Cloud Computing, The Internet of Things and Maritime Transportation
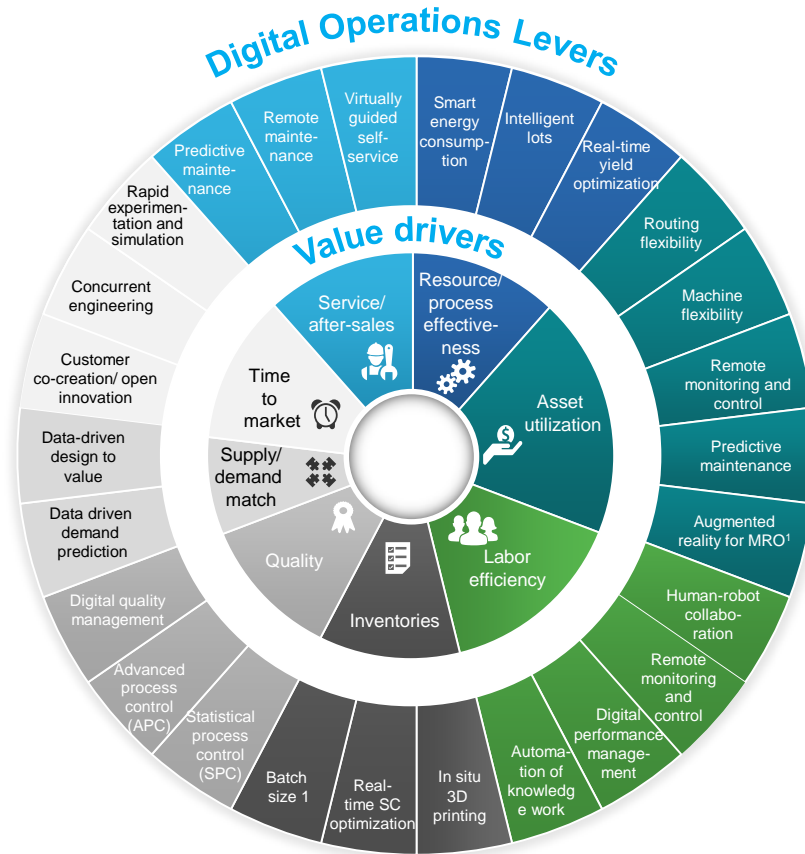
Barry Einsig

Global Transportation Executive
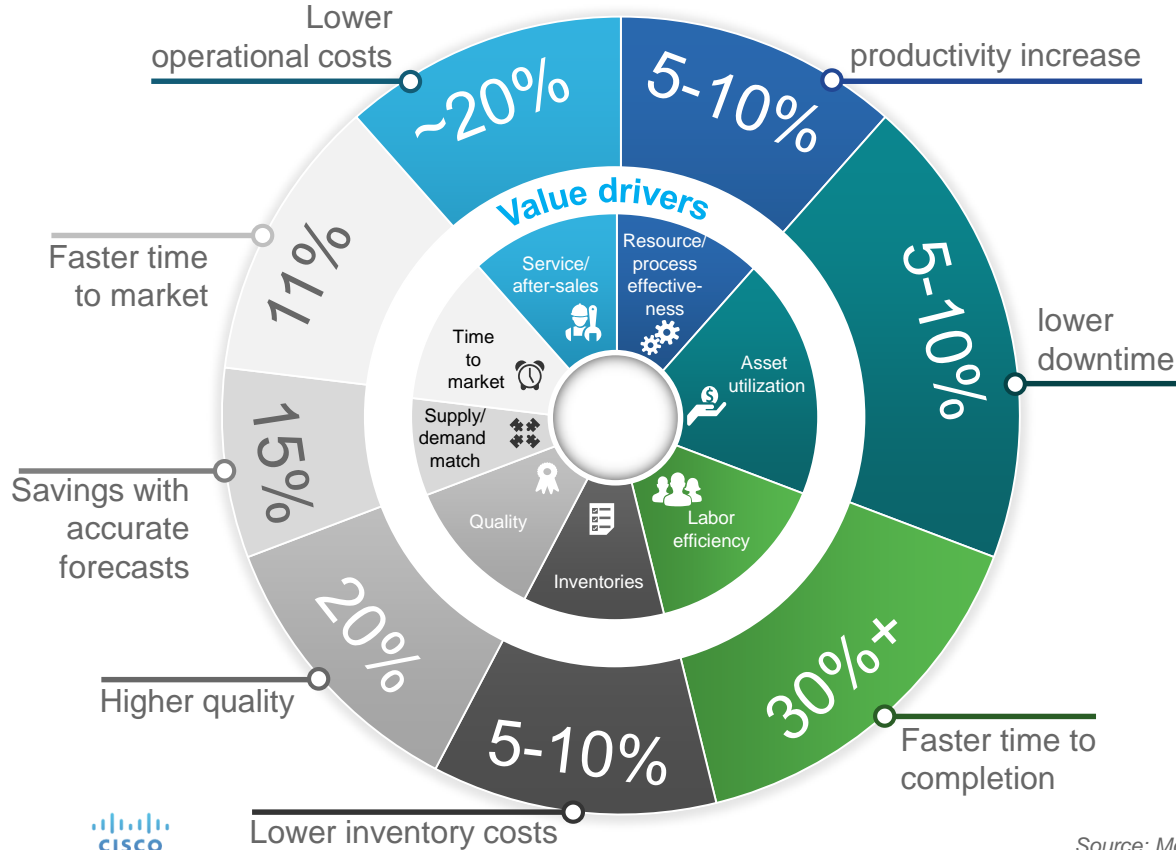
July 2016

