Army ERP Center of Expertise

Tailoring CMMI for an Enterprise Resource Planning COTS Software Environment

Director, Business Transformation and E-Systems Directorate,
Weapons & Software Engineering Center
Alison L. Schwier

Malcolm Baldrige National Quality Award 2007 Award Recipient

Director, Army COE
Mr. George Albinson

Agenda

- Background
- SEI CMMI models
- COE Decision to use CMMI for Development
- Tailoring Armament Software Engineering

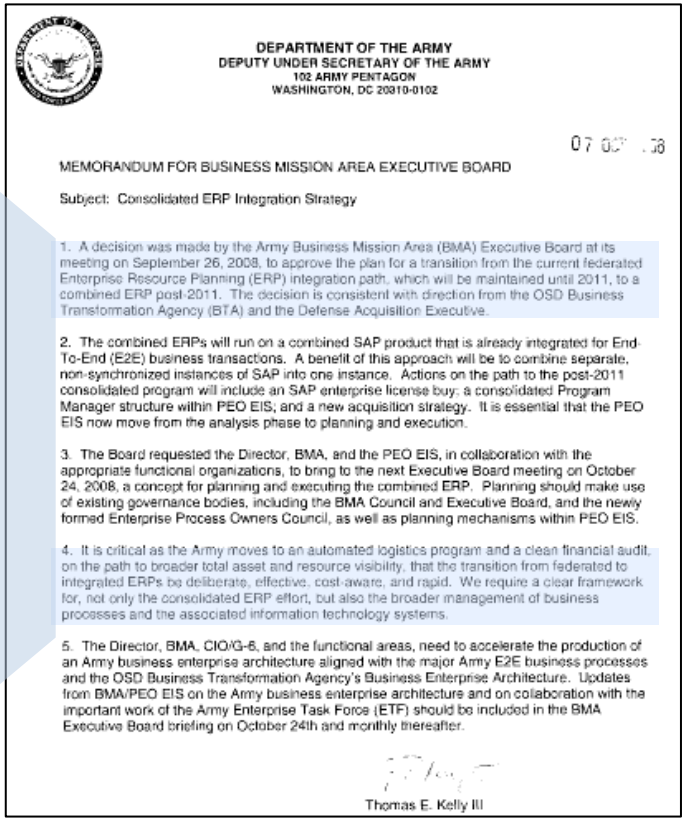
Center Policies/Procedures

- Lessons Learned

Consolidated ERP Integration Strategy Memo Dated 7 Oct 08

1. A decision was made by the Army Business Mission Area (BMA) Executive Board at its meeting on September 26, 2008 to approve the plan for a transition from the current federated ERP integration path, to a combined ERP post-2011. The decision is consistent with direction from the OSD BTA and the Defense Acquisition Executive.

4. It is critical as the Army moves to an automated logistics program and a clean financial audit, on the path to broader total asset and resource visibility, that the transition from federated to integrated ERPs be deliberate, effective, cost-aware and rapid. We require a clear framework for, not only the consolidated ERP effort, but also the broader management of business processes and the associated information technology systems.



DEPARTMENT OF THE ARMY
DEPUTY UNDER SECRETARY OF THE ARMY
102 ARMY PENTAGON
WASHINGTON, DC 20310-0102

07 OCT 08

MEMORANDUM FOR BUSINESS MISSION AREA EXECUTIVE BOARD

Subject: Consolidated ERP Integration Strategy

1. A decision was made by the Army Business Mission Area (BMA) Executive Board at its meeting on September 26, 2008, to approve the plan for a transition from the current federated Enterprise Resource Planning (ERP) integration path, which will be maintained until 2011, to a combined ERP post-2011. The decision is consistent with direction from the OSD Business Transformation Agency (BTA) and the Defense Acquisition Executive.

2. The combined ERPs will run on a combined SAP product that is already integrated for End-To-End (E2E) business transactions. A benefit of this approach will be to combine separate, non-synchronized instances of SAP into one instance. Actions on the path to the post-2011 consolidated program will include an SAP enterprise license buy; a consolidated Program Manager structure within PEO EIS; and a new acquisition strategy. It is essential that the PEO EIS now move from the analysis phase to planning and execution.

