

Unit-4. SOA and WS-* Extension

* Explain Message Exchange Pattern with its types.

=> Message Exchange Pattern represent a set of templates that provide a group of sequences for the exchange of message.

Message Exchange Pattern provides Pattern for describe how Service requestor and service provider exchange the messages.

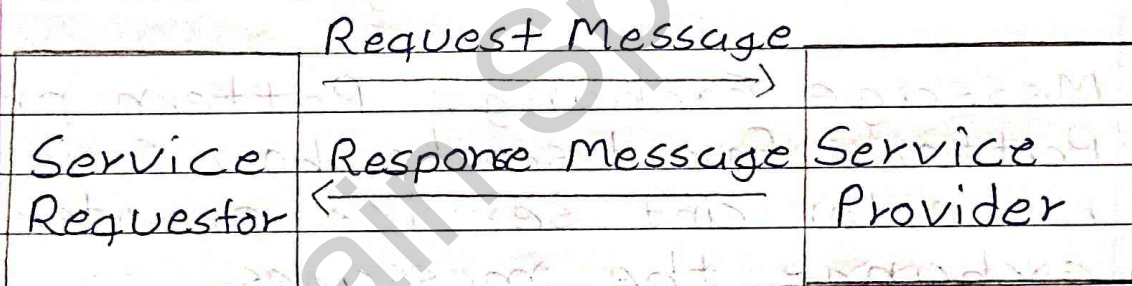
There are three types of Message Exchange Pattern or Primitive of Message Exchange Pattern.

- 1) Request - Response
- 2) Fire and Forget
- 3) Complex MEPs

1 Request - Response :

Request - Response structure provides synchronous communication.

The Request - Response MEP establishes a simple exchange pattern for Service Requestor and Service provider.



Service Requestor can request the message to the service provider.

Service Provider can response the service requestor message.

Service Requestor can do request for get any type of information from the Service Provider.

2 Fire and Forget :

Fire and Forget Provides unidirectional transmission pattern for exchange message.

There are three way to exchange message in Fire and Forget MEPs.

ci) Single Destination Pattern

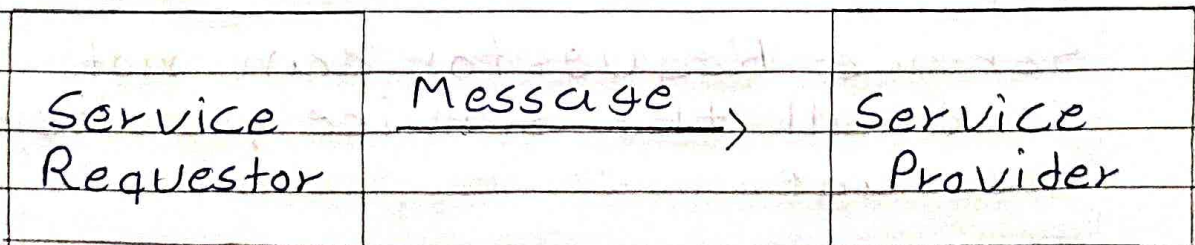
cii) Multi-Cast Pattern

ciii) Broadcast Pattern

i) Single Destination Pattern :

In this Pattern, only source will send the message.

