Cloud Innovation 2023

에이블클라우드의 국산 HCI 솔루션 '에이블스택'
그리고 Eco System 솔루션 소개 세미나

ABLESTOR
Dynamic Value Creator

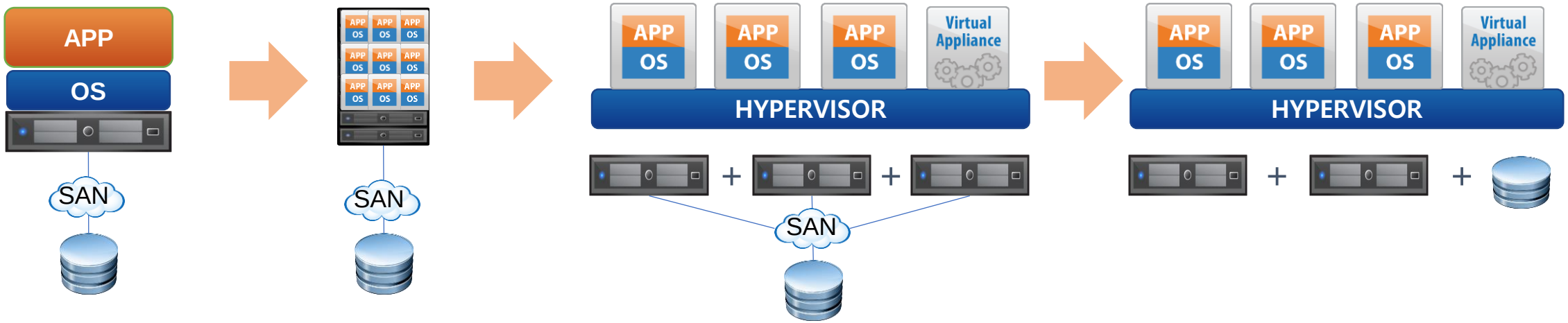
ABLECLOUD
All about data & cloud

가상화 네트워크를 위한 HCI 솔루션

박세일 차장

ARISTA

서버 가상화의 발전



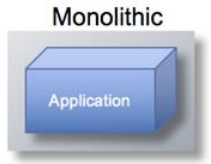
- 어플리케이션 프로비져닝
- 확장성 (Scale-out / Scale-in)
- 고 가용성
- 이동성(VM & Storage migration)
- 비용 감소

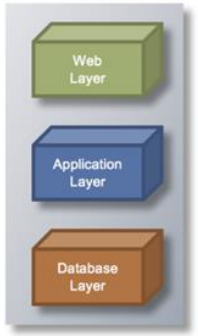
Changing Network Requirements

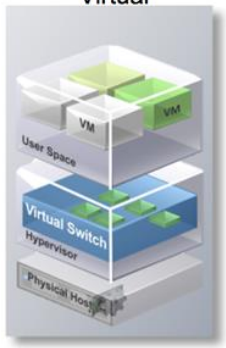
- 네트워크 프로비져닝
- 확장성(Scale-out / Scale-in)
- 고 가용성
- East-west Traffic 처리(Overlay)
- 자동화

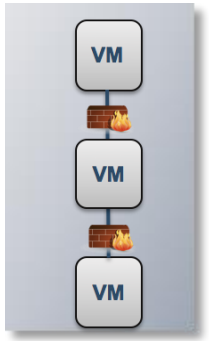
ARISTA

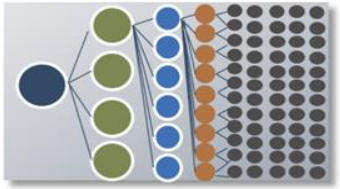
	Application Architecture	Deployment Architecture	Infrastructure Architecture	Development Architecture	
<2005	Monolithic	Physical	Datacenter	No-Ops	Siloed Firewall
2005 to 2017	Tiered	Virtual	Cloud	Automation	Micro-Segmentation
현재 진행 중	Microservices	Containers	Serverless	DevOps	ANY-Segmentation

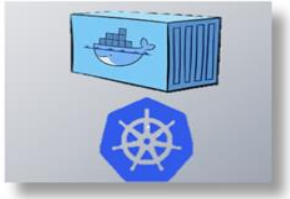


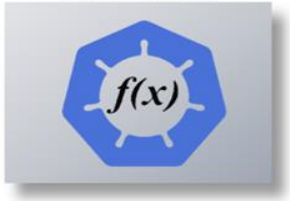


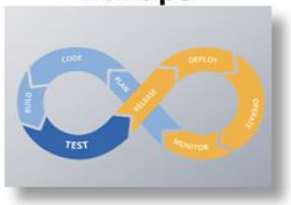


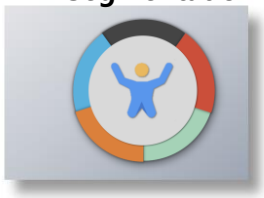












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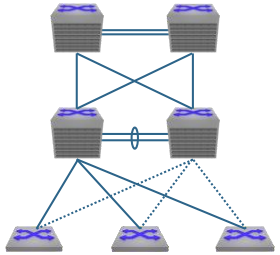
3 Tier Architecture (Fat Tree)

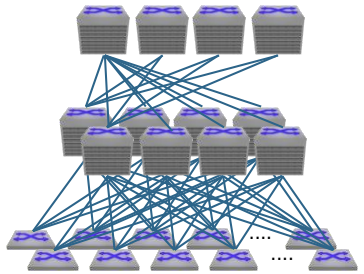


- Easy to deployment
- Easy to replacing
- High Cost and Power
- High Oversubscribed

DCell Architecture (Cube)

- Complex to deployment
- Complex to replacing
- High Scalable
- High Oversubscribed

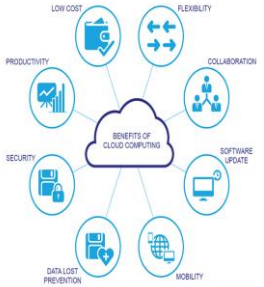
L2/L3 Leaf and Spine (CLOS Architecture)



- Easy to deployment
- Easy to replacing
- High Scalable
- Efficient Traffic forwarding

elasticsearch

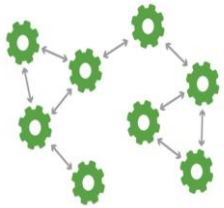
hadoop



openstack.

