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#CiscoLiveAPJC



The bridge to possible

Improving Application Quality of Experience through

Cisco SD-WAN Middle-Mile Optimization

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BRKENT-2135



#CiscoLiveAPJC

Cisco Webex App

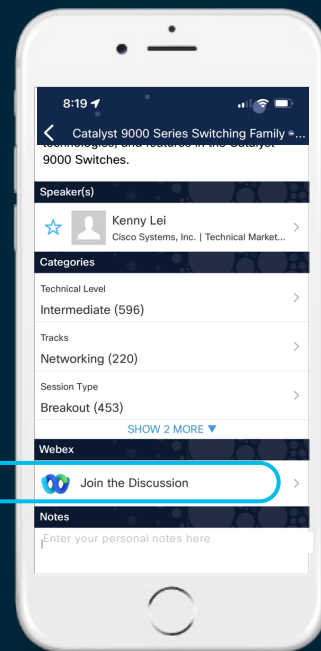
Questions?

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
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until Thursday 22 December, 2022.



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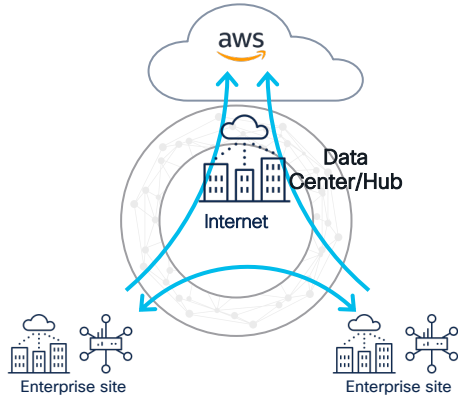


Agenda

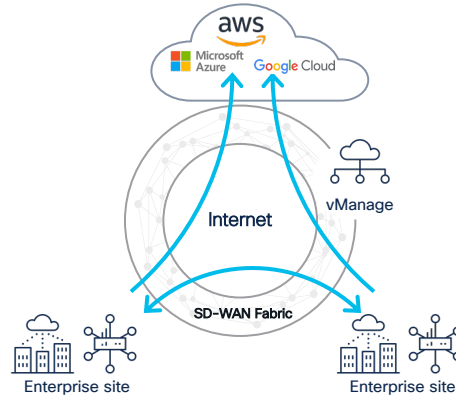
- What is Middle-Mile?
- Integration Partners
- Use cases for On Demand Connectivity
- Connectivity - Details
- Architectural Overview
- Demo