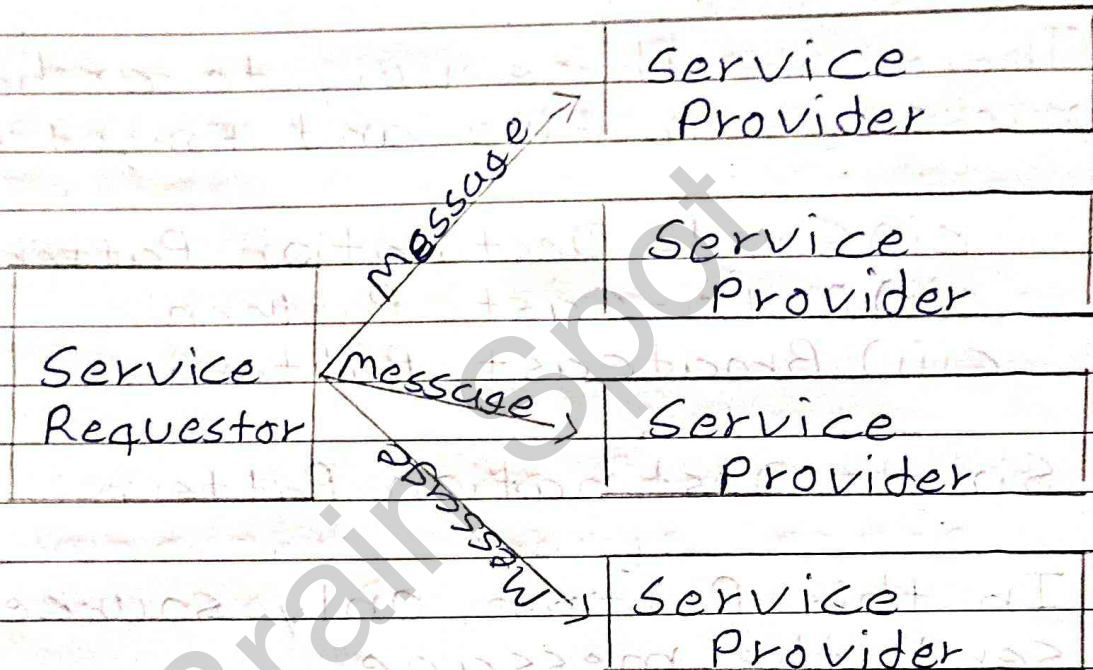
Service Requestor can only send the message but Service Provider can not response any message.



This Pattern is used to store the notification.

cii) Multi-Cast Pattern :

In this Pattern, Only one source send the message to the multiple destinations.



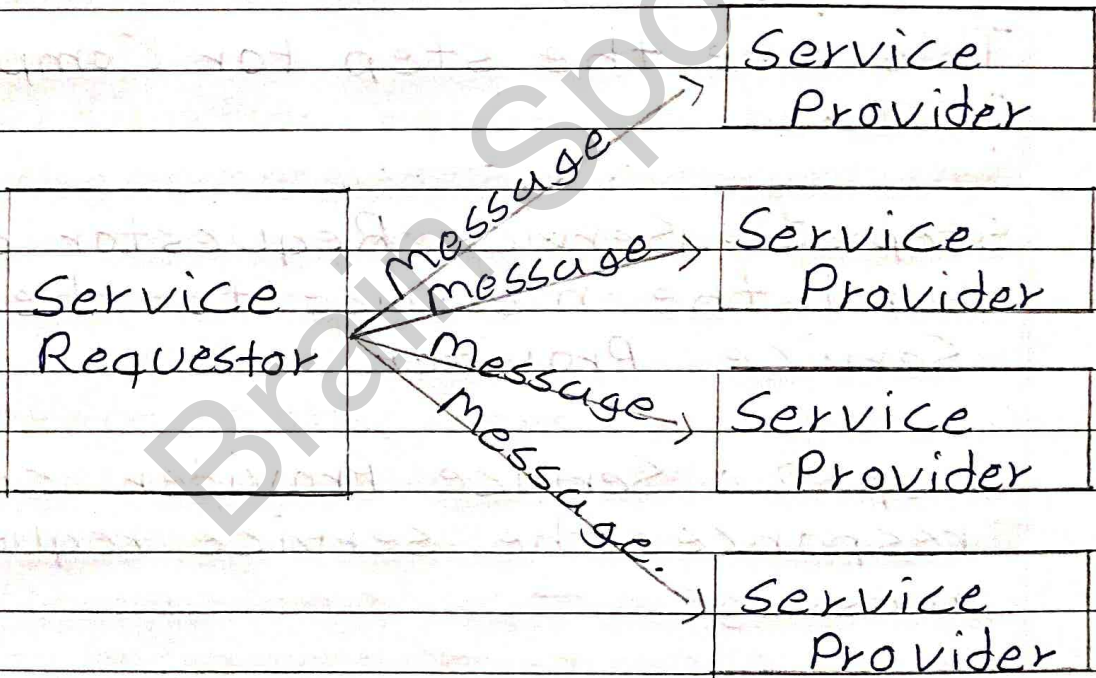
Service Requestor can send only message to predefined set of Service provider.

Service Requestor can not send all the service provider message.

ciii) Broad Cast Pattern:

In this Pattern, Only source can send the multiple service provider message.

In this Pattern, All the Service Provider get service source message.



In this Pattern, there is no Pre-define set of Service Provider.

