Internet of Things – Cisco's Vision & Approach

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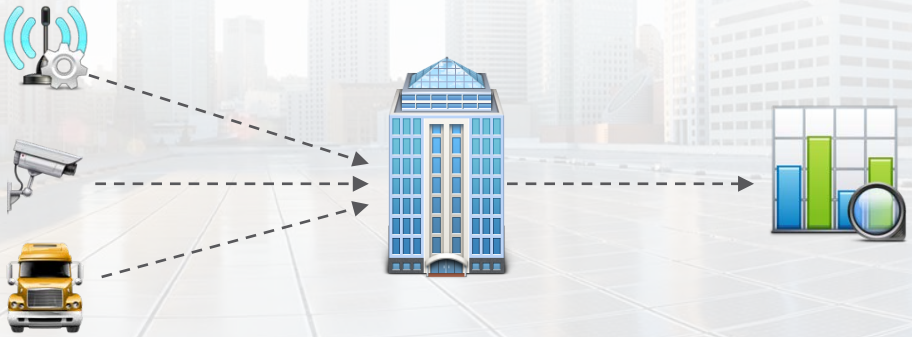
What is IoT?

Leveraging Machine Generated Data for Business Benefit

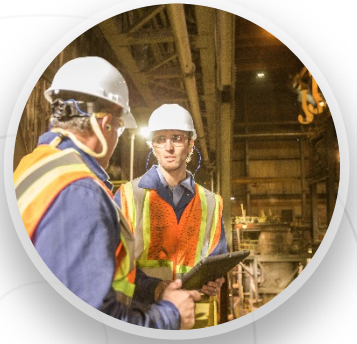


It Always Starts with a Business Problem…

Preventative Maintenance

Real-time Quality Detection

OEE (Overall Equipment Efficiency)



