communications
Enterprise IT Solutions

Lessons Learned in the Implementation of Measurement Techniques for CMMI GP 2.8

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communications
Enterprise IT Solutions

- **Major supplier of a broad range of products**
- **Major subsystem supplier**
- **Becoming a system supplier in:**
  - ISR
  - Training
  - Aircraft modernization and O&M
  - Government services
- **Major provider of national security solutions in:**
  - C4ISR
  - Homeland security and defense/GWOT*
  - Government enterprise IT
  - Transformational programs

* Global War on Terrorism (GWOT)

se IT Solutions (EITS) Division Overview

L3 communications
Enterprise IT Solutions

- Organization: **Division of L-3 Communications**
- Employees: **Over 2,000 professionals**
- Headquarters: **Reston, VA**
- **Chartered to support civil and defense Government agencies**
- Mission: **Provide world-class enterprise information technology (IT), communications, and engineering services and solutions to the public sector.**
- Vision: **Become the Government's trusted partner for exceptional IT, communications, and engineering services and solutions; and achieve a challenging and rewarding work environment.**

se IT Solutions (EITS)
ganizational Profile

communications
Enterprise IT Solutions

- **EITS Division composed of diverse business units operating under multiple industry models and standards (CMMI, ISO 20000, ITIL, PMBOK)**
- **Government and public agency customer base**
  - **NASA (National Air and Space Administration) – IV&V (independent verification and validation services) ; CMMI ML 3 Objective**
  - Metropolitan airport authorities (business process engineering) CMMI ML 3 Objective
  - County School Systems (IT infrastructure and support) ISO 20000 Objective
  - Federal Government (staff augmentation) CMMI ML3 Objective
  - FAA (Federal Aeronautics Administration software development) CMMI ML 3 Objective
- **Many (sometimes very) small projects in**
  - software development functional area (CMMI, PMBOK))
  - managed services functional area (ISO 20000, ITIL, PMBOK)
- **Staff augmentation projects predominate** (CMMI, PMBOK)

easurement Program Requirements

- EITS measurement program must efficiently support CMMI, ISO 20000 (ITIL), PMBOK best practices
- EITS measurement process assets must be tailorable to diverse functional areas (managed services, staff augmentation)
- EITS measurement activities must have minimum impact on limited project staff

easurement Program Challenges

- Customizing measurement solutions for non-homogenous business and functional areas
- Selecting the ñrightòmeasurements to best support business goals
- Cost effective staffing of measurement activities in small short term projects with minimal resources
- Effective monitoring and control of CMMI process areas with minimal measurement resources
- Mapping CMMI model measurement best practices based on larger software development projects into small non software development projects
- Integrating and reusing measurements based on CMMI measurement practices to support implementation of other industry standards (ITIL, ISO 20000, PMBOK)

Generic Practice 2.8

"CMMI Guidelines for Process Integration and Product Improvement" Second Edition; Crissis, Konrad, Schrum 2006

"Monitor and control the process against the plan for performing the process and take appropriate corrective action ….

Subpractice 1. Measure actual performance against the plan for performing the process"

nalizing CMMI GP 2.8 Case Study

The Dilemma …

Apparent gaps uncovered during CMMI GP 2.8 implementation in EITS NASA IV&V projects

- **Initial expectation:** existing IV&V measurement program adequately covered CMMI measurement requirements with only minor gaps
- **Reality check:** generally the case except for CMMI requirements around institutionalization of GP 2.8
- **Concern:** measurements would need to be implemented in all projects being appraised for all process areas at maturity levels 2 and 3 – resulting in almost 30 new measurements per project!

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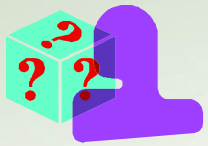
The Questions …



- What sort of measurements are appropriate and useful to monitor and control each process area?
- Are measurements necessary for each process area being assessed?
- Are there alternative qualitative methods to monitor and control process areas?
- How do projects tailor monitor and control of process area quantitative or qualitative activities?
- How should senior management be informed and involved with monitor and control of process performance in projects?
- How can monitor and control of process be implemented in a time and cost effective manner?

