The bridge to possible

How to Optimize SaaS Applications using Cisco SD-WAN

Cloud OnRamp for SaaS

Diptish Doshi, Technical Marketing Engineer

Cisco Webex App

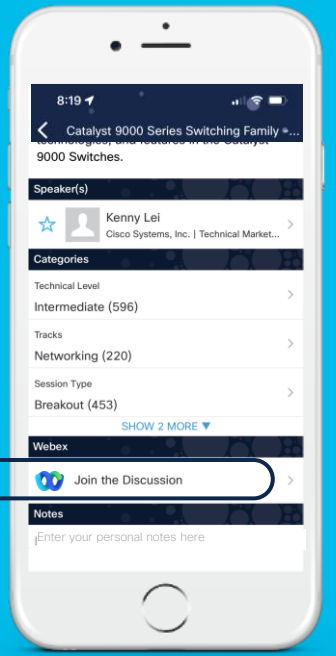
Questions?

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

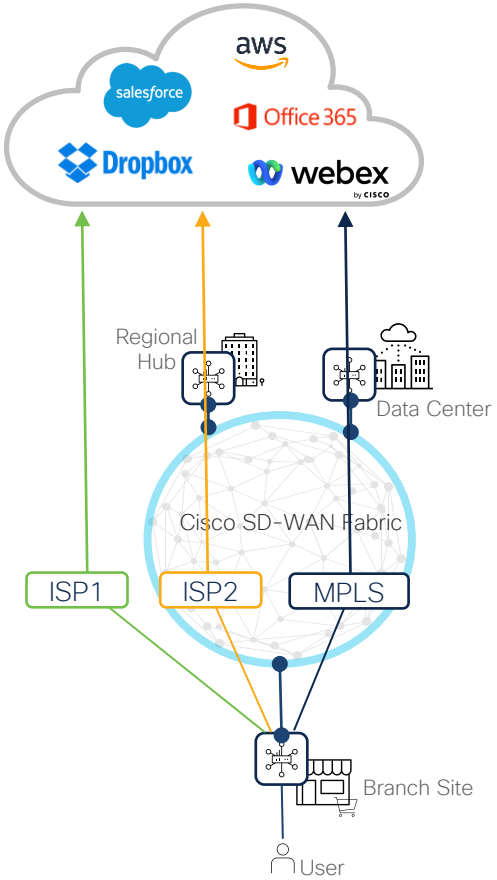
- SaaS Optimization
- Cloud OnRamp for SaaS
  - Workflow
  - Microsoft 365
  - Webex
  - Custom Enterprise Apps
- Cloud OnRamp for SaaS & Security
- Deployment Scenarios
- Summary

SaaS Optimization

SaaS Optimization

The Challenges

- What path to use for SaaS app?
  - Direct Internet Access
  - Regional Breakout
  - Data Center Backhaul
- Which path is having better SLA for a given SaaS app, How to get performance visibility for each path?
- When specific path is having performance issues, How to automatically steer traffic ?

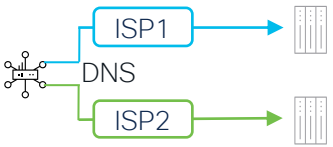


Cloud OnRamp for SaaS

Cloud OnRamp for SaaS – Monitoring

"How probes works" in 3 simple steps

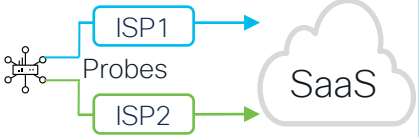
DNS Request



DNS requests is duplicated across all available Internet egress points or Gateway sites

Detection

Quality Probing



HTTP/HTTPS ping packets are sent to probe (loss/latency)

