

CMII-100D

CMII Standard
for
Enterprise
Configuration Management



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Notice

This standard was developed by a group of configuration management (CM) subject matter experts who are also certified CMII professionals (CMIIPs).

— CMII Group A —

**This revision (rev D) serves to align its format and content with
CMII-105C *CMII Standard for Product CM*
and
CMII-200C *CMII Standard for Business Process Certification***

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About this Standard

This standard defines the requirements for applying configuration management to the business enterprise and its core business processes in the same manner that CMII-105 defines the requirements for applying configuration management to products.

An enterprise baseline is the cornerstone to this standard as product baselines are the cornerstone to the CMII-105 standard.

The hierarchy of administrative requirements provides the framework for an enterprise baseline while physical item hierarchies provide the framework for product baselines.

Both standards utilize the same configuration management process which is enabled by the same business process infrastructure.

This is not an ANSI-sanctioned consensus standard, but its contributors include the most highly recognized experts in the field.

They are the CMII instructors who train the subject-matter experts from businesses and government agencies world-wide in how to build and utilize a CM-based business process infrastructure.

The CM process requirements defined herein are at a high level, yet sufficiently detailed such that those who implement and conform to this standard should achieve similar results.

Existing CM processes may also be assessed against this standard to identify their strengths and weaknesses.

Please send any questions to info@icmhq.com and use the form on the last page to request changes.

Definitions

Administrative Hierarchy - A hierarchy of administrative requirements and procedures used to run the business and which provide the framework for the enterprise baseline.

Administrative Procedure - Instructions for how to achieve an operating standard.

As-Planned/As-Released Baseline - A structured set of information that fully defines the current configuration and also provides visibility of planned changes.

Business Process Infrastructure - A set of processes designed to accommodate change, keep requirements clear, concise and valid and maintain records of work accomplished.

Change Review Board - A management team that makes business decisions.

CMII Model - A model for an enterprise and its business process infrastructure.

Core Business Process - A specific discipline for performing certain type of work.

Corrective Action - The extra effort, or intervention resources, required to compensate for something that should not be necessary.

Creator - A person who is the assigned author and co-owner of a specific document.

Design Basis - A high-level definition of the configuration is and how it does what it does.

Designated User - A person who is a user and a co-owner of a specific document.

Fast-Track Changes - Changes that may be approved and implemented by an individual.

Indenture Levels - The parent-to-child relationships between items or documents.

Intervention Resources - See corrective action.

Operating Standard - A requirement to be achieved by a core business process.

Physical Item Hierarchy - A set of indentured bills of material used to define products.

Release - The formal act of releasing and making something available for use.

Strategic Business Plan - Provides the design basis for the enterprise.

Traceability - Knowing, through records, where something came from and/or where it is.

Validation - The process of ensuring that a requirement is clear, concise and valid.

Verification - The process of ensuring that something conforms to its requirements.

Waiver (or Deviation) - Provides authorization to accept a nonconforming product.

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INTRODUCTION

Figure 1 provides insight to the CMII model and how the same CM process can be applied to products and the business enterprise. For products, the design basis requirements flow-down through the physical item hierarchy and into detailed designs and processes. Flow-down is an iterative process and changes are continuous. Ability to accommodate change and keep requirements clear, concise and valid is essential.

For a business enterprise, the high-level requirements of the strategic business plan flow-down through the administrative hierarchy and into detailed operating standards and procedures. There too, flow-down is an iterative process and changes are continuous. There too, the ability to accommodate change and keep requirements clear, concise and valid is essential. The CM process, itself, is the same.

