A Cooperative International Initiative

papiNet GIE IDEAlliance

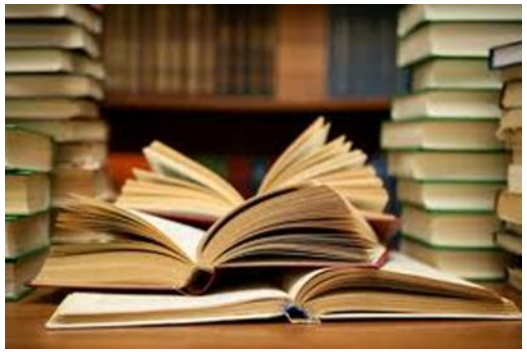
papiNet enabling Industry 4.0 for the Forest and Paper Industry

Brussels

19 November 2015

Outline

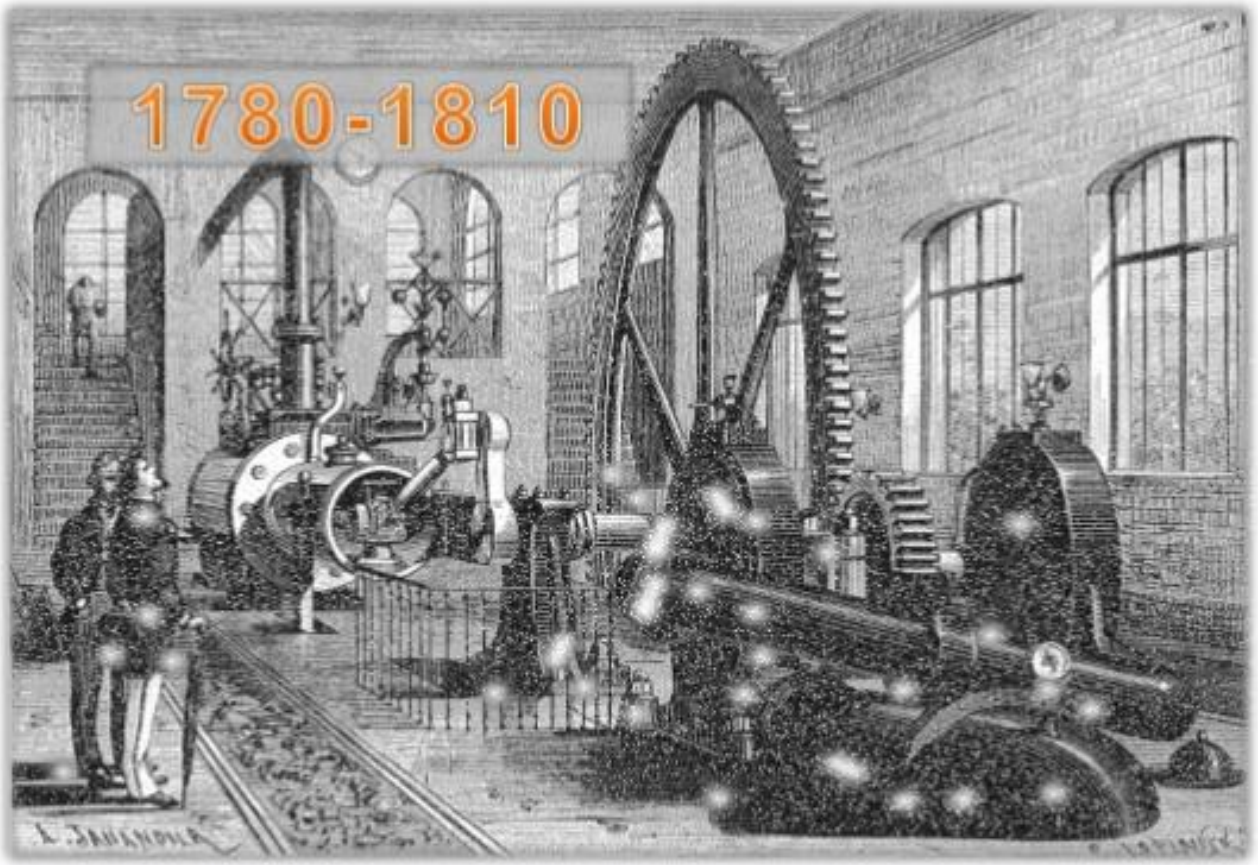
- Industry 4.0 Overview
- Why standards?
- About papiNet?