Optimization

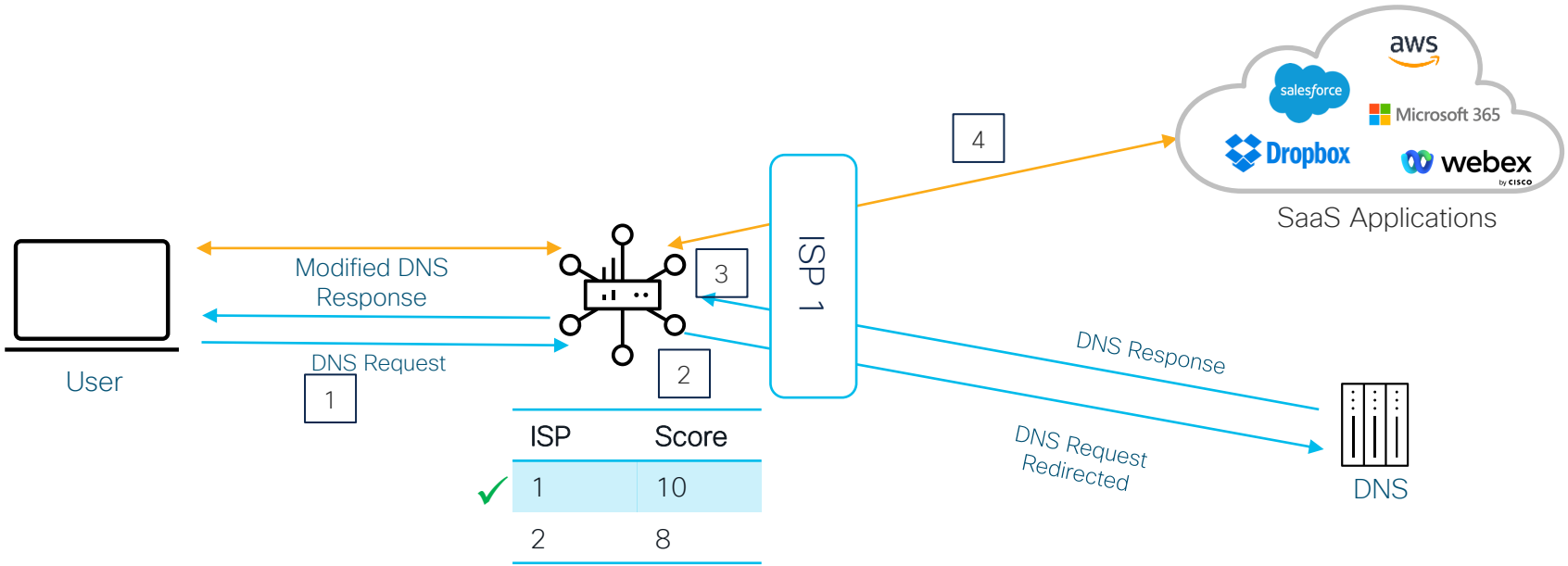
vQoE Score

	ISP	Score
✓	1	10
	2	8

vQoE Scores are calculated based on the loss/ latency for path selection

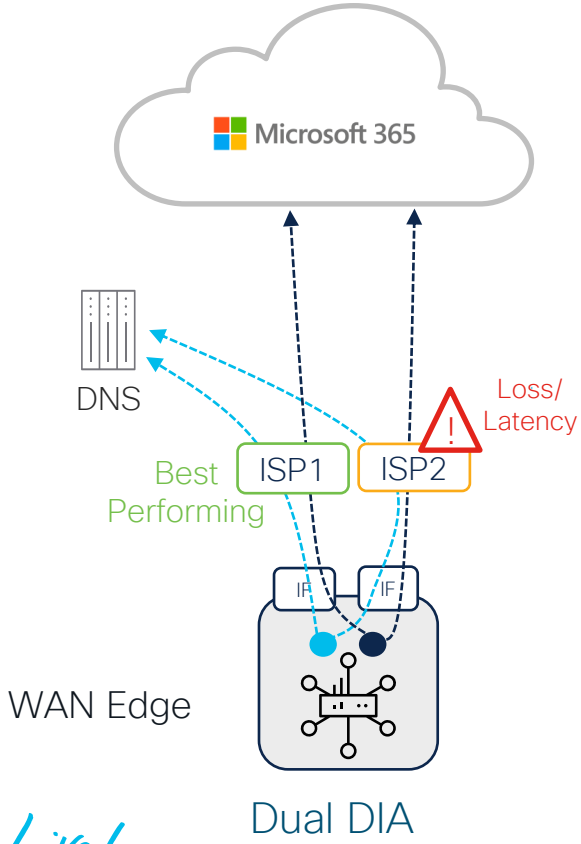
Selection

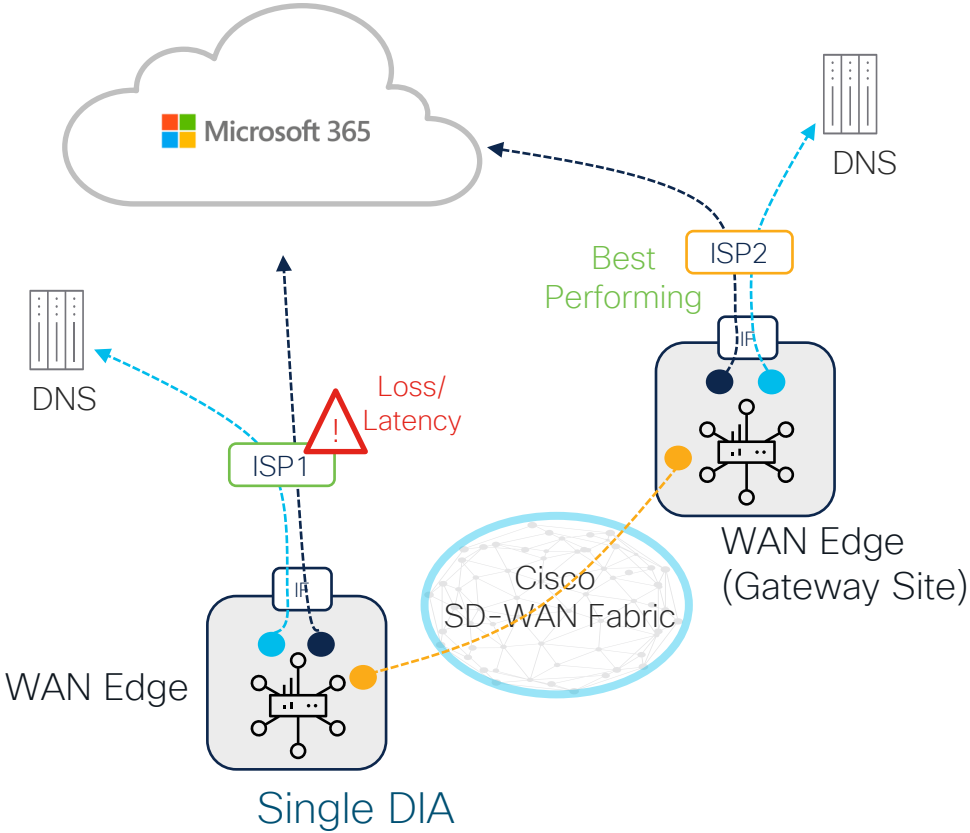
Cloud OnRamp for SaaS – User Traffic Packet flow



Cloud OnRamp for SaaS – Probing

Quality Probing

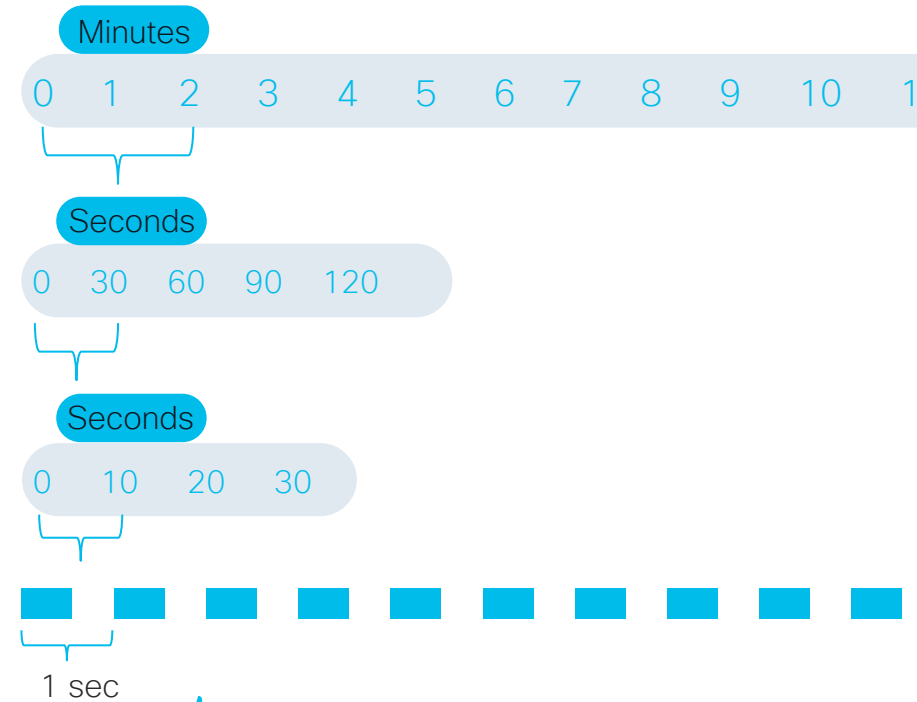




Cloud OnRamp for SaaS - Algorithm

Quality Probing: Performance calculation algorithm

Decision on picking interface is based on 12 minutes measurements



Moving average of 6 buckets of 2 mins each

Collect 4 sub-buckets of 30 seconds

Send 10 pings & sleep for 20 seconds

1 HTTP/HTTPS Ping per second

Cloud OnRamp for SaaS – vQoE

vQoE Calculation

1 - 5	Red
5 - 8	Yellow
8 - 10	Green

Microsoft 365

App	Path	Score
M365	ISP1 (DIA)	10
M365	ISP2 (DIA)	8

salesforce

App	Path	Score
Salesforce	ISP1 (DIA)	9
Salesforce	ISP2 (DIA)	10

Dual DIA

Microsoft 365

App	Path	Score
M365	ISP1 (DIA)	8
M365	Via Gateway	10

salesforce

App	Path	Score
Salesforce	ISP1 (DIA)	10
Salesforce	Via Gateway	7

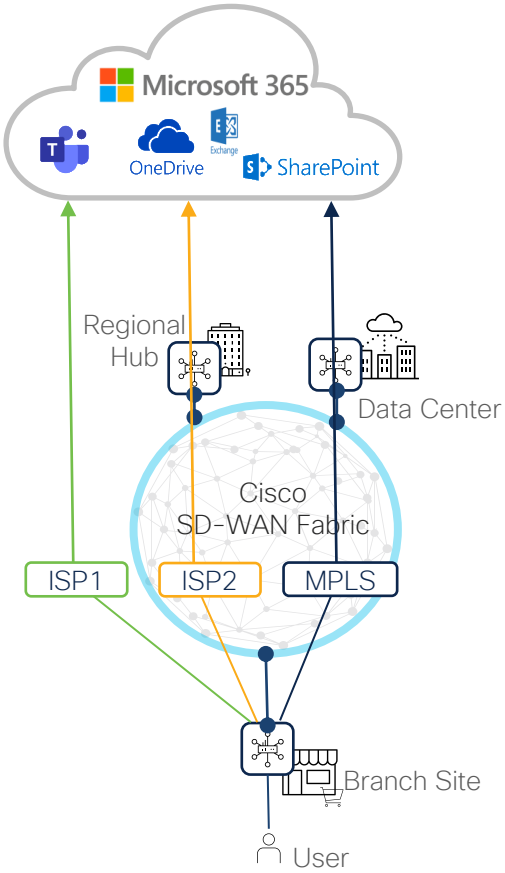
Single DIA

Cloud OnRamp for M365

Cloud OnRamp for M365

M365 Optimization Challenges

- How to optimize only certain M365 Categories?
- How to gain Application telemetry view to gain insights into Application Performance?
- When specific path is having performance issues, How to automatically steer traffic?



Cloud OnRamp for M365

Dynamic URL/IP Categorization

- Distinct URLs for different Applications.
- URLs/IPs can be mapped to different traffic categories and Service-Area.
- All M365 traffic divided into 3 categories based on sensitivity. Optimize, Allow and Default.
- All M365 Applications divided into Service Areas : Outlook, Sharepoint, Teams.

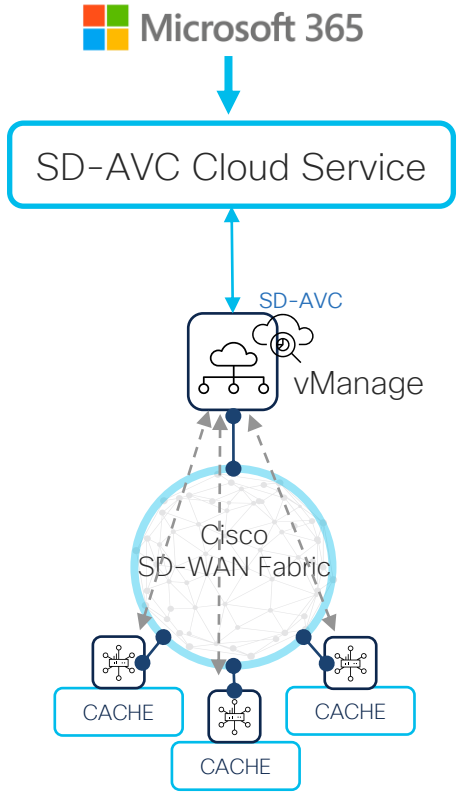
Microsoft Informed Network Routing

- End-to-end telemetry using Application Infused Path Feedback (AIPF) for Outlook, Sharepoint, Teams Service Areas
- Import and Export telemetry from/to Microsoft for best path selection