Where Are You on the Digital Journey?

Digital Operations Levers

Value drivers

Outer ring (Digital Operations Levers):
- Virtually guided self-service
- Remote maintenance
- Predictive maintenance
- Rapid experimentation and simulation
- Concurrent engineering
- Customer co-creation/ open innovation
- Data-driven design to value
- Data driven demand prediction
- Digital quality management
- Advanced process control (APC)
- Statistical process control (SPC)
- Batch size 1
- Real-time SC optimization
- In situ 3D printing
- Automation of knowledge work
- Digital performance management
- Remote monitoring and control
- Human-robot collaboration
- Augmented reality for MRO[1]
- Predictive maintenance
- Remote monitoring and control
- Machine flexibility
- Routing flexibility
- Real-time yield optimization
- Intelligent lots
- Smart energy consumption

Inner ring (Value drivers):
- Service/ after-sales
- Resource/ process effectiveness
- Asset utilization
- Labor efficiency
- Inventories
- Quality
- Supply/ demand match
- Time to market

Digitization Is the Key to Leapfrogging the Industry

Value drivers

- ~20% — Lower operational costs
- 5-10% — productivity increase
- 5-10% — lower downtime
- 30%+ — Faster time to completion
- 5-10% — Lower inventory costs
- 20% — Higher quality
- 15% — Savings with accurate forecasts
- 11% — Faster time to market

Inner ring labels: Service/after-sales, Resource/process effectiveness, Asset utilization, Labor efficiency, Inventories, Quality, Supply/demand match, Time to market

Typical company:
- 200+ Trucks/Busses
- 5,000+ Employees
- 30 Facilities

Digitization benefit

↑ $200m Revenue   ↓ $50M Cost savings

Digital Business* Is Enabled by the Internet of Things (IoT)
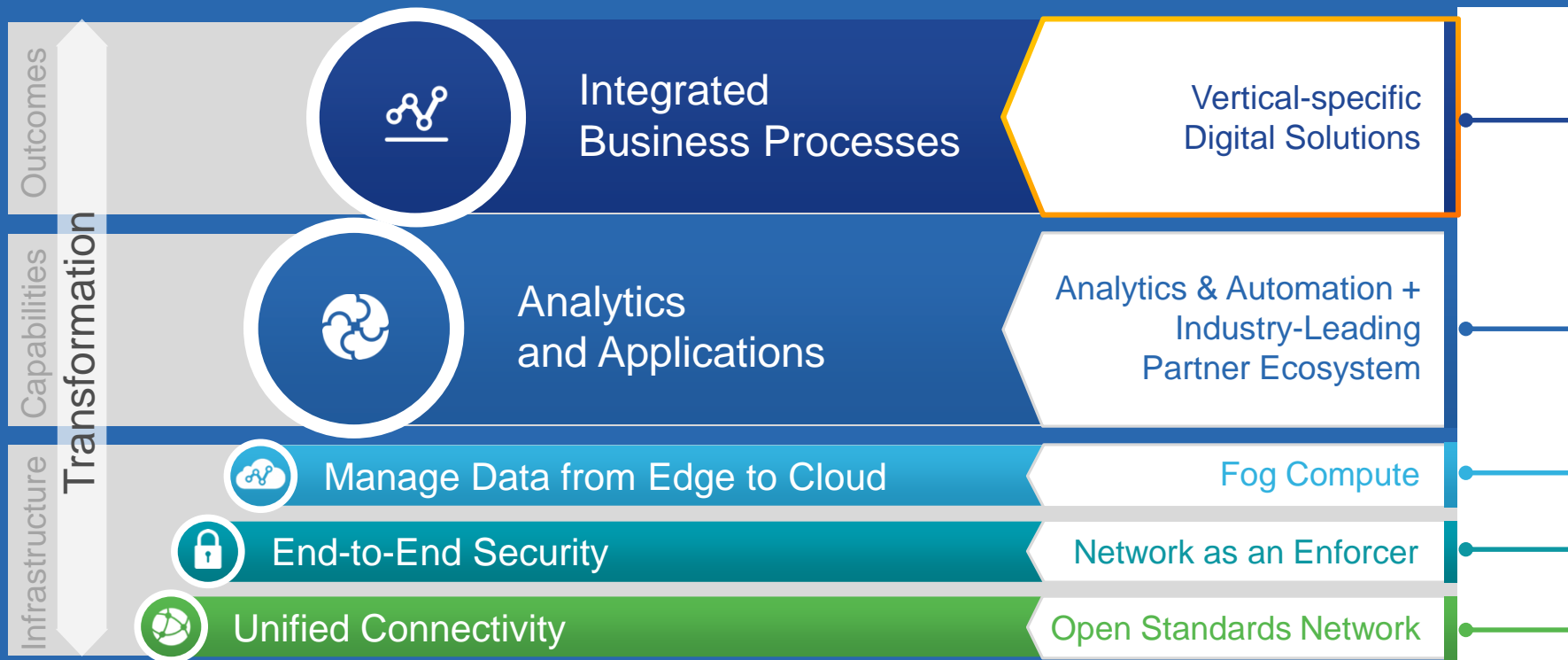
NETWORKED CONNECTION OF PEOPLE, PROCESS, DATA, THINGS