- Use case Forest
- Use case Pulp
- Use case Paper

Third Industrial Revolution

Mechanization of production using water and steam power



Second Industrial Revolution

Mass production with the help of electric power

Third Industrial Revolution

Digital communication technologies to automate production

Fourth Industrial Revolution

Interconnected systems for smart production

Computerization of the Manufacturing Industry

papiNet

- The goal of Industry 4.0 is the **smart and connected factory** with Internet of Things and Cyber Physical Systems as technology basis

- **Internet of Things (IoT)** is the interconnection of uniquely identifiable embedded computer devices (smart objects) within the internet infrastructure

- **Cyber Physical Systems (CPS)** are systems using computations and communications deeply embedded in and interacting with phycical processes

M2M communication

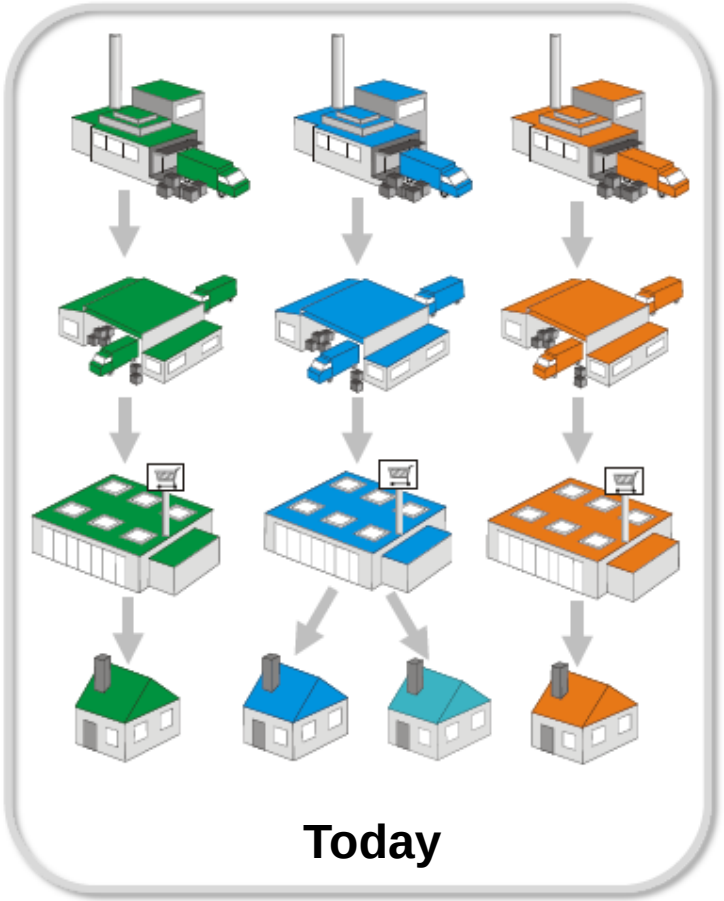
Video Source: http://www.ted.com/talks/lang/en/david_merrill_demos_siftables_the_smart_blocks.html

1. **Context-sensitive Component Behaviour**
2. **Dynamic Adaptation Based on Individual Role of the Component**

