

# Digital Transformation Elevates Port Development into the Next Generation

---

Franck Lett

Transportation Business Dev' Director



# Huawei Is a Leading Global Provider of ICT Infrastructure and Smart Devices



## Carrier business

- Provides network services for **3 billion** people across **170+** countries and regions.



## Enterprise business

- Digital transformation partner for **253** of the Fortune Global 500 companies.
- Serves **700+** cities in **100+** countries.



## Cloud business

- Launched **200+** cloud services and **190+** solutions.
- 10,000+** partners; Over **3 million** enterprise users and developers build their applications on the HUAWEI CLOUD.



## Consumer business

- Shipped approximately **240** million smartphones in 2019.
- No. 2** in global shipments\*

\*Source: IDC, 2019 Q3

Fortune Global 500 (2020)

**No. 49**

R&D Employees

**96,000+**

Global partner

**22,000+**

Industry joint R&D lab

**36+**

## Huawei's Value Proposition: Building a Fully Connected & Intelligent World



# Challenges & Trends



# Digital Transformation is the Trend

## Port of Rotterdam



2030 vision: Smarter Port

Global Hub and European industry assembling area

## Port of Singapore



Vision: Global Hub and international shipping center

Smart port :

- Safe harbor
- Efficient port
- Smart port
- Green port
- Humane port

## Port of Hamburg

Vision: Port 2025



Promote port intelligence:

- Safe
- Reliable
- Smart
- Green
- Ecological
- Efficient

## Port of Yangshan Shanghai

Vision: smarter port based on 3 E strategy



3 E Strategy:

- Excel
- Extend
- Explore

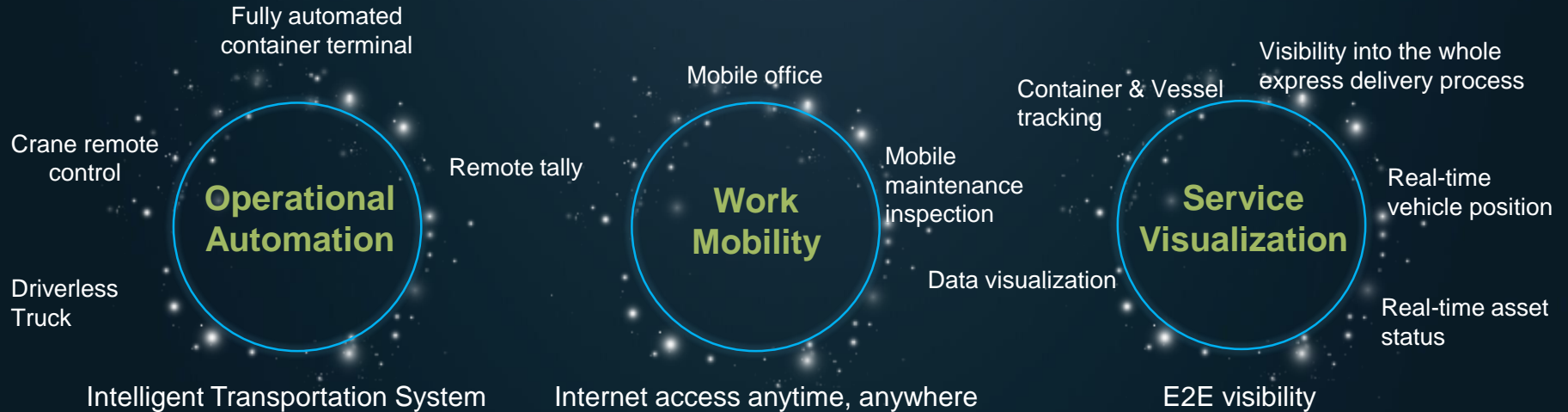
More Efficient

More Economical

Safer

Greener

# Directions for Digital Transformation



# Operations in Port are **Changing ...**



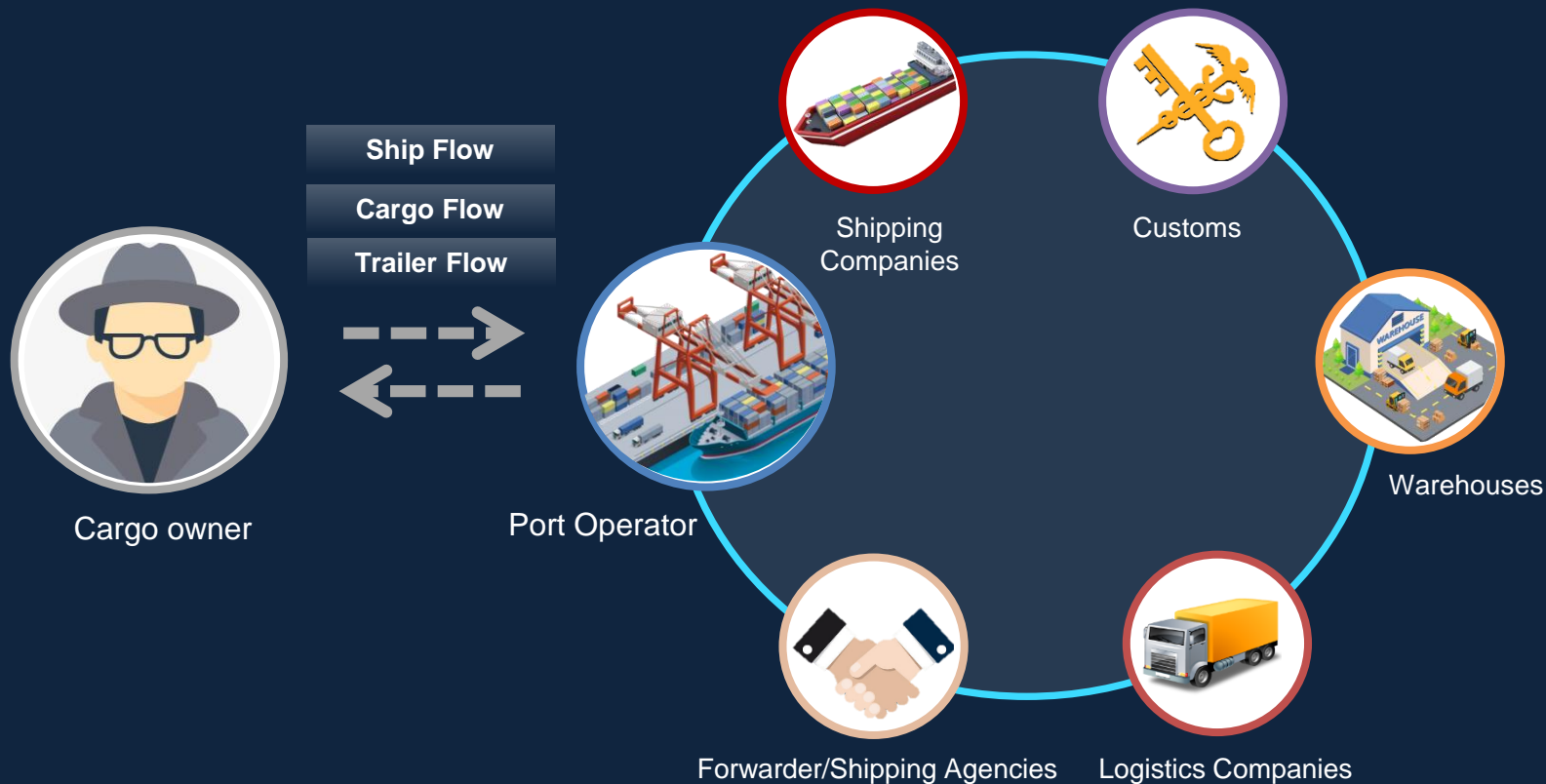
**Before**



**Now**

**... after Digital Transformation**

# Simplification of the Entire Process







# Solutions and References



# Digital Transformation at Terminals



## AI

- ◆ Unmanned container trailers/AGVs
- ◆ Intelligent gate operation
- ◆ Intelligent tally



## Blockchain

- ◆ Electronic delivery order (EDO)
- ◆ Electronic equipment interchange receipt (EIR)
- ◆ E-invoice



## Cloud Computing

- ◆ Intelligent scheduling of quayside container cranes
- ◆ Intelligent scheduling of rail-mounted gantry cranes (RMGs)
- ◆ Automatic stowage planning and intelligent storage yard
- ◆ Automatic berth allocation



## Big Data

- ◆ Big data dashboard
- ◆ Big data analysis
- ◆ Data exchange across systems and platforms

