Oracle® Communications Services Gatekeeper

Platform Test Environment Guide

Release 5.0

E16620-02

April 2011

Oracle Communications Services Gatekeeper Platform Test Environment Guide, Release 5.0

E16620-02

Contents

Preface

This document describes the Platform Test Environment (PTE), which is part of the Services Gatekeeper Platform Development Studio. The PTE simulates an end-to-end telecom network, including Services Gatekeeper, applications, mobile terminals, and network elements. You use this simulated telecom network to test both default Services Gatekeeper features and your own custom communication services.

Audience

This document is intended for Services Gatekeeper developers who will test default Services Gatekeeper features, and any new communication services that they create using the Platform Development Studio.

Documentation Accessibility

Related Documents

For more information, see the *Platform Development Studio Developer's Guide*.

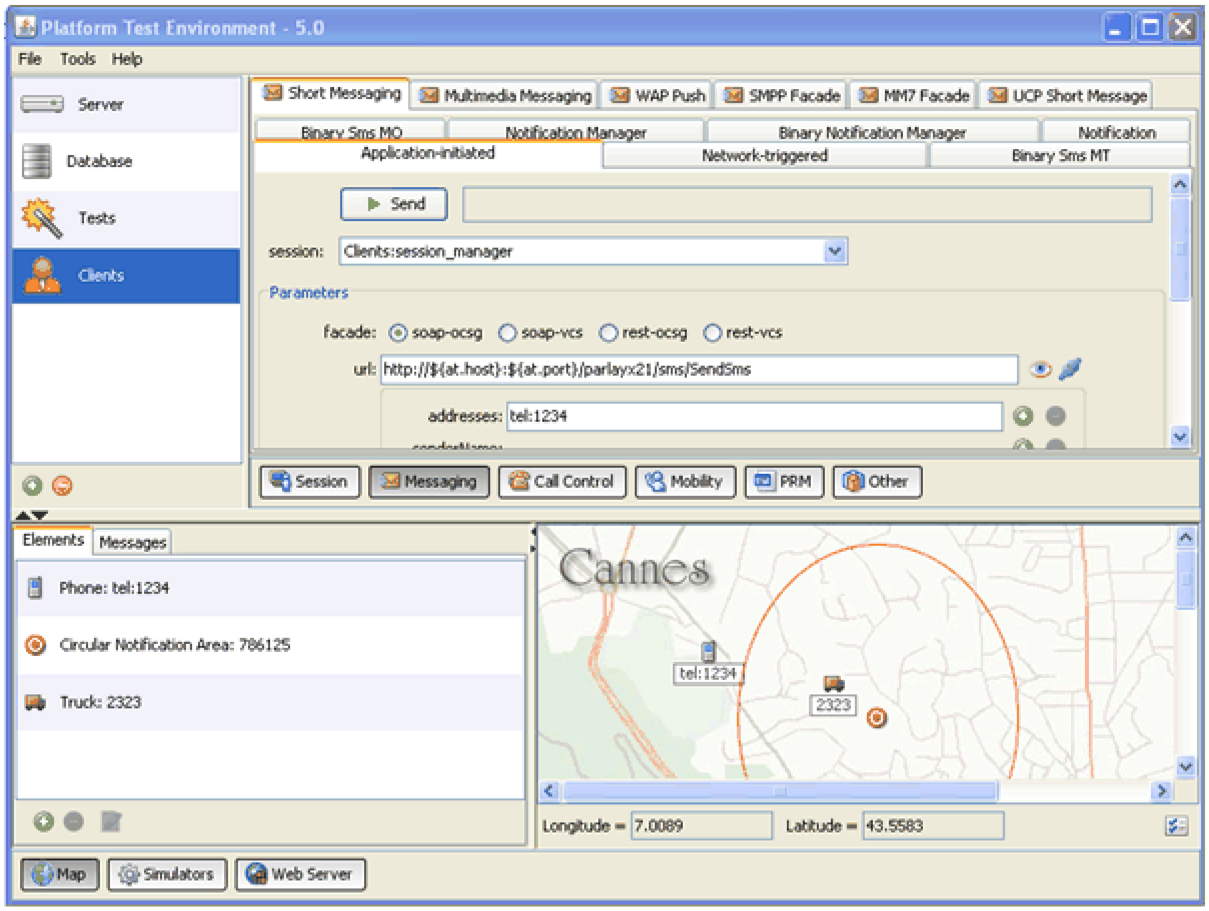
1 Understanding the Platform Test Environment

Oracle Communications Services Gatekeeper includes the Platform Test Environment (PTE), a graphical user interface (GUI) that you use to test default Services Gatekeeper features and your own custom communication services. This chapter introduces the PTE and provides a configuration workflow for using it.

Introducing the PTE

The PTE is a key part of the Services Gatekeeper Platform Development Studio. The PTE simulates both the application-facing interfaces and network-facing protocols so you can test Network Gatekeeper behavior. Figure 1–1 show an example of the PTE graphical user interface. The **Clients** tool is selected, configuring the tool to test application protocols. The **Messaging** set of application protocols is also selected, and you see tabs for each of the supported messaging protocols available to test. The lower half of the GUI shows the **Map** option for testing a telecom network is selected, and the map is populated with a sample coverage area circle, cell phone, and truck.

Figure 1–1 The PTE Graphical User Interface



session: Clients:session_manager

facade: [✓ soap-ocsg] soap-vcs rest-ocsg rest-vcs

url: http://${at.host}:${at.port}/parlayx21/sms/SendSms

addresses: tel:1234

Phone: tel:1234

Circular Notification Area: 786125

Truck: 2323

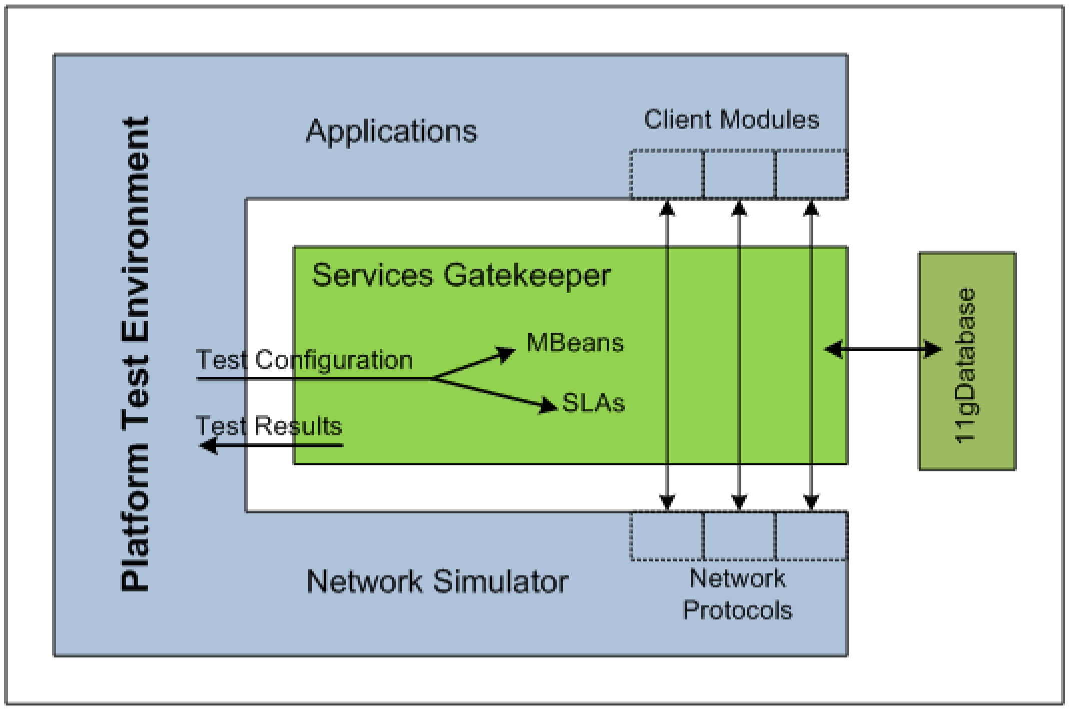
Longitude = 7.0089

Latitude = 43.5583

Figure 1–2 shows how the PTE is integrated with Services Gatekeeper. The PTE includes clients, simulators, tools, and plug-ins to mimic most of the default Services Gatekeeper features. The PTE is a complete telecom testing environment. You create actual applications (client module) within the PTE to use as application-facing interfaces. Each client module interacts with a simulated network protocol on the network-facing part of the PTE. The client modules interact with simulated network protocols just as they would in a production environment. You use the PTE to configure an actual running Services Gatekeeper implementation using MBeans and specify access and budgets with service-level agreements (SLAs) just as you would in a production environment. Test results are returned to the PTE during testing.

You can also extend the PTE to test your own custom features. After testing is complete, you can connect the PTE GUI to your production Network Gatekeeper installation and either continue testing or download your tested changes to the production system. You configure SLAs using a graphical SLA Editor and use the real-time graphic Budget Monitor to see how your changes affect the rates and quotas. A Diameter-based simulator allows you to test billing.

Figure 1–2 PTE/Services Gatekeeper Integration



The PTE offers these additional features:

- A default set of client modules for most default communication services that use both the Web Services facade and the RESTful facade.
- Partner Relationship Management (PRM) test clients for many operations covered by the PRM interfaces.
- Simulators for most network protocols supported by the default communication services.
- A log browser for checking server logs.
- A Java Message Service-based Event Data Record (EDR)/Customer Data Record (CDR)/alarm listener.
- A database browser for interacting with the database.
- Real-time duration test graphing.
- An embedded TCP monitor.
- An easily extendable architecture, including:
  - An example application test client for use with the example communication service.
  - An example network simulator for use with the example communication service.
  - A set of Service Provider Interfaces (SPIs) that allow your modules to interact with the PTE.
- A framework for building unit tests, including:
  - A base test class, derived from JUnit.
  - Mechanisms that simplify connecting to the PTE.

- An example test case for use with the example communication service.

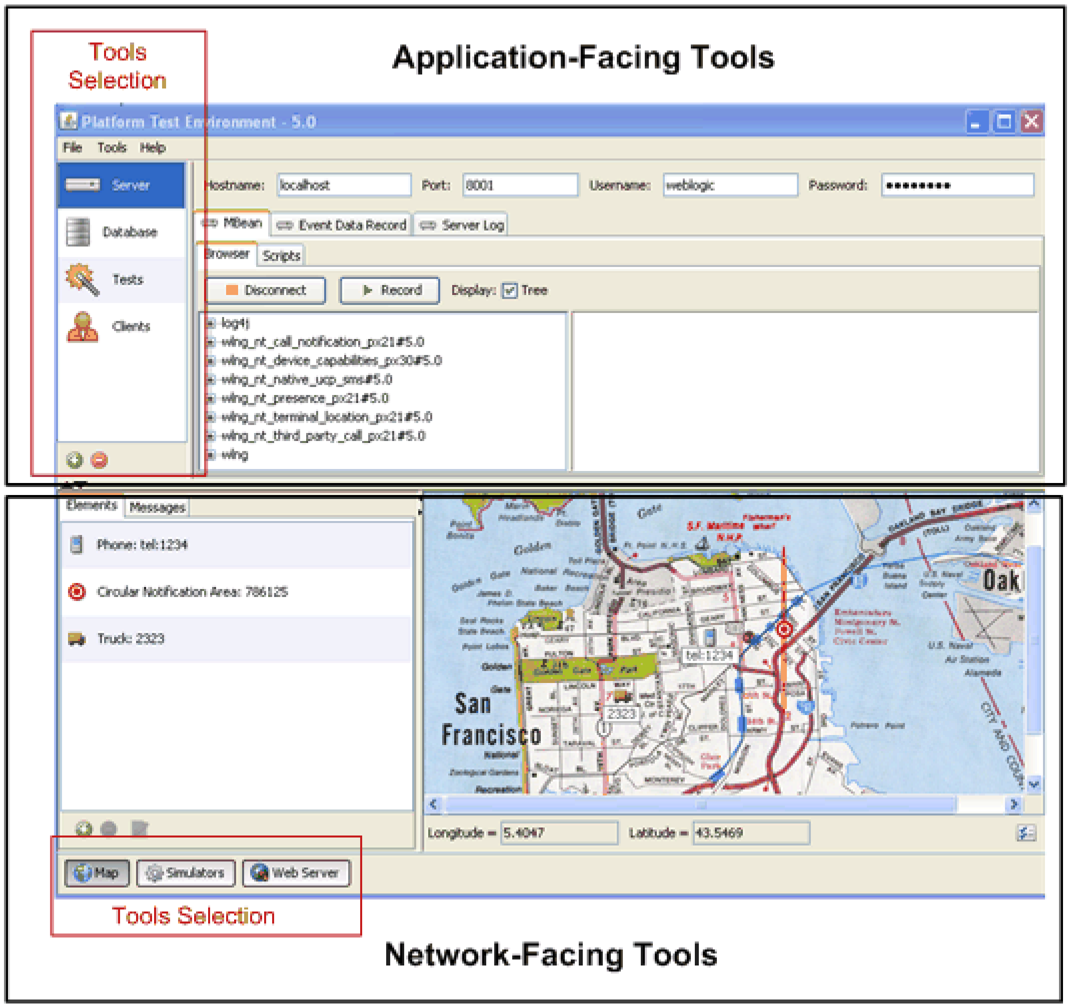
Introducing the PTE Graphical User Interface

The main PTE GUI components are:

- An application-facing configuration panel (shown in Figure 1–3) in the upper right of the GUI. You use this to select a server to connect to, a database to log on to, and individual applications (clients) to configure.
- The application-facing configuration panel includes a tools selection panel (shown in Figure 1–3) in the upper left of the GUI that you use to select a PTE tool to configure or test.
- A network-facing simulation panel (shown in Figure 1–3) in the lower part of the GUI that you use to simulate telecom network settings so you can test client/network behavior.
- The network-facing simulation panel also contains a tools selection panel (shown in Figure 1–3) in the lower left of the PTE GUI that you use to select a network simulation tool to configure.
- An SLA Editor that you use to configure and test SLAs. The SLA Editor is a graphical editor that you use to edit SLA files.
- The SLA Editor also contains a Contract Editor panel that you use to view SLA rates, restrictions, and quotas that individual applications are allowed.
- A Budget Monitor that shows you the effect that testing services has on existing Services Gatekeeper rates and quotas.

