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Rdb Authentication and LDAP

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Remote Speaker Photo

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Program Agenda

1. Rdb Authentication
2. Impersonation
3. Authentication Services
4. Introduction to LDAP
5. Resources

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Safe Harbor Statement

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Rdb Authentication

Attach, Connect and Declare Alias

Traditional

- Login through OpenVMS with **username** and **password**
- Rdb uses your process attributes as your credentials
- UIC is very important
  - Stored in object ACL (access control list)
  - Used as ID for **create user**
  - Function result of **current_uid**, **session_uid** and **system_uid**
- Assume 1-to-1 mapping of USERNAME to UIC
  - SHOW PROTECTION and SHOW PRIVILEGES will format the UIC
  - If LEE and JONES share a UIC might login as one but act as the other

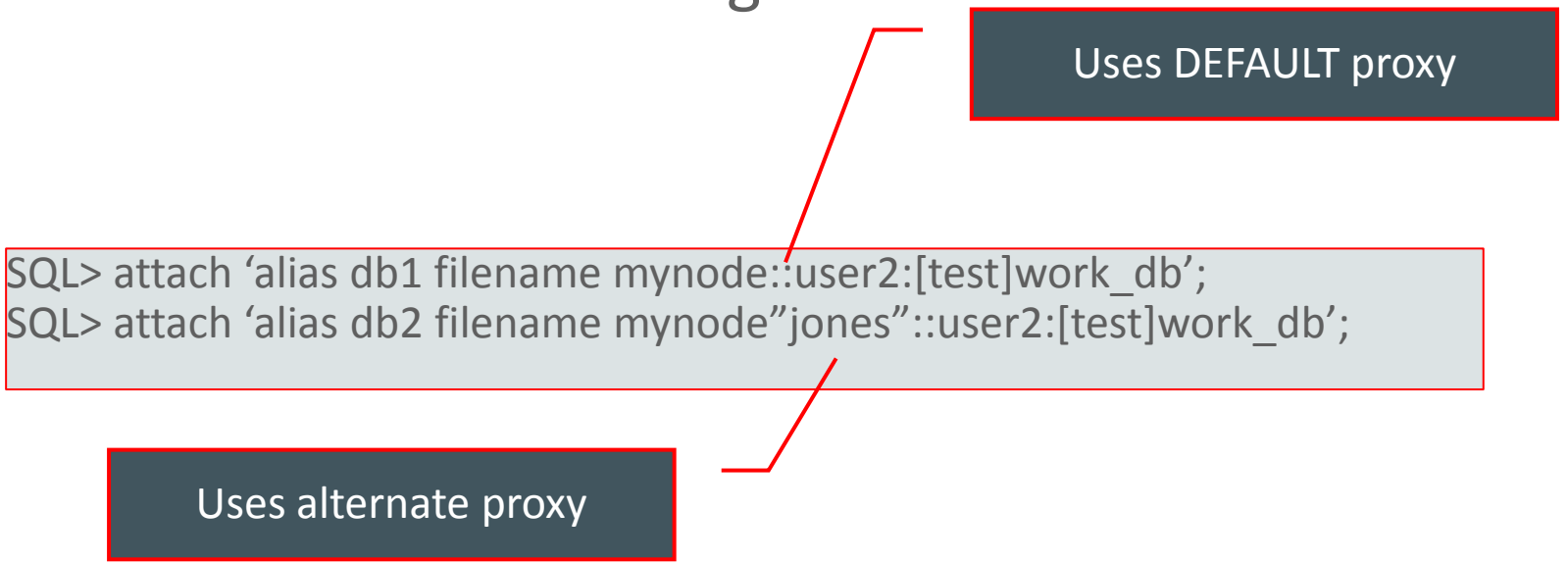
Remote Access - DECnet

- To access a remote database **username** and **password** can be supplied on the file specification
- This is handled by RMS (Record Management Services) as part of the DECnet interface
- Remote process is created with correct credentials and runs the RDBSERVER image

```
SQL> attach ‘filename mynode”smith blake7washere”::user2:[test]work_db’;
```

