IBM z Systems – Redefining Digital Business

Easy and agile development and administration for cloud, analytics and mobile computing

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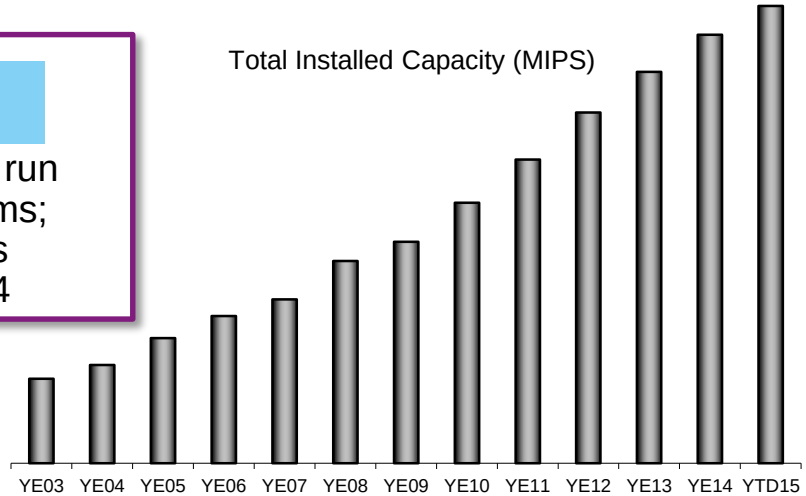
Agenda

1. Positioning your enterprise for cloud, analytics and mobile computing
2. The mainframe and mobile computing: A perfect match
   Break (15 minutes)
3. Scoring fast and winning big with analytics on z Systems
   Lunch (60 minutes)
4. Implementing hybrid clouds with z Systems
   Break (15 minutes)
5. **Easy and agile development and administration for cloud, analytics and mobile computing**
6. Building the business case for cloud, analytics and mobile computing
   Wrap up and Q&A

Numerous indicators show mainframe usage continuing to grow for the foreseeable future

- The first mainframe was introduced 50 years ago, and it continues to thrive today

318	13%	7,600+
new accounts over last four years	growth in installed IFL MIPS (YTY)	ISV applications run on IBM z Systems; 650 new apps added in 2014



- As one generation moves into retirement, another generation must replace it
  - Younger workers today will want new, modern tools, languages and devices

It's important for businesses to keep their pipelines for new, skilled z Systems talent full!

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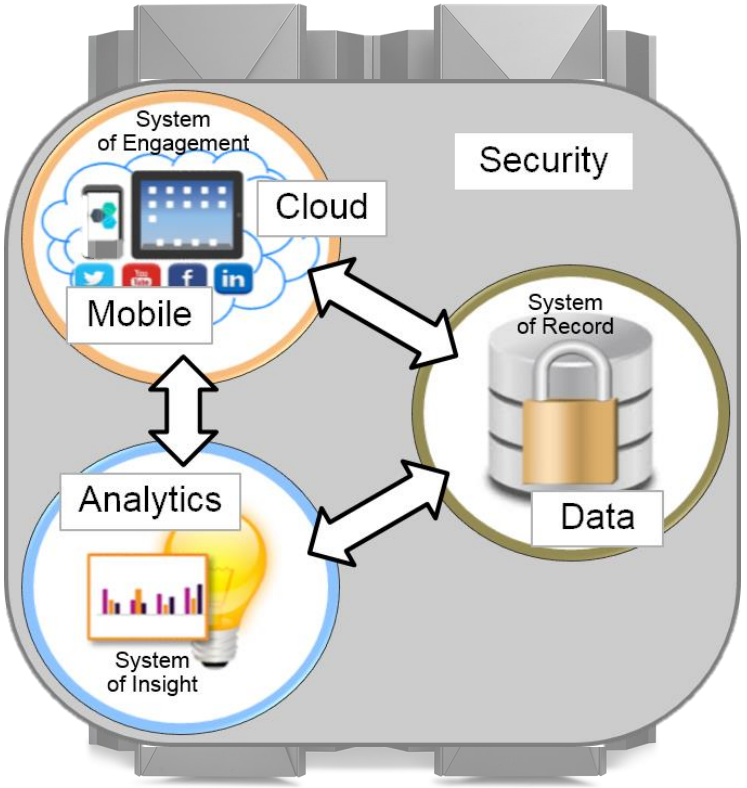
IBM is committed to helping businesses find and keep new z Systems staff

A full spectrum of easy-to-use, GUI-based mainframe administrative tools

Rich, familiar development tools and processes for new mainframe recruits

Worldwide university programs to excite and train students in the ease and value of working with the mainframe



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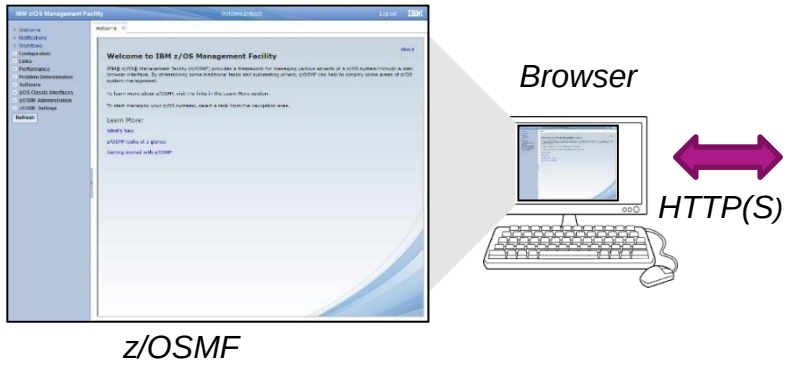
IBM z/OS Management Facility (z/OSMF) is a modern, browser-based console…

…revolutionizing day-to-day z/OS operations and administration!

- New mainframe system administrators work in a familiar environment
- Maximizes productivity of a diversified workforce
  - Simplification of tasks
  - Enhanced collaboration
  - Reduced learning curve
- Role-based, scenario-based, integrates with other tools



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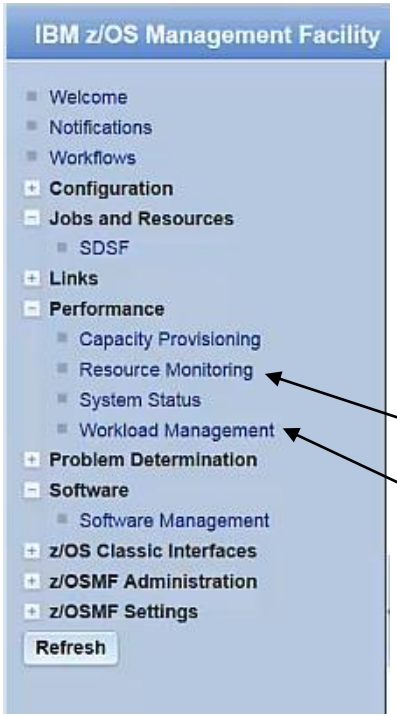
DEMO: Just in! An email that online banking isn't meeting Service Level Agreements…

z/OSMF navigation bar



Without z/OSMF, finding the problem can be laborious

- Find WLM screen, open it, search for where definitions are saved or extract them from data sets…
- Figure out the transaction class for the transactions…
- Search to find the rules in WLM for this type of server, then search the rules to find the service class…
- Back out of rules in WLM, and go into Service Classes. Search for and open up the appropriate service class…
- ……..

