

# Modernizing Mainframe applications for mobile and more

Track 3: Extending the mainframe to the mobile enterprise



## Where we are in today's agenda

- Mobilizing the mainframe
- Modernizing mainframe applications for mobile and more
- Exposing mainframe applications and services to mobile
- Developing an IBM MobileFirst platform application for z Systems
- Optimizing applications and data for mobile workloads
- Client use cases and getting started with mobile and z Systems

## Reduce

- Cost
- Risk
- Complexity
- Outage

## Manage

- Operational efficiency
- Critical business data
- Security & Compliance
- Skills and resources

## Deliver

- Service agility
- Business Intelligence
- Mobile solutions
- Cloud solutions



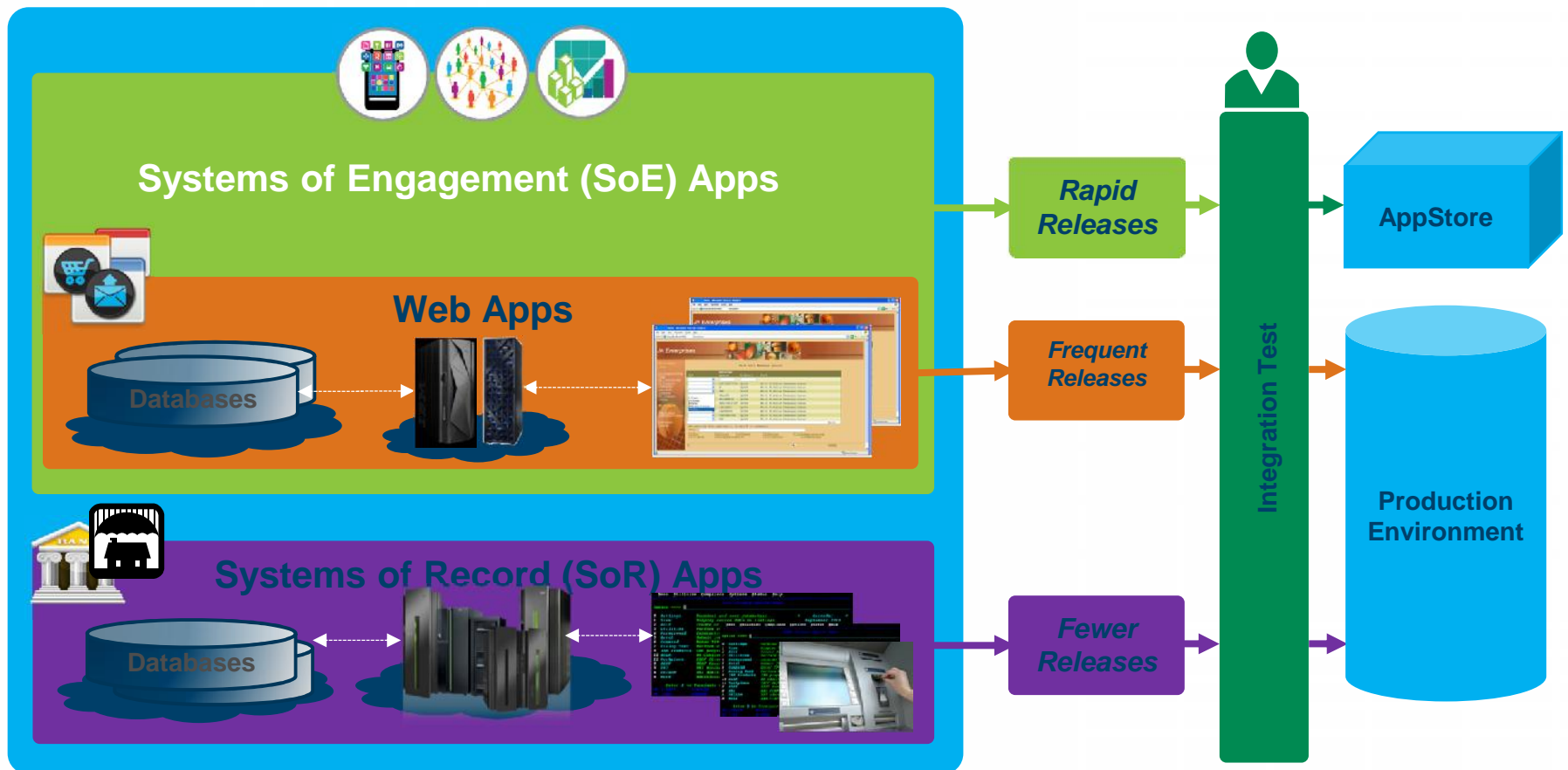
“Agility and accessibility will make the successful organization of the future.”



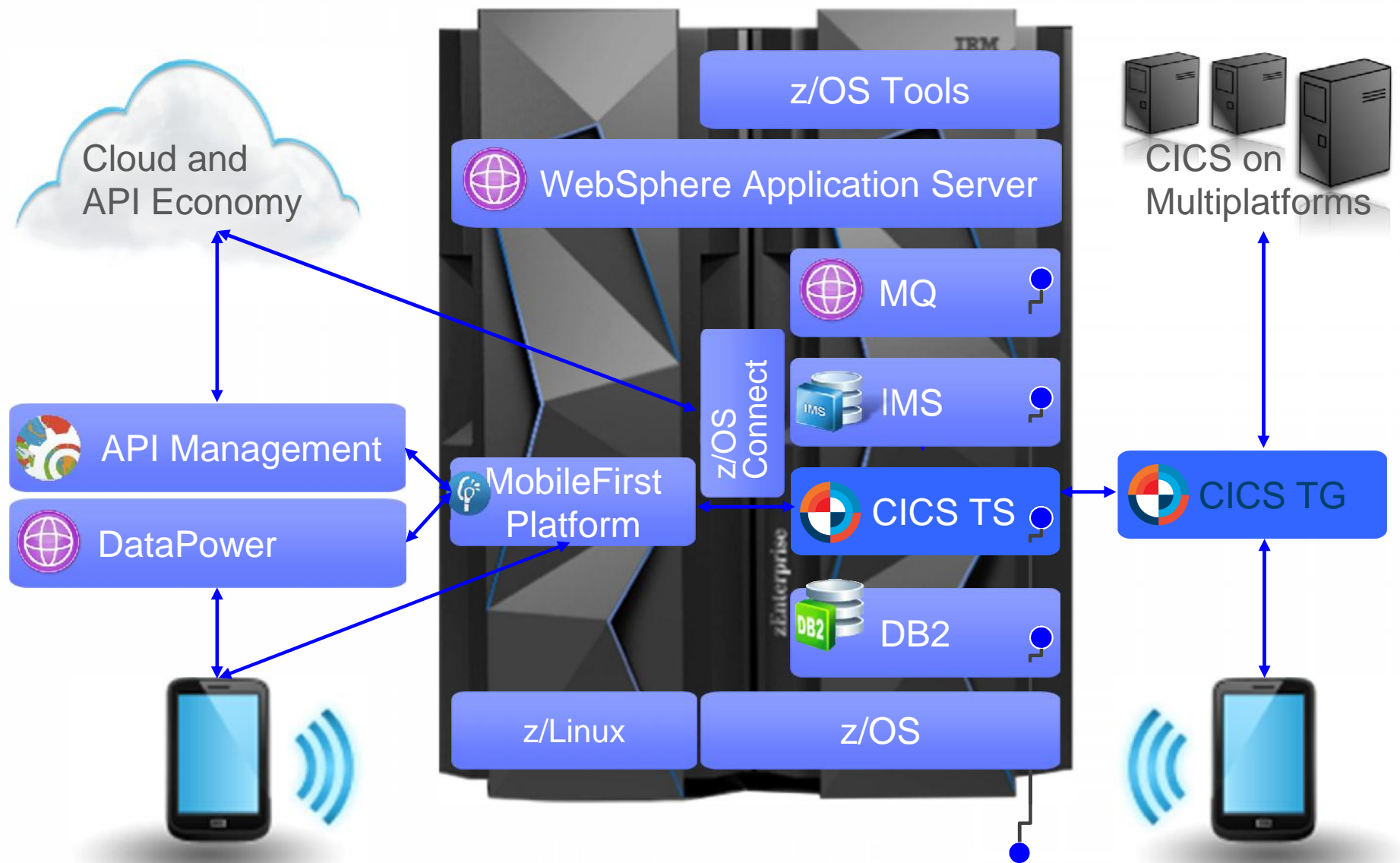
## Digital technologies lead CIO technology priorities

CIO technologies	Ranking of technologies CIOs selected as one of their top 3 priorities in 2013				
Ranking	2013	2012	2011	2010	2009
Analytics and business intelligence	1	1	5	5	1
Mobile technologies	2	2	3	6	12
Cloud computing (SaaS, IaaS, PaaS)	3	3	1	2	16

*Bringing together the people, processes, and tools across the entire software delivery lifecycle – spanning mobile to mainframe platforms*



# Systems of Engagement meet Systems of Record





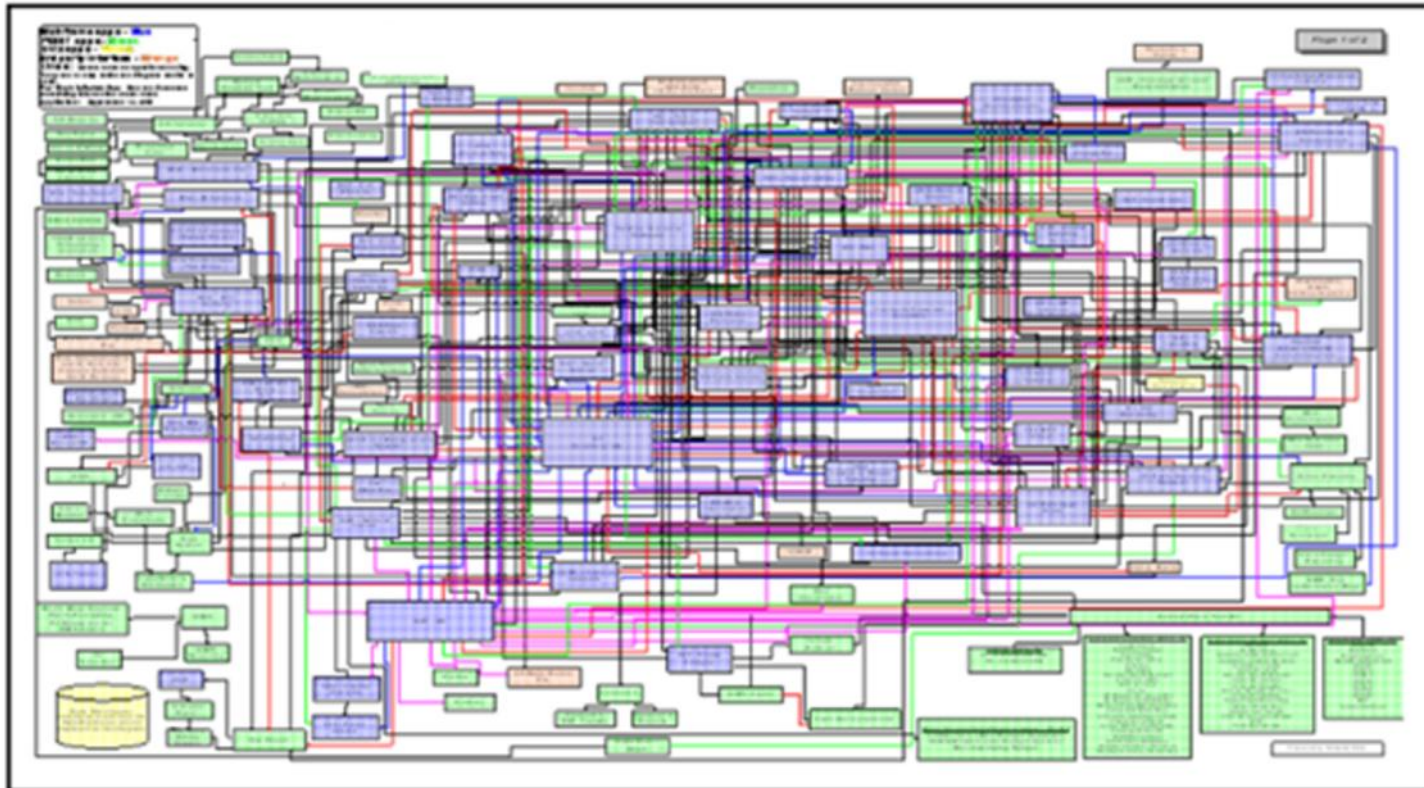
# Systems of Record can be complex systems built on decades of continuous & incremental development



Change?

Fix problems?

Optimize?



Modernize?

Where do I start?

Re-use?