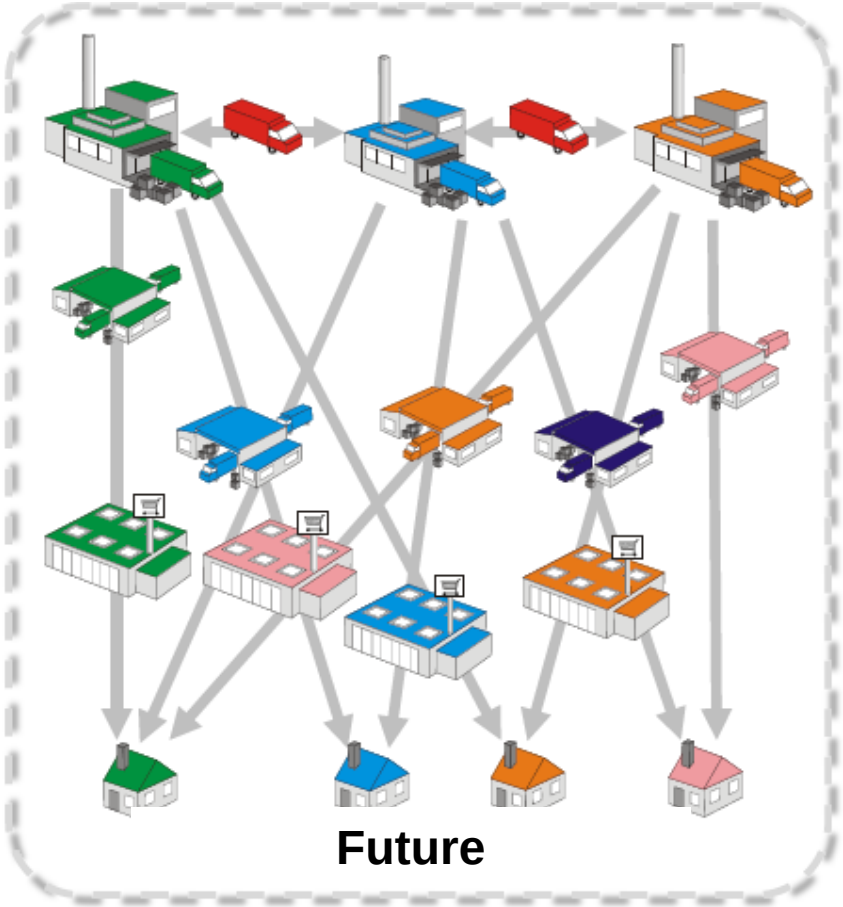
Networked Manufacturing

Supply Chains in the Future

papiNet



Today



Future

Connecting Machines with Intelligent Networks

Concept of Industry 4.0 is to **interconnect** machines, sensors and control systems together via **intelligent networks** to achieve:

- **Dynamic response to product demands**, enable rapid manufacturing of new products
- **Real time optimization** of manufacturing production and supply chain networks
- Strong customization of products, **mass customization**
- **Self optimization**, self configuration, and self diagnosis
- Active support of the manufacturing process by **smart products** themself

Standardization as a prerequisite for Industry 4.0

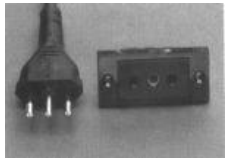
Industry 4.0 will involve **networking and integration of several different companies** through value networks.

This collaborative partnership will only be possible if a **single set of common standards** is developed.

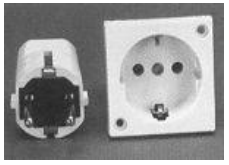
Open communication standards
Key to success for Industry 4.0

http://www.forschungsunion.de/pdf/industrie_4_0_final_report.pdf

Why Standards ?



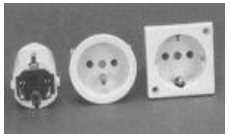
I



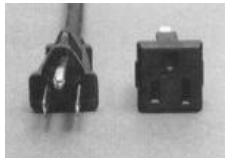
D, A, NL, S, N, SF

G

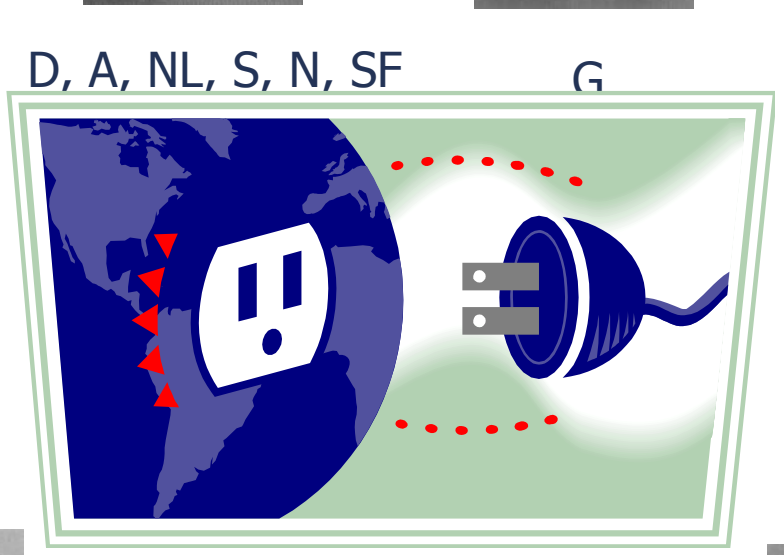
USA, CDN



F, B

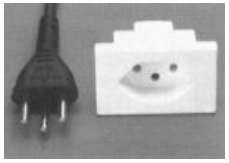


J

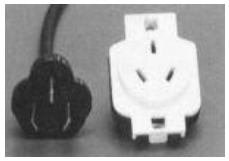


IND

IL



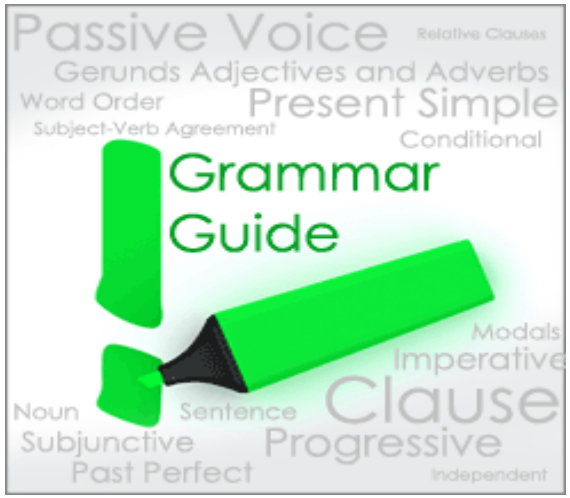
CH



AUS

The Approach

- XML definition
- by W3C



- Business process definition
- Data dictionary
- by papiNet

- Gaining intrinsic value
- by companies

About papiNet

Forest

Wood products

Pulp

Paper

Packaging

Labels

Books

Logistics

papiNet is…

- An enabler for collaboration, information sharing, process improvement and shared decision making
- The opportunity to improve processes across the entire supply chain network