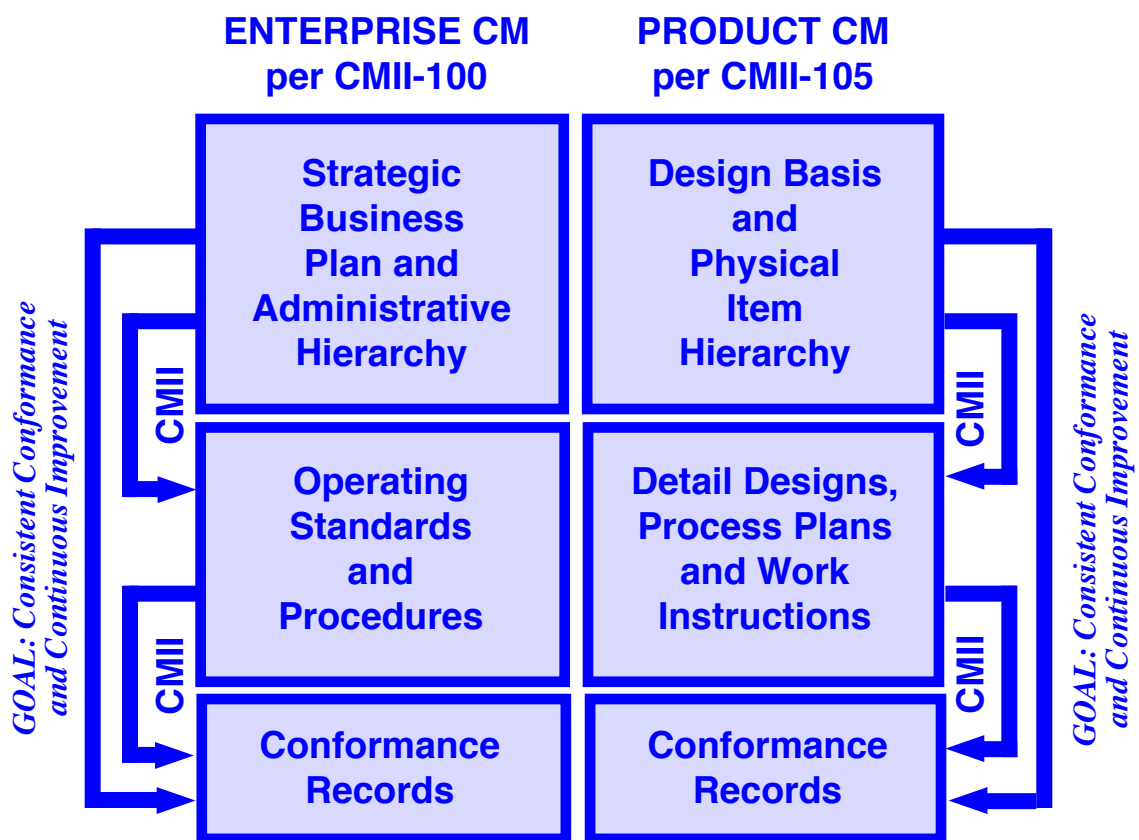


Figure 1 Enterprise CM Relative to Product CM

1. Enterprise Baseline and Its Importance

Activities in a business enterprise can be segregated into three tiers as shown below. A nonconforming situation in tier 3 is a symptom of a problem in tier 2 which, in turn, is a symptom of a problem in tier 1. The root causes for most problems in all three tiers can be traced back to the operating standards and procedures in tier 1.

The operating standards and procedures in tier 1 deserve top priority. High quality standards and procedures yield high quality designs and processes which, in turn, yield high quality products.

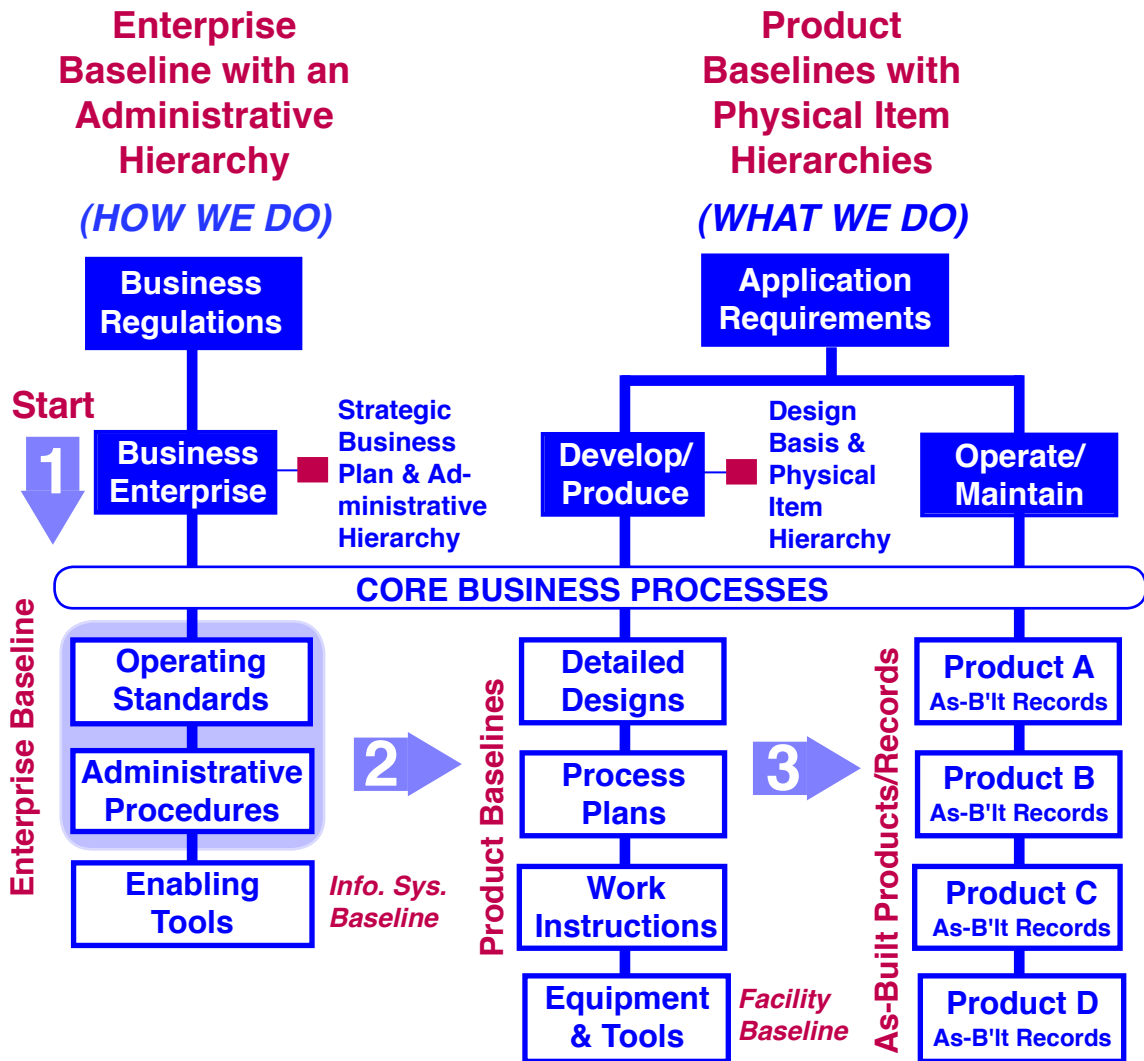


Figure 2 Enterprise Baseline and Work Flows

2. Effectiveness of Existing CM Processes

Figure 3 illustrates what it means to operate in the continuous improvement mode versus the corrective action mode. The outer-loop represents the continuous improvement mode. The inner-loop represents the corrective action mode. Those operating in the inner loop process a large number of changes to correct errors plus a large number of deviations/waivers to accept nonconforming products.

The root causes for corrective action, deviations and waivers reside in operating standards and procedures that are in the domain of CM. The proven solution is a business process infrastructure that can accommodate change and keep requirements clear, concise and valid. The building blocks required to achieve the desired business process infrastructure also reside in the domain of CM.