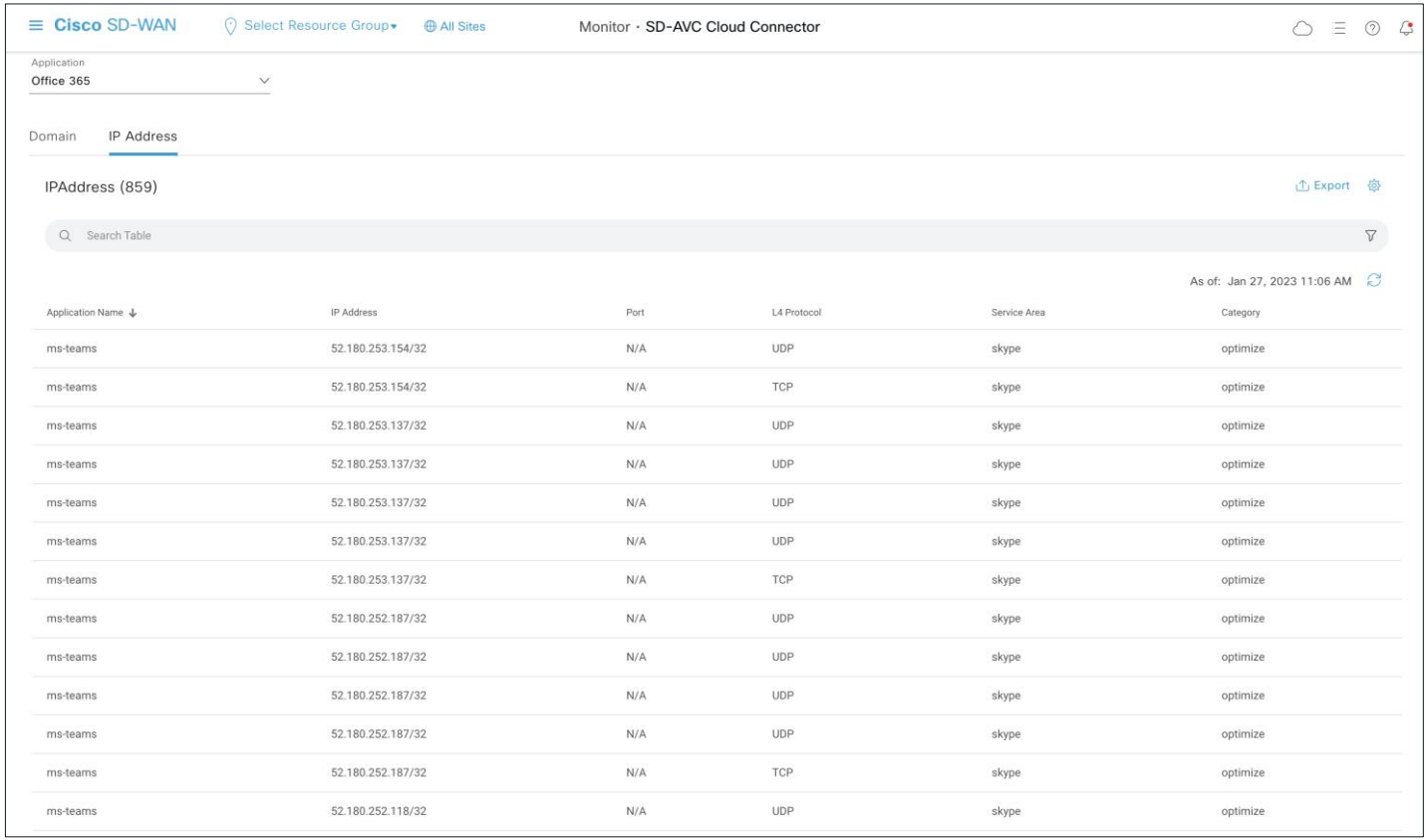
M365 Cloud Feed to SD-AVC Service

Dynamically updating IP/URL end-points.

- SD-AVC Cloud Service pulls M365 IP/URL Categories using M365 web service
- SD-AVC container runs on Cisco vManage
- Cisco vManage pulls M365 IP/URL Categories from SD-AVC Cloud Services
- SD-AVC Container dynamically pre-populates Edge router's NBAR cache with M365 IP addresses and URL Categories



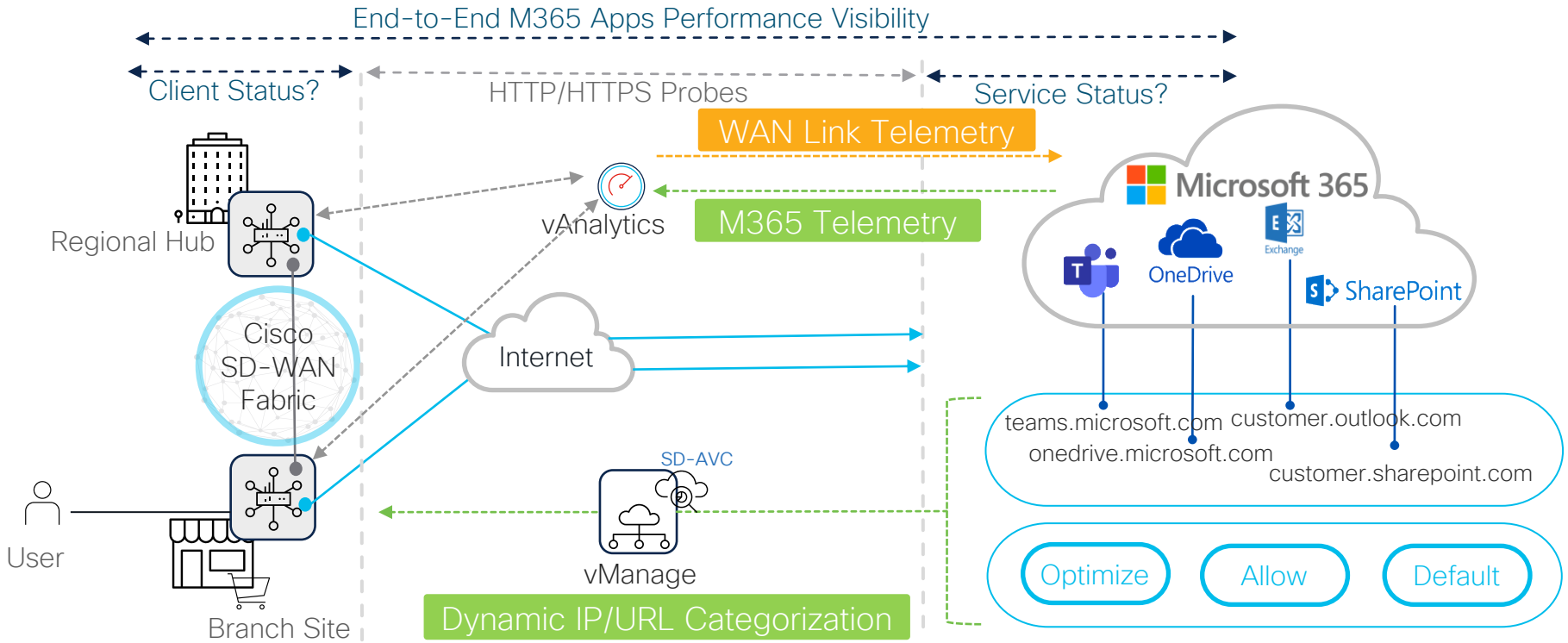
SD-AVC Cloud Connector Dashboard (M365)



Application Name	IP Address	Port	L4 Protocol	Service Area	Category
ms-teams	52.180.253.154/32	N/A	UDP	skype	optimize
ms-teams	52.180.253.154/32	N/A	TCP	skype	optimize
ms-teams	52.180.253.137/32	N/A	UDP	skype	optimize
ms-teams	52.180.253.137/32	N/A	UDP	skype	optimize
ms-teams	52.180.253.137/32	N/A	UDP	skype	optimize
ms-teams	52.180.253.137/32	N/A	UDP	skype	optimize
ms-teams	52.180.253.137/32	N/A	TCP	skype	optimize
ms-teams	52.180.252.187/32	N/A	UDP	skype	optimize
ms-teams	52.180.252.187/32	N/A	UDP	skype	optimize
ms-teams	52.180.252.187/32	N/A	UDP	skype	optimize
ms-teams	52.180.252.187/32	N/A	UDP	skype	optimize
ms-teams	52.180.252.187/32	N/A	TCP	skype	optimize
ms-teams	52.180.252.118/32	N/A	UDP	skype	optimize

Dynamic URL Categories + Informed Network Routing

End to End M365 User Experience

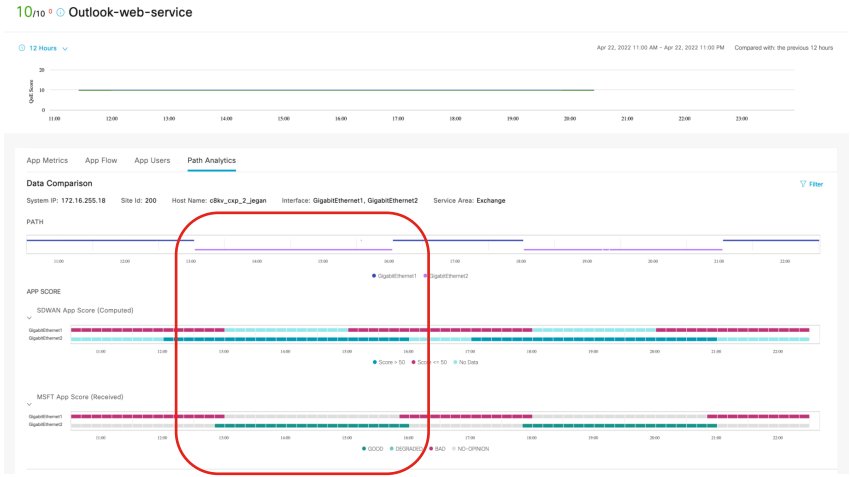


Microsoft Informed Network Routing (INR)

