The bridge to possible

Webex platform infrastructure

Where, How and Why we do it like this?
BRKCOL-2990

Harold Pulhug

Cisco Webex App

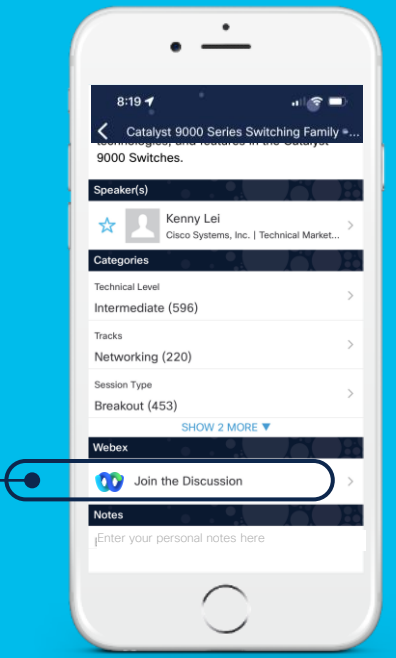
Questions?

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 until February 24, 2023.

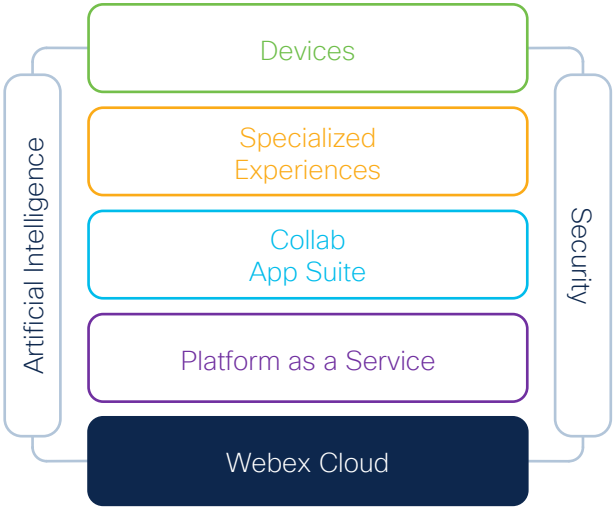


Agenda

- Introduction
- Webex Cloud
- Webex Services
- Webex High Availability
- Webex Connectivity
- Conclusion

Webex Cloud

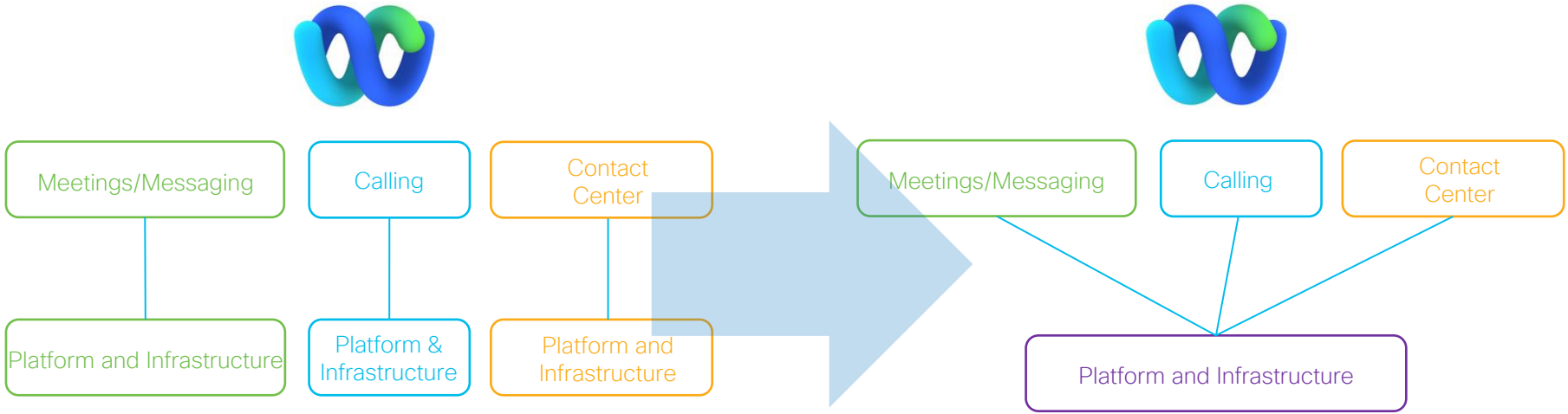
Webex Cloud



The robust, reliable, scalable, extensible, and secure platform foundation of everything we do in Webex, today and tomorrow

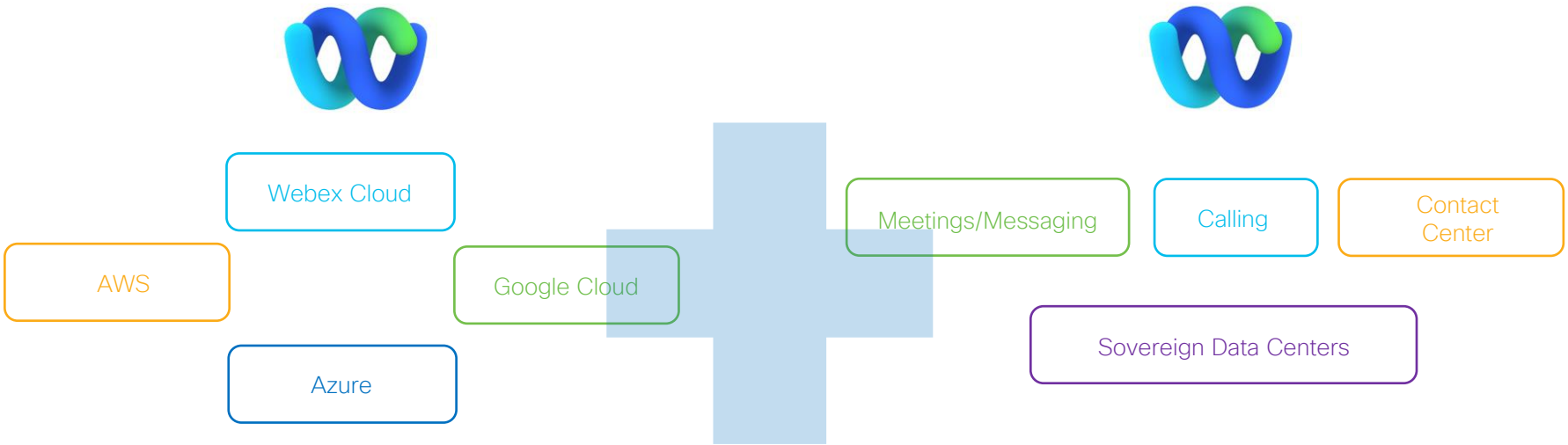
Combines Webex Datacenters and Cloud Service Providers into a seamless hybrid cloud with proscriptive operational and delivery models

Webex … a suite of services



Our challenge is to take traditionally independent services with separate platforms, infrastructure and deployment processes …and unified them and promote interoperability

Private/Public Clouds and Sovereign SaaS

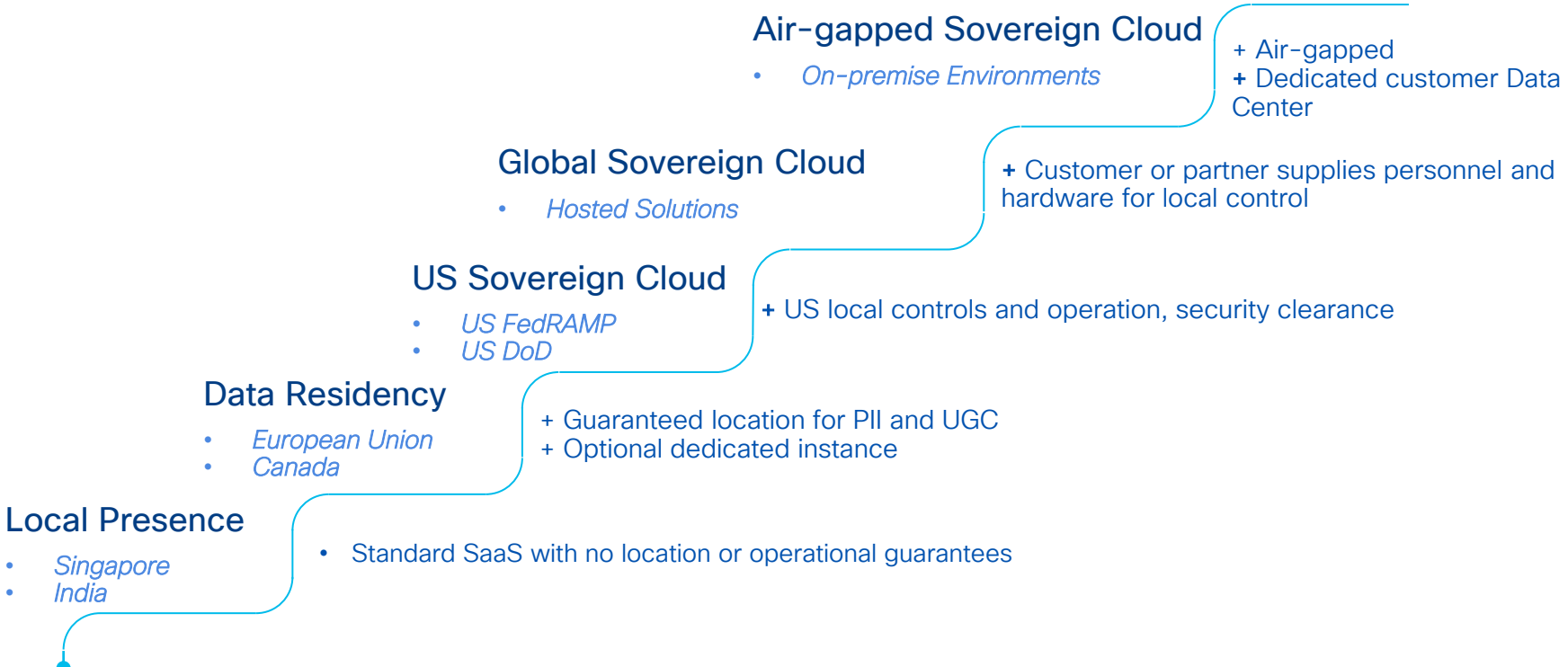


Over the past few years, we focused on a “hybrid cloud” approach to service deployments