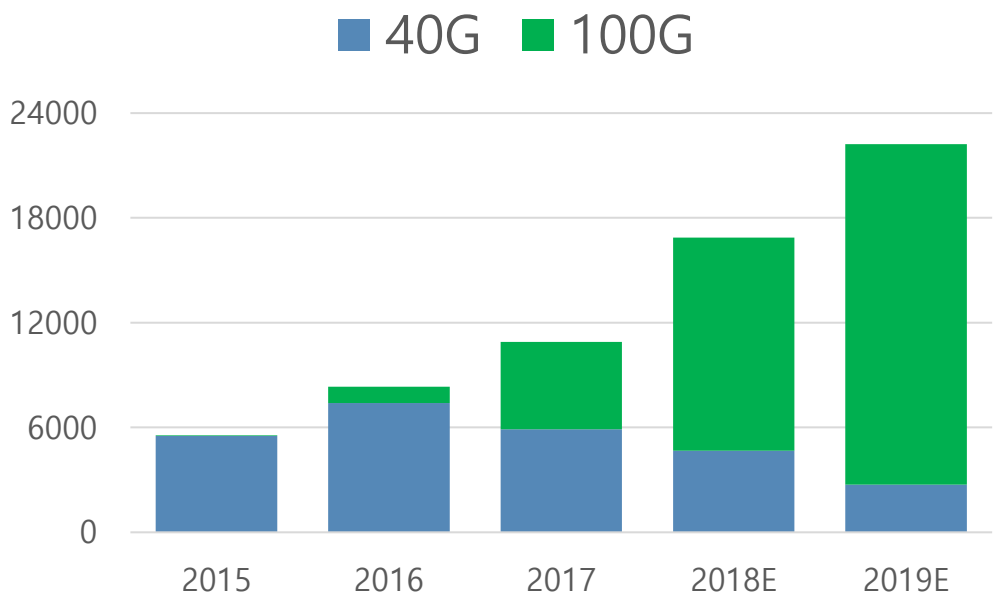
kubernetes

MICROSERVICES ARCHITECTURE



Scale Up

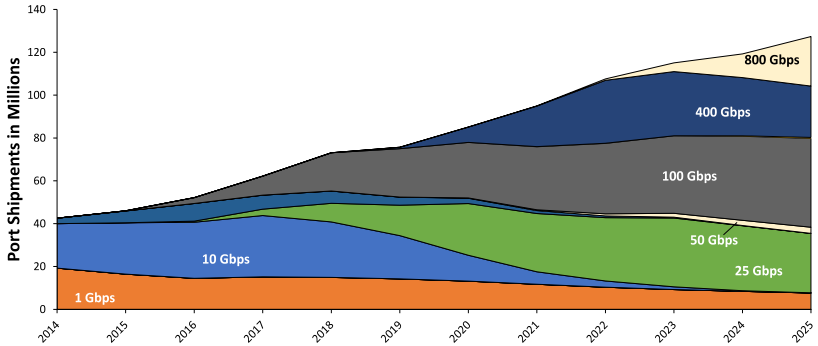
Scale Out



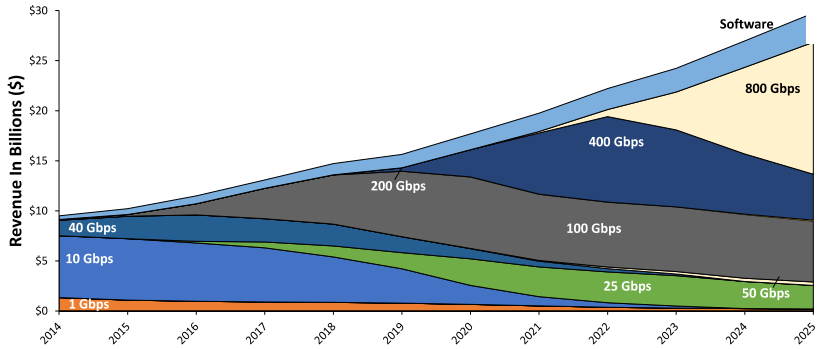
100G went from < 10% to > 50% in one year

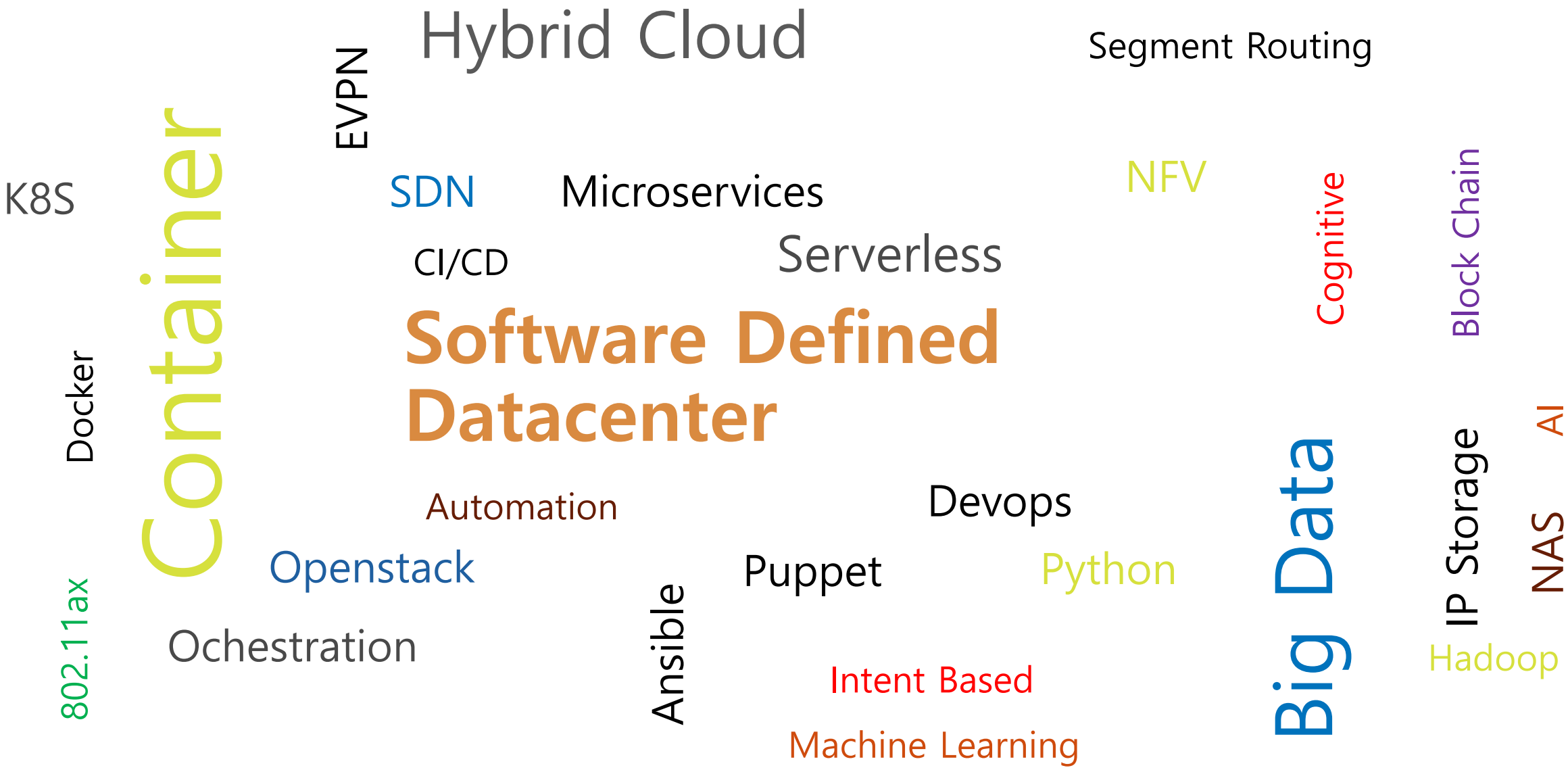
Source: Dell'Oro Market Research, Ethernet Switch Update, July 2018

