Cross Domain Configuration Management «CDCM»

Domänenübergreifendes Informationsmanagement zur Entwicklung komplexer cyberphysischer Produkte

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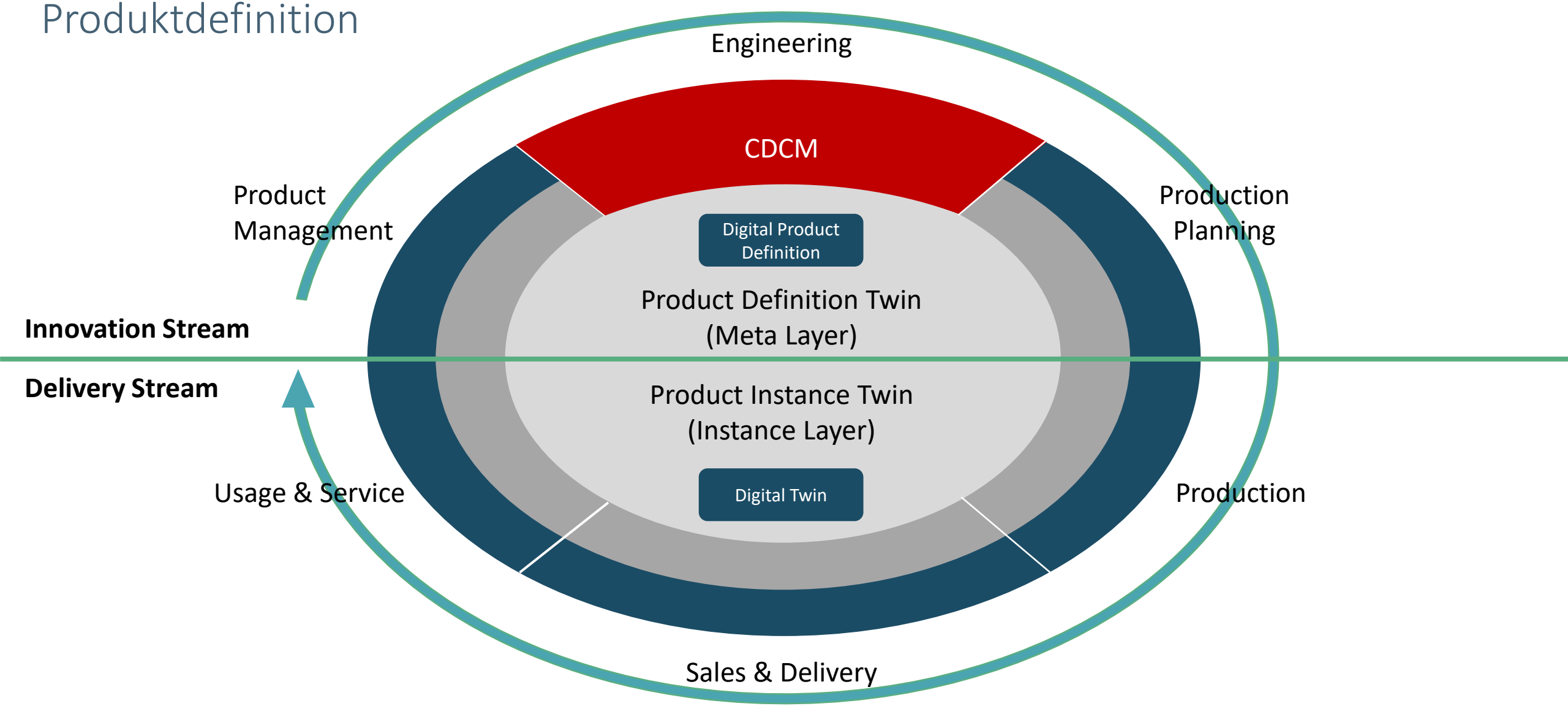
CDCM integriert eine Vielzahl von Domänenmodellen zu einer digitalen Produktdefinition



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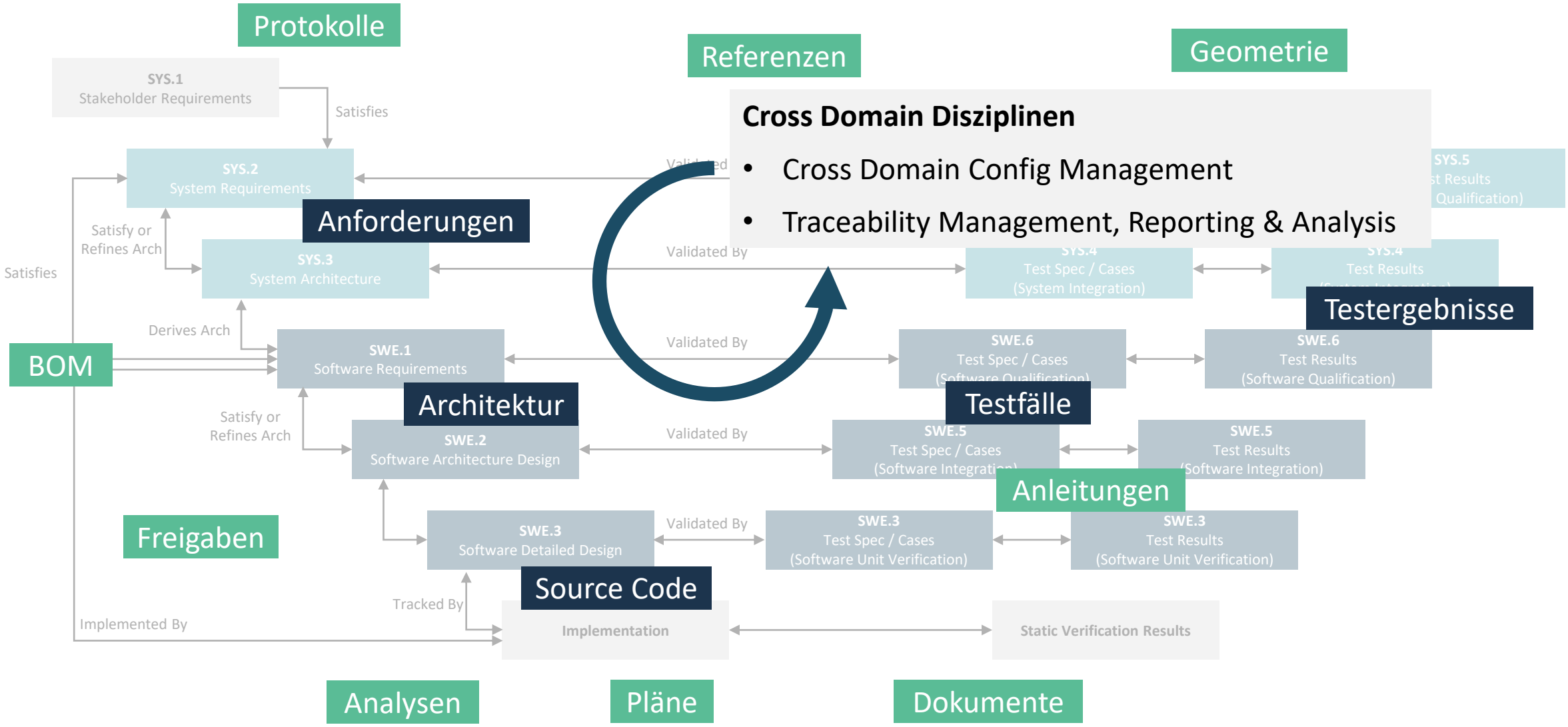
Die Kontrolle des "V" erfordert holistische Ansätze, um Silos zu überwinden



