# CDCM – Cross Domain Configuration Management

"Introduction of CDCM in a large Organization"

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# MID has 4 Decades of Experience in Consulting and Engineering Tool Development

- 180 Employees with offices in Germany and Switzerland
- Background: Development of Modeling Tools Innovator and Bpanda (UML, BPMN, Archimate, Data Modeling)
- Since 2020 focus on Configuration Management and OSLC based Traceability Management with a team of ca. 20 engineers
- Strong cooperation with the automotive industry (BMW, Mercedes, Bosch, Continental, ZF, others.)
- Engagement in the OASIS OSLC Group since 2020. Head of the Product Governing Board since 8/2025


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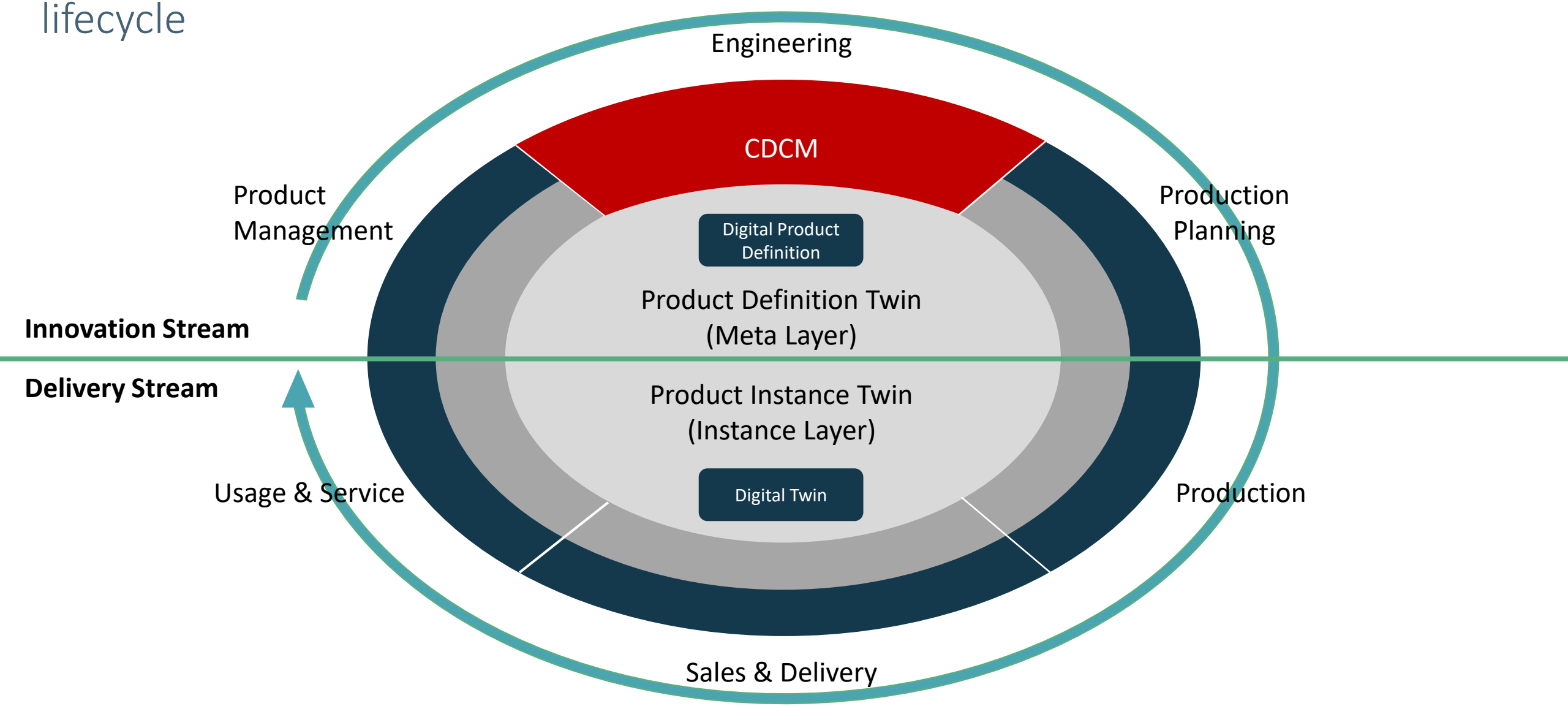
# CDCM plays a central role in one of the core value creation stages of the product lifecycle



# Core Targets of Cross-Domain Configuration Management

**Cross Domain Configuration Management**

- Comprehensive digital description of the product
- Enforce Reuse of Engineering Assets
- Manage a BOM across the Engineering Lifecycle
- Maximize Efficiency in managing Cross Domain Configurations

Requirements Management

Test Artifacts Management

Architecture Management (SysML)

