

Lessons Learned from a Joint CMMI (v1.2) and SSE-CMM (v3.0) Class B SCAMPI Appraisal

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Presentation Agenda/Topics

- ▶ Overview of the Organizations
- ▶ The Scope of the Appraisal
- ▶ The Models
- ▶ Appraisal Method Overview
- ▶ Lessons learned –Pre Appraisal
- ▶ Lessons Learned – Planning
- ▶ Lessons Learned - On Site Period
- ▶ Lessons Learned - Reporting Results
- ▶ Next Steps

About cClear Improvement

- ▶ cClear Improvement & Associates is a leading US-based professional services company and an Software Engineering Institute (SEI) Partner in the field of Systems and Software Process Improvement and Engineering.
- ▶ The cClear Improvement approach to process improvement models (such as the CMMI) is: business first, model second. cLIA appraisers and consultants will not suggest something simply to pass an appraisal, but rather to genuinely improve your business for the long-haul.
- ▶ Our mission is to establish long-term partnerships with our customers to enable them to achieve clear improvement for their systems and software engineering and IT-based model- and standard-based process improvement efforts yielding tangible business results for: Quality, Cost, while maximizing Functionality and Time-to-market
- ▶ Each of our consultants, appraisers, trainers and Associate Companies and Partners are hand-picked for their quality, reputation and similarity in philosophy, interpretation and results-orientation, and with an average range of experience of 12-20 years in process improvement
- ▶ More information can be found at our website: <http://www.clearimprovement.com>

About Booz Allen Hamilton

- ▶ Booz Allen Hamilton has been at the forefront of management consulting for businesses and governments for over 90 years. Booz Allen, a global strategy and technology consulting firm, works with clients to deliver results that endure.
- ▶ With more than 19,000 employees on six continents, the firm generates annual sales of \$4 billion. Booz Allen provides consulting services in strategy, operations, organization and change, and information technology to the world's leading corporations, government and other public agencies, emerging growth companies, and institutions.
- ▶ To learn more about the firm, visit the Booz Allen Web site at www.boozallen.com. To learn more about the best ideas in business, visit www.strategy-business.com, the Web site for *strategy+business*, a quarterly journal sponsored by Booz Allen.

Overview of Appraisal



▶ Organization Undergoing Appraisal

- 5 projects from Booz Allen Hamilton Global IT Team's System Development Organization

