# Oracle® Tuxedo System and Applications Monitor Plus

## Enterprise Manager for Oracle Tuxedo User's Guide

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Oracle Tuxedo System and Applications Monitor Plus Enterprise Manager for Oracle Tuxedo User's Guide, Release 22c

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# Preface

This guide discusses how to use Oracle® Tuxedo System and Applications Monitor Plus Enterprise Manager.


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# Using the Enterprise Manager for Oracle Tuxedo

This chapter describes how you can use the Enterprise Manager for Oracle Tuxedo (EM) to monitor Tuxedo targets, integrate with EM functionality, and automatically deploy your Tuxedo applications on different remote machines using resource broker. This chapter contains the following topics:


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# Using Web-Based Console

This section contains the following topics:



## 2.1 Logging into Enterprise Manager Cloud Control

The Enterprise Manager Cloud Control home page is displayed upon logging in. For information about the elements on the home page, click **Help** in the upper right of the page.

## 2.2 Viewing Tuxedo Summary

The Tuxedo Summary page filters all Tuxedo domain targets from a large number of Enterprise Manager monitoring targets, and allows you to centrally manage Tuxedo targets and easily navigate to each target home page.

To enter the Tuxedo Summary page, do the following:

1. Log in to Enterprise Manager Cloud Control as SYSMAN.
2. From the home page, click **Targets > Middleware** at the top.
3. In the Middleware page, click **Middleware Features > Tuxedo Summary**. The Tuxedo Summary page is displayed, as shown in the following figure:

The following figure illustrates Tuxedo Summary Page:



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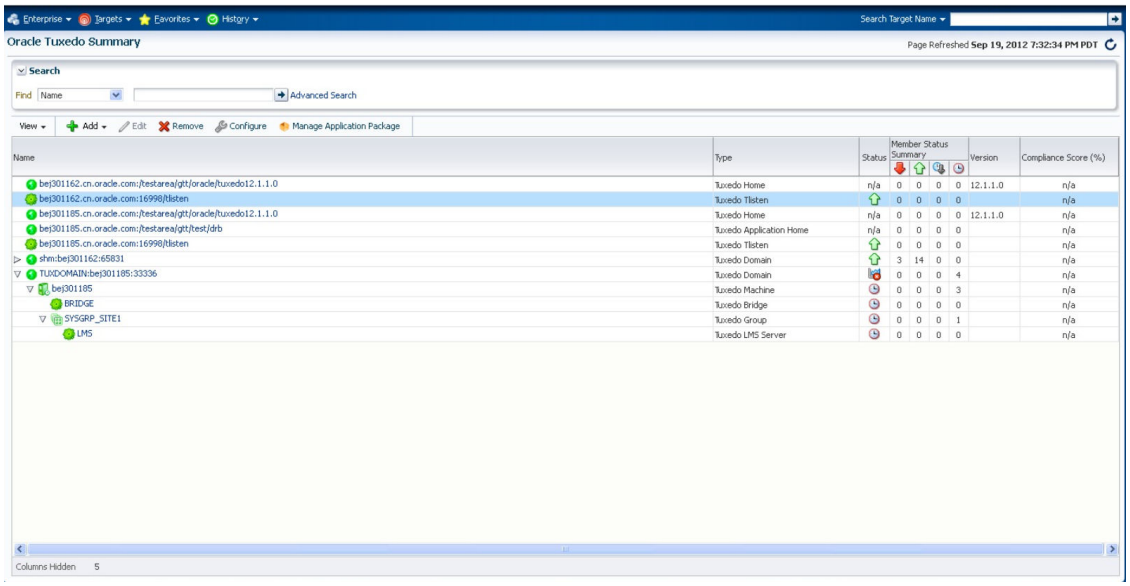
**Figure 2-1 Tuxedo Summary Page**




- Actions Bar
- Search Panel
- Target Summary

## 2.2.1 Actions Bar

The following table lists the action bar functions.

**Table 2-1 Actions Bar Description**

| Action | Description |
|---|---|
| Add | Adds Tuxedo domains to monitoring targets. You can choose to discover existing domains or create a new Tuxedo domain in Resource Broker Domain UBBCONFIG Editor. |
| Edit | Edits the highlighted Tuxedo domain in the Domain UBBCONFIG Editor. |
| Remove | Removes the Tuxedo target and all metrics associated with it from the Enterprise Repository. For Tuxedo domains, this action deletes all Tuxedo targets belonging to it.A Tuxedo `tlisten` target can be removed only if no Tuxedo Machine targets have "Managed_by" associated with them, otherwise a warning message pops up to prevent you from proceeding. |
| Configure | Configures the properties of the highlighted target. |
| Manage Application Package | Manages application packages that are specially used for resource broker feature. |

## 2.2.2 Search Panel

You can quickly search for a target by specific fields using the Search panel.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Select the field to be searched in the drop-down list and enter an appropriate search string in the text box to run a standard search. You can also use Advanced Search to run the search with more extensive filtering.

### 2.2.3 Target Summary

The following table lists descriptions to each summary column fields.

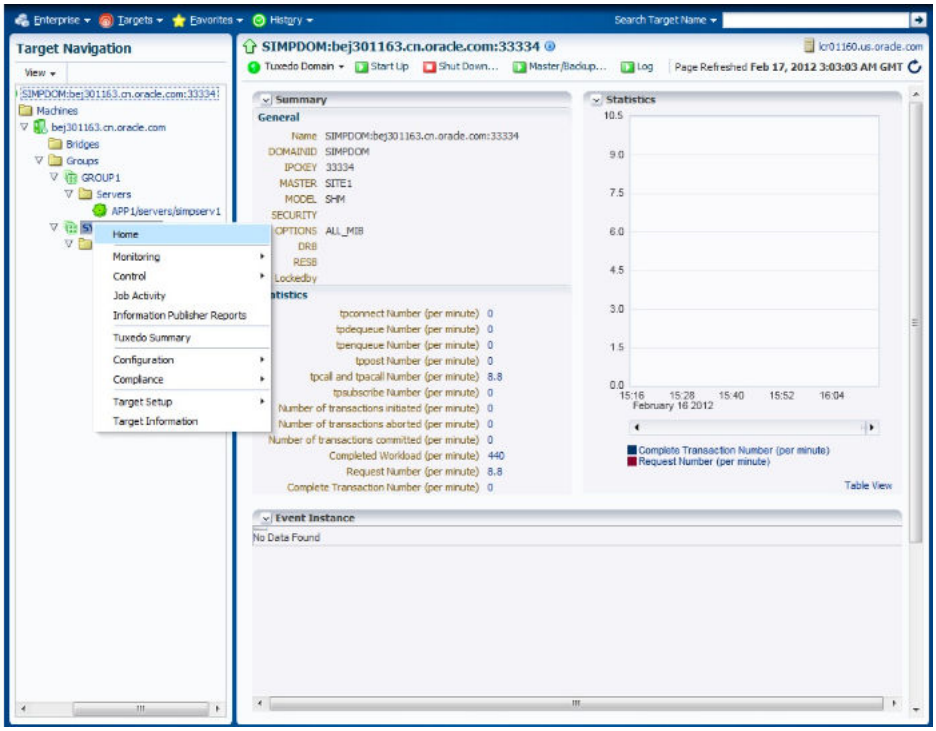
**Table 2-2 Target Summary Description**

| Item | Description |
|---|---|
| Name | The target name. |
| Type | The target type. |
| Status | Shows the target status. |
| Member Status Summary | Shows the statistics of underlying member status. |
| Version | The target version. |

## 2.3 Target Home Page Introduction

When you select a Tuxedo target from the Enterprise Manager Cloud Control home page or Tuxedo Summary page, the Home page for the target is displayed. For example, when you click on a Tuxedo Domain target, the screen shown below appears.

**Figure 2-2 Target Home Page**




The image above shows the target navigation pane on the left and the content page on the right. From the target navigation pane, you can expand or collapse the tree. When you select a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target, the target home page is displayed in the content pane and the target menu is displayed at the top of the page. You can also view the menu for a target by right-clicking the target in the navigation pane.

A typical target home page consists of the following items:

- Target Navigation Tree
- Target Menu
- Content Pane
- Right-Click Target Menu
- UBB Modification
- Credentials Page

## 2.3.1 Target Navigation Tree

Lists all Tuxedo targets monitored by the OMS instance in a navigation tree. All Tuxedo targets belonging to a Tuxedo Domain are displayed in a tree hierarchy as shown below:

**Tuxedo Domain Tree Hierarchy**

```
[Tuxedo Domain Name]
   Tuxedo Machines (Category)
      [Tuxedo Machine 1 name]
         Tuxedo Groups (Category)
           [Tuxedo Group 1 name]
                Tuxedo Server (Category)
                   [Tuxedo Server or System server name 1]
                   [Tuxedo Server or System server name 2]
                   [Tuxedo TMS name 1]
                   [Tuxedo TMS name 2]
                   ...
           [Tuxedo Group 2 name]
           ….
      [Tuxedo Machine 2 name]
```

There are two node types in the tree: category node and target node.

Category node does not correspond to a Tuxedo target; it is used to group all the same type targets under a higher level target. Clicking on the category node can expand or collapse all child nodes under it. Clicking on a target node in the tree shows its Target home page in the content pane.

## 2.3.2 Target Menu

Provides a list of operations that you can perform on the selected target. The menu that appears depends on the target you select. The menu for a specific target contains the same operations as those in the Right-Click Target Menu.

## 2.3.3 Content Pane

Shows the monitoring information of the selected target, including:

- Summary


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Configuration information collected from target Monitoring Configuration.

- Statistics
  In this panel, some important metrics are demonstrated using graphs and tables. By using graphs, you can easily watch for trends; by using tables, you can examine details of past metric severity history.
- Configuration
  The configuration information collected from UBB.

## 2.3.4 Right-Click Target Menu

Provides a list of operations that you can perform on the currently selected target. The menu is displayed when you right-click the target name in the target navigation pane.

## 2.3.5 UBB Modification

Enterprise Manager for Oracle Tuxedo provides a special UBB page for several targets, allowing you to modify UBB configuration from Enterprise Manager Cloud Control console. To enter the Modify UBB page, click **Control >Modify UBB** from the target top menu.

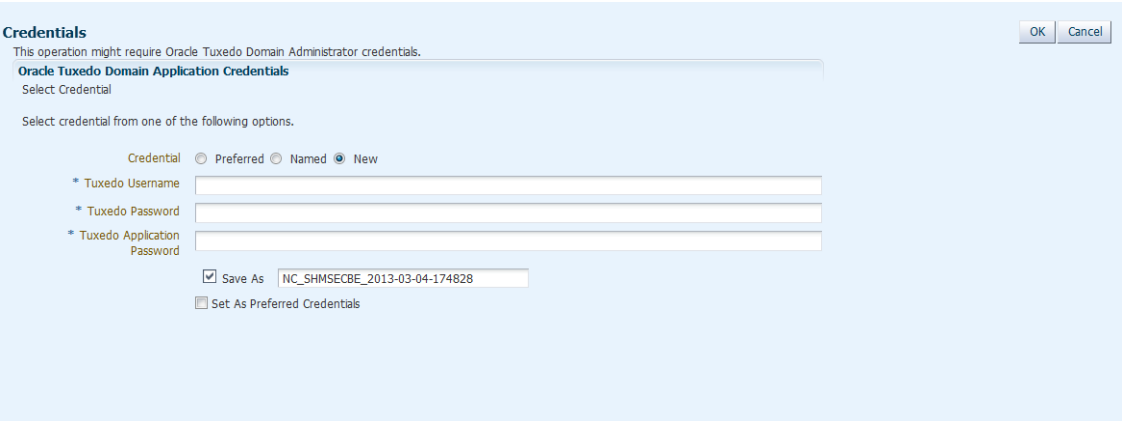
For more information, see Oracle Tuxedo Documentation.

> **Note**
>
> To make the UBB modification function work properly, a `DOMAINID` is required to be configured in the `UBBCONFIG *RESOURCES` section.

## 2.3.6 Credentials Page

For a security domain where the `UBBCONFIG` file `SECURITY` parameter is not `NONE`, when you first time perform high security-level operations (such as shutting up/down the domain, viewing log messages, modifying `UBB`, and so on in its target page or underlying targets page), the Credentials page appears as shown in below.

**Figure 2-3 Credentials Page**




To configure credentials, show in the image above do one of the following: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- Select **New** to create a new one. Set the following parameters:
  - Tuxedo Username/Password/Application Password: These values are used to join Tuxedo applications.
  - Save As: If this checkbox is selected, an Enterprise Manager credential is generated as well.
  - Set As Preferred Credentials: If this checkbox is selected, the newly-created credential is saved as the Preferred one.
- Select **Preferred** or **Named** to load a previous-saved credential. Click OK.

> **Note**
>
> - If Tuxedo Authentication and Authorization is APP_PW, even though Tuxedo does not use the **Tuxedo Username** and **Tuxedo Password** fields value to authenticate or authorize, you must input the two fields as place holders.
> - The new created/selected credential is applied to subsequent Tuxedo administrative operations in the domain during the current session. To change the credential you need to log out of the Enterprise Manager console first.
> - All the Named/Preferred Credentials can be managed by clicking **Setup -> Security** in the Enterprise Manager console.

# 2.4 Monitoring Tuxedo Targets

Before monitoring Tuxedo targets from Enterprise Manager Cloud Control, note the following:

- Make sure the Enterprise Manager OMS, Enterprise Manager Agent, and the DB instance time zones are the same. Take the following SQL script as an example to select SQL and modify the DB instance time zone: `SQL> select dbtimezone from dual;`

```
SQL> select dbtimezone from dual;
SQL> select sessiontimezone from dual;
SQL> alter database set time_zone='<new time zone>';
SQL> alter session set time_zone='<new time zone>';
```

- If you change the collection interval, make sure:
  - the collection interval for the `SERVICE_STATISTICS` metric of all targets in a domain are the same;
  - the collection interval for the `CLIENT_CONNECTION_NUMBER` metric of domain and machine targets in a domain are the same;
  - the collection interval for the domain metric `DOMAIN_OPERATION_STATISTICS` is same to the one of machine metric `MACHINE_OPERATION_STATISTICS` within the domain.
- You can easily change the collection interval for a batch of targets by clicking **Enterprise->Monitoring->Monitoring Templates** to create a template and applying it to multiple targets.
- A 5 or 15 minutes target collection interval is highly recommended.
  The following table summarizes the Tuxedo targets you can monitor from Enterprise Manager Cloud Control and the references to the metrics each target supports and specific administrative operations you can perform on each target home page.


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**Table 2-3 Tuxedo Targets**

| Product | Targets | Ref to Supported Metrics | Operations Provided on Target Homepage |
|---|---|---|---|
| Tuxedo | Tuxedo Home | Tuxedo Home | - |
| | Tuxedo Application Home | Tuxedo Application Home | - |
| | Tuxedo tlisten | Tuxedo tlisten | |
| | Tuxedo Domain | Tuxedo Domain | Switching Tuxedo machine work mode |
| | Tuxedo Machine | Tuxedo Machine | • Migrating servers between two machines<br>• Detecting dead clients or servers<br>• Managing native clients<br>• Aborting transactions<br>• Viewing Tuxedo ULOG |
| | Tuxedo Group | Tuxedo Group | Migrating servers between two machines |
| | Tuxedo Server | Tuxedo Server | Managing services |
| | - | - | - |
| Tuxedo | Tuxedo System Server | Tuxedo System Server | - |
| | Tuxedo Bridge | Tuxedo Bridge | - |
| | Tuxedo TMS | Tuxedo TMS | - |
| | Tuxedo LMS | Tuxedo LMS | - |
| | Tuxedo /T Domain Gateway | Tuxedo /T Domain Gateway | - |
| | Tuxedo Web Service Gateway | Tuxedo Web Service Gateway | - |
| | Tuxedo Workstation Listener | Tuxedo Workstation Listener | Viewing and managing handlers |
| | Tuxedo Jolt Listener | Tuxedo Jolt Listener | - |
| | Tuxedo Event Broker | Tuxedo Event Broker | - |
| | Tuxedo /Q Manager Server | Tuxedo /Q Manager Server | - |
| OTMQ | Tuxedo OTMQ Manager Server | Tuxedo OTMQ Manager Server | Creating a Queue |
| ART | Tuxedo ART CICS Region | Tuxedo ART CICS Region | - |
| | Tuxedo ART CICS Transaction | Tuxedo ART CICS Transaction | - |
| | ART CICS TSQ Server | ART CICS TSQ Server | - |
| | ART CICS TDQ Server | ART CICS TDQ Server | - |
| | Tuxedo Batch System | Tuxedo Batch System | • JES Job Operations<br>• GDG Management |

**Note**

- When you change the collection interval of a Enterprise Manager console target, it takes effect on metrics data collection from the next interval.
- All metrics with repository-side type only process historical database context and cannot be viewed in real time; otherwise, an exception of `NoSuchMetricException` is printed in `oms` log (`$MW_HOME/gc_inst/em/EMGC_OMS1/sysman/log/emoms.log`).


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# 2.5 Viewing TUXCONFIG / BDMCONFIG

Enterprise Manager ECM CCS (Customer Configuration Specification) is used to show Enterprise Manager Agent side configuration files, such as file name, full path name, content size, and content details.

Tuxedo Configuration files, `TUXCONFIG` and `BDMCONFIG`, are shown by CCS.

To show `TUXCONFIG` or `BDMCONFIG`, click Tuxedo Domain Target Instance Home Menu, and click **Configuration > Last Collected**. `TUXCONFIG.cfg /BDMCONFIG.cfg` is displayed under the Configuration Files tree node. If the `TUXCONFIG.cfg` or `BDMCONFIG.cfg` is missing under Configuration Files tree node after the Tuxedo Domain is discovered first time, click the tree root at the left panel. Click **Actions** at right panel, and click **Refresh**.

Click `TUXCONFIG.cfg` or `BDMCONFIG.cfg` under Configuration Files tree node to view each file details.

`BDMCONFIG.cfg` is shown only if it has been configured at Tuxedo side.

> **Note**
>
> - The details of `TUXCONFIG` and `BDMCONFIG` are gotten from decompilation by `tmunloadcf` or `dmunloadcf`. Actually there is no `TUXCONFIG.cfg` or `BDMCONFIG.cfg` disk file at Enterprise Manager agent side as normal CCS module. The file name, full name, and content size of `TUXCONFIG.cfg` or `BDMCONFIG.cfg` are virtual compared with other ECM CCS module.
> - `*JDBCCONNPOOLS` is ignored after running `tmunloadcf` if the `*JDBCCONNPOOLS` section is empty; if the `*JDBCCONNPOOLS` section is not empty, `*JDBCCONNPOOLS` is shown as other sections.

# 2.6 Viewing Configuration Topology

For targets on a JMX agent, you can view the configuration topology by clicking **Members -> Topology** from the Tuxedo Domain context menu. Select **Uses** in the View drop-down list, as shown in Figure below:


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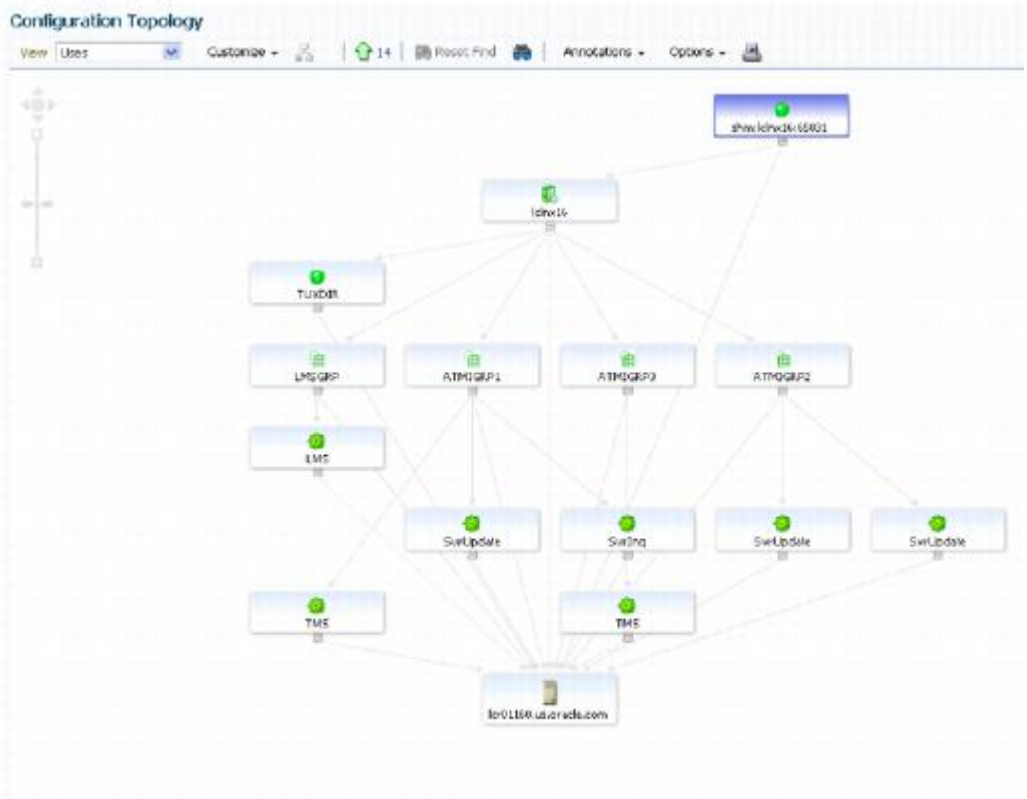
**Figure 2-4 Configuration Topology**





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# 3 TuxJES Monitoring

Enterprise Manager for Oracle Tuxedo enables you to monitor the Tuxedo Job Enqueueing Service (TuxJES) from Enterprise Manager Cloud Control.



## 3.1 Oracle Two-sided Configuration

Before the JES target instance can receive job statistics, do the following steps:

1. Set the environment variable `JESMONITOR=yes` before starting the Tuxedo domain.
2. Configure `UBBCONFIG` file `TMSYSEVT` and `TMUSREVT` parameters.
3. Configure `beamgr.conf TRAP_HOST` and `TMAGENT parameters`. For more information, Oracle SNMP Agent Configuration File: beamgr.conf
   For Enterprise monitoring, the Trap host is the Enterprise Manager agent host, and the port is the Enterprise Manager Agent SNMP listening port which will be configured at Enterprise Manager Agent side (see Monitoring Metrics).

   Following is an example:

   ```
   TRAP_HOST 10.182.54.215 1061 public

   SNMP_ENABLE_AUTH_TRAP 1

   TMAGENT tuxedo_agent_1 /home/oracle/tuxedo12c /home/oracle/test/jmx/fakemp/
   master/tuxconfig
   ```
4. Set the `BEA_SM_SNMP_MIBFILE` and `BEA_SM_BEAMGR_CONF` environment variables. Following is an example:
   - `BEA_SM_SNMP_MIBFILE=${TUXDIR}/udataobj/snmp/etc/mib.txt`
   - `BEA_SM_BEAMGR_CONF=<the directory for beamgr.conf>`
5. Start Oracle SNMP Agent. For more information, refer to Starting Oracle SNMP Agent. Following is an example:

   ```
   tux_snmpd -l tuxedo_agent_1 -p 5400 -s
   ```

> **Note**
>
> If your Enterprise Manager agent located at the same machine as your Tuxedo domain, make sure the port number followed by `-p` option is not equal to the trap port configured in `beamgr.conf`.



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## 3.2 Discovery

TuxJES monitoring discovery is done during the Tuxedo domain discovery process. After Tuxedo domain discovery is done, the JES target instance is created.

## 3.3 Login to TuxJES Monitoring Homepage

To log into TuxJES monitoring homepage, do the following steps:

1. From Enterprise Manager Cloud Control, click a Batch system target.
2. If the Batch system is on a Tuxedo domain where Privilege Mode parameter is not `NONE` (See Privilege Mode), you are required to log in with credentials. Click **Login** .
3. In the **Credentials** page, do one of the following:
   - Select **Preferred** or **Named** to load a previous-saved credential. Click **OK**.
   - Click **New** to create a new one. Set the following parameters:
     - **Tuxedo Username/Password/Application Password**: The login information used for joining the Tuxedo domain. The user name is used as the job owner when submitting a job, or the requestor when controlling jobs. The acceptable length is from 0 to 30 characters. If any of these three credential fields is input incorrectly or not specified, you cannot enter the Batch System target homepage.
     - **Connection String**: Optional. The acceptable length is from 0 to 2047 characters. You can type **NONE** in the field as an empty value.

       > **Note**
       >
       > An Enterprise Manager user cannot change Batch System credentials once logged in until the credentials expire or you log out from the Enterprise Manager Console.

   After you log in to the Batch system target home page, if the Tuxedo domain Privilege Mode parameter is `NONE` (See PRIVILEGE MODE), when you first click **Submit** on the page, a dialog box appears requiring a connection string. Once input, the connection string is saved in the current session until the session expires.

## 3.4 Monitoring Metrics

Tuxedo Batch System is a system target type used to monitor the metrics generated by JES jobs. For more information, see ART Batch Targets.

Before the Tuxedo Batch System can receive JES job statistics, you need to configure the SNMP port. Follow the steps below:

1. From the Tuxedo Batch System homepage, click the target menu. Select **Target Setup -> Monitoring Configuration**.
2. Set the SNMP port in the **Receive Port for SNMP Agent** field to the value configured in `beamgr.confg`.


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# 3.5 Operations on UI Console

You can view all available jobs and perform a set of Job operations by clicking the JES Jobs tag from the Tuxedo JES Admin target homepage. For more information, see JES Job Operations.

# 3.6 Creating an Enterprise Manager Job for Tuxedo Batch Operation

From Enterprise Manager Cloud Control, you can create the following types of JES jobs:

- Tuxedo Batch Process Control: This job makes one of these operations: submit, purge, hold, release, or cancel a Batch job.
- Tuxedo Batch Synchronizes Job: This job synchronizes all the JES Jobs related metrics data with the job statistics stored in JESROOT.
- Purge Tuxedo Batch Jobs: This job purges Batch Jobs at a scheduled time automatically.

