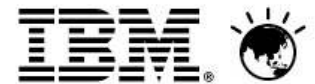


**Pulse**

IBM SolutionsConnect 2013

# Improving testing and development of mobile applications

*June 2013*



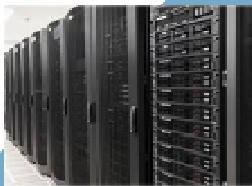


# Mobile is the NEXT dominant phase of computing

**Mobile is different:**

- Transformational business models
- Faster lifecycles
- More iterative

Host/Mainframe



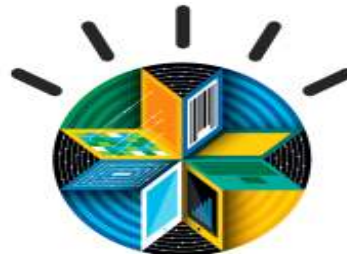
Client/Server



Web/Desktop



Mobile/Wireless/Cloud



**IBM Mobile Enterprise**

# Building a mobile application is more than just writing the code

## Specific challenges in building mobile apps:

### Imperatives from line of business & customers

- Strong demand by Line of Business
- Customers expect higher quality of user experience with mobile apps
- More direct involvement from users/stakeholders in design

### Fragmentation of technology and platforms

- Highly fragmented set of mobile devices and platforms
- Native programming models not portable across devices.
- Very large number of configurations of devices, platforms, carriers, etc. to test

### Urgent time-to-market, rapid pace of innovation

- Mobile landscape evolves at a much faster pace
- More frequent releases and updates for apps with more urgent time-to-market demands
- Lack of best practices guidance on how to deliver mobile applications



**How do you develop for and test against multiple platforms effectively?**

**How do you align business and development?**

**How do you gain control of your development process and accelerate time to delivery?**



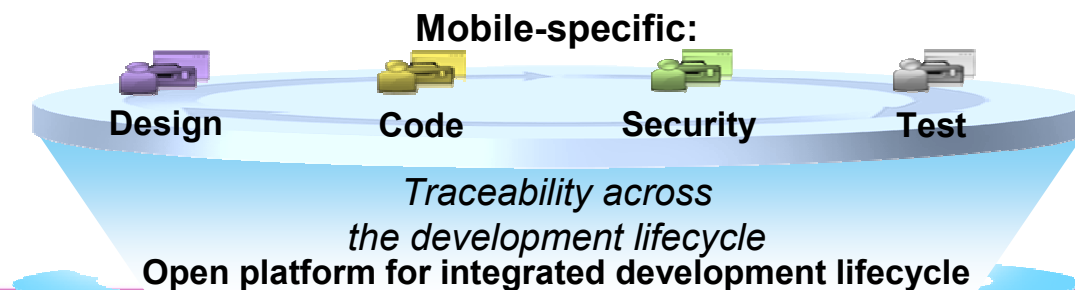
# Rational helps you manage your mobile application development lifecycle and provide mobile specific-capabilities to accelerate your development and test

## Rational CLM helps you manage your development lifecycle:

- Traceability of development activity across entire project lifecycle
- Real-time planning that is consistently accurate and up-to-date
- Tightly integrated with mobile code development capabilities
- Centralized code sharing and distributed mobile app build
- Integrate and manage full range of mobile testing tools and techniques

## Mobile specific-capabilities help you accelerate your development and test:

- Code construction tool using web-based technology to write multi-platform applications
- Distributed builds of mobile applications
- On-device functional testing of mobile applications





# IBM MobileFirst – Rational’s Point of View

*Continuous delivery of quality, multi-tiered mobile applications*

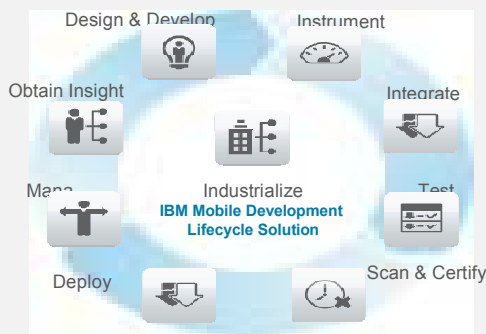
## Quality & Test Automation



**41% of projects fail to deliver expected business ROI**

- Automate testing for native & hybrid mobile apps
- Virtualize middle-tier and back-end services and systems
- Manage quality through open interfaces

