

IBM System z Technology Summit



Revitalizing Your (CICS) Applications Part 1 – CICS application development



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Session 2. Abstract

- **Breathe new life into existing applications by extending them into new business processes. Bundles can enable you to identify and package applications in a more flexible way. Learn how CICS and OSGi bundles simplify the process of rapidly assembling and deploying new business applications. Mature SOA support in CICS includes data mapping and Web services addressing, providing faster and enhanced conversion between XML and language structures for all Web services, and APIs to use these services, independent of Web services.**

Agenda

- **Events and CICS Bundles**
- **Java and OSGi Bundles**
- **Service enablement enhancements**
 - Atom
 - WS-Addressing
 - XML Transforms and offload



Events, Atom, and CICS Bundles



What are Bundles?

- **Provide a deployment and life cycle grouping for related application artefacts**
 - Provides a single point of management and control
 - The artefacts can be from a number of resource spaces
- **CICS Bundles are similar in concept to OSGi bundles for Java / Eclipse / WAS**
- **Allow such a grouping to express and police its dependencies**
 - Can express functional or resource related dependencies
- **Extensible**
 - Provide an extension point for Vendor or User artefacts to be deployed and managed alongside CICS Resources
 - Manifest File describes contents - “Imports”, “exports” , “defines”
 - User extensible via Callback program
- **CICS Resources which are “bundle-enabled”:**
 - CICS Bundles: Event Binding, XSD Bindfile, SCA Composite, ATOM feeds
 - OSGi bundles: Java applications for JVM Server deployment

BUNDLE Resource

```

Session C - [24 x 80]
File Edit View Communication Actions Window Help
VIEW BUNDLE(SCABUNDL) GROUP(RLTEST)
OBJECT CHARACTERISTICS
CEDA View Bundle( SCABUNDL )
Bundle      : SCABUNDL
Group       : RLTEST
Description : CICS BUNDLE CONTAI
Status      : Enabled
BUndledir   : /u/moxeyc/bundles/
(Mixed Case)
:
BASescope
(Mixed Case)
:
DEFINITION SIGNATURE
DEFinetime  : 03/24/10 17:06:25
+ CHANGETime : 03/24/10 17:06:25

PF 1 HELP 2 COM 3 END          6 CR
MA c
Connected to remote server/host winmvs2d.hursley.ibm.com using lu/pool IYXTC46 and port 23
  
```

Bundle Definition (SCABUNDL)

Bundle Definition (SCABUNDL) BUNDLE WITH SCA COMPOSITE

Attributes

Property	Value
[-] Basic	
Basescape	
Bundle Directory	/u/moxeyc/bundles/scabun
CSDGroup	RLTEST
Description	BUNDLE WITH SCA COMPOSITE
Name	SCABUNDL
Status	✓ ENABLED
Version	0
[-] Definition Signature	
Change Agent	CSDAPI
Change Release	0670
Change Time	24-Mar-2010 16:27:41
Change User ID	CICSUSER
Create Time	24-Mar-2010 16:27:41
Attributes	

Bundle Contents

.../scabun

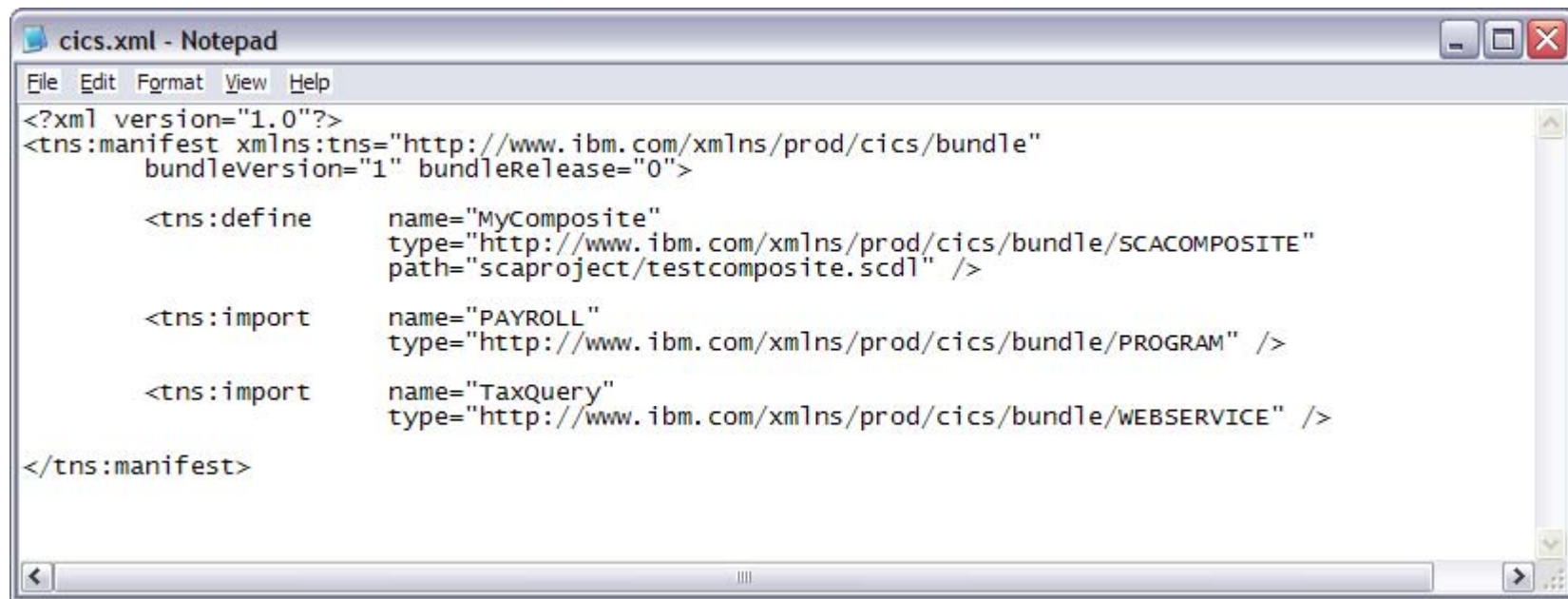
 /META-INF

 cics.xml

 /scaproject

 testcomposite.scdl

← Bundle manifest



```
cics.xml - Notepad
File Edit Format View Help
<?xml version="1.0"?>
<tns:manifest xmlns:tns="http://www.ibm.com/xmlns/prod/cics/bundle"
  bundleversion="1" bundlerelease="0">

  <tns:define      name="MyComposite"
                  type="http://www.ibm.com/xmlns/prod/cics/bundle/SCACOMPOSITE"
                  path="scaproject/testcomposite.scdl" />

  <tns:import      name="PAYROLL"
                  type="http://www.ibm.com/xmlns/prod/cics/bundle/PROGRAM" />

  <tns:import      name="TaxQuery"
                  type="http://www.ibm.com/xmlns/prod/cics/bundle/WEBSERVICE" />

</tns:manifest>
```


Bundle Operations

Session B - [24 x 80]

File Edit View Communication Actions Window Help

INQUIRE BUNDLE
 STATUS: RESULTS - OVERTYPE TO MODIFY
 Bun(catbundl) Ena Par(00001) Tar(00001) Enabledc(00001)
 Bun(/u/moxeyc/CatalogManager/)
 Bun(INITTEST) Dis Par(00004) Tar(00004) Enabledc(00003)
 Bun(/u/moxeyc/eptests/CatManAp)
 Bun(INSEVNTS) Ena Par(00001) Tar(00001) Enabledc(00001)
 Bun(/u/moxeyc/Insu...
 Bun(Ordering) Ena Par...
 Bun(/u/moxeyc/Order...

RESPONSE: NORMAL
 PF 1 HELP 3 END

MA b

Connected to remote server/hos...

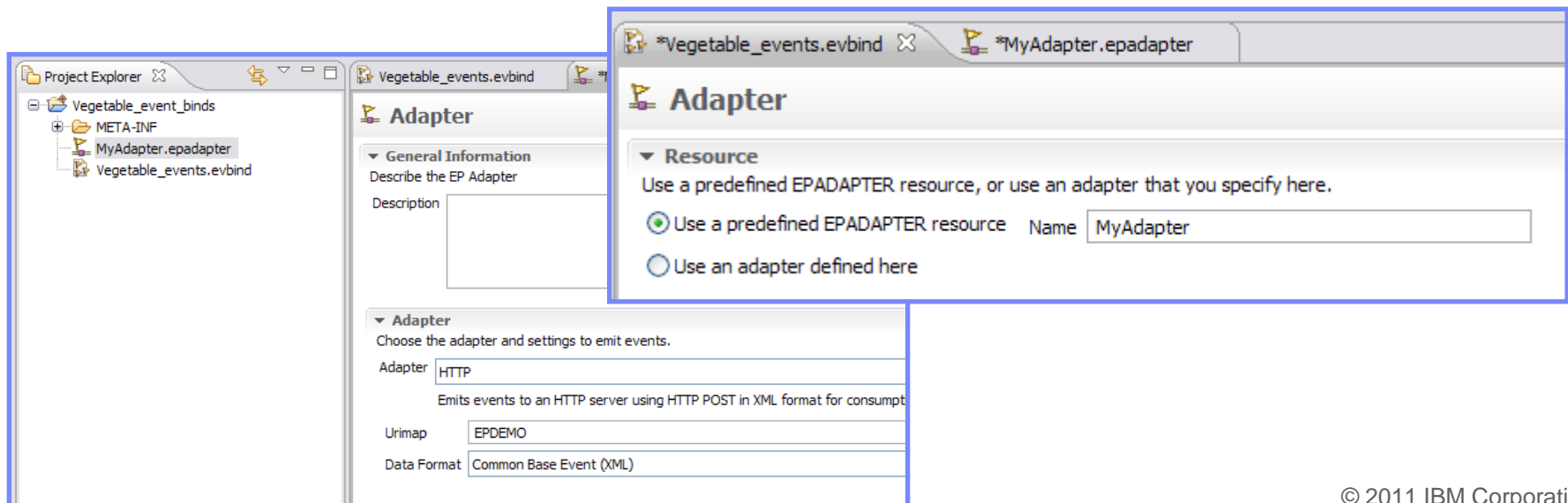
Regions LIBRARYs Event Bindings Bundles Programs Files Transactions

