

Oracle® Service Architecture Leveraging Tuxedo (SALT)

Product Overview

12c Release 1 (12.1.1)

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ORACLE®

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Oracle SALT Overview

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- [Configuring Web Services with Oracle SALT](#)
- [Oracle SALT Supported Standards](#)
- [What's Next?](#)

Understanding Oracle SALT

Oracle Service Architecture Leveraging Tuxedo (SALT) is an add-on product option for Oracle Tuxedo, enabling Oracle Tuxedo applications to participate in SOA environments.

Oracle SALT allows external Web services applications to invoke Oracle Tuxedo services as Web services, and Oracle Tuxedo applications to invoke external Web services. Oracle SALT does not require any coding to achieve this.

Understanding Oracle SALT Web Services

Oracle SALT complies with standard Web service specifications (SOAP 1.1, SOAP 1.2, and WSDL 1.1), allowing Oracle SALT to interoperate with other Web service products and Oracle SALT Overview development toolkits. Oracle Tuxedo applications can easily integrate with Web services applications using Oracle SALT.

What Are Web Services?

Web services are a set of functions packaged into a single entity made available to other systems on a network. They can be shared and used as a component of distributed Web-based applications. The network can be a corporate intranet or the Internet. Other systems, such as customer relationship management (CRM) systems, order-processing systems, and other existing back-end applications, can call these functions to request data or perform an operation. Because Web services rely on standard technologies which most systems provide, they are an excellent means for connecting distributed systems together.

The software industry has evolved toward loosely coupled service-oriented applications that interact dynamically over the Web. The applications break down the larger software system into smaller modular components, or shared services. These services can reside on different computers and can be implemented by vastly different technologies. They are packaged and made accessible using standard Web protocols, such as XML and HTTP.

Web services share the following properties that make them easily accessible from heterogeneous environments:

- Web services are accessed using widely supported Web protocols such as HTTP.
- Web services describe themselves using an XML-based description language.

Web services communicate with clients (both end-user applications or other Web services) through simple XML messages that can be produced or parsed by virtually any programming environment or manually, if necessary.

Why Use Oracle SALT?

Oracle SALT is a native Oracle Tuxedo Web service integration solution. It reduces Oracle Tuxedo/Web service integration costs and decreases conversion processes that may exist with other solutions for accessing Oracle Tuxedo services. It enables seamless connectivity between Oracle Tuxedo applications and external Web service applications.

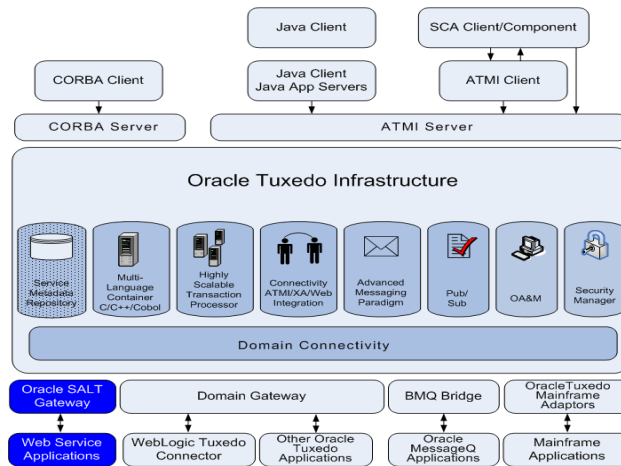
Oracle SALT allows existing Oracle Tuxedo services (inbound) to be easily exposed as Web services without additional programming tasks. It also allows you to create native Oracle Tuxedo applications that access external Web services (outbound) transparently.

Major Web services benefits include:

- Interoperability among distributed applications that span diverse hardware and software platforms
- Easy, widespread access to applications using Web protocols
- A cross-platform, cross-language data model (XML) that facilitates developing heterogeneous distributed applications

Figure 1 illustrates how the Oracle SALT gateway is used in the Oracle Tuxedo framework.

