

Lessons Learned on the way to Level 3

If we knew then what we know now...

The process improvement journey of
ARA's Southeast Division (SED)

NDIA 8th Annual CMMI[®] Technology Conference and User Group
November 17 – 20, 2008

- 
- Dave Groening *ARA SED QA & Process Improvement Lead*
 - Beth Layman *Principal, Layman & Layman*
 - Allen York *ARA SED Division Manager*





About ARA and Southeast Division

- ➔ An engineering and science services company with distributed offices
- ➔ Diverse DoD and Federal contractor
- ➔ 1,200+ employee owners
- ➔ FY 08 Sales of ~\$200 million

Division & Satellite Offices





ARA Southeast Division

- HQ in Raleigh, NC
- Sales of approx \$23M in FY08
- Mix of MS and PhD-level engineers/scientists and senior-level software system developers
- Areas of Expertise
 - Large-scale software system development
 - High-fidelity and fast-running physics-based weapon-target interaction modeling
 - Sensor exploitation & target recognition technologies
 - Synthetic environment generation for semi-automated forces and visual simulators
 - Conventional and nuclear (low and high altitude) weapon effects
 - Rapid site/facility modeling tools
 - C4ISR and decision support technologies
 - Counter-IED technologies





Our Customers Include



DTRA
DEFENSE THREAT REDUCTION AGENCY



MDA



TSWG



JTCG



AFRL



RDECOM



DIA



JIEDDO



PMS 408



PEO STRI



STRATCOM



ERDC
Engineer Research and Development Center



ProLogic
Incorporated





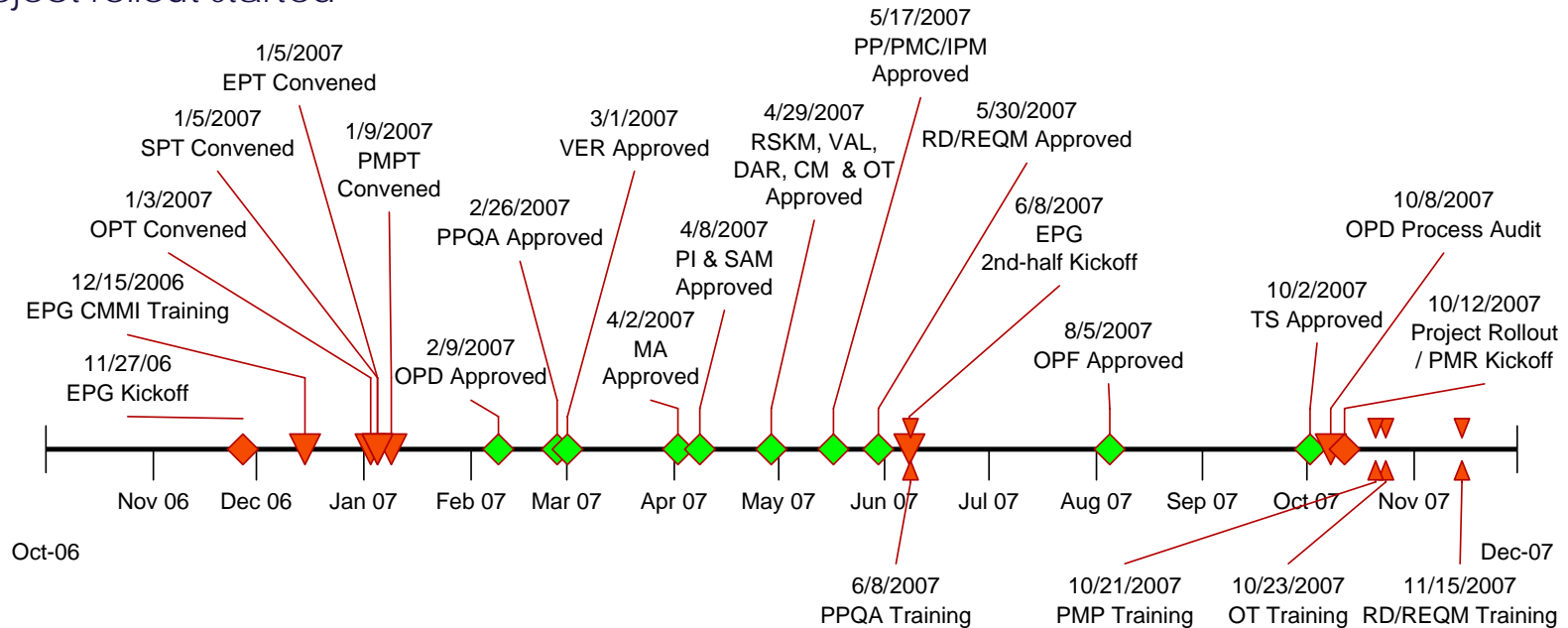
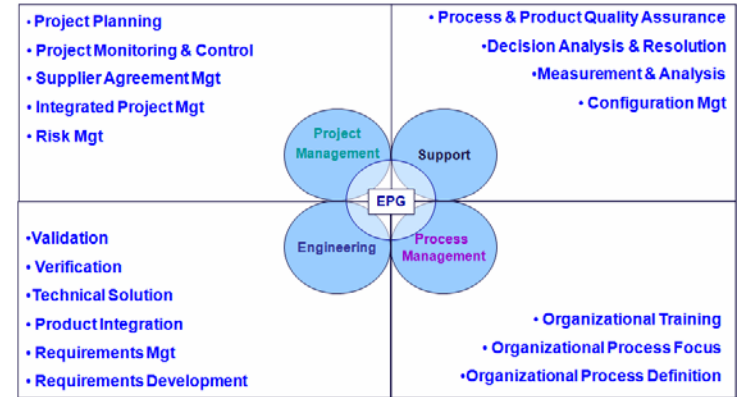
Our Process Improvement History

FY06:

- Additional CMMI training
- Creation of Process Asset Library (PAL)
- SCAMPI Class C Document Review

FY07:

