Chaos to DevOps
Re-architecting Maintenance for Continuous Delivery
Bianca Jiang, Senior Software Engineer
Ginny C Ghezzo, Program Director

March 18, 2015
O'Reilly Software Architecture Conference
What we do - Collaborative Lifecycle Management

Our tools help you plan, design, develop, and deliver better software and systems.

Agile Development
- Task tracking
- Source control
- Agile planning

Rational Team Concert

Lifecycle management for the whole team

Our products combine seamlessly to improve collaboration across the lifecycle and can integrate with a wide range of industry tools through the Jazz Platform.
- Rational Collaborative Lifecycle Management
- Rational Systems and Software Engineering
- DevOps

Check out all the Jazz products >

Requirements
- Capture business needs
- Manage and reuse requirements

Rational DOORS Next Generation

Quality Testing
- Get products ship-ready
- Plan, execute, and report on testing

Rational Quality Manager

Design
- Collaborate on architecture and design
- Manage design change

Rational Software Architect
Rational Rhapsody
What is DevOps

“The agile, "devops" culture will move from the software development lab to the front office. That will be required of sales and marketing, customer service, HR, product development… they (customers) will expect you to behave differently. Rapid response, iterative, fast with quality. It is a rare front office today that is ready for this.”
– Ginni Rometty, CEO IBM
CLM Improvements through DevOps

<table>
<thead>
<tr>
<th>Lifecycle Measurements</th>
<th>2008</th>
<th>2010</th>
<th>2012 – 2014</th>
<th>Total Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Initiation</td>
<td>30 days</td>
<td>10 days</td>
<td>2 days</td>
<td>28 days</td>
</tr>
<tr>
<td>Groomed Backlog</td>
<td>90 days</td>
<td>45 days</td>
<td>On-going</td>
<td>89 days</td>
</tr>
<tr>
<td>Overall Time To Development</td>
<td>120 days</td>
<td>55 days</td>
<td>3 days</td>
<td>117 days</td>
</tr>
<tr>
<td>Composite Build Time</td>
<td>36 hours</td>
<td>12 hours</td>
<td>5 hours</td>
<td>700 %</td>
</tr>
<tr>
<td>BVT Availability</td>
<td>N / A</td>
<td>18 hours</td>
<td>&lt; 1 hour</td>
<td>17 hours</td>
</tr>
<tr>
<td>Sprint Test Time</td>
<td>5 days</td>
<td>2 days</td>
<td>14 hours</td>
<td>4 days</td>
</tr>
<tr>
<td>Total Deployment Time</td>
<td>2 days</td>
<td>8 hours</td>
<td>4 hours -&gt; 20 minutes</td>
<td>2 days</td>
</tr>
<tr>
<td>Overall Time To Production</td>
<td>9 days</td>
<td>3 days</td>
<td>2 days</td>
<td>7 days</td>
</tr>
<tr>
<td>Time Between Releases</td>
<td>12 Months</td>
<td>12 Months</td>
<td>3 Months</td>
<td>9 Months</td>
</tr>
<tr>
<td>Innovation / Maintenance</td>
<td>58% / 42%</td>
<td>64% / 36%</td>
<td>78% / 22%</td>
<td>+20% / -20%</td>
</tr>
</tbody>
</table>

Continuous Delivery exposed some challenges in our implementation of the IBM Software Support LifeCycle Policy.
Maintenance Solution in a DevOps Journey

Challenge: How do we deliver high quality, timely resolution to defects that meets IBM’s Support Lifecycle agreement

1. Limited content through governance
2. Detailed description of content
3. Consistent for all Customers and Cumulative
4. Clarity on Upgrade Path
5. In-place installation
6. Easy Rollback
7. Right-sized
Challenges exposed by CD
Challenges exposed by CD

100+ product releases in Support Lifecycle in 2014
Challenges exposed by CD

100+ product releases in Support Lifecycle in 2014

Half a million downloads from jazz.net
Traditional Approaches: Hot Fix & Full Release
Cost of Traditional Maintenance - One Defect

