

Optimizing and Deploying Unified Communications on Cisco SD-WAN

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Agenda

- Setting the Stage
- Cisco SD-WAN UC Feature Overview
- Optimizing Cisco SD-WAN for UC
- Monitoring Your Solution

Setting the Stage

Cisco Calling Portfolio Overview



Unified Communications Manager (UCM)

- All business sizes
- On premises
- Feature-rich



Cisco UC-One¹

- SMB and basic UC
- Multi-tenant cloud
- Service provider-led and branded



Cisco Webex[®] Calling

- Mid-market and large enterprises
- Multi-tenant cloud
- Proven cloud PBX



Unified Communications Manager (UCM) Cloud

- Complex migrations
- Large enterprises and gov't agencies
- UCM/Jabber[®] features

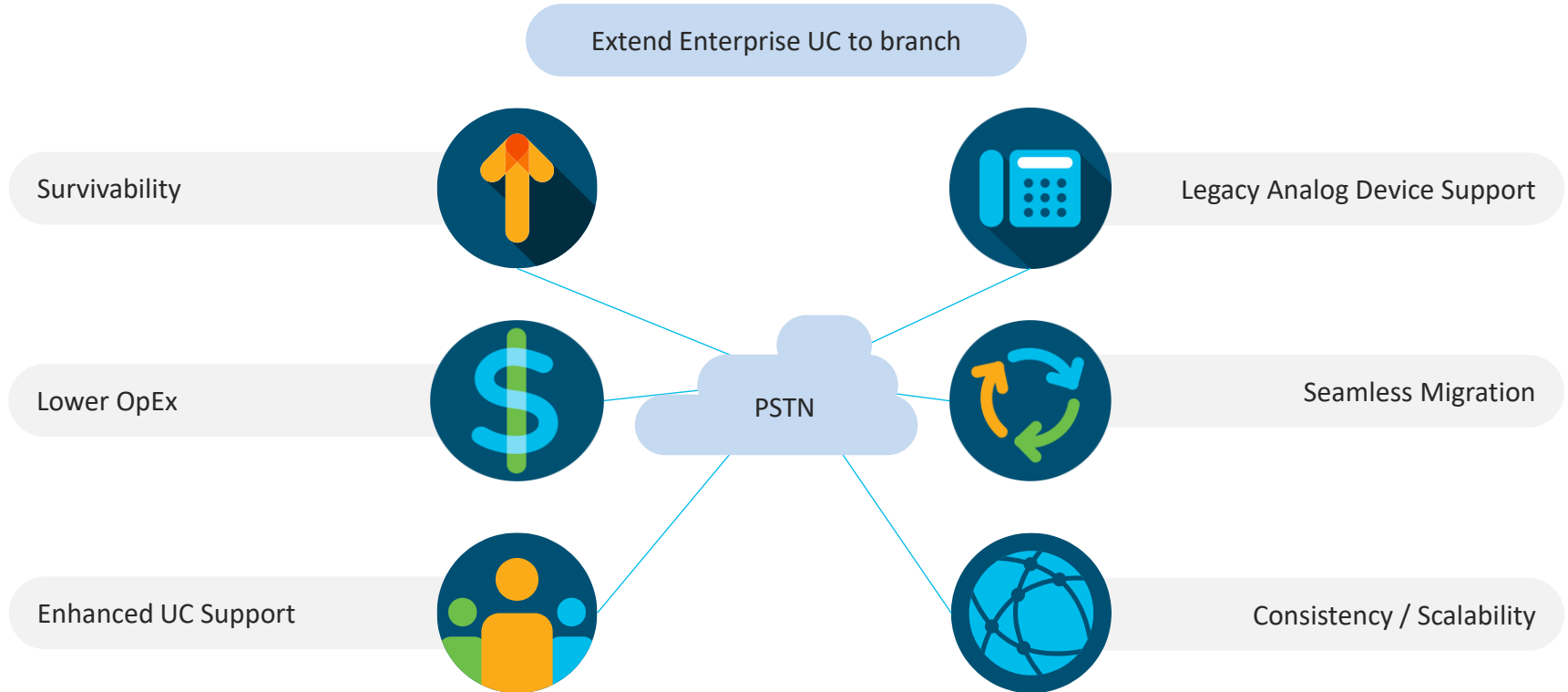
New Webex Teams unified and modular client experience supports all platforms

Broad portfolio | All customer segments | Flexible deployment and migration

1. Working name for new simplified SMB bundle to replace UC-One brand, based on the Webex services delivered and branded by Cisco service provider channel partners



What Do Customers Want?



Cisco SD-WAN UC Feature Overview

Unified Communications Summary (as of v20.3)

Problem

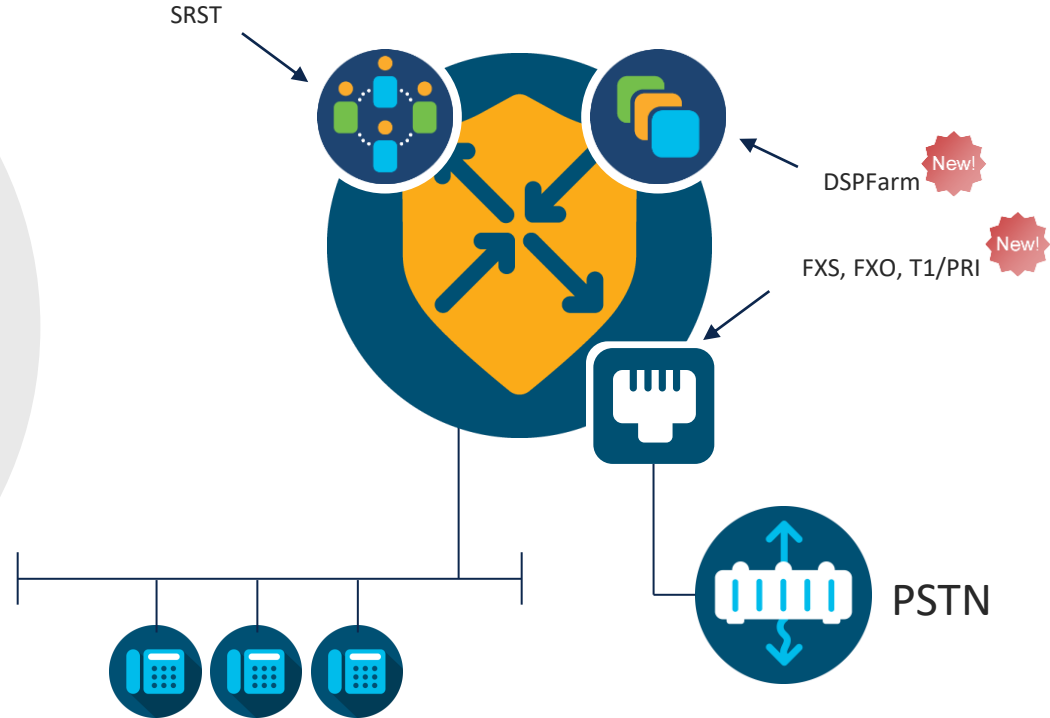
Customers seeking UC and SD-WAN integration were previously forced into a two-box solution at the branch. One box to terminate the SD-WAN fabric and another to handle UC termination. This increased cost, complexity and operational overhead.

Solution

As of v20.1 and 17.2.1 (Phase 1), Cisco SD-WAN now supports UC and SD-WAN within a single box (analog, basic SIP and SRST). Version 20.3 / 17.3 (Phase 2) adds additional capability for T1/PRI termination, DSPfarming and Fax Passthrough.