With z/OSMF, the task is much simpler

- Click Resource Monitoring to examine all workload response times. Immediately identify which workload is at fault
- Click link to go directly to appropriate Service Class in WLM. Workload settings are immediately obvious.
- Click another link to navigate to the appropriate Policy and increase the percentage

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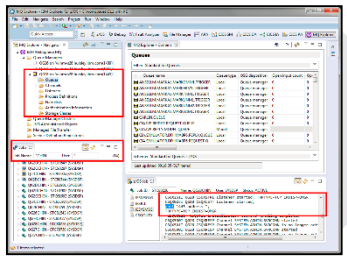
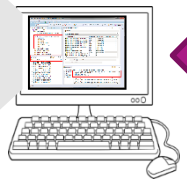
IBM Explorer for z/OS is an extensible application providing additional rich administrative tools

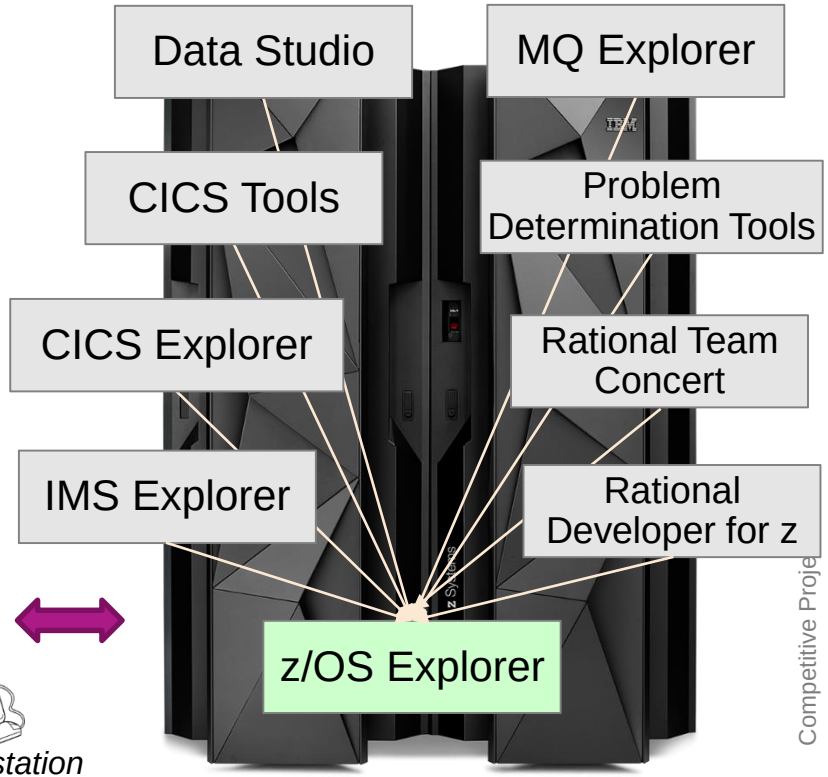
- Runs on a workstation; common base for many z/OS tools
- Foundation for a workbench of plug-ins with which to develop/test z/OS applications and manage related sub-systems
- Extendable to accommodate user's roles and responsibilities using Eclipse-based plug-ins



MQ Explorer plug-in in z/OS Explorer – showing Queues and Jobs

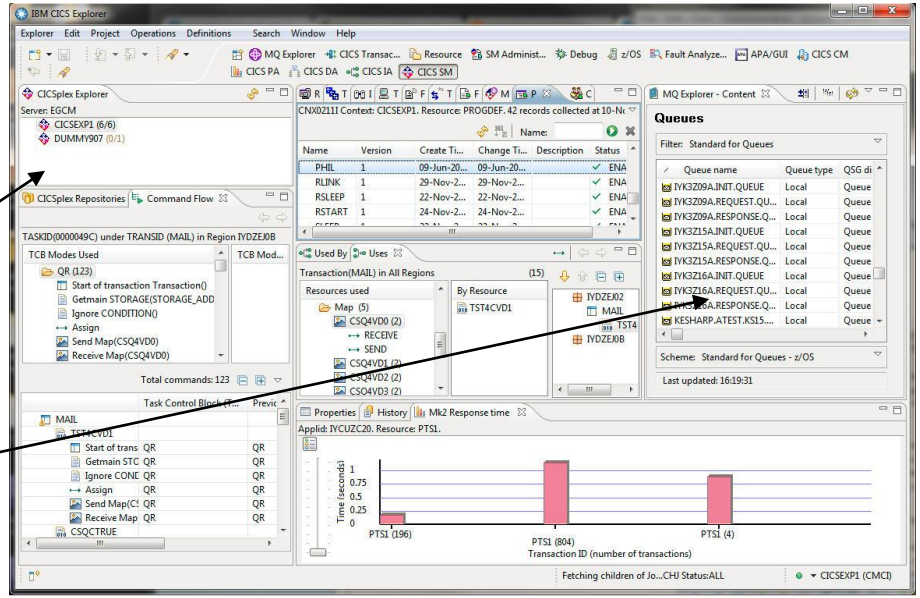


Eclipse workstation



For example, CICS Explorer eases CICS management

- View and control the CICS runtime and its resource definitions
- Easily create and manage CICS regions, tasks, files, transactions, events, etc.
- Easily manage across an entire CICS Parallel Sysplex
- Because it's Eclipse-based, other tools can be integrated into the same view (MQ Explorer)

