Danfoss goes iiRDS

Moving to a standard-based metadata model

Agenda

- Introduction: Danfoss and parson
- Background
- Motivation for change
- Project implementation
- Current status
- Future outlook
- Questions?

Introduction

Danfoss and parson

Danfoss at a glance

Worldwide sales in more than

100

countries

Three strong business segments with leading positions

Power Solutions

Climate Solutions

Power Electronics and Drives

Leading technology partner for our customers who want to decarbonize through energy efficiency, machine productivity, low emissions, and electrification

+42,000

Employees worldwide. People are the foundation of our business

Well on the way towards carbon-neutral global operations by 2030

97

Factories in more than 20 countries

1933

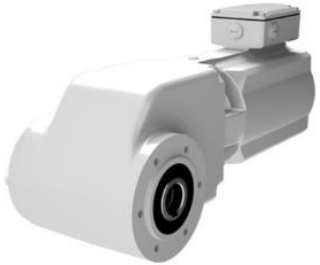
Long track record within innovation and engineering

› Low Voltage Drives

› Medium Voltage Drives

› Motion Control and Servo Drives

› Soft Starters



› VLT® OneGearDrive®

› Options and Accessories

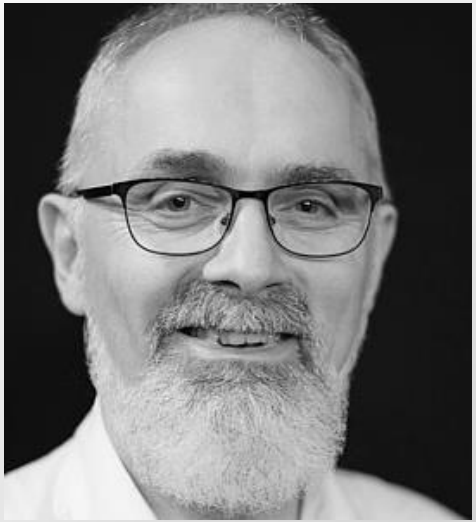
Holger Thater

Electrical engineer & Technical Communication professional since 11/1990

Senior Manager Technical Communication
Danfoss Power Electronics A/S, Gråsten, Denmark (since 11/2014)

Main responsibilities:

- Team Lead for global Technical Communication Team of 14
  Team tasks:
  - Creating technical product information in English master language for all product lines
  - Handling translations in up to 29 languages
  - Terminology Management
  - Release of documents to company website & product store
  - Make technical product information available on digital customer channels
- Member of the Digital Data Chain Consortium
- Vice-president tekom Danmark



Holger Thater | LinkedIn

www.parson-europe.com

- Develop information architectures for smart content
- Consulting for information management systems
- Technical writing for products and services
- Automation of content processes
- Content strategy

www.iirds.org/iirds-consortium/members

- iiRDS Consortium and Working Group Member
- Certified iiRDS Consultants

tekom iiRDS CONSORTIUM MEMBER

parson AG – Who we are

- Founded by Ulrike Parson in 2006

- **Hamburg**
- Berlin, Potsdam
- Freiburg
- Hildesheim

- 16 technical communicators and consultants
- 3 administrators

parson
we create knowledge

Danfoss

Frank Ralf

Senior Technical Consultant for parson AG since 2014

Focus

- Information architecture
- Metadata modeling
- Optimization of documentation workflows
- DITA authoring environments

Contact

frank.ralf@parson-europe.com

LinkedIn

Background

History & current situation

Legacy systems (2009-2014): Teamcenter + Teamcenter CMS

Teamcenter® CMS (client-server) with
- Publication-oriented authoring using **docbook** structure
- Arbortext XML editor
- Inconsistent versioning & baselining
- Based on old Java environment

Basic metadata on publication level, **no metadata for external use**

Layout of published material

Full manuals in print (in-box documents) or on demand & in PDF on www

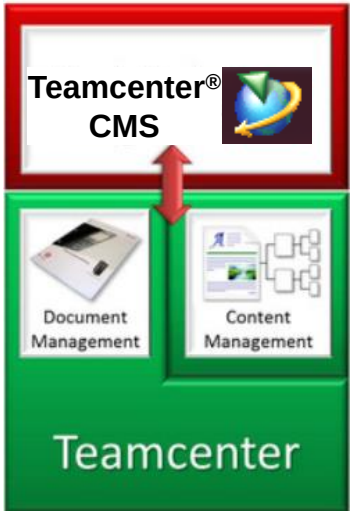
Not mobile friendly, **digital content exposure difficult**

Time demanding search procedure (**difficult reuse**)

Dependency on supplier for administrative tasks & stylesheet maintenance

PDF-based review outside TCCMS

Siemens Teamcenter® Unified Architecture



Current systems (2014-2023): Teamcenter + TechPub Studio

TechPub Studio® (client-server) with
- **Modular topic-based authoring** with **DITA structure**
- **Metadata** on bookmap & **topic level**
- **Oxygen** XML-Editor
- Consistent **versioning & baselining**

Reduction of printed manuals → focus on digital content delivery (intended, only to minor extent implemented)

No layout of published material

Easy search procedure using metadata (**increased reuse**)

Review/Proofreading workflow in the tool (intended, not implemented) → PDF review

Dependency on supplier for administrative tasks & stylesheet maintenance

Exposure of digital content via API (intended, not implemented)

Siemens Teamcenter® Unified Architecture

Motivation for change

Documentation pain points

- **Unspecific**
  Manuals currently describe a complete product family and customer needs to find what is relevant for his specific product.
- **Inconsistent user experience**
  Not much re-use across documents for the different product lines due to legacy.
- **Lack of digital content delivery**
  Manuals published only as PDF.
- **Poor findability**
  Too many search results on the web page due to lack of product-specific metadata.

Targeted digital content delivery strategy

Fast and **easy** access to **relevant** technical product information for our customers in **standard formats**.

Fast

- No-touch processes for content delivery (topics and manuals)
- External contributors (R&D and product management) and reviewers should work in the same system
  → support for agile processes

Easy

- Easy findability of product-specific product information down to topic level on customer touchpoints

Relevant

- Deliver not only product-line-specific PDFs any longer, but smaller chunks of information (topic level)
- Compiling documentation-on-demand based on topics

Standard formats

- Standard-based metadata taxonomies (iiRDS) and information structuring (DITA)
- Standard-based documentation package generation (VDI 2770, iiRDS) without extra effort

Content delivery use cases

- Users **search** for topics for a specific product:
  - Specific tasks (mechanical installation, electrical installation)
  - Troubleshooting help, for example, based on an error message or alarm code
  - Parameter information for commissioning
  - Deliver product information to the product display
- Potential **filter** options:
  - Product variant
  - Product features
  - Components
  - Subjects: parameter description, function description
  - Alarm codes or error messages
  - Audience
  - Document types
  - …

Project implementation

CCMS selection (Danfoss)
iiRDS-based metadata model (parson)

CCMS selection

The IXIASOFT project

Requirements for new CCMS

Goals of Danfoss and requirements for new CCMS:

- Switch from document-based to **topic-based content delivery**
- Enrich content with **metadata** to enable dynamic content delivery
- Support **delivery standards** like iiRDS and VDI 2770
- Accessibility of technical product information via **standard API**
- Contributor and Review **roles** integrated
- Standard-based **metadata** taxonomies (iiRDS) and information **structuring** (DITA)
- **Web-based** client
- **SaaS** solution

New CCMS – selection process

CCMS shortlist

- Paligo*
- Adobe AEM Guides
- Heretto (EasyDITA)
- IXIASOFT CCMS
- Schema ST4*

* No DITA

Selection process

- Market screening and **preselection** (Q2/2020)
- Schedule first product **demos** with TecCom CCMS superusers & direct managers (Q4/2020)
- CCMS **Comparison** meeting (with rating from all participants based on requirements (Q1/2021) → IXIASOFT and EasyDITA
- IT requirements workshop & **architecture** specification (Q2/2021)
- Second selection round and **decision** for IXIASOFT (Q2/2021)
- **Contract** signature and start-up phase planning, basic product **trainings**, DITA **content modeling** (Q4/2021-Q1/2022)
- **Kick-off** meeting for IXIASOFT implementation, Technical Analysis Meeting, DRM workshop, Basic user training (Q1-Q3/2022)
- **Localization** workshop, Admin training, start of **first content creation** (Q4/2022)
- **Migration planning**, stylesheet planning, start of migration (Q1+Q2/2023)

