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IBM Client Center Paris

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IBM

CICS TS V5.1: JVMSERVER et le conteneur WebSphere Liberty

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CICS Strategy and Design Manager

A (Very) Brief History of CICS.

1996 to date - CICS Transaction Server Highlights

1996 - CICS TS V1
e-business support
Java APIs
CPSM integration

2001 - CICS TS V2
Enterprise class Java
Threadsafe Performance
SOAP support

2005 - CICS TS V3
CICS Web Services
SOA integration
Channels-Containers

2009 - CICS TS V4
Event Processing
CICS Explorer
JVM Server Architecture

1969 to 1996 – Early CICS Highlights

Compatibility:
World's first high level API with inter-program communications

Capability:
Ultra high performance mixed language workloads with both file and database access

Scalability:
Inter-systems communications, with Sysplex exploitation and WLM

Reliability:
Automatic storage protection and transaction isolation

Manageability:
Online changes across a single system image with a single point of control

2011 – An Icon of Progress

In June 2011, IBM formally recognized CICS as one of the 100 most iconic achievements in the company's entire 100 year history.

securing online transactions

CICS was one of just seven IBM software innovations to make the list.

Java Update

- Java 7 (64-bit) JVMServer
- Equinox 3.7 as the OSGi framework.
  - Implements the OSGi R4.3 specification
- WAS Liberty Profile 8.5.0 based Web Container
- IBM CICS SDK for WebSphere Application Server Liberty profile v5.1
- Eclipse 3.6.2

Introduction to the CICS Java Web Container based on WAS Liberty technology

Summary of key Liberty benefits

Local. Lightweight. Fast. Web Applications run locally in CICS with direct access to CICS data and resources. No adapters, no converters, same address space.

Modular design. Architected in a modular way using OSGi, the server only enables and starts the features required by the applications and configuration. If you're not using a feature, it won't start in your server runtime

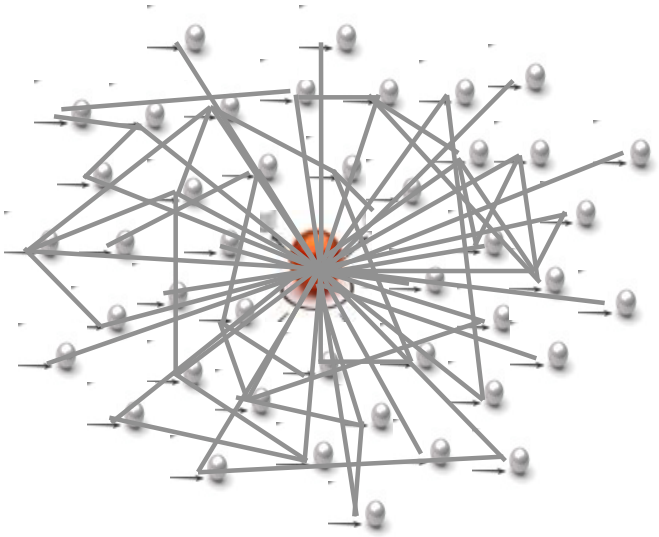
Standard tools for developers. Familiar, industry standard tools with Eclipse and Dynamic Web Projects. CICS Explorer SDK enhances the deployment experience.

Dynamic runtime. Features can be added to the server dynamically, using the OSGi framework, while the server is running, with zero downtime and server restarts. Similarly server and application config can be updated without the need to restart.

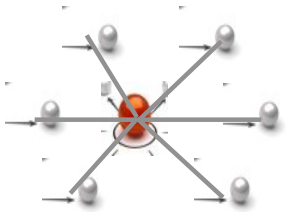
Portable. Presentation logic in Servlets, business logic in OSGi bundles. Servlets are portable across runtimes. Bundles provide componentization.

Eclipse based tools. The eclipse tools for the Liberty Profile are small and very well integrated with the Liberty Profile environment

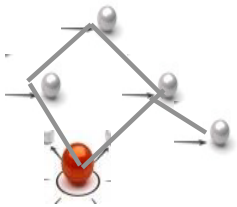
If this is tWAS...



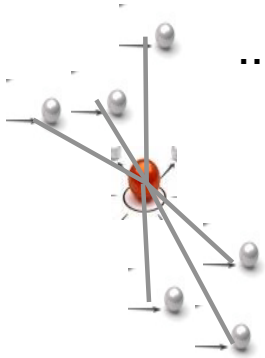
...this is Liberty (WAS)



...so is this



...or even this!