Running hot in Webex data centers and bursting peak loads to the Public Cloud + targeting rapid new market access with Public Clouds

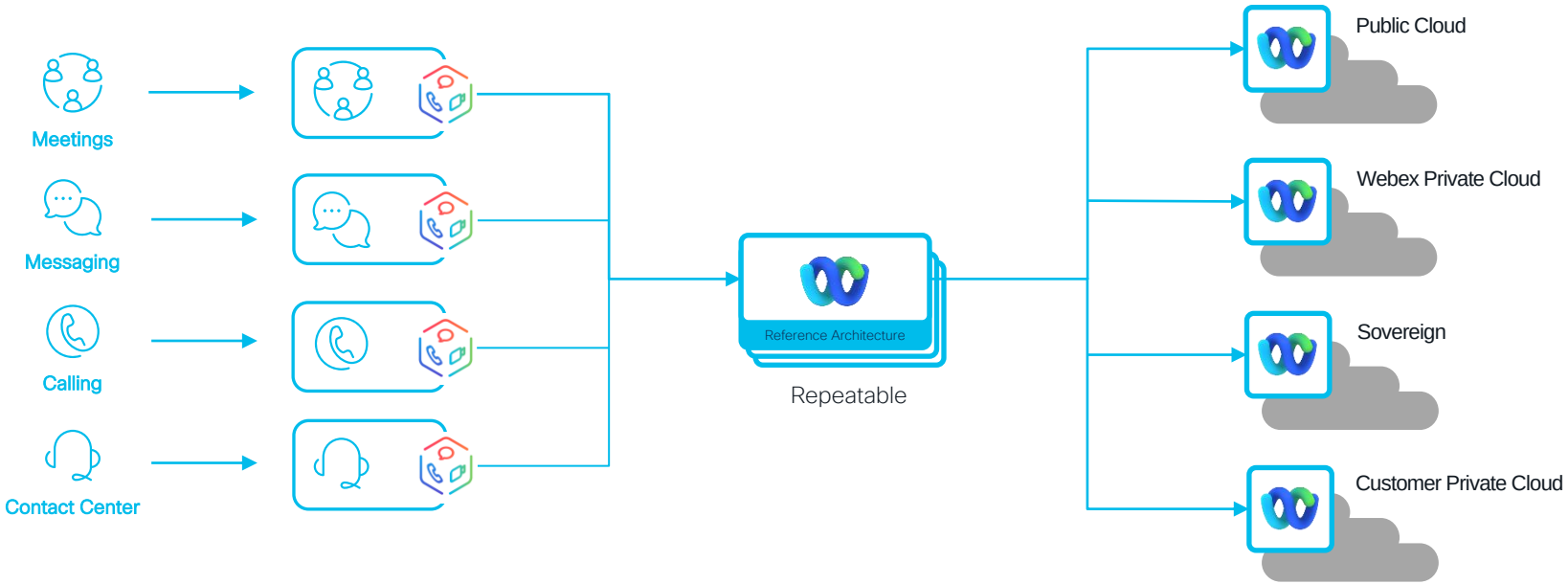
However… recent data residency and sovereignty requirements are driving collaboration services into specific or restricted environments

Collaboration Ladder of Service Deployments



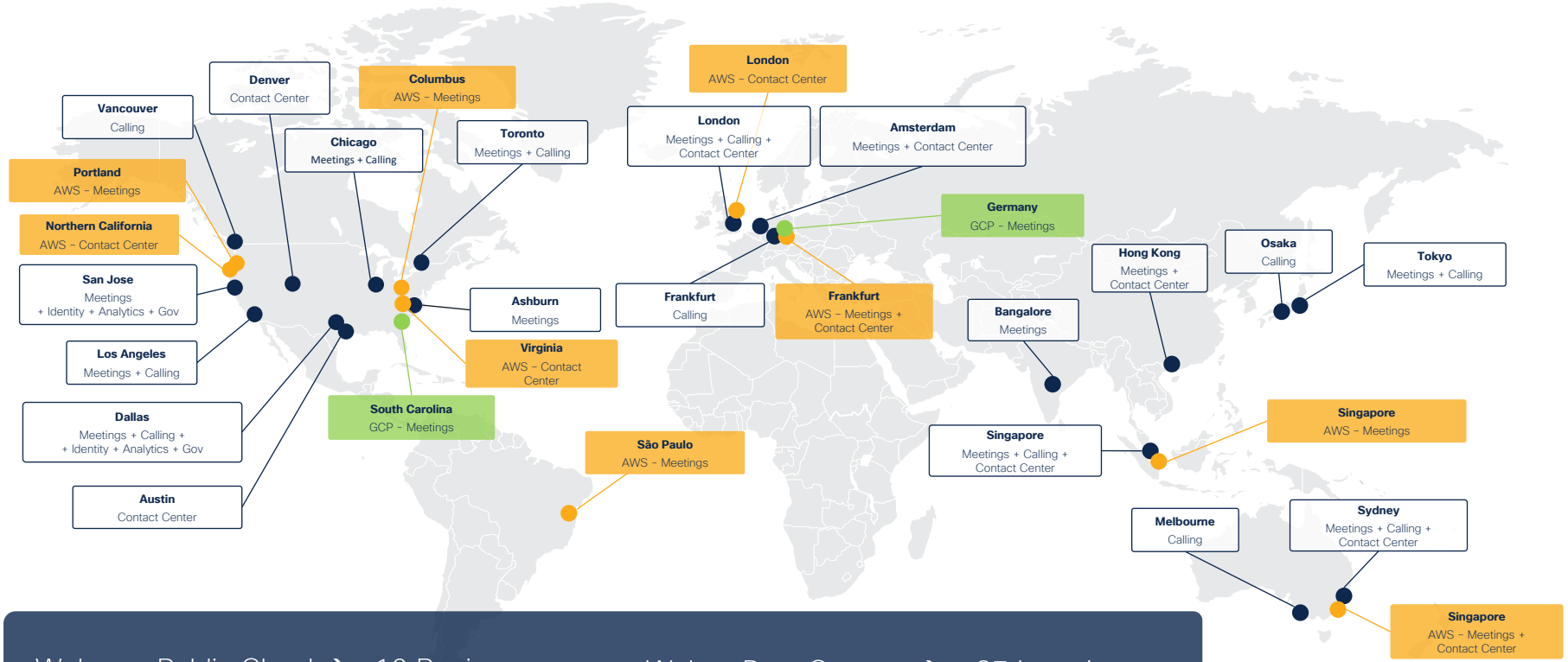
Deployment Repeatability

Enabling consistency, reliability and supportability across environments



Webex Cloud Landscape – Pre COVID

Cisco Webex



Webex + Public Cloud → ~16 Regions

Webex Data Centers → ~ 37 Locations

Then 2020 came…

The COVID pandemic stressed our services

Our infrastructure and platforms were not scalable enough to meet the unprecedented growth observed

Only a fraction of Webex services were ”Cloud Ready”