In 17.9 SD-WAN release, Microsoft INR feature can be enabled in below 2 modes

- With Traffic Steering (Use Microsoft Telemetry in M365 traffic routing decisions)
- Without Traffic Steering (Only use Microsoft Telemetry for visibility into application feedback)

With Traffic Steering



Without Traffic Steering

10/10 0 Outlook-web-service

12 Hours

Apr 22, 2022 11:00 AM - Apr 22, 2022 11:00 PM Compared with: the previous 12 hours

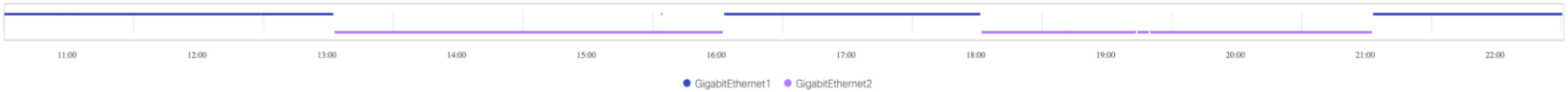
App Metrics | App Flow | App Users | Path Analytics

Data Comparison

Filter

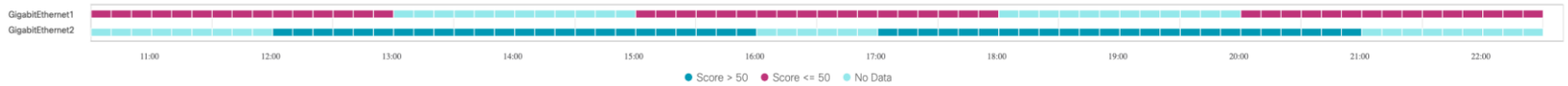
System IP: **172.16.255.18** Site Id: **200** Host Name: **c8kv_cxp_2_jegan** Interface: **GigabitEthernet1, GigabitEthernet2** Service Area: **Exchange**

PATH

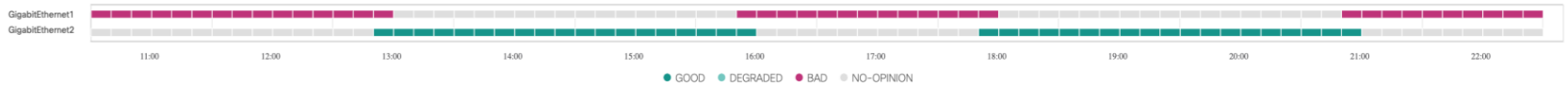


APP SCORE

SDWAN App Score (Computed)



MSFT App Score (Received)



CoR-SaaS for M365 Deployment Option:

- Traditional CoR-SaaS for M365
- M365 with Dynamic IP/URL Categorization
- M365 with Dynamic IP/URL Categorization and Microsoft Informed Network Routing
  - With Traffic-Steering
  - Without Traffic-Steering

Cloud OnRamp for Webex

Cloud OnRamp for Webex

Path Monitoring

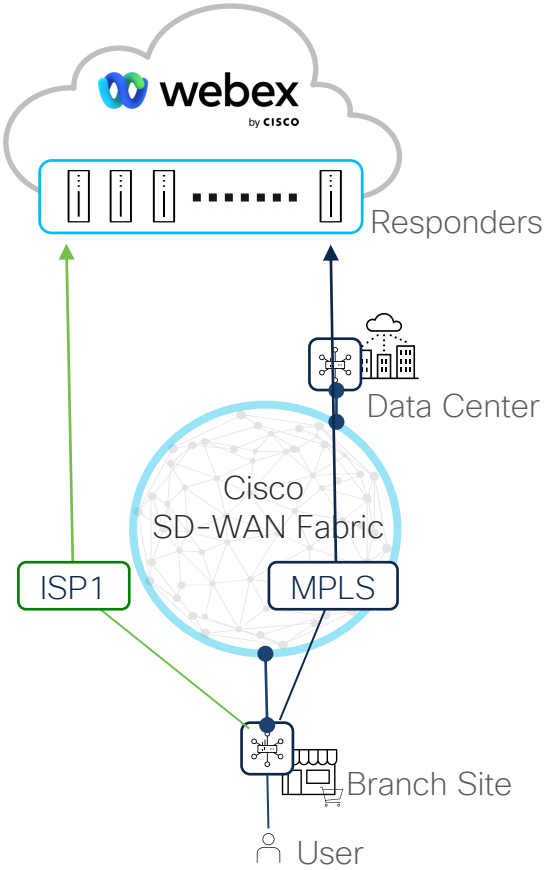
SD-WAN edge routers sends HTTPS probes to dedicated Webex Responders across global Webex regions

Traffic Classification

Webex API Integration with vManage to enhance classification of traffic going to various Webex regions

Traffic Optimization

Ensure Webex User traffic going to any Webex region is sent via the best performing path



Cloud OnRamp for Webex (Monitoring)

Cisco SD-WAN | Select Resource Group | Dashboard

Cloud onRamp for SaaS > Webex

How to Get Started | Manage Cloud OnRamp for SaaS

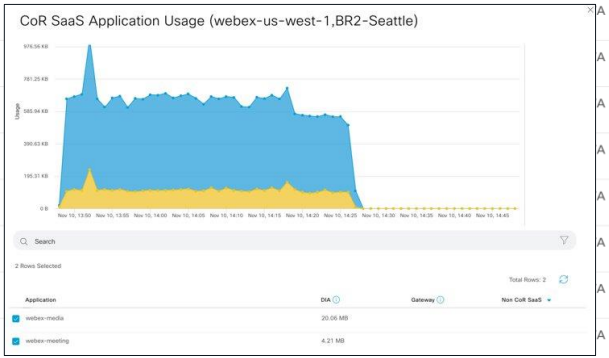
Bad (0-5) | Average (5-8) | Good (8-10)

Search

VPN List: All

Total Rows: 11

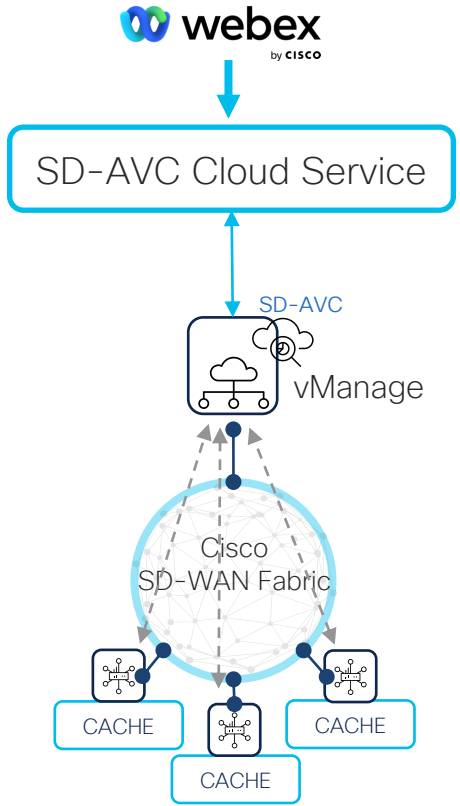
Sites List	Hostname	Webex region	vQoE Status	vQoE Score	DIA Status	Selected Interface	Activated Gateway	Local Color	Remote Color	Application Usage
9	BR2-Seattle	-			-	-	-	-	-	
9	BR2-Seattle	eu-west-1	⚠	6.0	local	GigabitEthernet1	N/A	N/A	N/A	View Usage
9	BR2-Seattle	ap-south-2	⚠	5.0	local	GigabitEthernet2	N/A	N/A	N/A	View Usage
9	BR2-Seattle	ap-southeast-1	⚠	6.0	local	GigabitEthernet2	N/A	N/A	N/A	View Usage
9	BR2-Seattle	us-west-1	✓	10.0						View Usage
9	BR2-Seattle	us-east-3	✓	8.0						View Usage
9	BR2-Seattle	us-central-1	✓	9.0						View Usage
9	BR2-Seattle	ap-southeast-2	⚠	6.0						View Usage
9	BR2-Seattle	ap-northeast-1	⚠	7.0						View Usage
9	BR2-Seattle	ca-east-1	✓	8.0						View Usage
9	BR2-Seattle	eu-central-1	⚠	6.0						View Usage
9	BR2-Seattle	eu-central-2	⚠	6.0						View Usage