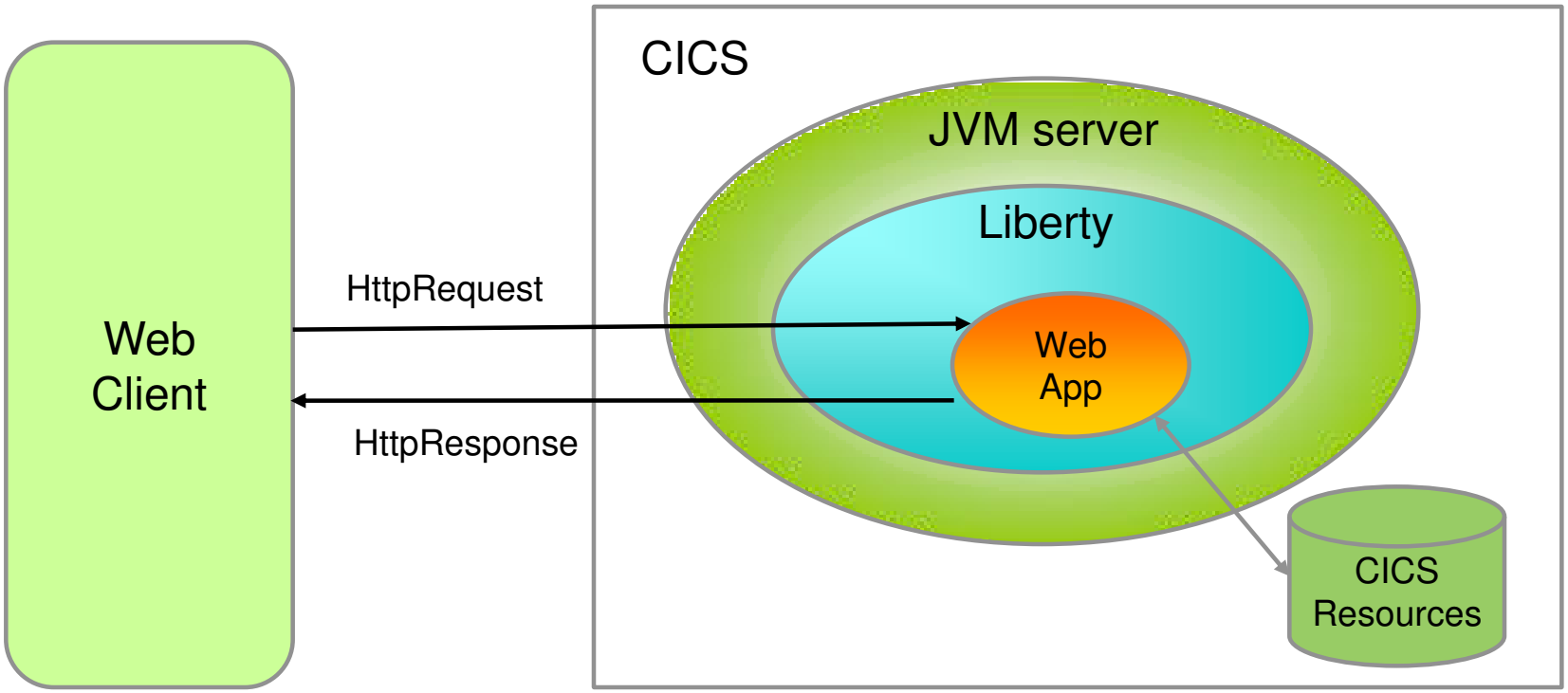
Configuration by Exception

- This is the entire configuration needed to run Liberty as a Web-container with Servlet support.

```
<server description="new server">

    <featureManager>
        <feature>servlet-3.0</feature>
    </featureManager>

    <application id="BasicWeb" location="BasicWeb.war"
      name="BasicWeb" type="war"/>

</server>
```

- “CICS TS V5.1 offers a fast and lightweight Java web container, providing developers with the rich features of the Java Servlet and JavaServer Pages (JSP) specifications, and fast local access to your existing CICS applications and data. Built on WebSphere Application Server Liberty technology, this web container runs in the CICS JVM server environment. A wide range of Java development tools can be used to develop web applications, such as WebSphere Application Server Developer Tools for Eclipse (WDT), and Rational Developer for System z. “

Liberty in CICS overview



Liberty Features (as of WAS 8.5.0)

- Bean validation
- Blueprint
- Java Database Connectivity (JDBC)
- Java Management Extensions (JMX)
- Java Persistence API (JPA)
- JavaServer Faces (JSF)
- JavaServer Pages (JSP)
- JAX-RS
- Secure Sockets Layer (SSL)
- Security, supported by either the basic user registry or a Lightweight Directory Access Protocol (LDAP) user registry
- Servlet
- Web application bundle (WAB)
- Web security
- zOS Security
- zOS Transactions

Liberty Features (for CICS TS V5.1 GA)

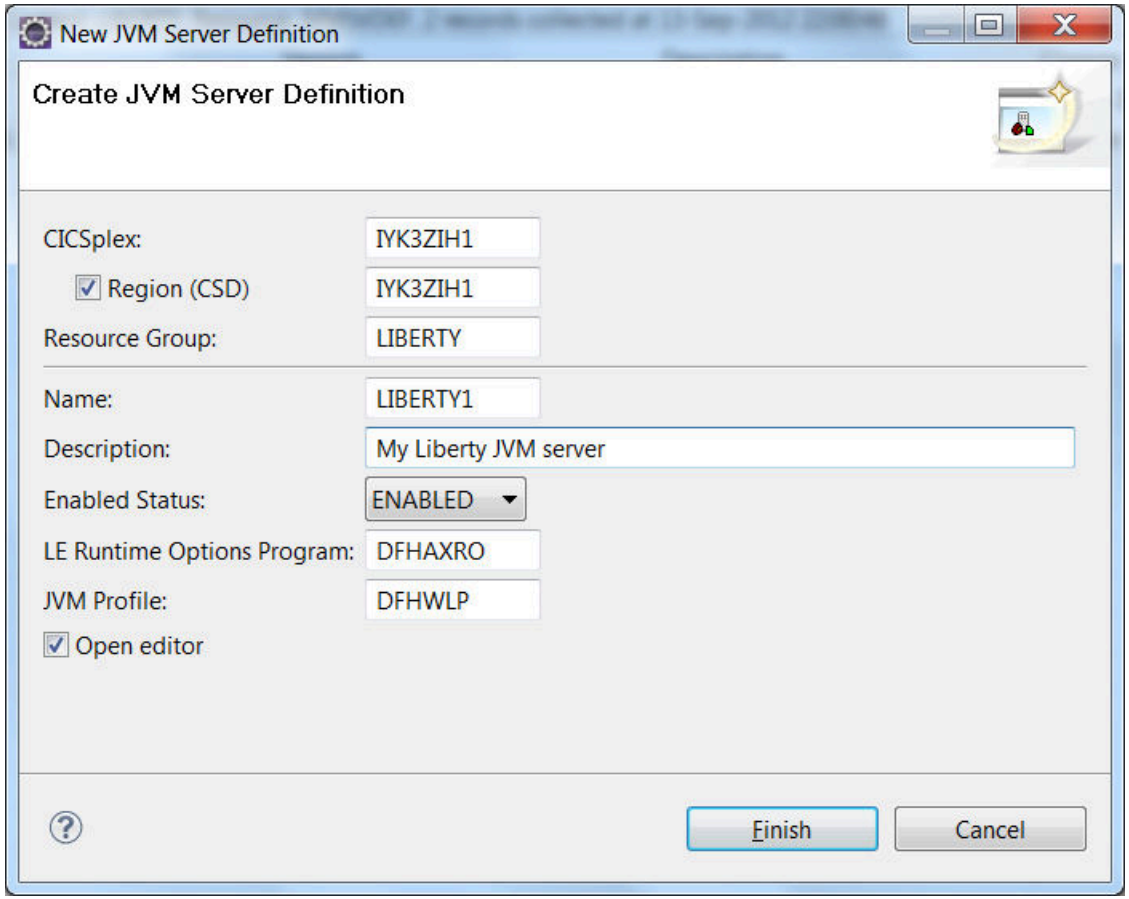
- Bean validation
- **Blueprint – via Service Stream**
- **Java Database Connectivity (JDBC)**
- Java Management Extensions (JMX)
- Java Persistence API (JPA)
- **JavaServer Faces (JSF)**
- **JavaServer Pages (JSP)**
- **JAX-RS, JSON – via Service Stream**
- **Secure Sockets Layer (SSL)**
- Security, supported by either the basic user registry or a Lightweight Directory Access Protocol (LDAP) user registry
- **Servlet**
- **Web application bundle (WAB) – via Service Stream**
- **Web security**

Benefits for CICS

- Provides “off the shelf” Web-server capabilities (JSPs and Servlets)
- Potential to re-use even more WebSphere technology in CICS.
- JSP and Web servlets have direct, local, access to CICS data and resources.
- Servlets can take advantage of existing CICS OSGi applications to provide a Dynamic Web front end.

