Siemens Digital Logistics
Intelligent Supply Chain
Version 1.0

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www.siemens-digital-logistics.com

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"Applying state-of-the-art software and profound consulting expertise to make logistics the engine of our customers' success - generating added value along every link in the supply chain."

Beyond Your Supply Chain

Supply Chain Planning

Supply Chain Execution

Supply Chain Visibility

Siemens Digital Logistics
At a glance

SIEMENS

300 in-house digital logistics experts

Dedicated, broad-based **industry** savvy

Over **50** years of combined experience in logistics and supply chain management.

More than **750** customers from over **20** industries.

Global footprint in over **20** countries,

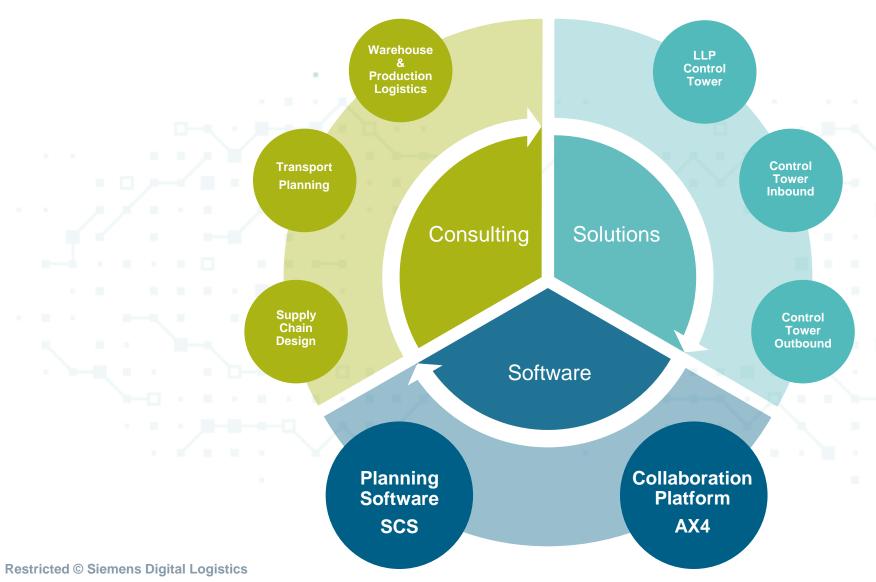part of a company with over **170** years of tradition

Customer
Audi, BASF, BAYER, BOSCH, Daimler, DB Cargo, DHL, dm-Drogeriemarkt
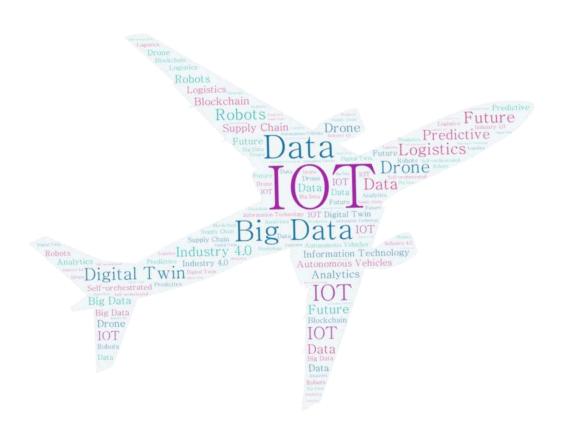
Products & Services
Overview

Warehouse & Production Logistics

Transport Planning

Supply Chain Design

Consulting

Solutions

Software

LLP Control Tower

Control Tower Inbound

Control Tower Outbound

Planning Software SCS

Collaboration Platform AX4

Introduction

#ISC

Your Supply Chain is becoming more complex, administrative and tailormade – against minimal margins

Gartner foresees reducing costs, improving internal productivity, and increasing visibility by tailormade workflows and direct communication between production and logistics (digital Supply Chain) driving the market through 2022

Source – Gartner "Magic Quadrant for Transportation Management Systems" March 2017

