconnected from the cluster.

1. Log into the ILOM using the Web based interface. You must have administrator privileges to perform the firmware upgrades.
2. To avoid trouble with service processors that may be in an error state begin by resetting the service processor.
  - a. Click on the "Maintenance" tab, then the "Reset SP" tab and then the "Reset SP" button.
  - b. Log out and then log back into the ILOM Web based interface. If necessary, the reset can be performed using the serial interface and CLI to the ILOM, then log back into the ILOM Web based interface.
3. Set the Session Time-out value to 3 hours (System Information tab, then Session Timeout tab).
4. Shut down the server.
  - a. For new installs, or FRU situations, prior to QuickStart you should power down using the ILOM Web Interface's Remote Control tab, select the Remote Power Control tab and then choose the Graceful Shutdown and Power Off action. Save this choice to have the server shut down.
  - b. For KMAs that have already been configured (QuickStart procedure), log into the OKM Console as an Operator and select the "Shutdown KMA" menu option to shut down the KMA.
5. Follow the procedures in the "Updating Firmware" chapter of the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Maintenance and Diagnostics – CLI and Web Guide*. On Step 6, set the "Preserve Configuration" option to retain the network configuration and other ILOM settings, and clear the "Delay BIOS upgrade until next server poweroff" option.
6. Log out of the ILOM and log back in. Verify that the SP and BIOS firmware levels are at the correct level (System Information tab, then Overview tab). If the BIOS level is still shown at the previous level, shut down the KMA as described in Step 4, and then power it up again by choosing the Power On action from the Remote Power Control tab.
7. Select the BIOS firmware level again (System Information tab > Overview tab).

BIOS settings revert to default values when the ILOM firmware is upgraded. You should limit access to the KMA by launching the BIOS Setup Utility and changing some of the BIOS settings. See ["Launching the BIOS Setup Utility from the ILOM - X4170 M2 Only"](#) on page D-18 and ["ILOM Configuration and Security Hardening"](#) on page D-18.

## Upgrading the ILOM 3.2 Server Firmware

The firmware update process takes several minutes to complete. During this time, do not perform any other ILOM tasks. When the firmware update process completes, the system will reboot.

Be sure you have met the initial requirements for the upgrade. Refer to “Before You Begin the Firmware Update” in the *Oracle ILOM Administrator’s Guide for Configuration and Maintenance*.

1. Log into the ILOM using the Web based interface. You must have administrator privileges to perform the firmware upgrades.
2. To avoid trouble with service processors that may be in an error state begin by resetting the service processor.
  - a. Click ILOM Administration > Maintenance > Reset SP and then click the Reset SP button.
  - b. Log out and then log back into the ILOM Web based interface. If necessary, the reset can be performed using the serial interface and CLI to the ILOM, then log back into the ILOM Web based interface.
3. Set the Session Time-out value to 3 hours (System Information tab, then Session Timeout tab).
4. Shut down the server.

For new installs, or FRU situations, prior to QuickStart you should power down using the ILOM Web Interface's Remote Control tab, select the Remote Power Control tab and then choose the Graceful Shutdown and Power Off action. Save this choice to have the server shut down.

For KMAs that have already been configured (QuickStart procedure), log into the OKM Console as an Operator and select the “Shutdown KMA” menu option to shut down the KMA.

---

**Note:** The process for upgrading the firmware is discussed in detail in “Update the Server SP or CMM Firmware Image” in the *Oracle ILOM Administrator’s Guide for Configuration and Maintenance*.

---

5. Click ILOM Administration > Maintenance > Firmware Upgrade.
6. Click the **Enter Firmware Upgrade Mode** button, then click **OK** in the upgrade confirmation dialog box to proceed.
7. In the Firmware Upgrade page, either click **Browse** to specify the firmware to upload or enter a URL to upload the firmware.
8. Click **Upload**.
9. In the Firmware Verification page, enable the Preserve Configuration option.
10. Click **Start**.
11. Click **OK** to proceed through a series of prompts. The Update Status page is displayed.

The system automatically reboots when the Update Status is 100 percent complete.

12. If you want to verify that the updated firmware has been installed, click **System Information > Firmware**.

## Launching the BIOS Setup Utility from the ILOM - X4170 M2 Only

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**Note:** Netra SPARC T4-1 servers do not include a BIOS; there are no BIOS procedures for users to follow.

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1. Log into the ILOM web-based interface. Follow (or navigate) to:  
Remote Control > Redirection  
and click Launch Redirection to launch the Remote Console.
2. Follow (or navigate) to  
Remote Control > Remote Power Control  
select Power Up, and click SAVE to reboot the system.
3. In the Remote Console, monitor normal boot messages. When the American Megatrends screen appears, press the F2 key to launch the BIOS Setup Utility.  
Use "ILOM Security Hardening" on page D-18 when you want to harden the ILOM. The table below is organized as displayed in the ILOM Web Interface using ":" to delimit the tab names presented by the ILOM web interface.

### ILOM Security Hardening

To further secure the KMA, customers may choose to update some of the ILOM settings. Table D-5 lists each navigational point in the ILOM web-based interface and identifies any recommended changes in that screen. Table D-6 shows additional considerations for security hardening.

**Table D-5 ILOM Configuration and Security Hardening**

Navigational Point	Recommended Changes
System Information: Overview	Nothing is prescribed as this is not a configuration screen.
System Information: Components	Nothing is prescribed as this is not a configuration screen.
System Information: Fault Management	Nothing is prescribed as this is not a configuration screen.
System Information: Identification Information	SP System Identifier – assign a meaningful name per customer policy. SP Contact – customer contact information SP Location – physical rack, or other, used to locate the server. The "Physical Presence Check" should be enabled (default setting).
System Information: Banner Messages	Changing the banner settings to contain the product name is recommended so that users of the ILOM are aware that the key management appliance is not a generic Sun Fire X4170 M2 server. Add a connect message, for example: "Oracle Key Manager ILOM Connect" Add a login message, for example: "Oracle Key Manager ILOM"
System Information: Session Timeout	Nothing is prescribed as this setting is for the current session only.
System Information: Versions	Nothing is prescribed as this is not a configuration screen.