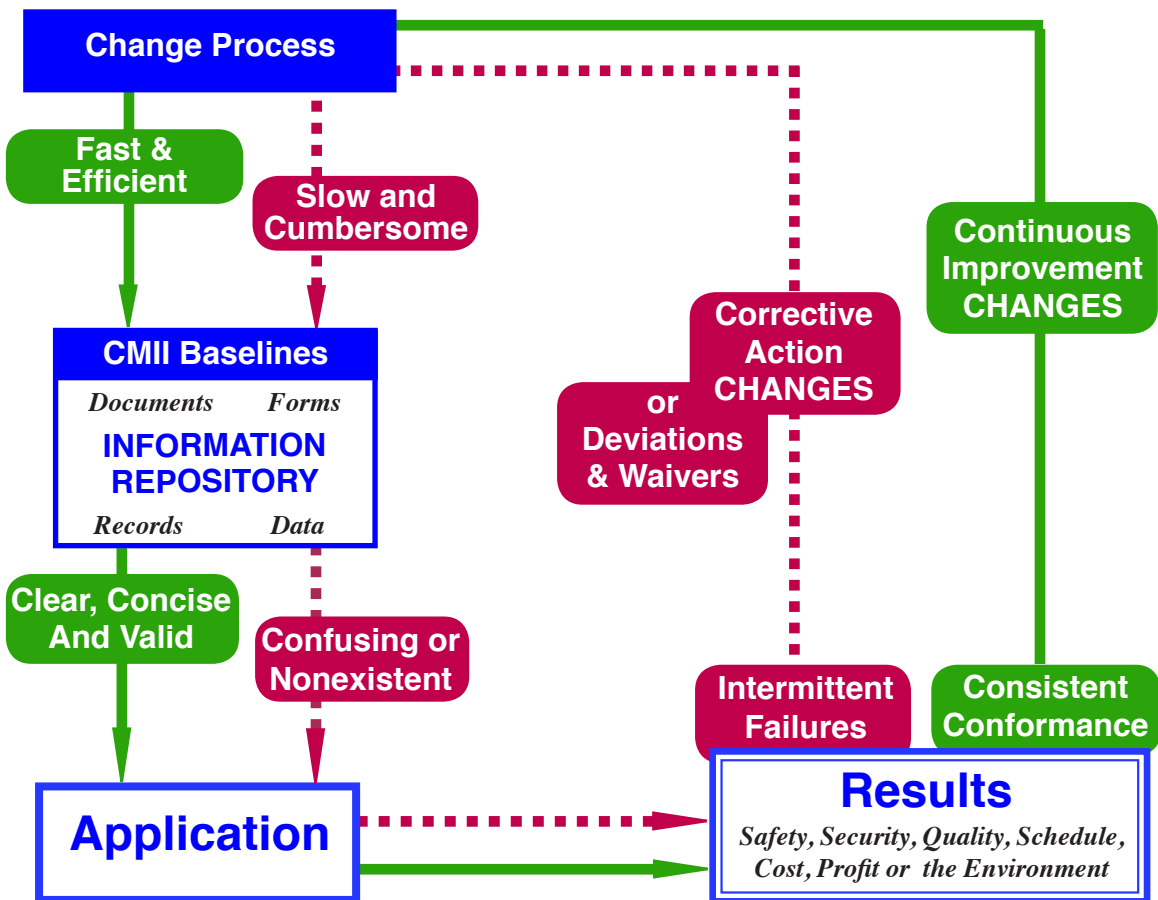


Figure 3 Measure of CM Process Effectiveness

3. Five Levels of Process Evolution

To achieve a business process infrastructure that can accommodate change and keep requirements clear, concise and valid represents five levels of process evolution. Organizations operating in the corrective action mode with no plan to escape are at level 1. Organizations that achieve level 5 are truly lean and agile. The transition from level 1 to level 5 is achievable in 8 steps as shown below.

The first two steps required to transition from level 1 to level 2 are most important. To start with a good plan is essential. This standard defines the requirements to be included in that plan. The ultimate goal is integrated process excellence. The appropriate business process infrastructure is a prerequisite and is built in steps 1 and 2.

