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The bridge to possible

# The New Era of LTE and 5G

The Cisco Catalyst Cellular Gateways

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BRKXAR-1433

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# Cisco Webex App

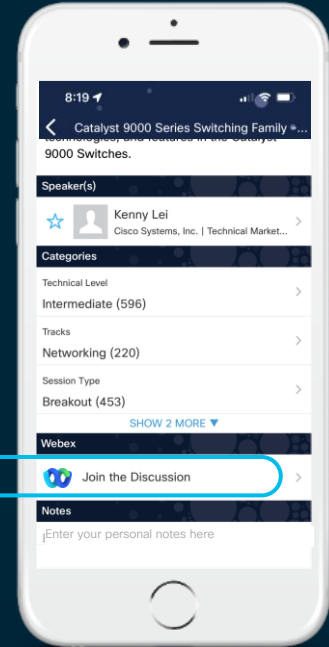
## Questions?

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

## How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
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Webex spaces will be moderated by the speaker until June 17, 2022.



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# Learning Map

## Branch and Aggregation Routing Solutions

BRKARC-1433



You are here!

The New Era of LTE and 5G – The Cisco Catalyst  
Cellular Gateways

TECARC-2407

Architecture, Deployments and Troubleshooting  
deep dive for Catalyst 8000 Series Edge Platforms

BRKARC-1881

Which one is the perfect ISR1K for me?

BRKXAR-2003

Extending Enterprise Network to the public cloud  
with Cisco Catalyst 8000V Edge Software

BRKARC-2885

Cisco Catalyst 8500 Series Edge Platform Deep  
Dive

BRKENT-2809

Untangle Enterprise Direct Cloud Connectivity with  
Powerful Catalyst 8500 Series Edge Platforms

BRKENT-2312

Cisco SD-WAN Security Evolution to SASE



# Agenda

- Cellular Gateways Overview
- Cellular Use Case
- Hardware Architecture
- Management and Monitoring
- IP Addressing
- Use Cases
- Reference

