
cisco
You make possible

Industrial Routing – Connectivity and Beyond

Connectivity and Beyond

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BRKIOT-2698

cisco Live!
Barcelona | January 27–31, 2020

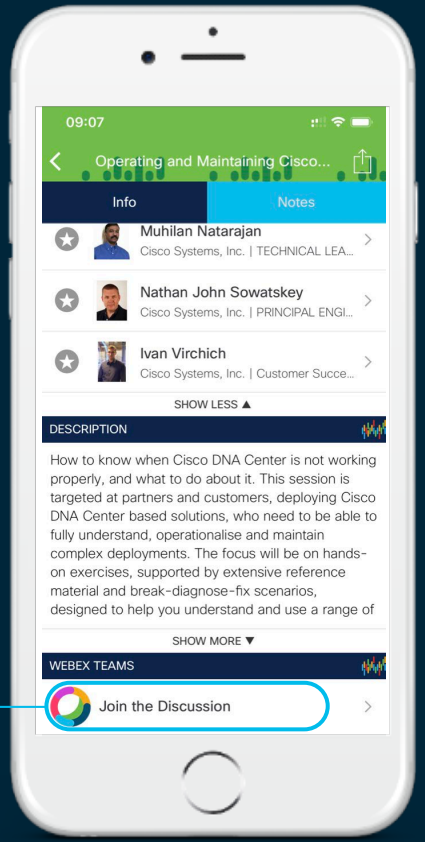
Cisco Webex Teams

Questions?

Use Cisco Webex Teams to chat with the speaker after the session

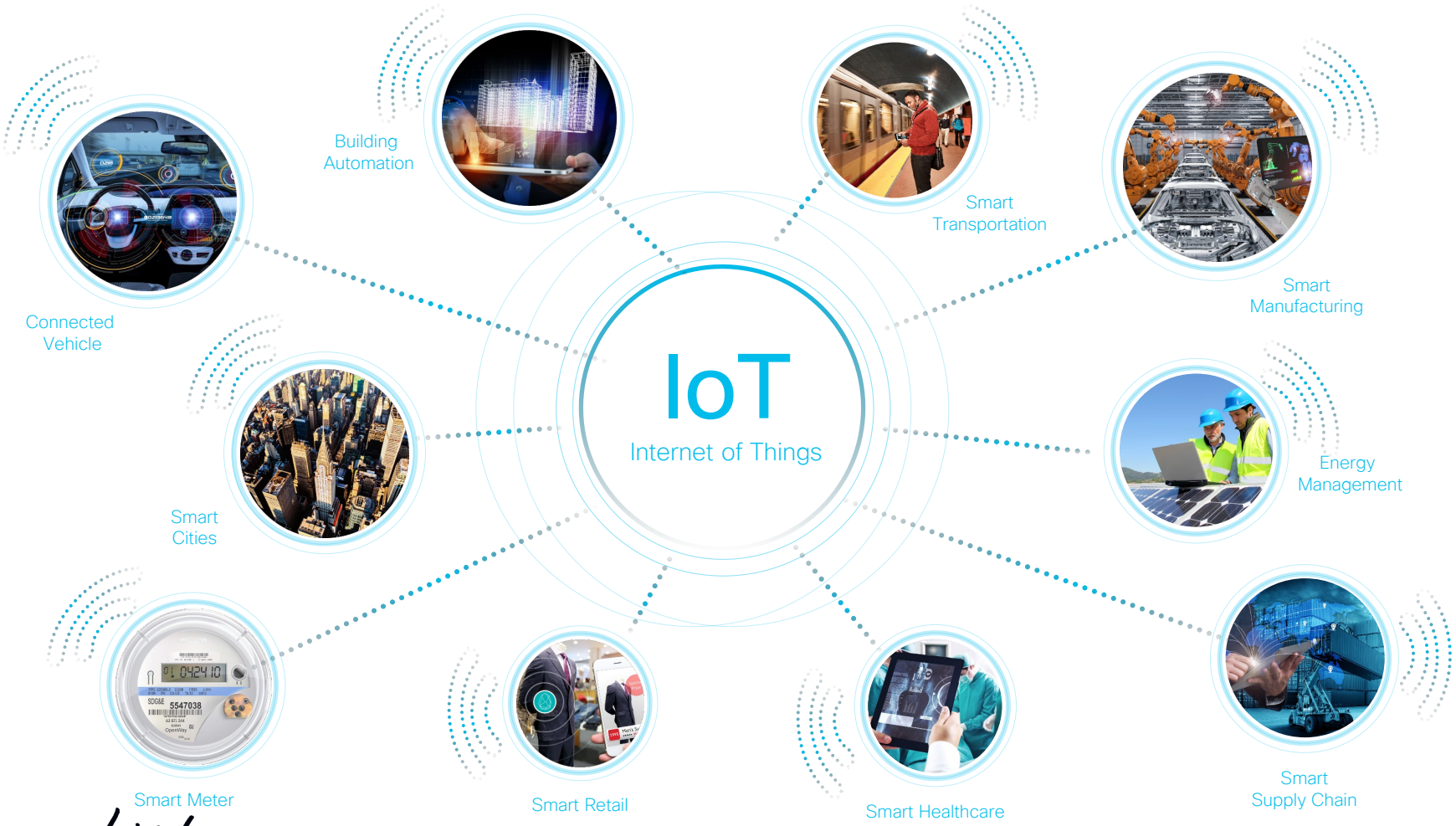
How

1. Find this session in the Cisco Events Mobile App
2. Click “Join the Discussion”
3. Install Webex Teams or go directly to the team space
4. Enter messages/questions in the team space



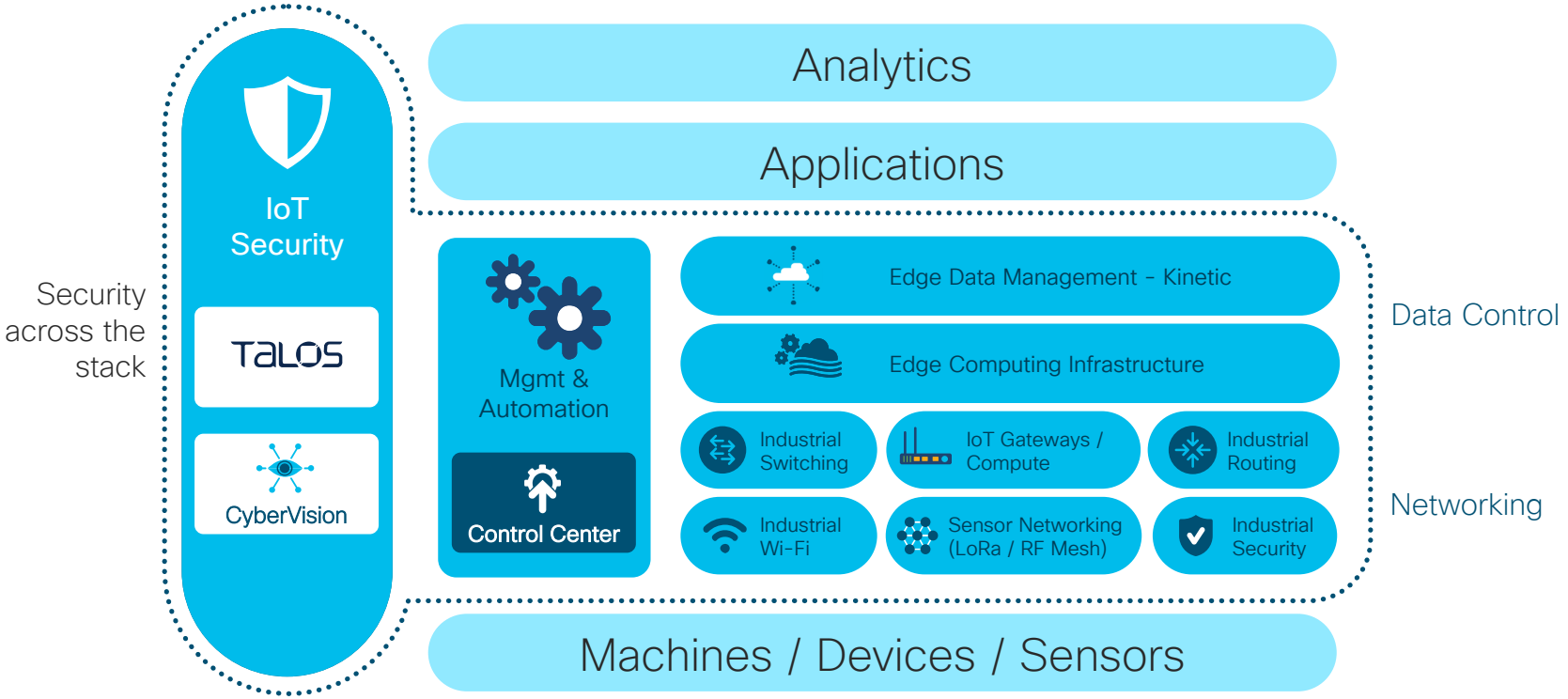
Agenda

- Introduction
- IoT Customer Requirements
- Cisco Solution Offerings
- Network Management Solutions