PEOPLE

Connecting people in more relevant, valuable ways

PROCESS

Delivering the right information to the right person (or machine) at the right time

IoE

DATA

Leveraging data into more useful information for decision making

THINGS

Physical devices and objects connected to the internet and each other for intelligent decision making
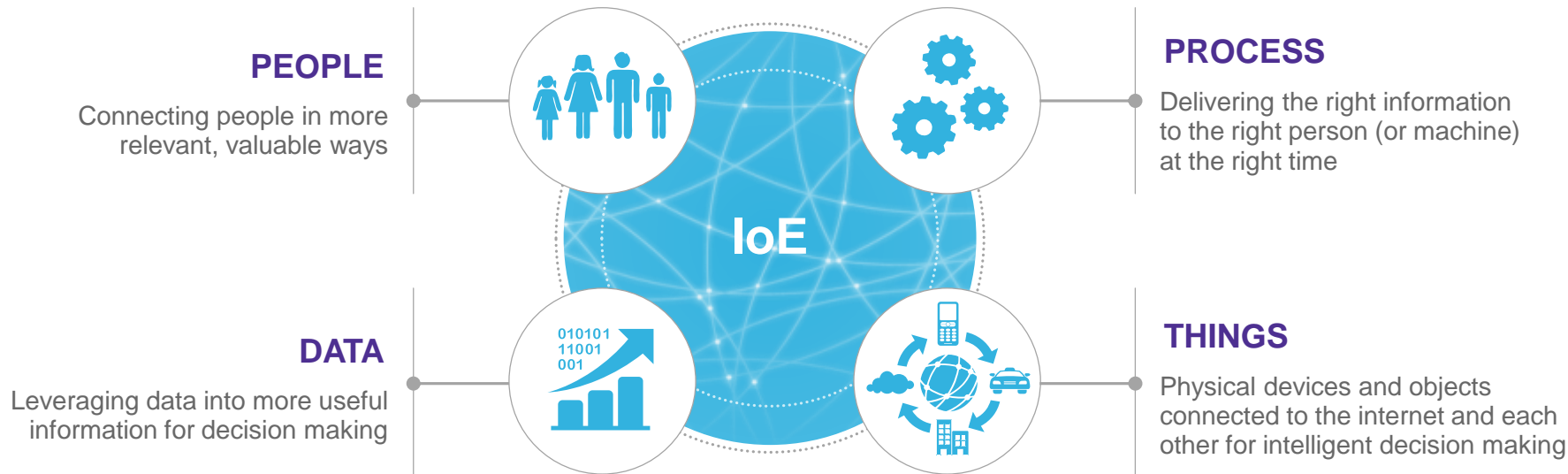
CONNECTING THE UNCONNECTED TO GENERATE BUSINESS VALUE