Intelligent Supply Chain

Major developments

❖ Industrial Internet of Things

❖ Big Data and Analytics

❖ Digital Twins

❖ (Block-Chain)

Intelligent Supply Chain

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There is still a lot of uncertainty about how Digital transformation will impact business

- ►**80%** of Execs believe that digital technologies will disrupt their business over the next 12 months

- ►**75%** say that digital technology has already disrupted their business

- ►**26%** of Execs say that their CEO sets a clear vision for digital in their business

- ►**25%** say that they fully understand the potential of digital to change i.e. how to create and deliver value to the customer

- ►**15%** feel they have the necessary people and skills to execute their digital strategy

Intelligent Supply Chain

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Organisations have to change from single, siloed systems….

…. to networks of capabilities

Today   **Future**

While today's enterprises are linearly organized and optimized within the boundaries of organizational and system silos…

PLM · CRM · ERP · MES · WMS

Drivers for Change

Connectivity
Internet of Everything
New (Digital) Competition
Cost Pressure
Individualized Products
Lot Size 1
Shorter Time To Market
Re-industrialization

Are you ready?

Siemens Digital Logistics/ Product Management
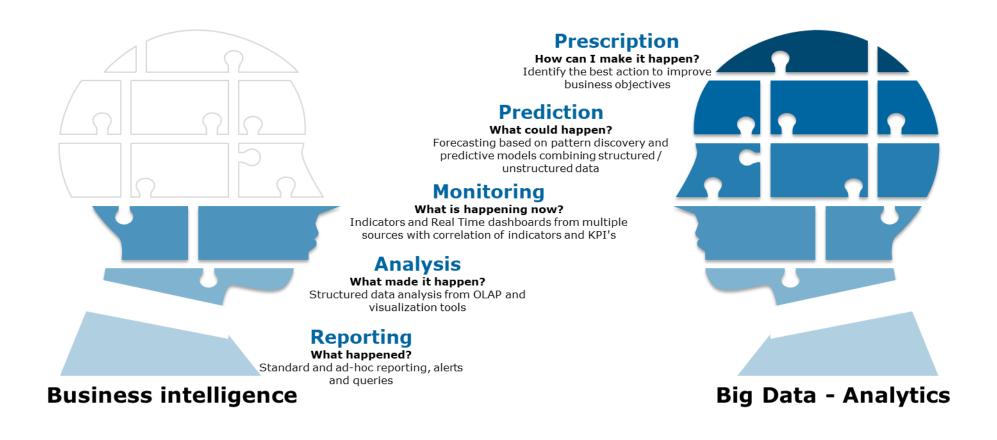
The path from Business Intelligence to Big Data

Prescription
How can I make it happen?
Identify the best action to improve
business objectives

Prediction
What could happen?
Forecasting based on pattern discovery and
predictive models combining structured /
unstructured data

Monitoring
What is happening now?
Indicators and Real Time dashboards from multiple
sources with correlation of indicators and KPI's

Analysis
What made it happen?
Structured data analysis from OLAP and
visualization tools

Reporting
What happened?
Standard and ad-hoc reporting, alerts
and queries

Business intelligence

Big Data - Analytics

Intelligent Supply Chain

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Building Blocks – Needed Capabilities

Monitoring the supply chain in real-time (close to real-time)

„**SEE**"

Predicting possible disruptions (history & external data sources)

„**PREVENT**"

Real-time insights	Predictive analytics

„**ACT**"

Respond planning	Artificial Intelligence

Planning capabilities incl. scenario modeling and impact analysis

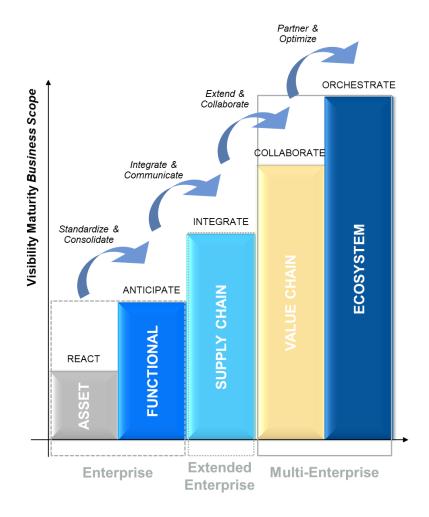„**OPTIMIZE**"