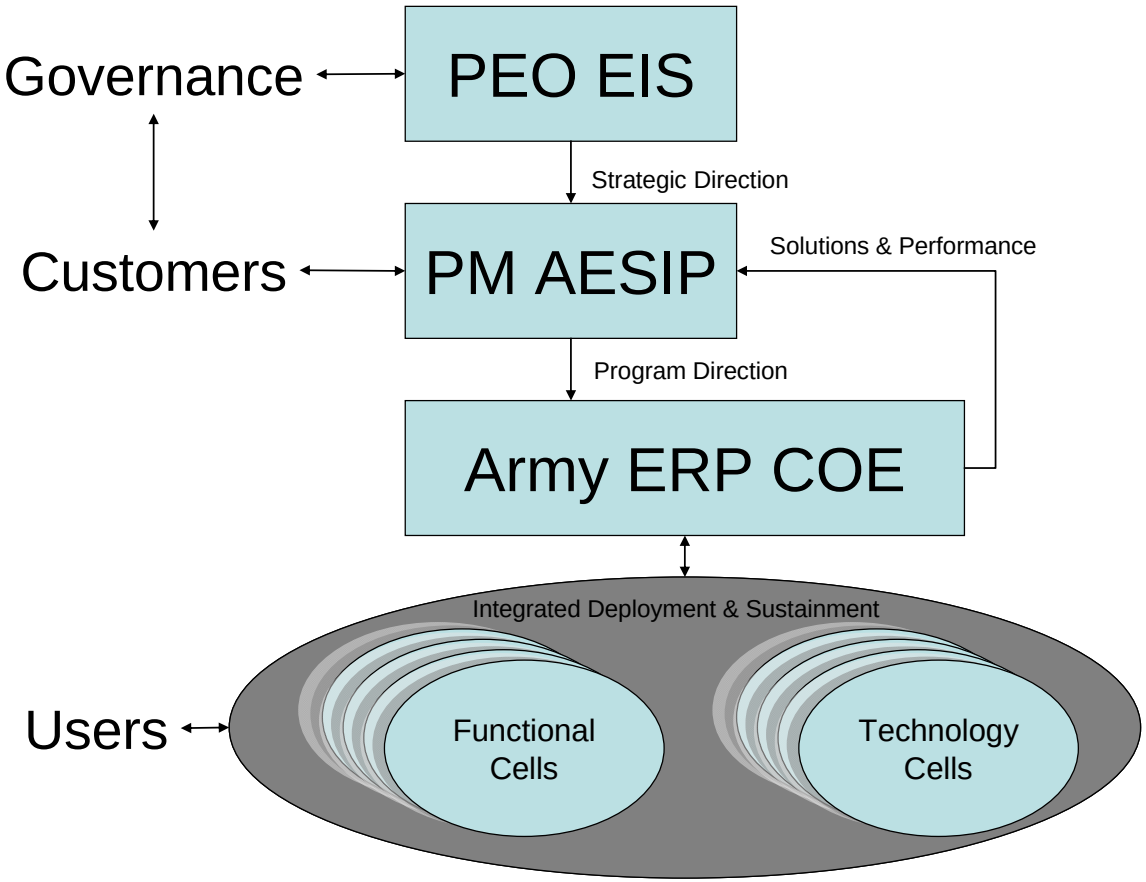
3. The Board requested the Director, BMA, and the PEO EIS, in collaboration with the appropriate functional organizations, to bring to the next Executive Board meeting on October 24, 2008, a concept for planning and executing the combined ERP. Planning should make use of existing governance bodies, including the BMA Council and Executive Board, and the newly formed Enterprise Process Owners Council, as well as planning mechanisms within PEO EIS.

4. It is critical as the Army moves to an automated logistics program and a clean financial audit, on the path to broader total asset and resource visibility, that the transition from federated to integrated ERPs be deliberate, effective, cost-aware, and rapid. We require a clear framework for, not only the consolidated ERP effort, but also the broader management of business processes and the associated information technology systems.

5. The Director, BMA, CIO/G-6, and the functional areas, need to accelerate the production of an Army business enterprise architecture aligned with the major Army E2E business processes and the OSD Business Transformation Agency's Business Enterprise Architecture. Updates from BMA/PEO EIS on the Army business enterprise architecture and on collaboration with the important work of the Army Enterprise Task Force (ETF) should be included in the BMA Executive Board briefing on October 24th and monthly thereafter.

Thomas E. Kelly III

Governance – Org Chart



Army ERP COE Concepts

- An Army in-house system integrator
  - "true" ERP with full cross-Domain business processes using SAP ERP based on Business Process Reengineering
  - full scale in-production platform with landscapes capable of launching COTS prototypes with vetted best practices & lessons learned
  - technical risk reduction & cost mitigation capabilities & techniques for rapid, effective & efficient implementations
  - value added stakeholder relationships
    - Strong ERP vendor relations
    - ❖ ARDEC SEC CMMI Level 5 center of excellence using in-house resources & lean tools
    - Defense Ammunition Center Trainers
    - OSD Business Transformation Agency ESG Member
    - Other Service ERP PM's in Navy & DLA

