1 Billion Smartphones a year and counting
How is your CICS connected?

Ian J Mitchell,
IBM Distinguished Engineer
z Systems Software Application Runtimes
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Agenda

- It’s a Mobile world!
- CICS mobile enablement options
  - CICS TS JSON web services
  - CICS TG JSON web services
- z/OS Connect and CICS: an evolution
  - Compare and contrast
- CICS TS and IBM MobileFirst Foundation
  (formerly IBM Worklight Foundation)
It’s a Mobile world
There are currently more than 1.038 billion smartphones in use. That's 1 out of every 6.7 people on the planet.

Media tablet sales:

- In 2012: 118.9 million
- By 2016: 369.2 million tablets will be sold

Late 2012 forecast:

More people will use mobile phones than desktop PCs to go online.

Global mobile vs. desktop internet user projection, 2007 - 2015:

- Mobile internet user
- Desktop internet users

Source: Morgan Stanley Research
>50% Smartphone adoption in 9 countries now

WW Smartphone adoption 2012-18

More than ONE in THREE worldwide by 2018!

Smartphone owners

Mobile marketshare %

Population share %

Source: emarketer.com
Mobile: Another stage in computing history

Mobile is different:

• Ubiquitous computing
• Mixed models – web/native/hybrid
• A different type of app – context aware
• Revolutionary to business models

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Even though the world is awash in unstructured data, it’s the **transactional data** that decision makers are focused on right now. And since the mainframe holds the vast majority of that data, it has a real role to play.

80% of world’s corporate data resides or originates on mainframes.
CICS mobile enablement options: 
*The story so far*
CICS mobile enablement – solution complexity

The level of “friction” between SoE & SoR data models determine the complexity of the enablement solution

“Zero-code” solution

- Based upon tooling not coding
- Creates re-usable assets
- Ideal for top-down / bottom up
- Simple to use with fast ROI
- Less flexible in terms of data transformation options

WSBind-based solutions

Bespoke integration

- Based upon bespoke integration code
- Can always integrate between independent SoE and SOR worlds
- Code must be written somewhere e.g.
  - JAX-RS application in WAS or CICS Liberty profile

Custom adapter / RESTful web app

Composite solutions might also use MobileFirst adapters, or CICS-COBOL wrapper with any of the above

Simplicity vs Flexibility
Web Service provider: CICS Liberty
Data transform: Bespoke/custom user code
CICS integration: Direct LINK
Base release: CICS TS V5.1

Topology #1: CICS Liberty JAX-RS

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What are WSBind files and the assistants?

CICS web services and JSON assistants

**Bottom-up**
- Existing SOR applications
- **Language Structures**

**Top-down**
- SOAP/XML web services
- **WSDL**
- **Language Structures**

- JSON web services
- **JSON schema**
- **Language Structures**

**WSBind file**

- Generated by off-line tooling e.g. *DFHLS2JS*
- Stored on zFS
- Maps data between a **web service** and an SOR **language structure** representation **at run time**
  - e.g. **JSON schema to COBOL copybook**

For the consumer of the web service
- e.g. mobile app developer

For the SoR developer
- e.g. COBOL, C, PL/1 developer

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Topography #2: CICS TS JSON web services

- **Web Service provider:** CICS JSON web services
- **Data transform:** WSBind files
- **CICS integration:** Direct LINK
- **Base release:** CICS TS V5.2

**a.k.a. “CICS TS Feature Pack for Mobile Extensions” (V4.2, V5.1)**

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Topology #3: CICS TG JSON web services

- **Web Service provider**: Liberty (embedded)
- **Data transform**: WSBind files
- **CICS integration**: Standard CICS communications
  - enables z/VSE, TXSeries and “i” integration
- **Base release**: CICS TG V9.1

https://ibm.biz/cicstg91

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What is z/OS Connect?
The API Economy
Where companies [providers] expose their (internal) digital business assets or services in the form of (Web) APIs to third parties [consumers] with the goal of unlocking additional business value through the creation of new assets.
It’s about getting REST and JSON into your mainframe environment in a way that enables you to best take advantage of the assets that exist there:

**Mobile Ecosystem**

Where z/OS Connect fits

- Liberty Profile Server
- Function IBM wrote to run in Liberty Profile
- No charge function provided with license entitlement for WAS z/OS, CICS or IMS customers

**z/OS Connect – What is it?**

REST – Representational State Transfer … the use of HTTP URLs that map to a ‘service’, such as ‘query account’ or ‘update data’

JSON – JavaScript Object Notation … a standard of representing data as a set of name/value pairs. This is passed back and forth along with REST request/responses

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Why z/OS Connect?

