
cisco Live!
Let's go

The bridge to possible

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

Christian Falckenberg, Technical Solution Architect

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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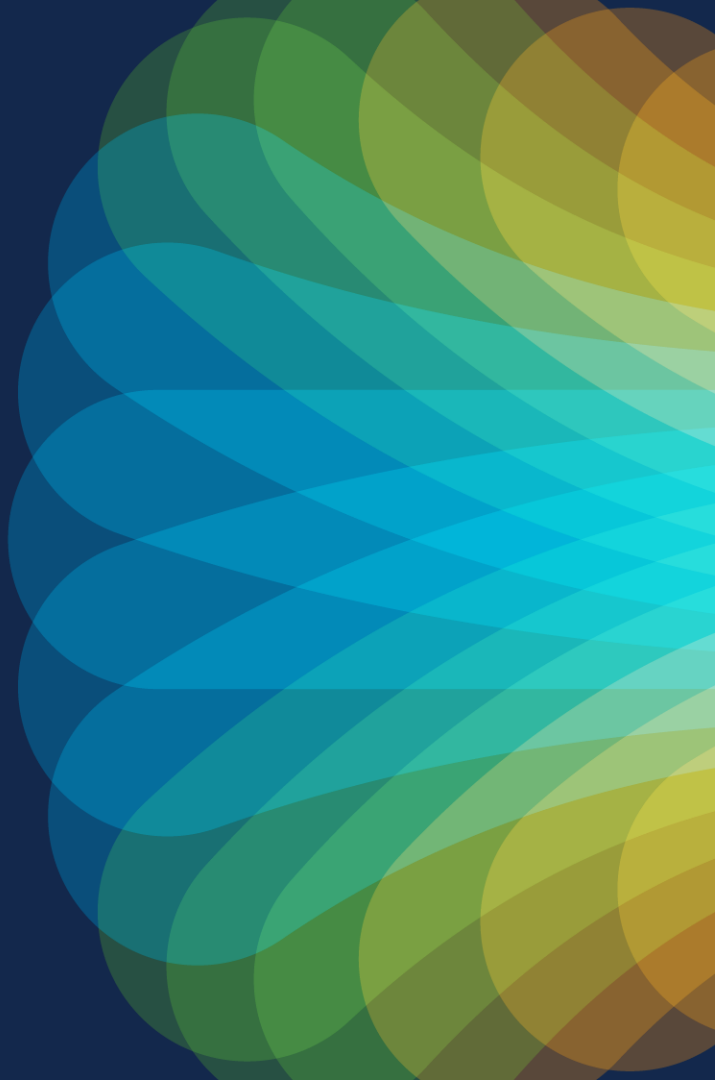
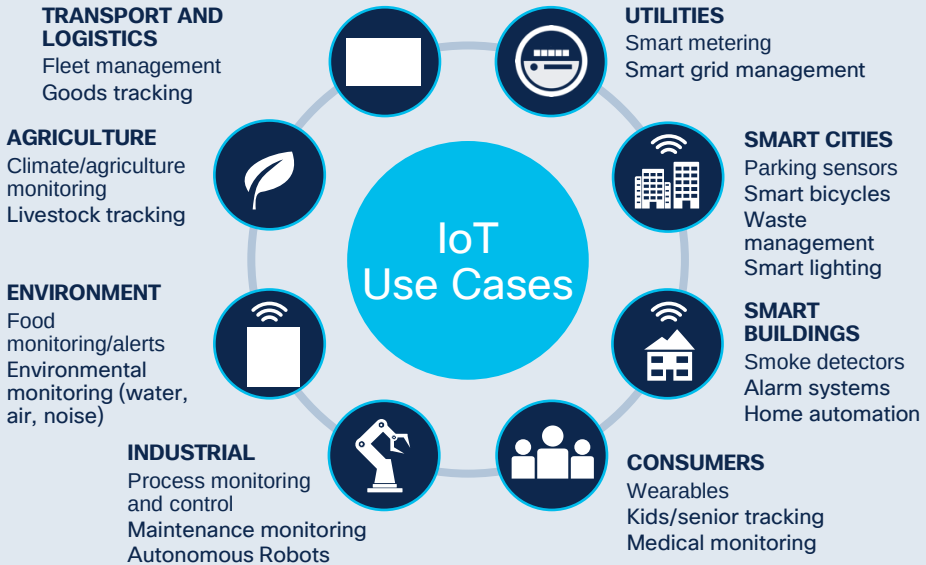
Agenda

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

IoT connectivity market



The complexity of the IoT market



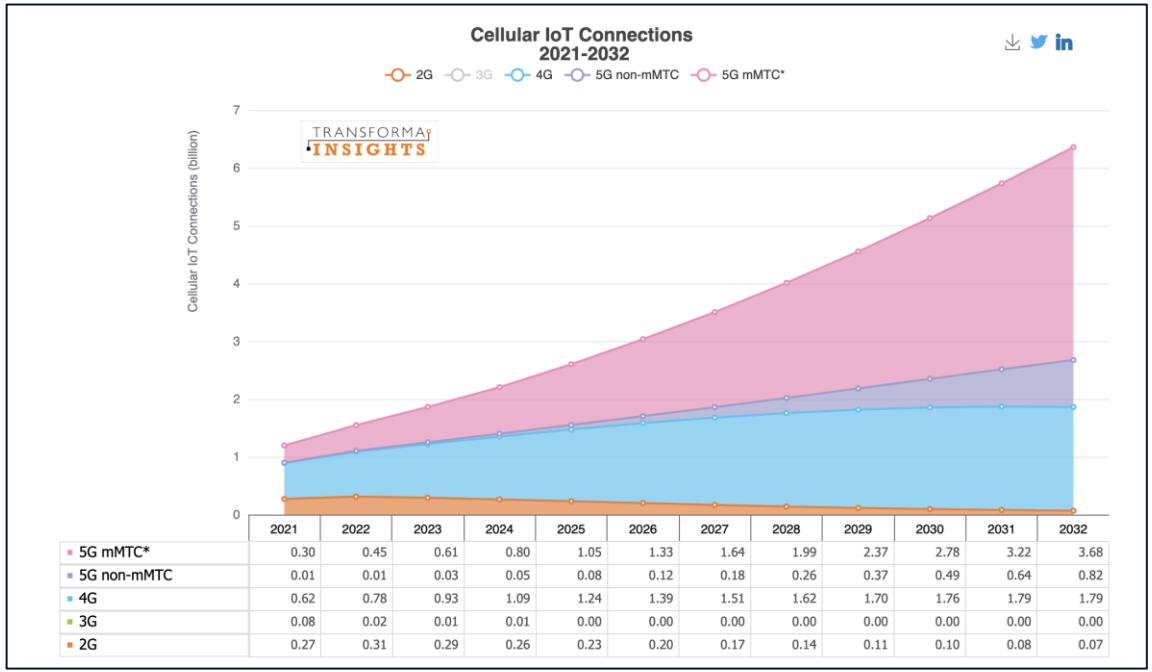
- Massive IoT requiring low cost / low power devices for small data volumes
- Industrial applications requiring low latency and extra security
- Mission Critical apps requiring high bandwidth and low latency
- Consumer and Enterprise
- Different vertical industries
- Variety of infrastructure and business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

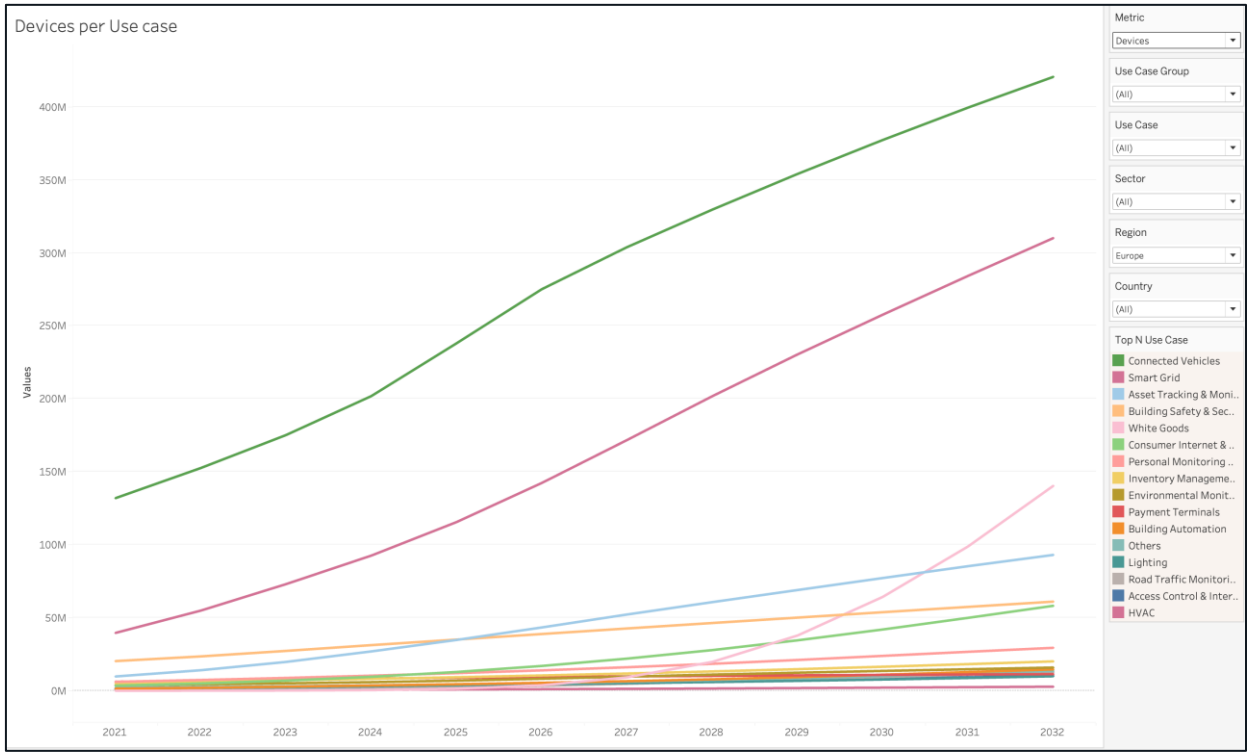


	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
5G mMTC*	0.30	0.45	0.61	0.80	1.05	1.33	1.64	1.99	2.37	2.78	3.22	3.68
5G non-mMTC	0.01	0.01	0.03	0.05	0.08	0.12	0.18	0.26	0.37	0.49	0.64	0.82
4G	0.62	0.78	0.93	1.09	1.24	1.39	1.51	1.62	1.70	1.76	1.79	1.79
3G	0.08	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2G	0.27	0.31	0.29	0.26	0.23	0.20	0.17	0.14	0.11	0.10	0.08	0.07

