

Update – Observations of the Relationships between CMMI and ISO 9001:2000

September 14, 2005

ASQ Section 509 - ISO 9000 Users Group

This presentation summaries points made and topics discussed at the TC176 Fall 2005 meeting.

Notice:

**Selected materials were used from a presentation
by David H. Kitson
to the US TAG to TC176 Fall 2005 Meeting, subject :
"The CMMI[®] Product Suite and International Standards."**

NOTE: [®] CMMI is registered in the US Patent & Trademark Office by Carnegie Mellon University

Software Engineering Institute (SEI)

Established as an FFRDC in 1984; contract awarded to CMU

Mandate to advance state of practice of software engineering in software-intensive systems

Model-based process improvement is one focal point of SEI

Began process assessments in 1987 using lessons learned from IBM programming site studies (Humphrey et al)

SW-CMM published in 1991.

CMMI Overview

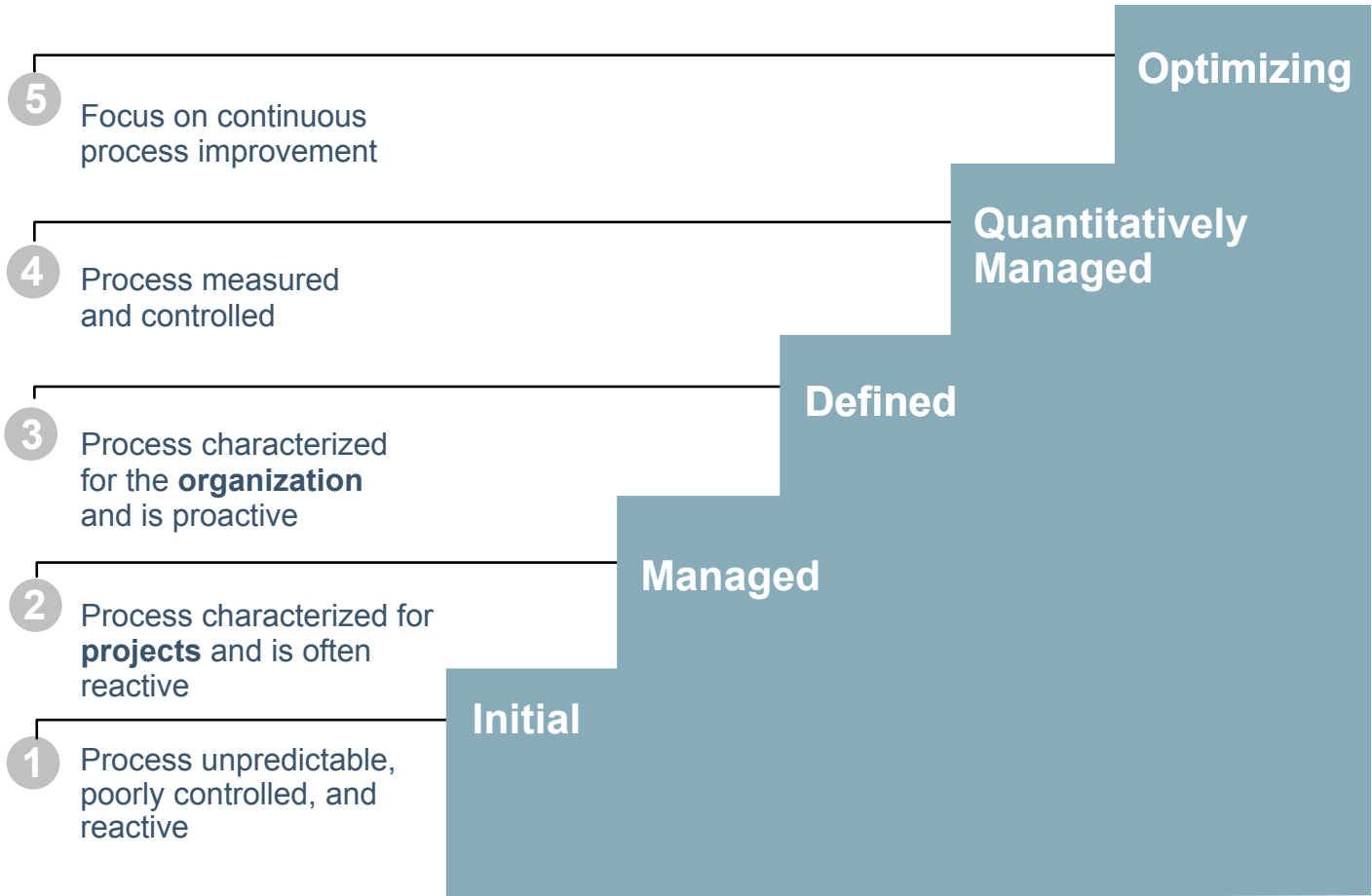
Product development best practice within the framework of a Capability Maturity Model

