

Accelerating lead times and inventory with Knowledge Graphs at Nokia and RFS.



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Gartner Cool Vendor in Intelligent Supply Chain Execution Technologies 2018.
Top10 GDPR Solution Provider 2019.

www.eccenca.com



AGENDA.

- 1. RADIO FREQUENCY SYSTEMS (RFS):**
Key figures and digitization challenges
- 2. FIRST THINGS FIRST:**
Building the knowledge graph foundation for future success
- 3. INTEGRATING SUPPLY CHAINS:**
Work with ASCM
- 4. STEPS INTO THE FUTURE:**
Turning data to money



KEY FIGURES

BUSINESS UNITS

4

- Cables
- Antennas & Filters
- Microwave
- Antennas Solutions
- Broadcast & Defense

REGIONS

4

- NAR
- EMEA
- APAC
- LATAM



35+
sales and technical support
offices in more than
20 countries

8

manufacturing facilities to
serve the world
Australia, Brazil, China, France,
Germany, India,
United Kingdom and the US

Read: disparate systems with lots of data

KEY CHALLENGES & SHORTCOMINGS

- Every location had a unique data model for their products
- No comparability between products, warehouses and production data

Resulting in

- No streamlined procurement, production planning, inventory and sales activities
- No knowledge transfer about Best Practices
- High inventory stock and restricted revenue streams

»Our vision is a digital, **agile supply chain** that connects suppliers and customers through manufacturing by means of **seamless data integration** and e2e digitization of operations.«

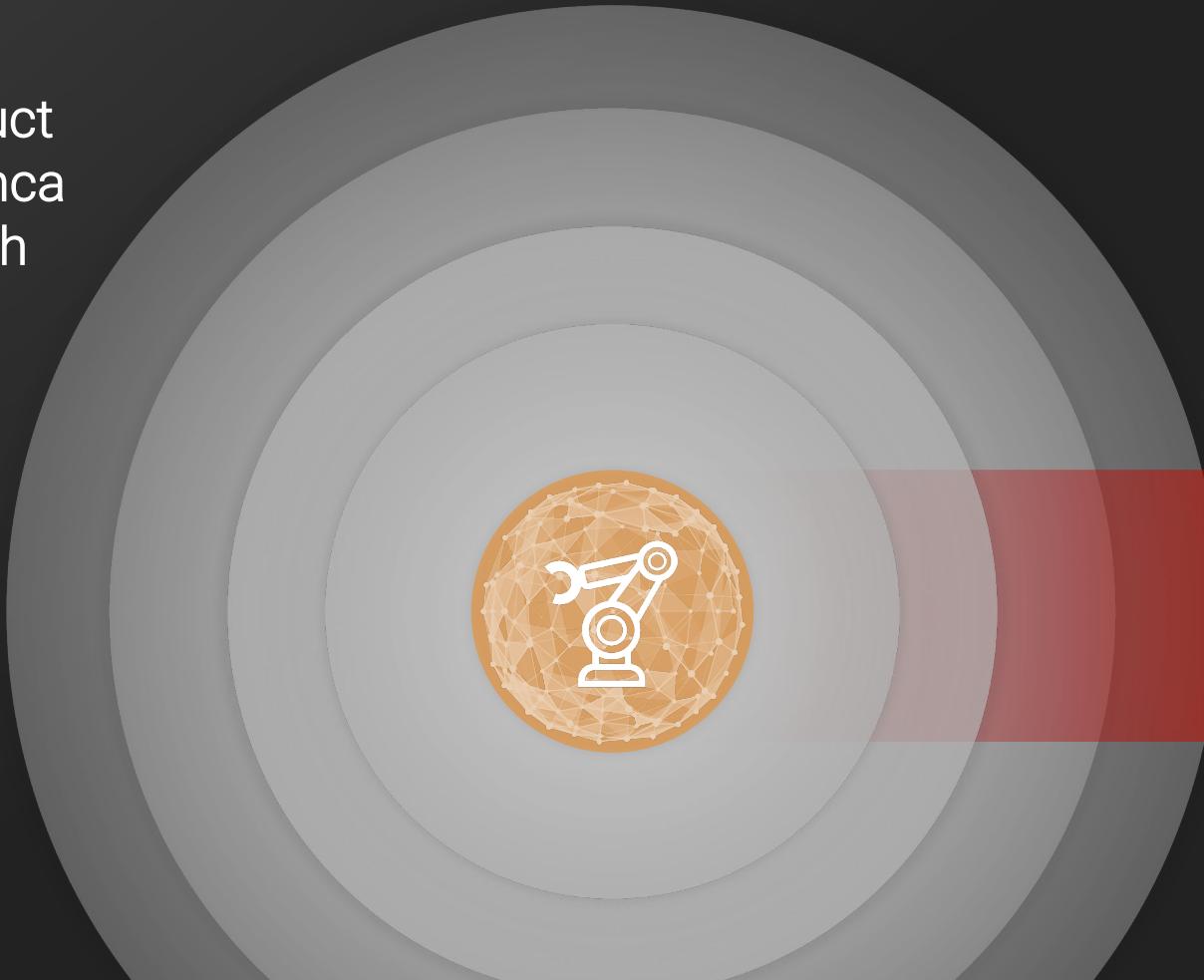
Thomas Gaal,
Director Digital Transformation RFS



