



# Build, Run, and Manage Mobile Applications with the IBM Rational Mobile Platform

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IBM Software

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## Agenda

- Introduction
- Challenges of Building Mobile Applications
- IBM Rational Solutions Targeting Mobile
- Summary



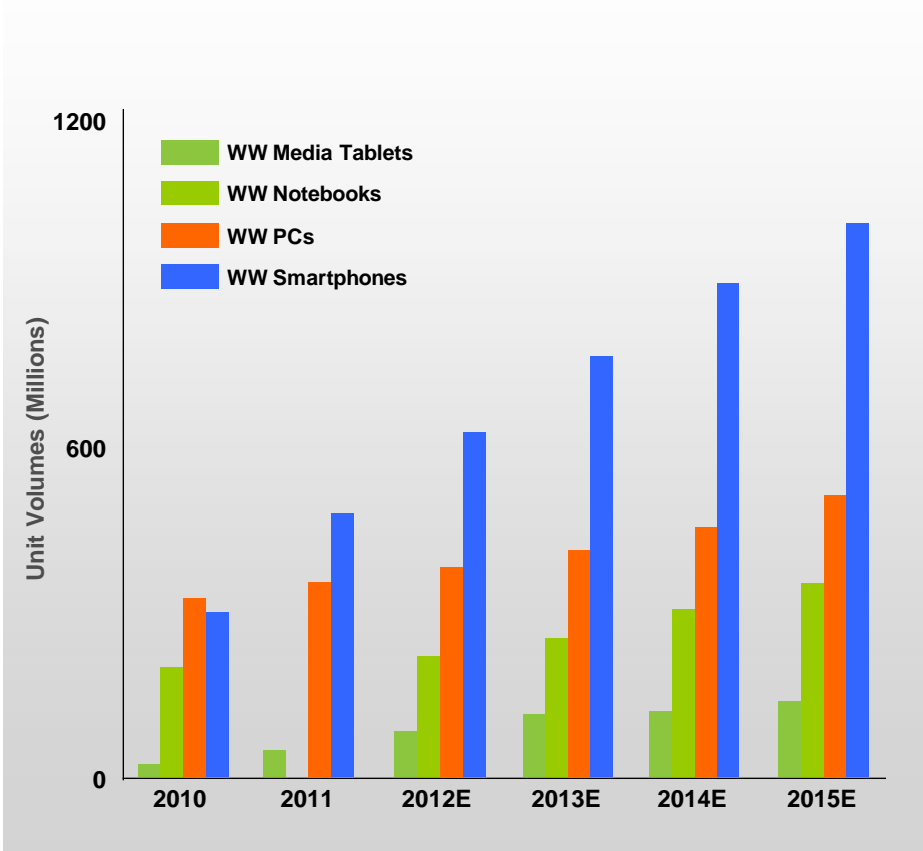
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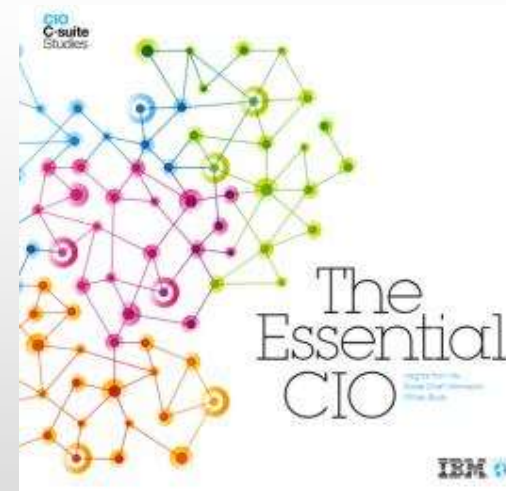


# Mobile is an enterprise priority

## Growth in Internet Connected Devices



## Mobile and Cloud are top spending priorities for CIOs<sup>1</sup>



### Dramatic Growth in Mobile Devices

- Mobile data traffic exceeded voice in 2010<sup>2</sup>
- Shipments of Smartphones exceeded total PC shipments for the first time in 2011<sup>3</sup>
- 10 Billion mobile connected devices are expected to be in use by 2020<sup>3</sup>

Source: Wells Fargo Securities, January 23, 2012  
 "Fostering the People: The Shift to Engagement Apps"

<sup>1</sup> 2011 IBM Global CIO Study  
<sup>2</sup> Wireless Industry News, August 26, 2010  
<sup>3</sup> 2011 Economist



## How is your business planning this “Essential Mobile” transformation?

### Business to Employee

- Increase worker productivity
- Improve processing times
- Extend existing applications to mobile workers and customers
- Increase employee and business partner responsiveness and decisions
- Resolve internal IT issues faster
- Reduce personnel cost utilizing personal devices



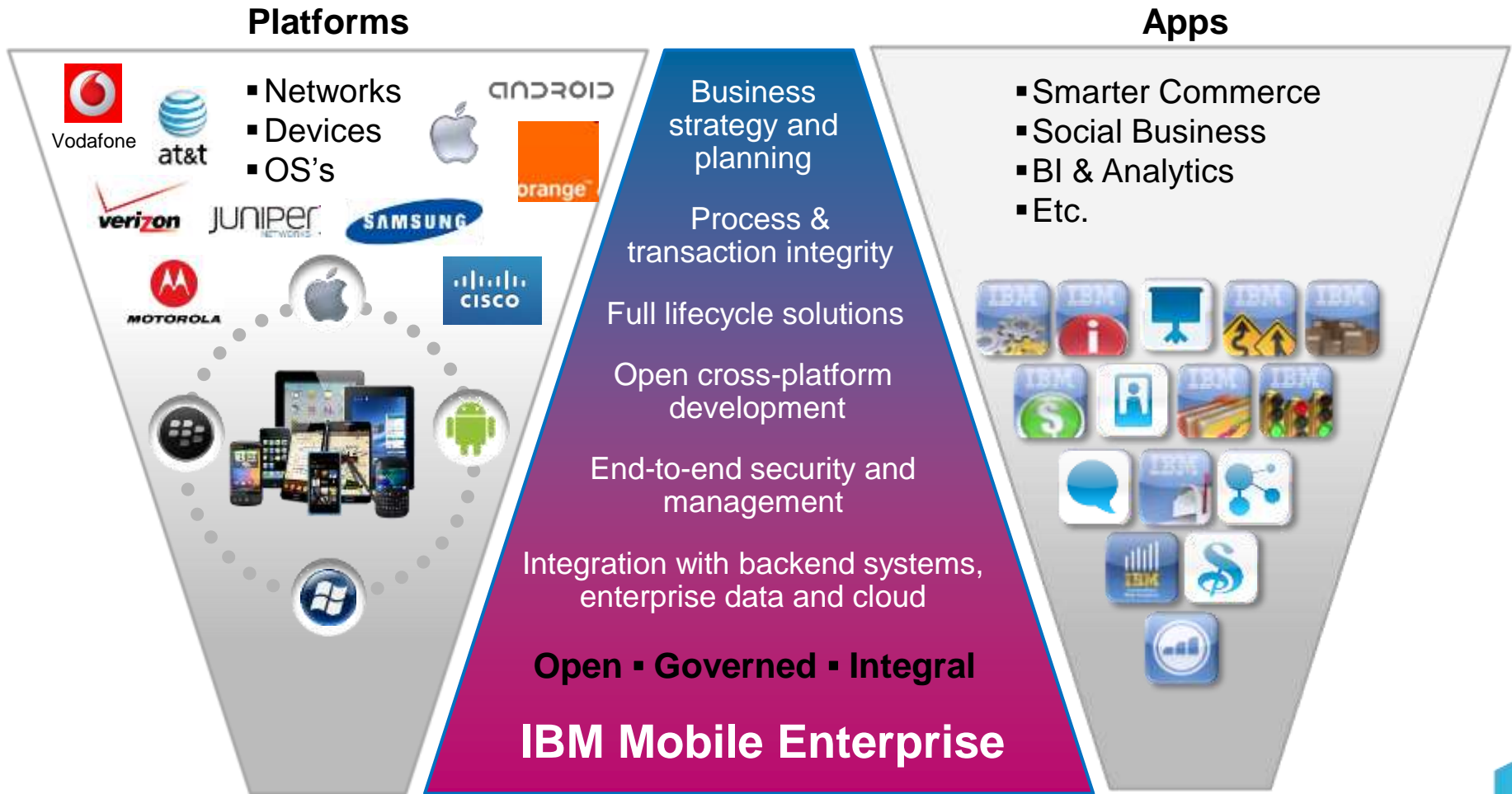
### Business to Consumer

- Improve customer satisfaction
- Build deeper engagement and loyalty
- Increase sales with personalized offers
- Streamline customer service
- Differentiate from competition
- Improve brand perception
- Create deeper insight into customer buying behavior for up sell and cross sell



- What B2E or B2C initiatives are you planning? Why?
- To support these business initiatives, what projects or products will you be building that require mobile applications?