Personnel Safety

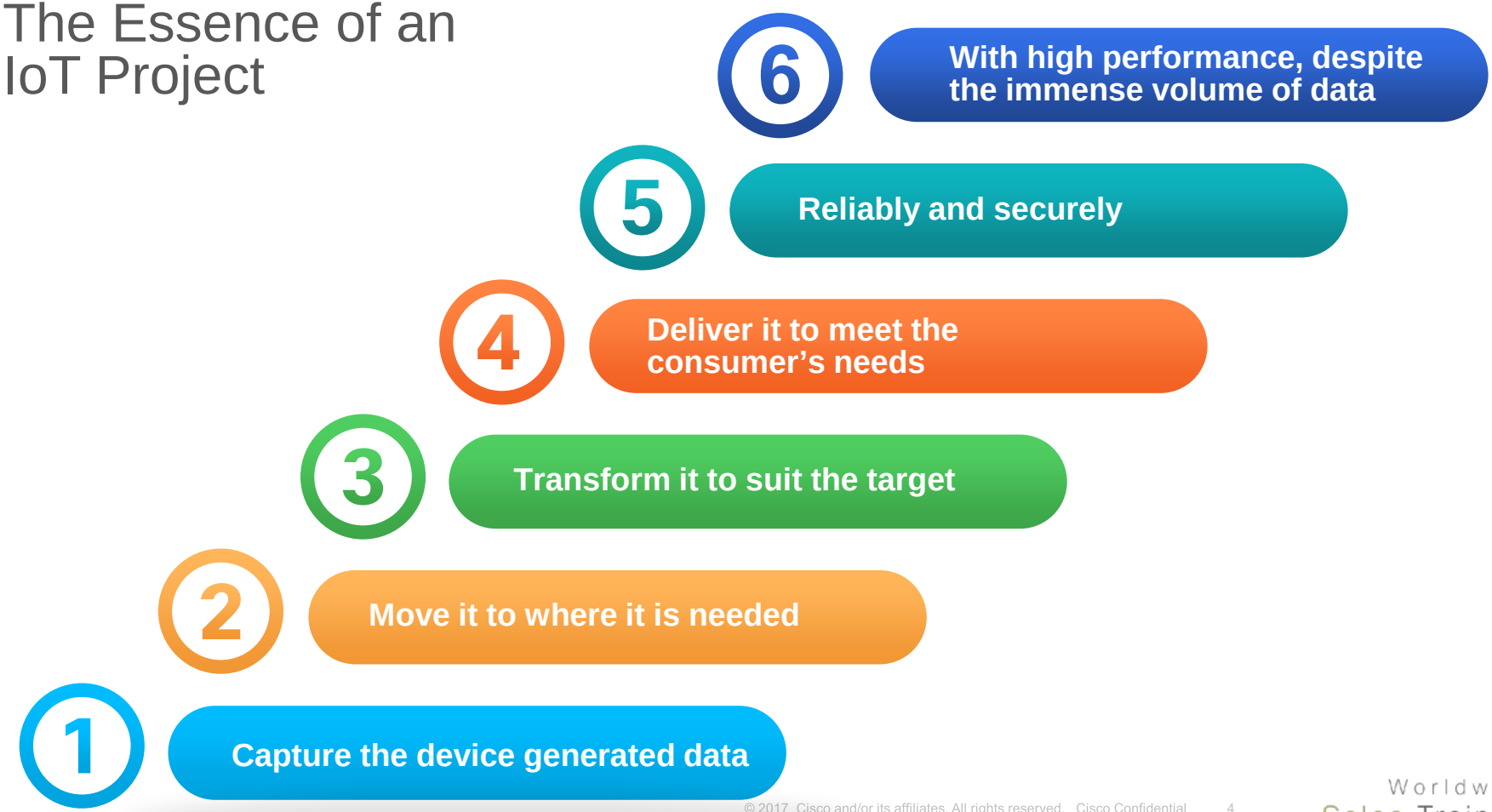
Remote Monitoring

Condition-Based Maintenance

Asset Tracking & Management

Real-time Quality Detection

