Discussion document

Project Mongoose

IT business continuity improvement

May 24, 2006

Contents

- Goals, scope, charter
- Root cause breakdown (“fishbone”)
- Key issues and trends
- Corrective action recommendations
- Timeline
- Assumptions
- Next steps

Scope

- **Goal:**

  Drive business continuity improvement by completing a full DMAIC analysis of P1/P2 cases to define:

    Issues and root causes (themes) driving upward trend in P1/P2 cases (level and volatility)

    Corrective actions and metrics for validating their effectiveness

    Prioritization and roadmap for implementation – top three issues

- **Scope**

  Operations of I2R-IT systems (C3, non-C3) and the organizations and processes that support those operations – as they relate to identified P1/P2 issues

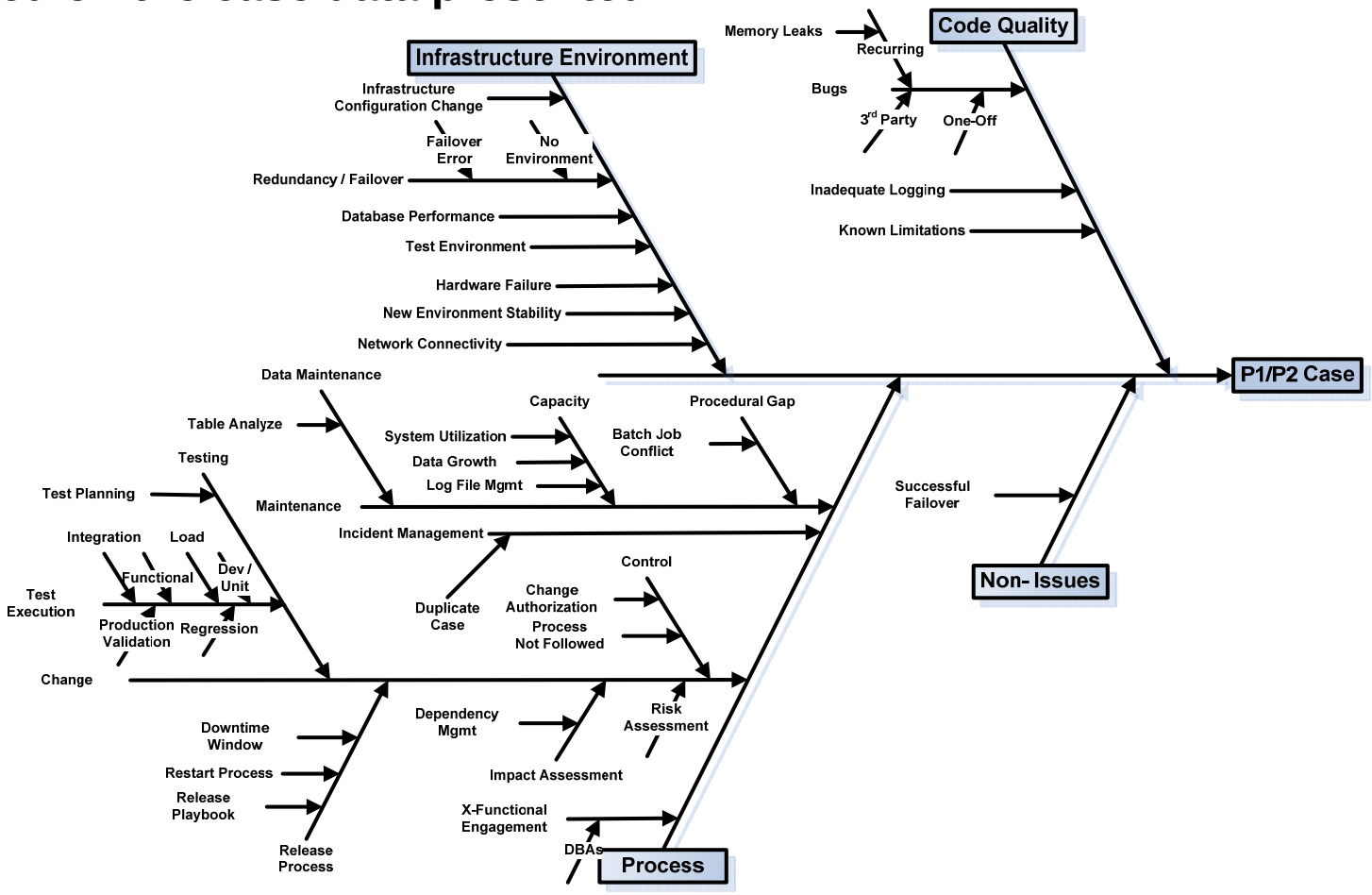
    Excludes SSM and Advanced Services

Charter

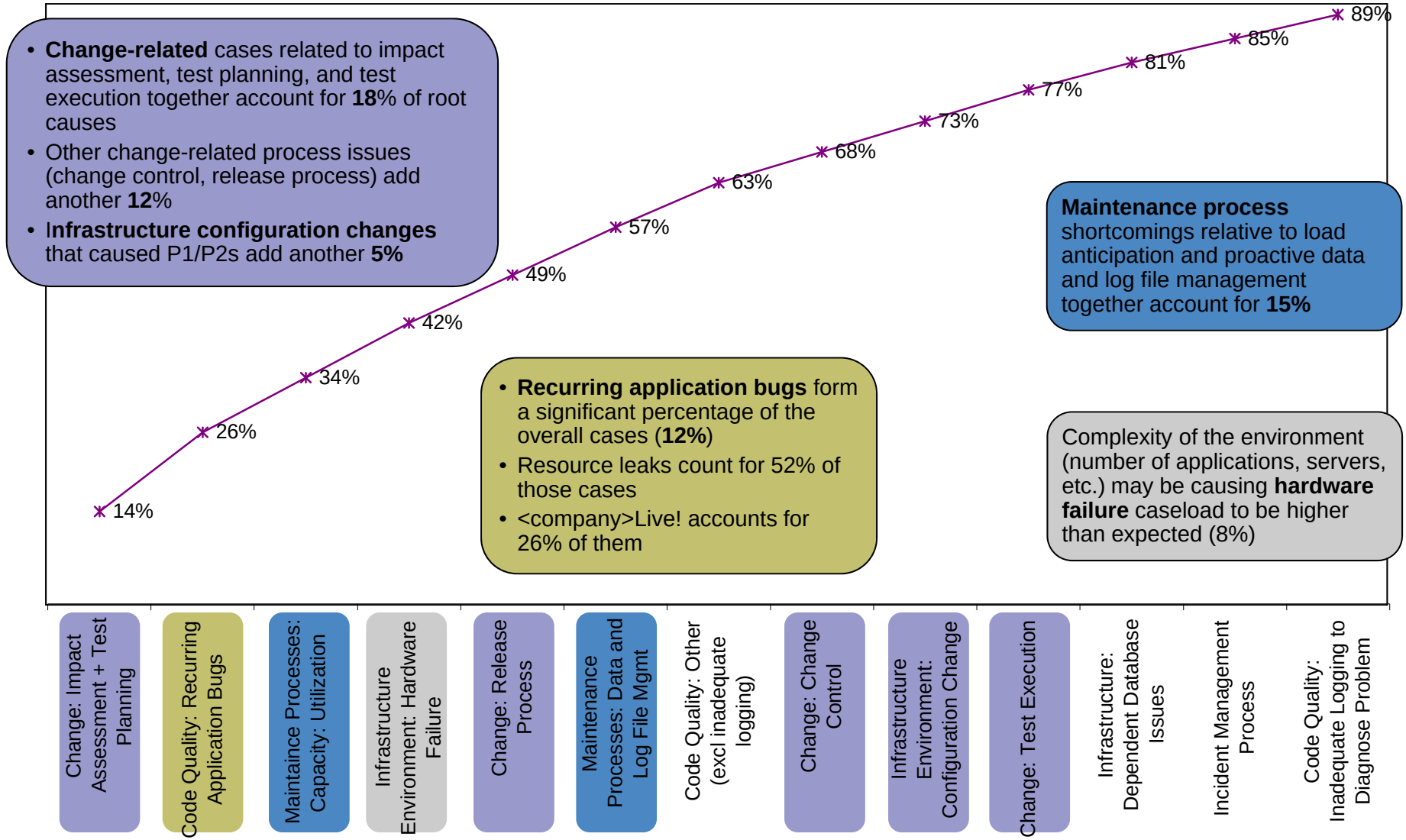
Process to be improved	System uptime is not a process, but issues with operational processes – change management, QA, maintenance procedures, etc. – may affect system availability. Process could be defined as: ***Operations of systems (C3 and non-C3) supporting the CA I2R functions*** I.e., processes that are likely root cause areas for system availability problems are within the scope of the investigation, at least as far as an "archeological dig" goes
Customers	***CA business users for I2R process:*** TAC, GPS/SSC, software distribution, CAP (critical accounts), CCIE (certification)
Problem statement	***The number of outages, measured as P1/P2 defects/week, needs to be decreased*** Note: We do not have a clear statement on the problem impact. The numbers look high, and trended up significantly Feb/Mar – but the degree of business impact has not been clearly articulated
Goal statement	***Reduce the number of business impacting outages per week*** Clear target for the improvement goals and time frame TBD. The current P1/P2 metric does not reflect degree of business impact. We will propose alternative measurements. Regardless, the number of outages needs to be reduced, and that is the focus of the initiative.
Project plan	*Coming up…*