- **Special emphasis on systems engineering and software engineering**
- **Reflection of the interests of SEI's DoD sponsor**

Introduced in 2002; replaces SW-CMM at end of this year

SEI “authorization” schema for model training and lead appraisers

The Maturity Levels



Process Areas of Maturity Levels

Level	Focus	Process Areas	Category
5 Optimizing	Continuous Process Improvement	Organizational Innovation and Deployment OI Causal Analysis and Resolution - CAR	Process Mgmt. Support
4 Quantitatively Managed	Quantitative Management	Organizational Process Performance - OPP Quantitative Project Management – QPM	Process Mgmt. Project Mgmt.
3 Defined	Process Standardization	Requirements Development – RD Technical Solution - TS Product Integration - PI Verification - VER Validation - VAL Organizational Process Focus - OPF Organizational Process Definition - OPD Organizational Training - OT Integrated Project Management – IPM Risk Management - RSKM Integrated Teaming - IT Integrated Supplier Management - ISM Decision Analysis and Resolution - DAR Organizational Environment for Integration – OEI	Engineering Engineering Engineering Engineering Engineering Process Mgmt Process Mgmt Process Mgmt Project Mgmt Project Mgmt Project Mgmt Project Mgmt Project Mgmt Project Mgmt Support Support
2 Managed	Basic Project Management	Requirements Management - REQM Project Planning - PP Project Monitoring and Control - PMC Supplier Agreement Management-SAM Measurement and Analysis – MA Process and Product Quality Assurance –PPQA Configuration Management – CM	Engineering Project Mgmt. Project Mgmt. Project Mgmt. Support Support Support

Generic Goals and Associated GPs

Generic Goals	Generic Practices
GG1: Achieve Specific Goals	GP 1.1: Perform Base Practices
GG2: Institutionalize a Managed Process	GP 2.1: Establish an Organizational Policy GP 2.2: Plan the Process GP 2.3: Provide Resources GP 2.4: Assign Responsibility GP 2.5: Train People GP 2.6: Manage Configurations GP 2.7: Identify and Involve Relevant Stakeholders GP 2.8: Monitor and Control the Process GP 2.9: Objectively Evaluate Adherence GP 2.10: Review Status with Higher Level Management
GG3: Institutionalize a Defined Process	GP 3.1: Establish a Defined Process GP 3.2: Collect Improvement Information
GG4: Institutionalize a Quantitatively Managed Process	GP 4.1: Establish Quantitative Objectives for the Process GP 4.2: Stabilize Subprocess Performance
GG5: Institutionalize an Optimizing Process	GP 5.1: Ensure Continuous Process Improvement GP 5.2: Correct Root Causes of Problems

