



IBM Software Group

# IBM® WebSphere® Application Server V7

## *Web Services Policy Framework*



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This presentation explains the new Web services policy framework in WebSphere Application Server version 7.

## Agenda

- Explain the Web Services Policy Framework (WS-Policy) specification
- How to configure WS-Policy
- Web Services-Metadata Exchange



This presentation begins by explaining the specification behind the Web Services Policy Framework (WS-Policy). The presentation then discusses how to configure WS-Policy within WebSphere Application Server version 7, and briefly explains a related piece of technology called Web Services Metadata Exchange.

## Section

# ***WS-Policy***



This section describes the WS-Policy specification.

## WS-Policy overview

- The Web Services Policy Framework specification provides a model and a syntax to describe and communicate the policies associated with Web services
  - ▶ Service providers can export their policy requirements in a standard way
  - ▶ Clients can use these requirements to establish a particular interaction
    - Useful when client and provider are not both using policy sets
- Allows interoperability for quality of service (QoS) configurations
- Easier configuration of Web service clients



The Web Services Policy Framework specification provides a way to describe and communicate the policies associated with Web services. A service provider can export its policy requirements in a standardized way, allowing service clients to use these requirements to establish a particular message interaction. This helps to allow interoperability for quality of service (QoS) configurations and easier configuration of Web service clients.

## WS-Policy example

```

(01) <wsp:Policy xmlns:sp="
      securitypolicy/200702"
      xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-
      wssecurity-utility-1.0.xsd" wsu:Id="X509EndpointPolicy" >
(02)   <sp:AsymmetricBinding>
(03)     <wsp:Policy>
(04)       <sp:RecipientToken>
(05)         <wsp:Policy>
(06)           <sp:X509Token sp:IncludeToken=
"
" Id="Token/Never">
(07)             <wsp:Policy>
(08)               <sp:WssX509V3Token10 />
(09)             </wsp:Policy>
(10)           </sp:X509Token>
(11)         </wsp:Policy>
(12)       </sp:RecipientToken>
(13)     ...

```

This namespace defines the policy language

The entire policy follows the WS-SecurityPolicy domain as defined by this specific namespace

**Blue text shows the WS-Policy syntax**

*WS-Policy is extensible for different domains*

*In this example, SecurityPolicy domain information is being used with the WS-Policy syntax in order to specify AsymmetricBinding configuration*

The WS-Policy specification creates namespaces that define the policy languages. The policy language is the generic syntax shared by all domains to define policy configurations.

Each domain, such as WS-Security, WS-Transaction, or WS-Addressing, has its own set of predefined policy assertions that may be used within the generic policy language. The policy assertions describe the configurations that are needed to communicate with the service provider.

## WS-Policy operators

- WS-Policy defines two operators for use in WS-Policy XML
- `<wsp:ExactlyOne>`
  - ▶ Specifies a list of possible policy alternatives
  - ▶ One of which must be adhered to in order to conform to the policy
- `<wsp:All>`
  - ▶ Specifies a list of policy alternatives
  - ▶ All of which must be adhered to in order to conform to the policy



WS-Policy introduced two operators that may appear in the WS-Policy XML for a service definition. The exactly one operator specifies a list of possible policy alternatives, one of them must be used in order to conform to the policy. The all operator also specifies a list of policy alternatives for a client, but in this case all of them need to be followed to conform to the policy.

## WS-Policy domains

- Each domain has its own set of predefined policy assertions that can be used within the generic policy language
- WebSphere Application Server V7 introduces various domains
  - ▶ WS-Addressing
  - ▶ WS-Transactions
  - ▶ WS-Reliable Messaging
  - ▶ WS-Security



Each WS-Policy domain has its own set of policy assertions that can be used within the generic policy language. A number of different domains are introduced in WebSphere Application Server V7 including; WS-Addressing, WS-Transactions, WS-Reliable Messaging, and WS-Security.

