3H TECHNOLOGY

Presentation to the NDIA 6th Annual CMMI Technology Conference

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Agenda

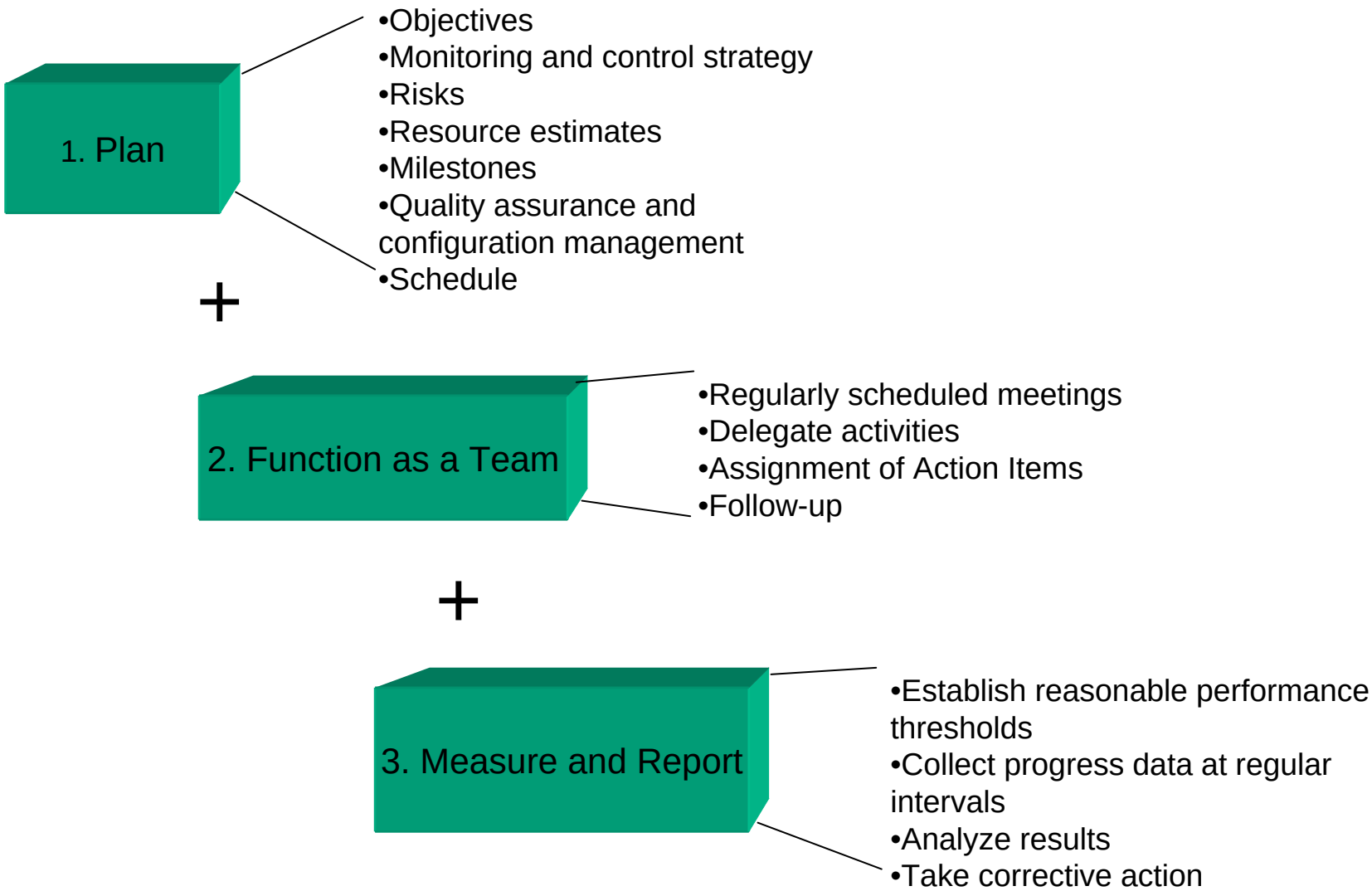
- Implementing processes for CMMI® Levels 2 and 3
  - Approach
  - Challenges
- Measurement
  - In the Measurement and Analysis Process Area
  - Estimates and Actuals for projects
- Benefits and Similar Observations

Implementing Processes for CMMI® Levels 2 and 3

Approach

- Set up the process improvement activity as a project
- Established the infrastructure first
- Selected documentation format
- Leveraged a strong set of existing practices
- Rolled out defined processes to pilot projects with training for everyone

A Project Approach



The Process Infrastructure

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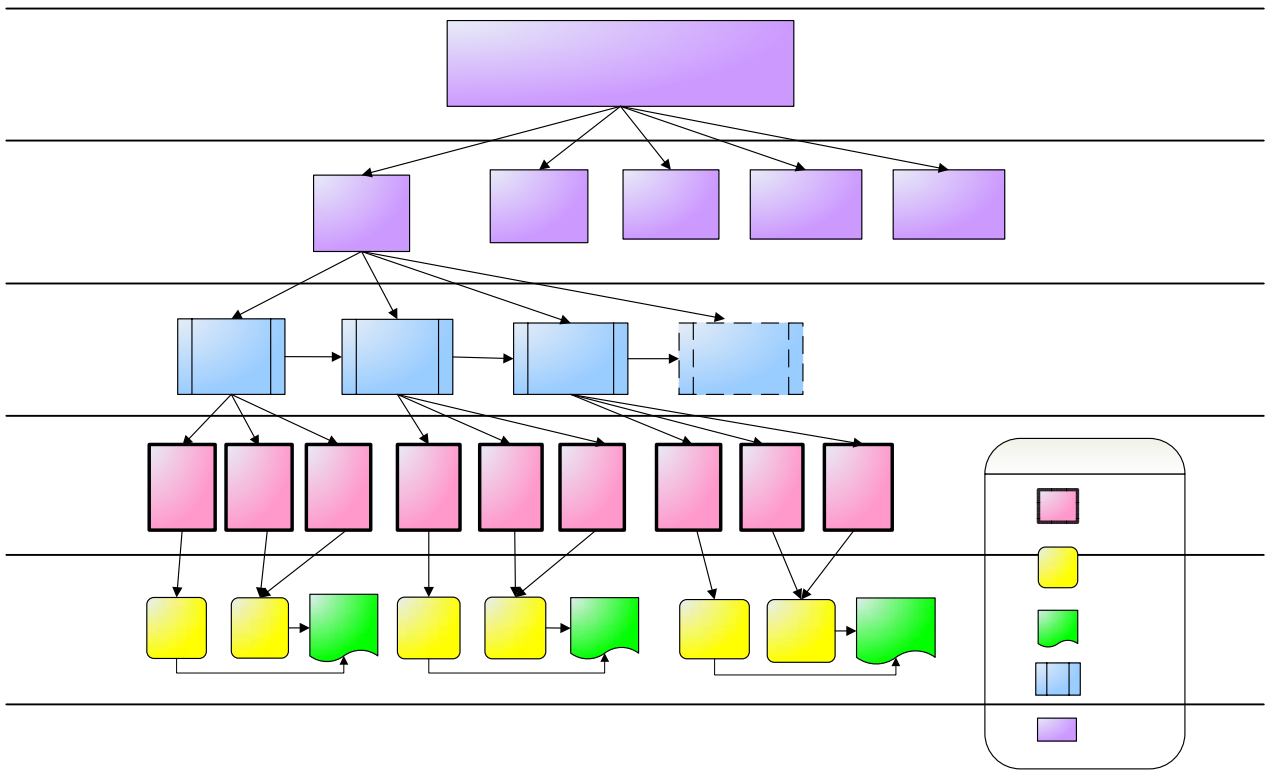
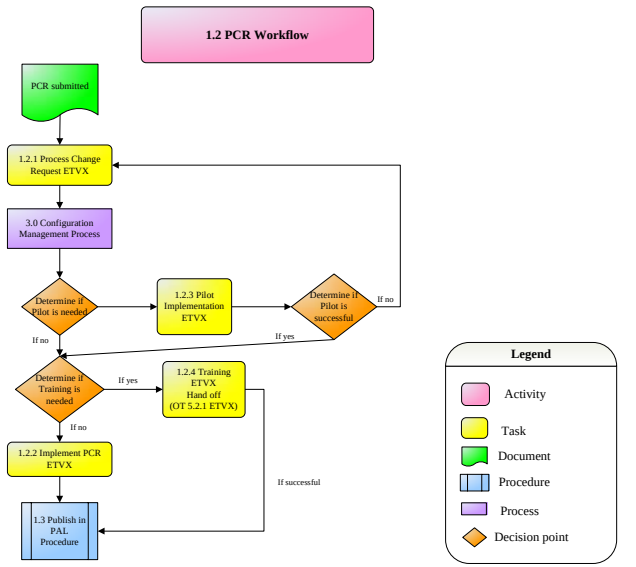
- Establish form of documentation
- Appropriate fit and formality for the organization
- Address functions of the model and the organization



Documentation Format

Flowcharts and Entry, Task, Verification and eXit (ETVX) tables



PRM-PD-02-1004

Entry Criteria	Task(s) to be Performed	Job Aids	Exit Criteria
• Approved Process Change Requests	1. EPG CM determines need for a pilot or training. 2. Review Process Change Request and document EPG Implementation Decision. 3. Implement change according to the timeframe documented in the PCR or by the EPG. 4. Once the change is complete notify PCR owner and the EPG.	1. Process Change Request Form and work instructions. 4. Process Hierarchy Architecture 4. ETVX Diagram.	Approved/Declined/Postponed PCR.

