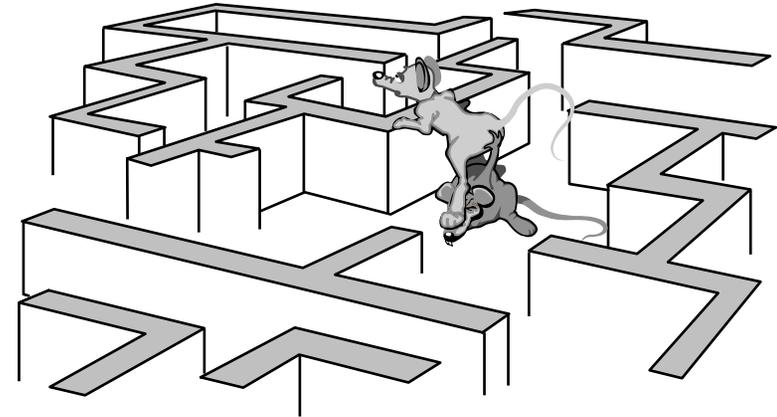# Configuration Management

**July 2006**

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# Overview of Lesson

- **Introduction**

- **Configuration Management Topics**
  - **EMD Configuration Management (CM) Activities**
  - **Configuration Control Boards (CCBs)**
  - **Configuration Change Requests (CCRs)**
  - **Software Baselines and Changes**
  - **Changes to Hardware Baselines**
  - **Changes to the Baseline**

- **Practical Exercise**

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# Objectives

- **Overall:  Proficiency in Configuration Management**
  - **Describe the EMD CM activities**
  - **List Configuration Control Boards (CCBs), roles, and responsibilities**
  - **Process a Configuration Change Request (CCR)**
  - **Review Configuration Parameters in Configuration Registry**
  - **Access baseline information**
  - **Process a change to the inventory**

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# Importance

**Lesson provides preparation for several roles to ensure effective CM for implementation of system changes**

- **CM Administrators**
- **System Engineers, System Test Engineers, Maintenance Engineers**

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# EMD CM Activities

- **Configuration Management team's primary responsibility is to provide and protect the integrity of the EMD baseline**
  - Also must ensure that baseline changes are made using formal processes

- **Objectives of EMD configuration control are to ensure:**
  - Changes are adequately defined, assessed for technical, cost, and schedule impacts by the EMD office(s), and formally considered by the appropriate CCB
  - Only approved changes are incorporated in the appropriate baseline in an orderly and systematic manner
  - Actions assigned by each CCB are monitored and brought to closure

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# EMD CM Activities (Cont.)

- **DAAC Unique Extensions (DUEs)**
  - **SCDV CCB reviews the DUEs for potential impact to the EMD Configuration Baseline System and for potential inclusion in the EMD Baseline System**
  - **If warranted, the SCDV CCB authorizes inclusion in the EMD Configuration Baseline System**

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# EMD CM Activities (Cont.)

- **Software Configuration Management (SCM)**
  - **Uses the CCR process to release COTS and custom software to the sites**
  - **A custom software component can only change with the issuance of an NCR using the Distributed Defect Tracking System (DDTS™) tool**
  - **The base upon which the change is made is the custom code design baseline, which is maintained by the ClearCase™ software configuration management tool**

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# EMD CM Activities (Cont.)

- **Software Configuration Management Tools**
  - **Remedy™ Trouble Ticketing**
  - **Distributed Defect Tracking System (DDTS™)**
  - **Software Turnover Tracking System (STTS)**
  - **ClearCase™ Software Configuration Management System (ClearCase™)**
  - **ClearCase™ Baseline Manager (BLM)**
  - **EMD Change Manager (ECM)**
  - **Proposal Assessment Board (PAB) Database**
  - **Data Management Tool**
  - **ClearCase™ Delivery Tool**
  - **Engineering Software Delivery Daemon**
  - **Source Code Delivery Tool**
  - **Custom Code Installation Emulator**

