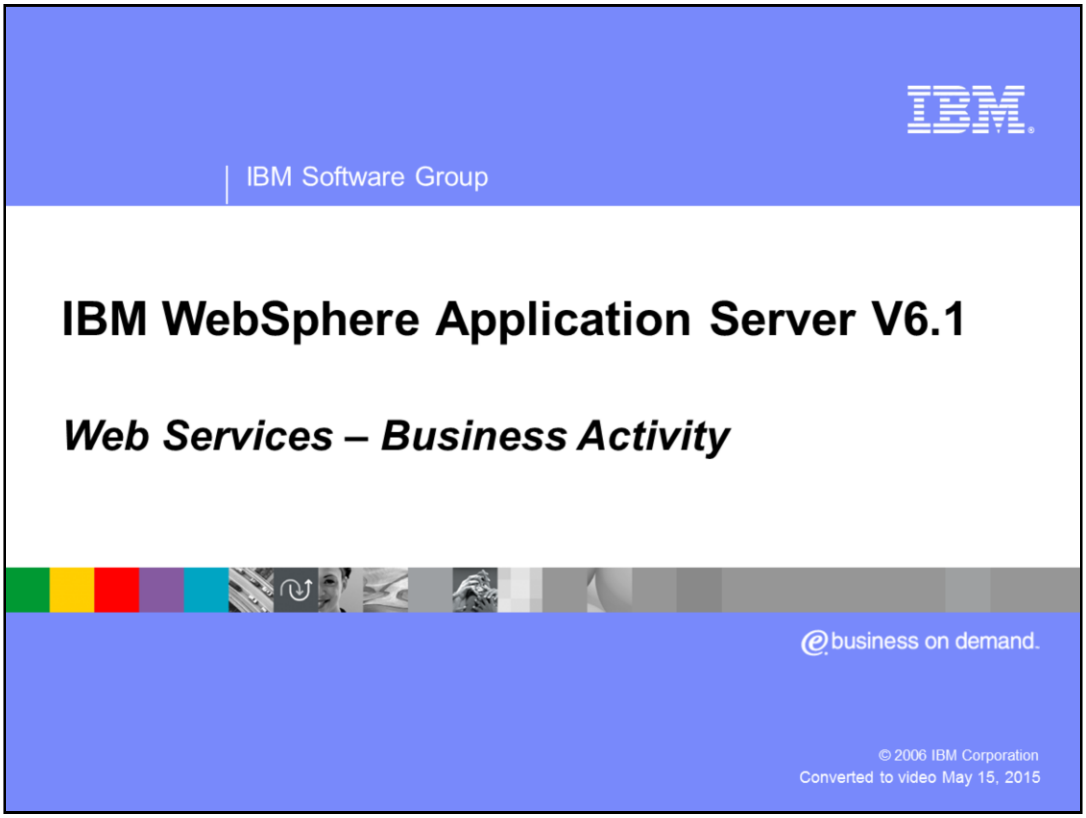

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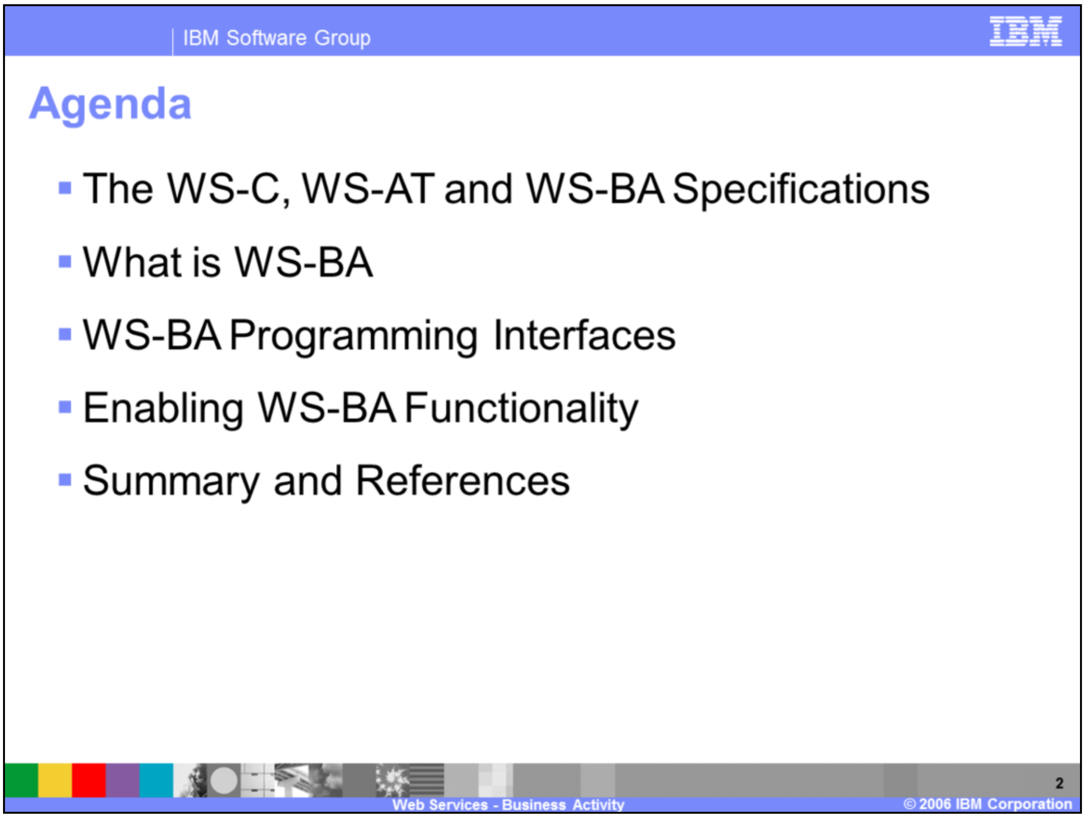
IBM WebSphere Application Server V6.1

Web Services – Business Activity

business on demand.

Converted to video May 15, 2015

This presentation will explain the Web Services Business Activity support in WebSphere® Application Server Version 6.1.



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Agenda

- The WS-C, WS-AT and WS-BA Specifications
- What is WS-BA
- WS-BA Programming Interfaces
- Enabling WS-BA Functionality
- Summary and References

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Web Services - Business Activity

