SW-CMM or CMMI?
Do Nuances Exist Beyond the Texts?

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- Siemens Medical Solutions USA, Inc. (1999 - 2003) - for the opportunity to learn and use the CMMI in a robust and challenging engineering environment

- Presentation is a sampling, not an exhaustive analysis
  - Generally, “stepping across the surface” of the models
  - CMMI SE/SW/IPPD V1.1 (Staged Representation)
Agenda

- Presentation Assertions
- General differences experienced in implementation
- KPA/PA Distinctions
- Stakeholder reaction (during transition)
Background

“You can see a lot by observing”...
Yogi Berra, New York Yankees, circa 1958

- Siemens Medical Solutions USA Inc.
  Angiography, Radiology, Division, Hoffman Estates, IL
  (aka SMS-AX)

  - Mar 2001 - Present: CMMI (Staged)
    - SCAMPI Appraisal June 2002 (L3)
      (Standard CMMI Appraisal Method for Process Improvement)
    - Transition driven by need for systems view

  - Two very different design and deployment approaches
    (SW-CMM and the CMMI)
    - SW-CMM: SQA and Software Mgr only
    - CMMI: “Process Champion” approach
General Assertions

- CMMI effort drives closer linkage to the organization’s business model for success. (e.g., “Measurement and Analysis”)

- CMMI helps reveal cross-organizational issues. It impacts all parts of the organization (marketing, finance, purchasing, other engineering)

- SCAMPI Appraisals were not as cleanly defined (at time of Appraisal) as CBA-IPI Assessments (i.e., the SCAMPI “scoring system”)

- SW-CMM lacks focus on product deployment issues (e.g. “Product Integration” process area, SP 3.4-1)

- SW-CMM lacks focus on acquisition (vs CMMI “Supplier Agreement Management,” SP 1.1-1 “Determine Acquisition Type”)

- CMMI has stronger focus on process improvement (“Directing Implementation,” GP 3.2)
General Assertions (2)

- CMMI affects organizational infrastructure (no longer some “black box” related to only software engineering folks)

- Organizational values, traditions, beliefs are challenged (e.g., in non-software areas)

- CMMI can be seen as intimidating and unnecessarily complex (e.g., if transitioning from the “familiar” SW-CMM)

- Management and leaders will be challenged to change (in addressing the CMMI Common Features)
  - “Directing Implementation” Common Feature - aimed at Generic Practices related to managing the process.
  - “Ability to Perform” - not new, but CMMI scope requires stronger focus across the organization
General Assertions (3)

- The critical (and underestimated) Common Feature “Ability to Perform” is same

- In most cases, the core requirements of the SW-CMM are “augmented” to make the concept more comprehensive and complete in the CMMI (e.g., Supplier Agreement Management)

- Custom Process Areas - Depending upon business needs, a customized process area may be required, such as information assurance or safety.

- Continuous Information-Sharing Improvement a “must” (e.g., intra-departmental)
  - SW-CMM (Intergroup Coordination) = other engineering areas
  - CMMI extends beyond engineering to “stakeholders” in business function areas (e.g., “Integrated Teaming”)
Some General Differences: SW-CMM/CMMI (1)

- **Common Feature Nuances**
  - Both sets (SW-CMM and CMMI) are enablers for Institutionalization, but...

  - CMMI has “Directing Implementation” (DI)
    Common Feature (in Staged Representation)
    - DI requires a conscious process improvement effort (i.e. GP 3.2)
    - “Manage Configurations” (GP 2.6) Levels/types of CM formality introduced (ref SCAMPI at SMS-AX)
    - “Identify & Involve Relevant Stakeholders” (GP 2.7) This can be far-reaching in CMMI, e.g., into suppliers’ organizations
Some General Differences:
SW-CMM/CMMI (2)

- CMMI “Supplier Agreement Management” (SAM)
  Is not identical to SW-CMM KPA “Software Subcontractor Management”

- CMMI “Decision Analysis & Resolution” (DAR)
  Provides structured decision-making process comparing alternatives against success criteria, selecting the best

- CMMI encourages a link to the business model
  (e.g. “Balanced Scorecard” approach, e.g., MA process area)

- NOTE: CMMI requires Root Cause analyses (GP 5.2)
  (brings benefits of defect prevention to L2, L3… BUT, only in the Continuous Representations)
Some General Differences: SW-CMM/CMMI (3)

