NA 005-01-39 AA N 1259

ORACLE Aconex

DIN SPEC 91391

– **Overview**
– **Further Intentions**
– **Discussion**

February 19th , 2019

Dipl.-Ing. Ulrich Hartmann, Product Management, BIM Expert
ORACLE, Construction & Engineering Global Business Unit

ORACLE

1. World's Largest Business Software Company
2. World's Fastest Database
3. #1 in Middleware
4. #1 in Enterprise Performance Management
5. #1 in Business Intelligence
6. #1 in Customer Relationship Management
7. #1 in Human Capital Management
8. Strong Partner Ecosystem (21,000 Partners Worldwide)
9. Focus on Customer Success
10. Continuous Innovation

Motivation and Purpose

Customers and Clients need exact Information: “What exactly is a CDE?”

- Capabilities
- Function Sets
- Services
- Interfaces

Differentiation

- DropBox, FTP Server, GoogleDrive, ...

Comparability

- Offerings (Competitors)
- Tenders

Consortium: Nemetschek Allplan, Fact, eTASK, think project!, planen-bauen 4.0, TNO Research (Netherlands), Aconex (Initiator)

https://www.din.de/de/forschung-und-innovation/erfolg-mit-standards/kick-off-din-spec-91391-gemeinsame-datenumgebungen-fuer-bim-projekte--258154

DIN SPEC 91391 - Team

Lead

- Ulrich Hartmann Aconex AG

Team / Consortium

- Aconex AG Ulrich Hartmann, Frank Weiß
- ALLPLAN GmbH Robert Blume, Thomas Müller
- eTASK Immobilien Software GmbH Klaus Aengenvoort
- Fact GmbH Dr. Volker Krieger
- Gesamtverband der Deutschen Versicherungswirtschaft e. V. Dr. Mingyi Wang
- planen-bauen 4.0 Dr. Jan Tulke, Ingo Schmidt, Michael Theiler
- think project! GmbH Sven-Eric Schapke, Simon Daum
- TNO Research Léon van Berlo

Aconex Initiative DIN SPEC 91391 “CDE”

General frame

ISO 19650*b

PAS 1192*a

We create specification

DIN SPEC 91391*c

- We help the market clarifying the requirements
- Structure BIM Use Cases to CDE Use Cases
- Differentiate between processes functions and technology

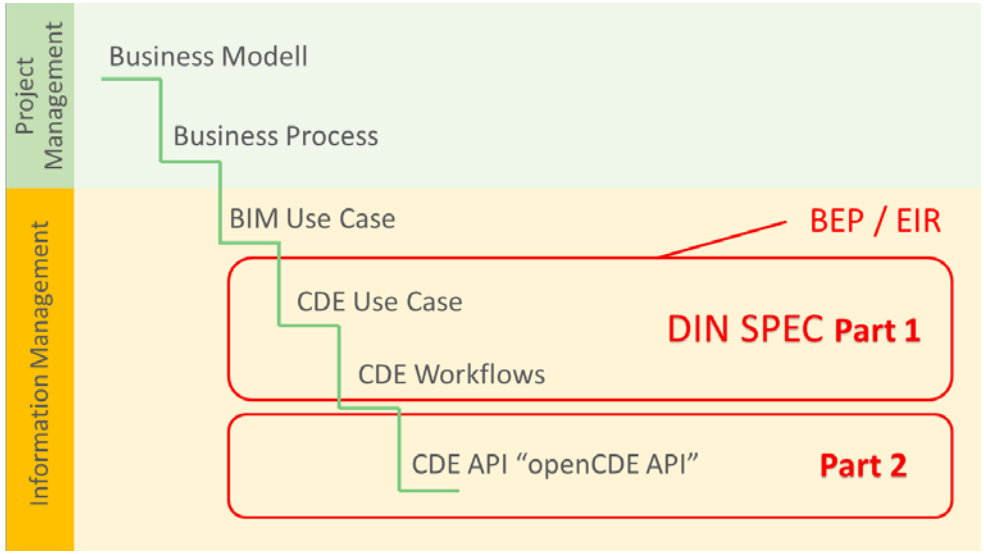
- **We are compliant with the Spec!**

a = British standard
b = International standard
c = German standard, base for international

DIN SPEC 91391

Common Data Environments for BIM Projects - Function Sets and open Data Exchange between Platforms of different Vendors

- Release: March / April 2019
- Clarifies ISO 19650 on CDE Functional Details
- Part 1: UCs + Workflows (PDF) & detailed Functions List (Excel)
- Part 2: openCDE API – Concept of Protocol and Exchange
- Bilingual from start EN/DE



Functions List

Part 1

Date:2018 December

DIN SPEC 91391-1

44 Pages

Common Data Environments for BIM Projects — Function Sets and open Data Exchange between Platforms of different Vendors — Part 1: Components and Function Sets of a CDE

Gemeinsame Datenumgebungen für BIM Projekte — Funktionen und offener Datenaustausch zwischen Plattformen unterschiedlicher Hersteller — Part 1: Module und Funktionen einer Gemeinsamen Datenumgebung

Environnements de Données communs pour la Modélisation des Données du Bâtiment (BIM) — Fonctions et Échange de Données entre des Plateformes des Fabricants différents — Partie 1: Composants et jeux de fonctions d'un CDE

+

Part 2

Date:2018 December

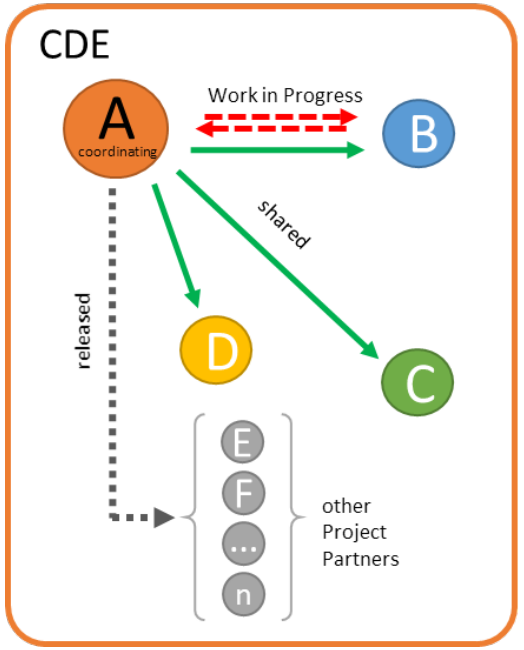
DIN SPEC 91391-2

29 Pages

Common Data Environments for BIM Projects — Function Sets and open Data Exchange between Platforms of different Vendors — Part 2: Open data exchange with common data environments

Gemeinsame Datenumgebungen (CDE) für BIM Projekte — Funktionen und offener Datenaustausch zwischen Plattformen unterschiedlicher Hersteller — Part 2: Offener Datenaustausch mit Gemeinsamen Datenumgebungen

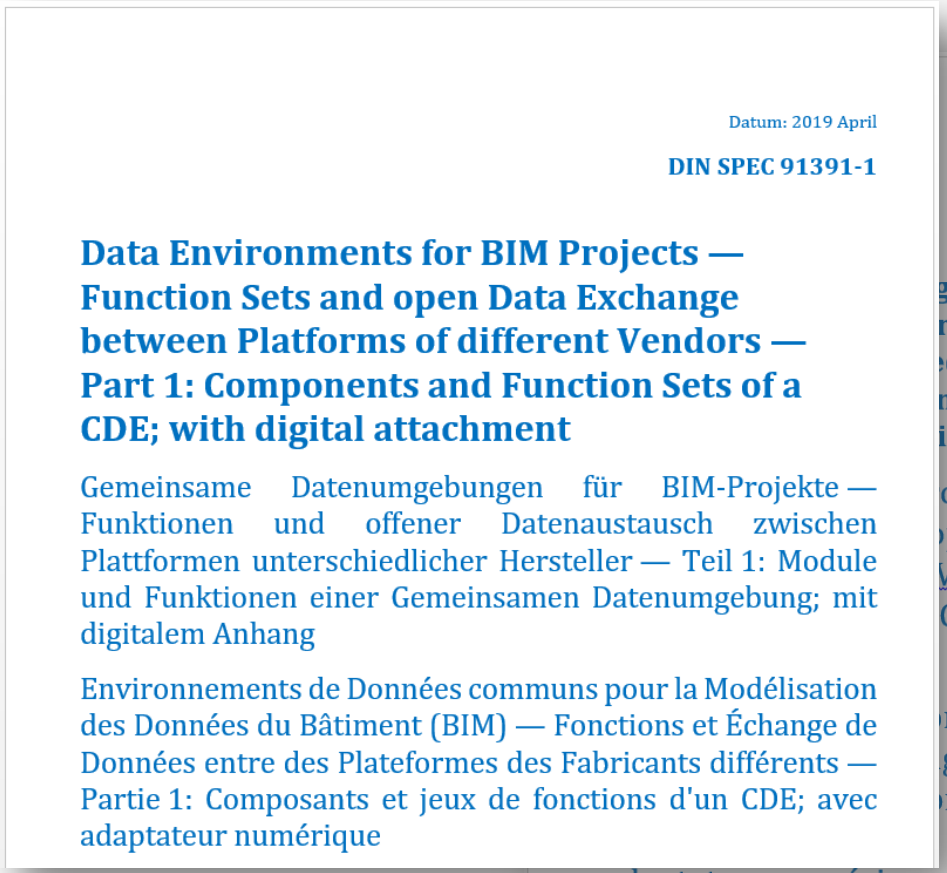
Environnements de données communs (CDE) pour les projets BIM — Fonctions et échange ouvert de données entre plates-formes de différents fabricants — Partie 2: Échange ouvert de données avec des environnements de données communs



