

Rochester Institute of Technology

## RIT Digital Institutional Repository

---

Theses

---

2004

### Assessment / audit system

Nicholas Bucciarelli

Follow this and additional works at: <https://repository.rit.edu/theses>

---

#### Recommended Citation

Bucciarelli, Nicholas, "Assessment / audit system" (2004). Thesis. Rochester Institute of Technology.  
Accessed from

This Master's Project is brought to you for free and open access by the RIT Libraries. For more information, please contact [repository@rit.edu](mailto:repository@rit.edu).



Rochester Institute of Technology  
College of Multidisciplinary Studies

# Assessment / Audit System Capstone Presentation

*By Nicholas Charles Bucciarelli*

*CMU/SEI Senior Fellow*

*IBM Systems/Software Architect*

*Motorola Research Institute Master Blackbelt*

# Agenda:

- **Need for Change,**
- **Path Forward Strategy,**
- **Assessment / Audit Development,**
  - **Business Management Schools of Thoughts,**
  - **Key Points,**
  - **Requirements Summary (Business/Technical),**
  - **Development Methodology,**
  - **Chart 1a – Component Layers**
  - **Chart 1b – Business Intelligence Elements**
  - **Chart 1c – Data Warehouse Schema**
  - **Chart 1d - IT Tools**
- **Outcome**
  - **Assessment / Audit System w/CAR and OBS workflow components,**
  - **Web Service for initiating process changes to the QMS documents,**
  - **Document Management System that is updated to reflect current organizational/project environments,**
  - **Examples.**

# Need for Change

- **Standardized Methodology/Process** for conducting Assessments/Audits,
- **Standardized Web Services** based system w/workflow engines,
- **Business Model** that contains strategic goals and provides the relationship criterion to establish the tactical goals at the functional organizational levels,
- **External Hybrid Process Model** creation as well as an **Internal Hybrid Model** based on derived goals,
- **External / Internal Hybrid Process Model** creation based on derived goals,
- **QMS** comprised of policies, procedures, work instructions based on HOBE and UML constructs (re-engineering of business and engineering processes into graphical models represented by a series of portals),
- **Real-Time synchronization Web Service** components w/workflow that keep the current QMS update to date based on changes in the business (changing basis of competition).
  - Zachman and SOA approach to multivariate system file management types
- **Information needs** (data-warehouse, MOLAP cubes, Statistics = Predictive/Inferential)

# Path Forward Strategy

In support of this project, I specifically did the following:

- Attended a two week hands-on workshop offered by CEEM,
- Examined current organizational and project process and tools for conducting Assessment / Audits,
- Consulted with Ph.D advisors and other academic resources,
- Developed a plan that included an approach and IT infrastructure,
- Selected systems/software development methodologies based on component modularity as opposed to an integral one,
- Selected Bayesian statistical methodology,
- Selected IT Tools and,
- Continued development with Multidimensional database cube (MOLAP)

# Business Management Schools of Thoughts

- **Dr. Clayton M. Christensen, Ph.D:**
  - Basis of Competition,
  - Strategic Frames,
    - (Business and Technology Strategies must become one)
  - Core Capabilities vs. Core Competencies,
  - Product and/or Service Innovation,
  - Disruptive and Sustaining Product or Service Platforms
    - S-curve switching vs. S-curve stretching
- **Michael Porter:**
  - Strategy (Activity Systems Mapping)
  - Five Forces Model
- **Carnegie Mellon University / Software Engineering Institute**
- **Rochester Institute of Technology**
- **Georgia Institute of Technology**

# Key Points

- **Aligning Company Culture with its Customers**
- **Overcoming the Innovator's Dilemma**
  - "There is something about the way decisions are made in successful organizations that sow the seeds of eventual failure." Clayton Christensen, *The Innovator's Dilemma*, Harvard Business School Press, 1997
- **Managing Innovation from a Customer's Perception / Point of View**
- **Creating environments for research and prototyping to understand the shifting basis of competition**

# Requirements Summary (Business/Technical),

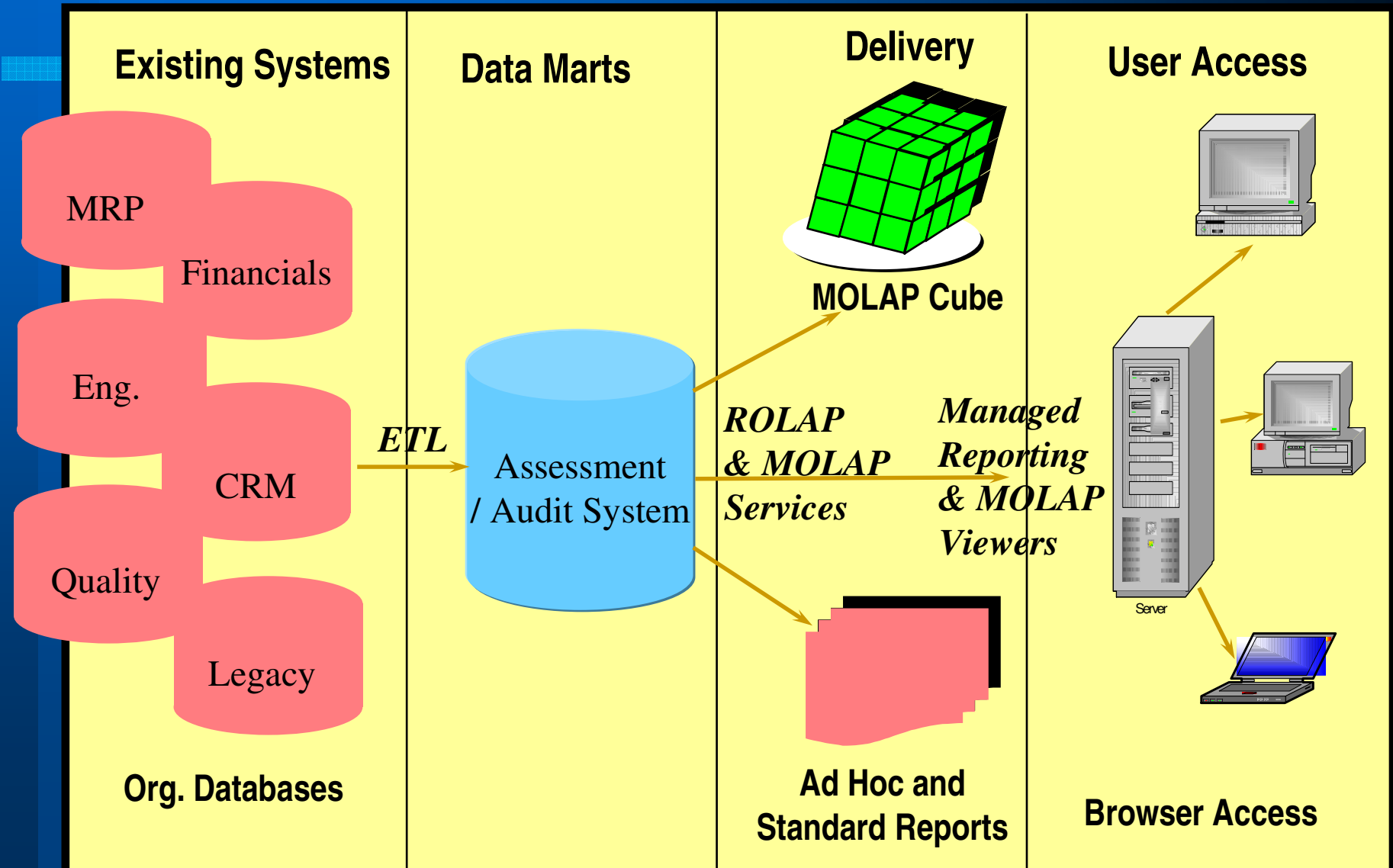
- **Multivariate Approach:**
  - Analysis of customer and supporting data,
  - Transformation of correlated data into informational views,
  - Interpretative understanding of informational views from past, present, and/or predictive perspectives, and
  - Development of a report that documents these interpretative informational views
    - In addition, this report provides guidance through recommendations and questions to be answered
- **Technology Approach:**
  - Web-based portal modular components
  - Data Warehouse construct/components for data cleansing
  - Relational & Object Oriented Database construct/components
  - Adapters for portal integration
  - Business Intelligence components for data-mining and analysis



