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Customer Success Is Our Mission

Adapting Small Projects Processes to CMMI

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The Problem

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- Standards (CMM, CMMI, ISO, Corporate Initiatives) written for large programs
- Organization processes derived from these standards
- Small projects can follow good process, but
  - Often find “process” intimidating
  - Do not need as much formal communication among team members
  - Cannot afford to produce enough artifacts to easily pass an appraisal
  - Metrics used to convey program status to management (generally not used to manage program)

Small Project Process Goals

- Scoped to include only directives used by most small projects
- Consistent with full process
- Short and Simple
  - Project buy-in
  - Supplemental non-directive guidelines and templates
- Comply with intent of appropriate standards (CMM, CMMI, ISO, Corporate Initiatives)
  - Project audited to tailored process
  - Not audited to standards
- Use phased implementation – by Discipline
  - Software Engineering, Systems Engineering, CM/DM …

The Results for Software (CMM)

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	Full Process	Small Process
Directives	122	12
Pages	436	37
Paragraphs	666	100
Tailoring Report		
Pages	38	2

A typical small software project is…

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- ≤ 3 Software developers for a year
  - ≅ 10,000 Hours
- ≤ $5M project cost
- Often are:
  - Company Funded
  - Software is not deliverable
  - Reuse into another project is not anticipated
  - Demo's
- Generally not focus candidates for assessments/ appraisals
- Often resistant to "process"

- Criteria required to use process – approved by Management

- Micro projects (<500 hours)
  - Recommended tailoring/scoping

History

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- Initial small process – Based on products: Requirements Document, Test Plan, VDD, etc.
  - Used only portions of directives related to products
  - Good Start… But
    - Still uses large process
    - Unclear which portions applied
    - Non-uniform process – not applied consistently
    - Not conducive to process improvement
    - Not Compliant with standards
- Lessons Learned fed into subsequent releases of small and full process