CNX0211I Context: IYCWZCGO. Resource: BUNDLE. 4 records collected at 31-Mar-2010 18:08:00

Region	Name	Partcount	Targetco...	Status	Bundledir
IYCWZCGO	catbundl	1	1	✓ ENABLED	/u/moxeyc/CatalogManager/
IYCWZCGO	INITTEST	4	4	✗ DISABLED	/u/moxeyc/eptests/CatManApp/
IYCWZCGO	INSEVNTS	1	1	✓ ENABLED	/u/moxeyc/InsuranceApplication/
IYCWZCGO	Ordering	1	1	✓ ENABLED	/u/moxeyc/OrderingPatterns/

Problem: Customer has many event bindings

- “We’ve started using events and we have many event bindings. All of our events are emitted using identical EP adapter specifications. What happens if need to change the EP adapter specification? We worry that it would be a lot of work to change it due the number of event bindings we have.”
- New in CICS TS V4.2 EP adapter specifications can be defined and managed separately to Event Bindings
- Event Bindings can reference these EP adapters by name.



EP adapters in bundles

Application Developer

Bundle

Event Binding

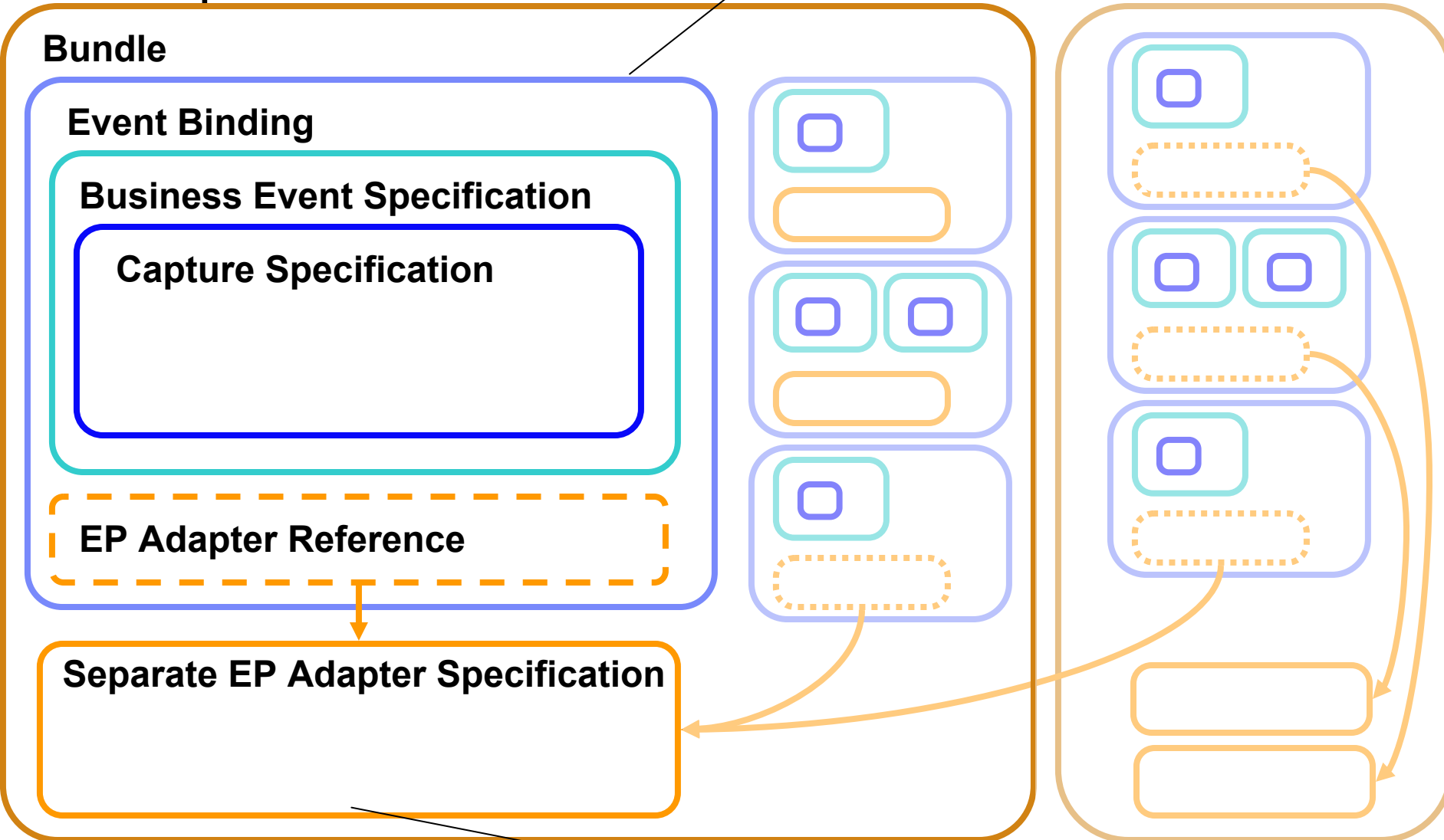
Business Event Specification

Capture Specification

EP Adapter Reference

Separate EP Adapter Specification

System Programmer



Other Event Processing improvements in CICS TS V4.2

- **More data types supported for filter and capture:**
 - Sign leading/trailing Zoned Decimal
 - Hexadecimal floating point
 - Binary floating point
 - Decimal floating point (requires optional hardware facility)
 - Null terminated character
 - Null terminated hex

- **HTTP EP adapter performance improvements if using a URIMAP with SOCKETCLOSE set.**



Java and OSGi Bundles



CICS OSGi Support Overview

▪ OSGi

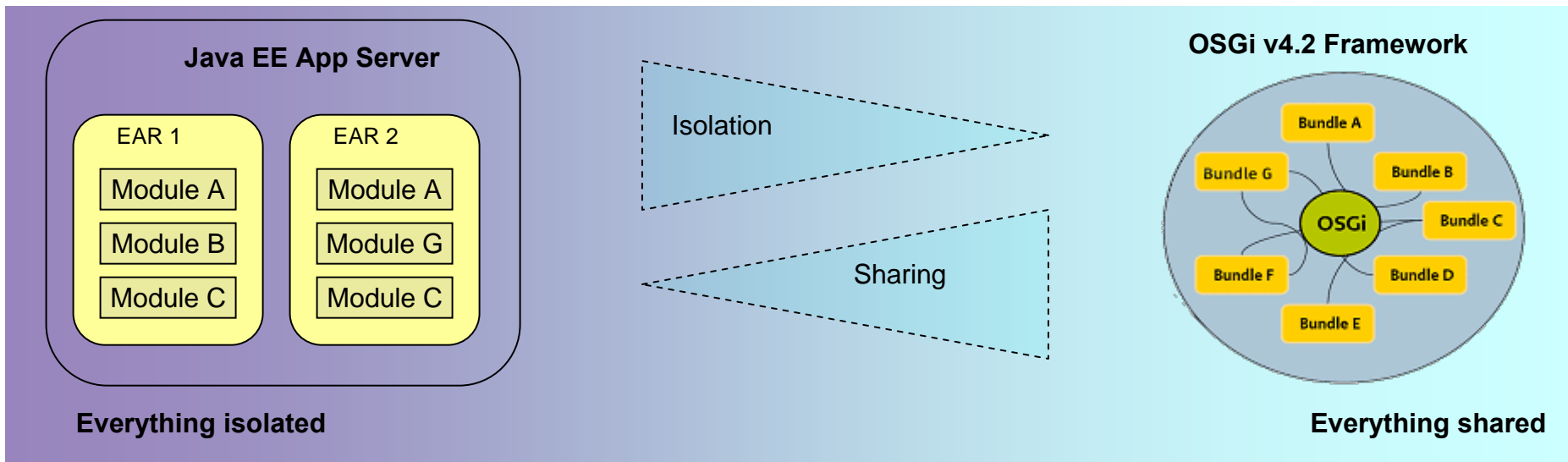
- OSGi development and packaging now required to deploy CICS applications to a JVM server
- Existing CICS Java applications using main() method linkage can run unchanged if wrapped in an OSGi bundle
- All JVM server applications must be thread-safe and can't use stabilised CICS EJB or CORBA functions
- Equinox used as OSGi implementation

▪ CICS Explorer SDK

- Provides CICS Java development toolkit for use in any Eclipse 3.6.2 IDE (i.e RAD 8.0 or vanilla Eclipse SDK)
- Can be used to develop and deploy applications for any release of CICS (CICS TS 3.2 onwards)
- Java projects are developed as Plug-in Projects and then packaged in a CICS bundle and exported to zFS
- CICS TS V3.2/V4.1 Pooled JVM applications classes/JARs can be wrapped and deployed to OSGi JVM servers

