



**Hewlett Packard**  
Enterprise

# SD-WAN을 통한 금융 서비스의 네트워크 보안 및 현대화

HPE Networking EdgeConnect SD-WAN

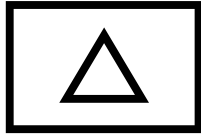
December 2024

# SASE Overview

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# Edge-to-cloud Zero Trust platform for Security-First, AI-Powered Networking



## SD-WAN

- SD-WAN, routing, WAN Optimization, network and visibility control
- Secure Internet breakout
- Next-generation firewall
- IDS/IPS, DDoS defense
- End-to-end network segmentation



## SSE

- ZTNA, SWG, CASB, FWaaS in a single platform
- Single policy engine
- Agent and agentless ZTNA
- Harmonized access across the world via a cloud-backbone of AWS, Microsoft Azure, Google, and Oracle



## ZERO TRUST, AI-POWERED

- AI-Powered visibility into connected devices, risk-based authentication
- Role-based segmentation
- Continuous trust adjustment
- AIOps, AI Search with natural language using LLMs



User



Laptop



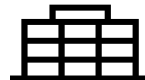
Mobile



IoT



WFH



Branch



HQ



Data Center



Public Cloud



SaaS



Internet

**HPE**   
**GreenLake**

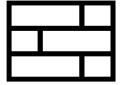
**Edge-to-Cloud Zero Trust Platform**

# EdgeConnect SD-WAN 솔루션 개요

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# EdgeConnect SD-WAN 플랫폼



Built-in next-generation firewall including IDS/IPS, DDoS defense and role-based segmentation



Multi-cloud networking



Dynamic routing with BGP and OSPF support



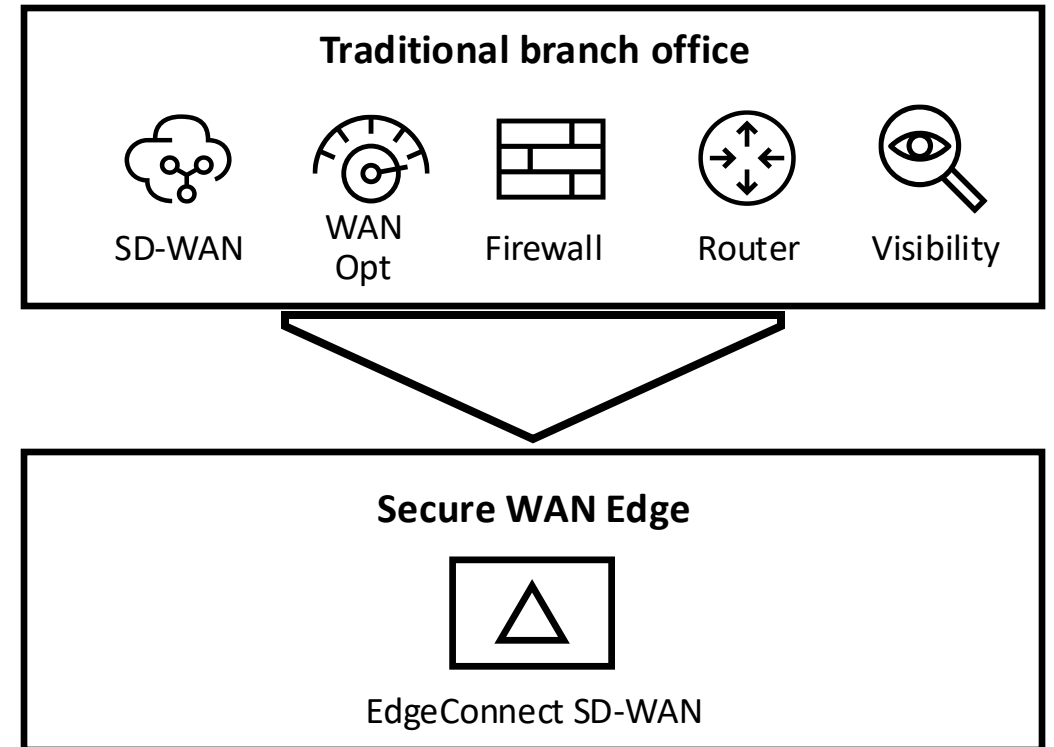
App performance with SaaS and WAN Optimization & Path Conditioning