Automated decision making through machine learning

„**AUTOMATE**"

Source: "Supply Chain Visibility: The Journey Has Just Begun", Christian Tietze, Gartner Analyst
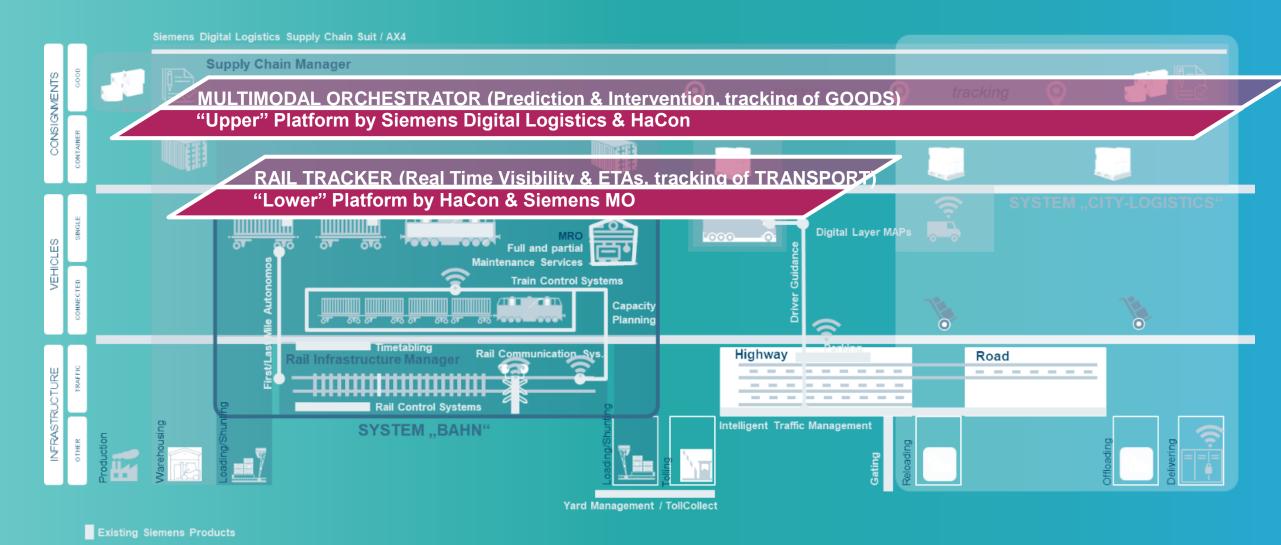
Gartner View on SC Visibility

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It is important to understand that the extent of visibility, depth of understanding and resolution capabilities vary considerably with supply chain organizational maturity