* Gartner Coined this term in 2014

Top Obstacles to Digital Transformation
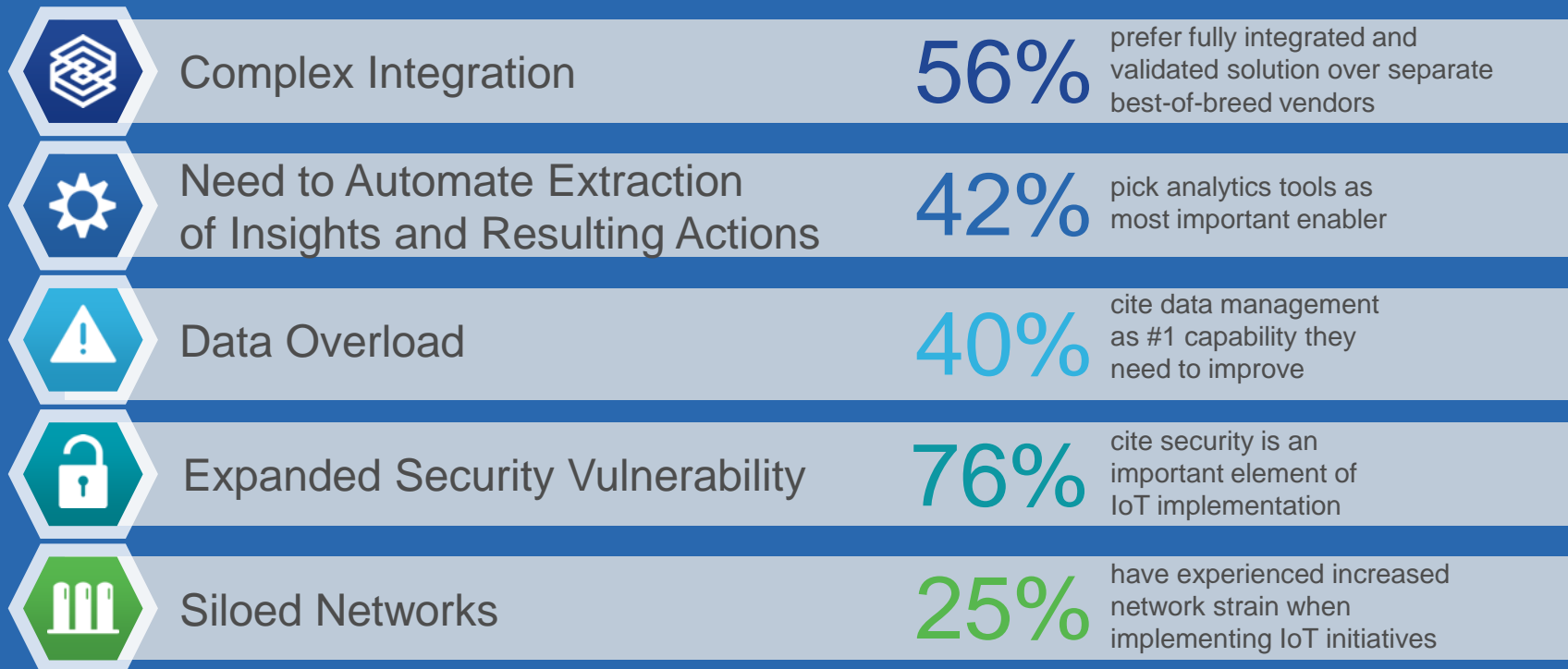
Complex Integration
56% prefer fully integrated and validated solution over separate best-of-breed vendors

Need to Automate Extraction of Insights and Resulting Actions
42% pick analytics tools as most important enabler

Data Overload
40% cite data management as #1 capability they need to improve

Expanded Security Vulnerability
76% cite security is an important element of IoT implementation

Siloed Networks
25% have experienced increased network strain when implementing IoT initiatives

Sources: Cisco IoT Purchase Process Global Study January 2015,
Forrester Research study commissioned by Cisco November 2014,
IDC Futurescape: Worldwide IoT Predictions Dec 3, 2014

Solution Framework for the Digital Journey

Outcomes

Integrated Business Processes — Vertical-specific Digital Solutions

Capabilities

Analytics and Applications — Analytics & Automation + Industry-Leading Partner Ecosystem

Transformation

Infrastructure

Manage Data from Edge to Cloud — Fog Compute

End-to-End Security — Network as an Enforcer

Unified Connectivity — Open Standards Network

Sources: Cisco IoT Purchase Process Global Study January 2015,
Forrester Research study commissioned by Cisco November 2014,
IDC Futurescape: Worldwide IoT Predictions Dec 3, 2014

Internet of Things Architecture

Tech Stack

IoT Stack

Services		
Tech / Pro Services	System Integration	Vertical consulting

Analytics		
Algorithms & mining	BI & Visualization	Real Time Analytics

Middleware		
Access & Discovery	ETL / Integration	Event processing

Data Management		
Databases / DWH	Hadoop	NoSQL / NewSQL

Infrastructure / IaaS		
Networking	Compute	Storage

5 **Application**
(Reporting, Analytics, Control)

Vertical Industry Solutions

Cloud based & Mobile Solutions

4 **Big Data / Analytics**
(Accumulation, Analysis & Transformation)

CIS

3 **Platform & Data Warehouse**
(Aggregation & Access)

Cloud, Prime, Whiptail

Cisco Prime Network Control System
Unified Management for Borderless Networks

2 **Connectivity**
(Comm & Processing Units, Data in motion)

UCS, Switches, Routers, WiFi
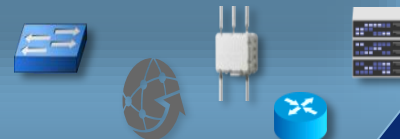
1 **Physical Devices**
(The "Things" in IoT, distributed analytics)

Sensors, Devices, Machines, Intelligent Edge Nodes

S E C U R I T Y

Digital Transformation

The use of technology
to radically improve performance.