▶ Appraisal Team

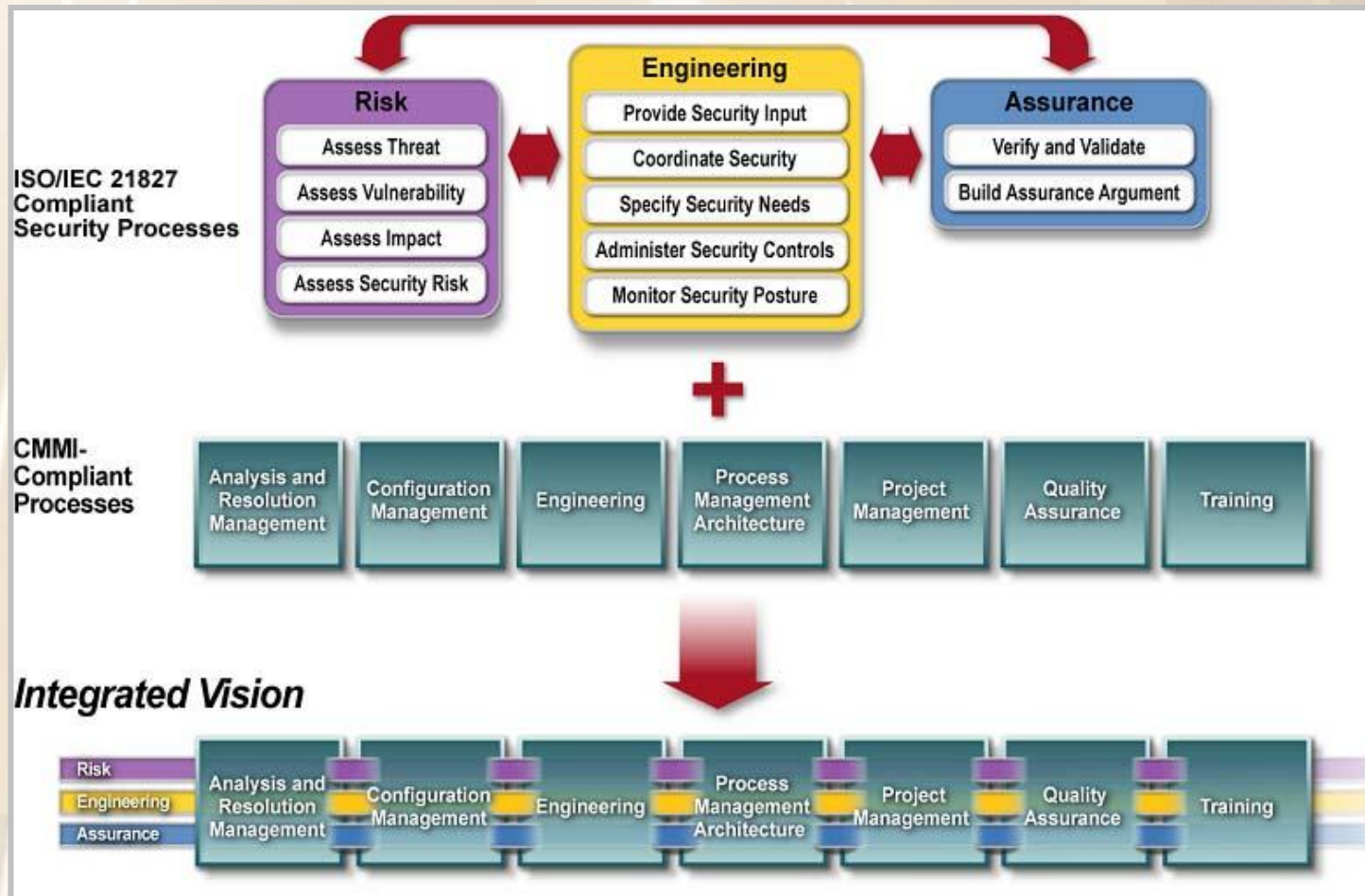
- Lead Appraiser Ron Lear cLear Improvement & Associates, LLC
- Blend of Booz Allen's CMMI ® and SSE-CMM Subject Matter Experts (SMEs)

▶ Feedback loop

- Project performance
- Risk Reduction
- Improvement Priorities
- Improvement Actions



CMMI ® Dev V1.2 and ISO/IEC 21827 were the models appraised



CMMI ® -DEV v1.2

► **Maturity Level Target: CMMI ® -DEV+IPPD, Maturity Levels 2-3**

- All Maturity Level 2-3 Process Areas were appraised

Staged	Continuous Categories			
ML	PROCESS	PROJ MGMT	ENG	SUPPORT
5	OID			CAR
4	OPP	QPM		
3	OPF OPD+IPPD OT	IPM+IPPD RSKM	RD TS PI VER VAL	DAR
		PP PMC SAM	REQM	MA PPQA CM



Organizational PAs are in Black, Project PAs are in Red

The Security Engineering Process Areas were included in the scope of the appraisal

Security Engineering Process Areas	# of Base Practices
Administer Security Controls	4
Assess Impact	6
Assess Security Risk	6
Assess Threat	6
Assess Vulnerability	5
Build Assurance Argument	5
Coordinate Security	4
Monitor Security Posture	7
Provide Security Input	6
Specify Security Needs	7
Verify and Validate Security	5

Project and Organizational Process Areas	# of Base Practices
Ensure Quality	8
Manage Configurations	5
Manage Project Risks	6
Monitor and Control Technical Effort	6
Plan Technical Effort	10
Refine Organization's Security Engineering Process	4
Improve Organization's Security Engineering Process	4
Manage Product Line Evolution	6
Manage Systems Engineering Support Environment	7
Provide Training Skills and Knowledge	8
Coordinate with Suppliers	5