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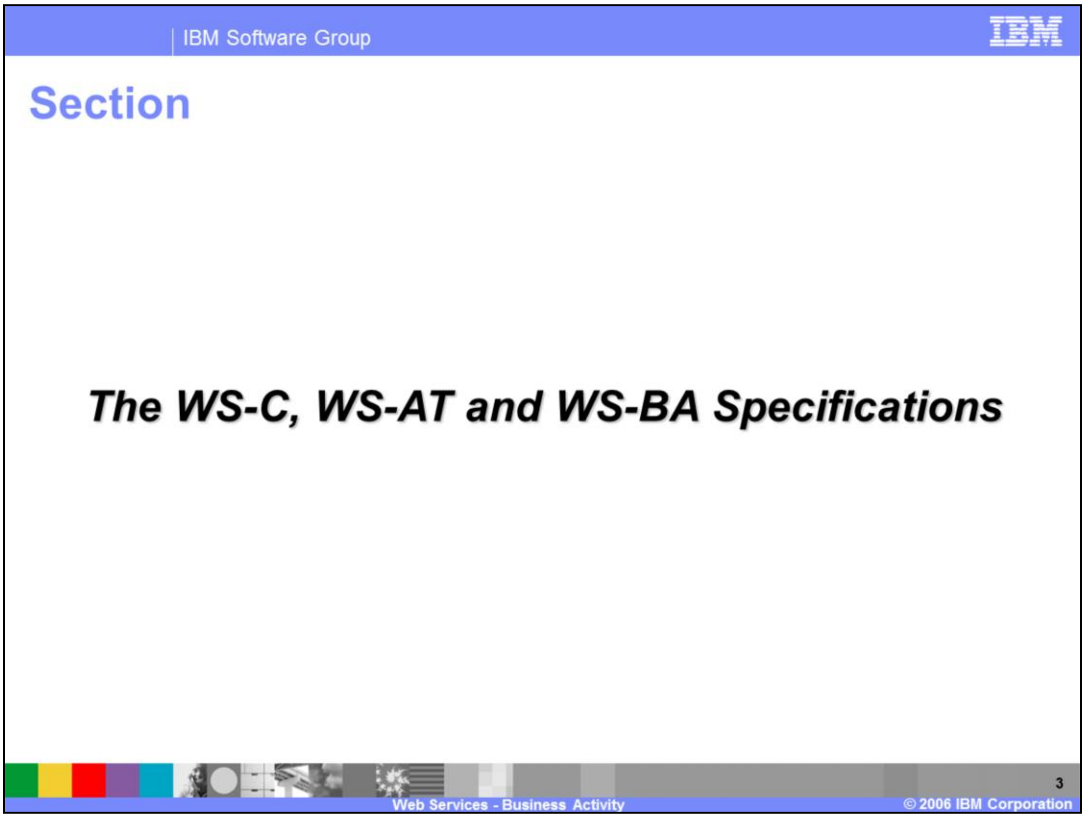
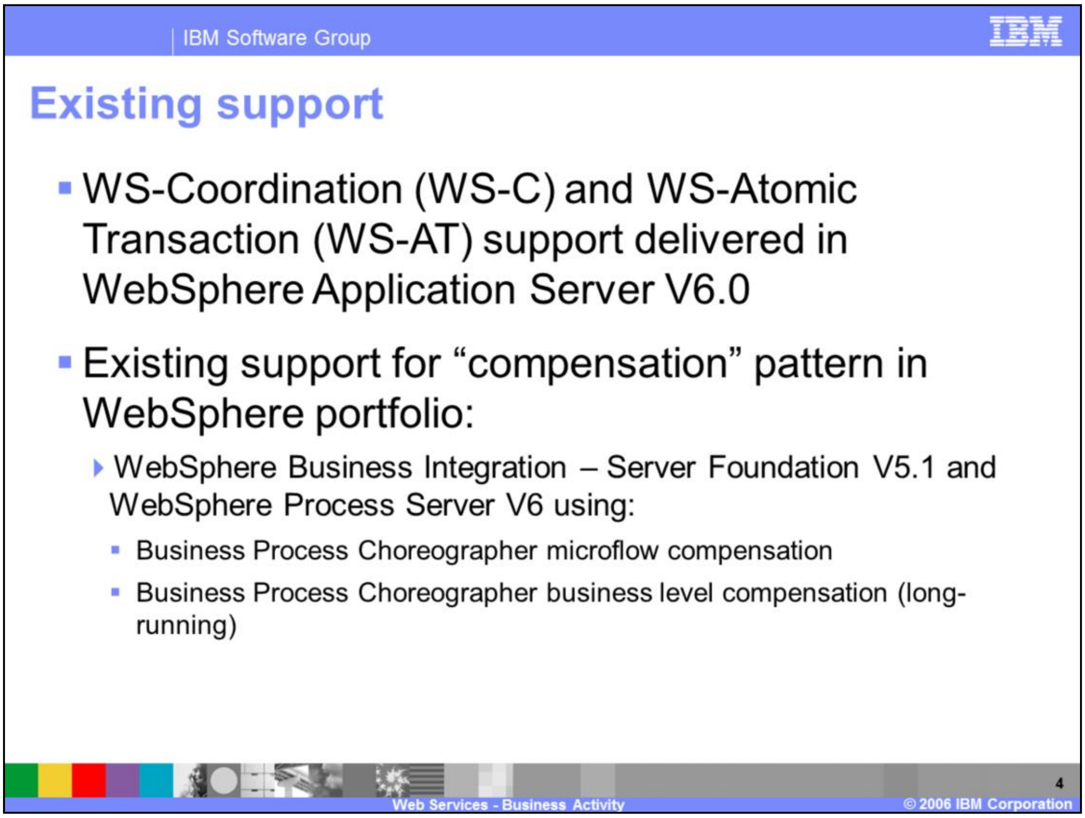
This presentation will begin by explaining the support offered in WebSphere Application Server for the specifications that Web Services Business Activity relies on. Next, this presentation will explain the Web Services Business Activity specification and give an example of the programming interfaces. Last, this presentation will explain how to enable Business Activity functionality within WebSphere Application Server.



Section

The WS-C, WS-AT and WS-BA Specifications

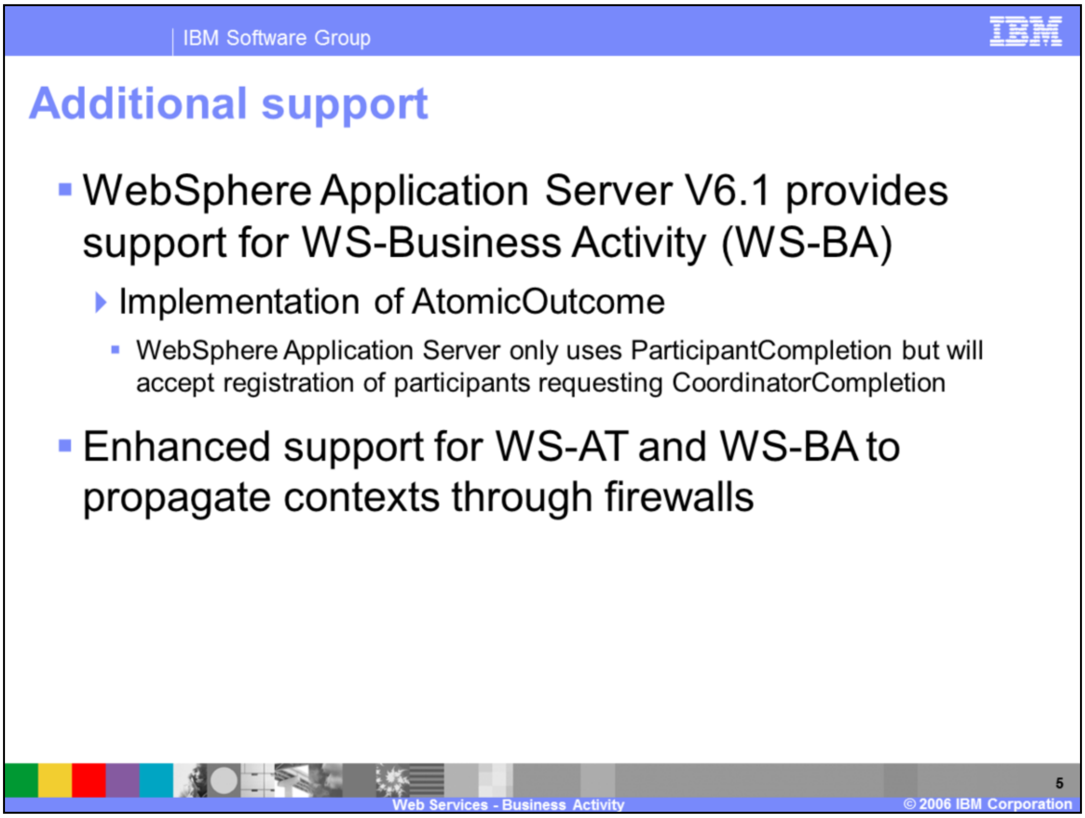
This section discusses the support for various Web Services Business Activity related specifications in WebSphere Application Server Version 6.1.



Existing support

- WS-Coordination (WS-C) and WS-Atomic Transaction (WS-AT) support delivered in WebSphere Application Server V6.0
- Existing support for “compensation” pattern in WebSphere portfolio:
  - WebSphere Business Integration – Server Foundation V5.1 and WebSphere Process Server V6 using:
    - Business Process Choreographer microflow compensation
    - Business Process Choreographer business level compensation (long-running)

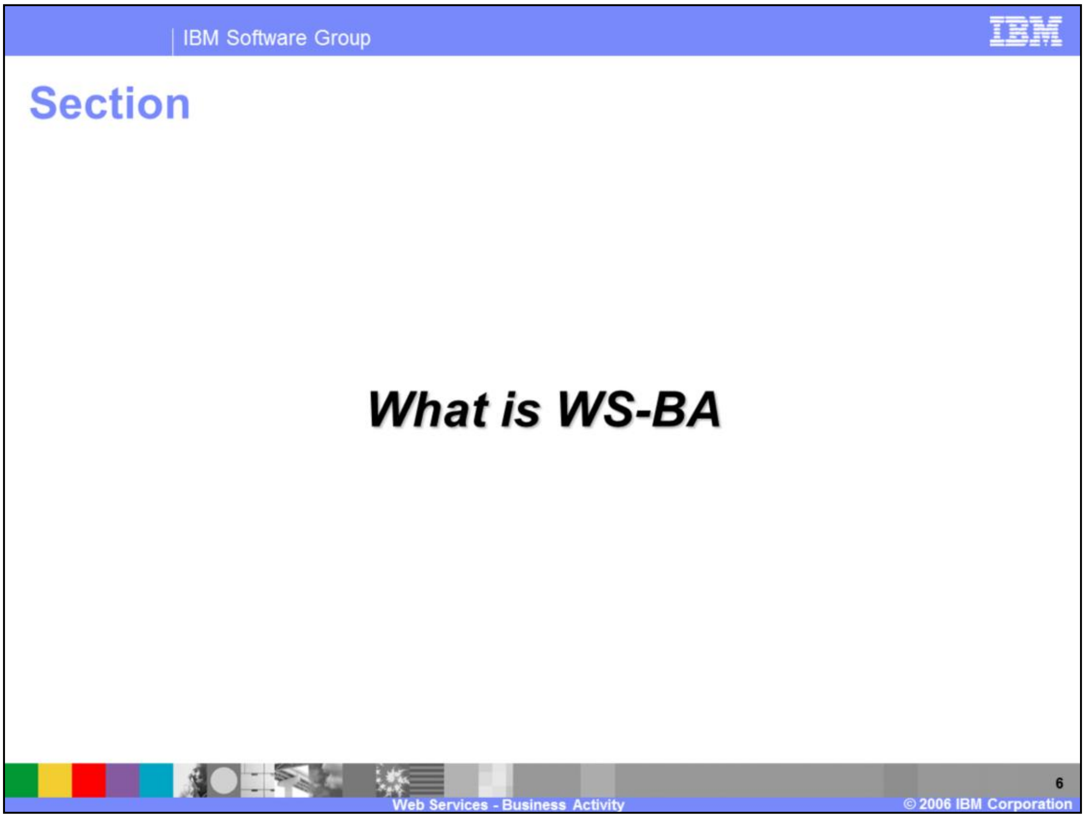
Support for the Web Services Coordination and Web Services Atomic Transactions was provided in WebSphere Application Server Version 6.0. Support for a larger compensation pattern similar to that provided by the Business Activity specification has been offered by other WebSphere products, such as WebSphere Business Integration Server Foundation and Business Process Choreographer.