Nought to Web-App

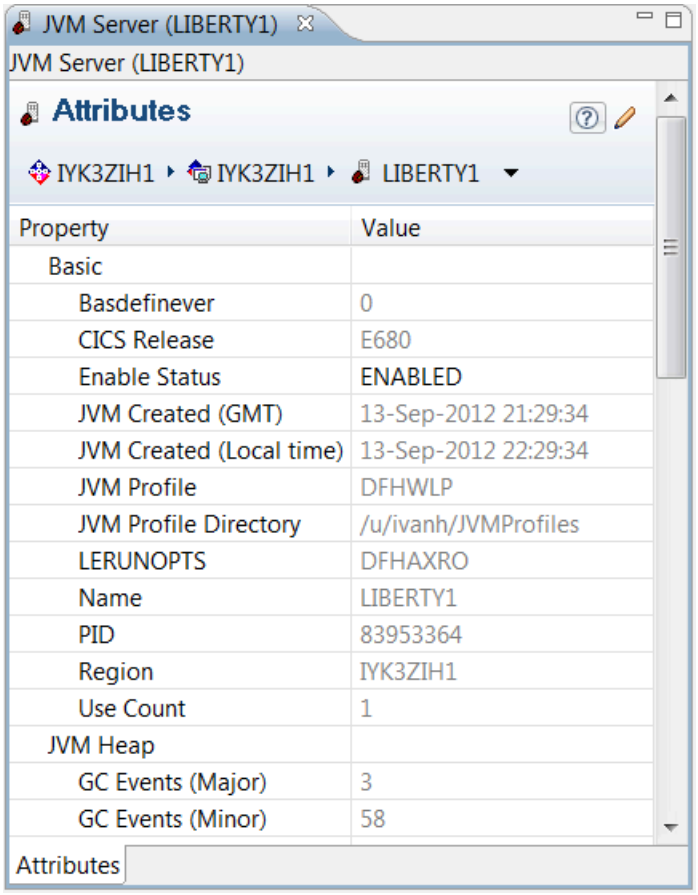
1) Create a JVM server resource in Explorer, CEDA, or CPSM.



2) Configure the JVMProfile

- Copy the sample DFHWLP
- Check JAVA_HOME is correct.
- Uncomment the WLP_SERVER_HTTP_PORT and choose a unique port number.
- Point your JVM server definition at the new JVMProfile

3) Enable the JVM server



4) Liberty is running! (check the logs).

Server defaultServer created.

Launching defaultServer (wlp-1.0.0.20120428-1251/websphere-kernel_1.0.0) on IBM J9 VM, version pmz6470sr1-20120302_01 (SR1) (en_US)

[AUDIT] CWWKE0001I: The server defaultServer has been launched.

[AUDIT] CWWKG0028A: Processing included configuration resource: file:/u/ivanh/IYK3ZIH1/LIBERTY1/wlp/usr/servers/defaultServer/installedApps.xml

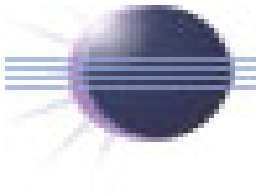
[AUDIT] CWWKG0028A: Processing included configuration resource: file:/u/ivanh/IYK3ZIH1/LIBERTY1/wlp/usr/servers/defaultServer/cicsSecurity.xml

[AUDIT] CWWKZ0058I: Monitoring dropins for applications.

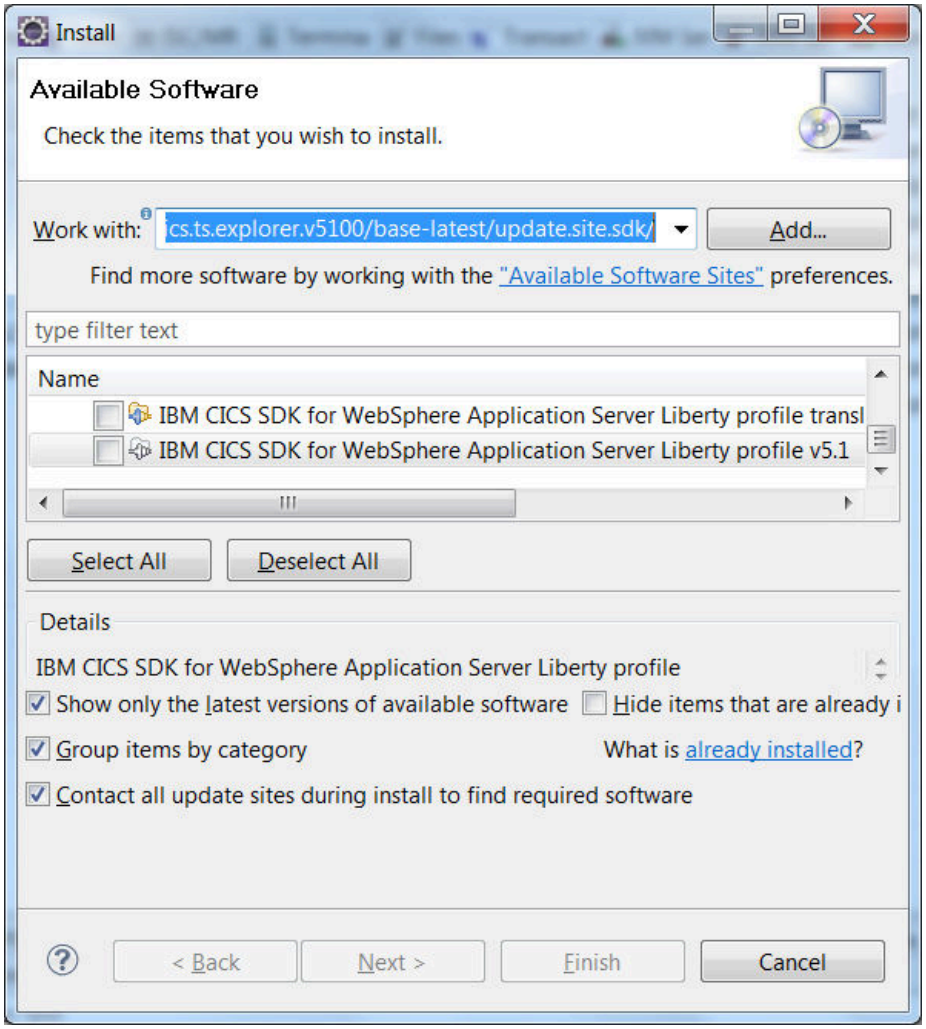
[AUDIT] CWWKF0011I: The server defaultServer is ready to run a smarter planet.