Introduction

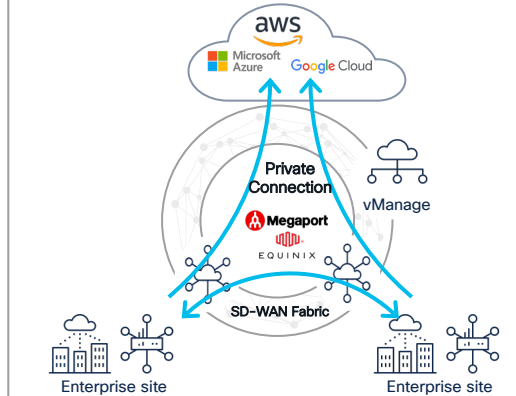
Single Cloud provider



Multiple Cloud providers

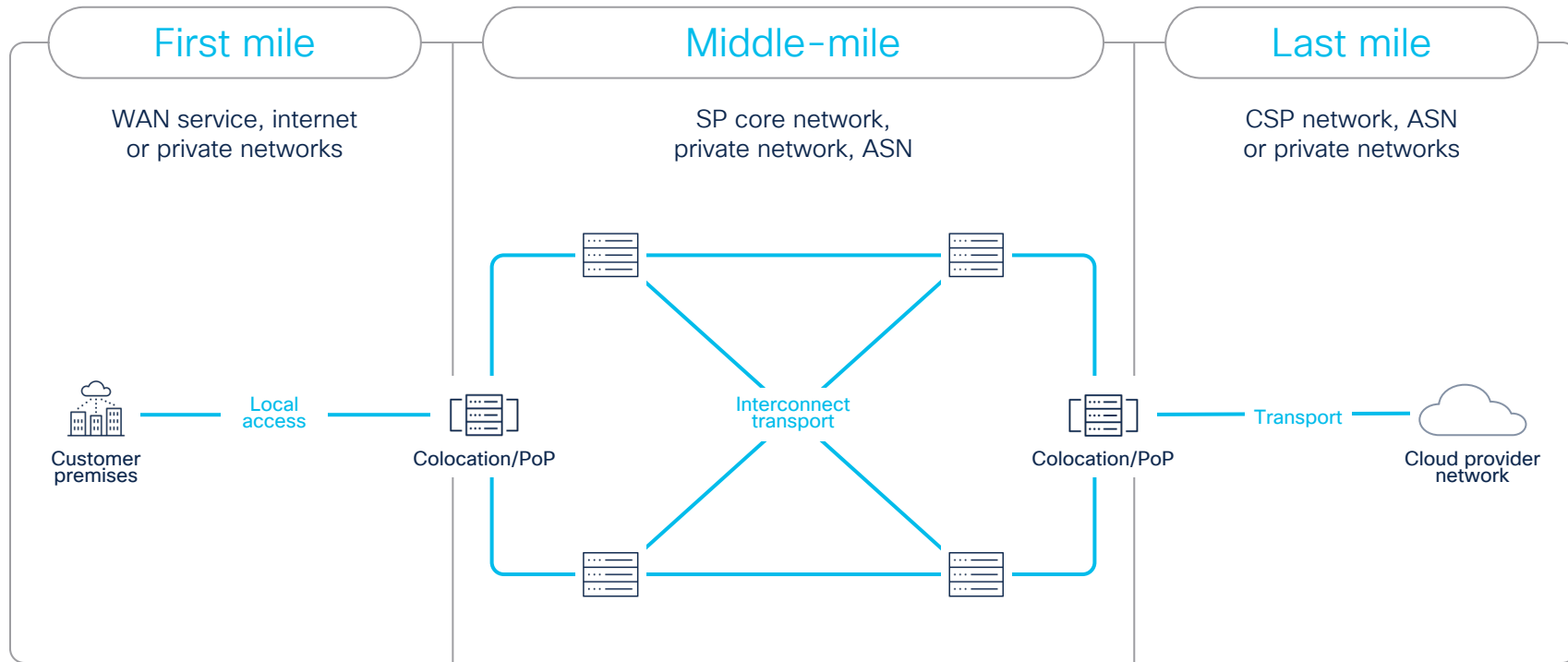


Middle-mile provider

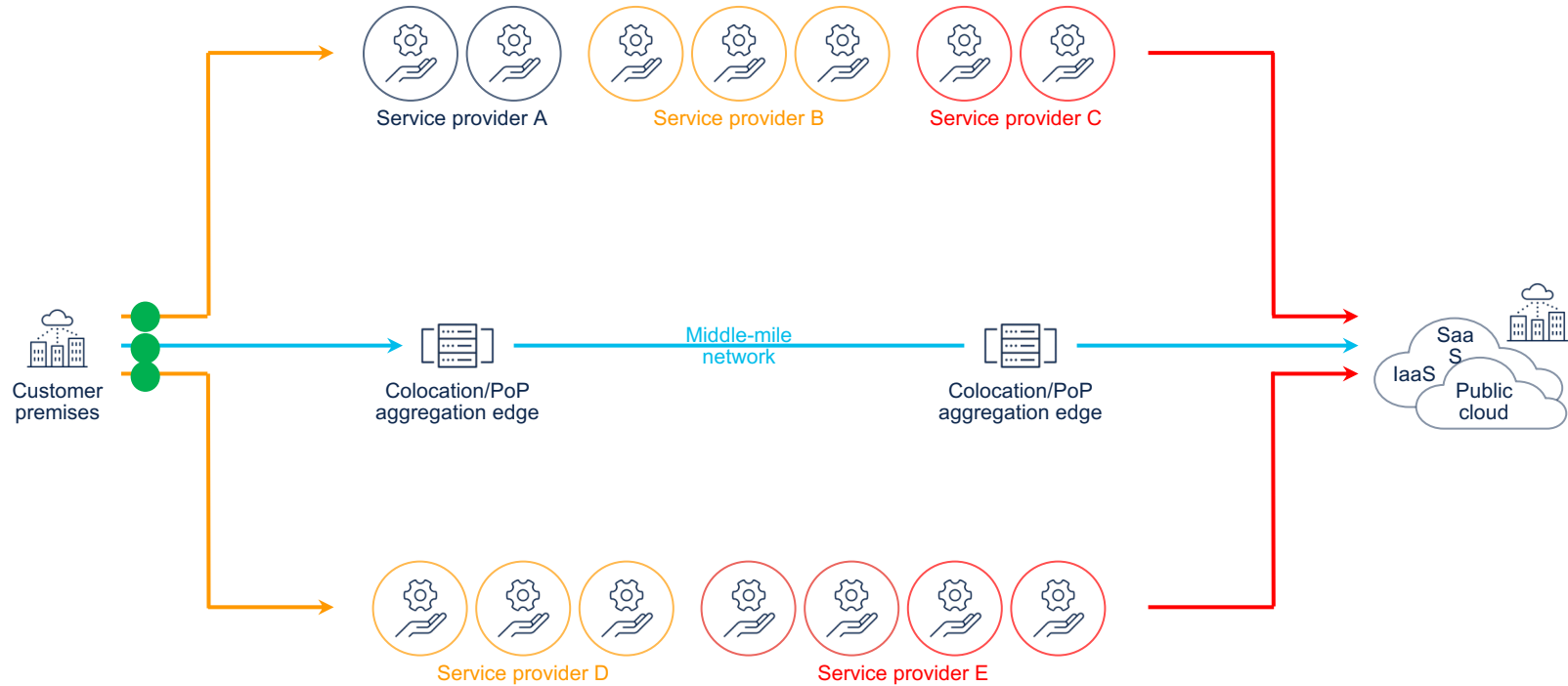


What is Middle Mile?

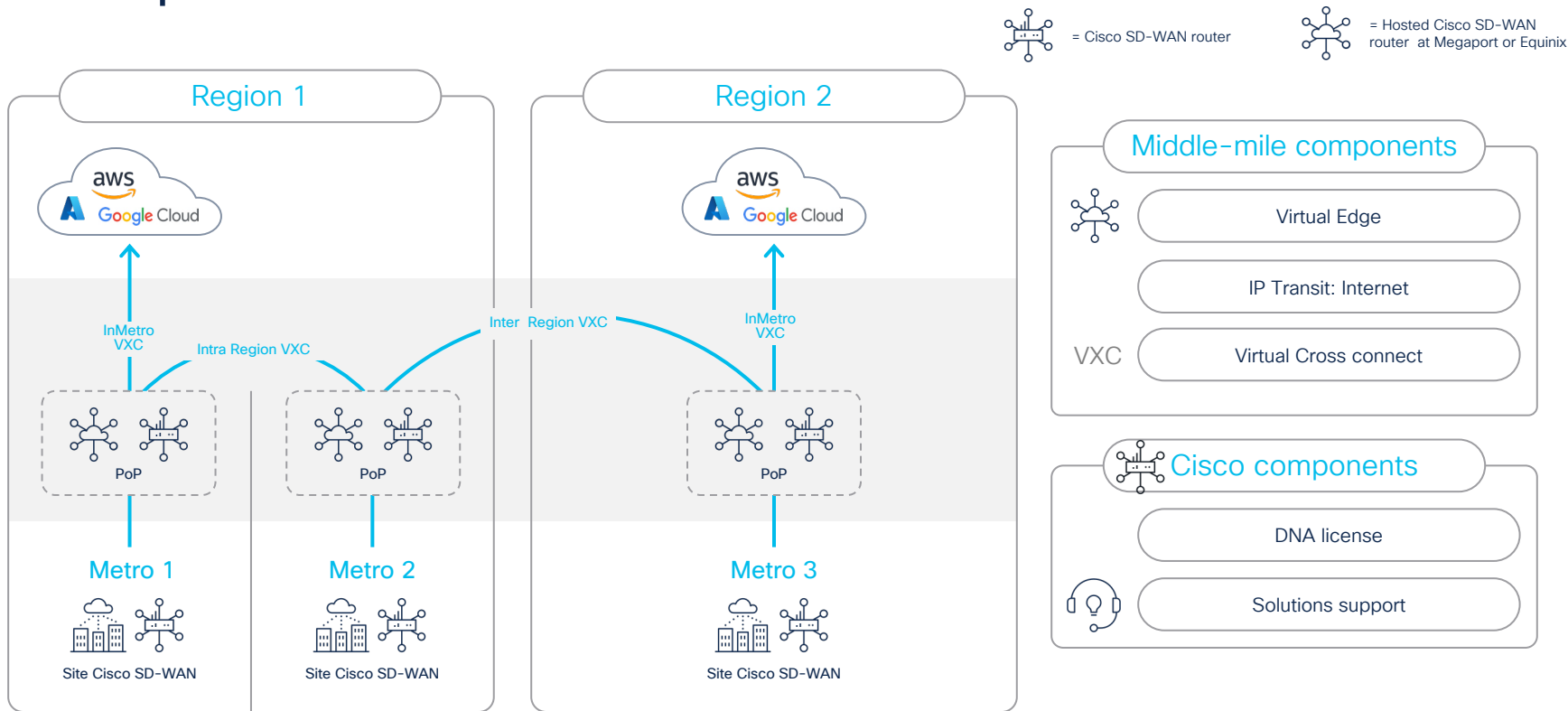
What is the Middle-Mile?