2018

Linking all product
data in an eccenca
knowledge graph

Objectives

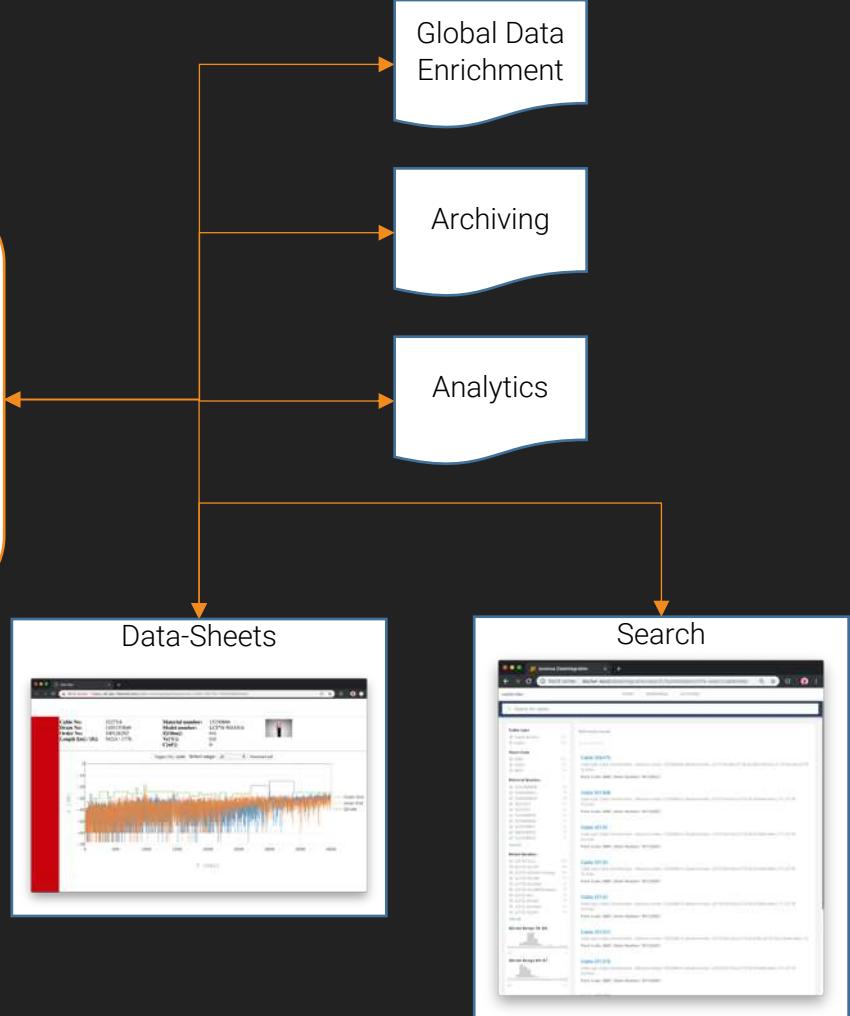
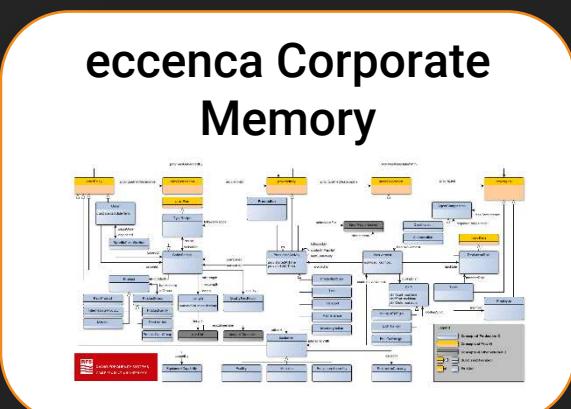
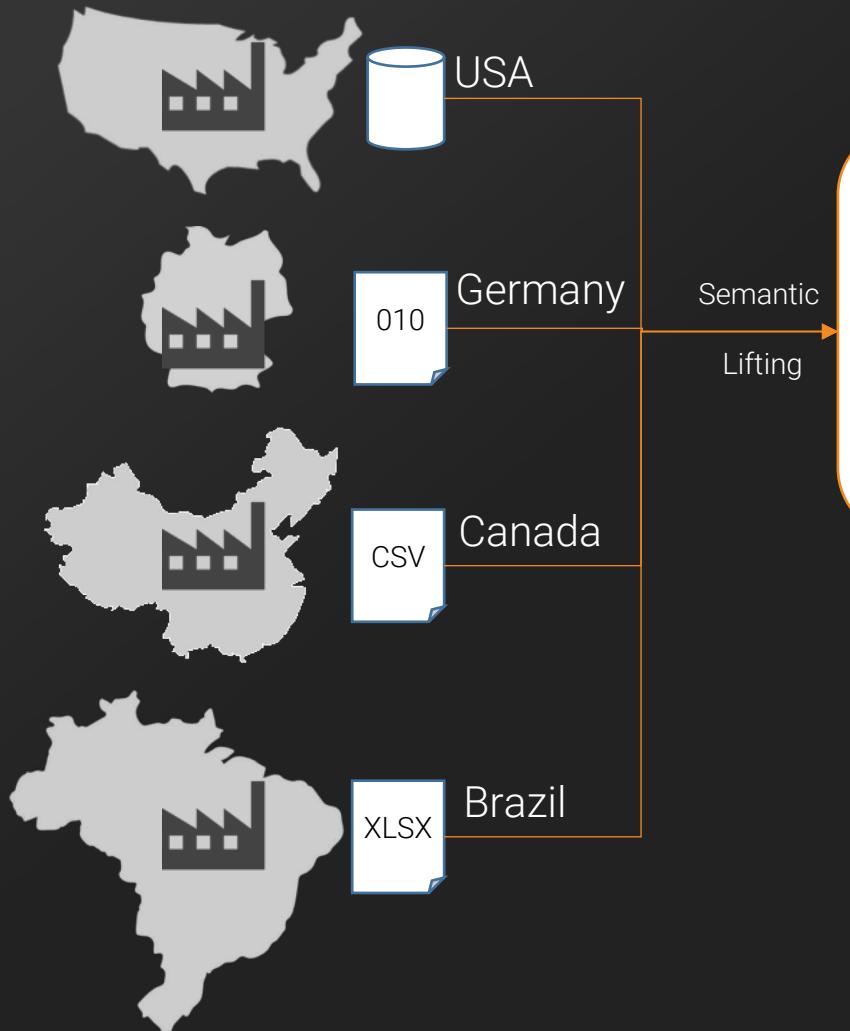


DIGITAL TWIN PRODUCT

Global, virtual warehouse of inventory
Standardized performance test characteristics