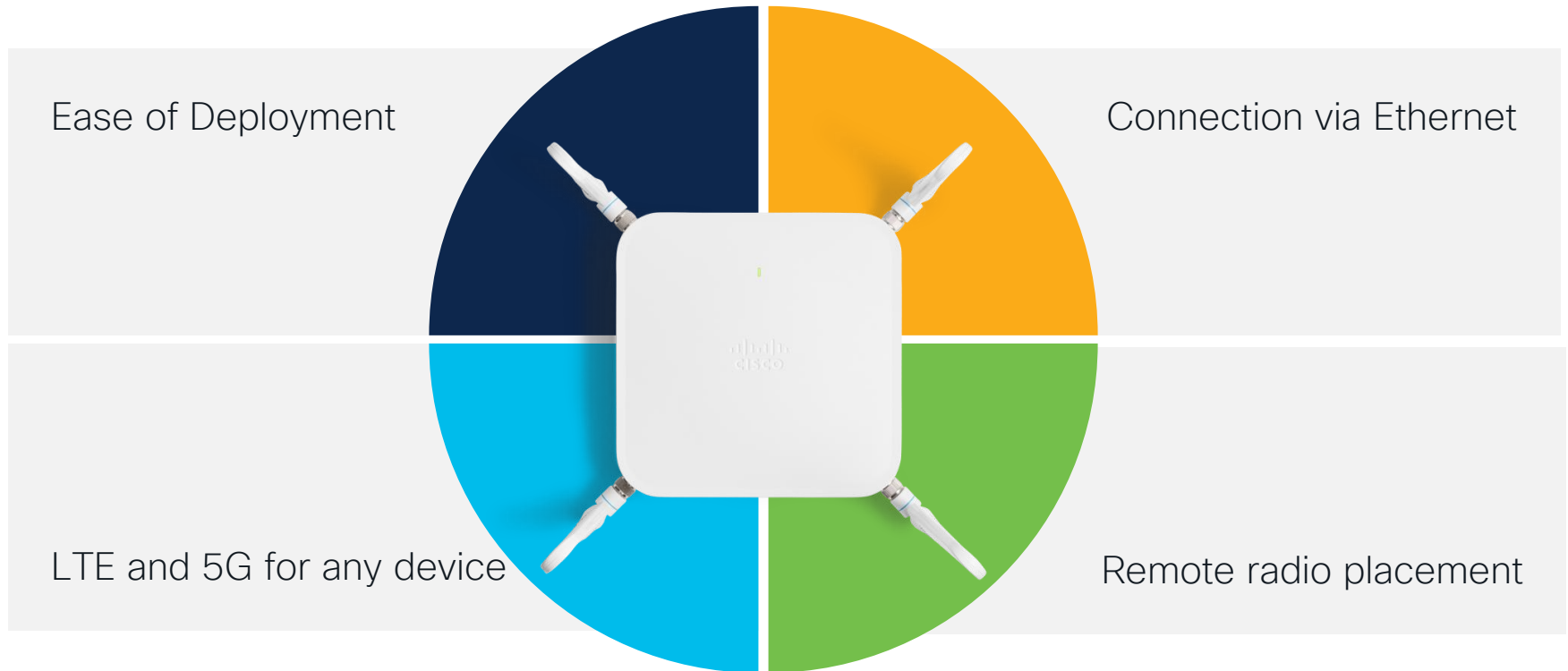


# Cellular Gateways Overview



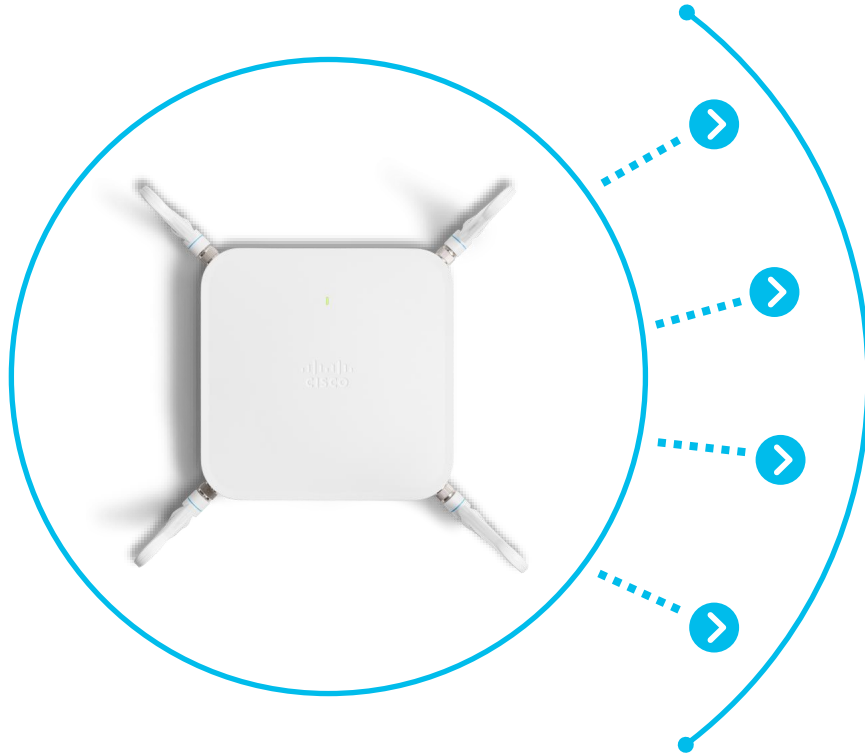
# Cisco Wireless WAN Current Offerings

## Cellular Gateways





# IP Passthrough device



No L3 / L4 features

No NAT

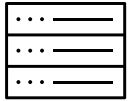
No Firewall

IP Passthrough device

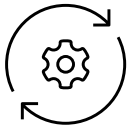
# Cellular Gateway platforms



Extending LTE/5G radio to favorable location



Use existing facility ethernet infrastructure to connect Cellular Gateway to network stack



Generic requirement for DHCP server / client operation

# Cellular Gateways

## All gateways

Dual Micro SIM  
Single Radio

Supported with 3<sup>rd</sup>  
party devices

Zero touch  
deployment

4x4 ↓ MIMO

2x2 ↑ MIMO

Carrier Aggregation

SD-WAN support

Secure boot

vManage support

## CG522-E

5G Sub-6 GHz  
4G Cat 20

↓ 3.3 Gbps  
↑ 400 Mbps

4G & 5G status LEDs

## CG418-E

CAT 18 LTE

↓ 1.2 Gbps  
↑ 150 Mbps

4G status LED

Same form factor

Same connectivity  
options



# LTE Advanced Pro Ushering Gigabit class

Cisco Cellular Gateway



## CG418-E

- ✓ Flexible Fail-Over Cellular Gateway
- ✓ 1.2Gbps DL / 150Mbps UL
- ✓ PoE+ Powered (or externally powered)
- ✓ IP Passthrough
- ✓ External Antenna Support
- ✓ Integrated security with ACT2 for SUDI
- ✓ Console Port for Out of band management
- ✓ Modem Telit LM960A18

### *Supported Bands :*

*LTE: 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 18, 19, 20, 25, 26, 28, 29, 30, 32, 38, 39, 40, 41, 42, 43, 46, 48, 66, 71*

*HSPA+: 1, 2, 4, 5, 8, 9, 19*

Improved WAN Connection  
Speed

Support for Dual  
SIM

Zero-Touch  
Provisioning

SD-WAN

# A pathway to 5G

## Cisco Cellular Gateway



## CG522-E

- ✓ Flexible Fail-Over Cellular Gateway
- ✓ 3.3Gbps DL / 420Mbps UL
- ✓ PoE+ Powered (or externally powered)
- ✓ IP Passthrough
- ✓ External Antenna Support
- ✓ Integrated security with ACT2 for SUDI
- ✓ Console Port for Out of band management
- ✓ Modem Sierra Wireless EM9190

### Supported Bands :

**5G:** n1, n2, n3, n5, n28, n41, n66, n71, n77, n78, n79

**LTE:** 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 18, 19, 20, 25, 26, 28, 29, 30, 32, 34, 38, 39, 40, 41, 42, 43, 46, 48, 66, 71

**HSPA+:** 1, 9, 19

Improved WAN Connection  
Speed

Support for Dual  
SIM

Zero-Touch  
Provisioning

SD-WAN

# Feature Rich Platform

## Auto SIM

Auto SIM will load the appropriate firmware and default Access Point Name (APN) values

## Dual SIM Failover

Ability to failover between two SIMs by trying to acquire a connection

## Custom APN configuration

Custom Access Point Name (APN) values can be configured via CLI or vManage

## Carrier Aggregation

Reach higher data rates with Carrier Aggregation

## Private LTE (CBRS)

Build your own private LTE network

# Cisco and Meraki Cellular Gateways Offerings

## CG522-E



 vManage Dashboard

5G Sub 6 GHz

CAT 20 cellular modem

3.3 Gbps / 420 Mbps (d/u)

x2 micro SIM slots (3FF)

Indoor deployment

Ceiling/wall/pole mountable

## CG418-E



 vManage Dashboard

4G LTE Advanced Pro

CAT 18 cellular model

1.2 Gbps / 150Mbps (d/u)

x2 micro SIM slots (3FF)

Indoor deployment

Ceiling/wall/pole mountable

## MG21/E



 Meraki Dashboard

4G LTE Advanced

CAT 6 cellular modem

300 Mbps / 50 Mbps (d/u)

x2 nano SIM slots (4FF)

IP67 rating

Ceiling/wall/pole mountable

## MG41/E



 Meraki Dashboard

4G LTE Advanced Pro

CAT 18 cellular modem

1.2 Gbps / 150 Mbps (d/u)

x2 nano SIM slots (4FF)

IP67 rating

Ceiling/wall/pole mountable

# Cellular Use Case

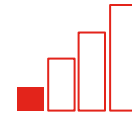




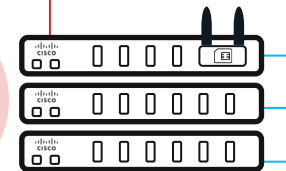
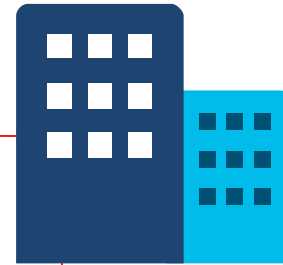
# Why Cellular Gateway is needed for high quality Wireless WAN