This represents another component to configure and maintain in your environment. So what value does it bring?

- Provides a common and consistent entry point for mobile access to one or many backend systems
- Java, so runs on specialty engines
- Shields backend systems from requiring awareness of RESTful URIs and JSON data formatting
- Provides point for authorization of user to invoke backend service
- Provides point for capturing usage information using SMF
- Simplifies front-end functions by allowing them to pass RESTful and JSON rather than be aware of or involved in data transformation
Different Delivery Approaches

This is planned to be delivered with WAS z/OS, CICS and IMS … objective is to provide different approach paths depending on what you have:

**WAS z/OS**

Delivered as function that runs inside Liberty Profile z/OS. Initially will use WOLA (WebSphere Optimized Local Adapters) to access backend.

**CICS**

Delivered as part of Liberty Profile that runs inside of CICS region with a JCICS local LINK, and CICS TG using standard CICS ISC connections.

**IMS**

Initially this ends up looking just like the WAS z/OS approach: that is, Liberty Profile z/OS with z/OS Connect inside. Difference is this: IMS z/OS Connect uses JCA* to talk to IMS Connect to get access into IMS.

These different delivery mechanisms tend to obscure the main story of what it is and how it works, so for now let’s stipulate IBM offers several ways to get this and now focus on some details

* A supplied IMS JCA resource adapter, as opposed to the local adapter support
The message here is that z/OS Connect is a piece of the Mobile architecture, but in most cases will not be the only component:

Users of z/OS Connect would access through normal corporate firewall infrastructure.

IBM MobileFirst Platform to provide application management, security and operational governance for mobile applications.

z/OS Connect would be behind the secure firewall, and on LPARs along with backend systems.

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z/OS Connect is software function that runs in a Liberty Profile.

z/OS Connect is described and configured in the Liberty server.xml file.

z/OS Connect is designed to accept RESTful URIs with JSON data payloads.

One part of z/OS Connect is a servlet that runs in Liberty Profile.

A ‘Service Provider’ is software that provides the connectivity to the backend system.

‘Interceptors’ are callout points where software can be invoked to do things such as SAF authorization and SMF activity recording.

Initially the backend systems supported will be CICS, IMS and Batch.

z/OS Connect provides the ability to transform JSON to the layout required by backend.
z/OS Connect and CICS

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Topology #4: WAS z/OS Connect

- **Web Service provider:** WebSphere Liberty on z/OS
- **Data transform:** WSBind files
- **CICS integration:** WebSphere Optimized Local Adapter (WOLA)
IBM CICS Transaction Server V5.3 open beta

enterprise grade mixed language application serving

Service Agility
- Enhanced support for Java and the WebSphere Liberty profile
- Additional Liberty features
- Enhanced interoperability
- Simplified management
- Enhanced Java SE support

Operational Efficiency
- Performance optimizations, enhanced metrics and additional security
- Web service optimizations
- Performance improvements
- Enhanced metrics
- Additional security options

Cloud with DevOps
- New cloud and DevOps support to automate CICS deployments
- Automated builds
- Scripted deployments
- UrbanCode Deploy support
- Enhanced cloud enablement

Planned open beta availability: 23rd Mar 2015

Announcement letter ENUS215-020
IBM intends to deliver IBM WebSphere Liberty z/OS Connect (z/OS Connect) as a common program component of WebSphere Application Server for z/OS, IMS™ Enterprise Suite for z/OS, CICS Transaction Server for z/OS, and CICS Transaction Gateway.

