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# IBM WebSphere Application Server V8

## Policy sets and bindings for service references



This presentation describes support for policy sets and bindings for service references included in IBM WebSphere Application Server V8.

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First, an overview of the policy set attachment support for web service references, then details on the administration and configuration.

Section

## ***Overview***

This section will cover the policy set attachments for service references.

## What are policy sets?

- A policy type represents the configuration of a specific quality of service (QoS)
  - Policy types include:
    - WS-Security
    - WS-Addressing
    - WS-ReliableMessaging
    - WS-Transaction
    - HTTP Transport
    - SSL Transport
    - JMS Transport
- Policy types are grouped together into named collections called policy sets
  - Pre-defined policy sets include:
    - WSAddressing default
    - WS-I RSP
    - LTPA SecureConversation
- Policy sets simplify configuration by allowing the reuse of configurations across multiple applications – configure once and use again
  - Configure the settings for the policy types in a policy set and reuse the policy set
  - Copy an existing policy set and modify settings instead of starting from scratch
  - Export or import an existing policy set to or from another system
- A policy set is “attached” to an application resource to enable the policy settings

A policy set is a named collection of policies, with each policy representing a quality of service, such as WS-Security or WS-ReliableMessaging. Policy sets simplify configuration by allowing reuse of configurations across multiple assets, including enterprise applications, WS-Notification service clients, and Service Component Architecture (SCA) applications. You can configure the policies in a policy set and attach the set to one or more web services to enable the qualities of service. You can copy an existing policy set and modify settings instead of starting from scratch, and you can export and import a policy set from another system. For ease of use, WebSphere provides a set of pre-configured policy sets which can be used as-is or copied and modified. Policy sets are only supported for JAX-WS web services. They are not supported for JAX-RPC web services.

The design of policy sets allows for the abstraction of the configuration from the business logic to provide a clean separation of roles. The domain experts define and configure the qualities of service using policy sets, and the developer's focus on the business logic by defining the web services and by selecting the pre-defined policy sets to enable the qualities of service.

## What is a service reference?

- Service reference
  - A logical name for a web service
  - A reference to a web service that can be invoked by a client application.
- Example:

```
@WebServiceRef(name="service/MyService1")
private MyService svc1;

@WebServiceRef(name="service/MyService2")
private MyService svc2;
```

The Web Services for Java EE (JSR 109) V1.3 specification allows application developers to define references to external web services in an application by using "logical" names called web service references. The references are included in the deployment descriptor, `webservices.xml`. A web service can have one or more service references, and a client application can use a service reference to invoke a web service.

In this example, two service references are defined for the `MyService` web service: `MyService1` and `MyService2`.

## What is new in V8?

- In prior releases, policy set and bindings attached to a service client were also applied to the service references
- In V8, each service reference can have its own policy and binding configuration
  - Can specify a different policy set and binding for a service reference
  - Can specify that a service reference has no policy
  - Default behavior is that a service reference inherits the policy set attachment from the service client
- Allows a single client to invoke one service in different ways through the use of multiple service references, for example:
  - One service reference could be configured to use security tokens, while another is configured without security
  - Each service reference could specify a different endpoint URL, allowing the client to direct requests to a specific server depending upon the reference used

A resource can be attached to a policy set to enable the policy settings for that resource, and multiple resources can be attached to the same policy set. A policy set can be attached at the application, service, endpoint, or operation level. A policy set attachment has inheritable behavior based on the hierarchical relationship of application, web service, endpoint and operation. For example, if a policy set is attached to an application, all the web services, endpoints and operations inherit the application level policy attachments, unless a policy set is also attached at a lower level in the hierarchy.

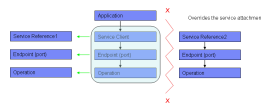
At runtime, during the initialization of a web service, during web service client calls, and when processing web service messages with the trust service, the resource in question is compared against the defined attachments for that resource type to see which policy set attachment, if any, should be used for that resource. If an exact match is found, then that policy set attachment will be used. However, if no exact match is found, the nearest match in hierarchical order, if any, will be used.

Before WebSphere V8.0, service references, including the endpoints and operations, were automatically assigned the same policy set attachments as the corresponding service client. In V8.0, a service reference still inherits the policy set attachment of the service client by default, but the user can specify a different policy set and binding for the service reference. In addition, the user can specify that a service reference should have no policy, even when a policy set is assigned to the service client.