5) Install Eclipse 3.6.2 - preferably JEE version, but Classic will suffice.

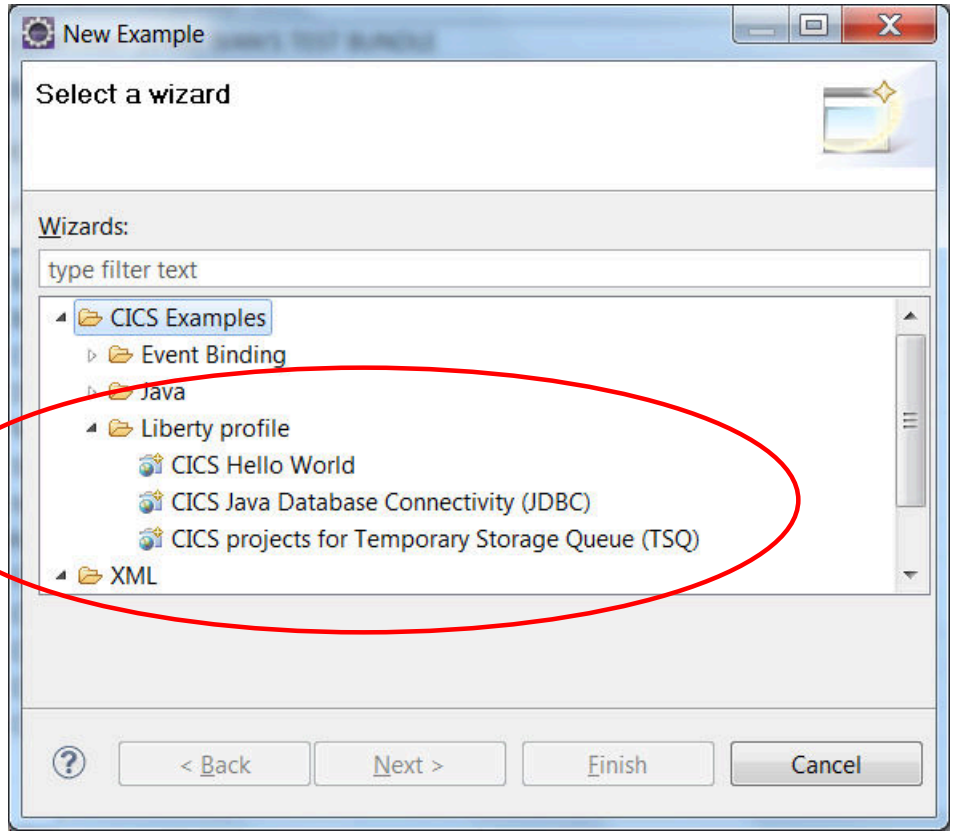
http://www.eclipse.org/downloads/packages/release/helios/sr2



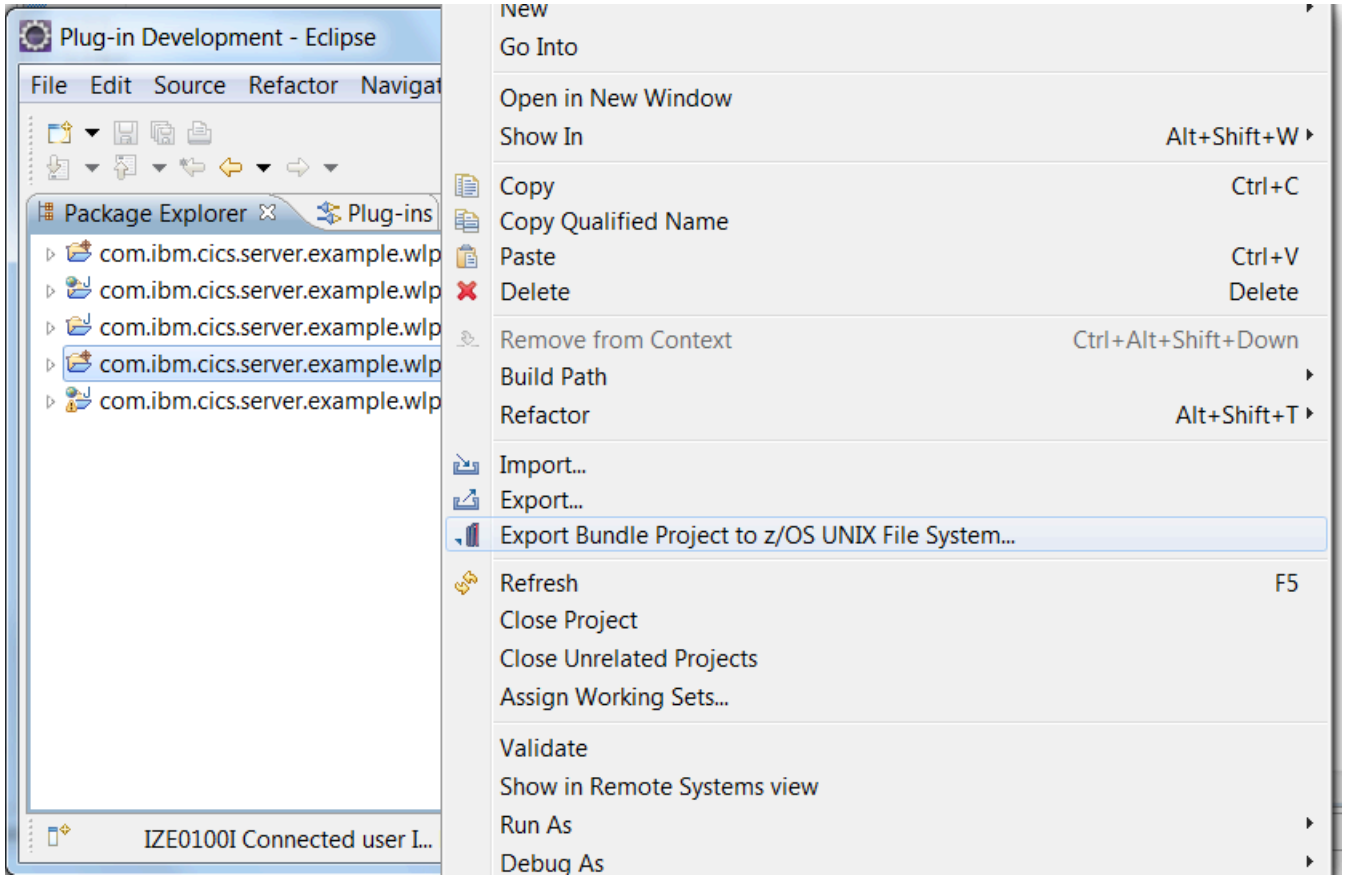
6) Install IBM CICS SDK for WebSphere Application Server Liberty profile v5.1