DIN SPEC 91391

Common Data Environments for BIM Projects — Function Sets and open Data Exchange between Platforms of different Vendors

Part 1: Components and Function Sets of a CDE; with digital attachment



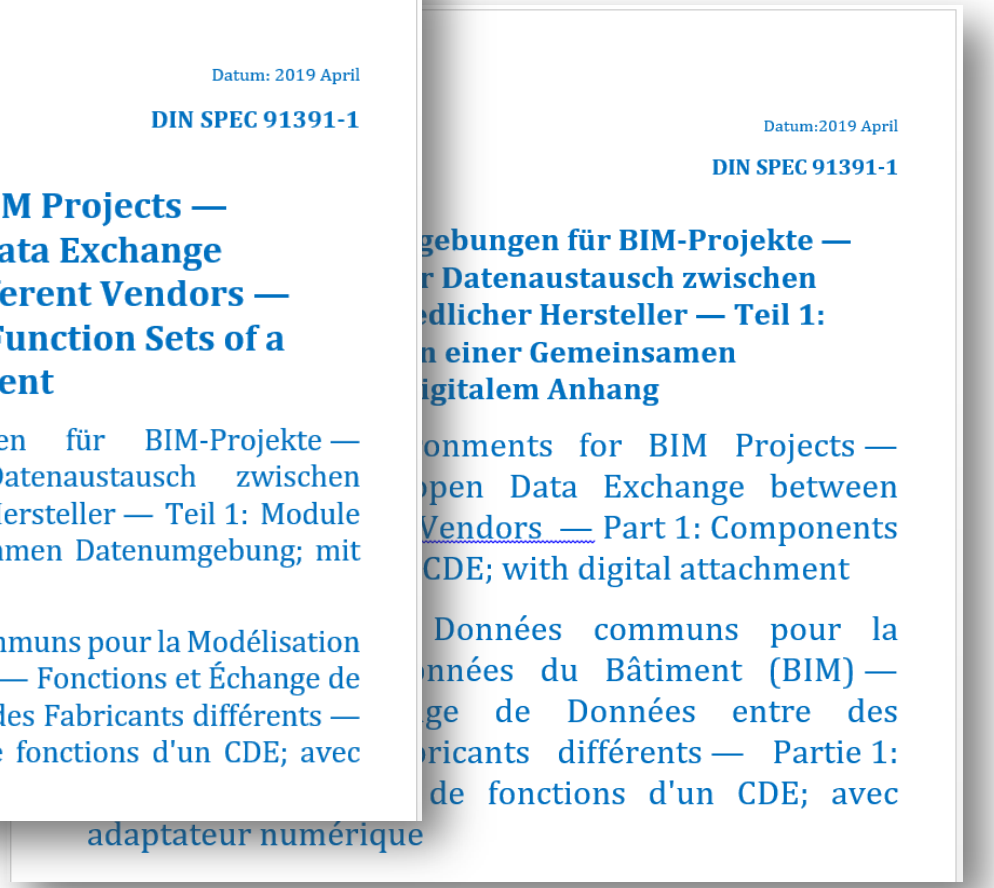
Datum: 2019 April

DIN SPEC 91391-1

Data Environments for BIM Projects — Function Sets and open Data Exchange between Platforms of different Vendors — Part 1: Components and Function Sets of a CDE; with digital attachment

Gemeinsame Datenumgebungen für BIM-Projekte — Funktionen und offener Datenaustausch zwischen Plattformen unterschiedlicher Hersteller — Teil 1: Module und Funktionen einer Gemeinsamen Datenumgebung; mit digitalem Anhang

Environnements de Données communs pour la Modélisation des Données du Bâtiment (BIM) — Fonctions et Échange de Données entre des Plateformes des Fabricants différents — Partie 1: Composants et jeux de fonctions d'un CDE; avec adaptateur numérique



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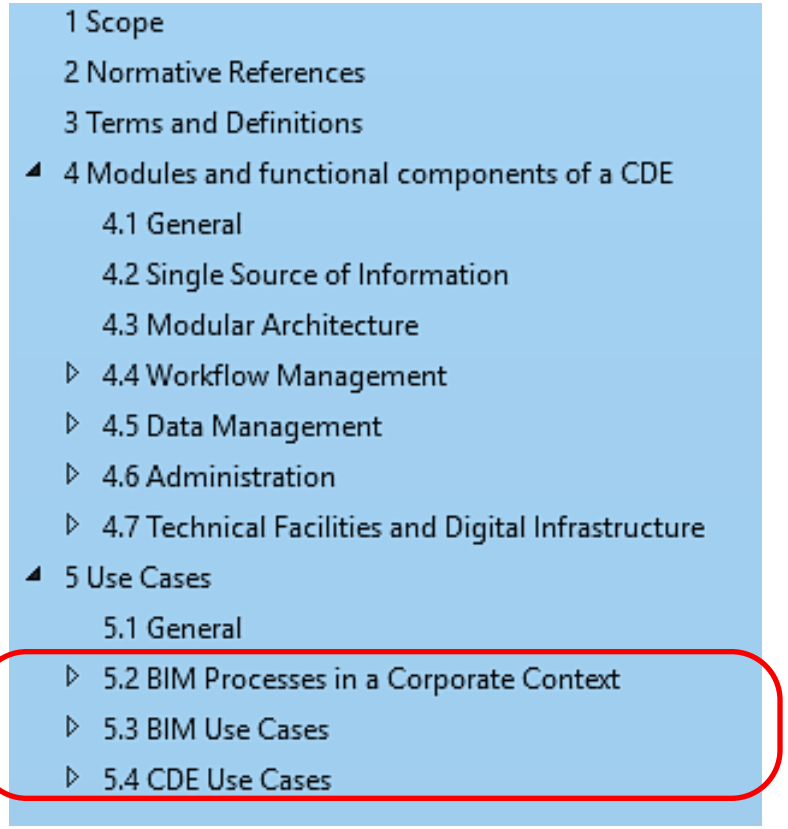
DIN SPEC 91391-1

gebungen für BIM-Projekte — r Datenaustausch zwischen dlicher Hersteller — Teil 1: n einer Gemeinsamen igitalem Anhang

onments for BIM Projects — pen Data Exchange between Vendors — Part 1: Components CDE; with digital attachment

Données communs pour la nnées du Bâtiment (BIM) — ge de Données entre des ricants différents — Partie 1: de fonctions d'un CDE; avec adaptateur numérique

