SP IoT Overview

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Innovation Edge– GSP EMEAR
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https://developer.cisco.com

http://newnet.telecom-paristech.fr/

Agenda

Cisco SP IoT Architecture
SP IOT Access
Fog Networking
SP IOT Platforms and Applications
Summary

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Cisco SP IoT Architecture

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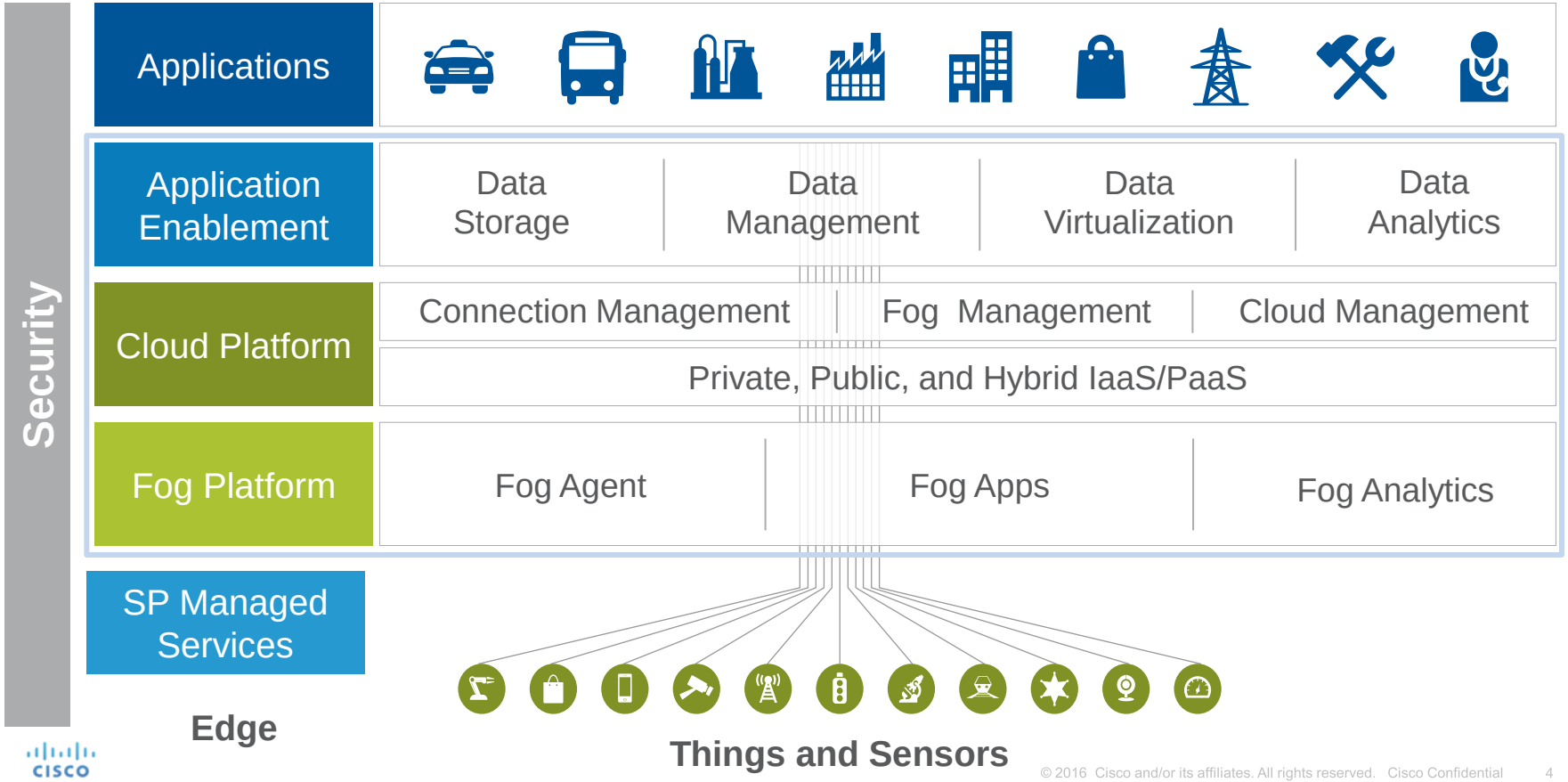
SP IoT Reference Framework

IoT World Forum SP Working Group



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Cisco SP IoT System Architecture

Secure, convergence, scale with fog, validated architecture & solutions

VERTICAL SOLUTIONS

- Transportation
- Oil and Gas
- Manufacturing
- Entertainment
- City
- Defense
- Utility
- Public Safety

APPLICATIONS

ECOSYSTEM

davra networks, device WISE, OSIsoft, BITSTEW SYSTEMS, ALSTOM, EMERSON, Rockwell Automation, Itron, azeti, BOMBARDIER, SK GROUP, SAP, Honeywell, GE Healthcare, LILEE

Application Enablement Platform
(Data aggregation/normalization, Analytics, Service Creation)

Connectivity Management Platform
(include control and bearer planes)

Fog Services Layer

LTE *Wi-Fi* IoT Connectivity *LPWA (LoRa, NB-IOT)*

Security

Management and Automation

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Cisco IoT Products Portfolio