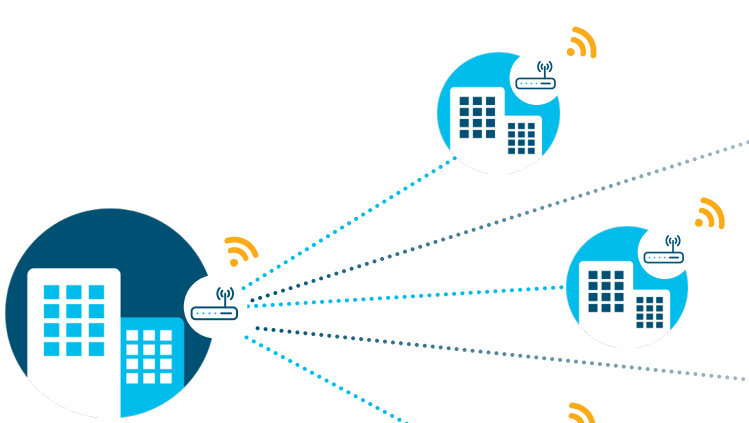


Extending Enterprise to OT Edge

Cisco's industry-leading IoT portfolio



Customer Requirements – Smart Utility



Utility Grid

Sub Station

Deployment
Low Power
Compact

Compliance
Utility
P-LTE

Future Proof
5G Ready
Long Lifecycle

Routing | Enterprise Routing | Security

Enterprise → Extended Enterprise

Customer Requirements – Remote Assets

Headquarters

Branch

Outdoor Kiosk

Trackside

Reliability
Dual
LTE

Rugged
Extended
Temperature

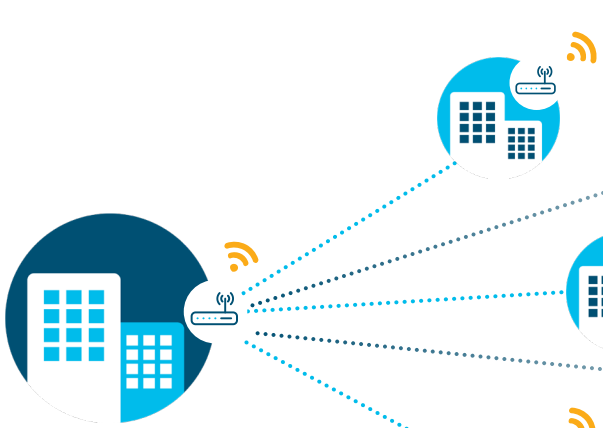
Management
Simplified Cloud
Management

Routing  Enterprise Routing  Security

Enterprise

Extended Enterprise

Customer Requirements – Oil and Gas



Compress Station

Pumping Station

Edge Compute
Application Hosting

Compliance
Hazardous Location

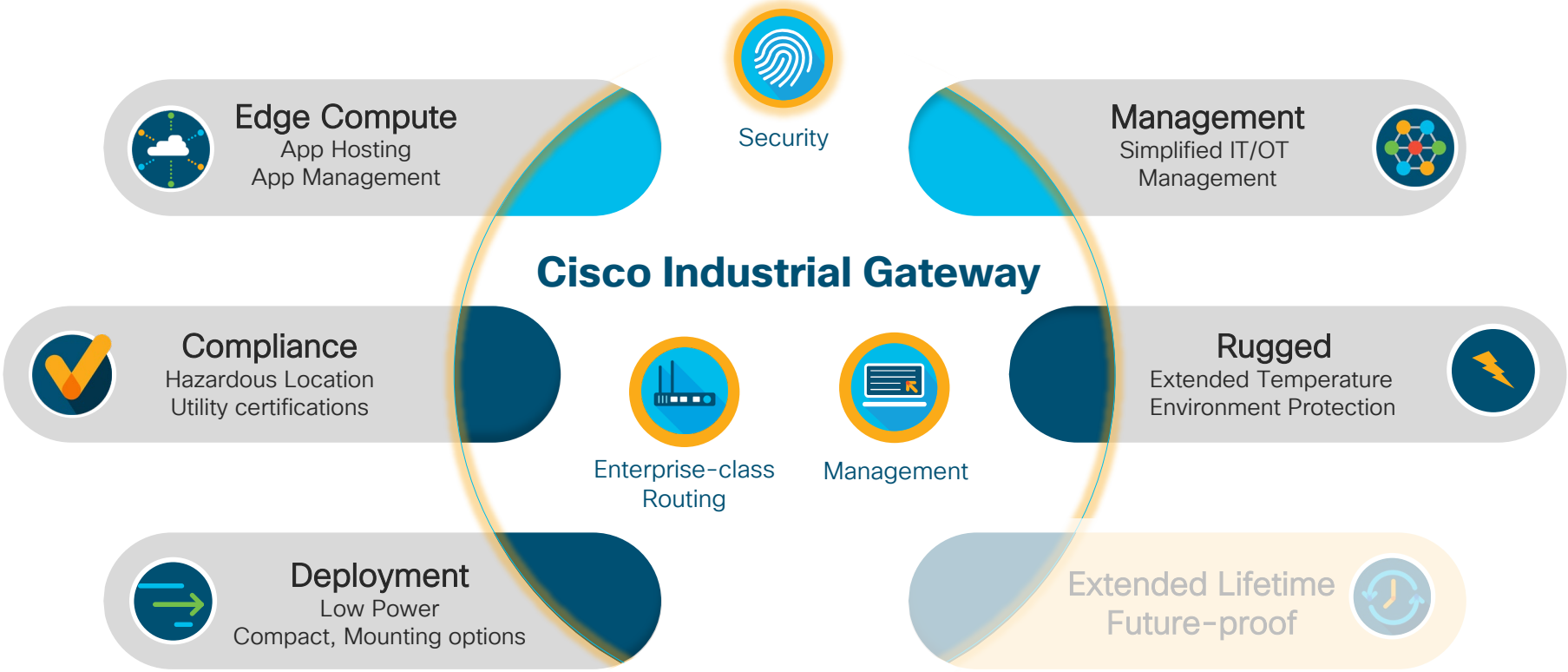
Management
IT Managed

Routing | Enterprise Routing | Security

Enterprise

Extended Enterprise

IoT Customer Requirements – Summary



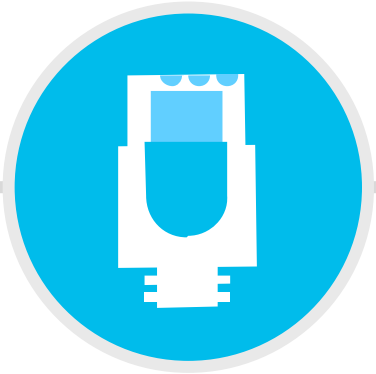
WAN Connectivity Options In the Past

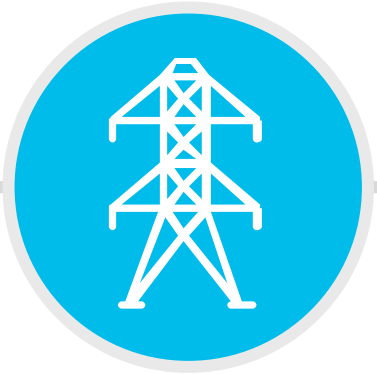
01 GE Copper

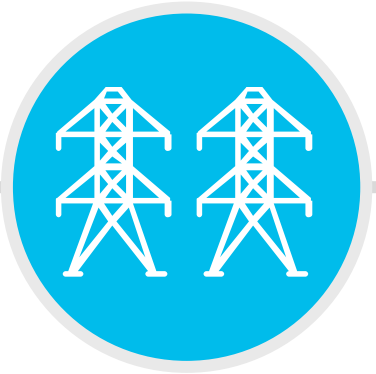
02 Fiber SFP