Case root cause breakdown

The following were used as root cause categories for the analysis, based on the case data presented



Critical Issue Pareto – Cumulative Percentages



Key issue trends and volatility

Factor	High Level	Upward Trend	Volatile
Impact assessment and linkage to test planning Impact Assessment: 24; Test Planning: 3 Non-C3: 17; C3: 7 Additional 8 (not counted in this bucket) for Test Execution	**YES (3/mo)**	**YES: NON-C3**	**YES: BOTH** (C3 higher)
Recurring application bugs Total: 23 total; Resource Leaks: 12: <company>Live!: 5 Non-C3: 16; C3: 7 Four related to TSRT Query (C3), all in Dec, 3 on Dec 6	**YES (~3/mo)**	NO	**YES: C3** (non-C3 consistently high)
Capacity utilization Non-C3: 15; C3: 1	**YES (2/mo)**	**YES: NON-C3**	**YES**
Hardware failures Non-C3: 13; C3: 3	**YES (2/mo)**	NO	**YES**
Release process Non-C3: 3; C3: 11	**YES (1.75/mo)**	(DOWN)	**YES: NON-C3**
Data and log file management Data Management: 7; Log File Management: 7 Non-C3: 4 (includes two on CTSPDM); C3: 10	**YES (1.75/mo)**	**YES**	**YES**
Code quality issues other than recurring and those not diagnosed due inadequate logging Non-C3: 6; C3: 7 C3	**YES (1.63/mo)**	**SLIGHT – NON-C3**	**MED**

Corrective action identification and scoring

- **Corrective actions were identified against the most critical (top seven issues)**
  - **One lower priority issue – Inadequate Error Logging – relates to Log File management and was also included**
- **Multiple corrective actions were identified for each issue**
- **Synergies among the corrective actions were identified (e.g., same corrective action improves multiple issues) and aligned**
- **Corrective actions were scored based on Impact, Time to Impact, Likelihood of Impact, and Effort Required**
  - **All factors were weighted equally**
  - **Three value levels were used (e.g., Low/Medium/High)**
  - **Definitions for each level are included in the worksheet**
- **Corrective action summary that follows shows the highest-ranking, most immediate actions**