OSGi - Isolated and Shared Bundles

- In Java EE, modules are isolated within an application and applications are isolated from one another.
 - Makes sharing modules difficult
- OSGi 4.2 all bundles have shared visibility to the externals of all others bundles within an OSGi framework (JVM)



OSGI Bundle types in CICS

▪ OSGi Bundles

- Just a jar with a few extra lines in the jar manifest file

▪ Application Bundles

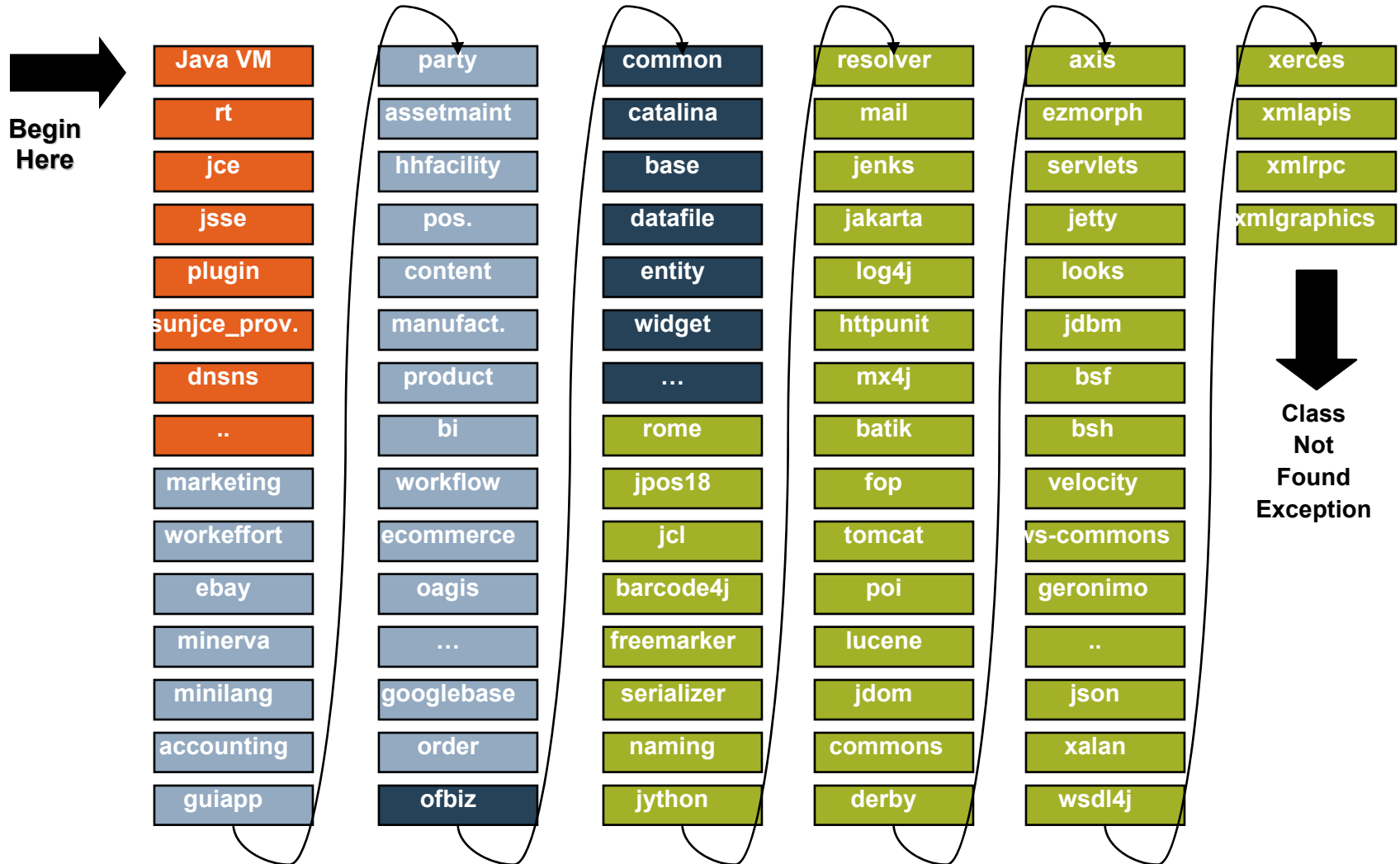
- Provide one or more entry points which can be LINKed too by CICS.
- This is done by using the CICS-MainClass directive
- Can import packages from other bundles, i.e. JCICS

▪ Library Bundles

- Provide no entry points but simply export code to be used by other bundles
- Shared library services

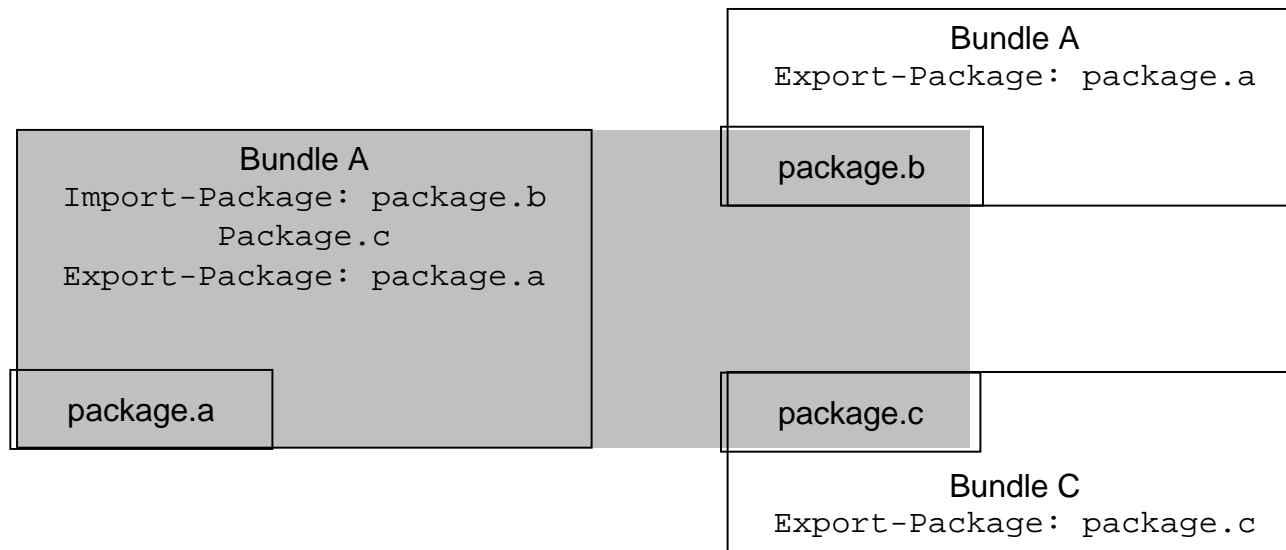
```
Manifest.mf
Bundle-SymbolicName: com.ibm.cics.server.examples.hello
Bundle-Version: 1.0.0
...
CICS-MainClass: examples.hello.HelloCICSWorld
Export-Package: my.library.classes 1.0.0
```