<u>Not</u> an electronic marketplace !

<u>Not</u> a software!

papiNet SCOR Model

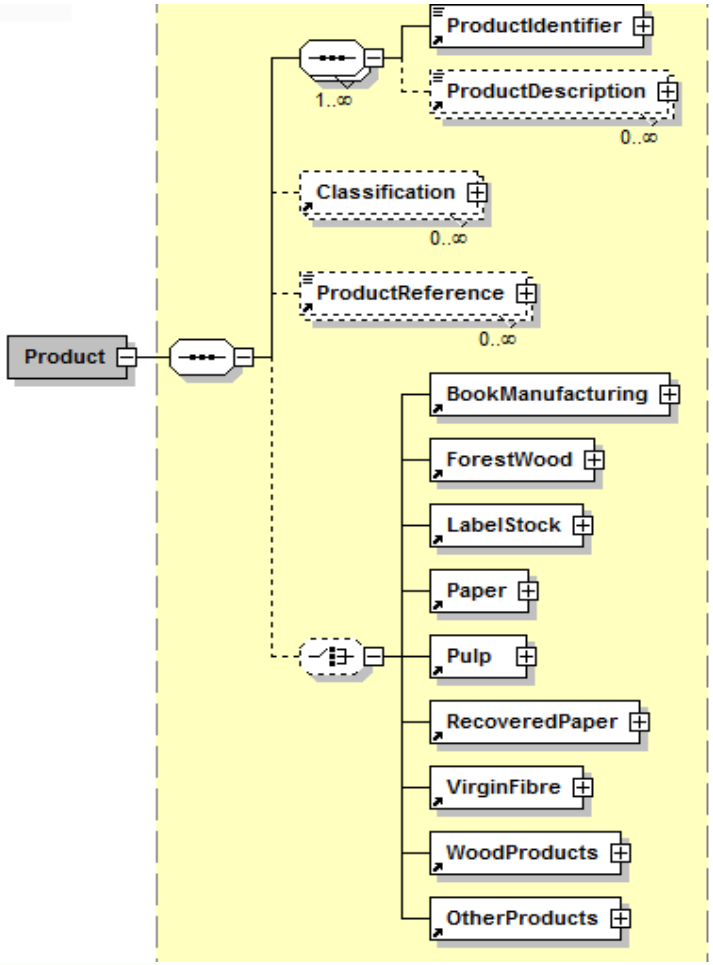
Plan	Source	Make	Deliver	Utility
▪ Product Attributes ▪ Planning	▪ Request For Quotation ▪ Availability ▪ Purchase Order ▪ Order Confirmation ▪ Call-Off ▪ Order Status ▪ Inventory Status	▪ Product Quality ▪ Usage ▪ Inventory Change ▪ Product Performance	▪ Delivery Message ▪ Goods Receipt ▪ Invoice	▪ Credit/Debit Note ▪ Business Acknowledgement ▪ Information Request ▪ Complaint ▪ Complaint Request

Standards are fundamental to an efficient supply chain:

- Enable timely, efficient and effective communications
- Avoid costly non-value added translation activities
- Enable fast and widespread connectivity
- Avoid “one-off”custom connections