**Table D–5 (Cont.) ILOM Configuration and Security Hardening**

<b>Navigational Point</b>	<b>Recommended Changes</b>
<b>System Monitoring: Sensor Readings, Indicators and Event Logs</b>	Nothing is prescribed as these are not configuration screens.
<b>Power Management: Consumption</b>	No specific changes are recommended for KMAs.
<b>Power Management: Limit</b>	The OKM has only been tested using the default power policy, so no specific changes are recommended for KMAs.
<b>Power Management: Allocation</b>	Nothing is prescribed as this is not a configuration screen.
<b>Power Management: History</b>	Nothing is prescribed as this is not a configuration screen.
<b>Storage</b>	Nothing is prescribed as this is not a configuration screen, the KMAs do not ship with RAID controllers.
<b>Configuration: System Management Access: Web Server</b>	No specific changes are recommended for KMAs, although a security best practice is to change the default port number for HTTPS.
<b>Configuration: System Management Access: SSL Certificates</b>	The ILOM uses a default certificate but supports loading an alternate certificate with its corresponding private key for stronger authentication.
<b>Configuration: System Management Access: SNMP Management</b>	For “Settings” the use of <b>SNMPv3 protocol is recommended</b> (v1 and v2c can be disabled) and “Set Requests” can be disabled to prevent configuration changes from happening via SNMP.  Refer to the Oracle Integrated Lights Out Manager Management Protocols Reference Guide for details.
<b>Configuration: System Management Access: SSH Server Settings</b>	No specific changes are recommended for KMAs.
<b>Configuration: System Management Access: IPMI</b>	This service should be disabled if there are no plans to use IPMI. Leaving this interface open exposes the KMA to reboots, that is, denial of service, from attackers knowledgeable of IPMI.
<b>Configuration: System Management Access: CLI</b>	Configure the session timeout as the default allows CLI sessions to remain open indefinitely.
<b>Configuration: System Management Access: WS-Man</b>	This service can be disabled if there are no plans to use WS-Management and CIM. Leaving this interface open exposes the KMA to attackers knowledgeable of the WS-Management protocol.
<b>Configuration: Alert Management</b>	No KMA specific changes are prescribed.
<b>Configuration: Network</b>	No KMA specific changes are prescribed.  <b>Note:</b> The OKM has not been tested using ILOM sideband management. Configuration for sideband management is described in the <i>Oracle ILOM 3.0 Supplement for X4170 M2 and X4270 M2 Servers</i> .
<b>Configuration: DNS</b>	No KMA specific changes are prescribed.  Auto DNS using DHCP may be disabled if there are no plans to use it.
<b>Configuration: Serial Port</b>	No KMA specific changes are prescribed.
<b>Configuration: Clock</b>	The ILOM SP clock is not synchronized with the host clock on a Sun Fire X4170 M2 server. So that ILOM events can be correlated with server events, the ILOM date and time should be set manually to UTC/GMT time or configured to synchronize with external NTP servers, preferably the same NTP servers to be used for the KMA server during QuickStart. Refer to the <i>Oracle Key Manager Administrator Guide</i> .
<b>Configuration: Timezone</b>	The ILOM timezone should be “GMT”.

**Table D–5 (Cont.) ILOM Configuration and Security Hardening**

<b>Navigational Point</b>	<b>Recommended Changes</b>
<b>Configuration: Syslog</b>	ILOM syslog forwarding pertains to the forwarding of ILOM alerts and not to the syslog events of the KMA server. The KMA, that is, the server in the ILOM documentation, syslog facility is not configurable. However, KMA syslog events may be viewed when examining a KMA system dump. Refer to the <i>Oracle Key Manager Administrator Guide</i> , for information on retrieving KMA system dumps.
<b>Configuration: SMTP Client</b>	No KMA specific changes are prescribed.
<b>Configuration: Policy</b>	Both Policies should use the defaults, disabled.
<b>User Management: Active Sessions</b>	No KMA specific changes are prescribed, not a configuration screen.
<b>User Management: User Accounts</b>	Use of user accounts and roles is recommended over just the default root account. Refer to the “User Account Management” section in the <i>Oracle ILOM 3.0 Concepts Guide</i> .
<b>User Management: LDAP, LDAP/SSL, RADIUS, Active Directory</b>	No KMA specific changes are prescribed. These services can all remain disabled.
<b>Remote Control: Redirection</b>	Launch Remote Console – This will be the typical means for accessing the KMA console. Once the console launches the default Devices, Keyboard and Video settings should be used. Storage Redirection - No KMA specific usage recommendations are prescribed.
<b>Remote Control: KVMS</b>	KVMS Settings – use the default settings Host Lock Settings – Leave this disabled.
<b>Remote Control: Remote Power Control</b>	Reset - Whenever possible it is preferable to use the corresponding OKM Console option to reboot the KMA as this provides an OKM audit entry Immediate Power Off – Avoid this whenever possible. Graceful Shutdown and Power Off - Whenever possible it is preferable to use the corresponding OKM Console options to shutdown the KMA as this provides an OKM audit entry. Power On – as needed Power Cycle – As needed. In some cases a Power Cycle is necessary for recovery of the KMA’s SCA 6000 card.
<b>Remote Control: Diagnostics</b>	Run Diagnostics On Boot – use the default(disabled) unless trouble shooting server hardware problems. Generate NMI – unnecessary but should have no noticeable affect on the KMA.
<b>Remote Control: Host Control</b>	The setting for “Next Boot Device” should be “Default (Use BIOS Settings)”. Other settings are not recommended for the KMA.
<b>Maintenance: Firmware Upgrade</b>	ILOM firmware should be kept up to date and updated as described in the <i>Oracle ILOM 3.0 Concepts Guide</i> , <i>Oracle ILOM 3.0 Getting Started Guide</i> , <i>Oracle ILOM 3.0 CLI Procedures Guide</i> or <i>Oracle ILOM 3.0 Web Interface Procedures Guide</i> . The KMA should be shut down prior to upgrading ILOM firmware as a precaution. Customers should establish a policy for verifying ILOM firmware on a regular basis and upgrading during system maintenance windows.
<b>Maintenance: Backup/Restore</b>	ILOM 3.0 supports backup and restore of the ILOM configuration. A good best practice is to configure the ILOMs on all KMAs with similar settings and to create a backup once a suitable configuration has been obtained. Refer to the “Configuration Management Tasks” section in the <i>Oracle ILOM 3.0 Concepts Guide</i> .