The Solution – Implemented for Software

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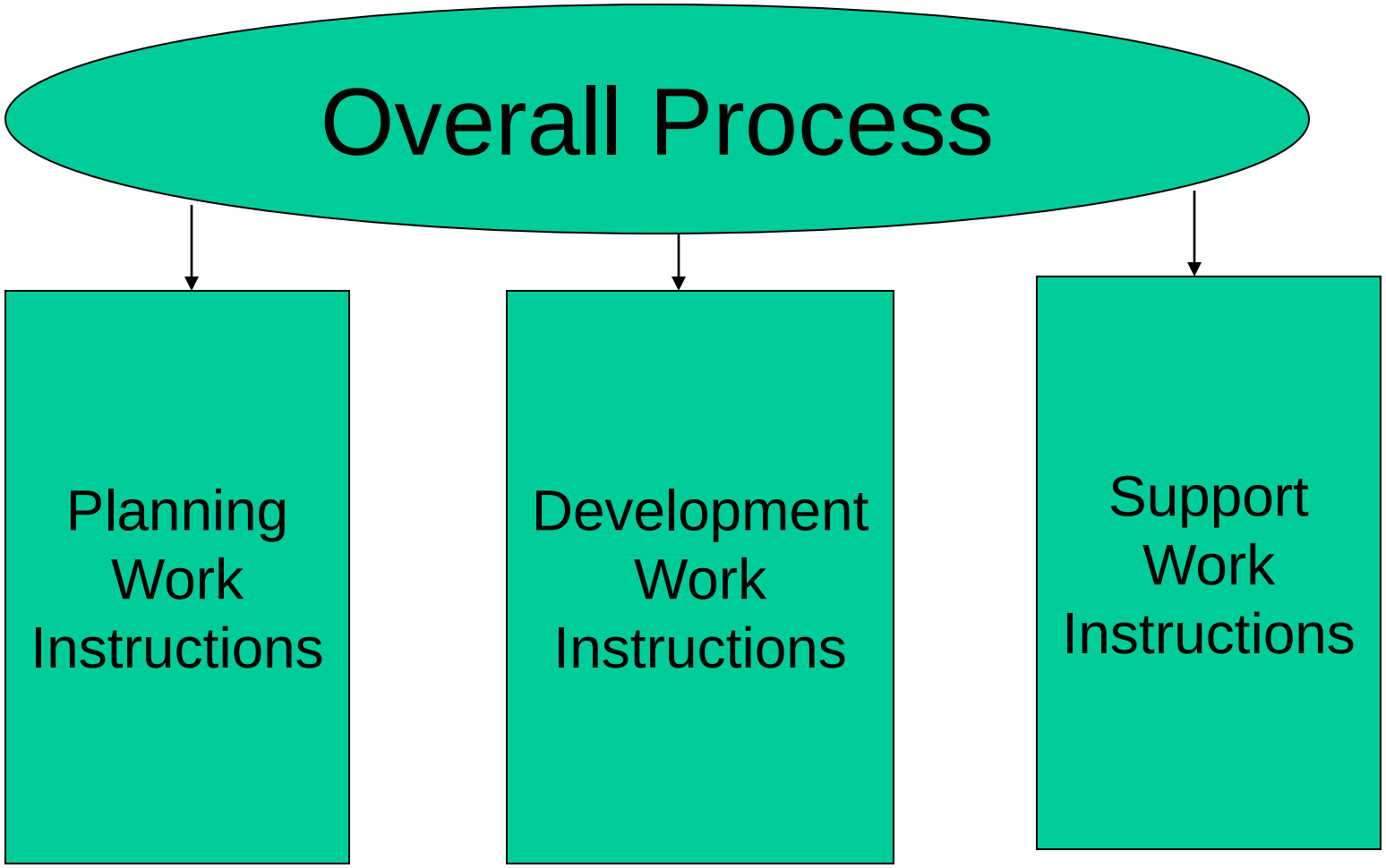
- Process for planning, managing and executing small software projects
  - Scoped from full process to cover characteristics used by most small projects
  - Procedure and 11 Work Instructions
  - Combine directives where practical
    - Within Discipline (Preliminary and Detailed Design)
    - Multi-Discipline (Peer Reviews)
  - Used “self-contained” or in conjunction with other disciplines (full process, for now)
- Eliminates directives not used by most small projects, but allows for their inclusion when necessary (e.g. Formal Customer Reviews)
- Generic wording
  - Document Requirements in SRS ➔ Document Requirements
  - SOW ➔ Tasks
- Almost no required formats

Small Project Metrics

- *Project Overview*
- *Accomplishments Summary*
- *Problem Summary*
- *Project Schedule*
- *Risk Status*
- *Earned Value*
- *Staffing and Management Effort*
- *Defect Analysis*
- *Scope Change*
- *Lessons Learned and Implemented*
- *Productivity Measurement*
- *Software Size Trend*
- *Software Requirements Volatility*

Small Project Software Process



Small Project Software Process

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Overall Procedure

- Criteria to Determine if Applicable
- Establishes Structure
- Roles and Responsibilities
- Metrics and Management Reporting
- Process Streamlined
  - Directives 10 ➔ 1
  - Pages 82 ➔ 4
  - Paragraphs 64 ➔ 12

Small Project Software Process

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Planning Work Instructions

- Small Project Planning
  - Determine Contractual/Program Reqts
  - Determine Tasks (SOW)
  - Negotiate Budget
  - Develop Schedule
  - Participate in Program Level Planning
  - SDP, SQP, SCMP, Training Plan
- Process Tailoring
  - Tailoring Instructions and Guidelines
  - Tailoring Codes
  - "Red-Lined" Process
  - Management Approval

Process Streamlined: Directives 14 ➔ 2

Pages 95 ➔ 20 Paragraphs 50 ➔ 11

Small Project Software Process

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- Requirements
  - Allocation of system requirements to software
  - Generate software requirements
  - Document software, interface requirements, traceability
  - Review and Control
- Design
  - Generate Design
  - Document
  - Resource Utilization
  - Review

