



# Quality Techniques for Improving Software Project Management

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## Congratulations. We Are Giving You An Opportunity To ...

1. Project is behind schedule or has an unrealistic delivery date
2. Executives just want the system delivered on schedule
3. No one knows or wants to admit the true status of the project
4. No documented requirements exist
5. Figure out what is important to deliver
6. Get users to buy-in into the system being delivered
7. Get the implementation team to synchronize their efforts to deliver the product the users need
8. No test strategy or plan exists
9. Time available for testing continues to shrink as development delays mount



## Problem Statement

- Acceptance testing must start no later than November 3rd
- System Integration Testing is scheduled to end by November 14th
- Stakeholders are concerned with potential schedule delays that may jeopardize the introduction of the system into production use
  - The system's requirements are "baselined," but incomplete
  - A critical software module that touches all other system components is behind schedule and is undergoing replanning
- Senior Management wants a simple way to:
  - Visualize progress and problem areas
  - Assess impact(s) on the project and Enterprise



## What Do We Want?

- Manage risk
  - Find problems sooner
    - So we have more time to fix them and re-test
  - Gain greater assurance that components that support mission critical capabilities are:
    - Identified and implemented in a timely manner
    - Tested early and often
- Move away from a reactive to a more proactive approach to managing projects and testing



## What Do We Want? (continued)

- A structured way to plan and organize from concept through systems test
- Can be implemented at any point in the project lifecycle - the sooner the better
- Can be used by Project Assurance and/or Independent Verification and Validation (IV&V) teams to check out the System
- Provides a mechanism to engage the user and development teams in the discussion of:
  - Acceptance Criteria
  - Priorities
  - Trade-offs



## What Do We Want? (continued)

- Identify gaps in:
  - Requirements
  - Understanding
  - Schedule
- Highlight:
  - Defects that are blocking progress
  - Where trade-offs need to be made to prioritize work



# Operational Scenarios

- Users can easily describe their mission critical operational threads
- Users have more confidence in the System if you can successfully demonstrate operational scenarios
- Operational scenario testing
  - Is necessary but not sufficient to assure quality
  - Is no substitute for thorough testing
  - Allows the user to more easily articulate their acceptance criteria and get a sense for whether the System works



## Operational Scenarios (continued)

- Use operational scenarios to:
  - Streamline and prioritize development and testing
  - Enable sanity checking of each software build before running all test cases
  - Provide a visual way for stakeholders and management to assess progress and problems in:
    - Project
    - Infrastructure
    - Software components





## Methodology

- Identify and prioritize operational scenarios that must pass test to satisfy user's Acceptance Criteria
- Identify Test Cases needed to demonstrate Operational Scenarios
  - Create Test Cases as needed
- Build three matrices:
  - Cross-reference Operational Scenarios to Test Cases
  - Test Case Status from Operational Scenarios
  - CI/CU Status from Operational Scenarios

# Cross-reference Operational Scenarios to Test Cases

Rank Order Operational Scenario Capabilities By Importance

Identify Test Cases Needed to Support the Operational Scenario

#	Operational Scenarios	TC 1	TC 2	TC 3	TC 4	TC 5	...	TC n
<b>System A Smoke Test</b>								
Sys 1	Register to user							
Sys 1a	Register and receive userID and Password	X	X					
Sys 1b	Register and No userID and Password	X	X					
Sys 4	Log-in and attempt to use Application							
Sys 4a	Suitable and granted permission to use services			X	X			
Sys 4b	Permission pending to use services			X	X			
Sys 4c	Unsuitable and denied permission to access services			X	X			
Sys 5	Delegate Roles							
Sys 6	Log-in to select transission of form 1234 series					X		
Sys 7	Log-in to select transission of form 567 series					X		
Sys 8	Log-in to select transission of form 2468 series					X		
Sys 9	Three data file extract (AAA, BBB, CCC)							
Sys 10	Demonstrate ID Matching							X
Sys 11	Demonstrate report delivery							X
:								
Sys n	Other reasonable Operational Scenarios to sanity check System A							
<b>Central System Smoke Test</b>								
Central 1	Log-in to Internet and file a 1234 series forms (using invalid data and formats)	X	X	X	X	X		X
Central 2	Log-in to Internet and file a 1234 series forms (using valid data and formats)	X	X	X	X	X		X
Central 3	Log-in to Internet and file a 567 series forms (using invalid data and formats)	X	X	X				X
Central 4	Log-in to Internet and file a 567 series forms (using valid data and formats)	X	X	X				X
:								
Central n	Other reasonable Operational Scenarios to sanity check Central System							X

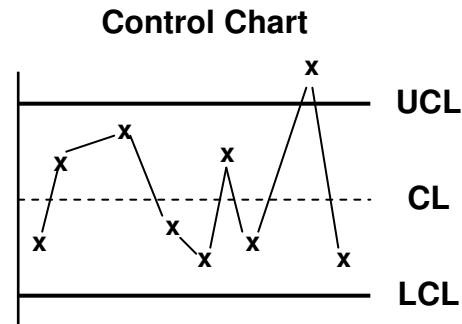
# Test Case Status from Operational Scenarios

