

COST-EFFECTIVE USE OF CLASS B AND CLASS C APPRAISALS

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L3 Communications - ILEX Systems

SCAMPISM

- Several Flavors of SCAMPISM
- Class A is the only “flavor” that can be used to generate Ratings
- Class B and Class C SCAMPIs are less expensive and quicker
- B or C Appraisals are recommended when a Maturity or Capability Level is not required

Key Attributes Vary

- Degree of Confidence in Appraisal Findings
- Generation of a Rating (only for Class A)
- Appraisal Cost and Duration
- Compliance with ISO/IEC 15504 (for only some Class A Appraisals)

CMMI Appraisal Method Classes

Characteristics	Class A	Class B	Class C
Amount of Objective Evidence Gathered (relative)	High	Medium	Low
Level Ratings Generated	Yes	No	No
Resource Needs (Relative)	High	Medium	Low
Team Size (Relative)	Large	Medium	Small
Appraisal Team Leader Req'ts	Lead Appraiser	Lead Appraiser or person trained & experienced	Person trained & experienced

Requirements for Appraisals

- Requirements for Appraisals are documented in the “ARC”
- Appraisal Requirements for CMMISM = ARC (see CMU/SEI – 2001-TR-034, Dec. 2001)
- A Detailed description of SCAMPI is covered in the Method Definition Document (MDD) – CMU/SEI 2001-HB-001, Dec.2001
- This presentation is based largely on the information in the above two SEI documents

Requirements for CMMI Appraisal Methods

- ARC Groups req'ts into several categories:
 - Responsibilities (4.1)
 - Appraisal Method Documentation (4.2)
 - Planning and Preparing for Appraisal (4.3)
 - Appraisal Data Collection (4.4)
 - Data Consolidation and Validation (4.5)
 - Rating (4.6)
 - Reporting Results (4.7)

Responsibilities (4.1)

- 4.1.1 - The method shall define the responsibilities of the appraisal sponsor, which at a minimum shall include the following activities:
 - a. (ABC) Verify the appraisal team leader has the appropriate experience, knowledge, and skills to take responsibility for and lead the appraisal

Responsibilities (4.1) - 2

- b. (ABC) Ensure that the approp. Organizational units or subunits participate in the appraisal
- c. (ABC) Support appraisal method provisions for ensuring non-attribution to appraisal participants
- d. (ABC) Ensure that resources are made available to conduct the appraisal
- e. (ABC) Review & approve the appraisal input prior to beginning of data collection by appraisal team

Responsibilities (4.1) - 3

- Note that all 5 of these requirements are necessary for Class A, Class B, and Class C
- These requirements are all the responsibility of the appraisal sponsor

Appraisal Team Leader Responsibilities

- 4.1.2 - The method shall define the responsibilities of the appraisal team leader, which at a minimum shall include the following:
 - a. (ABC) Ensure that appraisal is conducted in accordance with the method's documented process
 - b. (ABC) Confirm the sponsor's commitment to proceed with appraisal

Appraisal Team Leader Responsibilities - 2

- c. (ABC) Ensure appraisal participants are briefed on appraisal purpose, scope, & approach
- d. (ABC) Ensure that all appraisal team members have approp. experience, knowledge, & skills in appraisal reference model & appraisal method; the competence to use instruments or tools chosen; and access to documented guidance on how to perform the defined appraisal activities
- e. (ABC) Verify & document that appraisal method reqts have been met

Appraisal Team Leader Responsibilities - 3

- Note again that all 5 requirements must be met for Class A, B, & C Appraisals

Appraisal Method Documentation (4.2)

- 4.2.1 - The method shall be documented, and, at a minimum, include:
 - a. (ABC) identification of the CMMI models (version, discipline, representation) with which the method can be used
 - b. (ABC) identification of the ARC version upon which the appraisal is based
 - c. (ABC) identification of which CMMI appraisal reqts are satisfied by the method, with the CMMI Class

Appraisal Method Documentation (4.2) - 2

- d. (ABC) activity descriptions, artifacts, guidance that implement each appraisal reqt
- e. (A) declaration of whether or not method supports 15504 conformance

Requirement e is only applicable to Class A; other classes cannot be compliant with all the 15504 reqts.

