Bridging the IT/OT Divide: Field-to-Cloud Implementations

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PrismTech in Industrial IoT

"The Must-Follow Company award commends the teams that have us all on the edge of our seats, wondering what they'll come up with next "

Postscapes, January 2015

Gartner 2014 CoolVendor

" IT leaders looking for a scalable, high-performance messaging infrastructure technology to support business-critical, IoT-centric distributed applications integrating smart devices with on-premise, cloud and mobile applications should consider PrismTech's Vortex."

Gartner, April 2014

IIC MEMBER
industrial internet CONSORTIUM
www.iiconsortium.org

"PrismTech joined the Industrial Internet Consortium as its first (non-founder) industry member.

IIC, March 2014

BUSINESS STRATEGY
Sand Hill
SOFTWARE • CLOUD • MOBILE • BIG DATA

"PrismTech is a Needle Mover in Building the Future of the IoT in the list of early-stage companies positioned to play critical roles in the future of IoT ."

Sandhill, November 2014

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PrismTech in Smart Energy

PrismTech Smart Energy Solutions

By enabling a high quality, scalable, low-latency, real-time information infrastructure, Vortex provides a proven solution for smart energy grids. This in turn is helping deliver improved performance, data quality, data compliance and at the same time reduces costs.

CCFE
CULHAM CENTRE FOR FUSION ENERGY

smarter grid solutions

US Army Corps of Engineers

PrismTech in Industrial Process Automation

Vortex provides the integration, scalability and flexibility to support complex, highly sophisticated and distributed control systems

PrismTech Industrial Automation Solutions

Internet Protocol-based architectures are bringing modularity to Supervisory Control and Data Acquisition (SCADA) applications and enabling systems that are much more flexible and easier to update. Vortex provides a flexible, performant and highly scalable real-time data sharing solution for Industrial Automation

HARBRICK

Atlas Copco

CLAAS

Four Mega Trends Driving the IoT

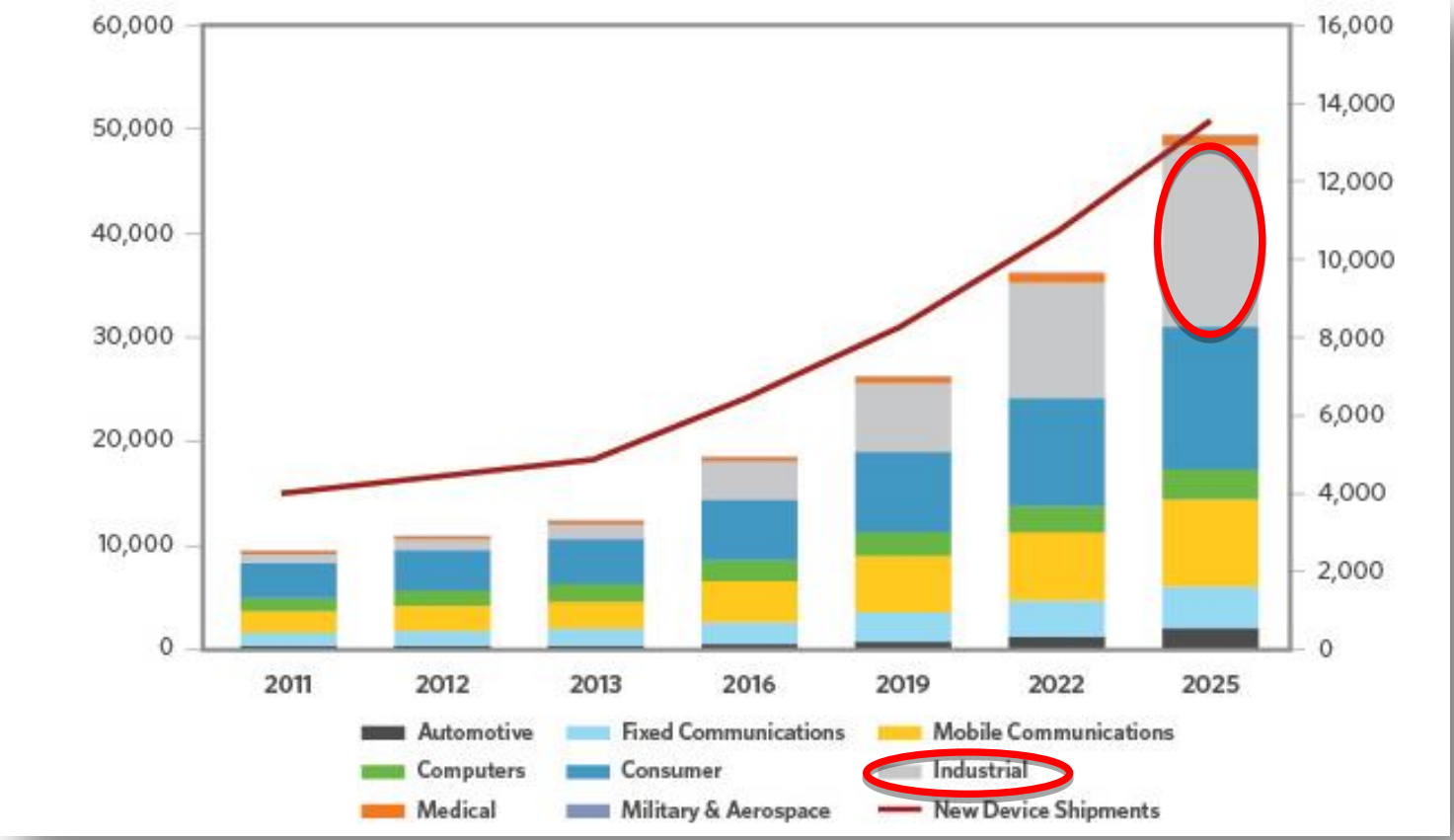
1. The cost of Internet-connected sensors is declining fast: 50% in the past decade and will continue dropping at a steady rate
2. Money is being poured into the IoT. Large companies and innovative startups: devices, gateways, software, cloud/fog nodes, analytics, HMI
3. Close to ubiquitous Internet connectivity
4. High adoption levels of smartphones, tablets, etc.. The IoT leverages BYOD, primarily smartphones and tablets

Read more at: http://www.businessinsider.com/four-elements-driving-iot-2014-10#ixzz3dExrjiOv

IoT Growth Forecast

World Market for Internet Connected Devices – Installed Base & New Shipments

Connected Devices (MM)



