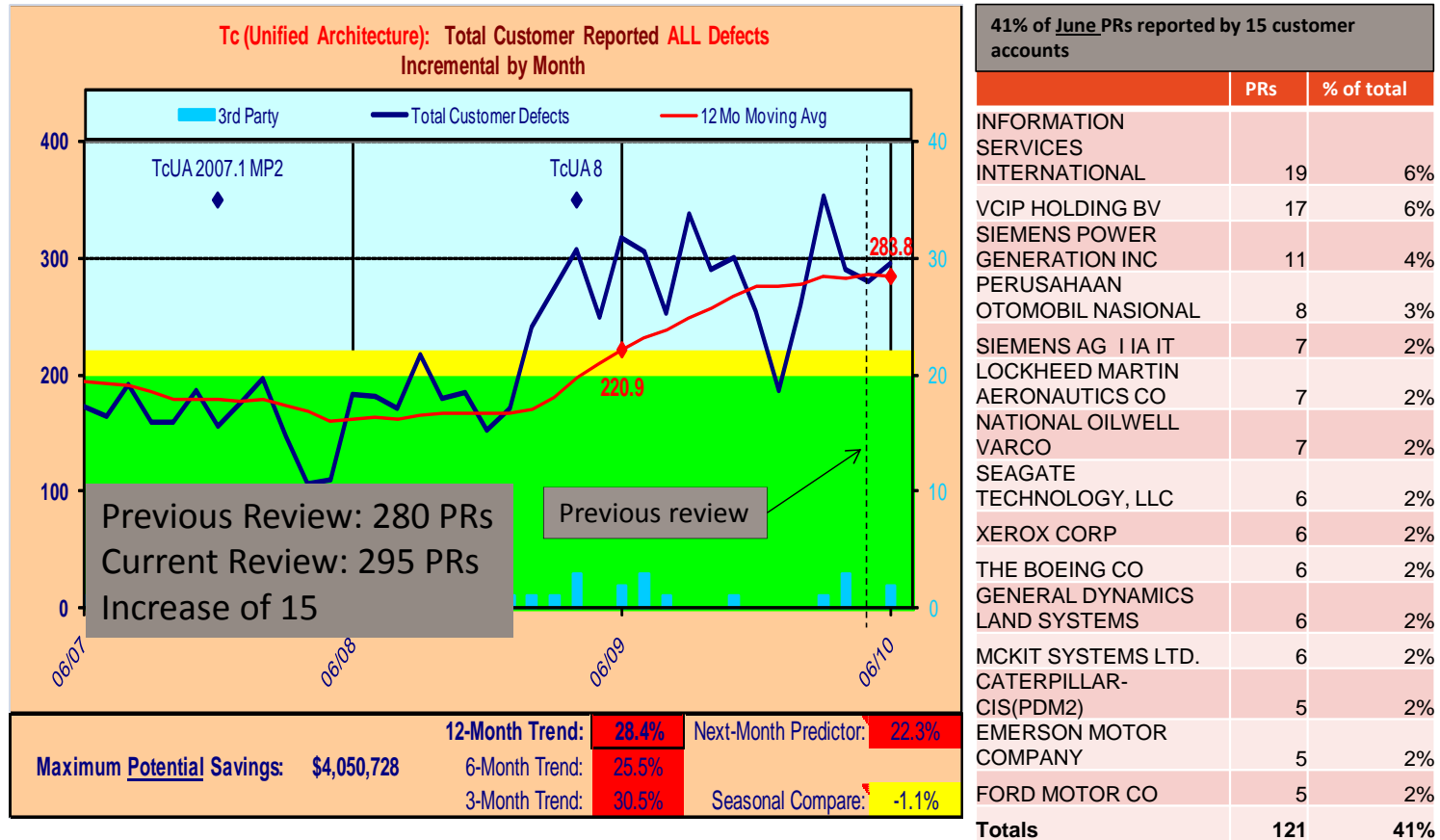


Continuous Improvement Program Overview

Mike Denley

Customer Issue Hot Spot Analysis



Quality Initiatives

– TC-ARCH-1

- Leveraging customer data
 - All code changes from core, include customer data for upgrade testing
 - DITL: RR, Honda, Intel DB's included. Foundation areas represents 15% of identified cases
 - Tc8.3 SIT2: data is being used as a part of the tests
 - Tc8.3 Site Consolidation: performance testing is being conducted
 - Performance COE: using customer data

