

Software Development Practices

Jeffrey Liu 2014/11/05

System Grid Design Pattern
SWG IM 2004 **NTU** Software Development
GCG **IBM** NKO Semanctic Web **Linux** Java
Mobility **Jeffrey Liu** Kernel
C/C++
Ad Tech SIP Appliance RADIUS
Video WESM **DataPower** DIAMETER
Conference B2B SQA WebGUI
SIP

Critical factors of Software Delivery

Project
Management

Team Collaboration

Continuous
Integration

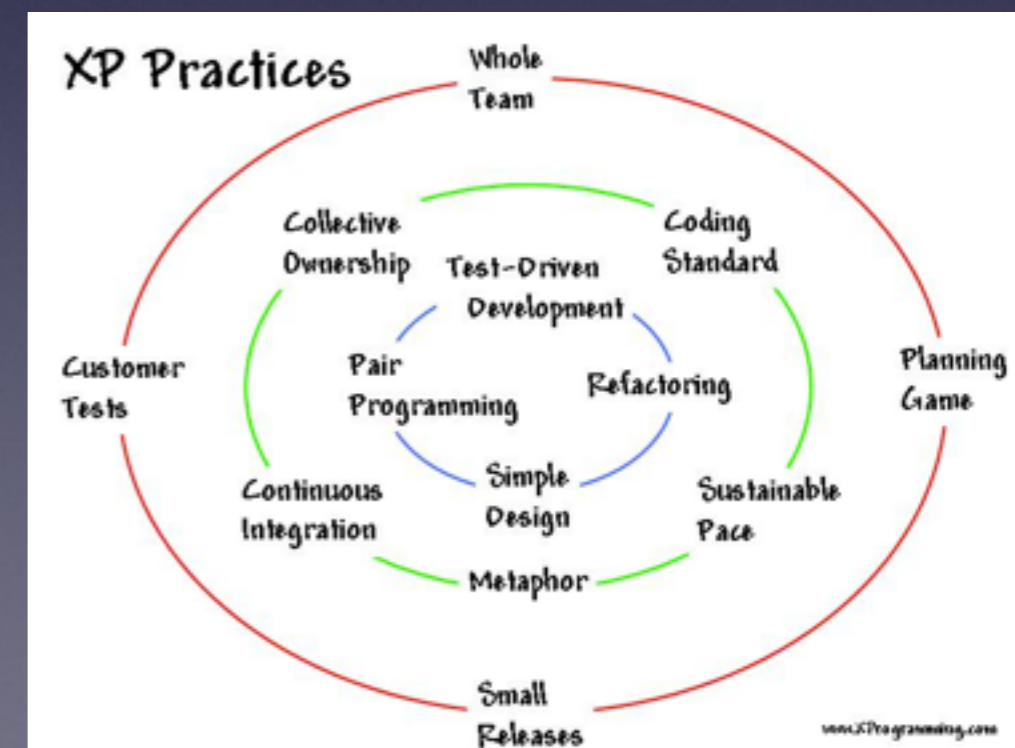
Issue Tracking

Agenda

- Part 1 : Agile Development Process
- Part 2 : Team Collaboration
- Part 3 : Continuous Integration
- Part 4 : IBM Experience

What I won't cover in this session

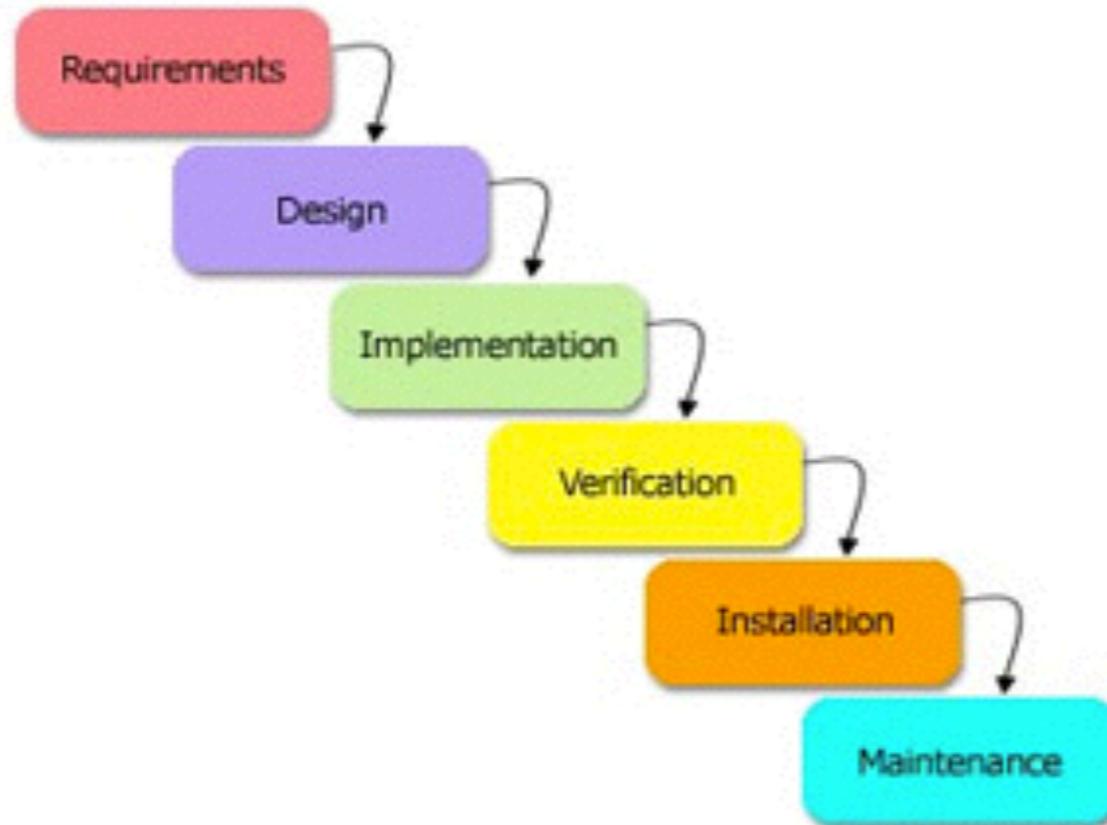
- Pair Programming
- Test-Driven Development
- Refactoring
- ...



Agile Development Process

What is Agile ?

What is the problem of waterfall development process



- Risk
- Cost
- **Satisfaction**

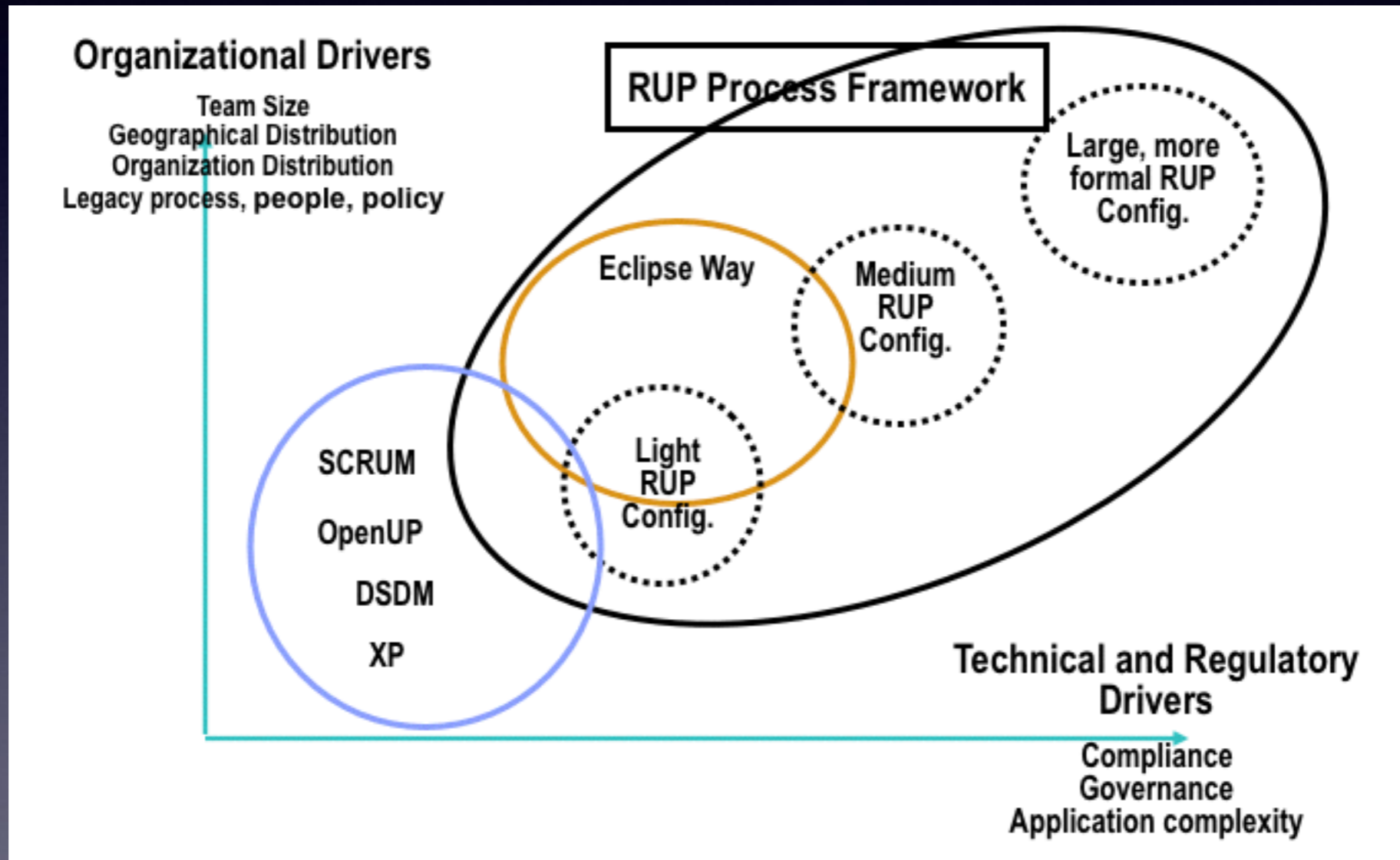
When to use waterfall development process ?

