Ohio | Public Utilities Commission

Green Belt Six Sigma Project Report Out

Greg Hughes
Public Utilities Commission of Ohio

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PUCO IT TESTING PROCESS

LEANOhio

PUCO IT TESTING PROCESS TEAM

Seated

- Cindy Money – Black Belt Mentor
- Carol Harp – SME
- Stephanie Allen – SME

Standing

- Venkat Rajagopal – Process Owner
- Ed Carr – Team Champion/Sponsor
- Greg Hughes – Team Lead

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BACKGROUND- SCOPE

- The PUCO currently handles system testing in an ad hoc way that is not consistent and does not allow for re-use. The team determined that creating detailed metrics would be difficult at present due to a lack of data since just one application had been tested using the current process. Instead, initial metrics will consist of :
  - Having a test plan
  - Include user sign-off for the test plan

  Other metrics will be verified as to their usefulness and implemented as they become needed.

- Scope: **Test the product**

  First Step: **Develop the test plan**

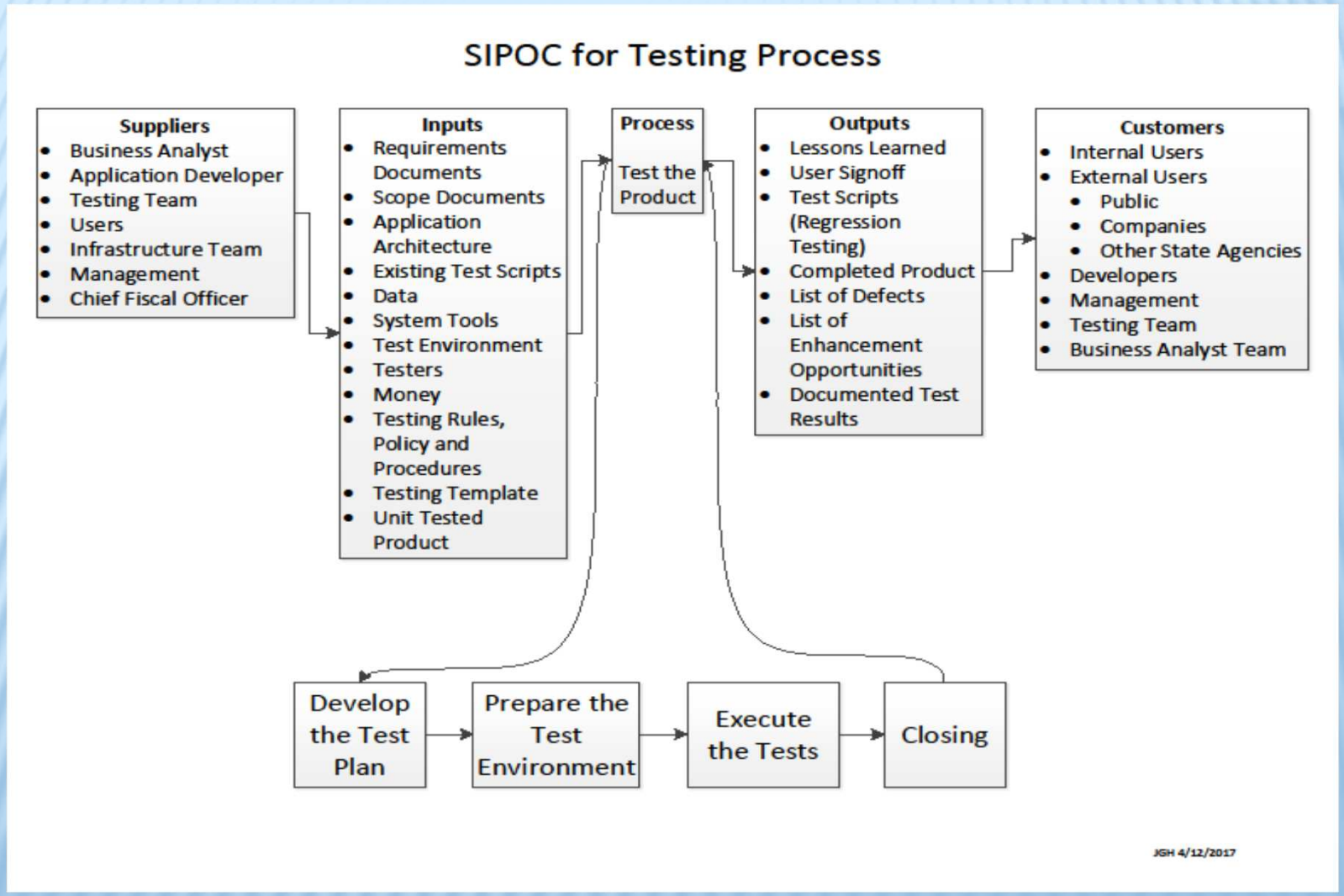
  Last Step: **Closing the testing portion of the project:**