The New Digital World
Accelerate Business Processes, Introduce New Services

IP-Based Dispatch and Incident Response

Extending Life-Saving Communications

Automated Super Terminal

More Efficient Shipping, Lower Costs

LINZ AG

On-Board Wi-Fi Centralized Ticketing

Enhanced Passenger Experience

AEGEAN MOTORWAY S.A.

Real-Time Incident Alerts and Live Video

Safer, Faster Roadways

ASFiNAG

Centralized Traffic Management

Greater Mobility and Collaboration

"Digital disruption will displace 40% of incumbent companies in the next 5 years."

- John Chambers, Cisco 2015 Partner Summit

Connected Transportation Sectors
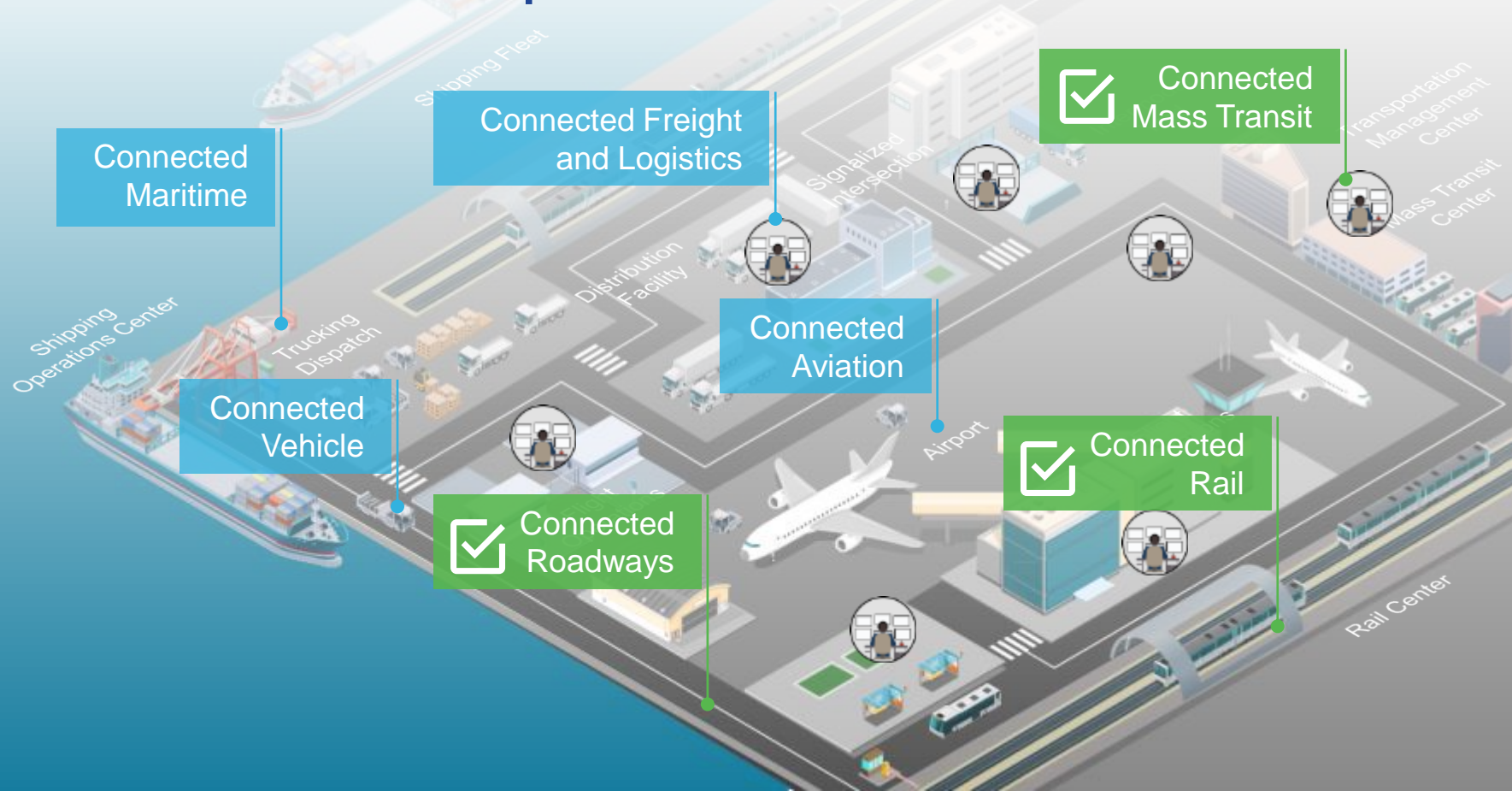
Digital Transportation Delivers

