

Excellence Combining Expertise™

Evolution of Project Planning & Project Monitoring and Control

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Topics to be covered

- **Overview of relevant SW-CMM KPAs**
 - ▶ **Software Project Planning**
 - ▶ **Software Project Tracking and Oversight**

- **Project Planning as a Staged Level 2 PA**
 - ▶ **Specific Goals & Specific Practices**

- **Project Monitoring & Control as a Staged Level 2 PA**
 - ▶ **Specific Goals & Specific Practices**

- **Generic Goals & Generic Practices**



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Level 2: Software CMM Version 1.1

Repeatable Level

● **Primary Objectives at the Repeatable Level**

- ▶ **Institutionalize effective management processes**
- ▶ **Although specific processes implemented by projects may differ, the process permits organizations to repeat successful practices**
- ▶ **Characteristics of such a process include - that they are**
 - **Documented**
 - **Practiced**
 - **Enforced**
 - **Trained**
 - **Measured & Able to Improve**
- ▶ **Establishes a sense of responsibility & discipline in performing planning & tracking activities**



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Level 2:

Software Project Planning

- **To establish reasonable plans for performing software engineering & for managing the software project**
- **It involves developing estimates for the work to be performed, establishing the necessary commitments and defining the plan to perform the work**
- **It includes steps to estimate the size of the software work products and the resources needed, produce a schedule, identify and assess software risks, and negotiate commitments**



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Level 2:

Software Project Planning - Goals

- **Goal 1 : Software estimates are documented for use in planning & tracking the software project.**
- **Goal 2 : Software project activities and commitments are planned and documented**
- **Goal 3 : Affected groups and individuals agree to their commitments related to the software project**



Level 2:

Software Project Planning

- **Project Manager is designated to be responsible for negotiating commitments and developing the project's software plan**



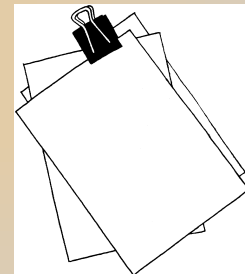
- **Project policy for planning software projects involves negotiation of commitments and communicating them with all affected groups after appropriate review using good change control procedures**



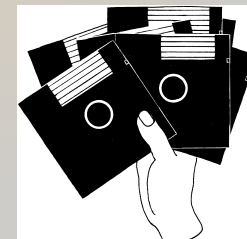
Level 2:

Software Project Planning

- **A documented and approved statement of work covering scope, goals and objectives along with cost and schedule constraints are established**



- **Changes to commitments if any, are controlled, maintained and all affected software work products are identified and modified**





Level 2:

Software Project Planning

- **Software project planning is initiated in the early stages of, and in parallel with the overall project planning**



- **Project commitments are made to individuals and groups external to the organization after they are reviewed with senior management**



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Level 2:

Software Project Planning

- **A software life cycle with predefined stages of manageable size is identified or defined according to a documented procedure**



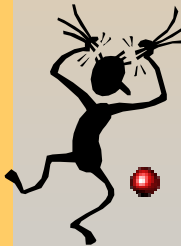
- **Software work products that are needed to establish and maintain control of the software project are identified**



Level 2:

Software Project Planning

- **Estimates for the size of the work products are derived according to a documented procedure, and where applicable historical data is used as basis**
- **Estimates for software project's schedule, resources, effort and costs are derived according to a documented procedure**
- **Software risks associated with the cost, resource, schedule and technical aspects of the project are identified, assessed and documented**





Level 2:

Software Project Planning



- Software planning data is recorded and committed into the organizational repository



- Status of project planning activities such as work completed, effort expended and funds used on software project are measured

- Activities for project planning activities are reviewed -
 - ▶ with senior management on a periodic basis
 - ▶ with project manager on both an event driven and periodic basis
 - ▶ with software quality assurance to report results on project planning activities



Level 2:

Software Project Planning - Probing Questions



- Are estimates (e.g., size, cost, effort and schedule) documented for use in planning and tracking software projects?



- Are all affected groups and individuals represented in agreements involving commitments made on projects?



- Does the project follow an approved written organizational policy for planning the software project?



- Are measurements made and used to determine the status of activities involving project planning activities?