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

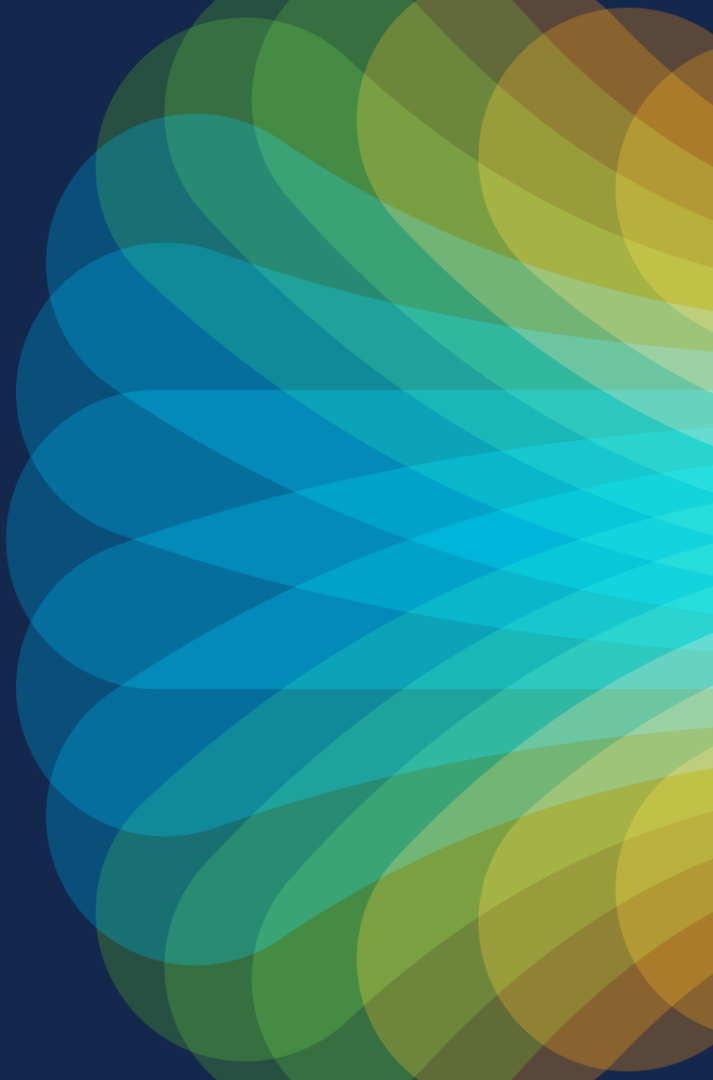
Devices per Use case in Europe



Based on Transforma IoT forecast

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

Cisco IoT Control Center solution



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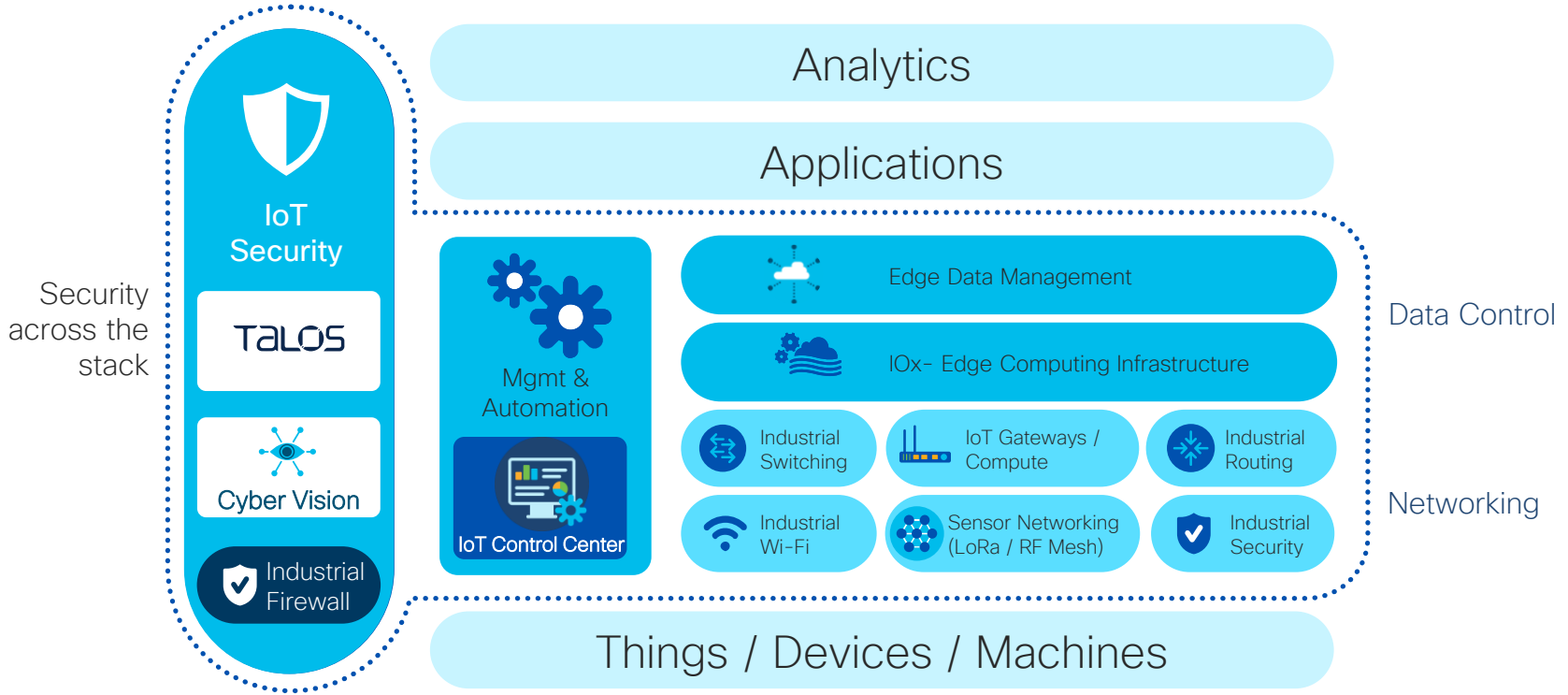
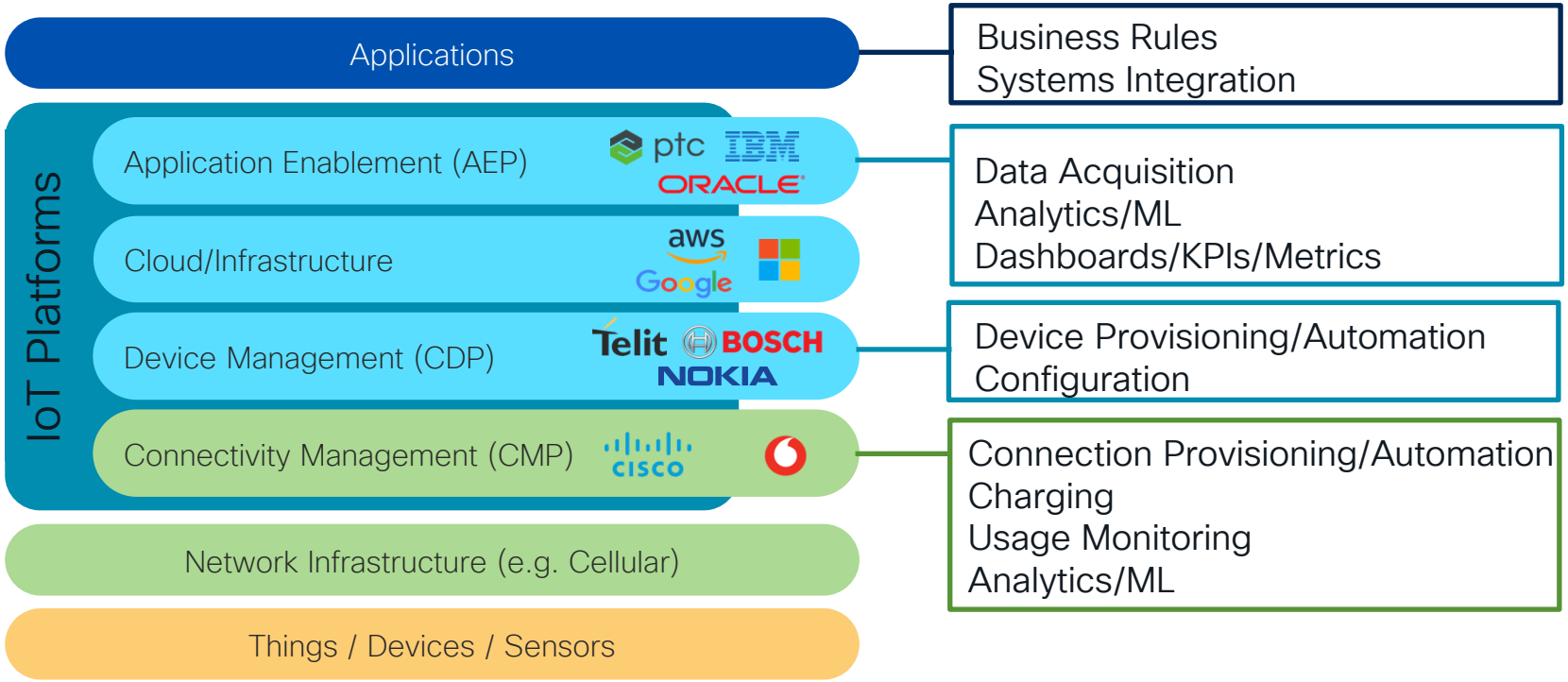
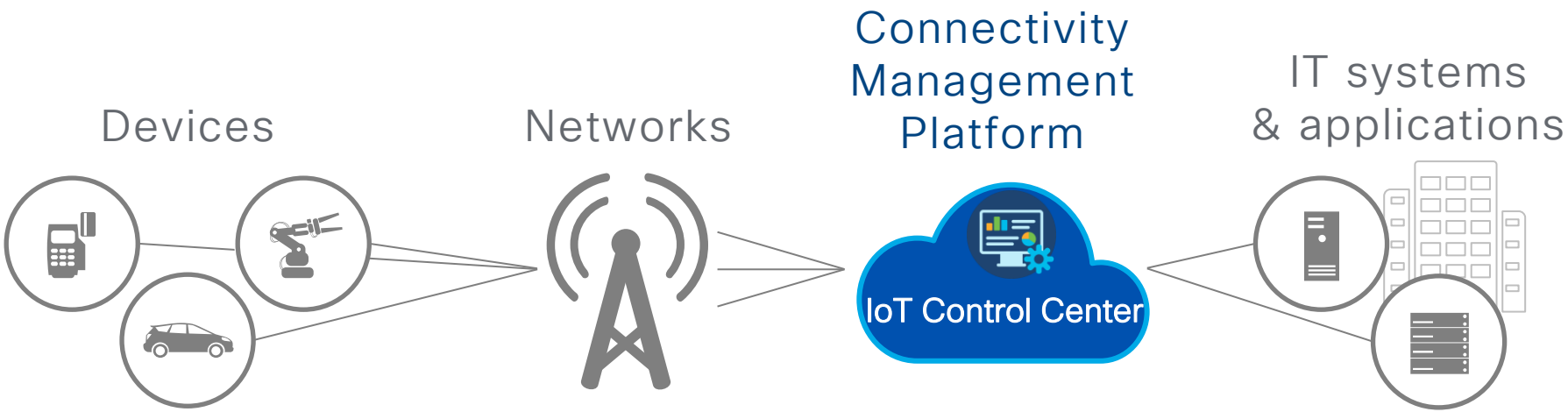
Cisco's industry-leading IoT portfolio