Figure 1–3 shows the main panels of the PTE GUI, with the application-facing tools area on top, and the network-facing tools on the bottom. The tools selection panels for both panels are outlined for emphasis.

Figure 1–3 The Main PTE GUI Sections



Many PTE windows offer icon shortcuts for common tasks. Hover over these icons, and tooltips appear.

To run the PTE, you must have set up application and service provider accounts in Services Gatekeeper, associated them with appropriate groups, and attached SLAs. You must have also configured the communications services that you are testing and created instances for those communication services as required. For a detailed description of these and other Services Gatekeeper management tasks, see *System Administrator's Guide*, *Communication Service Guide* and *Accounts and SLAs Guide*, separate documents in this set.

PTE Configuration Workflow

Using the PTE to test any of the default Services Gatekeeper features involves the following steps:

1. Use the Plug-in Manager to create a plug-in instance for each communication service to test. For details, see "Managing and Configuring the Plug-in Manager" in *System Administrator's Guide*, another document in this set.

2. Use the Plug-in Manager to set up routing for the plug-in instances. For details, see “Managing and Configuring the Plug-in Manager” in *System Administrator’s Guide*, another document in this set.
3. Install and start a database for Services Gatekeeper to use. For details, see “Installing the Database” in *Installation Guide*, another document in this set.
4. Install and start Services Gatekeeper. For details, “Installing Oracle Communications Services Gatekeeper” in *Installation Guide*, another document in this set.
5. Install and start the PTE. See "Starting the PTE" for details.
6. Connect your running PTE to your Services Gatekeeper implementation (database). For details, see "Connecting the PTE to Services Gatekeeper".
7. Using the PTE, configure your application-facing applications (clients). For details, see "Configuring Application-Facing Clients to Test".
8. Using the PTE SLA Manager, create an application account, service provider accounts, service provider groups, application groups. For details, see "Configuring and Testing Service-Level Agreements".
9. Tie your new SLA components into the PTE. For details, see *Accounts and SLAs Guide*, another document in this set.
10. Using the Plug-in Manager, set up SLA routing. For details, see “Managing and Configuring the Plug-in Manager” in *System Administrator’s Guide*, another document in this set.
11. Configure the applications (clients) using the PTE application-facing tools) For details, see "Configuring Application-Facing Clients to Test".
12. Configure the PTE network simulator. For details, see "Configuring Simulated Telecom Networks".

Extending the PTE

The default PTE implementation is preconfigured to test the default Services Gatekeeper communication services. You can customize these services or create your own new services. For details see “Extending the ATE and PTE” in *Platform Development Studio Developer’s Guide*, another document in this set.

After you have created or customized communication services, see "Adding and Testing Custom Client Modules" for testing instructions and a sample unit test.

2 Using the PTE to Test Services Gatekeeper

This chapter explains how to use the Platform Test Environment (PTE) graphical user interface to test an Oracle Communications Services Gatekeeper implementation. This GUI is the main access point for most PTE features. Any changes you make using the PTE are saved when you exit the program.

This chapter assumes that you have read Chapter 1, "Understanding the Platform Test Environment" and understand the PTE configuration workflow.

Starting the PTE

This section explains how to install and start the PTE.

Before you use the PTE, you must first:

- Install Services Gatekeeper. The PTE is automatically installed as part of Services Gatekeeper in the *Middleware_Home***/ocsg_pds_5.0/pte** directory by default. For details on installing Services Gatekeeper, see "Installing Oracle Communications Services Gatekeeper" in *Installation Guide*, another document in this set.
- Run the *Middleware_Home***/wlserver_10.3/server/bin/setWLSEnv** script or set the equivalent path so that you have access to the PTE scripts in *Middleware_home* **/ocsg_pds_5.0/pte**.

To start the PTE on a Windows-based system do one of the following:

- (GUI Mode) From your system **Start** menu, select **All Programs**, then **Oracle Communications Services Gatekeeper 5.0.0**, and **Platform Test Environment**.
- (GUI Mode) Using a command window, change directory to *Middleware_home* **/ocsg_pds_5.0/pte** and type `run.cmd`.
- (Console Mode) type `console.cmd` in a command window in the *Middleware_home* **/ocsg_pds_5.0/pte** directory. Console mode is usually only used for testing new or customized PTE extensions.

To start the PTE on a UNIX or Linux-based system do one of the following:

- (GUI Mode) Using a command window, change directory to *Middleware_home* **/ocsg_pds_5.0/pte** and type `run.sh`.
- (Console Mode) Using a command window, change directory to *Middleware_home* **/ocsg_pds_5.0/pte** and type `console.sh`. Console mode is usually only used for testing new or customized PTE extensions.

Note: Settings compatibility between different versions of the PTE is *not* guaranteed.

Configuring and Maintaining Your PTE Server Environment

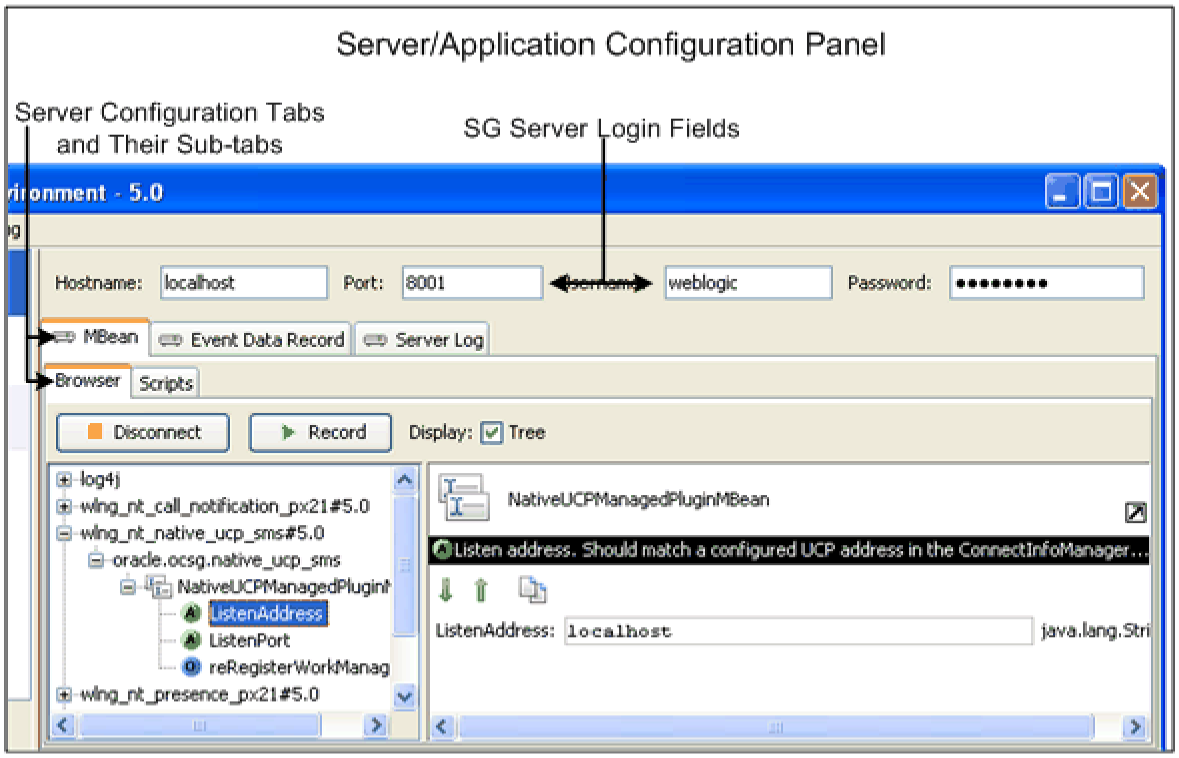
To configure and maintain your PTE Server environment, you perform these tasks using the PTE **Server** panel:

- Connecting the PTE to Services Gatekeeper
- Configuring Communication Services by Changing MBean Attributes and Operations
- Creating a Script to Capture Your MBean Changes
- Tracking Communication Service Behavior
- Tracking Server Behavior with the Server Log

Connecting the PTE to Services Gatekeeper

The PTE requires a connection to a running Services Gatekeeper implementation through a database domain. You can use PTE to control any running Services Gatekeeper server by changing the **Hostname**, **Port** number, and an administrative **Username** and **Password**. Figure 2–1 shows where you enter Services Gatekeeper login fields. The Server Configuration tabs and their sub-tabs are also marked.

Figure 2–1 The Server/Application Configuration Panel


Server/Application Configuration Panel
Server Configuration Tabs and Their Sub-tabs
SG Server Login Fields
ironment - 5.0
MBean
Event Data Record
Server Log
Browser
Scripts
Disconnect
Record
Display:
Tree
log4j
wlng_nt_call_notification_px21#5.0
wlng_nt_native_ucp_sms#5.0
oracle.ocsg.native_ucp_sms
NativeUCPManagedPluginM
ListenAddress
ListenPort
reRegisterWorkManag
wlng_nt_presence_px21#5.0
NativeUCPManagedPluginMBean

Hostname: localhost Port: 8001 Username: weblogic Password: ••••••••

Listen address. Should match a configured UCP address in the ConnectInfoManager...

ListenAddress: localhost java.lang.Stri

To connect to Services Gatekeeper:

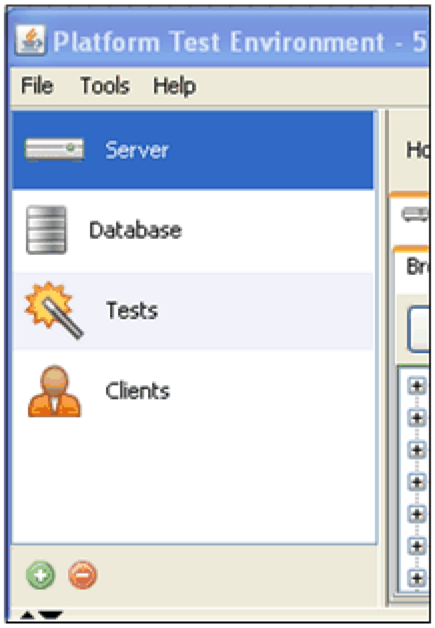
1. Do one of the following:
   - If you started the PTE from your system's **Start** menu, it automatically connects to the corresponding Services Gatekeeper implementation.

- To connect to a different Services Gatekeeper implementation, enter the **Hostname**, **Port**, **Username** and **Password** that you configured in that database domain and click **Connect**.

2. In the tools selection panel, click **Server**.

   Figure 2–2 shows the application-facing tools selection panel with the Server item selected.

Figure 2–2 The Application-facing Tools Selection Panel



3. Click the **MBean** sub-tab.
4. Click **Connect**. The MBean tree is populated.

To switch to a different Services Gatekeeper implementation:

1. Click **Disconnect**.
2. Enter the **Hostname**, **Port**, **Username**, and **Password** that you configured in the database domain.
3. Click **Connect**.

Configuring Communication Services by Changing MBean Attributes and Operations

You configure communication services by changing their MBean attributes and operations. You use the **MBean** tab to change individual MBean attributes and perform MBean operations. These changes persist in the database. You can also record a series of changes in a script and use the script to repeat the changes as needed.

This section assumes that you know the configuration changes you want to make for each communication service. For details on the configuration choices, read through the Services Gatekeeper *Communication Service Guide*, a separate document in this set.

To configure a communication service:

1. Connect to a Services Gatekeeper implementation.
2. In the tools selection panel, click **Server**.

3. Click the **MBean** sub-tab.
4. Click the **Browser** sub-tab which displays the list of available MBeans.
5. Select an MBean to modify. The MBean attributes are displayed in the panel to the right of the MBean.
6. Make any changes to the MBean attribute or operation.
7. Click the green down arrow (for attributes) or right--facing triangle (for operations) to save your changes to the database.
8. Select and edit any other MBeans as necessary to configure the communication service.

Creating a Script to Capture Your MBean Changes

You can record and repeat your MBean configuration changes using the **Scripts** sub-tab. You can run these scripts manually or programatically later as needed.

To create an MBean script:

1. Connect to a Services Gatekeeper implementation.
2. In the tools selection panel, click **Server**.
3. Click the **MBean** sub-tab.
4. Click **Record**.