## Continuous Delivery



**25+ Almost all expect to deploy more than 25 mobility applications in the next two years**

- Reduce response time to feedback
- Continuously build, install, test
- Adopt agile processes
- Collaborate throughout the development lifecycle

## Extension to the Enterprise



**Nearly 90% of developers are currently extending enterprise apps to mobile or plan to in the near future**

- Collaborate and integrate across front-end & back-end teams
- Extend the reach of enterprise data
- Embrace end-to-end development and test



IBM Rational solutions extend the IBM Worklight platform. Our solutions deliver what's needed for comprehensive mobile testing, exploiting existing infrastructure, and leveraging continuous delivery.



# Quality is critical for mobile applications

- Customers demand good user experience
- Customer facing (B2C) applications
  - ‘Face of the Business’
  - Engage customer personally and drive loyalty
  - User experience is key to brand perception
- Employee facing (B2E) applications
  - Increase worker productivity
  - Speed decision making and action
  - Poor user experience compromises investment



## Customer Ratings





# Why is Mobile testing different?

#1: *Testing involves much more than just the mobile front-end*



**Client Tier Devices**



**Middle Tier Server**



**Back-end Data & Services**

- Fragmentation of the endpoints (Mobile OS, form factors, screen resolutions) is unprecedented:
  - Thousands of phone models in use WW, ~300+ new smart phones/tablets released in 2011
  - Carriers and manufacturers push for device refresh every 24 months
- Mid-tier is increasingly under stress
  - Heavy focus on services APIs to facilitate quick mobile application development/updates
  - Network considerations (throughput, latency, disconnected use) are resulting in performance issues
- Backend data & services are hindering development/ test agility
  - Often 5x the number of developers on mid-tier/backend vs mobile application to deliver a mobile solution
  - End-to-end testing requires bringing together very complex infrastructures

# Why is Mobile testing different?

## #2: New specific testing challenges exist

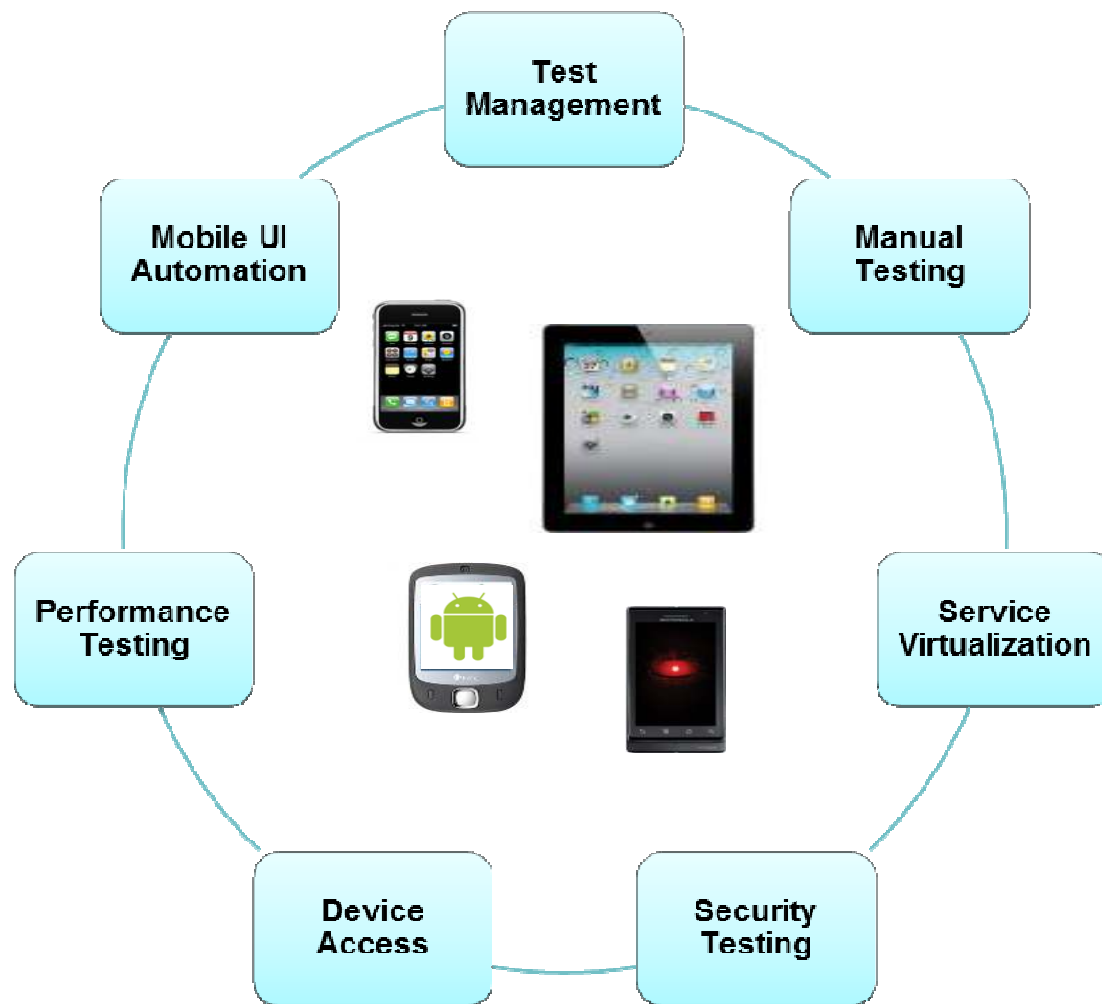
- New functional testing challenges
  - Context awareness: location, applications interactions
  - Variable states: connected/disconnected, device orientation
- User experience focus is much more critical
  - Usability testing
  - Translation testing
  - In-network testing (average response time, QoS)