To create an Enterprise Manager job, do the following steps:

1. From Enterprise Manager Cloud Control, click **Enterprise -> Job -> Activity**.
2. In the **Activity** page, select the job type in the **Create Job** list and click **Go**.
3. Type a name and description for the Enterprise Manager job.
4. Depending on the job type you selected, do one of the following:
   - For the **Tuxedo Batch Process Control** job, click **Add** to add a Tuxedo Batch System target for this job. Click the **Parameters** tab and select an operation from the **Operation** list and input the related parameters. Following operations can be made for the Batch job:
     - Submit a Batch job
     - Purge a Batch job
     - Hold a Batch job
     - Release a Batch job
     - Cancel a Batch job
   - For the Tuxedo Batch Synchronize Job, click the **Parameters** tab and select one or multiple Tuxedo domains in the **Domains** list. Only Batch domains are listed.
   - For the Purge Tuxedo Batch Jobs, click the **Parameters** tab and set the day/week time in the **Older than** text box. The JES Jobs older than that day/week will be purged. Select one or multiple Tuxedo domains listed in the **Domain** list. Only Batch domains are listed.
5. Click the **Credentials** tab and specify the credential information by one of the following:
   - Select an existing credential in the Preferred or Named category
   - Create a new credential by filling in the required information
     In the case that Tuxedo security is not enabled, you can create a Tuxedo Batch System Credential with any value for **Tuxedo Username**, **Tuxedo Password**, and **Tuxedo Application Password**.


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In the case that Tuxedo security is enabled, the Tuxedo Batch System credentials must be provided to make the JES Job operations. The credential provided here may be the same with the one used on the JES Jobs query page.

6. Click the **Schedule** tab and specify the Batch Job schedule. The Batch Job can be submitted immediately or at the scheduled time.
7. Click **Submit.**

The Enterprise Manager job status is shown in the Enterprise Manager Job Activity page. You can view the Batch Job status from the Tuxedo Batch System target page.

You can also manually synchronize JES jobs by clicking the **Synchronize** button in the Tuxedo Batch System target home page.


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# 4
# GDG Management

Enterprise Manager for Oracle Tuxedo enables you to manage Generation Data Group (GDG) files from Enterprise Manager Cloud Control.



## 4.1 Prerequisites

Before the GDG can receive data, perform the following steps below:

1. Make sure Enterprise Manager, ART Batch, and Oracle Tuxedo are installed.
2. Set up a Tuxedo domain (use the sample `$ART_HOME /Batch_RT/sample/simpjob file` in ART Batch).
   Set the environment variable `JESMONITOR=yes`.
3. Set the GDG management as DB-based in `$ART_HOME/Batch_RT/ejr/CONF/BatchRT.conf`. The values that need to be set in `BatchRT.conf` are:
   - `MT_GENERATION=${MT_GENERATION:-GENERATION_FILE_DB}`
   - `MT_DB=${MT_DB:-DB_ORACLE}`
   - `MT_GDG_DB_ACCESS=${MT_GDG_DB_ACCESS:-"tsam/tsam@tsam"}`
4. Copy the job template `$JESDIR/ejr_mf_ora/pp/macro/template/GDG_PREDEFINED_JOB` to the directory where TuxJES can be found. If `JOBREPOSITORY` is set in the `jesconfig` file, put it under `JOBREPOSITORY`; otherwise, put it under `APPDIR`.

## 4.2 Operations on UI Console

You can manage GDG files by clicking the GDG tag from the Tuxedo JES Admin target homepage. For more information, see GDG Management.



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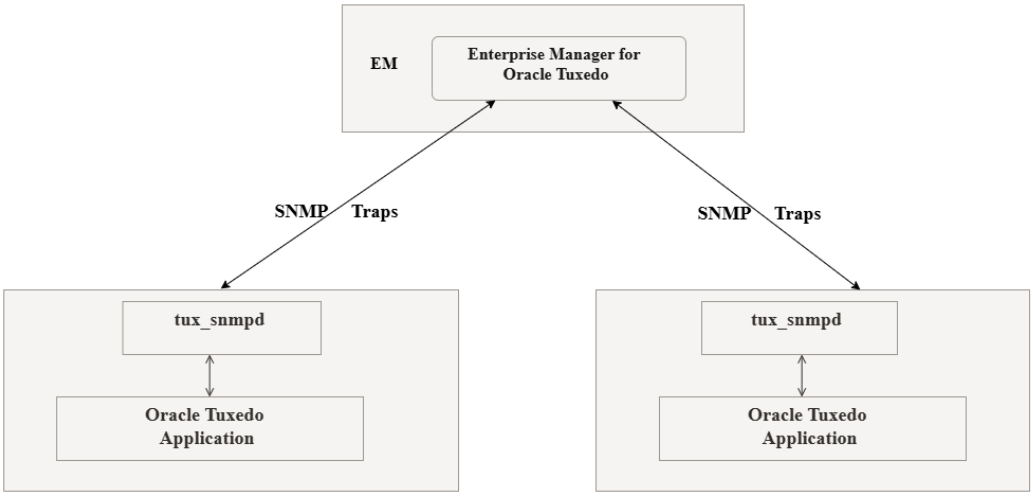
# 5
# Tuxedo Event Monitoring

**Figure 5-1 Tuxedo Event Monitoring Structure**




Every Tuxedo event trap on the domain target is received by the SNMP Receivlet in Enterprise Manager for Oracle Tuxedo. The Enterprise Manager for Oracle Tuxedo generates an Enterprise Manager metric alert with a severity of "Critical" or "WRAN" for the received Tuxedo event traps. "Critical" means the Tuxedo event trap severity is Error (1), while "WRAN" means the Tuxedo event trap severity is Warn (2). The severity Info (3) is not supported. Every alert generated by Tuxedo event trap creates an EM incident automatically if the SNMP listening port is configured correctly.

The event message is in the following format:

```
"EventName: <tuxEventsName>. Tuxedo Event LMID: <tuxEventsLmid>. Tuxedo Event
Detection Time: <tuxEventsTime>. Tuxedo Event Class: <tuxEventsClass>. Tuxedo
Agent Name:<beaLogicalAgentName>. Description: <tuxEventsDescription>"
```

For more information, see Oracle Tuxedo Documentation for Event Traps.

To enable Tuxedo events collection in EM, do the following steps:

1. Configure `TMSYSEVT` in `UBBCONFIG(5)` file.
2. Configure the `TRAP_HOST` and `TMAGENT` in `beamgr.conf`. For more information, refer to Oracle SNMP Agent Configuration File: beamgr.conf..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> **Note**
>
> The Trap host is the EM agent host and the port is the Enterprise Manager Agent SNMP listening port which will be configured at Enterprise Manager Agent in step 5.

Following is an configuration example.

```
TRAP_HOST 10.182.54.215 1061 public

SNMP_ENABLE_AUTH_TRAP 1

TMAGENT tuxedo_agent_1 /home/oracle/tuxedo12c /home/oracle/test/jmx/fakemp/
master/tuxconfig
```

3. Set the environment variable of `BEA_SM_SNMP_MIBFILE` and `BEA_SM_BEAMGR_CONF`
4. Start Oracle SNMP Agent. For more information, refer to Starting Oracle SNMP Agent. Following is an example:

   ```
   tux_snmpd -l tuxedo_agent_1 -p 5400 -s
   ```

> **Note**
>
> If your Enterprise Manager agent located at the same machine as your Tuxedo domain, make sure the port number followed by `-p"` option is not equal to the trap port configured in `beamgr.conf`.

5. Add SNMP listening port in the Tuxedo domain target configuration page.

> **Note**
>
> If one EM agent monitors multiple Tuxedo domains, each Tuxedo domain target SNMP listening port must be unique within one EM agent.

The following figure shows an incident created by EM and caused by Tuxedo event trap.


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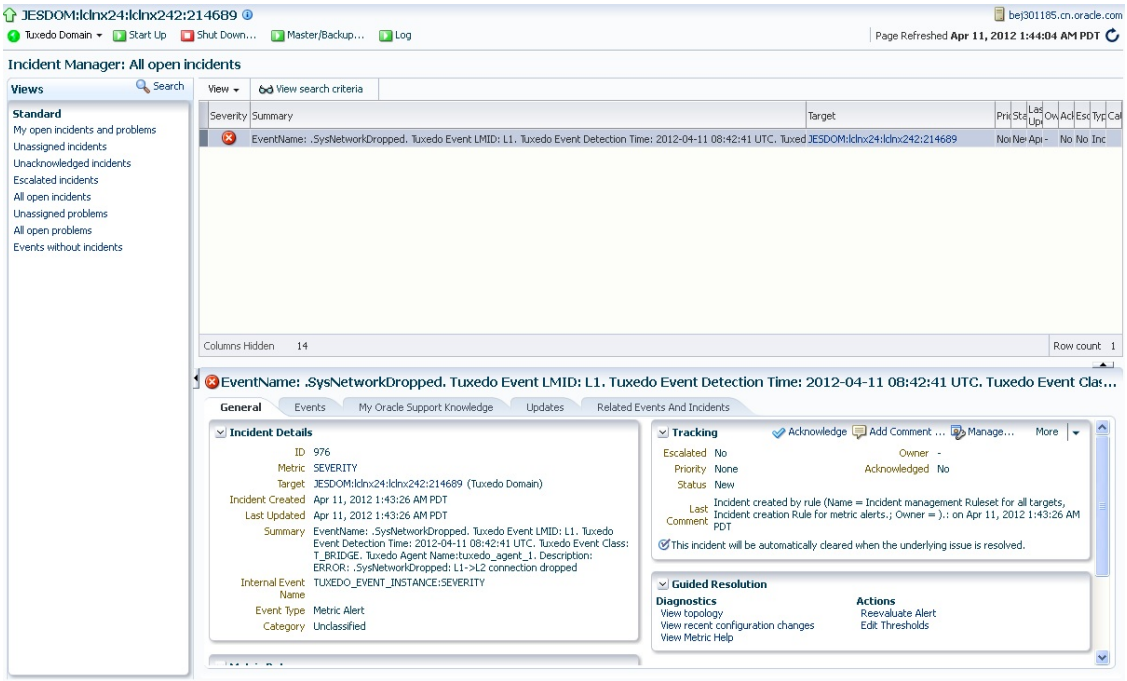
**Figure 5-2 Incident Example**




> **Note**
>
> Tuxedo Event Monitoring can monitor user events when the post data is a 32-bit fielded buffer containing the fields listed in the following table. The Tuxedo user events generated by TSAM Plus alert definitions can be trapped by the Tuxedo SNMP agent and subsequently monitored by Enterprise Manager for Oracle Tuxedo. Also, the `TMUSREVT` and `TMSYSEVT` must be configured for user event collection.

**Table 5-1 FML Fields**

| FML Field Name | Name in Event Trap | Description |
|---|---|---|
| `TA_EVENT_NAME` | `tuxEventsName` | Required. String[1…31] |
| `TA_EVENT_SEVERITY` | `tuxEventsSeverity` | Required. In the format of “ERROR”, "WARN", "INFO " |
| `TA_EVENT_LMID` | `tuxEventsLmid` | Optional. String[1…30] |
| `TA_EVENT_TIME` | `tuxEventsTime` | Optional. Time, in seconds, since 00:00:00 UTC, January 1, 1970 |
| `TA_EVENT_DESCRIPTION` | `tuxEventsDescription` | Optional. String[1…1118] |
| `TA_CLASS` | `tuxEventsClass` | Optional. String[1…30] |

The following code snippet is an example of user event that is trapped by Enterprise Manager for Oracle Tuxedo.

```
#include <stdio.h>

#include <string.h>
```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```
#include <stdlib.h>

#include <errno.h>

#include <time.h>

#ifdef WIN32

#include <sys/types.h>

#endif

#include "atmi.h"

#include "userlog.h"

#include "Uunix.h"

#include <evt_mib.h>

#define NFLOATS 50 /* Number of string fields */

#define LEN(NFLOATS * sizeof(float))
static long long_v;
#define LFADDR(x)(long_v = (x), (char * ) & long_v)
int
main(int argc, char * argv[]) {
   long len;
   int error;
   time_t currtime;
   FBFR32 * buf;
   char decTime[14];

   if (tpinit((TPINIT * ) NULL) == -1) {
      (void) fprintf(stderr, "Failed to join application -- %s\n",
         tpstrerror(tperrno));
      (void) userlog("Clientpost failed to join application -- %s\n",
         tpstrerror(tperrno));
      (void) exit(1);
   }

   if ((buf = (FBFR32 * ) tpalloc("FML32", NULL, Fneeded32(NFLOATS, LEN))) ==
NULL) {
      (void) fprintf(stderr, "Failure to allocate FML32 buffer -- %s\n",
         tpstrerror(tperrno));
      (void) userlog("Clientpost failure to allocate FML32 buffer -- %s\n",
         tpstrerror(tperrno));
      (void) tpterm();
      (void) exit(1);
   }

   if (Fadd32(buf, TA_EVENT_NAME, "Test Event", 0) == -1) {
      (void) fprintf(stderr, "Failed to add TA_EVENT_NAME field -- %s\n",
Fstrerror32(Ferror32));
      (void) tpfree((char * ) buf);
      (void) tpterm();
```


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```
      (void) exit(1);
   }

   if (Fadd32(buf, TA_EVENT_SEVERITY, "ERROR", 0) == -1) {
      (void) fprintf(stderr, "Failed to add TA_EVENT_SEVERITY field -- %s\n",
Fstrerror32(Ferror32));
      (void) tpfree((char * ) buf);
      (void) tpterm();
      (void) exit(1);
   }
   currtime = time(NULL);

   if (Fadd32(buf, TA_EVENT_TIME, LFADDR(currtime), 0) == -1) {
      (void) fprintf(stderr, "Failed to add TA_EVENT_TIME field -- %s\n",
Fstrerror32(Ferror32));
      (void) tpfree((char * ) buf);
      (void) tpterm();
      (void) exit(1);
   }
   if (tppost("Test Event", (char * ) buf, 0, TPSIGRSTRT) == -1) {
      (void) fprintf(stderr, "Failure to post request -- %s\n",
         tpstrerror(tperrno));
      (void) userlog("Clientpost failed to post request -- %s\n",
         tpstrerror(tperrno));
      /* Free any allocated buffers, leave the application, and exit */
      (void) tpfree((char * ) buf);
      (void) tpterm();
      (void) exit(1);
   }

   (void) tpfree((char * ) buf);
   (void) tpterm();

   exit(0);
}
```


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6

# Reporting for Tuxedo Targets

Reporting for monitored Tuxedo targets adopts the Enterprise Manager GC solution. BI publisher is a high customizable product (and is one recommended reporting solution for Enterprise Manager GC).

Follow the *BI Publisher Installation Guide* to install BI on your existing Enterprise Manager. After installing BI, you can go to the BI Publisher Enterprise Reports page by clicking on **Enterprise -> Reports -> BI Publisher Enterprise Reports** from the Enterprise Manager home page.

The new Webapp opens. You can only use the Enterprise Manager administrator user **sysman** to log into the new Webapp.

For more information, see Oracle Enterprise Manager 12c: Reporting with BI Publisher.


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7

# Using Enterprise Manager SLA

In order to use Enterprise Manager Service Level Agreement (SLA) functionality with Enterprise Manager for Oracle Tuxedo, you need to define Generic Service target first. In Enterprise Manager for Oracle Tuxedo, Generic Service targets can only be defined upon the following Enterprise Manager System targets:

- Tuxedo Domain
- Tuxedo Machine
- Tuxedo Group
- Tuxedo ART CICS region
- Tuxedo ART Batch system
  From the Enterprise Manager home page, click **Targets->Services** at the top actions bar to open the Services dashboard. On the Services page, click **Help** on the upper right corner for more information.

From the Enterprise Manager home page, click **Targets->Services** at the top actions bar to open the Services dashboard. On the Services page, click **Help** on the upper right corner for more information.



## 7.1 Creating Enterprise Manager Services

Tuxedo SLA is managed by Enterprise Manager Services SLA. To create an Enterprise Manager service, do the following steps:

1. From the Enterprise Manager home page, click **Targets->Services**. The Service page appears as shown in the showing in the figure below:



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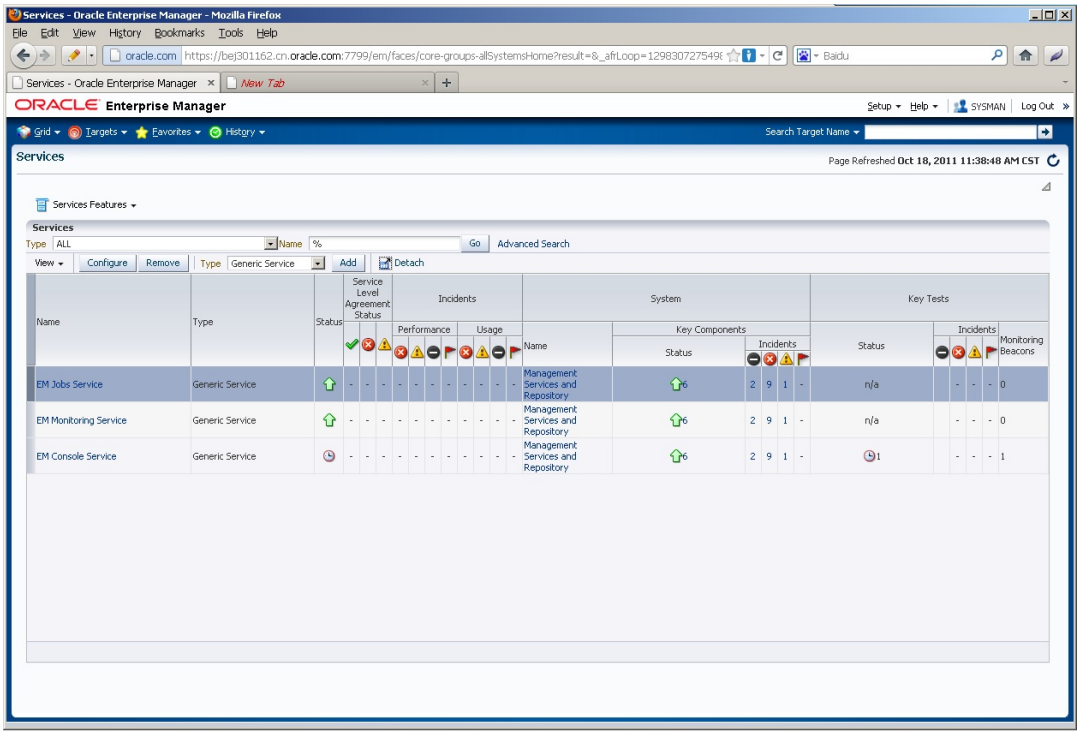
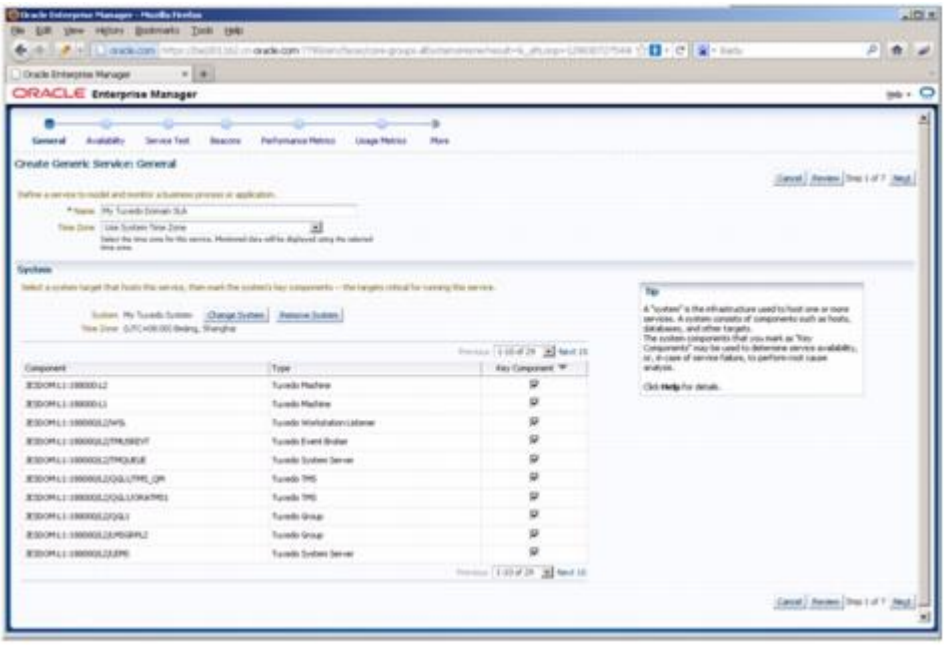
**Figure 7-1 Services Page**




2. Click **Add** to create Enterprise Manager services SLA, as shown in Figure below:

For more information, see online Oracle Enterprise Manager Documentation.

**Figure 7-2 Creating Enterprise Manager Services SLA**




Creating Enterprise Manager services SLA (Continued)


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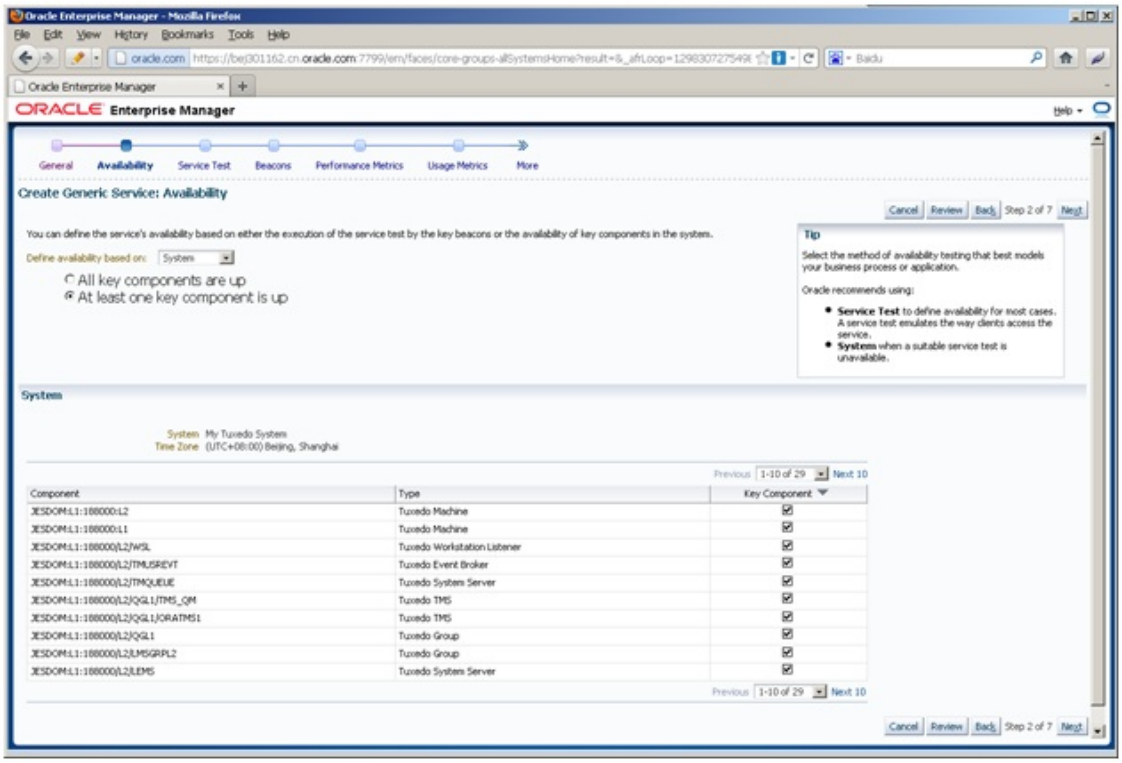
**Figure 7-3 Creating Enterprise Manager services SLA (Continued)**





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8

# Using Resource Broker

This section contains the following topics:



## 8.1 About Resource Broker

Resource Broker is a major Enterprise Manager for Oracle Tuxedo feature that coordinates and allocates resources elastically based on predefined Oracle Tuxedo application policies. It includes the following major functions:

- Manages Oracle Tuxedo application functions by organizing them to application packages.
- Creates a new Tuxedo domain based on application packages using Domain Editor
- Edits both existing Tuxedo domains and new Tuxedo domains created by Resource Broker using Domain Editor.
- Dynamically applies application package content to a running Oracle Tuxedo domain. The deployment can be performed manually or automatically using predefined policies.
- Dynamically adds slave machines to a running Oracle Tuxedo domain. The deployment can be performed manually or automatically using predefined policies.
- Dynamically adjusts the number of certain Tuxedo servers according to the predefined deployment policies.