Attaching different policy sets to different service references for the same service allows a client to invoke the service in different ways. For example, each service reference could be configured with a different endpoint URL, allowing the client to direct requests to a specific server, based on the specified service reference.

## Policy set inheritance for service references

- Service Reference1 inherits the policy set attachment of the service client
- Service Reference2 overrides the service client policy set attachment



The figure shows an example of a service client with two service references. Service Reference1 uses the default behavior in which it inherits the policy set attachment of the service client. The endpoint and operation of Service Reference1 will have the same policy set as the corresponding levels of the service client. Service Reference2 is configured to override the service client policy set attachment. Service Reference2 can either have no policy set or be attached to a different policy set than the service client. The endpoint and operation for Service Reference2 can be attached to a policy set or inherit the policy set attachment of the service reference.

## ***Administration and configuration***

This section provides an overview of the administration and configuration for policy set attachments for service references. Examples are shown for attaching policy sets and bindings to a service reference in the WebSphere Application Server administrative console.



## Enterprise applications

Enterprise Applications ?

**Enterprise Applications**

Use this page to manage installed applications. A single application can be deployed onto multiple servers.

⊕ Preferences

Start Stop Install Uninstall Update Rollout Update Remove File Export Export DDL Export File

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Select	Name	Application Status
You can administer the following resources:		
<input type="checkbox"/>	<a href="#">DefaultApplication</a>	➔
<input type="checkbox"/>	<a href="#">JaxWSServicesSamples</a>	➔
<input type="checkbox"/>	<a href="#">PlantsByWebSphere</a>	➔
<input type="checkbox"/>	<a href="#">SamplesGallery</a>	➔
<input type="checkbox"/>	<a href="#">ivtApp</a>	➔
<input type="checkbox"/>	<a href="#">jaxwseib3mcwar11</a>	➔
<input type="checkbox"/>	<a href="#">query</a>	➔
Total 7		

In the WebSphere Application Server administrative console, go to the Enterprise Application collections panel to display the list of installed applications. Click an individual application to view the application details.

## Application details

- Click service clients to view service references

<p><b>General Properties</b></p> <p>* Name  <input type="text" value="jaxwselj3mccvar11"/></p> <p>Application reference validation  <input type="text" value="Issue warnings"/></p> <p><b>Detail Properties</b></p> <ul style="list-style-type: none"> <li>▪ <a href="#">Target specific application status</a></li> <li>▪ <a href="#">Startup behavior</a></li> <li>▪ <a href="#">Application binaries</a></li> <li>▪ <a href="#">Class loading and update detection</a></li> <li>▪ <a href="#">Request dispatcher properties</a></li> <li>▪ <a href="#">JASPI provider</a></li> <li>▪ <a href="#">Custom properties</a></li> <li>▪ <a href="#">View Deployment Descriptor</a></li> <li>▪ <a href="#">Last participant support extension</a></li> </ul> <p><b>References</b></p> <ul style="list-style-type: none"> <li>▪ <a href="#">Shared library references</a></li> <li>▪ <a href="#">Shared library relationships</a></li> </ul> <p> <input type="button" value="Apply"/> <input type="button" value="OK"/> <input type="button" value="Reset"/> <input type="button" value="Cancel"/> </p>	<p><b>Modules</b></p> <ul style="list-style-type: none"> <li>▪ <a href="#">Manage Modules</a></li> <li>▪ <a href="#">Metadata for modules</a></li> <li>▪ <a href="#">Display module build Ids</a></li> </ul> <p><b>Web Module Properties</b></p> <ul style="list-style-type: none"> <li>▪ <a href="#">Session management</a></li> <li>▪ <a href="#">Context Root For Web Modules</a></li> <li>▪ <a href="#">JSP and JSF options</a></li> <li>▪ <a href="#">Virtual hosts</a></li> </ul> <p><b>Enterprise Java Bean Properties</b></p> <ul style="list-style-type: none"> <li>▪ <a href="#">Default messaging provider references</a></li> </ul> <p><b>Web Services Properties</b></p> <ul style="list-style-type: none"> <li>▪ <a href="#">Service clients</a></li> <li>▪ <a href="#">Service client policy sets and bindings</a></li> </ul> <p><b>Database Profiles</b></p> <ul style="list-style-type: none"> <li>▪ <a href="#">SQLJ profiles and pureQuery bind files</a></li> </ul>
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Under Web Services Properties, click Service clients to view the service clients and service references. Service references are not displayed on the Service client policy sets and bindings page. That page shows all the endpoints and operations for each service client, so the information would be confusing and unwieldy if it also contained all the endpoints and operations for every service reference for every service client.