*Order the closest cab to my location*



## What do mobile testers need?





# Testing the end-to-end mobile solution



***Testing involves much more than just the mobile front-end***





# IBM Rational mobile testing solution



## Rational Quality Manager

- Test Planning
- Configuration testing
- Test Construction
- Test Execution
- Team Collaboration
- Reporting & Dashboard



Client Tier Devices



Middle Tier Server



Back-end Data & Services

## Rational Test Workbench / Rational Test Virtualization Solution

- Test automation on device
- Mobile device cloud access
- Simulation of mid-tier or backend systems
- Test automation of mid-tier or back-end systems

# Automated Mobile Functional Testing

*Delivering support for native, web, and hybrid applications on Android and iOS*

- Supported Mobile Operating Systems
  - Android 2.2+
  - IOS 6+
  - Android & iOS hybrid apps
    - HTML5/CSS3
    - jQuery Mobile
- Capture (record) a test from a physical device or mobile emulator
- Structured test definition language (ClearScript) simplifies authoring and supports multi-language
- Shares multi-channel, Keyword, and execution capabilities within the Rational Test Workbench
- Shell-share provides seamless transition from Worklight to RTW

The screenshot displays the IBM BluePages mobile testing interface. At the top, there's a status bar with battery and time indicators. Below it, a navigation bar includes 'App Details', 'Original', 'Record', 'Test', and 'Clear' buttons. The main content area shows a list of tests for 'IBM Blue Pages'. One test, 'Test2', is selected, showing its location as '/FVT' and last edited on 25 mars 2013 14:59:16. Below the list, a detailed view of 'Test Test2' is shown, including a 'Run Test' button and a 'Reports' button. The test details include a table with the following information:

Test:	Test2 (last modified: 14:59)
Application:	IBM IBM Blue Pages 1.0; created on 18/03/13; imported on 25/03/13
Test Location:	/FVT

Below the table, a list of test steps is visible:

- 1 Start IBM Blue Pages
- 2 Enter text 'Dennis' in Edit text
- 3 Click on Image button to the right of Edit text
- 4 Click item at position 2 in List view