Figure 1 Oracle SALT Gateway/Oracle Tuxedo Infrastructure



Understanding Oracle SALT Web Application Server

Oracle SALT provides an HTTP server plug-in (`mod_tuxedo` for Apache/Oracle HTTP Server and `tux_nsapi` for iPlanet) that forwards HTTP requests to Tuxedo services. Replies from Oracle Tuxedo services are then sent back to HTTP clients such as web browsers by the same plug-in.

In addition, Oracle SALT provides a System Server (`WEBHNDLR`) that is capable of running PHP, Python and Ruby web applications, such as Symfony (PHP), Django (Python) and Rails (Ruby).

HTTP requests can also be handled directly by regular C/C++ Tuxedo servers using the CGI-like format which is counterpart to the HTTP server plug-in

Oracle SALT Web Application server provides the following support:

- Apache 2 Web Server Plug-in Support

Web Server plug-ins in Apache 2 format, for interfacing Apache HTTP server 2, Oracle HTTP Server or iPlanet Server and Oracle Tuxedo-based web applications.

- Web Gateway Interface Support

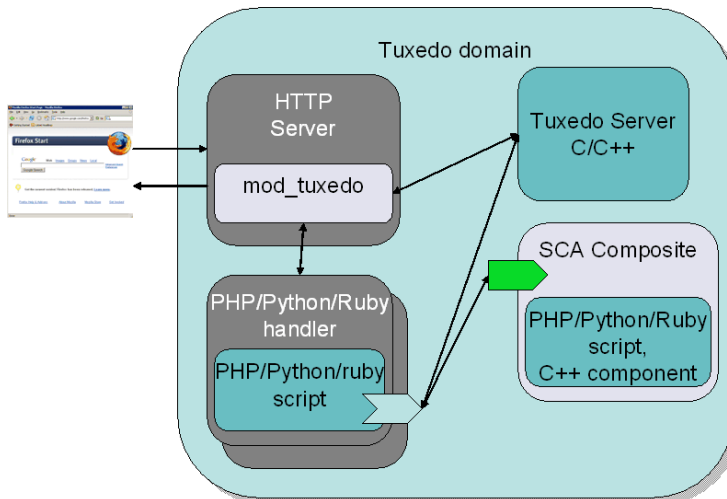
Support of a Web Gateway Interface in order to develop Oracle Tuxedo services that generate dynamic HTML pages.

- Web Server Plug-in Support

Web Server plug-ins in Apache 2 format, for interfacing Apache HTTP server 2, Oracle HTTP Server or iPlanet Server and Oracle Tuxedo-based web applications.

Figure 2 shows a high-level view of the Oracle SALT Web application server architecture.

Figure 2 Oracle SALT Web Application Server Architecture



Oracle SALT Release History

Oracle SALT is the latest add-on to the Oracle Tuxedo product family. Developed in 2006, Oracle SALT is designed to provide a seamless Oracle Tuxedo solution of integrating Oracle Tuxedo applications and standard Web services application.

- [Release 1.1](#)
- [Release 2.0](#)
- [Release 10g R3 \(10.3\)](#)
- [Release 11g R1 \(11.1.1.1.0\)](#)
- [Release 11g R1 \(11.1.1.2.0\)](#)
- [Release 11g R1 \(11.1.1.2.2\)](#)
- [Release 12c R1 \(12.1.1\)](#)

Release 1.1

Release 1.1 is the initial Oracle SALT release. Made available in 2006, SALT 1.1 introduced the following major features:

- Inbound Service Support
Permits Web service applications to invoke native Oracle Tuxedo services
- HTTP and HTTP over SSL Transport Support
- Asynchronous and Reliable Messaging Support

Release 2.0

The Oracle SALT 2.0 release incorporates significant enhancements based on the SALT 1.1 release. SALT 2.0 introduced the following features:

- Outbound Service Support
- Extended WS-* Standards Support
- SOAP Message Transmission Optimization Mechanism Support (MTOM)
- Oracle Tuxedo TPFAIL Support for Web Services
- Extensible Data Type Mapping and Message Conversion
- Multiple Encoding Support
- Configuration-Driven Deployment
- Leveraging the Oracle Tuxedo Service Metadata Repository

- Data Type Mapping and Message Conversion
- Asynchronous and Reliable Messaging
- Web Service Security Support

Release 10g R3 (10.3)

Oracle SALT 10g Release 3 (10.3) introduced the following features:

- Service Component Architecture (SCA) Programming

SCA provides a new programming model that aims at simplifying component re-use and seamless communications between components. The SALT 10g Release 3 (10.3) SCA container enables new programming model and leverages the most valued Oracle Tuxedo features (such as reliability, availability, scalability, and performance). Oracle SALT 10g Release 3 (10.3) introduces the following SCA features:

- Client-side binding for SCA invocations over ATMI and SOAP
 - Server-side binding for serving SCA requests made over ATMI and SOAP
 - Client-side binding for SCA invocations from Java environments
 - Development and runtime tools: Commands to build and deploy SCA clients and servers as well as commands for runtime administration. For more information, see the [SALT 10g Release 3 \(10.3\) Command Reference Guide](#).
 - Authentication and authorization for SCA services
 - Global transactions
 - Thread-safe SCA/SDO clients and servers
 - SCDL schema validation
 - Support for simple data types
 - Support for complex data types using SDO
 - Automatic data transformation to/from Oracle Tuxedo buffer types
 - Support for multi-byte characters using multiple encoding
- Service Contract Discovery

Automatically discover service contract information at run time. The generated information can be put into metadata repository automatically or to a file which can then be loaded manually into the metadata repository using the `tmloadrepos` utility. For more

information, see [Configuring an Oracle SALT Application](#) in the *Oracle Salt Administration Guide*.

- Access Log for All Incoming Requests

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

Release 11g R1 (11.1.1.1.0)

Oracle SALT Release 11g R1 (11.1.1.1.0) introduced the following features:

- Python and Ruby Support

Python and Ruby support in SALT SCA provides a simple SCA client API for each language to perform SCA calls from Python or Ruby client programs, and an SCAHOST system server to allow access to Python or Ruby components. Python, Ruby or C++ components can now call or be called to/from other Python, Ruby or C++ components.

For more information, see [Oracle SALT SCA Programming](#) in the Oracle SALT Programming guide.

- SCA Structure support

Provides additional C++ structure functionality for improved performance.

For more information, see [Oracle SALT SCA Programming](#) in the Oracle SALT Programming guide.

- Scatuxgen Metadata Generation Tool

The Scatuxgen Metadata Generation Tool parses C++ interfaces as used to develop SCA components for the SCA runtime functionality introduced in SALT 10gR3. It generates Oracle Tuxedo metadata repository interface data, and optionally a Web Services Definition File (WSDL) document.

For more information, see the [Oracle SALT Command Reference Guide](#).

- WS-TX Support

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

Outbound XA transactions are transparently propagated outside of an Oracle Tuxedo domain and mapped one-to-one to WS-TX transactions. Inbound WS-TX transactions are propagated into an Oracle Tuxedo domain and mapped to XA transactions.

For more information see, [WS-TX Support](#) in Oracle SALT Interoperability.

Release 11g R1 (11.1.1.2.0)

Oracle SALT 11g Release 11g R1 (11.1.1.2.0) introduced the following features:

- **SOCKS Proxy Support**

SOCKS proxy support provides a configurable element associated to outbound endpoints and allows configuring a SOCKS server address that will proxy outbound connections according to the SOCKS V4 and V5 protocol.

Inbound support is not be necessary as SOCKS proxies incoming connections without listening endpoints being aware of it. For more information, see the [Oracle SALT Deployment File Reference](#) in the Oracle SALT Reference Guide.

The `wsdlcvt` command is enhanced to connect to a SOCKS proxy server. For more information, see the [Oracle SALT Command Reference](#) in the Oracle Salt Reference Guide.

