Don't Just Connect, Grow your IoT Business with Cisco IoT Cellular Connectivity

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BRKSPG-1002

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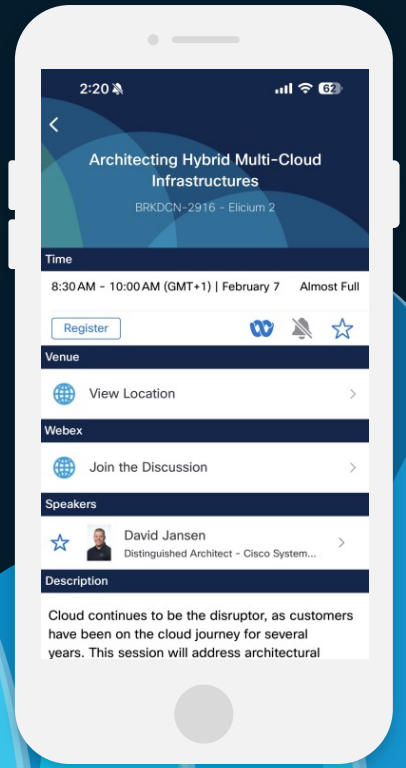

Who do you work for?

Service Provider who offers IoT connectivity

0%

Partner who sells IoT solutions

0%

Enterprise who uses IoT solutions

0%

Other

0%

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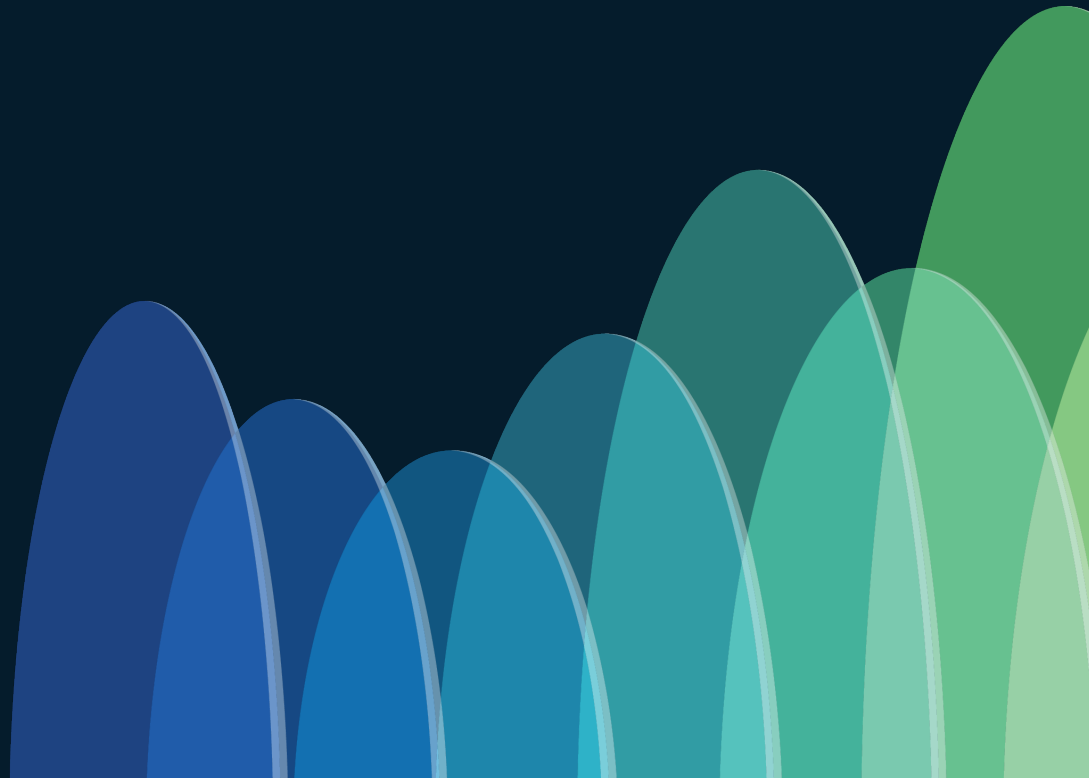
Agenda

- IoT Connectivity Market
- Cisco IoT Control Center Solution
- Demo:
  - Deploy, Manage and Mitigate
  - Automate
  - Program
- Innovation
- Why Cisco

IoT connectivity market



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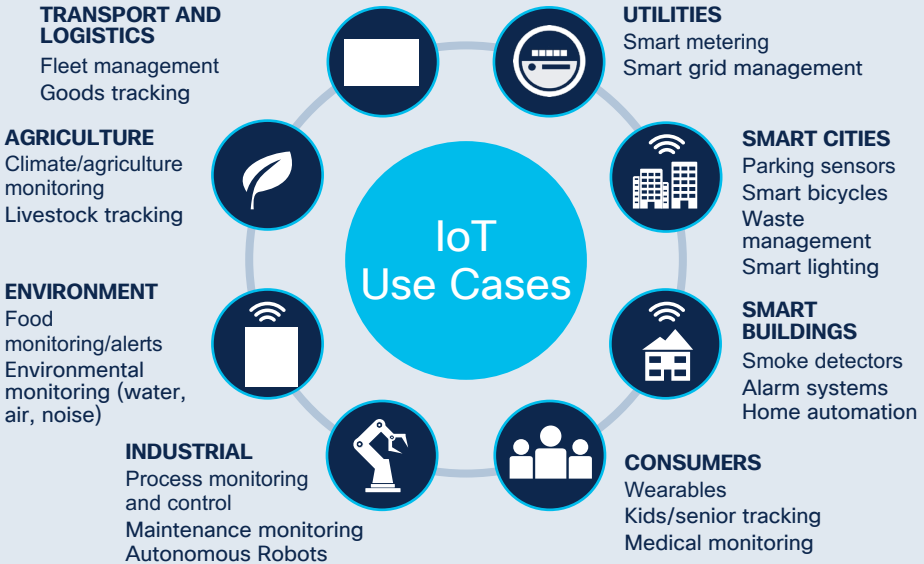
The complexity of the IoT market



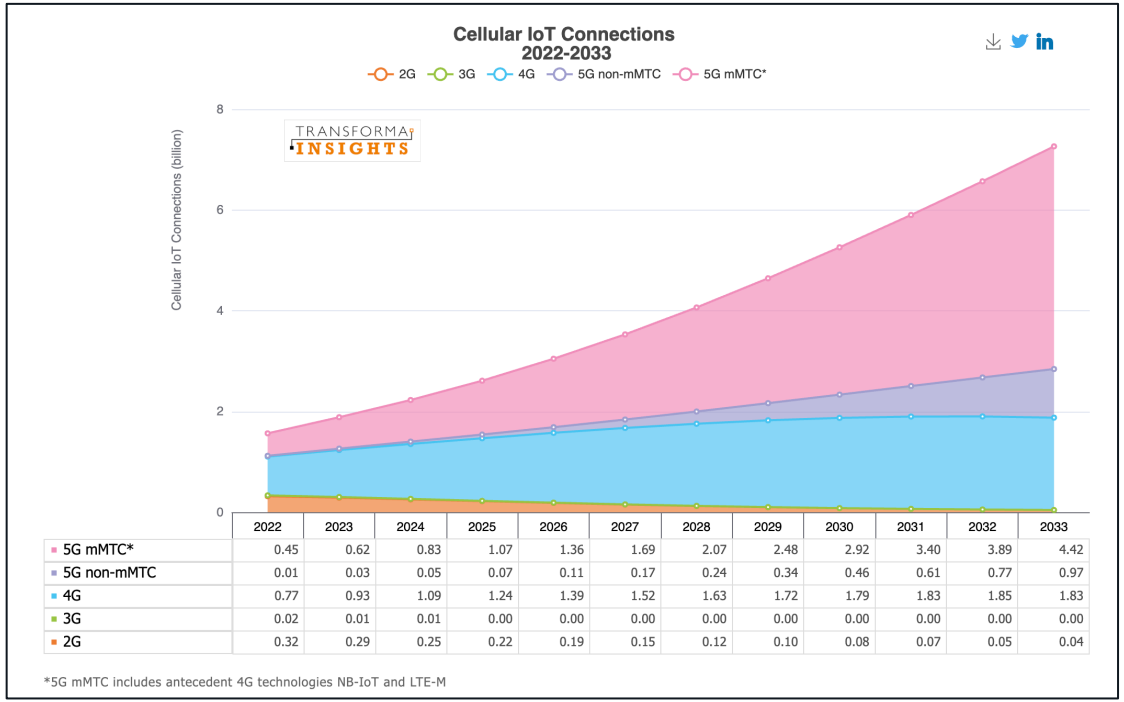
- Massive IoT requiring low cost / low power devices for small data volumes
- Industrial applications requiring low latency and extra security
- Mission Critical apps requiring high bandwidth and low latency
- Consumer and Enterprise
- Different vertical industries
- Variety of infrastructure and business requirements

All use cases need connectivity!

IoT Wireless Connectivity Options

4G, 5G	· Variable to high bandwidth, easy to deploy · Variable monthly cost, dependent on Service Provider
2G, NB-IoT, LTE-M	· Long range, low power, low bandwidth · Variable coverage and monthly cost, dependent on Service Provider
NoN-Cellular LPWA	· Long range, low power, very low bandwidth · Great for sensors with small data payload
802.11 Wi-Fi	· High bandwidth, broadly supported · Public spectrum, prone to interference
Cisco URWB (aka Fluidmesh)	· Ultra reliable, high bandwidth · Unlicensed spectrum

The IoT Connectivity Market
Steady growth for cellular connections



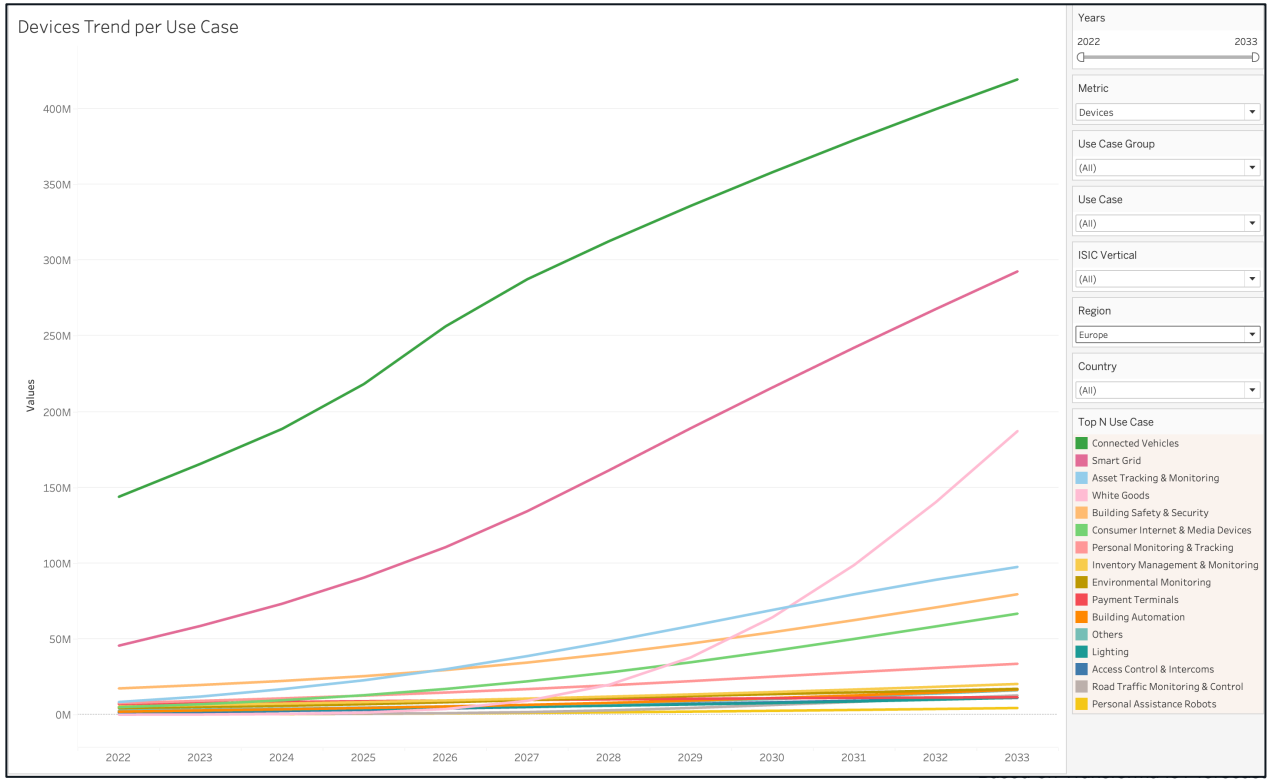
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
5G mMTC*	0.45	0.62	0.83	1.07	1.36	1.69	2.07	2.48	2.92	3.40	3.89	4.42
5G non-mMTC	0.01	0.03	0.05	0.07	0.11	0.17	0.24	0.34	0.46	0.61	0.77	0.97
4G	0.77	0.93	1.09	1.24	1.39	1.52	1.63	1.72	1.79	1.83	1.85	1.83
3G	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2G	0.32	0.29	0.25	0.22	0.19	0.15	0.12	0.10	0.08	0.07	0.05	0.04

*5G mMTC includes antecedent 4G technologies NB-IoT and LTE-M

https://transformainsights.com/research/forecast/highlights

- Cellular IoT connections growing from 2 billion in 2024 to 2030:
  - Transforma: 5 Billion
  - Omdia: 5.4 Billion
  - Counterpoint: 6 Billion