Caveats / Prerequisites

SIP only, cEdge only, 4GB DRAM is supported, CUBE is not supported, H323/MGCP/SCCP are not supported, T1/PRI **requires dedicated PVDM**



FXO/FXS Support on SD-WAN



Connect to PBX or key systems, or provide off-premises connections to the public switched telephone network (PSTN)

Built-in DSP with high analog port-density support

NIM-2FXO
NIM-4FXO
NIM-2FXSP
NIM-4FXSP

NIM-2FXS/4FXOP
SM-X-8FXS/12FXO
SM-X-16FXS/2FXO
SM-X-24FXS/4FXO

SM-X-72FXS



T1/E1 Voice PRI Support on SD-WAN

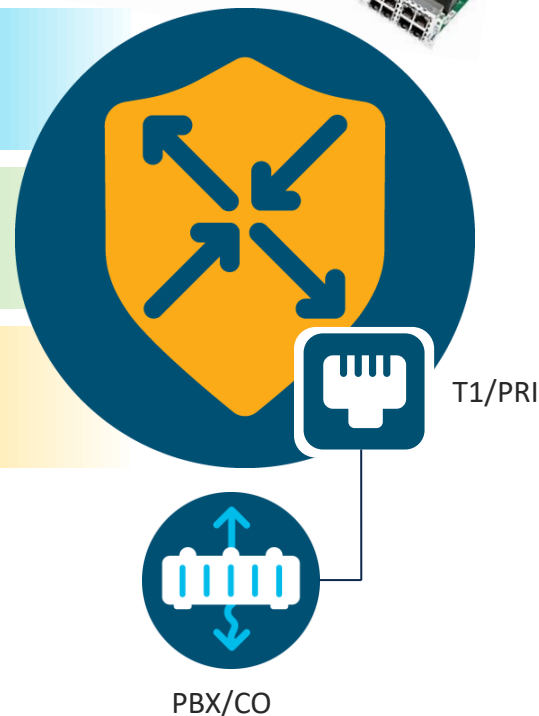


Packet Voice Solutions support (PBX & Central-Office Connectivity)

PSTN termination with multi calls per port: T1 PRI (23) and E1 (30)

NIM-1MFT-T1E1
NIM-2MFT-T1E1
NIM-4MFT-T1E1
NIM-8MFT-T1E1

NIM-1CE1T1-PRI
NIM-2CE1T1-PRI
NIM-8CE1T1-PRI



- T1/E1 Voice module contains onboard PVDM4 Slot
- PVDM4 Module **required** for T1/E1 packetization (**purchased separately**)
- Supported ISDN Switchtypes: QSIG, NET5, NTT, 4ESS, 5ESS, DMS100, and NI
- Verify T30x timer support

DSPFarm Services for SD-WAN Voice

Multi party audio conferencing with (8,16, 32) participants

Save bandwidth with audio codec transcoding

Media Termination Point for IP Calls
(DTMF Conversion, SIP call bridging, Trusted Relay Point, etc.)



Form Factor:

SM-X-PVDM-500
SM-X-PVDM-1000
SM-X-PVDM-2000
SM-X-PVDM-3000



Form Factor:

PVDM4 – 32
PVDM4 – 64
PVDM4 – 128
PVDM4 – 256



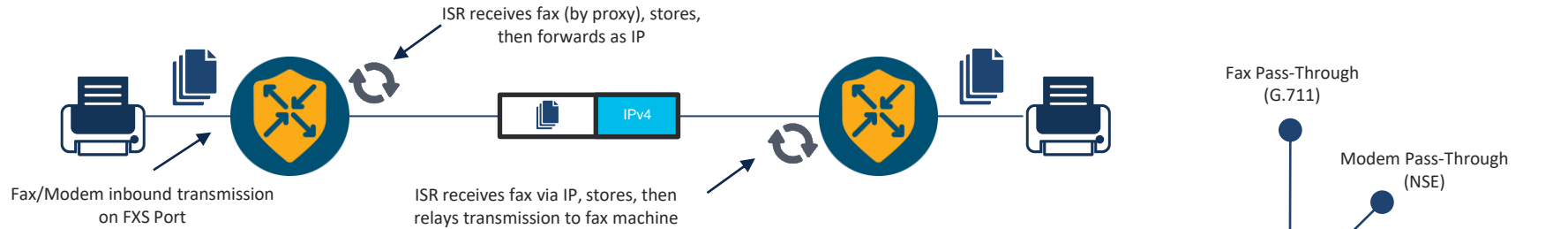
Form Factor:

NIM-PVDM-32
NIM-PVDM-64
NIM-PVDM-128
NIM-PVDM-256



NIM-PVDM Modules for IP Voice Services
SM modules for high density DSP usage

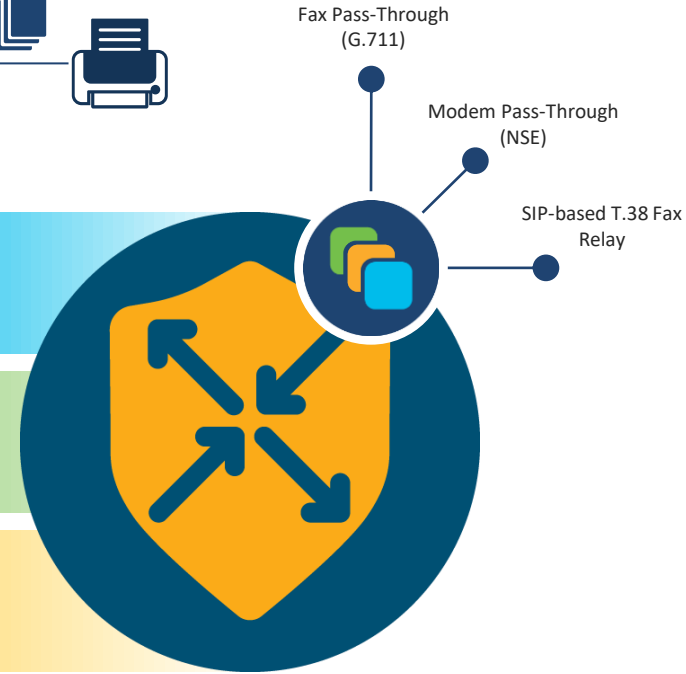
Fax/Modem Support on SD-WAN



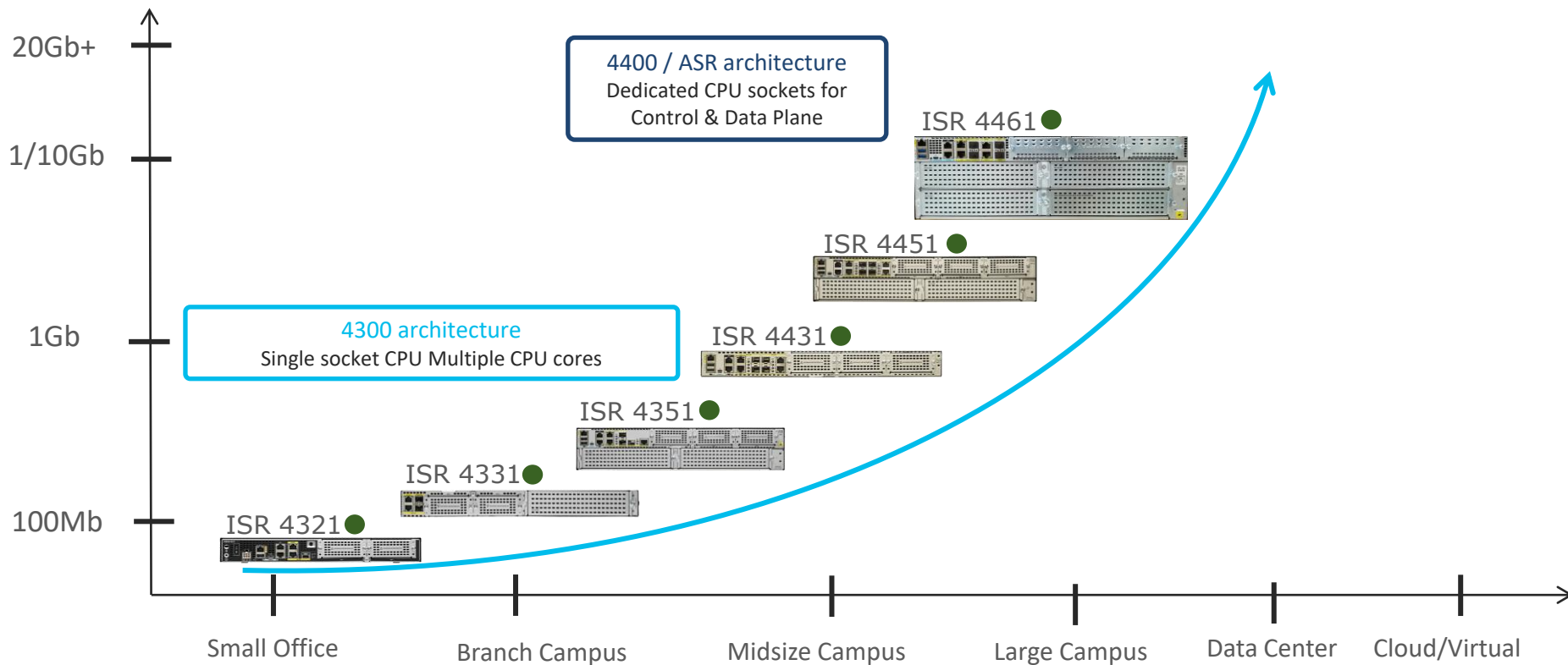
Investment protection (use existing Fax/Modem with UC advantages)