Release 11g R1 (11.1.1.2.2)

Oracle SALT 11g Release 11g R1 (11.1.1.2.2) introduces the following features:

- **Apache 2 Web Server Plug-in Support**

Web Server plug-ins in Apache 2 format, for interfacing Apache HTTP server 2, Oracle HTTP Server or iPlanet Server and Oracle Tuxedo-based web applications.

- **Web Gateway Interface Support**

Support of a Web Gateway Interface in order to develop Oracle Tuxedo services that generate dynamic HTML pages.

- **PHP, Python and Ruby Web Scripts Support**

- PHP scripts supported directly
- Python scripts supported via WSGI
- Ruby scripts supported via Rack
- PHP, Python and Ruby applications using most web frameworks such as Zend framework, Symfony, Django or Rails run as-is in an Oracle Tuxedo environment.

- **PHP SCA Script Support**

Support for PHP scripts as SCA client and SCA components, for SOA integration.

For more information, see the [Oracle SALT Administration Guide](#).

Release 12c R1 (12.1.1)

Oracle SALT 12c Release 12c R1 (12.1.1) introduces the following features:

- Web Services Configuration Tool

Oracle SALT 12c provides an HTTP-based configuration tool to expose existing Oracle Tuxedo services as Web services without manually editing configuration files. It allows you to learn service definitions for existing Oracle Tuxedo services, edit service definitions in metadata repository, and create Web services definitions and SALTDEPLOY files through an easy to use graphical user interface.

For more information, see Enabling the Oracle SALT Configuration Tool in the [Oracle Salt Configuration Guide](#).

- Security Assertion Markup Language (SAML) Single Sign-On (SSO) Support

Provides the ability to recognize an SAML token inside a SOAP message request received by the Oracle SALT Web Services Gateway (GWWS). Based on the token contents, GWWS makes the decision to grant or deny access to Oracle Tuxedo resources.

For more information, see Configuring Oracle Tuxedo Web Services/Configuring Security Features in the [Oracle SALT Configuration Guide](#).

- New Data Type Support

Supports nested View32 data types. It also supports mapping of additional View and View32 primitive types to and from XML.

For more information, see [Data Type Mapping and Message Conversion](#) in the Oracle SALT Programming Guide.

Note: Oracle SALT Python, Ruby, and SCA features are now part of Oracle Tuxedo 12c Release 1 (12.1.1). For more information, see [Oracle Tuxedo 12c Release \(12.1.1\) documentation](#).

Oracle SALT Components

Oracle SALT consists of the following major components:

- [Oracle SALT Gateway \(GWWS\)](#)
- [WSDL Assistant Utilities](#)

- [SCA Container APIs and Utilities](#)
- [Oracle SALT Web Server Plug-ins](#)

Oracle SALT Gateway (GWWS)

The Oracle SALT provided Oracle Tuxedo system server (GWWS), connects with other Web service applications via SOAP over HTTP/S protocol. The GWWS server acts as an Oracle Tuxedo gateway process and is managed in the same manner as general Oracle Tuxedo system servers. Each GWWS server has bi-directional (inbound/outbound) capability. The GWWS server:

- accepts SOAP requests from Web service applications and issue Oracle Tuxedo native calls to Oracle Tuxedo services.
- accepts Oracle Tuxedo ATMI requests and issues SOAP calls to Web Service applications.

You can have multiple GWWS instances in one Oracle Tuxedo domain. The same functionality for multiple GWWS instances is provided by specifying the same Oracle SALT configuration to improve throughput and failover protection. You can also group multiple GWWS instances in different configuration files for different purposes.

When the GWWS server boots, it loads the specified SALT configuration file and Oracle Tuxedo service contract information from the Oracle Tuxedo Service Metadata Repository.

The GWWS server also acts as a simple HTTP Web server for WSDL document and XML Schema file download.