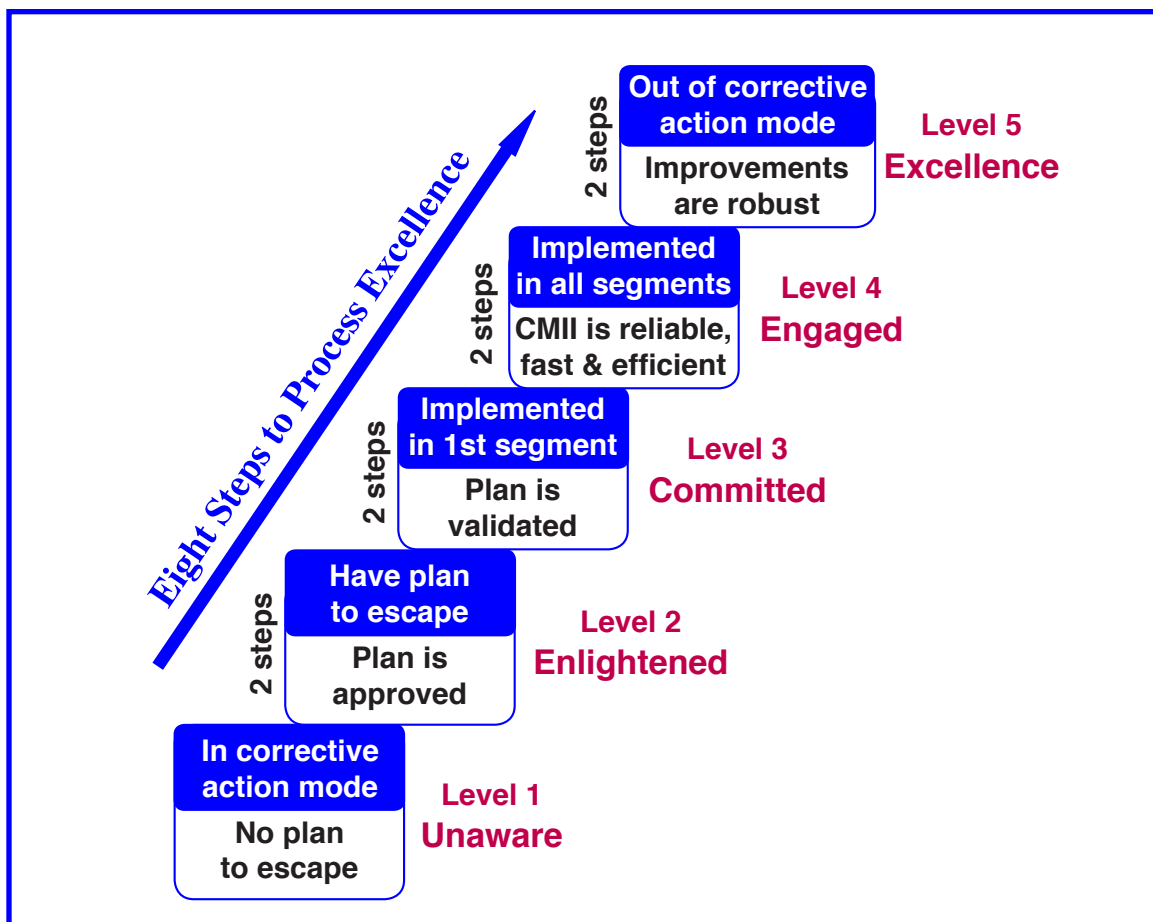


Figure 4 Five Levels of Process Evolution

4. Core Business Processes and Process Infrastructure

The CMII model for a business enterprise includes a strategic business plan and nineteen core business processes as shown below. The core business processes and their owners are identified in the strategic business plan. The process owners represent the ideal cross-functional team to be responsible for achieving the requirements of this standard.

The business process infrastructure is comprised of the strategic business plan and core process categories 1.0 through 8.0. Core process categories 1.0 through 7.0 reside in the domain of CM.

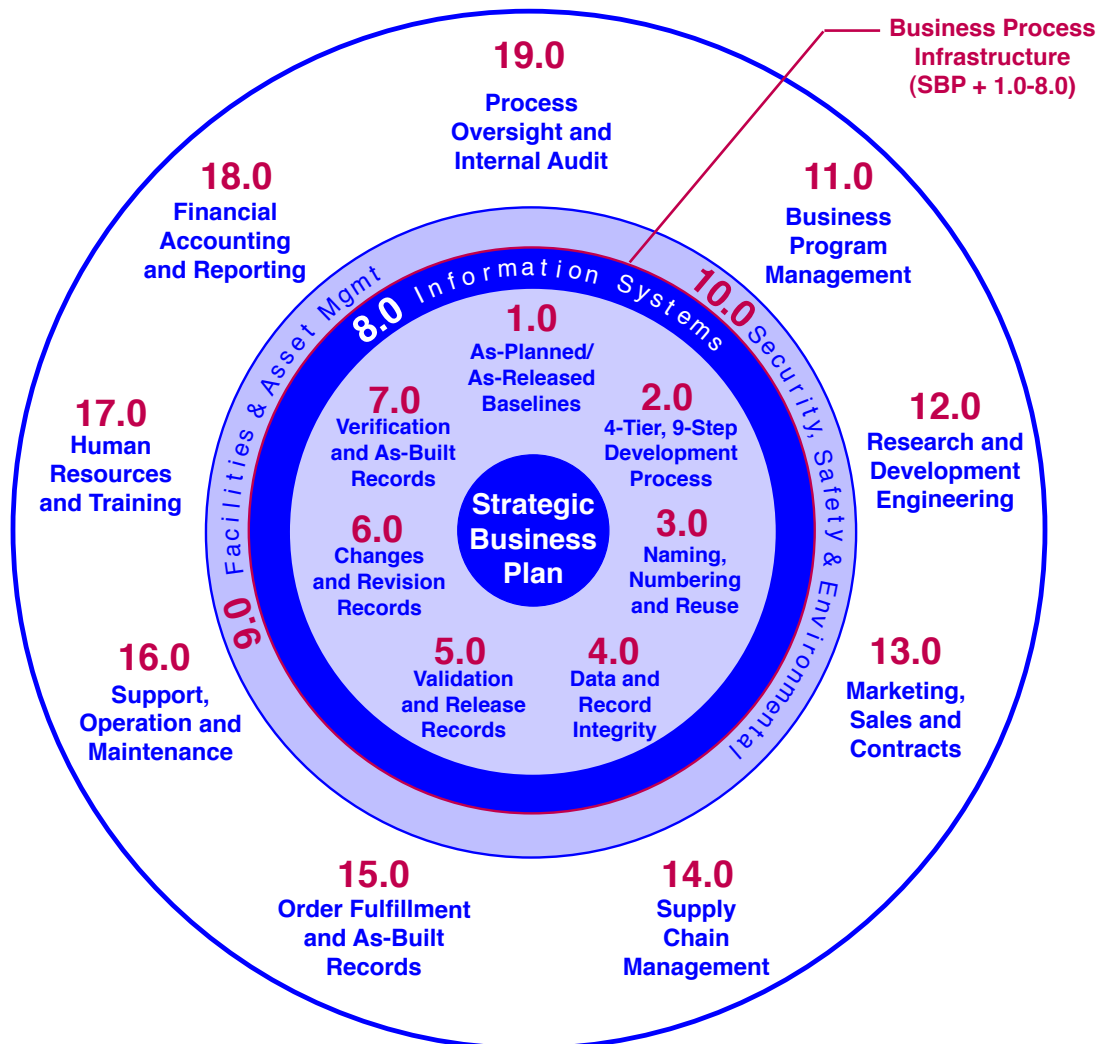


Figure 5 Core Business Processes and Infrastructure

5. Enterprise Baseline Content and Format

The hierarchy of administrative requirements in an enterprise baseline includes the following topics which reside at indenture levels 0 through 4:

5.1 Business regulations and standards	level 0
5.2 Strategic business plan	level 1
5.3 Strategic business plan parts	level 2
5.4 Core business processes and linkages	level 3
5.5 Operating standards and procedures	level 3.x
5.6 Baseline automation	level 4

The level of enterprise performance that is achieved once the enterprise baseline is formally established and implemented is ensured of being sustained, as long as the baseline is maintained.

