



IBM Software Group

2005 B2B Customer Conference

Pioneering New Horizons – Solutions that Evolve

B2B for your SOA using
WebSphere Partner Gateway and
WebSphere Process Server

WebSphere. software

Ashutosh Arora



ON DEMAND BUSINESS

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Objectives

- Explore how to implement B2B for your SOA using WebSphere Partner Gateway and WebSphere Process Server
- Explore various integration options for integrating WebSphere Partner Gateway with WebSphere Process Server



Agenda

- Assumptions
- WebSphere Process Server, SOA and B2B
- WebSphere Partner Gateway integration options
- JMS based Integration
- HTTP based integration
- Web Service based integration
- File based integration
- Handling backend integration packaging messages
- Demo
- Questions



Assumptions

- You are familiar with WebSphere Partner Gateway and its capabilities
- You are integration developer interested in creating B2B integration solutions using WebSphere Process Server



WebSphere Process

Service Components

Business Processes

Human Tasks

Business State Machines

Business Rules

Supporting Services

Interface Maps

Business Object Maps

Relation-ships

Selectors

SOA Core

Service Component Architecture

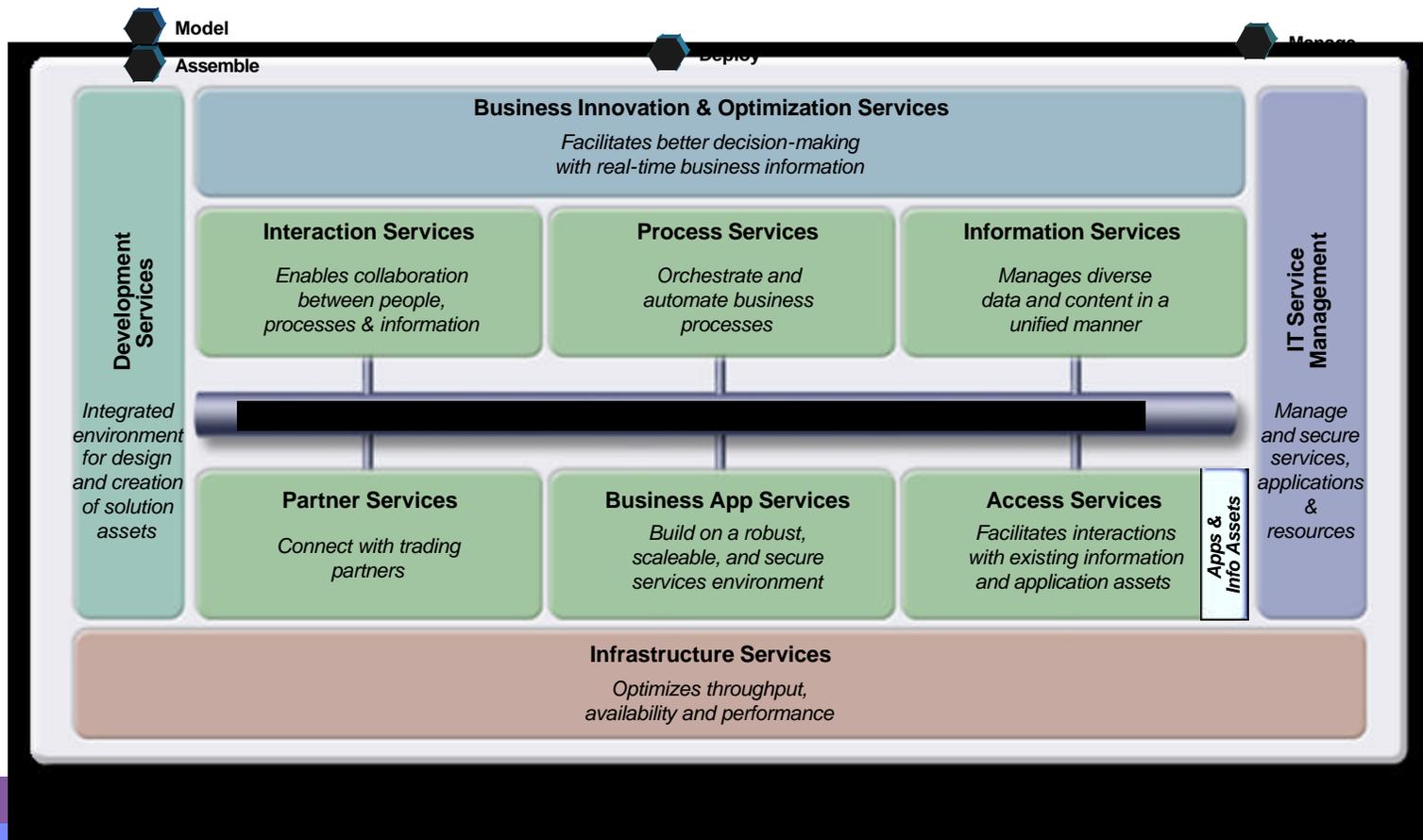
Business Objects

Common Event Infrastructure

WebSphere Application Server (J2EE Runtime)



SOA Reference Architecture





Integration in an SOA World

- To be easy to use a solution for SOA Integration requires
 - Common Data Model
 - All Data is represented consistently

 - Common Invocation Model
 - All components are represented consistently
 - All components are invoked identically

 - Common Connectivity
 - Enterprise Service Bus

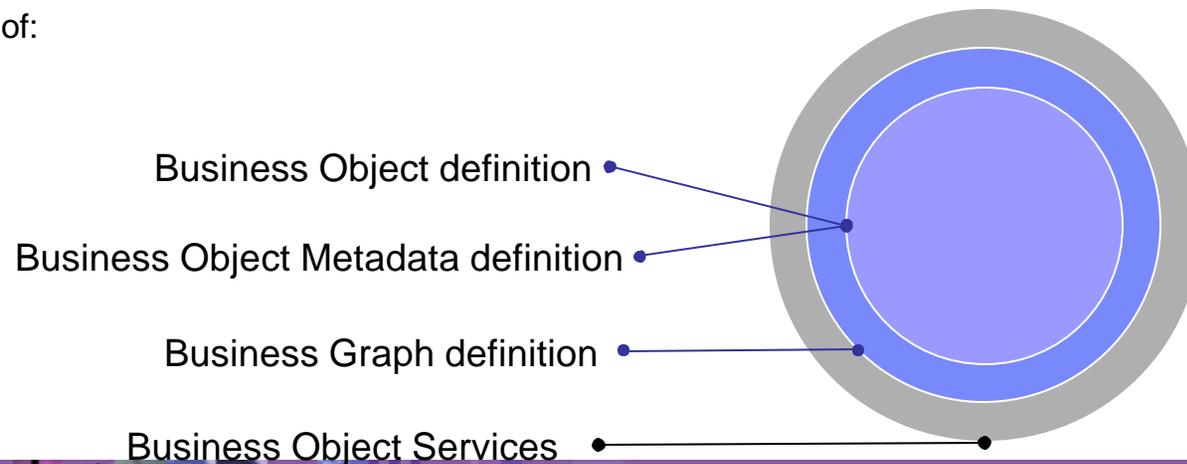
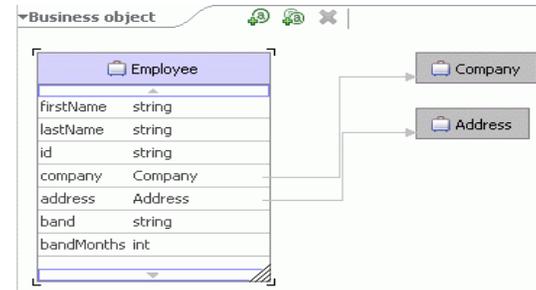
 - Service Choreography
 - Components can be choreographed independently of their implementation