WSDL Assistant Utilities

The Web Services Description Language (WSDL) is an XML-based specification that describes a Web service. A WSDL document describes Web service operations, input and output parameters, and how a client application connects to the Web service. Oracle SALT provides two utilities (`tmwsdlgen` and `wsdlcvt`) to map Oracle Tuxedo applications and Web Service WSDL descriptions.

WSDL Generator from Oracle Tuxedo Definitions

When using Oracle SALT to publish Oracle Tuxedo services as Web services, you do not need to compose a WSDL document manually; it is automatically generated as part of the SALT Web service development process. The generated WSDL document can be integrated using Web service development tools, or can be published to a UDDI server.

There are two ways to obtain a WSDL document:

- Use [tmwsdlgen](#) (the WSDL document file generating utility).
- Download the GWWS server generated WSDL document via HTTP(S).

WSDL Converter to Oracle Tuxedo Definitions

To support external Web Service applications, external WSDL documents need to be converted. The Oracle SALT conversion utility, [wsdlcvt](#), converts external WSDL documents to Oracle Tuxedo specific definition files (SALT Web Service Definition file, Oracle Tuxedo Service Metadata Repository Definition file and FML32 Field Table Definition file).

The SALT Web Service Definition file can be imported into a SALT Deployment file and utilized by a particular GWWS server. The Oracle Tuxedo Service Metadata Repository Definition file and FML32 Field Table Definition file provide service interface descriptions for Oracle Tuxedo client programming.

Oracle SALT Use Cases

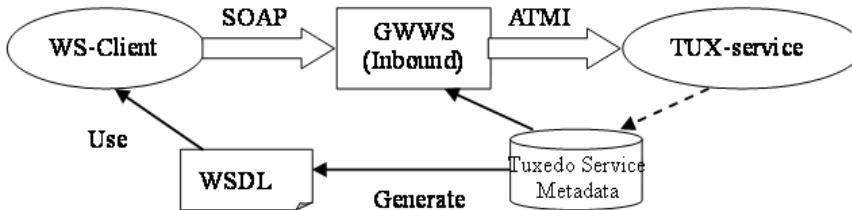
The following sections describe the most common Oracle SALT Web services use cases:

- [Use Case 1: Exposing Native Oracle Tuxedo Services as Web Services](#)
- [Use Case 2: Invoking Web Services from Oracle Tuxedo Applications](#)
- [Use Case 3: Connecting Oracle Tuxedo Domains Using SOAP Protocol](#)
- [Use Case 4: SAML Single Sign-On](#)

Use Case 1: Exposing Native Oracle Tuxedo Services as Web Services

Native Oracle Tuxedo services can be exposed as Web services using standard Web service SOAP protocol. The GWWS server accepts SOAP requests through HTTP/S and then converts them into Oracle Tuxedo ATMI calls. SALT generates a WSDL document that describes the open standard Web service interfaces for Oracle Tuxedo services. The Oracle Tuxedo Service Metadata Repository is used to define Oracle Tuxedo service contract information. This is an “inbound” use case.

[Figure 3](#) illustrates a generic inbound Web service call.

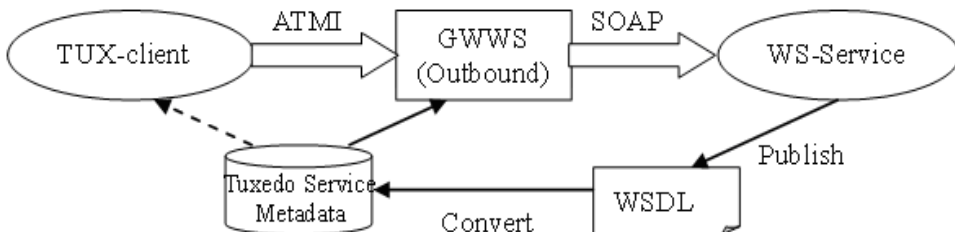
Figure 3 Exposing Oracle Tuxedo Services as Web Services (Inbound)

Use Case 2: Invoking Web Services from Oracle Tuxedo Applications

Web service applications can be imported into an Oracle Tuxedo domain, advertised as Oracle Tuxedo services through the GWWS server, and invoked from Oracle Tuxedo applications. SALT converts and maps each `wsdl:operation` as a particular Oracle Tuxedo service. The GWWS server advertises the mapped services (called SALT proxy services), and accepts Oracle Tuxedo ATMI requests from Oracle Tuxedo applications.