Software Architecture Management

Source Code Management

E/E Management

Document Management

PLM Artifacts

Proprietary Tools

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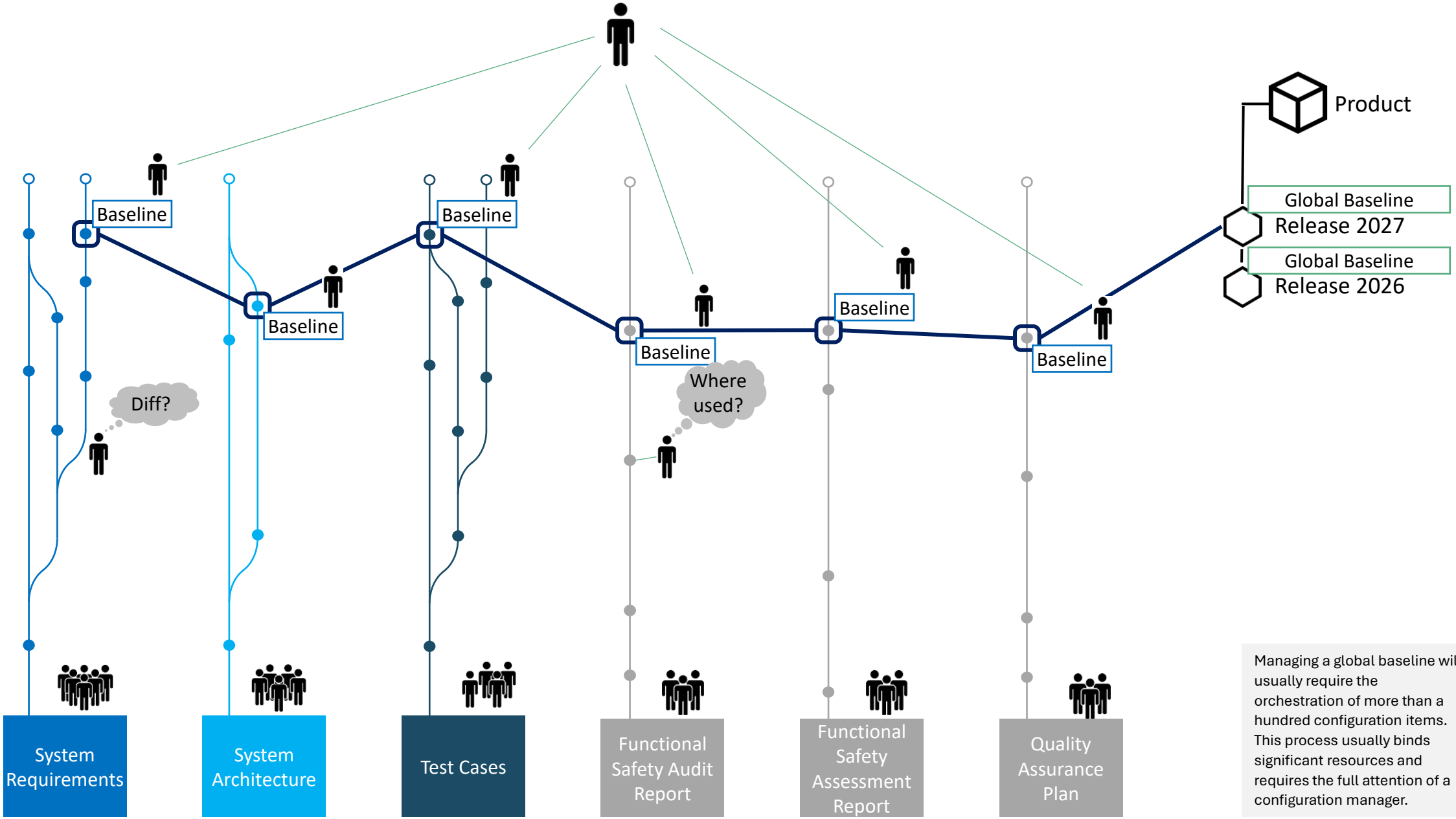


Managing a global baseline will usually require the orchestration of more than a hundred configuration items. This process usually binds significant resources and requires the full attention of a configuration manager.

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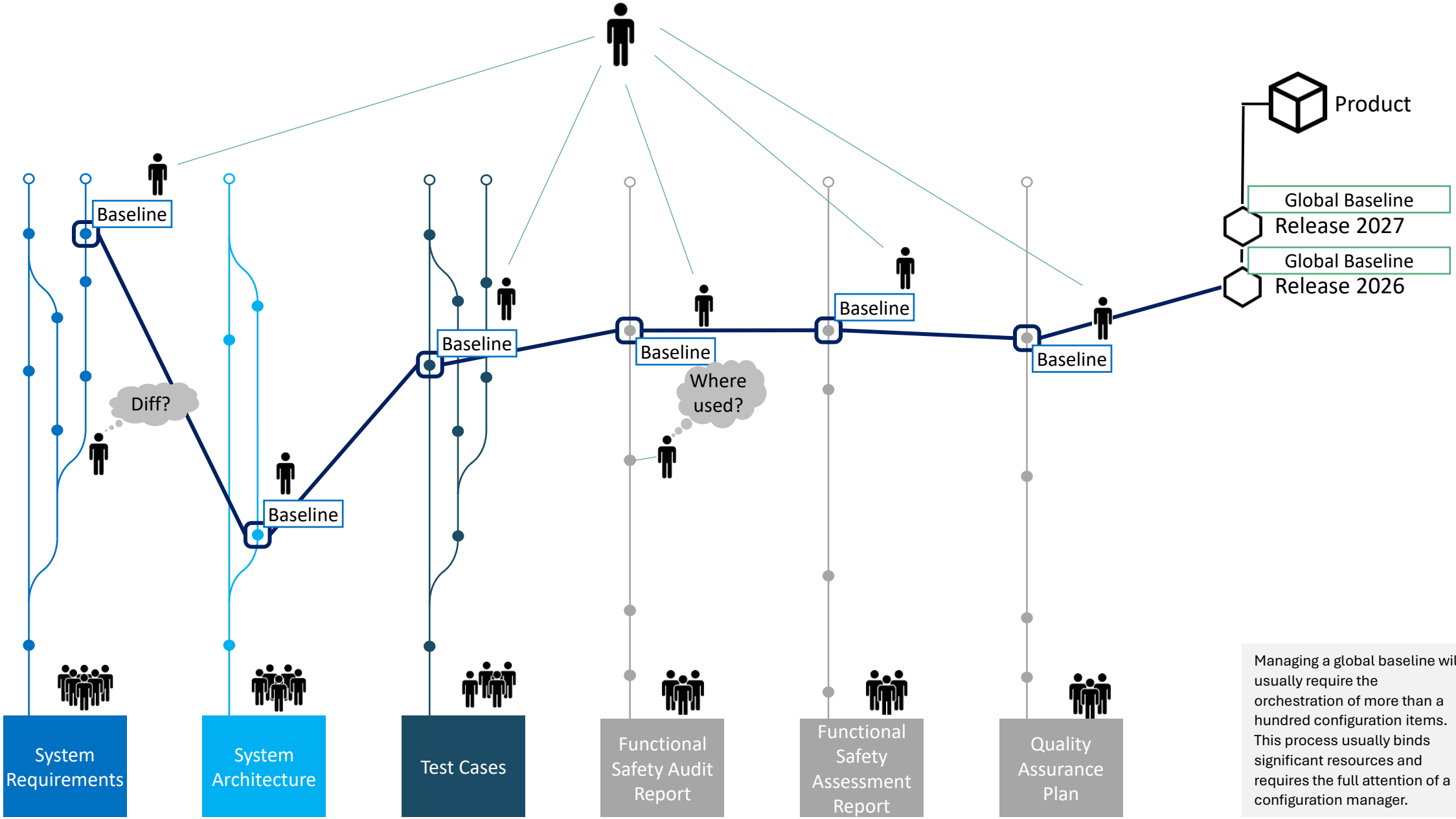


