

# Technical Guidelines of Upgrading to Tuxedo 11gR1

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This document provides introductions of new features and changes introduced in Tuxedo 11gR1 since Tuxedo 6.5, and give guidance on how to upgrade applications to Tuxedo 11gR1.

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# 1 Introduction

This document will first introduce new features and enhancements accumulated in Tuxedo 11gR1 from Tuxedo 6.5, and then provide guidelines on how to upgrade applications based on Tuxedo lower releases to Tuxedo 11gR1. The document also provides overview of Tuxedo 11gR1 integration with other Oracle products.

## 2 What's new in Tuxedo 11gR1

This section will introduce major features of Tuxedo which are accumulated from Tuxedo 7.1 till the 11gR1 release.

### 2.1 Tuxedo 7.1

#### ✧ Security for E-commerce

- **Support for Security Systems Provided by Third-party Vendors.** With the availability of the plug-in architecture, Oracle Tuxedo customers who want to customize authentication, authorization, auditing, or public key security can contact a third-party security vendor to procure the appropriate plug-ins (code modules). Alternatively, customers can use the Oracle Tuxedo default plug-ins provided for each of these security capabilities.
- **Message-based Digital Signature.** Message-based digital signatures enhance Oracle Tuxedo security by allowing a message originator to prove its identity, and binding that proof to a specific message buffer. The scope of protection is end-to-end: a message buffer is protected from the time it leaves the originating process until the time it is received by the destination process.
- **Message-based Encryption.** Message-based encryption keeps data private, which is essential for most applications that transport data over the Internet. The scope of protection is end-to-end: a message buffer is protected from the time it leaves the originating process until the time it is received by the destination process.

#### ✧ Multithreading and Multicontexting

In this release, the Oracle Tuxedo system provides new ATMI functions that enable programmers to write multithreaded and/or multicontexted clients and servers. In a multithreaded application, a single client can initiate multiple, concurrent (parallel) calls. In a multicontexted application, a client can establish multiple associations with multiple domains. On the server side, multithreading provides the ability to process multiple service requests simultaneously within one server process.

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### ❖ **Embedded FML (EFML) Support**

This release provides the ability to embed FML records within other FML records. By using this functionality, you can manage a single EFML buffer as a single structure rather than a series of discrete data fields.

### ❖ **XML Buffer Support**

XML buffers enable Oracle Tuxedo applications to use XML for exchanging data within and between applications. Oracle Tuxedo applications can send and receive simple XML buffers, and route those buffers to the appropriate servers. All logic for dealing with XML documents, including parsing, resides in the application.

### ❖ **IPC Tool**

The IPC tool allows system administrators to determine and clean up the IPC resources used by the Oracle Tuxedo system after an unexpected shutdown.

### ❖ **Domains MIB**

Provides programmatic and dynamic administration of the Domains configuration.

### ❖ **Jolt and Web-based Administration Console**

- Bundles Oracle Jolt and the Web-based Administration Console with the Oracle Tuxedo software.

## 2.2 Tuxedo 8.0

### ❖ **CORBA integration**

Bundles CORBA ORB from WebLogic Enterprise 5.1 with Oracle Tuxedo software and provide more functionality.

- **Support for Multithreaded CORBA C++ Applications.** Release 8.0 of Oracle Tuxedo supports multithreaded C++ client and server applications. While there are many advantages to writing multithreaded applications, there are some disadvantages such as application complexity. Oracle Tuxedo 8.0 supports two threading models: thread per object and thread per request.
- **Support for CORBA C++ Unicode Character Set.** Release 8.0 of the Oracle Tuxedo software supports international (multi-byte) characters, or wide characters. Support for wide characters enables the Unicode character set to be used in the CORBA Interface Definition Language (IDL) and in CORBA client and server applications. As part of this new functionality, the C++ IDL compiler now supports wchar and wstring data types, recursive sequences, indirect typecodes, and forward references.
- **Support for C++ Object-by-Value Types.** Support for C++ object-by-value types enhances the ability of Oracle Tuxedo CORBA C++ applications to access Oracle WebLogic Servers 6.0 via RMI/IIOP.

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## ❖ **Load Balancing Features**

- **Load Balancing that reduces bridge traffic.** Release 8.0 of Oracle Tuxedo includes new load balancing features. In Oracle WebLogic Enterprise 5.1, in a multiprocessor configuration, load balancing randomly distributed workload across all machines supporting a particular interface within a domain. In Oracle Tuxedo 8.0, load balancing favors the local machine when distributing workload and, thus, reduces bridge traffic.
- **Support for parallel objects.** Support for parallel objects was added to Oracle Tuxedo CORBA in release 8.0 as a performance enhancement. The parallel objects feature enables you to designate all business objects in a particular application as stateless objects. The effect is that, unlike stateful business objects which can only run on one server in a single domain, stateless business objects can run on all servers in a single domain.

## ❖ **Support for Single Sign-On Across ATMI and CORBA Domains**

Support for the T-Engine security plug-in framework was provided in Oracle Tuxedo 7.1 and Oracle WebLogic Enterprise 5.1 (CORBA-only), but security context could not be propagated across these environments. In Oracle Tuxedo 8.0, both the ATMI and CORBA environments support the same plug-in framework, and therefore, common, interoperable security is achieved.