# Development Methodology

- Zachman Framework,
- SOA,
- Lean Design techniques
- Rapid Application Development Methodology,
- Agile Development Methodology, and
- Spiral Development Methodology

# Component Layers



# Data Mining Apps & Algorithms

- Profiling Populations,
- Analysis of Business Trends,
- Target Marketing,
- Usage Analysis,
- Campaign Effectiveness, and
- Product Affinity
- Market Segmentation Analysis,
- Memory-based reasoning,
- Cluster Patterning,
- Relationship Analysis,
- Decision Trees / Rules-based algorithms,
- Value Chain Networks, and
- Coupling Algorithms

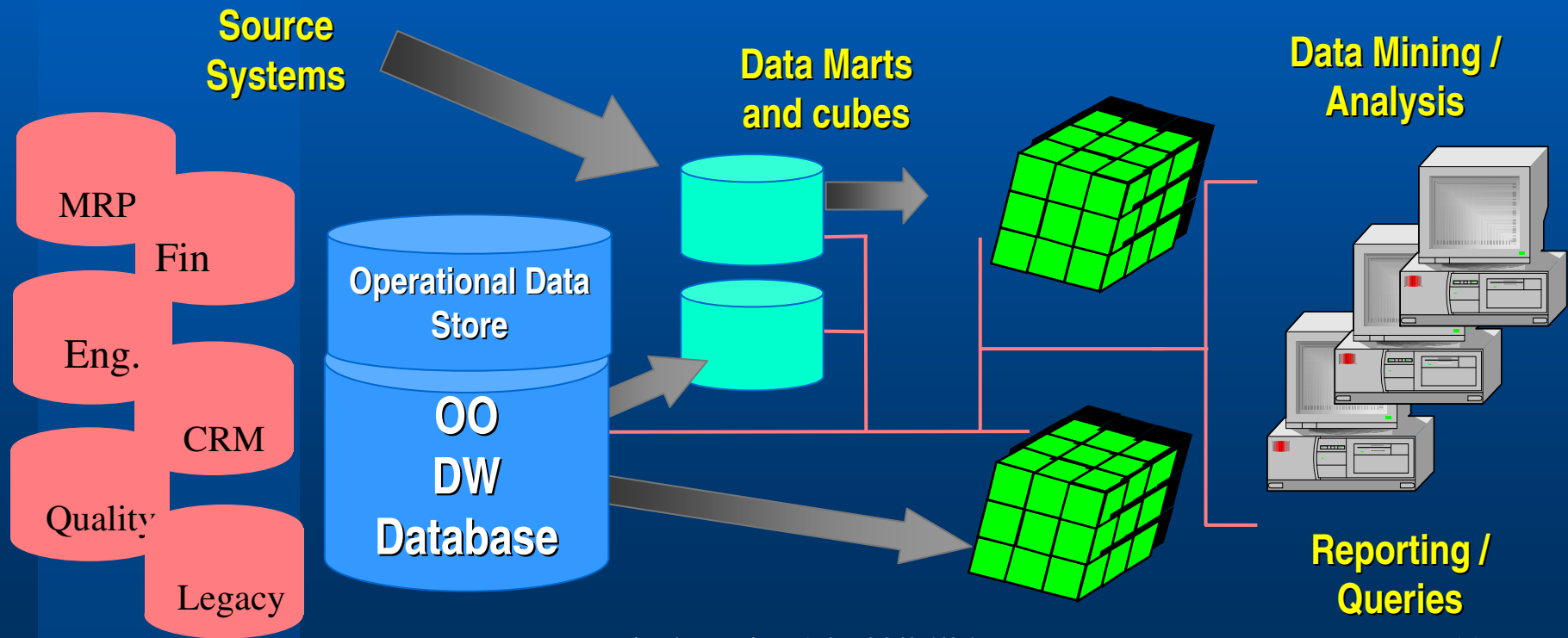
# Business Intelligence Elements

**Design the  
Data Warehouse**

