Functional Specification: Application Server Administration

Table of Contents (Status: Draft**,** Ready for Review , **Reviewed** , ARC'ed)

1. Introduction

1.1. Project/Component Working Name

GlassFish V2/Sun Java System Application Server 9.1.

1.2. Name(s) and e-mail address of Document Author(s)/Supplier

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1.3. Date of This Document

09/01/2006.

2. Project Summary

2.1. Project Description

The project is about administration and management support for GlassFish V2. This also c configuration. It includes the following areas: Domain Configuration Management, Admi Infrastructure, Inter Process Communication using JMX Connectors, Management API, J Security, Process Launcher and Startup, Synchronization, Dynamic Reconfiguration, and

It is assumed that the reader is familiar with the overall application server architecture. The architecture of application server is more or less similar to that of the previous releases. Th server 9.1) administrative projects are focused more on the improved scalability, performa feature set.

Since most of the server side entities are being enhanced in this release, this document just made to the existing features, along with new features, if any.

2.2. Risks and Assumptions

There are no risks in this project.

3. Problem Summary

3.1. Problem Area

The administration experience of application server should be enhanced. It is also importa performance of the Domain Admin Server is improved.

3.2. Justification

Administration of application server should always be improved and made more robust.

4. Technical Description

4.1. Details

Here is a list of things that we will be doing, for this release.

- Domain Configuration Management
- Administrative MBeans and JMX Infrastructure
- Inter Process Communication using JMX Connectors
- Management API (AMX)
- JSR 77 Support
- Administrative Security
- Process Launcher and Startup/Shutdown
- Synchronization
- Node Agent
- Miscellaneous

Item	Details
Domain Configuration	**Background** The configuration is stored in various files on disk. There are no new this release. **Changes planned for this release** • The domain's configuration DTD changes are being tracked ind http://www.glassfishwiki.org/gfwiki/Wiki.jsp?page=GlassFish • ~~Administrative interface will be provided to default web tier co default-web.xml). The exact list of settings that will be manage~~ ○ ~~The default web-tier configuration is applicable to all the domain.~~ ○ ~~All the affected servers will require a restart. In other wor web.xml are not dynamic.~~ **The default-web.xml editing support is NOT PLANNED fo**

Management	• It will be possible to copy the entire domain configuration folde dir>/domains/domain1) somewhere else on the same host. The i configuration does not depend on where the application softwar the user/administrator responsibility to make sure that the source application server are the same. Following should be noted in th ◦ This feature should not be confused with backup-restore (is not a replacement of the other. ◦ The start-domain command might have to change, after th moved from one place to another. ◦ The **name** of the domain (root folder containing domain's same. • It will also be possible to copy the entire installation somewhere (6418805, 90). Following should be noted in this regard: ◦ All the scripts in the **<install-dir>/bin** folder should conti as their "**execute**" permission is retained.
Administrative MBeans and JMX Infrastructure	**Background** These are the MBeans that pertain to the configuration changes of the CLI usually communicate with these MBeans to perform configuratio **Changes planned for this release** No changes are planned here.
Inter Process Communication using JMX Connectors	**Background** The JMX Connectors are used for two distinct purposes within applic • One-way communication between asadmin client and DAS. Th implementation of client-side JSR-160, over HTTP/HTTPS. • Two-way communication between DAS and node-agents + oth communicates with these over RMI/JMX -- the standard JSR-1(into the Java Platform. **Changes planned for this release** No changes are planned here, apart from some bug-fixes.
	Background AMX is the programmatic API to manage application server. **Changes planned for this release**

Management API (AMX)	- ~~Provide the offline configuration support for most of the configu domain.xml. This means that when a user wants to modify dom running, s/he should be able to do that. This is required when th changes to be made and does not want to start the DAS to be ru modify the domain's configuration, we need the DAS to be runn considered in this regard:~~ ○ ~~It is not required that application archive deployment is su reason is that the deployment is quite complex operation a running DAS In fact, following operations are **not requi** configuration, for this release:~~ ▪ ~~Deployment of application archives.~~ ▪ ~~Creation of users/groups that use the FileRealm.~~ ▪ ~~Load Balancer configuration.~~ ○ ~~Minimum validation of the domain's configuration must b~~ ○ ~~It should be ensured by AMX that domain is NOT runnin perform offline configuration.~~ ○ ~~No Dynamic reconfiguration support will be provided. In instances will have to be restarted so that their configurati administrators should make sure that no server side entitie configuration is performed.~~ ○ ~~This facility is meant mainly for the configurators that wa configuration in a certain manner, without having to start~~ **Offline Configuration is NOT PLANNED for this release** - Provide a way to **reload** an application.
JSR 77 Support	**Background** JSR 77 Specification is in maintenance mode, so there is no new revis **Changes planned for this release** - The first time startup of the domain/instance causes the MEjb ap application) to be deployed. This causes some delay in bringing incurs minor overhead to make sure that it is not required to be d are going to prepackage the MEjb application, so that the startup marginally increase the application server bundle size. - See the administrative security section for other changes made t clients.
	Background

Administrative Security

This section covers the changes being made to the administrative secu

Changes planned for this release

There are no major changes planned for administrative security.