   The Recording starts.
5. Perform the MBean tasks to capture.

   Click **Recording.**
6. Enter a name for the script and click **OK**.

Your new script appears in the **Scripts** sub-tab.

Running MBean Scripts

MBean scripts automate the process of changing your MBean operations and attributes.

To run an MBean script:

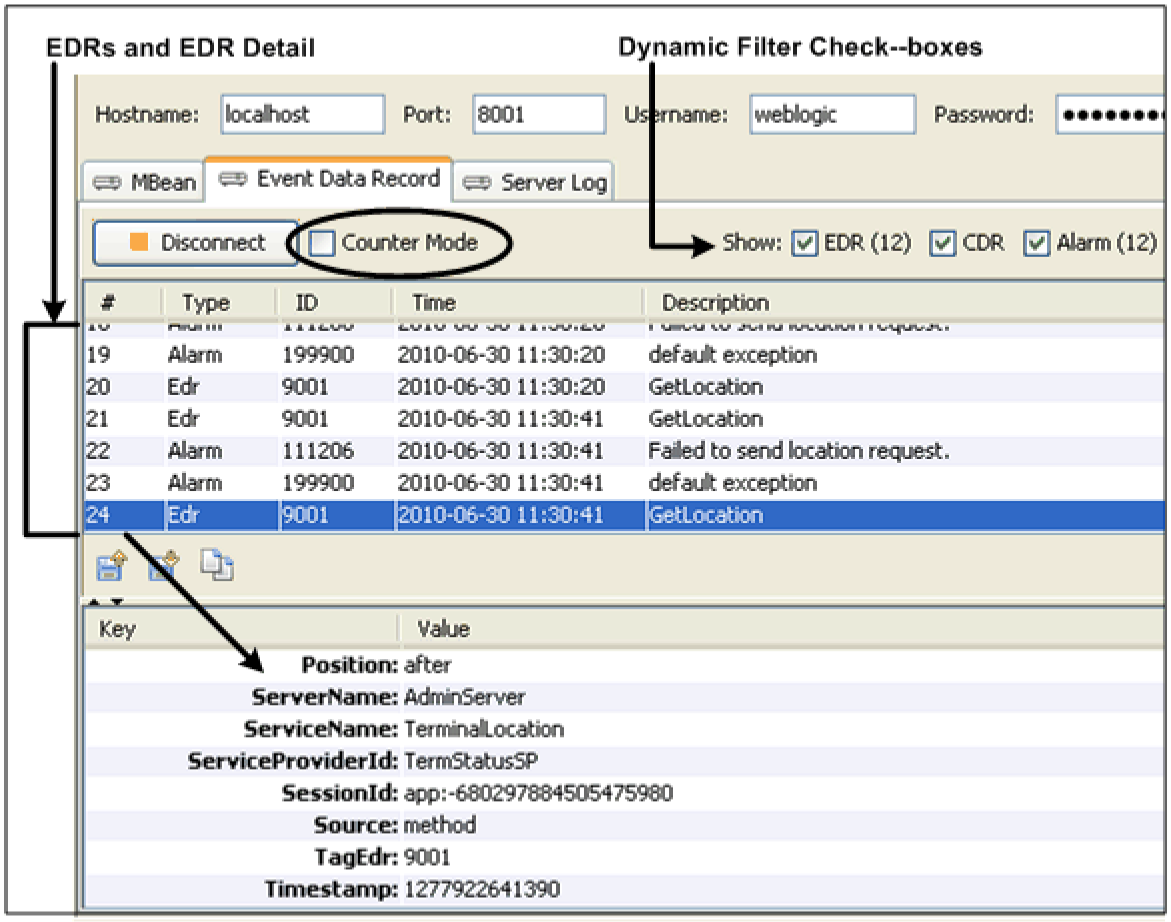
1. Connect to a Services Gatekeeper implementation.
2. In the tools selection panel, click **Server**.
3. Click the **Scripts** sub-tab.
4. Select a scrip to run.
5. Click **Run**.

Tracking Communication Service Behavior

Services Gatekeeper keeps track of communication service behavior by recording Event Data Records (EDRs) at logical points as the communication service communicates with applications, the network, and the database. You can track and debug communication service behavior by viewing the EDRs in the PTE. For details on the list of EDRs generated by each communication service, see Services Gatekeeper *Communication Service Guide*, another document in this set.

You use the **Event Data Record** tab to view EDR data. Figure 2–3 shows the Event Data Record tab populated with EDRs. EDR data is shown, including the EDR number, Type, ID number, a timestamp, and the EDR description. The Dynamic Filter boxes that limit the EDRs displayed are marked, as is the Counter Mode check box. The EDR key/value pairs are shown for EDR number 24 in the detail window at the bottom.

Figure 2–3 The Event Data Record Tab



#	Type	ID	Time	Description
19	Alarm	199900	2010-06-30 11:30:20	default exception
20	Edr	9001	2010-06-30 11:30:20	GetLocation
21	Edr	9001	2010-06-30 11:30:41	GetLocation
22	Alarm	111206	2010-06-30 11:30:41	Failed to send location request.
23	Alarm	199900	2010-06-30 11:30:41	default exception
24	Edr	9001	2010-06-30 11:30:41	GetLocation

Key	Value
Position:	after
ServerName:	AdminServer
ServiceName:	TerminalLocation
ServiceProviderId:	TermStatusSP
SessionId:	app:-680297884505475980
Source:	method
TagEdr:	9001
Timestamp:	1277922641390

To view EDRs for a communication service:

1. Connect to a Services Gatekeeper implementation.
2. Run a communication service.

   Each communication service generates a unique list of EDRs.
3. In the tools selection panel, click **Server**.
4. Click the **Event Data Record** sub-tab.
5. Click **Connect**.

   The list of EDRs generated by the communication service is displayed
6. Select an EDR to view its details in the panel below it.

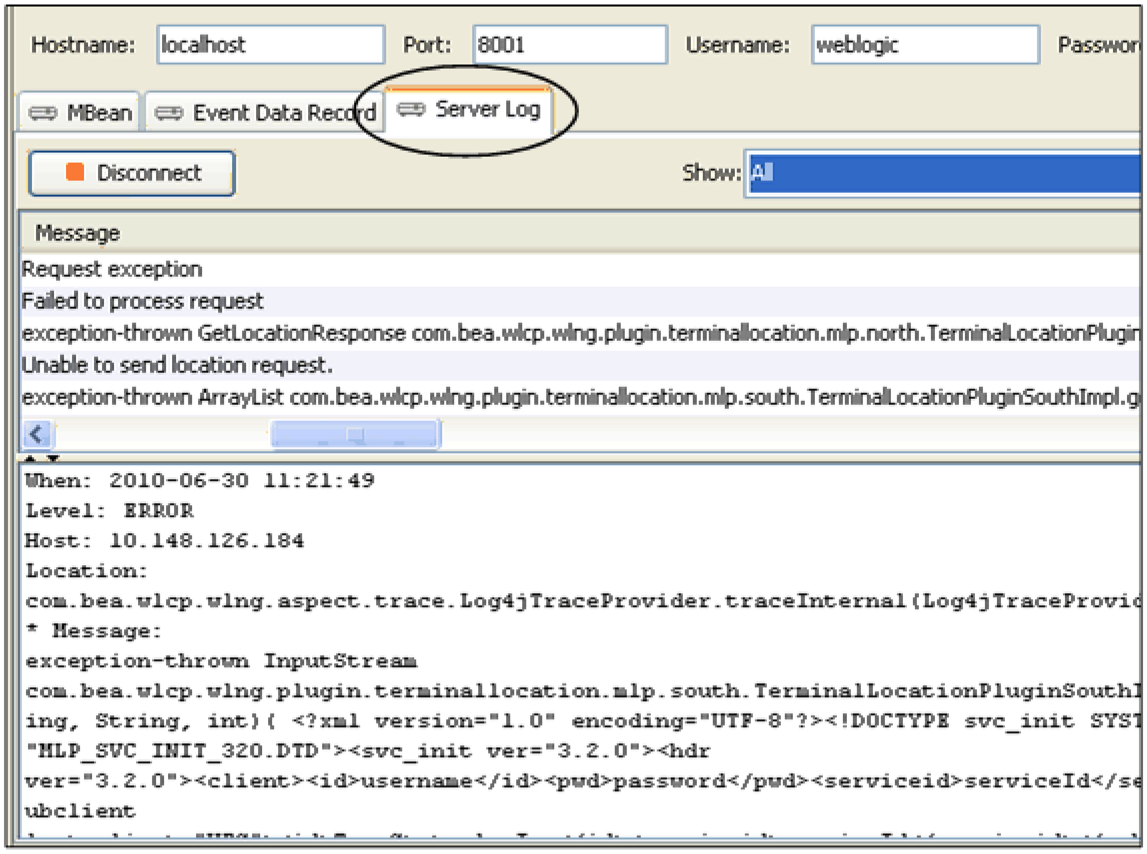
To export, import, or copy to the clipboard a list of EDRs, use the icons in the bottom left of the EDR list window.

To avoid performance degradation in situations where you are expecting a large number of EDRs, check the **Counter Mode** box. This returns a count of the number of records, but does not display the entire contents.

Tracking Server Behavior with the Server Log

Click **Server Log** to view the server logs. Figure 2–4 shows the **Server Log** tab populated with sample server log messages.

Figure 2–4 Server Log Message and Detail Panels



```
Request exception
Failed to process request
exception-thrown GetLocationResponse com.bea.wlcp.wlng.plugin.terminallocation.mlp.north.TerminalLocationPlugin
Unable to send location request.
exception-thrown ArrayList com.bea.wlcp.wlng.plugin.terminallocation.mlp.south.TerminalLocationPluginSouthImpl.g
```

```
When: 2010-06-30 11:21:49
Level: ERROR
Host: 10.148.126.184
Location:
com.bea.wlcp.wlng.aspect.trace.Log4jTraceProvider.traceInternal(Log4jTraceProvic
* Message:
exception-thrown InputStream
com.bea.wlcp.wlng.plugin.terminallocation.mlp.south.TerminalLocationPluginSouthI
ing, String, int)( <?xml version="1.0" encoding="UTF-8"?><!DOCTYPE svc_init SYST
"MLP_SVC_INIT_320.DTD"><svc_init ver="3.2.0"><hdr
ver="3.2.0"><client><id>username</id><pwd>password</pwd><serviceid>serviceId</se
ubclient
```

To view EDRs for a communication service:

1. Connect to a Services Gatekeeper implementation.
2. Run a communication service.

   Each communication service generates a unique list of EDRs.
3. In the tools selection panel, click **Server**.
4. Click the **Server Log** sub-tab.
5. Click **Connect**.

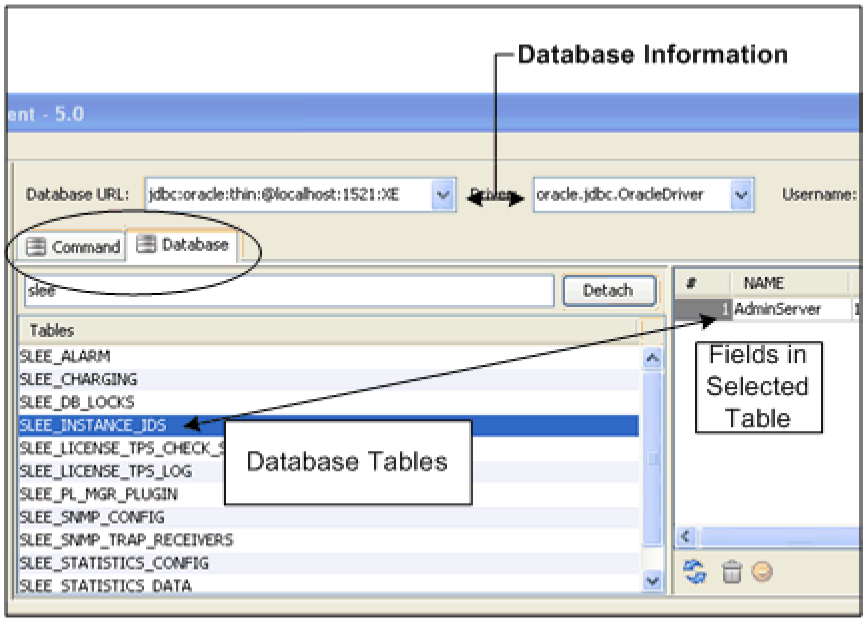
   Server log messages is displayed
6. Select a log message to view its details in the panel below it.

To export server log messages to a file, click the export icon on the right side of the panel. To clear the list of server logs, click the trash can icon on the right side of the panel.

Configuring and Managing a Database Connection

You can do a lot of testing without connecting the PTE to a database. For example you can verify communication service features and make changes to the SLAs. However, to confirm that your changes make the correct database changes, you need to connect the PTE to a running database. Use the Database Configuration panel to view and change the database connection and database tables. Figure 2–5 shows the Database Configuration panel populated with database tables. A table is selected and its fields shown.

Figure 2–5 The Database Configuration Panel



The Database panel has two sub-tabs:

- Use the **Command** sub-tab to enter SQL commands directly into the database.
- Use the **Database** sub-tab to view database tables and the data in them. To monitor a specific table more closely, select it and click **Detach**. That table appears individually as an additional tab.