1

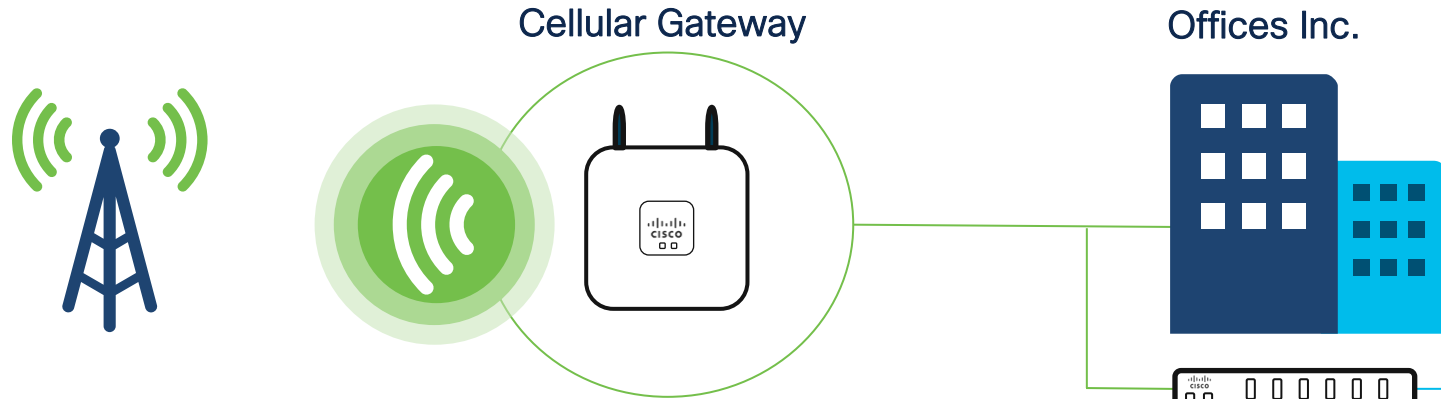
Network stack is buried deep inside the building, maybe underground. Chance of a high-quality LTE or 5G signal is slim. Extending the antenna via coax might only get to ground level.



Offices Inc.



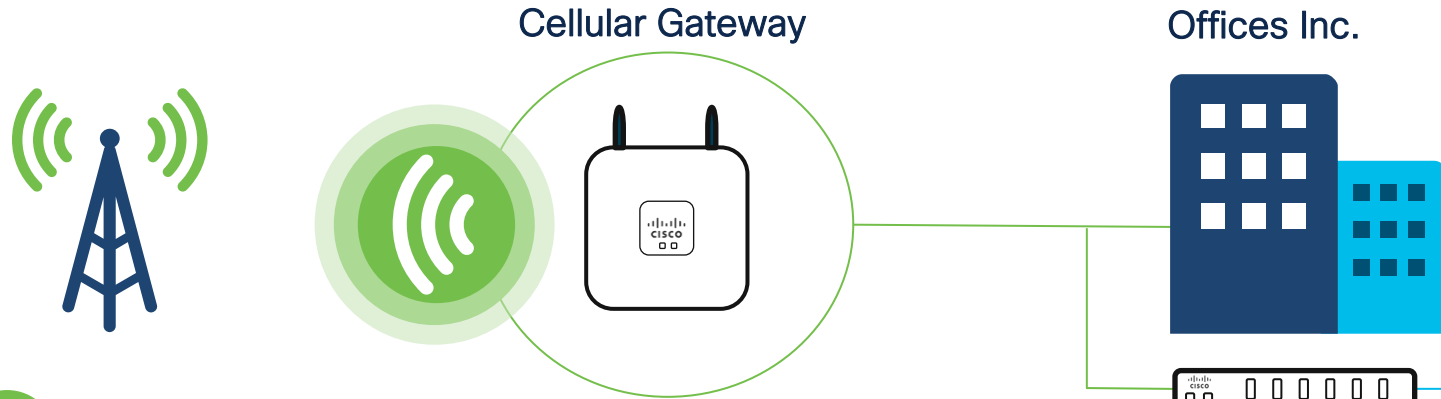
# Why Cellular Gateway is needed for high quality Wireless WAN



2

Ethernet power and connectivity from the Cellular Gateway to the network stack.

# Why Cellular Gateway is needed for high quality Wireless WAN



**3** Cellular gateway is positioned to get a high-quality LTE signal. Next to a window or mounted near the roof with external antennas with short coax runs.

# Hardware Architecture



# Cellular Gateway connections

## GPS Antenna connector

- Only available on CG418-E

## Management

- Serial console (115200 baud rate)
- Reset switch

## SIMs

- 2 micro-SIM cards



## AUX port

- Reverse console support

## Out of band power

- AC power brick connection

## Ethernet

- CG418-E: mGig 2.5G ethernet link to the client device
- CG522-E: 10G Ethernet link to the client device
- optional PoE+ power (Blue sticker as indicator)



