Process Improvement - *Real Life Cases*

Quality Assurance Institute Worldwide
Quality Engineered Software and Testing Conference [QUEST]
April 24, 2009 11am

By Barbara Ainsworth PMP, CSQA, CSTE, ITIL Service Mgmt.
Process Plus International, LLC
Phone: 618.749.2080 Cell: 314.605.6888 Email: ainsworth@papadocs.com

Introduction

No matter the end product, the foundation for and focus on implementing process improvement remains consistent. Using models as the basis for improving processes makes success more likely; however, no single model has all the right answers.

The *Real Life Cases* in this presentation are from companies where the process improvement goals focus on "increase efficiency and quality"; where various approaches, implementations, and models/frameworks were used.

Examples and Lessons Learned are shared to provide insight.

Terms & Premise

Process Improvement: An effort to improve the processes used in an organization to accomplish its business

Model [Framework]: Structured collection of elements that describe characteristics of effective processes

Model-Based Process Improvement: A process improvement effort that uses a model to appraise the quality of its current processes, identify and prioritize needed changes, and guide its improvement activities

Process Management Premise: The quality of a system is highly influenced by the quality of the process used to acquire, develop and maintain it. This premise implies a focus on processes as well as on products.

Why Use Models?

IMPROVE THE BOTTOM LINE !

- Business objectives are traceable to deliverables
- Internal operational efficiency; lower costs; less rework
- Metrics indicate bottom line impact
- Greater customer retention and satisfaction, increased market share, and improved profitability
  - Evidence suggests a long-term link between the use of models and improved business performance, growth, and prosperity in the world marketplace
- Some models are a means to earn certifications or awards
  - Business contracts may require certifications based on models
  - Some organizations use resultant certifications/awards as marketing tools

Why Use Models? (Contd.)

- Provide answers to important questions related to organization's current maturity
- Assess maturity of entire or specific parts of the organization; identify strengths & areas for improvement
- Promote organizational maturity awareness among senior management
- Attribute organizational success to process management
- Better employee relations, higher productivity
- Manage development, acquisition, and contractors/outsourcing processes
- Cohesive, comprehensive approach to guiding individuals, managing projects and achieving organizational strategies

PROCESS IMPROVEMENT REQUIRES FRAMEWORKS [Models] !

About Models

- Numerous models from various organizations
- Membership and/or Public Information
- Some models are related; some content “matches”, overlaps, and/or links
- Models provide starting place, benefit of experiences, common language/shared vision, framework for prioritizing actions, guide to define “improvement”
- Support measurement; framework for assessment
- Accepted widely across the US and around the world
- Models improve over time

About Models (Contd.)

Risks

- No silver bullet. *"All models are wrong; some are useful" - George Box*
- Need to expand the depth and breadth in order to implement successfully
  - Some provide high level guidelines - the "what"; others provide more details - the "how"
  - Still need to address crucial project success issues:
    - professional judgement; appropriate model interpretation
    - expertise in particular application domains;
    - determination of specific software technologies;
    - selection/hiring/motivating/and retaining competent people
- Some provide cross functional focus; others maintain stovepipes
- Need STRONG implementation management

About Models (Contd.)

Commonality

- Terminology can be industry common or model unique
- Process Focus:
  - 

  - Processes, procedures, practices, documentation, gates/status indicators, etc. [Required processes and content differ by model]
- Tools,Training,Support,Assessments,Metrics, Continuous Improvement
- Improved over time
- Many references, tools, and other guidance [interpreting, documenting, training, FAQs and answers, survival guides, business mapping techniques, support links, sample documentation, style guidelines, workbooks, etc.]
- Certified companies
- Compared to other models
- Can be successfully used; or disastrous

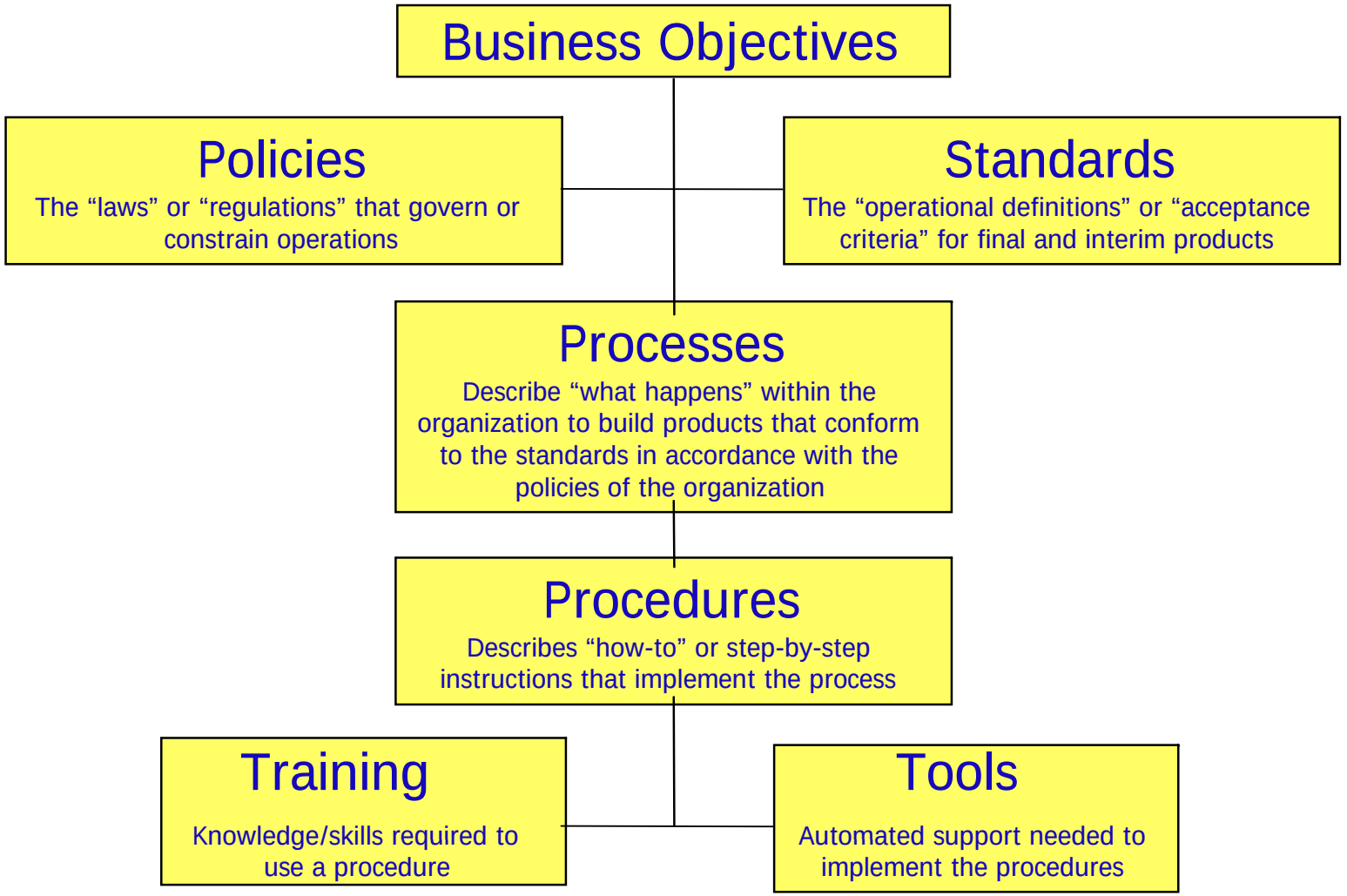
Real Life Cases: Summary

		#1	#2	#3	#4	#5
Used	SEI's *IDEAL*	Yes		Yes	Yes	
	SEI's Legacy SW_CMM	Yes		Yes	Yes	
	SEI's CMMi			Yes		Yes
	PMI's PMBOK	Yes		Yes	Yes	Yes
	Six Sigma	Yes		Yes		
	QAI's QACBOK and TQM		Yes			
	Enterprise PMO				Yes	
	Balanced Scorecard					Yes

Real Life Case #1:

		#1	#2	#3	#4	#5
Used	SEI's *IDEAL*	Yes		Yes	Yes	
	SEI's Legacy SW_CMM	Yes		Yes	Yes	
	SEI's CMMi			Yes		Yes
	PMI's PMBOK	Yes		Yes	Yes	Yes
	Six Sigma	Yes		Yes		
	QAI's QACBOK and TQM		Yes			
	Enterprise PMO				Yes	
	Balanced Scorecard					Yes

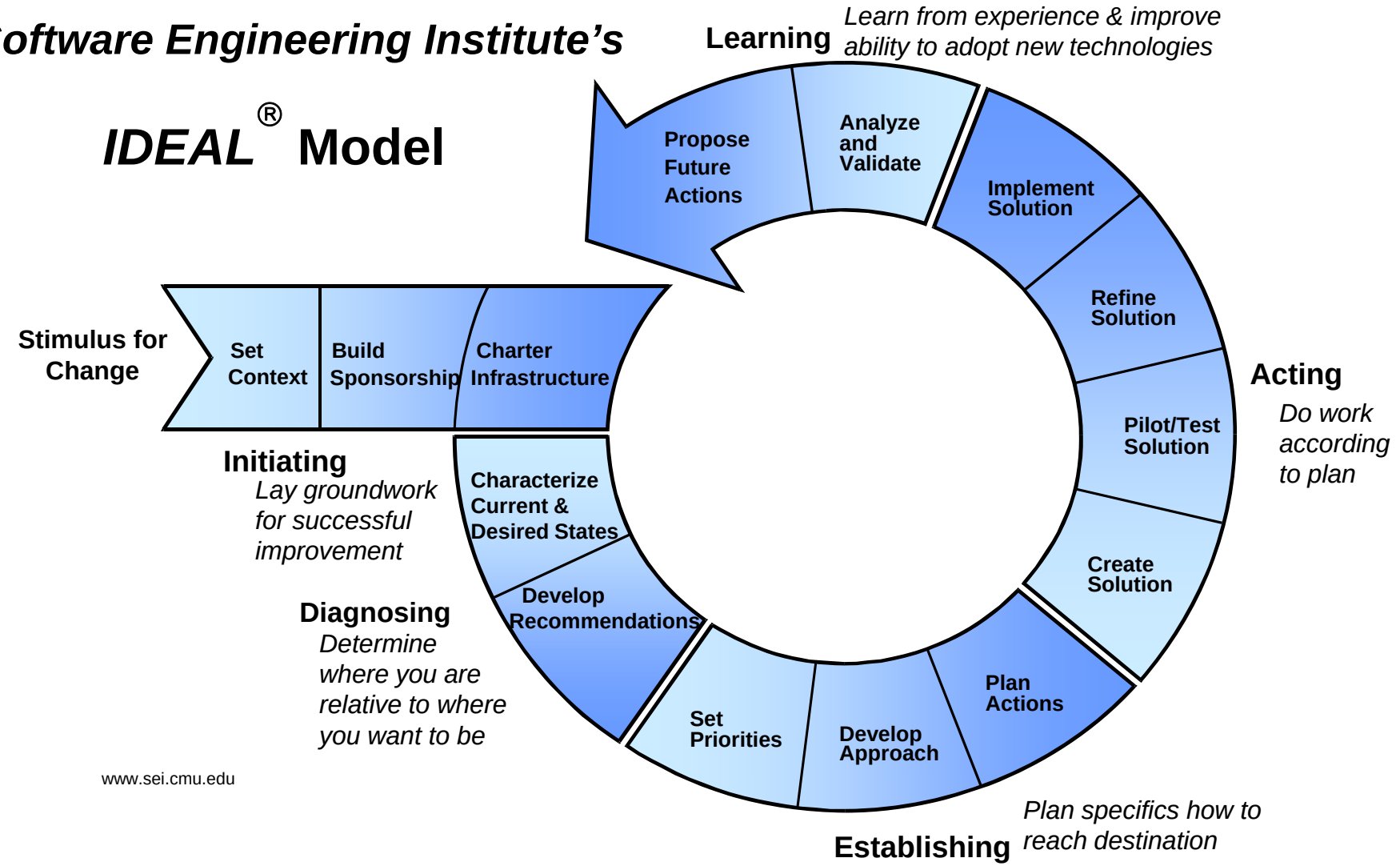
Case #1: Structure



Case #1: SEI *IDEAL*® Model

Software Engineering Institute's

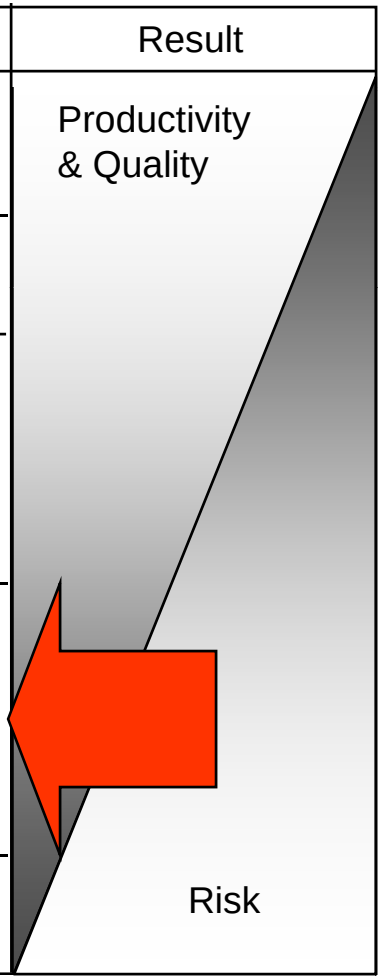
IDEAL® Model



Case #1: SEI SW_CMM®

SEI Software Capability Maturity Model v 1.1

Level	Focus	Key Process Areas
5 Optimizing	Continuous process improvement	Defect prevention Technology innovation Process change management
4 Managed	Product and process quality	Process measurement and analysis Quality management
3 Defined	Engineering processes & organization processes defined; Performance more predictable	Organization process focus Organization process defn. Peer reviews Training program Inter-group coordination Software product engineering Integrated software mgt.
2 Repeatable	Project management in place, individual performance repeatable	Requirements Mgt. Software Project planning Software Project Tracking & Oversight Software Quality Assurance Software Configuration Mgt. Software Subcontract Mgt. Software Test Mgt. [DRAFT]
1 Initial	Process informal and ad-hoc, unpredictable performance	



* sei.cmu.edu

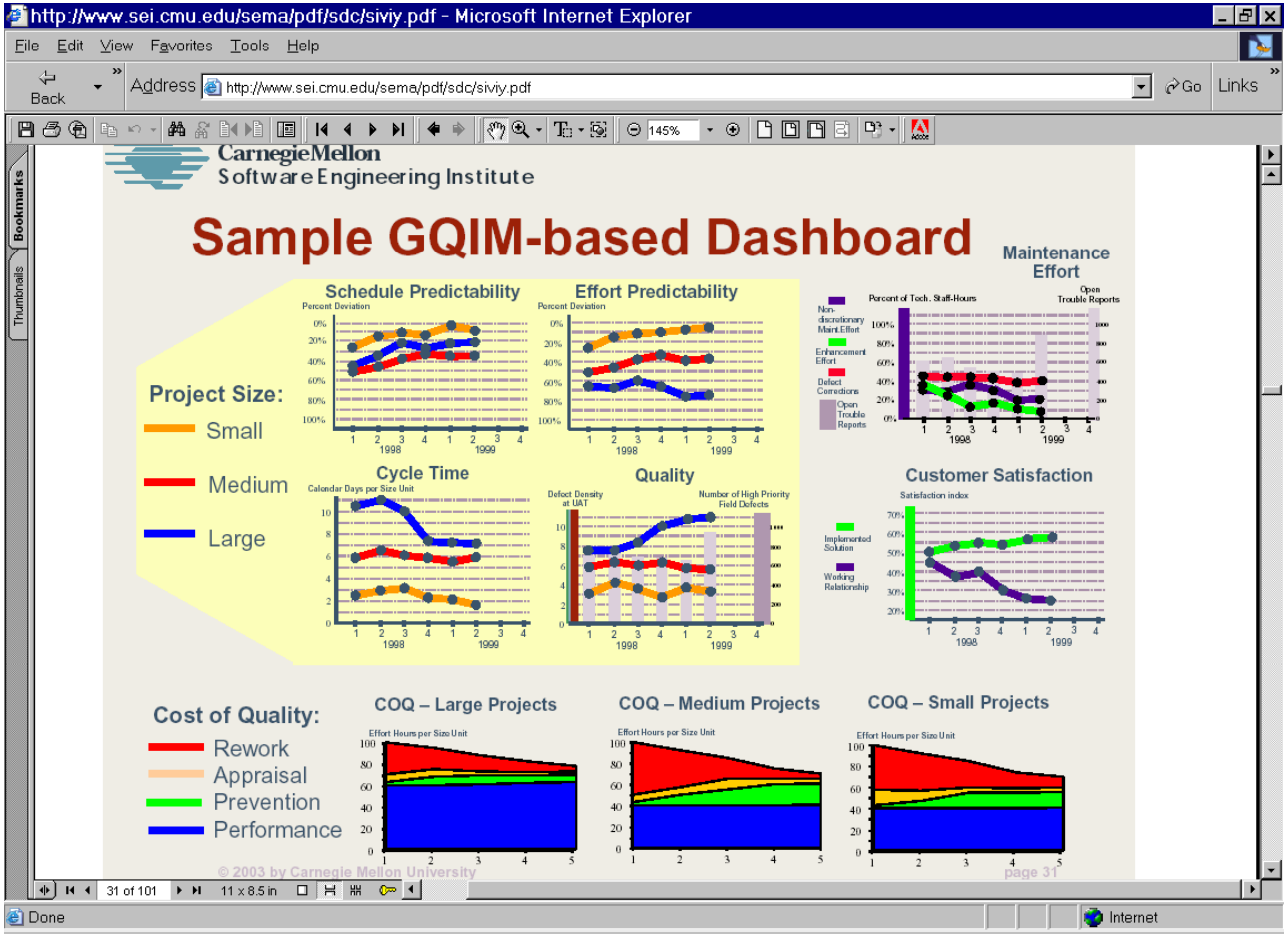
Case #1: PMI / SEI

PMI Knowledge Area	SW_CMM® Level 2 Key Process Area	SW_CMM® Level 3 Key Process Area
Integration Management	Project Planning, Project Tracking & Oversight	Intergroup Coordination
Scope Management	Requirements Mgmt.	
Time & Cost Mgmt	Project Planning & Project Tracking & Oversight	
Quality Mgmt	Software Quality Assurance	Peer Reviews
Human Resource Management		Training Program
Communications Management	Project Planning , Project Tracking & Oversight, Software Quality Assurance	Intergroup Coordination
Risk Mgmt	Project Planning, Project Tracking & Oversight	Integrated Software Management
Procurement Management	Subcontract Management	