Quality Issue	Initiative to address	Owner	Due Date
Lack of testing in a realistic customer environment with realistic customer processes	TC-ARCH-1 Pre-release software testing by services and customers	Mike Denley	Implemented and ongoing
High risk PRs being resolved too late in the development process	TC-ARCH-2 PR Backlog Reduction	Mike Denley	Implemented and ongoing
New features not being fully validated prior to QA	TC-ARCH-3 Feature Handoff Process Improvement	Mike Denley	Implemented and ongoing

– TC-ARCH-2

- DMs plans for reducing PR inflow
- Executing to goal of zero open PRs at rtm
- Field Engagement Program: Dev, Services, GTAC and Pubs (training, data exchange, influence)
 - Data Migration now active, Performance team is in progress; BMIDE conducted bootcamp*
- GTAC training workshops and events underway across all foundation domains
- Top50 P1 Analysis with supporting clean up actions
- RCA formalization for BU PRs; implementation of SharePoint-based RCA procedures

– TC-ARCH-3

- Autotest Zero Tolerance: underway; <10 in Foundation, working toward zero failing tests
- Performance Tracking on weekly baseline – Tc8.3 is now at a comparable Tc2007.1.3

Field Engagement Program Objectives and Outcomes

- Objectives

- Increase communication and interaction between the teams
- Provide feedback of product capabilities and gaps
- Identify and communicate best practices
- Data gathering for future releases feature/functionality

- Outcomes

- Enhance the customer experience; usage, interaction, practices
- Increase efficiency of Field Services and GTAC; deployment, demonstration, benchmarks, knowledge, experience and support
- Improve product capabilities; feature, performance and support

Continuous Improvement Programs

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System Integration Testing

- Foundation
- 99% exe
- 90% pass
- 118 failures, 51 PRs
- 0 Open PRs

VP/D/DM/Status	#
Bashada, Stephen M.	131
DeLuca, Anthony C.	45
Denley, Merton	51
rejected	13
fixed	38
Jockusch, Stefan	8
Mitchell, Andrew C.	2
Pawar, Pramod M.	25
Hirsch, Joan E	1
Ludwig, Helmuth	1
Grand Total	133

D/DM/Feature	#			Total
	NR	F	P	
DeLuca, Tony	14	67	634	741
Denley, Mike	12	118	1167	1301
Heyn, Dan	10	21	492	526
Distribution Services - GMS	0	14	389	403
Distribution Services - Multi-site Collaboration	0	2	29	31
Distribution Services - PIE	9	0	31	40
Distribution Services - TIE	1	5	43	52
Jasthi, Siva R.	2	73	360	435
Model Services / Core Data Model & Services	2	73	360	435
Kulkarni, Sarang	0	0	24	24
Rogers, Kenneth L.	0	24	291	316
Jockusch, Stefan	6	11	117	135
Mitchell, Andrew	15	14	223	249
Grand Total	47	210	2141	2426

System Integration Testing (SIT)

– 7/23, week #2

297 (73) tests executed in Foundation 67% (16%)