Middle-mile optimization



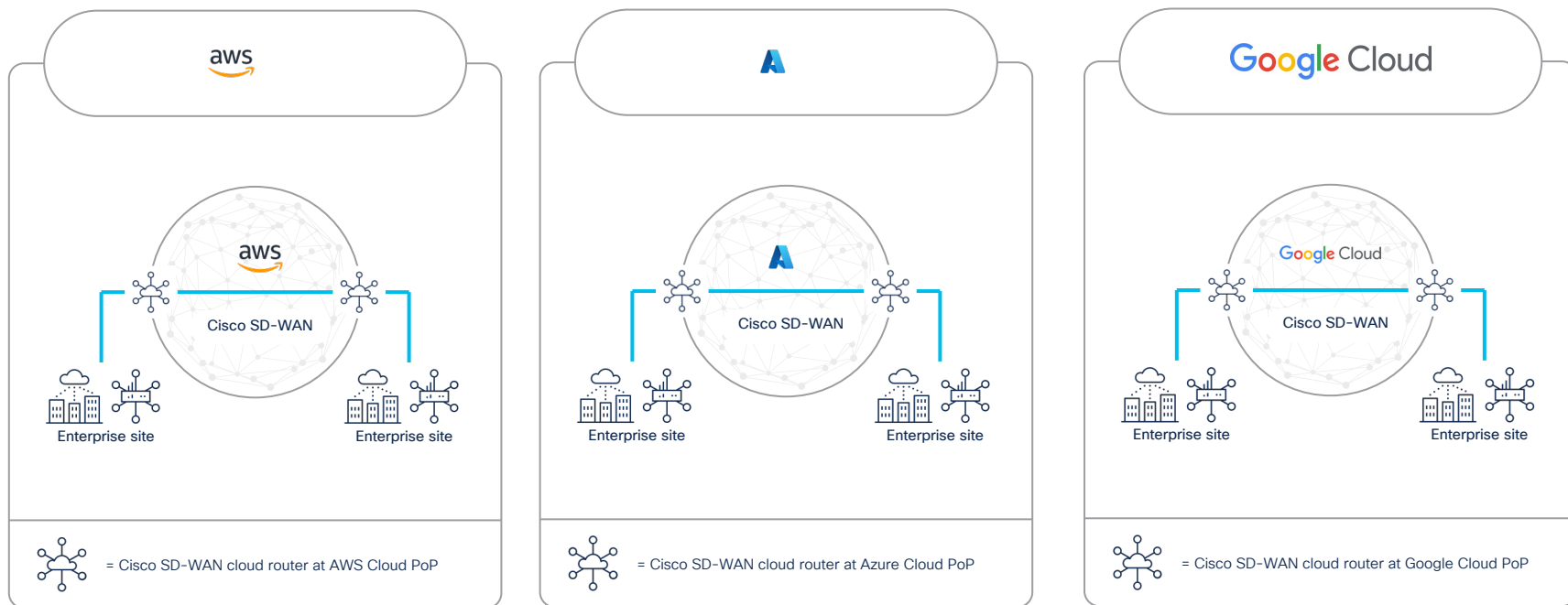
Components of SDCI



Integration Partners

Cisco offers a choice of middle-mile partners

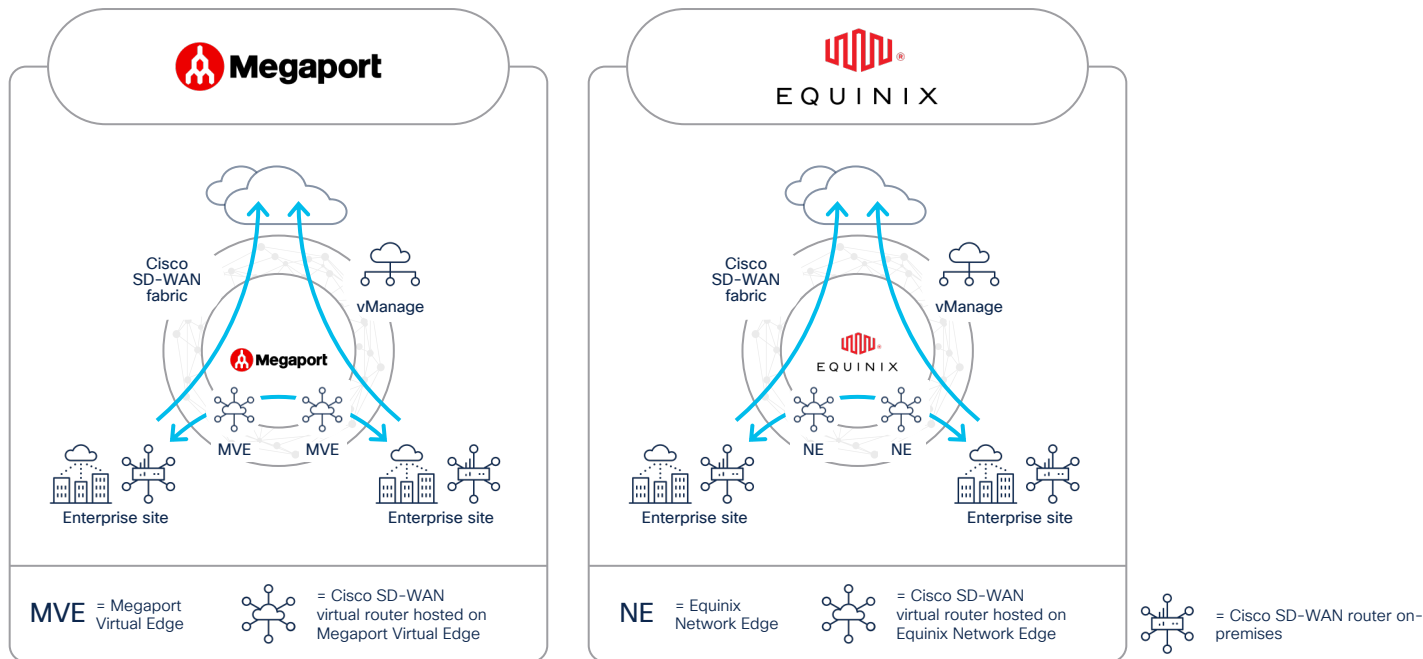
Integration with Cloud Service providers



Automated with Cisco vManage

Cisco offers a choice of middle-mile partners

Integration with SDCI providers



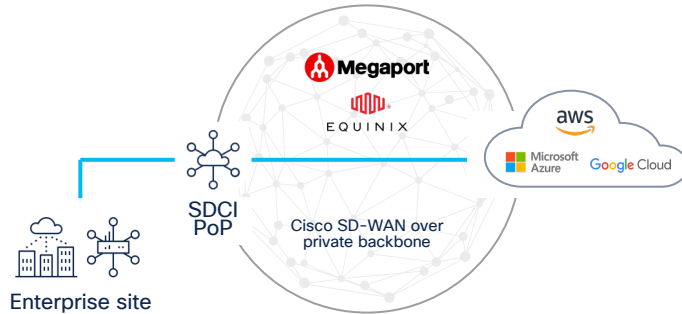
Automated with Cisco vManage

Use cases for On Demand Connectivity

Solution use cases with Cloud Interconnect Partners

 = Cisco SD-WAN router hosted at Megaport or Equinix

Site-to-multicloud

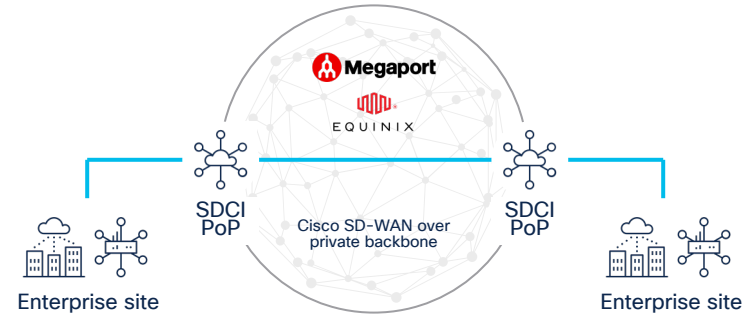


Simple

Automated

Secure

Site-to-site



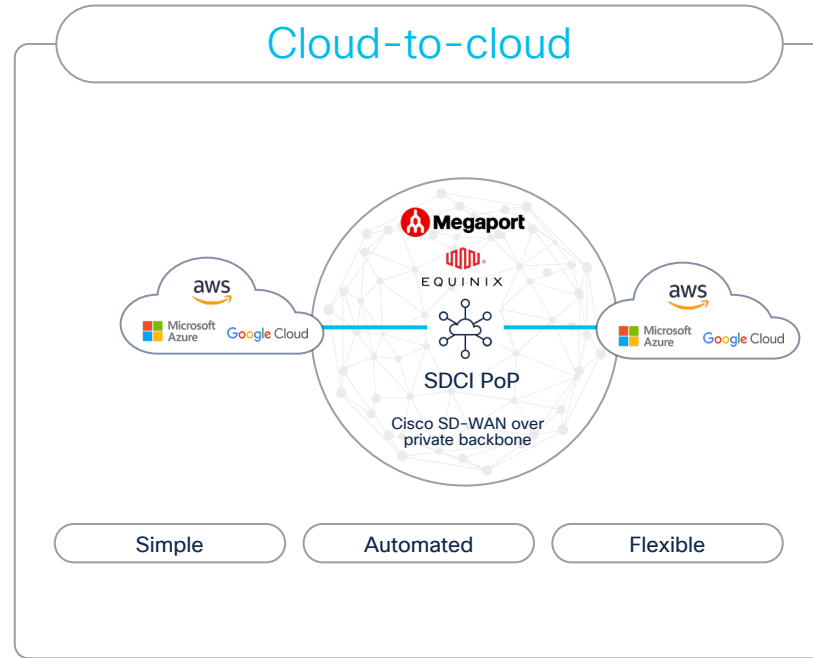
On-demand

High performance

Global connectivity

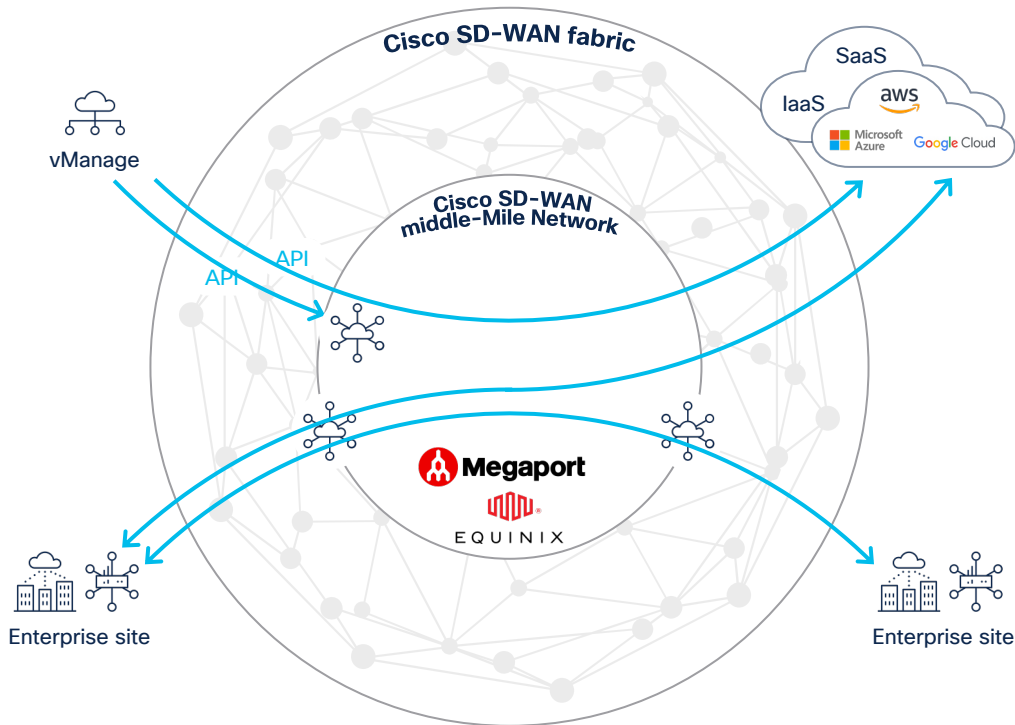
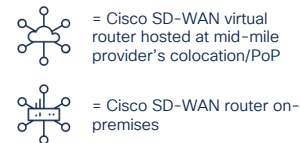
Automated with Cisco vManage