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

IoT Control Center Business Snapshot

40% **103M** Connected Cars

8% **21M** Smart Meters

8% **20M** Fleet Management Telematics

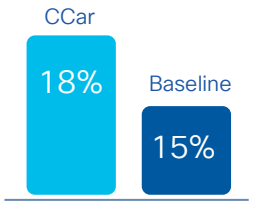
6% **15M** Security/Automation

3% **7M** Point of Sale

256M
IoT Subscribers

131M APIs / day
15TB data / day

142M on IoT CNaaS



YoY Growth

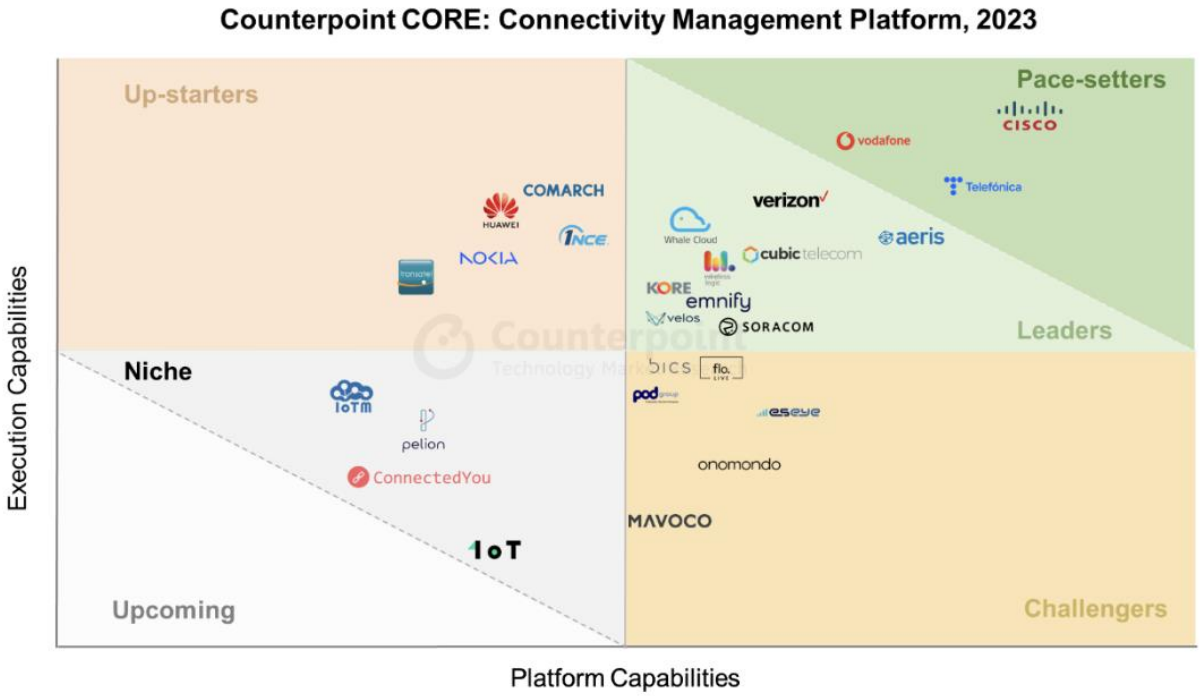
Global Scale

50+ Service Providers
29K+ Enterprises

World's 1st 5G SA CCar
2nd / 3rd in development

90M includes Consumer, Insurance, Industrial IoT, Asset tracking, Retail, and other use-cases.

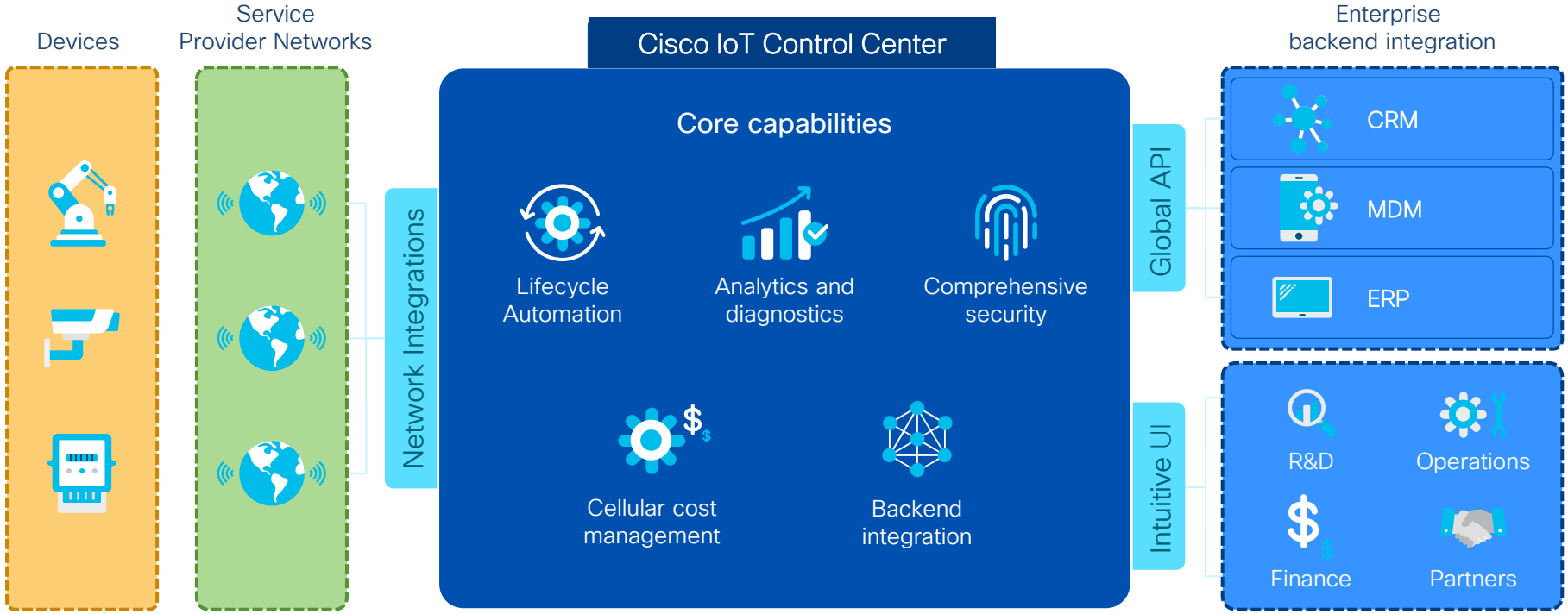
Independent market analysis from Counterpoint



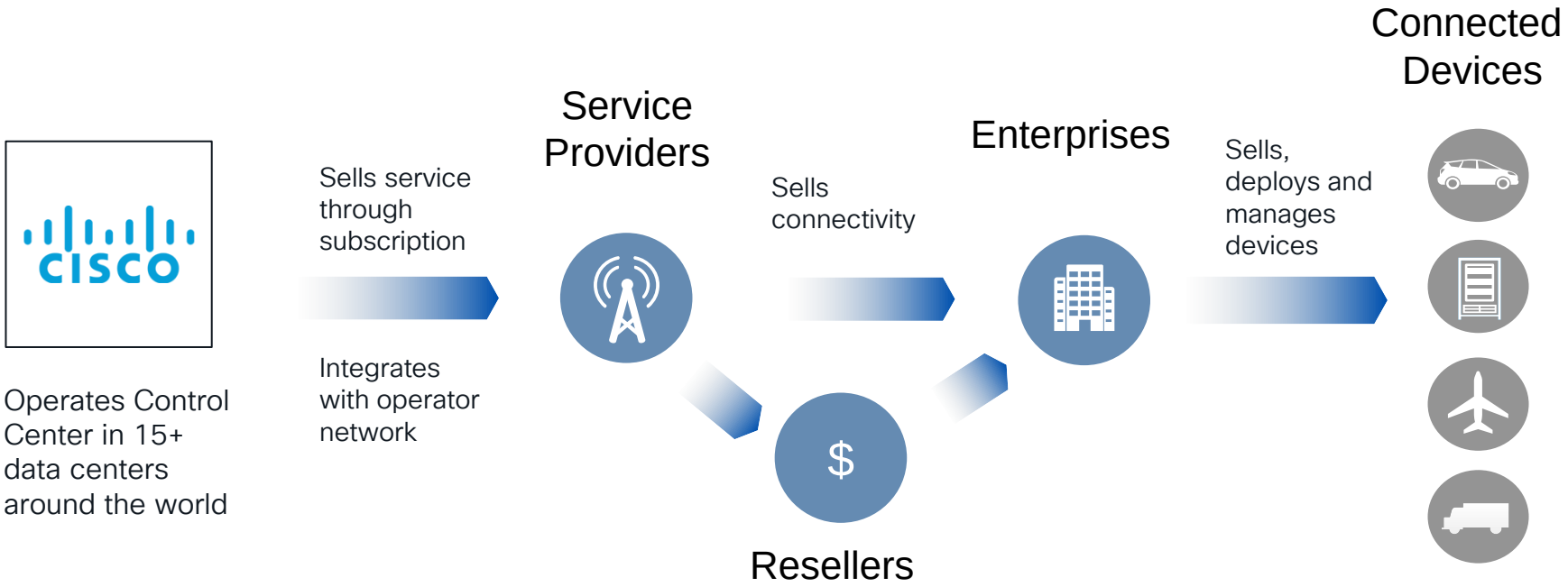
"Cisco leads in provisioning, orchestration, analytics, product maturity and integration with OSS/BSS"

https://www.counterpointresearch.com/insights/cisco-telefonica-and-vodafone-pacesetters-for-2023-iot-connectivity-management-platform-cmp-ranking/

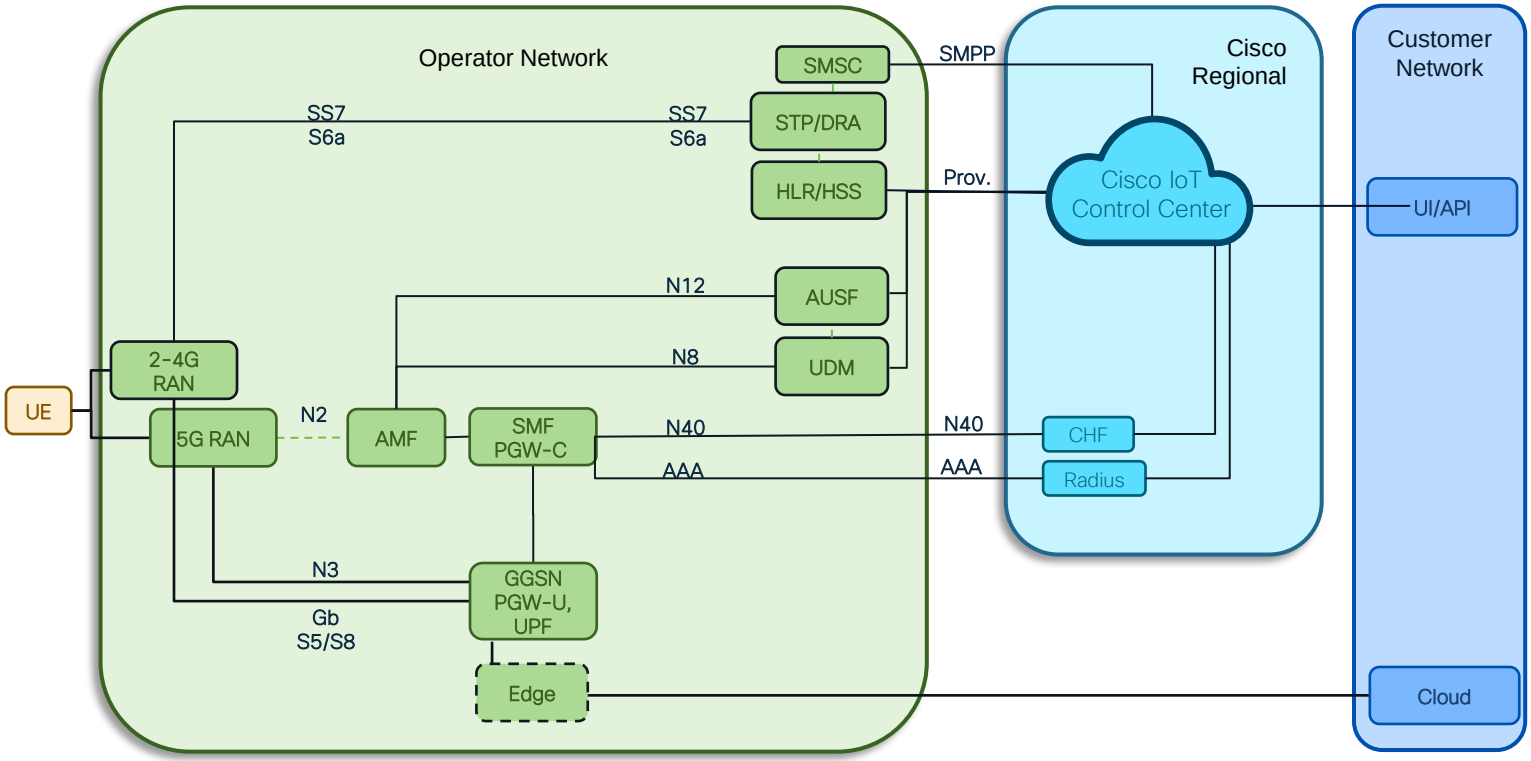
Automated connectivity management
Removing the complexity from the equation