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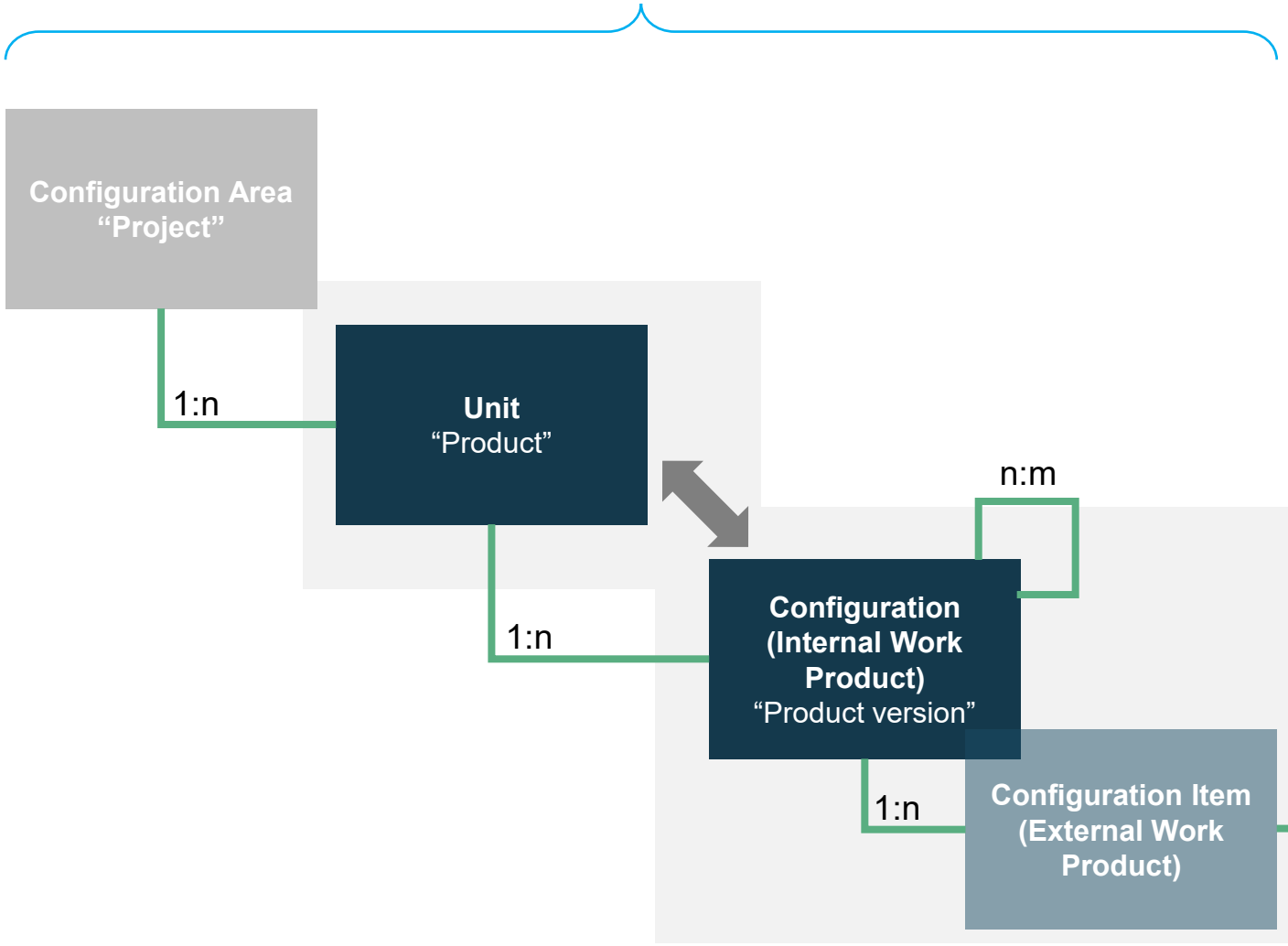
# All Companies developing complex systems do CDCM – most of them in Excel

# Core Data Model of CDCM

## Concept Types

All concepts can be defined in meta model, user interface and behavior.
E.g. product as engineered versus off-the-shelf product