## Service clients

- Service references are listed under each service client – click service or reference to view

Service / Service Reference	Type	Module
You can administer the following resources:		
<a href="#">CheckWSEJB3Bean1Service</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">service/CheckWSEJB3Bean19Service</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">CheckWSEJB3Bean15Port</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">CheckWSEJB3Bean12Service</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">CheckWSEJB3Port13</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">CheckWSEJB3Bean14Service</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">resource/CheckWSEJB3Bean17Service</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">CheckWSEJB3Bean16Service</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">CheckWSEJB3Bean2Service</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">service/CheckWSEJB3Bean20Service</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
<a href="#">resource/CheckWSEJB3Bean18Service</a>	JAX-WS	<a href="#">jaxwseib3mcwar11.war</a>
Total 11		

The Service clients page displays the list of service clients in the application. Indented under each service client are the service references. As with service clients, the hover text for each service reference displays the format of the resource name.

As in previous releases, the following format is supported for service client resources: “WebService:/module:{namespace}serviceName/endpointName/operationName”.

Service reference resource names will be specified as name-value pairs to allow for flexibility. Since a service reference contains many parts in the hierarchy and some parts can be optional, it may be difficult for users to specify correctly the service reference name as a concatenated string. The name-value pair format will also be allowed for service and service client resource strings. The format of the resource name is “type=T,module=A,component=B,service=C,serviceRef=D,endpoint=E,operation=F”. All parts of the string are optional except for type, which is required. Note that if any lower level component is specified, then all higher level components must also be specified. For example, if an operation is specified, then the service and endpoint must also be specified. The component field only applies to EJBs.

## Service client policy set attachments

### General Properties

#### Service client

```
{http://service1.jaxwsejb3.managedclients
/}CheckWSEJB3Bean1Service
```

### Additional Properties

- Application: [jaxwsejb3mcrwar11](#)
- Module: [jaxwsejb3mcrwar11.war](#)

### Policy Set Attachments

Define policy and binding configuration for the service reference, endpoints, or operations. Access the Policies Applied link to indicate whether to use and how to acquire policy from the service provider. Complete the attachment by providing system-specific configuration when you assign the appropriate binding.

#### Preferences

Select	Service/Endpoint/Operation	Attached Client Policy Set	Policies Applied	Binding
You can administer the following resources:				
<input type="checkbox"/>	CheckWSEJB3Bean1Service	<a href="#">WS-I RSP</a>	<a href="#">Client only</a>	<a href="#">Client sample</a>
<input type="checkbox"/>	CheckWSEJB3Bean1Port	WS-I RSP (inherited)	Client only (inherited)	Client sample (inherited)
<input type="checkbox"/>	check	<a href="#">SSL WSTransaction</a>	Client only	Default
<input type="checkbox"/>	result	WS-I RSP (inherited)	Client only (inherited)	Client sample (inherited)
Total 4				

This chart shows the policy set attachments for the CheckWSEJB3Bean1Service and its endpoints and operations. Note that the service client is attached to the WS-I RSP policy set and uses the Client sample binding. The endpoints and operations inherit that policy set attachment with the exception of the check operation, which is attached directly to the SSL WSTransaction policy set.

## Service reference policy set attachments (1 of 3)

- Service reference inherits policy set attachments of service client by default

**General Properties**

Service reference

**Additional Properties**

- Application: [iaxwseib3mcwar11](#)
- Module: [iaxwseib3mcwar11.war](#)
- Service client: [http://service1.iaxwseib3.managedclients/1/CheckWSEJB3Bean1Service](#)

**Policy Set Attachments**

Define policy and binding configuration for the service reference, endpoints, or operations. Click **Inherit** to clear all individual settings and use policy set attachments defined by the service client. Click **Override** to define separate policy sets and bindings.