**Table D–5 (Cont.) ILOM Configuration and Security Hardening**

Navigational Point	Recommended Changes
Maintenance: Reset SP	Nothing is prescribed as this is not a configuration screen.
Maintenance: Configuration Management	Only use this as necessary to reset the ILOM to defaults. Refer to the “Reset to Defaults Feature” section in the <i>Oracle ILOM 3.0 Concepts Guide</i> .
Maintenance: Snapshot	Use the Snapshot facility as requested by Oracle service.

**Table D–6 Other ILOM Considerations**

Navigational Point	Consideration
SSL v2, SSL v3 and TLS 1.0	It is currently not possible to disable use of SSLv2 so security scanning tools will report this vulnerability.
Monitoring	The ILOM has a variety of monitoring features. It is recommended that users consider the most appropriate facility for monitoring alerts originating from the KMA's ILOM service processor. Refer to the System Monitoring and Alert Management section in the <i>Oracle ILOM 3.0 Concepts Guide</i> . ILOM System Monitoring in conjunction with the KMA's SNMP audit events are recommended for staying abreast of hardware and software events that may affect KMA availability.
BIOS Upgrades	BIOS firmware is upgraded whenever ILOM SP firmware is upgraded. This applies to Sun Fire X4170 M2 servers only. Refer to the <i>Sun Fire X4170 M2 Server Service Manual</i> .
Interoperability with Oracle Management Tools and 3rd Party Tools	<p>Both the Sun Fire 4170 M2 Installation Guide section on “Managing Your Server” and the “Overview” section in Oracle ILOM 3.0 Concepts Guide mention integration with Oracle and 3rd party management tools. The following disclaimers are noted:</p> <p>The OKM has not been integrated with Oracle Enterprise Manager Ops Center, a.k.a. Sun xVM Ops Center, although ILOM firmware upgrades and system monitoring could likely be performed via this tool.</p> <p>Interoperability testing with Sun Management Center has not been performed. The Sun Server Hardware Management Pack is not supported nor is it pre-installed on the KMA. Consequently, the components provided through this tool are not available for system monitoring. This tool is also referenced in Oracle ILOM 3.0 Supplement for X4170 M2 and X4270 M2 Servers.</p> <p>Sun Installation Assistant – The X4170 M2 server is not supported, nor tested, so may not be used as a tool for updating ILOM or BIOS firmware on KMAs.</p> <p>3rd Party Tools listed at <a href="http://www.sun.com/systemmanagement/tools.jsp">http://www.sun.com/systemmanagement/tools.jsp</a> have not been tested with OKM.</p>
ILOM Troubleshooting	<p>Remote Console Hang – Should the remote console become non-responsive to keyboard input first try to Reset the SP. If this does not work, then a reboot of the Server can clear this condition.</p> <p>If you suspect ILOM configuration changes are causing problems, then ILOM settings can be restored to default values using the instructions in the <i>Sun Fire X4170 M2 Server Service Manual</i>, refer to “Troubleshooting the Server and Restoring ILOM Defaults”.</p>

## Configuring the BIOS - X4170 M2 Only

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**Note:** Netra SPARC T4-1 servers do not include a BIOS; there are no BIOS procedures for users to follow.

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You should ensure that the BIOS has specific settings defined in order to limit access to the KMA. Launch the BIOS Setup Utility and check these settings:

- When you deploy a KMA that is a Sun Fire X4170 M2 server
- Whenever you upgrade the ELOM or ILOM firmware on the KMA.

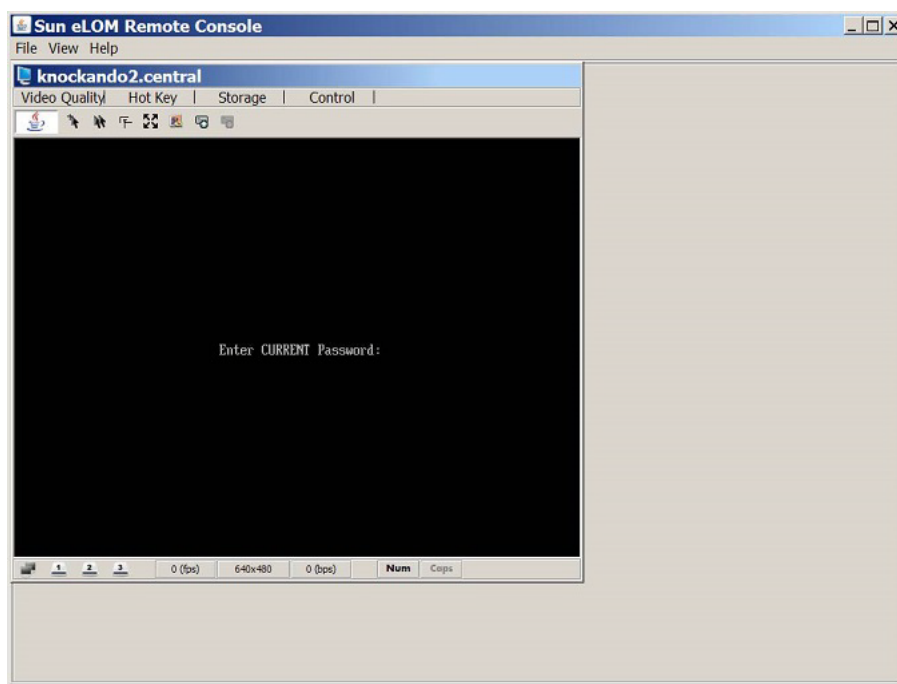
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**Note:** Netra SPARC T4-1 servers do not include a BIOS; there are no BIOS procedures for users to follow.:

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If you need to configure the BIOS for a KMA, perform the procedure below. For more information, refer to the *Sun Fire X4170 M2 Server Service Manual*, the *Sun Fire X2100 M2 Server Product Notes*, or the *Sun Fire X2200 M2 Server Product Notes* as appropriate for the server type of the KMA.