## Authoring Tools

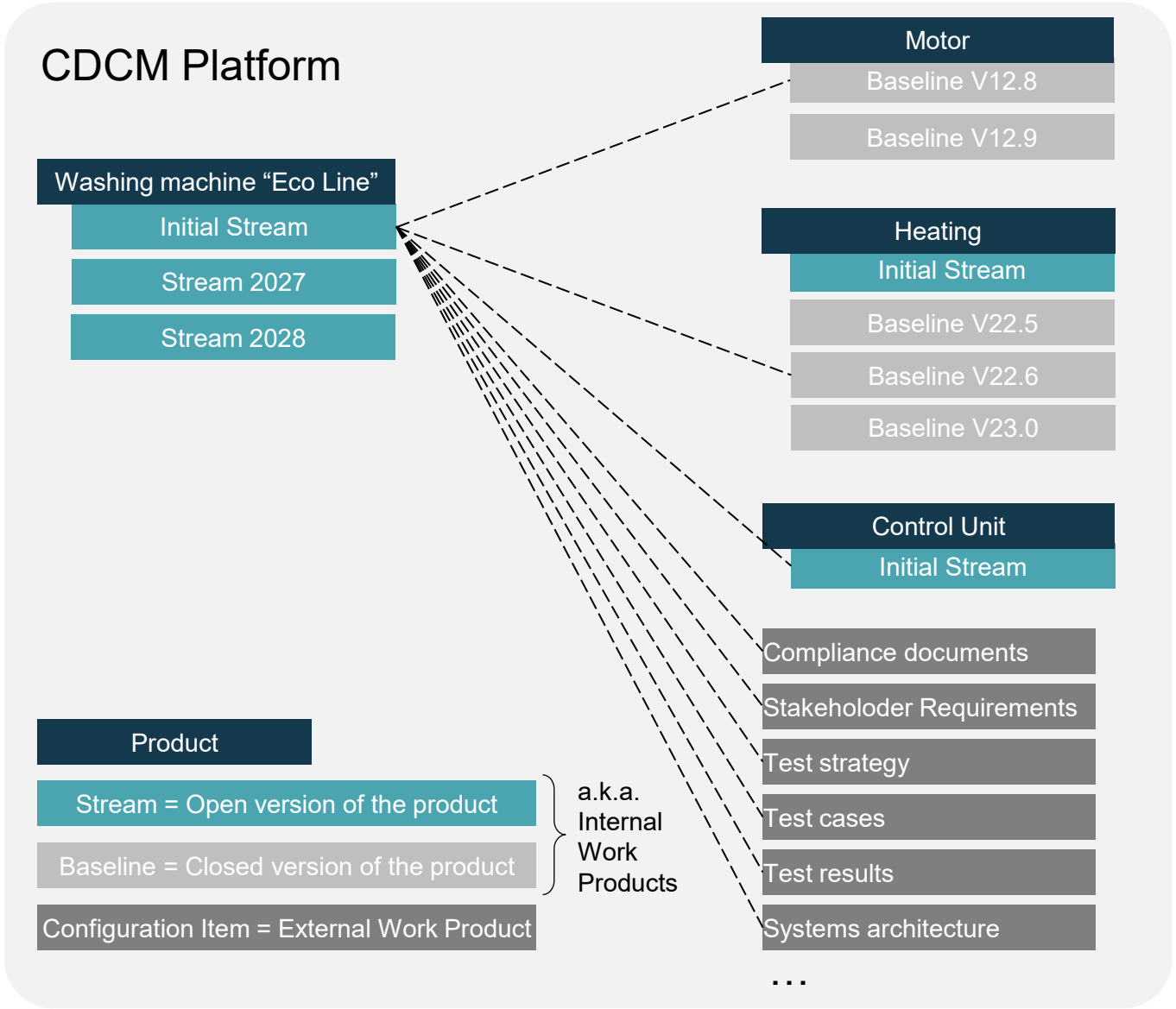
**Connectors available today**

- Codebeamer
- Codebeamer Documents
- DOORS 9.x
- GIThub Cloud
- GIThub Enterprise
- Jama Connect
- IBM ELM - DOORS Next
- IBM ELM - ETM
- IBM ELM - RMM
- PREEvision
- Pure Variants*
- Sharepoint Online Documents
- Smartfacts
    - Cameo Systems Modeler
    - Enterprise Architect
    - Matlab Simulink
    - Rhapsody
- Teamwork Cloud

OSLC / REST

**Work Product**
CAD Model, Requirements Module, Release document, etc.

# Example: Cross-Domain Configuration of a Washing Machine




Internal Work Products

External Work Products

Configuration Items

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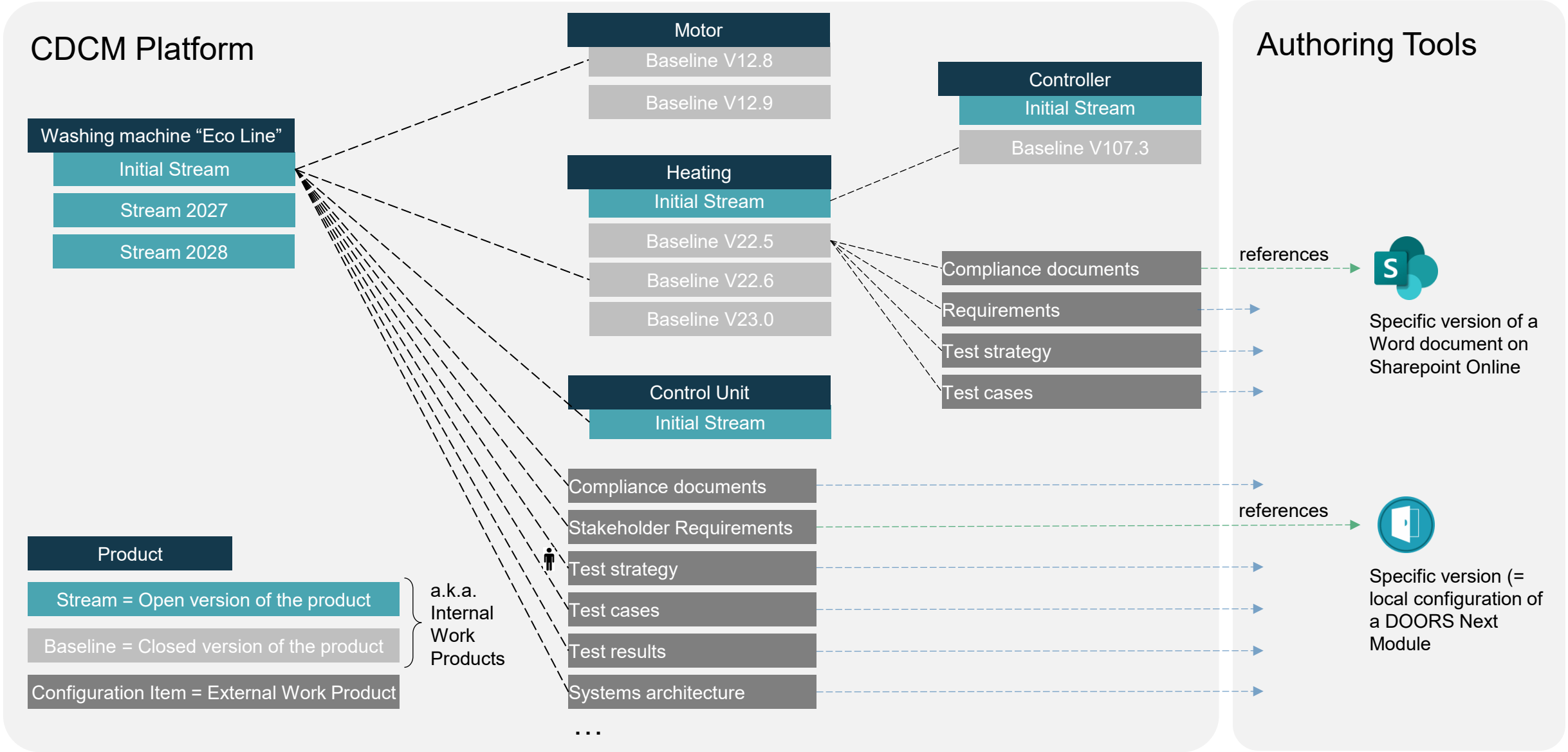
# Example: Cross-Domain Configuration of a Washing Machine



# DEMO

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# Core Capability: Configurability & Extensibility

**Meta Data Level**

- For each concept (unit, configuration, configuration item) multiple types can be defined with varying meta model
- Each concept type has its own state machine. Each state transition triggers a free to be defined java script code

**UI-Level**

- User interfaces and OSLC delegated UIs of all concepts can be freely configured
- User interface behavior can be defined, syntactical and logical validations are configurable

**Data Level**

- Master Data can be integrated, maintains via REST and referenced in the user interface
- VEL compliance allows to define variant points in configurations and configuration items.