Cisco IoT System

Industrial Switching

IE 2K,3K,4K,5K, CGS

Substation Routing

ASR 902/903, CGR 2000

Embedded Networks

ESS, 5900 ESR 5921 SW ESR

Network Management

FND, IOT-DM, IOK, IOX/Fog Director

Industrial Wireless

AP 1552, IW 3700 Manufacturing WBG/AP Mobile IP GW

Field Network Mobile Routing

819H, IR 809/829, IR 509, IR 910, CGR 1000

Industrial Security

ISA 3000

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SP IOT Access

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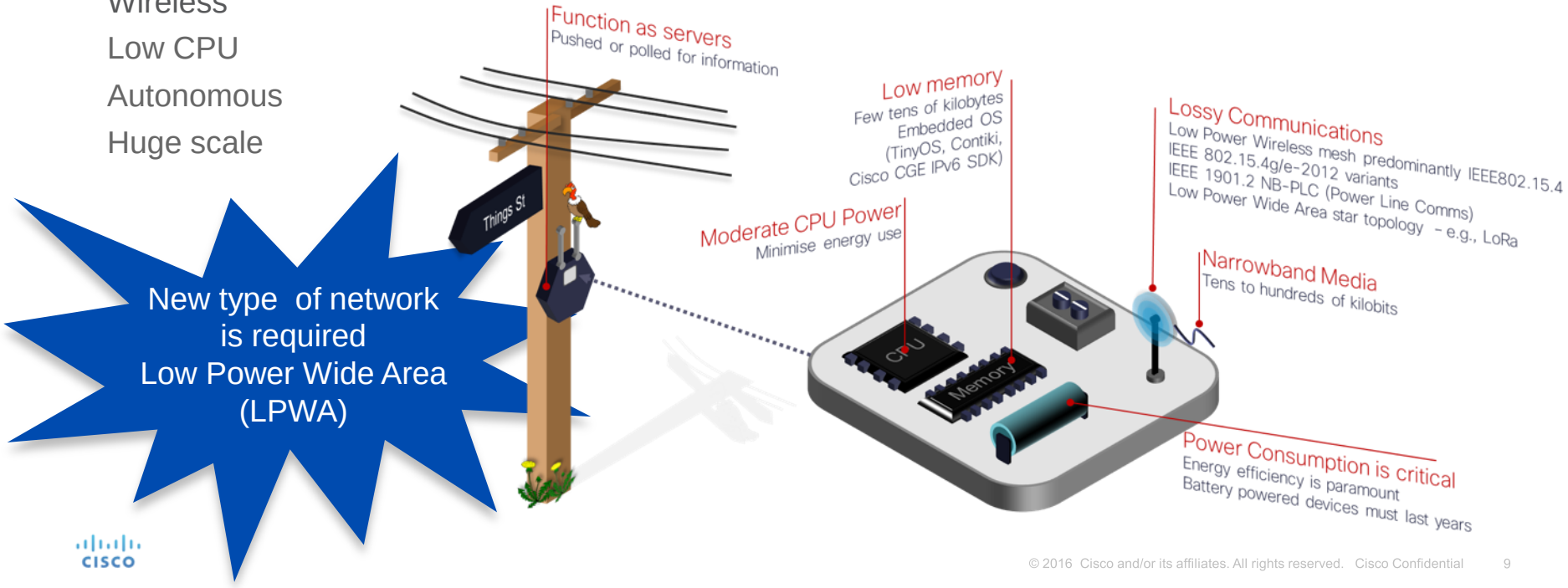
Cellular & WiFi not Suitable for Constrained Devices