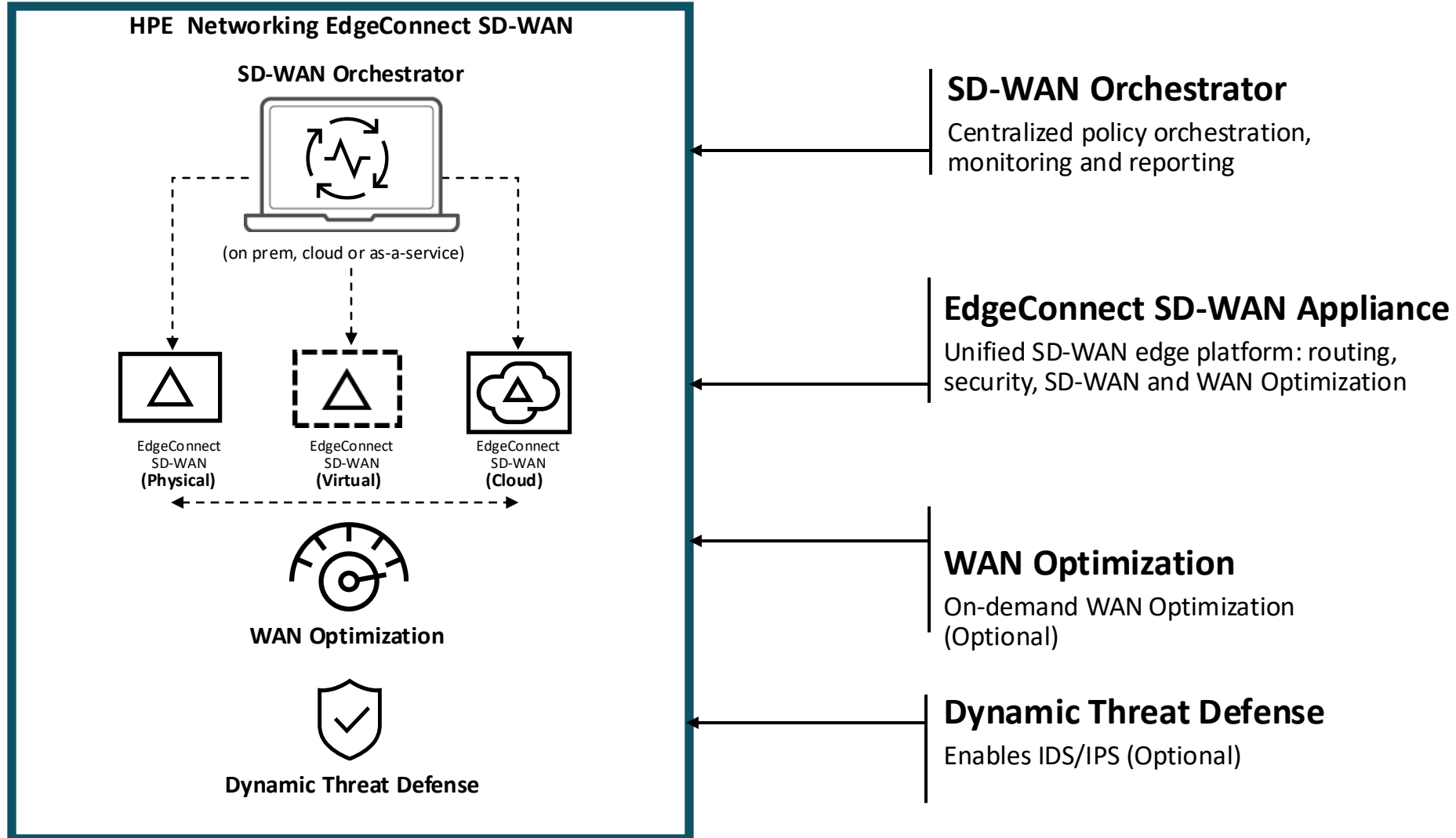
Network visibility and reporting



Automation and zero-touch provisioning

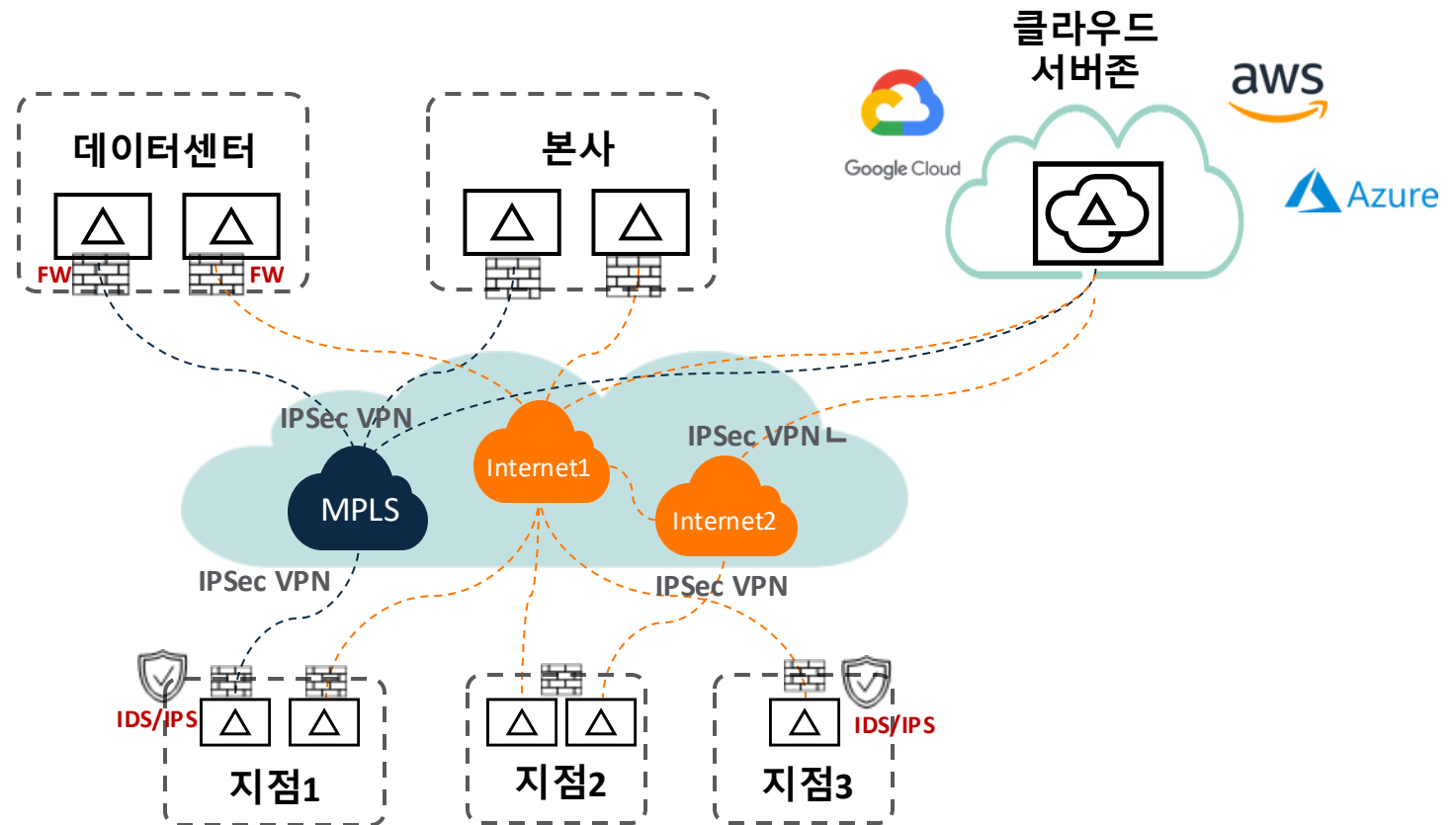


# EdgeConnect SD-WAN 솔루션 구성 요소



# EdgeConnect SD-WAN 구성 개요

다양한 분산 환경에 최적화된 SD-WAN 솔루션



# 솔루션 주요 기능

경로 최적화, WAN 가속 기능, 실시간 애플리케이션 트래픽 및 회선 품질 모니터링

## Path Conditioning

- Overcome the adverse effects of dropped and out-of-order packets that are common with broadband internet and MPLS connections

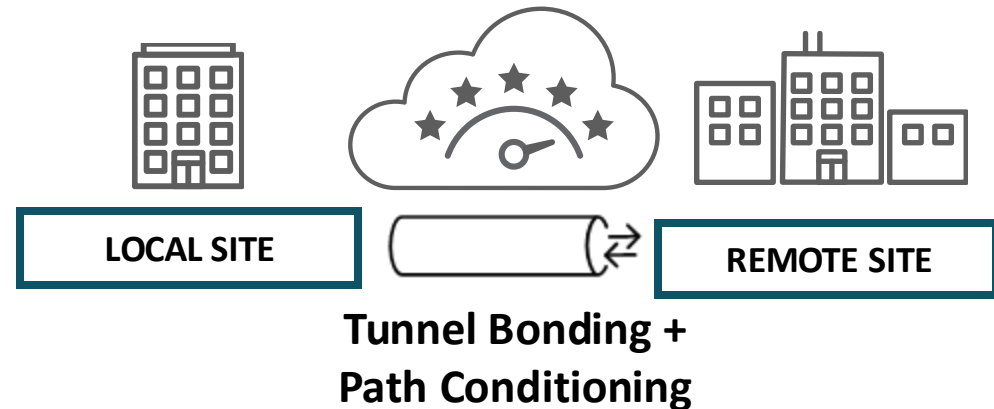
## WAN Optimization

- Leverage TCP Protocol acceleration and data compression techniques
- Find the best path and the shortest route to the closest point of presence to accelerate SaaS applications

## Real time Applications

- Experience consistent application performance including high quality voice and video over broadband connections.

**Best voice and video experience  
over any transport**





# 솔루션 주요 기능

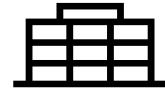
회선 QoS: 실시간 애플리케이션을 인터넷 상에서 안정적으로 제공



실시간 트래픽



여러 종류의 물리적인 회선을 묶고(Bonding), 동적으로 경로를 최적화하여(Dynamic Path Conditioning) 논리적 오버레이 경로에 더 높은 성능을 제공



실시간 트래픽



Overlay Network Health 100%

Tunnel Bonding

Path Conditioning Fixes Packet Loss and Out-of-Order Packets

성능이 저하된 언더레이 네트워크



# 솔루션 주요 기능

## WAN 가속 및 최적화

### 유연한 적용 방식

- 라이선스 활성화를 통한 옵션 기능
- 하드웨어가 불필요한 소프트웨어 최적화
- 필요한 장비와 구간에 한해 주문형으로 활성화

### 주요 기능

애플리케이션 가속 기능

중복 데이터 감소

유연한 대역폭 할당

- ✔ 성능을 중요시하는 애플리케이션을 사용하거나 지리적으로 멀리 떨어진 회선 구간에 적합  
데이터 복제, 이미징, 파일 서비스, 파일 전송, 웹 애플리케이션, 데이터베이스, 빅 데이터, 협업 툴 등

