Cisco SD-WAN a typické příklady nasazení SD-WAN v prostředí podnikové sítě

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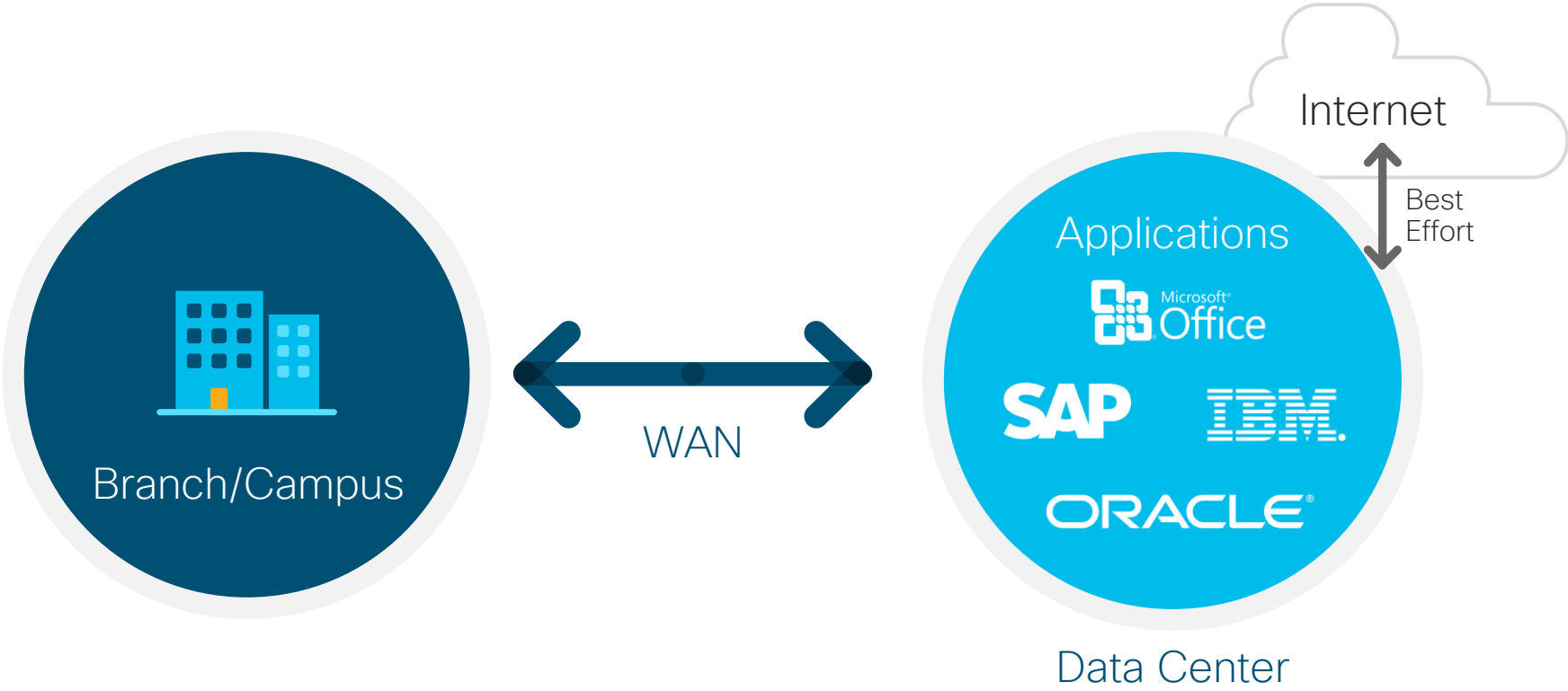
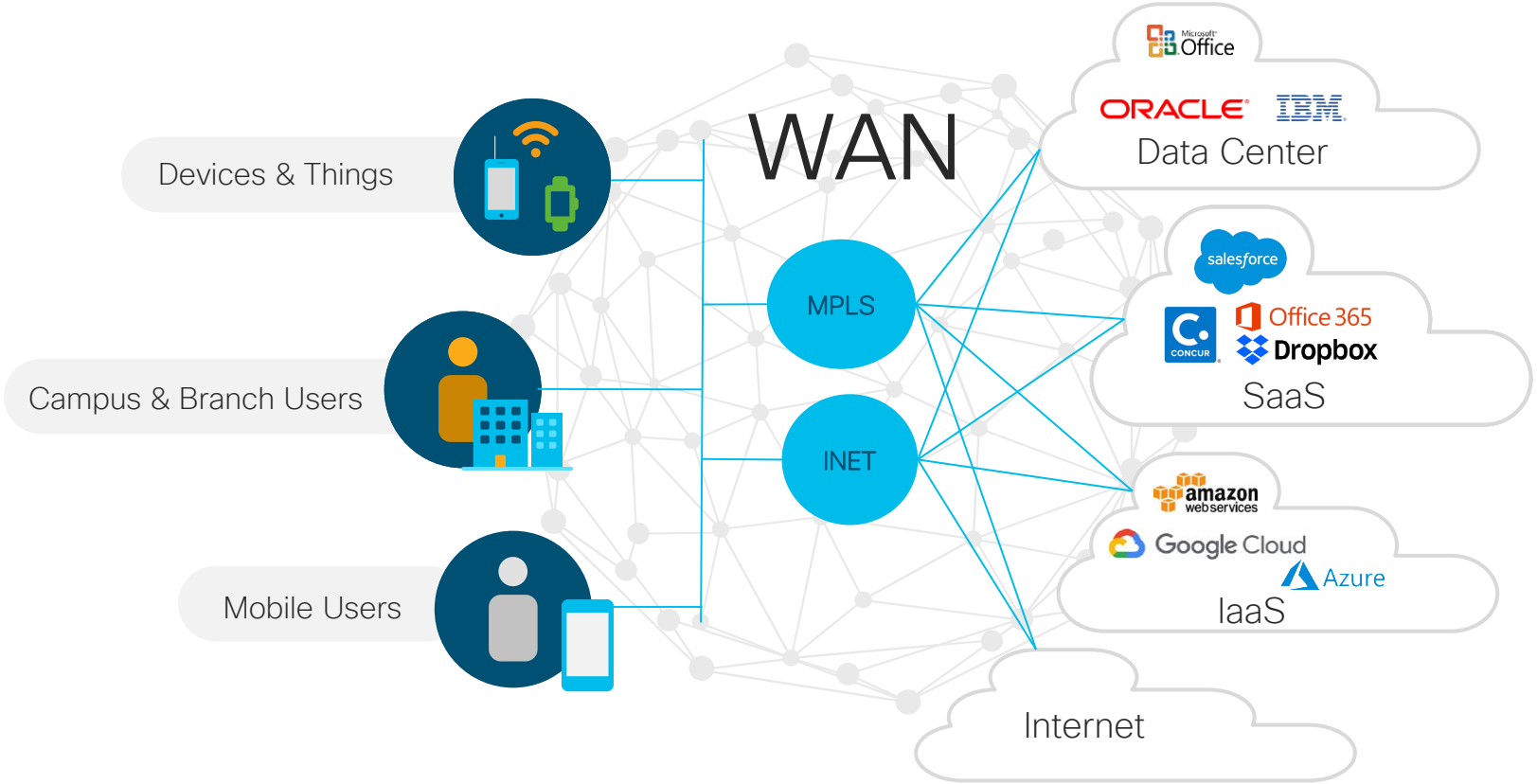
Agenda

1. Why SD-WAN
2. Cisco SD-WAN solution overview
3. Cisco SD-WAN and Application Experience
4. Cisco SD-WAN and Cloud Applications Optimization
5. Cisco SD-WAN and Secure Branch
6. Cisco SD-WAN and Simplified Management
7. Conclusion

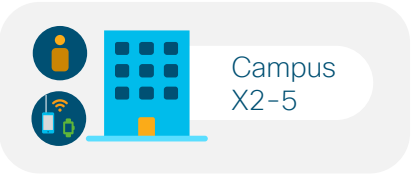
Connecting Users to Data Center was the Priority

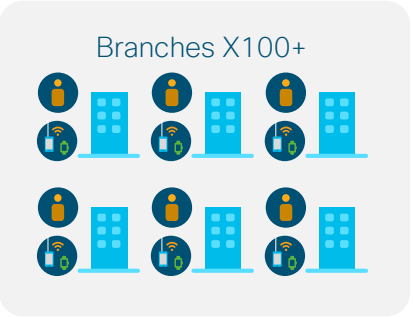


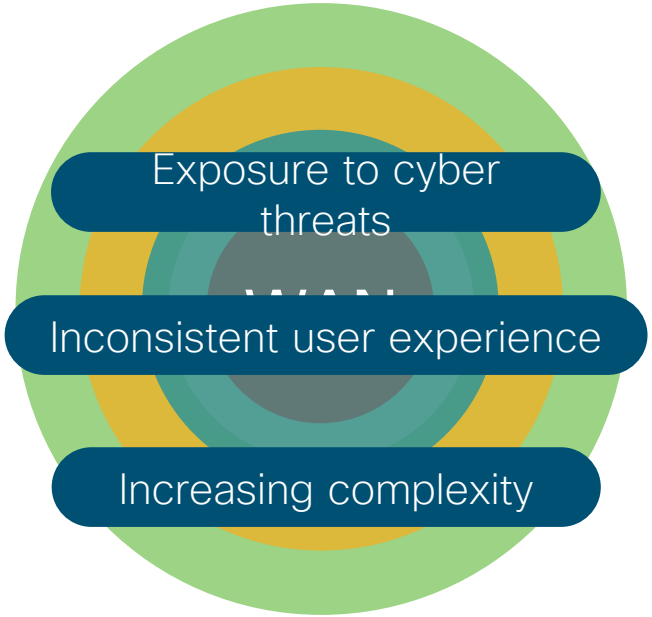
Today, things have changed completely



Internet Connectivity Becomes Business Critical

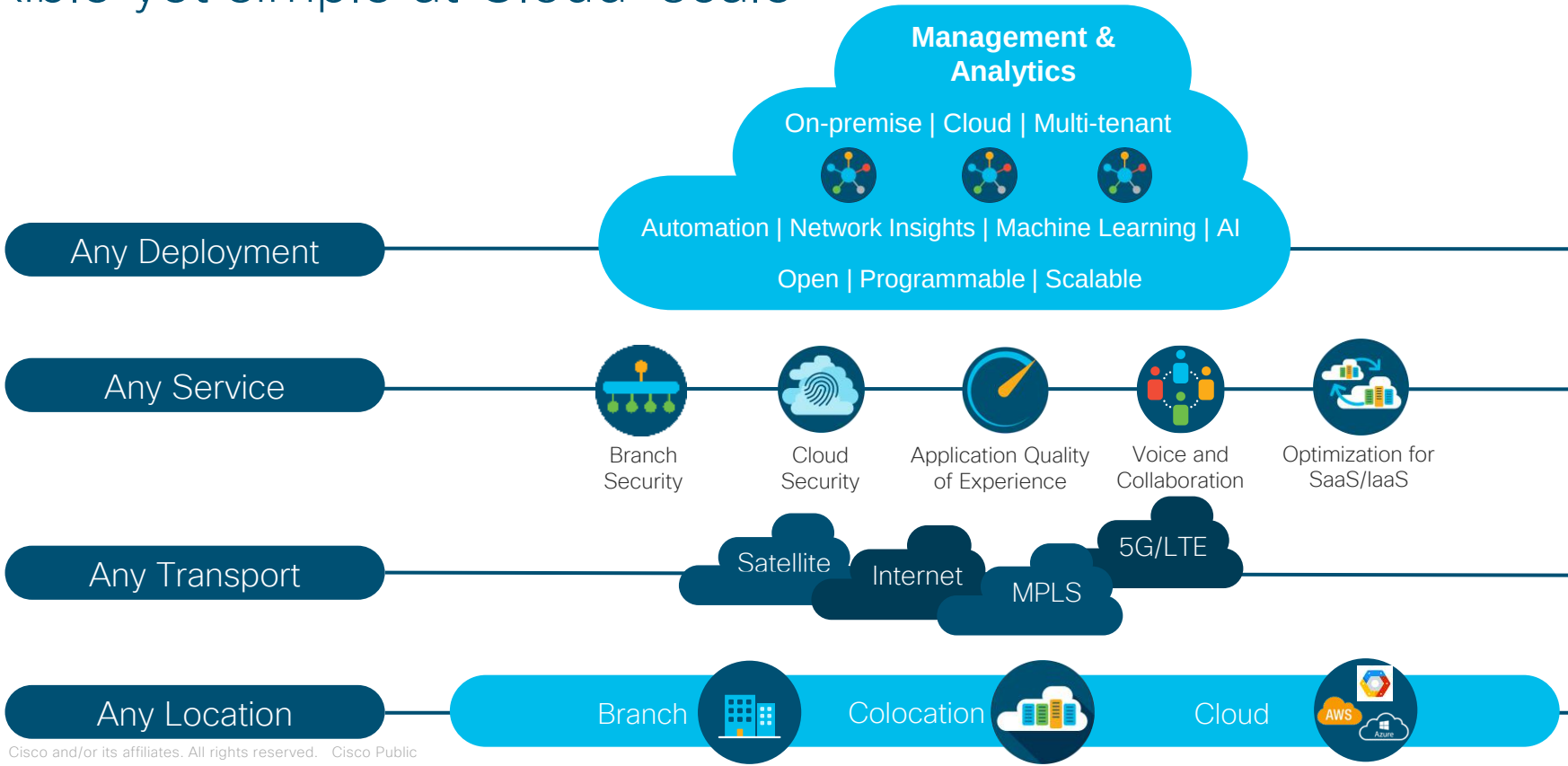






More users, things and applications, everywhere

Cisco SD-WAN
Flexible yet simple at Cloud-scale



Cisco SD-WAN solution overview

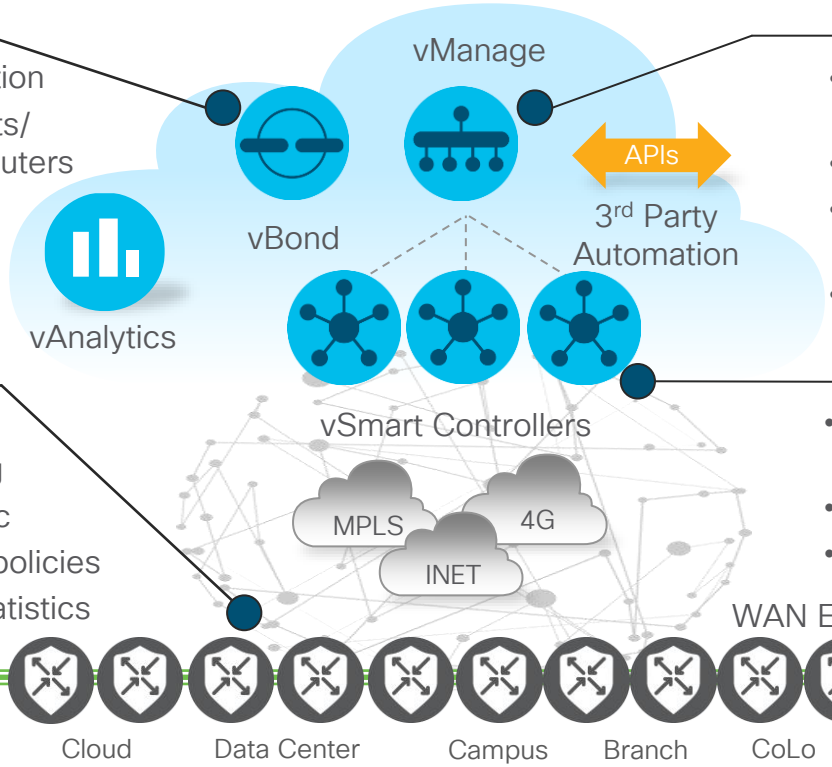
Cisco SD-WAN Architecture

Orchestration Plane

- First point of authentication
- Distributes list of vSmarts/ vManage to all vEdge routers
- Facilitates NAT traversal