03 Single LTE

04 Dual LTE







IR807

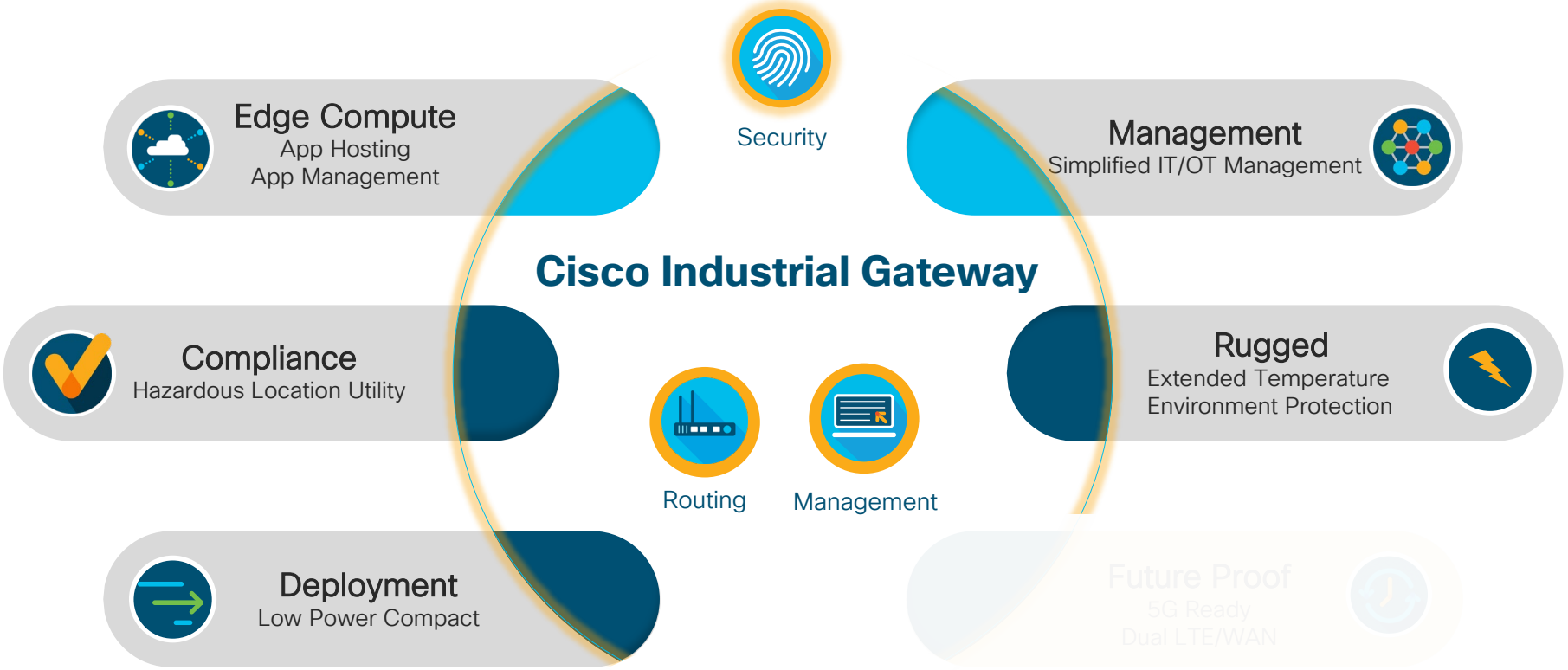
IR809

IR829

WAN Flexibility With Next-Gen IoT Gateways

	IR807	IR809	IR829
			
Copper Ethernet	✓	✓	✓
Fiber SFP			✓
LTE	✓	✓	✓
LoraWan	✓	✓	✓
Dual LTE			✓

Customer Requirements – Summary



Cisco IR1101

The Next-Generation Integrated Services Router Rugged

First IoT router with Cisco IOS® XE
High-end security programmability

Edge computing enabled

Cisco SD-WAN

Modular and 5G ready*

Low average power consumption of only 10W

Compact form factor for cabinet installation

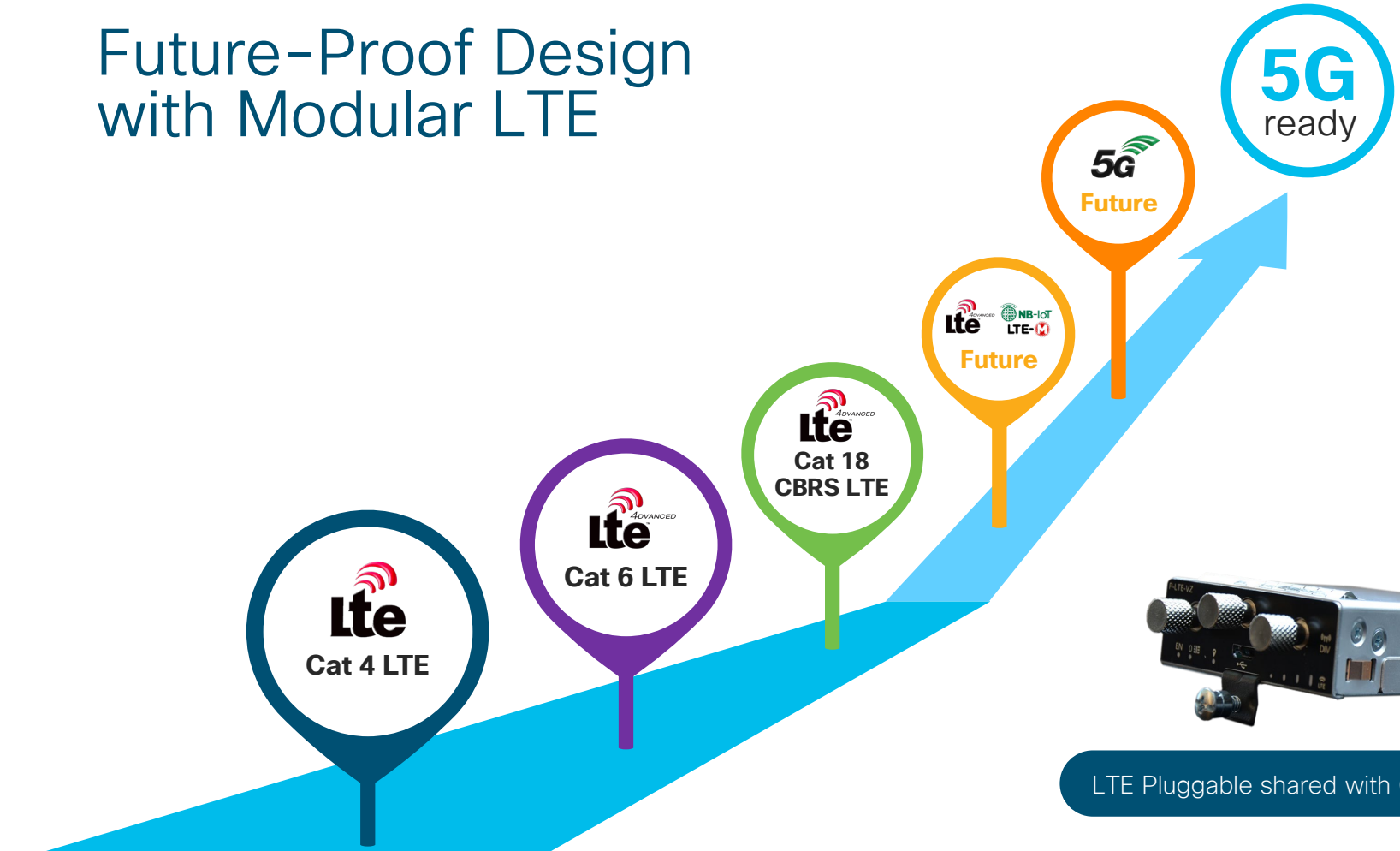
*with future software

Cisco IR1101

Expansion module for more flexibility

- Powered by base platform
- Compact form factor (2RU)
- Investment protection with additional modularity
- WAN redundancy and high availability
- Local storage

Future-Proof Design with Modular LTE



LTE Pluggable shared with Cisco ISR 1100

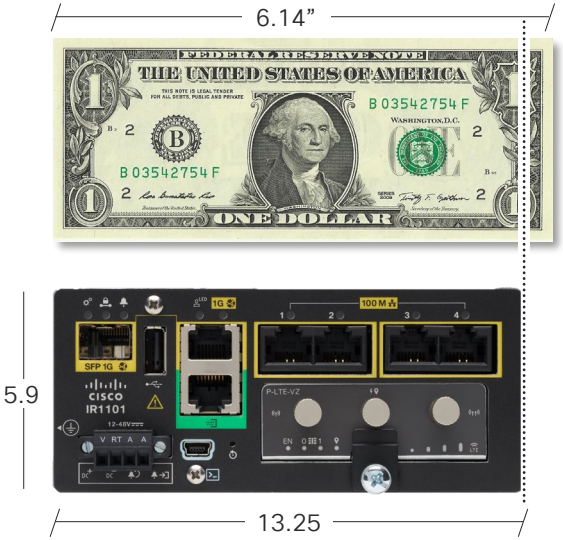
Designed for IoT Deployment

01 Mounting

DIN Rail, Wall Mount,
Rack Mount

02 Compact

5.9 x 13.25 x 12.49 cms



03 Lower Power

Solar

Battery

<1OW[1]
(Typical Consumption)