Data Center: Total Port Shipments by Speed



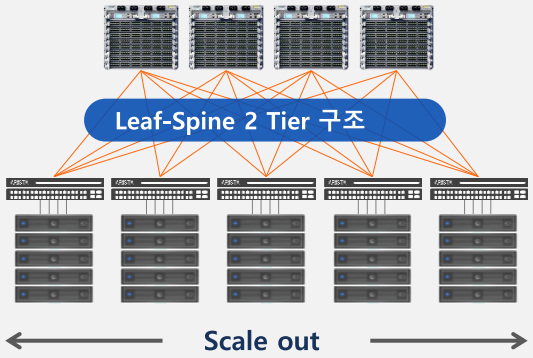
Data Center: Total Market Revenue by port Speed




Hybrid Cloud
Segment Routing
EVPN
Container
K8S
SDN
Microservices
NFV
Cognitive
Block Chain
CI/CD
Serverless
Software Defined Datacenter
Docker
Automation
Devops
AI
Openstack
Puppet
Python
Big Data
IP Storage
NAS
802.11ax
Ochestration
Ansible
Hadoop
Intent Based
Machine Learning

Bigdata 네트워킹 아리스타 주요 특징

차세대 네트워크 아키텍처

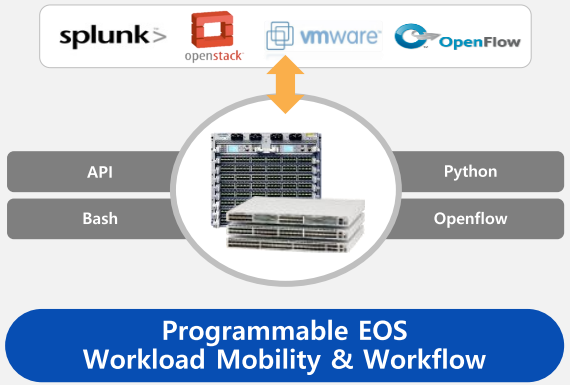


- 확장성, 가용성, 운영성
- 스케일 아웃/업 가능한 Leaf-Spine 2 Tier 구조
- East-West 트래픽 최적화
- Layer 3기반의 Layer 2 확장기능 제공

확장성 및 안정성이 보장된 인프라

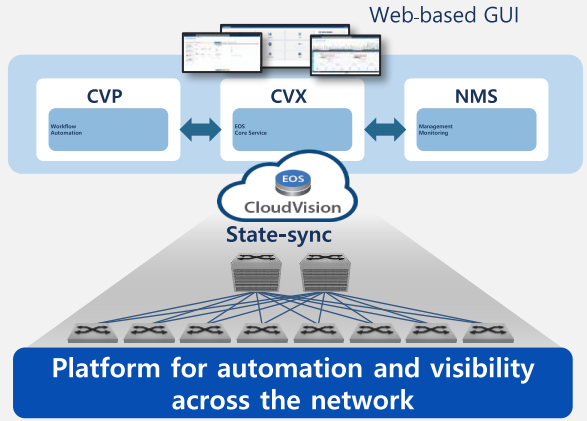
- 고집적 10G/ 25G 및 40G/ 100G 업그레이드를 고려한 시스템
- 포트당 최저 전력 소비 표준 플랫폼 및 OS 사용을 통한 운영 효율성
- 모든 제품이 Spine 및 Leaf 용도로 분리 및 제약 구성 없음

개방형 네트워크 표준 기술 수용



- 개방형 표준 기술 사용
- 이 기종 장비 및 다양한 솔루션 수용 가능
- 네트워크 가상화 등 최신 SDN 수용가능
- 프로그래밍 가능한 인프라 구성

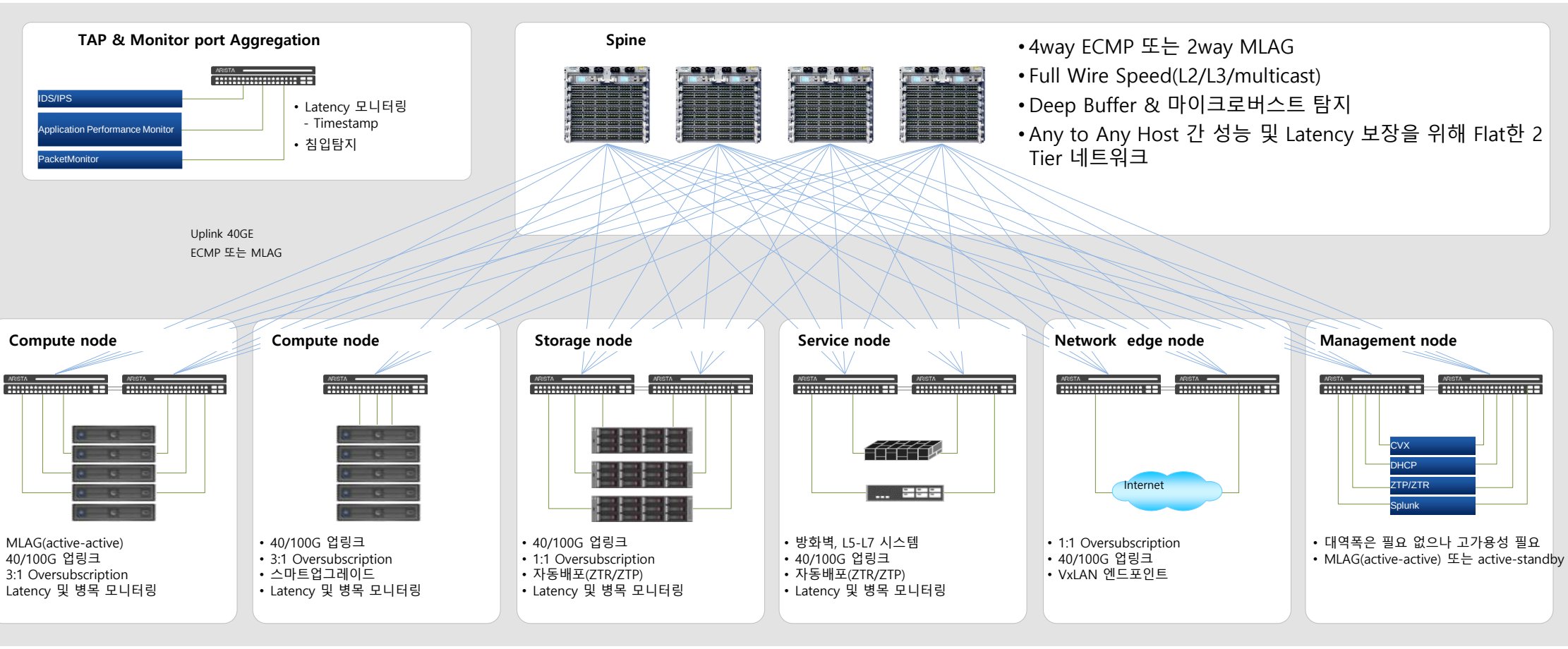
네트워크 구축 및 운영 자동화 및 가시성 확보



- 네트워크 구축/ 확장 자동화
- 설정 변경 자동화 및 추적 기능
- 전반적인 네트워크 작업 스냅샷 및 롤백 기능
- 망 상태 분석 및 가시성 확대