# How do we have to think about mobile differently?

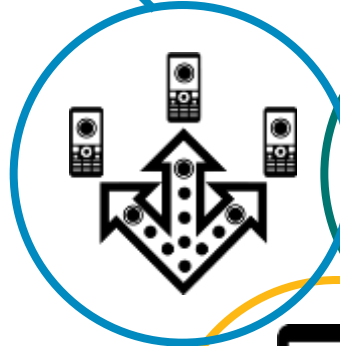


# IBM strategy addresses client mobile initiatives

## Extend & Transform

**Extend** existing business capabilities to mobile devices

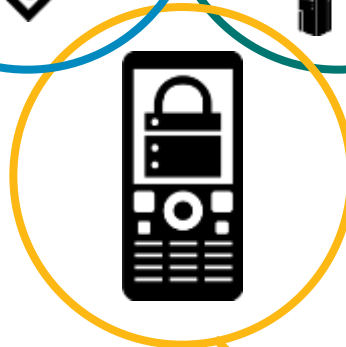
**Transform** the business by creating new opportunities



## Build & Connect

**Build** mobile applications

**Connect** to, and **run** backend systems in support of mobile



## Manage & Secure

**Manage** mobile devices, services and applications

**Secure** my mobile business

# A deeper look at **Build** and **Connect** capabilities

## Extend & Transform

*Extend* existing business capabilities to mobile devices

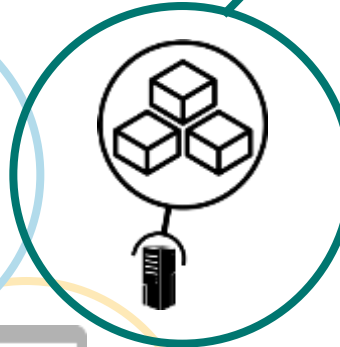
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## Build & Connect

*Build* mobile applications

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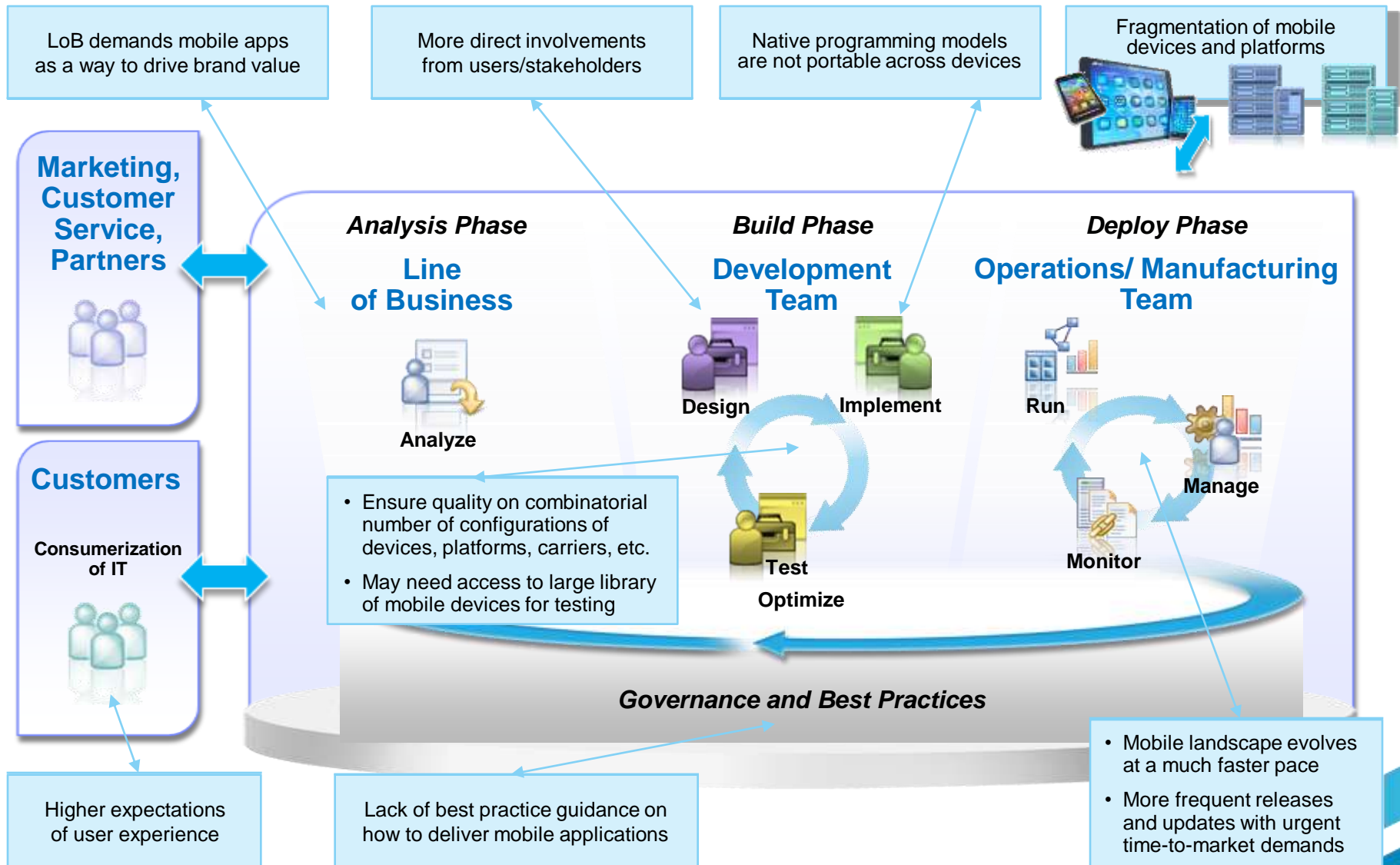
## Manage & Secure

*Manage* mobile devices, services and applications

*Secure* my mobile business



# Characteristics and pain points of the mobile development lifecycle



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# Challenge 1: Fragmentation and developing for multiple mobile platforms

- Several major platforms with their own
  - Tools
  - Languages, APIs, and programming models
  - App stores
  - Ecosystems
- Fragmentation within platforms, including
  - Physical device differences
  - Version incompatibilities
  - Vendor customizations
- And this market is moving very fast – new things are introduced all the time



## Challenge 2: Design and functional quality are both critical to the success of a mobile application

- Customers now know better – they know what good user experience is and they demand it
- Business-to-Consumer (B2C) applications
  - Line of Business wants these applications to improve customer satisfaction, drive customer engagement and loyalty
  - These apps are the new faces of the business
  - User experience is key to brand perception
- Business-to-Employee (B2E) applications
  - Increase worker productivity, improve responsiveness and decision making speed
  - Poor user experience directly compromises the value of the application



### Customer Ratings



## Challenge 3: Integrating with existing systems

- Mobile applications need to connect to enterprise back-end data and services
  - Existing programs and services may need to be refactored to be made mobile-consumable
  - Mobile-optimized services have different characteristics than traditional web services (payload size, incremental data access, etc)
- Mobile application development lifecycle needs to bridge the multiple teams responsible for different parts of the mobile application

Testing multi-tiered mobile applications can be slowed due to:

- All integrations with back-end must be available to test entire app through the UI
- Test environments are expensive, difficult and time consuming to configure
- Difficult and time consuming to isolate defect root cause
- Agile methodologies need fast iterations but testing delays are becoming a bottleneck



# Challenge 4: Meeting tight time-to-market requirements

Mobile is pushing traditional delivery approaches to the breaking point



	Mobile Apps	Desktop Apps
<b>Time-to-market</b>	Weeks to Months	Months to Years
<b>Frequency of updates</b>	Once every several weeks	12-18 month cycles



