

# **Interactive Content Delivery**

## **Technologies, Use Cases and Industrial Applications for IoT Scenarios**

**Prof. Dr. Wolfgang Ziegler (HSKA /I4ICM, Germany)**

**Thoi Viet Nguyen (ISE, Japan)**

## Prof. Dr. **Wolfgang Ziegler**

- Karlsruhe University of Applied Sciences  
„Communication und Media Management“
- » Information modelling and management
- » Information processes and systems in TC
- Institute for Information and Content Management (I4ICM)
- » Research Transfer (PI-Class, REx, CVM, CDP, CoReAn)
- » System evaluation/introduction, process analysis/engineering, CMS/CDP optimizing, classification/content engineering

## Thoi Viet Nguyen

» Stuttgart Hochschule der Medien  
„Usability Engineering“

- Information System Engineering (ISE)
- » Web Development
- » Programming

# Agenda

- **Content Management & Delivery**
  - CM + CD Methods
  - Intelligence Cascade

- **Digital Information Services**
  - CD Applications & Information Services
  - Visual Access and Robotics

- **Content and Data Analytics**
  - CMS & CDP
  - Industrial Analytics and AI

# **Introduction: Content Management & Delivery**

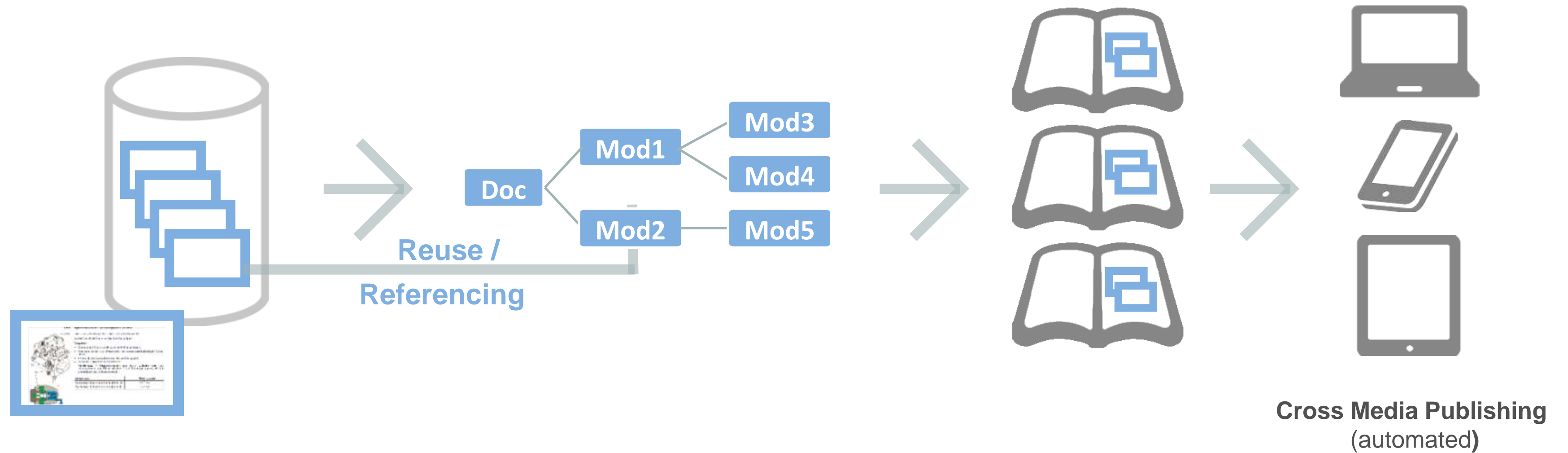
**How to build and manage intelligent content**

**CM Methods - CD Methods - Intelligence Cascade**

CM and Delivery

# CM Methods

## CM for Reuse, Process Management and Publishing



## CM Methods

### Basic CM Concepts in TC

- **CMS principles**

Controlled reuse of content modules (topics) in multiple documents or media by the use of metadata

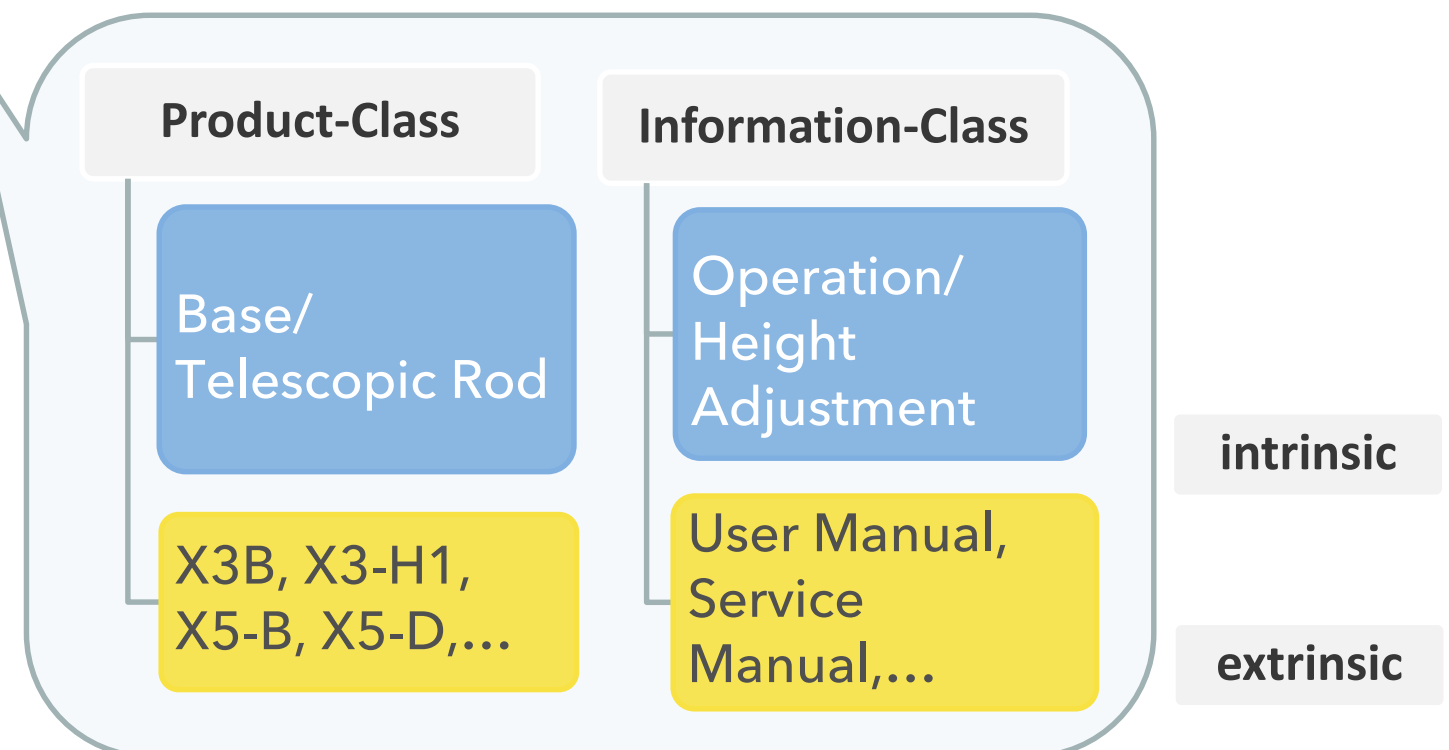
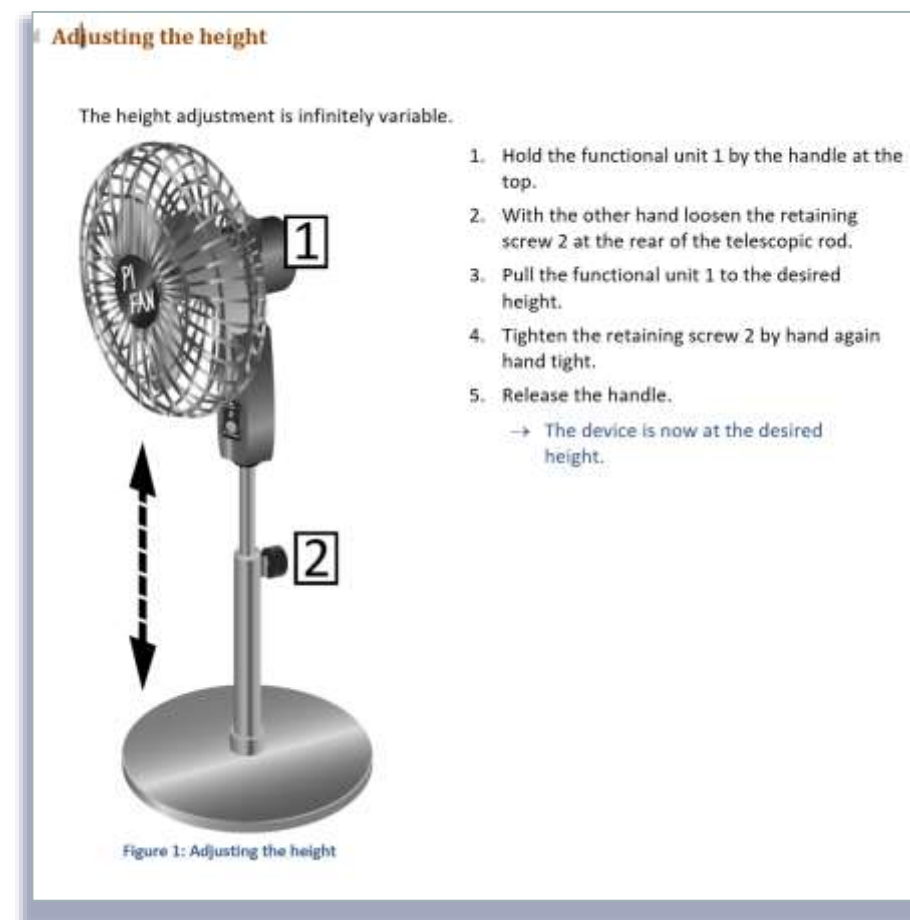
- **CMS offer technologies for**

- Variant management (product & media variants, configuration)
- Version management (change Management)
- Translation management (internationalization, globalization)
- Cross media & publishing management

→ ***Generating Docs by “native intelligence of data”***

# CM Methods

## Basic Dimensions of Module Classification (PI-Class<sup>®</sup> and de reference model PI-Fan)





## CM Methods

### Content Engineering:

- Topics
- Meta data (Class.)

## Classification of Components

Product class 1 (Assembly/ Functional group)	Product class 2 (Components/ Functional unit)	Product class 3 Part
Complete device		
Drive	Drive Connection Electric motor Gear box	
Lighting	Cover Light fitting	
Heating	Heating element	
Rotor	Blade Blade mount Impeller	
Protection	Safety grille	
Display_operating element	Speed controller Swivel control Temperature probe Temperature control Display	
Mounting bracket	Base	Base plate Telescopic rod
	Ceiling mount	

### Taxonomy of (intrinsic) Product Component Classes



Analogous procedure of component-based decomposition and classification of software products:

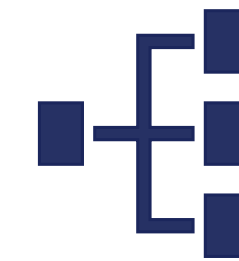
- software components
- software classes/objects
- GUI components
- programming units

EN Translation provided by RWS Group, Germany

# CM Methods

## Classification of Information Types

Information class 1 (Module type)	Information class 2 (Product life cycle)	Information class 3 (Detailed product life cycle)
Procedure	Operation	Blower adjustment Height adjustment Tilt adjustment Swivel activation Temperature adjustment
	Getting started	
	Storage	
	Assembly	
	Maintenance	Check Repair
Description	Layout	
	Disposal	
	Function	
	Tech. data	
Plan	Diagnostics	Error code Manual
Safety	General safety	
	Intended use	
	Specific safety	
	Forsee. misuse	



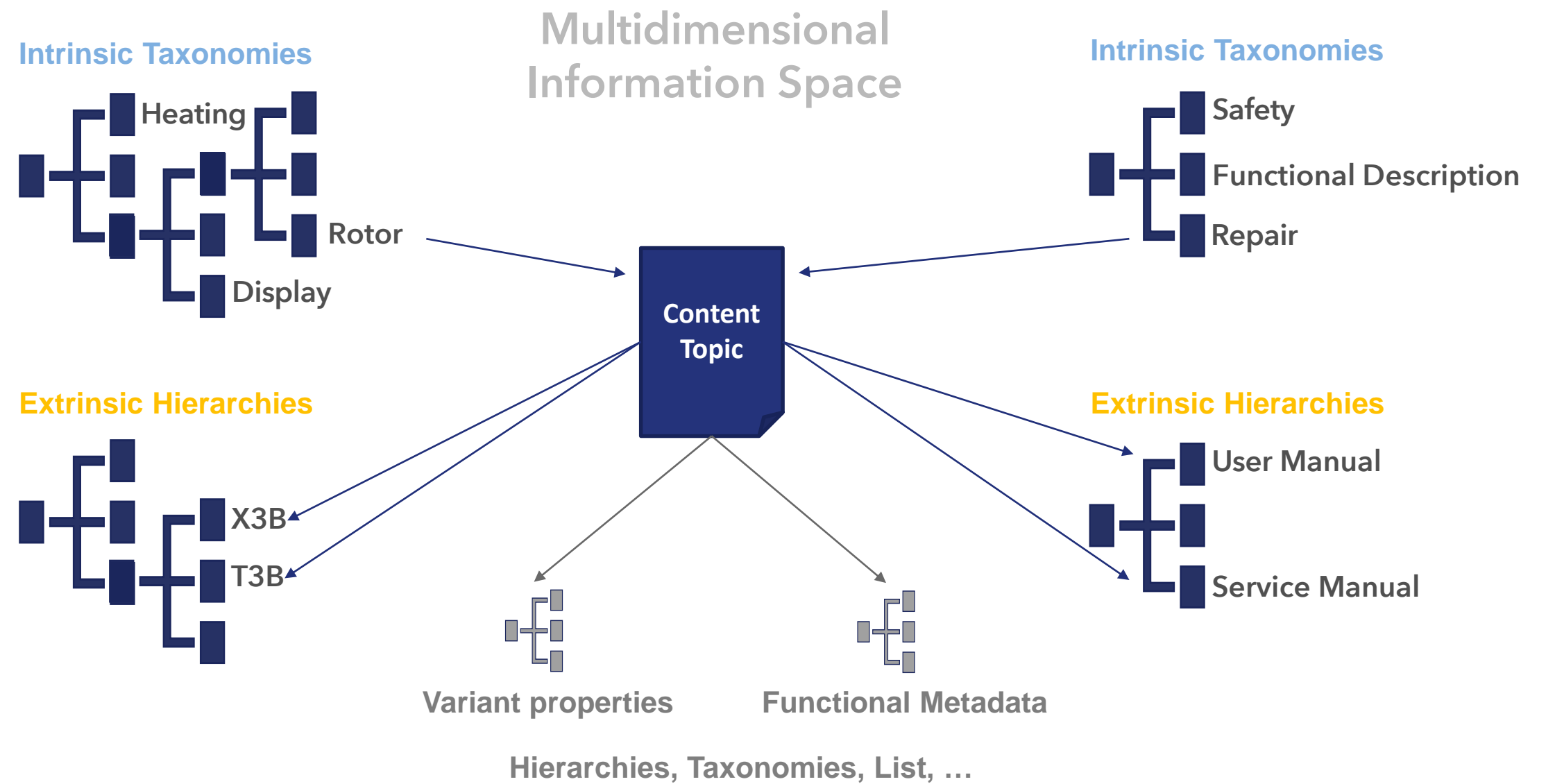
Taxonomy of (intrinsic) Information Classes

EN Translation provided by RWS Group, Germany

[www.pi-fan.de](http://www.pi-fan.de)

# CM Methods

## CMS „Taxonomies“ from Topic Classification



# CM Methods

## Implementation of PI-Classification/PI-Fan Methodology of Metadata & Variantmgnt.

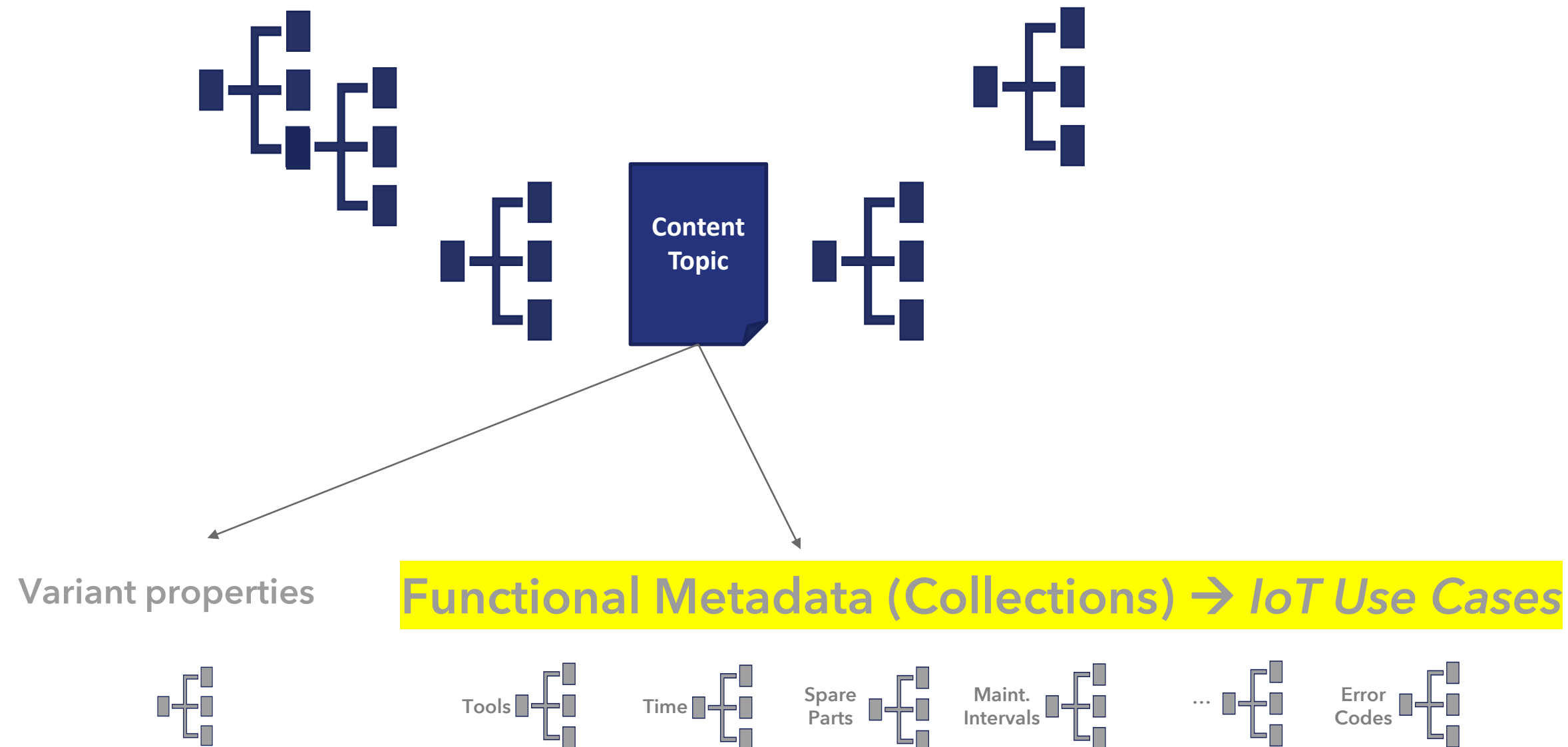
The image displays several overlapping screenshots from a software application:

- Navigation Tree:** Shows a hierarchical structure under 'PI-Fan' with sub-items like '1\_Allgemeine Sicherheitshinweise', '2\_Prodktbeschreibung', etc.
- Metadaten bearbeiten:** A table for editing metadata with columns for 'Eigenschaft' (Property) and 'T. Wert' (Value). Properties include 'Autor', 'Fälligkeitsdatum', 'Geplante Freigabe', 'Freigeber', 'Info-Klasse', 'Komponenten', and 'Mitwirkende'.
- TIM-VariantManager:** A dialog box showing a tree of variants under 'X-Serie', including 'X3-Reihe', 'X5-Reihe', 'XP-Reihe', and their sub-variants like 'X5-B', 'X5-DH1', etc.
- Validities Selection:** A window for selecting validities for an XML element.
- Classifizierung:** A detailed view of a product structure with a red callout box containing the text: 'Extrinsische Klassifizierung von submodularen Strukturen (XML-Elemente) -> submod. Varianten'.