A baseline is also a gateway to repositories of information. It should be possible to gain access any document directly from the baseline. A detailed format of an enterprise baseline is provided in Figure 9.

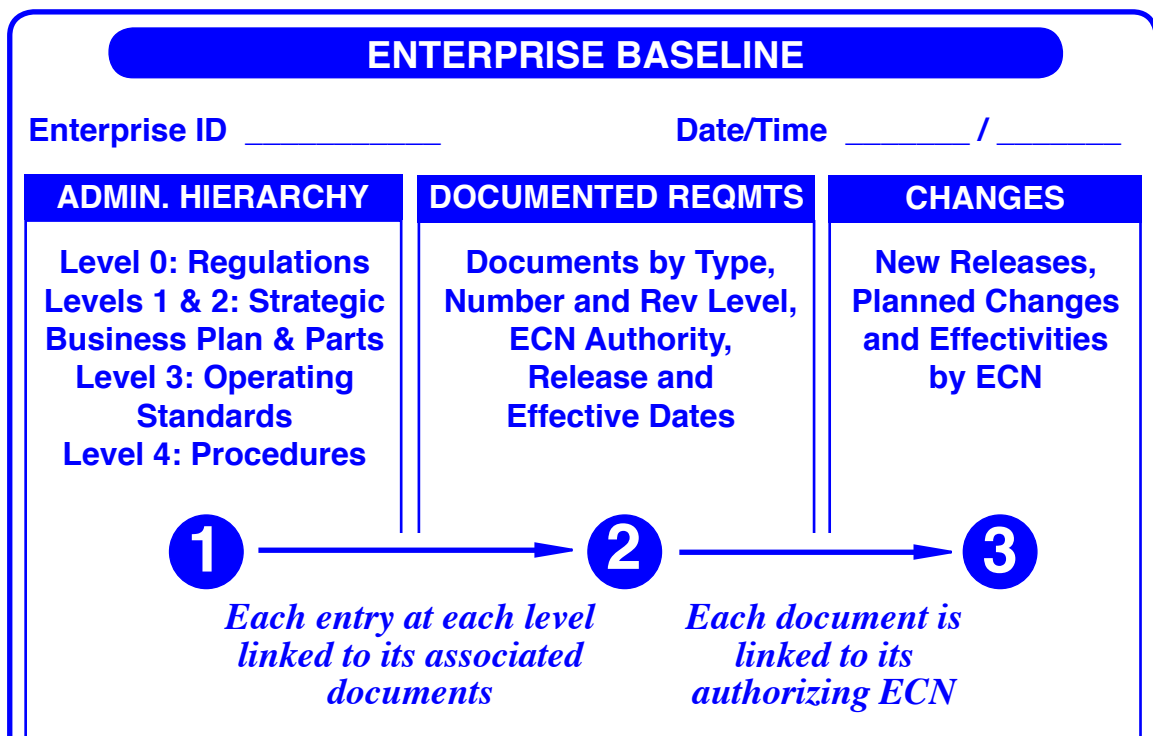


Figure 6 Enterprise Baseline Content and Format

5.1 Business Regulations and Standards

The enterprise baseline is the proper place to compile a list of all business regulations and standards to which the enterprise has chosen to comply. Each core business process owner is likely to have their own set and they may be segregated into like-groups accordingly.

1.0 As-Planned/As-Released Baselines <i>List of applicable regulations and/or standards</i>
2.0 4-Tier, 9-Step Development Process <i>List of applicable regulations and/or standards</i>
3.0 Naming and Numbering <i>List of applicable regulations and/or standards</i>
4.0 Data and Record Integrity <i>List of applicable regulations and/or standards</i>
5.0 Validation and Release Records <i>List of applicable regulations and/or standards</i>
6.0 Changes and Revision Records <i>List of applicable regulations and/or standards</i>
7.0 Verification and As-Built Records <i>List of applicable regulations and/or standards</i>
8.0 Information Systems <i>List of applicable regulations and/or standards</i>
9.0 Facilities and Asset Management <i>List of applicable regulations and/or standards</i>
10.0 Security, Safety and Environmental <i>List of applicable regulations and/or standards</i>
11.0 Business Program Management <i>List of applicable regulations and/or standards</i>
12.0 Research & Development Engineering <i>List of applicable regulations and/or standards</i>
13.0 Marketing, Sales and Contracts <i>List of applicable regulations and/or standards</i>
14.0 Supply Chain Management <i>List of applicable regulations and/or standards</i>
15.0 Order Fulfillment and As-Built Records <i>List of applicable regulations and/or standards</i>
16.0 Support, Operation and Maintenance <i>List of applicable regulations and/or standards</i>
17.0 Human Resources and Training <i>List of applicable regulations and/or standards</i>
18.0 Financial Accounting and Reporting <i>List of applicable regulations and/or standards</i>
19.0 Oversight and Internal Audit <i>List of applicable regulations and/or standards</i>

Table 1 Regulations/Standards by Core Business Process

5.2 Strategic Business Plan

A strategic business plan is the proper place to establish how the organization conducts business. Changes in personnel and/or assignments should have minimal impact on overall process effectiveness.

5.3 Strategic Business Plan Parts

Part 5, per the CMII model, is where the core business processes and their owners are identified. Part 5 serves to link the strategic plan to the detailed operating standards and procedures (as shown on page 15).