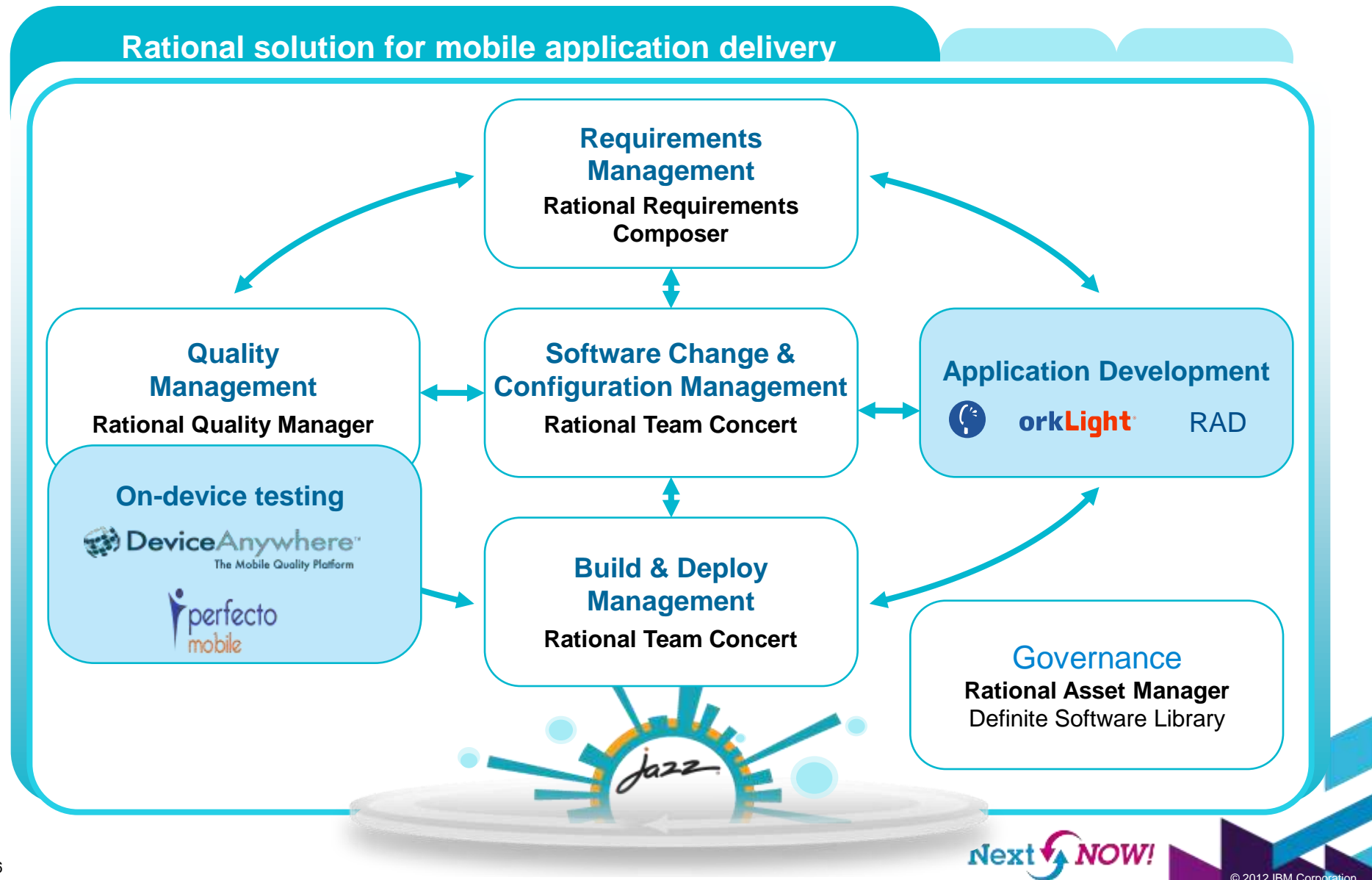


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# Rational mobile solution architecture

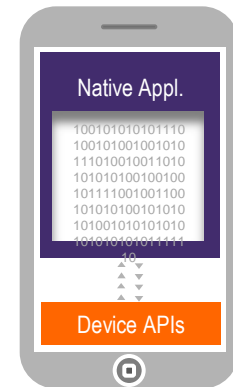




# Mobile application styles

## Addressing the multi-platform challenge with hybrid

Web	Mobile Web	Hybrid Mobile	Native
<ul style="list-style-type: none"> <li>HTML, JavaScript, CSS</li> <li>Accessed from a mobile web browser</li> <li>No device-specific capabilities</li> </ul>	<ul style="list-style-type: none"> <li>HTML, JavaScript, CSS</li> <li>Accessed from a mobile web browser; mobile-optimized UI</li> <li>Limited access to lower-level device capabilities</li> </ul>	<ul style="list-style-type: none"> <li>HTML, JavaScript, CSS, with optional native code</li> <li>Installed and run like a native mobile app; mobile-optimized UI</li> <li>Access to lower-level device capabilities</li> </ul>	<ul style="list-style-type: none"> <li>Native code</li> <li>Access to full set of lower-level device capabilities</li> </ul>



*Richness of Mobile Presentation / Services*

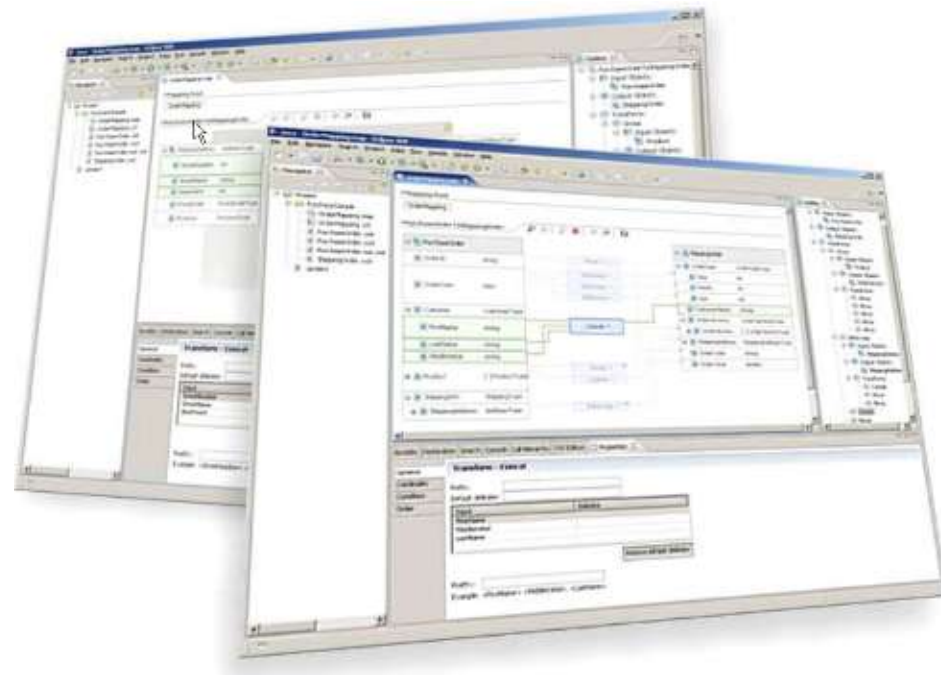
*Portability (cross-device reuse)*

*Maintenance Cost (TCO)*

# Rational Application Developer for WebSphere Software

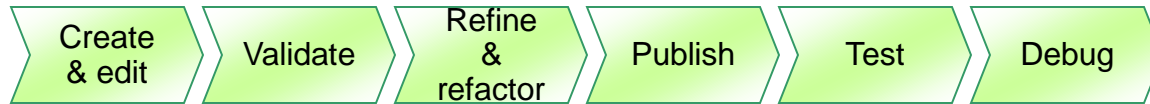
- Optimized development for WAS V8.0, V7.0, V6.1, V6.0 + Feature Packs and Portal
  - Java EE 6, OSGi, SCA, CEA, Web, Web 2.0
- **Increase productivity**
  - Eliminate mundane tasks to allow developers to be innovative
  - Shorten the learning curve, and provide unique backwards compatibility with existing standards
- **Improve quality**
  - Find and fix problems early in development with testing and analysis tools
  - Leverage Jazz to accelerate problem determination through team collaboration
- **Built on Eclipse**
  - Provide unique capability on top of the flexible and extensible Eclipse 3.6 platform
- **Mission critical ready!**
  - Award Winning!
  - 24 X 7 / 5 + 3 years support

Evans Data 2010 IDE  
User Choice Award

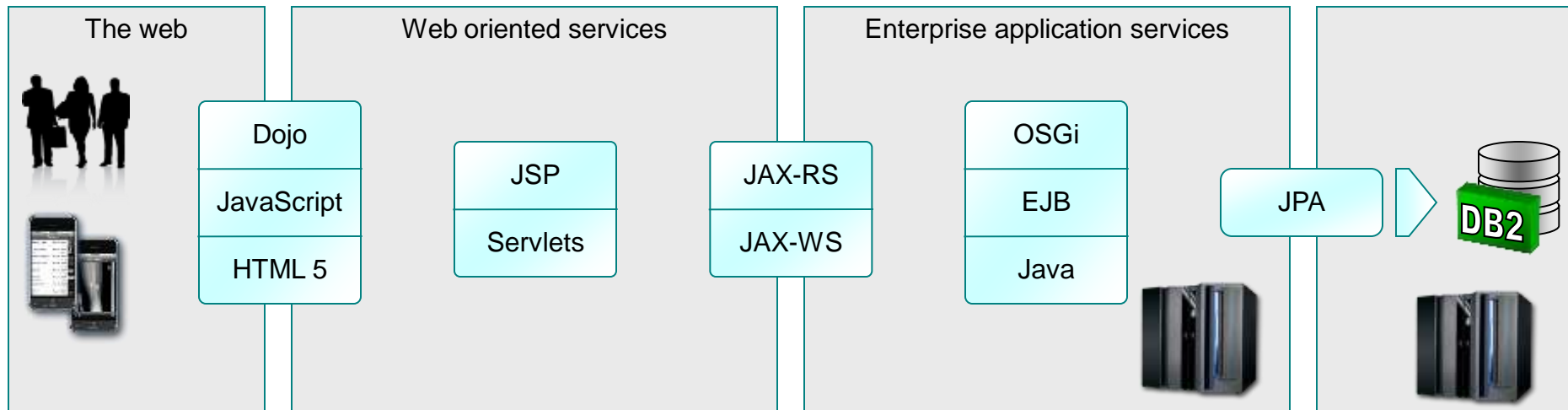


# Rational Application Developer

*A cost effective IDE focussed on web application and modern service development*