- When requirement and schedule are well-defined
- Quality is more much important than cost
- The uncertainty of technology and external impacts are low

Agile in a Nutshell

- Not just a set of methodologies
- Not just a set of practices
- It feels like a set of goals, principles, or values
- Do what you need to do to leverage instead of resist changes
- Reduce Risk
- Communication, Feedback, Simplicity, Teamwork

Difference Dev Process for different needs



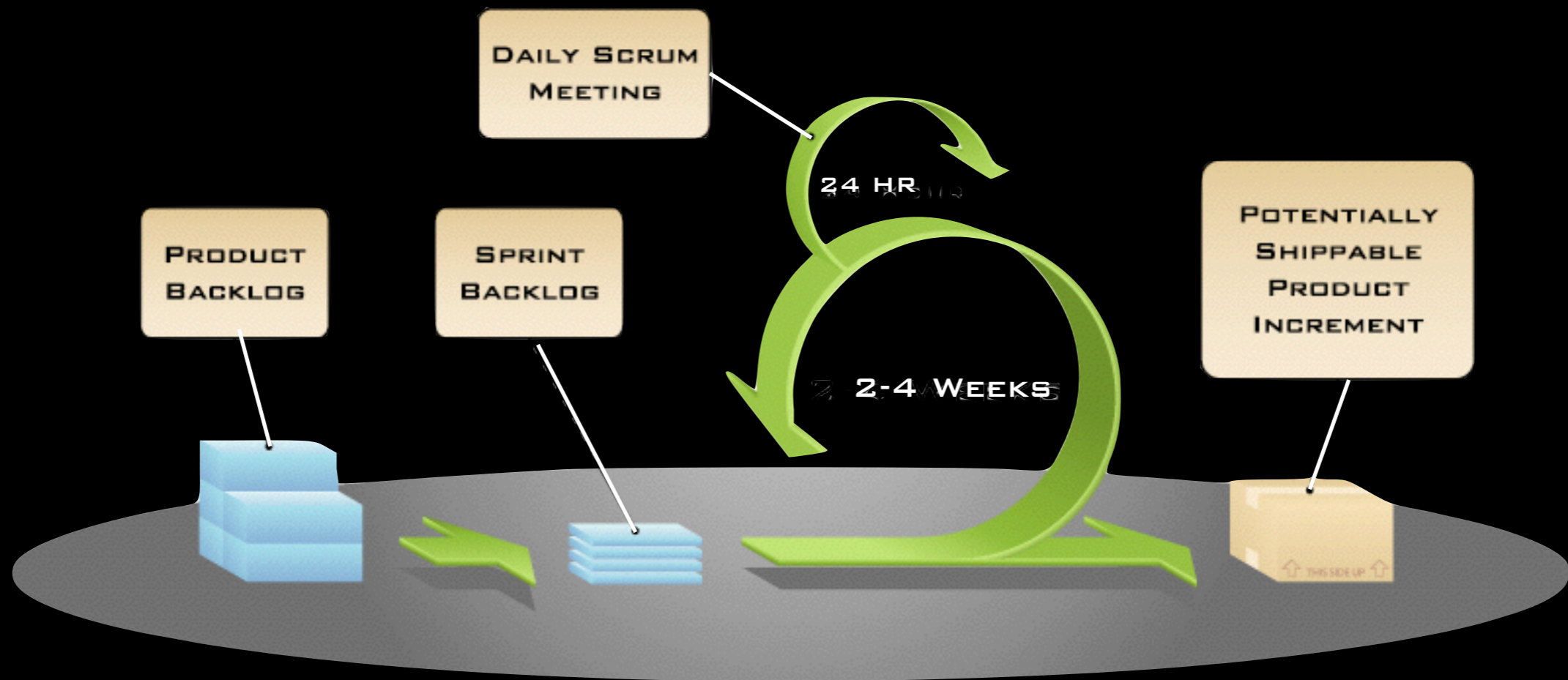
Agile Development with Scrum

What is scrum ?



Fig. 6: The Scrum

The scrum is a pushing contest between two teams of eight players. The ball is fed in from the side by the scrumhalf and the team that drives their opponent backwards and hooks the ball out past the last foot of their own scrum wins possession. A scrum down is used to restart play after certain infractions such as a “knock on” or a forward pass.



ROLES

PRODUCT OWNER
 SCRUM MASTER
 TEAM MEMBER

CEREMONIES

SPRINT PLANNING
 DAILY SCRUM
 SCRUM REVIEW
 SCRUM RETROSPECTIVE

ARTIFACTS

PRODUCT BACKLOG
 SPRINT BACKLOG
 POTENTIALLY SHIPPABLE PRODUCT INCREMENT

Iteration Exit ?

- Exit Check List
- Done, Done, Done
- Stakeholder Demo/Review
- Time Boxed Iteration

What if we can't finish all the content planned for this iteration ?

Team Collaboration

Version Control

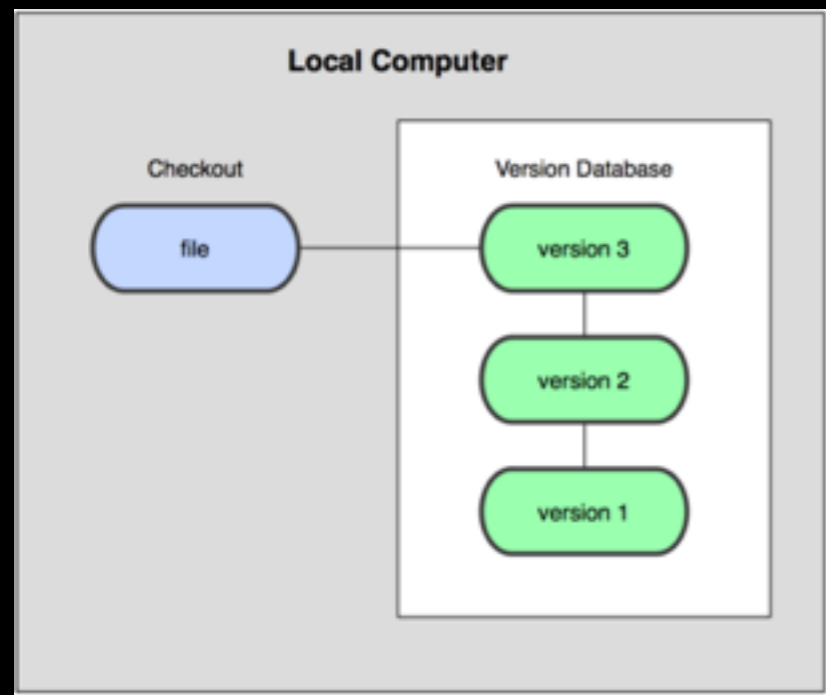
- Why Version Control ?
 - Backup and Restore
 - Source code sharing and synchronization
 - Merges
 - Branches