ARISTA

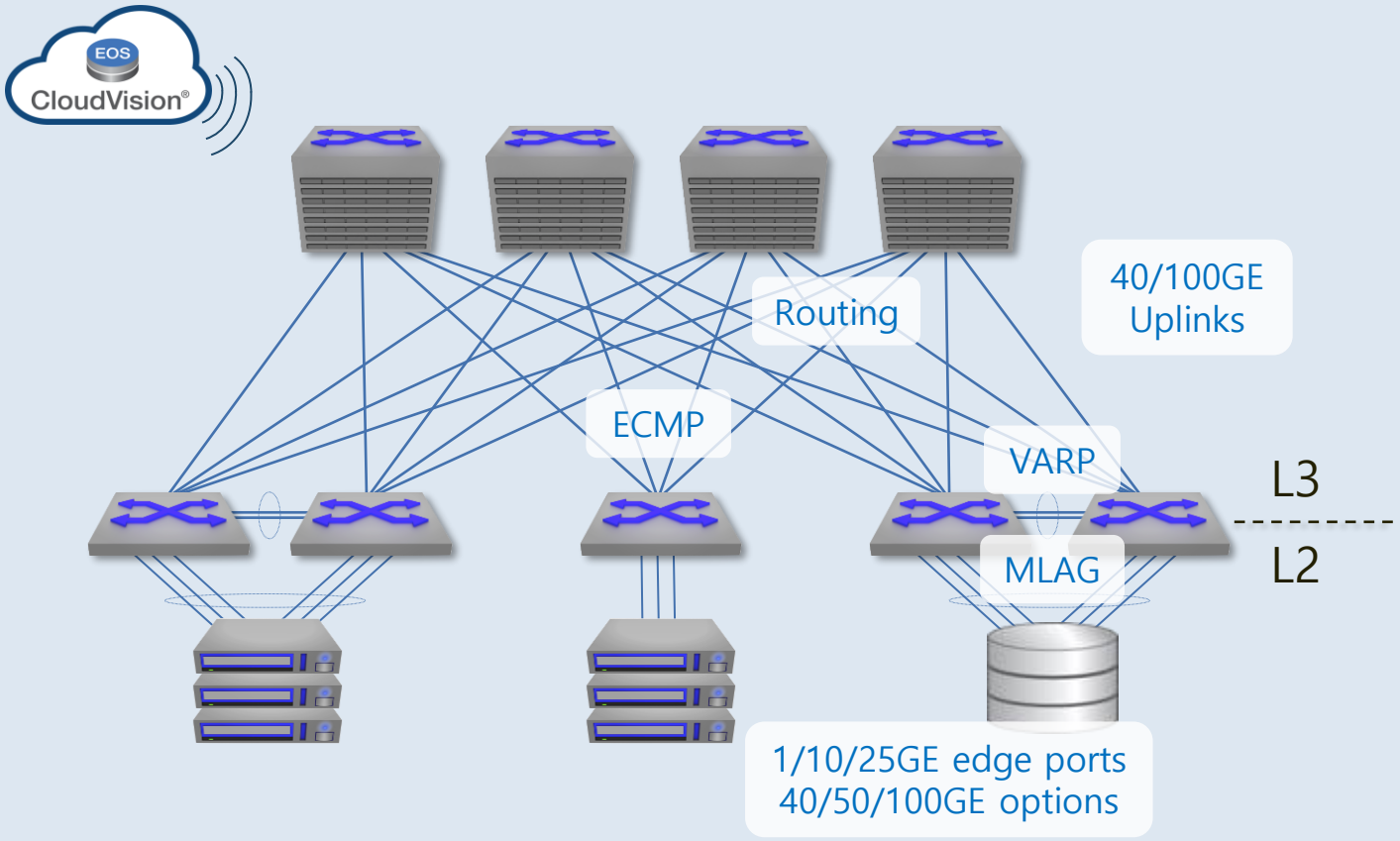
Architecture



Flat 구조의 단순한 네트워크 및 서비스 구성 → 인프라의 확장성 및 운용의 효율성 증가

업 링크는 100G로 구성, 서버 간 MLAG 구성 → 네트워크 가용성 확보

표준 아키텍처 수립 후 네트워크 구축을 자동화 → 운영작업 단순 화 및 장애 요소 최소화



- IP Routed fabric
- “N-way” Spine
- All links active (ECMP)
- Default gateway @ Leaf (VARP)
- Active-Active L2 homing @ Leaf (MLAG)
- MAC & ARP state constrained to Leaf
- Overlays for L2 services (if required)

표준 기반의 개방형 분산 처리 SDN 네트워크를 통해 대용량 트래픽에 대한 효율적인 처리 방안 제공

Controller Model

NSX OVSDB

vmware

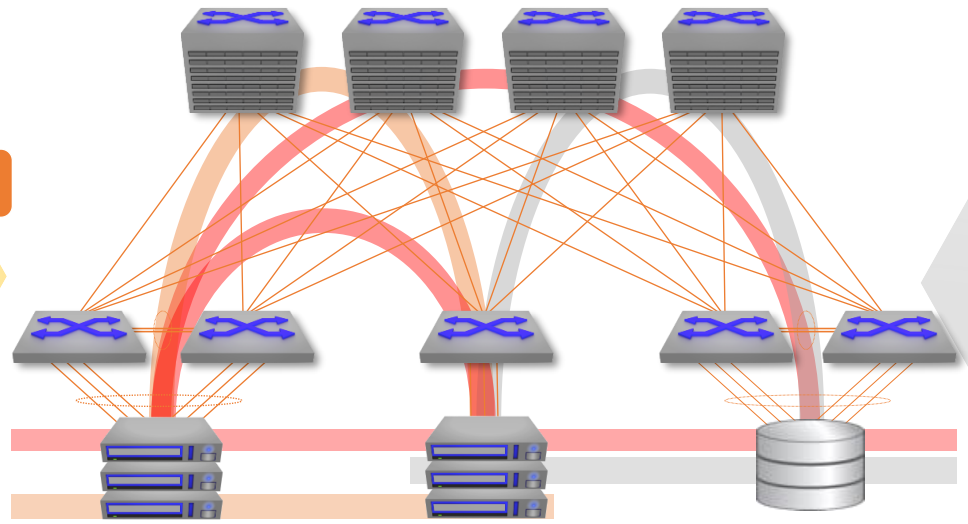
ML2 Plugin

openstack

nuagenetworks

OVSDB

EOS CloudVision eXchange



Controller-less Model

IP Multicast interop

EVPN

MP-BGP

Head End Replication (HER)