## Applications

- Service and mobile enablement
- Modern web and Java development
- Events, business rules and, Decision Management

## Infrastructure

- Connecting mobile, J2EE, and client-server applications
- Cloud enablement
- Modern batch

## Data

- Updating and testing new data schemas
- Data conversion
- Migrating VSAM data to DB2 without application change

As a Developer or Architect,

**Integrated tooling and DevOps**

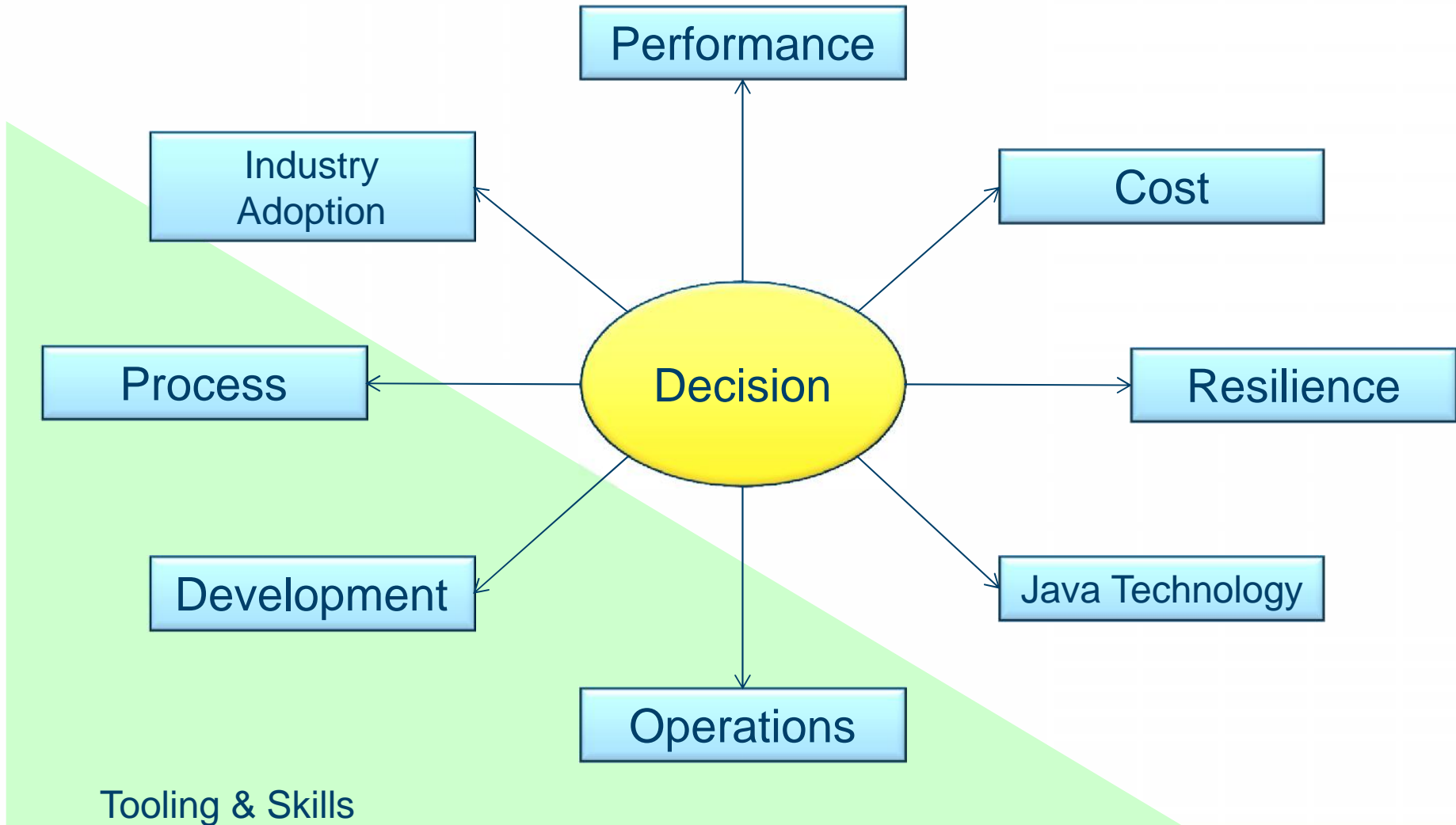
help me modernize applications, data, infrastructure, and processes

# Mobile enablement scenario by DevOps phase

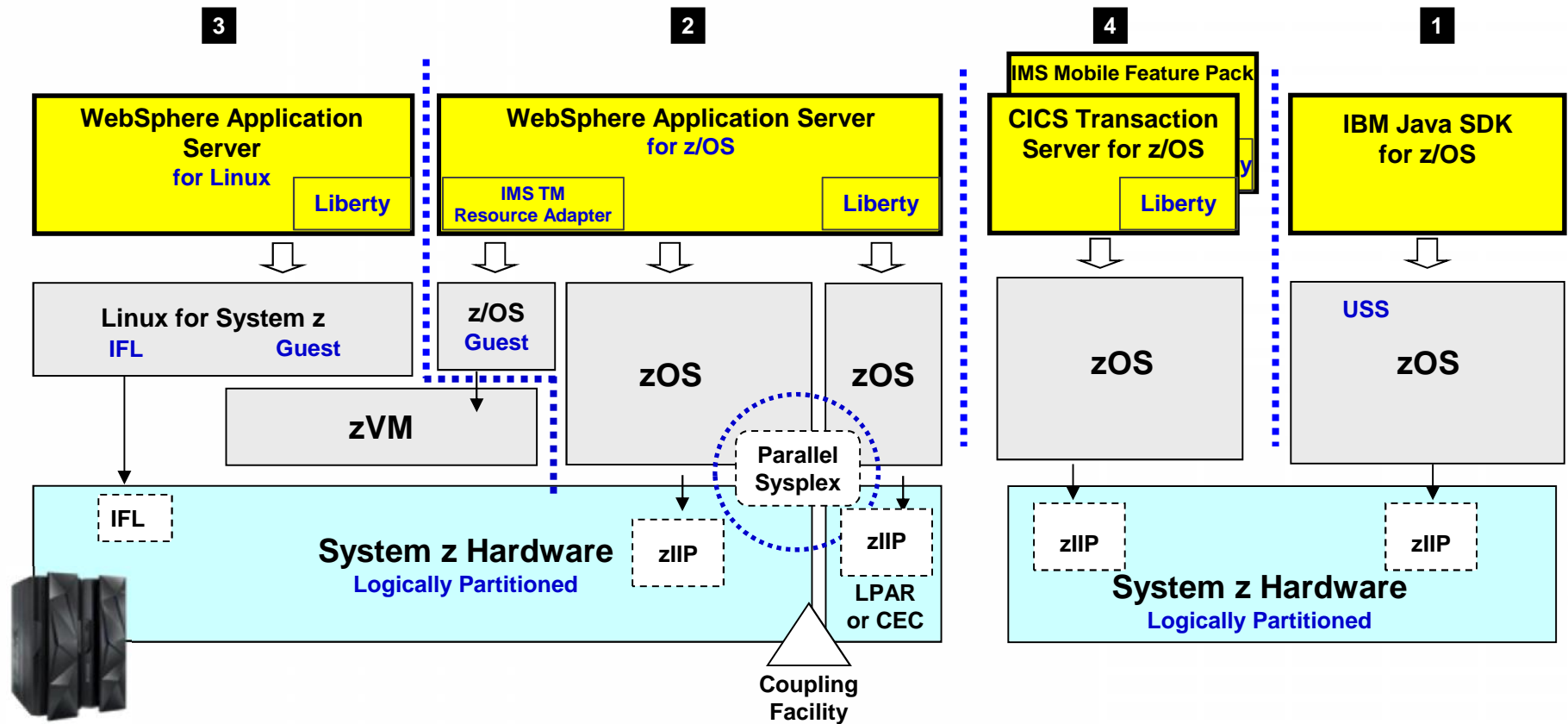


Steer	Develop and Test	Deploy	Operate
Create capacity plan CICS PA	Create dev / test regions CICS DA (take advantage of on premise/cloud RD&T)	Create production regions CICS DA	Analyze / optimize performance CICS PA, CICS IA, APA
Identify mobile service entry points CICS IA, IMS	Create mobile services CICS TS, CICS TG, IMS, z /OS Connect	Migrate production configuration CICS CM	Automate fault processing FA
Mobile workload usage and SLA reports CICS PA	Update data model FM	Update production data sources FM	Implement continuous availability CICS VR, Lifeline
	Update and unit test CICS and IMS programs (RDz, RD&T on premise and cloud, IMS E4D)	Update production libraries UC Deploy	Event- and rule-enablement ODM
	Build mobile app MobileFirst Platform	Update IMS applications UC Deploy	API self-service API Management
	Package configuration changes CICS CM		Migrate VSAM to DB2 CICS VT
	Function and load tests WSIM, RTVS		
	Time-sensitive testing Hourglass		
	Diagnose problems DT		
	Eliminate performance hot-spots APA, CICS PA		
	Create test data sources FM		





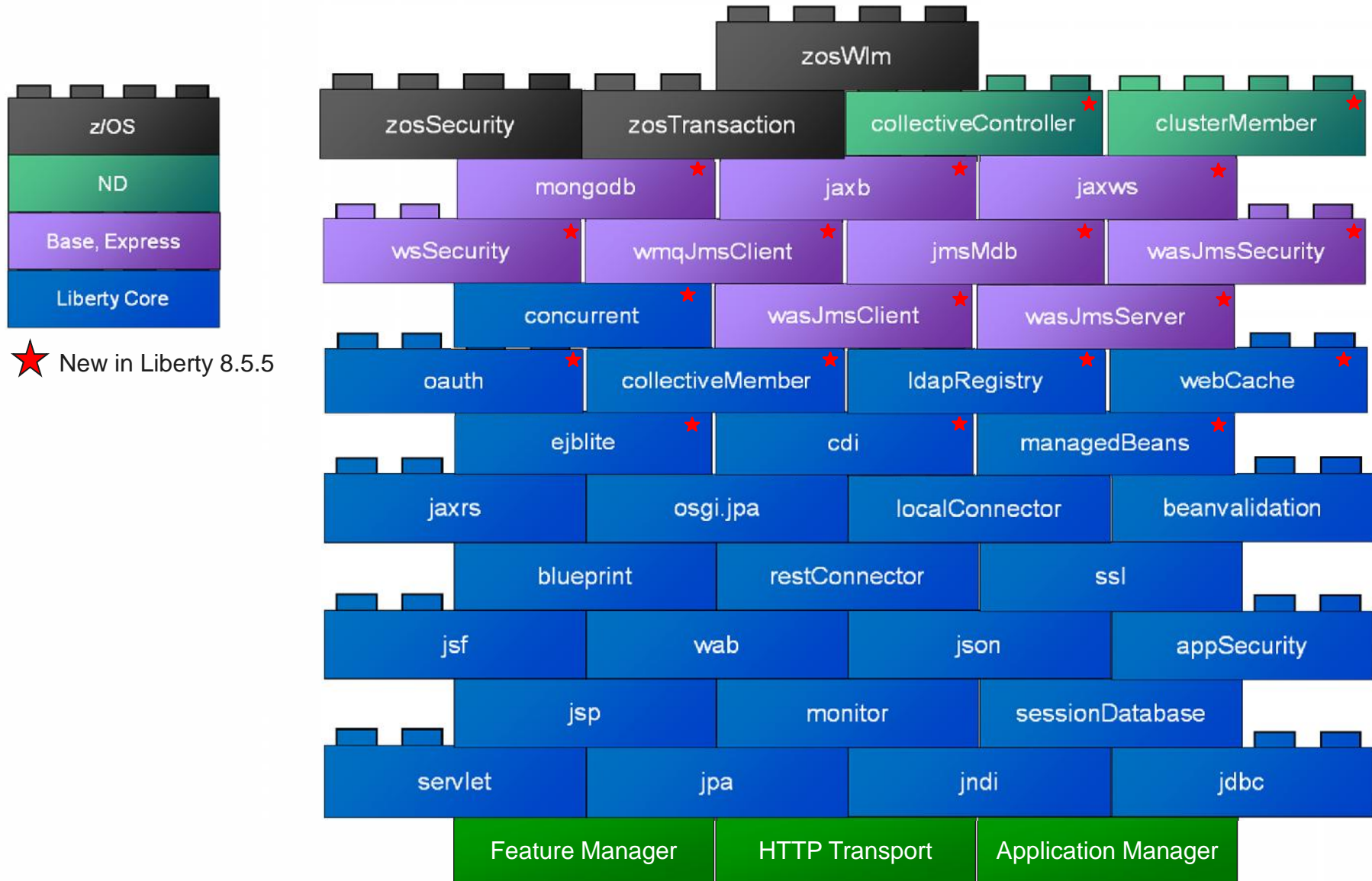
# Java Topologies on System z



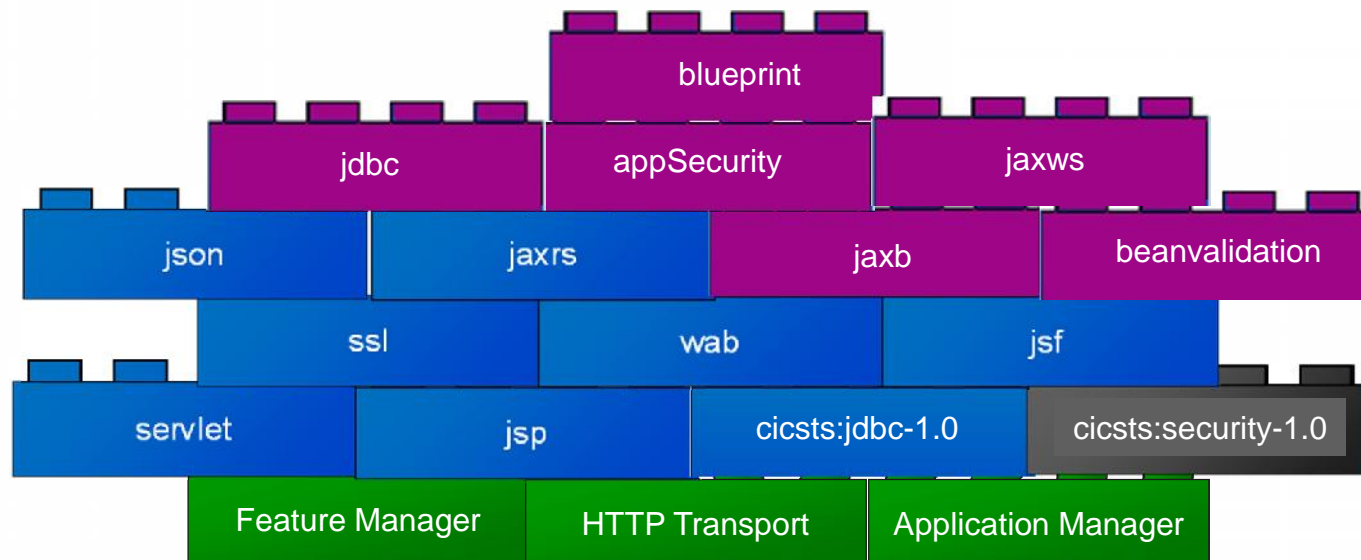
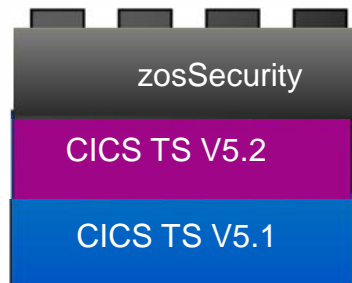
## *A lightweight, dynamic, composable runtime*