Source - IHS 2013

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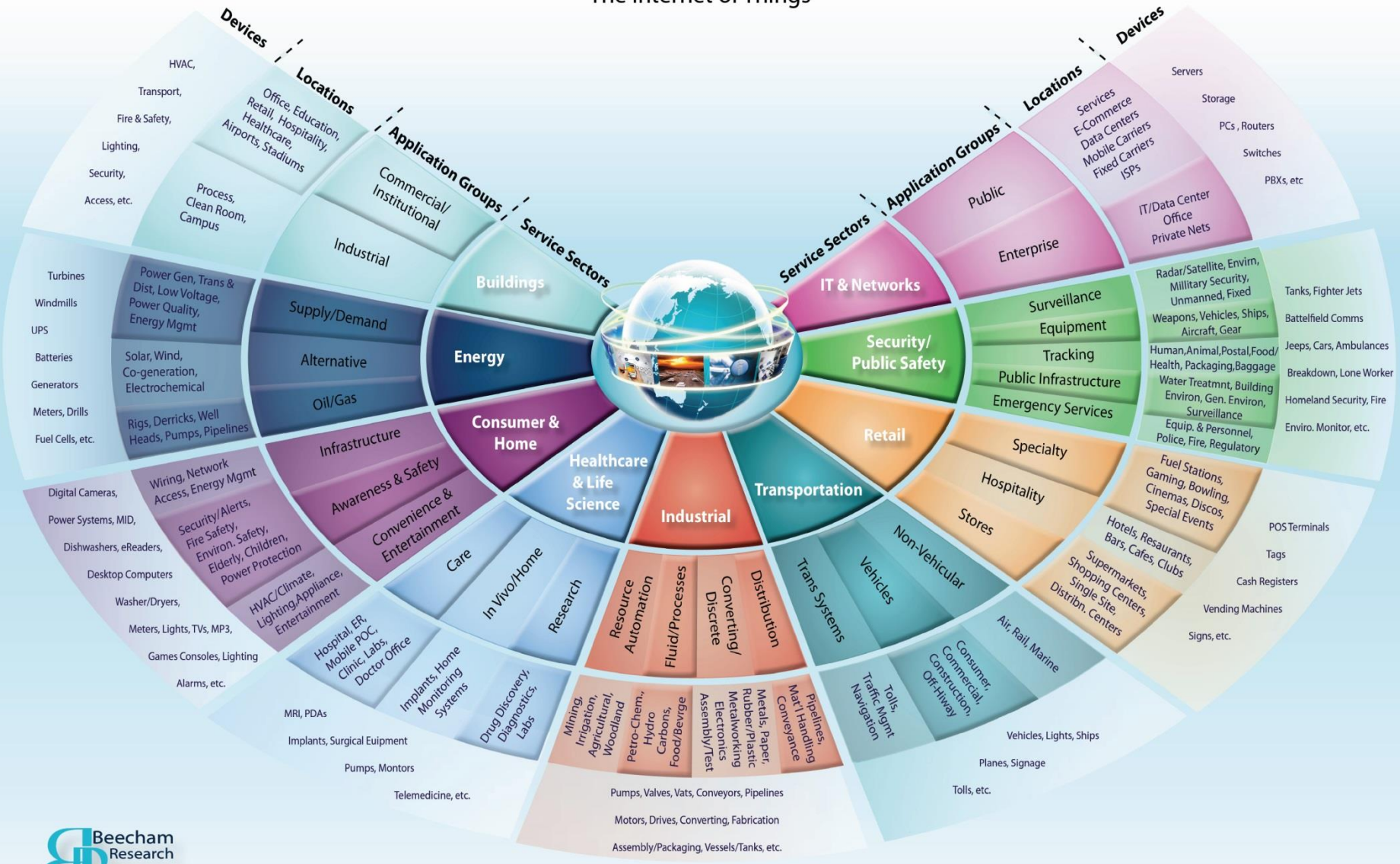
M2M World of Connected Services

The Internet of Things



Beecham Research

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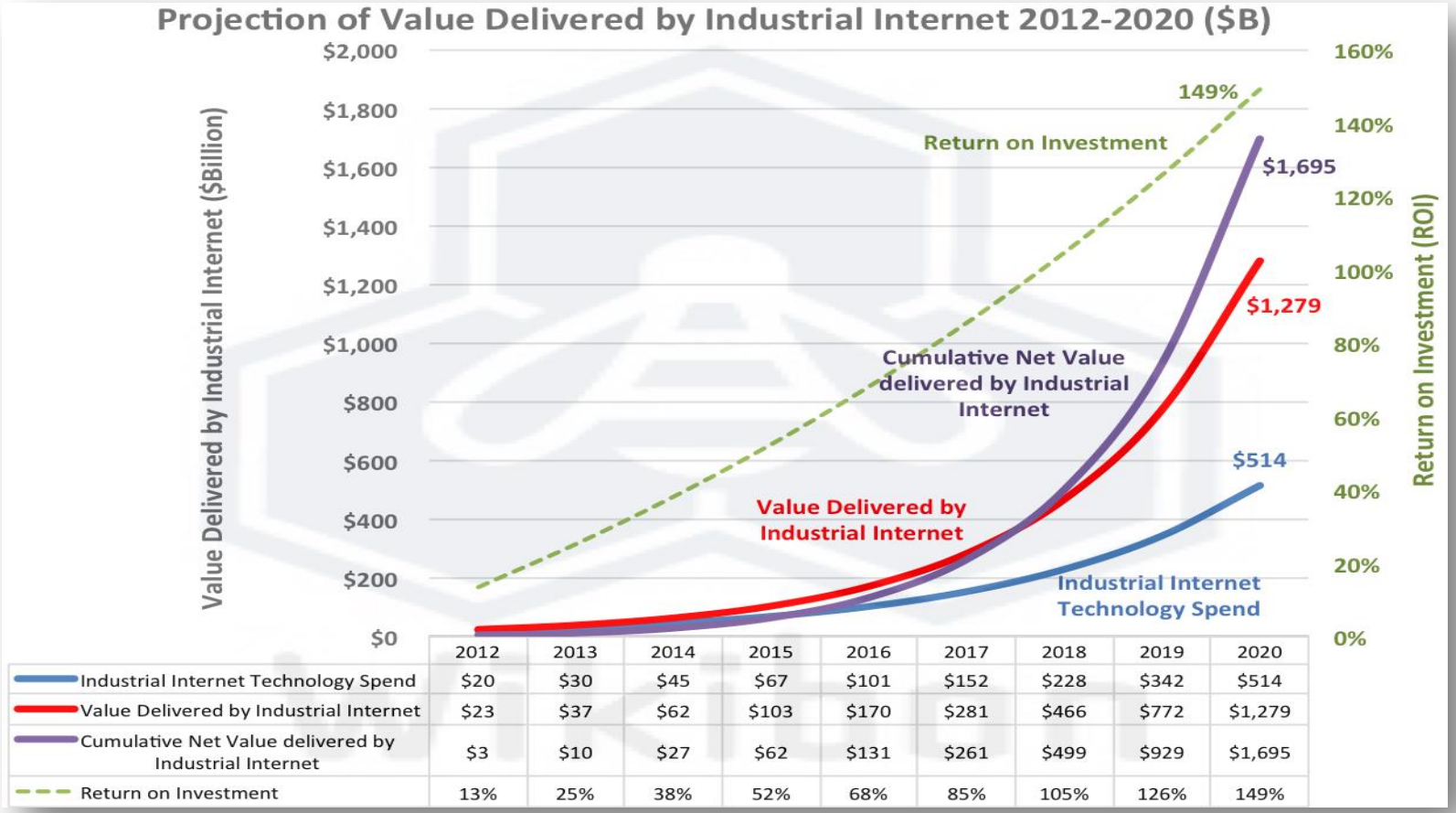
IoT Vertical Markets Size

Connected devices 2025

Industry	4,800MM
Consumer Electronics	3,700MM
Mobiles	2,300MM
Fixed Telecoms	1,000MM
Computers	600MM
Autos	500MM
Medical Devices	300MM
Mil/Aero	100MM