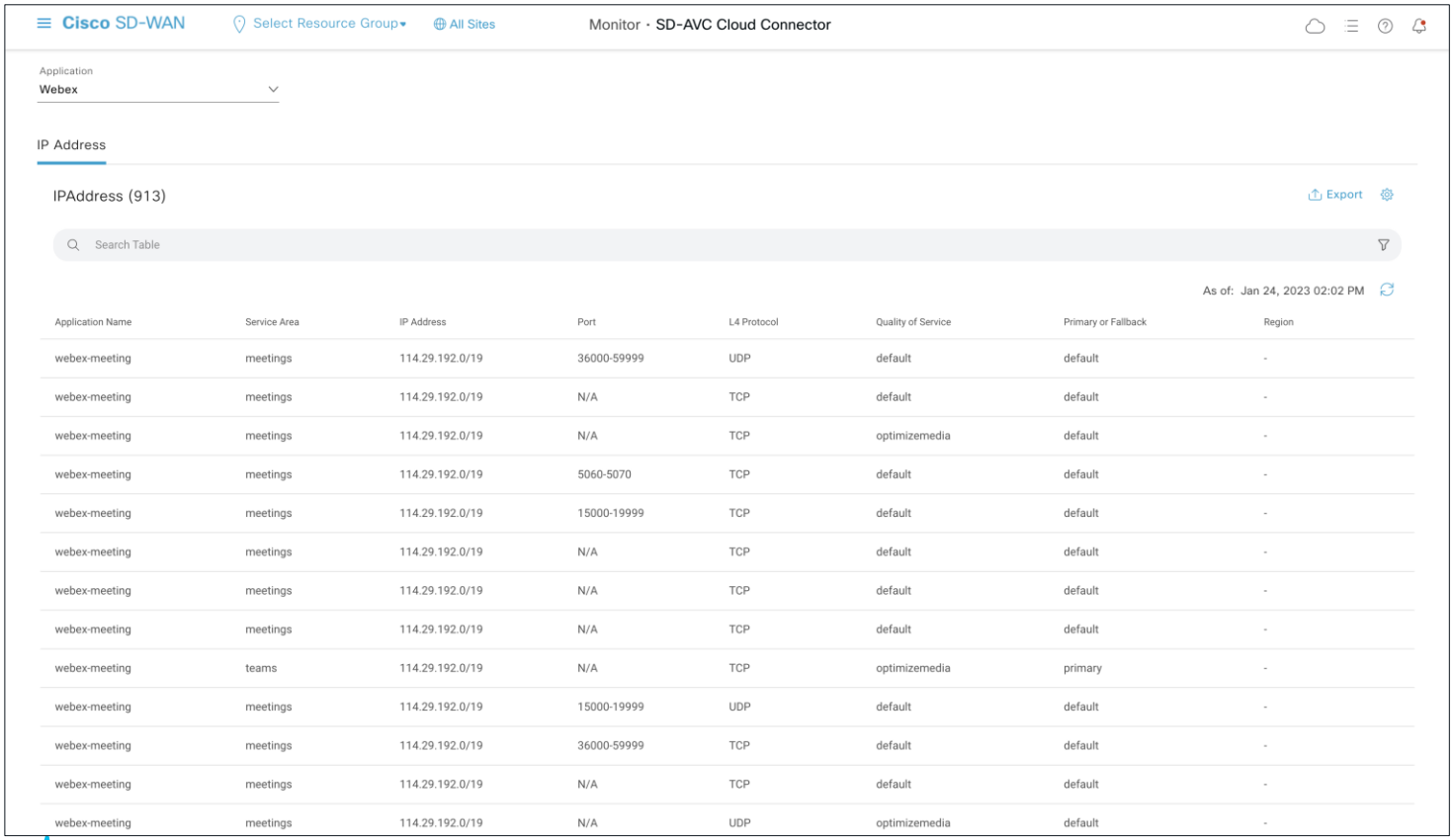
Webex Cloud Feed to SD-AVC Service

Dynamically updating IP end-points

- SD-AVC Cloud Service pulls Webex IP Signatures using Webex web service
- SD-AVC is pre-requisite for CoR-SaaS for Webex.
- SD-AVC container runs on Cisco vManage
- SD-AVC container pulls Webex IP end-points from SD-AVC Cloud Service
- SD-AVC Container dynamically pre-populates Edge router's NBAR cache with Webex IP end-points

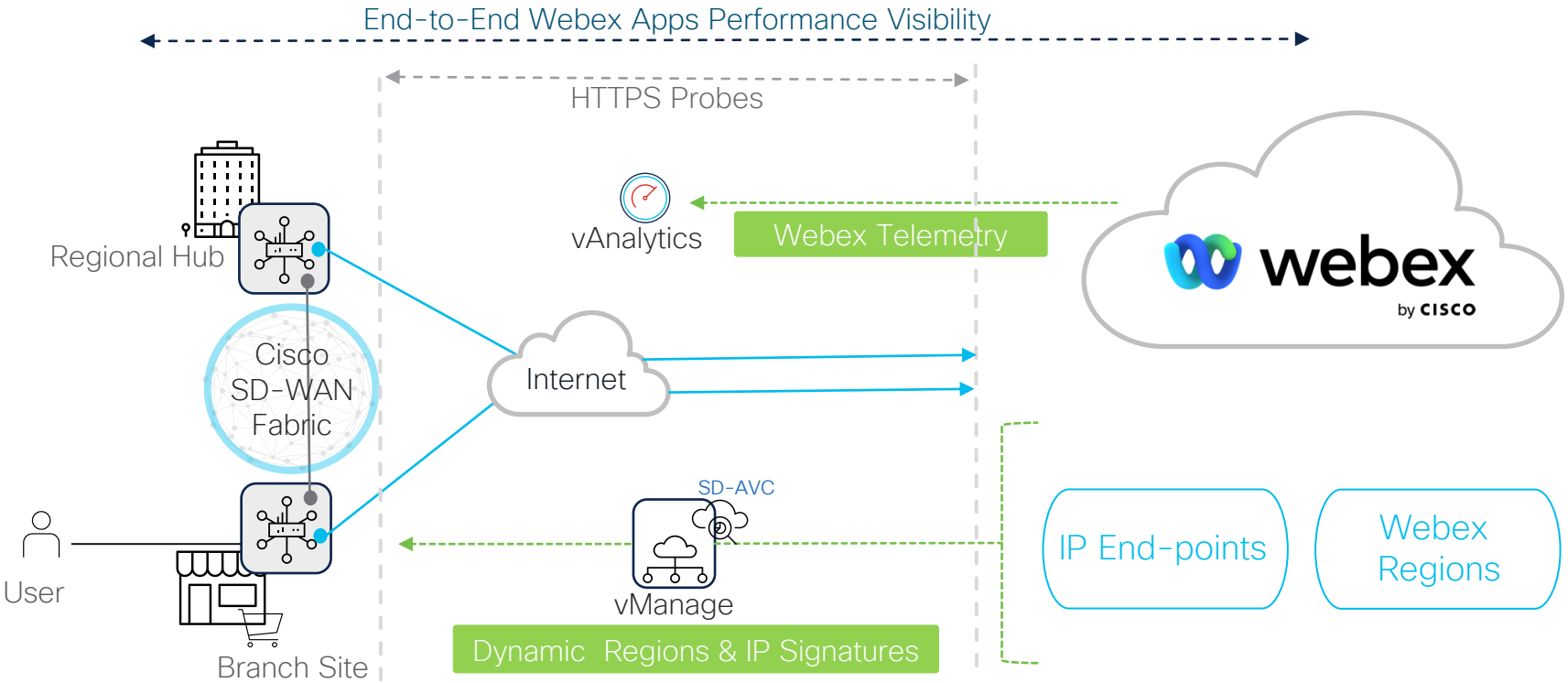


SD-AVC Cloud Connector Dashboard (Webex)



Application Name	Service Area	IP Address	Port	L4 Protocol	Quality of Service	Primary or Fallback	Region
webex-meeting	meetings	114.29.192.0/19	36000-59999	UDP	default	default	-
webex-meeting	meetings	114.29.192.0/19	N/A	TCP	default	default	-
webex-meeting	meetings	114.29.192.0/19	N/A	TCP	optimizemedia	default	-
webex-meeting	meetings	114.29.192.0/19	5060-5070	TCP	default	default	-
webex-meeting	meetings	114.29.192.0/19	15000-19999	TCP	default	default	-
webex-meeting	meetings	114.29.192.0/19	N/A	TCP	default	default	-
webex-meeting	meetings	114.29.192.0/19	N/A	TCP	default	default	-
webex-meeting	meetings	114.29.192.0/19	N/A	TCP	default	default	-
webex-meeting	teams	114.29.192.0/19	N/A	TCP	optimizemedia	primary	-
webex-meeting	meetings	114.29.192.0/19	15000-19999	UDP	default	default	-
webex-meeting	meetings	114.29.192.0/19	36000-59999	TCP	default	default	-
webex-meeting	meetings	114.29.192.0/19	N/A	TCP	default	default	-
webex-meeting	meetings	114.29.192.0/19	N/A	UDP	optimizemedia	default	-