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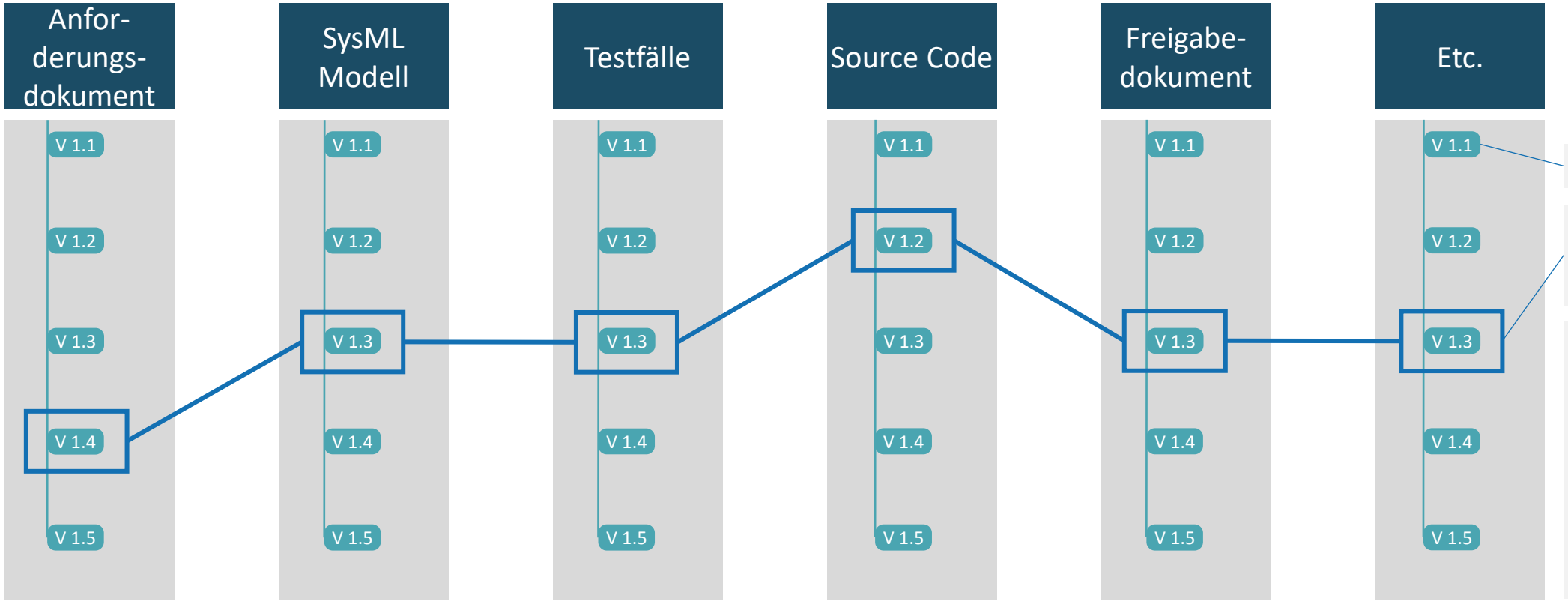
Versionierte Engineering Informationen sind über viele Werkzeuge und Domänen verteilt

Alle Autorenwerkzeuge erzeugen versionierte Inhalte



Configuration Item

Die **Cross Domain Configuration** besteht aus **Configuration Items**

Eine **Cross Domain Configuration** ist eine Sicht und Grundlage für

- Reporting
- Analysis
- Liste der Links zwischen zwei **Configuration Items**

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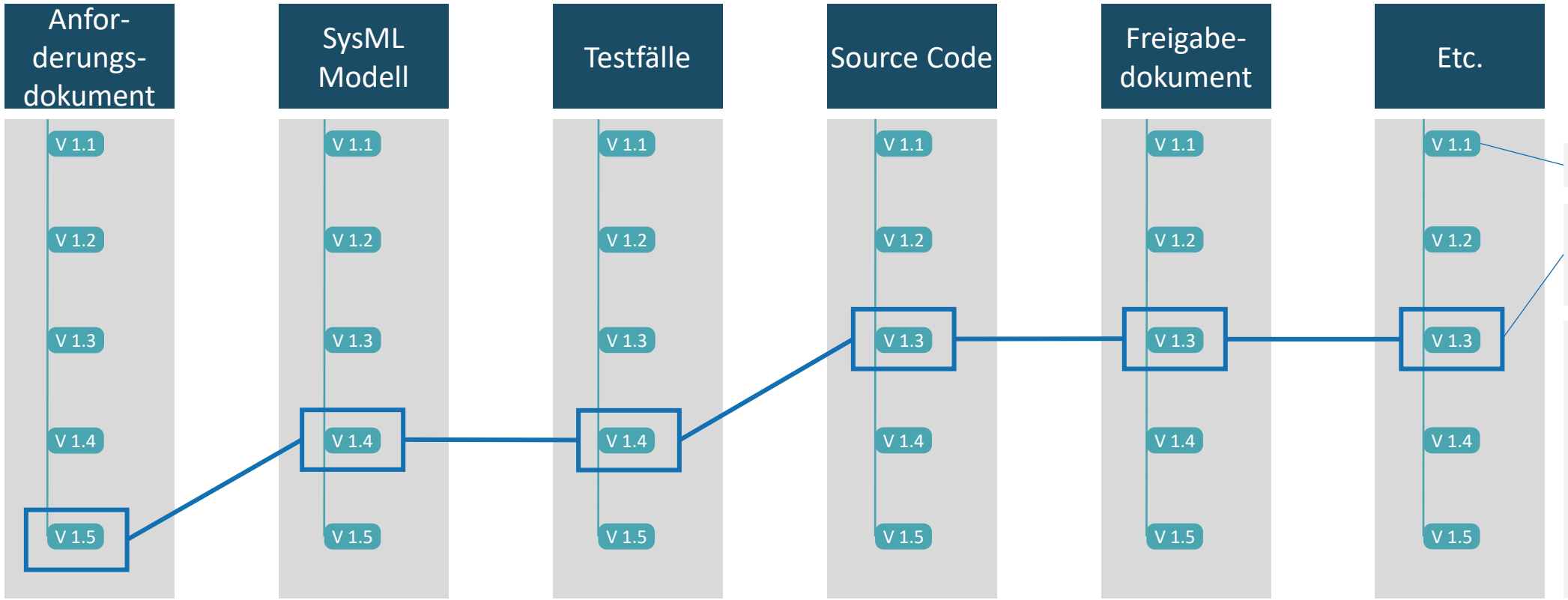