**Preferences**

Select	Service Reference/Endpoint/Operation	Attached Client Policy Set	Policies Applied	Binding
You can administer the following resources:				
<input type="checkbox"/>	service/CheckWSEJB3Bean19Service	WS-I RSP (inherited)	Client only (inherited)	Client sample (inherited)
<input type="checkbox"/>	CheckWSEJB3Bean1Port	WS-I RSP (inherited)	Client only (inherited)	Client sample (inherited)
<input type="checkbox"/>	check	SSL WSTransaction (inherited)	Client only (inherited)	Default (inherited)
<input type="checkbox"/>	result	WS-I RSP (inherited)	Client only (inherited)	Client sample (inherited)
Total 4				

This chart shows the policy set attachments for one of the service references for the CheckWSEJB3Bean1Service. To reach this page in the administrative console, click the name of the service reference on the service clients page. This service reference is using the default inheritance behavior. Note that each resource of the service reference inherits the policy set attachment of the corresponding resource of the service client. For example, the endpoint inherits the WS-I RSP policy set, whereas the check operation inherits the SSL WSTransaction policy set attachment of the check operation of the service client.

## Service reference policy set attachments (2 of 3)

- Click **Override** to break policy set attachment link from service client

**General Properties**

Service reference

**Additional Properties**

- Application: [jaxwselib3mcwar11](#)
- Module: [jaxwselib3mcwar11.war](#)
- Service client: [http://service1.jaxwselib3.managedclients/1/Check.WSEJB3Bean1Service](#)

**Policy Set Attachments**

Define policy and binding configuration for the service reference, endpoints, or operations. Click **Inherit** to clear all individual settings and use policy set attachments defined by the service client. Click **Override** to define separate policy sets and bindings.

Preferences

Select	Service Reference/Endpoint/Operation	Attached Client Policy Set	Policies Applied	Binding
You can administer the following resources:				
<input type="checkbox"/>	Check.WSEJB3Bean1SPort	None	None	Not applicable
<input type="checkbox"/>	Check.WSEJB3Bean1Port	None	None	Not applicable
<input type="checkbox"/>	check	None	None	Not applicable
<input type="checkbox"/>	result	None	None	Not applicable
Total 4				

When the **Override** button is clicked, the service reference resources will have no policy set attachments, even though the service client is attached to a policy set.

## Service reference policy set attachments (3 of 3)

- Attach policy set and binding to service reference resources
- Click Inherit to inherit policy set attachment from service client
- Click the link in the Policies Applied column to change the applied policies setting

**General Properties**

Service reference

CheckWSEJB3Bean15Port

**Additional Properties**

- Application: [iaxwseib3mover11](#)
- Module: [iaxwseib3mover11.war](#)
- Service client: <http://service1.iaxwseib3.managedclients/CheckWSEJB3Bean1Service>

**Policy Set Attachments**

Define policy and binding configuration for the service reference, endpoints, or operations. Click **Inherit** to clear all individual settings and use policy set attachments defined by the service client. Click **Override** to define separate policy sets and bindings.

☑ Preferences

Inherit Override Attach Client Policy Set Detach Client Policy Set Assign Binding

Select	Service Reference/Endpoint/Operation	Attached Client Policy Set	Policies Applied	Binding
You can administer the following resources:				
<input type="checkbox"/>	CheckWSEJB3Bean15Port	<a href="#">LTPA WSSecurity default</a>	<a href="#">Client only</a>	<a href="#">Client sample</a>
<input type="checkbox"/>	CheckWSEJB3Bean1Port	LTPA WSSecurity default (inherited)	Client only (inherited)	Client sample (inherited)
<input type="checkbox"/>	check	LTPA WSSecurity default (inherited)	Client only (inherited)	Client sample (inherited)
<input type="checkbox"/>	result	LTPA WSSecurity default (inherited)	Client only (inherited)	Client sample (inherited)
Total 4				

After clicking the Override button, you can attach a policy set to a service reference or to its endpoints and operations. In this example, the service reference is attached directly to the LTPA WSSecurity default policy set and the Client sample binding. Each endpoint and operation inherits the policy set attachment of the service reference. You can optionally attach a different policy set to the endpoint or operations.

You can also click the link in the Policies Applied column to view or change the settings for how policies are applied. If the service reference is attached directly to a policy set, then the displayed values for this field are Client only or Client and provider. For an endpoint or operation, the value is not a link, and it is followed by the word inherited in parentheses. You can only view or change this setting if the service reference is not inheriting the policy set from the service client.