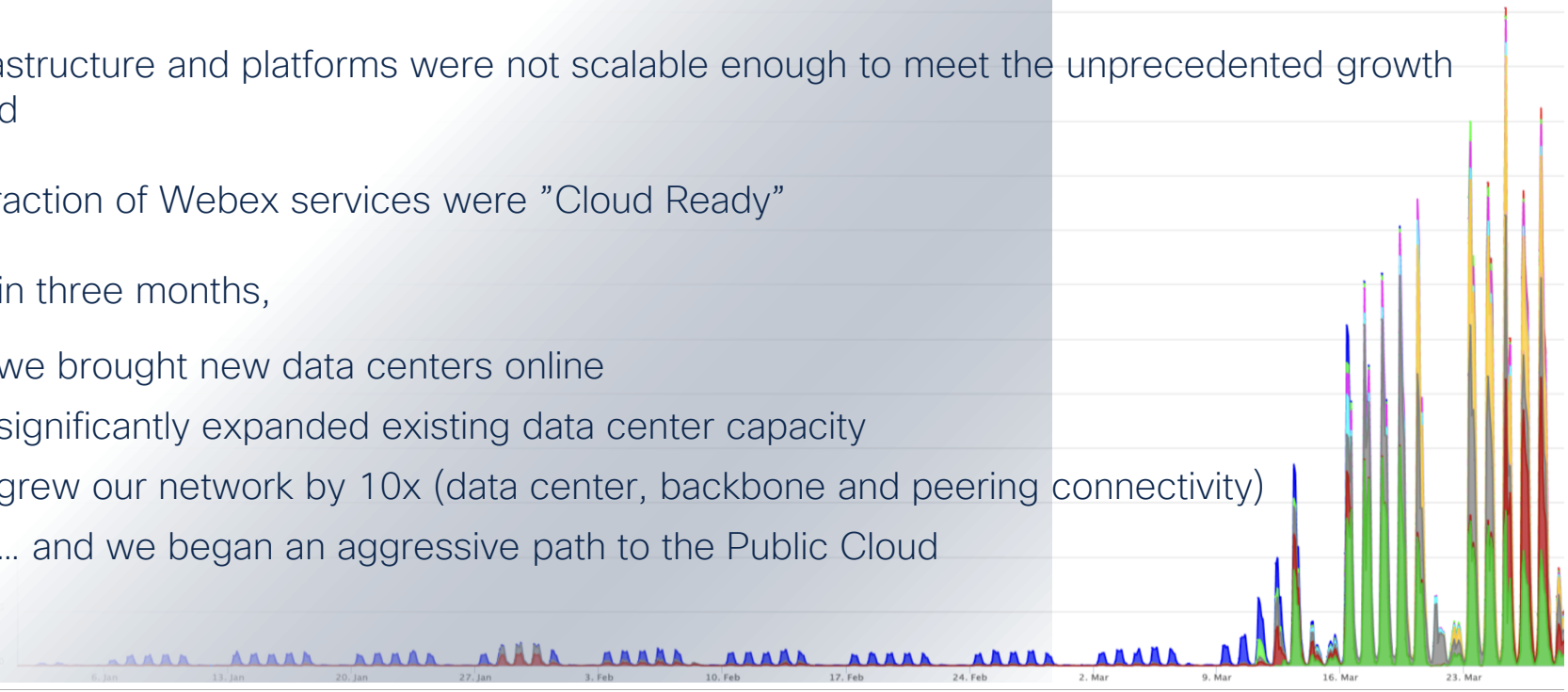
But within three months,

we brought new data centers online

significantly expanded existing data center capacity

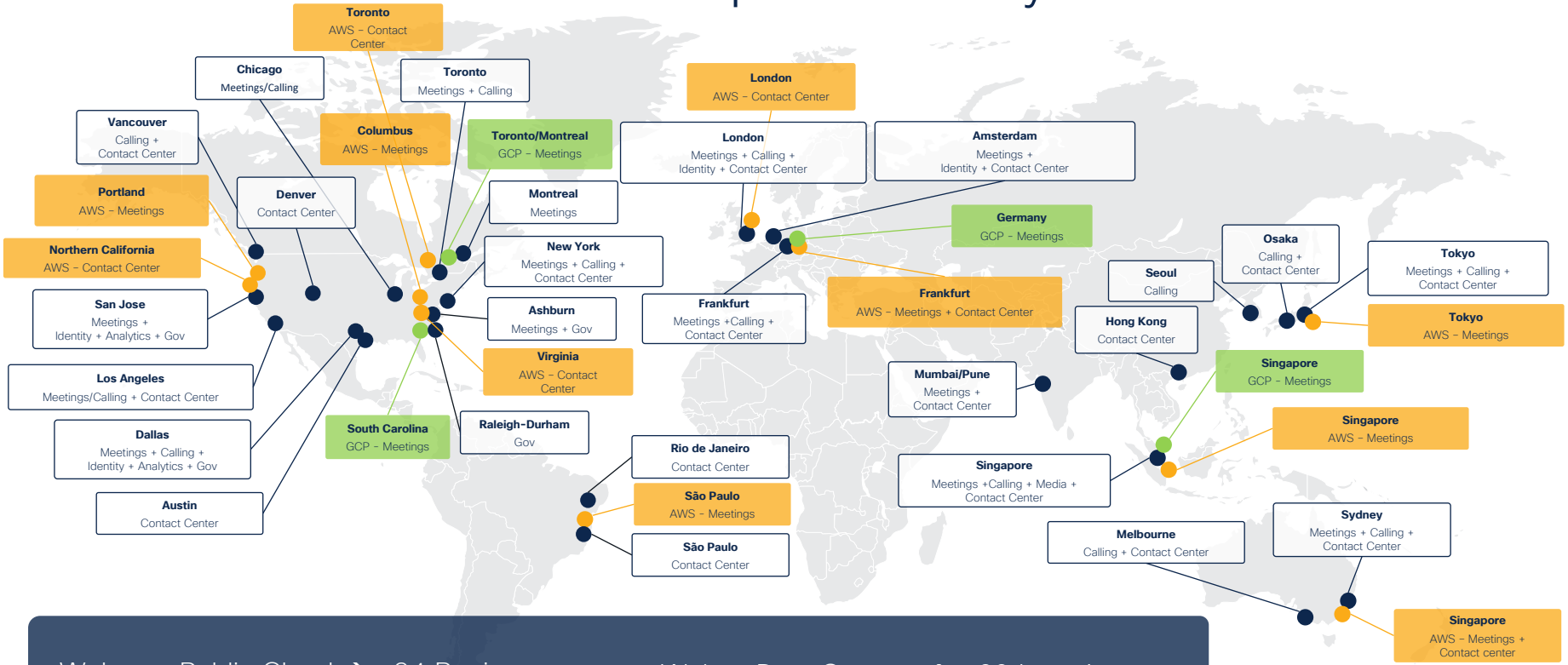
grew our network by 10x (data center, backbone and peering connectivity)

… and we began an aggressive path to the Public Cloud



Webex Cloud Landscape – Today

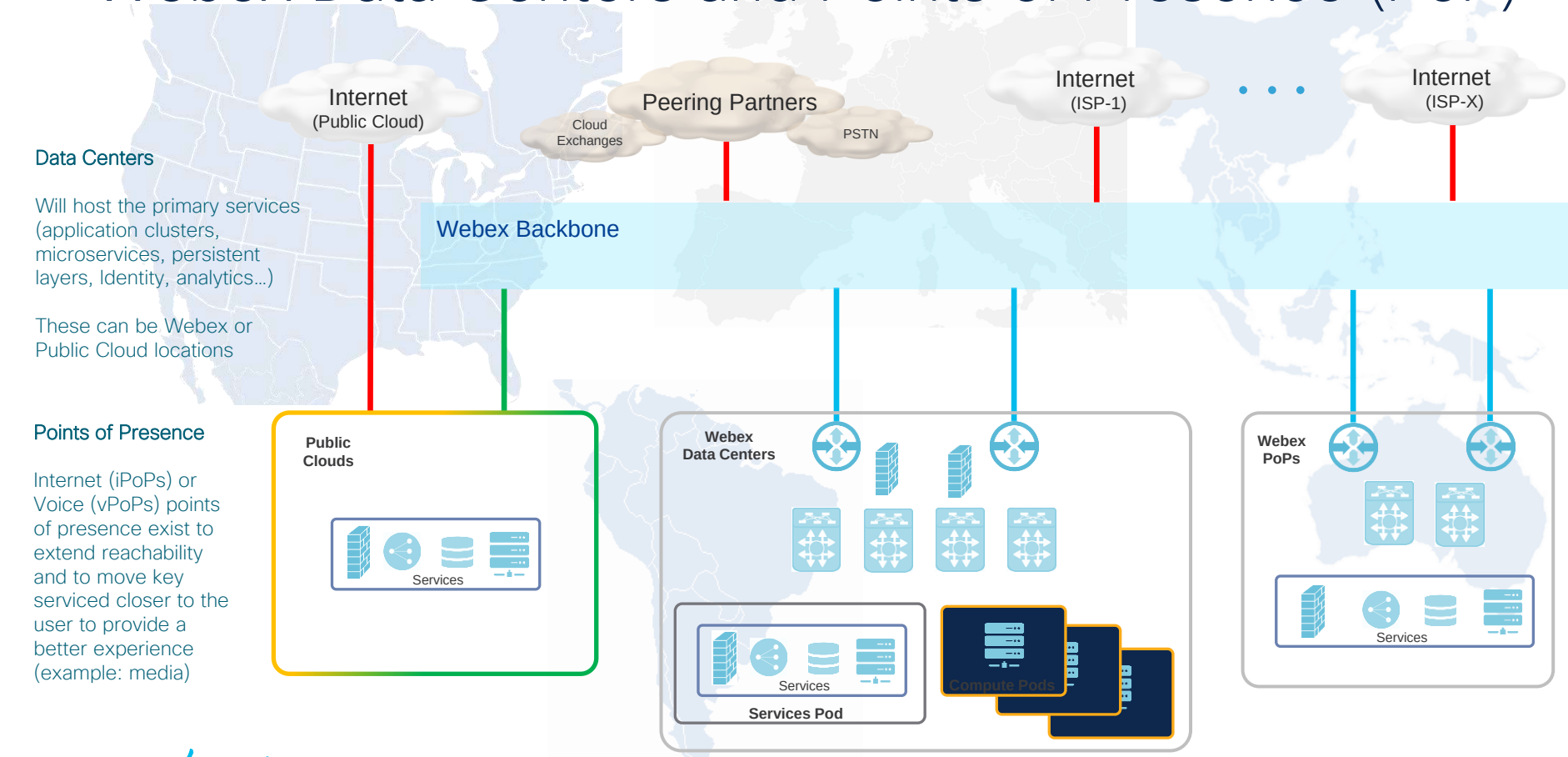
Cisco Webex



Webex + Public Cloud → +24 Regions

Webex Data Centers → ~60 Locations

Webex Data Centers and Points of Presence (PoP)