Part 1	Mission (or vision) statement High-level statement of the business objectives
Part 2	Relationships to other divisions/sites/partners Interdependencies, if not autonomous
Part 3	Organizational alignment and policies Organizational hierarchy and business rules
Part 4	Products, services and customers How perceived in marketplace and market share
Part 5	Core business processes and operating standards How day-to-day operations are conducted
Part 6	Financial accounting and reporting Past, present and future projections
Part 7	Human resource development and training Education, training and career development
Part 8	Compensation, stock options and bonus plans Salaries, performance reviews, contractor rates, etc.
Part 9	Internal and external audits Performance measurements (macro and micro)
Part 10	Product, process and administrative improvements Planned improvements; results of prior initiatives
Part 11	Stockholder expectations and community spirit Expected growth in value and contributions

Table 2 Strategic Business Plan Parts

5.4 Core Business Processes and Linkages

The goal is to establish a reliable and efficient process that can provide consistent results impervious to changes in personnel and organizational alignments. A parallel goal is to maintain agility. It should be possible to accommodate change without compromising reliability or efficiency.

The linkages shown below represent the flow-down of higher-level requirements to the supporting details. The processes are refined until repeatable results are being achieved. The processes are also revised and realigned as needed to support changing business conditions. Proper linkages make it easier to accommodate change and retain control.

The core business process owners are responsible for creating and maintaining the operating standards and administrative procedures.