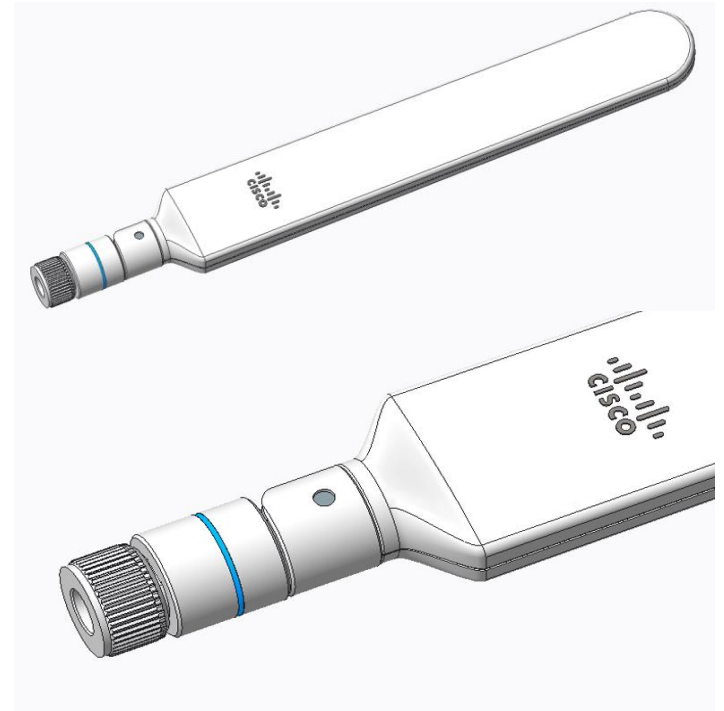
## Antennas

- 4 SMA connectors
- Supports 4x4 MIMO

# Dipole Indoor Antenna

## 5G-ANTM-SMA-D

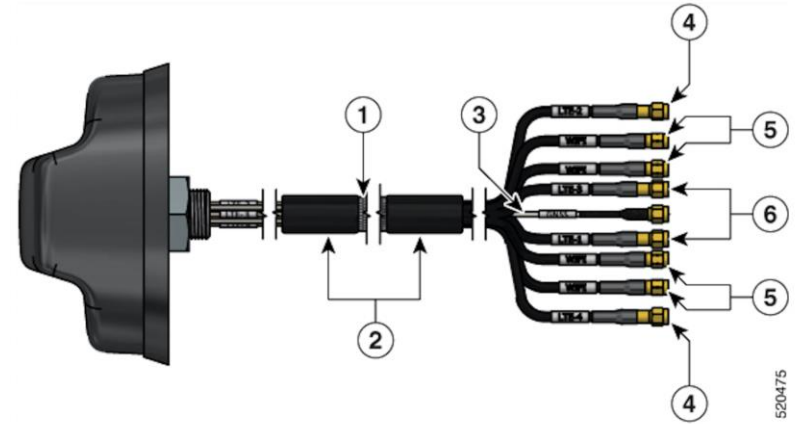
- There is a 5G recommended Dipole antenna
  - 5G-ANTM-SMA-D
    - 5G / LTE / 3G
- Antenna is capable of a different set of frequencies
- Optimized for straight and 90deg bent positions
- Appropriate for indoor use only



# Outdoor dome antenna

## 5G-ANTM-O-4-B

- There is a 5G recommended dome antenna
  - 5G-ANTM-O-4-B
    - 5G / LTE / 3G / Wi-Fi/ GPS
- Antenna is capable of a different set of frequencies
- Appropriate for indoor and outdoor use



# Management and Monitoring





# Management Use Cases with Flexibility



CLI



CG device



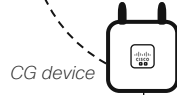
Cisco Router

1

CLI based Management Cellular Gateway and Router



vManage



CG device



Cisco Router

2

vManage directly managing Cellular Gateway

17.4



vManage



CG device

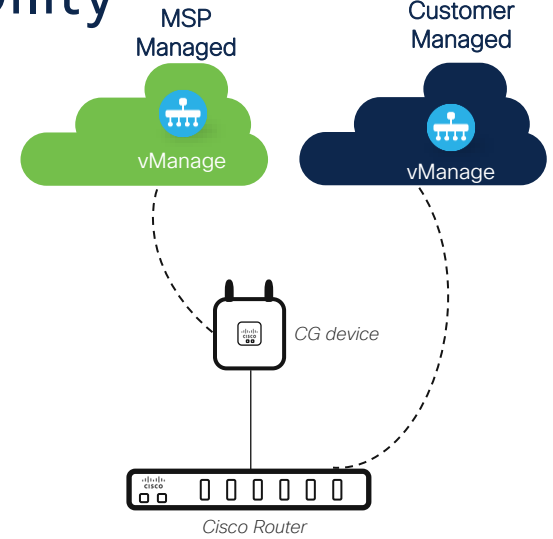


Cisco Router

3

vManage managing Cellular Gateway as extension of router

17.4



MSP Managed

vManage

Customer Managed

vManage

CG device



Cisco Router

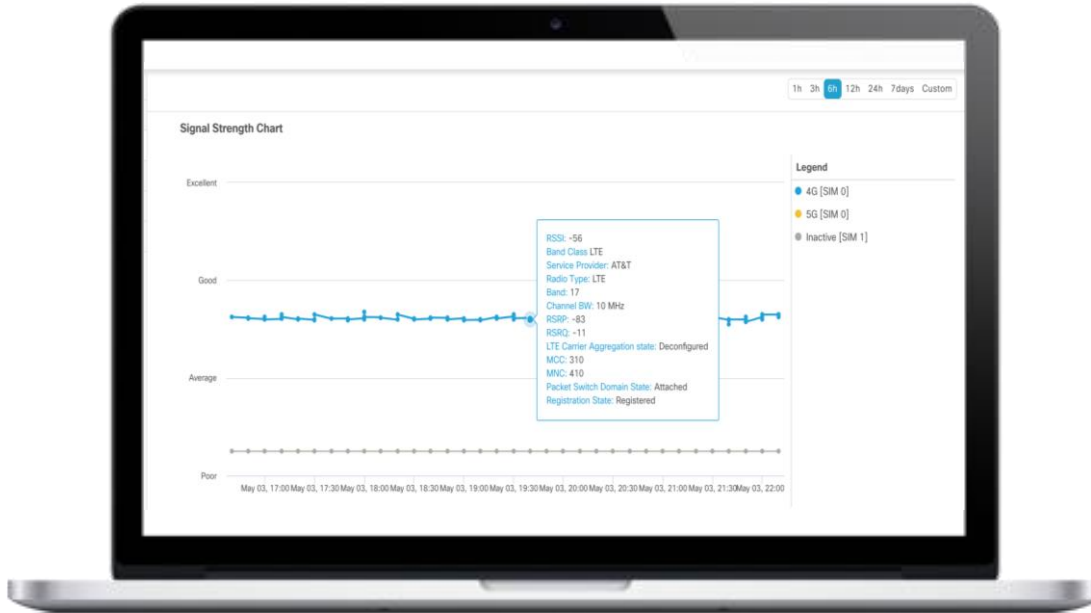
4

vManage managing Router and Cellular Gateway through service provider

17.4

Simplified management and cellular deployment while offering a bridge into 5G wireless WAN