# EMD CM Activities (Cont.)

- **EMD Baseline Information System (EBIS)**
  - **Implemented with a physical web server internal at Landover and locally at the DAACS**
  - **EBIS URLs are:**
    - **http://pete.hitc.com/baseline/  (Internal EBIS web server)**
    - **(External EBIS web servers)**

    - **LPDAAC   http://e0ins01.edcb.ecs.nasa.gov:10160/baseline/**
    - **GES       http://g0ins01.gsfcb.ecs.nasa.gov:10160/baseline/**
    - **LaRC      http://l0ins01.larcb.ecs.nasa.gov:10160/baseline/**
    - **NSIDC     http://n0ins02u.ecs.nasa.gov:10160/baseline/**
    - **SMC       http://m0mss04.ecs.nasa.gov:10160/baseline/**

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# EMD CM Activities (Cont.)

- **Library Maintenance**
  - **EMD program uses two distinct libraries**
    - **Document Center (maintained by the Data Management group)**
    - **COTS Software Library (managed by the ClearCase™ Support Group)**

# EMD CM Activities (Cont.)

- **Configuration identification**
  - Maintenance and control of technical documentation

- **Configuration status accounting**
  - Recording and reporting information about the configuration status of system documentation, hardware, and software
  - BLM reports

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# EMD CM Activities (Cont.)

- **Configuration audits**
  - **Physical Configuration Audits (PCAs) are formal assessments of the actual configurations of all baselined EMD hosts**
    - **Software PCAs compare the COTS software, custom software, O/S patches, and UNIX® kernel parameters of the actual hosts to the EBIS design baseline**
    - **Hardware PCAs compare the physical hardware to the EBIS design baseline, and covers items such as memory, disks, and host configuration**
  - **Functional Configuration Audits (FCAs) are conducted to assure that each EMD product meets its specified performance requirements to the extent that can be determined by testing**

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# Configuration Control Boards
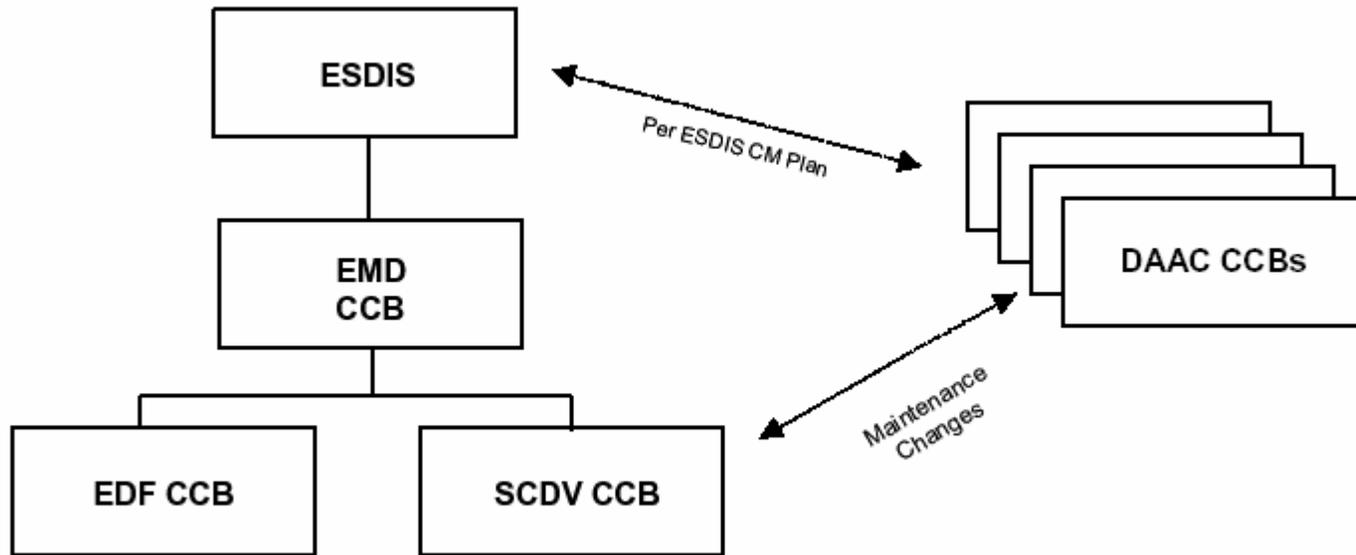
# Configuration Control Boards (Cont.)