Remote Access – DECnet using PROXY

- Most applications don’t want to include password in the access string
- OpenVMS DECnet supports a PROXY database
- Use AUTHORIZE to manage



Remote Access – DECnet using PROXY

- Simplifies access
- Rdb doesn't need your username or password
- DECnet handles the creation of a remote process with the credentials granted by the proxy definition

```
UAF> add/proxy SAMPLE::WALTER ROBIN/default
%UAF-I-NAFADDMSG, record successfully added to NETPROXY.DAT
```

Access from node SAMPLE by user WALTER can use the credentials of ROBIN on this node

Example

- **Walter** logs on to VMS
- Then uses SQL to attach to the database
  - SQL> attach ‘file SAMPLE::disk1:[db]acct.rdb’;
- The remote user will be **Robin**
- SYSTEM_USER, SESSION_USER and *probably* CURRENT_USER will reflect this state
  - Probably… can be changed by executing procedure

Simple Mapping

- Many systems use a simplified mapping for PROXY
- Allow same user to access any node
- UAF> add/proxy *::LEE LEE/default
- All nodes allowed but maps the username

Remote Access – TCP/IP

- Username/Password in the file specification is only used by DECnet
- For TCP/IP Rdb must perform the impersonation
  - Statements include keywords: USER and USING
- Accepted on various statements
  - Create, Alter, Drop, Import Database
  - Attach, Connect and Declare Alias
  - Set Session Authorization
- **attach** and **connect** are dynamic statements, so expect the password to be passed at runtime

Remote Access – TCP/IP

- Remote process (service) is run under RDB$REMOTExx user
- New user is impersonated by Rdb

Example

```
declare :usr,:pwd char(20);
accept :usr prompt 'Username: ';
accept :pwd prompt 'Password: ' hide;

attach 'alias db1 filename db$:personnel';

connect
   to 'alias db1 filename db$:personnel'
   as 'myatt'
   user :usr
   using :pwd;

show connection *;

disconnect all;
```

:usr and :pwd are parameters

Remote Access – TCP/IP

- Can also provide values for **user** and **using** in a configuration file
  - RDB$CLIENT_DEFAULTS.DAT
  - Opened via the logical name RDB$USER_DEFAULTS
  - Or, if found in SYS$LOGIN
- SQL_USERNAME and SQL_PASSWORD options
- Expect the .DAT file to be secured
- (Aside: Recommend defining SQL_NETWORK_TRANSPORT_TYPE as TCPIP if not using DECnet)

Remote Access – TCP/IP, with PROXY?

- To recap:
  - DECnet accepts the access string and creates the remote process
  - Or, DECnet contacts remote system and determines that a PROXY is defined and uses it
- Rdb has nothing to do with remote security
- TCP/IP doesn't have identical support

Remote Access – TCP/IP

- TCP/IP on OpenVMS has a PROXY database
- However, Rdb would have to get username to the remote system securely, and interface to that PROXY database
- Not done today
  - OpenVMS doesn't provide a public interface to the PROXY database
- Talking with HP and VMS to see if this can be done in a supported way… stay tuned

Impersonation

Persona

Servers perform user Impersonation

- SQL/Services
- OCI Services for Rdb
- ODBC
- JDBC
- ORDT (.NET)
- Use server architecture to share attaches between multiple users

User and Using

- Not restricted to remote access
- Servers use CONNECT to share attaches
- Or can use SET SESSION AUTHORIZATION
- Note:
  - SYSTEM_USER will be the server user
  - SESSION_USER will be the impersonated user
  - CURRENT_USER will match SESSION_USER unless overridden by procedure call

Persona is Enabled

- Database attribute controls the type of impersonation
  - Security checking is … (persona is enabled)
- For V7.3 **create database** or **import database** set this implicitly
- Databases from older versions stick with UIC (non-persona) impersonation
- Persona impersonation means that the full rights identifier credentials are used as well as the UIC

Persona

- OpenVMS provides a set of Impersonation system services
- Rdb uses a small subset
  - sys$persona_create
  - sys$persona_assume
  - sys$persona_delete