## 8.2 Application Package Organization and Content

A Tuxedo application (domain), as defined in a `TUXCONFIG` (`UBBCONFIG`) configuration file, is a set of machines, servers, and other resources. It can exist in a single machine or cross multiple network-connected machines. To deploy the entire Tuxedo applications automatically, first you need to upload your application packages from the Enterprise Manager Console. An application package (the basic unit of an application), may contain several Tuxedo application



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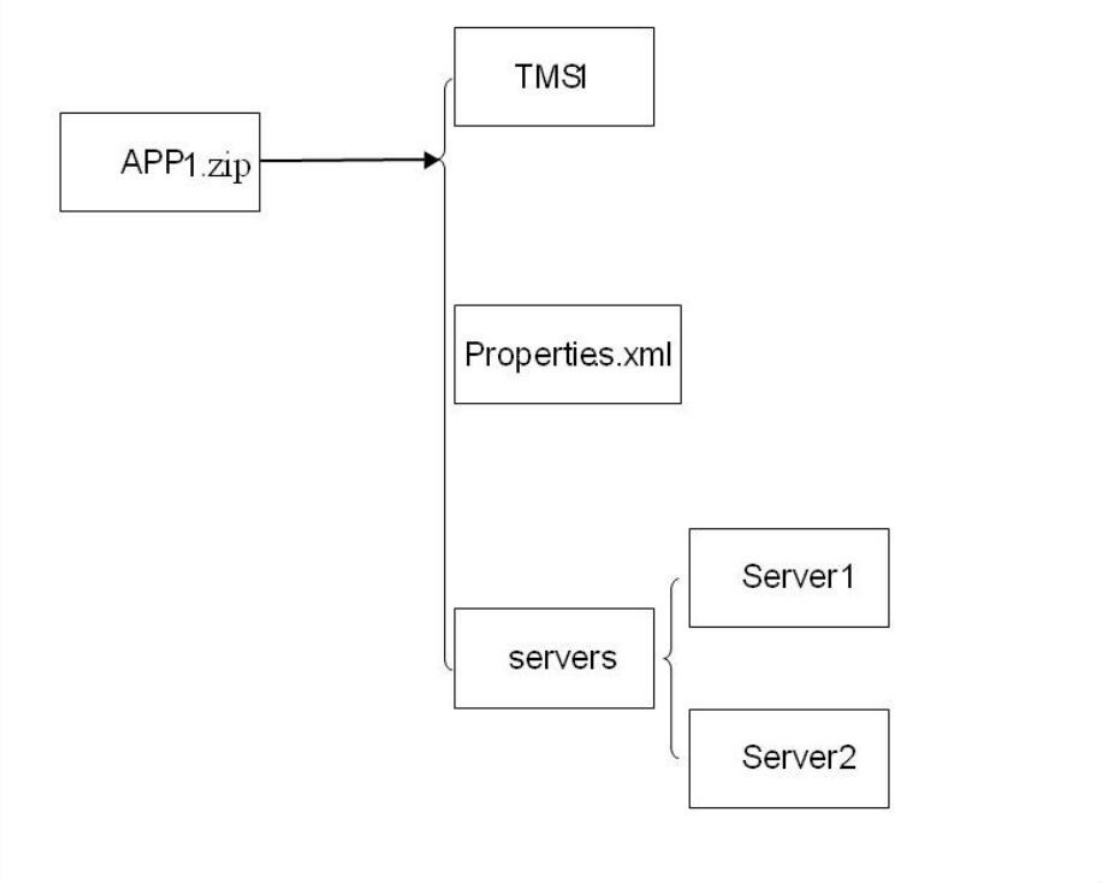
servers and other resources of a Tuxedo group. A Tuxedo application consists of one or more application packages.

One application package can be applied to different domains, one domain on different machines or one domain on the same machine repeatedly.

An application package is a zip file and contains all of the Tuxedo group consisting files that are needed by the Tuxedo system (such as application servers, TMS servers, ENVFILEs, application level configuration files, etc.). The application package structure is shown in the following figure:

**Figure 8-1 Application Package Structure**




- The application package name must be unique within all the uploaded application packages.
- The application package name must consist of 64 characters or less, without containing asterisk (*), comma, or colon.

Under the first directory, you can also create sub-directories to organize your applications. As shown in above graphics, there are two application servers, Server1 and Server2, located in the sub-directory servers.

- Deployed Application Package Structure On Machine
- Properties.xml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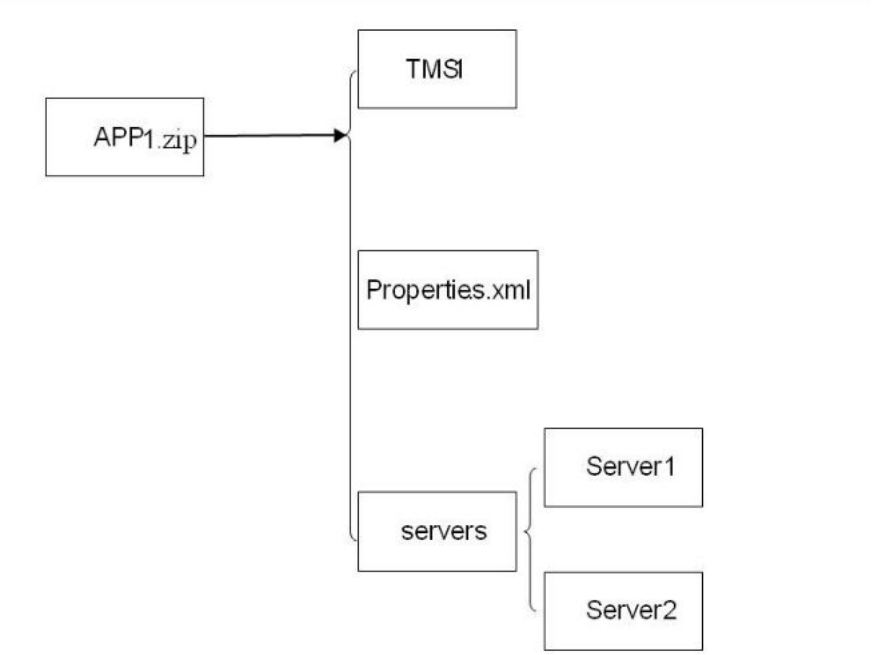
## 8.2.1 Deployed Application Package Structure On Machine

The following figure shows the machine application structure after the package is deployed on the machine. The application structure under DOM1 remains the same as the original application packages.

**Figure 8-2 Application Package Structure After Deployed on Machine**




## 8.2.2 Properties.xml

The "`Properties.xml`" file is a group-level `UBBCONFIG` file which describes the relationship and parameters of all the servers within groups in the package. It contains properties in the `*GROUPS`, `*RMS`, `*SERVERS`, and `*SERVICES` sections of a complete `UBBCONFIG` file and can contain multiple groups.

The `Properties.xml` file is used to generate the final `UBBCONFIG` file when deploying the package to a machine. Its content can be modified at that time.

A simple `Properties.xml` file is shown in listing below:

**Adding Pathname to Server Names**

```
<ApplicationProperties>
<PackageName>APP1.zip</PackageName>
<TuxedoVersion>12.1.3.0.0</TuxedoVersion>
<SupportedOS>Linux</SupportedOS>
<TuxedoWordSize>64<TuxedoWordSize>
<MachineArch>x86_64</MachineArch>
<LibPath>/path/to/libs</LibPath>
```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```
<Groups>
    <GroupSection GROUPNAME="G1" GRPNO="29999">
    <ServerSections>
  <ServerSection AOUT="servers/simpserv1" SRVID="20">
  </ServerSection>
    </ServerSections>
    </GroupSection>
</Groups>
</ApplicationProperties>
```

Besides the Tuxedo group related information in the `Groups` element, there are some package global attributes defined at the beginning of the `Properties.xml` file as shown in the table below:

**Table 8-1 Description Information of the Package**

| Item | Description |
|---|---|
| `PackageName` | The global unique application package name, for example, APP1.zip. |
| `TuxedoVersion` | The Tuxedo version this package is built on. This item is checked when assembling Tuxedo domain to decide if the package is suitable for certain Tuxedo installation. |
| `SupportedOS` | The Operation System this package can be deployed to. This information is compared with the corresponding item in Machine list entry when deploying the package. The possible values are Linux, SunOS, HP-UX, and AIX. |
| `TuxedoWordSize` | The Tuxedo word size this package is built on. The value can be 32 or 64 (bit). This information is compared with the corresponding item in Machine list entry when deploying the package. |
| `MachineArch` | The machine architecture this package can apply to. The possible values are: x86_64, SUNW, powerpc, IA64, and etc. Check the Platform property (Target Setup -> Properties) of a Host target to decide the appropriate value of the MachineArch here. Only when the MachineArch property value is a substring of the host Platform property, the value is a substring of the host property, the package can be deployed on the target machine. |
| `LibPath` | The path where the library locates in the package, if there is a library in it. |

All parameters in the `UBBCONFIG` file `*GROUPS`, `*RMS`, `*SERVERS`, and `*SERVICES` sections are divided into three categories, which determines how they are defined in `Propertise.xml`.

- Forbidden
  Indicates this parameter cannot be defined in the application packages Properties.xml file. It can only be filled in when assembling the `UBBCONFIG` in Resource Broker domain editor.
- Optional
  Indicates this parameter can be filled in the Properties.xml if needed, and it can also be modified when assembling the `UBBCONFIG`.
- Mandatory
  Indicates this parameter must be filled in the Properties.xml, and it can also be modified when assembling the `UBBCONFIG`.

The following table lists the category of each parameter in the `*GROUPS`, `*RMS`, `*SERVERS`, and `*SERVICES` sections.


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**Table 8-2 UBBCONFIG Parameter Categories**

| Section | Parameter | Category |
|---|---|---|
| GROUPS | GROUPNAME | Mandatory |
| | GRPNO = number | Mandatory |
| | LMID = string_value1 [,string_value2] | Forbidden |
| | ENVFILE = string_value | Optional |
| | TMSNAME = string_value | Optional |
| | MRM = {Y \| N} | Optional |
| | SIGNATURE_REQUIRED = {Y \| N} | Optional |
| | ENCRYPTION_REQUIRED = {Y \| N} | Optional |
| | OPENINFO = string_value | Optional |
| | CLOSEINFO = string_value | Optional |
| | TMSCOUNT = number | Optional |
| | SEC_PRINCIPAL_NAME = string_value | Forbidden |
| | SEC_PRINCIPAL_LOCATION = string_value | Forbidden |
| | SEC_PRINCIPAL_PASSVAR = string_value | Forbidden |
| RMS | RMSNAME | Mandatory |
| | RMID = number | Mandatory |
| | TMSNAME = string_value | Optional |
| | OPENINFO = string_value | Optional |
| | CLOSEINFO = string_value | Optional |
| | TMSCOUNT = number | Optional |
| | AUTO = {Y \| N} | Optional |
| SERVERS | SRVID = number | Mandatory |
| | AOUT | Mandatory |
| | ENVFILE = string_value | Optional |
| | RCMD = string_value | Optional |
| | CONV = {Y \| N} | Optional |
| | CLOPT = string_value | Optional |
| | SEQUENCE = number | Optional |
| | RQADDR = string_value | Optional |
| | MIN = number | Optional |
| | MAX = number | Optional |
| | RQPERM = number | Optional |
| | REPLYQ = {Y \| N} | Optional |
| | RPPERM = number | Optional |
| | MAXGEN = number | Optional |
| | GRACE = number | Optional |
| | RESTART = {Y \| N} | Optional |
| | SYSTEM_ACCESS = identifier[,identifier] | Optional |
| | MAXDISPATCHTHREADS = number | Optional |
| | MINDISPATCHTHREADS = number | Optional |
| | THREADSTACKSIZE = number | Optional |


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**Table 8-2 (Cont.) UBBCONFIG Parameter Categories**

| Section | Parameter | Category |
|---|---|---|
| | SEC_PRINCIPAL_NAME = string_value | Forbidden |
| | SEC_PRINCIPAL_LOCATION = string_value | Forbidden |
| | SEC_PRINCIPAL_PASSVAR = string_value | Forbidden |
| | SICACHEENTRIESMAX = string_value | Optional |
| | CONCURR_STRATEGY=PER_REQUEST | Forbidden |
| | CONCURR_STRATEGY = PER_OBJECT | Forbidden |
| SERVICES | SRVGRP = string_value | Forbidden |
| | SVCNM | Mandatory |
| | BUFTYPE = "type1[:subtype1[,subtype2 .<br>. . ]][;type2[:subtype3[, .<br>. . ]]] . . . | Optional |
| | SIGNATURE_REQUIRED = {Y \| N} | Optional |
| | ENCRYPTION_REQUIRED = {Y \| N} | Optional |
| | LOAD = number | Optional |
| | PRIO = number | Optional |
| | BUFTYPECONV = {XML2FML \| XML2FML32} | Optional |
| | BLOCKTIME numeric_value | Optional |
| | SVCTIMEOUT = number | Optional |
| | SESSIONROLE | Optional |
| | AFFINITYSCOPE | Optional |
| | AFFINITYSTRICT | Optional |
| | AUTOTRAN = {Y \| N} | Optional |
| | ROUTING = string_value | Forbidden |
| | TRANTIME = number | Optional |

For more information, see Properties.xml Schema in Enterprise Manager for Oracle Tuxedo Reference.

To make the TMS executable file (generated by command `buildtms`),accessible for Tuxedo application runtime when running `tmboot`, the TMS executable file should be located in sub-directory 'bin' of the application package. The `<package_name>/bin` folder is appended to the environment variable `PATH` in the generated `setenv` file. The `setenv` file is sourced before booting up the Tuxedo application.

For the `ENVFILE` mentioned previously, `RCMD` files, and `control_file` specified by "`TMSYSEVT -f`", this feature does not support deploying them to directories other than `APPDIR`. For example, if `APPDIR` is `/nfs/lcfilerc/vol1/APPDIR`, you cannot specify `ENVFILE=/nfs/lcfilerc/vol2/envfile` in `UBBCONFIG` because `ENVFILE` is under `/nfs/lcfilerc/vol1/APPDIR/APP1/`….


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> **Note**
>
> All the Tuxedo servers dependent third party libraries (such as Database client libraries), are not in the deployment scope of this feature.

# 8.3 Application Package Management

After you have prepared the application packages, you need to upload them using the Enterprise Manager Console. This can be done on the Tuxedo Summary page. For more information, see Viewing Tuxedo Summary.

- Uploading a Package
- Removing a Package

## 8.3.1 Uploading a Package

To upload a package, do the following steps:

1. From the Tuxedo Summary page, click **Manage Application Package**
2. Click **Browse**. Select your package in the File Upload dialog box.

> **Note**
>
> The package names must be unique among all the uploaded packages, otherwise the upload page reports an error.

## 8.3.2 Removing a Package

To delete an existing application package, do the following steps:

1. From the Tuxedo Summary page, click **Manage Application Package**
2. Select one or more packages in the Application Package Name drop-down list. Click **Delete**

# 8.4 Domain UBBCONFIG Editor

Domain `UBBCONFIG` editor is used for creating an Oracle Tuxedo domain or editing a discovered Oracle Tuxedo domain. To enter the Domain editor page, click **Add->Create Tuxedo Domain** on the Tuxedo Summary page; enter a domain name.

Click **OK**. The domain editor initial page appears.

The domain name must be global unique within current EM and consist of 0 to 256 characters.

- Editor Header
- Controls Panel
- Machine List Panel
- Package List Panel
- UBB Section Panels


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## 8.4.1 Editor Header

The editor header on top of domain editor displays the following information:

- Name of the domain being created.
- Domain target status
  It is shown by icons, indicating three status of Status Pending, Up, and Metrics Collection Error. The target status is refreshed every five minutes automatically.
- Domain deployment status
  The same as the status shown on Oracle Tuxedo Summary page.

A refresh button is shown on the top right corner of the page. Clicking on the button refreshes the domain status, as well as, machine/package list.

## 8.4.2 Controls Panel

The following table lists the Controls panel control buttons.

**Table 8-3 Control Buttons**

| Control Button | Description |
|---|---|
| Save | Saves the current domain configuration. You can load the saved domain by clicking **Edit** on the Tuxedo Summary page.<br>When saving the domain, the corresponding `UBBCONFIG` file is generated according to the parameters defined in each section and verified thoroughly. Once the domain is saved it is ready to be deployed. |
| Save & Deploy | Deploys the current domain directly in the domain editor page. Save action is performed automatically for each deployment.<br>There are two kinds of deployment: full (static) deployment and dynamic deployment. The deploy type of each deployment depends on the domain status. |
| Policy Management | Enters the Policy Management console where you define and manage policies centrally. Policies define the conditions that trigger a dynamic deployment/undeployment of application packages and machines and automatic server spawn/decay. For more information, see Policy Management or click **Help** on the upper right of the page. |
| Security Management | Enters the Security Management page. If you enable Tuxedo while assembling a Tuxedo application, you need to configure certain authentication and authorization related information in the Security Management page. For more information, see Security Management or click on **Help** the upper right of the page. |
| DMConfig | Lets you configure each section parameters of `DMCONFIG`. For more information, see Creating Domain Config or click **Help** on the upper right of the page. |
| JESConfig | Lets you configure the Tuxedo system servers that are specific to ART Batch in the Tuxedo domain. For more information, see JES Configuration or click **Help** on the upper right of the page. For the existing domain that is not ART Batch domain, this button is disabled. |
| CICSConfig | Lets you configure the Tuxedo system servers that are specific to ART CICS in the Tuxedo domain. For more information, see Using Resource Broker for ART CICS. For the existing domain that is not ART CICS domain, this button is disabled. |
| Packages | Brings up the application package management dialog (the same as the one on the Tuxedo Summary page). |
| Procedures | Opens the Procedure Activity page in a new tab. |
| Save & Close | Saves current domain configuration and returns to the Tuxedo Summary page. |
| Cancel | Cancels current domain configuration and returns to the Tuxedo Summary page. |


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## 8.4.3 Machine List Panel

The Machine List panel lists all machines managed by EM that are available for deploying Tuxedo domains. Machines used for Tuxedo domain deployment should meet the following two prerequisites:

- The host is being monitored by Enterprise Manager.
  That is, there is one Enterprise Manager agent deployed on that host, and the corresponding agent and host targets have been shown on the All Targets page. The Tuxedo domain can only be deployed to a host with Enterprise Manager agent running locally.
- `tlisten` and Tuxedo Home targets have been discovered and monitored by the Enterprise Manager agent on that host.

> **Note**
>
> - It is strongly suggested that you use the full machine name when adding Enterprise Manager agent and starting the Tuxedo `tlisten` process. Resource broker may not work properly with short machine names.
> - The standalone targets added by **Add Non-Host Targets by Specifying Target Monitoring Properties** in the Discovery page are not supported by Resource Broker.

Once the machine is added to the current domain by clicking '+' button for one machine entry, machine information appears as tooltips when pausing the mouse cursor over the machine entry.

## 8.4.4 Package List Panel

The package list panel (lower right) lists all the uploaded packages t. Also, pausing the mouse cursor over the package name displays detailed package information.

## 8.4.5 UBB Section Panels

On the left side, are the `UBB` section panels. Each `UBBCONFIG` file section corresponds to a panelbox. Only the valid parameters of each section can be edited in this area (that is, only the parameters belonging to the master machine version can be defined).

Initially, when you create an Oracle Tuxedo domain, the Domain `UBBCONFIG` editor provides a limited set of parameters in the `*RESOURCES` section that do not vary among different Tuxedo versions.

The **More ...** in the `*RESOURCES` section and **Add ...** in other sections are disabled. These parameters are displayed until the master machine is added to the domain. Once the master machine is added to the domain, according to the master machine Tuxedo version, all the invalid parameters for each section are filtered out and turned to invisible.

On first entering of the domain editor, the indicator `EXT_MON` of `OPTIONS` parameter is set by default for metrics collection purposes.

- *RESOURCES Section
- *MACHINES Section


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- *GROUPS Section
- *RMS Section
- *NETGROUPS Section
- *NETWORK Section
- *SERVERS Section
- *SERVICES Section
- *ROUTING Section

## 8.4.5.1 *RESOURCES Section

This panel provides a UBB_Resource template that you can choose to generate the UBBCONFIG file *RESOURCES section when creating a domain. The items in the template are listed in the following table:

**Table 8-4 UBB_Resource Template Items**

| Item | Value |
|---|---|
| IPCKEY | 33333 |
| MASTER | NULL When you specify the master machine, this item is generated automatically. |
| MODE | You can specify SHM or MP. |

All items can be modified except for MASTER. The MASTER item is generated as a Locked Variable when you specify the master and backup machines. Besides these parameters, you can add other parameters as well.

You can also create your own UBB_Resource templates and save them in the Software Library. In all templates, MASTER is filled in by the system automatically following above rule.

## 8.4.5.2 *MACHINES Section

This panel provides an UBB_Machine template that you can choose to generate the UBBCONFIG file *MACHINES section when creating a domain and specifying machine. The items in the template are listed in the following table:

**Table 8-5 UBB_Machine Template Items**

| Item | Value |
|---|---|
| ADDRESS | This item is generated by the system according to the machine logical name. It cannot be modified by users. |
| LMID | This item is generated automatically by the system. The naming rule is SITE1, SITE2, and so on. It cannot be modified by users. |
| APPDIR | This item is generated by the system according to the machine and the domain information when you add machines to one domain. |
| TUXCONFIG | This item is in and cannot be changed by users. |
| TUXDIR | This item is generated automatically by the system using the specified by the machine list. It cannot be modified by users. |

You can add other UBBCONFIGfile *MACHINES section parameters to the as well. You can also specify the TLOG to raw disk. The system deletes it when undeploying this domain.


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You can create your own UBB_Machine templates and save them in the Software Library. The parameters replacement follows the rule described in table above.

### 8.4.5.3 *GROUPS Section

When you add an application package to a domain, the system replaces some *GROUPS section parameters in Properties.xml as shown in the table below:

**Table 8-6 GROUPS Section Parameters**

| Item | Value |
|---|---|
| GROUPNAME | This item is generated automatically by the system. The naming rule is GROUP1, GROUP2, and so on. It cannot be modified by users. |
| LMID | This item is generated by the system according to the machine to which the package is deployed. |
| GRPNO | This item is generated automatically by the system. It cannot be modified by users. |

For more information, see Table 8-2. You can add other parameters to the UBBCONFIG file as well.

### 8.4.5.4 *RMS Section

When you add an application package to one domain, the system replaces some *RMS section parameters Properties.xml as shown in the table below:

**Table 8-7 *RMS Section Parameters**

| Item | Value |
|---|---|
| RMSNAME | This item is generated automatically by the system. The naming rule is RMS1, RMS2, and so on. It cannot be modified by users. |
| SRVGRP | This item will be replaced with the new group name generated by the system before. It cannot be modified by users. |
| RMID | This item is generated automatically by the system. The naming rule is 1, 2, and so on. It cannot be modified by users. |

For more information, see Table 3-3. You can add other parameters to the UBBCONFIG file as well.

### 8.4.5.5 *NETGROUPS Section

All the parameters in this section should be entered manually by users if needed.

### 8.4.5.6 *NETWORK Section

This section is also included in the UBB_Machine template. If the domain is in MP mode, the system automatically adds this section to the UBBCONFIG file as shown in table below:

**Table 8-8 *NETWORK Section Parameters**

| Item | Value |
|---|---|
| LMID | This is generated automatically by the system. You cannot modify it. |


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**Table 8-8 (Cont.) *NETWORK Section Parameters**

| Item | Value |
|---|---|
| NADDR | The system will generate //hostname:port_number, from which you can modify the port_number. |
| NLSADDR | The system will generate //hostname:port_number, from which you can modify the port_number. |

You can add other parameters to the UBBCONFIG file as well.

## 8.4.5.7 *SERVERS Section

When adding an application package to a domain, system replaces some *SERVERS section parameters in Properties.xml as shown in the table below:

**Table 8-9 *SERVERS Section Parameters**

| Item | Value |
|---|---|
| SVRGRP | This item is replaced with the new group name generated by the system before. It cannot be modified by users. |
| SRVID | This item is generated automatically by the system. The naming rule is 1, 2, and so on. It cannot be modified by users. |

For more information, see Table 3-3. You can add other parameters to the UBBCONFIG file as well.

## 8.4.5.8 *SERVICES Section

When adding an application package to a domain, system replaces some *SERVICES section parameters in Properties.xml as shown in the table below:

**Table 8-10 *SERVICES Section Parameters**

| Item | Value |
|---|---|
| SRVGRP | If Properties.xml contains this parameter, the system replaces it with the corresponding group generated before. Although this parameter is not mandatory, it is recommended that you add it. When there are same services in different application packages, they can have different operations. |
| ROUTING | If Properties.xml contains this parameter, then the system replaces it with the corresponding routing name generated by the system. |

For more information, see Table;3-3. You can add other parameters to the UBBCONFIG file as well.

## 8.4.5.9 *ROUTING Section

When adding an application package to a domain, system replaces some *ROUTING section parameters in Properties.xml.


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For other `Properties.xml` file `*ROUTING` section parameters, the system keeps their values and allows you to modify manually. You can add other parameters to the `UBBCONFIGfile` as well.

**Table 8-11 *ROUTING Section Parameters**

| Item | Value |
|---|---|
| `ROUTING Section Parameters` | This item is generated automatically by the system. The naming rule is ROUTING1, ROUTING2, and so on. It cannot be modified by users. |
| `RANGES` | The group of this parameter will be replaced by the system. |

# 8.5 Deploying Application Packages to Tuxedo Domain

Typically, you need to perform the following procedures to deploy application packages to a Tuxedo domain:

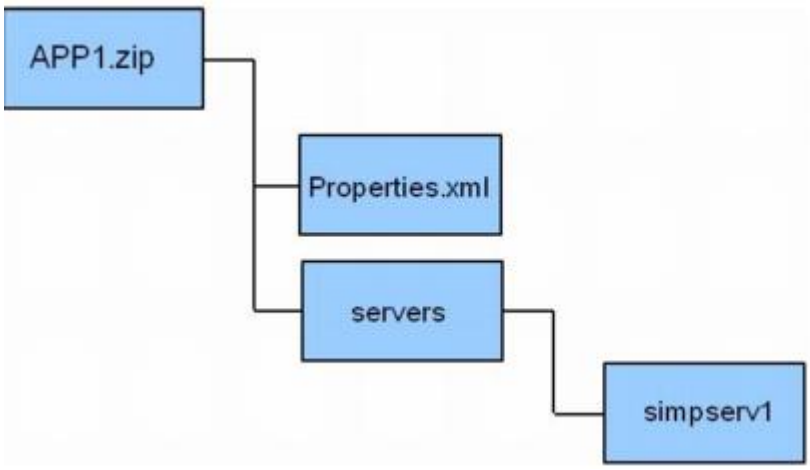
- Preparing Application Packages
- Discovering Tuxedo tlisten and Tuxedo Home
- Preparing a Tuxedo Domain
- Loading an Existing Domain
- Deploying Application Packages to Domain
- Deploying the Domain to Remote Machine

## 8.5.1 Preparing Application Packages

Each machine needs one application package. Refer to the descriptions in Application Package Organization and Content to prepare two application packages: `APP1.zip` and `APP2.zip`.

APP1.zip content structure is shown in following figure:

**Figure 8-3 APP1.zip Content Structure**




`APP1.zip Properties.xml` is shown in the listing below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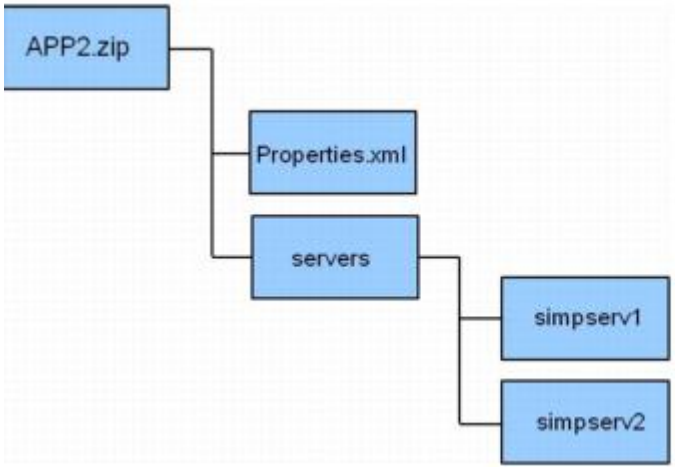
**APP1.zip Properties.xml**

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<ApplicationProperties>
<PackageName>APP1.zip</PackageName>
<TuxedoVersion>12.1.3.0.0</TuxedoVersion>
<SupportedOS>Linux</SupportedOS>
<TuxedoWordSize>64</TuxedoWordSize>
<MachineArch>x86_64</MachineArch>
<GroupSection GROUPNAME="GROUP1" GRPNO="29999">
<MRM>N</MRM>
<ServerSections>
<ServerSection AOUT="servers/simpserv1" SRVID="30000">
<CONV>N</CONV>
</ServerSection>
</ServerSections>
</GroupSection>
</ApplicationProperties>
```

`APP2.zip` content structure is shown in the following figure:

**Figure 8-4 APP2.zip Content Structure**




`APP2.zip Properties.xml` is shown in below:

**APP2.zip Properties.xml**

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<ApplicationProperties>
<PackageName>APP2.zip</PackageName>
<TuxedoVersion>12.1.3.0.0</TuxedoVersion>
<SupportedOS>Linux</SupportedOS>
<TuxedoWordSize>64</TuxedoWordSize>
<MachineArch>x86_64</MachineArch>
<GroupSection GROUPNAME="GROUP1" GRPNO="29999">
     <ServerSections>
```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```
<ServerSection AOUT="servers/simpserv2" SRVID="20000" />
<ServerSection AOUT="servers/simpserv3" SRVID="20010" />
            </ServerSections>
    </GroupSection>
</ApplicationProperties>
```

After the application packages are prepared, refer to Uploading a Package to upload them to EM through Manage Application Package on the Tuxedo Summary page.