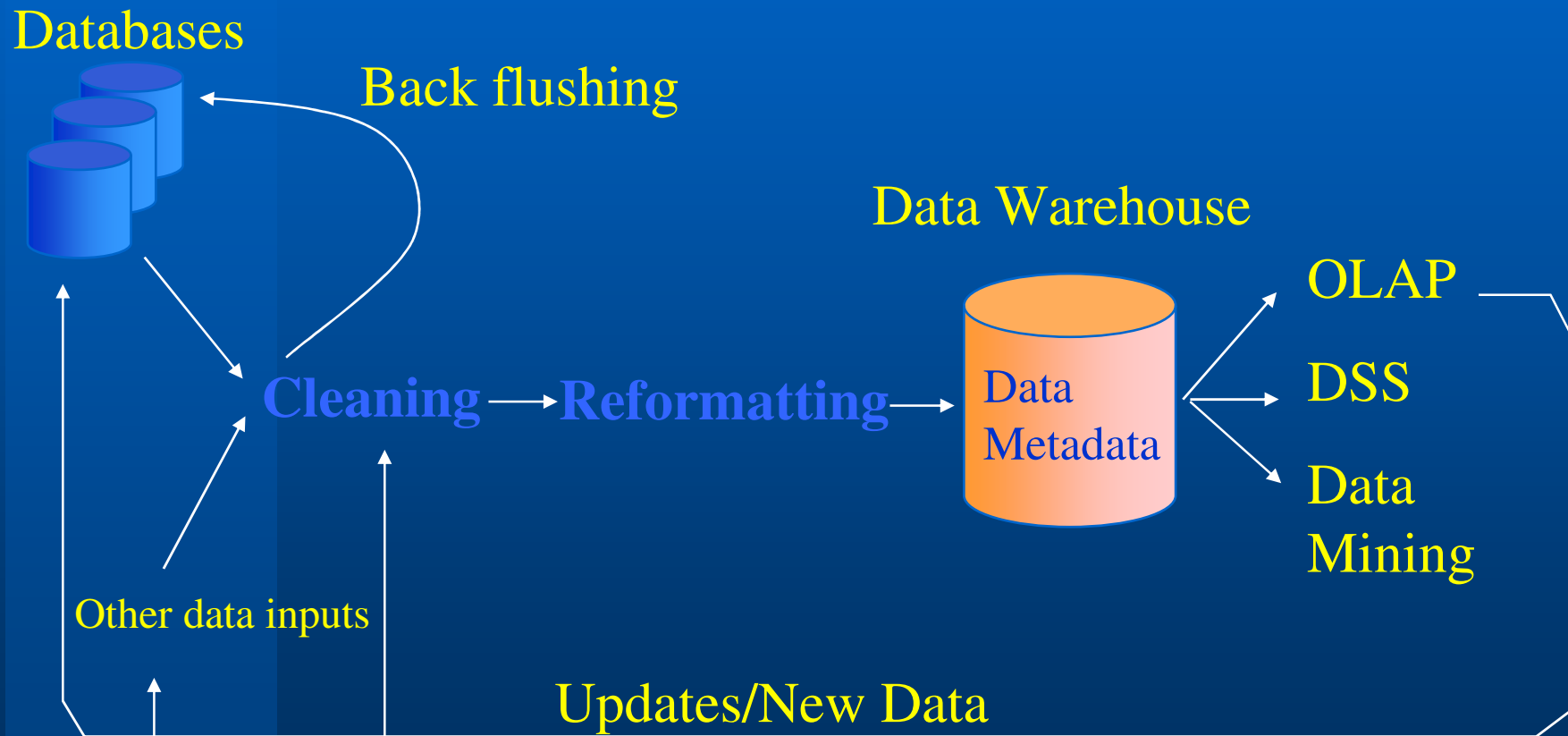
**Populate  
Data Warehouse**

**Create Cubes  
& Analysis**

**Query  
Data**



# Data Warehouse Schema

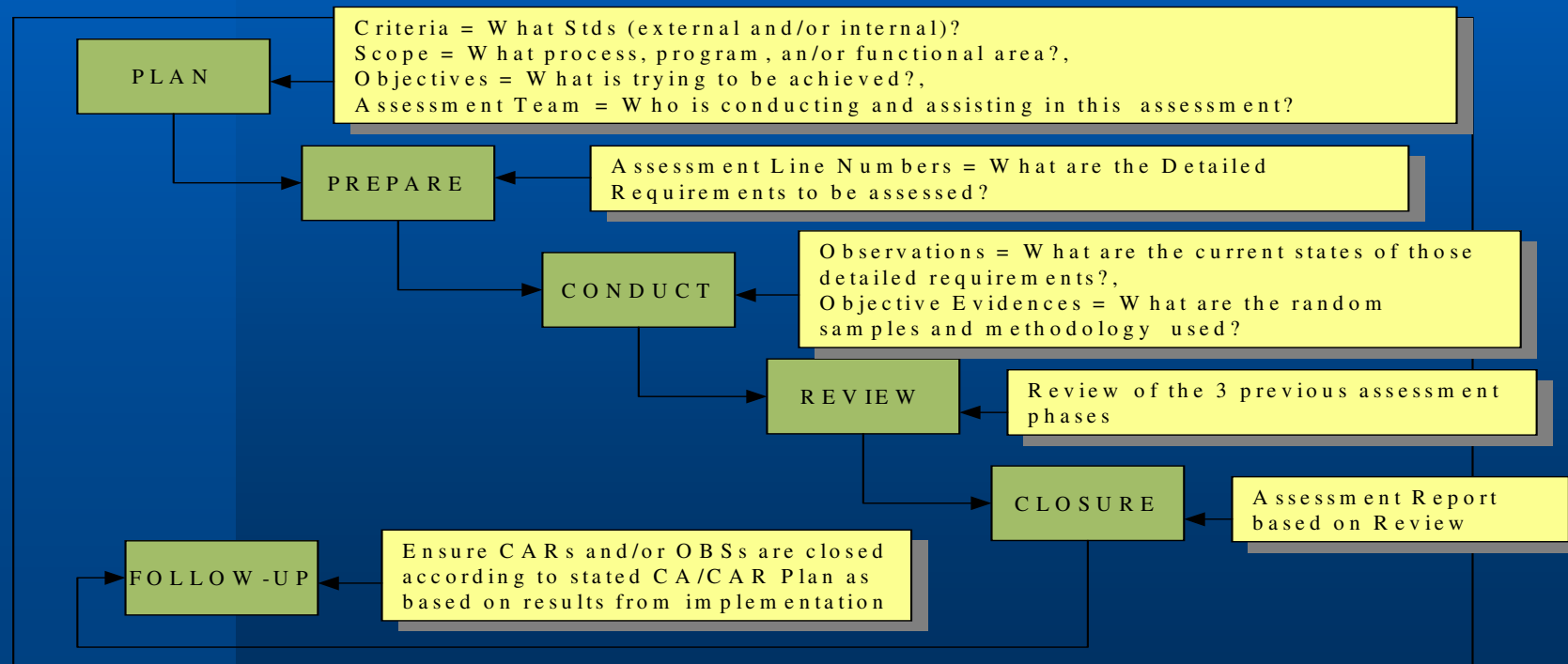


# Information Technology Tools

- **Data Warehousing**
  - ETL Q, Intelligent Storage, Warehouse Management
- **SAS Analytic Intelligence**
  - Data & Text Mining, Forecasting, Optimization & Management Science, Statistical Analysis, Quality Improvement
- **SAS Business Intelligence**
  - Enterprise Guide, OLAP, Web Enablement, Wireless Technologies, Integration Technologies
- **Business Objects OO Database**
- **Unified Modeling Language (RUP)**
- **Programming Languages: SAS, Visual C++, Java**