Further actions will be needed and are included in the detailed worksheet

Corrective action recommendations summary

Action	Action Detail	Impact Areas
1. **Institute impact assessment and link to test planning**	• Require documented **impact and risk assessment** as part of release scope planning process • Implement consistent **test planning** for all releases, linked to impact/risk assessment process	Impact Assessment and Test Planning (14%) Test Execution (4%)
2. **Prioritize and fix recurring bugs**	• Implement a focused effort to prioritize/staff, and solve existing **recurring bugs**, e.g., TSRT Query, Case Kwery, SWIFT • Increase accountability for system owners for system stability: ensure incentives support **accountability** for business continuity - not just delivering new business requirements	Code Quality (22%), particularly Recurring Bugs (12%)
3. **Define C3 data archive / retention**	• Define and implement **data archive/retention** policy for C3 • Implement **short-term performance improvements** for known problems	Data Management and Log Files (8%)

Risk assessment critical next steps

Ensuring impact assessment and test planning process changes are adopted requires <u>at least one</u> of the following:

RA.1. **Lock down the applications in Kintana*, using a gatekeeper role to:**
- Verify adequate risk/impact assessment and test plans are in place prior to migration to stage environments
- Verify the test plan has been executed with acceptable results prior to migration to production environments

RA.2. **Expand the scope of RMO and CCB to manage changes to non-C3 applications**

RA.3. **Hold system owners accountable for implementation of the process – ensure any change to their applications has risk/impact assessment performed and resulting test plan defined and executed**

RA.4. **Document key systems and interfaces, prioritized by application priority and degree of impact assessment issues**

*Applications with high case loads tend to also use Kintana. A prioritized list of applications to lock down is provided in Backup

Bug fix critical next steps

Critical next steps to address recurring bugs are the following:

BF.1.

Force a business decision on <company>Live!:

a.) Fix the outstanding bugs
b.) Retire the application (replace, consolidate), OR
c.) Downgrade the application (currently P2)

BF.2.

Drive a focused effort to implement fixes for other outstanding recurring bugs (TSRT Query, Case Kwery, SWIFT, etc.)

BF.3.

Drive accountability for system stability by aligning incentives to metrics that report, by IT manager by application:

- P1/P2 cases, outages, and business impact (severity and duration)
- Hours spent per week by support performing LTF workarounds
- LTF outstanding: number and age
- Recurring bugs outstanding and closure rates

Data archive/retention critical next steps

Critical next steps for data archive/retention are the following:

- **DA.1.** Define and implement short-term performance improvements to address analyze issues on tables used by C3 inventory cycle count
- **DA.2.** Define and implement data archive / purge action plan for history, log, and transaction information in the production C3 database
- **DA.3.** Complete the analysis for remaining high volume data items and define and implement complete data archive/retention strategy for C3
- **DA.4.** Longer term: Define data archive/retention strategy for CA Unification during implementation planning and implement at go-live

Assumptions

- **A person with sufficient bandwidth will be assigned to program-manage the effort**
- **Corrective actions are deemed high enough priority to ensure necessary resources are available**
- **Organizations can work together quickly to make needed changes**

Next steps

- **Corrective Actions:**
  - **Identify program management resource**
  - **Obtain additional input from other key parties**
  - **Agree or make adjustments to implementation plan**
  - **Identify and obtain needed resources**
  - **Kick-off work**
  - **Track and control**
  - **Measure results**

Suggested P1/P2 performance targets

Performance targets for business continuity to be measured along the following four dimensions:

Metric	Baseline*	Target (by Q1-end)
1. **Number of business-impacting P1/P2 cases**	~4.2 per week	< 8 per four weeks (average of 2/wk)
2. **Percent of cases that are recurrences**	~28%	< 10%
3. **Business impact total score (severity x duration)**	High: ~1 per week Medium: ~3 per week Low: ~2 per week	High: 1 per four weeks Medium: 5 per four weeks Low: 6 per four weeks
4. **Total number of P1/P2 cases**	~5.7 per week	< 12 per four weeks (average of 3/wk)

