



BUSINESS RESULTS THROUGH PROCESS

Implementing a Software Improvement Program in a Large, Fast Paced Organization

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Siemens Medical Solutions Health Services

Agenda

- Company Overview
- Corporate Quality Initiatives
- Software Process Improvement Program
- Lessons Learned and Summary

SIEMENS

- **SIEMENS** dedicates 55,000 people and between \$5 billion and \$6 billion globally to R&D, **every year**
- Forty percent of the automobiles rolling off the world's assembly lines have **SIEMENS** technology inside.

SIEMENS Business Segments

- Information and Communications
- **Medical Solutions**
- Automation and Control
- Lighting
- Power Generation & Distribution
- Transportation

SIEMENS Medical Solutions

- **SIEMENS'** ultrasound systems are used to perform more than 700,000 exams every day
- Every business day, **SIEMENS** Provides radiation therapy systems used to treat 29,000 cancer patients

SIEMENS Medical Solutions Units

- Angiography, Fluoroscopic- and Radiographic Systems
- Computed Tomography
- Magnetic Resonance
- Vacuum Technology
- Nuclear Medicine
- Special Systems
- Electromedical Solutions
- Audiology
- Oncology Care Systems
- Ultrasound
- **Health Services**
- Software Components and Workstations
- Customer Services

SIEMENS Medical Solutions Health Services (HS)

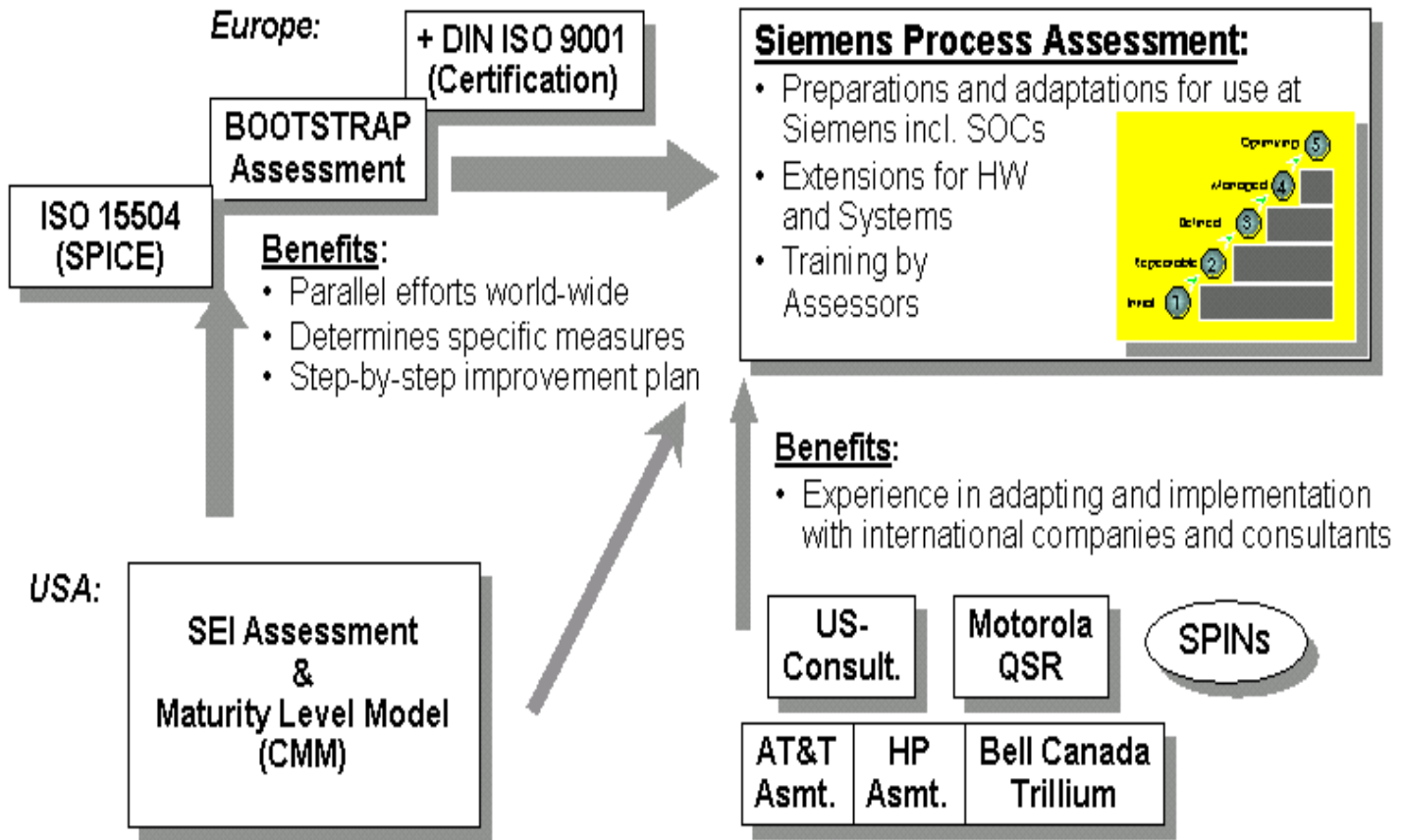
Develop software solutions and services for the Healthcare Industry.