EOS CloudVision eXchange

HER with CloudVision eXchange (CVX)

- Local learnt MACs and VNI binding published to CVX
- CVX dynamically distributes state to remote VTEPs
- Support for Third-party VTEP(s)
- Dynamic MAC distribution, automated flood-list provisioning
- HA Cluster support for resiliency

IP Multicast Control Plane

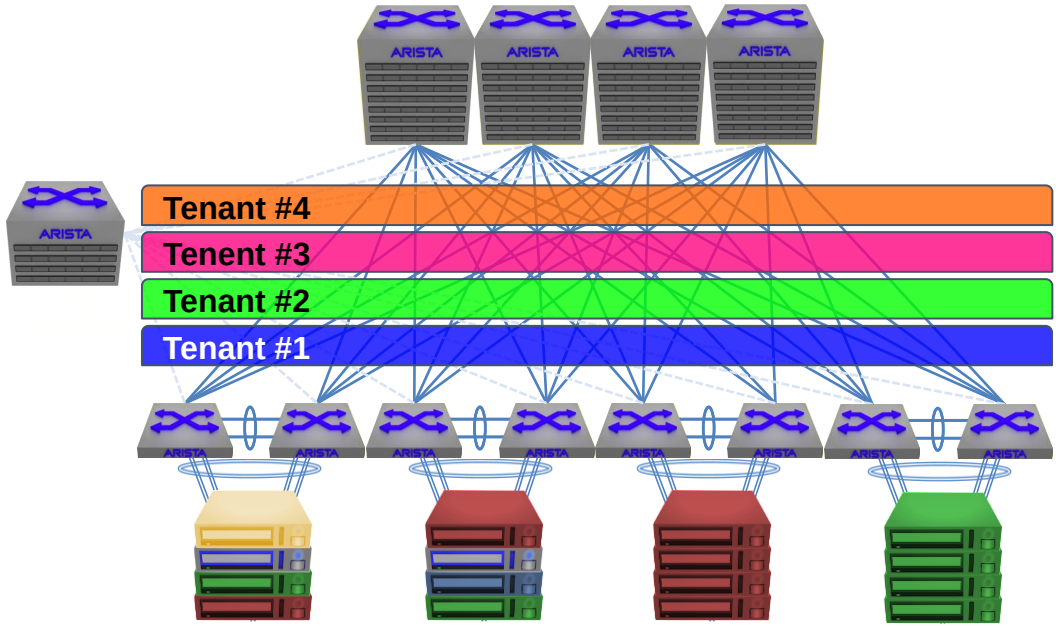
- VTEP join an associated IP multicast group (s) for the VNI(s)
- Unknown unicasts forwarded to VTEPs in the VNIs via IP multicast
- Support for Third-party VTEP(s)
- Flood and learn and requires IP multicast support – limited deployments

Head End Replication (HER)

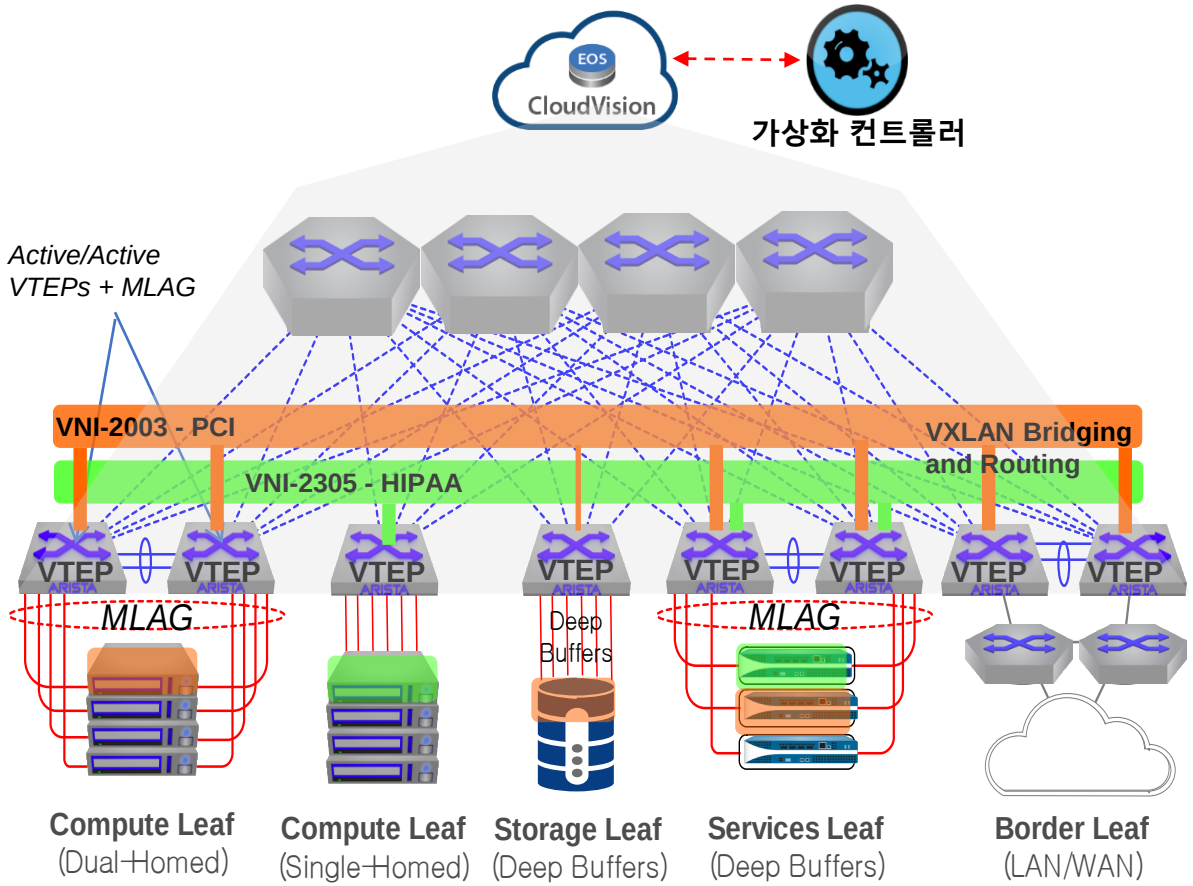
- BUM traffic replicated to each remote VTEPs in the VNIs
- Replication carried out on the ingress VTEP.
- Support for Third-party VTEP(s)
- MAC learning still via flood and learn but no requirement for IP multicast