1-IR807: 6.7W

1-IR1101: 9.8W

Designed for Rugged & Hazardous Location

- -40°C to 75°C (with 200 LFM of air)
- Salt & Fog Tolerant (IR1101)
- Solid Particle Protection: IP30
- Compliance: Hazardous Location, Safety, EMC (UL 60950, EN 60950-1, IEC 60079-0, EMC)
- Award-winning SmartNet Total Care

IR807

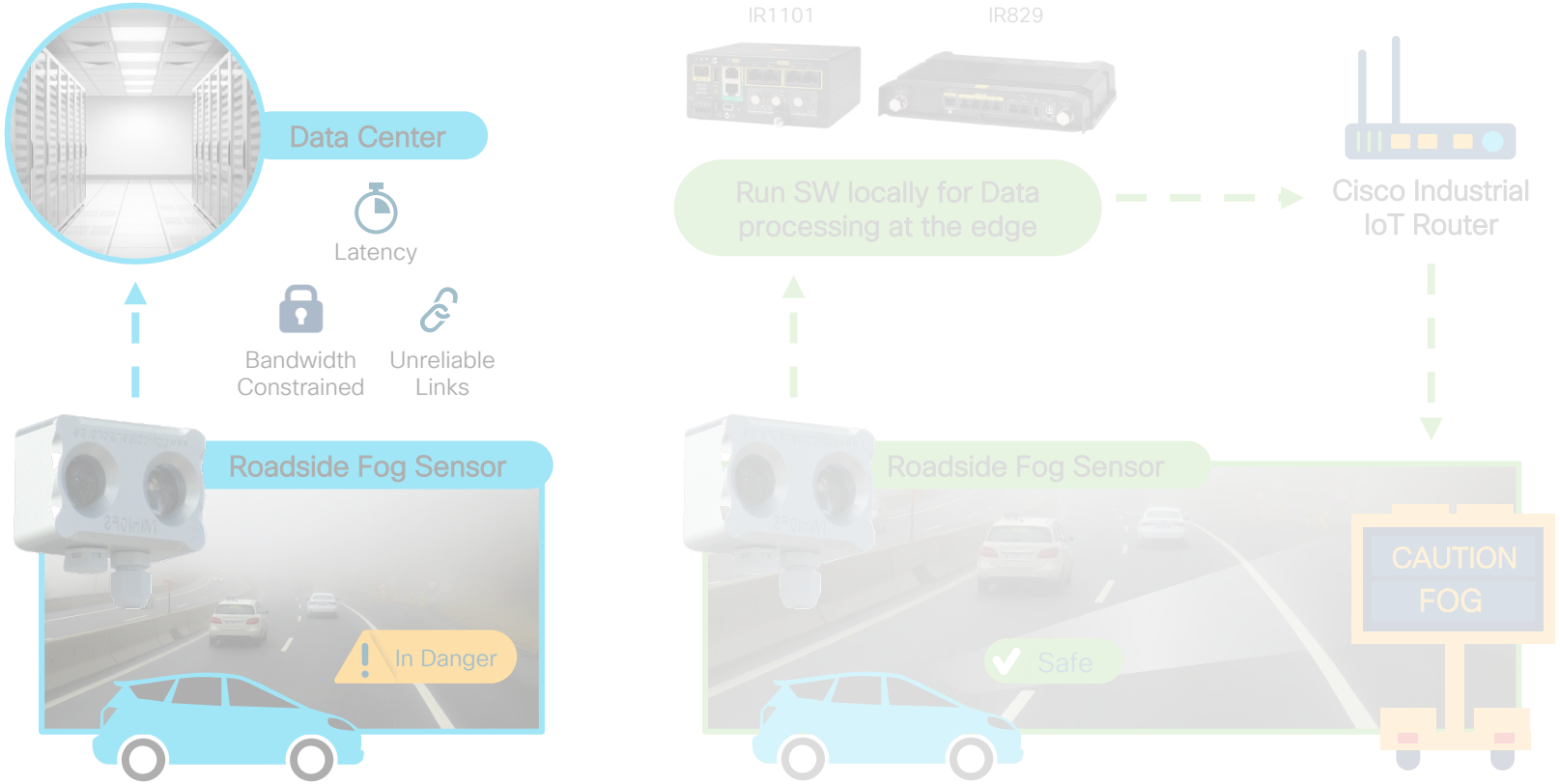
IR809

IR829

IR1101

Intelligence At Edge

Need for Edge Compute: Roadways Use Case



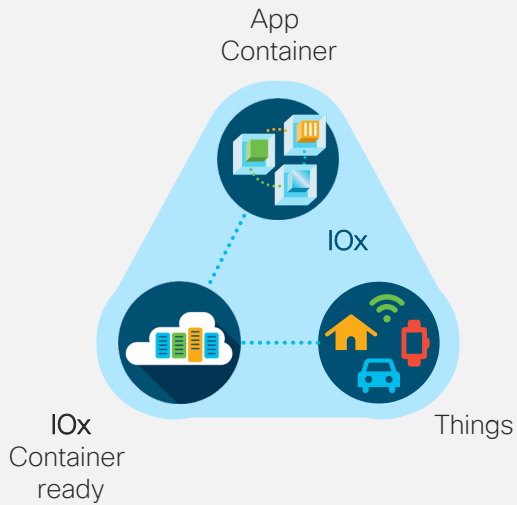
Edge Compute Enabled – Scalable Deployment

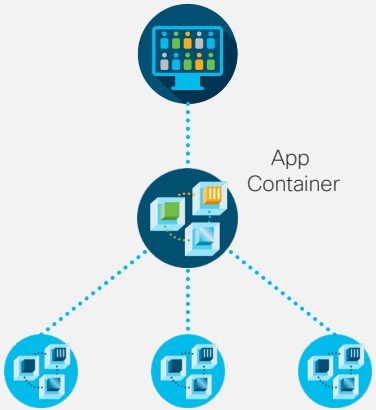
IR1101

IR829

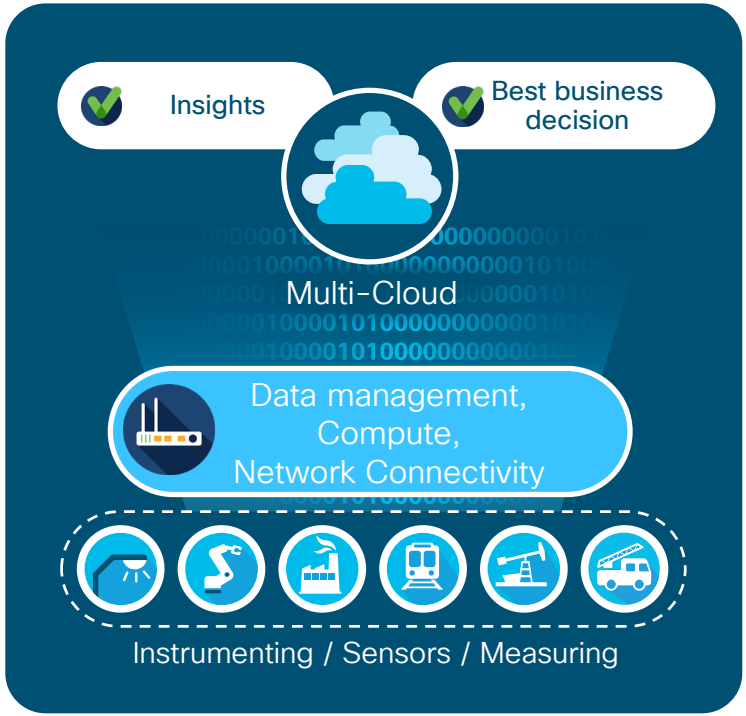
IR809

IOx developer tool	Cisco® IOx enabled	Centralized app lifecycle management





Many capabilities are required to get the right data



Difficult to:

- securely share data with app
- access data
- connect to the data
- control or govern data

End-to-end Security

Introducing
Cisco Edge Intelligence

Edge to multi-cloud data software that simplifies getting the right IoT data to the right applications at the right time.