- **ESDIS CCB**
  - Level 2 board responsible for interfacing with higher-level boards for changes that affect Level 1 requirements, controlling Level 2 requirements, approving specified documentation, and procurements

- **EMD CCB**
  - Responsible for establishing and managing the configured baselines at the project level

- **EDF (Infrastructure) CCB**
  - Responsible for establishing and managing development

- **Science and Development (SCDV) CCB**
  - Has the authority and responsibility for controlling system releases

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# Configuration Change Requests (CCRs)

- **No undocumented changes**
  - **all requests for change documented using CCR form**
  - **CCR generated against the baseline affected by the proposed change**
  - **Form can be completed electronically**
    - **Word processing form**
    - **Change Request Manager tool (CM Administrator)**

- **CCB review**
  - **CCR submitted to appropriate CCB**

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# Software Baselines and Changes

- **CSG ships the physical media, or delivers the files using the ClearCase™ Delivery Tool to the designated sites**
  - Electronic delivery is performed via secure copy (scp) to target DAACs

- **DAAC CCB approves the installation of the delivered software into a DAAC Operational Baseline (e.g., a mode, "OPS", "TS1", etc.)**
  - Software is installed in accordance with CCR installation instructions, and in accordance with local DAAC procedures/processes

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# Configuration Parameters

- **Default settings may or may not be optimal for local operations**

- **Changing parameter settings**
  - **May require coordination among Configuration Management Administrator, Database Administrator, and Operations personnel**
  - **Some parameters accessible on GUIs**
  - **Some parameters changed by editing configuration files**
  - **Some parameters stored in databases**

- **Configuration Registry**
  - **Script loads values from configuration files**
  - **GUI for display and modification of parameters**
  - **Move (re-name) configuration files so system servers obtain needed parameters from Registry Server when starting**

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# Configuration Registry

# Configuration Registry (Cont.)

# Hardware Baselines and Changes

- **Change Scenarios**
  - **COTS hardware problem repair that requires a CCR**
  - **System enhancement**

- **Repair with part of same make, model, version does not require CCR**

- **Change in make, model, version of a part to be used for repair, e.g., in an emergency, necessitates CCR to document the change**
  - **Review/approval by site CCB**
  - **EMD/ESDIS review for impacts/applicability to other sites**
  - **Provision of controlled document updates to Document Maintenance and entry into CM**
  - **CM system updates to reflect change**
  - **Audits (FCA/PCA)**

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# Changes to the Baseline

- **CM Tools for baseline changes**
  - **Baseline Manager (BLM):  ClearCase**
  - **Inventory/Logistical Maintenance (ILM) Manager:  Remedy**

- **Related tools**
  - **From Management Subfunction software**
    - **Trouble Ticket System (TTS)**
    - **Problem reporting and tracking**
    - **Used by users, operators, system administrators**

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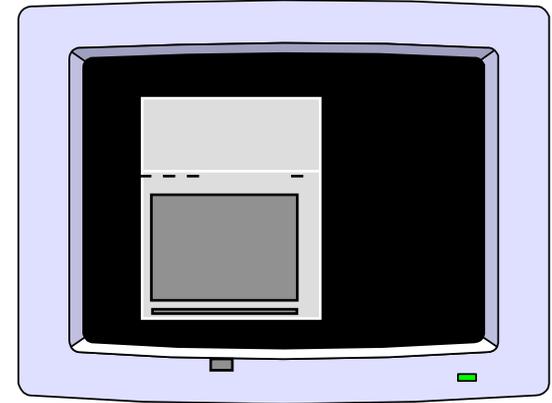
# Baseline Terms and Concepts