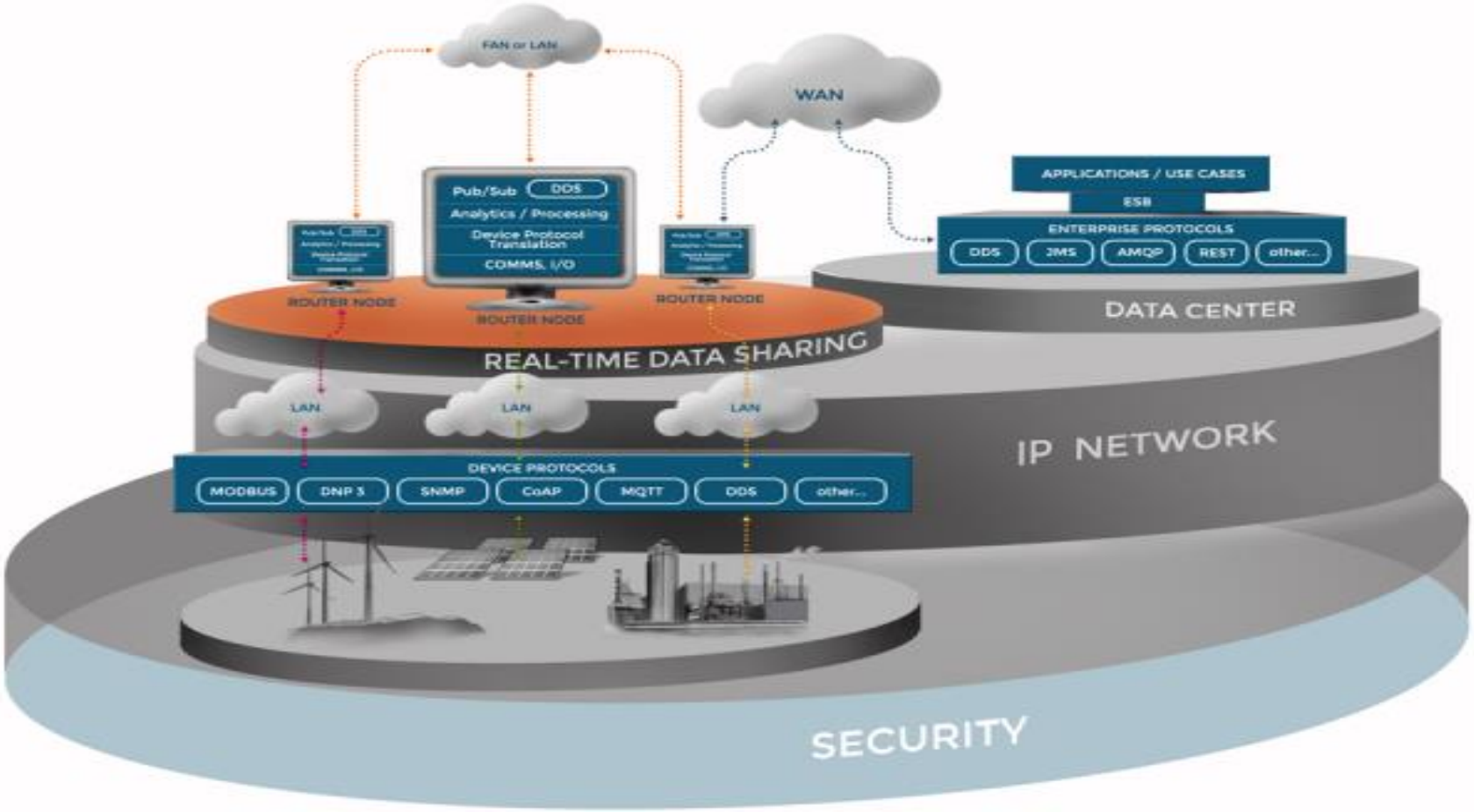
Industrial IoT Technology Spend



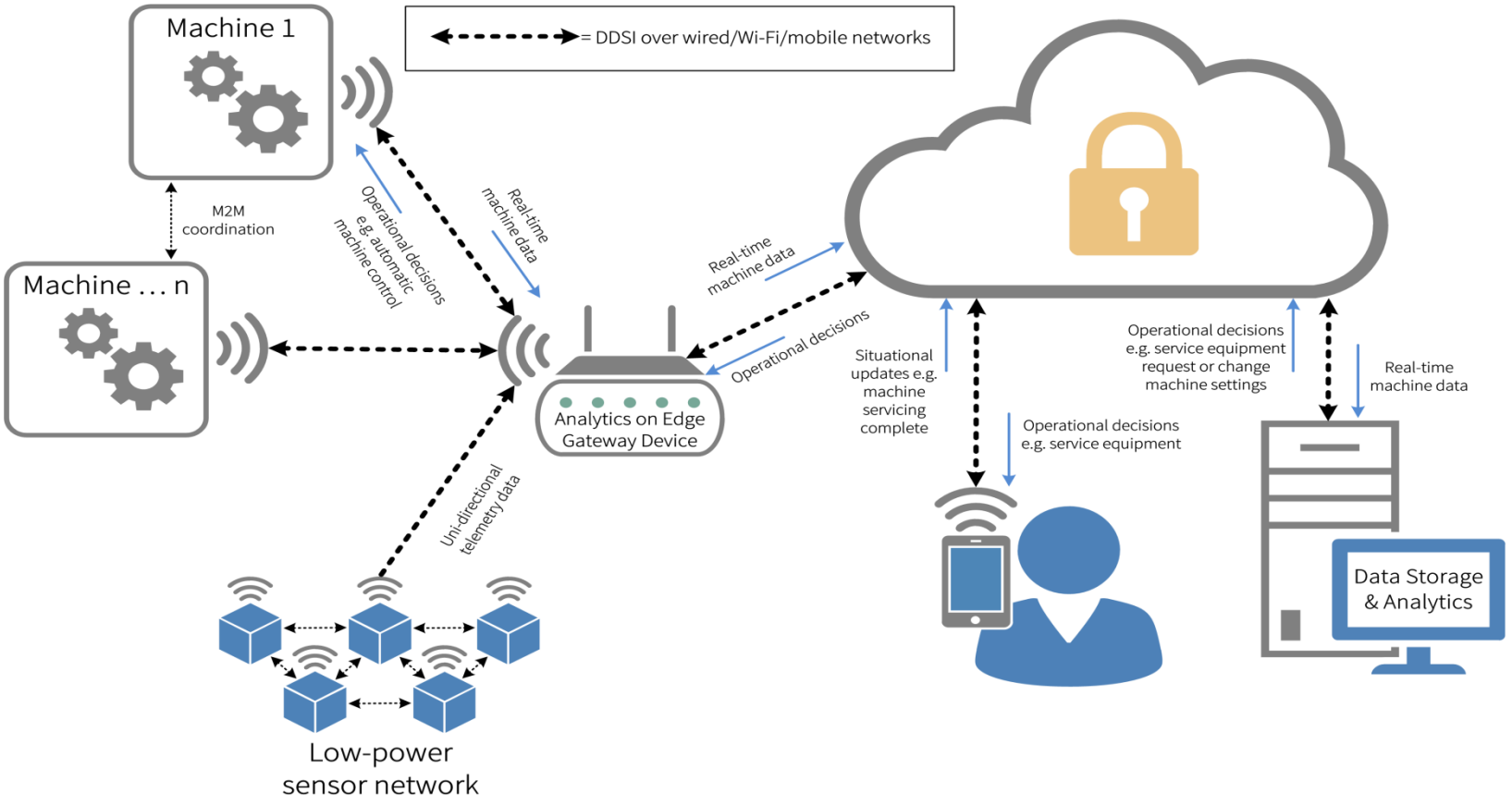
	2012	2013	2014	2015	2016	2017	2018	2019	2020
Industrial Internet Technology Spend	$20	$30	$45	$67	$101	$152	$228	$342	$514
Value Delivered by Industrial Internet	$23	$37	$62	$103	$170	$281	$466	$772	$1,279
Cumulative Net Value delivered by Industrial Internet	$3	$10	$27	$62	$131	$261	$499	$929	$1,695
Return on Investment	13%	25%	38%	52%	68%	85%	105%	126%	149%

Source – Wikibon 2013

What is an IIoT Platform?