The Oracle Tuxedo Service Metadata Repository is used to store converted Oracle Tuxedo service contract information and helps Oracle Tuxedo programmers understand what type of Oracle Tuxedo buffers are expected for the imported SALT proxy services. This is an “outbound” use case.

Figure 4 illustrates a generic outbound Web service call.

Figure 4 Invoking Web Services from Oracle Tuxedo Applications (Outbound)

Use Case 3: Connecting Oracle Tuxedo Domains Using SOAP Protocol

Oracle SALT also allows you to connect two *different* Oracle Tuxedo domains using GWWS servers as an alternative to using /T domain. The GWWS server in the calling domain works in an outbound direction, the GWWS server in the receiving domain works in an inbound direction.

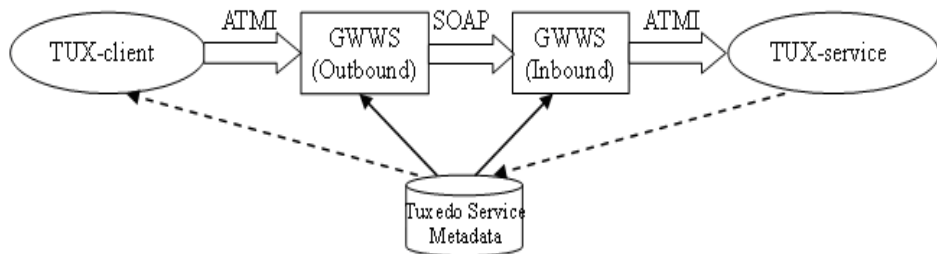
The receiving Oracle Tuxedo domain must propagate the Oracle Tuxedo service definition to the calling Oracle Tuxedo domain. This means that the calling domain Oracle Tuxedo Service Metadata Repository must contain the Oracle Tuxedo service definition file that runs in the receiving domain.

Note: This should be set up *manually*. The Oracle Tuxedo Service Metadata Repository infrastructure does not currently provide automatic propagation between Oracle Tuxedo domains.

The WSDL document is not required. Oracle SALT provides simple configurations to allow two GWWS servers to work together for domain connectivity using SOAP protocol without needing to exchange WSDL documents.

Figure 5 illustrates how to use Oracle SALT to connect two domains.

Figure 5 Connecting Two Oracle Tuxedo Domains with SOAP protocol



Two GWWS servers should not be used to create connections within the *same* Oracle Tuxedo domain, see Figure 6. Also, a single GWWS server cannot connect to itself, see Figure 7.

In either scenario, the GWWS server advertises the same Oracle Tuxedo services which are already advertised by other application servers. This might result in *dead-loop* service dispatching.

WARNING: It is strongly advised that you carefully plan and configure your Oracle SALT application to avoid these scenarios.

Figure 6 Two GWWS Servers Making a Connection Within the Same Oracle Tuxedo Domain

