Capability Maturity Model Integrated (CMMI)

Configuration Management Considerations

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Agenda

- SEI Overview
- Capability Maturity Models In General
- CMMI Overview
- Configuration Management Elements of:
  - Project Management
  - Engineering
  - Support
  - Process Management
- Conclusion

Software Engineering Institute (SEI)

- Established in 1984 by Congress as a federally funded research and development center

- Sponsored by the U.S. Department of Defense (DoD) Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics

- Trusted partner with industry organizations and government agencies in the development, acquisition, and support of software-intensive systems.

- Mission: Advance the practice of software engineering

- Long Range Goal: Make the acquisition, development, and sustainment of software-intensive systems predictably better, faster, and cheaper for the DoD.
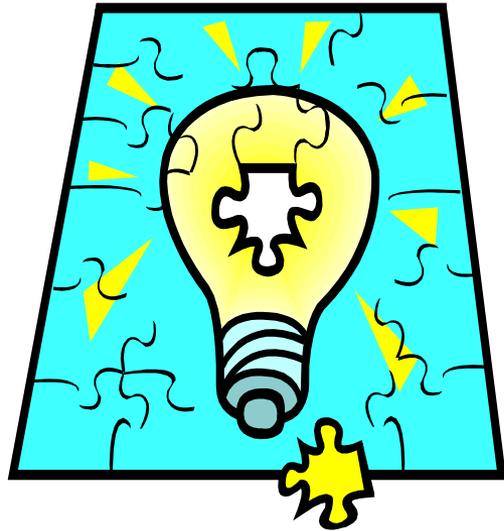
Capability Maturity Models

- The SEI has developed six Capability Maturity Model products. They are:

- CMMI®(Capability Maturity Model Integration)

- P-CMM (People Capability Maturity Model)

- SA-CMM (Software Acquisition Capability Maturity Model)

- Legacy CMMs
    - Capability Maturity Model for Software (SW-CMM)
    - Systems Engineering Capability Maturity Model (SE-CMM)
    - Integrated Product Development Capability Maturity Model (IPD-CMM)
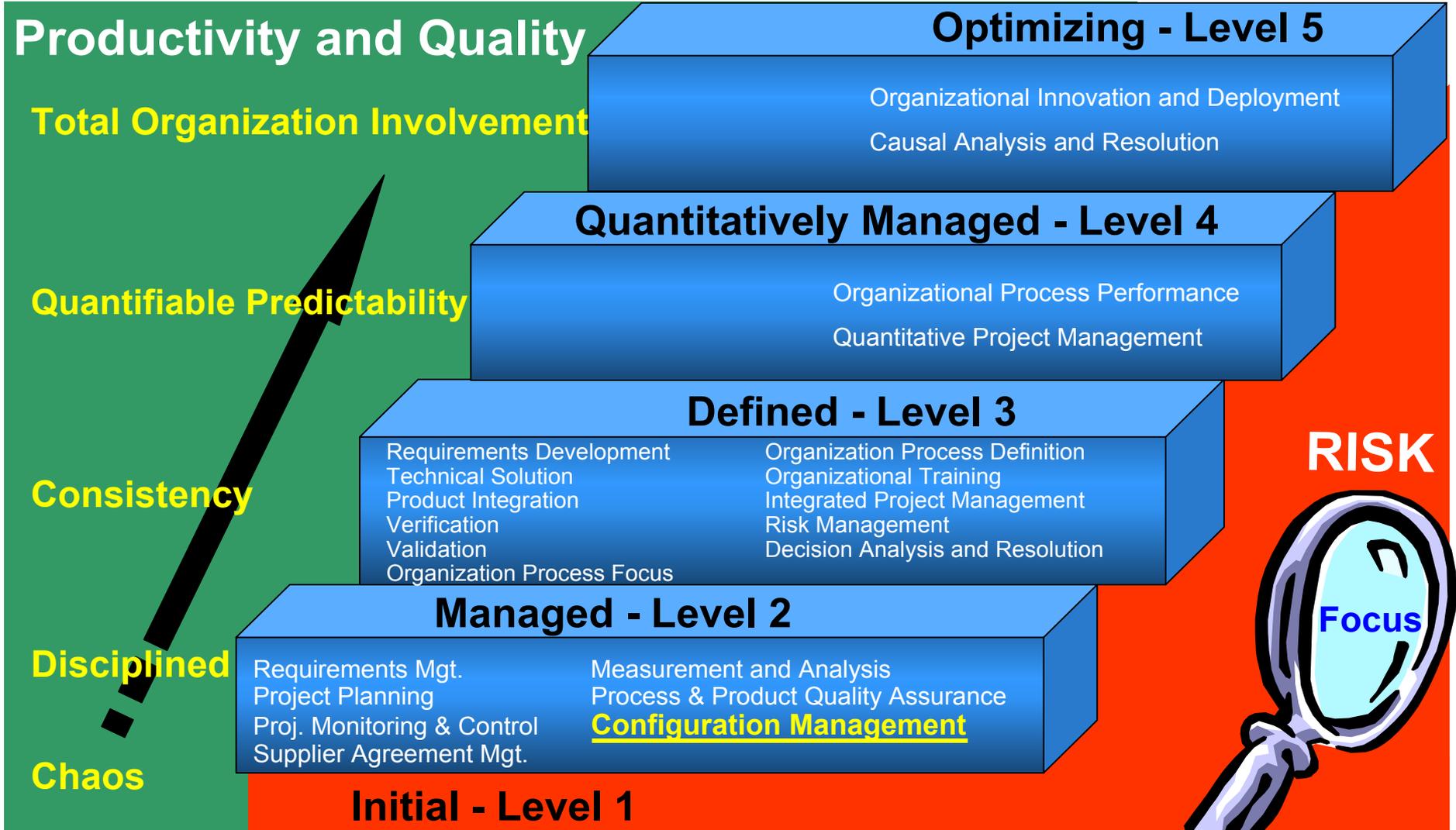
Capability Maturity Models (Continued)