An Enterprise IoT System



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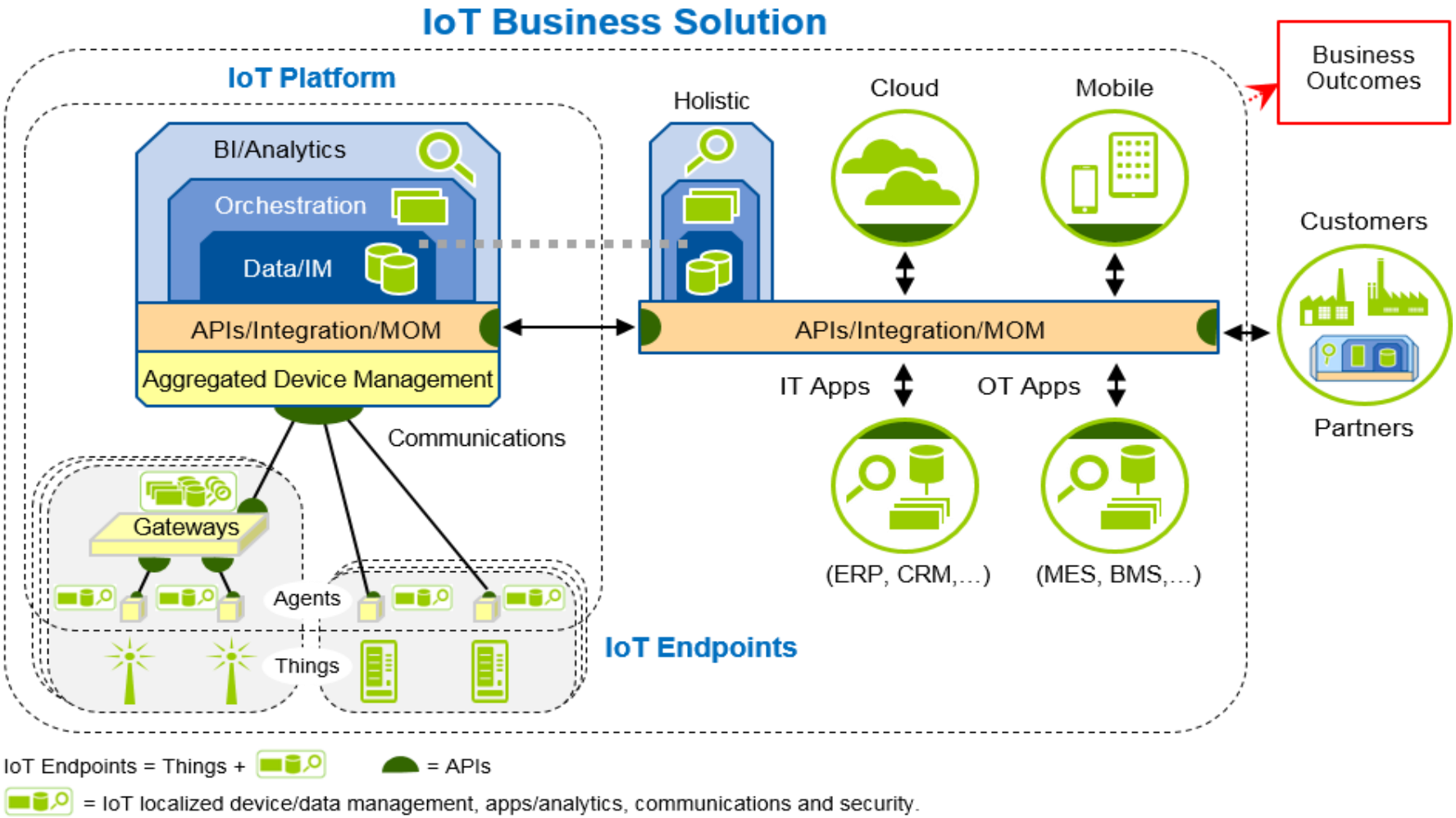