# CM Methods

## „Taxonomies“ used for Topic Classification

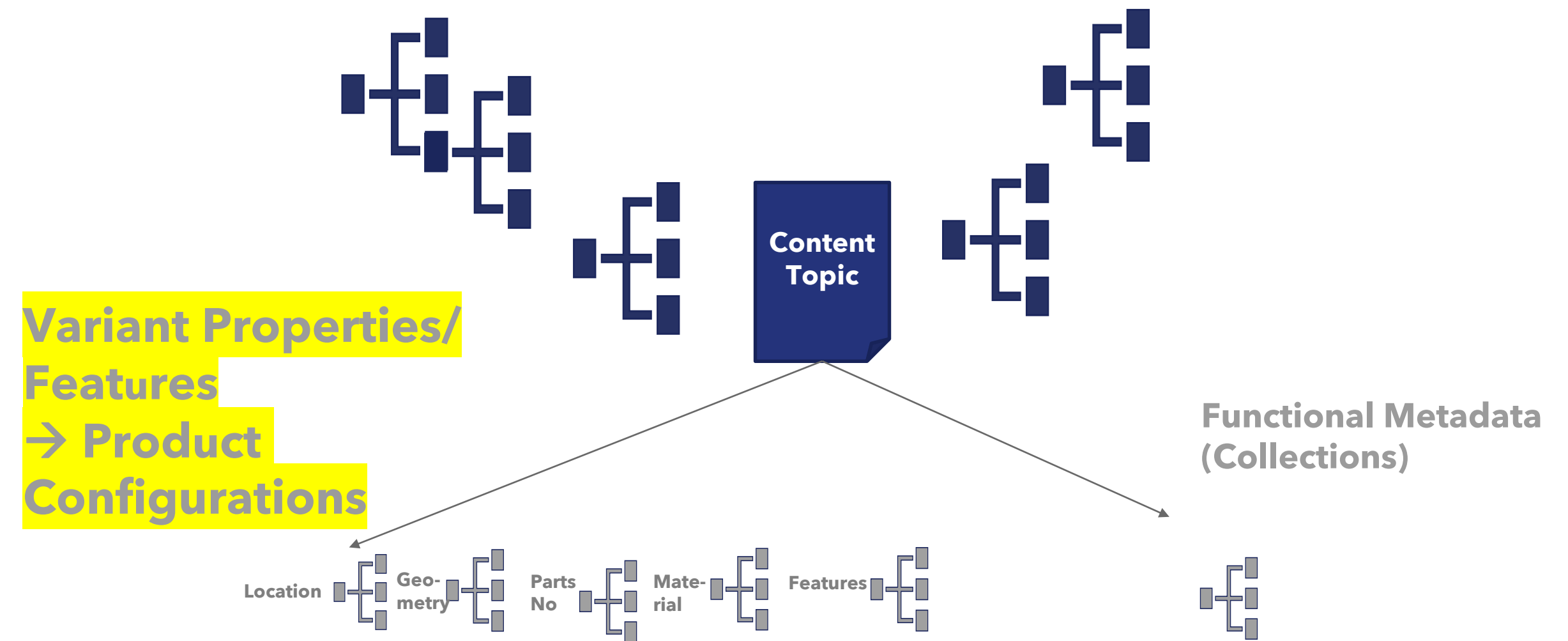
Extended PI-Class: Multidimensional Information Space



# CM Methods

## „Taxonomies“ used for Topic Classification

Extended PI-Class: Multidimensional Information Space



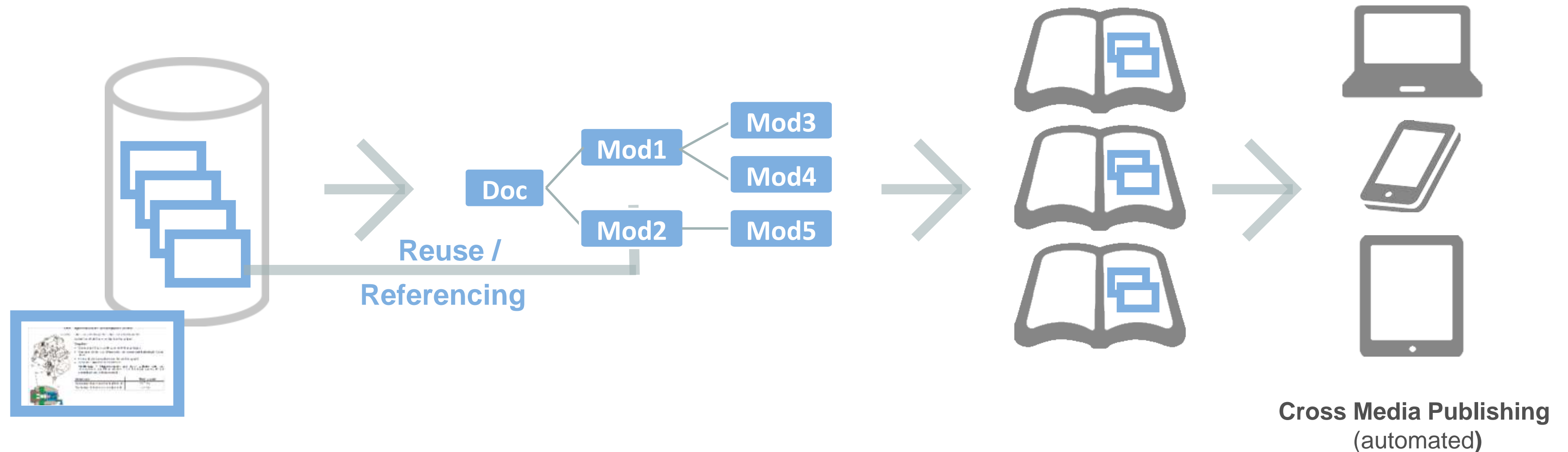
## CM and Delivery

## CM Methods

## Referencing modules

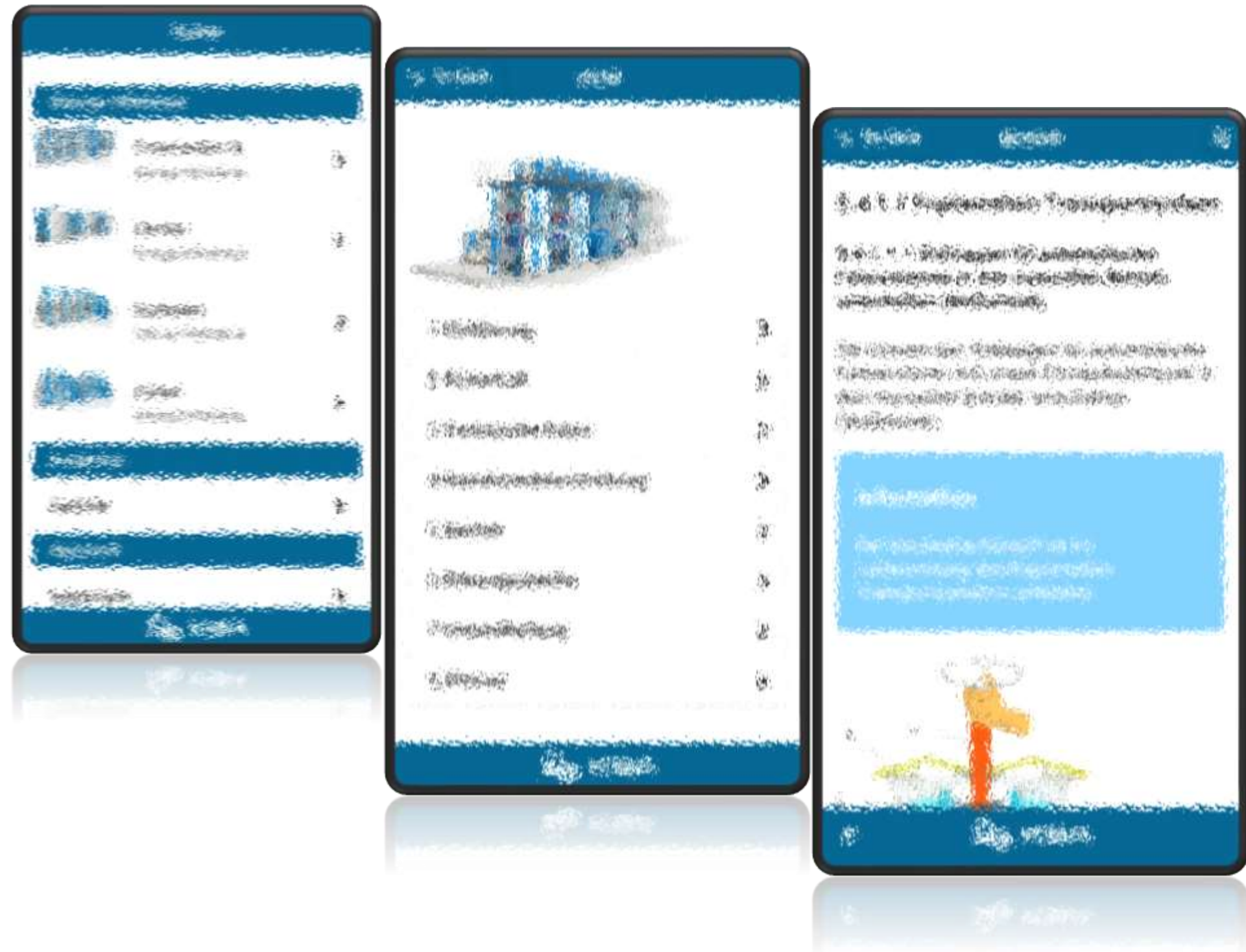
- permits controlled processes
- avoids uncontrolled redundancies
- defines and populates document structures by topics

## CM for Reuse and Publishing



# Web Delivery

## Web & Hybrid Apps from XML-Data / CMS





# Content Delivery Portals (CDP)

## Basic definition and objectives

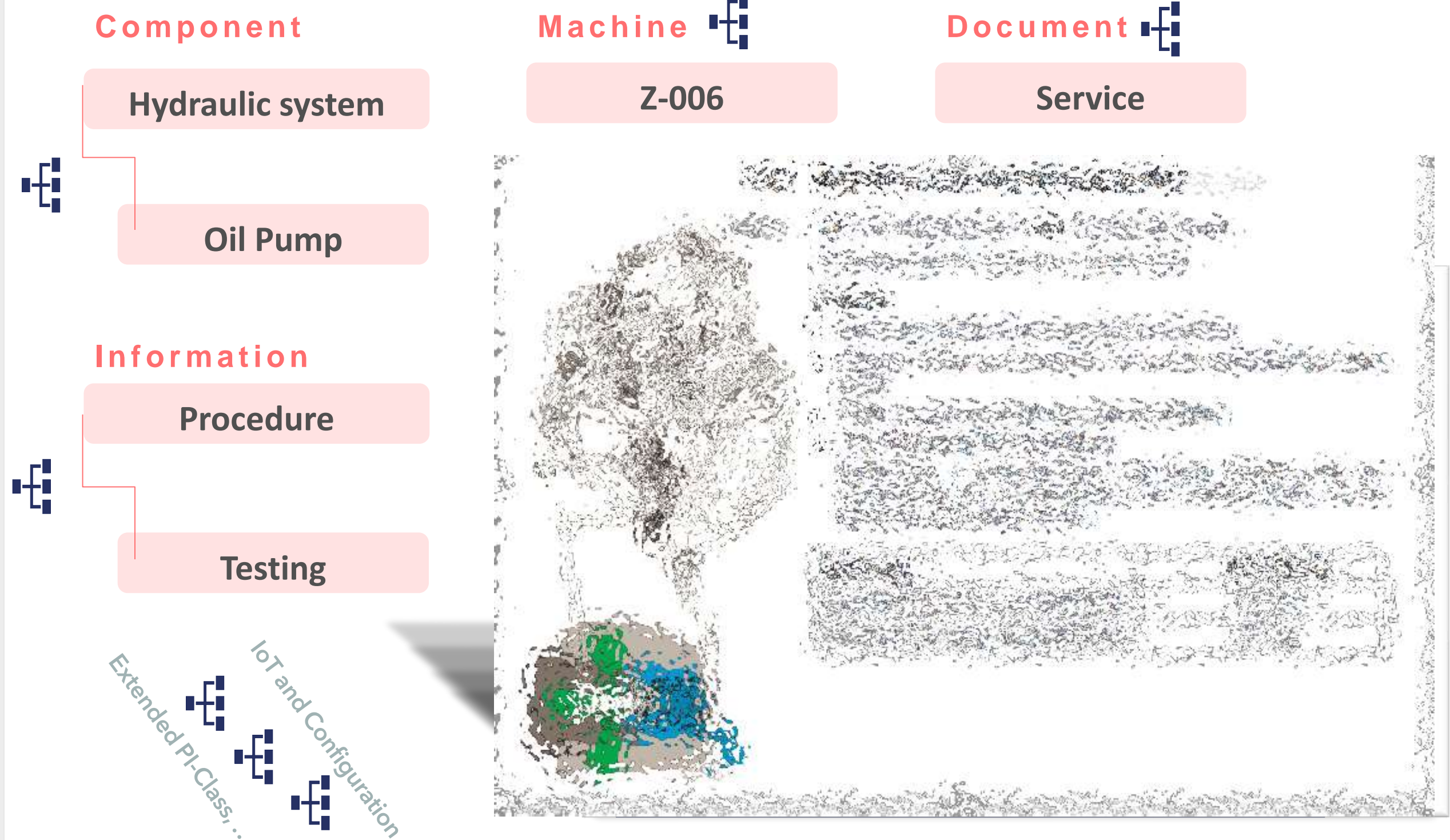
*Systems offering web based access to modular, aggregated content or other information for various user groups by related retrieval mechanisms.*

*→ Delivering the right piece of information needed in a specific situation (request / search / error / task / ...)*

# CDP Methods

## Interactive Delivery: Facetted search/request and topic delivery

Z-006, Z-007



## CM and Delivery

## CD Methods

Use Case:  
Retrieving/searching  
manually for topics

## Content Delivery Portal (PI-Fan)

The screenshot displays the TopicPilot web application interface. At the top, the browser address bar shows the URL: [https://service.topicpilot.de/i4icm/?search&query=Rotor&facets=PIF\\_P-intrinsisch\\_%7C\\_nid58190fc11dd21664c0a802645977d8c1+AND+Produkt\\_%7C\\_nid85e7506eb2e33f90c0a802687f559f0c+AND+Proc](https://service.topicpilot.de/i4icm/?search&query=Rotor&facets=PIF_P-intrinsisch_%7C_nid58190fc11dd21664c0a802645977d8c1+AND+Produkt_%7C_nid85e7506eb2e33f90c0a802687f559f0c+AND+Proc). The page header features the 'TOPICPILOT' logo and navigation icons. A search bar contains the term 'Rotor' and is labeled 'Direct Search'. A green arrow points to the search bar with the number '3'. Below the search bar, the page is divided into 'Structured Search Facets' and 'Navigation'. The 'Facets' section includes filters for 'Bauart' (Standgerät, Tischgerät), 'PIF\_I-intrinsisch' (Procedures), 'PIF\_P-intrinsisch' (All Components, Rotor, Steuerungsmechanik, Schwenksteuerung), and 'Produkt' (X-Series, X-Serie). The 'Navigation' section shows search results for 'Rotor reinigen' (Cleaning the rotor), 'Rotor montieren' (Mounting the rotor), and 'Schwenkbereich freiräumen'. The footer contains the Docufy Topic Pilot logo, the website URL [www.pi-fan.de], and copyright information: © DOCUFY GmbH, 2015 | Impressum and DOCUFY TopicPilot Web Application, v 2.0.2.

# CD Methods

## Content Delivery Portal (PI-Fan)

TOPICPILOT

Suche  Alles Anzeigen 2


**Navigating the document structure (before/after faceted search)**

Suchergebnisse

**Adjusting the tilt**

Neigung einstellen Ventilator „PI-Fan“ T3-B 03.02.2016

Der Ventilator hat einen Neigungswinkel von  $-15^\circ$  bis  $+35^\circ$ . Diesen können Sie schrittweise in  $5^\circ$  Schritten einstellen.



Neigung einstellen

- Greifen Sie den Ventilator am Griff auf der Oberseite.
- Neigen Sie den Ventilator, bis er den gewünschten Neigungswinkel erreicht hat.

**Notiz** Ein deutlich hörbares Einrastgeräusch signalisiert, dass sich der Neigungswinkel um eine Stufe geändert hat.

Weiterführende Informationen

**Filter** **Inhalt**

PI-Fan T3-B

- Allgemeine Sicherheitshinweise
- Produktbeschreibung
  - Bestimmungsgemäße Verwendung
  - Vorhersehbarer Fehlgebrauch
  - Technische Daten
- Montage
- Adjusting the tilt**
  - Inbetriebnahme
  - Bedienung
    - Neigung einstellen**
    - Einschalten und Geschwindigkeit einstellen
    - Schwenkfunktion ein-/ausschalten
  - Wartung
    - Rotor reinigen
  - + Fehlerbehebung
    - Kontaktdaten
    - Entsorgung

# CD Methods

## CDP: Facets in Documents

The screenshot displays the SCHEMA Portal interface for a document titled "Bedienungsanleitung T3-B". The interface is divided into several sections:

- Header:** "SCHEMAPortal" with a user greeting "Willkommen admin!", a search bar, and a language selector.
- Left Sidebar (INHALTSVERZEICHNIS):** A navigation menu with a search bar and a list of document sections:
  - Bedienungsanleitung T3-B
    - Allgemeine Sicherheitshinweise
    - Produktbeschreibung
    - Bestimmungsgemäße Verwendung
    - Vorhersehbarer Fehlgebrauch
    - Technische Daten
    - Montage
    - Inbetriebnahme
    - Bedienung
    - Wartung
    - Fehlerbehebungen
    - Kontakt Daten
    - Entsorgung
    - Glossar
- Main Content Area:** Displays the document title "Bedienungsanleitung T3-B" and a search bar.
- Faceted Filter (Filterkriterien):** A table showing document structure facets and their corresponding formats.
 

Aufbau Gesamtgerät	Format
▶ Antrieb	Adobe
▶ Anzeige- u. Bedienelemente	HTML
▶ Beleuchtung	▶ Micro
▶ Halterung	▶ Micro
▶ Bodenständer	▶ Micro
▶ Deckenhalterung	ZIP
Tischstandfuß	
▶ Wandhalterung	
▶ Heizung	
▶ Rotor	
▶ Schutz	

*Schema  
Content Delivery  
Server*

**Navigating the  
document structure;  
then faceted filter**

# CD Methods

## Content Delivery Portal (PI-Fan)

INHALTSVERZEICHNIS

Bedienungsanleitung T3-B  
Teleskopstange und Standplatte montieren

<

Suche

SCHEMA

Glossar

Bedienungsanleitung T3-B / Montage / Teleskopstange und Standplatte montieren

### Teleskopstange und Standplatte montieren

Bodenständer montieren

1. Befestigen Sie die Justierschraube 1 an der Teleskopstange 2, wie in Abbildung 1 zu sehen und ziehen Sie die Justierschraube handfest an.
2. Stecken Sie die Teleskopstange 2 in die runde Aussparung an der Oberseite des Bodenständers 3.
3. Befestigen Sie die Teleskopstange 2 am Bodenständer 3, indem Sie die Befestigungsschraube 4 durch den Bodenständer stecken, und handfest anziehen.