Many sensors are low cost, low power, constrained devices

- Battery/solar/scavenger energy
- Wireless
- Low CPU
- Autonomous
- Huge scale



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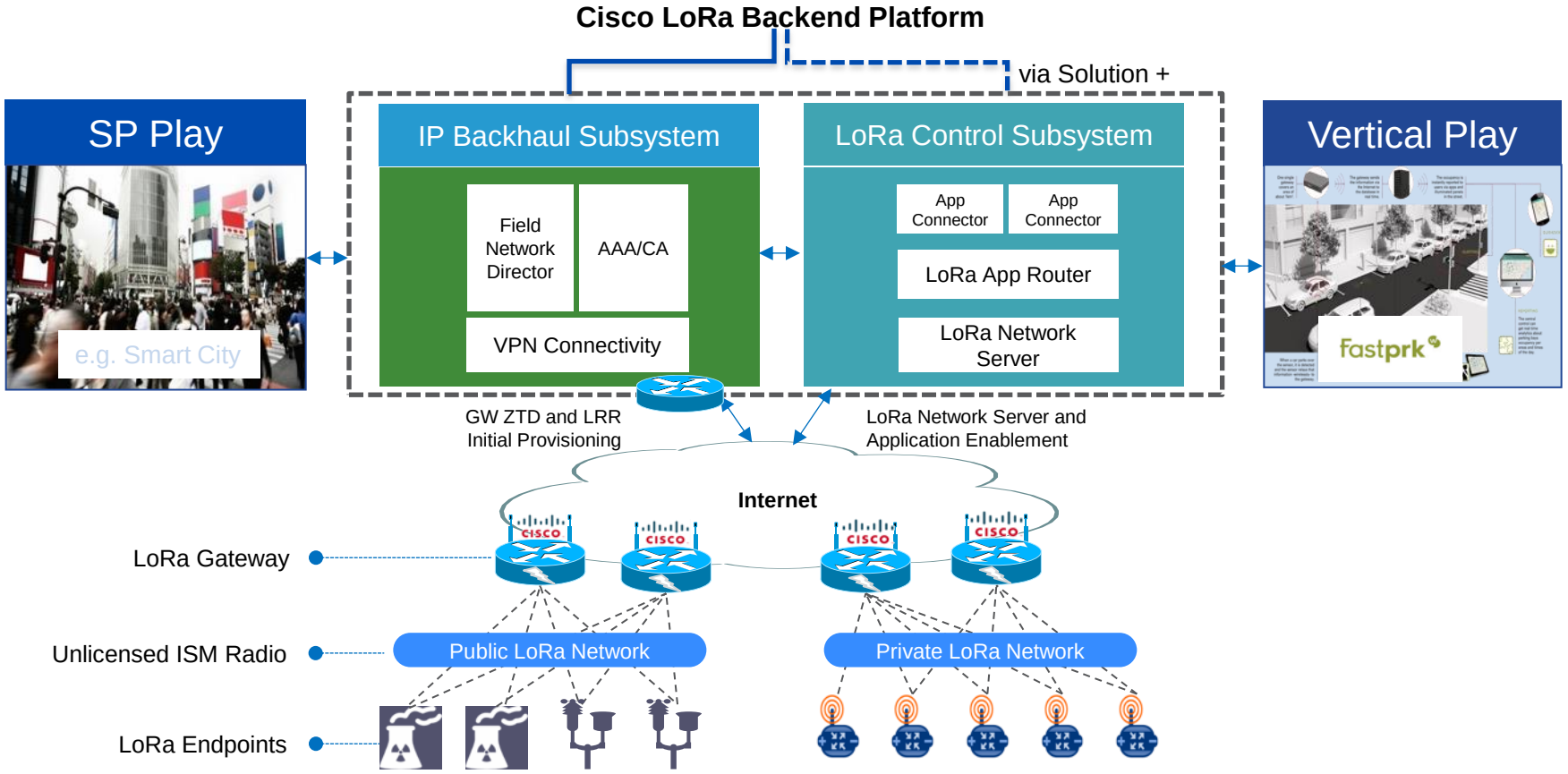
Cisco LoRa End-to-End Solution



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Low Power Use Cases

Smart metering

Street lighting

Smart building

Smart parking

Tracking

Leak detection & irrigation

Water level & flood management

Smart Farming

Smoke detectors

Smart energy & fast demand response

Waste management

Traffic management

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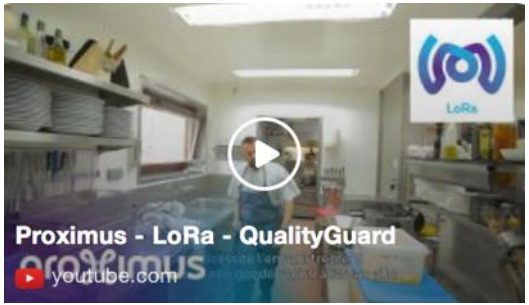
LoRa Sample Use Cases
Proximus Deployment

Food Control



Airport asset tracking

Smart Parking

Facility management

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Wireless IoT Connectivity Options

	Current SP Offering				Private Network			Emerging	
Technology	**2G**	**3G**	**LTE**	**WiFi**	**Zigbee**	**Wireless Hart**	**802.15.4g**	**LPWA (LoRa, Ingenu, SigFox, etc.)**	**NB-IOT EC-GSM**
Range	Long	Long	Long	Limited (<200m)	Short	Limited (<250m)	Limited (<1 km)	Long >10 km (rural) >1 km (urban)	Long
Topology	P2P	P2P	P2P	P2P/Mesh	Mesh	Mesh	Mesh	P2P	P2P
Tx Current Consumption (3V)	30mA to 400mA	500 to 1000mA	600 to 1100 mA	19 to 400 mA	34mA	28mA	~ 35mA	<20 mA	
Standby Current Consumption (3V)	0.35 mA	1.2 to 3.5mA	1.5 to 5.5mA	1.1 mA	0.003mA	0.008mA	~.005mA	<0.005mA	
Energy Harvesting	No	No	No	No	Possible	Possible	Possible	Possible	Possible
Operating Life on battery (2000mAh) h=hours; d=days A=active; I=Idle	4-8 h (A) 36 d (I)	2-4 h (A) 20 d (I)	2-3 h (A) 12 d (I)	4-8 h (A) 50 h (I)	60 h (A)	8-10 years	Variable	10-20 years	
Module Cost (est.)	$12	$35-$50	$40-$80	$5-$8	$6-$12	NC	$3	$5	?
Spectrum	Lic.	Lic.	Lic.	Unlic.	Unlic.	Unlic.	Unlic.	Unlic.	Lic.

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PMB Tactical LTE

- EPC, vPC from Cisco
- eNodeB and Server from Klas Telecom
- Cisco CSR1000v virtual router
- Netnumber TITAN HSS
- Thales Nexium Wireless MC-PTT

A FULL LTE NETWORK RUNNING ON BATTERIES!