Greater **Safety** and Security

Improved Operational **Efficiency**

Greater **Mobility**

Better **Passenger Experience**
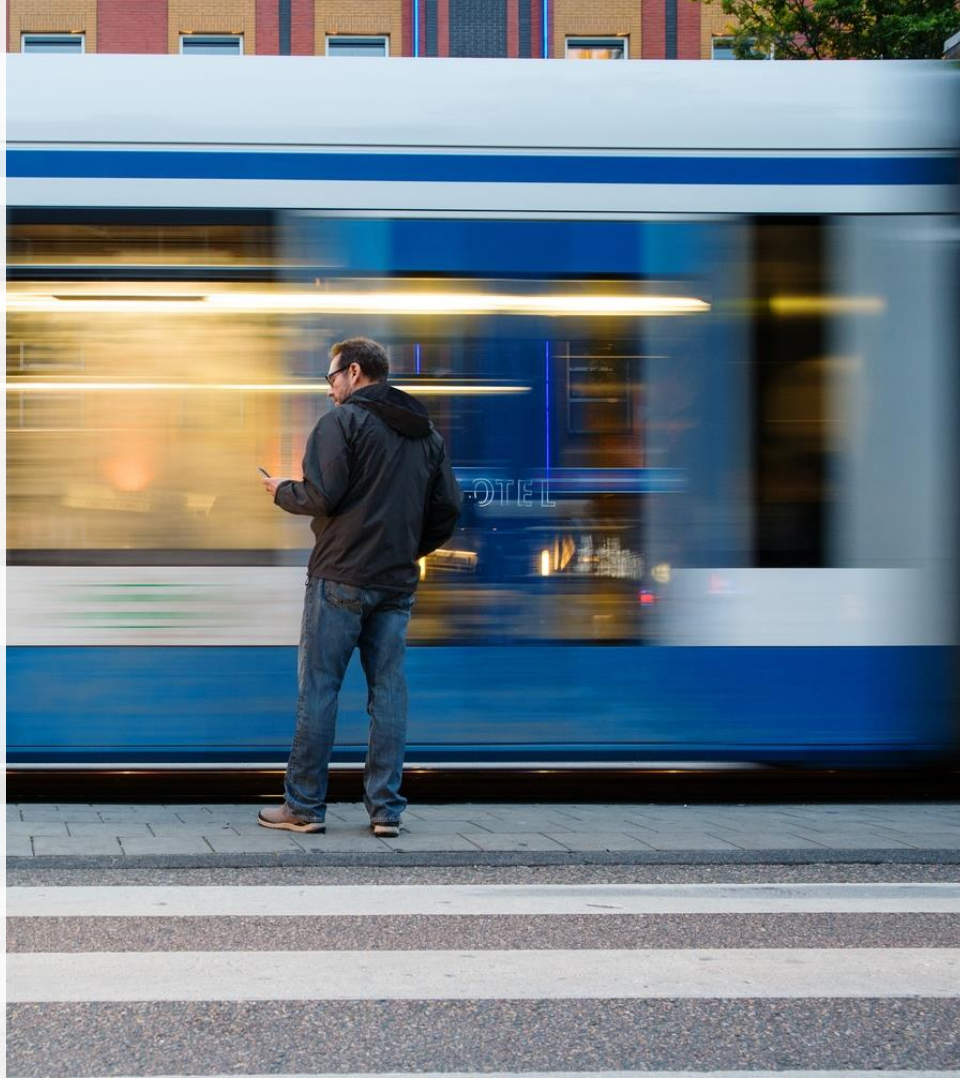
Maritime: Global IT Trend

Passenger/Crew Communication

- **Satellite communications**

- There are two broad service categories for maritime: *Mobile Satellite Services (MSS)* and *Very Small Aperture Terminals (VSAT)*.

  - ✓ *MSS* is offered by the likes of *Inmarsat* and *Iridium*, and offer volume-based charging

  - ✓ For *vessels with heavier communications needs*, such as cruise ships, or oil and gas rigs, *VSAT is often preferable*

- **Ship-to-shore Wi-Fi communications**

- *MTN*, which provides communications systems for cruise ships, is building out these facilities, which will enable vessels to offload large amounts of data when in range of the shore.

  - ✓ *SeaFi*, promoted by *Disault's* firm *Sea-Tech*, is another

Crew Management

- *Modern crew-management systems use a central server that collects data* from computers around the vessel. The captain manages work and rest hours, maintains the conditions for vessel certification. This *data gets transferred to on-shore systems, typically via VSAT links*.

Cargo Tracking

- *For constant cargo monitoring, special sensors are designed* which are placed inside the container units and linked to the communication antennas.

  - ✓ The sensors register the location of the container, along with other environmental variables, and they then communicate the data to the receivers.

  - ✓ The receivers can then send the information via local Wi-Fi to a central data aggregation system on the vessel, and from there it can be returned to the client's tracking system.

Source: Justifying Maritime IC...