The Essence of an IoT Project



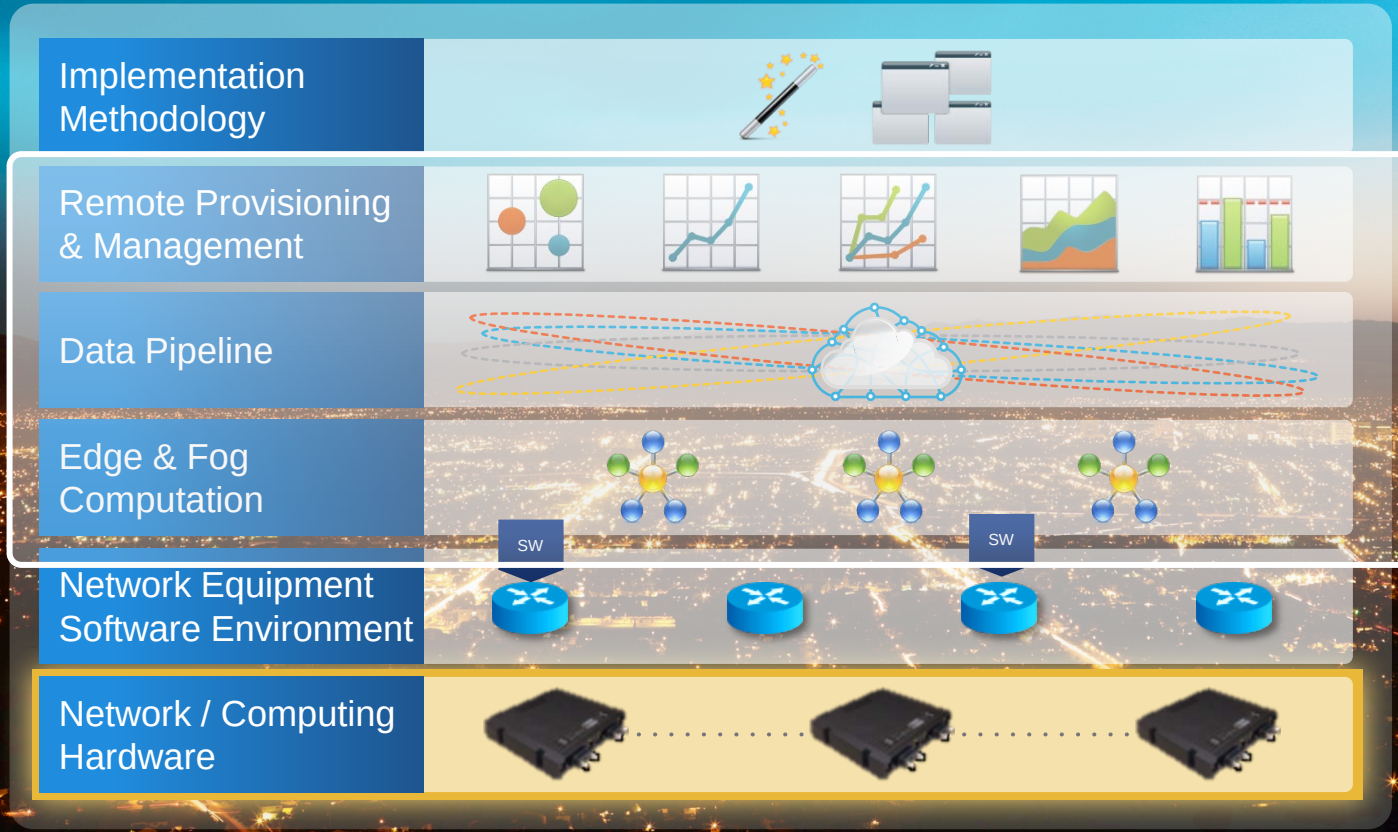
Leveraging Machine Generated Data and Networking for Business Benefit