- Address software development and maintenance
- Provide integrated process improvement reference models
- Build broad community consensus
- Harmonize with related standards
- Enable efficient improvement across disciplines

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How Does Configuration Management Fit In?

- The CMMI states that purpose of Configuration Management is to establish and maintain the integrity of work products using:
  - configuration identification
  - configuration control
  - configuration status accounting, and
  - configuration audits
- Configuration Management
  - is an overhead activity, But…..
  - the cost of not doing CM is higher then the cost of doing CM
- CM is discrete discipline, yet……
- It is a critical component of the overall project success

The CMMI® Model

Productivity and Quality

Total Organization Involvement

Quantifiable Predictability

Consistency

Disciplined

Chaos

Optimizing - Level 5
Organizational Innovation and Deployment

Causal Analysis and Resolution

Quantitatively Managed - Level 4
Organizational Process Performance

Quantitative Project Management

Defined - Level 3
Requirements Development · Organization Process Definition
Technical Solution · Organizational Training
Product Integration · Integrated Project Management
Verification · Risk Management
Validation · Decision Analysis and Resolution
Organization Process Focus

Managed - Level 2
Requirements Mgt. · Measurement and Analysis
Project Planning · Process & Product Quality Assurance
Proj. Monitoring & Control · **Configuration Management**
Supplier Agreement Mgt.