- *Baseline Management* is to identify and control baselined versions of hardware and software, and maintain a complete history of baseline changes

- *Control Item* is any EMD item under version control by CM

- *Configuration Item (CI)* is an aggregation of hard-ware, firmware, software, or any discrete component or portion, which satisfies an end user function and is designated for configuration control

- *Baseline* is a configuration identification document or set of such documents formally designated by the Government at a specific time in the life cycle of a CI

- *Configured Article* is a control item reportable as part of the Configured Articles List (CAL)

# Baseline Terms and Concepts (Cont.)

- **EMD Structure and Baseline Terms**
  - *Assembly*:  an item made up of other items
    - *Parent*:  a higher-level item (e.g., an assembly)
    - *Child*:  an item that is a component of a higher-level item
  - *Bill of Material*:  list of items that comprise an assembly
  - *Product Structure*:  the parent-child pairings that define the bill of material for an assembly; each product structure record specifies the effective dates and quantities for a single component of a parent for each engineering change
  - *Active Date*:  the date a component becomes effective in an assembly's bill of material
  - *Inactive Date*:  the date a component is no longer effective in an assembly's bill of material

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# Baseline Terms and Concepts (Cont.)

- **EMD Structure and Baseline Terms (Cont.)**
  - *Engineering Change*:  a mechanism for grouping, reporting, and controlling product changes collectively
  - *Revision*:  sequence number of a product structure change to an assembly; signifies a change to the configuration of an assembly that does not alter its form, fit, or function
  - *Implementation Status*:  a record describing the deploy-ment of a control item to a site and the current state and associated date of its implementation; each control item has one record for each site to which it is deployed
  - *Exporting Data*:  creating a formatted file or records extracted from the BLM database; control item engineer-ing change, product structure, and interdependency records may be extracted and sent to another BLM site via ftp
  - *Importing Data*:  loading BLM data from a formatted file

# Product Structure - Design View



```
                    ECS Product Baseline
                         ver: 2.0
     ┌──────────────┬────────────┴────────────┬──────────────┐
  Subsystem -1   Subsystem - 2           Subsystem - 3    Subsystem -4
   ver: 2.0        ver: 2.0                 ver: 2.0        ver: 2.0
  ┌─────┴─────┐              ┌──────────────┴──────────┐
HW CI - 1   HW CI - n     SW CI - 1               SW CI - n
 ver: 2.0    ver: 2.0      ver: 2.0                 ver: 2.0
 ┌───┴───┐                          ┌─────────┴─────────┐
Component-1  Component-n          CSC - 1            CSC - n
 ver: 2.0     ver: 2.0            ver: 2.0            ver: 2.0
```

