

The background is a vibrant, abstract graphic. It features a central bright white light source from which numerous colorful rays emanate, creating a sunburst or starburst effect. The rays transition through a spectrum of colors including yellow, orange, red, and various shades of blue and green. Overlaid on this are several large, semi-transparent, wavy shapes in similar color tones, giving the overall image a sense of motion and energy.

cisco *Live!*

Let's go

#CiscoLive



The bridge to possible

Deploy Visibility in Your SASE Architecture

with ThousandEyes

Primož Sečnik Kolman, Global Technical Solutions Architect
BRKOPS-2857

CISCO *Live!*

#CiscoLive

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 June 9, 2023.



<https://ciscolive.ciscoevents.com/ciscolivebot/#BRKOPS-2857>

Introduction

- Software development and computer networks background
- Joined ThousandEyes in 2015
 - Various customer-facing roles



Agenda

- Introduction
- Agent Deployment
- Test Configuration
 - Remote Worker
 - SD Branch
- Recap

Introduction



Sassy
and
Fablows
at 40

Cisco SASE Your Way

Solutions for Secure Connectivity, anywhere

Modular SASE

Flexibility and agility for the enterprise

NEW

Cisco Secure Access



Cloud-native, security services built on one platform and centrally managed through a single cloud-managed console

ZTNA, SWG, CASB, FWaaS,
Multi-mode DLP, Sandbox, RBI,
Interactive threat intelligence

+

Cisco SD-WAN



Software-defined network with advance analytics monitoring, and automation

Cisco SD-WAN Catalyst
Cisco SD-WAN Meraki

Unified SASE

Turnkey approach for lean IT

Cisco+ Secure Connect



Unified SASE, combining networking and security into one converged solution, powered on one platform with a single dashboard

Converged Cloud Security
Services + Cisco SD-WAN

Why do you need Visibility?

IF
YOU
CAN
READ THIS,
YOU PROBABLY
DON'T NEED IT

* Visibility? Observability?

Potato, potato!

Why do you need Visibility?



Employee

Houston, we
have a problem

Go ahead,
blame the network

2X

The Notorious
BGP

L

Real networking
is #NotSocial

L

f***
tracer*ute

XL

Route
BGP

2X

Cover your AS

M

ThousandEyes Overview

Discover New Insights into Your Network

ThousandEyes is a network management platform that provides visibility into your network and applications. It can help you understand your network and applications better than ever before. It can help you understand your network and applications better than ever before.

Actionable Intelligence to Improve End User Experience

ThousandEyes provides you with the ability to see, diagnose and fix network issues before they impact your users. It can help you understand your network and applications better than ever before.



Vantage Points for Any Network

See the relative view of your network through ThousandEyes Agents distributed in both internal and external networks. Expect visibility of the way to the user.



Cloud Agents

ThousandEyes' cloud agents are distributed across various cloud providers to provide visibility into your cloud environment.

Enterprise Agents

Monitor your corporate and remote networks and applications with ThousandEyes Agents distributed across your network.

Endpoint Agents

Monitor your corporate and remote networks and applications with ThousandEyes Agents distributed across your network.

Only One View

ThousandEyes Enterprise Agent for Cisco® Enterprise Routers



Network Insights for Your WAN and the Cloud

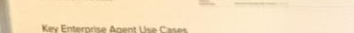
Enterprise Agents provide you with the ability to see, diagnose and fix network issues before they impact your users. It can help you understand your network and applications better than ever before.

Enterprise Agents integrate with Cisco Enterprise Routers, so you can get the most out of your network and applications. It can help you understand your network and applications better than ever before.



See App Performance over both Internal and External Networks

Enterprise Agents can also monitor the availability and response time of your applications. It can help you understand your network and applications better than ever before.



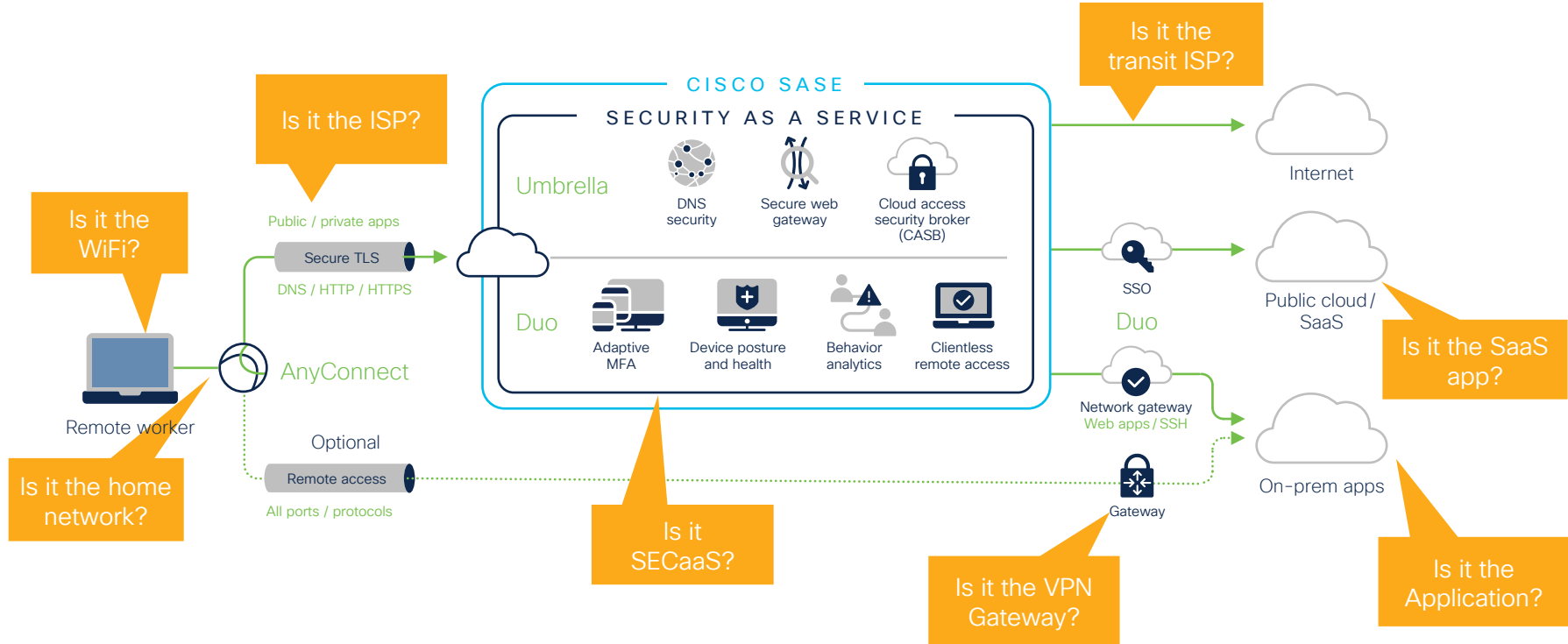
Key Enterprise Agent Use Cases

Optimize WAN Performance, Monitor Critical Enterprise Apps, Troubleshoot Issues at the Edge.