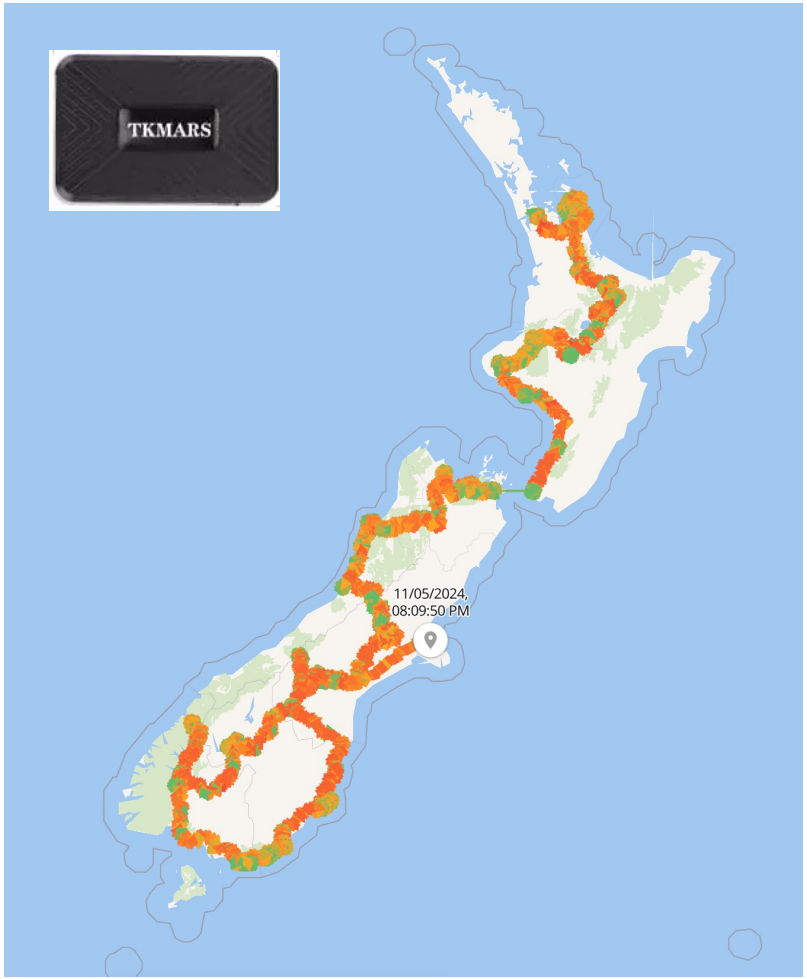
Devices per Use case in Europe



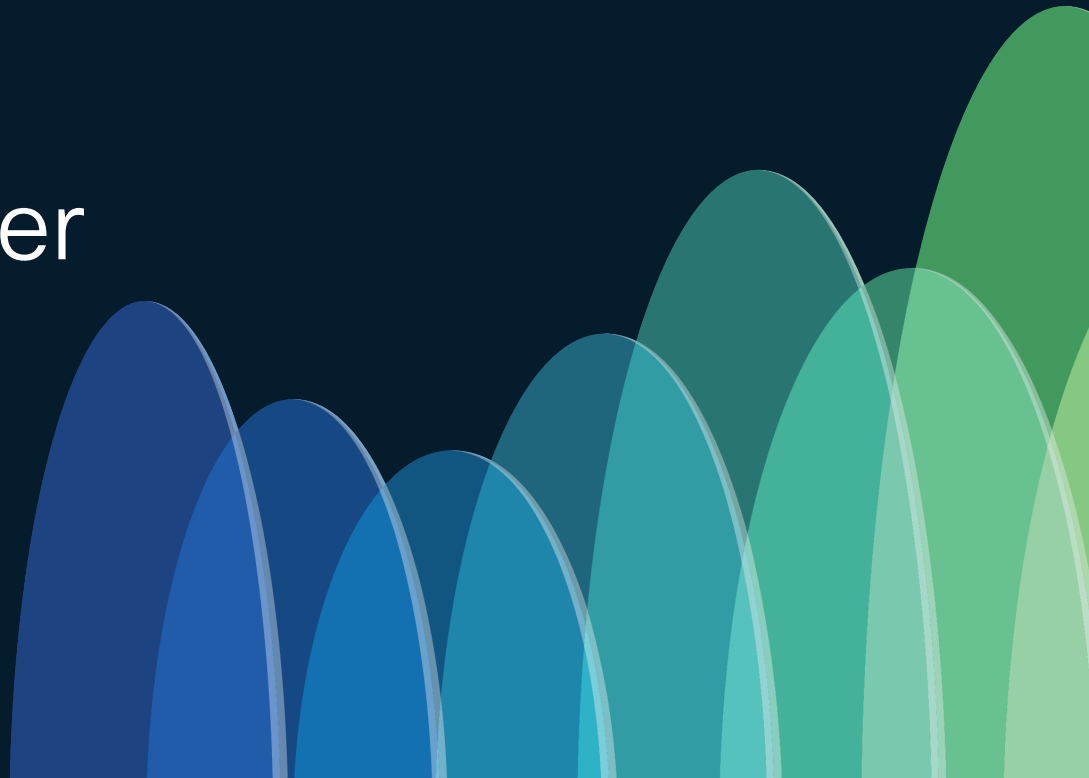
Connected vehicles are leading the growth, followed by Smart Grid, Asset Tracking and Building Safety and Security

My own IOT use case

- GPS tracker TK-913
- IOT SIM card with global roaming coverage
- Capturing GPS location of our rental RV during recent New Zealand vacation and uploading to traccar server at home
- Track imported to umap and used to add GPS data to pictures from SLR camera



Cisco IoT Control Center solution



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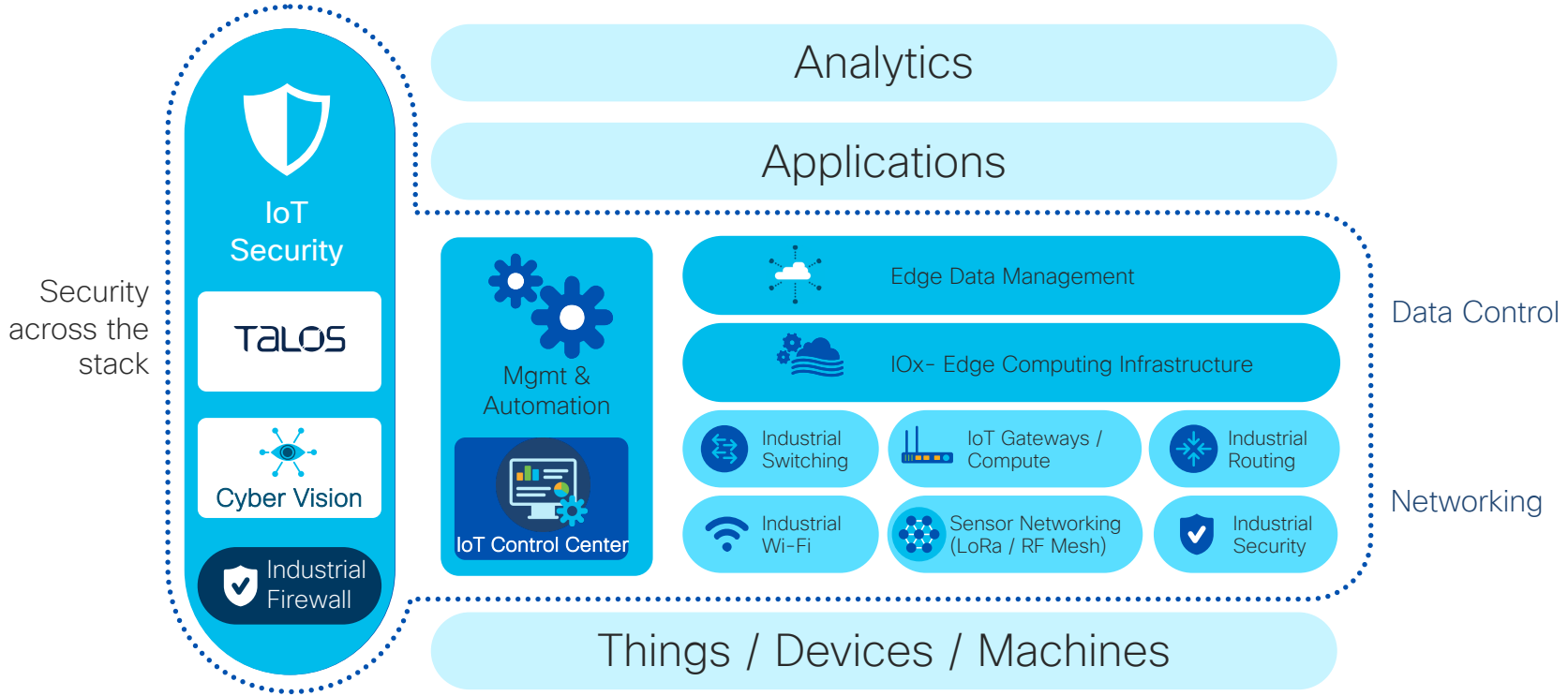
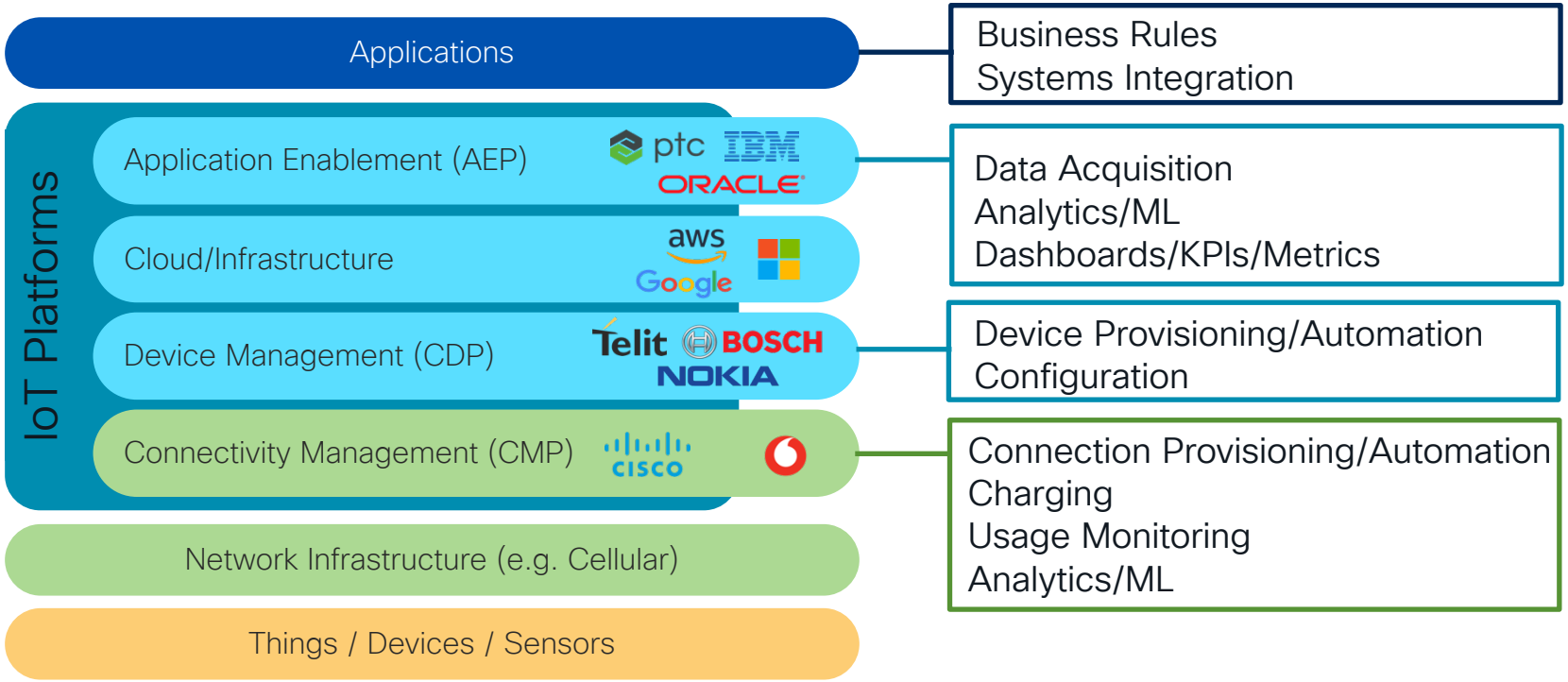
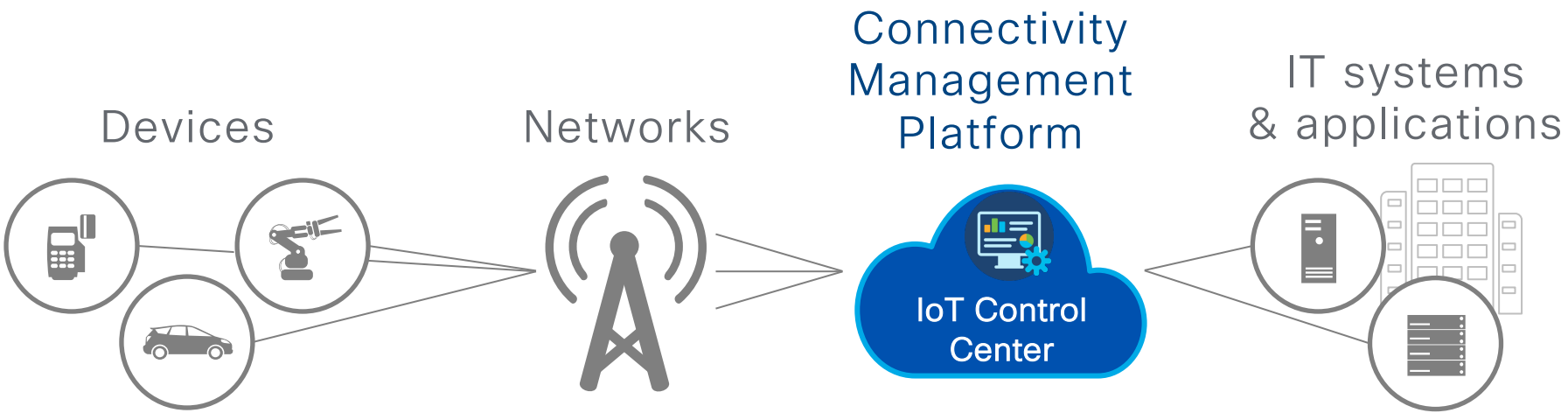
Cisco's industry-leading IoT portfolio



IoT Solutions address many different layers



Cisco Connectivity Management Platform



Automated connectivity management for all your devices globally

IoT CC meets customer needs across verticals

Connected Car

Auto makers are making driving safer through vehicle telematics

IoT CC ensures reliable cellular connectivity and helps save data costs for millions of cars on one platform.

High data usage, low latency, complex SIM lifecycle management

Financial Services

Financial organizations are getting scale and reliable service for Point of Sales and ATM systems

IoT CC enables businesses to remotely identify and resolve usage and connectivity issues at scale with analytics-based diagnostic tools.

Mission-critical connectivity, low data usage, low latency

Smart Meters

Utilities are saving costs and improving customer service with smart electric meters

IoT CC provides fine-grain visibility and control for millions of devices so organizations can manage issues themselves – day or night – without a call to their service provider.