- Currently, a group-name, **asadmin** is reserved for the group of a application server, who have administrative privileges. This wo authentication realm (file-realm) is used. But when, LDAP is us unfortunately all the users in this group get administrative acces customer issue 6454224 which will be fixed for this release.
- We should be able to use either JKS or NSS as our key-store an default, the Platform Edition of the product gets JKS, where as I this release, rather than hard-coding these, there will be a way to an administrator for a particular domain. Note however that, onc of store, it will not be possible to change it. These details are co profiles.

Background

The process launcher code is responsible for launching the application mode, a separate *launcher* VM is started that finally starts the applicati JVM). This is the default for this release. In case of the other flavor, a launcher process) that launches another native application server proce will need to maintain both the flavors for this release.

Changes planned for this release

- Improve the startup performance in the case of default mode: Cu is used, there is a Launcher JVM (2) that is started and that invo (3).

```
 _____________        _____________
| asadmin JVM  | ----- | Launcher JVM |----
|______(1)_____|       |_____(2)______|
       |
       |__(proposed) asadmin JVM -> app se
```

It is desired that we eliminate the separate Launcher JVM and n itself a launching JVM. For that matter, it should be possible for app server JVM as a separate process. This will be made part of becomes a public API. Note that following in this regard:

Process Launcher and Startup/Shutdown

- If possible, streaming API for XML will be used to parse form the Java invocation command line.
- There are some hairy issues here from a compatibility sta imperative that all the options on the start-domain and sta taken care of, while we try to make this change.
- The changes should apply to both start-domain and start-i case of start-instance command, the node-agent being the
- The Java-level thread-dump capability of the server must we have several ways to get the thread dump from the ap way is to send an OS signal (e.g. SIGQUIT on Solaris) to Something that must be noted (which is actually a Java be while using the Java Launcher, we cannot get the thread server's server.log, by sending the SIGQUIT-like signal t because the signal handler in the JVM (native code) does *PrintStream* that Java-land understands.
- There used to be an internal interface called *processlaunc* level of this interface will be assessed under changing circ be required in the case of Java Launcher.
- Debuggability of this code will be improved.

- Removal of Launcher from the stop-domain/stop-instance logic: why this is there to begin with. It makes no sense to go through SHUTDOWN event to a running application server JVM.

```
 _______________         _______________
| asadmin JVM   | ----- | Launcher JVM  |----
|______(1)______|       |_____(2)_______|
       |
       |
       |
       |
       +----(proposed)RMI Shutdown Event---
```

Whenever the server starts up an RMI Stub (A live object) is wr folder. If a piece of software can access this Stub, it can be an R server. So, while stopping the domain or server instance, all that this stub. In fact, the logic through the Launcher does the same t **PEMain** is called with an argument, *stop* and that becomes the SHUTDOWN event to the running server. To achieve this, we just need one JVM and that is of the asadmin, while stopping th

	node-agent, while stopping the server instance. This has huge b complexity. See Issue No. 949 for some hideous side effects of
Synchronization	**Background** This is the piece of code that is supposed to take care of bringing the c the central repository. For all practical purposes, the central repository domain's folder. **Changes planned for this release** **Nazrul Islam is supposed to provide the details here**.
	Background Node Agent controls the life cycle of the server instances on a given n instances, stops them, initiates synchronization of their repositories anc instances among other things. **Changes planned for this release** • Handling of admin password change across the domain: Curren changed, it is dynamically applicable only to the DAS The com agents/server-instances and DAS still continues to assume the o JMX connections. The upshot of this is that unless the DAS, all instances are restarted after changing the admin password (prov the process), the communication between DAS and node agents unpredictable. But having to restart all the entities in the domain change operation seems illogical. It might be hard to take care o release, when admin password is changed, but user experience r case. Following is what will be attempted for this release in this ◦ Admin Interfaces (admin CLI, GUI, AMX) should clearl what needs to restarted and how, after the admin passwor stress that until the restart is done in the described fashion instances will continue to use older admin password for ir don't know what happens when the auth-realm for admin this reason that we take a safe approach for this release. • Synchronize an instance on restarting the node-agent: We have administrators would like to forcefully sync the instance's cache repository **on restarting the node-agent**. Today, when a node- **stop-node-agent** followed by **asadmin start-node-agent**, the s