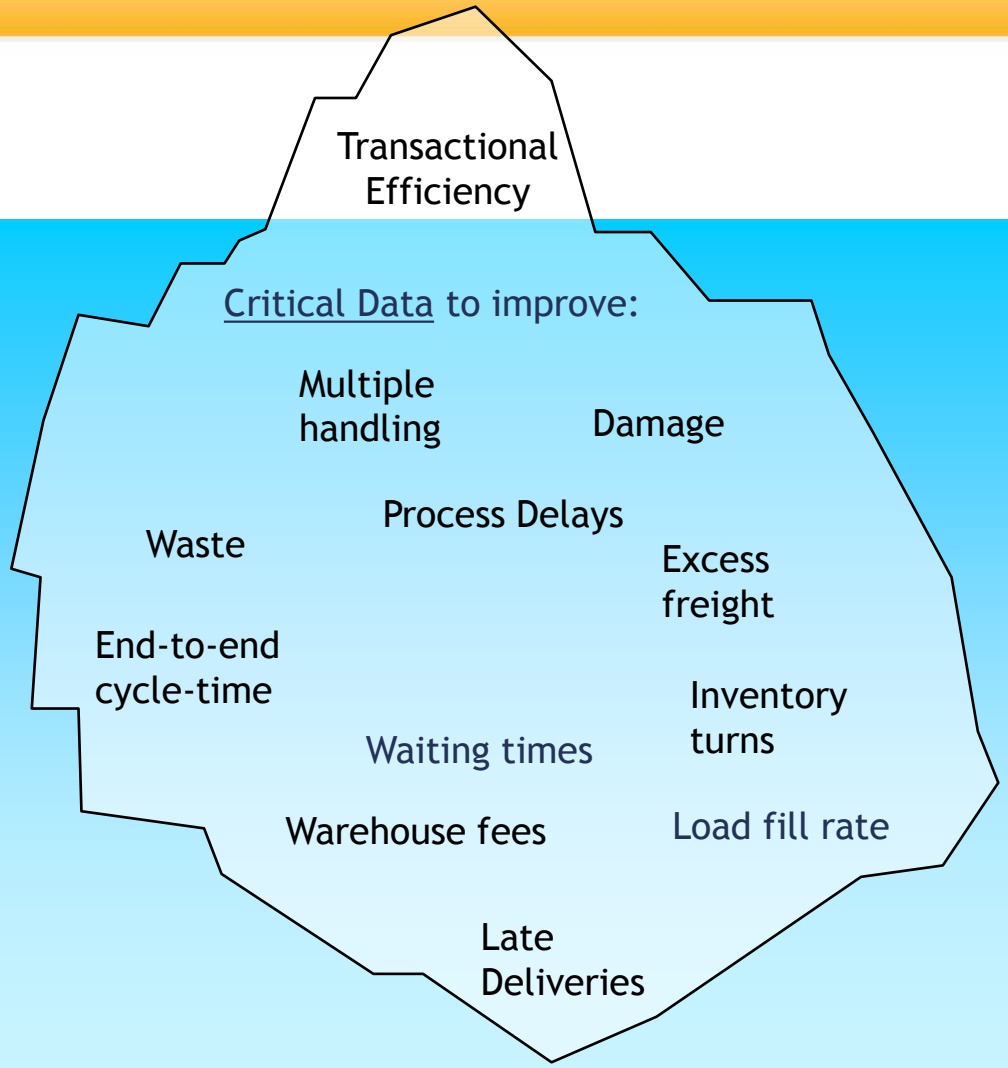
papiNet Assets

- Complete Set of XML Designs for the Forest and paper industry
- Extensive Documentation
- eDocuments