When you launch the BIOS Setup Utility, a password prompt appears if you have a password already defined.



T105\_046

1. If this prompt appears, you should enter the BIOS password if known.
2. If you do not know the password, you can simply press the Enter key to enter the BIOS Setup Utility with limited privileges.

If this prompt does not appear, then you see the Main menu of the BIOS Setup Utility.

**Verify BIOS settings as follows:**

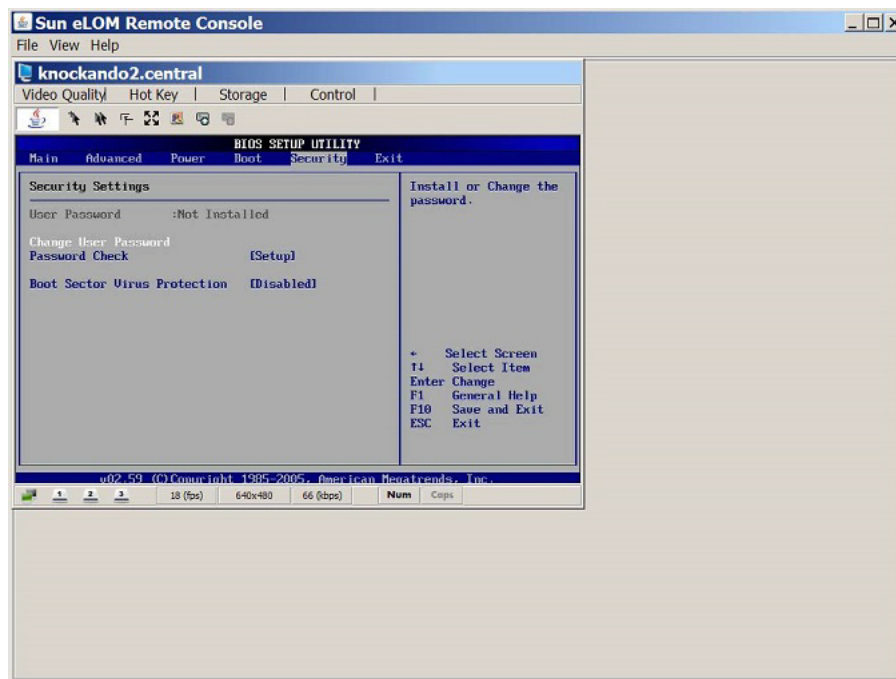


- BIOS password: If prompted the password should be “changeme”. If not prompted for a password, then a password has not been set.
- **Confirm these items:**
  - \* UTC time, Step 1 below.
  - \* User access, Step 3 below.
  - \* Boot order, Step 4 below.
  - \* Boot device priority, Step 5 below.
  - \* Network boot settings, Step 6 through Step 9.

If these are all correct, perform Step 2 and Step 11 through Step 14.

1. Navigate to the Main menu.
2. Set the BIOS supervisor password. Navigate to the Security menu.
3. Navigate to the Security menu.

If you did not enter a password at the password prompt, then the "Change Supervisor password" field does not appear.



T105\_047

4. Navigate to the Boot menu.
5. Select the "Boot Device Priority" using the up and down arrow keys, then press enter.

For the KMA's single disk device, such as:

HDD:P0-SEAGATE ST95000NSSUN500G102.

All other devices listed should be individually selected using arrow keys and disabled.

6. Navigate to the Boot menu.

7. Select "Option ROM Enable" using the up and down arrow keys and hit enter.
8. Select each "Net Option ROM" device (there are 4 numbered Net0 to Net3) using the up and down arrow keys and press enter.
9. Disable the ability to boot from this device by selecting "Disable" and pressing enter.
10. **Optional:** Disable PCI-E Option ROM for each of the 3 PCI-E slots to mitigate possibility of booting from PCI-E devices. The KMA does not ship with any PCI-E devices that support booting so there is marginal benefit from making this change.
11. Save the BIOS changes.
12. Navigate to the Exit menu.
13. Verify that the system boots correctly and that the supervisor password works for reentering the BIOS Setup Utility.
14. Go to "Using a Network Connection" to continue the installation.

Refer to the *Sun Fire X2100 M2 Server Product Notes*, the *Sun Fire X2200 M2 Server Product Notes* for the ILOM, or the *Sun Fire X4170 M2 and X4270 M2 Servers Installation Guide* as appropriate for the server type of the KMA.

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**Note:** A connection to the LAN 1 NET MGT interface is required to initially configure the servers. Never use the manual procedure for clearing CMOS NVRAM after a KMA has been Quick Started because it resets the clock.