## ❖ **Server Performance Enhancements**

Oracle Tuxedo 8.0 includes the following server options that enable you to customize the server for optimal performance:

Service and Interface Caching

Turning off Authorization and auditing security

Turning off Multithreaded Processing

Turning off XA transactions

## ❖ **Domain Performance Enhancements**

Enhancements have been made to the Oracle Tuxedo Domains software to improve performance in the following areas:

Reduce boot time in large domain configurations

Enable cross-domain assignment of message priorities

Domain transaction auditing

## ❖ **Oracle WebLogic Server Integration Enhancements**

In release 8.0, the Jolt software includes the following enhancements that improve the integration of Oracle WebLogic Server with Oracle Tuxedo services:

Propagation of Oracle WebLogic Server user authentication

Connection pools reset option

XML buffer type support

Buffer allocation enhancements

## 2.3 Tuxedo 8.1

### ✧ XML Parser Integration

Release 8.1 of Oracle Tuxedo incorporates the Apache Xerces C++ parser into the Oracle Tuxedo system for use by customer applications to read and write XML data. The Xerces C++ parser is enhanced to cache DTD, XML schema, and entity files.

### ✧ Multibyte Character Encoding

Release 8.1 of the Oracle Tuxedo software supports the multibyte coded character sets required by Chinese, Japanese, Korean, and other Asian Pacific languages. Oracle Tuxedo 8.1 includes a new multibyte string data typed buffer named MBSTRING for transport of multibyte character user data.

### ✧ Localized Install for Japan

Release 8.1 of Oracle Tuxedo includes an installation enhancement enabling customers to install and interface with the Oracle Tuxedo system in English or Japanese.

### ✧ TUXCONFIG Parameter Length Enhancement

This enhancement increases the maximum allowable length of certain Oracle Tuxedo configuration parameters from 64 or 78 to 256 characters. This enhancement is to increase the maximum length of pathname-holding parameters to hold longer pathname strings.

### ✧ Domain Keepalive Function

The Domains keepalive functionality keeps Tuxedo interdomain connections open during periods of inactivity, but also enables TDomain gateways to quickly detect interdomain connection failures.

### ✧ Global Maximum Transaction Timeout Enhancement

This enhancement adds a global maximum transaction timeout parameter to cap ATMI transaction timeout values that are excessively long.

### ✧ Single Point Security Administration Option

This feature allows Oracle Tuxedo and Oracle WebLogic Server applications to share the WebLogic Server database. This feature applies to deployments involving a Oracle Tuxedo 8.1 and WebLogic Server 7.0 or later application.

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### ❖ **Domain Gateway Performance Improvements**

The Domain gateway performance improvement requires no change in the user interface. Performance of the TDomain gateway improved by:

Improving various internal algorithms for scheduler and message receivers  
Using cache whenever feasible to look up configuration information

### ❖ **Remote Domain Connection Policy Enhancement**

This feature allows users to selectively establish connection on a per remote domain basis.

### ❖ **Multithreaded Bridge**

This feature introduces a Tuxedo Bridge server process that has both single-threaded and multithreaded execution capabilities. A configuration setting determines whether the Bridge process is configured for single-threaded execution or multithreaded execution.

## 2.4 Tuxedo 9.0

### ❖ **Service Metadata Repository**

The Tuxedo Service Metadata Repository is a repository similar to the Jolt repository. It provides Tuxedo application developers and administrators the ability to store and retrieve detailed services parameter information on any or all Tuxedo application services.

The Service Metadata Repository will provide enhanced Web services support and additional integration between Tuxedo and WebLogic.

### ❖ **XML To and From FML/FML32**

To better enable integration of XML into Oracle products, XML conversion to and from FML/FML32 in a Tuxedo environment is provided.

### ❖ **Xerces Parser Upgrade**

Tuxedo 9.0 will deliver the Xerces parser 2.5.0 as part of the installation package. This upgraded parser will provide support for XML parser validation as well as continued XML support comparable to that of Tuxedo 8.1.

### ❖ **Domain Gateway Performance Enhancement**

This feature improves the Tuxedo domain GWTDOMAIN performance by introducing multithreaded execution capability. It also allows other types of domain gateways to take advantage of this feature in the enhanced Common Gateway Architecture with simple program changes.

### ❖ **Domain Gateway Session Connection Policy**

This feature allows configuring a specific TDOMAIN session from a local GWTDOMAIN gateway to a remote GWTDOMAIN gateway.

✧ **Domain Gateway Connection Events**

Tuxedo 9.0 will report predefined events for Domain Gateway connections. Events will primarily report issues such as connection success, failure and dropped connections.

✧ **IIOB Client Failover**

Tuxedo CORBA remote clients invokes object methods via an IIOB gateway. In some cases, the IIOB gateway connection may fail due to reasons such as a shutdown of the IIOB gateway or network disconnection. This feature provides a transparent mechanism for a CORBA remote client to automatically connect to an alternative ISL and then retry the request.

✧ **Service Level Blocktime**

This feature provides applications with greater control over blocktime, providing capabilities to specify blocktimes for individual services, calls made by a particular Tuxedo context, or for one particular blocking call.

