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Applying Structured Requirements to Infrastructure Process Development Using TeamCenter SE

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Overview

- Background
- Sources of Project Requirements
- Development of Structured Requirements
- Synthesis of Functional Process Capabilities
- Depicting Functional Architecture
- Summary and Recommendations

Background

- Follow-on to Value Stream Study
- Project Scope:
  - Process to Configuration Manage Pro/E Design Model Files
- Team formed cross-functional, cross-organizational
- Identification of working level job scenarios
  - Typical work assignments & demonstration of complexities
    - 2-D drawings
    - Model revisions
    - Initial model development
    - Interface with existing released definition
- Basic Objectives
  - Guide staff through decisions – consistently applied process
  - Reduce or eliminate redundant data
  - Generate meta data for improved long-term reference to files

Sources of Project Requirements

- Team identify preliminary “requirements” that the process solution had to meet to be OK
- Initial process concepts were developed
- Pilot review, orientation and training revealed many more bits and pieces of needs from many sources
  - Management
  - Product definition staff
  - Pilot users
  - Trainers
  - The CM process itself
  - Individual work scenarios
  - Technical Business Practice requirements
  - Information systems

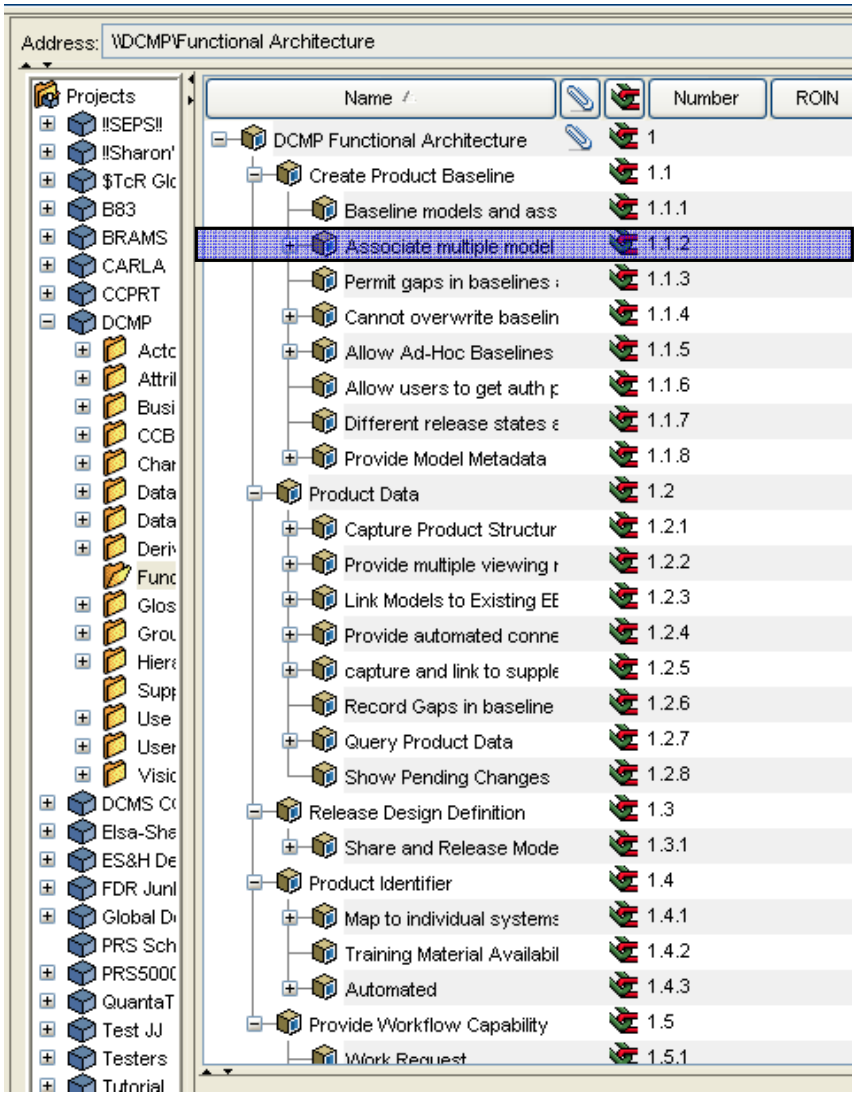
Synthesis of Functional Process Capabilities