Additional support

- WebSphere Application Server V6.1 provides support for WS-Business Activity (WS-BA)
  - Implementation of AtomicOutcome
    - WebSphere Application Server only uses ParticipantCompletion but will accept registration of participants requesting CoordinatorCompletion
- Enhanced support for WS-AT and WS-BA to propagate contexts through firewalls

In WebSphere Application Server Version 6.1 support is provided for the Web Services Business Activity specification. Enhancements are provided in the support WS-AT to allow contexts to be propagated through firewalls and other network intermediaries.



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Section

What is WS-BA

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Web Services - Business Activity

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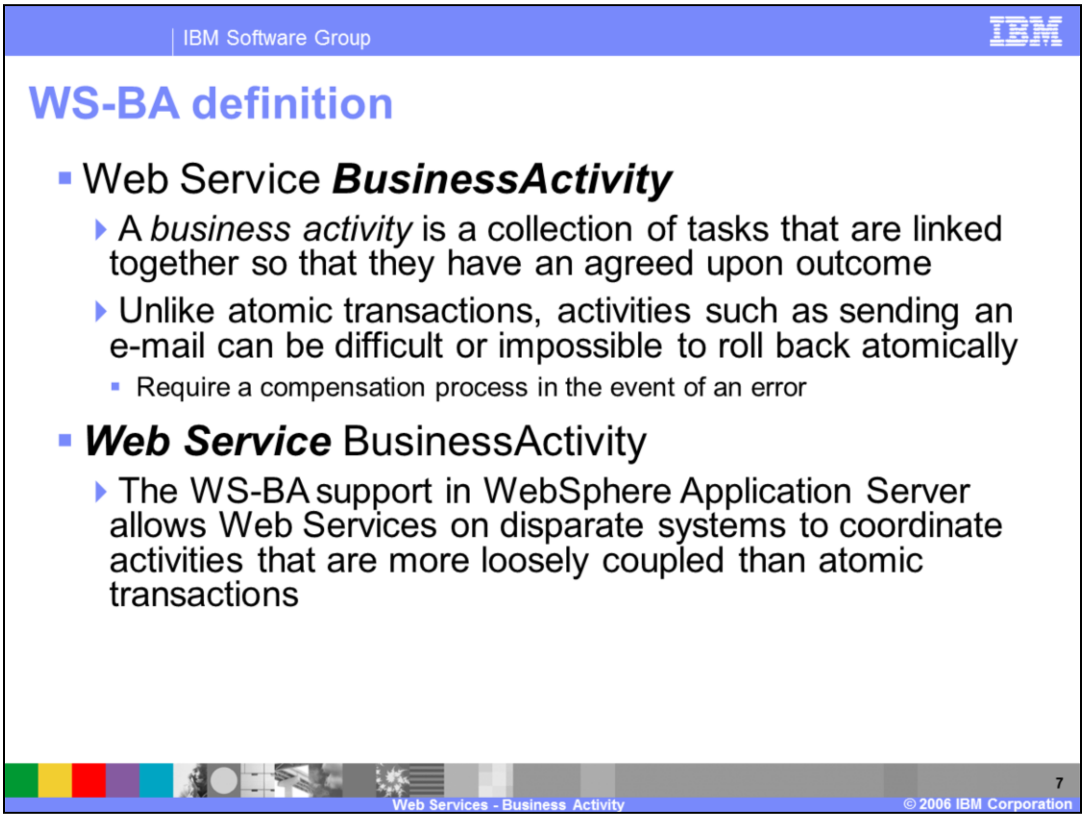
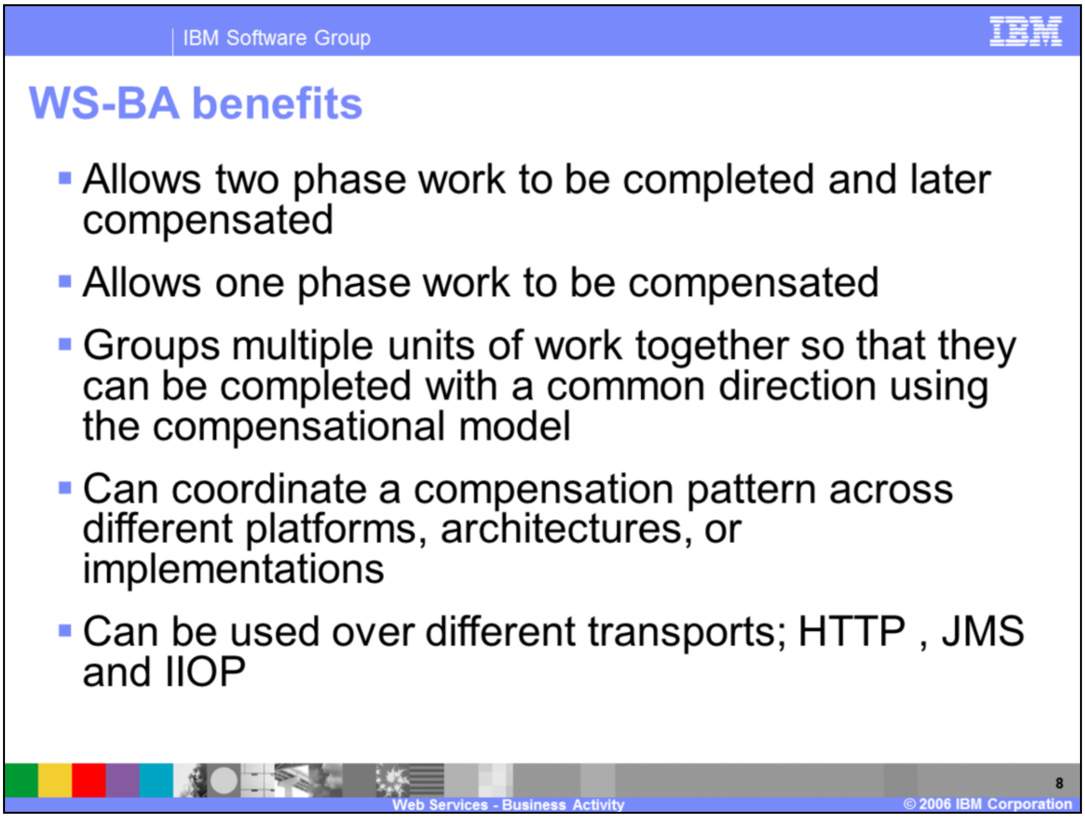
The next section will explain the Web Services Business Activity specification.



WS-BA definition

- Web Service ***BusinessActivity***
  - A *business activity* is a collection of tasks that are linked together so that they have an agreed upon outcome
  - Unlike atomic transactions, activities such as sending an e-mail can be difficult or impossible to roll back atomically
    - Require a compensation process in the event of an error
- ***Web Service*** BusinessActivity
  - The WS-BA support in WebSphere Application Server allows Web Services on disparate systems to coordinate activities that are more loosely coupled than atomic transactions

A business activity is considered a collection of tasks that are linked together in way that they have a common final state. These encompass larger more complex activities, such as sending an e-mail, that the atomic transactions specification cannot contain. From the stand point of Web Services, this allows services on different systems to operate together and coordinate their actions in a larger transactional context.