  Releasing the application to production

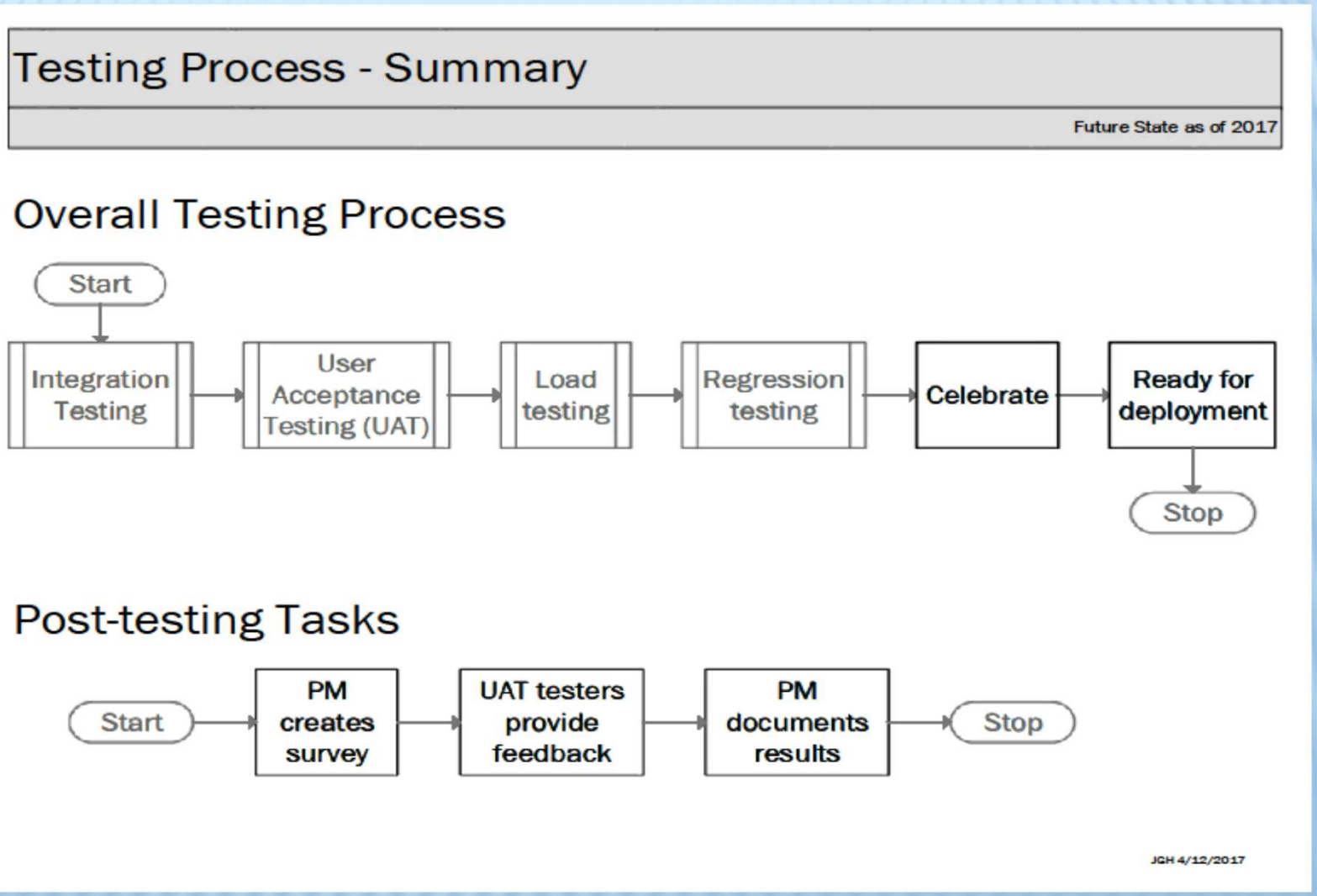
PROJECT GOALS

- Identify and use best practices in the PUCO's development and testing environments.
- Increase the Capability Maturity Model level from 1 to 2 - 4 with a minimum improvement of Level 2 (Repeatable).
- Create a consistent test plan and testing methodology.
- Create and use templates and artifacts, then include lessons learned into revised templates and processes.
- Be able to more accurately estimate testing time by developing metrics over time.
- Make the process a repeatable process for the next application.
- Increase employee comfort level by providing stability using well-defined roles.