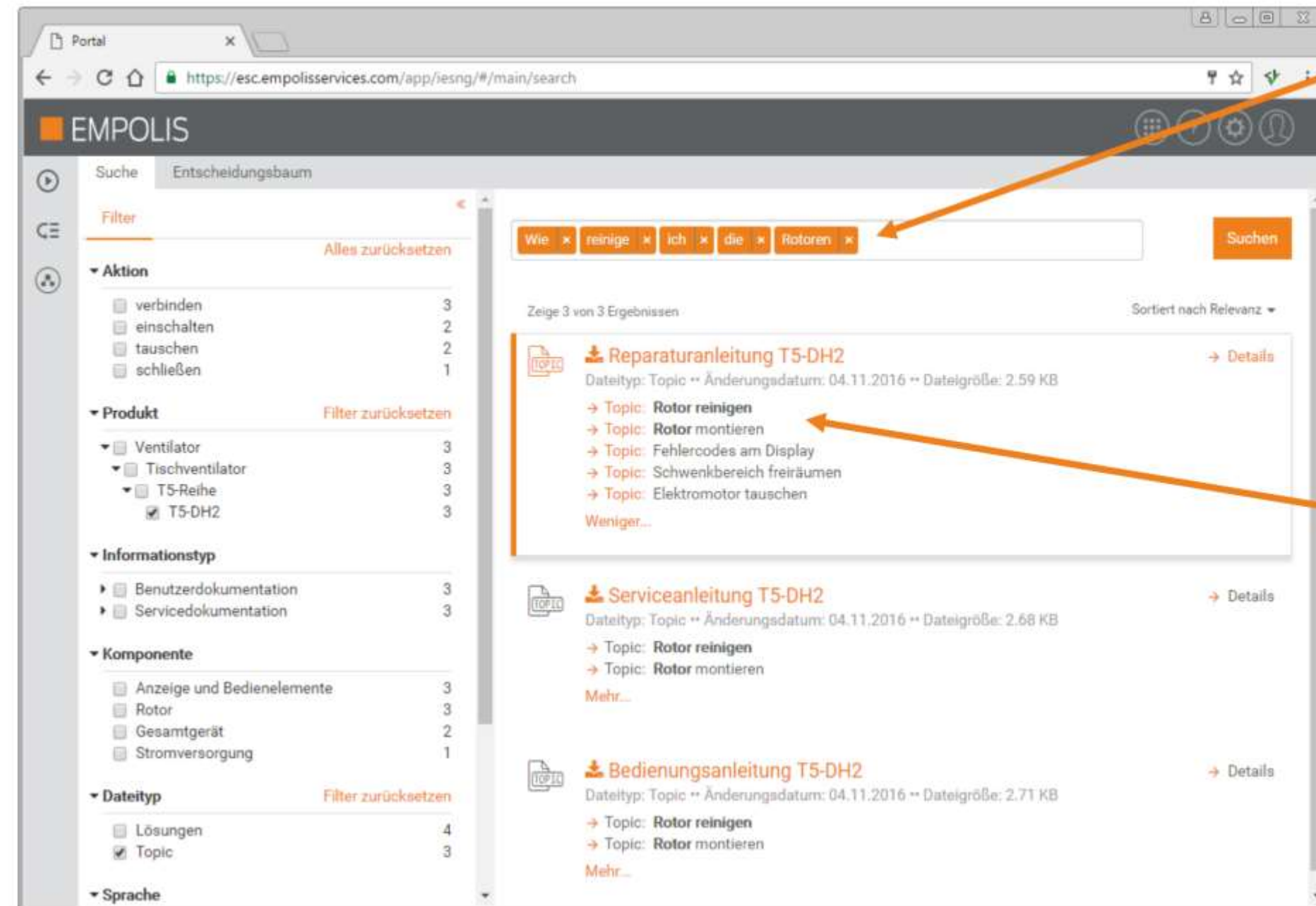
→ Die Teleskopstange ist nun am Bodenständer befestigt.

[www.pi-fan.de]

Schema  
Content Delivery  
Server

# CD Methods

## CDP and Semantic Search



Natural Language Processing (AI)

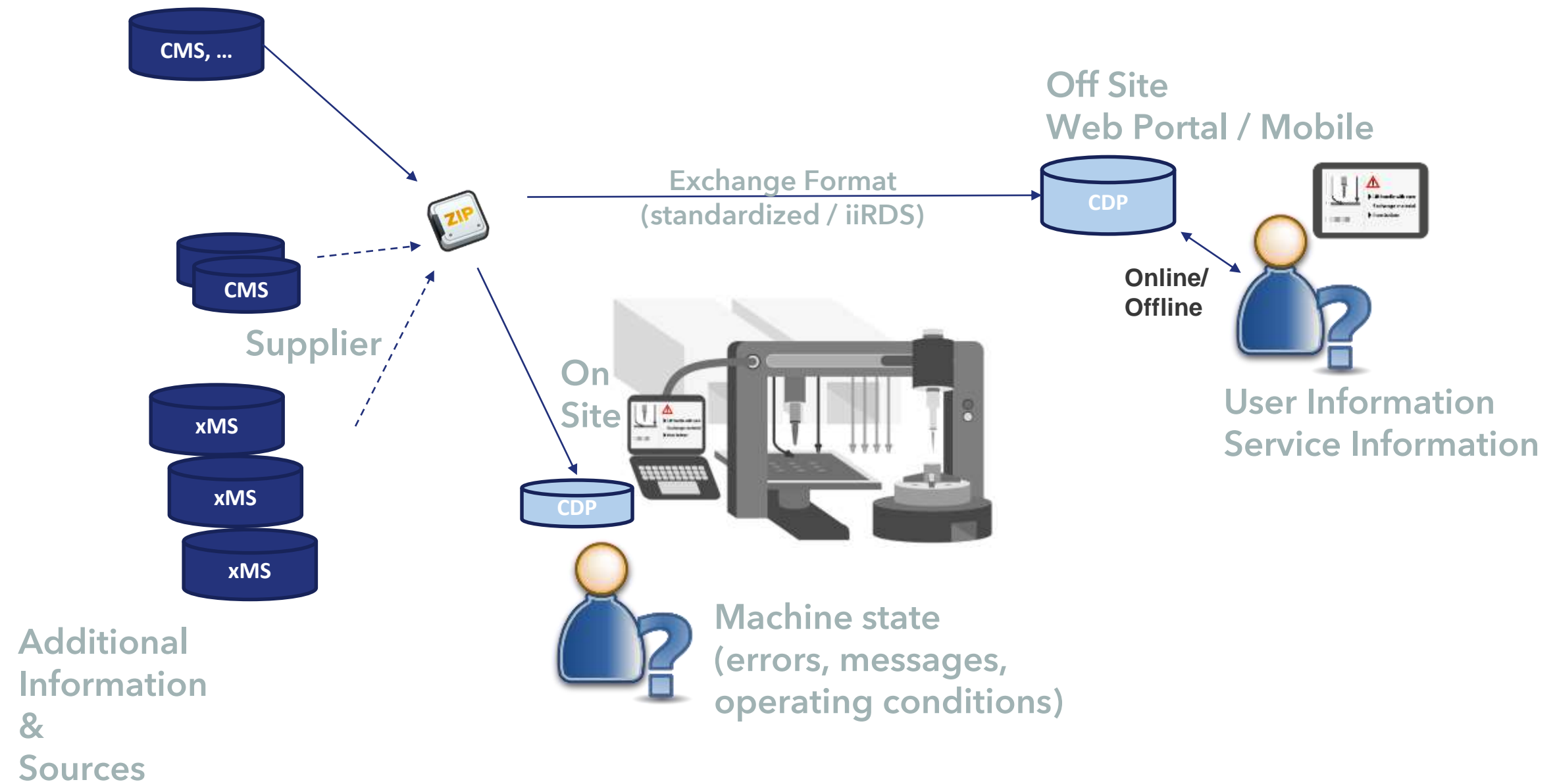
Retrieved Topics

Empolis Content Express

[www.pi-fan.de](http://www.pi-fan.de)

# CD Methods

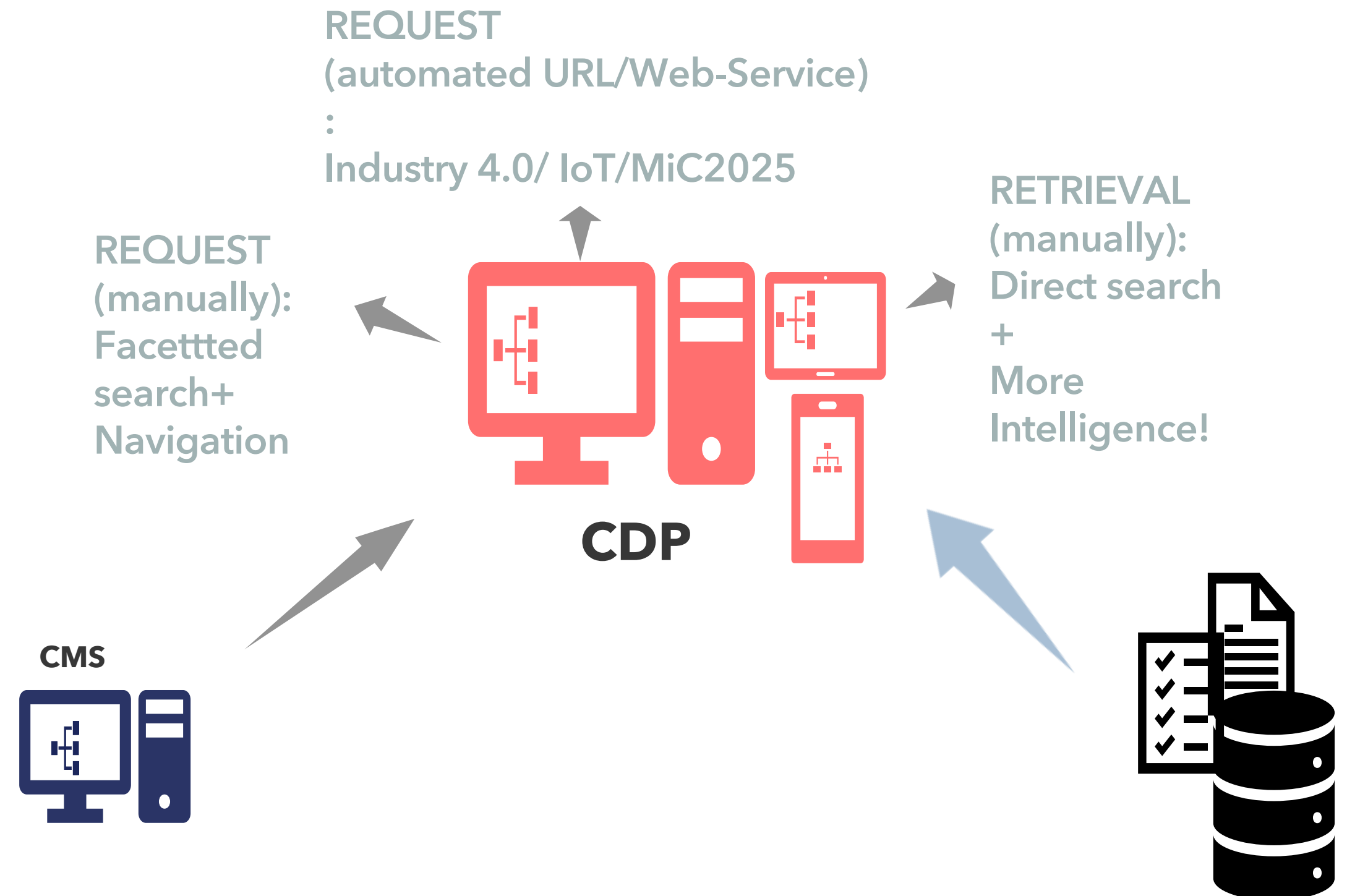
## CDP environment in industrial applications





# CD Methods

## CDP Use Cases (Sources / Access)



# Intelligence Cascade

## Typical challenges of (CMS) taxonomies

- Relations between product components;  
Dependencies of topics on combinations of components
- Multiple sources of content and metadata including correlations and dependencies
- Dependencies of additional variant properties on product components
- Multi occurrences of product components at different locations (in taxonomy)
- Dependencies of information types on other taxonomic values

# Intelligence Cascade

## Levels of Intelligent Content and Data

### **Native Intelligence**

Semantic content and semantic metadata for process automatization, e.g. PI-Classification

### **Augmented Intelligence**

Additional relations between content objects described e.g. by ontologies

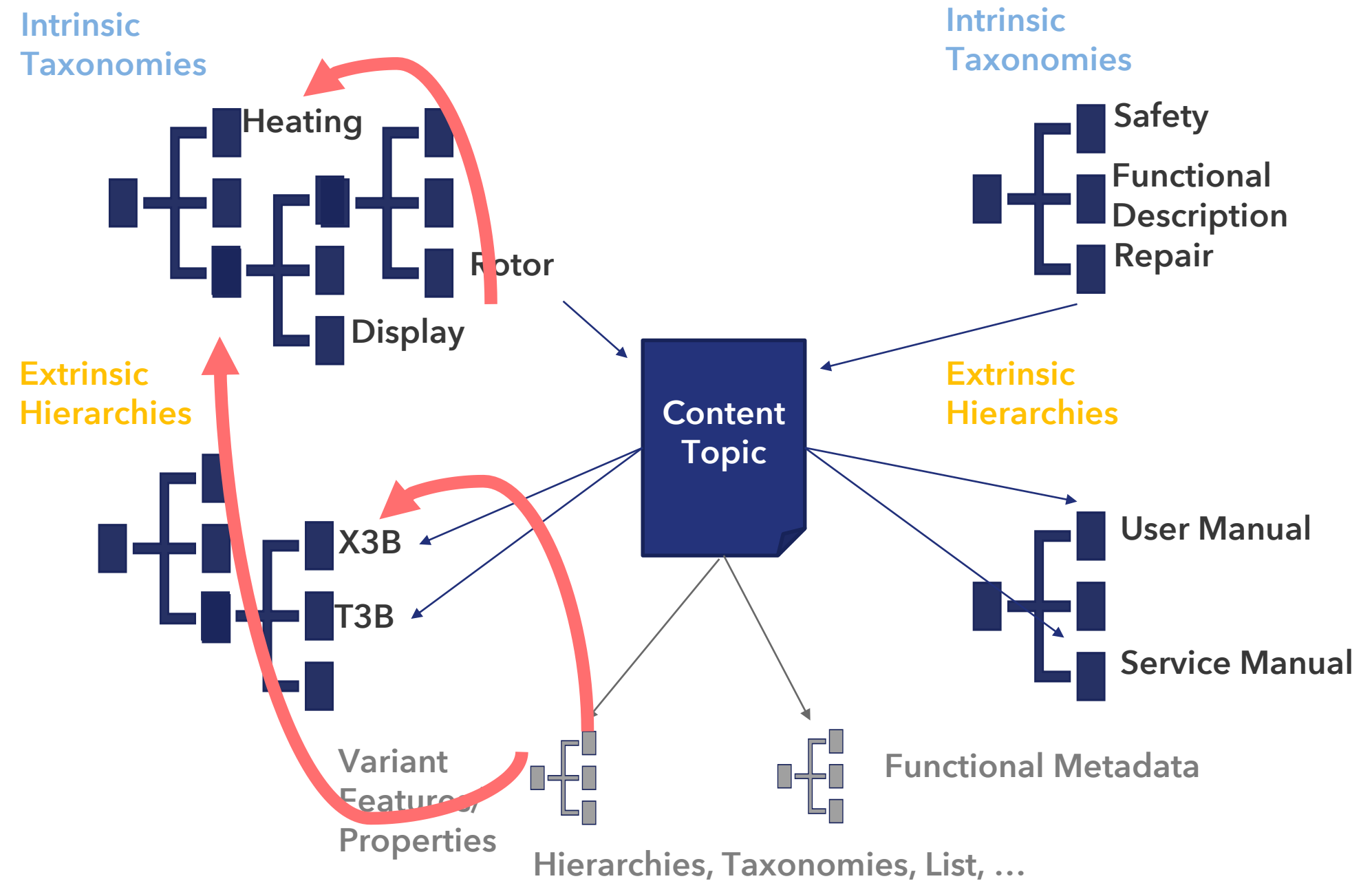
### **Artificial Intelligence**

Automated extraction of metadata and knowledge by statistical methods, ...

# Intelligence Cascade

## More Complexity (and Dimensions)

Multidimensional Information Space including relations

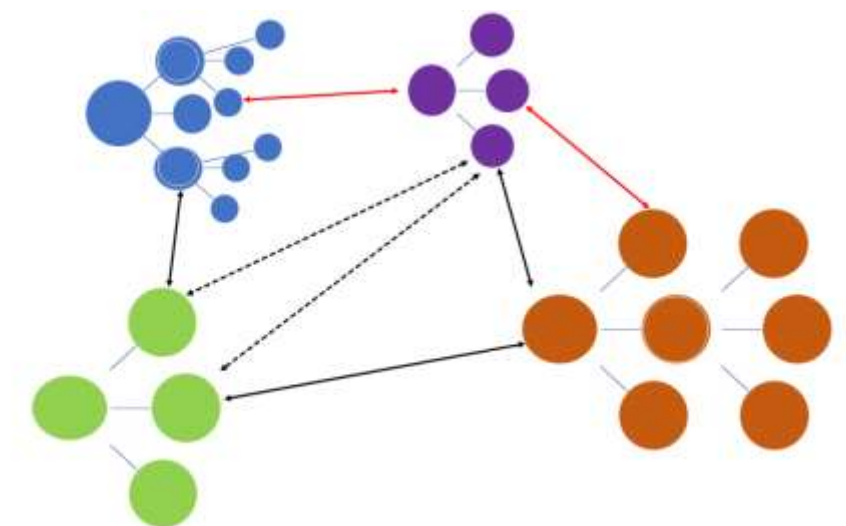


# Intelligence Cascade

## Augmented Intelligence

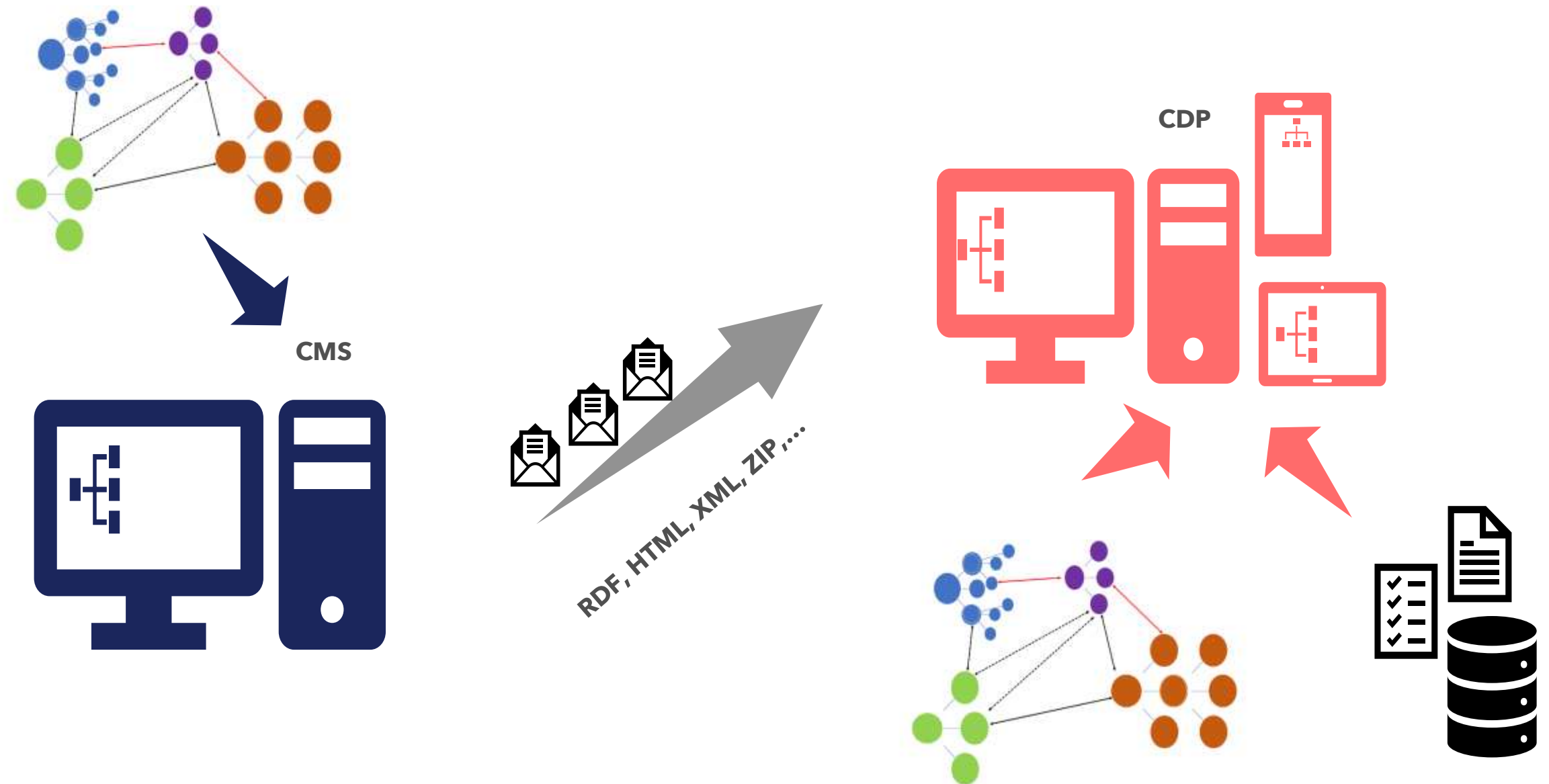
The purpose of augmented intelligence is to

- model the complexity of real world products and information
- overcome typical shortcomings of the taxonomic modelling of metadata
- Introduce model of objects, their properties and (conditional) relations between each other as semantic network → Ontologies