**Extensive REST-Layer**

- An extensive REST API supports integration and automation scenarios
- Extension point for tool integrations allows to easily build more tool integrations even to proprietary tools

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# Core Capability: Efficiency in Managing Cross-Domain Configurations

**Subscriptions & Notifications**

- Users can subscribe to certain events
  - Value Changes
  - Baselining and derivation actions
  - Baseline actions for work product responsibles
- Notification in the tool and / or via email

**Automated Workflows for Baseline Closing**

- Every Configuration Item has a Configuration Item Representative
- Configuration Item Representatives are notified in the event of opening a new Cross-Domain Configuration Baseline to baseline their content locally

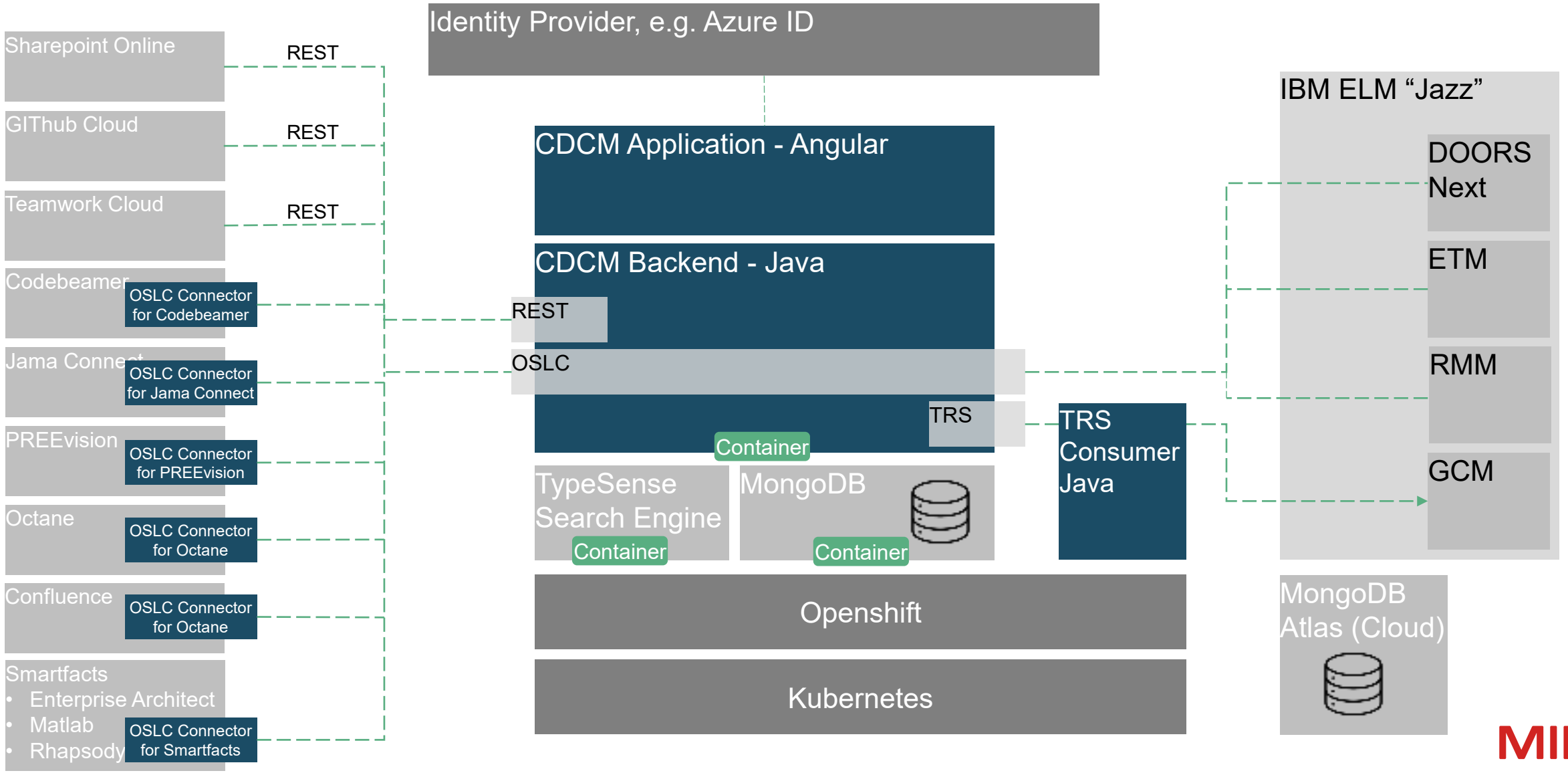
**Automated Baseline Validation**

- For each configuration item type validation rules can be defined
- Validations are executed by scripts
- The result of the validations is shown in the configuration item browser

**Integration of Variant Management**

- A feature model can be maintained in PTC Pure::Variants
- Variant strings are used to express a specific variant of a configuration based on a 150% unit / 150% configuration

# CDCM Technology Stack



# Features of CDCM 10 / 2025

**Highly Configurable**

- Data Model
  - Properties based on primitive data types with syntactical validation
  - Records = multi value properties
  - Master Data = externally synchronized
  - Calculated Fields
- User Interface
  - UI areas to be customized via forms builder
  - Fields can be masked
  - Master data selectors
- Behavior
  - Guards allow multi-field validations
- Data
  - Master Data can be maintained via REST

**Integration Mechanisms**

- Public REST layer providing 100+ endpoints
- Externally defined editors can be integrated
- OSLC TRS provides a TRS stream of Units, Configurations and Configuration Items
- OSLC Config Management is used to integrate authoring tools (OAuth1.0a / OAuth2)
- Integration with OIDC enterprise authentication providers
- Support of VEL (Variability Exchange Language)*