# vManage: Monitor Cellular Signal Strength



Plug-and-play devices

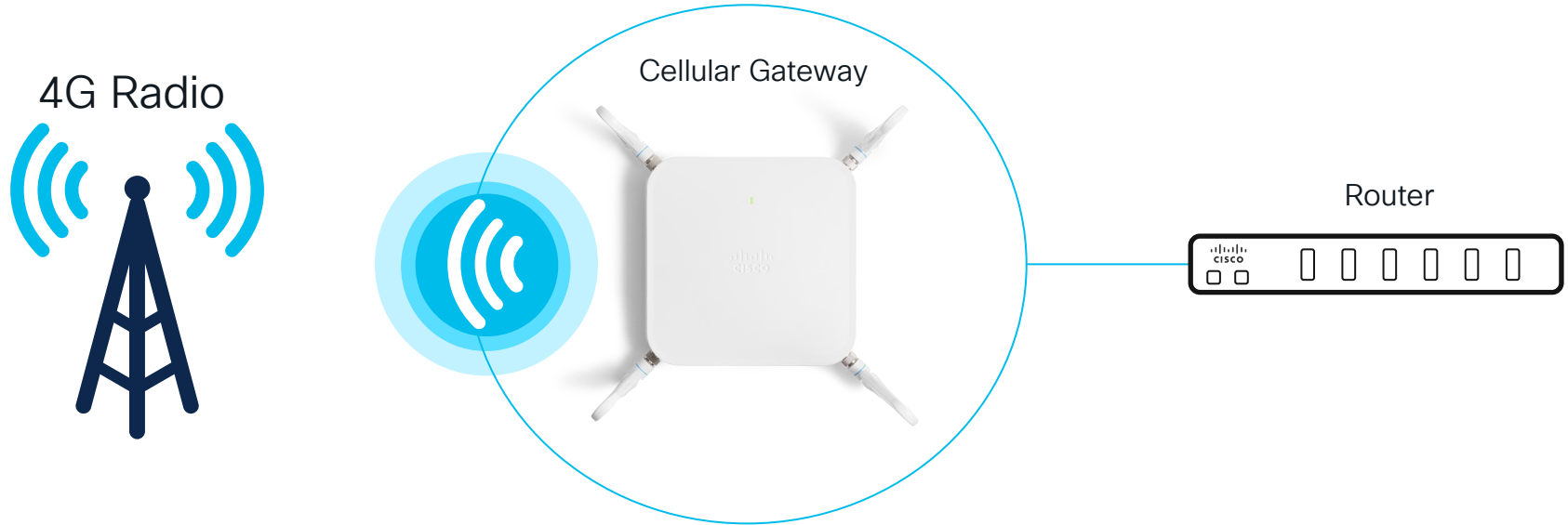
Remote Monitoring

Signal Strength Chart

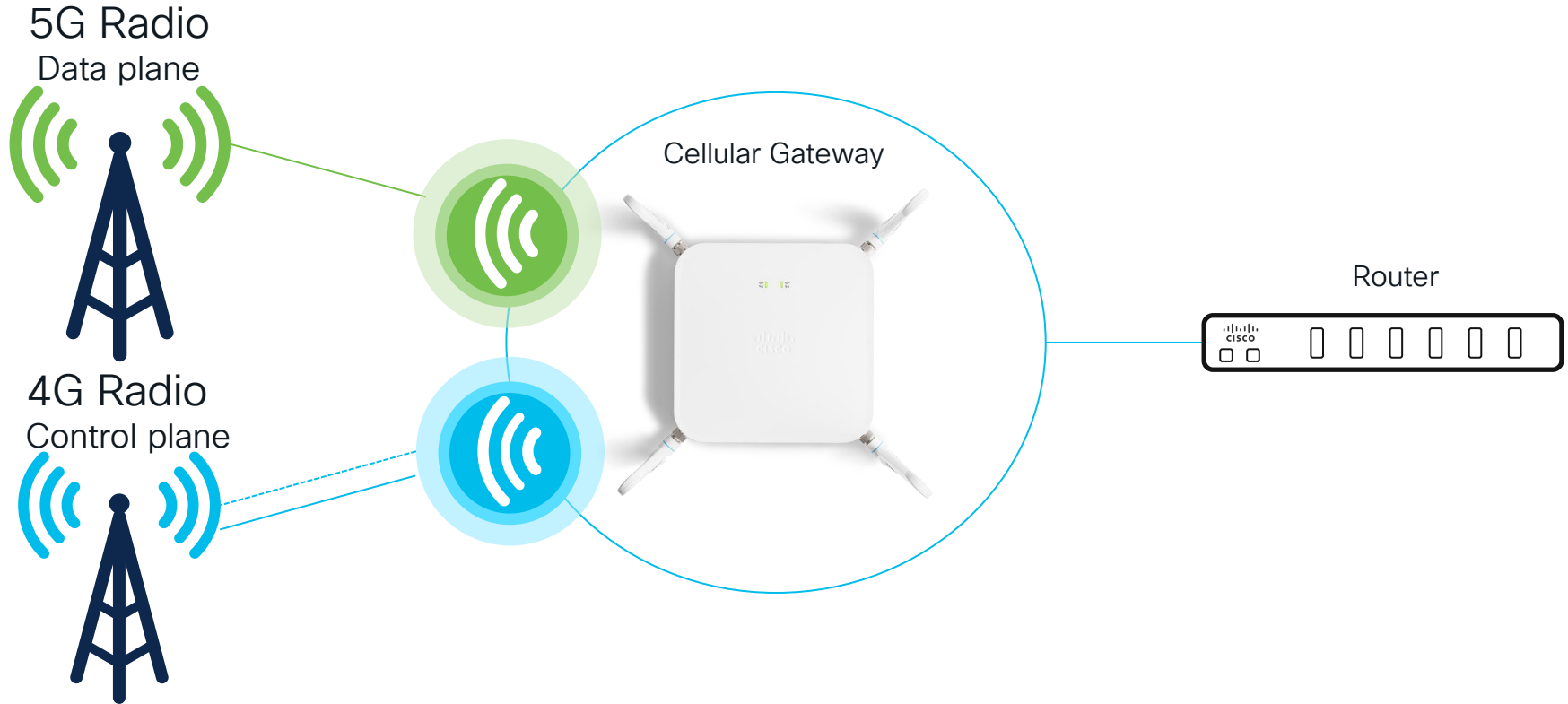
# IP Addressing



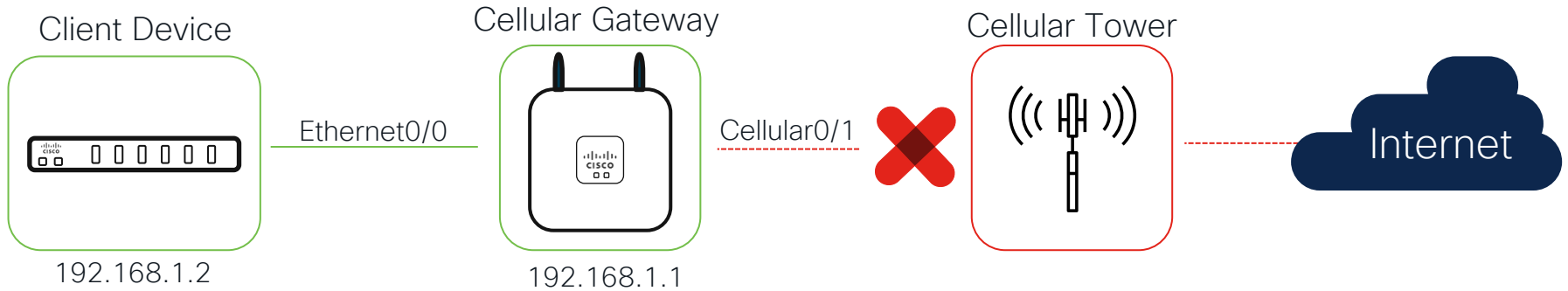