The Global Classpath

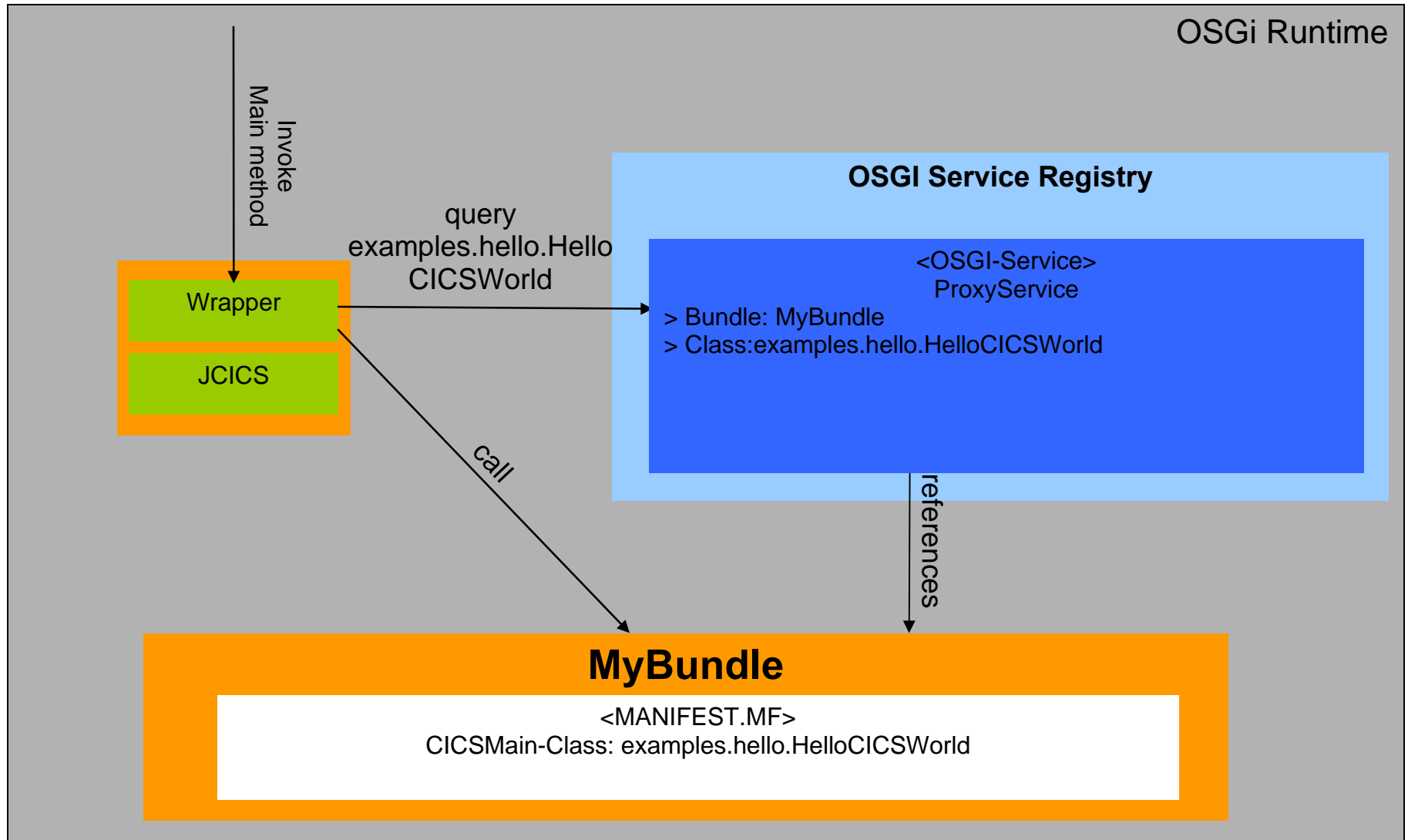


Class loading with OSGi

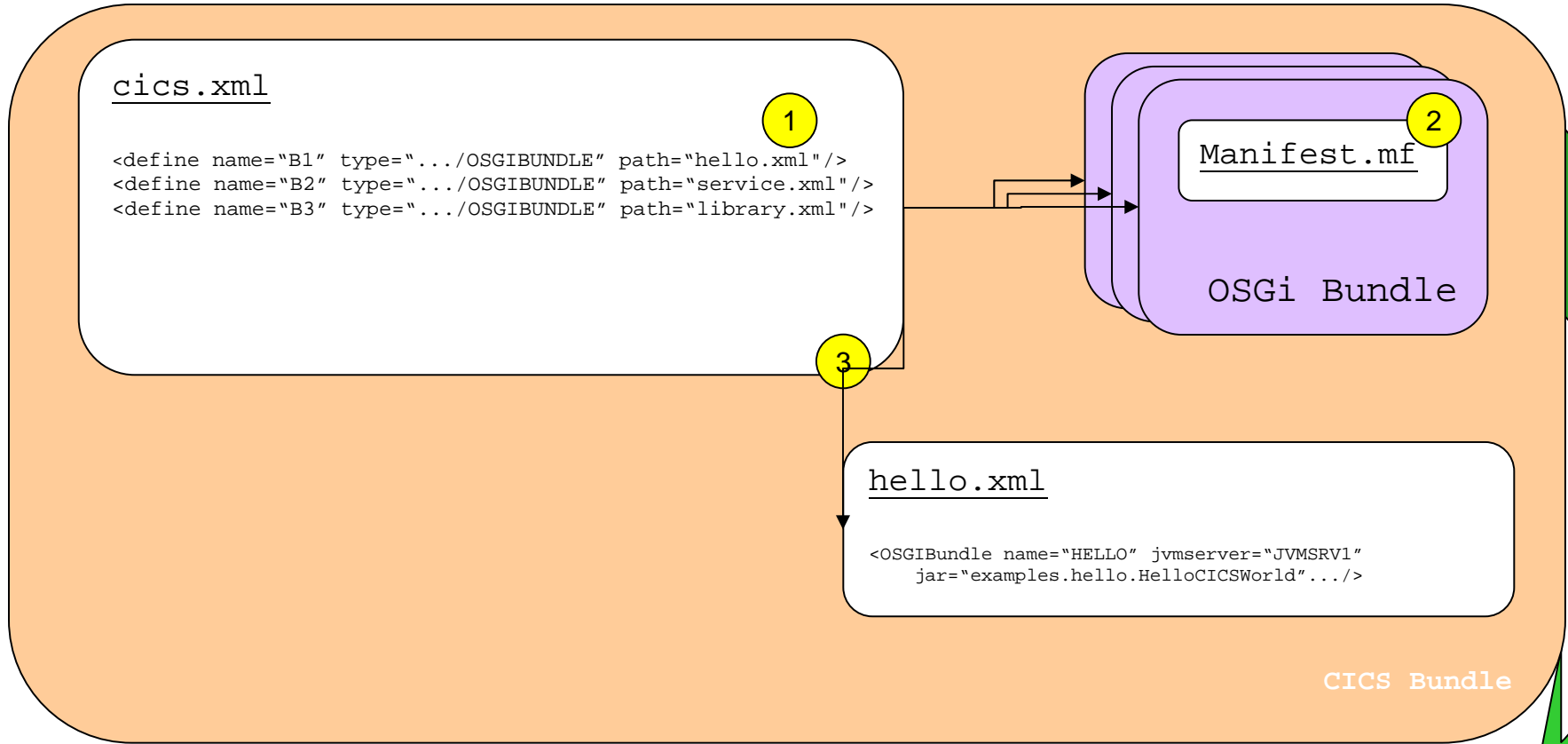
- No more **CLASSPATH**
 - Each bundle has its own class loader
- Class space is the classes required for the bundle
- Smallest unit is a package



JVMSERVER OSGi Details



Deployment with CICS Bundles



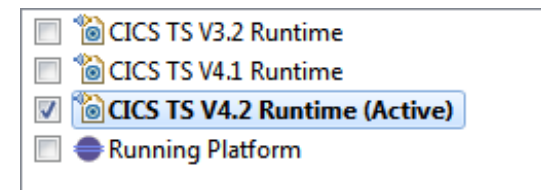
1. Define OSGi bundles
2. Declare PROGRAM "service(s)"
3. Define PROGRAM

Manifest.mf

```
Bundle-SymbolicName: com.ibm.cics.server.examples.hello
Bundle-Version: 1.0.0
...
CICS-MainClass: examples.hello.HelloCICSWorld
```

CICS Explorer SDK - Development

- **1. Install CICS Explorer SDK into Eclipse**
- **2. Set Target Platform (sets JCICS and JVM levels)**
 - [Window -> Preferences... -> Target Platform -> Add... -> Template](#)
- **3. Create New OSGi Project**
 - New -> Plug-in Project
- **4. Provided access to JCICS package**
 - [MANIFEST.MF -> Dependencies -> Imported Packages -> com.ibm.cics.server](#)
 - Add other bundle imports if require
- **5. Import/Create Java class**

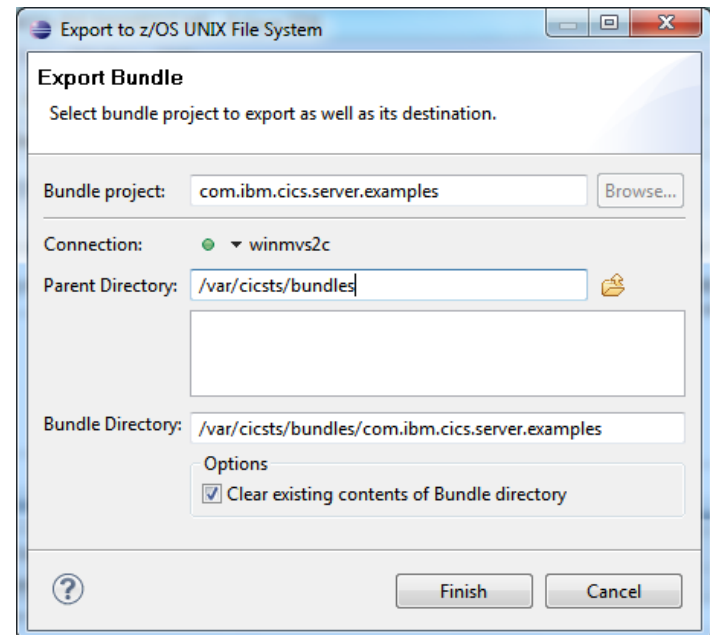
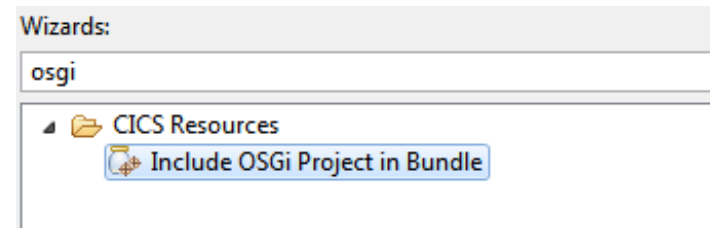
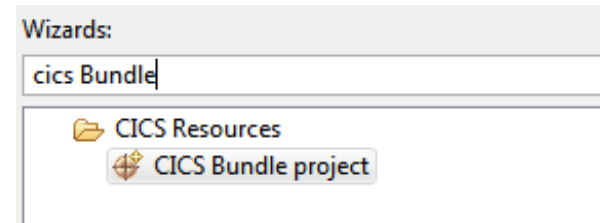


Imported Packages

Specify packages on which this plug-in depends without explicitly identifying their originating plug-in.