**Rich Functionality**

- Definition of hierarchical Units, Configurations
- Templates for creating new Units with pre-defined configuration items
- Branching, Baselining, Partial Baselining
- Search, where-Used, analysis can be stored
- Tagging of Units abd Configurations
- Compare functionality
- Configuration Clash / Skew
- Audit Trail / Derivation History
- Favorites / Recents
- Internal and external Delegated UIs for Units and Configurations
- Configuration picker Integration via OSLC
- CDCM exposes a CDC picker for authoring tools to pick a global context

## CDCM - Cross Domain Configuration Management

**Modern Deployment**

- Containerized web application
- Automated deployment via helm charts on Kubernetes or Openshift
- Update from online container repository
- Database can be MongoDB onPrem or Atlas in the cloud
- Made for large scale operations: 10.000+ users

**Large Variety of Tool Integrations**

- IBM ELM applications DNG, ETM, RMM
- Sharepoint Online
- MagicDraw / Cameo / Teamwork Cloud
- GIT
- Codebeamer
- PREEvision
- Octane
- DOORS Classic

**Basis for Advanced Analytics**

- Traceability management
- Link Validity
- Odata Interface to analytics database

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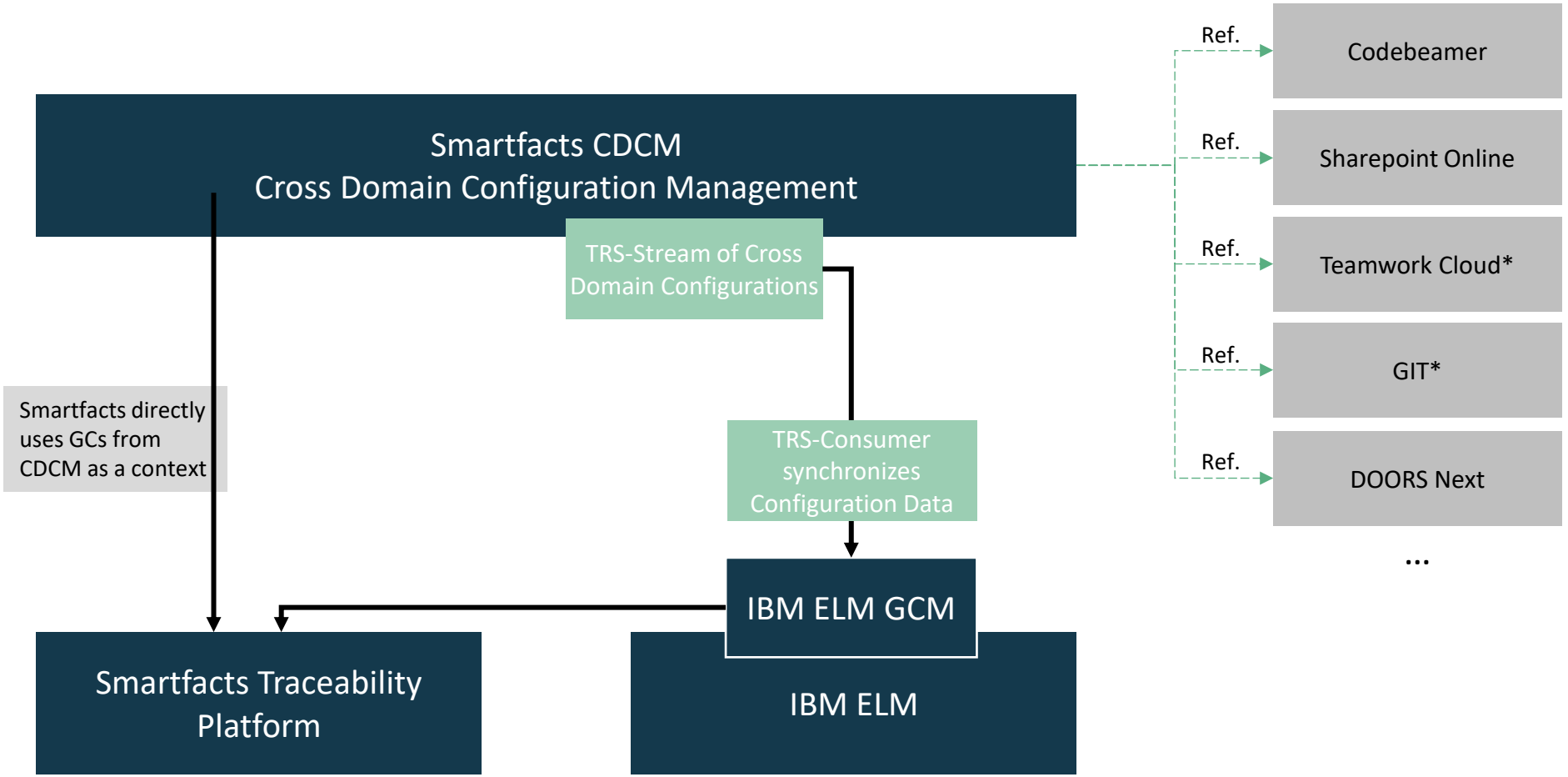
# CDCM as GC Provider to Smartfacts Traceability Management Platform and IBM ELM