# 솔루션 주요 기능

## WAN 가속 및 최적화

### ✓ WAN 가속 동작 방식

#### 1. Latency 극복을 위한 TCP ACCELERATION

국내외 원거리 사업장 간의 장거리 통신의 지연시간 완화를 위해 TCP 가속으로 사용자의 어플리케이션 사용 성능 및 사용자 경험 극대화



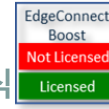
#### 2. 회선 혼잡 최소화를 위한 NETWORK MEMORY

실시간 데이터 트래픽 중복제거를 통해 한정된 회선 대역폭 내에서 가용 대역폭의 효율화와 최대화 제공



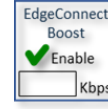
### ✓ WAN 가속 라이선스 적용

Optional 라이선스 방식



장비 도입에 종속되지 않는 필요 시 Boost 옵션 구매

Block 라이선스 방식



100Mbps 단위 구매로 원하는 장비에 나누어 적용

On-demand 라이선스 방식



모든 장비에 적용이 아닌 필요한 구간/트래픽에만 적용

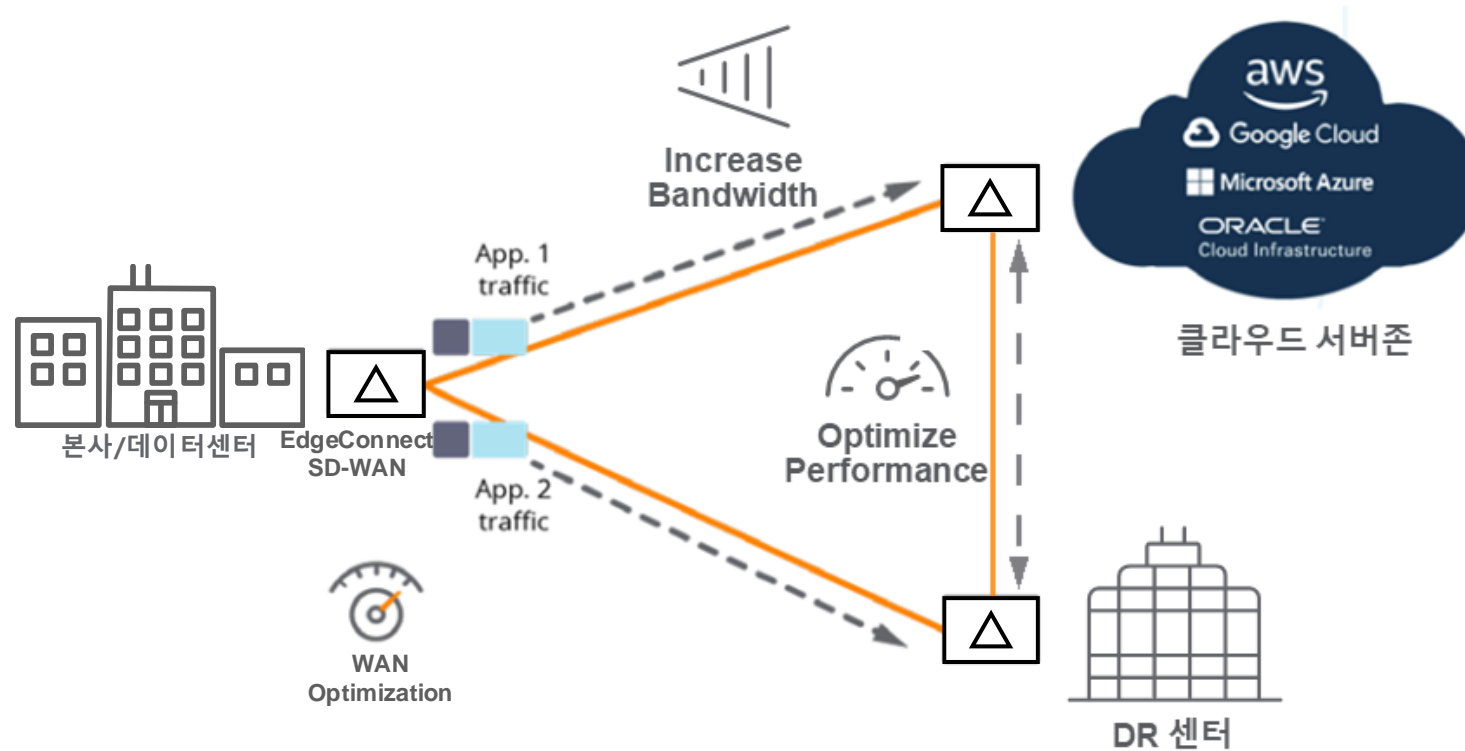
### ✓ WAN 가속 On-Site PoC 결과

Non-Boost	File Type/Size	Boost
1,056 Sec	OVA, 3.5GB	931 Sec (-125 Sec, 11.8%) (Reduction Rate: <b>9.4%</b> )
863 Sec	MOV, 2.9GB	347 Sec (-516 Sec, 59.8%) (Reduction Rate: <b>60.8%</b> )
950 Sec	DUM, 3.1GB	52 Sec (-898 Sec, 94.5%) (Reduction Rate: <b>99.4%</b> )

(한국 - 싱가포르 HPE Office 간 로컬인터넷, AWS, MPLS가 혼용된 네트워크 구성으로 테스트)

# 솔루션 주요 기능

## WAN 가속 및 최적화: 애플리케이션 성능 향상 및 DC-DR 회선 효율화



애플리케이션  
성능 향상

데이터 압축 / 중복제거  
회선 사용 효율화

데이터 백업 / DR

회선 / 클라우드  
비용 절감

# 솔루션 주요 기능

## 트래픽 관리: 편리한 애플리케이션 정책 적용

- Application Group
- Application
- Address Map
- Domain
- Geo Location
- Interface
- Protocol
- DSCP
- IP/Subnet
- Port
- Traffic Behavior
- Overlay
- Fabric or Internet
- User Role

Match Criteria

Select Match Criteria

- Application Group  Type to select
- Application  Type to select [Fewer Options](#)
- Address Map  Examples: \*Office365\* or \*Skype\* or \*Dropbox Inc\*  
 Src:Dest [+Attributes](#)
- Domain  DNS to match. Use \* in the beginning or end to match anything  
 Src:Dest
- Geo Location  Location name. Use \* in the beginning or end to match anything  
 Src:Dest
- Interface  Type to select
- Protocol  ip
- DSCP  any
- IP/Subnet  Example: 1.1.1.1/32 or 1.1.1.1-220 or fe80::204:23ff:fed8:4ba2/128 or fe80::204:23ff:fed8:4466-4999  
 Src:Dest [IPs](#) [Groups](#)
- Port  Example: 80 or 20-30 or 4|8|10  
 Src:Dest [Ports](#) [Groups](#)
- Traffic Behavior  Idle
- Overlay  Select...
- Fabric or Internet  Internet
- User Role  Enter Role  
 Src:Dest

[More User Profile Options](#)

- User Name
- User Group
- User Device
- User MAC

Match Criteria

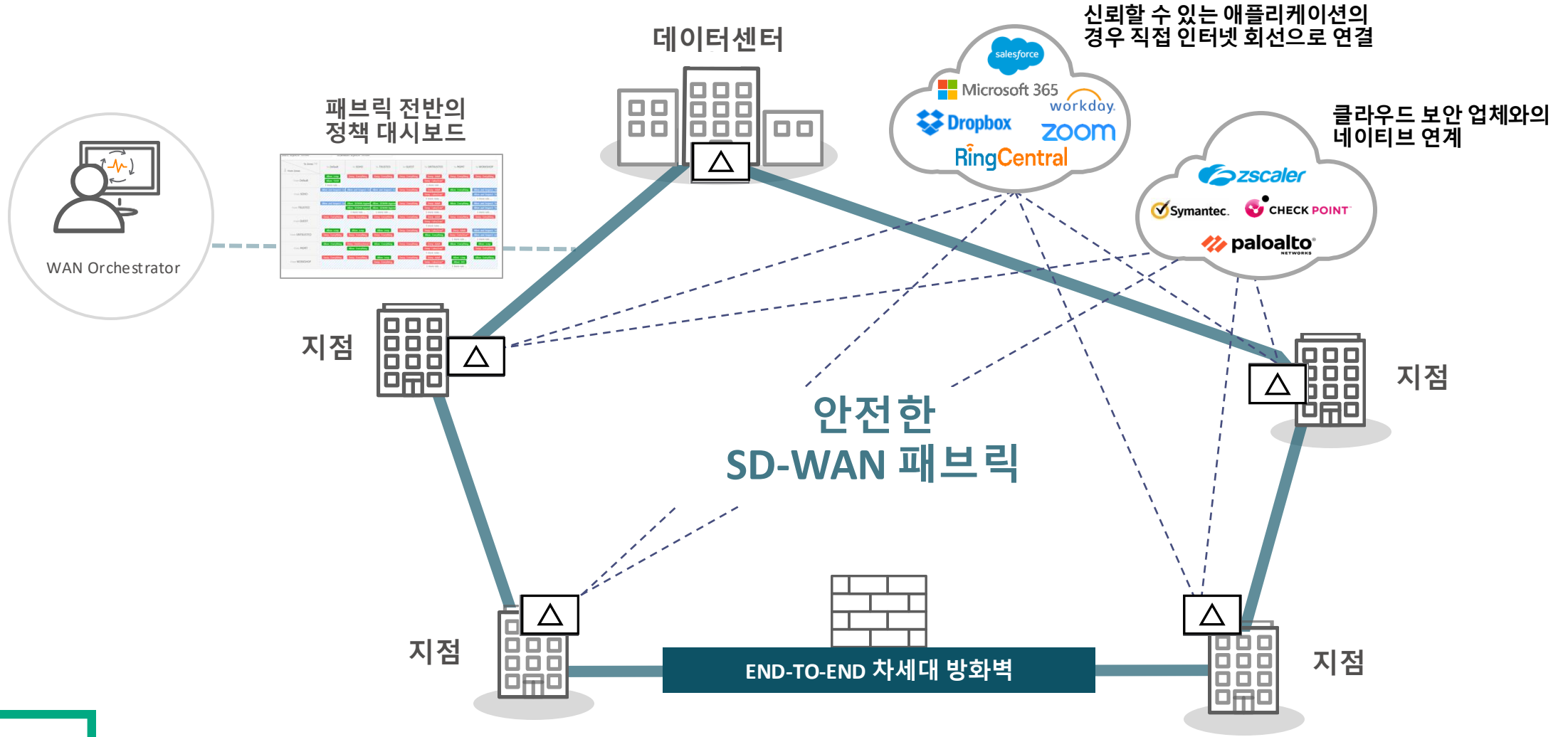
Select Match Criteria

- Application Group  Type to select
- Application  Type to select [More Options](#)
- User Role  Enter Role  
 Src:Dest [Fewer User Profile Options](#)
- User Name  Enter Source User Name
- User Group  Enter Source Group
- User Device  Enter Source Device
- User MAC  Enter Source MAC in XXXXXXXXXXXX format