Future tools and systems (from 09-2023)

- **SaaS Cloud-based** solution
- IXIASOFT CCMS (web client - cloud) with
  - Modular topic-based authoring with DITA structure
  - Metadata on bookmap & topic level **based on iiRDS standard**
  - Oxygen XML-Editor in **web environment**
  - Consistent versioning & baselining
- Standard-DITA XML file format enabling consistent digital content delivery
- No layout of published material, **flexible publishing pipelines**
- Easy search procedure using metadata (increased reuse)
- **Review/Proofreading & Contributor workflow** in the tool via web editor **on topic level**
- Administrative tasks & stylesheet maintenance **under own control**
- **Exposure of digital content via REST API**

tekom iiRDS project

First project → Focus of this presentation

1. Agreement with parson on a first support project for an iiRDS-based metadata taxonomy for our new IXIASOFT CCMS (07/2022)
2. First iiRDS pilot project (tekom funding) together with parson started (08/2022)
3. End of first support project with parson, handover to Danfoss (10/2022)
4. Presentation of result of the first pilot project at NORDIC TechKomm (09/2023) and tcworld conference (11/2023)

Second project

1. Agreement with parson on a second support project for the practical implementation of the iiRDS-based metadata taxonomy in our new IXIASOFT CCMS (07/2023)
2. Second iiRDS pilot project (tekom funding) together with parson started (07/2023)
3. Presentation of result of the second pilot project at NORDIC TechKomm and tcworld conference in 2024

iiRDS-based metadata model

The Danfoss project

Project scope

Goals

- Determine metadata requirements
  - for variant management
  - for content delivery
- Develop a scalable metadata model based on iiRDS
- Evaluate capabilities of IXIASOFT for metadata implementation

Deliverables

- Metadata model including documentation
- Recommendations for metadata implementation in IXIASOFT

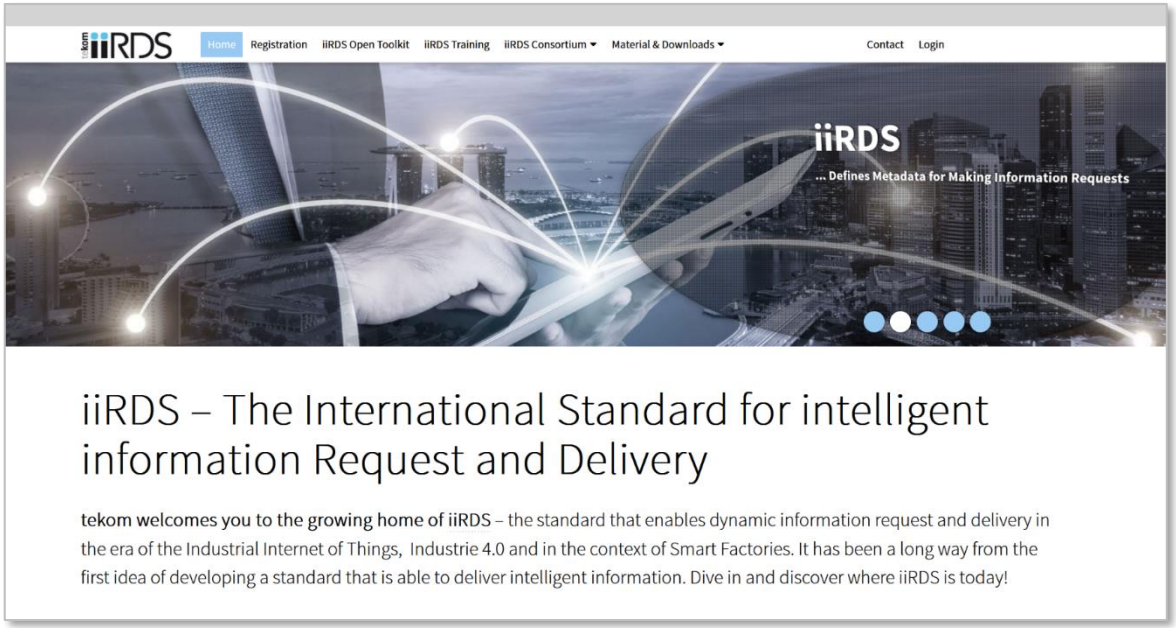
Out of scope

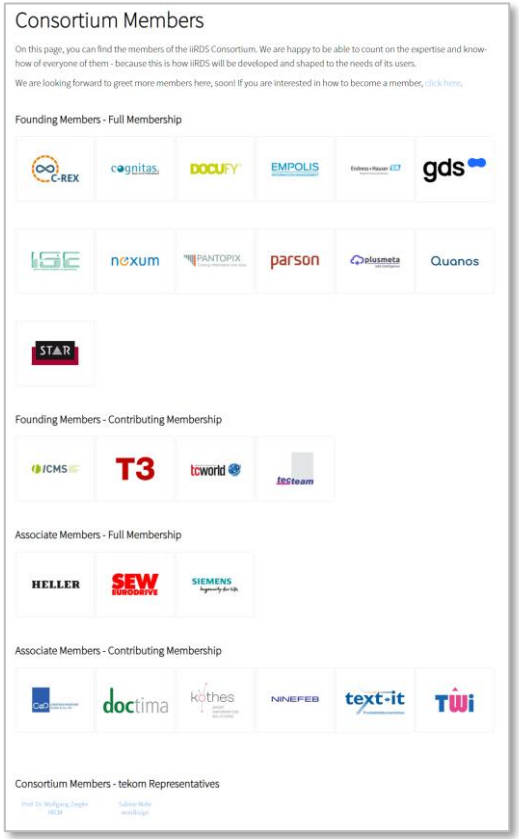
Complete model and actual implementation in IXIASOFT

iiRDS

A short introduction

iiRDS – a standard for metadata interoperability



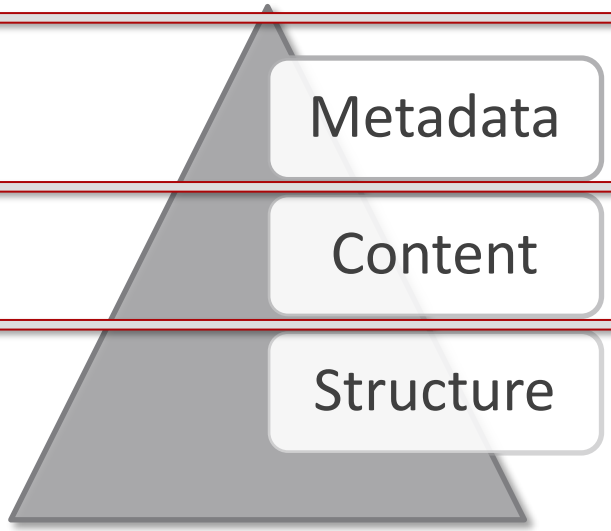


www.iirds.org

Levels of intelligent information

- Machine readable, also metadata
- Individually searchable, interchangeable and processable

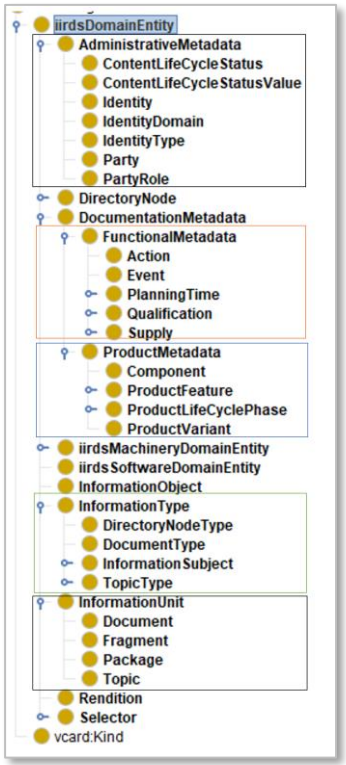
Processing and delivery



- Semantic
- Modular and reusable
- Useful and suitable for application
- Structured and format-free