It is the very first thing you need to start a project

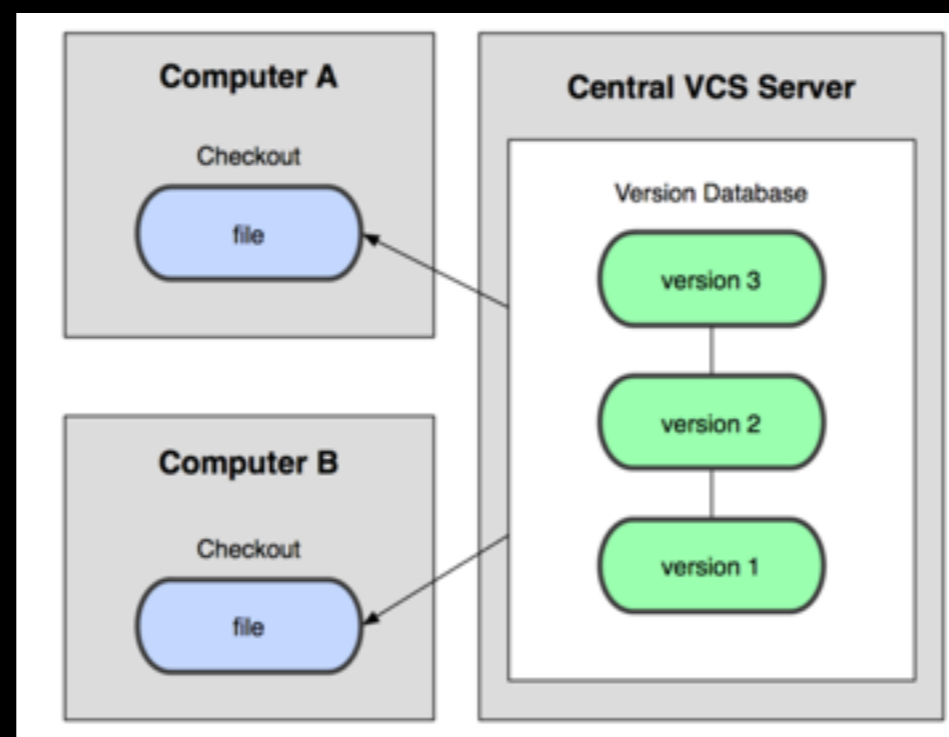
Version Control

- Tools available
 - CVS
 - Subversion
 - GIT
 - Mercurial
 - ClearCase
 - ...

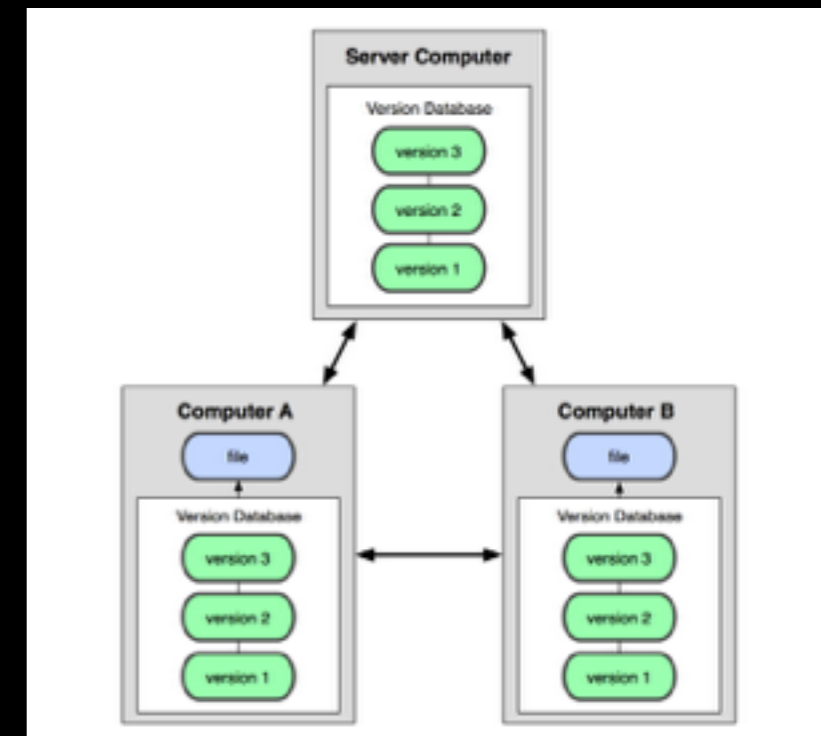
Different Topologies



Local

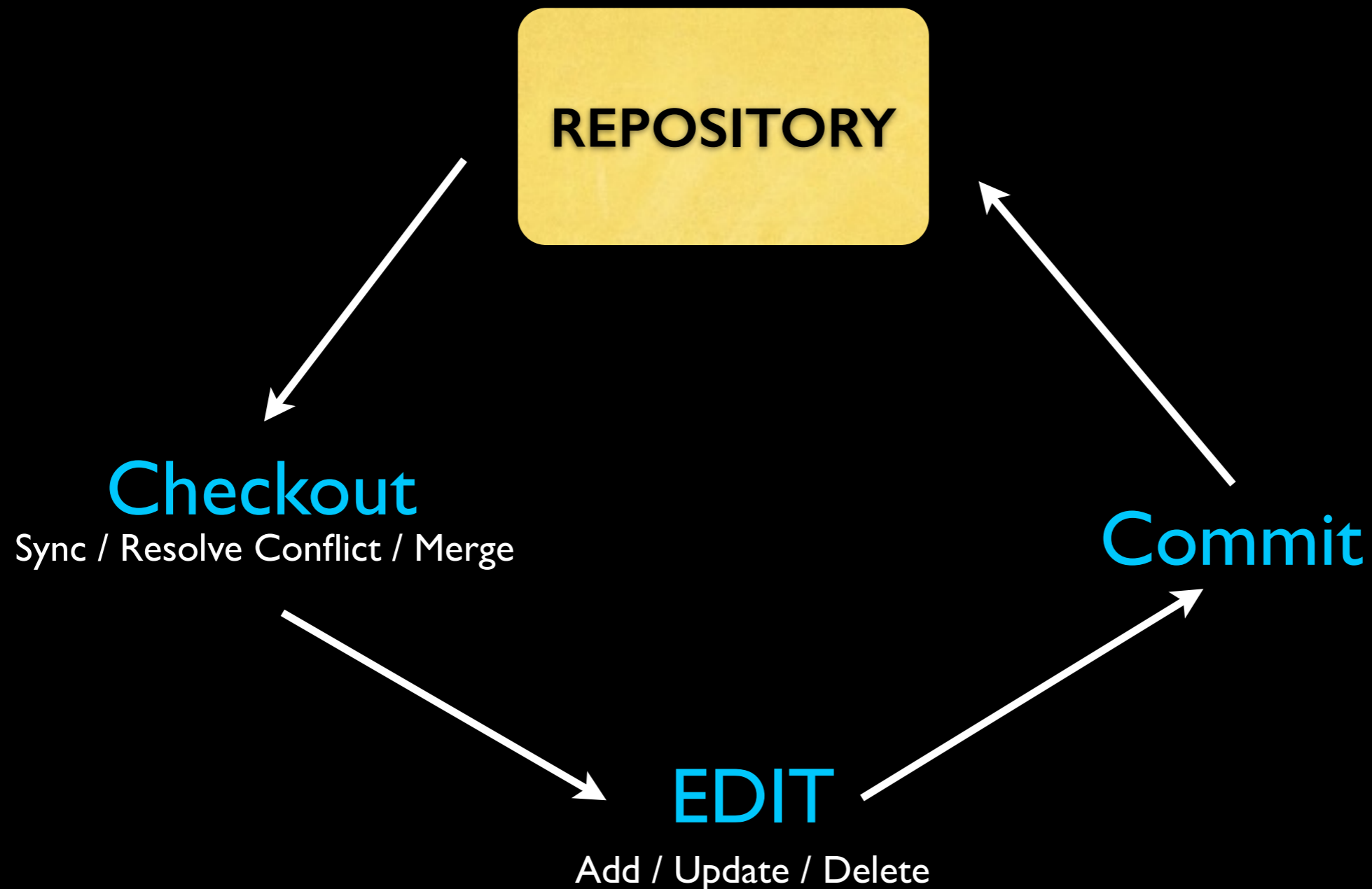


Centralized



Distributed

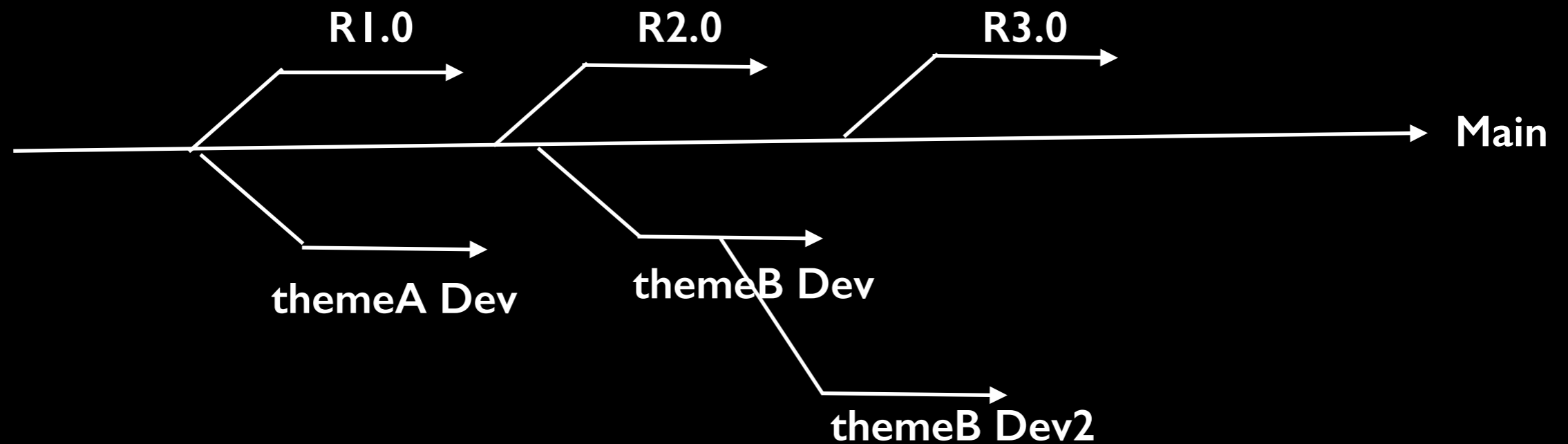
Common Usage Pattern



Basic Principles

- No build breaks
- Review your changes before submit
- Each submit should only deal with one task
- Make your submit comment clear

Common Branching Strategies



Issue Tracking System

- A centralized place to track all the “issues” that need to be followed up
 - Todos
 - Bugs
 - PMR
- The system maintain the life cycle of the issue, and provide the facilities for team members to collaborate on these issues

Rational Team Concert

What is RTC ?