2018

Linking all product
data in an eccenca
knowledge graph



DATASETS ATTRIBUTES

Dataset catalog Search



Dataset	Description ↑↓	Domain	Status	Created ↑↓	Modified ↑↓
▼ Loans	Loans dataset	Lending	approved	2018-05-29 15:17:17 UTC+00:00	2019-01-14 21:50:01 UTC+00:00
▼ Loans with client ratings	Tabular result	Lending	needs approval	2018-05-29 15:25:58 UTC+00:00	2019-01-14 21:50:48 UTC+00:00
▼ Client ratings	Client credit ratings	Lending	published	2018-05-29 15:32:19 UTC+00:00	2019-01-14 21:52:14 UTC+00:00
▼ Loans with client ratings graph	Linked knowledge graph	Lending		2019-01-09 20:57:30 UTC+00:00	2019-01-14 21:49:32 UTC+00:00
▼ products xlsx		Products	published	2019-08-12 19:46:55 UTC+00:00	2019-08-12 19:47:09 UTC+00:00
▼ services csv		Products	published	2019-08-12 19:50:03 UTC+00:00	2019-08-12 19:50:15 UTC+00:00
▼ orgmap xml		Products	published	2019-08-12 19:50:41 UTC+00:00	2019-08-12 19:51:01 UTC+00:00

Found 7 results. Rows per page 20 ▾ |< < Page 1 of 1 > >|



Service (7)