# Rational Test Workbench – Mobile Testing

- Supported Mobile Operating Systems
  - Android 2.2+
  - IOS 6+
  - Android & iOS hybrid apps
    - HTML5/CSS3
    - JQuery Mobile
- 4 steps-testing approach:
  - **Recording**: play your test first with the recording-ready app and generate a test script
  - **Authoring**: edit and enhance the test script by adding verification points and others instructions
  - **Playback**: run the test script on a real device, a simulator or an emulator
  - **Reporting**: generate an HTML report





# Rational Test Workbench – Record and Playback

Test Workbench	An Integrated Development Environment (IDE) to prepare mobile applications for testing and create and modify mobile tests
Mobile Client	Allows the recording and playback of test scenarios on the mobile device
Test Editor	Enable test creation using English narrative and application images to define test steps and verifications
Test Reports	Visualize the test flow and report on test failures

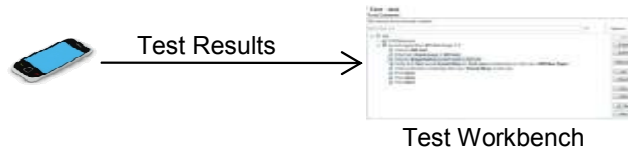
Prepare



Author



Execute



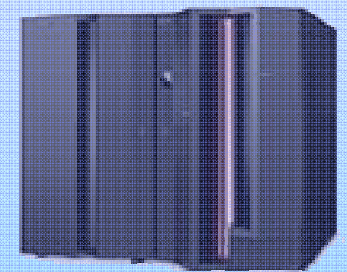
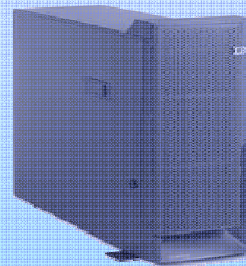
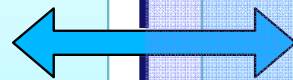


# RTW supports isolating tiers of the app for focused mobile testing

## Rational Test Workbench

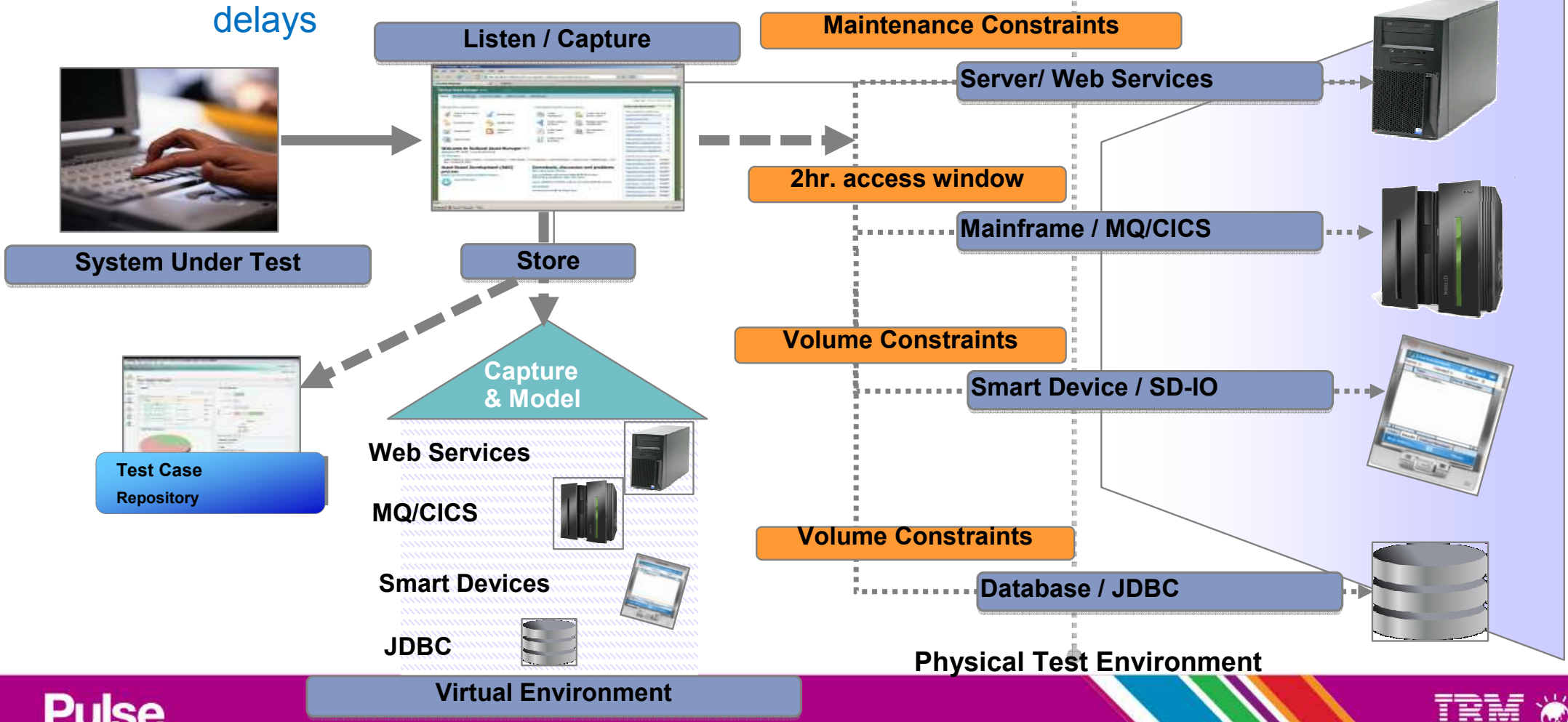
Test Virtualisation support for isolating mobile client tier