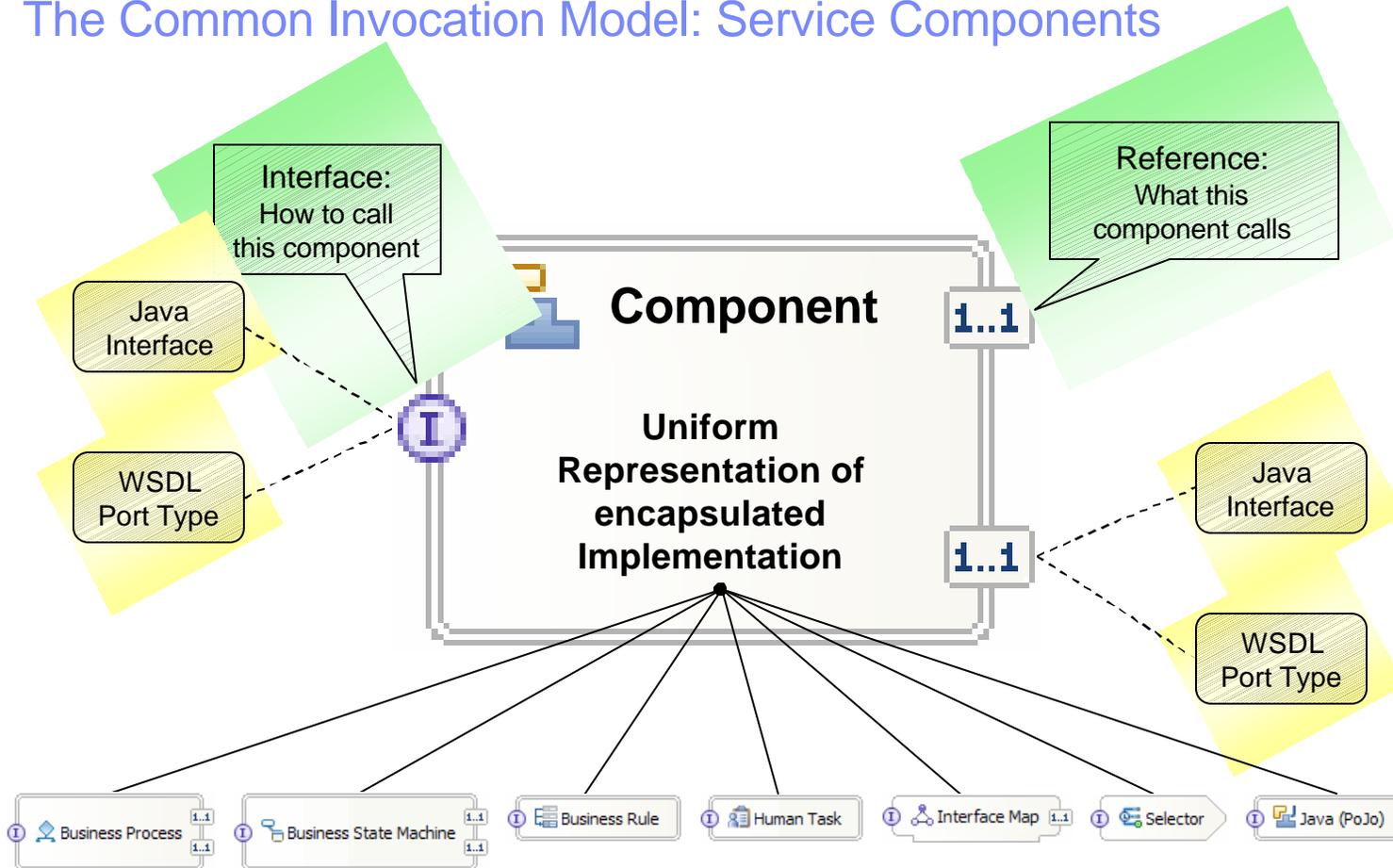


The Common Data Model: Business Objects

- Enhanced Service Data Object
 - Provides some function not available in base SDO specification (close to SDO 2.0)
 - Supports Inheritance and Aggregation
 - Enables import of 'standard' XSD
- Business Object Framework consists of:

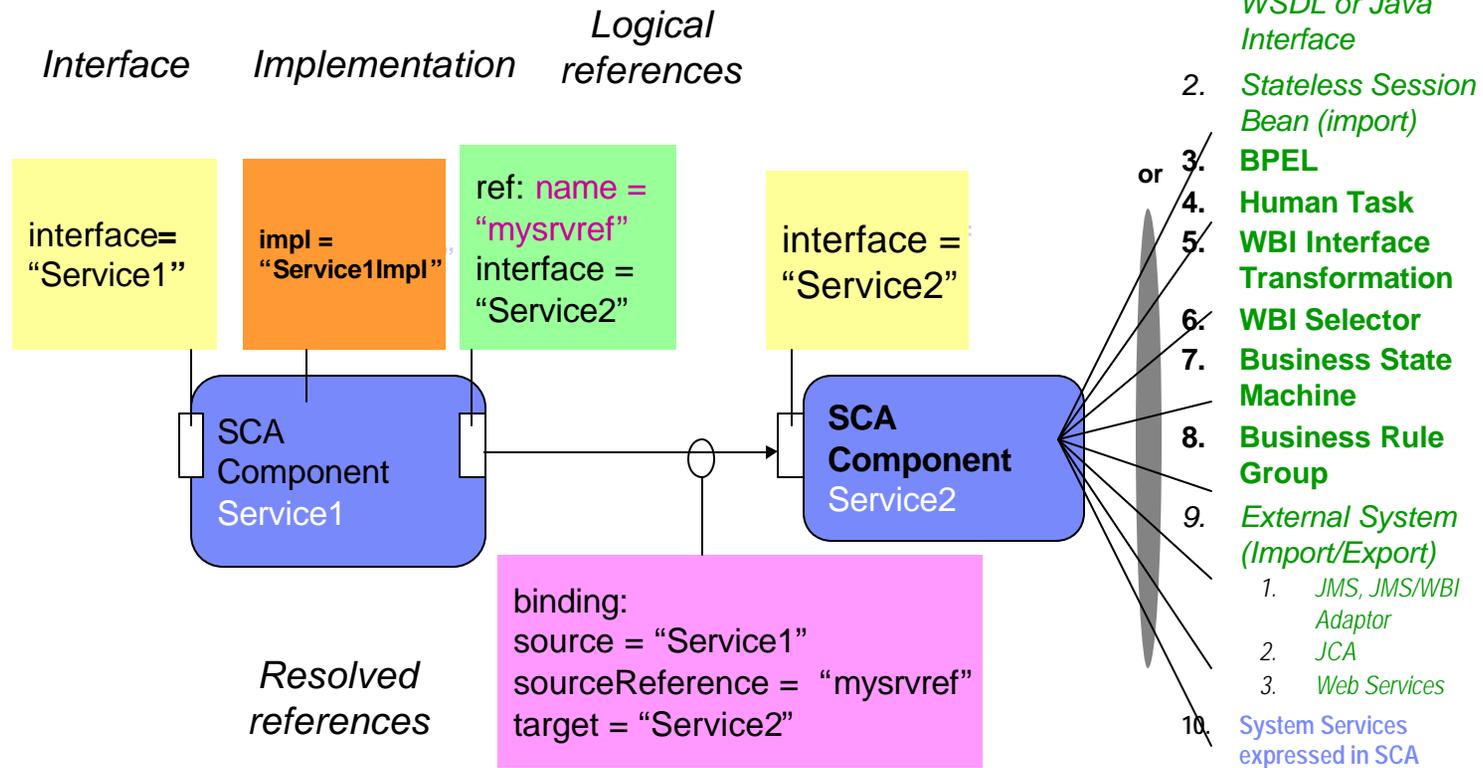


The Common Invocation Model: Service Components





SCA Overview and Implementation types





The Common Invocation Model: Imports / Exports

- **Adapters**
 - J2C 1.5
 - WBI Adapters

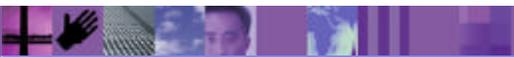
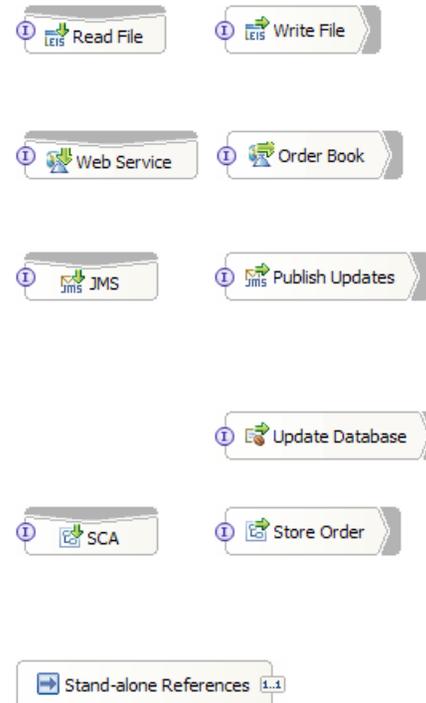
- **Web Services**
 - SOAP over HTTP, SOAP over JMS

- **JMS (WebSphere Messaging Resources)**
 - Point-to-Point and Publish/Subscribe
 - Integrate existing WebSphere MQ Solutions through MQ Link

- **EJB**

- **SCA**
 - Connect modules to each other without exposing the interface outside of WebSphere Process Server

- **Standalone Reference**
 - Enables an SCA API Client to call a Module





WebSphere Process Server and B2B

- WebSphere Process Server is built ground up on SOA
 - WebSphere Process Server components are exposed as SCA service
 - SCA service can invoke SCA and/or non-SCA services using their import and export

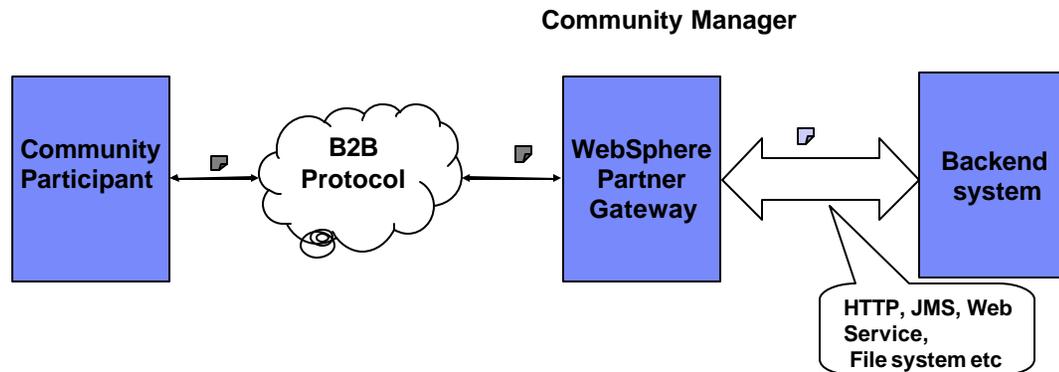
- WebSphere Process Server components can send business documents to community participants using
 - WebSphere Partner Gateway
 - Import of the component



- WebSphere Process Server components can receive business documents from community participants using
 - WebSphere Partner Gateway
 - Export of the component



WebSphere Partner Gateway backend integration mechanism



- WebSphere Partner Gateway supports various transport
 - HTTP, JMS, Web Service, File System etc
 - Using user exits custom transports can be developed
- WebSphere Partner Gateway supports various packaging:
 - Backend Integration Packaging:
 - Contains business document and transport headers.
 - Transport headers provide routing information
 - NONE: Only contains business document



WebSphere Partner Gateway backend integration supported options

Packaging type	Document type sent or received by backend	HTTP HTTPS	JMS	File system
Backend Integration	RosettaNet (RNSC)	Yes	Yes	No
	XML, EDI	Yes	Yes	No
	cXML	Yes	No	No
	Any structured (providing trading partner routing info)	Yes	Yes	No
	Binary, any unstructured	Yes	Yes	No
None	XML, EDI	Yes	Yes	Yes
	Web Services	Yes	No	No
	Any structured (providing trading partner routing info)	Yes	Yes	Yes
	cXML	Yes	No	No
	Web Services (SOAP/HTTP)	Yes	No	No
	Binary (only from WebSphere Partner Gateway)	Yes	Yes	Yes



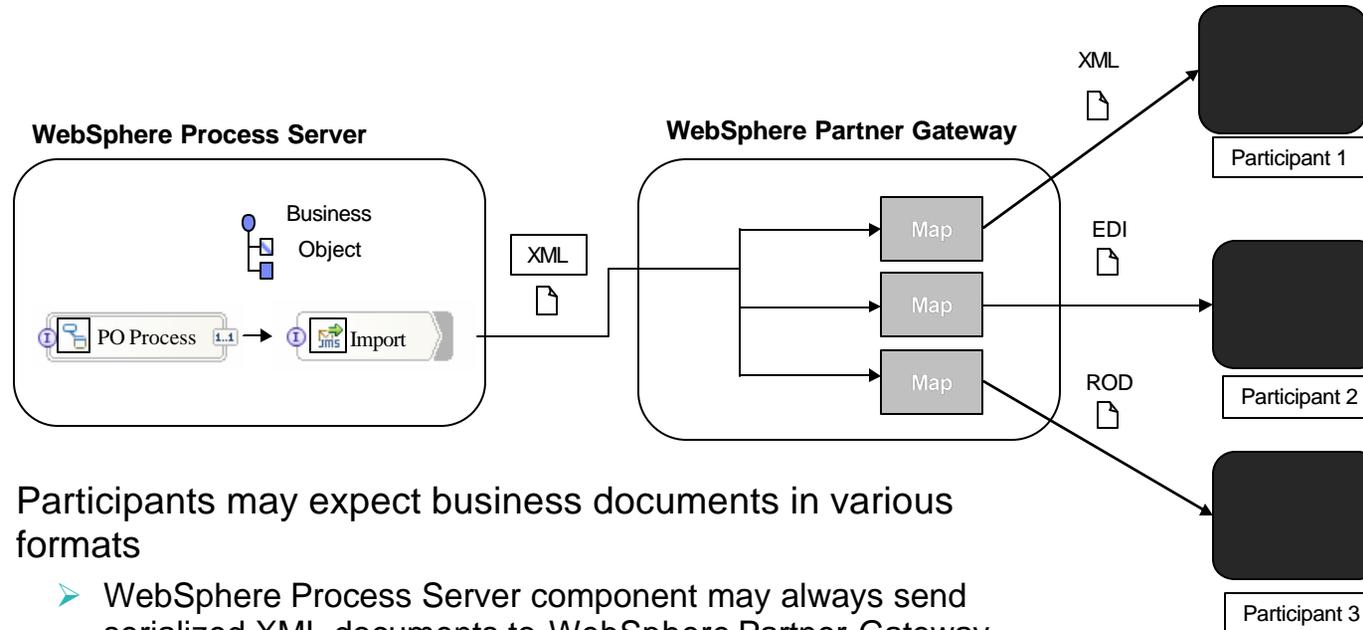
WPG and WPS supported installation options