Low data usage, lower reliability requirements, high latency

Leading IoT Use Cases and a Business Snapshot

37% **101M** Connected Cars

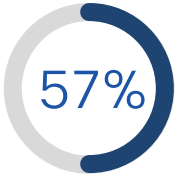
7% **20M** Smart Meters

7% **19M** Fleet Management Telematics

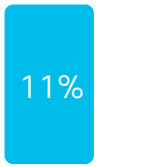
6% **17M** Security/Automation

3% **8M** Point of Sale/ Retail

270M
IoT Subscribers



154M on IoT CNaaS



YoY Growth (gross)

Global Scale

50+ Service Providers
30K+ Enterprises

Data Volume

500+ TB data / day
131M APIs / day

94M includes Consumer, Insurance, IIoT, Asset tracking, and other use-cases.

Recognized by analysts as leading CMP platform

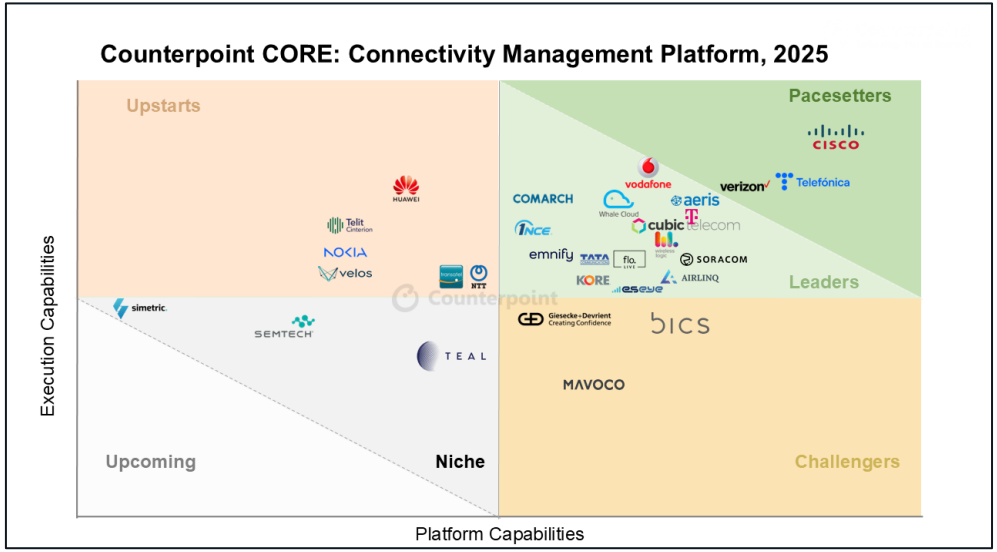
Cisco Earns Frost & Sullivan's 2024 Global Company of the Year Award for Transforming IoT Connectivity with Its Comprehensive IoT Control Center and Mobility Services Platform

Cisco is leading the IoT revolution with its sophisticated cloud-driven automation, providing enterprises with the seamless management of billions of connected devices across industries, including manufacturing, mining, healthcare, automotive, and utilities.

San Antonio, TX — November 14, 2024 — Frost & Sullivan recently researched the Mobile IoT Platforms industry and based on its findings, recognized Cisco with the 2024 Global Company of the Year Award. Cisco is a world-leading networking and telecommunications hardware, software, and technology provider that excels in developing and deploying advanced IoT and mobility solutions.

Cisco's groundbreaking IoT Control Center and Mobility Services Platform help businesses manage and connect IoT devices and networks. Together they simplify the integration, management, and security of IoT networks, providing scalable solutions that address the increasing demand for connected devices. Cisco's IoT Control Center enables seamless device connectivity, provisioning, and management at scale, helping businesses streamline operations and improve efficiency. The platform is also highly automated, has thousands of rules for various IoT use cases, and integrates advanced artificial intelligence (AI) and machine learning (ML) capabilities to optimize performance.

The company's trendsetting approach to IoT connectivity management is further enhanced by its collaboration with communication service providers. This collaboration accelerates the deployment of IoT devices and offers secure connectivity across public and private networks, positioning Cisco as a global leader in IoT and ensuring sustained growth and a superior customer experience.

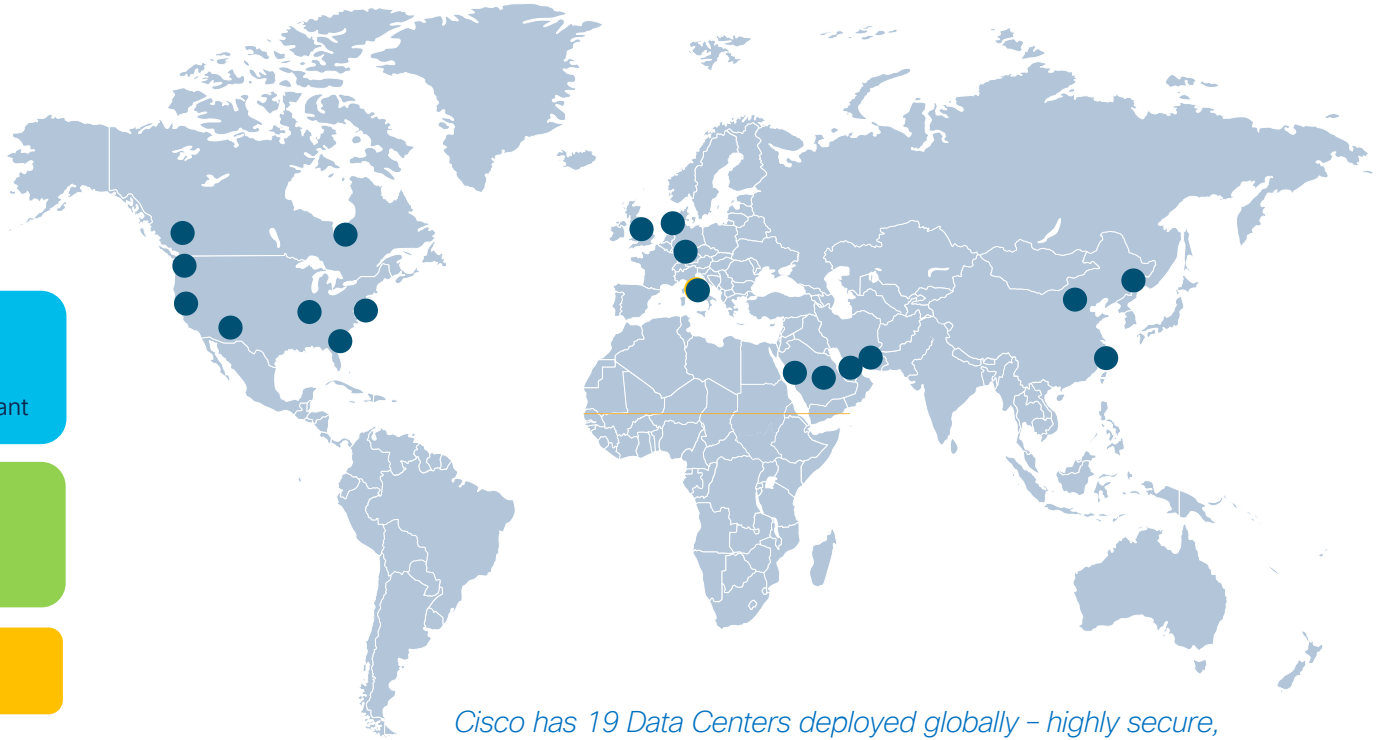


Software as a Service – deployed globally

- Tier3+ DCs
- Geo-redundant
- No Single Point Of Failure
- ISO27001 / GDPR Compliant

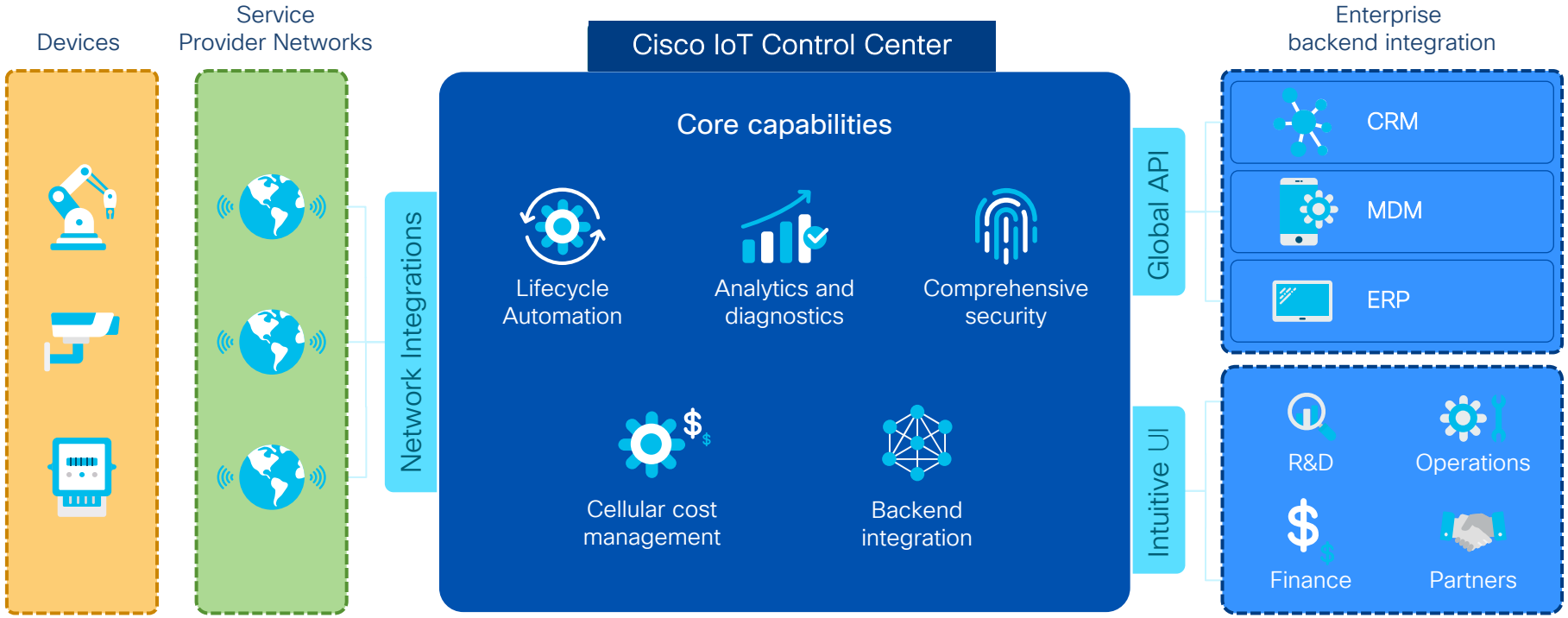
- Highly scalable
- SLA backed availability
  - 99.5% CMP
  - 99.9% Core

- Global Support
- Global Customer Care

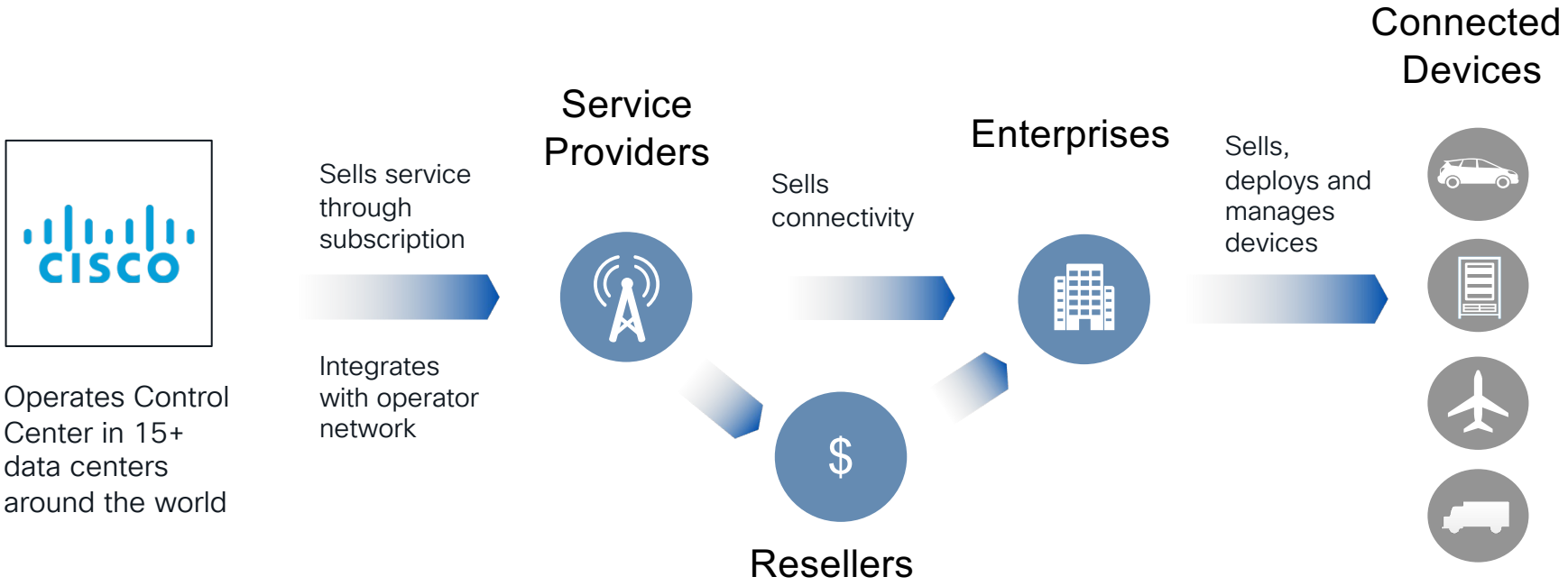


Cisco has 19 Data Centers deployed globally – highly secure, scalable and available – backed by commercial SLAs.