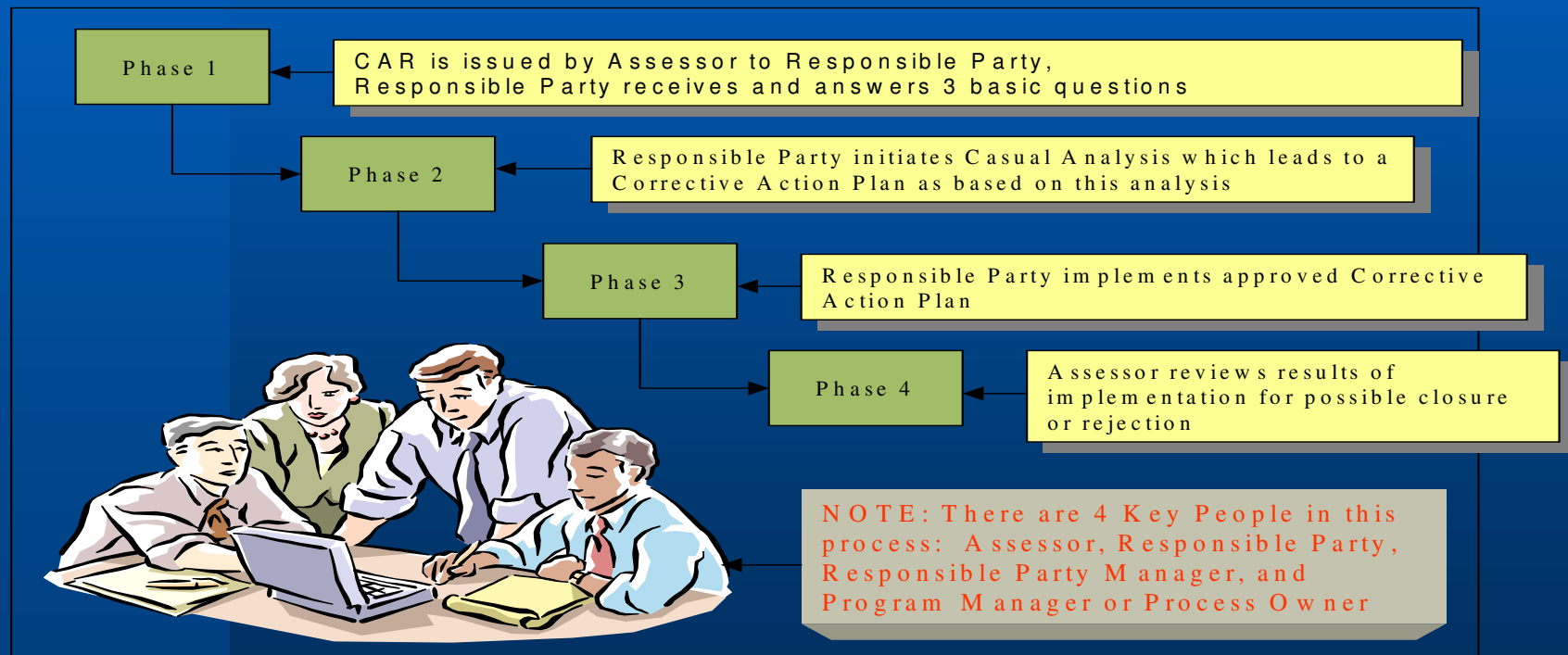
# Assessment / Audit System w/CAR and OBS workflow components