The Network has become The Platform

The Basic Issues

- Capturing data from the devices
- Moving it reliably across the network
- Converting data into information
- Delivering it to the right consumers

The Total Cisco IoT System



Industry’s Most Comprehensive IoT Network/Computing Hardware

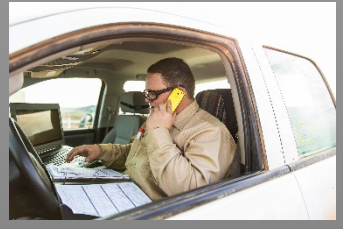
Field Area Network (Wi-SUN)

- AMI smart metering
- Distribution automation
- Street lighting
- O&G wellhead monitoring
- Water/wastewater


CGR1000


IR500

Fleet Vehicles Mass Transit



- Automated Vehicle Location tracking, Data Uploaded in Seconds with 4G / LTE
- Handles Multiple Wireless Laptops, Smartphones, Tablets Simultaneously


IR829


IE4000

Remote Asset Monitoring

- Pipeline monitoring
- Roadside infrastructure
- Distribution automation
- ATMs
- Digital Signage


IR809


IE4000

Premium Mobile Broadband (PMB)

- Public safety and security CPE


IR829


IR809

Low Power Long Range Wireless (LPWA – LoRA)

- SP IoT Infrastructures
- Battery powered sensors
- Environmental monitoring
- Smart Cities, parking, and Agriculture
- SP cell tower monitoring


IR910


IR8x9 + LoRA Modem (future)

Common IoT Edge Software Hosts

Connectivity & Sensors

- Ethernet
- Cellular 3G/4G
- Serial (RS232/RS485)
- Wi-Fi a/b/g/n (IR829)
- GPS
- *Accelerometer**
- *Gyrospcope**