Structure

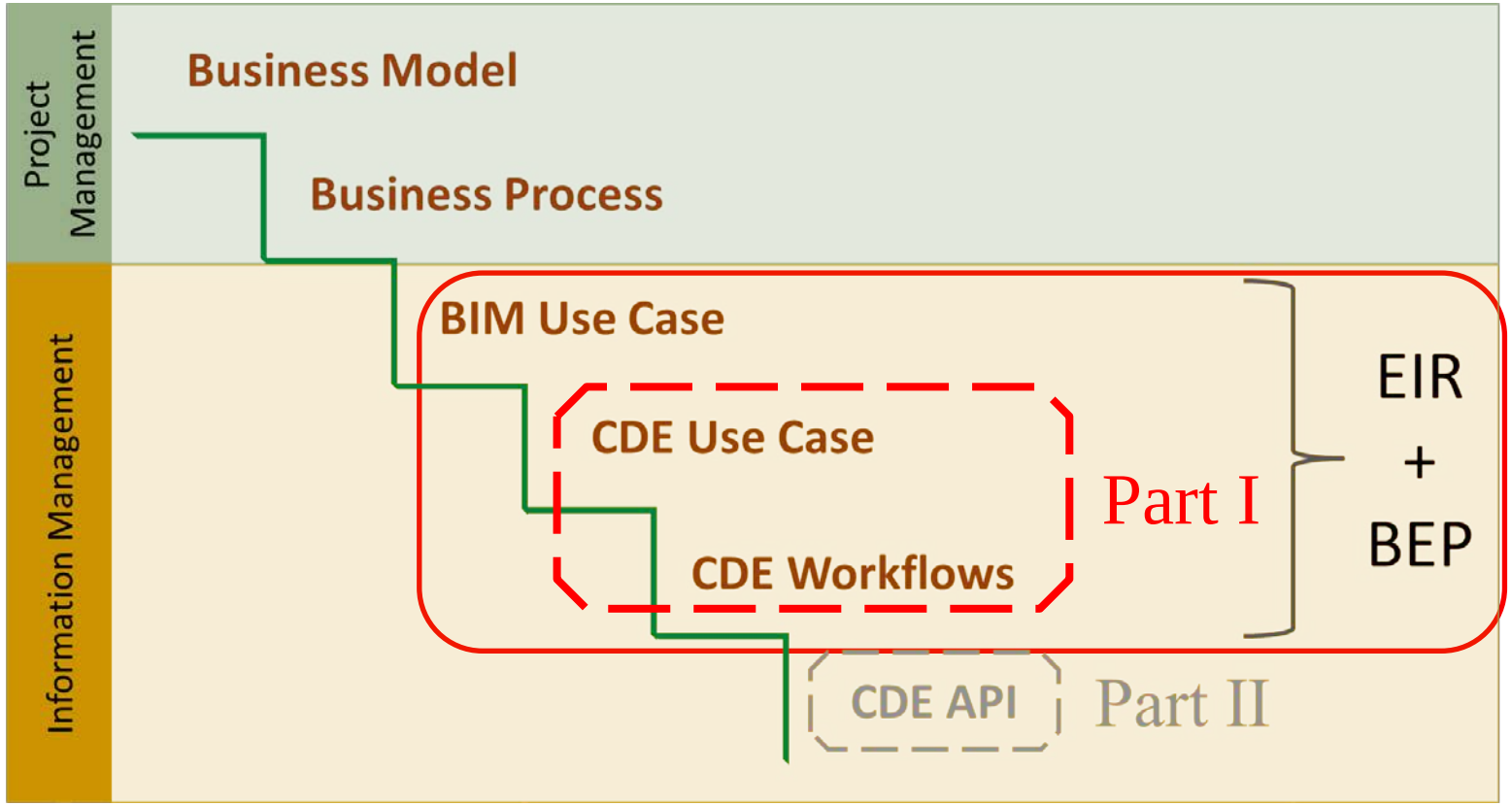


- 1 Scope
- 2 Normative References
- 3 Terms and Definitions
- 4 Modules and functional components of a CDE
  - 4.1 General
  - 4.2 Single Source of Information
  - 4.3 Modular Architecture
  - 4.4 Workflow Management
  - 4.5 Data Management
  - 4.6 Administration
  - 4.7 Technical Facilities and Digital Infrastructure
- 5 Use Cases
  - 5.1 General
  - 5.2 BIM Processes in a Corporate Context
  - 5.3 BIM Use Cases
  - 5.4 CDE Use Cases

DIN SPEC 91391

Common Data Environments for BIM Projects — Function Sets and open Data Exchange between Platforms of different Vendors

Part 1: Components and Function Sets of a CDE; with digital attachment



Structure

Structure

- 5.4.2 Coordination
- 5.4.3 Model Visualization
- 5.4.4 Quality Assurance
- 5.4.5 Planning and Controlling
- 5.4.6 Integration

DIN SPEC 91391 — **CDE Functions**

Section 5.4.2. CDE Use Case Coordination

Functions for Coordination

Information Exchange
Project Communication and Collaboration
Information Structuring
Testing and approval processes for models and documents

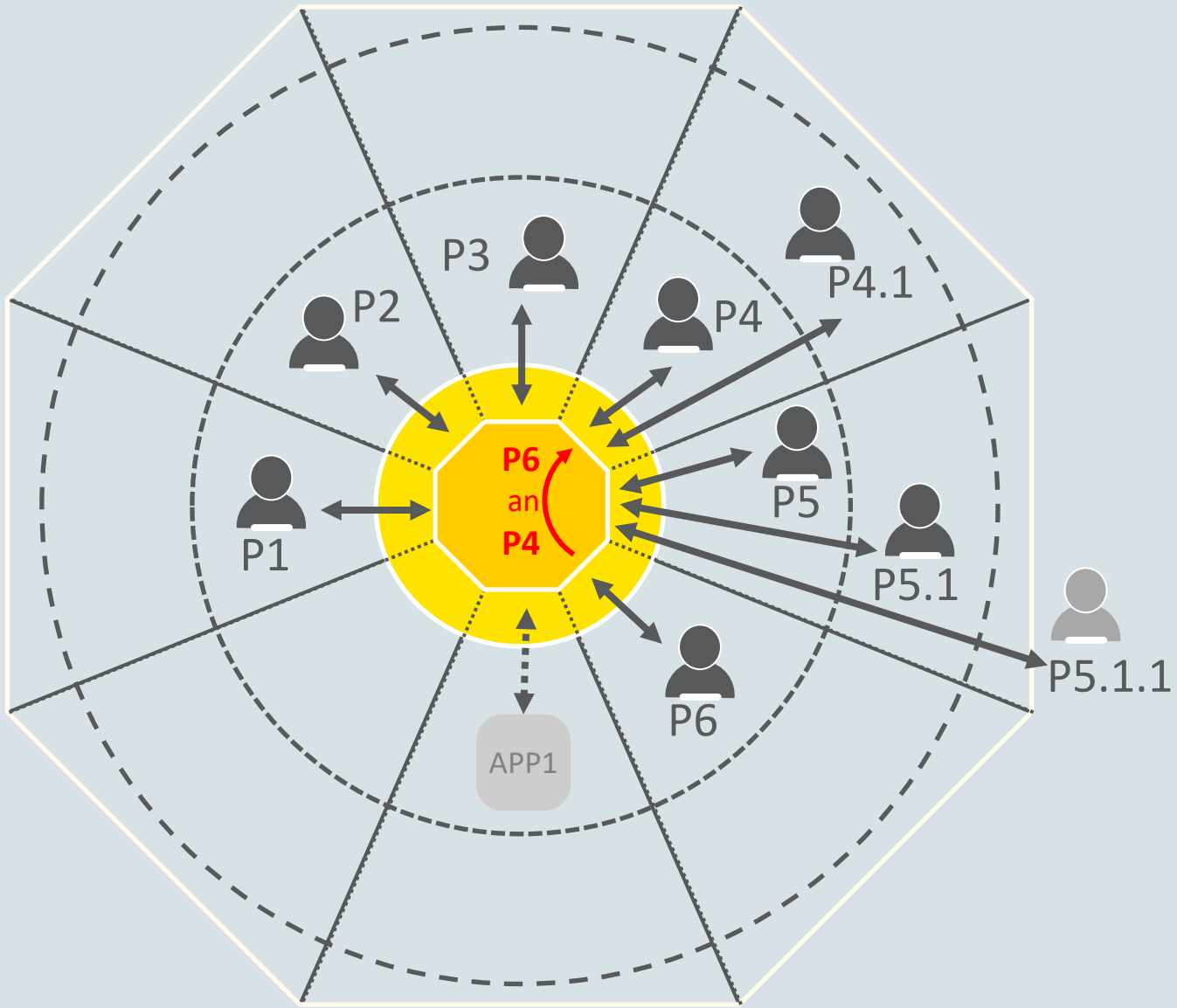
Container-based Information Exchange

	Provision of Information		Remarks
1		Upload	
2		Bulk upl	

Section 5.4.3 CDE Use Case Model Visualiz

Mandatory	Optional
✓	
	✓
	✓
✓	
✓	
✓	

272	202		capacity planning	✓
273	203		alarms (capacity, load)	✓
274	204			✓
	205		ISO 27001 certified	
275		information managed in compliance with ISO-27001		
276	206	stuff available in case of an event	on-call operations team	✓
277	207	backup hardware availability	Secondary standby hardware	✓
278	208	mirror data center	Disaster recovery in different geography	✓
279	209	prevent data losses by network failures	resilience to internet outages	✓