Industry standard T.38 Fax Relay support

High reliability & error-free transmission with T.38 Fax relay



UC Portfolio Summary



UC Configuration and Policy

vManage/vSmart



Does not participate in Call Routing

Provisions ISR for UC

- Distributed Dial Plan (SIP Dial Peer)
- Call Manipulation (Translation)
- Media/Codec Selection
- SRST



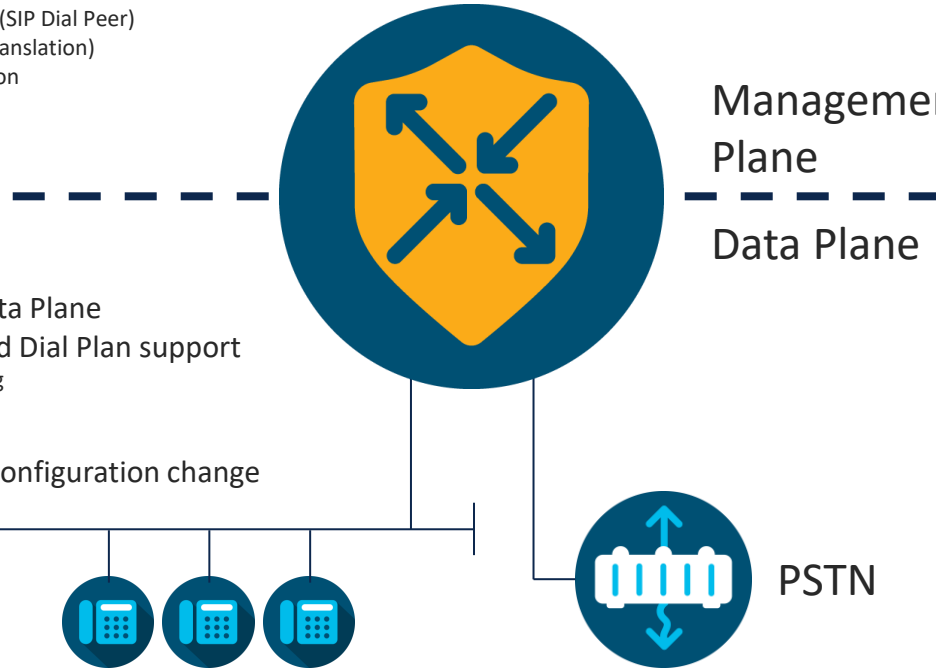
Call Control

Participates in Data Plane