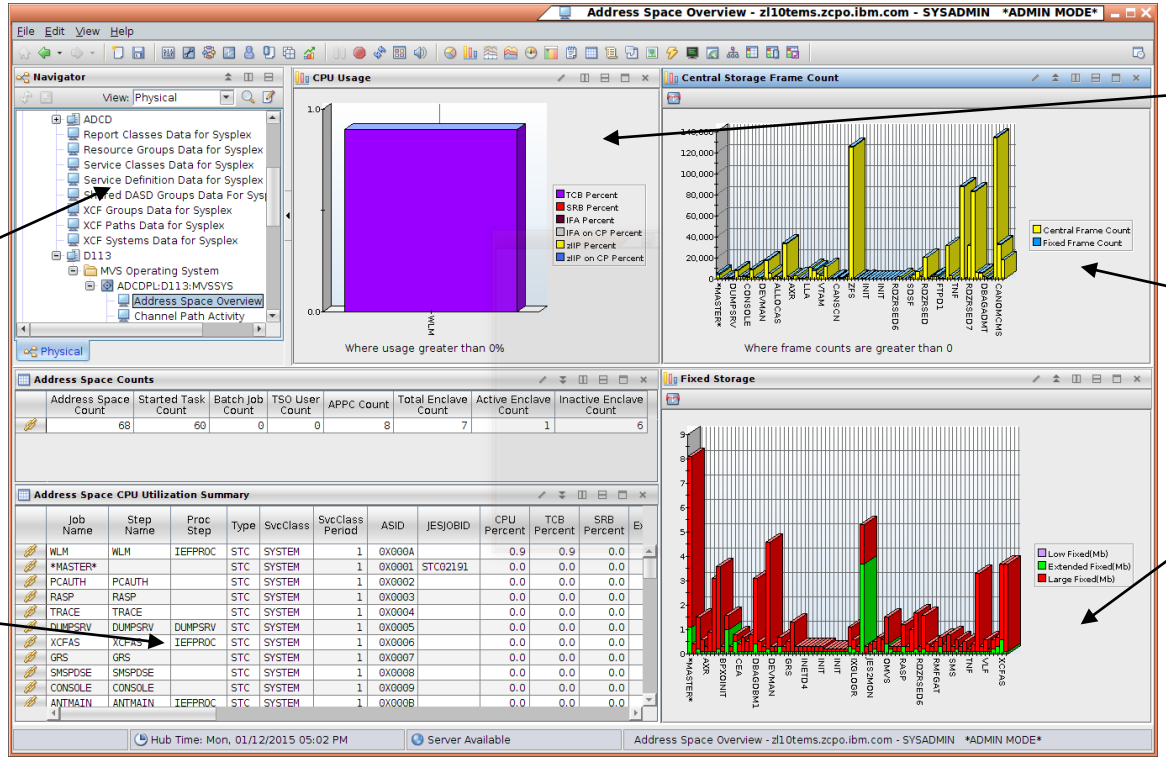


Additional GUI-based tools enable efficient management of the entire enterprise

Tivoli Enterprise Portal

Navigate among objects

View address space CPU utilization



Monitor CPU usage

Monitor central storage frame count and fixed storage

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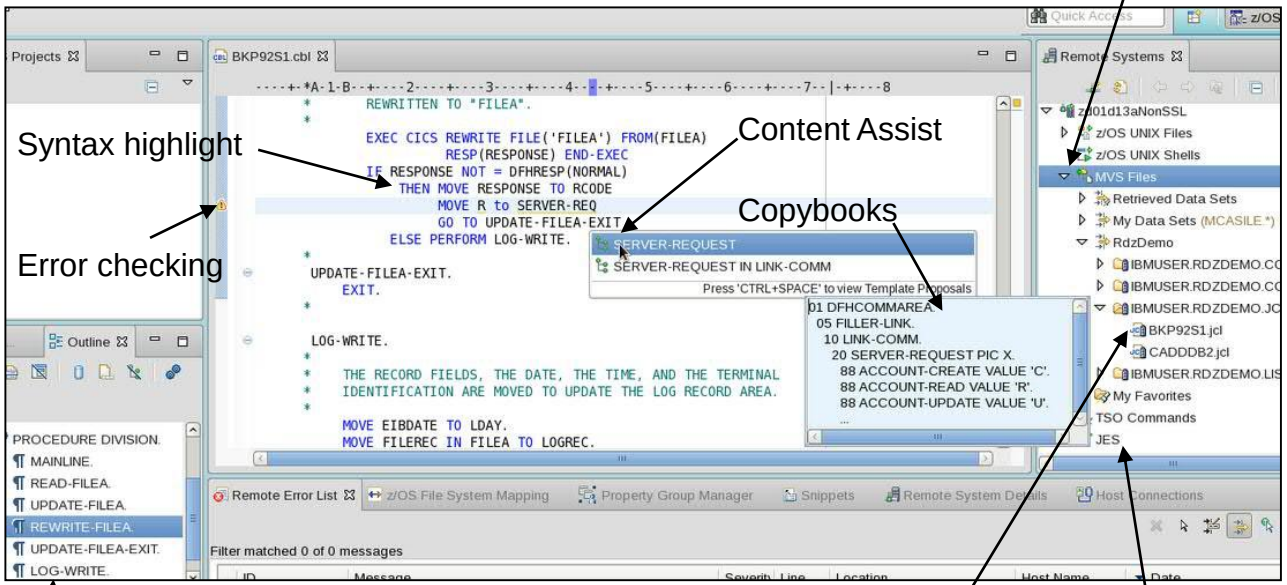
Developers use familiar, workstation-based tools for mainframe application development

- Supports all major languages (COBOL, PL/I, ASM, C/C++, Java)
- Supports all major runtimes (IMS, CICS, Batch, USS, DB2, WAS, Linux, Cloud)
- Web Services/JSON functionality, plugins for code analysis, debugging, and more

Rational Developer for z (RDz)