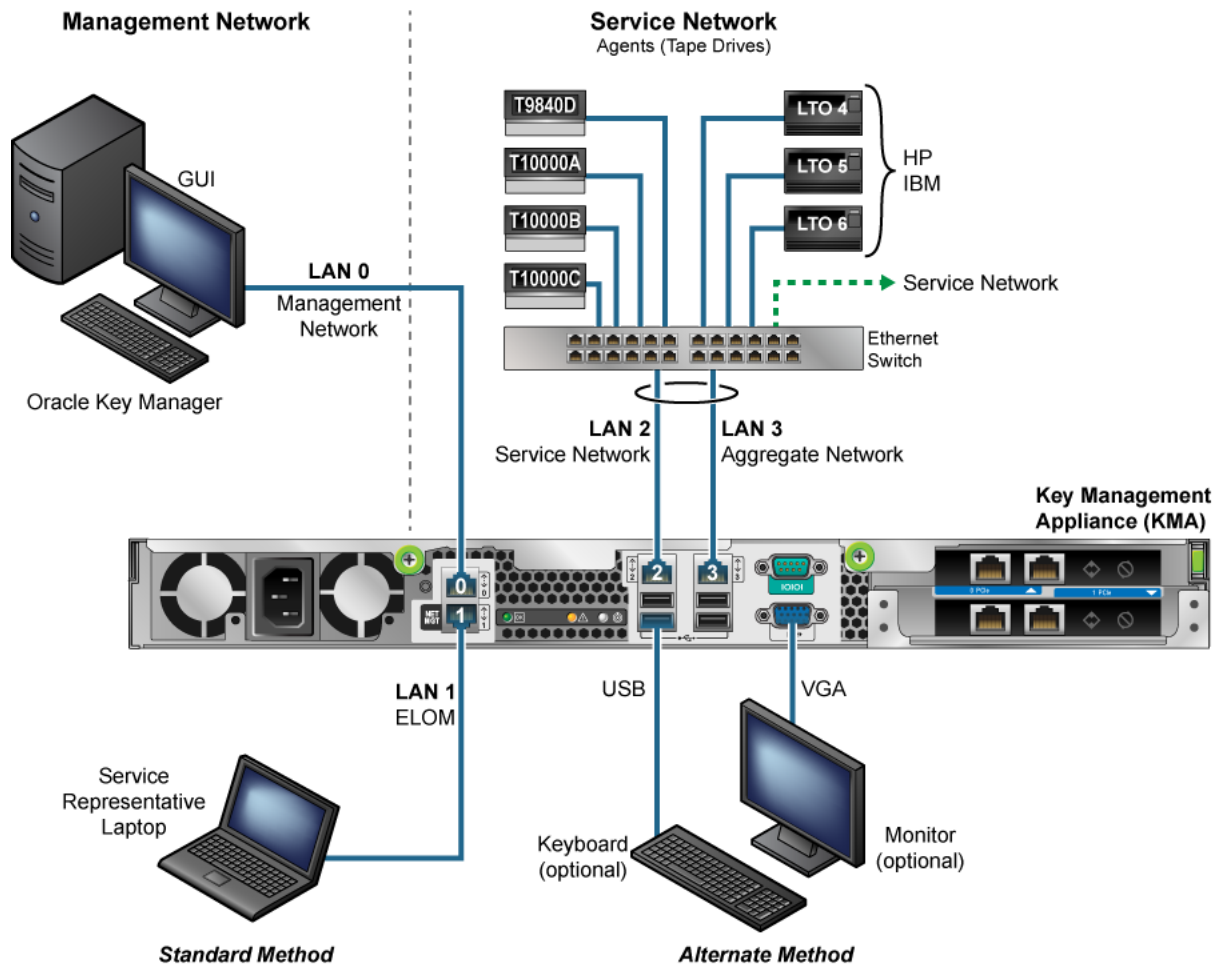
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## Keyboard and Monitor Attachment to the KMA

An alternate method to a network connection is to use a keyboard and monitor. The following graphics show these connections:

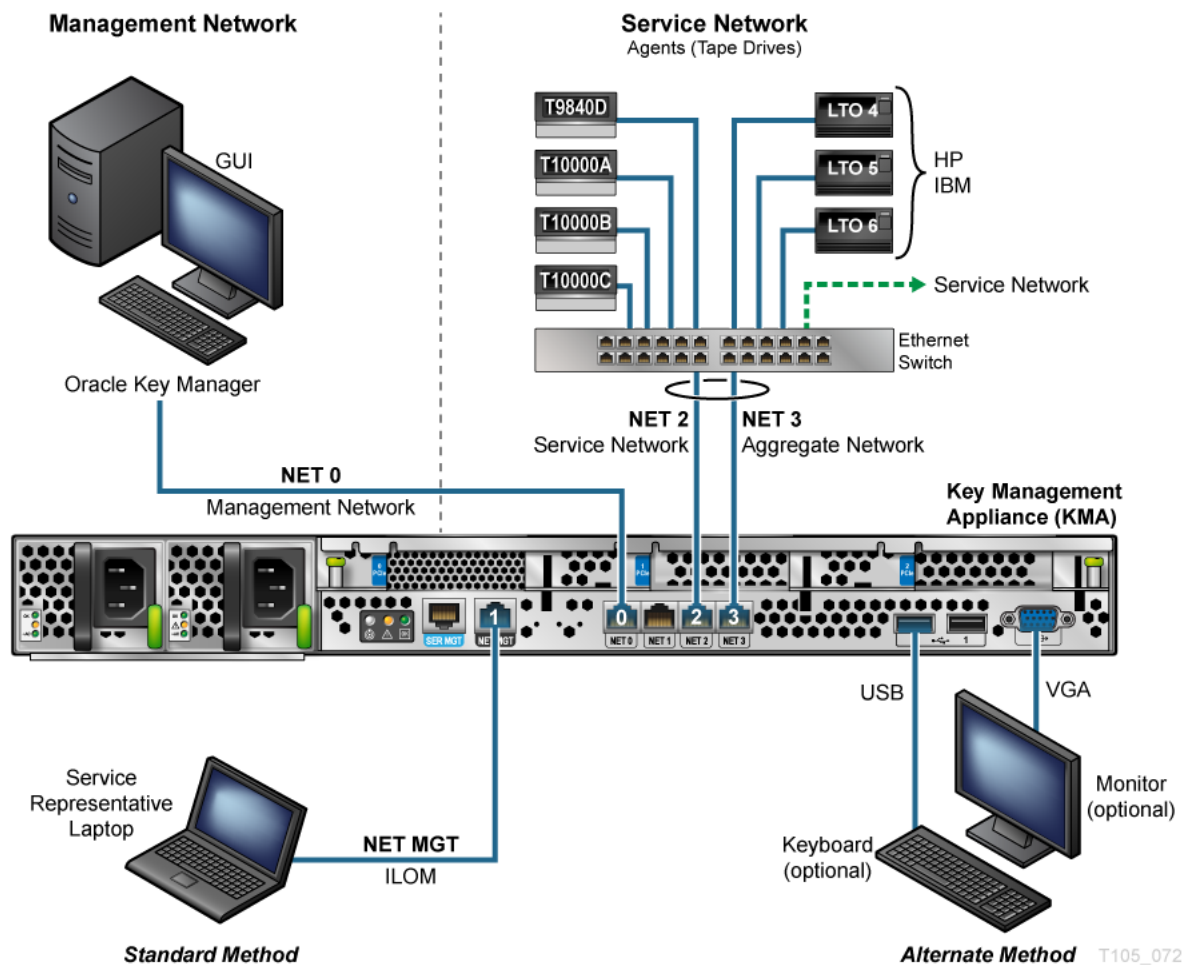
- [Figure D-5](#) — X2100 M2/X2200 M2
- [Figure D-6](#) — X4170 M2
- [Figure D-7](#) — Netra SPARC T4-1