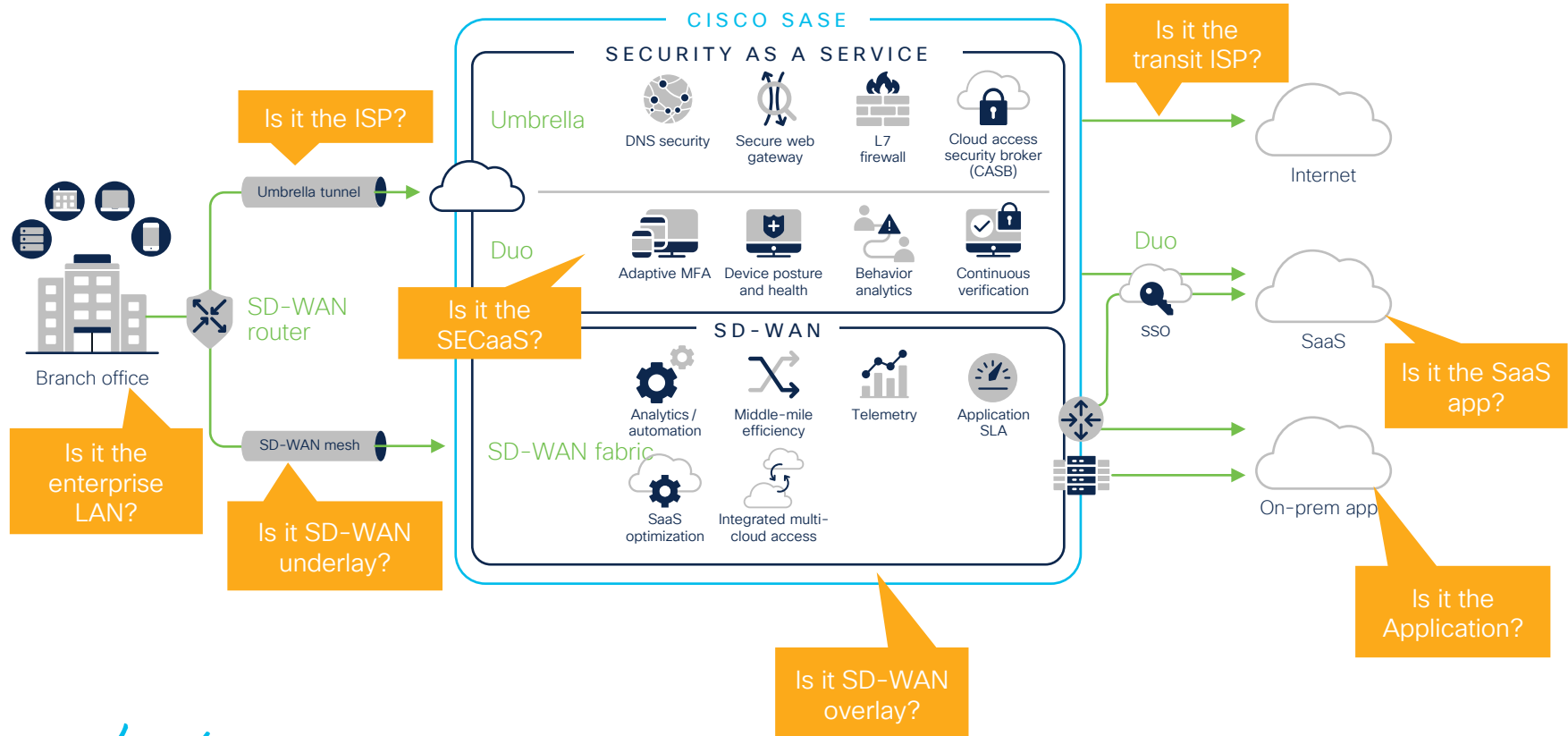
BRKOPS2857

11

Problem Landscape: Remote Worker



Problem Landscape: SD Branch



ThousandEyes SASE Visibility

Application
availability

O365 Availability

100% 0% Mean

Web - HTTP Server — Availability
1 Test • All Agents • 1 hour

Salesforce Availability

100% 0% Mean

Web - HTTP Server — Availability
1 Test • All Agents • 1 hour

Google Availability

98.33% 0% Mean

Web - HTTP Server — Availability
1 Test • All Agents • 1 hour

Umbrella Availability

100% 0% Mean

Web - HTTP Server — Availability
1 Test • All Agents • 1 hour

DNS Availability

100% 0% Mean

DNS — Availability
2 Tests • All Agents • 1 hour

SASE &
service
availability

Per-office
availability

Location Overview

Web - HTTP Server — Availability • 1 hour

Ljubljana Office 99.58 %

100

Outlook - Umbrella

100

Umbrella

100

Salesforce - Umb...

98.33

Google - Umbrella

Location Performance - HTTP Response Time

Web - HTTP Server — Total Time • 1 hour

Ljubljana Office 322.32 ms

805.64
Salesforce - Umb...

233.67
Outlook - Umbrella

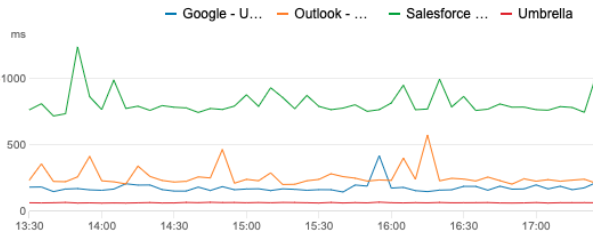
182.32
Google - Umbrella

65.31
Umbrella

Per-office
performance

Location Performance - SaaS HTTP Total Time

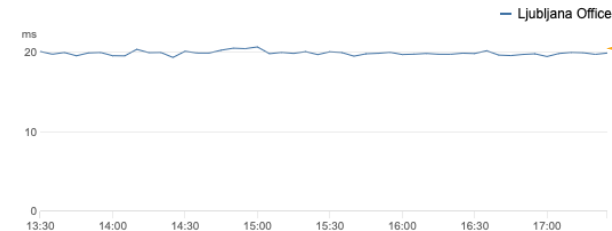
Web - HTTP Server — Total Time • 4 hours



Application
performance

Location Performance - Umbrella Latency

Network - Agent to Server — Latency • Umbrella • 4 hours



SASE
performance

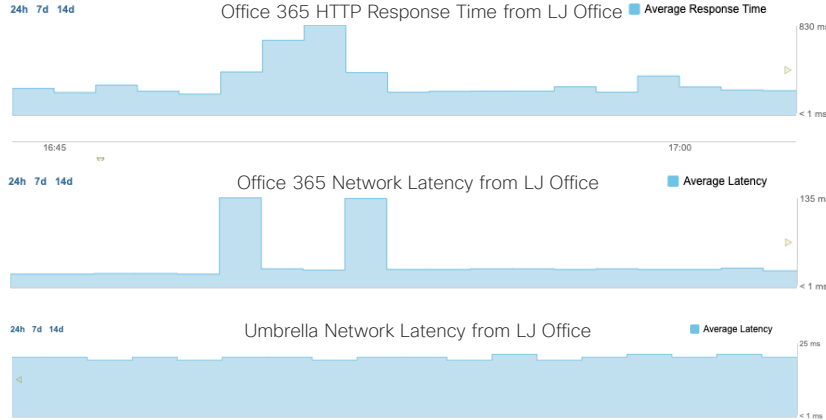
Visibility
puts you in
control

ThousandEyes 
part of Cisco



Visibility Must Be Actionable

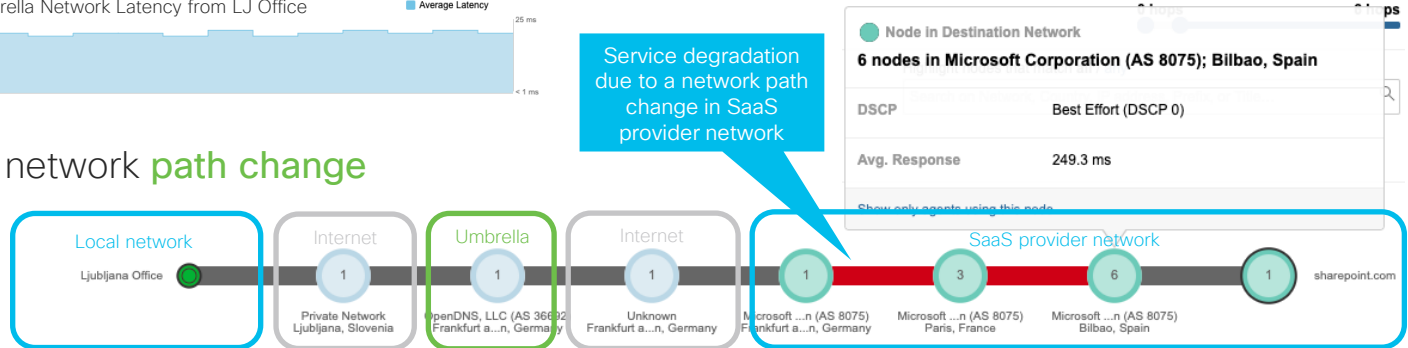
When service degradation occurs, quickly identify where the problem is.