Open communication standards
Key to success for Industry 4.0

Gaining Value by Anlayzing Big Data



Perceived Value

Intrinsic Value

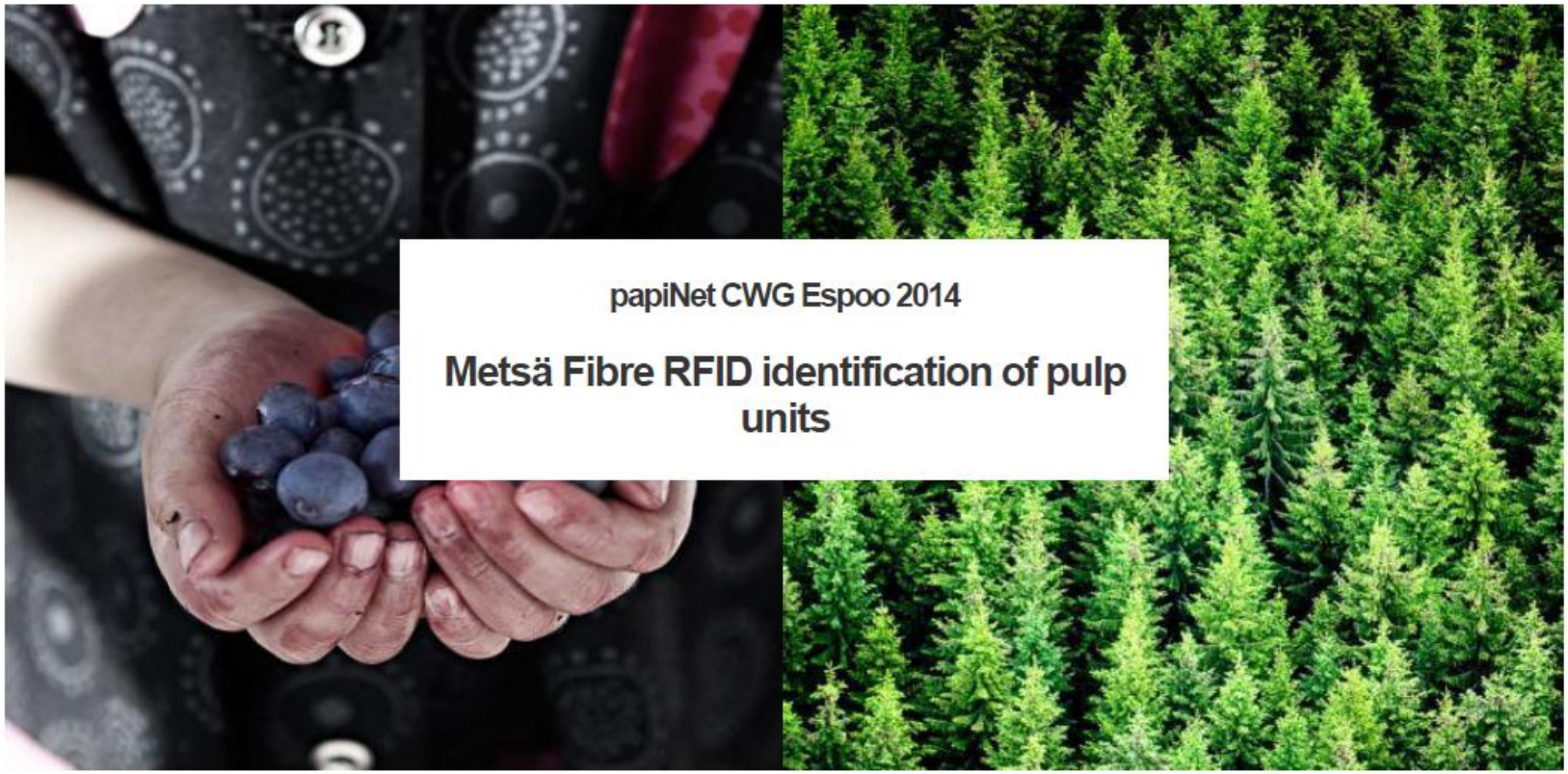
Use Case Forest QR codes

SKOG-DATA AS

Use Case Forest QR codes

- Standard on all way bills for FWS
- QR-code presented on paper and smartphones / pads
- Speeds up measuring prosess and reduces error rate
- New project for automatic measuring of chips by scale
  - Scan QR-code, weigh and produce Measuring Ticket
  - Web-cam photo for control

Use Case Pulp RFID



Use Case Pulp RFID

Metsä Fibre RFID solution overview

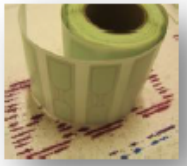
- Metsä Fibre mills apply RFID tags to pulp units on packing line
  - https://www.youtube.com/watch?v=hQ6F_FQoGsI
- RFID Identification is used to identify pulp units at (earlier units where tallied manually)
  - Metsä Fibre mills when moving units from packing line to mill warehouse
  - Metsä Fibre mills when loading outbound deliveries to loading port or customer
  - Loading ports when loading break bulk shipments or stuffing containers
  - Customer before pulp is used in production of product requiring pulp
- papiNet xml is used for integrating process against logistics partners and customers

Use Case Pulp RFID

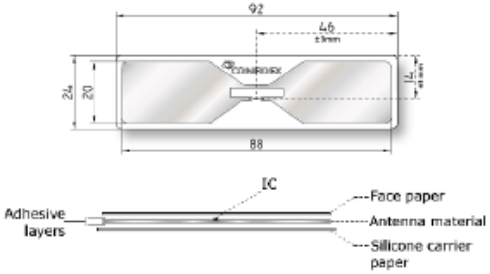
Metsä Fibre RFID solution overview

Type of RFID tag

- GS1 UHF EPC Gen2 standard with minimum 96bit EPC memory (http://www.gs1.org/gsmp/kc/epcglobal/uhfc1g2)
- RFID passive tag with a read range of appr. 2 meters
- Benefits compared to barcode
  - No line of sight needed for identification
  - Several units can be identified simultaneously
  - Not as vulnerable to dirt & physical damage as barcode



RFID tag



RFID tag on pulp bales

- GS1 EPC Tag Data Standard (TDS), SGTIN-96 encoding , is used for RFID data contents http://www.gs1.org/gsmp/kc/epcglobal/tds/
- RFID tag is applied to pulp unit on packing line, inserting it between bales, close to edge for reading optimization and to ensure tag isn't damaged during handling by forklifts or during transportation
- RFID tag is destroyed completely in pulping process, no need to remove before pulp is used