**Configured Articles**

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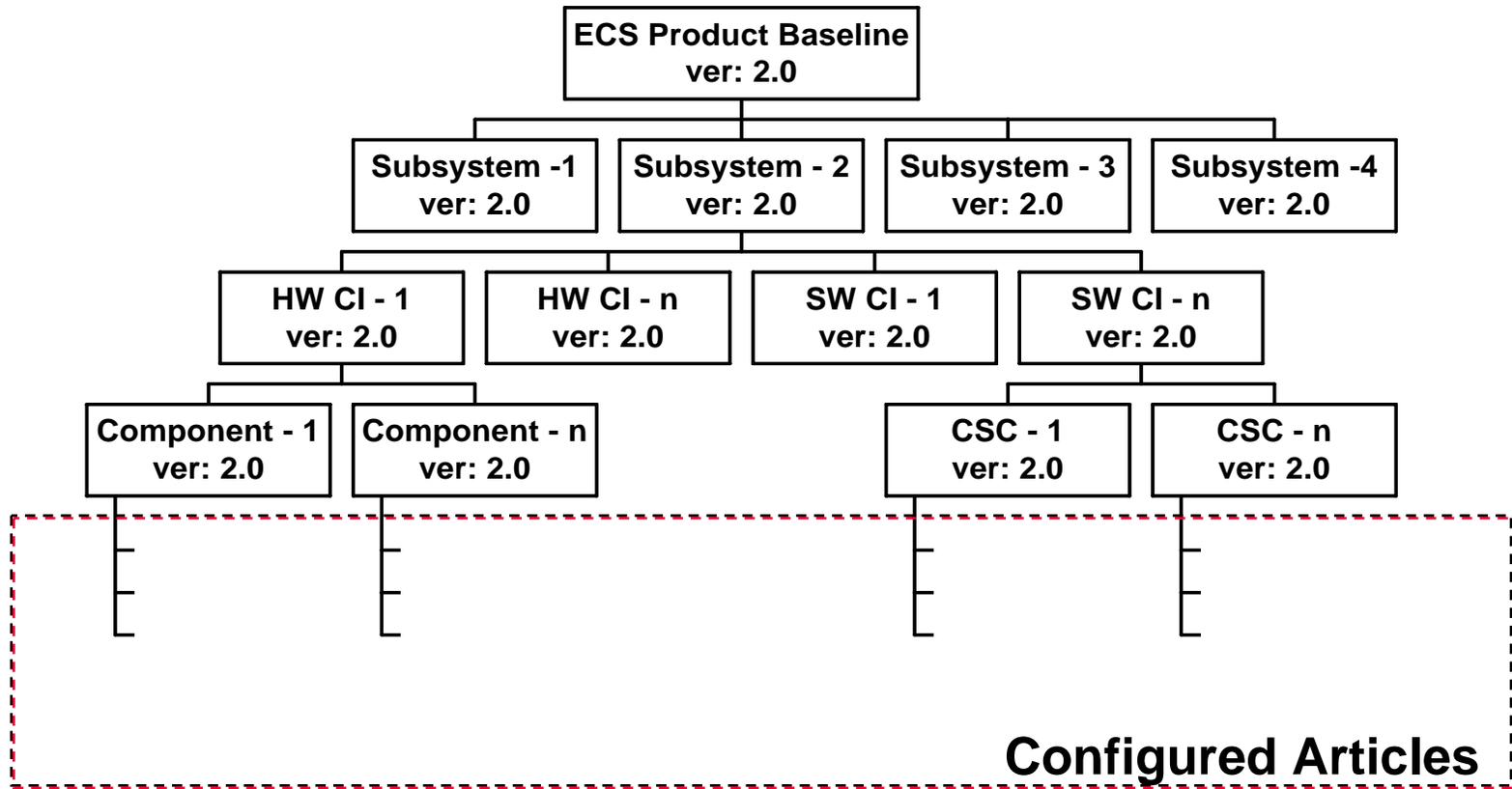
# Product Structure - Operational (Network) View