# How does CG418-E work?



# How does CG522-E work?



# IP Addressing and Management (cellular down)

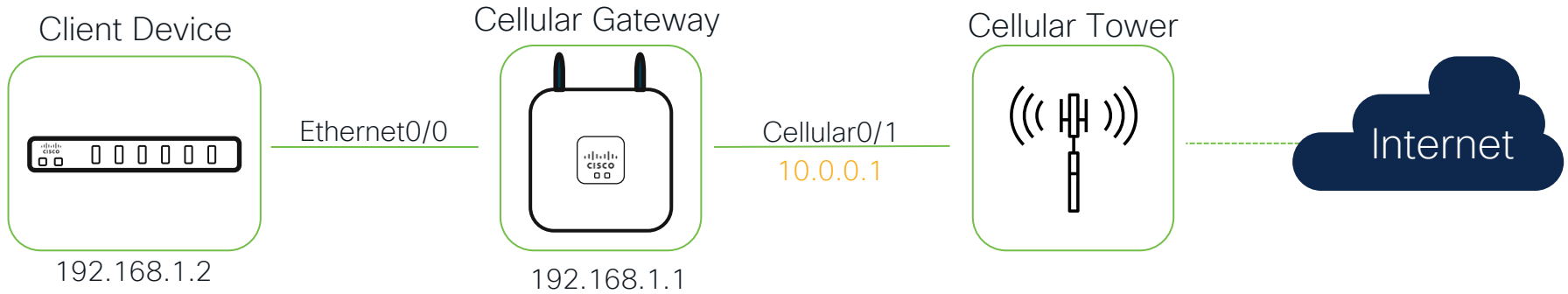


Cellular Gateway DHCP server offers 192.168.1.2 address



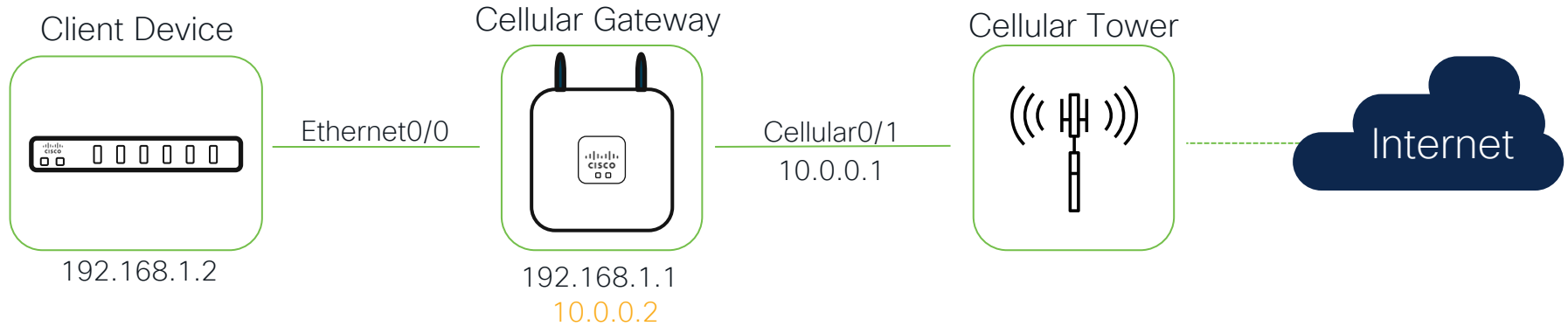
Management traffic is accepted at the Ethernet interface