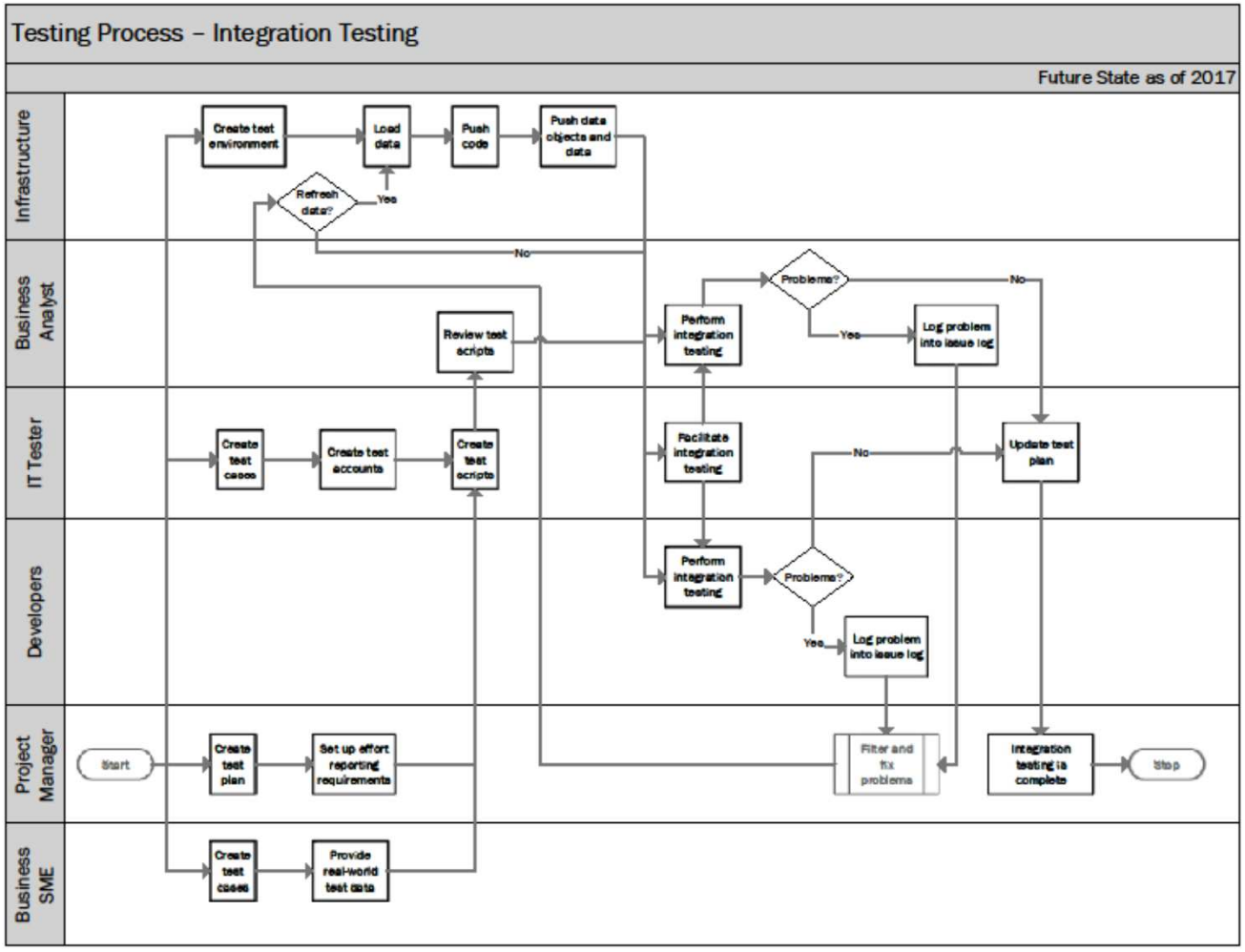
HIGH LEVEL PROCESS - SIPOC



PROCESS MAP - SUMMARY



PROCESS MAP – INTEGRATION TESTING



TIMUWOOD

T

TRANSPORTATION

- Transport from office to office
- Transport from floor to floor
- Transport from building to building
- Other transportation and travel