- Lightweight
  - Server install is only about 55 MB
  - Extremely fast server starts – typically well under 5 seconds
- Dynamic
  - Available features are user selected and can change at runtime
  - Restarts are not required for server configuration changes
- Composable
  - Features are implemented as loosely coupled components with lazily resolved optional and mandatory dependencies
  - The availability of features and components determines what Liberty *can* do and what's available to applications

# WAS for z/OS 8.5.5 Liberty feature set



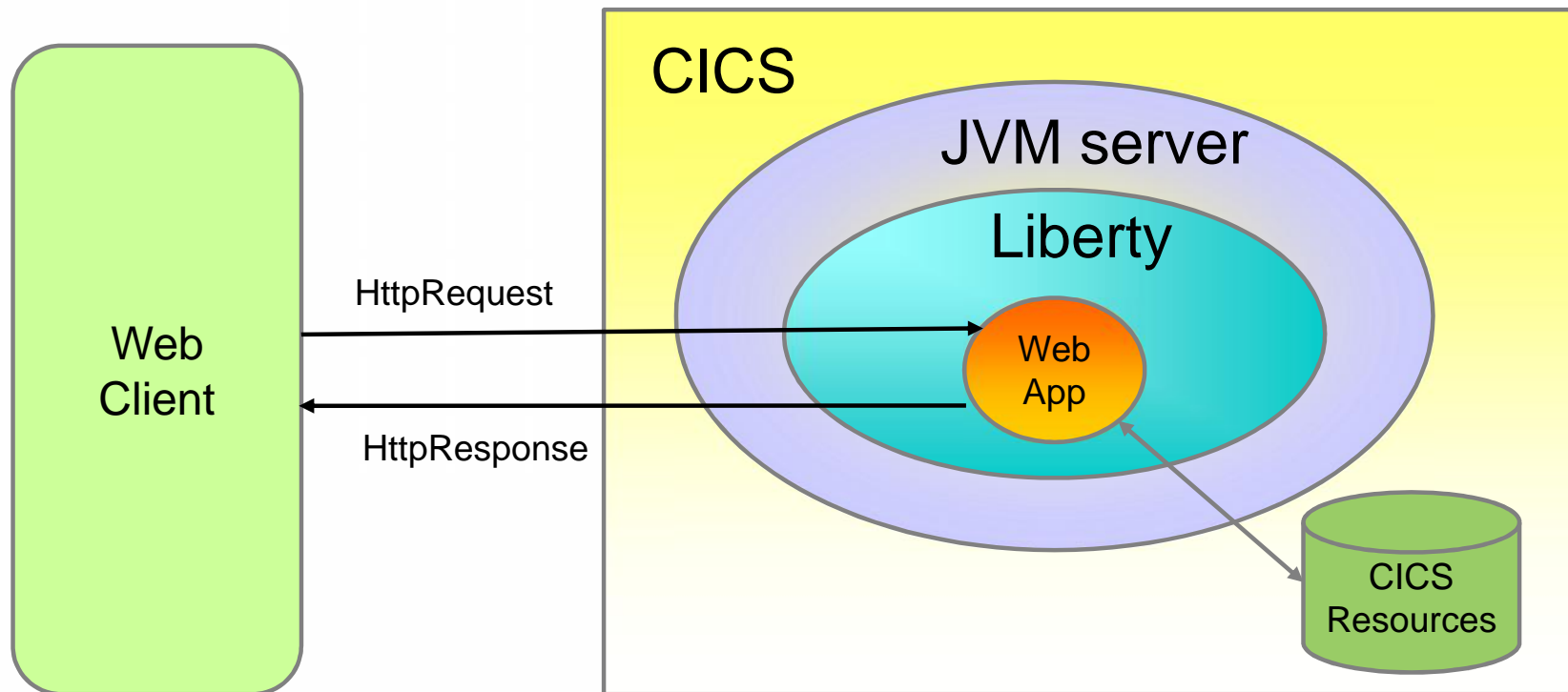
# CICS Liberty feature set - CICS TS V5.2



New Java web container is built on WebSphere Application Server Liberty profile technology

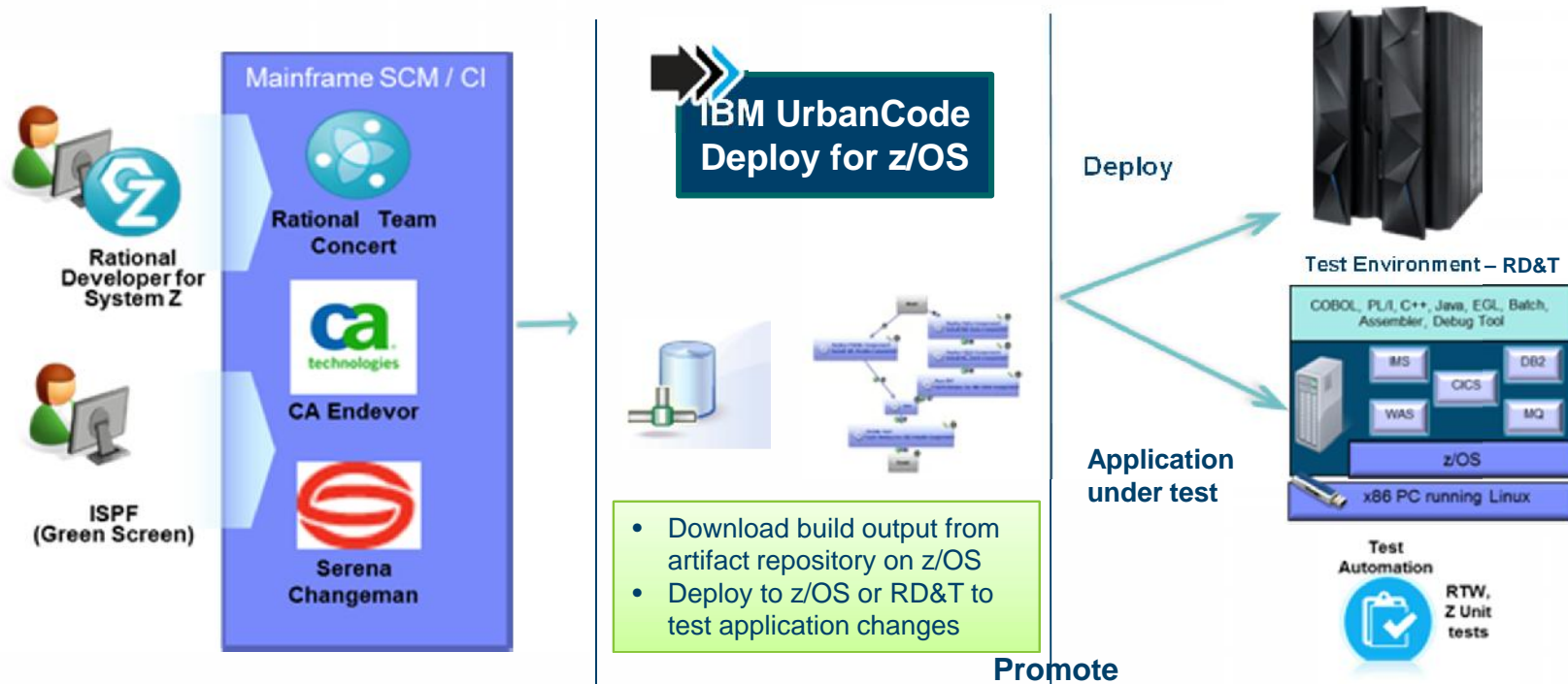
- Provides a fast and lightweight Java web container
- Provides “off the shelf” Web-server capabilities (JSPs and Servlets)
- JSP and Web servlets have direct, local, access to CICS data and resources
- Servlets can take advantage of existing CICS OSGi applications to provide a Dynamic Web front end





- Optimal scenarios for Web app. deployment to CICS
  - Access to existing CICS programs
  - Access to CICS/VSAM data
  - Sharing access to DB2 tables controlled by CICS
  - Reducing network I/O by removing remote connector

## New capabilities to speed delivery of dependent, multi-platform applications



- **Unified solution** for continuous delivery of heterogeneous enterprise applications
- **Accelerate delivery** and reduces cycle time to develop/test multi-tier applications across heterogeneous environments and platforms
- **Reduce costs** and eliminate delays for delivering mainframe applications
- **Minimize risk** improve productivity across disparate teams w/ cross-platform release plans

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Categories All (122)

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- IBM UrbanCode Release

## Plugins & Integrations

Search:

Sort: [A-Z](#) [Z-A](#)

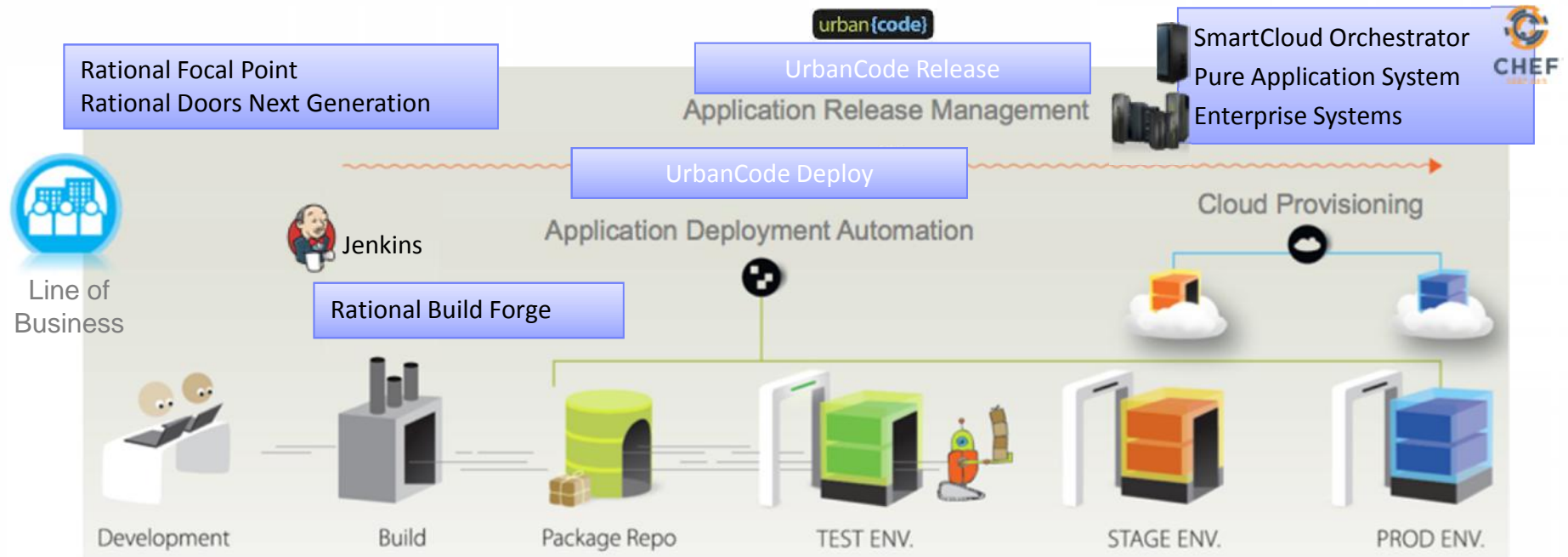
Plugin Name	Count	Badge
CICS TS *Beta*	6	Featured
IBM DB2 for zOS	1	Featured
IBM IMS	1	Featured
zOS Utility	5	Popular

**IMS Plug-in** is designed to simplify basic IMS operations by issuing IMS type-1 or type-2 commands and ultimately to facilitate automation of IMS application deployment

# Building a continuous delivery pipeline



**Built on an open standards based platform and a set of services enabling software teams to leverage open source and third party tools**



Rational Team Concert  
 Rational Developer for System z  
 Rational Developer for IBM i  
 Rational Application Developer  
 Compilers



Rational Quality Manager  
 Rational Test Workbench  
 Rational Development and Test Environments for System z  
 Rational Test Virtualization Server  
 InfoSphere Optim Test Data Mgmt