Solution use cases with Cloud Interconnect Partners



Automated with Cisco vManage

Cisco SD-WAN Cloud Interconnect



Cisco SD-WAN Cloud Interconnect integrates the middle-mile backbone network provided by Software Defined Cloud Interconnect (SDCI) providers (MegaPort or Equinix)

On-demand connectivity

Highly available backbone

Single pane of glass management

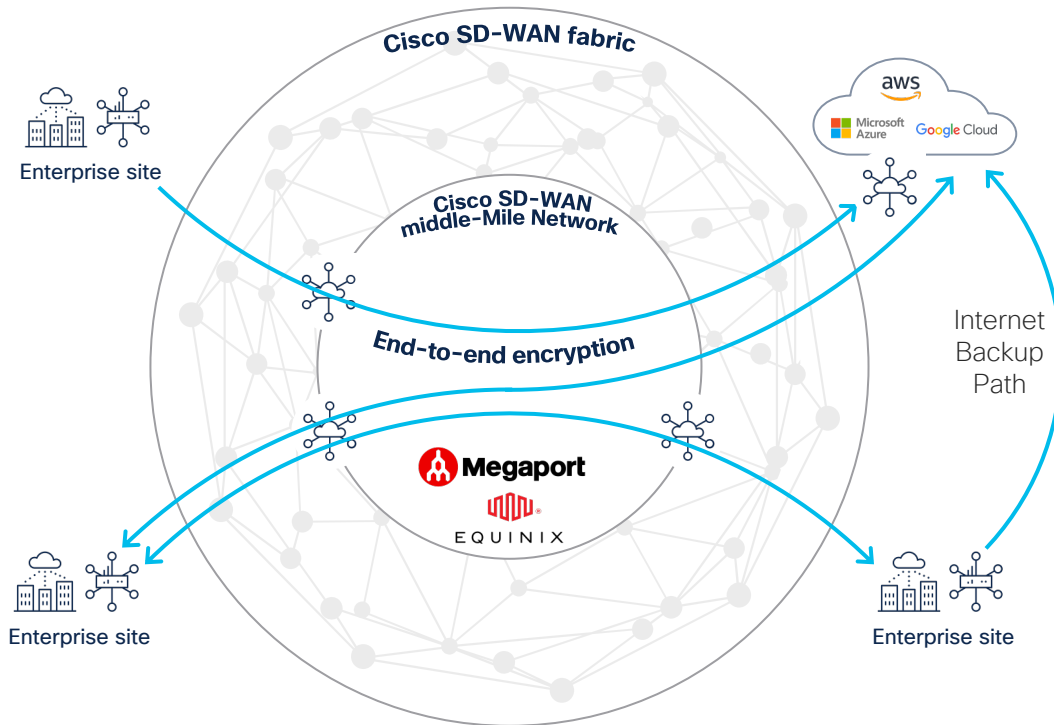
Secure SD-WAN

Encrypted Multicloud Interconnect

End-to-end encryption for site-to-cloud via Megaport/Equinix

 = Cisco SD-WAN virtual router hosted at mid-mile provider's colocation/PoP

