

Oracle® Tuxedo System and Applications Monitor Plus

Product Overview



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Primary Authors: Preeti Gandhe, Priya Pathak

Contributing Authors: Tulika Das, Maggie Li

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1

Oracle TSAM Plus Overview

Oracle Tuxedo System and Applications Monitor (TSAM) Plus product monitors machines, servers, services, and queues to deliver end-to-end visibility into distributed transaction performance. It measures transaction and service-level response times so you can quickly pinpoint bottlenecks, isolate slow components, and reduce mean time to resolution. In addition, it captures and retains key performance metrics to support trending, baseline comparisons, and capacity planning, helping teams anticipate growth and prevent outages before they impact users.

2

Understanding Oracle TSAM Plus

Oracle Tuxedo is widely used by enterprises that develop and use mission-critical applications. It acts as the infrastructure layer in distributed computing environments. The complexity of Oracle Tuxedo and the applications running on top of it make performance measurement extremely complex.

Oracle TSAM Plus provides comprehensive monitoring and reporting for Oracle Tuxedo system and applications. Oracle TSAM Plus monitors the major performance sensitive areas of a Tuxedo-supported enterprise computing environment. It can be used to monitor *real-time* performance bottlenecks and business data fluctuations, determine service models, and provide notification when pre-defined thresholds are violated. It includes three components: Oracle TSAM Plus Agent, Oracle TSAM Plus Manager, and Enterprise Manager for Oracle Tuxedo.

The Oracle TSAM Plus agent enables collection of various applications performance metrics (including call path, transactions, services, system servers). The Oracle TSAM Plus Manager provides a graphical user interface that correlates and aggregates performance metrics collected from one or more Tuxedo domains. It displays this information in *interactive* real-time. The Enterprise Manager for Oracle Tuxedo integrates Tuxedo management and monitoring with Oracle Enterprise Manager, allowing Tuxedo infrastructure and applications to be monitored and managed from the same console as other Oracle products.

- [Why Use Oracle TSAM Plus?](#)

2.1 Why Use Oracle TSAM Plus?

Because the Oracle Tuxedo framework and applications are widely deployed, comprehensive monitoring and reporting capability becomes increasingly critical. For example, you may want to know:

- End-to-end execution time of an ATMI request
- Where a call hangs
- How many requests to a service failed during a certain time period
- How many requests went through a domain gateway during a certain time period
- Current status of all participants in an XA transaction

Oracle TSAM Plus can provide this information and allows you to easily identify bottlenecks and expedite problem resolution. Oracle TSAM Plus can also help with performance tuning and capacity planning.

Oracle TSAM Plus allows you to define event alerts. The Oracle TSAM Plus Console reports an event when an alert is triggered, notifying you to take proper action.

3

Oracle TSAM Plus Features

The following lists Oracle TSAM Plus features:

- AI-based Operations Assistant, which helps answer questions about how to use Oracle TSAM Plus and questions related to the configuration and metrics. (Introduced in TSAM Plus 22c).
- OIDC support: configure Oracle TSAM to use OpenID Connect (OIDC) authentication instead of local authentication. (Introduced in TSAM Plus 22c).
- Tracking Oracle Tuxedo system call transmissions. Each monitored call is assigned a unique ID and is propagated along a call path tree. Oracle TSAM Plus is able to track calls across multiple machines and domains.
- *Real-time* call path tree tracking of a monitored request is displayed and the performance metrics for each step are available.
- Call pattern summarization based on historical call tracking data.
- Monitoring a particular Oracle Tuxedo service, checking its response time, IPC queue length and execution status. The data can be queried using recent or historical data.
- Gathers Oracle Tuxedo GWTDOMAIN, BRIDGE, and GWWS overall throughput, graphically displaying the business data flow curve.
- Tracking transactions with XA API specifications. Displays execution status and time used on each XA call. Oracle TSAM Plus helps diagnose global distributed transactions.
- The Oracle TSAM Plus Manager console allows you to create “Alert” definitions that generate events when predefined thresholds are reached. The events can be posted to Oracle Tuxedo and received by Oracle Tuxedo Event Broker subscribers.
- Programming APIs that retrieve metadata packaged in a monitored call. Helps developers make application decisions dynamically.
- Flexible monitoring controls. The sampling can be based on interval or ratio and the monitoring can be turned on or off dynamically without restarting the application.
- Plug-in mechanism for performance metrics collection at the Oracle Tuxedo infrastructure level. It provides extensive integration capability between Oracle TSAM Plus and other third-party products.
- Powerful event triggers without sending raw metrics data to the Oracle TSAM Plus Manager. It supports flexible FML boolean expression to achieve advanced event trigger conditions. Events can be posted to the Oracle Tuxedo Event Broker and/or the Oracle TSAM Plus Manager.
- Scalable Oracle Tuxedo-side server monitoring designed to meet the needs of small, medium, and large Oracle Tuxedo runtime environments.
- J2EE-based solution. A pure Web-based solution that is easy to deploy, configure and use. The Oracle TSAM Plus Console can be accessed anywhere using a compatible Web browser.
- Tuxedo-as-a-Service for private clouds. Based on Oracle Enterprise Manager, this feature allows one to create templates for Tuxedo system and applications. The service template then can be instantiated on one or more nodes from a pool of resources. This solution

enables customers to have a unified private middleware Platform-as-a-Service (PaaS) solution across many different Oracle products, such as WebLogic Server, Database, SOA Suite, etc.