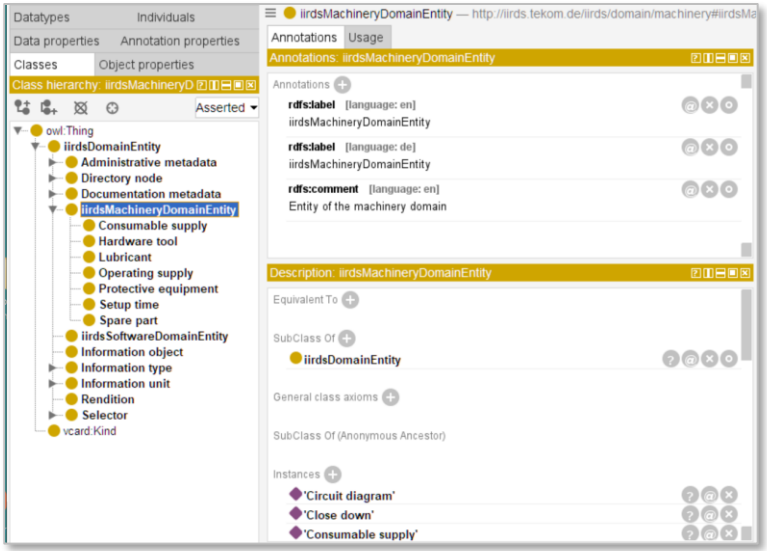
Main iiRDS classes

- Administrative metadata
- Functional metadata
- Product metadata
- Information type
- Information unit

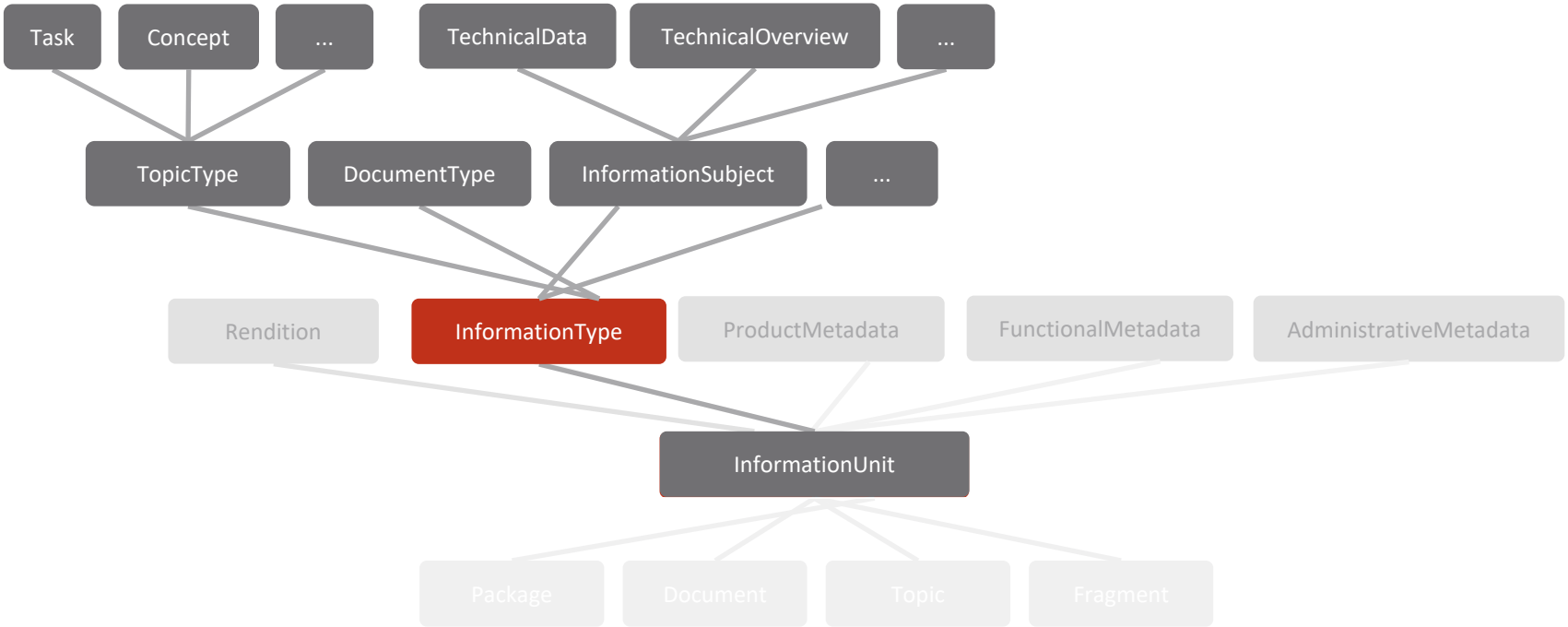


Additional iiRDS domains for Danfoss

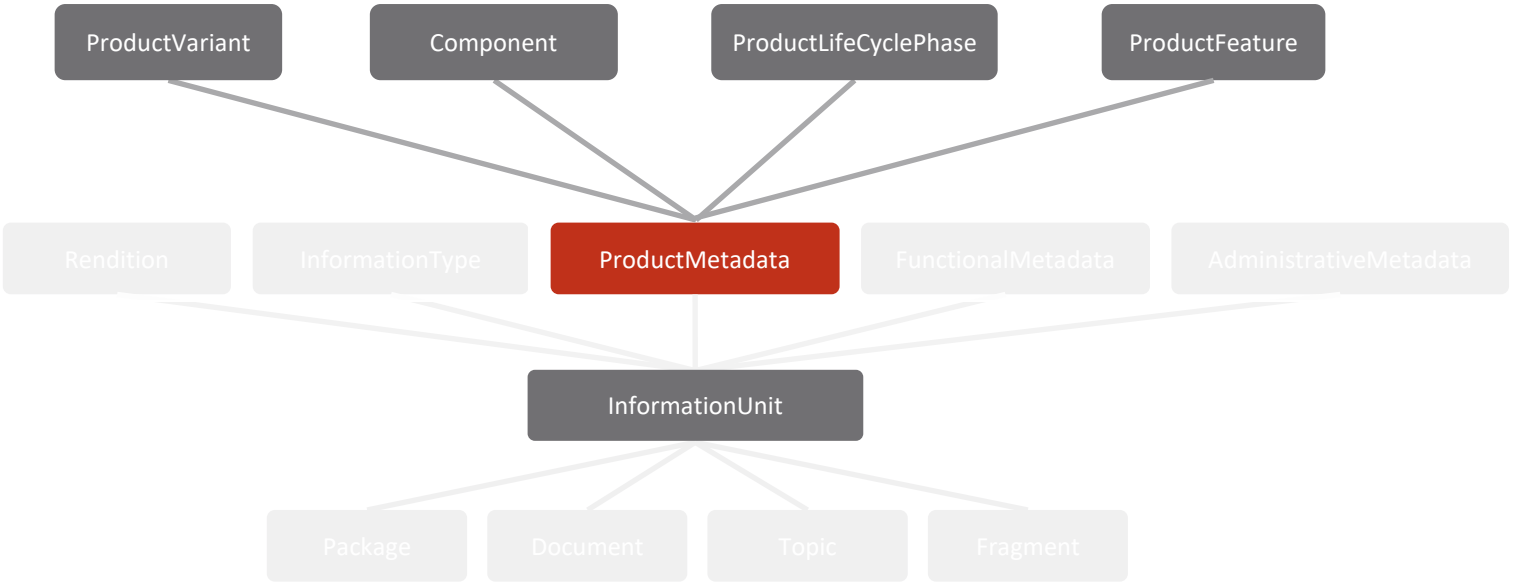
- iirdsMachineryDomainEntity
- iirdsSoftwareDomainEntity