SmartCloud Application Performance Management  
 Tealeaf

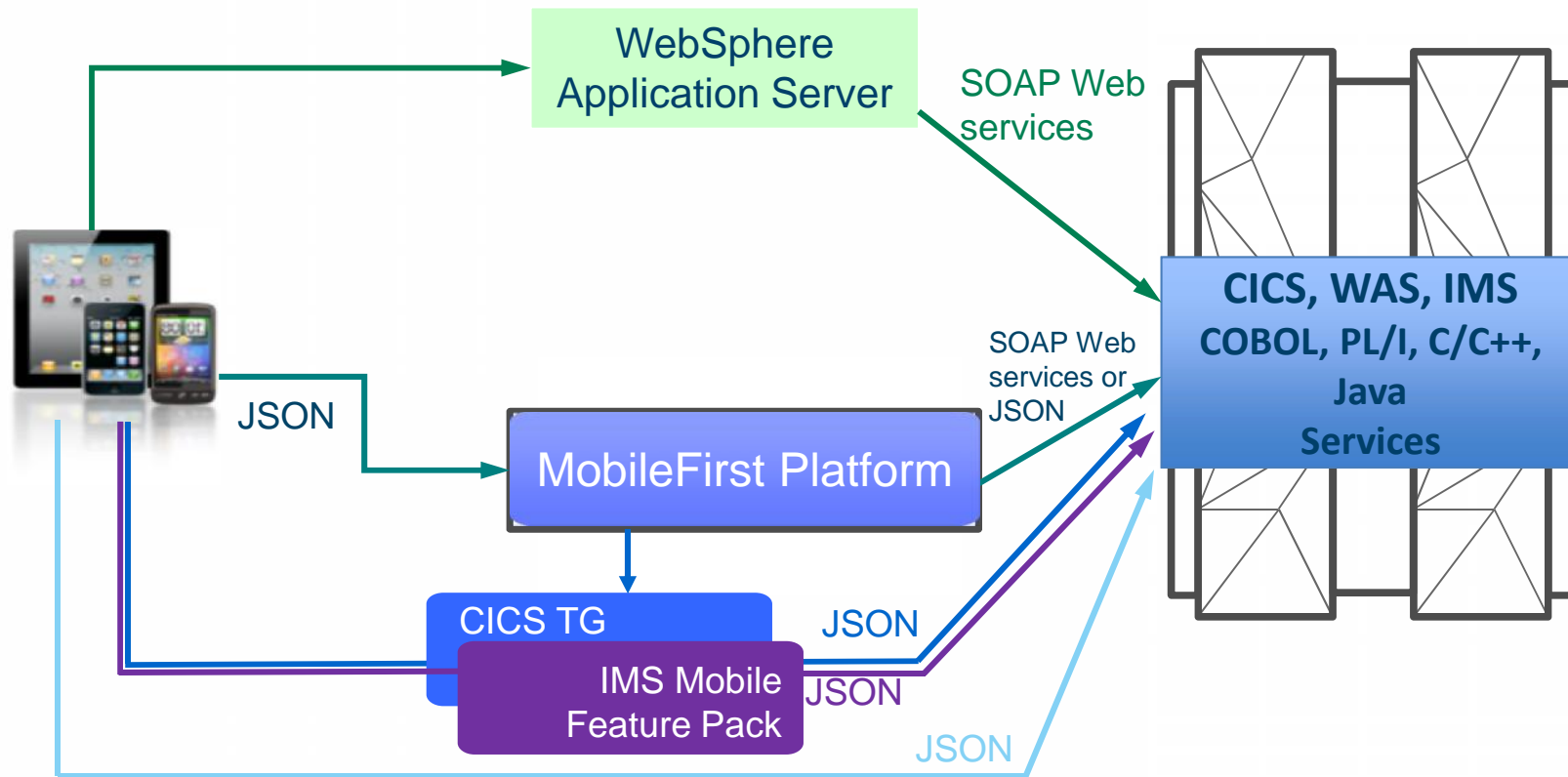


## CICS

- RESTful web services with JSON
- Web services over SOAP
- JCA with:
  - CICS TG
  - WOLA
- CICS Web Support
- Messaging
- CICS sockets

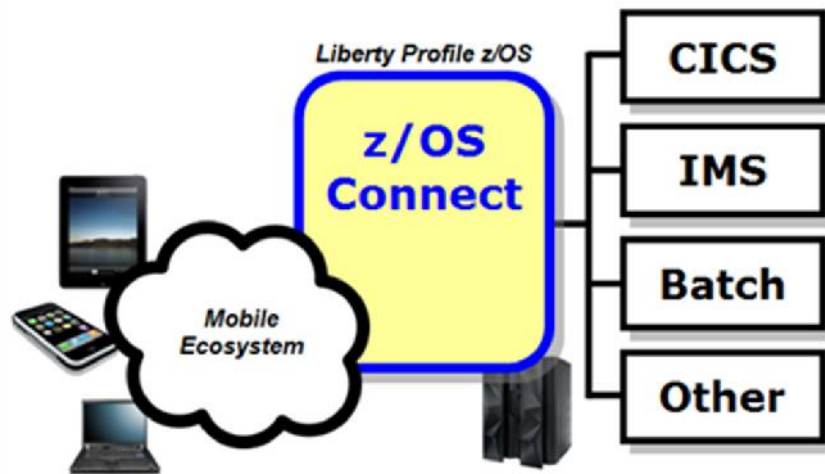
## IMS

- SOAP services with IMS SOAP Gateway
- RESTful web services with IMS Mobile Feature Pack
- JCA with:
  - WAS
  - IMS TM Resource Adapter
- Datapower





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



You *could* enable Mobile access without z/OS Connect

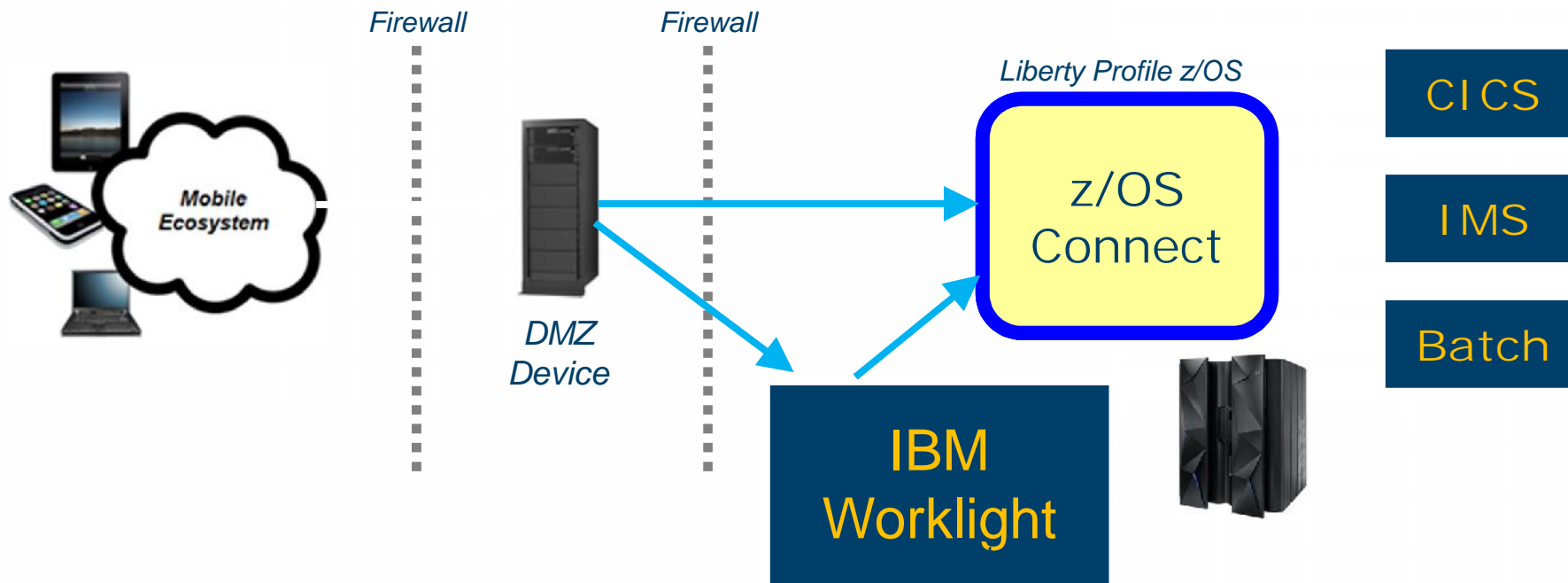
z/OS Connect simplifies and makes the environment more consistent and manageable

- 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

# Context Within Overall Mobile Architecture



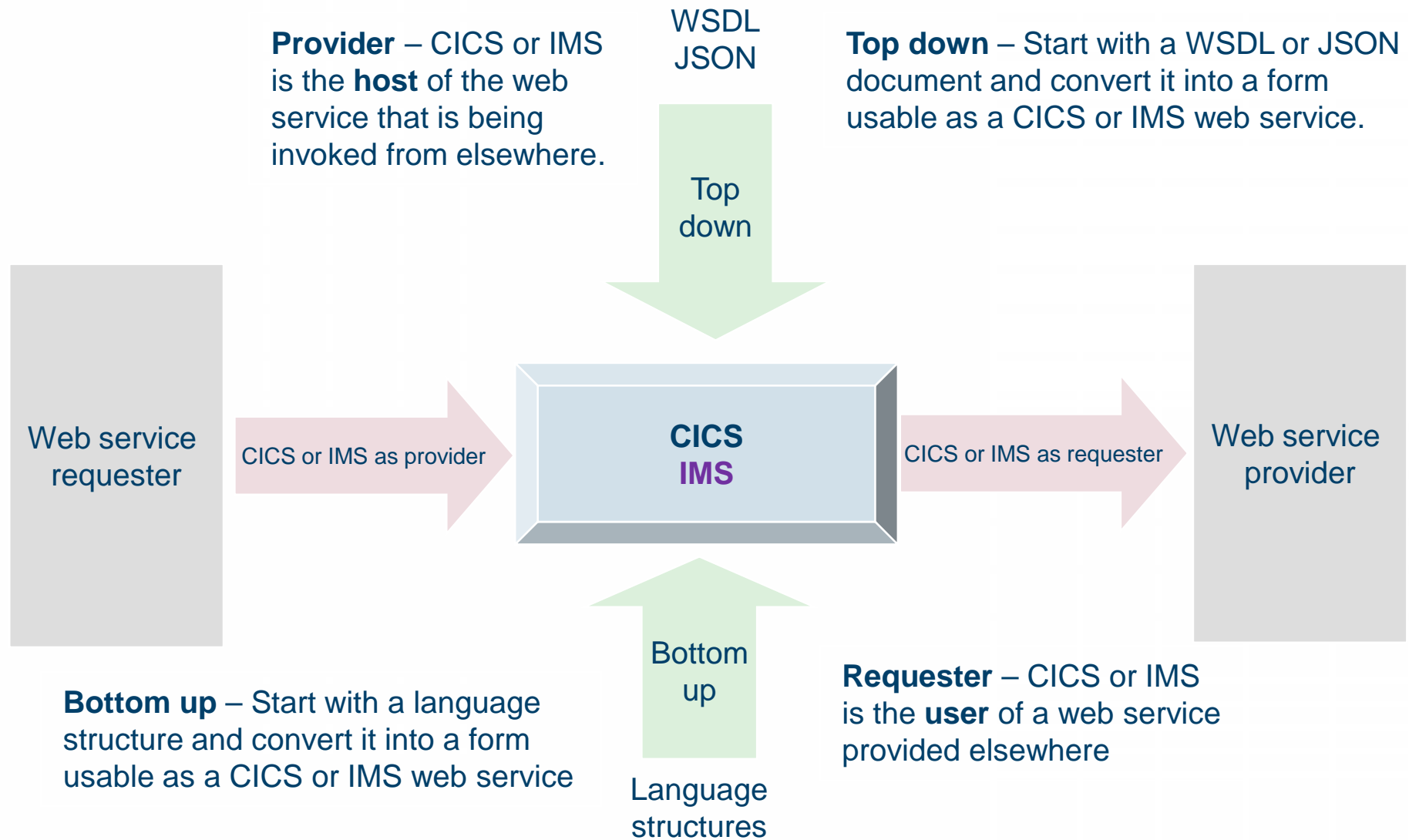
The message here is that z/OS Connect is a *piece* of the Mobile architecture, but in most cases will not be the only component:

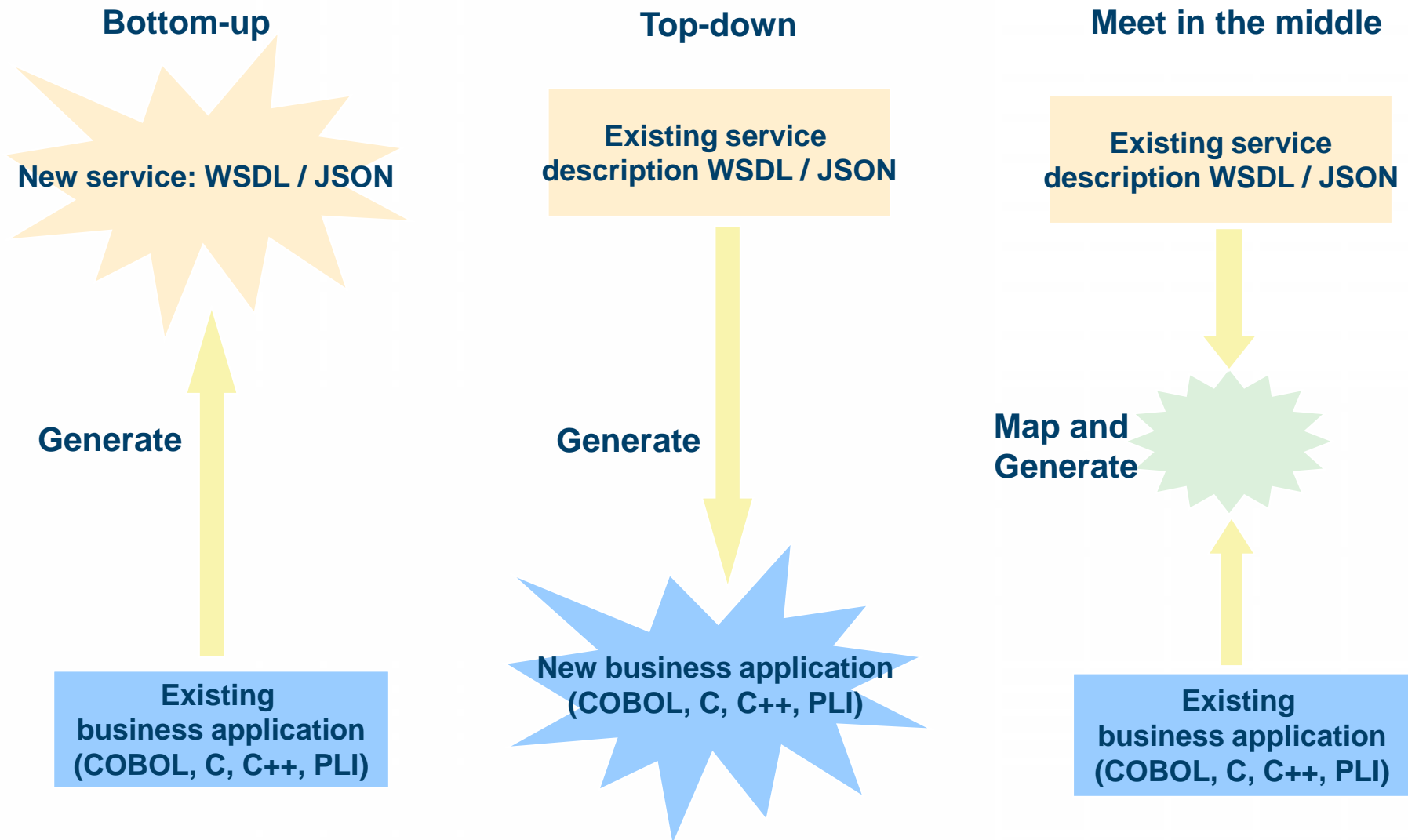


Users of z/OS Connect would access through normal corporate firewall infrastructure

IBM Worklight 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





- **Web Services and XML development:**
  - Create, view, edit and validate WSDL, document-type definitions (DTD) and XML schemas
  - Transform XML documents into text, HTML, or other XML document types.
  - Integrate relational databases and XML.
  - Generate COBOL adapters, CICS TS V3 WSBind, IMS interaction artifacts for converting between SOAP/WSDL and COBOL EBCDIC bytes.
  
- **CICS service flow feature:**
  - Extends CICS Transaction Server by providing adapters that exploit CICS interfaces to invoke the CICS terminal-oriented transactions and COMMAREA programs required by the web service generated from the service flow project.

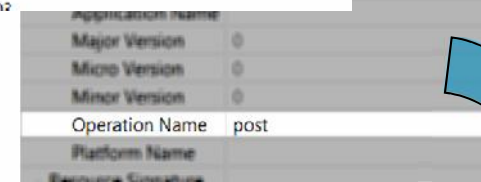
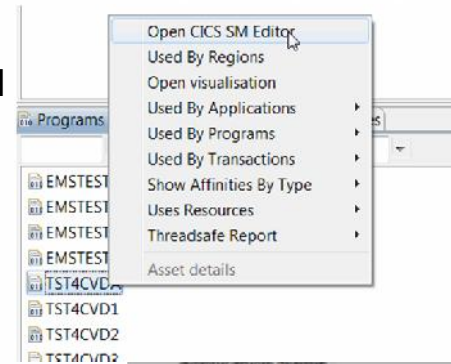
# Using CICS IA data to identify mobile entry points



## Benefits

- Upfront knowledge of resources required to define an Application Bundle

Open CICS SM Editor and assign an entry point



Collect and load data into DB2

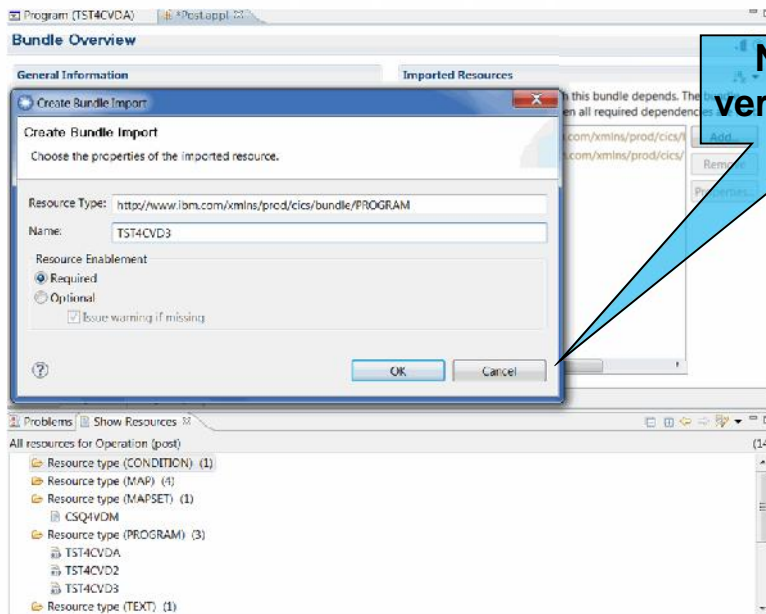


Name	Version
IA Applications (1)	
TS Applications (2)	
ia.mail.appl	1.0.0
mailappl	
CIUTEST OPERATIONS	0.0.0
post	

Context menu for 'post':  
Show All Resources  
Show

New! Multi-version support

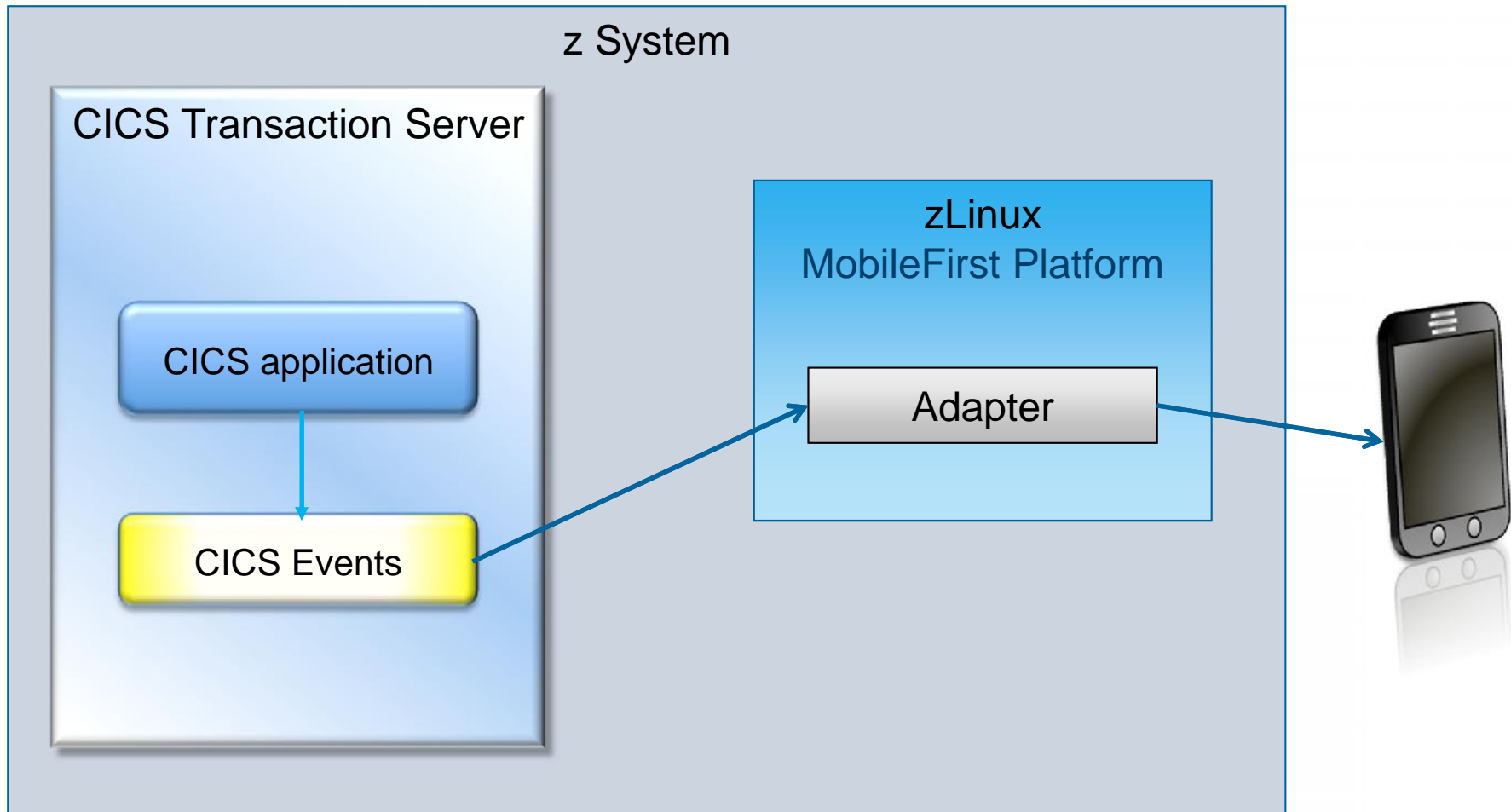
Define bundle using IA information





### Would you like to:

- Receive an SMS when the stock trade file is open for business?
- Notify your mobile dashboard whenever an application uses any 24-bit user storage?
- Reduce mobile workload driven by repeated balance inquiries by pushing notification of balance updates to customers?
- Send claim details to the other party's mobile device when an insurance claim is initiated?
- Trigger authorization request to a sales manager's mobile dashboard when an order is placed for > 50 high value items?
- Automatically send an email or PDF receipt to a customer when an order is processed?
- Have a means of delivering analytic data requested by the business without incurring long development cycles?



# Some examples of uses for events



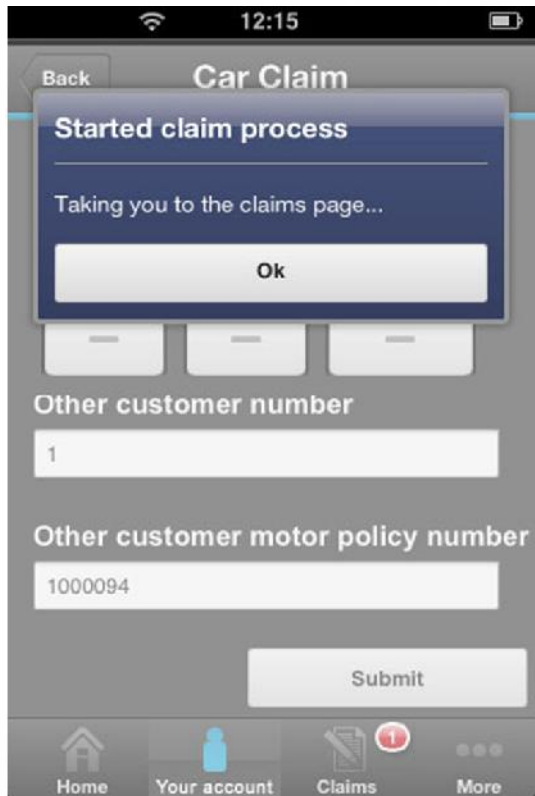
- Populate business dashboards
- Comply with compliance and governance requirements
- Customize promotional offers
- Monitor and improve warehouse efficiency
- Get notification if key files fail to open at CICS startup
- Fraud detection
  - Send text message when fraud occurs
  - Use events to optimize fraud checking
  - See also *ACI-1992: From OLTP to OLTP - Real-time Fraud Detection for CICS Payments Processing*
- Events to drive BigData and Analytics



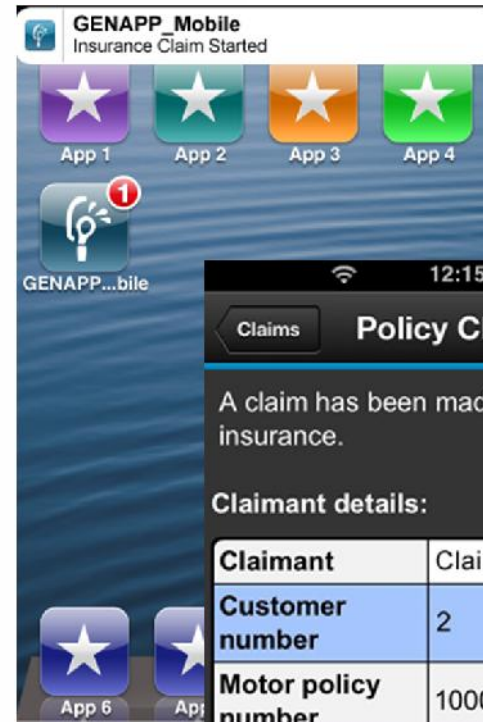
# The scenario



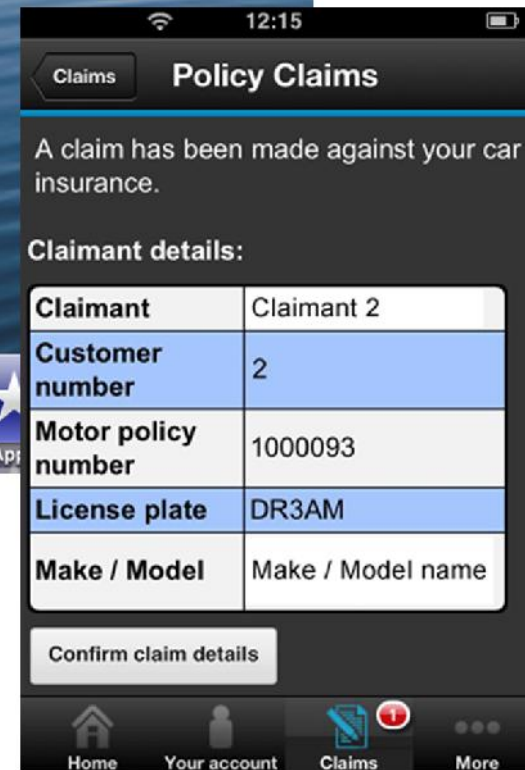
(2) Customer 2 starts a claim on their car policy using their mobile, specifying customer 1's details