*Design web, Java EE and OSGi applications with persistence*



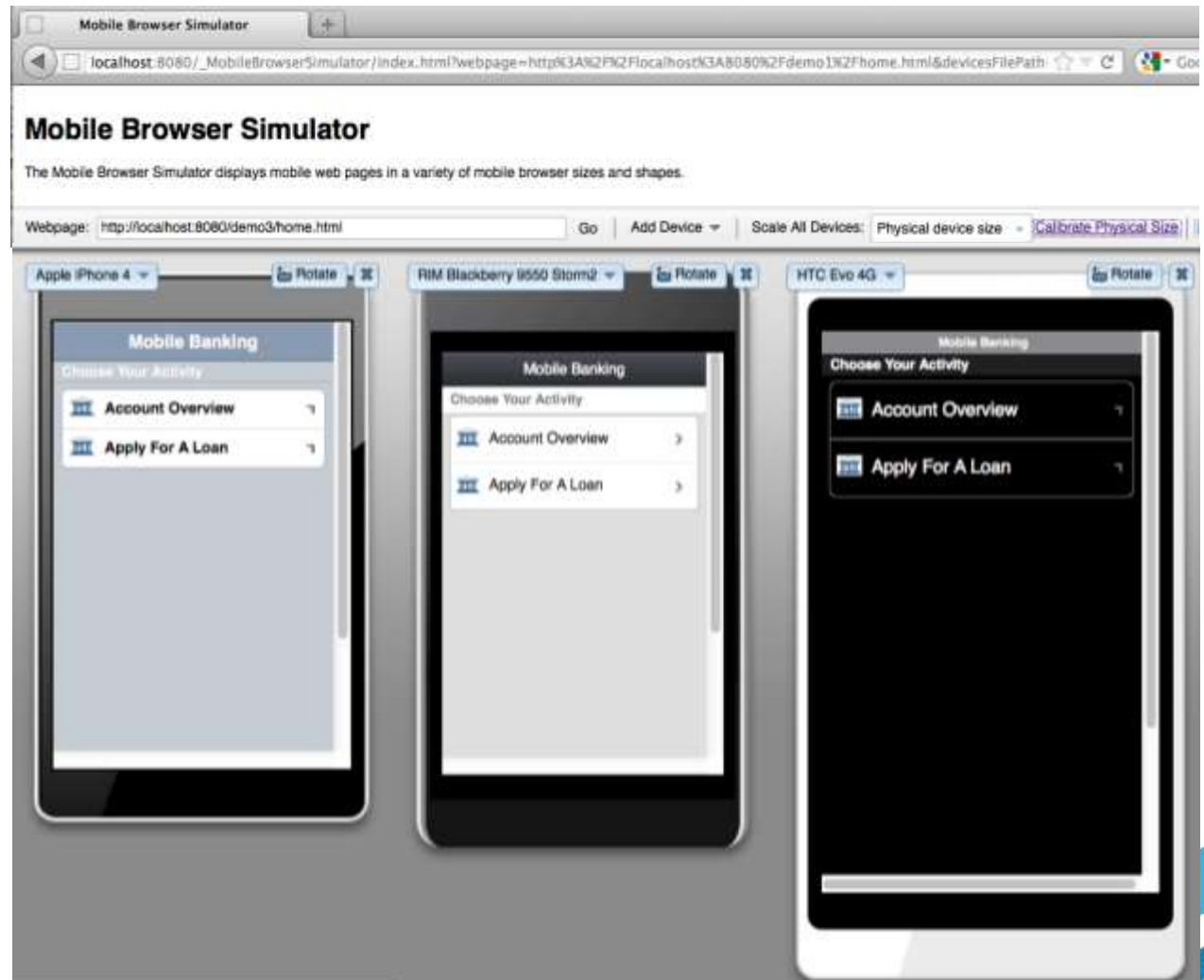
*Made for the WebSphere Application Server and Liberty profile  
Available from the Eclipse Marketplace*



# Previewing your mobile application

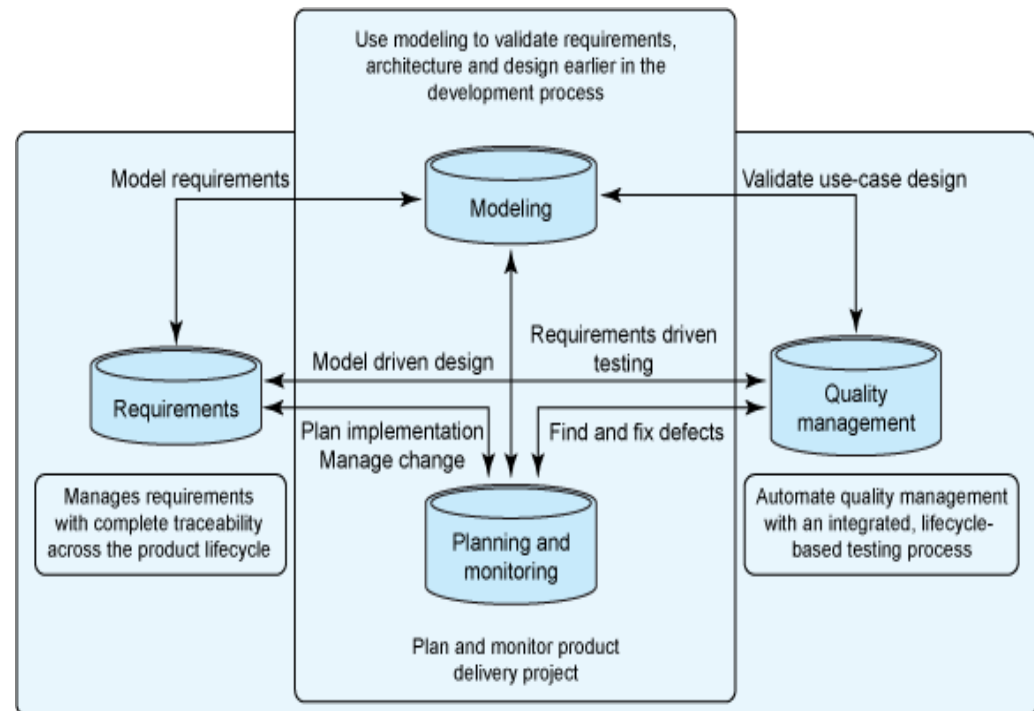
## *The Mobile Browser Simulator*

- Test your site in the browser
- Preview device look-and-feel with Dojo Mobile device themes
- Work with multiple device form factors at once



# Model Driven Development of Mobile Applications

- Early design and architecture of application, consumable by developers.
- Visualize the system with semantic information.
- Connect software development to requirements, testing and planning.
- Quickly create a visual representation of an app to communicate its value to multiple stakeholders.



IBM Rational Rhapsody enables MDD of Android applications



# Visualizing an android app as UML diagrams

The screenshot displays the Eclipse IDE with the following components:

- Package Explorer (Left):** Shows the project structure for 'NotesList', including packages like 'com.example.android.notespad' and 'com.google.provider', and classes like 'NotePadProvider', 'TitleEditor', 'NotesLiveFolder', and 'NoteEditor'.
- UML Class Diagram (Center):**
  - android.content.ContentProvider:** Methods include `ContentProvider()`, `ContentProvider(context Context)`, `getContext() Context`, and `onCreate() boolean`.
  - android.app.Activity:** Methods include `RESULT_CANCELED final int=0`, `RESULT_OK final int=1`, `RESULT_FIRST_USER final int=1`, and `FOCUSED_STATE_SET final int[]={com.android.internal.R.attr.st...`.
  - android.net.Uri:** Methods include `EMPTY final Uri new Hierarchical(Uri uri, Part NUL...` and `CREATOR final Parcelable.Creator new Parcelable...`.
  - Relationships:**
    - Generalization (solid line with hollow triangle): `android.app.Activity` generalizes `android.content.ContentProvider`.
    - Generalization (solid line with hollow triangle): `android.net.Uri` generalizes `android.app.Activity`.
    - Usage (dashed line with hollow arrow): `android.net.Uri` uses `android.app.Activity`.
    - Usage (dashed line with hollow arrow): `android.net.Uri` uses `android.app.Activity`.
- Properties Window (Bottom):** Shows details for the selected class, including Name, Stereotype, and Default Package.
- Open Perspective Dialog (Bottom Right):** Lists various development perspectives, with 'UML Modeling' selected.

