An "Embedded" SCAMPI-C Appraisal at the National Security Agency

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The "Situation" - 1

PM seeks to ascertain fidelity to CMMI among bidders; would like to encourage most capable to bid as "primes" and encourage others to partner.

PM has had good experience using CMMI and SCAMPI-B for previous source selection

PM needs to minimize time and effort to gather the data

SEI called in by SETA supporting PMO to develop a strategy that will work under these contraints

The "Situation" - 2

RFP to be released by NSA Program for software-centric infrastructure management system.

16 vendors express interest in competition through participation in pre-RFP workshops

Program is looking for "Level 3+" for potential winner

All potential bidders have "raised their hand+

The Plan: Simple Version

Publish a Request For Information seeking, among other things, objective evidence oriented to CMMI process areas

Use the FAR Multi-step Process (15.202) to conduct an evaluation and advise certain offerors that they are highly competitive. Note: all others may still bid with no prejudice.

Initial Steps

Help the program narrow the scope of CMMI process areas to those most critical for success

Quickly assemble an evaluation team and train them in CMMI (refresher) and SCAMPI

Produce an evaluation plan and communicate to offerors

What We Requested

Firstõ

A %BIID Matrix+listing appropriate artifacts for each CMMI practice within scope
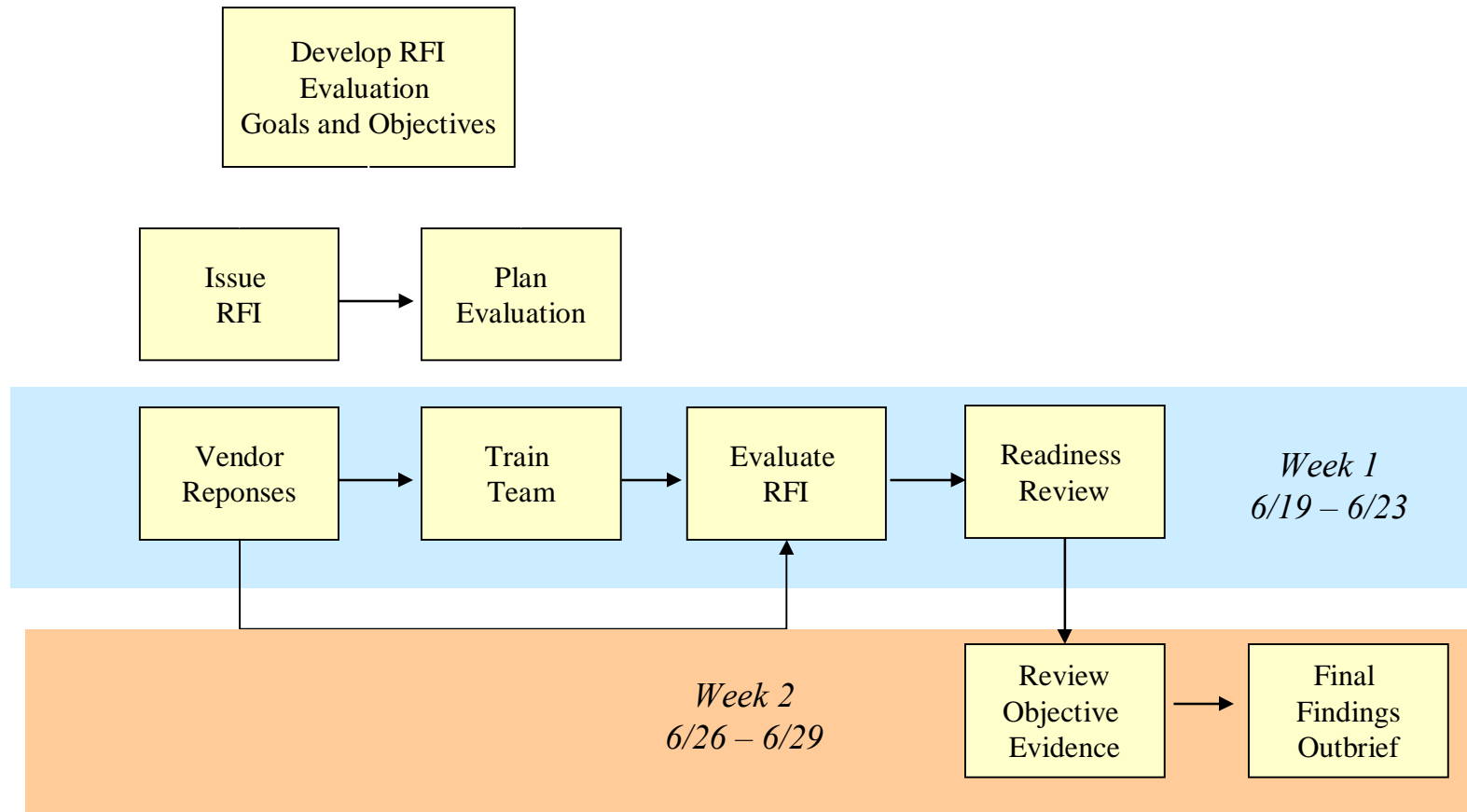
Thenõ