Note: *Moving windows are used to account for natural volatility in the caseload. I.e., due to random events, cases may occur closely in time followed by a quiet period. Overall business continuity results may be more accurately reflected by smoothing out some of the natural variation*

* As of 07May06

Corrective action task owners

Risk / Impact Assessment

Area	#	Action	Task	Owner
Impact Assessment	RA.1	Kintana lock-down	Communicate expectations and timeline regarding impact and risk assessment and test planning	Colleen / Steve
			Identify gatekeepers for initial application lock-down list	IT managers
			Document guidelines and minimum criteria for impact and risk assessment	PM or RMO
			Lock down the applications in Kintana, using a gatekeeper role to verify adequate risk/impact assessment and test plans are in place prior to migration to stage environments	IT managers
			Identify list of applications next in priority for lock-down and timeline	Chris Thomas
	RA.2	CCB / RMO scope expansion	Define plan to expand the scope of RMO and CCB to manage changes to non-C3 applications	Roger Douglas
			Implement plan	Roger Douglas
	RA.3	Accountability	Hold system owners accountable for implementation of the process – ensure any change to their applications has risk/impact assessment performed and resulting test plan defined and executed	Colleen / Steve
	RA.4	Documentation	Document system architecture that encompasses C3 modules, interfaces, bolt-ons, portals, B2B, and other interconnections	Joe Mastropolo
			Document business architecture that encompasses business data flow among C3 modules, interfaces, bolt-ons, portals, B2B, and other interconnections	Joe Mastropolo
			Document system architecture that encompasses Tablebuild, SIPS, SFA family of systems, including components, interfaces, and interconnections	Joe Mastropolo
			Document business architecture that encompasses business data flow among Tablebuild, SIPS, SFA family of systems, including components, interfaces, and interconnections	Joe Mastropolo

Corrective action owners (continued)

Recurring Bugs

	#		Task	Owner
	BF.1	<company>Live!	Force business decision	Ed Freeman
			Implementation plan or de-prioritization	Ed Freeman
	BF.2	Outstanding recurring bugs	TSRT Query: Resolve large file upload problem (cases 3922716, 3939229, 3938747, 3935934)	Ed Freeman
			Case Kwery: Investigate and resolve suspected memory leak (cases 4289514, 4271465)	Ed Freeman *(was Mike Grace)*
			Identify status of SWIFT case 3972505. Case information points to I2R 3329, which was implemented last fall (Sept/Oct) before the case occurred (December). Second SWIFT case (4043533) was categorized similarly but had a different I2R #, and was marked as implemented in February.	Sanjay Khera
			Drive resolution with MCA Solutions regarding SPO cases related to database connection failures (cases 3763698, 3899671, 4450313. All related to database connections, but may have different causes. None are marked as LTF implemented)	Ed Freeman *(was Mike Grace)*
			Resolve SVO Dispatch memory leak (case 3759022)	Ed Freeman *(was Mike Grace)*
Bug Fixes	BF.3	Accountability	Drive accountability for system stability by aligning incentives to metrics that report, by IT manager by application…	Colleen / Steve (incentives) Chris Thomas (metrics reporting)

Corrective action owners (continued)

Data Archive / Retention

	#		Task	Owner
Data Archive / Retention	DA.1	Cycle count analyze	Define and implement performance improvements to address failures in C3 cycle count analyze process	Ed Freeman
			Implement plan to address long term fix for cycle count analyze issues	Ed Freeman
	DA.2	C3 History, Log, Transaction data growth	Define data archive / purge action plan for history, log, and transaction information in the production C3 database	Ed Freeman
			Implement C3 data archive/purge/retention plan for history, log, and transaction information	Ed Freeman
	DA.3	C3 Archive / Purge / Retention	Longer-term: Complete the analysis for remaining high volume data items and define and implement complete data archive/retention strategy for C3	Ed Freeman
	DA.4	CA Unification	Longer term: Define data archive/retention strategy for CA Unification during implementation planning and implement at go-live	Ed Freeman

