CMMI
Overview

Quality
Frameworks

Outline

- Introduction
- High level overview of CMMI
- Questions and comments

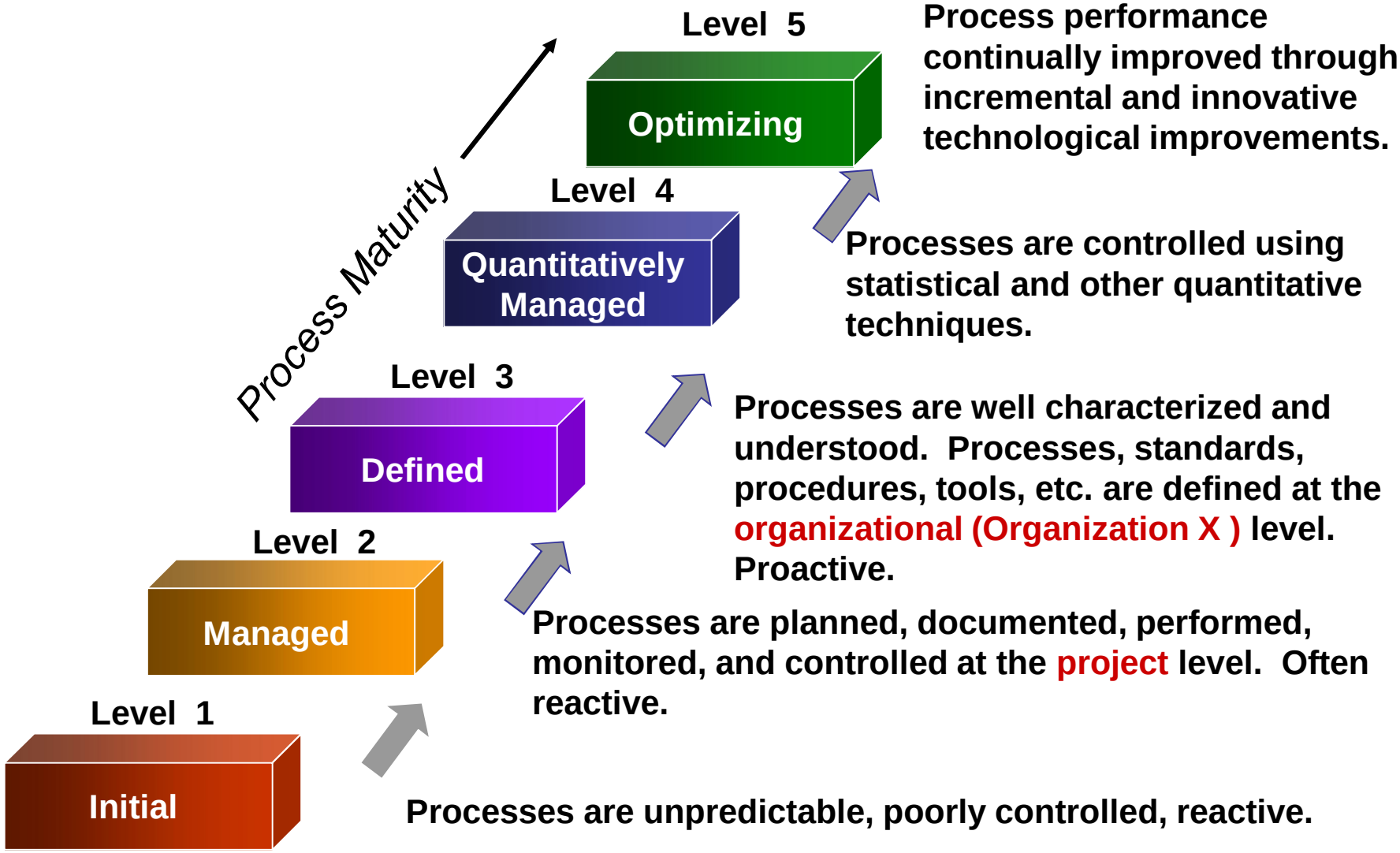
What is CMMI?