- Price (2)
 - Price
- Product Manager (0)
 - n/a
- eligible For (0)
 - n/a

Service

Service

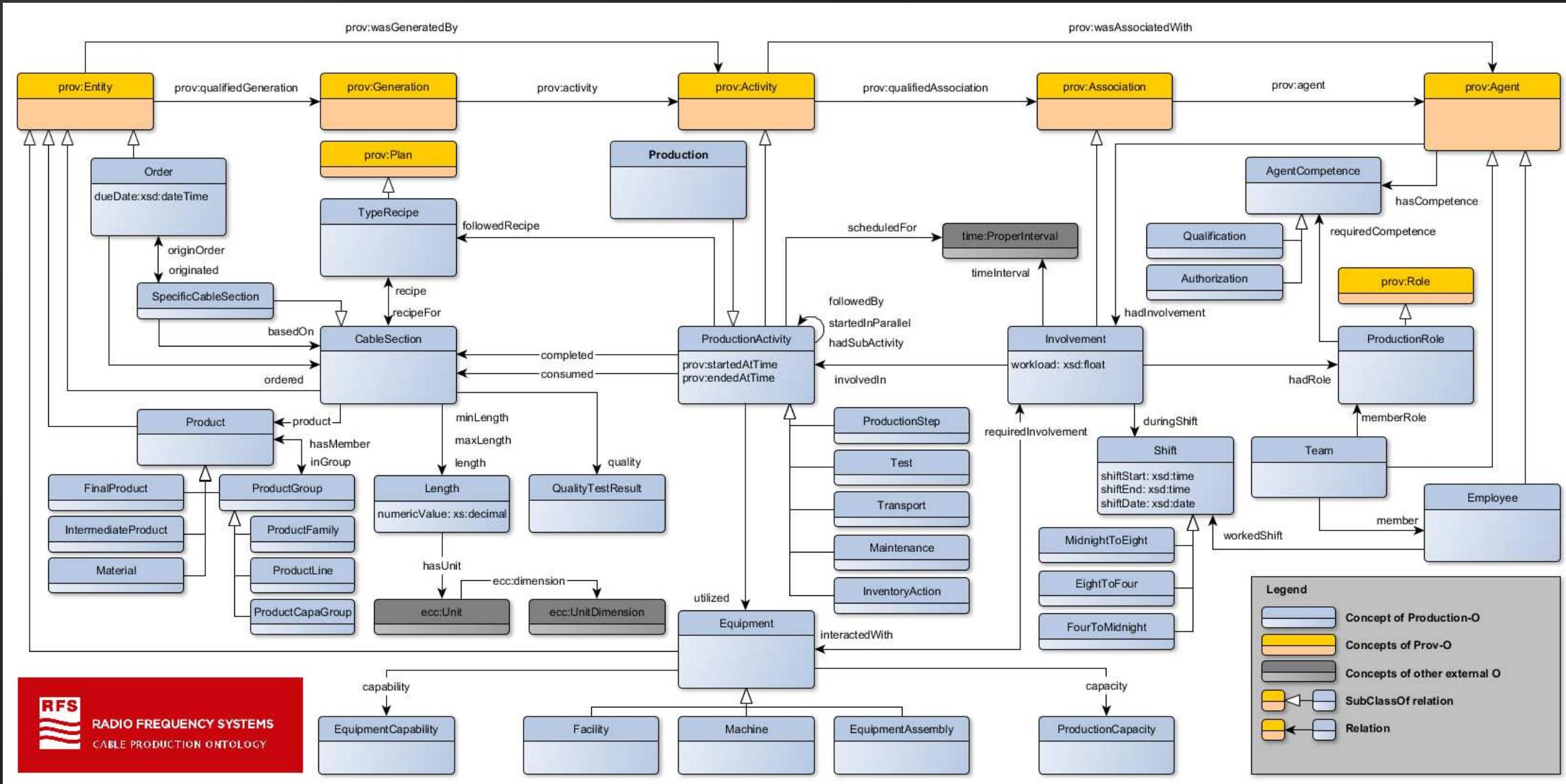
pi:srv-{ServiceID}

Mapping rules (7)

 Price pv:price	Price	n/a
 Product Manager pv:hasProductManager	n/a	n/a
 Service Name pv:name	StringValueType	ServiceName
 Service ID pv:id	StringValueType	ServiceID
 eligible For pv:eligibleFor	n/a	n/a
 label rdfs:label	StringValueType	ServiceName
 Copy of has Category pv:hasCategory	StringValueType	ServiceName



CLOSE



< Graphs ⋮

Search

Products Instances Imports

Products vocabulary

eccdm: eccenza Dataset Management Onto...

Navigation

Search

Ontology

ObjectProperty

Class

DatatypeProperty