Management Plane

- Single pane of glass for Day0, Day1 and Day2 operations
- Multitenant or single-tenant
- Centralized provisioning, troubleshooting and monitoring
- RBAC and APIs



Data Plane

- Physical or virtual
- Zero Touch Provisioning
- Establishes secure fabric
- Implements data plane policies
- Exports performance statistics

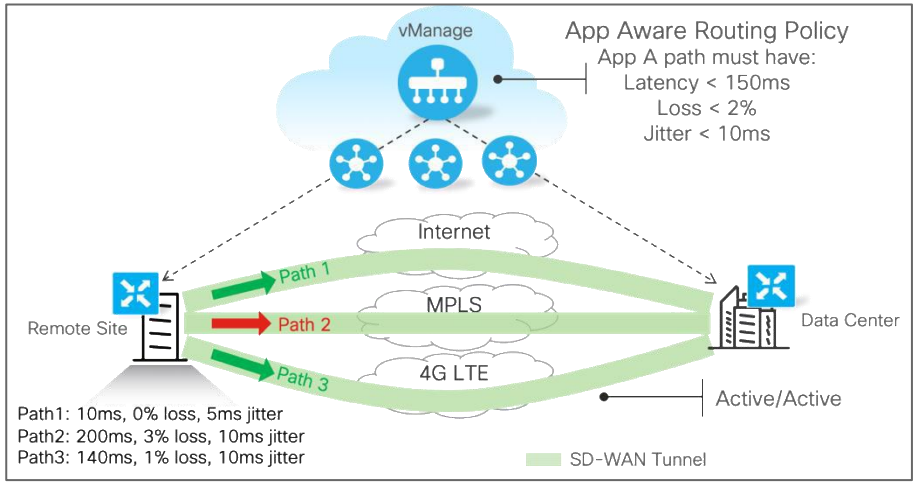
Control Plane

- Dissimilates control plane information between vEdges
- Distributes data plane policies
- Implements control plane policies

Cisco SD-WAN and Application Experience

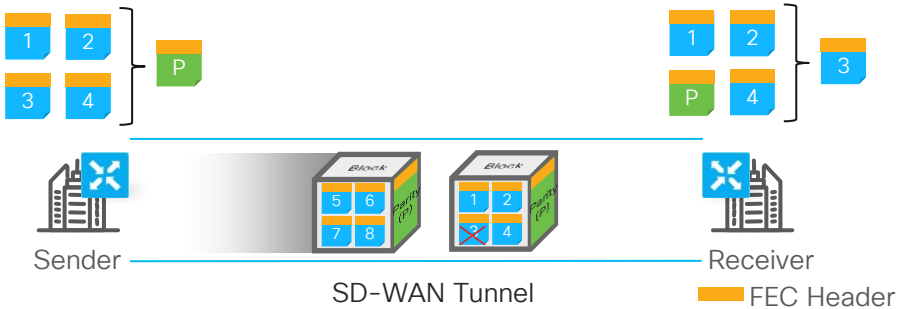
Cisco SD-WAN – Improving Application Experience

Application Aware Routing



Forward Error Correction (FEC)

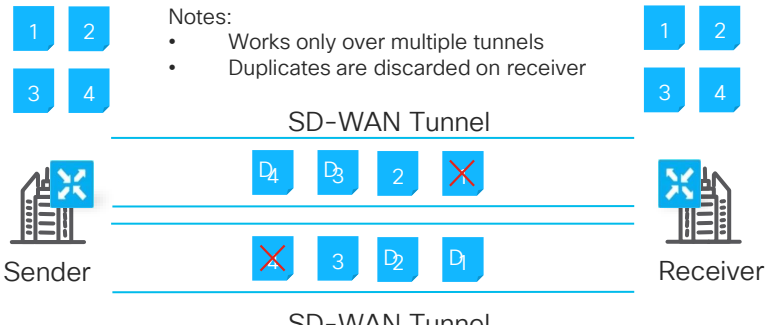
- Protects against packet loss
- Protocol (TCP/UDP) agnostic
- Supports multiple transports
- Applied with data policy



Packet Duplication

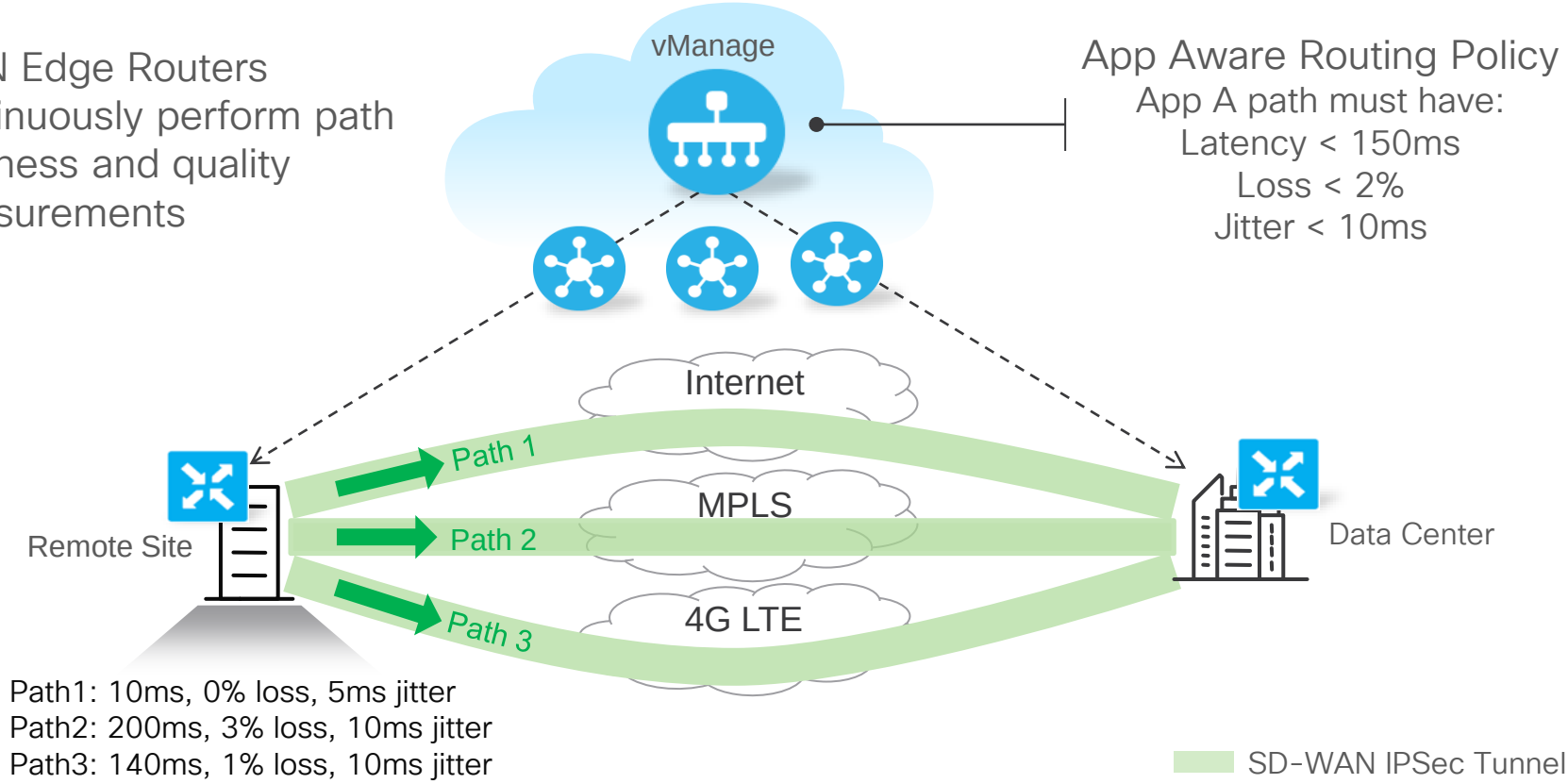
- Protects against packet loss
- Protocol (TCP/UDP) agnostic
- Operates over multiple tunnels
- Applied with data policy

Notes:
- Works only over multiple tunnels
- Duplicates are discarded on receiver



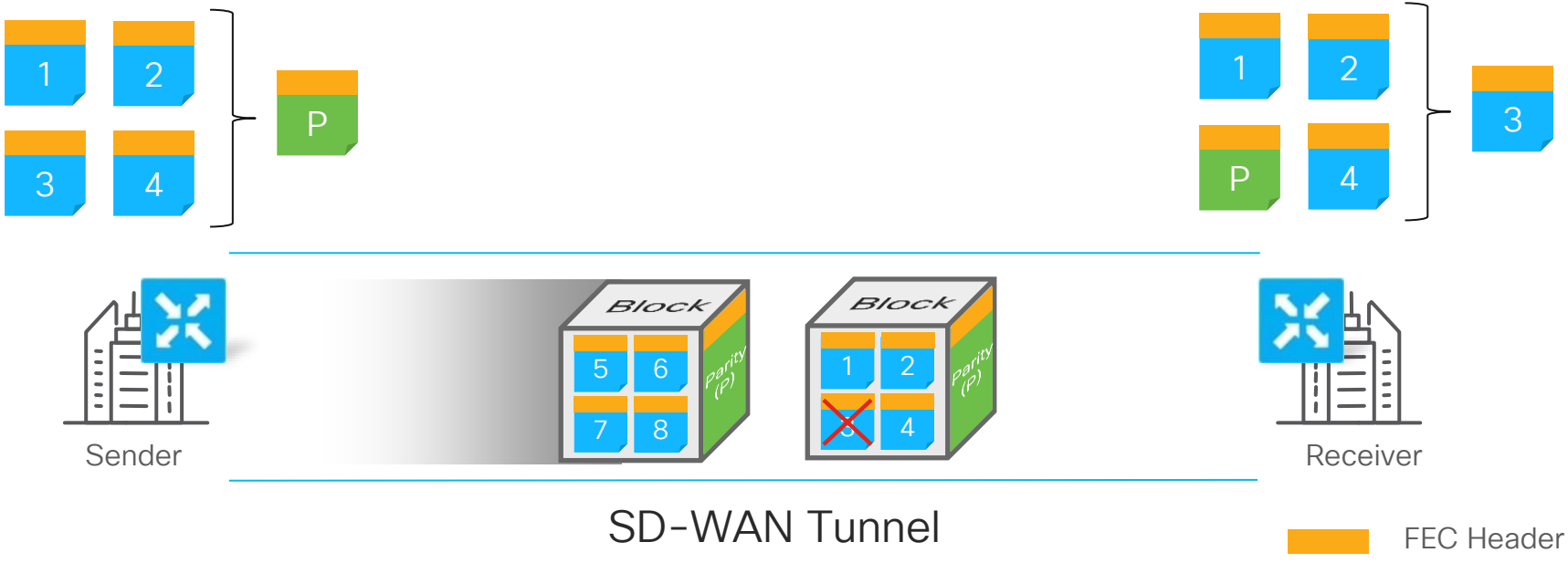
Application Aware Routing

- WAN Edge Routers continuously perform path liveliness and quality measurements



Application Aware Routing and FEC

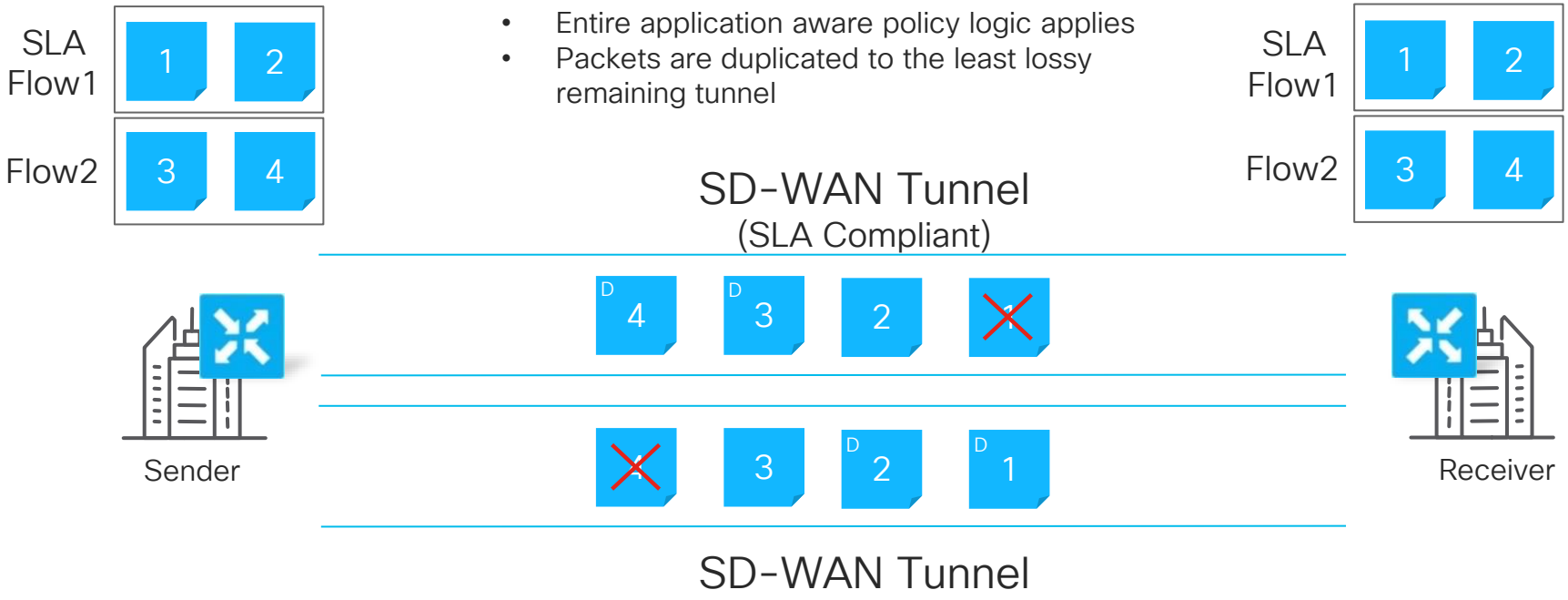
- Works independently
- AppAware first, data policy next
- AppAware chooses SLA tunnel(s)
- Data policy applies FEC



Application Aware Routing and Packet Duplication

- Works independently
- AppAware first, data policy next
- AppAware chooses SLA tunnel(s)
- Data Policy applies duplication