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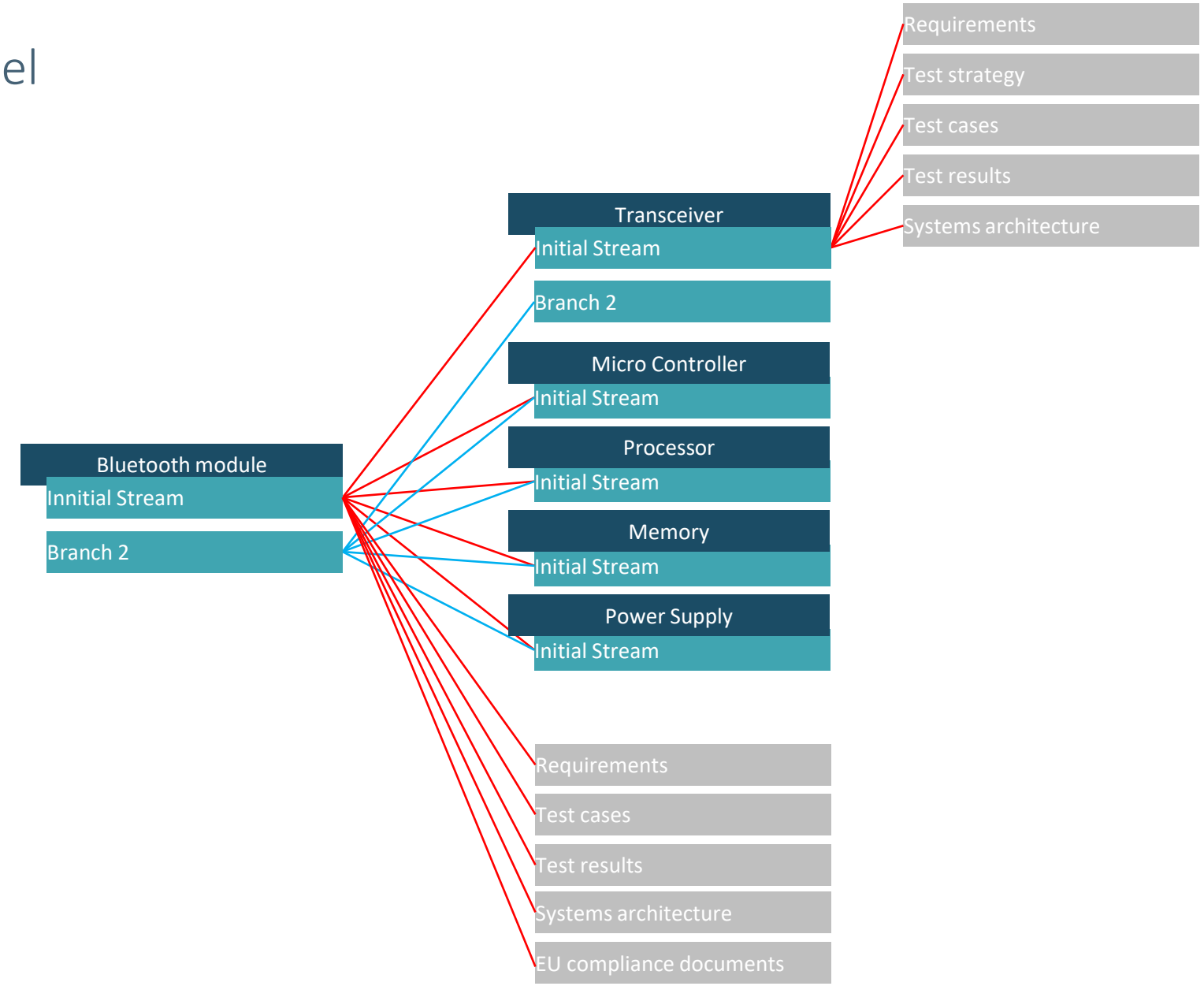
Ein Beispiel



Product

Configuration

Configuration Item aka: external work product

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Cross Domain Configurations bieten enorme Benefits

Ziel 1: Management der CDC

- Hierarchisierung von Produkten
- Forcierung von Wiederverwendung
- Sicherstellung von Konsistenz
- Effizienzsteigerung im Baselining, QM- und Freigabeprozess

Ziel 2: Nutzen der CDC als Kontext

- Cross Domain Analysen, z.B. Impactanalysen
- Traceability Management
- Compliance, z.B. ISO 26262
- Modernes Productline-Engineering

Aufbau einer vollständigen domänen-übergreifenden, toolunabhängigen Produktdefinition

Grundlage für modernes Productline engineering
→ Versionen / Varianten

Forcierung der Wiederverwendung von Engineering Assets

Erste digitale Definition des Produkts im Produktlebenszyklus

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Mit welchem Tool wird Cross Domain Configuration Management bei Euch gemacht?

Machen wir gar nicht

Machen wir irgendwie manuell oder mit Excel

Wir haben ein eigenes Tool dafür entwickelt

Wir nutzen Standardsoftware, z.B. IBM Jazz / GCM

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Entwicklung eines CDCM Tools bei Bosch