Initial - Level 1

RISK

Focus

Capability Maturity Model – Integration ^{SM} Version 1.1

Continuous Representation of CMMI®
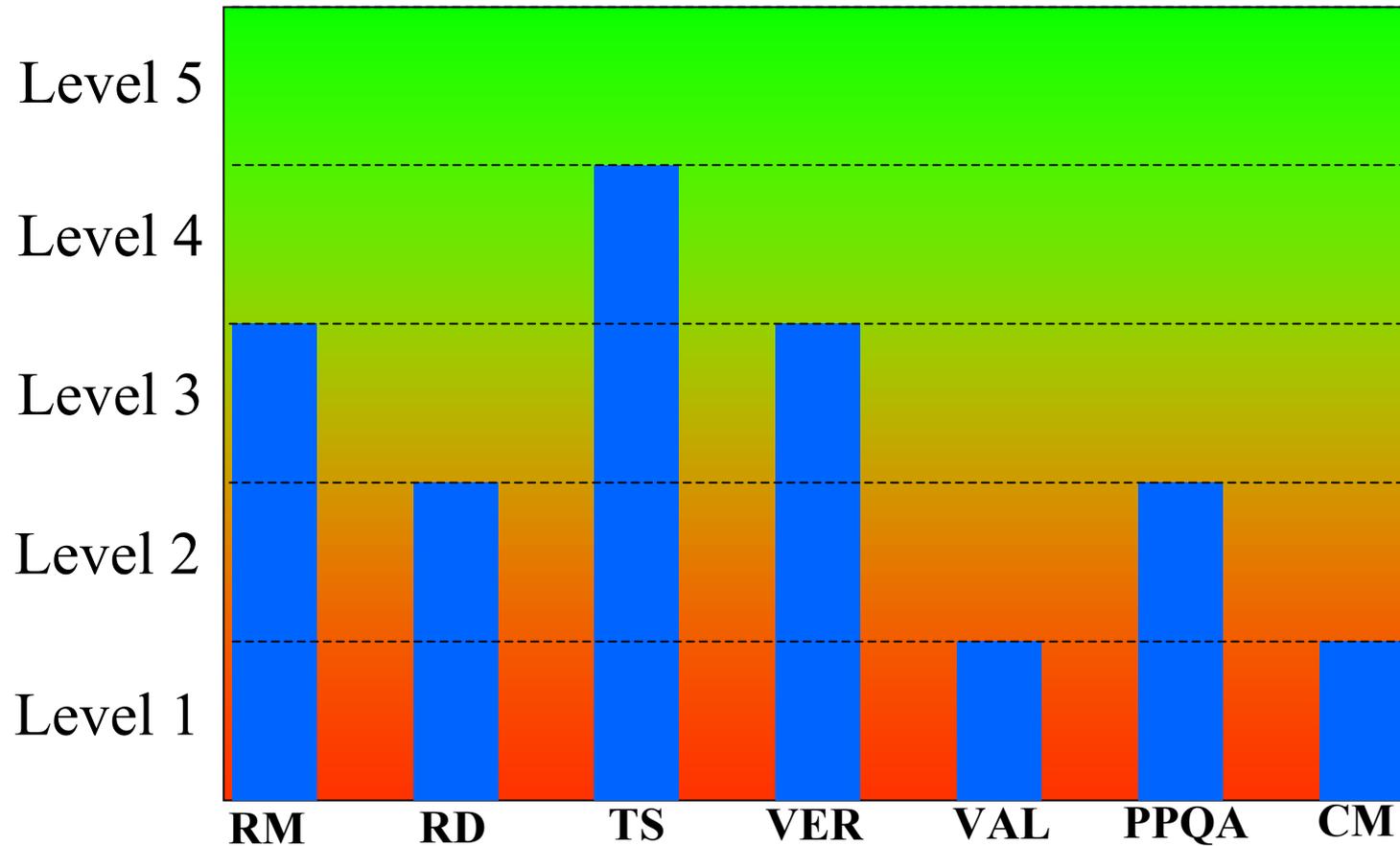
Project Mgt. (CM) Perspective

Scope Project

Estimate Project

Size, Effort, Schedule, Cost

Attributes	Schedule
Budget	Skills
Cost	Stakeholder
Data Mgt	Involvement
Effort	Resources
Lifecycle	Risks

Supplier Agreement Mgt

Project Plan(s)