Verification Steps
• EPG configuration audits • EPG configuration status reports

Existing Practices

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- Estimating levels of effort
- Project schedules
- Vision documents
- Defect tracking in an automated tool
- Test scripts
- Independent quality assurance organization
- Version management for all documents

Roll out of Defined Processes

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- Train pilot projects
- Invite everyone
- Rework as required

Challenges

- Everyone wanted to be on all the process action teams
- No one wanted to be a process area owner
- Constraints on membership in the Management Steering Committee
- Measures
- Tailoring
- Common practices
- Lack of well defined chain of command for reporting

New Words and Different Meanings

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- Project Plan is not equal to a project schedule
- Validation can have many names
- Configuration audits are not the same as process audits
- Quality assurance is not testing
- Product integration occurs, even if it is not a distinct procedure
- Tailoring means flexibility, not a waiver

Tailoring

- Define project size thresholds (value, FTE, or duration?)
- How to record project tailoring selections
- Document the guidelines to include roles and responsibilities
- Notations on process or work product, optional, alternative practice or must use as-is

Identifying Existing Practices

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- Confusion: same words, different meanings
- Confusion: different words, same meanings
- Confusion: new words
- Existing practices not fully documented
- Existing practices not consistently practiced
- Not all existing practices known across the organization

Measures

- Benefit hard to see
- We do enough of this already
- No time; the contract doesn’t pay for it
- How can you estimate these things? (Quality cannot be predicted (estimated))
- Size does not mean estimated resource or level of effort
- Staff level of effort is not the entire level of effort

Measurement

Measurement and Analysis Process Area

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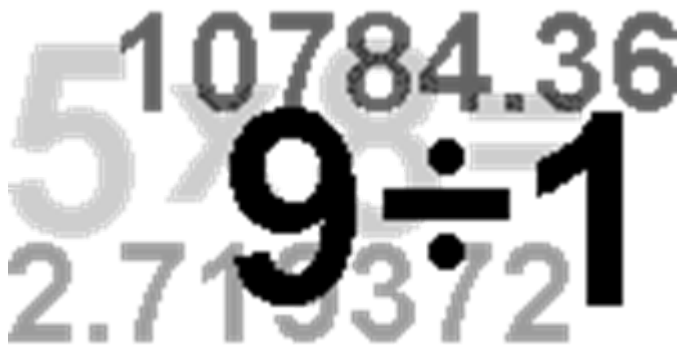
- Corporate level Measures Guide
- Four measurement categories
- Measures worksheet
- Industry best practices for thresholds
- Repository on Sharepoint
- Earned Value



Measures Categories

- For the Measurement and Analysis Process Area
  - Level of effort
  - Size
  - Quality
  - Schedule

Industry Best Practices

Measure	***Threshold for Analysis***	***Corrective Action***
Effort	10% *(Example: Cumulative labor time differs from the original estimate by 10% at any point in the project lifecycle)*	1.Review original estimating basis and determine impact on project schedule and cost 2.Assess impact on project risk 3.Report to relevant stakeholders
Quality	15% *(Example: Number of cumulative findings differs from the original estimate by 15% at any point in the project lifecycle.)*	1.Review original estimating basis and determine impact on project schedule and cost 2.Assess impact on project risk 3.Assess impact on deliverables 4.Report to relevant stakeholders

Measures Worksheet

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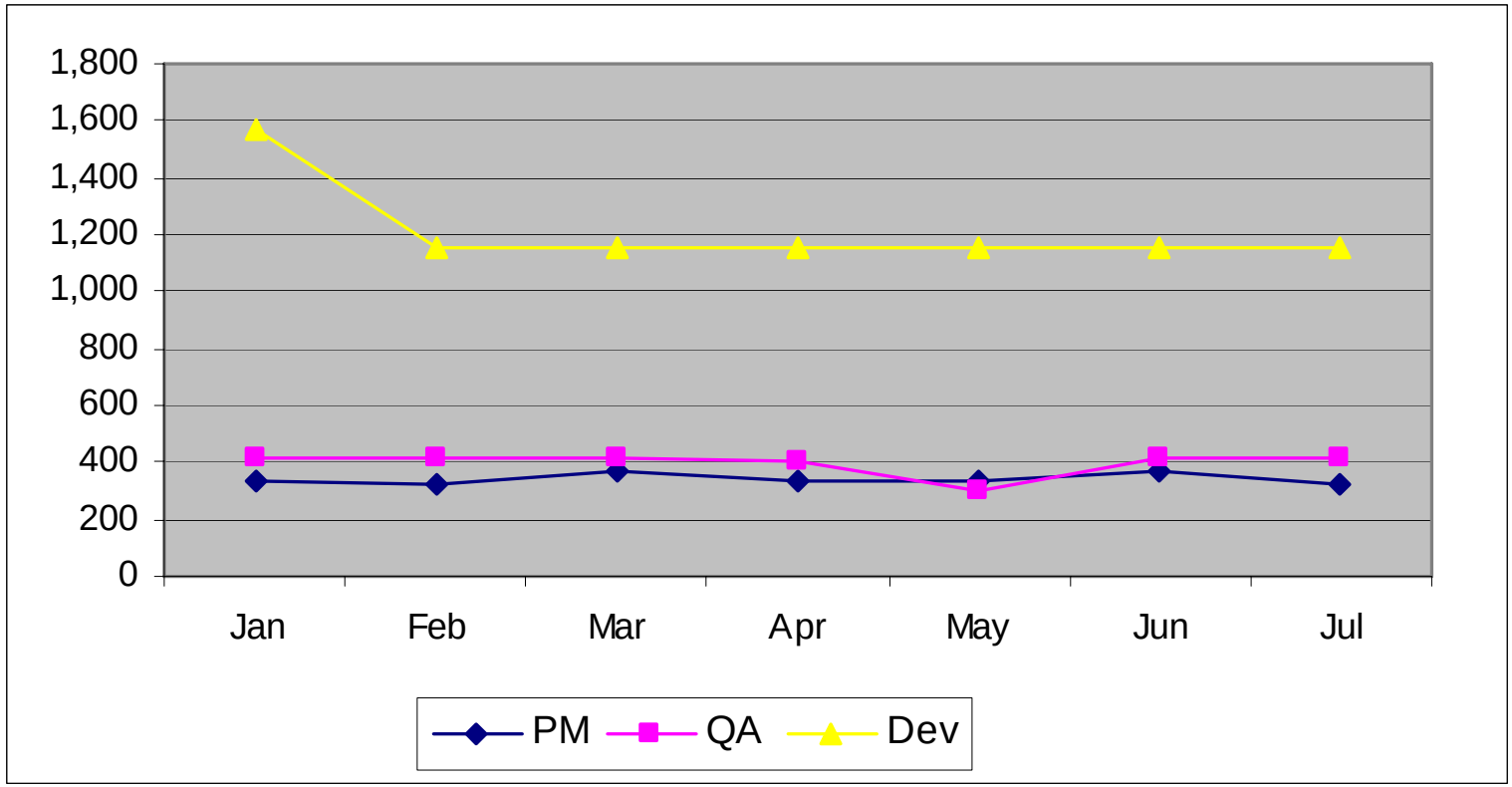
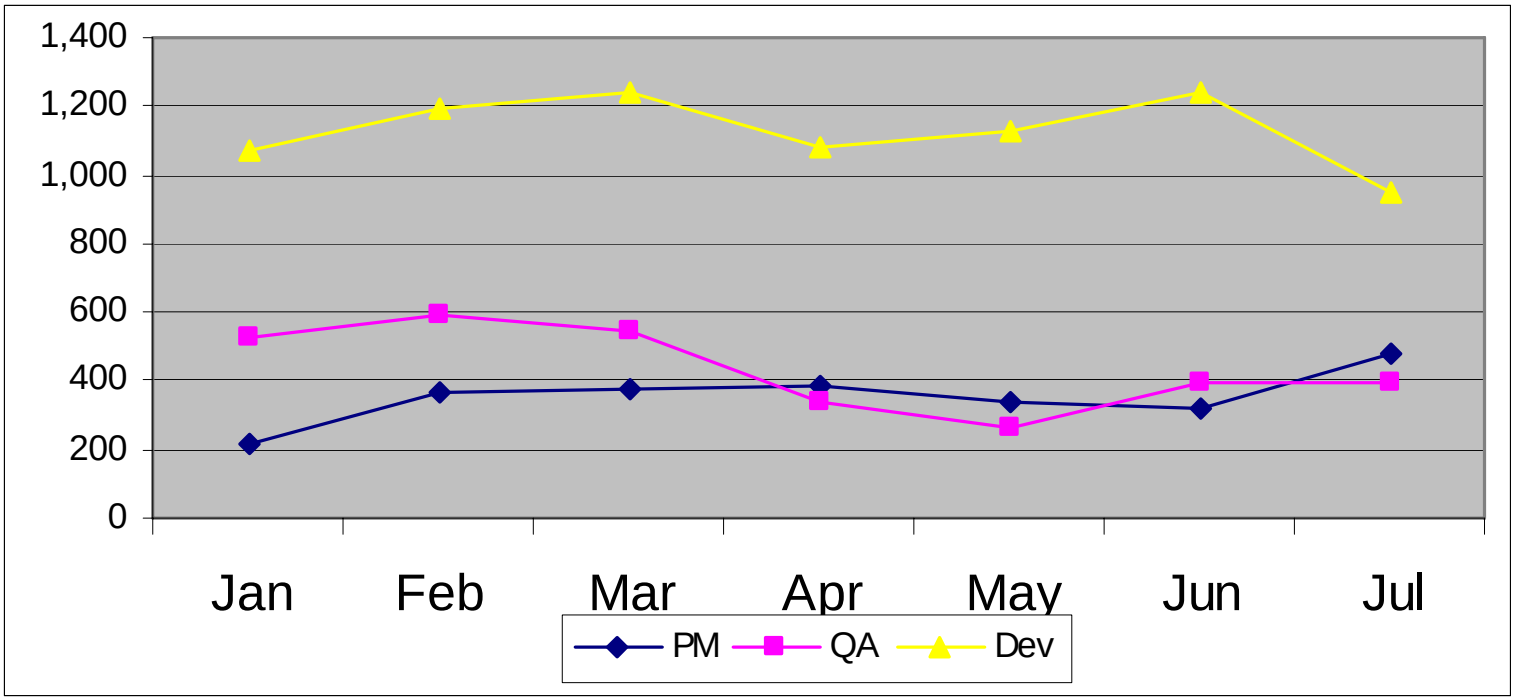
Measure	Measure Description	Initial Estimates	JAN	FEB	MAR	APR	MAY
Effort Estimates in Staff Hours	Effort Project End Estimate						
	Project Management						
	Quality Assurance						
	Product or Service Development						
Total Estimated Effort	Sum of Estimated Effort		0	0	0	0	0
Effort Actuals in Staff Hours	Project Management						
	Quality Assurance						
	Product or Service Development						
Total Actual Effort	Sum of Actual Effort		0	0	0	0	0