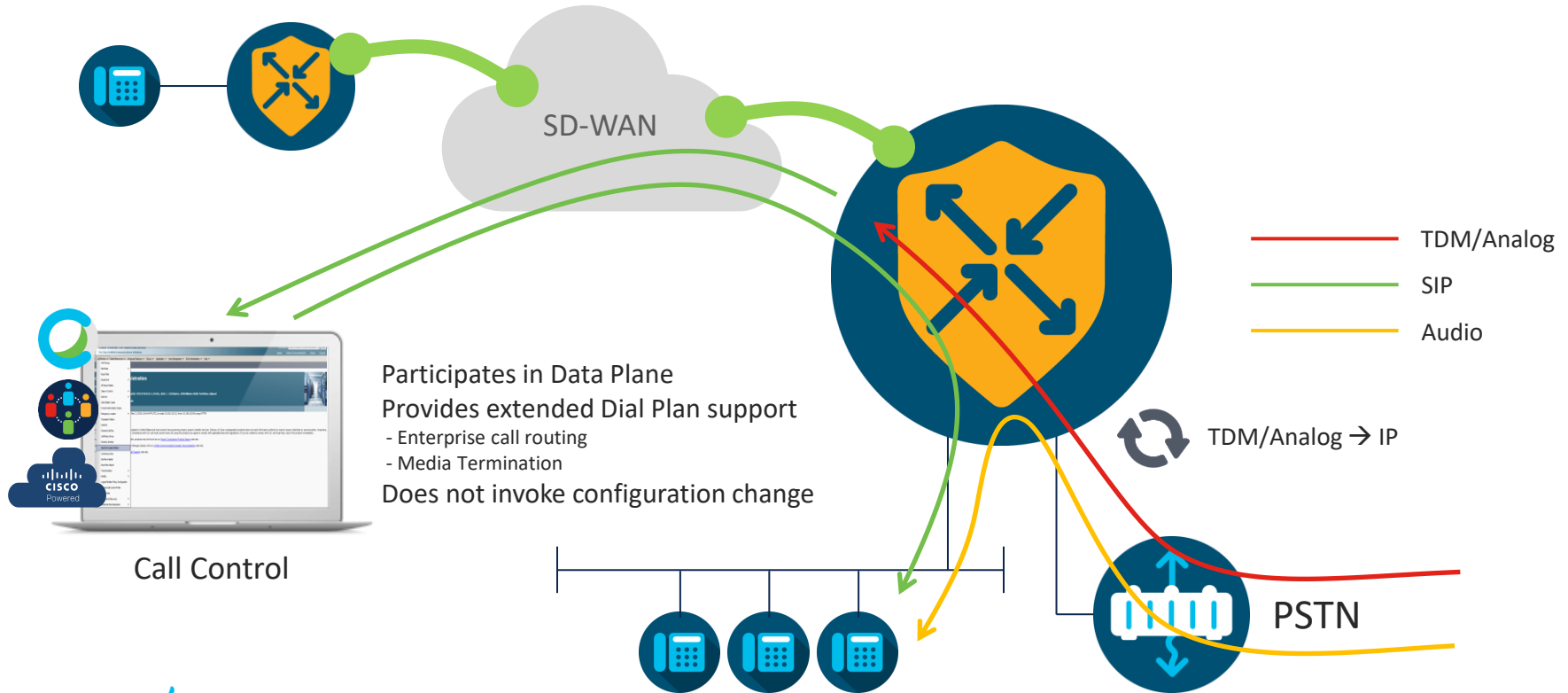
Provides extended Dial Plan support

- Enterprise call routing
- Media Termination
- SIP

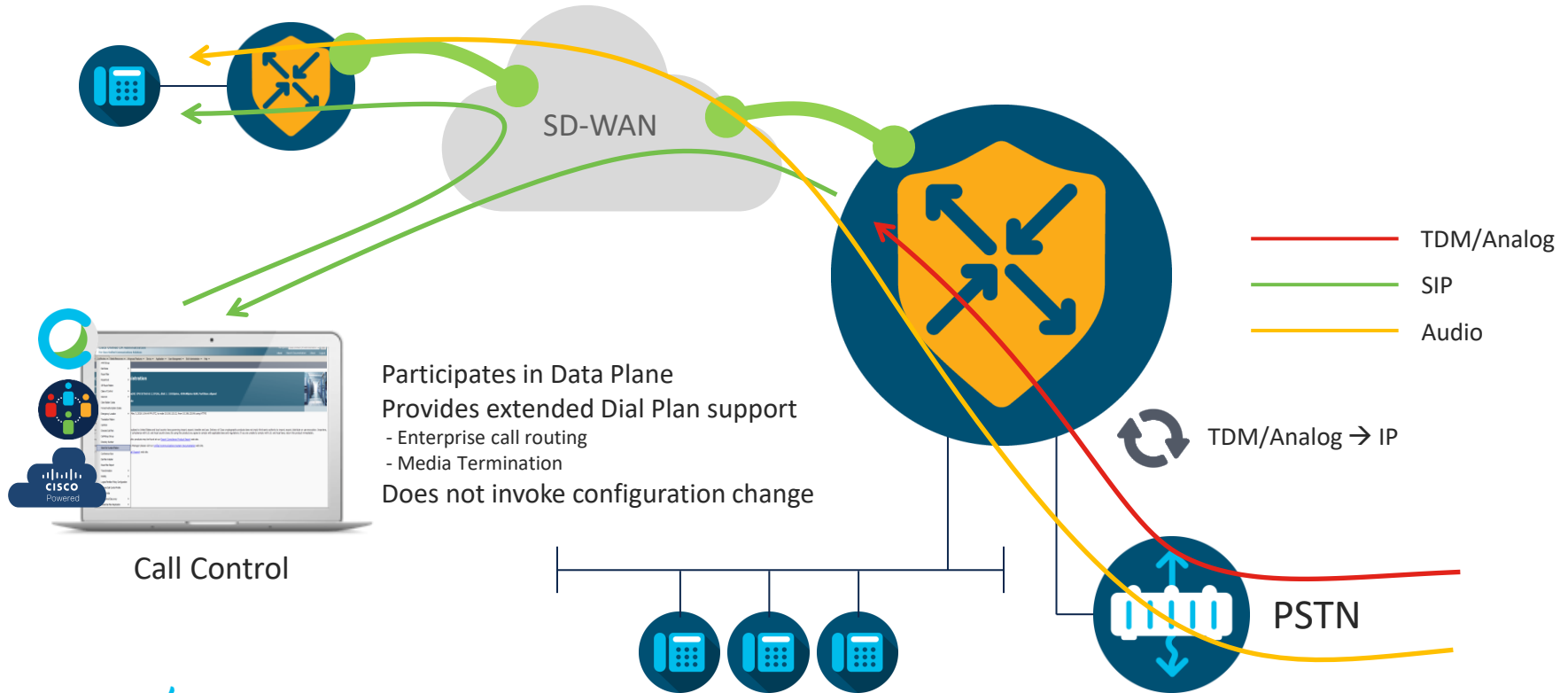
Does not invoke configuration change



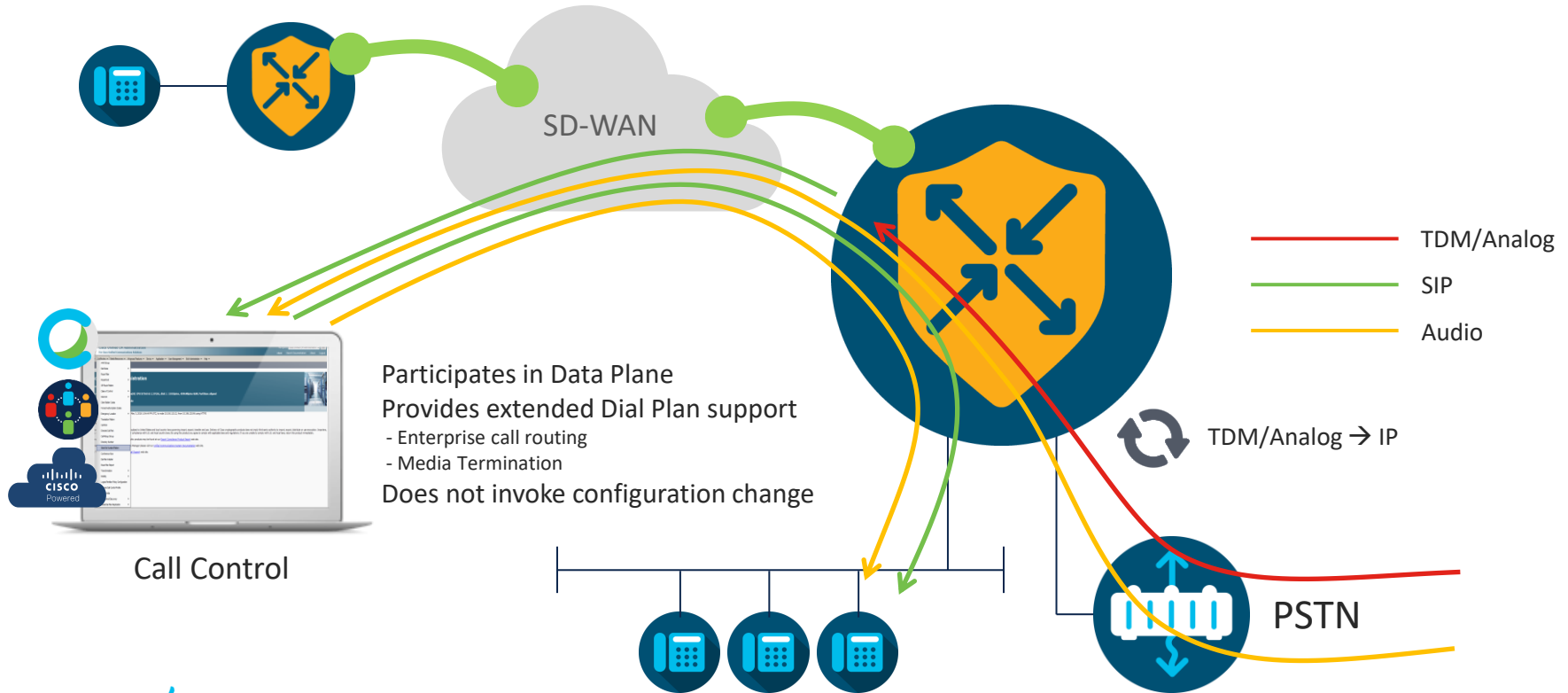
UC Configuration and Policy: Sample Call Flow



UC Configuration and Policy: Sample Call Flow



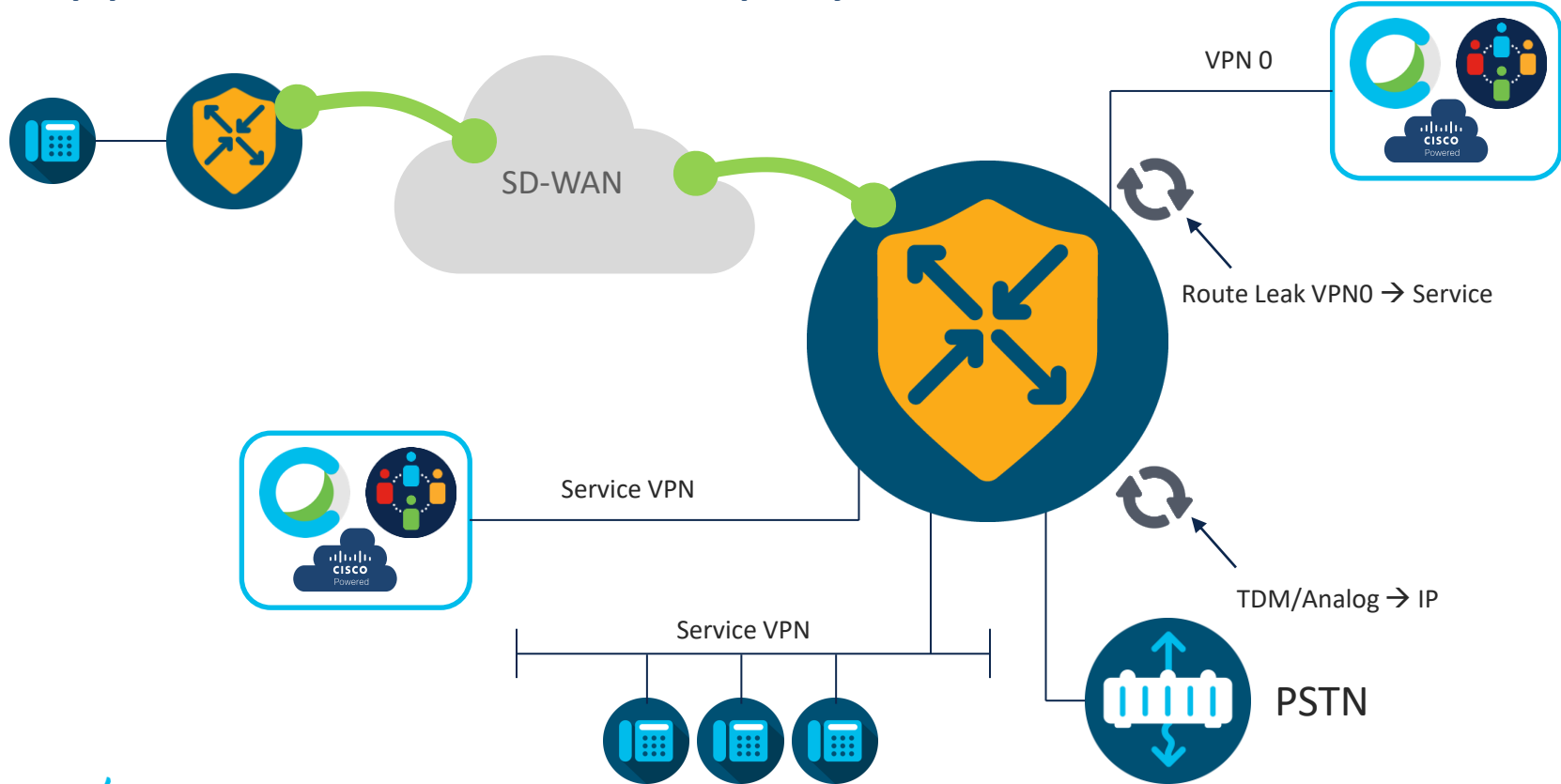
UC Configuration and Policy: Sample Call Flow