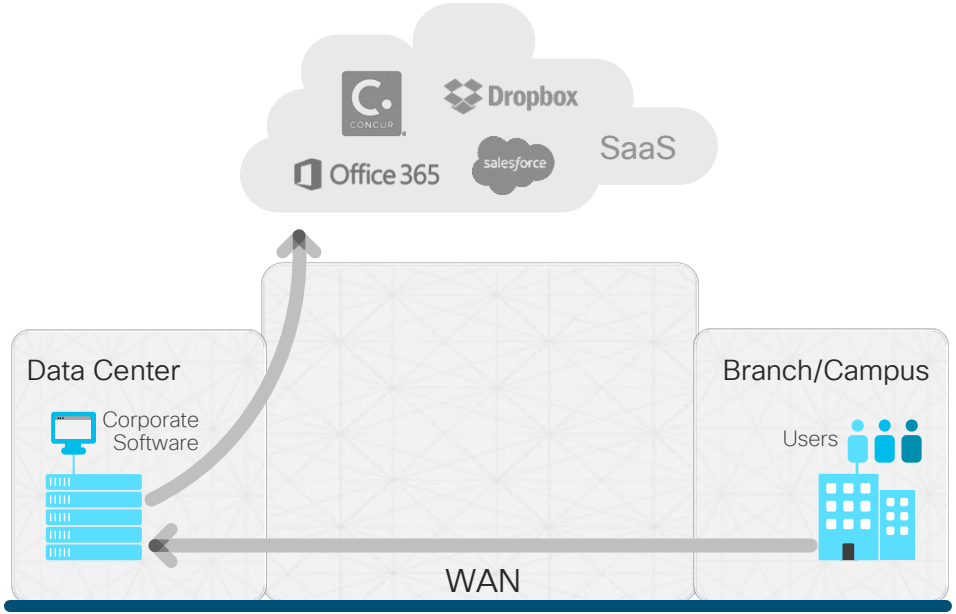
Notes:
- Entire application aware policy logic applies
- Packets are duplicated to the least lossy remaining tunnel



Cisco SD-WAN and Cloud Applications (SaaS) Optimization

Traditional Cloud Applications Access

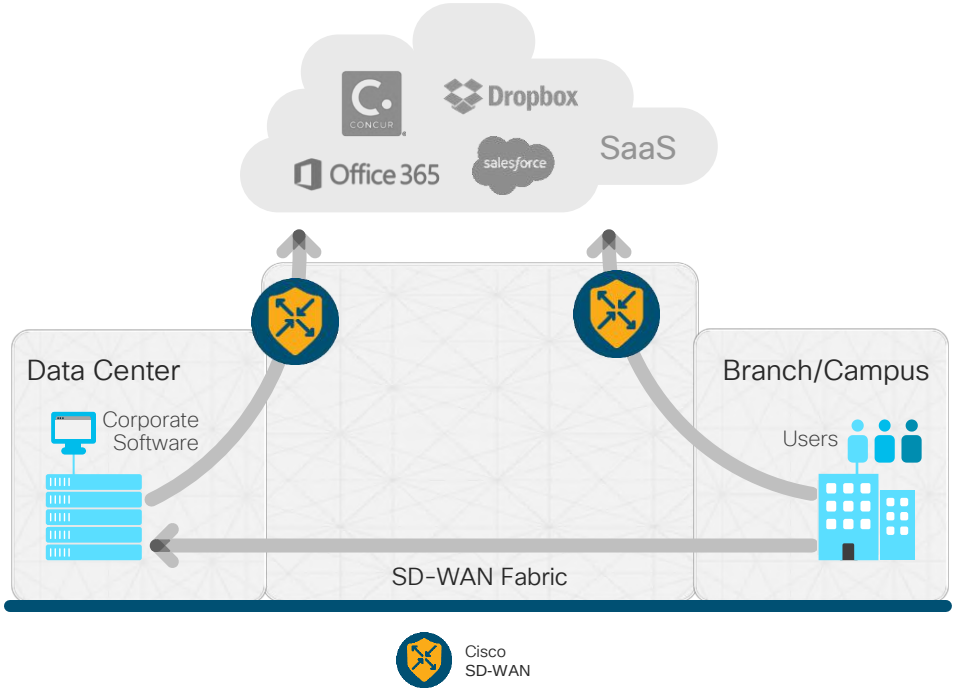
Why Backhauling Impacts Application Performance



- Data Center backhaul
- Costly MPLS transport
- Increased application latency
- Unpredictable user experience

All Internet and critical applications traffic competes for the same WAN bandwidth

Cisco SD-WAN - SaaS Optimization
Cloud OnRamp for SaaS

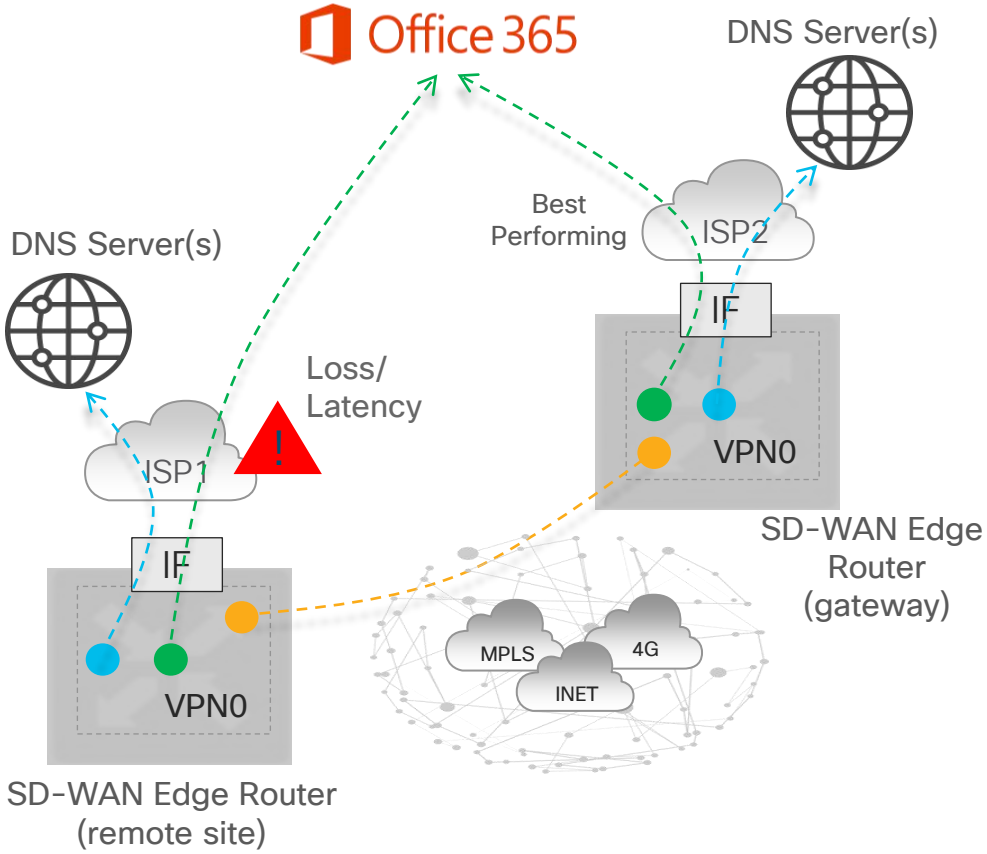


- Continuously monitors the SD-WAN Edge router to SaaS performance on both DIA (Direct Internet Access) path and the back-haul path
- Picks the best performing path based on the performance metrics (loss & delay)

Increased reliability and utilization of best path for SaaS applications

Cisco Cloud onRamp for SaaS

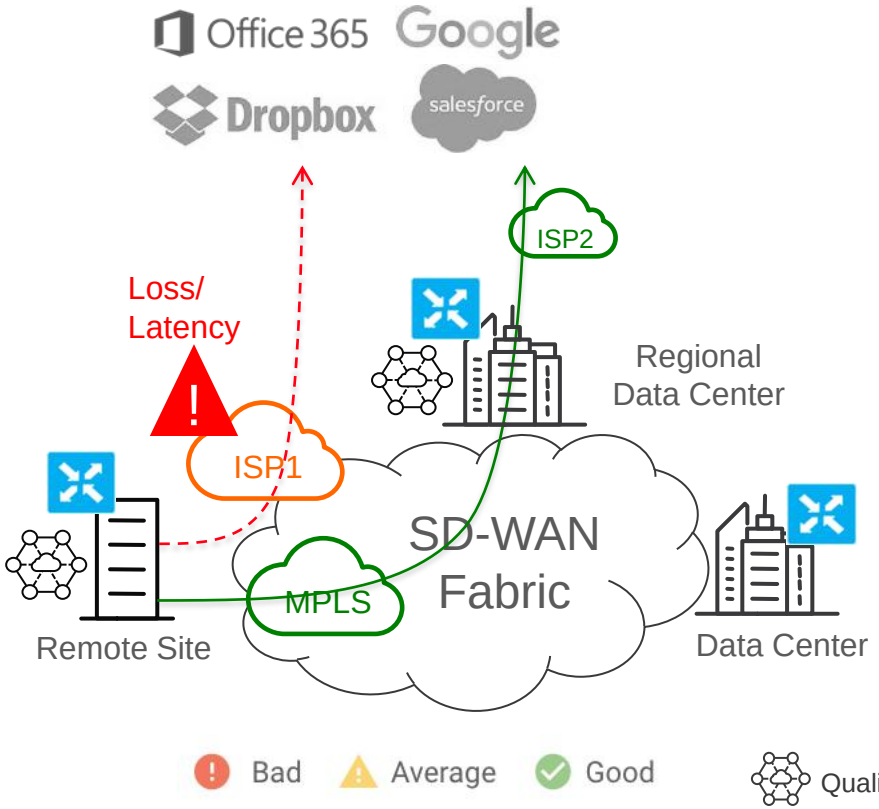
How does it work



- SD-WAN edge routers performs DNS resolution for the configured SaaS application on each path (DIA and gateway)
- SDWAN Edge routers initiates periodic HTTP pings toward the configured cloud onramp SaaS application
- A Quality of Experience (vQoE) score is then calculated for DIA and gateway
  - Remote Edge router compare SLA between local DIA and composite metric of HTTP ping + BFD through the Gateway Edge
- SDWAN Edge router determines best performing path toward Cloud onRamp SaaS applications based on vQoE scores

Cisco Cloud onRamp for SaaS

Direct Internet Access and Gateways



- One of the recommended designs, for SaaS deployments
- Cloud On-ramp continuously monitors the edge to SaaS performance on both DIA path and the back-haul path
- SDWAN Edge router picks the best performing path based on the performance metrics (loss & delay)
  - Per-Application, Per-VPN
- Automatic failover in case of performance degradation
- Fully automated

Cisco Cloud onramp for SaaS & vQoE scores

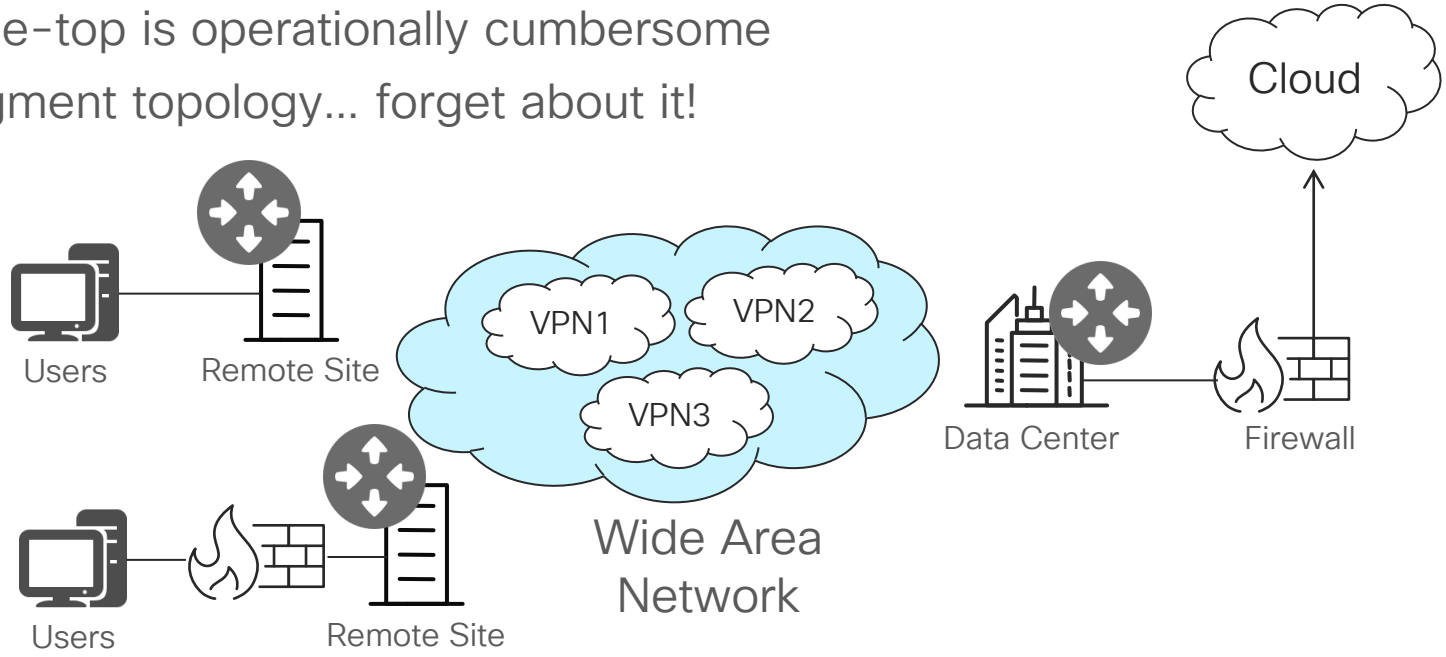
- The vQoE value ranges from 0 to 10, with 0 being the worst quality and 10 being the best.
- vQoE = desired metrics / actual metrics * 10
- vQoE score is computed for each remote site application and per path

SaaS Application	Path 1 - vQoE on ISP1 DIA	Path 2 - vQoE on Gateway 1
O365	9	4
Sales force	8	4
Box	6	8
Dropbox	6	8
Google Apps	7	9
Goto Meeting	1	8
Intuit	3	9
Oracle	7	4
SugarCRM	8	8
ZenDesk	4	8
Zoho CRM	6	9

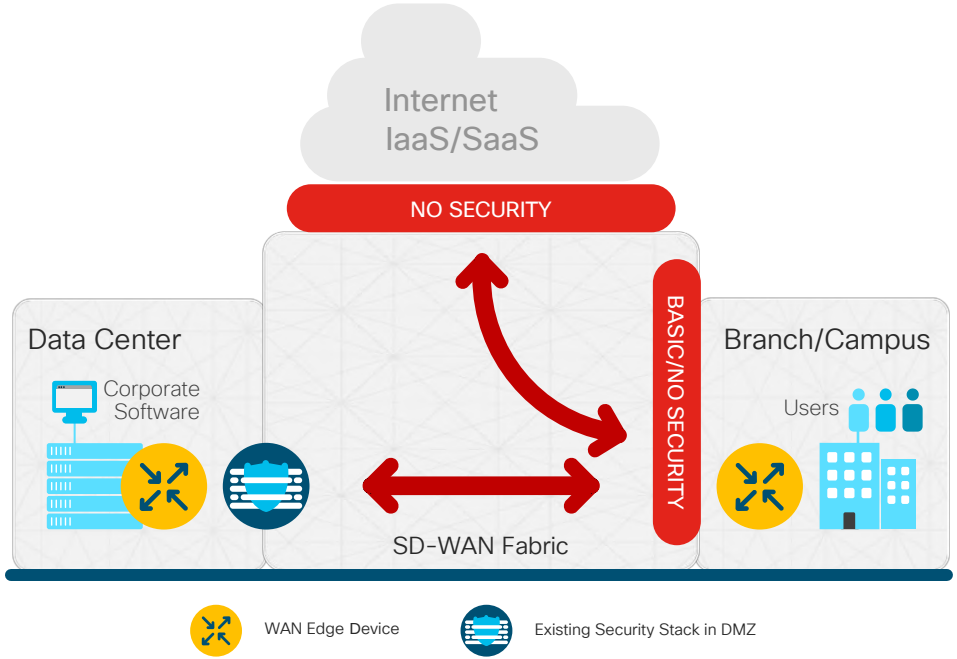
Cisco SD-WAN and Secure Branch

Traditional Branch Security

- Security enforcement at the branch is too costly, security enforcement at the data center is too inefficient (for cloud)
- Segmentation over MPLS is underlay specific, segmentation over-the-top is operationally cumbersome
- Per segment topology… forget about it!