CICS Explorer SDK - Deployment

- **6. Create CICS Bundle**
 - [New -> CICS Bundle Project](#)
- **7. Add OSGi bundle meta data file to CICS Bundle**
 - [New -> Include OSGi Project in Bundle](#)
- **8. Provide CICS region userid read access to bundledir**
 - mkdir /var/cicsts/bundles
 - chmod 750 /var/cicsts/bundles 1
- **9. Connect CICS Explorer to USS FTP daemon**
 - Windows -> Open Perspective -> z/OS
- **10. Export CICS Bundle to CICS**
 - [-> CICS to z/OS UNIX File System](#)



Developing Java applications with the CICS Explorer SDK

Java - com.ibm.cics.server.examples.hello/src/examples/hello/HelloCICSWorld.java - Eclipse SDK - /Users/matthew_webster/Workspaces/sdk

```

@start_nonaco_copyright@
package examples.hello;

import com.ibm.cics.server.CommAreaHolder;

public class HelloCICSWorld
{
    public static void main(CommAreaHolder CAH)
    {
        Task t = Task.getTask();
        if ( t == null )
            System.err.println("HelloCICSWorld example: Can't get Task");
        else
            t.out.println("Hello from a Java CICS application");
    }
}

```

Package Explorer

- com.ibm.cics.server.examples
 - META-INF
 - cicsweb.osgibundle
 - hello.osgibundle
 - hello.xml
 - helloworld.xml
 - jcics.osgibundle
 - com.ibm.cics.server.examples.hello
 - JRE System Library [J2SE-1.4]
 - Plug-in Dependencies
 - src
 - examples.hello
 - HelloCICSWorld.java
 - HelloWorld.java
 - META-INF
 - build.properties
 - com.ibm.cics.server.examples.jcics
 - com.ibm.cics.server.examples.web

z/OS UNIX Files

Path: /u/webster (12)

- cicsjava
 - com.ibm.cics.jdbc_3.62.38.split
 - com.ibm.cics.jdbc_3.62.38
 - com.ibm.cics.server.examples
 - cicsweb.osgibundle
 - com.ibm.cics.server.examples.hello_1.0.0.jar
 - com.ibm.cics.server.examples.jcics_1.0.0.jar
 - com.ibm.cics.server.examples.jdbc_1.0.0.jar
 - hello.osgibundle
 - jcics.osgibundle
 - META-INF
 - samp01.osgibundle
 - hello
 - lib
 - sample
 - java
 - test
 - WEBSTER

Problems

0 errors, 24 warnings, 0 others

Description	Resource	Path	Location	Type
Warnings (24 items)				

CICS Java Developer Guide >

Developing and deploying applications

What you need to know to develop and deploy C Java applications using the CICS Explorer.

[Setting up the target environment](#)

Before you start to develop your application, you must set up a target definition in Eclipse to identify the earliest level of CICS@ that your application runs on. A target definition consists of a set of plug-ins and environment settings and describes the CICS platform you are developing the application for. You must set up target definition for each level of CICS.

[The JCICS example programs](#)

CICS provides example programs that show you how to use the JCICS classes, and how to combine Java programs with CICS programs written in other languages. The Java source files are included in the CICS Explorer SDK.

[Loading the JCICS example programs](#)

The JCICS example programs are included in the CICS Explorer SDK and can be loaded in Eclipse as a Plug-in project.

[Exporting a JCICS bundle to a z/OS UNIX file system](#)

You can deploy your JCICS bundle to a CICS system by exporting the bundle to a z/OS@UN System Services (z/OS UNIX) file system.

Go To:

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Bundles in CICS Explorer

CICS SM - Eclipse SDK BETA

CICS Explorer Server: TONY

Regions Tasks ISC/MRO Connections Terminals Files Transactions Bundles JVM Servers Programs

Regions

CNX02111 Context: JTPLEX1. Resource: BUNDLE. 3 records collected at 08-Feb-2011 16:19:09

Region	Name	Status	Install Time	BundleIdr
IYK2Z2G1	ELIBUND	✓ ENABLED	08-Feb-2011 12:24:27	/u/flamini/osgi_bundle_test/
IYK2Z2G1	SAMPAW1	✓ ENABLED	08-Feb-2011 12:24:33	/u/webster/cicsjava/com.ibm.cics.server.
IYK2Z2G1	TWOOSGIB	✓ ENABLED	08-Feb-2011 12:24:35	/u/jtllil1/bundles/TwoOSGIBundles/

Bundle Parts

CNX02111 Context: JTPLEX1. Resource: BUNDPART. 4 records collected at 08-Feb-2011 16:19:06

Region	Bundle	Bundle Part	Enable Status	Meta Data File	Part Class	Part Type
IYK2Z2G1	SAMPAW1	cicsweb	✓ ENABLED	cicsweb.osgibundle	DEFINITION	http://www.ibm.com/xmlns/...
IYK2Z2G1	SAMPAW1	hello	✓ ENABLED	hello.osgibundle	DEFINITION	http://www.ibm.com/xmlns/...
IYK2Z2G1	SAMPAW1	jcics	✓ ENABLED	jcics.osgibundle	DEFINITION	http://www.ibm.com/xmlns/...
IYK2Z2G1	SAMPAW1	samp01	✓ ENABLED	samp01.osgibundle	DEFINITION	http://www.ibm.com/xmlns/...

OSGI Bundles

CNX02111 Context: JTPLEX1. Resource: OSGIBUND. 4 records collected at 08-Feb-2011 16:19:06

JVM Server	Symbolic Name	Version	State	Bundle	Bundle Part
OSGISRV1	com.ibm.cics.server.examples.hello	1.0.0	✓ ACTIVE	SAMPAW1	hello
OSGISRV1	com.ibm.cics.server.examples.jcics	1.0.0	✓ ACTIVE	SAMPAW1	jcics
OSGISRV1	com.ibm.cics.server.examples.jdbc	1.0.0	✓ ACTIVE	SAMPAW1	samp01
OSGISRV1	com.ibm.cics.server.examples.web	1.0.0	✓ ACTIVE	SAMPAW1	cicsweb

Bundle Definitions

CNX02111 Context: JTPLEX1. Resource: OSGISERV. 9 records collected at 08-Feb-2011 16:19:06

JVM Server	Service Name	Symbolic Name	Version	Service Status	Bundle	Bundle Part
OSGISRV1	examples.hello.HelloCICSWorld		1.0.0	✓ ACTIVE	SAMPAW1	hello
OSGISRV1	examples.hello.HelloWorld		1.0.0	✓ ACTIVE	SAMPAW1	hello
OSGISRV1	examples.ProgramControl.ClassOne		1.0.0	✓ ACTIVE	SAMPAW1	jcics
OSGISRV1	examples.ProgramControl.ClassTwoexamples.ProgramControl.ClassThree		1.0.0	✓ ACTIVE	SAMPAW1	jcics
OSGISRV1	examples.ProgramControl.ClassFour		1.0.0	✓ ACTIVE	SAMPAW1	jcics
OSGISRV1	examples.TDQ.ClassOne		1.0.0	✓ ACTIVE	SAMPAW1	jcics
OSGISRV1	examples.TSQ.ClassOne		1.0.0	✓ ACTIVE	SAMPAW1	jcics
OSGISRV1	examples.Web.Sample1		1.0.0	✓ ACTIVE	SAMPAW1	cicsweb
OSGISRV1	com.ibm.cics.server.examples.jdbc.samp01		1.0.0	✓ ACTIVE	SAMPAW1	samp01

Resource Group Definitions

CNX02111 Context: JTPLEX1. Resource: CSDGROUP. 1 record

Name	CICS System
DFHSJVM	IYK2Z2G1

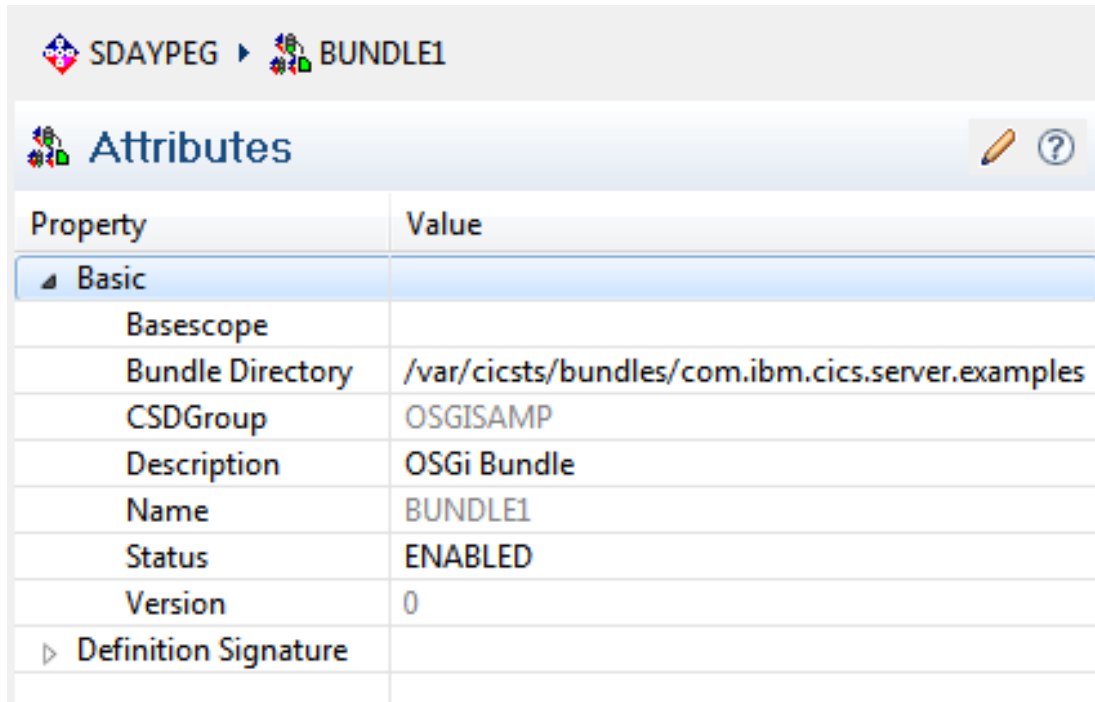
Events Properties Error Log Console Search