- Application introspection, which provides both command line and console modes to introspect the existing applications domain(s) and package those for deployment in another environment including private or public clouds. This feature makes it extremely easy to move Tuxedo applications from one environment to another.
- Application payload collection from Tuxedo transactions and service executions. With this feature, one can define payload collection and filtering policies, store the collected payload in one of the several ways (Oracle Database, Hadoop file system, or local files), and export the payload in plain text or XML format using a series of APIs and tools for further aggregation and analysis.
- Test Load Generator, a Tuxedo applications load test tool that facilitates effective and efficient load testing. This feature works in conjunction with the payload collection feature to capture the call path and payload metrics coming from a domain gateway, Web service client or application server. One can create replay definition from call paths and execute the replay based on policies for standard and stress test modes.
- Accounting and chargeback monitoring, which is able to collect data of all users and transactions during online processing and make offline analysis.
- Scripting tool provides Jython interface for writing scripts quickly for Tuxedo system and application management and monitoring. Such scripts can be used to automate operations, collect runtime statistics, perform administrative tasks, and so on.
- New management interface for Oracle Tuxedo UBBCONFIG and BDMCONFIG, including JMX interface.
- TSAM Plus manager HA and scaling
 - TSAM Plus agent fails over to the backup TSAM Plus manager in case the first TSAM Plus manager is not available
 - Monitor the same set of Tuxedo domains from more than one console.
- SNMP traps for Tuxedo events
- Domains configuration wizard
- Rule based automatic monitoring data purge
- Enterprise Manager for Oracle Tuxedo, which is an Oracle Enterprise Manager plug-in, provides the following monitoring and management features for Oracle Tuxedo product family:
 - Same console for management and monitoring as other Oracle products
 - Easy Tuxedo target discovery and automatic update
 - Monitor health of multiple domains from same console
 - Oracle Tuxedo admin console functionality integration to Oracle Enterprise Manager console
 - Centralized application management, including pre-defined provision and deployment procedures
 - Dynamic resource broker for rule based scale up and scale out of applications
 - Integration with OEM SLA and reporting framework
 - Support for monitoring Oracle Tuxedo as a JMX compatible target
 - Load balancing algorithm based on real time usage information of target nodes

- Ability to monitor and manage all components of Oracle Tuxedo family
- Support for Oracle Tuxedo system and user event monitoring
- Integrated management and monitoring of Oracle Tuxedo applications on Exalogic
 - * Ability to monitor Tuxedo domains on Exalogic from Exalogic dashboard.
 - * Oracle Enterprise Manager compliance and health checks for Tuxedo applications to ensure optimal deployment.
 - * One-stop configuration management of Tuxedo domains across Exalogic rack.
 - * One-stop rolling patch management of Tuxedo domains across Exalogic rack.

For more information, see the Oracle® Tuxedo System and Applications Monitor Plus User's Guide.

4

Oracle TSAM Plus Components

- [Oracle TSAM Plus Agent](#)
- [Oracle TSAM Plus Manager](#)
- [Enterprise Manager for Oracle Tuxedo](#)

4.1 Oracle TSAM Plus Agent

The Oracle TSAM Plus Agent handles all Tuxedo-side back-end logic. It works in conjunction with the TSAM Plus Manager and Enterprise Manager for Oracle Tuxedo. The Oracle TSAM Plus Agent includes the following sub-components:

- **Oracle TSAM Plus Framework:** The framework is the data collection engine. It is an independent layer working between Tuxedo infrastructure and other TSAM Plus components. This module is responsible for run time metrics collection, alert evaluation and monitoring policy enforcement.
- **Oracle TSAM Plus Plug-in:** An extensible mechanism invoked by the Oracle TSAM Plus Framework. The Oracle TSAM Plus Agent provides default plug-ins to send data to the LMS (Local Monitor Server), and then to the Oracle TSAM Plus Manager. The plug-in mechanism also allows custom plug-ins to be hooked into the framework to intercept and process metrics data. The default plug-in communicates with the LMS through shared memory, ensuring that the application is not blocked at the metrics collection point. You can develop your own plug-ins for additional data processing. A customized plug-in can be linked into the existing plug-in chain or used to replace the default plug-in.
- **Local Monitor Server (LMS):** The LMS is an Oracle Tuxedo system server. The Oracle TSAM Plus default plug-in sends data to the LMS. The LMS then passes the data to the Oracle TSAM Plus Manager in HTTP protocol. LMS is required on each Tuxedo machine if the node needs to be monitored.
- **accrpt:** A utility to analyze accounting and chargeback information generated by -a option in servopts(5).
- **JMX Agent:** A component working in conjunction with Enterprise Manager for Oracle Tuxedo, which enables you to monitor and manage Oracle Tuxedo applications through the JMX interface and furthermore, through the Oracle Enterprise Manager cloud control.
- **Oracle Tuxedo Scripting Tool:** A command-line scripting environment that you can use to manage and monitor Tuxedo domains.