CMMI Transition Status as of 6-30-05

Training

Introduction to CMMI – 34,501 trained

Intermediate CMMI – 1,575 trained

Introduction to CMMI Instructors - 346 trained

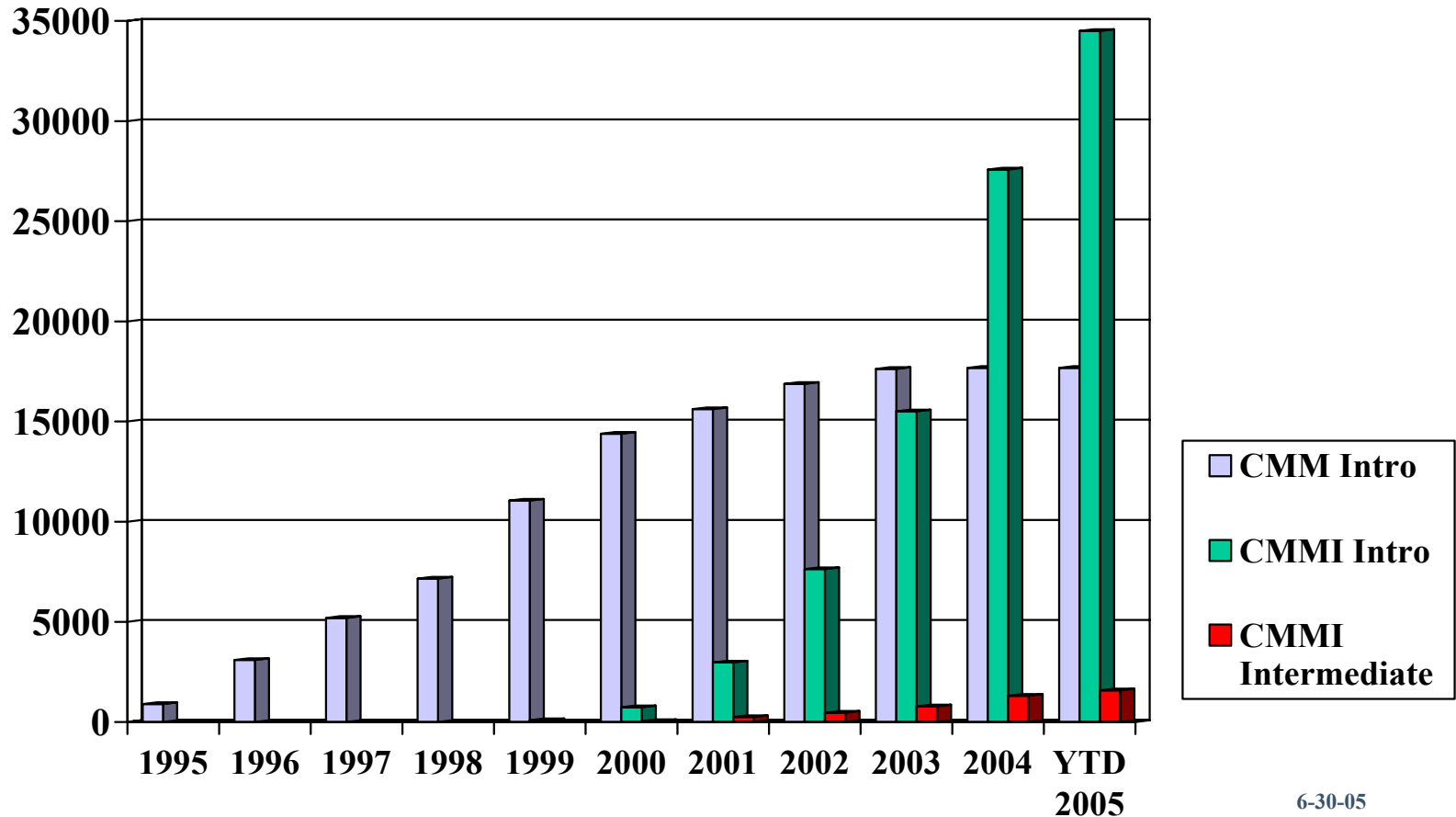