## Service reference WS-Policy properties

- Select the policies to be applied (client policy only or client and provider policy)
- Select the method of obtaining the provider policy (HTTP GET or WS-MetadataExchange request)

**Client WS-Policy Control Properties**

Apply the following policies:

Method to obtain provider policy:

HTTP GET request

Use the default request target

Specify request target

Attach a system policy set to the HTTP GET request

Policy set:

Binding:

WS-MetadataExchange request

Attach a system policy set to the WS-MetadataExchange request

Policy set:

Binding:

An application that is a web service client can obtain the policy configuration of a web service provider and use this information to establish a policy configuration that is acceptable to both the client and the service provider. In V8, this functionality is extended to service references. If a policy set is attached to the service reference, then the choices for the applied policy dropdown box are Client policy only and Client and provider policy. If no policy set is attached to the service reference, then the choices for the applied policy dropdown box are Inherit application attachment and Provider policy only. You can configure the method of obtaining the provider policy, either an HTTP GET request or a WS-MetadataExchange request.



## Service reference policy set attachments

- Both client and provider policies are now used for service reference

**General Properties**

Service reference

**Additional Properties**

- Application: [jaxwselib3mcar11](#)
- Module: [jaxwselib3mcar11.war](#)
- Service client: [http://service1.jaxwselib3.managedclients/1/CheckWSEJB3Bean1Service](#)

**Policy Set Attachments**

Define policy and binding configuration for the service reference, endpoints, or operations. Click **Inherit** to clear all individual settings and use policy set attachments defined by the service client. Click **Override** to define separate policy sets and bindings.

**Preferences**

Select	Service Reference/Endpoint/Operation	Attached Client Policy Set	Policies Applied	Binding
You can administer the following resources:				
<input type="checkbox"/>	CheckWSEJB3Bean1SPort	LTPA WSSecurity default	Client and provider	Client sample
<input type="checkbox"/>	CheckWSEJB3Bean1Port	LTPA WSSecurity default (inherited)	Client and provider (inherited)	Client sample (inherited)
<input type="checkbox"/>	check	LTPA WSSecurity default (inherited)	Client and provider (inherited)	Client sample (inherited)
<input type="checkbox"/>	result	LTPA WSSecurity default (inherited)	Client and provider (inherited)	Client sample (inherited)
Total 4				

Changes made in the Client WS-Policy Control Properties panel are reflected in the Policy Set Attachments list. In the example shown, both the client and provider policies will now be used for the service reference.

## ***Summary***

This section provides a summary of this presentation.

## Summary

- The new feature:
  - Provides the ability to specify policy set attachments for each service reference and its endpoints and operations
  - Allows configuration at a lower level of granularity
  - Allows flexibility to configure multiple service references differently

In WebSphere Application Server V8, you can specify a policy set and binding for a service reference that is different from the policy set attachment for the service. In addition, you can indicate to not attach a policy set to a service reference, even if a policy set is attached to the service. The default behavior is that a service reference, and its endpoints and operations, inherits the policy set attachment of the corresponding resources of the service. The new capability allows for more granularity and flexibility in configuring JAX-WS web services.

## References

- Information center documentation for IBM WebSphere Application Server V8

- Managing policy sets and bindings for service references using the wsadmin tool

[http://publib.boulder.ibm.com/infocenter/wasinfo/v8r0/index.jsp?topic=/com.ibm.websphere.nd.doc/info/ae/ae/txml\\_wbs\\_manageattachforservicerefs.html](http://publib.boulder.ibm.com/infocenter/wasinfo/v8r0/index.jsp?topic=/com.ibm.websphere.nd.doc/info/ae/ae/txml_wbs_manageattachforservicerefs.html)

- Managing policy sets and bindings for service references using the administrative console

[http://publib.boulder.ibm.com/infocenter/wasinfo/v8r0/index.jsp?topic=/com.ibm.websphere.nd.doc/info/ae/ae/twbs\\_jaxwsdetailclientserverref.html](http://publib.boulder.ibm.com/infocenter/wasinfo/v8r0/index.jsp?topic=/com.ibm.websphere.nd.doc/info/ae/ae/twbs_jaxwsdetailclientserverref.html)

- Service reference settings in the administrative console

[http://publib.boulder.ibm.com/infocenter/wasinfo/v8r0/index.jsp?topic=/com.ibm.websphere.nd.doc/info/ae/ae/uwbs\\_serviceclient3servref.html](http://publib.boulder.ibm.com/infocenter/wasinfo/v8r0/index.jsp?topic=/com.ibm.websphere.nd.doc/info/ae/ae/uwbs_serviceclient3servref.html)

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