# Worklight mobile platform overview



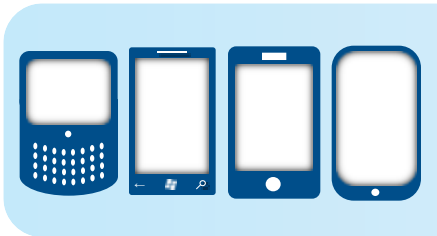
## Worklight Studio

The most complete, extensible development environment with maximum code reuse and per-device optimization



## Worklight Server

Mobile middleware offering unified push notifications, version management, security and integration



## Worklight Runtime Components

Extensive libraries and client APIs that expose and interface with native device functionality and the Worklight Server

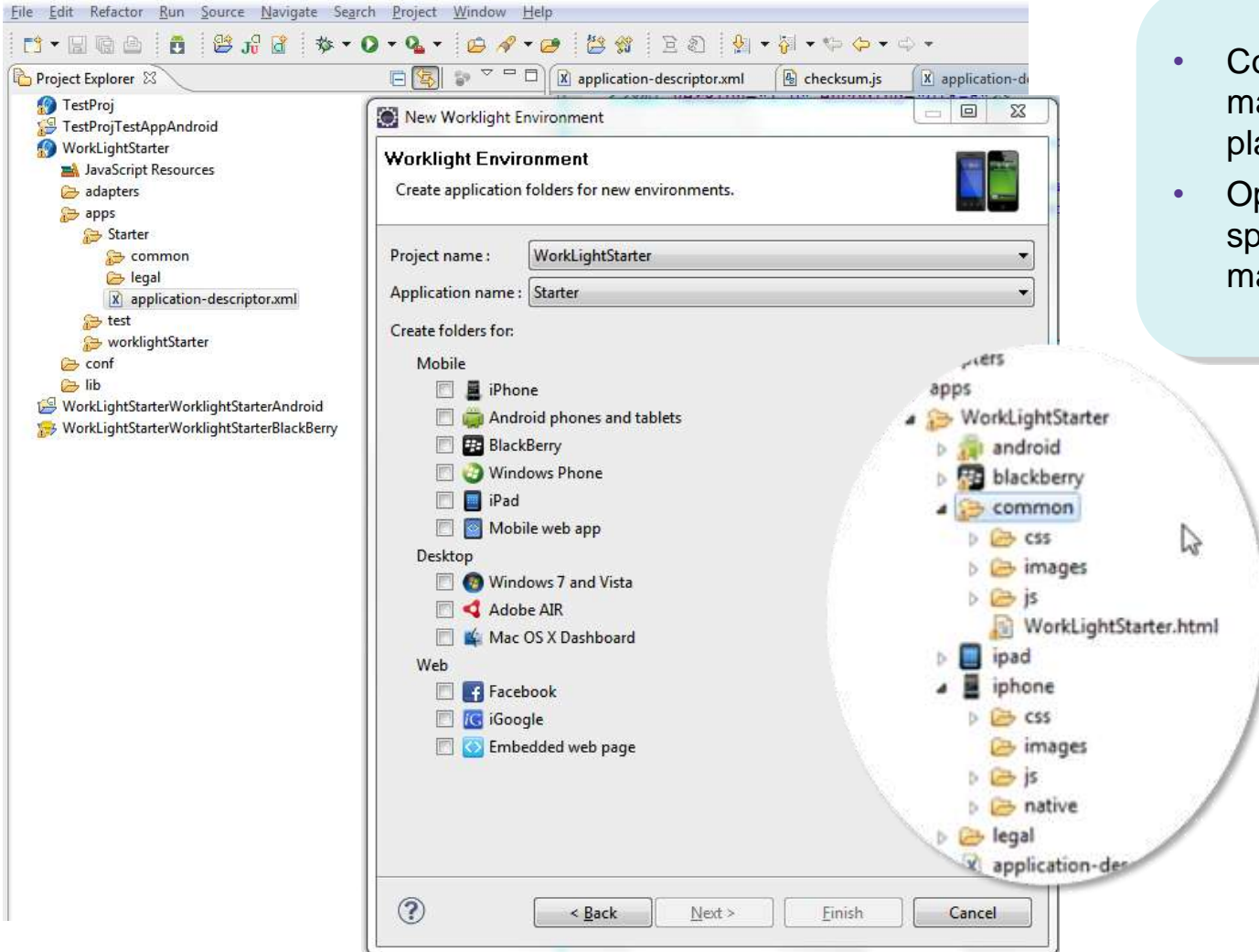


## Worklight Console

A web-based console for real-time analytics and control of your mobile apps and infrastructure



# Common web codebase facilitates reuse



- Common code is maintained in one place
- Optional environment-specific code is maintained separately

# WYSIWYG UI construction

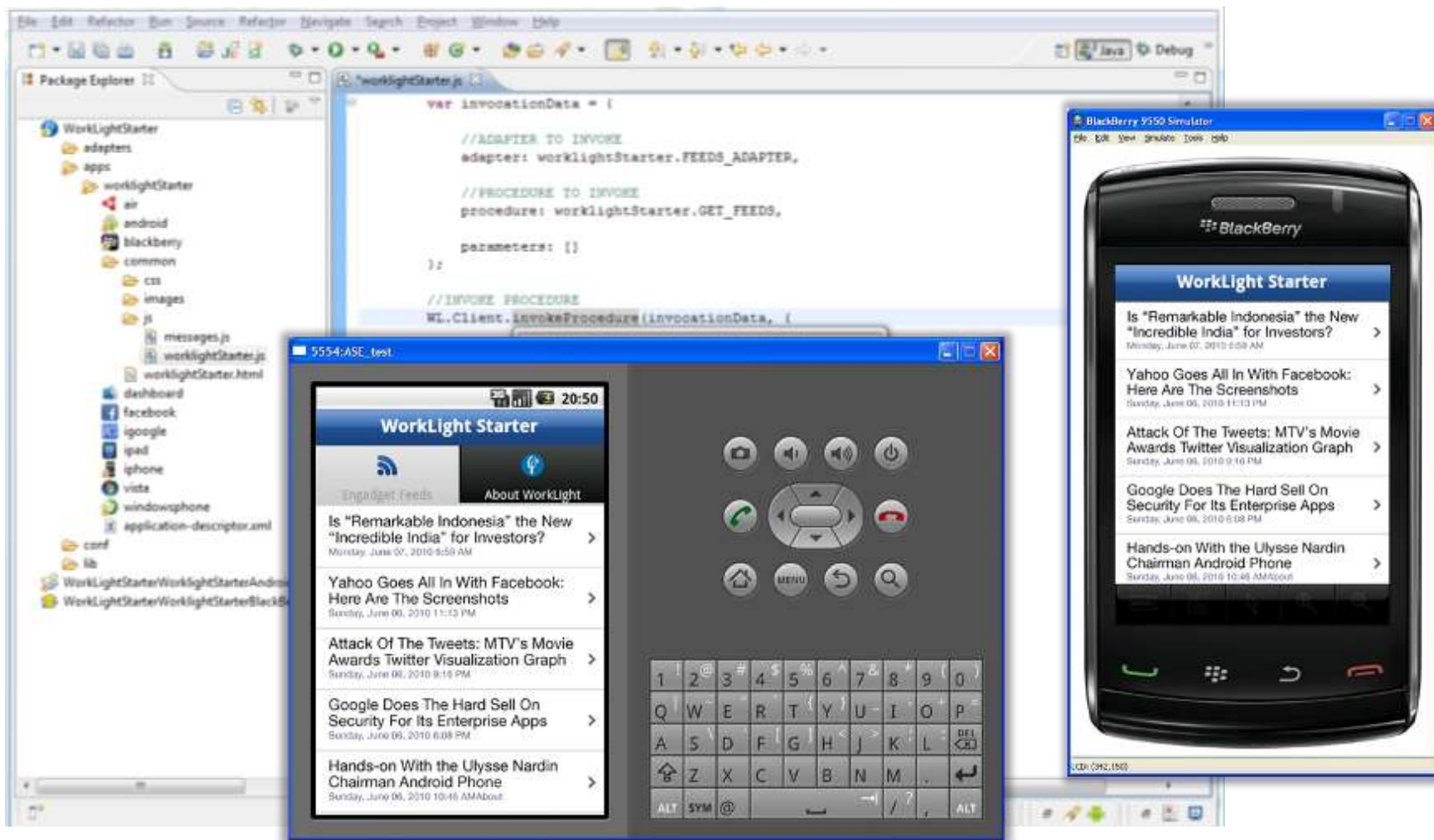
The screenshot displays the Eclipse IDE environment for developing a mobile application. The main Design view shows a mobile device simulator with a 'Demo' header and a 'Fruits' list containing 'Apples' and 'Oranges'. The Source view shows the underlying HTML and JavaScript code, including Dojo widget initialization and DOM structure. The Properties view on the right shows the configuration for the selected 'RoundRectList' widget, including its label and icon.

```

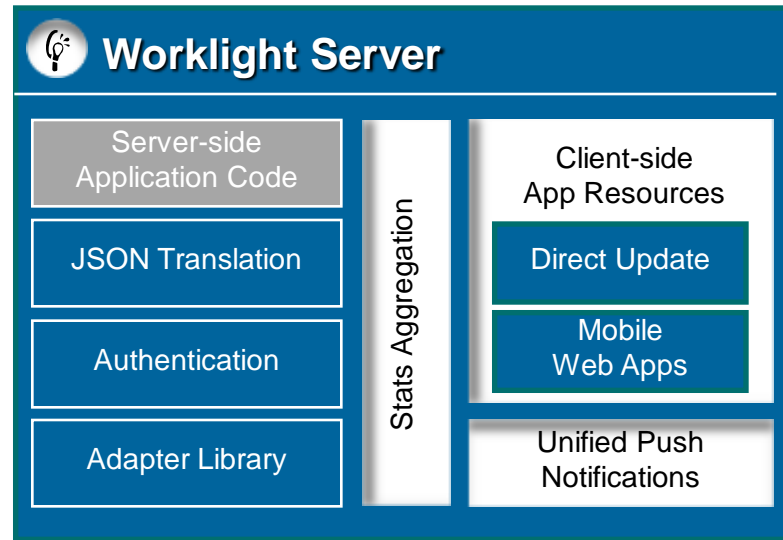
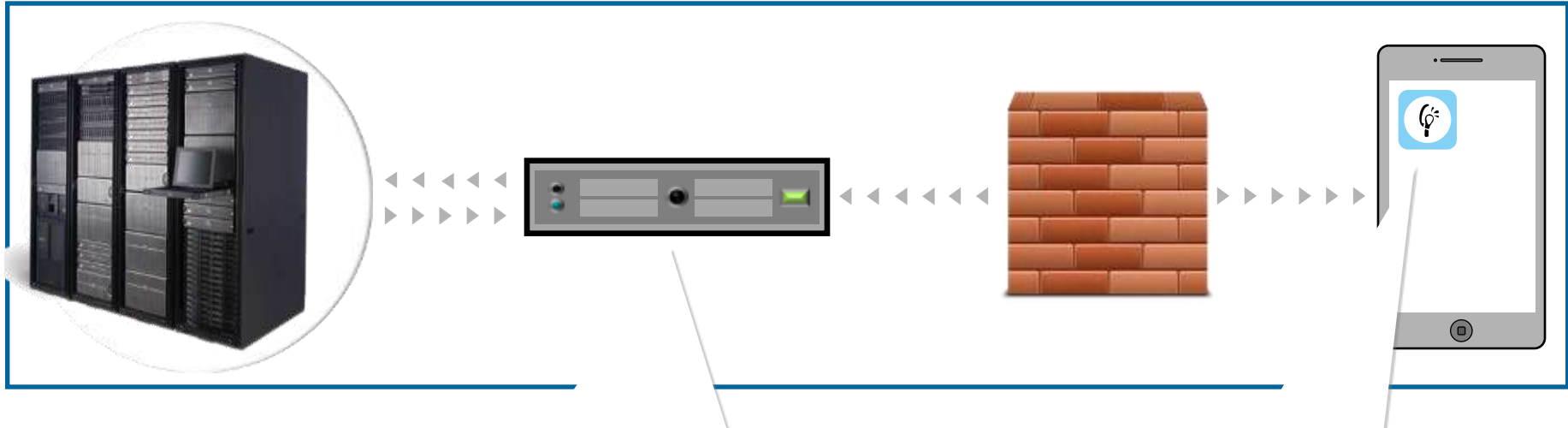
dojo.ready(function() {
});
});
</script>
<meta name="apple-mobile-web-app-capable" content="yes">
</head>
<body onload="NL.Client.init({})" id="content" style="display: none">
<div data-dojo-type="dojox.mobile.View" id="home"
  data-dojo-props="selected:true">
  <h1 data-dojo-type="dojox.mobile.Heading"
    data-dojo-props="label:'Demo'"></h1>
  <h2 data-dojo-type="dojox.mobile.EdgeToEdgeCategory">Fruits</h2>
  <div data-dojo-type="dojox.mobile.RoundRectList">
    <div data-dojo-type="dojox.mobile.ListItem"
      data-dojo-props="label:'Apples!' icon='images/apples.png'"></div>
    <div data-dojo-type="dojox.mobile.ListItem"
      data-dojo-props="label:'Oranges!' icon='images/oranges.png'"></div>
  </div>
</div>
<!-- application UI goes here -->
<script src="js/myApp1.js"></script>
<script src="js/messages.js"></script>
<script src="js/auth.js"></script>