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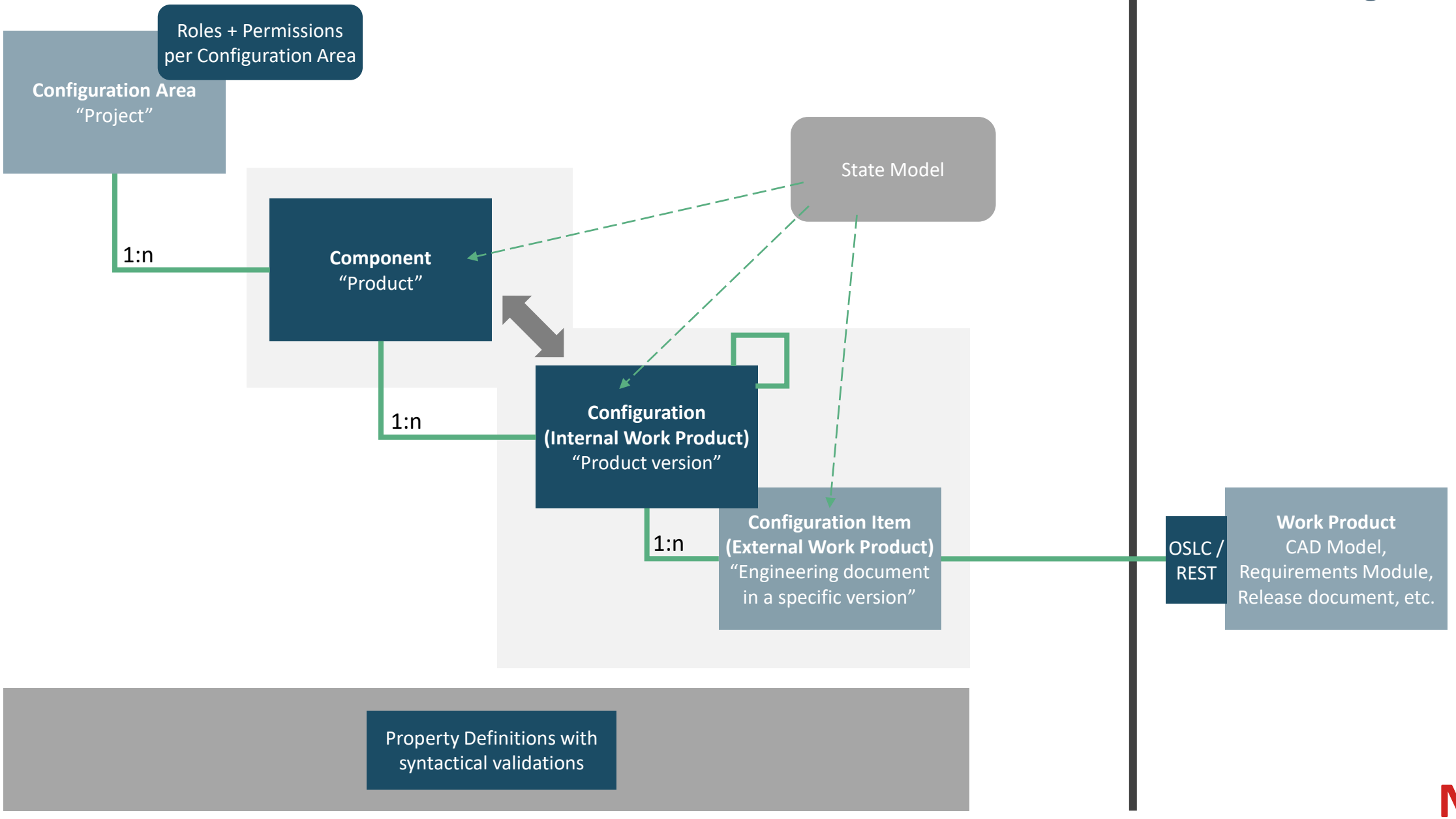
Core Data Model