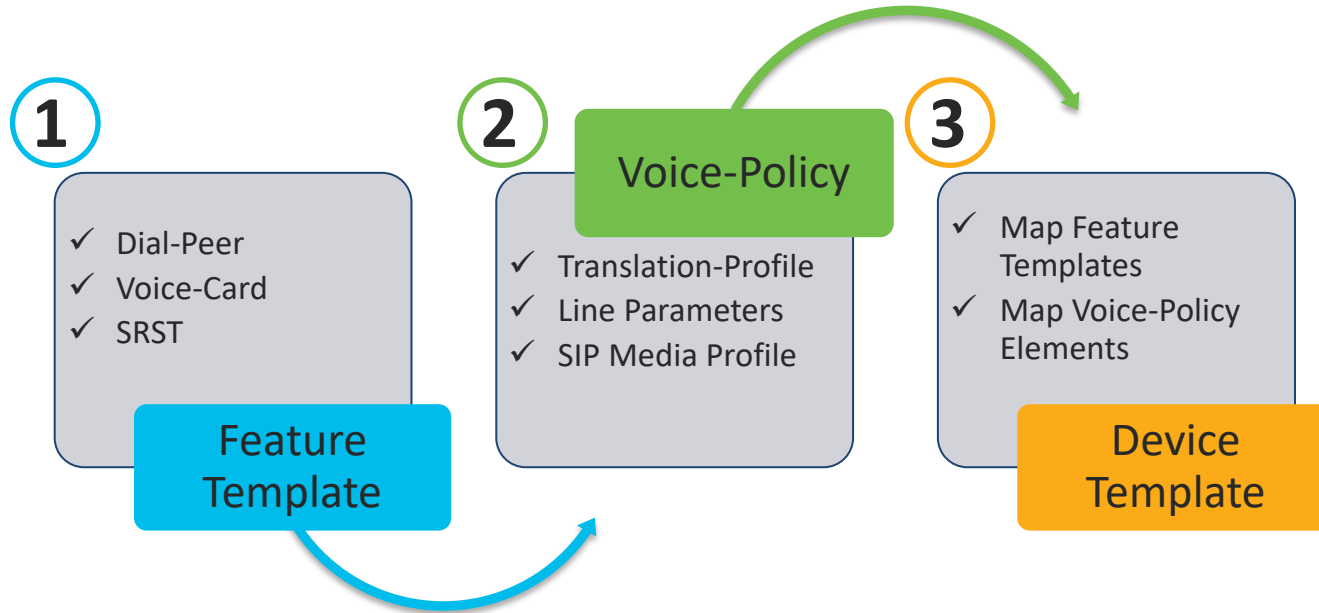
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Supported Call Control Deployment Scenarios



Basic Workflow



The background is a dark blue field filled with numerous small, semi-transparent squares and dots in various colors including light blue, teal, yellow, orange, and red. These elements are scattered across the frame, with a higher concentration of yellow and orange squares forming a diagonal band from the top right towards the bottom right. The word "Demo" is written in a light blue, sans-serif font on the left side of the image.

Demo

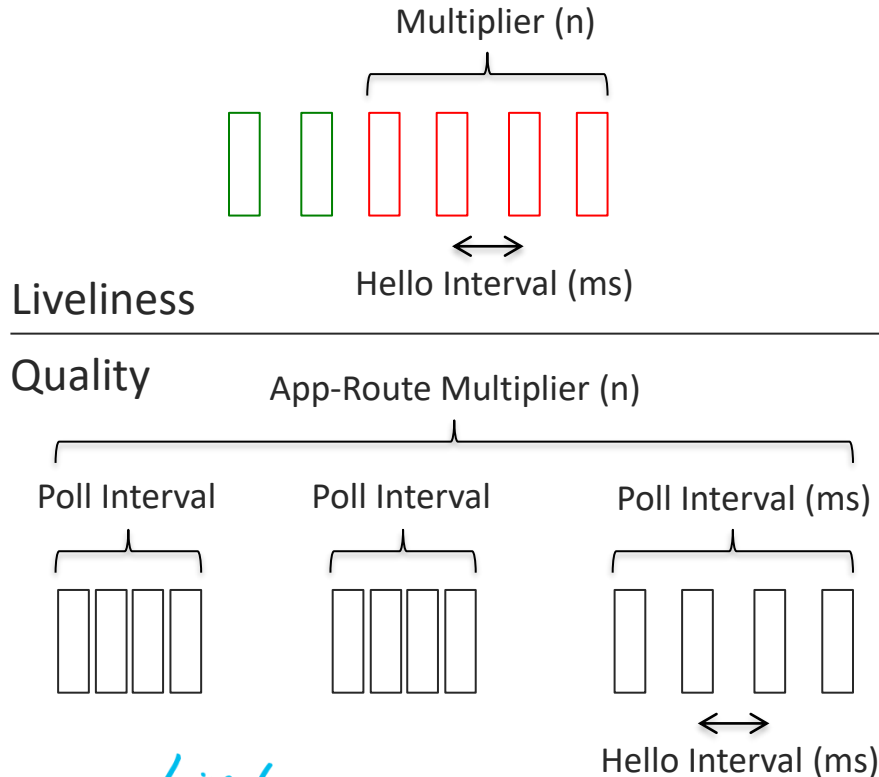
Optimizing Cisco SD-WAN for UC

AppQoE Checklist

- ✓ Bidirectional Forwarding Detection (BFD)
- ✓ Application Aware Routing (AAR)
- ✓ Forward Error Correction (FEC)
- ✓ Packet Duplication
- ✓ Quality of Service and Fragmentation Avoidance
- ✓ Cloud onRamp for SaaS
- ✓ TCP Flow Optimization
- ✓ Data Redundancy Elimination (DRE) and Caching (Coming Soon!)
- ✓ Software-Defined Application Visibility and Control (SD-AVC)
- ✓ AppNav and WAAS