## 8.5.2 Discovering Tuxedo tlisten and Tuxedo Home

Before a host can be used for deploying Tuxedo domains, Tuxedo `tlisten` and Tuxedo home targets must be discovered by EM agent on the host.

To discover Tuxedo `tlisten` and Tuxedo home targets, do the following steps:

1. From the Oracle Tuxedo Summary page, click **Add > Oracle Tuxedo Domain Discovery**
2. Fill in the `tlisten` host name and RMI port. Select a EM agent you want to use for discovery.
3. Uncheck **Find Oracle Tuxedo Domains**
4. Click **Discover Now**

> **Note**
>
> The two targets must be discovered by the preceding discovery process. Adding the two targets as standalone target separately does not work for Resource Broker.

## 8.5.3 Preparing a Tuxedo Domain

To prepare a Tuxedo Domain to be deployed, you can edit an existing domain discovered by Enterprise Manager or create a new domain. You can create two types of Tuxedo domains: SHM domain and MP domain.

- Creating an SHM Domain
- Creating an MP domain
- Edit a Discovered Domain

### 8.5.3.1 Creating an SHM Domain

To create an **SHM** domain, do the following:

1. Refer to Domain UBBCONFIG Editor to enter the domain editor page.
2. Fill out the `*RESOURCES` section.


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> **Note**
>
> - **IPCKEY**: This parameter is initialized to 33333 automatically for each new created domain.
> - **DOMAINID**: This parameter takes the last specified domain name by default.
> - **MASTER**: You can leave it blank since the value is initialized automatically when you add the first machine to the domain.
> - **MODEL**: Keep the default value, MP, to make dynamic machine deployment possible even if you are creating an SHM domain.
>
> Click **More...** to show more options.

3. From the Machine List panel, add a machine to domain by clicking + beside the machine name.
   A popup dialog is displayed to collect machine related information.

   If it is the first time the machine is being added, the **Application Home** option must be specified. The Application Home is the root directory where all domains are deployed. The “Environment Path Variable” can also be specified when adding a machine. It is a colon (UNIX/Linux) or semi-colon (Windows) separated string that contains paths where the environment specific commands are searched for. For example, the compiler or Oracle DB client that could be used by user programs.
4. Click **OK**.
   Another popup dialog which contains all `UBBCONFIG` file `*MACHINES` section parameters is displayed.
5. Fill in any parameter specific to this Tuxedo machine. Click **OK**.
   After a domain is created, the following changes appear on the page:
   - All the required information for this machine is collected and one `UBBCONFIG` file entry is added to the `*MACHINES` section on the left side.
   - Several `UBBCONFIG` file entries are generated automatically in other sections as well.
   - An LMS server (used for monitoring data collection), is added to the `*SERVERS` section. It is a mandatory server to enable the machine to be monitored by EM.
   - A grroup named `SYSGRP_<LMID>` is added to include LMS server.
   - The `*NETWORK` section entry is also added automatically.

## 8.5.3.2 Creating an MP domain

The procedures of creating an MP domain are similar to creating an SHM domain. An additional task is required; adding another available machine for deployment.

To deploy EM agent to a new host, do the following:

1. From the Enterprise Manager home page, click **Setup->Add Target->Add Targets Manually.**
2. In the Add Targets Manually page, select **Add Host Targets**. Click **Add Host …**
3. Enter the information required to deploy a new agent step-by-step to finish the deployment. For more information, click **Help** in the upper right of the page.

   After the deployment is successfully completed, you can find two new targets in the All Targets page. This is a prerequisite for discovery on the new host.


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To make the newly-added machine available for Tuxedo domain deployment, the `tlisten` process must be started and discovered on the 'Tuxedo Domain Discovery' page by the EM agent. Refer to Discovering Tuxedo tlisten and Tuxedo Home for instructions. Once the `tlisten` and Tuxedo home targets are discovered, verify the status on the Domain UBBCONFIG Editor page; the newly-added machine appears in the machine list.

### 8.5.3.3 Edit a Discovered Domain

To edit a discovered domain, do the following:

1. From the Oracle Tuxedo Summary page, select the domain you want to edit.
2. Click **Edit**. The domain is loaded in Domain UBBCONFIG Editor.
3. Refer to preceding sections to edit the domain.

> **Note**
>
> - Only when tlistens running on all machines deployed in a domain are discovered by their local Enterprise Manager agents, the domain can be edited.
> - Some files will be overwritten after deployment of the existing domain, such as `setenv.sh java.env`.
> - Full deployment with security is not supported for the existing domain.
> - For the ART CICS domain configured with MP mode, the `KIXDIR` and `COB installation DIR` must be set the same for machines.

## 8.5.4 Loading an Existing Domain

Resource Broker works for existing domains either. Before an existing domain can be deployed with application packages, you need to make sure the following:

The domain is running and has been discovered on Enterprise Manager.

All machines in the domain have Enterprise Manager agent installed and running.

The domain is discovered using the Enterprise Manager agent of master machine, while the tlisten and tuxedo home targets on other slave machines are discovered using the corresponding Enterprise Manager agent of each machine.

Once you confirm the above prerequisites are met, load the existing domain parameters to Domain Editor by the following steps:

1. Refer to Viewing Tuxedo Summary to enter the Tuxedo Summary page.
2. Highlight the domain you want to deploy, click **Edit**.
   The UBBCONFIG and DMCONFIG parameters are retrieved from Tuxedo domain backend, and then are parsed and filled in the corresponding section in the Domain Editor. Exceptionally, the default value of `IPCKEY`, `DOMAINID`, and `MASTER` in the `RESOURCES` section of UBBCONFIG editor cannot be changed.

   On the right side, all the machines available for adding to the domain are listed in the Machine List panel. If a machine belongs to the existing domain, the '+' button beside its name is disabled.


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The Package List panel box contains all the Tuxedo application packages. If a package is available to be added to the machines in the domain, its '+' button is enabled.

ART Batch and ART CICS configuration is not supported on the existing domain. If the original domain has ART Batch or ART CICS system configured, Resource Broker keeps the ART related resources untouched during a full deployment or a dynamic deployment. In that event, you need to provide correct environment variables so as to booting up the system.

- Controls

### 8.5.4.1 Controls

A few controls in the Controls panel box have special behaviors than the ones of a Resource Broker created domain.

- Save
  At the first time saving of the loaded existing Tuxedo domain, the application home targets are created automatically. The application home path is determined by the corresponding APPDIR on each machine. It is the parent directory of APPDIR.

  A window for collecting the credential information of each machine in the Tuxedo domain is displayed after the validation phase. The credential information is used by the subsequent deployment actions, especially for the dynamic deployment.

  Once the domain is saved, it is turned to a Resource Broker managed domain, which means the domain configuration status will be maintained on OMS side and all the changes made directly to the Tuxedo domain backend will not be detected by Resource Broker anymore.
- Deploy

During a full deployment, the APPDIR path is kept unchanged. This requires that the provided credential must has write permission to the application home (the parent directory of APPDIR), otherwise the deployment will fail.

In boot phase, you need to customize the boot script to provide any required environment variables.

## 8.5.5 Deploying Application Packages to Domain

To add an application package to a domain, do the following steps:

1. Click **+** beside the package entry you want to add to the Package List.
   The Add Application Package popup dialog appears. In the dialog, the Machines drop-down list shows all machines added to this domain and are applicable for this package.

   > **Note**
   >
   > The **+** button is inactive if the package is not suitable for the machine.

2. Check the machine entry tooltip information and package entry respectively to make sure the OS type, machine architecture, and Tuxedo version all match.
3. Click **OK**.

All entries described in `Properties.xml` of the package are added to the corresponding `UBBCONFIG` file sections as shown in figure below:


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The (*) signs before the GROUPS entry and SERVERS entry indicate new-added items to this domain that have not been deployed.

**Figure 8-5 New Added Entries**


The GROUPNAME and GRPNO parameters are generated automatically when adding the package. All groups and their assets defined in Properties.xml are added to the domain. Unlike machine entries, one application package can be added more than one time.

The Tuxedo domain is ready to be deployed and monitored.

## 8.5.6 Deploying the Domain to Remote Machine

After completing all necessary configuration for the Tuxedo domain, do the following steps to deploy the domain to a remote machine:

1. Click **Save&Deploy** in the Controls panel to deploy and boot the domain.
   The new Tuxedo Domain target is created (in the following format)

   <DomainId>:<PMID of master machine>:<domain IPCKEY>.

   > **Note**
   >
   > During every deployment process, all machine user credentials included in this domain are required. If the user credentials are inputted once, the retained ones are displayed. You must be a valid OS user on the target machine and have write privileges to the Application Home directory. The user must be in the same user group as the one who installed the Management Agent.

2. From the checkbox that indicates whether or not to boot the deployed domain, you can choose to customize the config and boot scripts for special requirements (for example, create TLOG, QUE, or ENVFILE).


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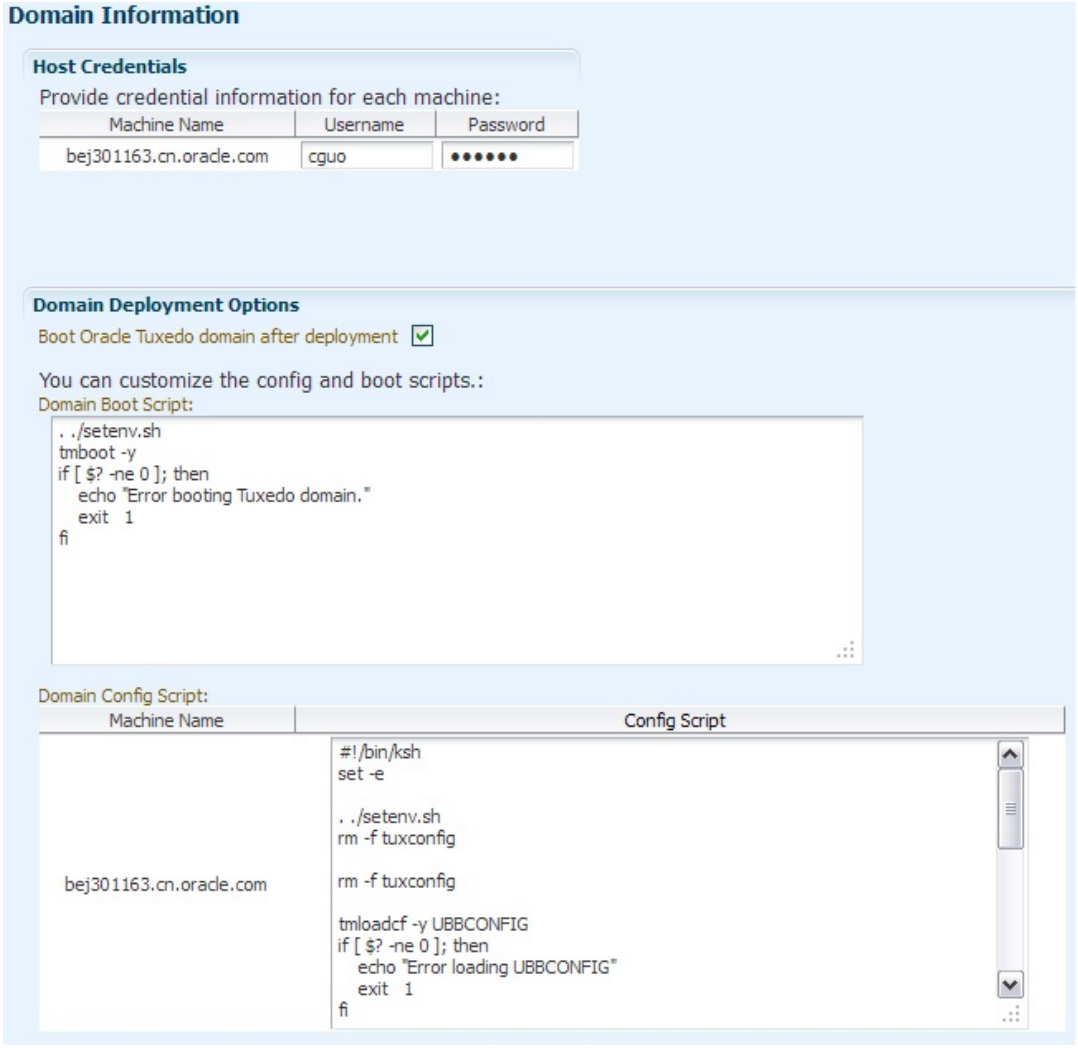
**Figure 8-6 Domain Deployment Options**




> **Note**
>
> Because certain information may not be collected from an existing domain, when deploying new machines or special servers to the existing domain, you need to manually add extra script before deployment.

3. Enter the usernames and passwords, and click **OK** on the upper right corner to proceed to the deployment tracking page.
4. Since the deployment is an asynchronous procedure, you need to manually refresh in the page periodically, or set the auto refresh rate at the upper right corner of the page. When all the steps are successful, the domain has been deployed to the Application Home on the target machine, and booted. The last step of deployment is **CheckDeployStatus**, where the deployment status is checked and corresponding entries status in the domain editor is changed accordingly. If the deployment is successful, an automatic domain discovery is performed. The new discovered targets belonging to the domain can then be found in the All Targets and Tuxedo Summary page.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# 8.6 Deploying an Application Package Dynamically

To deploy an application package dynamically, do the following steps:

1. Select the SHM domain target created before, for instance, in the Tuxedo Summary page and then click **Edit**
   The domain content is reloaded into the Domain UBBCONFIG Editor page.
2. Click **+** beside package APP2.zip to add it to the domain.
   The two servers `simpserv2` and `simpser3` in the group described in `APP2.zip Properties.xml` are added to the `*SERVERS` section.
3. Click **Save &Deploy** to activate the newly-added group and servers.

> **Note**
>
> - The domain must be in **Up** status when deploying the application package.
> - After deploying, only the newly-added packages are delivered to the existing domain `APPDIR`, and the included new group/servers are activated by Tuxedo MIB calls.
> - This feature is not supported for the existing ART CICS domain.

Once the deployment is complete, the new directory, `APP2,` can be found in domain `APPDIR` and the new targets corresponding to `GROUP2` and `simpserv2/simpserv3` are created.

# 8.7 Updating a Deployed Application Package

Sometimes you may need to update the application packages that have been uploaded. Currently, you can manually update it following these steps:

1. Remove the old package and then upload the updated one in the Manage Application Package dialog box in Tuxedo Summary page. See Uploading a Package and Removing a Package.
2. Shut down the Tuxedo domain which needs to be updated.
3. After the domain target status changes to down status, right click the domain target in the Tuxedo Summary page, and then select **Control->Deploy** to perform a full deployment of the domain.

# 8.8 Removing Package-Associated Groups

Once the package associated groups are added to a machine, the 'X' button beside the package name is available to remove the package from the machine.

To remove the package associated groups, do the following steps:

1. Click the **X** button beside the package you want to remove.
2. In the window that appears, choose the target groups in the package removing popup dialog. According to the selected groups, do one of the following:
   - For package-associated groups that have not been deployed and activated on a Tuxedo machine (indicated by *****), click **OK** to remove the selected groups/members.


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- For deployed and activated package-associated groups, a **Remove from management server only** checkbox is displayed.
  If you leave it unchecked and click **OK**, an instant undeployment action is triggered completely removing the selected groups from Tuxedo application runtime. If you check it and click **OK**, the selected groups are removed from the UI only, not impacting underlying Tuxedo application.

  Once such action is performed, no further dynamic deployment can be performed until full deployment is carried out for the domain.

# 8.9 Dynamic Resource Broker

The Dynamic Resource Broker enables Tuxedo server manual and policy-driven deployment, groups, and machines on a running Oracle Tuxedo domain for flexible resource allocation of a certain Enterprise Manager target.

There are three levels of dynamic deployment:

- Manual Dynamic Deployment
- Policy-Driven Dynamic Deployment
- Policies

## 8.9.1 Manual Dynamic Deployment

Both Tuxedo application packages and Tuxedo machines can be added to an active domain manually.

To deploy a package manually, click **Save & Deploy** on the **Controls** panel when there are new added packages to the domain (identified by an asterisk '*').

Once the **Save & Deploy** button is clicked, the current domain editing status is saved and a full validation is started on the domain `UBBCONFIG`. If the validation fails, the deployment process is stopped and an error message appears.

> **Note**
>
> The `UBBCONFIG` entries added manually by clicking **Add**… cannot be deployed and activated dynamically. Dynamic deployment only works on `UBBCONFIG` entries imported from application packages. To make the manually added `UBBCONFIG` entries active, a full deployment of the domain must be performed.

To deploy a machine manually, do the following steps:

1. Click the plus '**+**' in the **Machine List** panel to add a machine.
   The newly-added machine is identified with asterisk (*) at the beginning of each imported `UBBCONFIG` entry.
2. Configure the new machine in the `UBBCONFIG` section editor, if needed.
3. Click **Save & Deploy** in the **Controls** panel.

The deployment takes place immediately using the collected machine credentials and adds the new machine to the domain as a slave machine.


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> **Note**
>
> The machine-level dynamic deployment supports domains in MP mode only.

## 8.9.2 Policy-Driven Dynamic Deployment

The following three levels of dynamic deployment are driven by user-defined policies:

- **Package-level**
  Dynamic deployment or undeployment of one or more application packages on an active Tuxedo machine is triggered under certain conditions (for example, CPU load is low and does not exceed 60%). The final machine where the packages are deployed is selected among the candidate machines according to the predefined filtering policy.

  Before you create a package-level policy, packages should be added from the Package List as candidates ("**As Candidate"** checkbox is checked). You can modify the imported `UBBCONFIG` entries detailed configuration by clicking **Edit** for each entry and then create deployment policies for the candidate packages in the Policy Management console.

  > **Note**
  >
  > Before dynamic deployment of a package, any newly introduced TMS server must be put under the directory referred by the `PATH` environment variable on Tuxedo boot-up, otherwise, the TMS server will not be able to be found by Tuxedo application runtime, even if it is located in the bin sub-directory of the package.

- **Machine-level**
  Dynamic deployment or undeployment of machines is triggered when some conditions (incident rules), defined by policy are met.

  You can define policies on the new added machine entries to convert them to candidate machines. The final machine to be deployed is selected among the candidate machines according to the predefined filtering policy.

  Machine-level dynamic deployment is often used together with package-level deployment. When a machine is dynamically deployed, the packages added to the machine are deployed at the same time.

- **Server-level**
  The number of deployed running Tuxedo servers can be increased or decreased automatically when some conditions (incident rules), defined by policy are met. The minimum and maximum server number depends on the `MIN` and `MAX` parameter set in the `UBBCONFIG`.

For more information, see Policies.

## 8.9.3 Policies

The Resource Broker deployment policy (which works in association with Enterprise Manager incident rules), defines under what conditions the Resource Broker deployment policy evaluation is triggered.

- Creating an Incident Rule
- Creating a Policy


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## 8.9.3.1 Creating an Incident Rule

An incident rule specifies condition details that trigger a resource broker policy. The condition can be complex and made up of criteria combination that represents the event characters (for example, the event type, severity, category, and etc.). By defining incident rules, you can specify when one of the following conditions is met, the deployment policies are evaluated:

- The CPU utilization of a host reaches 85%
- The average execution time of certain Tuxedo service exceeds 500 microseconds
- Some Tuxedo machines are down, etc.

An incident rule can contain any metrics provided by any monitored target. To allow the incident rule to be evaluated on specific targets, create the Enterprise Manager Group on the targets and refer to this group in the rule set.

The following steps are given as an example to introduce how to define a CPU metric even type. Before creating a policy, you need to create incident rules.

1. From the Enterprise Manager console home page, click **Setup-> Incidents -> Incident Rules**
2. On the Incident Rules page, click **Create Rule Set...**
3. Enter a rule name, and choose **Specific targets** on the Targets tab at the bottom of the page.
4. Add your predefined Enterprise Manager Group(s) which contain(s) the target events under consideration.

> **Note**
>
> Selecting specific groups in this step is important, otherwise all the events of same type on any target implements the incident rule.

5. Choose the **Rules** tab. Click **Create** to create a incident rule.
6. Click **Continue** in the pop-up window to define an event-type incident rule.
7. In the page that appears, select **Type**. Choose **Metric Alert** in the list.
8. Choose **Specific events of type Metric Alert**
   A Metric Alert panel appears.
9. Click **Add** to designate a specific Metric Alert event.
10. In the Select Specific Metric Alert page, define an incident rule carried out when the CPU utilization of one host reaches the Warning threshold, as shown in figure below:
    Define a CPU Metric Event- Example


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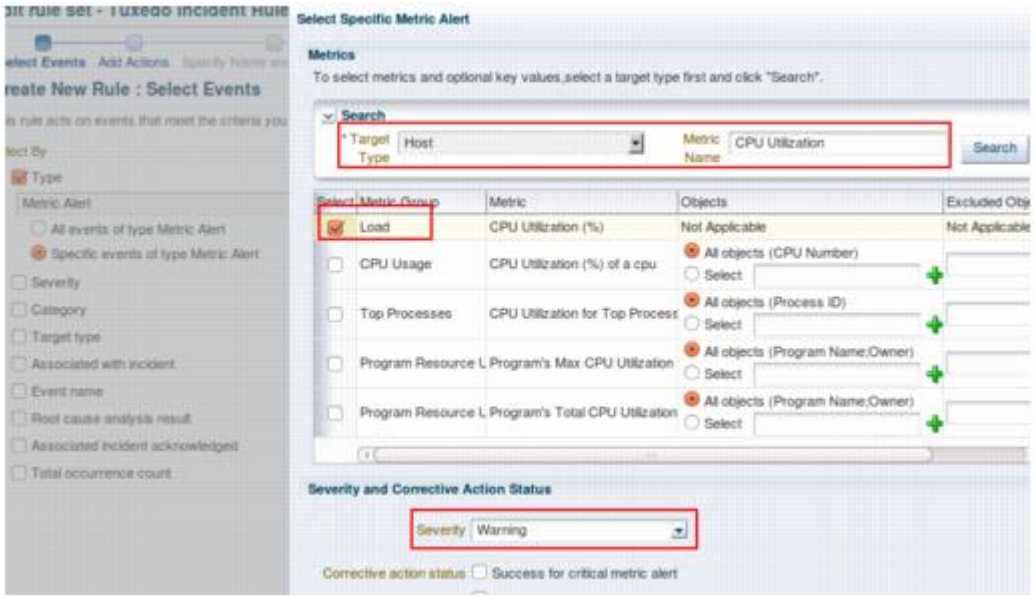
**Figure 8-7 Define a CPU Metric Event- Example**




11. Click **OK**.
    The newly-created event appears in the Metric Alert panel.
12. Click **Next** to proceed to the Add Actions step page.
13. In the Advanced Notifications panel, check the predefined notification named **Tuxedo Event Connector (PL/SQL Procedure)** .
    This means when the incident is produced, Tuxedo Event Connection is notified.
14. Click **Continue** in the upper right corner to complete the definition. Click **Next**.
15. Enter a name in the Specify Name and Description page. Click **Next**, and then **Continue** to finish the configuration.
    On the All Enterprise Rules page, you can find the incident rule is added under the Tuxedo Incident Rules rule set with “active” status.
16. Return to the Edit Rule Set page. Click **Save** to activate the defined incident rule.