SCAMPI Lead Appraisers - 543 trained

Authorized

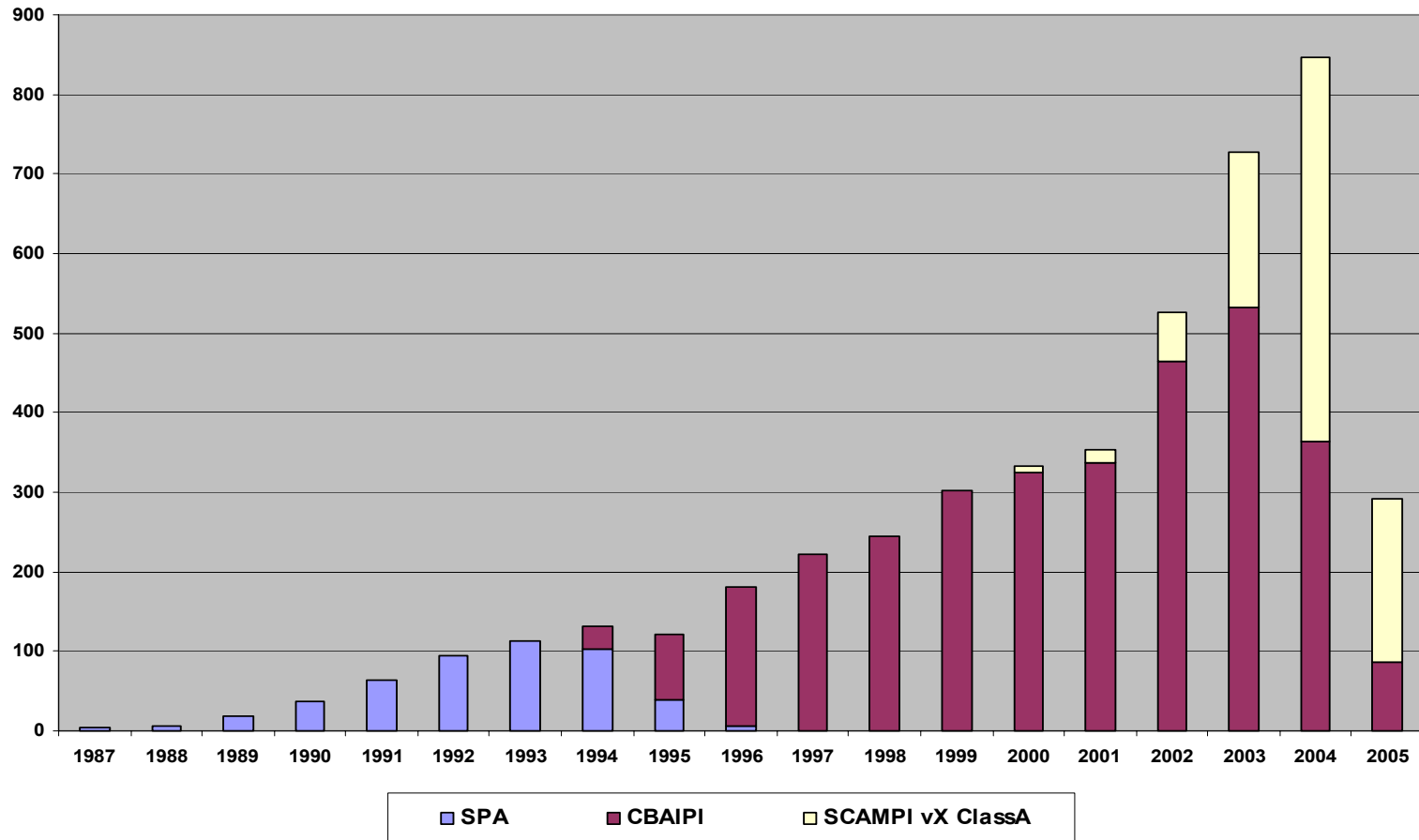
Introduction to CMMI V1.1 Instructors – 275

SCAMPI V1.1 Lead Appraisers – 379

Intro to the CMM and CMMI Attendees (Cumulative)