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The Happy Ending ….

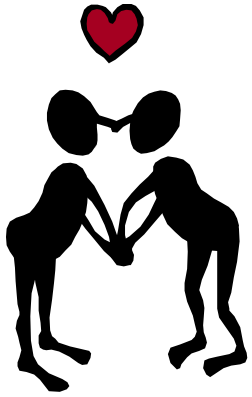
- EITS division + IV&V team chartered to map existing IV&V measurement to generic measurements and address any gaps
- almost 3 months of contentious discussion ensued in attempt to address gaps in least burdensome manner
- qualitative measurement alternatives suggested for low value process areas; a few simple to collect but useful measurements added
- solution strategy reviewed and approved

CMMI success !

nalizing CMMI GP 2.8
essons Learned

1) **Use qualitative alternatives to measurement where appropriate**
   - ï Strategically use qualitative alternatives to measurement (where appropriate) to minimize overhead

Aka K.I.S.S.



onalizing CMMI GP 2.8
mentation Strategies

Build on the KISS principle

- CMMI GP 2.8 requires that monitor and control of process areas be institutionalized.
- Obvious mechanism to do this is to define measurements for each process area
- May be expensive, time consuming, and non value added
- Division defines suggested measurements for each process area but
- Projects identify key process areas for measurement and reporting ï other process areas are monitored and controlled qualitatively with reporting by exception

2) Carefully define measurement tailoring guidelines and validate tailoring execution

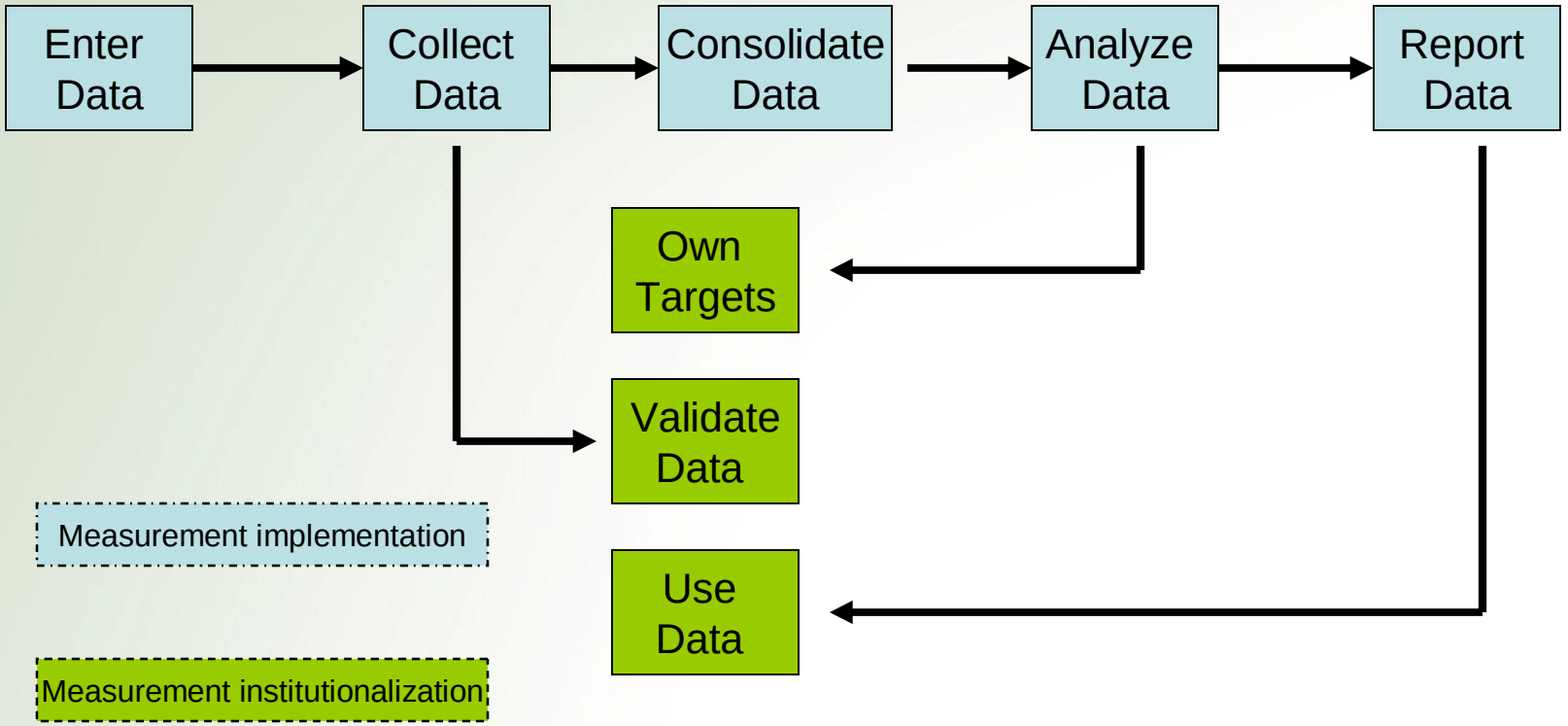
Generic division defined measurement	Tailored functional area measurement or alternative	Collection and analysis role	Reporting role and frequency
Actual cost compared to budget	Earned Value Cost Variance	Project Manager	Project Manager Monthly
Product defects	Number of formal customer issues	Functional area Quality System Manager	Quality System Manager Quarterly
Decision Analysis Review (DAR) scheduled versus actual	DAR performance stoplight	Functional Area QA auditor	Quality System Manager Quarterly