Sample Model Comparison - Not intended to be comprehensive

Case #1: Six Sigma & CMMI

- **Use Six Sigma for CMMI PA *Measurement & Analysis***



Case #1: *IDEAL*®,SW_CMM®, PMI, Six Sigma

- Determine scope and appropriate CMM based process improvement focus for organization (Level 2 & 3)
- Establish and appropriately staff PI Group to focus on increasing efficiencies
- PI Group budget $2.5M [to ~5M for other groups across division]
- PI Initiative:
  - Utilized the SEI SW_CMM, PMI and QAI frameworks for support including Business Case; strategic long term and short term business goals; program plans; schedule, charter organizational structure, etc.
  - utilized baseline provided by third party SW_CMM assessment; identified areas for improvement; established corporate action plan; developed and implemented procurement management plan, statement of work; established and managed Program Schedule in Microsoft Project Software

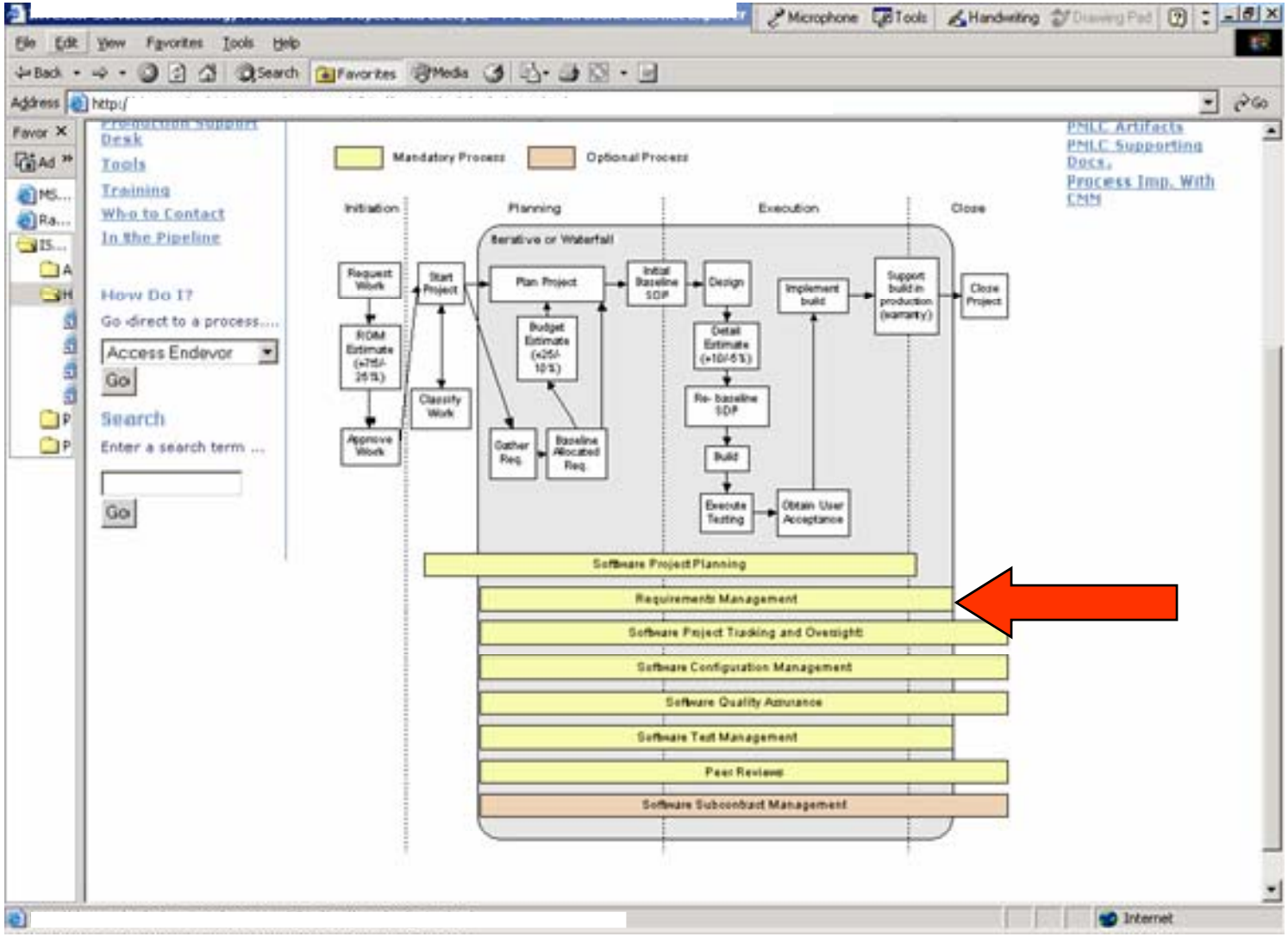
Case #1: *IDEAL*®,SW_CMM®,PMI,Six Sigma

- Developed and published policies based on SW_CMM Key Process Area “Goals” [met CMM “Commitment”], standards to support KPA “Ability to Perform” [met CMM “Abilities”], and core CMM compliant processes that met KPA “Activities to Perform”
- Created and deployed corporate communication plan including kick-off materials, presentations, internal newsletter articles, etc.
- Established and implemented Independent Quality Assurance Group to perform process compliance assessments and meet CMM’s “Verifying Implementation” requirements; assessment tool was developed and implemented.
- Created “core*” PI Group* charged with establishing and driving the *PI Initiative*; established the “extended” Process Group [SEPG] and enabled members to establish, implement, and deploy processes within each of their represented organizations

Case #1: *IDEAL*®,SW_CMM®,PMI,Six Sigma

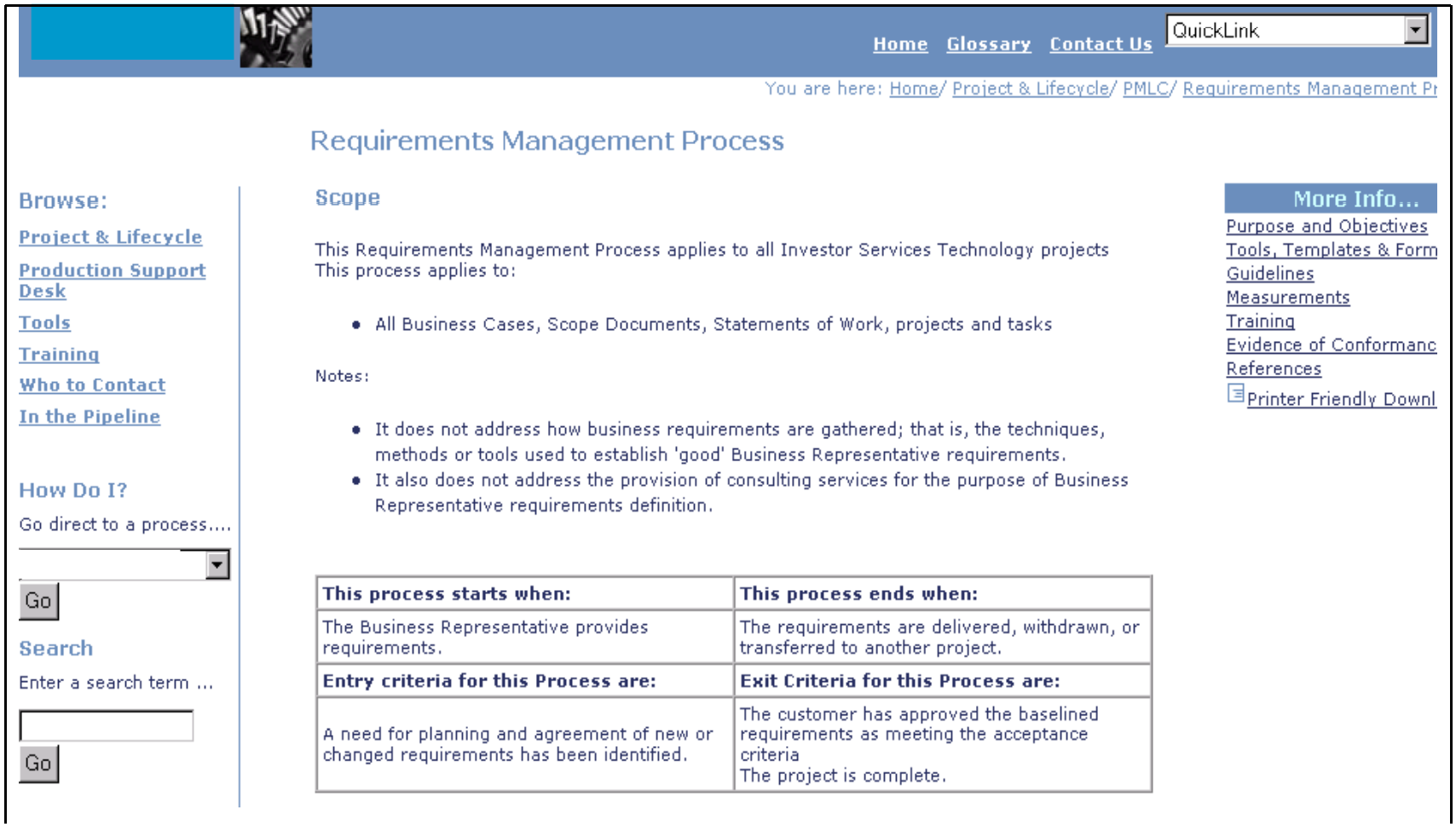
- Provided, tracked, and reported consulting and mentoring provided to organization by PI Group; developed, implemented and tracked communication plan, provided training curriculum [Level 3 Training Program focus]; developed and delivered training to meet CMM's KPA requirement for "Training" prior to implementation of newly published policies, standards, and core processes; deployed organizational processes and procedures; established and implemented metrics to meet CMM's KPA requirements for "Measurement and Analysis" and to promote and report progress; utilized phased approach for deployment
- Established web-based *Project Management Life Cycle*, (PMLC), which contains all policies [published with signature of CIO], standards, processes, artifacts, supporting documents (templates), tools, training, contacts, etc.;
- Established of organization--wide [then division wide] project list and reports for CIO and Executive Management, including project status "red/yellow/green" & issues & risks
- Utilized enterprise tool to record and manage all issues, risks, change requests, project list, etc.

Case #1: Real Life Sample *Readable at 200%*



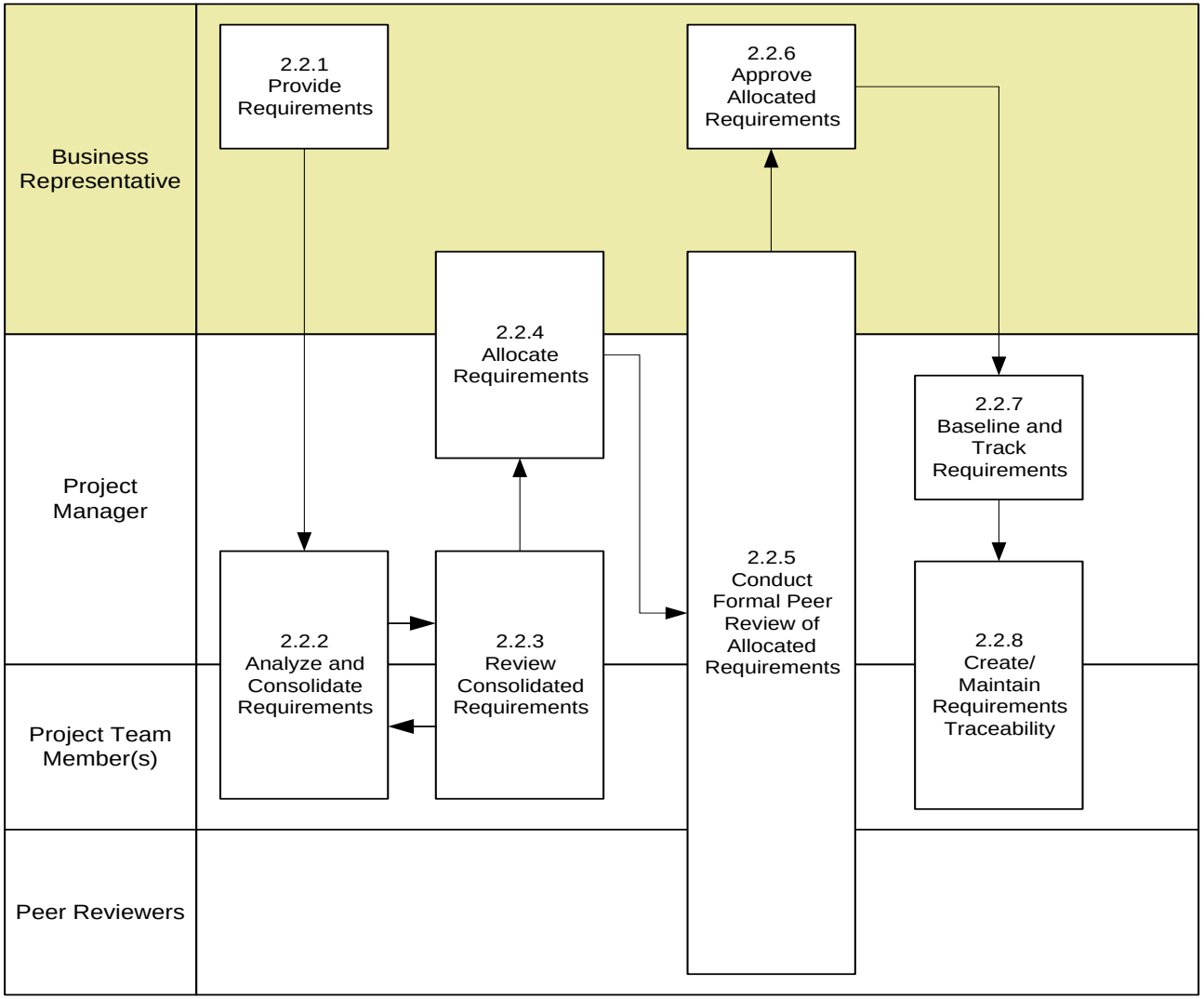
Case #1: Real Life Sample *Readable at 200%*

Example: Intranet Requirements Management Process



Case #1: Real Life Sample *Readable at 200%*

Requirements Management Process:



Case #1: Real Life Sample

- Requirements Management [RM]
  - Purpose of Requirements Management
  - Requirements Management establishes a common understanding between the customer and the project team as to the customer's requirements that will be addressed.
    - This common understanding (agreement) defines the system requirements allocated to the software ("allocated requirements"). The agreement covers both the technical and non-technical requirements.
  - The baselining of the “allocated requirements” is the kick-off for the test planning to start.
  - Test planning needs to form part of the project schedule as this activity will take time and effort.

Case #1: Real Life Sample

- **Requirements Management Includes Tracking Reqmts**
  - Analyse each change to a requirement to ensure that the change does not invalidated the requirement content
    - **Change to scope**
    - **Impact on other requirements within the same project**
    - **Change to the testing schedules**
  - Tracking any change to any requirement back to the version of the requirements document to which it relates.
  - Having traceability from the requirement to the testing process.
  - During testing ensuring that there is adequate requirements coverage to accept the testing or enough information to have confidence that enough business functionality has been tested.

Case #1: Real Life Sample *Readable at 200%*

- **Requirement Management Process [CMM compliance]**
  Deliverables need to be available to show project compliance with the intent of Requirements Management

Requirements Management Process - Evidence of Conformance

Quality Record	Where Stored
Completed Consolidated Requirements	Project Notebook
Completed Requirements Verification Checklist	Project Notebook
Baselined and Approved Allocated Requirements	Project Notebook
Completed Peer Review Form for the Allocated Requirements	Project Notebook
Completed Allocated Requirements Document/Report with Requirements to configuration item(s) Traceability OR Completed Requirements Traceability Document/Report containing requirements unique identification, deliverables, allocated to configuration item(s), and tested via, and any number of columns extracted from Allocated Requirements Document/Report with Requirements traceability.	Project Notebook
Approved Change Requests	Project Notebook

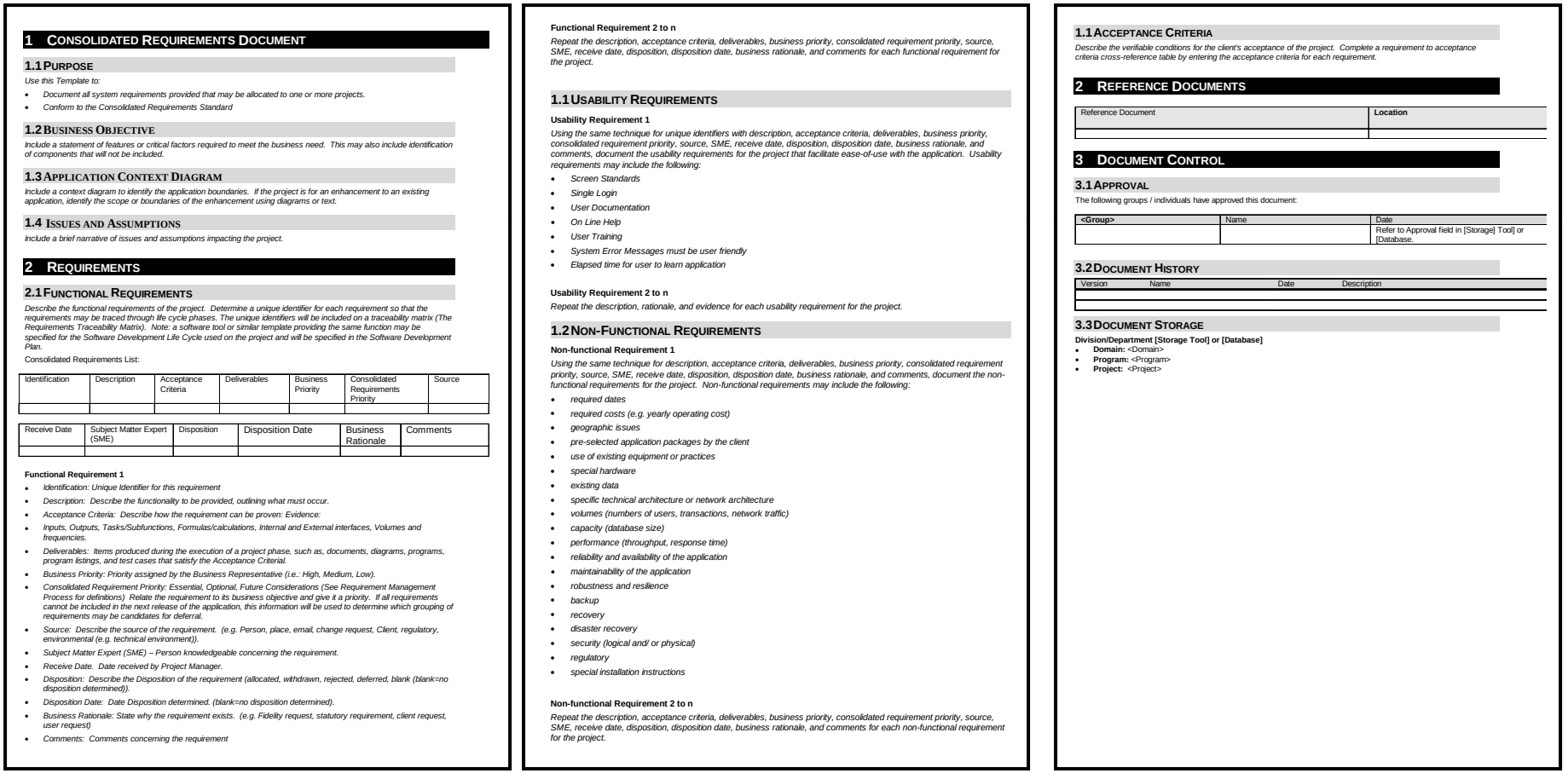
Case #1: Real Life Sample *Readable at 200%*