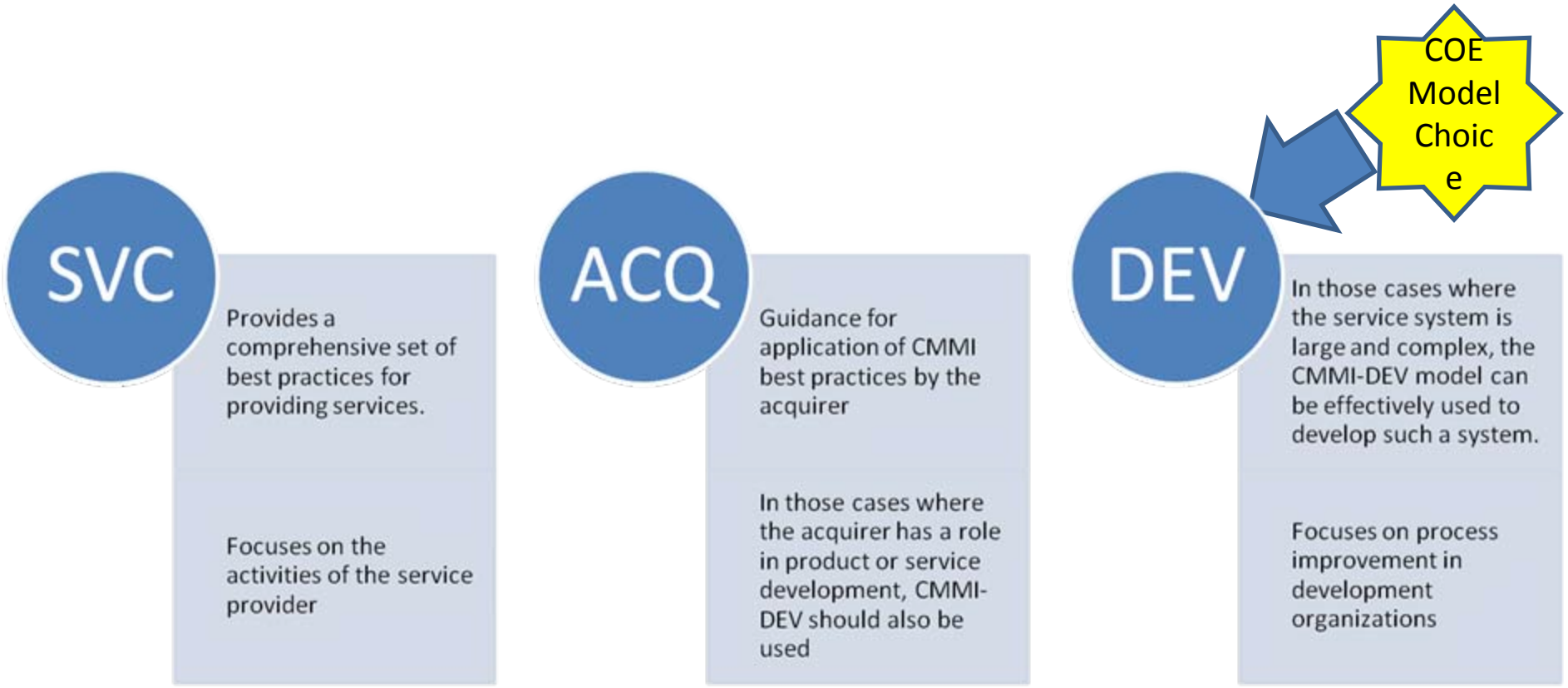
AMC Path Forward on Army ERP COE

Today's Realities

"The Americans will always do the right thing... after they've exhausted all the alternatives." -- Winston Churchill

- Large ERP Programs don't die
  - Sunk costs
  - Stakeholder resistance
  - System Integrator constituencies
  - Belief that government can't do the heavy lifting
- Army In-sourcing
  - Some view AMC as large inflexible lethargic bureaucracy
  - AMC has the SME talent
  - AMC has the base to start now & grow technology from SEC & eNOVA
  - PEO EIS has the acquisition capabilities
  - Strategic move from requirements analysis to conference room pilot approval
  - Move from DoD 5000 driven System Integrator contract milestones to moving at Commander's pace with latest technologies & latest strategies
    - Slices of end to end processes versus large monolithic stove pipe implementations
    - Build to holistic enterprise that matches strategy to transactions versus huge integration costs among internally focused stove pipes

Understand SEI's CMMI-DEV and CMMI-SVC



The COE is following the **CMMI-DEV** model – to develop this large and complex ERP system

Hybrid CMMI Implementation for Army ERP

CMMI-DEV (COTS)
+
CMMI-SVC (Select Practices)

CMMI-SVC

Initial large and complex development effort; augment with CMMI-SVC constellation

Eventually: Maintain a high-quality service-providing organization

Appraise to CMMI-DEV

Goals:
- Implement a hybrid CMMI Model
- Share templates and Best Practices

CMMI Model Comparison

Process Areas

	CMMI-SVC	CMMI-DEV	CMMI-ACQ
CMMI Model Foundation	✓	✓	✓
Services Specific	✓2		
Engineering		✓1	
Acquisition			✓3

[2] *Change Management added by COE to cover this crucial COTS function*

[1] 9 CMMI-DEV Model Foundation Process Areas have demands specific to COTS:

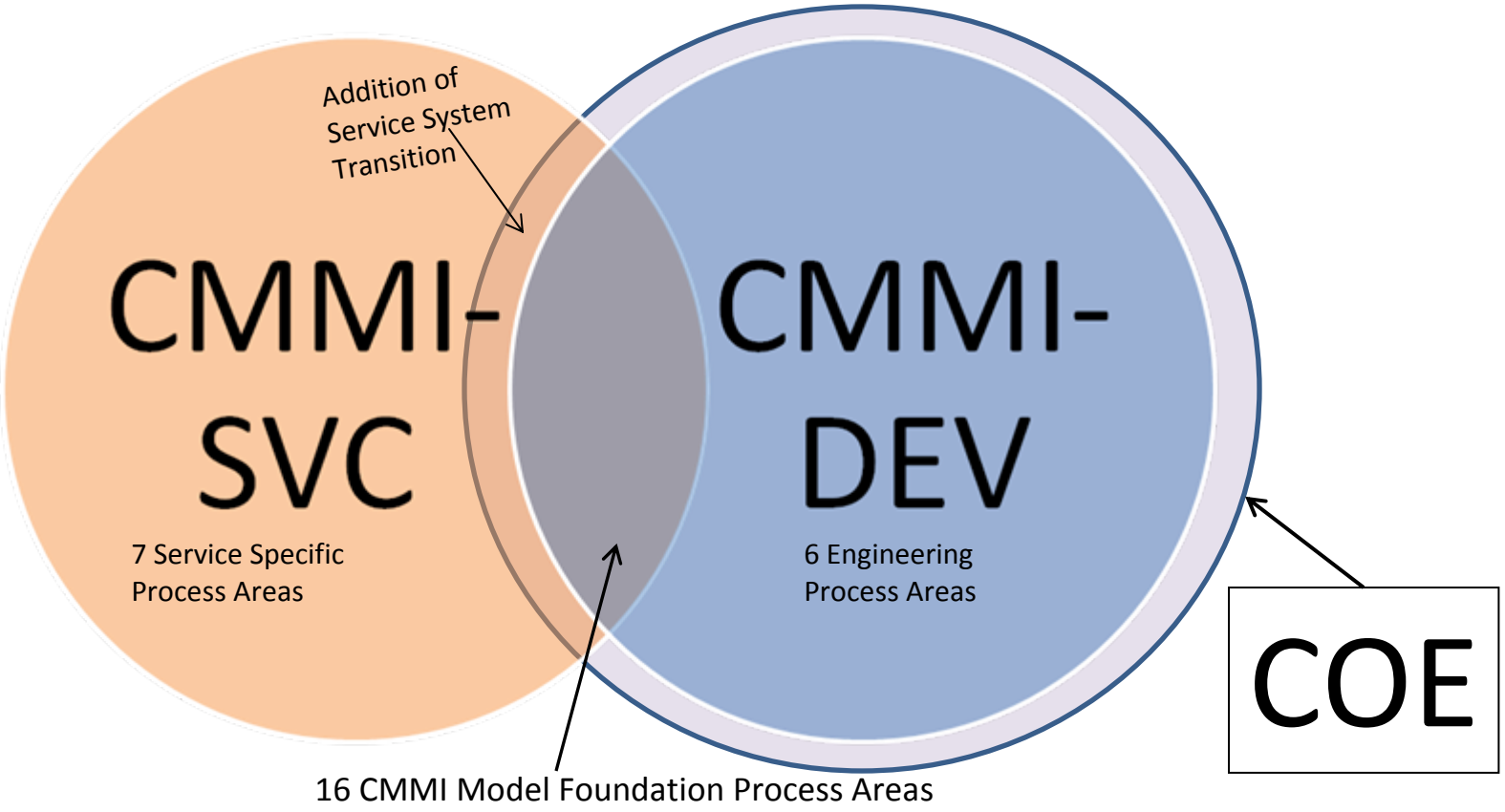
- Project Planning
- Risk Mgmt
- Requirement Mgmt
- Decision Analysis & Resolution
- Supplier Agreement Mgmt
- Process and Product Quality Assurance
- Integrated Project Management
- Configuration Mgmt
- Measurement and Analysis

The 7 Services Specific Process Areas:

- Service Delivery (SD)
- [2] Service System Transition (SST) (Change Management)
- Strategic Service Management (STSM)
- Capacity and Availability Management (CAM)
- Service Continuity (SCON)
- Incident Resolution and Prevention (IRP)
- Service System Development (SSD)

[3]Acquisition constellation is a resource when acquiring COTS software (SAP) and services (contractors with SAP skills).

Which process areas are covered by each model?



COE's COTS Implementation Process Areas

Continuous Representation

CMMI-DEV process areas

Process Management	
OPF	Organizational Process Focus
OPD	Organizational Process Definition + IPPD
OT	Organizational Training
OPP	Organizational Process Performance
OID	Organizational Innovation and Deployment
Project Management	
PP	Project Planning
PMC	Project Monitoring and Control
SAM	Supplier Agreement Management
IPM	Integrated Project Management + IPPD
RSKM	Risk Management
QPM	Quantitative Project Management
Engineering	
REQM	Requirements Management
RD	Requirements Development
TS	Technical Solution
PI	Product Integration
VER	Verification
VAL	Validation
Support	
CM	**Configuration Management ****
PPQA	Process and Product Quality Assurance
MA	Measurement and Analysis
DAR	Decision Analysis and Resolution
CAR	Causal Analysis and Resolution

+

Addition of 1 CMMI-SVC process area

Service Specific	
SST	Service System Transition

**** Tailor CM Policy & Procedures**

—Version control and numbering

—Product release and delivery

Relevant CMMI-ACQ Process Areas

Process Area	COE Examples
Agreement Management (AM) The purpose of Agreement Management (AM) is to ensure that the supplier and the acquirer perform according to the terms of the supplier agreement.	•At the highest level, the agreement between the Army and SAP. •Each services contract for SAP contractor assignments.
Acquisition Validation (AVAL) The purpose of Acquisition Validation (AVAL) is to demonstrate that an acquired product or service fulfills its intended use when placed in its intended environment.	•Audits and reviews of base SAP software against Army goals and vision. •Functional and Physical audits of various existing Army systems the COE acquires.
Acquisition Verification (AVER) The purpose of Acquisition Verification (AVER) is to ensure that selected work products meet their specified requirements.	•Verification that the skills and output artifacts from each contract are as expected. •Verification that the base SAP software performs as expected and support levels are maintained.