IoT Control Center Business Model
Sold by Cisco to Service Providers

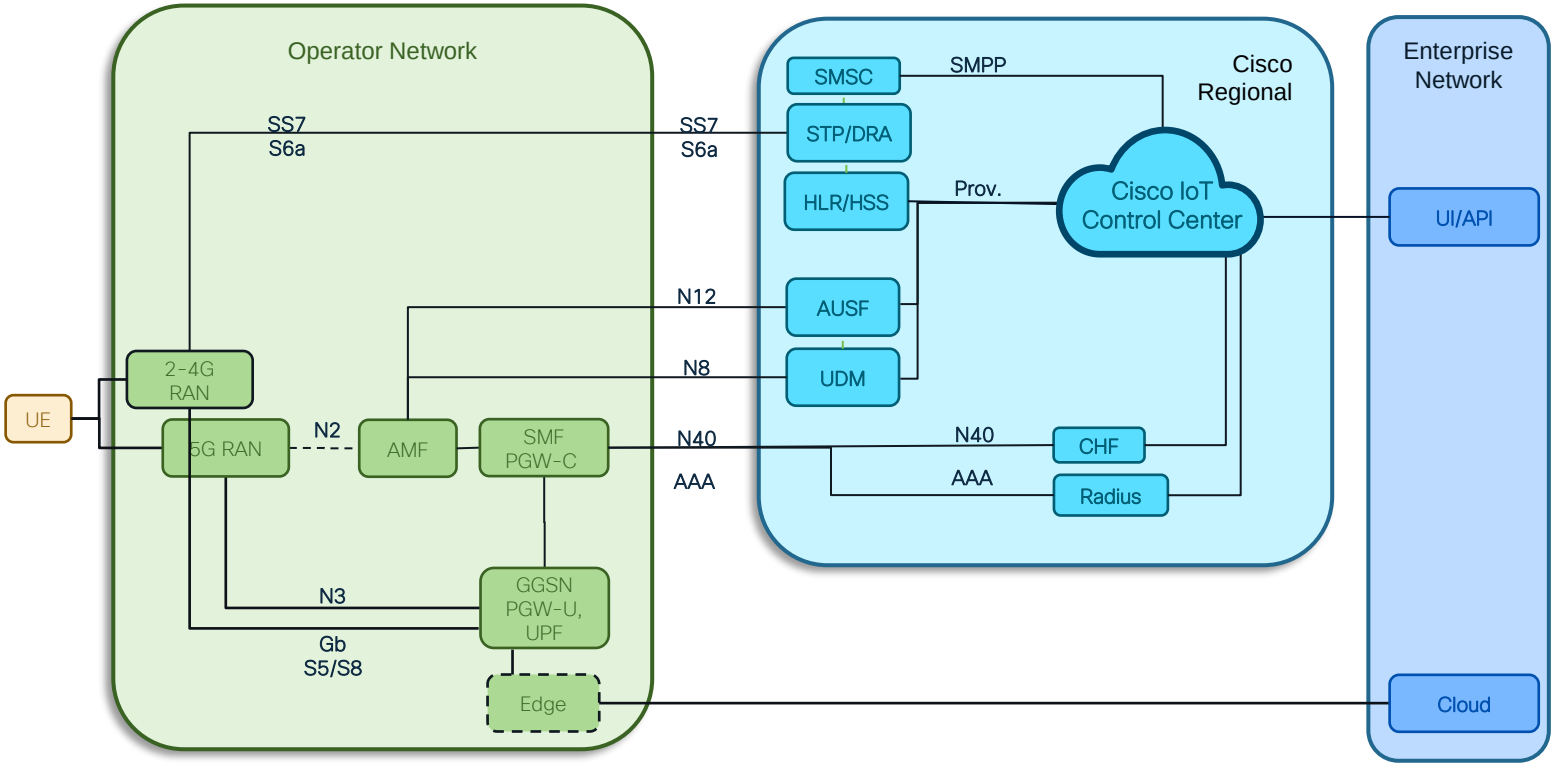


Control Center Deployment Model V2



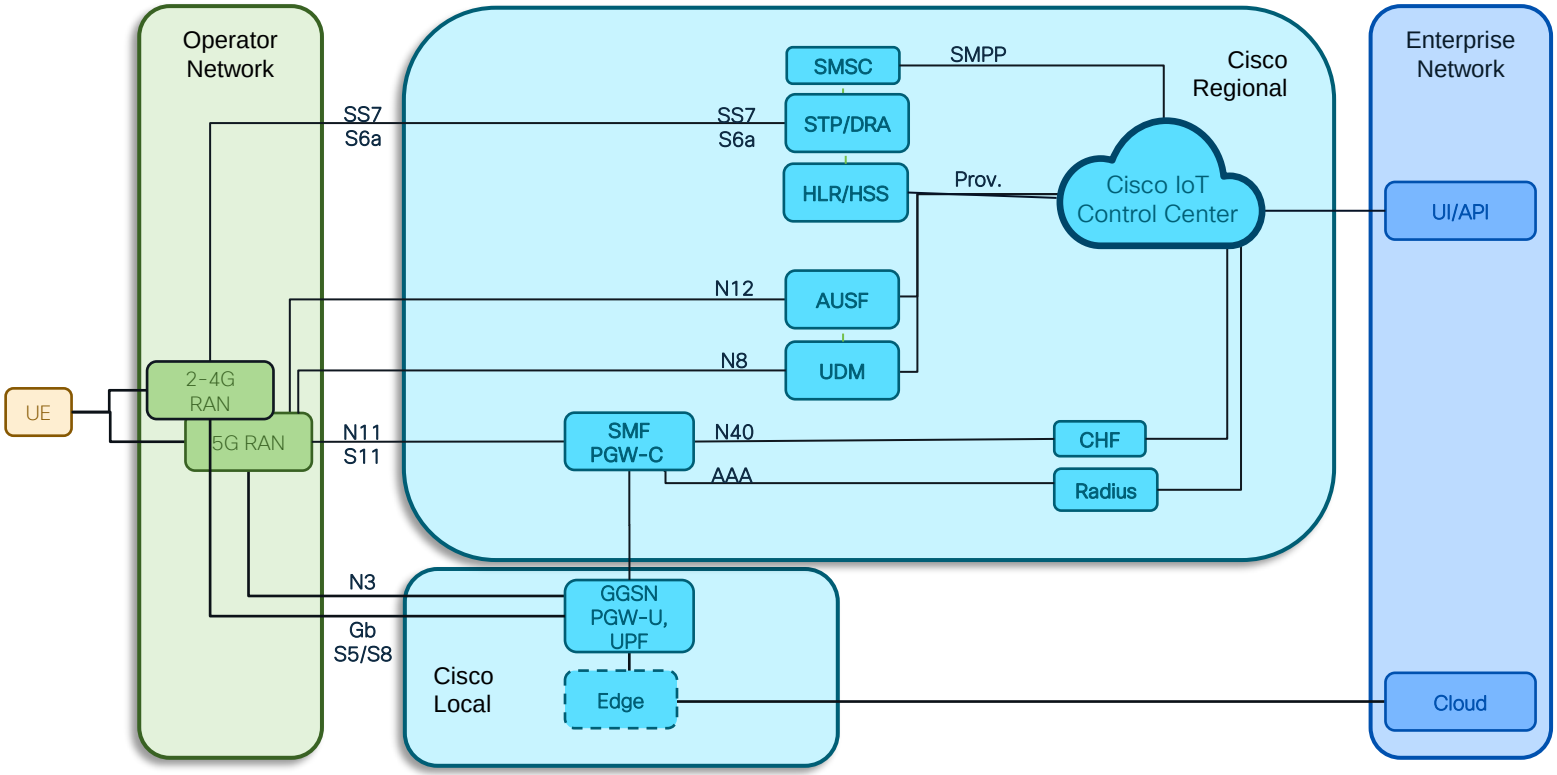
- CC provisions subscriber management from operator
- CC sends SMS via operator SMSC
- CC collects charging records via Radius, CHF or SFTP uploads

Control Center Deployment Model 1C



- CC provides the subscriber management systems and the SMSC
- CC collects charging records via Radius, CHF or SFTP uploads

Control Center Deployment Model 1B

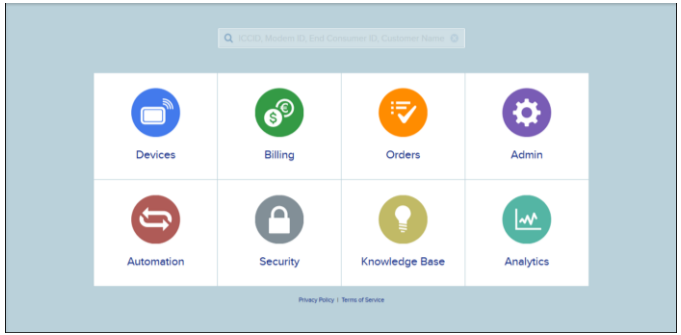


- Cisco operates CC, SMSC, subscriber management and the complete mobile core

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



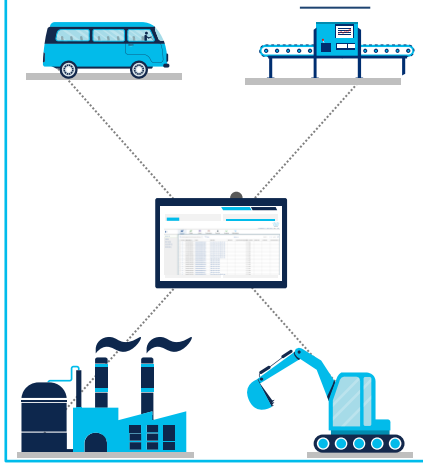
IoT Control Center for Enterprises

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

CC features – Scale faster

Zero touch provisioning

Speed time to revenue with near zero touch SIM onboarding



SIM State & Rate plan changes

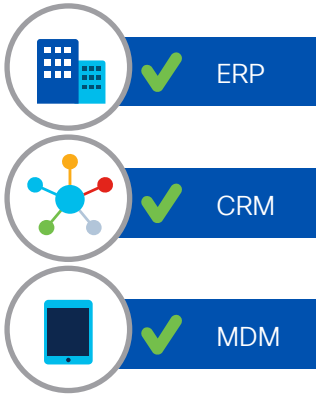
Empower your team to easily manage SIM status and rate plans themselves