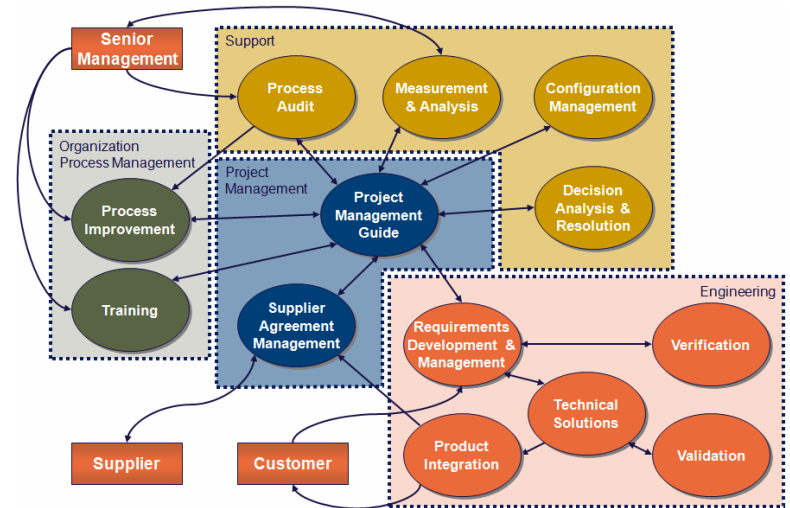
- EPG reviewed & approved processes
- Produced & began delivering process training
- Project rollout started





Process Improvement FY08

- ➔ October – December
 - ➔ Process training (PAL 1.0)
- ➔ January - February
 - ➔ Contracted with Layman & Layman
 - ➔ SCAMPI Class C
 - ➔ Revised FY08 Process Improvement plan
 - ➔ New PI organizational structure
- ➔ March – May
 - ➔ PAL 1.1 process revision
 - ➔ 5 working groups (PATs)
 - ➔ More unified, detailed and prescriptive set of processes - Easier to use
 - ➔ Overview sessions for all staff



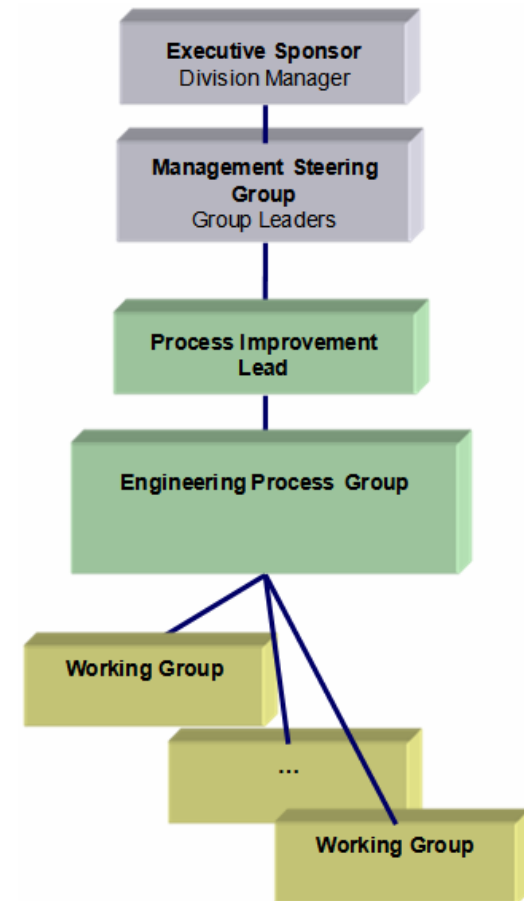
- ➔ June – August
 - ➔ New EPG
 - ➔ PI Plan update
 - ➔ Project transition workshops
 - ➔ Role-based training
 - ➔ PAL 1.1 process audits
- ➔ September
 - ➔ SCAMPI B





Establish an effective Process Improvement organization

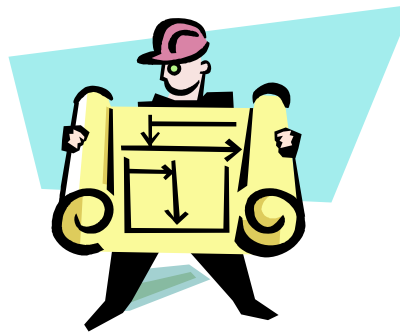
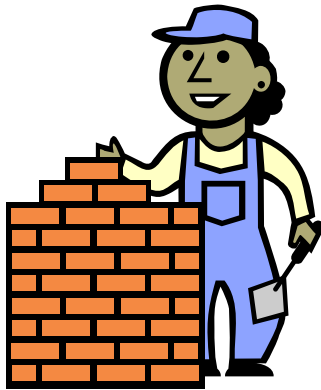
- ➔ Dedicate at least some of the resources
- ➔ Define Management's role and keep them engaged
- ➔ Gaining buy-in across the organization is critical
- ➔ Run process improvement like a project
- ➔ Consider using a consultant





On PI = Organizational Change

- ➔ Process definition is easy, process deployment and institutionalization is hard!
 - ➔ Lesson Learned: Don't spend all your energy on task work



- ➔ The ARA team initially underestimated their role and the powerful dynamics of change
 - ➔ Org. change leadership is now practiced w/great results!





MSG Role in Process Improvement

➔ What are your main responsibilities?
(Hint: There are 4 of them)



1. DRIVE PI PLANS

- ➔ create vision and desire for change
- ➔ approve all PI strategies, plans, roadmaps
- ➔ ...including Measurement & Training Plan development and execution

2. COMMUNICATE regularly about PI program to your teams

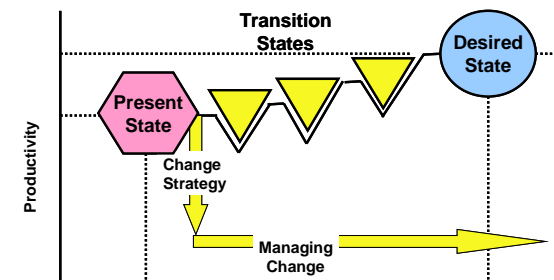
- ➔ tie business objectives of the organization to PI program
- ➔ review plans, scope, upcoming events, expectations