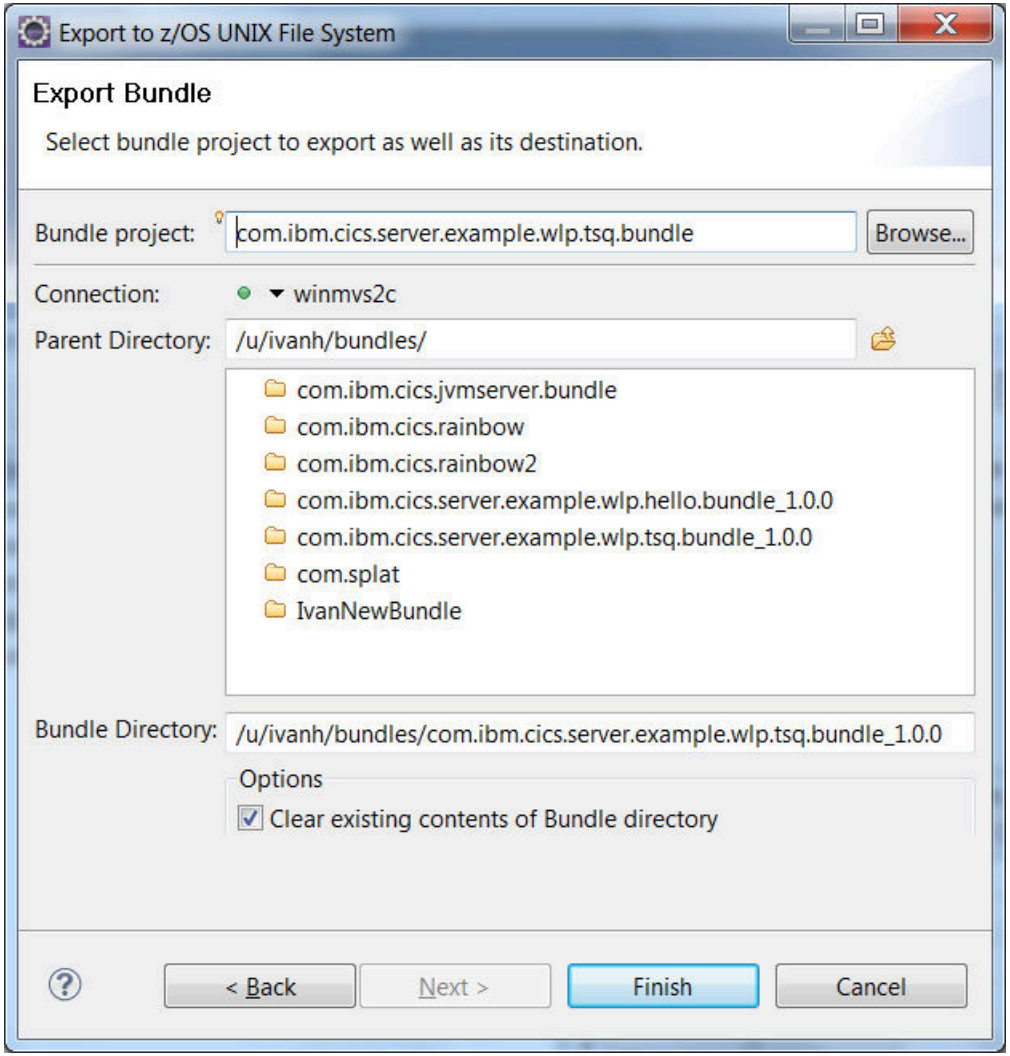
7) Create a Dynamic Web Project, or choose one of the Examples