Master Document List:

KPA	Title	Type	Version	Status	Location
All	[Organization Name] Policies	Pol	1.0	Baselined	ProcessWeb
	[Organization Name] Standards	Std	1.0	Baselined	ProcessWeb
	Managed Work Effort Process	Proc	0.6	Draft	[TOOLNAME]
	PMLC Waiver Process	Proc	1.0	Reviewed	[TOOLNAME]
	Waiver Request	Form	1.0	Reviewed	[TOOLNAME]
	Waiver Log	Form	1.0	Reviewed	[TOOLNAME]
	Project Definition	Std	0.4	Draft	[TOOLNAME]
	[Organization Name] Policy Training	Pres	0.3	Approved	[TOOLNAME]
RM	Consolidated Requirements Document	Template	1.0	Baselined	ProcessWeb
	Allocated Requirements Document Template	Template	1.0	Baselined	ProcessWeb
	Requirements Management Process	Proc	1.0	Baselined	ProcessWeb
	Requirements Verification Checklist	Chk	1.0	Baselined	ProcessWeb
	Requirements Elicitation, Documentation and Management	Pres	1.0	Baselined	ProcessWeb
	Requirements Management Process Training	Pres	1.2	Baselined	ProcessWeb
	SCI CMM Overview Presentation	Pres	1.3	Baselined	ProcessWeb
Test	Master Test Plan Template	Template	1.0	Baselined	ProcessWeb
	Detailed Test Plan Template	Template	1.0	Baselined	ProcessWeb
	Test Case Template	Template	1.0	Baselined	ProcessWeb
	Master Test Plan Checklist	Chk	1.0	Baselined	ProcessWeb
	Software Test Management Process	Proc	1.0	Baselined	ProcessWeb
	Detailed Test Plan Checklist	Chk	1.0	Baselined	ProcessWeb
	Test Case Checklist	Chk	1.0	Baselined	ProcessWeb
	Software Test Management Process Training	Pres	1.3	Baselined	ProcessWeb

Case #1: Real Life Sample *Readable at 400%*

- **Completed Consolidated Requirements**



1 Consolidated Requirements Document

1.1 Purpose

Use this Template to:

- *Document all system requirements provided that may be allocated to one or more projects.*
- *Conform to the Consolidated Requirements Standard*

1.2 Business Objective

Include a statement of features or critical factors required to meet the business need. This may also include identification of components that will not be included.

1.3 Application Context Diagram

Include a context diagram to identify the application boundaries. If the project is for an enhancement to an existing application, identify the scope or boundaries of the enhancement using diagrams or text.

1.4 Issues and Assumptions

Include a brief narrative of issues and assumptions impacting the project.

2 Requirements

2.1 Functional Requirements

Describe the functional requirements of the project. Determine a unique identifier for each requirement so that the requirements may be traced through life cycle phases. The unique identifiers will be included on a traceability matrix (The Requirements Traceability Matrix). Note: a software tool or similar template providing the same function may be specified for the Software Development Life Cycle used on the project and will be specified in the Software Development Plan.

Consolidated Requirements List:

Identification	Description	Acceptance Criteria	Deliverables	Business Priority	Consolidated Requirements Priority	Source

Receive Date	Subject Matter Expert (SME)	Disposition	Disposition Date	Business Rationale	Comments

Functional Requirement 1

- *Identification: Unique Identifier for this requirement*
- *Description: Describe the functionality to be provided, outlining what must occur.*
- *Acceptance Criteria: Describe how the requirement can be proven: Evidence:*
- *Inputs, Outputs, Tasks/Subfunctions, Formulas/calculations, Internal and External interfaces, Volumes and frequencies.*
- *Deliverables: Items produced during the execution of a project phase, such as, documents, diagrams, programs, program listings, and test cases that satisfy the Acceptance Criterial.*
- *Business Priority: Priority assigned by the Business Representative (i.e.: High, Medium, Low).*
- *Consolidated Requirement Priority: Essential, Optional, Future Considerations (See Requirement Management Process for definitions) Relate the requirement to its business objective and give it a priority. If all requirements cannot be included in the next release of the application, this information will be used to determine which grouping of requirements may be candidates for deferral.*
- *Source: Describe the source of the requirement. (e.g. Person, place, email, change request, Client, regulatory, environmental (e.g. technical environment)).*
- *Subject Matter Expert (SME) – Person knowledgeable concerning the requirement.*
- *Receive Date. Date received by Project Manager.*
- *Disposition: Describe the Disposition of the requirement (allocated, withdrawn, rejected, deferred, blank (blank=no disposition determined)).*
- *Disposition Date: Date Disposition determined. (blank=no disposition determined).*
- *Business Rationale: State why the requirement exists. (e.g. Fidelity request, statutory requirement, client request, user request)*
- *Comments: Comments concerning the requirement*

Functional Requirement 2 to n

Repeat the description, acceptance criteria, deliverables, business priority, consolidated requirement priority, source, SME, receive date, disposition, disposition date, business rationale, and comments for each functional requirement for the project.

1.1 Usability Requirements

Usability Requirement 1

Using the same technique for unique identifiers with description, acceptance criteria, deliverables, business priority, consolidated requirement priority, source, SME, receive date, disposition, disposition date, business rationale, and comments, document the usability requirements for the project that facilitate ease-of-use with the application. Usability requirements may include the following:

- *Screen Standards*
- *Single Login*
- *User Documentation*
- *On Line Help*
- *User Training*
- *System Error Messages must be user friendly*
- *Elapsed time for user to learn application*

Usability Requirement 2 to n

Repeat the description, rationale, and evidence for each usability requirement for the project.

1.2 Non-Functional Requirements

Non-functional Requirement 1

Using the same technique for description, acceptance criteria, deliverables, business priority, consolidated requirement priority, source, SME, receive date, disposition, disposition date, business rationale, and comments, document the non-functional requirements for the project. Non-functional requirements may include the following:

- *required dates*
- *required costs (e.g. yearly operating cost)*
- *geographic issues*
- *pre-selected application packages by the client*
- *use of existing equipment or practices*
- *special hardware*
- *existing data*
- *specific technical architecture or network architecture*
- *volumes (numbers of users, transactions, network traffic)*
- *capacity (database size)*
- *performance (throughput, response time)*
- *reliability and availability of the application*
- *maintainability of the application*
- *robustness and resilience*
- *backup*
- *recovery*
- *disaster recovery*
- *security (logical and/ or physical)*
- *regulatory*
- *special installation instructions*

Non-functional Requirement 2 to n

Repeat the description, acceptance criteria, deliverables, business priority, consolidated requirement priority, source, SME, receive date, disposition, disposition date, business rationale, and comments for each non-functional requirement for the project.

1.1 Acceptance Criteria

Describe the verifiable conditions for the client's acceptance of the project. Complete a requirement to acceptance criteria cross-reference table by entering the acceptance criteria for each requirement.

2 Reference Documents

Reference Document	Location

3 Document Control

3.1 Approval

The following groups / individuals have approved this document:

<Group>	Name	Date
		Refer to Approval field in [Storage] Tool] or [Database.

3.2 Document History

Version	Name	Date	Description

3.3 Document Storage

Division/Department [Storage Tool] or [Database]

- **Domain:** <Domain>
- **Program:** <Program>
- **Project:** <Project>

Sample only; Add Title Page, TOC, Header & Footer

Case #1: Real Life Sample *Readable at 400%*

- **Baselined & Approved Allocated Requirements**

1 Allocated Requirements Document

Use this Template to:
- *Document the "allocated requirements" for this project*
- *Conform to the Allocated Requirements Standard*

1.1 Business Objective

Include a statement of features or critical factors required to meet the business need (what the client wants). This may also include identification of components that will not be included.

1.2 Application Context Diagram

Include a context diagram to identify the application boundaries. If the project is for an enhancement to an existing application, identify the scope or boundaries of the enhancement using diagrams or text.

1.3 Issues and Assumptions

Include a brief narrative of principles (architectural principles), constraints, and assumptions impacting the project.

1.4 Functional Requirements

Describe the functional requirements of the project. Determine a unique identifier for each requirement so that the requirements may be traced. Note: a software tool or similar template providing the same function may be specified for the Software Development Life Cycle used on the project and will be specified in the Software Development Plan.

The following requirements can be copied from the Approved Consolidated Requirements Document.

Allocated Requirements List:

Identification	Description	Acceptance Criteria	Deliverables	Business Priority	Consolidated Requirements Priority	Source

Receive Date	Subject Matter Expert (SME)	Disposition	Disposition Date	Business Rationale	Comments	Allocated to (Configuration Item(s)/Unit(s))	Tested Via

1.4.1 Functional Requirement 1

Identification: Unique Identifier for this requirement
Description: Describe the functionality to be provided, outlining what must occur.
Acceptance Criteria: Describe how the requirement can be proven: Evidence: Inputs, Outputs, Tasks/Subfunctions, Formulas/calculations, Internal and External interfaces, Volumes and frequencies.
Deliverables: Items produced during the execution of a project phase, such as, documents, diagrams, programs, program listings, and test cases that satisfy the Acceptance Criteria.
Business Priority: Priority assigned by the Business Representative (i.e.: High, Medium, Low).
Consolidated Requirement Priority: Essential, Optional, Future Considerations (See Requirement Management Process for definitions). Relate the requirement to its business objective and give it a priority. If all requirements cannot be included in the next release of the application, this information will be used to determine which grouping of requirements may be candidates for deferral.
- *reliability and availability of the application*

Source: Describe the source of the requirement. (E.g. Person, place, email, change request, Client, regulatory, environmental (e.g. technical environment)).
Subject Matter Expert (SME) – Person knowledgeable concerning the requirement.
Receive Date. Date received by Project Manager.
Disposition: Describe the Disposition of the requirement (allocated, withdrawn, rejected, deferred, blank (blank=no disposition determined)).
Disposition Date: Date Disposition determined. (blank=no disposition determined).
Business Rationale: State why the requirement exists. (E.g. Fidelity request, statutory requirement, client request, user request)
Comments: Comments concerning the requirement
Allocated to: The configuration item(s)/unit(s) that satisfy the acceptance criteria
Tested via: The configuration item(s)/unit(s) that provide complete requirements traceability

1.1.1 2 to n Functional Requirement n

Repeat the description, acceptance criteria, deliverables, business priority, consolidated requirement priority, source, SME, receive date, disposition, disposition date, business rationale, comments, allocated to configuration item(s/unit(s)), and tested via for each functional requirement for the project.

1.2 Usability Requirements

1.2.1 Usability Requirement 1

Using the same technique for description, acceptance criteria, deliverables, business priority, consolidated requirement priority, source, SME, receive date, disposition, disposition date, business rationale, comments, allocated to configuration item(s)/unit(s), and tested via, document the usability requirements for the project that facilitate ease-of-use with the application. Usability requirements may include the following:
- *Screen Standards*
- *Single Login*
- *User Documentation*
- *On Line Help*
- *User Training*
- *System Error Messages must be user friendly*
- *Elapsed time for user to learn application*
- *2 to n Usability Requirement n*

Repeat the description, acceptance criteria, deliverables, business priority, consolidated requirement priority, source, SME, receive date, disposition, disposition date, business rationale, comments, allocated to configuration item(s)/unit(s), and tested via for each functional requirement for the project.

1.3 Non-Functional Requirements

1.3.1 Non-functional Requirement 1

Using the same technique for description, acceptance criteria, deliverables, business priority, consolidated requirement priority, source, SME, receive date, disposition, disposition date, business rationale, comments, allocated to configuration item(s)/unit(s), and tested via, document the non-functional requirements for the project. Non-functional requirements may include the following:
- *required dates*
- *required costs (e.g. yearly operating cost)*
- *geographic issues*
- *pre-selected application packages by the client*
- *use of existing equipment or practices*
- *special hardware*
- *existing data*
- *specific technical architecture or network architecture*
- *volumes (numbers of users, transactions, network traffic)*
- *capacity (database size)*
- *performance (throughput, response time)*
- *volumes (numbers of users, transactions, network traffic)*
- *capacity (database size)*
- *performance (throughput, response time)*
- *reliability and availability of the application*
- *maintainability of the application*
- *robustness and resilience*
- *backup*
- *recovery*
- *disaster recovery*
- *security (logical and/ or physical)*
- *regulatory*
- *special installation instructions*

1.1.1 2 to n Non-functional Requirement n

Repeat the description, acceptance criteria, deliverables, business priority, consolidated requirement priority, source, SME, receive date, disposition, disposition date, business rationale, comments, allocated to configuration item(s)/unit(s), and tested via for each non-functional requirement for the project.

1.2 Acceptance Criteria

Describe the verifiable conditions for the client's acceptance of the project. The completed requirement configuration item for each acceptance criteria provides a complete cross-reference table.

1.3 Reference Documents

Reference Document	**Location**

1.4 Document Control

1.4.1 Approval

The following groups / individuals have approved this document:

<Group>	Name	Date
		Refer to Approval field in [Storage Tool] or [Database.

1.4.2 Document History

Version	Name	Date	Description

1.4.3 Document Storage

Division/Department [Storage Tool] or [Database]
- **Domain:** <Domain>
- **Program:** <Program>
- **Project:** <Project>

Sample only; Add Title Page, TOC, Header & Footer

Case #1: Real Life Sample *Readable at 400%*

- **Completed Requirements Verification Checklist**

1 Requirements Verification Checklist

1.1 Checklist

Do each of the Requirements meet the following criteria?	Verification [Y, N, N/A]
Understandable	
• Statements are clear and concise	
• Source of requirement is known & documented.	
• Acceptance criteria are appropriate (Development and Acceptance Testing can determine whether each item has been satisfied.)	
• Terms and units of measurement are defined. (e.g. CST=GMT-6 hours)	
• Requirement is applicable to the Business Objective	
• Requirements is stated in terminology appropriate to the audience	
• There is a single interpretation of the stated requirement	
• Requirement is complete (all columns are filled in or marked TBD)	
• No documented/known requirements are missing	
Consistent / Feasible / Testable / Traceable / Manageable	
• Requirement does not conflict with other requirements allocated to the software project	
• Requirement can be implemented using available techniques, tools, resources, and personnel (either in-house or in the marketplace)	
• Requirement can be implemented under the specific cost and schedule constraints for the Project	
• Requirements are written at a consistent and appropriate level of detail	
• Dependencies among requirements are identified	
• Requirements provide an adequate basis for design	
• Requirements are within scope for the Project	
• Each functional requirement is traceable to a higher-level requirement (e.g., system requirement or use case)	
• Requirement is Testable (Development and Acceptance Testing can determine whether each item has been satisfied.)	

2 Reference Documents

Reference Document	**Location**

3 Document Control

3.1 Approval

The following groups / individuals have approved this document:

<Group>	Name	Date
		Refer to Approval field in [Storage] Tool] or [Database.

1.1 Document History

Version	Name	Date	Description

1.2 Document Storage

Division/Department [Storage Tool] or [Database]

- ***Domain:*** *<Domain>*
- **Program:** <Program>
- **Project:** <Project>

2 Appendix 1 – Additional Requirements Considerations.

Application requirements should answer these four basic questions about the functions to be provided:

- What processing takes place and what data is required for the processes?
- Who performs the work?
- When does the work need to be performed?
- Where does it happen?