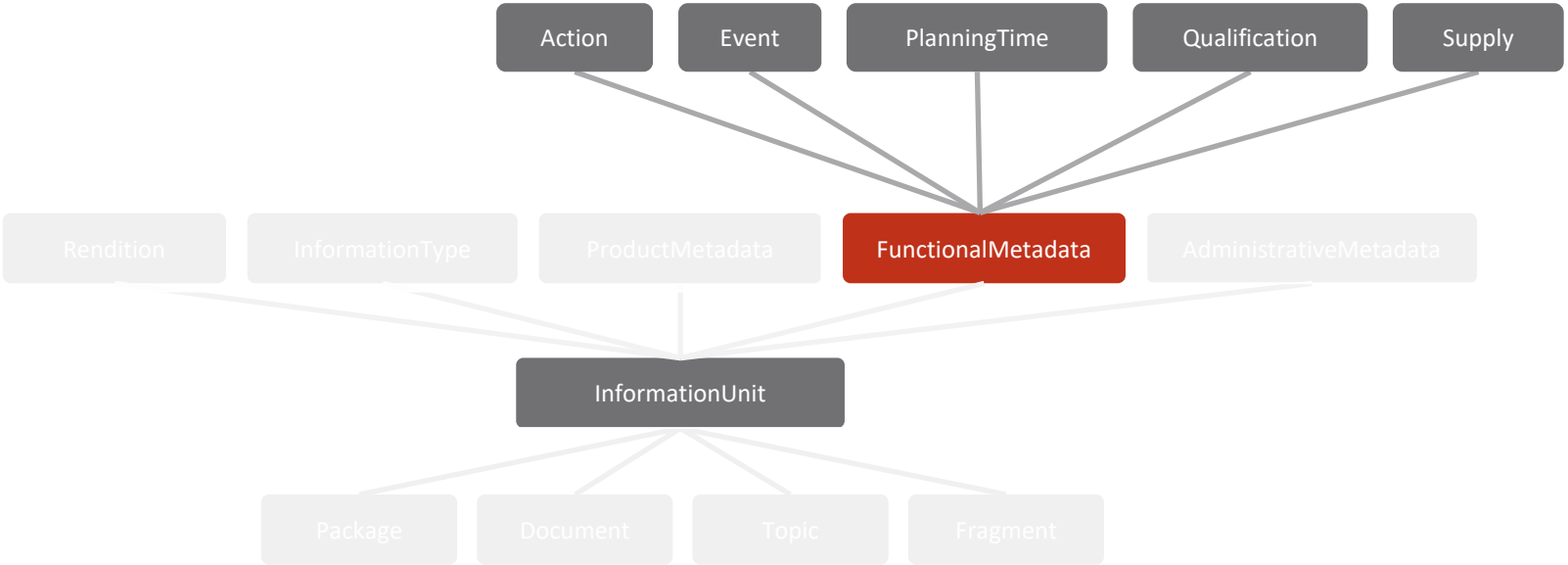
Metadata in iiRDS



Metadata in iiRDS



Metadata in iiRDS



iiRDS for consolidating metadata

Use the standard metadata model provided by iiRDS for modeling your metadata.

```
<audience experiencelevel="trained" job="commissioning" type="technician"/>
```

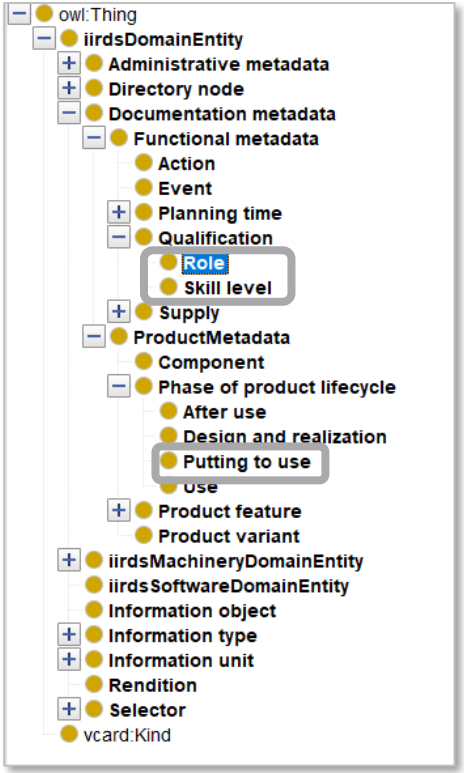
```
<target-group knowledge-level="trained" assignment="commissioning" role="technician"/>
```

Consolidate to iiRDS metadata:

Role = technician

Skill level = trained

Putting to use = commissioning



Developing the metadata model

General approach

General approach

- Basic principle: KISS – Keep it as simple as possible.
- Only use metadata that you actually need for variant management and content delivery.
- Use standards as much as possible.
- Only extend the standard if needed.

The process

- **Gather input** from all relevant stakeholders.

  Input sources
  - Metadata use with current CCMS
  - Current technical documentation
  - Product information systems (PIM, PLM)
  - Interviews with stakeholders
  - Online shop, website

- **Identify** relevant metadata
  - variant management
  - content delivery
- **Discuss** and **document** your results.

General requirements for metadata

Written as **user stories** – without any technical implementation in mind.

*"Technical writers can **find CCMS objects** based on metadata."*

*"Technical writers can **edit** the **metadata** of CCMS objects easily."*

*"Technical writers can **configure publication variants** based on metadata."*

*"Information architects can **extend the metadata model** with reasonable effort."*

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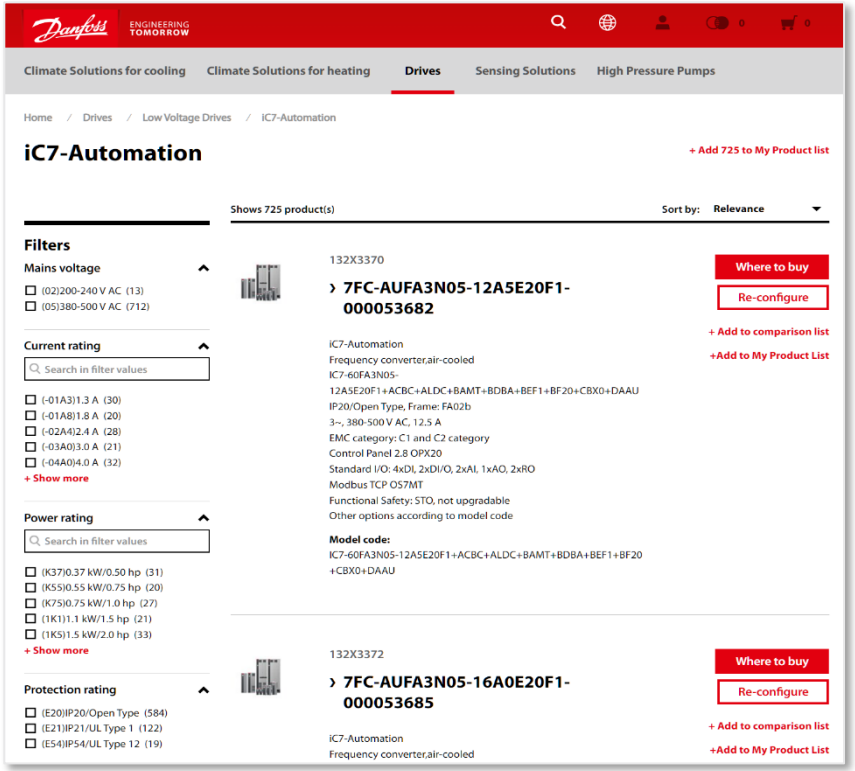
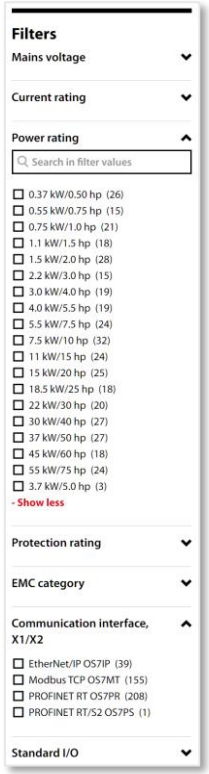
Danfoss

Analysing input

Example product line: iC7 – 725 products





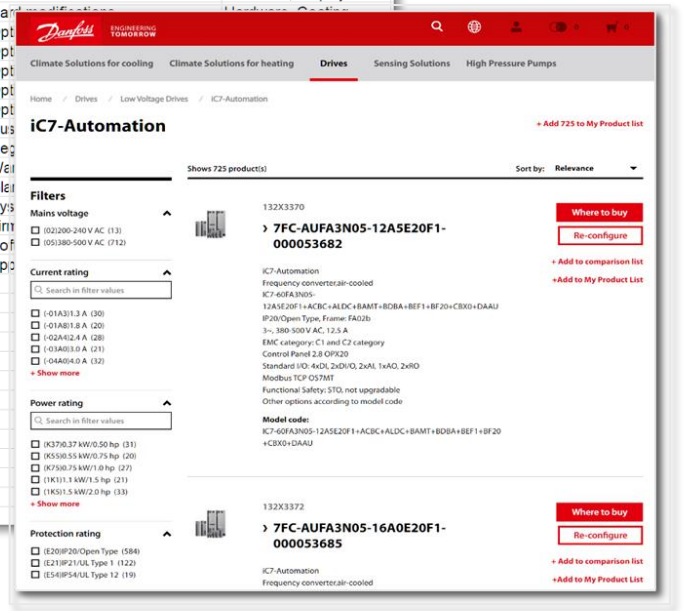
Analysis of existing information

Find suitable candidates for metadata:

- **Variant management**; examples:
  - Components (for example, filters)
  - Properties (for example, power range, voltage range)