Authentication Services

RDB$COSIP.EXE Image

Authentication Services

- Used by SQL/Services
- Rdb Remote access
- Set Session Authorization

Authentication Services

- Privileged image supplied with Oracle Rdb
- Calls system services such as SYS$GETJPIW, SYS$GETUAI, SYS$SCAN_INTRUSION, etc.
  - Enforced password check
  - Hourly and daily limits
  - Disabled users
  - Expired passwords
  - Reported access to VMS intrusion system
  - And so on

Changes in Rdb V7.3

- V7.3 replaced most of Oracle Rdb code with a call to **sys$acmw** system service
- ACM - Authentication and Credential Management
- Rdb no longer needs to maintain our authentication code
- Rdb automatically inherits any OpenVMS security upgrades and features

Advantages

- Allows interface to extra services such as the ACME LDAP Agent
- Setting UAF flag causes OpenVMS as well as Rdb to use LDAP to perform authentication
- Note that RDB$COSIP is not versioned; once V7.3 has been installed (multi-version mode) then V7.2 users can also use LDAP

Introduction to LDAP

Lightweight Directory Access Protocol

What is it?

- LDAP - Lightweight Directory Access Protocol
  - open,
  - vendor-neutral,
  - industry standard protocol
  - for accessing and maintaining distributed directory information services
- Commonly used to provide “single-signon” password
- Stored in a central repository
  - Oracle Internet Directory, Microsoft Active Directory, HP-UX LDAP-UX Integration Software, OpenLDAP, etc.

Usage

- When LDAP is setup you can enable specific users to be externally validated
- This means login to VMS, Rdb authentication, and so on all obey this mapping

Setup

Brief and incomplete

Setup

- Must install optional OpenVMS software
  - See documentation referenced later
  - Details beyond the scope of this talk
- Must configure VMS to use your existing LDAP server
  - Will examine briefly
- Or install and configure one of those listed previously
- Configure the user accounts in the UAF (AUTHORIZE)

Setup the ACME/LDAP agent on the OpenVMS nodes

- SYS$STARTUP:LDAPACME$CONFIG-STD.INI
- This LDAP configuration file is required
- It defines where the LDAP server resides and how to connect to it

SYS$STARTUP:LDAPACME$CONFIG-STD.INI

- It should have, as a bare minimum, the following items
  - server = ldapsys01.mycompany.com
  - port = 389
  - bind_dn =
  - bind_password =
  - base_dn =
  - login_attribute = samaccountname
  - scope = sub
  - port_security = none
- See also SYS$STARTUP:LDAPACME$CONFIG-STD.INI_TEMPLATE

SYS$MANAGER:ACME$START.COM

- The startup procedure comes with lines commented out
- Make sure they are active

```
$! The LDAPACME$INIT logical MUST contain the path name to the initialization
$! for the LDAP ACME Agent Server
$ DEFINE/SYSTEM/EXECUTIVE LDAPACME$INIT SYS$STARTUP:LDAPACME$CONFIG-STD.INI
$ @SYS$STARTUP:LDAPACME$STARTUP-STD                    ! LDAP_STD
```

Mapping LDAP users to OpenVMS users

- To activate LDAP to OpenVMS mapping a local mapping file must be created
- SYS$STARTUP:LDAPACME$CONFIG-STD.INI
- Towards the end of the supplied sample uncomment these lines

```
mapping = local
mapping_file=SYS$STARTUP:LDAP_LOCALUSER_DATABASE.TXT
```

Mapping LDAP users to OpenVMS users

- Each line is an ldapname,uafname pair
- The ldapname is not case sensitive on the LDAP server

```
“jenny.p.jones”,”J_JONES”
“marvin.t.robot”,”MTR”
“james.t.kirk”,”CAPTAIN”
```

Start the ACME/LDAP agent

- The ACME server must be started
  - $ SET SERVER ACME/RESTART
- or:
  - $ SET SERVER ACME/EXIT/WAIT
  - $ SET SERVER ACME/LOG/START=AUTO