Summary  
Protocol [ip](#), Traffic Behavior [Idle](#), Fabric/Internet [Internet](#)

# 솔루션 주요 기능

트래픽 관리: 세그먼트 기반의 차세대 방화벽을 통해 트래픽을 분리하고 보안성을 제고



# 솔루션 주요 기능

## Business Intent Overlay: 실제 업무 환경을 고려한 정책 기반 네트워크 설정

Apps, IaaS, PaaS

Circuits

Bonding + SLA

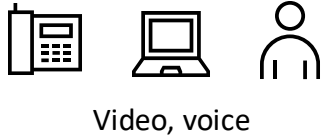
Topology

SaaS, Cloud, Internet Apps

Internet Policy & Security

Overlay Defaults

### Real Time Overlay



- MPLS
- Internet
- LTE (Backup)

#### Availability

Loss: 1%  
Latency: 400ms  
Jitter: 200ms



#### Best Circuit + Local Firewall



FW Zone: Real Time  
QoS: Real Time  
**WAN Opt: Disabled**

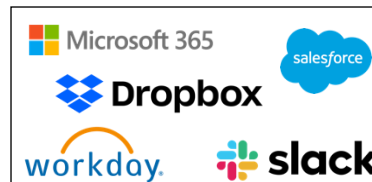
### Critical Apps Overlay



- MPLS
- Internet
- LTE (Backup)

#### High Quality

Loss: 2%  
Latency: 600ms  
Jitter: 300ms

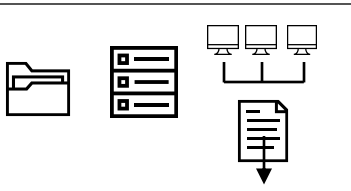


#### Best Circuit + SSE



FW Zone: Restrict  
QoS: Enterprise  
**WAN Opt: Enable**

### Default Overlay



- MPLS
- Internet
- LTE (Backup)

#### High Efficiency

Loss: 5%  
Latency: 800 ms  
Jitter: 500 ms



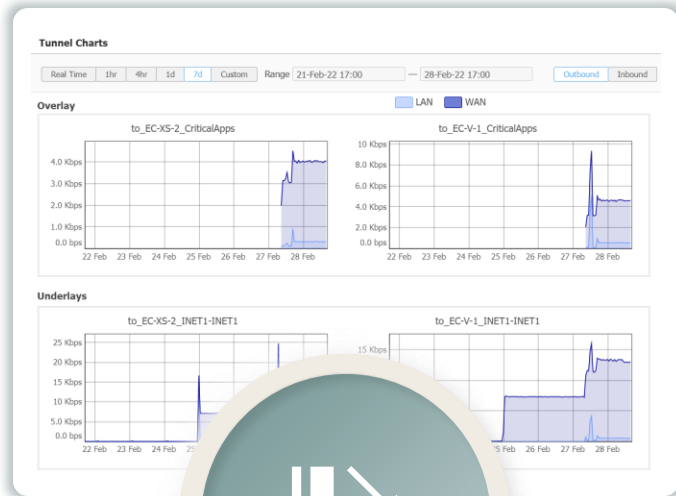
#### Load Balance + SSE



FW Zone: Default  
QoS: Best Effort  
**WAN Opt: Disabled**

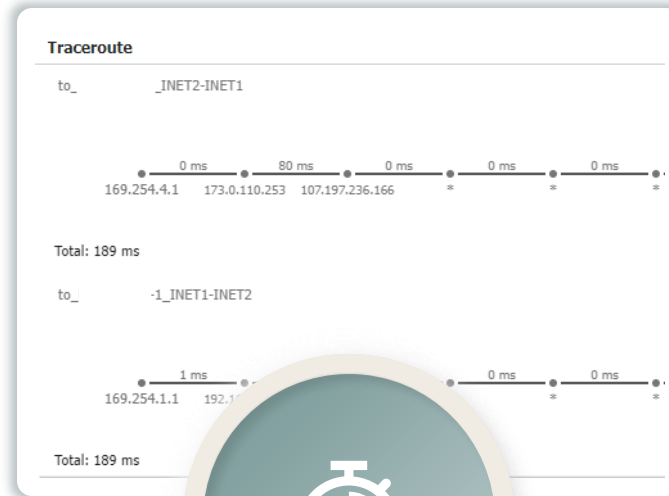
# 솔루션 주요 기능

## 가시성: 다양한 모니터링 기능



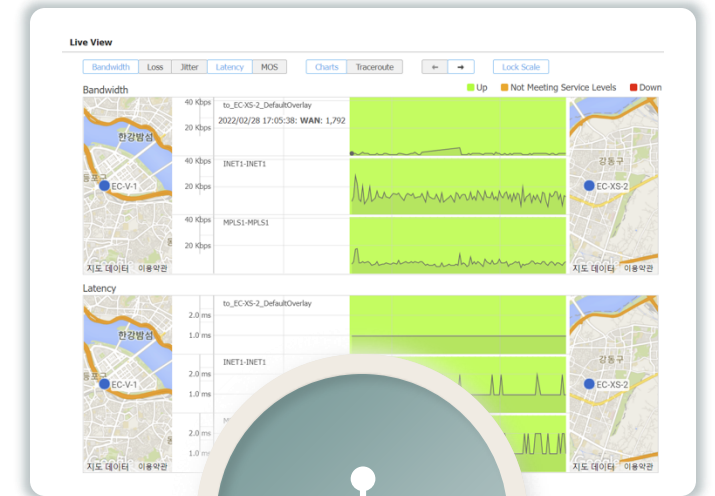
### 터널 트래픽

언더레이 및 오버레이  
트래픽을  
기간과 실시간으로 확인 가능



### Traceroute

터널의 End-to-End 간  
측정 가능한 경로에 대한  
구간 별 Trace 정보 제공



### 실시간 회선 품질

정보를 실시간으로  
언더레이와 오버레이 각각에  
대한  
상태 실시간 정보를 제공  
(사용량, Loss, Latency, MOS)



# 솔루션 주요 기능

## 가시성: Flow 모니터링 – WAN 가속 트래픽 모니터링

The screenshot displays the Flow Monitoring interface. At the top, there are various filters and controls. A red box highlights the 'Flow Characteristics' section, which includes 'Boosted', 'Route', 'Dropped', 'Embryonic', and 'Asymmetric' options. Below this is a table of flows. A red box highlights the 'Detail' column in the table. A large green arrow points from the 'Detail' column to a detailed view of a flow. The detailed view shows 'Flow details for IP1: 192.168.11.151 Port1: 51936 IP2: 35.186.34.223 and Port2: 443'. The 'Optimization' tab is selected, showing various settings. A red box highlights the 'TCP Acceleration Configured' and 'TCP Acceleration Status' settings, both set to 'Yes'. Another red box highlights the 'Network Memory' and 'Header Compression' settings, both set to 'Minimize Latency'.