Data Centers

Will host the primary services (application clusters, microservices, persistent layers, Identity, analytics…)

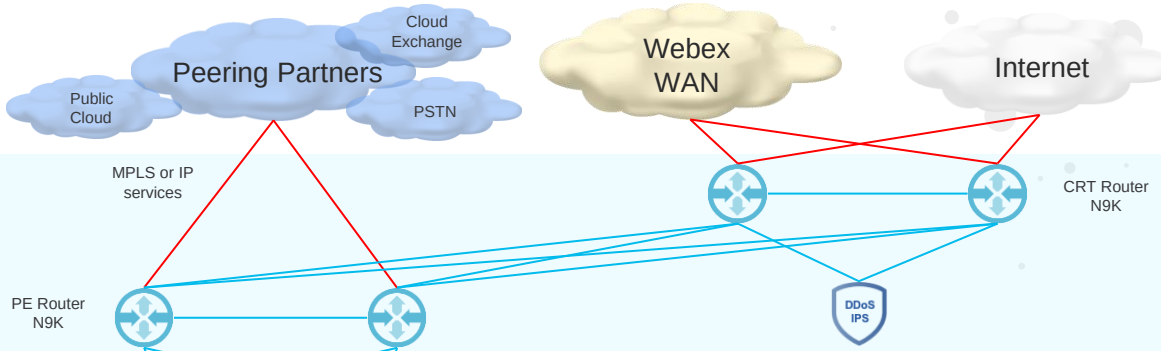
These can be Webex or Public Cloud locations

Points of Presence

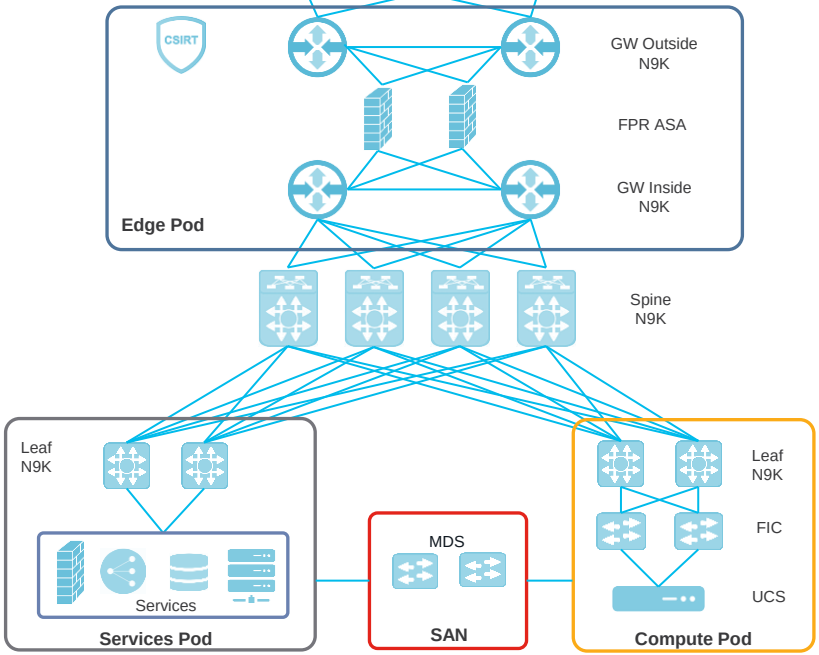
Internet (iPoPs) or Voice (vPoPs) points of presence exist to extend reachability and to move key serviced closer to the user to provide a better experience (example: media)

Webex Data Center Deployment

Backbone Layer



Data Center Layer



Edge Pod

- Responsible for providing network connectivity in and out of the data center
- Hosts data center edge Firewall cluster

Services Pod

- Storage
- Load balancers
- Database
- Services (East/West) firewalls
- DNS
- Monitoring + tools services

Data center deployment model based on the ACI data center design

Backbone layer design leveraged for greater scalability, performance and security

- ECMP routing
- High capacity 100G
- Introduces IPS at the edge (security and fraud requirements)

Standard base design – Compute Pod capacity

- 8 Compute racks
- Up to 320 UCS servers (40 servers per rack)
- Hosts Kubernetes, OpenStack and ESXi servers/services
- Horizontally expandable – multiple Compute Pods can be connected to the spine switches

cisco Live!

Webex Services

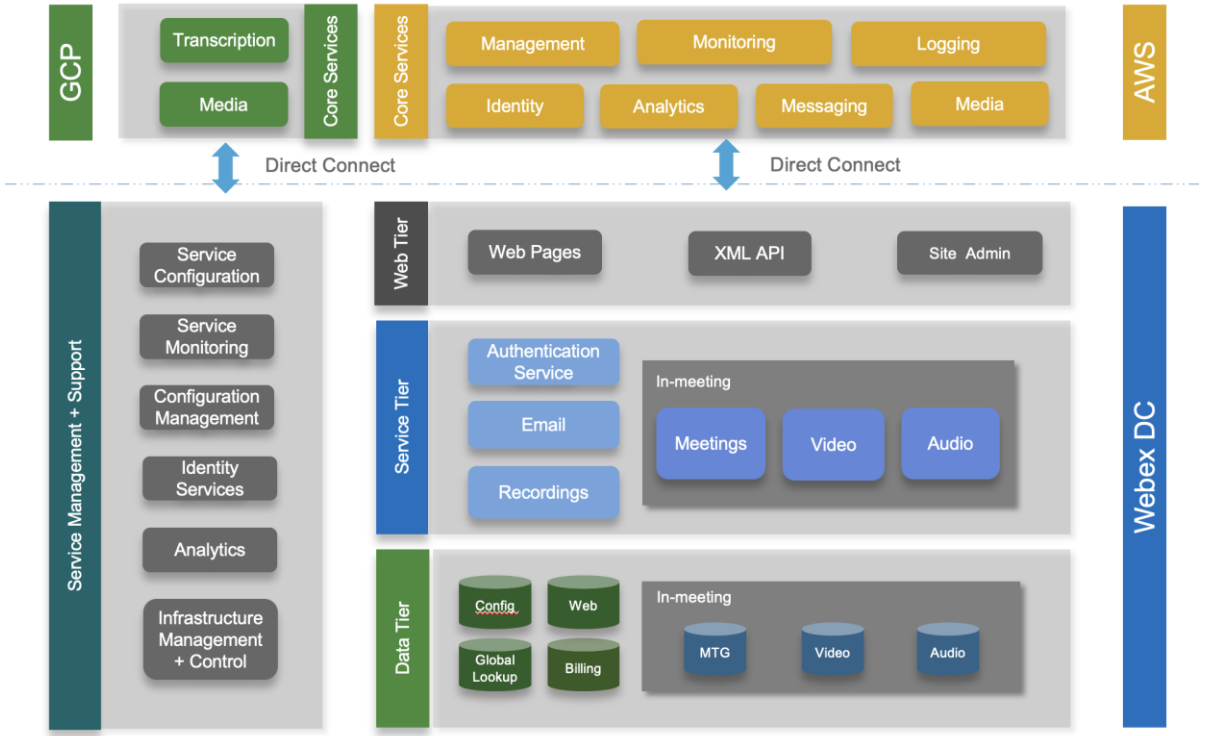
Webex Meetings and Messaging Services

Webex Meetings and Messaging services use a combination of hosted and Public Cloud environments to provide the customers the Webex experience

Webex Meetings is predominately hosted in Webex Data Center and select micro-services (to support Collaboration Meeting Rooms video)

Webex Messaging and core microservices (which supports Meetings and Messaging) are hosted in Amazon's Web Services Cloud and services running in Google Cloud

As Webex services become more tightly integrated, so will be the alignment and use of the Webex Core Services operating in Public Cloud

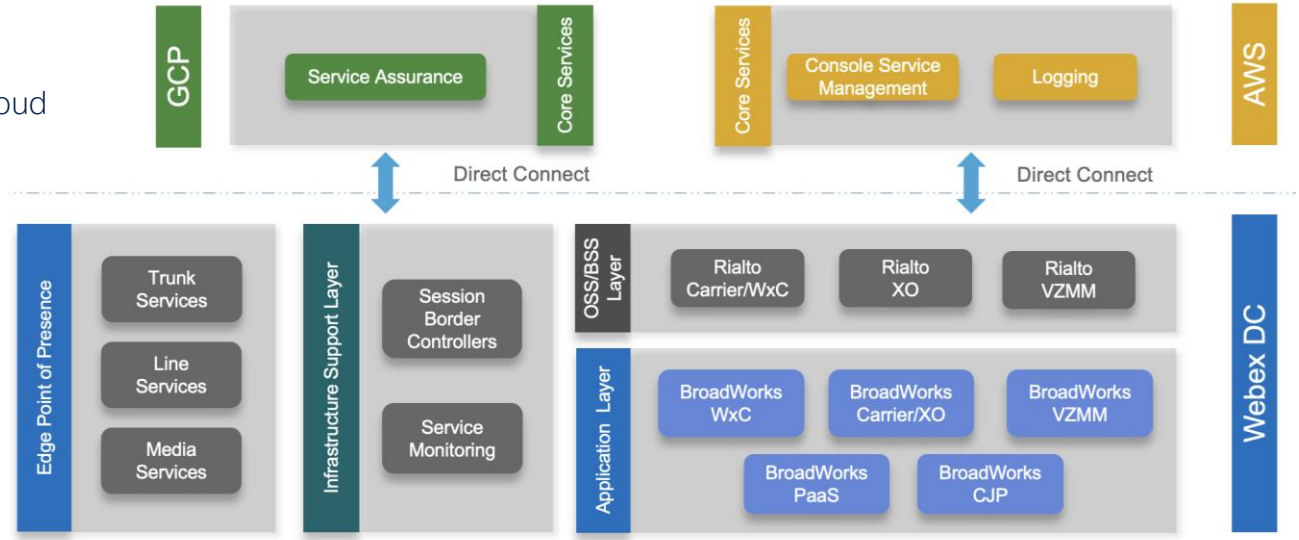


Webex Calling Services

Webex Calling services use a combination of hosted environments and the service deployment is as shown in the diagram