Backup

Impact and risk assessment priorities

- **The applications in the table below are the highest priority applications for which the impact and risk assessment corrective actions must be taken**

  Actions: Kintana lock-down, inclusion in CCB/RMO, architecture documentation:

Application	Cases	Application Priority	IT Manager	Kintana?
C3 – All modules	4	P1	Ed Freeman & Mike Grace	Yes
Machine Translation (e.g., MTP)	2	P1 or **P2***	Stephen Liem	Yes
Tablebuild**	2	P1	Wilson Shiu	Yes
SFA**	3	**P1** or P2*	Wilson Shiu	Yes
C3 B2B	1	P1	Mike Grace	Yes
SitePublish**	1	P1	Wilson Shiu	Yes
Topic/Google	1	P1	Stephen Liem	Yes
SVO Status	1	P1	Mike Grace	Yes
SIPS**	1	P2	Wilson Shiu	Yes
CCRT	2	P2	Sanjay Khera	No

** Discrepancy among data sources; bold value is from application repository*
*** These applications are organized / reported differently (i.e., sometimes together) depending on source*

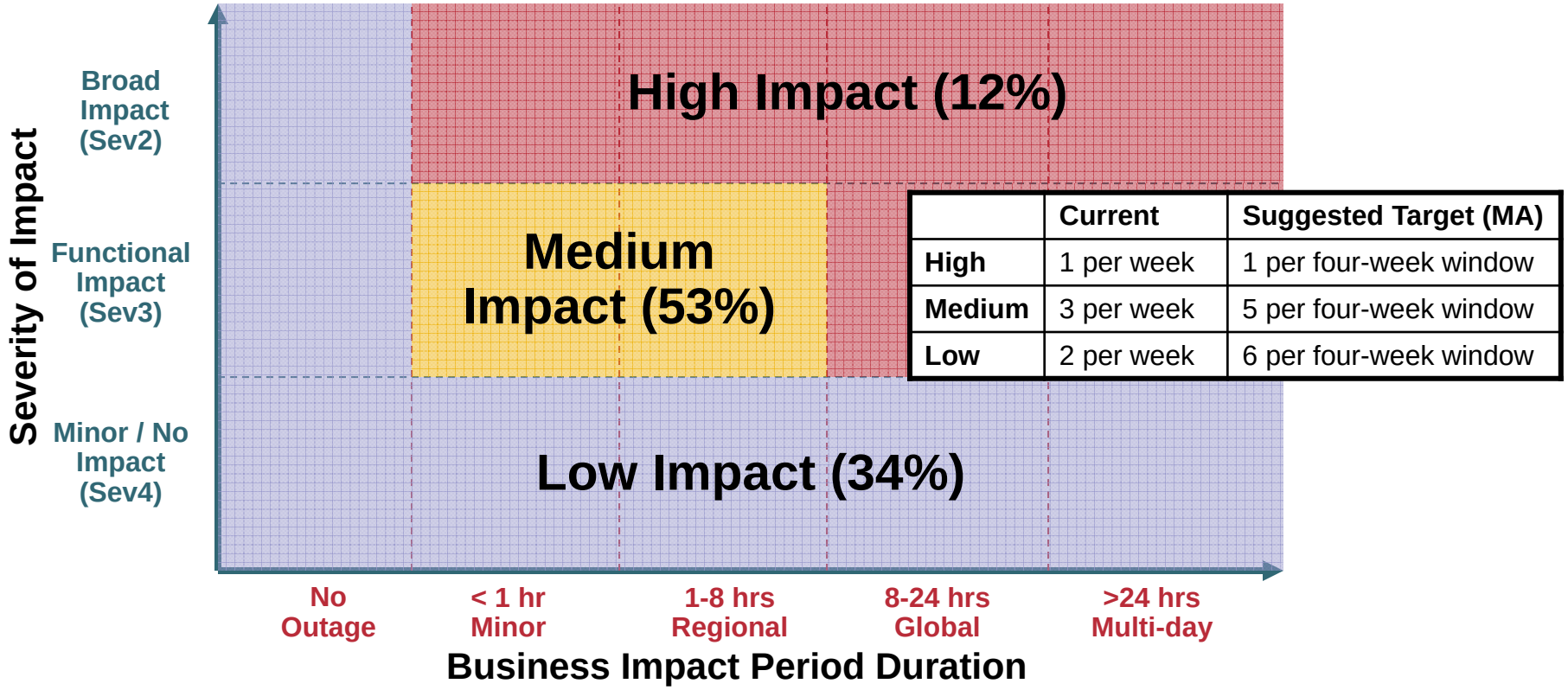
Bug fix priorities

- **The following applications have open cases identified as recurring bugs:**

Application	Cases	Application Priority	IT Manager
TSRT Query	5	P1	Ed Freeman
Case Kwery	2	P2	Ed Freeman
SPO	2	P2	Mike Grace
SVO Dispatch	1	P1	Mike Grace

Suggested P1/P2 performance targets

Performance targets for business continuity to be measured along the following three dimensions



	Current	Suggested Target (MA)
High	1 per week	1 per four-week window
Medium	3 per week	5 per four-week window
Low	2 per week	6 per four-week window

Other observations – RCA Process

- **RCA is not particularly well-suited for identifying and addressing non-technical root causes**
  - **Root cause analysis is performed on a case-specific basis by lead owner for the case with other technical participants**
  - **Root cause analysis appears to be very technical in nature, and less likely to identify true root causes for process and organization engagement deficiencies – and therefore less likely to result in needed changes**
    - **Identified root cause may reflect technical causes rather than underlying "root" cause**
    - **LTF may not address the underlying problem, as the case players have little direct influence to change higher-level issues**
- **These issues may be better identified by analyzing data across cases at a higher level – probably by other roles**