98% passing of exe

1 Unresolved PR

8.3 SIT 1 – 2nd week

49% exe, 95% pass

8.2 SIT 2 – 2nd week

74% exe, 94% pass

8.3 SIT2 hot spot focused

Count of Feature Desc	Column Labels			
Row Labels	Not Run	Fail	Pass	Grand Total
Foundation	143	7	290	440
CFV - HS_Model Services Core Data Model	31		11	42
REG - BU PR Validation	29		5	34
REG - Workflow	21			21
REG - 8.3 SIT 1 Cleanup	15		8	23
CFV - HS_Distribution Services TIE	12	2	11	25
CFV - HS_Distribution Services GMS	9	1	114	124
CFV - Workflow_CFV	6			6
REG - LMA	5			5
REG - Performance	4		51	55
CFV - Controlled Replication	4			4
CFV - Classic Multisite	4		5	9
CFV - Site Consolidation	3	2	8	13
CFV - Audit Manager			24	24
REG - SOA_BMIDE			21	21
REG - CoreDataServices		2	20	22
CFV - SOA_Framework			3	3
REG - Change Management			9	9

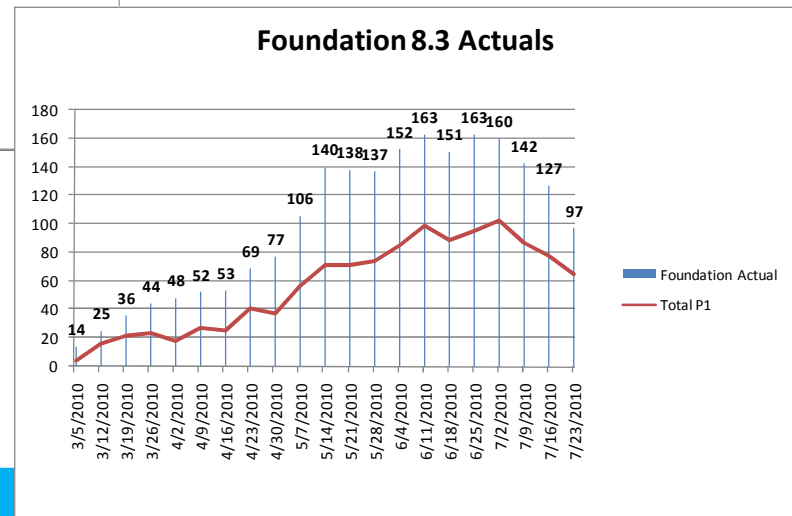
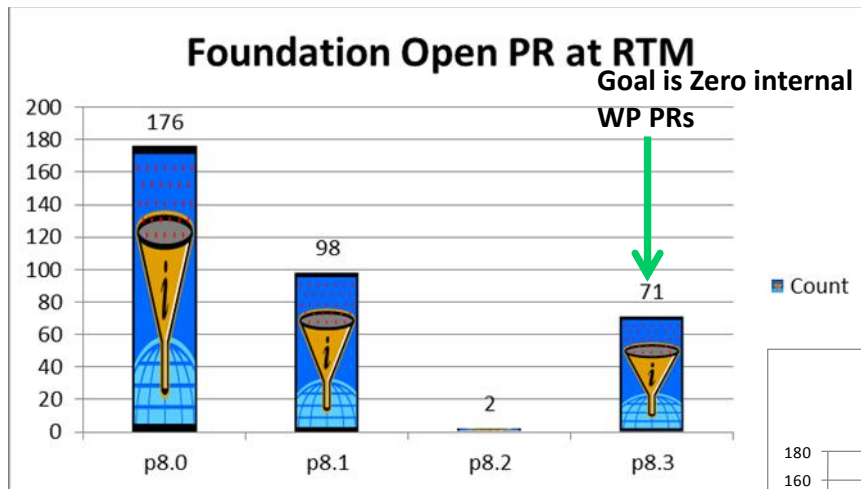
Automated Regression Testing

- Automate Product Validation Regression Tests
 - Evolve from manual test suite to automated
- Catch regressions early
 - To improve turnaround time
 - To ensure the quality of the build that becomes available to PV
- Achieve 'Test-Complete' coverage faster
 - Overall cycle time reduced
- Running more tests and iterations in each release
 - Improved test coverage for patches and releases
 - Improved platform coverage
 - Include in other testing efforts e.g., SIT

