9606: CICS ... It's Not Just COBOL: Java Support

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Themes & Topics

- Languages
- Environments
- Tools
Motivation

- **Maturity**
  - Am I taking full advantage of the capability CICS provides?
  - Am I using the right application programming language(s) and environment(s)?
  - Am I using the right tools?

- **Consumability**
  - Am I making the best use of skills?
  - Am I providing good value to my stakeholders (developers, consumers)?
  - **9600: CICS TS and the Cloud**

- **Agility**
  - How quickly can I bring a new application or version of an application to production?
  - How quickly can I repurpose an existing application?
System Maturity Roadmap

- **Standalone Regions**
- **System Management Single Server (SMSS)**
- **Single System Image (SSI)**
- **Workload Management (WLM)**
- **Business Application Services (BAS)**
- **Real-time Analysis (RTA)**
- **High Availability (HA)**

8272- Best Practices for CICS Systems Management
Application Programming Language Maturity Roadmap

- ASM
- COBOL, PL/I
- C/C++
- 4GL (CSP/EGL)?
- Java
- Dynamic Scripting (Java + PHP)
- Rules
Connectivity Maturity Roadmap

- 3270 & SNA
- Sockets (TCP/IP)
- Client/Server (DPL)
- WMQ
- IIOP/EJB
- Web (HTML)
- Web Services
Component Model Maturity Roadmap

Transaction Program -> EJB -> SOA -> SCA -> CICS bundles -> OSGi -> Cloud?
Java Programming Model Maturity Roadmap

- Pseudo-Conversational
- CORBA
- EJB
- SCA
- Plain Old Java Objects (POJOs)
- OSGi
- Services?
Application Environment Maturity Roadmap

- Macro
- EXEC CICS
- COBOL, PL/I, C/C++
- Language Environment (LE)
- Channels & Containers
- Service Oriented
- Cloud?
Languages
Languages

- ASM
- COBOL, PL/I, C/C++
- REXX
- Java
- Dynamic Scripting (PHP)
- Rules
- Event Processing
- Anything that I missed?
SHARE Questionnaire

Languages %

- COBOL: 95%
- ASSEMBLER: 73%
- JAVA: 73%
- PL1: 65%
- C++: 43%
- C: 35%
- REXX: 24%
ASM

- **Questions**
  - Who is using still ASM for applications rather than just user exits?
  - Why (legacy, performance, …)?

- **Characteristics**
  - High performance
  - High skill
COBOL (, PL/I & C/C++)

- **Questions**
  - Does anyone use more that one?

- **Characteristics**
  - Right balance between performance an skill
  - Right balance between abstraction and control
  - Full access to EXEC CICS API & SPI
  - Well understood performance characteristics
  - Mature lifecycle (SCM) & problem determination tools
  - Increasing scarce/expensive skill
REXX

- **Questions**
  - Is anyone using REXX online?
  - Is REXX used for API or just SPI?
  - What about CICSPlex SM?
  - Has anyone looked at Dynamic Scripting (PHP)?

- **Characteristics**
  - The first dynamic scripting
  - Great for automation

- **References**
  - 9327: CICSPlex What Is It, and Why Do I Care?
Java

- **Questions**
  - Who has Java in production today?
  - Who is considering Java for the future & why?

- **Characteristics**
  - Probably still the most widely used programming language
  - (Perceived) low performance
    - but can now match COBOL with zAAP
    - Half of Watson processes implemented in Java
  - Highly sophisticated (free) development tools
  - Less familiar lifecycle (SCM), problem determination & management tools
  - Only a subset of the CICS API & SPI (JCICS)
    - but Access to wide range of high quality 3rd party libraries & frameworks
  - Widely available skills
    - transferable from other platforms e.g. WAS

- **References**
  - [http://share.confex.com/share/116/webprogram/Session8274.html](http://share.confex.com/share/116/webprogram/Session8274.html)
  - 9607: CICS for Java Developers and Java for System Programmers - Two Sides of the Same Coin
  - 9575: Beyond Watson: Technology Implications Today and In the Future
Java

- Supported since CICS TS V1.3 (JDK 1.1 & HPJ)
- Updated in CICS TS V4.2 (Java 6 + JVM server + OSGi)

**Environments**
- High Performance Java (HPJ)
- JVM pool
- Batch (Compute Grid & JZOS)
- JVM server

**JRE**
- Resettable JVM & shared classes
- Java 5 (since CICS TS 3.2) concurrent & type accurate GC
- 64-bit (since CICS TS V4.2)
Dynamic Scripting