On the All Enterprise Rules page, you can find the incident rule is added under the Tuxedo Incident Rules rule set with “active” status.

### 8.9.3.2 Creating a Policy

The policies are defined and managed centrally in the **Policy Management** console. To enter the **Policy Management** console, click **Policies** in the domain editor Controls panel.

Once the incident rule is defined, you can create a policy by clicking **Add** in the **Policy Management** console and specifying the options in the **Policy Properties** page. For more information, see Policy Management. or click **Help** in the upper right of the page.

## 8.10 Controls on Tuxedo Domain Target

The Tuxedo Summary page provides a set of controls for the Tuxedo Domain target created by the Domain Editor. Right-clicking the domain target you can find actions specific to Resource Broker are included in the Control menu item.

- Deploy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- Config
- Start Up
- Shut Down
- Undeploy

### 8.10.1 Deploy

This action is exactly the same as the one on the Domain Editor page. When the domain is down or has not been deployed to the target machines, a full deployment is carried out. When the domain is in active status, the newly-added packages are deployed and activated dynamically.

### 8.10.2 Config

A domain should be configured so it can be booted up after it is deployed. This action can only be applied to a domain which is **not** in active status.

The default config action is to do `tmloadcf` of the `UBBCONFIG` on the master machine. If there are any specific configurations required before the domain boots up (for example, creating TLOG device, or QUEUE space), you can customize the script.

### 8.10.3 Start Up

This action can be applied to a domain which is **not** in active status. The default Start Up action is to execute `tmboot -y` on the master machine. You can also customize the boot script.

### 8.10.4 Shut Down

This action can only be applied to a domain which is in **active** status. The default action of Shut Down is to execute `tmshutdown -y` on the master machine. You can also customize the shutdown script.

### 8.10.5 Undeploy

This action can only be applied to a domain which is **not** in active status. The default Undeploy action is to remove the entire `APPDIR` on target machines. You can customize the unconfig script to do some cleanup before `APPDIR` is removed.

## 8.11 Using Resource Broker for ART Batch

To use resource broker for ART Batch in a Tuxedo domain, you need to configure both server and JES parameters. For existing domains, these information are introspected from runtime environment. All the configurations can be adjusted again just like the domain is created by resource broker.

- Server Configuration
- JES Configuration
- Assembling and Deploying JES Domain


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## 8.11.1 Server Configuration

Several Tuxedo system servers specific to ART Batch are required to be configured in the Tuxedo domain to make ART Batch work properly. For example, the servers `ARTJESADM`, `ARTJESCONV`, `ARTJESINITIATOR`, and `ARTJESPURGE` are necessary for a functional ART JES system.

Since ART Batch uses the Oracle Tuxedo Event component, an Oracle Tuxedo user event server, `TMUSREVT`, is required in the `UBBCONFIG` file. Additionally, a `TMQUEUE` server is also mandatory to store the JES job information.

There are three ways for adding these Tuxedo system servers.

- Adding Tuxedo System Servers Manually
- Adding Tuxedo System Servers Using Application Package
- Adding Tuxedo System Servers Using Server Template

### 8.11.1.1 Adding Tuxedo System Servers Manually

You can add the servers manually by clicking **Add** in the Servers section of Domain UBBCONFIG Editor. Make sure you provide correct parameters (`CLOPT`), to the servers. Once you save configurations in the domain, the Domain Editor performs `CLOPT` validation on the system servers.

### 8.11.1.2 Adding Tuxedo System Servers Using Application Package

System server-related information can be described in `Properties.xml`, and then packed into an application package. By adding the application packages to a Tuxedo domain, the corresponding servers are added accordingly.

This is the only way you can use policy-driven dynamic resource broker features.

The ART Batch specific system servers are:

- `ARTJESADM`
- `ARTJESCONV`
- `ARTJESINITIATOR`
- `ARTJESPURGE`

There should be no corresponding binaries for the above servers packed in the application packages. These system server binaries are included in the ART Batch installation directory.

The system servers are referred to in `Properties.xml` using a single server name.

### 8.11.1.3 Adding Tuxedo System Servers Using Server Template

You can add ART Batch related servers using a server template. Follow the steps below:

1. From the Domain UBBCONFIG Editor, click **JESConfig**
2. Select one or more machines from the Machines list. Click **Apply Server Template**. Following servers are added to the machine:
   - `JESQUEGRP`
   - `TMQUEUE`


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- ARTJESGRP
- TMUSREVT
- ARTJESADM
- ARTJESCONV
- ARTJESINITIATOR
- ARTJESPURGE

Since the TMS_QM used by server TMQUEUE requires a TLOG device, after applying the server template, TLOGDEVICE and TLOGSIZE parameters of the corresponding machine are configured to $APPDIR/TLOG if no path is specified.

## 8.11.2 JES Configuration

You can configure JES parameters by clicking **JESConfig** from the Domain UBBCONFIG Editor. JES Configuration consists of two parts:

- JES Configuration File
- Misc Configuration

### 8.11.2.1 JES Configuration File

A JES configuration file is used by the TuxJES administration server ARTJESADM. You can configure the following JES configuration file parameters:

- JES Base Directory
  The base JESROOT directory. If it is not set, the base directory is $APPDIR.
- JESROOT
  The root repository to store job information. This directory is created under the path set in **JES Base Directory**. For example, if JESROOT is set to jesroot and **JES Base Directory** is set to $APPDIR the full path of the JESROOT directory is {$APPDIR}/jesroot.

  If ART Batch related servers are configured on two Tuxedo machines, they must share the same JESROOT repository; only an absolute JESROOT path is acceptable and the directory should exist in the Network File System.
- DEFAULTJOBCLASS
  Optional. The default job class if the job class has not been set in JCL. The default job class is A if this option is not set.
- DEFAULTJOBPRIORITY
  Optional. The default job priority if the job priority has not been set in JCL. The default job priority is 0 if this option is not set.
- DUPL_JOB
  If NODELAY is not checked, only one job can be in execution status per job name. When it is checked, NODELAY removes the dependency check.
- EVENTPOST
  Specifies events posted for a job at particular stages.
  - S: Job submission event.
  - C: Job conversion complete event.
  - E: Job execution complete event.
  - P: Job purge event.


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  - A: All supported events
    If EVENTPOST is not specified, no event is posted. The data buffer with event post is FML32 type. The fields are defined in tuxjes/include/jesflds.h.

- JOBREPOSITORY
  The path of the stored job repository. The job submitting script file path may be a relative path in JOBREPOSITORY if it is set.
- PRIVILEGE MODE
  Specifies whether and how to enable the user substitution (See TuxJES User Substitution).
  - **NONE**: Default value. Indicates jobs are executed by the OS user who starts the JES system. This is compatible with all previous JES system implementations
  - **USER_IDENTICAL**: Indicates jobs are executed by the Oracle Tuxedo user where the JES client joins JES system. Make sure that each Oracle Tuxedo user corresponds to an existing OS user before you choose this option.
  - **USER_MAPPING**: The JES system looks up the TuxJES user mapping file and finds the OS user corresponding to the Oracle Tuxedo user where JES client joins JES system, and then appoints this OS user as the job executor.
- USER MAPPING FILE
  This option is enabled when you choose USER_MAPPING as Privilege Mode. Specify the user mapping file name. User mapping file is under the $APPDIR directory by default.

  The owner of the User Mapping File created by Resource Broker is root, and its file permission is "-rw-------".

> **Note**
>
> The User Mapping File name cannot be:
>
> - one of the following: Logs, QUE, TLOG, UBBCONFIG, acc, crlog, data, data_source, jesconfig, jesqinit, tools, tpacl, tpgrp, tpusr, and tuxconfig
> - the same as JESROOT if JESROOT is under the $APPDIR directory.
>   For the existing domain, since security is not supported, the user mapping file cannot be introspected and parsed.

- USER MAPPING Table
  The user mapping table displays the mapping relationship between Oracle Tuxedo users and OS users. When Privilege Mode is set to USER_MAPPING, the user mapping table is enabled allowing you to add, edit, or delete a user mapping entry Every line in the mapping table is in the following format:

  ```
  tuxedousername OSusername
  ```

> **Note**
>
> - Duplicated user pairs are not allowed.
> - One Oracle Tuxedo user can only be mapped to one OS user.

- Permission Settings When Enabling User Substitution
- Permission Requirements When Enabling User Substitution


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### 8.11.2.1.1 Permission Settings When Enabling User Substitution

When you set the privilege mode to either **USER_IDENTICAL** or USER_MAPPING, the following permission settings are made automatically by Resource Broker:

- UBBCONFIG permission settings
  - The PERM value in the RESOURCES section is set to 0666. The RQPERM and RPPERM value in all JES servers entries in the *SERVERS section is set to 0666. Therefore, all job users have full permissions to JES system IPC resources.
  - The UID and GID parameters of the machine where JES servers are located is set to root user UID and GID.

The following listing shows a UBBCONFIG file example.

**UBBCONFIG Example**

```
*RESOURCES
IPCKEY <IPCKEY> # for example 132770
DOMAINID jessample
MASTER SITE1
MODEL SHM
MAXACCESSERS 200
MAXSERVERS 50
NOTIFY SIGNAL
PERM 0666 #Adding "PERM=0666" in RESOURCES section
SECURITY USER_AUTH
AUTHSVC "AUTHSVC"

*MACHINES
#
<uname -n>
LMID = SITE1
TUXDIR ="<full path of TUXEDO software>"
TUXCONFIG = "<full path of APPDIR>/tuxconfig"
TLOGDEVICE ="<full path of APPDIR>/TLOG"
TLOGSIZE=10
APPDIR = "<full path of APPDIR>"
ULOGPFX = "<full path of APPDIR>/ULOG"

*GROUPS

ARTGRP
LMID = SITE1 GRPNO = 1
QUEGRP
LMID = SITE1 GRPNO = 2
TMSNAME = TMS_QM TMSCOUNT = 2
OPENINFO = "TUXEDO/QM:<full path of APPDIR>/QUE:JES2QSPACE"

EVTGRP
LMID= SITE1 GRPNO=3

#
*SERVERS
# Adding RQPERM=0666 RPPERM=0666 in all JES servers entry in SERVERS section
```


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```
DEFAULT: CLOPT="-A"

TMUSREVT SRVGRP=EVTGRP SRVID=1 CLOPT="-A"
RQPERM=0666 RPPERM=0666

TMQUEUE
SRVGRP = QUEGRP SRVID = 1
GRACE = 0 RESTART = Y CONV = N MAXGEN=10
CLOPT = "-s JES2QSPACE:TMQUEUE -- -t 5 "
RQPERM=0666 RPPERM=0666

ARTJESADM SRVGRP =ARTGRP SRVID = 1 MIN=1 MAX=1
CLOPT = "-A -- -i jesconfig"
RQPERM=0666 RPPERM=0666

ARTJESCONV SRVGRP =ARTGRP SRVID = 20 MIN=1 MAX=1
CLOPT = "-A --"
RQPERM=0666 RPPERM=0666

ARTJESINITIATOR SRVGRP =ARTGRP SRVID =30
CLOPT = "-A -- -n 20 -d"
RQPERM=0666 RPPERM=0666

ARTJESPURGE SRVGRP =ARTGRP SRVID = 100
CLOPT = "-A --"

AUTHSVR SRVGRP=ARTGRP SRVID=104 CLOPT="-A"
RQPERM=0666 RPPERM=0666

*SERVICES
```

- Permission settings for file system
  - File permission for the following folders is set to `777` under `$JES_BASE_DIR`:
    - `$DATA_SOURCE`
    - `$DATA`
    - `$MT_LOG`
    - `$SPOOL`
    - `$MT_TMP`
    - `$JESROOT`
  - The following empty files are created under `$JES_BASE_DIR` with file permission `666`:
    - `$MT_ACC_FILEPATH/AccWait`
    - `$MT_ACC_FILEPATH/AccLock`
  - File permission for `TUXCONFIG` is set to `644` under `$APPDIR`:

### 8.11.2.1.2 Permission Requirements When Enabling User Substitution

When you set privilege mode to either **`USER_IDENTICAL`** or `USER_MAPPING`, the following permission requirements must be met.

- Permission requirements for `UBBCONFIG`


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  - The TUXCONFIG file *RESOURCE section SECURITY parameter must be USER_AUTH, ACL, or MANDATORY_ACL
  - *RESOURCES section AUTHSVC and SERVERS section AUTHSVR parameters must be set properly in accordance with USER_AUTH, ACL, or MANDATORY_ACL settings.
- Permission requirements for file system
  - The home directory access permission where JES is deployed should be granted to the user who initiates the deployment, and JES executor before the deployment.
  - App home may be created by Resource Broker during deployment if it does not exist. In this case, you need to configure App home directory with access permission for other group.
  - The$JES_BASE_DIR directory should be created before deployment and be readable/writable/executable for JES domain creator and all JES job executors.
- Permission Requirements for Creating, Configuring, and Booting JES Domain
  - Resource broker needs "root" permission to create, configure, or boot JES domain.
    * For the SHM domain, JES domain should be created, configured, or booted by root user.
    * For the MP domain, if JES servers are on a machine, the machine should be created, configured, or booted by root user.
    * If a machine is created, configured, or booted up by root user, tlisten on that machine must be booted by root user as well before deploying the Oracle Tuxedo domain using resource broker.
  - SUDO configurations must be made for performing activities with root user privileges. Resource broker needs "root" permission to create, configure, or boot JES domain.

From Oracle Enterprise Manager Cloud Control, click **Setup** > **Security** > **Privilege Delegation**. For more information, see Configuring Privilege Delegation Settings in Oracle Enterprise Manager Lifecycle Management Administrator's Guide.

## 8.11.2.2 Misc Configuration

You can configure the following Misc Configuration field options to provide ART Batch related information:

- JES queue init script
  The JES queue initializing script. The one provided in the JES simpjob example is used as the default template. You can customize text field, if you do so, the queue file name must be "QUE".
- JES install dir
  Mandatory. The ART Batch installation directory must be specified on the page.

> **Note**
>
> When configuring an MP domain, the ART Batch installation directory path on all the machines must be the same.

- PDKSH
  Optional. The PDKSH executable file which is used for running ART Batch If not specified, the system default ksh command is used at runtime.


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## 8.11.3 Assembling and Deploying JES Domain

There are two types of deployment:

- Static Deployment (or Full Deployment)
  The domain does not exist at the outset. You need to create and assemble the JES enabled domain in the Domain Editor from scratch, and then deploy it onto the target machines.
- Dynamic Deployment
  The JES domain has already been deployed and booted up. Under certain circumstances, some new servers are added into the domain and activated dynamically.

> **Note**
>
> – When redeploying an existing domain, some files will be overridden (Ex setenv.sh, config.sh, etc).
>
> – All the runtime environment variables introspected from running domain will be exported to `setenv.sh` when redeploying.

- Static Deployment
- Dynamic Deployment

### 8.11.3.1 Static Deployment

When using static deployment, all ART Batch related system servers are assembled in the `UBBCONFIG` file as other servers. The saved JES Configuration file is packed in the distribution package for deployment. The deployed JES configuration file name is the one pointed by the `-i` option of `ARTJESADM CLOPT`. The `JESROOT` directory is not created at this stage; it is created automatically by ART Batch at runtime.

The following environment variable settings are added to the `setenv.sh` file if JES is configured:

```
JESDIR=<full path of ART JES software>
MT_KSH=<full path of pdksh>
MT_ROOT=$JESDIR/ejr
PATH=$JESDIR/bin:$PATH
QMCONFIG=$APPDIR/QUE
DATA_SOURCE=$APPDIR/data_source
DATA=$APPDIR/data
TMP=$APPDIR/tmp
MT_TMP=$APPDIR/tmp
MT_ACC_FILEPATH=$APPDIR/acc
MT_LOG=$APPDIR/Logs/log
SPOOL=$APPDIR/Logs/sysout
```

During configuration, the `JES QUEUE` system is initialized by the default `jesqinit` script or user-defined script.


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### 8.11.3.2 Dynamic Deployment

Package-level dynamic deployment is handled by the existing Resource Broker framework.

The JES-related Tuxedo system servers are described in the `Properties.xml` which is included in various application packages. You can add these packages into an existing domain as candidates and define their policies. When the policy is evaluated to be fulfilled, the packages are then deployed and the servers described in it are activated.

> **Note**
>
> Dynamic deployment is only on the package (server) level. `JESCONFIG` does not support dynamic deployment (for example, running Tuxedo domain without ART Batch configured), the `JESCONFIG` cannot be enforced dynamically.

## 8.12 Using Resource Broker for ART CICS

This section contains the following topics:

- Server Configuration
- CICS Application Package
- CICS Configuration Page
- Assembling and Deployment

### 8.12.1 Server Configuration

When using resource broker for ART CICS, you must configure several Tuxedo provided system servers in the `UBBCONFIG` file to enable resource broker for ART CICS Runtime. For existing domain, such information is introspected automatically. Note that ART CICS and COBOL compiler must be installed on the same location for each machine configured in domain.

There are three ways to add these Tuxedo system servers.

- Adding Tuxedo System Servers Manually
- Adding Tuxedo System Servers Using Application Package
- Adding Tuxedo System Servers Using Server Template

#### 8.12.1.1 Adding Tuxedo System Servers Manually

You can add the servers manually by clicking Add in the Servers section of Domain UBBCONFIG Editor. Make sure you provide correct parameters (CLOPT), to the servers. Once you save configurations in the domain, the Domain Editor performs CLOPT validation on the system servers.

#### 8.12.1.2 Adding Tuxedo System Servers Using Application Package

The ART CICS specific system servers can be divided into two categories:

- The ART CICS provided system servers:


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  - ARTADM
  - ARTCNX
  - ARTMON
  - ARTTCPH
  - ARTTCPL
  - ARTTDQ
- The system servers that can be built by users:
  - ARTSTR1
  - ARTSTRN
  - ARTATR1
  - ARTATRN
  - ARTCTR1
  - ARTCTRN
  - ARTDPL
  - ARTTSQ
  - ARTCKTI

For the ART CICS provided system servers, only the server name should be referred to in `Properties.xml`.

For the system servers that can be built by users, the server name you define in the `Properties.xml` must be prefixed by the listed server names.

### 8.12.1.3 Adding Tuxedo System Servers Using Server Template

You can add the ART CICS related servers using the server template. Follow the steps below:

1. From the Domain UBBCONFIG Editor, click **CICSConfig** .
2. Select one or more machines from the Machines list, and choose one or more of the following templates:
   - 3270 Terminal Initiated CICS Transaction, adds these servers to the machine:
     - ARTTCPL
     - ARTTCPL
     - ARTADM
     - ARTCNX
     - ARTSTRN
     - ARTATRN
   - Non-3270 Clients Initiated CICS Transaction, adds these servers to the machine:
     - ARTWTRN
     - ARTADM
   - Distributed Program Link, adds these servers to the machine:
     - ARTADM


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- ARTDPL

  All, applies all the three template types together.

3. Click **Apply Server Template**.

## 8.12.2 CICS Application Package

The CICS application package is introduced specifically to handle various CICS resources.

- Package Content
- Package Management

### 8.12.2.1 Package Content

Similar to the Tuxedo application package, the CICS application package is a `.zip` file that packs assets for running CICS Runtime.

It includes components described in the following sections:

- Properties.xml
- Resource Configuration Files
- COBOL Programs
- Mapdefs
- Shell Scripts

#### 8.12.2.1.1 Properties.xml

The `Properties.xml` (located in the root of the `zip` file), is used to describe the general properties of the whole package. These general Tuxedo application package parameters are also applicable to CICS packages:

- PackageName
- TuxedoVersion
- CICSVersion
- SupportedOS
- TuxedoWordSize
- MachineArch

All the elements are of the same meaning as the ones in a Tuxedo application package except for `SupportedOS`. There is no ART CICS for Windows platform. Only Linux, SunOS, and AIX are supported.

A new element, `CICSVersion`, is added to `Properties.xml`. It indicates which ART CICS version such package is built. This field is used for extension in the future. It can be configured to any value that matches the regex rule `1[1-9](\.[0-9]){3,4}`. For the 12cR2 release, the suggested value is 12.1.3.0.0.

To distinguish from Tuxedo application packages, a type attribute is introduced for the `ApplicationProperties` root element. To mark the package a CICS application package, set the type attribute to `CICS`. If the type is not set or set to `TUX`, the package is regarded as a Tuxedo application package.


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#### 8.12.2.1.2 Resource Configuration Files

Following CICS resource configuration files are supported by CICS Runtime:

- Groups Configuration (`list_of_groups.desc`)
- Tranclasses (`transclasses.desc` file)
  It is not allowed to define two same transclasses.
- Transactions (`transactions.desc` file)
  It is not allowed to define two same transactions, even if they are in different CICS groups.
- Programs (`programs.desc` file)
  It is not allowed to define two same programs in one CICS group. It is allowed to define two same programs in different groups.
- TS Queue Model (`tsqmodel.desc` file)
  It is not allowed to define two same TSQ models, even if they are in different CICS groups.
- Mapsets (mapsets.desc file)
  It is allowed to define two same mapsets in the file, but only the first one is used.
- Typeterms (`typeterms.desc` file)
  It is allowed to define two same typeterms in the file, but only the first one is used.
- Enqmodel (`enqmodel.desc` )
  It is not allowed to define two same "`enqmodel`" in the file, even if they are in different CICS groups.
- Extra TDQUEUE (tdqextra.desc)
  It is not allowed to define two same `tdqueue`, even if they are in different CICS groups.
- Intra TDQUEUE (`tdqintra.desc`)
  It is not allowed to define two same `tdqueue`, even if they are in different CICS groups.

It is not allowed to define two same `tdqueue`, even if they are in different CICS groups.

Each CICS application package can contain a set of the previously described `.desc` files, and each `.desc` can only occur at most once in one package. All the `.desc` files should be located in the package `DESC` sub-directory.

#### 8.12.2.1.3 COBOL Programs

All COBOL `.gnt` files are located in the `COBLIB` sub-directory of the package. These COBOL programs are referenced by the `programs.desc` file at runtime.

#### 8.12.2.1.4 Mapdefs

All the `.mpdef` files are located in the `MAP` sub-directory of the package. They are used by the `mapsets.desc` file.

#### 8.12.2.1.5 Shell Scripts

The script used to create /Q for ARTTDQ and TSQ DB may also be packed in the package. They should be located in the `SCRIPT` sub-directory and are called when the package is deployed. All the shell scripts are supposed to be independent of each other, and the calling sequence does not impact the script running result.


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### 8.12.2.2 Package Management

The CICS application packages are managed in the Tuxedo Summary page (same as Tuxedo application packages). For more information, see Application Package Management.

When uploading, a validation is performed for `Properties.xml` file and `.desc` resource configuration files in each package. The `Properties.xml` file is validated against the `.xsd` XML schema, while the resource configuration files are validated for the correct file format and content (for example, unique key field constraint, column number, and required columns etc.).

If any validation fails, the uploading fails with error message appearing. All errors in the package are reported in the pop-up dialog.

For existing domains, one default package is generated and applied to current ART CICS package list. This special package only contains resource files used in runtime environment.

To dynamically deploy a new added machine, configuration shell script including creating TLOG,/Q, special environment variable export, and so on must be added to CICS package.

## 8.12.3 CICS Configuration Page

To enter the CICS Configuration page, do the following:

1. From Domain UBBCONFIG Editor, click **CICSConfig**.
2. Fill in CICS and COBOL installation directories Click **Edit Configurations**
3. In the Confirmation message that appears, click **Yes**.

For more information, see Configuring CICS Configuration or click **Help** on the upper right.

## 8.12.4 Assembling and Deployment

During deployment, all saved CICS resource files and added CICS application packages are retrieved from the software library and then packed into the distribution package together with other Tuxedo domain assets.

In the deployed `APPDIR`, each CICS application package corresponds to a sub-directory named according to the package name. All the merged `.desc` resource files are located in the `APPDIR/resources` directory, which is referenced by the `KIXCONFIG` environment variable.

> **Note**
>
> Package level dynamic deployment is not supported for existing ART CICS domains.

The following environment variable settings are added to the `setenv.sh` file:

```
KIXDIR=<full path of ART CICS software>
KIXCONFIG=<full path of ART CICS resources configuration files, fixed
as $APPDIR/resources>
PATH=$KIXDIR/bin:$PATH
COBPATH=APP1/COBLIB:APP2/COBLIB:APP3/COBLIB: ... :$COBPATH
COB_LIBRARY_PATH=$COBPATH:$COB_LIBRARY_PATH
KIX_MAP_PATH=APP1/MAP:APP2/MAP:APP3/MAP: ... :$KIX_MAP_PATH
```


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**Note**

- If any environment variable not listed above is used, you must specify it manually in the confide script or boot script.
- For existing domains, all the environment variables are collected from master machine, so these variables are distributed to the target machine when re-deploying. For slave machine, if the same environment variable is defined before tlisten is started, the value from master machine is replaced. `KIXCONFIG` must be set before tlisten is started on master machine.


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9

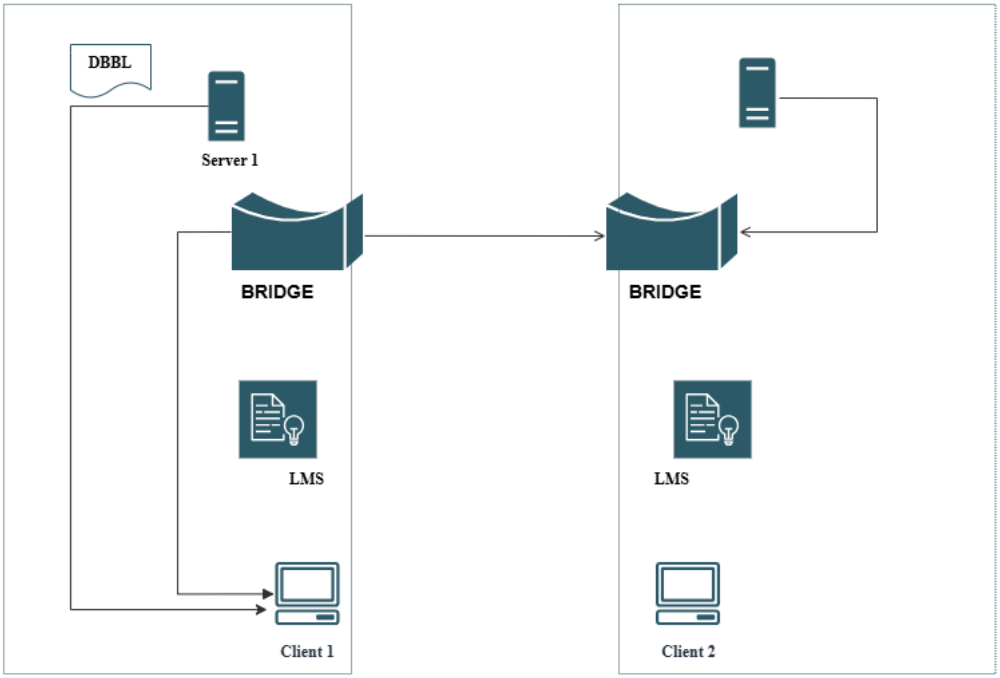
# Dynamic Request Broker

Dynamic Request Broker is a Tuxedo load balancing functionality enhancement that minimizes response time for request calls and provides more reasonable workload distribution across multiple servers (especially in a multiprocessor (MP) domain). More specifically, Dynamic Request Broker is a mechanism that introduces new request routing metrics (for example, service execution time, network time, etc.), as a replacement for the static load values set in `UBBCONFIG` file and reflects service and network load level dynamically. Furthermore, it syncs metrics across all distributed machines in an MP domain to achieve optimal resource utilization.

Typically, Dynamic Request Broker can be useful in following cases:

- In an MP domain, one of the servers in the candidate list is handling the requests from different machines. As shown in the figure below, `server2` serves both `client1` and `client2` that are located on different machines.

**Figure 9-1 Dynamic Request Broker in MP Domain**




- The service execution time is not constant; however, the load value specified in the `UBBCONFIG` file is static, which may not be applicable for the service as the situation changes.
- The server may be added or removed during run-time; however, the load value specified in the `UBBCONFIG` file is static, which may not be applicable for the service as the situation changes.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> **Note**
>
> Dynamic Request Broker only supports Oracle Tuxedo 12c and later releases.



# 9.1 Enabling/Disabling Dynamic Request Broker

You can enable or disable dynamic request broker functionality by clicking **Control -> Enable/Disable Request Broker** from the Tuxedo Domain menu on Enterprise Manager Console.

# 9.2 Viewing Dynamic Load Information

After the dynamic request broker function is enabled, you can view dynamic load information using following command:

```
$ tmadmin

> psc -m all -v
```


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10

# DM_MIB MBean Interface

TSAM Plus wraps configurations DM_MIB classes to MBean operations.

- Creating the TuxedoDomainGatewayTargetMBean Object
- Application Programming Interfaces
- Security Requirement
- User Cases

## 10.1 Creating the TuxedoDomainGatewayTargetMBean Object

JMXConnectorFactory.connect (JMXServiceURL serviceURL, Map<String,?> environment) is used to create a connection to the tlisten JMX server. The "serviceURL" format is "service:jmx:rmi:///jndi/rmi://%s:%s/server", host, port, where "host" is the host name tlisten runs, and port is the tlisten -j port value. The environment key is jmx.remote.credentials. The environment value is a String array.

The following table lists its elements:

**Table 10-1 Environment Value Elements**

| Index | Value | Description |
|---|---|---|
| 0 | Tuxedo user name | Its value may be null when the Tuxedo resource "SECURITY" value is not USER_AUTH, ACL, or MANDATORY_ACL. |
| 1 | Tuxedo user password | Its value may be null when the Tuxedo resource "SECURITY" value is not USER_AUTH, ACL, or MANDATORY_ACL. |
| 2 | Tuxedo application password | Its value may be null when the Tuxedo resource SECURITY value is not APP_PW. |
| 3 | Tuxedo DOMAINID | - |
| 4 | Tuxedo IPCKEY | - |

ObjectName domainId + "_" + ipckey + ":type=tuxedo_domain_gateway,group_name=" + groupName + ",SRVID=" + SVRID is used to create the TuxedoDomainGatewayTargetMBean object, where domainId is the Tuxedo domain DOMAINID, ipckey is the Tuxedo domain IPCKEY, groupName is the server GWTDOMAIN SRVGRP, and SVRID is the server GWTDOMAIN SVRID.

- get Operations
- add Operations
- delete Operations

### 10.1.1 get Operations

get operations are used to get the existing TM MIB entities.

Name


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`get+MIB class name` (in camel naming format)`+s` (if the return type is `TabularData`)

Parameters

All parameters are input ones. The format is `[keyType keyValue]*, CompositeData filter)`.

- keyValue: the key fields that are required when calling the DM_MIB get interface
- filter: includes all optional fields.

**Return Type**

The return type is `CompositeData` if only one recode is returned; otherwise the return type is `TabularData`.

**Exception**

It is always the `MBeanException` type.

## 10.1.2 add Operations

`add` operations are used to add a new TM MIB entity.

**Name**

`add+MIB class name` (in camel naming format)

**Parameters**

All parameters are input ones. The format is `CompositeData parameters` , where `parameters` includes all fields.

**Return Type**

`void`

**Exception**

It is always the `MBeanException` type.

## 10.1.3 delete Operations

`delete` operations are used to delete an existing TM MIB entity.

**Name**

`delete+MIB class name` (in camel naming format)

**Parameters**

All parameters are input ones. The format is `[keyType keyValue]+`),where `keyValue` is the key fields that are required when calling the `DM_MIB set` interface.

**Return Type**

`void`

**Exception**

It is always the `MBeanException` type.

**update Operations**

`update` operations are used to update an existing TM MIB entity.


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**Name**

`update+MIB class name` (in camel naming format)

**Parameters**

All parameters are input ones. The format is `[keyType keyValue]+, CompositeData parameters)`

- **keyValue**: the key fields that are required when calling the `DM_MIB set` interface.
- **parameters**: includes all fields to be updated.

> **Note**
>
> Key fields must not be in the "CompositeData parameters", otherwise an exception will be thrown.

**Return Type**

`void`

**Exception**

It is always the `MBeanException` type.

# 10.2 Application Programming Interfaces

All MBean DM_MIB operations are in the class "`oracle.tuxedo.jmx.tux.emmodel.TuxedoDomainGatewayTarget`", which extends "`javax.management.modelmbean.RequiredModelMBean`".

Here is the list of them:

**Table 10-2 Tdomain and Command Interfaces**

| MBeanOperation Name | Class Name | TA_OPERATION | Description |
|---|---|---|---|
| `TabularData getACLs(CompositeData filter)` | `T_DM_ACL` | get | Get an ACL list |
| `void addACL(CompositeData parameters)` | `T_DM_ACL` | set | Add a new ACL |
| `void deleteACL(String ACLName)` | `T_DM_ACL` | set | Delete an ACL |
| `void updateACL(String ACLName, CompositeData parameters)` | `T_DM_ACL` | set | Update an existing ACL |
| `TabularData getEventIns(CompositeData filter)` | `T_DM_EVT_IN` | get | Get events, which can be received from remote domains |
| `void addEventIn(CompositeData parameters)` | `T_DM_EVT_IN` | set | Add an event, which can be received from remote domains |
| `void deleteEventIn(String eventName, String lAccessPoint)` | `T_DM_EVT_IN` | set | Delete an event, which can be received from remote domains |
| `TabularData getEventOuts(CompositeData filter)` | `T_DM_EVT_OUT` | get | Get events, which can be sent to remote domains |
| `void addEventOut(CompositeData parameters)` | `T_DM_EVT_OUT` | set | Add an event, which can be sent to remote domains |


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**Table 10-2 (Cont.) Tdomain and Command Interfaces**

| MBeanOperation Name | Class Name | TA_OPERATION | Description |
|---|---|---|---|
| `void deleteEventOut(String eventName, String lAccessPoint, String rAccessPointList)` | `T_DM_EVT_OUT` | `set` | Delete an event, which can be sent to remote domains |
| `TabularData getExports(CompositeData filter)` | `T_DM_EXPORT` | `get` | Get local resources that are exported to one or more remote domains through a local access point |
| `void addExport(CompositeData parameters)` | `T_DM_EXPORT` | `set` | Add a local resource that is exported to one or more remote domains through a local access point |
| `void deleteExport(String resourceName, String lAccessPoint)` | `T_DM_EXPORT` | `set` | Delete a local resource that is exported to one or more remote domains through a local access point |
| `void updateExport(String resourceName, String lAccessPoint, CompositeData parameters)` | `T_DM_EXPORT` | `set` | Update a local resource that is exported to one or more remote domains through a local access point |
| `TabularData getImports(CompositeData filter)` | `T_DM_IMPORT` | `get` | Get remote resources that are imported through one or more remote domain access points |
| `void addImport(CompositeData parameters)` | `T_DM_IMPORT` | `set` | Add a remote resource that is imported through one or more remote domain access points |
| `void deleteImport(String resourceName, String lAccessPoint, String rAccessPointList)` | `T_DM_IMPORT` | `set` | Delete a remote resource that is imported through one or more remote domain access points |
| `void updateImport(String resourceName, String lAccessPoint, String rAccessPointList, CompositeData parameters)` | `T_DM_IMPORT` | `set` | Update a remote resource that is imported through one or more remote domain access points |
| `TabularData getLocals(CompositeData filter)` | `T_DM_LOCAL` | `get` | Get local domain access points |
| `void addLocal(CompositeData parameters)` | `T_DM_LOCAL` | `set` | Add a local domain access point |
| `void deleteLocal(String accessPoint)` | `T_DM_LOCAL` | `set` | Delete a local domain access point |
| `void updateLocal(String accessPoint, CompositeData parameters)` | `T_DM_LOCAL` | `set` | Update a local domain access point |
| `TabularData getPasswords(CompositeData filter)` | `T_DM_PASSWORD` | `get` | Get passwords for interdomain authentication through access points of type |
| `oid addPassword(CompositeData parameters)` | `T_DM_PASSWORD` | `set` | Add a password for interdomain authentication through access points of type |
| `void deletePassword(String lAccessPoint, String rAccessPoint)` | `T_DM_PASSWORD` | `set` | Delete a password for interdomain authentication through access points of type |


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**Table 10-2 (Cont.) Tdomain and Command Interfaces**

| MBeanOperation Name | Class Name | TA_OPERATION | Description |
|---|---|---|---|
| `void reCryptPasswords(String lAccessPoint,String rAccessPoint)` | `T_DM_PASSWORD` | `set` | Re-encrypt all passwords using a new encryption key. Applies to all password instances in the classes |
| `TabularData getRemotes(CompositeData filter)` | `T_DM_REMOTE` | `get` | Get remote domain access points |
| `void addRemote(CompositeData parameters)` | `T_DM_REMOTE` | `set` | Add a remote domain access point |
| `void deleteRemote(String accessPoint, String type)` | `T_DM_REMOTE` | `set` | Delete a remote domain access point |
| `void updateRemote(String accessPoint, String type, CompositeData parameters)` | `T_DM_REMOTE` | `set` | Update a remote domain access point |
| `TabularData getResources(CompositeData filter)` | `T_DM_RESOURCES` | `get` | Get resources |
| `void setResources(CompositeData parameters)` | `T_DM_RESOURCES` | `set` | Set resources |
| `TabularData getRoutings(CompositeData filter)` | `T_DM_ROUTING` | `get` | Get all routing list to a domain |
| `void addRouting(CompositeData parameters)` | `T_DM_ROUTING` | `set` | Add a routing to a domain through a remote domain access point |
| `void deleteRouting(String routingName, String bufType)` | `T_DM_ROUTING` | `set` | Delete a routing to a domain through a remote domain access point |
| `void updateRouting(String routingName, String bufType, CompositeData parameters)` | `T_DM_ROUTING` | `set` | Update a routing to a domain through a remote domain access point |
| `TabularData getTDomain(CompositeData filter)` | `T_DM_TDOMAIN` | `get` | Get the TDomain specific configuration for a local or remote domain access point |
| `void addTDomain(CompositeData parameters)` | `T_DM_TDOMAIN` | `set` | Add the TDomain specific configuration for a local or remote domain access point |
| `void deleteTDomain(String accessPoint, String nwaddr, String lAccessPoint)` | `T_DM_TDOMAIN` | `set` | Delete the TDomain specific configuration for a local or remote domain access point |
| `void setTDomain(String accessPoint, String nwaddr, String lAccessPoint, CompositeData parameters)` | `T_DM_TDOMAIN` | `set` | Update the TDomain specific configuration for a local or remote domain access point |

# 10.3 Security Requirement

The security level is controlled by Oracle Tuxedo. The corresponding credentials are required when the configuration item `SECURITY` value in the Tuxedo `UBBCONFIG` is not `NONE`.

`$TUXDIR/jmx/tmjmx_tux.jar` is reuqired to add the JAVA classpath, in which `oracle.tuxedo.jmx.tux.utility.Encryption.getInstance().encrypt()` is used to encrypt the APP password and user passwords.


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When the security level `USER_AUTH` or above is enabled, the client of the user used to login is required to be set to `tpsysadm` when calling `tpusradd`.

# 10.4 User Cases



## 10.4.1 User Case 1 - Specify the network address associated with a access point

1. Intall TSAM Plus Agent in Oracle Tuxedo 12c
2. Start tlisten with the `-j` option using the following command:
   `tlisten -j rmi://<host>:<rmiport> -l //<host>:<tlistenport>`
3. Boot up the tuxedo domain.
4. Compile and run the following source file:

**User Case 1 - Specify the network address associated with a access point**

```
import java.io.Closeable;
import java.io.IOException;
import java.net.MalformedURLException;
import java.util.HashMap;
import java.util.Map;

import javax.management.MBeanServerConnection;
import javax.management.ObjectName;
import javax.management.openmbean.CompositeData;
import javax.management.openmbean.CompositeDataSupport;
import javax.management.openmbean.CompositeType;
import javax.management.openmbean.SimpleType;
import javax.management.openmbean.TabularData;
import javax.management.remote.JMXConnector;
import javax.management.remote.JMXConnectorFactory;
import javax.management.remote.JMXServiceURL;
public class TuxedoDomainGatewayTargetTestCustom implements Closeable {

   private JMXConnector jmxc = null;
   private MBeanServerConnection mbsc = null;
   private ObjectName tuxedoDomainGatewayTargetMBean = null;

   private String host = "rno05038.us.oracle.com";

   private String port = "5039";

   private String userName = "";

   private String password = "";

   private String appPassword = "";

   private String domainId = "DOMAIN1";
```


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```
   private String ipckey = "123468";

   private String groupName = "SYSGRP1";

   private String SVRID = "3";

   TuxedoDomainGatewayTargetTestCustom() throws Exception {

      String[] credentials = new String[] {
         userName,
         password,
         appPassword,
         domainId,
         ipckey
      };

      jmxc = createJMXConnector(credentials);
      mbsc = jmxc.getMBeanServerConnection();
      tuxedoDomainGatewayTargetMBean = new ObjectName(domainId + "_" + ipckey
+
         ":type=tuxedo_domain_gateway,group_name=" + groupName +
         ",SRVID=" + SVRID);
   }

   @Override
   public void close() throws IOException {
      jmxc.close();
   }

   /*get all Tdomain items with the filter "TA_DMACCESSPOINT=accessPoint"*/
   public void getTDomain(String accessPoint) throws Exception {
      String[] itemNames = {
         "TA_DMACCESSPOINT"
      };
      Object[] itemValues = new Object[] {
         accessPoint
      };
      javax.management.openmbean.OpenType < ? > [] itemTypes = new
javax.management.openmbean.OpenType < ? > [] {
         SimpleType.STRING
      };

      CompositeType compositeType = new CompositeType(
         "tuxedo_domain_gateway", "tuxedo_domain_gateway", itemNames,
         itemNames, itemTypes);
      CompositeDataSupport filter = new CompositeDataSupport(compositeType,
         itemNames, itemValues);

      TabularData result = (TabularData) mbsc.invoke(
         tuxedoDomainGatewayTargetMBean, "getTDomain",
         new Object[] {
            filter
         },
         new String[] {
            CompositeData.class.getName()
```


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```
            });

         if (result != null)
            System.out.println(result.toString());
      }

      /*add a TDomain item*/
      public void addTDomain(String accessPoint, String nwaddr,
         String lAccessPoint) throws Exception {
         String[] itemNames = {
            "TA_DMACCESSPOINT",
            "TA_DMNWADDR",
            "TA_DMLACCESSPOINT"
         };
         Object[] itemValues = new Object[] {
            accessPoint,
            nwaddr,
            lAccessPoint
         };
         javax.management.openmbean.OpenType < ? > [] itemTypes = new
javax.management.openmbean.OpenType < ? > [] {
            SimpleType.STRING, SimpleType.STRING, SimpleType.STRING
         };

         CompositeType compositeType = new CompositeType(
            "tuxedo_domain_gateway", "tuxedo_domain_gateway", itemNames,
            itemNames, itemTypes);
         CompositeDataSupport compositeDataSupport = new CompositeDataSupport(
            compositeType, itemNames, itemValues);

         mbsc.invoke(tuxedoDomainGatewayTargetMBean, "addTDomain",
            new Object[] {
               compositeDataSupport
            },
            new String[] {
               CompositeData.class.getName()
            });

      }

      /*delete a TDomain item*/
      public void deleteTDomain(String accessPoint, String nwaddr,
         String lAccessPoint) throws Exception {
         mbsc.invoke(tuxedoDomainGatewayTargetMBean, "deleteTDomain",
            new Object[] {
               accessPoint,
               nwaddr,
               lAccessPoint
            },
            new String[] {
               String.class.getName(), String.class.getName(),
                  String.class.getName()
            });
      }

      private JMXConnector createJMXConnector(String[] credentials)
```


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```
   throws MalformedURLException, IOException {
      Map < String, Object > env = new HashMap < String, Object > ();
      env.put("jmx.remote.credentials", credentials);

      // Create an RMI connector client and
      // connect it to the RMI connector server

      JMXServiceURL url = new JMXServiceURL(String.format(
         "service:jmx:rmi:///jndi/rmi://%s:%s/server", host, port));

      System.out.print("try to connect " + url + " with the credentials=" +
         env + "...");
      JMXConnector jmxc = JMXConnectorFactory.connect(url, env);
      System.out.println("OK");

      return jmxc;
   }

   /*change the nwaddr of "DOMAIN2_3" from "//localhost:11003"
    * to "//localhost:11004"*/
   public static void main(String[] args) throws Exception {
      String accessPoint = "DOMAIN2_3";
      String oldNwaddr = "//localhost:11003";
      String newNwaddr = "//localhost:11004";
      String lAccessPoint = "DOMAIN1_1";

      TuxedoDomainGatewayTargetTestCustom tuxedoDomainGatewayTargetTestCustom
= new TuxedoDomainGatewayTargetTestCustom();

      tuxedoDomainGatewayTargetTestCustom.deleteTDomain(accessPoint,
         oldNwaddr, lAccessPoint);
      tuxedoDomainGatewayTargetTestCustom.addTDomain(accessPoint, newNwaddr,
         lAccessPoint);
   }
```

> **Note**
>
> `$TUXDIR/udataobj/jmx/tmjmx_exceptions.jar` should be added to the classpath when running it.

## 10.4.2 User Case 2 - When Tuxedo Security Level is "USER_AUTH"

1. Install TSAM Plus Agent in Oracle Tuxedo 12c
2. Add the Tuxedo user "user1" with the group name "group1" and password "user123456":
   `tpusradd -g group1 -c tpsysadm user1`

   `Enter password for user1:user123456`

   `Re-enter password for user1:user123456`: The client name must be "tpsysadm".
3. Specify the app password "app123456" when running `tmloadcf`:
   `tpusradd -g group1 -c tpsysadm user1`

   `Enter password for user1:app123456`


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```
Re-enter password for user1:app123456
```

4. Start tlisten with the "-j" option using the following command:
   `tlisten -j rmi://<host>:<rmiport> -l //<host>:<tlistenport>`
5. Boot up the tuxedo domain.
6. Compile and run the following source file:

**User Case 2 - When Tuxedo Security Level is "USER_AUTH"**

```
import java.io.Closeable;
import java.io.IOException;
import java.net.MalformedURLException;
import java.util.HashMap;
import java.util.Map;

import javax.management.MBeanServerConnection;
import javax.management.ObjectName;
import javax.management.openmbean.CompositeData;
import javax.management.openmbean.CompositeDataSupport;
import javax.management.openmbean.CompositeType;
import javax.management.openmbean.SimpleType;
import javax.management.openmbean.TabularData;
import javax.management.remote.JMXConnector;
import javax.management.remote.JMXConnectorFactory;
import javax.management.remote.JMXServiceURL;
public class TuxedoDomainGatewayTargetTestCustom implements Closeable {

   private JMXConnector jmxc = null;
   private MBeanServerConnection mbsc = null;
   private ObjectName tuxedoDomainGatewayTargetMBean = null;

   private String host = "rno05038.us.oracle.com";

   private String port = "5039";

   private String userName = "user1";

   private String password = oracle.tuxedo.jmx.tux.utility.Encryption
      .getInstance().encrypt("user123456");

   private String appPassword = oracle.tuxedo.jmx.tux.utility.Encryption
      .getInstance().encrypt("app123456");

   private String domainId = "DOMAIN1";

   private String ipckey = "123468";

   private String groupName = "SYSGRP1";

   private String SVRID = "3";

   TuxedoDomainGatewayTargetTestCustom() throws Exception {

      String[] credentials = new String[] {
         userName,
         password,
```


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```
            appPassword,
            domainId,
            ipckey
         };

         jmxc = createJMXConnector(credentials);
         mbsc = jmxc.getMBeanServerConnection();
         tuxedoDomainGatewayTargetMBean = new ObjectName(domainId + "_" + ipckey
+
            ":type=tuxedo_domain_gateway,group_name=" + groupName +
            ",SRVID=" + SVRID);
      }

      @Override
      public void close() throws IOException {
         jmxc.close();
      }

      /*get all Tdomain items with the filter "TA_DMACCESSPOINT=accessPoint"*/
      public void getTDomain(String accessPoint) throws Exception {
         String[] itemNames = {
            "TA_DMACCESSPOINT"
         };
         Object[] itemValues = new Object[] {
            accessPoint
         };
         javax.management.openmbean.OpenType < ? > [] itemTypes = new
javax.management.openmbean.OpenType < ? > [] {
            SimpleType.STRING
         };

         CompositeType compositeType = new CompositeType(
            "tuxedo_domain_gateway", "tuxedo_domain_gateway", itemNames,
            itemNames, itemTypes);
         CompositeDataSupport filter = new CompositeDataSupport(compositeType,
            itemNames, itemValues);

         TabularData result = (TabularData) mbsc.invoke(
            tuxedoDomainGatewayTargetMBean, "getTDomain",
            new Object[] {
               filter
            },
            new String[] {
               CompositeData.class.getName()
            });

         if (result != null)
            System.out.println(result.toString());
      }

      /*add a TDomain item*/
      public void addTDomain(String accessPoint, String nwaddr,
         String lAccessPoint) throws Exception {
         String[] itemNames = {
            "TA_DMACCESSPOINT",
            "TA_DMNWADDR",
```


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```
            "TA_DMLACCESSPOINT"
         };
         Object[] itemValues = new Object[] {
            accessPoint,
            nwaddr,
            lAccessPoint
         };
         javax.management.openmbean.OpenType < ? > [] itemTypes = new
javax.management.openmbean.OpenType < ? > [] {
            SimpleType.STRING, SimpleType.STRING, SimpleType.STRING
         };

         CompositeType compositeType = new CompositeType(
            "tuxedo_domain_gateway", "tuxedo_domain_gateway", itemNames,
            itemNames, itemTypes);
         CompositeDataSupport compositeDataSupport = new CompositeDataSupport(
            compositeType, itemNames, itemValues);

         mbsc.invoke(tuxedoDomainGatewayTargetMBean, "addTDomain",
            new Object[] {
               compositeDataSupport
            },
            new String[] {
               CompositeData.class.getName()
            });

      }

      /*delete a TDomain item*/
      public void deleteTDomain(String accessPoint, String nwaddr,
         String lAccessPoint) throws Exception {
         mbsc.invoke(tuxedoDomainGatewayTargetMBean, "deleteTDomain",
            new Object[] {
               accessPoint,
               nwaddr,
               lAccessPoint
            },
            new String[] {
               String.class.getName(), String.class.getName(),
                  String.class.getName()
            });
      }

      private JMXConnector createJMXConnector(String[] credentials)
      throws MalformedURLException, IOException {
         Map < String, Object > env = new HashMap < String, Object > ();
         env.put("jmx.remote.credentials", credentials);

         // Create an RMI connector client and
         // connect it to the RMI connector server

         JMXServiceURL url = new JMXServiceURL(String.format(
            "service:jmx:rmi:///jndi/rmi://%s:%s/server", host, port));

         System.out.print("try to connect " + url + " with the credentials=" +
            env + "...");
```


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```
      JMXConnector jmxc = JMXConnectorFactory.connect(url, env);
      System.out.println("OK");

      return jmxc;
   }

   /*change the nwaddr of "DOMAIN2_3" from "//localhost:11003"
    * to "//localhost:11004"*/
   public static void main(String[] args) throws Exception {
      String accessPoint = "DOMAIN2_3";
      String oldNwaddr = "//localhost:11003";
      String newNwaddr = "//localhost:11004";
      String lAccessPoint = "DOMAIN1_1";

      TuxedoDomainGatewayTargetTestCustom tuxedoDomainGatewayTargetTestCustom
= new TuxedoDomainGatewayTargetTestCustom();

      tuxedoDomainGatewayTargetTestCustom.deleteTDomain(accessPoint,
         oldNwaddr, lAccessPoint);
      tuxedoDomainGatewayTargetTestCustom.addTDomain(accessPoint, newNwaddr,
         lAccessPoint);
   }
```

**Note**

`$TUXDIR/udataobj/jmx/tmjmx_tux.jar` should be added to the classpath when compiling and running it.


