

# SIKiRDS

The Siemens Digital Industries  
pilot project



## Die Referenten



**Dipl. Inf. Robert Erfle**  
DOSCO GmbH

General Manager



**Dipl. Üb. Ursula Reuther**  
IAI Linguistic Content AG

Key Account Management  
Linguistic consulting



**Dipl. Ing. Marcus Hoffmann**  
SIEMENS AG  
Digital Industries, Factory Automation

Head of technical writing, member of  
the iiRDS consortium

# Agenda



<b>Product range SIEMENS Digital Industries</b>	<b>Marcus Hoffmann</b>
Motivation for iiRDS at SIEMENS	Marcus Hoffmann
Document export from SIPS+	Robert Erfle
General about iiRDS	Robert Erfle
Converter SIKiiRDS	Robert Erfle
Generating metadata using language technology	Ursula Reuther
Application examples	Marcus Hoffmann



## About 75,000 employees



**Software**



**Factory Automation**



**Motion Control**



**Process Automation**



**Customer Services**



**SIMATIC**  
Scalable industrial automation systems



**SIMOTION**  
High-end motion control system



**SINUMERIK**  
Intelligent solutions for machine tools



**SINAMICS**  
Frequency converter for every drive application

**SCALANCE**  
Reliable industrial communication

**SIMATIC PCS 7**  
Comprehensive process control system

**SIMATIC PCS neo**  
Web-based process control system

# Agenda



Product range SIEMENS Digital Industries	Marcus Hoffmann
<b>Motivation for iiRDS at SIEMENS</b>	<b>Marcus Hoffmann</b>
Document export from SIPS+	Robert Erfle
General about iiRDS	Robert Erfle
Converter SIKiiRDS	Robert Erfle
Generating metadata using language technology	Ursula Reuther
Application examples	Marcus Hoffmann

# Motivation for iiRDS at Siemens



1. Provide information for mechanical engineering, plant construction and end customers in a **standardized format**
2. Provide in-house content search & delivery portals with **standardized format**
3. **Standardized format** for integrating information into software products and apps
4. Create **independence** from the Content Management System
5. **Separation** of metadata and content
6. Extend **technological leadership** in technical information
7. Milestones for **Industry 4.0**



## Aims of the pilot project

Prototypical creation of iiRDS packages and evaluation of the customer view

- Discuss with potential users
- Analyze and evaluate the customer benefits of an iiRDS delivery
- Estimate the effort, benefits and risks of generating and maintaining the data:
  - For the editors
  - Cross-editorial
- Define requirements for a roll-out.

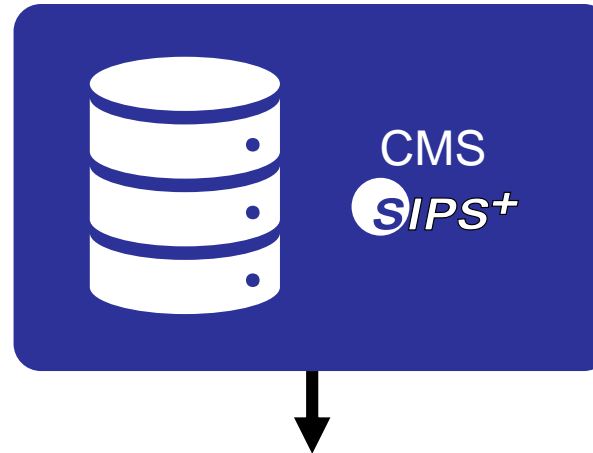
# Agenda



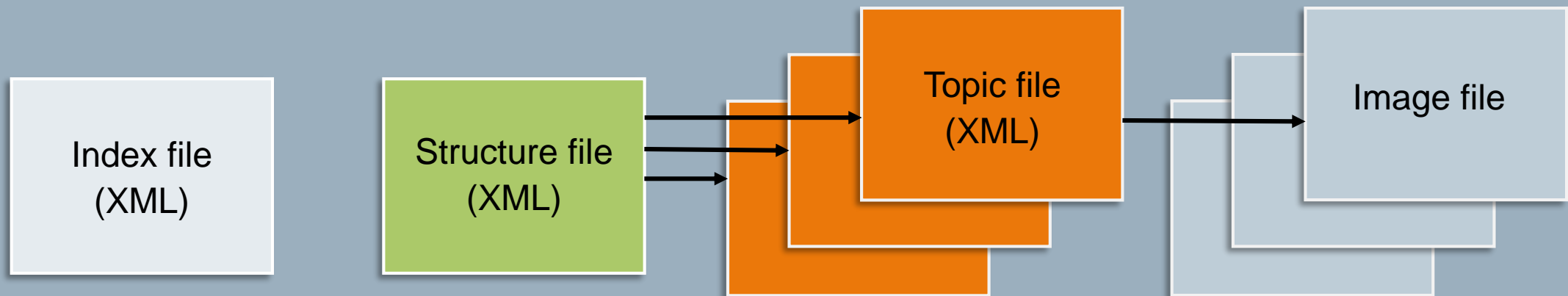
Product range SIEMENS Digital Industries	Marcus Hoffmann
Motivation for iiRDS at SIEMENS	Marcus Hoffmann
<b>Document export from SIPS+</b>	<b>Robert Erfle</b>
General about iiRDS	Robert Erfle
Converter SIKiiRDS	Robert Erfle
Generating metadata using language technology	Ursula Reuther
Application examples	Marcus Hoffmann