For focused automated mobile client tier functional testing, use RTW Test Virtualization to simulate the mobile middle tier and back office systems.



# Virtualise back-end interfaces and services

Test at the API layer avoiding last minute integration nightmares and delivery delays

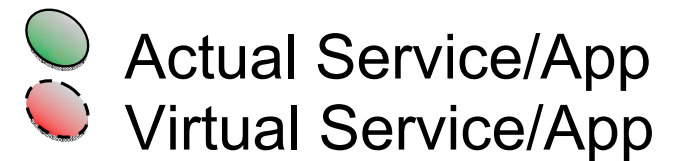




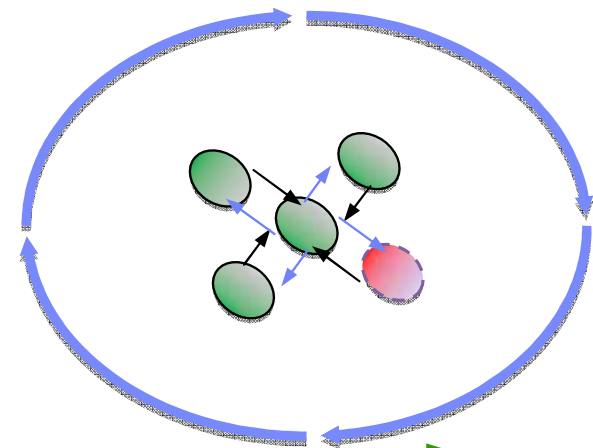
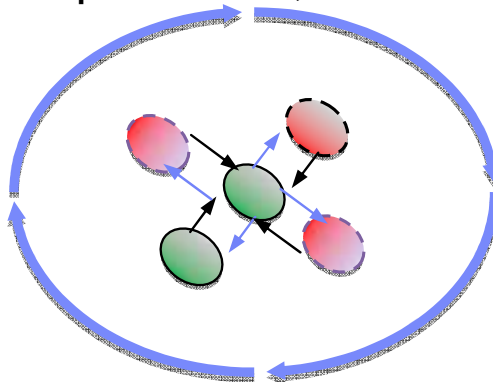
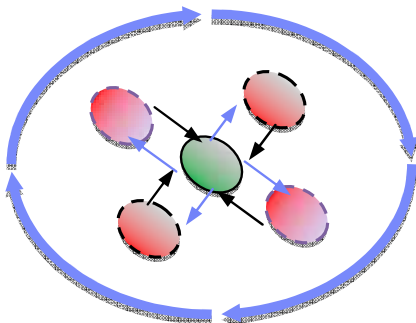
# IBM Rational Test Virtualization Solution is a key enabler for Continuous Integration Testing

## Test Virtualization is an enabler for continuous Integration Testing

- Isolate front-end from back-end
- Control over data and interface
- Decrease expensive setup costs



## Services, applications, systems are introduced into the continuous integration cycle in a prioritized, controlled fashion.