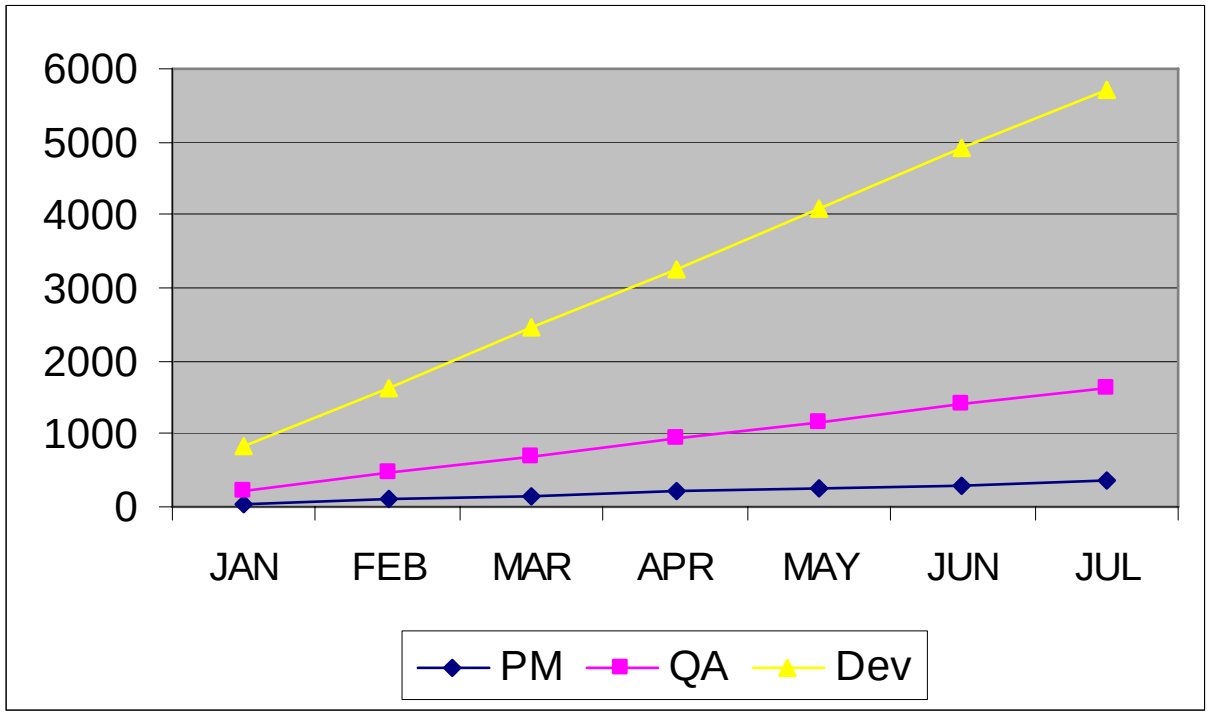
Measure: Estimated Effort - Project A



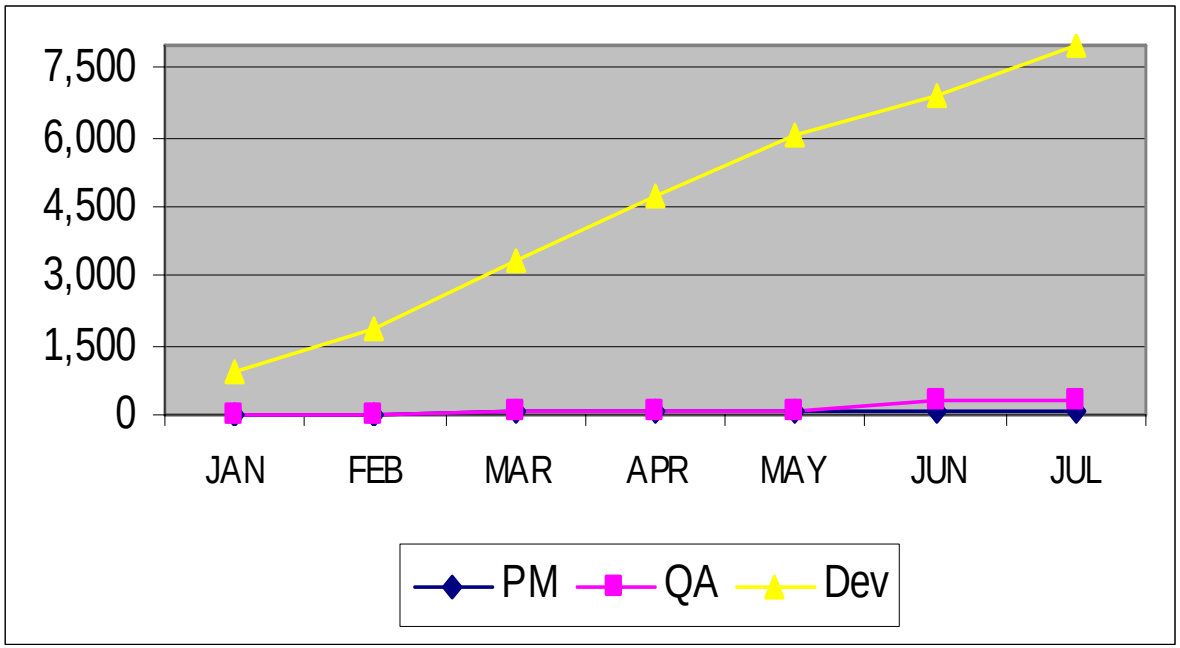
Measure: Actual Level of Effort – Project A