1 Increase in the **service response time**

2 Due to an increase in **network latency**

3 Caused by a network **path change**



Agent Deployment

Remote Worker

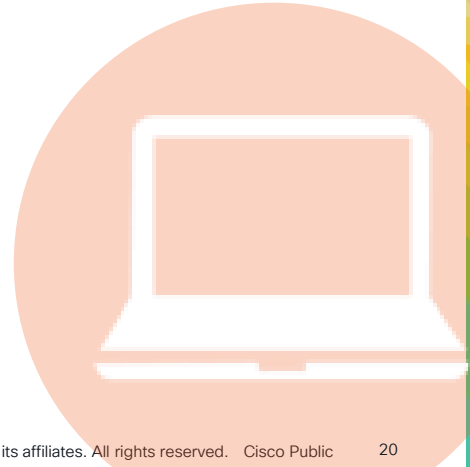


ThousandEyes
Endpoint agent

Remote worker

Endpoint Agent

- Install it on your employees' computers (Windows & macOS)
 - Manual, Group policy or Managed Software Center
- Performs active application and network performance tests
- Passively collects performance data (WiFi metrics, CPU, ...)
- Detects and monitors VPNs, proxies
- Follows the employee wherever he works from
 - Work from home
 - Work from office
 - Work from anywhere



SD Branch



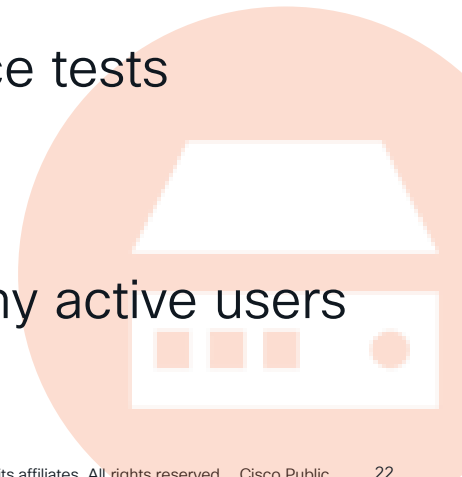
ThousandEyes
Enterprise agent



ThousandEyes
Cloud agent

Enterprise Agent

- Install it in your office in user VLAN
 - Cisco Catalyst 8000, Catalyst 9000, ISR 4000 and Meraki MX Series
 - VM, Docker, Intel NUC, Raspberry Pi
 - Install on whatever available, Catalyst devices give you no visibility advantage
- Performs active application and network performance tests
 - Performs complex Web application testing (incl. ZTNA)
 - Can test VPN and SD-WAN underlay
- Provides constant baseline regardless if there are any active users



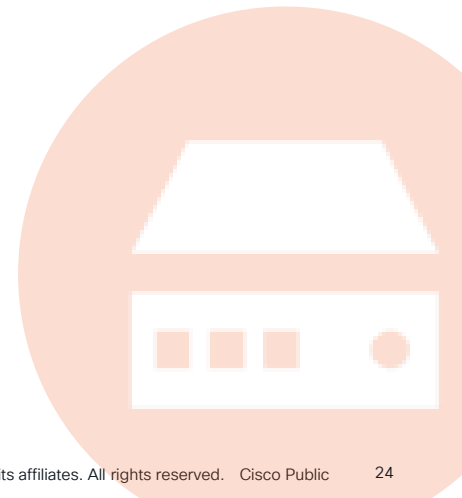
Enterprise Agent Installation on Cisco Devices

- Catalyst 8200, 8300, 8500, ISR 4000, ASR 1000
 - Install it through vManage
 - CLI installation only when router is not in SD-WAN mode
 - IOS XE > 17.6.1 (17.8 for Cat 8500 & ASR 1000)
 - Agent software auto-updates independent from IOS XE
 - No Browserbot tests
- Catalyst 9300, 9400
 - Install it through DNAC or CLI
 - IOS XE > 17.5.1 (17.3.3 for 9300 basic functionality)
 - SSD required for Browserbot tests



Enterprise Agent Installation on Meraki MX

- Cisco Live 23 announcement!
 - GA in the coming months
- Meraki MX 67 and above (except MX 84 & 100)
- One click installation through Meraki Dashboard
- No Browserbot tests