Authoring Tools

OSLC / REST

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

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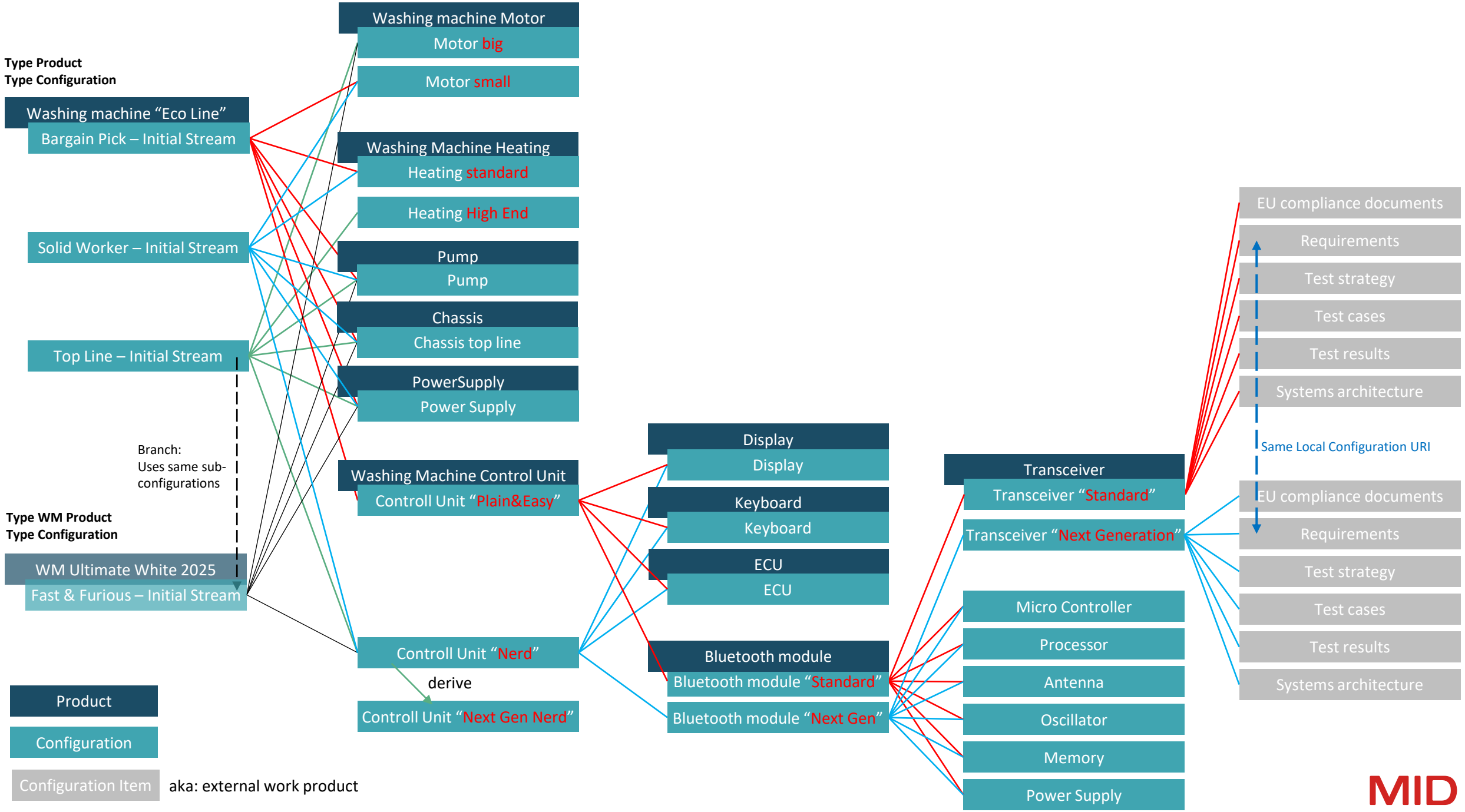
Type Product
Type Configuration
Washing machine "Eco Line"
Bargain Pick – Initial Stream
Solid Worker – Initial Stream
Top Line – Initial Stream
Branch:
Uses same sub-configurations
Type WM Product
Type Configuration
WM Ultimate White 2025
Fast & Furious – Initial Stream
Washing machine Motor
Motor big
Motor small
Washing Machine Heating
Heating standard
Heating High End
Pump
Pump
Chassis
Chassis top line
PowerSupply
Power Supply
Washing Machine Control Unit
Controll Unit "Plain&Easy"
Controll Unit "Nerd"
derive
Controll Unit "Next Gen Nerd"
Display
Display
Keyboard
Keyboard
ECU
ECU
Bluetooth module
Bluetooth module "Standard"
Bluetooth module "Next Gen"
Transceiver
Transceiver "Standard"
Transceiver "Next Generation"
Micro Controller
Processor
Antenna
Oscillator
Memory
Power Supply
EU compliance documents
Requirements
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Test cases
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Same Local Configuration URI
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Product
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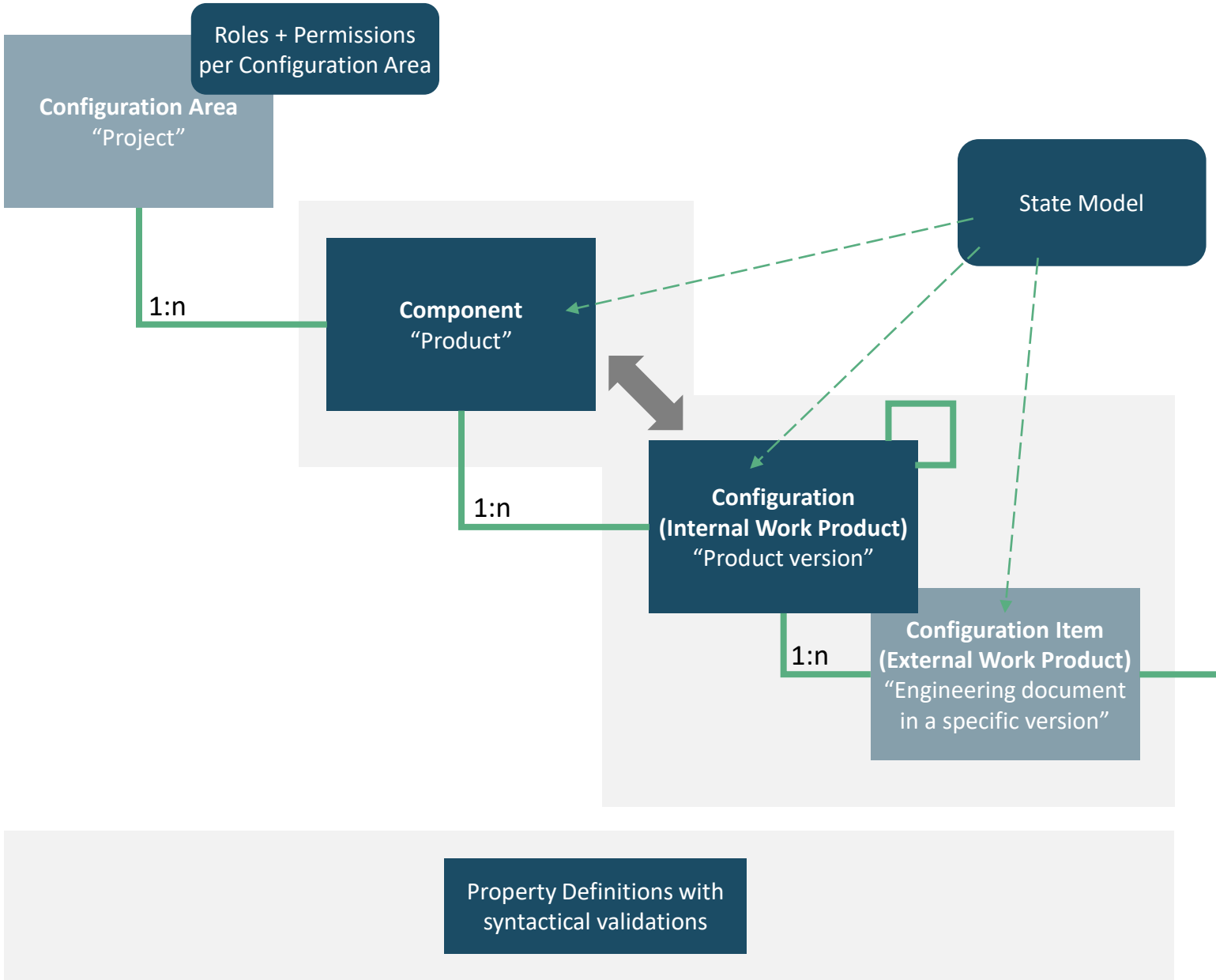
CDCM - Core Data Model



Authoring Tools

Connectors available for

- Codebeamer
- Jama Connect
- IBM ELM - DOORS Next
- IBM ELM - ETM
- IBM ELM - RMM
- Jama Connect
- PREEvision
- Smartfacts
- Cameo / Teamwork Cloud

In Development:

- Sharepoint Documents
- DOORS Classic
- GIT
- Octane
- Teamcenter

Good Chance, not evaluated:

- PTC Tools Windchill, RVNS, Modeler
- Polarion

OSLC / REST

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

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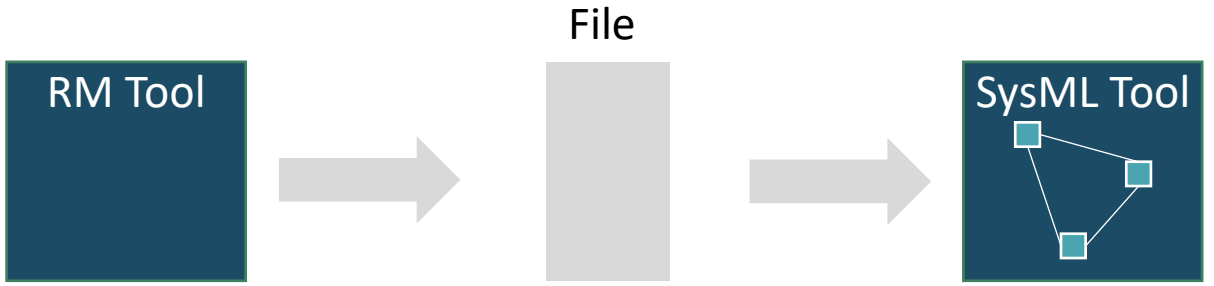
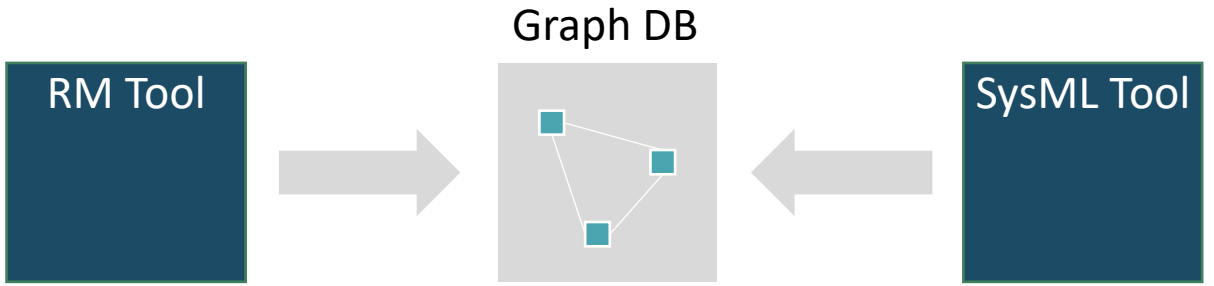
OSLC: Referencing Content - Instead of Synchronizing it

Synchronize one silo into the other and leverage tool internal link mechanisms



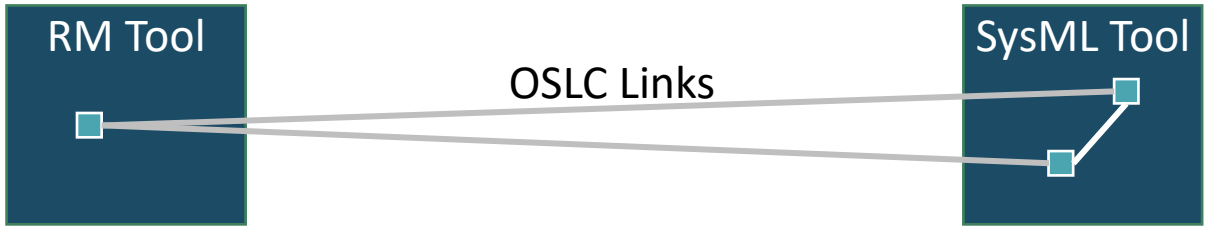
- Too little flexibility e.g. for variant management
- Security Issues
- Works only for two models

Synchronize models and links into one data source and manage them there



- Bad behavior in model branch and merge

Store the links in the models and **reference** to the other side



- Flexible
- Scalable
- Secure

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Was ist eigentlich der OSLC Standard?

- OSLC = Open Services for Lifecycle Collaboration
- Standard zur Verbesserung der Tool Interoperabilität
- Seit 2013 Mitglied in der Open Standard Organization OASIS
- Wichtige Bestandteile:
  - OSLC Core
  - OSLC Configuration Management
  - OSLC TRS (Tracked Resource Set)
  - Weitere in Arbeit…

- Primäre Nutzung: Sicherstellung der Traceability zwischen Artefakten unterschiedlicher Werkzeuge