✧ **Kerberos Authentication**

Tuxedo 9.0 provides a Kerberos security plug-in which allows Tuxedo native clients via an authentication server, KAUTHSVR, to validate the credentials passed by the security plug-in and return results. The KAUTHSVR will also take over what the default AUTHSVR does to provide Tuxedo security ACL checking.

✧ **Cert-C PKI Plug-in**

Tuxedo 9.0 provides a Cert-C PKI plug-in which allows users to sign, seal, and envelope Tuxedo typed message buffers by using the public key encryption algorithm. The plug-in allows the typed buffer to be encrypted and then put a signature on it.

## 2.5 Tuxedo 9.1

✧ **Oracle RAC Support**

Tuxedo 9.1 provides Transaction Monitor support for Oracle RAC by allowing an administrator to specify lists of groups associated with different RAC instances, thereby allowing Tuxedo to ensure that groups associated with different instances of the same RAC database do not participate in the same transaction.

✧ **Tuxedo .NET Workstation Client**

The Tuxedo .NET Workstation Client enables you to write Tuxedo client applications using .NET programming languages to access Tuxedo services. It also provides connectivity between .NET workstation applications and Tuxedo services.

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❖ **Remote Desktop Enhancement**

Allows Tuxedo to start up, be accessed and shut down using MS Windows Remote Desktop.

❖ **TDomain Transaction Performance Enhancement**

Improved performance when switching from Jolt or WLEC to WTC.

## 2.6 Tuxedo 10.0

❖ **SSL Support for ATMI Applications**

This feature provides support for SSL encryption over all network links in Tuxedo where LLE encryption is available.

❖ **Generic AUTHSVR**

Generic AUTHSVR is a new Tuxedo system server (GAUTHSVR) that enables Tuxedo users to be authenticated with LDAP based directory servers without need to write custom code.

❖ **MQ Adapter**

The MQ Adapter provides bi-directional, transactional connectivity to and from WebSphere MQSeries.

❖ **DoS**

Provides Tuxedo TDomain domain gateway features used to defend against DoS attacks, and Tuxedo Domain improved password pair configuration flexibility.

❖ **Integrating ACUCOBOL in buildclient/buildserver**

In Tuxedo 10.0, buildclient/buildserver can accept COBOL source files and generate C stub code automatically using ACUCOBOL compiler version 6.2.0 or above.

❖ **Integrating IBM COBOL v2.0 32-bit in buildclient/buildserver on AIX**

In Tuxedo 10.0, buildclient/buildserver can accept COBOL source files and generate C stub code automatically using IBM COBOL v2.0

❖ **OpenLDAP for X.509 Certificate Lookup**

Tuxedo 10.0 PKI plug-in added support for OpenLDAP for X.509 certificate lookup.

❖ **Extended MAXSERVICES Range**

The before Tuxedo 10.0 release the MAXSERVICES is limited to 32766. In Tuxedo 10.0, the upper limit of MAXSERVICES has been extended to 1048574.

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## 2.7 Tuxedo 10gR3

### ✧ IPv6 Support

Before Tuxedo 10gR3, only IPv4 is supported. In Tuxedo 10gR3, IPv6 is supported. The most obvious improvement in IPv6 over the IPv4 is that IP addresses are lengthened from 32 bits to 128 bits.

### ✧ Application-Created Context in ATMI Server

Two new APIs, [tpappthrinit\(3c\)](#) and [tpappthrterm\(3c\)](#), are provided for application-created thread in ATMI server to create and terminate separate Tuxedo context. In context created using [tpappthrinit\(3c\)](#), the application-created server thread can initiate service requests and define transactions.

### ✧ Oracle Tuxedo Access Log

Assists Tuxedo client administrators to monitor application validity at runtime. You can record application high water client count, current client count, and named users.

### ✧ Enhancements

- CLOPT Length

The CLOPT length of a Tuxedo ATMI server in UBBCONFIG is increased from 256 to 1024.

- FML/FML32 Field Name Length

The field name length of an FML/FML32 buffer is increased from 30 to 254.

- `tlisten(1)` password encryption

`tlisten.pw` file is system-encrypted. To add or change passwords, you must use `tlistpwd(1)`.

- Dynamic DMIB Update

Allow re-configuring the listening address of the remote domain gateway without shutting down the local domain.

- Domain Gateway Persistent Disconnect

Local domain with a `PERSISTENT_DISCONNECT` connection policy will neither connect to nor accept connect request from any remote domain.

- IBM COBOL v3.1 support on AIX

Tuxedo supports both 32-bit and 64-bit IBM COBOL v3.1 in buildclient/buildserver

## 2.8 Tuxedo 11gR1

### ✧ Client/Server Affinity

The Oracle Tuxedo Client/Server Affinity feature provides the flexibility to set up a simple session-aware application model. It creates a "virtual" request routing scope using the Oracle Tuxedo ATMI RPC infrastructure. When a session is established, all subsequent calls are impacted by the routing scope until the session is terminated (explicitly or implicitly). With Client/Server Affinity, you can retain session context resources inside the client/server affinity scope.

### ✧ Extended ATMI Service Name Length

The maximum Oracle Tuxedo ATMI service name length is increased to 127 characters.