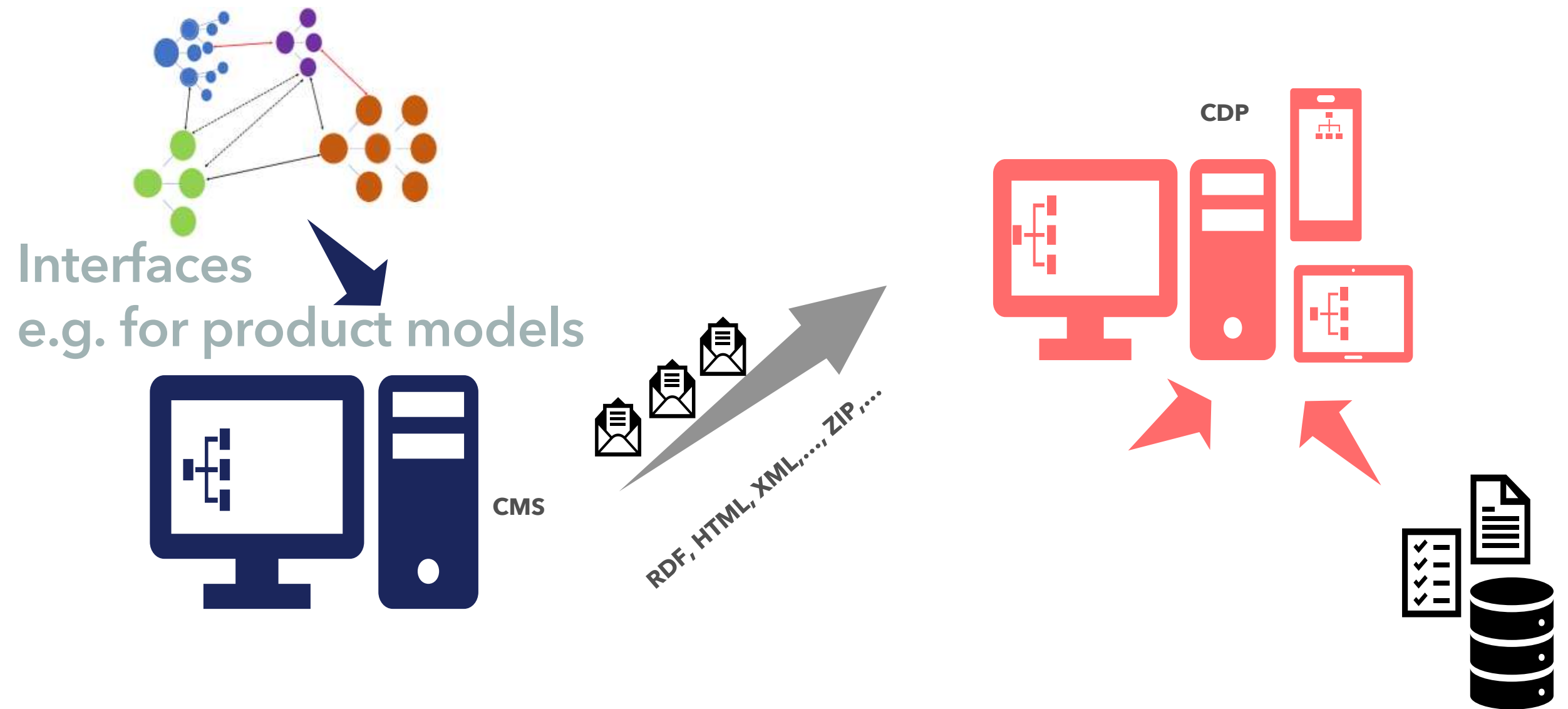
# Intelligence Cascade

## Augmenting CMS / CDP by Ontologies



# Intelligence Cascade

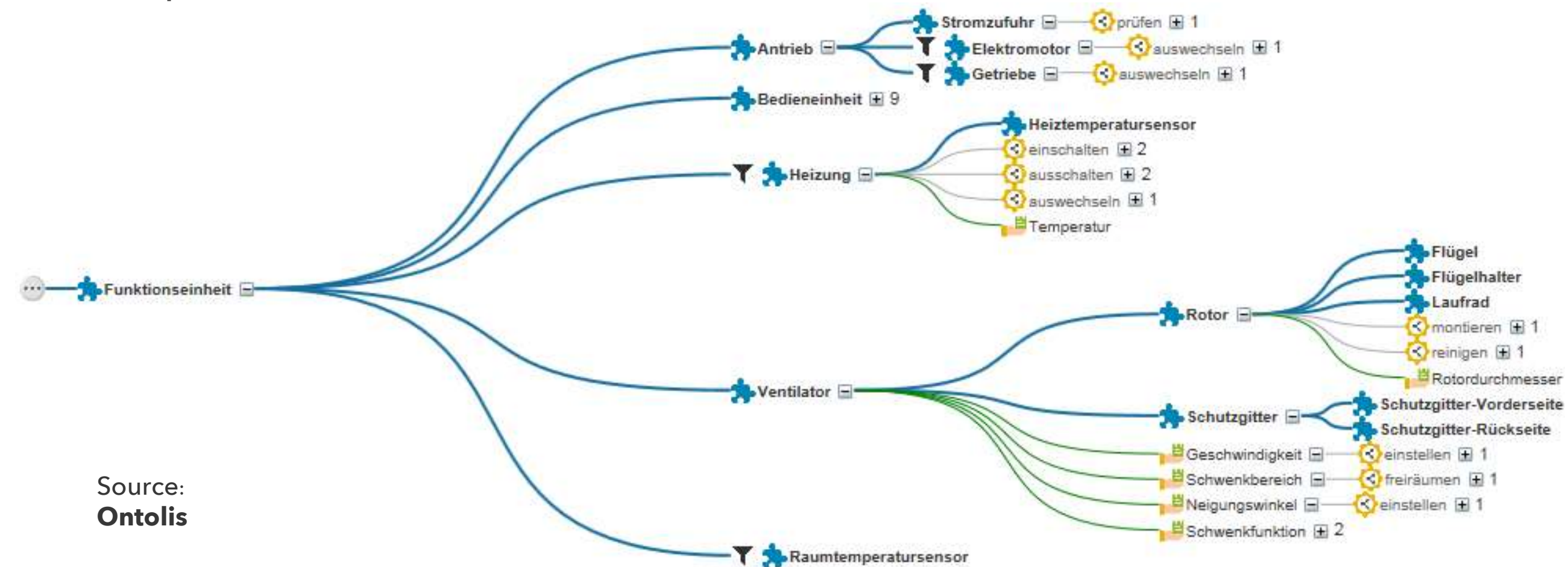
## Augmenting CMS by Ontologies



# Intelligence Cascade

## Ontology Modelling of PI-Fan

Product model (attached to engineering) as (as far as possible/needed complete) model of components, their relations, functions and properties with respect to variants

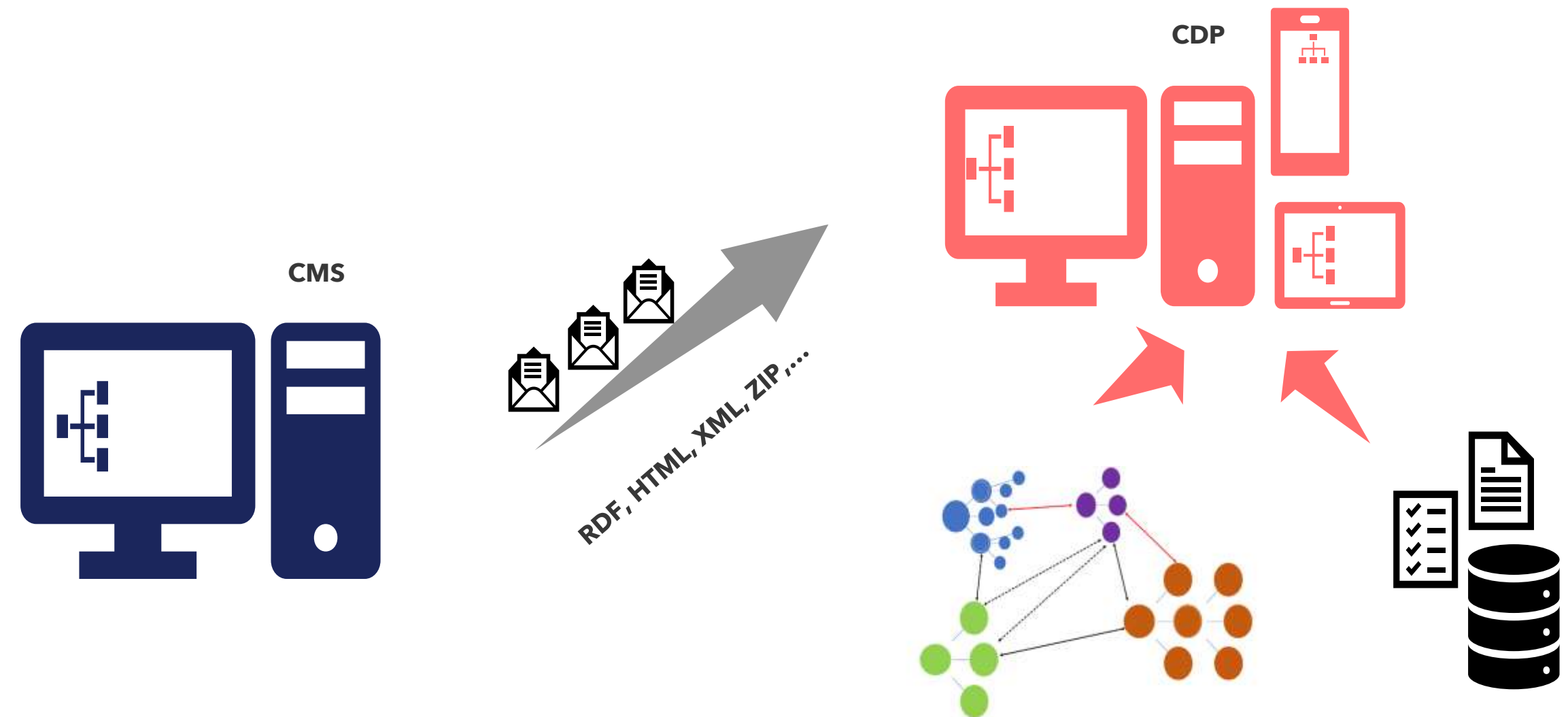


Source:  
**Ontolis**



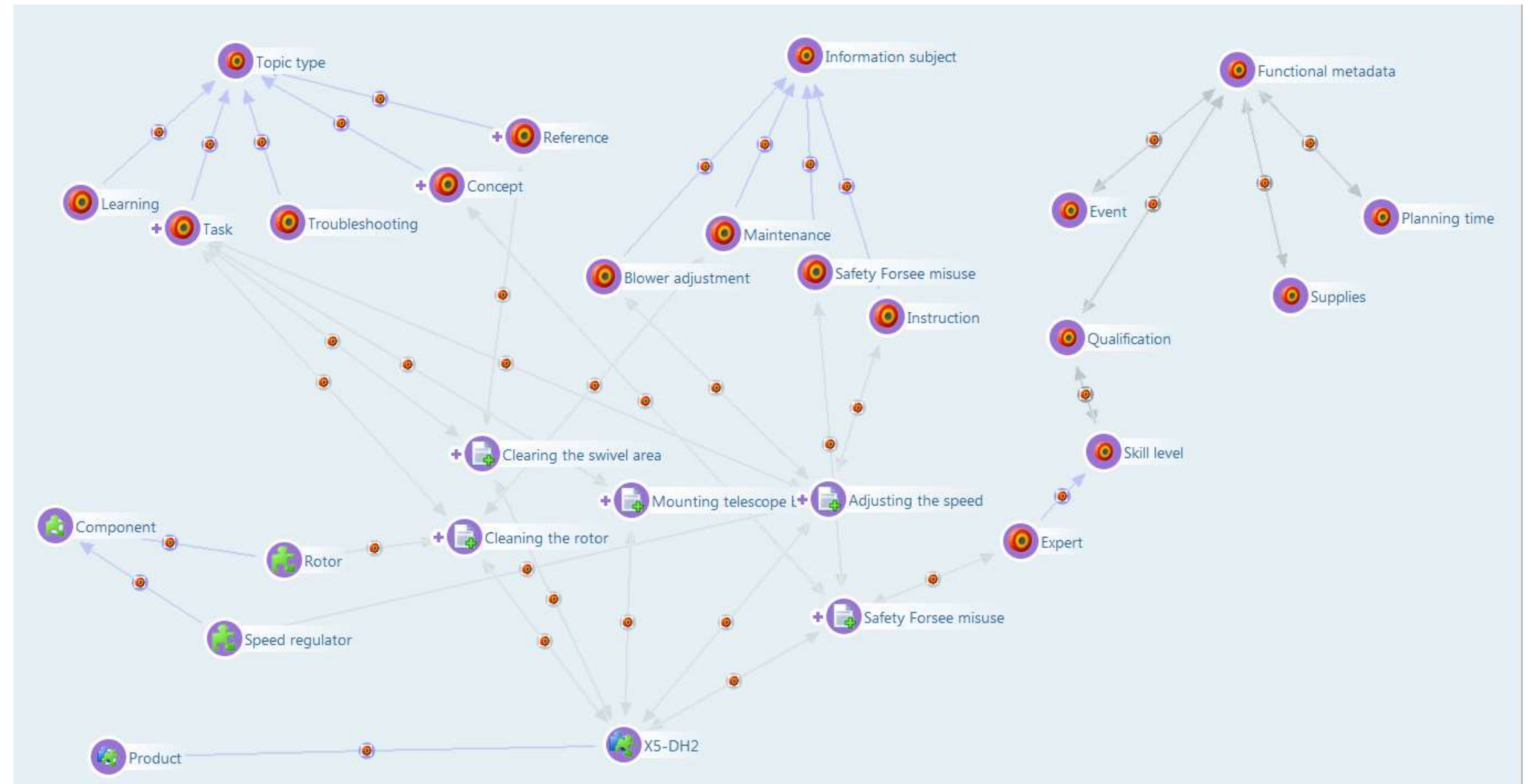
# Intelligence Cascade

## Augmenting CDP by Ontologies



# Intelligence Cascade

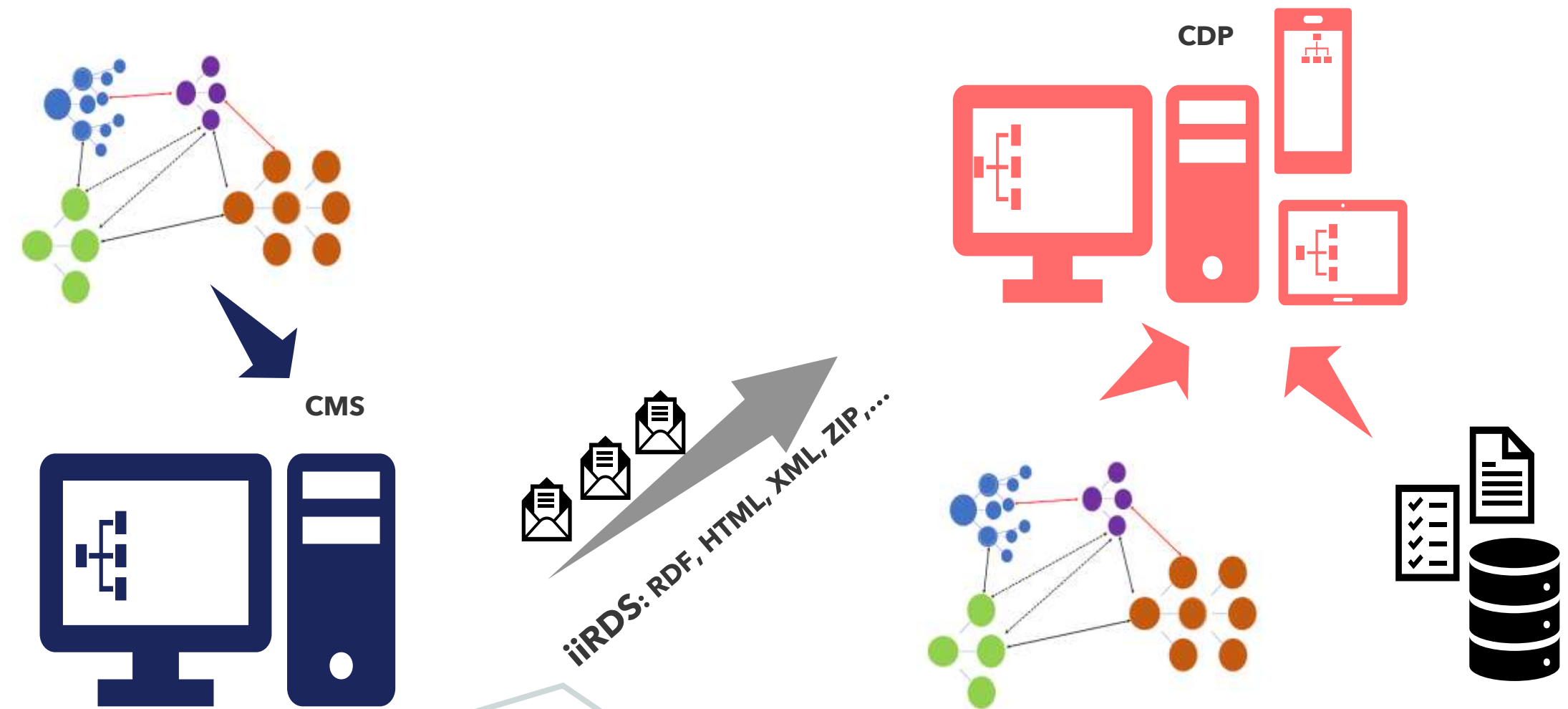
## Ontology modelling of PI-Fan



Source: I-Views

# Intelligence Cascade

## Standardizing Exchange by Ontologies



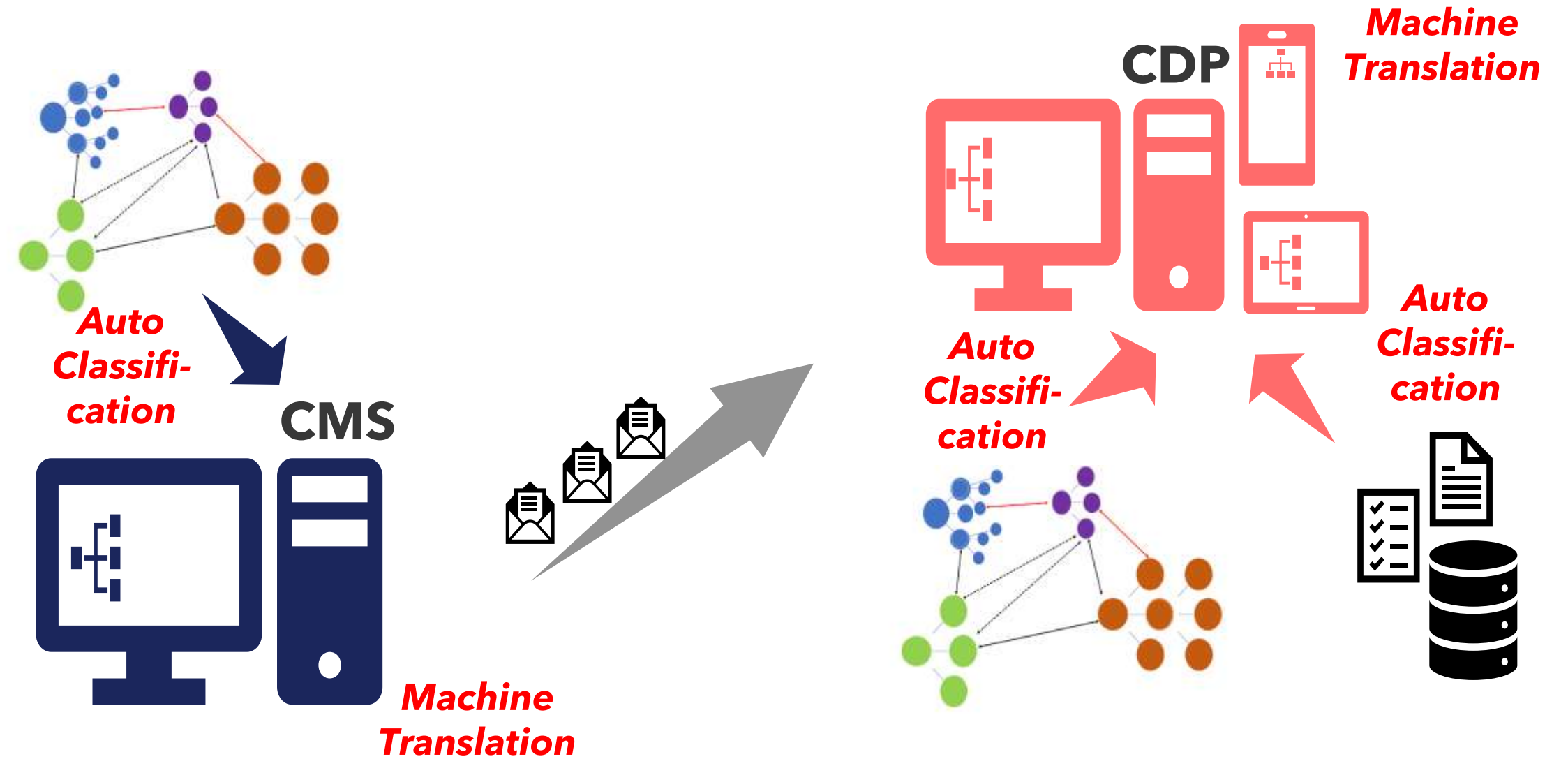
**iiRDS:** Standardized description and packaging of metadata and content. Metadata are described by using the formal ontology language RDF and the logic of extended PI-classification.