Appliance	Detail	Chart	Start Time	Uptime	Overlay	User Name	Protocol	Application	IP1	Port1	IP2	Port2	Inbound Bytes	Outbound Bytes	Inbound Tunnel	Outbound Tunnel
Kennesaw3-Powers	(i)		15:20:28	7m 10s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	52187	trapworker257-us1.dropca...	443	16M	164K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		15:20:27	1m 3s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	52186	oculus4630-us1.dropcam.c...	80	6K	4K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		15:16:53	4m 36s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	52170	trapworker286-us1.dropca...	443	8.4M	86K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		15:16:45	1m 10s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	52169	oculus4630-us1.dropcam.c...	80	6K	4K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		15:07:31	37s	BESTEFFORT	089798bd2792	tcp	Adblockplus	192.168.11.221	60558	easylst-downloads.adblock...	443	61K	2K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:47:05	30m 50s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	52074	trapworker315-us1.dropca...	443	72M	2.7M	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:47:04	1m 3s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	52073	oculus4630-us1.dropcam.c...	80	6K	4K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:41:22	6m 44s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	52048	trapworker185-us1.dropca...	443	13M	132K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:41:21	1m 3s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	52045	oculus4630-us1.dropcam.c...	80	6K	4K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:28:39	37s	BESTEFFORT	089798bd2792	tcp	Adblockplus	192.168.11.221	60397	easylst-downloads.adblock...	443	61K	2K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:20:27	37s	BESTEFFORT	3c7c3f0d0e11	tcp	Adblockplus	192.168.11.202	59826	easylst-downloads.adblock...	443	61K	2K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:12:39	29m 45s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	51936	trapworker184-us1.dropca...	443	74M	2.8M	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:12:31	1m 11s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	51934	oculus4630-us1.dropcam.c...	80	6K	4K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:12:01	2m 13s	BESTEFFORT	3c7c3f0d0e11	tcp	Youtube	192.168.11.202	59808	edgedl.me.gvt1.com (34.10...	80	1.2M	9K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:06:17	7m 24s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	51913	trapworker227-us1.dropca...	443	16M	165K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:05:30	1m 49s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	51910	trapworker397-us1.dropca...	443	1.5M	19K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:05:23	1m 56s	BESTEFFORT	c85b7656096f	tcp	Nest_AwareVideo	57905456 (192.16...	51909	oculus4630-us1.dropcam.c...	80	6K	5K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:04:45	23s	BESTEFFORT	089798bd2792	tcp	Adblockplus	192.168.11.221	52788	easylst-downloads.adblock...	443	564K	5K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		14:02:51	2s	REALTIME	graysonpowers	tcp	CCE	192.168.11.220	52951	config.edge.sky.com (52...	443	7K	2K	to_EAST2-AWS_REALTIME	to_EAST2-AWS_...
Kennesaw3-Powers	(i)		14:02:51	33s	REALTIME	graysonpowers	tcp	Webex	192.168.11.220	52962	ocsp.digicert.com (192.229...	80	1K	65s	to_EAST2-AWS_REALTIME	to_EAST2-AWS_...
Kennesaw3-Powers	(i)		14:02:51	33s	REALTIME	graysonpowers	tcp	Webex	192.168.11.220	52963	ocsp.digicert.com (192.229...	80	1K	65s	to_EAST2-AWS_REALTIME	to_EAST2-AWS_...
Kennesaw3-Powers	(i)		13:47:48	4m 2s	BESTEFFORT	089798bd2792	tcp	Youtube	192.168.11.221	64735	lyftimg.com (172.217.10.214)	443	20K	2K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		13:47:47	4m 4s	BESTEFFORT	089798bd2792	tcp	Youtube	192.168.11.221	64731	lyftimg.com (172.253.124.1...	443	74K	3K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...
Kennesaw3-Powers	(i)		13:47:46	4m 3s	BESTEFFORT	089798bd2792	tcp	Youtube	192.168.11.221	64733	www.youtube.com (64.733...	443	73K	4K	to_EAST2-AWS_BESTEFFORT	to_EAST2-AWS_B...

Flow details for IP1: 192.168.11.151 Port1: 51936 IP2: 35.186.34.223 and Port2: 443

General Optimization TCP NAT AVC/DNS Internet Performance User Details IP1 IP2

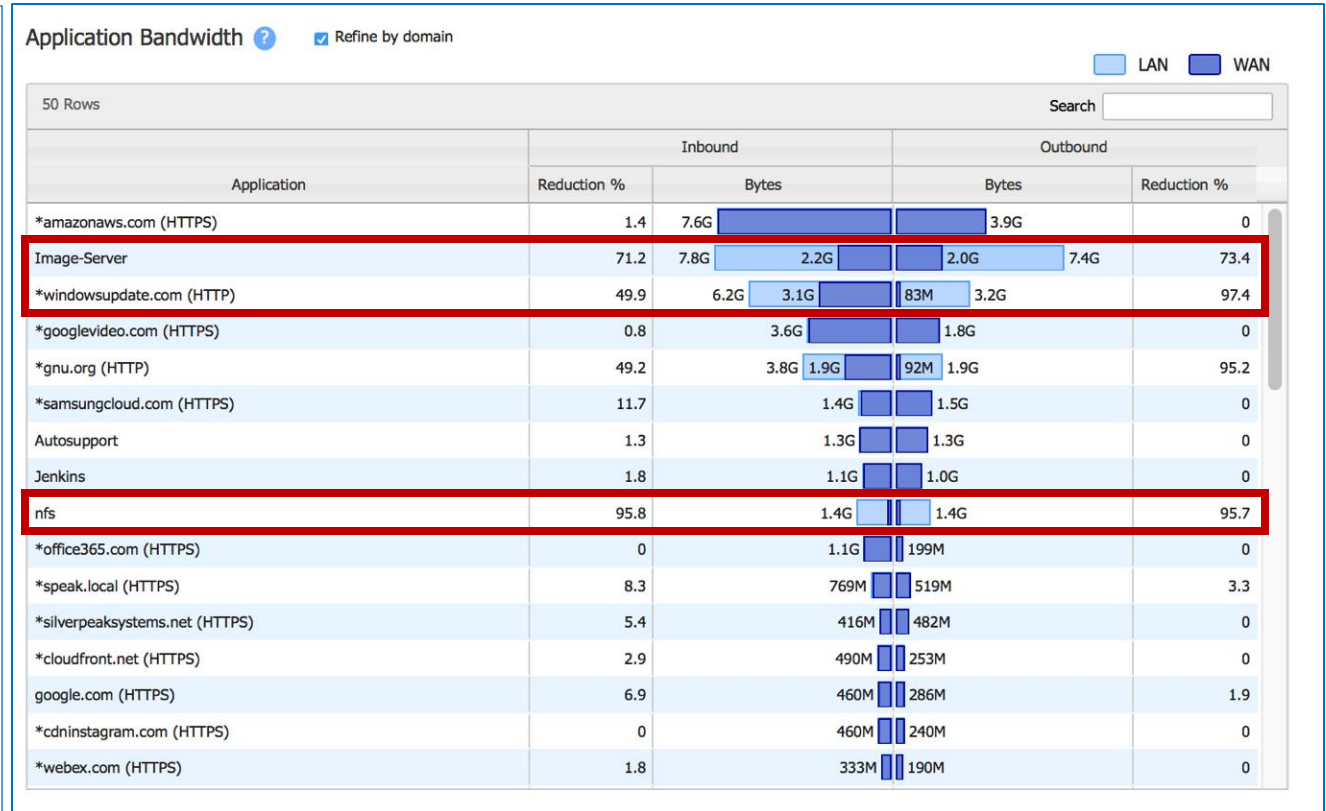
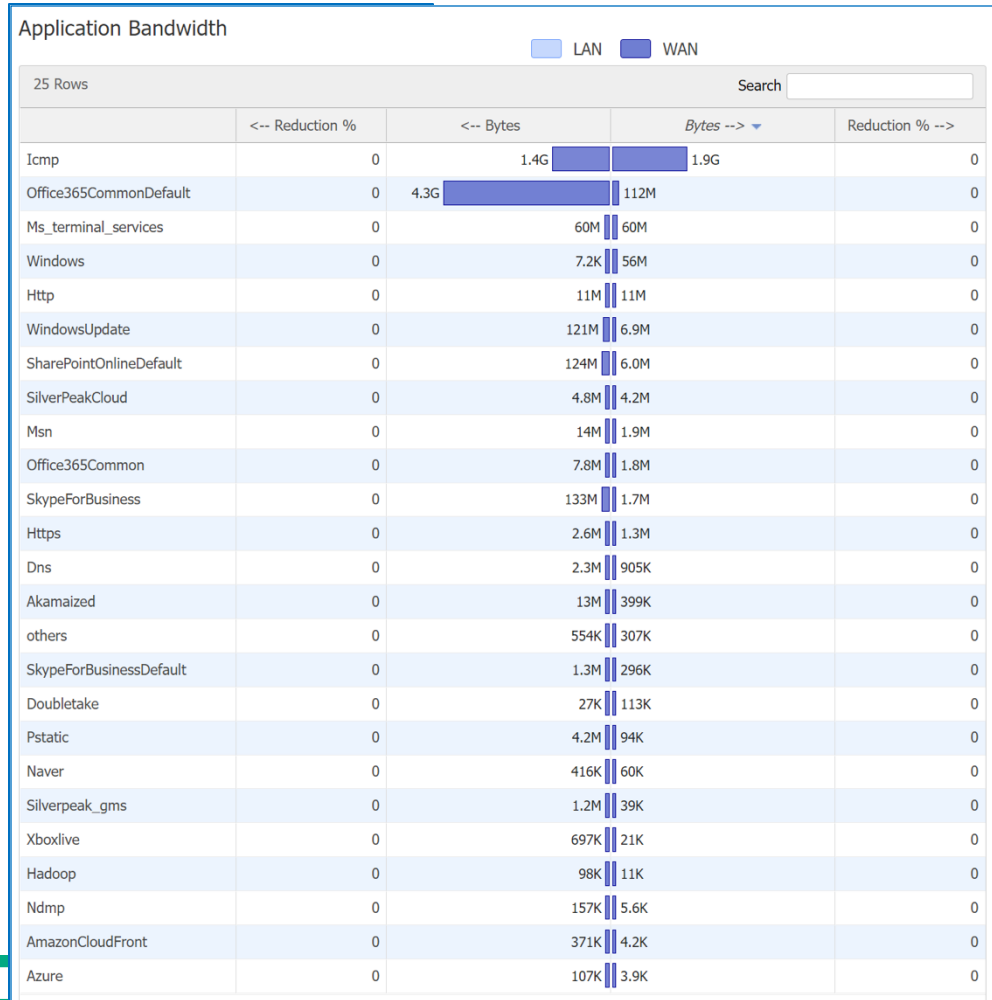
**Optimization**