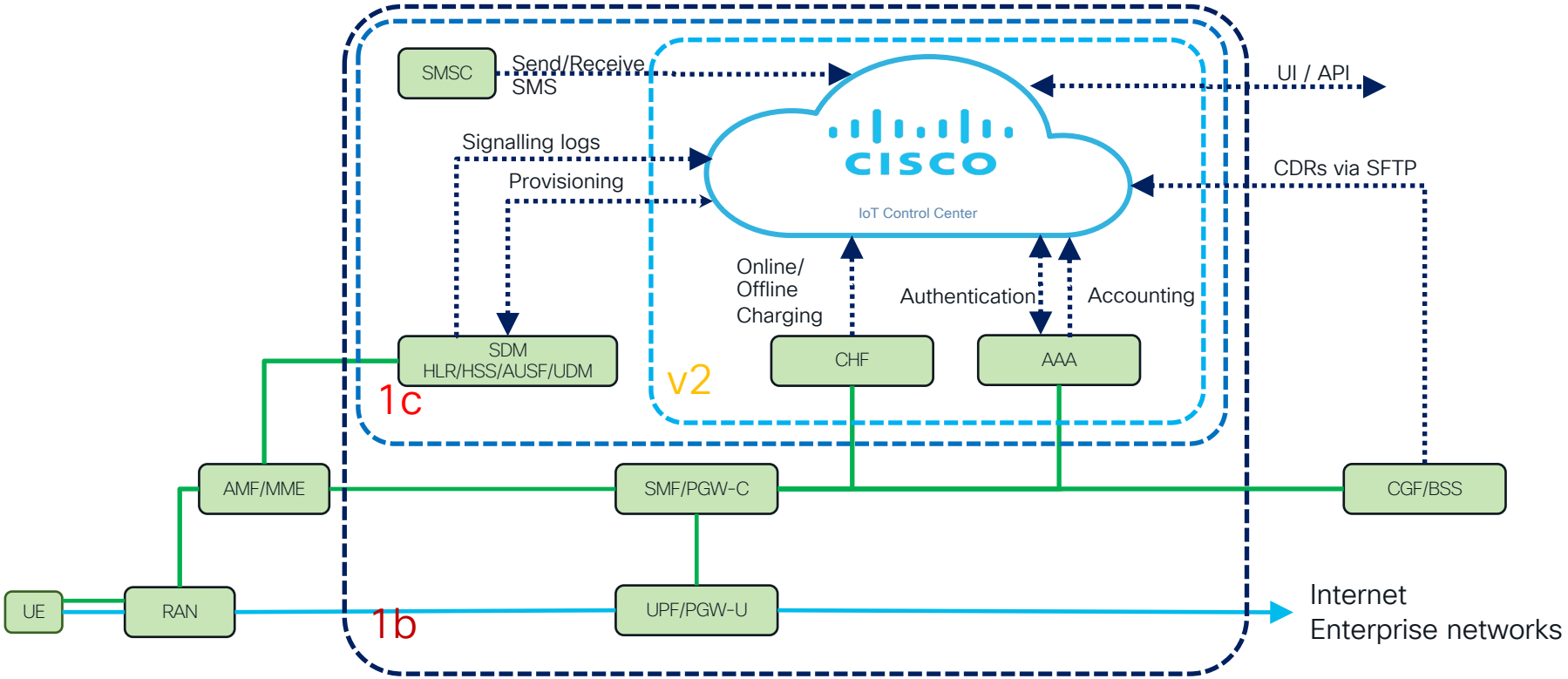
Automated connectivity management
Removing the complexity from the equation



IoT Control Center Business Model
Sold by Cisco to Service Providers



Control Center architecture and integration

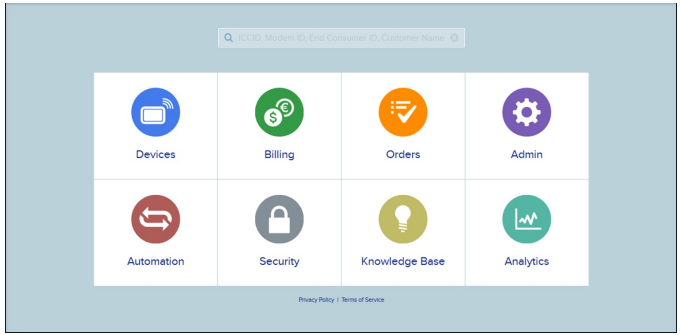


IoT Control Center Platform Application

Same platform but different views

IoT Control Center for Service Providers

- Onboard new Enterprise accounts
- Setup rate plans and services
- Integrate with internal systems
- Manage and view all their Enterprise accounts



IoT Control Center for Enterprises

- Monitor device status and usage
- Diagnose connectivity issues in a timely manner
- Automate business rules to streamline processes
- Track costs to ensure proper budgeting

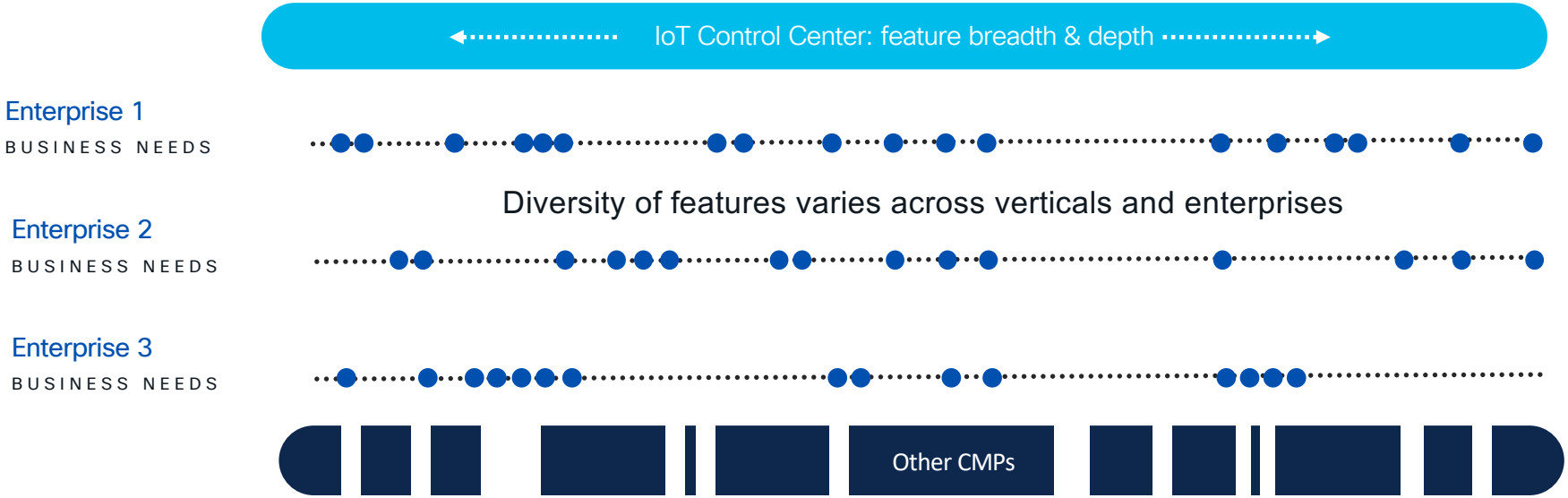
Control Center Breadth & Depth of Features

Devices	Services	Billing	Automation	Analytics	Security
SIM State Control	2G, 3G, 4G, 5G, APN(s)	Individual Plans	Usage Triggers	Account dashboard	IP Restrictions
Rate Plan Control	NB-IOT, LTE-M	Pooled Plans	Profile Change Triggers	Devices Dashboard	SSO
Diagnostics	SMS, Whitelists	Fixed Plans	Signalling Triggers	Revenue Dashboard	2 Factor Authentication
Spotlight	Voice, VoLTE, Whitelists	Pre-Paid Plans	IMEI Triggers	Usage Analytics	User Audit Trail
Bulk Changes	IPV4, IPV6	Event / Stacked / Add-ons	Rate Plan Triggers	Traffic Segmentation	IMEI Change + Permit List
Lifecycle Management	Fixed/Dynamic IP	Destination Rating	SMS Trigger	Service Analytics	Secure SIM
Free Test Data	Roaming Restrictions	APN, RG rating	SIM State Action	Reports	Password Policies
Session Visibility	LBS	**Multi-Party Billing**	Rate Plan Action	Dynamic Reporting	Support
Usage Visibility	Users	Overages	Email / SMS Actions	**Anomaly Detection**	Online Knowledge Base
Custom Labels	User Management	Commitments	Push API Action	APIs	Automated Walk Throughs
Custom Fields	Role Based Access	Adjustments	Comm Plan Actions	SOAP	Data Retention
Orders	Mirroring	Invoices	Trigger Audit Log	Rest	Notifications
SIM Orders	Account Groups	Proration	Billing Cycle Revert	Push / Pull	SP Links
Marketplace	Account Peering	**Cost Optimisation**	Device Filter	Webhook	API Demo

Cisco Control Center has the greatest depth and breadth of features of any CMP (the online user guide extends to 2000+ pages).

Cisco IoT Control Center Capabilities

It is no single feature – it is the capability to serve all verticals and enterprises that beats all competition



The depth and breadth of Control Center features ensures that the diverse IoT use case requirements are catered for by Cisco out of the gate – allowing you to focus on business and not chasing vendors.

Are you / your company using a Connectivity Management Platform

Yes, Cisco Control Center
0%

Yes, but another solution as offered by the regular SP
0%

Yes, from a specialized IoT Managed Service Provider
0%

No
0%

What does that mean?
0%

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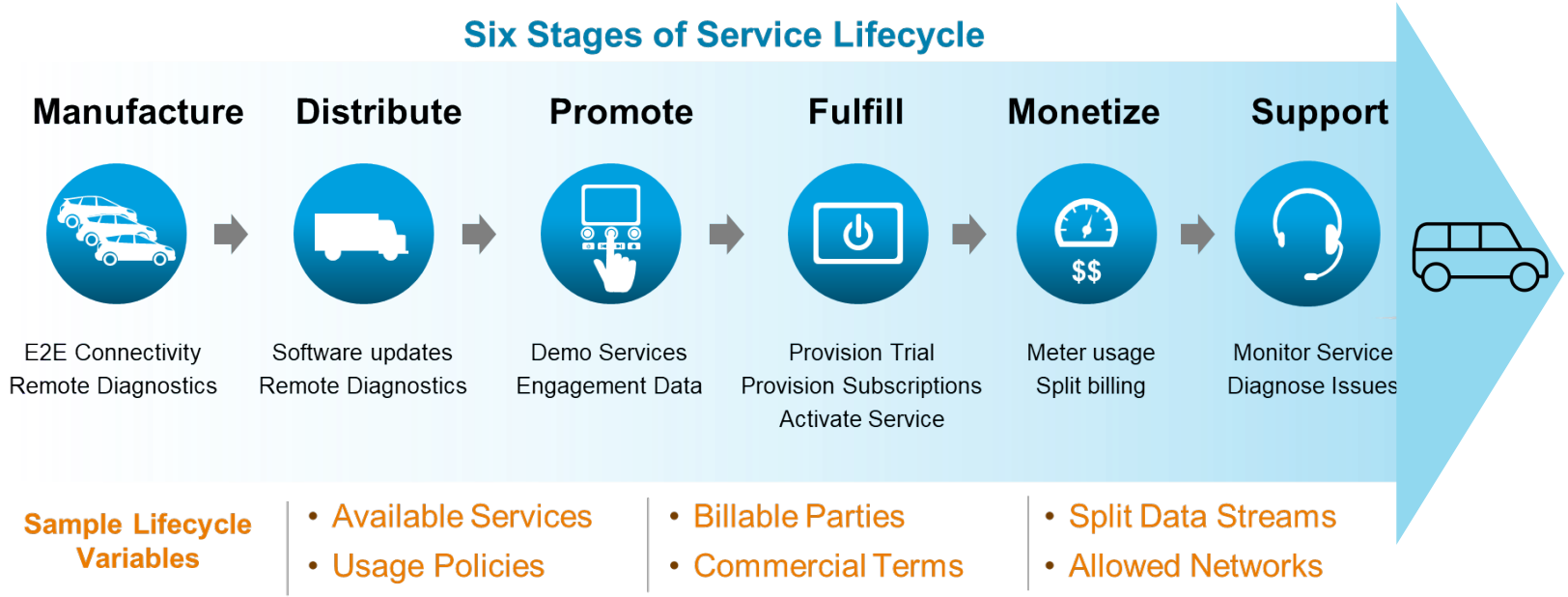
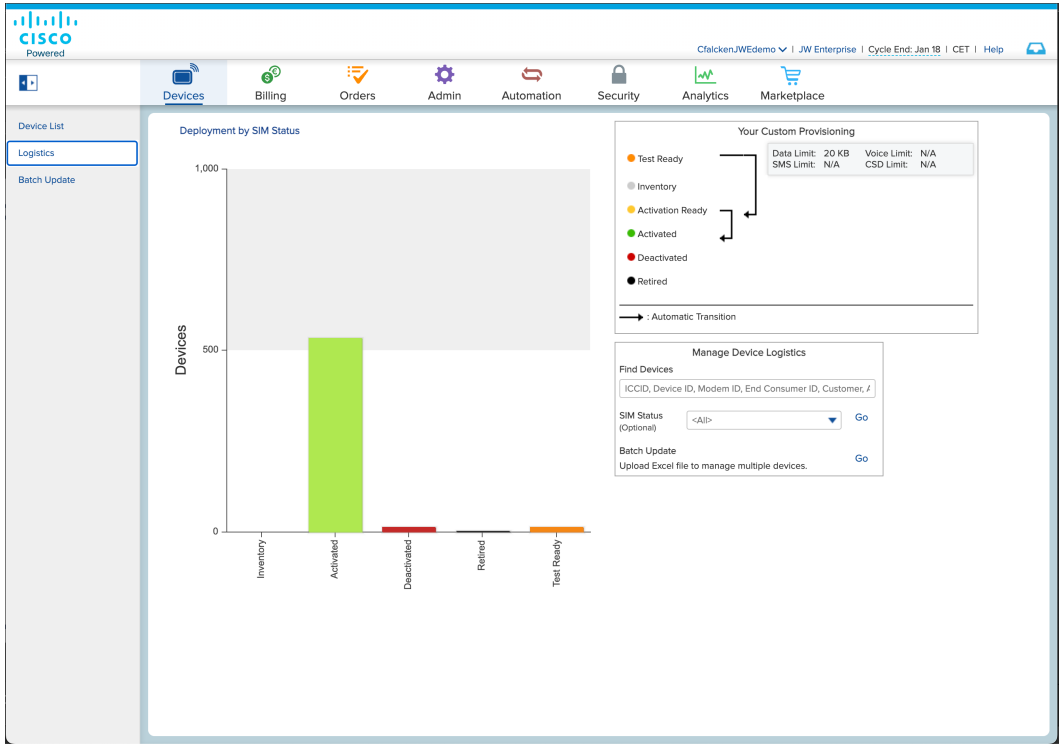
Demo:
Deploy, manage and mitigate