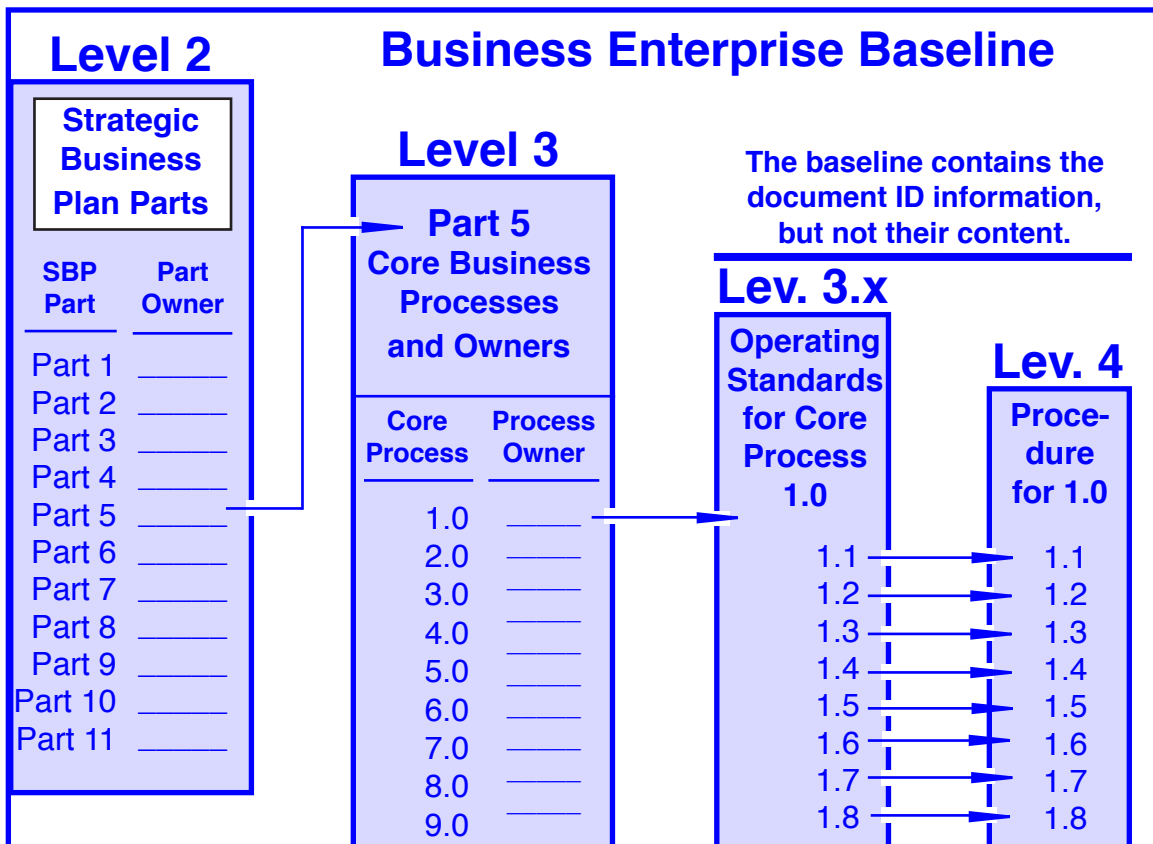


Figure 7 Core Business Processes and Linkages

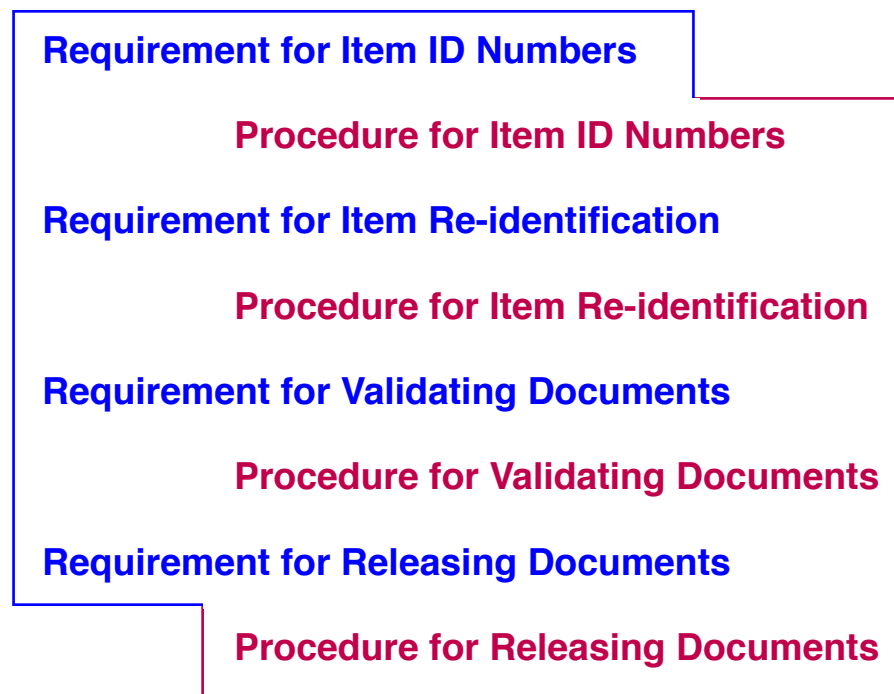
5.5 Operating Standards and Procedures

In CMII terms, each requirement to be achieved by a core business process is called an *operating standard*. An operating standard is a statement of the requirement and is limited to one, two or three sentences. An administrative procedure describes how to achieve an operating standard per the examples below.

For example, the requirements to be achieved by the 19 core business processes within the CMII model represent about 250 operating standards. The requirements in core business process categories 1.0 through 8.0, represent about half of the total.

All operating standards are integrated into one consolidated set and the entire set is validated by each of the core business process owners.

Enterprise Operating Standards



Administrative Procedures

Figure 8 Operating Standards and Procedures

5.6 Baseline Automation

CM process automation revolves around baselines and their input and output work flows. The inputs are provided by the change process. Outputs are the requirements that are referenced in work authorizations. Baselines and their inputs and outputs can be fully automated.

5.6.1 Access to Enterprise Baseline Content

A baseline provides direct access to the repositories of information about the enterprise configuration. All important information about the enterprise is entered into the baseline. Each important element has its own set of metadata. The required content of an enterprise baseline is defined in Part 5. See Figure 9 on page 21 for a detailed example.

Functionality of the enterprise baseline includes the ability to enter at any point and navigate up or down through the administrative hierarchy. It includes the ability to navigate side-ways from documents to their authorizing ECNs, release dates and effective dates. It also includes the ability to access any document, ECN or other key element directly from the baseline.

5.6.2 Changes and Baseline Updates

Each baseline is closely coupled with a common closed-loop change process. A change impact matrix is used to identify all baselined elements impacted by each change. The baseline includes visibility of planned changes and planned release dates for new and revised documents. The implementation plan for each change is used to update the baseline and display the planned change. The baseline is further updated as planned documents are released.

Change forms are used as templates to guide each change through each phase of the process. An analysis phase is separate from the implementation phase. Completed forms are retained as records of work accomplished.

6. Enterprise Process Improvement Plan

When operating in the corrective action mode, all parties are adversely affected. No one is immune. A process improvement plan must address the needs of the entire enterprise. The initial effort must focus on the business process infrastructure since that is where the root causes for corrective action reside. The business process infrastructure resides in the domain of configuration management.

6.1 Enterprise Process Improvement Team

The core business process owners comprise the cross-function team that is responsible for improving the overall process. To establish and maintain positive traction, the core business processes and their owners are formally identified in the strategic business plan.

6.2 Business Process Infrastructure Sub-Team

A sub-team of core business process owners is established to focus on improving the business process infrastructure. The sub-team members are the owners of core business process categories 1.0 through 8.0. The leader of the sub-team is the owner of the core business process categories 1.0 through 7.0.

6.3 Enterprise Configuration Management Plan

The operating standards and procedures for the business process infrastructure represent the CM plan for the enterprise.

6.3.1 Establish the Enterprise Baseline

The content and format of the enterprise baseline includes the hierarchy of administrative requirements, their indenture levels, revision levels and linkages. Place holders are used to identify documents that need to be created or revised.

6.3.2 Numbering Convention for Administrative Documents

A standardized numbering convention for identifying each document within the hierarchy of administrative documents is established.

6.3.3 Document Changes and Revision Levels

Conventions for identifying and advancing the revision level of each administrative document at each indenture level are established.

6.3.4 Effective Dates for Each Version of Each Document

Methods for determining when a newly released document, or a superseding document, shall be authorized for use are established.

6.3.5 Establish Ownership of Each Document

A creator and one or more designated users are identified for each document who shall be jointly responsible for its integrity.

6.3.6 Define the Enterprise Operating Standards

Each core business process owner shall define the requirements, or operating standards, that their process is to achieve on an ongoing basis.

6.3.7 Consolidate and Validate the Operating Standards

The core business process owner that has the most operating standards is responsible for consolidating and maintaining the entire set. The other core business process owners validate the entire set for completeness and individual integrity.

6.3.8 Administrative Procedures

Each core business process owner is responsible for developing administrative procedures as needed to achieve each operating standard. Each administrative procedure is co-owned by its assigned creator and a designated user.

6.3.9 One Common Closed-Loop Change Process

The entire hierarchy of administrative requirements is maintained with one common closed-loop change process.

6.3.9.1 Change Review Board and Fast-Track Changes

The Change Review Board is comprised of the core business process owners. The board members define the criteria for changes that are authorized to be processed on a fast-track basis.

6.3.9.2 Change Specialist Functions I, II and III

The closed-loop change process is managed on behalf of the core business process owners by three change specialist functions. Specialist I manages and/or supports the change analysis phase. Specialist II manages and/or supports the implementation of approved changes and updates to the enterprise baseline. Specialist III ensures that continuity is retained between superseded and superseding documents.

6.3.9.3 Reporting Relationships

The three change specialist functions report to the owner of core business categories 1.0 through 8.0.

6.3.10 Document Release and Validation Records

A release record for each released version of each document is retained and includes evidence of validation.

6.3.11 Change and Revision Records

A record of each problem report, each enterprise change request, each enterprise change notice and each document revision is retained.