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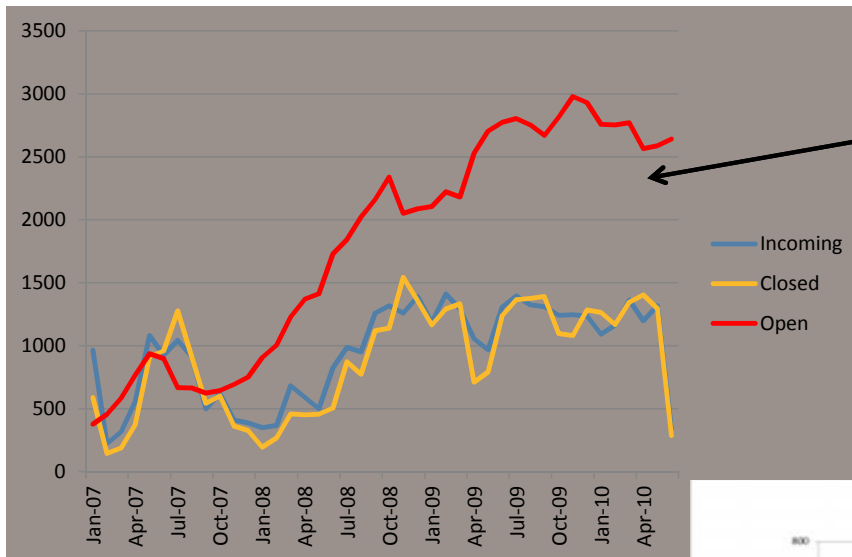
Open PRs at RTMs



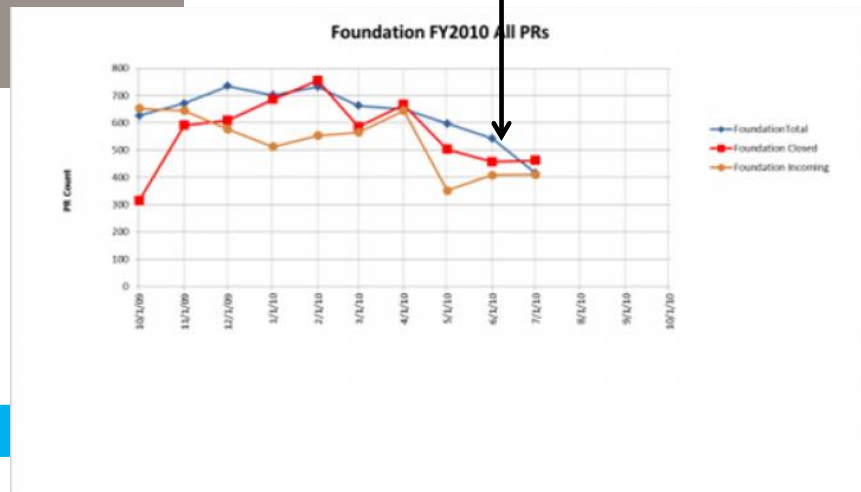
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Problem Backlog