4.2 Oracle TSAM Plus Manager

- [Components](#)
- [Application Server](#)
- [Database](#)

4.2.1 Components

The Oracle TSAM Plus Manager is built on J2EE technology. It includes the following components:

- Oracle TSAM Plus Data Server: The data server is responsible for:
 - accepting data from the LMS and storing them into database
 - accepting requests from representation layer and does data processing
 - communicating with LMS for configuration instructions.
- Oracle TSAM Plus Console: The Oracle TSAM Plus presentation layer. It is a J2EE Web application and can be accessed via a compatible Web browser. After logging on to the Oracle TSAM Plus Console, you have access to full Oracle TSAM Plus functionality.

4.2.2 Application Server

The Oracle TSAM Plus Manager runs in a Java application server. For more information about the supported Java application servers, see Oracle TSAM Plus Manager Supported Platforms, Web Containers, and DBMS.

4.2.3 Database

Oracle TSAM Plus uses a relational database to store the following information:

- Performance metrics collected by the Oracle TSAM Plus Agent
- Tuxedo component information from the Oracle TSAM Plus Agent
- User account information
- Alerts and events

Oracle TSAM Plus leverages WebLogic data source functionality. The data sources will reconnect to the DB if the connection is broken. All background threads (such as data persistence and call pattern calculation) in the TSAM Plus manager automatically reconnect to the database and re-establish their connection to the TSAM Plus console if the database connection is lost.

For more information, see the Oracle TSAM Plus Deployment Guide.

4.3 Enterprise Manager for Oracle Tuxedo

Enterprise Manager for Oracle Tuxedo is an Oracle Enterprise Manager plug-in, by which users are able to monitor and manage Oracle Tuxedo product family and other products in a centralized console with other product such as WebLogic Server and Oracle Database.