Viewing Database Tables and Fields

This procedure requires that you know the database URL, driver, username, and password.

To View Database Tables and Fields:

1. Connect to a Services Gatekeeper implementation.
2. From the tools selection panel, click **Database**.
3. In the **URL** field, enter the URL of a database to connect to.
4. In the **Driver** field, enter the driver of a database to connect to.
5. In the **Username** field, enter the name of a database administrative user in the database to connect to.
6. In the **Password** field, enter the password for the administrative user.

7. Click **Connect**.
8. Click the **Database** sub-tab.

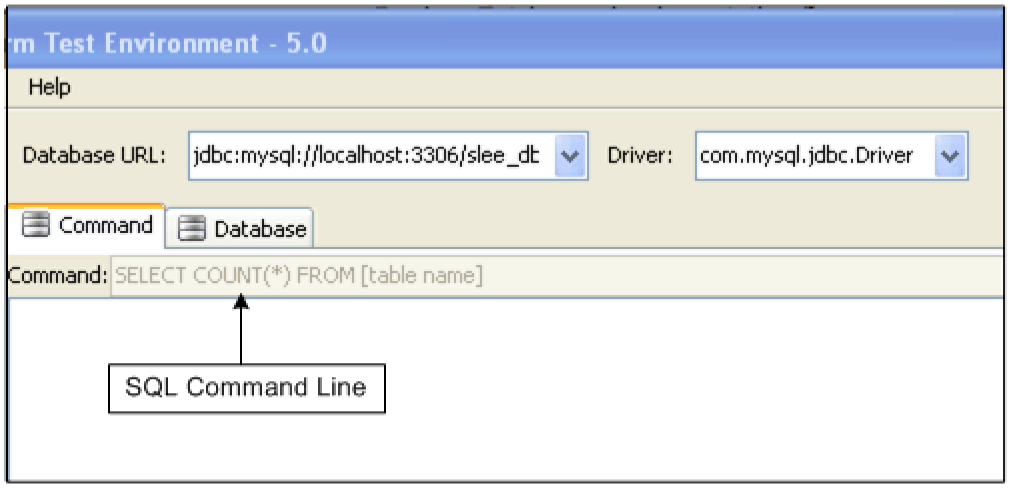
   The **Database** sub-tab is populated with database fields. The **Tables** panel on the left displays the database tables.
9. Select a table to display its fields in the panel on the right.

Running SQL Commands on the Database

The PTE database command line allows you to run SQL commands directly on your database. Figure 2–6 shows the **Command** tab window with the SQL command line marked.

This procedure requires a strong knowledge of SQL.

Figure 2–6 The Database Command Tab



Database URL: jdbc:mysql://localhost:3306/slee_dt
Driver: com.mysql.jdbc.Driver
Command: SELECT COUNT(*) FROM [table name]

This procedure requires that you know the database URL, driver, username, and password.

To run an SQL command against the database:

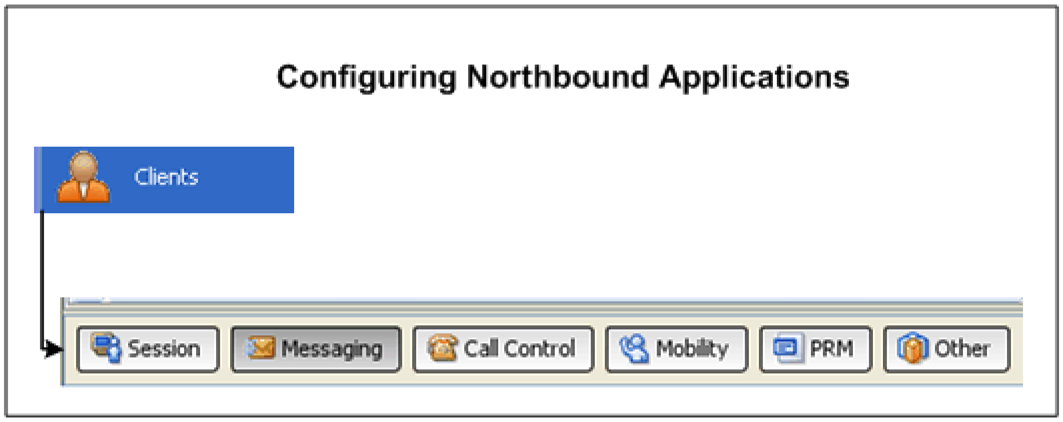
1. Connect to a Services Gatekeeper implementation.
2. From the tools selection panel, click **Database**.
3. In the **URL** field, enter the URL of a database to connect to.
4. In the **Driver** field, enter the driver of a database to connect to.
5. In the **Username** field, enter the name of a database administrative user in the database to connect to.
6. In the **Password** field, enter the password for the administrative user.
7. Click **Connect**.
8. Click the **Command** sub-tab.

   The **Command** dialog box is displayed.
9. Enter an SQL command line to execute on the database.

Configuring Application-Facing Clients to Test

Use the **Clients** tool to select and configure your application-facing interfaces (clients) and your Services Gatekeeper connection. Figure 2–7 shows the categories of clients available to configure for testing.

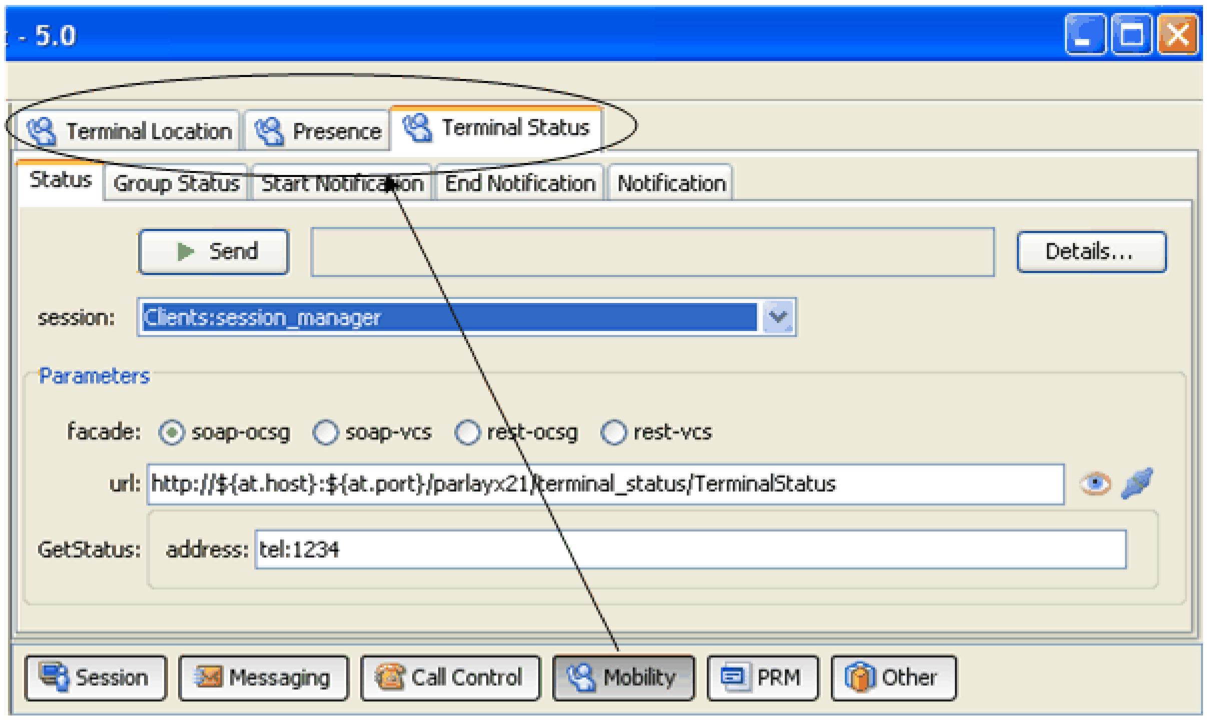
Figure 2–7 Configuring Application-facing Clients to Test



- Use the **Session** button to configure the Services Gatekeeper connection.
- Use the **Messaging** button to configure the Service Gatekeeper messaging applications, such as Short Messaging, Multimedia Messaging, and so forth.
- Use the **Call Control** button to configure Audio Call, Call Notification, and Third Party Call applications.
- Use the **Mobility** button to configure Terminal Location, Terminal Status, and Presence applications.
- Use the **PRM** button to configure Partner Relationship Management operator and service provider applications.
- Use the **Other** button to configure Subscriber Profile, Payment, Device Capabilities, and Netex applications.

Each application has unique configuration parameters organized by sub-tab. Figure 2–8 shows the **Mobility** applications, (Terminal Location, Presence, and Terminal Status) available to configure and test. The **Terminal Status** tab is selected, showing the parameters in the **Status** sub-tab.

Figure 2–8 The Mobility Applications



session: Clients:session_manager

facade: (●) soap-ocsg ( ) soap-vcs ( ) rest-ocsg ( ) rest-vcs

url: http://${at.host}:${at.port}/parlayx21/terminal_status/TerminalStatus

GetStatus: address: tel:1234

Configuring Simulated Telecom Networks

Each communication service requires a simulated network to test with the PTE. You use the network-facing simulator panel, in the lower part of the PTE, to configure simulated telecom network components and settings. There are three categories to choose from:

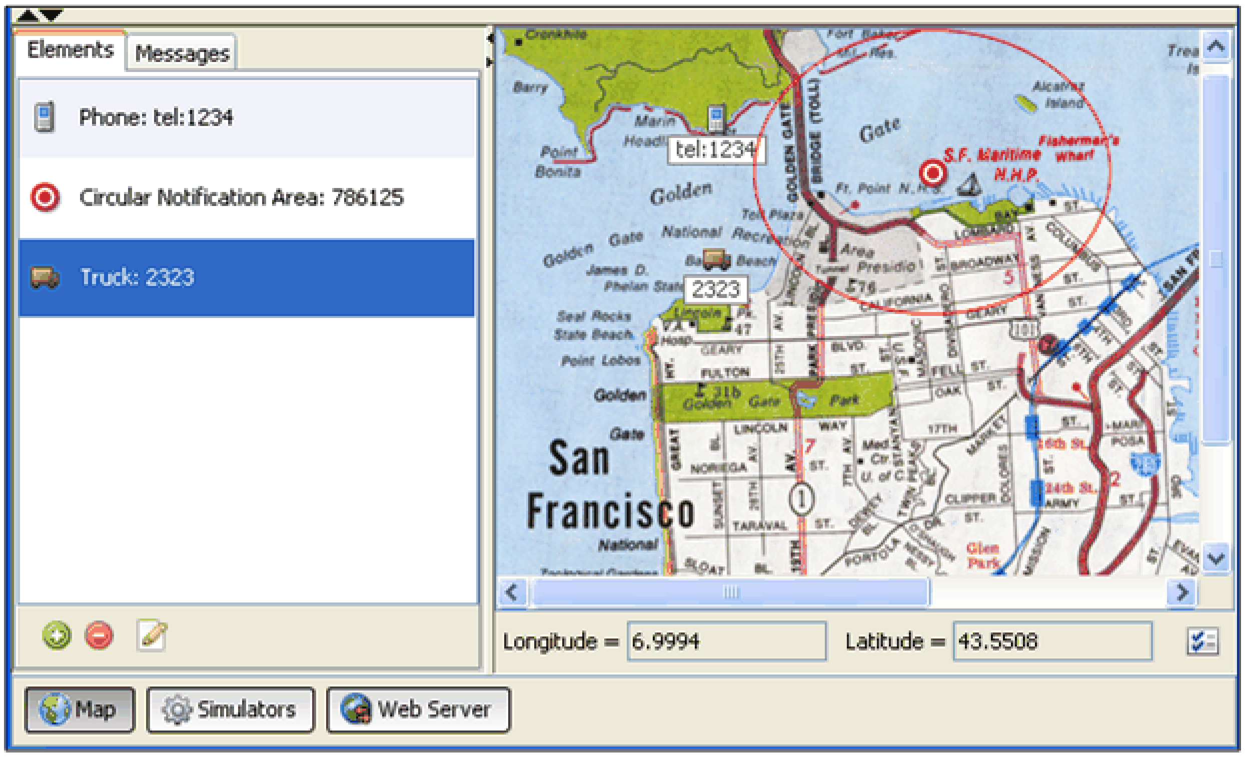
- **Map** displays a test map of a physical location that you can add network components to.
- **Simulator** offers the network protocols available to use as network-facing interfaces. This button also offers the Diameter billing feature.
- **Web Server** simulates an HTTP web server.

Configuring Network Elements on the Maps Panel

The **Maps** panel provides a map on which you can place sample phone terminals, mobile trucks, and connect them with sample coverage contact areas. This offers visual support for testing Parlay X 2.1 SMS, MMS, and Terminal Location traffic and their RESTful equivalents. Use the plus button on the bottom left to create your own sample test elements.

Figure 2–9 shows the **Map** panel with the Maps elements on the left side and the simulated map on the right. The map has an example telephone, truck, and circular notification area deployed on it.