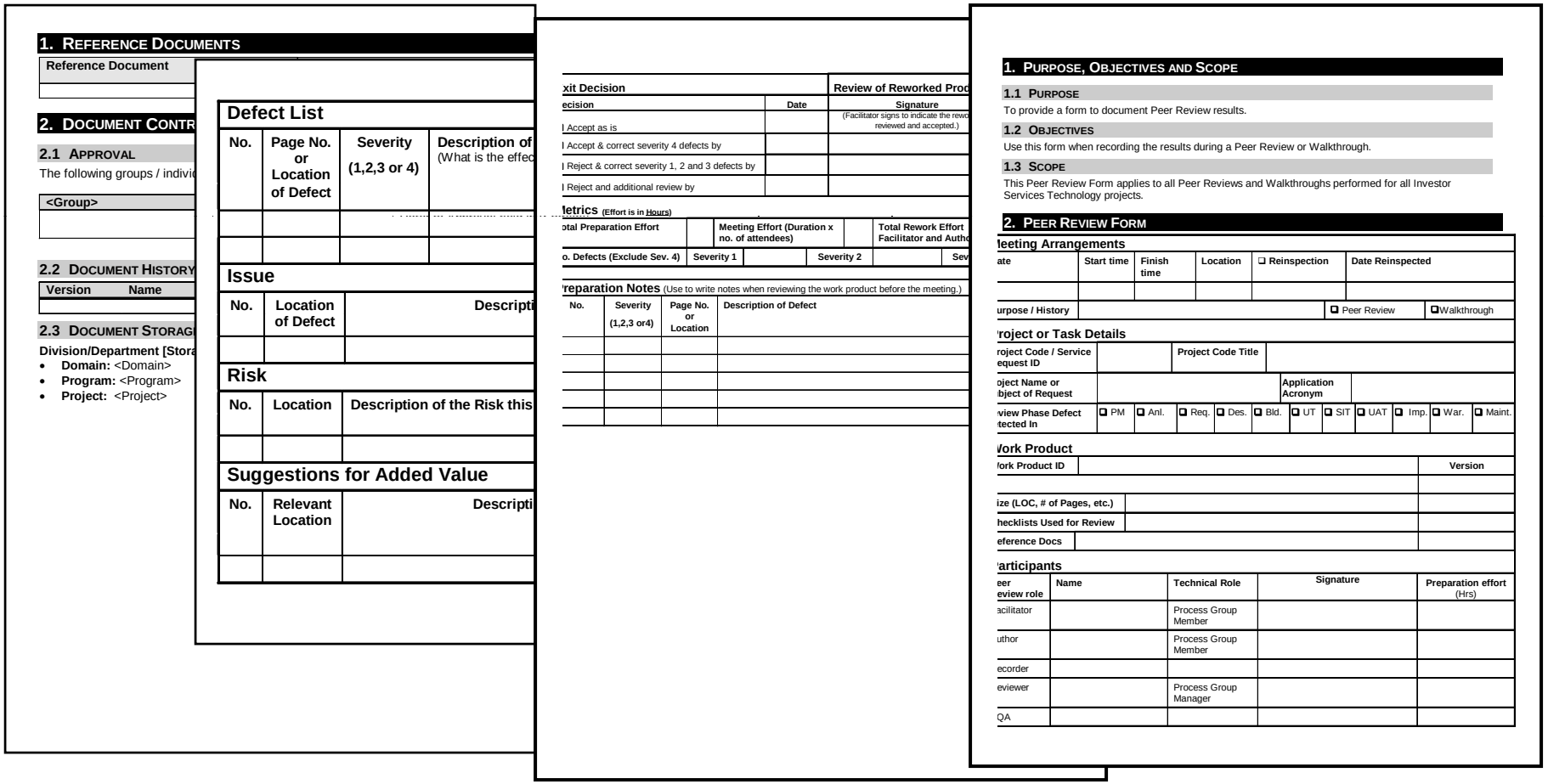
Consider the following in defining application requirements:

- Data entry, change, and validation
- Computation, manipulations, and data transformations
- Frequency and distribution of transactions
- Database requirements for historical information retention or archives
- Database requirements for backup and recovery
- Reporting and other data outputs
- Growth, flexibility, and expandability for databases and programs
- Special management information needs
- Security requirements for access control, software security, interfaces (communications and network) security, and data security including both software and data integrity
- Interface requirements such as interfaces with other systems and remote access
- Hardware and software constraints imposed on the system such as programming language, database management system (DBMS), operating system, mainframe, server, workstation, or peripheral device compatibility
- Performance goals for throughput and response time
- Reliability, availability, and maintainability
- Special installation requirements
- Application performance (e.g., 1 second response time for on-line transactions)
- Usability (e.g., elapsed time for user to learn new application)
- Volume (e.g., must support 1500 concurrent users accessing the database)
- Compatibility (e.g., must be able to access existing corporate data on a mainframe relational database)
- Cost (e.g., infrastructure and operational cost per user per year must not exceed some dollar amount)
- Capacity (e.g., must be able to cope with a10 gigabyte database)
- Availability (e.g., must provide continuous non-stop operation 24 hours/day, 365 days/year)
- Robustness/resilience (what range of failure conditions must the architecture deal with automatically?)
- Development productivity (e.g., must not lower the productivity rate for current host-terminal development)
- Maintainability (e.g., must be able to maintain and evolve the application over a ten year life)

Sample only; Add Title Page, TOC, Header & Footer

Case #1: Real Life Sample *Readable at 400%*

- **Completed Peer Review for Allocated Requirements**



1. REFERENCE DOCUMENTS

Reference Document

2. DOCUMENT CONTR

2.1 APPROVAL

The following groups / indivi

<Group>

2.2 DOCUMENT HISTORY

Version Name

2.3 DOCUMENT STORAG

Division/Department [Stora

- **Domain:** <Domain>
- **Program:** <Program>
- **Project:** <Project>

Defect List

No.	Page No. or Location of Defect	Severity (1,2,3 or 4)	Description of (What is the effec

Issue

No.	Location of Defect	Descripti

Risk

No.	Location	Description of the Risk this

Suggestions for Added Value

No.	Relevant Location	Descripti

xit Decision

ecision	Date	Review of Reworked Proc Signature (Facilitator signs to indicate the rewo reviewed and accepted.)
Accept as is		
Accept & correct severity 4 defects by		
Reject & correct severity 1, 2 and 3 defects by		
Reject and additional review by		

letrics (Effort is in Hours)

otal Preparation Effort		Meeting Effort (Duration x no. of attendees)		Total Rework Effort Facilitator and Autho

o. Defects (Exclude Sev. 4)	Severity 1		Severity 2		Sev

reparation Notes (Use to write notes when reviewing the work product before the meeting.)

No.	Severity (1,2,3 or4)	Page No. or Location	Description of Defect

1. PURPOSE, OBJECTIVES AND SCOPE

1.1 PURPOSE

To provide a form to document Peer Review results.

1.2 OBJECTIVES

Use this form when recording the results during a Peer Review or Walkthrough.

1.3 SCOPE

This Peer Review Form applies to all Peer Reviews and Walkthroughs performed for all Investor Services Technology projects.

2. PEER REVIEW FORM

leeting Arrangements

ate	Start time	Finish time	Location	❑ Reinspection	Date Reinspected

urpose / History	❑ Peer Review	❑Walkthrough

roject or Task Details

roject Code / Service equest ID		Project Code Title	
oject Name or bject of Request		Application Acronym	

view Phase Defect tected In	❑ PM	❑ Anl.	❑ Req.	❑ Des.	❑ Bld.	❑ UT	❑ SIT	❑ UAT	❑ Imp.	❑ War.	❑ Maint.

Work Product

ork Product ID		Version
ize (LOC, # of Pages, etc.)		
hecklists Used for Review		
eference Docs		

articipants

eer eview role	Name	Technical Role	Signature	Preparation effort (Hrs)
acilitator		Process Group Member		
uthor		Process Group Member		
ecorder				
eviewer		Process Group Manager		
QA				

Sample only; Add Title Page, TOC, Header & Footer

Case #1: Real Life Sample *Readable at 200%*

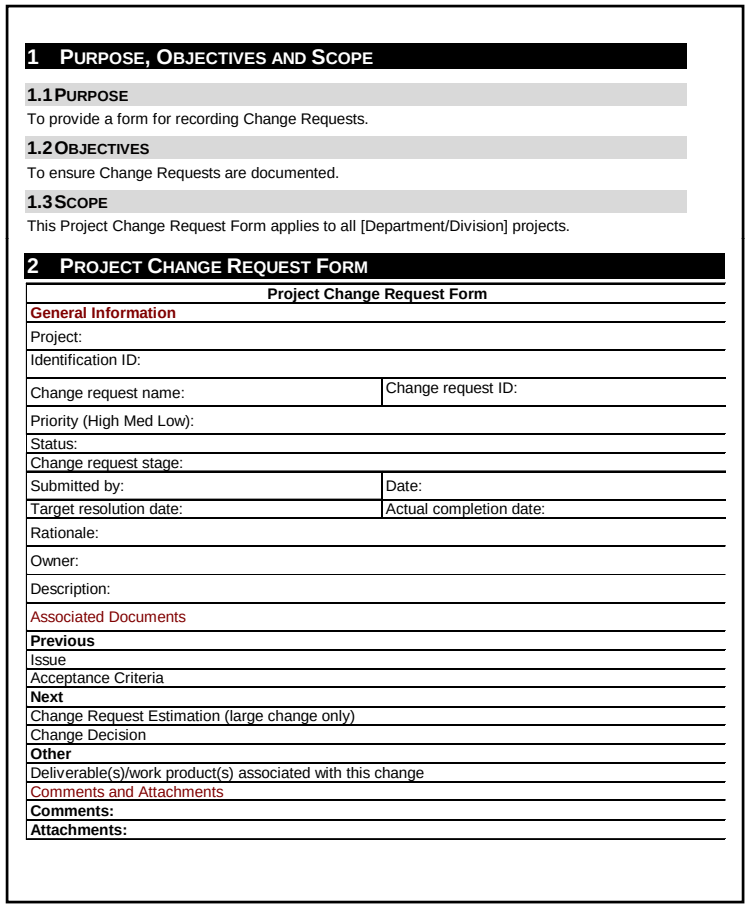
- **Completed Requirements Traceability Document**

ID (ARD#)	Description	Details	BRD#	BUC Use Case #	SRS#	CRD#	Config Item	Config Unit	Tested Via (Test Case)
4.1	The Forms/FAX server shall be accessible to XYZ users via the intranet.				3.1	4.1			
	4.1.1	There will either be a forms button that is always visible on the ABC screen or a link in Citrix that will activate a separate browser window and display the Forms/FAX Server application's login screen.	7.1.1	1.1, 1.3	3.1.1	4.1.1	log4.cpp	log4_user	LAC_012 INI_001
	4.1.2	The Forms/FAX Server will be accessible from the XYZ Intranet directly by entering the URL in an open browser, which will bring the User to the Login Screen.	7.1.1, 7.1.2	1.2	3.1.1, 3.1.2	4.1.1, 4.1.2	log4.cpp	log4_user	BRW_403
	4.1.3	The Forms/FAX Server will not be accessible from outside the XYZ network. (Application is within the Firewall.)	7.1.2	1.2	3.1.2	4.1.2	log4.cpp	log4_user rej6_user	INI_023
4.2	A user must login to use the Forms/FAX Server.								
	4.2.1	User names and passwords will be stored in the Forms/FAX Server local database and the user name will be the same as the ABC User ID name. (RISK)	7.1.2	2.7	3.2.1	4.2.1	log4.cpp	log4_user id_user	LAC_012 INI_001
	4.2.2	The initial User Password will be the same as the user's login ID.	7.1.2	2.7	3.2.2	4.2.2	log4.cpp	log4_user idn_user	LAC_012 INI_001

Sample only; Add Title Page, TOC, Header & Footer

Case #1: Real Life Sample *Readable at 400%*

- Approved Change Requests



1 Purpose, Objectives and Scope

1.1 Purpose

To provide a form for recording Change Requests.

1.2 Objectives

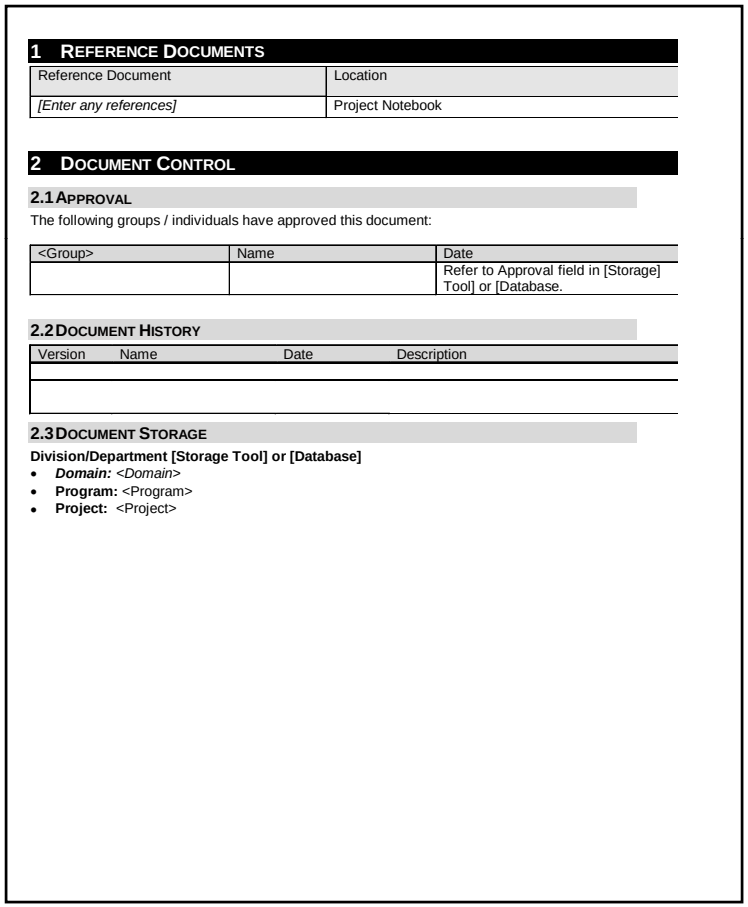
To ensure Change Requests are documented.

1.3 Scope

This Project Change Request Form applies to all [Department/Division] projects.

2 Project Change Request Form

Project Change Request Form	
General Information	
Project:	
Identification ID:	
Change request name:	Change request ID:
Priority (High Med Low):	
Status:	
Change request stage:	
Submitted by:	Date:
Target resolution date:	Actual completion date:
Rationale:	
Owner:	
Description:	
Associated Documents	
Previous	
Issue	
Acceptance Criteria	
Next	
Change Request Estimation (large change only)	
Change Decision	
Other	
Deliverable(s)/work product(s) associated with this change	
Comments and Attachments	
Comments:	
Attachments:	



1 Reference Documents

Reference Document	Location
[Enter any references]	Project Notebook

2 Document Control

2.1 Approval

The following groups / individuals have approved this document:

<Group>	Name	Date
		Refer to Approval field in [Storage] Tool] or [Database.

2.2 Document History

Version	Name	Date	Description

2.3 Document Storage

Division/Department [Storage Tool] or [Database]

- ***Domain:*** *<Domain>*
- **Program:** <Program>
- **Project:** <Project>

Sample only; Add Title Page, TOC, Header & Footer

Case #1: Real Life Sample

Process Improvement Project Notebook Contents

- CIO's SPI Letter
- CIO's Town Hall Slides
- Second-In-Command's Message
- Manager's Slides from Town Hall
- Process Improvement Overview Presentation
- Assessment Results
- PI Plan
- PI Milestones
- PI Schedule
- Project/Division Implementation Action Plan
- PI Contacts
- PI Rewards and Recognition
- PI Performance Objectives
- Division/Department IT Organization Chart
- PI Organization Chart
- Data Storage Tool User Training Guide
- PI Roles and Responsibilities
- Glossary
- Assessment Log
- Maturity levels and descriptions (Maturity Questionnaire)
- Location(s) to find docs, etc.
- Web Sites (www.sei.edu; www.pmi.org; etc.)
- Suggested Reading List
- Published Policies, Standards, Core Processes
- Matrix of Six Sigma/CMM/PMBOK
- IS Technology Publications / Communications (evidence it is real)
- Div/Dept Success Stories; Comments from Sr. Mgmt
- PI Status Report/Chart (for each group/project & overall IT)
- Contact list
- Project Lists with PMs info
- Client Assignments (project/groups assigned to each of us)
- Client Visit Log (consulting/mentoring)

Real Life Case #2:

		#1	#2	#3	#4	#5
Used	SEI's *IDEAL*	Yes		Yes	Yes	
	SEI's Legacy SW_CMM	Yes		Yes	Yes	
	SEI's CMMi			Yes		Yes
	PMI's PMBOK	Yes		Yes	Yes	Yes
	Six Sigma	Yes		Yes		
	QAI's QACBOK and TQM		Yes			
	Enterprise PMO				Yes	
	Balanced Scorecard					Yes

Case #2: QACBOK & TQM

- TQM [Total Quality Management] is the organization-wide management of quality.
- *Management* consists of planning, organizing, directing, control, and assurance.
- Total quality is called *total* because it consists of two qualities: *quality* of return to satisfy the needs of the shareholders, and *quality* of products.
- Evolved into criteria for Malcolm Baldrige National Quality Award

Case #2: QACBOK

Certified Software Quality Analyst

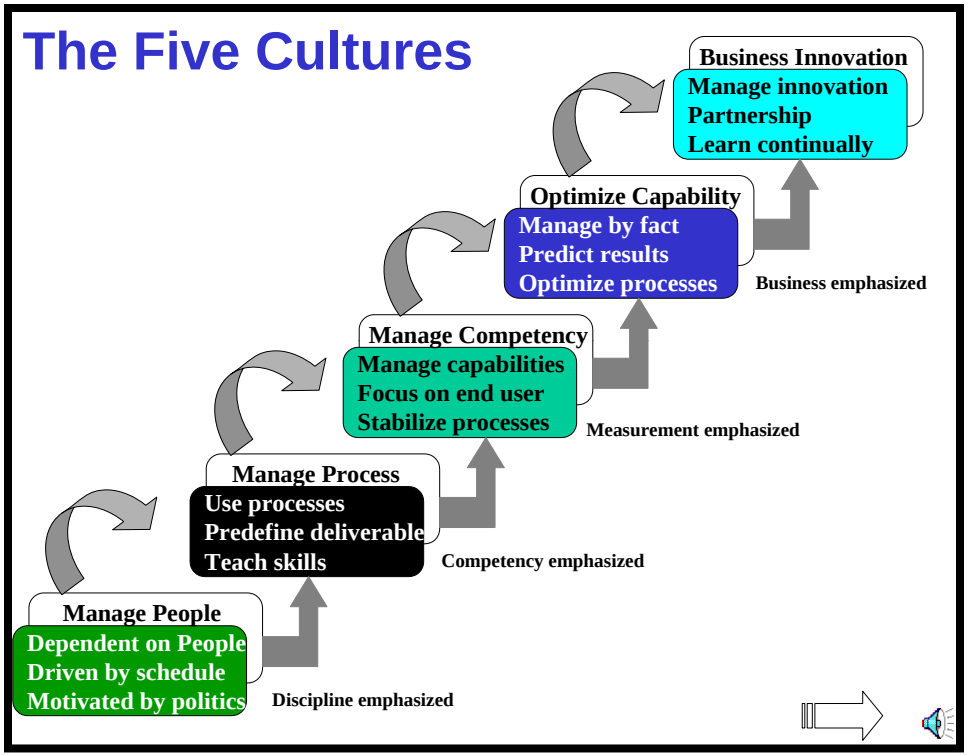
Common Body of Knowledge

Table of Contents:

1. Quality Principles
2. Software Development, Acquisition and Operation Processes
3. Quality Models and Quality Assessment
4. Quality Management/Leadership
5. Quality Assurance
6. Quality Control Practices
7. Define, Build, Implement, and Improve Work Processes
8. Quantitative Methods

Case #2: QAI Approach to Quality

- Involve Experts
  - Use established, successful Strategic Approach to Quality
    - Quality Assurance Institute Implementation Model
  - Three simple steps:
    - Where are you going? = Vision
    - Where are you now? = Review
    - How will you get there? = Plan/Approach
  - Implementation Support
    - Implementation Approach
    - Process Warehouse www.qaiworldwide.com
    - On-Site Support
    - Best Practices Training: Boot Camps, Process Training (How- To)



CSQA CSPM CSTE

Mike Pregman
Quality Assurance Institute
QAIAdvantage.ppt

Case #2: QACBOK & TQM

- Organization: reactionary mode; heros vs teaming; chaos
- Individual process oriented; obtained training for Total Quality Management [TQM]; became enthusiastic for process improvement
- Improvement suggestions were based on a model, however no model was made available for use to the group
- Models used in ***stealth*** mode: Quality Assurance Institute's (QAI) *Quality Assurance Common Body of Knowledge*; and TQM
  - worked with individuals to improve their work processes
  - allowed to develop processes, tools, templates, procedures and implement small improvements for the group
    - Quality Circles; Test Management; Defect Reporting; and programmer level Change Control
    - kept localized within group
  - accepted/implemented on 'voluntary' basis