Obtain Commitments

Monitor Plans & Assumptions

Predict Outcome

Deliver Commitments

Take Corrective Action

Engineering (CM) Perspective

Requirements Development

Technical Solutions

Requirements Management

Validation

Integration

Verification
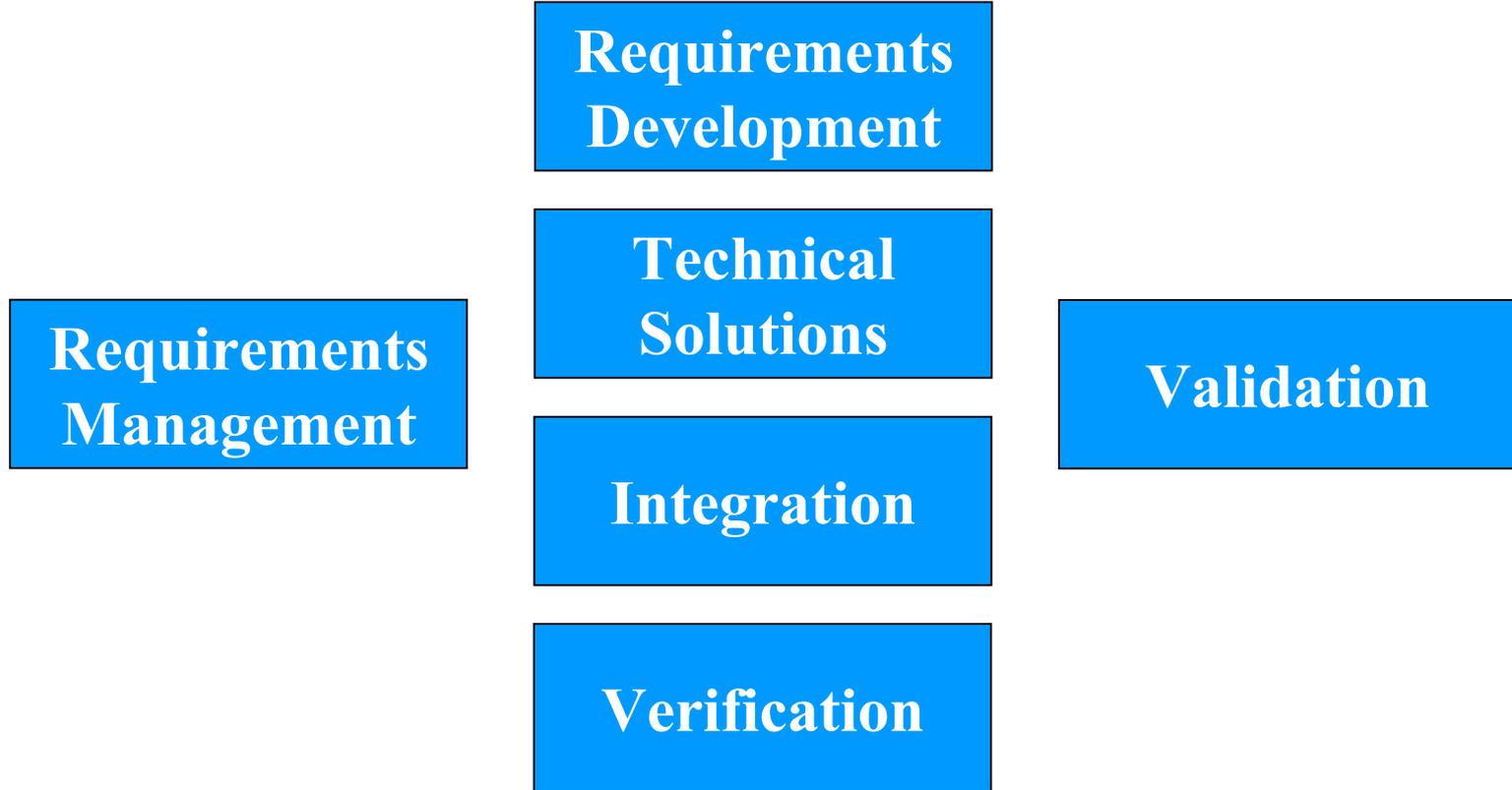
Support (CM) Perspective
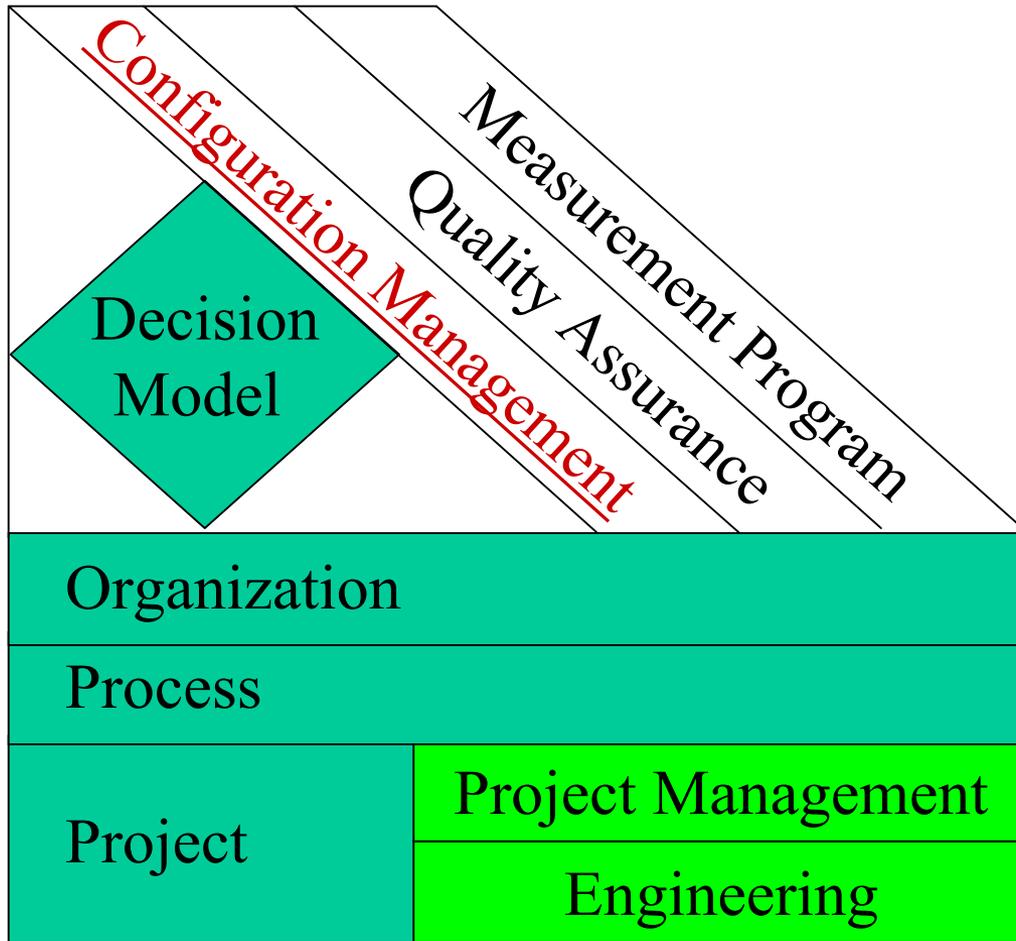
Configuration Management
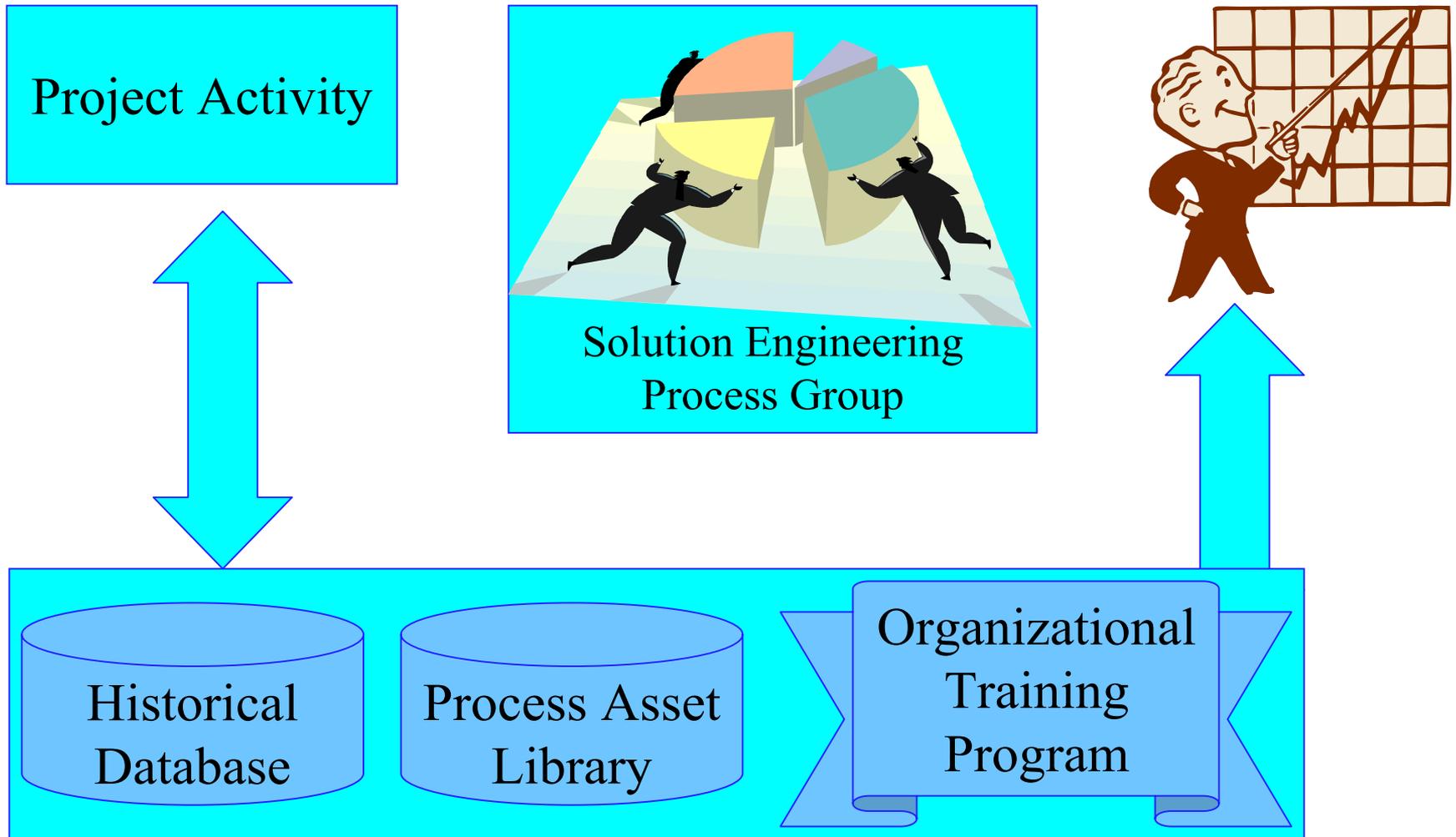
Establishing Baselines