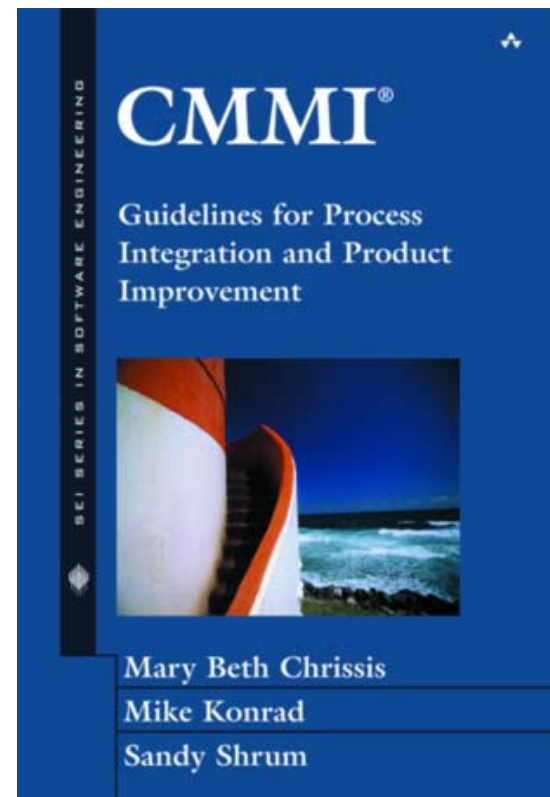
Number of Appraisals Conducted by Year Reported as of 30 June 2005



Adoption—What's Available?

The Addison-Wesley SEI Series Book and:

- CMMI Distilled: Second Edition
- Practical Insight into CMMI
- Interpreting the CMMI
- Real Process Improvement Using the CMMI
- Making Process Improvement Work
- CMMI: Un Itinéraire Fléché
- A Guide to the CMMI
- CMMI: A Framework...
- CMMI SCAMPI Distilled
- CMMI Assessments
- Systematic Process Improvement Using ISO 9001:2000 and CMMI
- Balancing Agility and Discipline



Examples of CMMI Impact: Return on Investment

- 5:1 ROI for quality activities (Accenture)
- 13:1 ROI calculated as defects avoided per hour spent in training and defect prevention (Northrop Grumman Defense Enterprise Systems)
- Avoided \$3.72M in costs due to better cost performance (Raytheon North Texas Software Engineering)
 - As the organization improved from SW-CMM level 4 to CMMI level 5
- 2:1 ROI over 3 years (Siemens Information Systems Ltd, India)
- 2.5:1 ROI over 1st year, with benefits amortized over less than 6 months (reported under non disclosure)

Synergy With Selected International Standards

Key standards identified to date are

- **ISO 900x:2000 family of standards (as well as selected domain derivatives)**
- **ISO/IEC 12207 SW Life Cycle Processes**
- **ISO/IEC 15288**
- **ISO/IEC 15504 SPICE**