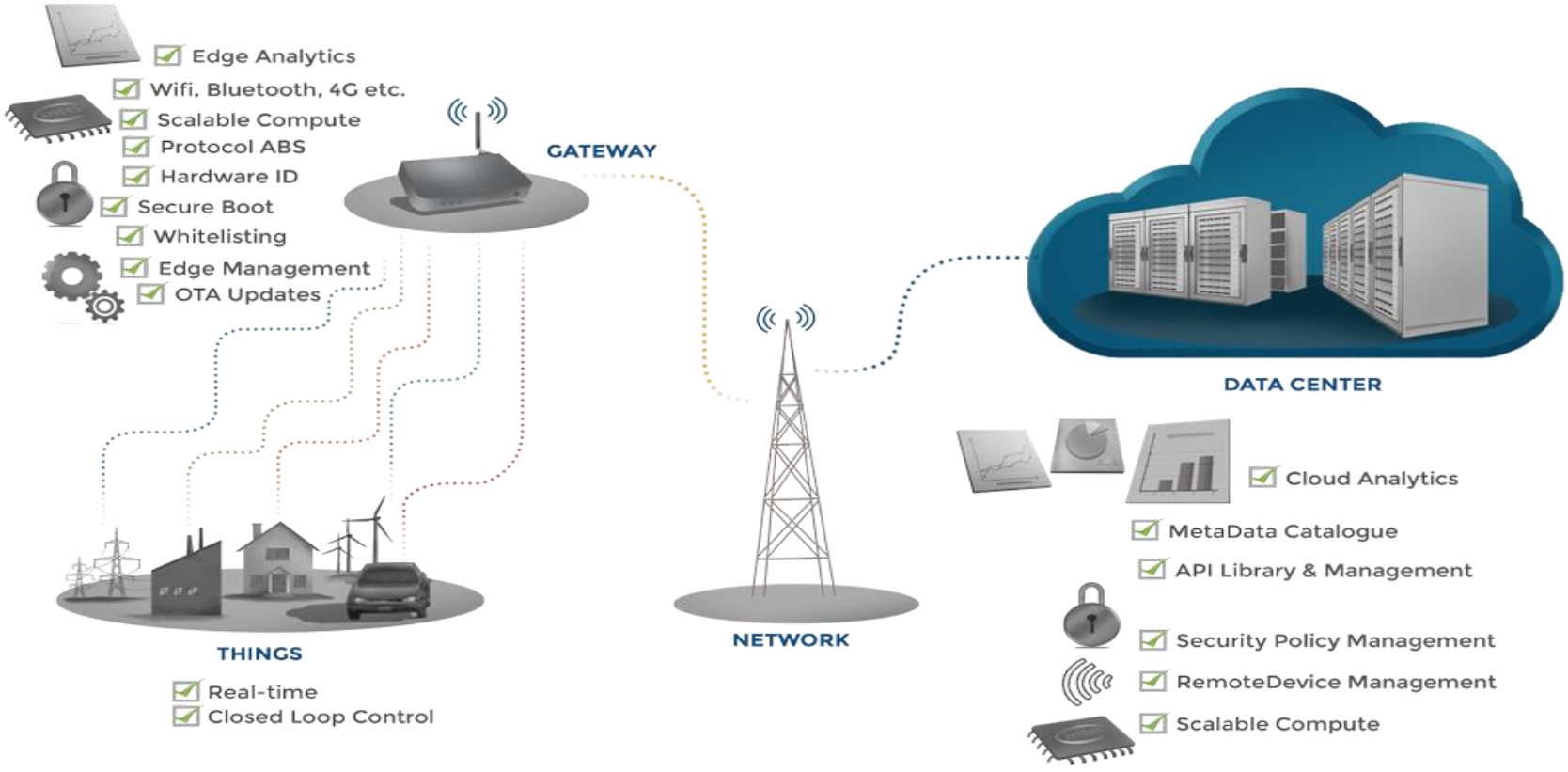
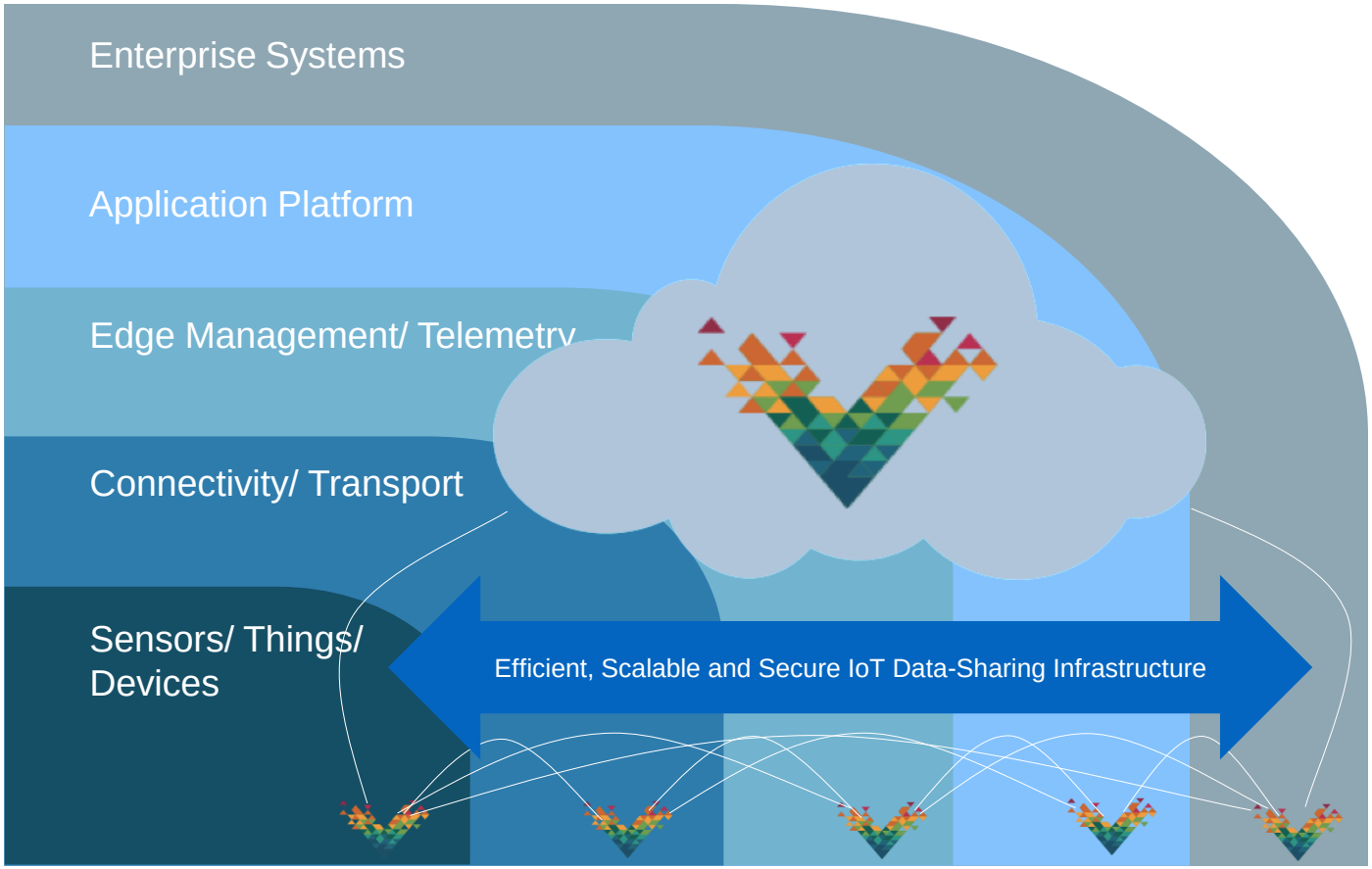