Webex Integration for Dynamic IP End-points & Regions



vAnalytics Dashboard (Network Telemetry)

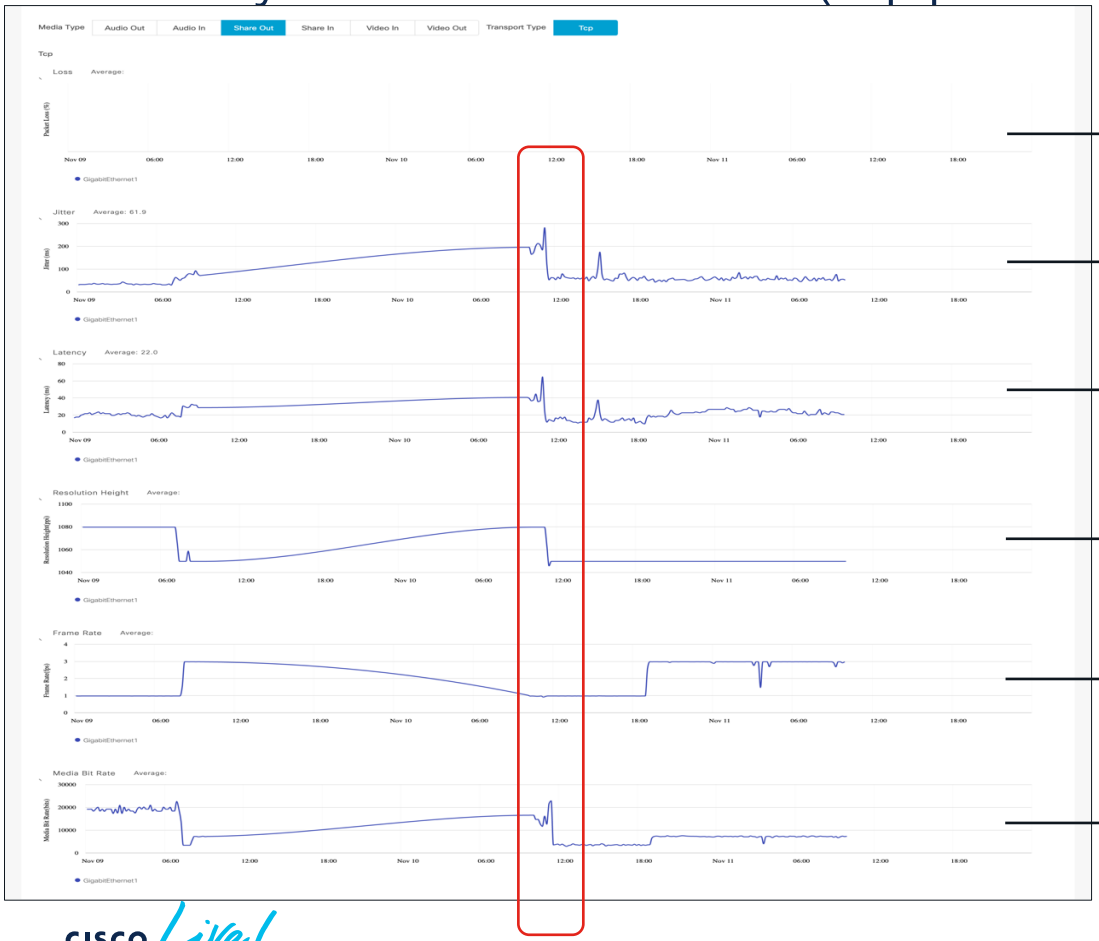
→ Selected Path for Webex Traffic

→ Network Latency measured using CoR SaaS Probes

→ Network Loss measured using CoR SaaS Probes

→ Webex Application Usage

vAnalytics Dashboard (Application Telemetry)



Packet Loss measured by Webex App for Content Sharing traffic

Jitter measured by Webex App for Content Sharing traffic

Latency measured by Webex App for Content Sharing traffic

Resolution Height measured by Webex App for Content Sharing traffic

Frame Rate measured by Webex App for Content Sharing traffic

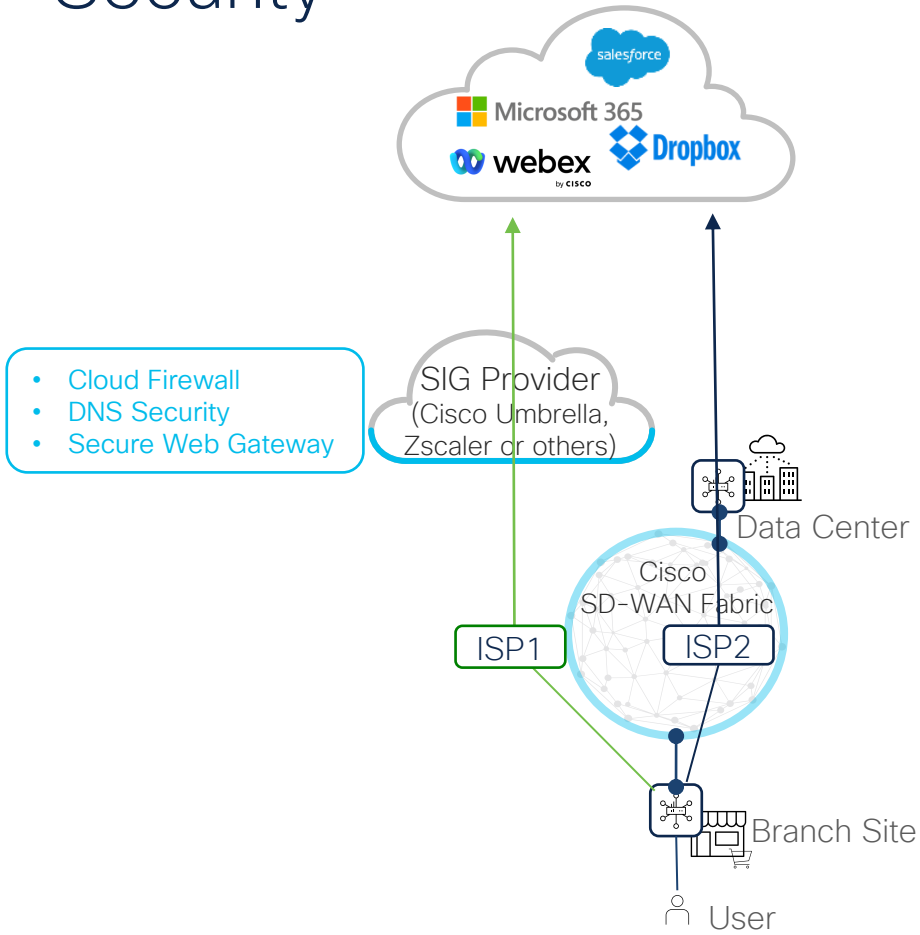
Media Bitrate measured by Webex App for Content Sharing traffic

Cloud OnRamp for Webex Demo

Cloud OnRamp for SaaS – Security

Cloud OnRamp for SaaS – Security

- In security cautious deployments, users can access Internet only through SIG at branch sites.
- SIG Auto Tunnel is supported with Umbrella and Zscaler. With other SIG providers, the tunnels could be manually established.
- With Cloud OnRamp for SaaS, edge router will send the HTTP/HTTPS Probes through the SIG tunnels.
- Based on probe results, the SD-WAN edge router selects the best performing tunnel for SaaS traffic.



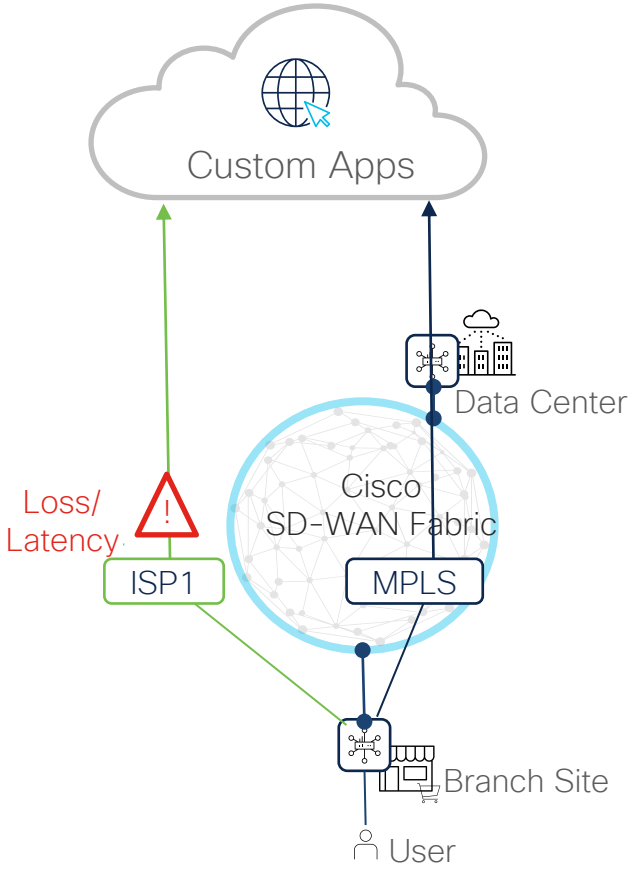
Cloud OnRamp for Enterprise & Custom Apps

cisco Live!