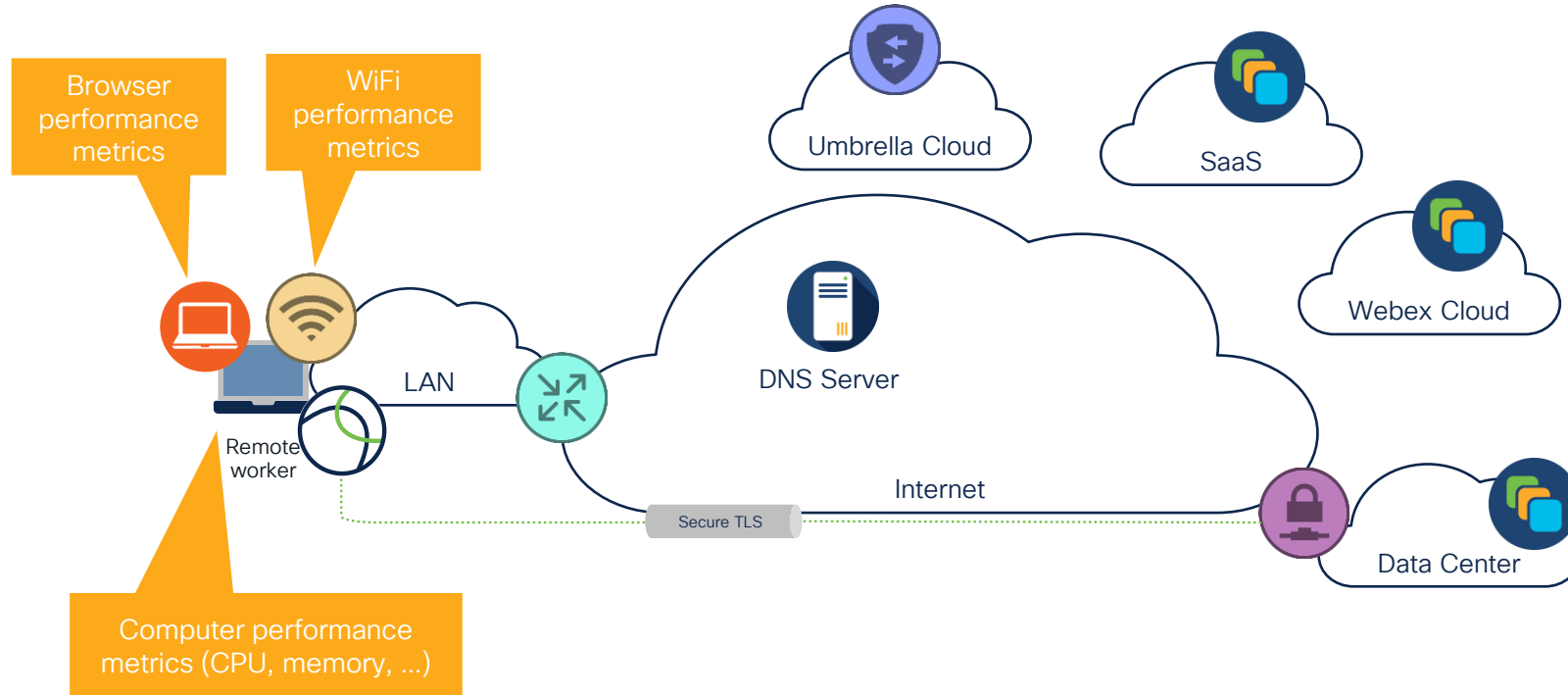
Cloud Agent

- Installed in 251 cities and 64 countries around the world
 - Broadband ISPs
 - Cloud providers (AWS, Azure, GCP, Alibaba)
 - Webex data centers
- Complements and improves your Enterprise agent tests
 - Reference metrics (your office vs other ISPs in the area)
 - Two-way network testing between your office and Cloud providers
 - Two-way RTP testing between your office and Webex data centers