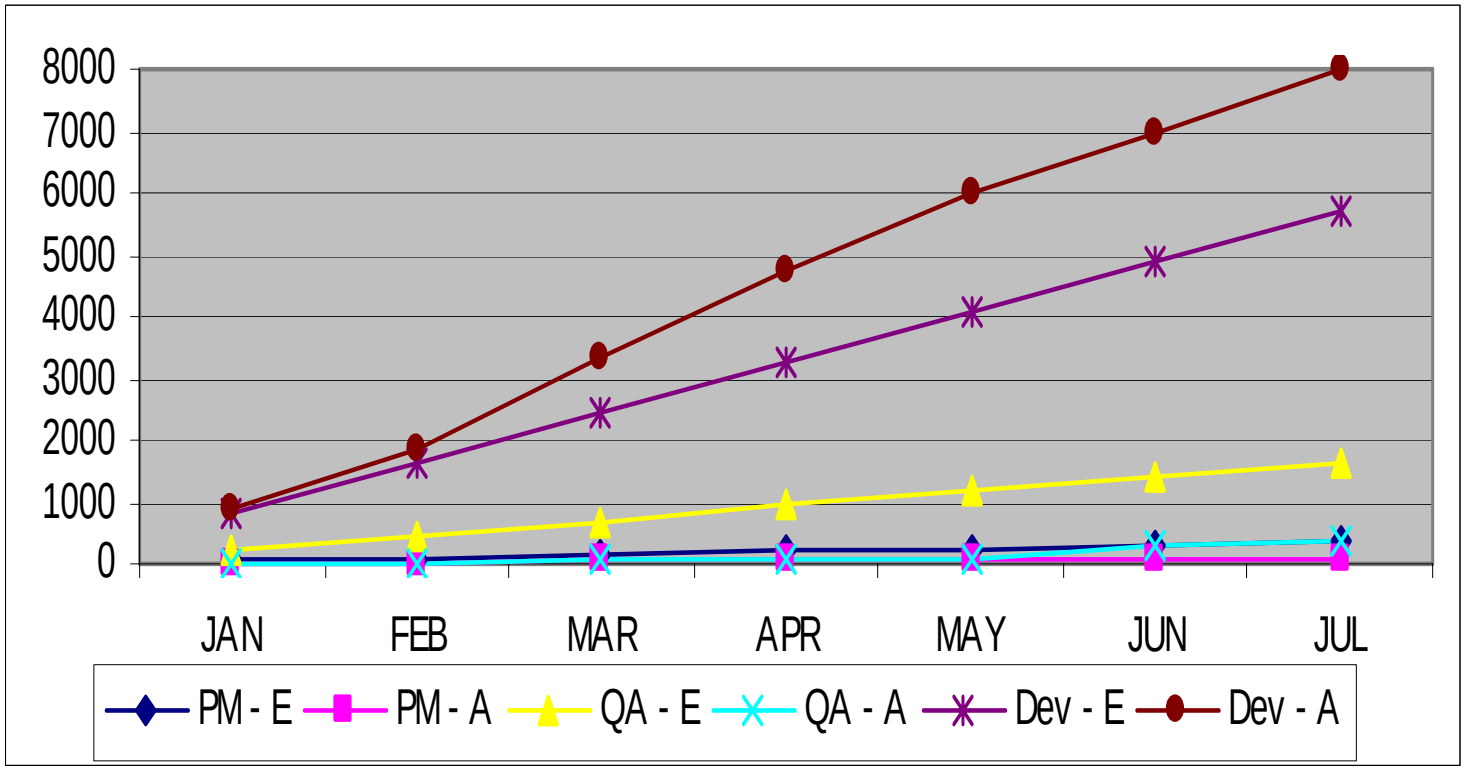
Measure: Estimated Effort – Project B



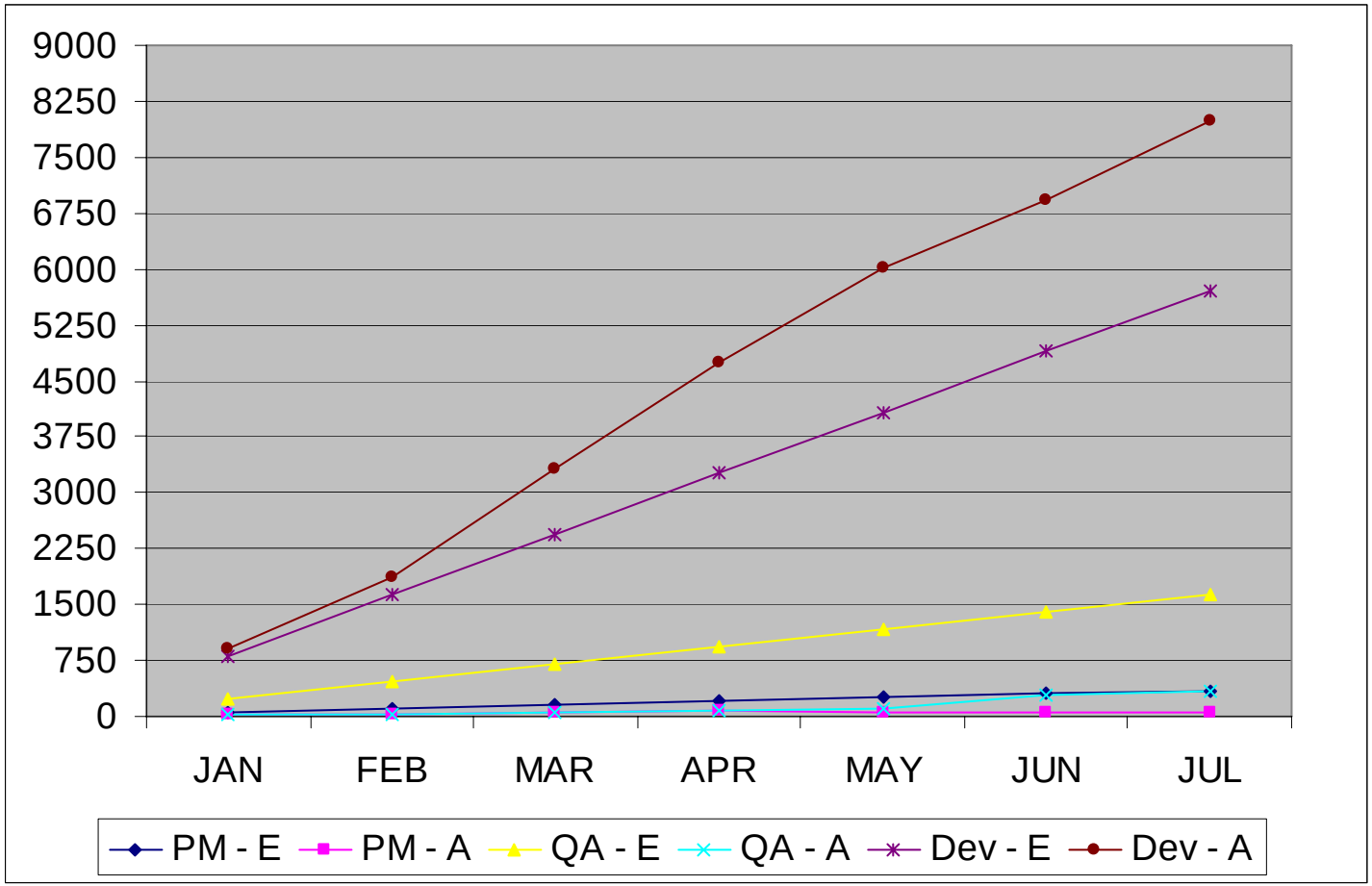
Measure: Actual Level of Effort – Project B



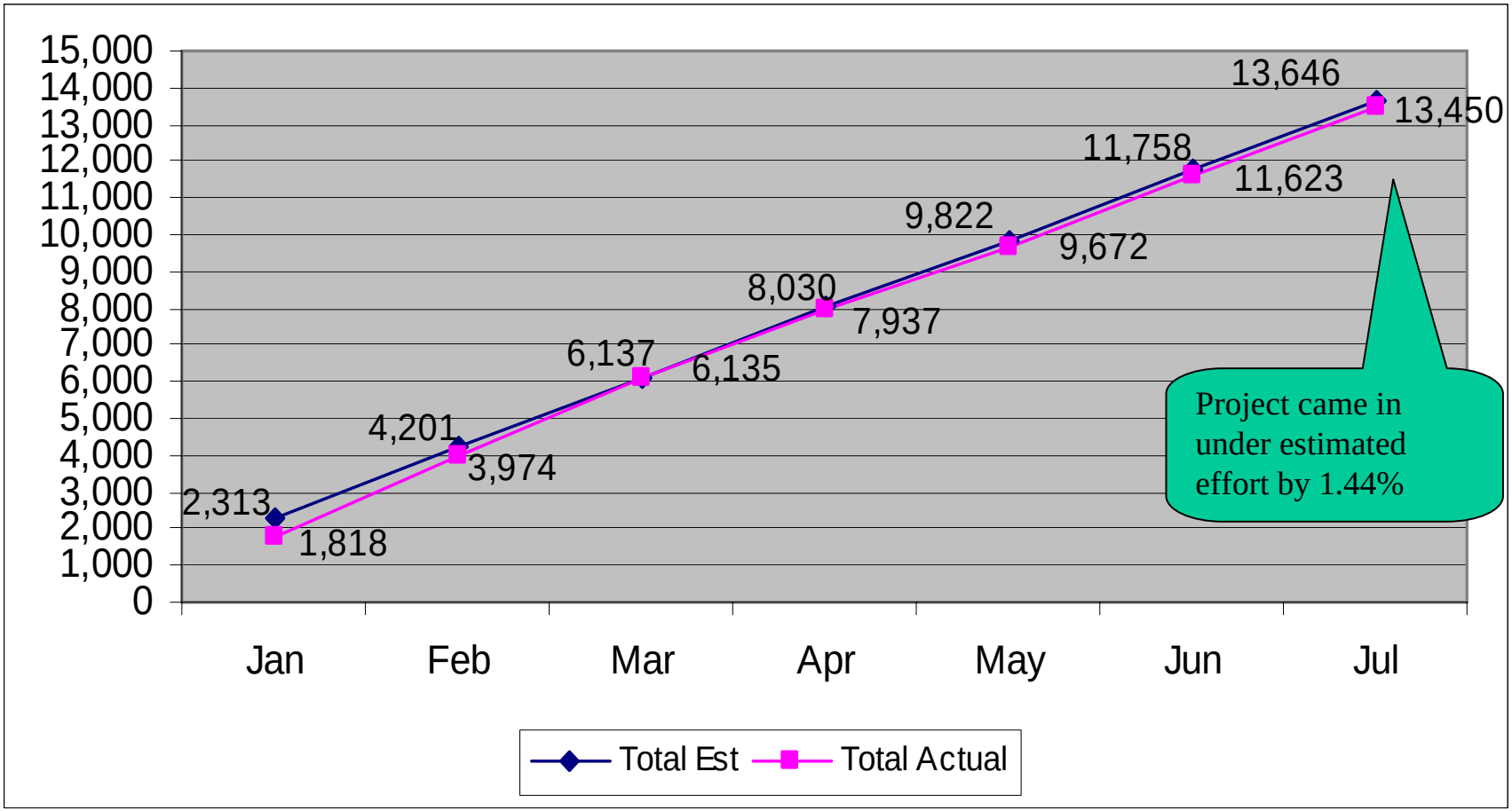
Measure: Estimated vs Actual Effort – Project A



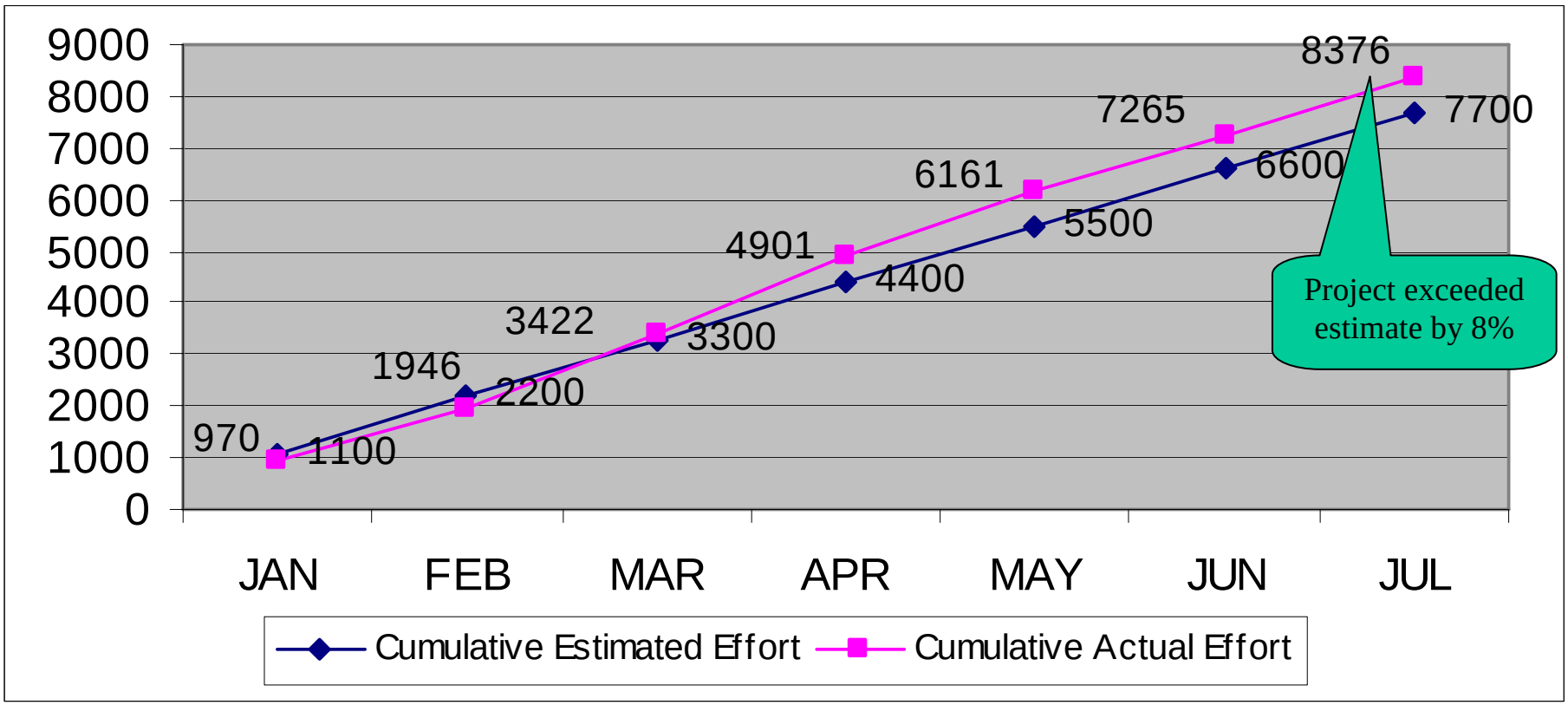
Measure: Estimated vs Actual Effort Project B