Appraisal Method Documentation (4.2) - 3

- 4.2.2 The method documentation shall provide guidance for:
 - a. (ABC) identifying an appraisal's purpose, objectives, constraints
 - b. (ABC) determining suitability of appraisal method for appraisal's purpose, objectives, constraints

Appraisal Method

Documentation (4.2) - 4

- 4.2.3 - Method documentation shall provide guidance for identifying scope of the CMMI model(s) to be used
 - a. (ABC) process areas to be investigated (continuous & staged representations)
 - b. (ABC) capability levels to be investigated for each process area (continuous representation only)

Appraisal Method

Documentation (4.2) - 5

- 4.2.4 - The Method documentation shall provide guidance for identifying their organizational unit to be appraised:
 - a. (ABC) the sponsor of appraisal & sponsor's relationship to organizational unit being appraised
 - b. (ABC) participating projects in organizational unit

Appraisal Method

Documentation (4.2) - 6

- c. (ABC) functional elements of organizational unit that will participate
- d. (ABC) names & affiliations (organizational units) of participants in appraisal activities

Appraisal Method

Documentation (4.2) - 7

- 4.2.5 - The method documentation shall provide guidance for selecting appraisal team members and criteria for qualification, including:
 - a. (ABC) technical experience (discipline-specific)
 - b. (ABC) management experience
 - c. (ABC) experience, knowledge, skills in the appraisal reference model & appraisal method

Appraisal Method Documentation (4.2) - 8

- 4.2.6 - The method documentation shall provide guidance for an appraisal team leader's qualification criteria, including:
 - a. (ABC) training & experience using the appraisal reference model
 - b. (ABC) training & experience using appraisal method
 - c. (ABC) experience in delivering training, managing teams, facilitating group discussions, making presentations

Appraisal Method

Documentation (4.2) - 9

- 4.2.7 - (ABC) The method documentation shall provide guidance for determining appropriate size of the appraisal team
- 4.2.8 - (ABC) Method documentation shall provide guidance on roles & responsibilities of appraisal team members
- 4.2.9 - (ABC) Method documentation shall provide guidance for responsibilities of appraisal sponsor

Appraisal Method

Documentation (4.2) - 10

- 4.2.10 - (ABC) Method documentation shall provide guidance on responsibilities of appraisal team leader
- 4.2.11 - (ABC) Method documentation shall provide guidance for estimating resources required to conduct appraisal (including time to conduct appraisal)
- 4.2.12 - (ABC) Method doc'n shall provide guidance for appraisal logistics

Appraisal Method

Documentation (4.2) - 11

- 4.2.13 - (ABC) Method doc'n shall provide guidance for collecting relevant data on organizational unit, & associating data to specific & generic practices of appraisal reference model
- 4.2.14 - (ABC) Method doc'n shall provide guidance for creating findings, including strengths & weaknesses vs. appraisal model

Appraisal Method

Documentation (4.2) - 12

- 4.2.15 - (ABC) Method doc'n shall provide guidance for protecting confidentiality of appraisal data, & ensuring non-attribution of data to appraisal participants
- 4.2.16 - Method doc'n shall provide guidance for (1) recording traceability between data collected during appraisal & the findings/ratings, (2) retention & safekeeping of appraisal records...

Appraisal Method

Documentation (4.2) - 13

- 4.2.16(3) compiling & maintaining an appraisal record that supports the appraisal team's findings/ratings, and that contains the following minimum content:
 - a. (ABC) appraisal dates b. (ABC) appraisal input
 - c. (A) objective evidence, or ID thereof, to substantiate goal ratings
 - d.(ABC) ID of appraisal method (& version) used, with any tailoring
 - e. (ABC) findings f. (A) any ratings rendered during appraisal
 - g. (A) subset of 15504 process profiles resulting from appraisal, if requested by sponsor

Planning and Preparing for Appraisal (4.3)