- **Content delivery**; examples:
  - Events: alarm codes, troubleshooting content
  - Actions: typical actions described in task topics

iC7	VACON NX	VLT FC 302
Product group	Product Group	Product Group
Product category	Current	VLT Series
Product type	Mains voltage	Power
Mains voltage	Control Keypad	Power Size
Current rating	Enclosure	Voltage
Cooling capacity	EMC emission levels	Enclosure
Protection rating	Brake Chopper	Hardware, RFI filter
EMC category	Electrical modification	Hardware, Brake & Stop
Cable entry and EMC plate	Mechanical modification	Hardware, Display
Integrated brake chopper	Ca	
Extension, Integration unit	Opt	
Marine construction	Opt	
Extra environmental protection	Opt	
Humidity Protection Device	Opt	
Integrated common-mode filter	Opt	
Mains input device	Cus	
DC fuses and devices	Reg	
DC terminals	Wai	
Touch protection	Gle	
Cooling circuit connector type	Sys	
Cooling circuit hose length	Fin	
Heat sink access panel	Sof	
Control Unit Supply	Ap	
Communication interface, X1/X2		
Communication interface, X0		
Standard I/O		
Functional safety		
Control panel		
Control panel mounting type		
Control panel cable length		
Interface board		
Control unit cable length		
StarCoupler board cable length		
Option slot A		
Option slot B		
Option slot C		



Metadata use in current CCMS

- Classification tree in **TechPub Studio** reflects the current use of metadata.
- Currently, metadata is not delivered. => Assignment was not mandatory.
- Some of the metadata will be transferred to the new architecture.
- Most used metadata:
  - Audience
  - Document Type
  - Product
  - Country
  - Information type (describes *Assembly*, *Commissioning*, *Disposal*, …)
  - Enclosure Size, Power Rating

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE bookmap PUBLIC "-//OASIS//DTD DITA BookMap//EN" "bookmap.dtd" []>
<bookmap id="Bookmap" translate="no" xml:lang="en-US">
  <booktitle class="- topic/title bookmap/booktitle ">
    <mainbooktitle class="- topic/ph bookmap/mainbooktitle ">VACON® 100 INDUSTRIAL</mainbooktitle>
  </booktitle>
  <bookmeta>