Fog Networking

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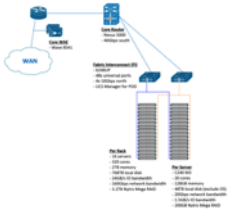
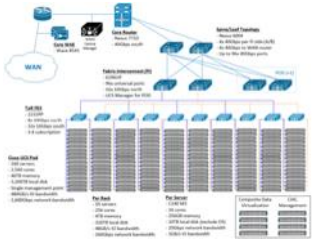
Case Study: 7,000 wells x 1,000,000,000 bytes/day/well = 7,000,000,000,000 bytes/day (over a 3G network bandwidth)





Edge Processing

7,000 Oil Wells

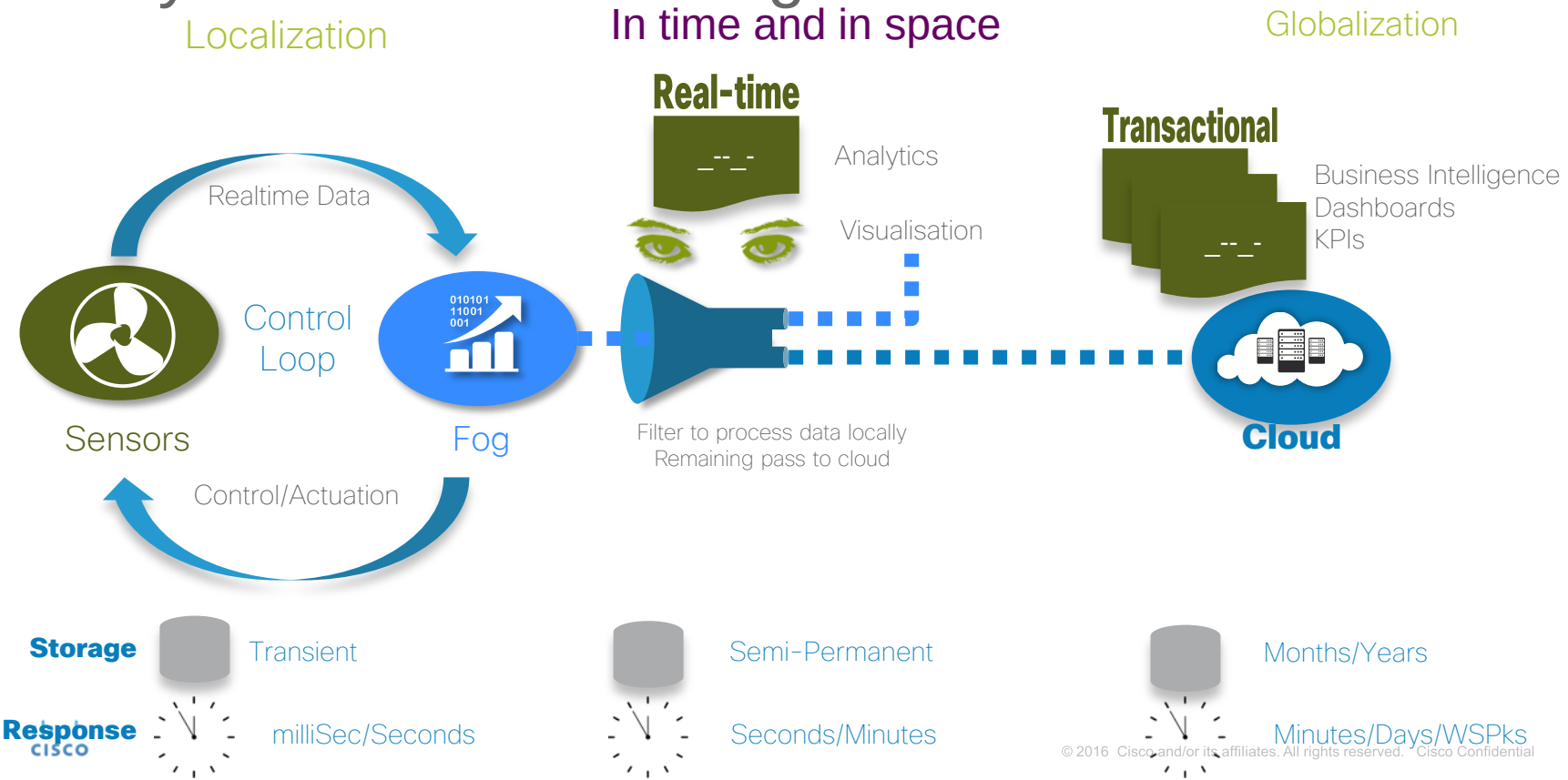
Fog Processing

300 Platforms

Data Center

IT Central

Cisco Data-In-Motion (DMo) – fog supported analytics and data management



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Extending the Cloud to the Things