# Output system SIPS+

## Document export as XML



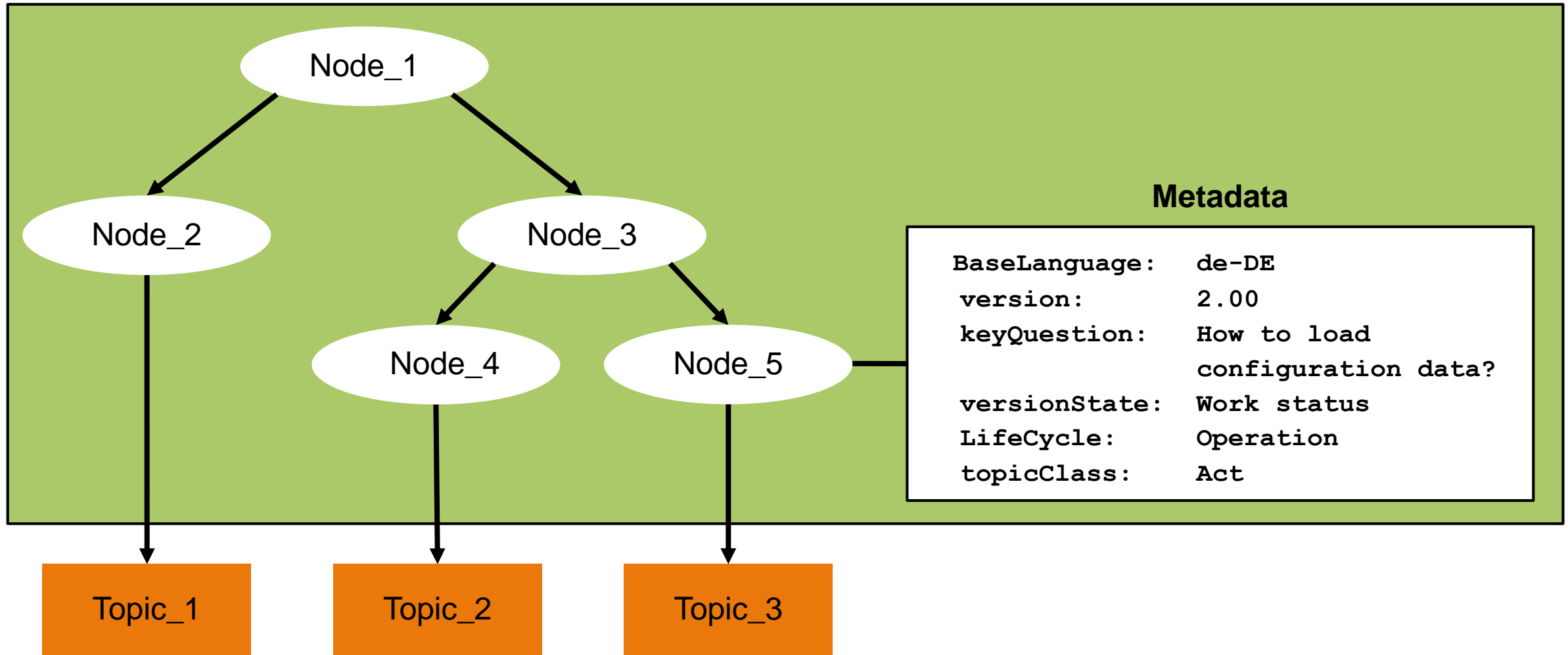
Exported Document (ZIP)





# Document export

## Structure file

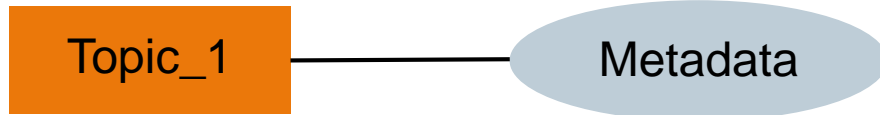


# Agenda

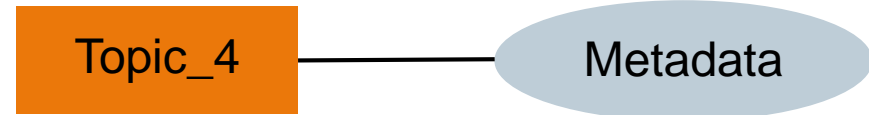


Product range SIEMENS Digital Industries	Marcus Hoffmann
Motivation for iiRDS at SIEMENS	Marcus Hoffmann
Document export from SIPS+	Robert Erfle
<b>General about iiRDS</b>	<b>Robert Erfle</b>
Converter SIKiiRDS	Robert Erfle
Generating metadata using language technology	Ursula Reuther
Application examples	Marcus Hoffmann