- Formally Shared Medical Systems (SMS), acquired in July 2000
 - ◆ “Med Meets IT”
- Located in Malvern, PA
- ~5,300 U.S.-based employees
- Our Centers of Excellence
 - ◆ Financial Systems
 - ◆ Clinical Systems
 - ◆ Integrated Systems (Workflow)
 - ◆ Managed Services
 - ◆ Technology Services (ASP)
- Siemens Information Services Center processes **136 million transactions per day** (greater than 1,000 transactions per second)

Definitions – Our Lingo

- BPO – Business Process Owner
- SPO – Sub-Process Owner
- QP – Quality and Productivity Manager
- EFQM – European Foundation for Quality Management
- BPR – Business Process Engineering
- QMS – Quality Management System
- TOP+ - **SIEMENS** Business Excellence Program
- SLC – Solution Life Cycle Business Process

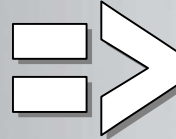
SIEMENS CMM Based Assessment



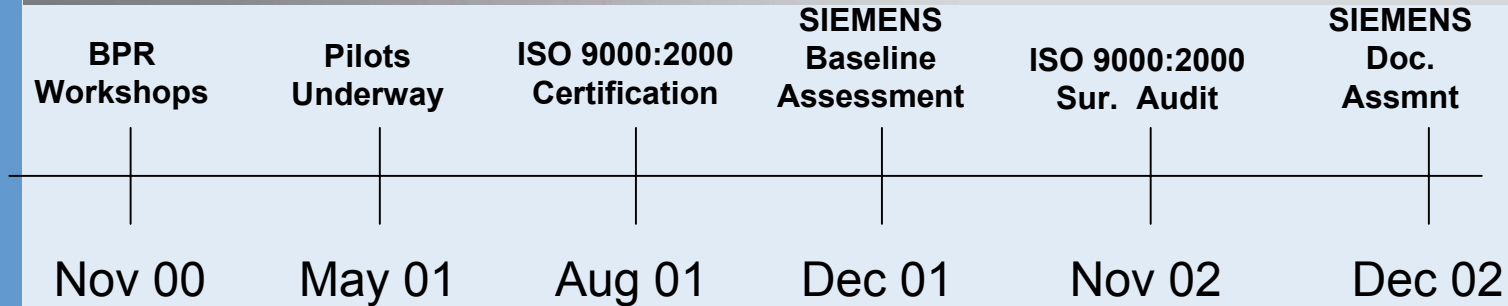
HS Business Process Re-Engineering A Transformation

HS Process Re-Engineering Timeline

SPEED



BUSINESS RESULTS THROUGH PROCESS



HS Process Management

Identification

Definition

Implementation

Optimization

Business Process Re-Engineering

Process Improvement

- Business Excellence Workshop I **150 Top Managers**
- Business Excellence Workshop II
300 Managers, Process Candidates
- Process Integration Workshop Jan 2001
375 Process Experts
- Cont. Improvement Educ. for QP's
375 Process Experts
- Cross Process Integration Feb 21, 2001
 Implementation Start March, 2001
 Migration Plan **The Company: 5,300 People**

ISO Certification

Quality Manual

- Business Segment's ISO9001 Documentation
 Jan 2001
- ISO9001 Pre-Audit
 May 10 - 18, 2001
- Pilot Period
 May/June 2001
- ISO9001 Certification Achieved
 August 6 - 12, 2001



