Raytheon

Customer Success Is Our Mission

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Let Tailoring be Your Guide
Early Use of Baseline Data

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Agenda

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- Presenter Biography

Overview

- Where in the process do you start to use statistical data?
  - We believe starting earlier in the lifecycle to effectively make choices can make a difference in the outcome
- Our organization has performed an analysis of the tailoring performed on each procedure.
- Data generated from this activity was compared with baseline statistics against each function, function to function, and even across the different project types. This data is maintained as part of the baselines established.
- Questions you might consider for yourself:
  - Why do organizations choose the data they choose for analysis? Do they understand their selection requirements? Do they choose wisely? Or do are they just trying to “get” a maturity level 4/5 appraisal result?

Overview

What we ended up doing:

- Sifted through results of
  - 20,000 plus process tailoring records
  - Results of many internal assessments
  - Results of internal objective evaluations
- Discovered apparent relationships
- Checked the current compliance state of a project*
- Creating some recommended changes

* for this presentation I will use the word project to mean both a project or a program

Why did we get here?

- Numerous internal assessments and external appraisals
- Review of our issues
- Review of our meta process of the process creation and usage

Our Theory

- That project delivery of the product has problems that grow becoming worse over time, which also has ripple effects into other process and product issues, and that the earlier in the lifecycle of process usage we could intervene to make the procedures and the adherence to those procedure better, the better off we would be.