The actual artifacts for review by the SCAMPI Team

Summary of the CMMI-DEV®

Category	Process Areas
Process Management	**Organizational Process Focus** **Organizational Process Definition** **Organizational Training** **Organizational Process Performance** **Organizational Innovation and Deployment**
Project Management	**Project Planning** **Project Monitoring and Control** **Supplier Agreement Management** **Integrated Project Management for IPPD** **Risk Management** **Integrated Teaming** **Integrated Supplier Management** **Quantitative Project Management**
Engineering	**Requirements Management** **Requirements Development** **Most Critical** **Technical Solution** **for Program** **Product Integration** **Verification** **Validation**
Support	**Configuration Management** **Process and Product Quality Assurance** **Measurement and Analysis** **Decision Analysis and Resolution** **Organizational Environment for Integration Causal** **Analysis and Resolution**

RFI Evaluation Process

Develop RFI Evaluation Goals and Objectives

Issue RFI → Plan Evaluation

Vendor Reponses → Train Team → Evaluate RFI → Readiness Review

Week 1
6/19 – 6/23

Week 2
6/26 – 6/29

Review Objective Evidence → Final Findings Outbrief

Scope of the Evaluation

Eight of the original sixteen organizations chose to participate in the evaluation

This was not known until the first day of the evaluation

Three projects from each organizations were to be evaluated

Needed to scope the activities to match the available resources

Used variation of Nominal Group Technique to assist team in selection of critical Specific and Generic Practices from CMMI V1.1

The Challenge

Requirements Development: 10 Specific Practices

Technical Solution: 9 Specific Practices

Product Integration: 9 Specific Practices

Generic Practices (CL3): 36 Practices

Multiply by 8 Business Units and 3 projects per BU

1536 practices to be characterized in approximately 20 hours!

Three Dimensions

CMMI V1.1 Process Areas

- É   Most critical to program success
- É   Specific (performance) and
       generic (institutionalization) practices

Target Capability Level

- É   Indicated by fidelity to Generic Practices in each PA
- É   Target is Capability Level 3
  - ô   Organizational processes
  - ô   Tailored for program use
  - ô   Stakeholder involvement
  - ô   Monitoring and control
  - ô   Driven by policy

Past Appraisal Data

- É   Appraisal Disclosure Statement

CMMI Scope – Specific Practices

Requirements Development

- É Goal 1, Develop Customer Requirements, is excluded
- É Establish Product Requirements
- É Allocate Requirements to Components
- É Identify Interface Requirements
- É Establish CONOPS and Scenarios
- É Validate Requirements

Technical Solution

- É Evolve CONOPS and Scenarios
- É Select Product Solutions
- É Design the Product
- É Establish Tech Data Package
- É Design Interfaces
- É Implement the Product Design

Product Integration

- É Establish Integration Environment
- É Manage Interfaces
- É Confirm Product Readiness for Integration
- É Assemble the Product
- É Evaluate the Assembled Product
- É Package and Deliver the Product

Generic Practices for Each PA

- É CL3: Establish and Maintain Organizational Processes
- É CL2: Plan the Process
- É CL2: Involve Relevant Stakeholders

Typical Work Products

Requirements Development	*Requirements Specifications* *Allocation Tables* *Requirements Traceability Matrices* *Interface Control Documents* *SRR Presentations*
Technical Solution	*CONOPS* *Use Cases and Scenarios* *Unit Development Folders* *Source Code* *Rack Elevations*
Product Integration	*Integration and Test Plans* *Integration Test Results* *Pre-Ship Checklists* *System Inventory* *Shipping Documentation*

Review of Objective Evidence

Each offeror supplies the actual artifacts for the CMMI® practice listed in the PII matrix submitted earlier.

Appraisal team makes a judgment based on the artifact and %characterizes+ the practice for each project by CMMI® process area.

Appraisal team aggregates the characterization to the BU level .

This is the same process used during a SCAMPI-A^{SM} with much less evidence, coverage and rigor.

Characterizing Practices

Low	*The intent of the model practice is judged to be absent or poorly addressed in the approach or deployment. Goal achievement is judged unlikely because of this absence or inadequacy.*
Medium	*The intent of the model practice is judged to be partially addressed in the approach or deployment. Only limited support for goal achievement is evident.*
High	*The intent of the model practice is judged to be adequately addressed in the set of planned or deployed practices, in a manner that clearly supports achievement of the goal in the given process context.*

Rating of CMMI Practice Characterization for the Business Unit (BU)

The BU Characterization is Red

É when at least one of the instances is characterized Red

The BU Characterization is Yellow

- when none of the instances are characterized Red, and fewer than two of the instances are characterized Green

The BU Characterization is Green

- when at least two of the instances are characterized Green and none of the instances are characterized as Red.

Final CMMI Scope: 25 Practices, 200 Instances

Past Appraisal Data

Offerors were asked to submit relevant Appraisal Disclosure Statements (ADS) dated within the last 3 years

An ADS is generated each time that a SCAMPI^{SM}-A appraisal is conducted. The only way for a business unit to obtain a CMMI$^{®}$ Capability or Maturity Level is to conduct a SCAMPI^{SM}-A .