IoT Business Solution
IoT Platform
BI/Analytics
Orchestration
Data/IM
APIs/Integration/MOM
Aggregated Device Management
Communications
Gateways
Agents
Things
IoT Endpoints
Holistic
Cloud
Mobile
APIs/Integration/MOM
IT Apps
OT Apps
(ERP, CRM,...)
(MES, BMS,...)
Business Outcomes
Customers
Partners
IoT Endpoints = Things +
= APIs
= IoT localized device/data management, apps/analytics, communications and security.

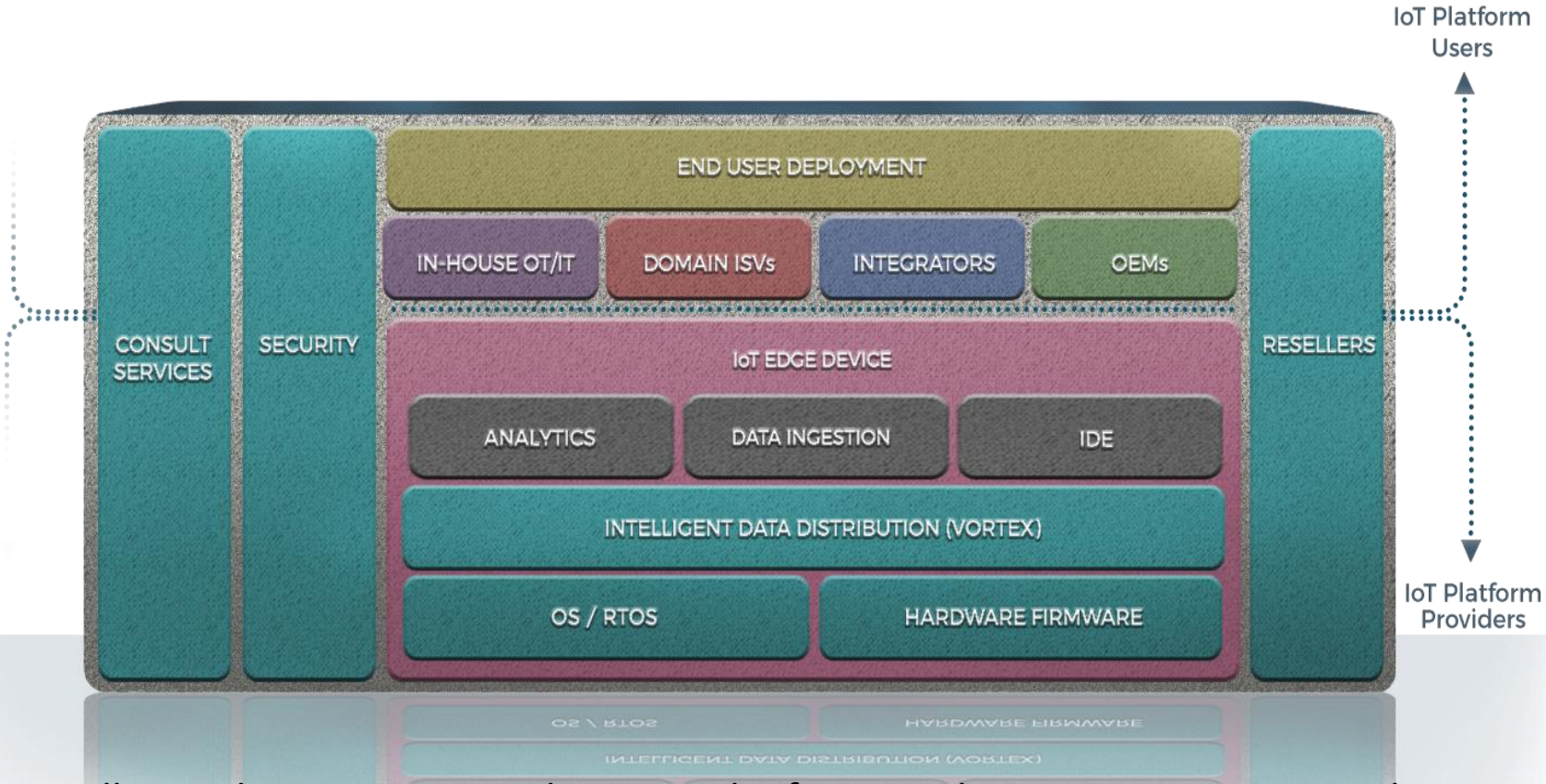
End-to-End IoT System Functionality



Ubiquitous Data Availability

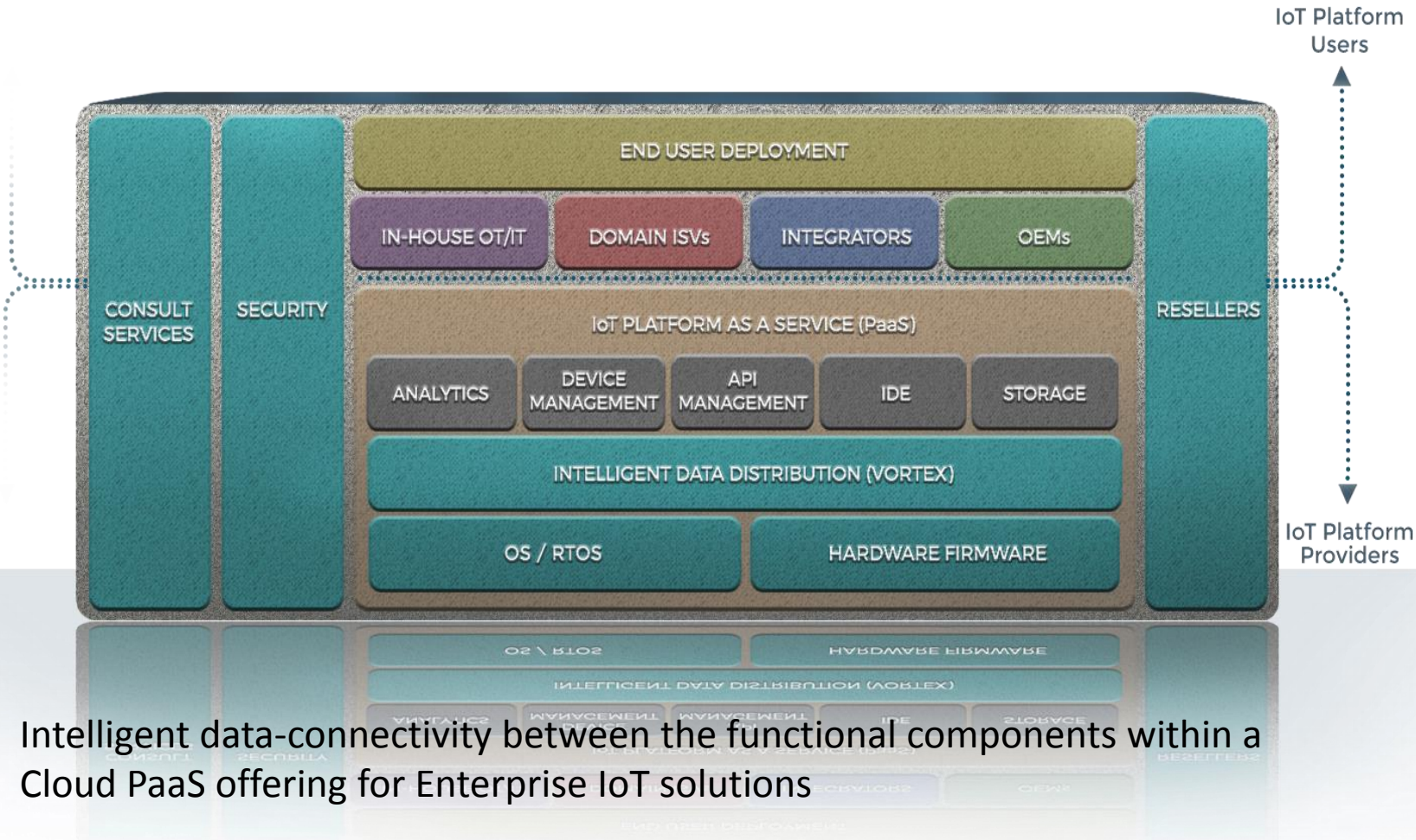


IoT Edge-Device Environment



Intelligent data-connectivity between the functional components in an IoT device and other devices, sub-systems and cloud services in Enterprise IoT solutions

IoT Cloud Services Environment



Intelligent data-connectivity between the functional components within a Cloud PaaS offering for Enterprise IoT solutions

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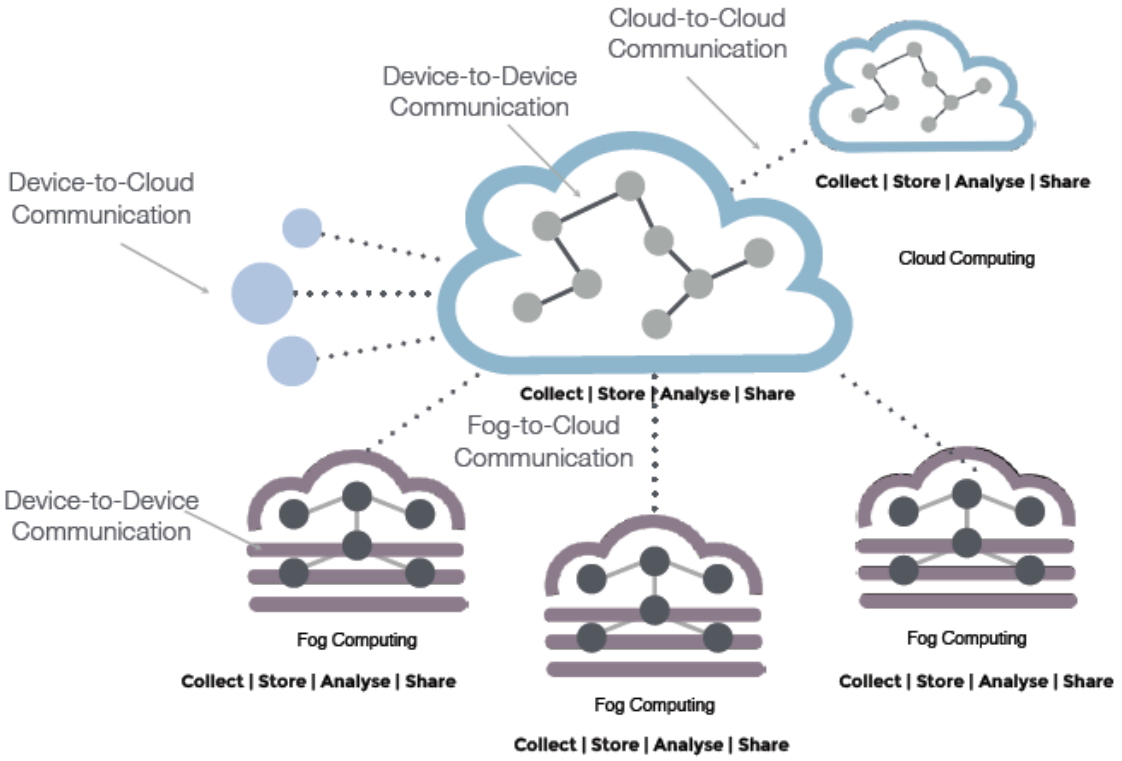
Cloud and Fog Computing