Case #2: QACBOK & TQM

- Individuals using improvements experienced consistent success
- Recognized as Driving Force for Quality within group
  - Defect Reporting and Tracking system expanded to include Enhancements; implemented across group; and staffed to 3
  - Expanded focus:
    - Process Definition, Analysis, and Improvement for one Vendor
    - Workbench modeling; process documentation and flowcharting
    - Recognition program for group
  - Conducted training/mentoring sessions for QC and QA; Senior level through technicians
  - Initiated, developed and executed *Vendor Process Management Project*
- Participated in cross-divisional TQM/Process Improvement efforts across product lines and system functions
- Result: processes implemented were executed even after individual left the organization

Case #2: Real Life Sample *Readable at 200%*

SYSTEM CHANGE REQUEST

_____Enhancement (or) _____ Defect Requester:_____

Date Found:_____ Signature:_____
(Director PMD/Administrator PensPMD)

System (Over) and Version Number:_____

Product(s):_____

List of systems on back of form

Description: (Must include input, output and error message)_____

_____

What was expected, what is correct?_____

_____

_____

PROGRAMMER - PLEASE COMPLETE:
Date Started:_____ Date completed:_____ In Version #_____
Hardcopy of code: Y or N Code comment line: Y or N Date "PUT"_____
Procedure(s) affected:_____
Describe correction:_____
Correction location:_____
Root Cause:_____

Case #2: Real Life Sample *Readable at 200%*

```
PROJECT COORDINATOR - PLEASE COMPLETE:
Tested on: computer=_____________  printer=_____________  Color Monitor: Y or N
Sample or Regression Test:  S or R     Number of cases tested:_________________
Corrected in first test or rework needed:  1st  or Rework
Date 1st test completed:_____________   Date retest completed:_________________
_____Defect is result of current programming changes to modificaton #_________.
_____Defect existed in production and is not due to current changes.
Added to test plan:  Y or N

**************************************************************************************
                                FOR QC/IFS USE ONLY
ID Number:_____________________________ Logged by:_____________________________

Date Recd:_____________________________ Date Closed:_____________________________

Status:_____________________________________________________________________________

_____________________________________________________________________________________

Client Representative:_____________________  Priority:  1=High  2=Med  3=Low
```

Case #2: Real Life Sample

Vendor Process Management Project:

- Interviews / Data Collection
- Vendor/Client Mission Statements, Operational Goals, Culture, etc.
- Assessment results utilized 597of 923 records [top 4 of 7 categories]:
  - 376 Product; 211 Process; confirms QC focus vs QA
  - 103 Strengths, 202 Problems, 59 Short Term and 233 Development Long Term Solution Recommendations
  - Keywords used for sort, analyze, summary:
    - Documentation: Requirements, Compliance Standards, Measurement Standards, Systems, Processes
    - Project Management: Roles, Planning, Scheduling, Kickoff, Change Management, Design
    - Testing: Plans, Defects, Acceptance, Unit Testing, Benchmarks, Autocompare Program, Regression Testing,
    - Code: Libraries, Source Code Escrow Accounting, Code Structure,
    - Training: Process Ownership, Attitude,
    - Communication: Changes and Status

Case #2: Real Life Sample

Vendor Process Management Project (Contd.)

- Flow Chart: As-is process
- Report Charts for each Keyword
- Task List: High level and detailed in MS Project
  - Decisions for recommendations need risk, impact and ROI analysis

Real Life Case #3:

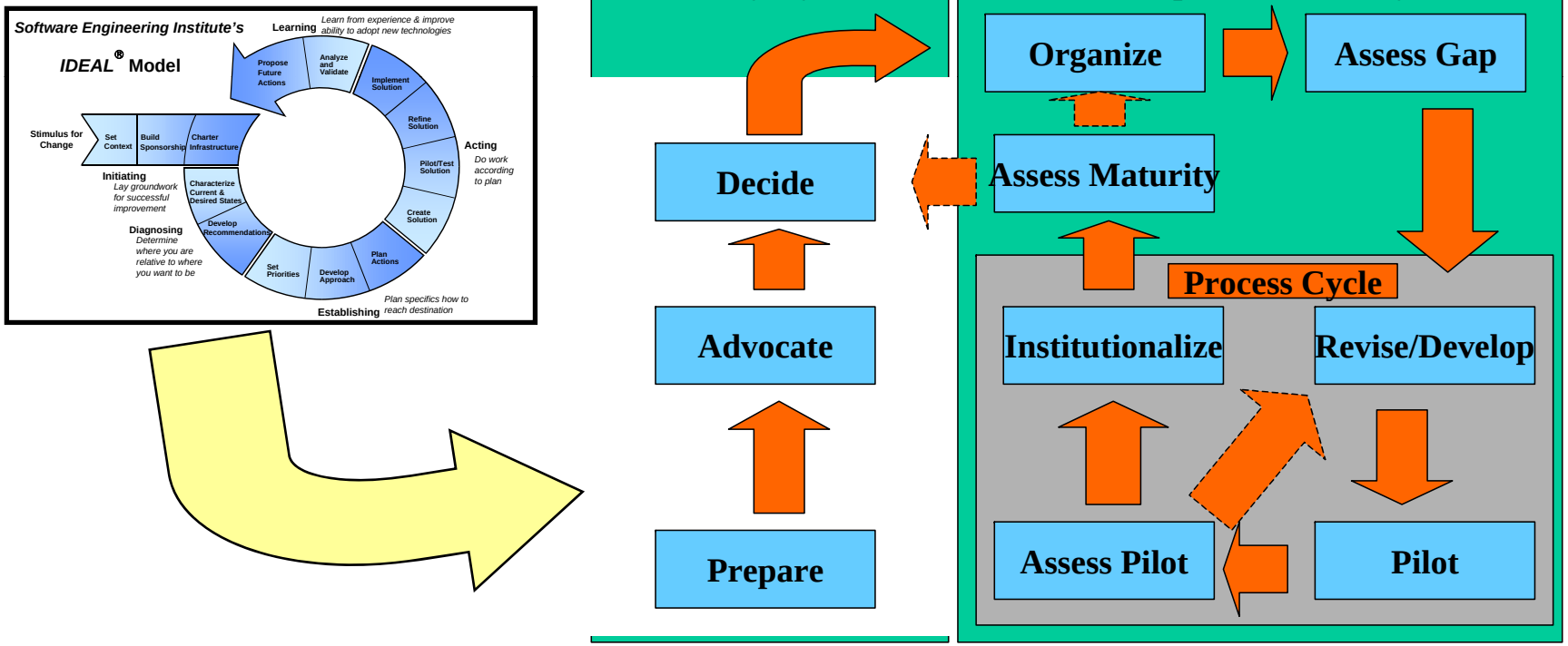
Began One Model 'Set' then Changed
[*IDEAL*®, SW_CMM®, PMI, and Six Sigma] transitioned to CMMI

		#1	#2	#3	#4	#5
Used	SEI's *IDEAL*	Yes		Yes	Yes	
	SEI's Legacy SW_CMM	Yes		Yes	Yes	
	SEI's CMMi			Yes		Yes
	PMI's PMBOK	Yes		Yes	Yes	Yes
	Six Sigma	Yes		Yes		
	QAI's QACBOK and TQM		Yes			
	Enterprise PMO				Yes	
	Balanced Scorecard					Yes

Case #3: Transitioned SW_CMM® to CMMI®

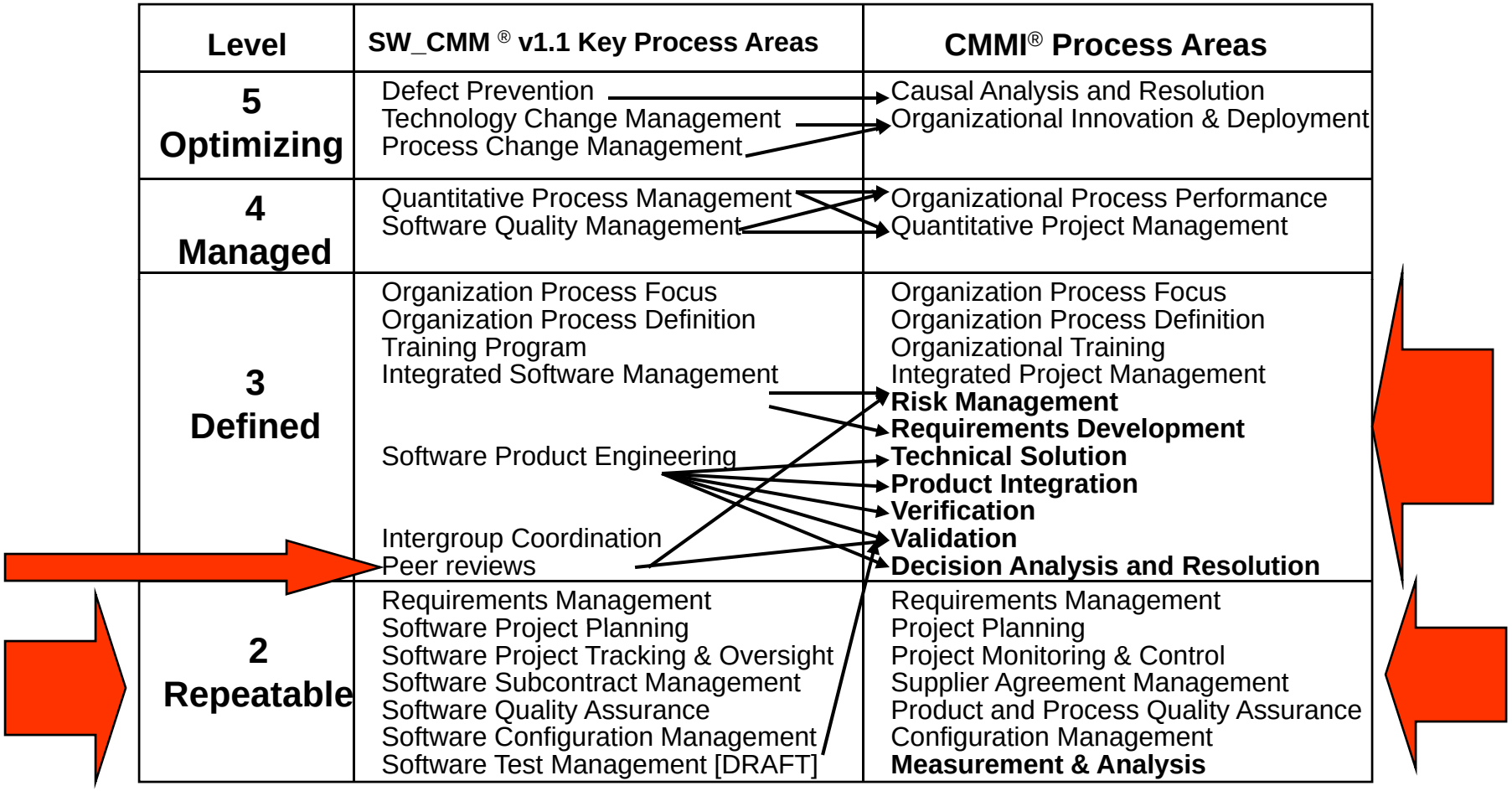
Implementation Approach based on *IDEAL*® Model

SEI CMMI Products v 1.1 CD; ExecGuide v0.5.doc; 2/2002



www.sei.cmu.edu

Case #3: Transitioned SW_CMM® to CMMI®



Case #3: Transitioned SW_CMM® to CMMI®

- Example 1:
  - Case 1 [discussed earlier] began *IDEAL*® Model with SW_CMM supported by Project Management Institute's (PMI) Models and Body of Knowledge and Six Sigma, and then transitioned to CMMI
- Established SW_CMM processes were Level 2&3 compliant; mapped to CMMI; identified gaps and adjusted/republished processes as needed

Case #3: Transitioned SW_CMM® to CMMI®

Results

http://www.sei.cmu.edu/cmmi/adoption/pdf/cmmi-overview05.pdf

Note: Per SEIR, of 3446 organizations appraised in 2008, 38% appraised at 'Managed' level 2; 48% at 'Defined' level 3; and 12% levels 4 & 5 **http://www.sei.cmu.edu/appraisal-program/profile/pdf/CMMI/2009MarCMMI.pdf**

***Real Life Case #4*:**

Began One Model 'Set' then Changed

[*IDEAL*®, SW_CMM®, and PMI] transitioned to Enterprise PMO

		#1	#2	#3	#4	#5
Used	SEI's *IDEAL*	Yes		Yes	Yes	
	SEI's Legacy SW_CMM	Yes		Yes	Yes	
	SEI's CMMi			Yes		Yes
	PMI's PMBOK	Yes		Yes	Yes	Yes
	Six Sigma	Yes		Yes		
	QAI's QACBOK and TQM		Yes			
	Enterprise PMO				Yes	
	Balanced Scorecard					Yes

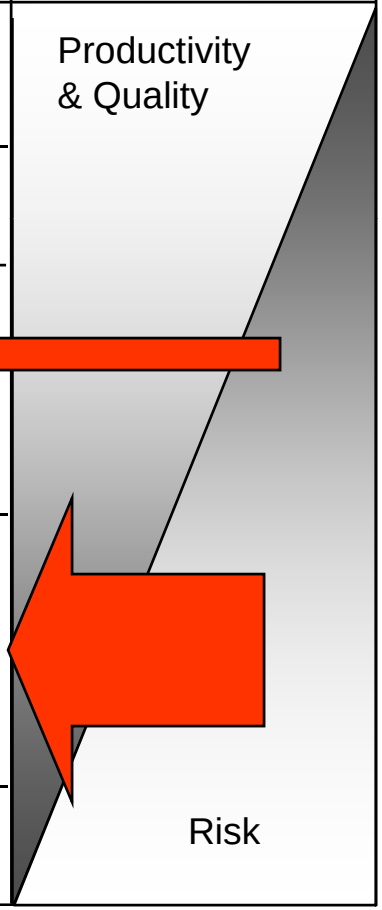
Case #4: Began with SEI SW_CMM®

- Organization began using *IDEAL*® Model, selected SW_CMM Key Process Areas, including Requirements Management, Configuration Management, and Project Planning Tracking and Oversight (PTO)
- Supported by Project Management Institute's (PMI) Models and Body of Knowledge
- Transitioned to Technology Division-wide Project Management Office

Case #4: Began with SEI SW_CMM®

SEI Software Capability Maturity Model v 1.1

Level	Focus	Key Process Areas
5 Optimizing	Continuous process improvement	Defect prevention Technology innovation Process change management
4 Managed	Product and process quality	Process measurement and analysis Quality management
3 Defined	Engineering processes & organization processes defined; Performance more predictable	Organization process focus Organization process defn. **Peer reviews** Training program Inter-group coordination Software product engineering Integrated software mgt.
2 Repeatable	Project management in place, individual performance repeatable	**Requirements Mgt.** **Software Project planning** **Software Project Tracking & Oversight** Software Quality Assurance **Software Configuration Mgt.** Software Subcontract Mgt. Software Test Mgt. [DRAFT]
1 Initial	Process informal and ad-hoc, unpredictable performance	



* sei.cmu.edu

Case #4: Began with SEI SW_CMM®

- Established QA/PMO Division; charged with Centralizing quality and program management
- Established and controlled Business Case, Charter, Plans,Schedule, $2.5M budget; staff of 7 planned to15
- Consulted stakeholder's short and long term business goals: achievement of SW_CMM Level 2 assessment in 18-24 months, and Level 3 thereafter as measured by the Interim Profile
- Conducted staffing skills identification and interviews for both the PI Program Team as well as for other areas across the organization
- Created and deployed corporate communication plan including kick-off materials, presentations, internal newsletter articles, etc.

Case #4: Began with SEI SW_CMM®

- Planned, developed, and implemented the *Process Improvement Cycle*:
- Utilized SEI's "Interim Profile" and conducted assessment to establish initial baseline for the SW_CMM Key Process Areas including Requirements Management, Project Planning, Project Tracking and Oversight, Configuration Management, Test Management, Subcontract Management, and Peer Reviews;
- Analyzed assessment results and identified areas for corporate-wide improvement; provided project assessment findings to project managers and a combined project / overall view to senior management
- Managed Program Staff who worked with specific assigned areas / projects to drive / implement improvements

Case #4: Began with SEI SW_CMM®

- Developed and published corporate action plan; created and published SW_CMM compliant policies, standards, and core processes; created process group [SEPG] and enabled members to establish, implement, and deploy BU TD level processes; provided leadership for BU TD level procedure definition
- Established and implemented metrics to meet SW_CMM's KPA requirements for "Measurement and Analysis" and to promote and report compliance progress; management oversight reporting provided weekly to CIO and staff and monthly during status meetings with Corporate IT CIO and numerous business unit IT CIOs
- Utilized phased approach to establish project level role (QA) that drove compliance to all policies, standards, core and facilitating processes, and use of tools and templates within the Process Improvement Program; PI Group representative assigned to project provided oversight and support; PI Group provided progress results to the CIO

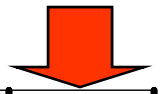
Case #4: Began with SEI SW_CMM®

- Provided consulting and mentoring; provide training curriculum [Level 3 KPA Training Program] for quality assurance and quality control; developed and delivered “survival training” to enable implementation of newly published policies, standards, and core processes
- Identified and led PI Group to identify specific PI Program WBS deliverables and activities to achieve them, that were then incorporated into the MS Project schedule with cost & duration estimates
- Developed and deployed PI Program’s Communications Plan; developed formal and informal presentations / training on Project Management, Requirements Management, Test Management, Configuration Management, etc.; published and rewarded successes
- Reported, tracked and managed program level issues/risks, change requests, corrective actions; lessons learned, reviewed for regular updates

Case #4: Enterprise PMO Transition

- Established Technology Division-wide project list that identified programs, projects, project managers, cost, current phase, assessment cycle schedule, etc.;
- Created and provide CMM compliant “Management Oversight” reports to CIO and CFO for use in strategic direction planning and control

***Real Life Case #5*:**



		#1	#2	#3	#4	#5
Used	SEI's *IDEAL*	Yes		Yes	Yes	
	SEI's Legacy SW_CMM	Yes		Yes	Yes	
	SEI's CMMi			Yes		Yes
	PMI's PMBOK	Yes		Yes	Yes	Yes
	Six Sigma	Yes		Yes		
	QAI's QACBOK and TQM		Yes			
	Enterprise PMO				Yes	
	Balanced Scorecard					Yes

Case #5: Balanced Scorecard

	Project Management	Business Process Improvement	Balanced Scorecard
Age of Approach	Decades	Began in DoD 1992	Began 1990
Prime Customer	External Sponsor	Internal Director	External & Internal Directors
Goal Definition	Project Requirements, Mission Needs Statement	Cost, cycle time reductions	Strategic management system
Focus	Technical Mission	Business Processes	Multiple perspectives
Scope	Specialized Unit	Unit to Enterprise	Dept. to Enterprise
Plans	Plan of Action & Milestones	Process Improvement Plan	Strategic Plan, Performance Plan
Schedule & Teaming	Work Breakdown Structure, Action Items	Team directed, focus groups	Cross-functional teams, 1-2 yr. implementation
Management Activities	Team Building, Budgeting, Task Tracking, Reviews	Baseline process analysis, to-be process design, automation	Define metrics, collect data, analyze data, decide on changes
Tools	MS Project, Primavera	TurboBPR, IDEFO	Data collection system, scorecards
Measures of Success	Deliverables on time, on budget	Cost reductions minus cost of BPI effort	Learning what strategies work; improved results on many metrics

Case #5: Balanced Scorecard

- Balanced Scorecard (BSC)
  http://www.balancedscorecard.org/basics/bsc1.html
- Two options for implementing new management methodologies in a traditional project management organization

  Recommend

  – train the managers in the new approaches and techniques
  – translate the new approaches into familiar project form, and treat them as conventional projects.