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WS-BA benefits

- Allows two phase work to be completed and later compensated
- Allows one phase work to be compensated
- Groups multiple units of work together so that they can be completed with a common direction using the compensational model
- Can coordinate a compensation pattern across different platforms, architectures, or implementations
- Can be used over different transports; HTTP , JMS and IIOP

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Web Services - Business Activity

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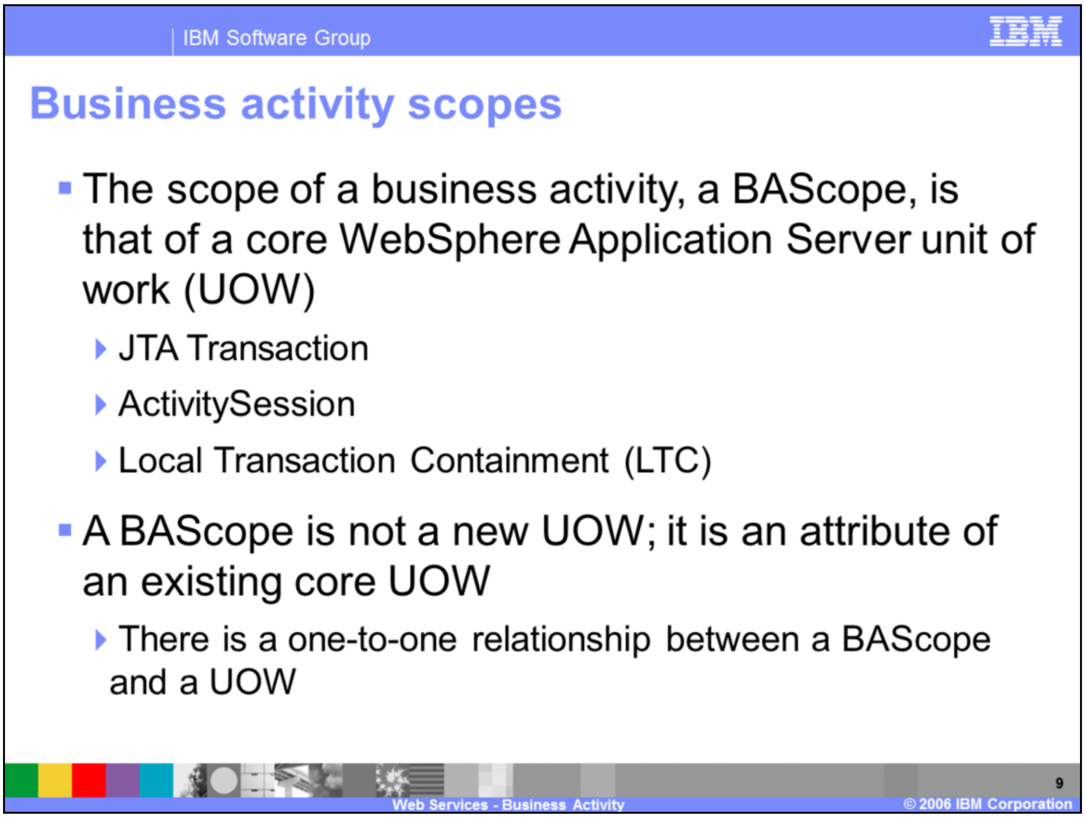
The WS-BA specification allows single phase work to be compensated, and two phase work to be completed and then compensated at a later time. The specification provides a model for grouping together multiple units of work so that they can be completed in the same compensational model. Since this is a Web Services specification it must be flexible enough to manage compensations across multiple platforms and implementations in a heterogeneous environment. The specification also supports multiple transports, including HTTP, JMS and IIOP.



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Business activity scopes

- The scope of a business activity, a BAScope, is that of a core WebSphere Application Server unit of work (UOW)
  - JTA Transaction
  - ActivitySession
  - Local Transaction Containment (LTC)
- A BAScope is not a new UOW; it is an attribute of an existing core UOW
  - There is a one-to-one relationship between a BAScope and a UOW

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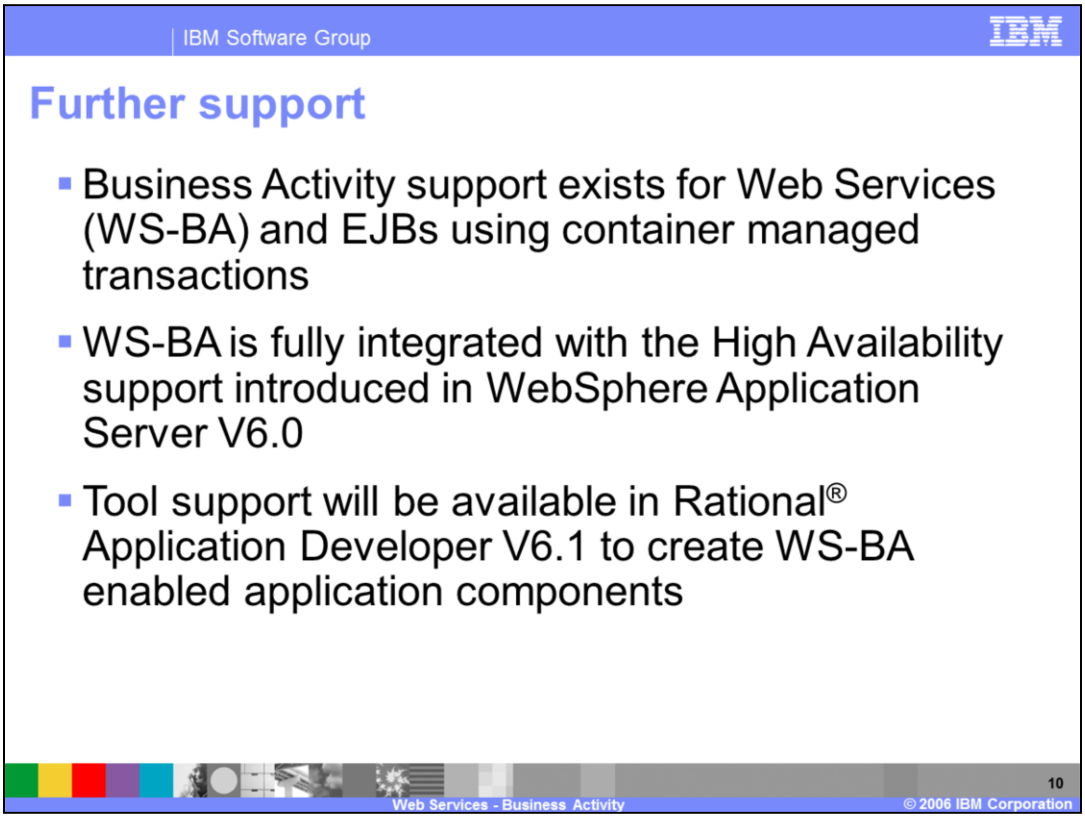
Web Services - Business Activity

A business activity is scoped to a core WebSphere Application Server unit of work, such as a JTA transaction. A business activity scope or BAScope, is not a new unit of work, but rather it exists as an attribute of an existing unit of work in a one-to-one relationship.



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Further support

- Business Activity support exists for Web Services (WS-BA) and EJBs using container managed transactions
- WS-BA is fully integrated with the High Availability support introduced in WebSphere Application Server V6.0
- Tool support will be available in Rational® Application Developer V6.1 to create WS-BA enabled application components

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Web Services - Business Activity