3 Complex MEPs :

Complex MEPs is combination of Request-Response Pattern and Fire-Forget Pattern.

Complex MEPs is Provides Asynchronous communication Method.

This are the step for Complex MEPs :

Step-1 : Service Requestor can send the message to the Service Provider.

Step-2 : Service Provider can response the service requestor message.

Step-3 : Using Fire-Forget Pattern Service provider can send the message to the service consumer or requestor.



* Explain Coordination.

=> Coordination refers to the process of organizing and synchronizing activities or tasks to achieve a common goal.

Coordination is crucial in complex systems involving multiple components.

WS - Coordination provides a framework for execution of transactions in web services.

There are two types of WS - Coordination.

- ci) WS - Atomic Transaction
- cii) WS - Business Activity

WS - Coordination is also provides different coordination protocol.

Coordination Protocol is provides set of rules that provides different activities.

WS - Coordination composition consists this type of services.

ci) Activation Service:

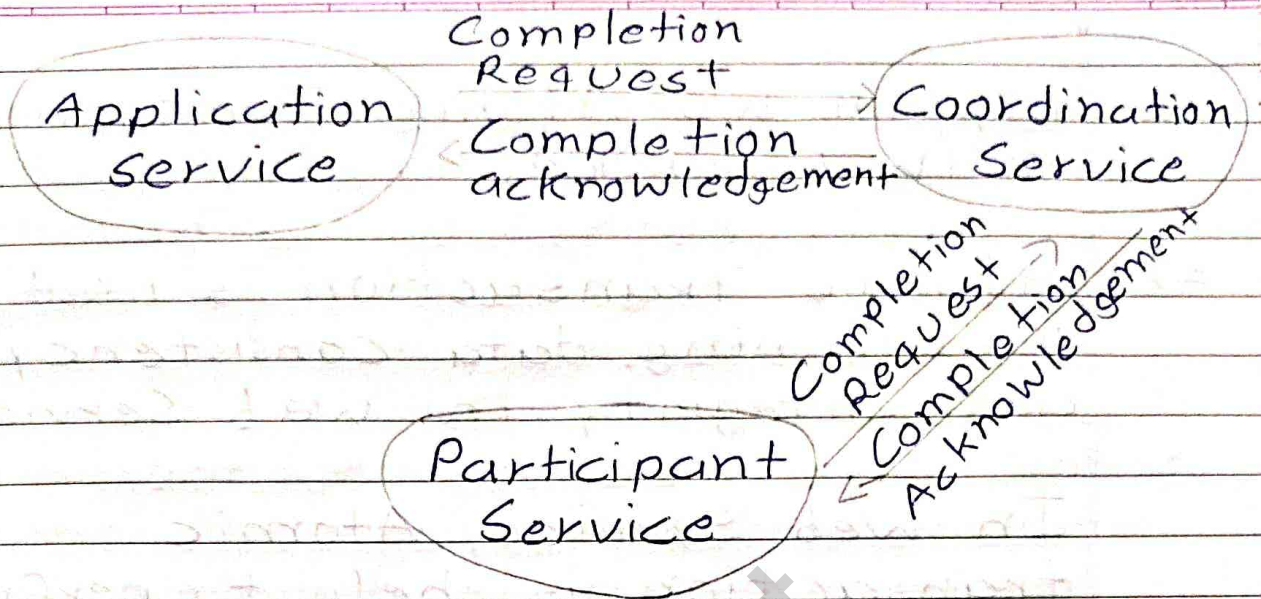
This Service is responsible for create new context and combine with new activity.

cii) Registration Service:

This Service is used to support context protocol and allows to use context information.

ciii) Protocol-specific Service:

This services is used to represent the protocols that support coordinator's coordination type.



Coordination Service is request to Application Service and get Completion Acknowledgement From the Application Services.

Participant Service is request to Coordination Service and get Completion Acknowledgement From the Coordination Service.

Using this Services, We can done completion Process in WS-Coordination.

* Explain WS-Atomic Transaction in web service.

=> Atomic Transaction is used to Maintaining data consistency and Integrity in web Service

In Web Service, Atomic transaction is help to perform multiple operation in different services.

Atomic Transaction have to follow ACID Properties.

There are Four ACID Properties.

(1) Atomicity

(2) Consistency

(3) Isolation

(4) Durability

1 Atomicity : IF All Operation are performe in transaction than it will be perform completely either get roll back into the original state.