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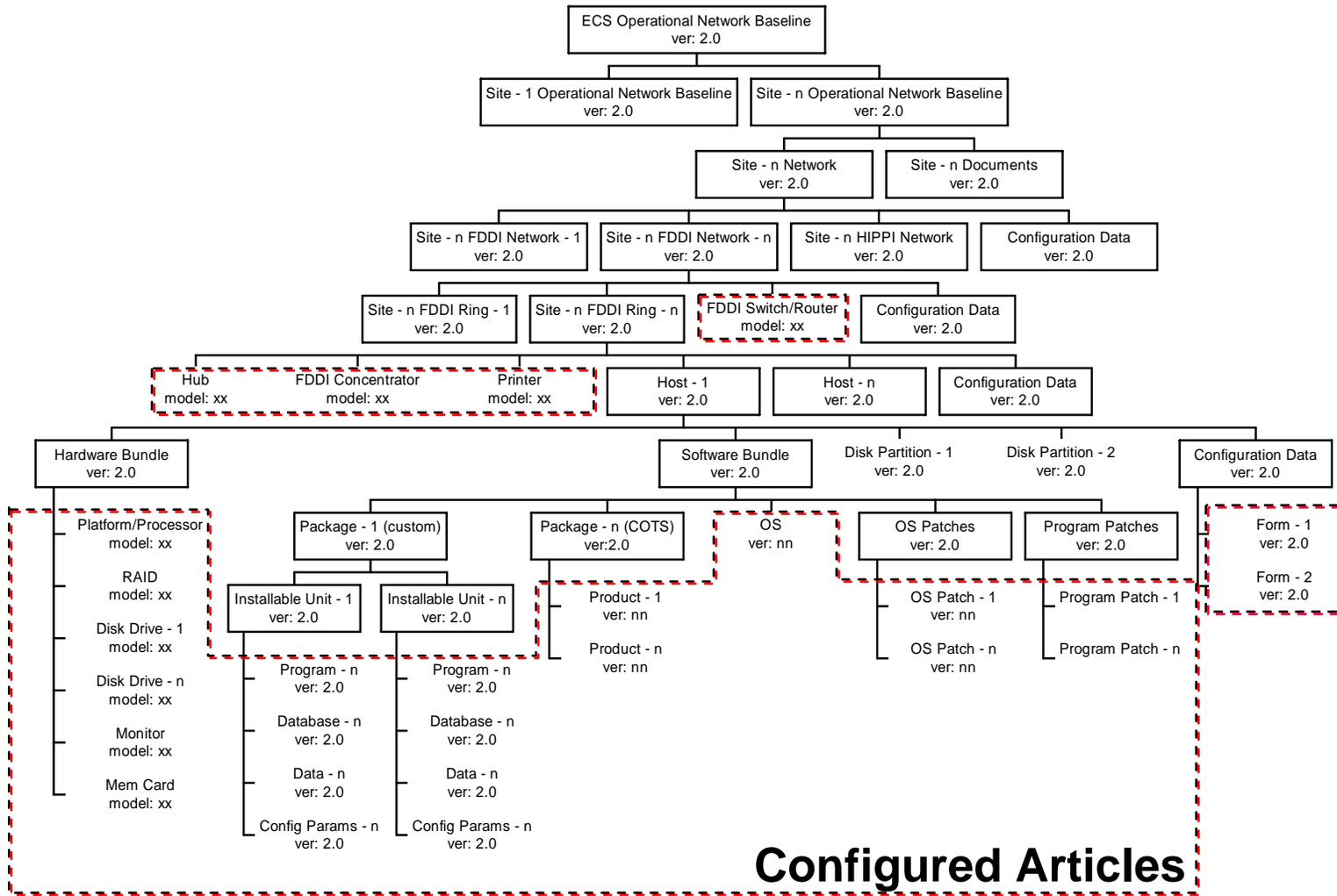
# Product Structure - Operational (Subsystem) View