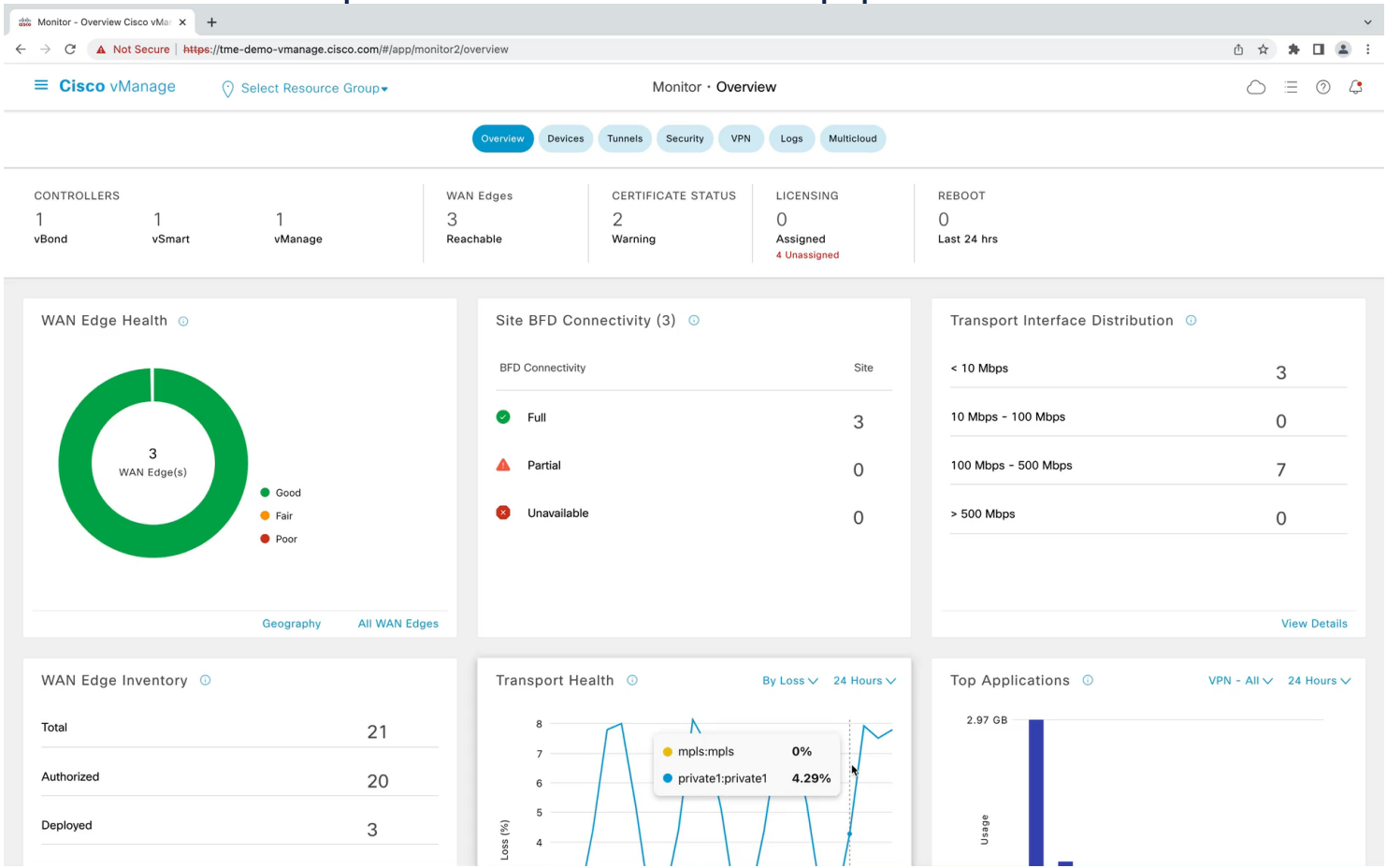
Cloud OnRamp for Enterprise & Custom Applications

BYOA – Bring your Own App

- Classify traffic using NBAR signatures (1400+ well-known Enterprise Apps) or define your own App using FQDN, L3-L4 Parameters
- XE SDWAN router sends HTTP/HTTPS probes to user defined probe endpoints (IP address or FQDN or URL) and calculates best performing path for respective SaaS & Enterprise Applications
- Based on HTTP/HTTPS probe results, Custom and Enterprise application traffic is sent via the best performing path.



Cloud OnRamp for Custom Apps



Cloud OnRamp for SaaS – API

Cloud OnRamp for SaaS workflow can also be configured using below APIs

Description	API URI
Applications and Policy	/template/cloudx/manage/apps
Attach VPN 0 or Service VPN Interfaces to CoR SaaS	/template/cloudx/interfaces
Attach DIA or Gateway or Client Sites	/template/device/config/attachcloudx

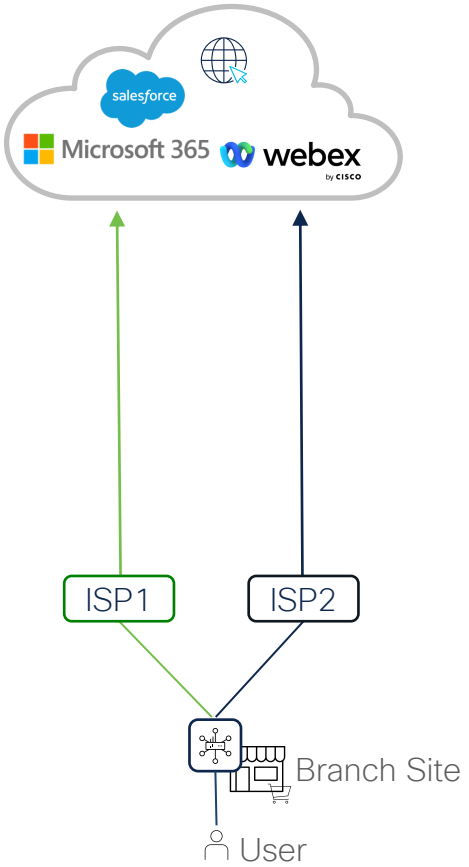
https://developer.cisco.com/docs/sdwan/#!sd-wan-vmanage-v20-10

Deployment Use Cases

Branch with Dual DIA

Use Case-1

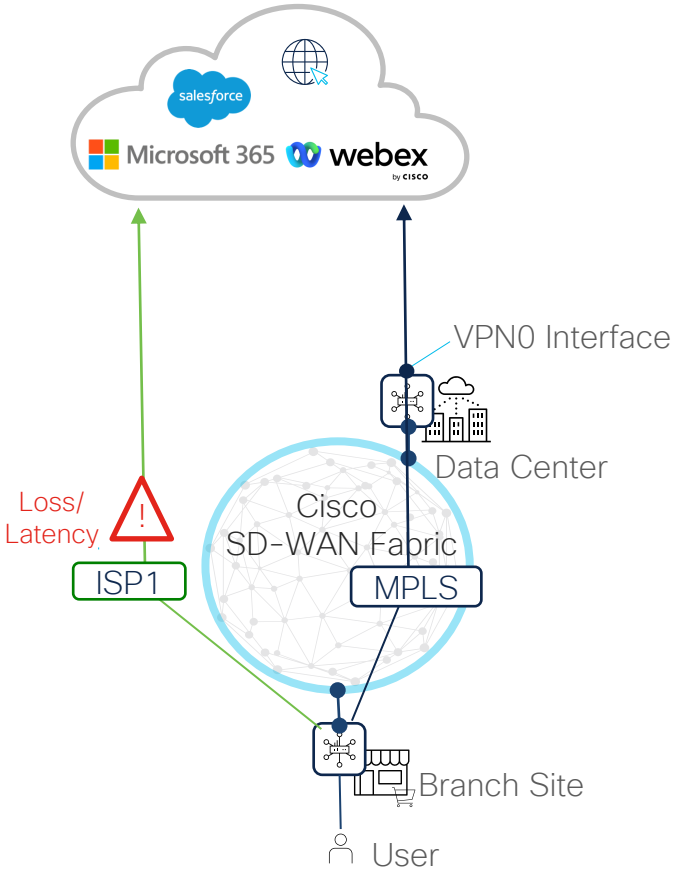
- Branch with two internet circuits.
- HTTP/HTTPS probes sent via both ISP circuits
- Calculates latency and loss score and selects best performing path for SaaS or Enterprise(Custom) apps.