EVPN Model

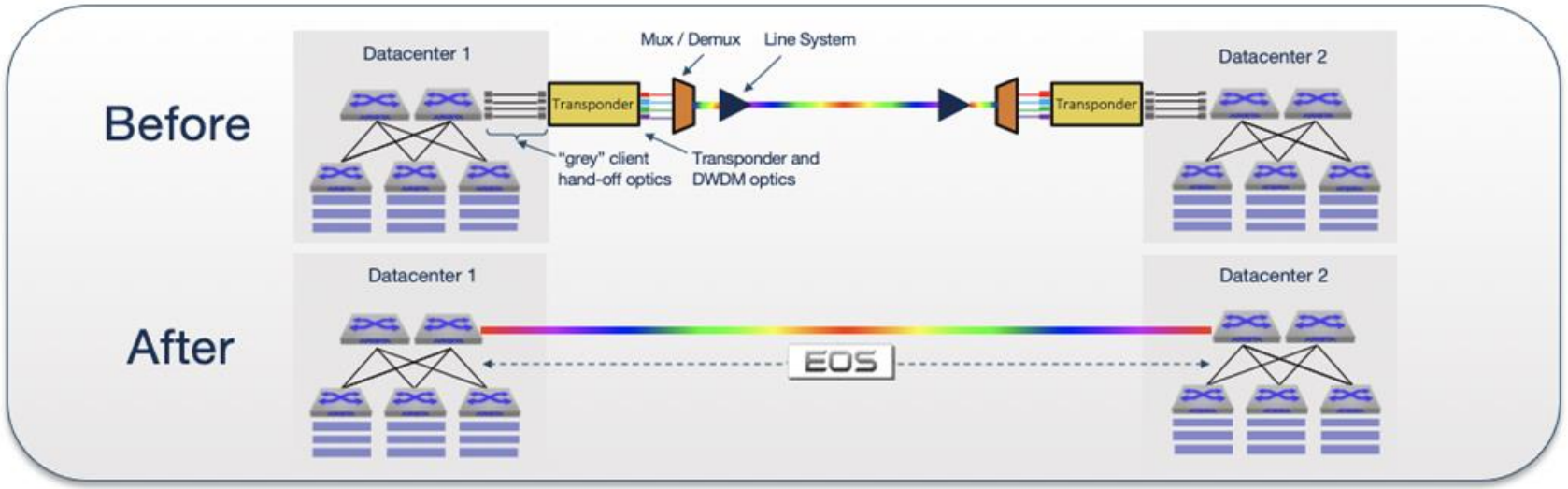
- BGP used to distribute local MAC address and MAC/IP bindings to VTEPs
- Broadcast traffic handled via IP multicast or HER models
- Dynamic MAC distribution and VNI learning, configuration can be BGP intensive
- Support for Third-party VTEP(s)
- Operates outside the CVX model



- 논리적인 망 분리 및 서비스 확장 기술 → VXLAN/EVPN
  - 서비스별 고객별 논리적인 망 분리 : EVPN 기술 적용
  - Rack간 이동에도 동일한 네트워크/서브넷 환경 유지 : VXLAN 기술
  - CloudVion기반으로 아리스타를 이용한 유연성 있는 적용 기술 제공



VXLAN + EVPN IPv4 기반기술을 통해 자유로운 이동 환경 및 멀티 테넌트 환경 제공



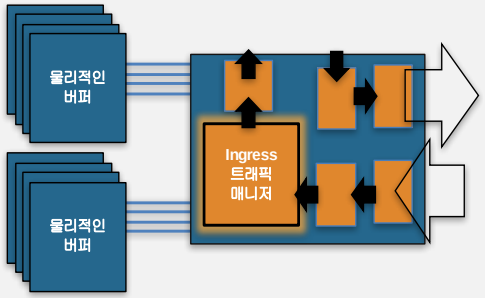
DWDM 솔루션을 통해 Remote backup 및 DR 서비스 연동 등 효율적인 구성 방안 제공

딥버퍼
관련 기술

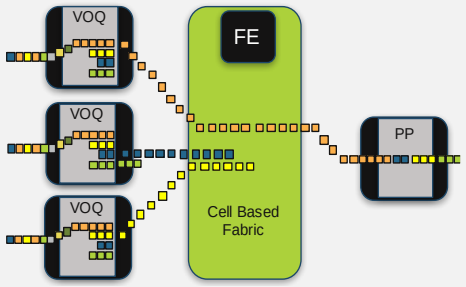
VOQ 아키텍처

- 버퍼를 최적화하는 VOQ 기술

버퍼 구조

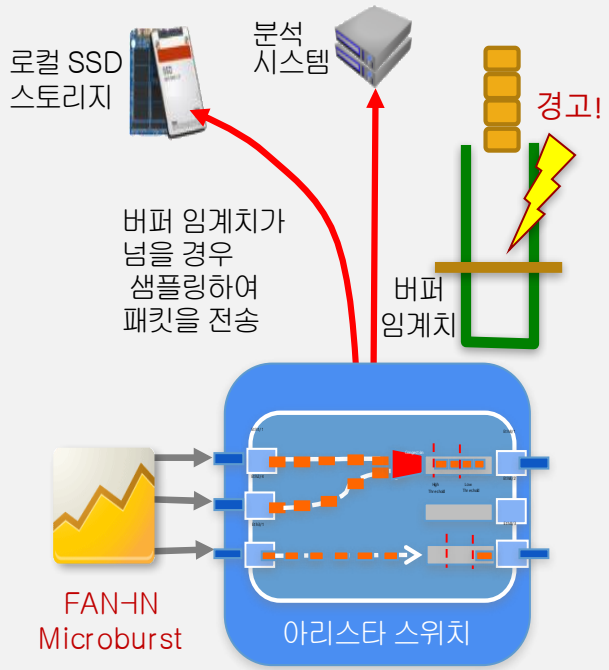


VOQ 동작 개념



실시간 버퍼 모니터링

- 버퍼 사용량을 nano sec로 관리
- 임계치 기반 관리 기능 제공



버퍼 텔레메트리

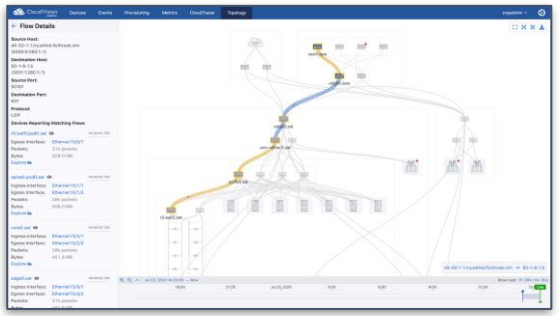
- 실시간/이벤트 기반 텔레메트리
- 텔레메트리를 이용하여 전체 망의 중앙 집중 모니터링