- A collaboration tool that includes
 - Project Planning
 - Requirement Management
 - Issue Tracking
 - Version Control
 - Continuous Integration

MEMBER



Profile

Availability

Preference

TEAM



Team Members
Development Line
Process

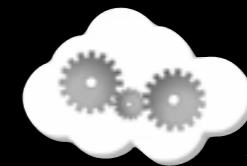
PROJECT



Teams

Release

Process



Process

Naming	Product Backlog , Sprint
Roles	Scrum Master, Product Owner
Permissions	Only Scrum Mater Can create iteration plan
Precondition	All code must be code reviewed before checkin
Follow up	When bug fixed, QA will be notified to verify the fix

Release






WORK ITEM

- Each Work item will be associated with an estimate
- Along with team member's available resource, the progress and loading of each individual/team/iteration plan could be transparently tracked
- Supported notification mechanisms : mails , event views, RSS , pop-up

4.4 m1 Apr 19, 2008 - May 19, 2008		
Name	Team Area	Progress
JUnit Plan	JUnit Team	79 / 79 - h <input type="text" value="No Open Work Estimated"/> 0%

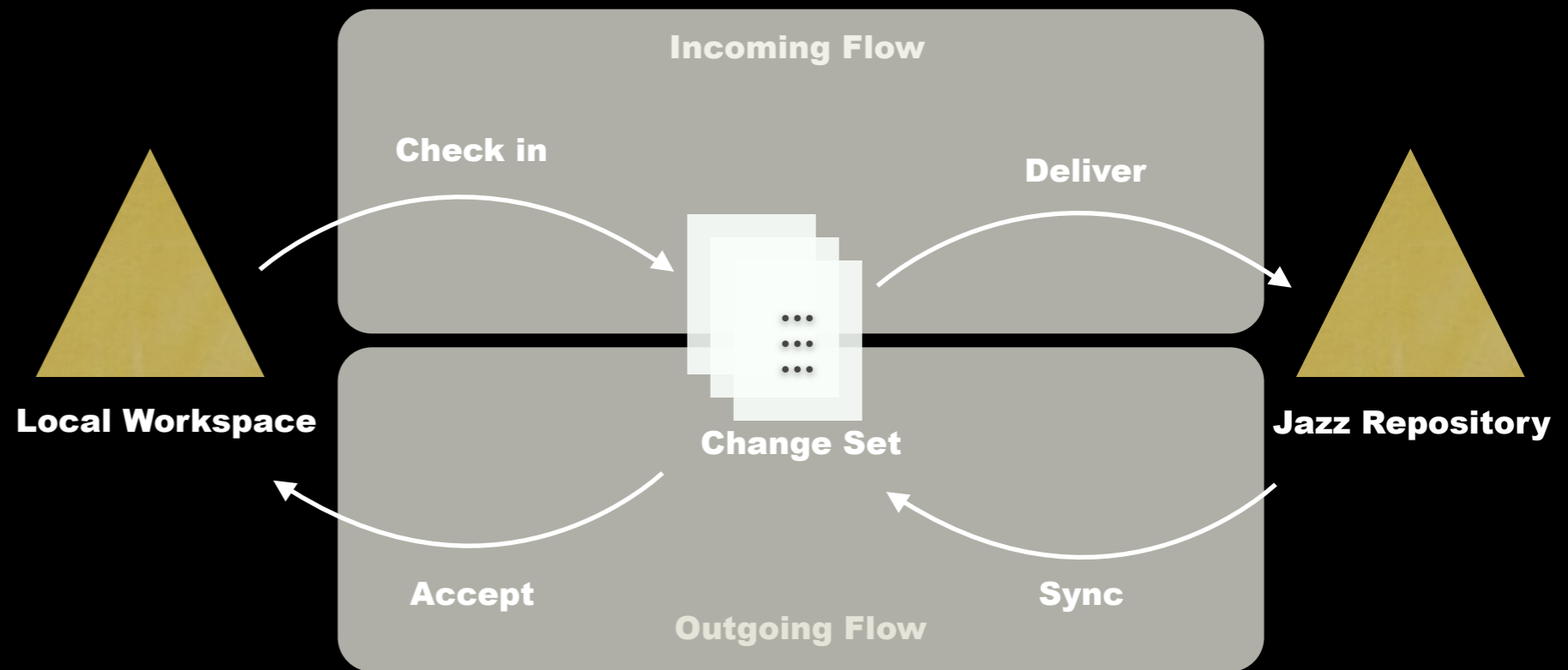
4.4 m2 May 19, 2008 - Jun 18, 2008		
Name	Team Area	Progress
JUnit Plan	JUnit Team	13 / 186 -47 h <input type="text" value="75%"/>

4.4 May 19, 2008 - no end date		
Name	Team Area	Progress
JUnit Release Plan	JUnit Team	0 / 0 h <input type="text"/>

	Bill Cassavelli Closed Items: 8 Open Items: 0	<input type="text" value="Progress: 25 / 25 - h"/> Estimated: -
	Jason Mitchell Closed Items: 1 Open Items: 0	<input type="text" value="Progress: 0 / 0 - h"/> Estimated: -
	Markus Kent Closed Items: 13 Open Items: 1	<input type="text" value="No Open Work Estimated"/> Estimated: 0%

VERSION CONTROL

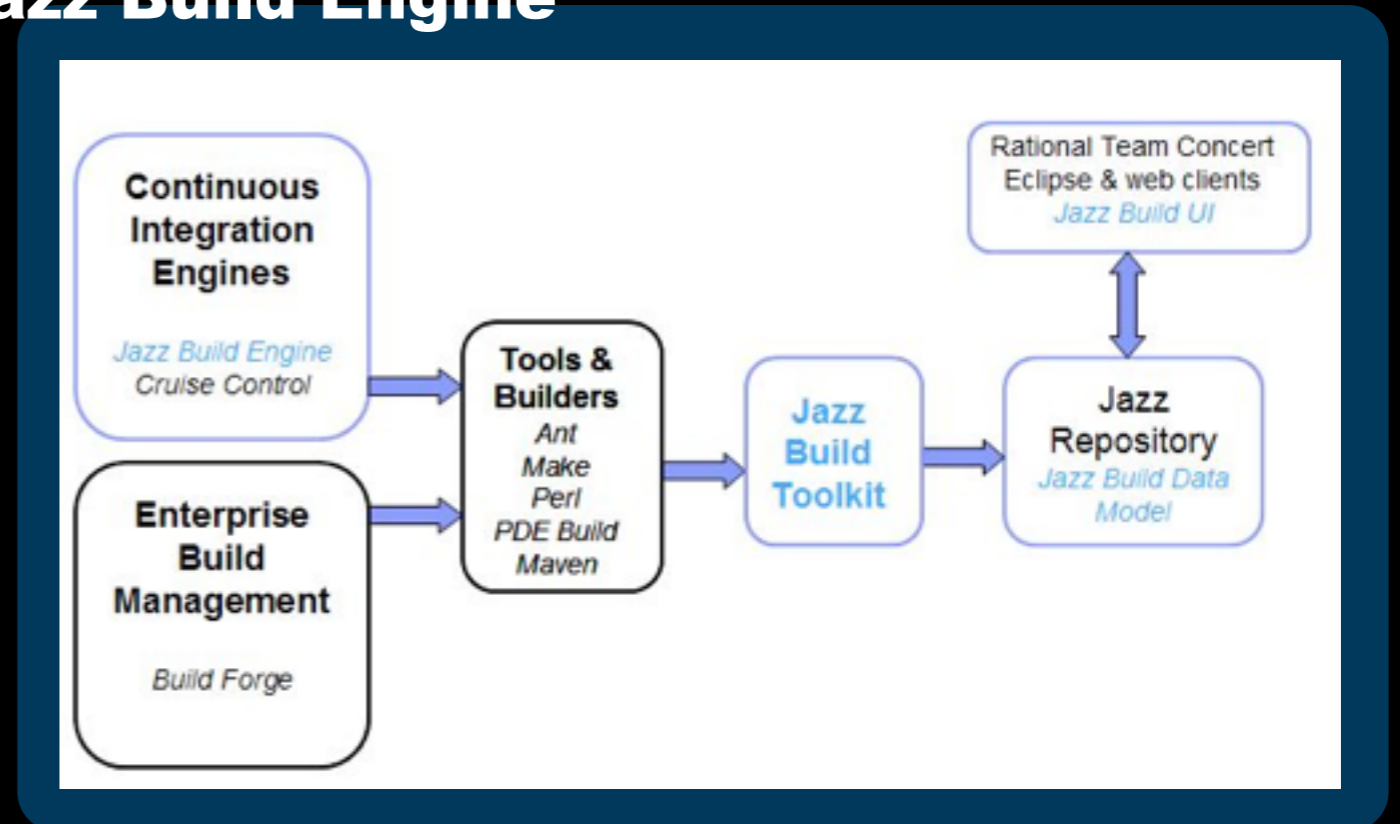
- Stream
- Component
- Change Set
- Baseline
- Snapshot