FOG COMPUTING

WHAT IS IT

Fog Infrastructure for Running Apps Close to Things

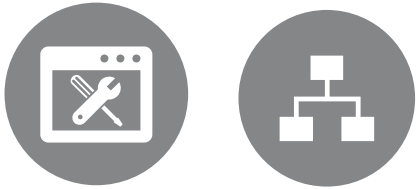
CISCO VISION

RICH SERVICE CAPABILITIES:
APIs

ECOSYSTEM PARTNERS

FOG NODE CHOICE

CISCO PORTFOLIO



APIs: IOx

PLATFORMS: CGR, 8X9 SERIES HARDENED COMPUTE

ECO SYSTEM PARTNERS

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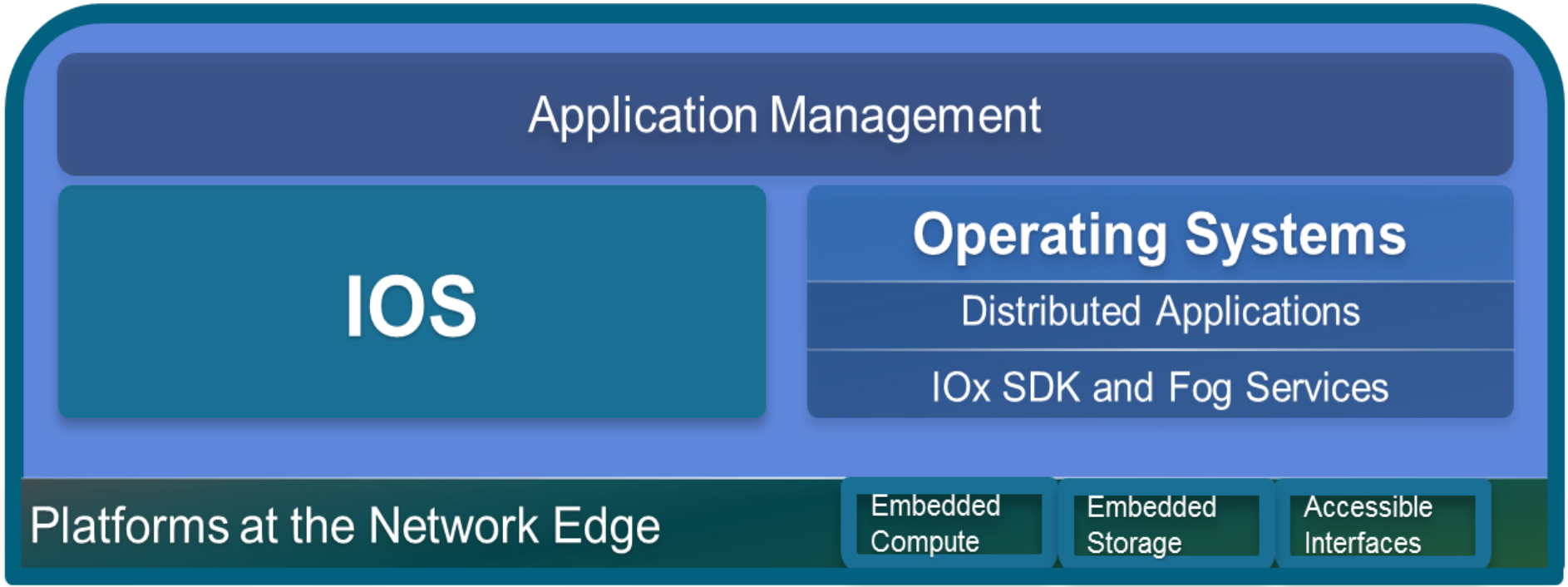
IOx and Fog Capabilities Progress



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Cisco Fog Director

IOx Application Management Module

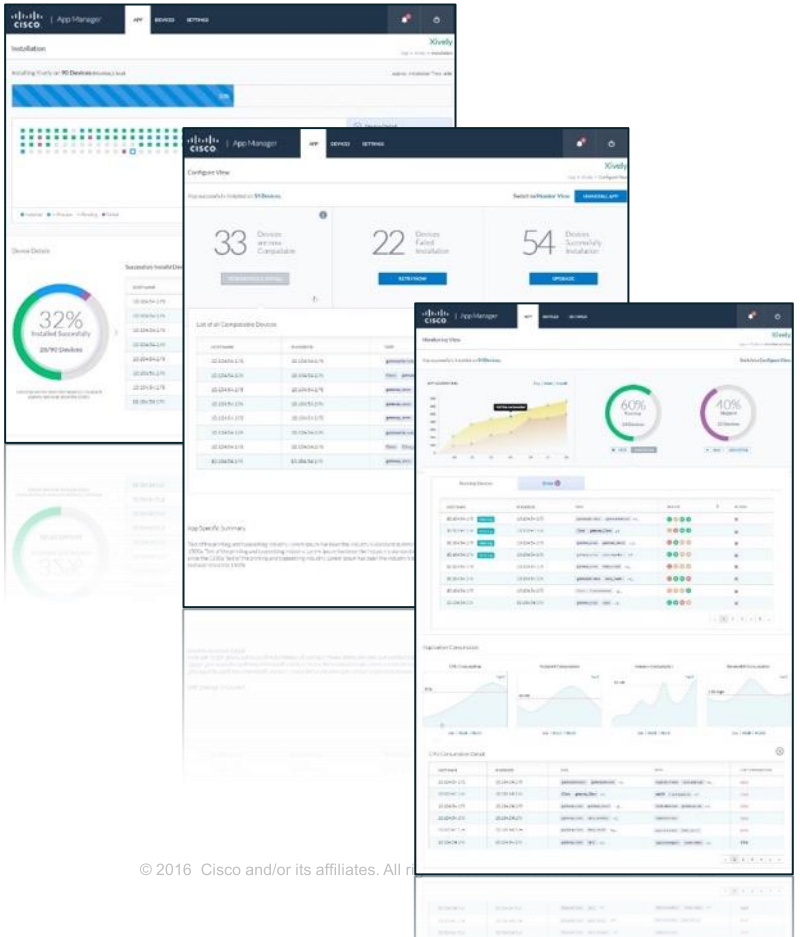
- Simplified application lifecycle management
- Stand Alone UI or may be integrated into 3rd party applications restful APIs

Understand your IOx resources

- Tracks IOx resource utilization (CPU, Memory, BW)
- Display per application and per device historical trends
- Establish per application status frequency from the onboard agent