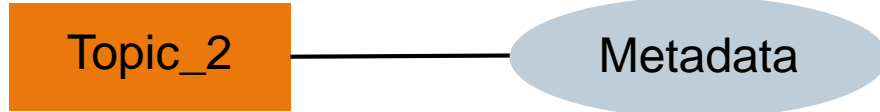
InformationUnit



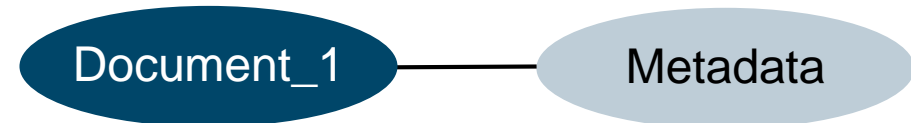
InformationUnit



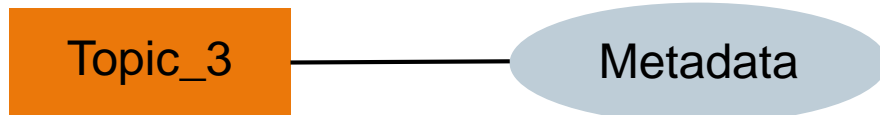
InformationUnit



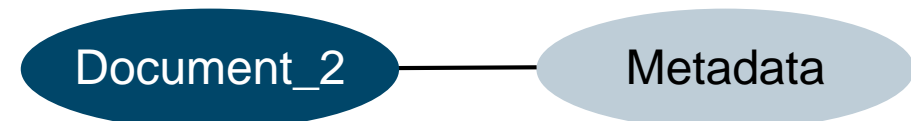
InformationUnit

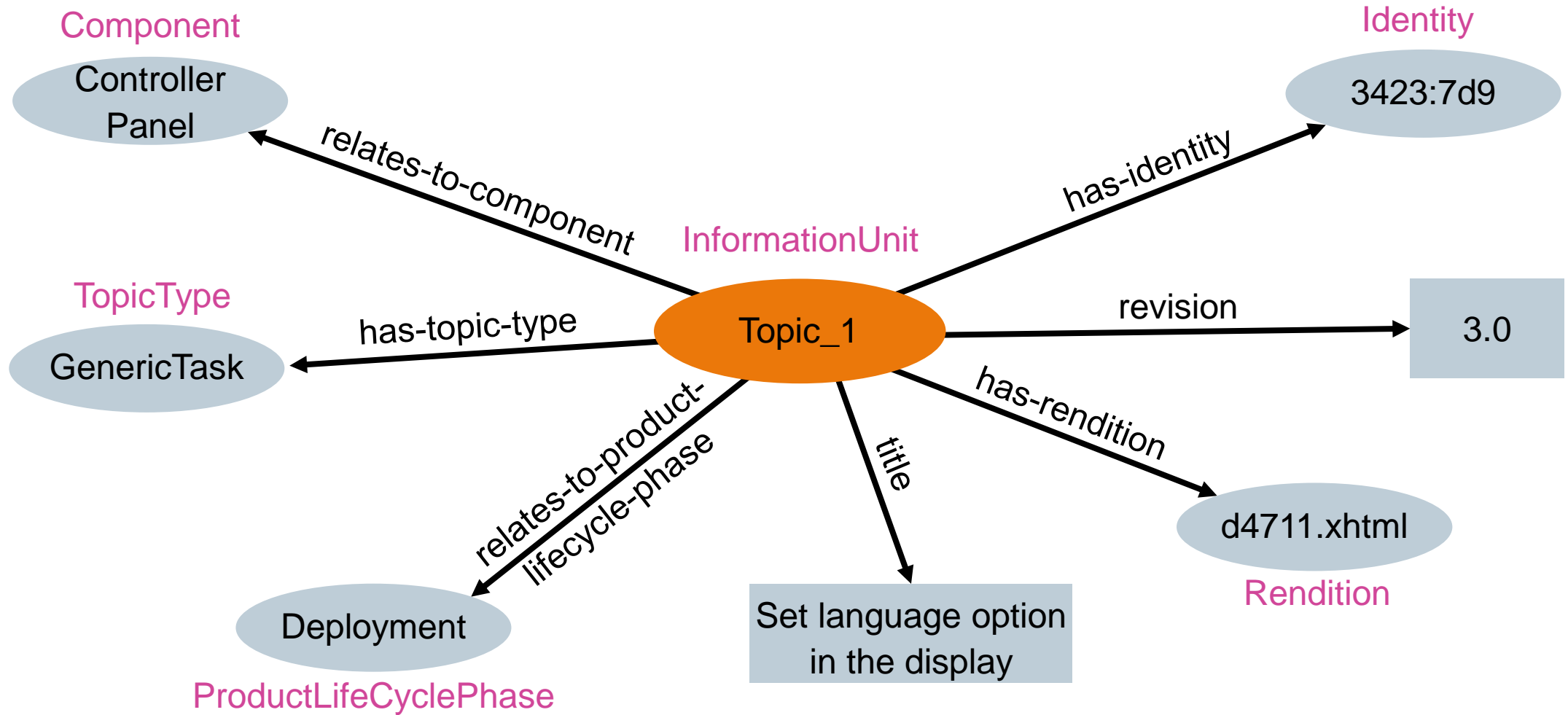


InformationUnit



InformationUnit