The majority of services are in Webex data centers but there is interest to support the core services in Public Cloud to meet new market or specific opportunities (Webex for Defense)

There is also a greater integration with Webex Contact Center and as we move forward, we will be performing alignment between services within our environments (both Webex and Public Clouds)



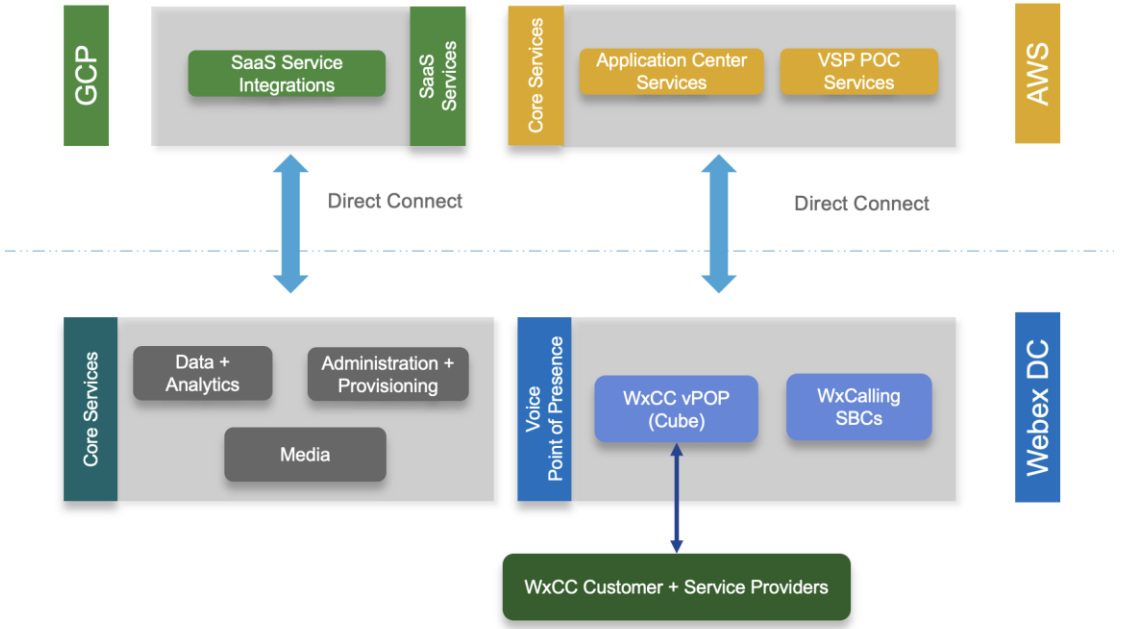
Webex Contact Center Services

Webex Contact Center uses a combination of hosted environments to provide customers the Webex contact center experience

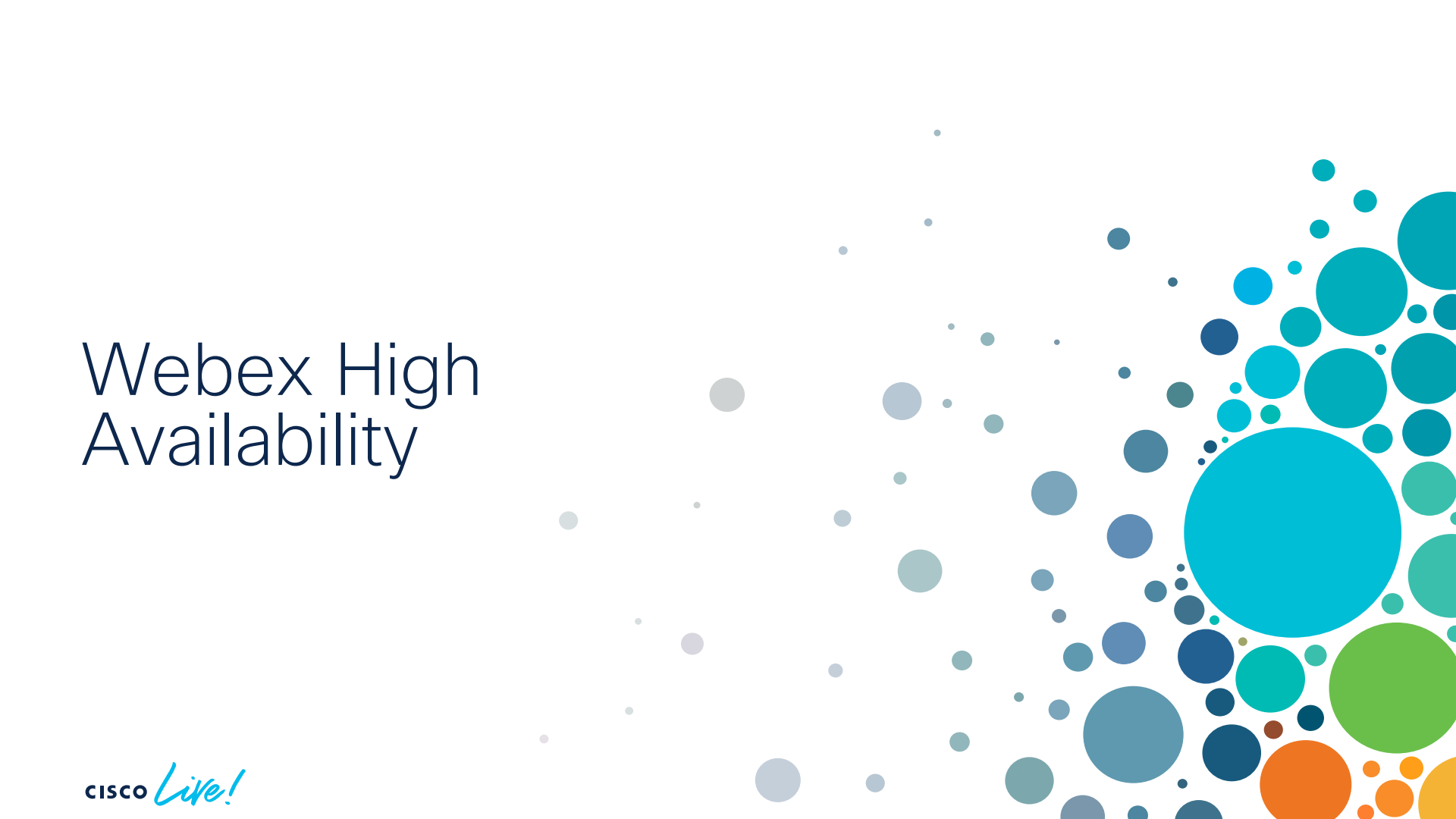
The Contact Center services are separated into Voice Points of Presence (vPOP) and Application Center services, where the Application Data services are hosted in AWS and GCP locations

Voice Points of Presence (vPOP) are more globally distributed in their own data centers

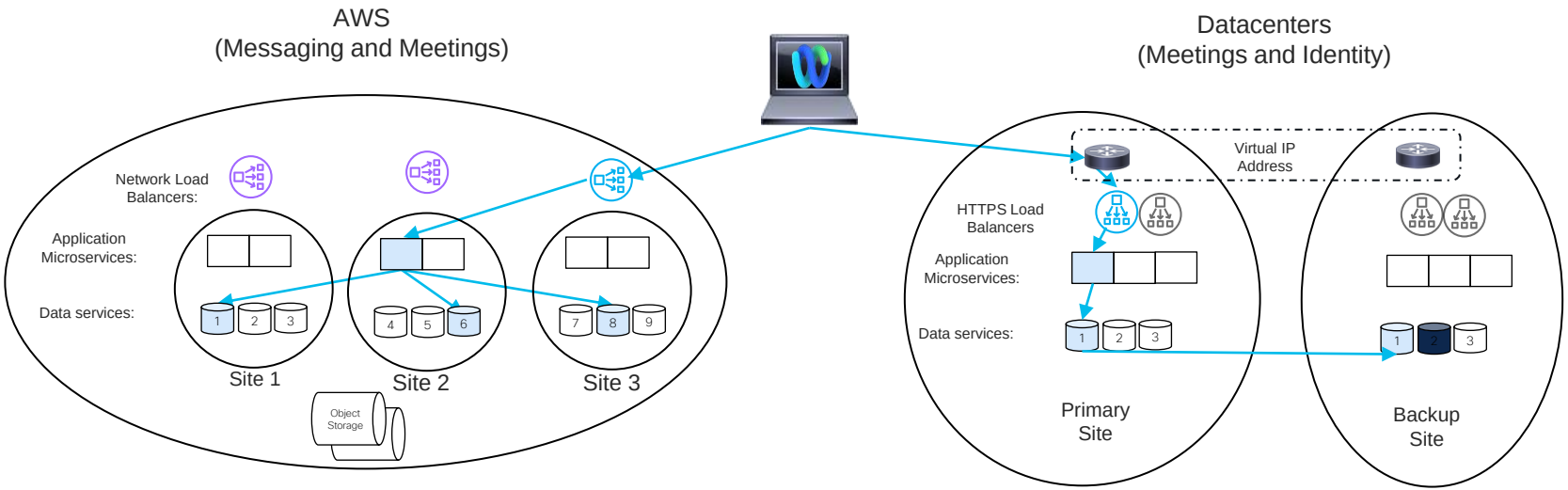
A goal we are working towards is to bring these services into Webex Unified Data Centers