3. Provide CONSEQUENCES for “not doing” it

- ➔ ENFORCE compliance
- ➔ tie to CDP/annual reviews

4. MONITOR & CONTROL PI Program

- ➔ treat it like any other project
- ➔ remove roadblocks



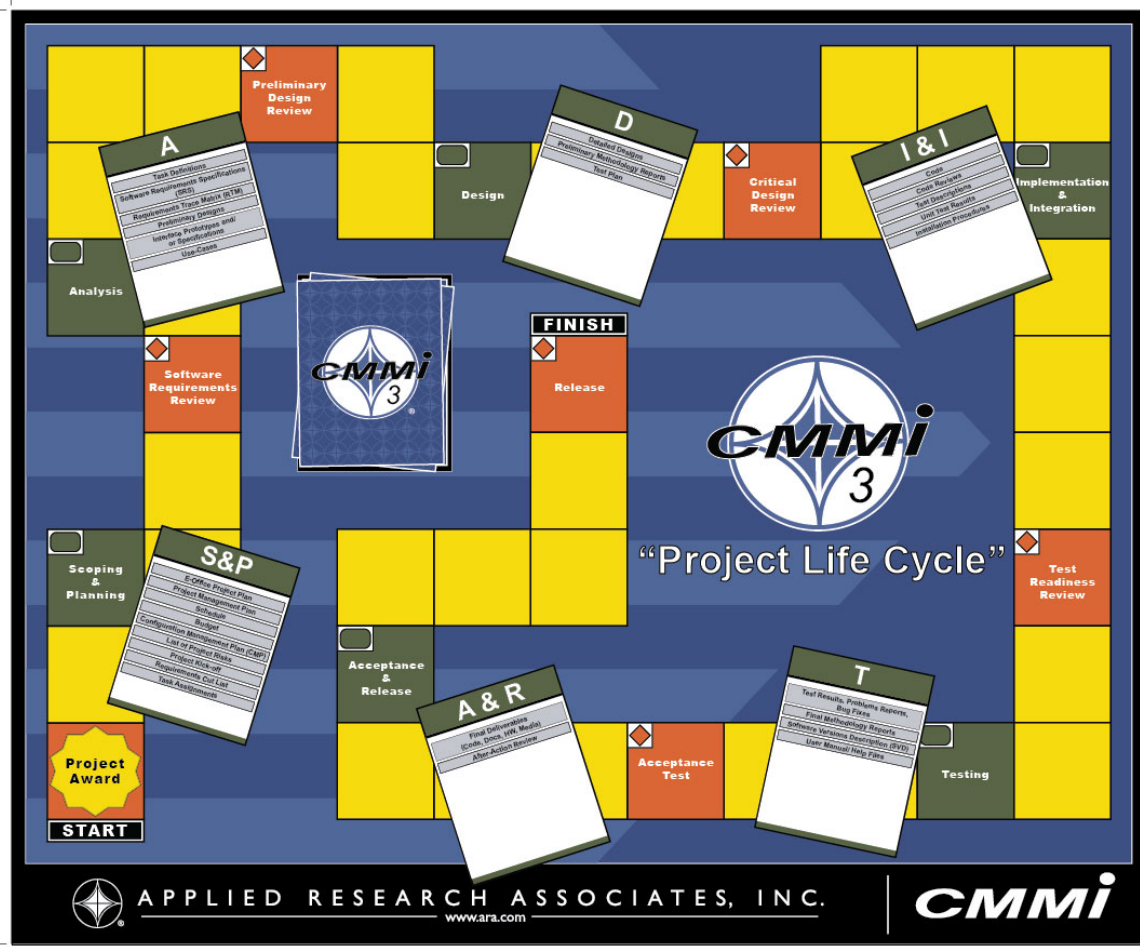


SED's Communication Plan

APPLIED RESEARCH ASSOCIATES, INC.

SED Comm R

consistency



qual' about what's expected

is (growth, larger projects)

more detailed

more prescriptive

easier to execute RSKM mgt example

PI mechanism PI suggestion flow

were doing about it





PI Program Funding

- ➔ Our ongoing software projects could not be burdened with our PI/CMMI start-up expenses – expenses not planned for the projects
 - ➔ We did not pursue asking the government to fund our PI program through existing software projects
- ➔ Funding is a critical constraint because
 - ➔ SED is essentially a small business
 - ➔ Received little corporate support
 - ➔ Cannot use “profit” - must fund within our cost structure
 - ➔ Required an Internal Research and Development (IR&D) effort
 - ➔ IR&D funds are limited and are shared with costs to prepare proposals → *trading PI for business* up front





Funding Strategy

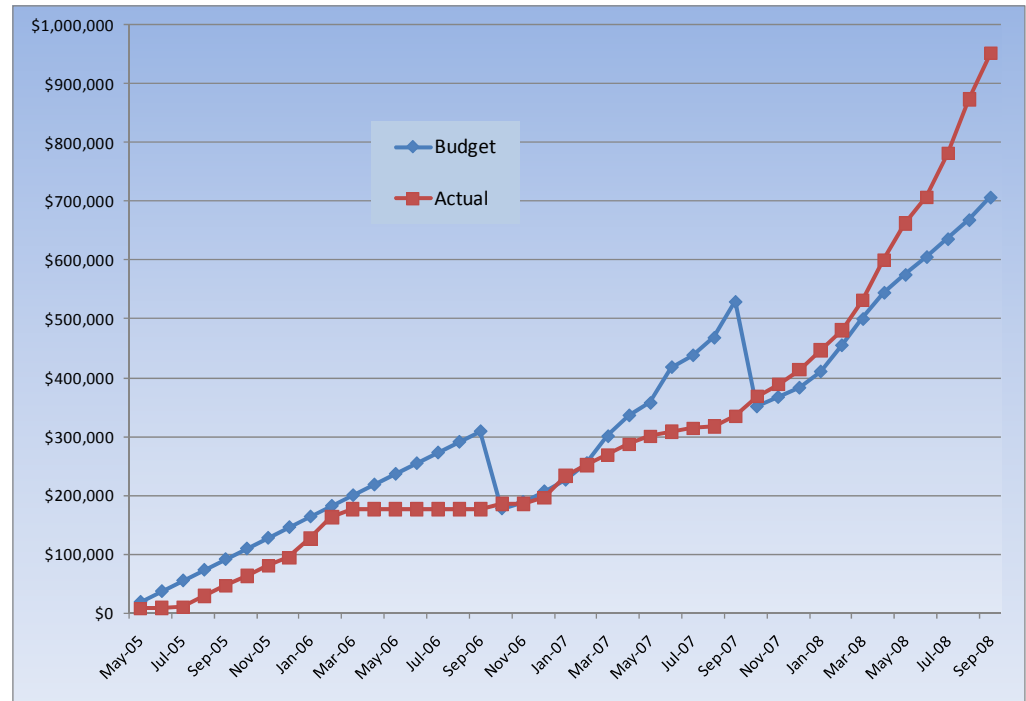
- ➔ Took out a multi-year IR&D
 - ➔ Had to be approved by CEO
- ➔ IR&D covered expenses for
 - ➔ Creating PAL, processes, templates, forms, plans
 - ➔ PIL, SCAMPs and appraisal team, consultant
- ➔ Projects covered expenses for
 - ➔ Adopting processes – process training
 - ➔ Creating artifacts
 - ➔ Molding contractual documents to fit PI/CMMI standards
 - ➔ Process audits





How much did it cost?