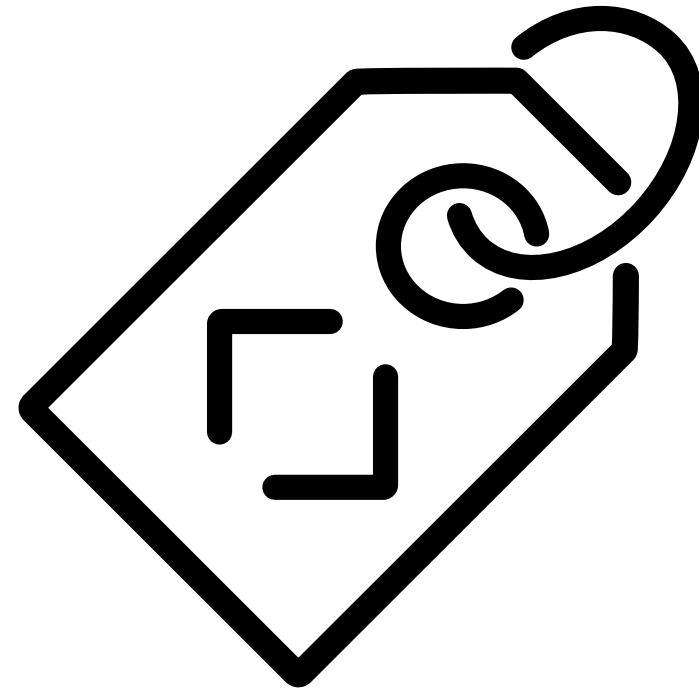




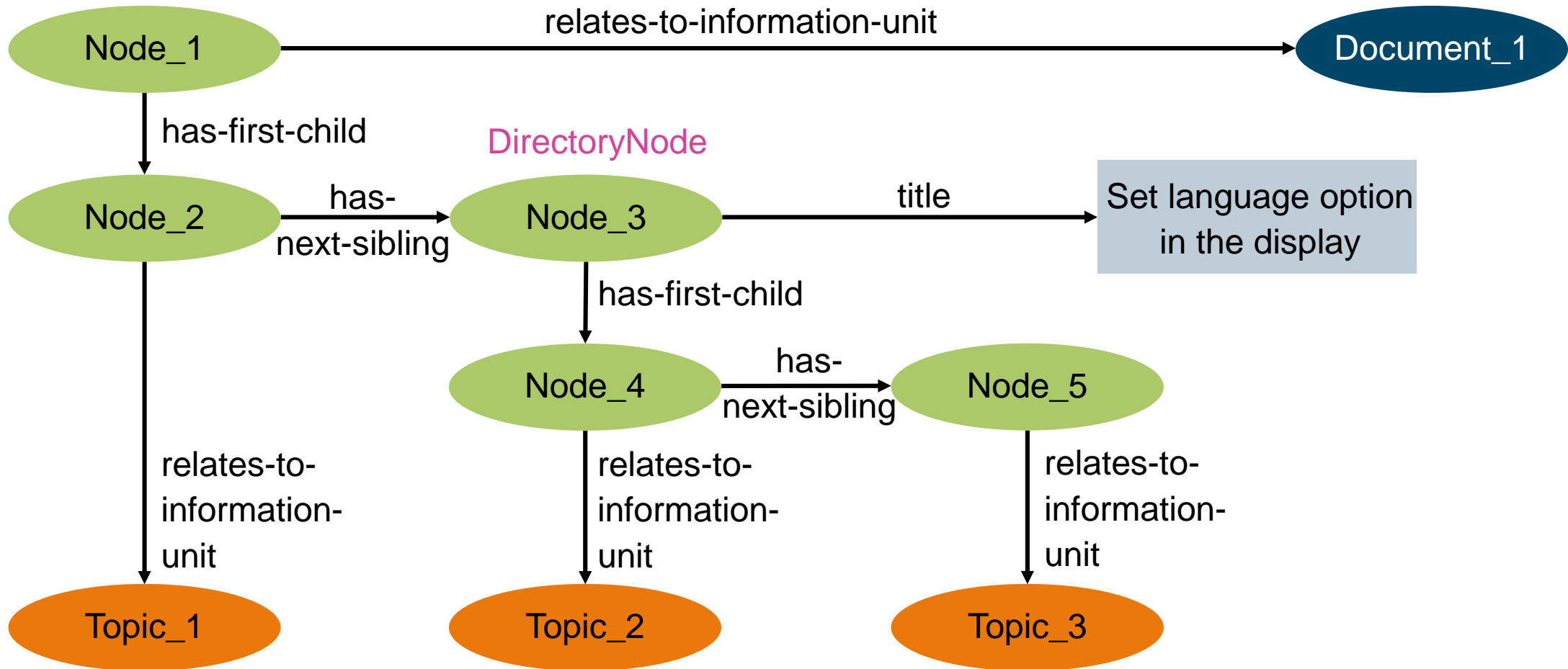
# iiRDS

## Metadata (2)

- Extensive set of predefined metadata
- Some metadata have predefined values
- Examples for iiRDS metadata:
  - language
  - revision
  - TopicType
  - InformationSubject (predefined values)
  - ContentLifeCycleStatus (predefined values)