## Legend

- A** Gantry/Yard crane
- B** Quayside container crane
- C** Storage yard
- D** Seaside container trailer
- E** Landside container trailer



## 4G / 5G Connectivity

- ◆ Remote control of quayside container cranes
- ◆ Remote control of rail-mounted gantries (RMG)
- ◆ Remote control of rubber-tyred gantries (RTG)
- ◆ Dispatching communications



## Examples of Smart Port Solutions

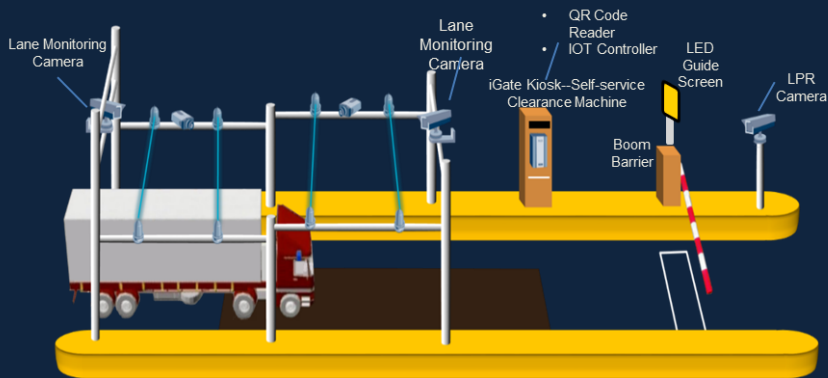
- 1) Smart Port Services with 4G
- 2) Intelligent Gate
- 3) Intelligent Recognition of Containers
- 4) Real-Time Container Tracking
- 5) Intelligent Operation Center

# Solution 1: Smart Port Services with 4G



# Solution 2: Intelligent Gate

- Automatic vehicle license plate recognition
- Automatic container number identification
- Real-time interaction with terminal management system
- Intelligent management and control of exit gates



## Shortening Checkpoint Release Time

3-5min → 10-20s





# Solution 3: Intelligent Recognition of Containers



Provide high-definition images of 5 sides of containers

## Visual AI-based Container Information Recognition System

Average recognition  
rate

**98.7 %**

Average recognition  
time

**0.1 sec**

Synchronous  
recognition scope

**9 lanes**

Seals, damages, and hazardous symbols are identified and recorded in tally, gate in/out, RTG scenarios.

## Massive Self-Learning and Application

Cumulative tally  
volume  
**> 38 million TEUs**

Times of self-learning  
**> 228 million**

Applied RTGs  
**> 200 sets**



# Solution 4: Real-Time Container Tracking



# Solution 5: Big Data - Intelligent Operation Center

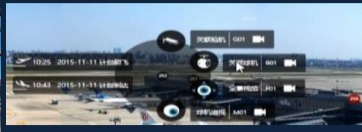
Panoramic video stitching



One click for a specific area



Truck tracking



One click for a specific camera



Port status



Video-based inspection

All things sensing, all things connected, all things intelligent

AIS Station

Vessel Track

CCTV

4G

IoT





# Reference 1: 4G/5G Powered Automatic Terminal (Shanghai)



SIPG

上海集團

Shanghai SIPG  
Yangshan Port

## Yangshan Terminal 4 Automatic Port

- Annual container volume (2019): 19.8M TEU
- Terminal 4 Automatic Port operating since 2017
- 4G/5G is adopted to support automatic operation

85% ↓

Work Staff in the  
Terminal

30% ↑

Efficiency  
Improvement

... and also unmanned operations on the 6 other terminals (with networking, data center, cloud, 4G/5G)

# Reference 2: 5G and Artificial Intelligence (Spain)



## Port of Algeciras

Control and security improvement with 5G, AI, real-time video streaming



## Port of Barcelona

Accurate and real-time geolocalisation of vessels with 5G, AI, Cloud & Edge Computing



# Huawei Already Serves **30+ Seaports**



## Smart Port

Automatic and intelligent methods to reduce costs and increase efficiency.



## Green Port

Energy saving and environmental protection.



## Hub Port

Hub of logistics to serve regional economy.



<https://e.huawei.com/en/solutions/industries/transportation>

[franck.lett@huawei.com](mailto:franck.lett@huawei.com)