Why SD-WAN Branch Security?



Internal & External Threats

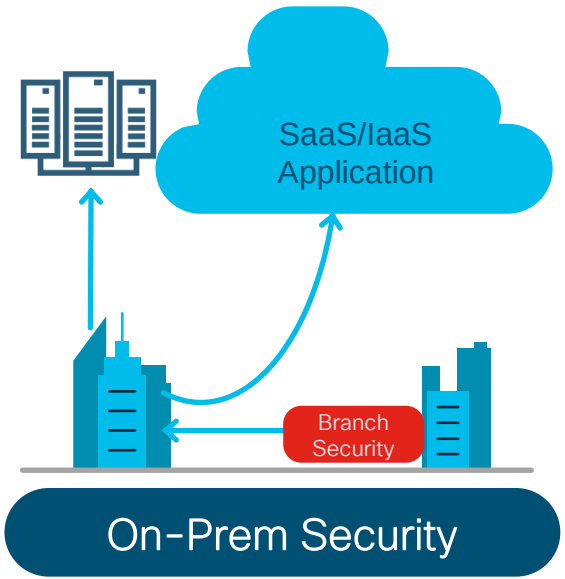
External

- Exposure to malware & phishing due to direct internet and cloud access
- Data breaches
- Guest access liability

Internal

- Untrusted access (malicious insider)
- Compliance (PCI, HIPPA, GDPR)
- Lateral movements (breach propagation)

SD-WAN Security Models. Driving towards SASE

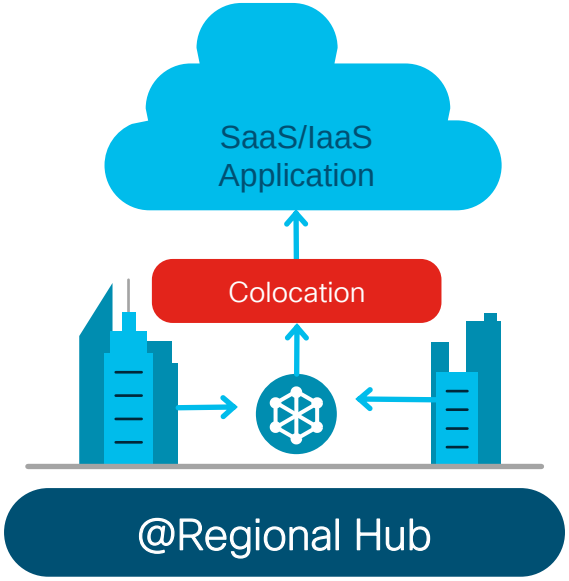


On-Prem Security

Thick branch with Routing and Security (SD-Branch model)

Cloud Security & SASE

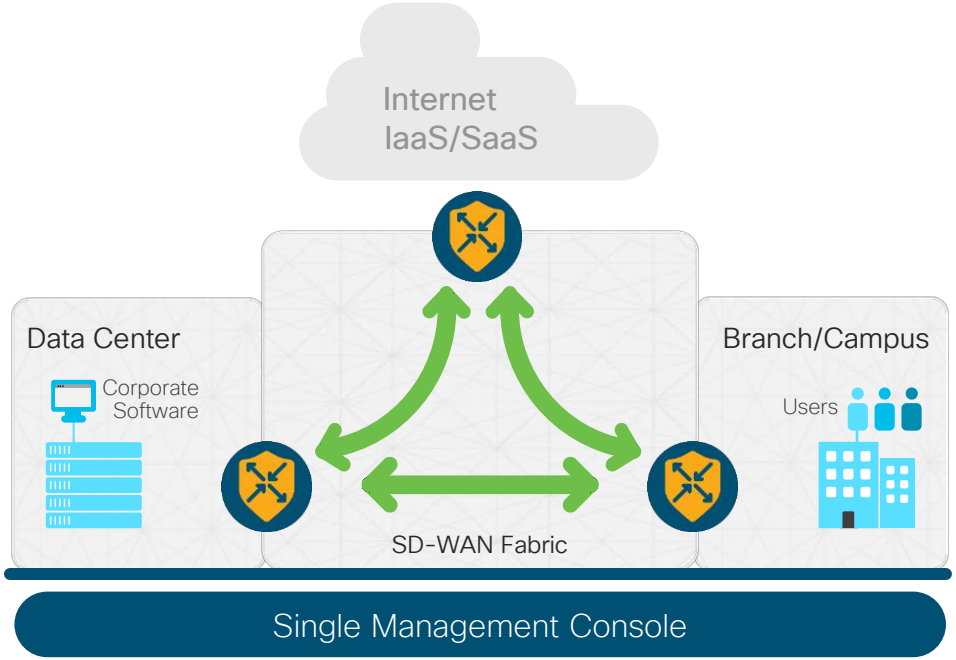
Thin branch with security in the cloud



@Regional Hub

Security Services as VNF at Regional Colocation Hub

Cisco Secure SD-WAN: Cisco SD-WAN + Branch Security



Full Edge Security Stack

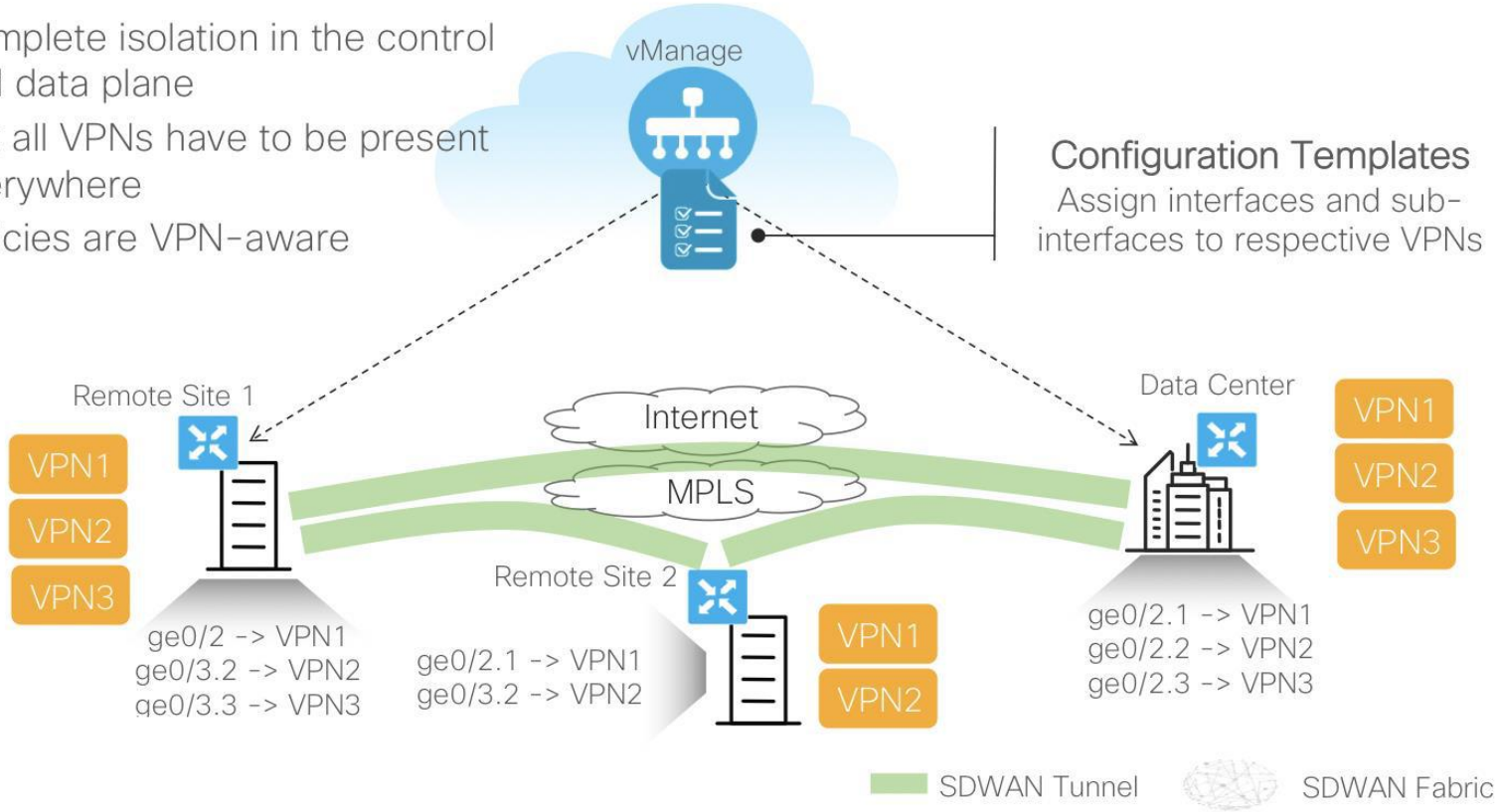
On-Prem Security
Mitigate Internal & External Threats

Cloud Security
Mitigate External Threats at Scale

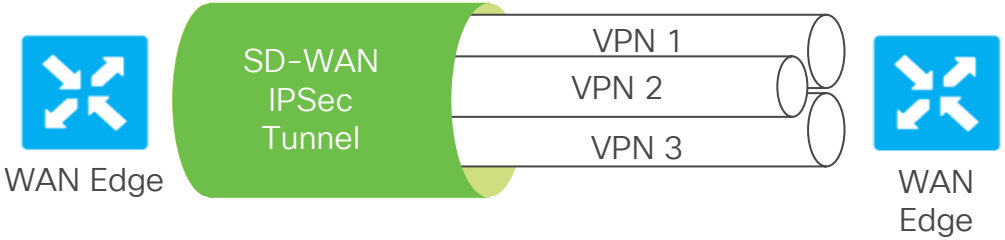
- SWG, DNS protection, CASB
- FW, URL filtering, IPS
- Segmentation & Policy
- Zero-trust authentication and Encryption

Cisco SD-WAN – Secure Branch Segmentation

- Complete isolation in the control and data plane
- Not all VPNs have to be present everywhere
- Policies are VPN-aware

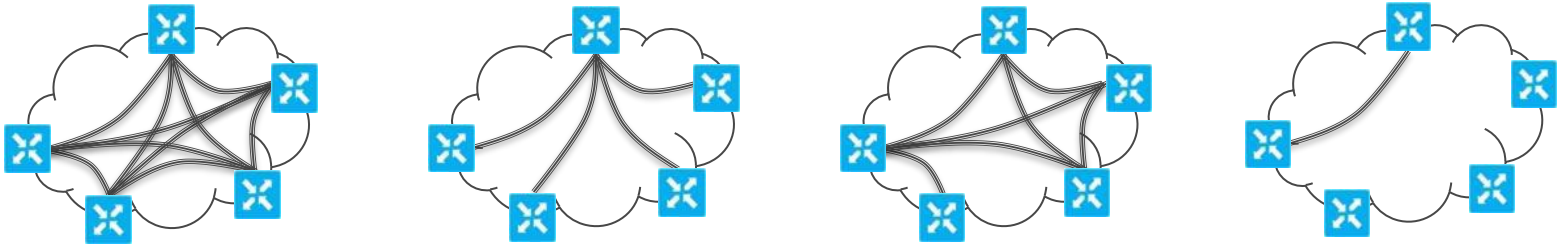


Cisco SD-WAN – Secure Branch Segmentation



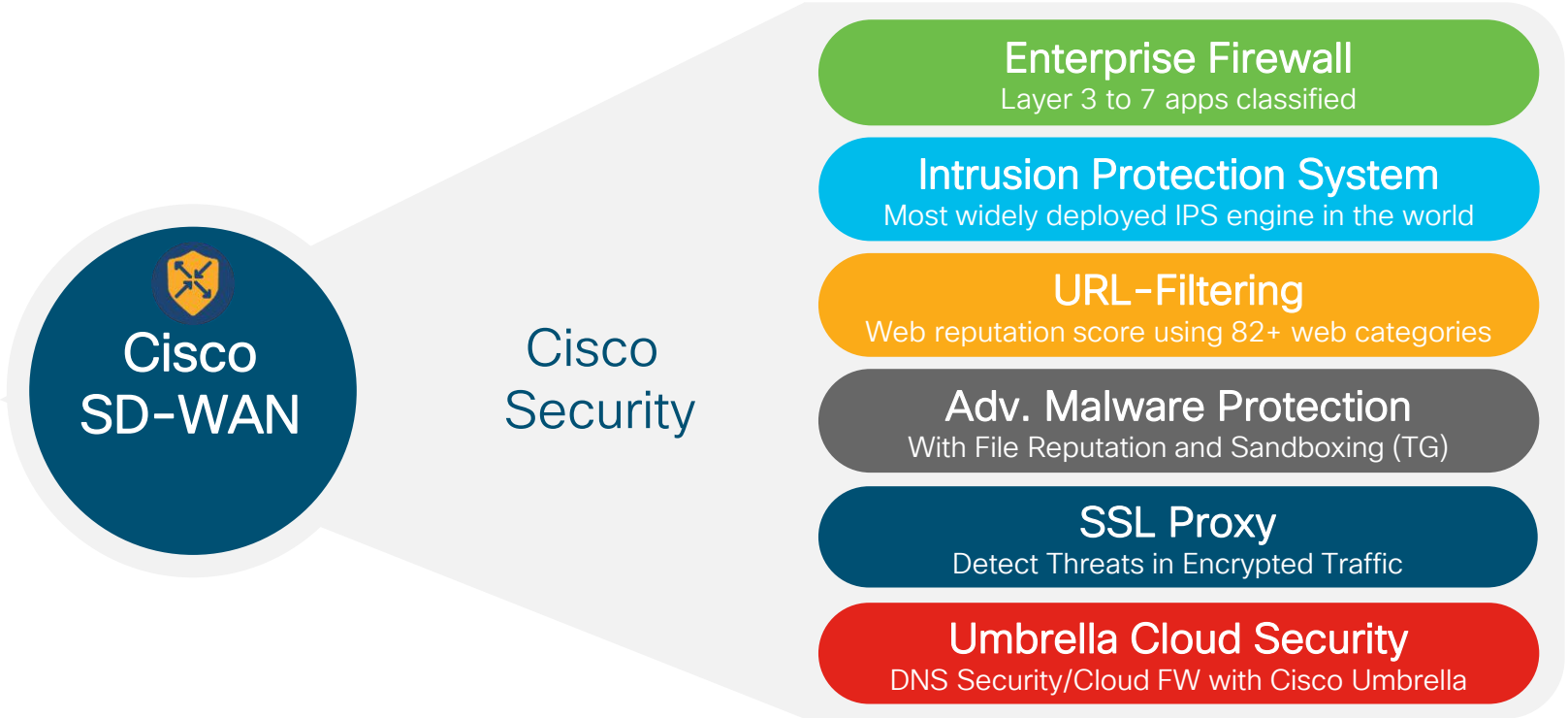
- Security Zoning
- Compliance
- Guest Wi-Fi
- Multi-Tenancy
- Extranet