nalizing CMMI GP 2.8 mentation Strategies

Use Generic measurements with tailoring validation

- Generic measurements for process area monitoring and control specified at division level with tailoring guidelines
- Existing project measurements mapped to generic specifications
- Minimal set of additional measurements and qualitative alternatives identified, reviewed, approved and implemented

3) Collect and analyze measurements at highest possible level of organization



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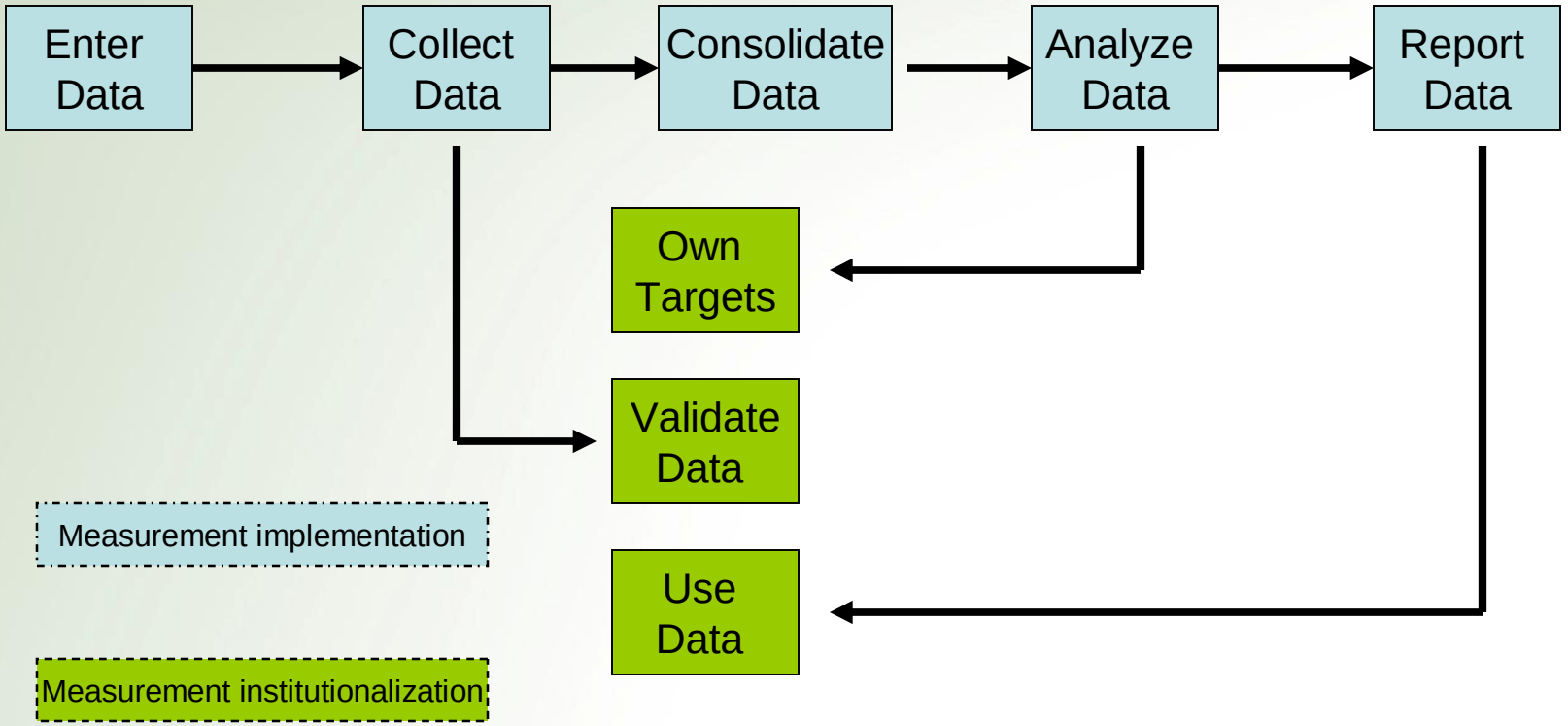
"Push up" implementation

- Collect data at organizational level of related business goal
- Measurements supporting division goals collected, analyzed, and reported by division measurement roles
- Measurements supporting functional area goals collected, analyzed, and reported by functional area measurement roles
- Projects collect and report only project operational measurements

4) Push institutionalization down to lowest organizational levels



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"Push down" institutionalization

- Measurements supporting process goals for common processes collected, analyzed, and reported by higher organizational level but é
- Projects collect and report project operational measurements
- Projects ***receive and use measurements reported by all organizational levels***