Bidirectional Forwarding Detection

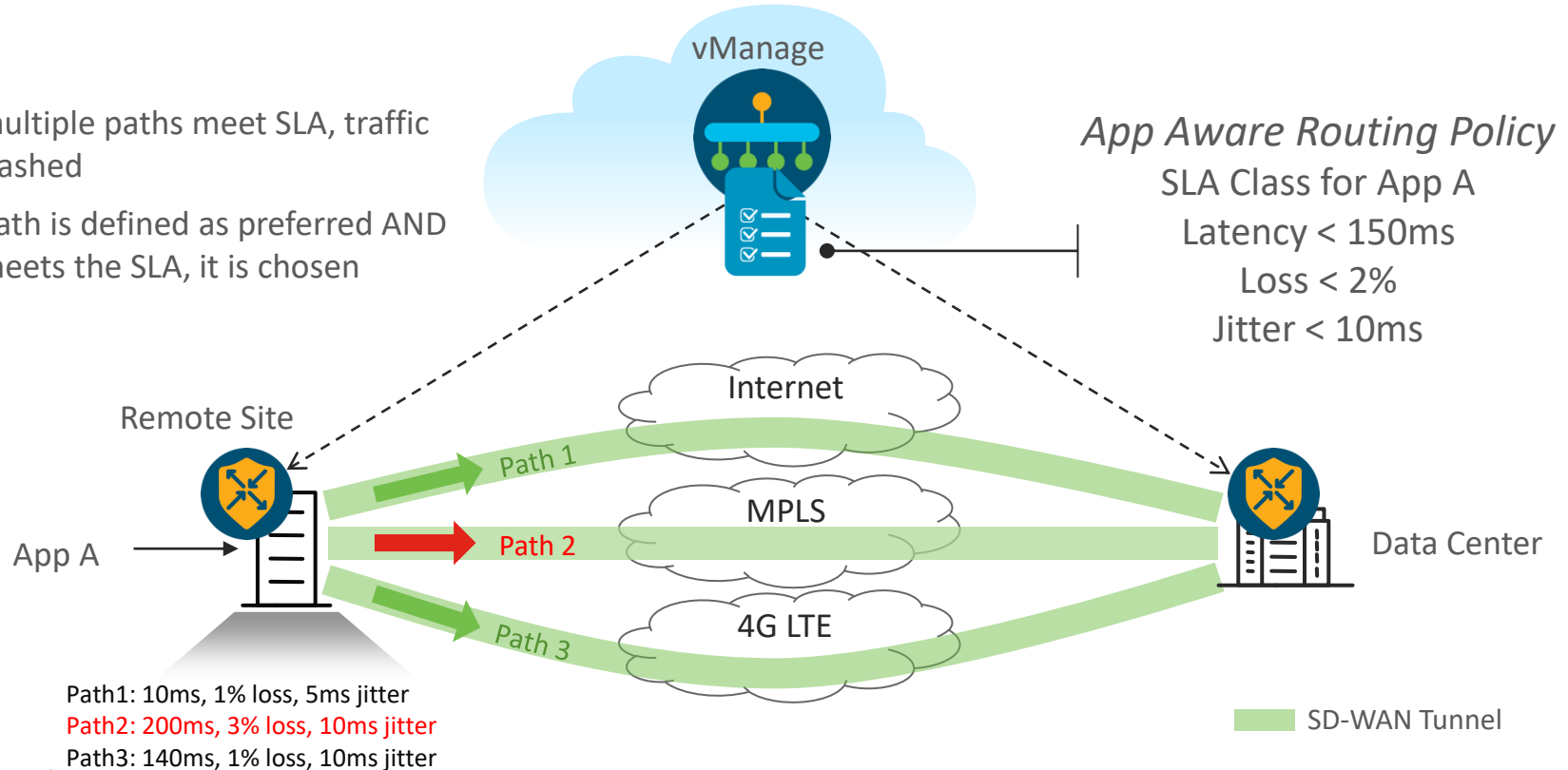
Path Quality Detection



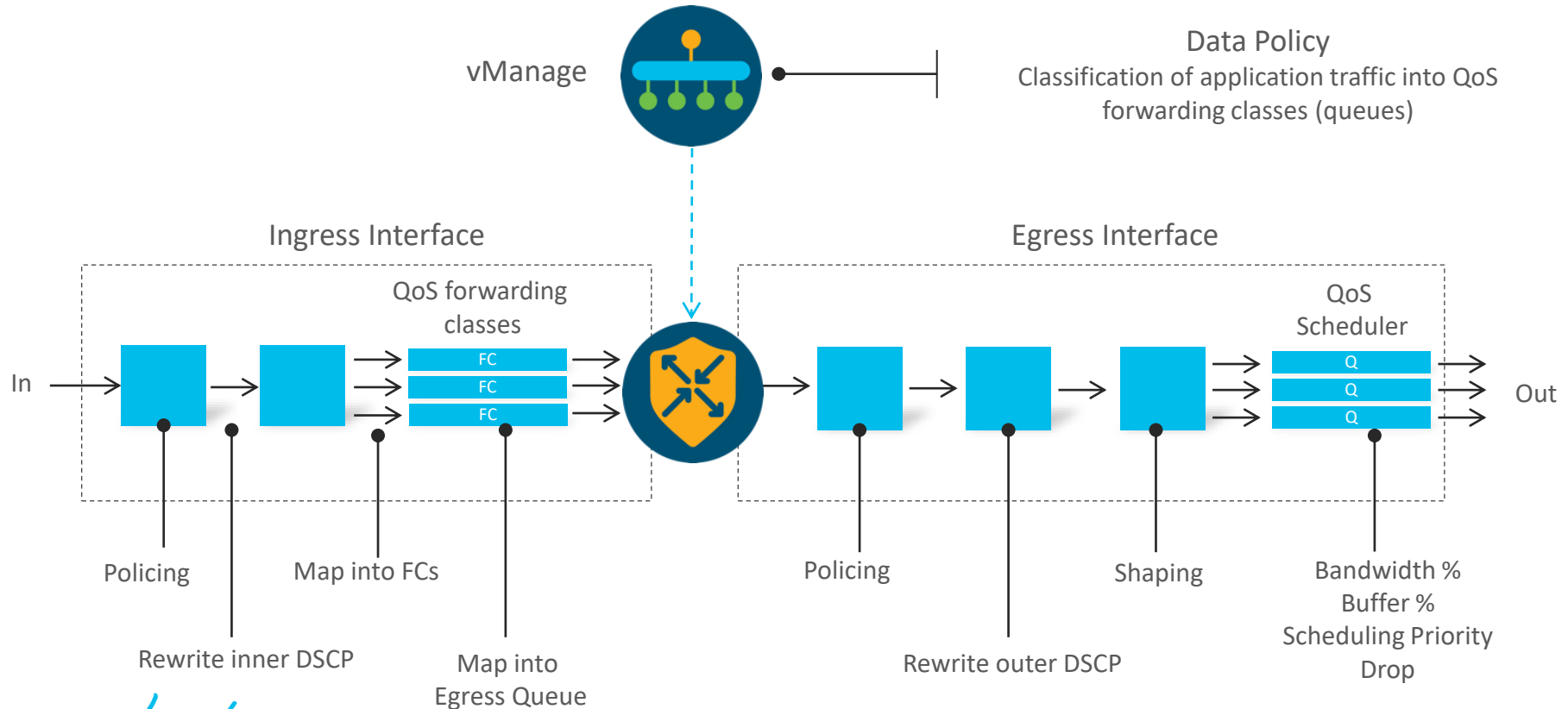
- Each WAN Edge router initiates BFD packet every hello interval
 - Echo mode, no neighbors
 - Tunable to sub-second level
- Poll interval determines the window for calculating path quality
 - Averaged
 - Tunable to sub-second level
- App-route multiplier determines number of poll intervals for establishing overall average path quality
 - Compared against application aware routing thresholds

Application Aware Routing

- If multiple paths meet SLA, traffic is hashed
- If path is defined as preferred AND it meets the SLA, it is chosen