IR809

IR829

IE4000

Compute Module CGR1240

Broad Connectivity

- Ethernet
- Cellular 3G, 4G LTE
- Wi-Fi
- LoRaWAN

Pervasive Security

- HW Accelerated Encryption
- IPSec VPN
- 802.1x
- Firewall
- Identity Services

Industrial Grade

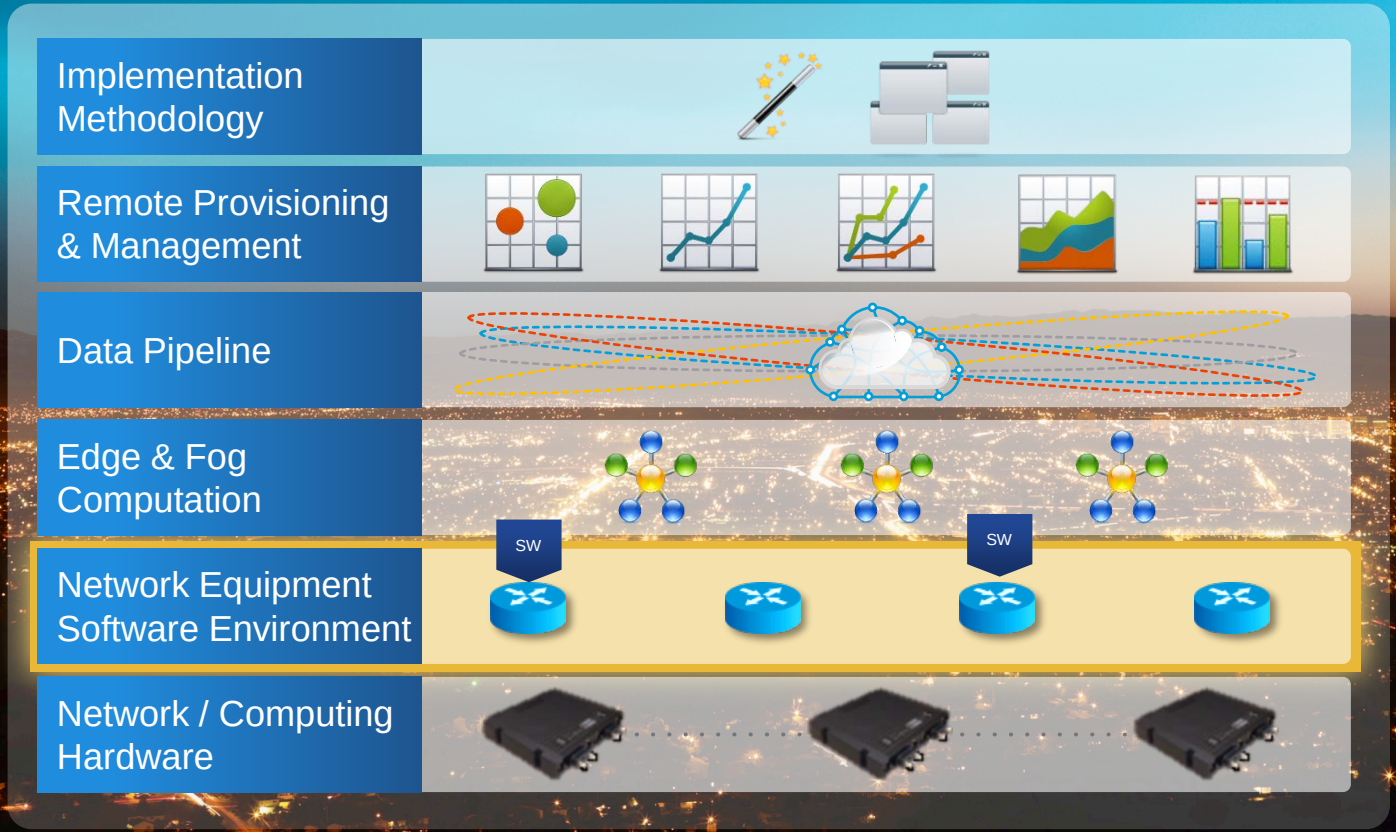
- Ruggedized for shock / vibration, humidity, temperature, dust
- DC power supplies