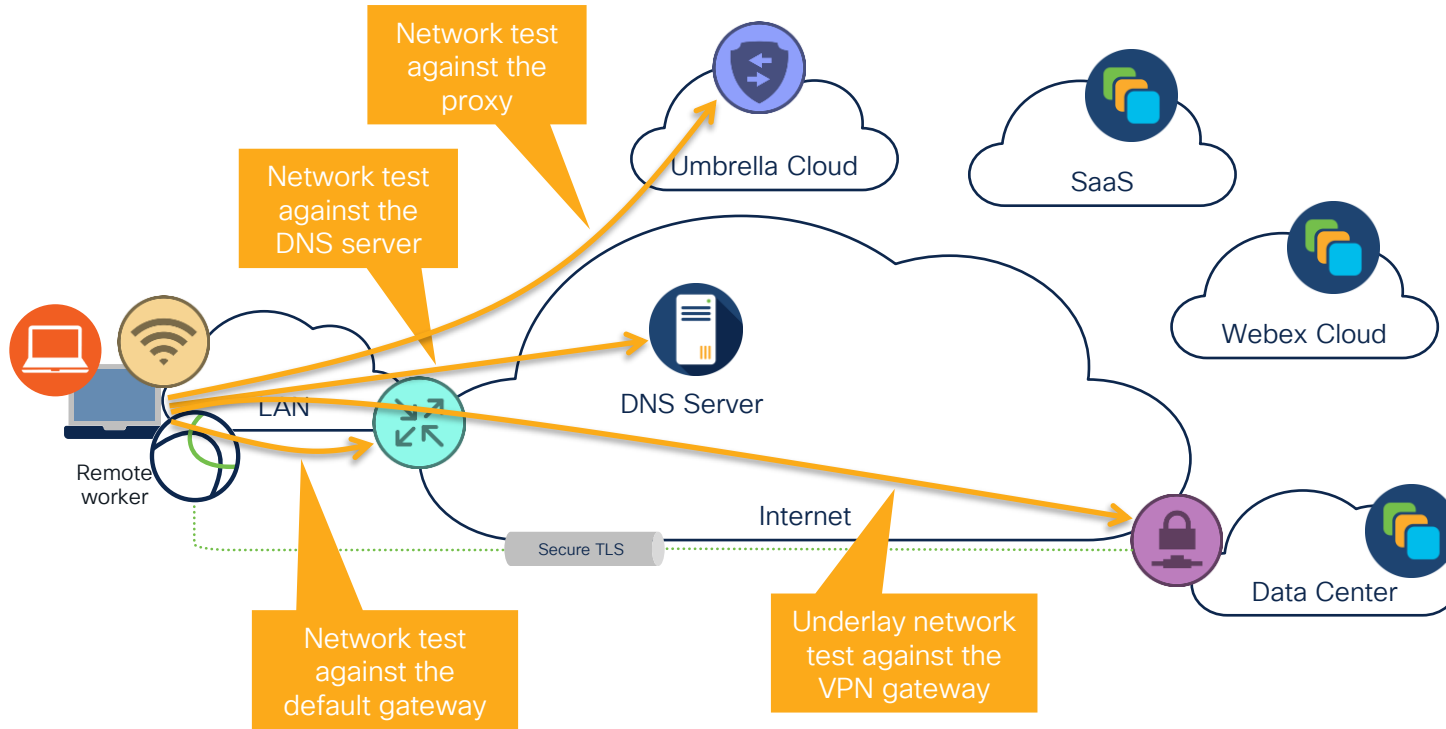
Test Configuration

Remote Worker

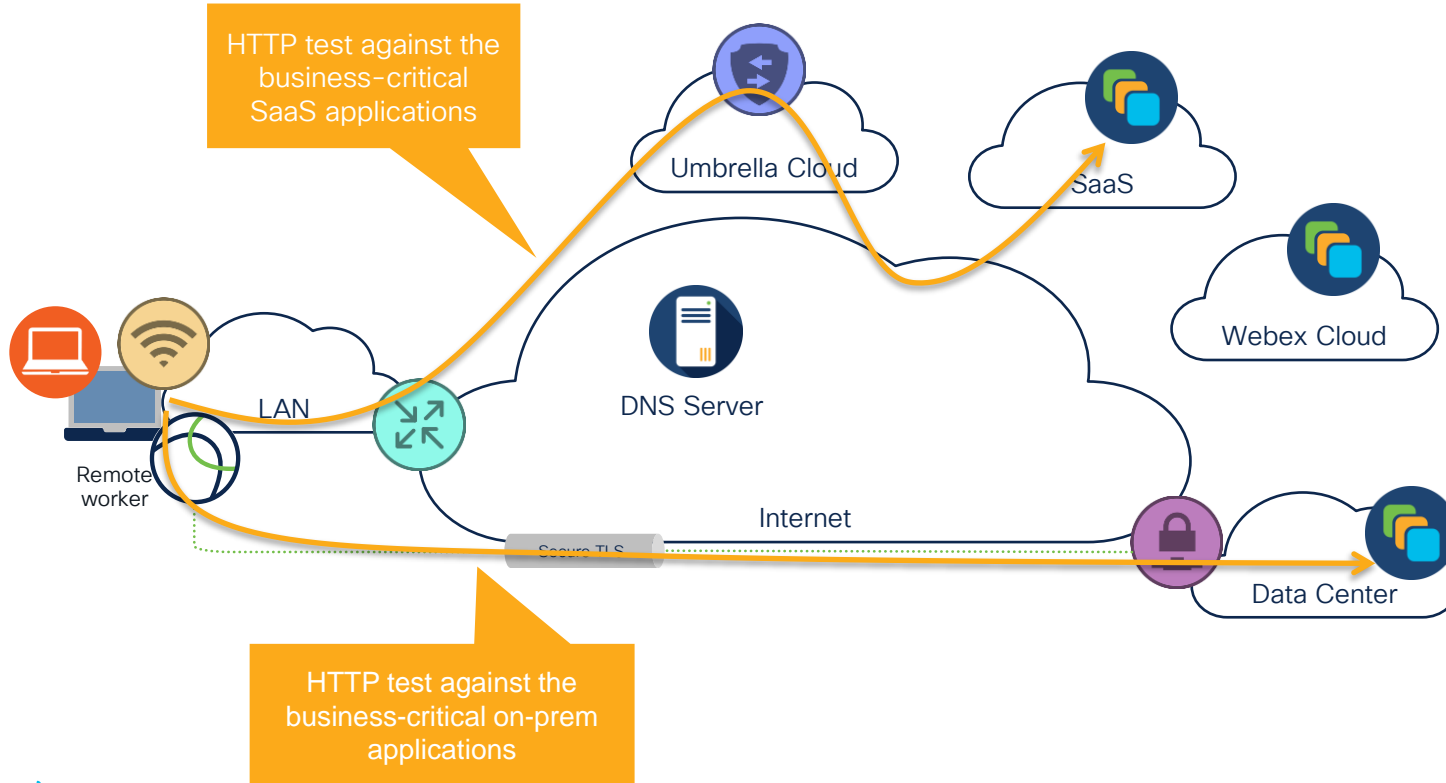
Endpoint Agent: Passive Monitoring



Endpoint Agent: Default Network Testing

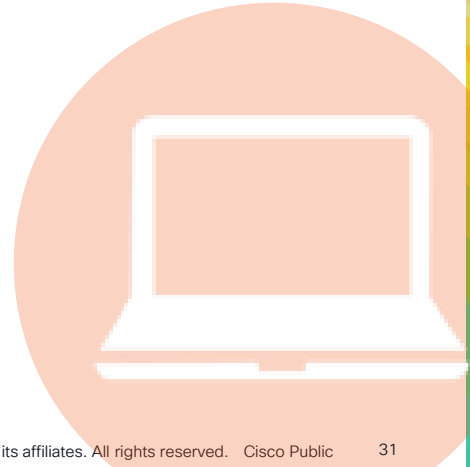


Endpoint Agent: Scheduled Testing

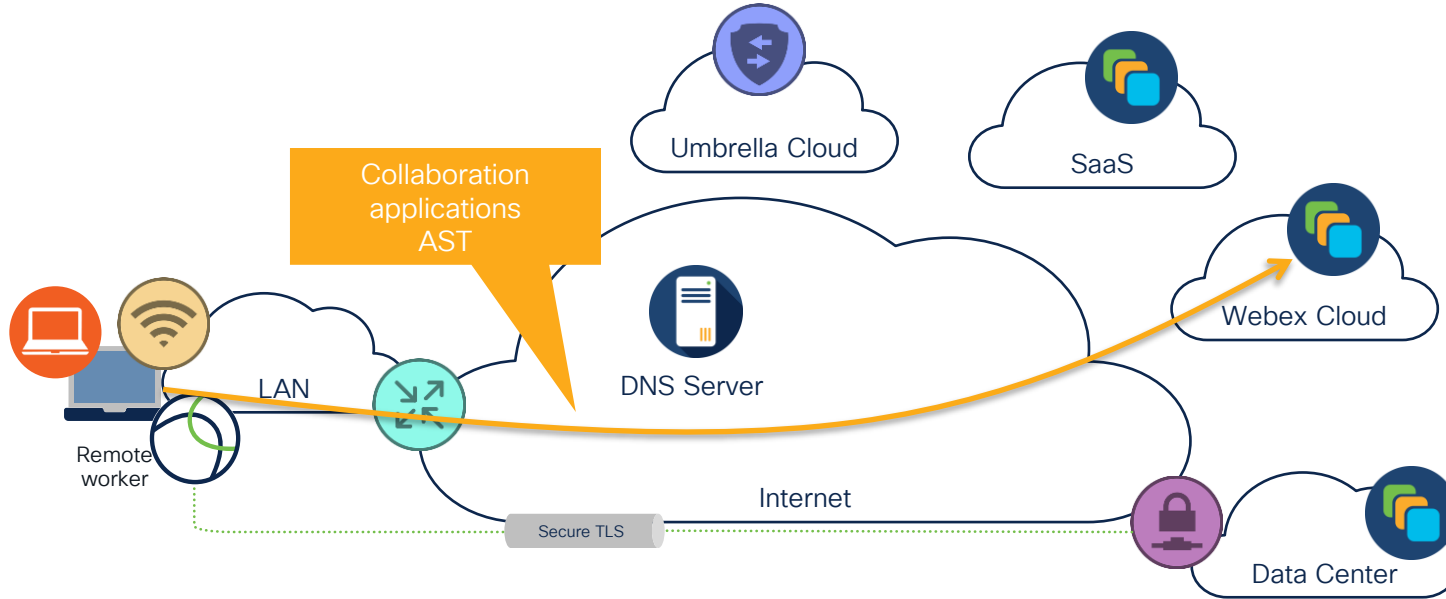


Endpoint Agent: Scheduled Testing

- Target business-critical applications regardless of their location
 - ThousandEyes test traffic will follow routing of your SASE environment through Umbrella, VPN or Internet
 - Umbrella CA cert will be preinstalled on client computer
- Configure appropriate test types
 - HTTP server for web applications
 - Network tests for everything else



Endpoint Agent: Automated Session Testing



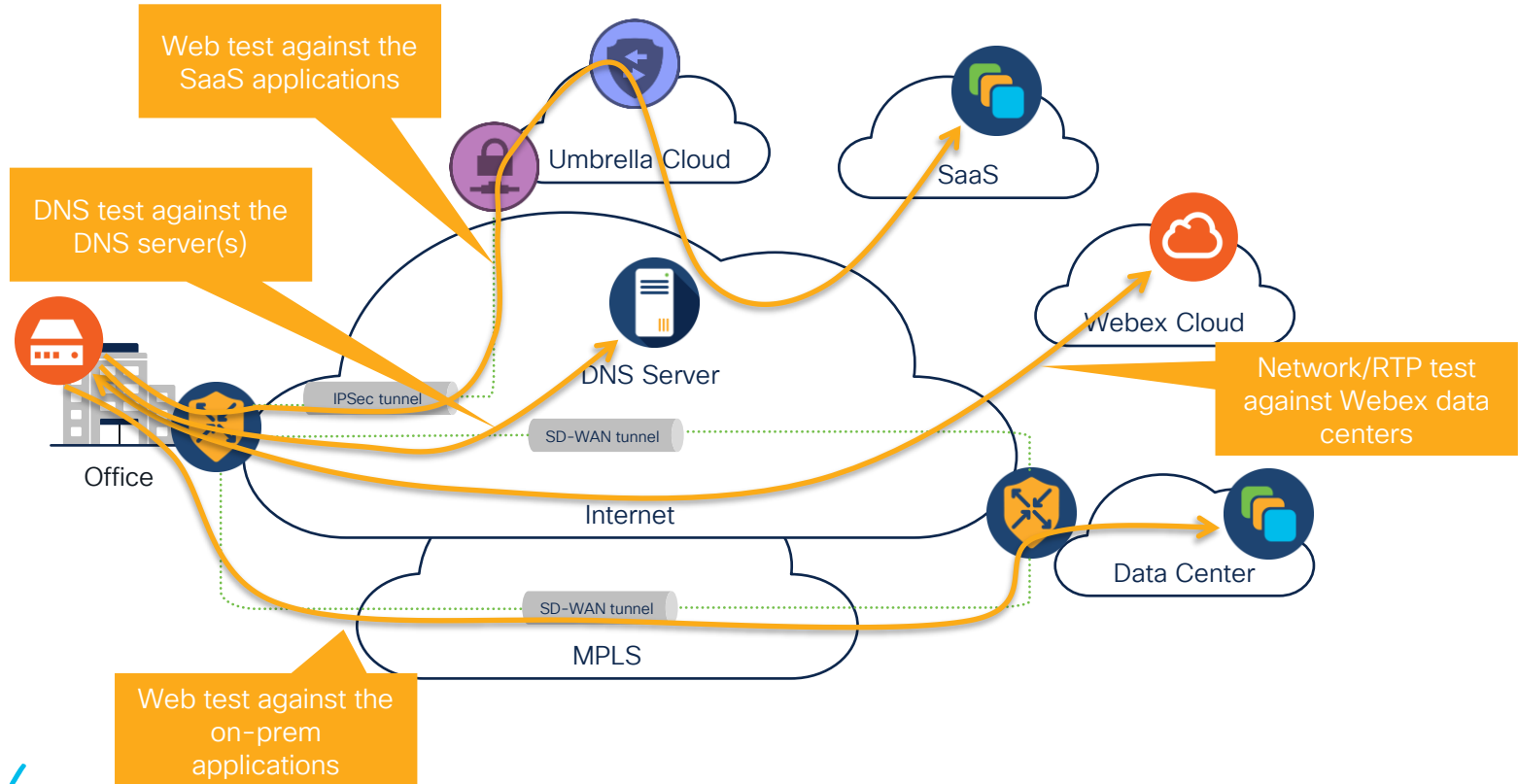
Endpoint Agent: Automated Session Testing