- ➔ Over \$1M !
 - ➔ Over 3 years
- ➔ We have tracked about \$950k through IR&D project
- ➔ Estimate some IR&D expenses went on overhead and some went on "personal" time
- ➔ By far, the longest and most expensive IR&D in corporate history

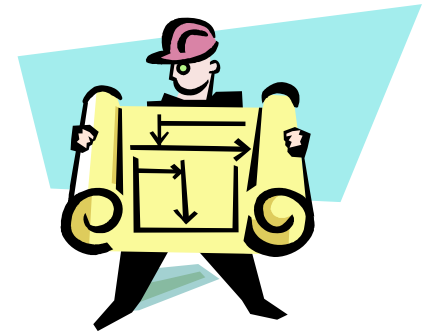




On Good Process Architecture

Lessons Learned:

- The model's just a model
- Terminology does matter
- Avoid process silos – what's needed is a cohesive set of processes
- Prescriptivism is better than vagaries
- Allow legacy variances (but not for preferences)
- Connect processes and training through roles
- Integrate process and measurement
- Ease the implementation burden with simple tools





Specific Process Areas

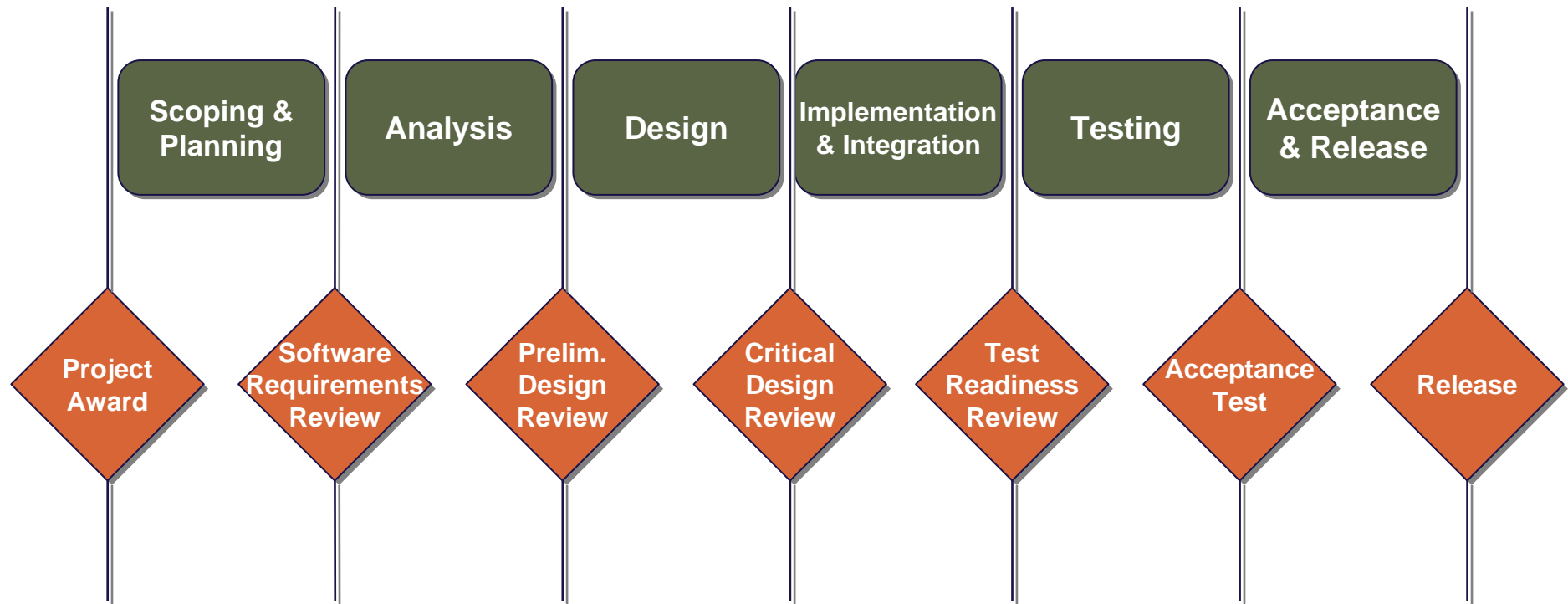
- ➔ Project Management
 - ➔ tying everything together with a lifecycle model
- ➔ Measurement & Analysis
 - ➔ the benefits of using a measurement information model
- ➔ Organizational Training
 - ➔ linking training with strategic planning and performance management
- ➔ Process & Product Quality Assurance
 - ➔ monitor process improvement progress





Project Management

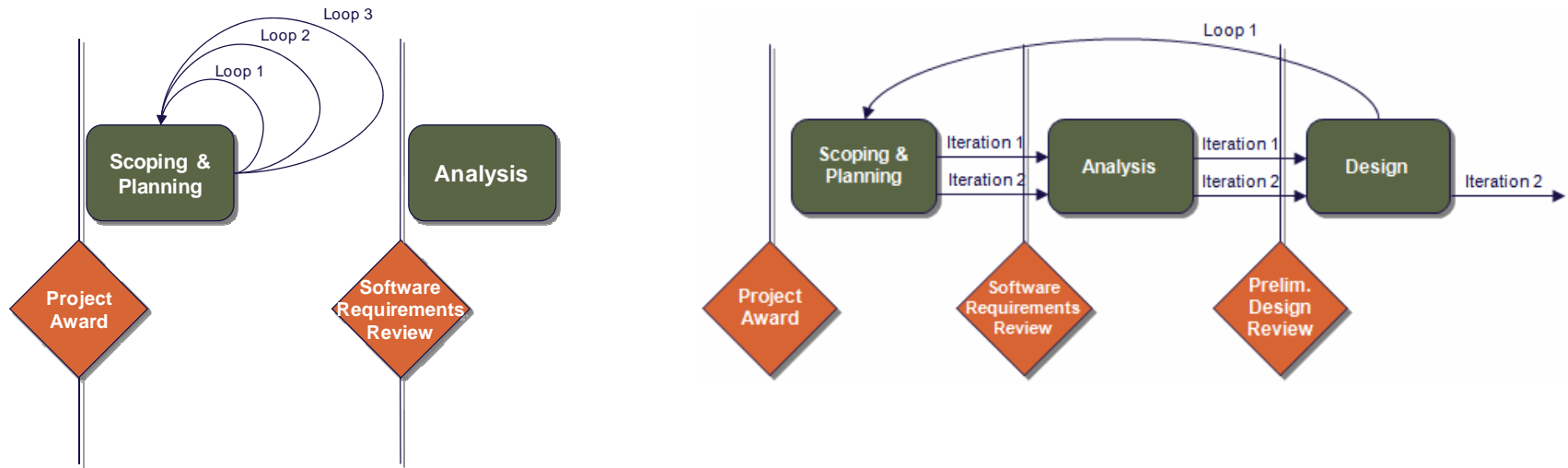
tying everything together with a lifecycle model