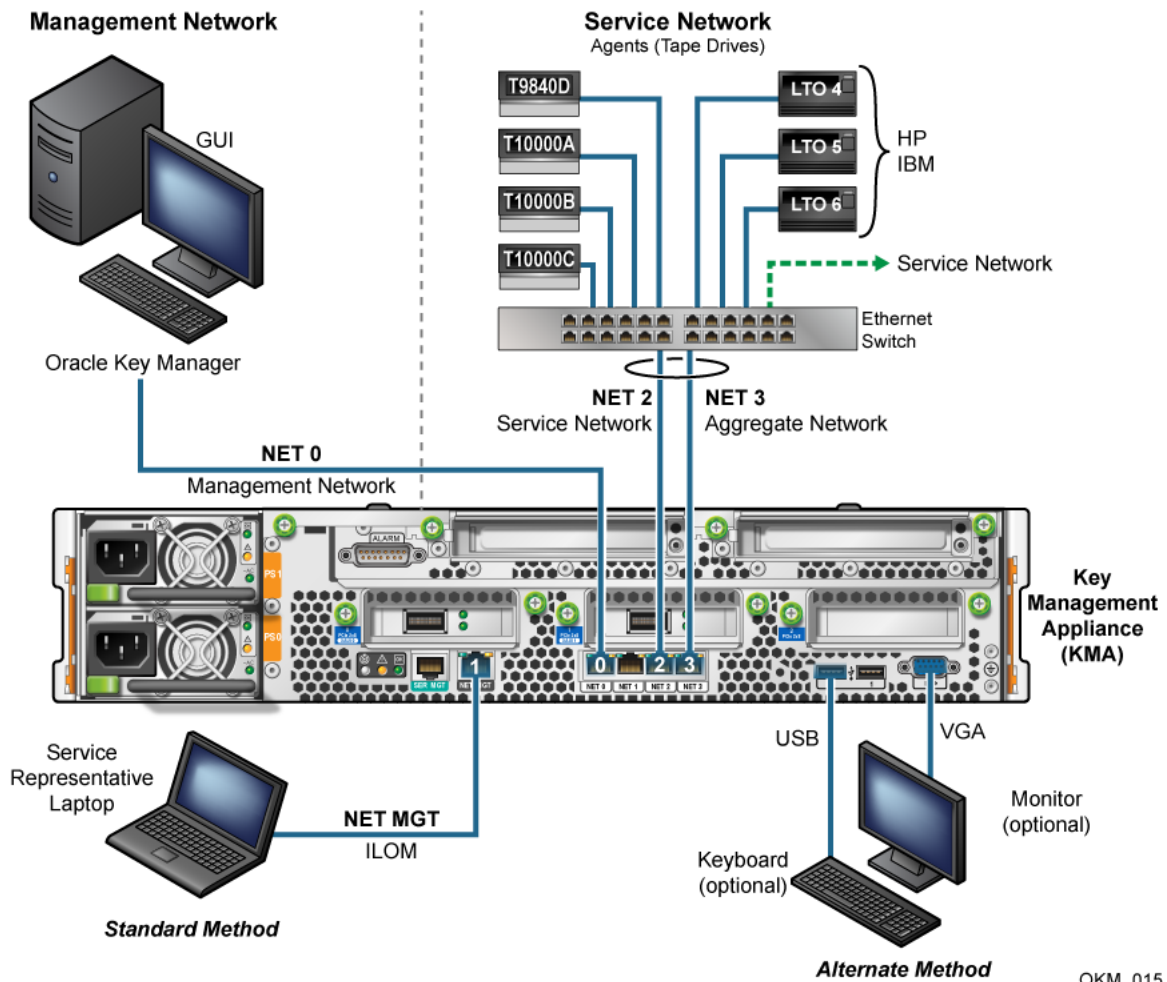
Follow the same procedure as described in "[Using a Network Connection - ELOM](#)" on page 2-2 or "[Using a Network Connection - ILOM](#)" on page 2-5, depending on the server you use.

**Figure D–5 X2100 M2/ X2200 M2 — Rear Panel Connections**

T105\_071

**Figure D–6 X4170 M2 — Rear Panel Connections**



**Figure D-7 Netra SPARC T4-1 — Rear Panel Connections**

OKM\_015



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# Glossary

## **Abnormal end of task (abend)**

A software or hardware problem that terminates a computer processing task.