- The IPPD (Integrated Process & Product Development) extension
  - L2 PA - “Integrated Teaming”
  - L3 PA - “Organizational Environment for Integration”

- Focus on collaboration among functional areas/disciplines throughout the product lifecycle (not only software)

- Vastly broadens blend of stakeholders
  - Traditional players still exist (engineering, development, test …)
  - Enhanced participation by non-traditional players:
    (mfg, marketing, finance, logistics, disposal, packaging …)

- May radically change way leaders think/work
KPA/PA Distinctions (1)

- L2 PA - “Supplier Agreement Management” (SAM)

  - SP 1.1-1 “Determine Acquisition Types”
    - forces a tight linkage to the “Technical Solution” PA (SP 2.4-3 Perform Make, Buy, or Reuse Analysis)
    - e.g., Commercial Off-The-Shelf (COTS), Modified COTS, Government Furnished Equipment, In-house

  - SP 2.3-1 “Accept the Acquired Product”
    - SW-CMM requires acceptance testing (Activity 12)
    - CMMI requires testing AND adherence to non-technical commitments:
      (license, warranty, ownership, usage, support/maintenance.)

  - SP 2.4-1 “Transition Products”
    - linked to the “Product Integration” PA
    - ensure facilities & training to receive, store, use, maintain acquired product
"Measurement & Analysis"
- Is a Common Feature in SW-CMM
- SW-CMM says “Measurements are made and used...”, vs CMMI’s dedicated Process Area

CMMI says:
- map to the “Goal, Question, Metric” paradigm (detailed trace of measures - base & derived)
- data collection, storage, analysis, reporting required
- measures also be used for process improvement
- avoid inappropriate use of measures (e.g., personal attacks, out of context use, disclosure)
KPA/PA Distinctions (3)

- “Decision Analysis & Resolution” (DAR)
  - Which issues need a formal decision-making process?
  - Helps greatly in avoiding subjectivity of decisions
  - Strongly supports “Tech Solution” process area

- “Requirements Management”
  - CMMI requires vertical AND horizontal trace (SP1.4-2)

- “Requirements Development”
  - CMMI expands to address elicitation, development of requirements
KPA/PA Distinctions (4)

- **“Risk Management”**
  - Requirement to define risk parameters not in SW-CMM
  - Parameters: e.g., probability, consequence, mitigation

- **“Technical Solution”**
  - “Select Product-Component Solutions” (SG 1)
  - SG 1 has a Pre-design focus
  - Quantitative measures support alternative solution selection (e.g., cost, schedule, performance, risk)
  - Relies heavily on DAR and RD process areas

- **“Verification” (VF)**
  - Peer Reviews in fact have a higher standard in the SW-CMM (e.g., collection of PR data required in SW-CMM, is a sub-practice (= suggestion) in CMMI)
Stakeholder Reactions (1)

Reactions to:

- The framework
  - some embraced the order/structure (i.e., software and system engineering, familiar with the SW-CMM)
  - most opposed. (e.g., finance, marketing, mfg., Hardware Engineering, Electro-Mechanical Engineering)
  - Generally, taught the formal Standard Operating Procedures (SOP), not the CMMI process areas
  - Adapted the CMMI to the organization, vs adapting the organization to the model (as with SW-CMM)

- Other (new) stakeholders
  - drastic change in inter-group coordination, interfaces
  - product-related view challenged “territories”
  - parent organization in Germany (culture/ geographical challenges)
Stakeholder Reactions (2)

Reactions to:

◆ “Process Champion” approach (the integrated team)
  ◆ recruit, empower, lead
  ◆ processes more user-friendly, more ”real-world”
  ◆ “Ability to Perform” (reinforced with senior management)

◆ The SCAMPI appraisal (June 2002)
  ◆ SCAMPI V1.1 was new (released about Jan 2002)
  ◆ Lack of clear pass/fail criteria, i.e., the “grades”
  ◆ Subjective insofar as Lead Assessor guidelines
  ◆ Combined SCAMPI with “OPAL” (bad idea)
  (Note: OPAL is Siemens’ internal assessment method, resembling the SW-CMM)
Summary

So... the question remains: which Maturity Model is best for you? ...for your business?

**Augustine’s Law Number XIX**

“Although most products will soon be too costly to purchase, there will be a thriving market in the sale of books on how to fix them”

from *Augustine’s Laws*, Norman R. Augustine, 1997