SIM Lifecycle Automation

Run more efficiently with fewer resources by automating SIM changes

API Integrations

Connect to the rest of your enterprise systems with comprehensive APIs



CC features – Operate smarter

SIM level diagnostics

Resolve issues quickly using intuitive diagnostic tools

SIM level insights

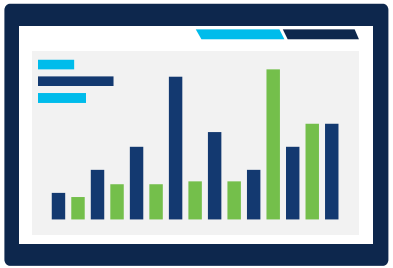
Spotlight historical analysis

Uncover business insights through historical connectivity analytics

Connectivity insights

Call Detail Record (CDR) Analytics

Track month-to-date business-wide voice, data, and SMS usage



Usage insights

Advanced Analytics & Traffic Segmentation

Achieve business KPIs with insights from the usage, service, and deployment dashboards

Business level insights

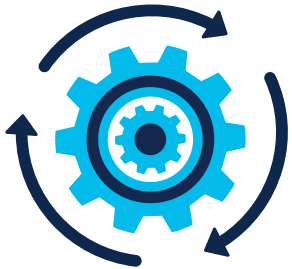
CC features - Protect better

IMEI Allow & Deny Lists

Restrict SIM behavior to prevent unauthorized activity & access

Rules Automation Engine

Customize security rules to your unique business needs



Fraudulent activity-triggered deactivation
Team notifications

2-Factor authentication
User security profiles
Audit trails & IP Restrictions

Trust world-class SaaS platform security & user management

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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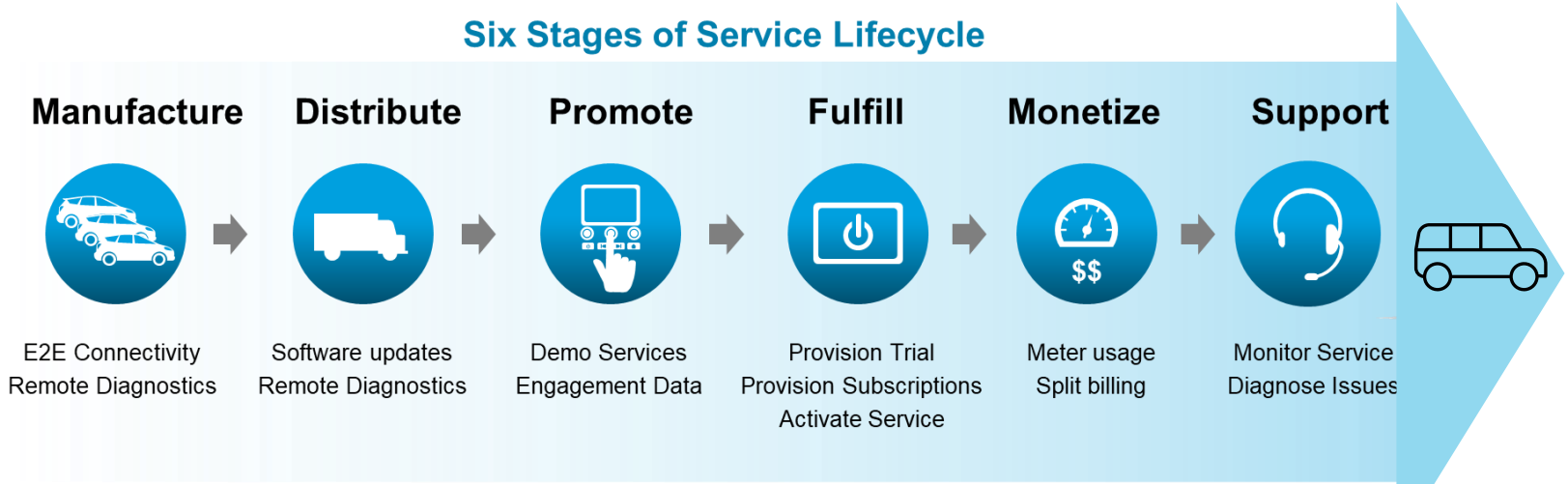
Demo:

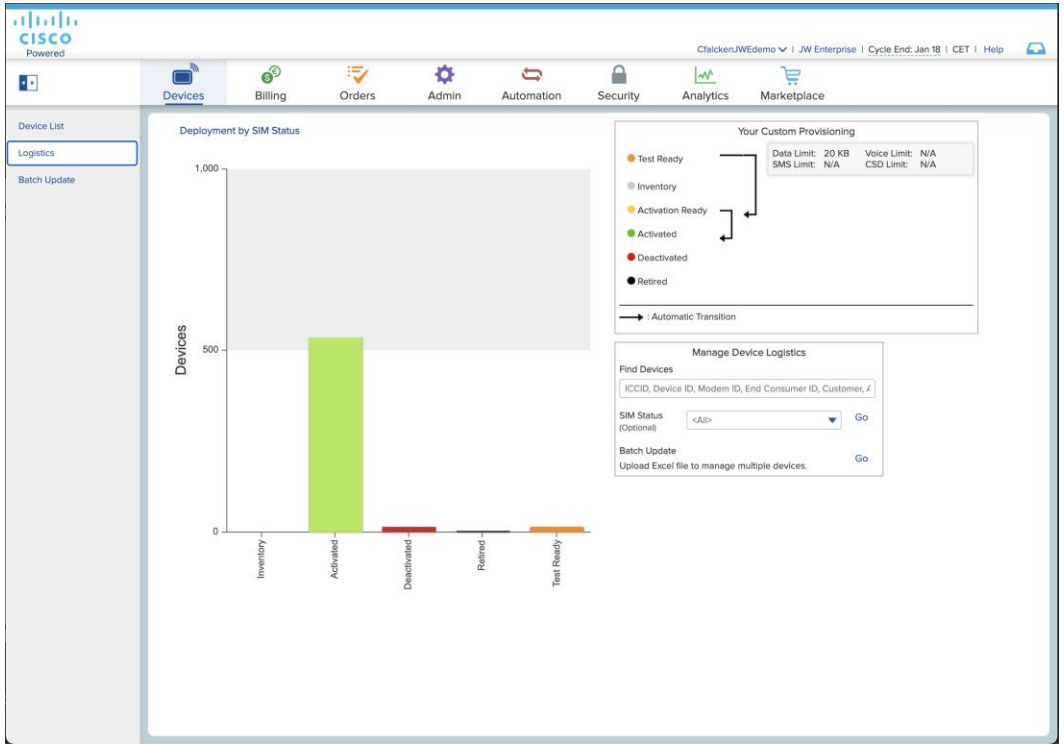
Deploy, manage and mitigate

Service Lifecycle
Connected Car example



SIM Lifecycle management

Demo

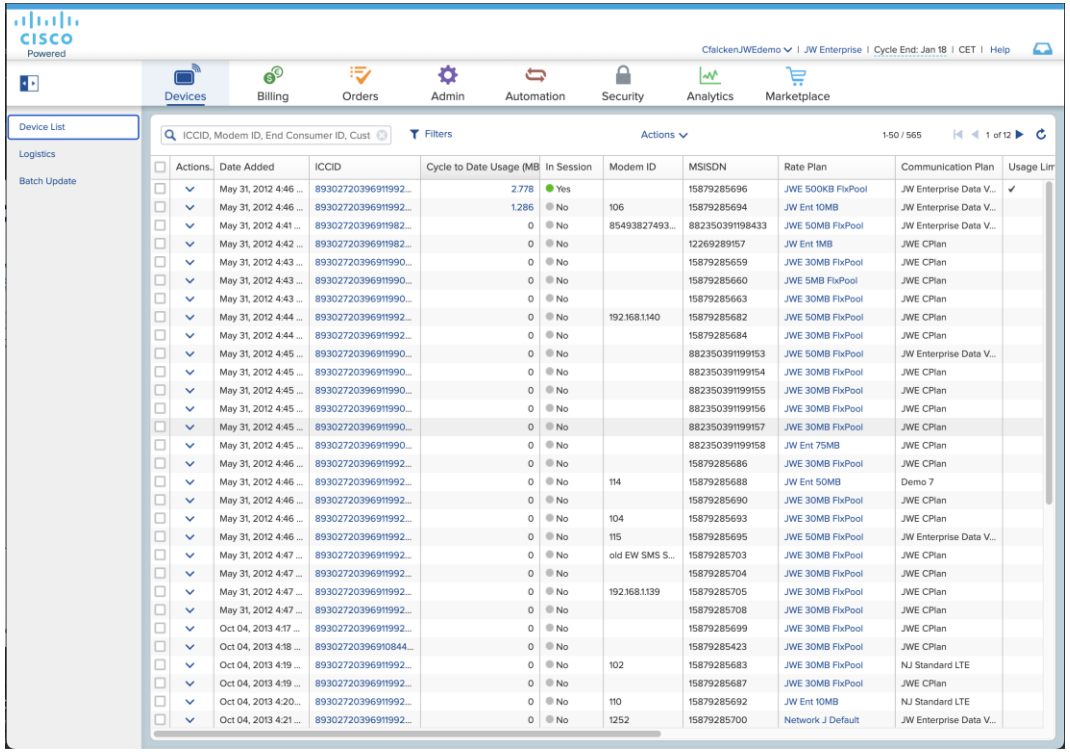


Key Features

- 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

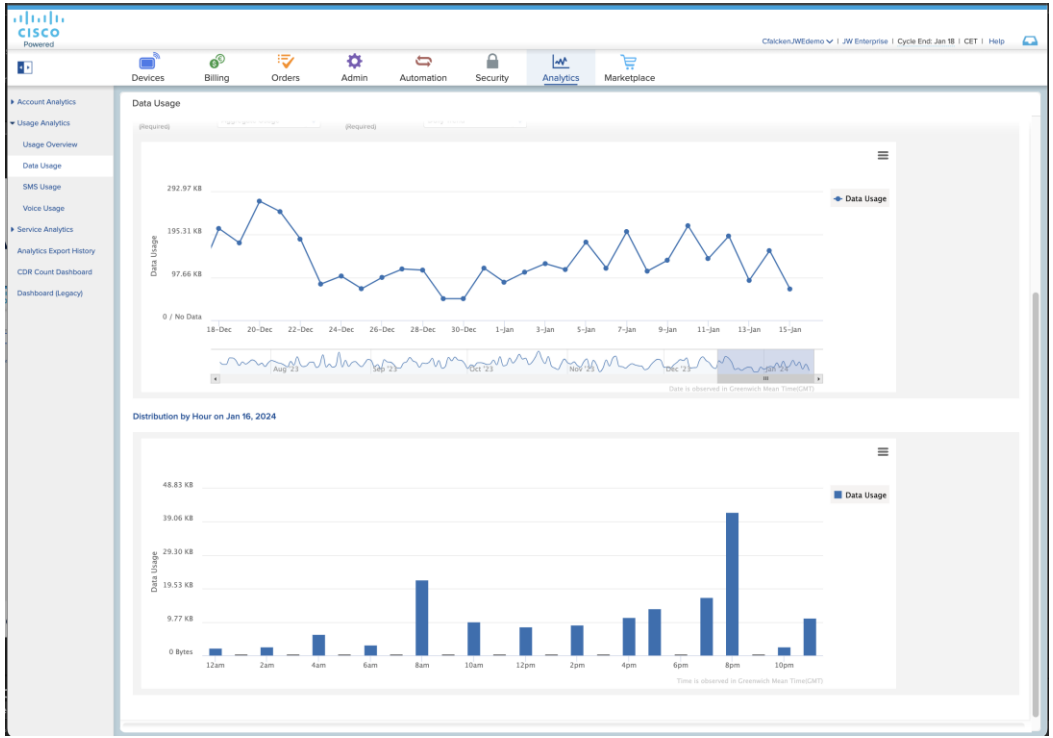


Key Features

- 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

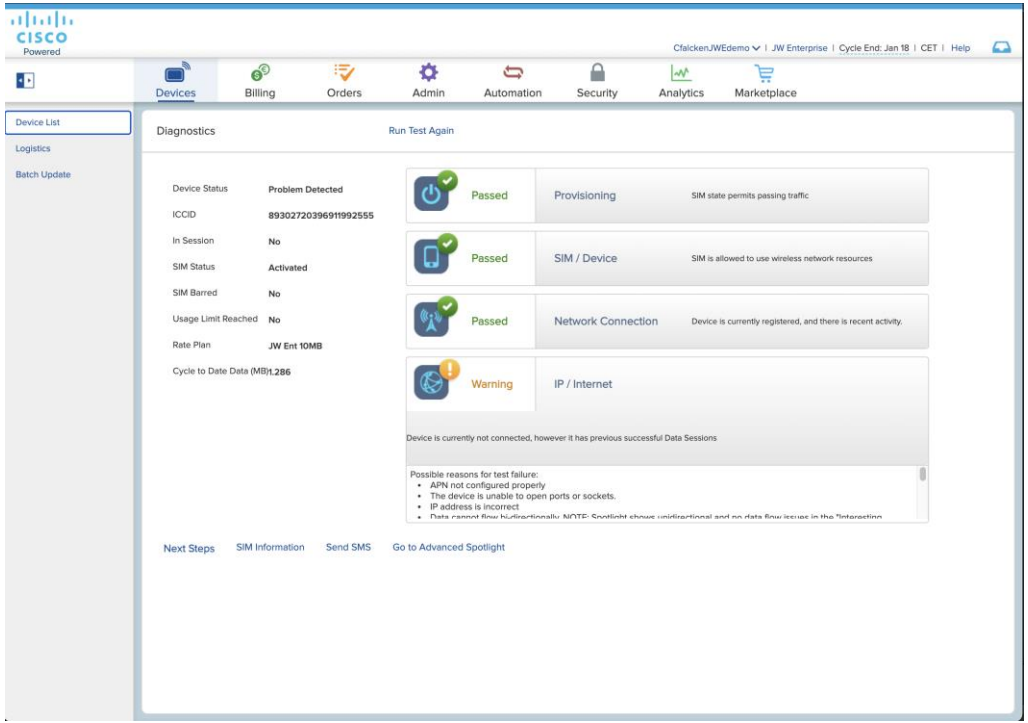


Key Features

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

Diagnostics

Demo

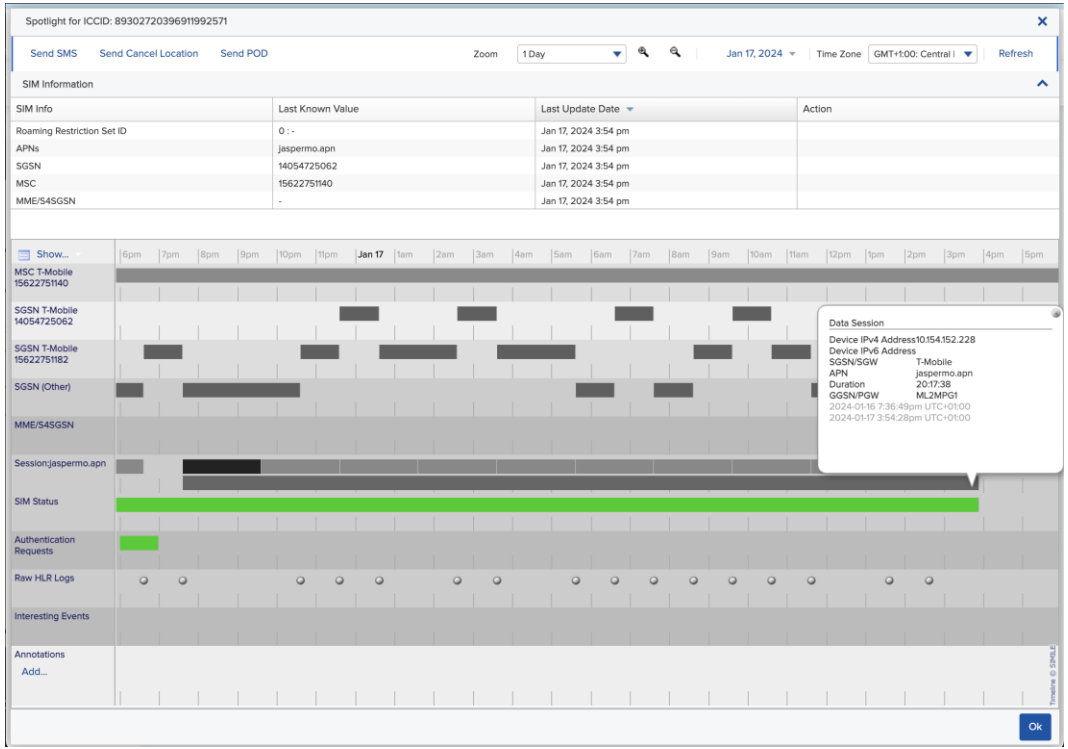


Key Features

- 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

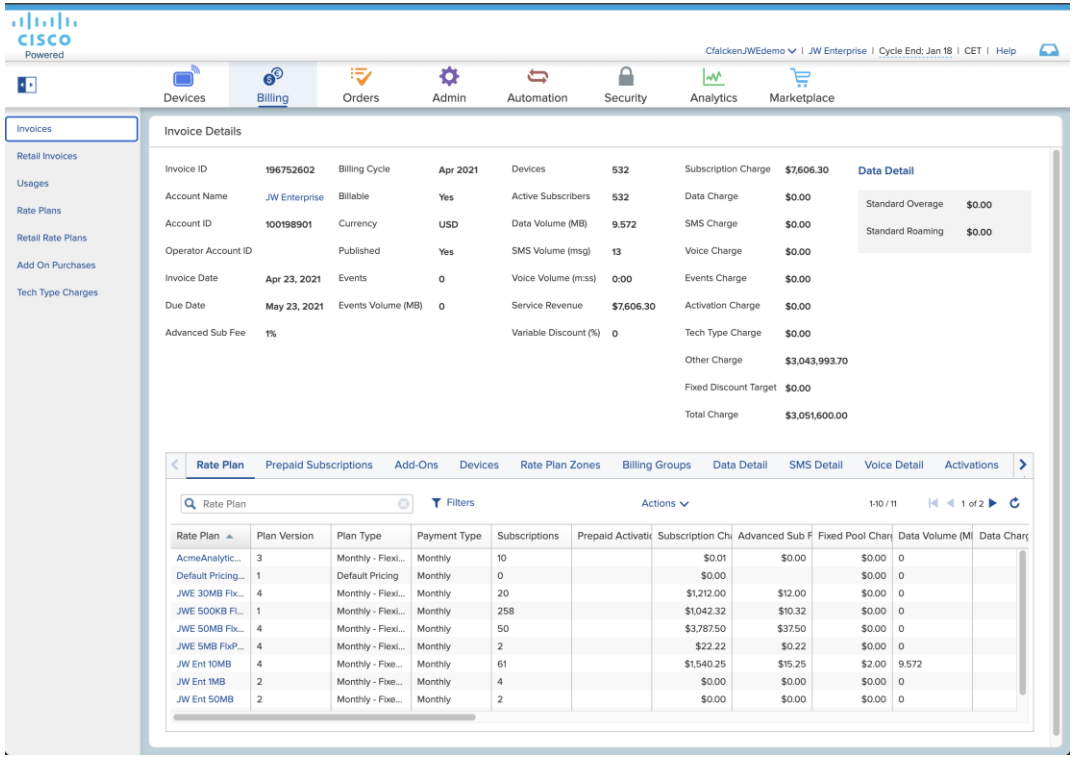


Key Features

- 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

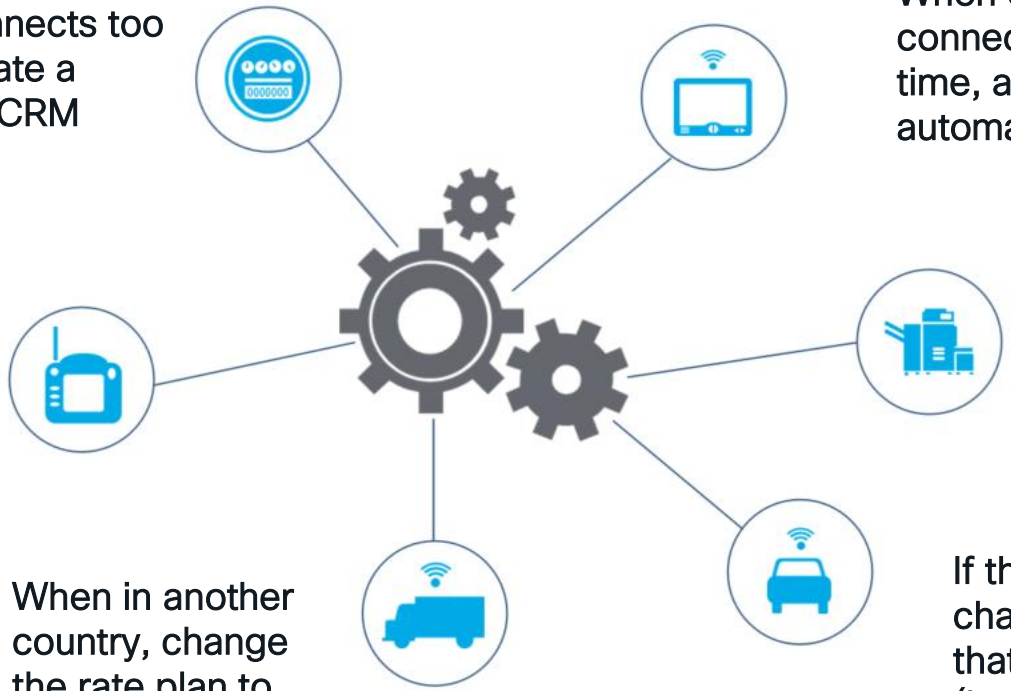
Demo:

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

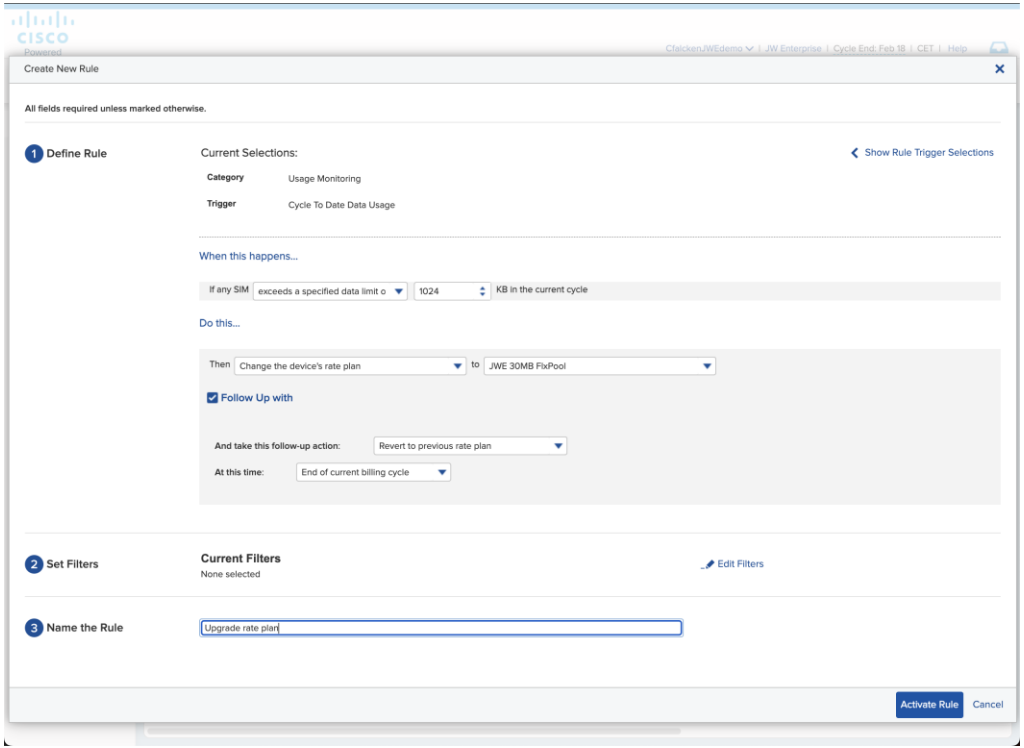
If the connection is lost, send a message to a technician