Policy-based Management

- Centralized control
- Network
- Security
- Fog applications

Worldwide Sales Training

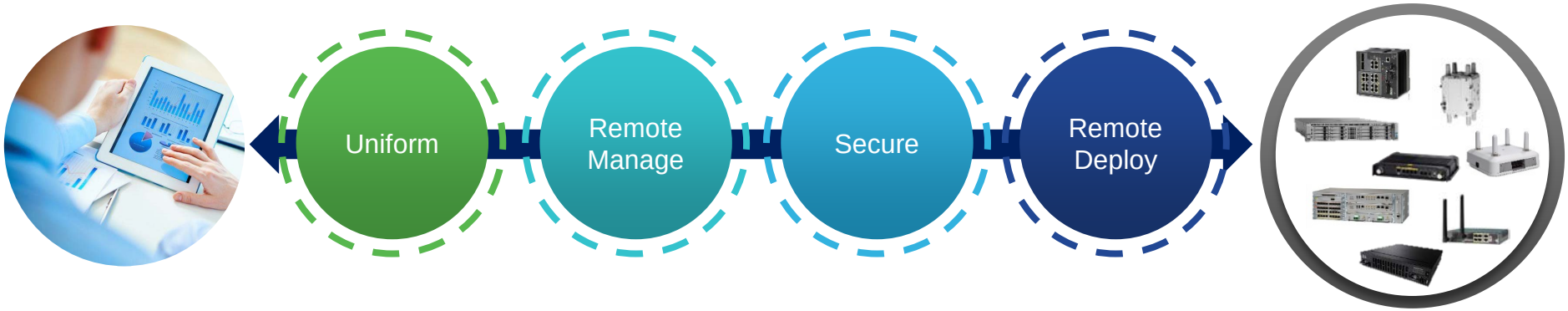
The Total Cisco IoT System



IOx: Enabling Network devices as IoT Gateways

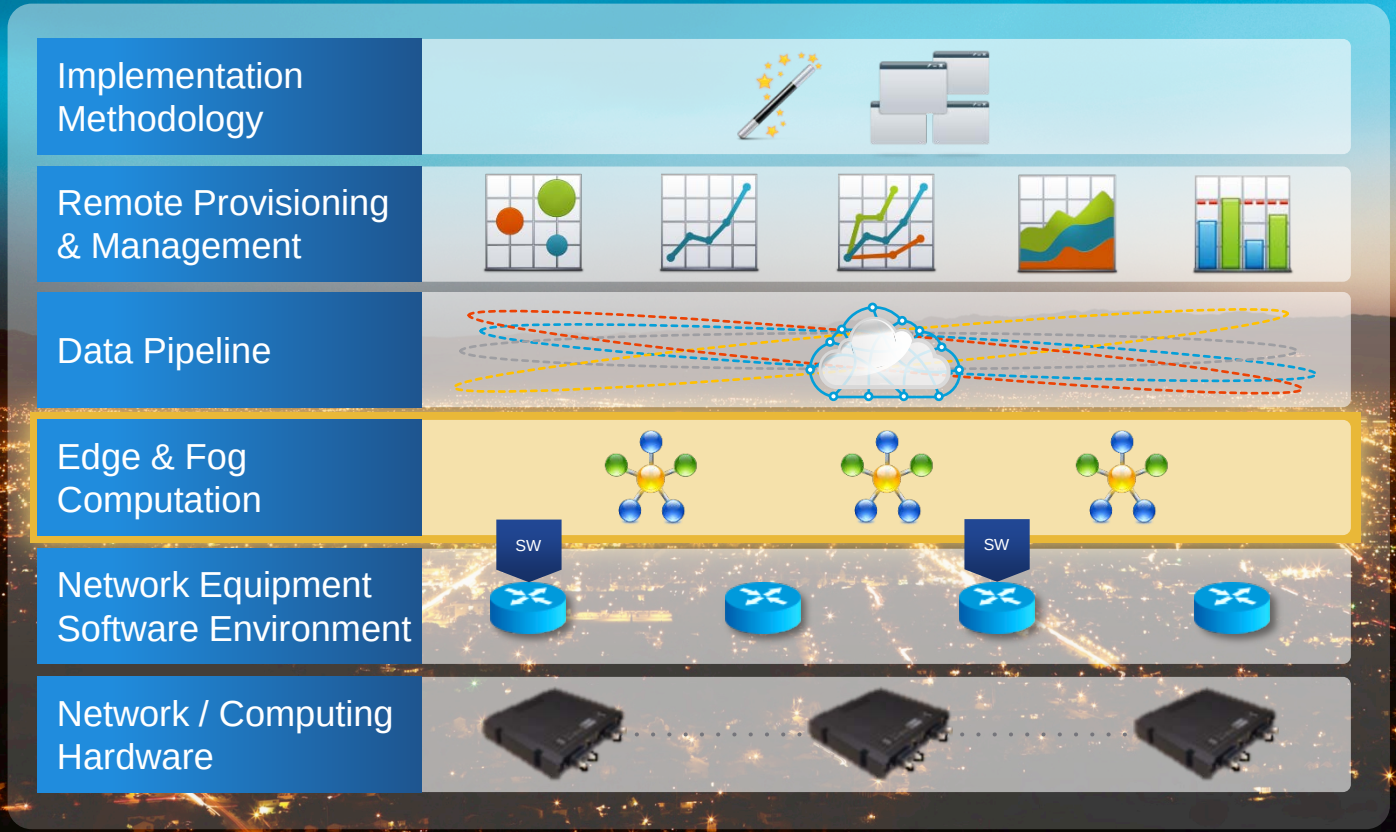
Transforms Network Appliances into Microservices Hosting Infrastructure