(1) Customer 1's car "makes contact with" customer 2's car

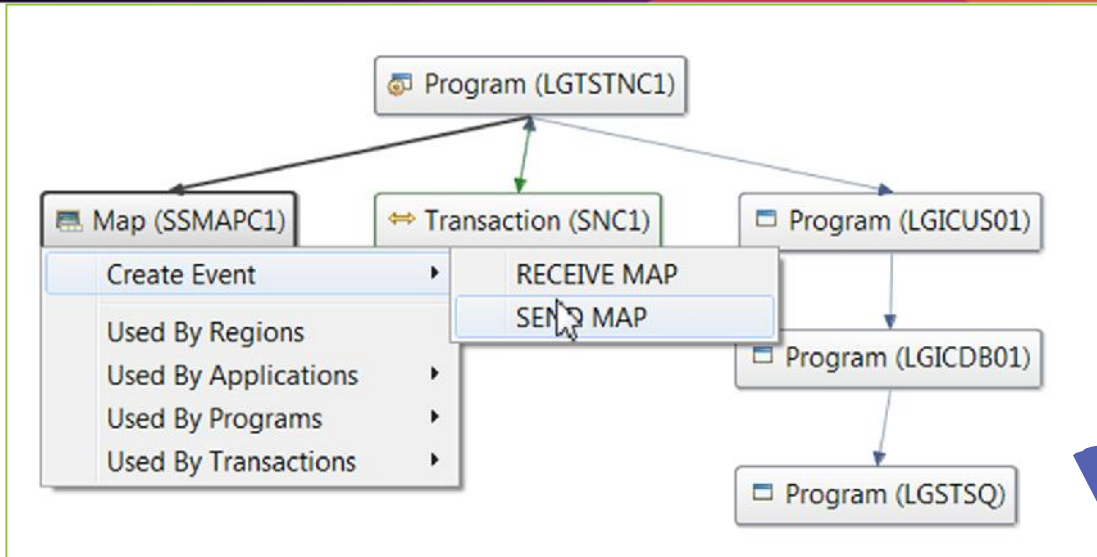


(3) Customer 1 gets notified on their mobile about the claim, with the claimant's details



CA0D: IBM GENAPP mobile application sample for CICS TS  
CB12: GENAPP, a General Insurance Application

# Where to capture events? CICS IA to the rescue...



**▼ Capture Point**  
Select an Application or System capture point.

Application Capture Point

- RECEIVE
- RECEIVE MAP**
- RETRIEVE
- RETURN
- REWRITE
- SEND
- SEND MAP

Capture before or after command runs

Before  After

**▼ Context**  
Define context predicates to filter events.

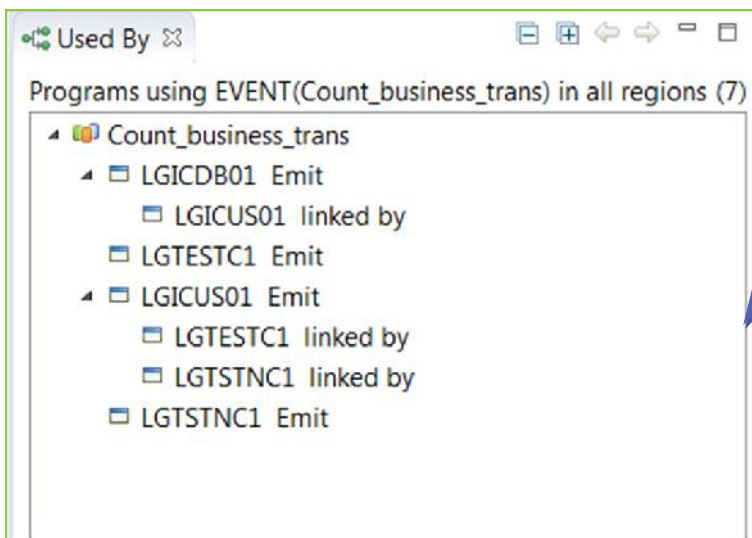
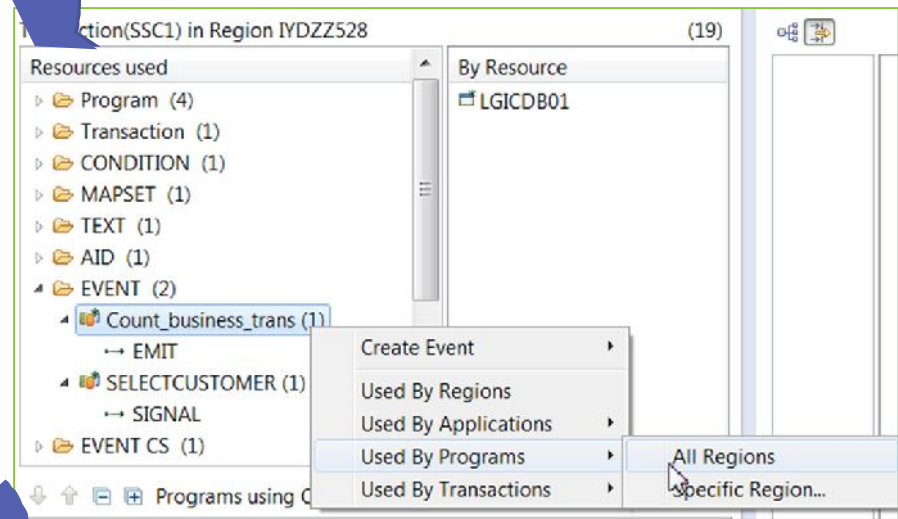
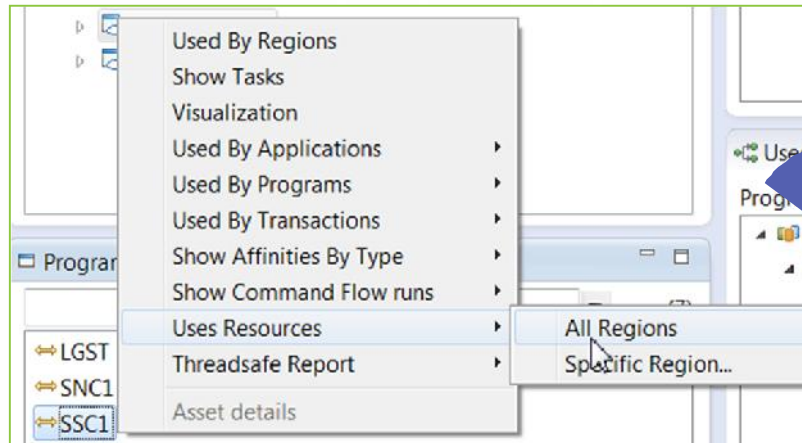
Context

Transaction ID	All	Operator	
Current Program	All	Operator	
User ID	Equals	Operator	JAMESE
Response Code	All	Operator	Ok
EIBAID	All	Operator	Enter
EIBCPOSN	All	Operator	1

**▼ Event Options**  
Define predicates for event options. Predicates marked with \* should be specified to maintain CICS performance.

Name	Operator	
MAP*	Equals	SSMAPC1
MAPSET	All	

# CICS IA can help too – CICS IA captures event data





# What happened? CICS PA can tell you



Event Processing (22/22 rows)

Appid: CICS2A3. Records from: 2013-04-15 14.30.18 Current layout: \*CIMP

Interval	Put events	Commit forward as	Commit backward as	Current event	Peak event capture	Current transaction	Peak tran	Async normal ev	Async priority e	Transactional e	Transa	Dispatch	Cur
0	413	0	0	0	1	0	0	413	0	0	0	0	0
1	407	0	0	0	1	0	0	407	0	0	0	0	0
2	390	0	0	0	1	0	0	390	0	0	0	0	0
3	425	0	0	0	1	0	0	425	0	0	0	0	0
4	396	0	0	0	1	0	0	396	0	0	0	0	0
5	402	0	0	0	1	0	0	402	0	0	0	0	0
6	408	0	0	0	1	0	0	408	0	0	0	0	0
7	376	0	0	0	1	0	0	376	0	0	0	0	0

Event Processing (48/48 rows)

Appid: CICS2A5. Records from: 2013-04-03 10.30.52 Current layout: \*Default layout

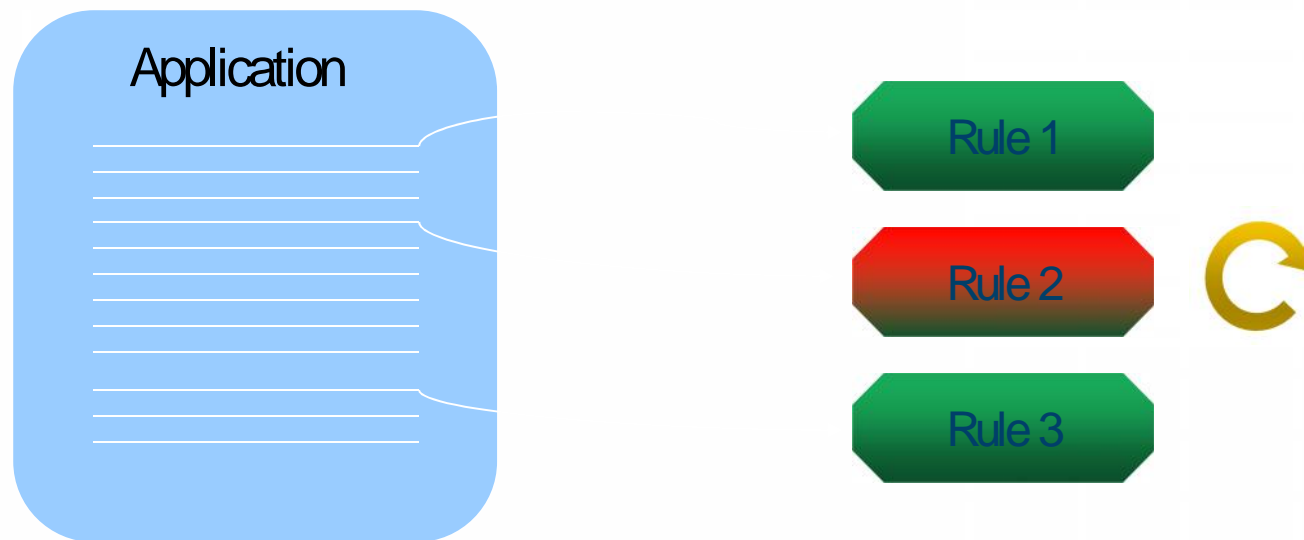
Interval	Put events	Commit	Commit	Current	Peak ev	Current	Peak tra	Async n	Async pr	Transact	Transa	Dispatch	Current	Peak dis	Custom	WebSph	Transact	Tsqueue	Events to HTTP	Events lost (dis	
0	6,299	0	0	0	2	0	0	6,299	0	0	0	0	2	2	0	0	6,299	0	0	0	0
1	5,424	0	0	0	1	0	0	5,424	0	0	0	0	2	2	0	0	5,424	0	0	0	0
2	5,276	0	0	0	2	0	0	5,276	0	0	0	0	2	2	0	0	5,276	0	0	0	0
3	4,495	0	0	0	1	0	0	4,495	0	0	0	0	2	2	0	0	4,495	0	0	0	0
4	3,543	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	3,543	0	0	0	0
5	2,671	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	2,671	0	0	0	0
6	2,246	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	2,246	0	0	0	0
7	1,556	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	1,556	0	0	0	0
8	732	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	732	0	0	0	0
9	478	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	478	0	0	0	0
10	476	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	476	0	0	0	0
11	483	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	483	0	0	0	0
12	45	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	45	0	0	0	0
13	10	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	10	0	0	0	0
14	9	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	9	0	0	0	0
15	11	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	11	0	0	0	0
16	11	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	11	0	0	0	0
17	12	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	12	0	0	0	0
18	12	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	12	0	0	0	0
19	12	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	12	0	0	0	0
20	15	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	15	0	0	0	0
21	10,532	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	10,532	0	0	0	0
22	20,244	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	20,244	0	0	0	0
23	20,701	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	20,701	0	0	0	0
24	22,752	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	22,752	0	0	0	0
25	21,672	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	21,672	0	0	0	0
26	12,120	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	12,120	0	0	0	0
27	4,526	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4,526	0	0	0	0
28	3,771	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	3,771	0	0	0	0
29	3,722	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	3,722	0	0	0	0
30	3,842	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	3,842	0	0	0	0