Akteur in Project Phase
P: Project Partner

Handlungsbereich im Pojekt

Privater Unternehmensbereich

DIN SPEC konforme Project CDE

APP1 Software Application

Anwender/Software Interaction

Software/Software Interaction

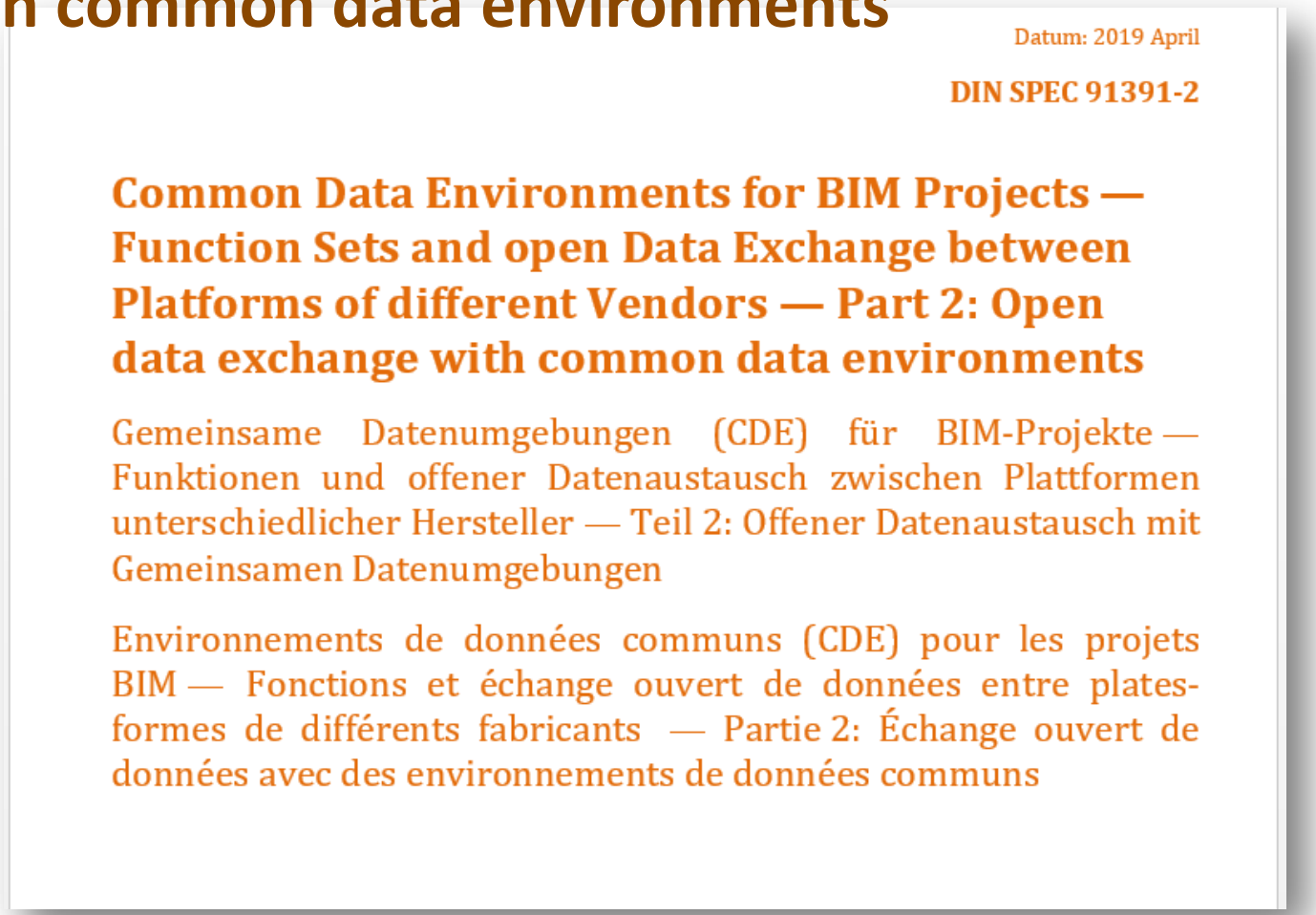
Informationslieferung

DIN SPEC 91391

Common Data Environments for BIM Projects — Function Sets and open Data Exchange between Platforms of different Vendors

Part 2: Open data exchange with common data environments

Structure



Datum: 2019 April

DIN SPEC 91391-2

Common Data Environments for BIM Projects — Function Sets and open Data Exchange between Platforms of different Vendors — Part 2: Open data exchange with common data environments

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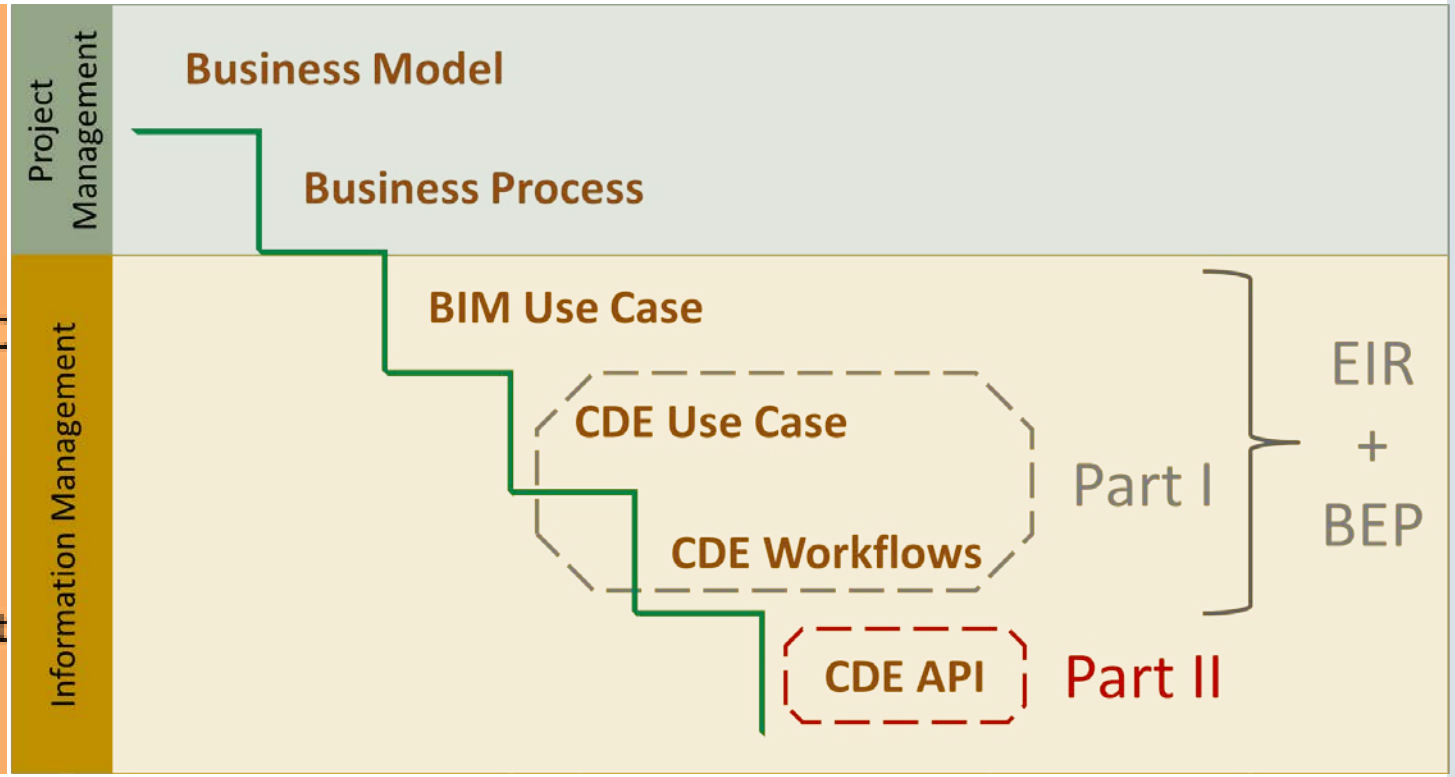
DIN SPEC 91391