Development Work Instructions

- Coding
  - Develop Coding Stds
  - Generate Code
  - Document
  - Resource Utilization
  - Review and Control
- Integration and Test
  - Plan Testing
  - Document in STP/STD
  - Traceability
  - Test Report
- Process Streamlined:
  - Directives 17 ➔ 4
  - Pages 48 ➔ 8
  - Paragraphs 110 ➔ 28

Small Project Software Process

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- Engineering Repository and Support Documentation
  - SEN, SDFs, VDD
- Software Configuration Management
- Peer Reviews
- Software Quality Engineering
- Project Management Team
- Process Streamlined
  - Directives 34 ➔ 5
  - Pages 114 ➔ 14
  - Paragraphs 220 ➔ 40

Support Work Instructions

Software Testing - Full Process

- **Unit Testing Procedure**
  - Unit Test Procedure and Report Product Standard Work Instruction
- **Integration and Testing Procedure**
  - Regression Testing Work Instruction
  - Build Plan Product Standard Work Instruction
  - Software Integration and Test Procedure Product Standard Work Instruction
  - Software Integration and Test Report Product Standard Work Instruction
  - Software Integration and Testing Guideline Work Instruction
- **CSCI Testing Procedure**
  - Software Test Plan Product Standard Work Instruction
  - Software Test Description Product Standard Work Instruction
  - Software Test Report Product Standard Work Instruction
  - Software Test Plan Guideline Work Instruction
  - Software Test Description Guideline Work Instruction
  - Software Test Report Guideline Work Instruction

Small Project Testing

- Plan testing. Determine extent of testing, whether to combine unit, integration, CSCI testing.
- Document test planning. Create test plan or include in ENB:
  - The test environment
  - Background information/overview
  - Schedules
  - Requirements traceability
  - Individual tests to demonstrate compliance to requirements
  - Control item tested, including COTS
- Create test description: TP and TD may be combined or included in ENB:
  - Test preparations – hardware and software
  - Test cases, descriptions, procedures
  - Requirements addressed
  - Prerequisite conditions
  - Inputs, Expected results, Evaluation criteria
  - Assumptions and constraints
  - Requirements traceability

Small Project Testing (continued)

- For each defined level of testing, execute test procedures and record results.
  - Ensure any necessary setup and calibration of test equipment.
  - Maintain test history log. Record data from each test, including P/F.
  - Evaluate test results, make corrections and retest, as necessary.
  - Document and report non-conformances. Classify defects.
- Create a Test Report. TP, TD, and TR may be combined or included in ENB:
  - Test results Overview/assessment
  - Problems encountered
  - Detailed test results or test log (may be annotated TD)
  - Deviations from test cases/procedures
- Peer reviews of TP, TD, and TR.
- Control test products: Ensure consistency with other products

Micro Sized Projects – Really small

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- <500 hours
- Tailor small project software process per scope of project
- Emphasis on Requirements Management, Testing and Configuration Management
- Key planning events
- Limited Metrics
- Use of legacy plans/documents

Results of CMM software projects

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- Initially piloted on 3 programs ➔ Deployed on over 40 programs
- Feedback incorporated in subsequent releases (and into full process)
- Overwhelming positive response from PMs, SQE, Business Units, and Line and Project Management
- Tailoring time for software reduced from an average of 160 staff-hours to average of 4 staff hours
- Used in Seven Engineering Centers
  - Five non-software centers were also not process oriented
- Adapted for use on micro size projects (200-500 hours)

Summary

- Goals:
  - ISO 9000, IPDS, CMM/CMMI Level 3 Compliant for project, as scoped
  - Not Planned for Focus Projects in Assessments or Appraisals
- Method
  - Start with full process
  - Scope for small projects
  - Eliminate items not used by typical small project
  - Keep it short and simple ➔ Really short and simple
  - Check for compliance with standards and make adjustments as necessary
  - Phased implementation
- Management Approval

Questions ? ? ?