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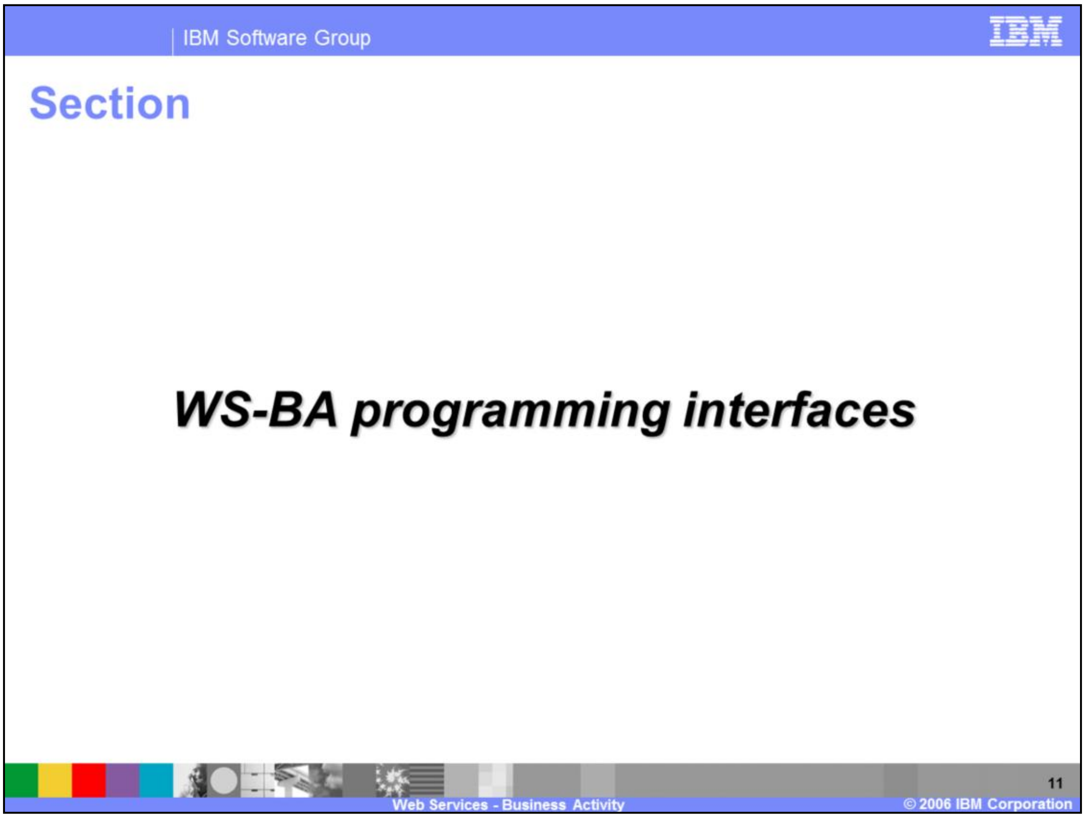
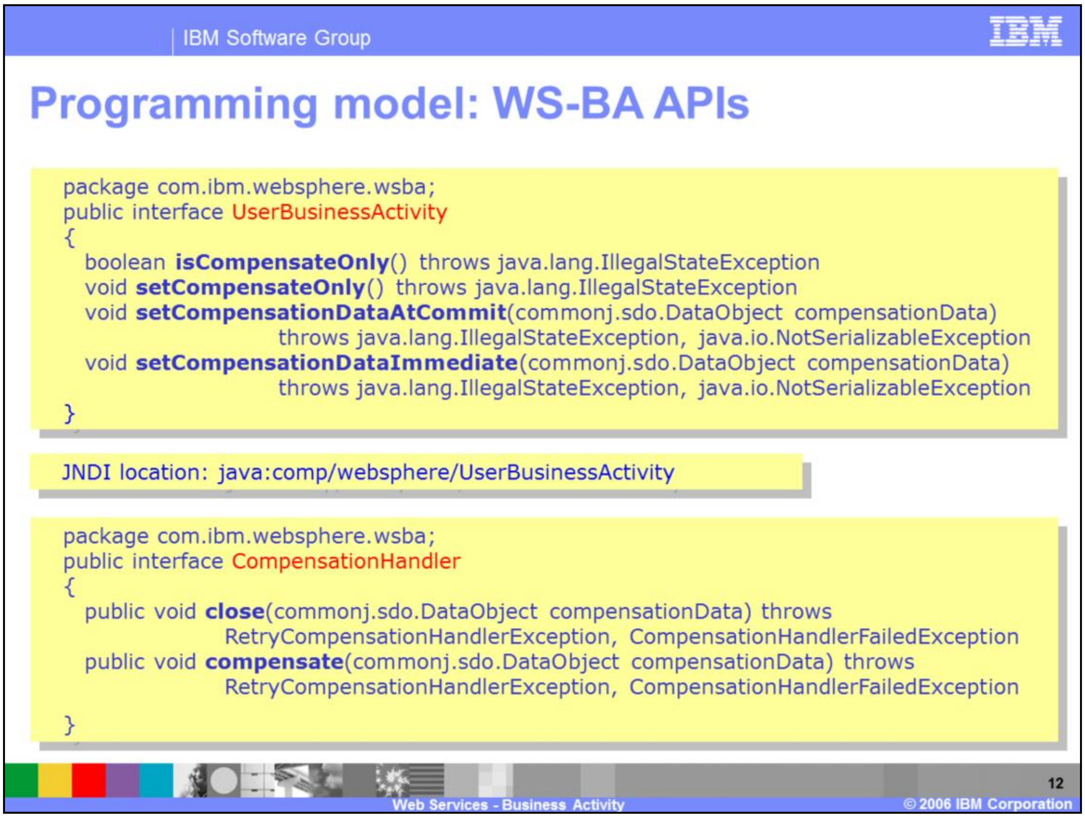
Business activity support exists for Web Service and EJBs using container managed transactions. This is also fully integrated with the high availability support that was introduced in WebSphere Application Server V6.0. Tool support for the Business Activity specification is included in the new Rational tools as well.



Section

WS-BA programming interfaces

The next section shows an example of the programming interfaces for Web Services Business Activity.



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Programming model: WS-BA APIs

```
package com.ibm.websphere.wsba;
public interface UserBusinessActivity
{
  boolean isCompensateOnly() throws java.lang.IllegalStateException
  void setCompensateOnly() throws java.lang.IllegalStateException
  void setCompensationDataAtCommit(commonj.sdo.DataObject compensationData)
                  throws java.lang.IllegalStateException, java.io.NotSerializableException
  void setCompensationDataImmediate(commonj.sdo.DataObject compensationData)
                  throws java.lang.IllegalStateException, java.io.NotSerializableException
}
```

JNDI location: java:comp/websphere/UserBusinessActivity

```
package com.ibm.websphere.wsba;
public interface CompensationHandler
{
  public void close(commonj.sdo.DataObject compensationData) throws
               RetryCompensationHandlerException, CompensationHandlerFailedException
  public void compensate(commonj.sdo.DataObject compensationData) throws
               RetryCompensationHandlerException, CompensationHandlerFailedException

}
```

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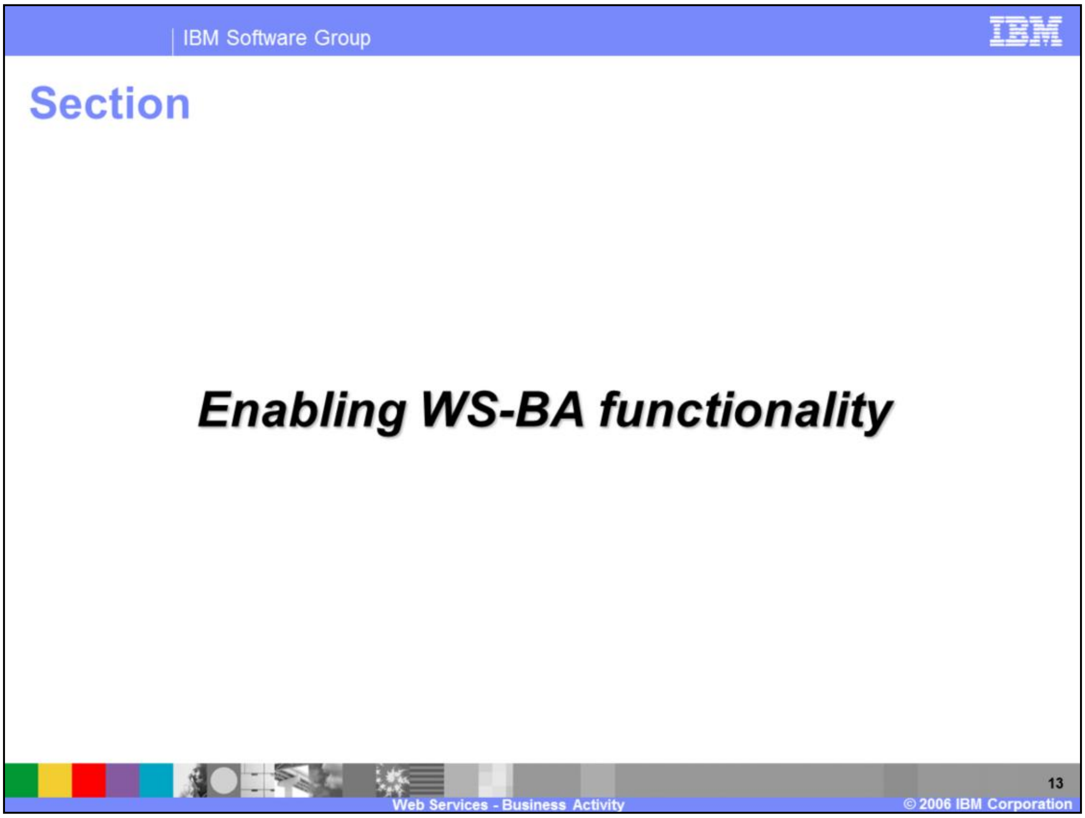
Web Services - Business Activity

This slide illustrates the interfaces for a UserBusinessActivity and a CompensationHandler. The CompensationHandler interface defines the compensate activity that is required for the transaction, whereas the UserBusinessActivity specifies how to handle the compensation.



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Section

Enabling WS-BA functionality

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Web Services - Business Activity