Business Processes

Process Owners

Sub-Process Owners

QP Managers

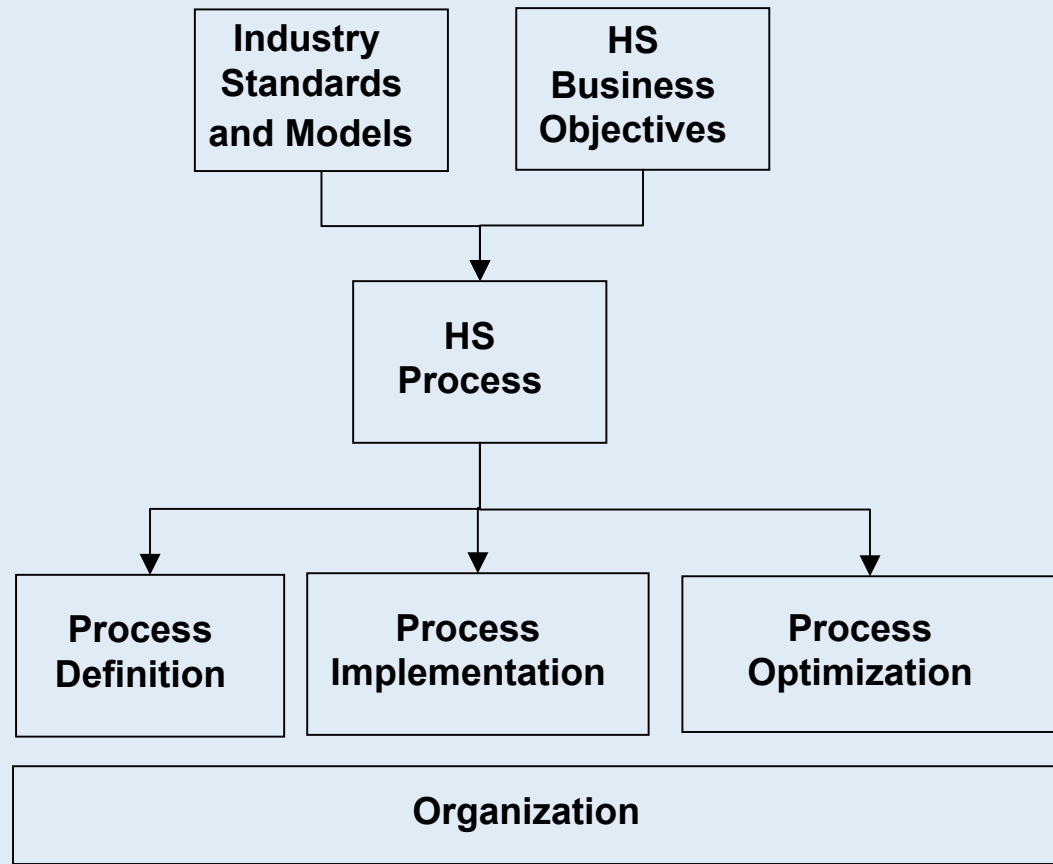
Integrated Process Map

QMS Process/Tool Relationship

Intranet Navigation Tip Sheet

IMS Erlangen Processes

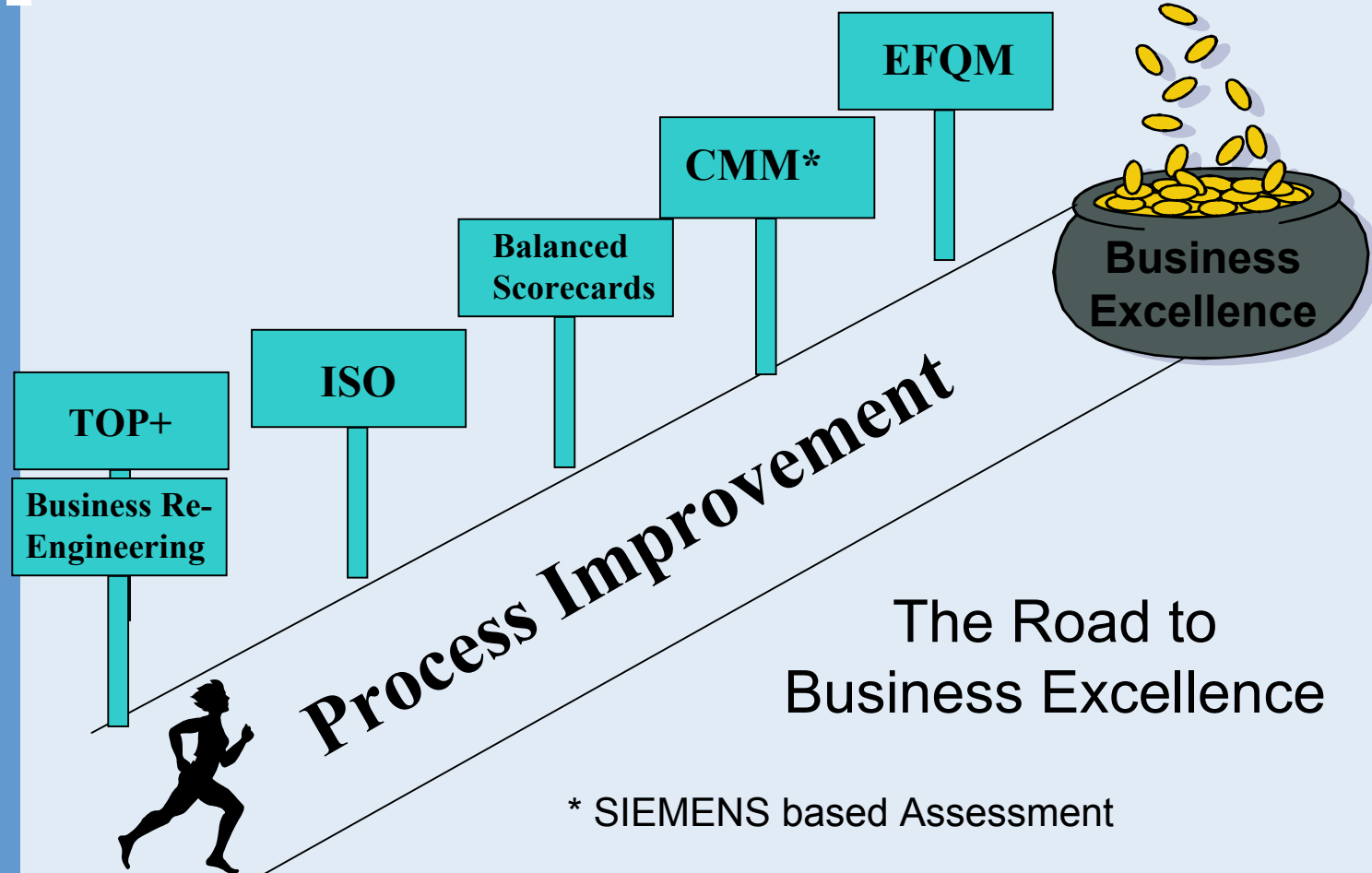
HS Process Framework



Industry Standards and Models

- BPR, TOP+, ISO, CMM, EFQM, Balanced Score Cards all provide methods, tools and assessments of Process Improvement
- Each provides a different view and focus of the process improvement efforts
- All have the overriding goal of improving processes, increasing customer satisfaction and improving quality.
- Its important to APPLY the Standards and Models to your organization and align to your business vision and objectives
- Need to buffer your organization and present a single process model to the organization

Industry Standards and Models



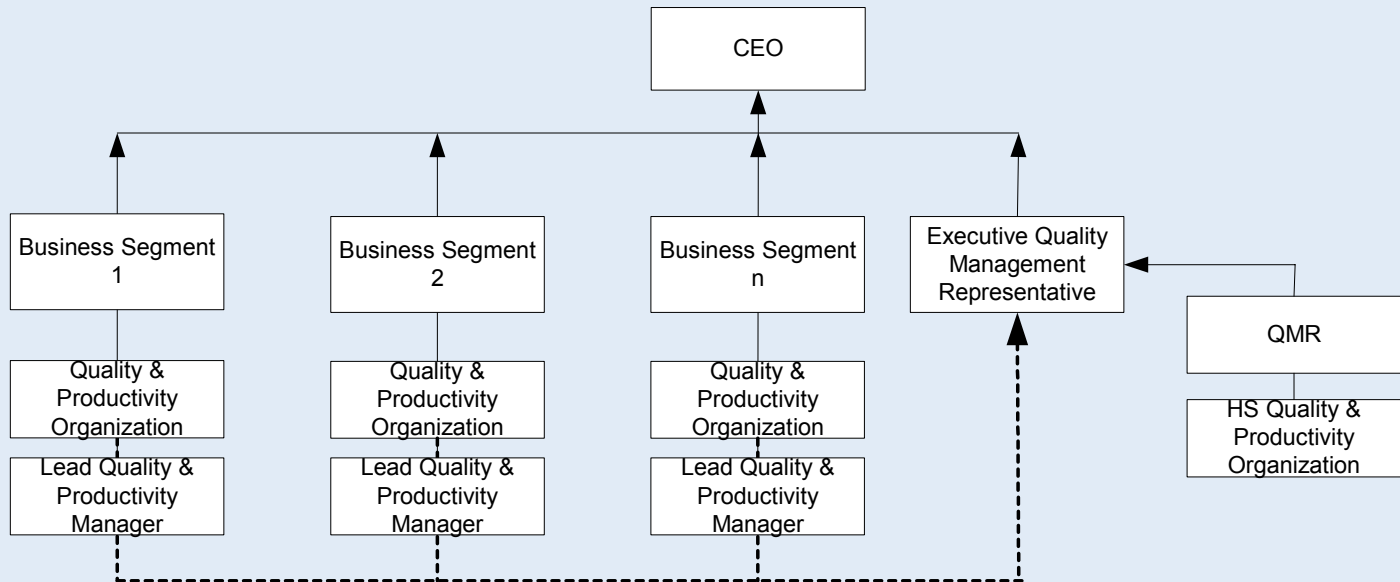
The Road to
Business Excellence

* SIEMENS based Assessment

HS Process Management

- Process Meta Model
 - ◆ Standard for process definition
 - ◆ Enables Integration of all QMS Processes
- Process Management Processes
- Metrics Program
 - ◆ Process Metrics
 - ◆ Balanced Score Card
- Process Published to Intranet
- In-house Tools for Process Definition and Authoring
- TOP+ provides principles and tools for Process Management