Figure 2–9 The Maps Panel



To add an element to the map:

1. Connect to a Services Gatekeeper implementation.
2. Select the **Map** button at the bottom of the PTE screen.

   The Map appears.
3. Click the green plus icon at the bottom of the **Elements** sub-tab.

   The **Add Element** screen appears.
4. Select the type of element to add.
5. The **Properties** screen appears. Do one of the following:

   For a cell phone, enter:

   - An **address**.
   - A **longitude**.
   - A **latitude**.
   - An **altitude**.
   - A **status** (reachable, unreachable, busy)

   For a circular notification area, enter:

   - An **id**.
   - An **address**.
   - A **trigger**.
   - A **longitude**.
   - A **latitude**.

- A **radius**.
- An **interval**.
- A **duration**.
- A **count**.

For a TS (terminal Status) notification area, enter:

- An **id**
- An **address**.

For a truck, enter:

- An **address**.
- A **longitude**.
- A **latitude**.
- An **altitude**.

6. Click **OK**.

   The new element appears on the map.

Changing the Map Image

You can use any .gif or .jpeg file for the map image.

To change the Map image:

1. Connect to a Services Gatekeeper implementation.
2. Select the **Map** button at the bottom of the PTE screen.

   The Map panel appears.
3. Click the Map Properties icon on the bottom right of the map panel.

   The Map Properties panel appears.
4. Click the **Custom Image** radio button.
5. Click the **Browse** button and navigate to the location of an image to use for the map.
6. Click **OK**.

   The **Map Properties** panel disappears and the new image is displayed in the PTE Map panel.

Changing the Map Range

You can use any longitude and latitude ranges for the map image.

To change the Map longitude and latitude ranges:

1. Connect to a Services Gatekeeper implementation.
2. Select the **Map** button at the bottom of the PTE screen.

   The Map appears.
3. Click the Map Properties icon on the bottom right of the map panel.

   The Map Properties panel appears.

4. Enter new values for the longitude and latitude ranges.

   No validation checking is performed on longitude or latitude. You can enter any values regardless of whether they make sense.

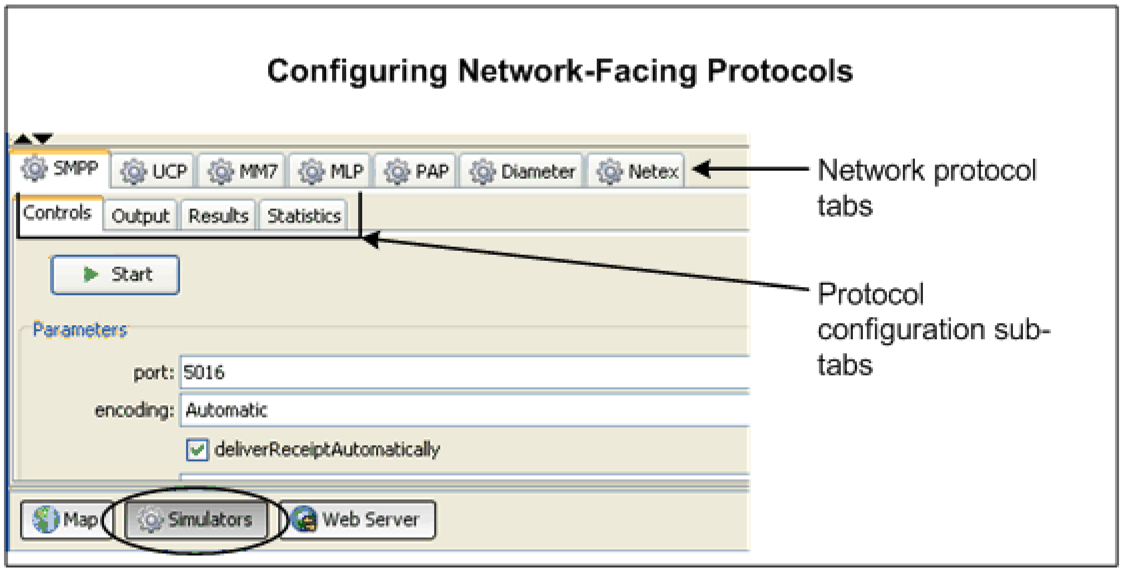
5. Click **OK**.

6. The **Map Properties** panel disappears and the new ranges are displayed in the PTE Map panel.

Configuring Network Protocols to Test With

Each communication service requires a network-facing protocol to test against, and you configure them using the **Simulators** button in the lower part of the PTE. Figure 2–10 shows the network simulator components.

Figure 2–10 Configuring a Network Protocol to Test With



port: 5016
encoding: Automatic
✓ deliverReceiptAutomatically

To configure a network protocol for testing:

1. Connect to a Services Gatekeeper implementation.
2. Select the **Simulators** button at the bottom of the PTE.
3. Select a network protocol from the tabs available.
4. Configure, start, and view results from the protocol using the sub-tabs available.

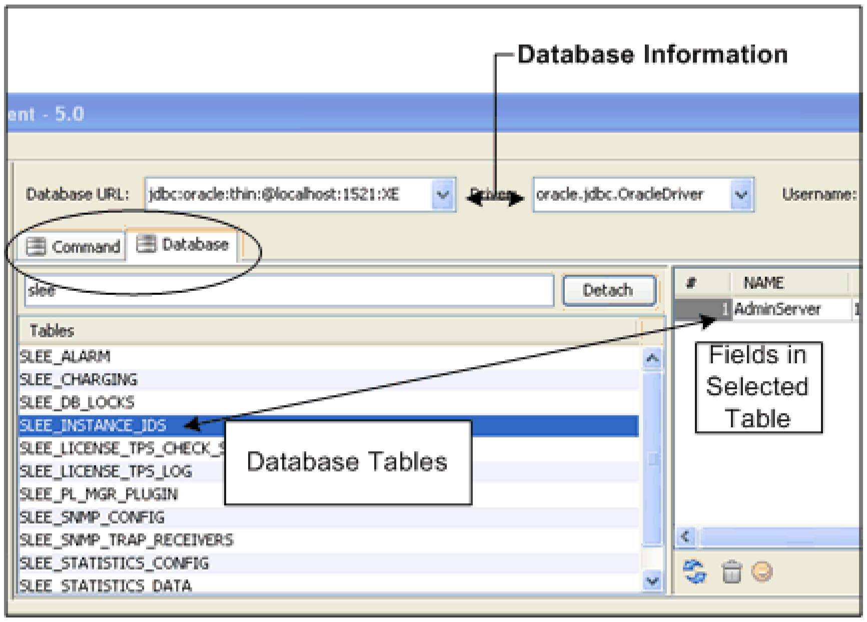
The number and type of protocol configuration sub-tabs offered depends on the individual protocol. In all cases, there is a **Controls** tab to configure the protocol. This area is also where the **Start** button is for each of the modules. The other tabs vary; for example, they may allow you to see the actual content of a message or show you the statistics associated with traffic.

Configuring Diameter Billing Tests

The **Diameter** tab allows you to set up and run any billing simulator integrated with the Diameter protocol. For example, to use the billing simulator with the Payment communication service, create a user in the billing simulator corresponding to the **endUserIdentifier** field in the Payment client, and send a request from the client through the Diameter simulator to the Billing simulator.

Do not use an existing `localhost` value for the Diameter Origin Host parameter in the Payment communication service. You must use the actual name of a host. Figure 2–11 shows the Diameter simulator **Controls** tab.

Figure 2–11 The Diameter Simulator Controls Tab



To configure Diameter testing:

1. Create a Diameter plug-in instance.
2. Connect the PTE to a Services Gatekeeper implementation.
3. Click the **Simulators** button at the bottom of the PTE GUI.
4. Click the **Diameter** tab.
5. Click the **Controls** sub-tab.
6. Enter a Diameter realm to use.
7. Enter the first Diameter request listener port in the **port1** field. This port can accept either Rf (ACR; post-paid) or Ro (CCR; pre-paid) requests, and can be a multi-home port. The default value is `3588`.
8. Enter the second Diameter request listener port in the **port2** field. This port can also accept either Rf (ACR; post-paid) or Ro (CCR; pre-paid) requests, and can be a multi-home port. The default value is `3589`.
9. (As needed) Change the **failingSubscriberIdData** identifier.

   The default identifier (**123123**) is an Oracle-supplied subscriber account that does not have any funds. This is useful for testing “insufficient funds” scenarios. Change this if you need to.
10. (As needed) Check the **recordBillingEvents** checkbox.

    Checking this box directs the PTE to record and display billing events.
11. (As needed) Check the **dumpMessage** checkbox to delete Diameter messages.

    Checking this box directs the PTE to delete Diameter messages instead of sending them to the PTE output panel.

12. (As needed) Enter an alternate value for **maxRecordBillingEvents**.

    This value specifies the maximum number of billing events that the PTE records. As new billing events arrive the older events are deleted.

13. Select **Start** to start the Diameter service.

    These next steps are necessary to specify the listening ports for your Diameter simulator in Services Gatekeeper.

14. Select the **Multi-home** sub-tab.
15. Copy the top port number or IP address to your system clipboard by clicking the Copy to Clipboard icon.
16. Select the **Server** tool in the upper right of the PTE GUI.
17. Select the **MBean** sub-tab.
18. Select **Connect**.

    The MBean tree appears.

19. Select **wlng_nt_payment_px30#5.0** > *Diameter_plugin_name* > **PaymentMBean**.
20. Paste the IP address from your clipboard into the **DestinationAddresses** attribute field.
21. Add a comma immediately after the IP address.
22. Return to the **Diameter Multi-home** sub-tab and copy the lower IP address to your clipboard.
23. Return to the **MBeans** sub-tab and paste the second IP address in the **DestinationAddresses** field after the comma without any blank spaces.
24. Select the green down arrow to make the change take effect.

    You can add additional addresses up to a 255 character limit.

25. Select **Disconnect** in the MBean **Browser** tab, then select **Connect** again.
26. Select **wlng_nt_payment_px30#5.0** > *Diameter_plugin_name* > **PaymentMBean** > **Connected**.
27. Confirm that the **Connected** checkbox is checked, indicating that the PTE is now connected to the destination addresses.

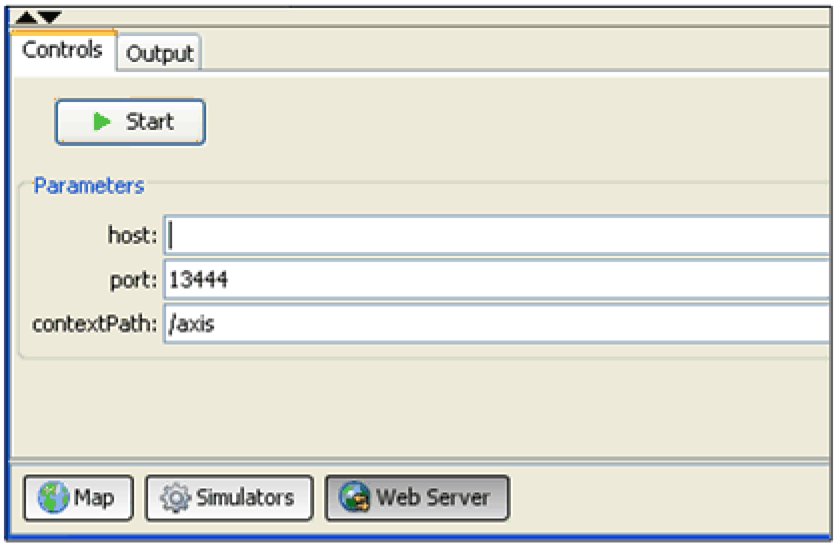
Configuring a Web Server for HTTP Testing

The **Web Server** button offers configuration and output for a simulated HTTP server. This simulator is required to run traffic over HTTP based protocols like MM7.

Set up and start a web server simulator:

1. Connect to a Services Gatekeeper implementation.
2. Click the **Web Server** button at the bottom of the Network Simulator panel. The Web Server Controls tab appears. Figure 2–12 shows the **Web Server Controls** tab.

Figure 2–12 The Web Server Controls Tab



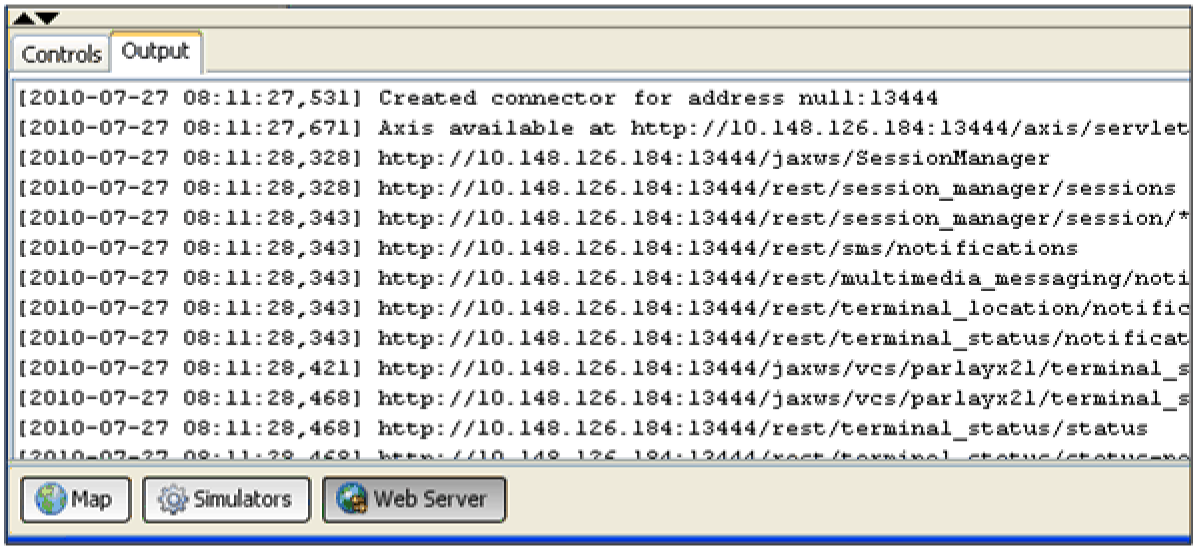
host:
port: 13444
contextPath: /axis

3. Enter the **host** of the web server to use.
4. Enter a **port** for the web server to use.
5. Enter **contextPath** (`/axis` by default) for the web server to use.
6. Click **Start** to start your web server.