**Configuration Management**

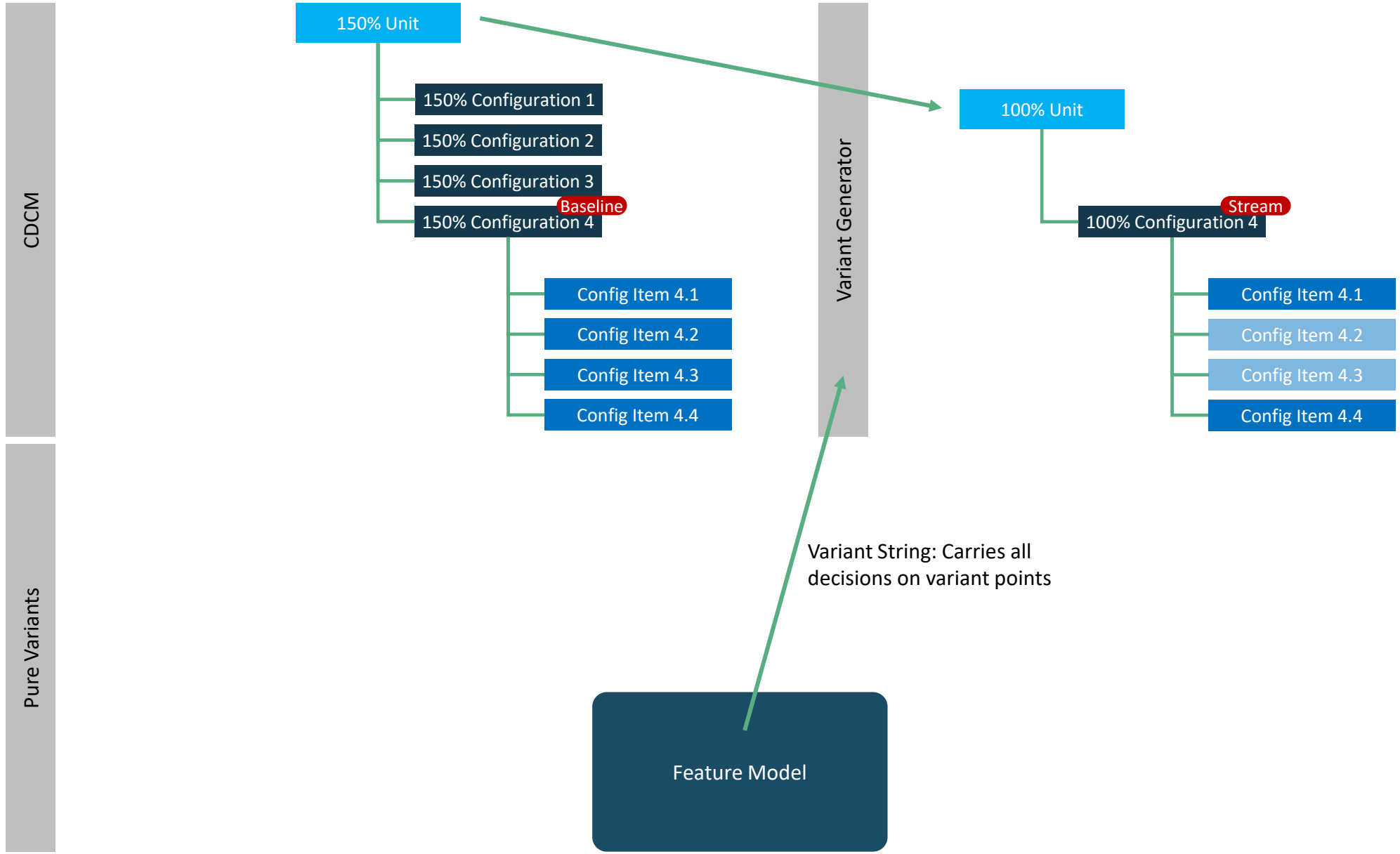
**Traceability Management**




The Smartfacts Traceability Platform uses CDCM Cross Domain Configurations or IBM ELM Global Configurations as a context for traceability views and analysis

IBM ELM Platform uses Global Configurations as a context for traceability views and analysis.

# Special Use Cases: Variant Management as Part of Configuration Management



# CDCM is much more than Managing Configurations

## Traceability

**Cross Tool Traceability** in the Context of Configurations

## Analysis

Definition of **Data Marts of Engineering Lifecycle Data** for Analysis, Reporting & AI by Configuration Areas

- Define a **comprehensive digital representation** of the product “from document to model”:
- **Enforce reuse** of engineering assets
- **Maximize Efficiency** in managing Cross Domain Configurations, Stream, Baselines