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Appraisal Background

▶ Key Appraisal Objectives

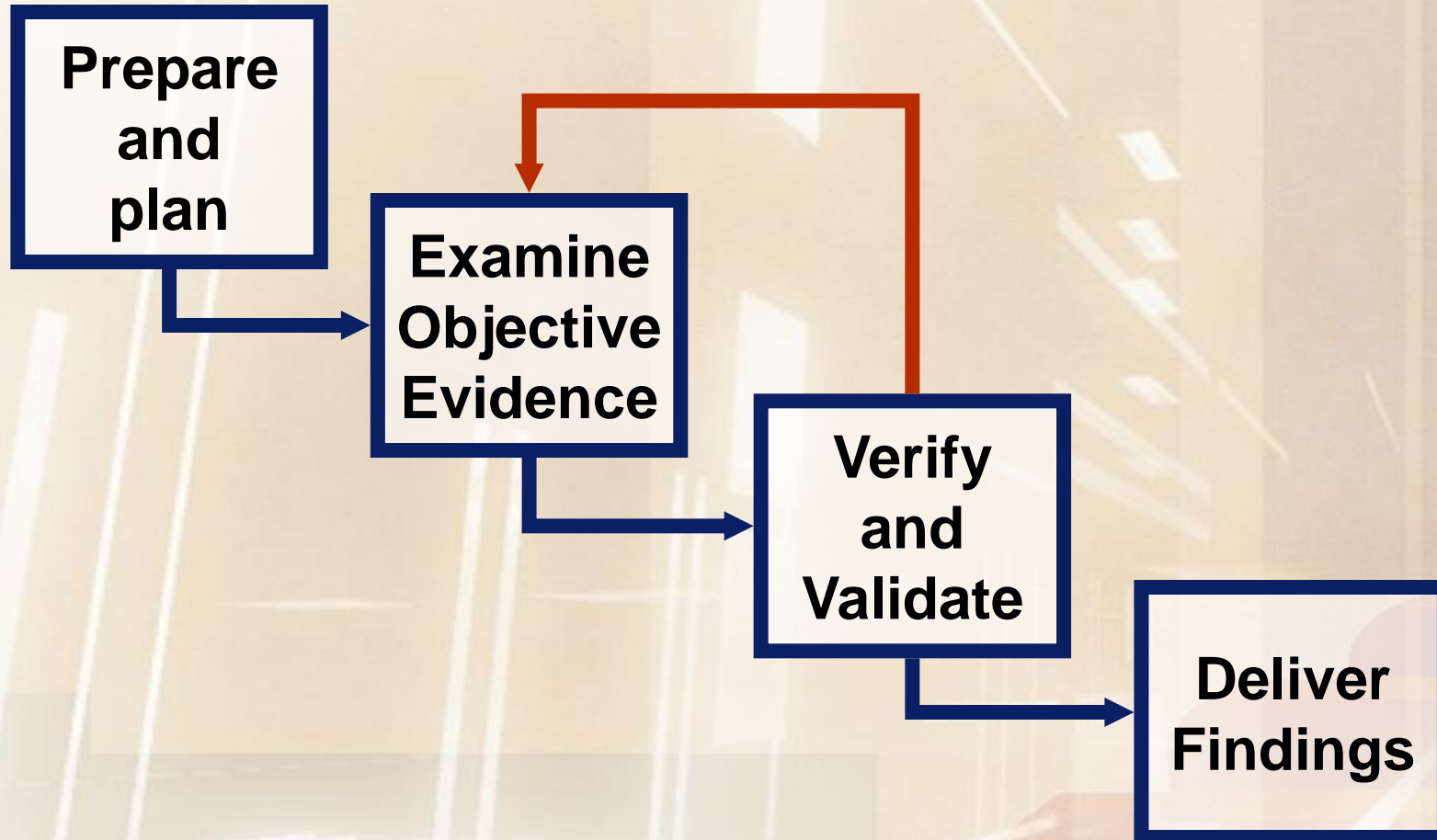
- SCAMPI Class B appraisal to determine project implementation and institutionalization of the standard process set against recent CMMI v1.2 changes
- Provide a pilot opportunity for a joint appraisal approach for CMMI and the SSE-CMM (Assurance) models and provide lessons learned
- Leverage existing PIID data and interviews to characterize SSE-CMM with relevant CMMI PAs and report as a part of appraisal and results