IOx Application Rollout

- Stage the application image within the local application catalog
- Identify target devices directly or via sites, etc.
- Detailed application rollout tracking



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SP IOT Platforms and Applications

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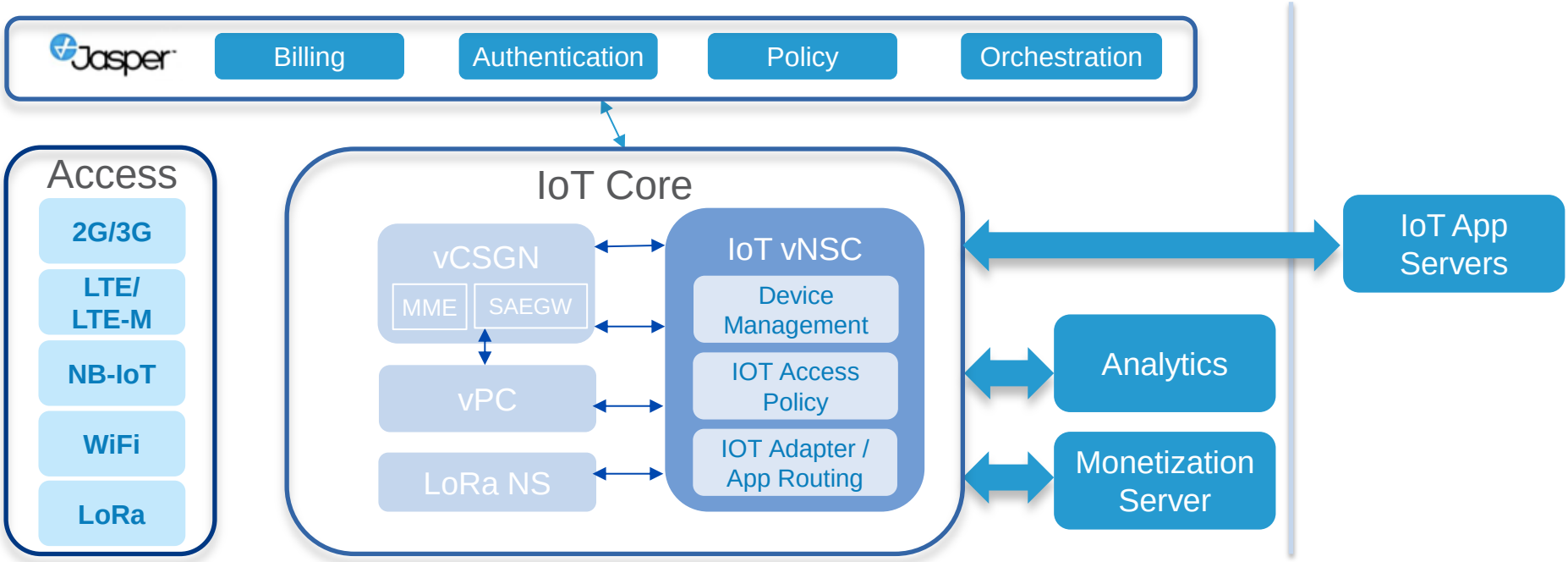
Cisco IoT Core Vision



- Multi-access core with unified policy, charging and service capability layer.
- Additional capabilities – analytics, data exposure provide monetization opportunities
- Network Service Capabilities (NSC) based on ETSI framework exposes various network capabilities to the applications and includes adapters for different access types (Cat-M, NB-IOT, LTE-M, LPWA)

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Connected Asset Management for Cell Sites

What Operations Needs To Know

- Diesel availability/theft
- Battery availability – potential to fail
- Position change of antennas
- Copper theft
- Perimeter breech
- Who entered and when in/out
- Alarm status
- Temperature and Humidity – in/out
- Cell throughput/signal
- Damage to facility – e.g. flooding
- Tenant specific Energy consumption
- Optimal source of energy