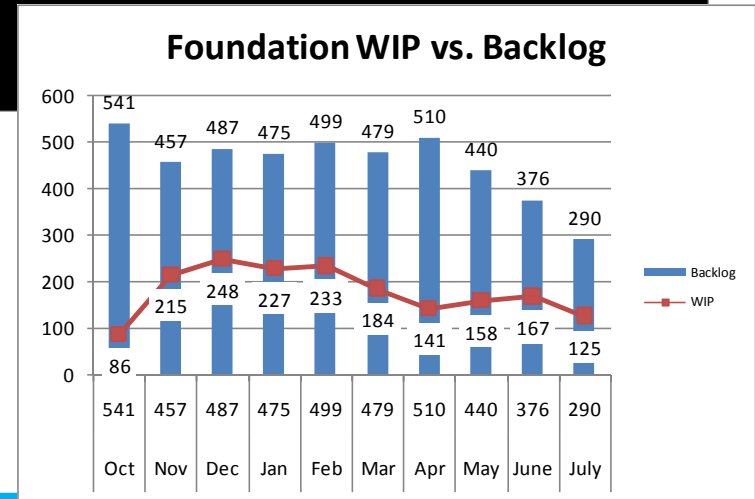
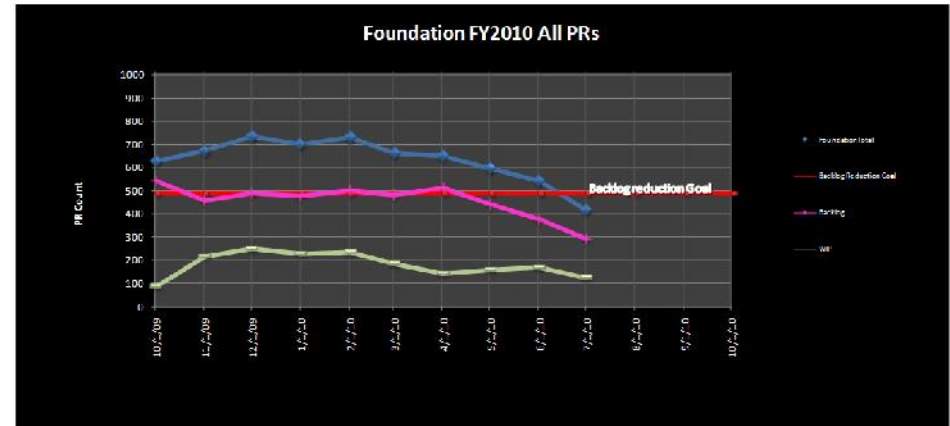
Backlog has begun to decrease



PR Reduction – Goal and Approach

- Goals
 - Sustainable backlog
 - Zero WIP PRs at release
- Approach
 - 2 phase backlog reduction
 - Reduce inflow
 - Identify hot spots
 - Account clean up
 - Greater efficiency in PR resolution

- Domain Initiatives
- Reduce IRs generation and IR conversion to PRs
- Reduce internal backlog; include corrections in
 - BU, MP, Major and Minor releases
- Know your Numbers team reviews – PRs, aging, hot spots
- Hot Spot reviews for each sub-domain area with QPO
- Increase use case coverage testing; AOS, RCAF, xUnit test suite



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Lowering Customer Found Defects

- **Significant control and management of the issues**
- Significant number of PRs raised are non-code based e.g., UE, SC,
 - Consistent in PV and GTAC at 20%
 - Important to understand
 - Ability to reduce IRs generation and IR conversion to PRs
 - Train GTAC representatives in product areas
 - Ensure documentation is accurate
 - Share best practices and features with Services teams
 - Leverage Field Engagement Program, conduct Brown Bags, ...
- Reduce Internal PRs
 - Be proactive, each internal PR becomes candidate for PR
 - Reduce internal backlog
 - Over 50% of internal PRs are development generated
 - Include corrections in BU, MP and major/minor releases vehicles
 - Ensure release coverage – having in 1 BU is not enough

Lowering Customer Found Defects

- Increase use case coverage testing
 - Significant number of external PRs discovered are regressions, non-tested capabilities
 - Introduce modified and additional tests for xUnit, AOS and RCAF to improve coverage
 - Use customer data, processes and use cases
 - Over 12 customer databases inventoried
 - Top 20% customers generate over 50% of PR – know your customers
 - Ensure *Fit for Promote* testing is comprehensive and conducted before and after promotion/integration
 - Ensure *Fit for Testing* reviews (TDS) are conducted
 - Tests need to include planned CCPs testing
 - Include corrections in BU, MP and major/minor releases vehicles
 - Longer we wait, greater opportunity for PR discovery
- Follow through on Established Processes and Programs
 - Know your numbers – PRs, aging, customers, hot spots
 - Hot Spot reviews
 - RCA
 - Internal team reviews and quality plan