## Relation to policy sets

- Policy sets are not normally concerned with the WS-Policy specification
  - ▶ Instead deal with the configuration of Web services
  - ▶ Should be considered as a front-end to WS-Policy
- Policy sets provide a mechanism to specify policy within a WebSphere Application Server environment
  - ▶ In certain environments Policy Sets alone may be enough
- They do NOT provide a mechanism to communicate this policy to non-WebSphere Application Server partners in a heterogeneous environment
- Policy Sets also do NOT provide a mechanism for the client to calculate effective policy
  - ▶ The policy acceptable to both client and provider



WS-Policy is a separate concept from policy sets. Policy sets are not normally concerned with the WS-Policy specification, instead they deal with the specific configuration of Web services. Policy sets should be considered as a front-end to WS-Policy. Policy Sets provide a mechanism to specify policy configurations within a WebSphere Application Server environment, which in certain environments may be enough. Policy Sets do not provide a mechanism to communicate this policy configuration to non-WebSphere Application Server partners in a heterogeneous environment. Policy sets also do not provide a mechanism for the client to calculate effective policy, which is a policy acceptable to both the service client and provider. WS-Policy provides these extra capabilities.



## Overview of support

- WS-Policy version 1.5 is supported in WebSphere Application Server version 7
  - ▶ <http://www.w3.org/ns/ws-policy>
- Services can share their policy set configuration in a WS-Policy interoperable format embedded in the WSDL
- Clients can use a WSDL with WS-Policy data to dynamically configure themselves at runtime
- Users administer this behavior
  - ▶ The WSDL containing the WS-Policy data is dynamically exchanged by the runtime just before the first Web service request



The Web services policy version 1.5 is supported in WebSphere Application Server version 7. This support allows servers to share their policy set configurations in an interoperable format that is embedded in the WSDL document. Clients can then use WSDL documents containing this policy data to dynamically configure themselves at runtime. You must administratively configure the service to imbed policy data in its WSDL document and must configure client environments to dynamically use that information.

## WS-Policy

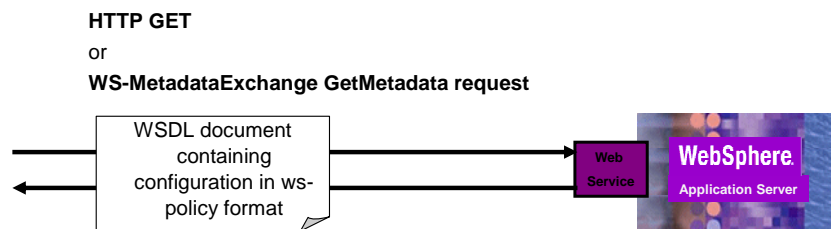
- **Service clients**
  - ▶ Enable a WebSphere Application Server service client to acquire details of a service provider's policies
  - ▶ The WS-PolicyAttachment specification defines a standard mechanism to contain WS-Policy data in WSDLs
    - WS-PolicyAttachments are distinct from (IBM) Policy Set attachments
- **Service providers**
  - ▶ Enables a WebSphere Application Server service provider to export details of its policy configuration to clients
- **Outside of enabling WS-Policy most of this is handled by the runtime**



WS-Policy enables a WebSphere Application Server service client to acquire the details of a service provider's policies. The WS-PolicyAttachment specification defines a standard mechanism to contain WS-Policy data in WSDL documents. WS-PolicyAttachments are distinct from IBM Policy Set attachments. WS-Policy enables a WebSphere Application Server service provider to export details of its policy configuration to its WSDL document. When clients access that WSDL document they receive the policy configuration details they need to connect to the service provider. Outside of enabling WS-Policy most of the details are handled by the runtime.

## Service Provider

- Service Provider
  - ▶ Enables a WebSphere Application Server version 7 service provider to export details of its policy configuration to clients



WS-Policy enables a WebSphere Application Server service client to acquire the details of a service provider's policies. A WebSphere Application Server version 7 service provider can export details of its policy configuration using its WSDL document. When clients access that WSDL document they receive the policy configuration details they need to connect to the service provider.

## WS-Policy clients

- WebSphere Application Server service clients can acquire details of a service provider's policies
  - ▶ The WS-PolicyAttachment specification defines a standard mechanism to contain WS-Policy data in WSDL
    - WS-PolicyAttachments are distinct from (IBM) Policy Set attachments
- Clients can obtain this WSDL through several mechanisms
  - ▶ WSDL publication
  - ▶ Acquired using HTTP GET
  - ▶ In metadata returned by a WS-MetaDataExchange request



WS-Policy enables a WebSphere Application Server service client to acquire the details of a service provider's policies. The WS-PolicyAttachment specification defines a standard mechanism to contain WS-Policy data in WSDL documents. WS-PolicyAttachments are distinct from IBM Policy Set attachments. WebSphere Application Server version 7.0 allows WSDL version 1.1 documents containing WS-PolicyAttachment information to be exported. Clients can obtain the WSDL documents through several mechanisms; WSDL publication, using HTTP GET, or in metadata returned by a WS-MetaDataExchange request.