Property	Value

1 CNX01001 Connected user DUMMY to host winmv52c.hursley.ibm.com on port 30801

John Tilling

Defining a CICS BUNDLE



SDAYPEG ▸ BUNDLE1

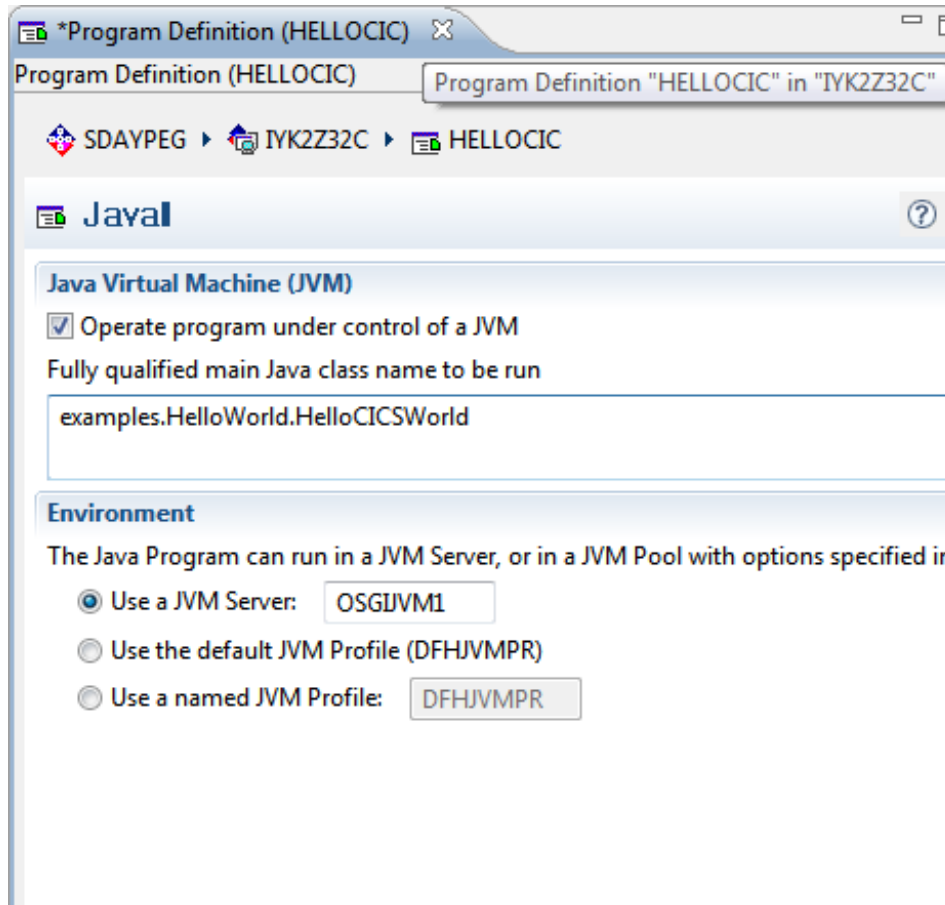
Attributes

Property	Value
Basic	
Basescope	
Bundle Directory	/var/cicsts/bundles/com.ibm.cics.server.examples
CSDGroup	OSGISAMP
Description	OSGi Bundle
Name	BUNDLE1
Status	ENABLED
Version	0
Definition Signature	

- Bundle Directory
 - Name of directory containing deployed JAR and bundle meta data files

- Status
 - ENABLED -> Activate on install of resource

Defining a Program to run in JVMSERVER



- JVMServer
 - Name of JVM server resource
- Main Java class
 - OSGIService defined in the OSGi bundle manifest
 - Either an alias or the full package.class name
- Also required
 - CONCURRENCY(THREADSAFE)
 - EXECKEY(CICS)

CICS Bundle Operations

BUNDLE
 BUNDLEDIR=/var/cicsts/bundledir
 com.ibm.cics.bundle

INSTALL
ENABLE
DISABLE
DISCARD

BUNDLEPART - B1
PARTYPE=OSGIBUNDLE

BUNDLEPART - B1
PARTYPE=OSGIBUNDLE

PROGRAM
 Java Class = mypkg.ClassB1
 JVMSERVER=MYJVM

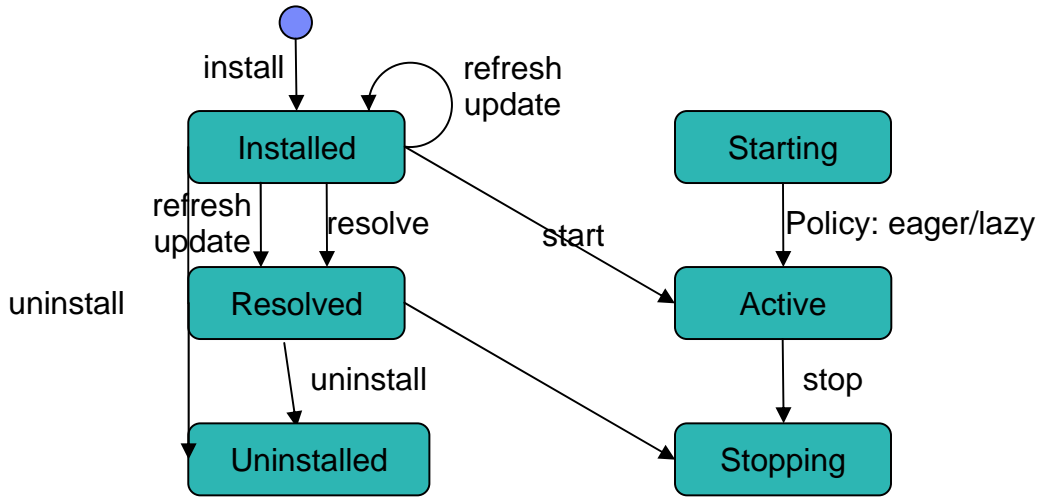
INSTALL
ENABLE
DISABLE
DISCARD

OSGISERVICE

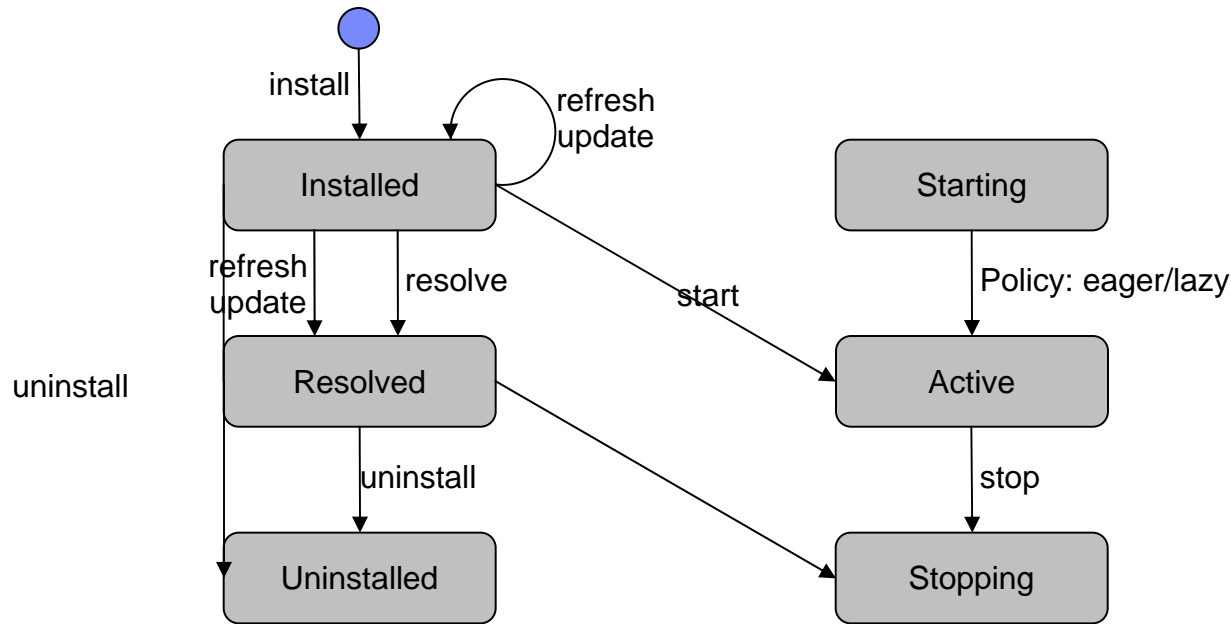
CICS-MainClass: mypkg.ClassB1

OSGIBUNDLE

Note: BUNDLEPART, OSGISERVICE and OSGIBUNDLE dynamically created based on BUNDLE lifecycle