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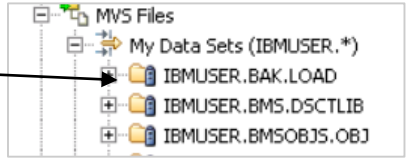
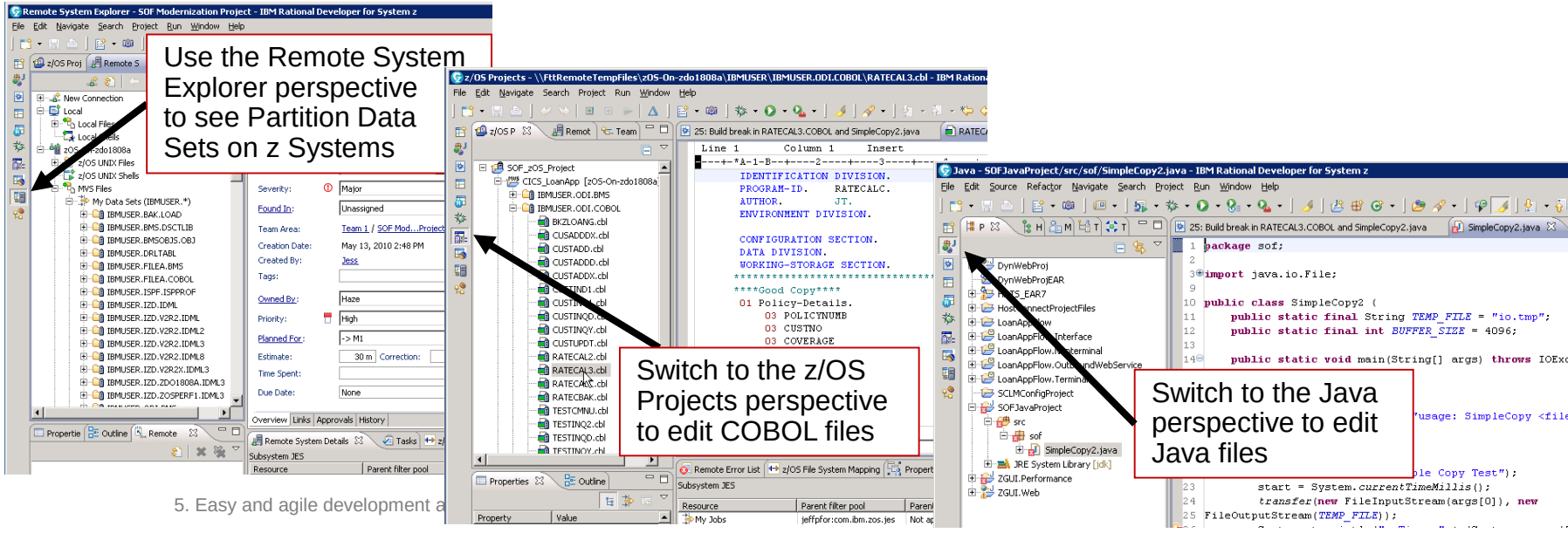
DEMO: RDz makes COBOL development much easier

- Members and partitioned data sets look familiar – like files and folders!
- Double-click to open a z/OS member or Linux file
- Error icons assist in finding problems
- Use local syntax checking – saves MIPS costs!
- Use content-assist to quickly complete variable names and other statements
- Search for strings in files
- Edit JCL and submit – while the code window is still open!



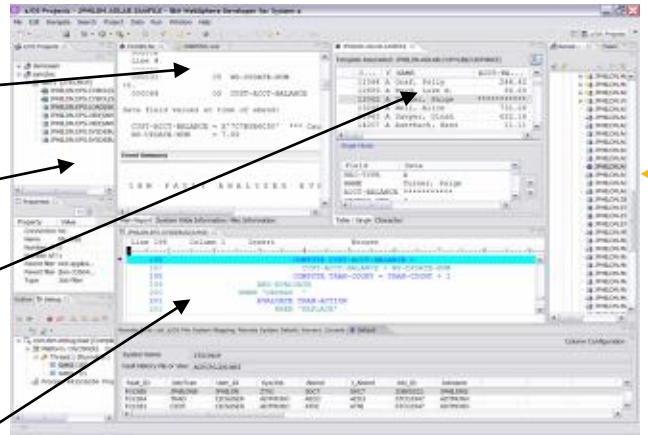
Grow and enhance the skills set of development teams with multi-faceted, integrated tools

- Features in RDz enable cross-pollination of development skills
- RDz makes it easy for Java developers to also contribute to COBOL applications
- Build for z/OS, for Linux on z, for a cloud of Linux on z servers, etc.



Mainframe Problem Determination Tools are integrated into the RDz development environment

- Access PDT tools when running in connected mode
- Easily debug and step through multi-tier applications

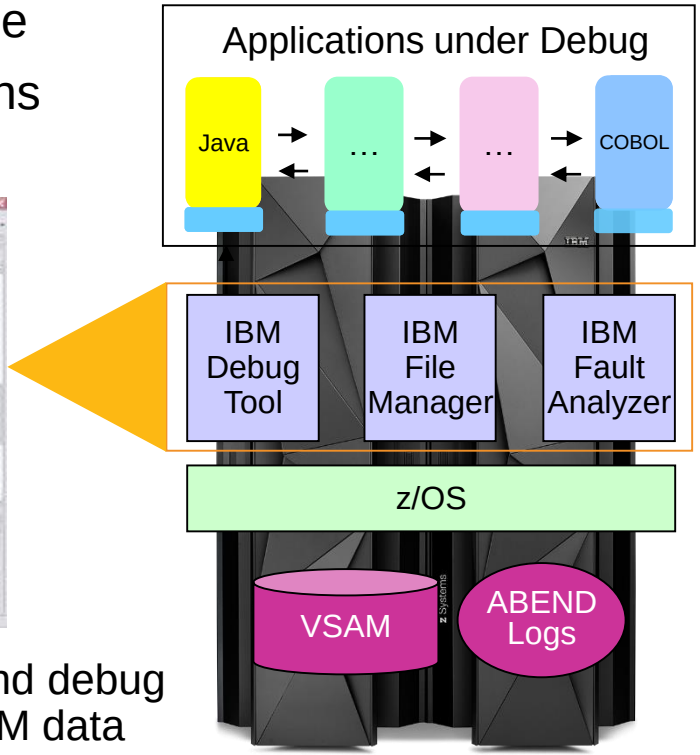


Fault Analyzer report

Development window for z/OS application

Edit data with File Manager

Debug application with Debug Tool or the ***new Integrated Debugger***



- End-to-end debug
- Edit VSAM data
- Analyze ABEND logs

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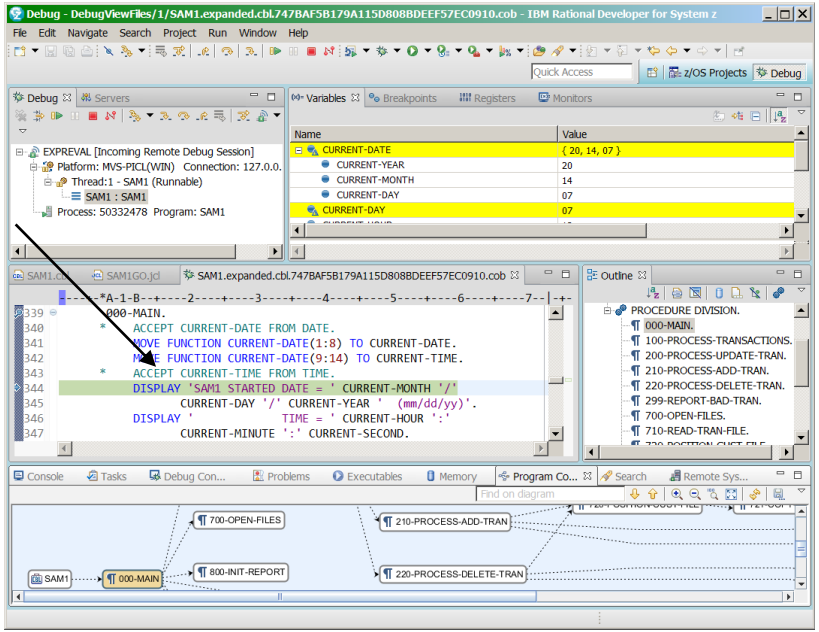
DEMO: Debugging with the RDz Integrated Debugger has never been easier