### ✧ Enhancements

- Domain retries connection establishment after incorrect password failure

When configured, ON\_STARTUP domain gateway continuously re-tries to establish connection to remote domain when domain password pair validation fails.

- Flexibility to run Oracle Tuxedo as user other than administrator on Microsoft Windows

If configured in Microsoft Windows, processes booted in an Oracle Tuxedo domain are owned by the user who executed the tmboot command, instead of the user who starts the TUXIPC system service.

## 3 Compatibility

Applications built with Oracle Tuxedo lower release is upwardly compatible with Oracle Tuxedo 11gR1 on source code level. The customer need to recompile all the application code using new compiler supported by Oracle Tuxedo 11gR1 on new supported OS, the

detailed platform and compiler information can be found at :  
[http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/install/inspds.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/install/inspds.html). All existing configuration files should be regenerated on Oracle Tuxedo 11gR1.

Besides, some default behaviors in Tuxedo have been changed to meet new requirement, several switches are introduced to revert back to Tuxedo lower release behaviors:

#### ✧ **TM\_CBL\_IGNORE\_CONTEXT**

This switch applies to COBOL application only. CONTEXT-FLAG is introduced in Tuxedo 8.1, which make Tuxedo 6.5 COBOL program to call TPINITIALIZE fail with TPEINVAL.

From Tuxedo 8.1, this environment variable is introduced. If it is set to “Y”, existing Tuxedo 6.5 COBOL program will run correctly in Tuxedo 11gR1, the consequence is they cannot get multiple-context feature. If customer decides to use multiple-context in Tuxedo 11gR1 COBOL program, this should be disabled.

#### ✧ **TM\_TUX65\_COMPATIBILITY**

This switch is introduced in Tuxedo 8.0, it applies to \$APPDIR directory access permission. In Tuxedo 6.5, if the security configuration of Tuxedo is NONE, even though Tuxedo administrator has no write access to \$APPDIR, they can generate BDMCONFIG using tmloadcf, even with CMDTUX\_CAT:1278 reported. In Tuxedo 8.0 and later, CMDTUX\_CAT:1278 and CMDTUX\_CAT:1275 are reported, tmloadcf fails.

This may address some requirement where Tuxedo administrator has no Tuxedo application binary access in \$APPDIR. If TM\_TUX65\_COMPATIBILITY is set to 1, Tuxedo 6.5 behavior will be restored.

#### ✧ **TPNOTRAN\_PASS**

This switch applies to transaction applications to keep the same behavior of Tuxedo 8.1 and Tuxedo 11gR1, when the current transaction already fails but native client is still trying to send requests via tpcall with TPNOTRAN flag.

In Tuxedo 8.1, if transaction is already in ABORT\_ONLY status, tpcall() or tpacall() with TPNOTRAN flag can still send request message to server; but from Tuxedo 9.0 onwards, including Tuxedo 11gR1, only tpacall() with TPNOBLOCK|TPNOTRAN|TPNOREPLY flags can succeed. Otherwise, the tpcall will fail by either TPETIME or TPSVCERR.

With this environment variable set to “yes”, native client will be able to send tpcall() requests with TPNOTRAN flag to server even when current transaction is already in ABORT\_ONLY status.

#### ✧ **GWTDOMAIN and TMNOTHEADS**

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This switch applies to enhance performance for single thread applications. From Tuxedo 9.0 onwards, including Tuxedo 11gR1, GWTDOMAIN works in multi-thread mode by default, and set TMNOTHEADS=Y to GWTDOMAIN server will cause undefined behavior. Please either unset this environment variable for GWTDOMAIN, or use “-s” CLOPT for GWTDOMAIN in UBBCONFIG so that GWTDOMAIN will work in single thread mode.

## 4 Interoperability

When upgrading to Oracle Tuxedo 11gR1, it is possible that applications based on the two Tuxedo releases need to co-exist for some period, and provide same services at the same time. Interoperability means the ability to communicate between the two tuxedo releases over a network connection. It includes Intradomain, Interdomain, Client-Server interoperability.

Oracle Tuxedo can interoperate with other Oracle products, so it is required to know the interoperability between Tuxedo 11gR1 and other Oracle products then other relevant Oracle products should be considered after upgrading to Tuxedo 11gR1

For interoperability between Tuxedo 11gR1 and other Oracle products, WebLogic Server and Oracle Service Bus(formerly known as Aqualogic Service Bus) will be addressed.

### 4.1 Intra-domain Interoperability

In a multiple-machine Tuxedo domain (application) where some machines are running Tuxedo 11gR1, and some machines are running Tuxedo lower release. These machines can communicate via Tuxedo Bridge process. In this mixed domain, message exchange and protocol compatibility exist, the propagation of transaction context (transactional state information) and security context (user identity) between application clients and servers is fully supported. Also, administration is fully supported.

And this domain is qualified to be one Tuxedo 11gR1 domain which is mentioned in Interdomain interoperability section below.