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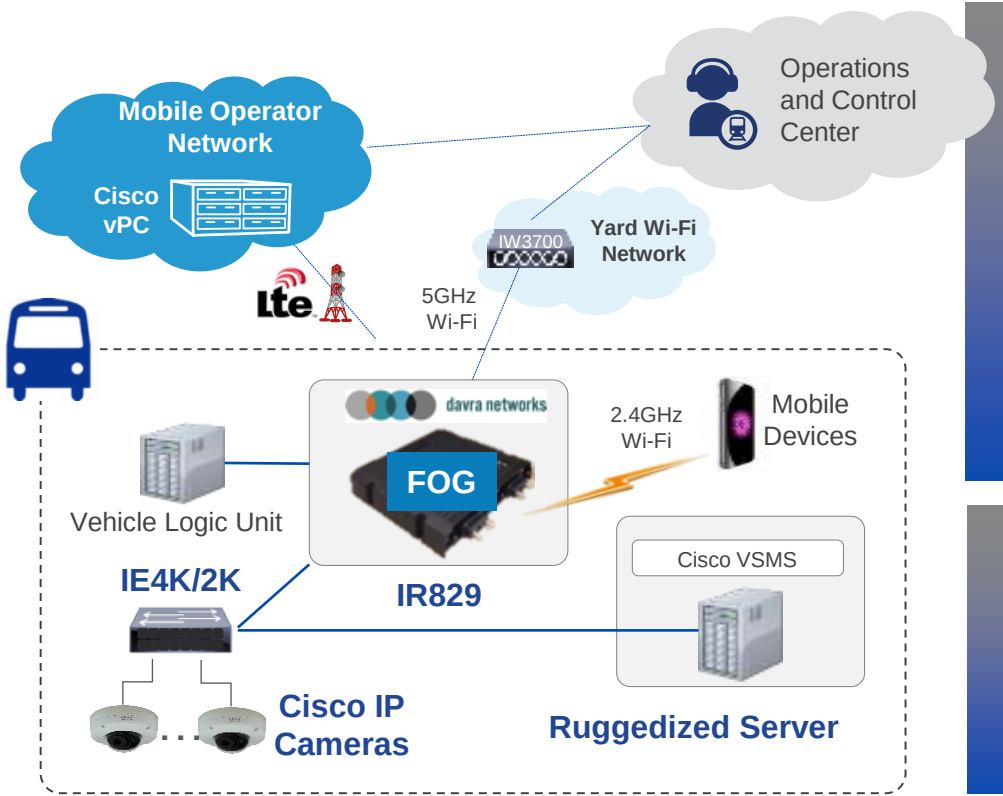
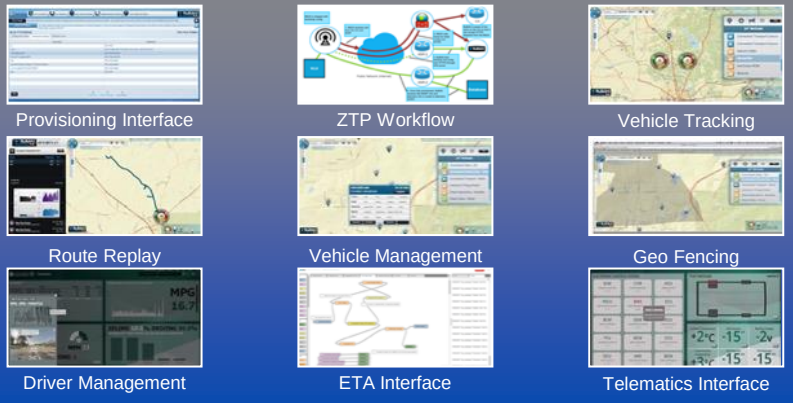
Cisco Solution for Fleet Management

System Architecture



Cisco Service Delivery Platform



Cisco Video Surveillance Manager

- On-board Cisco Video Surveillance Media Server
- Video recording and storage based on event triggers
- Video offload via Wi-Fi in maintenance yard

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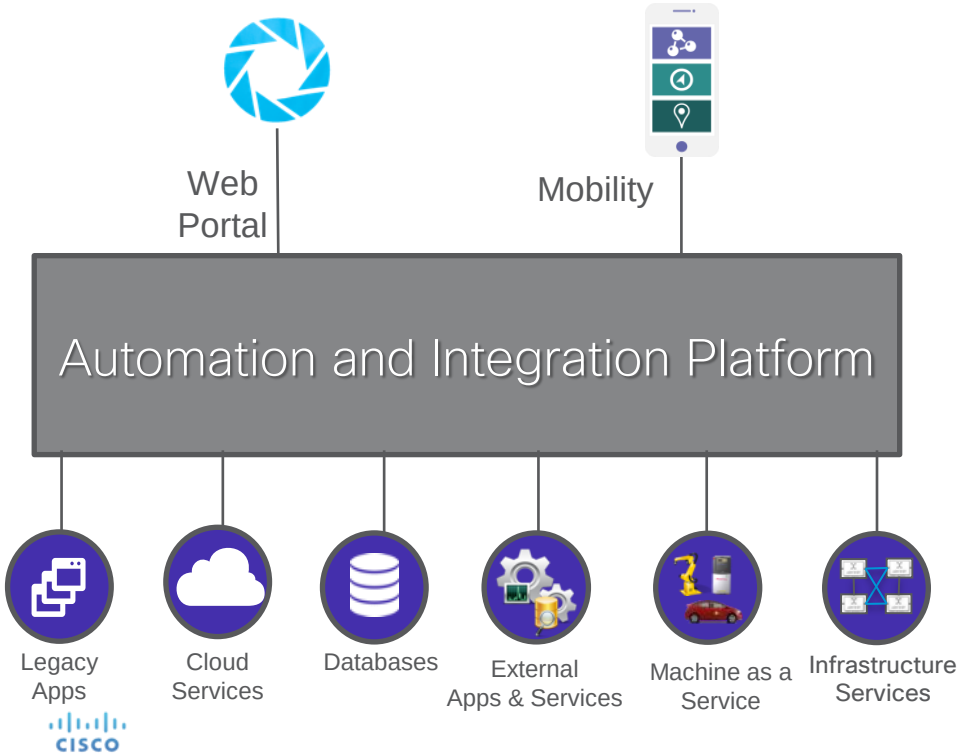
Cisco Automation and Integration Platform (AIP)

Expose, Compose and Govern across organizations



EXPOSE

Catalog of assets exposed securely as services via APIs and portals

COMPOSE

Create new apps and processes by connecting applications, data and users

GOVERN

Policy-based access and control via fully federated single sign-on, ID mgmt, and APIs

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The Platform Enables Multiple Smart City Use Cases