Level 2:

Software Project Tracking & Oversight

- **Provide adequate visibility into actual progress so that management can take corrective actions when the performance deviates significantly from the plan**
- **Corrective actions may include revising the development plan to reflect actual accomplishments and re-planning the remaining work**
- **It involves tracking and reviewing the accomplishments and results against documented estimates, commitments and plans**



Level 2:

Software Project Tracking & Oversight - Goals

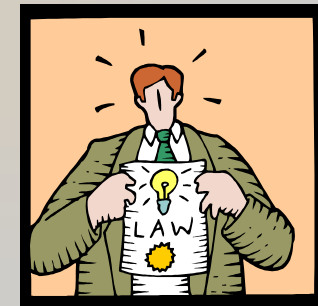
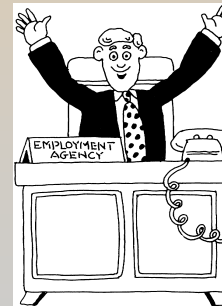
- **Goal 1 : Actual results and performance are tracked against the software plans.**
- **Goal 2 : Corrective actions are taken and managed to closure when actual results and performance deviate significantly from the software plans.**
- **Goal 3 : Changes to software commitments are agreed to by the affected groups and individuals.**



Level 2:

Software Project Tracking & Oversight

- Documented policy which addresses the following is used as basis for managing the project
 - ▶ Project Status and Issues Tracking
 - ▶ Corrective actions taken when the plan is not being achieved
 - ▶ Changes to commitments with the involvement & agreement of affected groups
 - ▶ Senior management review of changes to commitment & new software project commitments





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Level 2:

Software Project Tracking & Oversight

- A documented software project plan is used as basis for executing the software project
- Work products to be developed along with effort, cost, budget and schedule are tracked with all affected groups





Level 2:

Software Project Tracking & Oversight

- Software managers are trained and receive orientation on the project's
 - ▶ software engineering standards,
 - ▶ procedures &
 - ▶ application domain
- Software development plan is revised as appropriate and commitments and changes to them are reviewed at each revision with senior management using a documented procedure



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Level 2:

Software Project Tracking & Oversight

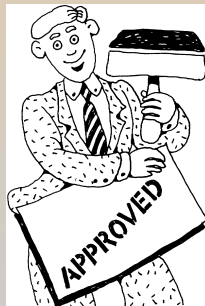
- **Approved changes are communicated to all affected groups**
- **Project's Software Effort, Resources, Schedule & Costs are tracked and corrective actions are taken as necessary**
- **The project's technical activities are tracked against the established project plan**
- **Risks associated with the execution are tracked and the risk management plan is updated with new risks as they are encountered**



Level 2:

Software Project Tracking & Oversight

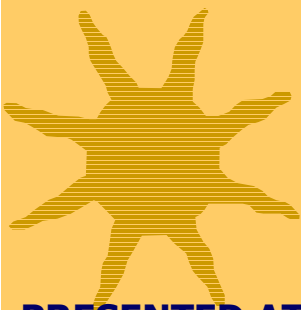
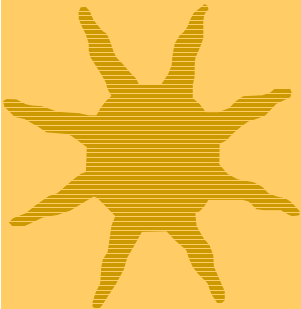
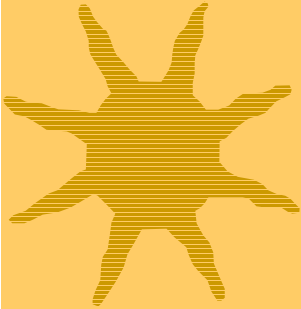
- Software engineering group conducts periodic internal reviews to track technical progress to address the accomplishments and results of the software project execution
- Project Tracking & Oversight activities are reviewed with-
 - ▶ Senior Management on a periodic basis
 - ▶ Project Manager on a periodic and event driven basis
 - ▶ Software Quality Assurance group to report on project tracking & oversight activities





Level 2:

Software Project Tracking & Oversight – Probing Questions



- To what extent are the project's actual results (e.g., schedule, cost, size) compared with estimates in plan?
- What types of corrective action are taken when actual results deviate significantly from the plan?
- How are changes to software commitments communicated?
- What types of measurements are used to determine the status of the activities for software tracking & oversight?
- Who reviews the software project tracking activities?