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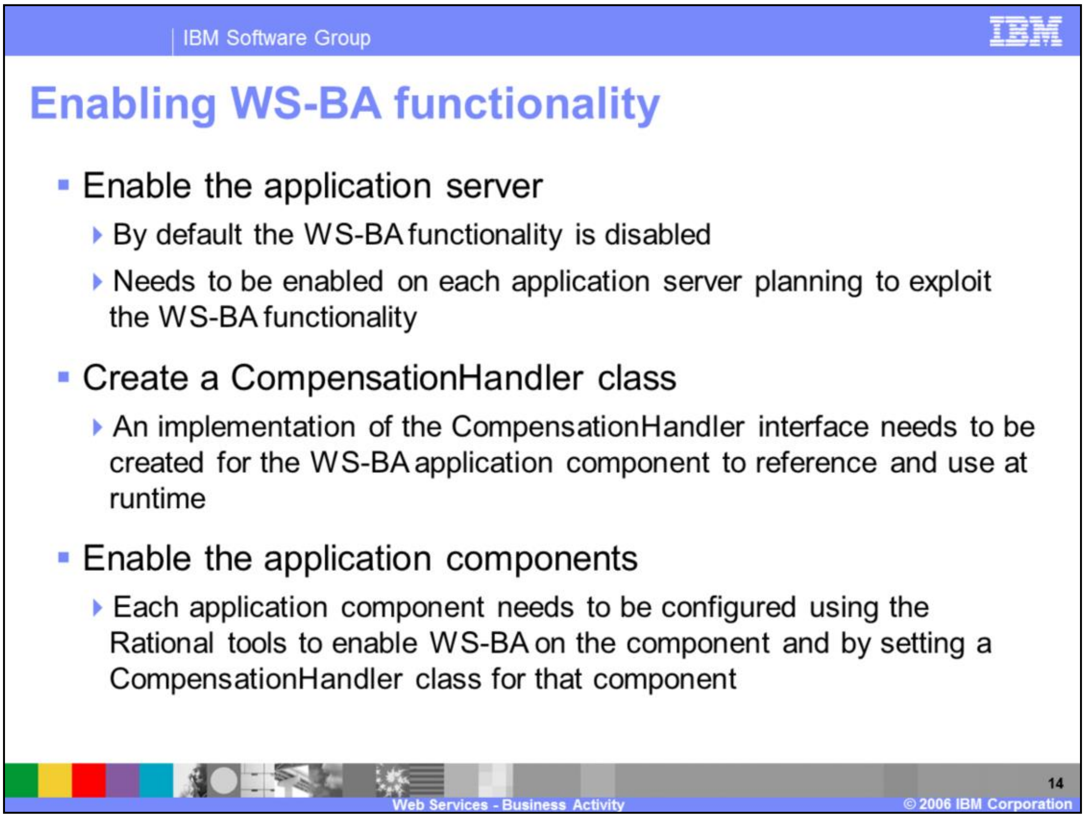
The next section explains how to enable Web Services Business Activity functionality within WebSphere Application Server Version 6.1.



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Enabling WS-BA functionality

- Enable the application server
  - By default the WS-BA functionality is disabled
  - Needs to be enabled on each application server planning to exploit the WS-BA functionality
- Create a CompensationHandler class
  - An implementation of the CompensationHandler interface needs to be created for the WS-BA application component to reference and use at runtime
- Enable the application components
  - Each application component needs to be configured using the Rational tools to enable WS-BA on the component and by setting a CompensationHandler class for that component

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Web Services - Business Activity

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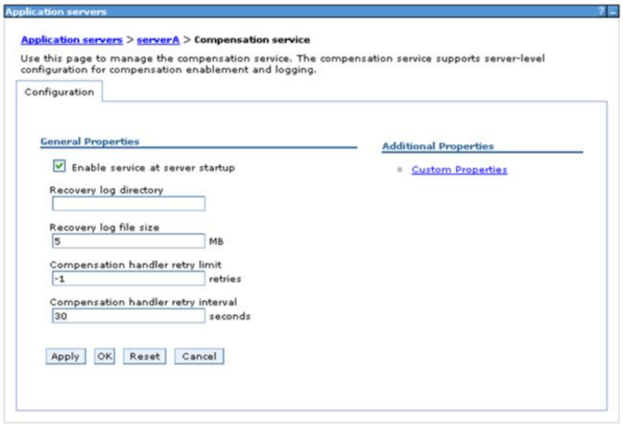
First the business activity functionality must be enabled for the application server, by default it is disabled. This must be enabled for every application server that will be involved with the business activity functionality. Then you must create a compensation handler class, like that shown in the last section. This will be used by the business activity application during runtime. Last the application components need to be enabled for business activity.

Enable the application server

1. In the Administrative Console, click Servers > Application servers > *server_name* > [Container Settings] Container Services > Compensation Service
2. Select the Enable service at server startup checkbox
3. Restart all the servers for the changes to take effect



Application servers

Application servers > serverA > Compensation service

Use this page to manage the compensation service. The compensation service supports server-level configuration for compensation enablement and logging.

Configuration

General Properties

☑ Enable service at server startup

Recovery log directory:

Recovery log file size: 5 MB

Compensation handler retry limit: -1 retries

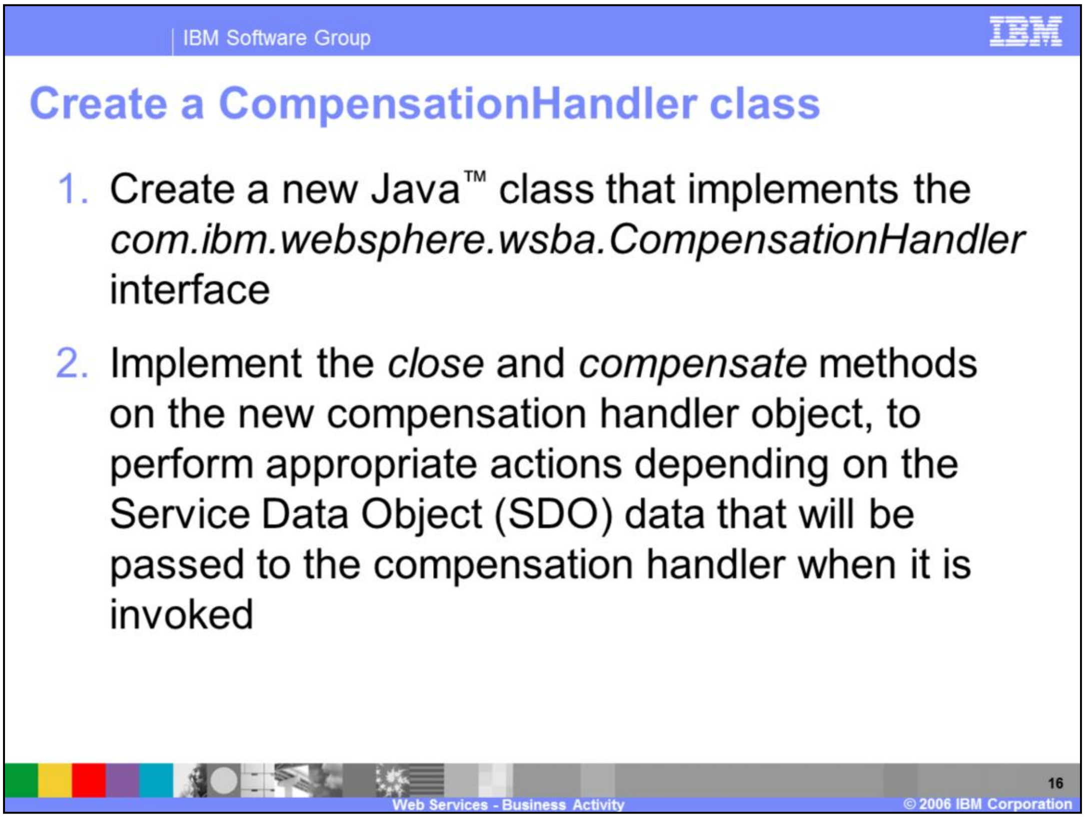
Compensation handler retry interval: 30 seconds

Apply | OK | Reset | Cancel

Additional Properties

- Custom Properties

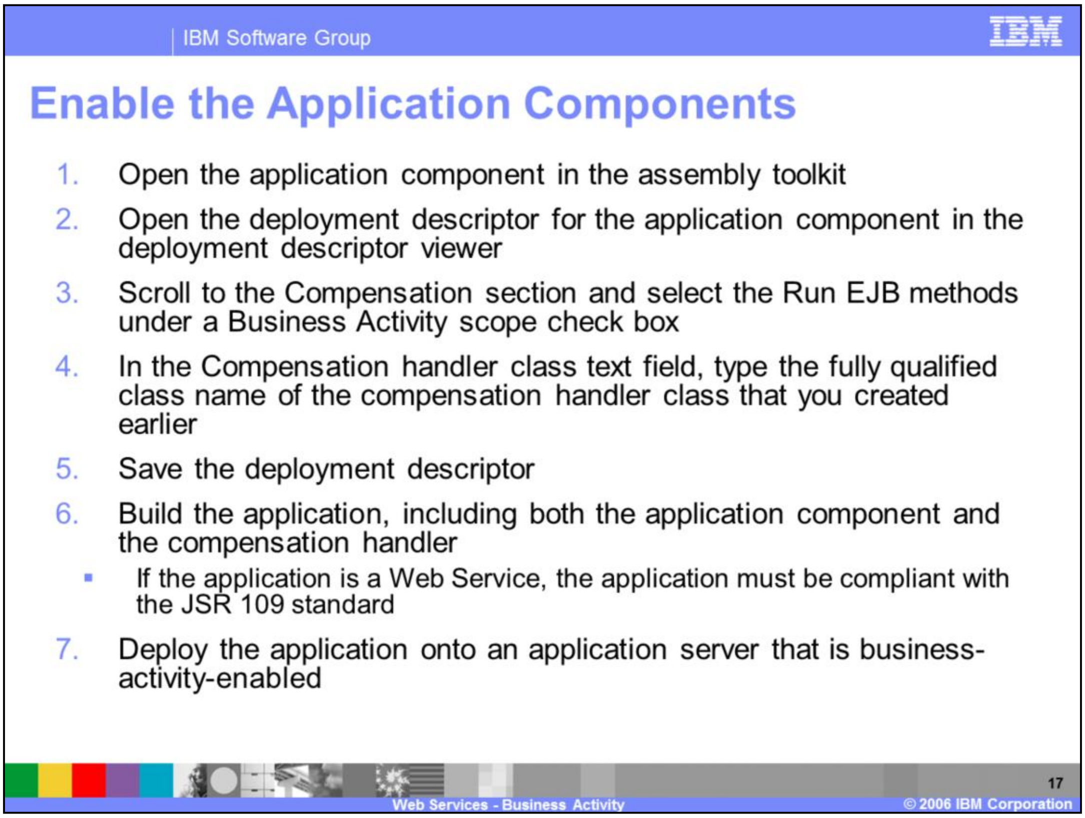
The business activity functionality can be enabled for an application server as a container service. Select the compensation service, and check the box for enabling the service during startup. After this had been enabled, the application server will need to be restarted.