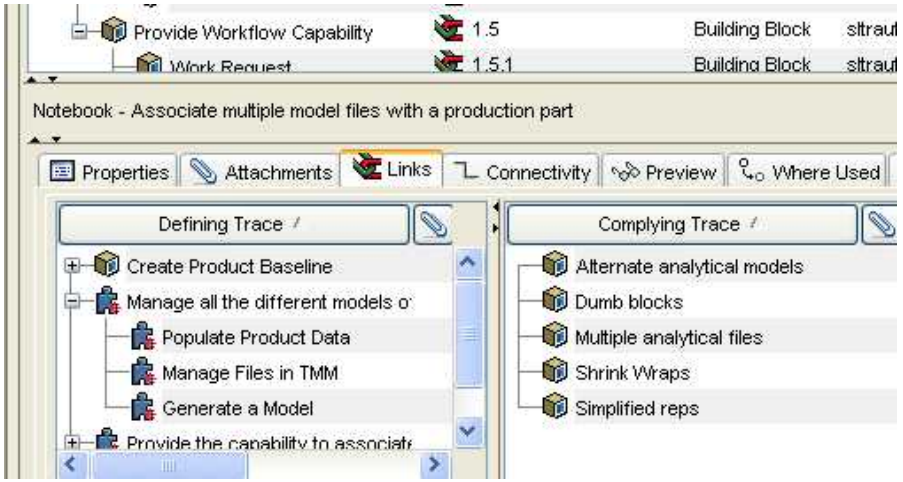
- Over 350 distinct user feedback statements were obtained about the preliminary process concepts
  - Considerable complexity
  - Disparate comments
  - Difficulty determining next steps
- Increased process detail began to evolve –
  - Training needs
  - More process details
  - Interfaces to information systems
- Increasing team uncertainty that the right process infrastructure elements were being considered

Synthesis of Functional Process Capabilities (cont)

- Process team agreed to enter all user-identified needs into the Teamcenter Systems Engineering tool
  - Needs, wants, expectations
  - Modifications requested during review
- Conceptual Functional Hierarchy developed in Teamcenter
  - Functional decomposition to structured into the level of detail necessary
  - Allocation of needs (requirements)
    - Functions address a real need
    - Breaks problem down into more manageable pieces

TcSE Functional Hierarchy





- Hierarchy is traced to needs captured from any source
- Enables determination that the functional capabilities can meet requirements
- Defining Trace – The driving architecture piece or collection of requirements that is the reason the function exists
- Complying trace – the piece of the architecture that implements the functionality and meets that subset of requirements

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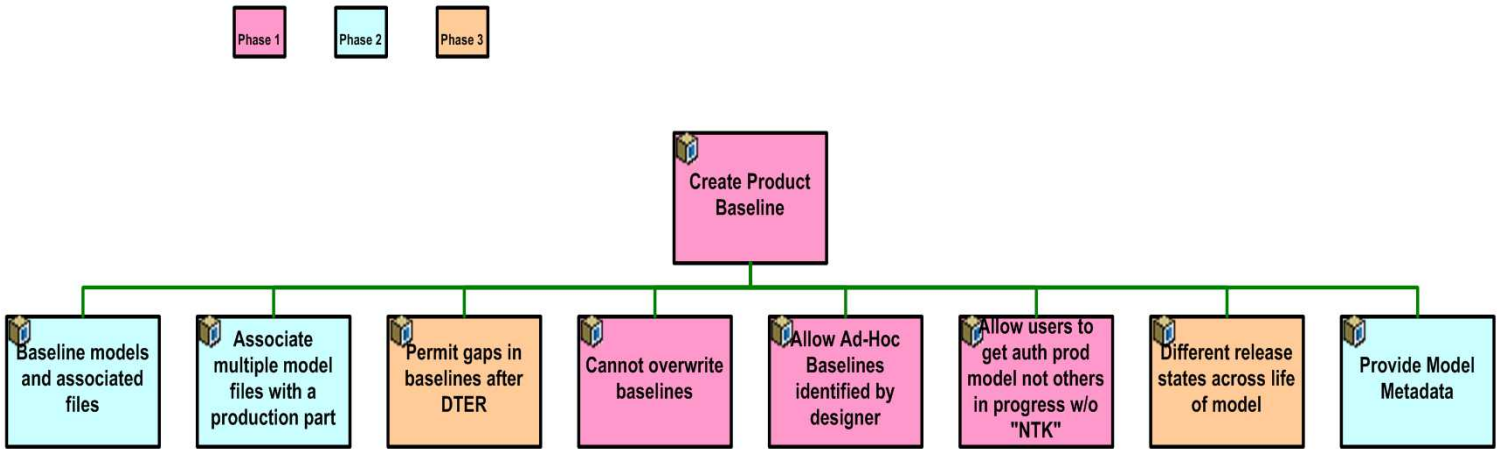
Depicting Functional Architecture



- Exporting the architecture from Teamcenter to create a VISIO diagram provides a graphical representation of functional structure.
- Diagrams were color coded based on priorities
- Diagrams provide easy review mechanism

Summary

- Systems engineering approaches were found applicable to a process-focused problem
  - Functional architecture
  - Requirements traceability
- Use of TcSE facilitated
  - Reviews
  - Problem partitioning and manageability

Recommendations

- Engineer process-based solutions
  - Apply SE techniques
  - Analyze requirements
    - Don't limit to requirements flow-down
      - Expect to find gaps, overlaps
      - Expect "orders" to follow stream of consciousness
    - Look for ways to provide functional capabilities that can address sets of requirements
  - Determine functional architecture
  - Represent graphically, including flows
- Use a tool – TcSE worked well
  - Architect the process
  - Guide follow-on work, esp. regarding information
  - Simply responding to changes
  - Focus improvement to the areas of architecture needing the change