> Product

Product Category

> Agent

Address

1 - 10 | < < > >|

Sensor Adjustment

PROPERTIES REFERENCES TURTLE

type Service [SHOW IN LIST](#) [ADD](#)

label Sensor Adjustment [SHOW IN LIST](#) [ADD](#)

eligible for Switch Encoder Transducer [SHOW ALL 217 IN LIST](#) [ADD](#)
Rheostat Transformer
Transistor Compensator
Potentiometer Inductor
Multiplexer Transistor Transformer

has category Adjustment [SHOW IN LIST](#) [ADD](#)

has product manager Ulrik Denzel [SHOW IN LIST](#) [ADD](#)

price pi:price-N558-1730215-EUR [+](#)

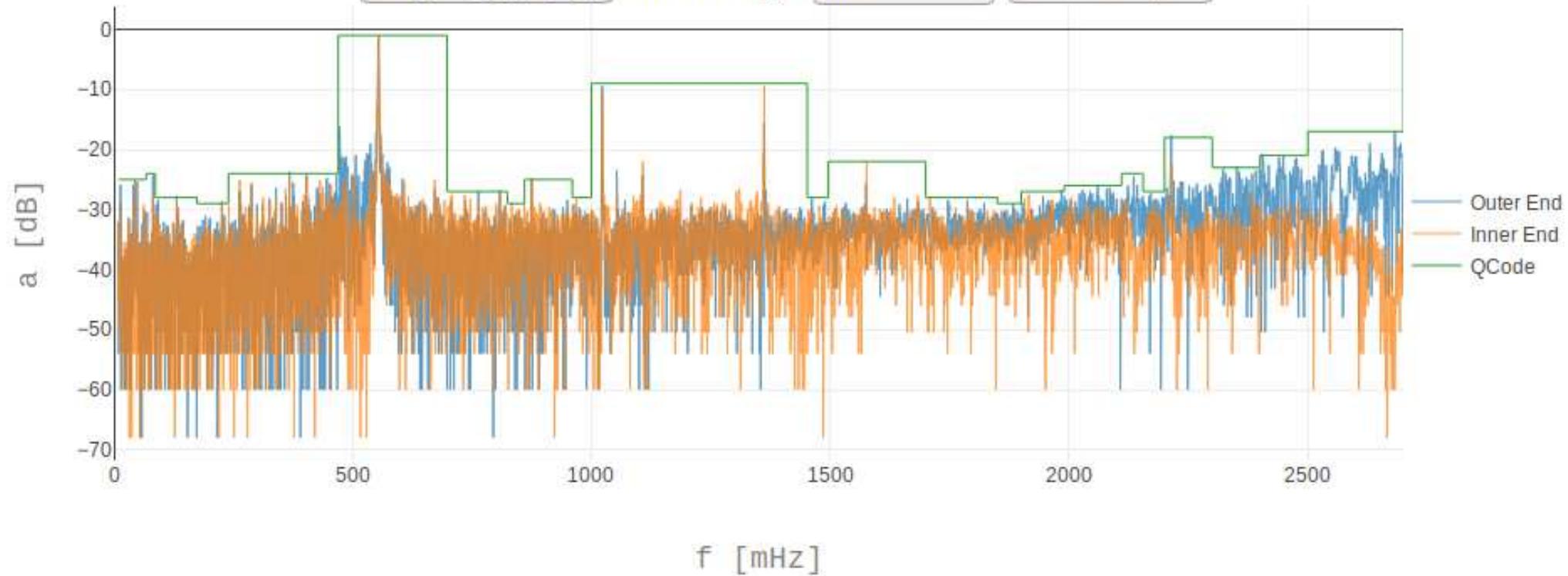
Cable No: 24821
Drum No: 2157158624
Order No: 100938281
Length l[m] / [ft]: 505.0 / 1657