  - ProductVariant
  - Component
  - ProductLifeCyclePhase (predefined values)
  - Event
- "Own" metadata may be added







## iiRDS ZIP Archive

root

mimetype

META-

INF

metadata.rdf

<arbitrary directory structure>

<arbitrary directory structure>

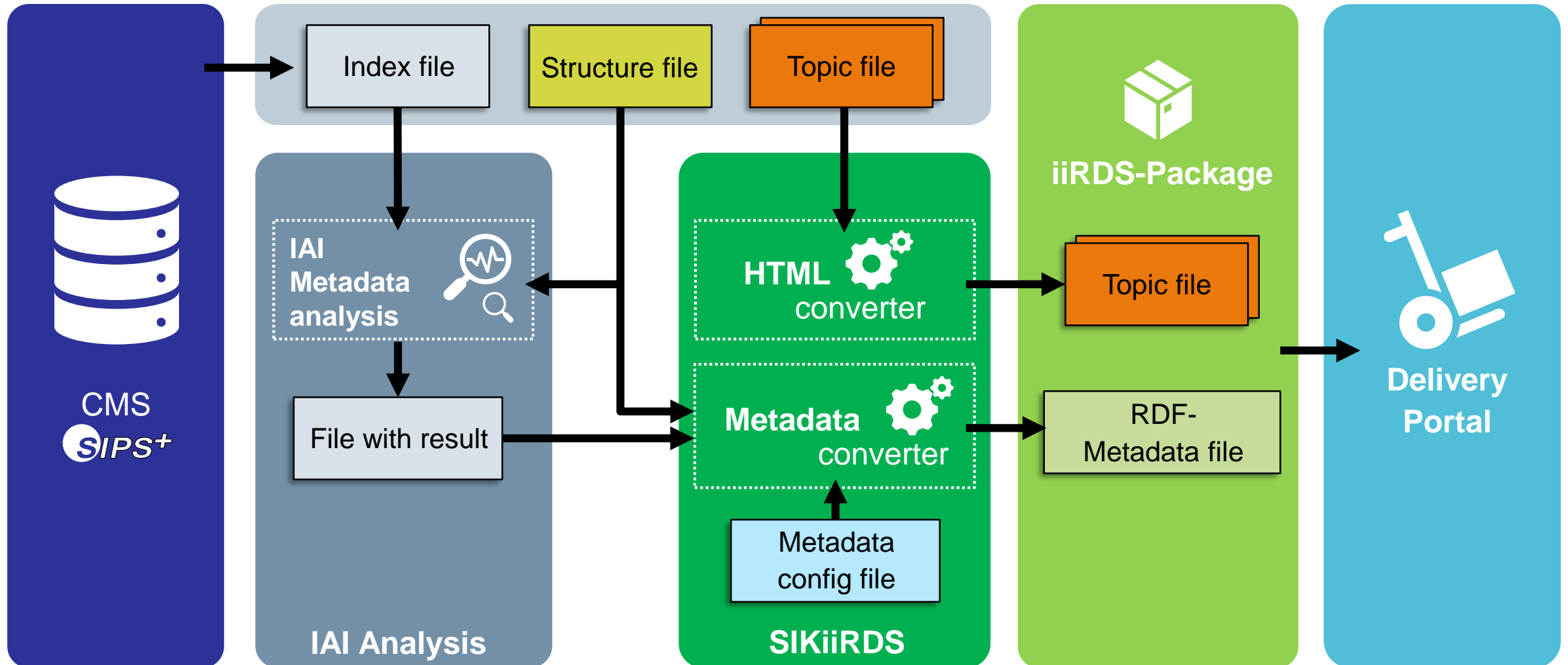
...