- Collaboration client connects to multiple different nodes
 - Web zone
 - Multi-media nodes
 - Collaboration bridges
- Collaboration client connects to multiple different regions
- AST will track collaboration client connections
 - and setup network tests against target nodes
- AST supports multiple different applications



SD Branch

Enterprise Agent: Application Testing



Enterprise Agent: Application Testing

- Target business-critical applications regardless of their location
 - ThousandEyes test traffic will follow routing of your SASE environment through Umbrella, SD-WAN fabric or DIA
- Configure appropriate test types
 - Page Load or Web Transaction (SSO) for web applications
 - DNS server for application domains against your DNS resolvers
 - Network or RTP tests for collaboration applications
- There is real value in Cloud network performance
 - SASE components are just a part of whole journey

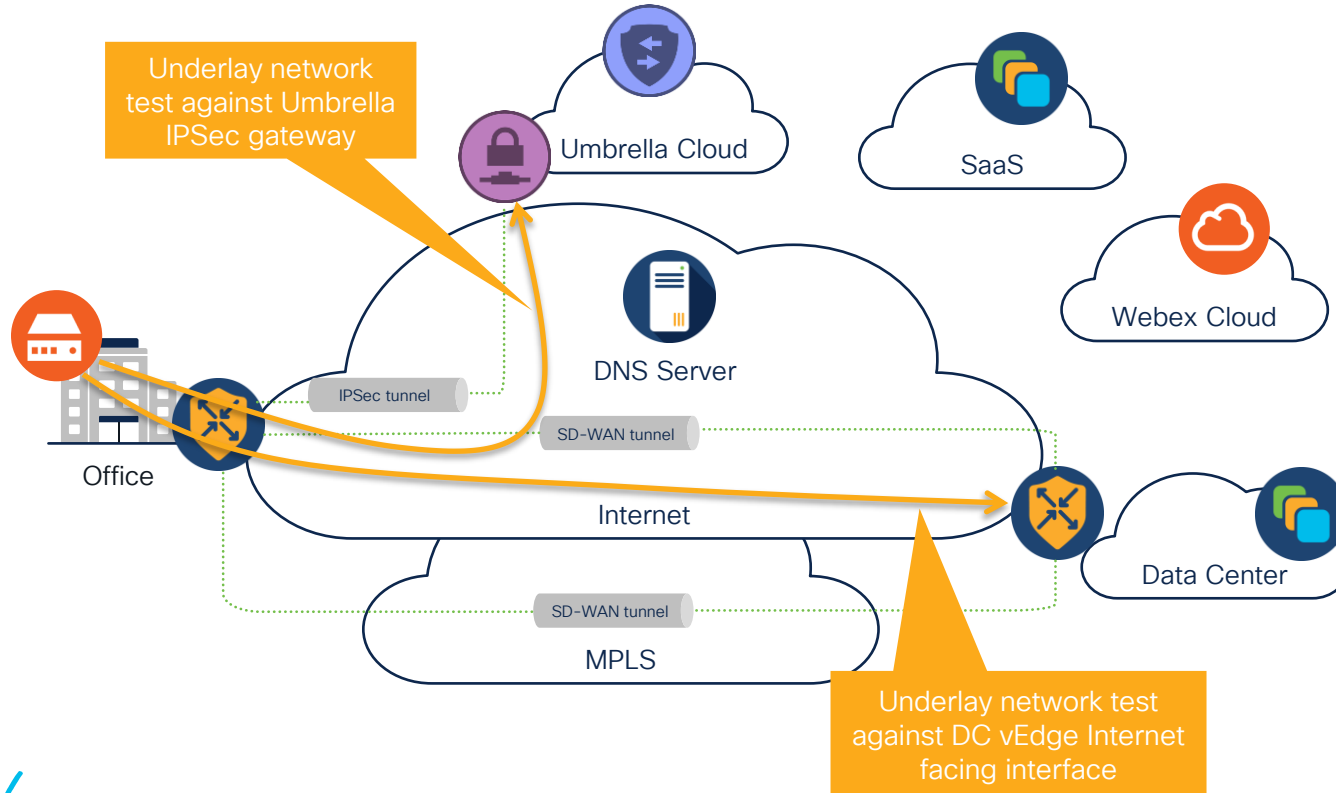


Cloud Agent: Application Testing

- Cloud agent doesn't play a major role in SASE Visibility
- Use Cloud agents in Webex data centers for two-way network and RTP tests
- Use Cloud agents in the same area as your office for reference testing
 - Does a business-application perform better or worse from my office compared to a cloud location in the area?



Enterprise Agent: Underlay Testing



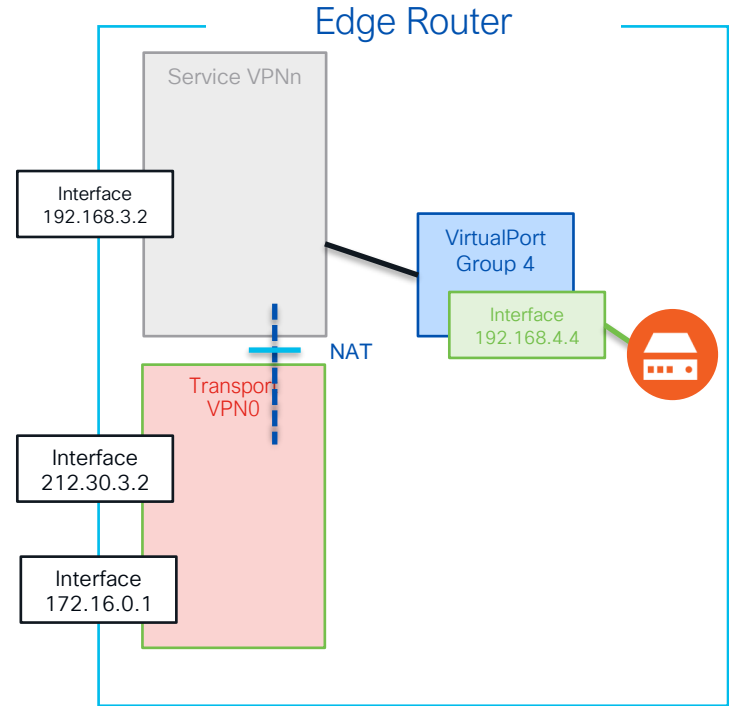
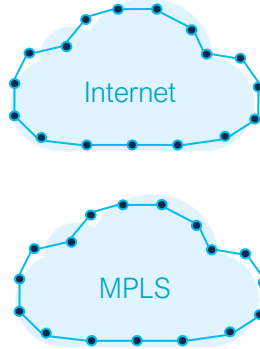
Enterprise Agent: Underlay Testing on Catalyst