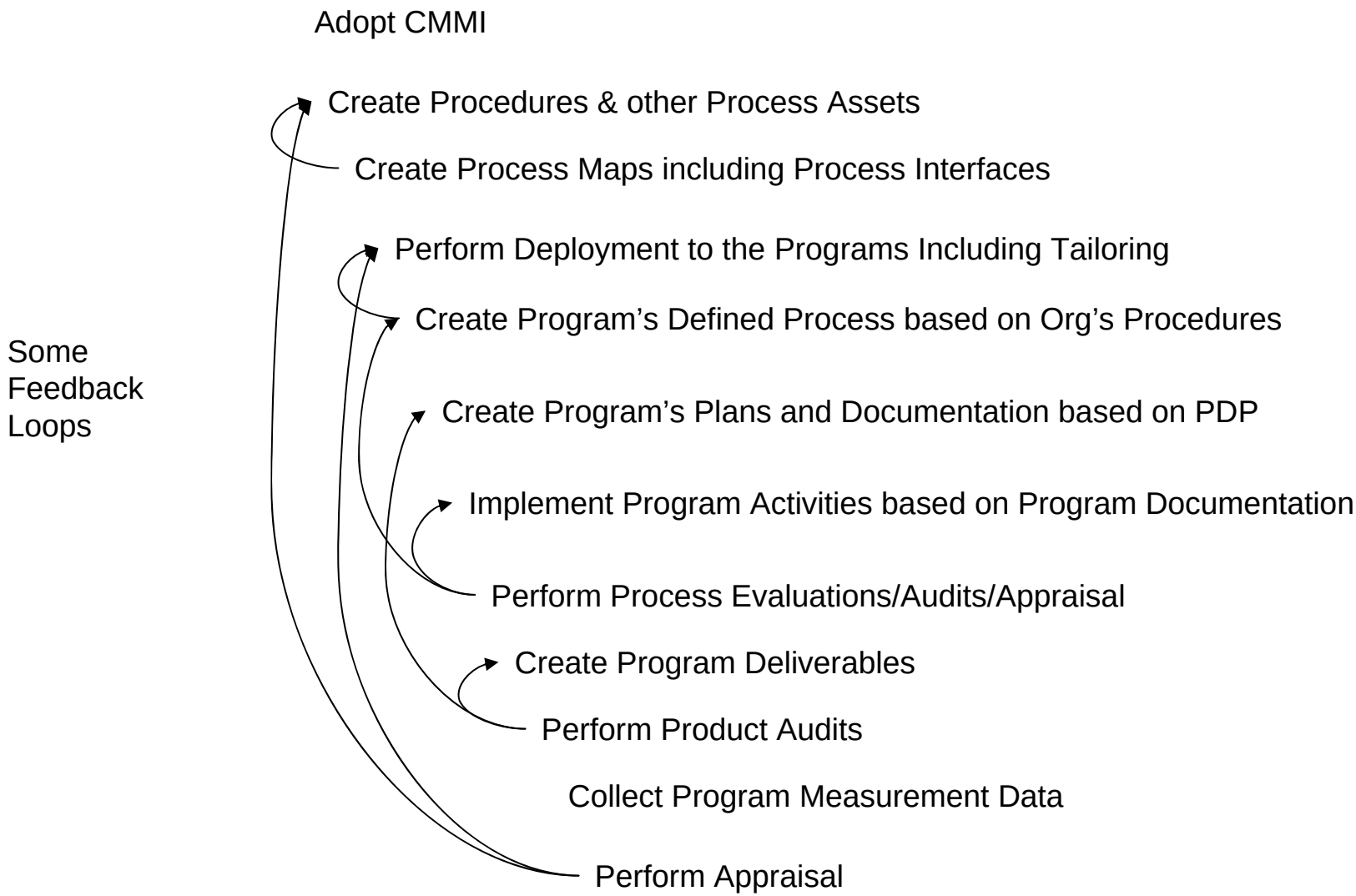
Relationship to meta process lifecycle

Where does the problem really begin?
- With a delivered product ?
- With a new project ?
- With the process tailoring ?

Lifecycle
- Product usage
- Product delivery
- Project execution
- Project planning
- Project Level Process definition and tailoring
- Project Vision
- Procedures in the process assets (or not)
- Process Architecture
- Process Requirements driving the creation of process assets
- Process Vision

(think a timeline from the end of a project back to the start)

Relationship to meta process lifecycle



What are some relationships others have discovered?

Others have focused on later lifecycle predictions such as:

- Productivity might be a function of
  - {Domain Experience (High, Medium, Low) + Team Size + Skill sets + Programming Language}
- Delivered Defect Density might be a function of
  - {Requirements Volatility + Design and Code Complexity + Test Coverage + Escaped Defect Rates}
- Best types of testing to do might be a function of
  - {Predicted Types of Defects + Schedule compression + Features + Experience of Development Team}

Back to our thoughts:

- Project planning goodness (and process compliance) might be a function of
  - {Process assets + tailoring guidance + deployment team training + formalized plan and schedule review by a trained team member }

Business Goal

We have a business goal for our organization to have our process assets institutionalized

Procedures affecting the outcome of this goal include the following

- Process development procedures
- Process tailoring procedures
- Project planning procedures

Measures that provide some insight include

- Practice level characterization
- Deployment team training
- Time spent in project plan development
- Time spent in project plan review

Hypothesis We Considered

We have a business goal for our process assets to be institutionalized

Null Hypothesis: what we are led to believe given the current conditions today

First Hypothesis

- H1-0 Internal Class C assessment results are the same across all levels of team membership and training of the deployment team
- H1-A The Class C results are different, and an association exists between the Class C results and the team membership and training of the deployment

Second Hypothesis

- H2-0 Internal Class C assessment results are the same across all levels of early documentation reviews performed.
- H2-A Results from Class C assessments are different based on the level of review performed of the initial project planning documentation

Some criteria we used to select

- Overall
  - Simple is better
  - Data collection is easy to perform
- Model
  - can be used to validly predict a future outcome “Y” in some future time frame based on the current “x” factors
  - provides reasonably accurate data based on our organizational needs
  - is consistent across different uses and situations
  - is applicable to our projects and processes
  - is easy to conceptually understand
  - is easy to implement
  - is easy to use