Per-VPN Topology

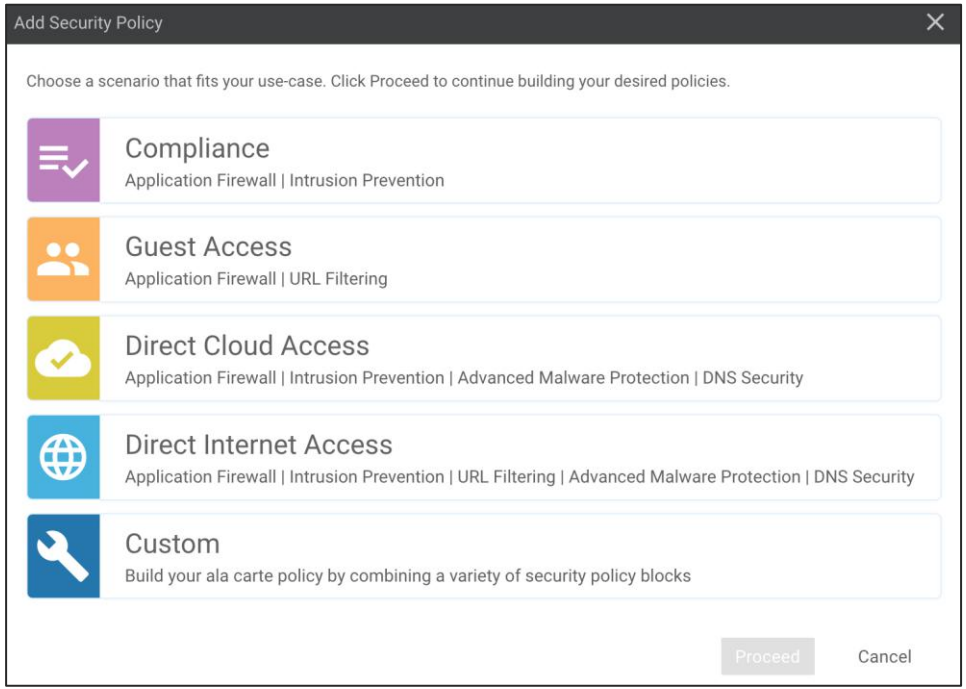


Cisco Cisco SD-WAN Security & SASE Solution

Consistent across on-prem and cloud



SD-WAN Security: vManage Provisioning Wizard

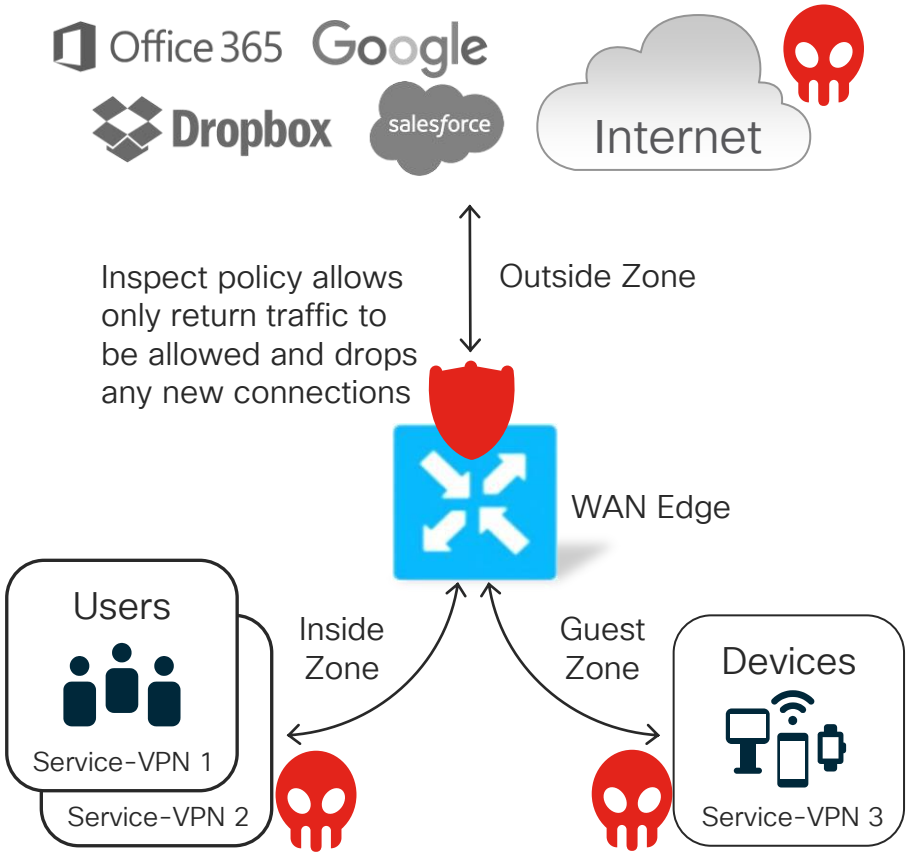


Configuration > Security

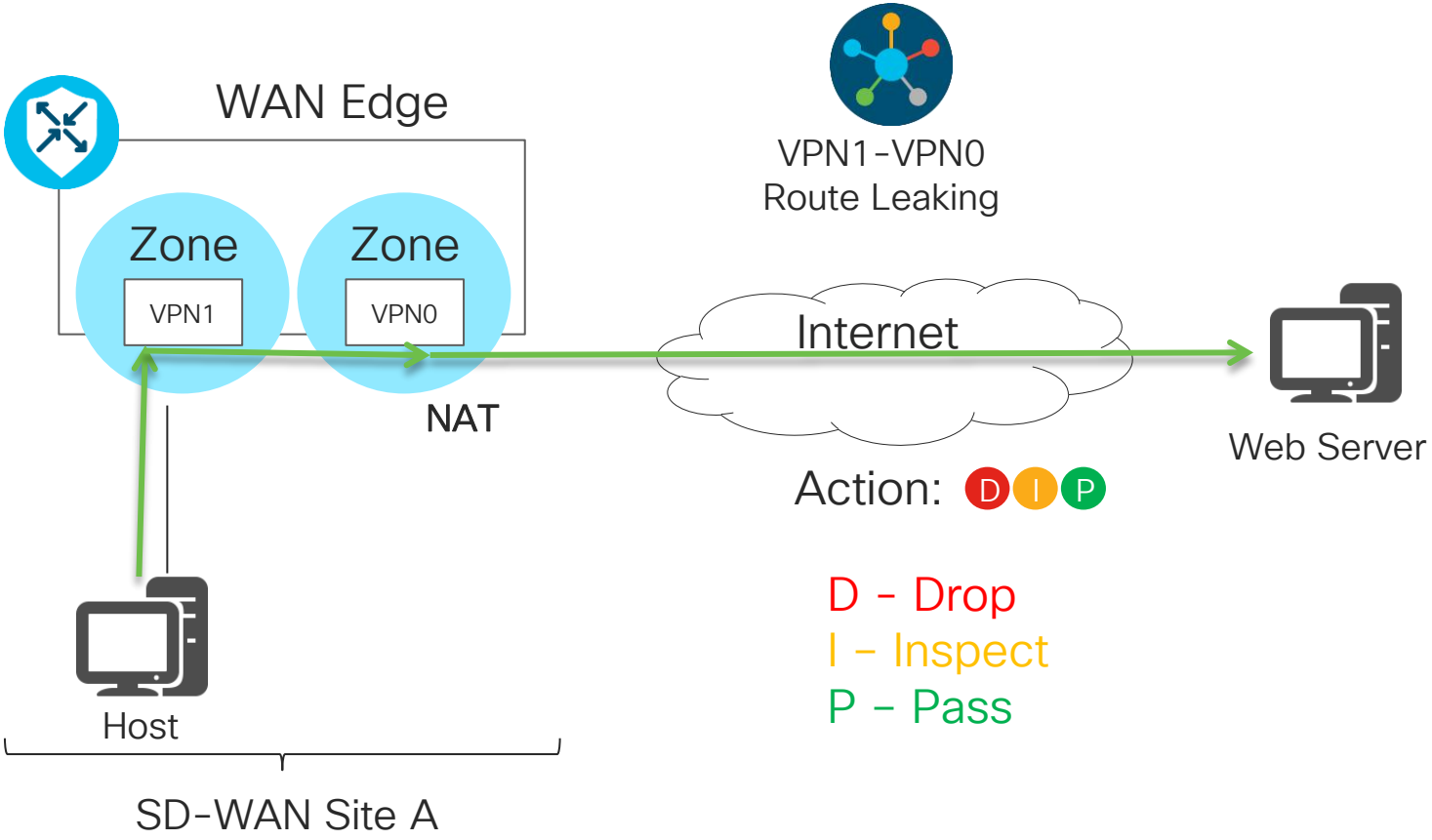
Add Security Policy

Application Aware Firewall

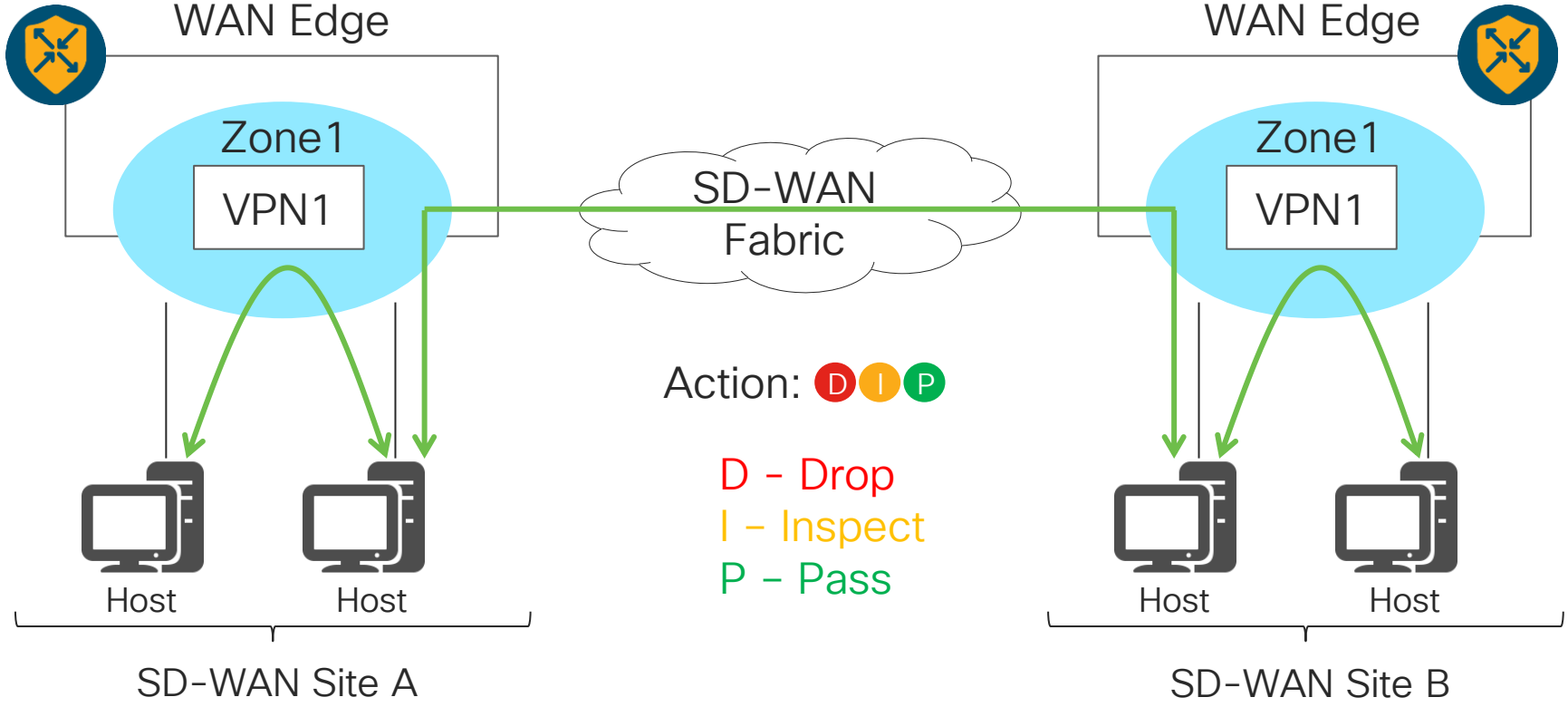
- Stateful Firewall, Zone Policies
- VPN(s) are mapped to a zone
- Intra-zone, inter-zone and zone to DIA traffic policies
- Block, pass or inspect traffic
- Block 1400+ Layer 7 Applications
- HSL Logging
- Self Zone Policy