# Agenda



Product range SIEMENS Digital Industries	Marcus Hoffmann
Motivation for iiRDS at SIEMENS	Marcus Hoffmann
Document export from SIPS+	Robert Erfle
General about iiRDS	Robert Erfle
<b>Converter SIKiiRDS</b>	<b>Robert Erfle</b>
Generating metadata using language technology	Ursula Reuther
Application examples	Marcus Hoffmann

# Siemens Converter for iiRDS (SIKiRDS)



# Configuration of metadata Transfer Siemens - iiRDS

- Entry per metadata
- Necessary information:
  - Name Metadata Siemens
  - Name iiRDS property
  - Name iiRDS class
  - Distinction instance or literal
  - Differentiation predefined values or not
  - Mapping of the predefined values if necessary

```
sikiirdsConfiguration "http://www.w3.org/2001/XMLSchema#document"
  !-- Existing metadata from SIPS+
  > metadata documentPublishEdition
  > metadata documentSearchClass
  > metadata lifeCycle
  > metadata versionState
  > metadata ProductFamily
  > metadata topicClass
  !-- Metadata from IAI analysis
  > metadata subject
  > metadata productLifeCyclePhase
  > metadata productFunction
  > metadata productProperty
  > metadata component
```



# Configuration of metadata

## Example versionState

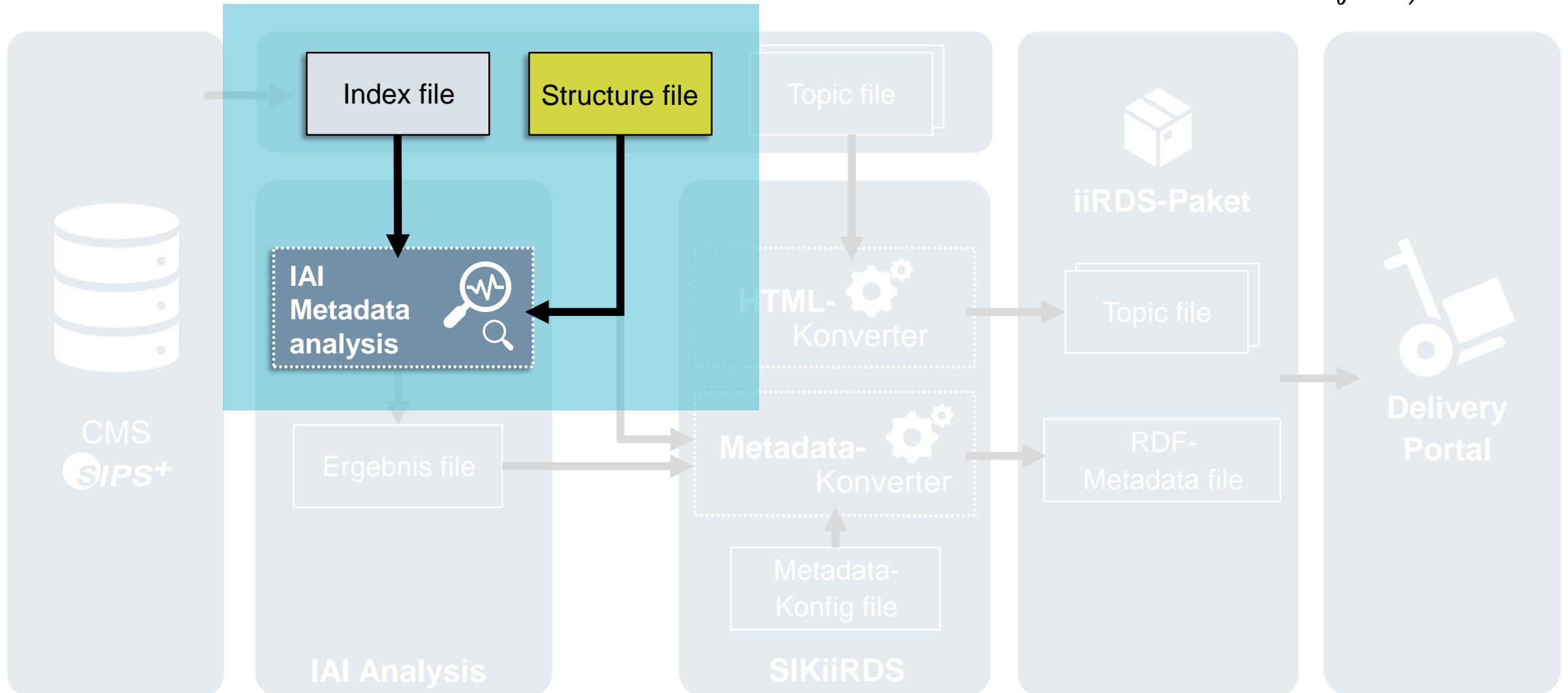
- `metadata versionState`
  - `name versionState`
  - `context document`
  - `context chapter`
  - `context topic`
- ▲ ● `mapping http://iirds.tekom.de/iirds#has-content-lifecycle-status`
  - `targetProperty "instance-predefined" http://iirds.tekom.de/iirds#has-content-lifecycle-status`
  - ▲ ● `values "http://iirds.tekom.de/iirds#ContentLifeCycleStatusValue"`
    - ▲ ● `value Working version`
      - `source Working version`
      - `target http://iirds.tekom.de/iirds#InPreparation`
    - ▷ ● `value Editorial Release`
    - ▷ ● `value Test Release`
    - ▷ ● `value Final Release`