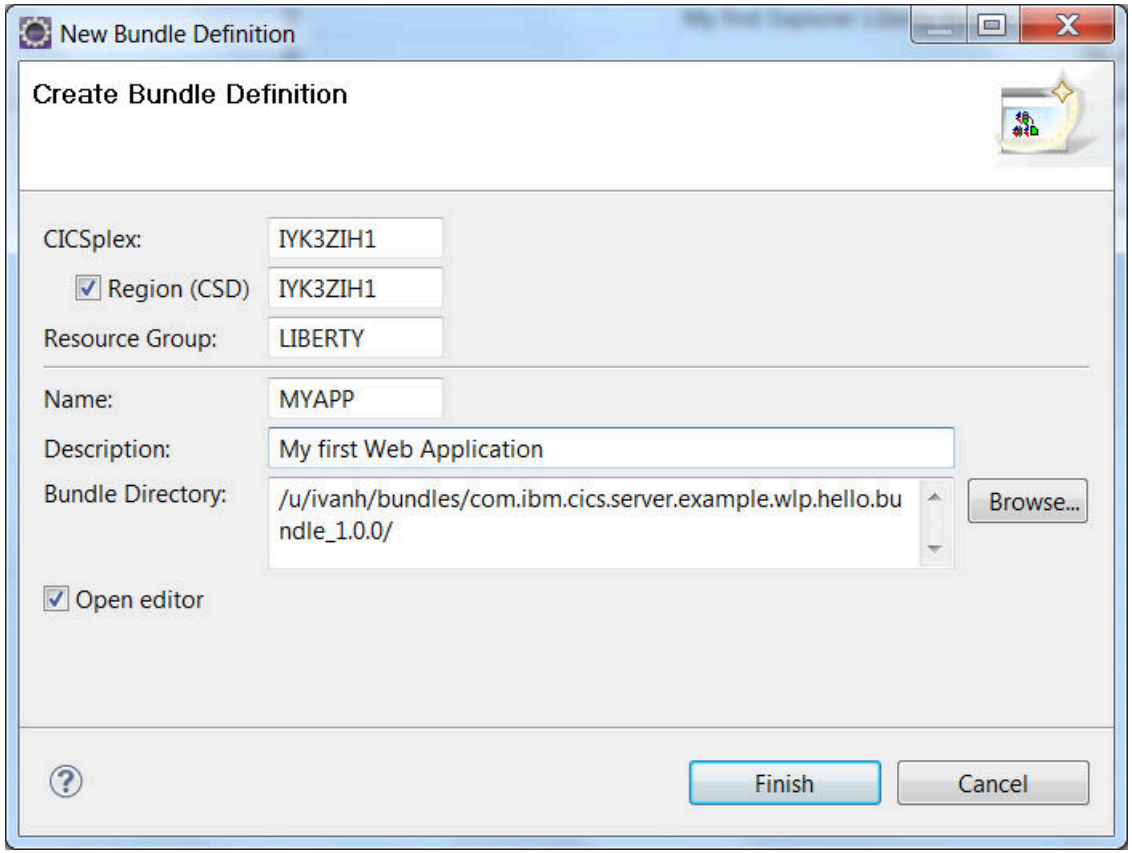
8) Export the CICS bundle project



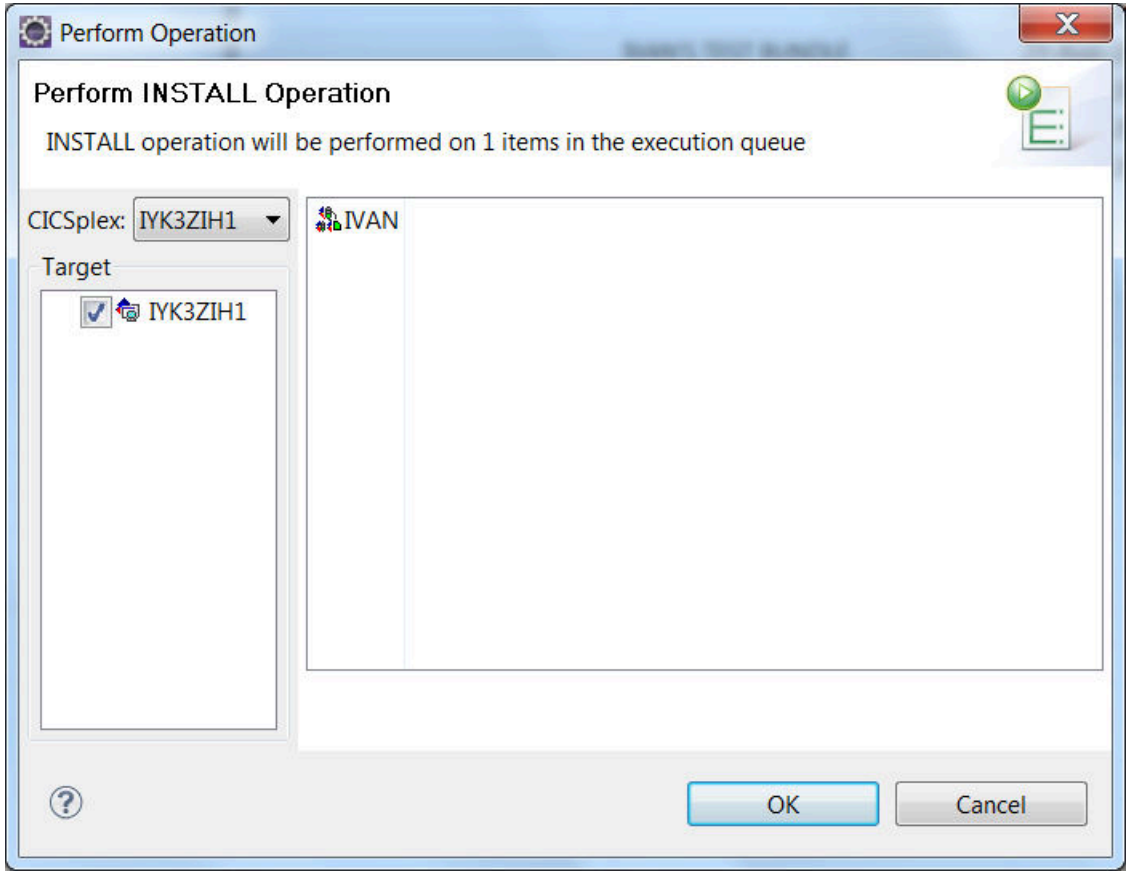
9) Pick a zFS location for the CICS bundle project