## Assessment Process Flow



# Assessment / Audit System w/CAR and OBS workflow components

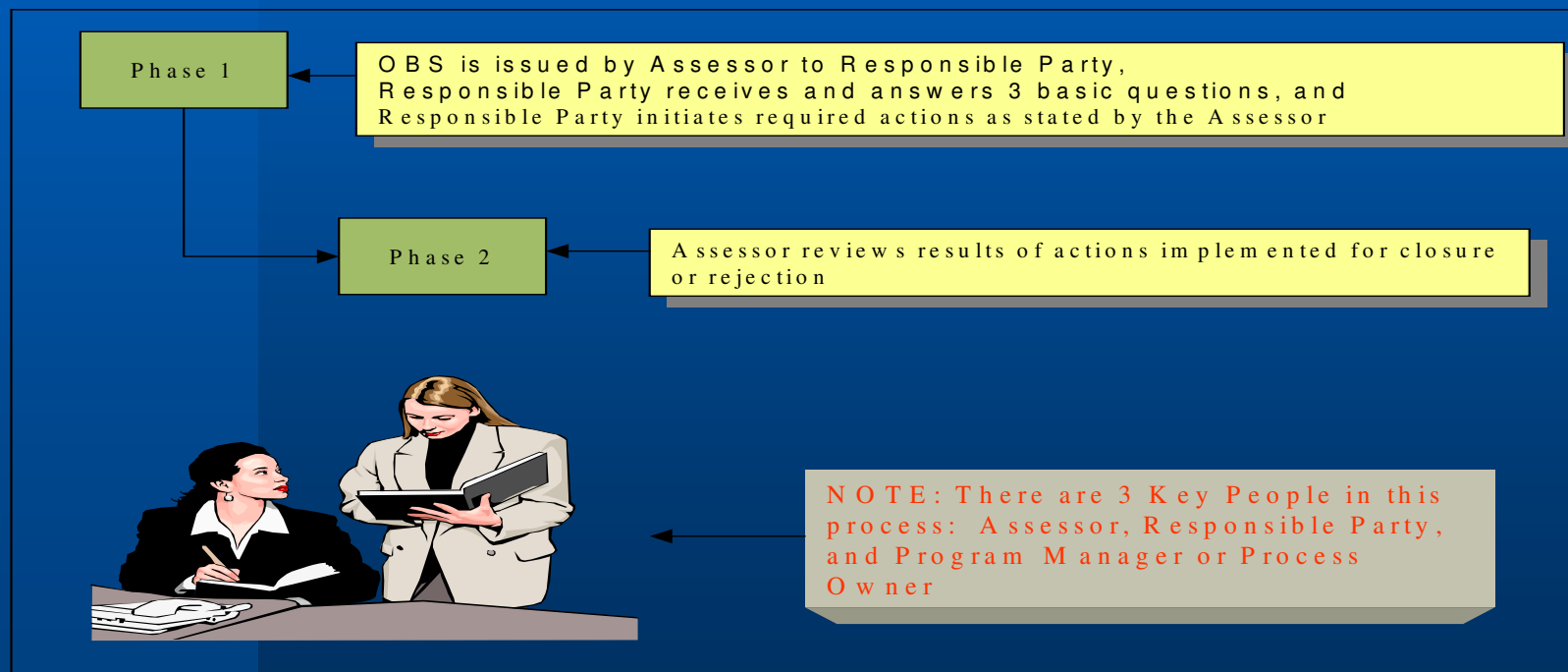
## C A R Process Flow





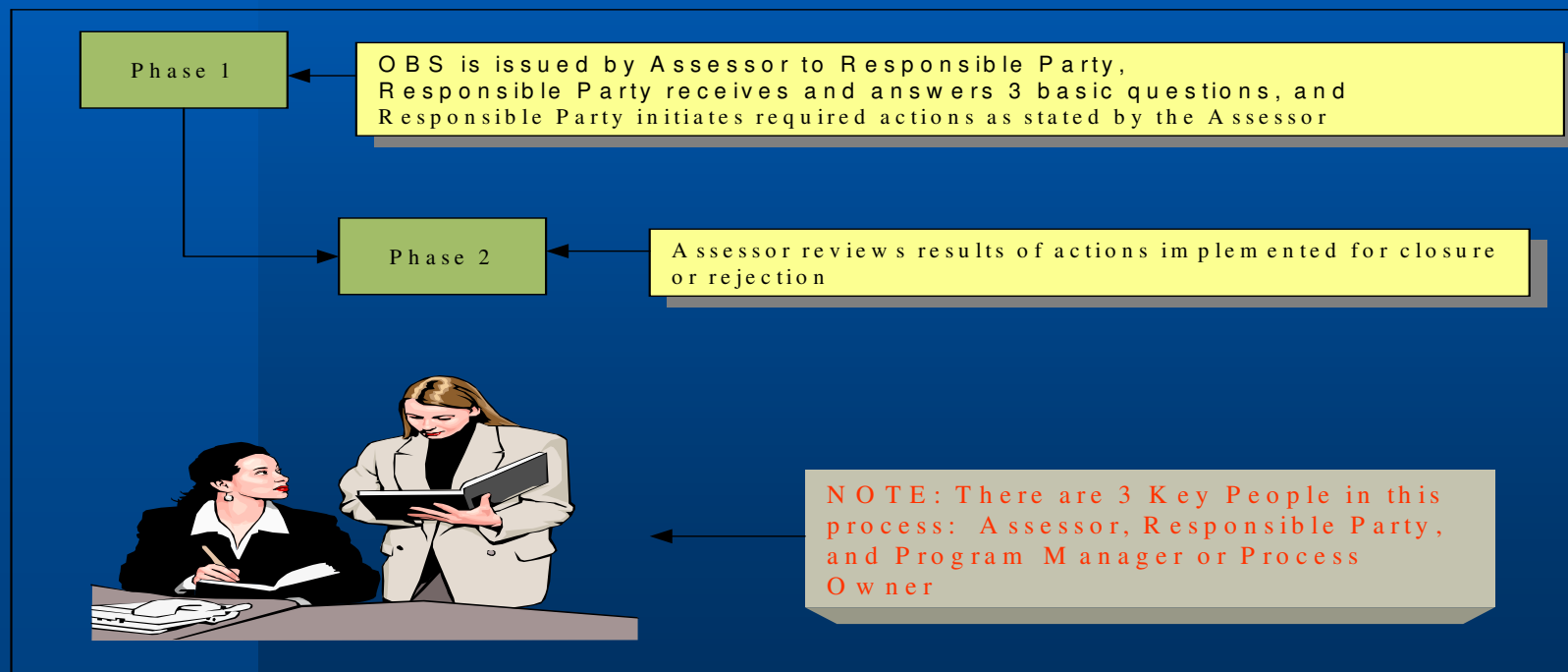
# Assessment / Audit System w/CAR and OBS workflow components