Managing Changes to Baselines

Quality Assurance

Product Quality

Process Quality

Corrective / Preventive Actions

Measurement Program

Measurement Strategy

Measurement Plan

Measurement Infrastructure

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Process Management (CM) Perspective

Project Activity

Solution Engineering Process Group

Historical Database

Process Asset Library

Organizational Training Program

Attributes

- Project Mgt
- Engineering
- Support
- Process Mgt

What needs to be performed or built

- Configuration Items
  – System Components
  – Documentation
  – Hardware
- CM Tasks
  – CM Infrastructure
  – Builds
  – Releases

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Resources

- Project Mgt
- Engineering
- Support
- Process Mgt

- Personnel
  - CM Manager
  - CM Coordinator
  - CM Administrator

- Tools
  - Version Control
  - Ticket Management
  - Code Control
  - Requirements Management

- May involve Supplier Agreement Management (SAM)

when the outcome matters…

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Configuration Management Plan

- Project Mgt
- Engineering
- Support
- Process Mgt

- **Organization**
- **Responsibilities**
- **Activities**
  - **Configuration Identification**
  - **Configuration Control**
  - **Configuration Status Accounting**
  - **Configuration Auditing**
- **CM Milestones**
- **Training**
- **Subcontractor/Vendor Support**

- **For CM Plan guidance, see http://www.sei.cmu.edu/legacy/scm/papers/CM_Plans/CMPlans.MasterToC.html**

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Data Management

- Deliverable and non-deliverable data items (information, documents) in any format or medium need to be identified
- They should be created based on specified requirements for format and content
- The reason for collecting each document should be clear
- Establish requirements and procedures to ensure privacy and security of the data.
- Access to data
- Archive data
- Retrievable (and useable)
- Determine the project data to be identified, collected, and distributed.

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Data Management (Continued)

- Typical work products may include:
  - Data management plan
  - Master list of managed data
  - Data content and format description
  - Data requirements lists for acquirers and for suppliers
  - Privacy requirements
  - Security requirements
  - Security procedures
  - Mechanism for data retrieval, reproduction, and distribution
  - Schedule for collection of project data
  - Listing of project data to be collected

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Data Management (Continued)

- Important Considerations
    - Virus Protection
    - Windows Critical Updates
    - Disaster Recovery
    - Backup and Restore

- Plan & Monitor !

- Responsibility
    - System Admin
    - Configuration Manager
    - Project Manager
    - CIO

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Configuration Management

- Identifying the configuration of work products that compose the baselines at given points in time

- Controlling changes to configuration items

- Building or providing specifications to build work products from the configuration management system

- Maintaining the integrity of baselines

- Providing accurate status and current configuration data to developers, end users, and customers

- The work products placed under configuration management include the products that are delivered to the customer, designated internal work products, acquired products, tools, and other items that are used in creating and describing these work products.

Configuration Management Goals

- **Establish Baselines**
- **Track and Control Changes**
- **Establish Integrity**
- **Institutionalize a Managed Process**
- **Institutionalize a Defined Process**

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Institutionalization
Laying the foundation

- Establish an Organizational Policy
- Plan the Process
- Provide Resources
- Assign Responsibility
- Train People
- **Manage Configurations**
- Identify and Involve Relevant Stakeholders

- Monitor and Control the Process
- Objectively Evaluate Adherence
- Review Status with Higher Level Management
- Establish a Defined Process
- Collect Improvement Information

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Conclusion

Just focus on doing CM right at the

– project

– process and

– organizational level

and you will satisfy the CMMI expectations

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