- 2 Consistency: After the completion of transaction, system transaction from one state to other consistent state.
- 3 Isolation: When multiple transaction perform at a same time than all the transaction is isolated from each other.
- 4 Durability: Once a transaction is complete then it will be permanently stored in system.

This are the Basic Atomic Transaction Protocol.

a Completion Protocol:

It is used to define commit or abort state of the transaction.

b Durable 2PC Protocol:

It is used to define services representing ~~Pa~~ Permanent data in register.

c Volatile 2PC Protocol:

It is used to define or manage the temporary data in register.

d Two-phase commit Protocol:

It is used to define atomicity in web service transaction.

WS-Atomic Transaction protocol is used coordinator controller service.

Atomic Transaction coordinator helps to manage the participants of transaction process.

* Explain WS-Addressing.

⇒ WS-Addressing provides standard way to address web service and provide addressing information in the form of message.

WS - Addressing, Provides in two way concepts.

- 1) End Point Reference
- 2) Message Information Headers.

1 End Point Reference :

End Point Reference is used to provides identifiers that contain instance of service.

End Point Reference is consists the following part.

- Address : Address is contains URL of a web services.
- Reference Properties - Defines a Property values which connect with web services.
- Reference Parameters : Defines a Parameters values which connect with web services.
- Service Port type : Defines a location of a services description.

- Policy : Defines a rules and information related to web services instance.

2. Message Information Headers :

WS - Addressing is include SOAP Header which is includes message exchange related information.

Message Information Header Provides the following information.

- Destination : Defines the address where data has to be send.
- Source Endpoint : Defines the end point reference which is generated is web services message.
- Reply Endpoint : Defines the address where reply data should be send.
- Fault Endpoint : Defines the address where fault message should be send.

- Message Id : Defines the Unique number of message.

- Action : Defines a URL value that indicates the message.

SOAP Message contain detailed information that defines the behavior of the service.

* Explain Reliable Messaging.

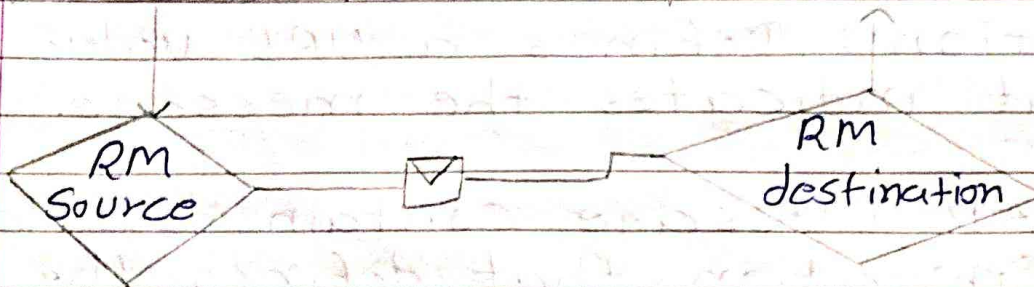
=> Reliable Messaging Provides a framework for messages are transmitted in proper way or not.

Reliable Messaging Gives the information of message is successfully arrived at destination.

It is also gives the information of message transmission is failed or not.

In Reliable Messaging, All the reliability rules are implemented as SOAP headers.

Application Source		Application Destination
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Application Source can send the message to the RM Source.

RM Source is receive message from Application source and send to the RM Destination.

RM Destination is receive message from RM Source and send to the Application destination.

Application Destination can receive message from the RM destination.

Application Source and destination can transfer the message

Using the RM Source and Destination,

In Reliable Messaging, Sequences is used to Pass or transfer the message one-by-one to RM Source to Destination.

Sequences is used to create order of message in the Reliable Messaging.

In Sequences, each message has a particular number for transfer the message.

According to sequence, we can send and receive acknowledgement from the source and destination.

There are four types of Delivery Assurances in Reliable Messaging.

- i) The AtMostOnce
- ii) The AtLeastOnce
- iii) The ExactlyOnce
- iv) The InOrder

- c) The AtMostOnce: Deliver one or zero message, if more than one message deliver than error is occurs.
- cii) The AtLeast Once: Deliver one or more message, if more zero message deliver than error is occurs.
- ciii) The ExactlyOnce: Deliver only one message, if less than one or more than one message is deliver than error is occurs.
- civ) The InOrder: Deliver according to sequence, if sequence is not follow than error is occurs.