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11

# Integration with Exalogic Elastic Cloud



## 11.1 Viewing Tuxedo Domains in Exalogic Elastic Cloud Targets

From Exalogic Elastic Cloud target home page, you can view details about the Oracle Tuxedo domains deployed on Exalogic Elastic Cloud hosts.

To go to the Exalogic Elastic Cloud target home page, follow these steps:

1. In Enterprise Manager, click **Targets > Systems** to go to the Systems page.
2. Filter the entries in the Search field by choosing Exalogic Elastic Cloud from the drop-down list and click the search button.
3. In the Search Results table, choose the Exalogic Elastic Cloud you want to view.

Enterprise Manager displays the Exalogic Elastic Cloud Home page where you can monitor the status of the Exalogic target and its components.

By default, Exalogic Elastic Cloud Home page Software tab does not display Tuxedo Domains. Follow these steps to add Tuxedo Domains manually:

1. **Personalize Page** () at the upper right.
2. Click **Add Content**.
3. Click **Add Tuxedo Domains in Exalogic System**
4. Close the page to complete editing.

Exalogic Elastic Cloud Home page displays the Tuxedo Domain Summary panel.

On the Summary panel you can view a chart that shows the status of the Tuxedo Domains and displays the percentage of domains that are up and down. You can also view the status information along with alerts and policy violation and metric data for each Domain, as follows:

- Name: Tuxedo Domain target full name. Click the hyperlink to go to related Tuxedo Domain home page.
- Status: Tuxedo Domain target status.
- Member Status Summary: Total number of member status summary.
- Incidents: All incidents occurred in this Tuxedo Domain.
- Machines: All machines (hosts), on which Tuxedo domain is deployed in UBBCONFIG. The drop down list lists all machines belonging to the Tuxedo domain; If the machine is an exalogic compute node and deployed with Enterprise Manager agent, a hyperlink is available for going to the host home page.
- Tuxedo domain metric data:



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- Request Per Minute
- Clients
- tpcall and tpacall Per Minute
- Native Clients
- Workstation Clients
- Jolt Clients

Columns of tpcall and tpacall Per Minute/ Native Clients/ Workstation Clients/ Jolt Clients are hidden by default.

# 11.2 Easy Configuration for Multiple Tuxedo Domains

You can easily configure multiple Oracle Tuxedo domains in Oracle Tuxedo Application Runtime environment by clicking the **Config** button on **Tuxedo Domains** panel.

You can dynamically change the parameters in `UBBCONFIG` for multiple Oracle Tuxedo domains by doing the following steps:

1. From the **Tuxedo Domains** panel, click **Config ->UBB Configure**.
2. In the Domain Parameter Configuration panel, specify the desired parameters and the domain to be applied.
   There is a button beside each parameter field. Click that button and then to select the domain you want to apply the parameter, and click **Apply**.

   You can set the following parameters in `UBBCONFIG`:

   - `RESOURCES` section in `UBBCONFIG`
     - `AUTOTRAN`
     - `TRANTIME`
     - `LDBAL`
     - `OPTIONS` (only `NO_AA`, `EXT_AA`, `EXT_MON`, `ECID_CREATE`, and `ECID_USERLOG` can be set)
     - `OPTIONS` (only `NO_AA`, `EXT_AA`, `EXT_MON`, `ECID_CREATE`, and `ECID_USERLOG` can be set)
     - `SCANUNIT`
     - `SANITYSCAN`
     - `DBBLWAIT`
     - `BBLQUERY`
     - `BLOCKTIME`
     - `DBBLFAILOVER`
     - `SGRPFAILOVER`
3. Click **Next**. The current domain parameter configuration is displayed.
4. Click **Submit**.
   You can also dynamically change the following parameters in `DMCONFIG` for multiple Oracle Tuxedo domains by clicking **Config ->DM Configure** in the **Tuxedo Domains** panel:

   - DM_LOCAL section in DUBB


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  - BLOCKTIME
  - CONNECTION_POLICY
  - RETRY_INTERVAL
  - DYNAMIC_RAP
- DM_TDOMAIN section in DUBB
  - CONNECTION_POLICY
  - RETRY_INTERVAL
  - TCPKEEPALIVE
  - DMKEEPALIVE
  - DMKEEPALIVEWAIT
-

You can also reboot one or multiple Tuxedo domains running on one Exalogic RAC.

# 11.3 Easy Applying Oracle Tuxedo Patches

You can centrally manage the Oracle Tuxedo patch and easily apply an Oracle Tuxedo patch to existing Oracle Tuxedo systems for Batch by clicking **Tuxedo Patch** on the **Tuxedo Domain** panel.

You can centrally manage Oracle tuxedo patches for Linux x86_64 and Solaris SPARC_64 platforms:

- Uploading a Tuxedo Patch
- Distributing a Tuxedo Patch

## 11.3.1 Uploading a Tuxedo Patch

To upload a Tuxedo Patches, do the following steps:

1. From the **Tuxedo Domains** panel, click **Tuxedo Patch ->Manage Patch**.
2. In the Upload Patch area, specify the following:
   - The tuxedo version that patch can be applied. Currently only 12.1.1.0 is supported
   - The tuxedo platform that patch can be applied. Currently only Linux x86_64 and Solaris SPARC 64 are supported.
3. Select the Tuxedo patch on local file disk and upload to OMS soft library. The patch must meet the conditions that Tuxedo Version and Tuxedo Platform required.
   When the patch is uploaded to the OMS soft library, it is shown in the table. You can select one patch and delete it from OMS soft library by clicking **Delete Patch**.

## 11.3.2 Distributing a Tuxedo Patch

To Distribute a Tuxedo Patch, follow the steps below:

1. From the **Tuxedo Domains** panel, click **Tuxedo Patch -> Distribute Patch**.
   The Distribute Patch page is displayed with all the uploaded Tuxedo patches and existing domains loaded in the page. Before applying the Tuxedo patch, you can remove the domains listed in the table by clicking **Remove** or reload the Tuxedo patches from OMS soft library and all the existing domains by clicking **Reset**.


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2. From the **Select One Tuxedo Patch** list, select the Tuxedo patch to be applied to the existing tuxedo systems.
3. Click **OK**.
   A new job is created to distribute and apply the selected package.

> **Note**
>
> - If none of the domain is valid and can be applied, the **OK** button is hidden.
> - The host preferred credential must be set first before applying the patch.

# 11.4 Oracle Tuxedo Exalogic Compliance Standard

Oracle Tuxedo Exalogic Standard is integrated into Enterprise Manager Compliance Library to evaluate the compliance of Tuxedo Domains under Exalogic.

Oracle Tuxedo Exalogic Standard includes following rules:

- Oracle Tuxedo Exalogic Check
- Oracle Tuxedo Exalogic Direct Cross Node Communication Leveraging RDMA Check
- Oracle Tuxedo Exalogic Self-Tuning Lock Mechanism Check
- Oracle Tuxedo Exalogic SDP Support for MP Check
- Oracle Tuxedo Exalogic SDP Support for GWTDOMAIN Check
- Oracle Tuxedo Exalogic SDP Support for WSL Check
- Oracle Tuxedo Exalogic SDP Support for JSL Check
- Oracle Tuxedo Exalogic Shared Memory for Inter Process Communication Check
- Oracle Tuxedo Exalogic Read-only Optimization for XA Check

To view details of Oracle Tuxedo Exalogic Standard rules, follow these steps:

1. From the Enterprise menu, select **Compliance-> Library**.
2. Click the **Compliance Standards** tab.
3. Click **Oracle Tuxedo Exalogic Standard** in the Compliance Standard column.
   The View Compliance Standard page appears. All the Oracle Tuxedo Exalogic Standard rules are listed on the right. Click each rule item to view the related properties.

- Associating the Oracle Tuxedo Exalogic Standard with Targets
- Viewing Tuxedo Domain Compliance Evaluation Results

## 11.4.1 Associating the Oracle Tuxedo Exalogic Standard with Targets

Before you can use the Oracle Tuxedo Exalogic Standard to check the Tuxedo domain compliance, you need to establish association between them using one of the following methods:

- Associate the Oracle Tuxedo Exalogic Standard with various Tuxedo domains:
  - From the Enterprise menu, select **Compliance -> Library**.
  - Click the **Compliance Standards** tab.


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  - Highlight **Oracle Tuxedo Exalogic Standard**. Click the **Associate Target** button.
  - Select the targets you want to associate with this compliance standard. Click **OK**.
- Associate the individual Tuxedo domain with the Oracle Tuxedo Exalogic Standard:
  - Go to the home page of the Tuxedo domain you want to associate the compliance standard.
  - From the target menu, click **Compliance -> Standard Associations**.
  - Click **Edit Association Settings**.
  - Click **Add**.
  - Select **Oracle Tuxedo Exalogic Standard** and click **OK**.

## 11.4.2 Viewing Tuxedo Domain Compliance Evaluation Results

You can view the Tuxedo domain compliance evaluation results by way of the Cloud Control home page and individual target home pages.

To view results using Cloud Control home page, follow these steps:

1. From the Enterprise menu, select **Compliance -> Results**.
2. Highlight **Oracle Tuxedo Exalogic Standard**. Click **Show Details**.

To view compliance evaluation results from a target's home page, follow these steps:

1. Go to the home page of the Tuxedo domain you want to view compliance result.
2. From the target menu, click **Compliance -> Results**.
3. Highlight **Oracle Tuxedo Exalogic Standard**. Click **Show Details**.

Use the result page to get a comprehensive view about a target in regards to compliance over a period of time. Using the tables and graphs, you can easily watch for trends in progress and changes.


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12

# Setting Up Oracle Tuxedo as a Cloud Service

This chapter contains the following sections:



## 12.1 Overview

Enterprise Manager for Oracle Tuxedo supports modeling Oracle Tuxedo system and applications as a cloud service (TXaaS) and supplies a set of implementation (UI, Profiles, Jobs etc.) to be managed by Enterprise Manager. TXaaS enables customers to have a unified private middleware PaaS solution across different versions of Oracle Tuxedo. Self service application administrator (SSA admin) can manage Oracle Tuxedo cloud and corresponding Oracle Tuxedo services based on requirements. Self service application users (SSA user) select proper service for provisioning and then deploy their business applications on the service instance. From cloud administration point of view, this feature supplies the cloud management functions like resource provider management, quota management, and service template definition. From end user point of view, this feature provides operations like, service instance creation, application management, and deployment, automatic scaling based on scheduled plan or metrics.

## 12.2 Setting Up the Tuxedo Self Service Portal

> **Note**
>
> Before you set up a Tuxedo service family, the common setup tasks must have been performed. See Common Setup Tasks in Enterprise Manager Cloud Administration Guide for details.

To set up the Oracle Tuxedo as a Service, go to the Tuxedo Service Setup page by following these steps:

1. Log in to Enterprise Manager as a user with the `EM_SSA_ADMINISTRATOR` role.
2. From the Enterprise menu, select **Cloud-> Cloud Home**. The Cloud Home page appears.
3. From the Oracle Cloud menu, select **Setup -> Getting Started**. Click the **Setup** link next to **Tuxedo** in the left panel.
   From the **Getting Started: Tuxedo** page, you need to complete the following required setup steps. Click on a tab in the left to show the related setup page in the right side detail pane.

- Creating a Tuxedo PaaS Infrastructure Zone



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- Creating a Tuxedo Pool
- Configuring Tuxedo Profiles
- Setting Up Quotas
- Creating a Service Template
- Configuring Request Settings
- Configuring Chargeback

## 12.2.1 Creating a Tuxedo PaaS Infrastructure Zone

A PaaS Infrastructure Zone can contain a group of hosts. Each zone can contain homogeneous resources of only one type. Each resource in a zone represents a location at which a service instance is to be deployed.

The Tuxedo PaaS zone is an out-of-box component and can share with other cloud services. The Tuxedo PaaS zone can be deleted only when none of service instance is running on any of its hosts.

To create a Tuxedo PaaS zone, follow these steps:

1. In the **Getting Started: Tuxedo** page left panel, click **PaaS Infrastructure Zone**. Then click **Create**.
2. In the **Create PaaS Infrastructure Zone: General** page, enter the target name, name, and description for the zone. Click **Next** .
3. Click **Add** to add one or more host members to the zone. The hosts that you select cannot be present in more than one PaaS Infrastructure Zone. Click **Next**.
4. In the **Create PaaS Infrastructure Zone: Credentials** page, specify the host credentials that are to be used for provisioning all targets in this zone. The credentials provided should be of global credential type (valid across the members in the zone) and owned by the current user. Click **Next**.

   > **Note**
   >
   > To create new named credentials, from the Setup menu, select Security, then select Named Credentials. You can create user or password named credentials here. Other types of credentials such as SSH must be created from the Security menu and can be used here. The named credential must be the one configured as "Global preferred credential" for the host target type.

5. Specify appropriate values for the placement policy constraints based on the resources available to the host members.
   The placement policy constraints are used to set maximum ceilings for any host in the zone. Placement policy values are used during deployment to filter out hosts that are overburdened. You can define the following placement policy constraints for each host:
   - **Maximum CPU Utilization**: The average CPU utilization percentage for the past 7 days.
   - **Maximum Memory Allocation**: The average memory allocation for the past 7 days.

   Hosts exceeding these thresholds will not be considered for provisioning operations.
6. Click **Next**. In the **Create PaaS Infrastructure Zone: Characteristics** page, specify the target properties such as cost center, lifecycle status, location, and so on.


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7. Click **Next**. The **Create PaaS Infrastructure Zone: Roles** page appears. A PaaS Infrastructure Zone can be made available to a restricted set of self service users with the `EM_SSA_USER` role. Click **Add** to add and select the roles that can access this PaaS Infrastructure Zone.
8. Click **Next**. The **Create PaaS Infrastructure Zone: Review** page appears. Review the details of the zone being created and click **Submit** to create the zone.

## 12.2.2 Creating a Tuxedo Pool

A Tuxedo Pool contains a set of resources that can be used to provision a Tuxedo service instance within a PaaS Infrastructure Zone. You must create separate Tuxedo pools in the PaaS Infrastructure Zone for different type of hosts.

To create a Tuxedo Pool, follow these steps:

1. In the **Getting Started: Tuxedo** page left panel, click **Tuxedo Pool**.
2. Click **Create**. The **Create Tuxedo Pool: General** page appears. Enter a name and description for the Tuxedo Pool. Select the PaaS Infrastructure Zone in which the Tuxedo pool is to be created. Click **Next**.
3. In the **Members** page, select the platform of the hosts you are going to add. The Host table filters all the hosts running on the selected platform.
4. Click **Add** to add one or more host members to the pool. Click **Next**.
5. In the Create Tuxedo Pool: Placement Constraints page, enter the maximum number of tuxedo domain instances that can be deployed to a host target. Click **Next**.
6. In the Characteristics region, specify direcory under which the Tuxedo products and related applications are to be installed and a NFS location used to deploy the JES domain that requires NFS directory for JESROOT configuration.

> **Note**
>
> For the existing domain, if `IsHostExclusive` of the domain package was configured to `true`, you can choose to keep all primary directory structure and deploy to the same directories on the target host.

7. In the **Target Properties** region, specify the characteristics that will be used to tag and identify the target properties. Click **Next**.
8. Review the information and click Submit to create the Tuxedo pool. The newly created pool can now be used to create Tuxedo Service Templates.

## 12.2.3 Configuring Tuxedo Profiles

Provision profiles are designed to provide the Tuxedo domain deployment package for provisioning service instance and creating one kind of Tuxedo installation. By use of the provision profile, user can collect necessary software installation into an image and distribute it to other hosts avoiding install and configure all these software from the beginning.

TSAM Plus supports packaging Tuxedo products, customer domain deployment packages, and Oracle DB client libraries in a profile. All the softwares required by running the domain must be included in the domain package.

For products, the Tuxedo installation media must be uploaded from local machine.


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For customer applications, the whole Tuxedo domain should be introspected from target hosts. The same directory structure is kept during Tuxedo domain redeployment.

- Creating a Tuxedo Profile

## 12.2.3.1 Creating a Tuxedo Profile

The Tuxedo profile uses the Tuxedo domain package to provision service instances. Before creating a Tuxedo profile, you must have created the desired domain package. You can create it from scratch or from an existing domain using the introspection feature in the Enterprise Manager Console. For more information, refer to Introspecting an Existing Domain.

To create a Tuxedo profile, follow these steps:

1. In the **Getting Started: Tuxedo** page left panel, click **Tuxedo Profile**.
2. In the Tuxedo: Tuxedo Profile page, click **Create**.
3. Enter a name and description for the profile, and select the platform the product installation media supports. Click **Next**.
4. Click **Add** and select the product you want to add.
   You can add more than one products to a profile for provisioning. Only one tuxedo installation media is needed.

   Oracle Tuxedo, Oracle Tuxedo Application Runtimes, Oracle Tuxedo Patch, and Other Products can be configured in the profile. Default installation scripts (Perl script) is provided for installing these products. You can specify the default scripts for special installation purpose. When configuring other products, installation location and environment variables are required to tell provisioning procedure where the product to be installed and what runtime environment variables should be exported to applications. `PROD_DIR`,`ORA_HOME`, and `BASE_DIR` can be used as the marco in runtime variables. The macro format is `${macro name}`.

   For example, for ART CICS application, COBOL-IT is mandatory and the third party software must be installed before Oracle Tuxedo Application Runtime installation. Following parameters must be specified when configuring COBOL-IT installation.

```
Name: COBOL-IT_Package

Display Name: COBOL-IT Package

Description:

Install Location:cobol

Environment Variables:

export COBOLITDIR=${PROD_DIR}

export LD_LIBRARY_PATH=$COBOLITDIR/lib:$LD_LIBRARY_PATH

export PATH=$COBOLITDIR/bin:$PATH

export COB_ENABLE_XA=1
```

> **Note**
>
> `${ORA_HOME}` is used as the default home name in Oracle inventory. it must not be used before.


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You need to configure the installation scripts if the default scripts cannot meet your installation requirements.
For example:

```
COBOL-IT.zip
.
|-sbin
|-samples
|---test
|---sort
|---screens
|---customer
|-docs
|-doc
|-share
|---icucit
|-----51.1
|-------config
|---locale
```

If two products depend on each other, you need to customize the scripts to install them properly.
Click **Save** when you complete editing of the scripts. Click **Next**.

5. (Optional) If you want to deploy the Tuxedo domain, add a domain package to the profile and click **Next**. Currently, only one domain package can be configured.
6. Review the information and click **Submit** to create the Tuxedo profile.

You will find the profile status shows Ready if the Tuxedo profile has been created successfully.

## 12.2.4 Setting Up Quotas

Quota refers to the total machines of a Tuxedo domain that can be allocated to each self service user belonging to a certain role. This quota applies only to the service instances provisioned through the Tuxedo Self Service Portal. Quota is enforced at the time of self service request.

If the current quota is reduced, this change in quota does not affect existing service instances. The new quota applies only to new self service requests.

To define a quota, follow these steps:

1. In the **Getting Started: Tuxedo** page left panel, click **Quotas**.
2. In the Create Quota page, select the Role Name for which the quota is to be granted.
3. Specify the maximum number of the Tuxedo machines that can be configured for the user with this role. Click **OK**

## 12.2.5 Creating a Service Template

A service template can be used to provision Tuxedo service instances into one or more Tuxedo Pool. When creating a service template, you need to define a provision profile to provide product installation media, default configurations and corresponding Tuxedo domain deployment packages. So a Tuxedo provision profile must have been created beforehand.


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To create a service template, follow these steps:

1. In the **Getting Started: Tuxedo** page left panel, click **Service Templates**
2. Click **Create**. Enter a name and description for the service template.

> **Note**
>
> If you want to create a new template with similar configuration settings of an existing service template, you can get a quick start by selecting that service template in the list and click **Create Link** to launch the creating wizard with all configured parameters loaded.

3. In the Provisioning Profile field, click the search icon and select a Tuxedo provisioning profile.
   The Tuxedo provisioning profile you select can contain either of the following:
   - Only the Tuxedo products. This type of profile just packages the Tuxedo installation media.
   - Tuxedo application binaries besides Tuxedo installation. In this case, entire Tuxedo configurations, scripts, and binaries are included in the profile in the format of Tuxedo domain package.
4. Click **Next**. In the Characteristics page, specify the characteristics that will be used to tag and identify the target properties. Service instances created from the template will have the characteristics.
5. Click **Next**. In the Resource Providers page, Click **Add** to select the Tuxedo Pool into which the service instances are to be provisioned.
6. Click **Next**. In the Configuration page, specify the parameters that will be used to provision service instances according to onscreen descriptions.
   The Tuxedo domain configuration options displayed here vary depending on the placeholders configured in the domain package definition.

   Before creating the service instance, these parameters can be overridden by the SSA user if the parameter is not locked or hidden by the SSA administrator.

   To hide or lock the parameter to the SSA user, select the Hide checkbox or click the Lock icon.

> **Note**
>
> If no domain package is defined in the provisioning profile or just a number of hosts with necessary products installed are provided, you can set the "Only Products" option to true and specify the host number. In such case, only the specified number of hosts are reserved and installed when requesting a service instance.

7. Click **Next**. In the Roles page, click **Add** to select the self service user roles to which this service template will be available. All users belonging to the selected role can use this service template.


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> **Note**
>
> If no role is added here, the SSA user will fail to request a service due to lack of quota.

8. Click **Next**. Review the information entered so far and click Submit.
   You will find the newly created service template is displayed in the Service Templates page. You can click on the Service Template Name link to view additional details.

## 12.2.6 Configuring Request Settings

You can configure the request settings by specifying when a request can be made, its duration, and so on. To configure the request settings, follow these steps:

1. In the **Getting Started: Tuxedo** page left panel, click **Request Settings**.
2. Specify the following parameters to set the global settings or settings for a specific role:
   - Future Reservation: How far in advance can a request be made.
   - Request Duration: Maximum duration for which a service can exist.
   - Archive Policy: Maximum duration after which archived requests are automatically deleted.
   - Service Instance Approval: Select this checkbox if all requests need to be approved by the self service administrator.
   - Service Instance Share Settings: A service instance can be shared with another user or a role. You can select either or both the checkboxes:
     - Allow SSA User to share service instances with other Users.
     - Allow SSA User to share service instances with Roles.
3. Click **Apply**.

## 12.2.7 Configuring Chargeback

> **Note**
>
> Before using Chargeback, it is assumed that you have read Enterprise Manager Cloud Administration Guide. Make sure that you have deployed Oracle Consolidation Planning and Chargeback plugin. If Oracle Consolidation Planning and Chargeback is absent, deploy it following Managing Plug-Ins in Enterprise Manager Cloud Administration Guide Enterprise Manager Cloud Administration Guide.

There is only one Chargeback Entity Type for Tuxedo, Oracle Tuxedo Machine. Therefore, Tuxedo Chargeback is based on Tuxedo Machine target instance number.

To create a Chargeback for the Tuxedo Machine, follow these steps:

1. Click Configure Charge Plan link to go to Charge Plans page to create a Chargeback for Tuxedo Machine.
2. Click Create drop down list, select **Plan** to create a new Tuxedo chargeback plan.
3. Click **Add** under Entity Types. In the **Add Entity Types** window, make sure Oracle Tuxedo Machine is selected.


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4. In the Oracle Tuxedo Machine page, click **Add** to add Chargeback items.
5. Click **Configure Cost Center** to configure cost center. For more information, see Chargeback Administration in Enterprise Manager Cloud Administration Guide.
6. Click **Configure Targets** to assign the Chargeback plan to an existing Tuxedo Machine. You can choose the target instances of Tuxedo Cloud Service, Tuxedo Domain, or Tuxedo Machine. If you choose target instances of either Tuxedo Cloud Service or Tuxedo Domain, only the Tuxedo Machines inside the Tuxedo Cloud Service or Tuxedo Domain are used to calculate total costs.

# 12.3 Using the Tuxedo Self Service Portal

Self Service Application users can use the Tuxedo Self Service Portal to create and control Tuxedo service instances, and monitor Tuxedo services.

> **Note**
>
> Before using the Tuxedo self service portal, the `EM_SSA_USER` role must have been configured in the Paas Infrastructure Zone, Quotas, and Service Templates definition.

To view the Tuxedo Self Service Portal, log in to Enterprise Manager as a user with EM_SSA_USER role.

Select **Enterprise -> Cloud -> Self Service Portal**, and click **Tuxedo Cloud Services**.

In the Tuxedo Cloud Services page, the top region shows the following icons:

- Instances: This icon shows the number of service instances that have been created by the current SSA user and their status.
- Expiry: The number of instances due to expire today, this week, and in the future.
- Usage: Shows the service instance number in normal status.