    <critdates>
      <revised modified="2021-05-05" />
    </critdates>

    <othermeta name="graphic_path" content="C:\WINDOWS\TEMP\PUBLISH_TOPIC\0kpy5c7p4/" />
    <othermeta name="sec" content="NO_USER" />
    <othermeta name="document_type" content="Application Guide" />
    <othermeta name="topicTypeName" content="Bookmap" />
    <othermeta name="type" content="Bookmap" />
    <othermeta name="privileges" content="K" />
    <othermeta name="index" content="true" />
    <othermeta name="Enclosure Size" content="MRx" />
    <othermeta name="Products" content="VACON 100 Industrial" />
    <othermeta name="Domain" content="TechCom" />
    <othermeta name="Audience" content="Authorized" />
    <othermeta name="Country" content="" />
    <othermeta name="Document Type" content="Application Guide" />
    <othermeta name="Power Rating" content="" />
    <othermeta name="table_toc" content="false" />
    <othermeta name="scheduling_start_date" content="2021/05/19 23:00:00" />
    <othermeta name="r_number" content="DPD00927" />
    <othermeta name="language" content="en-US" />
    <othermeta name="className" content="DPEDitaDynamicMap" />
    <othermeta name="illustration_toc" content="false" />
    <othermeta name="xmlNumber" content="X002404" />
    <othermeta name="no_toc" content="false" />
    <othermeta name="lifecyclestate" content="Released" />
    <othermeta name="versionNumber" content="A.10" />
    <othermeta name="toc" content="true" />
  </bookmeta>
```

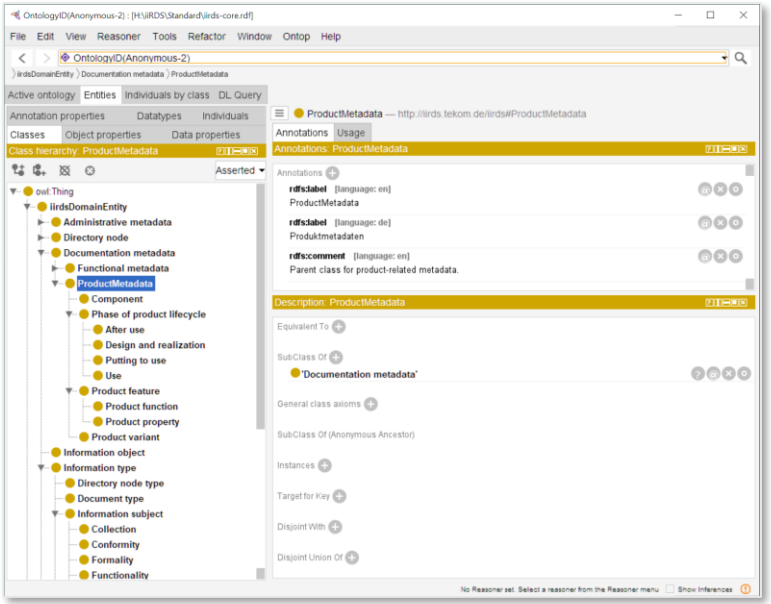
Modeling

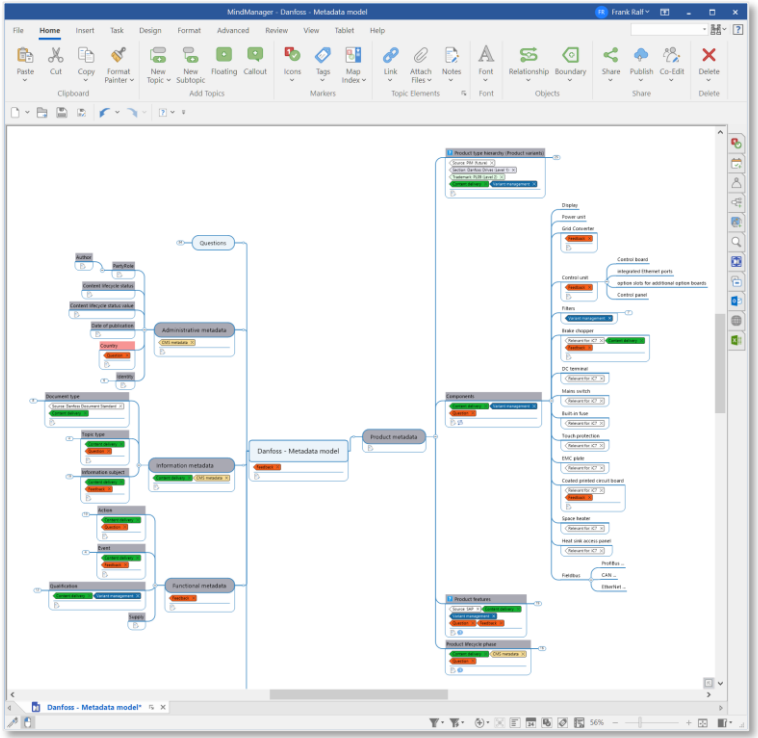
Tools and results

Tools for metadata modeling

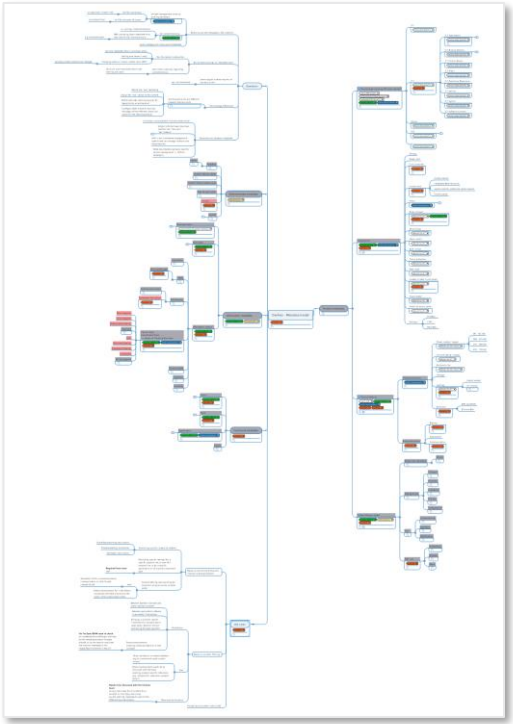
Use low-level tools:

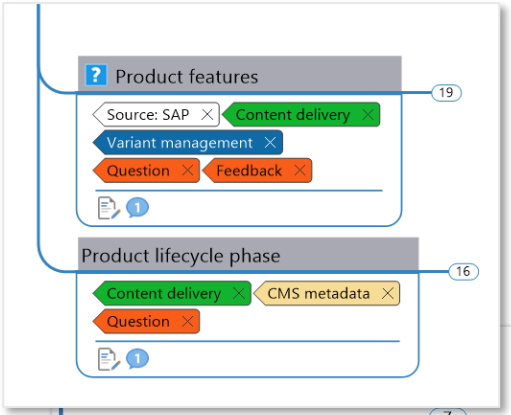
Mindmap instead of Protegé

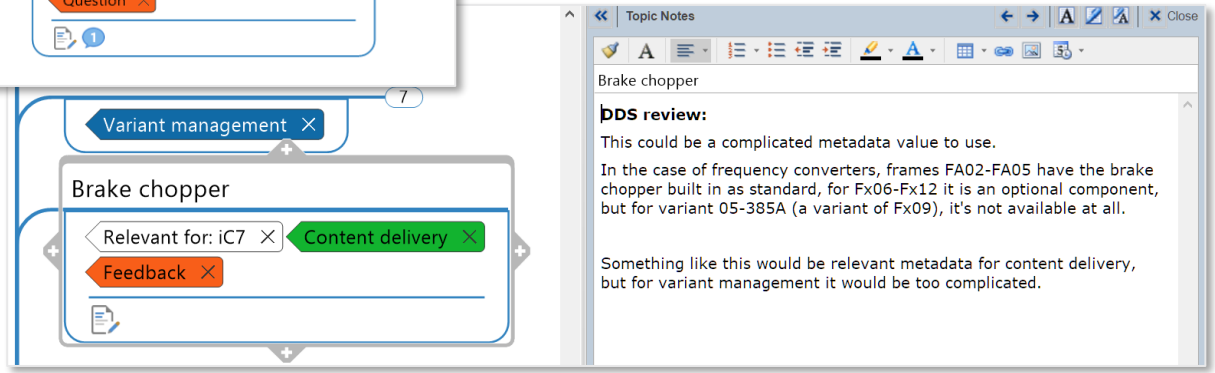




Metadata model as mindmap



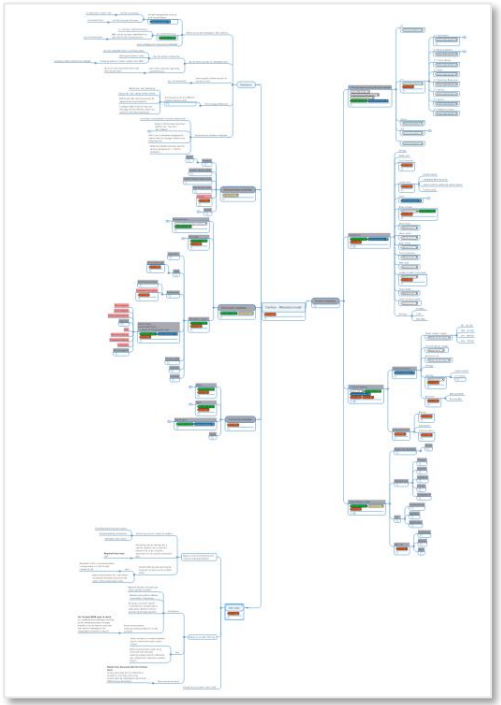




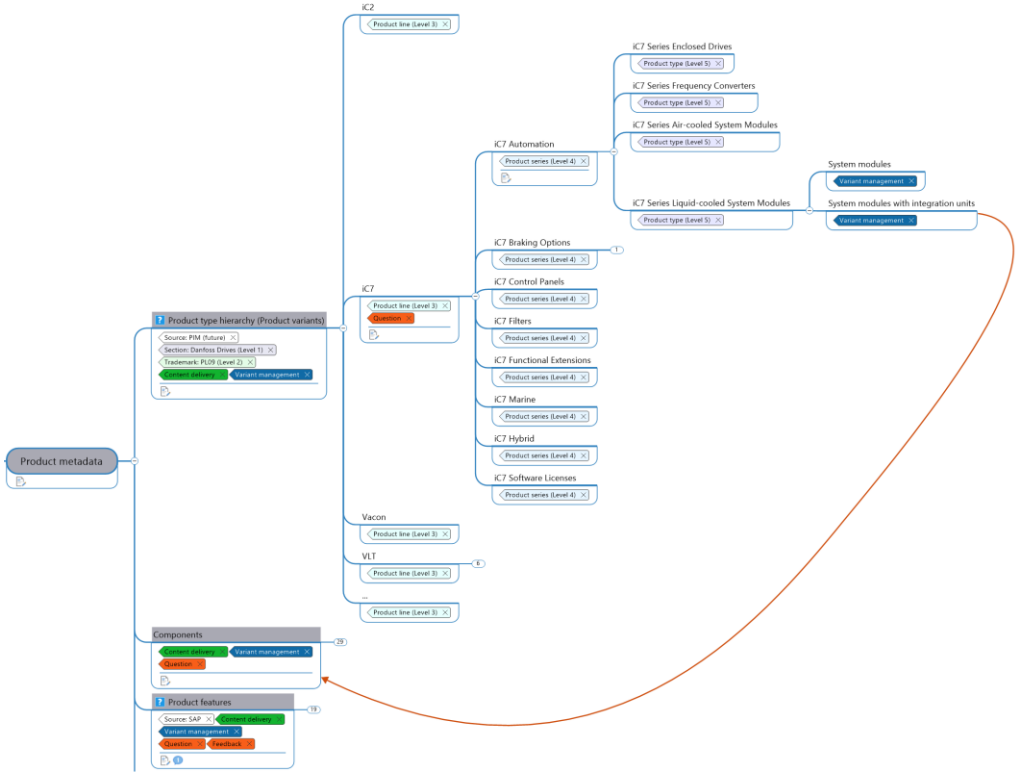
Use labels and notes for communication and documentation.

Create the initial metadata model

- **Identify** relevant iiRDS classes based on your analysis.