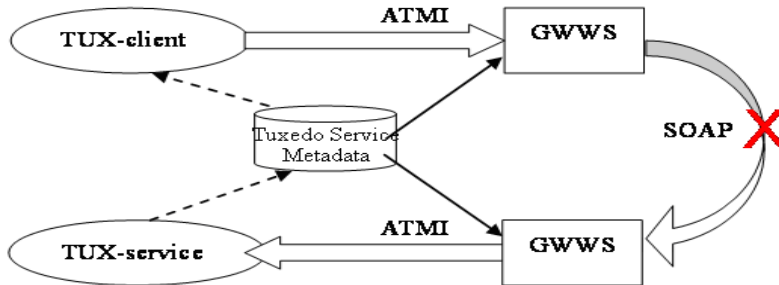
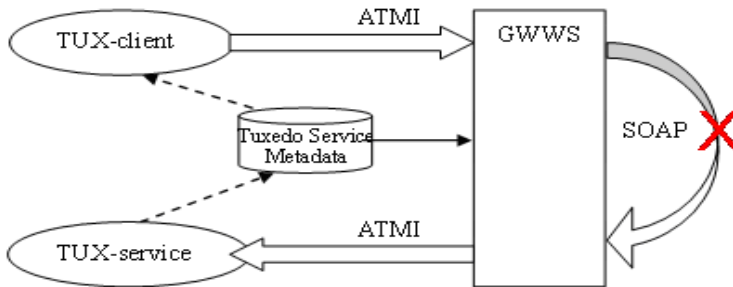


Figure 7 Single GWWS Server Making a Connection to Itself



Use Case 4: SAML Single Sign-On

The Web Service client user agent, usually a web browser, attaches a Security token with valid SAML assertions to a SOAP message using WSS: SOAP Message Security by placing assertion elements inside a <wss:Security> header and sending the request to GWWS as shown in [SAML Single Sign-OnFigure 8](#)

Figure 8 SAML Single Sign-On

Oracle SALT will not accept these assertions unless it has successfully validated the integrity of the assertions. The only supported subject confirmation method is currently sender-vouches, in this case Oracle SALT must also have TRUST relationship with the attesting entity. When all these requirements are satisfied, the user is granted access to Oracle Tuxedo resources.

An Oracle WebLogic Server instance security can be a SAML issuer. In a WLS environment the typical intermediary is Web Service, but a web browser can also be an intermediary. To establish a TRUST relationship with an attesting entity, GWWS must have access to either a shared secret with attesting entity or its public key.

The SAML issuer is the party creating the SAML assertion, and "intermediary" is the party that attaches the SAML security token to the SOAP message before it is forwarded to GWWS.

The general flow is as follows:

1. Client sends request to WLS.
2. WLS authenticates the client.
3. WLS forwards all necessary login information to the issuer (WLS Web Server).
4. WLS Web Server issuer creates the SAML assertions and returns to WLS.
5. WLS attaches the SAML security token with SAML assertion to the SOAP message and forwards it to GWWS.

6. GWWS returns the reply/fault to WLS.

7. WLS returns the reply/fault to client.

There is a trust relationship between GWWS and WLS/issuer.

Configuring Web Services with Oracle SALT

The following steps are used typically when you configure Web services using Oracle SALT:

1. Configure Inbound Oracle Tuxedo Services
 - a. Define Oracle Tuxedo application services using the [Oracle Tuxedo Service Metadata Repository](#).
 - b. Compose one or more Oracle SALT Web Service Definition Files (WSDF).
2. Configure Outbound Web Services
 - a. Convert an external WSDL document into Oracle Tuxedo the following components: SALT Web Service Definition file, Oracle Tuxedo Service Metadata Repository Definition file, and FML32 Field Table Definition file.
 - b. Resolve potential naming conflicts for the auto-generated service names and FML32 field names.
3. Load all Oracle Tuxedo Service Definitions into the Oracle Tuxedo Service Metadata Repository using [tmloadrepos](#).
4. Compose the Oracle SALT Deployment File for both inbound and outbound services.
5. Add the [TMMETADATA](#) and [GWWS](#) servers to your Oracle Tuxedo [UBBCONFIG](#) file.
6. Boot the Oracle Tuxedo application.

Invoking Oracle Tuxedo Services Using Web Service Client Toolkits

1. Client end user downloads the WSDL document file from the GWWS server.
2. Client end user generates client-side stubcode from the WSDL document file with a SOAP development kit.
3. Generate client-side program.
4. Run the client to invoke the Web service with SOAP messages.