#	Operational Scenarios	TC 1	TC 2	TC 3	TC 4	TC 5	...	TC n
<b>System A Smoke Test</b>								
Sys 1	Register to user							
Sys 1a	Register and receive userID and Password	P	P					
Sys 1b	Register and No userID and Password	P	F1					
Sys 4	Log-in and attempt to use Application							
Sys 4a	Suitable and granted permission to use services			P	P			
Sys 4b	Permission pending to use services			P	F2			
Sys 4c	Unsuitable and denied permission to access services			F1	F1			
Sys 5	Delegate Roles							
Sys 6	Log-in to select transission of form 1234 series					P		P
Sys 7	Log-in to select transission of form 567 series					P		F2
Sys 8	Log-in to select transission of form 2468 series					P		P
Sys 9	Three data file extract (AAA, BBB, CCC)							
Sys 10	Demonstrate ID Matching							F2
Sys 11	Demonstrate report delivery							P
:								
Sys n	Other reasonable Operational Scenarios to sanity check System A							
<b>Central System Smoke Test</b>								
Central 1	Log-in to Internet and file a 1234 series forms (using invalid data and formats)	P	P	P	P	P		F1
Central 2	Log-in to Internet and file a 1234 series forms (using valid data and formats)	P	P	P	P	P		F2
Central 3	Log-in to Internet and file a 567 series forms (using invalid data and formats)	P	F1	P	P			F2
Central 4	Log-in to Internet and file a 567 series forms (using valid data and formats)	P	F1	P				F2
:								
Central n	Other reasonable Operational Scenarios to sanity check Central System							F2

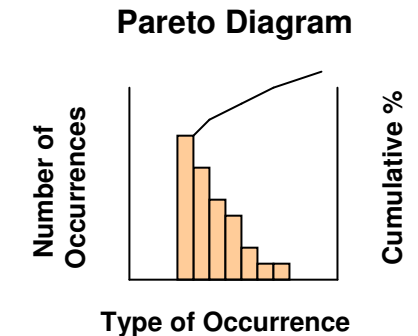
Test Case  
 P – Pass  
 Fn – Fail  
 n – Severity  
 (1 High to 5 Low)

# Test Case Status

- Provides an indication of where the problems are in the system
  - Constant source of problems
  - Blocking problems
- Provides statistics for trending problem areas
  - Statistical Process Control (SPC) techniques can be applied here to predict where to test



- **Helps reduce variability**
- **Monitors performance over time**
- **Allows process corrections to prevent rejections**
- **Trends and out-of-control conditions are immediately detected**

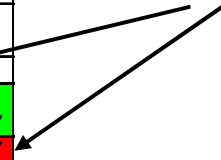


- **Identifies most significant problems to be worked first**
- **80% of problems are due to 20% of the factors**
- **Shows the vital few**

# CI/CUs Status from Operational Scenarios

#	Operational Scenarios	TC 1	TC 2	TC 3	TC 4	TC 5	...	TC n
<b>System A Smoke Test</b>								
Sys 1	Register to user							
Sys 1a	Register and receive userID and Password	CI/CU1	CI/CU2					
Sys 1b	Register and No userID and Password	CI/CU1	CI/CU3					
Sys 4	Log-in and attempt to use Application							
Sys 4a	Suitable and granted permission to use services			CI/CU55	CI/CU60			
Sys 4b	Permission pending to use services			CI/CU56	CI/CU22			
Sys 4c	Unsuitable and denied permission to access services			CI/CU22	CI/CU23			
Sys 5	Delegate Roles							
Sys 6	Log-in to select transission of form 1234 series					CI/CU13		CI/CU17
Sys 7	Log-in to select transission of form 567 series					CI/CU14		CI/CU17
Sys 8	Log-in to select transission of form 2468 series					CI/CU15		CI/CU17
Sys 9	Three data file extract (AAA, BBB, CCC)							
Sys 10	Demonstrate ID Matching							CI/CU92
Sys 11	Demonstrate report delivery							CI/CU200
:								
Sys n	Other reasonable Operational Scenarios to sanity check System A							
<b>Central System Smoke Test</b>								
Central 1	Log-in to Internet and file a 1234 series forms (using invalid data and formats)	CI/CU4	CI/CU8	CI/CU12	CI/CU13	CI/CU15		CI/CU102
Central 2	Log-in to Internet and file a 1234 series forms (using valid data and formats)	CI/CU4	CI/CU8	CI/CU12	CI/CU13	CI/CU15		CI/CU102
Central 3	Log-in to Internet and file a 567 series forms (using invalid data and formats)	CI/CU4	CI/CU 2, CI/CU3	CI/CU12	CI/CU13			CI/CU102
Central 4	Log-in to Internet and file a 567 series forms (using valid data and formats)	CI/CU4	CI/CU 2, CI/CU3	CI/CU12				CI/CU102
:								
Central n	Other reasonable Operational Scenarios to sanity check Central System							CI/CU102

**Cross reference Test Case Discrepancy Results to CI/CU P/F**





## CI/CU Status

- Shows which CI/CUs may be a problem and their impact on other operational scenarios
- Use test data and CI/CU results to populate the operational scenarios to Test Cases matrix
- Include scheduled due date for CI/CU
- Build project plan to monitor operational capabilities



## Some Lessons Learned

- Allocate plenty of time to develop and review operational scenarios
  - This can be a very tedious, complicated, time consuming task
- Keep the operational scenarios simple
  - Try not to make the scenarios too complicated
- Match test data the operational scenario
- Encourage the vendor run the operational scenarios as part of their development process
  - Greatly reduced the number of defects found during system integration testing and acceptance testing
- Communicate issues with team to ensure everyone is on same page (e.g. version of XML schemas for testing and if they will be updated)



# For More Information

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