- 4.3.1 - Method shall provide for preparation of appraisal participants by addressing, as a minimum:
 - a. (ABC) purpose of appraisal
 - b. (ABC) scope of appraisal
 - c. (ABC) appraisal approach
 - d. (ABC) roles & responsibilities of participants
 - e. (ABC) schedule of appraisal activities

Planning and Preparing for Appraisal (4.3) - 2

- 4.3.2 - (ABC) Method shall provide for development of appraisal input prior to beginning of data collection by appraisal team
- 4.3.3 - At a minimum, appraisal input shall specify:
 - a. (ABC) identity of sponsor, & sponsor's relationship to organizational unit being appraised

Planning and Preparing for Appraisal (4.3) - 3

- b. (ABC) appraisal purpose, including alignment with business objectives
- c. (ABC) appraisal reference model scope, including process area, & highest maturity level/or capability level by PA
- d. (ABC) organizational unit that's subject of appraisal
- e. (ABC) process context (size of org'n unit, demographics, application domain, size/criticality/complexity of products/services, quality characteristics of products/services)

Planning and Preparing for Appraisal (4.3) - 4

- f. (ABC) Appraisal constraints (availability of key resources, schedule constraints, max. am't of time, specific PAs to be excluded, minimum or maximum or sample size desired, ownership of appraisal outputs & any restrictions, controls on info resulting from confidentiality agreement, non-attribution of data to sources)
- g. (ABC) identity of CMMI models used, including version, discipline, representation

Planning and Preparing for Appraisal (4.3) - 5

- h. (ABC) criteria for experience, knowledge, & skills of appraisal team leader
- i. (ABC) ID & affiliation of appraisal team members, including team leader, with their specific appraisal responsibilities
- j. (ABC) ID & affiliation of appraisal participants & support staff, with their specific appraisal responsibilities
- k. (ABC) any add'l info to be collected during appraisal to support achievement of objectives

Planning and Preparing for Appraisal (4.3) - 6

- 1. (ABC) Description of planned appraisal outputs, including any ratings to be generated
- m. (ABC) anticipated follow-on activities (e.g., reports, appraisal action plans, reappraisal, ...)
- n. (ABC) planned tailoring of appraisal method & associated tradeoffs, including sample size or coverage of organizational unit

Planning and Preparing for Appraisal (4.3) - 7

- 4.3.4 - (ABC) - Method shall require the appraisal input, & any change to appraisal input, shall be agreed to by the sponsor (or delegated authority), & documented in appraisal record

Planning and Preparing for Appraisal (4.3) - 8

- 4.3.5 - (ABC) Method shall require development of an appraisal plan that, at a minimum, specifies:

Appraisal Data Collection (4.4)

- 4.4 - Appraisal items shall base their findings on observations that, in turn, are based on objective evidence gathered from one or more sources. Sources of objective evidence recognized by CMMI appraisal are:
 - 4.4.1 collect data by administering instruments (questionnaires, surveys, ...)

Appraisal Data Collection (4.4) -2

- 4.4.2 - collect data by conducting interviews (with project leaders, managers, practitioners, ...)
- 4.4.3 - collect data by reviewing documentation (e.g., organizational policies, project procedures, implementation-level products/artifacts)

Appraisal Data Collection (4.4) - 3

- For Class A: all 3 sources are required
- For Class B: at least 2 of the sources, and one must be interviews
- For Class C: at least one source

Data Consolidation and Validation (4.5)

- 4.5.1 - (AB) Method shall require appraisal team consensus in decisions when establishing validity of observations, creating findings, and establishing ratings

Data Consolidation and Validation (4.5) - 2

- 4.5.2 - Method shall require a mechanism for consolidating the data collected during an appraisal into accurate observations, per following criteria:
 - a. (ABC) Observation was derived from objective evidence seen or heard during data collection sessions
 - b. (ABC) Observation is clearly worded, phrased without attribution, & expressed in terminology used at organizational level

Data Consolidation and Validation (4.5) - 3

- C. (ABC) Observation is relevant to appraisal reference model, & can be associated with a specific model
- 4.5.3 Method shall require a mechanism for validating each accurate observation per following criteria:
 - a. (AB) Observation is corroborated
 - b. (AB) Observation is consistent with other validated observations