Service Lifecycle
Connected Car example



SIM Lifecycle management

Demo

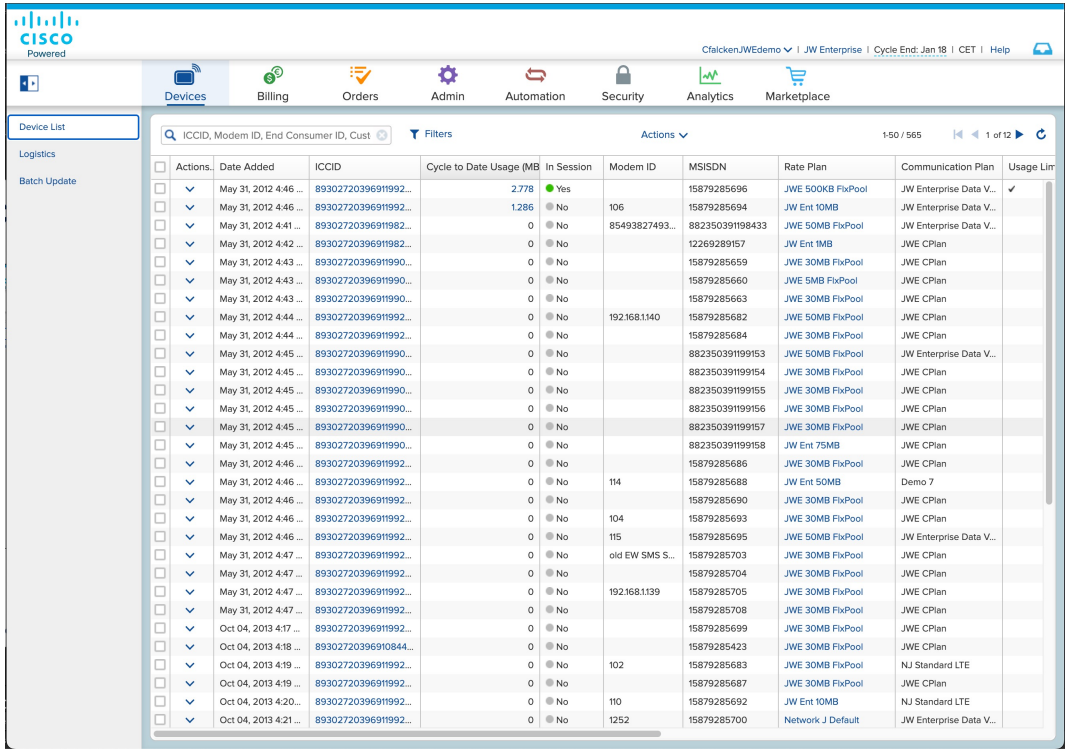


Key Features

- Test Ready state allows testing data and SMS during production testing without getting billed
- “Activation Ready” keeps a device in a non-billable state until it transitions to “Activated” with first data session or SMS
- Devices can be “Deactivated” or retired by enterprise customer to stop further usage and billing

Device list

Demo

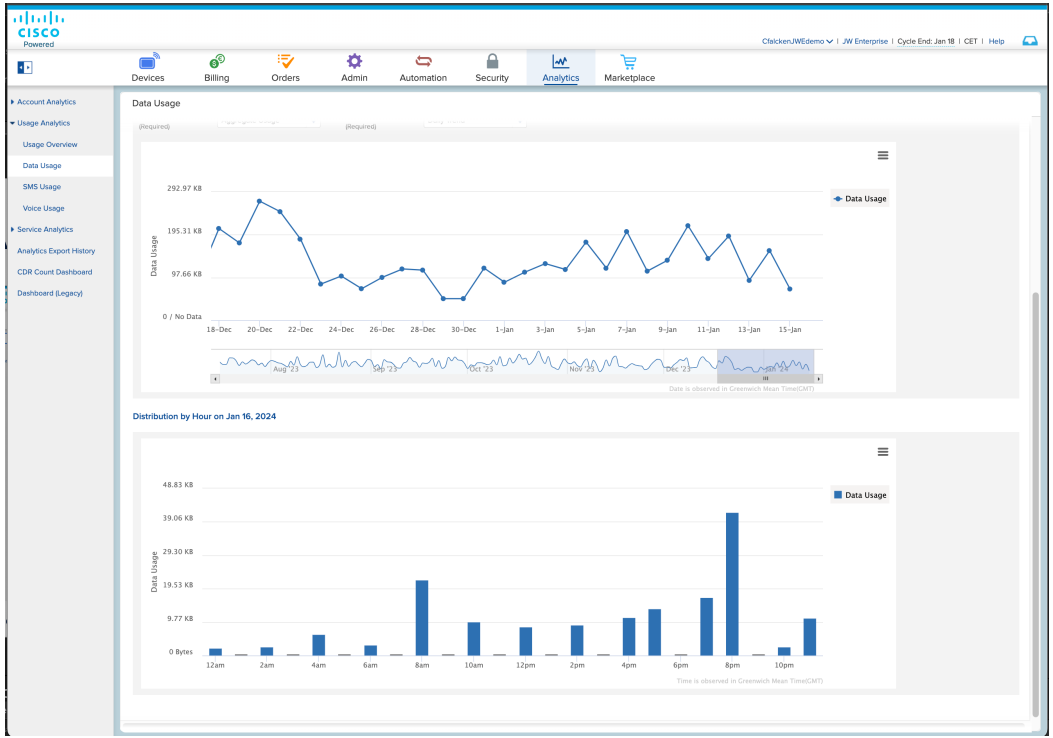


Key Features

- View, filter and export all devices with custom columns
- Monitor usage and session status
- Change SIM status or rate plan
- Perform Batch updates

Analytics

Demo

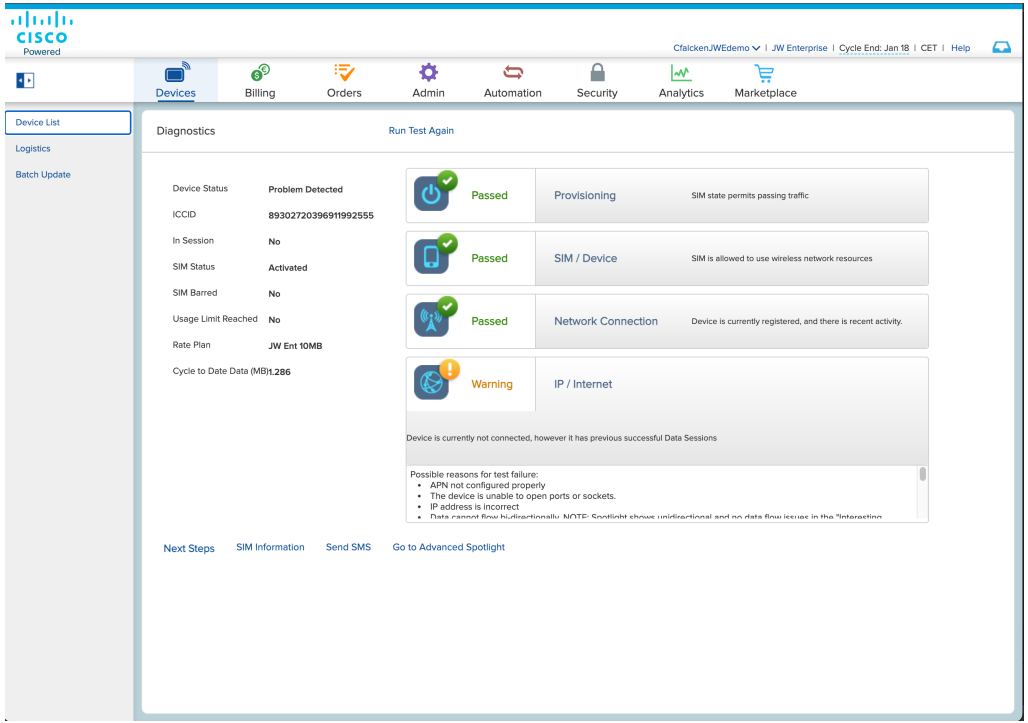


Key Features

- Account summary
- Usage Analytics
  - Data / SMS / Voice
- Service Analytics
  - Completed / Ongoing sessions

Diagnostics

Demo

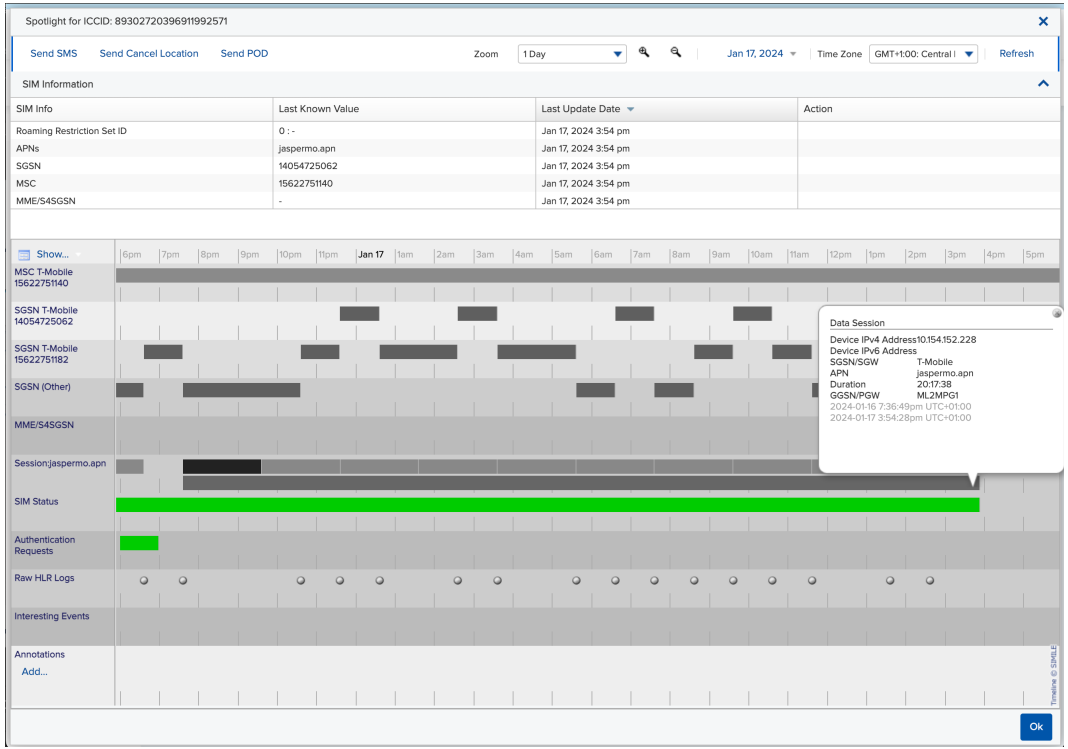


Key Features

- Simple device checks of the related to Provisioning, SIM permissions, network connection and Internet access
- Includes possible root causes and steps to mitigate warnings and errors

Advanced Spotlight

Demo

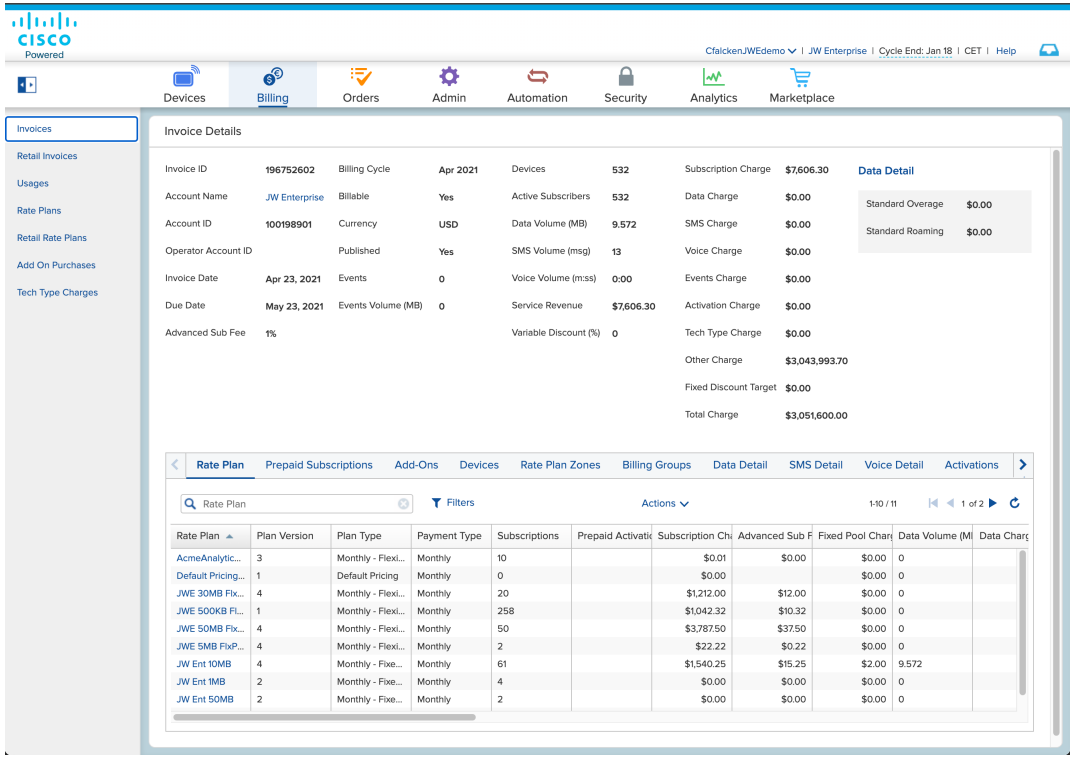


Key Features

- Get quick insights to device signaling events up to 30 days in the past
- Troubleshoot device connectivity
- Send SMS to device
- Cancel Location causing the device to reregister on the network
- Packet of Disconnect (soft reset) only disconnecting the ongoing data session. Device remains registered on the network