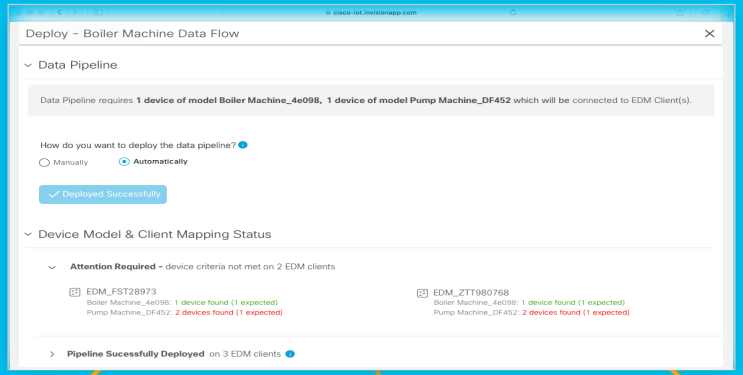
Unlocks business intelligence
by simplifying the edge to multi-cloud data flow

On a scalable, secure Cisco network

Deployed on Cisco's network for ultimate scale and security

April 2020

Cisco Edge Intelligence
Software as a service



IC3000 Industrial Compute

829 Gateway

IR 1101 Gateway

Cisco Edge Intelligence supported hardware

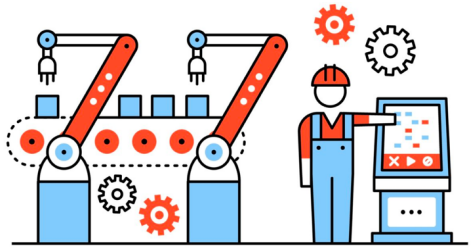
Security

Examples of Recent OT Attacks

Industry Digitization Increases The Attack Surface

TODAY
Traditional automation systems

Energy, Manufacturing,
Transportation, Process



TOMORROW
The Industrial Internet of Things

Industrial Control Systems are not designed for cybersecurity

You cannot secure what you don’t know

Most customers don’t have accurate asset inventory

55% have no or low confidence that they know all devices in their network

Blind to what their assets are communicating with

ICS equipment deployed over the years without strict security policies

Cisco's End-to-End Security Offering

User/Hardware Authentication
- ACT2
- SUDI
- Input Alarm for digital sensors
- Secure Boot
- Sim card locking plate

Secure Remote Management
- Factory provisioned credentials
- Mutual Authentication
- SSL/TLS/DTLS Encryption

Cellular Security
- Private APN
- Multi-PDN
- SIM Authorization
- Jasper SIM management

Access Control
- RBAC
- MFA
- AAA
- (LDAP/Radius/
- TACACS+)

Management Service

Data Security
- Cyber Vision
- Netflow
- Stealthwatch
- Umbrella

VPN
- IKev2
- FlexVPN
- DMVPN

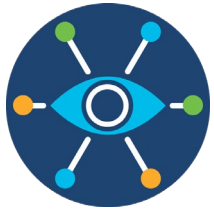
ASR

Enterprise Integration

Enterprise

Cisco Cyber Vision

Asset Inventory & Security Platform for the Industrial IoT



ICS Visibility

Asset Inventory
Communication Patterns
Device Vulnerability

Operational Insights

Identify configuration changes
Record control system events
relevant to the integrity of the system

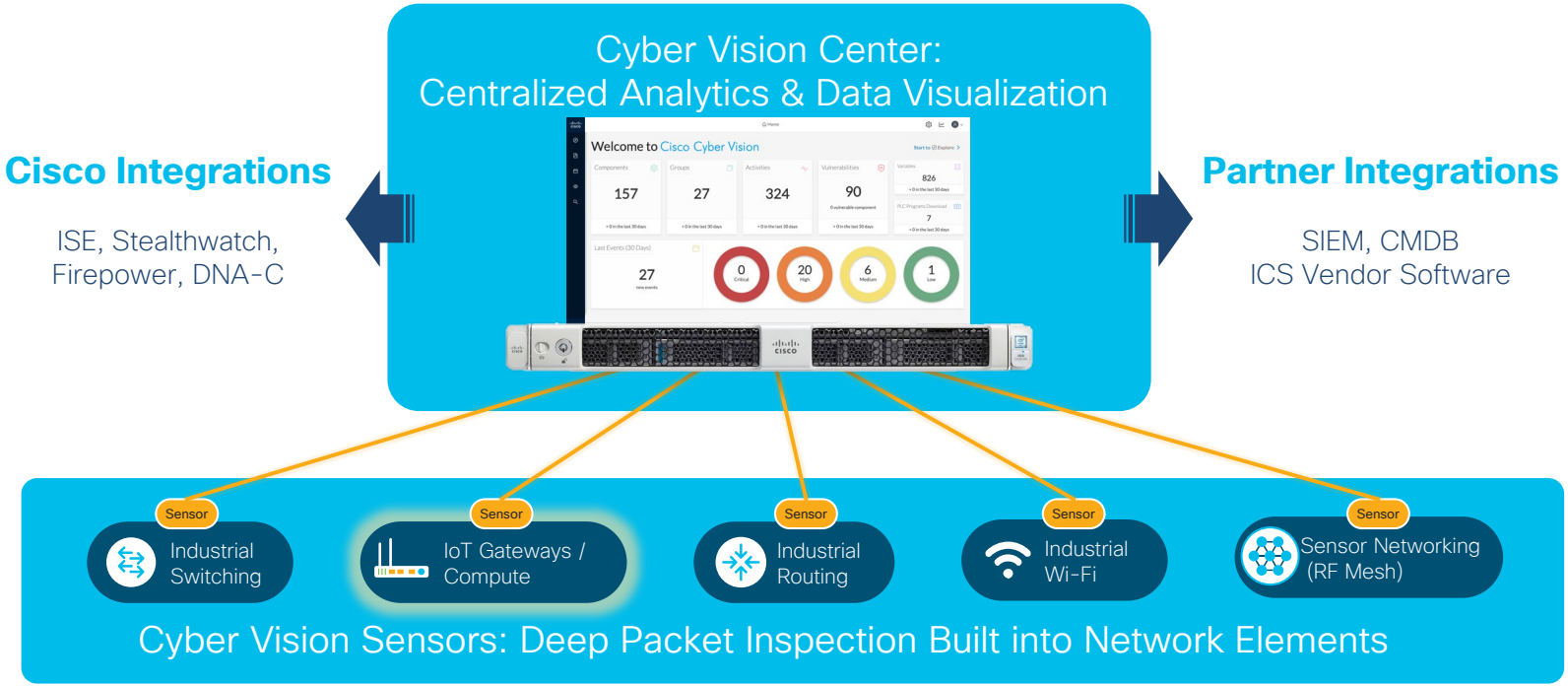
Threat Detection

Behavioral Anomaly Detection
Signature based IDS
Real-time alerting

Cisco Cyber Vision helps companies protect
their industrial control systems against cyber risks

Cisco Cyber Vision

A 2-tier edge architecture that integrates with your existing security solutions

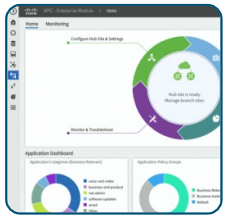


Network Management

Network Management Solution

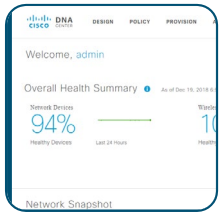
IT Driven

OT Driven

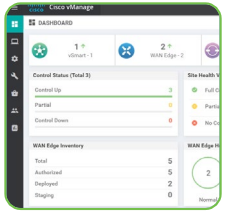


Cisco DNA Center

Cisco Prime Infrastructure

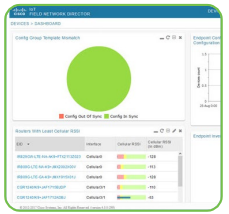


Cisco SDWAN



Control Center Support – SIM Management

Cisco Kinetic GMM



Cisco IoT Field Network Director

IR807

IR809

IR829

IR1101

cisco Live!

ZTD with PnP


IR1101


IR829


IR809

- Low cost of operation/deployment
- Fast and easy bring-up
- Does not require technical expertise to deploy

1 4G Modem Attachment

4G modem will attach to base station and obtain DHCP IP

2 PnP Discovery

Cellular interface is configured with DHCP automatically.

PnP discovery kicks off over 4G

3 PnP Cloud Connection

Resolve DNS host devicehelper.cisco.com.

Secure connection to PnP cloud is established and device presents SN#.

Obtain APIC-EM IP from Cloud.