"IoT at the edge. By 2018, 40% of IoT-created data will be stored, processed, anlayzed, and acted upon close to the edge of the network." – *Dec 2014*

IDC
Analyze the Future



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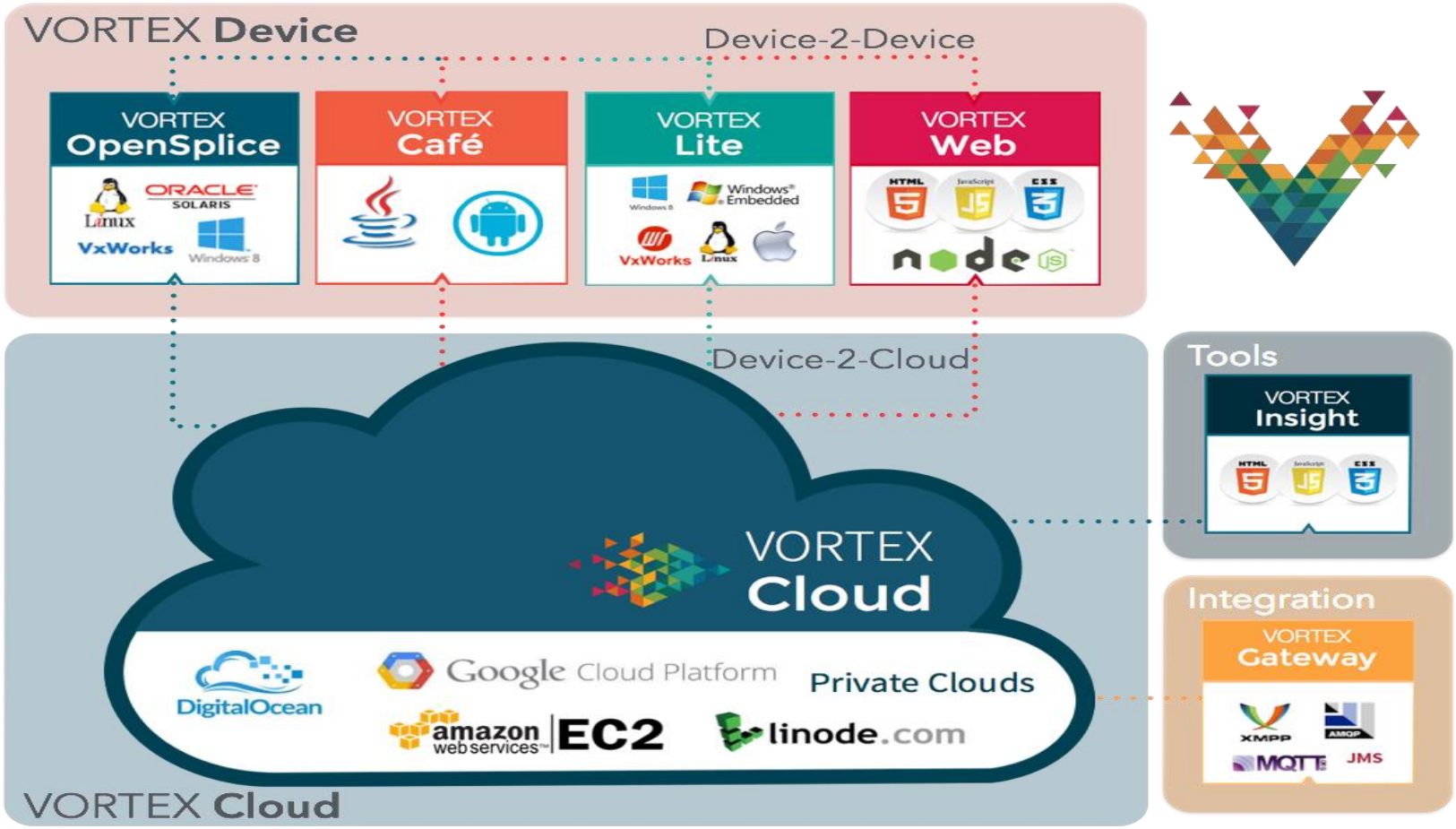
Device-2-Device and Device-2-Cloud



Related Smart Industry Blogs

More business oriented blogs:
http://www.smartindustry.com/blogs/smart-industry-connect/the-bottom-line-for-enterprise-iot/

http://www.smartindustry.com/blogs/smart-industry-connect/how-will-the-enterpriseindustrial-iot-add-value-over-traditional-ot-and-it-systems/

More tech oriented blogs:
http://www.smartindustry.com/blogs/smart-industry-connect/how-does-the-industrial-internet-differ-from-m2m-and-scada/

http://www.smartindustry.com/blogs/smart-industry-connect/beyond-m2m-to-enterprise-iot/

IIoT versus OT Key Differences

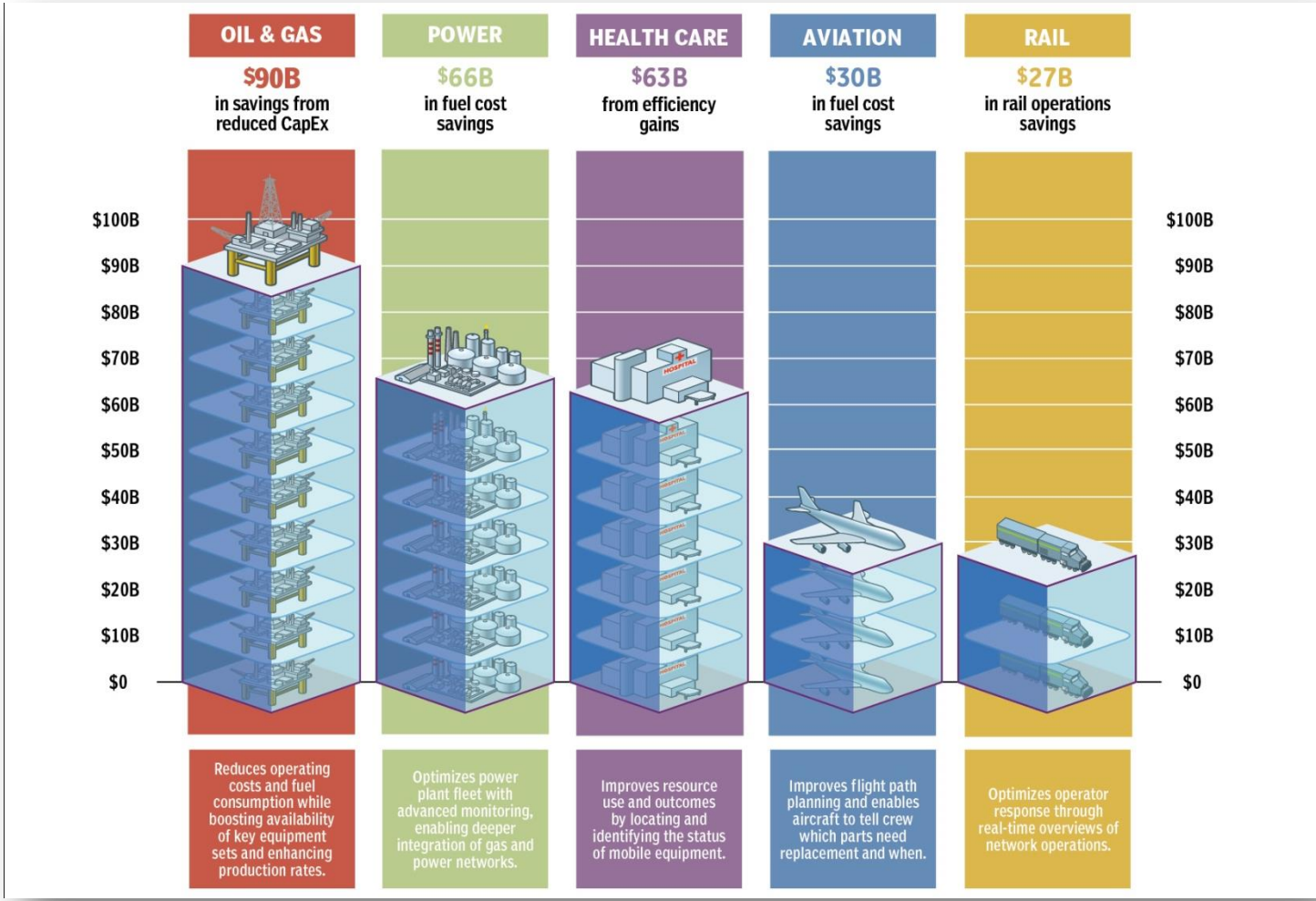
- Ubiquitous on-demand data accessibility: iDevices, connected silos
- Legacy and new 3rd-party sub-system inter-operability
- Selective (optimized) data movement for security and efficiency
- Distributed applications (analytics, HMI, edge computing, fog computing) generating new actionable insights
- New technologies lowering costs (cloud services, mobiles, etc.)
- From social (human) to operational (Things and humans) networks
- Twitter-for-Things enablement (system-wide pub/sub data sharing)
- Innovative applications from anywhere (New $B businesses)
- F.U.D. if we do nothing. Opportunity + Threat = Action