Common Data Environments for BIM Projects — Function Sets and open Data Exchange between Platforms of different Vendors

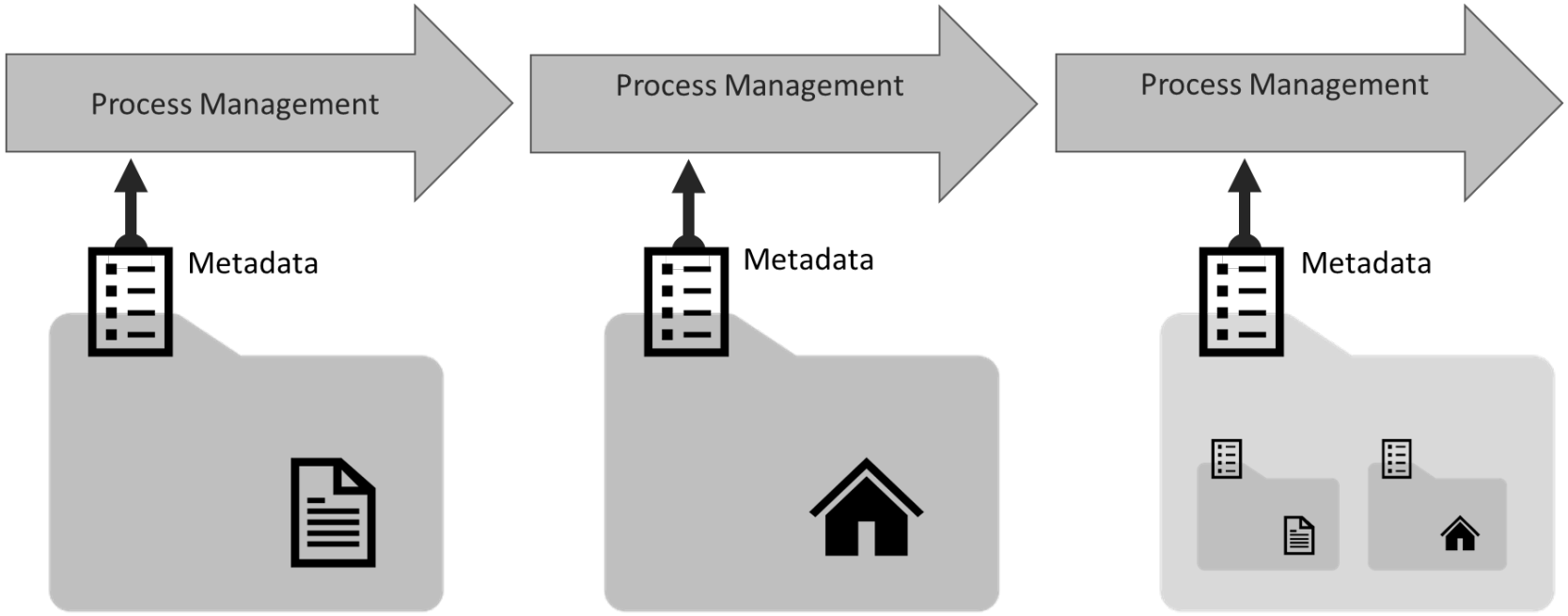
Part 2: Open data exchange with common data environments

Structure

1 Scope
2 Normative References
3 Terms and Definitions
▷ 4 Specification of the openCDE Interface
▷ 5 Example for the Implementation of an openC
▷ 6 openCDE API Use Cases
◢ Annex A (informative) Use Cases
A.1 General
▷ A.2 Example: Facility Management — Maint
▷ A.3 Risk Protection (RP)