Invoice details

Demo



Key Features

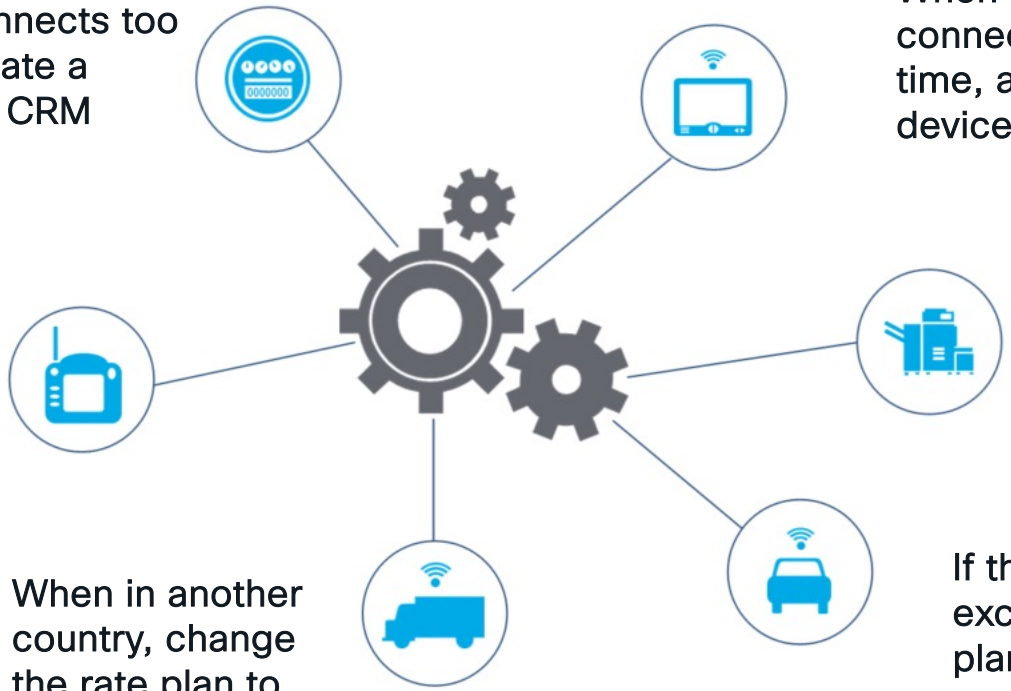
- Total cost for a billing cycle with breakdown of the charges for subscription, data/SMS/voice and other service
- Detailed usage and costs per rate plan and per device

Demo: Automate

Automation Use Cases

If the device connects too many times, create a service ticket in CRM System

When consumer connects for the first time, activate the device automatically



If the device's SIM connects from a different device, deactivate the SIM

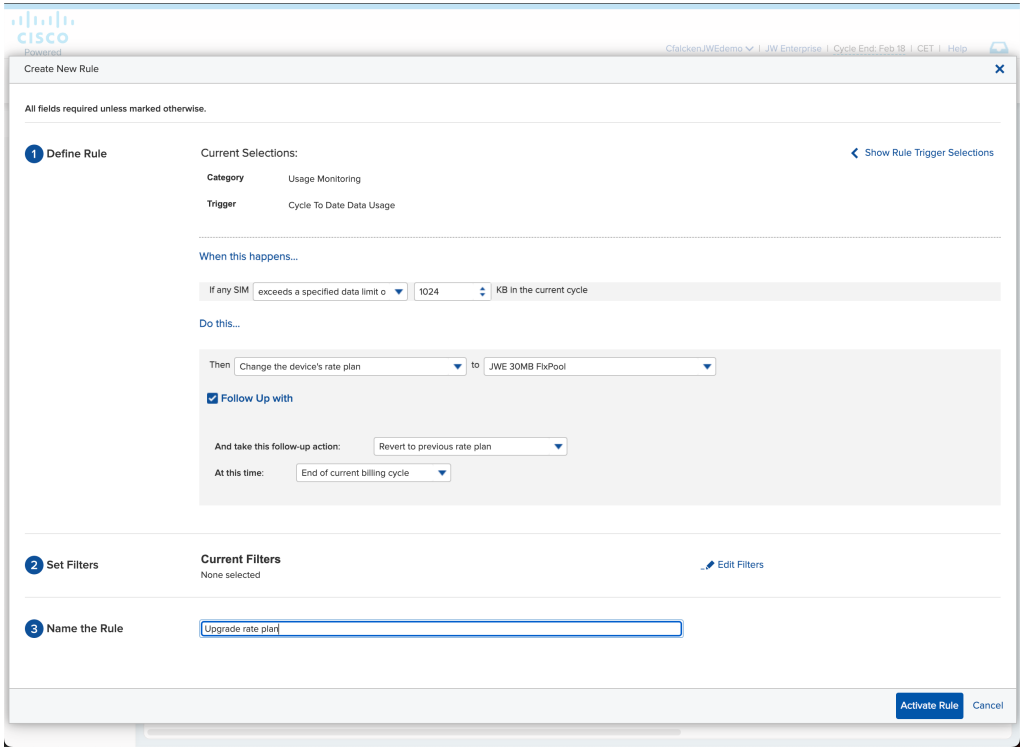
If the connection is lost, send a message to a technician

When in another country, change the rate plan to favorable rates

If the data limit is exceeded, change the rate plan to one that includes more volume (but switch back next month)

Creating automation rules

Demo



Key Features

- Select one of many rule triggers
- Define actions from notifications to directly applying changes
- Define filters to apply rules to a subset of your devices

Demo: Program

Have you used an API before?

Yes, played with Postman but don't have programming skills

0%

Yes, with Python or other programming languages

0%

No

0%

What does API mean?

0%

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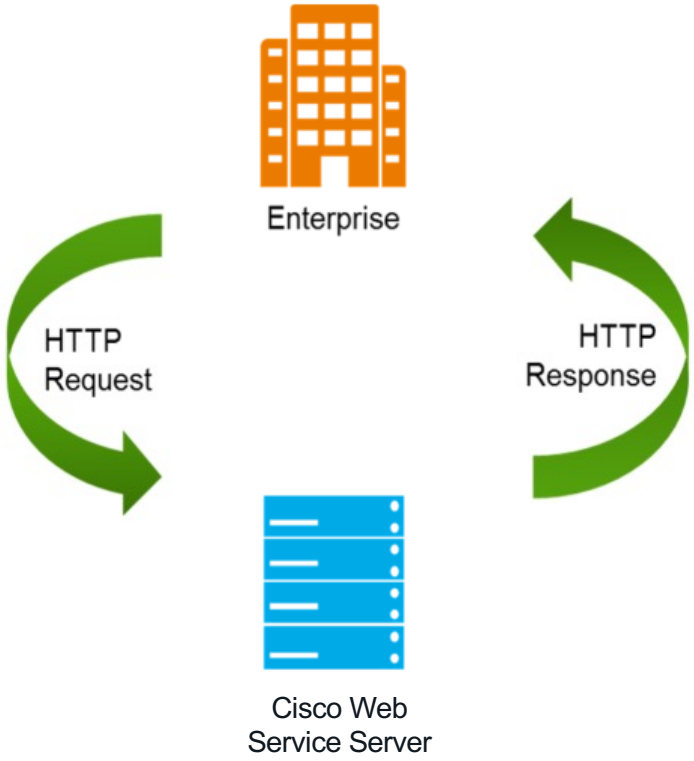
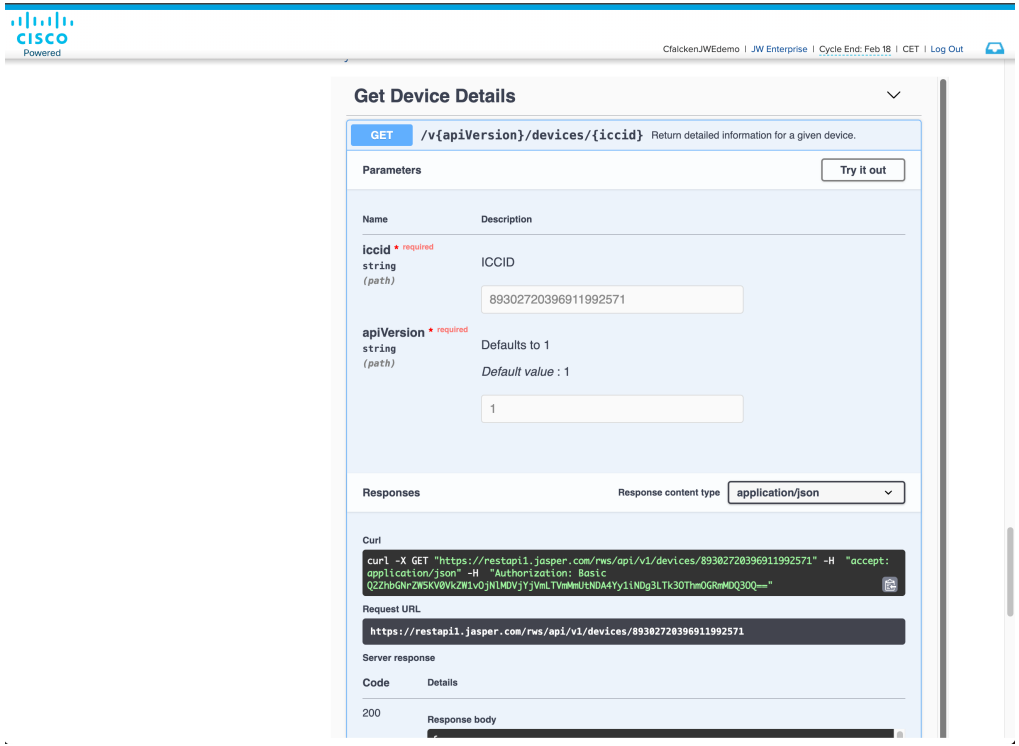
Enterprise Integration with API Overview



- Similar functions to Control Center web interface
- Use the enterprise's existing infrastructure to manage device deployment
- Supported interfaces:
  - SOAP (XML)
  - REST API
- Sandbox environment available
- Sample code/online documentation available
- Same APIs for 50+ Service Providers

“Try it out” in Knowledge Base

Demo

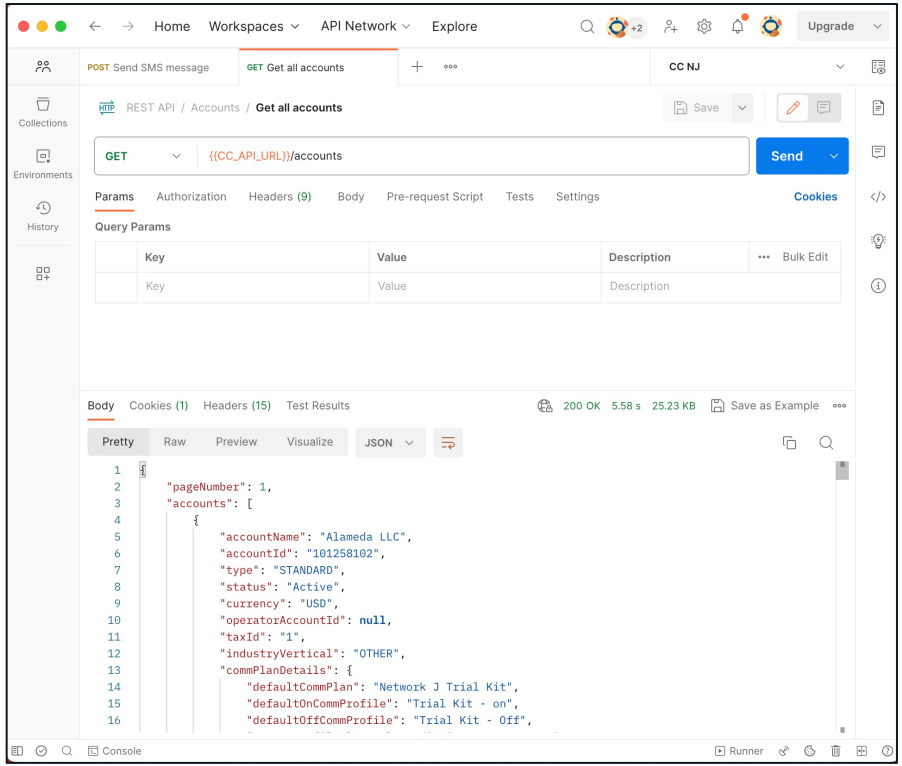


Key Features

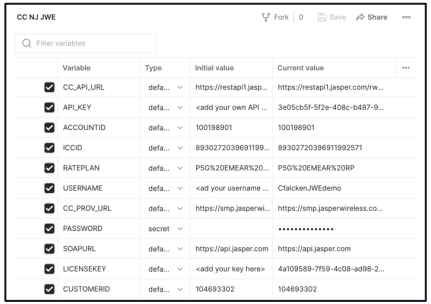
- Detailed documentation of all API functions and parameters in the Online Help aka Knowledge Base
- “Try it Out” uses your own API key to quickly test API messages with the real system

Using REST API with Postman

Demo



- Postman is a powerful tool to define API calls and use them with different environments
- Using REST API simply means sending an HTTP GET or POST request with a specific URL
- Response is returned in JSON format



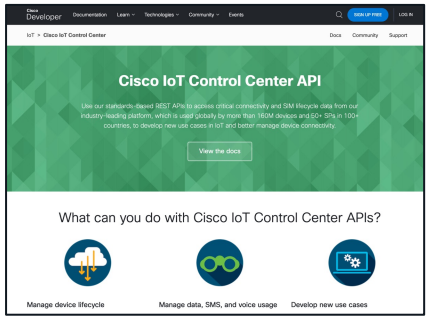
Using REST API with scripts – Get

Demo

- Many programming languages support simple interfaces to talk to a REST API and to process the response
- Python's "request" library makes it very simple to send a REST API call

Documentation, sandbox environment and sample scripts offered via Cisco DevNet

https://developer.cisco.com/control-center




```
#!/usr/local/bin/python
#
import requests
import json
import base64
import pprint
import yaml
import sys
import os
from pathlib import Path
import argparse
import time

# Parse the command line to get the site name
#
parser = argparse.ArgumentParser(os.path.basename(__file__))
parser.add_argument("site", help="Name of the site as specified in settings.yaml", type=str)
parser.add_argument("string", help="String to send for echo", type=str)
args = parser.parse_args()

# Get the settings (URL, username, apikey) from external file
#
full_file_path = Path(__file__).parent.joinpath('../settings.yaml')
with open(full_file_path) as settings:
    settings = yaml.load(settings, Loader=yaml.Loader)

print("Sending echo request for ", args.string, file=sys.stderr)

myResponse = requests.get(
        settings[args.site]["resturl"] + "/echo/" + args.string,
        auth=((settings[args.site]["username"]),settings[args.sit

# For successful API call, response code will be 200 (OK)
if(myResponse.ok):

    # Loading the response data into a dict variable
    # json.loads takes in only binary or string variables so usin
    # Loads (Load String) takes a Json file and converts into pyt
    jData = json.loads(myResponse.content)

else:
    # If response code is not ok (200), print the resulting http
    print("Failure")
    myResponse.raise_for_status()

print (jData["context"])
```

```
./get_device_usage.py kpn -i 893108232208919 7xxx
Processing 1 ICCIDs
Getting usages for ICCID ['893108232208919 7xxx']
[
    {
        "iccid": "893108232208919 7xxx",
        "imsi": "204080823499xxx",
        "msisdn": "3197045090xxx",
        "imei": "8652340326409xxx",
        "status": "ACTIVATED",
        "ratePlan": "Cisco IOT Demo 500MB Data",
        "communicationPlan": "Cisco IOT Demo DATA",
        "ctdDataUsage": 0,
        "ctdSMSUsage": 0,
        "ctdVoiceUsage": 0,
        "ctdSessionCount": null,
        "overageLimitReached": false,
        "overageLimitOverride": "DEFAULT"
    }
]
```