## OBS Process Flow

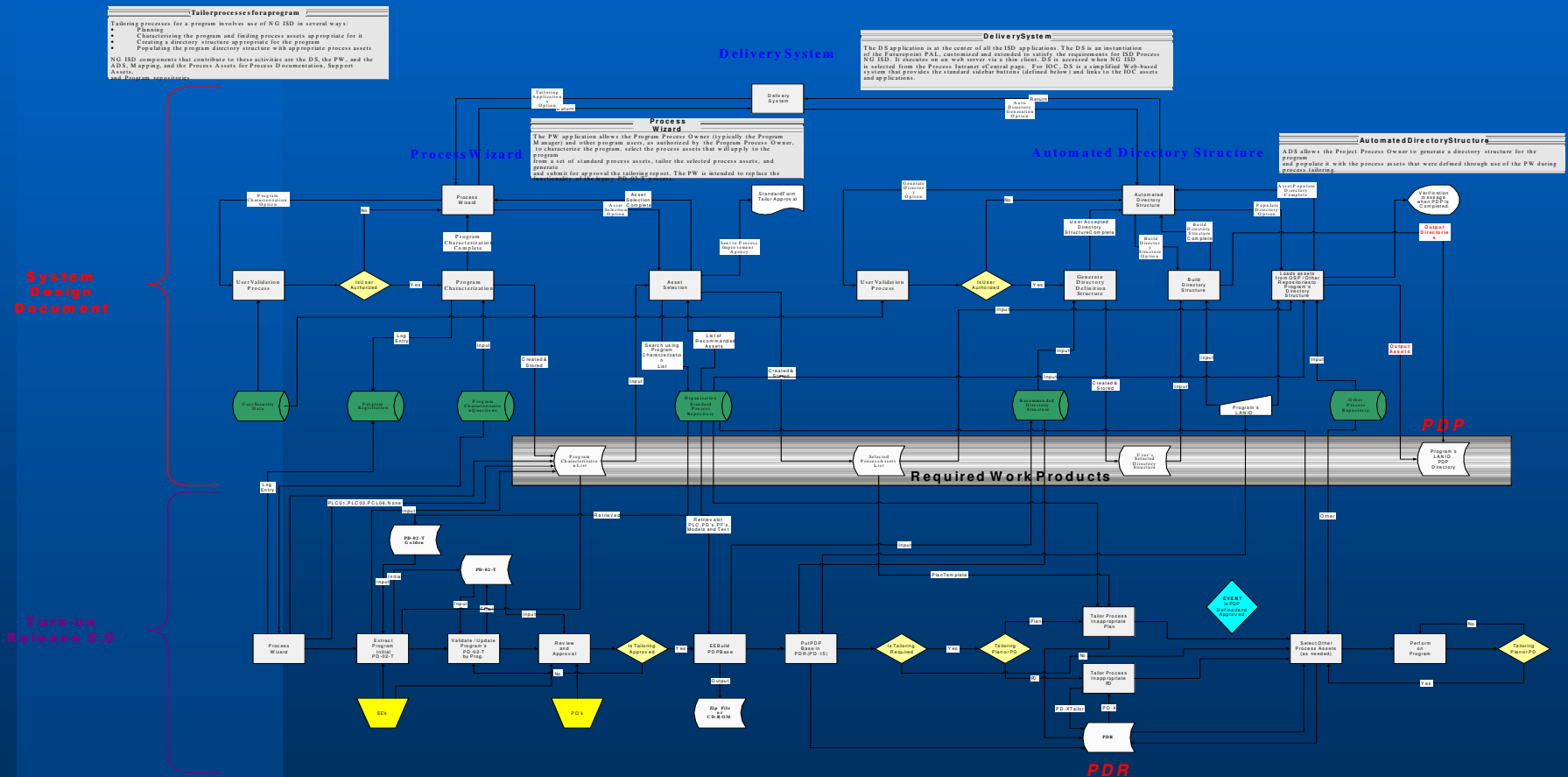


# Assessment / Audit System w/CAR and OBS workflow components

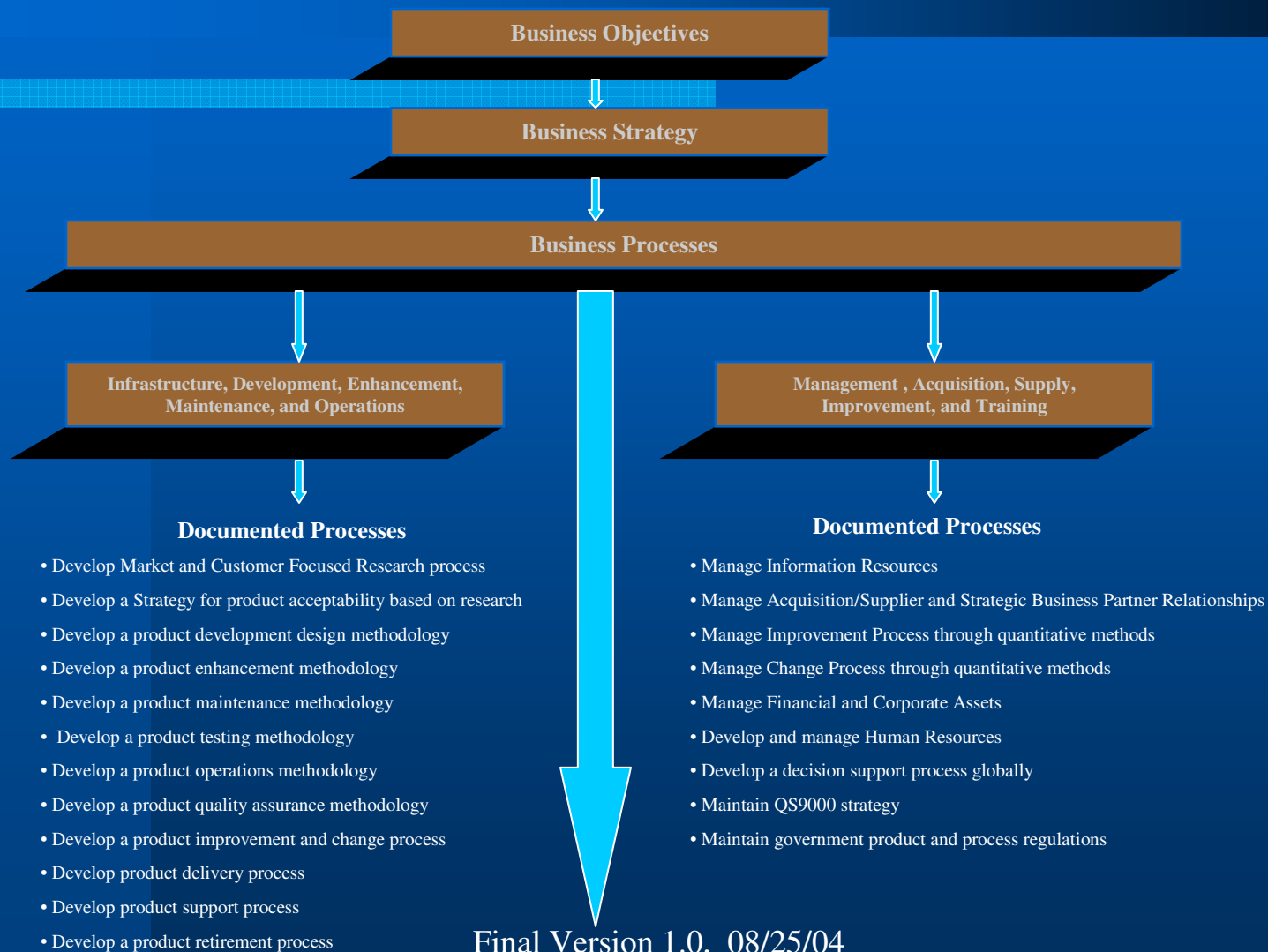