5

Oracle TSAM Plus Architecture

Figure 5-1 Oracle TSAM Plus Architecture - TSAM Plus Manager and Agent

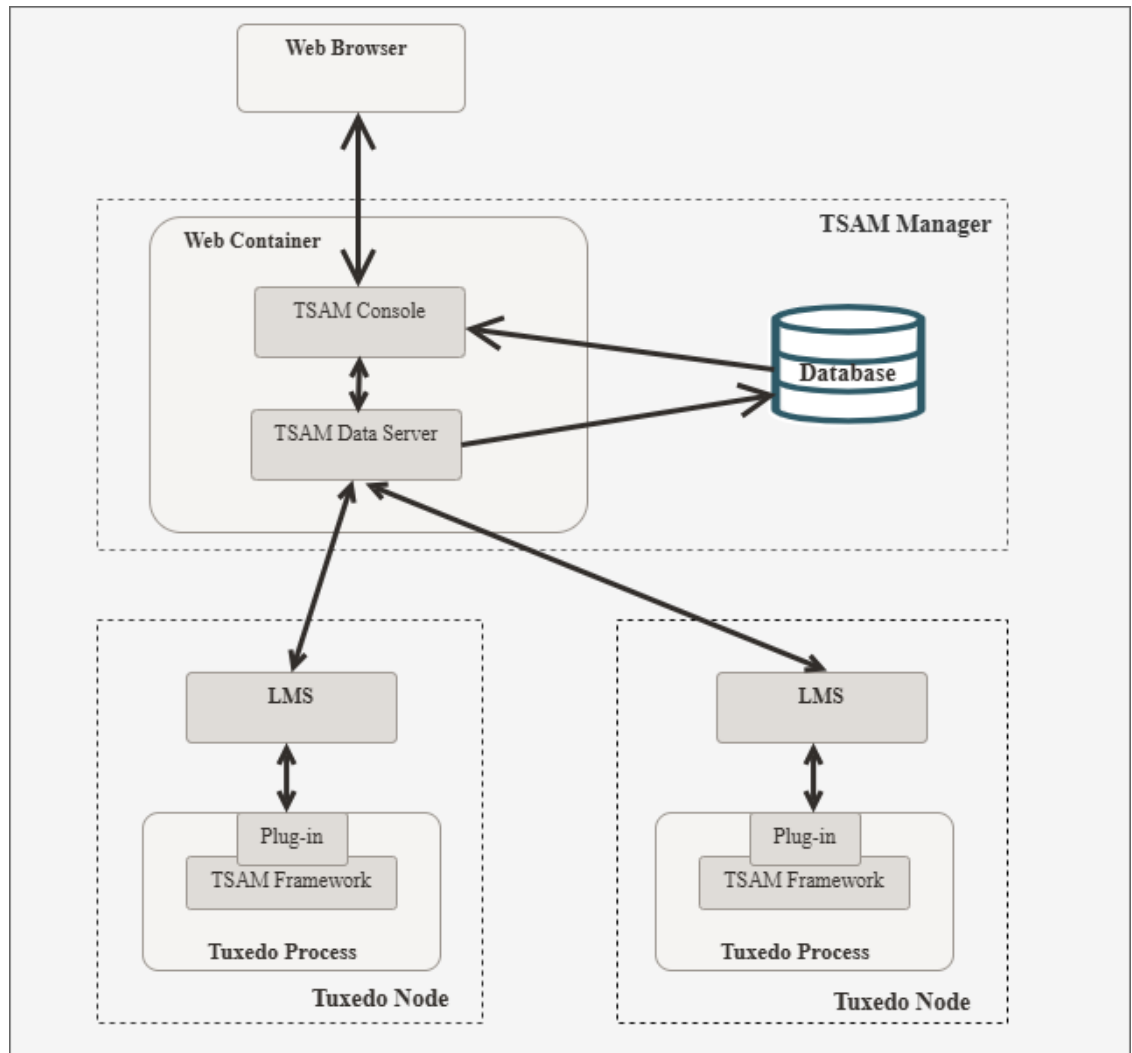
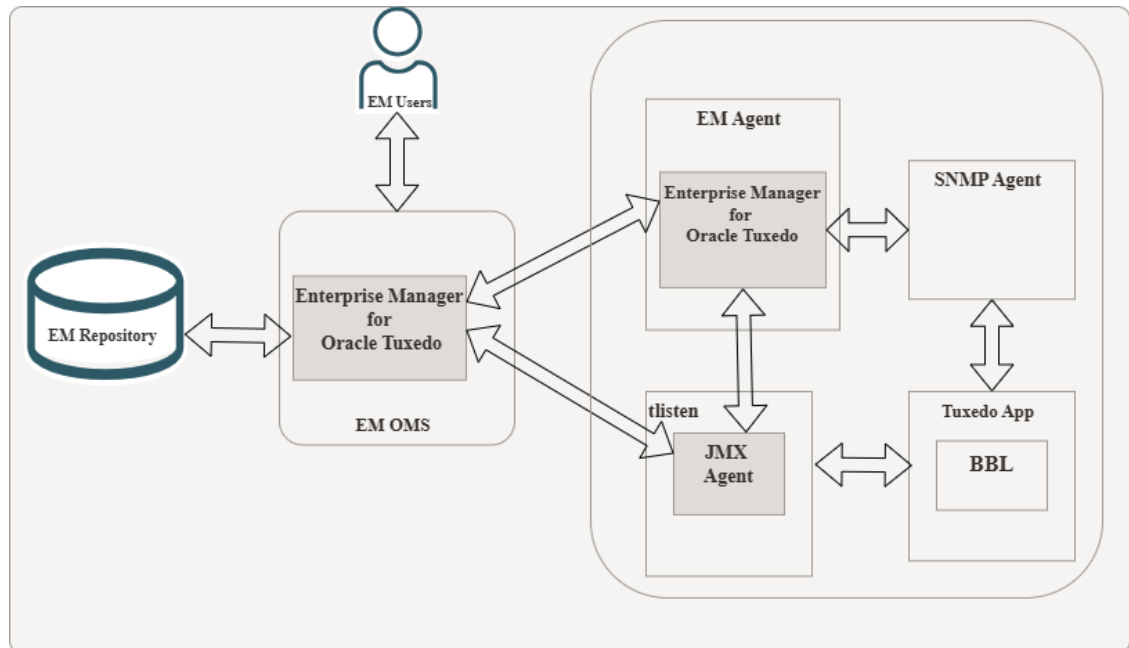


Figure 5-2 Oracle TSAM Plus Architecture - Enterprise Manager for Oracle Tuxedo

The above figure contains the following main components:

- TSAM Plus on both Enterprise Manager server and agent side.
- Enhanced Tuxedo tlisten process
Works as a proxy and agent between Tuxedo and Enterprise Manager agent. A JMX agent is embedded and every target instance inside the associated Tuxedo domain corresponds to an MBean instance in the JMX domain. JMX agent receives metrics and job requests from Enterprise Manager agent and forwards them to the corresponding Tuxedo target instances.
- BBL
Ensures that the MBean instances embedded in the connected JMX agent tlisten is consistent with the Tuxedo domain it is running on.
- tux_snmpd
Must be started for Oracle Tuxedo Event Collection and Oracle ART Batch System Server. The Oracle TSAM Plus on Enterprise Manager agent receives the event trap from tux_snmpd after the receive port is configured.