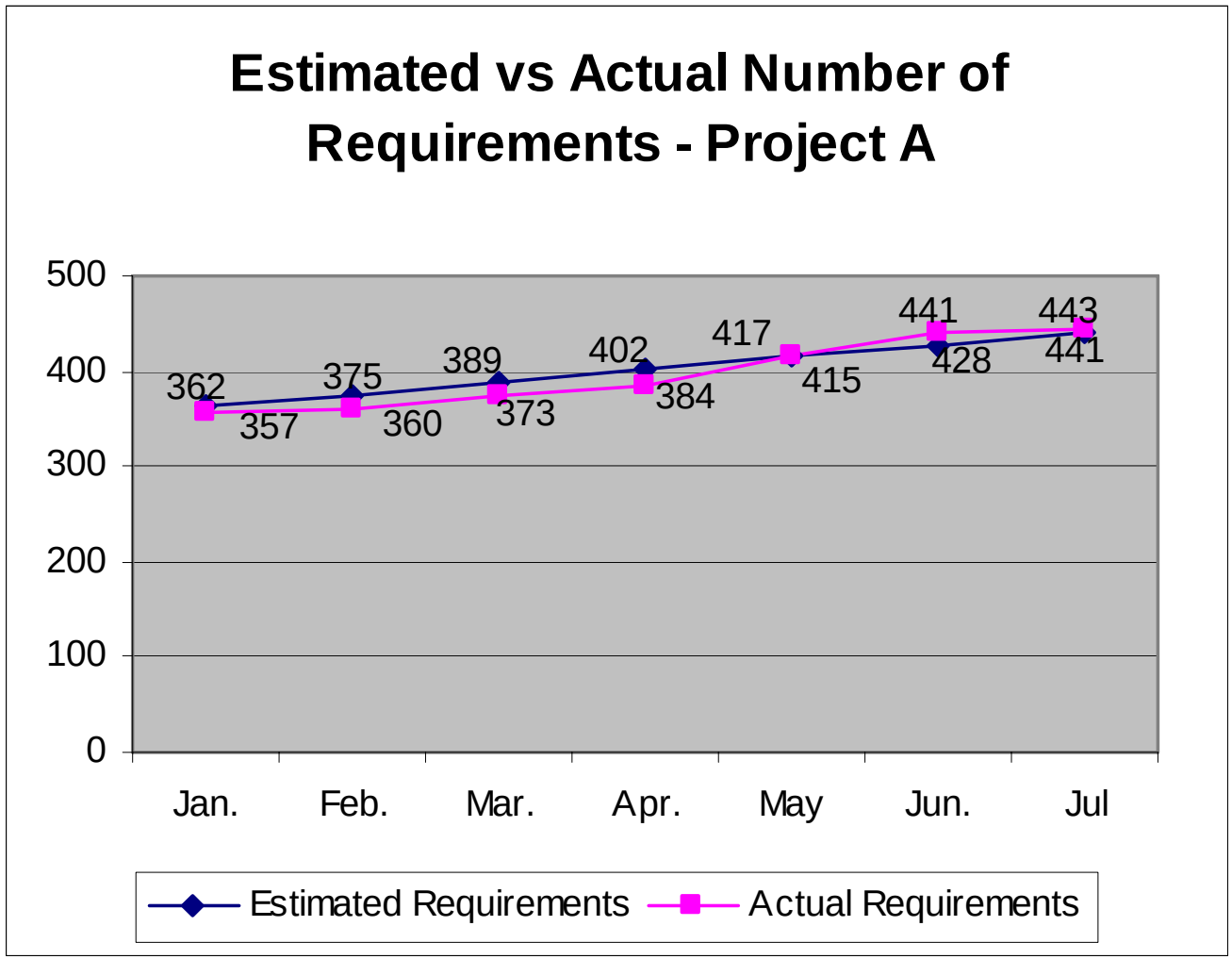
Measure: Effort Final Results – Project A



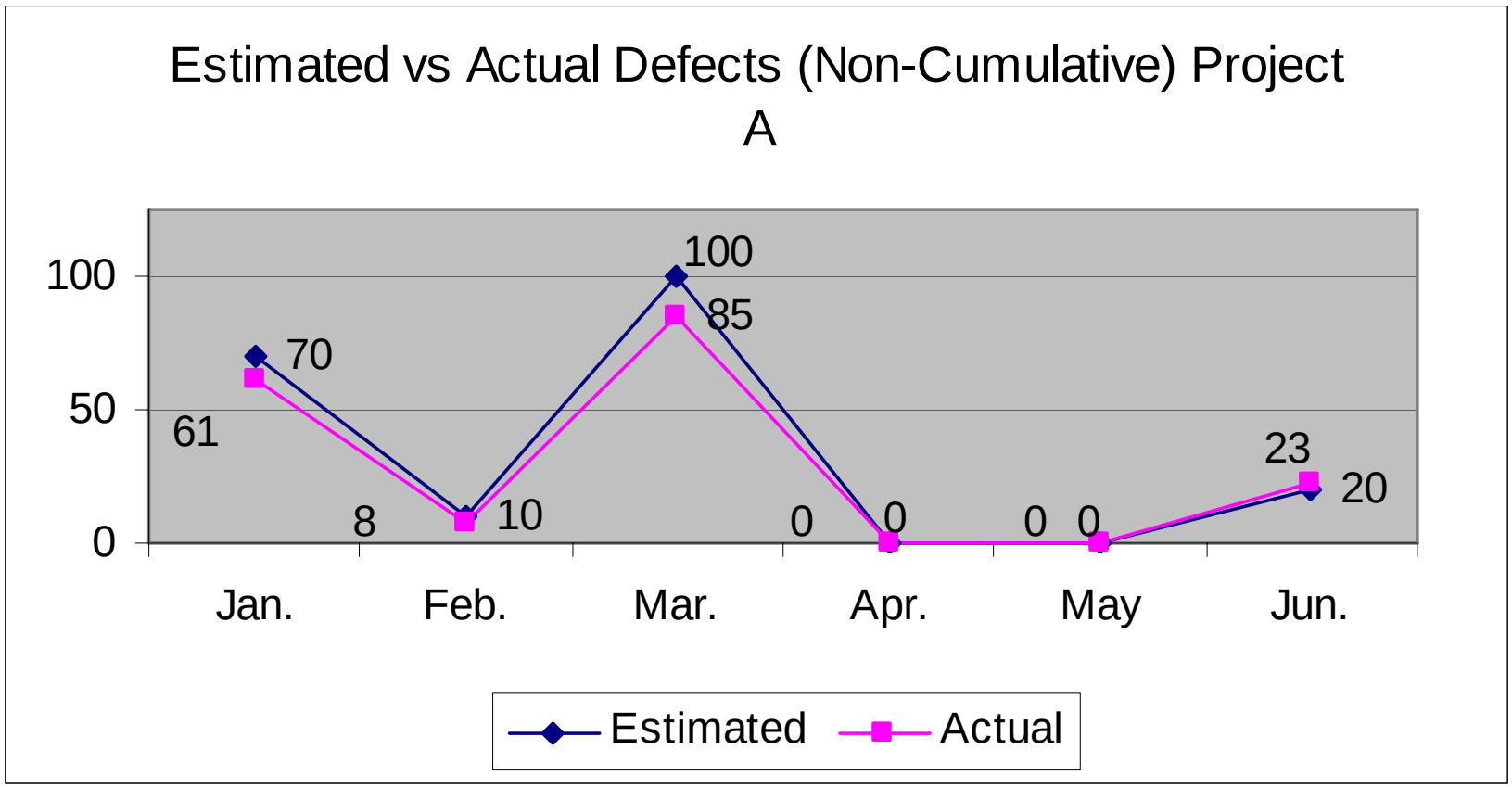
Measure: Effort Final Results – Project B