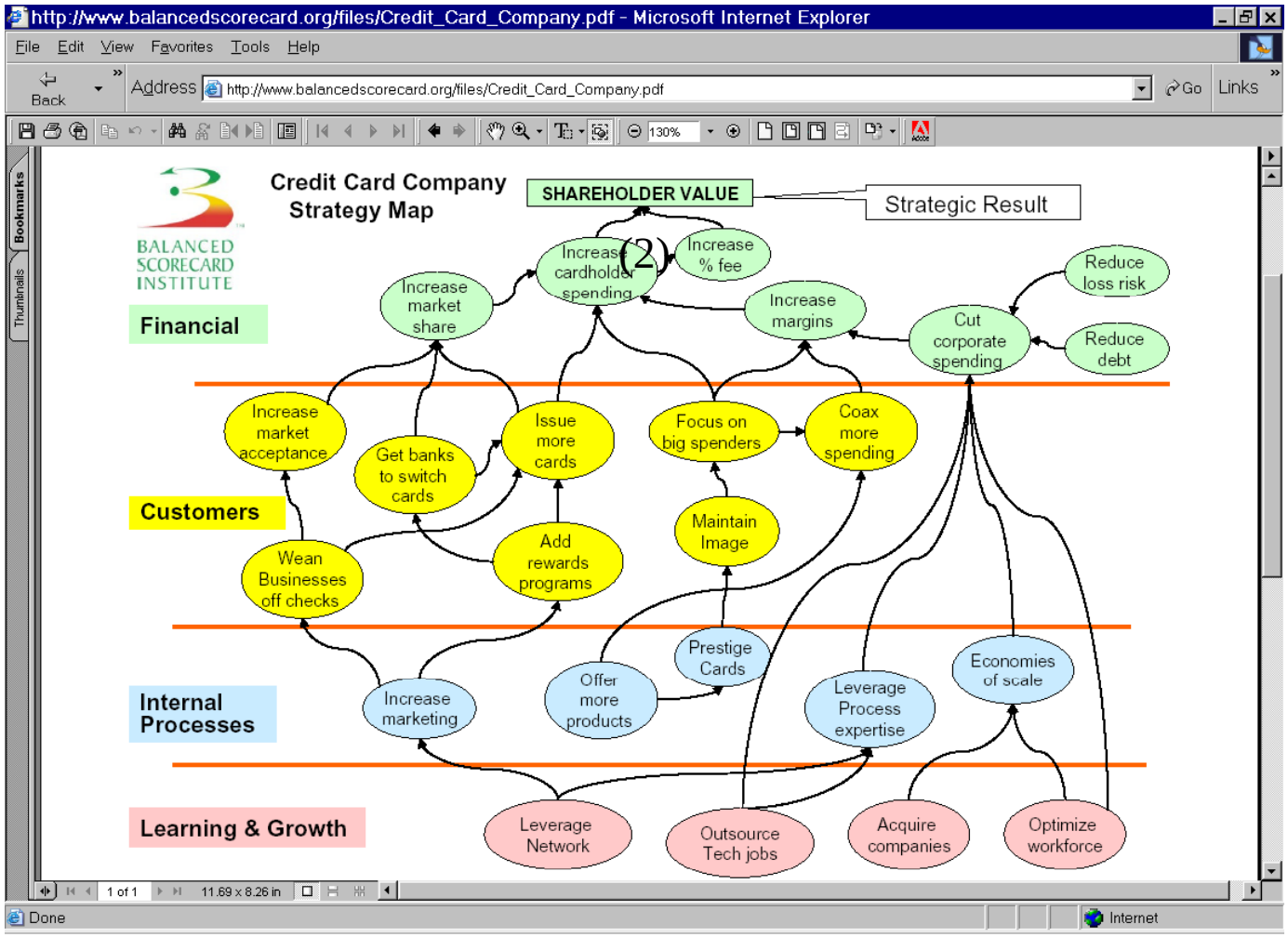
Case #5: Balanced Scorecard

The Balanced Scorecard (BSC) - Who's Doing It?

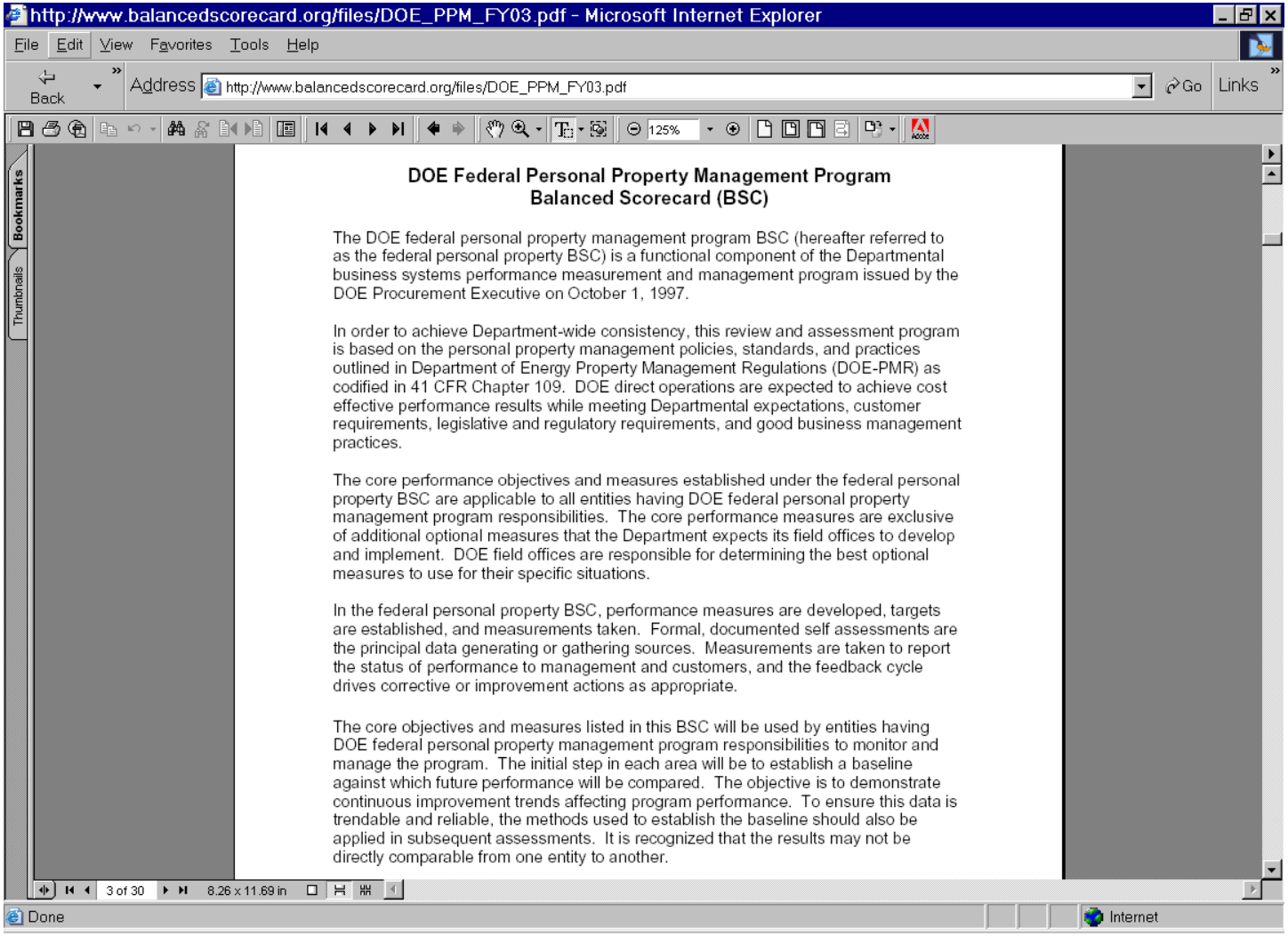
http://www.balancedscorecard.org/examples/index.html

- Database of working balanced scorecard examples
- By the end of 2001 about 36% of global companies are working with the balanced scorecard (per Bian)
  - much of the information in the commercial sector is proprietary, because it relates to the strategies of specific companies
  - Public-sector (government) organizations are usually not concerned with proprietary information, but also they do not usually have a mandate (or much funding) to post their management information on web sites.
- Link [website above] to data of organizations that have at least partial adoption BSC: *Adopters of the balanced scorecard*

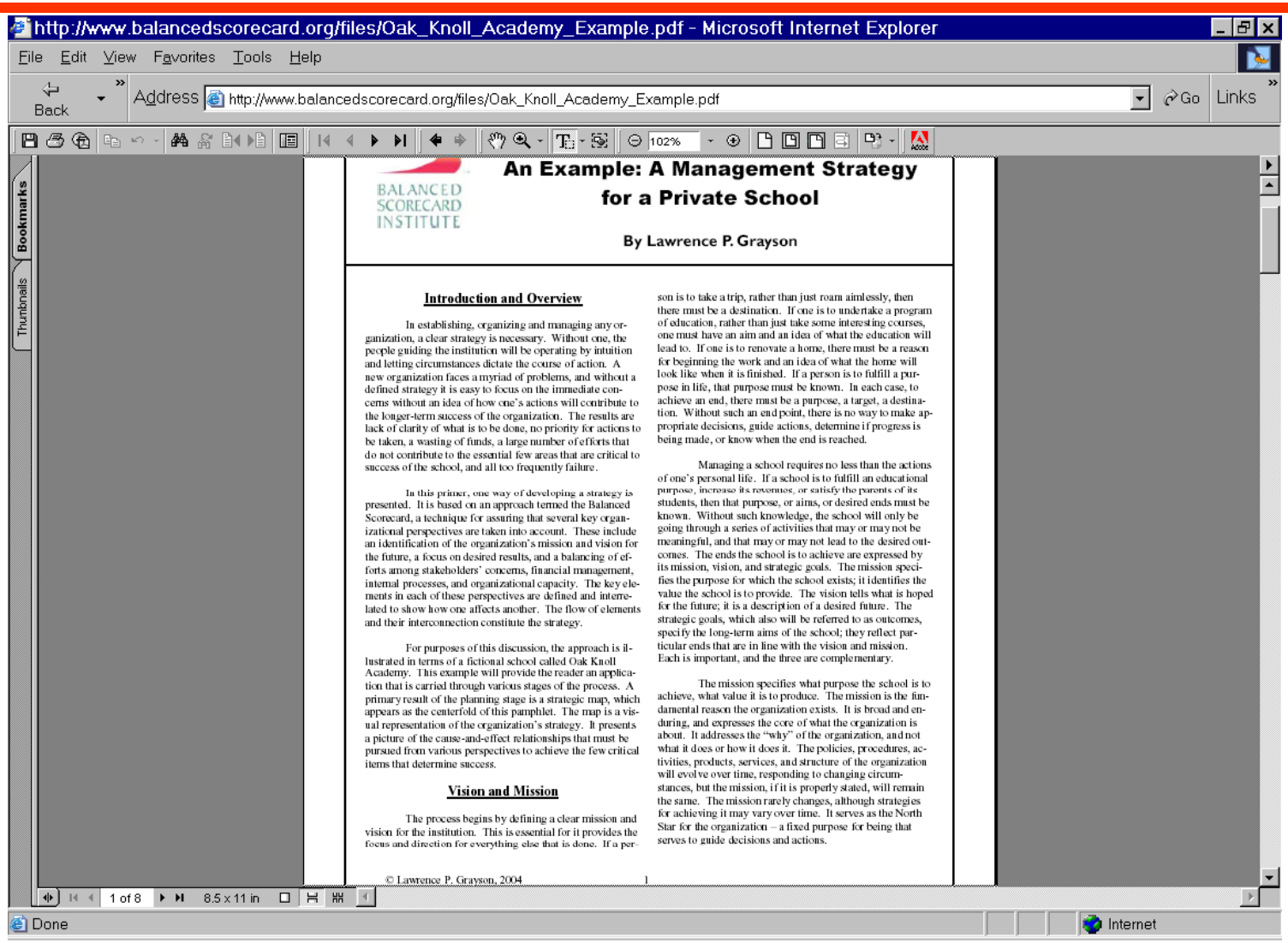
Case #5: Real Life Sample *Readable at 200%*



Case #5: Real Life Sample *Readable at 400%*

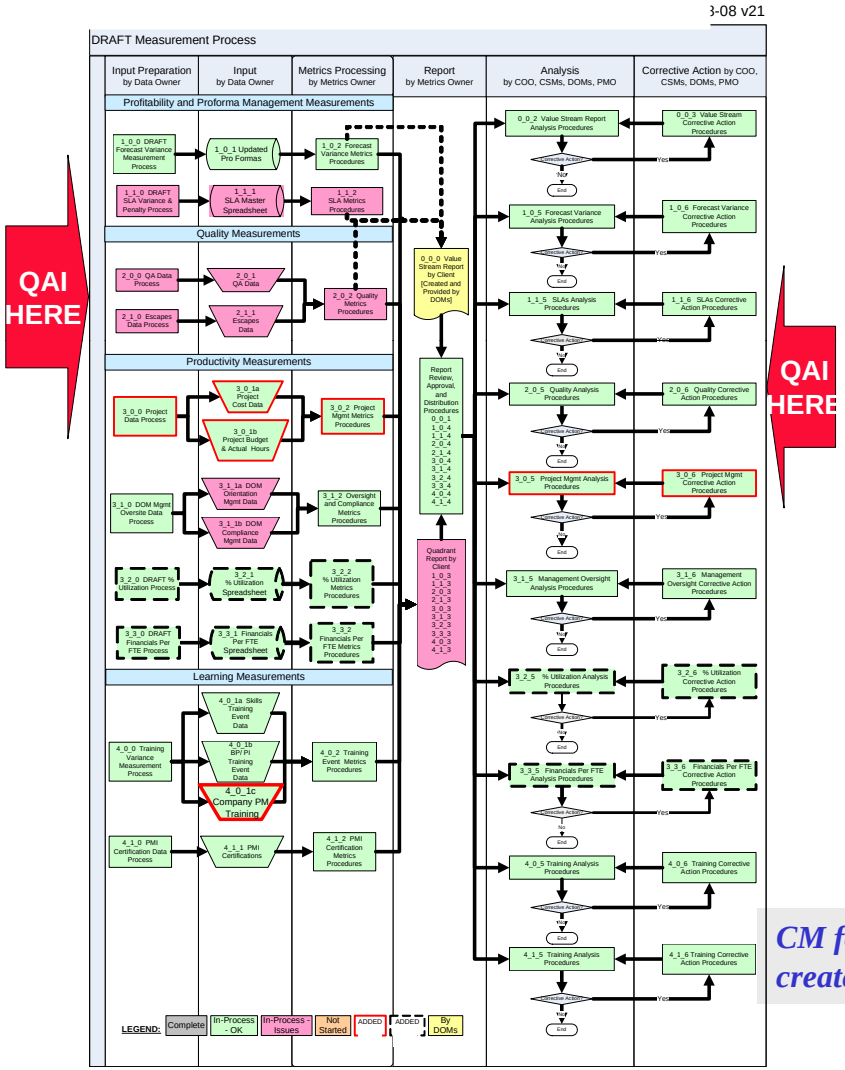


Case #5: Real Life Sample *Readable at 400%*



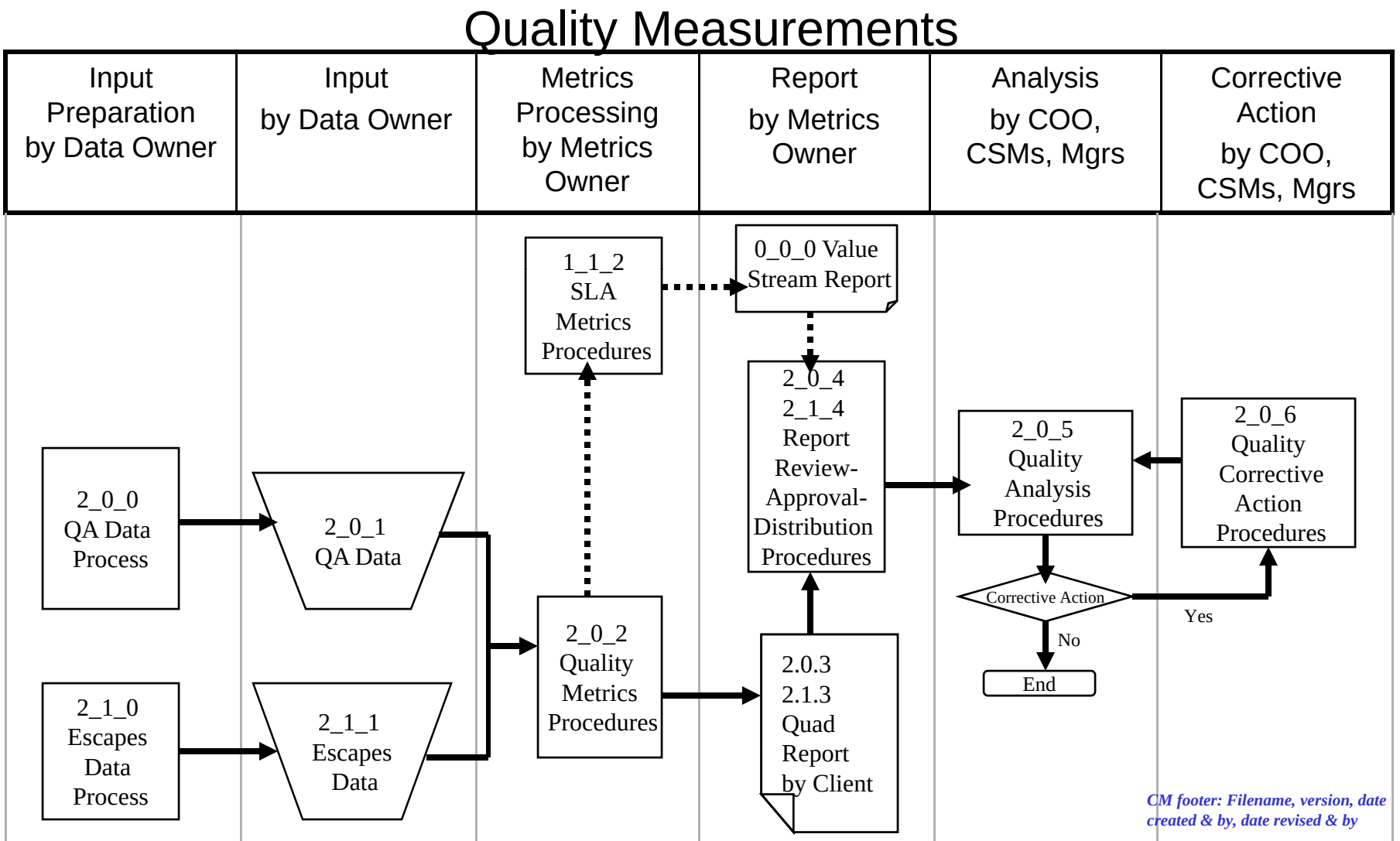
Case #5: Real Life Sample *Readable at 400%*