6

Oracle TSAM Plus Concepts

- [Call Path Monitoring](#)
- [Service Monitoring](#)
- [System Server Monitoring](#)
- [Transaction Monitoring](#)
- [Oracle Tuxedo Application Runtime for CICS and Batch Monitoring](#)
- [Policy Monitoring](#)
- [Performance Metrics](#)
- [Tuxedo Targets Monitoring](#)
- [JMX Agent and tlisten](#)
- [Private Cloud](#)
- [Dynamic Resource Broker](#)
- [Dynamic Request Broker](#)

6.1 Call Path Monitoring

Tuxedo is typically used by a client program (not necessarily a Tuxedo client process) that calls a service to perform a business computing logic scenario. The service implementation is completely transparent to the caller. This type of middleware transparency provides many benefits for development, deployment, and system administration. However, from a monitoring perspective, it is difficult for the end user or administrator to figure out what happens “behind the scenes”. Oracle TSAM Plus call path monitoring helps to alleviate this problem.

- [Call Path Tree Definition](#)
- [Monitoring Initiator](#)

6.1.1 Call Path Tree Definition

A simple Tuxedo application call triggers a set of service invocations. The involved services constitute a tree (“call path tree”). A call path tree strictly defines the following factors:

- What type of services are involved to perform the initial service request.
- The service invocation depth (that is, the depth of the call path tree).
- The service invocation sequence. For example, client A calls SVC1. SVC1 calls SVC2 and SVC3.
- Call transportation. The edge (how information is sent and received) of a call path tree represents the transportation information from caller to service provider. It could be an IPC queue, BRIDGE connection or DOMAIN connection. The elapse time used for each transportation is also recorded.

- Call path metrics. Lots of metrics are available during the message propagation within Tuxedo system, such as the message size, execution status, transaction and CPU consumption, etc.

6.1.2 Monitoring Initiator

A "monitoring initiator" is a process that "initiates" tracking a call path tree. The process can be a Tuxedo client, application server, client proxy server (WSH/JSH), the Tuxedo domain gateway server or web service gateway server GWWS. A typical scenario is when a `tpcall`/`tpacall`/`tpconnect` is invoked by the monitoring initiator; call path monitoring begins. All the back-end services involved in this call are displayed on the call path tree representation in the Oracle TSAM Plus Console.

① Note

Currently only `tpcall`/`tpacall`/`tpconnect` can trigger a call path monitoring. Other communication models are not supported.

For `tpconnect`, there are limitations in the different scenarios:

- For common usage scenarios, only service `in` and return call segment are supported. The response call path is missed if the client issues `disconnect` and the call is handled by a bridge.
- When a client invokes `tpdiscon`, the time stamp is later than the last call path segment.
- If `tpconnect` fails, nothing is recorded in Oracle TSAM Plus manager, that is, no information is displayed for the call.

A Tuxedo application server performs two functions:

- All sub-calls made in the service implementation are a part of the call path tree started by the original monitoring initiator (if the incoming request is already monitored).
- It is a monitoring initiator with calls made in the service routine according to the monitoring policy definition.

6.2 Service Monitoring

Service monitoring focuses on Tuxedo service execution status. It does not care about call correlation, as call path monitoring does. Service monitoring can be used with call path monitoring together or performed independently. Tuxedo CORBA is also based on the service infrastructure, so the CORBA interfaces can also be monitored.

6.3 System Server Monitoring

Tuxedo has several important system servers: BRIDGE, GWTDOMAIN and GWWS. BRIDGE connects multiple Tuxedo machines within a Tuxedo domain. GWTDOMAIN connects one Tuxedo domain with others. GWWS is the web services gateway. The system server monitoring tracks message throughput, pending sent messages and awaiting reply messages on each network link for BRIDGE and GWTDOMAIN. For GWWS, the web service requests statistics will be collected.

6.4 Transaction Monitoring

A critical use of Tuxedo is transaction monitoring. Tuxedo coordinates activities in a distributed transaction with an XA compliant resource manager, such as a database. Oracle TSAM Plus transaction monitoring tracks each XA call triggered in a transaction allowing you to clearly identify where a global distributed transaction is where the bottleneck occurs. TSAM Plus supports the transaction monitoring capability propagation. That is if the transaction initiator is monitored, all XA calls on the transaction path will be monitored. The propagation supports transactions across domains.

6.5 Oracle Tuxedo Application Runtime for CICS and Batch Monitoring

Oracle TSAM Plus allows you to monitor the following Oracle Tuxedo Application Runtime for CICS and Batch components.