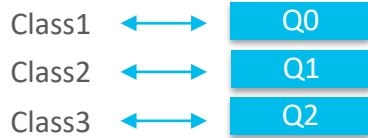


WAN Edge Router QoS Overview



WAN Edge Router Traffic Prioritization

Forwarding Class Maps



1

2

Voice
Business
Best Effort

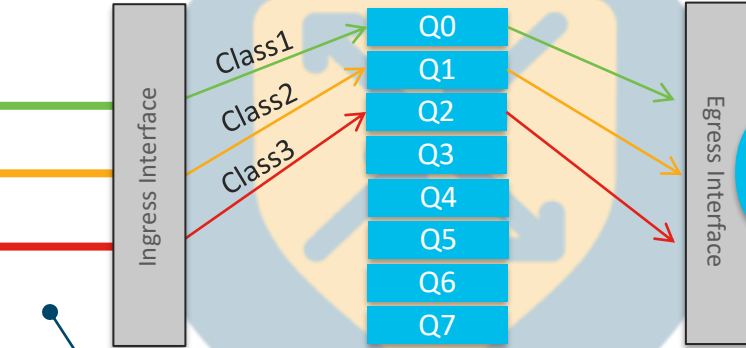
Classification



(Ingress Interface ACL)

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WAN Edge



Traffic
Classification
(1)(2*)

QoS
Scheduling
(3)

QoS
Mapping
(4)

QoS Schedulers



4

QoS Map

Scheduler A
Scheduler B
Scheduler C

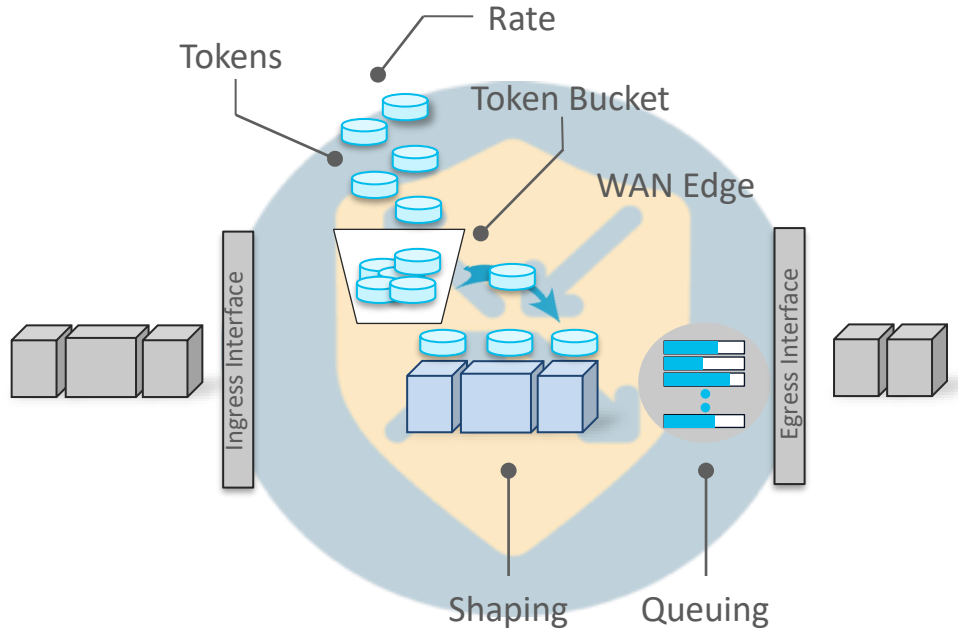
(Egress Interface)

Queue 0 is strict priority

* Local Policy ACL or Data Policy

** Linear drop probability

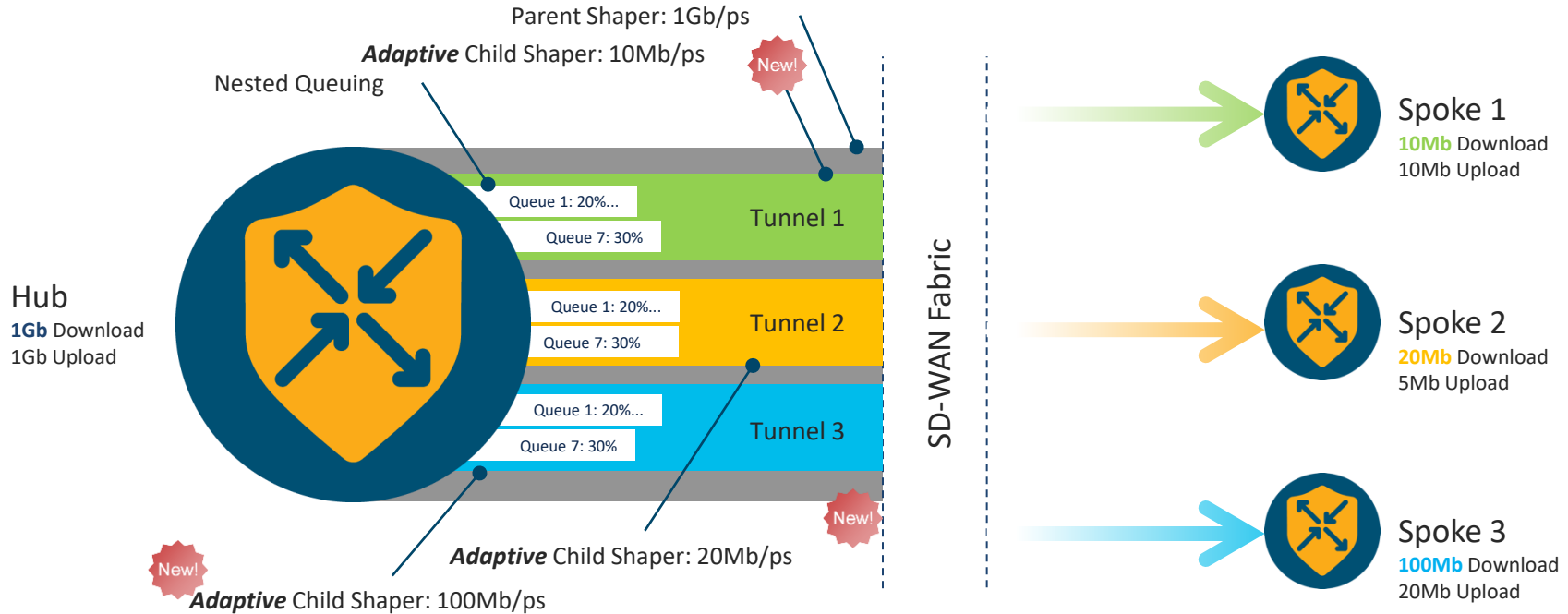
Shaping



Note: Shaping determines link bandwidth considered for queuing

- Shaping effective on egress physical interfaces
 - Not supported on sub-interfaces
- Forward traffic that conforms to configured shape rate
 - Tokens available in the bucket
- Queue traffic that exceeds configured shape rate
 - Tokens not available in the bucket
- Weighted Round-Robin for queued packets