Every SCAMPI^{SM}-A consists of a model scope (CMMI$^{®}$ process areas) and an organizational scope (sample projects and support groups)

The current ADS in use leaves much room for variability in the amount of insight provided, thus the need for some expert analysis

Past Appraisal Data: Example

Submitted ADS (11/04) for the business unit ABC Systems.

Achieved ML3 which represents equivalence of CL3 in PA scope.

No projects listed on ADS. Cover letter indicates that one submitted project %participated+.

Lead by consultant lead appraiser with additional lead appraiser on the team.

Very little contextual information in ADS.

YELLOW

Combined Aggregated Results

	Establish Product Requirements	Allocate Product Requirements	Identify Interface Requirements	Establish CONOPS and Scenarios	Validate Requirements and Scenarios	Establish a Defined Process for RD	Plan RD Process	Involve Stakeholders in RD Process		Evolve CONOPS and Scenarios	Select Product Solutions	Design the Product	Establish Tech Data Package	Design Interfaces Using Criteria	Implement the Design	Establish a Defined Process for TS	Plan TS Process	Involve Stakeholders in TS Process		Establish Integration Environment	Manage Interfaces	Confirm Readiness for Integration	Evaluate Assembled Product	Package and deliver Product	Establish a Defined Process for PI	Plan PI Process	Involve Stakeholders in PI Process	
Offeror #1	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H	
Offeror #2	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H	H		H	H	H	M	H	H	H		
Offeror #3	H	H	H	H	H	H	H	H		H	M	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H	
Offeror #4	H	H	H	H	M	H	H	H		H	H	H	H	M	H	H	H	H		H	H	H	M	M	H			
Offeror #5	H	H	L	L	L	L	H	H		H	L	L	L	L	L	L	H	H		H	L	L	H	H	L	H	H	
Offeror #6	H	L	H	L	L	H	L	L		L	L	L	L	L	L	H	L	L		M	L	L	L	H	H	L	L	
Offeror #7	L	L	L	L	L	L	L	L		L	L	L	L	L	L	L	L	L		L	L	L	L	L	L	L	L	
Offeror #8	L	L	L	L	L	L	L	L		L	L	L	L	L	L	L	L	L		L	L	L	L	L	L	L	L	
	Requirements Development									**Technical Solution**										**Product Integration**								

Addressed | Yellow Questionable | Red Not Addressed

Qualities of Relevant Past Performance
Aggregate

Criteria	One	Two	Three	Four	Five	Six	Seven	Eight
1. Rapid Prototyping	Y	G	G	R	R	G	Y	Y
2. Transitioning software prototypes to operations	G	R	G	Y	R	R	Y	Y
3. Service Oriented Architecture	Y	R	Y	R	G	G	G	G
4. Modular design that accommodates new interfacing systems and growth to enhanced protection levels	Y	Y	G	R	Y	G	G	Y
5. Systems engineering, integration and software development processes	Not Pass	Not Pass	Pass	Pass	Pass	Pass	Pass	Not Pass
6. EITC and NSA Enterprise Architecture compliance	R	R	R	R	R	Y	Y	G
Aggregate								

Screening Gate

Qualities of Relevant Past Performance
Aggregate
(Using Process as a gate)

Weight	Evaluation Criteria	Three		Four		Five		Six		Seven	
0.2	1. Recent performance record in developing, producing, and delivering rapid prototypes or capabilities in Spins or Spirals.	10	2	1	0.2	1	0.2	10	2	5	1
0.2	2. Recent performance record in transitioning software prototypes to operational status.	10	2	5	1	1	0.2	1	0.2	5	1
0.2	3. Recent performance record in developing a service oriented architecture with a foundation of logical core services that enables the system to be extended over time.	5	1	1	0.2	10	2	10	2	10	2
0.2	4. Recent performance record in the development of a scalable, extensible, and modular design that accommodates new interfacing systems, changes to interfaces, and growth opportunities to enhanced protection levels.	10	2	1	0.2	5	1	5	1	10	2
0.2	6. Recent performance record in integrating new COTS capabilities into customer legacy systems with EITC and NSA Enterprise Architecture compliance.	1	0.2	1	0.2	1	0.2	1	0.2	5	1
1	Total Scores		7.2		1.8		3.6		5.4		7
	Rating	Highly Competitive		Competitive		Highly Competitive		Highly Competitive		Highly Competitive	

GREEN = 10
YELLOW = 5
RED = 1

Lessons Learned

The Advisory Multi-step Request For Information (RFI) is an excellent mechanism for identifying contractor viability.

Using the CMMI© and SCAMPI℠ to verify process maturity of future offerors during the RFI evaluation was valuable and proved to be a useful %gating+mechanism

If Appraisal Disclosure Statements rate very high in relation to timeliness, correlation of sample projects, CMMI scope, etc, use that project data versus inspecting CMMI artifacts

Offerors should be advised that they have the option to also submit final findings or other contextual information to accompany any relevant ADS

Offerors should be given a firm requirement for data format (e.g. CD, DVD, etc) and not allowed to deviate

Questions

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