Webex High Availability



Webex Messaging and Meetings High Availability



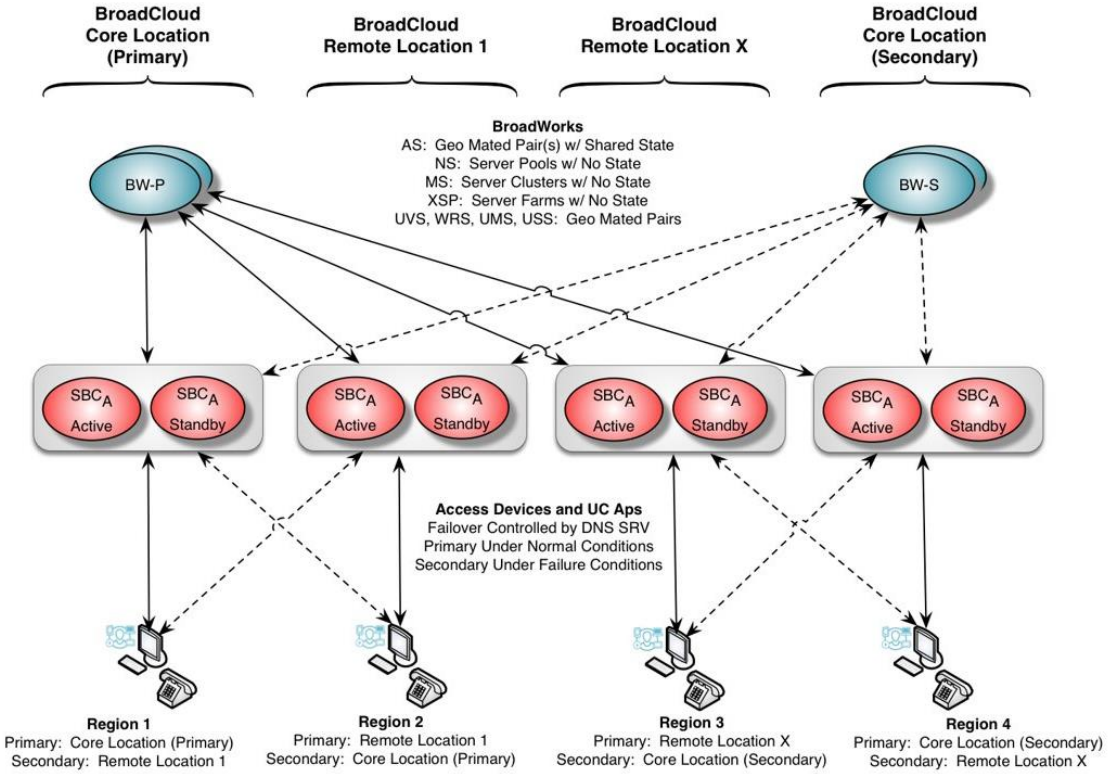
- Network load balancers in each DC load balances traffic to healthy nodes in the DCs.
- Data service stores a replica's of each piece of data in each DC. Quorum reads and writes are used to enforce consistency.
- Sites are in physically separate facilities, with distinct power, cooling, and (per-site redundant) connectivity
- Periodic, encrypted backups from all data service instances are pushed to provider object storage

- Virtual IP addresses (VIPs) are used to route traffic to load balancer in one datacenter which then distributes traffic to healthy nodes. If none are healthy, request is sent to backup site. VIPs can also be manually failed over to the other site.
- Example: primary site in San Jose, backup Dallas Fort Worth (geo-redundancy)
- Data services replicate data from the active datacenter to the inactive one.
- Identity is our common authentication and authorization service used for Calling, Meetings, and Messaging that is run out of our datacenter.

Webex Calling High Availability – Voice Services

The voice services are supported in an Active – Standby mode within a data center location and are supported in an Active-Active mode between physical locations

Application services at primary and secondary sites are connected to voice services at multiple locations



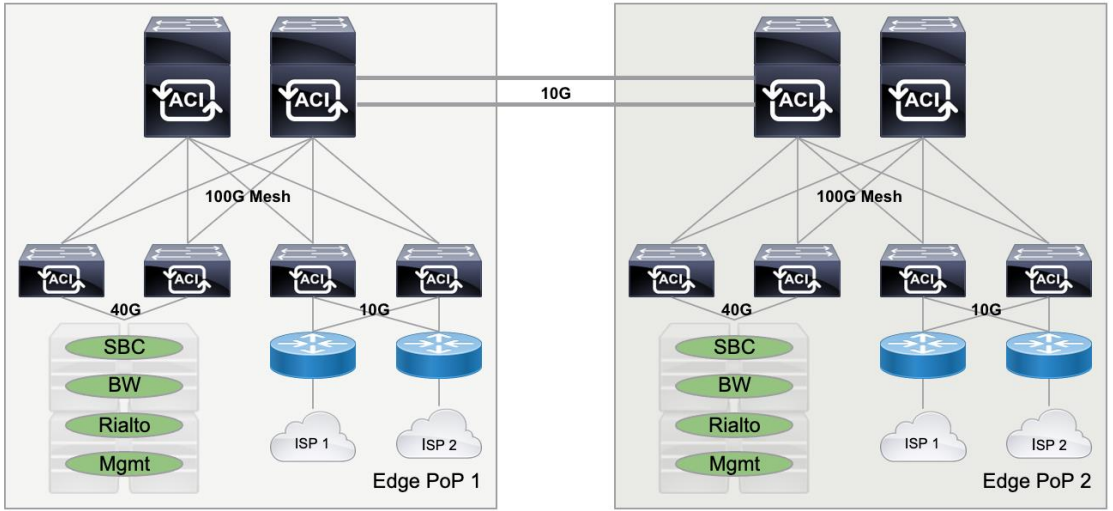
Webex Calling High Availability – Application Services

Webex Calling application services are built in an Active – Active high availability model - between two data centers