CONTINUOUS INTEGRATION

- **Build Scheduling**
- **Build Progress monitoring**
- **Build Alert**
- **Build Result Viewing**
- **Regression Testing**
- **Coverage Testing**
- **Linkage with other artifacts**
 - **Work items**
 - **Change Sets**

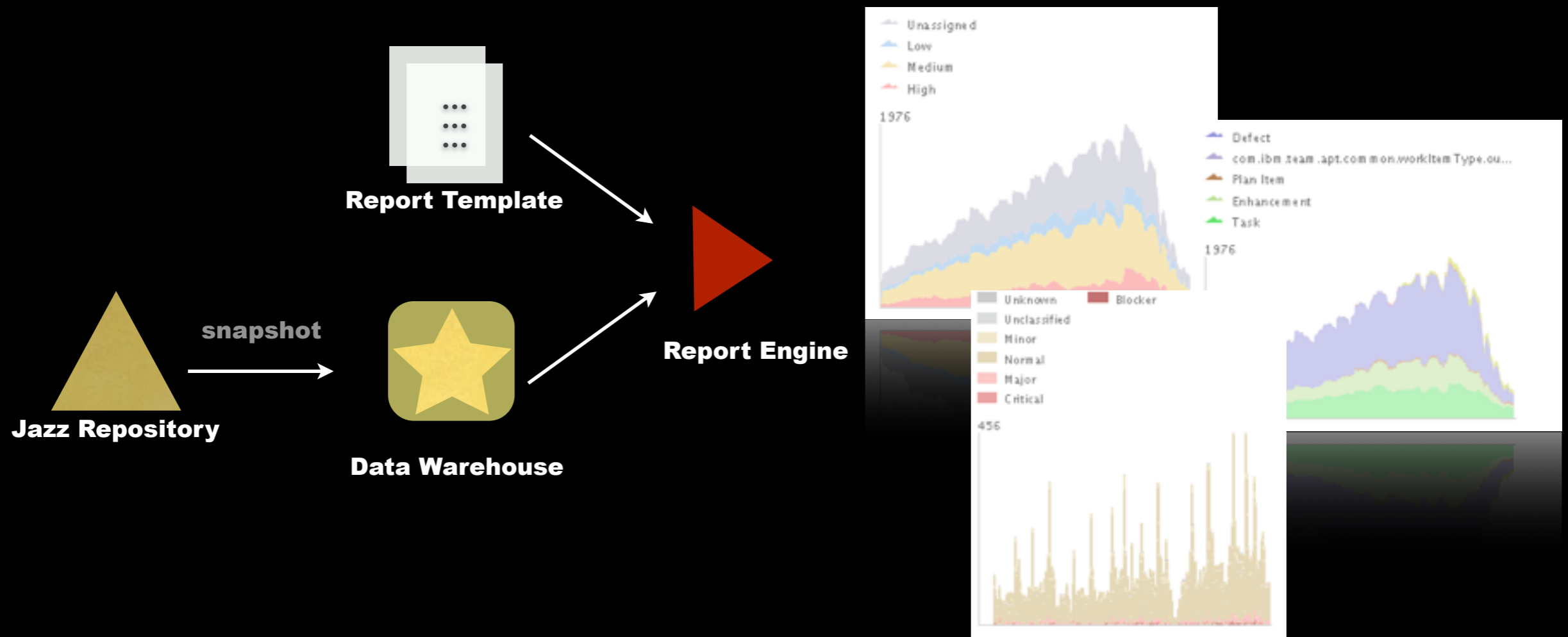
Jazz Build Engine



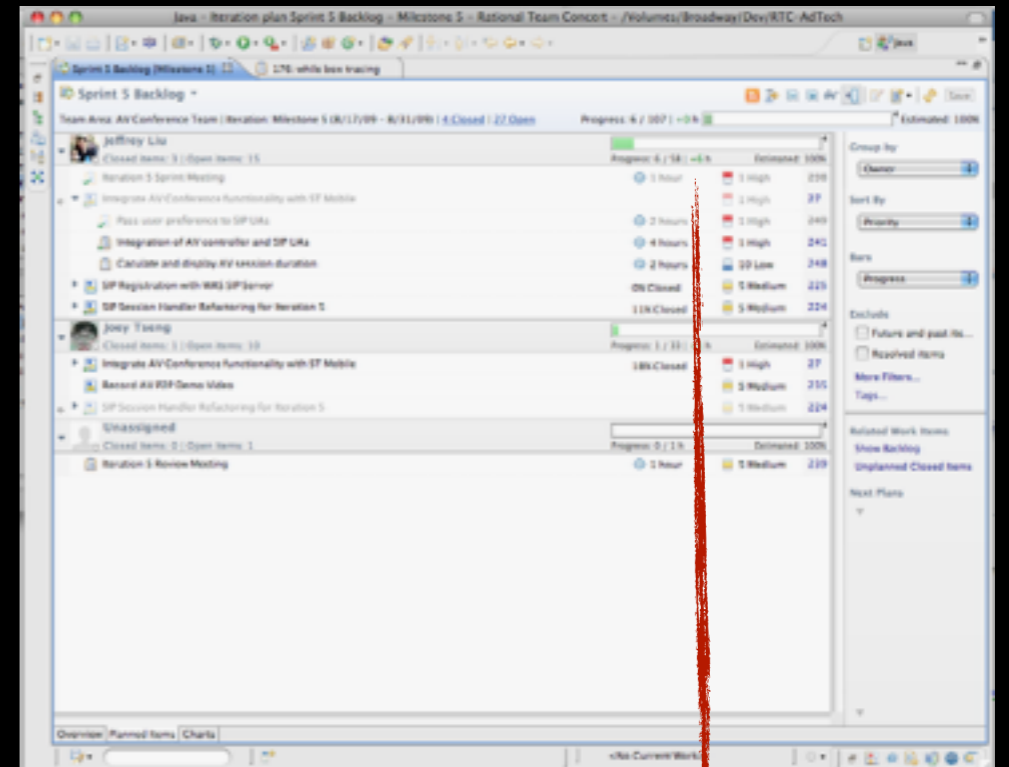
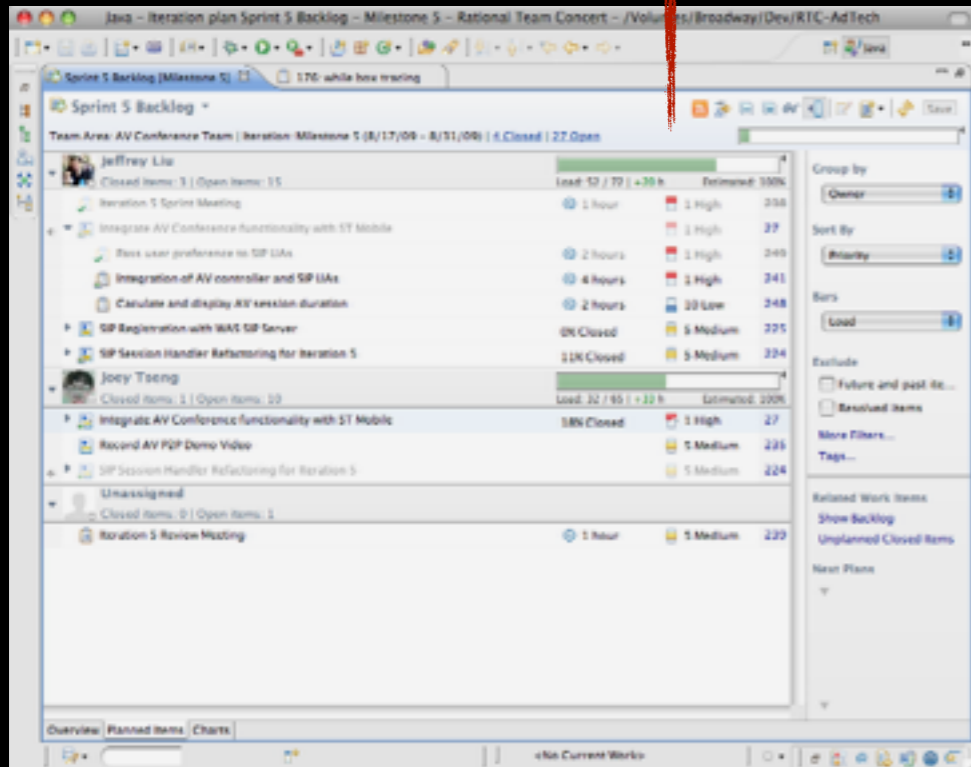
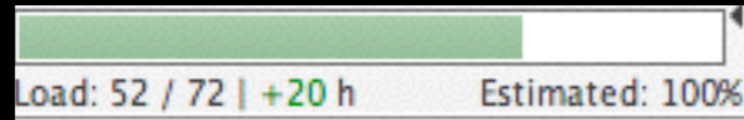
REPORT