CISCO

Maritime: Adoption of ICT trends

Technologies	Description	Implications
Social Media and Web 2.0	• Internet-based protected websites such as "Cargo Portals" enable to query maritime vessel operators for real-time space availability and pricing, to book shipments, etc • Cruise lines connect with their past and future passengers in digital space. The customers discover its offerings via advancements such as QR codes	• P&O Cruise's 2013–15 brochure includes interactive technology that can be accessed from tablets and smartphones.
Business Intelligence & Analytics	• The solution enables situational awareness by collecting data from systems and sensors onboard, combining them with operational knowledge, and providing them in the right format to fleet management offices and/or suppliers' support systems.	• Kongsberg Maritime has embedded Attunity replication technology as part of the new business intelligence and operational support solution.
Mobile and Location-Aware Technology	• Port State Control (PSC)* mobile tool-kit has been successful in operations. • The mobile app offers functions: taking and marking pictures, typing comments, recording voice notes, follow up progress and generate reports that can be sent to shore directly from the device.	• 3500 DNV-classed ships are using PSC tool-kit as a cost-effective solution for expertise among officers preparing ships for flawless PSC inspections.
Networking and connectivity	• The IMO's directive on the use of electronic maps from 2012 onwards has driven the industry toward the adoption of high-speed connectivity. • There are two broad service categories for maritime: Mobile Satellite Services (MSS) and Very Small Aperture Terminals (VSAT).	• Imtech Marine offers always-on broadband communication solution that covers all major shipping routes and provides guaranteed quality of service
Cloud	• Cloud-based technology is used by vessels to store inspection and owner's manuals. It provides boat owners email notices when maintenance is required.	• Vessel Vanguard, an Internet-based boat maintenance technology firm, uses the technology for City Dock*.

Source: Gartner Hype Cycle, 2012

Cisco Cloud Collaboration Services

Cloud & Hybrid Services

Taking advantage of new cloud services, 'cloud-connecting' them to, and extending value of existing infrastructure and collaboration investments

Effective Delivery Improves

Workload Deployment Choice

Take Advantage of Cloud Benefits

Making Connections between Services

Analytics & Management

The Way We Buy & Use Services Has Changed

Past	Today
Fixed contracts	Annuity based agreements
Rigid, incremental capacity	Elasticity, scale on-demand
Capex / Opex decision	Investment fluidity
IT deployment, big projects	IT services broker, user downloaded
Business case, ROI, hierarchy	Cost effective, available to all
Role based tools, IT decide	Work my way

CISCO

Service Delivery - Across Many Clouds

Cloud Services

Public
Cloud Services

Partner
Collaboration Cloud

cisco Powered

Cisco
Collaboration Cloud

Customer
Private Cloud / On
Premises

Open & Extensible Cloud Environment – Customer, Cisco & Partner Clouds

Extending Value - Premises & Cloud

Cloud Services

Public Cloud Services
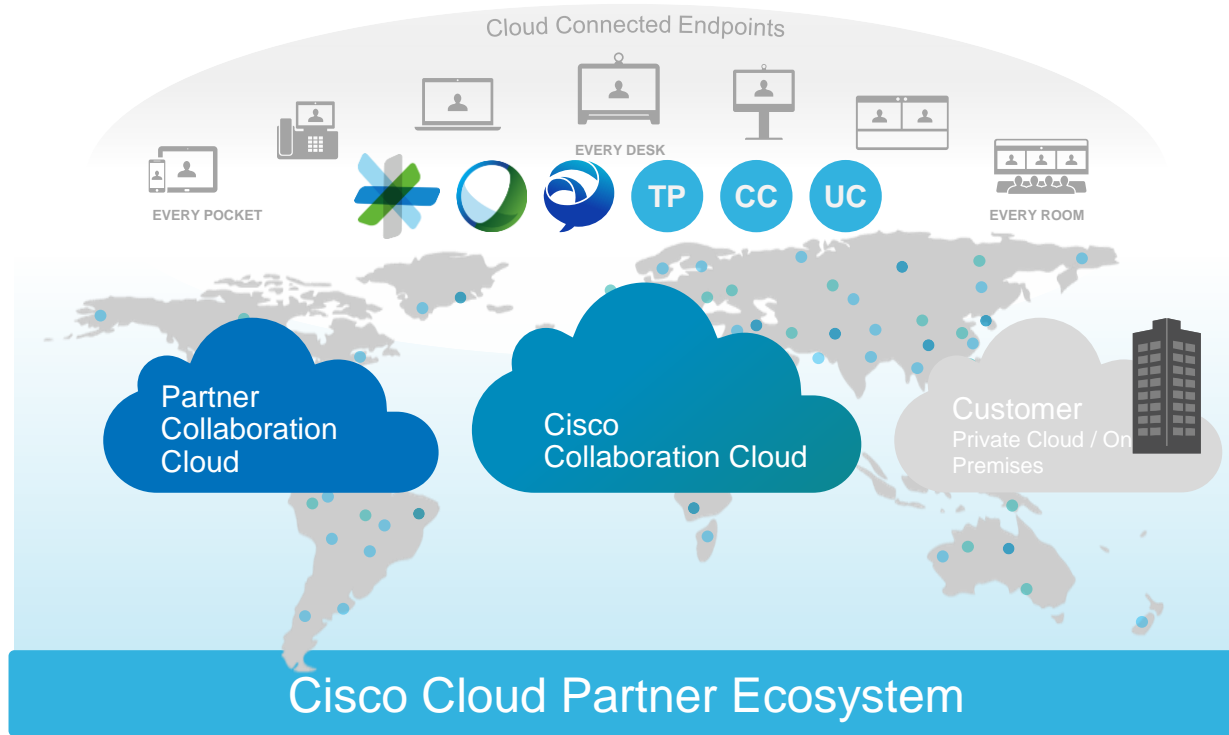
Partner Collaboration Cloud