- CMMI (Capability Maturity Model Integration) is a proven industry framework to improve product quality and development efficiency for both hardware and software
  - Sponsored by US Department of Defence in cooperation with Carnegie Mellon University and the Software Engineering Institute (SEI)
  - Many companies have been involved in CMMI definition such as Motorola and Ericsson
  - CMMI has been established as a model to improve business results
- CMMI, staged, uses 5 levels to describe the maturity of the organization, same as predecessor CMM
  - Vastly improved version of the CMM
  - Emphasis on business needs, integration and institutionalization

How can CMMI help?

- CMMI provides a way to focus and manage hardware and software development from product inception through deployment and maintenance.
  - ISO/TL9000 are still required. CMMI interfaces well with them. CMMI and TL are complementary - both are needed since they address different aspects.
    - ISO/TL9000 is a process compliance standard
    - CMMI is a process improvement model
- Behavioral changes are needed at both management and staff levels. Examples:
  - Increased personal accountability
  - Tighter links between Product Management, Development, SCN, etc.
- Initially a lot of investment required – but, if properly managed, we will be more efficient and productive while turning out products with consistently higher quality.

CMMI Staged Representation - 5 Maturity Levels



Maturity Level 1
Initial

- Maturity Level 1 deals with performed processes.
- Processes are unpredictable, poorly controlled, reactive.
- The process performance may not be stable and may not meet specific objectives such as quality, cost, and schedule, but useful work can be done.

Maturity Level 2
Managed at the Project Level

- Maturity Level 2 deals with managed processes.
- A managed process is a performed process that is also:
  - Planned and executed in accordance with policy
  - Employs skilled people
  - Adequate resources are available
  - Controlled outputs are produced
  - Stakeholders are involved
  - The process is reviewed and evaluated for adherence to requirements
- Processes are planned, documented, performed, monitored, and controlled at the project level. Often reactive.
- The managed process comes closer to achieving the specific objectives such as quality, cost, and schedule.

What Happens During Level 2

- Processes become easier to digest and understand.
- Managers and team members spend less time explaining how things are done and more time doing
- Projects are better estimated, better planned, and more flexible
- Quality is integrated into the project
- Costs may go up initially, but do go down over time
- And yes, there may be more documentation and paper

Maturity Level 3
Defined at the Organization Level

- Maturity Level 3 deals with defined processes.
- A defined process is a managed process that:
  - Well defined, understood, deployed and executed across the entire **organization**. Proactive.
  - Processes, standards, procedures, tools, etc. are defined at the organizational (Organization X) level. Project or local tailoring is allowed, however it must be based on the organization's set of standard processes and defined per the organization's tailoring guidelines.
- Major portions of the organization cannot "opt out."

What Happens During Level 3

- Process Improvement becomes the standard – Cross-Functional teams look for ways to “short-cut” the system
- Solutions go from being “coded” to being “engineered”
- Quality gates appear throughout the project effort with the entire team involved in the process, reducing rework
- Risks are managed and don’t take the team by surprise

Behaviors at the Five Levels

Maturity Level	Process Characteristics	Behaviors
5 Optimizing	Focus is on continuous quantitative improvement	Focus on "fire prevention"; improvement anticipated and desired, and impacts assessed.
4 Quantitatively Managed	Process is measured and controlled	Greater sense of teamwork and inter-dependencies
3 Defined	Process is characterized for the organization and is proactive	Reliance on defined process. People understand, support and follow the process.
2 Managed	Process is characterized for projects and is often reactive	Over reliance on experience of good people – when they go, the process goes. “Heroics.”
1 Initial	Process is unpredictable, poorly controlled, and reactive	Focus on "fire fighting"; effectiveness low – frustration high.