OSGi Bundle Lifecycle



OSGi bundle state displayed in CICS Explorer OSGi bundle view

Region	Symbolic Name	State	Bundle Part	Bundle	JVM Server	Install Time	Version	Bundle ID
IYK2Z32C	com.ibm.cics.server.examples.hello	✓ ACTIVE	hello	SAMPLES	OSGIJVM1	24-Mar-2011 09:41:11	1.0.0	13
IYK2Z32C	com.ibm.cics.server.examples.jcics	✓ ACTIVE	jcics	SAMPLES	OSGIJVM1	24-Mar-2011 09:41:11	1.0.0	14
IYK2Z32C	com.ibm.cics.server.examples.web	✓ ACTIVE	cicsweb	SAMPLES	OSGIJVM1	24-Mar-2011 09:41:11	1.0.0	15
IYK2Z32C	sleep	✓ ACTIVE	sleep	SLEEP	OSGIJVM1	23-Mar-2011 21:49:46	1.1.0	12

CICS OSGi bundle resource states

BUNDLE	BUNDLEPART	OSGIBUNDLE	OSGISERVICE
DISABLING	DISABLING	STOPPING	<i>n/a</i>
DISABLED	DISABLED	INSTALLED RESOLVED UNINSTALLED ²	<i>n/a</i>
	UNUSABLE	<i>n/a</i>	<i>n/a</i>
ENABLING	ENABLING	<i>n/a</i>	<i>n/a</i>
ENABLED	ENABLED	STARTING ¹	<i>n/a</i>
		ACTIVE	ACTIVE INACTIVE ³

1 – Bundle activation policy = lazy

2 – Transitory state during termination

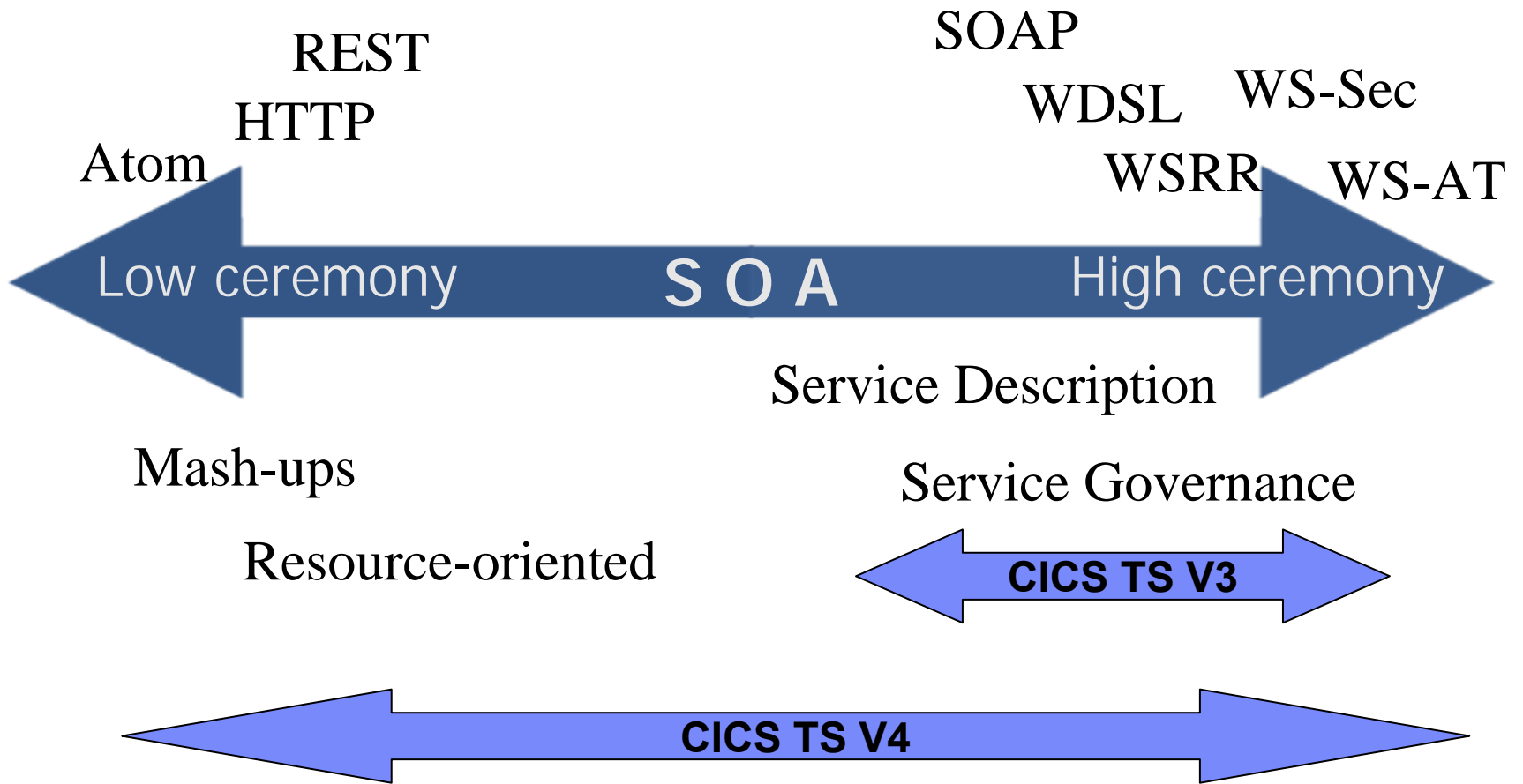
3 - Inactive OSGIService if duplicates existing active OSGI service or Main class invalid



Service Enablement



A Spectrum of Service Enablement



RESTful web services

- **REST**

- REpresentational State Transfer - See http://en.wikipedia.org/wiki/Representational_State_Transfer
- How the Web has always worked...
 - HTTP methods POST | GET | PUT | DELETE
... all the verbs you'll ever need
 - Everything else is a *resource* – with a representation of its state

- **“Clean and meaningful URLs”**

- For everything!
- e.g. a file, a database, a TQueue....
 - or a single record within each resource

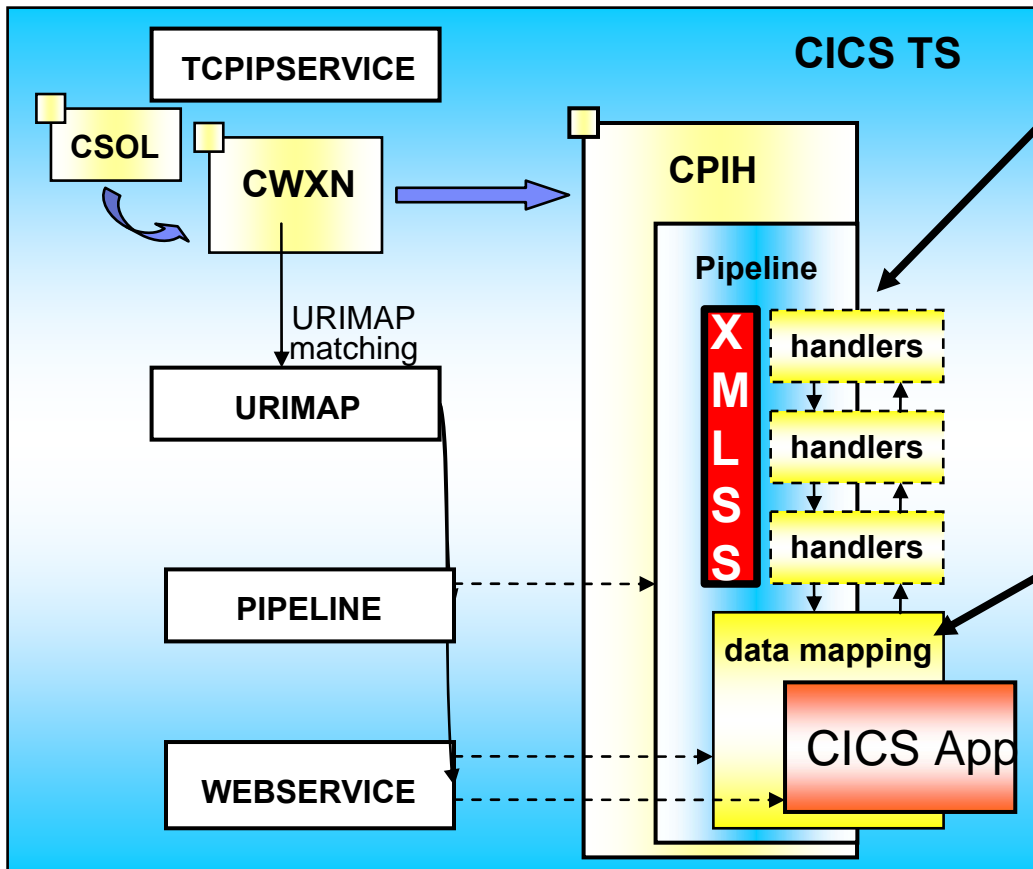
Atom Consumability enhancements in CICS TS V4.2

- **Simplified deployment and administration of ATOM services**
- **ATOMSERVICE and XMLTRANSFORM resources can be deployed via CICS BUNDLES**
 - Appropriate URIMAP will be dynamically generated
- **CICS Explorer enhancements to generate and deploy the BUNDLE**
- **Sample BUNDLES provided with general-purpose XMLTRANSFORM resources for use in creating ATOM Feeds**

XML to language structure mapping services

- **API to convert between XML and application data**
 - Map between XML and language structure
- **EXEC CICS TRANSFORM TRANSFORMTYPE(XMLTODATA ; DATATOXML)**
- **Command options depend on the direction of the transformation**
 - XMLTRANSFORM resource provides XML binding and schema used for the transformation
 - Required for DATATOXML, optional for XMLTODATA (depending on whether transforming or querying XML)
 - XMLTRANSFORM resource installed via Bundle support
- **CICS XML Assistant**
 - Batch utilities that transform XML into high-level language structures and vice versa
 - Generate metadata in XML bind file, stored on z/OS UNIX