Create a CompensationHandler class

1. Create a new Java™ class that implements the *com.ibm.websphere.wsba.CompensationHandler* interface
2. Implement the *close* and *compensate* methods on the new compensation handler object, to perform appropriate actions depending on the Service Data Object (SDO) data that will be passed to the compensation handler when it is invoked

Next you will need to write a new Java class that implements the CompensationHandler interface. You will have to create implementations of the *close* and *compensate* methods to perform the necessary actions depending on the data that is passed to the handler during runtime.



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Enable the Application Components

1. Open the application component in the assembly toolkit
2. Open the deployment descriptor for the application component in the deployment descriptor viewer
3. Scroll to the Compensation section and select the Run EJB methods under a Business Activity scope check box
4. In the Compensation handler class text field, type the fully qualified class name of the compensation handler class that you created earlier
5. Save the deployment descriptor
6. Build the application, including both the application component and the compensation handler
   - If the application is a Web Service, the application must be compliant with the JSR 109 standard
7. Deploy the application onto an application server that is business-activity-enabled

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Web Services - Business Activity

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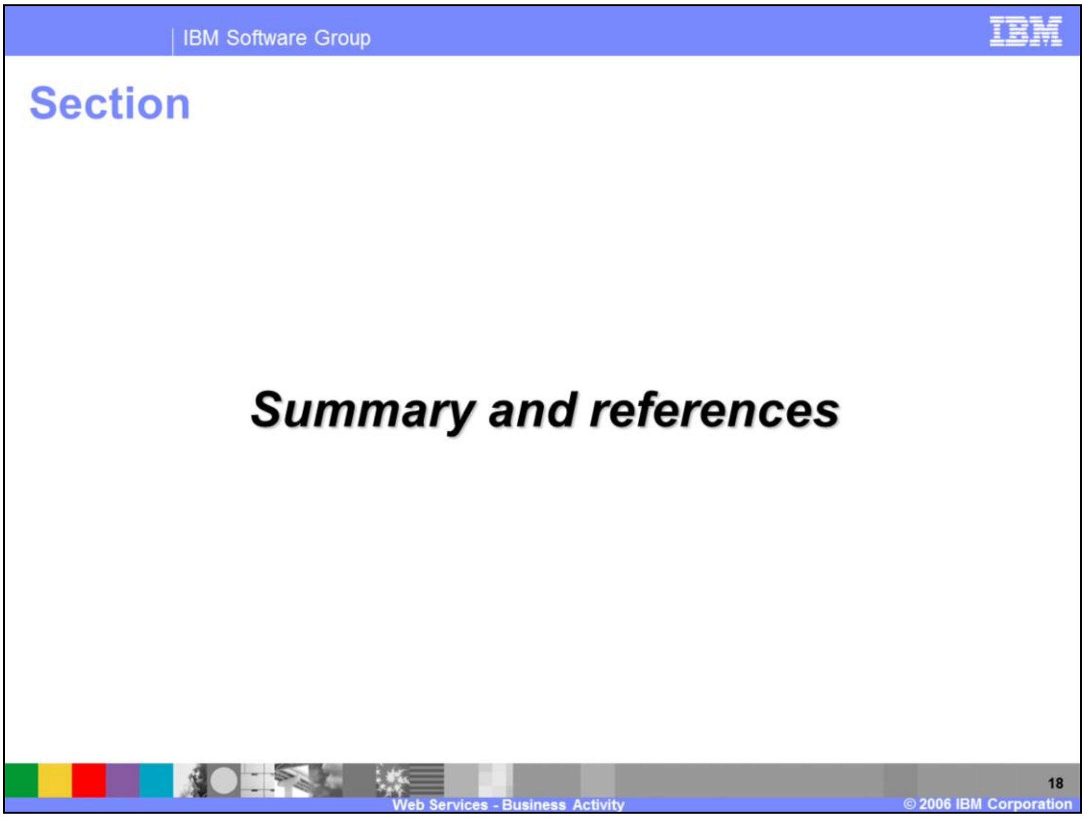
The various application components must also be enabled for business activity support, this can be done using the assembly toolkit. Within the deployment descriptor for the application the parameters for the CompensationHandler will need to be set and saved. Then the application will need to be rebuilt containing the new CompensationHandler, and then redeployed to the environment where the business activity support has been enabled.



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Section

Summary and references

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Web Services - Business Activity

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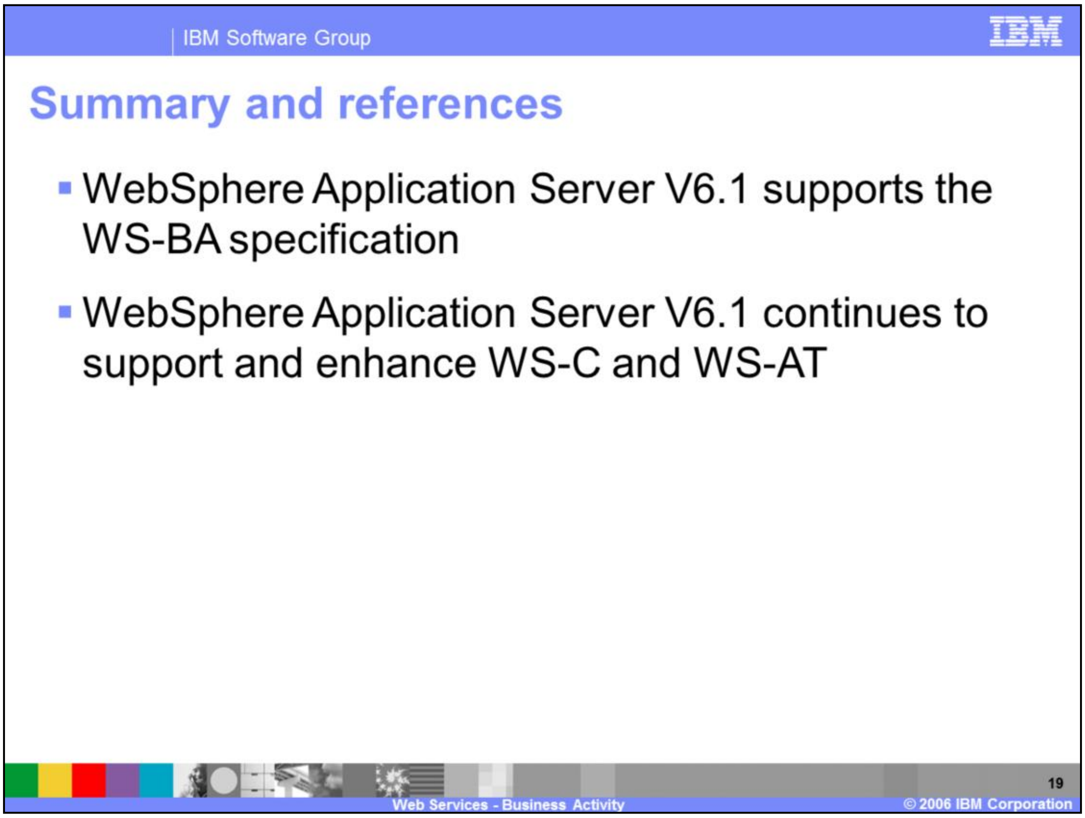
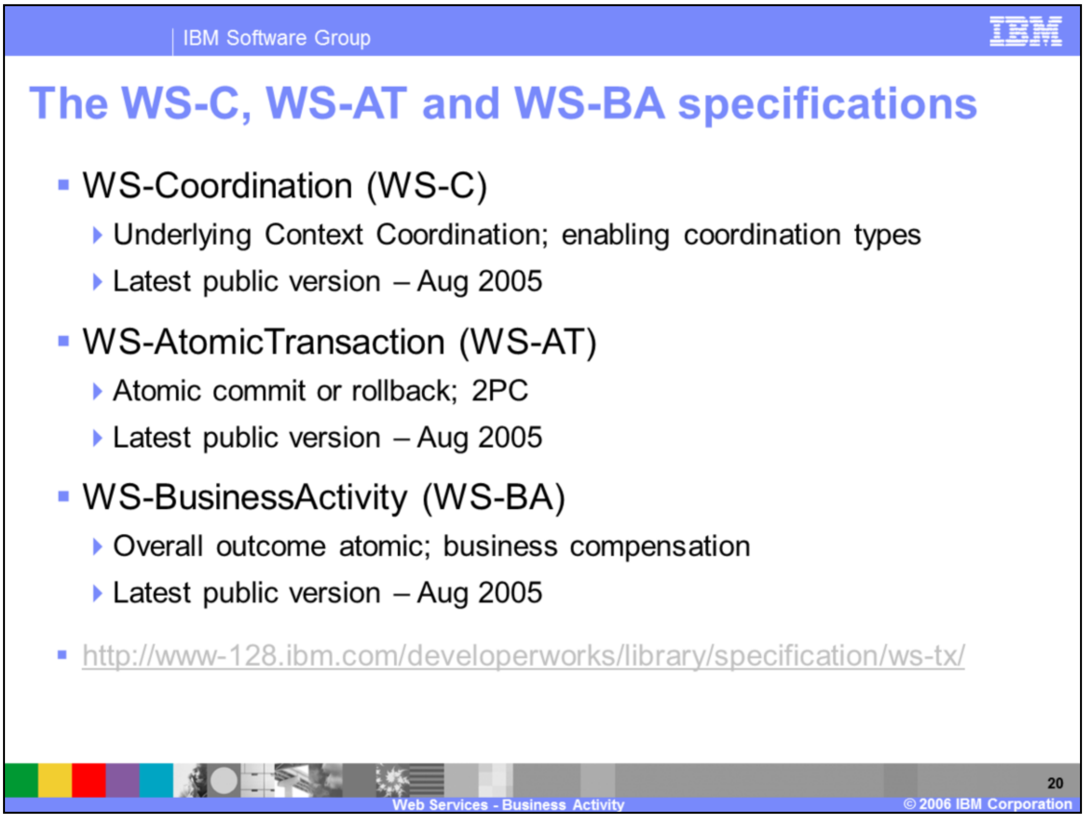
The next section is a summary of the presentation.