4 PnP Provision

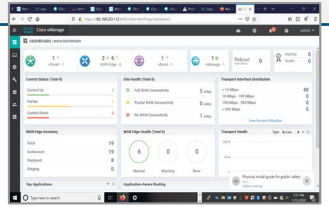
Provision configuration and image securely.

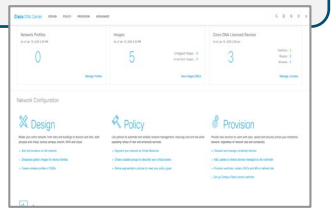
Cisco vManage

Cisco DNA Center

Cisco FND

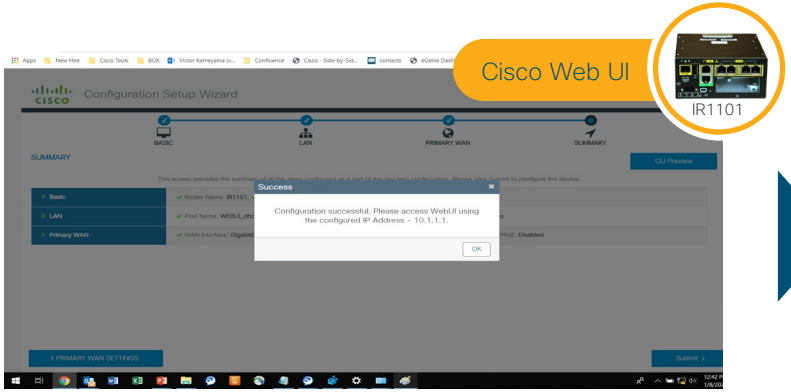

FND


vManage


DNA Center

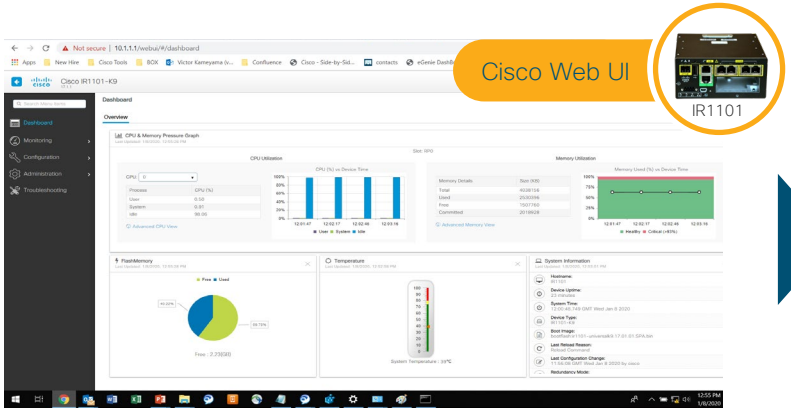
Embedded Web Management Tool with PnP

Shipping with Router



Day 0 set-up includes:

- Cellular
- WAN
- LAN
- IOx
- Security
- VPN: Advance configuration

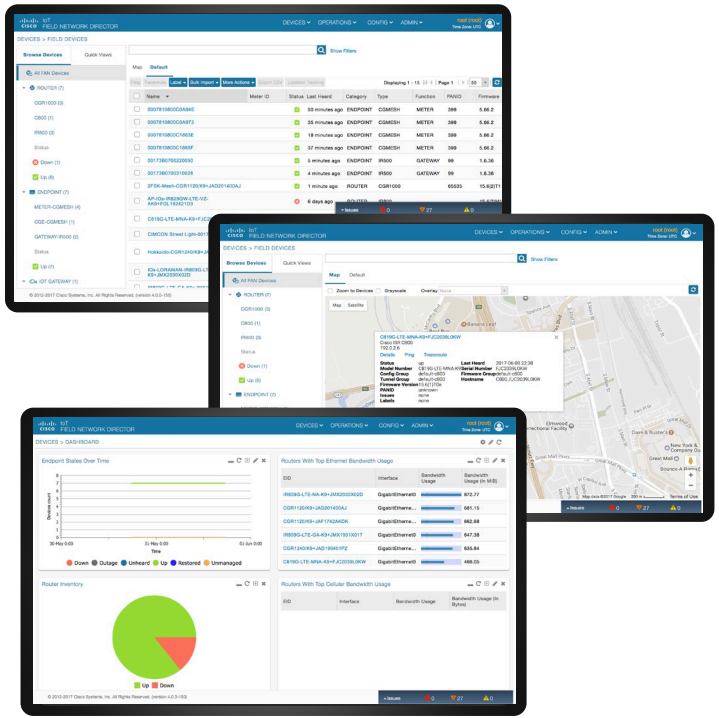


Day 1 set-up includes:

- Interface information and status
- Traffic volume
- Device information (Hostname, IOS version etc)
- Cisco Active Advisor: Lifecycle information of network inventory

Field Network Director

What is Cisco IoT Field Network Director?



- Network Management System for the IoT Field Area Network
- Secure zero touch deployment (ZTD) at scale
- Real-time critical infrastructure monitoring
- Enterprise-class visibility for gateways and endpoints
- Geographical visualization of all network assets
- Field device lifecycle management
- Application management*
- Multi-tenancy and RBAC support
- Supports FAN solutions: AMI / DA in utilities, and street lighting in cities
- API for 3rd party integration
- Over 8 Million endpoints deployed
- On Prem

IoT FND Benefits

Scale

- 10,000 gateways
- 11,000,000 endpoints
- Zero touch deployment (ZTD)
- Gateway and app lifecycle management

Security

- Role-based access
- Audit trail
- Network layer encryption
- Certificate based device identity

Visibility

- Active monitoring
- Location tracking
- Events and logs
- Alerts

Optimized

- Reliable communication over Cellular and Low Power and Lossy Networks (LLNs)
- Bandwidth efficient protocols

FND Full Lifecycle Management

FND Functionality

Deploy

- Automatic enrollment and provisioning
- Secure tunnel provisioning
- Zero-touch deployment

Manage

- Configuration and network management
- Troubleshooting
- API for 3rd party integration