Various project artifacts make it expensive to create report on-the-fly

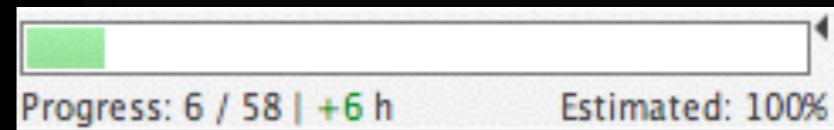
A **data warehouse** is a storage facility for read-only, historical and aggregated data.



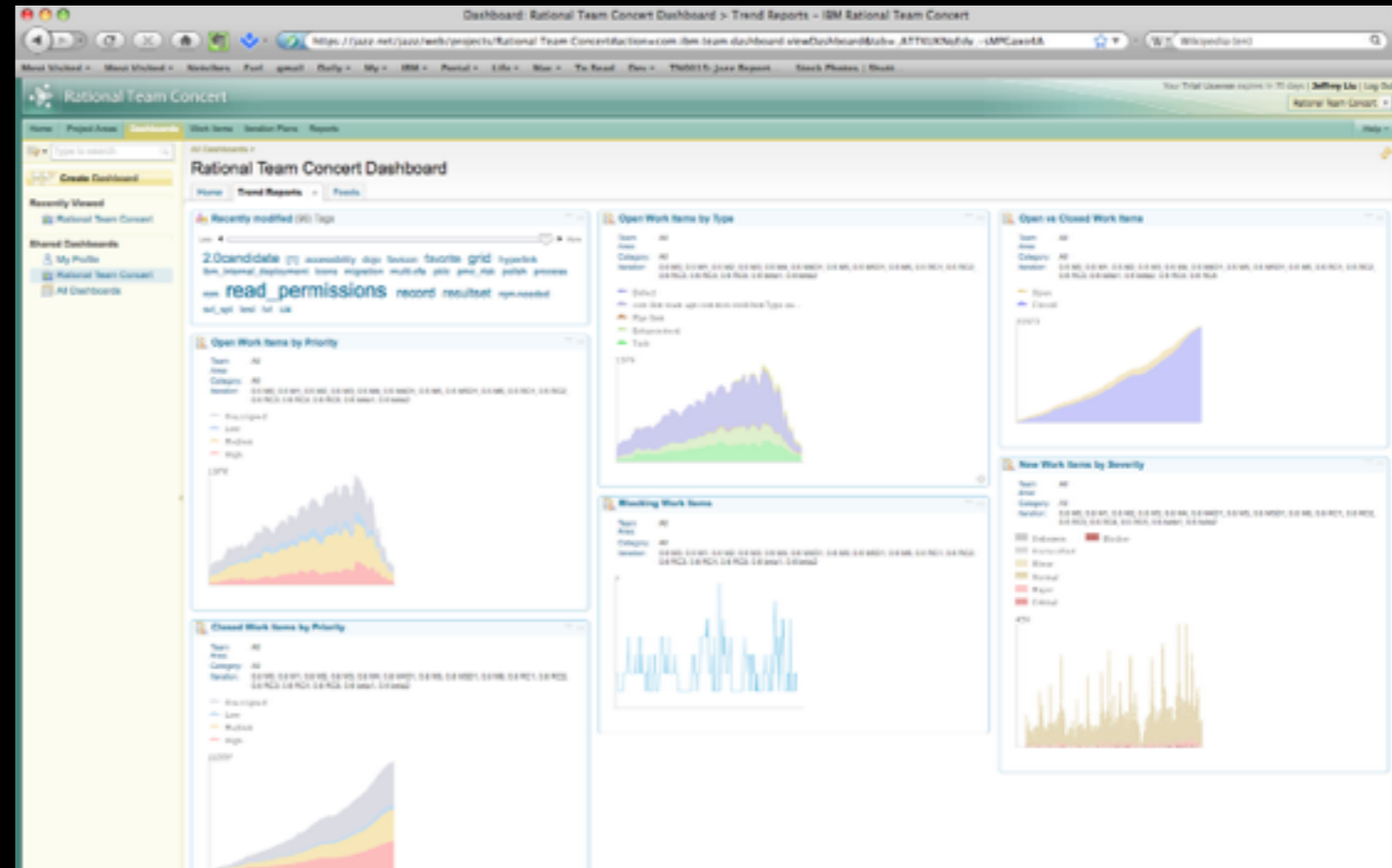
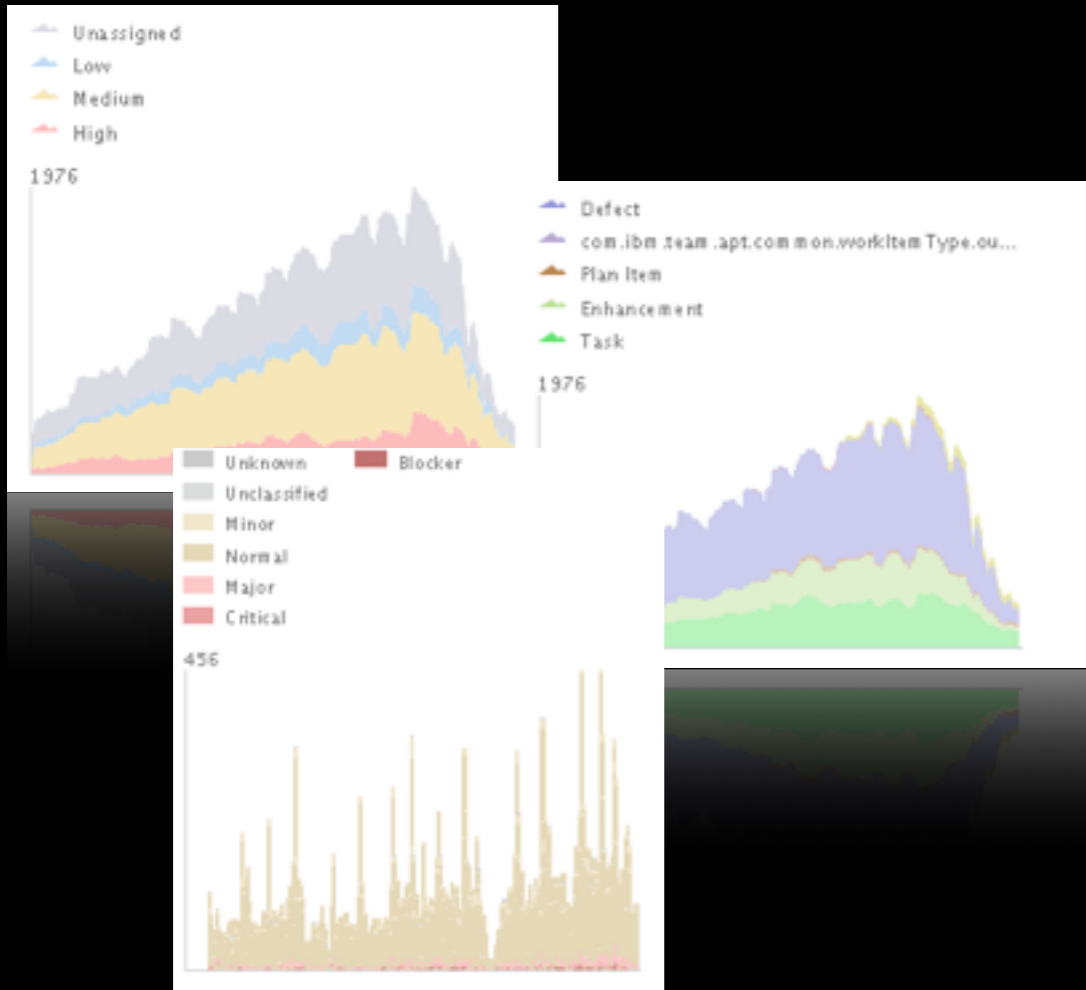
Work Load



Work Progress



Development Velocity



Continuous Integration

Life without CI ...