As Siemens family together with our „sister" HaCon and the complete Siemens Mobility spectrum, we have the best capability to provide two open platforms for the key building blocks
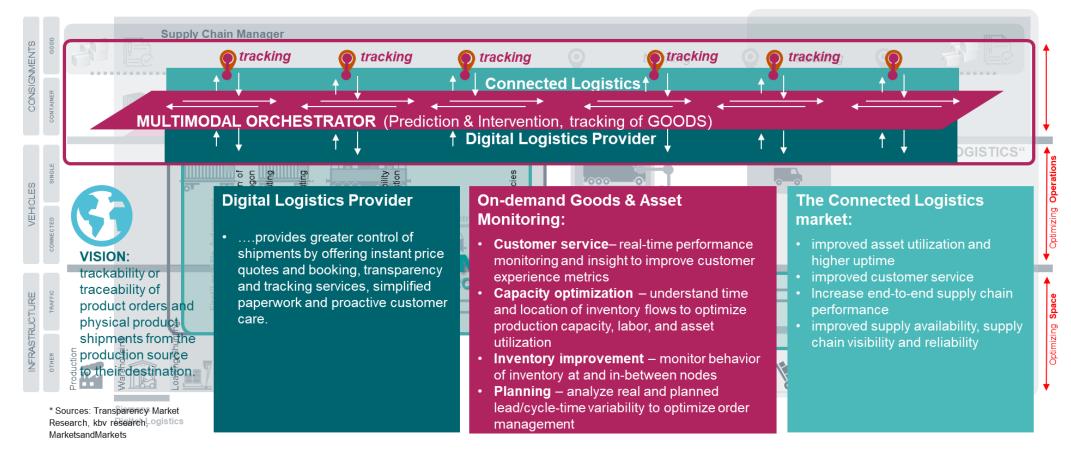

Siemens Digital Logistics Supply Chain Suit / AX4

Supply Chain Manager

CONSIGNMENTS — GOOD — CONTAINER

MULTIMODAL ORCHESTRATOR (Prediction & Intervention, tracking of GOODS)
"Upper" Platform by Siemens Digital Logistics & HaCon

RAIL TRACKER (Real Time Visibility & ETAs, tracking of TRANSPORT)
"Lower" Platform by HaCon & Siemens MO

SYSTEM „CITY-LOGISTICS"

VEHICLES — SINGLE — CONNECTED

First/Last Mile Autonomos

MRO
Full and partial
Maintenance Services

Train Control Systems

Capacity Planning

Digital Layer MAPs

Driver Guidance

INFRASTRUCTURE — TRAFFIC — OTHER

Timetabling

Rail Infrastructure Manager

Rail Communication. Sys.

Rail Control Systems

SYSTEM „BAHN"

Highway

Road

Intelligent Traffic Management

Production

Warehousing

Loading/Shunting

Loading/Shunting

Tolling

Yard Management / TollCollect

Gating

Reloading

Offloading

Delivering

tracking

Existing Siemens Products

Vision
Siemens Digital Logistics as Multimodal Orchestrator

Siemens Digital Logistics (SDL) is already today with its various project implementation the data orchestrator between various collaboration partners in logistics (e.g. shipper customers, suppliers, logistic service providers) and various transport modes. In the future SDL aims to orchestrate all business partners in a network-of-network approach to enable with its offering intelligent decisions in Supply Chain Management based on Logistics IoT, Analytics & AI.
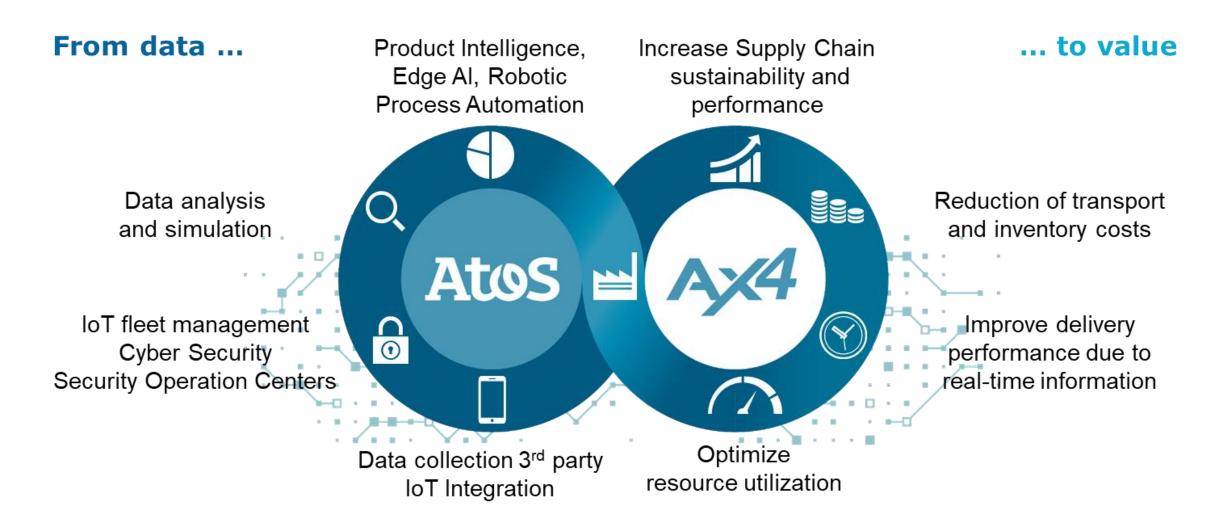