CM and Delivery

# Intelligence Cascade

Artificial Intelligence

## Where Artificial Intelligence can be used ....



Emphasis and technology use depend on market,

industry, use cases / DIS

# **Digital Information Services (DIS)**

**How to make use of intelligent content and content delivery**

**CDP Applications - Information Services**

# Delivery Applications

CDP support various  
processes within the  
product lifecycle phases

## Recent target groups & CDP applications

- Sales
- Production
- TC department (review, QA)
- Customer / End User (Handover & Use)
- Training
- Service (inhouse & external)
- Help Desk
- ...

# Ontology & Delivery Applications

## Use Case: Search and generating of sales information



# Ontology & Delivery

## Use Case:

### Search and generating of sales information

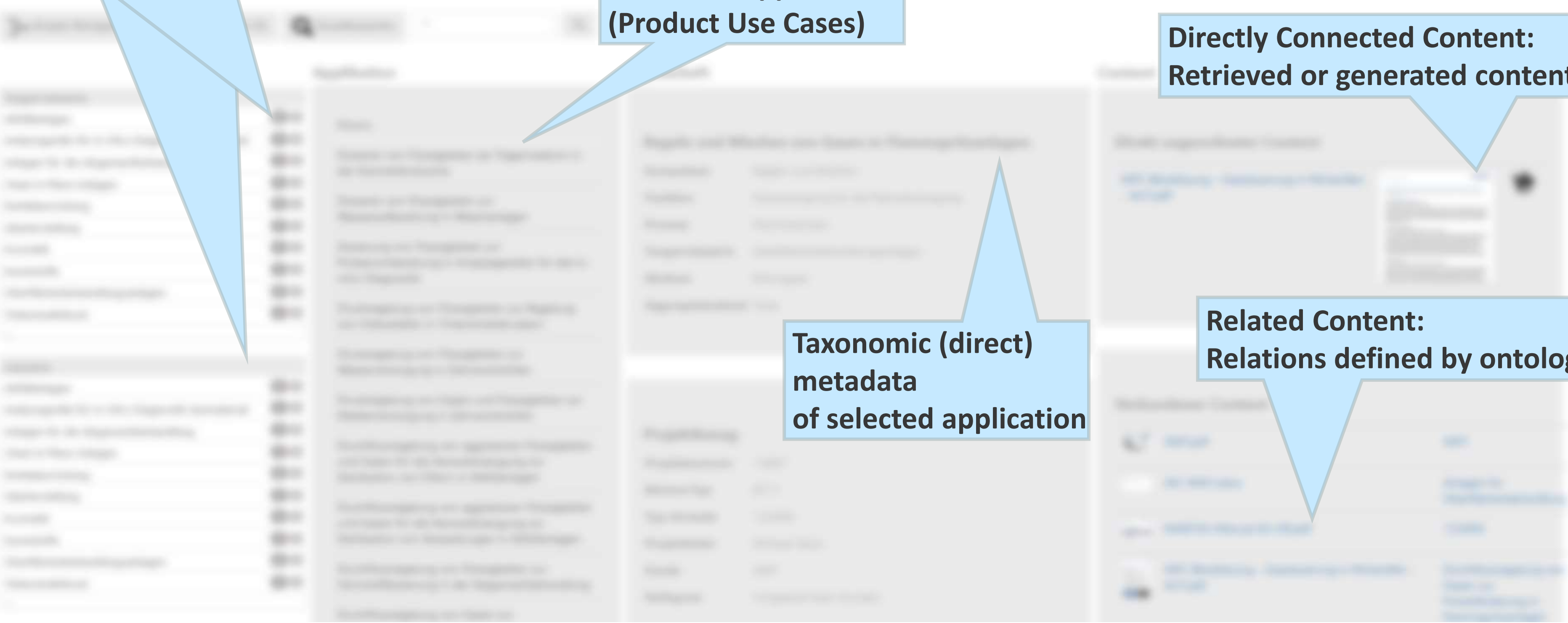
**Facetted search:**  
Classes and relations defined by ontology

**Search Result:**  
Industrial Application  
(Product Use Cases)

**Directly Connected Content:**  
Retrieved or generated content

**Taxonomic (direct) metadata**  
of selected application

**Related Content:**  
Relations defined by ontology





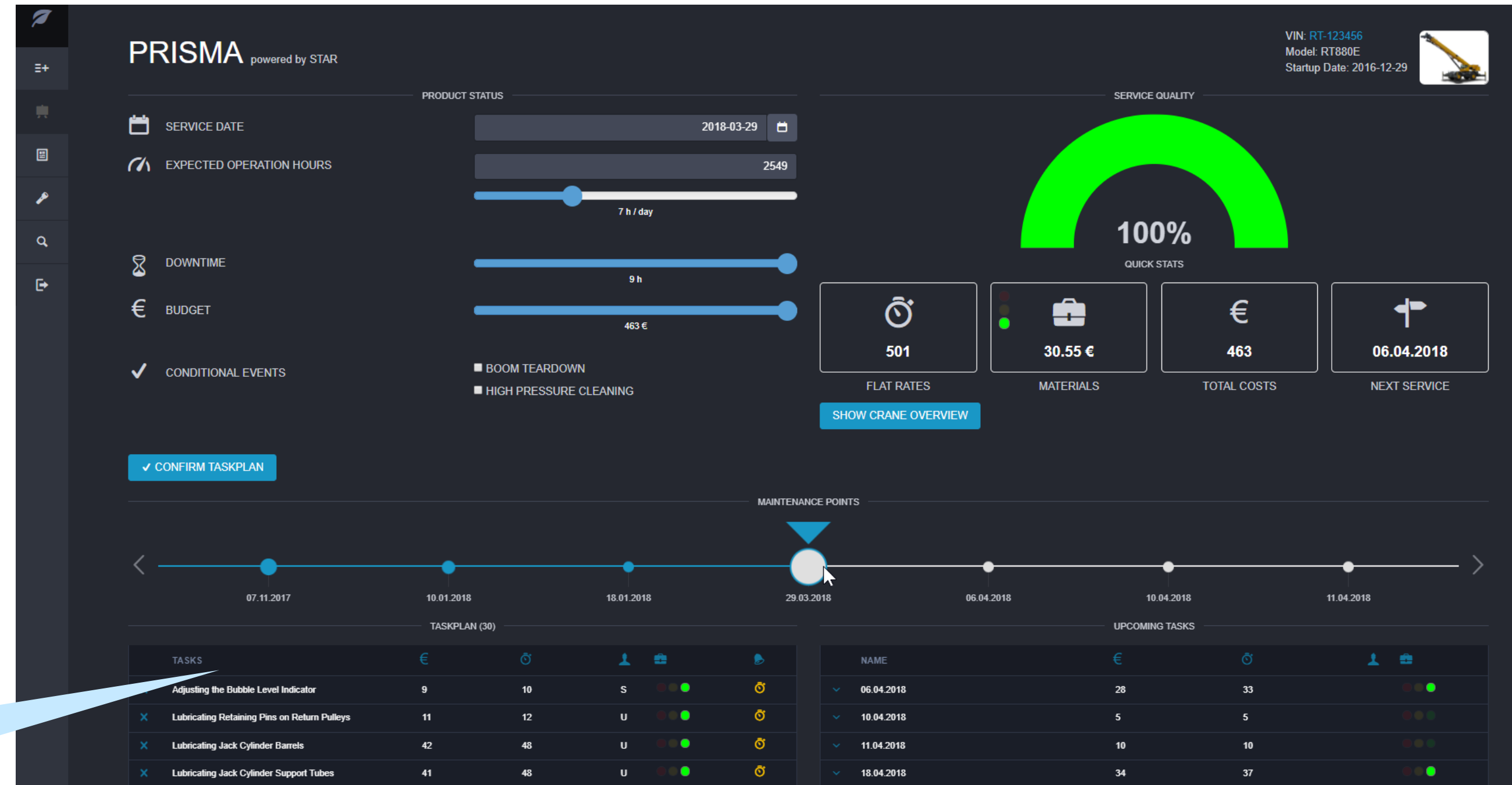
Digital Information Services

# Digital Service Information Service"

CDP and information is connected to service processes

Retrieval/request by (PI-)Classification

## Service planning and tracking



Source: STAR AG

## Digital Information Services

# Digital Service Information Service

## Access to granular service information & data

The screenshot displays the PRISMA web application interface. At the top, there is a browser window showing the URL [https://prisma-demo.star-group.net/taskplan-viewer/RT-123456\\_2017-12-08-17-08-08-6477029-01-00](https://prisma-demo.star-group.net/taskplan-viewer/RT-123456_2017-12-08-17-08-08-6477029-01-00). The main interface features a sidebar on the left with navigation icons. The central area is titled "PRISMA" and contains a task list with three items:

- Materials: ( 1 )
- Objects: ( 3 )
- Control block for Z-Kinematics: Check and adjust the secondary pressu...
- Checking Air Cleaner Filter
- Checking Oil Level in Turntable Gear Box

On the right side, there is a small image of a crane and technical data:

- VIN: RT-123456
- Model: RT880E
- Startup Date: 2016-12-29

The main content area shows a detailed technical drawing of a hydraulic control block with numbered callouts (1-5). Below the drawing, there is a task description: "6. Measure high pressure (PA) for function lifting the boom (1)". A pressure measurement dialog is open, showing a value of 300 bar and a warning: "The measured value is out of tolerance." The dialog also includes an "OK" button and a "bar" unit indicator.

Interactive Data from CMS & Engineering: Sensing & archiving of data setting

(PA) Measured pressure:  OK bar

The measured value is out of tolerance.

Source: STAR AG

Digital Information Services

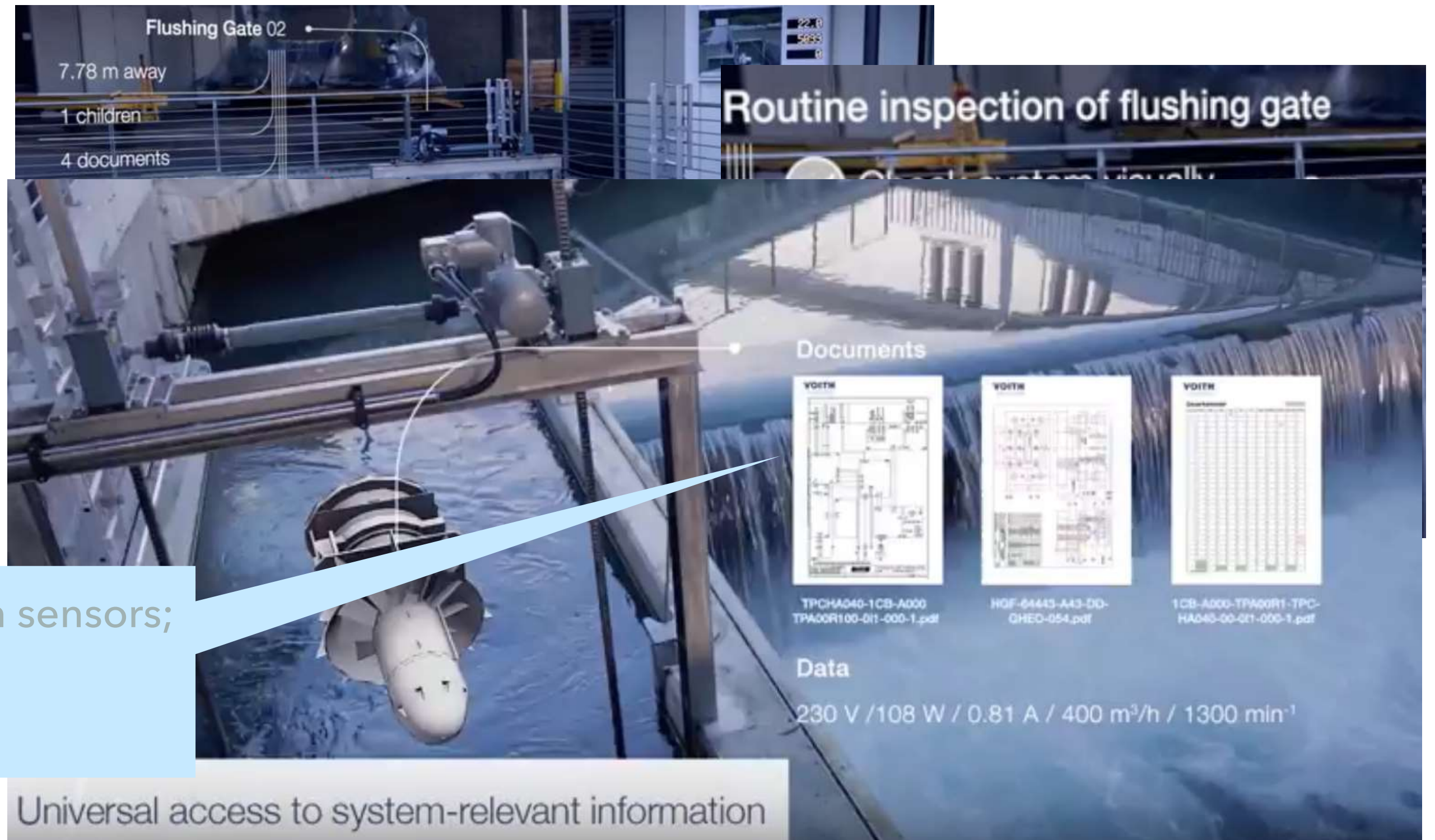
# Digital services as extended product portfolio

Source: Voith Hydro

<https://www.youtube.com/watch?v=nyDZ7Q4AFu8>

Interactive Data from system sensors;  
Content integration from various sources;

## Service Information and AR (Hololens)



DIS

## Digital services as extended product portfolio

Source: Voith Hydro

### Service Information and AR (Hololens)



<https://www.youtube.com/watch?v=nyDZ7Q4AFu8>

## Digital Information Services

# Service Information Delivery

The delivery of service information can be coupled to machine states.

This concept can be aligned with the digital twin from IoT and I4.0.

Scheduled/preventive maintenance and moreover predictive maintenance will be supported by system/product analytics.

## Digital twin and analytics

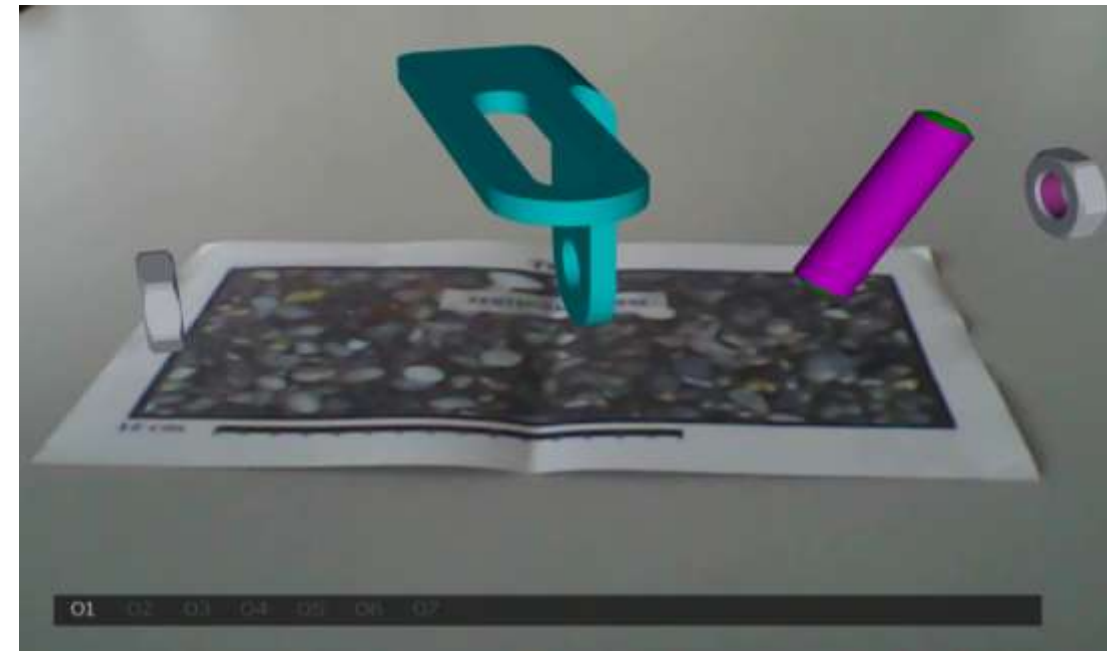


Source: GE  
<https://www.youtube.com/watch?v=DjK3-A5RgW8>

DIS

## Technologies supporting CDP

### Extended interfaces and navigation/requests



[www.heidelberg.com](http://www.heidelberg.com)

- Augmented and virtual reality applications permit to select visually components (p-classes) and to request corresponding topics

- Natural language processing and AI technologies permit to address topics: Speech recognition determines (PI-)classification and additional parameters for requests
- Chatbots using predefine „topics“ or in future generated content

# Use Cases and Industrial Applications for IoT and Service Applications

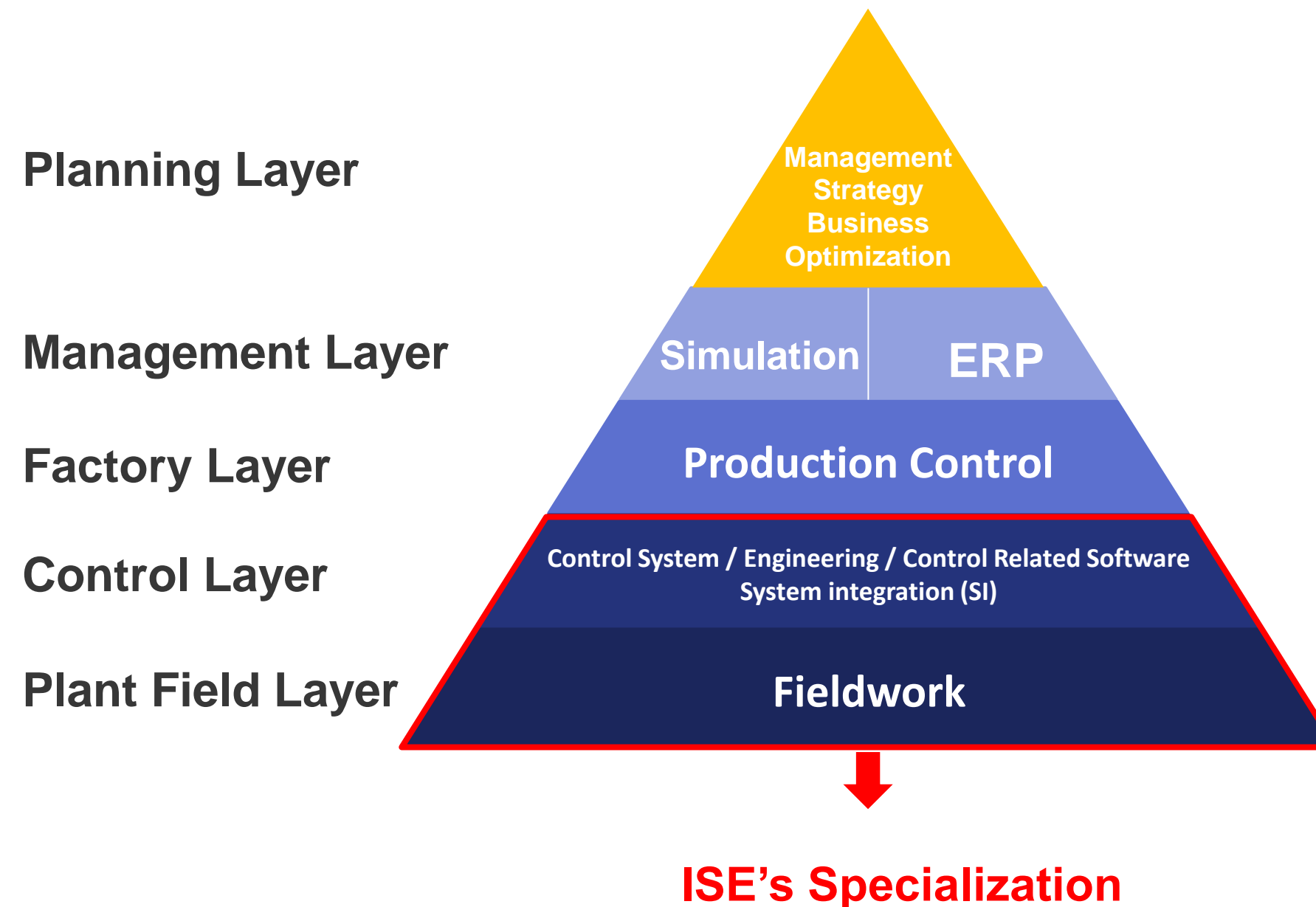
## Research Cooperation and Field Study

Fieldwork

# Fieldwork area



## Business Layers





# Examples



## Examples for Fieldwork

Fieldwork areas:

- Cure & Care
- Sales
- Logistics
- Servicing and Maintenance

Challenge:

- Both digital and physical documents have to be carried

Ideal:

- Having both hands free and an ideal device to show information

Device

## Ideal Device

# Microsoft HoloLens



# Concept



## ISE's planned Interface Platform

### **Human Interface Platform**

- Service Engineers with Microsoft's HoloLens

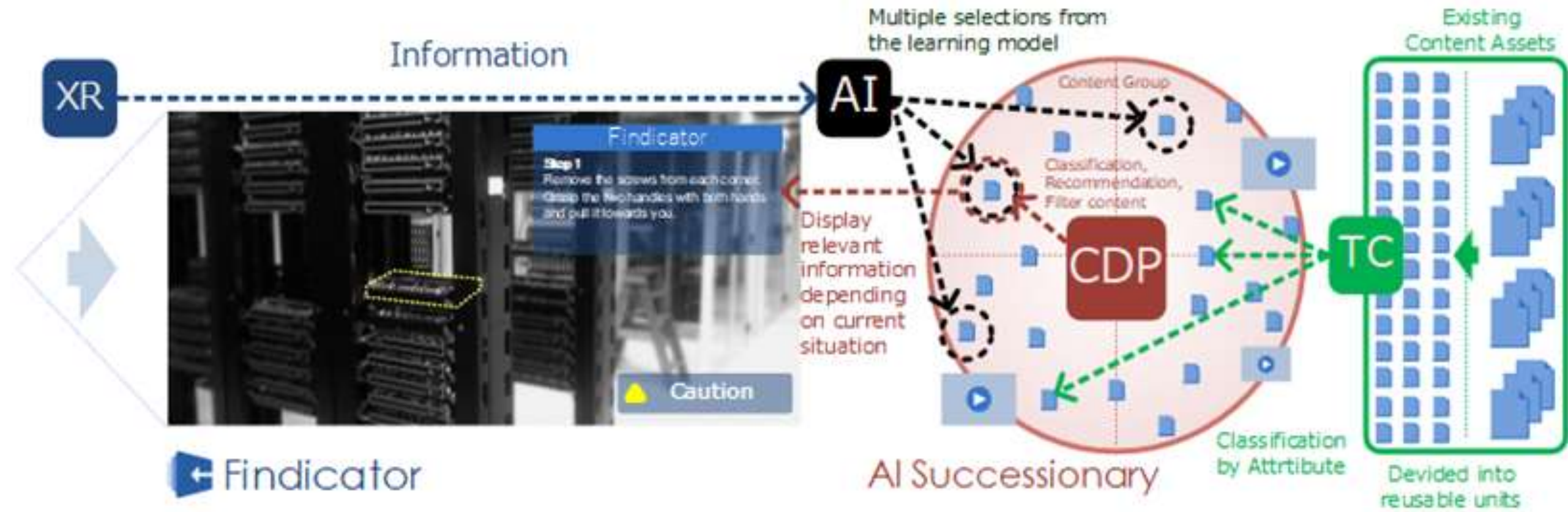
### **Human Interface Platform with Robotics**

- Operating Robotics in addition to Microsoft's HoloLens

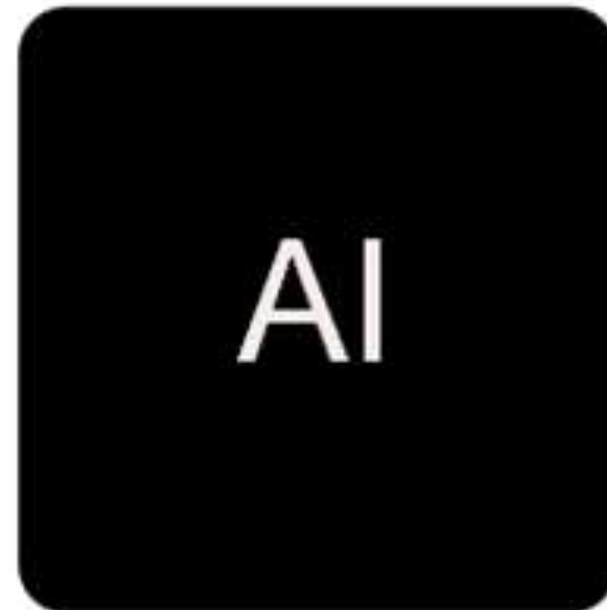
# Human Interface Platform

## Fieldwork solution

Microsoft HoloLens



Extended Reality, displays necessary information as holograms using the Microsoft HoloLens



Narrows down the relevant information without manual operation, acquired by AI Technology



Information Transmission Technology independent of specific CMS

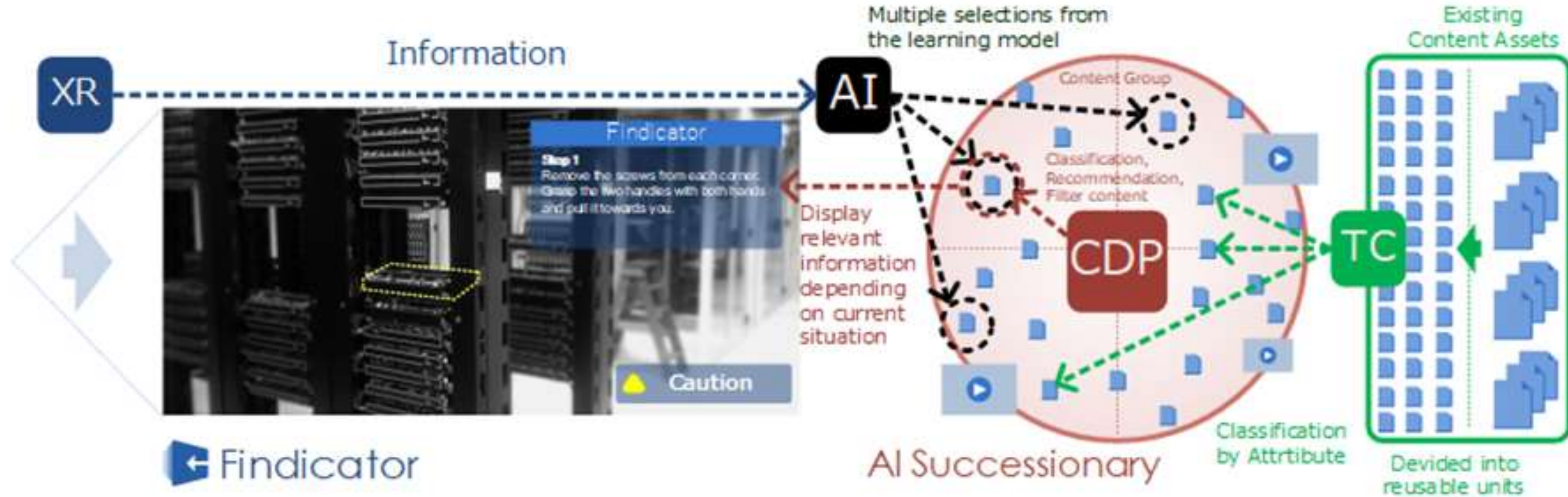


Classification Technology for making effective use of massive existing information assets owned by customers

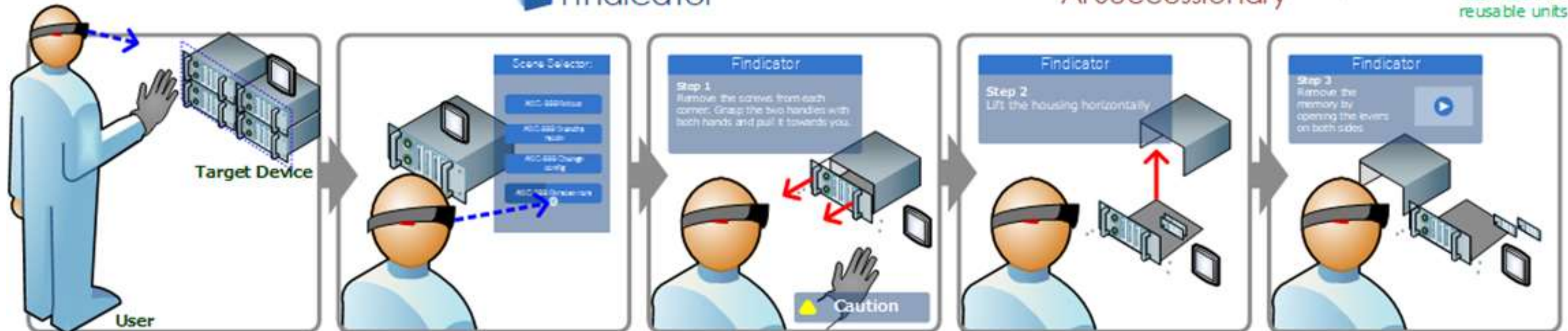
# Use Case: Device Maintenance

## Fieldwork solution

Microsoft HoloLens



Findicator



# Guidance



## Guidance for the Fieldwork

- Display information on the Microsoft HoloLens
- HTML-based
  - Text
  - Images
  - Videos
- Based on the Context of Use, further Information for can be displayed at the same time on the Microsoft HoloLens

# Feasibility Experiment



## Feasibility Experiments at the TC Symposium 2018 in Tokyo and Kyoto

To prove the Fieldwork Solution:

### Solving Puzzle Demonstration

While wearing the Microsoft HoloLens, the user had to solve a puzzle by referring to the displayed information on the device



# Example

## Feasibility Demonstration



3種類のIDカードの中からプレイしたいアイコンを  
選び、目の前にかざしてください。  
初級: チーズ  
中級: フライドポテト  
上級: ハンバーガー



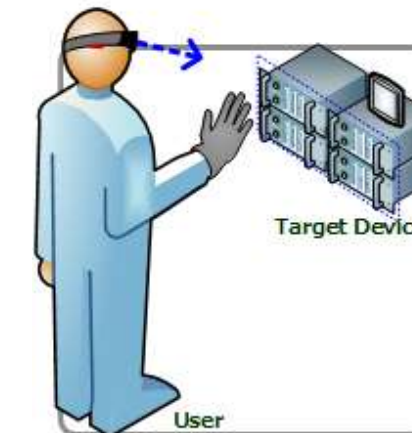
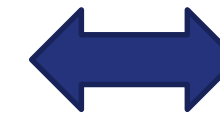
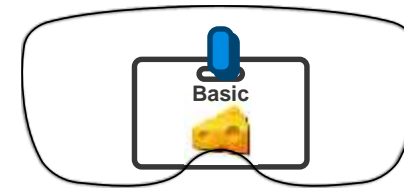
Feasibility Experiment

# Analogy



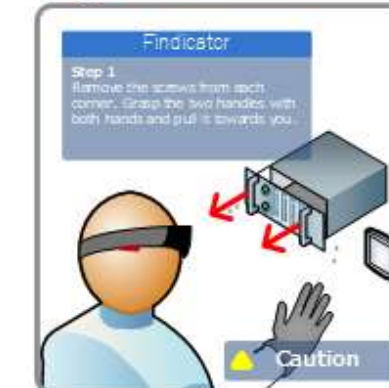
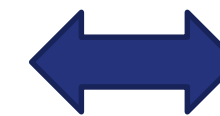
## Analogy

Step 1



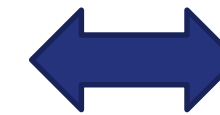
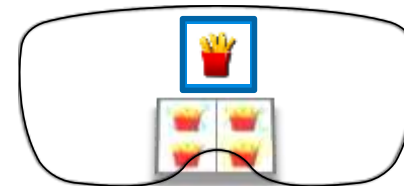
**Microsoft HoloLens recognizes the Target Device**

Step 2



**Relevant information is displayed on the Microsoft HoloLens**

Step 3



**Next information / instructions are displayed on the Microsoft HoloLens**

## Results



### Results of the Feasibility Experiments

- Related information is always in the field of view
- Hands-free
  - User is able to work with both hands while having documents or instructions always in sight
- Users with different skill levels can operate
- Positive feedback and results from collaborators

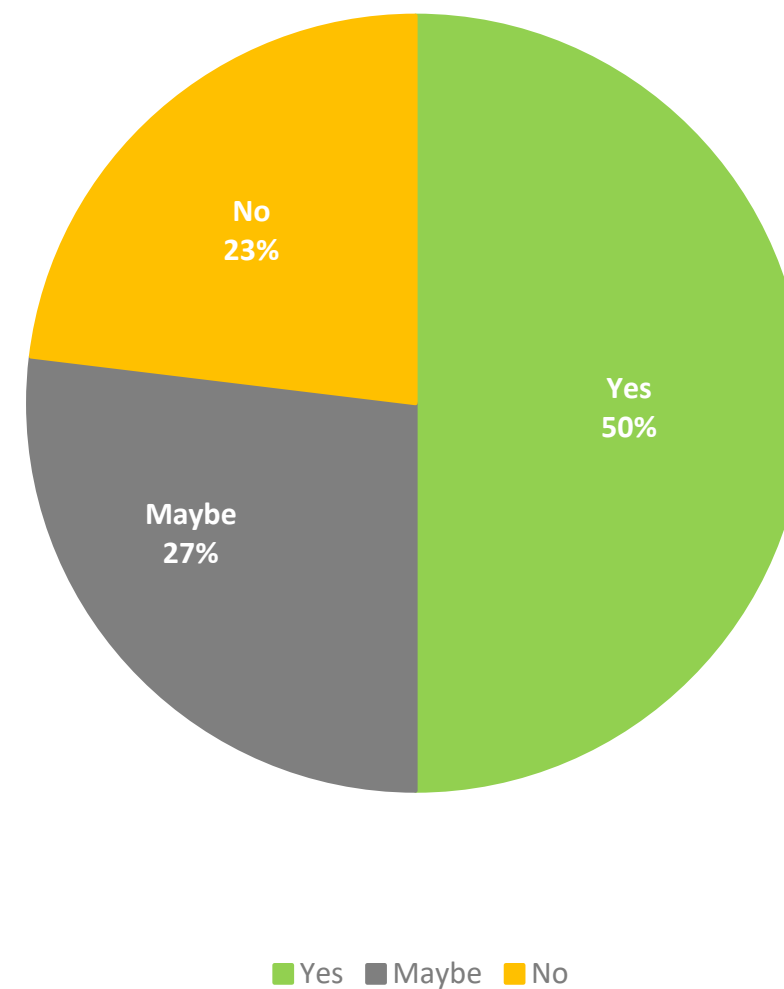
## Feasibility Experiment

## Results



## Questionnaire

Possibility of Recommending the  
Technology to Superiors or Customers



26 out of 40 testers participated

Yes: "...highly interested"

Maybe: "...unimaginable"

No: "...the device didn't fit"

- **Demand and Interest exists in the Japanese Market**
- **Microsoft's HoloLens can be well applied for the Fieldwork Solutions**

# Background



## Human Interface Platform with Robotics

Change of the social structure in Asia

- Japan has a rapid changing social structure
  - Aging Society
  - Recently, more Asian countries tend to have the same changes
- More elderly than young
  - Not enough people to take care of the elderly

**Solution: Robotics**

# Real Haptics



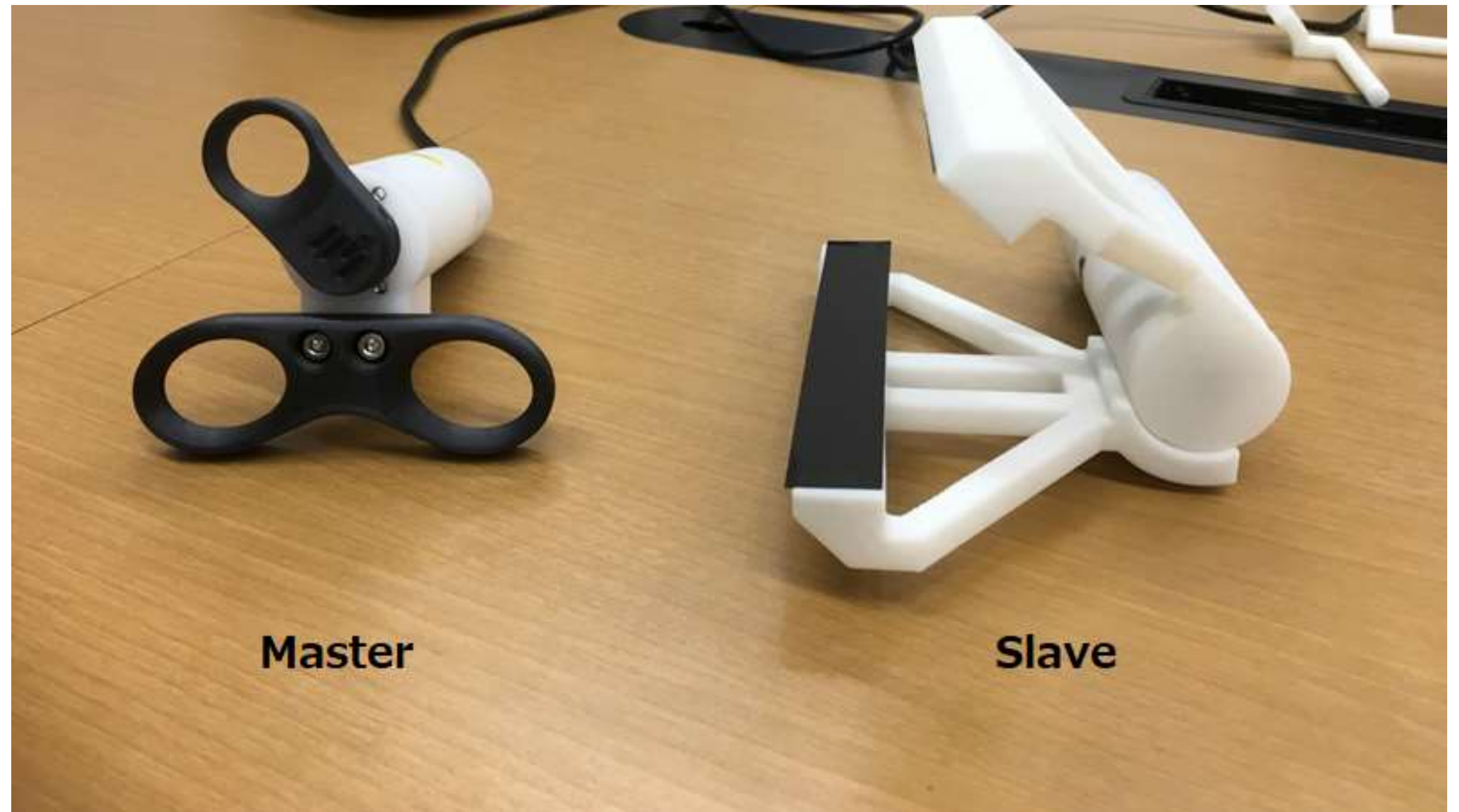
## Keio University's Real Haptics Technology

- Keio University is pioneering Real Haptics Technology
- Real Haptics
  - Robotics
  - Transmission between "Master" and "Slave"
  - Transmit tactile and force sensation
    - Even the sensation of the surface of the material can be transmitted