- Hard to pinpoint the root cause of failures
- Depending on project natures, it might take significant effort for integration
- It increase the testing efforts
- Low release quality

Practices of CI

- Single Source
- Automate the build
- Make your build self-testing
- Every commit should be built
- The status of the build and test is available to everyone in the team

RTC Build History

Work Items - 20110928-0332 - Rational Team Concert

File Edit Navigate Search Project Run Window Help

Team Team Project My Wo Team

All Project and Team Areas (11 of 12 areas selected)

- 0.5.3 build
- 0.5.4 build
- 0.5.5 build
- 0.5.6 build
- 0.5.7 build
- 2.0.0 build
- 3.0.0 build - MCP6 express - 9004
- 3.0.0 build - MCP6 express - 9005
- 3.0.0 build - MCP6 with the works 9004
- 3.0.0 build - MCP6 with the works 9005
- BVT only
- Trunk Integration MCP6 build express - 9004
- Trunk Integration MCP6 build express - 9005
- Trunk Integration MCP6 build express without protected-sr
- Trunk Integration MCP6 build with the works - 9004
- Trunk Integration MCP6 build with the works - 9005
- Trunk Integration MCP7 build express - 9004
- Trunk Integration MCP7 build express - 9005
- Trunk Integration MCP7 build express - Blade
- Trunk Integration MCP7 build express without protected-sr
- Trunk Integration MCP7 build with the works - 9004

Build Trunk Integration MCP7 build express - 9005 20110928-0332

Completed

Duration: 1 hour, 30 minutes, 51 seconds
 Start Time: September 28, 2011 3:32:17 PM
 Completed: September 28, 2011 5:03:08 PM

Status Trend:

Reported Work Items
 Work items reported against this build to help stabilize i
 None reported against this build
[Create a new work item](#)
[Associate an existing work item](#)

Contribution Summary

Changes: [Show changes](#)
 Downloads: [19 downloads](#)
 Logs: [7 logs](#)
 Repository Workspace: [Trunk Integration MCP7 express 9005 build workspace](#)
 Snapshot: [Trunk Integration MCP7 build express - 9005_20110928-0332](#)
 Tests: [293 tests, 0 failures, 0 errors](#)
 Work items: [1 included in build](#)

General Information

Requested by: (scheduled build)
 Build Definition: [Trunk Integration MCP7 build express](#)
 Build Engine: [build2](#)
 Build History: [33 builds](#)
 Tags:
 Deletion allowed

Overview Activities Tests Downloads Logs Properties

Work Items Tag Cloud Problems Team Advisor Change Explorer Pending Changes Builds History Console Repository Files Search Properties

Trunk Integration MCP7 build express - 9005 - Found 33 Builds (8093 ms)

Build	Label	Progress	Estimated Completion	Start Time	Duration
Trunk Integration MCP7 build express - 9005 (personal build by CLEMENT SU)	20110928-0629	4% (Pre-build setup)	in 1 hour and 17 minu...	September 28, 2011 6:29:40 PM	23 seconds
Trunk Integration MCP7 build express - 9005 (personal build by Robert D. Callaway)	20110928-0628	8% (Fetching files)	in 1 hour and 16 minu...	September 28, 2011 6:28:52 PM	1 minute, 11 secc
Trunk Integration MCP7 build express - 9005	20110928-0332	Completed		September 28, 2011 3:32:17 PM	1 hour, 30 minute
Trunk Integration MCP7 build express - 9005 (personal build by Robert D. Callaway)	20110928-0144	Completed		September 28, 2011 1:44:52 PM	1 hour, 21 minute
Trunk Integration MCP7 build express - 9005 (personal build by CLEMENT SU)	20110928-0016	Completed		September 28, 2011 12:16:06 PM	1 hour, 29 minute

Search for ID or Text Bedrock Hub

<No Current Work>

Build Failed

Build Trunk Integration MCP7 build express - 9005 (personal build by CLEMENT SU) 20110927-2042

Completed

Duration: 1 hour, 29 minutes, 44 seconds
Start Time: September 28, 2011 8:42:22 AM
Completed: September 28, 2011 10:12:07 AM

Status Trend:

Contribution Summary

Downloads: [19 downloads](#)
Logs: [7 logs](#)
Repository Workspace: [Trunk Integration Workspace](#)
Tests: **293 tests, 10 failures, 0 errors**

Reported Work Items

Work items reported against this build to help stabilize it.

- None reported against this build
- [Create a new work item](#)
- [Associate an existing work item](#)

General Information

Requested by: CLEMENT SU
Build Definition: [Trunk Integration MCP7 build express - 9005](#)
Build Engine: [build3](#)
Build History: [34 builds](#)
Tags:
 Deletion allowed

Trunk Integration MCP7 build express - 9005 - Found 33 Builds (8093 ms)

Build	Label	Progress	Estimated Completion	Start Time	Duration
Trunk Integration MCP7 build express - 9005 (personal build by Jeannie K. Hawrysz)	20110927-2114	Completed		September 28, 2011 9:14:31 AM	1 hour, 34 minutes, 5...
Trunk Integration MCP7 build express - 9005 (personal build by Jeannie K. Hawrysz)	20110927-2043	Completed		September 28, 2011 8:43:55 AM	1 hour, 35 minutes, 3...
Trunk Integration MCP7 build express - 9005 (personal build by CLEMENT SU)	20110927-2042	Completed		September 28, 2011 8:42:22 AM	1 hour, 29 minutes, 4...

Failed Test Cases

Build Trunk Integration MCP7 build express - 9005 (personal build by CLEMENT SU) 20110927-2042

JUnit Tests

Name	Tests	Failures	Errors	Time Taken	Run ...
FVT-onbox-JUnit-remanufacture	245	10	0	23 m 44 s	
com.ibm.bedrock.fvt.suites.BedrockFvtFilteredTestSuite	245	10	0	23 m 44 s	
com.ibm.bedrock.fvt.LicenseAcceptanceCliTests	6	2	0	24 s	
testLicenseRejectSSH6	1	1	0	11 ms	5
testLicenseAcceptSSH6	1	1	0	2 ms	6
com.ibm.bedrock.fvt.FileGetPutCliTests	36	8	0	3 m 17 s	
testGetFileSCP6	1	1	0	2 ms	14

Details

Class name:

Method:

Time taken:

Overview Activities Tests Downloads Logs Properties

Build Logs

The image shows a screenshot of a build management interface. The top window displays the title "Build Trunk Integration MCP7 build express - 9005 (personal build by CLEMENT SU) 20110927-2042". Below the title is a "Log Files" section with a table listing various log files.

File Name	Description	File Size
Build		
compile-3.9.7.0-mcp7-REL-20110927-2042.log	...Compiling log	
virtual-20110927-2042.log	...Virtual image	
Test		
beam-20110927-2042.log	Performing BEA	
bvtRun-20110927-2042.log	BVT Client serial	
smoketest-prepped-REL-20110927-2042.log	...Smoke test	
unittest-3.9.7.0-mcp7-REL-20110927-2042.log	...Running unit	
<no component>		
build-1317170540945.log	Full Build Log	

The bottom window shows a detailed view of the build log for "build-1317170540945.log". The log content is as follows:

```
2011-09-27 20:42:21 [Jazz build engine] running on host: bedrock.rtp.raleigh.ibm.com
2011-09-27 20:42:21 [Jazz build engine] Should build occur?
2011-09-27 20:42:21 [Jazz build engine] Yes: Always build a user initiated request.
2011-09-27 20:42:23 [Jazz build engine] Invoking pre-build participant "com.ibm.team.build.jazzscm"
2011-09-27 20:42:27 [Jazz build engine] Deleting fetch destination "/home/build3/jazz/buildsystem/buildengine/
2011-09-27 20:42:44 [Jazz build engine] Fetching files to fetch destination "/home/build3/jazz/buildsystem/bui
2011-09-27 20:45:02 [Jazz build engine] Invoking build participant "com.ibm.team.build.ant"
Buildfile: /home/build3/jazz/buildsystem/buildengine/eclipse/workspace/src/rtc-build.xml
[echo] bvt.pxeFirmwareFilename: build3.tar.gz

buildall:
[echo] bvt.pxeFirmwareFilename: build3.tar.gz

setup:
[echo] SDK version: 3.9.7.0
[echo] buildDefinitionId: Trunk Integration MCP7 build express - 9005
[echo] Personal build: [no]
[echo] buildLabel/RTCBUILDID: 20110927-2042
[echo] buildResultUUID: _revswOlqEeC8LpMKdz5Pgw
[echo] build userid: build3
[echo] BRDEVHOME: /home/build3/jazz/buildsystem/buildengine/eclipse/workspace
[echo] BRHOME: /home/build3/bedrock-adk
[echo] MCP_CACHE_DIR: /home/mcp-cache-dir
[echo] JAVA_HOME (OK if unset): [unset]
[echo] mcp.env: mcp7
[echo] mcp64.env: mcp7_64
[echo] Ant version: Apache Ant version 1.7.1 compiled on June 27 2008
[echo] build cache hostname: bedrock.rtp.raleigh.ibm.com
```