User data (database) is dynamically replicated between physical locations

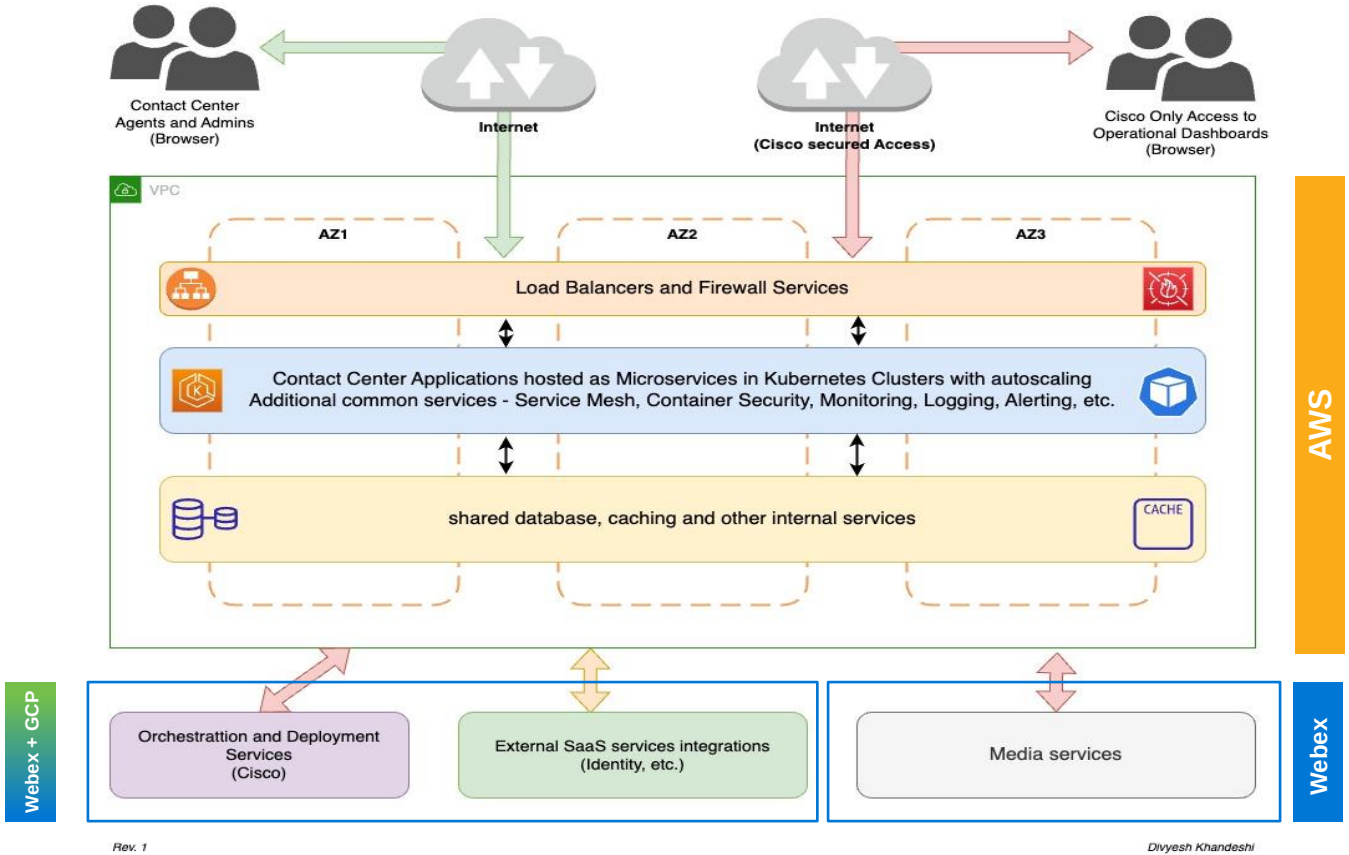
Multi-tenant design

Automated Real-time Monitoring and Alerting



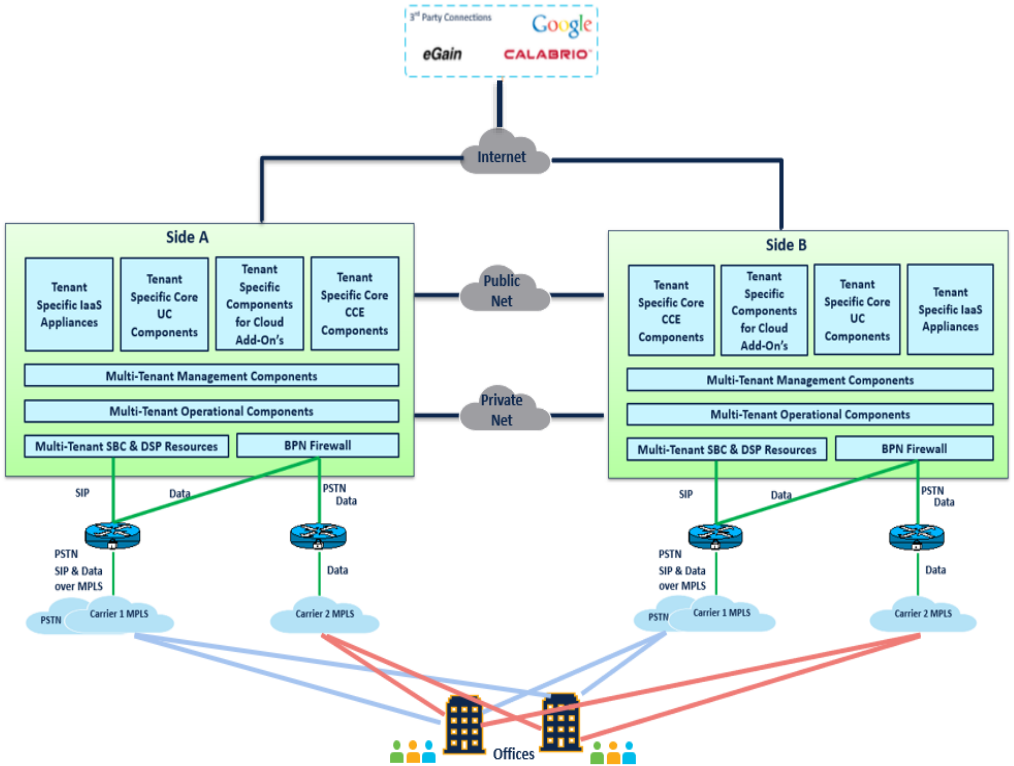
Webex Contact Center (Cloud) High Availability

- Multi-region spread of Datacenters
- Multi-AZ Spread within each DC
- Auto-scaling and auto-recovery
- Multi-tenant
- Cloud Native Technologies
- Modern Layered Security
- Automated Real-time Monitoring and Alerting



Webex Contact Center Enterprise High Availability

Webex Data Centers



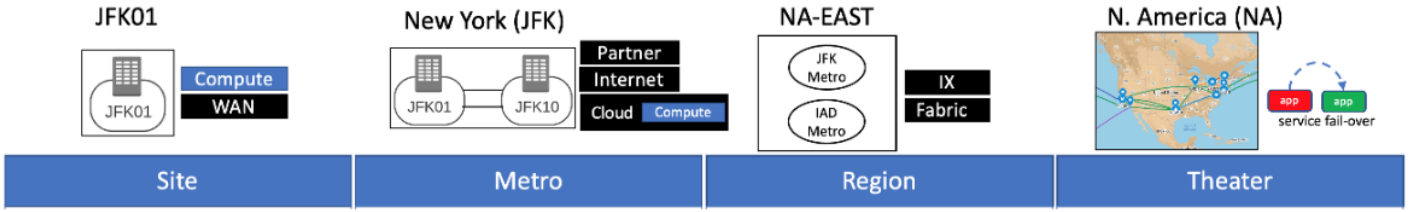
- Geographical redundancy
- Redundant circuits between DCs
- Hot Standby for core components
- Heart-Beat mechanism for failover detection
- Automatic failover and recovery

Webex Connectivity

cisco Live!

Webex Connectivity Expectations

Network boundaries influence traffic flows by limiting how networks are advertised and received. Boundaries limit network complexity and minimize latency for services



	Site	Metro	Region	Theater
Performance Goals	Internal to the Site • Latency: < 1ms one way • Loss: 0.001%	Site-to-site within a Metro • Latency: < 2.5ms one way • Loss: 0.01%	Site-to-site within a Region • Latency: < 25ms one way • Loss: 0.01%	Site-to-site within a Theater • Latency: < 100ms one way • Loss: 0.02%
Shared Services	WAN	• WAN • Internet • DDoS security • Partner Peering Point • Cloud peering Point *if available • Cloud Exchange *if available	• WAN • Internet • DDoS security • Partner Peering Point • Cloud peering Point • Internet Exchange • Equinix Fabric (ECX)	• WAN • Internet • DDoS security • Partner Peering Point • Cloud peering Point • Internet Exchange • Equinix Fabric • DDoS Cloud Peering
General Guidelines	• Compute & Storage are self-contained within a site • IP subnets is limited to a single site. VLANs are not stretched between locations.	• Internet connectivity is self-contained within a Metro	• Internet Exchange (SFI) and Cloud peering connectivity should be limited to the Region's boundary	• Application fail-over between data center sites should occur within the same theater

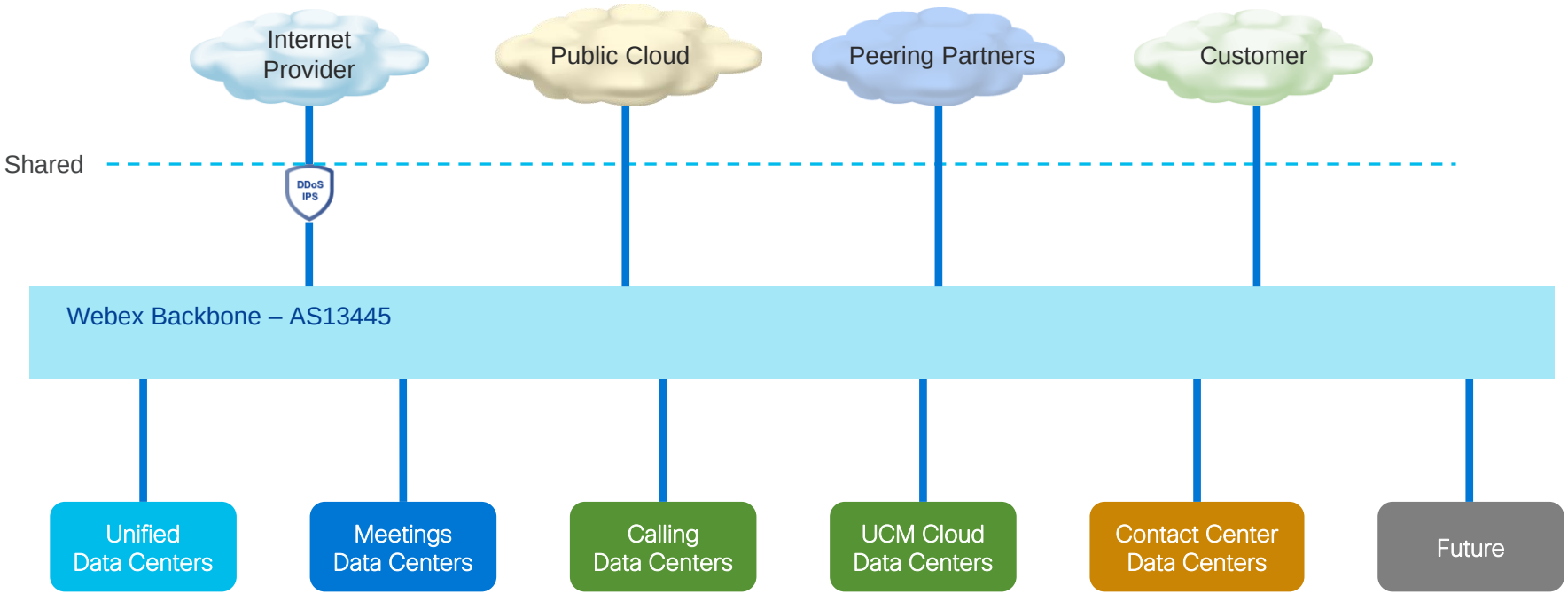
Route Policy Boundaries

Route policies utilize network boundaries to minimize asymmetric routing and influence local connectivity