## OBS Process Flow



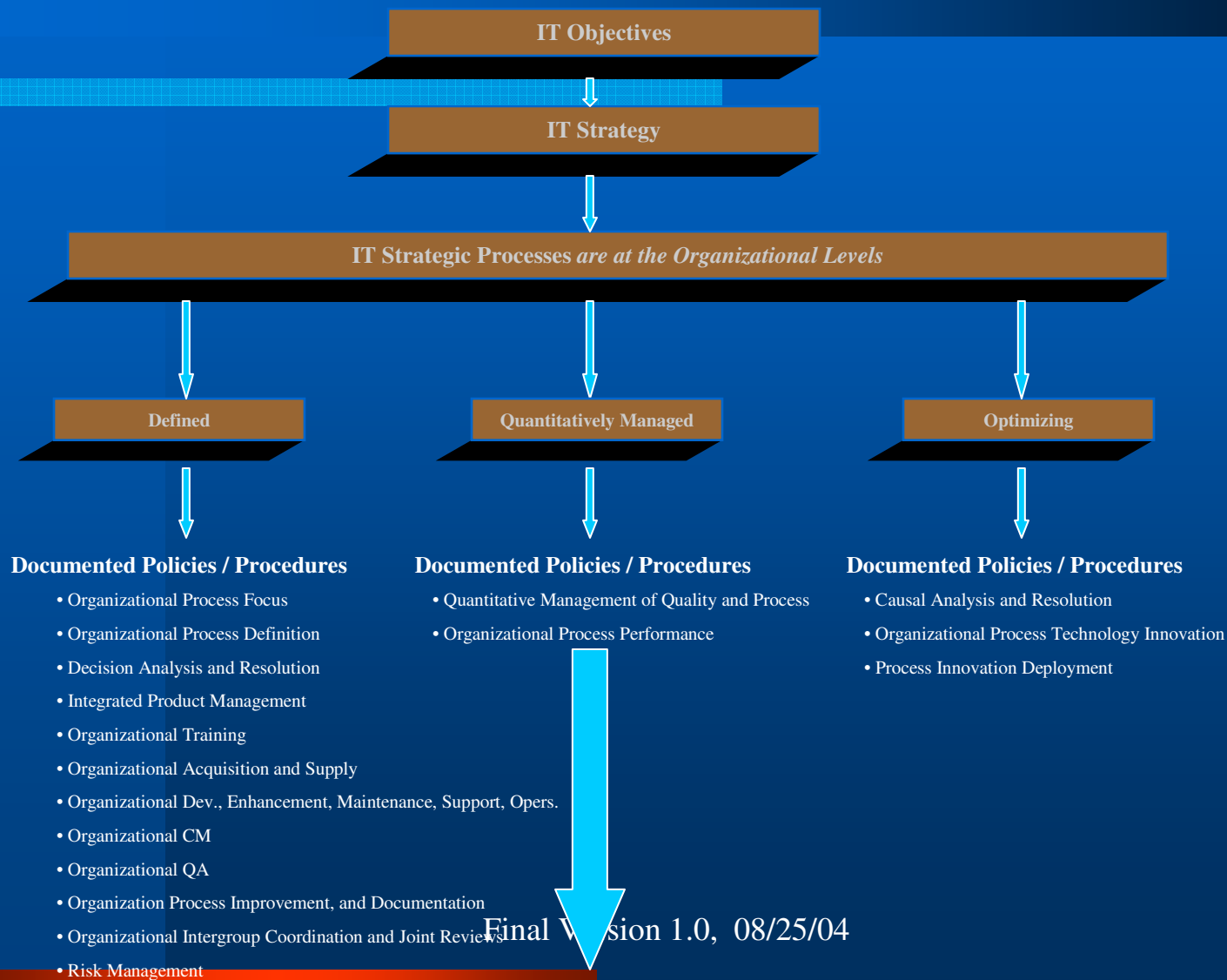
# Web Service for initiating process changes to the QMS documents



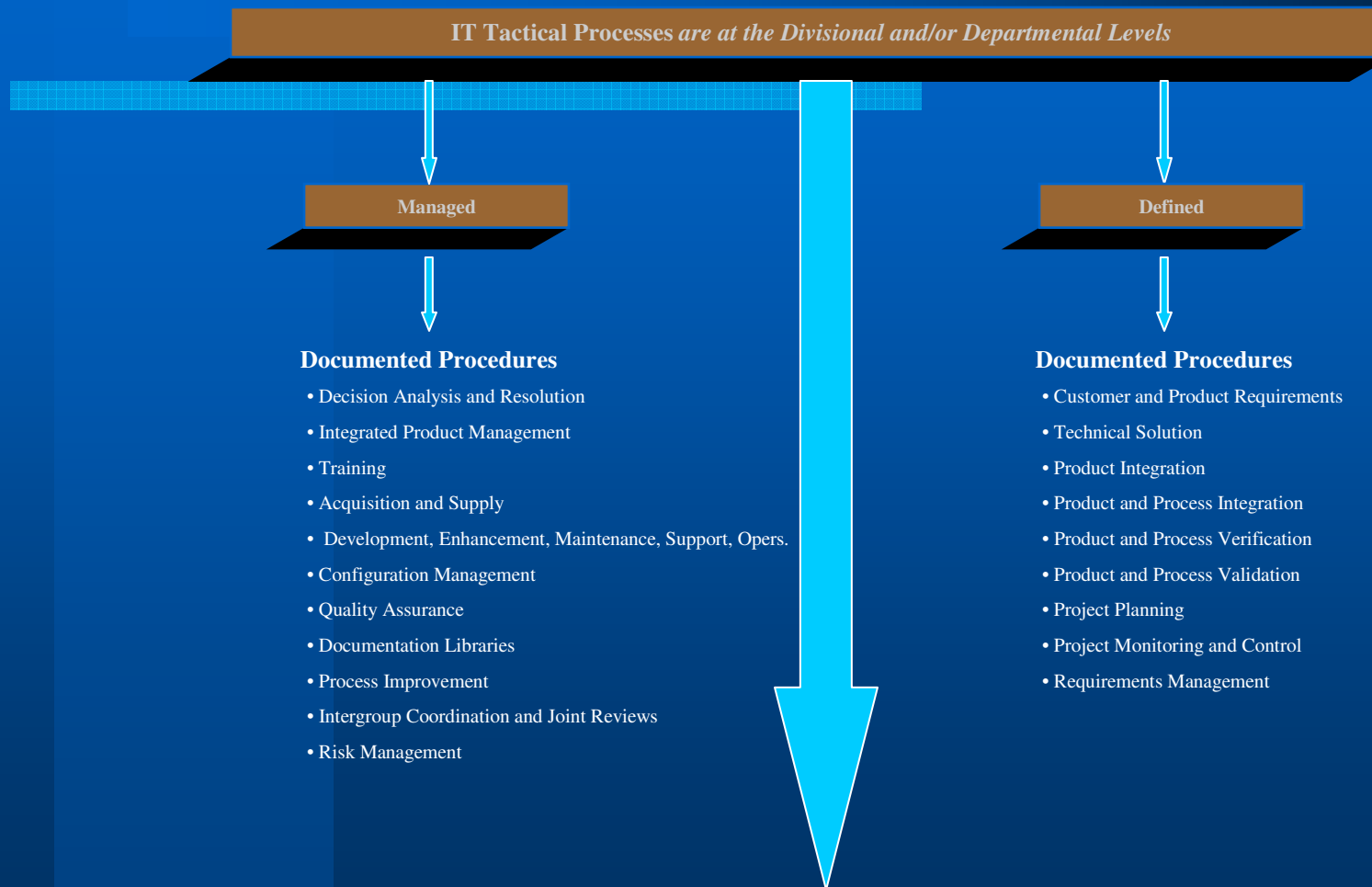
# Framework for Strategic Business Processes