리얼타임 이벤트 감지

상세 버퍼 감시

중앙 관리 및
실시간 텔레메트리 모니터링

중앙 관리 및 실시간 텔레메트리 모니터링



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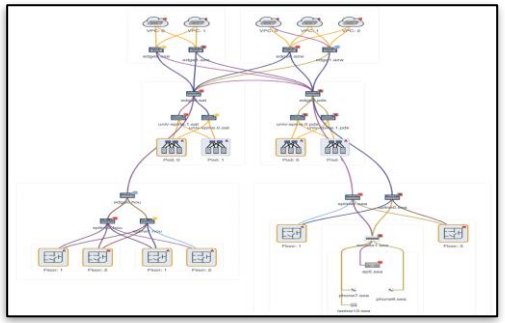

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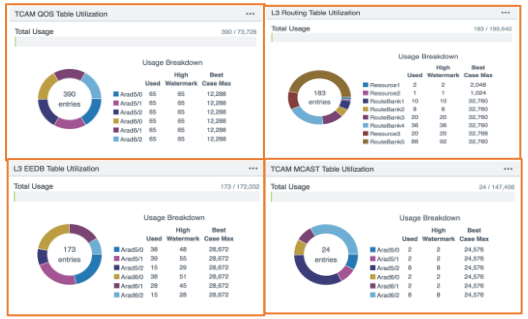
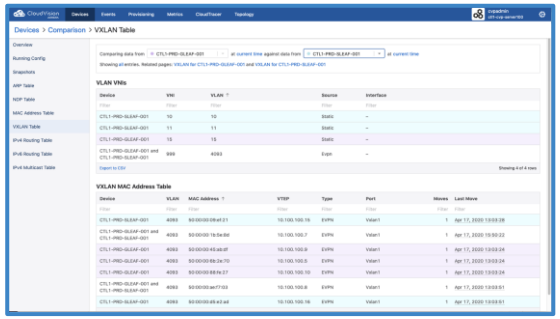
<VXLAN 토폴로지 기능>



<하드웨어 리소스 확인>



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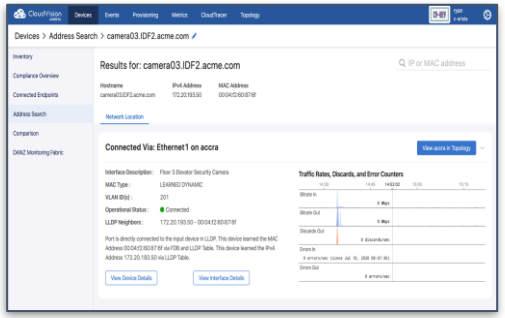

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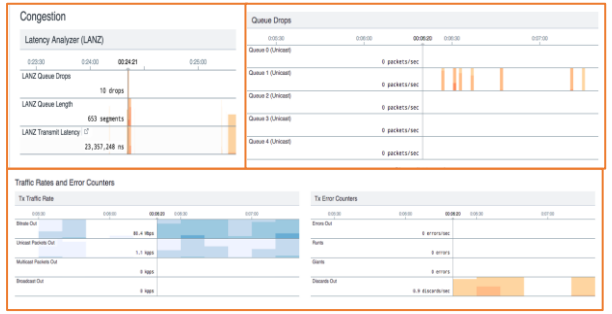

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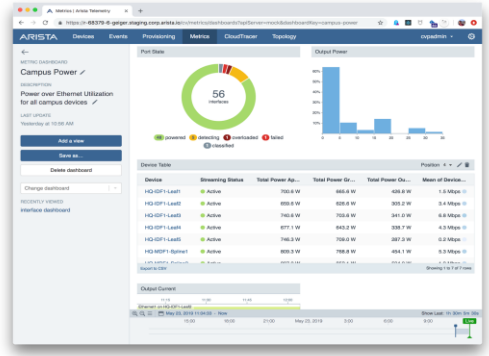
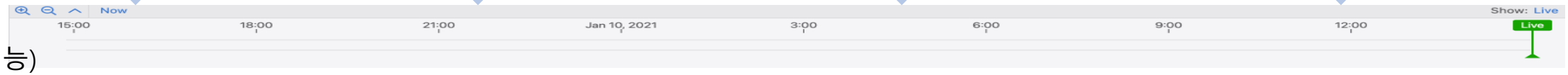


<POE 관리 기능>

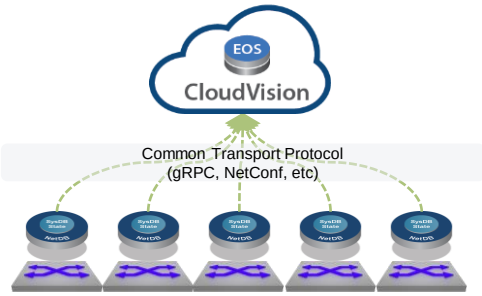
Time Slide

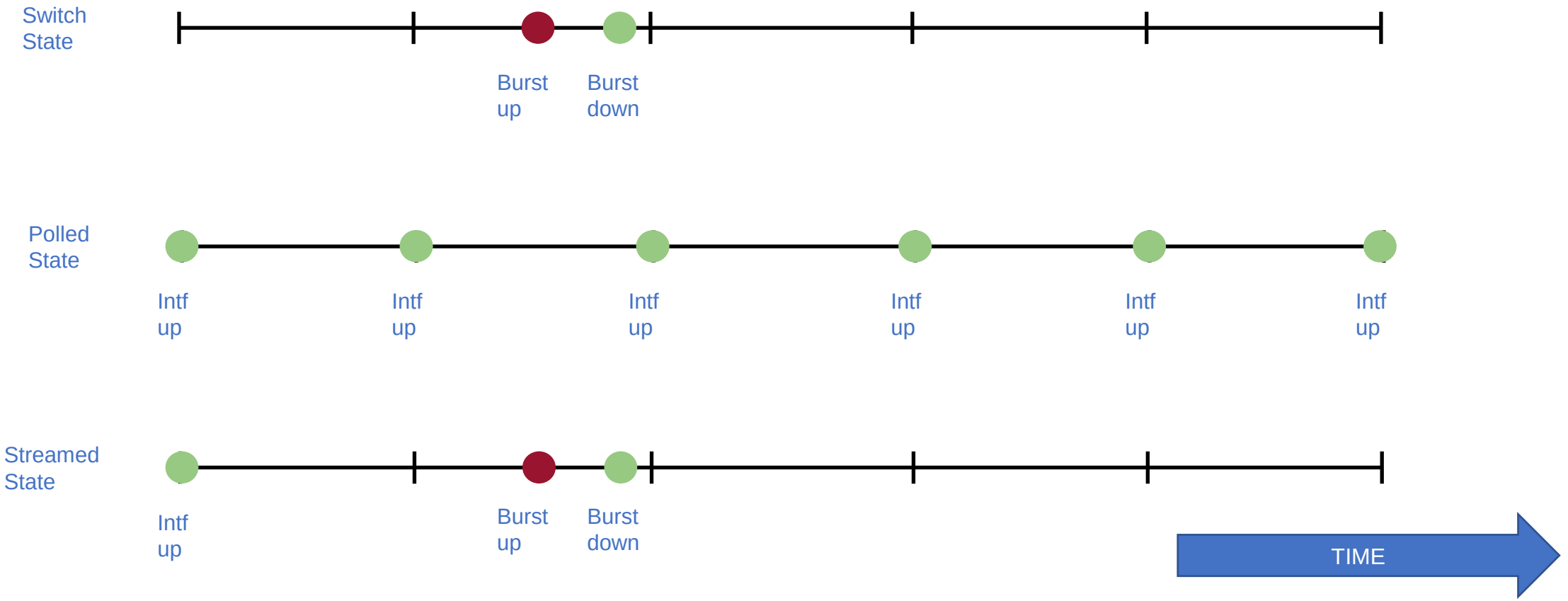
(히스토리 추적 기능)