IBM Experience

Role and Responsibilities

Release Management Team



Stakeholder Review

Scrum of Scrum

Iteration Exit Review

Iteration Exit Demo

Theme Lead Meeting

Theme A



Iteration Sprint

Daily Scrum

Post Mortem



DEV



SQA



ID

Theme B



Iteration Sprint

Daily Scrum

Post Mortem



DEV



SQA



ID

Theme B



Iteration Sprint

Daily Scrum

Post Mortem



DEV



SQA



ID

IBM Experience Tooling

bugzilla@mozilla - Bug List

Thu Apr 2 2009 01:32:10 PDT

ID	See	See	See	Assignee	Status	Resolution	Summary
486205	nor	--	All	general@pts.bugs	UNCO		TM: Arrays 90% performance regress
486206	nor	--	Win	nobody@mozilla.org	UNCO		Prevent the screensaver from starting when viewing videos
486208	erh	--	All	nobody@mozilla.org	UNCO		Provide "read receipt" with an option to "kill" on composition
486209	nor	--	Win	nobody@mozilla.org	UNCO		context menu on right click displayed away from current mouse position in two monitor configuration
486211	maj	--	Win	nobody@mozilla.org	UNCO		javascript $XPath$ query stopped to work in Firefox 3.1
486216	erh	--	All	nobody@mozilla.org	UNCO		Enhancement requested: Conversion of attachments to ODF formats
486221	nor	--	Win	nobody@mozilla.org	UNCO		Security dialog boxes
486226	maj	--	Mac	nobody@mozilla.org	UNCO		Cache problem - The code updates, but not the display
486231	erh	--	All	nobody@mozilla.org	UNCO		Enhancement suggestion: New option for sent mail folder selection
486238	win	--	Win	nobody@mozilla.org	UNCO		files in downloads window have the folder icon
486240	maj	--	Win	nobody@mozilla.org	UNCO		TS "forgot" existing folders
486243	maj	--	Win	nobody@mozilla.org	UNCO		Pop-up blocker prevents windows from opening
486249	nor	--	Win	nobody@mozilla.org	UNCO		did not install
486254	nor	--	Win	nobody@mozilla.org	UNCO		Cookies seem to reset when Firefox is closed regardless of "Clear Private Data" options.
486257	nor	--	Linux	nobody@mozilla.org	UNCO		Segmentation fault when right-clicking on a specific YouTube bookmark
486266	nor	--	Linux	nobody@mozilla.org	UNCO		MPN_GemRI(Notify) downloads empty files
486267	cr	--	Win	nobody@mozilla.org	UNCO		Profile not saving. Toolbars, bookmarks, history, all being cleaned upon closure, and all still missing upon opening
486269	cr	--	Linux	nobody@mozilla.org	UNCO		Segmentation fault "[prog] \$(1+'@')
486281	nor	--	Win	nobody@mozilla.org	UNCO		Sent folder won't copy email nor does it contain text of the body of the email.
486282	nor	--	All	nobody@mozilla.org	UNCO		chrome overrides do not work with query strings
486284	nor	--	Linux	nobody@mozilla.org	UNCO		Incorrect mail tree in IMAP account
486288	nor	--	Win	nobody@mozilla.org	UNCO		the browser keeps shutting down, A box pops up and says sorry lost connection want to restart or new session
486291	erh	--	Win	nobody@mozilla.org	UNCO		window Popup blocker: URL's property for blocking sites, too
486292	nor	--	Win	nobody@mozilla.org	UNCO		Poor performance using bookmarks menu with large amounts of bookmarks.
486294	nor	--	Win	nobody@mozilla.org	UNCO		When saving an image using the right click "save image as" option Firefox 3.1b4pre freezes before saving

The screenshot shows the IBM Rational ClearQuest tooling interface. It displays a project overview for "828 7.0 (Release 7.0)" with various team areas and tasks. The interface includes a sidebar with navigation options like "Repository Connections", "DataPower (workspace)", "Favorites", "My Repository Workspaces", and "My Team Areas". The main area shows a list of tasks with columns for "Progress", "Estimated", and "Actual" values. A "Story" section is visible, detailing tasks like "Integrate 828 Gateway 6 828 Persistence with the configured values, and rules" and "Implement Active/Inactive configuration object prototype".

DATAPOWER

Search

Items - Tools - Downloads - Your Account - Submit News - Top 10

Latest Autobuild/Run/Status

Run ID	Branch	Host	Start	End	Duration(D)	RunType	Changeset	Passing	Failing	Total	Comment
176236	main	401-vm01-vm	2013-10-07 22:03:54	2013-10-08 00:36:15	2.8	40-vm	235218	1316	0	1316	
176203	main	auto7	2013-10-07 17:46:46	2013-10-07 20:17:06	2.5	40-44	235206	1316	0	1316	
176109	main	401-vm01-vm	2013-10-07 08:18:55	2013-10-07 10:51:23	2.5	40-vm	235196	1316	0	1316	
176107	main	auto19	2013-10-06 20:37:27	2013-10-06 22:46:39	2.1	40-64	235185	1316	0	1316	
176106	main	401-vm01-vm	2013-10-06 09:03:24	2013-10-06 12:05:12	3.3	40-vm	235182	1316	0	1316	
176105	main	401-vm01-vm	2013-10-06 00:36:02	2013-10-06 06:07:10	2.8	40-vm	235181	1316	0	1316	
176104	main	401-vm01-vm	2013-10-06 04:31:45	2013-10-06 07:34:23	2.7	40-vm	235180	1316	0	1316	
176103	main	401-7196	2013-10-05 15:40:43	2013-10-05 18:11:54	2.4	40-64	235178	1316	0	1316	
435244	main	401-vm01-vm	2013-10-05 03:33:21	2013-10-05 06:00:51	2.5	40-vm	235176	1316	0	1316	
176102	main	401-vm01-vm	2013-10-04 23:02:30	2013-10-05 00:21:03	2.4	40-vm	235175	1316	2	1318	
176117	main	401-vm01-vm	2013-10-04 14:23:37	2013-10-04 17:09:36	2.6	40-vm	235173	1316	0	1316	
176116	main	auto5	2013-10-04 00:48:14	2013-10-04 03:10:13	3.1	40-64	235167	1316	0	1316	
176115	main	401-vm01-vm	2013-10-03 18:03:11	2013-10-03 18:00:20	2.8	40-vm	235172	1316	0	1316	
176114	main	404-vm01-vm	2013-10-03 18:06:06	2013-10-03 19:33:51	3.5	40-vm	235163	1316	0	1316	
176141	main	404-vm01-vm	2013-10-02 21:52:59	2013-10-03 00:04:04	2.5	40-vm	235152	1316	0	1316	
176139	main	401-7196	2013-10-02 11:25:53	2013-10-02 13:58:50	2.8	40-64	235190	1316	0	1316	
176143	main	401-vm01-vm	2013-10-02 10:33:17	2013-10-02 13:44:06	3.2	40-vm	235188	1316	0	1316	
176138	main	401-vm01-vm	2013-10-01 23:52:57	2013-10-02 00:11:16	2.6	40-vm	235186	1316	0	1316	
176137	main	408-vm01-vm	2013-10-01 14:53:47	2013-10-01 17:03:08	2.5	40-vm	235184	1316	0	1316	
176129	main	404-vm01-vm	2013-09-30 23:43:48	2013-10-01 03:23:58	3.7	40-vm	235180	1315	1	1316	
176100	main	auto6	2013-09-30 19:51:55	2013-09-30 21:51:22	2.3	40-64	235179	1315	1	1316	
176145	main	401-vm01-vm	2013-09-30 13:18:20	2013-09-30 13:54:27	3.6	40-vm	235181	1315	1	1316	
176144	main	401-vm01-vm	2013-09-29 16:31:09	2013-09-29 18:06:14	2.8	40-vm	235171	1316	0	1316	
176142	main	auto21	2013-09-29 12:10:29	2013-09-29 14:20:51	2.2	40-64	234938	1316	0	1316	
176139	main	401-vm01-vm	2013-09-29 09:18:07	2013-09-29 09:05:22	2.8	40-vm	235180	1316	0	1316	
176135	main	401-vm01-vm	2013-09-28 22:57:58	2013-09-29 01:24:04	2.8	40-vm	235178	1315	1	1316	

PERFORCE
Version everything.

IBM Experience

Practices

- * Continuous Process Improvement. Theme lead meeting is especially useful
- * Process need to be enforced with appropriate tool
- * Agreed Developer disciplines.

Summary

- Before You Start your project
 - Decide the development process that works for your team
 - Identify the tools to use for team collaboration
 - Version Control, Issue Tracking, Information Sharing, Todo...
 - Identify your build tools, unit testing framework, and setup your continuous integration system.
 - Setup the development disciplines

Questions