1. Submit JCL to automatically open the Debugger Perspective
2. Step through code, view variables, set breakpoints, use the outline view to navigate
3. Allow the program fail (abend)
4. Find the problem, make a change, step back before the abend
5. See that the program runs to completion

A problem report comes in…



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Developers easily view execution statistics for a program using the Code Coverage feature

- See which lines of code are executed and which are not
- Remove dead, unexecuted code
- Easy and straightforward to use
  1. Modify the JCL
  2. Add "CC" to the ENVAR statement
  3. Resubmit the JCL
  4. The code coverage summary report will open…

```
//******* ADDITIONAL RUNTIME JCL HERE ******
//CEEOPTS DD *
  ENVAR("AQE_STARTUP_KEY CC EXPREVAL")
//AQEV4LST DD DISP=SHR,DSN=IBMUSER.RDZDEMO.LISTING
```

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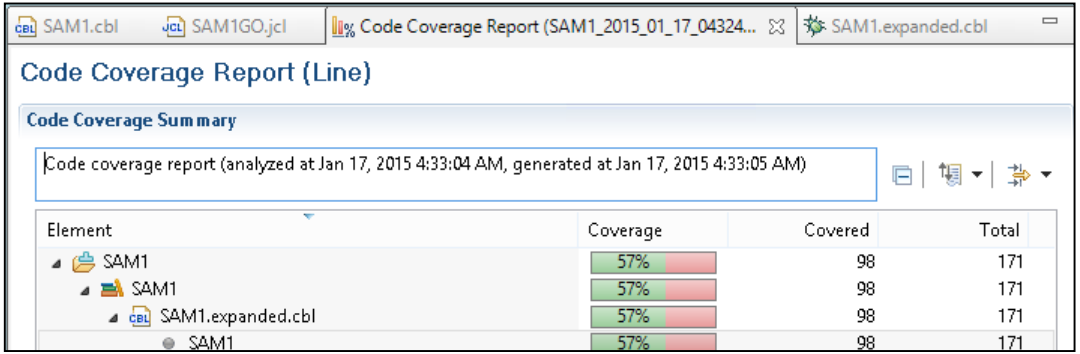
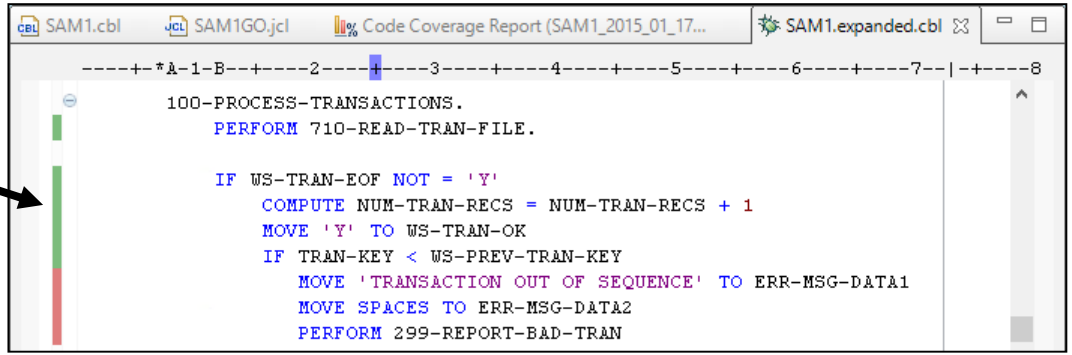
DEMO: Code Coverage summary uses color coding to make finding unexecuted code easy

1. When development is done, run the Code Coverage tool to scan for unexecuted code



2. Green indicates code is executed; Red indicates code is not executed



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Optimizations make building and deploying integrated, modern applications on z13 easy

- Java 8 applications are enhanced with SMT on z13
  - Up to **50%** improvement in throughput compared to Java 7 on zEC12
  - Application serving with SSL clear key can see up to **2x** improvement in throughput per core vs. Java 7 on zEC12
  - Encrypt data using clear key in **half** the time and reduce CPU time by **one third** compared to using Java 7.1 on zEC12.
- Cloud application deployments with IBM Cloud Manager with OpenStack are standardized and automated using patterns

12 patterns
for key z Systems portfolio

WAS Network Deployment
WAS Liberty
ODM Decision Server
ODM Decision Center
Integration Bus
DB2

Business Process Server
Business Process Center
Business Monitor
WebSphere Portal
WebSphere MQ
MobileFirst Platform

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Businesses reap the benefits of modernizing with RDz

- Produced **better quality code** that led to fewer deployments onto test environments
- Implemented standard interfaces that enabled a **DevOps** strategy toward continuous testing

- Significantly **raised COBOL and PL/1 developer productivity**
- Planning, budgeting and forecasting now done much **more efficiently**

- Successfully moved to **agile development** methodology with IBM Rational Solution for Collaborative Lifecycle Management
- **Accelerated the delivery of business value** while reducing the risks associated with software development