- **Supportpac CA1S: REST support in CICS using PHP for use with CICS TS for z/OS V3**
  - Just PHP

- **CICS TS and WebSphere Application Server Feature Packs for Dynamic Scripting (V4.1)**
  - Full sMASH (PHP, Groovy & Java)

- **Characteristics**
  - Ideal for “situational” applications
    - Currently better suited to the “long tail”
  - Emphasis on presentation layer & Web 2.0
    - Presentation & business logic mixed
  - Only a subset of the CICS API & SPI (JCICS)
    - but can also use Java libraries & frameworks
  - Cloud-style lifecycle
  - Full JDBC
    - simplified ZRM (Zero Resource Model)
    - PHP Data Objects (PDO)
  - PHP leverages libraries that are compiled C code
    - a bit like Java was used to access existing (high performance) COBOL in the early days

- **References**
  - **9608: CICS Dynamic Scripting**
CICS Dynamic Scripting

Can be used to develop and deploy lightweight, ‘fit for purpose’, situational applications that meet departmental, team, project and personal requirements, e.g.:

- Creating reports, dashboards and widgets
- Quickly front ending existing applications
- Exposing CICS assets in mash-ups
- Creating productivity applications
- Quickly trying out new business ideas
- Introducing new IT staff to CICS via PHP
- Developing without a dedicated budget
- Porting existing unmanaged PHP into CICS

Time to value is more important than enduring value
Rules

- **Supportpac CA0A: CICS channels and container support utility for ILOG Rules for COBOL**

- **Characteristics**
  - Business logic in rules not code
  - Visual development
  - Opportunity for end user programming & testing
  - Cross platform reuse
  - Generates linkable COBOL program
  - Agility

- **References**
  - [http://share.confex.com/share/116/webprogram/Session8282.html](http://share.confex.com/share/116/webprogram/Session8282.html)
Rules Authoring Delivered to Business
Rules for COBOL Generated Program
Event Processing

- Available from CICS TS V4.1
- Enhanced in CICS TS V4.2

**Characteristics**
- Orthogonal programming model
- Product integration
- Non-invasive
- Agility

**References**
- **9330:** CICS Event Processing
Environments
Batch

- Online & offline
- Dual mode
  - COBOL
  - Java (JZOS & JCICS)
- EXCI
- Compute Grid
Pooled JVM vs. JVM Server

- **Pooled JVM**
  - Discontinued in future release

- **JVM Server**
  - CICS V4.1: Dynamic Scripting & Compute Grid only
  - CICS V4.2: Any CICS application, OSGi development/deployment/management

- **References**
  - 9607: [CICS for Java Developers and Java for System Programmers - Two Sides of the Same Coin](http://www.ibm.com/software/htp/cics/tserver/v42/)
JVM server vs existing Java support

<table>
<thead>
<tr>
<th>Single JVM - serves many tasks (reduced storage)</th>
<th>Pool of JVMs - each serves only a single task.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(concurrent, multi-threaded, up to 256 threads per JVM server)</td>
<td>Java Program Isolation</td>
</tr>
<tr>
<td>T8 (CICS key)</td>
<td>J8 (CICS key), J9 (User key)</td>
</tr>
<tr>
<td>MAXTHRDTCBS (automatically calculated), up to max of 1024 per region</td>
<td>MAXJVMTCBS, SIT parm</td>
</tr>
<tr>
<td>More standard Server model (+ data-sharing)</td>
<td>Difficult, convoluted to share data and state.</td>
</tr>
<tr>
<td>Dynamic update and replace of modules</td>
<td>JVMs must be restarted to effect changes</td>
</tr>
</tbody>
</table>
Why OSGi?
Why OSGi?

THIS IS A PATH
Why OSGi?

geek & poke
Why OSGi?

AND THIS IS A CLASSPATH?

YEP
Pooled JVM – Application Lifecycle

Must restart the JVM pool
JVM Server – Application Lifecycle

JVMServer + OSGi

PROGRAM

APP1

APP2

APP3

APP1 V2

plugins
Pooled JVM – Application/Library Versioning

Cannot support 2 versions of a library
JVM Server – Application/Library Versioning
Tools
Rational Developer for z

- **Questions**
  - What tools do you use for traditional application development?