Project Management

tying everything together with a lifecycle model



Product Version 1.0



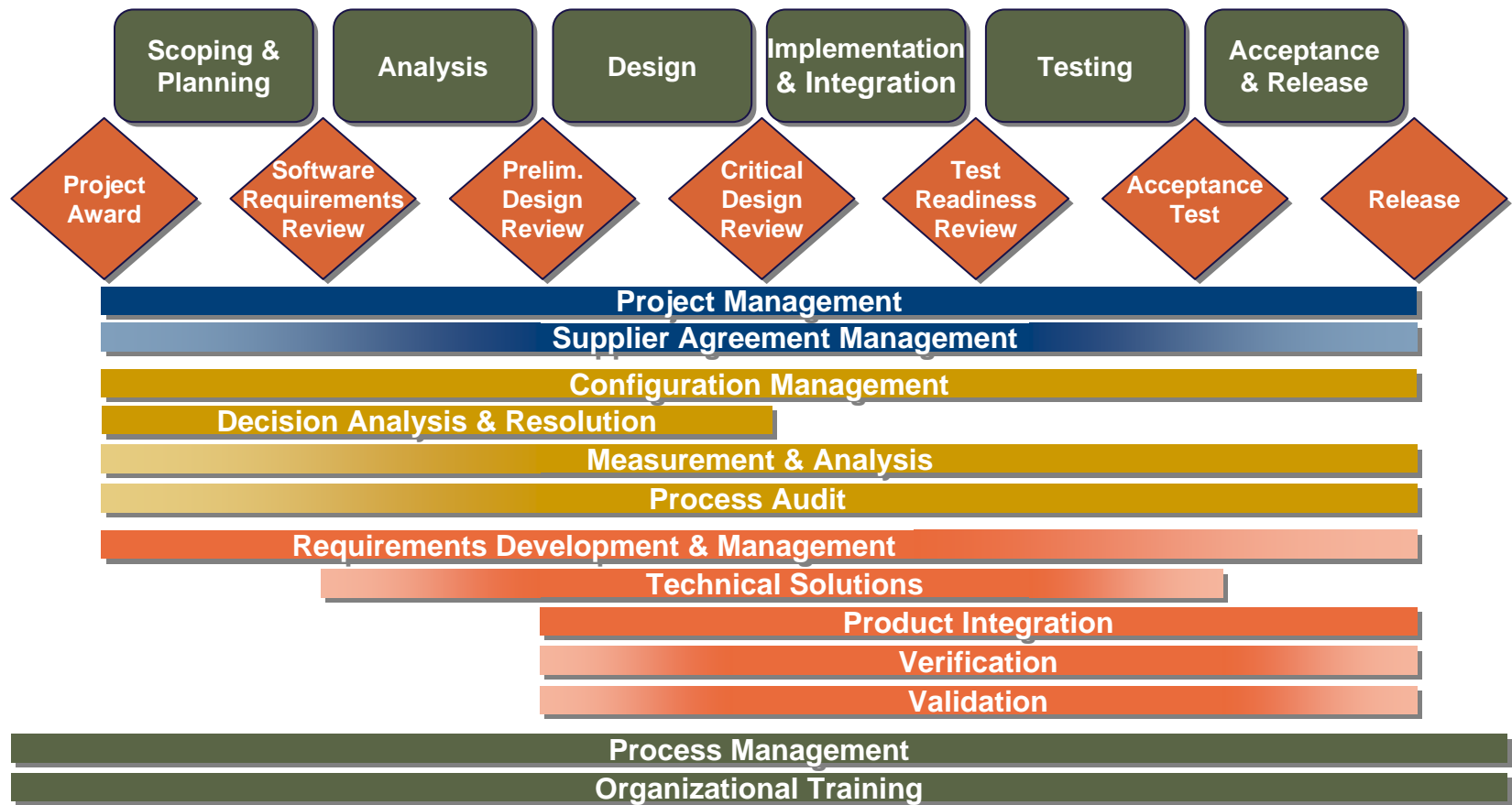
Product Version 1.5





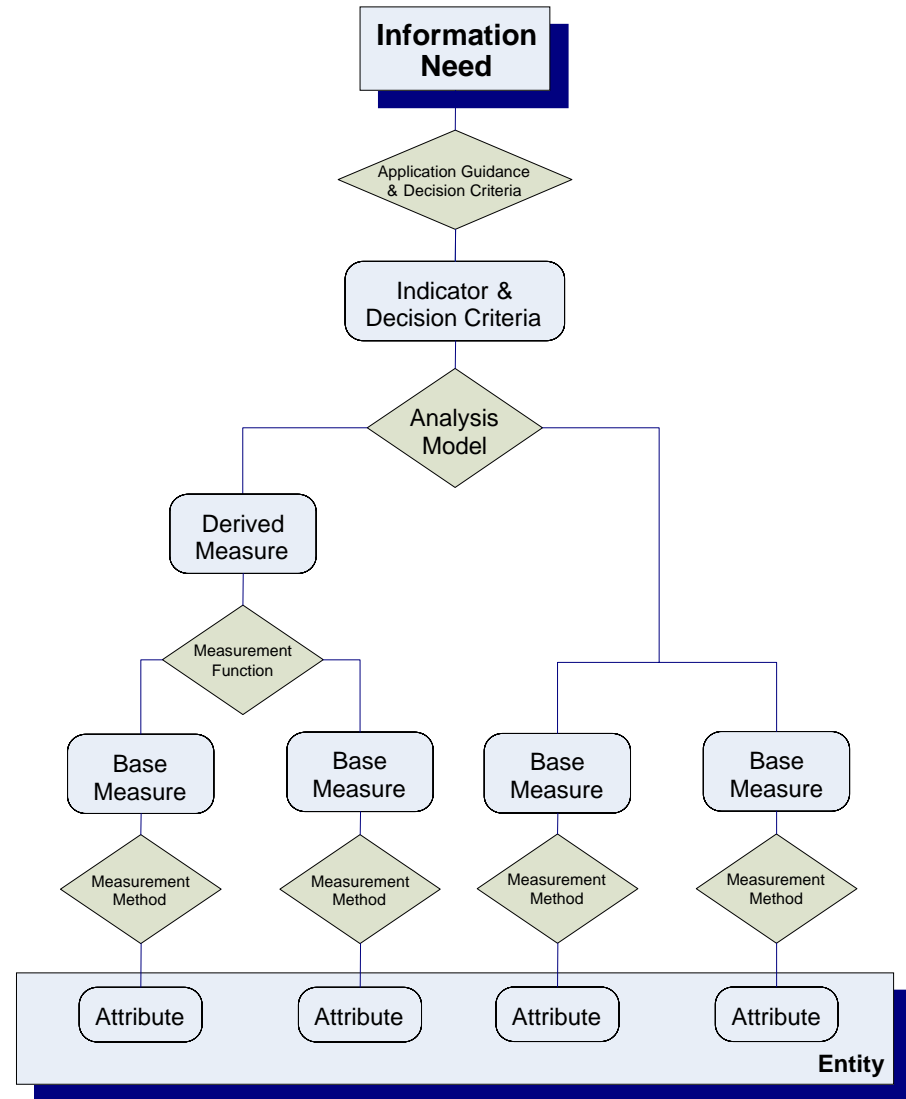
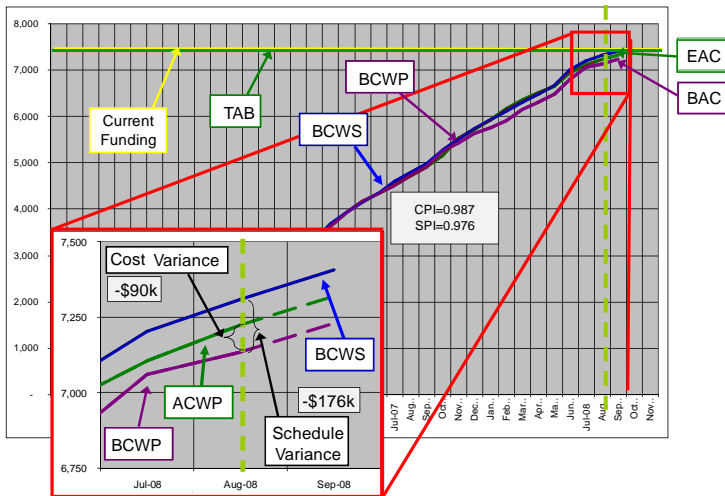
Project Management