- CICS Region representation (status and components).
- CICS Transaction metrics monitoring.
- CICS Terminal related metrics monitoring.
- ARTJES component monitoring

For more information, see [Oracle Tuxedo Application Runtime for CICS and Batch Documentation](#).

6.6 Policy Monitoring

Oracle TSAM Plus provides a comprehensive policy monitoring mechanism. When the proper policy monitoring settings are created, you can collect the exact metrics needed with minimum application performance impact. You define a policy using the TSAM Plus Web console and apply it to an Oracle Tuxedo application automatically. Oracle TSAM Plus Policy Monitoring has the following characteristics:

- **Monitoring Category.** One monitoring policy can focus on one kind of monitoring, such as call path. It can also cover multiple interested areas.
- **Enable or Disable.** Oracle TSAM Plus monitoring can be dynamically turned on or off. Monitoring policy can be predefined and enabled when the monitoring is required. All enabled monitoring policies will be applied to Tuxedo applications automatically while applications are running. Non-started applications will get the policy while it is started .
- **Interval-Based Monitoring.** Monitoring is initiated based on specific time intervals. For example, call path monitoring. An interval-based monitoring policy can specify that the call path is tracked in 60-second intervals.
- **Ratio-Based Monitoring.** Monitoring is initiated by the number of executions. For example, service monitoring. A ratio that is set to 5 indicates that every 5 executed services are monitored. For call path monitoring, a ratio set to 5 indicates that every 5 tpcall/tpacall calls are monitored.
- **Runtime Condition Filtering.** TSAM Plus monitoring policy supports some run time filters. Customer can monitor a particular service, a request from specific client and some kind of process type. The filter supports regular expression format.

- **Flexibility to Reduce Monitoring Performance Impact.** Oracle TSAM Plus monitoring control enables you to configure the monitoring policy based on your application size, load and network activity. The monitoring policy can support only alert triggering without raw metrics storage.

6.7 Performance Metrics

Oracle TSAM Plus performance metrics are listed as follows:

- **Correlation ID:** A unique identifier that represents a call path tree. It is generated by the monitoring initiator plug-in. It uses the following format:

```
DOMAINID:MASTERHOSTNAME:IPCKEY LMID PROCESSNAME PID TID COUNTER TIMESTAMP
```

Listing 1 shows an example of a Correlation ID. The monitored call is started by the program “bankclient” with process ID **8089** and thread ID **1** on machine **SITE1** on Tuxedo domain **TUXDOM1**. The master is **bjsol18** and **IPCKEY** in **TUXCONFIG** is **72854**.

Listing 1 Correlation ID Example

```
TUXDOM1:bjsol18:72854 SITE1 bankclient 8089 1 99 1259309025
```

- **Service name:** The name of an Oracle Tuxedo Service.
- **Location:** The set of metrics to identify the process who sends out the performance metrics. It includes information about domain, machine, group and process name etc
- **IPC Queue Length:** The message number in an IPC queue.
- **IPC Queue ID:** Oracle Tuxedo identifier of an IPC queue.
- **Wait Time:** The time a message spends in transit during the transmission stage.
- **CPU Time:** The CPU time consumed by the service request processing. It only applies to single threaded server.
- **Message Size:** The Oracle Tuxedo message size.
- **Execution Status:** The tpretun service return code. It is defined by the Oracle Tuxedo ATMI interface.
- **Call Flags:** The flags passed to tpcall/tpacall in the Oracle Tuxedo ATMI interface.
- **Call Type:** tpcall, tpacall, or tpforward
- **Elapse Time:** The time elapsed time a call is monitored.
- **GTRID:** Oracle Tuxedo global transaction ID.
- **Pending Message Number:** The number of messages delivered to the Oracle Tuxedo network layer that are waiting to be sent.
- **Message Throughput:** The total message number and volume accumulated in system server monitoring intervals.
- **Waiting Reply Message Number:** The number of requests in GWTDOMAIN awaiting a reply from the remote domain.
- **XA Code:** The XA call return code in transaction monitoring
- **XA Name:** The XA call name.
- **GWWS Metrics:** A set of metrics used to measure GWWS throughput, including:
 - Inbound Message Throughput

- Inbound Message Processing Time
- Outbound Message Throughput
- Outbound Message Processing Time
- Oracle Tuxedo Application Runtime for CICS and Batch Metrics
- Transaction metrics
- TCP terminal throughput

6.8 Tuxedo Targets Monitoring

Tuxedo targets are Tuxedo host machines, applications, Tuxedo family components that can be managed and monitored in Enterprise Manager Cloud Control. Enterprise Manager for Oracle Tuxedo is a plug-in that comes with a comprehensive set of performance and health metrics used for Tuxedo targets monitoring, providing administrators with a rich source of diagnostic information and trend analysis data.