Node Agent	That's by design and cannot be overridden. But in some cases, a knowingly want to synchronize the instances, an option could b will provide an explicit option to synchronize the instances whe Administrators must know however that when used, *all* the inst node-agent's startup. • Improved restore of DAS from a backup(6380268): When a DA (after a machine failure), all the node-agents must be *manually* r this release, we will make changes such that since the DAS kno agents (that have shaken hands with DAS) in the given domain changed location to the node-agents. This way, node-agents do ◦ For this release, this applies to all the node-agents that are DAS's startup. Any node-agents that are not running at th modified to know DAS's changed location. ◦ There is no explicit command/interface defined for this op **implications of doing this implicitly, TBD**]. DAS perfo background task at the time of its own startup. ◦ A node-agent establishes the trust with the new incarnatio ▪ DAS has the right admin user and admin password ▪ DAS sends the right server certificate that is alread that a node-agent is either unbound or is bound to e agent can be contacted by a DAS (or its reincarnati one handshake between the two. Also note that eve server certificate, by default. • Separation of client trust-store and server trust-store: Currently, **.asadmintruststore** in the user's home directory that is used to s the secure domains that are contacted by asadmin over HTTPS, As of now, the same trust-store is used by the node-agents. The trust store for server side communication between node-agents, Using the domain-specific trust-stores for an intra-domain comn including avoiding the accidental trust of a node-agent on a DA that it has trusted at the time of binding (See 6450817).
	Following miscellaneous changes will be done for this release. • Provision of sample resource creation templates for frequently u improve the usability of the *asadmin add-resources* command, defines the resources (See RFE - 582). Following templates wil database vendor specific properties will be provided, so that the reference. For this release, only templates would be provided fo with appropriate resource types (e.g. JDBC Resource, JDBC C template):

Miscellaneous	○ Oracle ○ JavaDB ○ MySQL • Attempt to do better integration with the operating platforms: To create-service in asadmin that creates the so-called Operating Sy Solaris-10 SMF integration as of now. We will need to do follo release. Creation of services pertains to Domain and node-agent integrated with services infrastructure on a particular platform, v for server instances. ○ Fix the issues 695, 726 blocking SMF integration on Sola ○ Provide etc/rc scripts for RedHat Linux. Integrate them w ○ Revive and enhance the support for Windows. Integrate i We have an executable called *appservService.exe*, that is approach is not usable.

4.2. Bug/RFE Number(s)

These are noted against the details above.

4.3. In Scope

The items covered in 4.1 are in scope.

4.4. Out of Scope

The items *not* covered in 4.1 are not in scope. Nothing in particular. Not all bugs and RFE release can be mentioned here.

4.5. Interfaces

http://www.opensolaris.org/os/community/arc/policies/interface-taxonomy/ describes the p

4.5.1 Exported Interfaces

Interface	Stability	Former Stability (if changing)	Comments
sun-domain_1_3.dtd (An XML file)	EVOLVING	EVOLVING	The configuration entire domain.
			The schema derive

sun-resources_1_3.dtd (An XML file)	EVOLVING	EVOLVING	domain_1_3.dtd, a the resources. All t in any XML used l *resources* must cor
New asadmin commands	EVOLVING	EVOLVING	These are covered
New AMX interfaces	EVOLVING	EVOLVING	These will be cove Javadocs.
processlauncher.xml	UNSTABLE	UNSTABLE	Customers edit this and because we di has become a sort

4.5.2 Imported interfaces

Interface	Stability	Exporting Project: Name, Specification or other Link.	Comme
schema2beans.jar	EVOLVING	NetBeans	Contain runtime Pertains
schema2beansdev.jar	EVOLVING	NetBeans	Used fo beans. I 5.5.
jdmkrt.jar	EVOLVING	Java SE	Java DM feature.
Jakarta Commons Modeler	EVOLVING	Apache	Used fo MBeans generati

4.5.3 Other interfaces (Optional)

Not applicable.

4.6. Doc Impact

Moderate impact

Moderate impact.

4.7. Admin/Config Impact

Administration specification, this is.

4.8. HA Impact

Not applicable.

4.9. I18N/L10N Impact

Not applicable.

4.10. Packaging & Delivery

Standard packages, zip files that are documented in the packaging specification.

4.11. Security Impact

Not applicable.

4.12. Compatibility Impact

TBD.

4.13. Dependencies

- Security Functional Specification
- Profiles Functional Specification
- CLI One Pager

5. Reference Documents

// List of related documents, if any (BugID's, RFP's, papers, Blogs).
// Explain how/where to obtain the documents, and what each
// contains, not just their titles.

6. Schedule

6.1. Projected Availability

Covered elsewhere.

7. Document History

Version	Date	Author, Comment
1.0	06 January 2007	Incorporated some feedback. Made changes for features that could not make it.
0.91	01 September 2006	Kedar Mhaswade, Added material related to platform services.
0.9	31 August 2006	Kedar Mhaswade. Added material, Made it ready for review.
0.8	29 August 2006	Kedar Mhaswade, created.