HS Quality Organization



Commitment

- Process Initiatives are driven from **SIEMENS**
- Visible Senior Management Commitment
 - ◆ Bi-monthly SET meetings (CEO + 1 level of reports)
 - ◆ Monthly Executive Group meetings (CEO + 2 levels of reports)
 - ◆ Monthly managers meetings
 - ◆ Quarterly employee meetings
- COO responsible for overall business process introduction / re-engineering
- Creation of corporate quality group
- Deployment of resource to process definition and quality roles
- Quality objectives set yearly by and for SET
 - ◆ Part of everyone's performance objectives

Business Objectives

- Well Rounded Quality Objectives (SLC)
 - ◆ Customer Satisfaction
 - ◆ Defect Density
 - ◆ Milestones Met
 - ◆ Process Maturity
 - ◆ ISO Compliance
 - ◆ **CMM Based Rating – Bottom up**

Process Management in the SLC

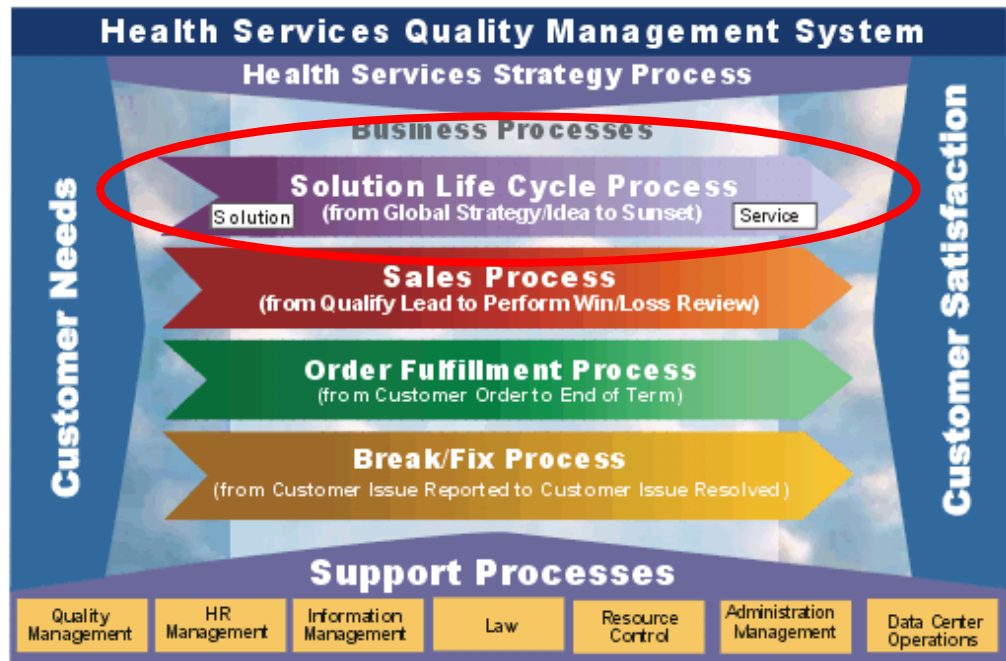
Practice What You Preach

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Processes Roles Artifacts Templates Metrics References Glossary Procedures Segment Info

- Business Processes
- Process Owners
- Sub-Process Owners
- QP Managers
- Integrated Process Map
- QMS Process/Tool Rltship
- Intranet Navigation Tip Sheet
- IMS Erlangen Processes