Summary and references

- WebSphere Application Server V6.1 supports the WS-BA specification
- WebSphere Application Server V6.1 continues to support and enhance WS-C and WS-AT

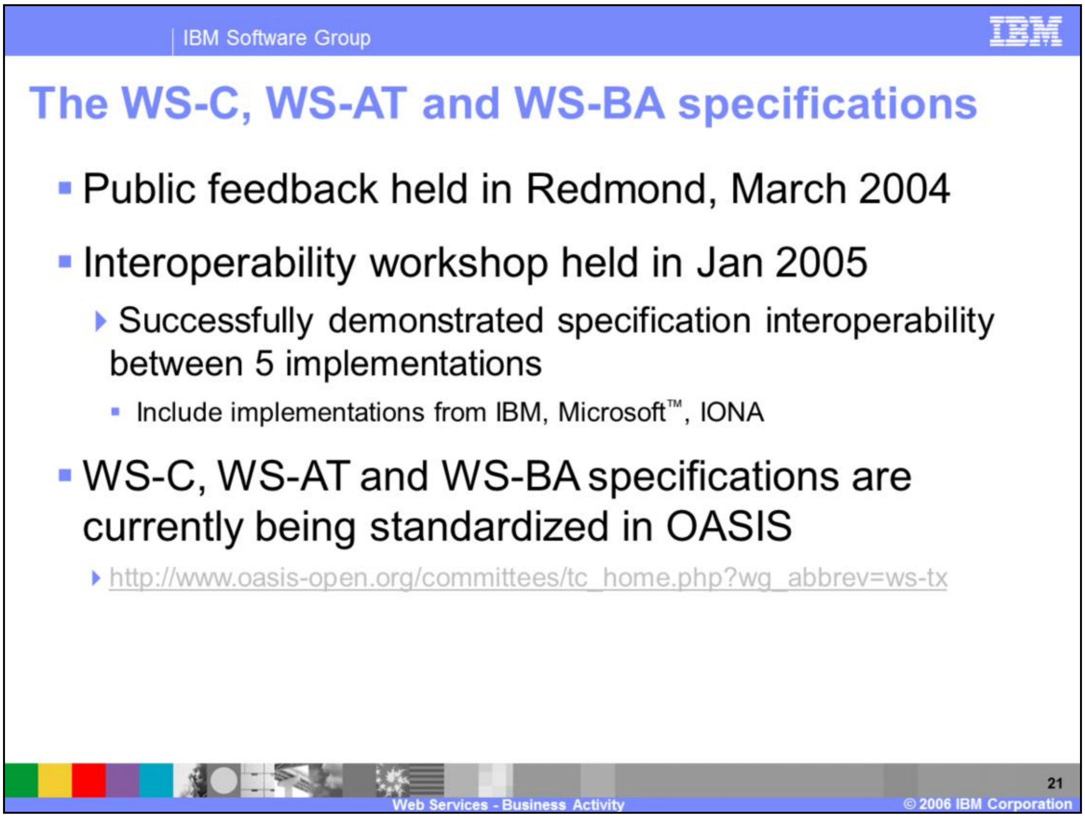
This presentation explained the new support for the Web Services Business Activity specification in WebSphere Application Serer Version 6.1.



The WS-C, WS-AT and WS-BA specifications

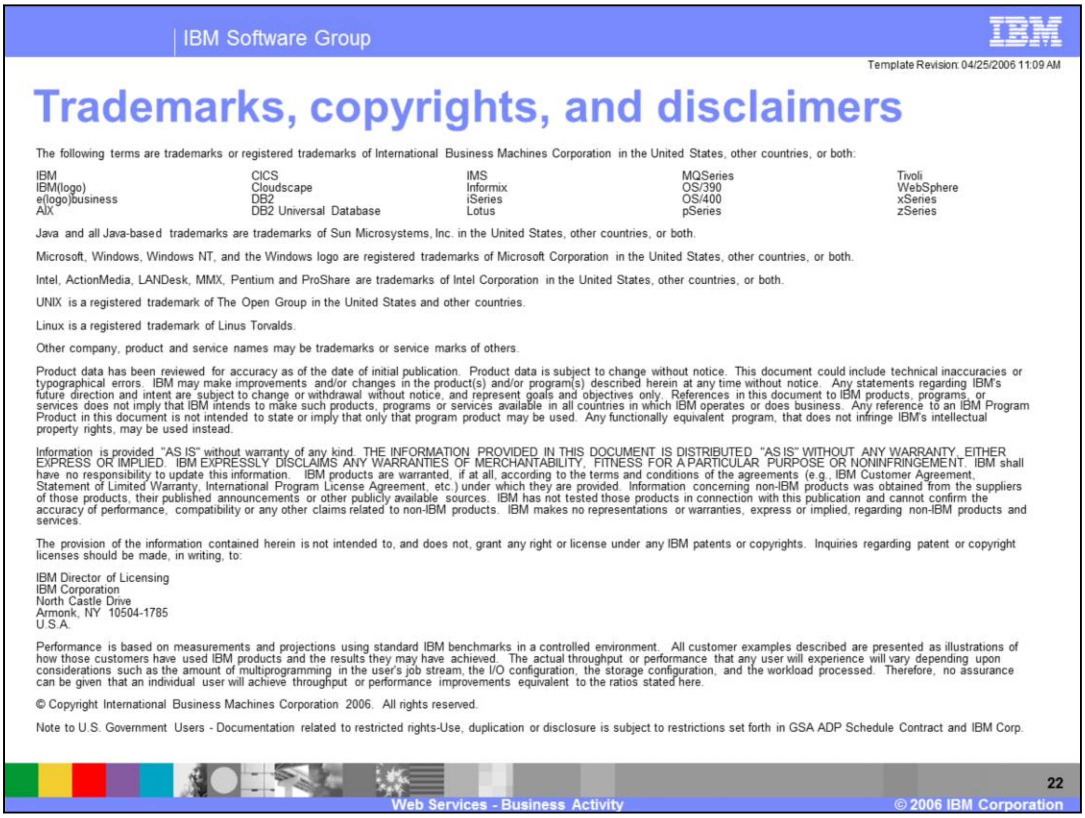
- WS-Coordination (WS-C)
  - Underlying Context Coordination; enabling coordination types
  - Latest public version – Aug 2005
- WS-AtomicTransaction (WS-AT)
  - Atomic commit or rollback; 2PC
  - Latest public version – Aug 2005
- WS-BusinessActivity (WS-BA)
  - Overall outcome atomic; business compensation
  - Latest public version – Aug 2005
- http://www-128.ibm.com/developerworks/library/specification/ws-tx/

This slide and the next one show information about the specifications.



The WS-C, WS-AT and WS-BA specifications

- Public feedback held in Redmond, March 2004
- Interoperability workshop held in Jan 2005
  - Successfully demonstrated specification interoperability between 5 implementations
    - Include implementations from IBM, Microsoft™, IONA
- WS-C, WS-AT and WS-BA specifications are currently being standardized in OASIS
  - http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=ws-tx



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