Joe's 4.0.3 workspace for Customer A

Mark's 4.0.3 workspace for Customer B

Lisa's 3.0.1.6 workspace for Customer B

3.0.1.6 Maintenance Stream

4.0.6 Maintenance Stream

Customer A

Customer B

All

Hot Fix

Hot Fix

Hot Fix

Full Releases

Full Releases

1

2

3

4

5
“The Matrix of Chaos”
Mission

Quality, predictable and timely maintenance that is a no-brainer to deploy and manage for customers, with lower cost.
Mission

Quality, predictable and timely maintenance that is a no-brainer to deploy and manage for customers, with lower cost.

L3 Subtitle:
Make customers happier, faster, with less resources.
What is required of CLM Maintenance?

Scope:
- Corrective + Proactive Fixes
- Changes on Maintenance Stream after GA

Goal:
- Deliver the “delta”: timely, frequently, and iteratively with high quality
- Deploy the “delta”: easily, quickly, and continuously with low risk
Traditional Installer

1. directly modify existing installed bits
2. can not rollback
3. big footprint
4. can’t do *iterative update*
The Deploy & Build problem

Traditional Installer
1. directly modify existing installed bits
2. can not rollback
3. big footprint
4. can’t do *iterative update*

Patch Service
Drop in one file to patch the entire server.
1. does not modify existing bits, run-time
2. fast, easy install, easy rollback
3. very lean
4. *iterative update* possible
The Deploy & Build problem

Traditional Installer
1. directly modify existing installed bits
2. can not rollback
3. big footprint
4. can’t do *iterative update*

Patch Service
Drop in one file to patch the entire server.
1. does not modify existing bits, run-time
2. fast, easy install, easy rollback
3. very lean
4. *iterative update* possible

New Approach

Make it Reusable!
The Deploy & Build problem

1. Maintenance Stream
   - GA
   - WI 1
   - WI 2
   - WI 3
   - WI 4
   - WI 5
   - WI 6

Patch

Generate

?
The Deploy & Build problem
The Deploy & Build problem

1. GA
2. WI 1
3. WI 2
4. WI 3
5. WI 4
6. WI 5
7. WI 6

Maintenance Stream

Patch

Build calm.501.maintenance CALM501M-I20141028-2031

Artifacts:
- Patch Service
  - reieng.patch.prepopulate.file
  - readme.txt
  - publish.txt
  - missingfile.txt
- CALM_server_patch_5.0.1.0-CALM501M-I20141028-2031.zip
- CALM_client_patch_5.0.1.0-CALM501M-I20141028-2031.zip
- changeFile.log
- Installation Manager

Automation!

Generate
The Deploy & Build problem

1. Generation & automation of artifact downloads

2. Maintenance Stream

3. Patch

Artifact Downloads

- Patch Service
- readme.txt
- publish.txt
- missingfile.txt
- CLM_server_patch_5.0.1.0-CALM501M-20141028-2031.zip
- CLM_client_patch_5.0.1.0-CALM501M-20141028-2031.zip
- changefile.log
- Installation Manager

Description

- Patch Prepopulate File
- Patch Readme File
- Publish output file
- Missing File List
- CALM Patch Zip
- Client Jar Zip File
- Change File Log
Mission

Quality\(^3\), predictable and timely\(^4\) maintenance that is a no-brainer to deploy\(^1\) and manage\(^2\) for customers, with lower cost.
Easy to manage: Traceability

Build calm.501.maintenance CALM501M-120141028-2031

Artifact Downloads

- Patch Service
  - releng.patch.prepopulate.file
  - readme.txt
  - publish.txt
  - missingfile.txt
  - CLM_server_patch_5.0.10-CALM501M-120141028-2031.zip
  - CLM_client_patch_5.0.10-CALM501M-120141028-2031.zip

Description

- Patch Prepopulate File
- Patch Readme File
- Publish output file
- Missing File List
- CALM Patch Zip File
- Client Jar Zip File