VISION: trackability or traceability of product orders and physical product shipments from the production source to their destination.

* Sources: Transparency Market Research, kbv research, MarketsandMarkets

Digital Logistics Provider

- ....provides greater control of shipments by offering instant price quotes and booking, transparency and tracking services, simplified paperwork and proactive customer care.

On-demand Goods & Asset Monitoring:

- **Customer service** – real-time performance monitoring and insight to improve customer experience metrics
- **Capacity optimization** – understand time and location of inventory flows to optimize production capacity, labor, and asset utilization
- **Inventory improvement** – monitor behavior of inventory at and in-between nodes
- **Planning** – analyze real and planned lead/cycle-time variability to optimize order management

The Connected Logistics market:

- improved asset utilization and higher uptime
- improved customer service
- Increase end-to-end supply chain performance
- improved supply availability, supply chain visibility and reliability

Intelligent Supply Chain – Vision of Planning & Execution

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Customer Value Chain

| Supplier | Procurement | Production | Sales | Customer |

Data

Inbound Logistics   **Production**   **Outbound Logistics**

Detect Anomalies - Realtime Process Prediction

Find Solutions: Analyze, Simulate, Solve Problems

Create visibility & communicate solutions with collaboration partners

Customer Value Chain KPI

Logistics Value Chain KPI

Control Tower

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Intelligent Supply Chain

From data ...   **... to value**

Product Intelligence, Edge AI, Robotic Process Automation

Increase Supply Chain sustainability and performance

Data analysis and simulation

Reduction of transport and inventory costs

IoT fleet management Cyber Security Security Operation Centers

Improve delivery performance due to real-time information

Data collection 3rd party IoT Integration

Optimize resource utilization

Intelligent Supply Chain

- Integrate all partners and systems in your supply chain network

- Deliver real-time data for transparent processes and effortless collaboration

- Offer a complete "digital twin" model of your supply chain for planning and simulation

- Identify potential for optimization based on innovative algorithms and consulting expertise

- Support planning and decision-making processes using both planning data and actual data

- Use of IoT technologies (Siemens MindSphere) for integrating machine and production data into logistics processes

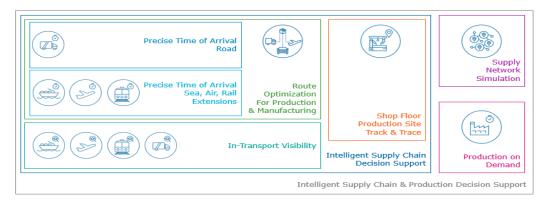- Development of predictive logistics through the use of artificial intelligence (here Atos Codex)

Digital twin

Operational IT platform

Real network

Siemens Digital Logistics / Product Management

Intelligent Supply Chain
Product Overview

Use Cases

Integrated Analytics Packages

Integration with Siemens AX4 and SCS

Complex Logistic Equations into Analytics

Inbound Logistics Automotive

The problem

- ▶ Mistrust in ordering times
- ▶ Behavior of pre-ordering
- ▶ Materials arriving too early
- ▶ Overstocking of warehouses
- ▶ Rise of OpEx

The solution

- ▶ Reach a decrease in OPEX
- ▶ Trusting ordering times
- ▶ Realtime prediction of arriving materials