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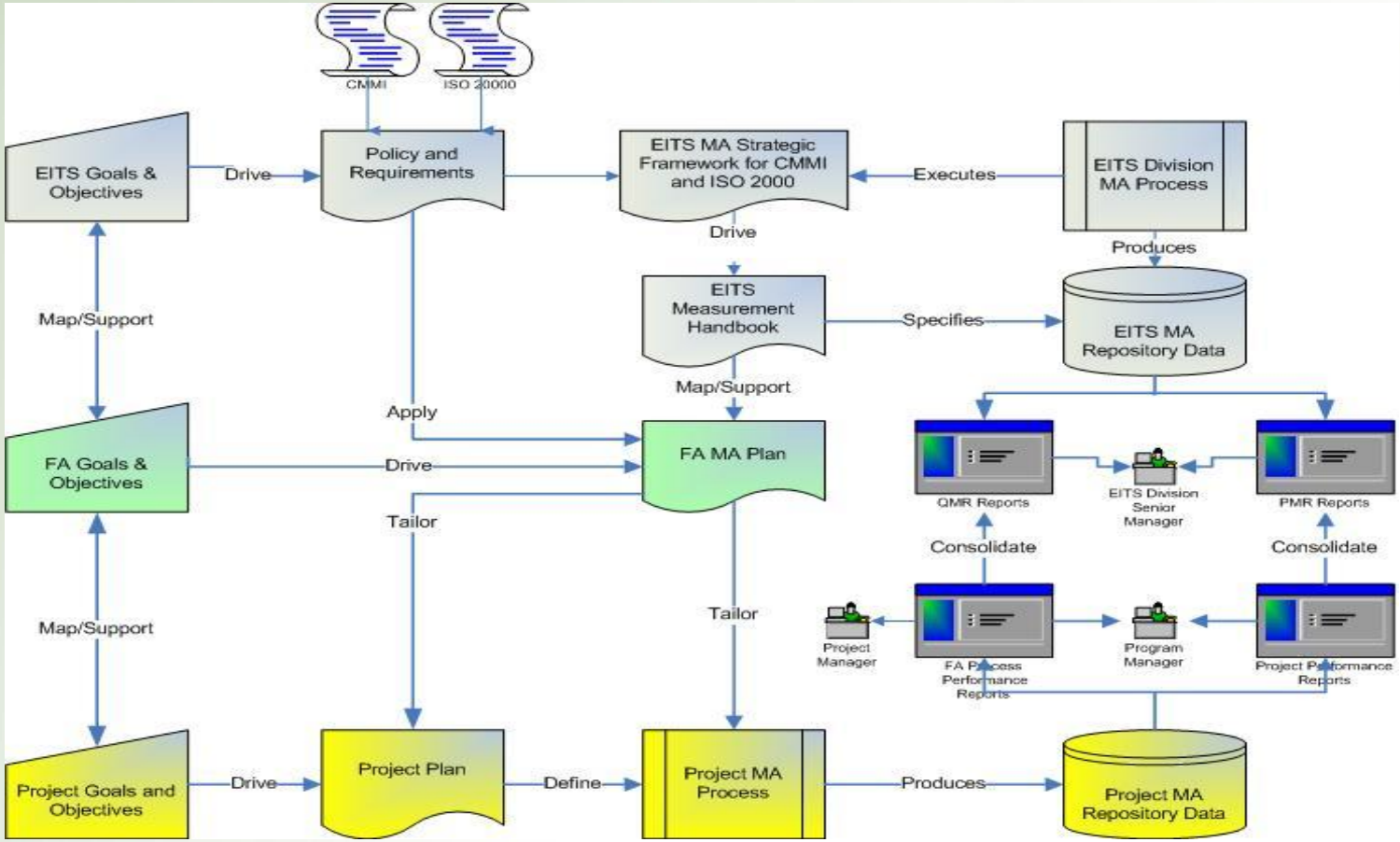
essons Learned

5) Leverage organizational measurement resources and best practices



nalizing CMMI GP 2.8 mentation Strategies

Leveraging organizational assets and best practices

- Division develops measurement framework (specifications, tailoring guidance, interfaces) to support all standards and practices
- Functional areas develop application specific measurement planning frameworks with tailoring guidance ; best practices shared
- Projects tailor from functional area measurement planning framework; best practices shared

Case Study: Finalizing CMMI GP 2.8 Implementation Summary

Measurement program preparation for CMMI ML3 appraisal of NASA IV&V projects

- Generic measurements for process area monitoring and control specified at division level
- Existing IV&V measurements mapped to generic measurements; gaps identified
- Division/IV&V working team chartered to address gaps
- Minimal set of additional measurements and qualitative alternatives identified, reviewed, approved and implemented

nalizing CMMI GP 2.8 ns Learned Summary

- ✓ Use qualitative alternatives to measurement where appropriate
- ✓ Carefully define measurement tailoring guidelines and validate tailoring execution
- ✓ Collect and analyze measurements at highest possible level of organization
- ✓ Push institutionalization down to lowest organizational levels
- ✓ Leverage organizational measurement resources and best practices

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