Per-Tunnel QoS with Adaptive Shaping

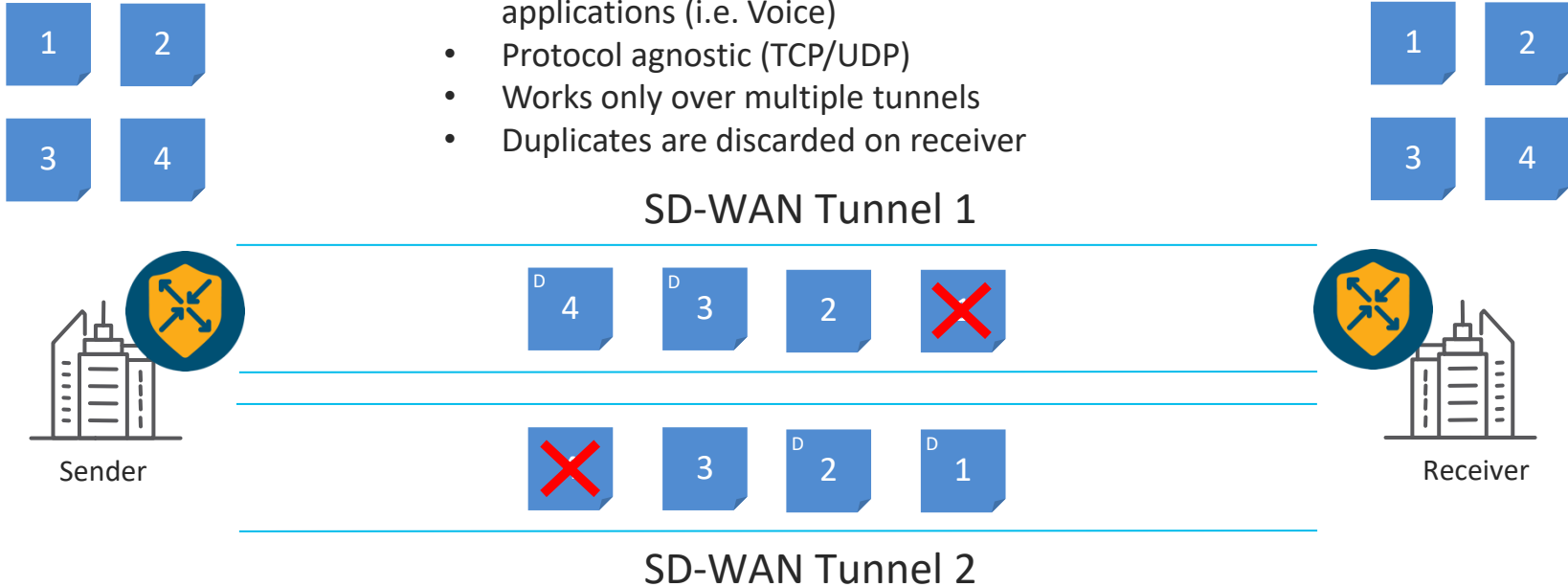


Per-Tunnel QoS allows the Hub site to dynamically adjust the sending rate of its traffic to accommodate lower bandwidth circuits at remote locations. Adaptive shapers measure the **true** circuit capacity at any given moment – rather than relying on static configuration.

Packet Duplication

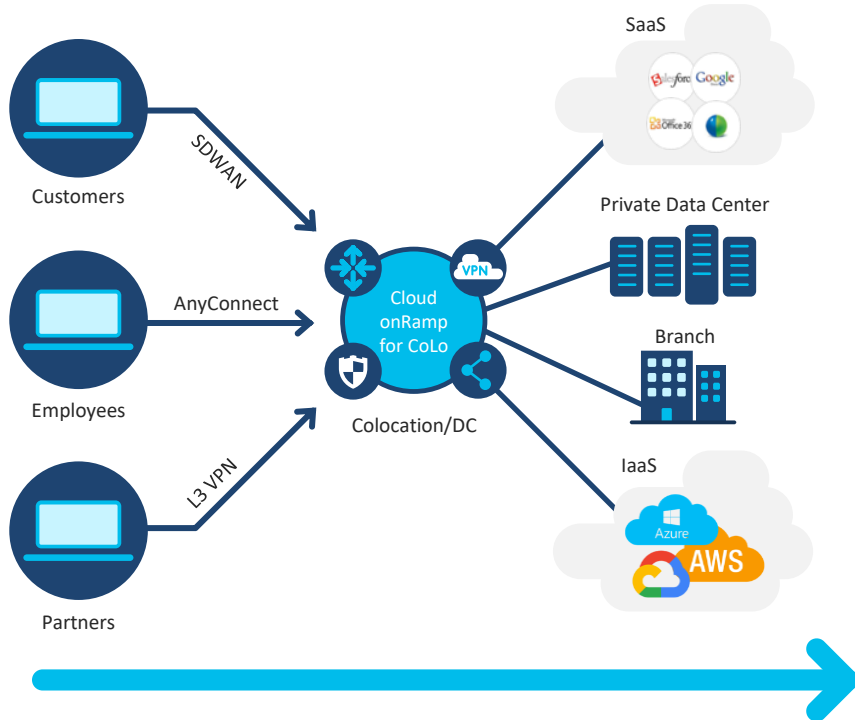
Highlights:

- Protects against packet loss for critical applications (i.e. Voice)
- Protocol agnostic (TCP/UDP)
- Works only over multiple tunnels
- Duplicates are discarded on receiver



Cisco SD-WAN Cloud onRamp for Colocation

Securely Connecting Users and Application Providers



Security

Central policy enforcement



Agility & Performance

Rapid provisioning, change control and scale-out architecture via NFV fabric. Speed of software with the performance of hardware.



Cost Savings

Lower OpEx and CapEx through NFV. Reduce circuit costs and number of circuits.

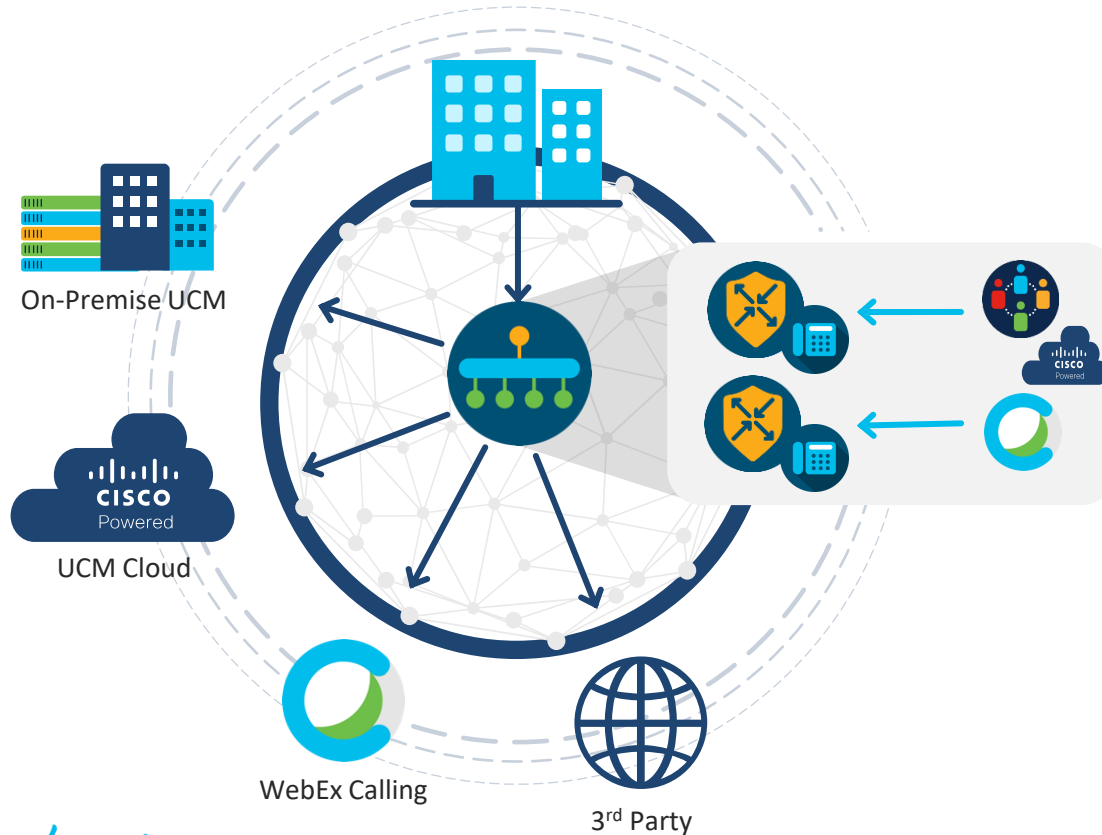
Turn-key orchestration and automation of enterprise WAN Service-Chains!

The background is a dark blue field filled with numerous small, semi-transparent squares and dots in various colors including light blue, teal, yellow, orange, and red. These elements are scattered across the frame, with a higher concentration of yellow and orange squares forming a diagonal streak from the top right towards the bottom right.

Monitoring and Troubleshooting

Conclusion

Takeaways...



Flexible Connectivity

Directly connect with Cloud or On-Premise call control with improved user experience while positioning for the future

Large Scale VoIP Provisioning

Leverage the power of vManage Templating and Policy orchestration to provision scalable, consistent UC across the enterprise

Hardware Consolidation

Reduce CapEx and OpEx by consolidating UC and SD-WAN into a single CPE

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Thank you



Possibilities

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