Single Framework for Distributed Microservices



Worldwide Sales Training

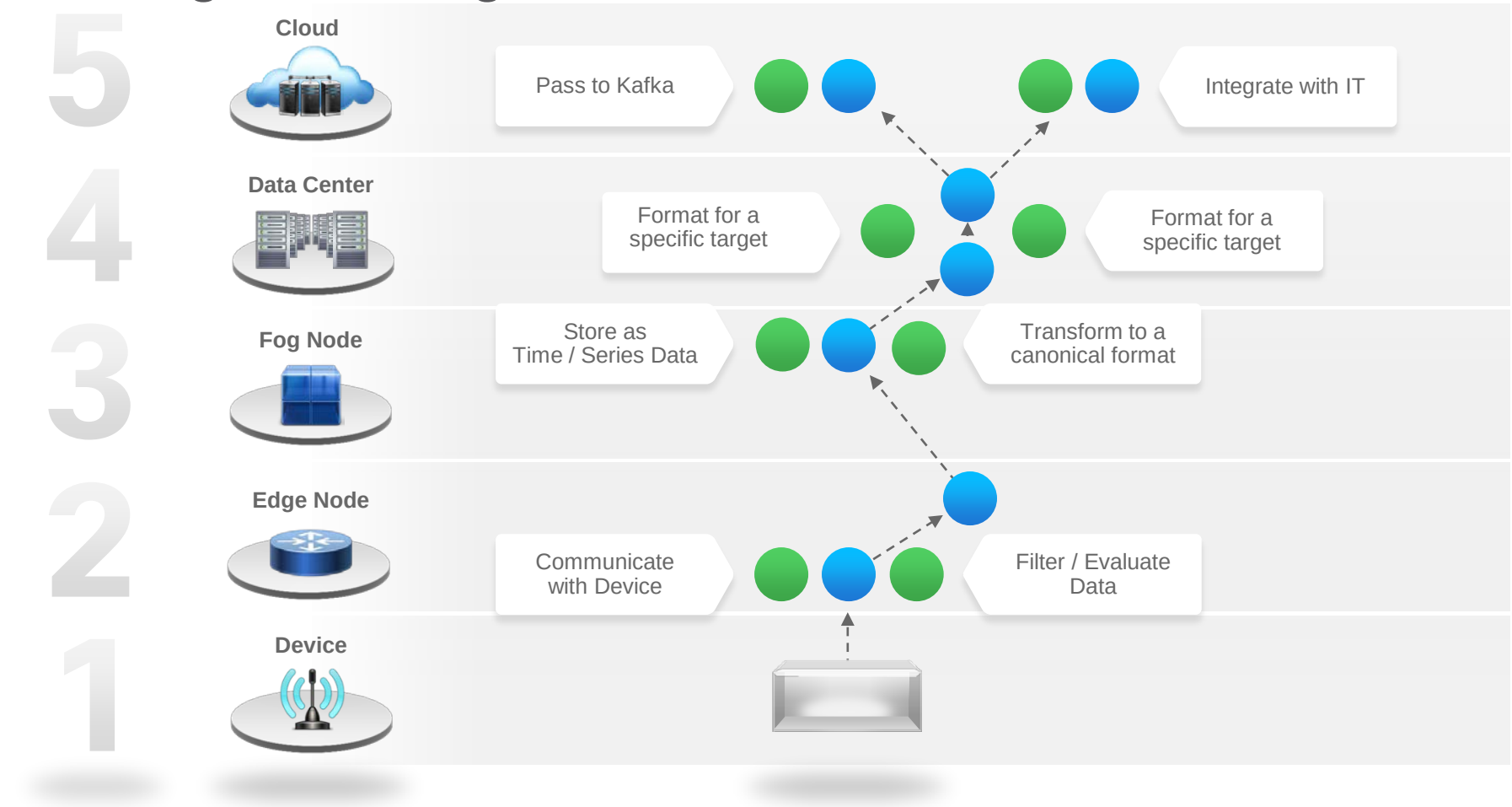
The Total Cisco IoT System



Why Compute at the Edge?

There may not be enough network bandwidth	**Data Reduction**
Most of the data is not interesting	**Filtering**
The use of data may be at the edge	**Latency Optimization**
Computation can be optimized for some purposes	**Partitioning**
Data normalization	**Application Simplification**
Data redirection based on the content of the data	**Dynamic Changes**
Data time stamping for later forensic analytics	**Analytic Support**

The Edge and Fog “Fabric”