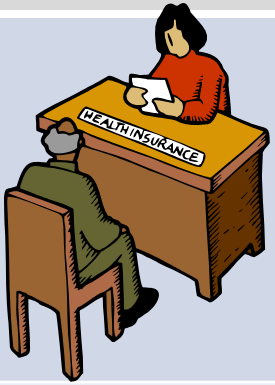
Decision Analysis and Resolution for CMMI-DEV Model Choice

Our team considered:

Credibility
"Proven Product"

"Applying CMMI to a COTS adaptation is a new effort. We will be most successful by using Armament Software Engineering Center's Level-5 Organizational Framework"

Ease and Speed of Implementation
"Leverage"

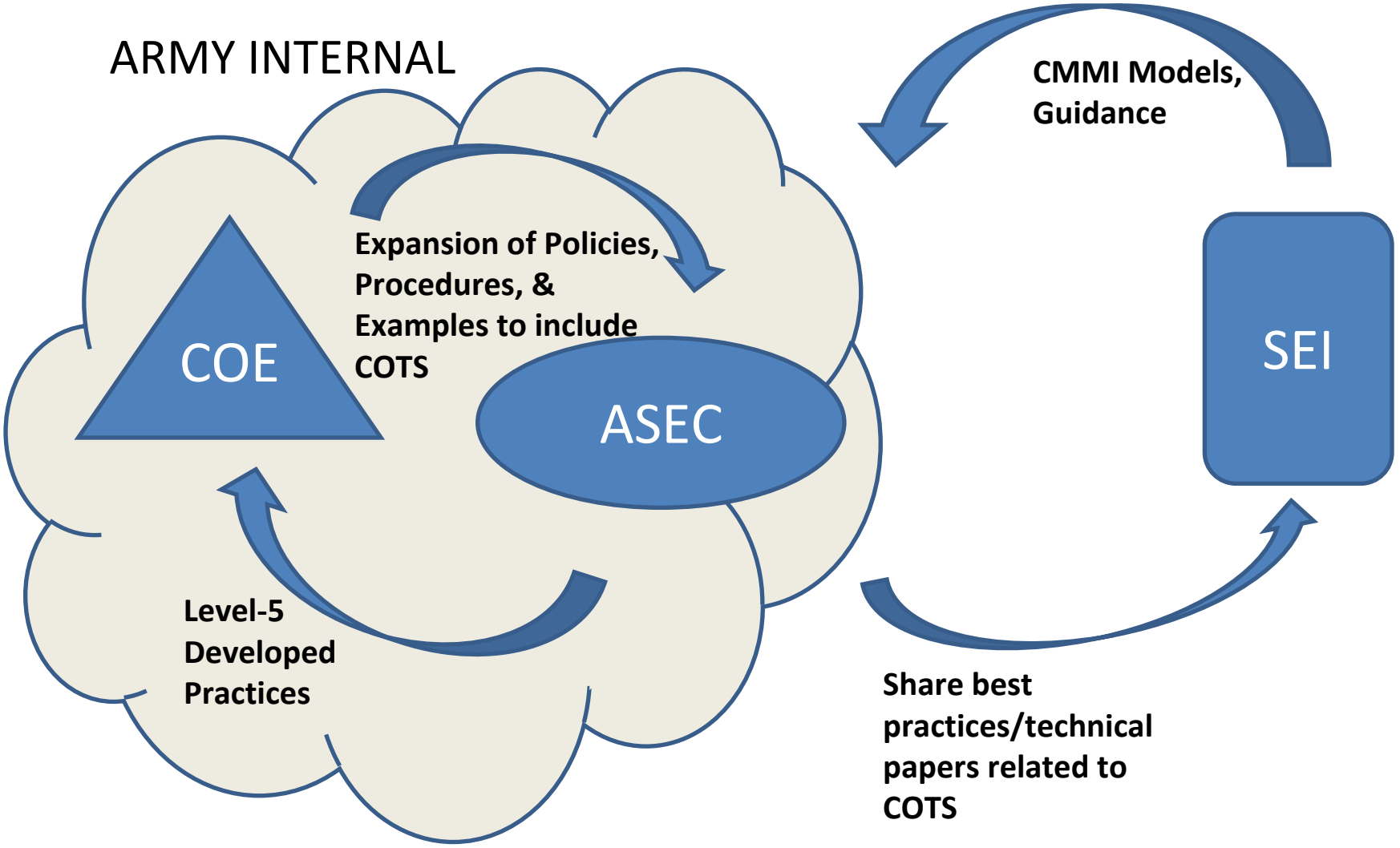


"Armament Software Engineering Center Level-5 policies, procedures and templates are based on CMMI-DEV"

Cost

"Costs include staffing and training a new process engineering group for CMMI-SVC model"

Strengthen internal and external relationships



Armament SEC's processes are robust enough to handle this COTS effort

What Organizational Standard Processes did we tailor?