  - **Implementation of a real fix for those types of issues requires involvement of other roles and higher levels of the organization**
- **The current approach limits the overall impact that the RCA process will have within <company>**
- **Consider: Discussing RCA process improvements with EIO**

Other observations – P1/P2 categories

As identified prior, the current categorization does not accurately reflect business continuity

- **Reflects priority of the application more than priority of the case**
- **Does not identify whether there actually *was* any business impact**
- **Does not quantify the impact (revenue lost, productivity lost – or even duration of outage)**
- **Priorities cannot be reduced once set to an inappropriate level**

As such, the statistics are of little help in gauging actual continuity results

- **Primary value at this point seems to be as a benchmark to compare whether corrective actions have had an effect**

Consider: Case prioritization scheme that reflects the actual priority of the specific case

Some information from the data set*

Case distribution	Non-C3: 64% C3: 36%
Frequently occurring non-C3 apps	Tablebuild (9%), <company>Live! (8%), SFA (7%), SIPS(5%) , Case Kwery (6%), C3 business layer (5%), Topic/Google (5%)
Frequently occurring C3 areas	B2B related: 18% SVO related: 11% Related to TSRT Query: 9%
Business impact indication	Business-impacting: 72%
Severity distribution	S2: 12% S3: 65% S4: 33%

**** Using the April 7 data set***

Documentation received*

- Introduction to SOX program controls
- CCB encyclopedia
- Environmental plan (Concurrent Dev transformation)
- I2R process decomposition
- P1/P2 priority definitions
- Application map to process
- January 15 health report
- EIO program and metrics (link)
- December playbook
- June transition overview
- June release schedule
- Tactical release process
- Emergency bug fix process
- Severity definitions
- QA process documentation

** Not an exhaustive list – also includes Mongoose project background and other documents*

Approach

- **Choice #1: Strictly follow the DMAIC approach**

  Ignore the P1/P2 data for now

  Get clearly articulated needs statements with respect to system availability needs from the business users

  Start by documenting the high-level process flow for the set of processes that interrelate to govern operations of the I2R systems

