

# Chances and Risks of Digitalization in Railway Signaling

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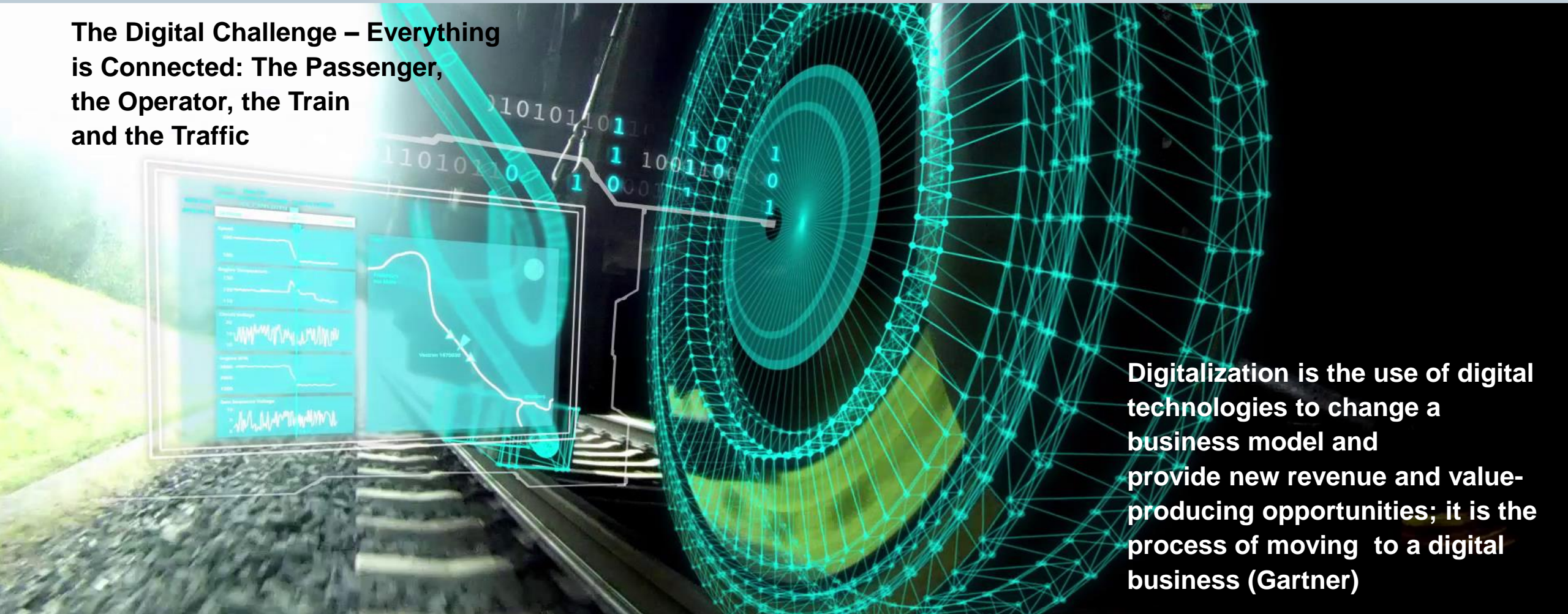
Nico Gramenz, VP Business Development & Strategy Siemens AG, Mobility Management



# Exponential growth of digitalization will change rail transportation enormously – and has already begun!

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**The Digital Challenge – Everything is Connected: The Passenger, the Operator, the Train and the Traffic**



**Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business (Gartner)**

# Railway in Germany and Digital Railway Strategy

## Key Focus areas

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Objective is to make Germany the international technology leader in Rail Automation

ETCS and  
Electronic Interlocking...

Digital Innovation...

Automatic Train Operation  
for Mainline...

Increased Network Capacity...

Standardised Digital  
Planning and Construction...

Free Internet on ICE...

*"With DB 4.0, we are working aggressively in three areas of action," CEO Grube says. "First, at the **interface with the customer** to make travel easier, more convenient, more flexible and personal, secondly, to **improve internal processes and procedures**, and thirdly the intelligent use of new, **data-based business models**."*



## Digitalization Technology Trends will strongly impact Mobility solutions

Many of these technologies are **not new** and have already **shaped other industries**

However, they are now becoming relevant for **Mobility** and **safety relevant applications**

Wireless Connectivity  
Open Source Development  
Data Analytics  
IT Security  
Everything as a Service  
Inspection Drones  
Better Batteries  
Cloud Computing  
Blockchain  
Overlay Companies  
Advanced Sensors  
Robotics  
Cognitive Computing  
Mobile Devices  
Context-Aware Applications  
Microfactories