**Incremental Integration Testing**



# IBM Rational Test Virtualization Solution

## *A Smarter Solution for Better Quality in Mobile Applications*

### Significantly Lesser Test Lab costs

- Test lab infrastructure costs can be reduced by up to 90%
- Labor involved in setting up test environments can be reduced by 80%+
- Reduced or eliminated the cost of invoking 3rd party systems for non-production use, fee-based web services

### Reduced Cycle Time

- Test environments can be configured in minutes vs weeks
- More testers can be focused on testing, rather than configuring test environments
- More regression testing can be done independently from the Mobile User Interface, during development

### Lower Risk

- Developers have the means to test software earlier at the Service/API level
- Large teams working on different parts of an application or system can effectively do parallel development by virtualising different parts of the system



# Quality management techniques can help ensure adequate test coverage in the fragmented environment

## ▪ Test coverage optimization

- Testing against all possible combinations of devices, OS versions, carriers, etc requires large combinatorial number of tests
- Combinatorial optimization can dramatically cut down on number of test cases that need to be run while providing coverage for interaction between environment factors

## ▪ “Mobile device cloud” services

- Sometimes it is necessary to test on specific devices/carriers
- Maintaining a huge library of device across the world is impossible/extremely costly
- “device-cloud” services provide virtual access to physical devices



# Test environment optimization

The screenshot displays the IBM Rational Quality Manager console for configuring test environments. The interface is divided into several sections:

- Test Case Information:** Test Case: 30: Mobile donor can donate to n... (URL: https://clm.jkebanking.net:9443/qm/web/console/JKE Banking (Quality Management)#action=com.ibm.rqm.planning.home.actionDispatcher)
- Originator:** CLM Admin
- Test Plan:** Unassigned
- Iteration:** Unassigned
- Owner:** CLM Admin
- Reuse Existing Test Environments:** Select one or several attributes from the columns below. The number of attributes selected, the level of coverage that you choose, and the Advanced Properties.
- Generate Test Environments:** A grid of checkboxes for various attributes:
  - CPU:** ALL, AMD64, Alpha, EM64T, IA64, PL-DPC
  - Browsers:** ALL, Chrome, Chrome 10, Chrome 11, Chrome 12, Firefox
  - Database:** ALL, DB2, DB2 10.x, DB2 7.x, DB2 8.x, DB2 9.x
  - Application Server:** ALL, Tomcat, Tomcat 4.1, Tomcat 5.5, Tomcat 6.0, Tomcat 7.0
  - Management Agent:** ALL, Build Forge Agent, STAF/STAX, Tivoli Application Dependency Discovery Manager, Tivoli Provisioning Manager
  - Operating System:** iOS 4.0, iOS 4.1, iOS 4.2, iOS 4.3, iOS 5.0, iOS 5.1
  - Screen Size:** ALL, Phone (Large), Phone (Medium), Phone (Small), Tablet (Large), Tablet (Small)
  - Mobile Network:** AT&T, Airtel, China Mobile, T-Mobile, Telenor
- Advanced Properties:** A link to view more options.
- Generation Properties:** A dropdown menu for coverage levels:
  - Minimal - One-way interaction
  - Minimal - One-way interaction (highlighted)
  - Medium - Pair-wise interaction
  - Large - Three-wise interaction
  - All - All permutations

- ✓ Generate an optimized set of device characteristic combinations (screen size, memory, CPU, etc.)
- ✓ Reduce test device possibilities from thousands to dozens

# Test integrated fully into the process

- ✓ No wasted effort – development is qualitative and aligned to the agreed upon requirements at the right time
- ✓ Quality Assured – test teams know exactly what requirements and functionality have and haven't been tested
- ✓ Whole team buy-in improves team trust, efficiency and focus

Developers understand the business needs and test effort



**JKE Banking**  
Dashboards | Work Items | Plans

### Release 1.0 Backlog

Plan Details

Planned Items | Links | Snapshots

Add: Contributes To Plan in 'Current'

Implements Requirement Collection

Release 1 Planning

Tested by Test Plan

1: JKE Banking Release 1

**JKE Banking Release 1**  
Test Plan Overview | Snapshots | History

Originator: Tammy | Owner: Tammy | Action: Select Action | State: Approved

Description: Defines testing for the Release 1 of JKE Banking. Significant capabilities being added in Release 1 include the Money that Matters initiative whereby account holders can elect to redirect dividends from their investments to causes needing assistance.