Ent. Firewall App Aware: DIA / DCA

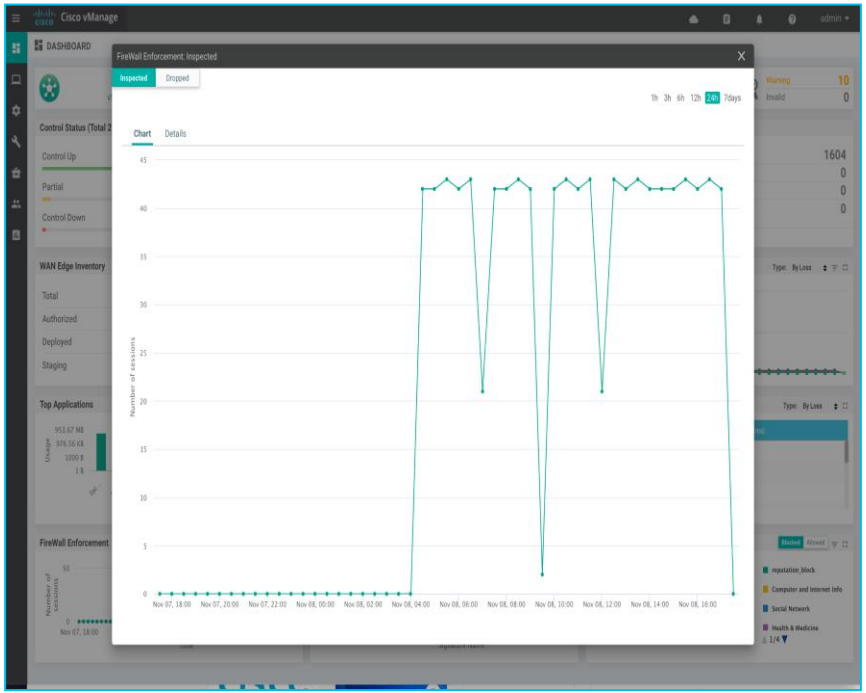


Ent. Firewall App Aware: Intra-Zone Security

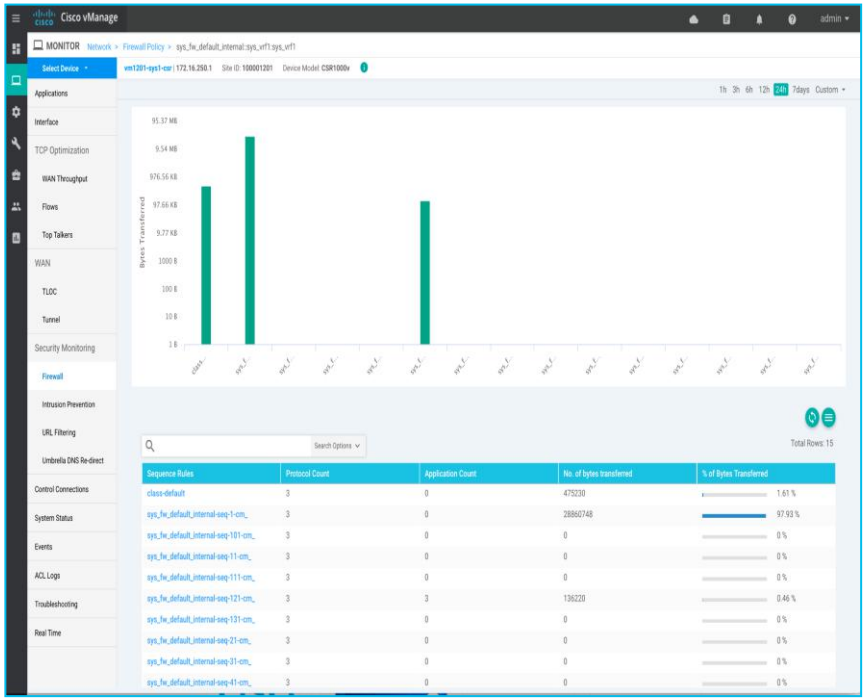


Enterprise App Aware Firewall Monitoring

Overall Dashboard – Firewall Enforcement

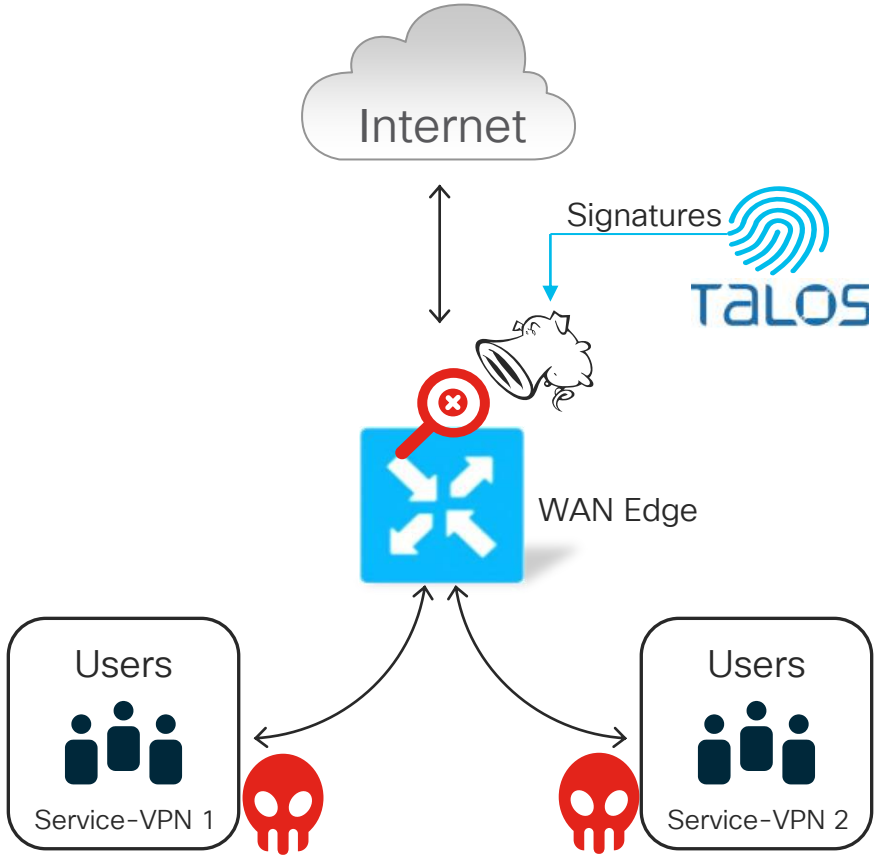


Device Dashboard – Firewall



Intrusion Prevention and Detection

- Snort IPS engine
- Runs in a service container on Cisco SD-WAN Edge routers (ISR1K/ISR4K/CSR1K)
- Backed by global Threat Intelligence (TALOS) signatures updated automatically
- Inspects traffic in VPNs of interest
- Supports three levels of signature sets
- Signature whitelist support
- Can run in detection mode



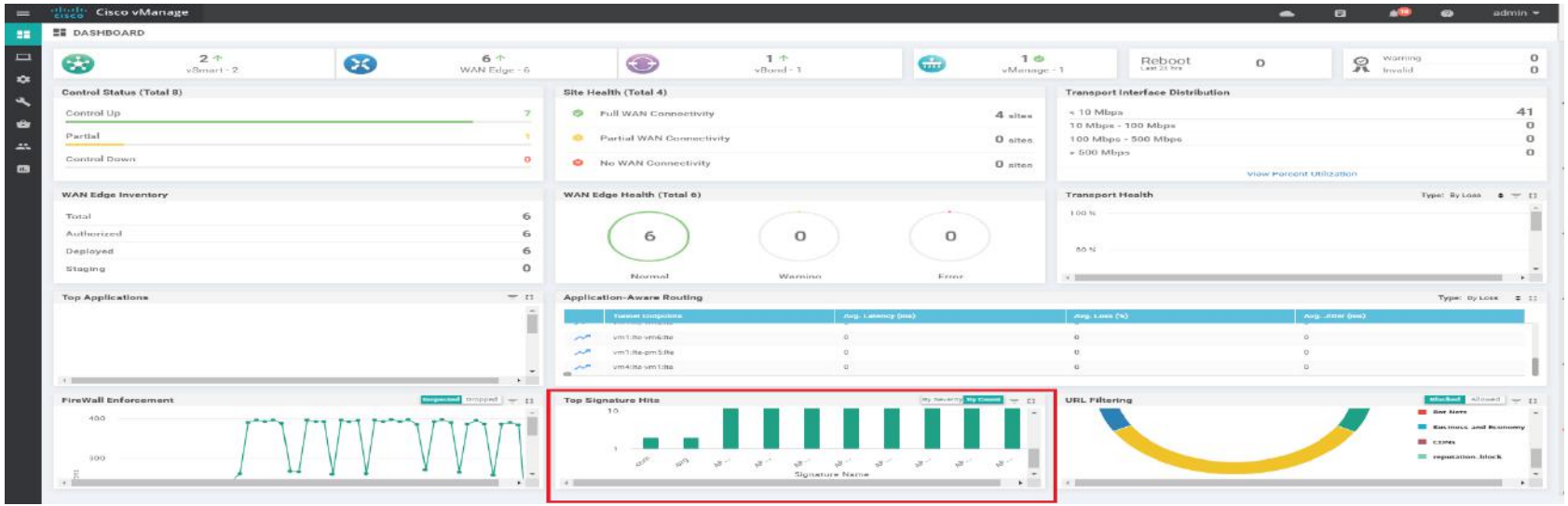
Intrusion Prevention – Monitoring

Top Signature Violations dashboard

Signatures seen by the devices running IPS in the network

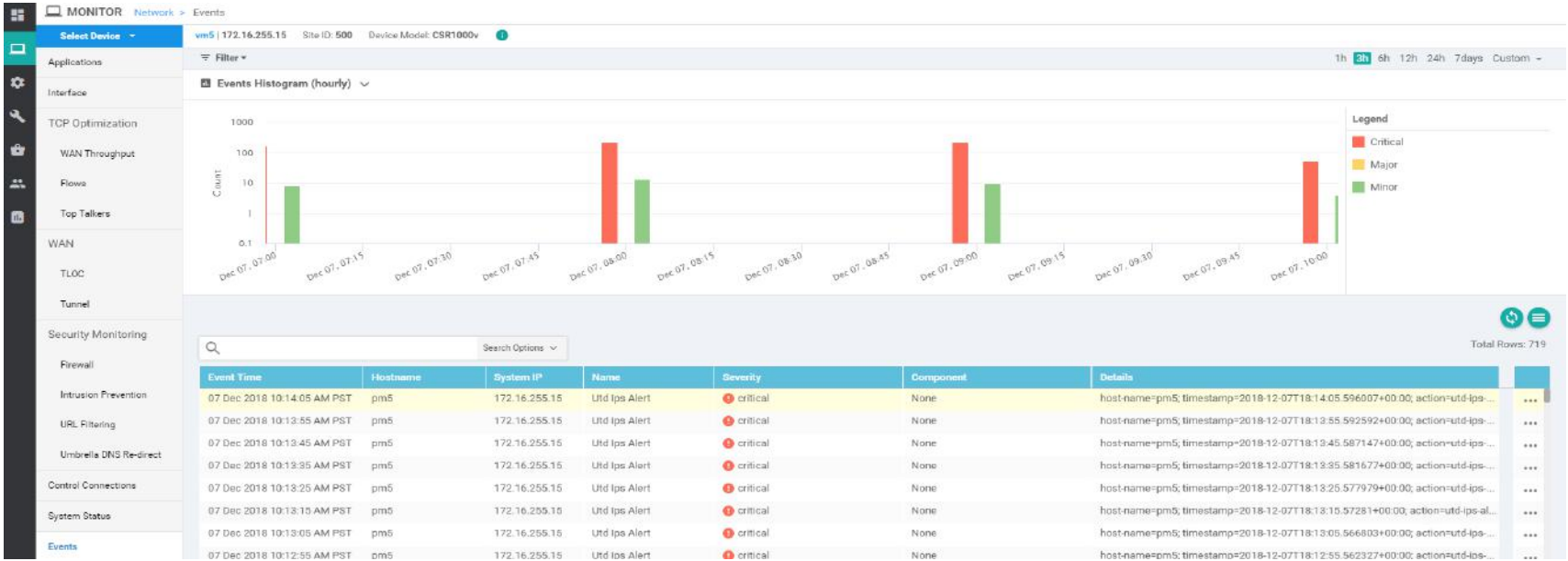
Two Views:

- Threats by severity (over time)
- Total threat count (for the selected time period)



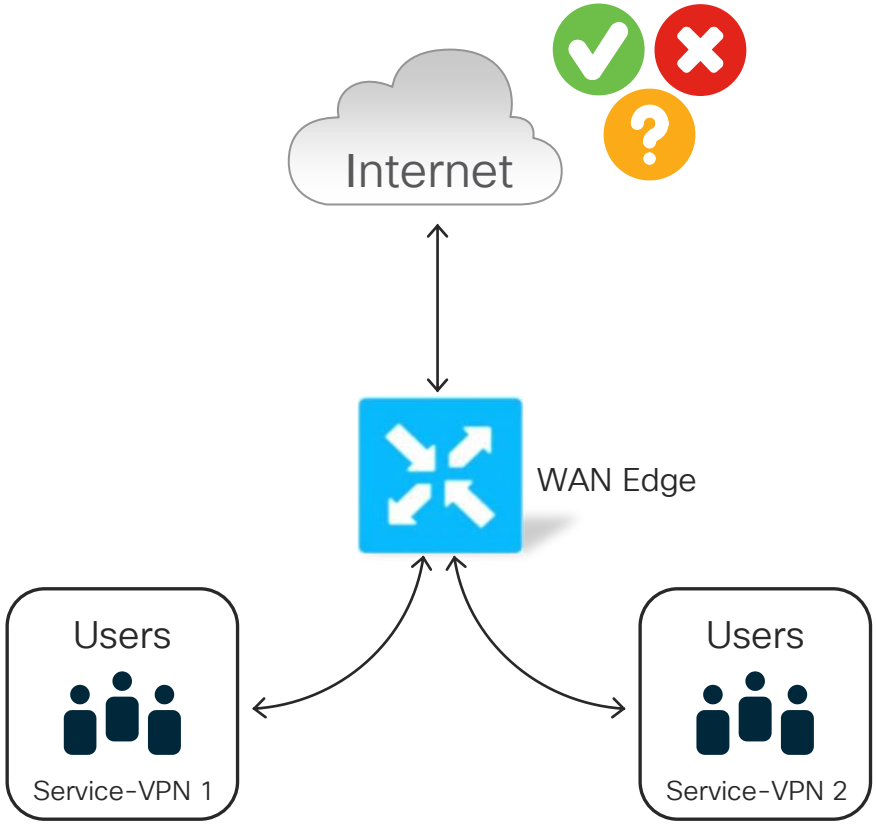
Intrusion Prevention – Monitoring

Check device level alerts in the Device events page

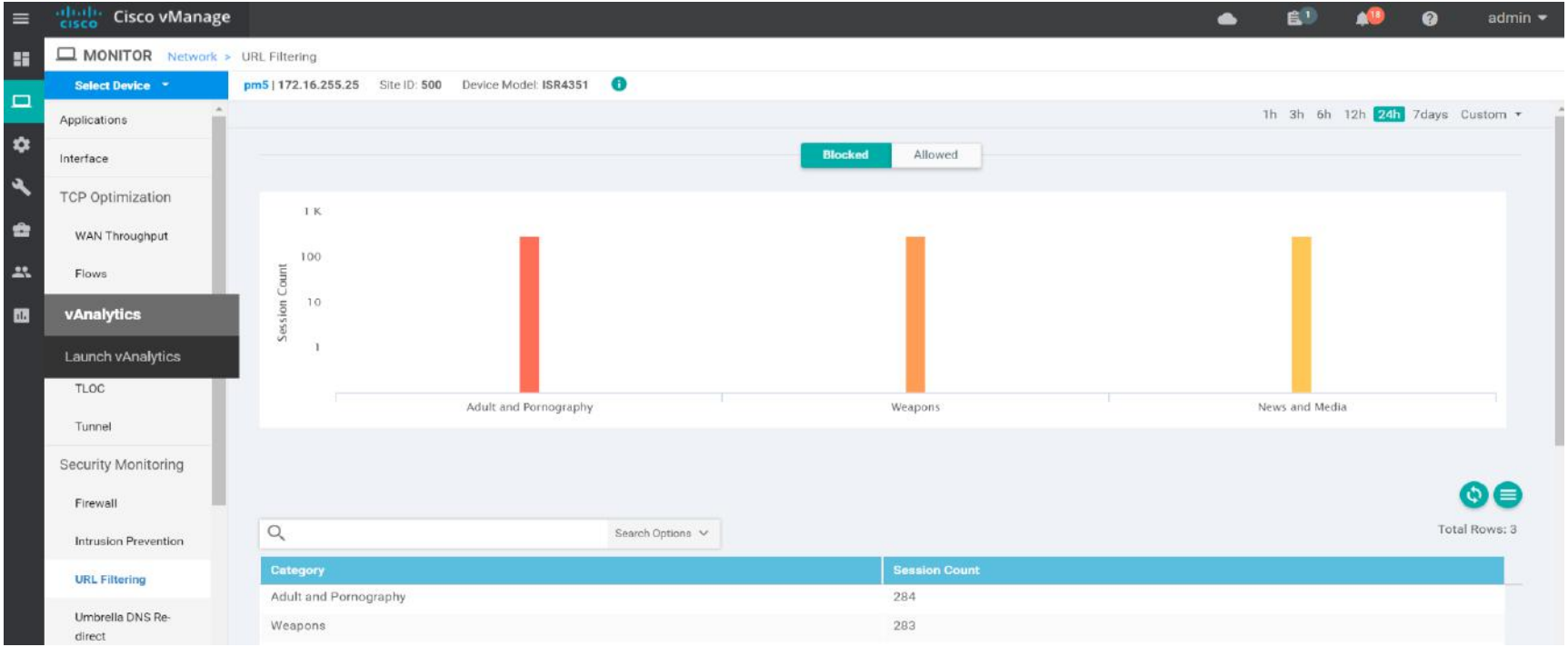


URL Filtering

- Runs in a service container on Cisco SD-WAN Edge Routers (ISR1K*/ISR4K/CSR1K)
- Cloud lookup with local caching or local lookup
  - Local lookup downloads URL database to the router
- 82+ Web Categories with dynamic updates
- Inspects traffic in VPNs of interest
- Block based on Web Reputation score
- Create custom Black and White Lists
- Customizable end-user notifications