WebSphere Partner Gateway 6.0* Components (Console, Document manager, Receiver)	WebSphere Process Server 6.x*	Comments
Install with embedded WebSphere option	Install on WebSphere 6.x or WebSphere ND 6.x	Supported. IMPORTANT: Do NOT install WebSphere Process Server on WebSphere instances created for WebSphere Partner Gateway components WebSphere Partner Gateway install cannot be part of ND cell.
Install on WebSphere 6.x	Install on WebSphere 6.x or WebSphere ND 6.x	Supported. IMPORTANT: Do NOT install WebSphere Process Server on WebSphere instances created for WebSphere Partner Gateway components WebSphere Partner Gateway install cannot be part of ND cell.

- Important:
 - Refer to respective product documentation for hardware and software requirements
 - Integration with WebSphere Process Server 6.x is supported by WebSphere Partner Gateway Fixpack 1 and above.



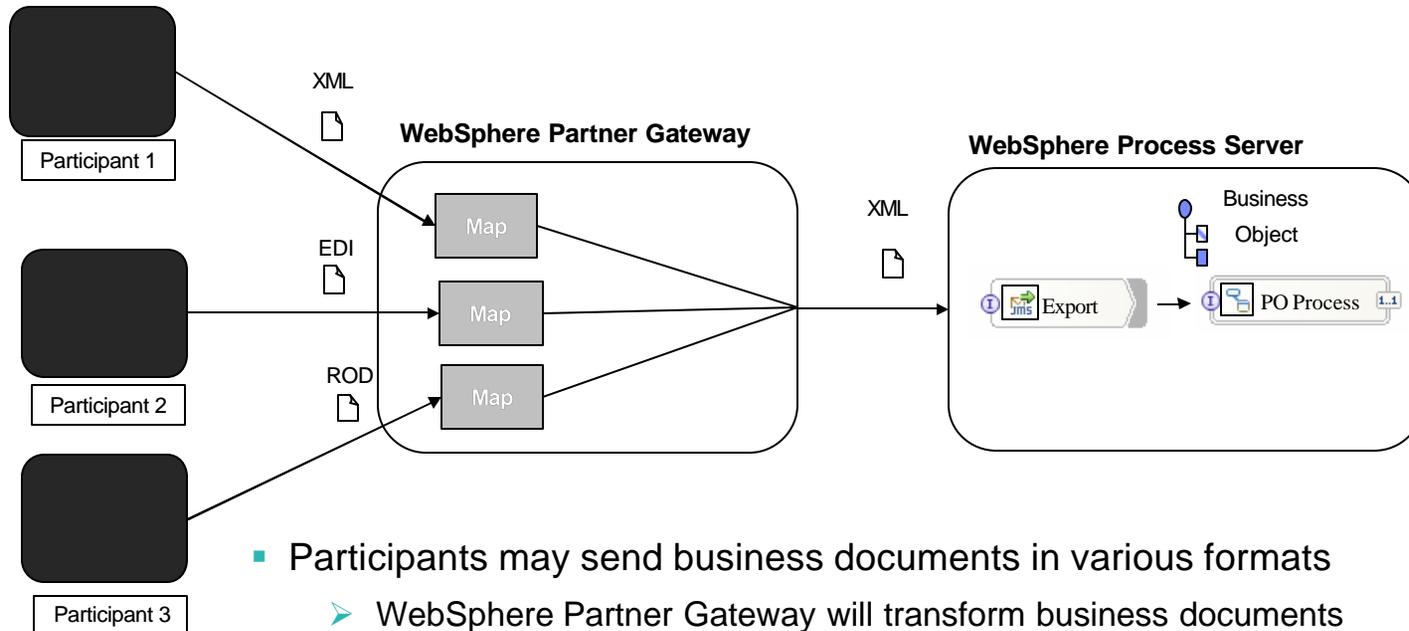
WebSphere Process Server and message types



- Participants may expect business documents in various formats
 - WebSphere Process Server component may always send serialized XML documents to WebSphere Partner Gateway
 - WebSphere Partner Gateway will transform business documents into format as expected by community participants



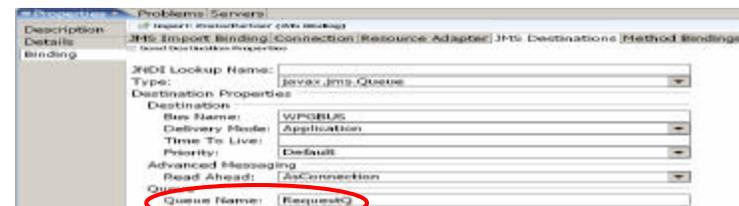
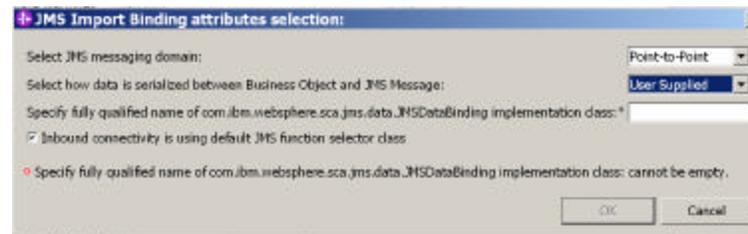
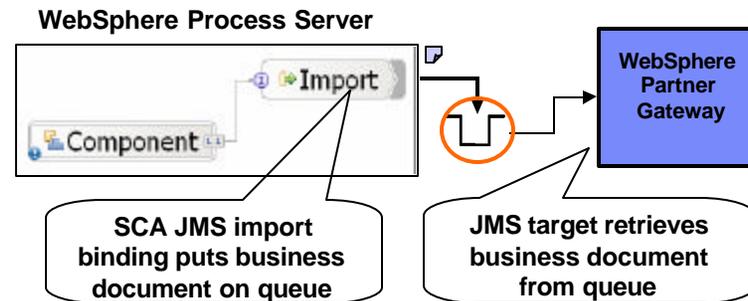
WebSphere Process Server and message types contd.