- **Characteristics**
  - Common development environment for COBOL, PL/I, C/C++, and Java
  - Analyze, understand, edit, build, and unit test all from the same environment
  - Remote source level debugging
  - Code/meta-data generation and language integration wizards
  - Integration with SCMs including Team Concert and Endevor
  - Almost infinitely extensible

- **References**
  - [http://share.confex.com/share/116/webprogram/Session8657.html](http://share.confex.com/share/116/webprogram/Session8657.html)
  - **9586: IBM Rational Developer for System z V.8.0 (+)**
  - **9767: Application Development for z/OS - Not Your Father's Green Screen**
  - **10126: A System z Developer's Journey Through the Application Lifecycle - Lunch’n’Learn**
IDE-based development

- Common development environment for COBOL, PL/I, C/C++, and Java
- Simplified development with more information at your fingertips

Syntax Check
Submit jobs, access job output, or open source members with a single click

Edit Source
Open and edit multiple source and JCL members simultaneously

Statement in error indicated in source

Double-Click on the Error
Error list in Problems view

Outline view presents COBOL structure
Multi-platform Application Development - the Nimble Programmer

Tools – A Silver Bullet (in more ways than one)

- Integrated Development Environments (IDEs have advanced incredibly in the past several years
  - Cross-platform differences are reduced
  - Access to multiple systems simultaneously is expected
  - Multiple language support is now common-place
  - Integration of multiple development tools into a single development environment is now reality

- At the same time, effective use of an IDE requires education and experience
  - On first sight, there is an overload of information
  - On second sight, there are “hidden” features – Where do I click?
  - On third sight, there are sometimes endless UI elements to interpret and understand

- But past the learning curve …
  - Using an IDE allows programmers to concentrate on the application
  - Regardless of programming language
  - Regardless of runtime environment
The Nimble Programmer

- **Application Developers**
  - can’t afford to be one trick pony
  - probably need to know multiple languages
  - should be able to target multiple execution platforms: mainframe, distributed even mobile

- **Architects**
  - don’t just architect by language
  - won’t architect for a single system

- **Project Managers**
  - must allow skills growth
Rational Developer for System z Unit Test

- **Questions**
  - Has anyone got RDz UT?

- **Characteristics**
  - Bring up an entire z/OS software stack on your (Linux) laptop or blade
  - Build and test applications locally
  - Integration with RDz etc
  - Only for development
    - not for stress testing or production

- **References**
Eclipse IDE with CICS Explorer SDK

- **Questions**
  - Anyone doing Java development *not* using an Eclipse-based IDE?
  - Why?

- **Characteristics**
  - Platform independent (Windows, Linux, …)
  - Can use the same environment for other “modern” workloads e.g. PHP
  - Can also Eclipse-based IDE for COBOL, PL/I & C/C++ with RDz
  - First class integration with source code management (version control) e.g. RTC, SVN, CVS, …
  - First class integration with workflow & planning tools e.g. RTC
  - Test-driven development and continuous integration (Agile) with JUnit & mock objects

- **References**
  - 9607: [CICS for Java Developers and Java for System Programmers - Two Sides of the Same Coin](#)
Eclipse IDE with CICS Explorer SDK

Java - com.ibm.cics.server.examples.hello/src/examples/hello/HelloCICSWorld.java - Eclipse SDK

package examples.hello;

import com.ibm.cics.server.ComAreaHolder;

public class HelloCICSWorld {
    public static void main(ComAreaHolder 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");
        }
    }
}
Summary

- Languages
- Environments
- Tools
Other Sessions

- **Monday**
  - 9586: IBM Rational Developer for System z V.8.0 (+)
  - 9322: CICS TS V4.2 Technical Overview

- **Tuesday**
  - 9327: CICSPlex What Is It, and Why Do I Care?
  - 9600: CICS TS and the Cloud

- **Wednesday**
  - 9319: CICS Emerging Technologies Hands-on Lab Part 1 of 2
  - 9320: CICS Emerging Technologies Hands-on Lab Part 2 of 2
  - 9608: CICS Dynamic Scripting

- **Thursday**
  - 9606: CICS ... It's Not Just COBOL: Java Support
  - 9607: CICS for Java Developers and Java for System Programmers - Two Sides of the Same Coin
  - 9613: CICS Question Box and Pot Luck
  - 9330: CICS Event Processing

- **Friday**
  - 9614: CICS Nuts, Bolts and Gotchas
More Information

- **IBM CICS Explorer**

- **SHARE (Past Conferences)**
  - 8272: Best Practices for CICS Systems Management
    http://share.confex.com/share/116/webprogram/Session8272.html

- **Podcasts**

- **Blog**
  - http://masterterminal.wordpress.com/

- **developerWorks Forum**