## **Advanced Encryption Standard (AES)**

A FIPS-approved NIST cryptographic standard used to protect electronic data.

## **AES**

See Advanced Encryption Standard.

## **Agent**

Various types of encryption agents can be created to interact with the OKM for creating and obtaining keying material. The StorageTek T10000 models A and B, T9840D, and the HP LTO Gen 4 and Gen 5 tape drives are types of encryption agents when enabled for encrypting.

## **Agent API**

See Agent Library API.

## **Agent Library**

The Agent Library is used by an Agent to retrieve key material from a OKM.

## **Agent Library API**

The API provided by the Agent Library. Agents call this API.

## **Audit**

See Audit Log.

## **Audit Log**

The OKM Cluster maintains a log of all auditable event occurring throughout the system. Agents may contribute entries to this log for auditable events.

## **Auditor**

A user role that can view system audit trails (Audit List events and KMA security parameters).

## **Autonomous Lock**

When autonomous unlock is enabled a quorum of Security Officers is required to unlock a locked KMA. When disabled, the KMA can be unlocked by any Security Officer.

**Backup File**

The file created during the backup process that contains all the information needed to restore a KMA. Encrypted with a key generated specifically for the backup. The key is contained in the corresponding backup key file.

**Backup Key File**

A file generated during the backup process containing the key used to encrypt the backup file. This file is encrypted using the system master key. The master key is extracted from the core security backup file using a quorum of the Key Split Credentials.

**Backup Operator**

A user role that is responsible for securing and storing data and keys.

**BOT**

Beginning of Tape.

**CA**

See Certificate Authority (CA).

**Certificate**

A Certificate is a digitally-signed document that serves to validate the holder's authorization and name. The document consists of a specially formatted block of data that contains the name of the certificate holder (Subject DN), a serial number, validity dates, holder's public key, Issuer's DN, and the digital signature of the Issuer for authentication. The Issuer attests that the holder's name is the one associated with the public key in the document.

**Certificate Authority (CA)**

A Certificate Authority registers end-users, issues their certificates, and can also create CAs below them. The KMAs themselves act as the certificate authority to issue certificates to users, agents, and other KMAs.

**Cluster**

A Cluster is a set of Key Management Appliances that are grouped together into a single system to enhance fault tolerance, availability, and scalability.

**Communications key**

Adds another layer of encryption and authentication during transmission over a LAN from the token to the drive.

**Compliance Officer**

A user role that manages the flow of data through your organization and can define and deploy data contexts (Key Groups) and rules that determine how data is protected and ultimately destroyed (Key Policies).

**Critical Security Parameter**

Security-related information (for example, secret and private cryptographic keys, and authentication data such as passwords and PINs) whose disclosure or modification can compromise the security of a cryptographic module.



**Crypto-Accelerator**

A Crypto-Accelerator is a hardware device (a card) that can be used to increase the rate of data encryption/decryption, thereby improving system performance in high demand conditions.

**Crypto-active**

And encryption-capable tape drive that has had the encryption feature turned on in the drive.

**Crypto-ready**

A tape drive that has the ability to turn on device encryption and become encryption-capable.

**Cryptography**

The art of protecting information by transforming it (encrypting) into an unreadable format, called cipher text. Only those who possess a special key can decipher (decrypt) the message into its original form.

**Cryptoperiods**

The length of time in which a key can be used for encryption. It starts when the key is first assigned to the drive. This value corresponds to the "Originator Usage Period" in NIST 800-57.

**Data Unit**

Data units are abstract entities within the OKM that represent storage objects associated with OKM policies and encryption keys. The concrete definition of a data unit is defined by the Encryption Agent that creates it. For tape drives, a data unit is a tape cartridge.

**Device key**

Enables the tape drive for encryption. KMS Version 1.x term.

**EKT**

Enabling key token (device keys). KMS Version 1.x term.

**Enable key**

Unique 64 character key used to enable the tape drive. See also PC Key.

**Encryption**

The translation of data into a secret code. Encryption is one of the most effective ways to achieve data security. To read an encrypted file, you must have access to a special key or password that enables you to decipher it.

**FIPS**

Federal Information Processions Standards. The National Institute of Standards and Technology (NIST) is a non-regulatory federal agency within the U.S. Commerce Department's Technology Administration and Laboratories, which develops and promotes standards and technology, including:

- Computer Security Division and Resource Center (CSRC)
- Federal Information Processing Standards (FIPS)

For more information visit:

<http://www.nist.gov/>

**GUI**

Graphical User Interface.

**Hash Message Authentication Code (HMAC)**

In cryptography, a keyed-Hash Message Authentication Code, or HMAC, is a type of message authentication code (MAC) calculated using a cryptographic hash function in combination with a secret key.

**Internet Protocol (IP)**

A protocol used to route data from its source to its destination in an Internet environment.

**Internet Protocol (IP) address**

A four-byte value that identifies a device and makes it accessible through a network. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be from 0 to 255. For example, 10.172.145.23 could be an IP address.

Also known as TCP/IP address.

**Key**

A key in this context is a symmetric data encryption key. Agents can request new key material for encrypting data corresponding to one or more Data Units. A key belongs to a single Key Group so that only Agents associated with the Key Group can access the key. Keys have encryption and decryption cryptoperiods that are dictated by the Key Policy associated with the Key Group of the particular key. The type of key (that is, its length and algorithm) is specified by the Encryption Agent.

**Keys**

A random string of bits generated by the Oracle Key Manager, entered from the keyboard or purchased. Types of keys include:

- Device keys enable the tape drive encryption feature.
- Media keys encrypt and decrypt customer data on a tape cartridge.
- PC Keys enable the tape drive for encryption.
- Communication key adds another layer of encryption (authentication) to the media key during transmission over the LAN from the token to the drive.
- Split keys are unique to each drive and work with the wrap key for protection.
- Wrap keys encrypt the media key on the LAN and the token.