RFID tag applicator

RFID tag placement on pulp unit

RFID reading equipment

- RFID reading can be done using several types of equipment, i.e. using
  - Gate readers
  - Fixed readers on needed locations
  - Reader & antennas fixed to fork lifts
  - Handheld readers

Gate readers

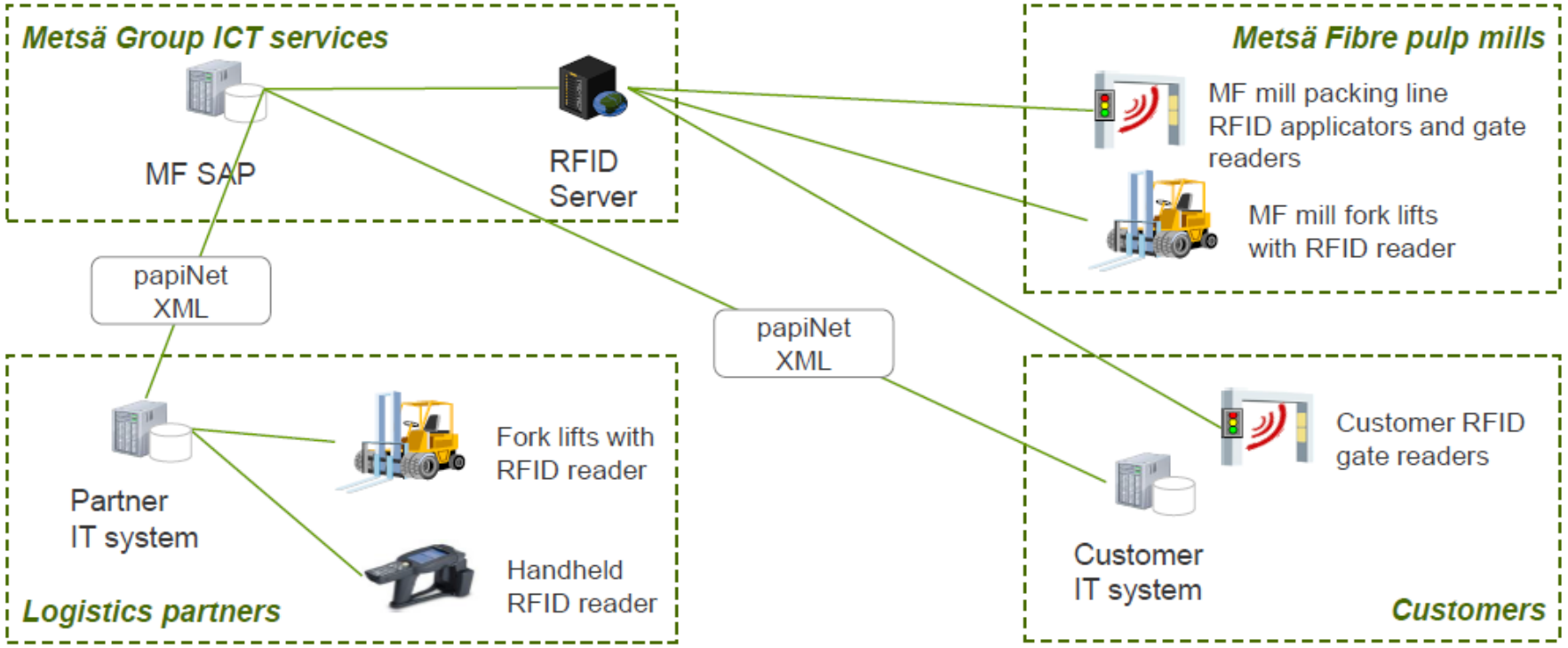
Fixed reader on conveyor

Clamp truck reader

Handheld scanner

Use Case Pulp RFID

Metsä Fibre RFID solution technical infrastructure



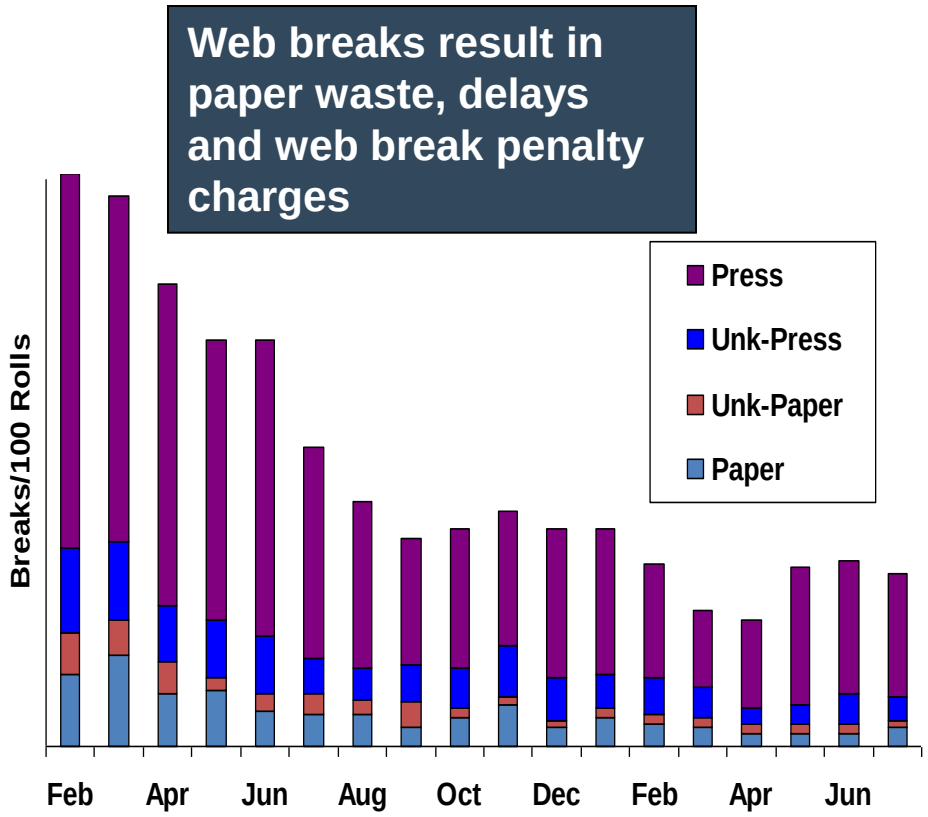
Use Case Paper Big Data