Push API with scripts

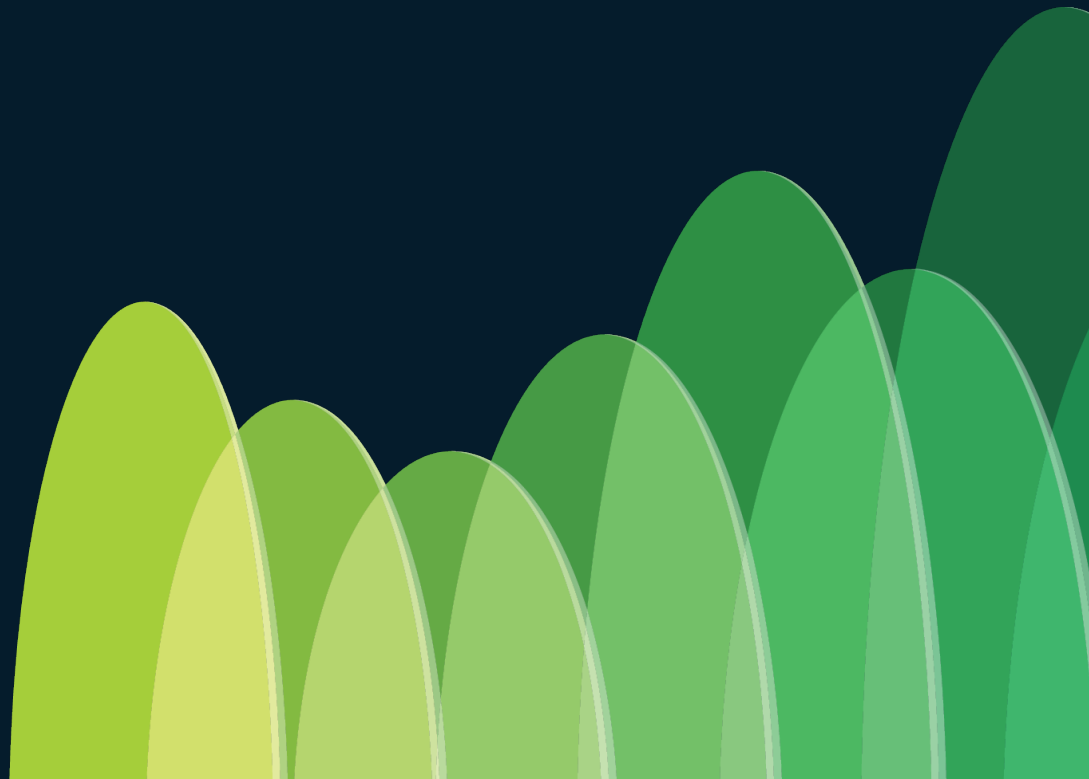
Demo

- Events triggered by automation rules can be sent to a Push API receiver (i.e. an HTTP POST is sent to a specified URL)
- Received events can then be used to trigger REST API calls
- Sample code for Java receiver downloadable from Control Center help, but much simpler with Python

```
import http.server
import …

secret_key = b"BredaDemo"
PORT = 8888

class PushAPIHandler(http.server.BaseHTTPRequestHandler):
    def do_POST(self):
        content_type = self.headers.get('Content-Type')
        if content_type.startswith('application/x-www-form-urlencoded’):
            content_length  = int(self.headers.get('Content-Length'))
            post_data       = self.rfile.read(content_length)
            form_data       = urllib.parse.parse_qs(post_data.decode('utf-8'))
            event           = form_data["eventType"][0]
            signature       = form_data["signature2"][0]
            data            = form_data["data"][0]
            timestamp       = form_data["timestamp"][0]

            hash     = hmac.new(bytes(secret_key), bytes(timestamp, 'utf-8'), hashlib.sha256)
            hash_str = base64.b64encode(hash.digest()).decode('utf-8’)

            print("Event            : " + event)
            print("Signature        : " + signature)
            print("Hashed timestamp : " + hash_str)
            if hash_str == signature:
                print("Signature verification successful")
            else:
                print("Signature verification failed")

            xml_data = ET.fromstring(data)
            xmlstr = minidom.parseString(ET.tostring(xml_data,
encoding='utf8').decode('utf8')).toprettyxml(indent="   ")
            print("XML data         :")
            print(xmlstr)

            # Send a response back to the sender
            #
            self.send_response(200)
            self.send_header('Content-type', 'text/plain')
            self.end_headers()
            self.wfile.write(b'Received push notification')

# Start the server listening on the given port
#
with http.server.HTTPServer(("", PORT), PushAPIHandler) as httpd:
    print("Push API receiver listening on port", PORT)
    httpd.serve_forever()
```

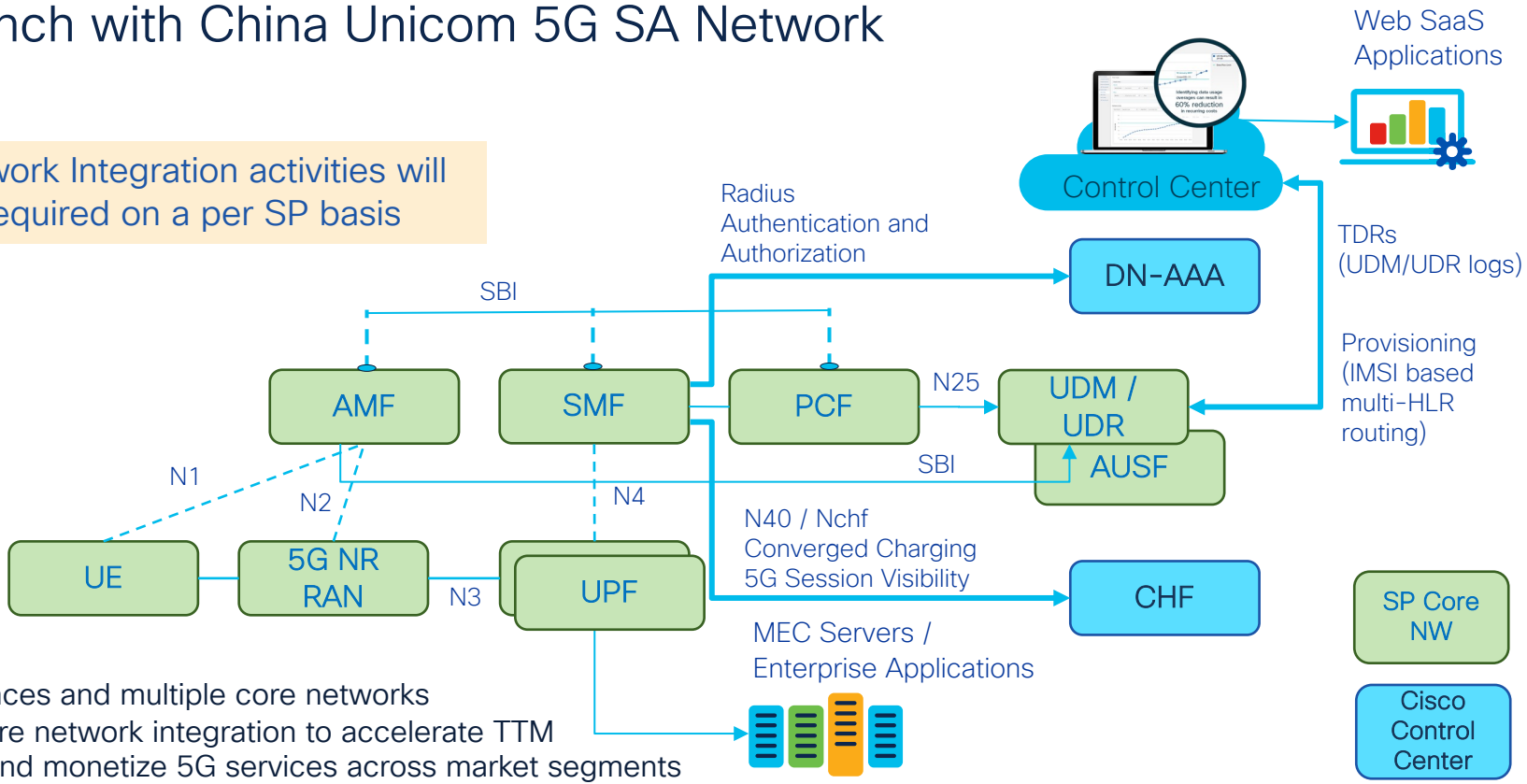
Shortened example, full script on Github (see previous Devnet link)

Innovation



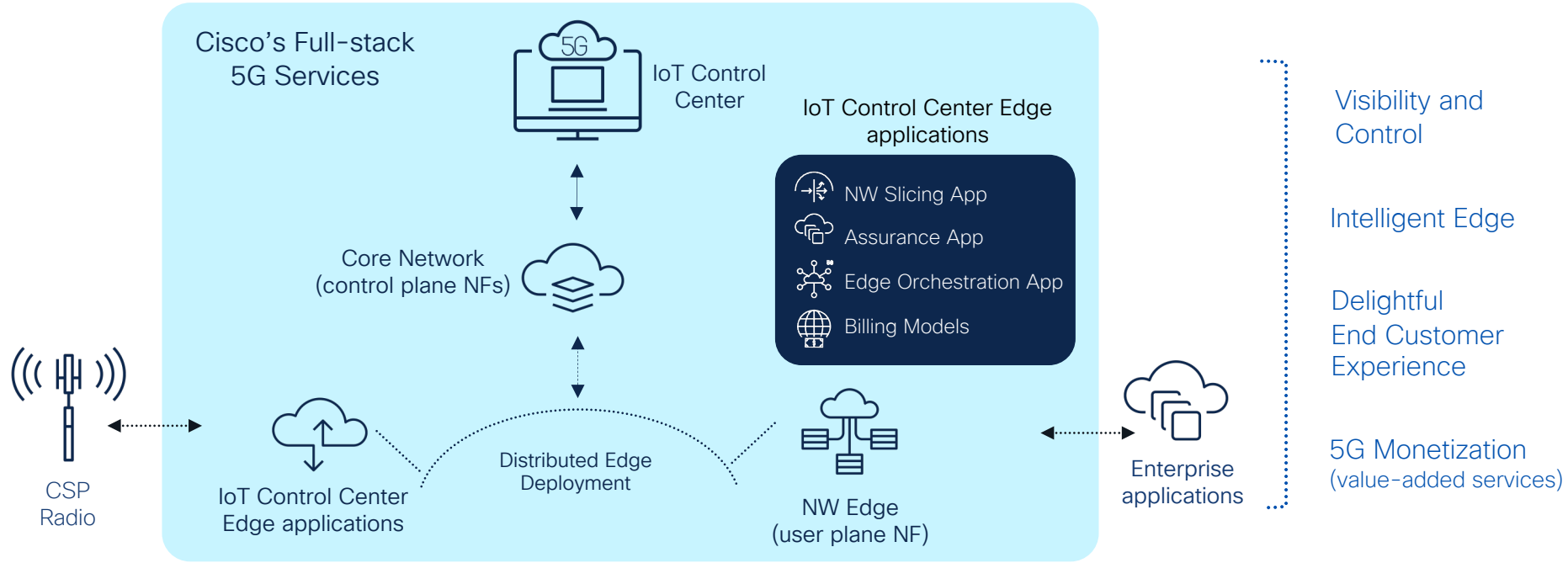
Control Center evolution to 5G
Launch with China Unicom 5G SA Network

Network Integration activities will be required on a per SP basis

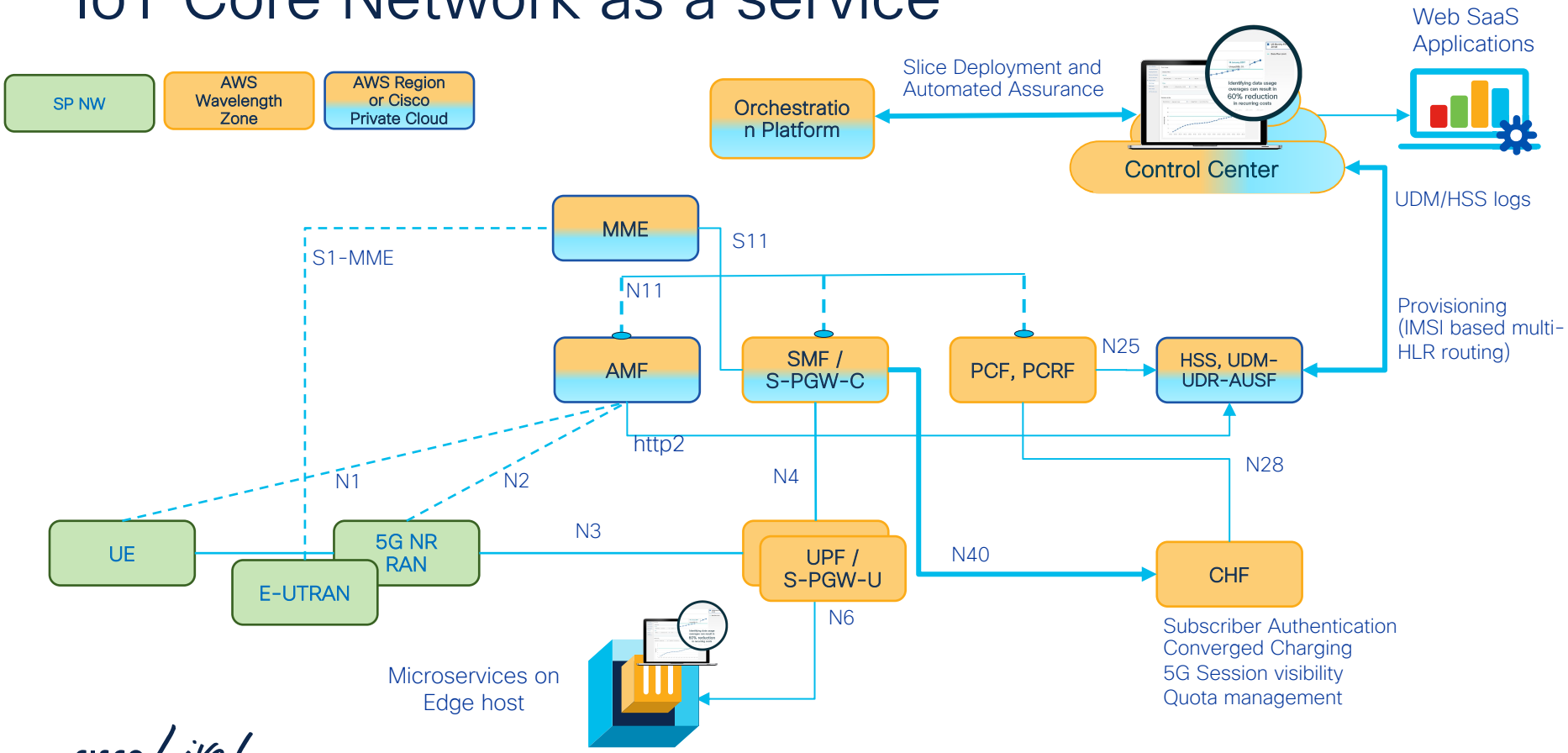


- ✓ 31 provinces and multiple core networks
- ✓ Direct core network integration to accelerate TTM
- ✓ Launch and monetize 5G services across market segments
- ✓ Cisco hosted CHF to enable rapid innovation with session visibility