Customize Columns - Event Processing Current layout: \*Default layout

Available attributes	Current viewer columns
	Interval number
	Put events
	Commit forward async events
	Commit backward async events
	Current event capture queue
	Peak event capture queue
	Current transactional queue
	Peak transactional queue
	Async normal events
	Async priority events
	Transactional events
	Transactional events discarded
	Dispatcher tasks attached
	Current dispatcher tasks
	Peak dispatcher tasks
	Custom adapter events
	WebSphere MQ adapter events
	Transaction adapter events
	Tsqueue adapter events
	Events to HTTP adapter
	Events lost (dispatch) - config
	Events lost (dispatch) - other
	Events lost - config
	Events lost - other
	Events lost - no adapter

Use IBM ODM to unlock rules hidden in existing applications



- Gradually pull out rules from existing applications
  - Focus on those business decisions that change fast and often
  - Re-express business rules in natural language
  - Manage and store them in a central facility
  - Does not require a “big bang” change

# Redefined Application Change Cycle



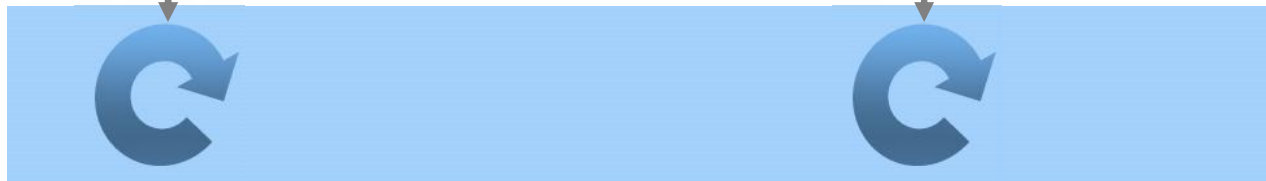
Functions / Tasks / Flow  
changes in Weeks / Months



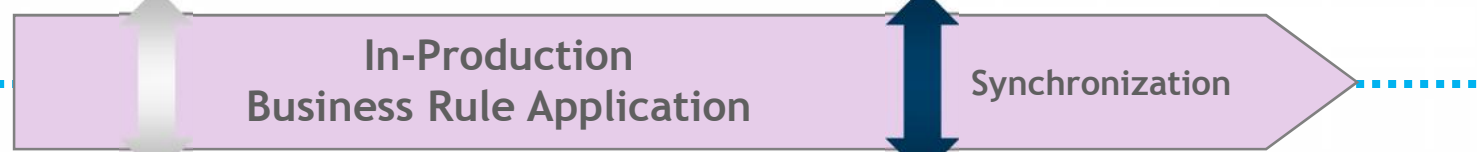
Application  
Developer

Functional  
Requirements

Functional  
Enhancements /  
Platform Upgrades



Application  
Development



Business Rule  
Management



Business  
policies

Business policy  
and rule  
changes

Business policy  
and rule  
changes

Business policy  
and rule  
changes

Business policy  
and rule  
changes



Business & IT

Decisions / Policies  
Changes in Days / Weeks

# Decision Management: Comprehensive Flexibility



Architect,  
Application  
Developer



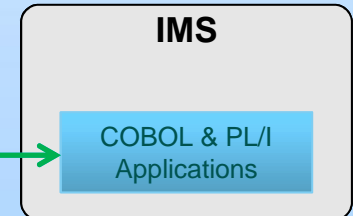
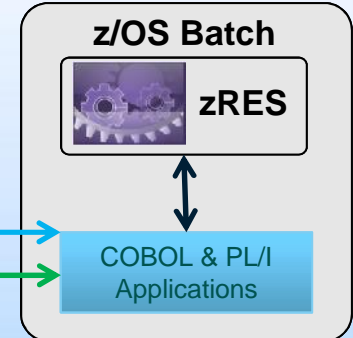
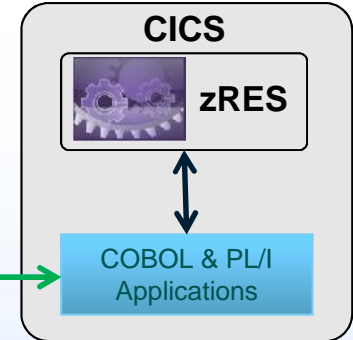
Business  
Analyst,  
Business  
Manager



Deploy

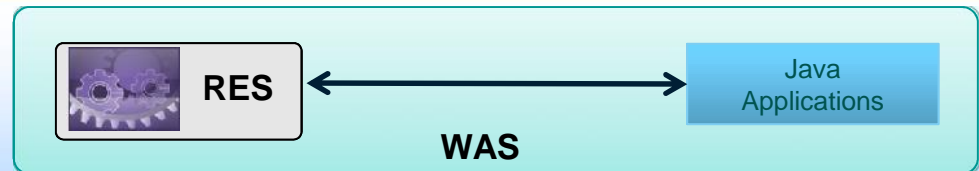
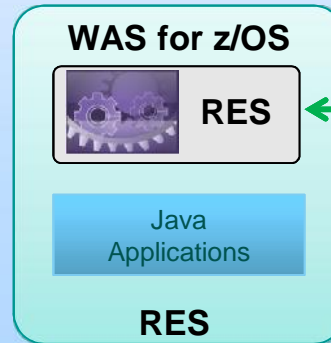
Deploy

z/OS



WOLA

Cross Memory



Distributed

*Decision Server access on z/OS  
optimized for COBOL & PL/I*

*Decision services delivering consistent  
business behavior enterprise wide*

## Yes ... for many very good reasons:



### z/OS Specialty Engines

Pressures on cost containment often dictate greater use of z/OS specialty engines. Java offloads to zAAP. Java batch does as well.

### Tooling Support

Development tooling for Java has advanced to the point where some tools (IBM Rational Application Developer) are very powerful and sophisticated.

This also provides an opportunity to consolidate to a common tooling environment for both OLTP and batch development.

### Processing in OLTP Runtime

Running Java batch in the same execution runtime as Java OLTP provides an opportunity to mix and manage the two processing types together under the same management model.

### Availability of Skills

Java is a programming language with wide adoption in the industry. Skills for Java programming are common and affordable.

# Batch processing is evolving



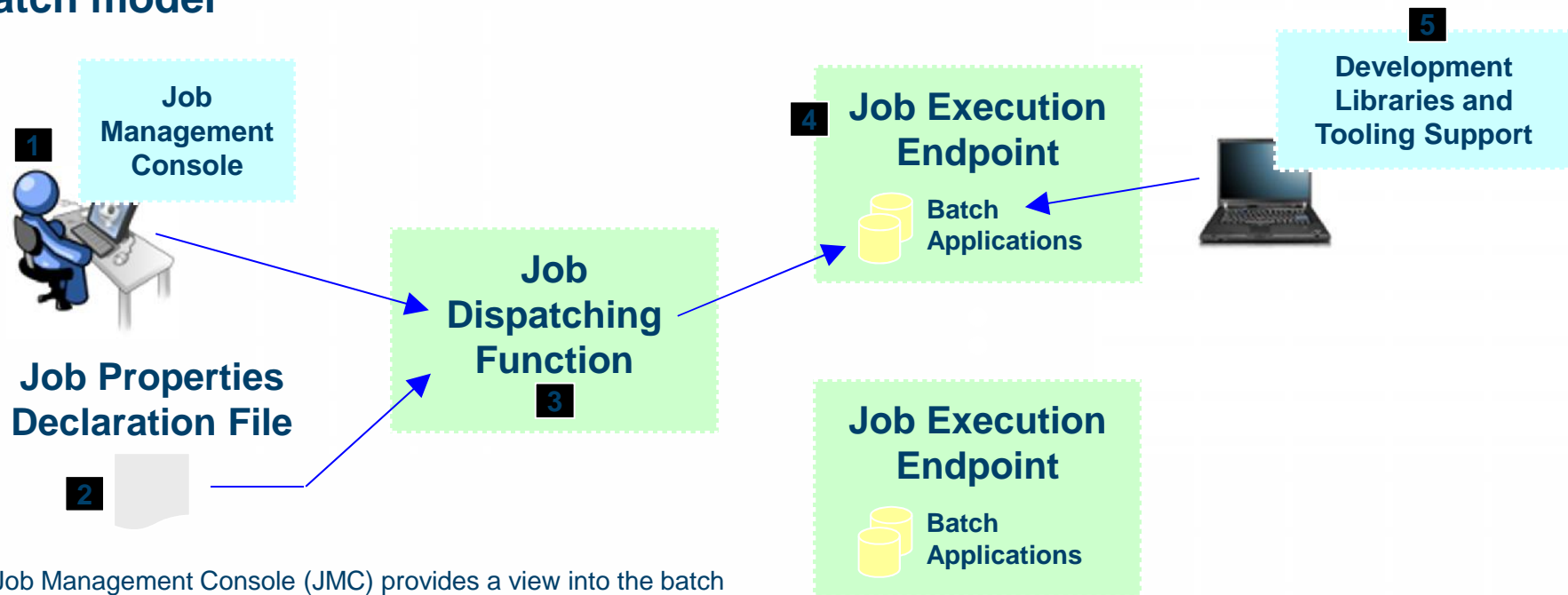
Windows of time which used to be dedicated to batch processing are shrinking, while batch workloads continue to grow as online transactions increase



The need to process batch work has not gone away.  
The need to perform batch concurrent with online has emerged.



This picture illustrates some of the key components of the WebSphere Java Batch model



1. Job Management Console (JMC) provides a view into the batch environment and allows you to submit and manage jobs
2. Job declaration file (xJCL) provides information about the job to be run, such as the steps, the data input and output streams and the batch class files to invoke
3. The Job Dispatching function interprets the xJCL, dispatches the job to the endpoint where the batch application resides, and provides ability to stop and restart jobs
4. The Execution Endpoint is a WAS server in which the deployed batch applications run
5. The development libraries and tooling assist in the creation of the batch applications

A comprehensive Java batch execution platform  
Built on the proven Java runtime environment  
of WebSphere Application Server

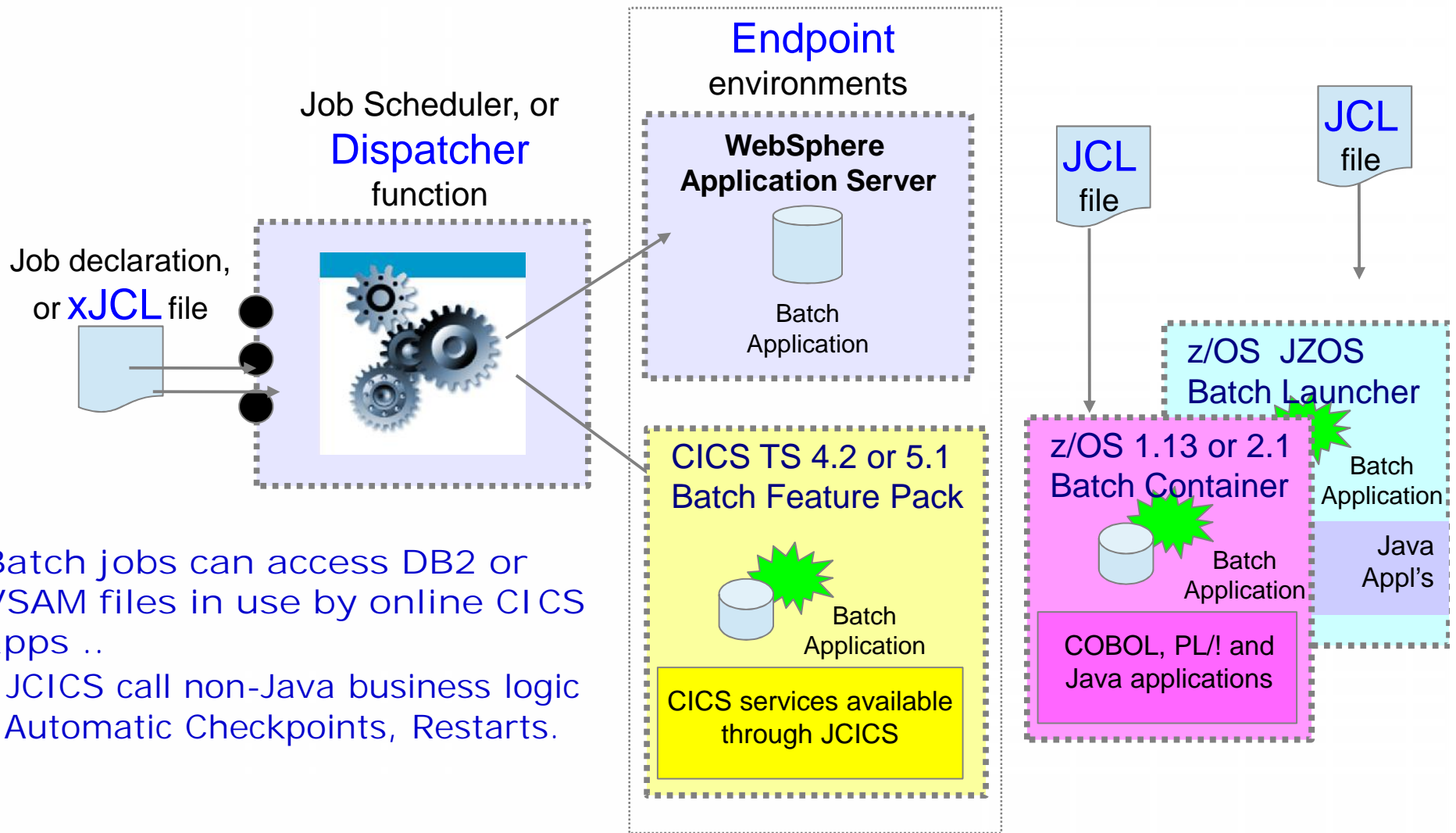


# "Batch Containers" are not limited to WAS



There's also a Java batch container for CICS ...