- Underlay testing gives you hop-by-hop insight into the underlay Internet
- Typically requires additional data policies on your edge router
 - Enterprise agent runs in user subnet (VLAN/VRF)
 - Underlay tests target Umbrella / Cisco Secure Access IPSec gateway or DC edge router with ICMP
 - You're OK if DIA is already configured for those IPs
- Interested in deep implementation details?
 - BRKENT-2126 - 3 Steps to Gain Actionable Visibility in the Cisco SD-WAN Using ThousandEyes



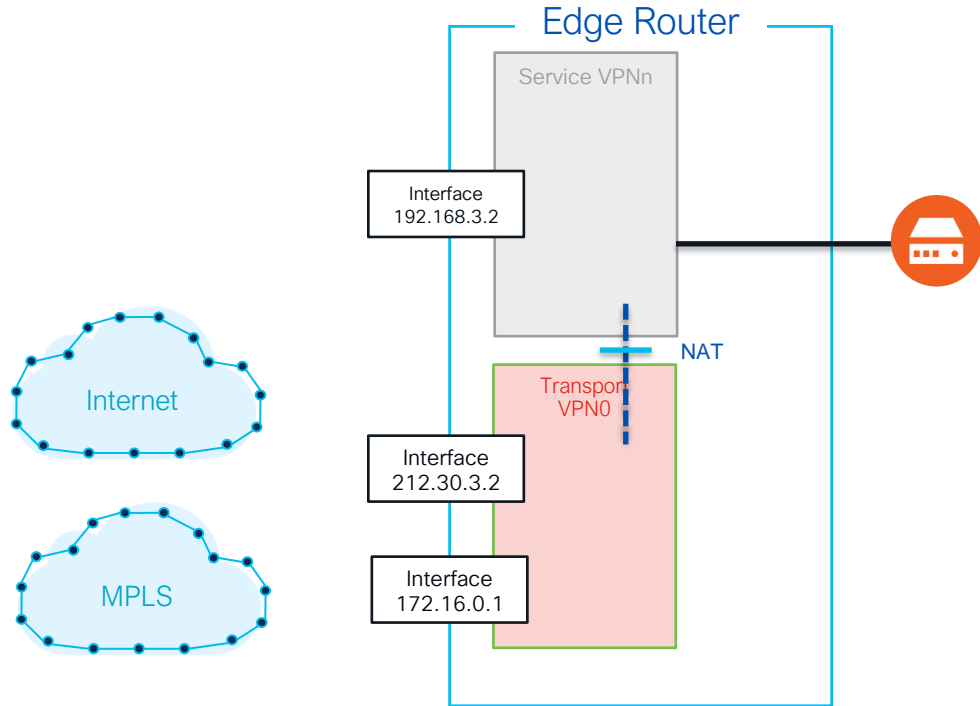
Enterprise Agent on Catalyst Router

- Agent has an interface in VPG
- VPG can be placed in any VPN, but you should place it in a service VPN
- VPG requires unique subnet
 - Which gets automatically advertised into the SD-WAN fabric
 - But not beyond!
- Up and ready for application testing

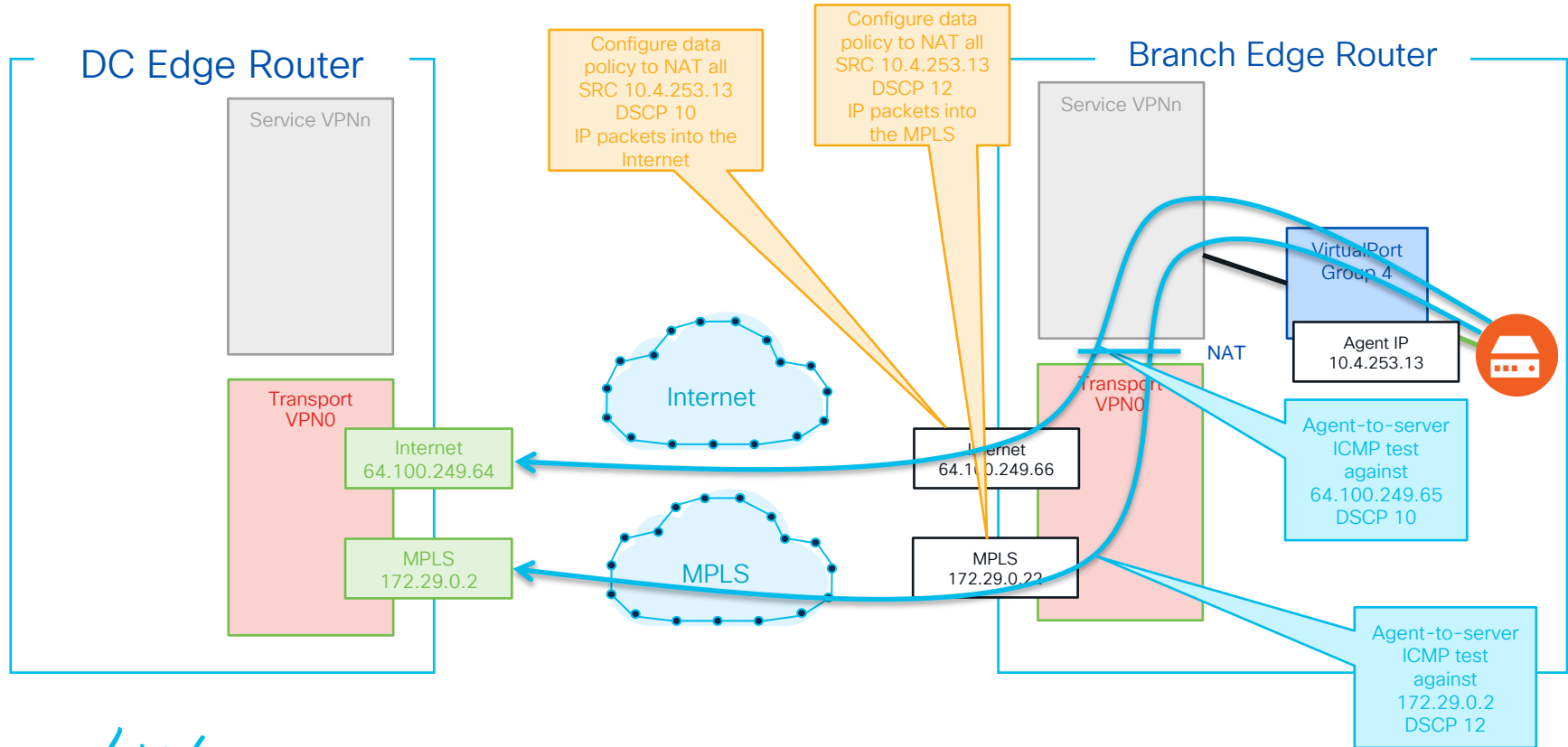


Enterprise Agent Behind a Cisco Router

- Agent is in a user subnet in Service VPN
- You can reuse existent IP space for agent
- You can run an agent on a platform that supports Browser tests
- But you need a platform to host it



Cisco Router Underlay Testing Policies



vManage Underlay Testing Policy Configuration

Add Data Policy

Name*

ThousandEyes_Underlay_Testing

Description*

Description of the policy

Required

+ Sequence Type

Drag & drop to reorder



Internet



Sequence Rule

Drag and drop to re-arrange rules

1



Match Conditions

Source Data Prefix List:

ThousandEyes_Agents

Source: IP

DSCP:

10

Actions

Accept

NAT VPN:

0

Fallback

Local TLOC List:

public-internet

Encapsulation

IPSEC

Restrict

true

Umbrella Underlay Testing

- If you have 1 Internet and 1 MPLS transport network with DIA enabled, it will work out of the box
- Otherwise, you need configure another Data Policy on the SD-WAN router

Enterprise Agent: Underlay Testing on Meraki

- No data policy exceptions are possible at the moment
- Underlay tests target Umbrella / Cisco Secure Access IPSec gateway or DC edge router with ICMP are possible if DIA is already configured for these IPs
 - Other Underlay testing scenarios are not supported.