* Explain WS - Policy with its Framework.

=> Policy is used to defines the web service rules and constraints.

Every web service, have different types of Policy like service behavioral, technical limitation of Service etc.

WS - Policy is used to describe the Policy Document in web Service.

WS - Policy Framework contains three Parts.

i) WS - Policy

ii) WS - Policy Attachments

iii) WS - Policy Assertions.

i) WS - Policy :

WS - Policy document Provides Services properties such as rules, behaviors and requirement.

(ii) WS - Policy Attachments:

WS - Policy Attachment contains two types of Attachments.

(a) WS - Policy Language

(b) WS - Policy expression bind Policy Scope.

a WS - Policy Language:

WS - Policy Language is used to implement Policy assertions.

b Policy Expression bind Policy Scope.

Policy expressions are used to bound the policy scope using the Policy expression attachment.

Policy expression is written in simple XML statement to express Policy assertions.

(iii) WS - Policy Assertion.

Web Service Properties express by Policy description is identified as a Policy assertion.

Policy assertion includes service characteristics, preferences, requirements and rules of service.

There are two types of Policy Assertion.

- (a) XSD Schemas
- (b) XML Vocabularies.

a XSD Schemas:

Policy assertion types associate policy assertion with specific XSD schemas.

b XML Vocabularies:

XML Vocabularies are defined in XSD Schemas which represent the collection of policy types.

* Explain Metadata Exchange in Web Services.

=> Metadata Exchange is used to provide service provider's services description.

Metadata Exchange is given to the service requestor to the service information.

WS-Metadata Exchange specification provides standard request message.

Service Requestor can use metadata exchange to request all service description documents.

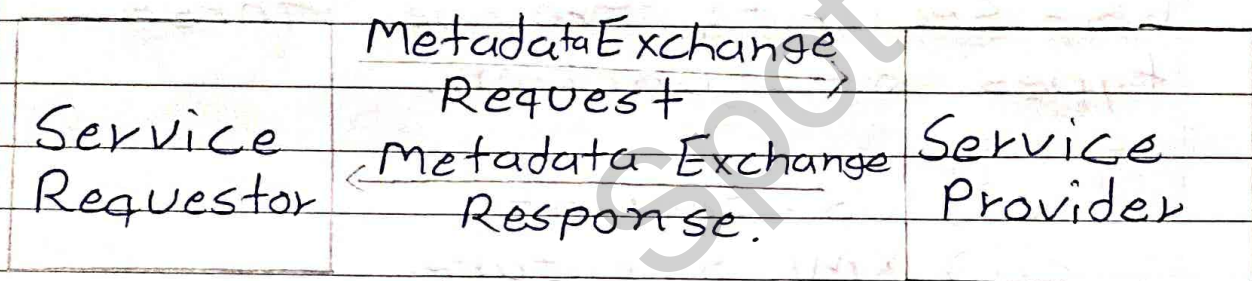
Metadata Exchange is used request-response pattern to provide the service description documents.

Metadata Exchange provides three types of request message.

- Get WSDL
- Get Schema

- Get Policy

Service Requestor can request to get Policy Document, get WSDL Document or get schema Document.



Service Requestor can request for Metadata Exchange request to Service Provider.

Service Provider can response the metadata exchange request and ask service requestor to get WSDL, Schema or Policy Document.

According to Service requestor request, service provider get send WSDL, Schema or policy document.

* Explain Security in Web Service.

=> WS - Security Provides the SOAP message to quality of Protection.

WS - Security Provides three types of Function.

- ci) WS - Security
- cii) XML Signature
- ciii) XML Encryption.

ci) WS - Security :

WS - Security is works on three phase of security function.

- ca) Identification
- cb) Authentication
- cc) Authorization

In Identification Phase, web service User have to require identity to complete this process.

After the Identification, web service requestor can authenticate with the service provider.

If service requestor get successfully authentication then service provider gives authorization to access service.

In WS - Security, there is Single Sign on to Authenticate the User,

In Single sign on, services requestor have to authenticated only once, After that there is no need to authenticate again.

ii) XML Signature:

In XML Signature, we have to use Digital signature.

XML Signature can be applied on message to provide the message security.

ciii) XML Encryption:

XML Encryption can be applied to any specific part of the message either entire the message.

XML Encryption can increase the message security in web service.