- **Map** your metadata to iiRDS classes.
- Use **existing iiRDS metadata** as much as possible.
- If you need to add a new metadata element, try to find a **suitable class** and add a new instance to an already existing class.
- Create a **custom class** with custom instances only if there is no suitable standard class.
- (You might already keep the **implementation** in mind.)



Product variants for iC7



Components relevant for iC7

Larger View

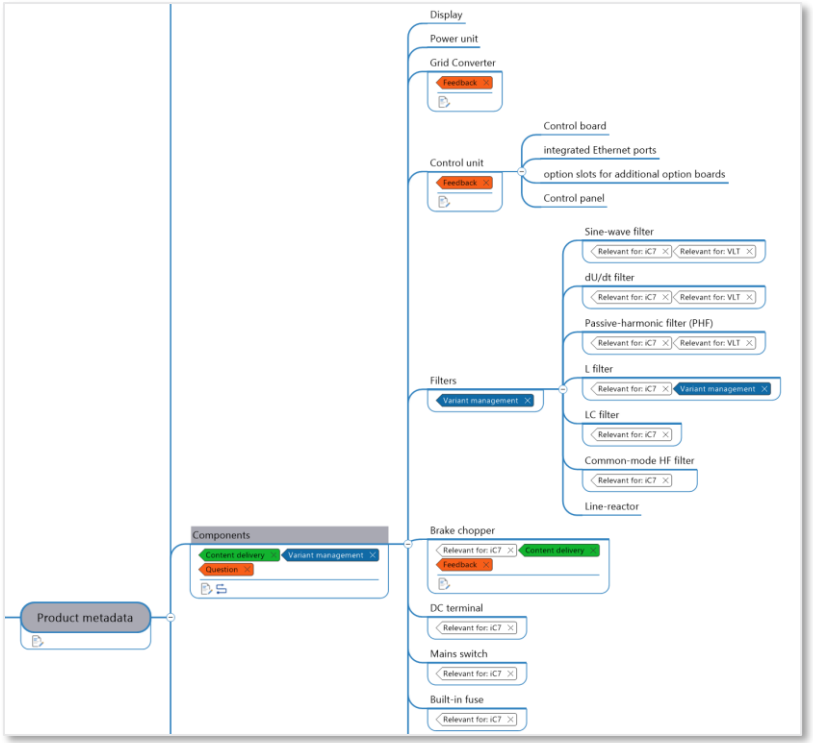
7FC-AUFA3N02-12A5E20F2-000112053

137H5957

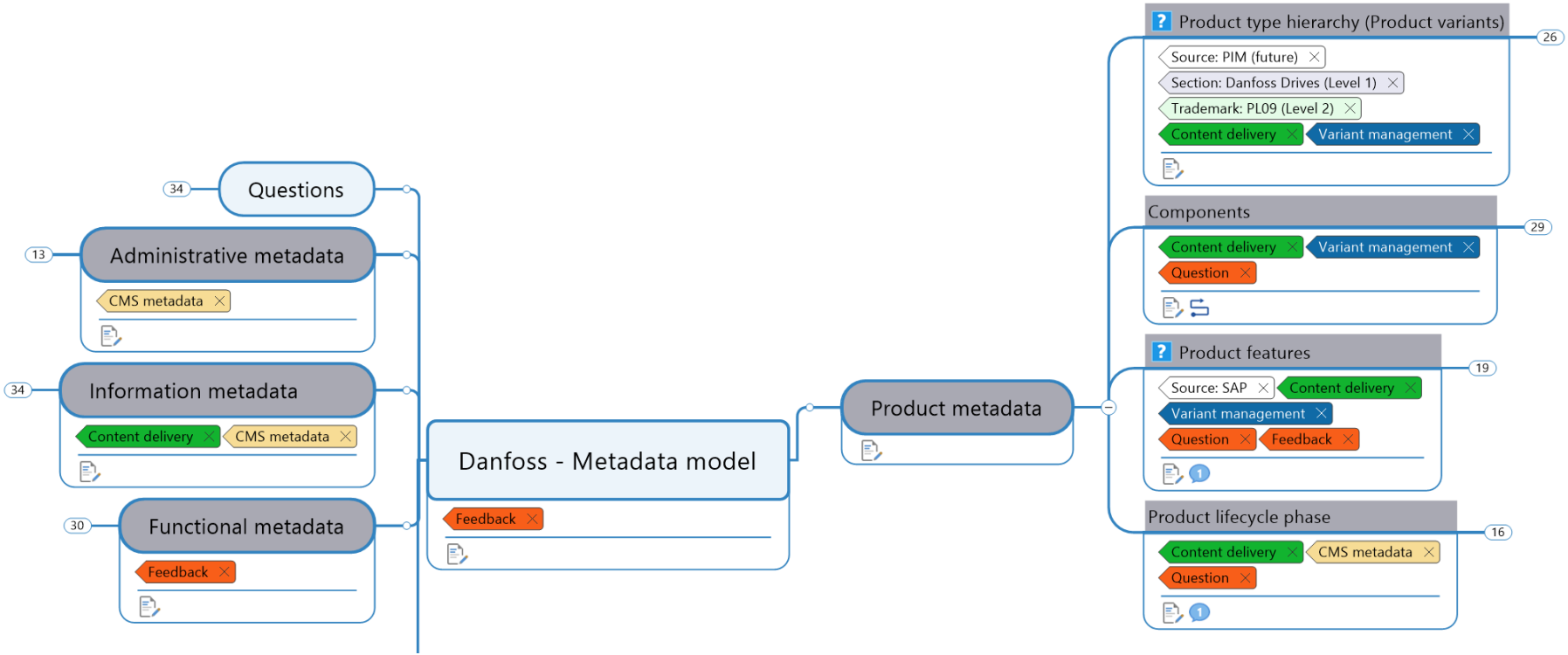
iC7-Automation
Frequency converter,air-cooled
IC7-60FA3N02-12A5E20F2+ACBC+ALDC+BAMT+BDBA+BEF1+BF01+CBX0+DAAU
IP20/Open Type, Frame: FA02b
3~, 200-240 V AC, 12.5 A
EMC category: C2 category
Wireless Panel OPX01
Standard I/O: 4xDI, 2xDI/O, 2xAI, 1xAO, 2xRO
Modbus TCP OS7MT
Functional Safety: STO, not upgradable
Other options according to model code

Model code:
IC7-60FA3N02-12A5E20F2+ACBC+ALDC+BAMT+BDBA+BEF1+BF01+CBX0+DAAU

The iC7-Automation frequency converter is dedicated to a wide range of demanding automation applications. With precision motor control even in open loop, the drive offers unique shaft performance and embedded industrial IoT security. This compact drive is configurable to match the specific application needs and system setup. It covers the power range 0.37- 710 kW at 380-500 VAC, and is available in protection ratings IP20/Open Type and higher.



Metadata, relevant for variant management and content delivery



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Danfoss

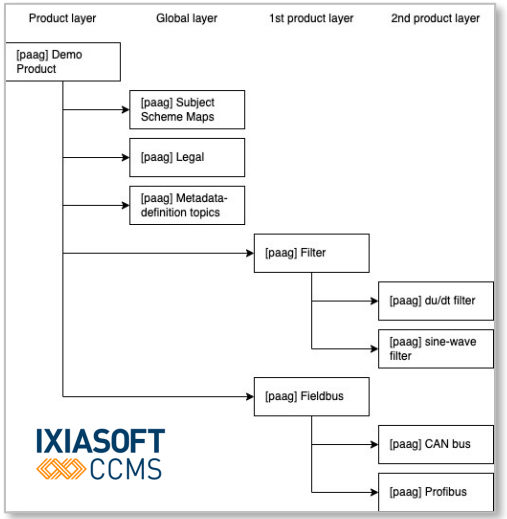
Implementing the model

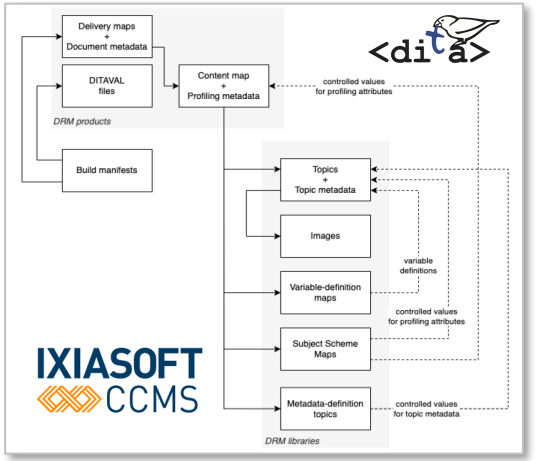
DITA and IXIASOFT

How to implement the model?

- **Identify** the metadata support of the CCMS (IXIASOFT) and other features that could be used to implement the metadata model:
  - ~~Taxonomies~~
  - Dynamic Release Management (DRM)
  - Libraries

- **Decide** which metadata to implement in DITA and which in the CCMS.





DITA implementation – Elements

One specialized "Delivery" map