Enable your users

- Use AUTHORIZE to set some user flags

```
UAF> modify j_jones/flags=(extauth,pwdmix)
%UAF-I-EXTAUTH, ExtAuth set for J_JONES; field modification may have no effect
%UAF-I-MDFYMSG, user record(s) updated
```

Some flags don't make sense

User flags in SYSUAF file (from HELP)

- EXTAUTH
- Considers user to be authenticated by an external user name and password, not by the SYSUAF user name and password
- The system still uses the SYSUAF record to check a users login restrictions and quotas and to create the users process profile

User flags in SYSUAF file (from HELP)

- DISPWDSYNCH
- Suppresses synchronization of the external password for this account. See bit 9 in the SECURITY_POLICY system parameter for system wide password synchronization control

User flags in SYSUAF file (from HELP)

- PWDMIX
- Enables case-sensitive and extended-character password. After PWDMIX is specified, you can then use mixed-case and extended characters in passwords

Example

- Use LDAP to login to OpenVMS

```
Username: jenny.p.jones
Password:
TRIBLE - Property of Oracle Corporation
   Last interactive login on Tuesday, 23-SEP-2014 01:19:29.87
**** Logon authenticated by LDAP ****
$ @sys$share:rdb$setver 73
Current PROCESS Oracle Rdb environment is version V7.3-111 (MULTIVERSION)
Current PROCESS SQL environment is version V7.3-111 (MULTIVERSION)
Current PROCESS Rdb/Dispatch environment is version X7.3-01 (MULTIVERSION)
$ sql$
SQL> attach 'filename abc';
SQL> select system_user from rdb$database;

 J_JONES
1 row selected
```

Example

- Trying remote access…

```
$ sql$
SQL> attach 'f 0"jenny.p.jones …"::COSI_USER1:[JJONES]abc';
SQL> show version
Current version of SQL is: Oracle Rdb SQL V7.3-111
Underlying versions are:
   Database with filename 0"jenny.p.jones password"::COSI_USER1:[JJONES]abc
            Oracle Rdb V7.3-111
            Rdb/Dispatch V7.3-01 (OpenVMS Alpha)
            Remote Server V7.3-111 (OpenVMS Alpha)
            Remote Client V7.3-01 (OpenVMS Alpha)
            Rdb/Dispatch V7.3-01 (OpenVMS Alpha)
SQL> select system_user, session_user, current_user from rdb$database;

 J_JONES                J_JONES                J_JONES
1 row selected
```

Resources

HP and Other Sources

Just skimming the surface

- Did you attend the OpenVMS Bootcamp?
- ACME/LDAP setup and troubleshooting
  Speaker: Dan Buckley, HP

HP Documentation

- **Security Features in OpenVMS Version 8.4**
  - http://h71000.www7.hp.com/openvms/security.html#acme_ldap_changes
- HP OpenVMS ACME LDAP Installation and Configuration Guide
  - SYS$HELP:ACMELDAP_STD_CONFIG_INSTALL.PDF
- HP OpenVMS Guide to System Security
  - http://h71000.www7.hp.com/doc/84FINAL/ba554_90015/ba554_90015.pdf

More Documentation

- HP OpenVMS – External Authentication using ACMELDAP
  - http://www.openvms.org/stories.php?story=12/12/14/4832565
- ACME Developers Readme
  - SYS$HELP:ACME_DEV_README.TXT
- Some useful notes from Hoffman Labs
  - http://labs.hoffmanlabs.com/index.php?q=node/619

More…

OCI

- What about OCI Services for Rdb?
  - Currently users are defined in the USER$ table
  - We store an encoded password (different encoding to that used by OpenVMS and LDAP servers)
  - This password is used to authenticate with the Oracle server
- Looking at a project to use the LDAP environment but must be able to fetch this special encoded password
- Use LDAPACME$INIT logical so OCI shares the same LDAP server

Is this ready for production use?