# Framework for IT Strategic Org-Level Processes



# Framework for IT Tactical Project Processes



# Framework for IT Individual-Level Processes

IT Operational Processes are *at the Project Level*

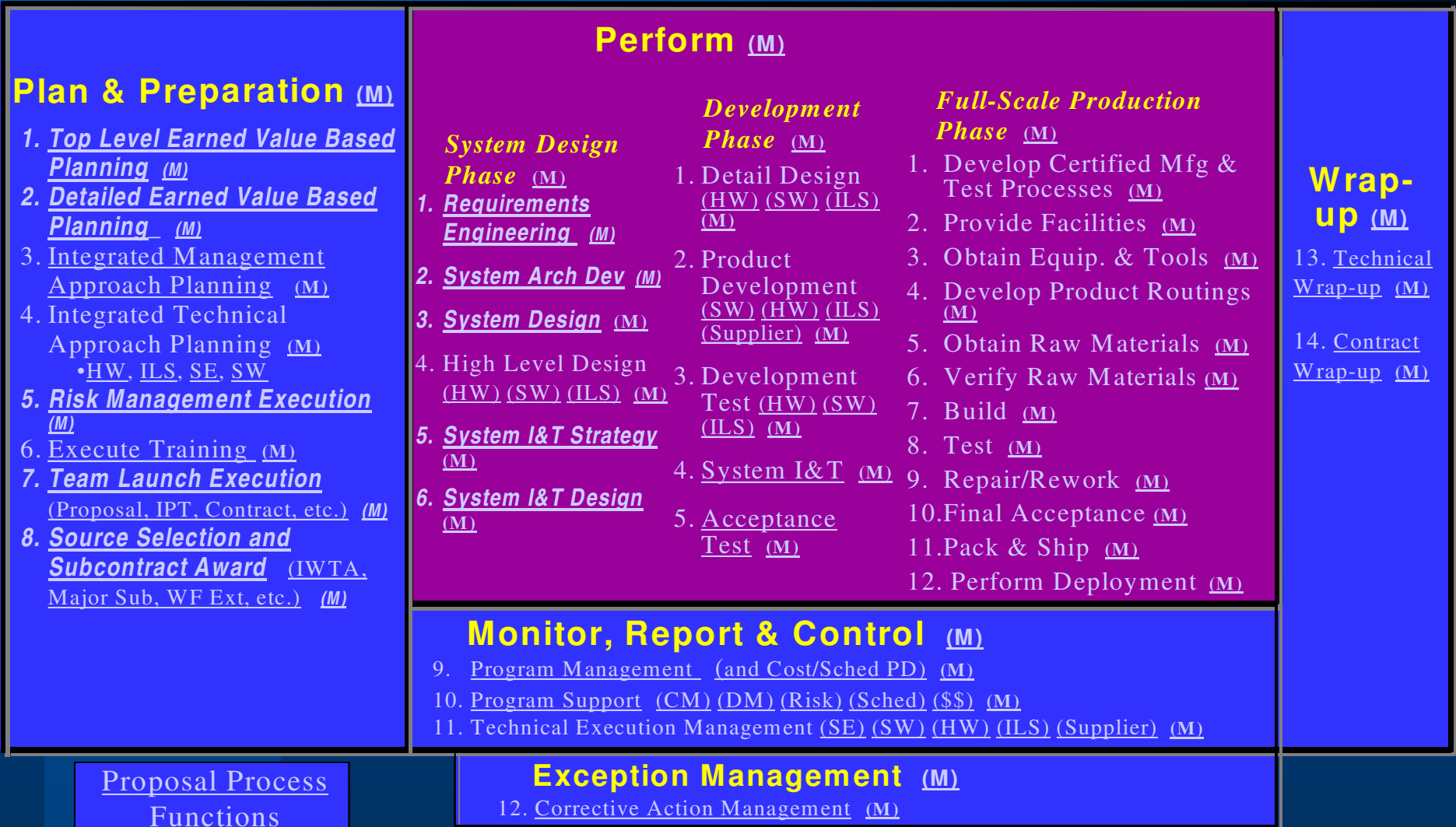
Executed/Managed

## Documented Procedures and Work Instructions

- Decision Analysis and Resolution
- Integrated Product Management
- Training
- Acquisition and Supply (*Managing Agreements*)
- Development, Enhancement, Maintenance, Support, Opers.
- Configuration Management
- Process and Product Quality Assurance
- Documentation Libraries
- Process Improvement
- Intergroup Coordination and Joint Reviews
- Risk Management
- Technical Solution
- Product Integration
- Product and Process Integration
- Product and Process Verification
- Product and Process Validation
- Project Planning
- Project Monitoring and Control
- Requirements Management
- Measurement and Analysis

# Document Management System Portal

This view represents the process functions associated with Program Life Cycle 1 (M)



Legend: Click text for Process info, Click (M) for models

Fire

Hit "Esc" on keyboard to exit

5/04

*Italicized items are detailed modeled Process Functions (PFs)*

23



# Critical IT processes to focus on

---

## **Selection of the 3 to 5 critical IT process areas for focus** *(review of criteria that was used for selecting these IT processes )*

### **IT Processes:**

- Acquisition/Supply and Strategic Business Partner Relationships
- Requirements Development, Allocation, and Management
- System Development and Deployment
- Configuration Management
- Quality Assurance and Process Improvement
- Measurement and Analysis

### **Selection Criteria:**

The criteria used in the selection of these processes are as follows:

- CMMI
- ISO SPICE 15504
- ISO 12207
- ISO 9001: 2000

# Summary

- **Leading several GM projects to Level 3 of the SW-CMM, and CMMI,**
  - **One process model that is consistent with their business model,**
  - **QMS that is in synch with the operations of their functional organizations and projects.**
- **Moving forward to include additional criterion.**