tying everything together with a lifecycle model



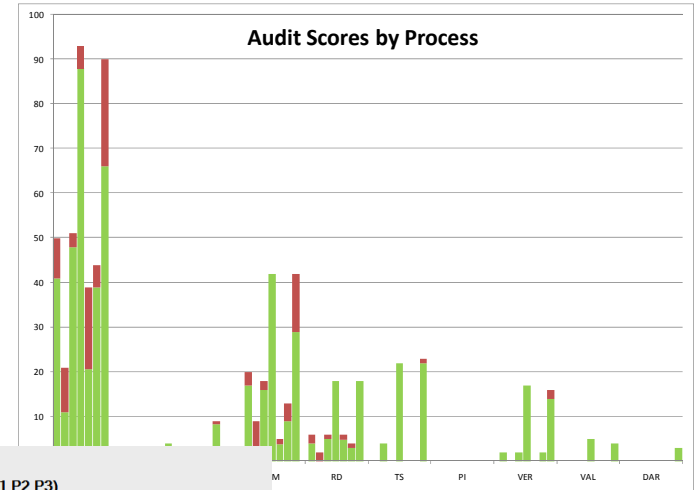
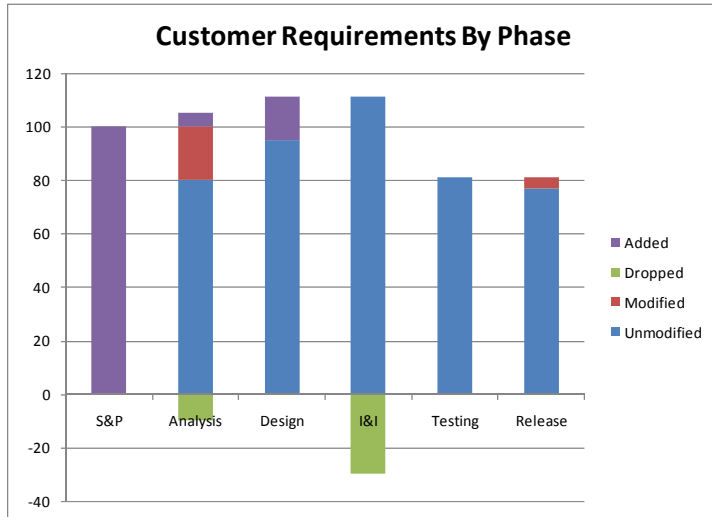