I

INFORMATION, INVENTORY

- Finished product
- Storage
- Printed in advance
- Work in process
- In the warehouse
- Requiring unnecessary info on a form

M

MOTION

- Inter-office movement
- Office to office
- Cubicle to cubicle
- Going to the copier or scanner
- Going to the fax
- Going to the storeroom
- Reaching
- Bending

U

UNDERUTILIZATION

- Employees
- Talent
- Office space
- Technology
- Equipment

W

WAITING

- Nonproductive time
- Waiting for:
  - copier
  - scanner
  - delivery
  - catchup
  - person upstream
  - mail/shipper
  - computer

O

OVERPRODUCTION

- Making too many
- Making in advance of requests
- Throwing away the excess
- Things getting outdated
- "We have to be ready"
- Not cautious, but wasteful

O

OVERPROCESSING

- Adding things that nobody wants
- Report that nobody reads
- "Gold plating"
- The best
- Better than good enough
- Beyond meeting customer expectations

D

DEFECTS

- Mistakes
- Broken
- Inaccurate
- Can't read
- Can't understand
- Wasted materials
- Returned

WASTE - DEFECTS

The following were identified as things to be aware of in the current process that we can try to avoid in the new process:

- There were no business specifications (Input Defect)
- Legal and Public Affairs were not included as stakeholders (Input Defect)
- An unplanned-for SQL Server update slowed down the testing (Input Defect)
- There were too many “fixing code and testing” loops
- In the issue log, the same issue was documented multiple times

WASTE - UNDERUTILIZATION

The following were identified as things to be aware of in the current process that we can try to avoid in the new process:

- Developers created the test instead of the IT – Tester
- The initial issue log could not be accessed by the developers
- The revised issue log was made sharable, but some of the updates did not get saved to the issue log
- Not using the business requirements to determine whether or not a requirement was within scope
- Failure to fully utilize email groups created situations where participants were inadvertently excluded from mailings
- An automated software testing application needs to be used
- Missing environmental baseline and stepwise starting places for testing

WASTE –WAITING & OVER-PROCESSING

The following were identified as things to be aware of in the current process that we can try to avoid in the new process:

- Waiting – The creation of the testing environment took too long
- Over-processing – Not all need to attend to observe stakeholders' reactions to the system

VA – NVA - NVAN

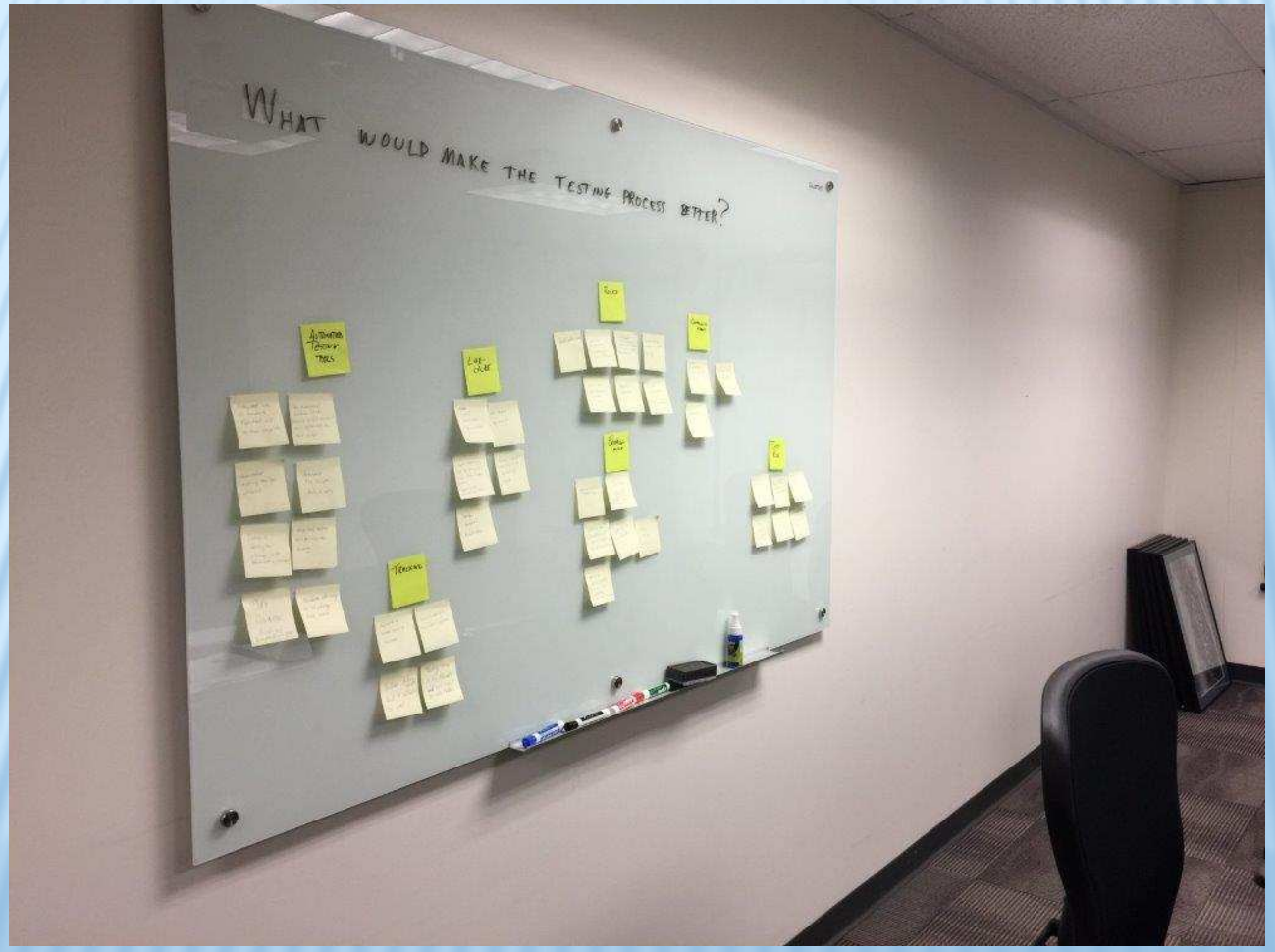
*Nothing in the process constitutes as **value-added (VA)**. If the developers created the code correctly in the first place, testing would be unnecessary.*