```

# Incorporated native mobile SDKs



# Worklight runtime architecture



# Application distribution (for development and test)



A cross platform private mobile application store similar to public app stores but focused on the needs of an organization or a team

## Key capabilities:

- delivers distribution and management of mobile applications within a company / teams
- easy distribution of iOS and Android apps within a team
- provides versioning and updates
- centralizes rating and feedback information
- controls who can modify or install an application
- easy to install and simple to run



# Perceived app quality is influenced as much by design quality as it is by functional quality

## Design Quality

- User experience is critical for mobile applications
- Mobile applications typically require you to rethink how your customers interact with your business
- Line of business expects these applications to improve customer satisfaction, drive engagements, and loyalty

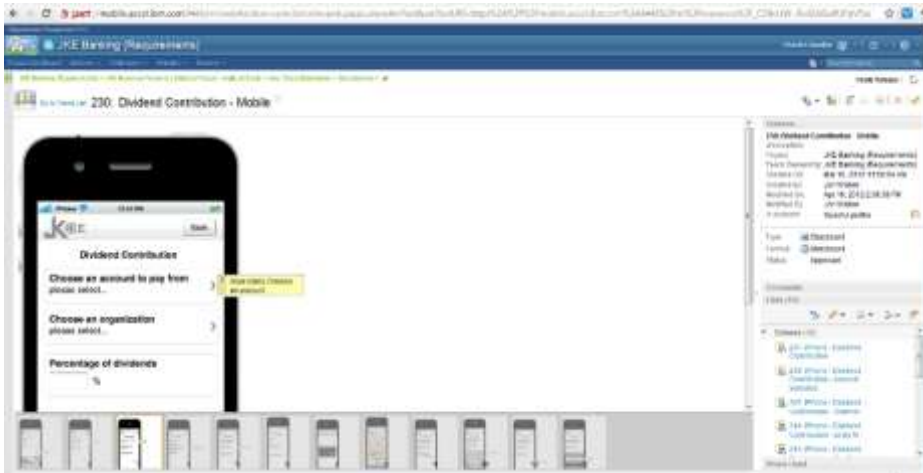
## Functional Quality

- Planning tests against all combinations of devices, OSes, carriers in fragmented market yields exponential number of test cases
- Testing is complicated by unconventional ways of interacting with mobile devices (camera, accelerometer, gestures, speech)
- Maintaining large library of devices in-house is cost prohibitive

**Goal:** deliver apps that align with business goals and are perceived as high quality – both from a user experience and functional point of view

# Ensuring high app quality – both design and functional

## Integrated requirements, planning, and quality management with Rational Requirements Composer and Rational Quality Manager



Mobile Device Cloud

### Client Challenge

Delivering apps that align with business goals and are perceived as high quality – both from a user experience and functional point of view.

### Key Capabilities

- End-to-end integration across the development lifecycle, including design and test phases
- UI sketching and storyboarding
- Design requirements management
- Collaborative reviews and approvals
- Test plan optimization to minimize number of tests required to be executed
- Integration with mobile “Device-cloud” testing services (e.g. DeviceAnywhere and Perfecto Mobile) and automated testing

## Lifecycle techniques to help optimize user experience

- **Improve collaboration** and communications between line-of-business stakeholders and development team
  - Ensure that development understands and will deliver an app that meets business objectives
  - Engage non-technical stakeholders
  - Improve collaboration to find a cheaper yet satisfying solution
  
- Put more focus on the **application design** and conceptualization phase
  - Iterate during the phase of the lifecycle when it is cheapest to make changes, not when the code is done and changes require drastic re-architecture
  
- **Use UI sketching, storyboarding, and business process diagrams**
  - Improves communications – “a picture is worth a thousand words”
  - Avoid over-elaboration with sketches; focus on high-level, big-picture issues
  - Ensure proper application flow and interactions with business process diagrams



# Storyboards depict the flow of the application

Requirements Management (RM)

JKE Banking (Requirements)

Project Dashboard Artifacts Collections Modules Reports

JKE Banking (Requirements) > JKE Business Recovery Matters Project > User Story Elaboration > Storyboards

No Tags Defined

Go to Frame List 362: Dividend Contribution – Mobile

1 The app displays the Dividend Contribution screen

2 The user selects Choose an account to pay from

Overview

362: Dividend Contribution – Mobile

Description:

Project: JKE Banking (Requirements)

Team Ownership: JKE Banking (Requirements)

Created On: Apr 21, 2012 11:14:17 AM

Created By: Bob

Modified On: Apr 21, 2012 12:13:19 PM

Modified By: Bob

Is Suspect: Select a profile

Type: Storyboard

Format: Storyboard

Status: Draft

Comments

Links (13)

Where Used

IBM

Unsupported browser

jazz

- ✓ Collaborate as a team using comments and annotations
- ✓ Get feedback from non-technical stakeholders