 = Cisco SD-WAN router on-premises



SD-WAN fabric
extended over
private underlay to
the cloud



Complete encryption
of traffic from branch
to cloud



Automatically steers
traffic over alternate
paths during failures

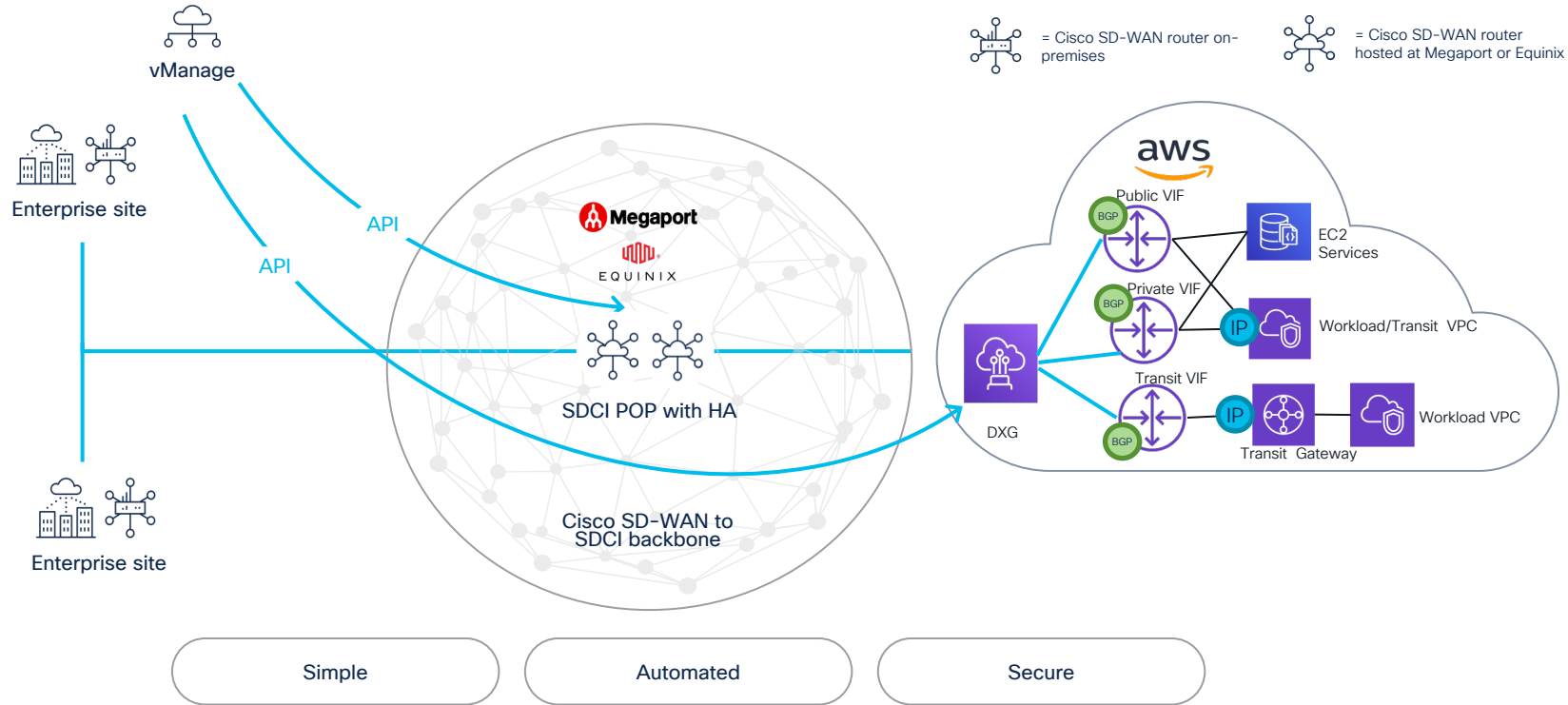
Connectivity - Details

Site to AWS on-Demand

Private connectivity



Cisco SD-WAN with SDCI – To AWS



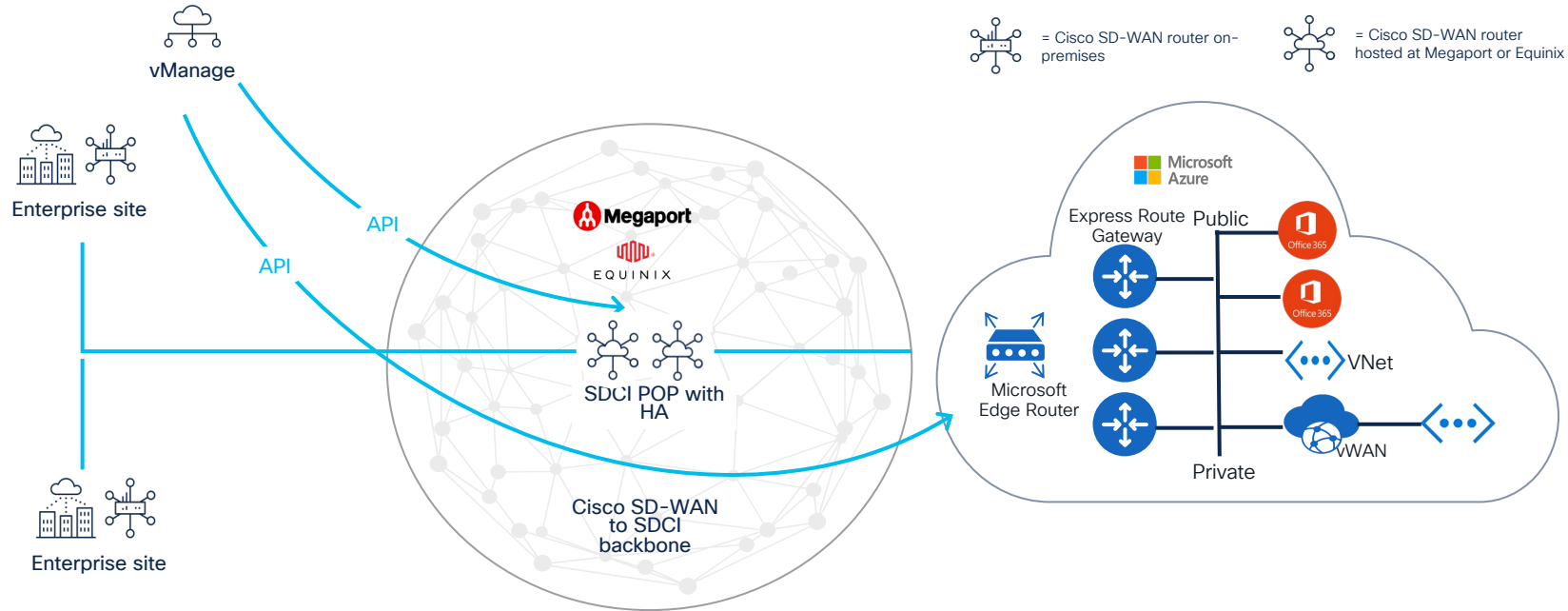
Automated with Cisco vManage

Site to Azure on-Demand

Private connectivity



Cisco SD-WAN with SDCI – To Azure



Simple

Automated