   The web server starts.
7. Click the **Output** tab and check for web server messages.

   Figure 2–13 shows an example **Controls** tab populated with web server messages.

Figure 2–13 The Web Server Output tab



```
[2010-07-27 08:11:27,531] Created connector for address null:13444
[2010-07-27 08:11:27,671] Axis available at http://10.148.126.184:13444/axis/servlet
[2010-07-27 08:11:28,328] http://10.148.126.184:13444/jaxws/SessionManager
[2010-07-27 08:11:28,328] http://10.148.126.184:13444/rest/session_manager/sessions
[2010-07-27 08:11:28,343] http://10.148.126.184:13444/rest/session_manager/session/*
[2010-07-27 08:11:28,343] http://10.148.126.184:13444/rest/sms/notifications
[2010-07-27 08:11:28,343] http://10.148.126.184:13444/rest/multimedia_messaging/noti
[2010-07-27 08:11:28,343] http://10.148.126.184:13444/rest/terminal_location/notific
[2010-07-27 08:11:28,343] http://10.148.126.184:13444/rest/terminal_status/notificat
[2010-07-27 08:11:28,421] http://10.148.126.184:13444/jaxws/vcs/parlayx21/terminal_s
[2010-07-27 08:11:28,468] http://10.148.126.184:13444/jaxws/vcs/parlayx21/terminal_s
[2010-07-27 08:11:28,468] http://10.148.126.184:13444/rest/terminal_status/status
```

Configuring and Testing Service-Level Agreements

SLAs are XML files that you use to control your partners' access to the services that Network Gatekeeper manages. For details on SLAs, see *Accounts and SLAs Guide*, another document in this set.

To help you manage SLAs, the PTE includes an SLA Browser, which displays SLAs, and an SLA Editor, which you use to change tags and validation. In a test environment, changing details multiple times for various iterations of testing is common, and these tools free you to focus on setting values.

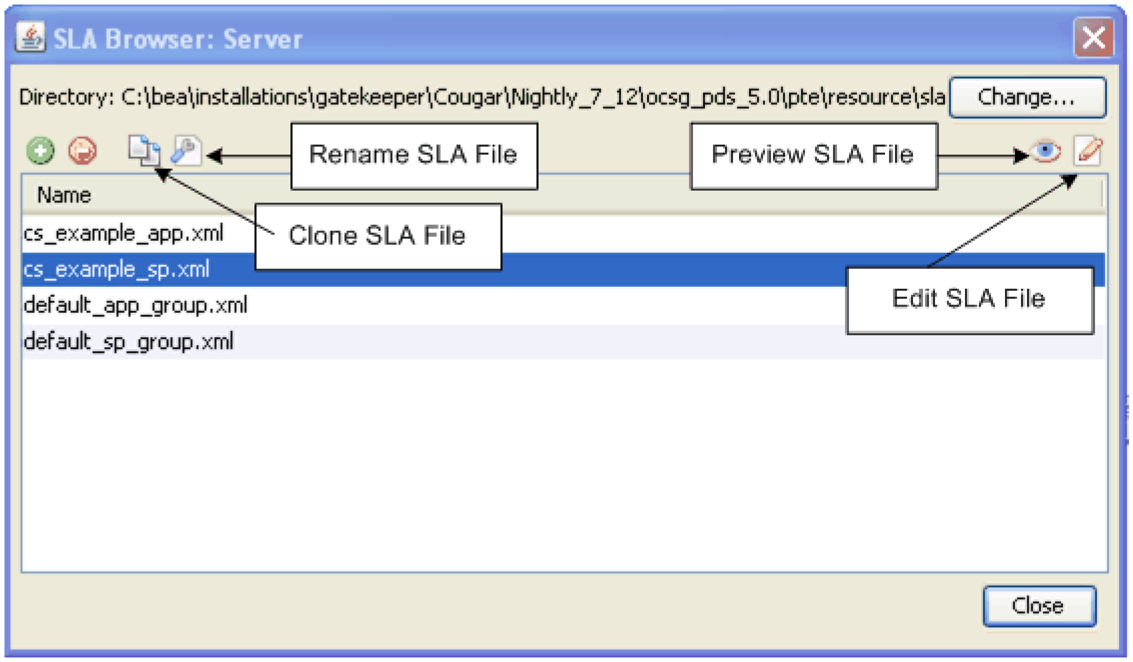
To Access the SLA Manager:

1. Connect to a Services Gatekeeper implementation.
2. In the tools selection panel, click **Server**
3. Click the **MBean** sub-tab.
4. Click **Connect**.
5. Pull down the **Tools** menu from the top of the PTE, and select **SLA Manager**.

   The SLA Manager appears displaying the example SLAs available in the default SLA directory: *Middleware_Home*/**ocsg_pds_5.0/pte/resource/sla**.

Figure 2–14 shows an example **SLA Browser** with SLAs available, and the various **SLA Browser** tools highlighted.

Figure 2–14 The SLA Browser

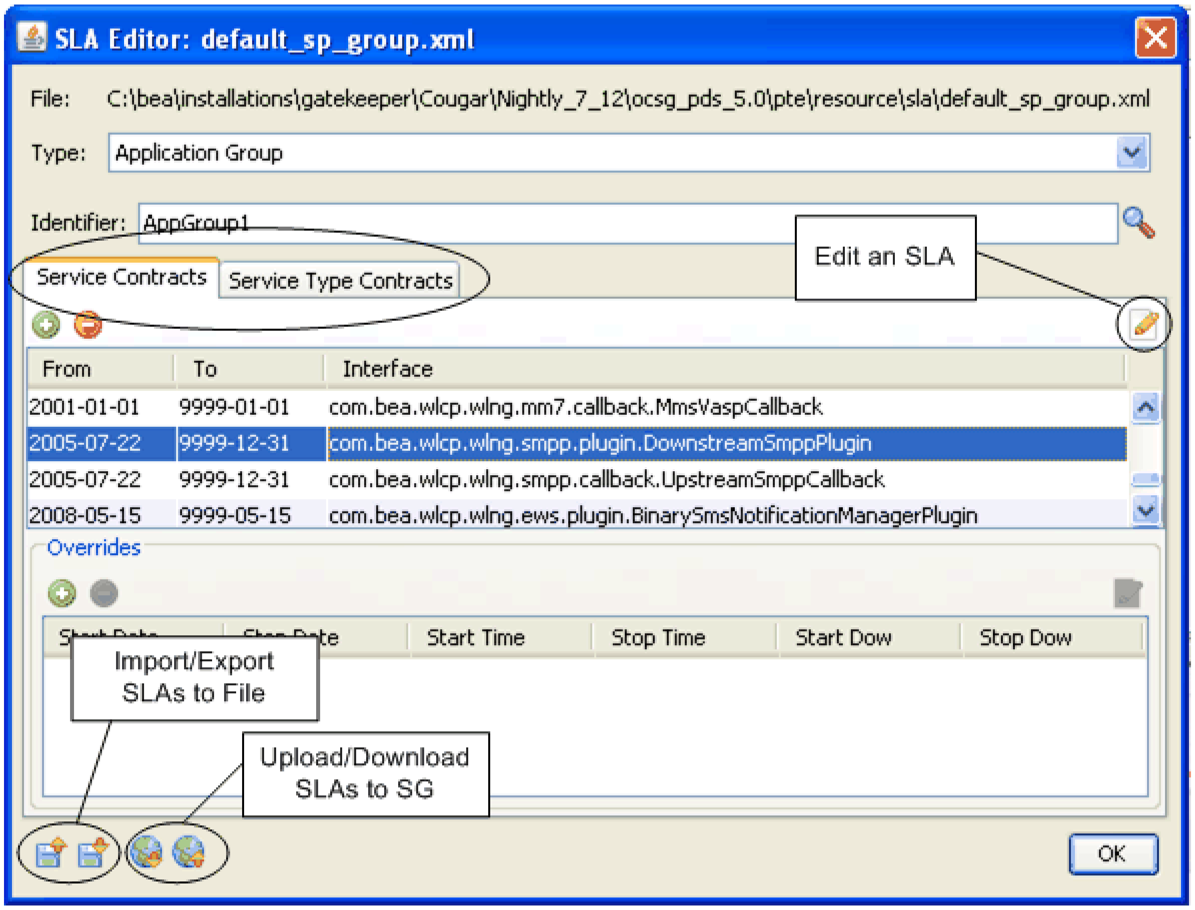


The example SLAs model the various options for SLA construction. To display a different SLA file, click **Change** and select it using the file browser that appears. To create a new SLA, click the Plus button in the upper left corner of the **SLA Browser** window. You can also delete or rename SLAs from the same area.

To view a SLA XML file, select it, then click the eye icon in the upper right corner of the pane. To edit an SLA, select it and click the pencil icon in the upper right corner.

The **SLA Editor** window appear. Figure 2–15 shows the **SLA Editor** window with its controls highlighted.

Figure 2–15 The SLA Editor


SLA Editor: default_sp_group.xml
Edit an SLA
Import/Export SLAs to File
Upload/Download SLAs to SG
Service Contracts
Service Type Contracts
Overrides
OK

File: C:\bea\installations\gatekeeper\Cougar\Nightly_7_12\ocsg_pds_5.0\pte\resource\sla\default_sp_group.xml

Type: Application Group

Identifier: AppGroup1

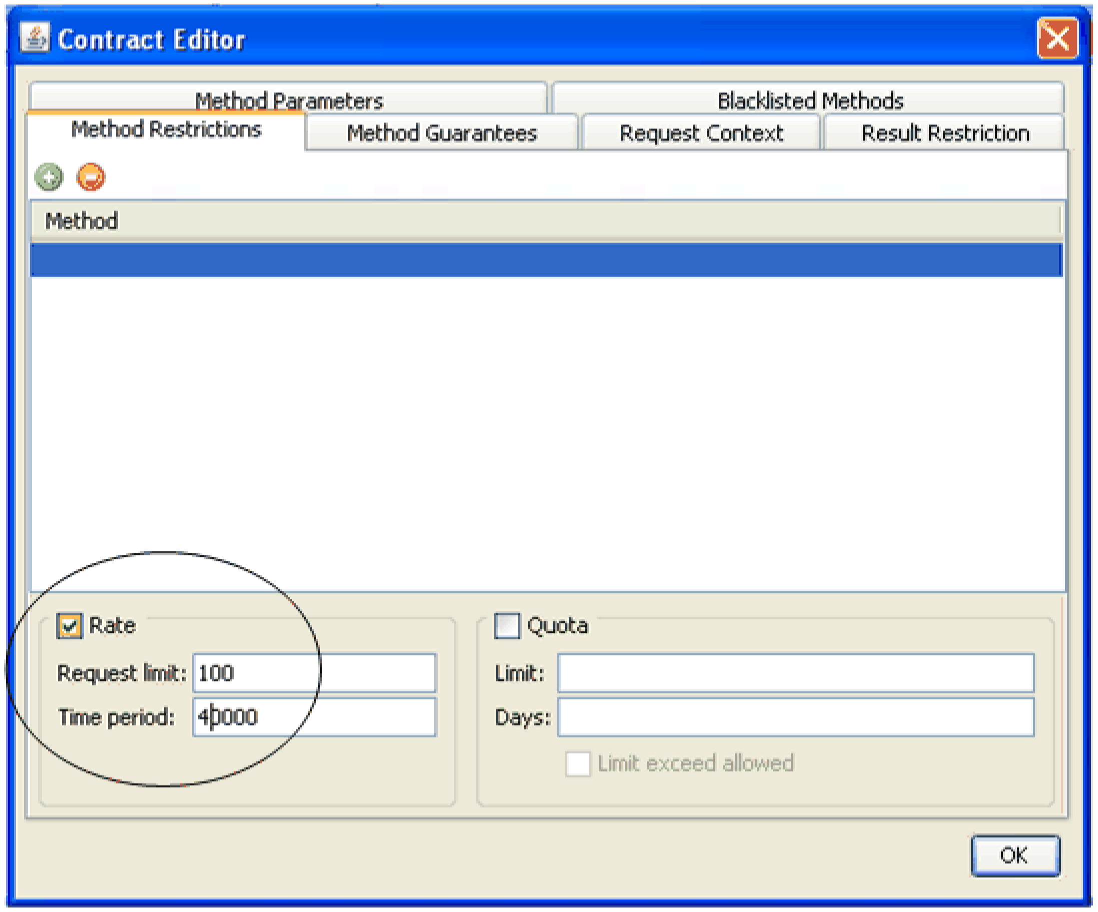
From	To	Interface
2001-01-01	9999-01-01	com.bea.wlcp.wlng.mm7.callback.MmsVaspCallback
2005-07-22	9999-12-31	com.bea.wlcp.wlng.smpp.plugin.DownstreamSmppPlugin
2005-07-22	9999-12-31	com.bea.wlcp.wlng.smpp.callback.UpstreamSmppCallback
2008-05-15	9999-05-15	com.bea.wlcp.wlng.ews.plugin.BinarySmsNotificationManagerPlugin

Start Date	Stop Date	Start Time	Stop Time	Start Dow	Stop Dow

Select the SLA **Type** from the dropdown menu and specify the group identifier. Use the import and export icons on the bottom left to import an SLA from the file system or to save changes. Use the upload and download icons on the bottom left to upload the SLAs to, or download them from Services Gatekeeper.