Data Consolidation and Validation (4.5) - 4

- 4.5.4 - Method shall require the following set of criteria be satisfied for an observation to be “corroborated”:
 - a. (AB) Observation based on data from at least 2 different sources
 - b. (AB) Observation is based on data from at least 2 different data gathering sessions
 - c. At least 1 of the 2 data points must reflect work actually being performed

Data Consolidation and Validation (4.5) - 5

- 4.5.5 - Method shall require a mechanism for determining that sufficient data has been collected to cover scope of appraisal, per the following minimum set of rules:
 - a. (A) A specific or generic practice has sufficient data coverage if validated observations exist, &
 - are adequate to understand extent of implementation
 - are representative of organizational unit
 - are representative of life-cycle phase in use

Data Consolidation and Validation (4.5) - 6

- b. (A) In a staged representation, a process area has sufficient data coverage if all of its specific & generic practices have sufficient data coverage
- c. (A) In continuous representation, a process area has sufficient data coverage if all of its specific practices (& the generic practices within appraisal scope) have sufficient data coverage up thru capability level being investigated for PA

Data Consolidation and Validation (4.5) - 7

- 4.5.6 - (A) Method shall require a mechanism for consolidating observations into draft findings (of strengths & weaknesses relative to the appraisal reference model
- 4.5.7 - (A) Method shall require the appraisal participants be presented with draft findings - to solicit their responses for verification of findings' accuracy & clarity

Rating (4.6)

- 4.6.1 - Method shall define a rating process that specifies, as a minimum: (A) only
- 4.6.2 - (A) Method shall require maturity level ratings &/or capability level ratings based on definitions of capability in CMMI
- 4.6.3 - Method shall rate each specific & generic goal (provided the prerequisites of rating are completed) within appraisal scope in a/w following rules: (A) only

Rating (4.6) - 2

- 4.6.4 - Method shall rate each process area within appraisal scope, if requested by sponsor, in a/w following rules: (A) only
- 4.6.5 - Method shall rate maturity level, if requested by sponsor, in a/w following rules: (A) only

Reporting Results (4.7)

- 4.7.1 - (ABC) Method shall require documenting & reporting appraisal findings &/or ratings to sponsor & to appraised organization
- 4.7.2 - (A) If ISO 15504 conformance is desired, method shall define a way to convert objective evidence used by team into associated process attribute outcomes per translation requirement of ISO/IEC TR 15504-2 (clause 7.6)

Reporting Results (4.7) - 2

- 4.7.3 - (A) Method shall require submission of appraisal data req'd by CMMI Steward (SEI) for purpose of reporting aggregate appraisal info to constituent community
- 4.7.4 - (ABC) Method shall require that appraisal record be provided to sponsor for retention

Differences between Class A, B and C Appraisals

- There are a fair number of differences in the requirements for Class B (vs. Class A)
- A relatively small number of differences between requirements for Class C and Class B
- Details on next charts

What is the Difference between Class A and B ?

- Class A is required for Baseline/rating
- ARC Requirements are relaxed in:
 - Appraisal Method Documentation (4.2)
 - Planning/Preparing for Appraisal (4.3)
 - Appraisal Data Collection (4.4)
 - Data Consolidation & Validation
 - Rating (4.6) - N/A for Class B
 - Reporting Results (4.7) - nothing to SEI

Differences in Appraisal Method Documentation (4.2)

- Documentation of Method (4.2.1) - Class A requires all documentation elements (a -e), but a Class B does not require element f:
declaration of 15504 conformance
- Class B does not require recording & retention of any ratings rendered, nor the set of 15504 process profiles (4.2.16) - elements f & g

Differences in Planning/ Preparing for Appraisal (4.3)

- Content of Appraisal Inputs (4.3.3) - Class B is the same as a non-15504 conformant Class A, but differs from a compliant Class A Appraisal (the quality characteristics of products or services not req'd for B, or a non-compliant A)
- Development of Appraisal Plan (4.3.5) - Class B requires only elements a -e, but not f: criteria to verify that 15504 reqts have been met