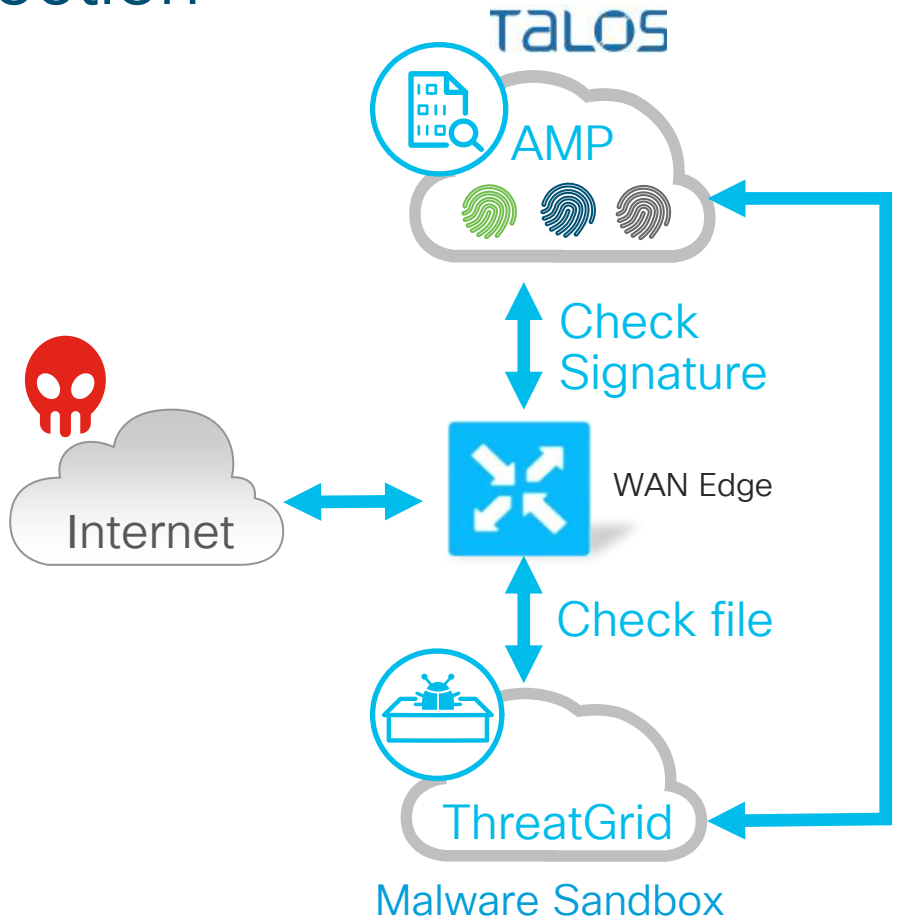


vManage – URL Filtering Monitoring

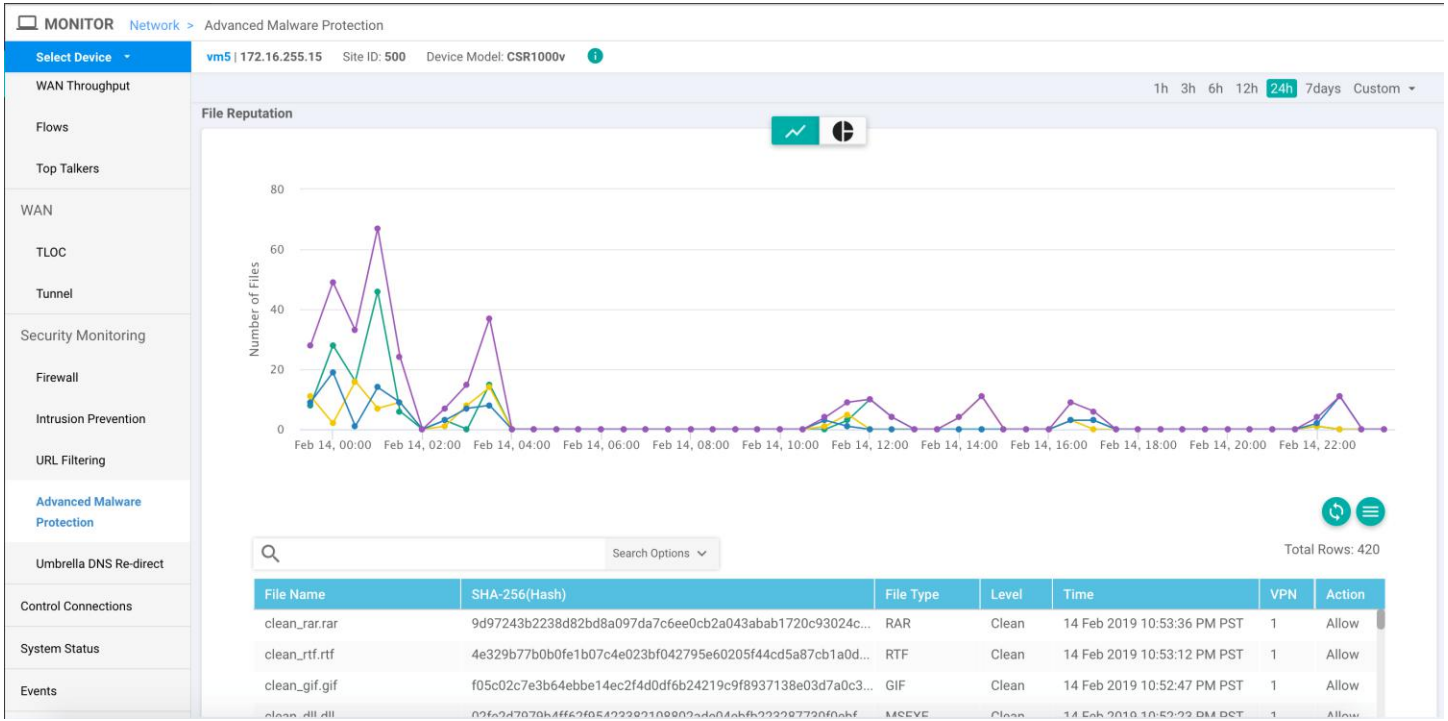


Advanced Malware Protection

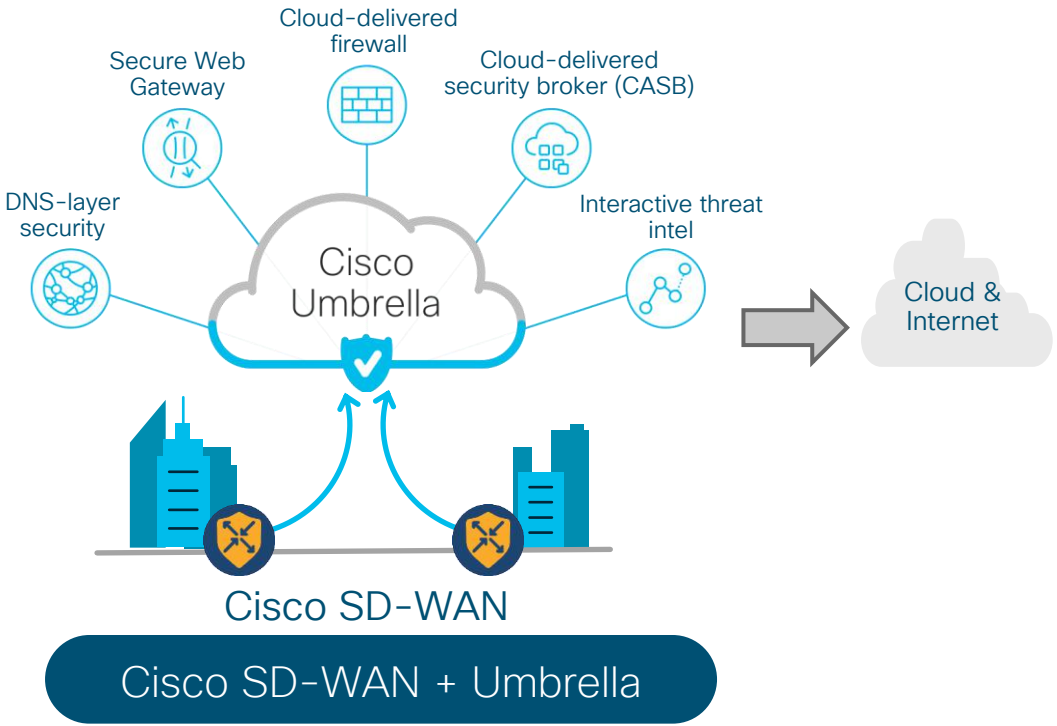
- Runs in a service container on Cisco SD-WAN Edge routers (ISR1K/ISR4K/CSR1K)
- File reputation check powered by Talos
- Automated signature update from ThreatGrid to Talos
- Inspects traffic in VPNs of interest
- Leverages Snort engine to identify file transfers
- Sandboxing and file analysis for unknown signatures powered by ThreatGrid



vManage – AMP Monitoring



Cisco SD-WAN and Cloud Security (SIG)

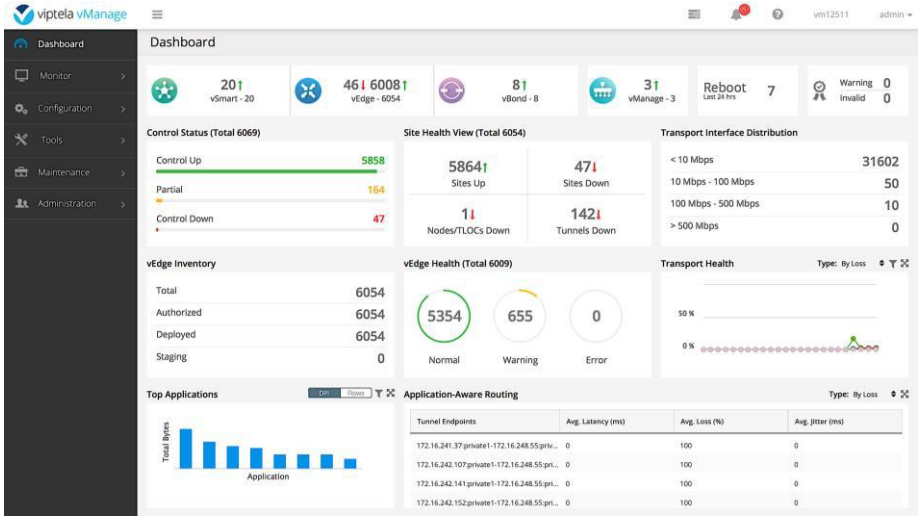


- Cisco Umbrella – Secure Internet Gateway is a platform with many different security services
- The current platform includes DNS-layer security, Web Gateway (SWG), Cloud Delivered Firewall, CASB
- Traffic redirection for SIG services via IPSec tunnel
- Automated IPSec tunnel creation support

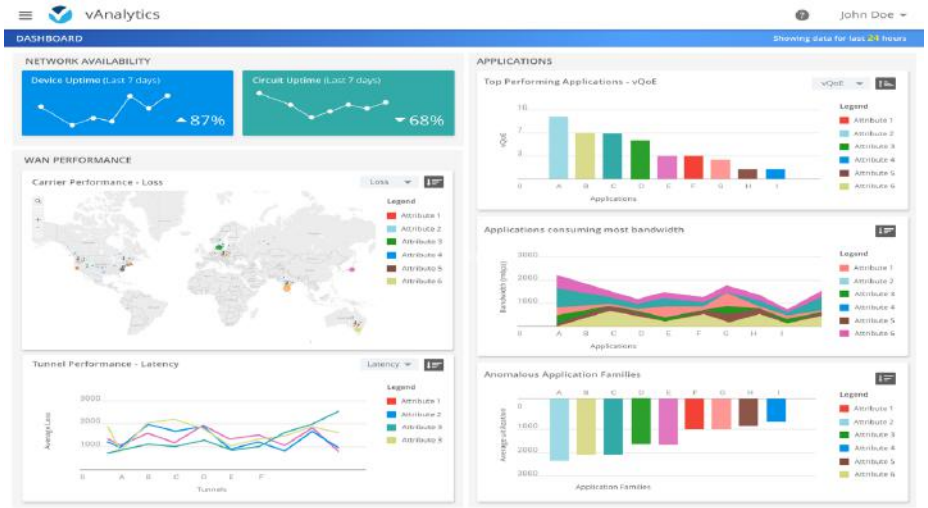
Cisco SD-WAN and Automation and Simplified Management

Cisco SD-WAN – Automation and Simplified Management

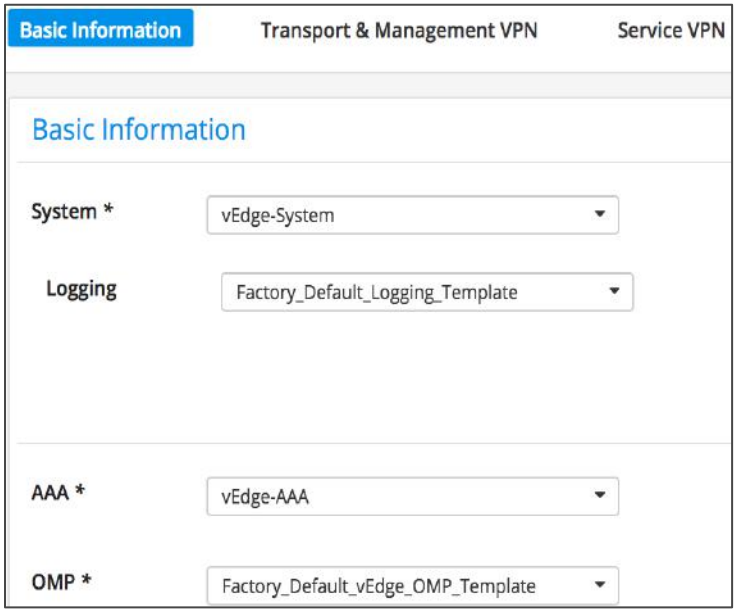
vManage – Single Pane Of Glass Operations



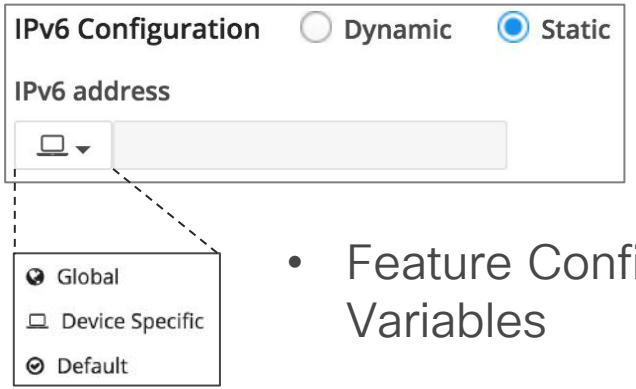
vAnalytics – Rich Analytics



Centralized Device Configuration Enforcement



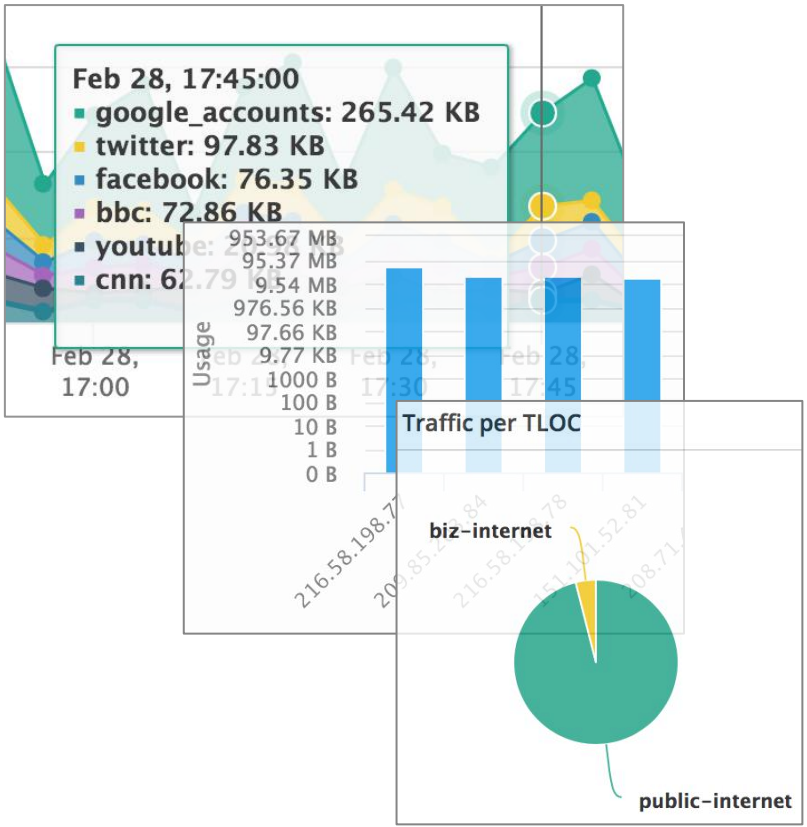
- Centralized Feature Templates
- Enforces configuration compliance
- Self-recover on misconfiguration