▶ The organization targeted for this appraisal

- Previously appraised against the CMMI v1.1 and similar models and standards (e.g. SW-CMM).
- Conducted activities supporting other model compliance and implementations (such as the SSE-CMM)
- September 2006 - Appraisal Objective was to Perform a “proof of concept” on integrated CMMI SCAMPI and SSE-CMM Appraisal (Did not have an impact on the SCAMPI appraisal and was not reflected in the results)

▶ The September 2007 appraisal was a joint effort between two SEI Partner organizations, one contracting with the other for leading the appraisal activity.

Nominal Appraisal Activity Flow



Prepare and Plan – Lessons Learned

▶ Key Activities

- Sponsor initiated planning for an integrated appraisal led by an external lead appraiser
- Tailoring and adjustments to the SCAMPI method and objectives for the appraisal were made
- September 2007 - Appraisal Objective leverage existing PIID data and interviews to characterize SSE-CMM with relevant CMMI ® PA and report to organization with appraisal results)

▶ There was no place in the PIID to capture most of the organizational management and IA-related evidence at the organizational level

▶ For SSE-CMM, an agreed-upon mapping between CMMI ®, SSE-CMM and OSP/PDPs must be completed for the appraisal team/PIID use

▶ Need some basic training for SSE-CMM (or whatever model is in play) for interpretation reasons – Team members have difficulty shifting between model paradigms

▶ Identify IA PIID elements *with suggestions and more guidance for projects* - helps projects identify evidence for IA practices ahead of the SCAMPI, so there is less discovery

CMMI to SSE-CMM Mapping

CMMI+IPPD (v1.2)	
SSE-CMM (v3.0)	
MI Process Area	SSE-CMM Process Area
REQM	PA04 Assess Threat PA10 Specify Security Needs
PP	PA02 Assess Impact PA06 Build Assurance Argument
PMC	PA02 Assess Impact PA06 Build Assurance Argument PA08 Monitor Security Posture
SAM	PA04 Assess Threat PA07 Coordinate Security PA08 Monitor Security Posture
MA	PA02 Assess Impact PA06 Build Assurance Argument
PPQA	PA06 Build Assurance Argument
CM	PA01 Administer Security Controls PA08 Monitor Security Posture
RD	PA04 Assess Threat PA10 Specify Security Needs
TS	PA05 Assess Vulnerability PA09 Provide Security Input
PI	PA09 Provide Security Input PA10 Specify Security Needs
VER	PA05 Assess Vulnerability PA11 Verify and Validate Security
VAL	PA04 Assess Threat PA11 Verify and Validate Security
OPF	PA07 Coordinate Security
OPD+IPPD	PA07 Coordinate Security
OT	PA07 Coordinate Security
IPM+IPPD	PA07 Coordinate Security
RSKM	PA03 Assess Security Risk PA08 Monitor Security Posture
DAR	PA03 Assess Security Risk PA09 Provide Security Input

CMMI PIID example – Project Planning

Practice #	Practice Title	Practice Description	Charac- ter- ization	Direct	Indirect	Affirmation	Weaknesses	Strengths
					SG1	0%		
					SG2	0%		
					SG3	0%		
					GG2	0%		
					GG3	0%		
SP 1.1	Estimate the Scope of the Project	Establish a top-level work breakdown structure (WBS) to estimate the scope of the project. [PA163.IG101.SP101]	H					
SP 1.2	Establish Estimates of Work Product and Task Attributes	Establish and maintain estimates of the attributes of the work products and tasks. [PA163.IG101.SP102]	H					
SP 1.3	Define Project Life Cycle	Define the project life-cycle phases on which to scope the planning effort. [PA163.IG101.SP103]	H					
SP 1.4	Determine Estimates of Effort and Cost	Estimate the project effort and cost for the work products and tasks based on estimation rationale. [PA163.IG101.SP104]	H					