```
delivery-map-dds:
    document-title-dds,
    document-meta-dds,
    keydef*,
    topicref*,
    disclaimerref-dds*,
    reltable*
```

```
document-title-dds:
    maintitle-dds,
    subtitle-dds*
```

Specialized elements with sub-elements

```
document-meta-dds:
    keywords*,
    othermeta*,
    document-type-dds*,
    document-numbers-dds?,
    cover-image-dds?,
    brand-logo-dds?,
    front-url-dds?,
   (data.elements.incl; |
    foreign.unknown.incl
```

```
event-dds:
    event-type-dds,
    event-code-dds?,
    event-desc-dds
```

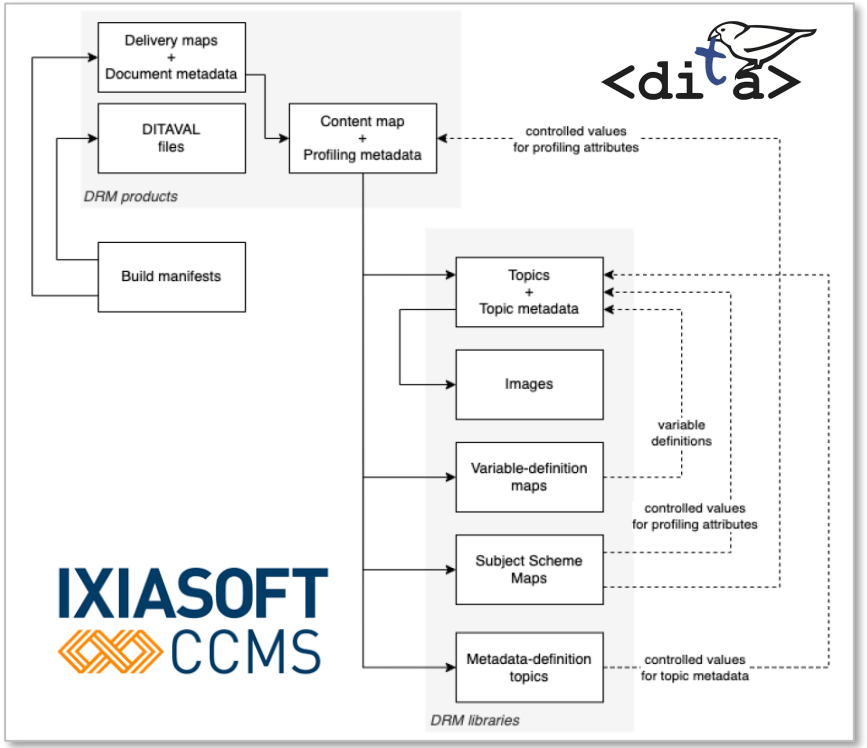
```
document-numbers-dds:
    document-set-num-base-dds,
    document-version-dds,
    document-revision-dds,
    region-code-dds,
    m-number-dds,
    r-number-dds,
    master-date-dds
```

DITA implementation – Profiling attributes

4 new profiling attributes

- `@product-type-hierarchy`
- `@product-components`
- `@product-characteristics`
- `@product-functions`

- Allowed values managed via DITA Subject Scheme Maps
- Separate `@product-type-hierarchy` for each product series
- Stored in IXIASOFT DRM libraries



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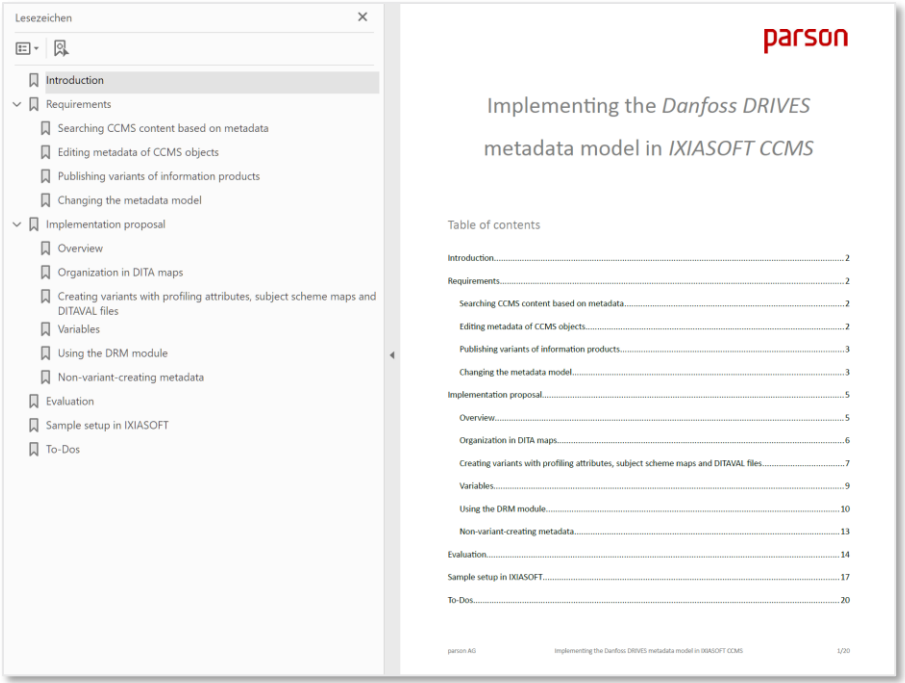
Current status

Implementation in IXIASOFT
Impact on technical writers

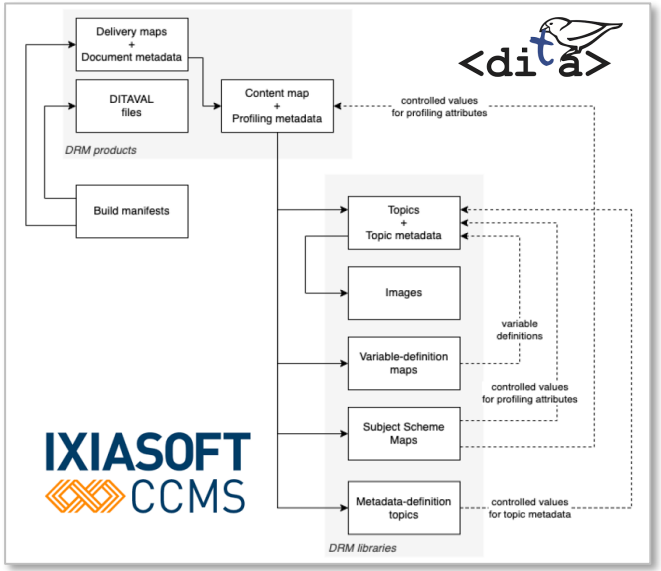
Metadata model in IXIASOFT – current status

- The **metadata model** has been developed and to some extent implemented (e.g. product variants tree).
  → Finishing planned for second project.
- The **content libraries** for the different product variants have been created and are being populated in the ongoing migration.
- The **publishing stylesheet** is using the defined metadata (especially the product variants).
- The already defined metadata is applied to topics during **migration**.

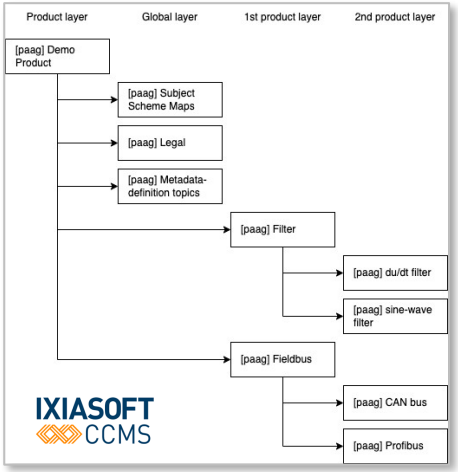


DITA implementation in IXIASOFT

- The **DITA model** is defined and currently being documented by Danfoss in a style guide.



- **Delivery maps** are created as part of the content migration (we decided not to use bookmaps for publications).
- **Subject scheme maps** and **DRM libraries** have been created.



Impact on Technical Writers

We came from a system, where **we only knew how to use the content elements** (p, steps, figure...) to create content, but we didn‘t know a lot about DITA elements (delivery maps, DITAVAL…) because the previous CCMS used a proprietary process for this.

We had to learn much more about using DITA as such, in all aspects, especially, as **IXIASOFT is a pure DITA system**. Furthermore, we need to adjust to the DRM structure and the new metadata model.

The writers have now learned how to **create the delivery maps** and how to **migrate content** from the previous CCMS.

It has been a big challenge to **learn** all this **while staying operative and creating manuals** as needed in our current CCMS.

It is a **challenge** to currently **create content** in IXIASOFT **without being able to publish properly** (stylesheet still under development) and **translate the content** (translation process right now being tested).

Very positive: The **writers** are **learning from each other** in weekly knowledge sharing meeting which has proven very helpful.

Future outlook

What is the future plan?

Developing publication channels to expose the CCMS topics with metadata to support:

Danfoss My Drive Assistant

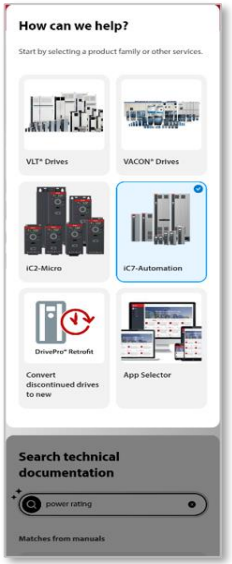
- Released topics populating the knowledge base automatically.

Danfoss Software Tools

- Accessing exposed topics to provide online help.

Content Delivery Portal

- Accessing exposed topics via a CDP, where customers can search for information on their product – down to topic level – and create their own content collections.



My Drive Assistant

What is the future plan?

Topic-based exposing of content to different touchpoints

Product-instance-based documentation

DITA topics are the granular base of information to create **serial number specific product information**.

VDI 2770

Compiling activity-related documents for automated VDI 2770 (and later iiRDS) package **generation**.

Integrations

PIM (inheriting product hierarchy and product attributes).

PLM/DAM (connecting information products to product lifecycle).

What is the future plan?

Second iiRDS Project

Come back to the next NORDIC TechKomm to see the results!

NORDIC TECH KOMM

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Questions?

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Thank you!