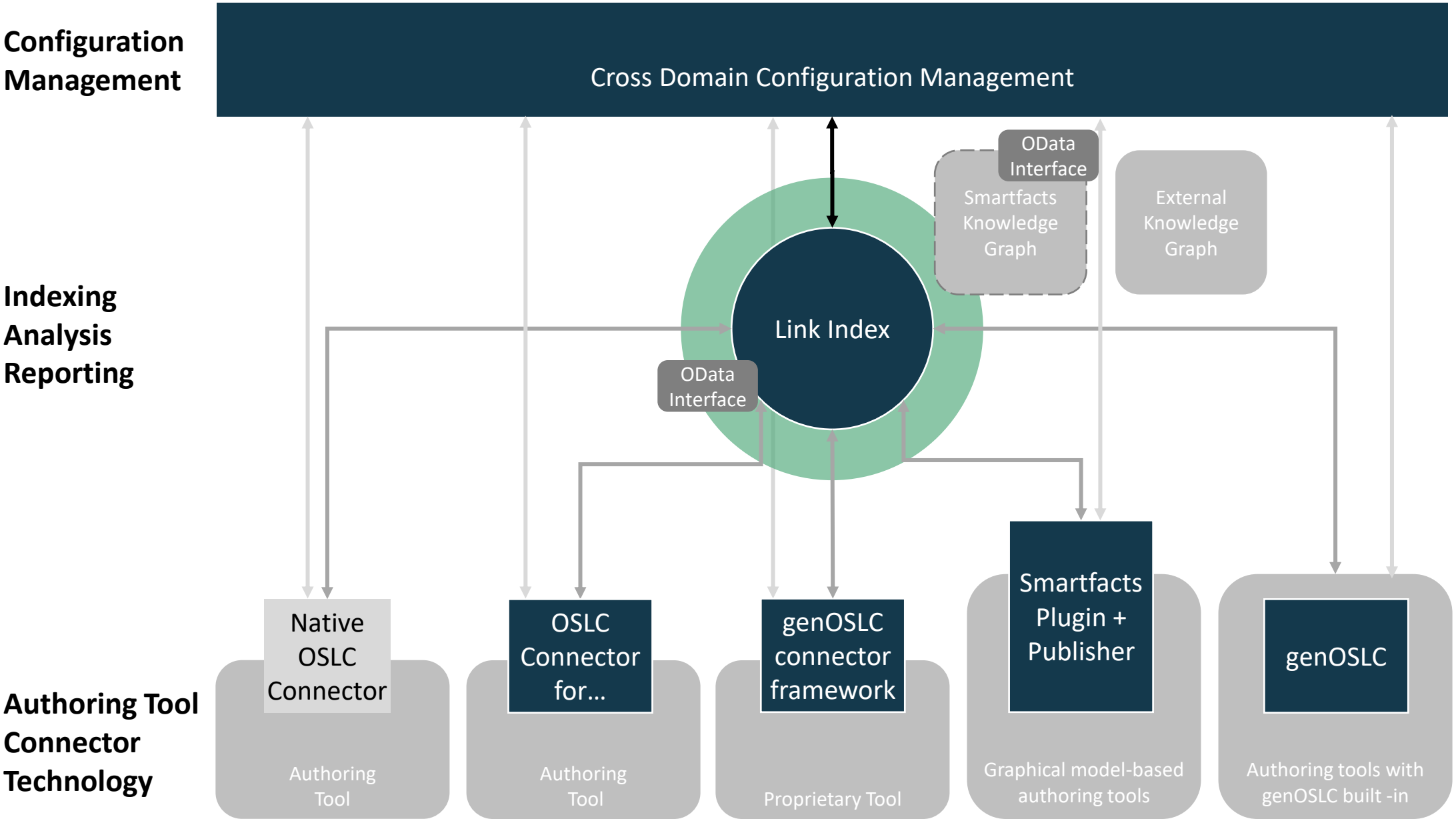
## Digital Twin

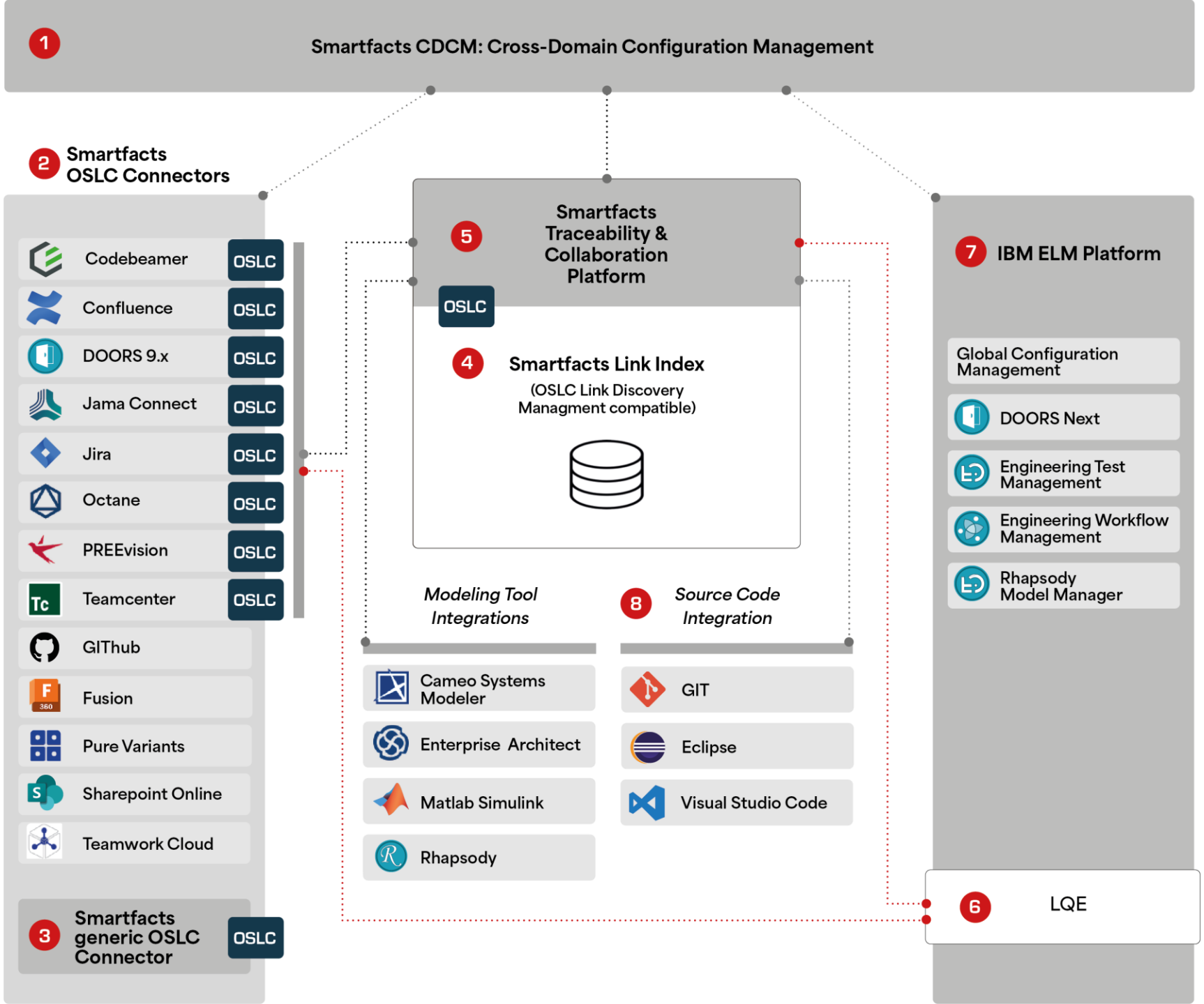
Lay the Foundation for the D**igital Type Twin** in development

## Variant Management

Cross Domain Configuration Layer for **Holistic Variant Management** and **Product-Line Engineering**

# Downstream Usage of Cross-Domain Configuration Management

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Smartfacts CDCM: Cross-Domain Configuration Management
2
Smartfacts
OSLC Connectors
Codebeamer
OSLC
Confluence
OSLC
DOORS 9.x
OSLC
Jama Connect
OSLC
Jira
OSLC
Octane
OSLC
PREEvision
OSLC
Teamcenter
OSLC
GIThub
Fusion
Pure Variants
Sharepoint Online
Teamwork Cloud
3
Smartfacts
generic OSLC
Connector
OSLC
5
Smartfacts
Traceability &
Collaboration
Platform
OSLC
4
Smartfacts Link Index
(OSLC Link Discovery
Managment compatible)
Modeling Tool
Integrations
8
Source Code
Integration
Cameo Systems
Modeler
Enterprise Architect
Matlab Simulink
Rhapsody
GIT
Eclipse
Visual Studio Code
7
IBM ELM Platform
Global Configuration
Management
DOORS Next
Engineering Test
Management
Engineering Workflow
Management
Rhapsody
Model Manager
6
LQE