Before you manage and monitor Oracle Tuxedo applications, you must first discover the Tuxedo targets using Enterprise Manager Cloud Control.

6.9 JMX Agent and tlisten

Tuxedo tlisten process works as a proxy and agent between Tuxedo and Enterprise Manager agent. A JMX agent is embedded and every target instance inside the associated Tuxedo domain corresponds to an MBean instance in the JMX domain. JMX agent receives metrics and job requests from Enterprise Manager agent and forwards them to the corresponding Tuxedo target instances.

6.10 Private Cloud

Oracle TSAM Plus provides support for using private clouds to deploy and run Tuxedo applications. The Enterprise Manager for Oracle Tuxedo component allows the provisioning, administration, and management of private cloud resources to create Tuxedo Platform as a Service. Using the OEM Cloud Management, one can define service templates that control the provisioning of Tuxedo applications. These templates can be selected by users in a self-service portal to create fully provisioned and configured Tuxedo instances. Service quotas allow the cloud provider to limit the resources available to users.

This feature includes the following major functions:

- The cloud administration functions like resource provider management, quota management, and service template definition. These functions allow a self-service application administrator (SSA admin) to manage Tuxedo cloud and Tuxedo cloud services consumed by end users.
- The end user operations like service instance creation, application management, deployment, and automatic scaling based on scheduled plan or metrics. The self-service application users (SSA user) can instantiate a particular Tuxedo service, which could consist of Tuxedo system or a complete application.

6.11 Dynamic Resource Broker

The Dynamic Resource Broker is a major Enterprise Manager for Oracle Tuxedo feature. It enables manual and policy-driven deployment of Tuxedo servers, groups, and machines on a

running Oracle Tuxedo domain for flexible resource allocation towards certain Enterprise Manager targets.

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.

6.12 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.

7

Oracle TSAM Plus Use Cases

Oracle TSAM Plus is built on top of Oracle Tuxedo and provides unique capabilities for tracking services, calls, and transactions. Enterprise organizations typically deploy many widely distributed services, where a single client request often requires complex coordination among multiple back-end services to complete a business process.

In such environments, it can be challenging for administrators to determine exactly what is happening during these interactions. Oracle TSAM Plus call path monitoring helps address this challenge by providing greater visibility into service interactions and transaction flows.

You can gain a better understanding of how Oracle TSAM Plus works with your applications through the following typical use cases.

- [Optimizing Application Development](#)
- [Understanding Your Applications](#)
- [Solving Application Performance Problems](#)
- [Improving Application Performance](#)

7.1 Optimizing Application Development

- [Is the message routing working as expected?](#)

7.1.1 Is the message routing working as expected?

Message routing is a critical concept in Oracle Tuxedo because it directly affects system performance, business process correctness, application reliability, and high availability. Several factors can influence how messages are routed within a Tuxedo application, including:

- Load balancing
- Data-dependent routing (DDR)
- Transaction affinity (Oracle RAC support)

During the development phase, extensive testing is required to verify that routing configurations work as expected. Without Oracle TSAM Plus, it can be difficult to determine whether requests are being routed to the intended services correctly. Oracle TSAM Plus call path monitoring provides clear visibility into each request flow, making it easier to validate routing behavior and accelerate the development and testing process.

7.2 Understanding Your Applications

- [What happens behind a simple call?](#)
- [What about my services?](#)
- [Is my network busy?](#)
- [Who participates in my transaction?](#)

7.2.1 What happens behind a simple call?

Enabling call path monitoring for a Tuxedo client or application server allows you to find out all the information behind a simple `tpcall/tpacall`. The tracking points span multiple machines and multiple domains. You can clearly see the following information in the call path tree:

- The service invocation hierarchy that supports your call
- The transmission cost for each message flow step, from IPC Queue to Network
- The execution status of each service involved
- The call type and call flags of all the intermediate calls
- The waiting time in queue and response time for each service
- The end-to-end response time

7.2.2 What about my services?

Service monitoring enables you to measure your service response time, IPC queue length, and execution status. Service monitoring provides the following information:

- **Service Execution Status Summary.**
Oracle TSAM Plus tells you how many service executions succeeded or failed recently or during a period of time. Oracle TSAM Plus also computes the average response time. These are important factors in measuring the quality of your services.
- **Service Activity Trends.**
Oracle TSAM Plus also displays your services activity trends. It tells you what the peak time is and when the services requests are low.

7.2.3 Is my network busy?

Oracle TSAM Plus allows you to monitor the network connection attached to your local domain gateways. You can easily find which link is busy and its data fluctuation trend. You have more in-depth understanding of the business data flow model between departments and organizations.