Top 50 Accounts Analysis Summary

- 14 customers with greater than 10 PRs
 - Top accounts are aligned across Top50, TopPlus, and BU reporting
- 10 applications/areas with greater than 10 PRs
 - Few concentrated applications but most PRs are spread across areas
- Top applications with 30+ PRs
 - Environmental Compliance, MSE & Enterprise
 - Environmental compliance is not identified in TopPlus and BU reporting
- 51% of PRs Opened in 2010
- <20% of Top 50 P1 PRs have Corrections
- Business Urgency
 - Customer Care: 68% BU are Priority 1 PRs
 - Top 50 Accounts: 13% BU are Priority 1 PRs

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Customer “Day In The Life” Testing

- Improved Quality Experience
 - Reduce the critical functional issues reported by customers
 - Eliminate the upgrade problems at customer sites
 - Improve holistic experience of end user across whole application and full object life cycle
- Close the GAP between internal testing and customer usage
 - Identify end-to-end test cases and lifecycles
 - Increase breadth of an application in one test case
 - Span applications and integration
 - Cover the full lifecycle of the objects
- Methodology
- Use of customer data and usage
 - Identify end-to-end use cases, UATs
 - BMIDE template, workflow template, structures...
 - Identification of end-to-end use cases, UATs, etc.

Customer Benefits of Providing Testing Use Cases and Data

- Objectives
 - Support Teamcenter Quality and Testing initiatives
 - Increase quality by increasing exposure to true customer data, structures and relationships
 - Leverage multiple testing disciplines and environments
 - Provide customer feedback on recommendations concerning data and release upgrades
- Inclusion of multiple Teamcenter Release Testing environments and types
 - Release Upgrade testing
 - Development Functional Unit Testing
 - System Integration Testing
 - Product Validation Testing
 - Day-in-the-Life testing simulating customer scenario with customer data
- Increases software quality
 - Non-passing tests have PRs filed which must be resolved as a part of the respective release
- Customer Value
 - Customer supplied database is tested and validated for upgrading to specific releases
 - Significantly reduces possible issues on-site in a production upgrade
 - Reduces upgrade cost at customer site
 - Contributes and influences Teamcenter upgrade product capabilities and procedures
 - Product enhancements, diagnostic tools, test use cases
- Provide feedback recommendations to respective customers to enhance use/performance
 - Data, structure, configuration, etc.

Day in the life Testing Coverage

	A	B	C	D	E	F	G	H	I
1	Sr No	What is sold	What TDIL covers	Covered	Customer/OOTB				
2					RR	Honda	VW	Intel	JCB/OOTB
12		Bill of Materials Management	Process-specific data structure and data management	1	Yes	Yes	No	No	Yes
15	2	Community Collaboration	PLM information sharing	1	Yes	No	No	No	No
16		Community Collaboration	Real-time, ad hoc information capture and sharing	1	Yes	No	No	No	No
17		Community Collaboration	Team collaboration workspaces	1	Yes	No	No	No	No
18		Community Collaboration	Desktop application sharing	1	Yes	No	No	No	No
19		Community Collaboration	Visual issues management	1	Yes	No	No	No	No
20	3	Compliance Management	Information management, access and retrieval	1	Yes	No	TBD	No	No
21		Compliance Management	Compliance traceability	1	Yes	No	TBD	No	No
22		Compliance Management	Secure management of intellectual property and sensitive information	1	Yes	No	TBD	No	No
23		Compliance Management	Integrated Device Master Record (DMR), Design History File (DHF), and Corrective and Preventative Actions (CAPA) management	1	Yes	No	TBD	No	No
24		Compliance Management	Grading against various environmental regulations	1	Yes	No	TBD	No	No
25		Compliance Management	Electronic records management	1	Yes	No	TBD	No	No
26		Compliance Management	Closed-loop change management	1	Yes	No	TBD	No	No
48	7	Enterprise Knowledge Foundation	Audit management	0	No	No	No	No	No
49		Enterprise Knowledge Foundation	Change management	1	Yes	Yes	Yes	No	Yes
51		Enterprise Knowledge Foundation	Information access/navigation/retrieval	1	Yes	No	No	No	No
53		Enterprise Knowledge Foundation	Issue management	1	Yes	No	No	No	No
56		Enterprise Knowledge Foundation	Subscription and notification management	1	Yes	No	Yes	Yes	Yes
57		Enterprise Knowledge Foundation	Workflow management	1	Yes	Yes	Yes	Yes	Yes
115	13	Platform Extensibility Services	Business modeler integrated development environment (BMIDE)	1	Yes	Yes	Yes	Yes	No
116		Platform Extensibility Services	Integration gateway for ERP	1	Yes	No	TBD	No	No
117		Platform Extensibility Services	Global services for enterprise application integration	1	Yes	No	TBD	No	No
118		Platform Extensibility Services	Service-oriented architecture (SOA) services	1	Yes	Yes	TBD	Yes	No
129	15	Reporting and Analytics	Executive Dashboards	1	Yes	No	No	No	No
130		Reporting and Analytics	Standard reports	1	Yes	Yes	No	Yes	Yes
131		Reporting and Analytics	Ad hoc reports	1	Yes	Yes	No	Yes	Yes