#### **Limitations/Actions:**

- ✧ The *master* machine (and *master backup* machine if so configured) must run Tuxedo higher release.
- ✧ -t must be specified in servopts of servers, like BRIDGE and application servers, to enable interoperate with Tuxedo 6.5. See detailed information at [http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/rf5/rf5.html#wp1003290](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/rf5/rf5.html#wp1003290)

In Tuxedo 11gR1, service name length is increased from 15 to 127. Resource name and remote service name length have also increased from 15 to 127 in domain configuration (for TDomain only). You can also configure a locale resource locator or a remote service with a name less than or equal to 127 characters for TDOMAIN. Please pay attention to the following related with the service name length increase:

- ✧ Long service names are not permitted when Oracle Tuxedo 10gR3 or earlier coexists in, and joins the same Oracle Tuxedo 11gR1 domain.
- ✧ In the UBBCONFIG file, the value of the AUTHSVC keyword in the \*RESOURCE section and the SVCNM keyword in the \*SERVICES section are not allowed to use long service names when Oracle Tuxedo 10gR3 or earlier software coexists in the same Oracle Tuxedo 11gR1 domain. If long service names are used, the earlier Oracle Tuxedo release site will not boot.
- ✧ Oracle Tuxedo 11gR1 application servers with one or more services using long service names will not boot when Oracle Tuxedo 10gR3 or earlier coexists in same the Oracle Tuxedo domain.
- ✧ Any dynamic addition of services with long names fail when Oracle Tuxedo 10gR3 or earlier coexists in the same Oracle Tuxedo domain.
- ✧ Oracle Tuxedo 10gR3 or earlier software is not allowed join a domain if one or more services with long names has already booted in the current Oracle Tuxedo domain.
- ✧ You cannot configure a long local resource and remote service name for TDOMAIN gateway servers that are deployed in running Oracle Tuxedo 10gR3 or earlier in the same Oracle Tuxedo domain.

## 4.2 Inter-domain Interoperability

In a multiple-domain Tuxedo configuration, Tuxedo domain with different releases can co-exist, and they can communicate via Tuxedo domain gateway process. Within these mixed domains, message exchange and protocol compatibility are supported, the propagation of transaction context (transactional state information) and security context (user identity) between application clients and servers is fully supported. Also, administration is fully supported.

### **Limitations/Actions:**

- ✧ The interdomain capabilities are limited to the capabilities available in lower release Tuxedo domain.
- ✧ For interdomain transactional requests between Tuxedo 6.5 and Tuxedo other releases including Tuxedo 11gR1, patch level 446 or later must be applied on Tuxedo 6.5 side. If Tuxedo 6.5 cannot upgrade to rolling patch 446 or later,, one environment variable TM\_GWT\_OLDSECHECK should be applied to GWTDOMAIN of Tuxedo releases after 6.5. Once all Tuxedo 6.5 domains are upgraded to that patch level, this environment variable can be eliminated from all domains. See detailed information at

[http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/rf5/rf5.html#wp1027414](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/rf5/rf5.html#wp1027414).

- ✧ -t must be specified in servopts of servers, like GWTDOMAIN and application servers, to enable interoperate with Tuxedo 6.5 domain. See detailed information at [http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/rf5/rf5.html#wp1003290](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/rf5/rf5.html#wp1003290).

### 4.3 Client-Server Interoperability

The Client-Server interoperability means the ability of interoperation between Tuxedo 11gR1 and Tuxedo lower release clients and servers. Details can be found here:

[http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/interop/iopcoexist.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/interop/iopcoexist.html)

#### **Limitations/Actions:**

- ✧ -t must be specified in servopts of servers, like WSL and application servers, to enable interoperate with Tuxedo 6.5. See detailed information at [http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/rf5/rf5.html#wp1003290](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/rf5/rf5.html#wp1003290).
- ✧ WSINTOPPRE71: Set on /WS client of Tuxedo 11gR1 to interoperate with Tuxedo 6.5 server domain. See detailed information at [http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/rf5/rf5.html#wp1027414](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/rf5/rf5.html#wp1027414).

### 4.4 Interoperate With Other Oracle Products

#### 4.4.1 WebLogic Server

Tuxedo 11gR1 can interoperate WebLogic Server releases, There are three approaches to support it: Jolt for WebLogic Server, WebLogic Tuxedo Connector and Oracle Tuxedo JCA adaptor.

##### ✧ **Jolt for WebLogic Server:**

As described in Tuxedo client-server interoperability section, Tuxedo 11gR1 Jolt client can interoperate with Tuxedo ATMI servers via Jolt 1.2. and later releases Besides, Jolt is also bundled with WebLogic Server 7.0 and later, which provides one communication channel between Tuxedo 11gR1 and WebLogic Server.

Jolt for WebLogic Server can provide unidirectional communication from WebLogic Server to Tuxedo 11gR1. It provides Java-based client API that manages requests to Tuxedo services via a Jolt Service Listener (JSL) running on the Tuxedo server. The Jolt API is embedded within the WebLogic API and is accessible from a servlet or any other Oracle WebLogic application.

##### ✧ **WebLogic Tuxedo Connector**

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The WebLogic Tuxedo Connector (WTC) is bundled with WebLogic Server 7.0 and later. The WTC gateway supports the TDomain gateway protocol, working with Tuxedo TDomain gateway, it enables bidirectional interoperability between the WebLogic Server and Tuxedo ATMI and CORBA environments.

Detailed information of interoperability between Tuxedo 11gR1 and WebLogic Server can be found at [http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/interop/iopwls.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/interop/iopwls.html).