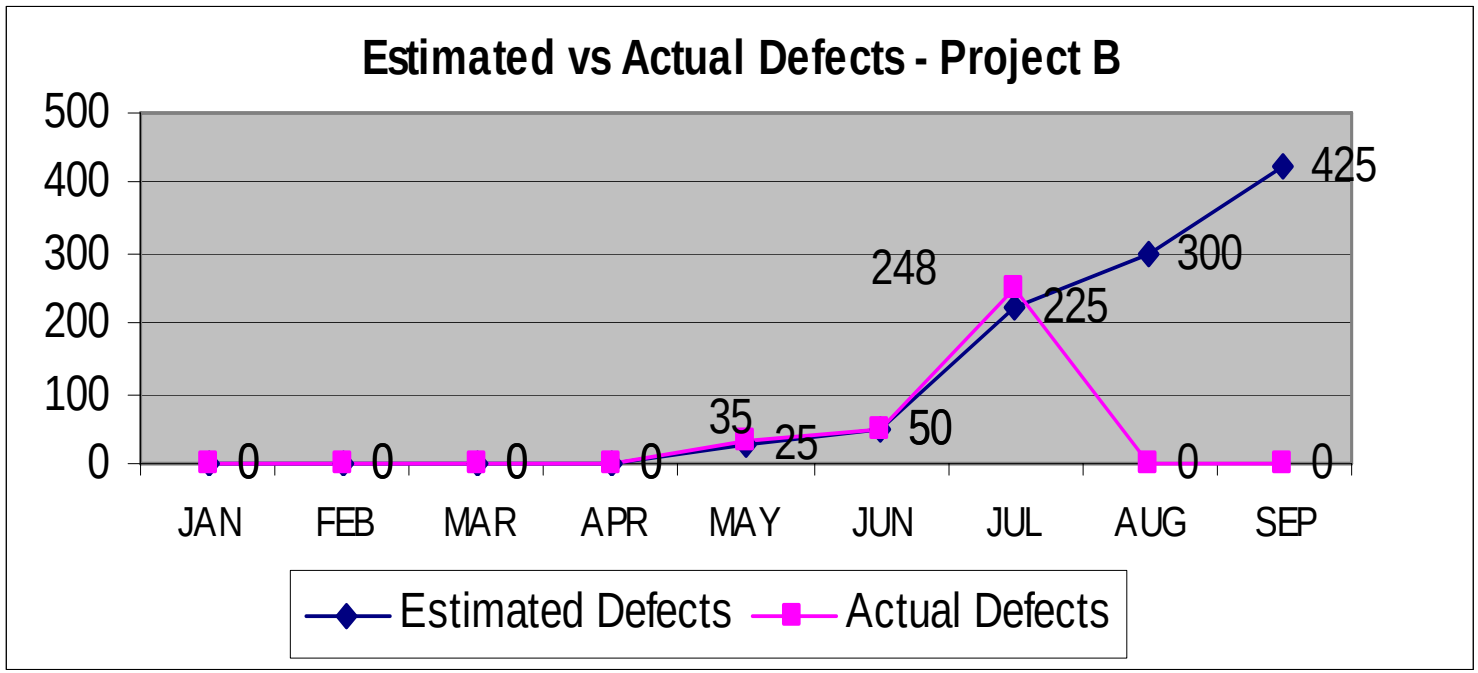
Measure: Size



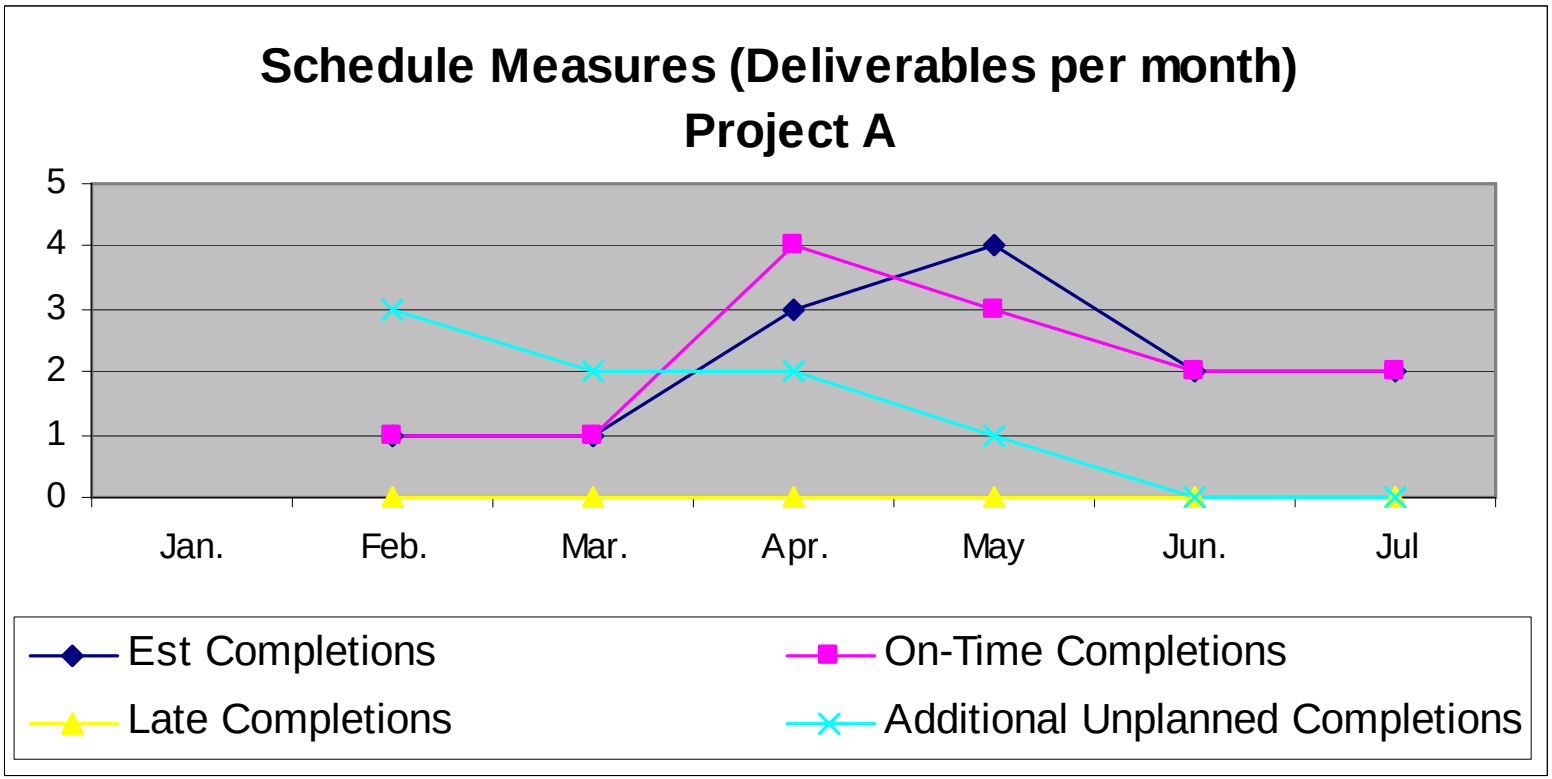
Measure: Quality



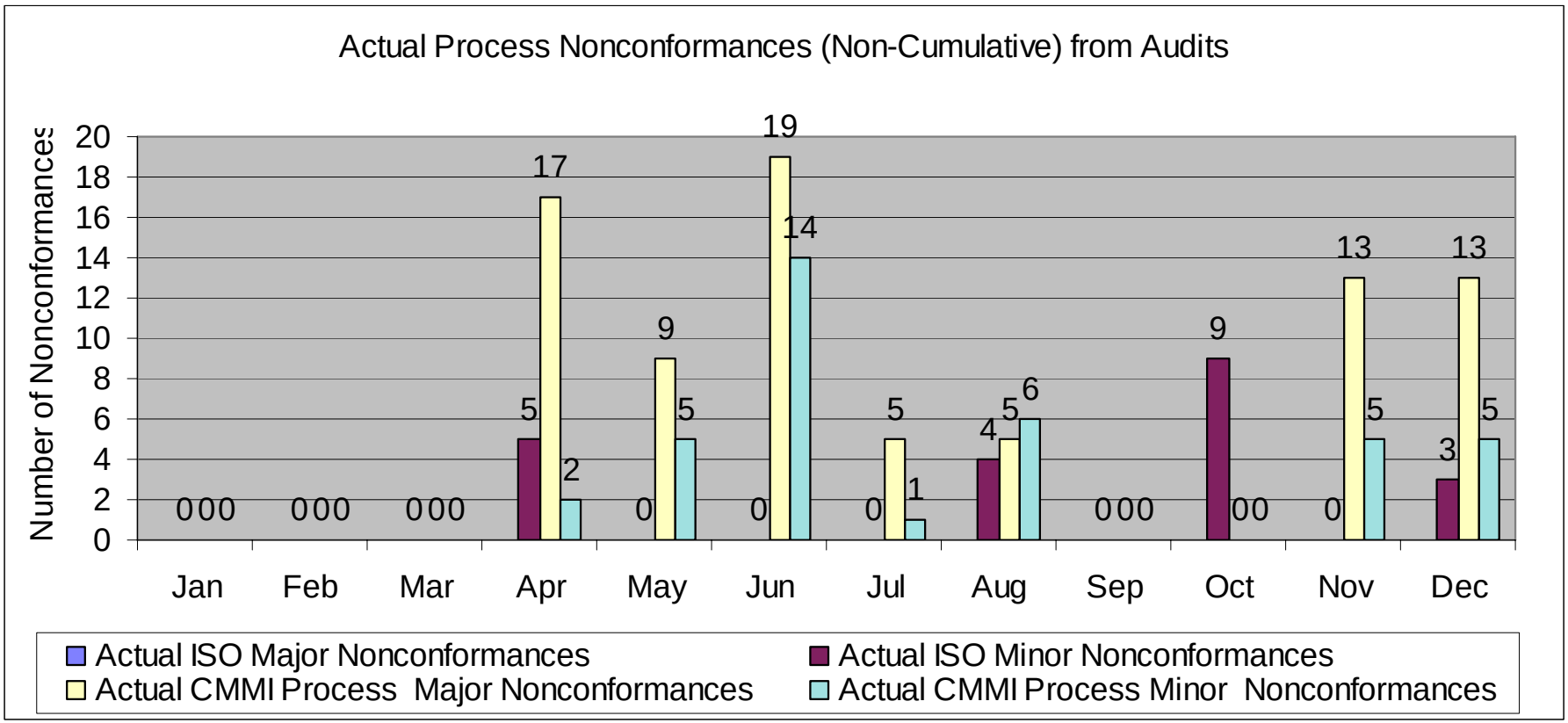
Measure: Quality



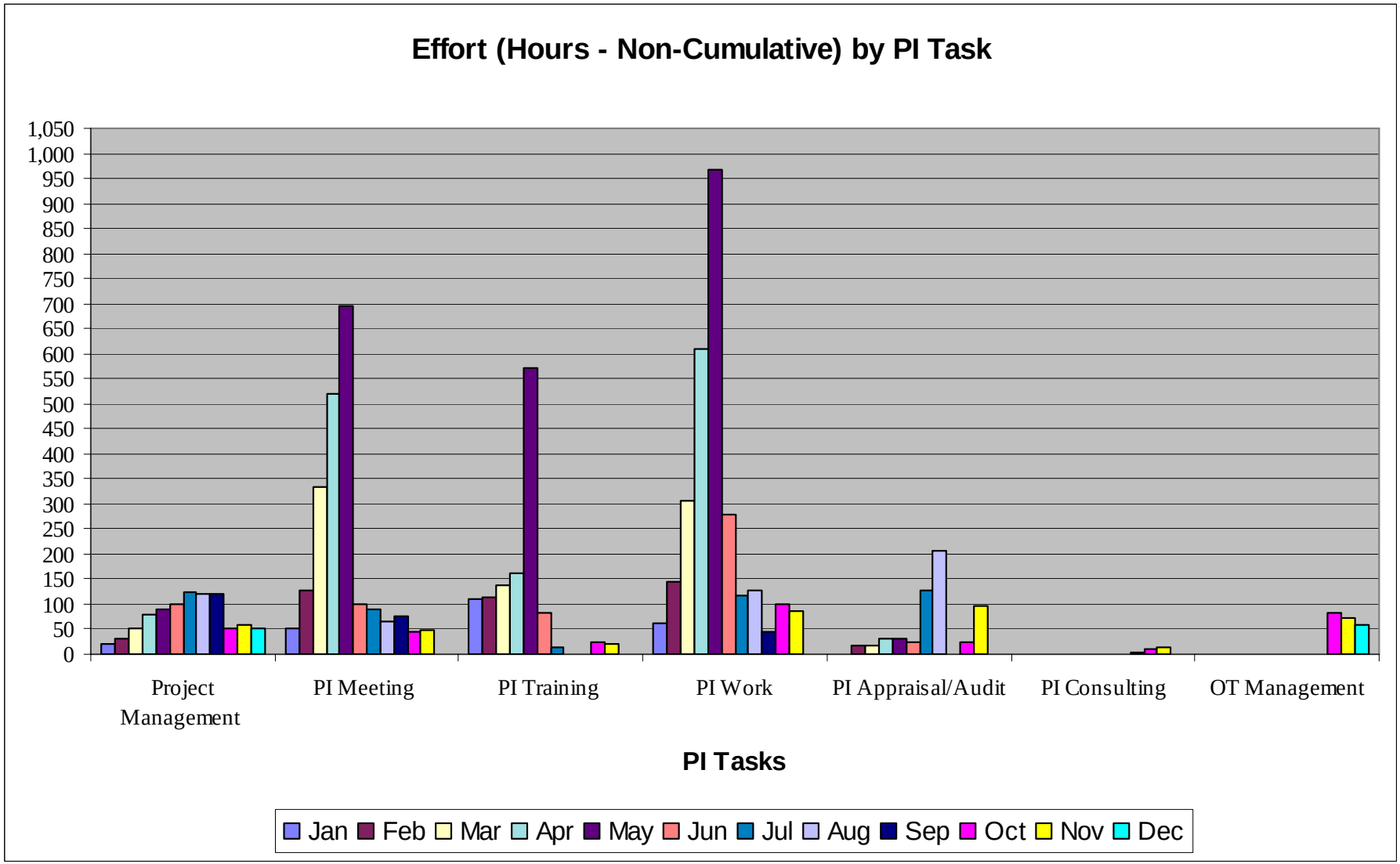
Measure: Schedule



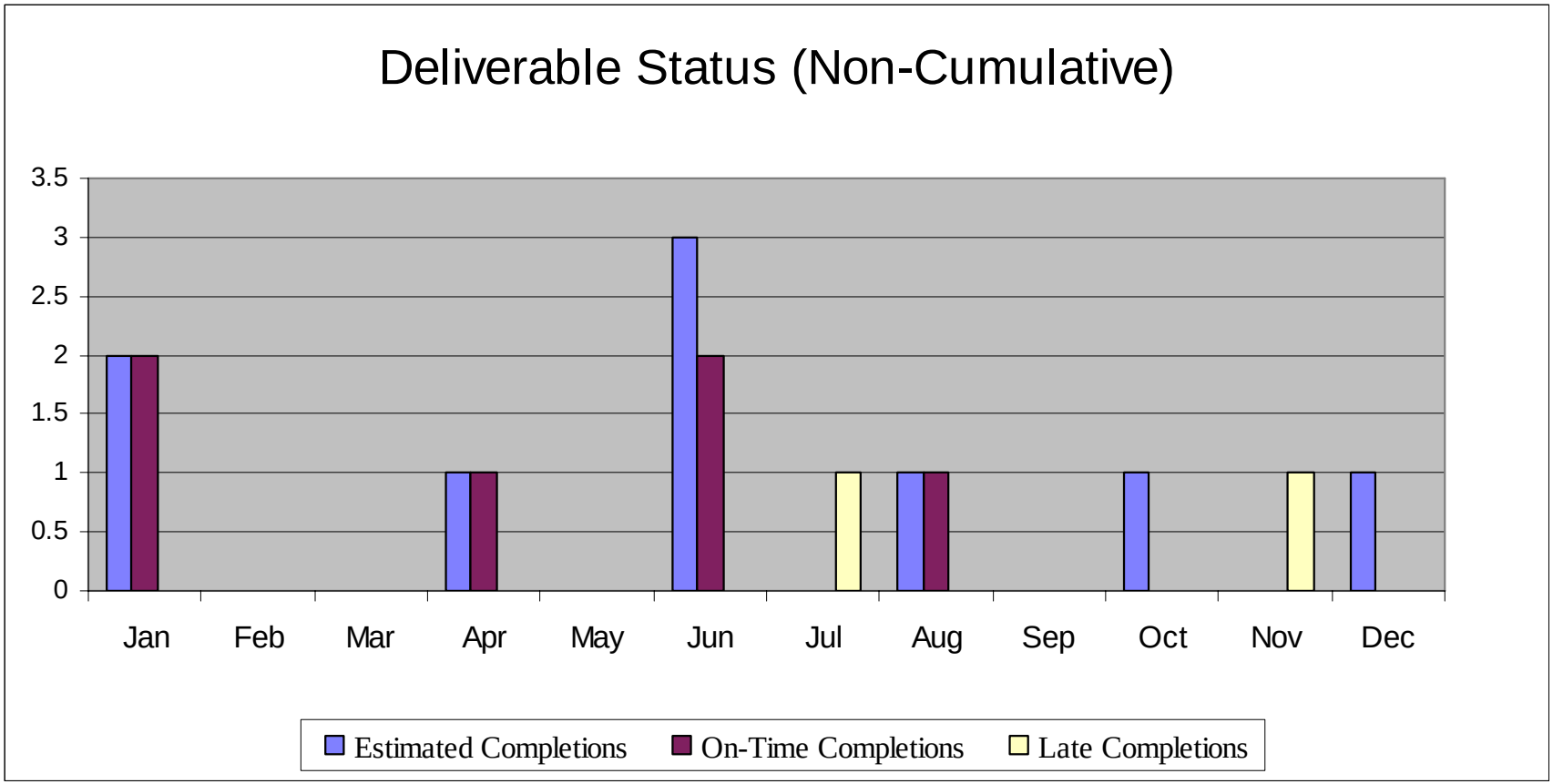
PI Measures - Quality



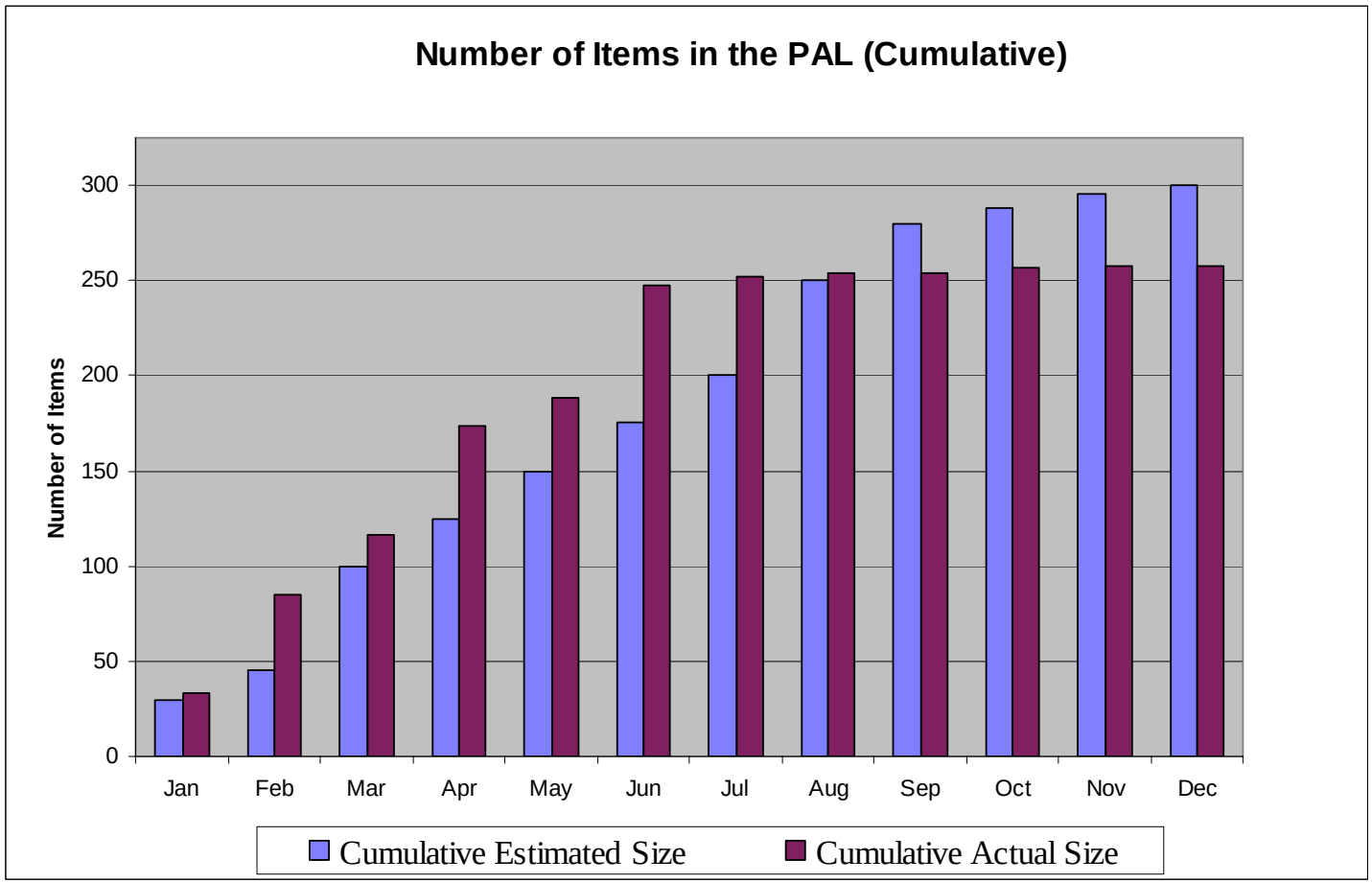
PI Measures - Effort



PI Measures - Schedule



PI Measures - Size

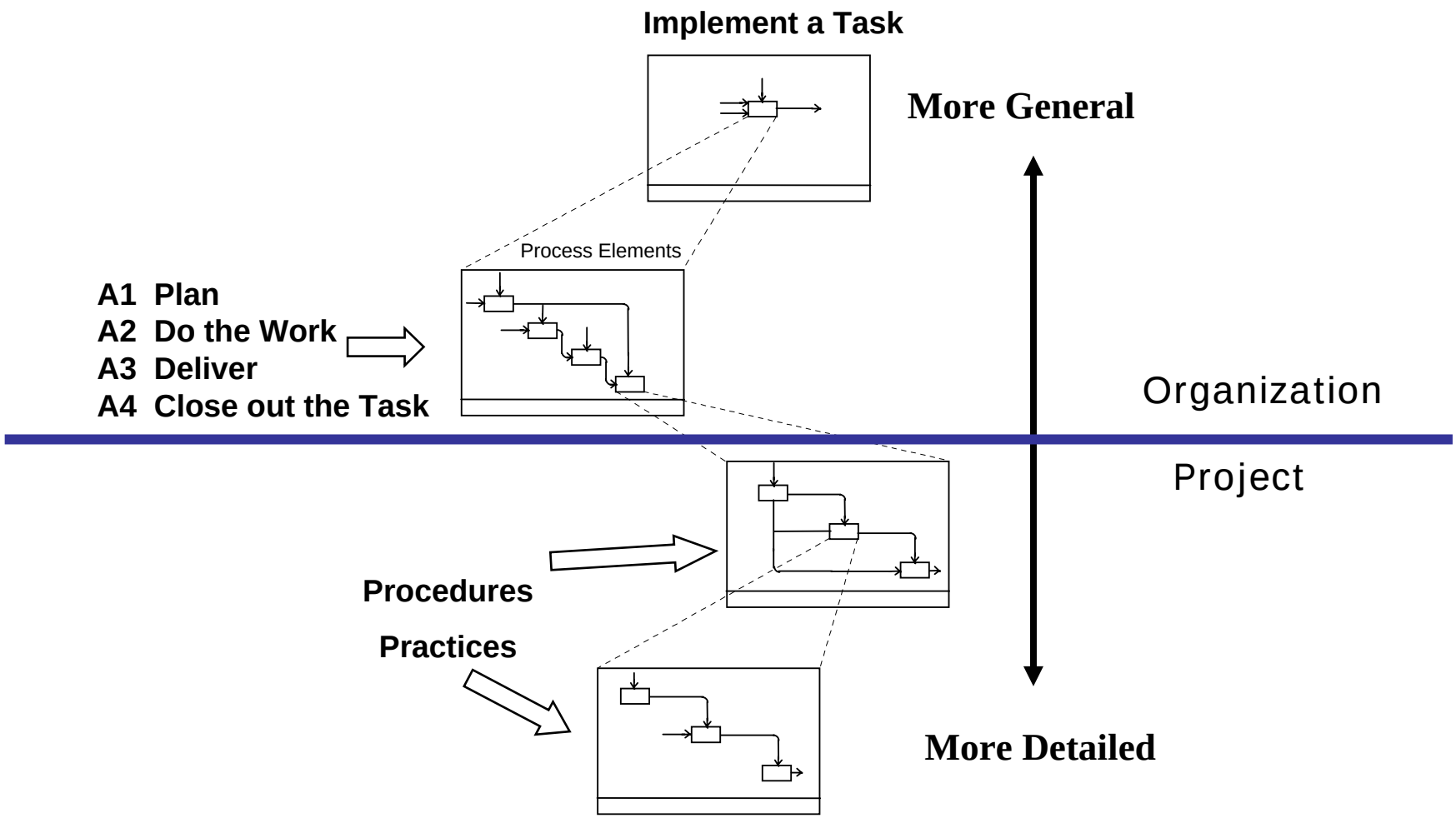


Benefits and Similar Observations

Benefits and Similar Observations

- Implementation perspectives
- Alternate Practices and Waived Process Areas
- Things We Got Right
- Lessons Learned
- Benefits

Implementation Perspectives



Process Decomposition Into Elements

Modified from a briefing developed by the Software Productivity Consortium NFP, Inc.

Alternate Practices and Waived PAs

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- SP 3.2 Perform Configuration Audits (CM)
- Some Verification and most Validation performed by external group
- Supplier Agreement Management
- SP 1.3-3 Establish Product Integration Procedures and Criteria (PI)

Things We Got Right

- Practiced what we preached
- Set up the infrastructure before working the details
- Leveraged existing processes
- Engaged a consultant as objective third party
- Used measures at all stages to determine progress and justify all requests for resources and support