SED Measurement Information Model

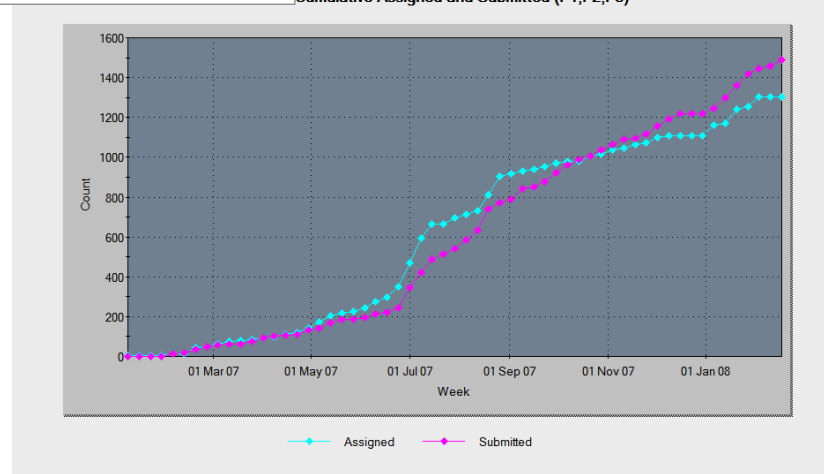




Project Measures

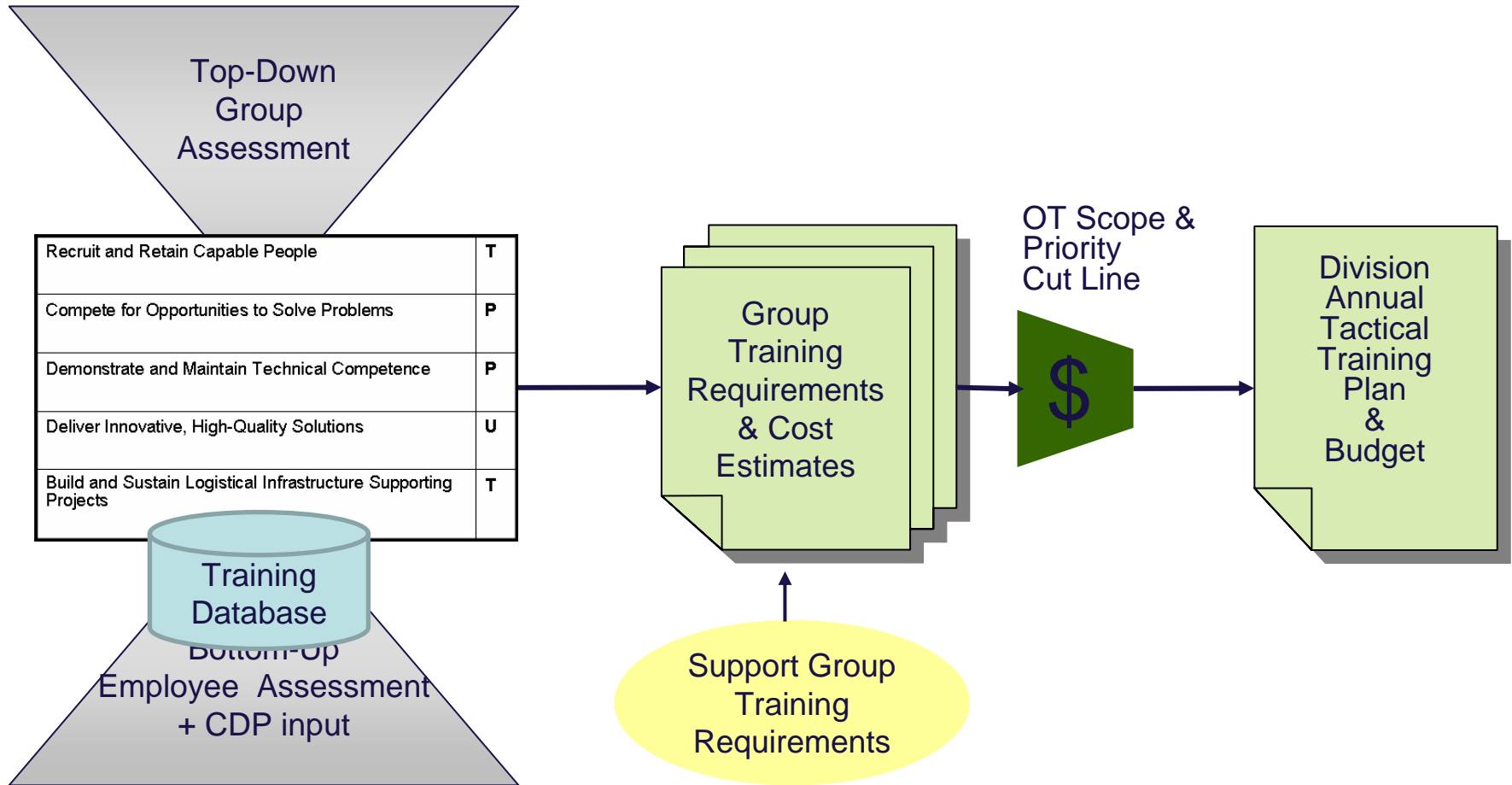


Cumulative Assigned and Submitted (P1,P2,P3)