# IP Addressing and Management (cellular up)



Cellular Gateway acquires IP address from service provider

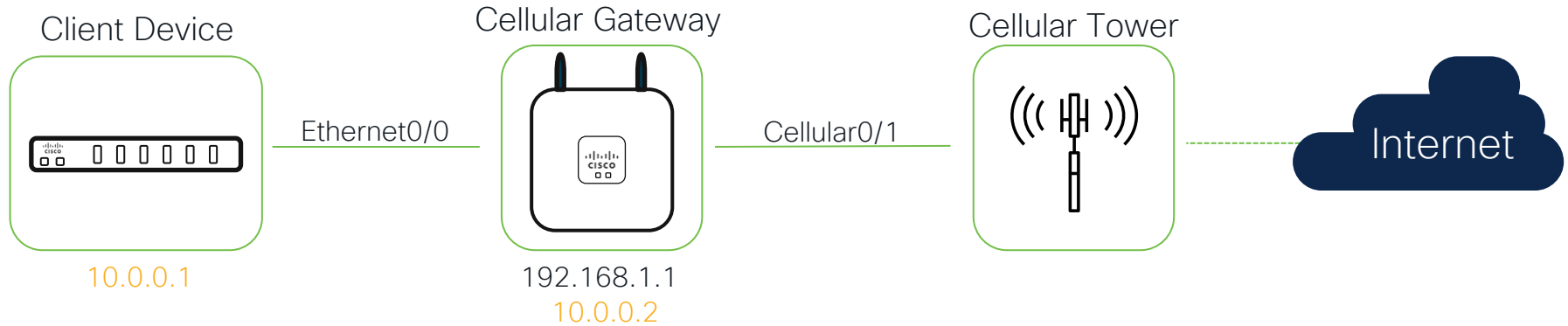
# IP Addressing and Management (cellular up)



Cellular Gateway generates IP to use as default gateway and applies to bridged network based on LTE address



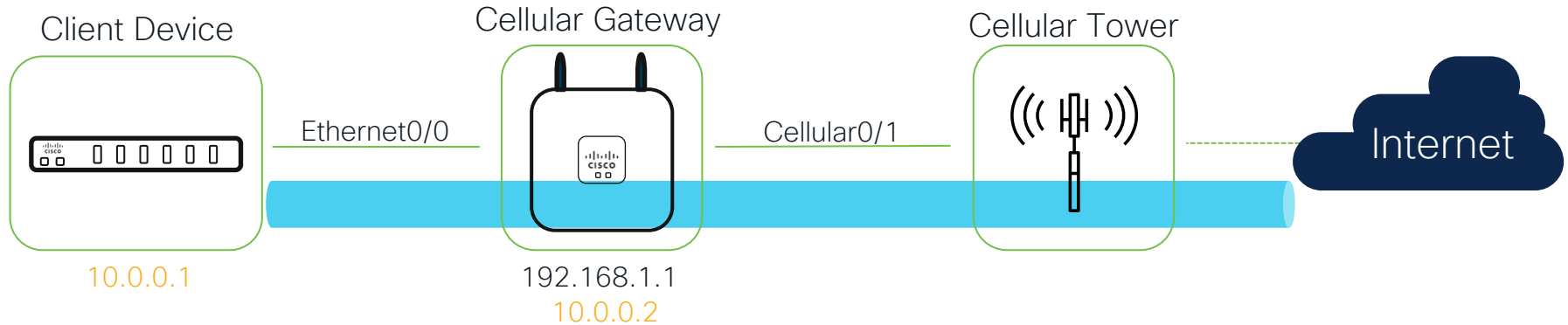
# IP Addressing and Management (cellular up)



Cellular Gateway DHCP server offers:  
10.0.0.1 address  
10.0.0.2 gateway  
192.168.1.1 Cellular Gateway Management IP  
via 10.0.0.2

Management traffic is intercepted as it enters Cellular Gateway

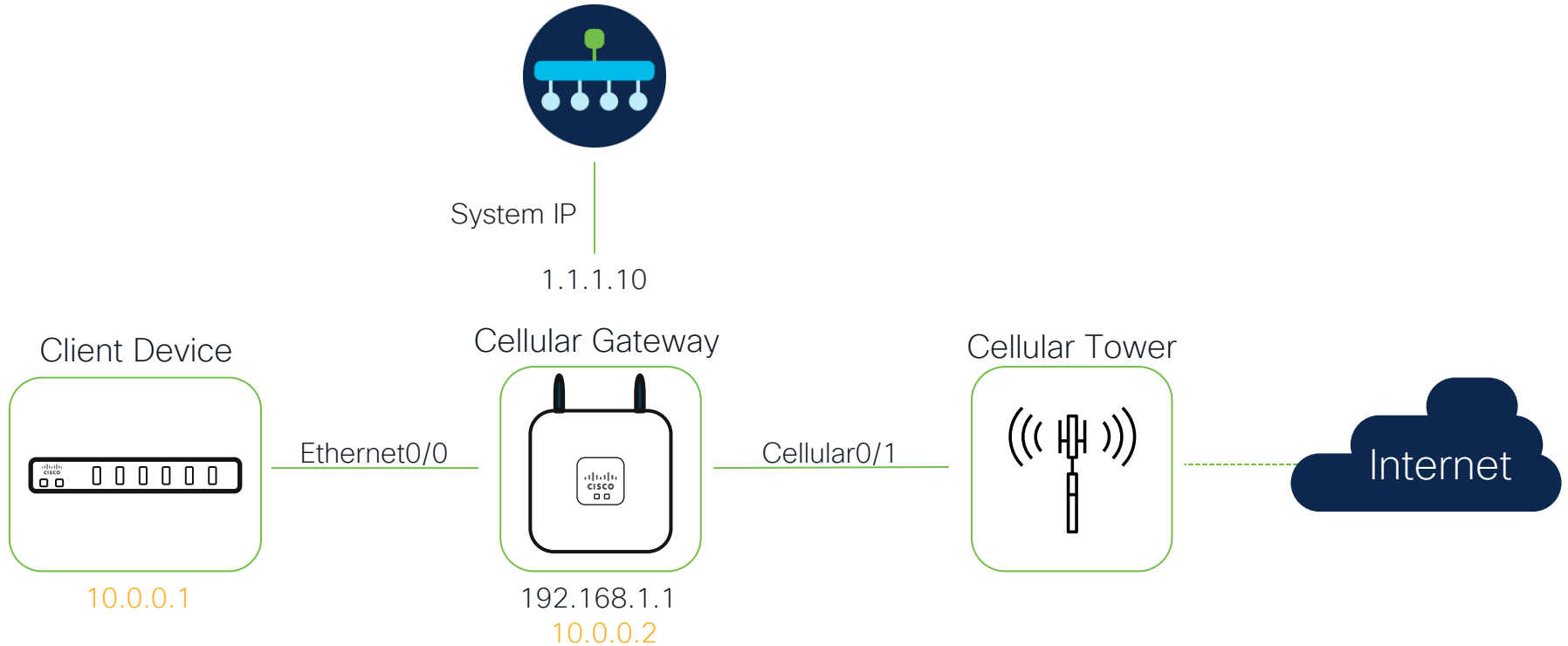
# IP Addressing and Management (cellular up)



WAN traffic sourced from the service provider offered address and routed via dynamically generated default gateway address.