Cisco Collaboration Cloud

Customer Private Cloud / On Premises

Fusion

Fusion
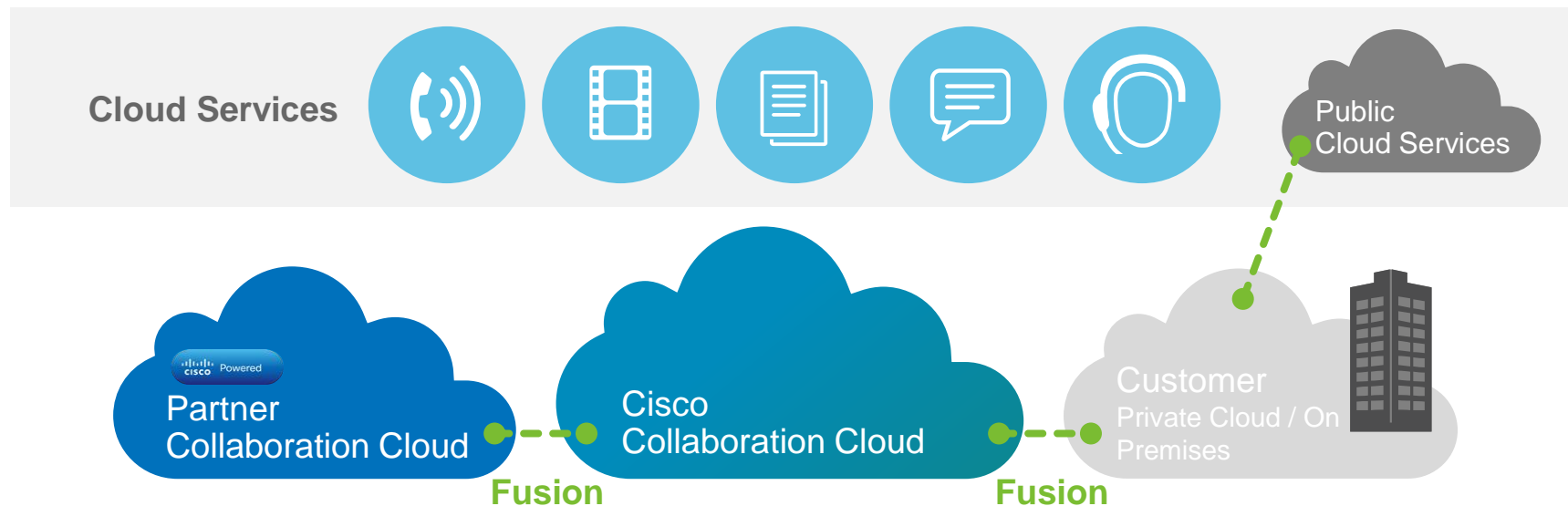
Hybrid Collaboration - Connecting Premises & Cloud, extending value

Connecting Cloud Services

TP
CC
UC

Powered

Partner
Collaboration Cloud

Fusion

Context
Service

Cisco
Collaboration Cloud

Fusion

Public
Cloud Services

Existing
Services

Customer
Private Cloud / On
Premises

Simple Collaboration – extending the range of services

Cisco Collaboration Cloud Services

Cloud Connected Endpoints

EVERY DESK

EVERY POCKET

TP CC UC

EVERY ROOM

Partner Collaboration Cloud

Cisco Collaboration Cloud

Customer
Private Cloud / On Premises

Cisco Cloud Partner Ecosystem

More Cisco Resources

Websites

Cisco product and solution collateral and architecture diagrams available online

www.cisco.com/go/transportation
www.cisco.com/go/iot

Videos

Cisco Connected Transportation and Smart Cities
Cisco Connected Mass Transit
Cisco Connected Roadways
Cisco Connected Rail and Real-time Analytics
Cisco Connected Train
TechWise TV and Cisco Connected Transportation

Transportation Case Studies

LINZ AG
ASFiNAG (video and case study)
Alaska DOT
Aegean Motorway
Hamburg Port Authority (video & case study)
Bombardier
Long Beach Container Terminal (LBCT)
California Shock Trauma Air Rescue (CALSTAR)
Copenhagen Airport
Austin Airport and Boingo (video)
Dubai Roads and Transit Authority (RSA)
City of Mississauga
Lufthansa
National Airport of Romania
Tokyu Corporation
Transport for London (video)

Digitizing Transportation

Safety | Mobility | Efficiency