# Siemens Digitalization – leveraging digital technology trends for concrete customer benefits

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-  Collaboration and mobile
-  Smart data and analytics
-  Cloud technologies
-  Connectivity and Web-of-systems
-  Cyber-Security

## Siemens Digitalization

Improved productivity &  
time-to-market

**Design &  
engineering**



Higher flexibility &  
resilience

**Automation &  
operation**



Increased availability &  
efficiency

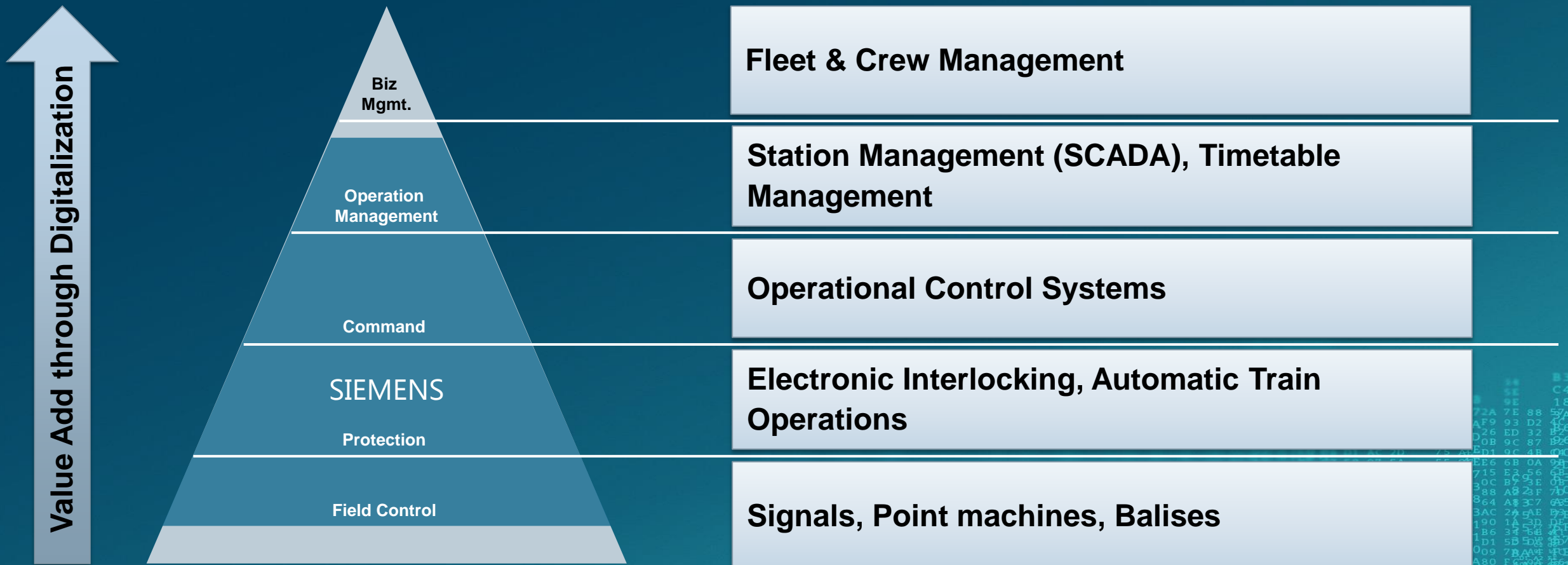
**Maintenance &  
services**



**Combining the virtual & physical world ...  
... across entire customer value chains**

# Existing Portfolio and Digitalization - Increased power of data & intelligence and Internet-of-things brings unique value to conventional solutions

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**Point to Ponder...**

**Major Rail operators cannot ignore advancement in Road Transport...**

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**Increased urbanization and sustainability  
will raise importance of rail transport...**

**...but to get to train stations,  
autonomous cars will play an important role.**

**Moreover autonomous buses will be an  
effective alternative for intercity transport...**





## Main Line and Regional Passenger & Freight Transport

- Self-Driving Regional and Main Line Trains
- Distributed/Virtualized Wayside Infrastructure
- Drones for Rail Track Monitoring
- Intelligent Control Center
- Smart Wagons and Highly Automated Yards
- ...

## Urban Transport

- Fully automated train operation (GoA4) for Metro
- Door2Door Mobility
- Personalized Passenger Guide
- Hands-Free Payments
- ....





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