Invoking Web Services Using Oracle Tuxedo Programming Interfaces

1. Create an Oracle Tuxedo client/server program according to the generated Oracle Tuxedo Service Metadata Definition file. The client program can be written in any Oracle Tuxedo supported client-side programming language (C/C++, Java, COBOL, .NET, and so on).
2. Compile and deploy the Oracle Tuxedo client/server program.
3. Run the Oracle Tuxedo application to invoke the external Web service applications.

Oracle SALT Supported Standards

Oracle SALT support the following standards:

- [SOAP Standards](#)
- [SCA and SDO Standards](#)
- [Single Sign-On Standards](#)

SOAP Standards

- Standards for transmitting data and Web service invocation calls between the Web service and the user of the Web service.
 - SOAP 1.1
For more information, see:
<http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>
 - SOAP 1.2
For more information, see:
<http://www.w3.org/TR/soap12-part0/>
 - SOAP with Attachment
For more information, see:
<http://www.w3.org/TR/SOAP-attachments>
 - MTOM
For more information, see:
<http://www.w3.org/TR/soap12-mtom/>
- A standard for client applications to find a registered Web service and to register a Web service.

- UDDI 2.0

For more information, see:

<http://uddi.org/pubs/ProgrammersAPI-V2.04-Published-20020719.htm>

- Standards for describing the Web service to clients so they can invoke it.

- WSDL 1.1

For more information, see:

<http://www.w3.org/TR/2001/NOTE-wsdl-20010315>

- WS-Policy

For more information, see:

<http://specs.xmlsoap.org/ws/2004/09/policy/ws-policy.pdf>

<http://specs.xmlsoap.org/ws/2004/09/policy/ws-policyattachment.pdf>

- Standards for Web Service infrastructure.

- WS-Addressing

For more information, see:

<http://www.w3.org/Submission/2004/SUBM-ws-addressing-20040810/>

- WS-ReliableMessaging

For more information, see:

<http://specs.xmlsoap.org/ws/2005/02/rm/ws-reliablemessaging.pdf>

<http://specs.xmlsoap.org/ws/2005/02/rm/WS-RMPolicy.pdf>

- Standards for Web Service Security.

- WS-Security 1.0

For more information, see:

<http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf>

<http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0.pdf>

<http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0.pdf>

- WS-Security 1.1

For more information, see:

<http://www.oasis-open.org/committees/download.php/16790/wss-v1.1-spec-os-SOAPMessageSecurity.pdf>

<http://www.oasis-open.org/committees/download.php/16782/wss-v1.1-spec-os-UsernameTokenProfile.pdf>
<http://www.oasis-open.org/committees/download.php/16785/wss-v1.1-spec-os-x509TokenProfile.pdf>

- Standards for Web Service Transactions.
 - WS-Coordination 1.0
For more information, see:
<http://schemas.xmlsoap.org/ws/2004/10/wscor/>
 - WS-AtomicTransaction 1.0
For more information, see:
<http://schemas.xmlsoap.org/ws/2004/10/wsat/>

Single Sign-On Standards

- Single Sign-On Standards
 - SAML 1.1
For more information, see: <http://www.oasis-open.org/standards#samlv1.1>
 - SAML 2.0
For more information, see: <http://www.oasis-open.org/standards#samlv2.0>

What's Next?

After becoming familiar with the Oracle SALT Product Overview, refer to the following topics for installing, configuring, and running Web services using the SALT product:

- Install the Oracle SALT product.
For an explanation of how to install the product, refer to the [Oracle SALT Installation Guide](#)
- Configure and administer the Oracle SALT product.
For an explanation of how to configure and administer the product, refer to the [Oracle SALT Administration Guide](#)
- Program Web Services using the Oracle SALT.

For an explanation of how to program with SALT, refer to the [*Oracle SALT Programming Guide*](#)

- Oracle SALT Web service samples

For Oracle SALT Web service application samples, refer to the [*Oracle SALT Sample Guide*](#).