Glossary

- Translation guidance for COTS terms to custom development terms
- Added COTS-specific terms: Change Management, Customer Competency Center, Work Plan
- Updated definitions: Configuration Management Terms, Traceability Matrix

Add Service System Transition Process Area

- i.e. Change Management
- Concept borrowed from CMMI-SVC
- Users often experience significant change in SAP installations
- New Policy and Procedures written

Configuration Management Policy & Procedures

- CCB operates differently
- COTS Issue Management process needs standardization
- Audit processes are slightly different

Tailor Armament SEC Policies and Procedures for COTS Implementation

Translate SAP terms in the glossary

Update CM policy, including: versioning product delivery

Armament SEC Organizational Processes

POLICIES (All Currently Common)

File Name	Title	Status
CMMI-Dev v1.2 Common Policies Trace Matrix.xls	CMMI-Dev v1.2 Common Policies Trace Matrix	Approved
Common Policy Glossary - 11 Mar 08.doc	Common Policy Glossary, 11 Mar 08	Approved
Policy AM-05 - 11 Mar 08.doc	Policy AM-05, Acquisition Management	Approved
Policy CM-05 - 30 Dec 2005.doc	Policy CM-05, Configuration Management	Approved
Policy DI-03 - 11 Mar 08.doc	Policy DI-03, Development and Integration	Approved
Policy OPM-05 - 11 Mar 08.doc	Policy OPM-05, Organizational Process Management	Approved
Policy PA-06 - 11 Mar 08.doc	Policy PA-06, Process Assurance	Approved
Policy PE-05 - 11 Mar 08.doc	Policy PE-05, Product Evaluation	Approved
Policy PFM-04 - 11 Mar 08.doc	Policy PFM-04, Performance Management	Approved
Policy PM-06 - 11 Mar 08.doc	Policy PM-06, Project Management	Approved
Policy RM-05 - 11 Mar 08.doc	Policy RM-05, Requirements Management	Approved
Policy SR-05 - 11 Mar 08.doc	Policy SR-05, Status Review	Approved