- Participants may send business documents in various formats
 - WebSphere Partner Gateway will transform business documents into XML as expected by WebSphere Process Server components
 - WebSphere Process Server Components will receive XML document from WebSphere Partner Gateway

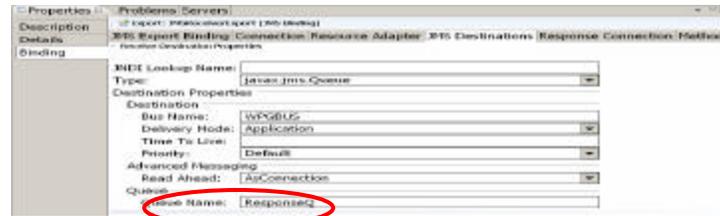
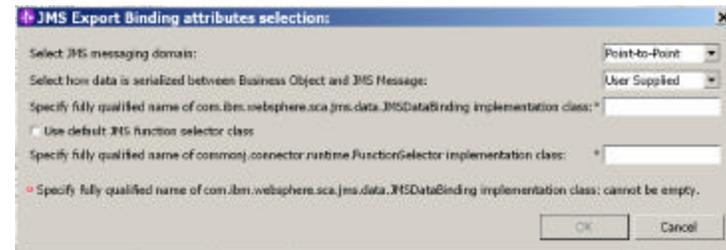
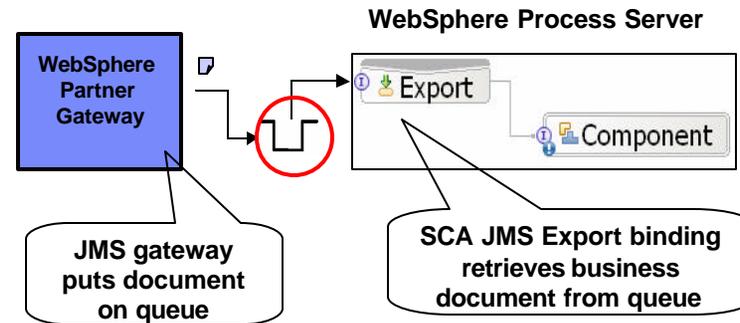
JMS based integration using SCA JMS binding

- WebSphere Process Server components can use their SCA JMS import binding to send business documents to WebSphere Partner Gateway over JMS
 - JMS queue configured in the JMS Target of WebSphere Partner Gateway Receiver is the queue on which WebSphere Process Server component will send JMS messages
 - This JMS queue destination is configured in the SCA JMS Import binding of the SCA component.



JMS based integration using SCA JMS binding contd.

- WebSphere Process Server component can receive business document from WebSphere Partner Gateway using SCA JMS export binding
 - ?To? Gateway of the WebSphere Partner Gateway participant connection is a JMS gateway
 - This JMS gateway is configured to send JMS messages to JMS queue
 - This JMS queue is the queue configured in the SCA JMS Export binding of the SCA component



Configuring WebSphere Process Server for JMS based integration

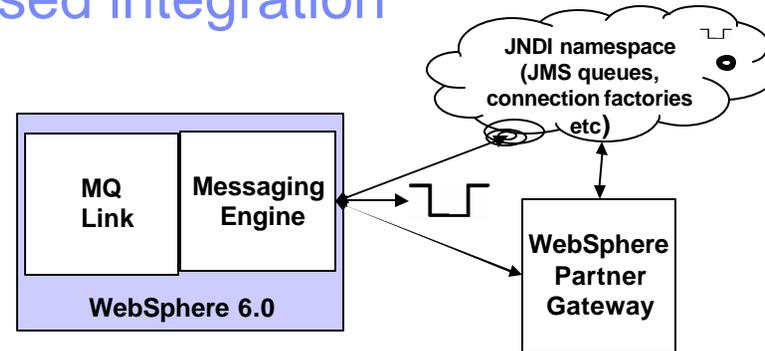
- Configure and setup JMS provider
 - Administratively create required JMS objects (queues and connection factory)
 - Store references to JMS objects in JNDI
 - WebSphere Process Server uses WebSphere JNDI of the WebSphere instance on which it is running
- If component will send business documents to WebSphere Partner Gateway generate SCA JMS import binding
 - Use point-to-point as messaging domain
 - Develop required JMS data binding or use WebSphere Process Server provided default JMS data binding
- If component will receive business documents from WebSphere Partner Gateway generate SCA JMS export binding if
 - Use point-to-point as messaging domain
 - Develop required JMS data binding or use WebSphere Process Server provided default JMS data binding
 - Develop JMS function selector



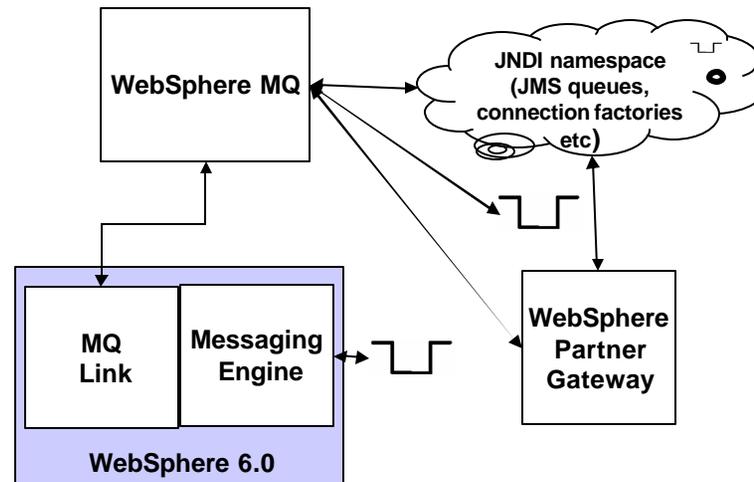
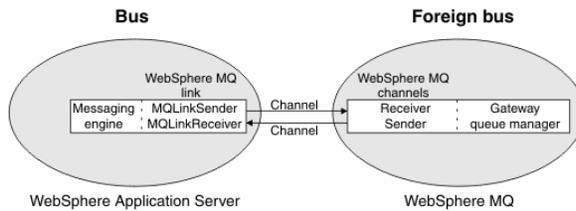


JMS providers for JMS based integration

- WebSphere 6.0 default messaging provider



- WebSphere MQ via MQ link





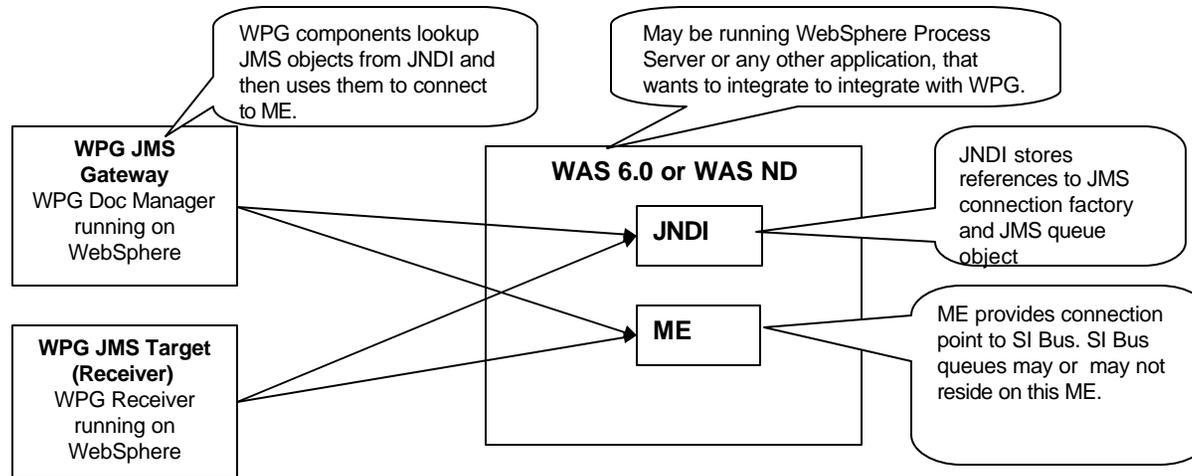
JMS providers for JMS based integration contd.