Branch with DIA + Gateway

Use Case-2.1

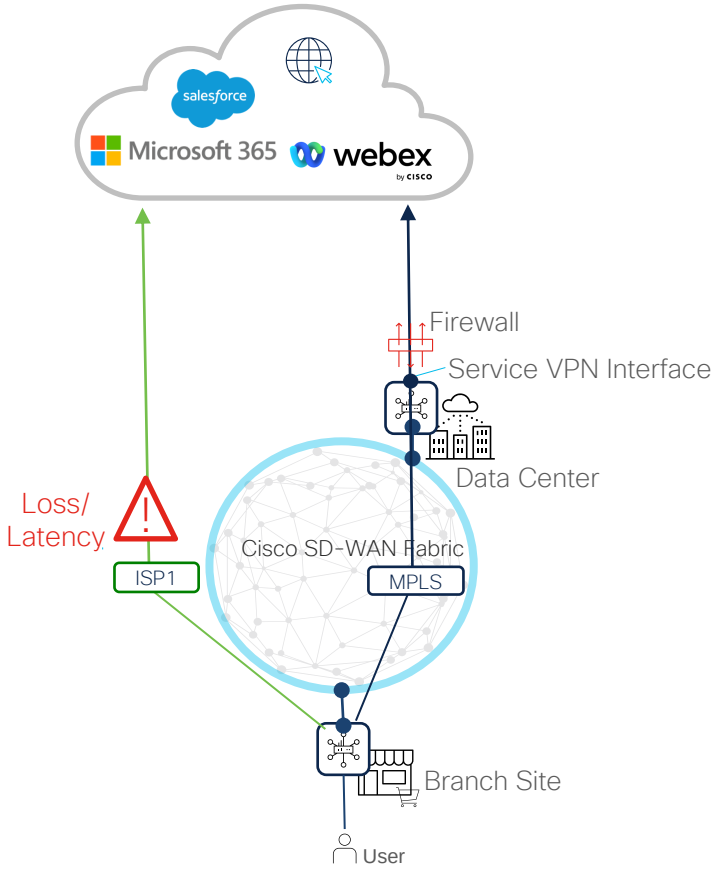
- Branch with Single DIA circuit and using Gateway back-haul
- HTTP/HTTPS probes sent via DIA circuits from branch router and via VPN 0 (Transport VPN) interfaces from Gateway router
- Calculates latency and loss score and selects best performing path for SaaS or Enterprise(Custom) apps



Branch with DIA + Gateway

Use Case-2.2

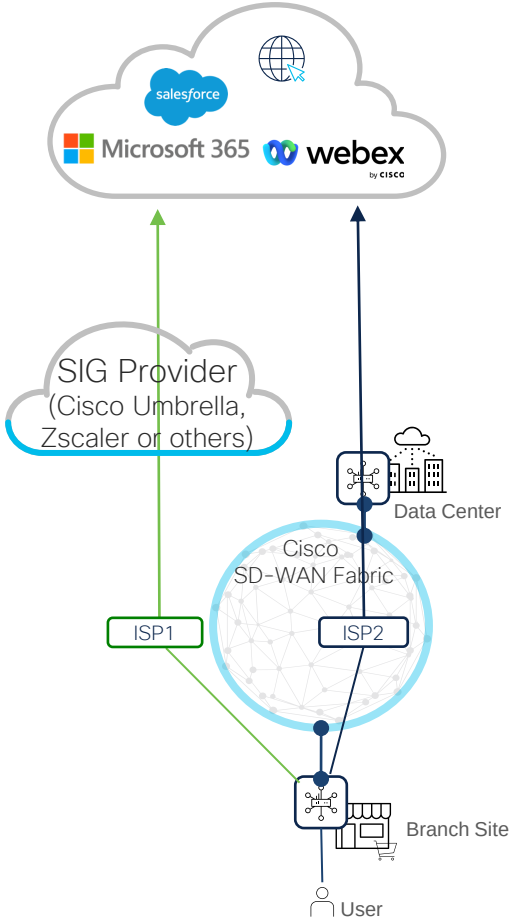
- Branch with Single DIA circuit and using Gateway back-haul
- HTTP/HTTPS probes sent via DIA circuits from branch router and via Service VPN interfaces from Gateway router
- Traffic from Gateway router is sent via Service VPN interface to a Firewall and Firewall does inspection & NAT before sending the traffic to SaaS apps destination.
- Calculates latency and loss score and selects best performing path for SaaS or Enterprise(Custom) apps



Branch with SIG + Regional DC

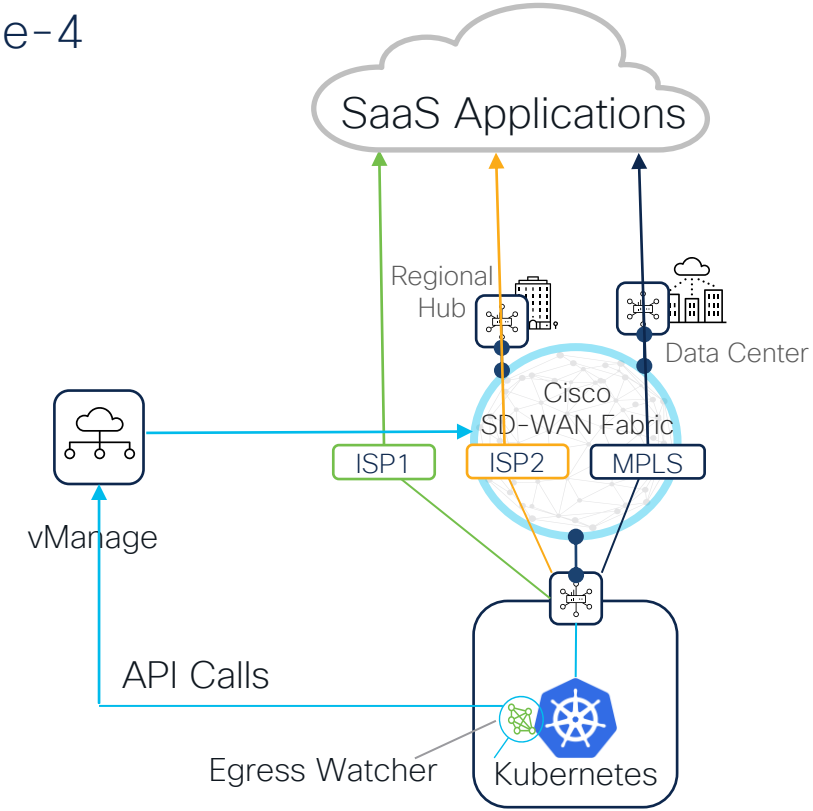
Use Case-3

- Branch with Single DIA circuit (via SIG) and using Gateway back-haul
- Branch users access internet via SIG tunnels or via Gateway site with Central Security inspection.
- HTTP/HTTPS probes sent via SIG tunnels from branch router and via VPN 0 or Service VPN interfaces from Gateway router
- Calculates latency and loss score and selects best performing path for SaaS or Enterprise(Custom) apps



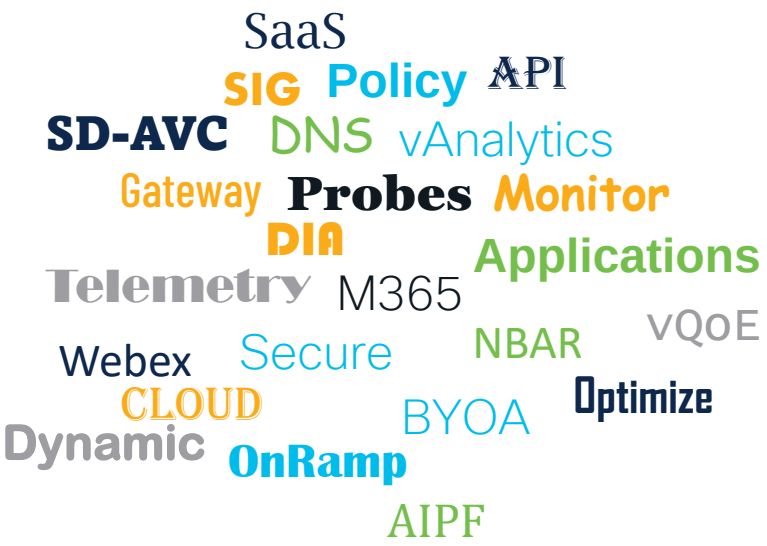
The Power of Custom App + vManage APIs

Use Case-4



https://www.cisco.com/c/en/us/solutions/collateral/enterprise-networks/sd-wan/sd-wan-cloud-onramp-integration-wp.html

Cisco OnRamp for SaaS – Summary



- DNS resolution
- Quality Probing and Performance visibility
- Best Performing Path selection
- Cloud OnRamp for selective M365 URL/IP Categories
- Enhanced visibility with M365 Application Telemetry
- Cloud OnRamp for SaaS for per region Webex Traffic
- Bring Your Own App (BYOA) to Cloud OnRamp

An innovative way to identify the best path to Any SaaS application

Plan of Action :

Only 3 words ….

Just Enable Monitoring

Additional Resources

- Cloud OnRamp for SaaS
- Cloud OnRamp for Microsoft 365
- What Is Cloud OnRamp for SaaS?
- Cloud OnRamp with Microsoft 365 demo video
- Cloud OnRamp with Webex demo video
- Cisco SD-WAN Cloud OnRamp

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.

The bridge to possible

Thank you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