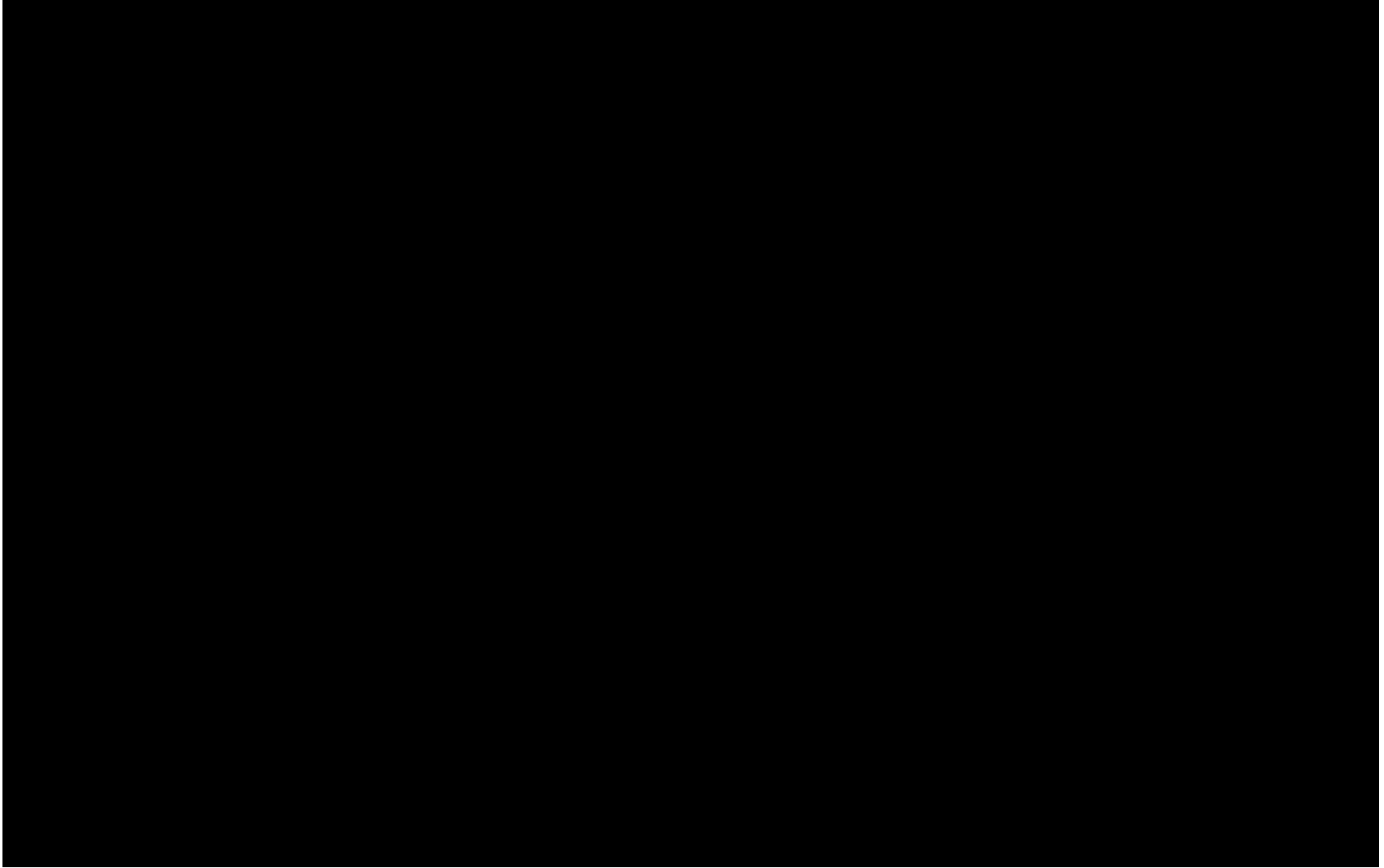


Training linked to strategic planning & performance management





Process Audits throughout Project Life-Cycle





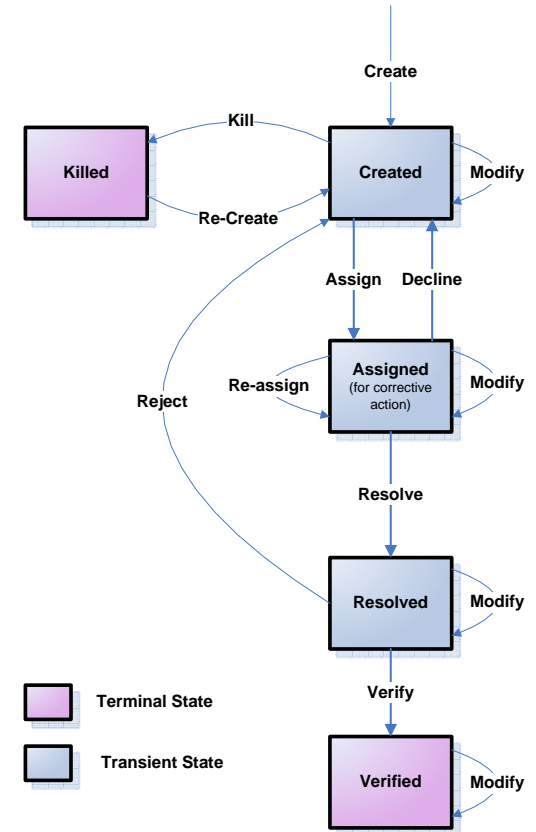
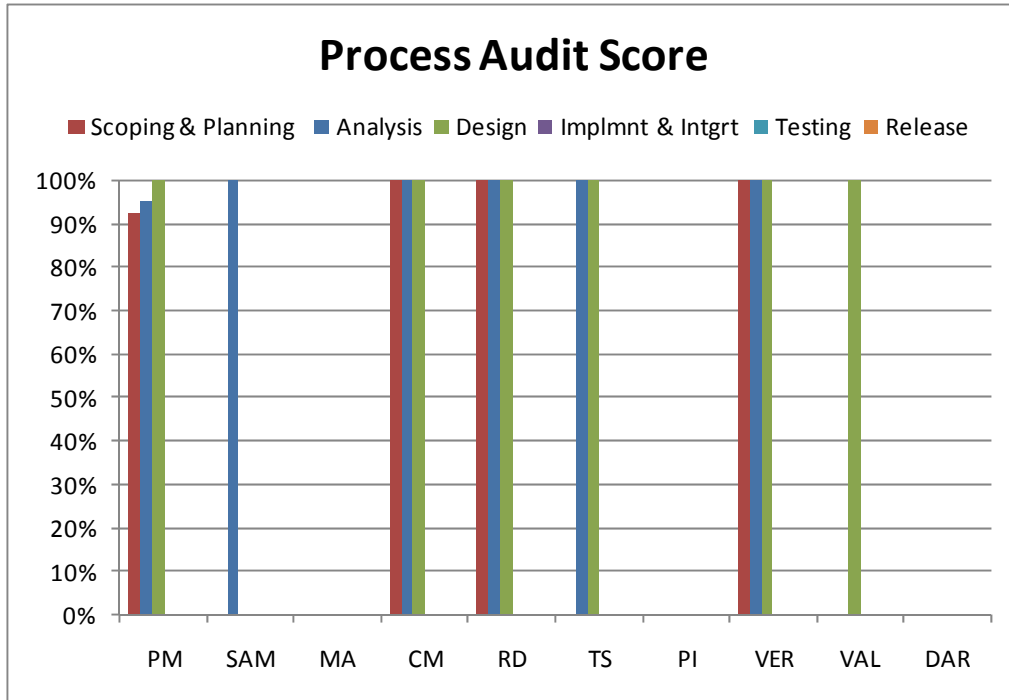
Process Audits throughout Project Life-Cycle

Process Area	Checklist	Meets Req'mts
PM	Project Management Plan:	
PM	PMP is under revision control	Yes
PM	PMP is peer reviewed and updated	Yes
PM	Estimation Spreadsheet created (per task)	Yes
PM	Project Schedule:	
PM	Work Breakdown Structure updated and reviewed	Yes
PM	Schedule is reviewed monthly and updated	Yes
PM	Schedule is under revision control	Yes
PM	Project Budget:	
PM	Work Breakdown Structure updated and reviewed	Yes
PM	Budget is reviewed monthly and updated	Yes
PM	Budget is under revision control	Yes
PM	Project Risk Spreadsheet:	
PM	List of Project Risks updated	Yes
PM	Priority Rankings updated	Yes
PM	List of Project Risks under revision control	Yes
PM	Risk Information Sheet updated	Yes
PM	Risk Mitigation Plan updated	No
PM	Risk status reviewed and updated	Yes
PM	Tasking Spreadsheet under revision control	Yes
PM	Project Reviews (IPRs) conducted:	
SAM	Project Acquisition List included in PMP (if applicable)	Yes
SAM	Acquisition List reviewed at least monthly	Yes
SAM	If this is a COTS product, a PO or supplier agreement/contract must be included	Yes
SAM	If this is a consulting service, project should have an approved Agreement for Consulting Services	N/A
SAM	If this is a subcontracting product:	
RD	Accepted Customer Requirements and Software Requirements added to RequisitePro	Yes
RD	Software Requirements Specification generated	Yes
RD	SRS under revision control	Yes
RD	SRS peer reviewed	Yes
RD	Interface Requirements added to RequisitePro	Yes
RD	Customer commitment at milestone (meeting minutes)	Yes
RD	Customer commitments are under version control	Yes





Process Audits throughout Project Life-Cycle



Process Anomaly (PA) state transition diagram





Summary of Lessons Learned

- ➔ Establish organizational infrastructure with adequate resources
- ➔ Don't overlook organizational change aspect (writing processes is the easy part)
- ➔ Overall process design/architecture is important
- ➔ Managing process improvement project is critical

If we had known these things at the outset, it would have taken less time and less money to achieve Maturity Level 3





Thank You – Questions?

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