- Citizen Engagement App
- Parking Enforcement App

Citizen Applications

Urban Services Applications

- Operations Center
- City Dashboard

Cisco City Digital Platform

Intercloud

Parking | Lighting | Traffic | Others

Smart City Network

Cisco GW with IoX

MESH MESH MESH

Cisco GWwith LoRa Module

Parking Sensor with ZigBee

Smart Lights and Multi-Sensing Nodes

Parking Sensor with LoRa

Traffic Traffic

Parking and Traffic Flow Sensors

Traffic Traffic

Parking and Traffic Flow Sensors

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Summary

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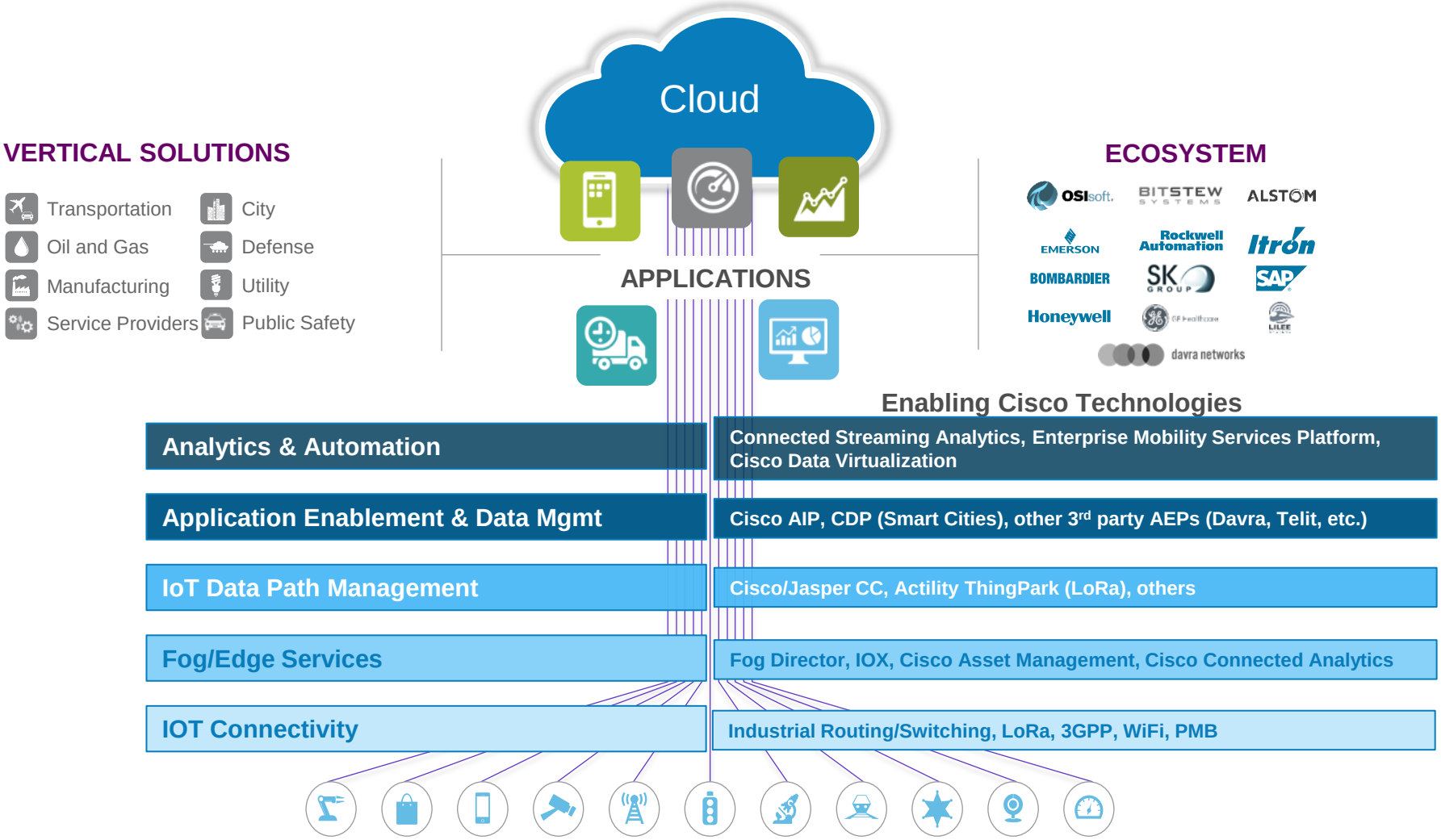
Cloud
VERTICAL SOLUTIONS
Transportation
City
Oil and Gas
Defense
Manufacturing
Utility
Service Providers
Public Safety
APPLICATIONS
ECOSYSTEM
OSIsoft.
BITSTEW SYSTEMS
ALSTOM
EMERSON
Rockwell Automation
Itron
BOMBARDIER
SK GROUP
SAP
Honeywell
davra networks
Enabling Cisco Technologies
Analytics & Automation
Connected Streaming Analytics, Enterprise Mobility Services Platform, Cisco Data Virtualization
Application Enablement & Data Mgmt
Cisco AIP, CDP (Smart Cities), other 3rd party AEPs (Davra, Telit, etc.)
IoT Data Path Management
Cisco/Jasper CC, Actility ThingPark (LoRa), others
Fog/Edge Services
Fog Director, IOX, Cisco Asset Management, Cisco Connected Analytics
IOT Connectivity
Industrial Routing/Switching, LoRa, 3GPP, WiFi, PMB

CISCO