You edit **Service Contracts** and **Service Type Contracts** using the tabs in the upper window, and edit any **Overrides** in the lower. To edit a Service Contract, click it and the **Contract Editor** window appears. Figure 2–16 shows the **Contract Editor** window and the elements available to add or change.

Figure 2–16 The SLA Contract Editor



☑ Rate

Request limit: 100

Time period: 40000

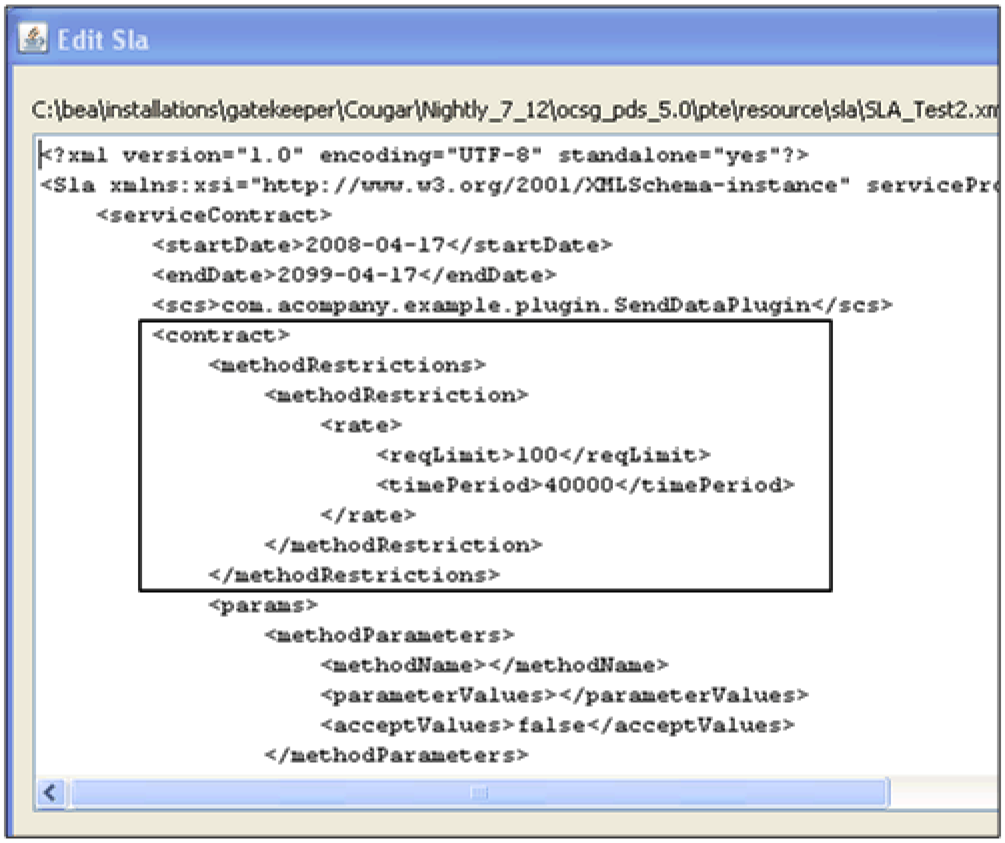
The editable tags appear as tabs at the top of the window. Make any changes and click **OK** to save them and close the window. For more information on these tags, see the “Defining Service Provider Group and Application Group SLAs” chapter in *Accounts and SLAs Guide*, a separate document in this set.

Figure 2–16 shows a new rate method restriction being added to SLA_test1.xml. Click **OK** to save your changes.

Click **OK** once again (on Figure 2–15) to finish.

To preview your edits in XML format, click the Eye icon at the top left of the SLA Browser (Figure 2–14). The **Preview SLA** window opens. See Figure 2–17.

Figure 2–17 The Preview SLA window


Edit Sla
C:\bea\installations\gatekeeper\Cougar\Nightly_7_12\ocsg_pds_5.0\pte\resource\sla\SLA_Test2.xm

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<Sla xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" servicePr
    <serviceContract>
        <startDate>2008-04-17</startDate>
        <endDate>2099-04-17</endDate>
        <scs>com.acompany.example.plugin.SendDataPlugin</scs>
        <contract>
            <methodRestrictions>
                <methodRestriction>
                    <rate>
                        <reqLimit>100</reqLimit>
                        <timePeriod>40000</timePeriod>
                    </rate>
                </methodRestriction>
            </methodRestrictions>
            <params>
                <methodParameters>
                    <methodName></methodName>
                    <parameterValues></parameterValues>
                    <acceptValues>false</acceptValues>
                </methodParameters>
```

The Method Restriction rate limit that was added in Figure 2–17 is shown outlined in red.

When you have completed your edits, click the **Close** button on the **SLA Browser** window.

Monitoring Budget Use

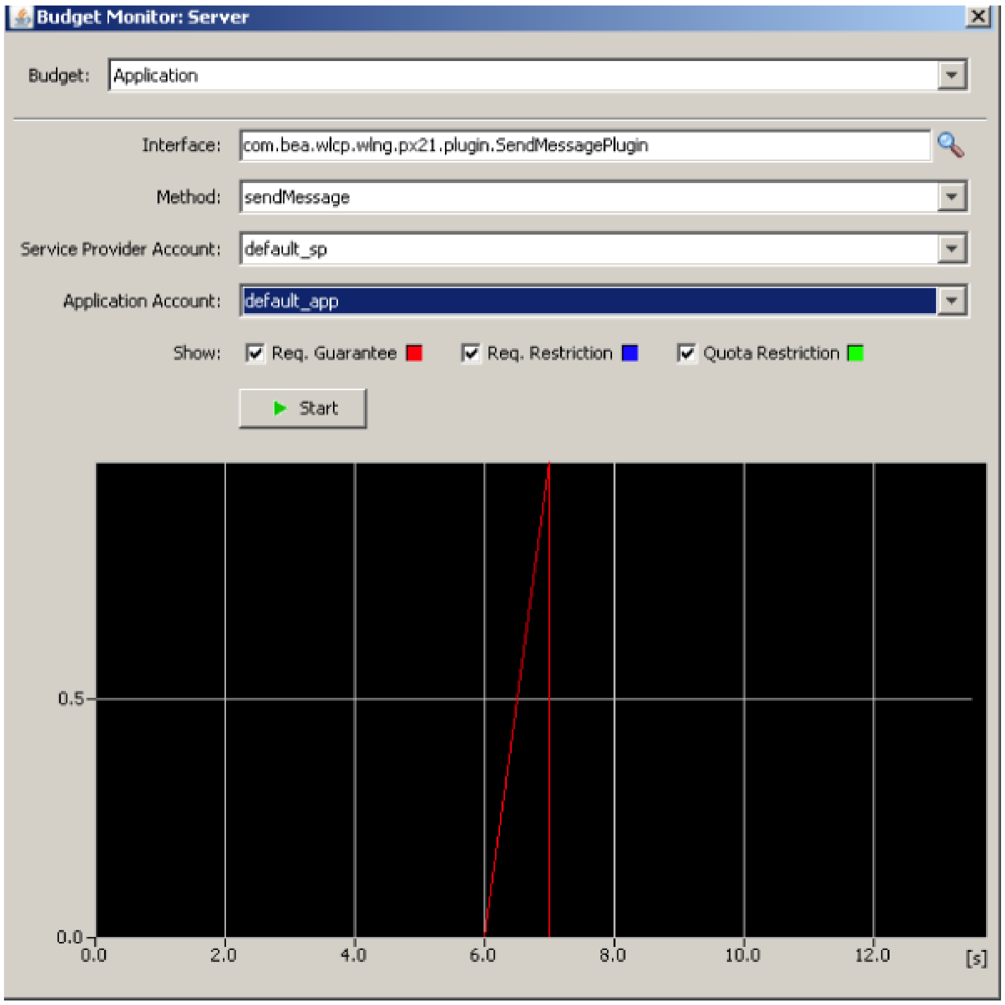
Budgets measure the level of access an application has to Services Gatekeeper over time. For details o n budgets, see “Managing and Configuring Budgets” in *System Administrator’s Guide*, another document in this set for details.

You must create instances of certain communication services to use them in Services Gatekeeper. For these communication services, only Service Types that have been instantiated show up in the **Selector** panel.

To monitor budget use:

1. Connect to a Services Gatekeeper implementation.
2. In the Tools Selection panel, select the **Server**.
3. From menu bar at the top left of the PTE GUI, select the **Tools** menu, and then **Budget Monitor**. The Budget Monitor window appears. Figure 2–18 shows the **Budget Monitor** window.

Figure 2–18 The Budget Monitor window



Budget: Application

Interface: com.bea.wlcp.wlng.px21.plugin.SendMessagePlugin

Method: sendMessage

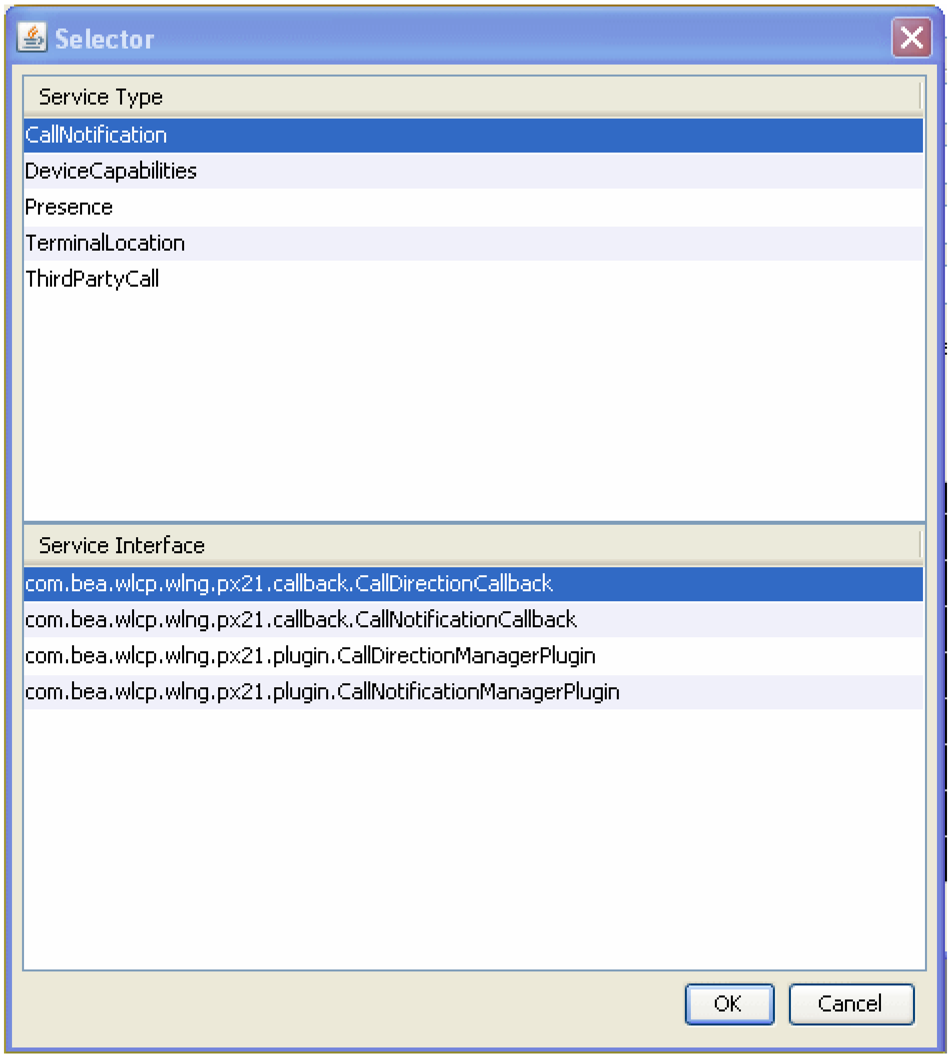
Service Provider Account: default_sp

Application Account: default_app

Show: [✓] Req. Guarantee 🟥 [✓] Req. Restriction 🟦 [✓] Quota Restriction 🟩

4. From the **Budget** drop-down list, select a type of budget to monitor.
5. If you selected an **Application** or **Service Provider**, do the following:
   a. The Selector window appears. Figure 2–19 shows the **Selector** window populated with service types and service interfaces.
   b. Select the **Service Type** and a **Service Interface** to monitor.
   c. Click **OK**. The **Selector** window closes and the **Budget Monitor** window reappears.

Figure 2–19 The Selector Window



Service Type
CallNotification
DeviceCapabilities
Presence
TerminalLocation
ThirdPartyCall

Service Interface
com.bea.wlcp.wlng.px21.callback.CallDirectionCallback
com.bea.wlcp.wlng.px21.callback.CallNotificationCallback
com.bea.wlcp.wlng.px21.plugin.CallDirectionManagerPlugin
com.bea.wlcp.wlng.px21.plugin.CallNotificationManagerPlugin

6. Select a **Method** and its associated **Service Provider Account** from the lists.
7. Click **Start**.

The X-axis indicates time in seconds and the Y-axis the amount of budget that is available. The number of units in the Y-axis depends on values assigned in the SLA for the selected budget. Rates, quotas, and restrictions can all be mapped.

3 Adding and Testing Custom Client Modules

This chapter explains how to extend the PTE by adding and testing custom client modules. Client modules serve as the application-facing interfaces for communication services. Client modules are displayed in the PTE GUI when you select the **Clients** item in the tools selection panel. An example unit test is included with this release that you can use as a model for your own customizations.

Adding Custom PTE Client Modules to the PTE

For instructions on how to create and deploy new client modules (application-facing), network protocol simulators (network-facing), and communication services, see "Extending the ATE and PTE" in *Platform Development Studio Developer's Guide*, another document in this set.

Testing New or Changed Client Modules

This section explains how to verify that your new or modified client modules are functioning correctly.

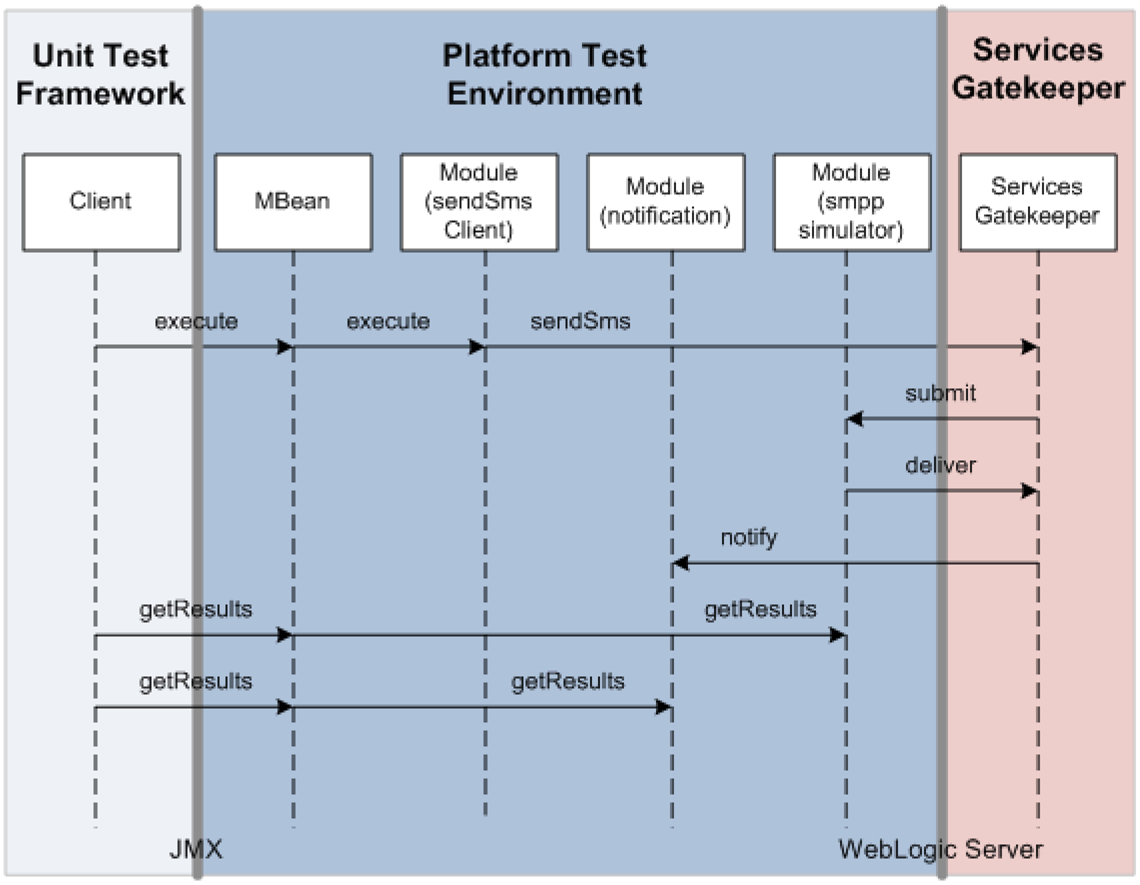
Understanding Communication Service Unit Tests

Unit tests are an essential part of creating or changing a Services Gatekeeper communication service. You add known data to the system, run tests on it, and confirm that the test results are what you expect, all programatically.

You use the Unit Test Framework to create PTE unit tests. Its main tools include:

- The `OCSGBaseTestCase` abstract class (located in *Middleware_Home*/**ocsg_pds_5.0/lib/wlng/pte_api.jar**) manages the mechanics of using JMX and JMS to connect to the PTE.
- The **test.properties** file (located in *Middleware_Home*/**ocsg_pds_5.0/lib/wlng/pte_api.jar**) defines the commonly changed properties of the test.

Figure 3–1 An Example SMS Unit Test Workflow



The workflow of the SMS unit test is as follows:

1. The test client calls `execute` on the PTE Module Management MBean. The mechanics of the JMX call are taken care of by the base class.
2. The MBean calls `execute` on the specified module; in this case, `sendSMS`. This request includes a request for delivery receipts.
3. The `sendSMS` module sends the request to Services Gatekeeper.
4. Services Gatekeeper processes the request and submits it to the network simulator module; in this case, the SMPP module.
5. The simulator module returns a delivery receipt to Services Gatekeeper
6. Services Gatekeeper sends the receipt on to the Notification module (which represents the client Web Service implementation).
7. The test client retrieves the result of Services Gatekeeper's `submit` from the SMPP simulator.
8. The test client retrieves the delivery receipt from the Notification module.

Understanding the Example Unit Test

To help you understand how unit tests work, PTE includes an example unit test (**TestSendData.java**), which tests an example communication service using the example clients and simulator. The default location for this file is *Middleware_*

Home/**ocsg_pds_5.0/example/unit_test/src/oracle/ocsg/et/example/TestSendData.java**. Example 3–1 shows the **TestSendData.java** file example communication service test.

Example 3–1 A Unit Test for the Example Communication Service