- Feature Configuration with Variables

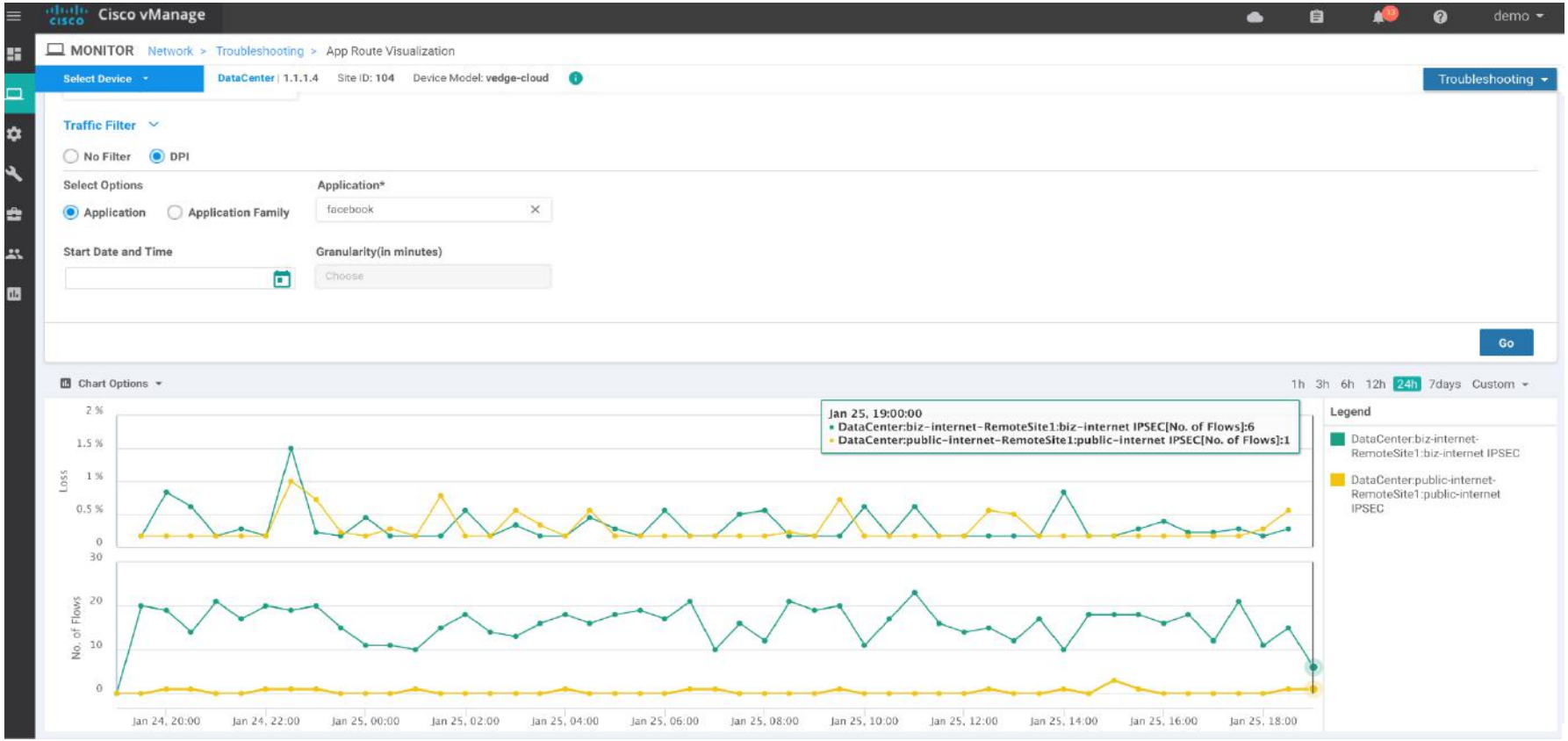
Status	Chassis Number	System IP	Hostname	Latitude	Longitude	System IP	Site ID	Bandwidth Upstream
✓	4de0b85f-a2ae-42ec-8b45-3808285cd008	1.1.1.4	RemoteSite	37.33	-121.88	1.1.1.4	104	100
✓	5f05358a-bef7-4e15-9ade-8ffd8f27ec93	1.1.1.6	AWS	45.52	-122.67	1.1.1.6	106	100
✓	9391da23-f0d1-4259-88d9-e10ae714708c	1.1.1.5	DataCenter	40.71	-74.0	1.1.1.5	105	250

Application and Flow Visibility

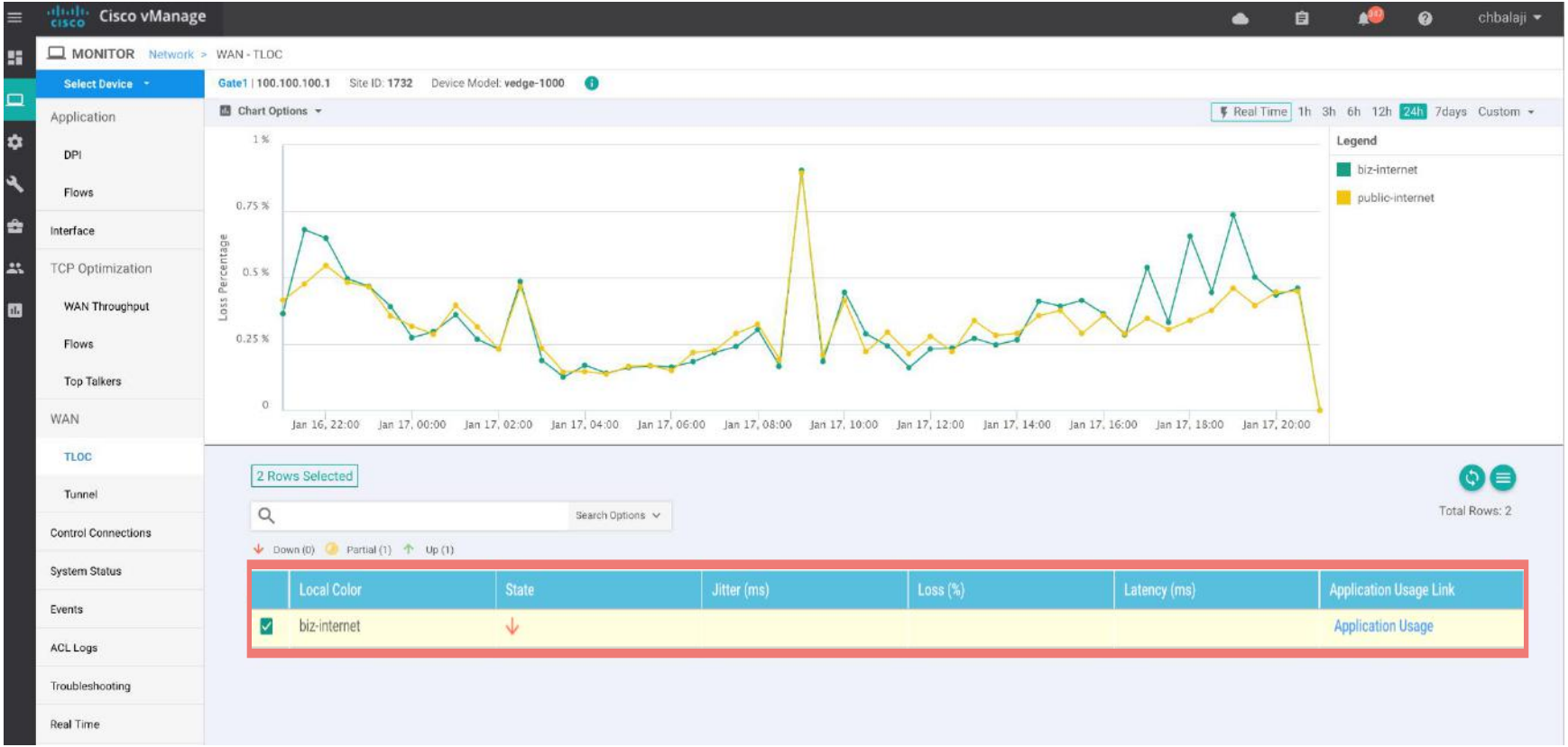


- Application and flow visibility for each WAN Edge router
  - DPI/NBAR2 need to be enabled for application visibility
  - Flow data can be exported from WAN Edge to external collector
- Realtime views or custom timeline views granularity
- Views can be zoomed into

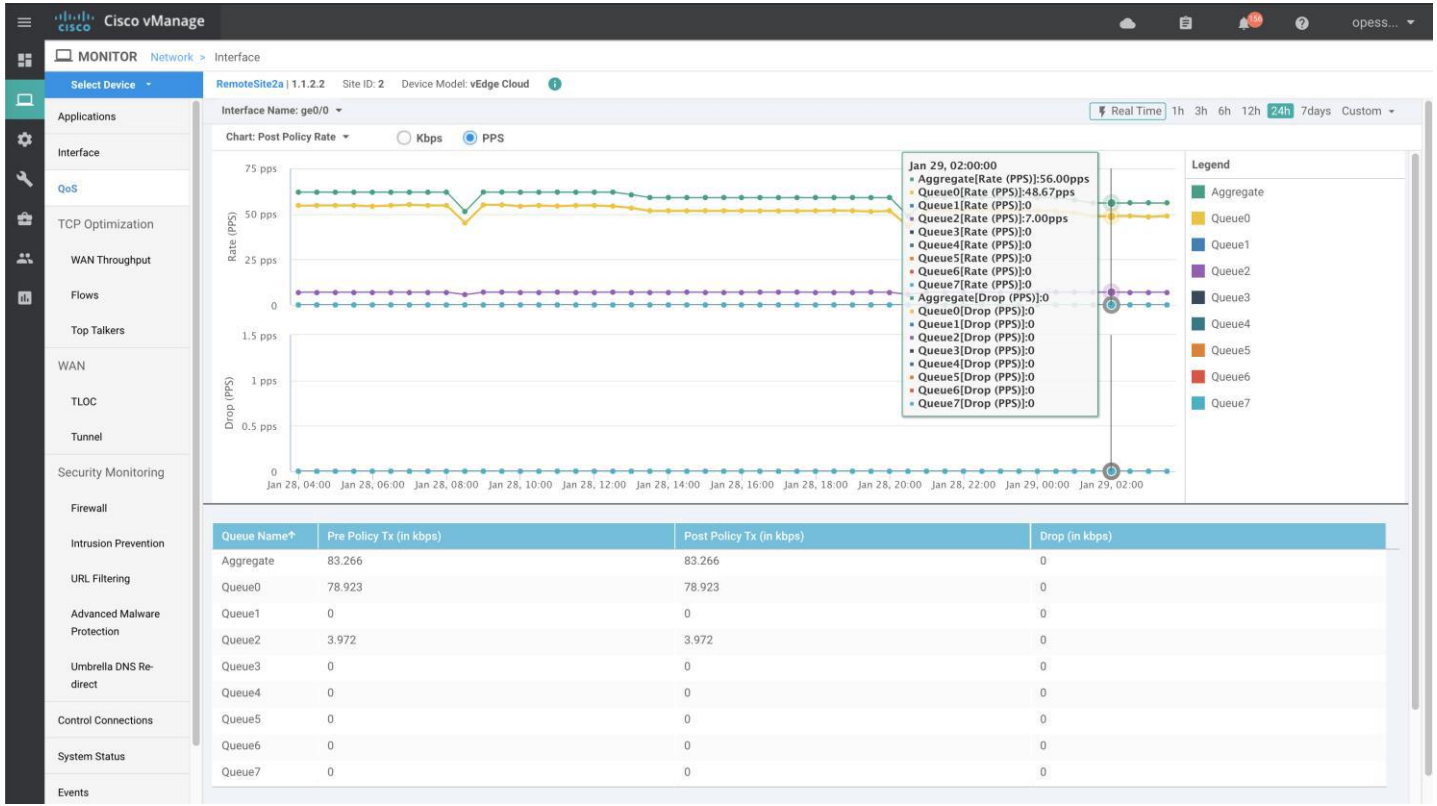
Visualizing Application Paths



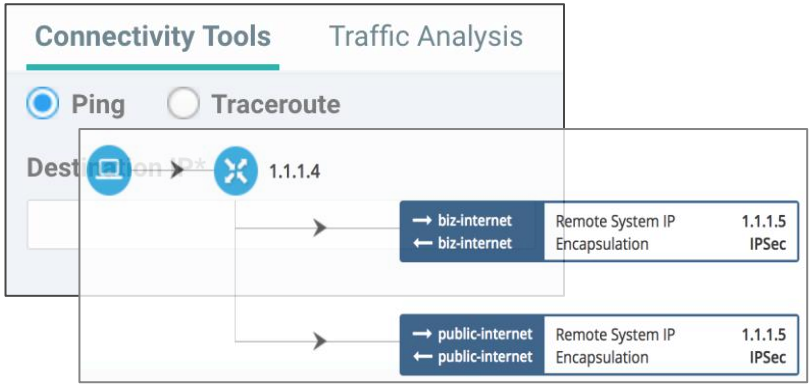
Checking Transport Quality



Checking QoS

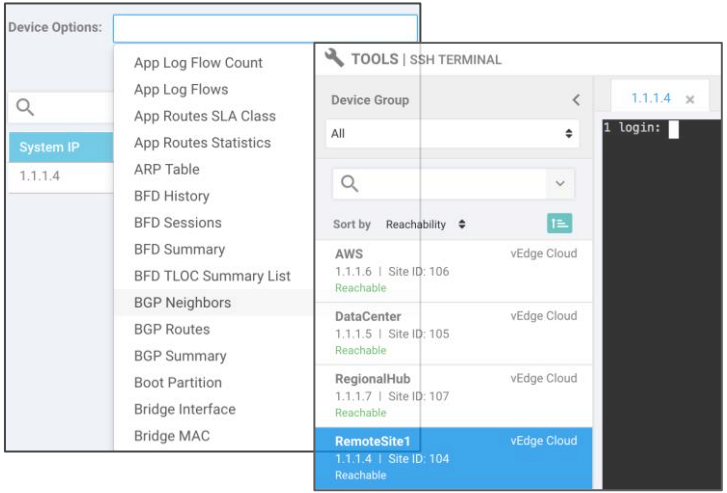


Troubleshooting



- Expert troubleshooting with full featured CLI and Linux bash shell
- Traffic analysis with synthetic traffic generation to test policies

- Basic connectivity troubleshooting with ping and traceroute from any vEdge in the topology to any destination
- Advance troubleshooting with real-time queries against vEdge routers



Conclusion

Benefits of Cisco SD-WAN

Predictable app experience

Support for evolving business application strategy

Cloud OnRamp for IaaS, SaaS and Colocation

Right security, right place

Secure segmentation across entire network stack

Full edge security stack from branch to cloud and colocations

Enterprise grade, simplified

Intent-based networking with multi-domain policy

Proven deployments to over 10,000+ sites

One user interface for Security and SD-WAN across branch, cloud, and co-location