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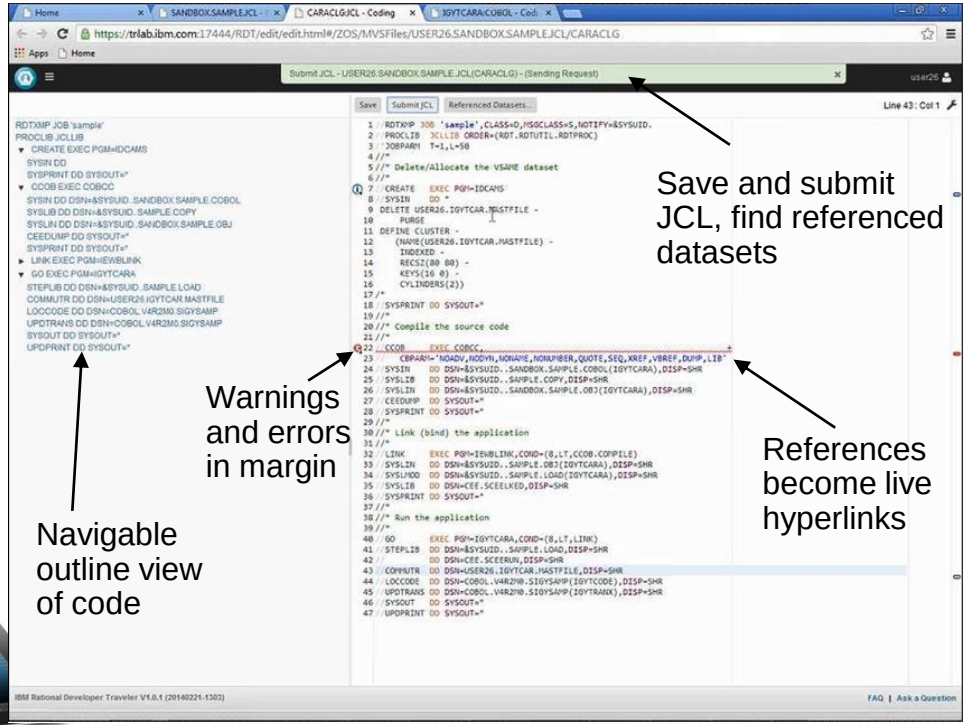
Rational Developer Traveler enables browser-based z/OS development…

…from mobile devices as well as desktops

- Experimental technology from Rational
- Edit/Compile/Run enterprise applications using a Web browser
- No content stored locally

Visit the IBM Rational Developer Traveler Community on IBM developerworks



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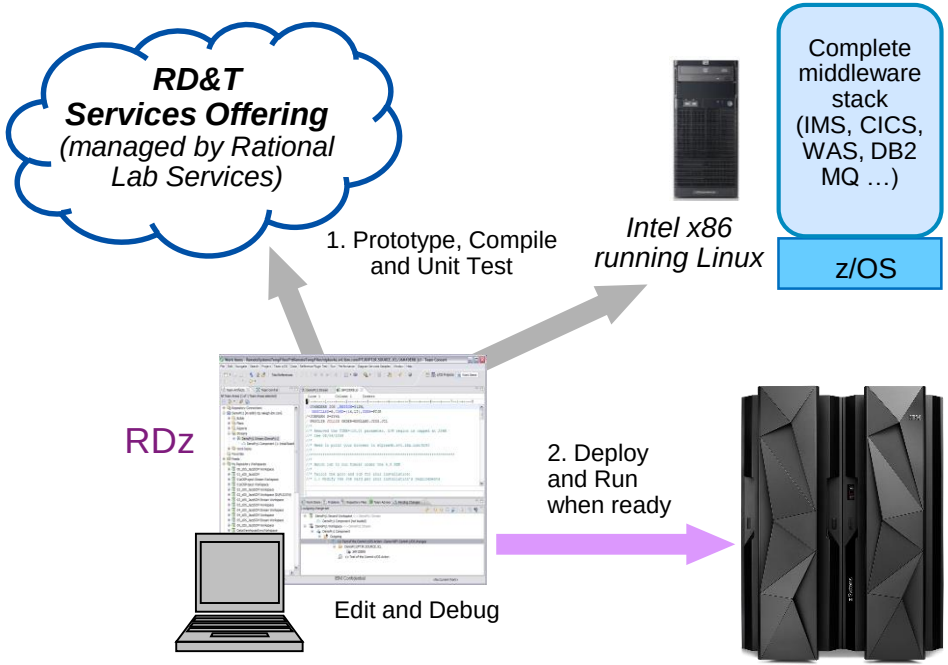
To reduce costs and simplify operations, perform compilation and unit testing off-platform

Rational Development and Test (RD&T)



- Compile and Unit Test *off* the mainframe
  - Reduce MIPS costs, eliminate delays
  - No interruptions to mainframe production
- RD&T desktop server runs z/OS and all mainframe software
  - Cloud-based services offering also available
- Stack is continuously updated to emulate the latest releases of z Systems hardware and software

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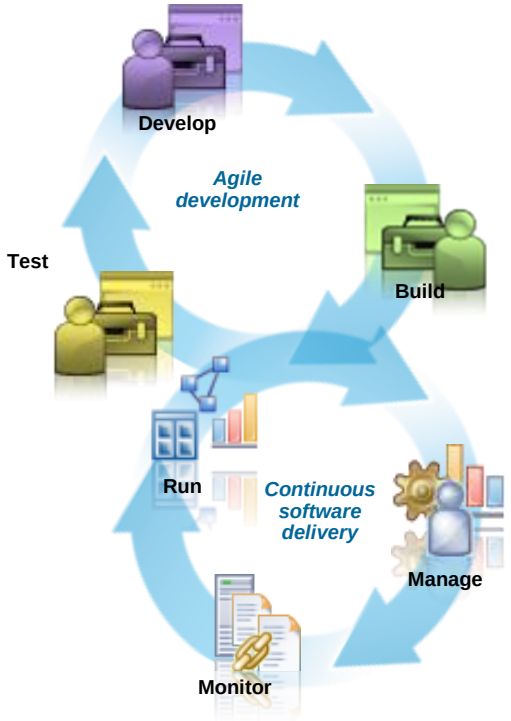
Digital business necessitates a DevOps approach for continuous development and operations

Today, customers expect better product quality and shorter release cycles. Businesses must meet this challenge, while keeping costs low

DevOps:

- A process that addresses this challenge
- Unites Development and Operations around a continuous and agile delivery model
- Enables testers to have production-like environments
- Ensures an integrated view to govern and manage end-to-end continuous delivery pipeline