# Agenda



Product range SIEMENS Digital Industries	Marcus Hoffmann
Motivation for iiRDS at SIEMENS	Marcus Hoffmann
Document export from SIPS+	Robert Erfle
General about iiRDS	Robert Erfle
Converter SIKiiRDS	Robert Erfle
<b>Generating metadata using language technology</b>	<b>Ursula Reuther</b>
Application examples	Marcus Hoffmann

# Sources of metadata creation



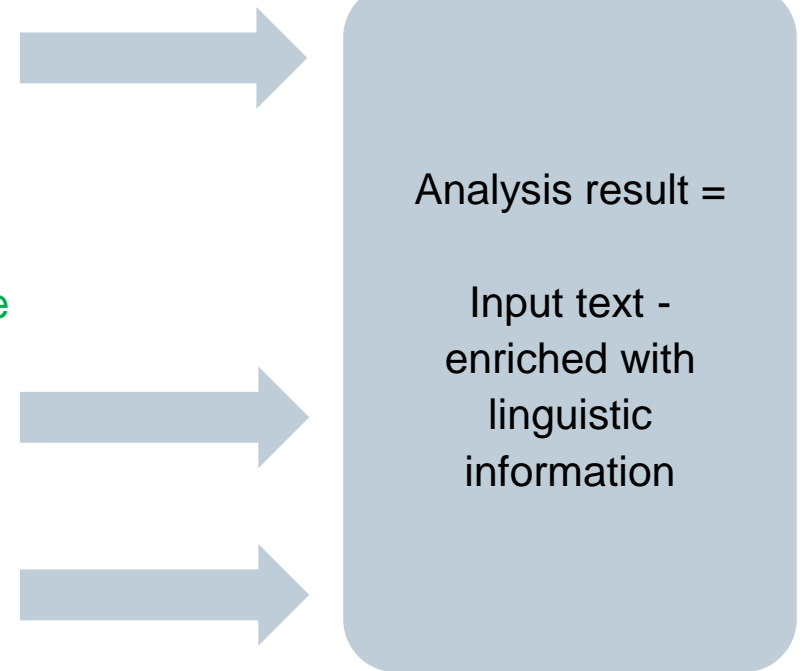
# Generating metadata using language technology



- Linguistic analysis techniques are very well suited for the generation of metadata
- Other applications of metadata generation
  - Indexation
  - Document classification / Document clustering
  - Document similarity
- Now: Application to iiRDS

## How does linguistic analysis work?

- Language-specific and rule-based
- On a morpho-syntactic basis
  - Each word is broken down into its smallest components  
*Auslieferungszustände* → *Auslieferungszustand*  
*Auslieferung – s – zustand*  
*aus\_liefern # ung – zustand*  
*Semantik: process/massnahme # state*
  - Out of single words phrases are built  
*[das [vom Ingenieur [[für den Einbau] [vorgesehene]]] Modul]*
  - Out of phrases sentences are built





*What information can be derived from the analysis results?*



Einspeisung	<i>ein_speisen # ung, sem=process</i>
Synchronisierer	<i>synchronisieren # -ierer, sem=agent/instr</i>
Das Importieren	<i>Nominal infinitive +</i>
Einrichten von Verbindungen	<i>optional PP</i>
Laden in CPU	
Felder konfigurieren	<i>Object + infinitive =</i>
Die verwendeten Versionen auslesen	<i>Impersonal imperative form</i>
Wie stelle ich ... ein?	<i>Interrogative clause with „wie“ + pronoun</i>



Mapping  
Ruleset



ProductFunction

Component

Configuration

ProductLifeCycle  
Phase

...

# Example for automatically generated iiRDS metadata

ProductFunction

...

Commissioning

Configuration

System diagnosis

Setting up connections

Optimize position controller

Load in CPU

Feed-in

Read out the versions used

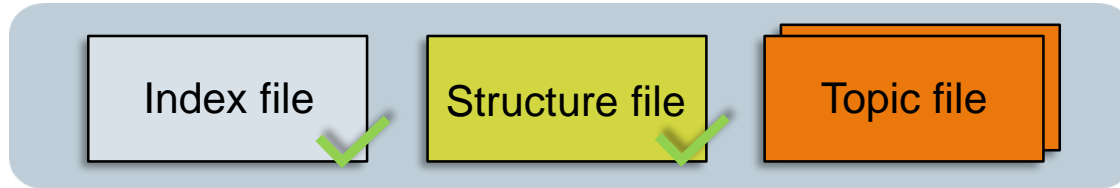
Referencing

Synchronisation

...