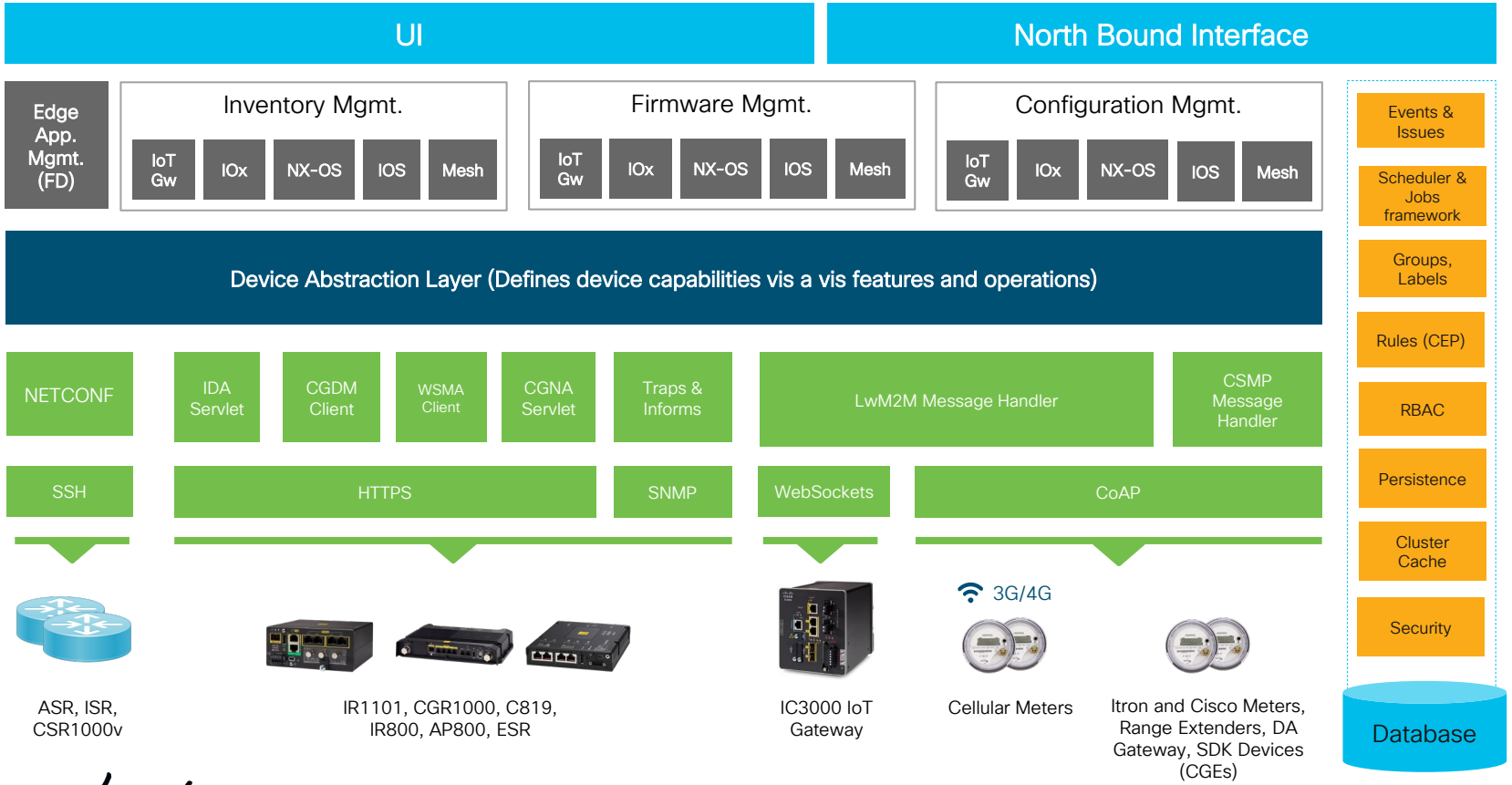
Monitor

- Realtime monitoring & alerts for critical events
- Location tracking and geo fencing
- Customizable dashboard

Maintain

- Over-the-air configuration and firmware management
- Reconfiguration and Field engineer support

FND Architecture



FND
Use Case

Distribution Automation

Advanced Metering (AMI)

Grid Security

Substation Automation

Scale

- 10,000 gateways
- 11,000,000 endpoints
- Zero touch deployment (ZTD)
- Gateway and app lifecycle management

Security

- Role-based access
- Audit trail
- Network layer encryption
- Certificate based device identity

Visibility

- Active monitoring
- Location tracking
- Events and logs
- Alerts

Optimized

- Reliable communication over Cellular and Low Power and Lossy Networks (LLNs)
- Bandwidth efficient protocols







Software Defined WAN

What is Cisco SD-WAN?

- A cloud-delivered overlay WAN architecture that enables digital and cloud transformation
- Ensures predictable user experience for applications and provides a seamless multi-cloud architecture
- It's best-in-class security is integrated everywhere, rather than being an afterthought
- Accompanying Analytics capability delivers the visibility and insights necessary for you to isolate and resolve issues promptly and deliver intelligent data analysis for planning and what-if scenarios
- Simple to operate

SD-WAN Benefits

Application Experience

- Predictable SLA
- Application aware policies with real-time enforcement around network problems
- Multiple hybrid active-active links for all scenarios

Integrated Security

- Zero-touch foundation with authentication and encryption
- Segmentation to isolate and protect critical assets

Cloud Optimized

- Seamlessly extend the WAN
- Real-time optimized performance
- Optimized workflows for AWS and Azure

Operational Simplification

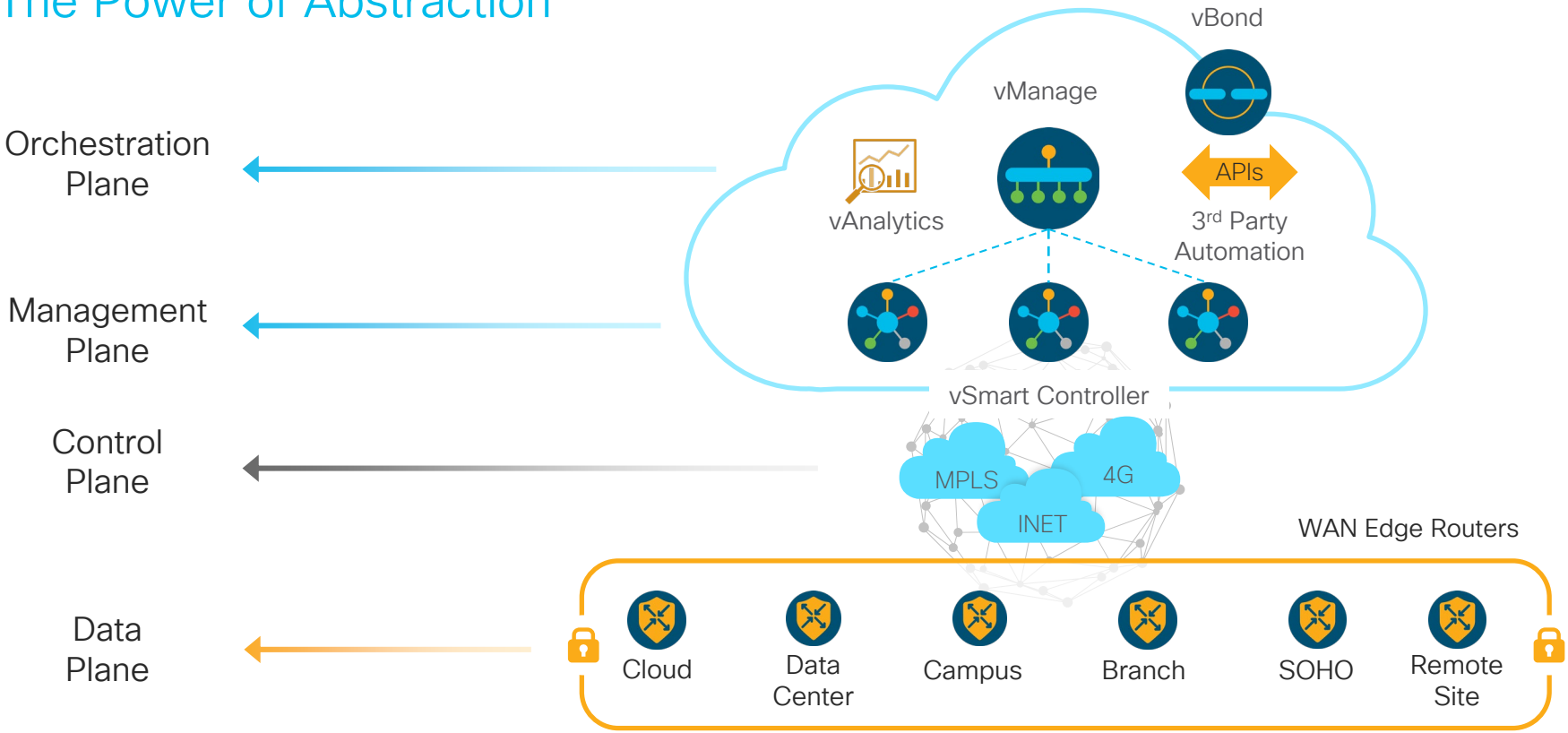
- Simple management dashboard for configuration and management of WAN
- Zero-touch provisioning
- Full automation with RESTful integration

Rich Analytics

- Granular visibility of applications and infrastructure
- Sophisticated forecasting and what-if analysis
- Recommendations for policy changes

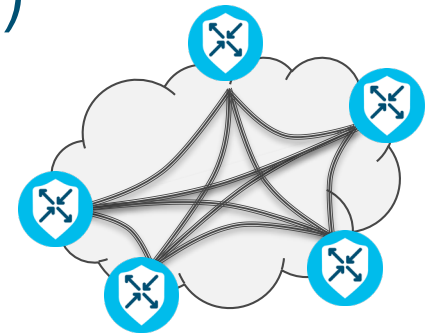
Cisco SD-WAN Architecture

The Power of Abstraction

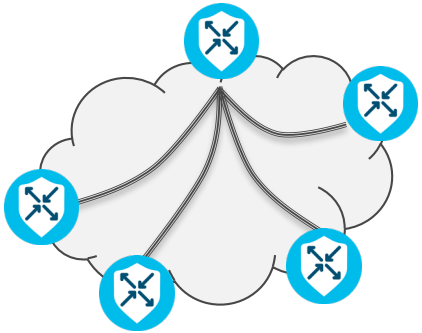


Build topologies (per VPN)
Using centralized policy

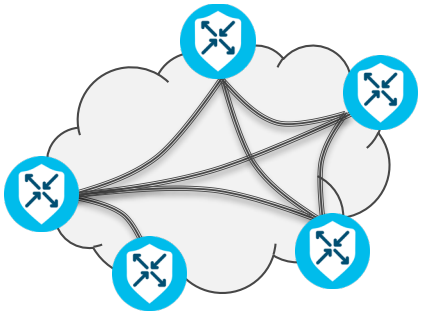
- Each VPN can have it's own topology
  - Full-mesh, hub-and-spoke, partial-mesh, point-to-point, etc
- Operator can build their VPN topologies using centralized policies
- Applications can benefit from shortest path, e.g. voice takes full-mesh topology
- Security compliance can benefit from controlled connectivity topology, e.g. PCI data takes hub-and-spoke topology