# Prototype



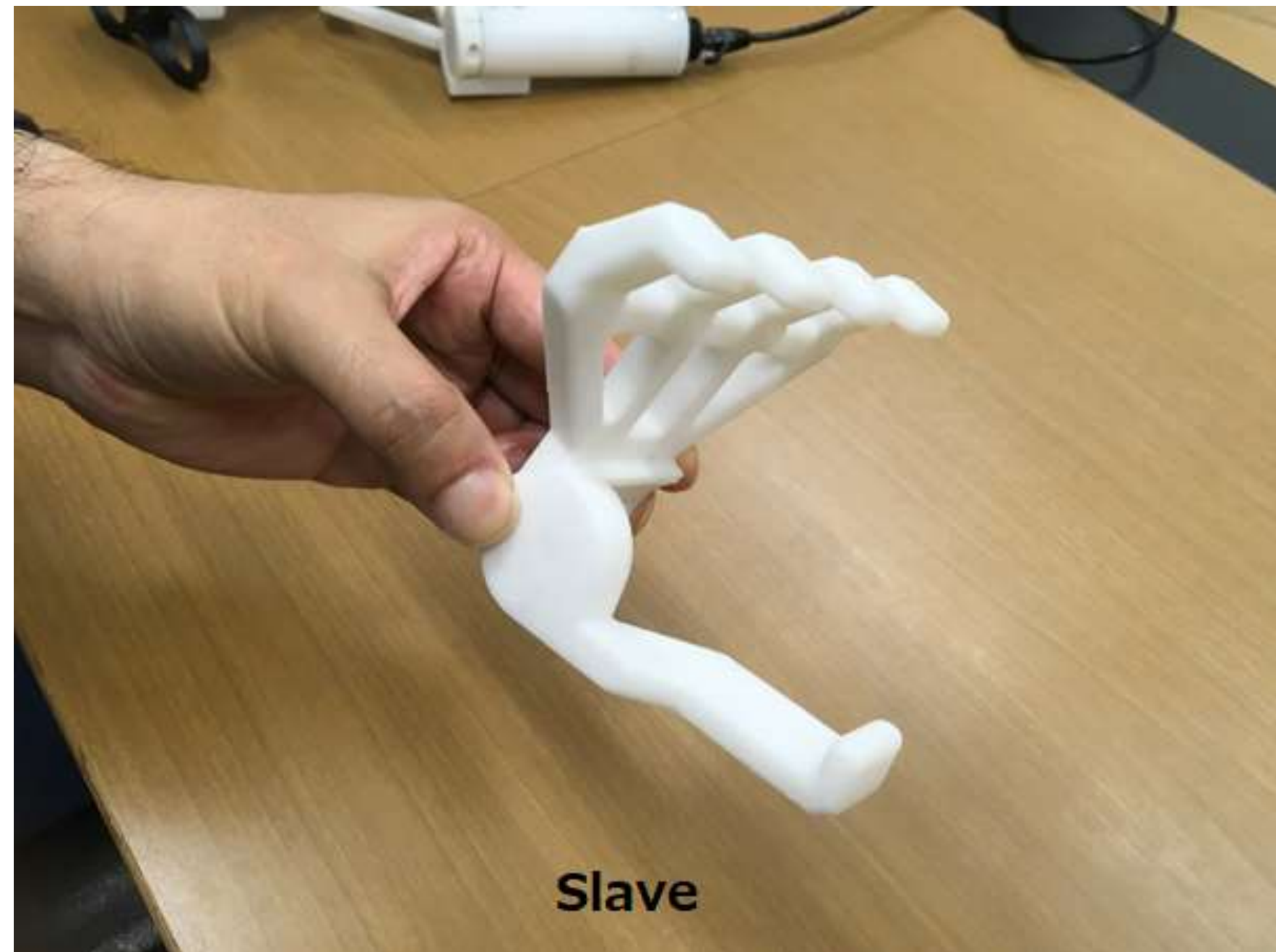
## Real Haptics Prototype (1/2)



# Prototype



## Real Haptics Prototype (2/2)



## Use Cases

### Real Haptics planned Use Cases



- Nursing
- Medical Care
- **Industry**, Assembly and Production
- Cases that require Human Engagement and sensitive haptics can be executed remotely with Robots



# Cooperation



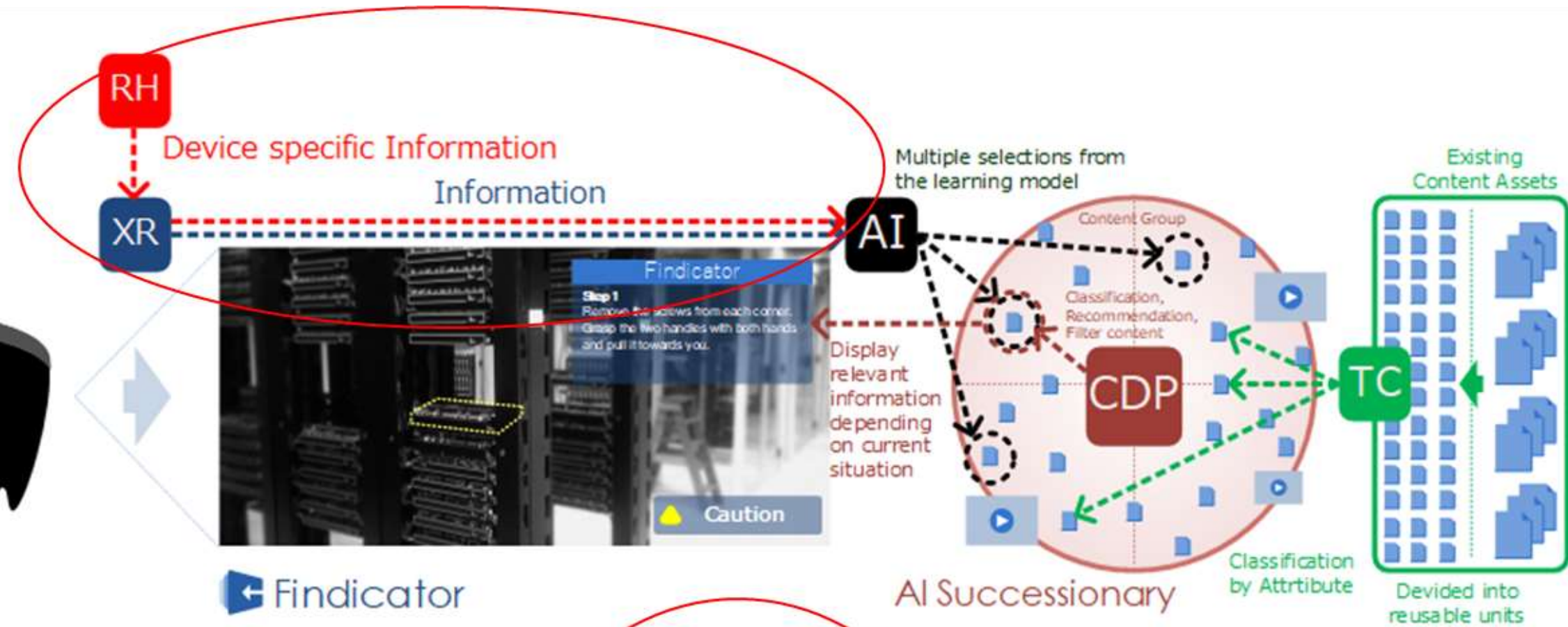
## ISE's Cooperation with Keio University

- Extended Use Case: Fieldwork
- ISE develops Information System for the Robotics, based on Real Haptics
  - "Robot Glove" Solution
- Tasks that require Human Engagement and sensitive haptics can be enhanced for the Fieldwork Solution

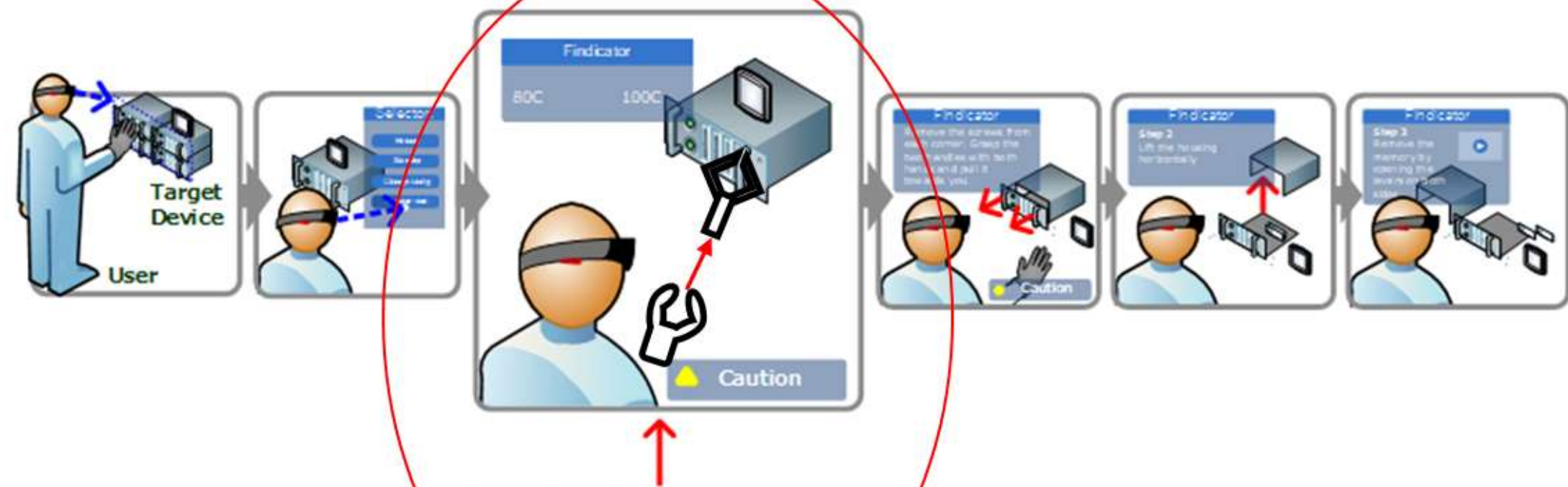
# Enhancement with Robotics

## Fieldwork solution

Microsoft HoloLens



Real Haptics, force and haptic information interface between human and robot (Robot Hand)



Additional Information can be acquired with the "Robot Glove" Solution

## Enhancement



### Additional Value with Robotics

- Additional Data can be acquired when operating a Robot, such as
  - **Weight** of the target object
  - **Pressure** on the target object
  - **Temperature** of the target object
- Compares actual Data with Master Data
- Based on the comparison, optimal Information for Use can be displayed on the Microsoft HoloLens

# **Content & Data Analytics**

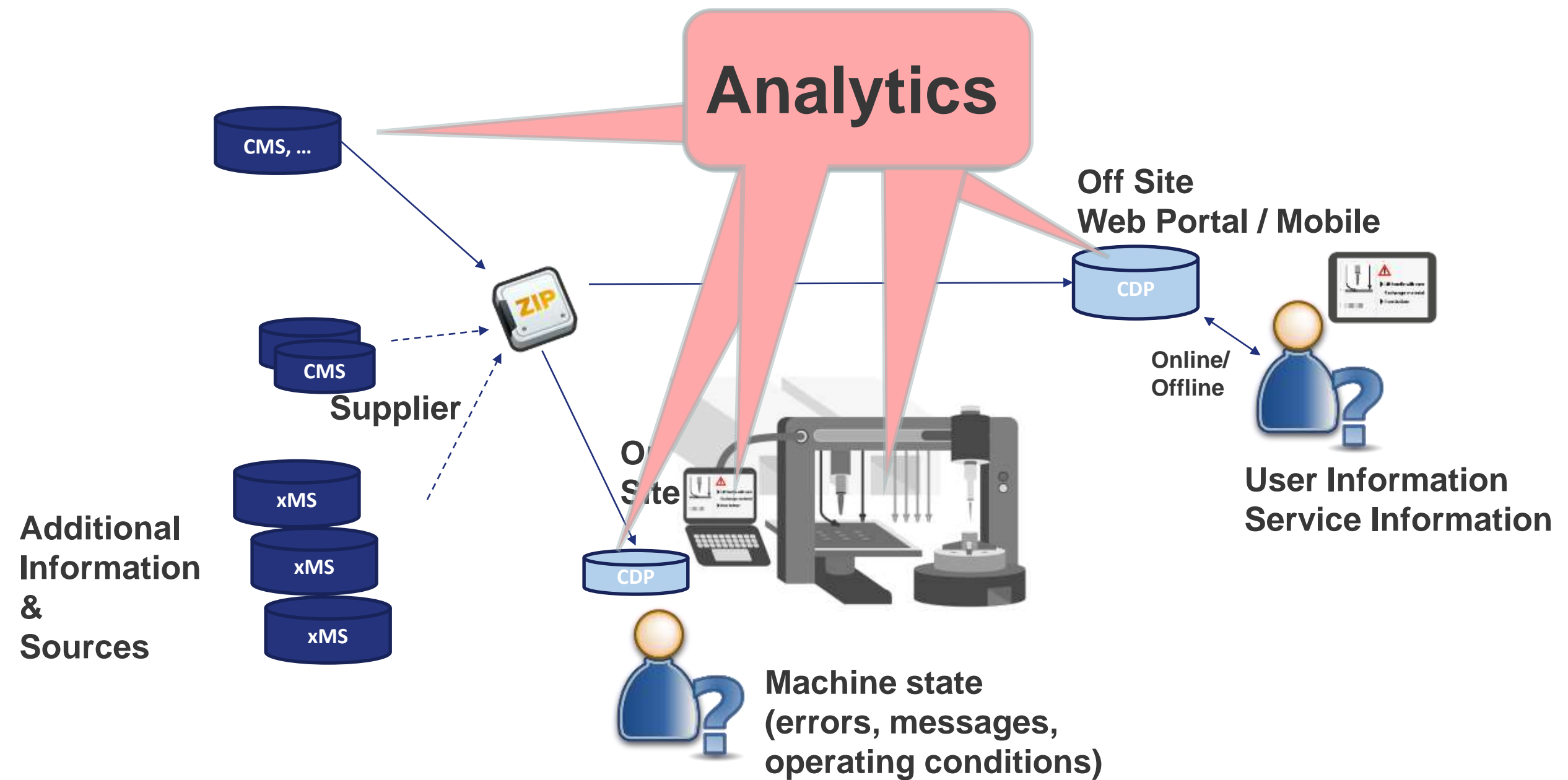
**How to measure intelligent content**

**CMS Analytics - CDP Analytics - Product Analytics**

Analytics

# CD Environment

## CDP and analytics in industrial applications

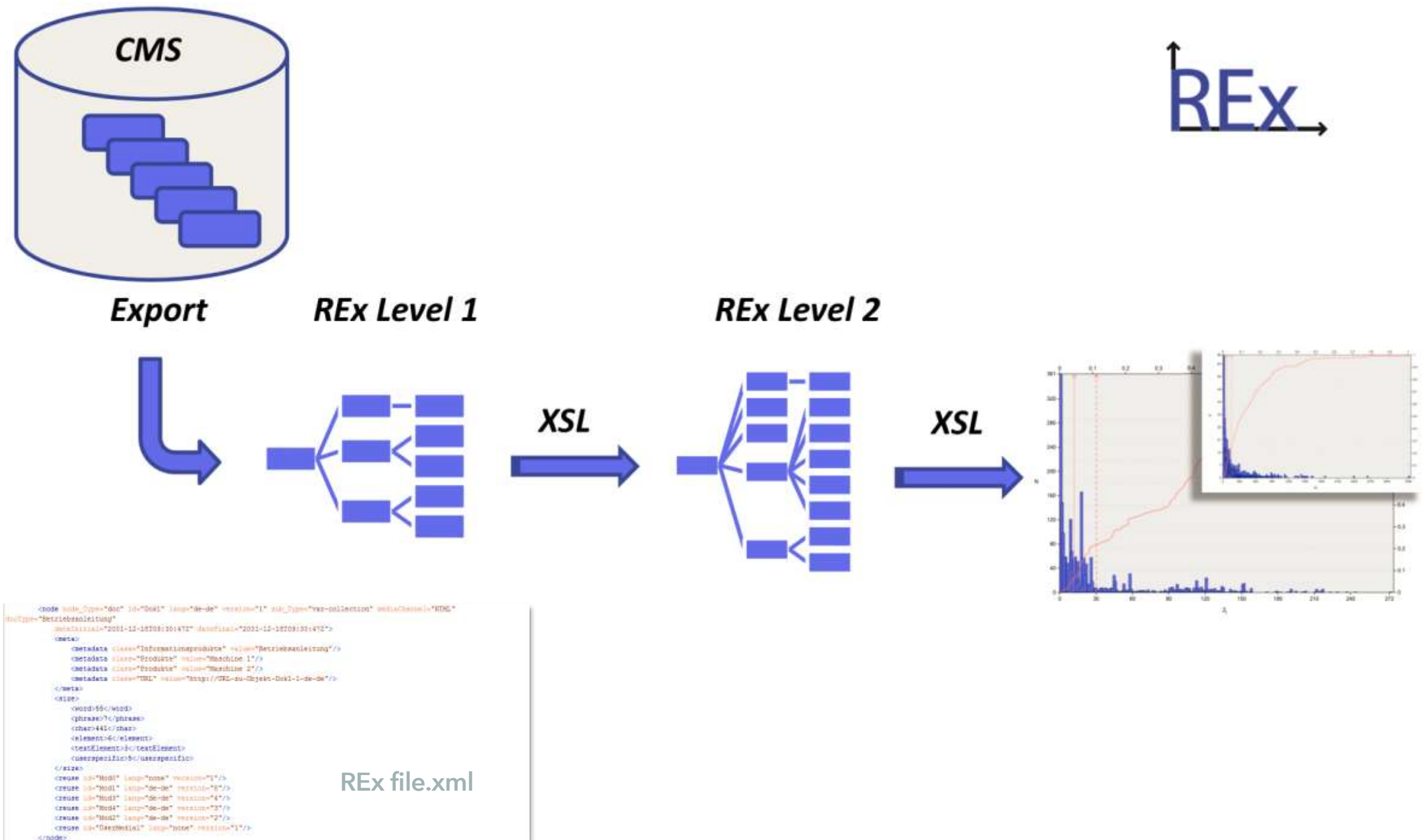


Analytics

# CMS Analytics

- REx interface defined by I4ICM;
- Export function for raw REx data provided by CMS vendors;
- REx data set analyzed by I4ICM;