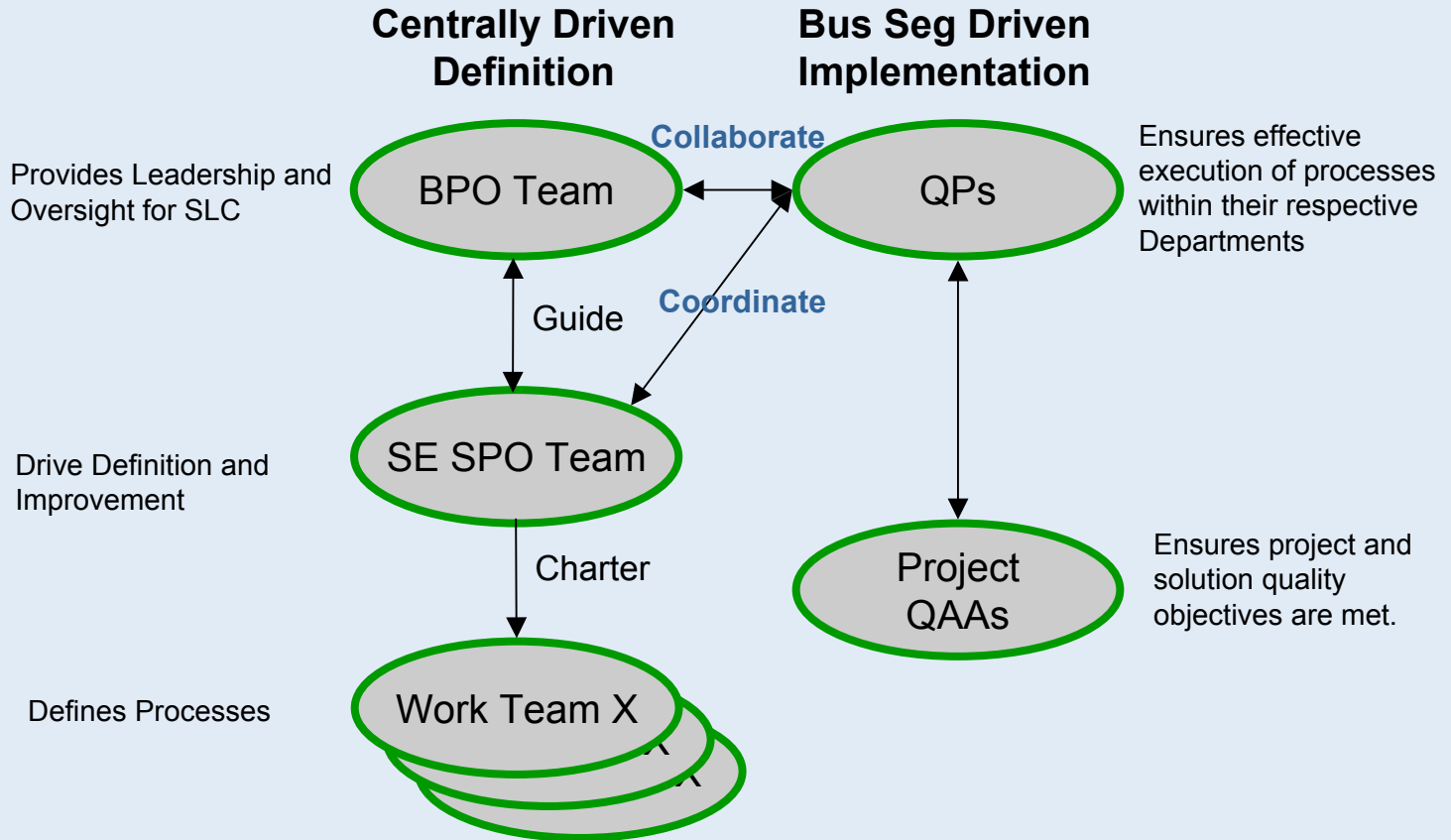
SLC Vision

- Establish a world-class SLC process that drives profitable business results while we:
 - ◆ Leverage CMM action plan to improve CMM level
 - ◆ Meet ISO criteria
 - ◆ Meet Migration Plan dates
 - ◆ Leverage both internal and external expertise
 - ◆ Use industry best practices

Software Process Challenges

- ~1700 Employees involved in Software Development.
- Project Size
 - ◆ Small Projects 1-2 FTEs, 1 Month
 - ◆ Large Projects 400 FTEs, 2 Years
- Methodologies
 - ◆ Structured, Object Oriented
- Life Cycles
 - ◆ Waterfall, Iterative, Incremental
- Multi-site Development
- Internal/External Projects

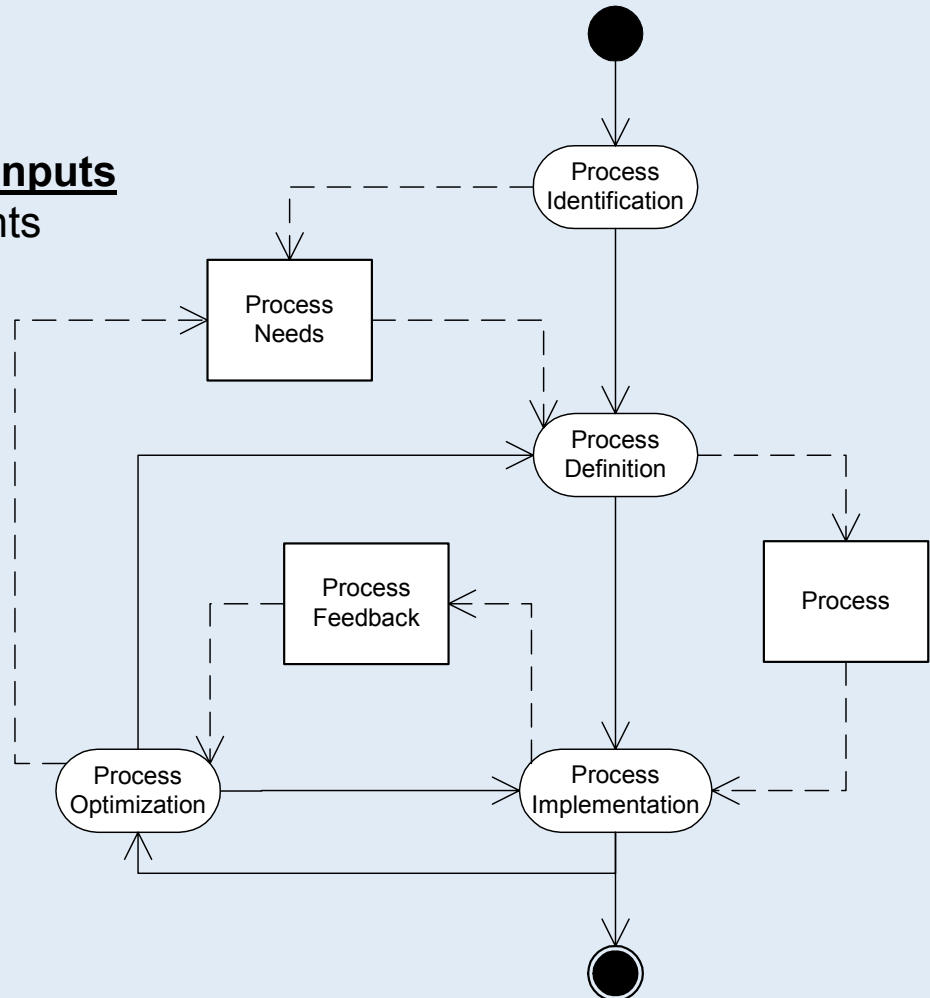
SLC Process/Quality Organization



SLC Process Management

Process Improvement Inputs

- CMM based Assessments
- ISO Audits
- User Feedback
- Lessons Learned
- Metrics
- QP Feedback