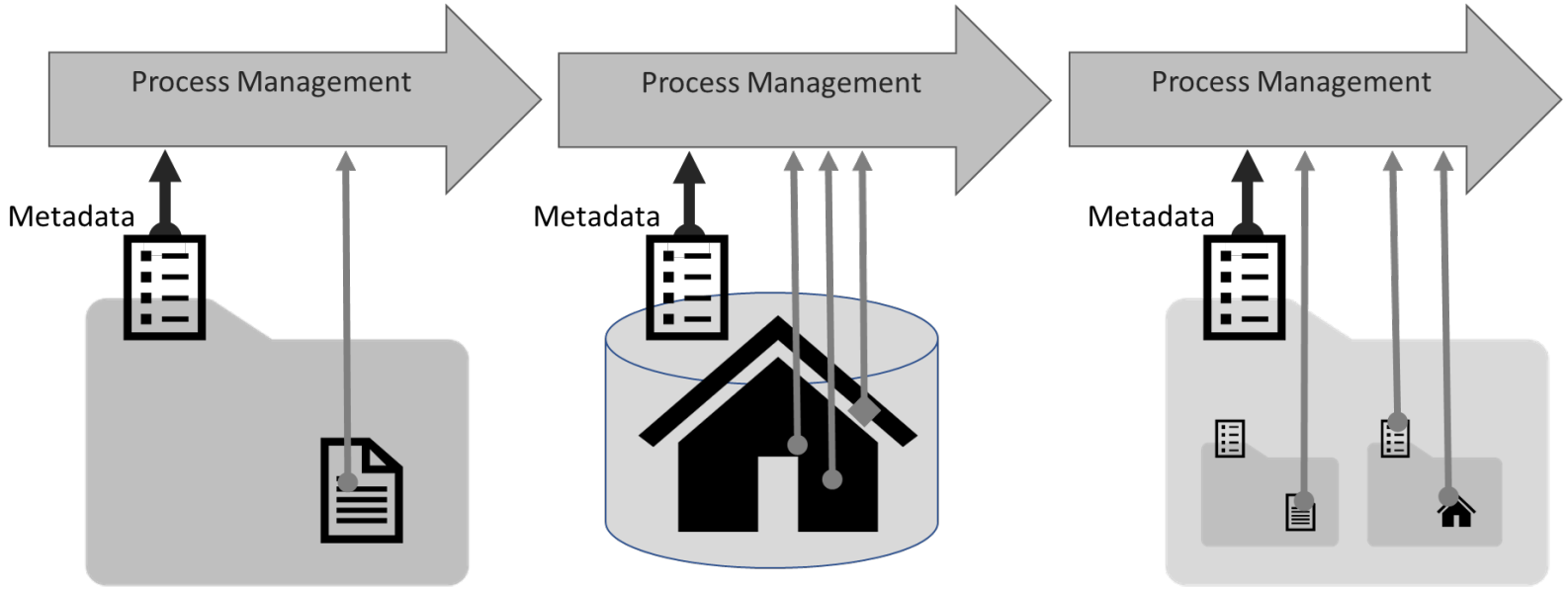


Part 2: Open data exchange with CDEs – BIM Maturity Levels

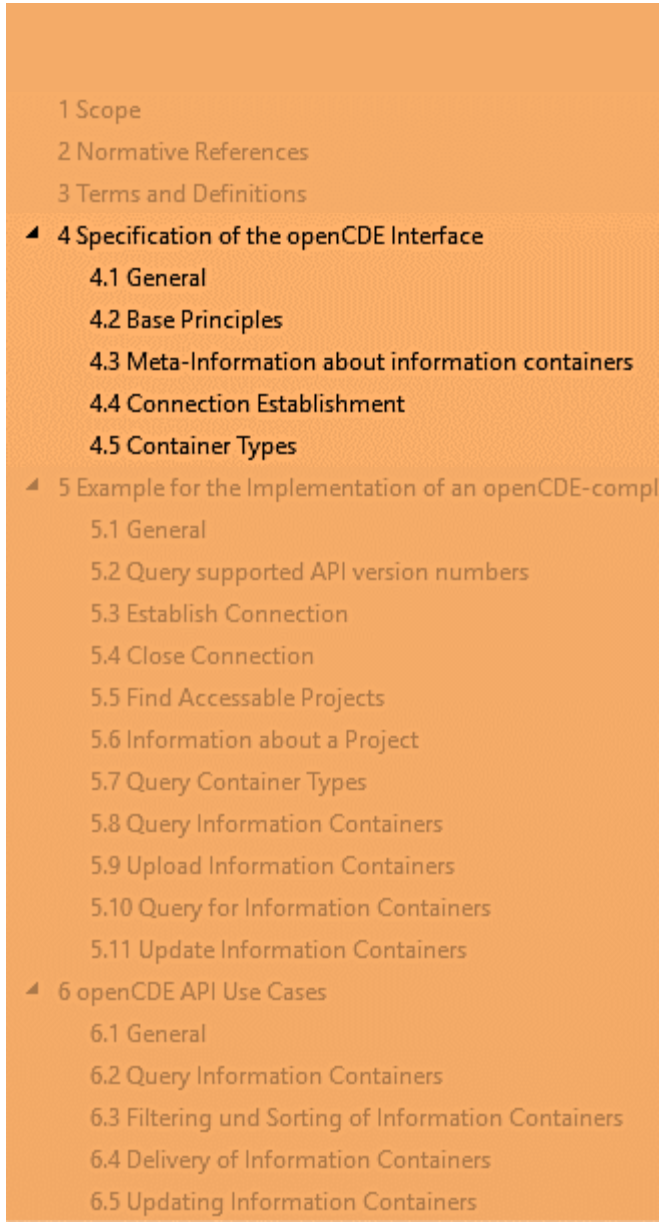


Level-2-CDE and access to information containers via metadata

Part 2: Open data exchange with CDEs – BIM Maturity Levels



Level 3 CDE with access via metadata or direct access to model elements and attributes (database)



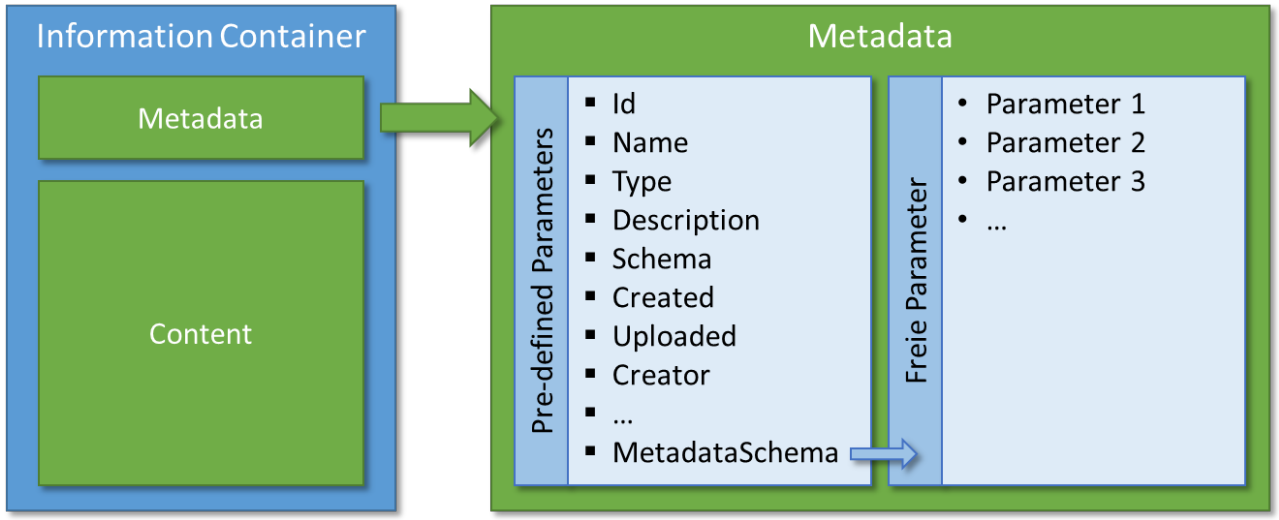
Part 2: Specification of the openCDE Interface

Base Principles

- Interface specified in **OpenAPI 3.0** format
  OpenAPI 3.0 is a specification for machine-readable interface definitions. Used for the description, generation, operation, and visualization of **RESTful** Web Services
- **Information Container**-based Data exchange. Structure of containers is referred to from metadata
- No container structure inferred or given

Part 2: Specification of the openCDE Interface

Meta-Information about Information Containers



Level 2 CDE Interface: optional and mandatory container metadata

Part 2: Specification of the openCDE Interface

Meta-Information about Information Containers

Parameter	Datatype	Mandatory/ optional	Description
Id	Unique Identifier[a]	mandatory	Unique identifier of the container
Name	Text	mandatory	Human-readible name of the container
Type	Text (Enumeration)[b]	mandatory	Type of Containers, e.g. “Drawing”, “Model”, “Report”
Description	Text	optional	complementary description of container
Created	Date, Time	optional	Creation time and date of Container, e.g. “2016-05-06T08:12:46+02:00”
Uploaded	Date, Time	optional	Container CDE upload time.
Creator	Text (Enumeration)[b]	optional	Reference to authorof Container.
Sender	Text (Enumeration)[b]	optional	Reference to senderof Container
Recipients	Text (Enumeration)[b]	optional, may have multiple occurences	Reference to addressees of the container
Suitability	Text (Enumeration)[b]	optional	Suitability respectively context of the containers, e.g. according PAS 1192, e.g. “Suitable for Costing”
Revision	Text[c]	mandatory	Revision number of containers
Version	Text[c]	optional	Version number of container
Status	Text (Enumeration)[b]	optional	Status of a container, e.g. “Open”,“Rejected”, “Accepted”
Content	Object	optional, may have multiple occurences	Content of containers. Each content contains the parameters from the following table:

Parameter	Datatype	Mandatory/ optional	Description
Name	Text	mandatory	Name of content, e.g. a Model “MyModel.ifc”.
Location	Text (URL)	mandatory	Reference to storge location (Download-Address).
Type	Text	optional	Media type of content according Internet Assigned Numbers Authority (IANA) spezification
Schema	Text ***	optional	Reference to schema specifing the content, e.g. “IFC4” or “http://www.buildingsmart-tech.org/ifc/IFC4/Add2/IFC4_ADD2.xsd”.
SchemaVersion	Text	optional	Version of content schemas, “IFC 4.0.2.1”.
SchemaSubset	Text	optional	Subset of schema specifing the content, e.g. ModelView / MicroMVD / BIM-Profile, e.g. “Reference View 1.2”