Secure

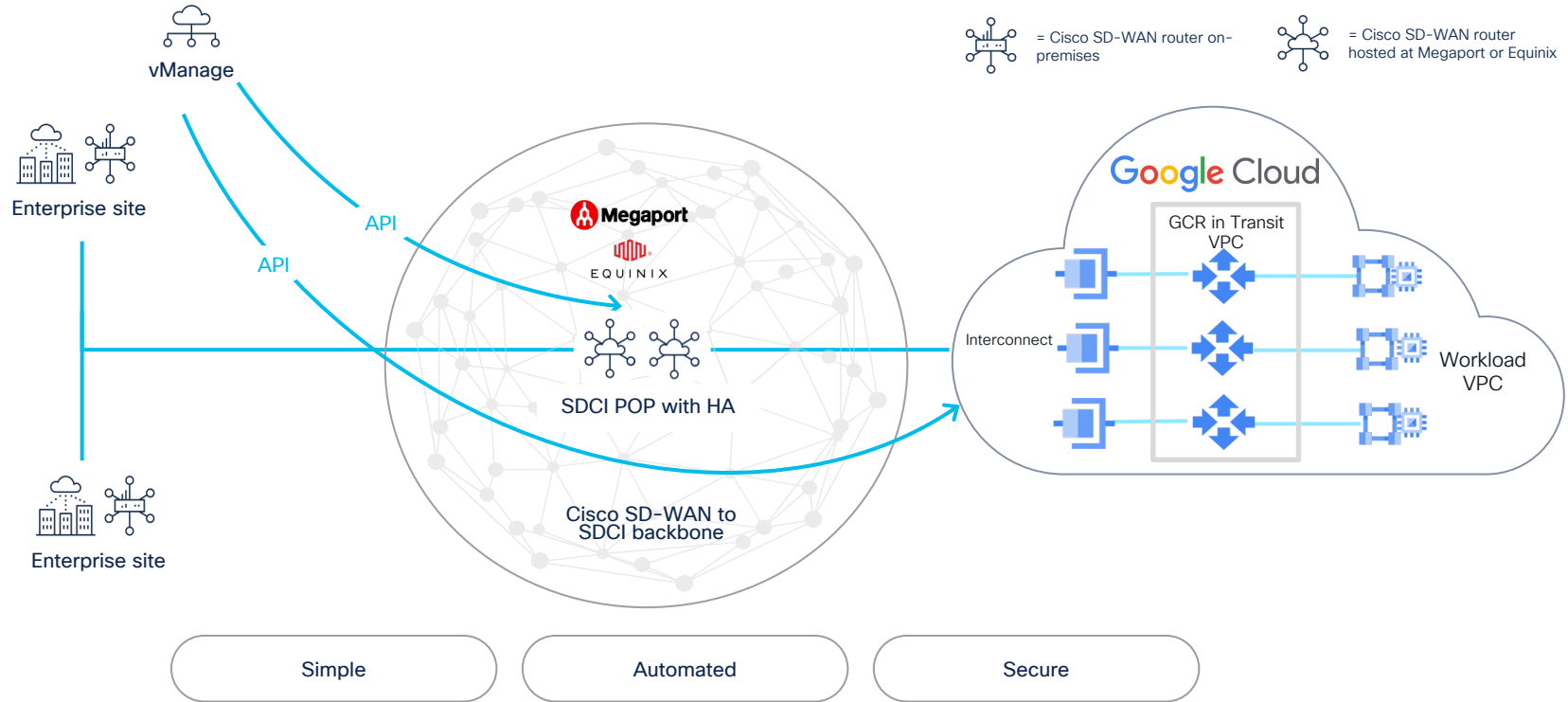
Automated with Cisco vManage

Site to GCP on-Demand

Private connectivity



Cisco SD-WAN with SDCI – to Google Cloud

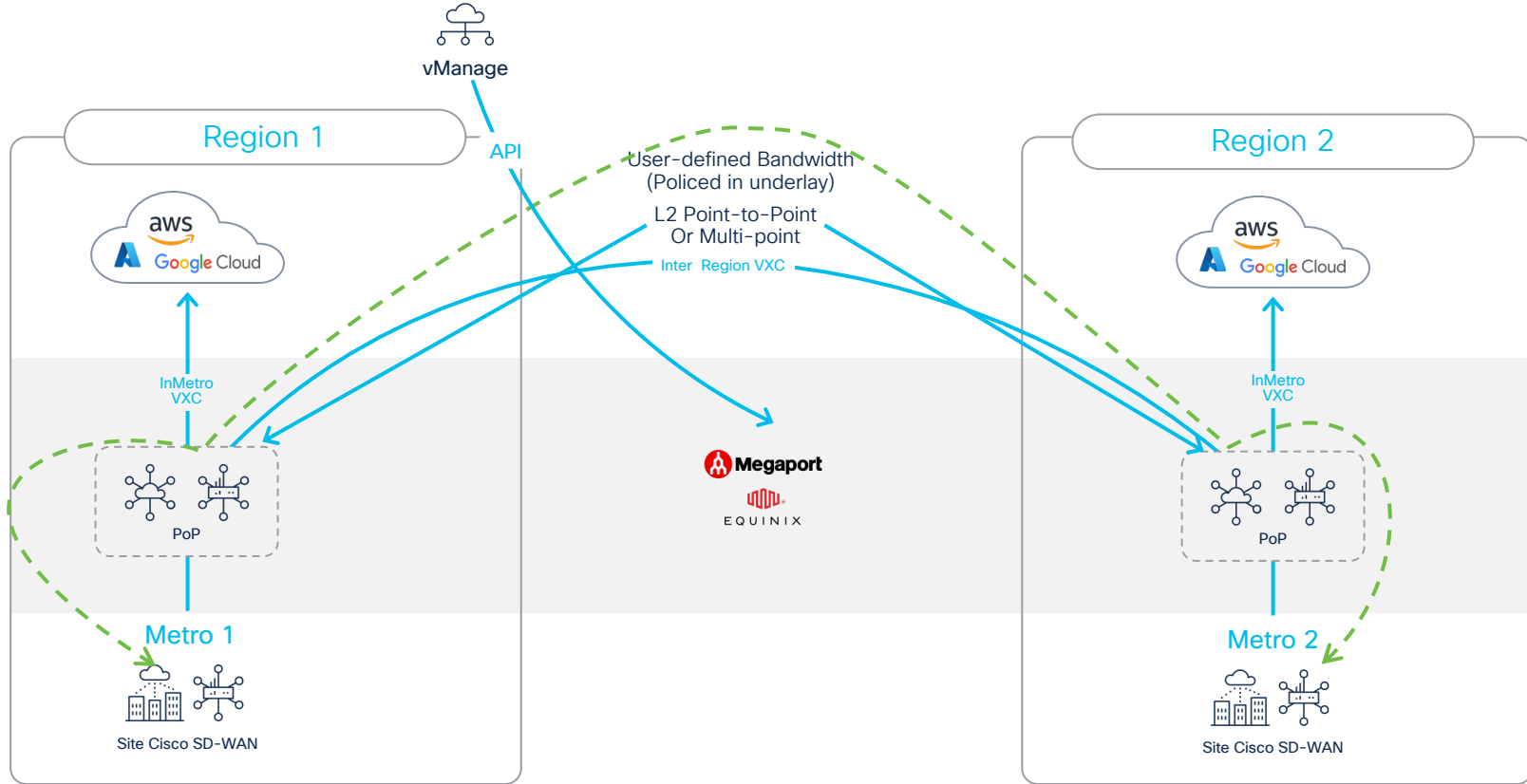


Automated with Cisco vManage

Site to Site – Private Backbone



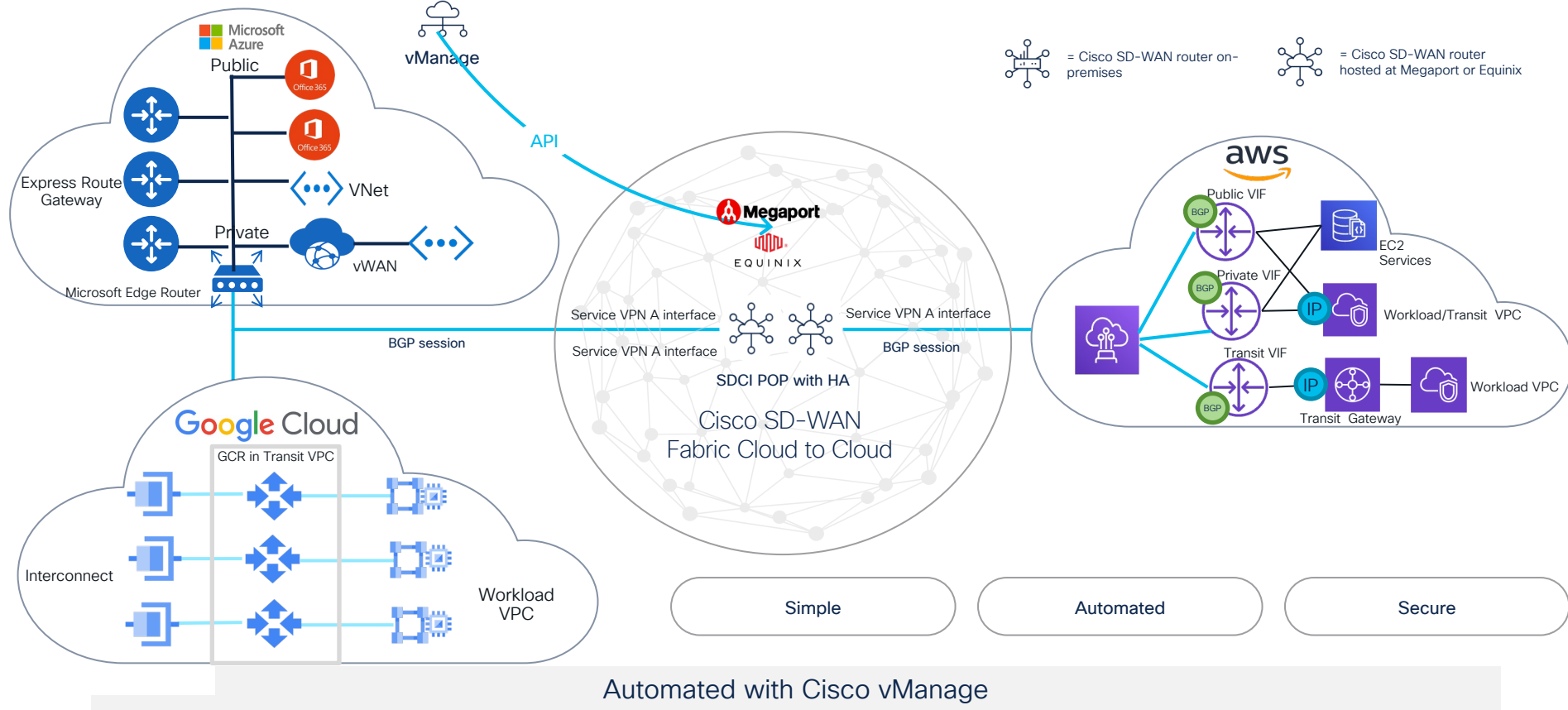
Site to Site Connectivity



Cloud to Cloud

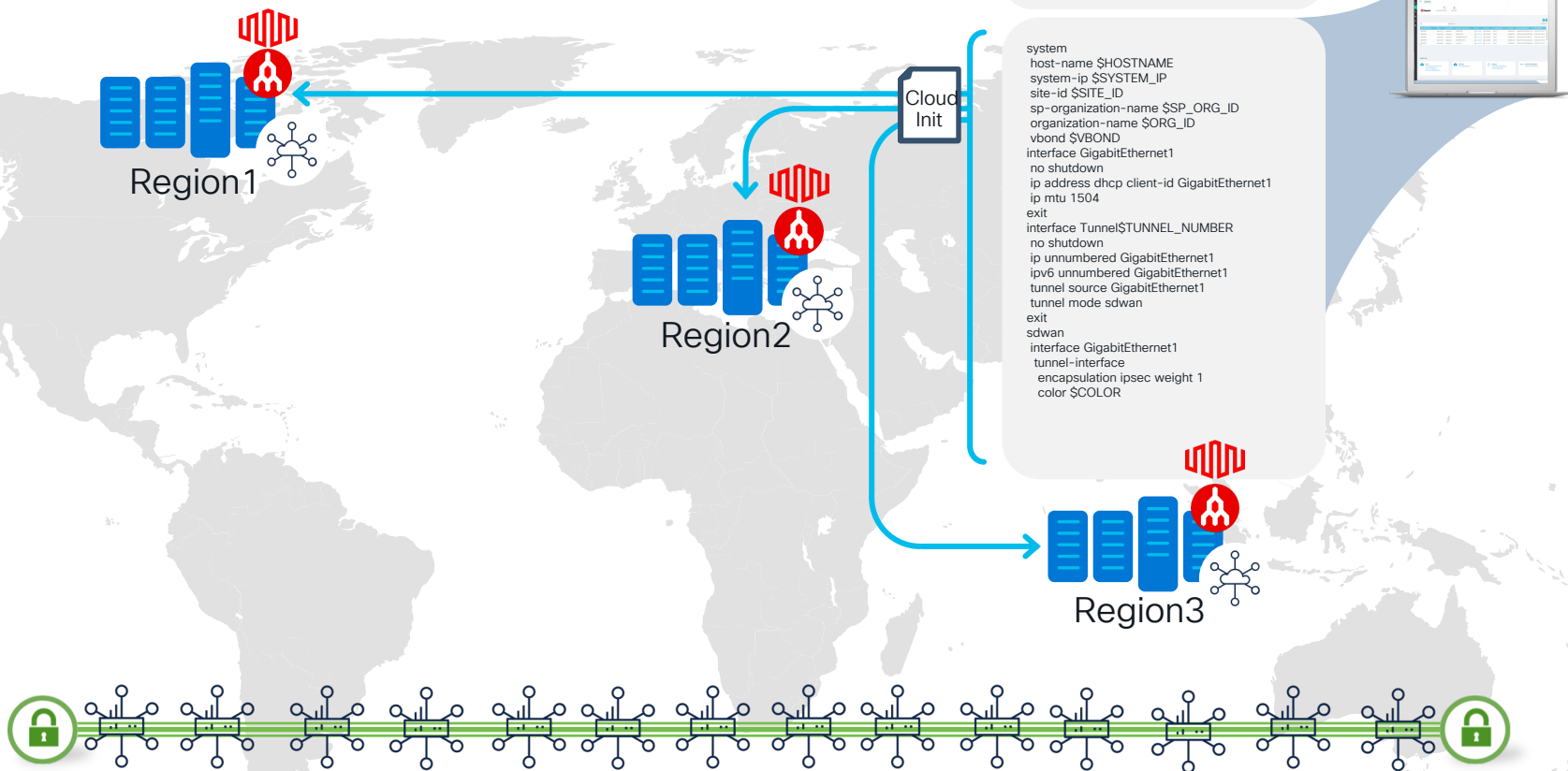


Cisco SD-WAN with SDCI – Cloud to Cloud



Architectural Overview/Day 0

Day0 Onboarding



* Customer is responsible for “first mile” connectivity (i.e. branch ISP)