## Next steps and further possibilities

- Extension of input data to topic content in SIPS+



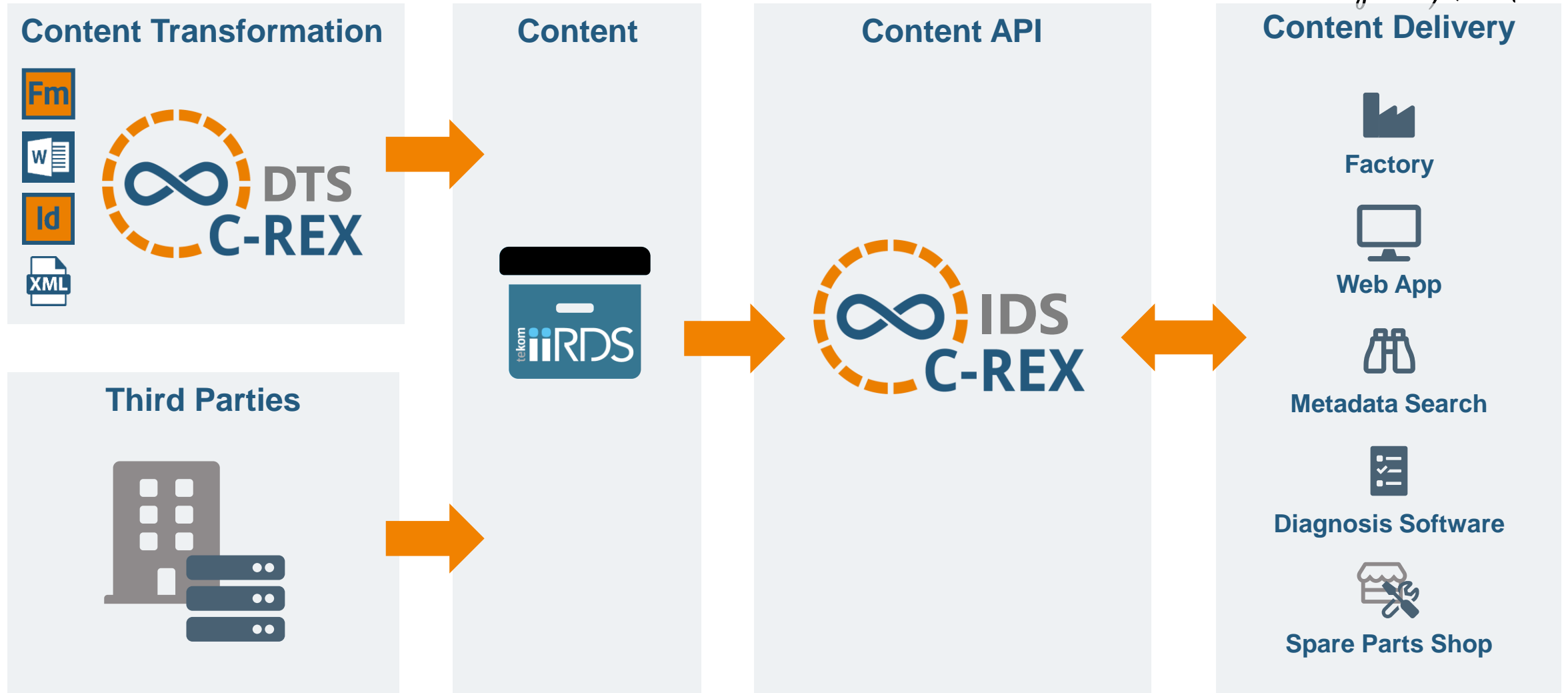
- Extension of the Mapping Ruleset
  - Currently, 88% of 3,000 document nodes have received a correct iiRDS metadata
  - Consideration of further iiRDS metadata classes
- Extension to further data models, e.g. VDI 2770
- Identification of the generic parts of the ruleset
  - Keyword recognition
  - Certain word stems (e.g. Configuration, Configuration Configuration)
  - ...

# Agenda



Product range SIEMENS Digital Industries	Marcus Hoffmann
Motivation for iiRDS at SIEMENS	Marcus Hoffmann
Document export from SIPS+	Robert Erfle
General about iiRDS	Robert Erfle
Converter SIKiiRDS	Robert Erfle
Generating metadata using language technology	Ursula Reuther
<b>Application examples</b>	<b>Marcus Hoffmann</b>

# Pilot delivery via c-rex.net



# Example

## Automatically generated iiRDS metadata

The screenshot shows a search interface with a left sidebar containing a list of metadata categories. The 'productFeatures' category is highlighted with an orange box. An orange arrow points from this box to the right-hand list of product features.

### productFeatures

productFeatures	Count
Inbetriebnahme	8 / 8
Konfiguration	6 / 6
Diagnose	6 / 6
anzeigen	6 / 6
Schutz	3 / 3
Lageregler optimieren	3 / 3
Laden in CPU	2 / 2
Einspeisung	2 / 2
die verwendeten Versionen auslesen	2 / 2
Referenzieren	2 / 2
Programmieren	2 / 2