Map Name	PRODUCTION
Proxy Remote Acceleration	No
SRDF Acceleration Configured	No
SRDF Acceleration Status	No
SSL Acceleration Configured	No
SSL Acceleration Status	No
SSL Acceleration Reason	No
ISCSI Acceleration Configured	No
Network Memory	Minimize Latency
Header Compression	Yes
Payload Compression	Yes

Using State Map Entry NO

# 솔루션 주요 기능

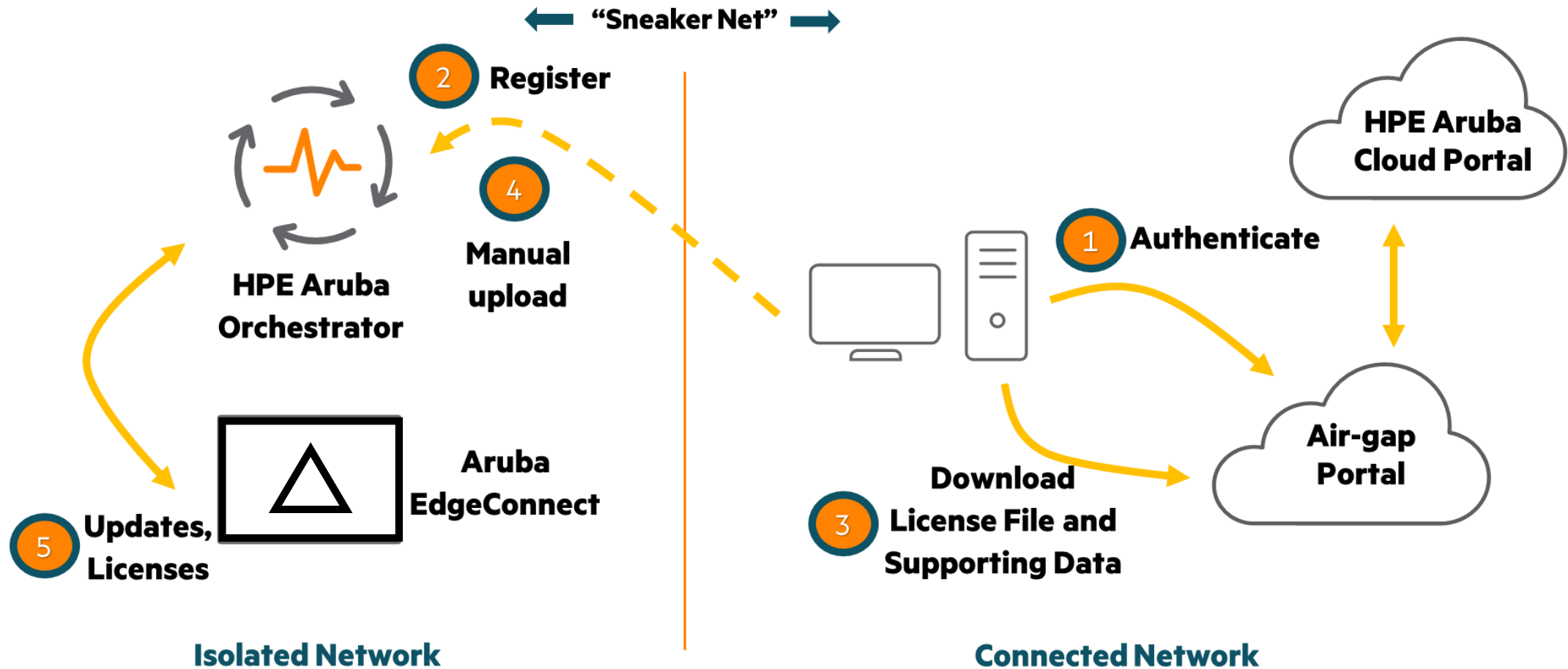
## 가시성: 애플리케이션 실시간 현황



애플리케이션 및 트래픽 종류별 WAN 가속 효율 모니터링

# 솔루션 주요 기능

Air-Gap: 망분리 등 인터넷 접속이 불가능한 폐쇄망에서의 SD-WAN 구성



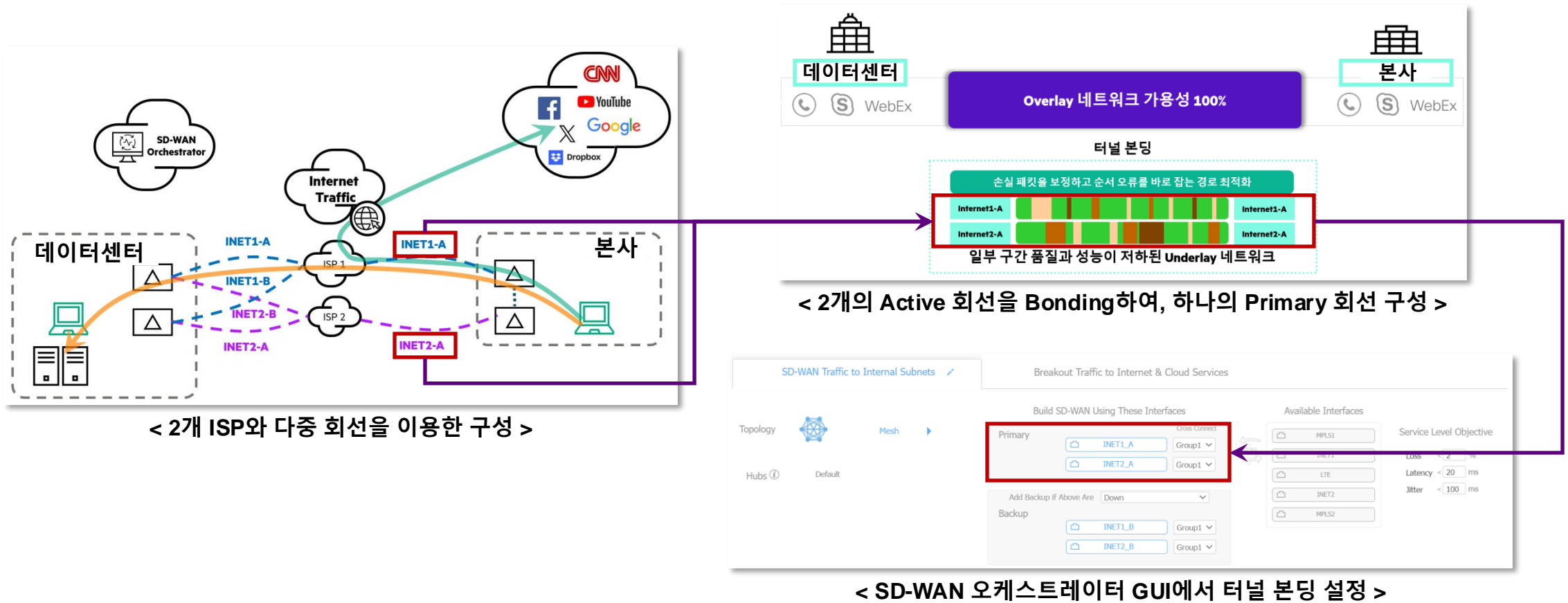
# 기대 효과 및 사례

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# 기대효과 1: 회선 및 업링크 다중화를 통한 안정적 회선 운영