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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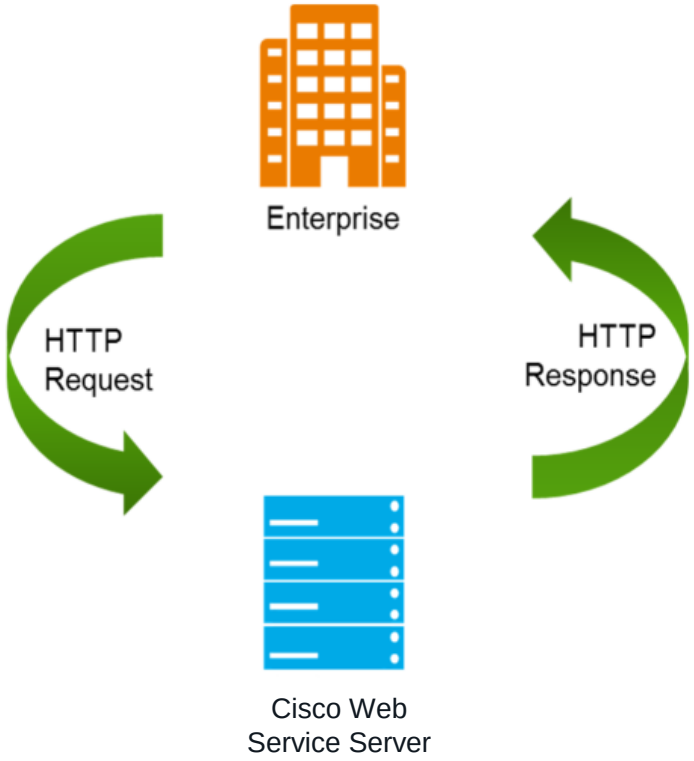
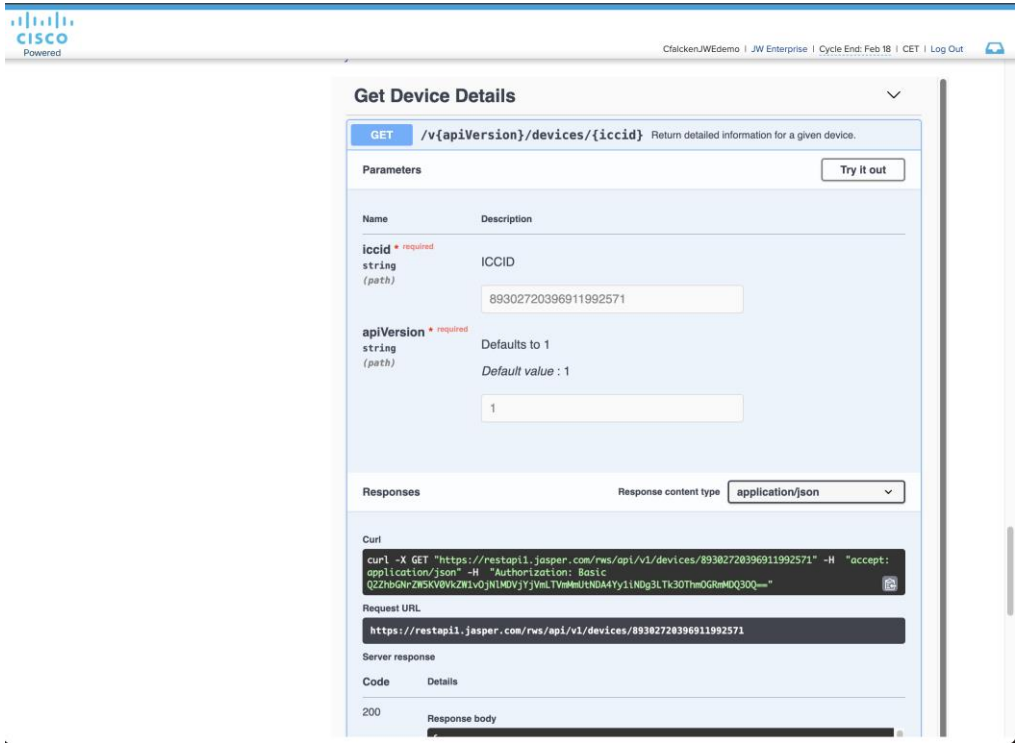
Enterprise Integration with API Overview



- 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

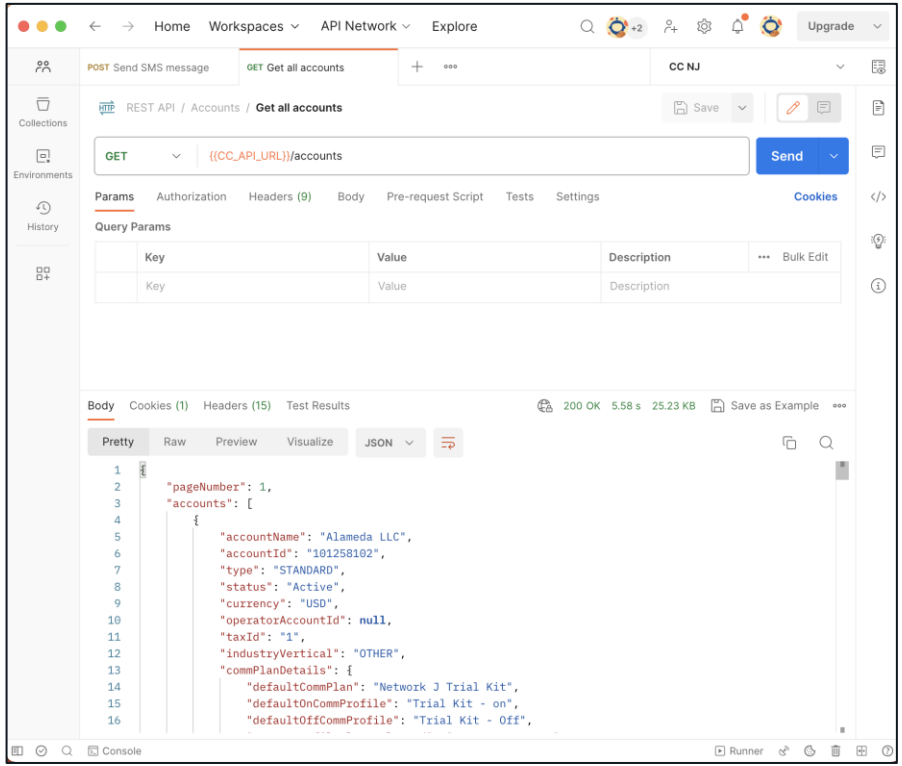


Key Features

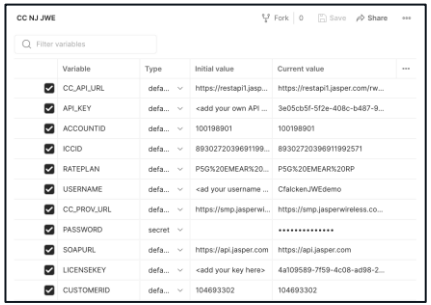
- Detailed documentation of all API functions and parameters in the Online Help aka Knowledge Base
- “Try it Out” uses your own API key to quickly test API messages with the real system

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



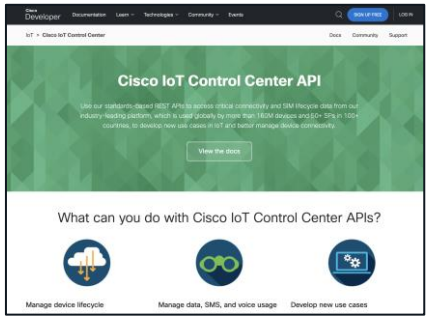
Using REST API with scripts – Get

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 8931082322089197xxx
Processing 1 ICCIDs
Getting usages for ICCID ['8931082322089197xxx']
[
    {
        "iccid": "8931082322089197xxx",
        "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

Continual industry-defining innovation

Machine Learning Anomaly Detection

Be alerted to anomalies based on your business' ever-changing norms

Machine Learning Cost Optimization

Automatically optimize device rate plans for the most efficient bill

5G Standalone Support

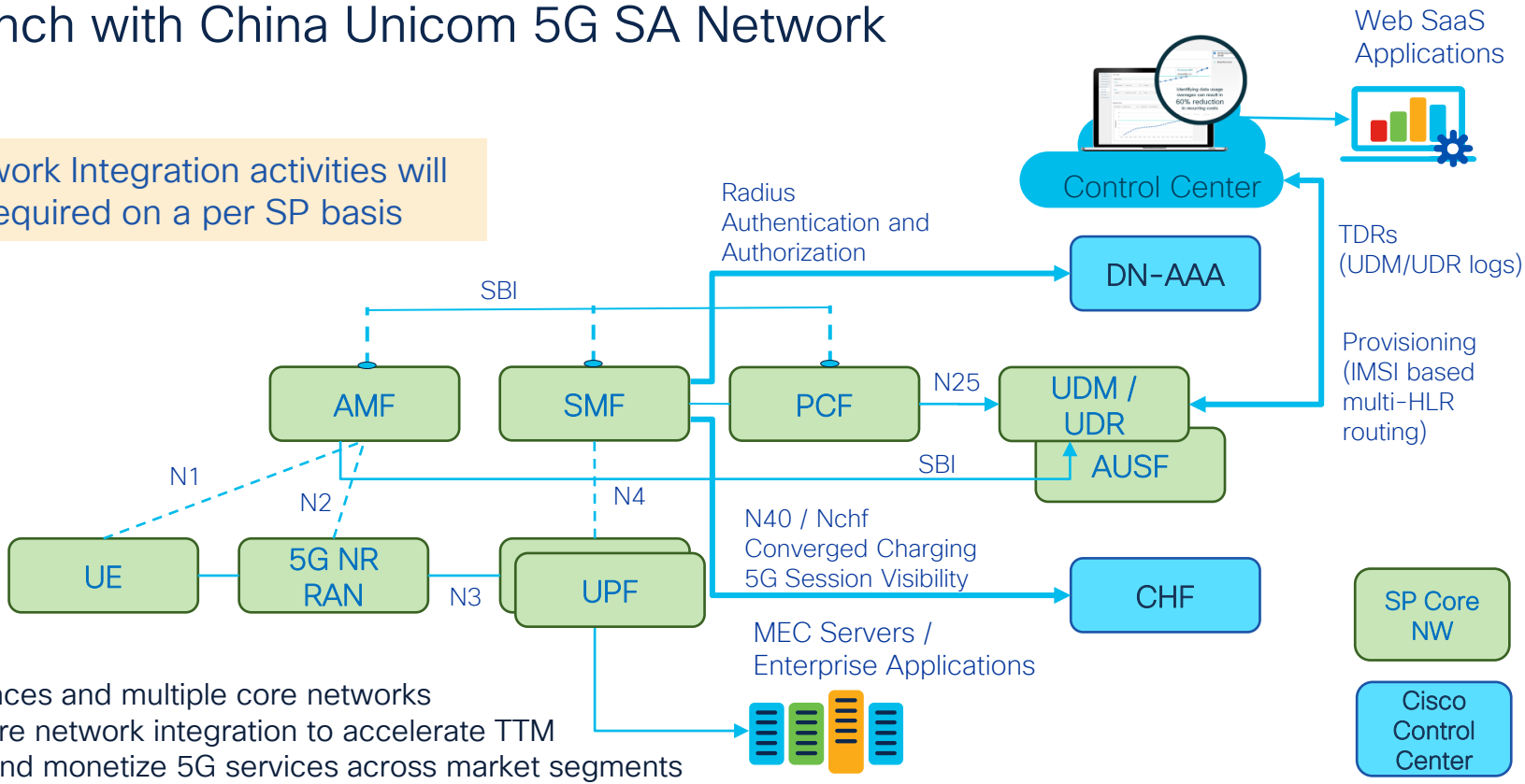
Start incorporating 5G into your strategy