- **Choice #2: Follow the data**

  Start with the data and follow a data-driven approach, and use the data to drive where we drill into the process

- **Choice #3: Hybrid approach *(recommended)***

  Use the P1/P2 defects per week as a proxy measurement for users' availability requirements *for now*

  Review and document the high-level interconnections of the operations processes

  Review the currently collected data, identify gaps and improvements to data collection, and perform initial analysis – "archeological dig"

  Define user-oriented performance metrics once initial information capture and analysis is complete

Process documentation coverage

Change Authorization	*Risk / Impact Assessment*	*Test Planning / Strategy*	*Test Execution*
• CCB process for C3 – CCB Encyclopedia • Gatekeepers matrix for other systems – WIP • Tactical release process documentation (CC/EC not "approvals" per se) • I2R release planning process (v11)	• <Not done at release level (across projects)> • Tacticals – not always done? • No formal documentation	• QA process documentation (where QA involved) • SOX minimum level of testing matrix and PCC process • Mentioned in tactical release process	• QA process (where QA involved) • Some documentation in tactical release process • December playbook – deployment testing only

Deployment Planning	*Deployment Process*	*Maintenance Procedures*
• December playbook • June transition overview	• SOX gatekeeper • Kintana enforcements (for systems that use Kintana) • December playbook	• EBF process • <No other documentation>

Data collection gaps

- **Ongoing / recurring problems cloud the analysis**
  - **May be one case kept open (in which case the actual outage information not correct) or multiple cases to reflect the same problem**
  - **Known issues not easily seen**
  - **Recurrence information reflects very specific recurrences versus thematic problems**
- **Use of free text data complicates roll-up analysis**
  - **E.g., application affected, outage duration, etc.**
- **Will need to make analysis less manual for ongoing monitoring – or it will probably not be done once this focus is lessened**

Key observations *("What we've heard")**

Controls

- **Gatekeepers not defined for all systems; for some systems, access to make changes is not limited to people with defined authority to approve changes**
- **No formal approvals on CC, EC, scope changes for tactical releases**

Coordination

- **Holistic view of risk / impact assessment across projects within a release seems to be missing – "others" assumed to know (users, technical leads, etc.)**

Quality

- **Risk / impact assessment not clearly linked with test strategy**
- **Adequate regression testing typically not performed**
- **QA involved in about 65% of major releases, but not generally involved in tacticals**
- **Observations made that change-related issues are fewer when QA involved (not evaluated from data at this point)**
- **Scope of SOX is 11i-only and focused on change control and data quality, not stability**

Process

- **Process documentation difficult to find**
- **Unclear why C3 and non-C3 are treated differently (change control, quality, etc.)**

Boundaries

- **Definition of C3 versus non-C3 and defined scope of CCB depend on who you ask**

Maintenance

- **No archive/purge strategy and no active monitoring of log file size**

** From interviews – to be correlated with case data*

Templates and tools

Define	Measure	Analyze	Improve	Control
• *Identify the problem and goals* • *Define scope and customer requirements* • *Document high level process*	• *Identify measurements and data collection plan* • *Collect data, assess, and baseline current performance*	• *Analyze data* • *Develop hypotheses and test* • *Identify root causes*	• *Generate solutions* • *Define and execute implementation plan* •*Institute performance metrics* •*Measure impact*	• *Evaluate results and key learnings* • *Monitor and continually improve performance*

Sample Tools:

Define	Measure	Analyze	Improve	Control
• Cost benefit • Voice of Customer • **Project charter** • SIPOC / **High-level process description**	• **Run chart** • **Histograms** • DPMO • Process Capability • **Business impact matrix**	• **Cause/Effect** • **Pareto** • **Histograms** • Chi Square • Five Why's • Process map • Root cause	• **Brainstorming** • Process map • QFD • FMEA / Mistake proofing • Cost benefit	• Control chart • Control plan • Performance dashboard • Post project assessment

31