```
package oracle.ocsg.et.example;
import oracle.ocsg.pte.api.OCSGBaseTestCase;
import java.util.List;
import java.util.Map;
/**
 * This class illustrates how to use the Unit Test Framework to
 * test the Communication Service Example. A few things are assumed before
 * running this class:
 * - the OCSG should be running and configured properly
 * - the CS example should be deployed and ready
 * Note: this example uses also the wlngJmx to be able to access the OCSG
 * MBeans to ask the CS example plugin to connect to the Netex simulator.
 *
 */
public class TestSendData extends OCSGBaseTestCase {

  private static final String SEND_DATA_MBEAN =
"com.bea.wlcp.wlng.pte:group=traffic,name=example_application_initiated";
  private static final String NETWORK_TRIGGERED_MBEAN =
"com.bea.wlcp.wlng.pte:group=traffic,name=example_network_triggered";
  private static final String NOTIF_MANAGER_MBEAN =
"com.bea.wlcp.wlng.pte:group=client,name=example_notif_manager";
  private static final String NOTIF_MBEAN =
"com.bea.wlcp.wlng.pte:group=client,name=example_notif";
  private static final String NETEX_SIMULATOR_MBEAN =
"com.bea.wlcp.wlng.pte:group=netex,name=example_simulator";
 // Make sure the InstanceName correspond to the instance name provided
 // in the PluginManager Mbean when creating the plugin instance.
 private static final String EXAMPLE_PLUGIN_MBEAN =
          "com.bea.wlcp.wlng:AppName=example_enabler#4.0," +
                  "InstanceName=example_1," +
"Type=com.acompany.plugin.example.netex.management.ExampleMBean";

  public TestSendData() throws Exception {
  }

  @Override
  protected void setUp() throws Exception {
    super.setUp();
    ocsgJmx.open("localhost", 8001, "weblogic", "weblogic");
    start(NETEX_SIMULATOR_MBEAN);
  }

  @Override
  protected void tearDown() throws Exception {
    ocsgJmx.close();
    stop(NETEX_SIMULATOR_MBEAN);
    super.tearDown();
  }

  public void testSendData() throws Exception {
    assertTrue(isRunning(NETEX_SIMULATOR_MBEAN));
    resetStatistics(NETEX_SIMULATOR_MBEAN);

    ocsgJmx.invokeOperation(EXAMPLE_PLUGIN_MBEAN, "connect");
    String data = "Hello at " + System.currentTimeMillis();
    String to = "tel:1234";

    putParameter(SEND_DATA_MBEAN, "url",
"http://localhost:8001/example/SendData");
    putParameter(SEND_DATA_MBEAN, "data.data", data);
    putParameter(SEND_DATA_MBEAN, "data.address", to);

    start(SESSION_MBEAN);
    assertTrue(isRunning(SESSION_MBEAN));

    execute(SEND_DATA_MBEAN);

    Thread.sleep(2000);

    stop(SESSION_MBEAN);

    Map<String,String> stats = listAllStatistics(NETEX_SIMULATOR_MBEAN);
    System.out.println("Simulator statistics: "+stats);
    assertEquals("MessageReceived", "1", stats.get("MessageReceived"));
    assertEquals("MessageSent", "0", stats.get("MessageSent"));
  }

  public void testSendNetworkTriggeredData() throws Exception {
    String data = "Hello at " + System.currentTimeMillis();
    String from = "tel:1234";
    String to = "tel:7878";
    String correlator = "1234567890";

    assertTrue(isRunning(NETEX_SIMULATOR_MBEAN));
    resetStatistics(NETEX_SIMULATOR_MBEAN);

    ocsgJmx.invokeOperation(EXAMPLE_PLUGIN_MBEAN, "connect");

    start(SESSION_MBEAN);
    assertTrue(isRunning(SESSION_MBEAN));

    putParameter(NOTIF_MANAGER_MBEAN, "url",
"http://localhost:8001/example/NotificationManager");
    putParameter(NOTIF_MANAGER_MBEAN, "start.address", "tel:7878");
    putParameter(NOTIF_MANAGER_MBEAN, "start.correlator", correlator);
    putParameter(NOTIF_MANAGER_MBEAN, "start.endpoint",
"http://localhost:13444/jaxws/NetexNotification");
    putParameter(NOTIF_MANAGER_MBEAN, "stop.correlator", correlator);
    start(NOTIF_MANAGER_MBEAN);

    start(NOTIF_MBEAN);

    putParameter(NETWORK_TRIGGERED_MBEAN, "data", data);
    putParameter(NETWORK_TRIGGERED_MBEAN, "fromAddress", from);
    putParameter(NETWORK_TRIGGERED_MBEAN, "toAddress", to);

    clearResults(NOTIF_MBEAN);

    execute(NETWORK_TRIGGERED_MBEAN);

    Thread.sleep(2000);

    stop(NOTIF_MBEAN);
    stop(NOTIF_MANAGER_MBEAN);
    stop(SESSION_MBEAN);

    Map<String,String> stats = listAllStatistics(NETEX_SIMULATOR_MBEAN);
    System.out.println("Simulator statistics: "+stats);
    assertEquals("MessageReceived", "0", stats.get("MessageReceived"));
    assertEquals("MessageSent", "1", stats.get("MessageSent"));

    List<Map<String,String>> results = listAllResults(NOTIF_MBEAN);
    System.out.println("Notification results: "+results);
    assertEquals("Correlator", correlator, results.get(0).get("Correlator"));
    assertEquals("From Address", from, results.get(0).get("From Address"));
    assertEquals("Data", data, results.get(0).get("Data"));
  }

}
```

Creating and Running a New Unit Test

To create and run a PTE unit test:

Note: The PTE should be running in Console (non-GUI) mode when you run your test. See "Starting the PTE" for instructions on starting the PTE in Console mode.

1. Create any necessary client or simulator modules for the PTE using the required SPI and XML configuration files. See "Adding Custom PTE Client Modules to the PTE" for details.
2. Implement a test class based on the `OCSGBaseTestCase` abstract class.
3. Add the test class to the PTE. For details, see “Extending the ATE and PTE” in *Platform Development Studio Developer’s Guide*, another document in this set.
4. Start the PTE and make sure the modules are correctly loaded. For details on starting PTE, see Starting the PTE. If your new module is correctly loaded, it appears in the PTE GUI.
5. Run the test class. See Chapter 2, "Using the PTE to Test Services Gatekeeper" for details.

Figure 3–1 shows the workflow of a typical unit test; in this case an SMS communication service unit test.