Intelligent Supply Chain
PTA Model Training

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INPUTS

Logistics / Supply Chain Management Data

Enterprise Resource Planning / Warehouse Management Data

Manufacturing Execution System / Product Lifecycle Data

Maps / Traffic Data

Weather Data

Internet of Things Data

Various **relevant datasets from internal and external sources**

PREDICTIVE MODEL

Designed, built and trained by a **team of Atos data scientists**

Trained statistical model will **generate an accurate prediction for each supply chain shipment**

OUTPUTS

#1 Latest Dispatch Date/Time = Tue 16/12/2018 12:40

Predicted date and time by when **shipment must be dispatched from** the origin location **in order to arrive to the required destination by certain date and time.**

#2
- **Leg 1 Time:** 37 hrs.
- **Leg 2 Time:** 14 hrs.
- **Leg 3 Time:** 4,5 hrs.

Predictions of travel time (with accuracy of days/hours) **between the origin and destination locations** for **each individual legs of the journey**

#3 **Shipment Time:** 55,5 hrs.

Overall **end-to-end travel time** for each shipment.

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Intelligent Supply Chain
PTA Model Training

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Geo Position Data — Geo Position Data — Geo Position Data — Geo Position Data

Origin Location — **A** — Journey Leg #1 — Dist. Centre #1 — **B** — Journey Leg #2 — Dist. Centre #2 — **C** — Journey Leg #3 — Dist. Centre #3 — **D** — Journey Leg #4 — Destination Location — **E**

FUTURE DATA

Shipment ID

Actual Pick-Up Time — In / Out — In / Out — In / Out — Actual Time of Arrival

CURRENT HISTORICAL DATA

Disruptions and delays long the journey (e.g. damages, delays, custom checks, etc.)

Actual Pick-Up Time — In / Out — In / Out — In / Out — Predicted Time of Arrival

PREDICTIVE MODEL

Transit Time (Road) — Transit Time (Sea & Air) — Traffic — Weather — Strikes

EXTERNAL DATA

Smart App: Improve Insights via Mobile App (under development)

➢ Forecast **Precise Time of Arrival** that can be used to plan inbound, warehouse and production processes

➢ Calculate **Latest Departure Time** of shipment to save warehouse costs, but assure production is not hindered

➢ **Track Part Numbers** on shipments to support last minute decisions like changeover or maintenance
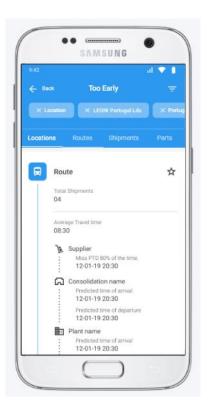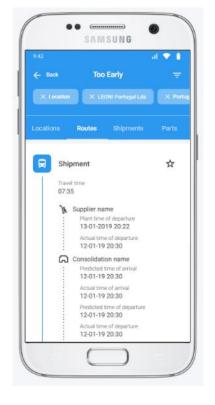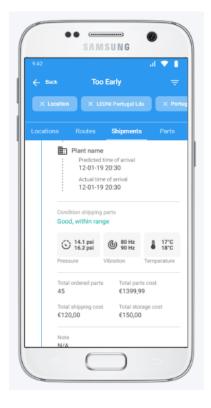
Intelligent Supply Chain
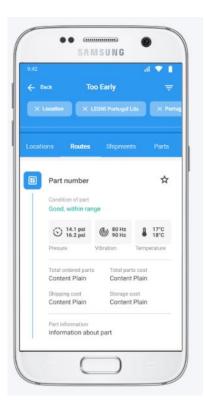## Intelligent Supply Chain Mobile Apps (based on AX4 LEONI PoV)

Intelligent Supply Chain Mobile Apps (based on AX4 LEONI PoV)

Thanks for your attention!

Uwe Schumacher, VP Business Development, Siemens Digital Logistics