eSIM Flex

The fastest easiest SIM portability solution on the market

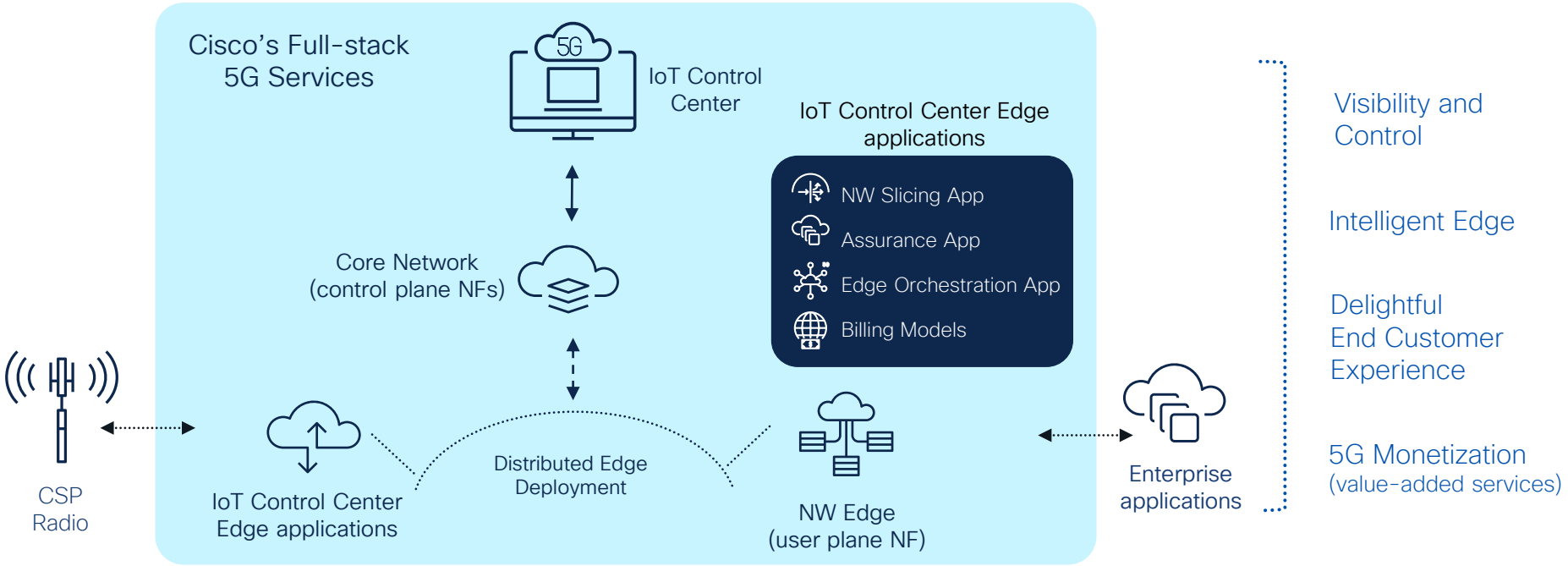
Control Center evolution to 5G
Launch with China Unicom 5G SA Network

Network Integration activities will be required on a per SP basis

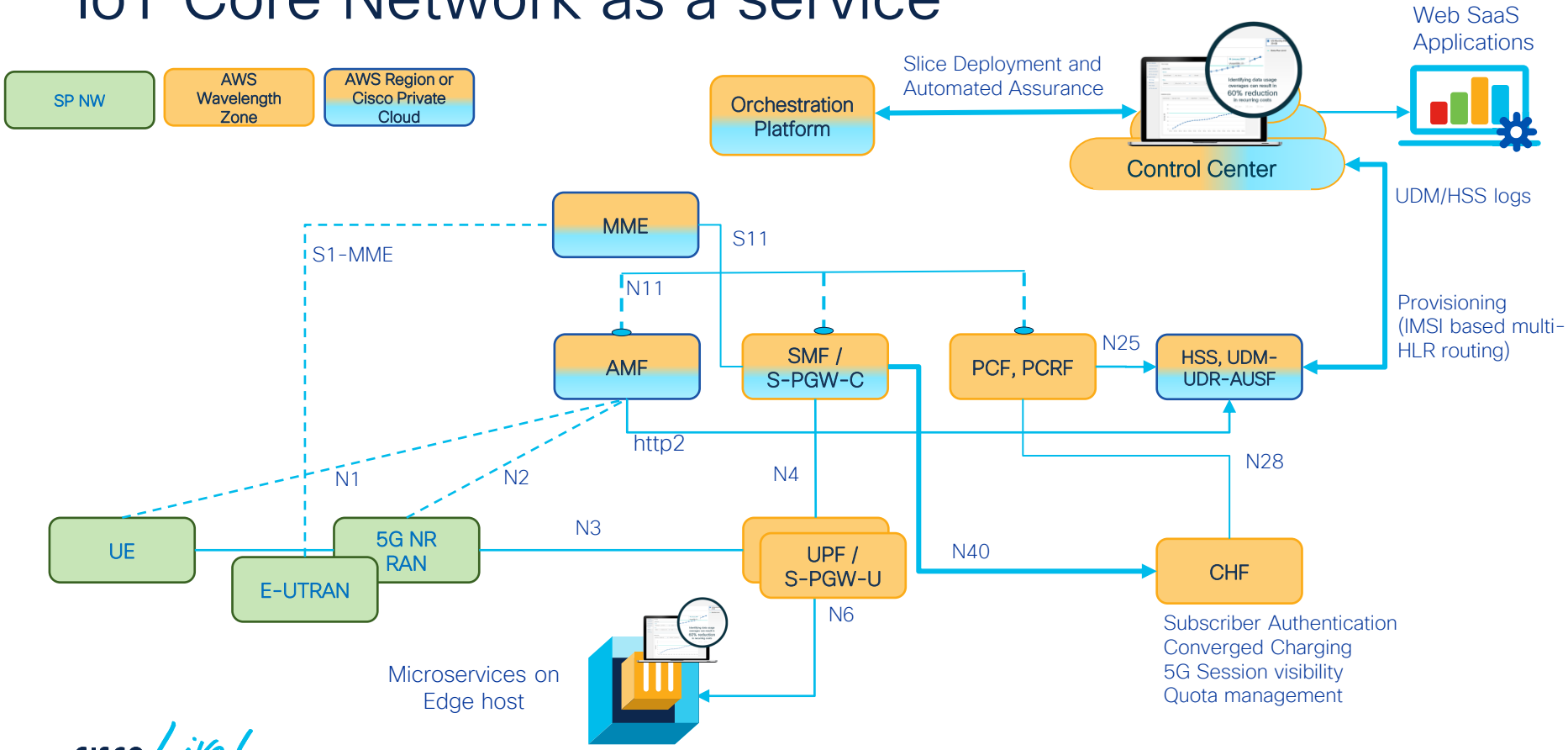


- ✓ 31 provinces and multiple core networks
- ✓ Direct core network integration to accelerate TTM
- ✓ Launch and monetize 5G services across market segments
- ✓ Cisco hosted CHF to enable rapid innovation with session visibility

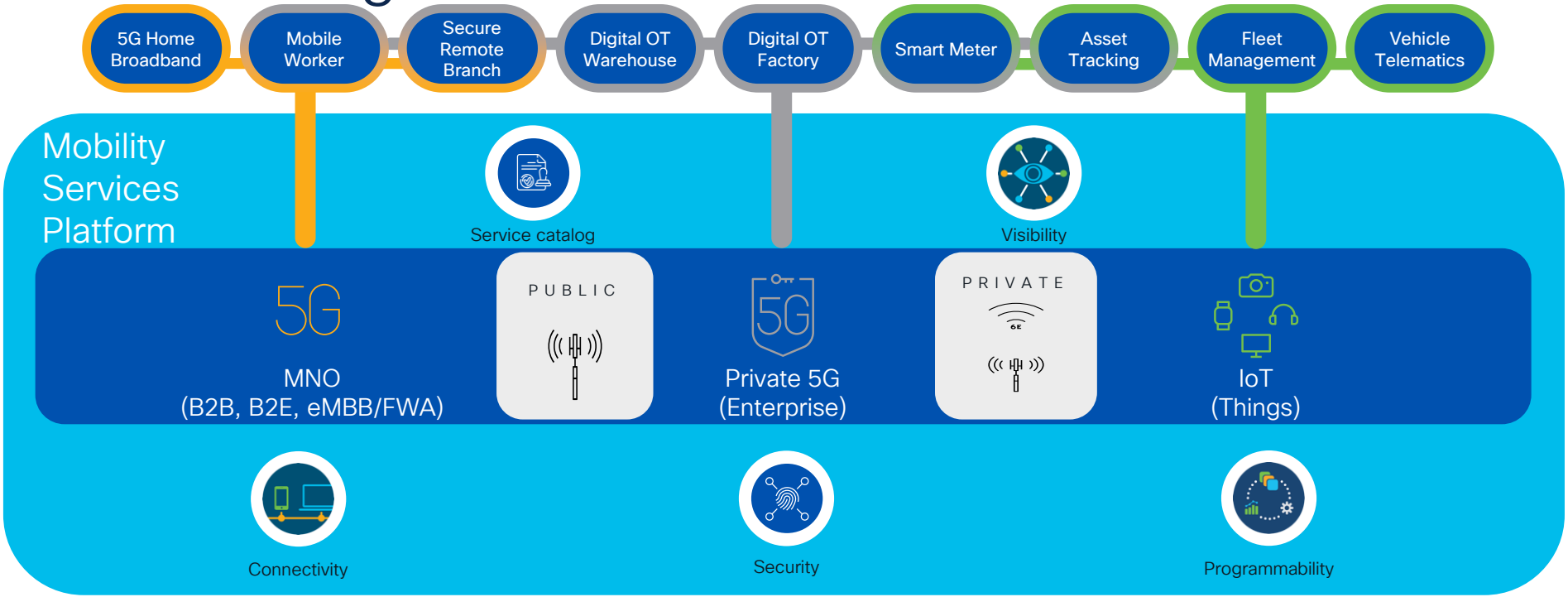
Cisco's full stack 5G service
Enabling global IoT deployments with agility



IoT Core Network as a service



Introducing Cisco MSP



Public & private hybrid infrastructure deployment models

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


cisco
The bridge to possible
Thank you
cisco Live!


cisco Live!
Let's go