- Conducted a Class C, then a Class B before the Class A (with variation)

Lessons Learned

- Focusing on measures is worth the effort
- Including infrastructure early pays off
- Manual works, but automated is much better (action items, change management, version control)
- Consistent documentation standards make a difference in creating, documenting, tailoring, referencing and using processes

Benefits

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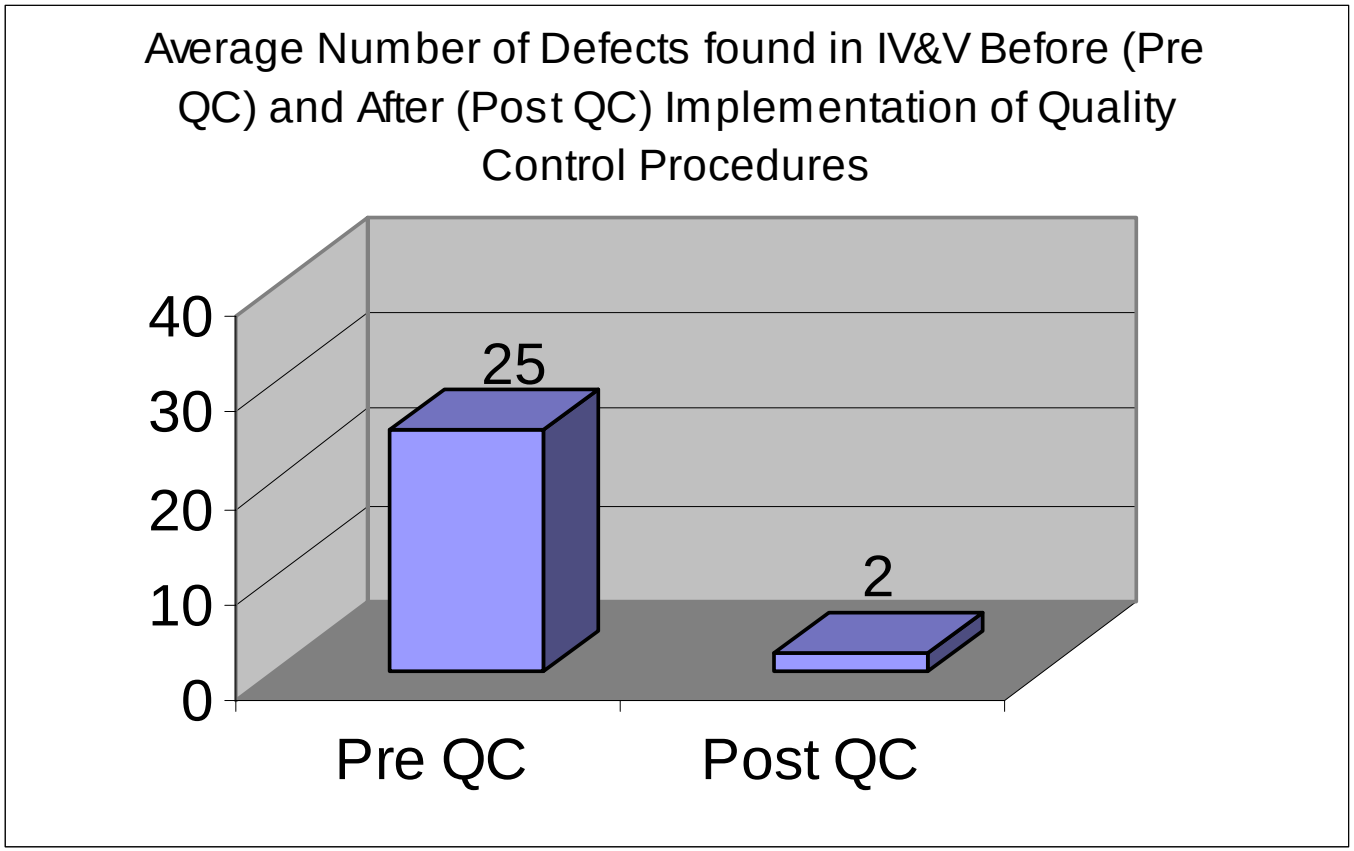
- Quality control improvements
- Information sharing and communication among team members
- Clarification of roles and responsibilities
- Improved use of measures to make decisions
- Significant additional business opportunities

Quality Control Improvements



Information Sharing

- Diversity on the process action teams
- Cross-organization membership on the Engineering Process Group including ISO organizations
- Cross-organization membership on the internal process audit teams

Clarification of Roles and Responsibilities

- Roles and Responsibilities defined in a matrix
- Combined separate tasks by process/lifecycle phase, roles and process tailoring by size
- Created summary cards for certain roles

Roles and Responsibilities Matrix

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Project Duration, Size and/or Value Threshold:	<=3 months or <$150,000 or < 3 FTE staff resources and Risk and Criticality to Client Operations is Low or Medium								
Governing Statement:	Those responsible for creating work products must ensure that appropriate staff provide input, review and approve content				**Role and Responsibility**				
Process or Process Artifact	**Process(P) or Process Artifact(A)**	**Comment**	Due Date (if applicable, unless overridden by the contract)	Related Resources	**PM**	**TM**	**QM**	**CM**	**Senior Mgmt**
	Pre-Award								
No Tailoring or Alternate Practice		***Comment***							
Optional									
At Risk Form	A	Used when funds are not available but work is required.			C				R,A
Statement of Work or RFP	A	Customer/client generates this document	NA		R	R	R	R	R
SOW/RFP Proposal (including cost proposal)	A		By due date		C	I	I	I	A
Vision Document	A				C	R	R	R	A
Product									
	Project Management Process								
No Tailoring or Alternate		***Comment***							
		This is accomplished by the Project Setup Form. This can be delegated to PMs for pre-award work under $20K; is optional for work defined under existing T&M, FFP contracts and maintenance. Form goes to Finance. The At							

Improved Use of Measures to Make Decisions

- Decision Analysis for selecting technical implementation options, pilots and training for process change requests
- Setting measurement goals to guide analysis efforts
- Risk management
- Escalation of process audit results

Questions