## WS-Policy clients

- On receipt of requester and provider policy, the service requester runtime calculates a policy acceptable to both sides
  - ▶ This calculation will occur at runtime before the first service invocation and is done in accordance with the WS-Policy specification
- This acceptable policy configuration is used in subsequent requests to the same endpoint or operation
  - ▶ Policy calculations are cached in the client for performance
    - No current mechanism to persist calculations
- The application is unaware that any form of WS-Policy processing is taking place
  - ▶ Policy is specified by the administrator
- Transport policies (HTTP, SSL, JMS) must be configured separately as part of the policy set configuration for a client

13

When the runtime for the requester of the service receives the requester and provider policy, it calculates a policy acceptable to both sides. This calculation will occur at runtime before the first service invocation and is done in accordance with the WS-Policy specification. This acceptable policy configuration is then used in subsequent requests to the same endpoint or operation. Policy calculations are cached in the client for performance; there is no current mechanism to persist calculations further than that. The application is unaware that any form of WS-Policy processing is taking place; policy is still specified by the administrator. If the client requires transport policies such as HTTP, SSL or JMS; these must be configured as part of the policy set configuration for the client.

## Section

# *Configuring WS-Policy*



The next section explains how to configure WS-Policy in WebSphere Application Server version 7.

## Configuring a service to share policy data

- From the administrative console, select **Applications > Application Types > WebSphere enterprise applications > service\_provider\_application\_instance > [Web services properties] Service provider policy sets and bindings** .
- In the row for the application or service where the provider policy that you want to share is attached, click the link in the Policy sharing column. The link is either **Enabled** or **Disabled**. The Policy Sharing panel is displayed.
- To include the policy configuration of the service provider in its WSDL so that it can be either published or obtained using an HTTP Get request, select **Exported WSDL**.
- To enable WS-MetadataExchange and make the policy configuration of the service provider available to a WS-MetadataExchange GetMetadata request, select **WS-MetadataExchange request**.
- `AdminTask.setProviderPolicySharingInfo([-applicationName WebServiceProviderApplication -resource WebService:WebServiceProvider.war:{http://example_path/}Service1 -sharePolicyMethods [httpGet ]])`

15

This shows the steps to enable a provider service to share its policy data within its WSDL document. Navigate to the Web services properties for an application, and select service provider policy sets and bindings. Select the option to enable the policy sharing for the application. Choose the exported WSDL option to enable the service to publish the information in its WSDL. Select the option for WS-MetadataExchange request, to provide the policy information for a WS-MetaDataExchange request. The AdminTask script for this command is also shown.

# Example

The screenshot shows the administrative console for the Web Services Policy Framework. The main window is titled 'Service providers' and is currently displaying the configuration for 'EchoService'. The 'Policy Set Attachments' section shows a table of resources with their respective policy sets and sharing status.

Select	Service/Endpoint/Operation	Attached Policy Set	Binding	Policy Sharing
<input type="checkbox"/>	EchoService	WS-I RSP	Default	Enabled
<input type="checkbox"/>	EchoServicePort	WS-I RSP (inherited)	Default (inherited)	Enabled(inherited)
<input type="checkbox"/>	echoOperation	WS-I RSP (inherited)	Default (inherited)	Enabled(inherited)
Total 3				

An inset window titled 'Service providers > EchoService > Policy Sharing' is open, showing the configuration for policy sharing. It includes a section for 'Service Provider WS-Policy Control Properties' with the following options:

- Exported WSDL (HTTP messages secured with the application transport policy if defined)
- WS-MetadataExchange request (secured with the application transport policy if defined)
- Attach a system policy set to the WS-MetadataExchange

Below these options, there are two dropdown menus for 'Policy set' with values 'System WS Security Default' and 'Default'. At the bottom of the inset window are buttons for 'Apply', 'OK', 'Reset', and 'Cancel'.

Here is an example of the administrative console where the echo service has been configured to share policy data.