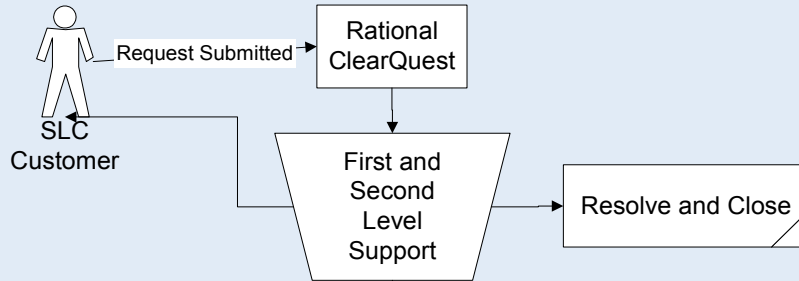
Tools for Process Management

- Process Requirement
 - ◆ Caliber-RM – Standard Requirements Tool
- Defects
 - ◆ Rational ClearQuest
- Process Definition
 - ◆ Visio – Activity Diagrams
 - ◆ MS Word Design Templates
- Authoring
 - ◆ In-house Process Database Repository
- Project Management
 - ◆ MS Project and Various Templates

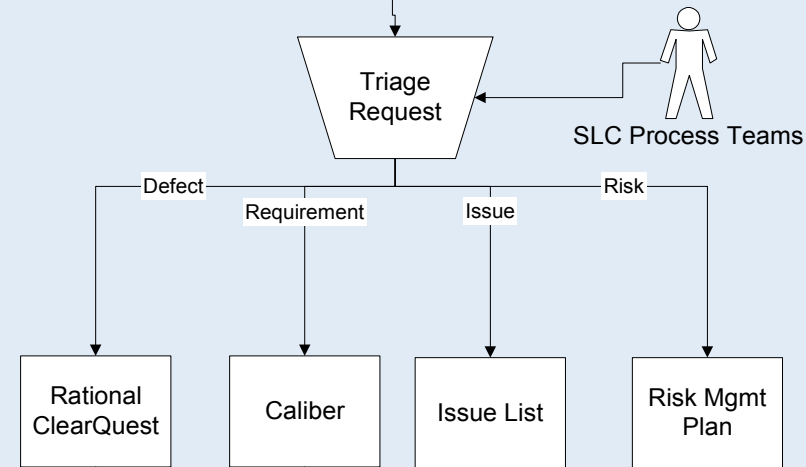
Requests Inputs

Intranet

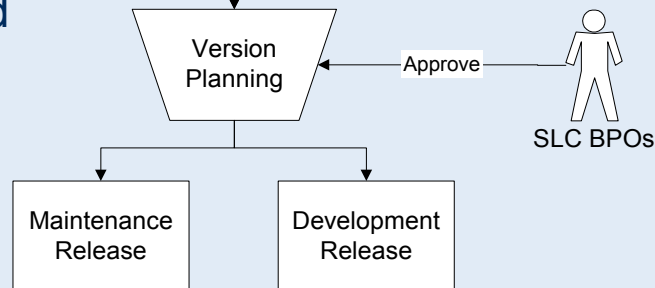
QP's



Analyze Requests



Set Scope based On Priorities



SIEMENS Caliber-RM Requirements

The screenshot displays the Siemens Caliber-RM software interface. The title bar reads "RM CaliberRM [Chad Haggerty] SE SPD". The menu bar includes "File", "Edit", "View", "Requirement", "Tools", "Reports", and "Help". The toolbar contains various icons for navigation and editing. The "Project" dropdown is set to "SE SPD" and the "Baseline" dropdown is set to "Current Baseline".

The left pane shows a hierarchical tree structure under "aStakeholder Request (SRQ)":

- + Solution Life Cycle
- + Business Management
- + Configuration Management
- + Decision and Review
- + Process Management
- + Marketing
- + Project Management
- Quality Assurance
 - R Revise Tables within Quality
 - R Regulatory Analyst versus R
 - R Deviation list for workflow of
 - R 510K (FDA) Usage
 - QA and Reviews
 - + [13.01] - QA resp
 - + [13.02] - Quality Plan
 - [13.04] - QA Reporting
 - [13.05] - QA Reporting-
 - [13.06] - Deviations
 - R CAR-Inspection of test equip
 - R CAR-Incoming product from
 - R Metrics collection
 - R Regulatory gaps
 - R Clarify deviation list and the
 - R Defect Prevention
 - R Configuration Auditing
 - R Process auditing
 - R Metrics Training
 - R Lessons Learned add sensitiv

The right pane is titled "Project Info" and "Discussion". A large yellow callout box is overlaid on the right pane with the text:

Analyze requests against our business needs to determine our requirements and release schedule.

Rational ClearQuest - [BPI_ : Health Services Business Process Intranet (SESPO Defect In work (Defect))]

File Edit View Chart Actions Query Window Help

Run Chart

Workspace: Queries, Charts, Reports

- Personal Queries
 - WebQueries
 - New Defect query 0
 - New Report 3
 - QRYDefectIndex
 - SESPO 1 Level Triage
 - SESPO 2 Level Triage
 - SESPO Close Requirements
 - SESPO Current Release
 - SESPO defects All
 - SESPO defects by Owner
 - SESPO Versioning Input
 - SESPO Version Planning
 - SEPO Version Planning
 - SESPO Defect In work
 - SESPO Defect Per Release
 - SESPO Planning List
 - SESPO Version Planning
- Public Queries

Count	Keyword	Status
18		
7		
11		
5	SLC_B	
2	SLC_B	
3	SLC_Bsm	deferred
1	SLC_BSM	in work

Result set / Query editor

Analyze defects against our business needs to Which defects will be addressed In a given release.