“Before” PIID example – SSE-CMM Add-on to PP

Practice #	Practice Title	Practice Description	Charac-ter-ization	Direct	Indirect	Affirmation	Weaknesses	Strengths
					SG1	0%		
					SG2	0%		
					SG3	0%		
					GG2	0%		
					GG3	0%		
Assurance								
PA02	Assess Impact	The security impacts of risks to the system are identified and characterized.	H					
	Purpose	The purpose of Assess Impact is to identify impacts that are of concern with respect to the system and to assess the likelihood of the impacts occurring. Impacts may be tangible, such as the loss of revenue or financial penalties, or intangible, such as loss of reputation or goodwill.						
Base Practices List								
	BP.02.01	Identify, analyze, and prioritize operational, business, or mission capabilities leveraged by the system.						
	BP.02.02	Identify and characterize the system assets that support the key operational capabilities or the security objectives of the system.						
	BP.02.03	Select the impact metric to be used for this assessment.						
	BP.02.04	Identify the relationship between the selected metrics for this assessment and metric conversion factors if required						
	BP.02.05	Identify and characterize impacts.						
	BP.02.06	Monitor ongoing changes in the impacts.						

“AFTER” PIID example – SSE-CMM Add-on to PP (Base practices needed for accurate interpretation)

Practice #	Practice Title	Practice Description	Charac-ter-ization	Direct	Indirect	Affirmation	Weaknesses	Strengths
					SG1	0%		
					SG2	0%		
					SG3	0%		
					GG2	0%		
					GG3	0%		
Assurance								
PA02	Assess Impact	The security impacts of risks to the system are identified and characterized.	H					
	Build Assurance	The work products and processes clearly provide the evidence that the customer's security needs have been	H					
	Purpose	The purpose of Assess Impact is to identify impacts that are of concern with respect to the system and to assess the likelihood of the impacts occurring. Impacts may be tangible, such as the loss of revenue or financial penalties, or intangible, such as loss of reputation or goodwill.						
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	BP.02.06	Monitor ongoing changes in the impacts.						

Examine Objective Evidence – Lessons Learned

- ▶ **Key activities**
 - **Tailored SCAMPI method to accommodate joint models**
Relied on some evidence (DA/IA) from projects
Affirmations (questions) by projects
 - **Employed IA-trained Sub-mini-team on IA**
 - **Lead appraiser listening for and tracking progress against both models**
- ▶ **Raising awareness of integrated vision before SCAMPI (war rooms and additional PIID details for evidence collection before SCAMPI) was a critical activity**
- ▶ **Projects where IA deliverables are in scope benefit from more specifics in the PIIDs, projects where IA activities are not specified need alternative evidence to review**
- ▶ **Adding rows to each PIID for each PA appears to work very well to capture specific evidence items as it enabled re-sorting the PIID spreadsheet facilitates examining IA evidence *across* practices)**
- ▶ **Areas that were more mature (had a longer process improvement history) had more solid IA answers related to processes**

Verify and Validate - Lessons Learned

- ▶ A successful integrated appraisal with a diverse team, requires frequent checks of IA and attention to mini team composition – possibly a mini team IA checklist of sorts to help supplement teams who are weaker in IA for times when the ideal team composition is not possible
- ▶ Diverse levels of IA knowledge on the appraisal team make adequate review of IA evidence and discovery challenging
- ▶ An integrated appraisal is not recommended for appraisals that require a high level of discovery (continual shifts in reconciling/understanding of appraisal goals by the appraisal team detracts from the focus on a joint/other appraisal goals)

Deliver Findings - Lessons Learned

- ▶ **Base practices (of the SSE-CMM) must be characterized to understand the implementation of the goals and to ensure consistency in interpretation (PIIDs)**
- ▶ **Objective view of the maturity of SSE-CMM practices created enthusiasm and increased ownership of the engineering process set**

Next Steps



- ▶ The appraisal team and sponsor reached consensus that we achieved the objective to determine that a joint appraisal approach is feasible
- ▶ Incorporating information assurance into future CMMI ® appraisal efforts (and evidence gathering) as a part of an organizations continual improvement efforts is possible
- ▶ Feedback loop required for progress
 - Project performance
 - Risk Reduction
 - Improvement Priorities
 - Improvement Actions



Thank you! Questions?

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