Material number: 16609066
Model number: RLKU158-50JFLAH
Z[Ohm]: 49.94
Vr[%]: 89.67
C[nF]: 37.6611



Select range:

all



2018

Linking all product
data in an eccenca
knowledge graph

12%

Inventory
reduction within
3 months

50%

Lead-time
reduction

200%

ROI within first
six months



DIGITAL TWIN PRODUCT

Results

Improved Order
To Delivery global
cross-fulfillment

New business process
capability Global S&OP
inventory netting

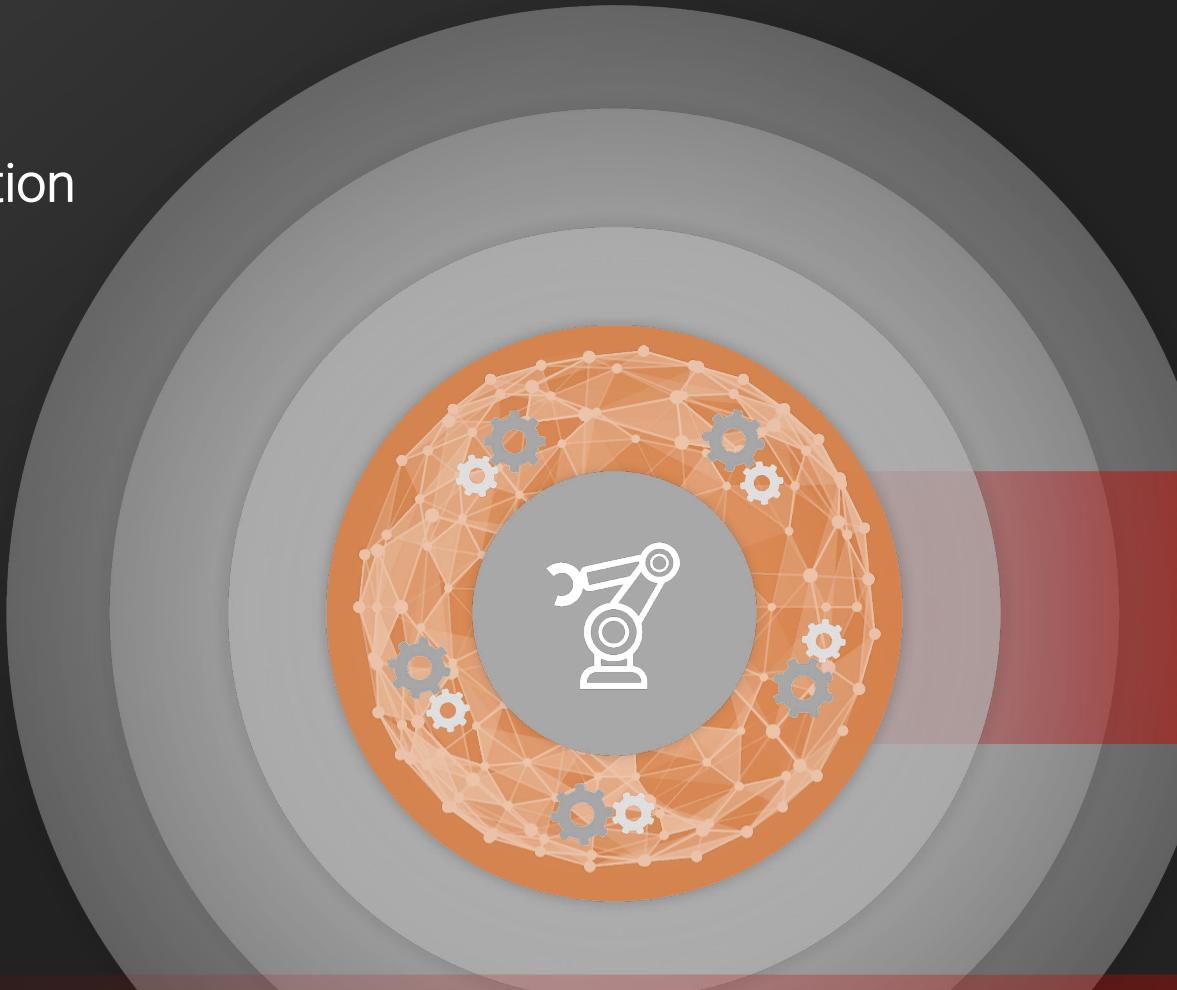
»We've enabled data agility by creating a **semantic data architecture** embedded in our enterprise IT architecture. **We reduced 20 man-months** of transactional effort in internal processes, and are in discussion with suppliers and customers to **collaborate with exchanging data** thus moving away from EDI and supply portals.«