10) Create a CICS bundle definition to control the life-cycle of the Application



11) Install the CICS bundle definition

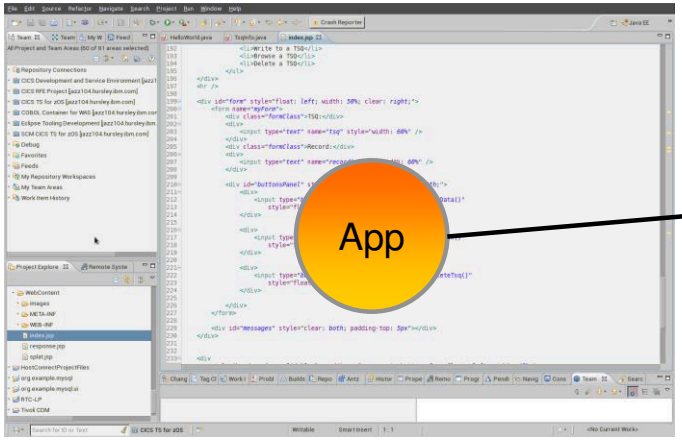


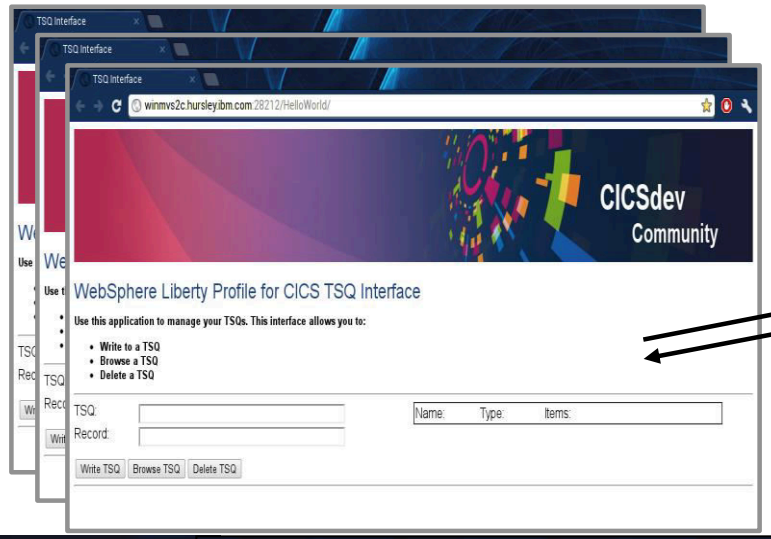
12) Run the application!

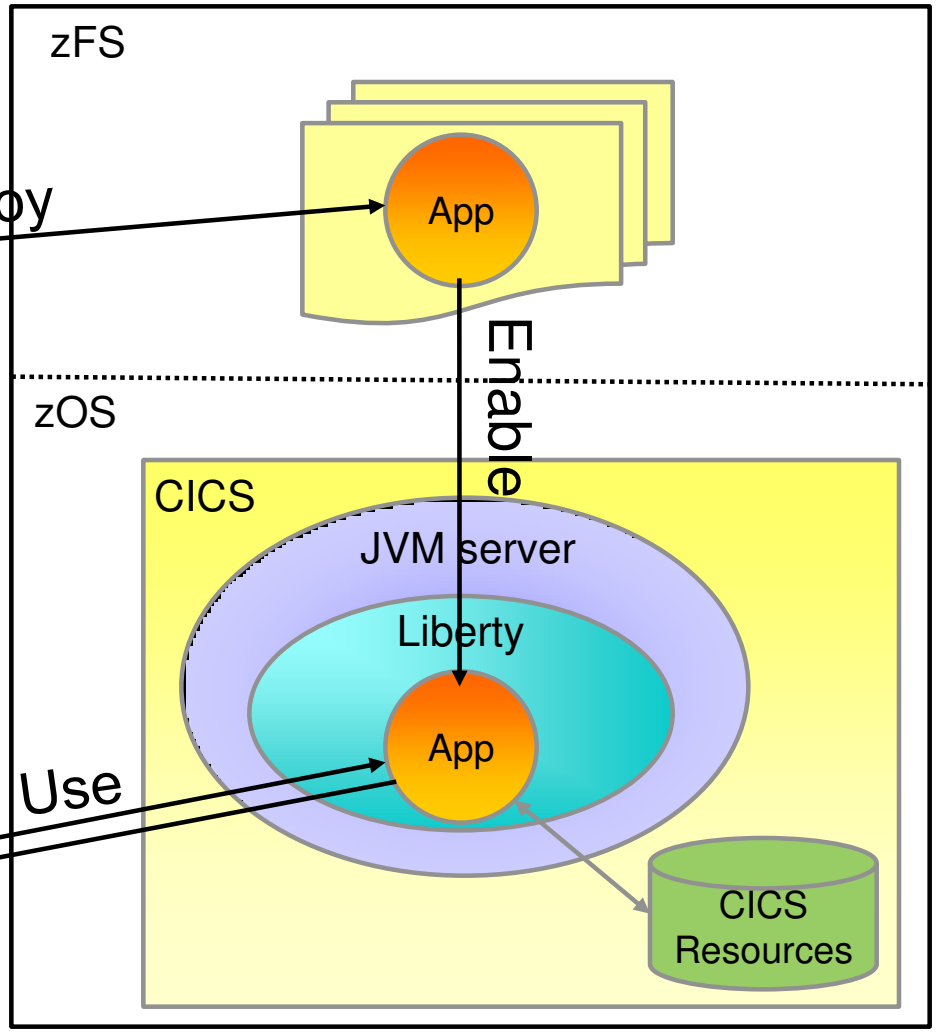
[AUDIT] CWWKT0016I: Web application available (default_host):
http://winmvs2c.hursley.ibm.com:27245/com.ibm.cics.server.example.wlp.tsq.web/