## Report Exchange (REx) data export from CMS



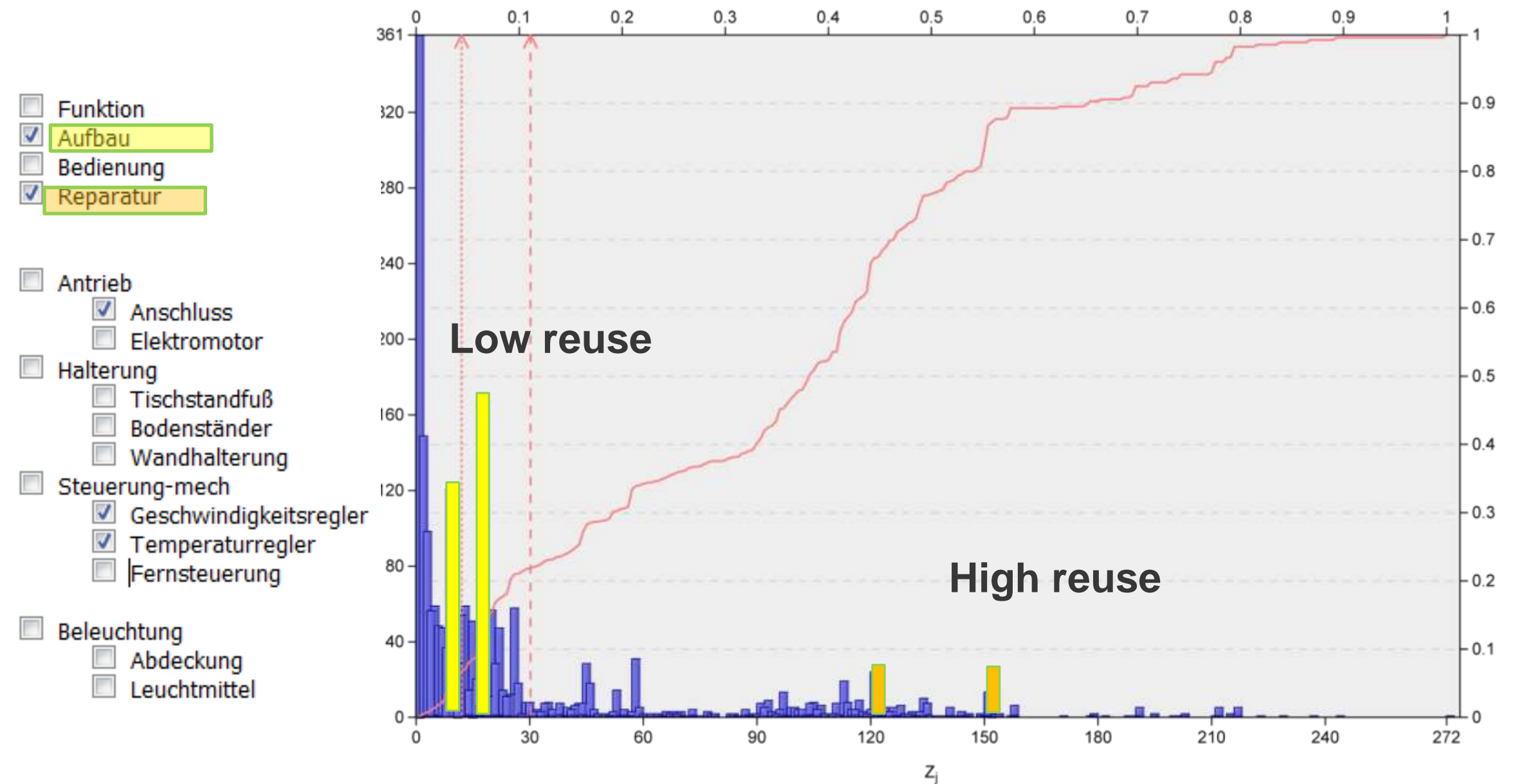
## Analytics

# Efficiency & cost metrics for CMS

(Intrinsic/extrinsic)

metadata can be used as analytic filters for detailed analysis of modular reuse

## Topic reuse counts within system/company (facetted)



Analytics

# CMS & CDP Analytics

## Overview of Content Intelligence

### CMS Analytics (REx)

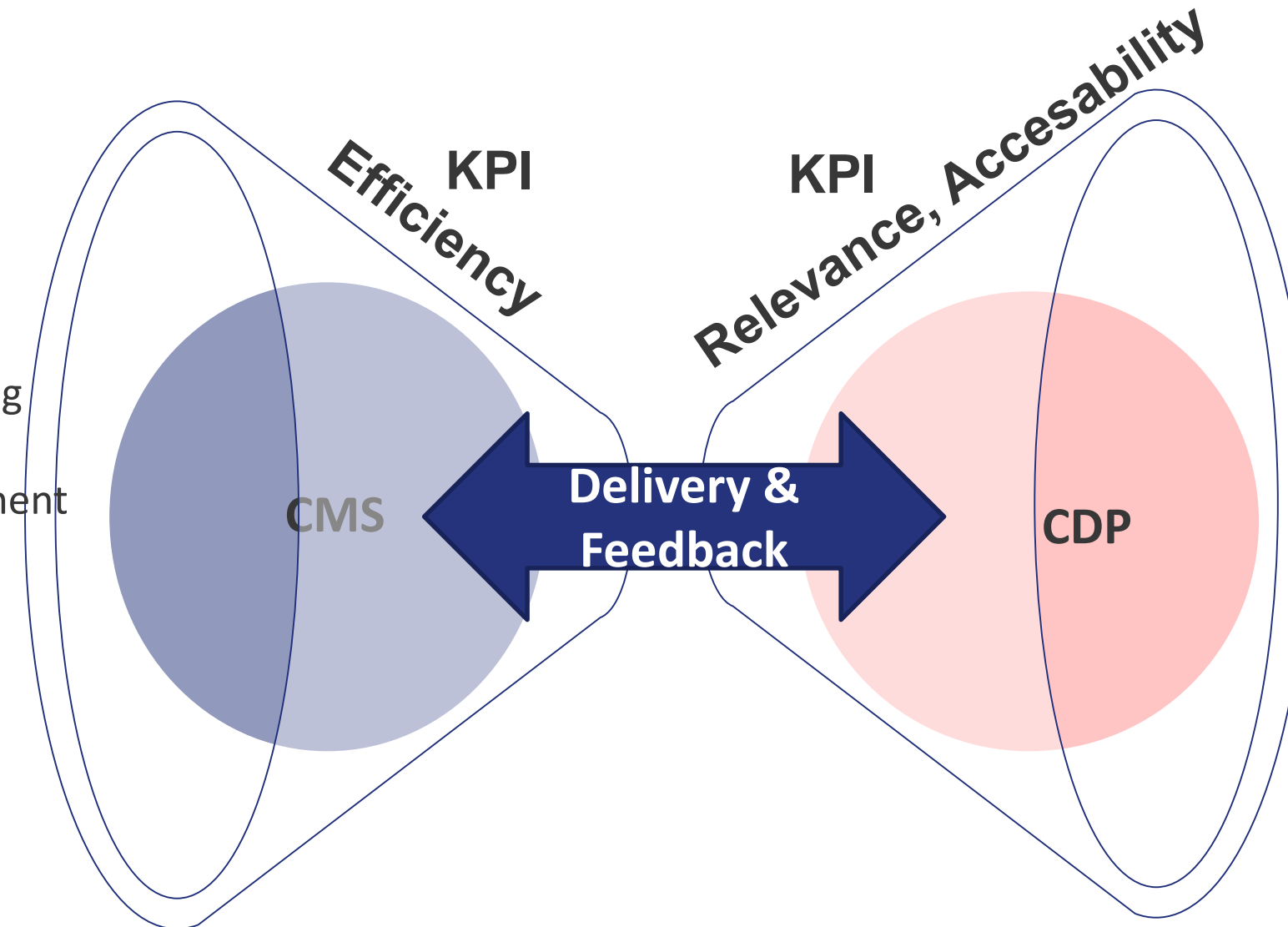
- Metrics:
- Reuse Rates (Abundancy)
- Redundancy
- Document Sharing factor
- Variant management
- Correlations; Distributions

...

### Artificial Intelligence

- Quality assurance:
- Similarity analysis
- Classification quality

...



### CDP Analytics (CoReAn)

Indirect feedback

- Metrics:
- visiting time,
- Visit frequency
- search behaviour
- search terms
- ...

Direct feedback

- Rating
- Satisfaction

- Improve:
- Product
- Information
- Terminology (Harvesting)

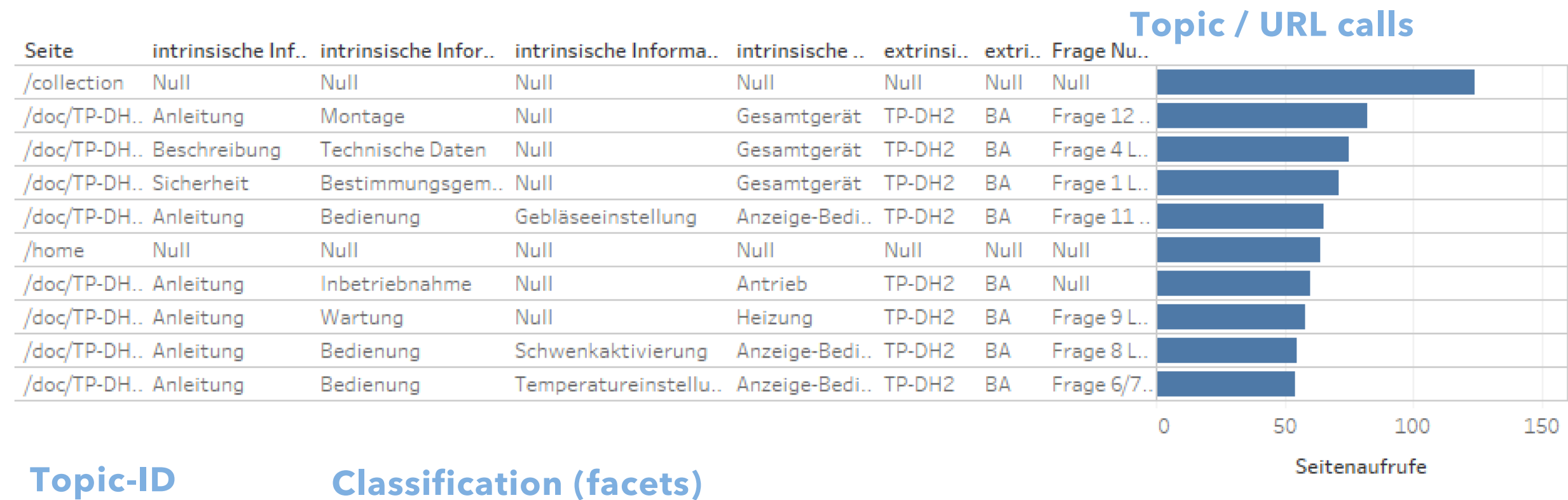


## Analytics

## CoReAn

Most requested topics can  
trigger content  
enhancement  
or product reengineering

## Number of topic requests (URL calls)



## Analytics

## CoReAn for CDP

Corresponds to SEO in classical web analytics

Search terms with no results trigger topic creation

## Monitoring of used terminology (search terms)

Site Search Keywords

Keyword	Searches ▼	Search Results pages
cookie	3	1
2496	2	1
adwords	2	1
grouping	2	1
log in	2	1
login	2	1
plugin	2	1
#2496	1	1
aclk	1	1
apache	1	1

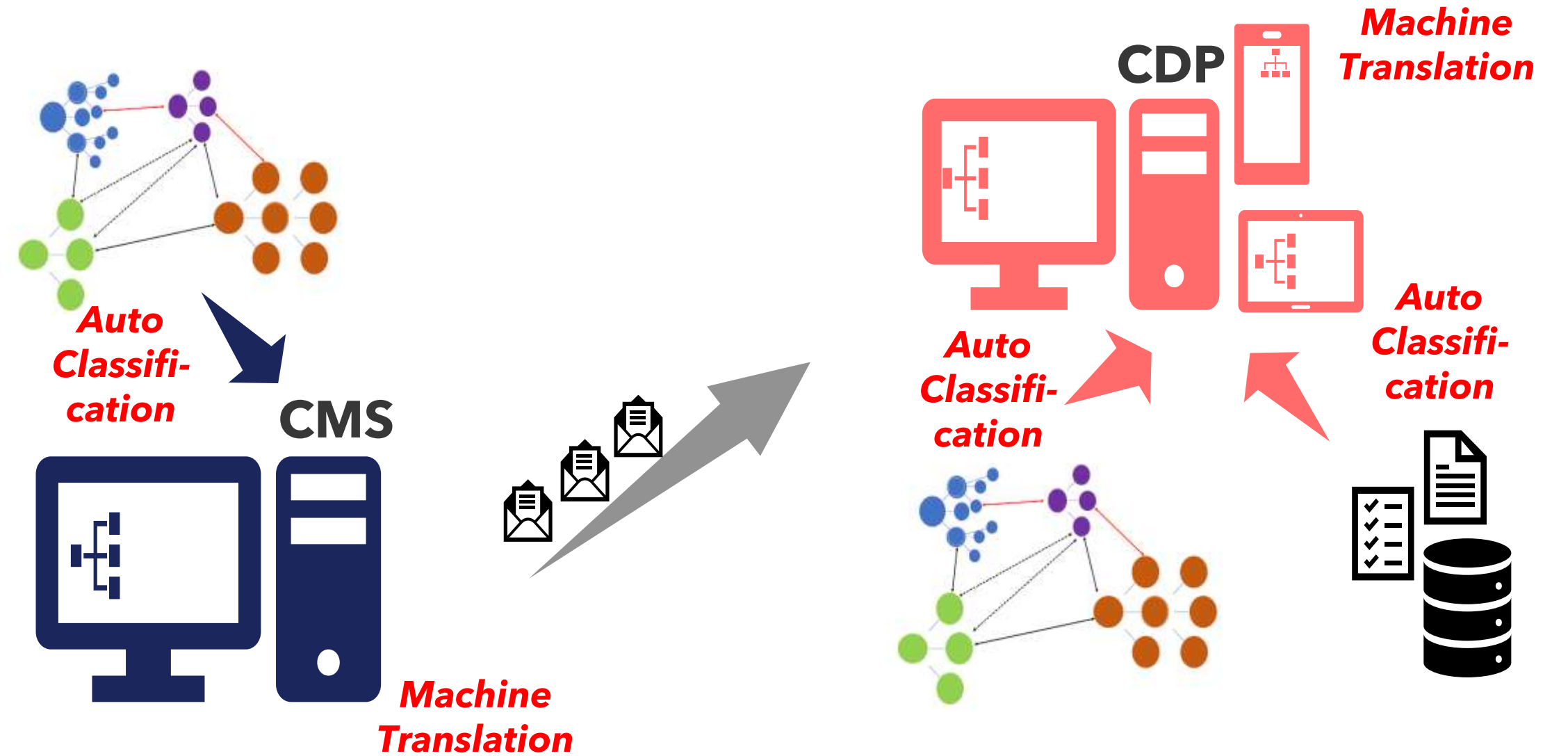
<https://piwik.org/wp-content/uploads/2012/10/Pages-following-Site-Search.png>  
<https://piwik.org/wp-content/uploads/2012/10/Site-Search-keywords.png>

CM and Delivery

# Intelligence Cascade

Artificial Intelligence

## Where Artificial Intelligence can be used ....



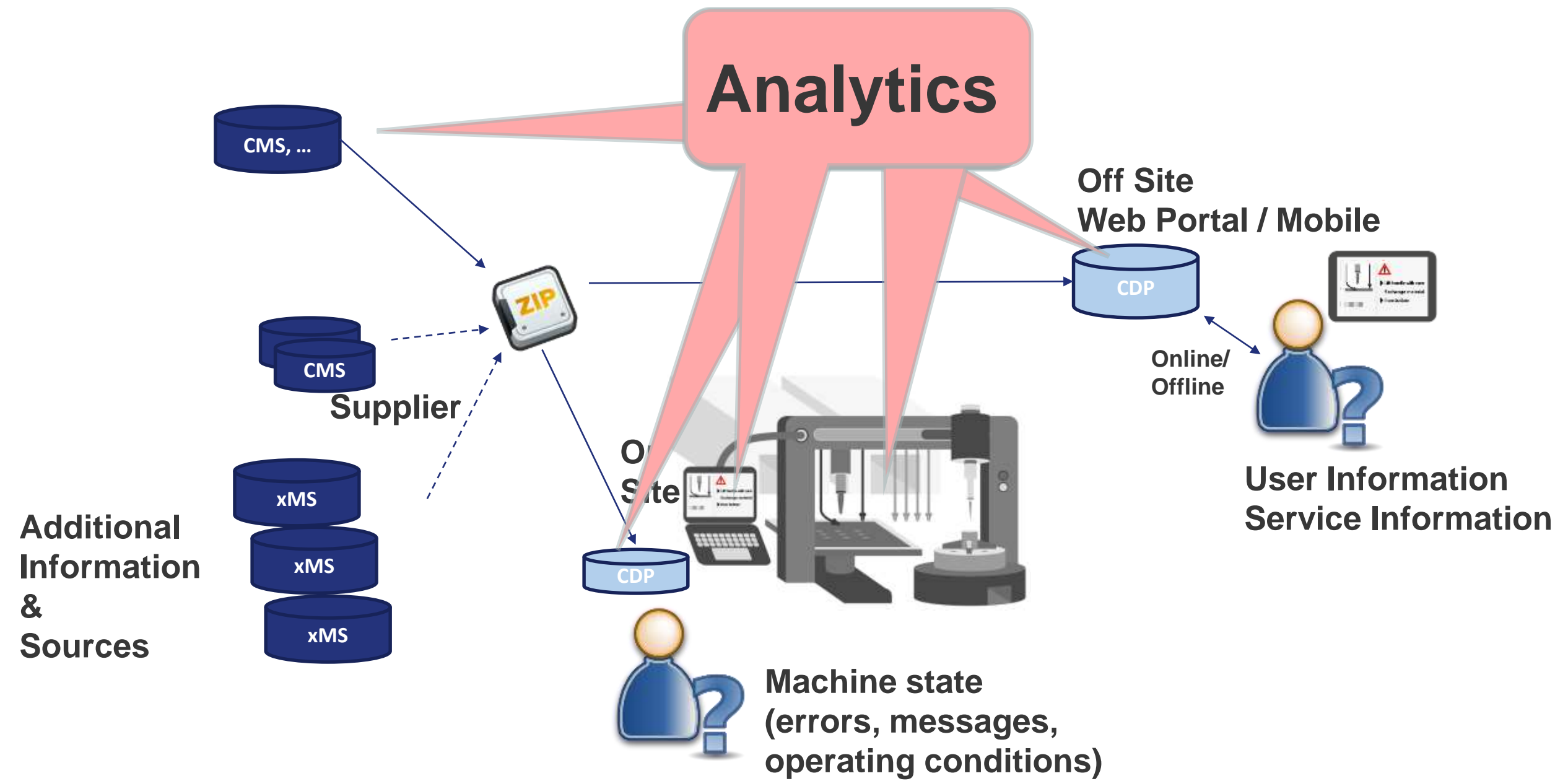
Emphasis and technology use depend on market,

industry, use cases / DIS

Analytics

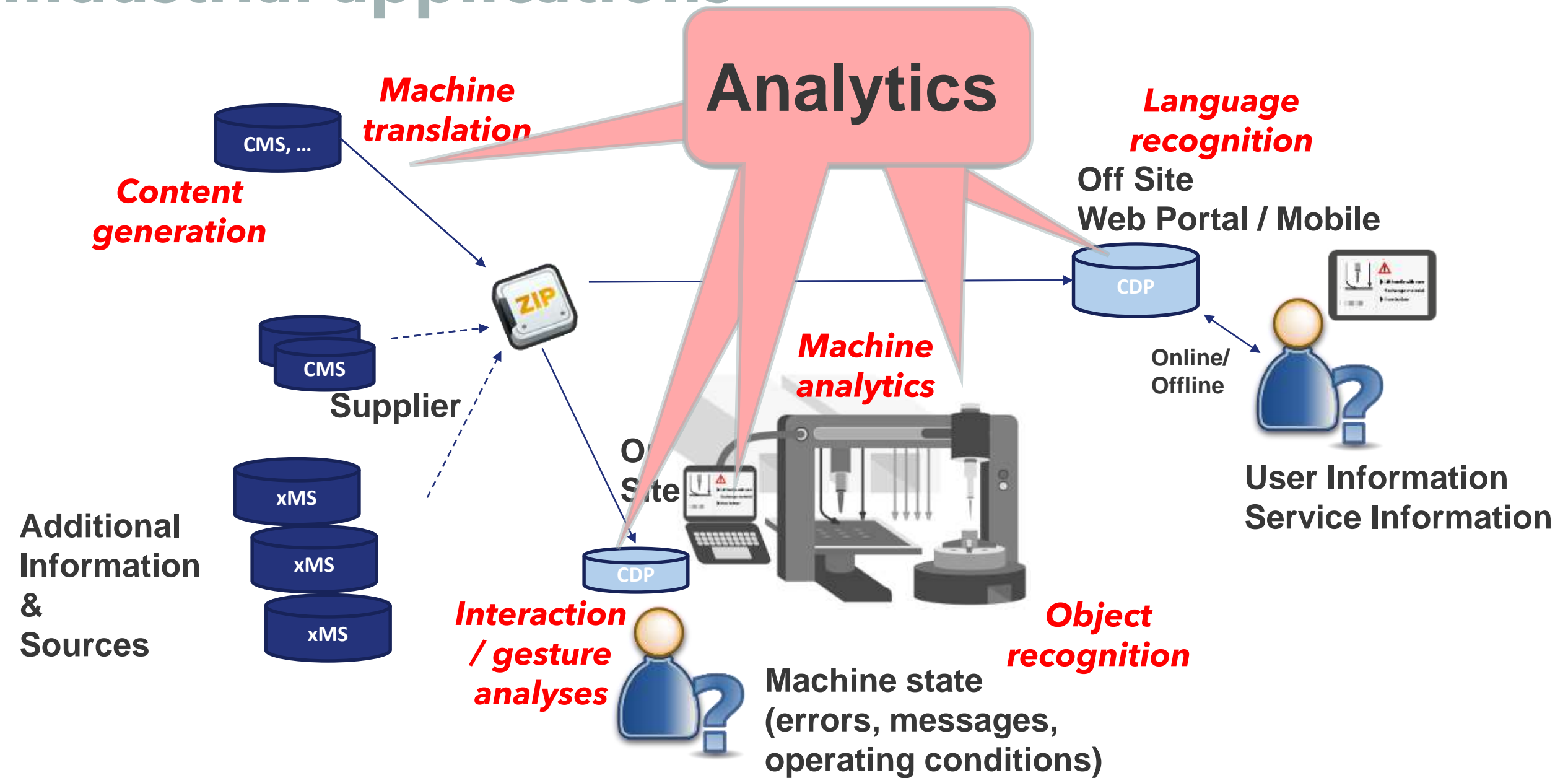
# CD Environment

## Analytics in industrial applications



# Intelligence Cascade

## Where AI and analytics can be used in industrial applications



Thank you for your attention!

wolfgang.ziegler@i4icm.de

tctn-user02@ise.co.jp



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