*In addition, nothing in the process is required by statute or law. Therefore none of the steps would be considered to be a **non-value-added-but-necessary (NVAN)** step.*

*Thus, all steps are **non-value-added (NVA)** and should be minimized as much as possible.*

BRAINSTORMING AND AFFINITY DIAGRAM

What would make the testing process better?



PROJECT BENEFITS - INTANGIBLE

- Teambuilding
- Inter-departmental cooperation
- Well-defined roles and expectations
- Testing status via where we are in the process

IMPROVEMENT SUMMARY

Current Key Issues	How We Improved
No test plans	Test plans are part of the process
No mechanism for sign-off	Sign-off will be necessary before an application moves to production
No feedback loop for getting better	Checklists and sub-processes will be monitored to optimize future metrics

IMPLEMENTATION PLAN

Task	Who	When	Status
Complete Visio Diagram	Greg	2/8/2017	Complete
Word doc for Metrics	Greg	2/9/2017	Complete
Define Infrastructure Checklist	Venkat	2/15/2017	Complete
Define Tester list checklist for setting up the process	Stephanie	2/15/2017	Complete
Define checklist of all documents needed (required v. optional)	Stephanie	2/15/2017	Complete
Create Standard Operating Procedure from the Flow Diagram	Greg	2/10/2017	Complete
Train department on the SOP	Stephanie	?	Started PowerPoint document
Create templates for all documents	Carol	2/15/2017	Complete
Communicate direction at a high level	Ed	?	?

AS A RESULT – DEFINED TERMS (FROM SOP)

IT Related Terms & Items

PUCO staff members responsible for testing should be familiar with the following terms and items:

- ***Application Architecture:*** The overall structures of the application and how they fit together such as SSRS, automated emails, the database(s), and programming languages like JavaScript in combination with Visual Basic.
- ***Application Lifecycle*:** The movement of an application from inception through the various stages of requirements gathering, analysis, design, implementation, and testing.
- ***Artifacts:*** The items documenting what happened throughout the process. These include documents such as business requirements and business SME signoff.
- ***Change Control:*** The movement of data objects and data through the various test environments. A second definition could be the attempt to control scope through the association of changes in scope with changes in cost and time.
- ***Cycle:*** Also known as test cycle. This term refers to the refreshing of a test environment through the actual testing to the listing of associated problems or issues needing to be addressed. It can be referred to in conjunction with terms such as "cycling or "churn". This situation of too many cycles can stem from issues such as low quality code or variable business requirements.
- ***Effort Reporting:*** The documentation of the amount of time expended on a task.
- ***External Users:*** People outside of the PUCO that use the PUCO's applications.
- ***Integration Testing:*** The verification of functionality by individuals within the IT department.
- ***Internal Users:*** People inside of the PUCO that use the PUCO's applications.
- ***Issue Tracking:*** The process makes sure that any exception found in testing does not get lost. These items should be eventually classified as items needing to be fixed now, items to be fixed after this release, or items that do not need to be fixed.
- ***Lessons Learned:*** An artifact of the process listing the things that went well, methods of handling problems that worked and didn't work, and possible ways of improving them in future projects.
- ***Load Testing:*** The verification of the application's functionality when many used at the same time by many people.
- ***Project Charter:*** The initial document summarizing the major components of a project such as its scope, communications, a listing of the team and their overall responsibilities, an expected completion time, and the anticipated cost.
- ***Quality Assurance** (QA):* This activity makes sure that the application matches the business requirements and functions properly as it does so.
- ***Regression Testing:*** The verification of the application's functionality regarding previously-tested requirements. This typically involves running automated versions of old test scripts.
- ***Requirements Documents:*** Functionality needed to automate or replace portions of existing business processes.
- ***Requirements Traceability Matrix:*** A document matching each of the pieces of functionality with the test cases covering them.
- ***Scope Documents:*** Written information discussing the functionality planning to be completed as a result of completing the project. In phased projects, this includes information about what will not be included in specific phases.
- ***Stakeholders:*** People that will be affected by the project.
- ***Test Issue Log:*** A list of results found through the testing process that do not match expected results. This can also referred to as a "problem log".
- ***Test Scripts:*** A sequence of steps used to test one or more pieces of functionality.
- ***Test Plan:*** A documented plan showing the types of testing that will be performed, who will perform them, and timelines with completion dates for each.
- ***Unit Tests:*** Validation of the basic workings of the application including checking to make sure that the code matches information set forth in the business requirements document.
- ***User Acceptance Test (UAT):*** The verification of the application's functionality by the people who will be using the system.
- ***User Signoff:*** The final step in the UAT process. This step signifies that the users can use the system and that any items remaining to be fixed represent minor issues of little consequence to the operation of the business process.

AS A RESULT – TESTING ROLES (FROM SOP)

- *Business Analyst:*
  The testing role of the business analyst still revolves around the business specifications. Knowledge of these requirements enables a person acting in this capacity to review test scripts to make sure they match the initial business requirements and to validate the application through the execution of test scripts.
- *Business Subject Matter Expert (SME):*
  These people know the business and should be used as the final check to make sure that the final resulting application produced conforms to the needs of the business. For that reason, these people act as the final word for validating applications and need to be the people that "sign off" or attest to the application's usability. In addition to the people that actually perform the work, other business SME's include the Chief Fiscal Officer, since they need to verify the way payments move through a process, and the Office of Public Affairs since they need to make sure that the way information goes to the public matches their standards.
- *Developers:*
  Those that create code help with the testing process by thoroughly unit-testing their code before the testing process and by fixing or modifying the code to match the sometimes fluid needs of the business SME's throughout the testing process.
- *Infrastructure:*
  These caretakers of the environment insure that all of the pieces of the application live in a place that they can communicate when they should, and be shunned from the village if security requires it. In addition, these individuals move and track code and data through the various environments as code is "promoted" through environments such as development and production.
- *IT Tester:*
  The person that helps to facilitate the actual testing by generating scripts, helping set up testing accounts for others, helping other people perform their testing, and handling the more automated testing functions such as regression and load testing.
- *Project Manager:*
  The person that keeps the testing from spawning too many cycles or taking too much time, effort, or money. They also make sure that when the testing ends that the Business SME's have a quality product.

AS A RESULT – REPEATABLE PROCESS

With the Future State Diagram, the framework now exists for the testing process, putting the IT Testing Process at Level 2 (Repeatable) for the Capability Maturity Model.

- As a result, anytime a new application project needs to be tested by IT:
  - A pre-defined series of steps can be followed.
  - The steps themselves are general enough that all projects should fit this framework.
  - Pre-defined roles help in the task assignment process.
  - Clear triggers are set to determine when the application passes each phase of the testing process.

SPECIAL *THANKS* TO…

Senior Leadership:

- Ed Carr
- Patrick Donlon
- Christopher Cunningham

Sponsor:

- Ed Carr

Process Owner:

- Venkat Rajagopal

Subject Matter Experts:

- Carol Harp
- Stephanie Allen

Six Sigma Mentor:

- Cindy Money

QUESTIONS/COMMENTS