Policy SST-01 – 25 Sep 09.doc **Policy SST-01, Service System Transition**

Add new policy for Change Mgmt

All CM procedures tailored

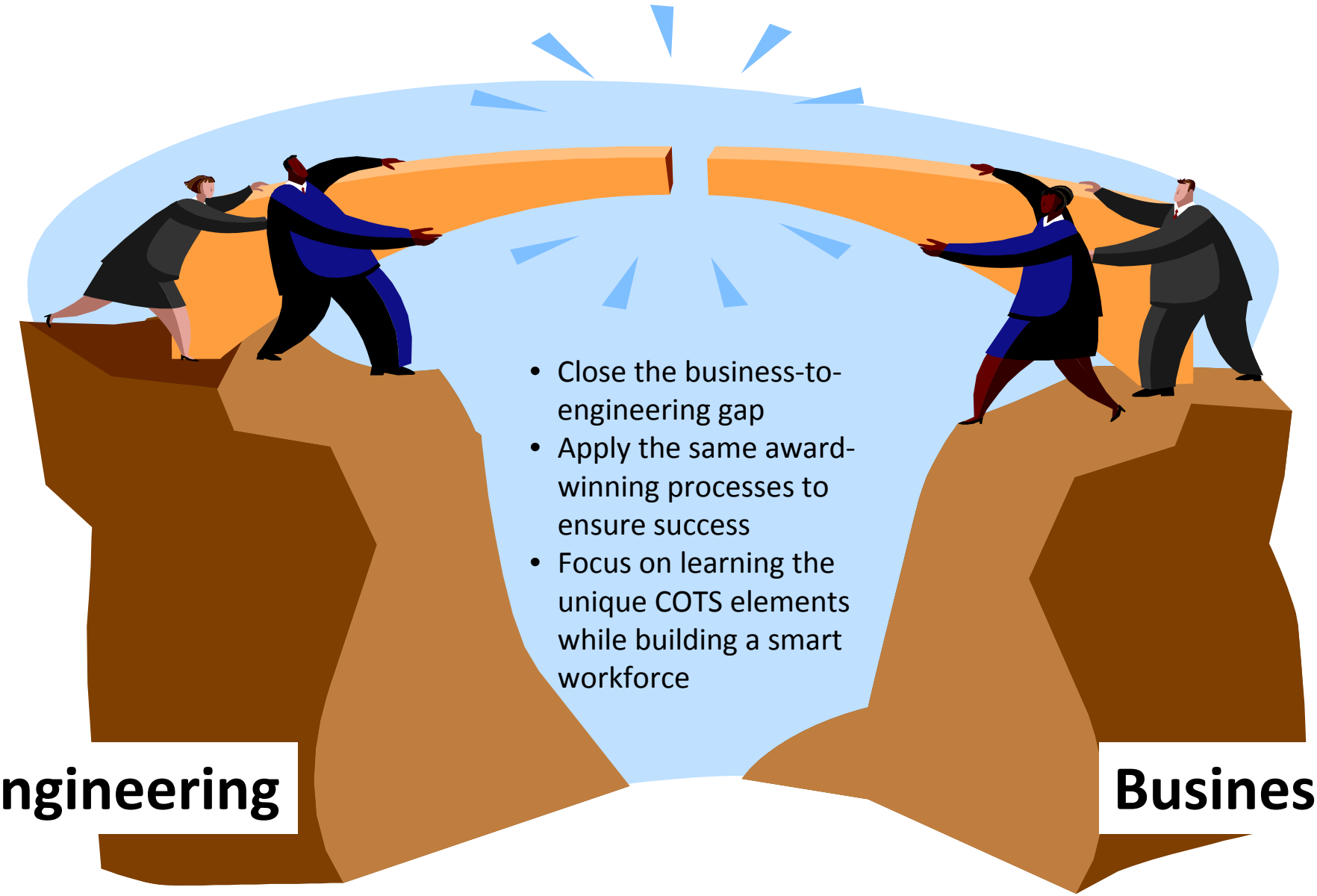
Procedures: Organizational Level

File Name	Title	Status
CP001 Organiz Process Mgmt - 11 Mar 2008.doc	CP001 Organiz Process Mgmt - 11 Mar 2008	Approved
CP002 Policy Dev - 11 Mar 08.doc	CP002 Policy Development - 11 Mar 08	Approved
CP003 Procedure Dev - 11 Mar 08.doc	CP003 Procedure Development - 11 Mar 08	Approved
CP004 Lifecycle Model Dev - 11 Mar 08.doc	CP004 Lifecycle Model Development - 11 Mar 08	Approved
CP005 Lessons Learned - 11 Mar 08.doc	CP005 Lessons Learned - 11 Mar 08	Approved
CP006 Organiz & Project Training - 11 Mar 08.doc	CP006 Org & Project Training - 11 Mar 08	Approved
CP007 Acquisition Management - 11 Mar 08.doc	CP007 Acquisition Management - 11 Mar 08	Approved
CP CM002 Change Requests Problem Rpts - 30 Dec 05.doc	CP-CM002, Change Requests Problem Rpts	Approved
CP-CM003 Processing Baseline Changes -07 April 09.doc	CP-CM003 Processing Baseline Changes -07 April 09	Approved
CP-CM004 Creating & Releasing Products - 07 April 09.doc	CP-CM004 Creating & Releasing Products - 07 April 09	Approved
CP-CM006 Conducting FCA PCA - 07 April 09.doc	CP-CM006 Conducting FCA PCA - 07 April 09	Approved
CP-PA001 Auditing Projects Reporting Results - 11 Mar 08.doc	CP-PA001 Auditing Projects Reporting Results - 11 Mar 08	Approved
CP-CM001 Managing Software CCB Activities - 07 April 09.doc	Managing Software CCB Activities - 07 April 09	Approved

Add new procedure for Change Mgmt

CP008 Service System Transition – 25 Sep 2009.doc **CP008 Service System Transition – 25 Sep 2009.doc**

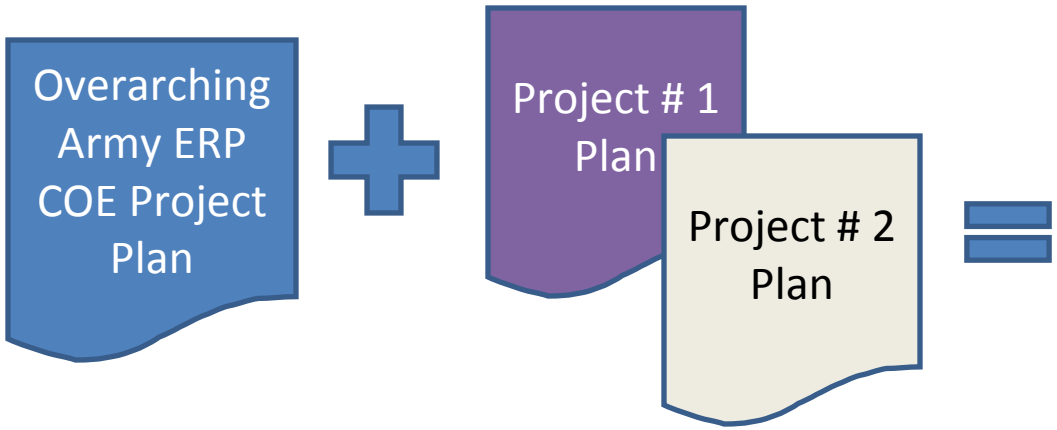
The Army ERP COE is bridging the gap



- Close the business-to-engineering gap
- Apply the same award-winning processes to ensure success
- Focus on learning the unique COTS elements while building a smart workforce

Backups

Overarching Project Plan Approach



Streamlined common processes

Deltas to the overarching Project Plan

- Streamlined processes followed for every project iteration
- More efficient use of Project Members' Time
- Simpler to review and manage
- Less chance of error and missed sections

This is a tried-and-true approach followed by multiple current Armament SEC projects

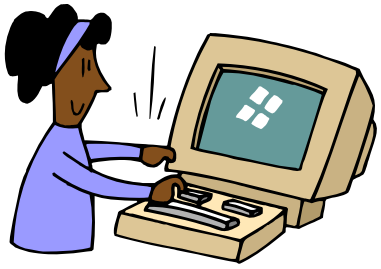
CMMI for Acquisition (CMMI-ACQ) Considerations

Acquisition of the core COTS product

- Continuous, indefinite partnership with software provider (SAP)
- Software development of the base product is managed by COTS company
- Insight into SAP software development practices is limited