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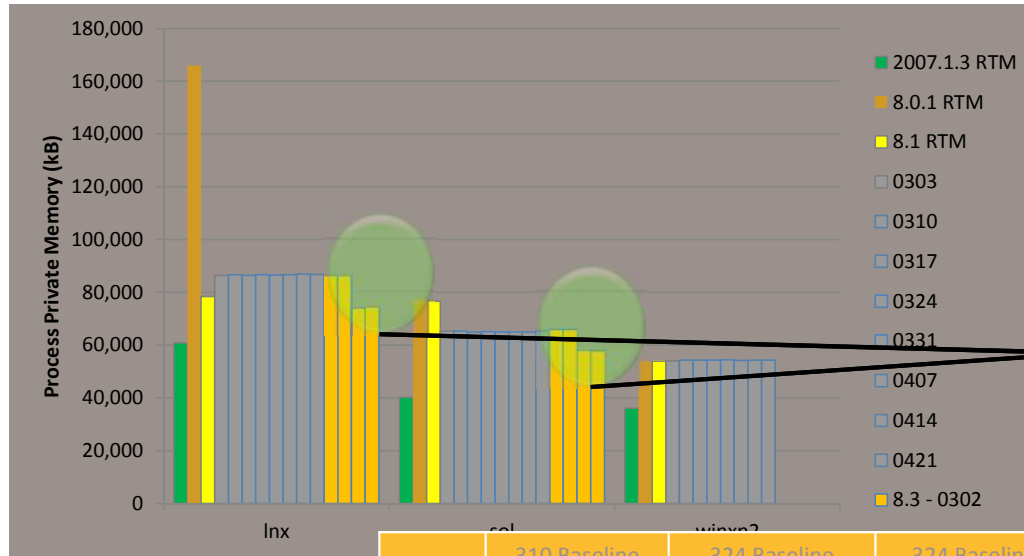
Teamcenter Continuous Improvement Programs

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Tiger Team: Memory & Performance

- Set release performance objectives and requirements
- Establish Release Projects
 - Tc8.2, Tc8.3, Tc9.0
- Alignment with DO and PM architecture directions & planning, guidelines and processes
- Methodology
 - Hot Spot Analysis
 - Testing
- Metrics
 - Measures against Tc2007.1.3
 - Objectives to improve in comparison
- Formalization in Tc9 Timeframe to COE: Fit to Perform