Differences in Data Collection (4.4)

- Major differences in this area! Significant differences in time and cost or Appraisal
- For Class A, all 3 methods of data collection are req'd for each Specific and Generic Practice (Instruments, Interviews, Document Reviews)
- For Class B, only 2 methods req'd (one of which must be interviews)

Differences in Data Consolidation & Verification (4.5)

- Mechanism for determining sufficient data (4.5) - only required for A
 - validate observations for the practice, & understand extent of implementation
 - are representative of organization & life-cycle phase
 - for staged representation, all specific or generic practices have adequate data coverage (PA)
 - participants presented with draft findings - solicit responses for verification

Differences in Rating (4.6)

- Only applies to Class A
- No requirements for B (and C)
- Significant savings in cost & time for a Class B

Differences between B and C

- Appraisal Data Collection (4.4.1, 4.4.2, 4.4.3) – Class B requires 2 sources of data, one of which is interviews; Class C requires only one source (any one)
- Data Consolidation & Validation –
 - Consensus (4.5.1) – Consensus is optional for C
 - Validation of Observations(4.5.3) – optional for C
 - Corroboration of Observations (4.5.4) – Corroboration optional for Class C

Differences in Reporting Results (4.7)

- Class B - no reqmt for a mechanism to convert OE into associated process attribute assessments, per ISO 15504-2 (clause 7.6)
- However, same as reqts for a non-compliant Class A
- Class B does not require submission of appraisal results/data to CMMI steward (SEI). Significant time/cost savings.

Different Purposes for Appraisals

- Starting out in Process Improvement: where are we, and where do we need improvements
- Improvement Monitoring (in the middle of PI) – how are we doing ? More work needed anywhere??
- Readiness Review – are you ready or “almost ready” for a formal Class A ?
- Benchmarking – get formal rating (Class A)

Other purposes ???

- Incremental Appraisals (spread over time)
- Others ???

Days on site

- Initial Appraisal : 1- 5
- Mini Appraisal: 3 – 5
- Gap Analysis: 1 – 3
- Improvement Monitoring: 1 – 3
- Delta Appraisal: 1 – 2
- Incremental Appraisal: 3 – 8
- ***Benchmarking (Rating): 5 - 15***

Scope and Coverage Depth

- Initial Appraisal : Broad x Shallow
- Mini Appraisal: Narrow x Deep
- Gap Analysis: Broad x Shallow
- Improvement Monitoring: Narrow x Deep
- Delta Appraisal: Very Narrow x Deep
- Incremental Appraisal: Narrow x Deep
- ***Benchmarking (Rating): Broad x Deep***

Team Size

- Initial Appraisal : B or C - Medium (5 - 7)
- Mini Appraisal: B or C - Medium (5 – 7)
- Gap Analysis: B or C - Medium (5 – 7)
- Improvement Monitoring: B or C-Medium (5 – 7)
- Delta Appraisal: B or C - Medium (5 – 7)
- Incremental Appraisal: B or C - Medium (5 – 7)
- ***Benchmarking (Rating): A - Large (7 – 9)***

Relative On-Site Effort (staff days)

- Initial Appraisal : 5 - 35
- Mini Appraisal: 15 - 35
- Gap Analysis: 5 - 21
- Improvement Monitoring: 5 - 21
- Delta Appraisal: 5 - 14
- Incremental Appraisal: 15 - 56
- ***Benchmarking (Rating): 35 - 135***

On-Site Effort – Appraisal Team

- Initial Appraisal: B or C 5 – 35 staff-days
- In-Process Mini Appraisal: B or C 15-35 sd
- Readiness Appraisal (Mini): B or C 15-35 sd
- Formal Benchmarking: A 35 –135 sd
- Total on-site effort (Appraisal Team): 70 – 240
sd

Comparison

- If all A's: $155 \text{ sd} \times 4 = 620 \text{ sd}$
- If 3 B's and 1 A: $180 + 20 + 25 + 25 = 250 \text{ sd}$
- Difference = 370 sd
- If a Class B is sufficient for the first 3, why take the extra time and \$???

Questions ???