7.2.4 Who participates in my transaction?

Oracle TSAM Plus monitors the transaction XA calls. Transaction participants are listed on the transaction monitoring page. For a large distributed transaction, a slow branch can result in the entire transaction being slowly completed. Oracle TSAM Plus lets you know who the transaction participants are, and how much time is used during XA calls. The transaction monitoring can also help find the bottleneck in a two phase commit stage if multiple resource managers are involved.

7.3 Solving Application Performance Problems

- [Why is the service response time slow recently?](#)
- [My back-end services failed, but I don't know which one.](#)
- [How many kinds of call paths are in my application?](#)
- [Why is my global distributed transaction completed slowly?](#)

- [I want to correlate local transactions with remote transactions.](#)
- [When does my local domain use the most resources from the remote domain, and how busy is it?](#)
- [Can I check program request information?](#)

7.3.1 Why is the service response time slow recently?

Turn on the call path monitoring for a particular call to investigate the following:

- How much network-side time is used
- Which services are the most time-consuming point in the call path tree
- Is the service routed to a remote machine or a domain
- Is client wait time a reply problem?

7.3.2 My back-end services failed, but I don't know which one.

Turn on call path monitoring. You can find the service execution status for this call.

7.3.3 How many kinds of call paths are in my application?

Turn on call path monitoring using an adequate sampling policy. Oracle TSAM Plus will tell you how many call paths (a "call pattern") exist in your application.

7.3.4 Why is my global distributed transaction completed slowly?

Turn on Oracle TSAM Plus transaction monitoring. You can see the execution time used by the transaction participants.

7.3.5 I want to correlate local transactions with remote transactions.

Turn on Oracle TSAM Plus transaction monitoring for all involved processes and GWTDOMAIN. The Oracle TSAM Plus Console shows you the transaction mapping between local and remote transactions.

7.3.6 When does my local domain use the most resources from the remote domain, and how busy is it?

Use Oracle TSAM Plus system server monitoring on the GWTDOMAIN. Oracle TSAM Plus records the information for you, and shows you the throughput trends.

7.3.7 Can I check program request information?

Turn on call path monitoring with the proper monitoring policy and then use `tpgetcallinfo`. The following information is provided.

- The timestamp when the request leaves the caller
- The timestamp when the request comes into to the server IPC queue
- The client IP address (workstation client, GWWS client)

The monitoring initiator process, `tpgetcallinfo()`, can also tell you the total time used.

7.4 Improving Application Performance

- [Are my services too fine grained?](#)
- [Are my services deployed properly?](#)
- [Do I have too many servers configured?](#)
- [I want to be notified when something is wrong with my system](#)
- [How to drop stale requests?](#)

7.4.1 Are my services too fine grained?

In some cases, too many services supporting a request may add to performance overhead. Use call path tree to investigate. The service number and the tree depth are key analysis factors.

7.4.2 Are my services deployed properly?

Some services are called more frequently than others. Use call path monitoring to gather the information, and re-consider the service deployment. It is best to have the most used services located on the local machine and LAN. Services across domain services should be used carefully.

7.4.3 Do I have too many servers configured?

Oracle TSAM Plus provides a central view of your Tuxedo applications with multiple domain support. Using Oracle TSAM Plus Console allows you to easily see how many domains, machines, servers and services are configured.

7.4.4 I want to be notified when something is wrong with my system

Oracle TSAM Plus provides comprehensive alert configuration based on the metrics collected. The base technology of TSAM Plus alert evaluation is Tuxedo FML Boolean expression, so you can combine complex conditions to compose an alert, such as:

- Report an alert while the execution time greater than 30 seconds and execution is failed.
- Report an alert if heuristic commit happens
- Report an alert if the CPU time consumption is too high in my service

7.4.5 How to drop stale requests?

Sometimes service execution becomes slow, causing request messages to remain in the IPC queue for an extended period of time. In some cases, the client that initiated the request may have already received a timeout notification, while the service continues processing the request in the background.

Oracle TSAM Plus Alert enables you to configure automated “drop request” actions based on specific metrics and conditions. For example, you can configure the system to drop a request when the message wait time exceeds a defined threshold. You can also define alerts that trigger a drop request action when the number of messages in the request queue exceeds a specified limit.

8

What's Next?

After becoming familiar with the Oracle TSAM Plus Product Overview, refer to the following topics for installing, deploying, and using Oracle TSAM Plus.

- **Release Notes**
For more information on the current release, see the Oracle TSAM Plus Release Notes.
- **Installing Oracle TSAM Plus**
For an explanation of how to install the product, see the Oracle TSAM Plus Installation Guide.
- **Deploying Oracle TSAM Plus**
For an explanation of how to deploy the product, see the Oracle TSAM Plus Deployment Guide.
- **Configuring Oracle TSAM Plus**
For an explanation of how to configure the product, see the Oracle TSAM Plus Configuration Guide.
- **Using Oracle TSAM Plus**
For instructions on using the product, see the Oracle TSAM Plus User's Guide.