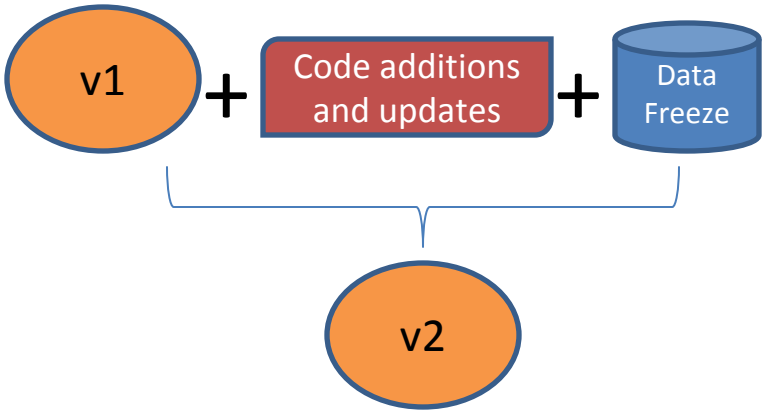
Acquisition of IT services specific to COTS development (SAP skills)

- Efforts towards an Organic base of skills start with a higher percentage of contractors
- Human Capital Plan goal is 70% government and 30% contractor COE resources thru hiring and conversion
- Best Practices from CMMI-ACQ will be referenced. These include managing supplier agreements, verifying and validating delivered solutions.

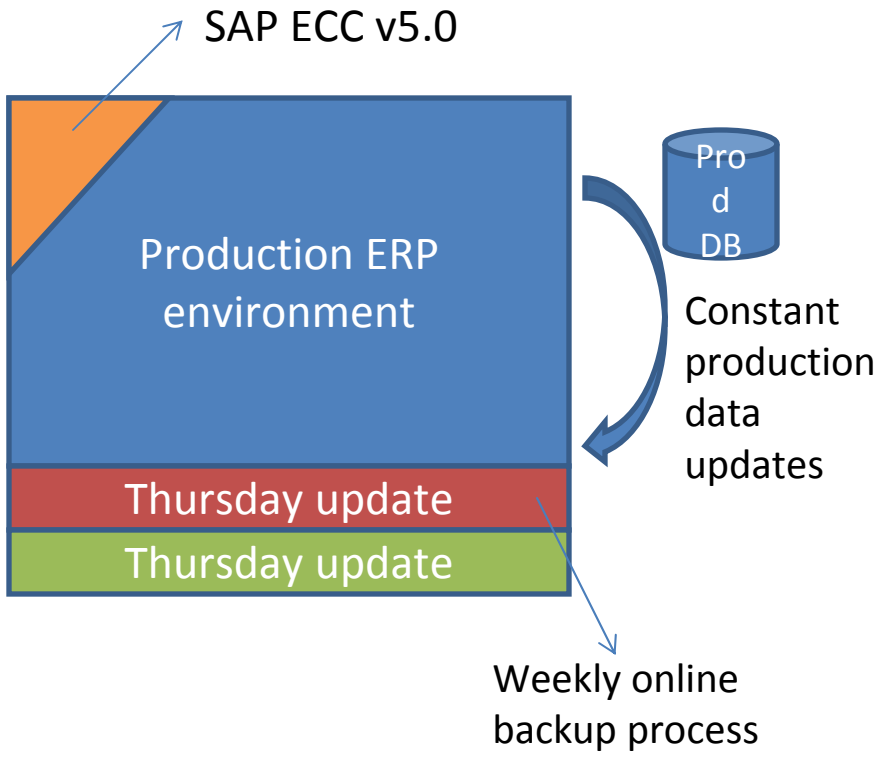


Configuration Management Tailoring: Versioning

Traditional Custom Development Versioning



COTS Versioning



Version numbers are assigned by the vendor to the out-of-the-box COTS product

Configuration Management Tailoring: Product Delivery

Traditional Software Delivery

Development Environment

CUSTOMER

Packaged software delivered "fielded" to customer. Installation required.

COTS Software Delivery

- Seamless updates to the user
- Training provided for user-impacting

The ERP organization owns the development as well as production environments

Lessons learned while tailoring

☑Translation guide of SAP terms, roles and activities helped us all speak the same 'language'

☑Crosswalk of available CMMI models showed us that although this is a service-provider system with some acquisition pieces, it is also a complex development effort that will benefit most from CMMI-DEV

☑Configuration Management practices – versioning, delivery of the product and the communication to the customer - follow a completely different path than most ASEC projects. We've tailored the policy and procedures accordingly.

☑Large system integration efforts such as an ERP have huge user impacts. The Service System Transition (Change Management) process area from CMMI-SVC addresses these.

☑COE and ASEC have a mutually beneficial relationship: COE utilizes CMMI-Level 5 developed practices and ASEC expands their policies, procedures and examples to include COTS systems

☑An overarching Project Plan approach, with smaller plans for each project iteration, suits the COE ERP effort best. It embeds streamlined processes that line up with the goal of integration of multiple systems

☑We see a great opportunity for use of CMMI in a COTS product and will share our best practices with the SEI.

☑A big hurdle in our understanding of COTS development efforts is that a developer "configures" the software as opposed to traditional "coding" in software development