Benefits of Device Connectivity

How Much Could We Save With Connected Machines?

A 1% improvement in efficiency in these five industries could add up to $276 billion over 15 years

Source – GE 2013



Economic Benefits of the IIoT

Bank of America Merrill Lynch May 2014

Employee productivity increases: Better insight; independent monitoring; 2.5%-5% saving in operating costs in manufacturing

Improved Customer Service: Tracking customer behavior; better products and services

Combined real-time data and response: Faster, more agile, more accurate initiatives

Positive environmental, social and governmental impact: energy efficiency, lower pollution, regulatory, safety improvements

IoT market for software: $10B in 2013 to $36B in 2017; 37%CAGR

Changing Vendor Landscape

OT Vendors:	SCADA, CIM (OPC-UA, etc.)
IT Vendors:	Corporate systems, mobility, etc.
M2M Vendors:	Tactical SaaS (MQTT, etc.)
IIoT Platforms:	MS Azure, GE Predix, SAP HANA
Data Connectivity:	PrismTech Vortex, RTI Connext
Enterprise IT:	Build your own IIoT platform
New IoT Entrants:	???

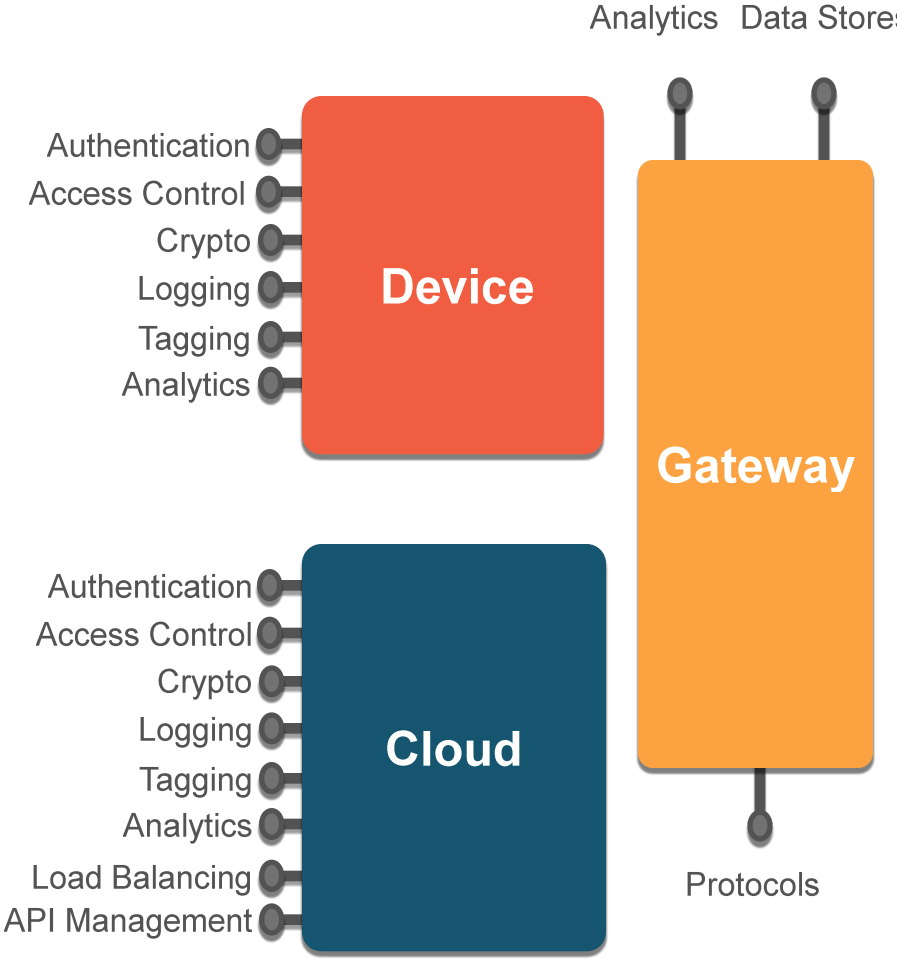
Platform Critical Gaps

Most IoT platform solutions have not yet moved beyond stovepipe connectivity. To build systems that unleash the most valuable part of the IIoT (the data) *a scalable date-sharing infrastructure* must include:

- Secure, efficient and ubiquitous device-to-device and device-to-cloud data sharing
- Scalable automatic discovery
- Elastic analytics, i.e., run the analytics where it makes sense: in the Cloud or at the Edge
- Seamless application interoperability
- Integration of IT and OT domains
- Ease of integration with other IoT building blocks
- Support for Edge intelligence (e.g. Fog nodes)

Extensibility and Integration

- Security
- Analytics
- Load Balancing
- API Management
- Edge Management
- Data Ingestion



Data Protocol Selection

	Transport	Paradigm	Scope	Discovery	Content Awareness	Data Centricity	Security	Data Prioritisation	Fault Tolerance
DDS	UDP/IP (uni-cast + m-cast) TCP/IP	Publish/Subscribe Request/Reply	Device2Device Device2Cloud Cloud2Cloud	Yes	Content-Based Routing, Queries	Encoding, Declaration	TLS, DTLS, DDS Security	Transport Priorities	Decentralised
AMQP	TCP/IP	Point-to-Point Message Exchange	Device2Device Device2Cloud Cloud2Cloud	No	None	Encoding	TLS	None	Implementation Specific
CoAP	UDP/IP	Request/Reply (REST)	Device2Device	Yes	None	Encoding	DTLS	None	Decentralised
MQTT	TCP/IP	Publish/Subscribe	Device2Cloud	No	None	Undefined	TLS	None	Broker is the single PoF

Change is the Only Constant

Cost declines are driving potential and ambitions within budgets (Cloud, BYOD, iDevices, Internet, etc.). Multi-$M projects are becoming multi-$K projects

Do you use Facebook, Twitter, Instagram today? Did you in 2005?

Corporate dislocation: IT / OT alignment. New terminology: Cloud + Fog + Edge = IT + OT + Sensor

Corporate strategy: Disrupter or disrupted (c.f. GE, Tesla Power Storage, Google/Apple Cars, Uber, Services vs Products)

Thank You

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