Putting it all together

Eclipse with Liberty Tools





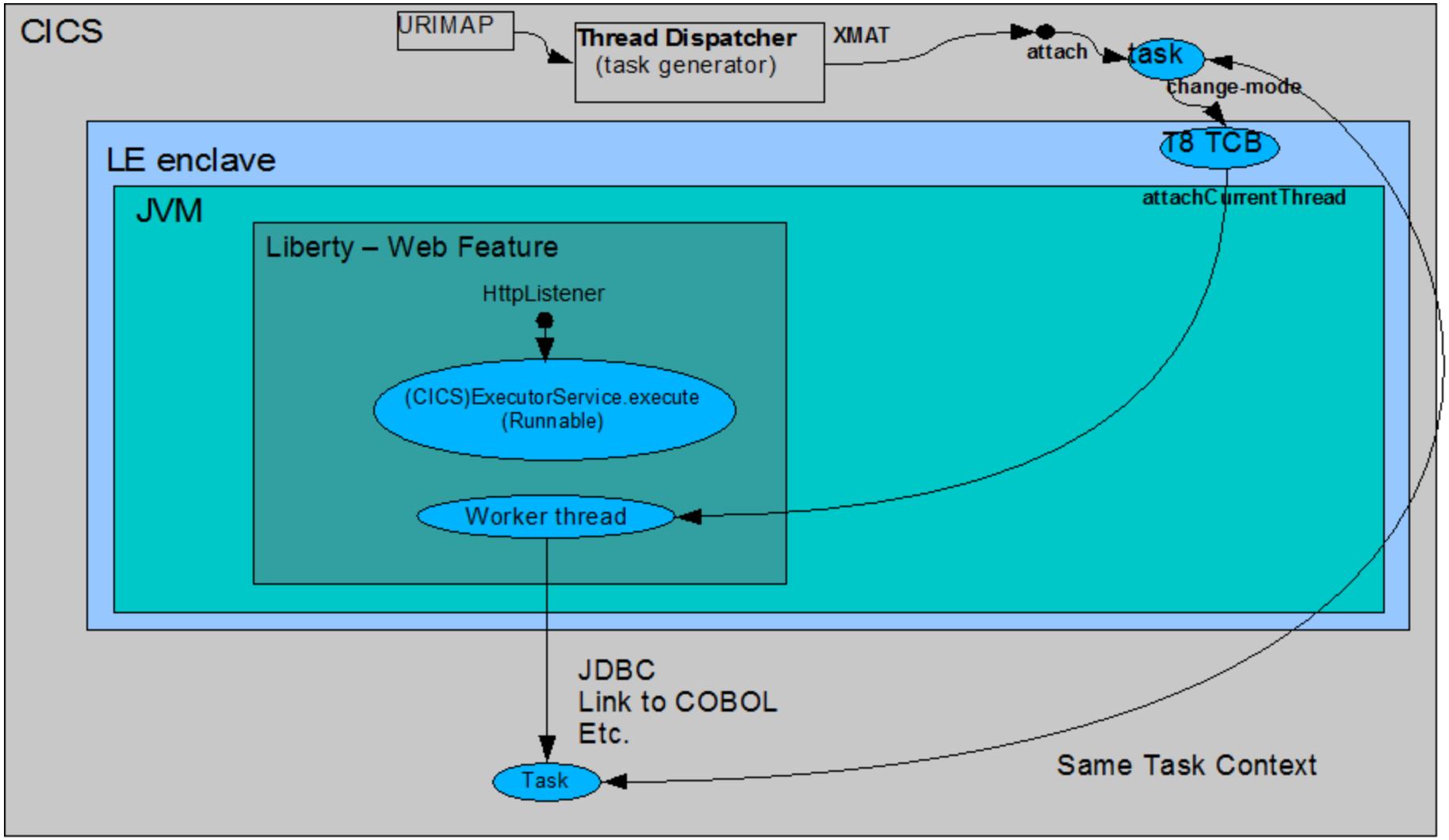


The Technology

Principles

- As little customization as possible.
  - Do things the Liberty way first, and if appropriate, only the Liberty way.
  - Ensure Server.xml can be configured dynamically by the user.
  - Support Liberty monitored drop-ins directory for applications.
- Provide CICS enhancements only where absolutely necessary (Security, Tasks, JDBC, MQ)
- Provide End-to-end Development and Deployment experience to enable non-mainframe professionals to develop for CICS.
- Fully compatible with existing CICS OSGi Java applications running within the same JVM server.

Hybrid Threads



JCICS – ExecutorService

- Thread.start equivalent (from Java concurrency package)
- A standard Java pattern for dispatching runnable code to threads.
- CICS provides “CICSExecutorService” - to create CICS capable threads.
- CICSExecutorService registered with OSGi registry, can be obtained and used by 'vendor' products and applications.
- A convenience method provided called “CICSExecutorService.runAsCICS()”
- Liberty requests an ExecutorService from the OSGi service registry.When running in CICS JVM server, it is given the CICSExecutorService which produces JCICS enabled threads for Liberty to run servlets on.

Benefits of Hybrid Threads

- Each 'Invocation' (think Servlet Request) on a Hybrid Thread is also a CICS Transaction (Has a Tranid, Task Context etc).
- This gives you
  - A single common Transaction (UOW) and CICS Managed JDBC
    - Which can cross between Java and Cobol
  - Full JCICS API Access
    - In particular, LINK and access to VSAM
  - WLM (CICS WLM, Performance Classes etc).
  - Monitoring / Statistics
  - CICS Transaction Tracking / Association Data

CICS Security with Liberty Profile

- Servlets run under default transaction CJSA with CICS default user.
- **SEC=YES** turns Security ON.
- Basic-auth only (http or https) – Client cert not yet supported.
- **Client Application**: Web.xml needs <security_constraint> to run with Security
- **Liberty**: Server.xml will be updated by CICS automatically
  - <application-bnd>
- Role based Security not supported.

URIMAP enhancements

- URIMAP provides CICS authorisation via Transaction Security

- URIMAP allows context switch to a 'user' transaction
  - Transaction Security (URL mapped to transaction)
  - monitoring and audit purposes.
  - “Transaction class” support

Part 4 – Summary and Future

Summary of Key Benefits

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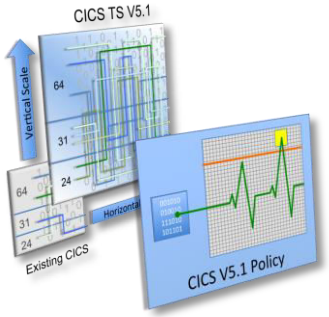
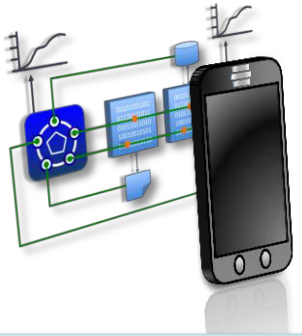
CICS Today. CICS Transaction Server V5.1

4Q 2012 – CICS Transaction Server V5.1 Highlights

Operational Efficiency: Controlling cost



Greater capacity
Managed operations
Increased availability
Deeper insight



First-class applications
First-class platforms
Modern interfaces
Foundational enhancements

Service Agility: Deliver results faster

2013 - Major post CICS TS V5.1 deliverables:

2Q 2013 – CICS Transaction Server V5.1 Value Unit Edition (VUE)
A new price option for qualified new CICS workloads

2Q 2013 – CICS TS Feature Pack for Mobile Extensions V1*
Support enabling direct access to CICS applications via mobile

2Q 2013 – CICS TS Feature Pack for Modern Batch V1*
Support CICS batch programming model and parallel

3Q 2013 – CICS TS Feature Pack for Dynamic Scripting V2*
Support PHP application in the CICS TS Feature container

*Available on CICS TS V4.2 and V5.1

2013 – The engine of world business

IBM estimates that in 2013, across the world, CICS Transaction Server processes 100 Billion transactions every single day.

100 000 000 000 transactions a day

IBM estimate

Questions?