From the tabs in the left of the page, you can also enter the following pages:

- Requests: Click on this tab to view a list of all requests. For each request, the status, type, start date, and submission date of the request is displayed. Click on the status icon to view the execution details of the request. These details are helpful in troubleshooting a failed request.
  Select columns from the View menu to view more details about the request. You can select a scheduled request and click **Reschedule** to reschedule the request. To delete a request, select the request and click Delete.
- Chargeback: Click the Chargeback tab to view the charge summary information. For more information, see Chargeback
- Policies: Click the Policies tab to view the list of policies that you have defined. You can create a new Performance or Schedule Based Policy or a Policy Group for one or more Tuxedo services and define Scale Up or Scale Down on these policies. For more information, see Defining Policies for Tuxedo Services.
- Requesting a Tuxedo Service
- Controlling the Tuxedo Service
- Viewing the Tuxedo Service Home Page
- Chargeback


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- Defining Policies for Tuxedo Services

## 12.3.1 Requesting a Tuxedo Service

To request a Tuxedo service, follow these steps:

1. Click **Create Instance** in the Home page of the Tuxedo Cloud Self Service Portal.
2. The Service Catalog - Create Instance window appears. A list of service templates available to the self service user is displayed. Choose a service template and click **Select** to launch the Create Instance wizard.
3. Enter a name for the instance and select the Self Service Zone in which the new service is to be deployed.
4. In the **Instance Duration** region, specify the schedule for the instance.
   - Creation Date: You can choose Immediately (request is executed immediately) or Later. If you select the Later option, specify the date from which the service is to be available.
   - End Date: Select Indefinitely to make the service available for a indefinite period of time. If you select Until, specify the date on which it will be deleted and no longer available.
5. Click **Next**. The Characteristics page appears.
6. In the Target Properties region, specify the characteristics that will be used to tag and identify the target properties. Service instances created from the template will have the characteristics.
7. Click **Next**. The Configuration page appears.
8. Specify the Tuxedo domain externalizable variables, service provisioning mode, and port range according to the description of each option in the page. Click **Next**.

> **Note**
>
> This step settings overwrites the parameters configured in the Sevice Template. You can configure a tlisten password which is used for security connections between tlisten processes in a MP mode domain.

9. Review the information entered so far and click **Submit** to create the service request. This request will now appear in the Request page in the Tuxedo Self Service Portal. You can monitor the status of this request in this table. When the request has been completed, you can refresh the page to view the new service in the Instances table.

> **Note**
>
> - The user with the EM_SSA_ADMIN role cannot create service instances.
> - The SSA users having no quota cannot make a service request.


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## 12.3.2 Controlling the Tuxedo Service

In the Instances page, the Instances table shows the list of Tuxedo services owned by the self service user and any other services for which the user has view privileges. You can perform the following actions when selecting a service from the table:

- Delete: Delete the service instance. The entire domains associated to this service instance will be stopped and all applications will be deleted from each host that has been deployed before. This action does not uninstall the Tuxedo installation media.
- Extend: Extend the life of the service instance. You are prompted for the End Date. Enter a date later than the current one and click OK to extend the service instance.
- Start: Start the service and boot the corresponding Tuxedo domain.
- Stop: Stop the service and shut down the corresponding Tuxedo domain.
- Grant: You can grant view, manage, or full privileges over the service instance to other users and roles.
- Revoke: You can revoke privileges that you have granted to other users and roles.

## 12.3.3 Viewing the Tuxedo Service Home Page

The Tuxedo Service Home page provides detailed information about the services you have requested. To view the Tuxedo Service Home page, click the Name link of the Tuxedo service instance in the service instance table. This page contains the following regions:

- Top action menu: it provides the following actions:
  - Set End Date: Specify an end date for the Tuxedo service.
  - Start and Stop: Start or stop the service.
  - Scale Up and Scale Down: Increase or reduce the number of Tuxedo machines.
- Summary: Shows the availability status of the service, status summary of the Tuxedo Servers.
- Tuxedo Domain List: Lists Tuxedo domains.
- Requests: Lists the requests against this Tuxedo service instance in 24 hours.

## 12.3.4 Chargeback

The Chargeback page displays charge information for Tuxedo machines in login SSA user. Only the Tuxedo Machine target instances associated with predefined Tuxedo Charge Plan are monitored here. For more information, seeConfiguring Chargeback .

Top region shows total charge amount. From the bottom region you can view the Charge Trend in graph and details in table.

## 12.3.5 Defining Policies for Tuxedo Services

To define a policy, click the Policies tab. From the Create menu, you can select either of the following:

- Creating a TXaaS Schedule Policy
- Defining a TXaaS Performance Policy


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## 12.3.5.1 Creating a TXaaS Schedule Policy

For instance, if you want to create a schedule based policy that states that a tuxedo service must be scaled up every Monday, follow these steps:

1. Click the **Policies** tab in the Tuxedo Self Service Portal.
2. Click **Create** and select **Schedule Policy**.
3. Enter a name and description for the policy.
4. Select the Policy Action. There are four actions:
   - Scale Down Tuxedo Service Instance
   - Scale Up Tuxedo Service Instance
   - Start Tuxedo Service Instance
   - Start Tuxedo Service Instance
5. In the Start field, specify the date from which this policy must be effective.
6. In the Repeat field, specify **Every N** minutes/hours/days/weeks and then specify **N**.
7. Click **OK** to create the policy. You will return to the Policies page where the policy you have defined will appear in the Policies table. To apply these policy for a target, click Add in the **Associations** region and select a target with which this policy must be associated.

> **Note**
>
> TSAM Plus 12.2.2 does not support scaling up the Jolt domain. (Kindly review this note).

## 12.3.5.2 Defining a TXaaS Performance Policy

Performance policies are formed based on the performance metrics of a specific target type and its associated targets. You can create conditions and rules for the policy based on the metrics. To define a performance policy, follow these steps:

1. Click the **Policies** tab in the Tuxedo Self Service Portal.
2. Click **Create** and select the **Performance Policy** type.
3. In the General Information page, enter the name and description of the policy. Click **Next**.
4. In the Create Performance Policy: Rule page, select a metric from the right panel and click **Add to Definition**. Specify the condition, value, and number of occurrences. When these conditions are met, the policy is executed. Click **Next**.
5. Select one of the following actions from the **Action** drop down list. Click **Next**.
   - Scale Down Tuxedo Service Instance
   - Scale Up Tuxedo Service Instance
   - Start Tuxedo Service Instance
   - Stop Tuxedo Service Instance
6. Review the policy details and click **Save** and return to the Policies page.
7. In the Associations region, click **Add** and select one or more targets to be associated with this policy. The associated targets are listed in the **Associations** region.


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Click on the target link to view a list of policies associated with the target. Once the targets have been associated, the policy is activated. Click **View History** to view the policy action history.

# 12.4 Introspecting an Existing Domain

The Tuxedo profile uses the Tuxedo domain package to provision service instances. Before creating a Tuxedo profile, you must have created the desired domain package. You can create it from scratch or from an existing domain using the introspection feature in the Enterprise Manager Console or introspecting command.

This section contains the following topics:



## 12.4.1 Introspecting an Existing Domain From Console

To introspect an existing domain into a domain package from Enterprise Manager Console, follow these steps:

1. Create a new introspection project: .
   a. From the Enterprise Manager Console menu, click **Targets > Middleware** at the top
   b. In the Middleware page, click **Middleware Features > Tuxedo Summary**.
   c. In the Oracle Tuxedo Summary page, click **Introspect**.
   d. Click **New** to create a new introspection project and select one of the domains monitored by Enterprise Manager from the list.
      The master machine information is listed at the bottom. If the host on which the master machine deployed are configured with the preferred credential, the host credential will be filled automatically.

      Alternatively, if you want to introspect a tuxedo domain not monitored by Enterprise Manager, fill the necessary machine configuration parameters in the bottom panel.

      > **Note**
      >
      > Any host can be the candidate to retrieve the UBB

   e. Click **OK**to retrieve the tuxedo domain UBB configurations.
      When the tuxedo domain UBB configuration is successfully retrieved from target host/ machine, each tab page shows the machine configuration of this domain. You can configure “Third Party Software” which is required by the domain but outside of APPDIR. Such binary/configuration file must be added in the right table list one by one. When packaging the machine binary package, these file/folder will be collected together with all contents under APPDIR.
2. Click **Package > Introspect** to invoke the introspecting process. When the process completes successfully, the Confirmation window with the result and domain package file name is displayed.
3. Click **Package >Download** to download the desired domain package to the local machine.


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4. (Optional) Click **Save** to export the newly created introspection project parameters to the local computer. The file is exported as XML format without a user password. The file can be used to introspect the domain under the command line mode as well.
5. (Optional) Click **Open** to upload a local project file saved before.
   After the project file is successfully uploaded and parsed, all the introspection parameters are shown.

After the project file is successfully uploaded and parsed, all the introspection parameters are shown.

## 12.4.2 Introspecting an Existing Domain Using Command Line

**Introspection Command**

Name

java -jar TxdoDomainPackager.jar

Synopsis

```
java -jar TxdoDomainPackager.jar -prop property file [-template]
```

Options

**prop**

Required. Full path to the property file which contains introspection parameters and corresponding values.

**template**

Optional. Creates a property file template to let you focus on specifying necessary values.

Examples

```
java -jar TxdoDomainPackager.jar -template
```

A property file template `InputParamsTemplate.xml` is created under the location where java command invoked.

Edit the template `InputParamsTemplate.xml` to suit your environment and save it as `params.xml`.

```
java -jar TxdoDomainPackager.jar -prop params.xml
```

A binary package zip file is created under the location where java command invoked.

- Property File Template Format
- Application/Library Package
- Limitation
- Placeholders File Format and Usage

### 12.4.2.1 Property File Template Format

**Property File Template**

```
<?xml version="1.0" encoding="UTF-8"?>
<CmdOptions>
```


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```
<General>
<!-if these options not configured in general section, then configure these
items should be configured to each host section
, especially for those mandatory items, i.e. AppDir,TuxDir, TuxConf,User,Pwd.
Default value of "IncludeLocal" is false.
-->
<AppDir>[application directory]</AppDir>
<TuxDir>[Description of this package]</ TuxDir >
<JavaHome>[full path of java home]</ JavaHome>
<TuxConf>[tuxedo configuration full path]</ TuxConf >
<EnvFile>[Set runtime environment file]</EnvFile>
<DmConf>[tuxedo configuration full path]</ DmConf >
<SaltConf>[tuxedo configuration full path]</SaltConf >
<TnsNamesLocation>[tuxedo configuration full path]</ TnsNamesLocation>
<OraDbClientDir> [Oracle DB client Directory] </OraDbClientDir>
<IncludeLocal>[true or false]</ IncludeLocal>
<User>[user which can be shared with all hosts]</User>
<Pwd>[password which can be shared with all hosts]</Pwd>
</General>
<Hosts>
<Host>
<NetAddress></NetAddress
<Softwares>
<Software> <!-can be multiple -->
<Name>[Name of this software]</Name>
<Location>[full path where is this software]</Location>
</Software>
</Softwar>
[Following options can be specified to override the same one configured in
general section]
<User></User>
<Pwd></Pwd>
<AppDir/>
<TuxDir/>
<JavaHome/>
<WorkingDir />
<TuxConf/>
<DmConf/>
<SaltConf/>
<TnsNamesLocation/>
<IncludeLocal/>
<JavaHome/>
</Host>
```

Following is a property file example:

**Property File Example**

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<CmdOptions>
<General>
<TuxDir>/home/yfli/oracle/tux_oh/tuxedo12.1.3.0.0</TuxDir>
<JavaHome>/home/yfli/tools/jdk1.7.0_55</JavaHome>
<User>yfli</User>
<Pwd></Pwd>
```


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```
</General>
<Hosts>
<Host>
<NetAddress>localhost</NetAddress>
<TnsNameLocation>/home/yfli/tools/ora_client/12.1.0/client_1/tnsnames.ora</
TnsNameLocation>
<OraDbClientDir>/home/yfli/tools/ora_client/12.1.0/client_1</OraDbClientDir>
<AppDir>/home/yfli/apps/tux1213/domapp/domain1</AppDir>
<TuxConf>/home/yfli/apps/tux1213/domapp/domain1/tuxconfig</TuxConf>
<DmConf>/home/yfli/apps/tux1213/domapp/domain1/bdmconfig</DmConf>
<SaltConf>/home/yfli/apps/tux1213/domsalt/saltconfig</SaltConf>
<EnvFile>/home/yfli/apps/tux1213/domsalt/setenv.sh</EnvFile>
<Softwares> <Software>
<Name>test1</Name>
<Location>/home/yfli/apps/tux1213/cics</Location>
</Software>
<Softwares> </Host>
<Host>
<NetAddress>…...cn.oracle.com</NetAddress>
<JavaHome>/home/yfli/tools/jdk1.7.0_55</JavaHome>
<AppDir>/home/yfli/apps/tux12130/mp</AppDir>
<TuxDir>/home/yfli/oh/tux12130</TuxDir>
<TuxConf>/home/yfli/apps/tux12130/mp/tuxconfig</TuxConf>
<User>yfli</User>
<Pwd> </Pwd>
<Softwares>
<Software>
<Name>cmds</Name>
<Location>/home/yfli/cmds</Location>
</Software>
</Softwares> </Host>
</Hosts>
</CmdOptions>
```

## 12.4.2.2 Application/Library Package

A binary package zip file is created during introspection process for each of machine configured in the Tuxedo domain. This package includes all the applications, libraries, and all third party products that the domain needs. The file is named `[lmid].zip` and is configured in the Tuxedo domain package configuration file. For example, when introspecting the machine "LMID1" on a host, its binary package in the configuration file may look like the following:

**Binary Package in Configuration File**

```
<?xml version="1.0" encoding="UTF-8"?>
<DomainPackageConfig>
…
<PackagesUsed>
<BinaryPackage>
<ArchiveFormat>ZIP</ArchiveFormat>
<SubFolders>
<FolderInfo>
<Name>APPDIR</Name>
<Destination/>
<IsShared>false</IsShared>
```


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```
</FolderInfo>
</SubFolders>
<Name>SITE1.zip</Name>
<Description/>
<Location/>
<Destination/>
</BinaryPackage>
…
</PackagesUsed>
…
</DomainPackageConfig>
```

The zip file includes following contents which are all copied from APPDIR:

```
`-- APPDIR
|-- java.env
|-- setenv.sh
|-- simpcl
|-- simpserv1
|-- starttlisten
|-- tuxconfig
|-- tuxconfig.decompiled
|-- ubb
`-- ubb.test
```

> **Note**
>
> The configuration files in this folder will be overwritten by the ones in config_LMID1 folder if those files destination location is APPDIR.

## 12.4.2.3 Limitation

When introspecting an existing domain running on the different machine with OMS, the machines configured in the domain can not post message in the `.bashrc` configuration file. This causes SFTP connection failure.

## 12.4.2.4 Placeholders File Format and Usage

Placeholders are used to replace old values in configuration files. These placeholders can be treated as "Variables" which will be filled with the real value at deployment time. All the placeholders are defined in the package configuration file. The following listing shows the definitions.

**Placeholders Definition**

```
<Name></Name> // this is the variable name used in the configuration file in
the format of ${name}
```


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```
<Type> </Type> // Indicates that the macro is well-known or not
<Label> </Label> //Label name that will displayed on GUI
<Value> </Value> //Value of this placeholder delegate
<Description/> //Hint messages that will displayed on GUI
<IsSecurity></IsSecurity> //The value should be inputted by a security text
box
<OriginalValue></OriginalValue> //Original value in the configuration file
```

Placeholders can be used in any configuration and script files which will be handled during provisioning procedure. The placeholder in these files is in format of `${placeholder}`.

**Placeholders Example**

```
<?xml version="1.0" encoding="UTF-8"?>
<DomainPackageConfig>
…
<Placeholders>
<Placeholder>
<Name>SITE1-tsam-manager-host</Name>
<Type>UBB_TSAM_ADDR</Type>
<Label>TSAM Manager Address</Label>
<Description/>
<IsSecurity>false</IsSecurity>
<OriginalValue>10.182.55.120</OriginalValue>
</Placeholder>
…
</Placeholders>
…
</DomainPackageConfig>
```

UBB, DM, SALT, and Oracle TNS configuration files are parsed during introspecting, and replaced with placeholders at deployment time automatically. The following listing lists the well-known placeholder types:

**Well-known Placeholder Types**

```
IPC_LOCAL //IPC key which will be filled value automatically
NET_PORT //Net port which will be filled value automatically
LOCAL_NET_ADDR //Local net address which will be filled value automatically
UBB_MACHINE_NAME //real host name of machine
UBB_NET_ADDR // net address
UBB_NLS_PORT //NLS net port
UBB_NA_PORT // NA net port
JMX_PORT //JMX net port
JMX_ADDRESS //JMX net address
DM_LOCAL_ADDRESS // Domain gateway local net address;
DM_LOCAL_PORT // Domain gateway local net port;
DM_REMTOTE_PORT // Domain gateway remote net port;
DM_REMOTE_ADDRESS // Domain gateway remote host address;
UBB_DOMAIN_IPCKEY //Domain IPC Key
UBB_DOMAIN_ID //Domain ID
DOMAIN_PWD //Domain Application password
DOMAIN_USER //User name if domain configured with ACL/Mandatory ACL
DOMAIN_USER_PWD //User password
```


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```
GLOBAL_VAR //Global variable
CUSTOMIZED //User defined placeholder
```

The placeholders assigned with the type of UBB_MACHINE_NAME, UBB_NET_ADDR, UBB_NLS_PORT, UBB_NA_PORT, JMX_PORT, JMX_ADDRESS, DM_LOCAL_ADDRESS, DM_LOCAL_PORT are handled automatically. That is, their values are filled by provisioning procedure. For those placeholders assigned with the type of "GLOBAL_VAR", the value can be embedded with other placeholders. See the example shown in below:

**Placeholders with GLOBAL_VAR**

```
<?xml version="1.0" encoding="UTF-8"?>
<DomainPackageConfig>
…
<Placeholders>
<Placeholder>
<Name>SITE1-G_VAR</Name>
<Type> GLOBAL_VAR </Type>
<Label>TSAM Manager Address</Label>
<Value>${SITE1-ADDRESS}:${SITE1-PORT}</Value>
<Description/>
<IsSecurity>false</IsSecurity>
<OriginalValue>10.182.55.120</OriginalValue>
</Placeholder>
…
</Placeholders>
…
</DomainPackageConfig>
```

When manually making a domain package instead of using introspecting tool, you can use the following placeholders in the configuration and scripts files directly:

- `lmid-APPDIR`
- `lmid-TUXDIR`
- `lmid-ORAHOME`

`lmid` is the logical name of the machine configured in UBB.

For those automatically handled placeholders, for example, `${SITE1-machine-name}` is filled with a real host name at provisioning time without any input from end users. But in the case that there is no proper value to replace the placeholder, you need to input the values. For example, `${GWDOMAIN3-remote-port}` in DM CONF will be filled with proper value to the best extent possible. If no proper value can be determined automatically, you need to input the value. Here is an example that shows the process of how to handle such placeholders.

Suppose two domains are connected with each other through domain gateway and both are included in a provisioning profile. Domain 1 connects to WTC which will be viewed as domain 3. The DM configuration will look like this:

**Domain 1 DM configuration-dm1.conf**

```
*DM_RESOURCES
*DM_LOCAL
"GWDOMAIN1" GWGRP="SYSGRP"
ACCESSPOINTID="GWDOMAIN1"
…
```


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```
*DM_REMOTE
"GWDOMAIN2" ACCESSPOINTID="GWDOMAIN2"
CREDENTIAL_POLICY="LOCAL"
"GWDOMAIN3" ACCESSPOINTID="GWDOMAIN3"
CREDENTIAL_POLICY="LOCAL"
*DM_TDOMAIN
"GWDOMAIN1" NWADDR="//${GWDOMAIN1-local-addr}:${GWDOMAIN1-local-port}"
NWPROTOCOL=LLE
"GWDOMAIN2" NWADDR="//${GWDOMAIN2-remote-addr}:${GWDOMAIN2-remote-port}"
"GWDOMAIN3" NWADDR="//${GWDOMAIN3-remote-addr}:${GWDOMAIN3-remote-port}"
```

**Domain 2 DM configuration-dm2.conf**

```
*DM_RESOURCES
*DM_LOCAL
"GWDOMAIN2" GWGRP="SYSGRP"
ACCESSPOINTID="GWDOMAIN2"
…
*DM_REMOTE
"GWDOMAIN1" ACCESSPOINTID="GWDOMAIN1"
CREDENTIAL_POLICY="LOCAL"
*DM_TDOMAIN
"GWDOMAIN1" NWADDR="//${GWDOMAIN1-remote-addr}:${GWDOMAIN1-remote-port}"
NWPROTOCOL=LLE
"GWDOMAIN2" NWADDR="//${GWDOMAIN2-local-addr}:${GWDOMAIN2-local-port}"
```

When handling dm1.conf at provisioning time, the assembly procedure attempts to find the host in Domain 2 UBB configuration (find it by access point) by comparing original net address value. If the host is successfully found, the new address will be filled `${GWDOMAIN2-remote-addr}`, but if domain 2 is not included in the profile or such host can not be found in domain 2 UBB, then you need to provide this value before submitting the provisioning procedure, for example, provide the value for `${GWDOMAIN3-remote-addr}`.

Following configuration files are introspected and handled automatically:

- `UBB CONF`
- `DM CONF`
- `SALTCONFIG`
- Oracle TMS configuration file
  UBB sample assembled with placeholders:

```
…
*MACHINES
"${SITE1-machine-name}" LMID="SITE1"
TUXCONFIG="${STITE1-APPDIR}/tuxconfig"
TUXDIR="${SITE1-TUXDIR}"
APPDIR="${SITE1-APPDIR}"
TLOGNAME="TLOG"
TLOGSIZE=100
MAXWSCLIENTS=20
"${SITE2-machine-name}" LMID="SITE2"
TUXCONFIG="${SITE2-APPDIR}/tuxconfig"
TUXDIR="${SITE2-TUXDIR}"
APPDIR="${SITE2-APPDIR}"
```


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```
TLOGNAME="TLOG"
TLOGSIZE=100
…
*SERVERS
LMS" SRVGRP="GROUP1"
SRVID=100
CLOPT="-A -- -l ${SITE1-tsam-manager-host}:${SITE1-tsam-manager-port}/tsam"
RQPERM=0666
REPLYQ=N
RPPERM=0666
MIN=1
MAX=1
…
```

# 12.5 Introspecting ART Applications

When introspecting ART applications, following parameters and files are collected and zipped into a domain package.

- ART CICS Introspection
- ART Batch Introspection
- ART IMS Introspection

## 12.5.1 ART CICS Introspection

**Table 12-1 ART CICS Introspection**

| Description | Source | Type | Placeholder | Add to Package |
|---|---|---|---|---|
| `ARTTCPL -n netaddr -S ssladdr -L pnetaddr` | CLOPT | Network address | Y | n/a |
| `ARTTCPL [-p profile-name]` | CLOPT | File location | Y | N |
| `ARTCSKL -p port` | CLOPT | Network address | Y | n/a |
| `DD_VSAMFILE` | Env Variable | File location | Y | Y |
| `KIXCONFIG` | Env Variable | File location | Y | Y |
| `KIXDIR` | Env Variable | File location | N (auto set to ARTCICS install dir) | N |
| `KIX_CWA_IPCKEY` | Env Variable | IPC Key | Y | n/a |
| `KIX_DUMP_FILE` | Env Variable | File location | Y | N |
| `KIX_JOURNAL_DIR` | Env Variable | File location | Y | N |
| `KIX_MAP_PATH` | Env Variable | File location | Y | Y |
| `KIX_QSPACE_IPCKEY` | Env Variable | IPC Key | Y | n/a |
| `KIX_SHR_IPCKEY` | Env Variable | IPC Key | Y | n/a |
| `KIX_SPOOL_OUTPUT_DIR` | Env Variable | File location | Y | N |
| `KIX_TD_DIR` | Env Variable | File location | Y | N |
| `KIX_TD_QSPACE_IPCKEY` | Env Variable | IPC Key | Y | n/a |


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**Table 12-1 (Cont.) ART CICS Introspection**

| Description | Source | Type | Placeholder | Add to Package |
|---|---|---|---|---|
| KIX_TECH_DIR | Env Variable | File location | Y | N |
| KIX_TRACE_PATH | Env Variable | File location | Y | N |

## 12.5.2 ART Batch Introspection

**Table 12-2 ART Batch Introspection**

| Description | Source | Type | Placeholder | Add to Package |
|---|---|---|---|---|
| JESDIR | Env Variable | File location | N (Batch RT install dir) | N |
| $JESDIR/ejr/CONF/* | Env Variable | - | Y | Y |
| PROCLIB | Env Variable | File location | Y | N |
| MT_ACC_FILEPATH | Env Variable | File location | Y | N |
| MT_CTL_FILES | Env Variable | File location | Y | N |
| MT_KSH | Env Variable | File location | N (pdksh dir) | N |
| MT_DB_LOGIN | Env Variable | User/passwd | Y | n/a |
| MT_DB_LOGIN2 | Env Variable | User/passwd | Y | n/a |
| MT_GDG_DB_ACCESS | Env Variable | User/passwd | Y | n/a |
| MT_LOG | Env Variable | File location | Y | N |
| MT_ROOT | Env Variable | File location | - | - |
| MT_SYSOUT | Env Variable | File location | Y | N |
| MT_TMP | Env Variable | File location | Y | N |
| DATA | Env Variable | File location | Y | N |
| TMP | Env Variable | File location | Y | N |
| SYSIN | Env Variable | File location | Y | N |
| MT_CONFIG_FILE | Env Variable | File location | Y | Y |
| ARTJESADM -i JESCONFIG | CLOPT | File location | Y | Y |
| JESCONFIG:JESROOT | Config option | File location | Y | N |
| JESCONFIG:JES_ACL_FILE | Config option | File location | Y | Y |
| JESCONFIG:JOBREPOSITORY | Config option | File location | Y | Y |
| JES_TRACE_PATH | Env Variable | File location | Y | N |

## 12.5.3 ART IMS Introspection

**Table 12-3 ART IMS Introspection**

| Description | Source | Type | Placeholder | Add to Package |
|---|---|---|---|---|
| IMSDIR | Env Variable | File location | N (IMS RT install dir) | N |
| ART_IMS_CONFIG | Env Variable | File location | Y | Y |


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**Table 12-3 (Cont.) ART IMS Introspection**

| Description | Source | Type | Placeholder | Add to Package |
|---|---|---|---|---|
| ART_IMS_DB | Env Variable | File location | Y | Y |
| ART_IMS_FMT | Env Variable | File location | Y | Y |


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