**Key Group**

Key Groups are used for organizing keys and associating them with a Key Policy. Key Groups are also used to enforce access to the key material by the Encryption Agents.

**Key Management Appliance (KMA)**

A Netra SPARC T4-1, Sun Fire X2100 M2, X2200 M2, or X4170 M2 server preloaded with the OKM software. The appliance delivers policy-based key management and key provisioning services.

**Key Policy**

A Key Policy provides settings for the cryptoperiods to be applied to keys. Each Key Group has a Key Policy, and a Key Policy may apply to zero or more Key Groups. The encryption and decryption cryptoperiods specified on the policy limit the usage of keys and trigger key life cycle events, such as the deactivation or destructions of keys.

Key Policies also control where keys governed by the Key Policy can be exported to other Key Transfer Partners or imported from other Key Transfer Partners.

**Key Transfer File**

A file containing keys and associated data units (if defined) used to move key material from one OKM Cluster to another. Both parties to the transfer must configure a key Transfer Partner of the other party to the exchange. The key transfer file is signed and encrypted to ensure both privacy of the transferred information as well its integrity.

**Key Transfer Partner**

The Key Transfer Partner is the recipient of keys being exported from one OKM to another.

**KMA**

See Key Management Appliance.

**Media key**

Encrypts and decrypts customer data on a tape cartridge.

**network**

An arrangement of nodes and branches that connects data processing devices to one another through software and hardware links to facilitate information interchange.

**NIST**

National Institute of Standards and Technology.

**OKM**

See Oracle Key Manager.

**OKM Cluster**

A set of one or more interconnected KMAs. All the KMAs in a OKM Cluster should have identical information. This is not be the case only when a OKM is down, or when a newly created piece of information has not yet propagated through all KMAs in the OKM Cluster. An action taken on any KMA in the OKM Cluster eventually propagates to all KMAs in the OKM Cluster.

**OKT**

Operational key token (media keys). KMS Version 1.x term.

**Operator**

A user role responsible for managing the day-to-day operations of the system.

**Oracle Key Manager (OKM)**

A system providing key management. The Oracle system has a OKM component providing key management on behalf of encryption agents.

**PC Key**

Enables the tape drive to read and write in encrypted mode.

**Quorum Member**

A user role that views and approves pending quorum operations.

**Read key**

This is a media key that is used when reading data from a tape.

**Rijndael algorithm**

An algorithm selected by the U.S. National Institute of Standards and Technology (NIST) for the Advanced Encryption Standard (AES). Pronounced “rain-dahl,” the algorithm was designed by two Belgian cryptologists, Vincent Rijmen and Joan Daemen, whose surnames are reflected in the cipher's name.

**RSA**

In cryptography, RSA is an algorithm for public-key cryptography created by Ron Rivest, Adi Shamir, and Leonard Adleman at MIT. The letters RSA are the initials of their surnames.

**Secure Hash Algorithms (SHA)**

Secure Hash Algorithms are cryptographic hash functions designed by the National Security Agency (NSA) and published by the NIST as a U.S. Federal Information Processing Standard.

**Security Officer**

A user role that manages security settings, users, sites, and Transfer Partners.

**Security Policy**

A rigorous statement of the sensitivity of organizational data, various subjects that can potentially access that data, and the rules under which that access is managed and controlled.

**Shamir's Secret Sharing**

An algorithm in cryptography where a secret is divided into parts, giving each participant its own unique part, where some of the parts or all of them are needed in order to reconstruct the secret. Counting on all participants to combine together the secret might be impractical, and therefore a quorum or threshold scheme is used.

**Site**

A site is an attribute of each OKM and Encryption Agent that indicates network proximity, or locality. Encryption Agents should try first to contact a KMA at the same site, then try to contact a KMA at a different site if no KMA at the local site responds.

**System Dump**

A user-invoked operation that results in all the relevant data being collected into a single file and then that file being downloaded to the machine from which the user invoked this operation. Once the download is complete, this file is deleted from the KMA.

**T10000 tape drive**

The T10000 tape drive is a small, modular, high-performance tape drive designed for high-capacity storage of data. T10000A stores up to 500 gigabytes (GB) of

uncompressed data, T10000B 1 terabyte, T10000C 5 terabytes, and T10000D 8 terabytes.

**TDE**

See Transparent Data Encryption (TDE).

**Token**

KMS Version 1.x term.

Tokens are handheld, intelligent devices that connect to a token bay with an Ethernet connection. The two roles of the tokens are:

- Enabling key token
- Operational key token

**Token bay**

KMS Version 1.x term.

A chassis that houses the physical tokens and provides power and connectivity for one or two tokens through the rear blind-mating connector. The token bay is compatible with a standard 19-inch rack—a 1U form factor. The token bay comes in two styles: desktop and rack-mount.

**Transparent Data Encryption (TDE)**

A feature of Oracle database management systems that provides the services for encrypting and decrypting sensitive database information.

**Transport Layer Security (TLS)**

A cryptographic protocol that provide secure communications on the Internet for such things as web browsing, e-mail, Internet faxing, instant messaging and other data transfers.

**UID**

A string that serves as a unique identifier for a OKM entity, e.g. an encryption agent or user.

**Ultra Tape Drive Encryption Agent**

Ultra-compliant encrypting tape drives utilize Ultra Tape Drive Encryption Agent software for key management. These drives acquire key material from the OKM to be used with tape volumes. Each write from BOT results in the use of fresh key material being used for encryption of data on the volume. Consequently, the definition of a data unit maps to a tape volume where the external ID of the data unit is the volume serial number.

**UTC**

Coordinated Universal Time.

**Volume Serial Number**

A six-character alphanumeric label used to identify a tape volume.

**Wrap key**

Encrypts the media keys on the LAN and on the token.

**Write key**

This is a media key that is used when writing data to a tape.

**Zeroize**

To erase electronically stored data, cryptographic keys, and Critical Security Parameters by altering or deleting the contents of the data storage to prevent recovery of the data.

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