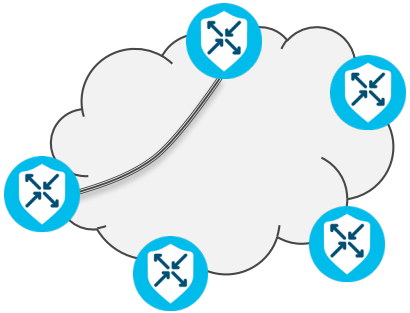
VPN 1
Full-Mesh



VPN2
Hub-and-Spoke
(IR1101)



VPN 3
Partial Mesh



VPN 4
Point-to-Point

vManage
Use Case

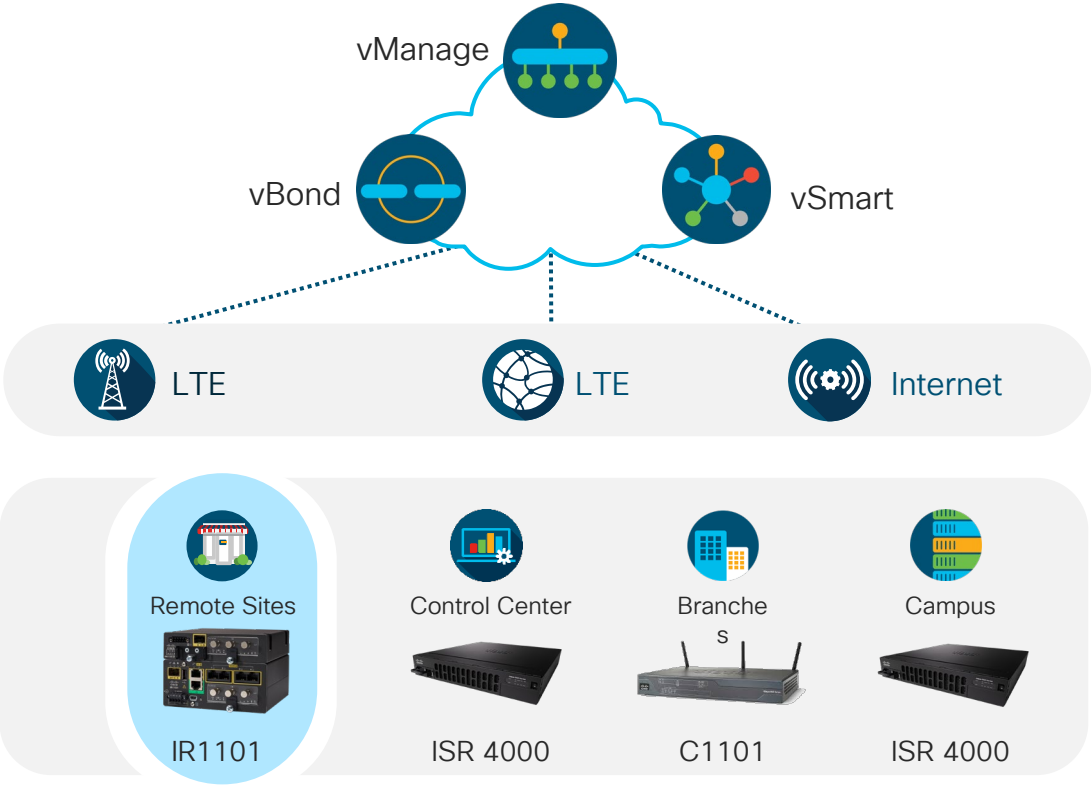
Roadways
Intersections and infrastructure

Kiosks

Pipeline Monitoring

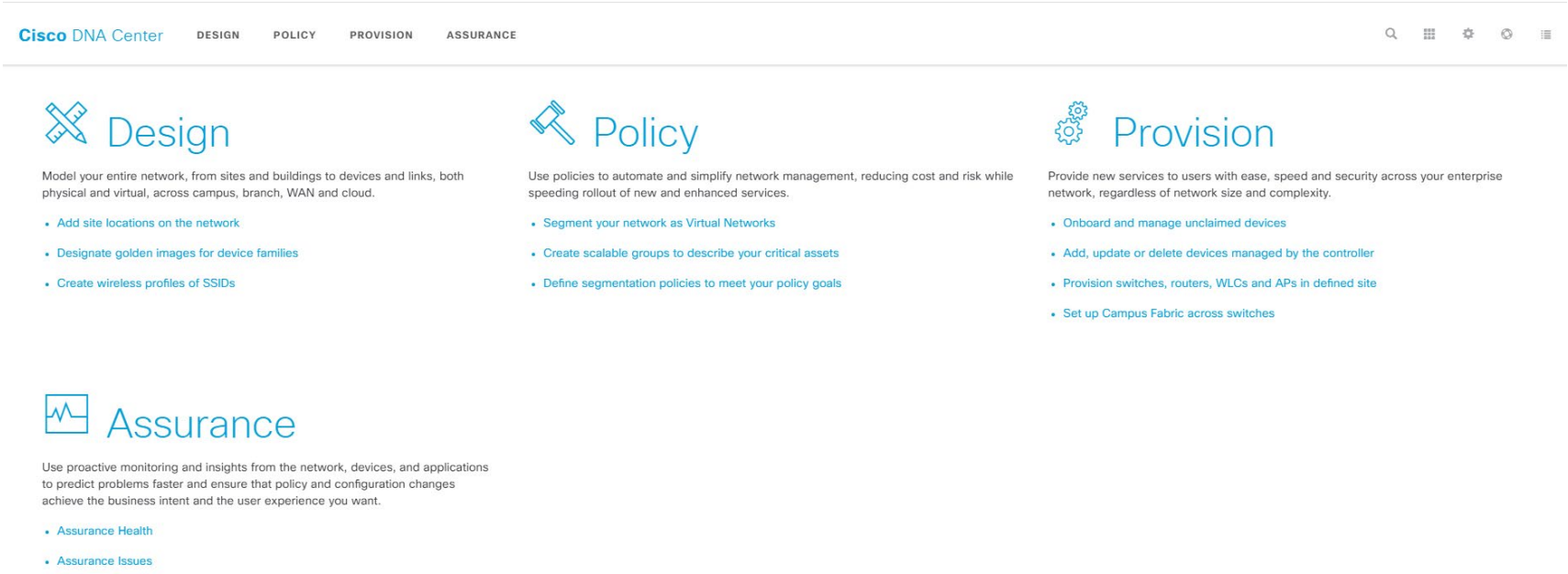
Utility Substation

- Zero Touch Deployment
- Active/Active WAN
- Enterprise Routing & Security
- Simple Scalable Policy Distribution



DNAC

DNAC



DNAC Features

Inventory

IR807

Topology

IR809

SWIM

IR829

PnP

IR1101

DNAC Benefits

Simplicity

Leveraging existing tools and process

Scalability

Plug and play, automation

IoT Environment

Industrial Routers, Industrial Switches, Industrial Wireless

DNAC
Use Case

Airport

Warehouse

Distribution Center

Parking Lot

Simplicity

Leveraging existing tools and process

Scalability

Plug and play, automation

IoT Environment

Industrial Routers, Industrial Switches, Industrial Wireless

Cisco Validated Designs

Blueprints: Key Use-cases per Industry

Cisco Validated Design

Simplicity · Security · Scalability

Manufacturing	Power Utilities	Energy	Transportation	Smart Cities
				

Industry Cisco Validated Designs (CVDs)

Manufacturing	Power Utilities	Energy	Transportation	Smart Cities

• Industrial Automation
• Plant Wide Connectivity
  • Factory Security
  • Factory Wireless
	• Substation Automation
	• Smart Metering
	• Distribution Automation
	• Utility WAN
		• Industrial Automation
		• Connected Pipeline
			• Connected Rail
			• Connected Mass Transit
			• Connected Roadways
				• Lighting, Parking, Environment, Safety and Security
				• Connected Community Blueprint

Industry & Remote & Mobile Assets IoT Blueprints

Rockwell Automation · Landis+Gyr · Itron · EXIMPROD Power Systems · iteris · SIEMENS · FLUIDMESH NETWORKS · SEL · MITSUBISHI ELECTRIC · Schneider Electric

Proven Integrations

iOmniscient · Cohda Wireless · Actility · ECONOLITE · EATON Powering Business Worldwide · BECKWITH ELECTRIC CO.INC. · CIMCON Lighting · KLAS TELECOM

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