Keyword_2

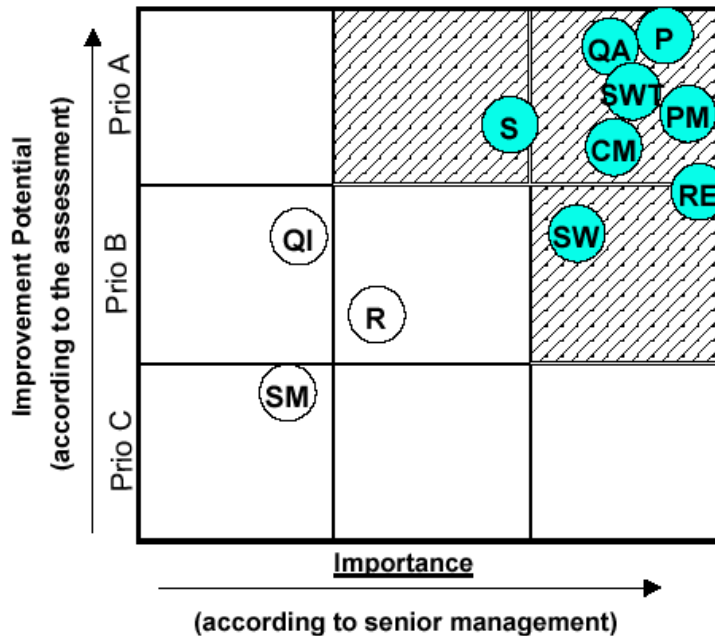
- qualified
- deferred
- in_work
- in_decision

Ready Record: 1 Count: 43

SIEMENS CMM Based Priorities

SIEMENS

Action Matrix



Process Areas

- P** Process Definition + Maintenance
- S** Standard Training
- QI** Quantitative Improvement
- PM** Planning + Tracking
- SM** Subcontractor Management
- QA** Quality Assurance + Reviews
- CM** Configuration + Change Mgmt.
- RE** Requirements Engineering
- SW** SW Development
- SWT** SW Integration + Test
- R** Reuse

High Priority



SLC Version Planning

■ Inputs

- ◆ Caliber Request
- ◆ ClearQuest Defect
- ◆ Our SLC business needs

■ Outputs

- ◆ Assigned Requests
- ◆ Assigned Defects
- ◆ Project Plan to Start Process Definition