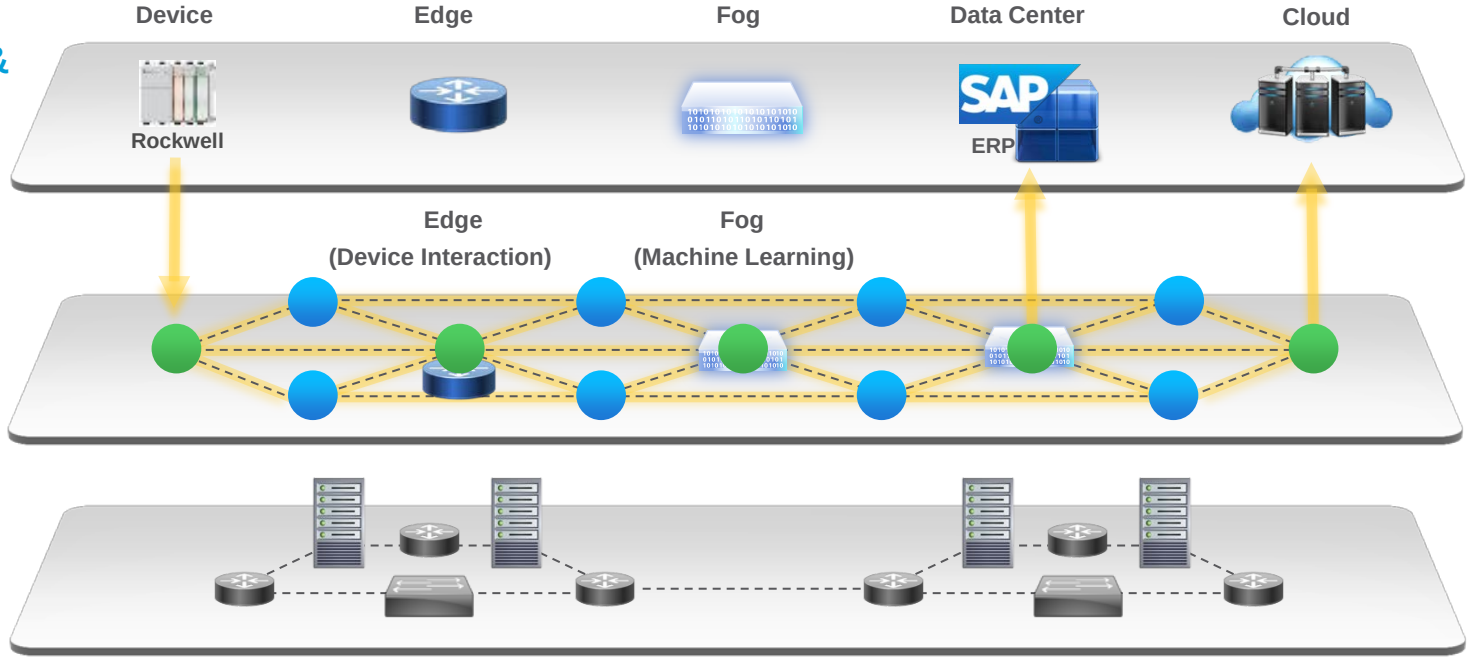


“Edge & Fog Fabric”: **A Smarter Network**

Enabling Apps & Creating Bus Results

Computing Fabric

IP Network

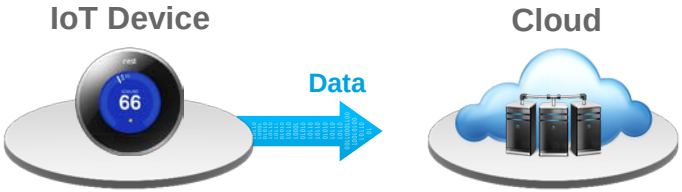


Microservices Run in Software Routers, UCS, Data Center, Cloud

The Total Cisco IoT System

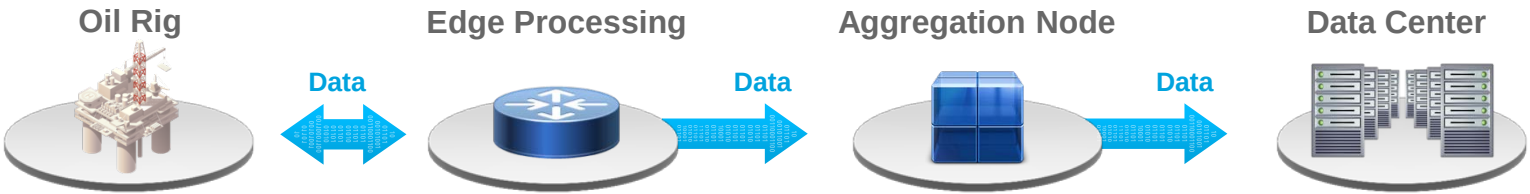
General Patterns

2 Tier



3 Tier

4 Tier



Methodology

5

Cloud

Converge to a single common global interface

4

Data Center

Converge to a common location

3

Fog Node

Converge to a common data format

2

Edge Node

Converge to a common protocol

1

Device

Many interfaces, protocols, data formats

An Open System

Microservices
(Develop or Buy)

3rd Party

Time-Series Historian Database (ParStream)

Correlation

Aggregation

Filtering

Event Stream Processing

Machine Learning

Access & Integration (CIS)

Analytics

Device or Controller

Edge Node

Fog Node

Data Center

Cloud

Generating Data

Capturing Data

Aggregating Data

Leveraging Data

Analyzing Data

IoT Case Studies