Information Container Structure referred, not implied

Part 2: Specification of the openCDE Interface

Connection Establishment

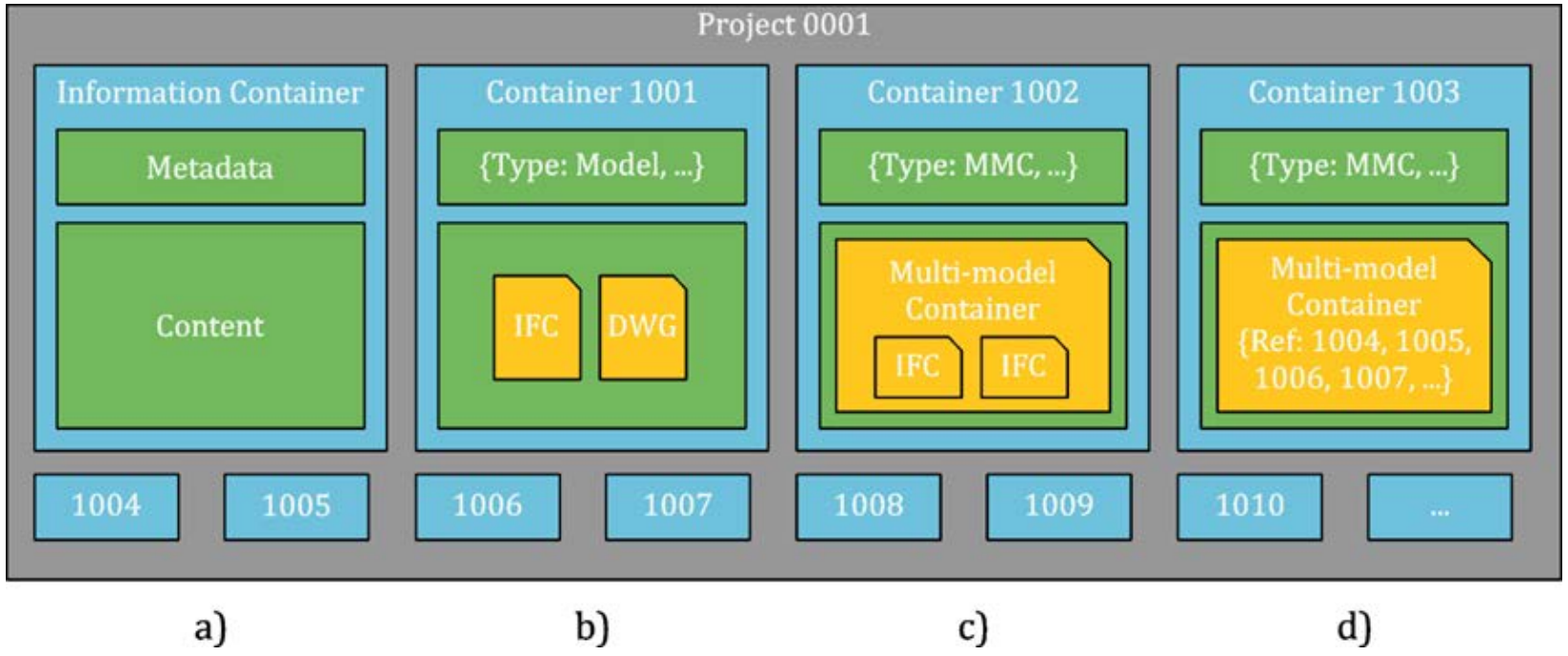
Connection Protocol

- Request for supported API versions
- Establish connection
- Retrieve accessible projects
- Retrieve container types
- Select information containers (i.e. by filtering and/or sorting)
- Download or upload of an information container and its meta information
- Shutdown connection

Part 2: Specification of the openCDE Interface

Container Types (Examples)

Information container in a project:
a) Abstract structure of an information container
b) Container with two internal structures (IFC, DWG)
c) Multi-container containing sub-structures (IFC, IFC)
d) Multi-container with references to further containers (1004, 1005, …)



Part 2: Specification of the openCDE Interface

Connection Establishment with Pseudo Calls

5.1 General

5.2 Query supported API version numbers

5.3 Establish Connection

5.4 Close Connection

5.5 Find Accessable Projects

5.6 Information about a Project

More detailed information about individual projects can be requested via a call to retrieve information about a project. The projects are referenced via a *projectId* in the URL.

URL:

GET	*/{version}/projects/{projectId}*

5.7 Query Container Types

Within a project can be selected from certain container types. To find container types in the project, an openCDE interface provides a request that lists all supported or existing container types.

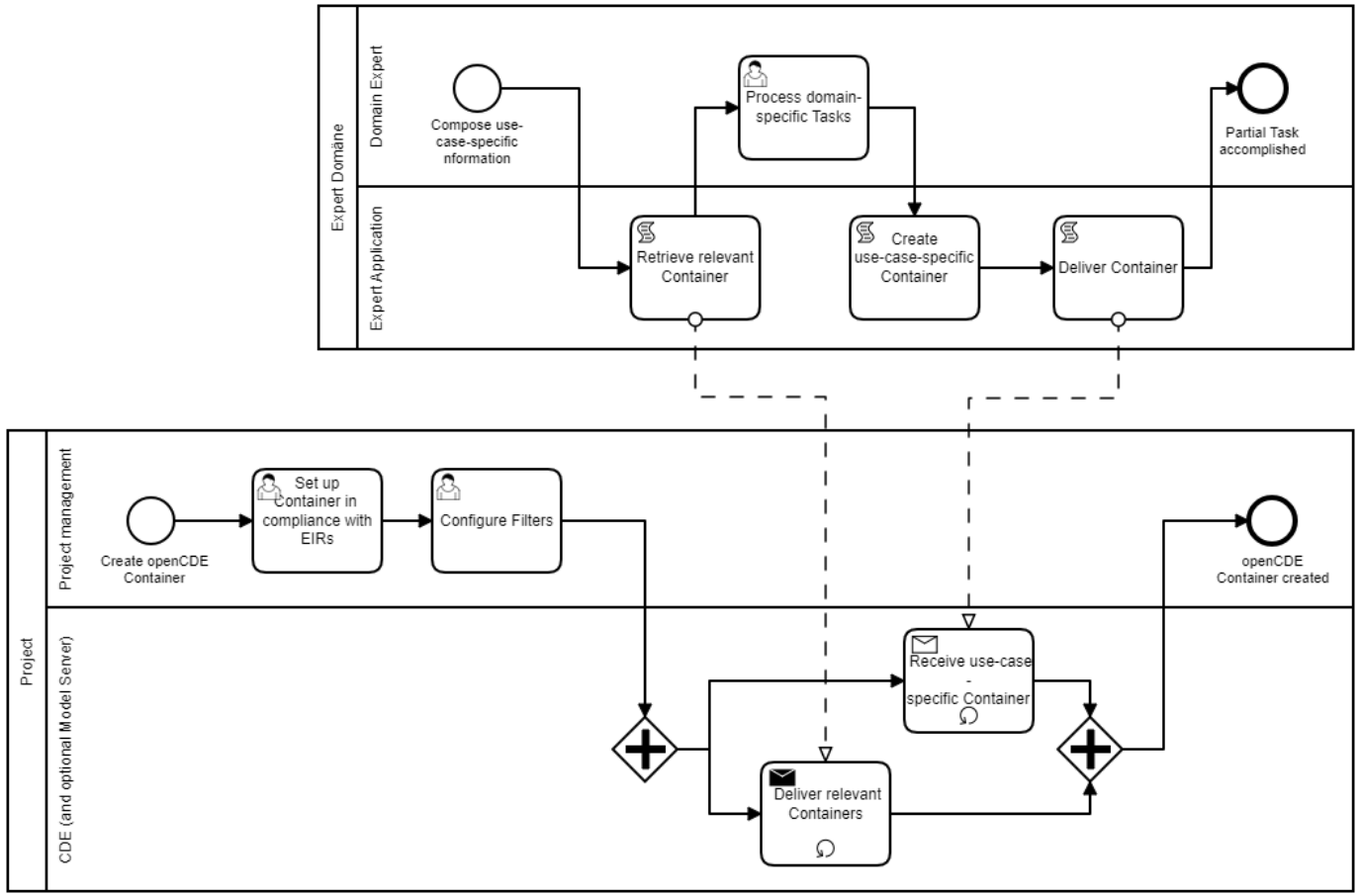
URL:

GET	*/{version}/projects/{projectId}/containerTypes*

1 Scope
2 Normative References
3 Terms and Definitions
4 Specification of the openCDE Interface
4.1 General
4.2 Base Principles
4.3 Meta-Information about information containers
4.4 Connection Establishment
4.5 Container Types
5 Example for the Implementation of an openCDE-compl
5.1 General
5.2 Query supported API version numbers
5.3 Establish Connection
5.4 Close Connection
5.5 Find Accessable Projects
5.6 Information about a Project
5.7 Query Container Types
5.8 Query Information Containers
5.9 Upload Information Containers
5.10 Query for Information Containers
5.11 Update Information Containers
6 openCDE API Use Cases
6.1 General
6.2 Query Information Containers
6.3 Filtering und Sorting of Information Containers
6.4 Delivery of Information Containers
6.5 Updating Information Containers