- ACMELDAP support has been around for several years on OpenVMS (8.3 originally)
- Original implementation using SYS$ACMW in RDB$COSIP was in V7.3.1
- Used in-house for a few years
  - 7.3.1.2 allows longer LDAP user names
  - 7.3.1.x will further improve the interface
- Plan to document the support for our next kit
- Talk to us

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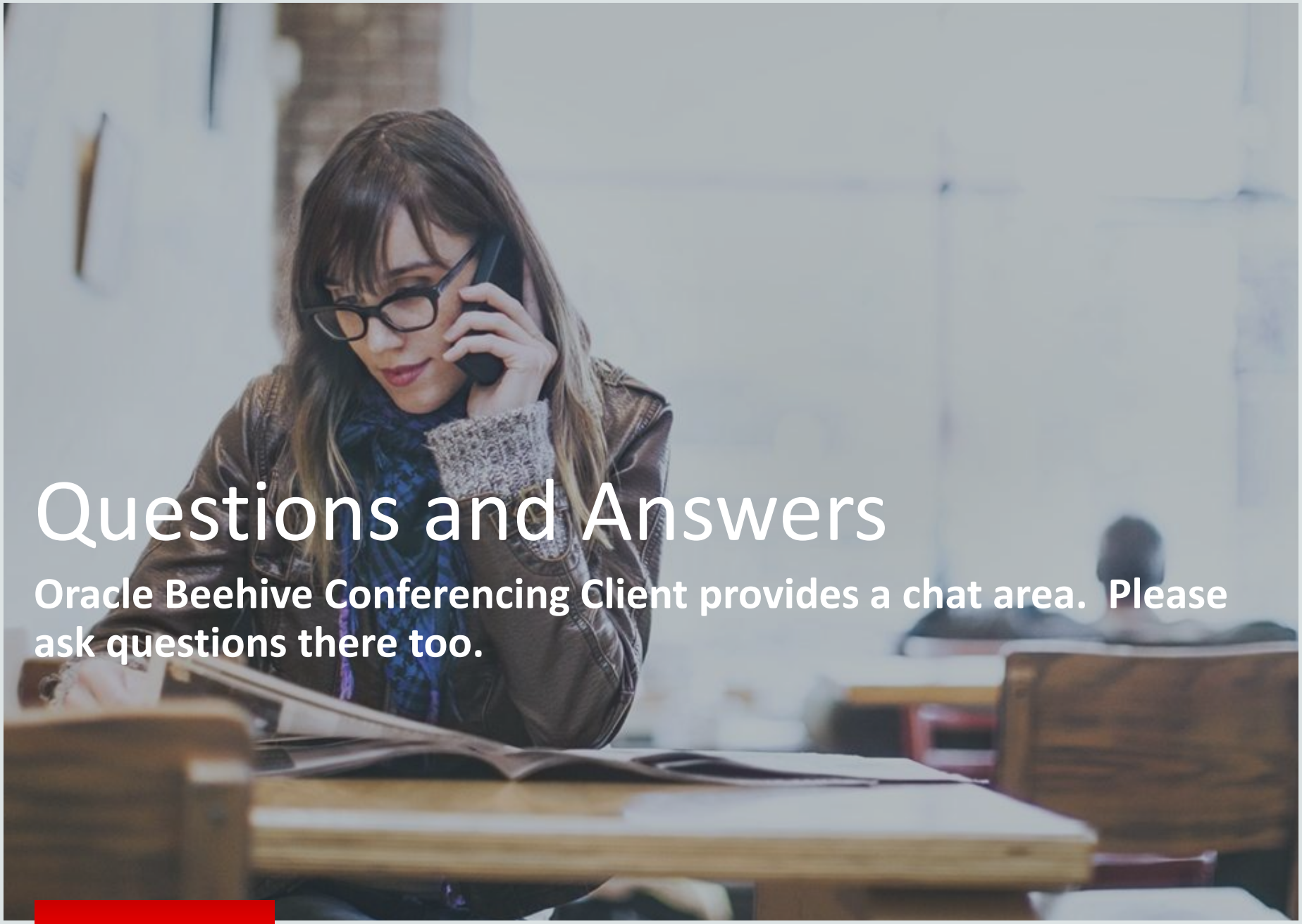

Questions and Answers

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