EBGP	Metro	Region	Theater	Global	Comments
Internet Transit	X				
Internet Exchange	X	X			
SIP PSTN	X	X	X		
Edge Connect	X	X	X	X	Customer controlled route policy
Webex DC to DC	X	X	X	X	Webex originated routes are shared globally

Unified Edge Peering

It starts with getting everything on a common backbone…



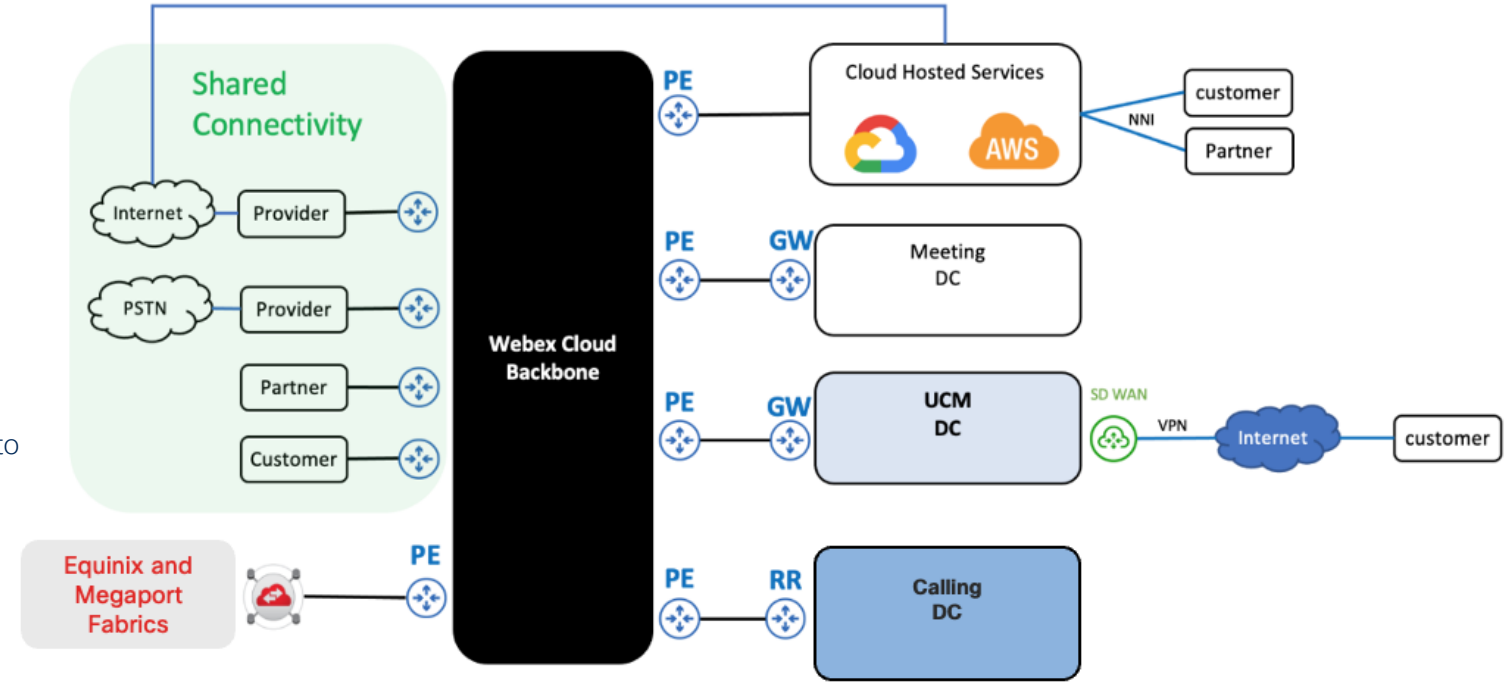
Unified Edge Peering

We weave in the connectivity to the peering providers – Internet, PSTN, Edge Connect…

We do what you see here today

But are actively expanding and looking to simplify connectivity for customers and providers

Example: adding more services to Edge Connect to support Meetings, Calling, UCM Cloud and Contact Center Enterprise…

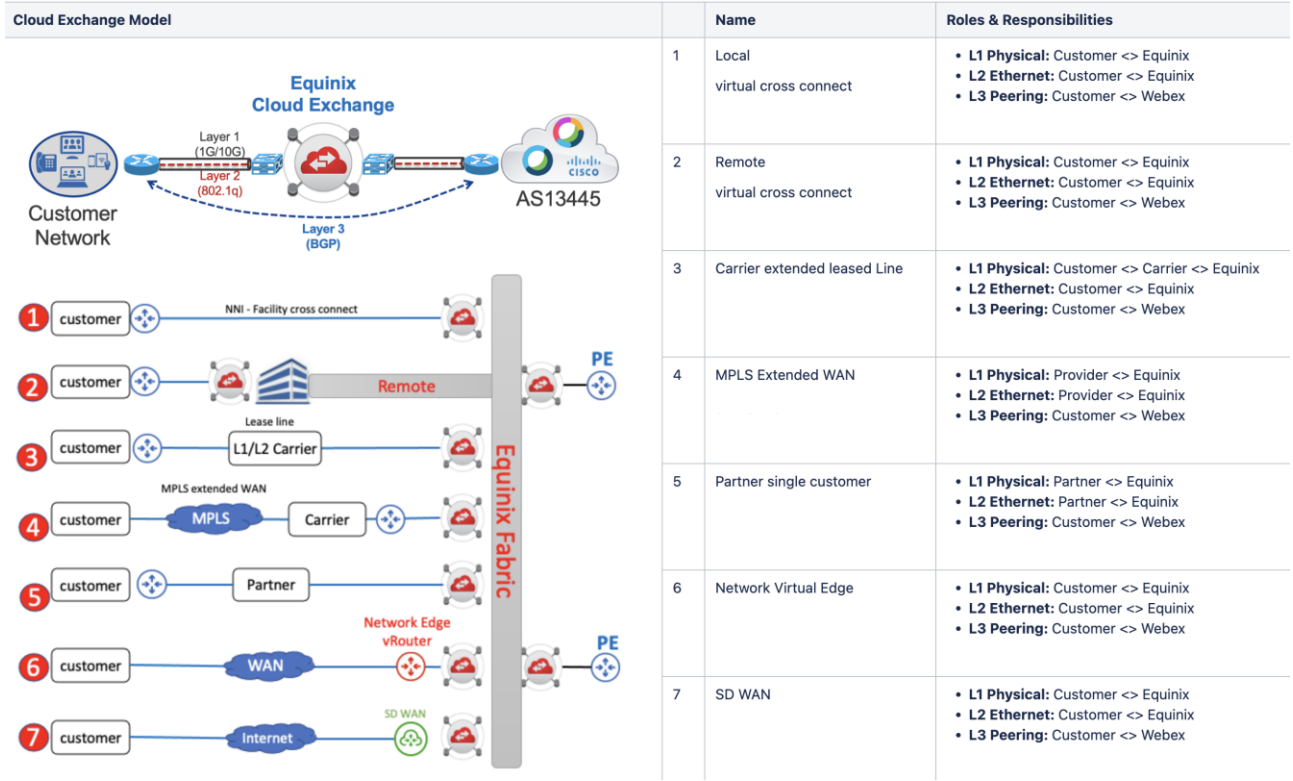


Unified Edge Peering

Edge Connect and how we peer with customers…

There are numerous ways to connect customers to Webex via Equinix Cloud Exchange, Megaport or through an ISP that proxies the connection for the customer

It's important to understand that these connections and that the Layer 3 connection is always between the customer and Webex



	Name	Roles & Responsibilities
1	Local virtual cross connect	• **L1 Physical:** Customer <> Equinix • **L2 Ethernet:** Customer <> Equinix • **L3 Peering:** Customer <> Webex
2	Remote virtual cross connect	• **L1 Physical:** Customer <> Equinix • **L2 Ethernet:** Customer <> Equinix • **L3 Peering:** Customer <> Webex
3	Carrier extended leased Line	• **L1 Physical:** Customer <> Carrier <> Equinix • **L2 Ethernet:** Customer <> Equinix • **L3 Peering:** Customer <> Webex
4	MPLS Extended WAN	• **L1 Physical:** Provider <> Equinix • **L2 Ethernet:** Provider <> Equinix • **L3 Peering:** Customer <> Webex
5	Partner single customer	• **L1 Physical:** Partner <> Equinix • **L2 Ethernet:** Partner <> Equinix • **L3 Peering:** Customer <> Webex
6	Network Virtual Edge	• **L1 Physical:** Customer <> Equinix • **L2 Ethernet:** Customer <> Equinix • **L3 Peering:** Customer <> Webex
7	SD WAN	• **L1 Physical:** Customer <> Equinix • **L2 Ethernet:** Customer <> Equinix • **L3 Peering:** Customer <> Webex

Complete your Session Survey

- Please complete your session survey after each session. Your feedback is important.
- Complete a minimum of 4 session surveys and the Overall Conference survey (open from Thursday) to receive your Cisco Live t-shirt.

- All surveys can be taken in the Cisco Events Mobile App or by logging in to the Session Catalog and clicking the "Attendee Dashboard" at https://www.ciscolive.com/emea/learn/sessions/session-catalog.html

Continue Your Education

Visit the Cisco Showcase for related demos.

Book your one-on-one Meet the Engineer meeting.

Attend any of the related sessions at the DevNet, Capture the Flag, and Walk-in Labs zones.

Visit the On-Demand Library for more sessions at ciscolive.com/on-demand.


cisco
The bridge to possible
Thank you
cisco Live!


CISCO Live!
ALL IN