High Level Measurement Process:



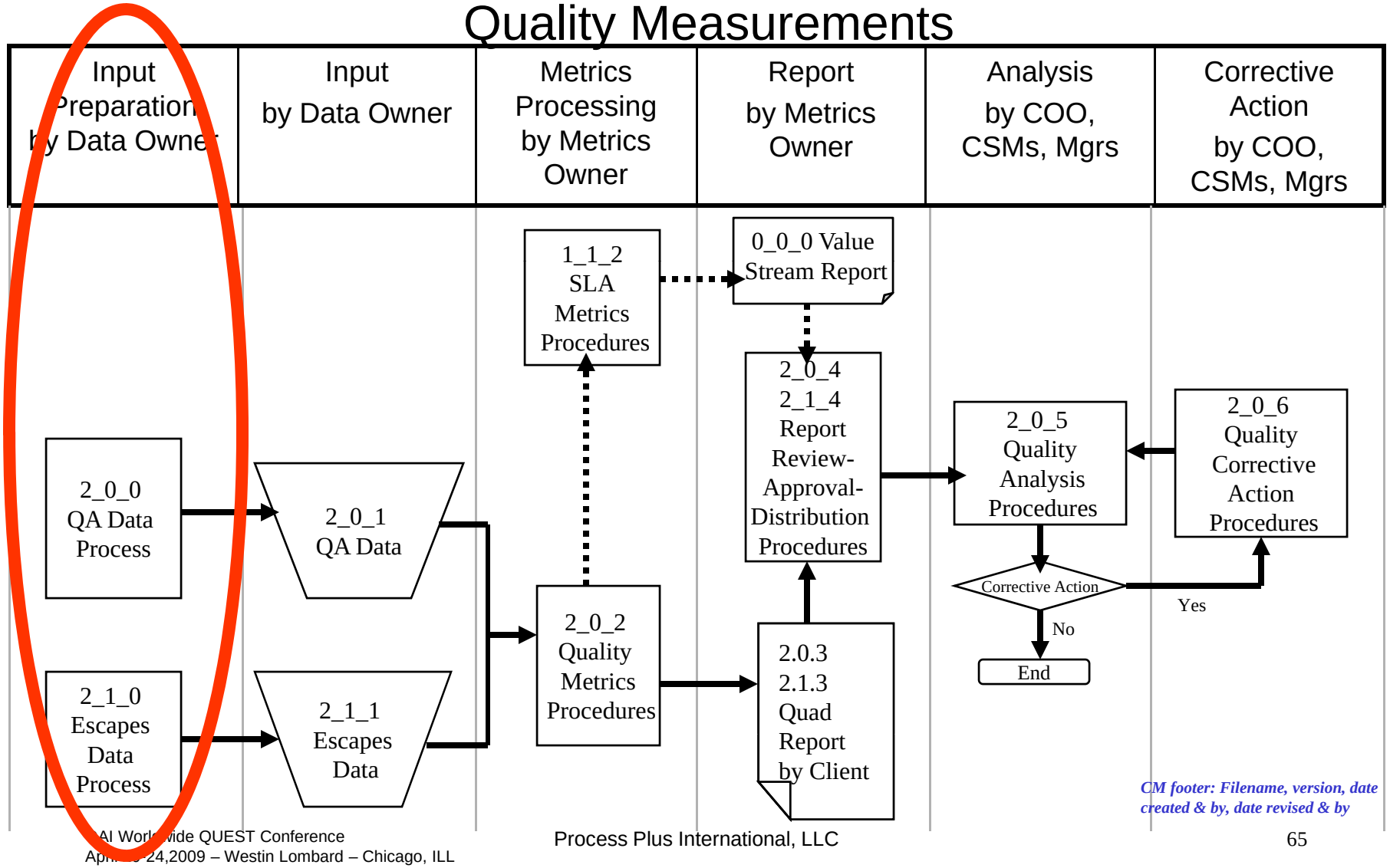
CM footer: Filename, version, date created & by, date revised & by

Case #5: Real Life Sample



CM footer: Filename, version, date created & by, date revised & by

Case #5: Real Life Sample



CM footer: Filename, version, date created & by, date revised & by

Case #5: Real Life Sample *Readable at 400%*

Procedures:

ABC Company

Process Name: 2_0_0, 2_1_0 Draft Quality and Escapes Variance Measurement Process	Goals: - All software and non-software changes are tested. - Reduce Post-Launch defects that are found in testing and produced earlier in the life cycle. - Number of Escapes is reduced.
Process Purpose: Communicate Quality and Escapes data for reporting, analysis and corrective action.	Process Alignment: Per 3yr Plan: In 2008, Move BU Monthly Forecast Variability from 4th Position to 2nd or better; Improve Quality; Retain Resources
Process Objectives and Measurement: Objective: - All software and non-software changes are tested. - Reduce Post-Launch defects that are found in testing and produced earlier in the life cycle. - Number of Escapes is reduced.	Process Manager: PMO Metrics Owner

Process Components

Environment: workspace electricity	Machines: desktop and operational network	Materials: paper
People: Client Services Managers [CSM], Directors of Operations [DOM], QA Test Group; Project Mangers, PMO Metrics Owner		
Methods: Excel; G: Drive; Reports from Mercury; SOP for Testing; SDLC Policies; QA/QC Processes; web linked Mercury Software at http://xxyyxxyy/start_a.htm		

INPUT →	Value Added Transformation →	OUTPUT
Supplier Process: N/A **Individual/Group:** Mercury Tracking tool; G: Drive artifacts [i.e., test request forms, estimates, test results, requirements documentation]	**Process Flow** 1.. Client Service Managers, Directors of Operations, Project Managers, and Data Integrity Specialists: - report all escapes to the QA Group. See instructions at: http://xyxyxyxy - identify all changes [software and non-software] and provide notification to the QA Group 2. The QA Group validates escape and change data is complete and correct. 3. The QA Group logs all escapes in the Mercury tracker tool for inclusion as 'post production' defects. 4. The QA Group determines where the escape originated; gains concurrence from CSM and/or DOM who reported it; and documents the origin in Mercury tracking tool. 5. The QA Group logs and tracks all defects found in system testing, UAT, and Post Launch. 6. On the ***first day of each month for each client***, the QA group: 6.1 - compares the list of software and non-software changes provided in step 1 to the actual changes that were tested; and creates the following Excel cells of weekly data for each client: 7. A separate QA person verifies, and validates the data is complete and correct prior to sending to PMO Metrics Owner. 8. Lessons Learned / Process Improvement suggestions/recommendations to PMO Metrics Owner	**Receiver Process:** MetProc_All Data_PMO MetOwnr Filename and path here **Individual / Group:** PMO Metrics Owner

Process Partners: ABC Company
Process Stakeholders: COO, BU Mgrs, DOMs, CSMs, Proj Mgrs, PMO, BU, Dir. Delivery Performance Systems, Finance
Process Influencers: Competitors
Process Maturity Level: Repeatable
Process Strategy: Move from current Initial/Level One CMMi process maturity to higher level.

Next Slide

Following Slide

Case #5: Real Life Sample *Readable at 200%*

ABC Company

Process Name: 2_0_0, 2_1_0 Draft Quality and Escapes Variance Measurement Process	Goals: - All software and non-software changes are tested. - Reduce Post-Launch defects that are found in testing and produced earlier in the life cycle. - Number of Escapes is reduced.
Process Purpose: Communicate Quality and Escapes data for reporting, analysis and corrective action.	Process Alignment: Per 3yr Plan: In 2008, Move BU Monthly Forecast Variability from 4th Position to 2nd or better; Improve Quality; Retain Resources
Process Objectives and Measurement: Objective: - All software and non-software changes are tested. - Reduce Post-Launch defects that are found in testing and produced earlier in the life cycle. - Number of Escapes is reduced.	Process Manager: PMO Metrics Owner

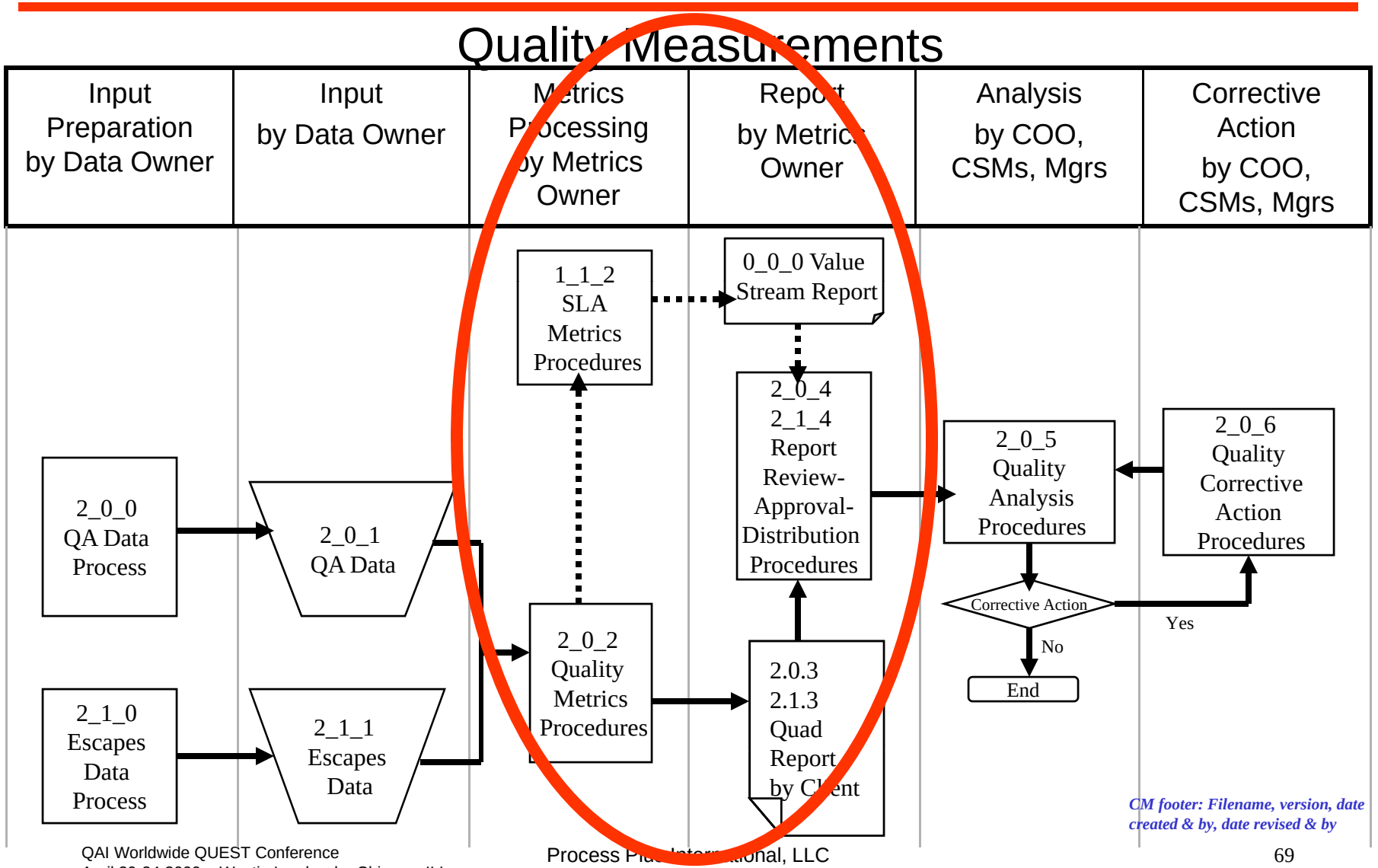
Process Components

Environment: workspace electricity	Machines: desktop and operational network	Materials: paper
People: Client Services Managers [CSM], Directors of Operations [DOM], QA Test Group; Project Mangers, PMO Metrics Owner		
Methods: Excel; G: Drive; Reports from Mercury; SOP for Testing; SDLC Policies; QA/QC Processes; web linked Mercury Software at http://xxyyxxyy/start_a.htm		

Case #5: Real Life Sample *Readable at 200%*

INPUT →	Value Added Transformation →	OUTPUT
Supplier Process: N/A **Individual/Group:** Mercury Tracking tool; G: Drive artifacts [i.e., test request forms, estimates, test results, requirements documentation]	**Process Flow** 1.. Client Service Managers, Directors of Operations, Project Managers, and Data Integrity Specialists: - report all escapes to the QA Group. See instructions at: http://xyxyxyxy - identify all changes [software and non-software] and provide notification to the QA Group 2. The QA Group validates escape and change data is complete and correct. 3. The QA Group logs all escapes in the Mercury tracker tool for inclusion as 'post production' defects. 4. The QA Group determines where the escape originated; gains concurrence from CSM and/or DOM who reported it; and documents the origin in Mercury tracking tool. 5. The QA Group logs and tracks all defects found in system testing, UAT, and Post Launch. 6. On the ***first day of each month for each client***, the QA group: 6.1 - compares the list of software and non-software changes provided in step 1 to the actual changes that were tested; and creates the following Excel cells of weekly data for each client: 7. A separate QA person verifies, and validates the data is complete and correct prior to sending to PMO Metrics Owner. 8. Lessons Learned / Process Improvement suggestions/recommendations to PMO Metrics Owner	**Receiver Process:** MetProc_All Data_PMO MetOwnr Filename and path here **Individual / Group:** PMO Metrics Owner

Case #5: Real Life Sample



CM footer: Filename, version, date created & by, date revised & by

Case #5: Real Life Sample *Readable at 400%*

Quality Metrics:

QUAD CHART QUALITY Excel Chts 2/19/0x Vx

Relates to G-Q-M Directory - Metrics_Quality file dated xx/xx/xx version #xx

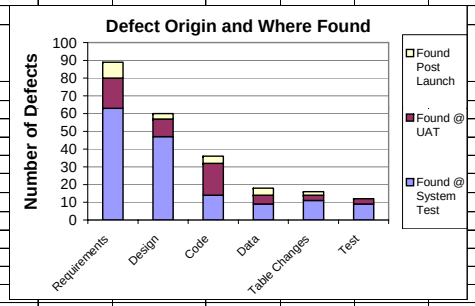
GROUP's Monthly data

Data for chart is from QA Group / Mercury Tool

Instructions COMPLETE 2/19/0x

Goal: Reduce Post Launch defects that are found in testing and produced earlier in the life cycle.

	Found @ System Test	Found @ UAT	Found Post Launch
Requirements	63	17	9
Design	47	10	3
Code	14	18	4
Data	9	5	4
Table Changes	11	3	2
Test	9	3	



Obtain Defect Data from QA Group [or data from Mercury in Excel spreadsheet]

Type data over the appropriate cells above [or copy and paste from another excel spreadsheet from Mercury.
CAUTION: copy & paset sections of the data so as not to LOOSE the entire existing chart.]

Look at chart details. Ensure format is correct.

Save this Excel file to same name, current date, and next higher version number.

Click on the chart [select the chart]; then copy

On that GROUP/Client's Quad Report, select and delete the current chart in the Qualilty section for -Testing Metrics - Goal: Reduce Post Launch defects that are found in testing and produced earlier in the life cycle.

Paste Special Picture [Windows Metafile] into each of the GROUP's Client Quad Reports in the Qualilty section for -Testing Metrics - Goal: Reduce Post Launch defects that are found in testing and produced earlier in the life cycle.

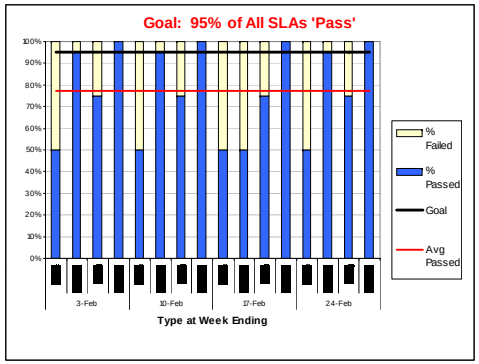
Click on Chart and resize as needed. The size of other charts may need to be adjusted to enable fit in Quad Chart.

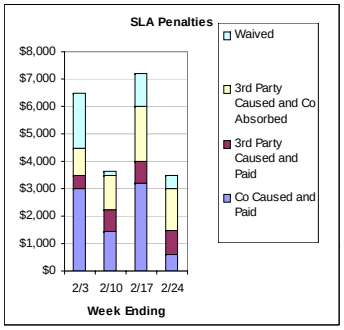
Doublecheck that chart inserted in Quad Chart is complete/correct [i.e, data, spacing, format, etc.]

Save the MS Word Quad Report file to same name with current date and next higher version number.

Case #5: Real Life Sample *Readable at 400%*

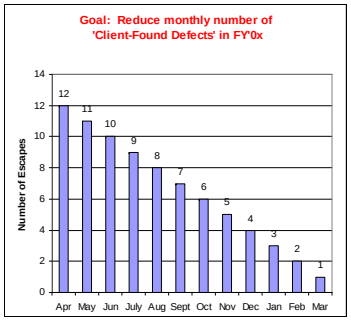
Profitability (by Group)

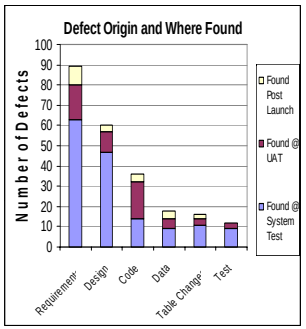


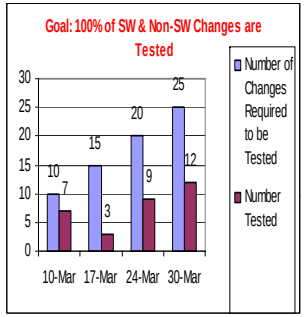


Quality (by Group)

Goal: Reduce Post Release defects that are found in testing and produced earlier in the life cycle life cycle.