Generate

Manage

Automated!
Easy to manage: Traceability
Easy to manage: Documentation

Maintenance Stream

Maintenance Item 349289

Summary: WebUI - infinite calls to PlanRestService

Type: Maintenance Item
Backport From:
- 339559: WebUI - infinite calls to PlanRestService

Fixed In Release: 6.0 Sprint 10
APAR ID: PBO79
Patch Service Compliant: Yes - can be applied by patch server
Non-patch Install Instruction:

readme.txt

Interim fix CLM_802_18124461
This interim fix is only valid for the CLM 5.0.2.0 release.
After this interim fix, upgrade to CLM 6.0 or later.

CONTENTS OF THE INTERIM FIX

1. Server patch file: CLM_server_patch_5.0.2.0-CALM502M-T20
2. Rational Team Concert Eclipse client update site: Update:
3. readme.txt (this file)

1. SERVER PATCH
To install the server patch:
   a. Stop the CLM server.
   b. Copy the server patch file CLM_server_patch_5.0.2.0-CALM/ the /server/server directory.
   d. Start the server.

This server patch contains fixes for the following defects:

--- Product BRF
Fixed in release 6.0:
[APAR P128526] [WPE in ManagedFloatingLicenseClient$LeaseController https://jazz.net/jazz/resource/itemName/com.ibm.team.workitem/ (APAR P128526)] [Diagnostics Oracle JDBC Driver version check: https://jazz.net/jazz/resource/itemName/com.ibm.team.workitem]
Deploy, Build and Documentation

1. GA
2. WI 1
3. WI 2
4. WI 3
5. WI 4
6. WI 5
7. WI 6

Build calm.501.maintenance CALM501M-20141028-2031

Artifact Downloads

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLM_server_patch_5.0.10-CALM501M-20141028-2031.zip</td>
<td>CALM Patch Zip List</td>
</tr>
<tr>
<td>CLM_client_patch_5.0.10-CALM501M-20141028-2031.zip</td>
<td>Client Jar Zip File</td>
</tr>
</tbody>
</table>

readme.txt

```
Interim fix CLM_5G1_vFix003.zip
This interim fix is only valid for the CLM 5.0.1.0 release. After this interim fix, upgrade to CLM 5.0.2 or later.

CONTENTS OF THE INTERIM FIX
...
1. SERVER PATCH
To install the server patch:
...

This server patch contains fixes for the following defects:
-- Product RJE
Fixed in release 5.0.2:
[APAR P125496] [Add back flag for HTTP support] [https://jazz.net/jazz/resource/itemName/com.ibm.team.worklit]
[APAR P128436] [Fix regression in report performance] [https://jazz.net/jazz/resource/itemName/com.ibm.team.worklit]
[APAR P128462] [Fix report caching causing errors in the loco] [https://jazz.net/jazz/resource/itemName/com.ibm.team.worklit]
```
Deploy, Build and Documentation

Build calm_5010

Artifact Details

Patch Service
- relogin
- readme
- publisher
- missingFile
- CLM_serverPatch
- CLM_client_patch_5010_CALM
- changeFile.log
- Installation Manager

Overview | Activities | Downloads | Logs | External Links | Properties

29
Deploy, Build and Documentation
Mission

Quality, predictable and timely maintenance that is a no-brainer to deploy and manage for customers, with lower cost.
Quality: Continuous Testing
Quality: Continuous Testing

Maintenance Stream

Patch

Build
Unit Test

Pipeline
Acceptance Test
Scenario Test
Integration Test
Patch Content
Quality: Continuous Testing
Quality: Continuous Testing

Maintainance Stream

Build
- Unit Test

Patch
- Auto Generate
- Auto Deploy

Pipeline
- Acceptance Test
- Scenario Test
- Integration Test
- Patch Content

L3 Dev
- Auto Notify
- Analyze Failure & Fix

GA
- WI 1
- WI 2
- WI 3
- WI 4
- WI 5
- WI 6
Quality: Continuous Testing
Quality: Continuous Testing