#### ❖ **Oracle Tuxedo JCA Adapter**

The Oracle Tuxedo JCA Adapter is a JCA-based resource adapter that provides bi-directional service invocation between a JCA 1.5 compliant application servers and the Oracle Tuxedo system. Oracle Tuxedo JCA Adapter supports global and local transactions conforming to JCA transaction standards. It supports connection management, transaction infestation, identity propagation, and link-level security. Oracle Tuxedo JCA Adapter is certified with Oracle WebLogic Server 10g Release 3

Detailed information about JCA Adapter can be found at:

[http://download.oracle.com/docs/cd/E15261\\_01/jca/docs11gr1/index.html](http://download.oracle.com/docs/cd/E15261_01/jca/docs11gr1/index.html)

#### **4.4.2 Oracle Service Bus**

Tuxedo 11gR1 can interoperate with all current supported Oracle Service Bus releases, including Oracle Service Bus 2.0 and later.

Before Oracle Service Bus 2.5, including 2.0 and 2.1, through JMS transport and WebLogic Tuxedo Connector bundled with Oracle Service Bus, working with Tuxedo TDomain gateway, Oracle Service Bus and Oracle Tuxedo can interoperate to use the services that each product offers. Detailed information can be found at [http://download.oracle.com/docs/cd/E13171\\_01/alsb/docs21/interop/tuxedo\\_interop.html](http://download.oracle.com/docs/cd/E13171_01/alsb/docs21/interop/tuxedo_interop.html).

From Oracle Service Bus 2.5, native Tuxedo Transport is introduced to provide interoperability. Working with Tuxedo TDomain gateway, it allows secure, guaranteed, high performance, bi-directional service access to Tuxedo domain from Oracle Service Bus. WebLogic Tuxedo Connector is still used, but it will communicate with Tuxedo transport directly in lieu of Oracle Service Bus JMS transport. Detailed information can be found at [http://download.oracle.com/docs/cd/E13171\\_01/alsb/docs25/interoptux/index.html](http://download.oracle.com/docs/cd/E13171_01/alsb/docs25/interoptux/index.html).

From Oracle Service Bus 10gR3, Tuxedo Transport provides sufficient configuration of WTC artifacts from the OSB console instead of configuring WTC artifacts in WebLogic

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Server Administration Console. Also this releases supports JATMI queuing capabilities. Detailed information can be found at

[http://download.oracle.com/docs/cd/E13159\\_01/osb/docs10gr3/interoptux/index.html](http://download.oracle.com/docs/cd/E13159_01/osb/docs10gr3/interoptux/index.html)

## 5 Integration

There are several add-on product options which can work with Tuxedo together to provide add-on services.

### 5.1 SALT (Service Architecture Leveraging Tuxedo)

Oracle SALT (Service Architecture Leveraging Tuxedo) is a separate product that runs on top of Tuxedo. Currently Oracle has released SALT 1.1, SALT 2.0, SALT 10gR3 and SALT 11gR1. Oracle SALT exposes existing Tuxedo services as standard Web services and provides access points to Tuxedo services through SOAP over HTTP/S protocol.

In addition to basic Web service protocols, Oracle SALT complies with most primary Web services specifications: WS-ReliableMessaging and WS-Addressing, SOAP 1.1, SOAP 1.2, WSDL 1.1, WSSE 1.0 and 1.1 (from SALT 2.0), and MTOM (from SALT 2.0), allowing Oracle SALT to interoperate with other Web service products and development toolkits. With Oracle SALT, you can easily export existing Tuxedo services as Web services without having to perform any programming tasks. In SALT 2.0, external Web service access capability from Tuxedo applications is provided, and you can easily extend Tuxedo integration capability without having an extensive understanding of Web services.

SALT 10gR3 provides Service Component Architecture (SCA) Programming and Service Contract Discovery.

SALT 11gR1 provides new features including:

- Python and Ruby Support  
Python and Ruby support in SALT SCA utilizes the SCAHOST API to perform SCA calls from Python or Ruby client programs, and language extensions to access Python or Ruby components.
- SCA Structure Support  
Provides additional C++ structure functionality, improved performance.
- Scatuxgen Metadata Generation Tool  
The Scatuxgen Metadata Generation Tool parses C++ interfaces as used to develop SCA components for the SCA runtime functionality introduced in SALT

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10gR3. It generates Tuxedo metadata repository interface data, and optionally a Web Services Definition File (WSDL) document.

- **WS-TX Support**  
Provides bi-directional transactional interoperability between Web Services and Oracle Tuxedo applications. Applications transparently make use of the GWWS system server transactional capabilities.

Detailed information can be found at

[http://download.oracle.com/docs/cd/E15261\\_01/salt/docs11gr1/index.html](http://download.oracle.com/docs/cd/E15261_01/salt/docs11gr1/index.html)

## 5.2 TMA (Tuxedo Mainframe Adapter)

Oracle Tuxedo Mainframe Adapter is a domains-based connectivity product that provides bidirectional connectivity between Oracle Tuxedo clients or servers and application programs residing on different mainframe platforms, it can achieve this connectivity through SNA, OSI TP and TCP protocol.

After upgrading Tuxedo 11gR1, Tuxedo Mainframe Adapter should be upgraded too. TMA 11gR1 is required for Tuxedo 11gR1. Please contact your Oracle contact to find out about availability of TMA 11gR1.