SD-WAN topologies

- Hub & spoke
 - $w = (n - 1) * 2$
- Full-mesh
 - $w = n * (n - 1)$
- Hybrid

- You can't monitor full-mesh underlay
 - Focus on App data flows
 - You will end up with hub-and-spoke



Demo

Umbrella SSL Inspection

- If Umbrella is decrypting SSL, agent will fail to connect to ThousandEyes cloud
 - Download Umbrella root cert and [install it on the agent](#) (preferred)
 - Disable SSL decryption for agent traffic (source IP based)



SSL Decryption

Enhances security by performing inspection of HTTPS traffic for deeper security insight

The Cisco Umbrella root certificate must be installed on all computers configured in this policy.

Without the certificate installed, users will not be able to connect to some HTTPS sites and some SSL connections will be broken. [Please read our guide for distributing the root certificate. >>](#)

[DOWNLOAD CERTIFICATE](#)

Umbrella SAML Authentication

- If Umbrella is enforcing SAML authentication for all users, your web tests will fail
 - Disable SAML authentication for agent traffic (source IP based)
 - Use Web Transaction tests to solve SAML authentication
 - ... but HTTP server tests will then terminate at Umbrella



ThousandEyes Enterprise Agents

Ruleset Rules

ADD RULE

SAML

Disabled

Endpoint Agent in SD Branch

- But wait, why can't you just use the Endpoint agent?
- Endpoint agent does bring some value into SD Branch
 - Employees still use WiFi and rely on local network performance when in office
- But the Enterprise agents has multiple benefits
 - Consistent baseline
 - App layer scheduled test types (Web transactions, RTP test, DNS test, ...)
 - Underlay testing



Device Layer & Internet Insights

- Device layer provides visibility into performance of SD Branch internal network devices by gathering network device topology
- Internet insights provide network and SaaS app outage detection at Internet scale
 - Visibility into network outages that disrupt your global SD-WAN mesh
 - Visibility into SaaS application outages, and its scale and geographic scope
- **Eliminate unnecessary troubleshooting cycles**

WAN Insights

- Applies statistical models to Cisco vAnalytics path metrics
- Provides network forecasts and SD-WAN policy recommendations
- Optimizes user experience across enterprise sites
- If you have vAnalytics, you're eligible to use it!

Introducing Cisco Secure Access

Accelerating your SASE journey with a robust Security Service Edge

Converged, cloud-native security modernizes your protection

Better for Users: Boost productivity with a frictionless user experience from devices anywhere to any app everywhere

Easier for IT Simplify operations with one console to visualize traffic, set up policies, and analyze risk

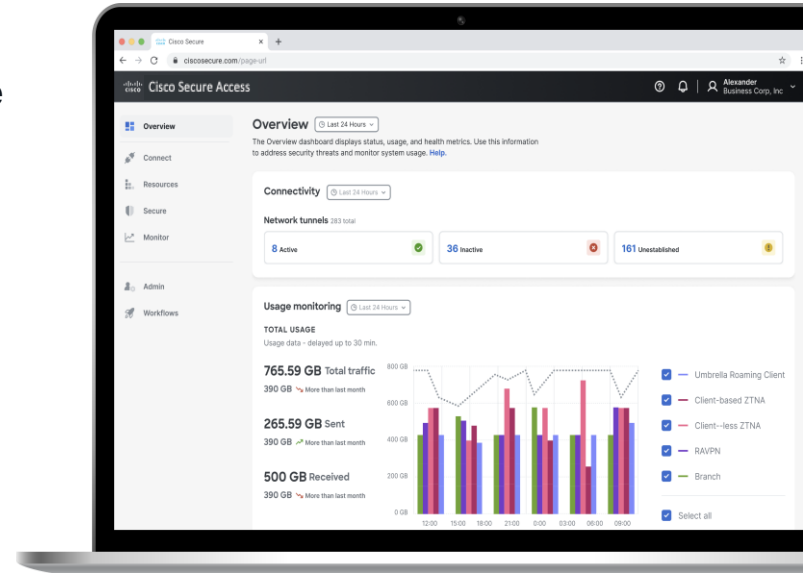
Safer for Everyone: Converged, cloud-native security with deep visibility to block more threats and remediate, faster



Ecosystem of
Partners



Security Cloud
Platform



Visibility
puts you in
control

ThousandEyes 
part of Cisco

Recap

Recap

Remote Worker

- Endpoint agent
 - Employees' computer
- Passive performance monitoring
- Active scheduled tests
- Automated session testing

SD Branch

- Enterprise agent
 - Catalyst, VM, appliance, ...
- Web, DNS, network, RTP tests
- Two-way tests vs Cloud agents
- Underlay tests

Visibility
puts you in
control

ThousandEyes 
part of Cisco

Fill out your session surveys!



Attendees who fill out a minimum of four session surveys and the overall event survey will get **Cisco Live-branded socks** (while supplies last)!



Attendees will also earn 100 points in the **Cisco Live Challenge** for every survey completed.



These points help you get on the leaderboard and increase your chances of winning daily and grand prizes

Continue your education



- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Engineer meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand



The bridge to possible

Thank you

CISCO *Live!*

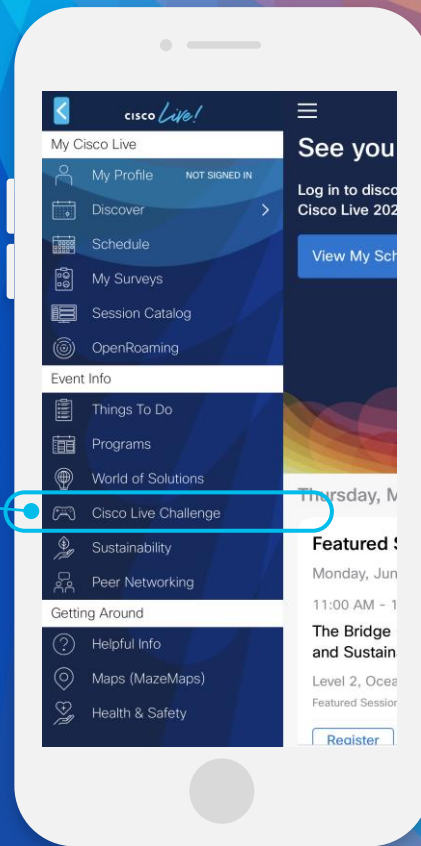
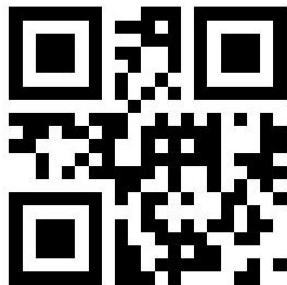
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Cisco Live Challenge

Gamify your Cisco Live experience!
Get points for attending this session!

How:

- 1 Open the Cisco Events App.
- 2 Click on 'Cisco Live Challenge' in the side menu.
- 3 Click on View Your Badges at the top.
- 4 Click the + at the bottom of the screen and scan the QR code:



The background of the slide is a vibrant, abstract graphic. It features a series of overlapping, wavy bands of color in a rainbow spectrum, transitioning from red and orange on the left to yellow, green, and blue on the right. A bright, white, starburst-like light source is positioned on the right side, with rays of light emanating from it, creating a sense of energy and movement. The overall effect is dynamic and celebratory.

cisco *Live!*

Let's go

#CiscoLive