Maintenance Stream

Build

- Unit Test

Patch

- Generate
- Deploy

Pipeline

- Acceptance Test
- Scenario Test
- Integration Test
- Patch Content

L3 Dev

- Analyze
- Failure & Fix

Change
Quality: Continuous Testing
Quality: Continuous Testing
Quality: Continuous Testing

Quality: Continuous Testing
Quality: Continuous Testing
Quality: Continuous Testing
Mission

Quality, predictable and timely maintenance that is a no-brainer to deploy and manage for customers, with lower cost.
Process: Development & Delivery

- 1 Code Review, 1 Team Lead Approval
- 1 Code Review, 2 Team Lead Approvals
- 1 Code Review, 2 Team Lead Approvals, 1 PMC Approval
Maintenance via iFix

- Cumulative
- Continuous deploy
- Predictable
- Traceability
- Upgrade Path
- Consistent
- Customer Feedback
- Agile
Mission

Quality, predictable and timely maintenance that is a no-brainer to deploy and manage for customers, with lower cost.
# CLM Maintenance Improvements

<table>
<thead>
<tr>
<th>Lifecycle Measurements</th>
<th>2013</th>
<th>2014</th>
<th>Total Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Resolution</td>
<td>4 months</td>
<td>4 weeks</td>
<td>12 weeks</td>
</tr>
<tr>
<td>Security Issues Addressed</td>
<td>4 months</td>
<td>4 weeks</td>
<td>12 weeks</td>
</tr>
<tr>
<td>Predictability for Customers</td>
<td>Unannounced</td>
<td>Monthly Cadence</td>
<td>Customer Satisfaction</td>
</tr>
<tr>
<td>Adoption for Customers</td>
<td>Hours to Days</td>
<td>10 minutes</td>
<td>At least 30% less down time.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>More for most customers</td>
</tr>
<tr>
<td>Variance in the Field</td>
<td>720+ hotfixes</td>
<td>1 iFix per release</td>
<td>Clarity for Support</td>
</tr>
<tr>
<td>Innovation / Maintenance</td>
<td>58% / 42%</td>
<td>64% / 36%</td>
<td>+20% / -20%</td>
</tr>
</tbody>
</table>

“*The process to get the iFixes for CLM works perfect. I’m up and running with V.5.0.1 ifix004 within 30min after announcement on first server. A big compliment to IBM Rational for this ifix concept and the implementation of it. It’s a huge improvement for us as customers and it gives a lot of trust into the product.*”

@BiancaJiang  @GinnyGhezzo  #oreillysacon  #devops
Take away: DevOps Architecture

1. Smaller improvement, faster feedback loop
2. Short term investment, long term gain
3. Make it reusable, make it repeatable
4. [leadership] More on the why, less on the how
Resources

- Jazz.net - https://jazz.net/
- Inspirational Leadership TED talk - http://www.ted.com/talks/simon_sinek_how_great_leaders_inspire_action
Disclaimer

Copyright © 2015 by International Business Machines Corporation (IBM). Information in these presentations (including information relating to products that have not yet been announced by IBM) has been reviewed for accuracy as of the date of initial publication and could include unintentional technical or typographical errors. IBM shall have no responsibility to update this information. THIS document is distributed "AS IS" without any warranty, either express or implied. In no event shall IBM be liable for any damage arising from the use of this information, including but not limited to, loss of data, business interruption, loss of profit or loss of opportunity. IBM products and services are warranted according to the terms and conditions of the agreements under which they are provided.

Any statements regarding IBM's future direction, intent or product plans are subject to change or withdrawal without notice.

Performance data contained herein was generally obtained in a controlled, isolated environments. Customer examples are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual performance, cost, savings or other results in other operating environments may vary.

References in this document to IBM products, programs, or services does not imply that IBM intends to make such products, programs or services available in all countries in which IBM operates or does business.