## 5.3 TSAM (Tuxedo System and Application Monitor)

Oracle TSAM (Tuxedo System and Application Monitor) is a separate product that runs on top of Tuxedo. Currently Oracle has released TSAM 1.1, TSAM 10gR3 and TSAM 11gR1. Tuxedo 10.0 has TSAM 1.1 Agent integrated. For TSAM 10gR3 and TSAM 11gR1, there are separate installer binaries. Customers should install TSAM 11gR1 on top of Tuxedo 11gR1. TSAM 11gR1 only support Tuxedo 11gR1. Oracle TSAM provides comprehensive monitoring and reporting for Oracle Tuxedo system and applications. It includes two components: Oracle TSAM Agent and Oracle TSAM Manager.

The Oracle TSAM agent enables collection of various applications performance metrics (including XA and non-XA transactions, services, system servers). The Oracle TSAM Manager provides graphical user interface that correlates and aggregates performance metrics collected from one or more Tuxedo domains. It displays this information in real time.

Oracle TSAM major features are:

- \* Call Path Monitoring and Analysis

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- \* Service Monitoring and Statistics
- \* System Server Monitoring and Statistics
- \* Transaction Monitoring
- \* Event Alerts
- \* Open Plug-in Framework
- \* Dynamic Monitoring Policy Management
- \* Web-based Reporting and Management

Oracle TSAM is designed for detailed end-to-end transaction and services monitoring. It enables users to set and monitor response-time service level agreements (SLAs), investigate the performance and behavior of live application services, and improve capacity planning by using comprehensive utilization metrics for all components of the Oracle Tuxedo infrastructure. Furthermore Oracle TSAM helps customers optimize resources to maximize IT hardware in complex, mission-critical application environments.

## 6 Tuxedo 11gR1 Upgrade

Two kinds of procedures are provided to upgrade from Tuxedo lower release to Tuxedo 11gR1 :

- ✧ Simple upgrade
- ✧ Hot upgrade

Simple upgrade is for the configuration that the whole Tuxedo domain can be shutdown during upgrade. If the whole Tuxedo lower release domain still needs to serve as normal during upgrade, hot upgrade can be used, where Tuxedo 11gR1 can be added without interrupting the service operation, in order to do this, the original Tuxedo domain need to be one multiple-host domain with *backup master* node configured.

The following sections describe the steps to upgrade to Tuxedo 11gR1 from a lower Tuxedo release. In the text we take upgrading from Tuxedo 8.1 to Tuxedo 11gR1 as example. Actually the same steps are generally applicable when upgrading from a lower Tuxedo release to a higher release.

The detailed guideline can be found at [http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/install/insup.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/install/insup.html).

### 6.1 Simple Upgrade

- ✧ **Shutdown the Tuxedo 8.1 domain**
- ✧ **Backup required files in Tuxedo 8.1 domain**

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There are certain files, such as RM file, CATLOG configuration file, Jolt configuration file, etc, that you need to back up prior to the installation of Tuxedo 11gR1 and then restore after the installation is complete.

❖ **Get Tuxedo configuration files in Tuxedo 8.1 domain**

The text version Tuxedo 8.1 configuration files is required in Tuxedo 11gR1, they can either be got from earlier backup or generated by commands, like `tmunloadcf`.

❖ **Backup binary version configuration**

This is just for backup purpose.

❖ **Preparing machines and required software**

If the original Tuxedo 8.1 machine is qualified for Tuxedo 11gR1 installation, which mainly addresses the operating system and compiler installed, just uninstall Tuxedo 8.1. If they are Windows system, the relevant Tuxedo windows services should be stopped before uninstall. Before installing the Oracle Tuxedo 11gR1 software, make sure that the required versions of the operating system and the compiler have been installed. For operating system and compiler requirements for each supported platform, see [http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/install/inspds.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/install/inspds.html).

❖ **Installing Tuxedo 11gR1**

For multiple-host Tuxedo 8.1 domain, Tuxedo 11gR1 must be installed on *master* and *backup* node at least. Other nodes can be upgraded to Tuxedo 11gR1 at the same time, but they can also co-exist with Tuxedo 11gR1 and upgrade later.

❖ **Reload Tuxedo 11gR1 configuration files**

The original text version Tuxedo 8.1 configuration files, such as UBBCONFIG, DMCONFIG, device files for /Q and transaction log, should be regenerated on the *master* machine. The configuration might has some difference. Text version files should be updated first before regeneration. Possible changes include:

\*TUXCONFIG and TUXDIR need to be changed if they are different from the original setting.

\*If users will use Event Trigger in TSAM (TSAM supports Tuxedo 8.1/9.1/10.0/10gR3), In UBBCONFIG, MAXSPDATA need to be set, its value should be bigger than  $(MAXQUEUES * 257 * 2 + 8224)$  or  $(MAXSERVERS * 257 * 2 + 8224)$  if MAXQUEUES is not defined in UBBCONFIG.

- ✧ **Recompile and relink all your Tuxedo application code using Tuxedo 11gR1 build utilities**
- ✧ **Reboot the Tuxedo 11gR1 domain**
- ✧ **Shutdown and upgrade other nodes in your multiple-host configuration**

This is same as above steps, you can also upgrade all machines before rebooting the domain.