Process Definition

QP Communication

Send D Point Presentation and links to Documents

D1

Send D Point Presentation and links to Documents

D2

Send D Point Presentation and links to Documents

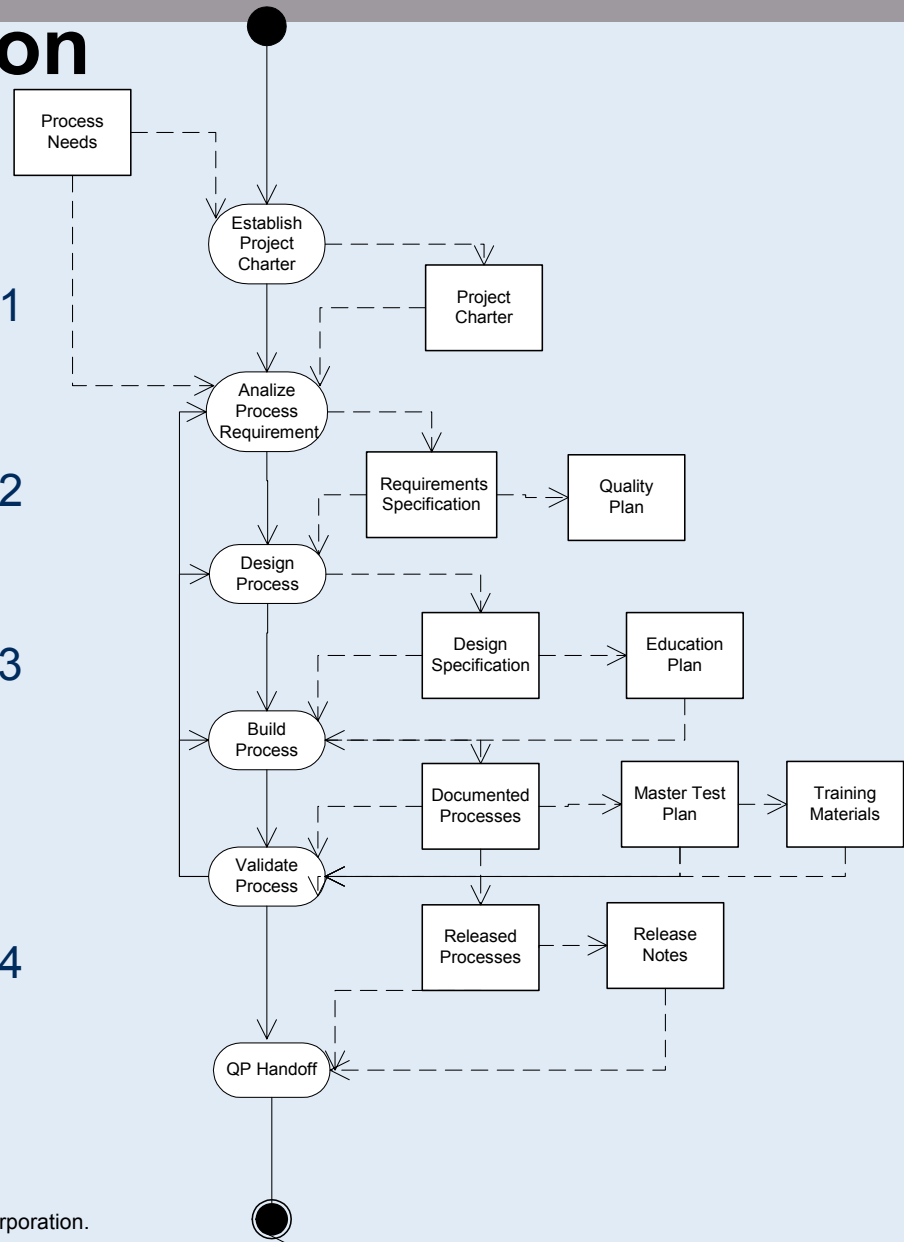
D3

Conduct High Level Review

Send D Point Presentation and links to Documents

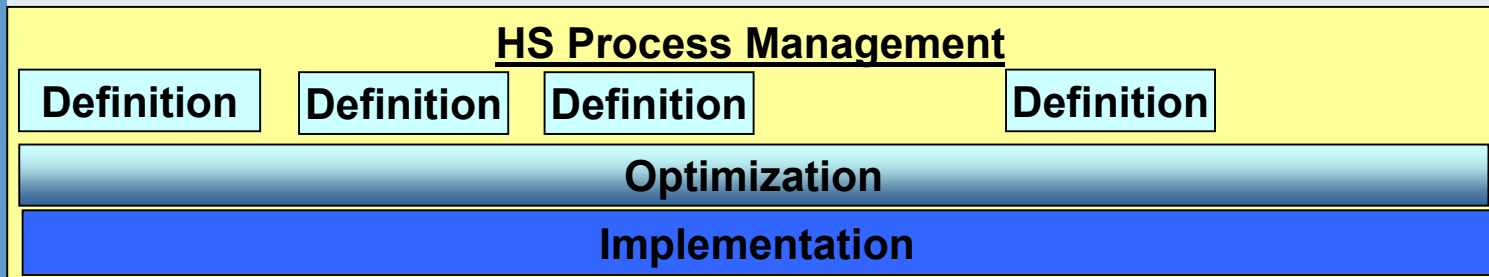
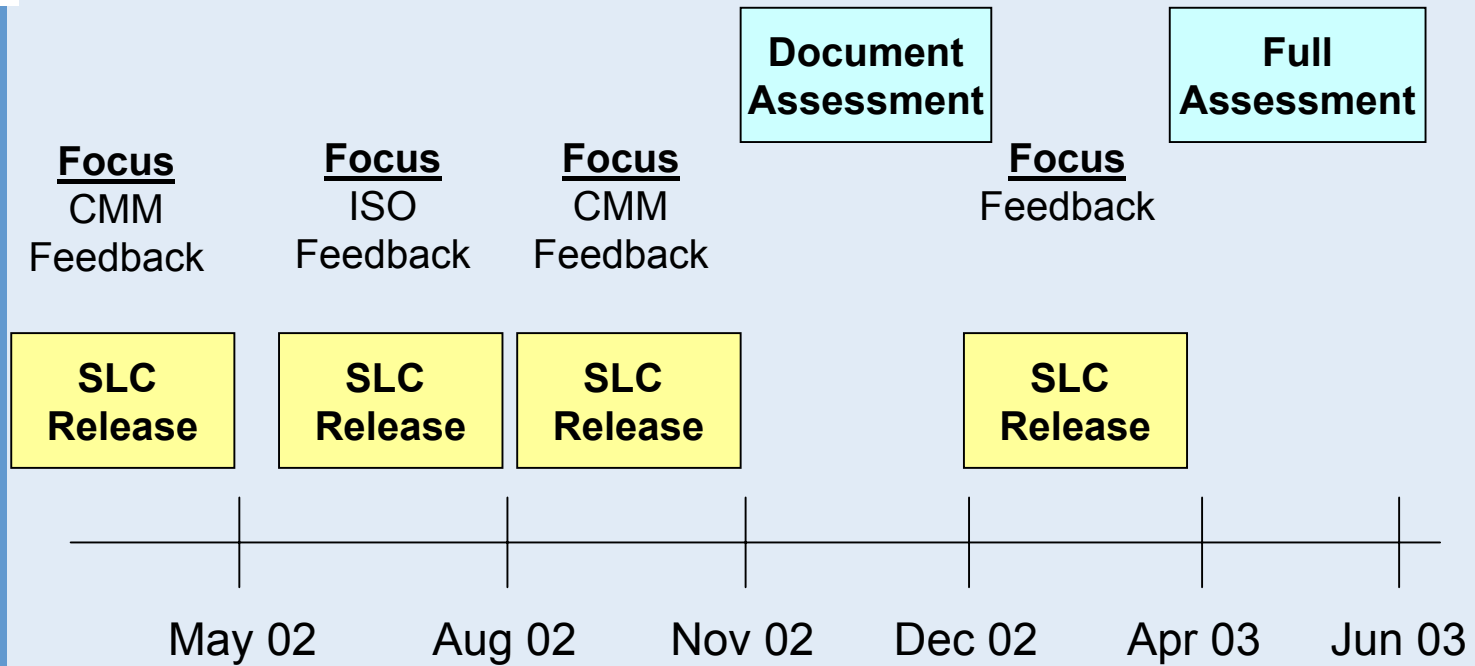
D4

Conduct Detailed Review



SLC Improvement Program

Based on Baseline Assessment



The SLC Results.....

A Quick Demo

Initial Results – Impacting our Customers

- 72% reduction on Post-GA Defects for some products
- 16% reduction in cycle time to fix Post-GA defects
- 69% reduction of customer effort for Implementation
- 20% reduction of customer fees for Implementation
- 15% increase in Customer Satisfaction

Lessons Learned

- Senior Management Commitment is KEY
- Put First Things First (CMM Level 2, then 3 etc.)
- Slow down the Process Definition after Critical Mass Achieved
 - ◆ Two releases year
 - ◆ Cannot implement as fast
- Migration ≠ Proficiency
 - ◆ Cannot train enough
 - Training on Process and Concepts behind them
 - ◆ Employees need skillset training
 - ◆ Movement of resources and skill to the front end of the process
- Scalable Process required for our Organization
 - ◆ One size does not fit all
 - ◆ Different Sizes, Life Cycles and Methodologies
- First time use is by the letter of the law
 - ◆ Applying the process to your project is difficult

So far we have....

- Established a Quality Management System
- Defined and implemented effective process management
- Certified to ISO 9001:2000
- Zero non-compliances during certification and surveillance audits
- Certified 15 out of 15 employees to ASQ CSQE
- Migrated about 5300 people to Our QMS
- Made Significant Progress in Process Maturity
- Deployed a corporate Balanced Scorecard
- Deployed monthly process and project metrics reporting

Summary

- Set up for Success
 - ◆ Apply models to your culture and business needs
 - ◆ Dedicate resources to Process Improvement
- First Things First
 - ◆ Work on the Level 2 areas first
 - ◆ Define effective process management processes
- Speed of Improvement
 - Set tangible goals around Process Improvement
 - ◆ Only as fast as you can change the culture
 - ◆ There is NEVER a good time to migrate
 - ◆ Understand the trade off between Project Pressures and Process Improvement

Contact Info

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Solutions that help**