Cisco’s full stack 5G service
Enabling global IoT deployments with agility



IoT Core Network as a service



Cisco Control Center Evolution

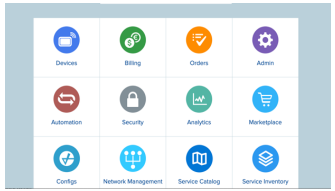
SP BSS

SP Marketplaces

Marketplace

Enterprises

Cisco Digital Services



Control Center GUI

Cisco DEVNET Developer APIs

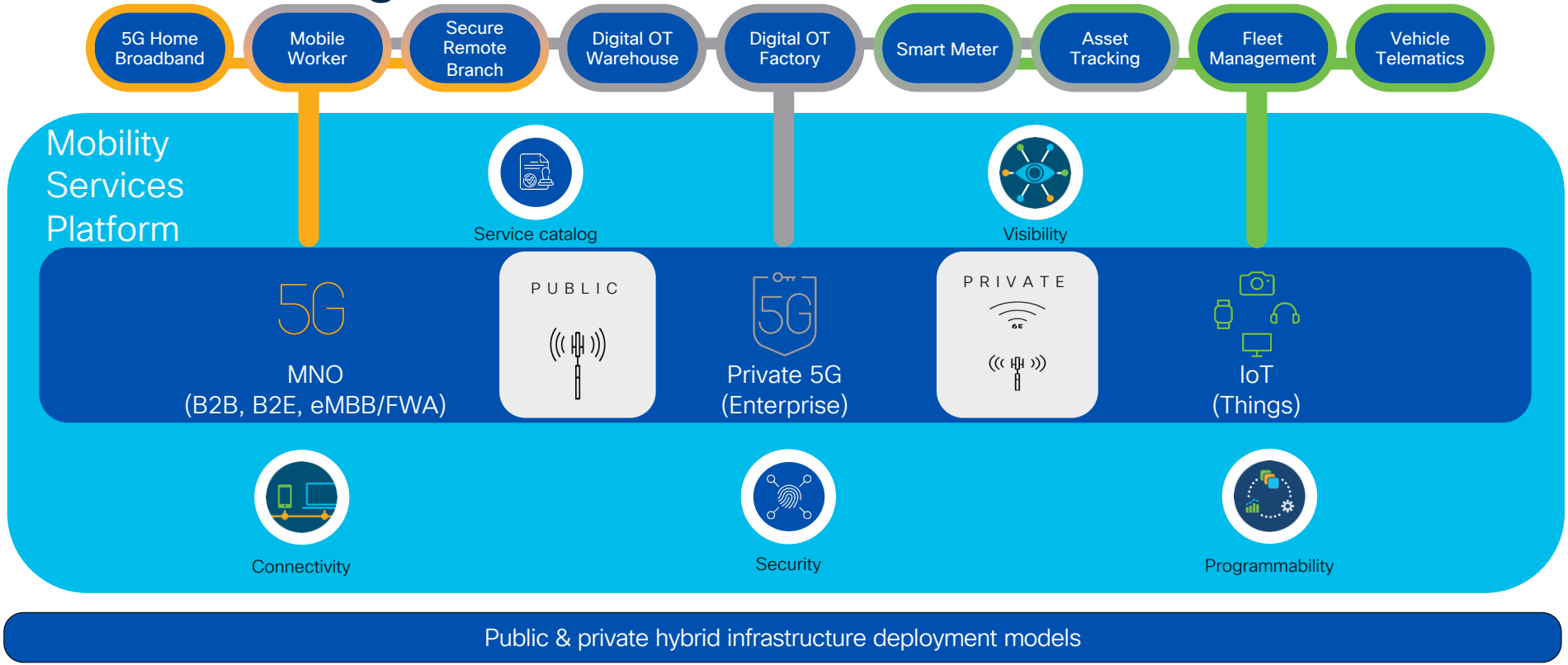
3rd pty Developers (future)

Automation / orchestration

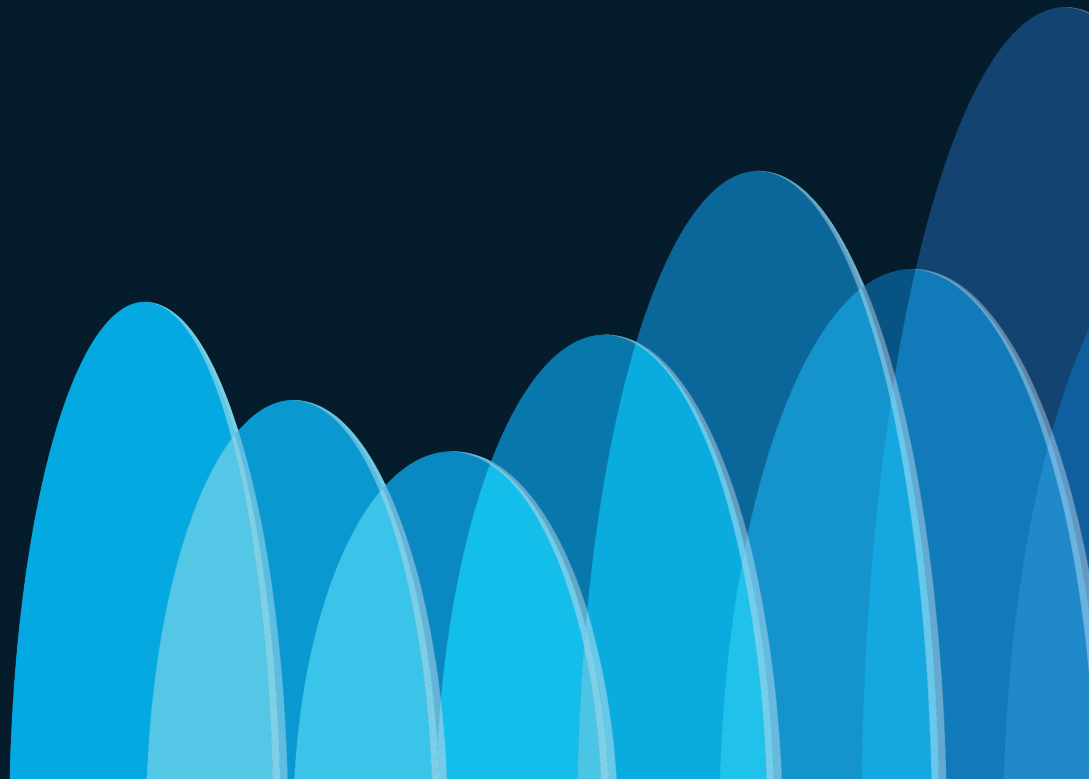
Cisco Mobile packet core
Data, voice, IMS

3rd pty mobile core

Introducing Cisco MSP



Why Cisco?



Why SPs and Enterprises should consider Cisco

- Footprint / Global Enterprises
- Innovative features
- Cisco has built this platform for 20 years implementing requirements from Service Providers and Enterprises
- Common User Interface for CMP, Private/Public 5G
- Integration with Device Management Platforms / Simple Device Onboarding
- We are here to stay

Next steps

As a service provider

Talk to us if you already use the Cisco platform and want to use advanced features, or if you are interested in replacing or supplementing your current IOT CMP solution

As an enterprise customer or reseller

Talk to one of our existing SP customers to get connected through our platform, or convince your current SP to start offering the Cisco solution

Webex App

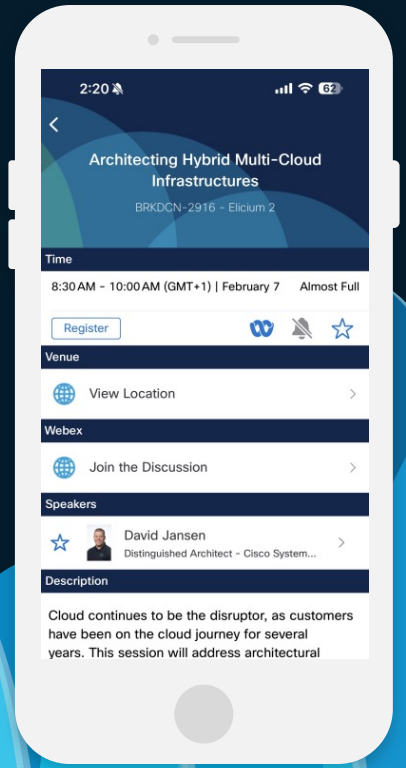
Questions?

Use the Webex app 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 the Webex app or go directly to the Webex space
4. Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until February 28, 2025.



Fill Out Your Session Surveys

Participants who fill out a minimum of 4 session surveys and the overall event survey will get a unique Cisco Live t-shirt.

(from 11:30 on Thursday, while supplies last)

All surveys can be taken in the Cisco Events mobile app or by logging in to the Session Catalog and clicking the ‘Participant Dashboard’

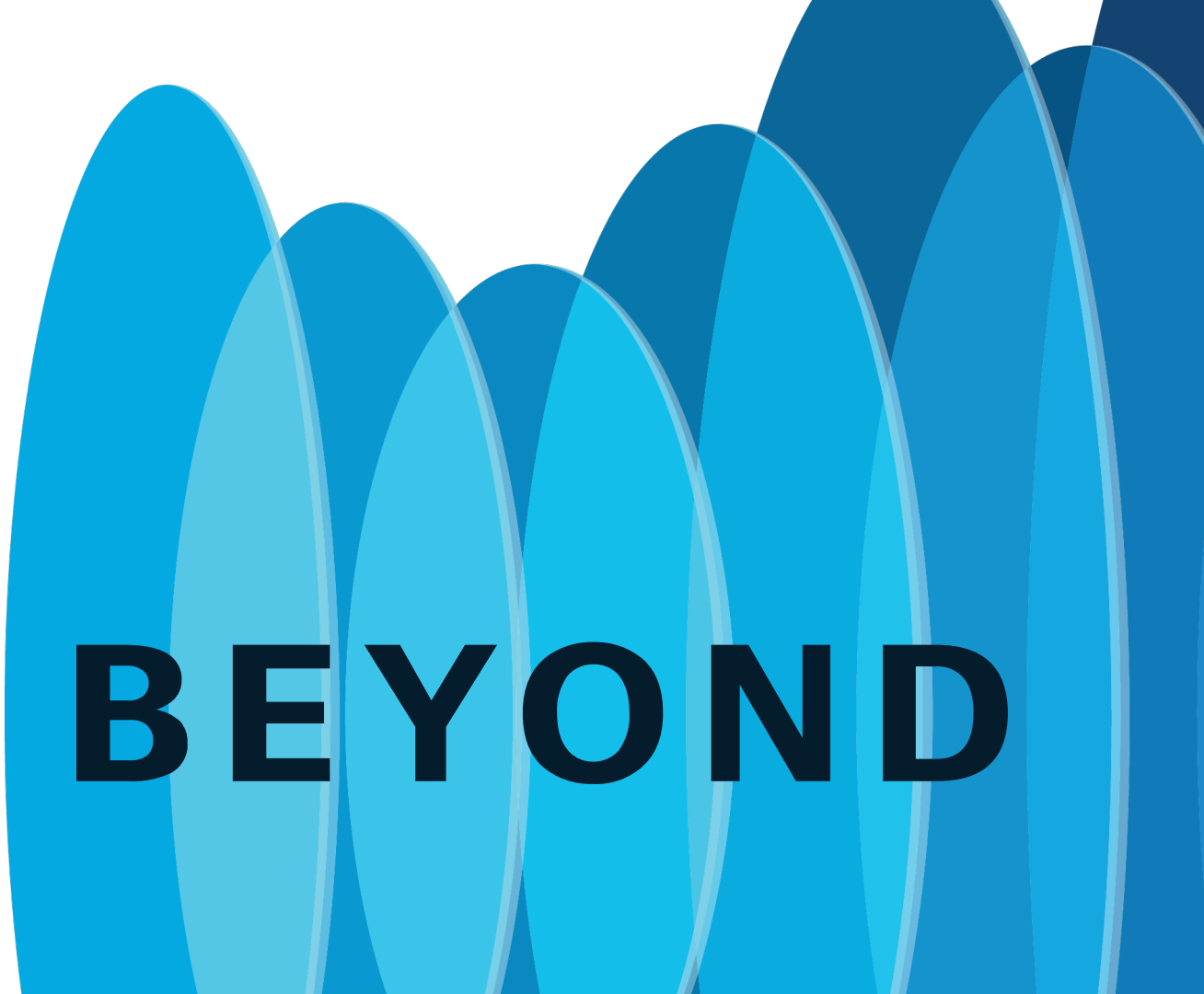
Content Catalog

Continue your education

- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Engineer meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at ciscolive.com/on-demand. Sessions from this event will be available from March 3.


cisco
Thank you
cisco Live!

cisco Live!



GO BEYOND