## Configuring a client with policy data

- From the administrative console, click **Applications > Application Types > WebSphere enterprise applications > service\_client\_application\_instance > [Web services properties] Service client policy sets and bindings** .
- In the row for the application or service where you want to apply the policy, click the link in the Policies Applied column. The Policies Applied panel is displayed.
- Select one of these options from the drop down list:
  - ▶ **Provider policy only**. Configure the client based solely on the policy of the service provider. This option is available when a client policy set is not attached.
  - ▶ **Client and provider policy**. Configure the client based on both the client policy set and the policy of the service provider. This option is available when a client policy set is attached.
- `AdminTask.setClientDynamicPolicyControl('[-applicationName WebServiceClientApplication -resource WebService:/ClientApplication.war:{http://example_path/}Service1 -acquireProviderPolicyMethod [httpGet ] -httpGetProperties [httpGetTargetURI http://example_path?WSDL]')`



Configuring WS-Policy on the client is a little different. Start by navigating to the Web services properties for the client applications, and selecting Service client policy sets and bindings. Select the link in the policies applied column for the application that is being enabled. There are two options. **Provider policy only** configures the client based solely on the policy of the service provider. This option is available when a client policy set is not attached. **Client and provider policy** configures the client based on both the client policy set and the policy of the service provider. This option is available when a client policy set is attached. The associated scripting AdminTask is also shown.

# Example

**Service clients > EchoService**

Use this page to manage policy sets and bindings or to attach/detach policy sets to service clients.

**General Properties**

Service client  
 (http://com.ibm.was/wssample/sei/echo/EchoService)

**Policy Set Attachments**

Define policy and binding configuration for the service client. Applied link to indicate whether to use and how to attach policy set to the service client by providing system-specific configuration.

**Preferences**

Attach Client Policy Set | Detach Client Policy Set

Select	Service/Endpoint/Operation	Attached Client Policy Set	Policies Applied	Binding
<input type="checkbox"/>	EchoService	None	Provider only	Default
<input type="checkbox"/>	EchoServicePort	None	Provider only (inherited)	Default (inherited)
<input type="checkbox"/>	echoOperation	None	Provider only (inherited)	Default (inherited)
Total 3				

**Service clients > EchoService > Policies Applied**

Use this page to specify which policies to apply to the application or service client. If you choose to use the provider policy, you can also specify the method by which the client should acquire this policy.

**Client WS-Policy Control Properties**

Apply the following policies:  
 Provider policy only

Method to obtain provider policy:  
 HTTP GET request (secured with the application transport policy if defined)  
 Use the default request target  
 Specify request target

WS-MetadataExchange request (secured with the application transport policy if defined)  
 Attach a system policy set to the WS-MetadataExchange

Policy set:  
 SystemWSSecurityDefault

Binding:  
 Default

Apply OK Reset Cancel

This shows an example of the administrative console where the echo service client has been configured to share policy data for the service provider only.

## Section

# *WS-Metadata Exchange*



The next section explains the WS-Metadata Exchange specification.

## WS-Metadata Exchange

- The WS-MetadataExchange specification (WS-Mex) defines an alternative bootstrap mechanism to HTTP GET for the retrieval of metadata from an endpoint
- The WS-Mex specification V1.1 was written by several companies
  - ▶ Planned for submission to a standards body
  - ▶ Draft version:  
<http://specs.xmlsoap.org/ws/2004/09/mex/WS-MetadataExchange.pdf>



The WS-MetadataExchange specification, or WS-Mex, defines an alternative bootstrap mechanism to HTTP GET for the retrieval of metadata from an endpoint. It can be used as an alternative secured method to retrieve a WSDL document from a service provider. The WS-Mex specification v1.1 was written by several companies and is planned for submission to a standards body, but is currently in a draft version.

## WS-Metadata Exchange

- WebSphere Application Server V7 does not provide full support for the WS-Mex specification
  - ▶ Focused on key support for the WS-Policy implementation
- It is not possible to explicitly drive WS-Mex in WebSphere Application Server V7
  - ▶ WS-Mex support is used purely for the export and acquisition of WS-Policy by the runtime



WebSphere Application Server version 7 does not provide full support for the WS-Mex specification, rather the implementation is focused on key support for WS-Policy. It is not possible to explicitly drive WS-Mex in WebSphere Application Server version 7, instead it is used purely for the export and acquisition of WS-Policy by the runtime.

## Section

# *Summary*

Following is the summary for the presentation.

## Summary

- WS-Policy allows for services to share policy configuration data
- Easier configuration of Web service clients



WebSphere Application Server version 7 allows WS-Policy to be used as a mechanism to share policy configuration data between service clients and providers. This provides an easier method for configuring Web services clients.

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