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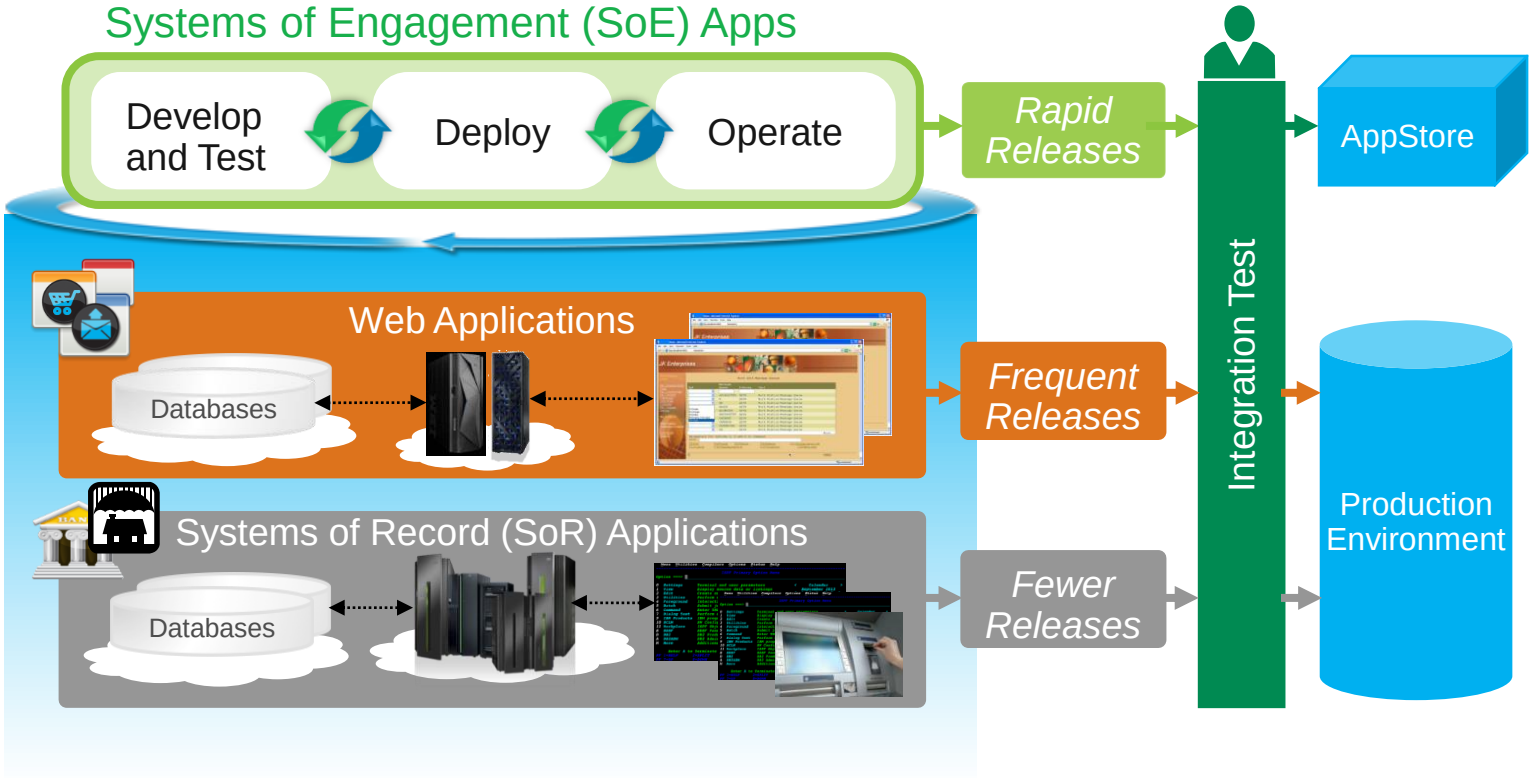
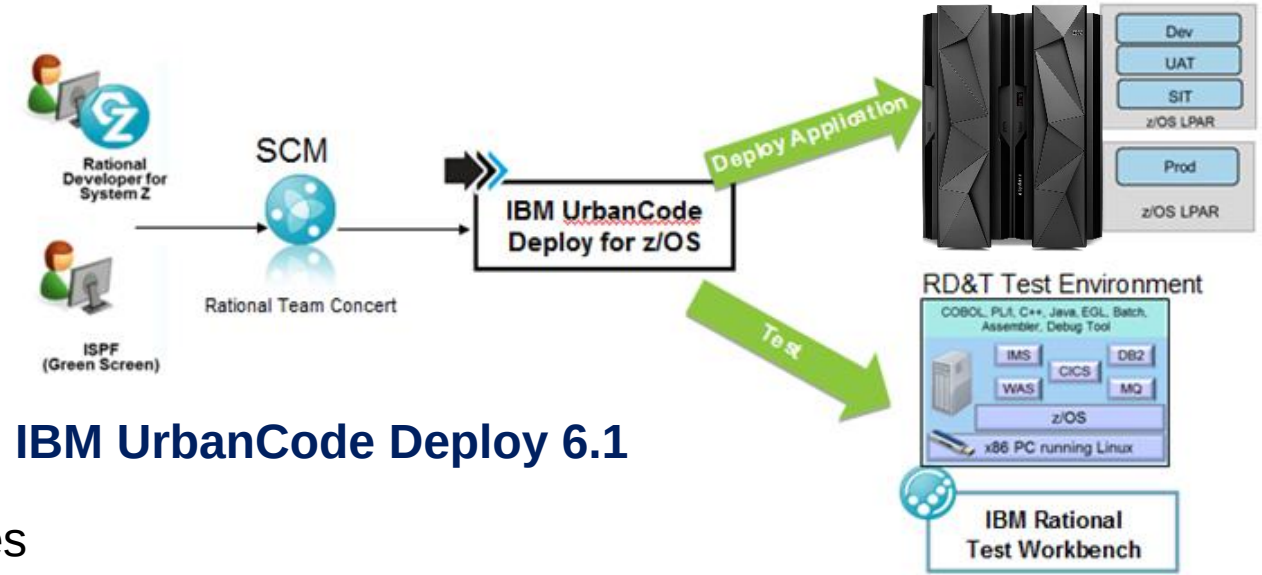
DevOps tools manage and coordinate mobile, cloud and mainframe deployments



Save costs by automating DevOps deployment and testing on back-end Systems of Record

- Deploy components to IBM z/OS data sets with enhancements to display partitioned data set members in component versions
- Set up artifact repositories in agent relays that cache downloaded artifacts
- Use **IBM Rational Test Workbench** to drive testing while temporarily simulating missing components