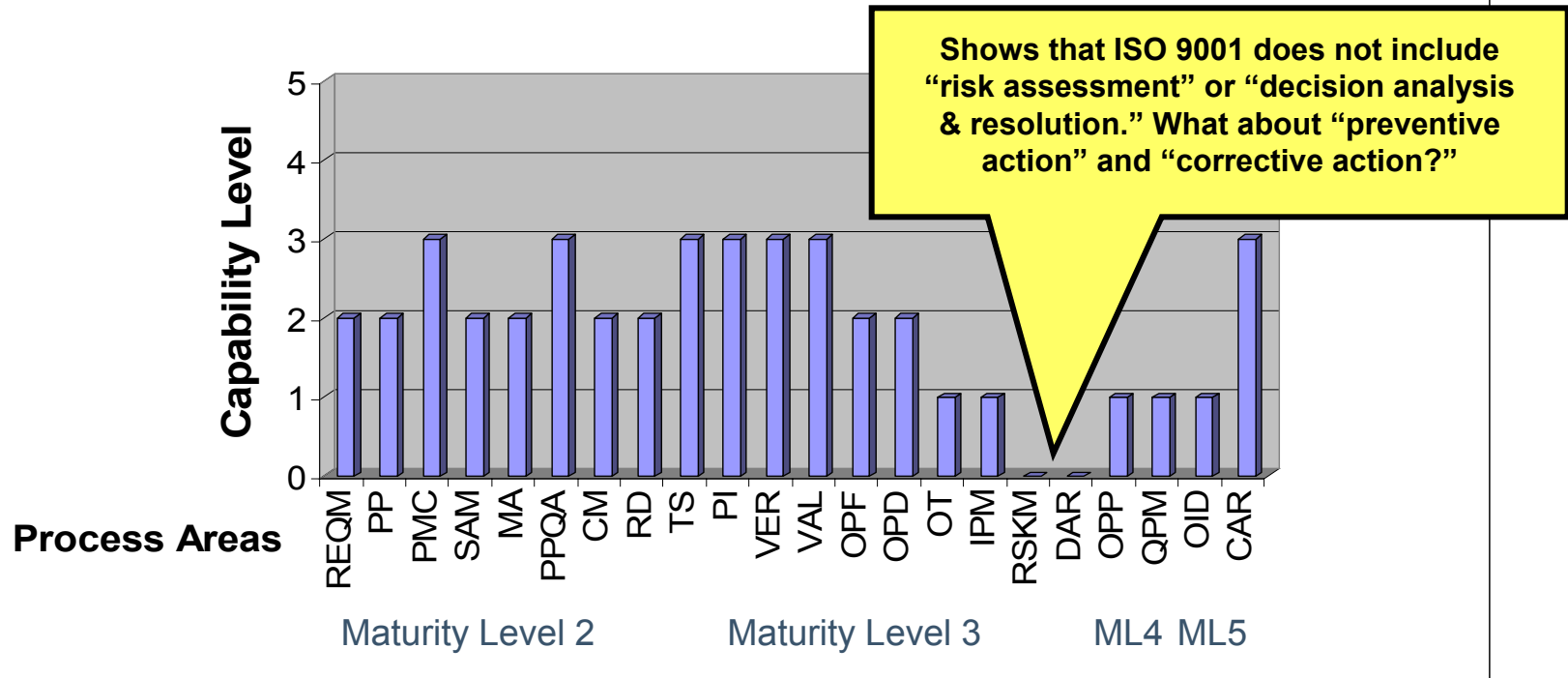
Note that 15504 provides a mechanism for establishing important relationships to other important process-related international standards

Usage Scenarios

Initial pilots this year and next are focused on addressing the following scenarios:

- “we are also working towards ISO 9001 compliance – how are we doing?”
- “we have already achieved ISO 9001 certification and we would like to see how our [CMMI initiative, ISO 9001 certification] is supporting our [ISO 9001 accomplishments, CMMI initiative]”
- Variations of above:
 - If we are CMMI maturity level x, what are the implications for ISO 9001 certification?
 - If we are ISO9001 certified, what are the implications for CMMI maturity?

CMMI - ISO9001:2000 Capability Profile by Equivalent Staging



CMMI and ISO 9001 Discussion Topics

Synergy between CMMI and ISO 9001

- **Equipment Calibration as an omission within CMMI,**
- **Customer satisfaction – is it emphasized enough in CMMI?**

Inter-operability and cross-fertilization

- **Could an organization get “credit” towards ISO 9001 certification as a result of a SCAMPI appraisal?**
- **Are there outputs from a ISO 9001 audit which could be useful as inputs to a SCAMPI appraisal?**
- **What are the right parties to such discussions?**

Stove-piped communities – should we be paying more attention to one another?

CMMI approach to Generic Goals – some ISO 9001 clauses map well to GPs while some do not. Any action appropriate?

Points at Issue

Areas where our CMMI-ISO 9001 mapping diverges:

- Control of Records
- Customer Focus / Customer Satisfaction
- Internal Communication
- Infrastructure and Work Environment
- Control and Monitoring of Measuring Devices
- Internal Audit
- Control of Nonconforming Product
- Preventive Action

Considerations...from TC 176 Fall Meeting

CMMI

- Extensive number of audits
- “Shelf life” of maturity level
- No requirement to measure customer satisfaction
- Level of information: Required, Expected, Informational
- Number of required auditors: 4

ISO 9001

- Surveillance audits required
- Level of information: Normative, Informative
- Evaluation reporting for 19011 could learn from CMMI
- Number of required auditors: 1

Common Concerns & Nice-to-haves

- How auditors are paid (who’s buying?) ==> risk of bias to registration
- Cross reference table [would assist implementers and auditors]
- Cross training of auditors [single visit versus separated, redundant audits]
- Common definitions of terms
- Ability of TC 176 and SEI to cooperate