## 6.2 Hot Upgrade

- ✧ **Shutdown the *backup master* machine**
- ✧ **Backup required files in Tuxedo 8.1 domain**

This is same as simple upgrade, you can get the backup files from *backup master* node.
- ✧ **Preparing machines and required software**

Same as simple upgrade, select either the original *backup master* machine or one new machine meeting the software requirements of Tuxedo 11gR1.
- ✧ **Installing Tuxedo 11gR1 on backup master machine**

Install Tuxedo 11gR1 on *backup master* machine.
- ✧ **Generate upgrade indicator files**

Generate one empty file *UPGRADE* at \$APPDIR directory of *master* node and *backup master* node.
- ✧ **Recompile and relink all your Tuxedo application code on backup master machine using Tuxedo 10gR3 build utilities**
- ✧ **Boot up the backup master Tuxedo 11gR1 node from master node**
- ✧ **Migrate master machine from Tuxedo 8.1 to new Tuxedo 11gR1 node**
- ✧ **Shutdown the acting backup master node running Tuxedo 8.1**

The original text version Tuxedo 8.1 configuration files should be regenerated on the *master* machine. Configuration has some difference, before regeneration, you have to change the text version files accordingly first.
- ✧ **Installing Tuxedo 11gR1 on acting backup master machine**

This is similar with Tuxedo 11gR1 installation on original *master backup* node, same software requirement should be met.

- ✧ **Recompile and relink all your Tuxedo application code on acting backup master machine using Tuxedo 11gR1 build utilities**
- ✧ **Remove upgrade indicator files**
- ✧ **Boot up the acting backup master Tuxedo 11gR1 node from master node**
- ✧ **Shutdown and upgrade other nodes in your multiple-host configuration**  
This is same as simple upgrade.

## 7 Performance Impact and Memory Usage Increase

Tuxedo 11gR1 have similar performance compare with Tuxedo 8.1/9.0/9.1/10.0/10gR3. Users can disable some of the features if not needed, to get better performance.

1. If multi-thread is not needed, users could set the environment variable **TMNTHREADS=Y** to disable multi-thread in Tuxedo 11gR1 application.
2. If distributed transaction and Plug-in Security mechanism are not used in users' applications, users could define **OPTIONS NO\_XA, NO\_AA** in UBBCONFIG file to disable the two features for better performance.

Compare with Tuxedo 8.1/9.0/9.1/10.0/10gR3, the memory usage of each server would be similar. Compare with older releases the increase might be slightly bigger, but still should not be a concern at all at customer site. Several factors contributed to the memory increase, such as OS library size, Tuxedo library size and the scale of Tuxedo configuration. In Solaris 9, compare with Tuxedo 6.5 the increase might be at least is 6M for each server. We recommend users to run tests using the actual configuration to verify how much memory is needed.

## 8 Reference

This document is to provide one consolidated guidelines for upgrading to Tuxedo 11gR1. The detailed instructions should be referenced at following Tuxedo 11gR1 and other related products online document:

1. Tuxedo online documentation main page  
[http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/index.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/index.html)
2. Tuxedo 11gR1 documentation main page  
[http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/index.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/index.html)
3. Tuxedo 11gR1 platform datasheet  
[http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/install/inspds.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/install/inspds.html)

4. Tuxedo 11gR1 interoperability  
[http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/interm/interop.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/interm/interop.html)
5. Upgrade the Oracle Tuxedo Systems to Release 11gR1  
[http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/install/insup.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/install/insup.html)
6. Tuxedo interoperability with Oracle Service Bus 2.1  
[http://download.oracle.com/docs/cd/E13171\\_01/alsb/docs21/interop/tuxedo\\_interop.html](http://download.oracle.com/docs/cd/E13171_01/alsb/docs21/interop/tuxedo_interop.html)
7. Tuxedo interoperability with Oracle Service Bus 2.5  
[http://download.oracle.com/docs/cd/E13171\\_01/alsb/docs25/interoptux/index.html](http://download.oracle.com/docs/cd/E13171_01/alsb/docs25/interoptux/index.html)
8. Tuxedo interoperability with Oracle Service Bus 10g Release 3  
[http://download.oracle.com/docs/cd/E13159\\_01/osb/docs10gr3/interoptux/index.html](http://download.oracle.com/docs/cd/E13159_01/osb/docs10gr3/interoptux/index.html)
9. Tuxedo interoperability with Oracle WebLogic Server  
[http://download.oracle.com/docs/cd/E15261\\_01/tuxedo/docs11gr1/interop/iopwls.html](http://download.oracle.com/docs/cd/E15261_01/tuxedo/docs11gr1/interop/iopwls.html)
10. Oracle TSAM 11gR1 Documentation  
[http://download.oracle.com/docs/cd/E15261\\_01/tsam/docs11gr1/index.html](http://download.oracle.com/docs/cd/E15261_01/tsam/docs11gr1/index.html)
11. Oracle SALT 11g R1 Documentation  
[http://download.oracle.com/docs/cd/E15261\\_01/salt/docs11gr1/index.html](http://download.oracle.com/docs/cd/E15261_01/salt/docs11gr1/index.html)