ENUS214-107, April 7th, 2014

GA June 2014

- IBM WebSphere Application Server delivered Liberty z/OS Connect as a new repository feature
- IMS™ Mobile Feature Pack delivered, based upon Liberty z/OS Connect
CICS TS V5.3 open beta : Service Agility

Enhanced support for Java and the WebSphere Liberty profile

The CICS TS V5.3 open beta offering also includes a technology preview of the ability for Java programs in a Liberty profile JVM server and non-Java programs to call each other using standard CICS API calls. This technology preview enables:

- Java applications to use the standard JEE Connector Architecture (JCA) to invoke CICS programs in any supported language.
- Non-Java CICS programs to issue an EXEC CICS LINK to call a Java application running in a Liberty profile JVM server.

Additionally, the **Liberty z/OS Connect** feature is now supported by the CICS TS V5.3 open beta offering*. This provides RESTful APIs and accepts JavaScript Object Notation (JSON) payloads between CICS, mobile devices, and cloud environments.

* Also available in CICS TS V5.2 via APAR PI25503.
Topology #5: CICS TS z/OS Connect

- **Web Service provider:** CICS TS z/OS Connect (embedded)
- **Data transform:** WSBind files
- **CICS integration:** Direct LINK

**Now available!**
- **CICS TS V5.3 open beta** includes embedded z/OS Connect
  - Also available in **CICS TS V5.2 via APAR PI25503**

Complete your session evaluations online at www.SHARE.org/Seattle-Eval
## CICS mobile enablement – Product options

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<td></td>
<td>• CICS TS V4.2, V5.1 JSON web services&lt;br&gt;• CICS TS V5.2, or later</td>
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<td><strong>CICS z/OS Connect</strong></td>
<td>CICS z/OS Connect&lt;br&gt;• CICS TS V5.2 PTF&lt;br&gt;• CICS TS V5.3 open beta</td>
<td>✓ Proximity to data&lt;br&gt;✓ Service management + APIM integration</td>
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<tr>
<td><strong>CICS TG products</strong></td>
<td>JSON web services&lt;br&gt;• CICS TG V9.1&lt;br&gt;• CICS TG V9.2 open beta</td>
<td>✓ CICS TS family + TXSeries&lt;br&gt;✓ Choice of platforms including cloud e.g. SoftLayer</td>
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<tr>
<td><strong>WAS for z/OS</strong></td>
<td>WebSphere Liberty z/OS Connect&lt;br&gt;• WAS for z/OS V8.5.5.2 Liberty repository feature</td>
<td>✓ Multiple z/OS subsystems CICS, IMS, Batch&lt;br&gt;✓ Service management + APIM integration</td>
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WAS for z/OS + CICS TS for z/OS both also offer JAX-RS through Liberty.
# CICS mobile enablement – Product options

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Each of these solutions share common code for both tooling and run time to transform data between JSON and binary representations.

Data transformation for CICS programs is based around “WSBind” files. They represent the SOR data structure and enable the run-time transformation for JSON web services.

WAS for z/OS + CICS TS for z/OS both also offer JAX-RS through Liberty.
z/OS Connect vs CICS JSON web services

Point-in-time comparison for CICS TS z/OS Connect

- IBM API Management
  - z/OS Connect and support for IBM API Management

- Non-RESTful CICS programs (JSON RPC, request/response)
- RESTful CICS programs
  - z/OS Connect must return JSON

- Outbound JSON web services
  - Not available with z/OS Connect

z/OS Connect is evolving…we’d like your input!

Complete your session evaluations online at www.SHARE.org/Seattle-Eval
CICS TS and IBM MobileFirst Platform Foundation
Rapid multi-platform development using a single shared codebase

From the complexity of many...
• Multiple sets of tools & frameworks
• Four codebases to develop and maintain

To the simplicity of one
• One development environment
• One codebase to develop and maintain

IBM MobileFirst Foundation
IBM MobileFirst Platform Foundation components

**MobileFirst Studio**
Leading tools for native and hybrid development that help maximize code reuse and accelerate development.

**MobileFirst Server**
Mobile-optimized middleware providing a gateway between applications, back-end systems and cloud-based services.