CICS and z/OS XML System Services Parser (XMLSS)



First parse of message now uses XMLSS

- Locates the SOAP headers
- Handler execution is outside of XMLSS

XMLSS is zAAP eligible

- Offloads MIPS for this element of the processing

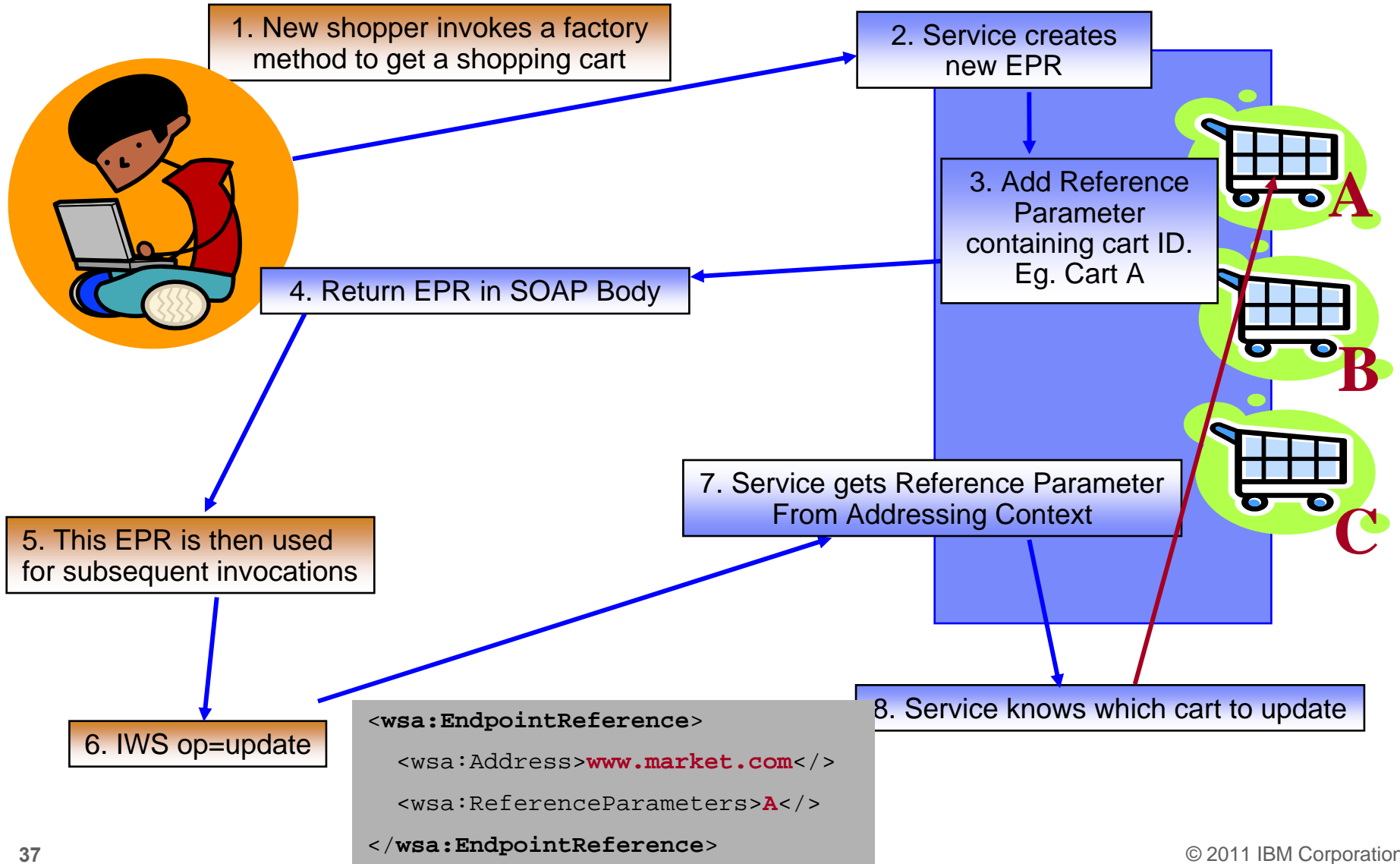
“Shredding” of body into Containers or Commareas is *NOT* XMLSS

- and so ***NOT*** zAAP eligible.

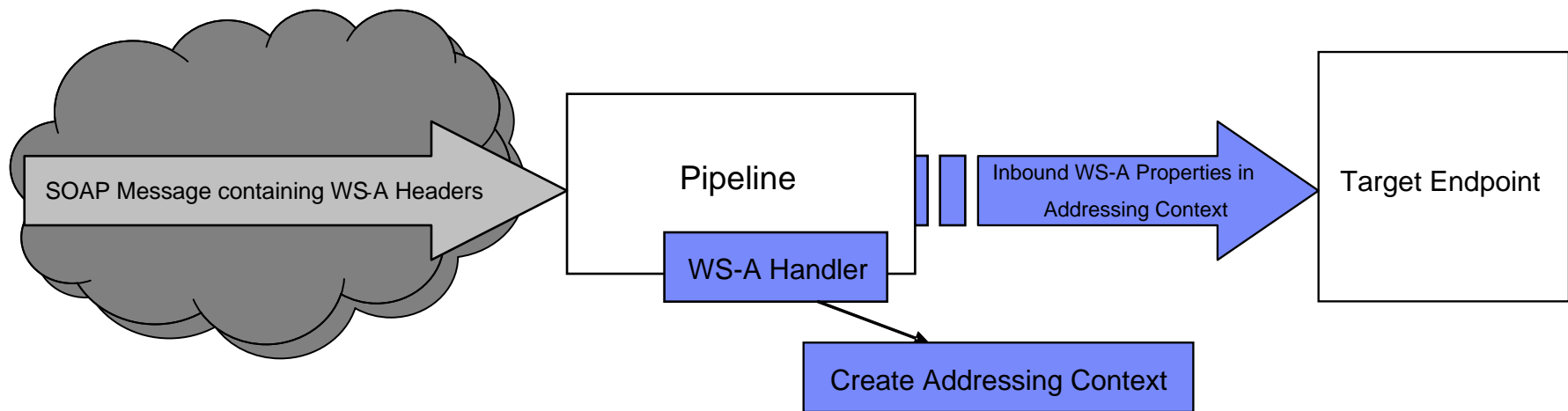
WS-Addressing goals

- **Defines transport-neutral mechanisms to address Web services and support message transmission through networks**
- **Improves interoperability with other Web Services implementations such as .NET**
- **XML elements to identify Endpoints: EndpointReferences (EPRs)**
 - More than just a URI
 - Can have Reference Parameters and metadata
 - Allows for Psuedo-Conversational style web service requesters in CICS
- **WS-Addressing Message Addressing Properties (MAPs)**
 - Standard placeholders in the SOAP header for WS-Addressing information
 - Plus reference parameters in target EPR

Example of a WS-Addressing Resource Access Pattern



WS-Addressing in CICS



WS-Addressing in CICS

▪ Pipeline configuration

- Configure Requester pipeline to use WS-Addressing handler giving specification version
- Configure Provider pipeline to use WS-Addressing handler

▪ Requester

- Requester application is not aware requests are WS-Addressed
 - CICS handles the required addressing responses
- Requester is WS-A aware
 - Uses EXEC CICS API to create an addressing context and set Message Addressing Properties (MAPs)

▪ Provider

- Provider application is not aware request/response is WS-Addressed
 - CICS handles the required addressing responses and routing
- Provider is WS-A aware
 - Uses EXEC CICS API to interrogate Addressing Context and set MAPs (e.g. Get EPR to extract Reference parameters)
 - ReplyTo or FaultTo EPR used for reply endpoint (default is anonymous address to reply back to the requester)

Summary

- **Revitalize your applications using modern practices**
 - Exploit new CICS capabilities with Bundles
 - Develop, package and deploy java applications in standard way with OSGi and CICS JVM Servers
 - Easy to use XML Transforms
 - and reduce licence fees with zAAP offload
 - Improve interoperability with WS-Addressing

Resources



For more information



CICS Development Technical Services

Engage the IBM Hursley CICS development team to ensure that you get the maximum value from your CICS investments.

Consultants are now available via a funded services engagement directly from CICS development providing a complete range of CICS services - no one has more experience!

- For more information please contact: CICSDTS@uk.ibm.com



CICS On Demand Seminars

Free customised technical agenda of CICS TS and CICS tools products

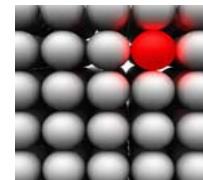
- Web Services, Events, Web 2.0, version upgrades, tooling etc.

Targeted at AD, System Programmers and Architects at customers' own location

Demonstrates how to use the new features in the latest releases to leverage existing solutions

Can be tailored to customers interests

- For more information please contact: cicssem@uk.ibm.com



CICS Communities and Information

- **CICS Transaction Server V4.2**
 - <http://ibm.com/cics/tserver/v42>
- **CICS Explorer**
 - Home page ibm.com/cics/explorer
- **Twitter**
 - Subscribe to the [IBM System z channel](#) & [CICSfluff](#) channel to get CICS news flashes
- **Facebook [I ♥ CICS group](#)**
 - News and views
- **YouTube channels**
 - [CICS Explorer](#) - Videos, demos and other cool stuff
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Thank You !