## How is mobile application testing different?

- The size of the device configuration matrix is vast and continues to expand
  - iOS, Android, BlackBerry, Windows Phone, Symbian, etc.
  - Multiple form factors and screen resolutions
  - There are literally thousands of potential device configurations from hundreds of manufacturers
  - New devices are being released at a rapid pace
    - In 2011 alone, there were over 300 new smart phones and tablets released
- New capabilities to test
  - Camera, GPS, direction, orientation, voice, etc.
- More network considerations
  - Multiple carriers
  - Variable throughput and latency
  - Disconnected use
  - Network switching



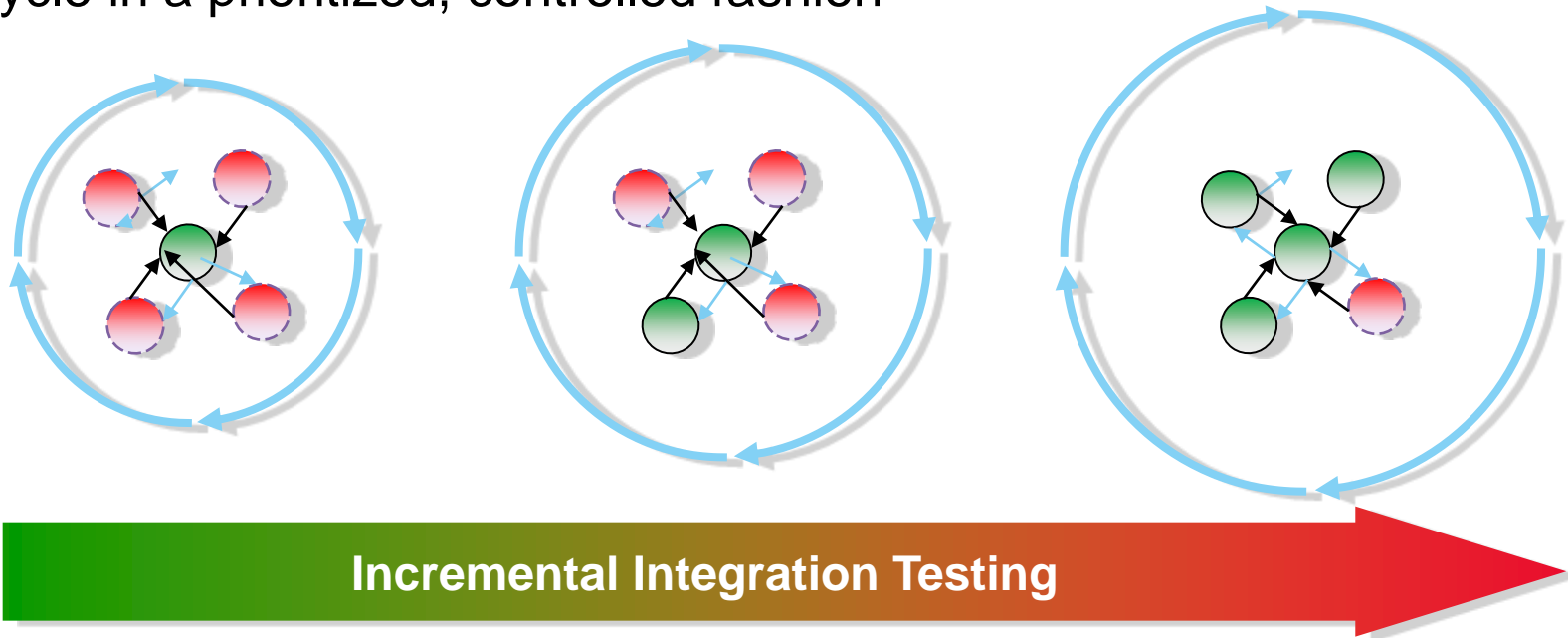
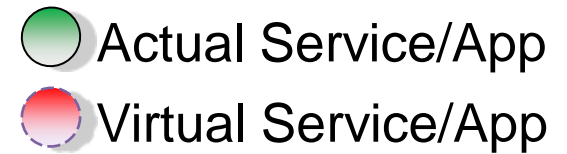
# Testing the end-to-end mobile solution



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

# Green Hat Virtualization Technology

- Test Virtualization is an enabler for continuous Integration Testing
- Services, applications, systems are introduced into the continuous integration cycle in a prioritized, controlled fashion



## Security Testing

- Static analysis of mobile app.
  - Confidentiality
  - Authentication
  - Availability
  - Integrity
  - Authorization
  - Non-Repudiation
- Manual penetration testing
  - Cross-Site Scripting
  - Denial of Service
  - SQL Injection
  - Buffer Overflow
- Search for vulnerabilities, especially in the web code and XSS, SQL and other common operations.

IBM Worklight and IBM Appscan offer unique features to plug security holes

# Aligning teams across the development lifecycle

## *Collaborative Lifecycle Management, Rational IDEs, and Worklight*



Construct, debug, and test mobile UIs



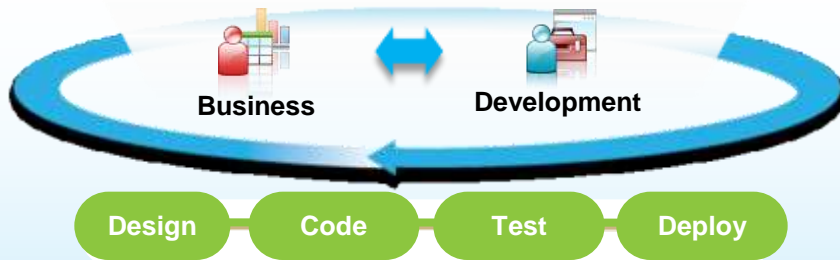
Refactor and extend existing logic as mobile-consumable services

### Client Challenge

Mobile apps are typically multi-tiered and require collaboration between multiple teams, including teams responsible for design, development, test, and deployment

### Key Capabilities

- Common, integrated tool set across all phases of development and components of the mobile solution
- Integration with Worklight Studio to ensure developers have access to plans, tasks, builds, and code from within their development IDE
- Traceability across the entire mobile application development lifecycle – all teams are aware of changes (for example, a changing requirement)



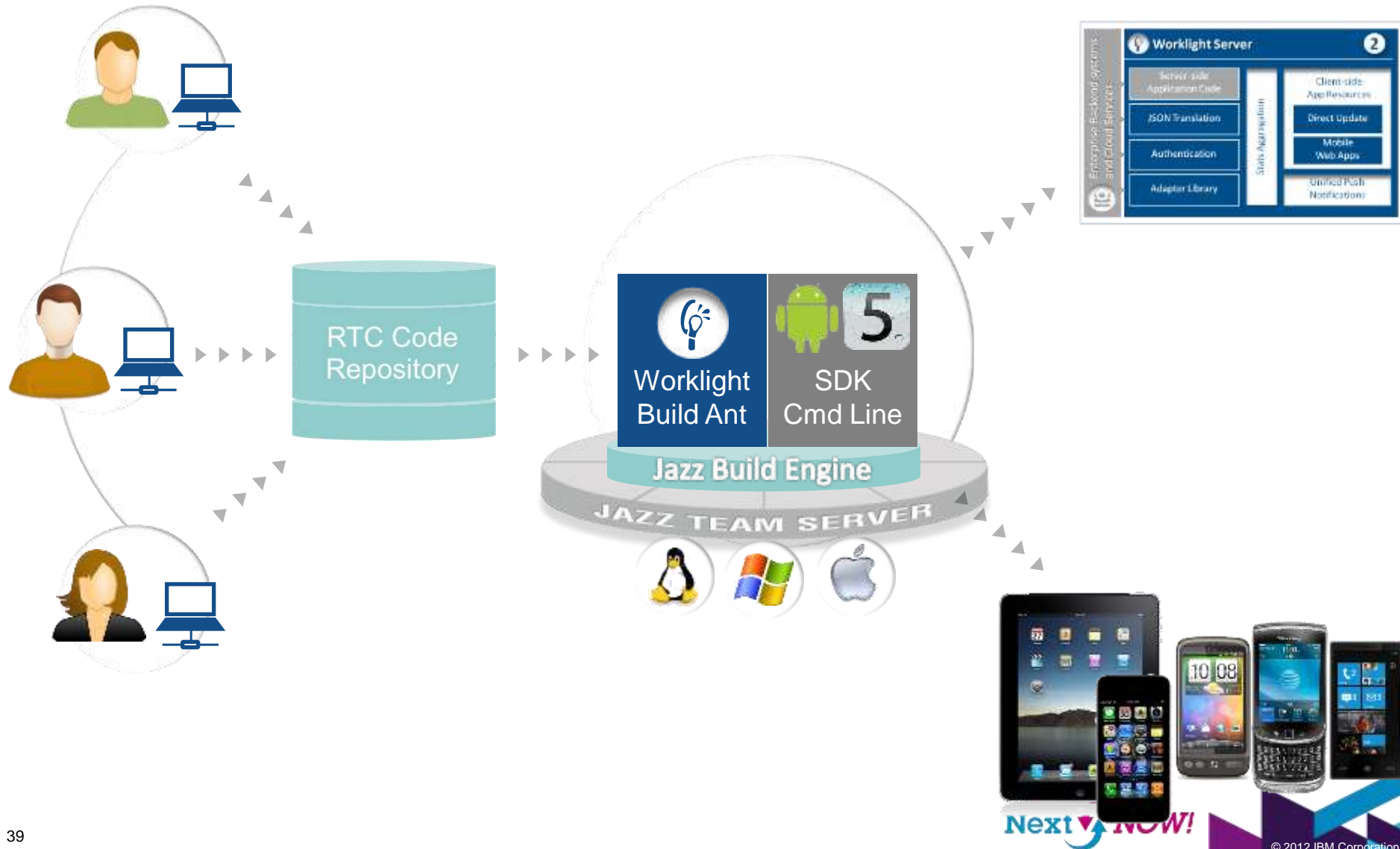
*Traceability across the entire development lifecycle*