Thomas Gaal,
Director Digital Transformation RFS

2019

Leveraging IoT
data for production
optimization



DIGITAL TWIN PROCESS

Objectives

Link process and product performance data
Quality prediction & reduction of rejects
Predictive Maintenance

2020

Optimizing Supply Chain



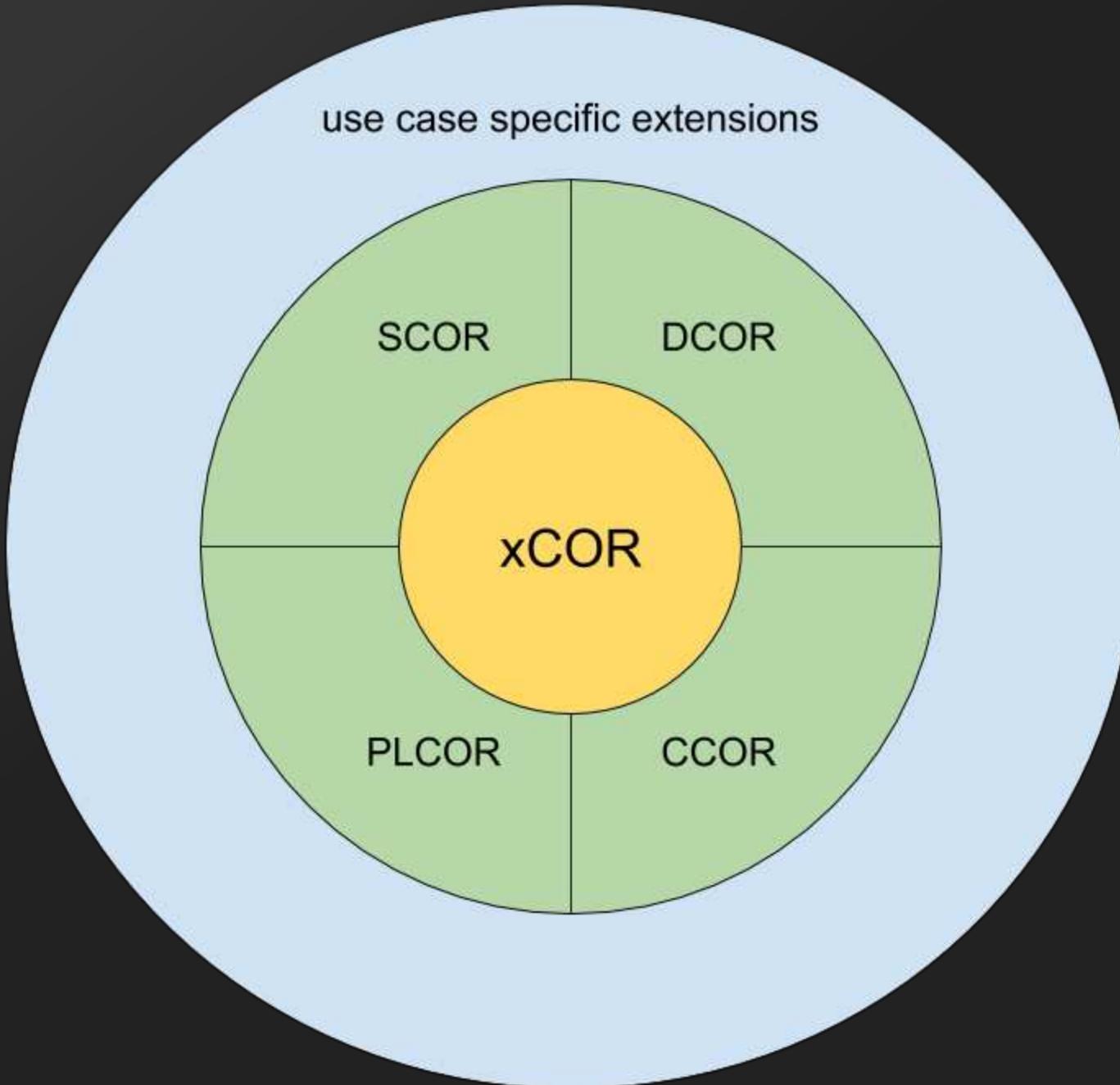
Objectives

Optimization of supplier contracts
Optimization of plant load balancing
Further reduction of lead-time

DIGITAL TWIN PARTNERS

Supply Chain Integration using SCOR

- Supply Chain Operations Reference model
- Under the patronage of the Association for Supply Chain Management
- Create an ontology reflecting the collected and combined knowledge
- Abstracting an upper level ontology – xCOR
 - Covering all sub domains (SCOR, DCOR, CCOR, PLCOR)
 - Integration of multiple existing taxonomies (Processes, Metrics, etc.)
 - Portraying implicit knowledge, introducing additional (Agents, Events, Units, etc.)



Supply Chain Integration using xCOR/SCOR

- Capable of answering typical SCOR queries
 - Suitable metrics for a given SC process
 - Validating a given process chain
 - Best practices for specific metric short fall
- Providing additional support for new concepts
 - Which event class may influence a given SC Process and its resulting metrics
 - Linking plans to a specific process, involved agents, etc.
 - Pointing out internal guidelines, statutes or other types of policies observed or otherwise relevant.

Supply Chain Extension using xCOR/SCOR

- Covering typical and pressing use cases
 - 3 / 4 way matches
 - Mapping disparate and intricate data to calculate high-level KPIs