SD-WAN의 최대 강점인 IPsec 터널 본딩(1)과 Multi-Active 회선 구성(2) 기능을 통해 **고가용성을 보장함**과 동시에 **대역폭의 낭비를 최소화**하여 회선 비용을 효율화 함



- (1) 다수의 물리적인 회선(IPsec Underlay Tunnel)을 논리적으로 묶어(Bonding) 일부 회선의 품질 저하 및 장애 시에도 회선 가용성을 보장하는 Overlay 기능
- (2) Active 회선만 사용하고 Backup 회선은 유향 상태를 유지하는 Active-Standby 방식이 아닌, 모든 회선의 대역폭을 최대한 활용할 수 있는 Multi-Active 회선 구성 기능

# 기대효과 2: 애플리케이션 기반 트래픽 정책 및 QoS 적용

SD-WAN이 식별(First-Packet IQ)하거나 사용자 정의한 애플리케이션을 기반으로 하여 트래픽 정책 설정이 가능하므로, 특정 회선을 통한 경로 설정, 라우팅, QoS 등을 적용할 수 있음

The screenshot displays the SD-WAN configuration interface. On the left, there are various traffic and content type categories. The main area shows 'Application Definitions' with a search for 'youtube' and a list of application groups. A 'Match Criteria' dialog is open, showing a list of YouTube-related domains. On the right, three traffic policy overlays are shown: 'Real Time Overlay' (with Zoom, Webex, RingCentral), 'Critical Apps Overlay' (with AWS, SAP, Microsoft Azure, Oracle), and 'Default Overlay' (with Facebook, YouTube). Each overlay shows specific QoS and SLA settings for different interfaces.

**Application Group**

Application Group	Application
	Computer_and_Electronics_Software
	Computers_Electronics_and_Technology_Search_Engines
	Arts_and_Entertainment_TV_and_Video
	Arts_and_Entertainment_Computers_Electronics_and_Technology_TV_and_Video
	Computers_Electronics_and_Technology
	Arts_and_Entertainment_TV_and_Video

**Match Criteria**

Select Match Criteria

Type to select

- Adblock-for-youtube
- Bajaryoutube
- Descargayoutube
- Easy-youtube-mp3
- Genyoutube
- Listentoyoutube
- Mp3-youtube-download
- Safeyoutube
- Savoyoutube
- Scory-youtubers
- Soyoutube
- Yolecharger-youtube-mp3

**Traffic Policy Overlays:**

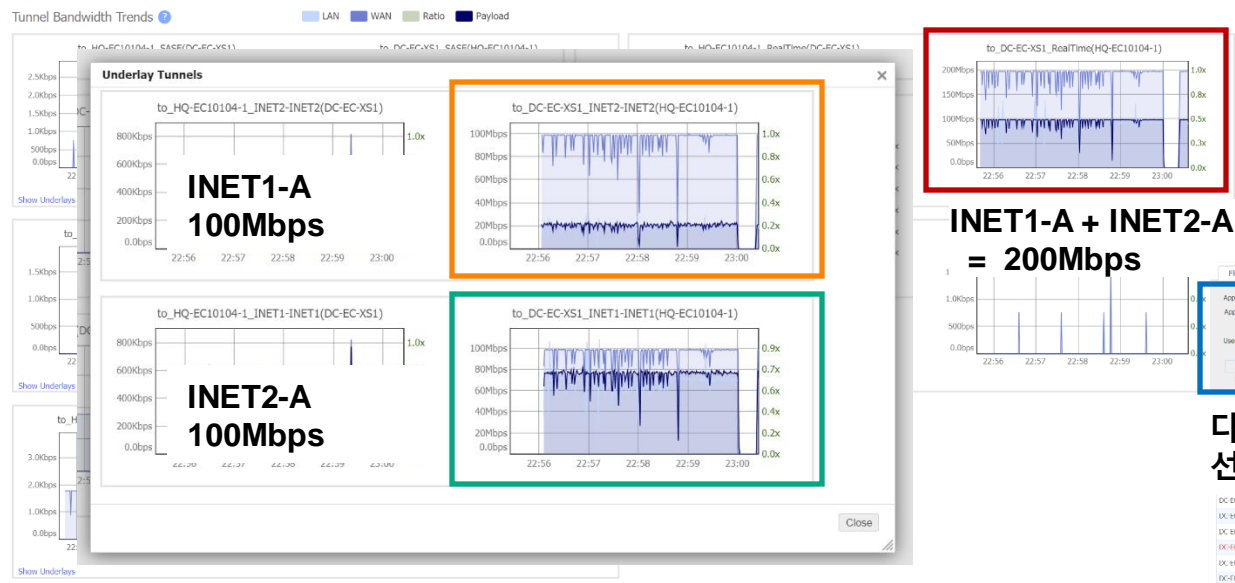
- Real Time Overlay:** High Availability. Loss: 1%, Latency: 400ms, Jitter: 200ms. Mesh topology. Applications: Zoom, Webex, 8x8, RingCentral. FW Zone: Real Time, QoS: Real Time, WAN Opt: Disabled.
- Critical Apps Overlay:** High Quality. Loss: 2%, Latency: 600ms, Jitter: 300ms. Spoke topology. Applications: AWS, SAP, Microsoft Azure, Oracle, Microsoft 365, Dropbox, Slack, Workday. FW Zone: Restrict, QoS: Enterprise, WAN Opt: Enable.
- Default Overlay:** High Efficiency. Loss: 5%, Latency: 800ms, Jitter: 500ms. Hub & Spoke topology. Applications: Facebook, YouTube. FW Zone: Default, QoS: Best Effort, WAN Opt: Disabled.

< 사전 식별 및 사용자 정의된 애플리케이션 >

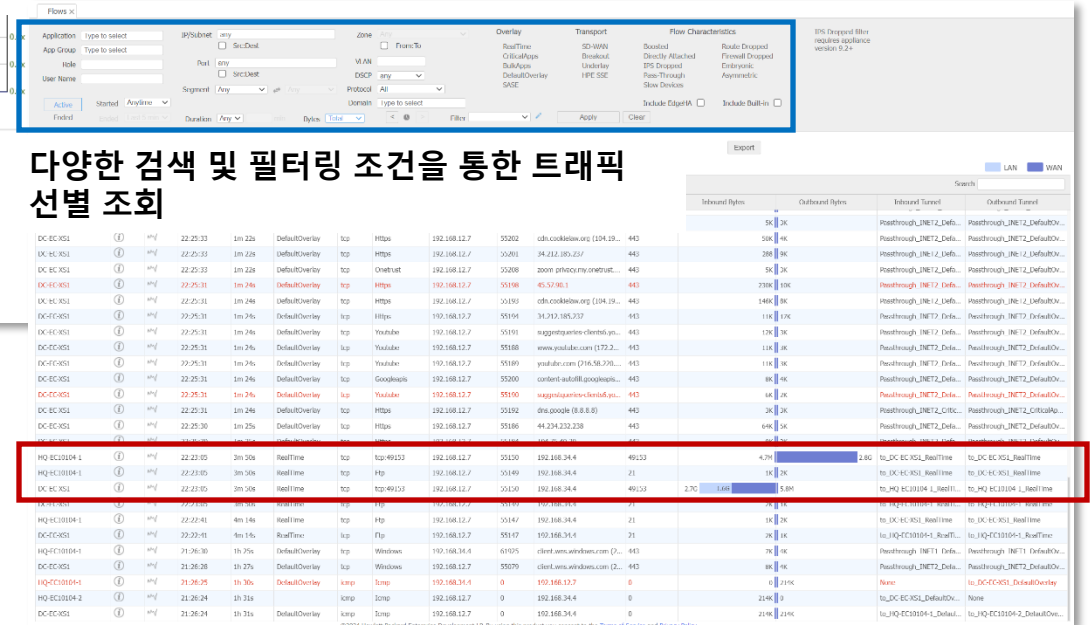
< 애플리케이션 기반으로 오버레이별 회선 경로, QoS, SLA를 설정 >