The Process

- Define the organization
- Identify all projects and programs within that scope
- Randomly select one project*
- Perform a Class C type CMMI assessment of that one project
  - Train the appraisal team well, and lead the team rigorously
  - ATL should be at least an authorized B/C Team Lead
  - Include Engineering, Program Management, and Support Process areas at ML2 and ML3
  - Use the Class C to review all program documentation, no interviews would be done in order to minimize impact to the program
- Pilot an upgraded tailoring on a second selected project
  - Create an upgraded deployment team using training
  - Do not allow inappropriate deleting of procedure steps
  - Include engineering, tailoring, deployment, CMMI expertise
  - Perform the deployment on the new program
  - Wait for deployment plus 30 days (30 - 60 days?)
- Performa a Class C type CMMI assessment of the second program
- Compare the results of the before and after Class C appraisals from a count perspective
  - Total practice characterization counts
  - Practice characterization counts for each PA

Outcome

- What Has Happened
  - Lots of data crunching
  - First project assessment completed
  - Resource constraints which slowed down the schedule dramatically

- Still to Do
  - Perform assessment on second project
  - Perform comparisons of results from first to second projects

- Containment actions - based on what we have discovered so far, we are considering process improvements on the following
  - Modifications to the tailoring process
  - Modifications to our tailoring and deployment training
  - Modifications to our tailoring and deployment tool
  - Changes to what data is available for use
  - Increased numbers of early lifecycle project reviews

Summary

- The first time through everything seems to take longer to do than initially planned
- We discovered some activities we could do for containment without first completing everything in our plan
- There are already other initiatives being worked based on what we discovered in our data analysis with this initiative

Questions

Presenter Biography

John Miller

- John is currently employed at Raytheon IIS in Denver. He has worked at several defense contractors and engineering firms over the past several years.

  He has performed activities related to training, appraisals, and consulting for numerous years in the areas of program and project management, systems engineering, and process improvement. He has degrees in business, physics, and engineering.

  He is a SEI Certified SCAMPI High Maturity Lead Appraiser and is also an instructor for the SEI Introduction to CMMI and SEI IPPSS courses.

Back Up Charts

Backup Charts

- Suggested Readings from SEI Sites
- Suggested Readings
- Project Participants

Suggested Readings from SEI Sites

1. High Maturity Misconceptions - by Will Hayes from the SEI
   - http://www.sei.cmu.edu/appraisal-program/presentations/hi-matmis.pdf

2. SEI Communication about the importance of the informative material
   - http://www.sei.cmu.edu/cmmi/adoption/cmmi-informative.html

3. High Maturity How Do We Know - developed by many SEI staff members
   - http://www.sei.cmu.edu/cmmi/presentations/sepg07.presentations/konrad.pdf

4. CMMI for Development, version 1.2 The following five process areas (in recommended reading order):
   - http://www.sei.cmu.edu/pub/documents/06.reports/pdf/06tr008.pdf
     - Measurement and Analysis (MA), page 178, Specific Goal 1 materials
     - Organizational Process Performance (OPP), page 261
     - Quantitative Project Management (QPM), page 364
     - Causal Analysis and Resolution (CAR), page 101
     - Organizational Innovation and Deployment (OID), page 198
     - Glossary, page 532

5. Living the High Life - by Rusty Young, Bob Stoddard from the SEI
   - www.sei.cmu.edu/cmmi/adoption/pdf/Young08.pdf

6. A Practitioners View of CMMI Process Performance Models - by Rusty Young, Bob Stoddard
   - www.sei.cmu.edu/sema/presentations

Suggested Readings (the short list*)

1. CMMI Guidelines for Process Integration and Product Improvement v1.2 (Chrissus, Konrad, Shrum)
2. Measuring the Software Process (Florac, Carleton)
3. Understanding Variation (Donald Wheeler)
4. CMMI and Six Sigma (Siviy, Penn, Stoddard)
5. Statistical Quality Control Handbook (Western Electric / AT&T)

* a longer list can be provided if you wish to contact me