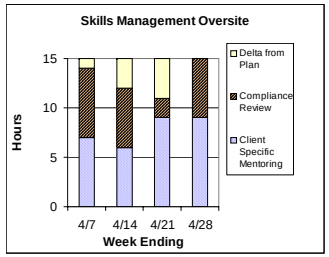


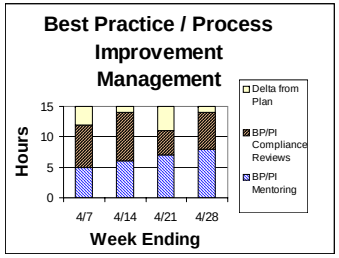
Productivity (by Group)

Goal: Variance between Wkly % Percent Budgeted Hours Used and % Work Completed is within plus or minus 10%.

Client/Group	Budgeted Hours	Projected Cost (in Dollars)	Actual Hours to Date	Actual Cost (in Dollars)	% Budget Used	% Work Complete	Variance
Client #1	1,393	$111,440.00	1,015	$79,726.00	72.86%	77.22%	4.36%
Client #2	0	$0.00	0	$0.00			
Group Name	**1,393**	**$111,440.00**	**1,015**	**$79,726.00**	**72.86%**	**77.22%**	**4.36%**

- Management Oversight Goal: 40% Wkly Mgmt Time is Coaching and Enforcing Compliance [by Group]





Learning (by Group)

- Goal: 100% Specialists Complete Skills Training by EOFY'0x

Total # of **'Specialist Classes'** Required		Actual # of **'Specialist Classes'** Completed YTD	% of Total **'Specialist Classes'** completed	% of **Specialists** that Completed Classes YTD		Variance
430		350	81%	70%		-12%

- Goal: All Designated Roles Attend Best Practices/Process Improvement Classes

Total # of **'BP/PI Classes'** Required		Actual # of **'BP/PI Classes'** Completed YTD	% of Total **'BP/PI Classes'** Completed YTD	% of **People** that Completed Required Classes YTD		Variance
600		300	50%	17%		-33%

- Goal: All Project Managers Complete Internal Training Classes by EOFY'0x

Total # of **'Internal PM Classes'** Required		Actual # of **'Internal PM Classes'** Completed YTD	% of **'Internal PM Classes'** Completed YTD	% of **PMs** that Completed 'Internal PM Classes' YTD		Variance
300		100	33%	100%		67%

# of PMs Who Hold Certifications YTD = 2

CM footer: Filename, version, date created & by, date revised & by

Lessons Learned:

The Impossible is Do-able and Rewarding

Lessons Learned: Models Change

- **CMMI®**
  - Sunset Version 1.1 Dec '07; then Version 1.2
  - SCAMPI Appraisal Method Improvements
  - Training Improvements
- **New Model: CMMI® For Services @ SEPG 2009**
- **Organizations choose/change model focus as Senior Management Changes**
  - One organization: CIO focused on CMM/CMMI, new CIO no model focus, next CIO CMMI with more Governance, etc.

Lessons Learned: Bad Excuses

Relating to ***Quality***:

- You cannot measure quality because you never can be sure how many defects you have not found.
- We take quality seriously, QA continuously audits compliance with the organizational process.

Relating to ***Formal Inspections***:

- We have formal reviews to find problems.
- We have formal inspections, …code walk-throughs followed by unit tests.
- We use advanced software technology..[iterative]..inspections do not apply.
- Inspections add too much to the cost of development.

Lessons Learned: Bad Excuses

Relating to ***Risk Management***:

- We deal with problems as they arise.
- We cannot identify risks based on industry metrics because our process is different.
- Our job is to develop software, not fill out bureaucratic forms.
- Our methodology is Rapid Application Development [RAD], so we have no schedule risk.

Relating to ***Configuration Management***:

- CM only applies to source code.
- CM does not apply since we use rapid prototyping.
- CM limits technical team flexibility.
- We cannot control our internal development because our development and CM tools are not integrated.

Lessons Learned: Bad Excuses

Relating to ***Schedule Problems***:

- We can get out of schedule problems by adding people; and/or performing fewer tests; and/or working overtime.
- It is a success-oriented schedule; when you challenge people they do great things.
- It is not our fault because…[reqmts not stabilized, contractors lack management skills, buyer slow in approvals, lost technical staff, etc.]

Relating to ***Cost and Schedule Control***:

- You can't predict cost and schedule when requirements are always changing.
- Our cost estimate is good because we use a cost estimation tool.
- Technical staff will not accept the degree of control necessary for Earned Value metrics.

Lessons Learned: Bad Excuses

Relating to ***People***:

- Training people costs to much; people are too busy for training; if we train them they will be worth more and leave
- We won't meet the schedule because people are burnt out.
- Anyone can learn to be a [engineer, project manger, etc.] in a few months.
- There is no shortage of skilled [engineers, managers, etc.]. Haven't you heard about the massive [layoffs, job losses]?

Relating to ***Process***:

- If we follow organizational process we will automatically have high productivity and low cycle time.
- We don't measure process improvement because it is not required.
- We have good people; we don't need process.
- It is a good process because it is repeatable.

Lessons Learned:

Process Improvement *IS NOT* 'One Size Fits All'

- Business Needs are the basis for Process Improvement
- Size and Shape of PI is determined by Business Needs
- Organizational culture, politics, etc. *DO* affect Process Improvement success
- Strong Sponsorship is mandatory; determine and meet key priorities of Sponsor

No Crystal Ball For I.T. http://www.cio.com/archive/070105/keynote.html

- You Can't Always Know What You Want
- Succeed sooner: fail early and often
- Budget/finance incrementally
- Match incremental investment iteratively to project prototypes
- Great technology looking for a business problem causes IT project failure

Lessons Learned: Warnings

- **CMM Ratings**
  - "U.S. CIOs want to do business with offshore companies with high CMM ratings. But some outsourcers exaggerate and even lie about their Capability Maturity Model scores."
    http://www.cio.com/archive/030104/cmm.html
- **Six Sigma**
  - "One word of warning: A cautious CIO might be tempted to try a little bit of Six We tried too hard to go part-time on some of this stuff, so projects were taking too long. Now we try to focus black belts full-time on a project, and in most cases we're seeing between $1 million and $3 million in benefits," he says." Sigma here and there to see if it works. That's a mistake, says Costa. "http://www.cio.com/archive/120103/sigma.html

Lessons Learned: Six Sigma

Six Sigma Best Practices http://www.cio.com/archive/120103/sigma.html

- Pick the right people: start with best and brightest and show that Six Sigma training accelerates careers; achieves a waiting list for black belt training
- Give trained people a project right away
- Don’t just throw technology at a business problem, all you wind up with is a bad process with new technology
- Don't get bogged down in numbers: understand what you're measuring
- The "define" phase in DMAIC is the most important part of the discipline, and it's the one that involves the fewest metrics.

"Chartering the team and specifying who the customers are and defining what a good experience is and what's a defect, that's where the value is,"

Lessons Learned: Optimize ROI

[SPI] Cost benefit analysis for process improvement...?

http://groups.yahoo.com/group/spi/message/3717

- Cannot do everything first and eventually intend to make all improvements, a tactical approach:
  - ask the business what its highest priority software-related problem is,
  - do root cause analysis of that problem
  - make the improvement that would address the most major root causes
  - validate that the "improvement" actually did lead to better results,
  - Repeat until satisfied.
- Maximizing ROI: suggest focus on improving end-to-end value flow vs optimizing individual process steps at expense of entire process
- Look into Lean Software Development (http://www.poppendieck.com/): how to effectively optimize overall value flow

Lessons Learned: Sponsorship

- Relationships are key; understand requirements / acceptance criteria
- Guide/Mentor the Sponsor to understand their Roles and Activities
- Project Manager has Roles and Responsibilities to the Sponsor

Problem*	Possible Causes*	Solutions*	Field Tested Solutions by Others
Overcontrol	Style, Lacks Confidence in Team, Quicken Project, Team Approach is Uncomfortable	Sponsor ask for facilitation guidance/activities; pose questions versus statements; ask seasoned sponsors about a like situation	Communicate; offer feedback professionally; identify clear aiming pint/needs & satisfy consistently; incremental results; Escalation Process; Process & Project Mgmt
Too Close/Too Far From Team; Fluctuations	Role Not Clear; Reacting to Quickly or Assuming No Problems; Style is Directive or Overcompensates	Sponsor ask PM for feedback, facilitation guidance; ask seasoned PM about like situation	Process & Project Mgmt; Communication Plan; elevator speech
Not Enough Time	Crisis, increased workload, delegation issues, prefers 'fire fighting', project deemed low priority	Delegate; empower PM to direct team; assign facilitator to work with team who contacts sponsor when needed; ask experienced sponsor to take over for awhile; reduce team meeting frequency	Process & Project Mgmt; Communication Plan; elevator speech; identify & address resistance
Overburdened	Scope explosion; unexpected risk/complexity; PM inadequate; resistance; date moved forward - urgency increased	Delegate; empower PM to direct team; assign facilitator to work with team who contacts sponsor when needed; rotate PMgr	Process & Project Mgmt; Communication Plan; elevator speech
Manipulating the Team	No trust/see no value in Teaming; uses team to present idea to avoid appearing 'self serving'	Consider team recommendations; understand agenda; identify/analyze pros & cons;	Process & Project Mgmt; Communication Plan; elevator speech
Not Sharing Insights /Ideas	Does not realize needs to provide broad perspective to generate insights, anything that saves time helps	Ask if too close/too far from team; if suggestions would help/hinder team	Process & Project Mgmt; Communication Plan; elevator speech;

* The Project Sponsor Guide Neil Love and Joan Brant-Love 2000

Lessons Learned: Resistance

- Expect resistance; get resistance out into the open
- 20-50-30 Rule [change friendly, neutrals, resisters]

  or

  10-40-40-10 Rule [innovators, acceptors, skeptics, never]

- Explain the change rationale; provide a clear aiming point; choose opening moves carefully
- Take care of 'me' issues; judiciously involve people; promise problems
- Over-communicate; wear your commitment on your sleeve
- Beware of bureaucracy; alter reward system to support change
- Make sure people have the know-how; measure results
- Outrun the resisters

When change hits, move YOURSELF first!

Resistance: Moving Beyond Barriers Price Pritchett 1996

Lessons: CMMI Adopters

- **Current adopters can help**
  - SEI Published Appraisal Results @ //sas.sei.cmu.edu/PARS/pars.aspx
  - LinkedIn Discussion Group: CMMI Adopters @ linkedin.com/groups?gid=40011&trk=hb_side_g

SEI CMMI Products v 1.1 CD; ExecGuide v0.5.doc; 2/2002

Lessons: Traps and Time Wasters

- Have process group meetings with no project representation.
- Don’t link process to product quality, cost, schedule, and performance.
- Let experts/zealots write the procedures.
- Management should dictate process changes without any coordination, because it speeds things up.
- Don’t bother to capture the hearts and minds of middle management.
- Select your most important project as your [model] CMMI pilot–get biggest bang for your buck.
- Align your practices exactly to the [model] CMMI, instead of to what you do.

SEI CMMI Products v 1.1 CD; ExecGuide v0.5.doc; 2/2002

Summary

Summary

- Base process improvement on business objectives; trace through implementation; measure ROI
- Models/frameworks are the foundation; need to expand depth and breadth in order to successfully implement
- Choose and use models/frameworks wisely
- Implementation is key; implement compliant processes and measure compliance
- Change takes time, commitment, resources

Questions? Need help?
Contact info is on title page...

References

References

Books	CMMI: Guidelines for Process Integration and Product Improvement	by Mary Beth Chrissis; Mike Konrad; & Sandy Shrum www.sei.cmu.edu/publications/books/process/cmmi-process-int-prod-improve.html
	CMMI® Distilled: A Practical Introduction to Integrated Process Improvement, Second Edition (Paperback)	by Dennis M. Ahern, Aaron Clouise, and Richard Turner
	*Jumpstart CMM/CMMI® Software Process Improvements: Using IEEE Software Engineering Standards (**Note: Level 2 Focus)*	by Susan K. Land (Paperback - January 27, 2005)
	Practical Support for ISO 9001 Software Project Documentation using IEEE Software Engineering Standards (Practitioners)	by Susan K. Land, John W. Walz (Paperback - April 7, 2006)
	The Project Sponsor Guide	by Neil Love and Joan Brant-Love, Project Management Institute 2000
	What is SIX SIGMA?	by Pete Pande and Larry Holpp
Publications & Presentations	*All Together Now: CMM, CRM, ERP and Six Sigma*	http://www.cio.com/archive/120103/sigma_sidebar_1.html
	Assessing Readiness for (Software) Process Improvement	by Hans Sassenburg http://www.methodsandtools.com/archive/archive.php?id=35
	Balanced Scorecard Examples	http://www.balancedscorecard.org/examples/index.html
	Capability Maturity Model® Integration (CMMI®) Overview	www.sei.cmu.edu/cmmi/adoption/pdf/cmmi-overview05.pdf
	Case Studies, White Papers, Library	http://www.savvion.com; http://www.robbinsgioia.com
	CASE STUDY: What is continuous improvement?	http://www.bizmanualz.com/articles/02-08-05_Process_Improvement.html?email=ID111
	CMMI	www.sei.cmu.edu/cmmi/adoption/pdf/shrum-phillips04.pdf
	CMMI	www.sei.cmu.edu/cmmi/presentations/euro-sepg-tutorial
	CMMI Mappings to SW-CMM or EIA/IS 731	www.sei.cmu.edu/cmmi/adoption/comparisons.html
	CMMI Usage, Preparation & Appraisal Process	www.sei.cmu.edu/cmmi/adoption
	CMMI Usage, Preparation & Appraisal Process	www.sei.cmu.edu/cmmi/adoption/early-adopters.html
	CMMI® How to Select a CMMI Representation	www.sei.cmu.edu/cmmi/adoption/cmmi-reps.html
	CMMI® Maturity Profile Report	http://www.sei.cmu.edu/appraisal-program/profile/profile.html
	CMMI® Models and Modules	http://www.sei.cmu.edu/cmmi/models/models.html

References

Publications & Presentations (contd.)	CMMI® Partners for Appraisals & Reports	http://partner-directory.sei.cmu.edu
	CMMI® Training Dates & Locations	www.sei.cmu.edu/products/courses/course-by-location.html
	CMMI® Transition Aids	http://www.sei.cmu.edu then search for CMMI Transition Aids
	CMMI® V1.1 - "Improving Processes for Better Products"	Mike Phillips & Mike Konrad SEI, SEPG 2002
	CMMI®: Ask the right questions/obtain estimates	www.sei.cmu.edu.appraisal-program
	CMMI®: How to Select CMMI Disciplines	www.sei.cmu.edu/cmmi/adoption/cmmi-discs.html
	CMMI®: Training Available	www.sei.cmu.edu/cmmi/trainng/training.html
	Executive Eye: What does CMMI® Level 5 mean for the CIO?	Syran Kant, International Conference on Software Process Improvement, Orlando, FL, April 3rd-7th 2006
	GUI Testing Checklist	by Barry Dorgan http://www.methodsandtools.com/archive/archive.php?id=37
	How Six Sigma fits with process-improvement and value methodologies	http://www.cio.com/archive/120103/sigma_sidebar_1.html
	How Six Sigma Works in IT	http://www.cio.com/archive/120103/sigma.html
	Introduction to CMMI® Staged Representation Version 1.1	2002-2003 by Carnegie Mellon University; Class by PS&J under licensed agreement with the SEI
	List of Published SCAMPI Appraisal Results	http://seir.sei.cmu.edu/pars/pars_list_iframe.asp
	No Crystal Ball for IT	http://www.cio.com/archive/070105/keynote.html
	Process Improvement: Based on Models - Implemented in Reality	Barbara Ainsworth, PMP, CSQA, CSTE; Quality Assurance Institute's International SW QA & Testing Conference 2005
	Process Improvement: Emerging Software for Engineering Firm's Key To Competition in the 21st Century	Robbins Gioia Case Study: FuGEN Technologies, Inc. 1/28/2006
	SCAMPI B&C Handbook (available to public soon)	www.sei.cmu.edu/appraisal-program/publications/index.html
	Six Sigma / CMMI® Measurement Infrastructure	http://www.sei.cmu.edu/sema/pdf/sdc/siviy.pdf
	Six Sigma Comes to IT	http://www.cio.com/archive/120103/sigma.html
	Six Sigma process improvement project…	http:/www.flexpi.com
	SPICE Document Suite	http://www.sqi.gu.edu.au/spice/
	Sunsetting Version 1.1 of the CMMI® Product Suite	http://www.sei.cmu.edu/cmmi/adoption/sunsetcmmiv11.html

References

Publications & Presentations (contd.)	*Transitioning to CMMI®: A Guide for Executives*	SEI CMMI Products v 1.1 CD; ExecGuide v0.5.doc; 2/2002
	What is Continuous Improvement?	http://www.bizmanualz.com/articles/02-08-05_Process_Improvement.html?email=ID111
	What is the Balanced Scorecard	http://www.balancedscorecard.org/basics/bsc1.html
	Your Six Sigma Measurement Infrastructure…and Beyond	http://www.sei.cmu.edu/sema/pdf/sdc/siviy.pdf
Websites:	Balanced Scorecard	http://www.balancedscorecard.org
	CIO Magazine	http://www.cio.com
	ISO Certified Companies	search Yahoo.com by ISO CERTIFIED COMPANIES
	Malcolm Baldrige National Quality Award	http://www.baldrige.nist.gov; http://www.baldrige.nist.gov/Award_Recipients.htm
	Methods & Tools: practical and free knowledge for the software developer, tester and project manager	http://www.methodsandtools.com/archive/archive.php?id=35
	Open forum for exchanging info on Software Process Improvement (SPI).	http://groups.yahoo.com/group/spi/
	Process Improvement	http:/www.yahoo.com search for "process improvement'
	Project Management Institute (PMI)	http://www.pmi.org
	Quality Asssurance Institute	http://www.qaiworldwide.com
	SEI - Software Engineering Institute Information Repository of Data	http://www.sei.cum.edu; click on SEIR; must register; can de-register; no cost
	SEI FAQ: Sunsetting of SW CMM	http://www.sei.cmu.edu/cmmi/adoption/sunset-faq.html
	SEI How Will Sunsetting of the SE CMM Be Conducted	http://www.sei.cmu.edu/cmmi/adoption/sunset.html
	Six Sigma	http://www.ge.com/sixsigma
	SPICE	http://www.sqi.gu.edu.au/spice/
	Systems and Software Consortium	http://www.software.org
	The IT Metrics and Productivity Institute	http://www.itmpi.org/
	Universal Modeling Language (UML)	http://www.uml.org