 - Demand Driven Material Requirement Planning
 - Increasing visibility along the supply chain
 - Gaining high-level insights based on data of different departments, customers, suppliers, supplier-suppliers ...
 - Automating process validation, policy adherence, supporting audits

Coordinating RFS production worldwide

- RFS plans to add their supplier and distributors to their production management.
- Currently, every plant has its own contracts and delivery schedules with suppliers.
 - Missing opportunities in MRP (discounts, continuous replenishment, trust)
 - Ordering from different suppliers in small batches
- Need for aligning their global demand and procurement processes based on **unified and shared** information landscape (model + graph)
 - Establishing a global procurement process
 - Basing this process on shared product descriptions, global requirements planning data (same format, same schema)

Coordinating RFS production worldwide

- Streamlining processes that have a direct effect on their entire supply chain
 - On time material delivery / availability -> through balanced stock management
 - Optimized contracts
 - faster delivery of the finished good
 - (Semi-) automated product and process validation

2020

Data-driven services and
value propositions



**NEW BUSINESS
OPPORTUNITIES**

Objectives

Availability driven pricing (premium-price delivery)
Quality data as an asset for upselling
Increased conversion with new services (track & trace)

SUMMARY

DIGITAL TRANSFORMATION
IS ALL ABOUT LINKED,
SMART DATA.

Thank you.



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