# IP Addressing and Management (cellular up)

## SD-WAN



# IP Routing table for client connectivity

Gateway of last resort is 10.0.0.2 to network 0.0.0.0

```
S*    0.0.0.0/0 [254/0] via 10.0.0.2
      10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      10.0.0.0/29 is directly connected, GigabitEthernet0/0/0
L      10.0.0.1/32 is directly connected, GigabitEthernet0/0/0
      192.168.1.0/32 is subnetted, 1 subnets
S      192.168.1.1 [254/0] via 10.0.0.2, GigabitEthernet0/0/0
!
! LAN Routing
!
      192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.12.0/24 is directly connected, GigabitEthernet0/0/1
L      192.168.12.151/32 is directly connected, GigabitEthernet0/0/1
```

# Basic required configuration

## Cisco client device

```
!  
interface GigabitEthernet0/0/1  
  ip mtu 1428  
  ip address dhcp  
  negotiation auto
```

Commands in **blue** are the minimum requirement for IPv4 DHCP client.  
MTU values may vary, check value from service provider.

# Use Cases



# Maintain consistent quality of service

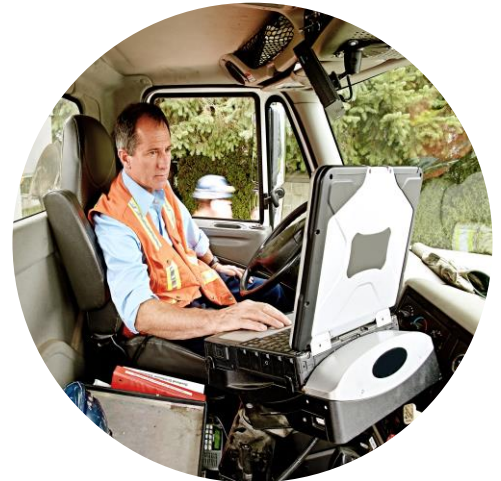
## LTE/5G Primary or Backup Connectivity



Provide business agility and scale across the entire network



Cellular connectivity ensures constant access to machines, even in remote locations



Setup remote offices quickly and easily from anywhere using cellular coverage

# Provide a network that is always on

## LTE/5G Primary or Backup Connectivity



Cellular connectivity means your employees remain productive regardless of their location



Offer continuous connectivity to users for a seamless experience



Provide WAN network service even during outages and service disruptions



# Reference



# Resources - External

- Step-by-step Cellular Gateway onboarding on vManage: <https://community.cisco.com/t5/networking-documents/step-by-step-cellular-gateway-onboarding-on-vmanage-using-pnp/ta-p/4454345>
- Cellular Gateway relevant documents: <https://www.cisco.com/c/en/us/support/routers/catalyst-cellular-gateways/series.html>
- Hardware Installation Guide: <https://www.cisco.com/c/en/us/td/docs/routers/wireless-wan/Cisco-Catalyst-Cellular-Gateways/b-cisco-catalyst-cellular-gateways-hig/m-overview-Cisco-catalyst-cellular-gateway.html>
- Software Installation Guide: [https://www.cisco.com/c/en/us/td/docs/routers/wireless-wan/Cisco-Catalyst-Cellular-Gateways/cisco\\_catalyst\\_cellular\\_gateway\\_swcfg.html](https://www.cisco.com/c/en/us/td/docs/routers/wireless-wan/Cisco-Catalyst-Cellular-Gateways/cisco_catalyst_cellular_gateway_swcfg.html)
- Software Download Link: <https://software.cisco.com/download/home/286326885?catid=268437899>
- CG522-E Cellular Gateway FAQ: <https://www.cisco.com/c/en/us/products/collateral/routers/catalyst-cellular-gateways/nb-06-cg522-e-cellular-gateway-faq-cte-en.html>
- Catalyst Cellular Gateway FAQ: <https://www.cisco.com/c/en/us/products/collateral/routers/catalyst-cellular-gateways/q-and-a-c67-744212.html>

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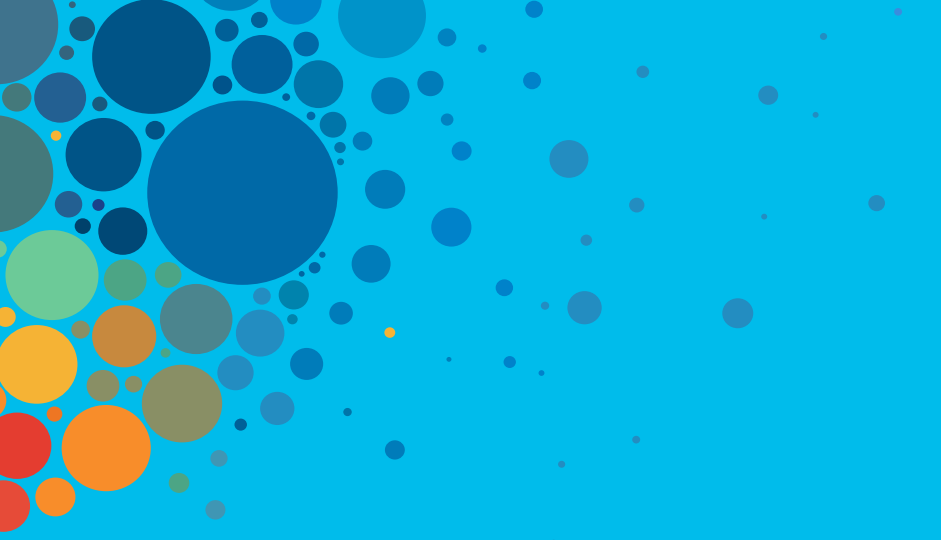
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The bridge to possible

# Thank you

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