**Client-side runtime components**
Runtime client APIs designed to enhance security, governance and usability.

**Application Center**
Set up an enterprise app store that manages the distribution of production-ready mobile apps.

**MobileFirst Operations Console**
An admin GUI with real-time operational analytics for the server, adapters, applications and push services. Manage, monitor & instrument.
MobileFirst iOS Solution standard architecture
z Systems detail

iOS Enterprise App
Platform SDK
iOS Platform

API Gateway
API Mgmt
API Analytics
API Assembly

Advanced Mobile Access
Push
Security
Node.js

Mobile Data Store
Quality Assurance

MobileFirst Platform

Solution Specific Components
IBM Industry Solutions
Workflow
Enterprise Content Mgmt
Business Analytics

Enterprise SOR Interface (Service/API based)

Enterprise SOR
Service based integration (WebServices)
Enterprise Data
Content

Service Bus
Subsystem WebServices
Enterprise Systems

API Management
WAS
CICS
IMS
z/OS Connect

API based integration (WebServices/REST)
SOAP/XML
JSON

Push through APNS

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Mobile scenario

Connect directly to CICS z/OS Connect from MobileFirst using end-to-end JSON

Step 1
DFHLS2JS to generate the JSON artefacts for the target CICS service.

Step 2
Mobile developer uses JSON schema to build a MobileFirst adapter.

Step 3
Frontend mobile developer calls the MobileFirst adapter which calls the service hosted in CICS.
1. Mobile user sends an insurance customer request

2. The CICS application is invoked by a MobileFirst adapter

3. CICS z/OS Connect converts the JSON request to the COMMAREA interface of the GENAPP application

4. The GENAPP Cobol application processes the insurance policy customer details
IBM MobileFirst Platform Studio: Simulator
IBM CICS Transaction Gateway V9.2 open beta

CICS intercept plug-in allows virtualization of CICS servers

DevOps

Zero MIPS continuous integration testing option for integrated CICS solutions

Service Agility

Enhanced OS support adds Ubuntu (Intel x86-64) as a Multipaltforms option for CICS TG run time, and Apple OS/X for CICS Explorer users

Operation al Efficiency

IBM® SDK, Java™ Technology Edition, Version 8 delivers significant performance benefits for IBM z13

- IBM intends to deliver enhanced capability for IBM Rational Test Workbench to exploit IBM CICS TG V9.2 open beta
- Ubuntu continues to grow in the enterprise, is popular with developers, and available on SoftLayer
- Use the CICS TG plug-in for CICS Explorer on Apple OS/X
- Simultaneous-Multi-Threading (SMT) facility for zIIP processors
- Encryption exploitation of zEDC and CPACF hardware

Planned open beta availability: 23rd Mar 2015

Announcement letter ENUS215-031
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Planned open beta availability: 23rd Mar 2015

Announcement letter ENUS215-031
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Mobilize your mainframe in our fun app-building contest for z Systems clients & business partners!

Register now at

ibm.biz/mmathrowdown

and submit your app by April 12th
# Need expert help?

## CICS Development Services, for worldwide services assistance

<table>
<thead>
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<tbody>
<tr>
<td>Get a deep dive into your systems with a CICS health check</td>
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<tr>
<td>Move forward with mobile with our customized mobile workshop</td>
</tr>
<tr>
<td>Soar into the cloud with our tailored cloud workshop</td>
</tr>
<tr>
<td>Want to know more about CICS and Java? We offer tailored Java education</td>
</tr>
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<td>Need to optimize your systems? Then ask about a performance optimization engagement</td>
</tr>
<tr>
<td>Need to modernise your workload in CICS? Ask about a integration and connectivity engagement</td>
</tr>
<tr>
<td>Get the low down on performance with a CICS performance workshops</td>
</tr>
<tr>
<td>Need some help upgrading to the latest release? Then ask about our upgrade workshop</td>
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<tr>
<td>Need to reduce cost by optimizing your systems? Then a performance optimization engagement may be for you</td>
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<tr>
<td>Need something different? Then we can build a customized workshop, just for you!</td>
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