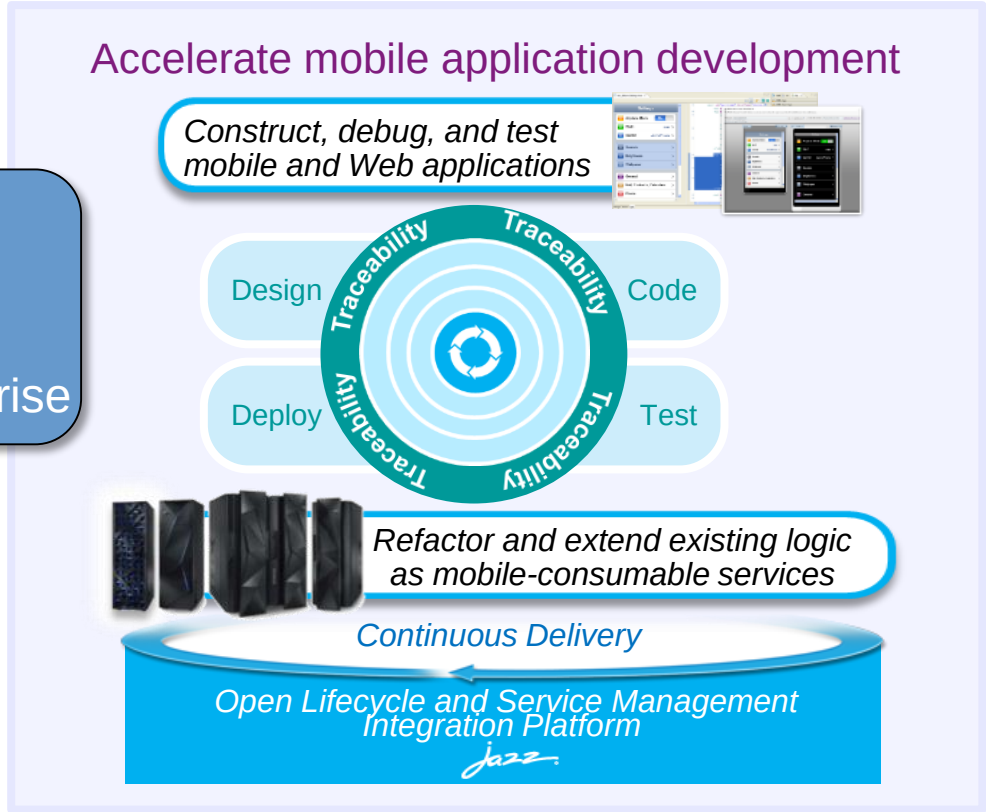


IBM UrbanCode Deploy 6.1

Competitive Proj

Rational tools offer many DevOps capabilities for mobile apps with enterprise systems

Rational Test Workbench
IBM MobileFirst Platform
IBM UrbanCode Deploy
Rational Developer for the Enterprise



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With the Academic Initiative, IBM is working to develop and train new mainframe skills

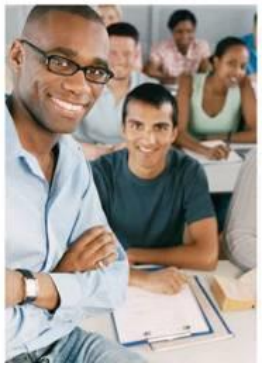
- Since its inception in 2003, the program has grown significantly benefiting schools, students, and clients
- Market place demand for enterprise systems resources over the last decade has remained strong
- Our clients have expressed continued interest in expanding the program to ensure a healthy ecosystem

http://www.ibm.com/university/systemz

Program Investment
$10M+ over in 10 years

Growth
64K+ Students
1,000+ Schools in 70 countries

Job Candidates
Over 4,200 Job Seekers



Corporate Engagement
360+ companies actively recruiting

Professional Connections
9 Communities

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The Academic Initiative is also partnering to offer mainframe-focused MOOCs…

…Massive Open Online Courses

MARIST

"An Introduction to Enterprise Computing"
https://mooc.marist.edu/web/ecc

SYRACUSE UNIVERSITY

"Enterprise Computing Strategies"
http://ischool.syr.edu/contact/forms/ecsmooc.aspx

THE LINUX FOUNDATION

"Introduction to Linux"
https://www.edx.org/course/introduction-linux-linuxfoundationx-lfs101x-2

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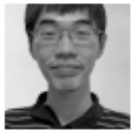
IBM sponsors Master the Mainframe – a contest to grow high school and university talent

68,000+ Participants since 2005!

2014 Master the Mainframe World Championship New York City

43 students from **23** countries



Yong-Siang Shih - 1
Score: 3407
National Taiwan University
Taiwan

Rijnard van Tonder - 2
Score: 3329
Stellenbosch University
South Africa

Philipp Egli - 3
Score: 3186
University of Brighton
United Kingdom

Mugdha Kadam - 4
Score: 3031
University of South Florida
United States

Coming soon, the *"2016 z Systems Master the Mainframe World Championship"*

http://www.ibm.com/systems/z/education/academic/masterthemainframe/

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Use the IBM z Systems Job Connector to find needed skills

http://systemzjobs.com

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IBM is committed to helping businesses find and keep new z Systems staff

Easy-to-use, GUI-based administrative tools

z/OSMF z/OS Explorer

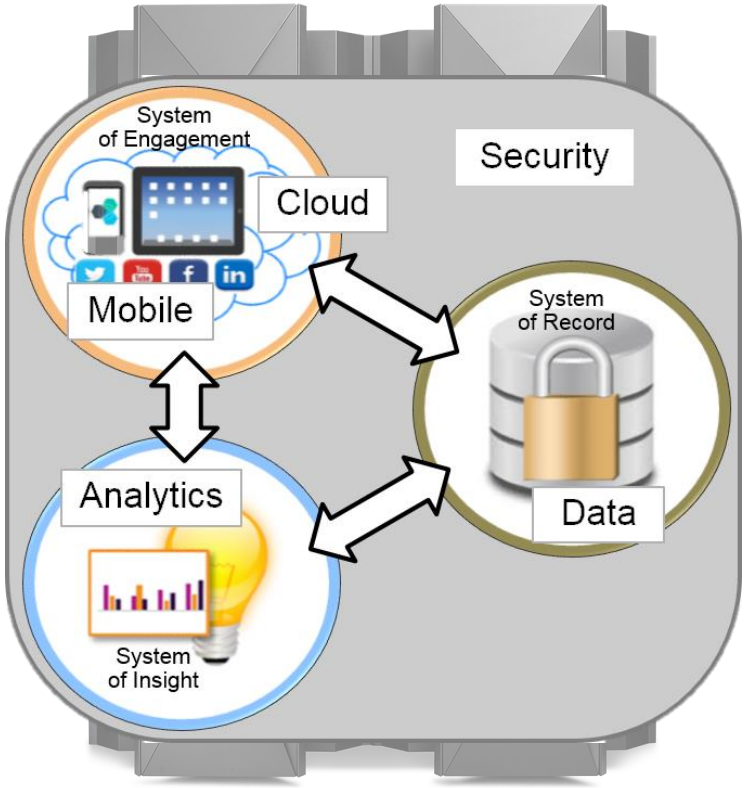
Rich, familiar development tools

Rational Developer for z
Rational Development & Test

Worldwide university training programs

Academic Initiative Master the Mainframe

4,200+ Academic Initiative graduates seeking jobs!



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