Cloud Connection Configuration

Catalyst 8000v



```
interface GigabitEthernet1.$VLAN or interface
GigabitEthernet[4-23]
 no shutdown
 encapsulation dot1Q $VLAN
 ip address $IP_ADDRESS
 ip mtu 1500
 exit
...
router bgp $BGP_LOCAL_AS
 bgp log-neighbor-changes
 neighbor $BGP_NEIGH remote-as $BGP_AS
 neighbor $BGP_NEIGH ebgp-multihop 1
 neighbor $BGP_NEIGH password $PASS
 address-family ipv4 unicast
  neighbor $BGP_NEIGH remote-as $BGP_AS
  neighbor $BGP_NEIGH activate
  neighbor $BGP_NEIGH send-community both
 redistribute omp
 exit-address-family
...
omp
 address-family ipv4
  advertise bgp
```

New Interface Block:

- VLAN ID provided by Megaport
- IP Address is auto selected from pool or custom-defined within workflow

BGP Peering:

- Peering instantiated with AWS Direct Connect Gateway automatically, and Azure Express route gateway and GCP GCR.
- Peer address is custom-defined during workflow or as part of *Global Settings*
- Mutual redistribution (OMP to BGP and vice versa)

Backbone on Demand Configuration

Catalyst 8000v



```
interface GigabitEthernet1.$VLAN1 or [4-23]
no shutdown
encapsulation dot1Q $VLAN
ip address $IP_ADDRESS
ip mtu 1500
exit
interface Loopback1
no shutdown
ip address $IP_ADDRESS
ip mtu 1500
interface Tunnel1
no shutdown
ip unnumbered Loopback1
ipv6 unnumbered Loopback1
tunnel source Loopback1
tunnel mode sdwan
exit
ip route $PEER_LOOPBACK_IP
$PEER_PHYS_IP
sdwan
interface Loopback1
tunnel-interface
color $COLOR
max-control-connections 0
vmanage-connection-preference 0
```

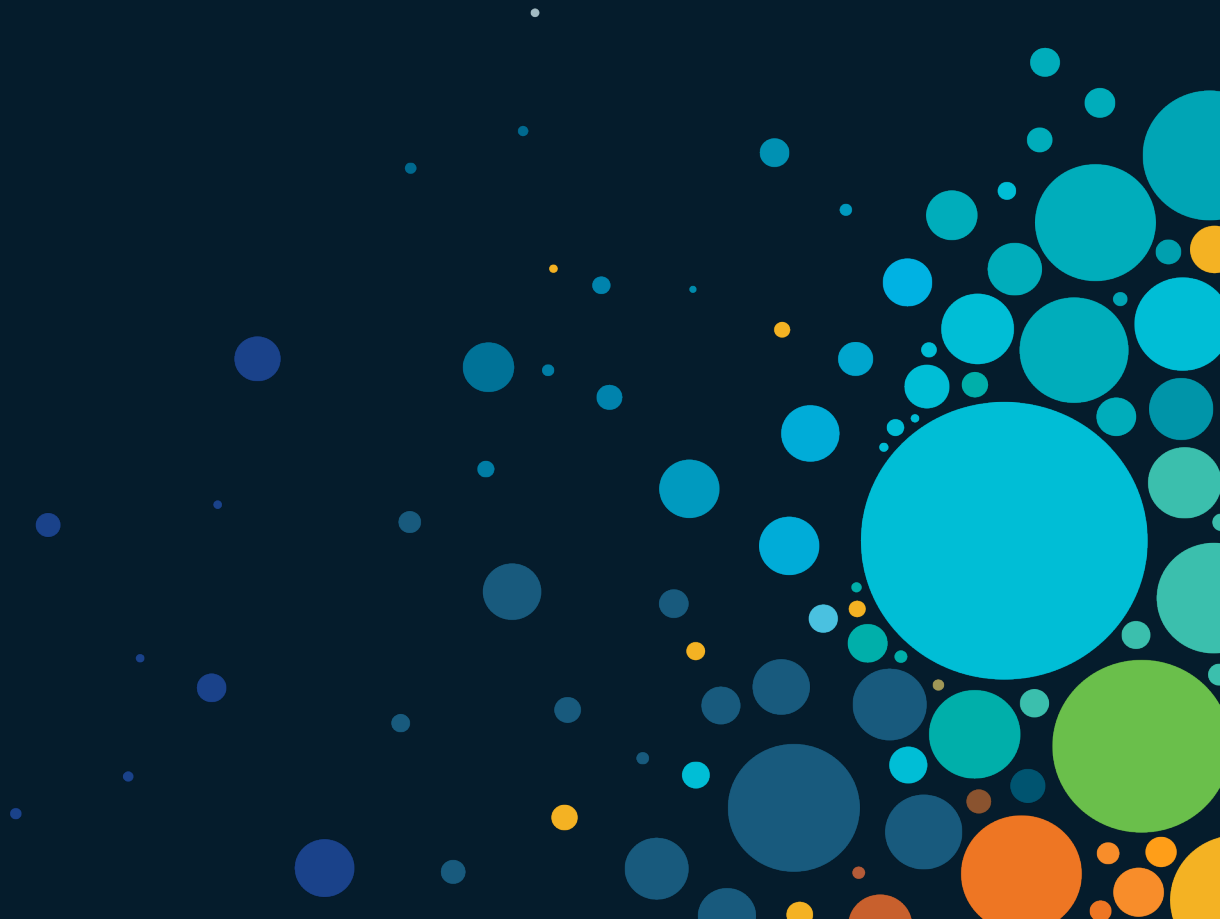
New Interface Block:

- VLAN ID provided by Megaport
- IP Address is auto-defined
- Represents L2 point-to-point connection to remote region

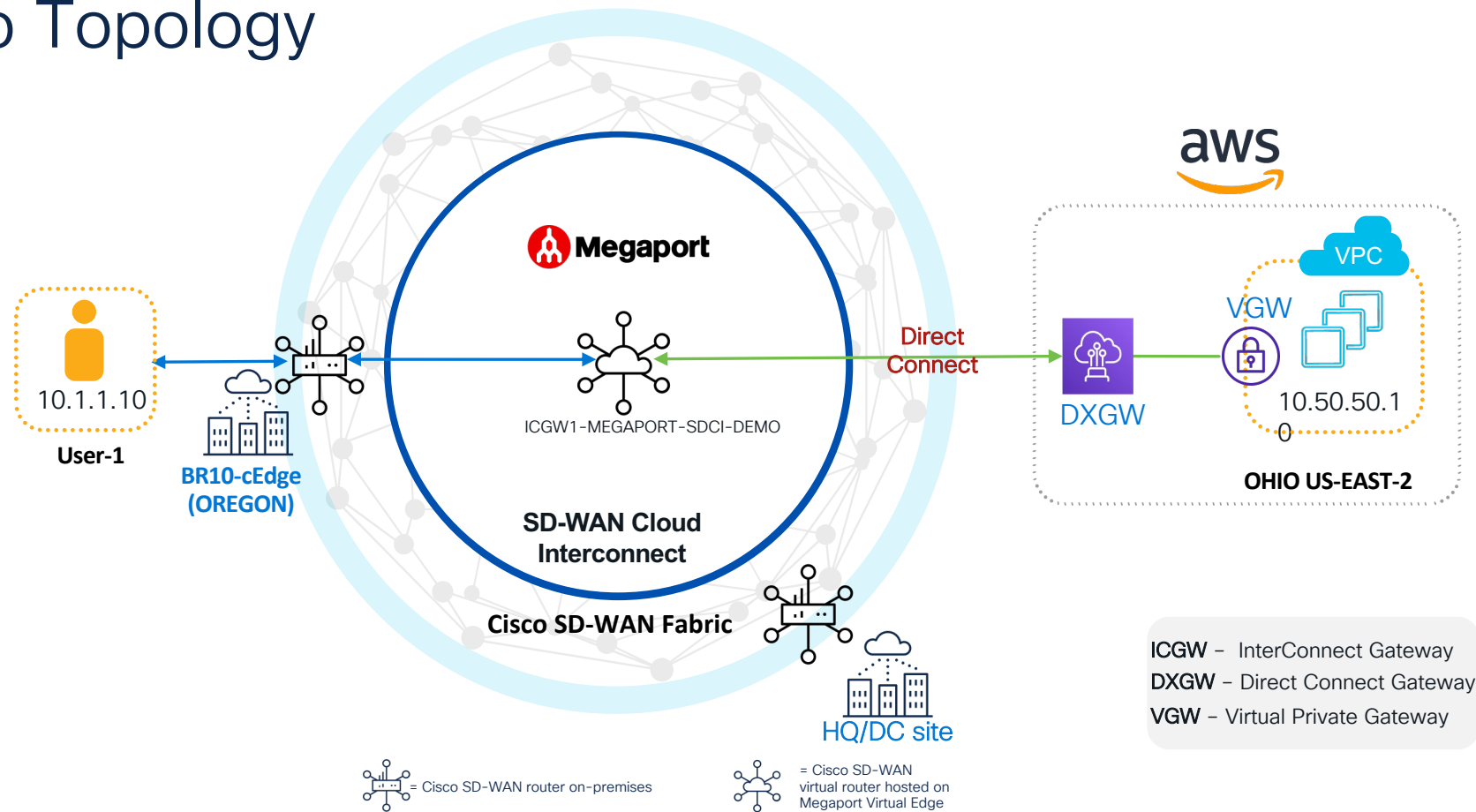
New TLOC Interface:

- Unbound Loopback
- New backbone connections to other regions create a new sub-interface, but utilize existing Loopback, Equinix uses device link
- IP Address is auto-defined
- Static route defined to establish connectivity to remote Loopbacks
- Color defined in *Global Settings*

Demo



Demo Topology



- Overview
- Devices
- Tunnels
- Security
- VPN
- Logs
- Multicloud

CONTROLLERS

1	1	1
vBond	vSmart	vManage

WAN Edges

1
Reachable

CERTIFICATE STATUS

0
Warning

LICENSING

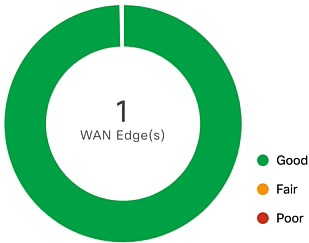
0
Assigned
1 Unassigned

REBOOT

6
Last 24 hrs

Actions

WAN Edge Health



Geography All WAN Edges

Site BFD Connectivity (1)

BFD Connectivity	Site
Full	0
Partial	0
Unavailable	1

Transport Interface Distribution

< 10 Mbps	3
10 Mbps - 100 Mbps	0
100 Mbps - 500 Mbps	0
> 500 Mbps	0

View Details

WAN Edge Inventory

Total	10
Authorized	10
Deployed	1
Staging	0

Transport Health

By Loss 24 Hours



Top Applications

VPN - All 24 Hours



No Data to Display

Summary

Steps done in Demo – Summary

1. Attached Service-VPN template to Interconnect device template

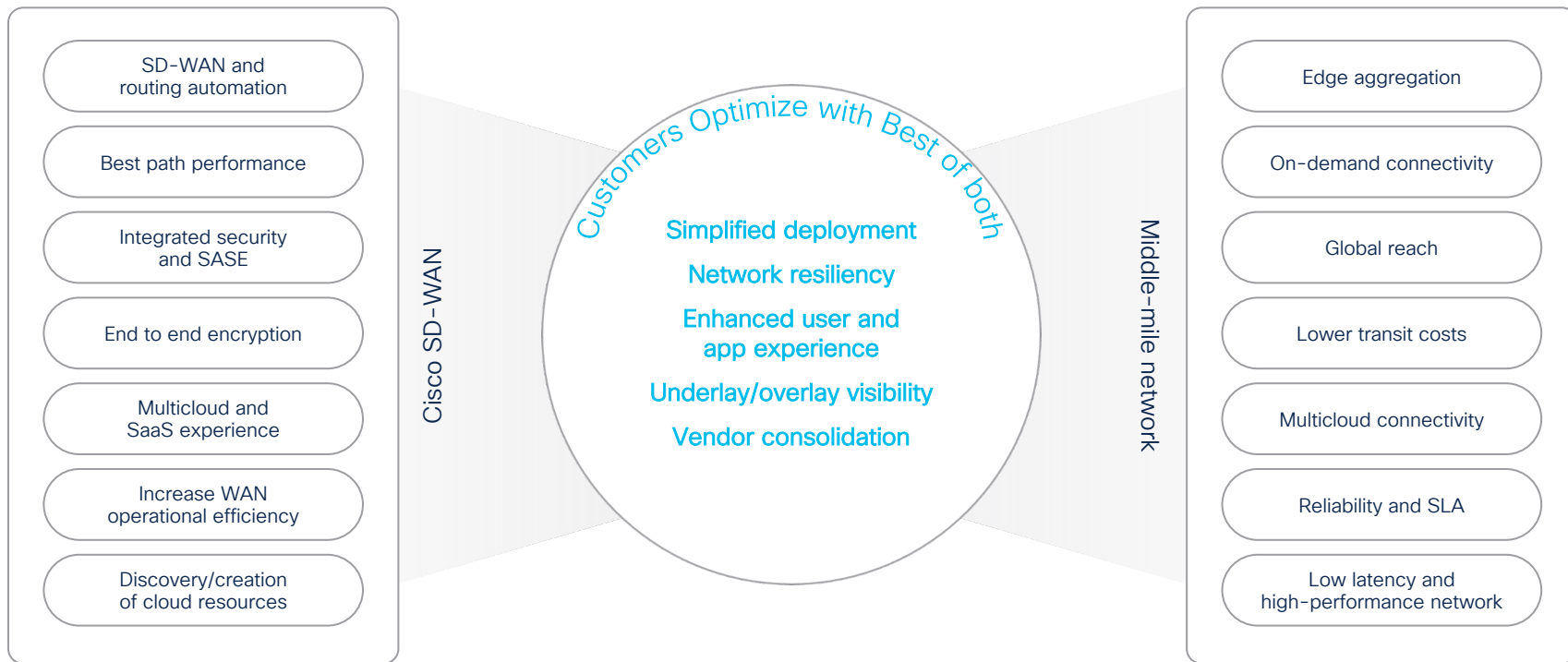
2. Associate Interconnect Account

3. Interconnect Global Settings configuration

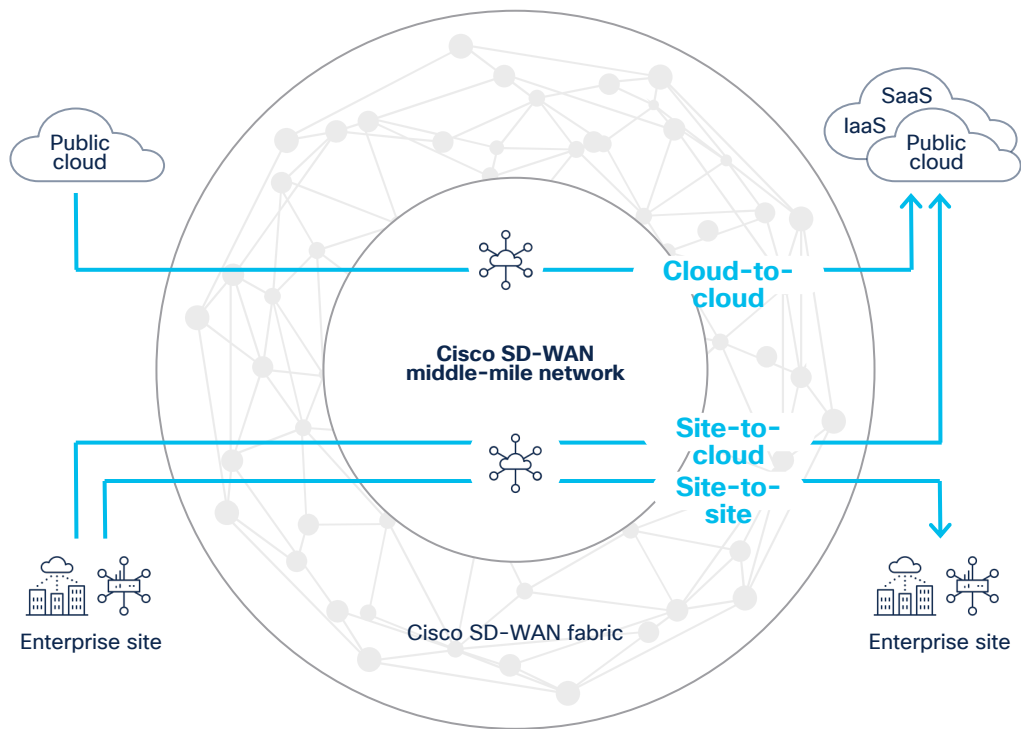
4. Create Interconnect Gateway router

5. Interconnect connectivity

Best of both world



Improved Application Experience through middle-mile!



Cisco SD-WAN delivers an optimized global network by provisioning a private backbone via API, to directly and securely interconnect cloud and enterprise sites

IT providers can accelerate their cloud transformation journey with on-demand consumption to connect any network, anywhere, anytime

Network admins benefit with full stack automation that addresses today's low cost and low latency requirements



= Cisco SD-WAN virtual router hosted at mid-mile provider's colocation/PoP



= Cisco SD-WAN router on-premises

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The bridge to possible

Thank you

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