Quality

Product
Performance

Use Case Paper Big Data

1. **Use scorecard and feedback metrics to measure paper performance on press**
2. **Paper supplier used data to change how paper was produced**
3. **Resulting paper ran better on press, reducing waste, delays and web break penalty charges**



30

15 years ago….


WWW


Value works
e-Marketplaces


Electronic Data Interchange
EDI

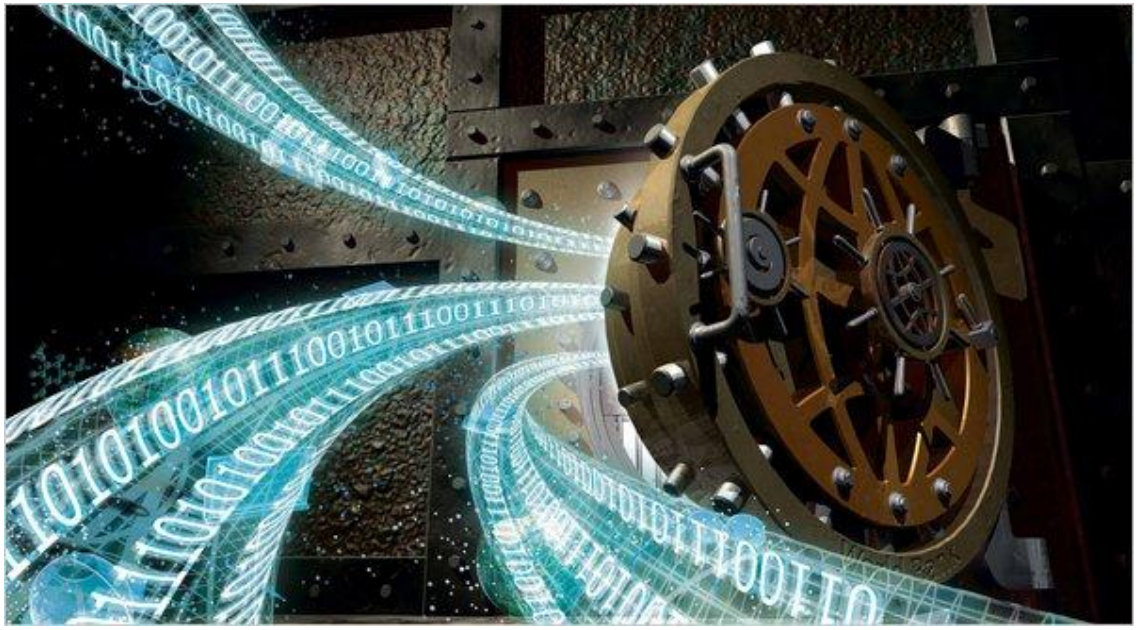

XML

Today….

MOBILE
SOLUTION

Mobile changed the world

Future Winners



www.papinet.org