### Development Plan List

Linked development plans:

Owner	Iteration
JKE Banking	Release 1.0 (9/8/10 - 10/17/10)

Show All | Items per page: 4/279 pgs | 100%

Summary

Release 1.0 Backlog

Show More

Testers understand Sprint Plans and business expectations



ID	Name	Artifact Type	Last Modified By	Last Modified Date
5	Allocate dividends by amount and frequency	User Story Elaboration	cp	Sep 20, 2010 8:38:57 PM
8	Dividend alloc by percentage			
11	Customers can nominate an organization for the program			
12	Donor/Dividen Allocation Criteria			
13	Donors Deposit Money in Peoples Assistance Fund			
18	Requests sent in	Feature	cp	Sep 20, 2010 8:40:20 PM

49: Release 1 Planning  
Project: JKE Business Recovery Matters  
Created On: Sep 20, 2010 8:30:46 PM  
Modified On: Sep 21, 2010 4:17:12 PM  
Modified By: cp

type: Release Collection

Owner: JKE Banking  
Iteration: Release 1.0 (9/8/10 - 10/17/10)

12/279 pgs | 100%

Implementer By (1): Release 1.0 Backlog [Release 1.0]

Validate By (1): 1: JKE Banking Release 1

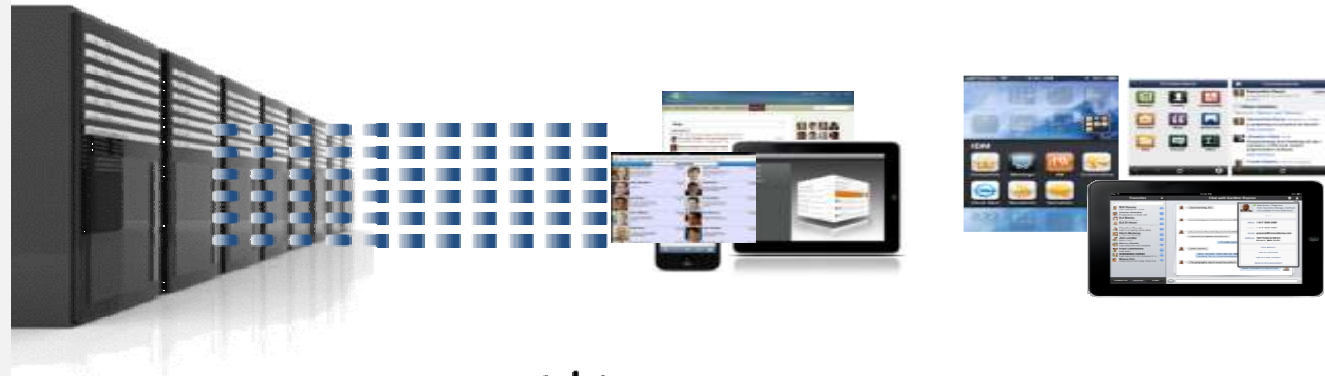
Requirements owners clarify the business needs in a collection



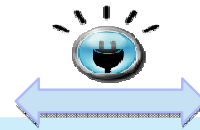


# Rational accelerates delivery of enterprise mobile applications

**Rational**  
Enable customers to **continuously** deliver high quality mobile and Web applications by providing comprehensive integrated **multi-channel** and **multi-tier** development and test automation solutions