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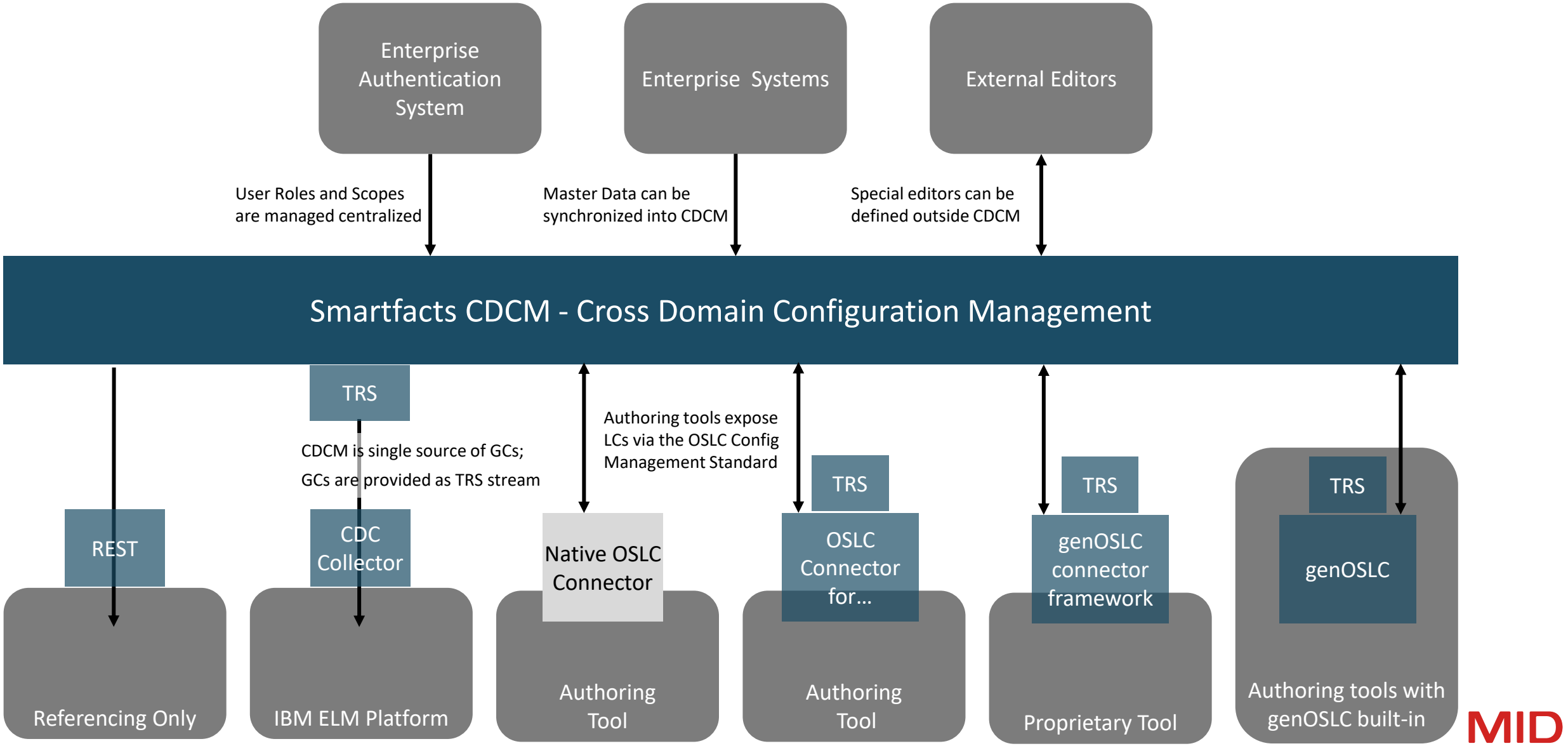
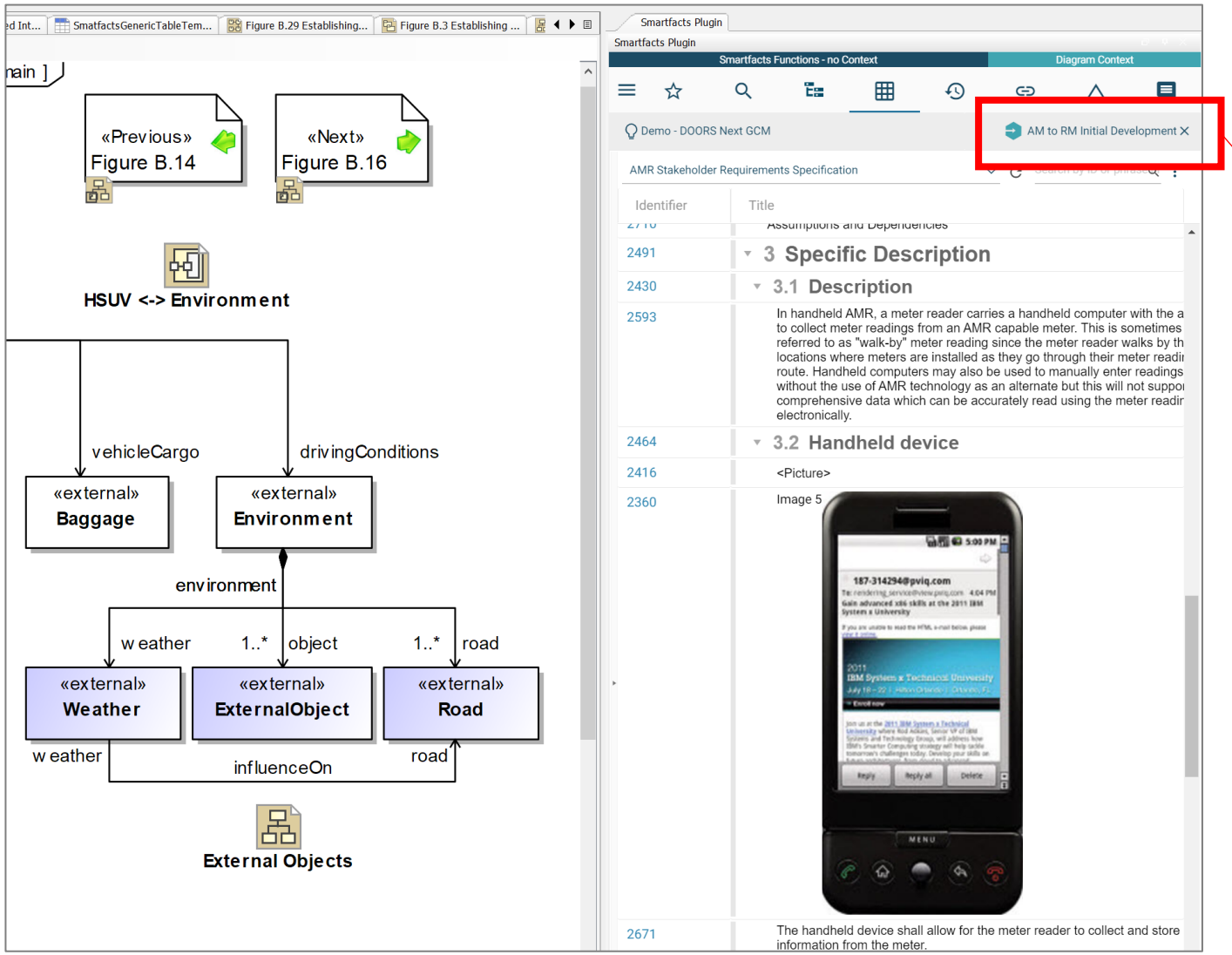
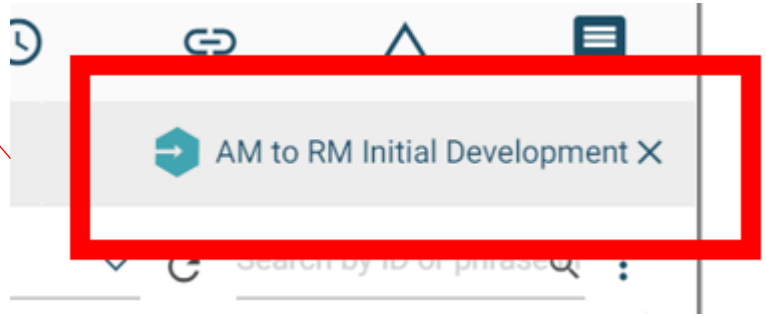
Schritt I: Anbindung einer großen Anzahl von Autorenwerkzeugen