6.3.12 Traceability via Retained Records

Ability to retrieve any previous version of the enterprise baseline and demonstrate that it was properly authorized and validated is established.

7. Measurements of Process Effectiveness

The ratio of existing resources being spent on intervention is measured and reported.

The ratio of products with nonconforming conditions and the number of deviations/waivers being written are measured and reported.

The ratio of changes being written for corrective action purposes are measured and reported.

The ratio of output value relative to input costs is measured and reported.

Annex A Enterprise Baseline Example

The illustration below is an example of an enterprise baseline populated with a hierarchy of administrative requirements. The entire hierarchy is comprised of five indenture levels, levels 0 through 4. The numbering convention for identifying the administrative documents at levels 1 through 4 is similar to a Dewey Decimal system.

Document type codes include BR for business regulations, SP for the strategic business plan and its parts, OS for operating standards and AP for administrative procedures.

BUSINESS ENTERPRISE BASELINE							
Enterprise ID _____							
Administrative Hierarchy				Documented Requirements			
Indenture Levels				Type	Number	Rev	
0	1	2	3	4	Topic Structure	Document Sections and Titles	
•						<i>Business Regulation</i>	BR 777777 R
•						<i>Business Regulation</i>	BR 888888 R
	•				100000	<i>Strategic Business Plan</i>	SP 100000 R
		•			Part 1	<i>Mission (or Vision) Statement</i>	SP 100000-1 R
		•			Part 2	<i>Relationships to Other Divisions/Sites</i>	SP 100000-2 R
		•			Part 3	<i>Organizational Policies and Alignment</i>	SP 100000-3 R
		•			Part 4	<i>Products, Services and Customers</i>	SP 100000-4 R
		•			Part 5	<i>Core Business Processes and Opr. Stds</i>	SP 100000-5 R
		•			CORE PROC. 1.0	<i>AS-PLANNED/AS-RELEASED BASELI</i>	SP 100000-5-1.0 R
		•			Opr. Std. 1.1	<i>General purpose</i>	OS 100000-5-1.1 R
		•			Adm. Proc. 1.1		AP 100000-5-1.1 R
		•			Opr. Std. 1.2	<i>Hierarchy of requirements</i>	OS 100000-5-1.2 R
		•			Adm. Proc. 1.2		AP 100000-5-1.2 R
		•			Opr. Std. 1.3	<i>Physical items and documented requireme</i>	OS 100000-5-1.3 R
		•			Adm. Proc. 1.3		AP 100000-5-1.3 R
		•			Opr. Std. 1.4	<i>Identification of items and documents</i>	OS 100000-5-1.4 R
		•			CORE PROC. 2.0	<i>4-TIER, 9-STEP DEVELOPMENT PRO</i>	BP 100000-5-2.0 R
		•			Opr. Std. 2.1	<i>First tier creates the high-level plan</i>	OS 100000-5-2.1 R
		•			Adm. Proc. 2.1		AP 100000-5-2.1 R
		•			Opr. Std. 2.2	<i>Second tier creates the detailed plan</i>	OS 100000-5-2.2 R
		•			Adm. Proc. 2.2		AP 100000-5-2.2 R
		•			Opr. Std. 2.3	<i>Third tier creates detailed designs/process</i>	OS 100000-5-2.3 R
		•			CORE PROC. 3.0	<i>NAMING, NUMBERING AND REUSE</i>	BP 100000-5-3.0 R
		•			Opr. Std. 3.1	<i>Standardized numbering conventions</i>	OS 100000-5-3.1 R
		•			Adm. Proc. 3.1		AP 100000-5-3.1 R

Figure 9 Enterprise Baseline Example

Annex B Related Standards, White Papers and Courses

Related CMII Standards

- CMII-105C — CMII Standard for Product Configuration Management
- CMII-200C — CMII Standard for Business Process Certification

Related CMII White Papers

- CMII-800D — Configuration Management: Traditional CM versus CMII
- CMII-805D — CMII versus Other CM Certification Programs
- CMII-810C — Exponential Curve for Intervention Resources and Derivation
- CMII-815B — How CMII Can Further Enhance ISO 9001-2008
- CMII-820C — Enterprise Architecture Methodologies and the CMII Model
- CMII-855C — Configuration Items: History and Current Usage
- CMII-860C — Comparison of DoD and CMII Development Practices
- CMII-865C — How to Write Requirements for Development Programs

Related Courses for CMII Training and Certification

- Course I The CMII Model (2 days)
- Course II Structuring and Managing Requirements (2 days)
- Course III Key Elements of the CMII Change Process (2 days)
- Course IV The CMII Change Process (2 days)
- Course V The Business Case for CMII (2 days)
- Course VI CMII Implementation and Application (2 days)
- Course VII How to Achieve Integrated Process Excellence (2 days)
- Course VIII CMII Process Automation (2 days)
- Course X CMII Awareness (1 to 4 hours)
- Course XI CMII Tutorial (1 day)
- Course XIII Software Development and Software CM Tools (4 days)
- Course XIV Export Control, Security and Governance (2 days)
- Course XV CMII Bootcamp for Management (3 days)
- Course XVI CMII Laboratory for Creator/User Team Training (3 days)

Other Standards that Have Similar Objectives

- ISO 9001:2008 Quality Management Systems — Requirements
- CMMI Capability Maturity Model Integration (and Process Maturity Levels)

8. Form for Requesting Changes

Recommended changes to this standard should be submitted to CMII Research Institute by FAXing this completed form to (602) 595-8942.

CMII-100 Change Request

CR No. _____

REQUESTOR	PHONE	DATE	Page ____ of ____
MAIL OR E-MAIL ADDRESS			
REQUESTED CHANGE			
BASIS FOR THIS REQUESTED CHANGE			
CONCLUSION AND RECOMMENDATION BY REVIEWER			
			Reviewer _____ Date _____
IMPLEMENTATION PLAN IF APPROVED			