**Development**



**Test Automation**



**CLM**

**Continuous Delivery**

**Open Lifecycle Integration Platform**



## Three ways to get started with IBM MobileFirst

1

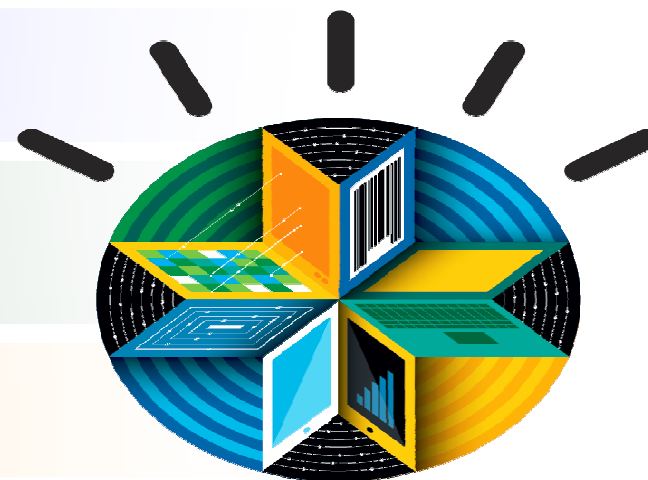
Learn more at  
[ibm.com/mobilefirst](http://ibm.com/mobilefirst)

2

Join the conversation:  
• [#IBMMobile](https://twitter.com/IBMMobile)  
• [facebook.com/IBMMobile](https://facebook.com/IBMMobile)

3

Schedule an IBM MobileFirst Journey  
Workshop -- [ibmmobile@us.ibm.com](mailto:ibmmobile@us.ibm.com)





## IBM MobileFirst Journey Workshops

*One day interactive workshop with an IBM Mobile expert to help enterprises plan and develop a customized roadmap for success*

**New!**

### Workshop



For Line of business and IT leaders seeking expertise and experience in developing, enhancing, and/or executing their mobile enterprise strategy.

### Client Value



- Industry expertise with top use cases and successes
- Capability assessment including identification of opportunities and gaps in mobile strategy
- A detailed client report and next steps

### Highlights



- Interactive discussion to understand client business drivers, pains and requirements
- Overview of IBM MobileFirst Strategy, technology and POV's
- Industry trends and imperatives
- Structured working session to outline next steps

To schedule a workshop, email: [ibmmobile@us.ibm.com](mailto:ibmmobile@us.ibm.com)

**Pulse**







# QUESTIONS

<http://www.ibm.com/software/rational/mobile/>



## Contacts

---

- Linda Glucina  
Rational Mobile – [Linda.Glucina@au1.ibm.com](mailto:Linda.Glucina@au1.ibm.com) - 0439650156
- Natalie Krivushenko  
Websphere Mobile - [nkrivu@au1.ibm.com](mailto:nkrivu@au1.ibm.com) - 0477 607 777



© Copyright IBM Corporation 2012. All rights reserved. The information contained in these materials is provided for informational purposes only, and is provided AS IS without warranty of any kind, express or implied. IBM shall not be responsible for any damages arising out of the use of, or otherwise related to, these materials. Nothing contained in these materials is intended to, nor shall have the effect of, creating any warranties or representations from IBM or its suppliers or licensors, or altering the terms and conditions of the applicable license agreement governing the use of IBM software. References in these materials to IBM products, programs, or services do not imply that they will be available in all countries in which IBM operates. Product release dates and/or capabilities referenced in these materials may change at any time at IBM's sole discretion based on market opportunities or other factors, and are not intended to be a commitment to future product or feature availability in any way. IBM, the IBM logo, Rational, the Rational logo, Telelogic, the Telelogic logo, and other IBM products and services are trademarks of the International Business Machines Corporation, in the United States, other countries or both. Other company, product, or service names may be trademarks or service marks of others.

Pulse



# BACK UP SLIDES



## Benefits of Rational Mobile Solution

- ✓ Reduced time-to-deliver mobile applications (deliver new applications and updates to employees and consumers in less time)
- ✓ Lowered development and test costs (reduce costs associated with training and maintaining multiple development teams and their infrastructures)
- ✓ Improved mobile application quality (make end-users happy and more productive)
- ✓ Increased alignment between LOB and development (ensure applications meet business goals the first time)
- ✓ Integrated, end-to-end development tools
- ✓ Tools to extend existing assets on IBM Enterprise Platforms (System z and Power) as mobile-consumable services