Memory and Performance Tiger team results



Reduction
removal of multiple inheritance

	310 Baseline		324 Baseline (no Derby)		324 Baseline (No virus checking)		324 Baseline (No virus checking and clean path)		324 Baseline (No virus checking and clean path and files in memory)	
	Cold	Warm	Cold	Warm	Cold	Warm	Cold	Warm	Cold	Warm
Login Dialog	1:42	0:06	1:36	0:04	0:38	0:05	0:28	0:04	0:07	0:05
Login	0:35	0:20	0:25	0:17	0:34	0:17	0:28	0:16	0:18	0:16
Total	2:17	0:26	2:01	0:21	1:12	0:22	0:56	0:20	0:25	0:21
Delta b cold/warm		19%		17%		17%		36%		84%

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Continuous Improvement Initiatives

Initiated	Program	Category	Status
Q1 09	Compiler warnings reduction	Quality	<ul style="list-style-type: none"> • Static code analysis purchase negotiations and management support currently underway • <i>Compiler warning tracking will be added as post build step</i>
Q2 09	Plan for Success	Operational	<ul style="list-style-type: none"> • 4 in FY2Q2010; GTAC to be included in future sessions
Q2 09	Build Initiatives	Quality	<ul style="list-style-type: none"> • Autotest via. code coverage being widely utilized • <i>2 builds per week implemented for 8.3; planning for Tc9</i> • <i>'merge out' process ready for Tc9</i> • <i>Distribution speedup software in-house – Rollout in process</i> • <i>Performance of BMIDE build; 50-75% improvements – rollout planned in Q4</i>
Q2 09	Child package backlog reduction	Operational	<ul style="list-style-type: none"> • Continuous monitoring by release management – close to 10 day backlog goal; Foundation approximately 2-5 CCPs
Q2 09	Componentization (break up high contention files)	Operational	<ul style="list-style-type: none"> • <i>Breaking up Pref file project scheduled for Tc9</i> • <i>Component plan for Foundation areas presented</i>
Q2 09	Center of Excellence	Quality	<ul style="list-style-type: none"> • <i>Zero tolerance for unit test failures rolled out – lowest failure rate in the past 3 releases</i>
Q2 09	Release milestones	Operational	<ul style="list-style-type: none"> • Tc9 release milestones and metrics in place
Q3 09	Memory footprint and performance improvements program	Quality	<ul style="list-style-type: none"> • <i>8.3 release will achieve goal with measures in line with 2007.1.3</i>

Continuous Improvement Initiatives

Initiated	Program	Category	Description
Q2 FY10	Release level capacity plan	Operational	<ul style="list-style-type: none"> • Resource planning for Tc9 completed, Tc10 rolled out • <i>Pilot with Microsoft tools being evaluated for Tc10</i>
Q2 FY10	BU PR RISK Assessment	Quality	<ul style="list-style-type: none"> • Risk Assessment at PR and Patch levels • Used in weekly PR Validation planning with PV • <i>Inclusion in patch planning in process</i>
Q2 FY10	Purify rollout	Quality	<ul style="list-style-type: none"> • Wide usage of Quantify tools has begun • <i>Purify usage stalled due to complications in SM allocator</i>
Q2 FY10	Fit for Quality improvements	Quality	<ul style="list-style-type: none"> • Improvements in vetting process for Tc9 and Tc10 • <i>Fit for Test in pilot for Tc9; seeking granular test plans by project promote dates</i>
Q2 FY10	Teamcenter metrics	Operational	<ul style="list-style-type: none"> • Uniform metrics for Teamcenter focused on <ul style="list-style-type: none"> • Customer satisfaction • Operational execution • Execution efficiency • <i>Metrics for Tc9 has been established</i>
2008	RCAF	Quality	<ul style="list-style-type: none"> • <i>34 new test cases for BMIDE based SOA service</i> • <i>135 new test cases for core model</i> • <i>Issue – changes in UI will need substantial regeneration of automated tests</i>
2008	White papers	Operational	<ul style="list-style-type: none"> • <i>47 total: 38 New, 9 revisions from previous, 7 published</i>

Thank you