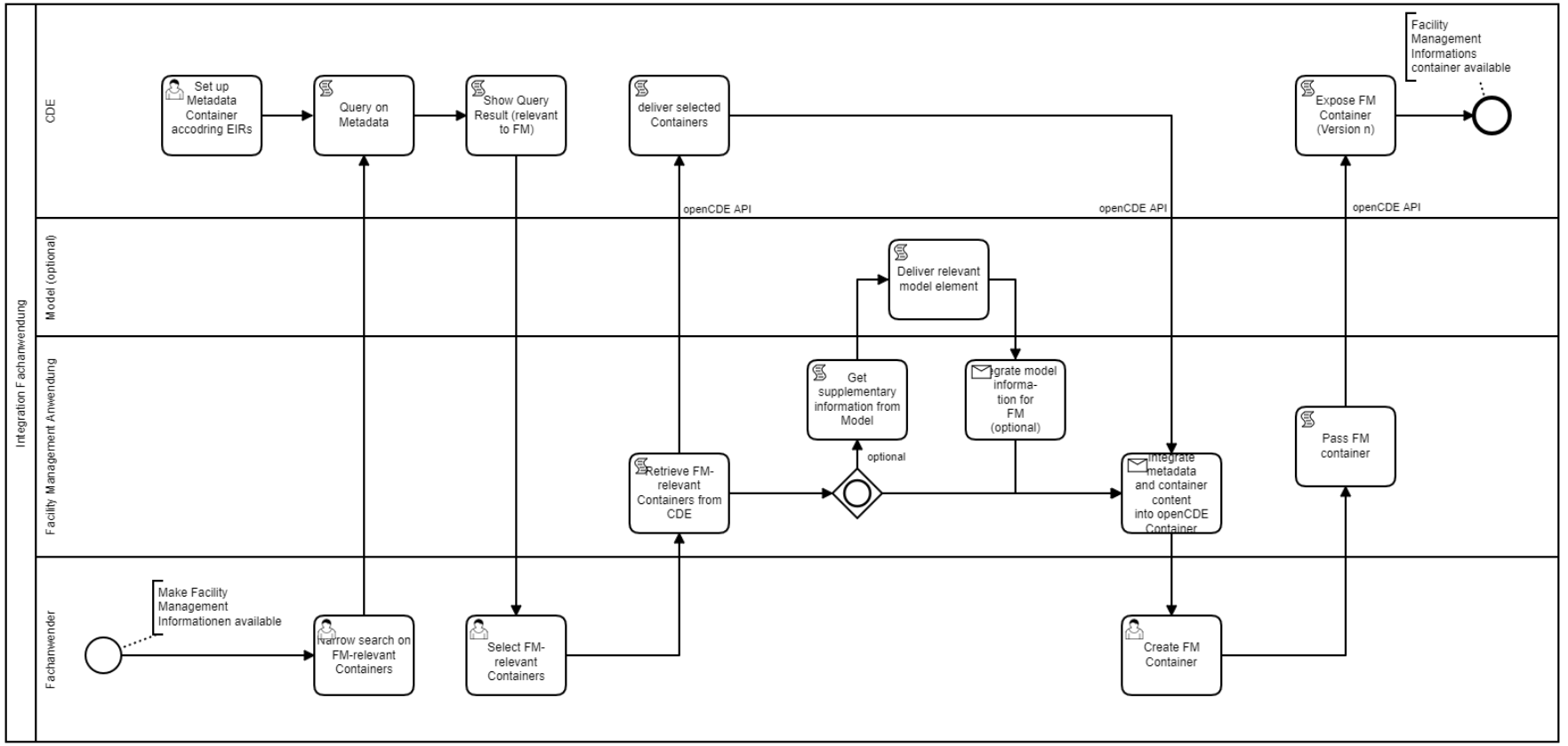
Part 2: Specification of the openCDE Interface

Open CDE API Use Cases (General)



Part 2: Specification of the openCDE Interface

Open CDE API Use Cases (Facilities Management)



What we stood away from…

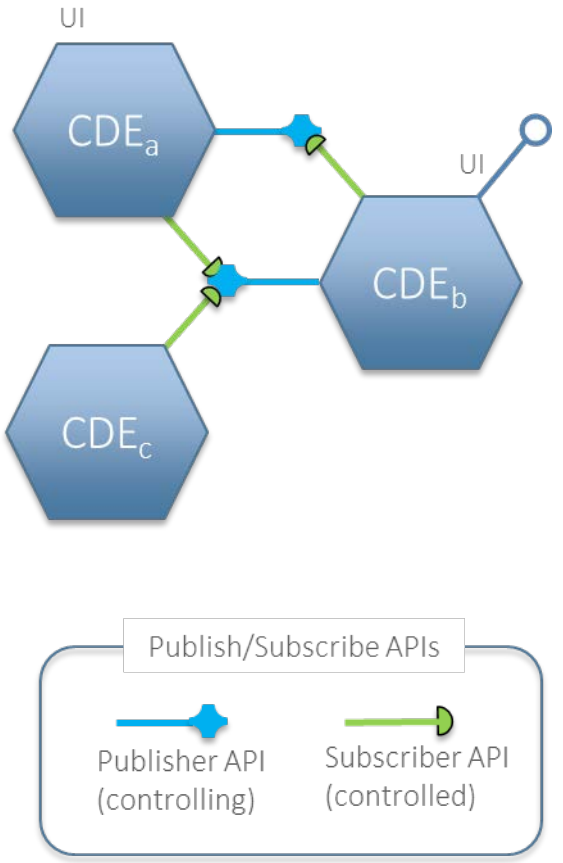
Interface

- No Function names
- No exact Function parameters
- No Data Types / Structures
- No Result Types / Structures
- No Push / Pull / Update / Call-back
- No internal container structure (metadata only)

Cross-CDE Coordination

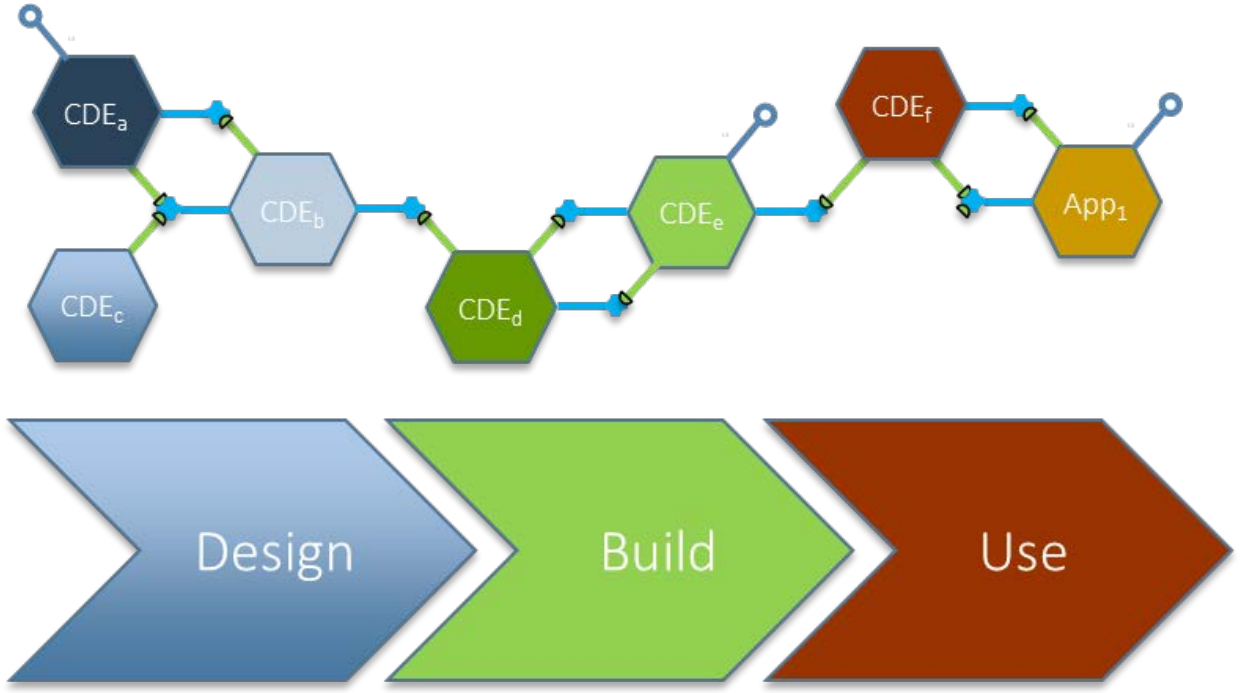
- Workflow
- Container State Tracking
- Container Identity

Publish/Subscribe - Mesh Configurations



What we stood away from…

CDEs in a networked Configuration



Scope and Need for an open CDE Interface Standard

Situation

- ISO 19650 and BS/PAS 1192:

  CDEs central to BIM information management and collaboration
- CDEs operate throughout lifecycle of a built asset
- Different CDE vendors in parallel operation
  - Horizontally (lifecycle): design, construction, operation
  - vertically (supply chain): sub-contractors, appointment, procurement

→ **Seamless data integration between systems is critical**

Scope and Need for an open CDE Interface Standard

Standardization Need

- Elevates perception of data integration
  from the level of
  - single-vendor software portfolios (closed BIM) to the
  - level of general market requirement (open BIM)
- Attracts CDE vendors to commit themselves to data-centric lifecycle support in their products
- Message to AEC market and to BIM projects to stick to lifecycle data integrity

Standard should be carried out by an IT-affine group.
Also ensures parallel implementation and practical feedback.

bSi Initiative to be announced on bSi Summit 2019 Düsseldorf, Germany, March 2019

Danke für Ihre Aufmerksamkeit

Diskussion