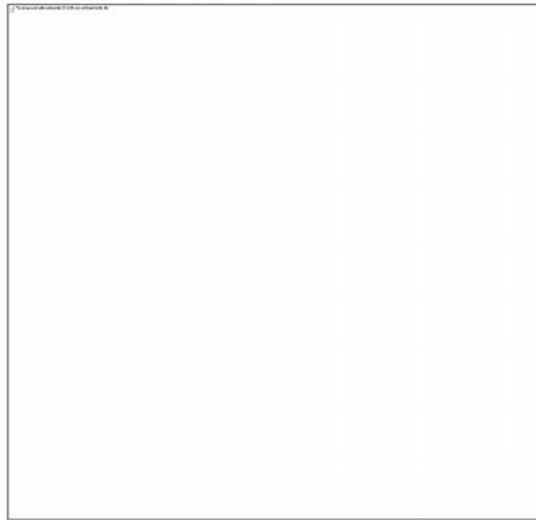
and z/OS



Batch jobs can access DB2 or VSAM files in use by online CICS apps ..

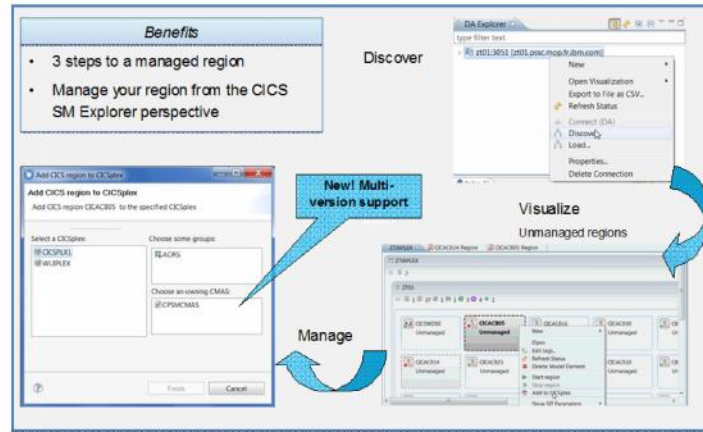
- JCICS call non-Java business logic
- Automatic Checkpoints, Restarts.

Optimize applications, systems, and processes to achieve more with less



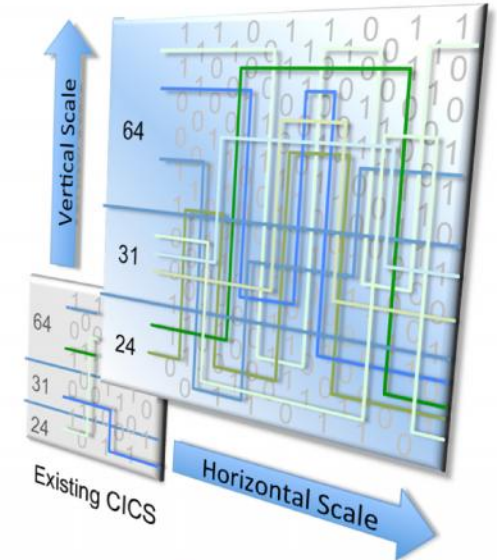
## Step 1

**Threadsafe** analysis and implementation to reduce CPU utilization by up to 20%



## Step 2

**Workload Management** to cope with mobile scalability and availability needs



## Step 3

**Region Consolidation** to reduce management overhead and CPU utilization (up to 10%)

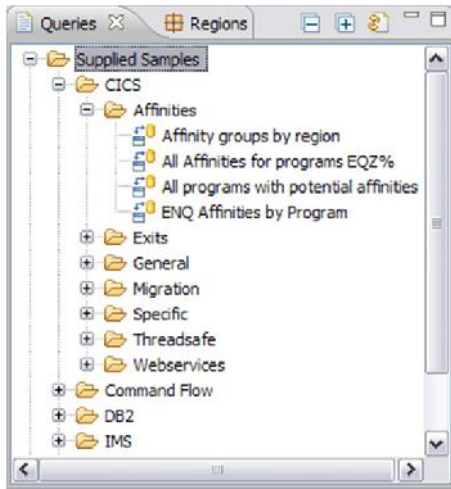
**Humana.**

*“Improved application performance by 10–20 percent and reduced the cost of processing claims, positioning it to handle growing numbers of claims”*

# Three steps to Data Modernization

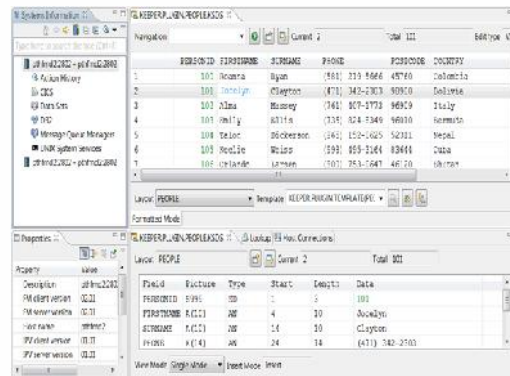


## Adding new data fields and converting EBCDIC data to UNICODE



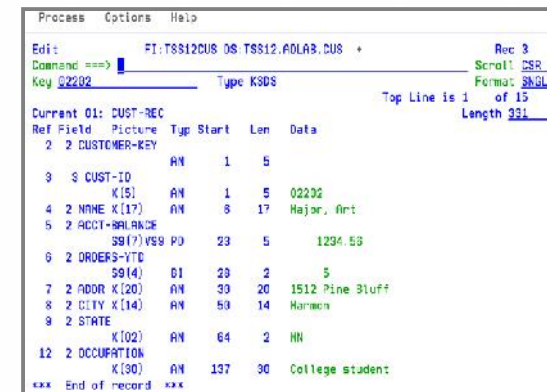
### Step 1

Identify CICS programs & data affected by this change



### Step 2

Create masked test data in new format and initialize new fields to something sensible



### Step 3

Copy the current production data to the new format, converting text data from EBCDIC to UNICODE and the initialized new fields

**Major US manufacturer** Purchased FM to copy data from EBCDIC to UTF8. This was a need for them and could not be fulfilled by the CA File Master product.

## CICS VSAM Transparency for z/OS

### Why Migrate from VSAM to DB2?

- Integration with new applications that are already DB2 based
  - Web App. Servers
  - Multi-platform applications
  - Data analytics
- Shared data for inquiry and update
- Ease in running ad-hoc queries
- Built in Data Integrity
- Adhere to data governance mandates
- Support 24x7 Applications

### CICS VT enables you to...

- Migrate VSAM files to DB2 without changing application programs
- Maintain single copy of the data
- CICS and batch programs access data in DB2 under the control of CICS VT
- Access migrated DB2 data natively using SQL



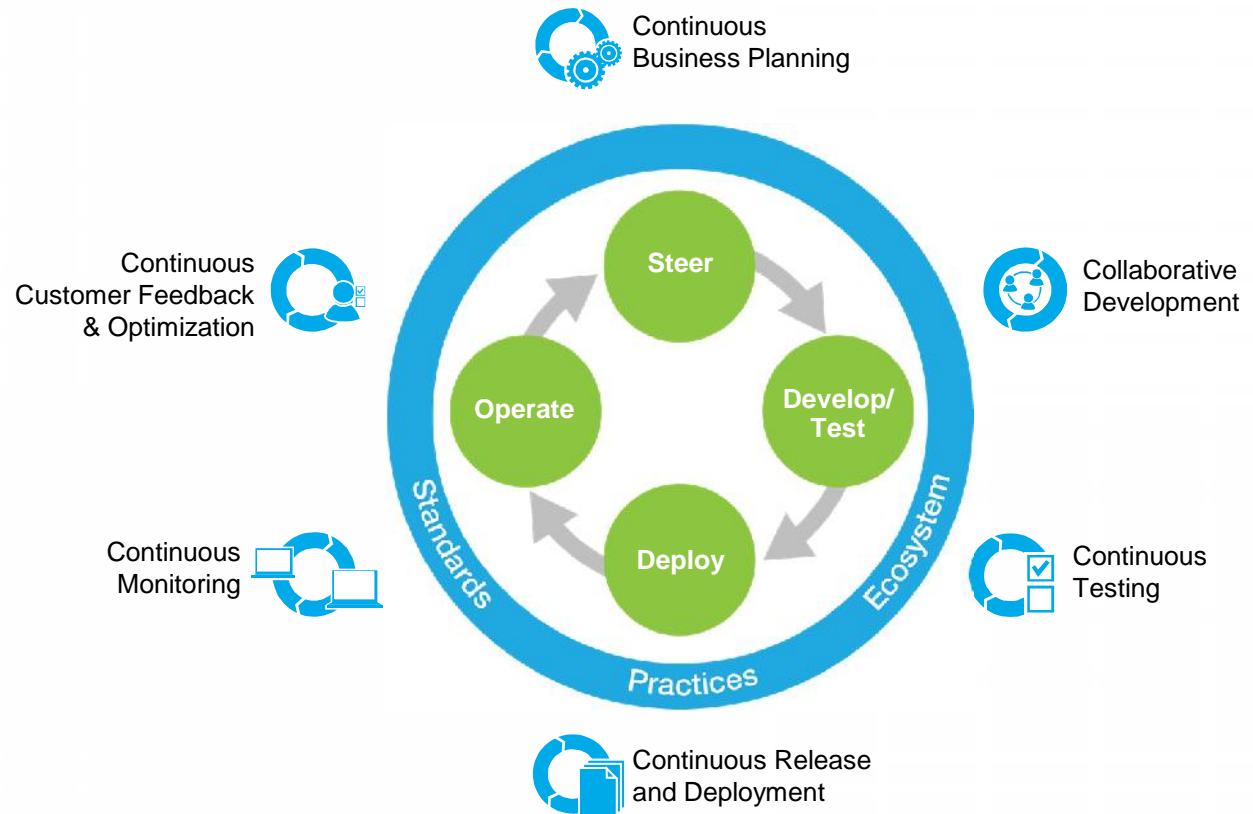


Enterprise capability for continuous software delivery that enables organizations to seize market opportunities and reduce time to customer feedback

**Accelerate software delivery –**  
*for faster time to value*

**Balance speed, cost, quality and risk –**  
*for increased capacity to innovate*

**Reduce time to customer feedback –**  
*for improved customer experience*



Our DevOps POV is resonating with clients and they are delivering **measurable business outcomes with DevOps**

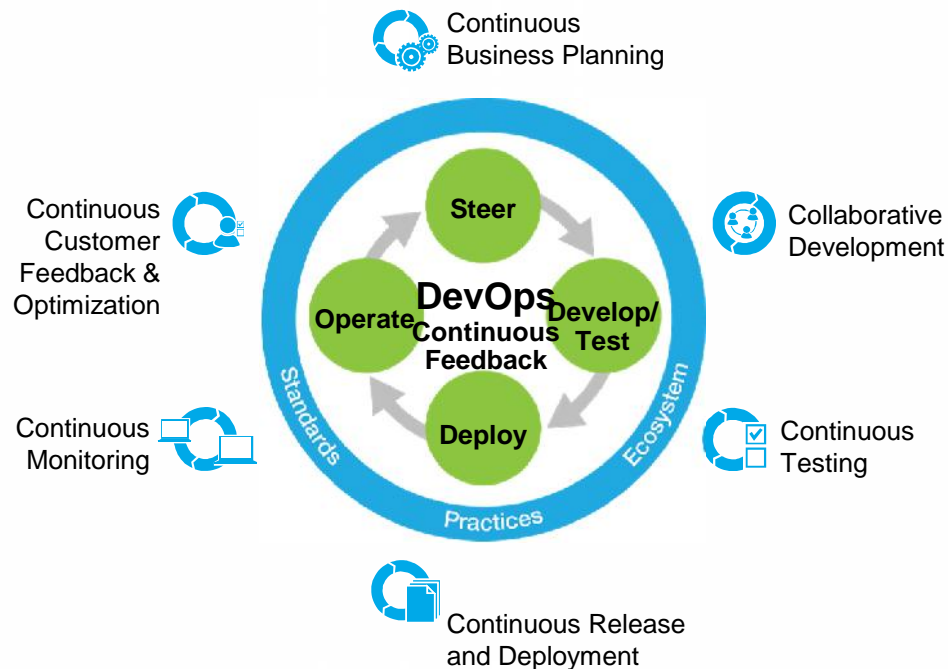
# DevOps and common tools build agile applications



Integrated tooling to respond to mobile dynamics

**“CICS products helped streamline processes, increase productivity and reduce errors”**

Leading healthcare provider



**“Threadsafe functionality helped us cut our CPU usage by 550 MIPS - US\$440,000 annually**  
HUK-COBURG



- IBM IMS Explorer for Development
- IBM CICS Tools
- IBM Problem Determination Tools
- IBM Rational Developer for the Enterprise
- IBM Rational Team Concert
- IBM MobileFirst Platform
- IBM z/OS Explorer
- IBM Enterprise COBOL, PL/I, C/C++

Enabling you to...

**Optimise** applications, data, infrastructure for IT value

**Modernize** applications, data, infrastructure for business value

**Diagnose** problems and test and solutions for successful outcomes

**“Increased programmer productivity by 10 percent with fewer transaction failures”**

HSBC Bank Argentina S.A



- **Web pages**

- <http://ibm.com/cics>
- <http://ibm.com/ims>
- <http://ibm.com/software/data/db2imstools/products/ims-tools.html>
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- <http://ibm.com/cics/tools>
- <http://ibm.com/software/awdtools/deployment>

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# Thank You