- WebSphere Process Server supports WebSphere 6.0 default messaging provider (Service Integration Bus)
- WebSphere Partner Gateway 6.0 fixpack 1 supports WebSphere 6.0 default messaging provider (Service Integration Bus)
 - NOT supported if WebSphere Partner Gateway installed with embedded WebSphere option
 - If WebSphere Gateway installed with embedded option, WebSphere MQ should be used as JMS provider
 - WebSphere Partner Gateway connects to WebSphere MQ queue manager
 - MQ Link is configured on service integration bus. WebSphere MQ queue manager becomes foreign bus for Service integration bus





JNDI for JMS based integration



- **WebSphere Partner Gateway on WebSphere**

- WebSphere JNDI on WebSphere instance of WebSphere Process Server or on WebSphere Partner Gateway or on any other WebSphere instance can be used
 - WebSphere admin console of WebSphere instance can be used to administer JMS objects



JNDI for JMS based integration contd.

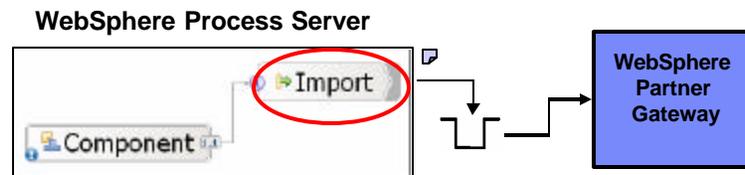
- WebSphere Partner Gateway installed with embedded WebSphere option
 - WebSphere MQ file system JNDI is used



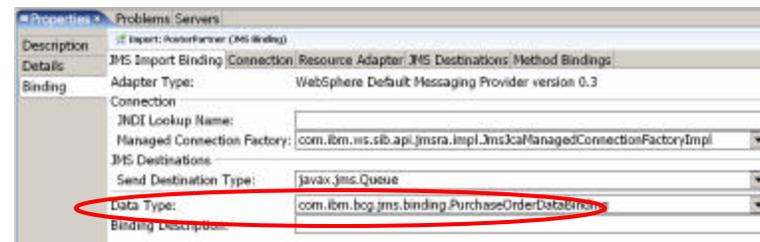
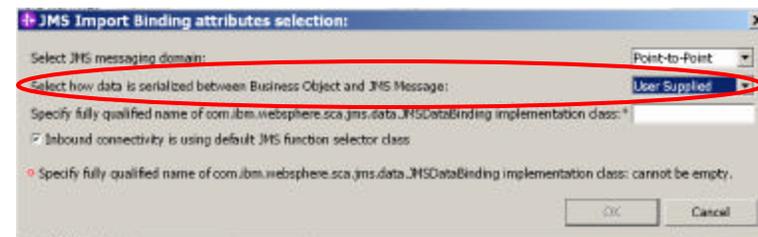


SCA JMS Import binding

- JMS Import uses JMS data binding to convert business object into JMS message and vice versa

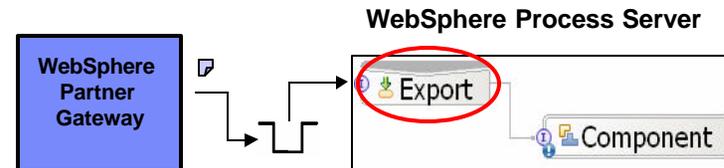


- NONE packaging:
 - XML/JMS messages: Use WebSphere Process Server provided default data binding or develop your own
 - Other message types: Develop your own data binding
- Backend integration packaging: Use backend integration packaging data binding (more later)

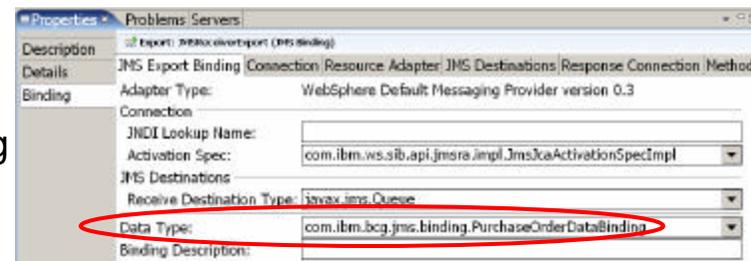
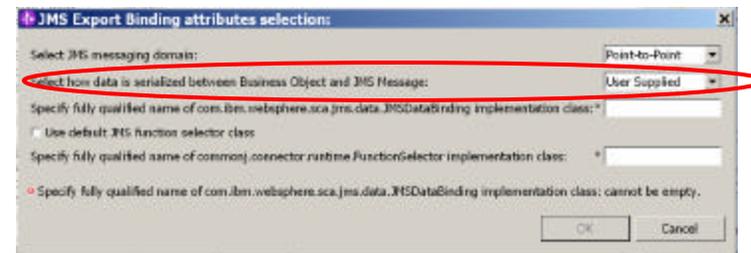


SCA JMS Export binding

- JMS Export binding uses JMS data binding to convert JMS message into business object and vice versa



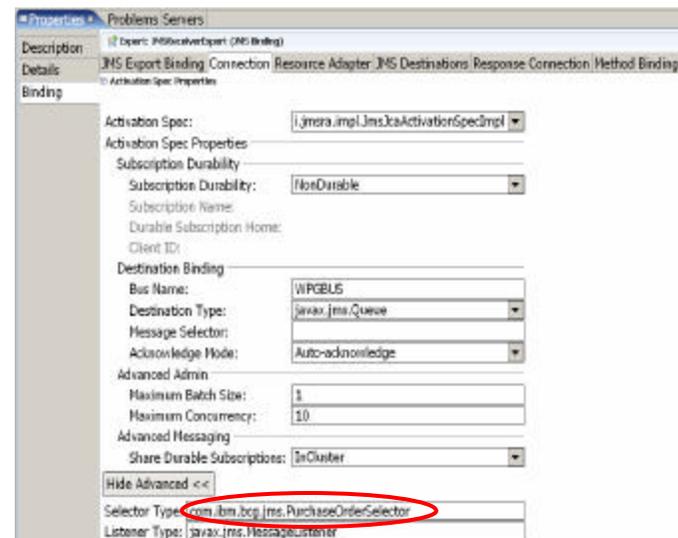
- NONE packaging:
 - XML/JMS messages: Use WebSphere Process Server provided default data binding or develop your own
 - Other message types: Develop your own data binding
- Backend integration packaging: Use backend integration packaging data binding (more later)





SCA JMS Export binding contd.