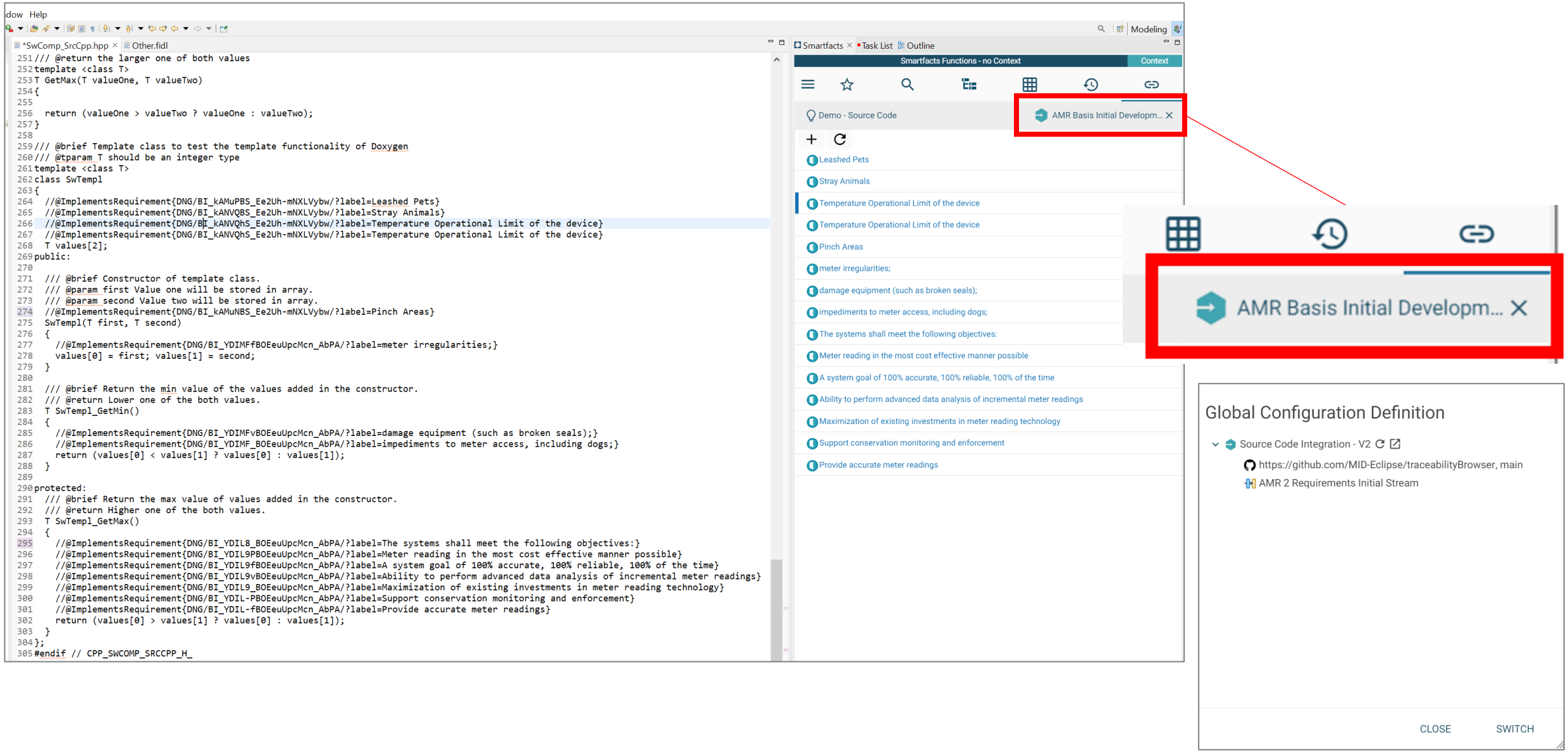
Beispiel: Integration mit Cameo Systems Modeler



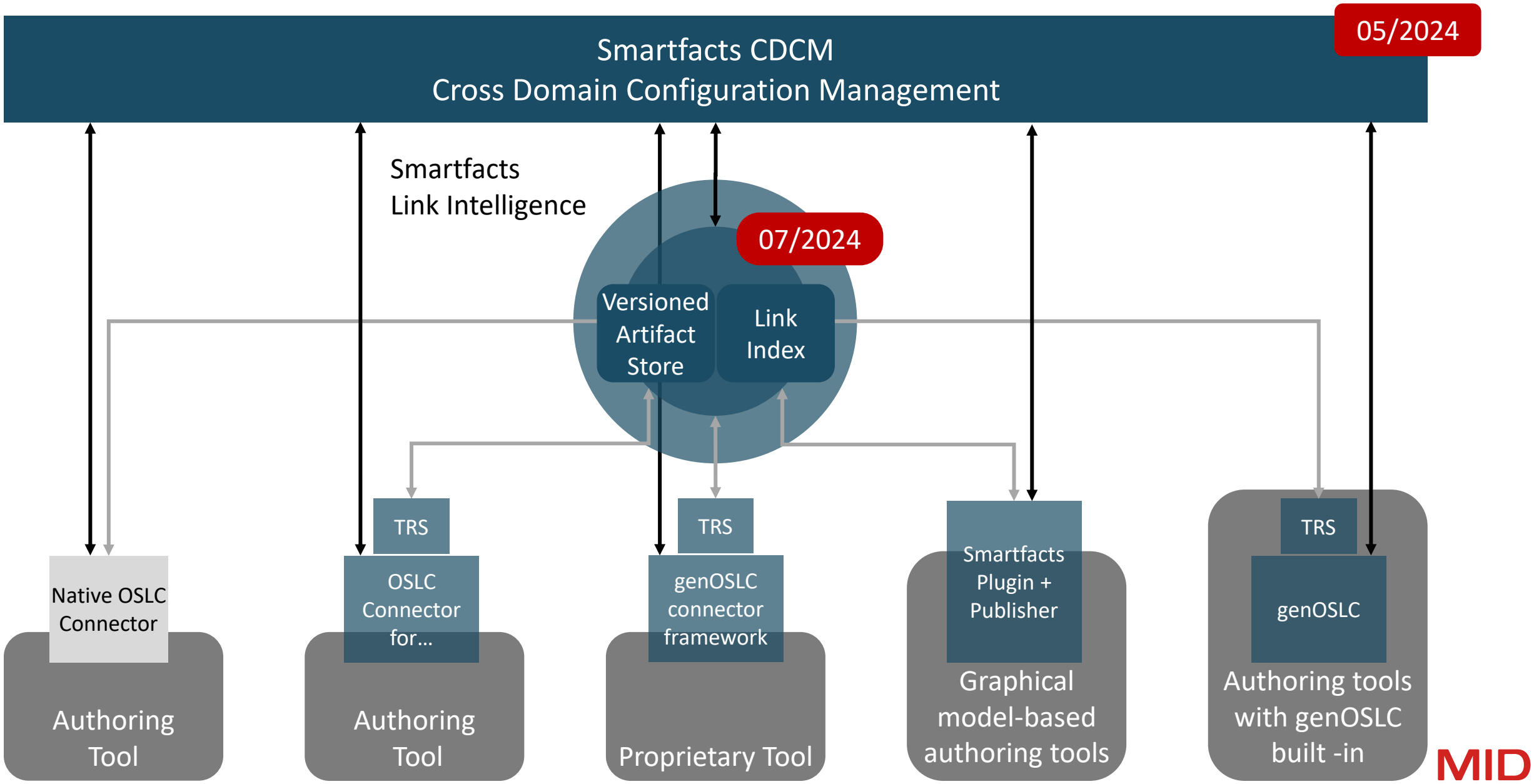
Tool-übergreifender Kontext
definiert, in welcher Cross-Domain Configuration gearbeitet wird



Beispiel: Integration mit Source Code in Eclipse



Schritt II: Link Intelligence Platform



Version 1 nach 12 Monaten

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 can be customized vai a 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 40+ endpoints
- Externally defined editors can be integrated
- Webhooks support integration with external systems, e.g. leveraging an event bus
- OSLC TRS provides a TRS stream of Components and Configurations
- OSLC Config Management is used to integrate authoring tools (OAuth1.0a / OAuth2)
- Integration with OIDC enterprise authentication providers

Rich Functionality

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

Smartfacts 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 Documents
- 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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Mehr gerne am Stand von MID

Kontakt:
Christoph Bergner, c.bergner@mid.de
Ed Gentry, e.gentry@mid.de

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