Open Lifecycle Integration Platform



*End-to-end Lifecycle Management for Mobile Application Development*

# Rational Team Concert Integration





# Accelerating build and deployment time

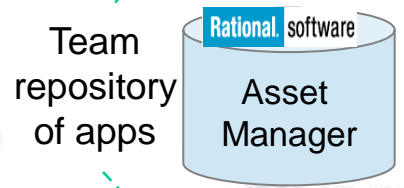
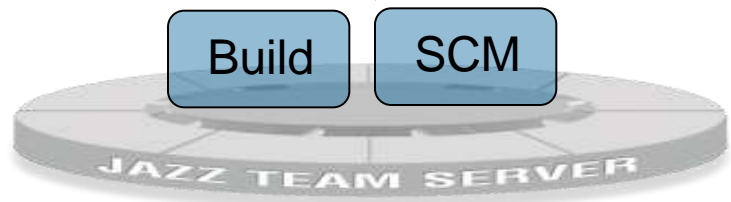
## Orchestrating native mobile app builds with Rational Team Concert



Mobile devices & emulators



*RTC build engine and Worklight mobile build utility provide a controlled build environment for mobile apps – both native and hybrid*

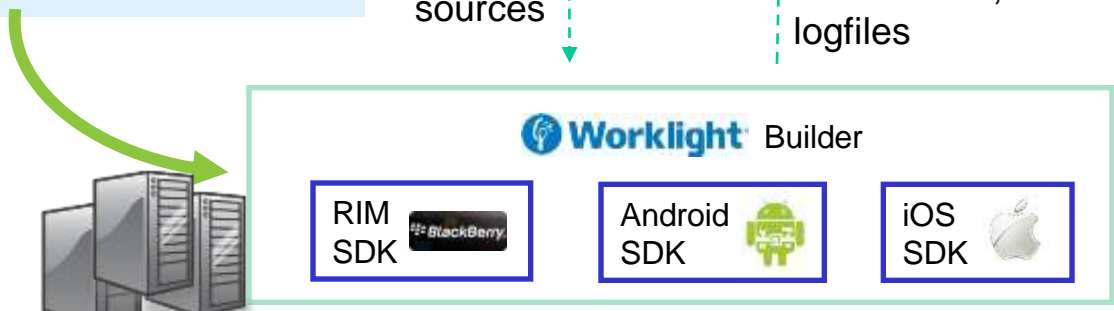


sources

executables, logfiles



App stores





## As a definitive library, RAM enables you to:



### Search

You can find assets through the advanced search, keyword search, filters, user-defined categories, and tags.



### Publish and consume

Publishing and consuming assets has never been easier. Access assets using your choice of Web client, Eclipse client, or use the friendly API interface for programmatic access



### Collaborate

You can rate an asset, raise a discussion, report a problem, and make requests. Collaborate with other project members through discussions. Receive notifications about asset changes and availability of new or updated assets through email subscriptions and RSS feeds



### Apply Governance

Governance features give all stakeholders input into the decision making for an asset. With lifecycle workflows, reviews, approvals, policies, and audit trail you can apply the right level of governance to meet your needs



### See traceability, statistics and reporting

Track asset usage, asset feedback, and asset quality metrics for reporting purposes. Assess how changes in activities affect your software development assets.

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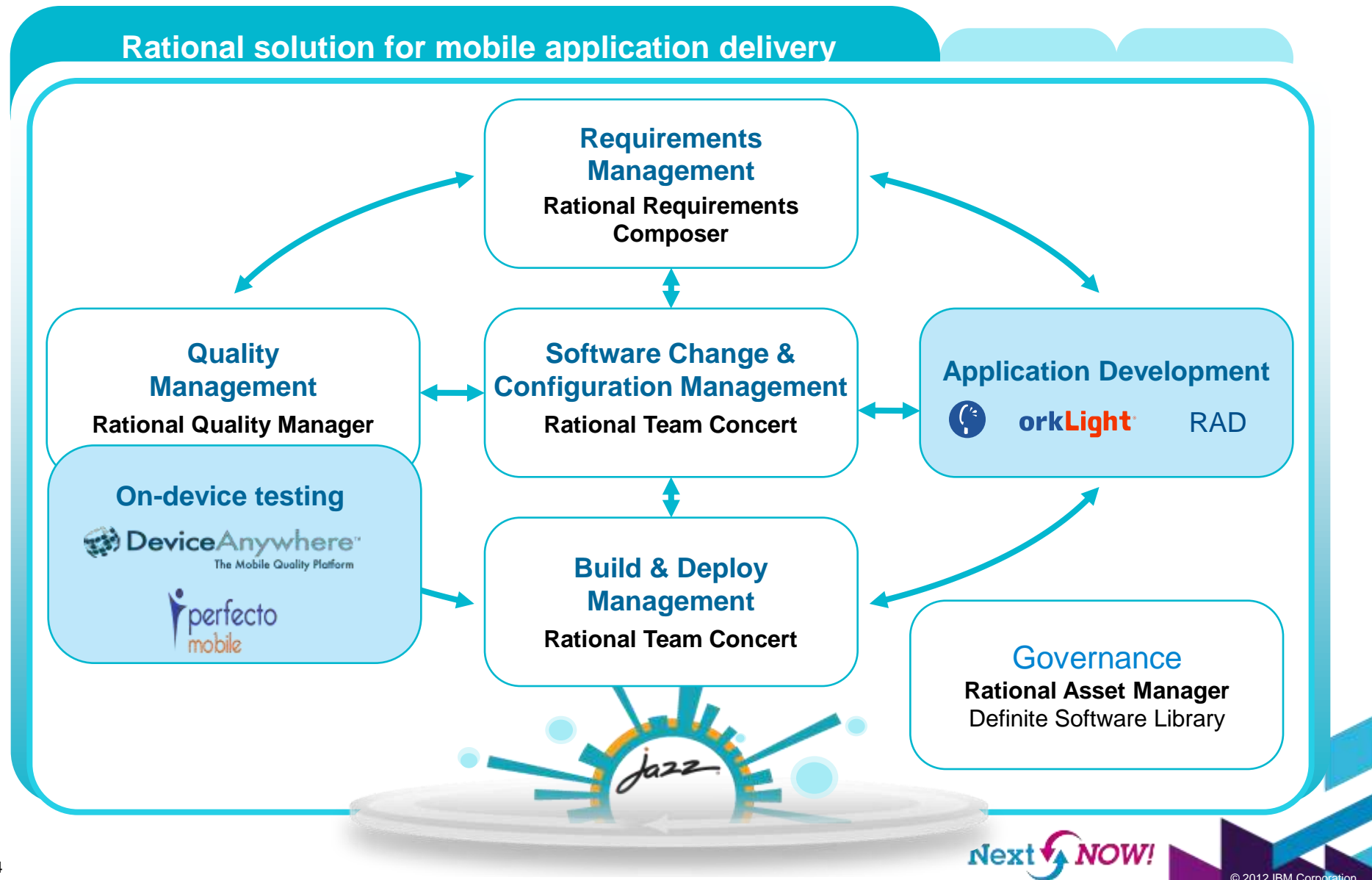


## IBM delivers a comprehensive end-to-end mobile solution for the enterprise

- Code development is just one aspect of the mobile application development lifecycle
- Rational has a comprehensive set of capabilities that enable development teams to efficiently design, develop, test and deliver complex, multi-tier enterprise mobile applications
- IBM Worklight complements Rational's capabilities to help you develop mobile apps that:
  - Run on multiple mobile devices
  - Deliver high quality user experience
  - Connect to enterprise back-end applications and information systems
  - Fulfills fast time-to-market requirements and can be rapidly updated with new releases



# Rational mobile solution architecture



## Next Steps



- Learn more at:

[www.ibm.com/software/rational/mobile/](http://www.ibm.com/software/rational/mobile/)

- Access white papers and webcasts
- Get product and services information

- Evaluate for yourself:

- [Download IBM Worklight Developer Edition](#)

[Try Rational Collaborative Lifecycle Management on IBM SmartCloud Enterprise](#)

- Talk with your IBM representative or IBM Business Partner to find the right next step for you

# QUESTIONS

[www.ibm.com/software/rational](http://www.ibm.com/software/rational)





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