- SCA JMS Export binding uses functional selector to extract native method of service from the input JMS message
 - Backend Integration packaging: Use backend integration packaging JMS headers to determine method name
 - NONE packaging: Use one of these approaches
 - Minimal parsing: Do minimal parsing to extract method name
 - Trivial function selector: Always return same method name. This requires your component to have only one JMS Export.
 - Dispatcher component: Front end your component with Dispatcher component. Dispatcher determines method name

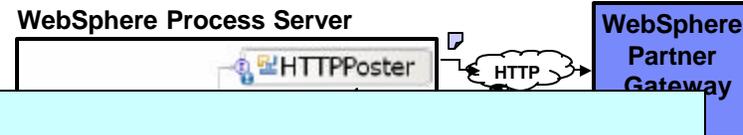


HTTP based integration using SCA binding

- WebSphere Process Server components can use SCA import binding to send WebSphere Partner Gateway HTTP

- You need (preferably)
 - Serial business document
 - Does WebSphere HTTP

- You wire component business component POST



```

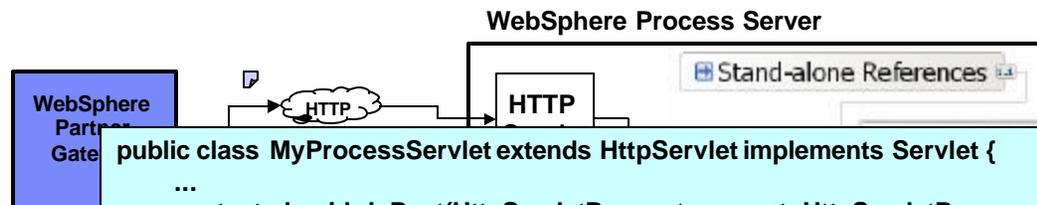
byte[] busDoc;
// convert business object into bytes
...
try{
    java.net.HttpURLConnection uc = (java.net.HttpURLConnection) new
        URL(wpgHTTPTargetURL).openConnection();
    uc.setDoInput(true);    uc.setDoOutput(true);
    uc.setRequestMethod("POST");

    uc.setRequestProperty("Content-Type", "text/xml"); // Set the content type
    uc.connect();
    BufferedOutputStream os = new BufferedOutputStream(uc.getOutputStream());
    os.write ( busDoc ); os.close ();
    ...
    // If you are expecting response business document read the response
    InputStream is = uc.getInputStream();
    if(is != null){
        BufferedInputStream bis = new BufferedInputStream
            (uc.getInputStream());
        // Read response business document bytes from BufferedInputStream
        // Convert response business document into business object
        ...
        bis.close ();
    }
}
catch( Throwable ex ){ ... }

```



HTTP based integration using SCA binding contd.



- WebSphere
 - from WebSp
 - ?To?Gat
 - a HTTP
 - This HT
 - which H
 - You nee
 - const
 - Invok

```

public class MyProcessServlet extends HttpServlet implements Servlet {
    ...
    protected void doPost(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
        ServiceManager serviceManager;
        contentType = request.getContentType();
        InputStream ios = request.getInputStream();
        BusinessObject bo;          // Convert input stream to business object
        ...
        try{
            // locate bo factory service
            serviceManager = new ServiceManager();
            BOFactory bofactory = (BOFactory)serviceManager.locateService (
                "com/ibm/websphere/bo/BOFactory");
            // create business object
            bo = bofactory.create("http://myprocessbons", "myprocessbo");
            // read bo attributes from stream
            ...
            // Invoke service
            Service service = (Service) serviceManager.locateService(SERVICENAME);
            service.invoke(METHODNAME, bo);
        } catch(Exception ex){exp.printStackTrace(); ... }
        ...
    }
}
    
```

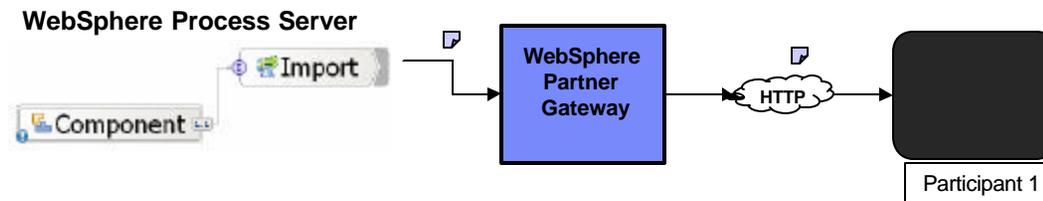


Web Service based integration using SCA WS binding

- WebSphere Process Server components can invoke Web Services hosted by community participants as SOAP/HTTP Web Services
 - Community Participant provides SOAP/HTTP WSDL
 - This WSDL has URL of Community Participant specified as end point
 - Import SOAP/HTTP WSDL provided by Community Participant into WebSphere Partner Gateway console
 - This will make Web Service available at WebSphere Partner Gateway URL
 - Generate SCA WS Import binding for the WebSphere Process Server component interested in invoking the Web Service
 - Update the end point URL of SCA WS import binding to specify WebSphere Partner Gateway URL as end point
 - Alternatively you can also update the URL from WebSphere Admin console after deploying your integration module into WebSphere Process Server
 - If you are not using HTTPS between WebSphere Process Server and WebSphere Partner Gateway
 - After deploying your integration application specify HTTP basic authentication credentials from WebSphere Process Server admin console

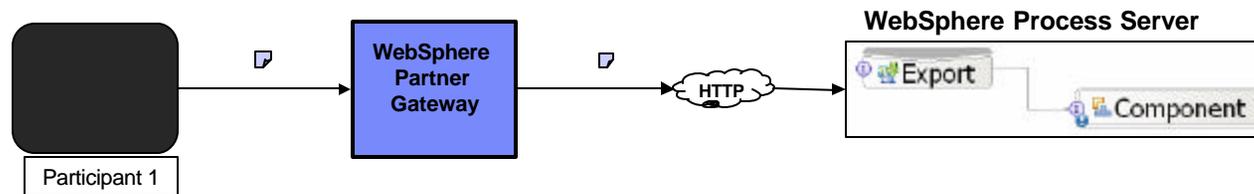


Web Service based integration using SCA WS binding contd.



- Invoking Web Services hosted by community participants continued...
 - At run-time WebSphere Process Server component invokes Web Service at the URL of WebSphere Partner Gateway
 - WebSphere Partner Gateway acts as proxy and in-turn invokes the service at Community Participant end point
 - The response received from the community participant is returned to WebSphere Process Server in the same HTTP connection as the request.

Web Service based integration using SCA WS binding contd.