**Configured Articles**

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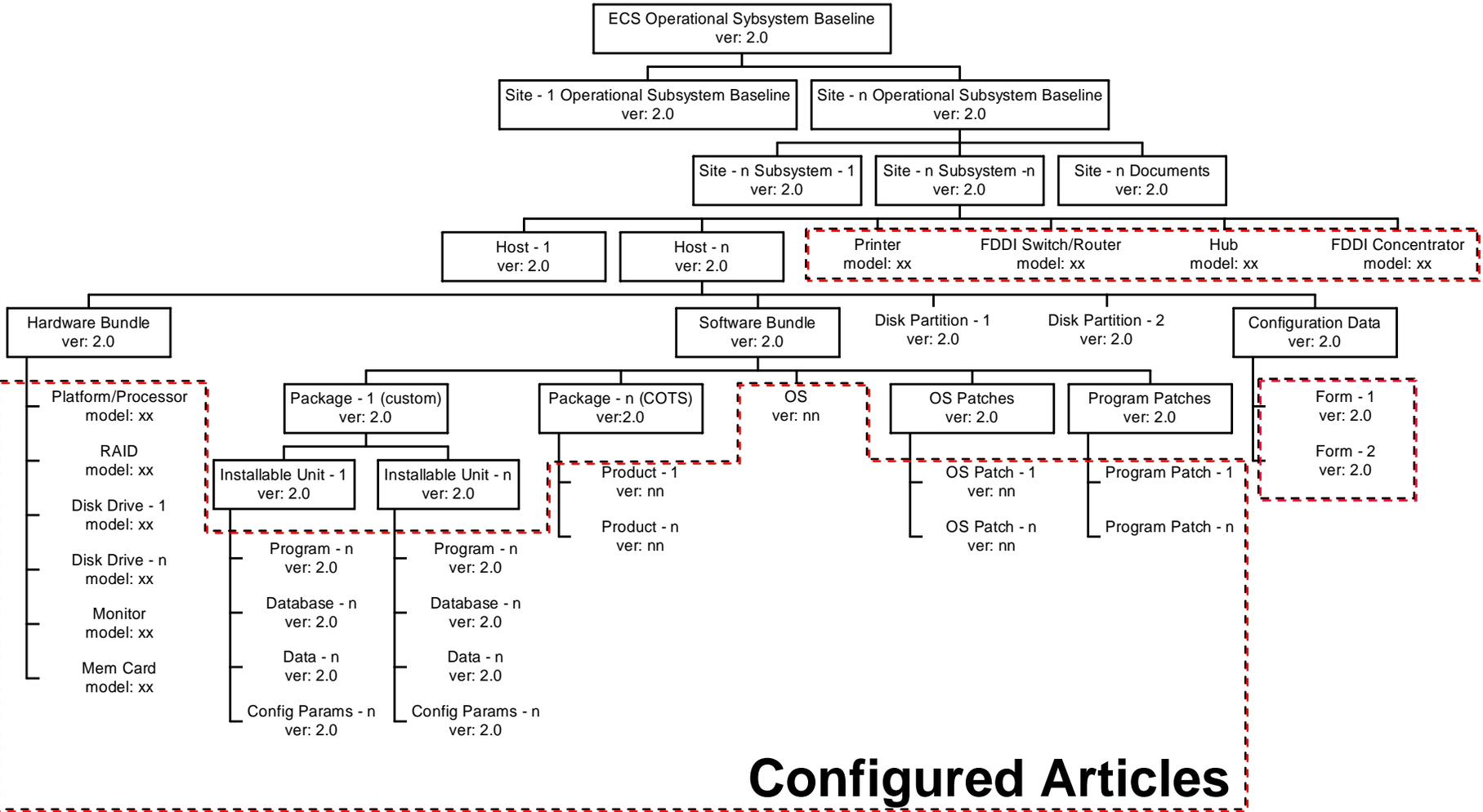
# Baseline and Inventory Management:  Tools

- **Baseline Management (BLM):  ClearCase**
  - **Manages Baseline Records on software, scripts, GUIs**
  - **Maintained at ECS Development Facility (EDF)**
  - **Technical Document outputs posted to EMD Baseline Information System (EBIS) at http://cmdm-ldo.raytheon.com/**
    - **Including 910-series affecting all sites and 920-series site-specific documents**

- **Inventory/Logistical Management (ILM):  Remedy**
  - **Used at EDF to maintain property, repair, and software license data**
  - **Used at sites to create Maintenance Work Orders (MWOs) and record equipment maintenance activity**

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# EMD Baseline Information System (EBIS)

# EBIS List of Technical Documents

# Remedy OPEN Dialog for ILM Access

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# New ILM-EIN Entry Form

# ILM-OEM Parts Form

# ILM-EIN Transaction Form

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# ILM-EIN Process Component Form