# 기대효과 3: 트래픽 실시간 분석 및 회선 사용량 모니터링

별도의 분석 솔루션 없이 SD-WAN에 자체 내장된 실시간 트래픽 분석과 모니터링 기능을 통해 WAN 인프라 및 트래픽의 현황을 정확히 파악할 수 있으며, 업무 최적화 된 정책과 회선 운영 가능



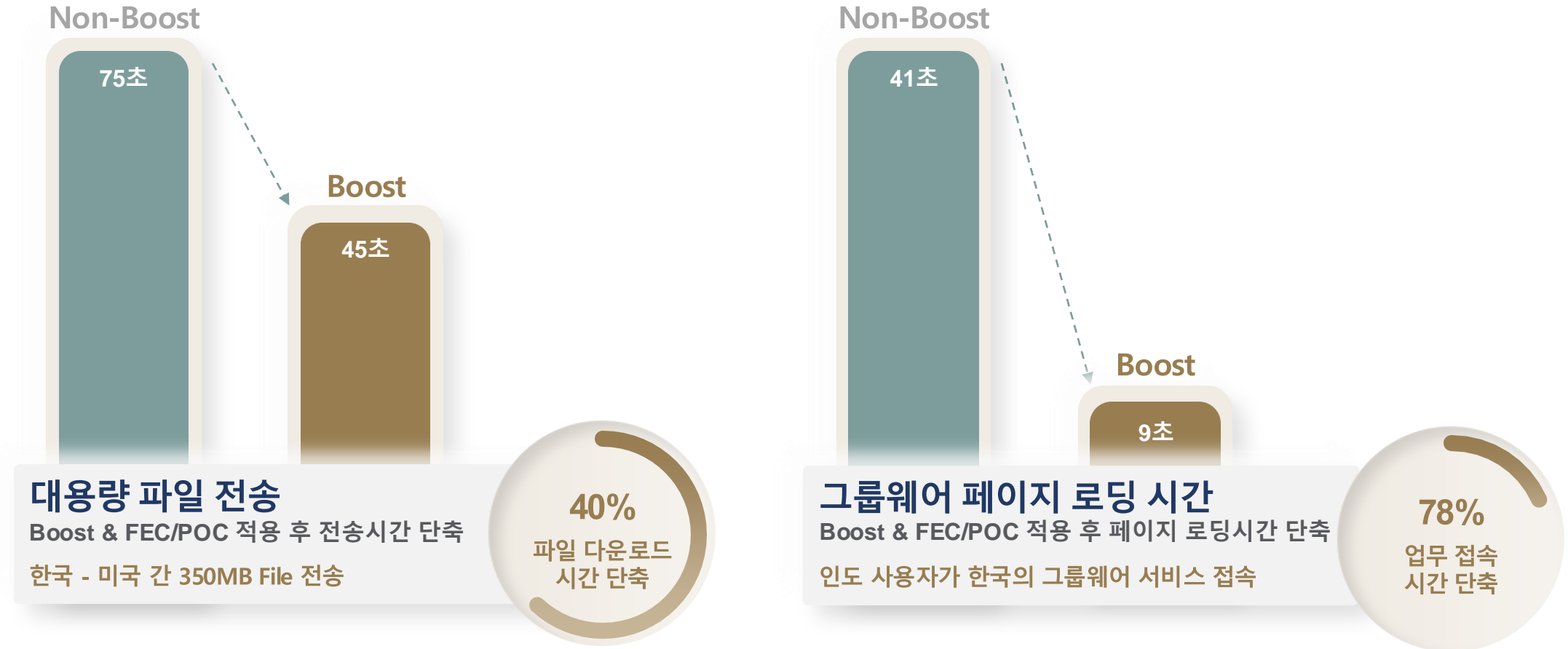
< Underlay 터널(회선)별 트래픽 실제 사용량 확인 >



< Flow 기반의 실시간 트래픽 분석 및 애플리케이션 모니터링 >

# 기대효과 4: 소프트웨어 기반의 WAN 최적화 기능

WAN 가속을 이용한 애플리케이션 성능 향상 및 트래픽 효율화를 통한 업무 성과 개선





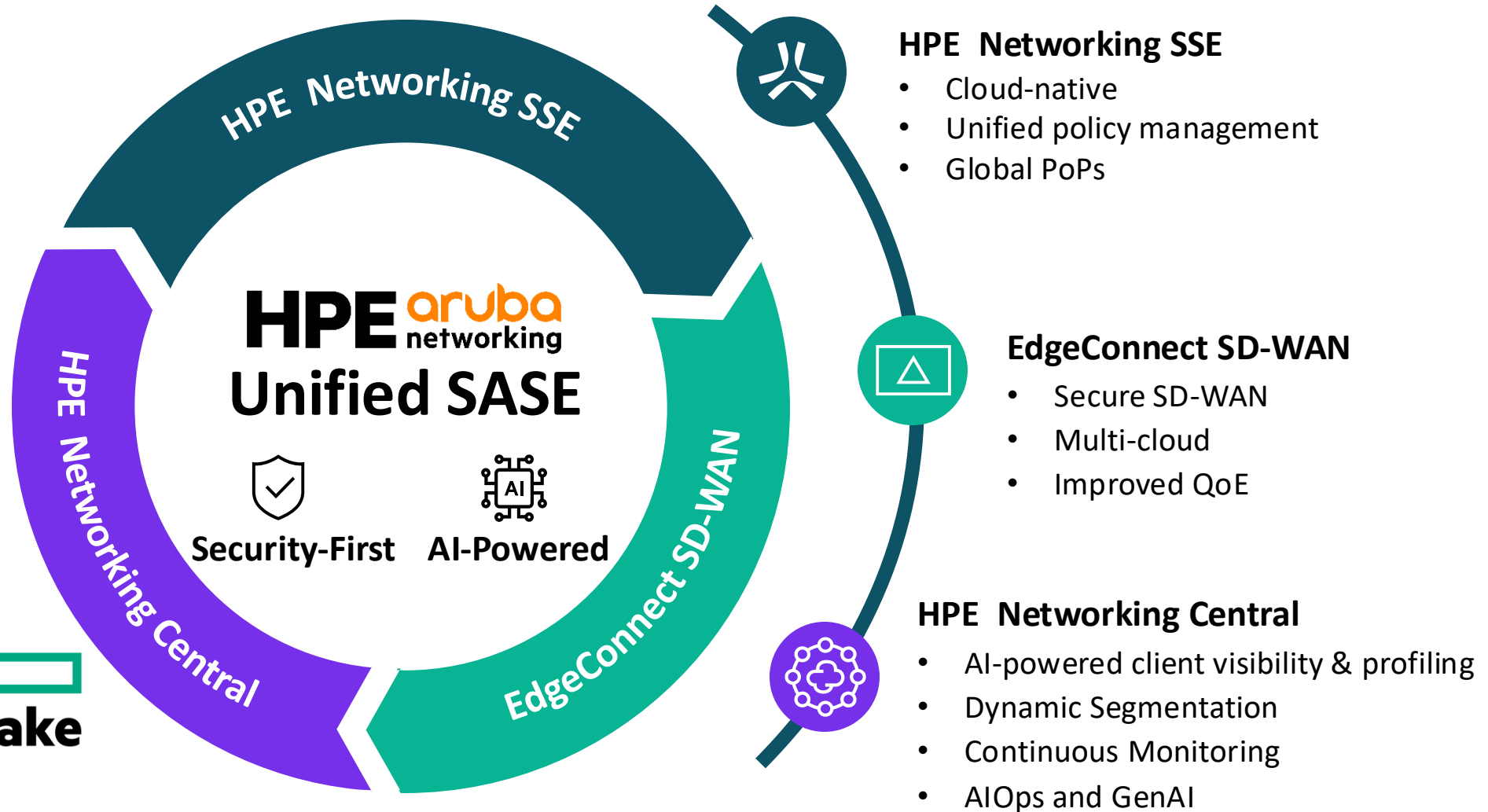
# Summary

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# HPE Networking approach to Zero Trust and SASE

Apply zero trust security controls to protect users and applications, no matter where they connect



**HPE GreenLake**

# Thank you

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