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Level 2: CMMI-SE/SW/IPD Version 1.0 Managed Level

● Primary Objectives at the Managed Level

- ▶ **Institutionalize effective management processes**
- ▶ **Standards, process descriptions and procedures may be in use in limited context (in a project)**
- ▶ **Characteristics of such a process at the project level include - that they are**
 - **Planned**
 - **Documented**
 - **Performed**
 - **Monitored**
 - **Controlled**
- ▶ **Establishes a sense of responsibility & work products are under appropriate levels of configuration management**



Level 2:

Project Planning

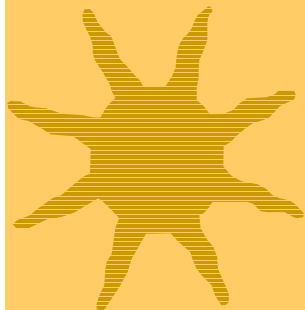
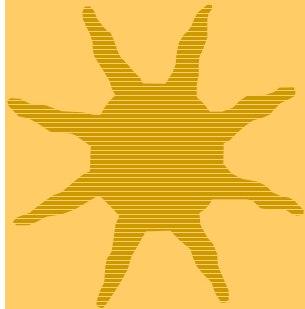
- To establish and maintain plans that define project activities
- It involves developing the project plan, **interacting with stakeholders** appropriately and **getting commitment to the plan**, and maintaining the plan
- It includes estimating attributes of the work products and tasks, resources needed, negotiating commitments, producing a schedule and identifying and analyzing project risks



Level 2:

Project Planning – Specific Goals

- **SG 1: Estimates of project planning parameters are established and maintained**
- **SG 2: A project plan is established and maintained as the basis for managing the project**
- **SG 3: Commitments to the project plan are established and maintained**

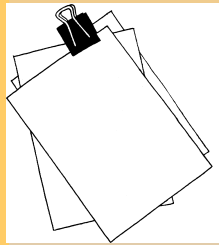




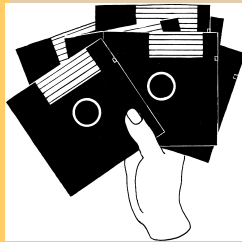
Level 2:

Project Planning – Specific Practices

- **Estimates of project planning parameters are typically based on –**



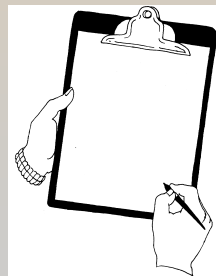
- **Project requirements**



- **Identified tasks and work products**

- **Technical Approach**

- **Attributes of work products and tasks such as size and complexity of work**



- **Models and historical data**

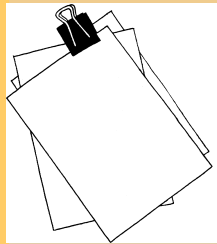
- **Methodology used**



Level 2:

Project Planning – Specific Practices

- **A top level Work Breakdown Structure is maintained to estimate the scope of the project –**



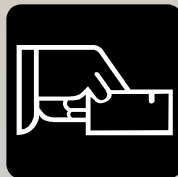
- **WBS is a product-oriented structure**

- **Identifies work products, project tasks, responsibilities and the schedule**



- **Identifies risks and mitigation tasks**

- **Identifies work products that will be externally acquired, and**



- **Work products that will be reused**



Level 2:

Project Planning – Specific Practices

- **Define the project life-cycle phases and establish appropriate project plans**
 - ▶ **Systems Engg: Systems Engineering Mgmt Plan**
 - ▶ **Software Engg: Software Development Plan**
- **Estimate the effort and cost of the project using models and/or historical data**
- **Identify, Analyze & Prioritize project risks and collect project data for archival**
- **Plan project resources after establishing the knowledge and skills needed to perform the project**



Level 2:

Project Planning – Specific Practices

- **Commitments to the project plan are established and maintained -**
 - ▶ **By reviewing subordinate plans and strategies**
 - ▶ **By obtaining stakeholder involvement**
 - ▶ **Reconciliation of scope of work and resource availability**





Level 2:

Project Monitoring & Control

- **To provide understanding into project's progress so that appropriate corrective actions can be taken when performance deviates significantly from the plan**
- **Corrective actions may include revising the development plan to reflect actual accomplishments and re-planning the remaining work**
- **It involves tracking and reviewing the accomplishments and results against documented estimates, commitments and plans**

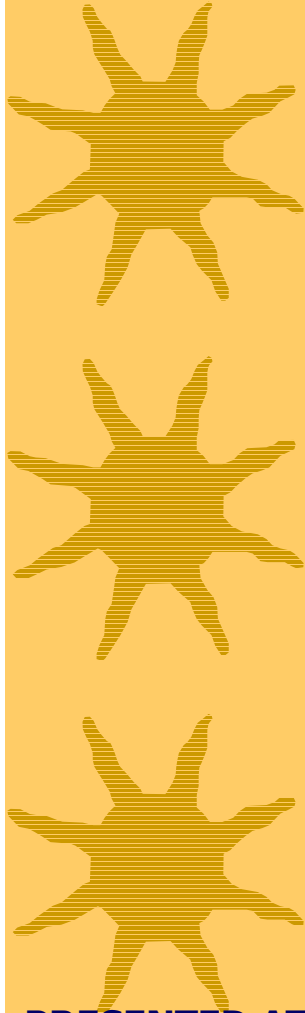


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Level 2:

Project Monitoring & Control – Specific Goals

- **SG 1: Actual performance and progress of the project is monitored against the project plan**
- **SG 2: Corrective actions are managed to closure when the project's performance or results deviates significantly from the plan**





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Level 2:

Project Monitoring & Control – Specific Practices

- **Actual performance and progress of the project is monitored by –**
 - ▶ **Tracking actual values of project attributes to estimates**
 - ▶ **Documenting any significant deviations in the planning parameters**
 - ▶ **Maintaining records of project performance**

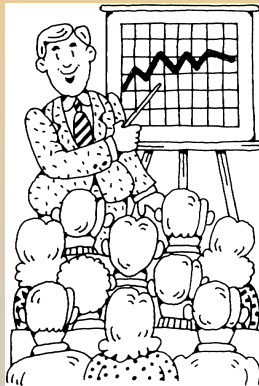




Level 2:

Project Monitoring & Control – Specific Practices

● Monitor and record observations and deviations on –



- ▶ Both external and internal commitments to the project
- ▶ Risks encountered during project execution against those identified in the project plan
- ▶ Project data & stakeholder involvement

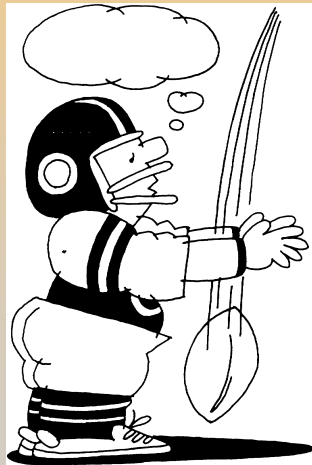
... based on periodic progress reviews and milestone reviews



Level 2:

Project Monitoring & Control – Specific Practices

● **Corrective actions are managed to closure after –**



- ▶ **Collecting and Analyzing issues**
- ▶ **Developing corrective action plans to eliminate issues after obtaining relevant stakeholder agreement**
- ▶ **Recording the corrective action results based on analyzing their effectiveness**



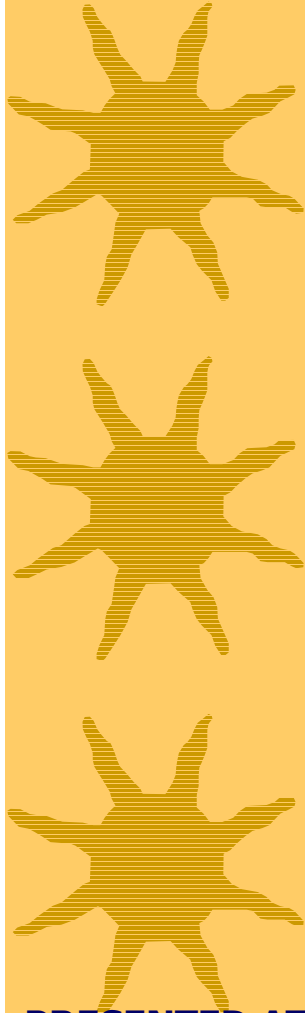
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Level 2:

Generic Goals

- **GG 1: Achieve Specific Goals**
 - ▶ **GP 1.1 - Identify Work Scope**
 - ▶ **GP 1.2 - Perform Base Practices**

- **GG 2: The process is institutionalized as a MANAGED process**





Level 2:

Generic Practices

- **GP 2.1 : Establish and maintain an organizational policy for planning and performing [PP/PMC] process (CO.1)**
- **GP 2.2 : Establish and maintain the requirements, objectives, and plans for performing the [PP/PMC] process (AB.1)**



Level 2:

Generic Practices

- **GP 2.3 : Provide adequate resources for performing the planned process, developing the work products and providing the services for the [PP/PMC] process (AB.2)**



Level 2:

Generic Practices

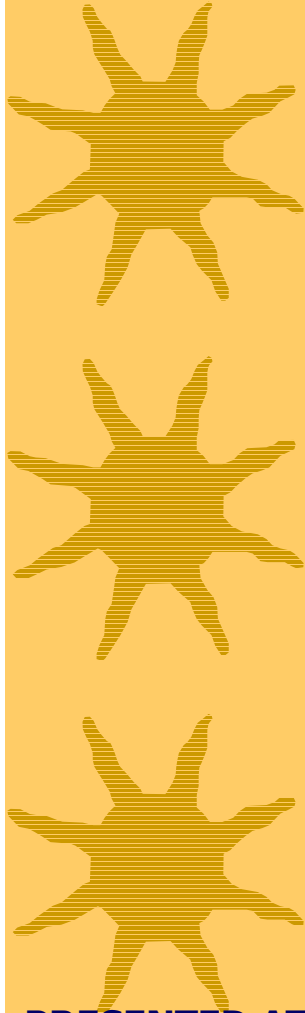
- **GP 2.4 : Assign responsibility and authority for performing the process, developing the work products, and providing the services of the [PP/PMC] process (AB.3)**
- **GP 2.5 : Train the people performing or supporting the [PP/PMC] process, as needed (AB.4)**



Level 2:

Generic Practices

- **GP 2.6 : Place designated work products of the [PP/PMC] process under appropriate levels of configuration management (DI.1)**
- **GP 2.7 : Identify and involve the relevant stakeholders of the [PP/PMC] process, as planned (DI.2)**





Level 2:

Generic Practices

- **GP 2.8 : Monitor and control the [PP/PMC] process against the plan and take appropriate corrective action (DI.3)**
- **GP 2.9 : Objectively evaluate adherence of the [PP/PMC] process and the work products and services of the process to the applicable requirements, objectives and standards and address noncompliance. (VE.1)**

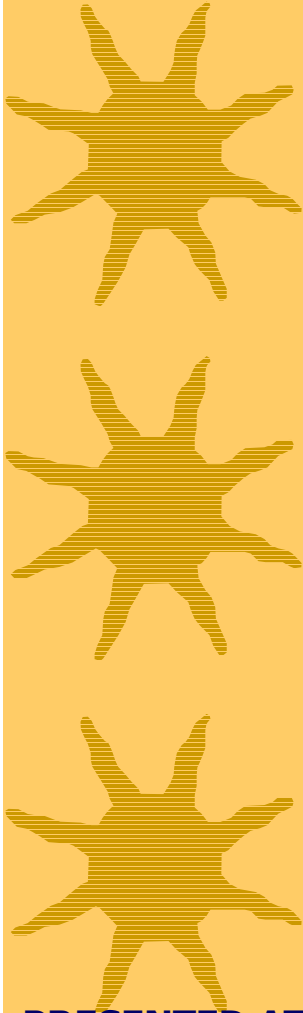


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Level 2:

Generic Practices

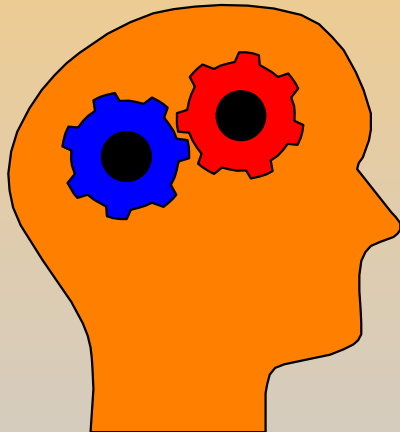
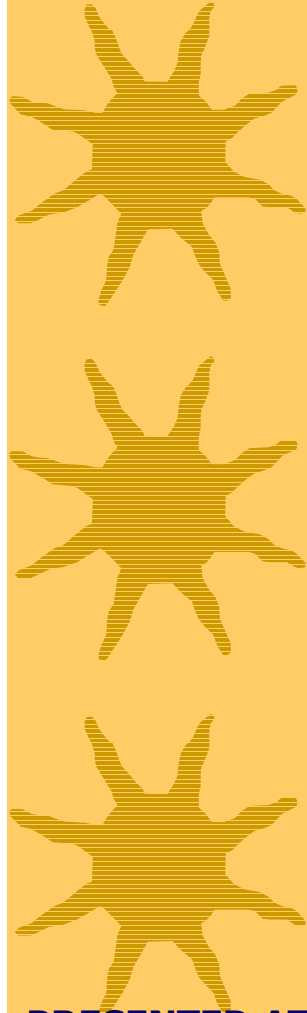
- **GP 2.10 : Review the activities, status, and results of the [PP/PMC] process with management and resolve issues (VE.2)**





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Feedback, Discussion, Q&A



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