- Community Participants can invoke WebSphere Process Server component as SOAP/HTTP Web Services
 - WS Export binding of the component generates the SOAP/HTTP WSDL for the component
 - This WSDL has URL of WebSphere Process Server specified as end point
 - Import SOAP/HTTP WSDL generated by WS Export binding into WebSphere Partner Gateway
 - Provide Community Participant with SOAP/HTTP WSDL which has URL of WebSphere Partner Gateway specified as end-point
 - At run-time Community Participant invokes Web Service at the URL of WebSphere Partner Gateway
 - WebSphere Partner Gateway acts as proxy and in-turn invokes the URL specified in the WSDL generated by WS Export binding of the WebSphere Process Server component



File system based integration

- WebSphere Process Server components can use SCA EIS export binding to receive business document from WebSphere Partner Gateway over file system
 - IBM WebSphere Adapter for Flat File is used
 - Flat File Adapter ASBO is required

- WebSphere Process Server component can receive business document from WebSphere Partner Gateway using SCA EIS export binding
 - To? Gateway of the WebSphere Partner Gateway participant connection is a File gateway

 - This File gateway is configured to write business document to the directory at which IBM WebSphere Adapter for Flat File is polling

 - At runtime WebSphere Partner Gateway writes business document into the file system

 - Flat File Adapter retrieves the business document file from the file system
 - De-serializes file into Flat File Adapter ASBO
 - Invokes the component with the Flat File Adapter ASBO





File system based integration contd.

- WebSphere Process Server components can use SCA EIS import binding to send business document to WebSphere Partner Gateway over file system
 - IBM WebSphere Adapter for Flat File is used
 - Flat File Adapter ASBO is required

- WebSphere Process Server component can send business document to WebSphere Partner Gateway using SCA EIS import binding
 - IBM WebSphere Adapter for Flat File is configured to write to the file directory which is configured as the File Target of WebSphere Partner Gateway
 - At runtime WebSphere Process Server component serializes business object and creates Flat File Adapter ASBO
 - Component then invokes Flat File Adapter with Flat File Adapter ASBO
 - Flat File Adapter uses Flat File Adapter ASBO to serialize business document on file system
 - WebSphere Partner Gateway File Target retrieves business document from the file directory





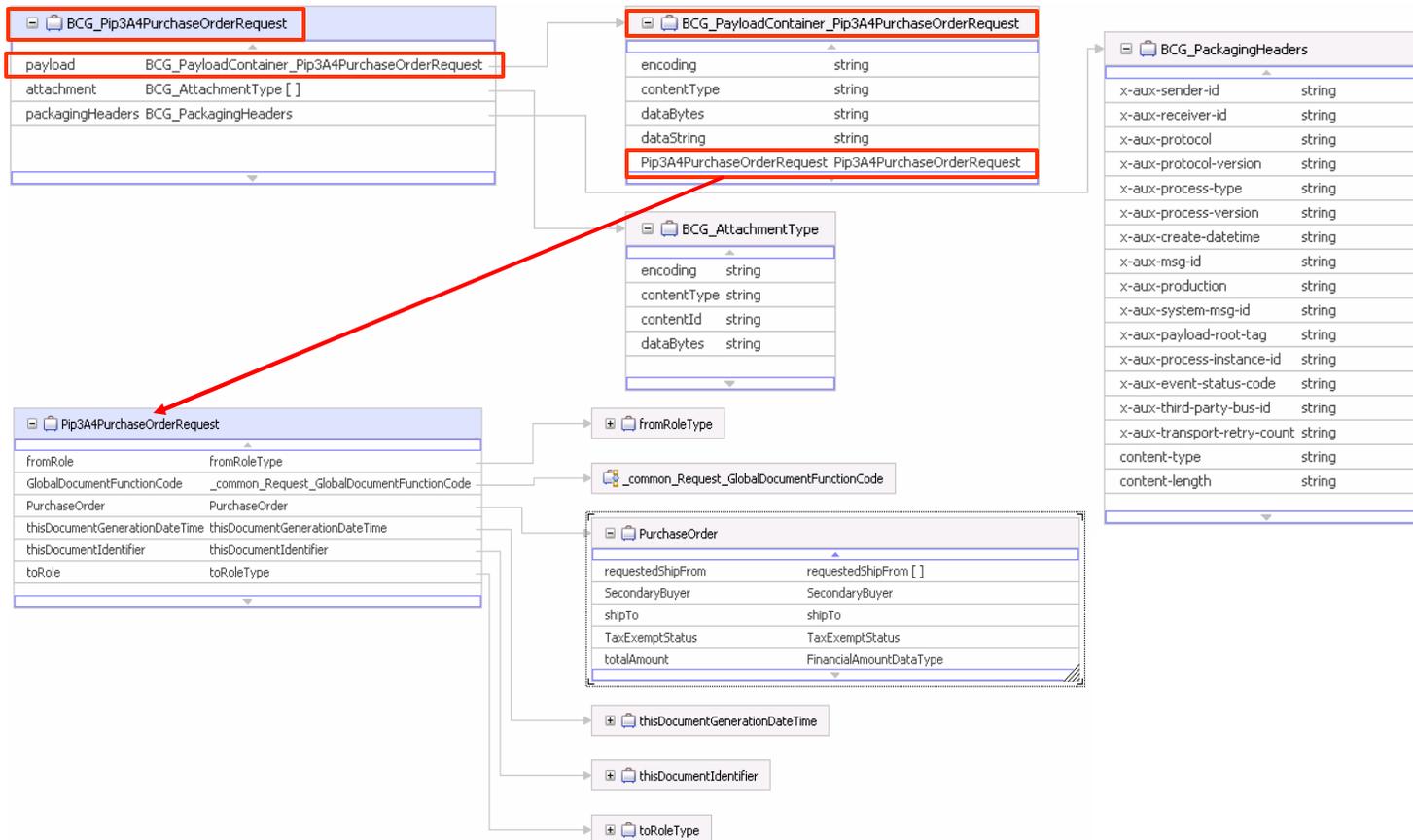
Handling backend integration packaging messages

- To handle backend integration packaging messages WebSphere Partner Gateway provides
 - `BCGBackendIntegrationJMSSDataBindingImpl` class
 - JMS data binding implementation
 - Can be used as is or can be extended and customized
 - `BCGBackendIntegrationDataBindingUtil` class
 - Utility class for handling backend integration packaging messages
 - Can be used for serializing backend integration stream into business object and vice versa
- Backend integration packaging ASBO required
- No 'standard' function selector provided
- Supports XML messages within transport envelope, plain XML message and non-XML messages





Backend integration packaging ASBO.





Integration samples and documentation

- There are two samples included with WebSphere Partner Gateway 6.00 Fixpack 1 (<WPG>/Integration/WBI/WebSphereProcessServer)
 - JMS Example (JMSSample.zip)
 - Project interchange file illustrates how to develop and configure for JMS based integration
 - PIP Example (BCG_PIP3A4Sample.zip)
 - Project Interchange file which includes modules for RosettaNet PIP 3A4 buyer and seller that include interfaces, business objects, process logic and custom extensions on the WPG data binding
- Documentation of integration approaches and step by step guide of the examples are available at:
 - <http://publib.boulder.ibm.com/infocenter/wbihelp/index.jsp>





Summary

- Various approaches highlighted in this presentation can be used to implement B2B for your SOA using WebSphere Partner Gateway and WebSphere Process Server
- The approach to use depends on B2B protocol and integration requirements





धन्यवाद
Hindi

多謝
Traditional Chinese

ขอบพระคุณ
Thai

Спасибо
Russian

Gracias
Spanish

Thank You
English

شكراً
Arabic

Merci
French

Obrigado
Brazilian Portuguese

Grazie
Italian

多谢
Simplified Chinese

Danke
German

நன்றி
Tamil

ありがとうございました
Japanese

감사합니다