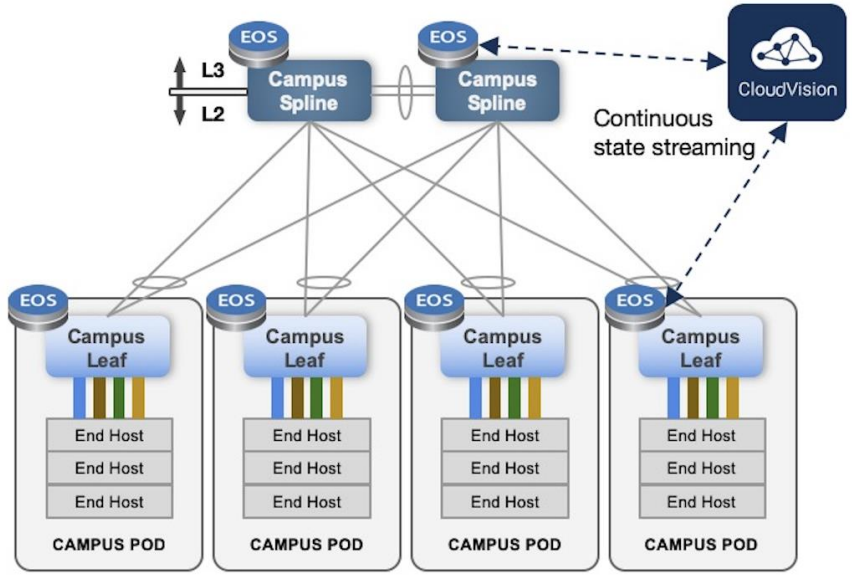
텔레메트리 기반의 실시간 모니터링을 통해 단말 및 네트워크 인프라 및 앤드포인트 의 모든 현황 정보에 대한 가시성 제공
히스토리 추적 기능을 통해 과거 특정 시점의 데이타에 대한 확인 및 비교가 가능한 시점 별 비교 데이타 제공

Polling Data == Missing Data



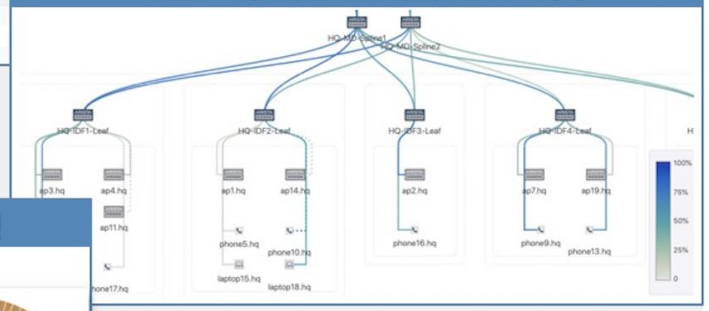


평상시, 네트워크 정상시 관리

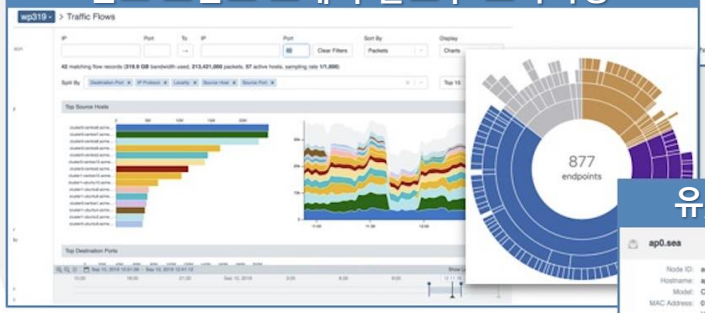


실시간 POE 사용량 관리

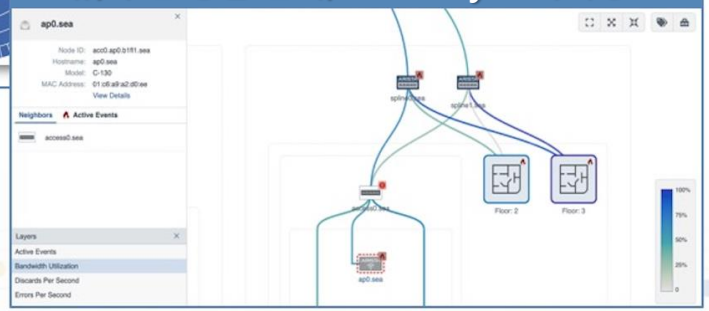
토폴로지 기반 트래픽 경로 제공



엔드 포인트 트래픽 플로우 모니터링



유/무선 통합 관리, 3rd Party 모니터링



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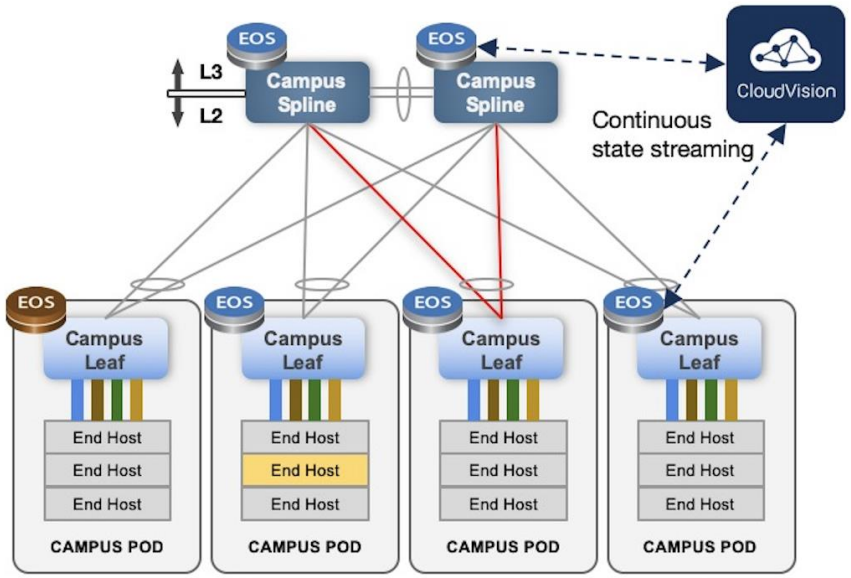
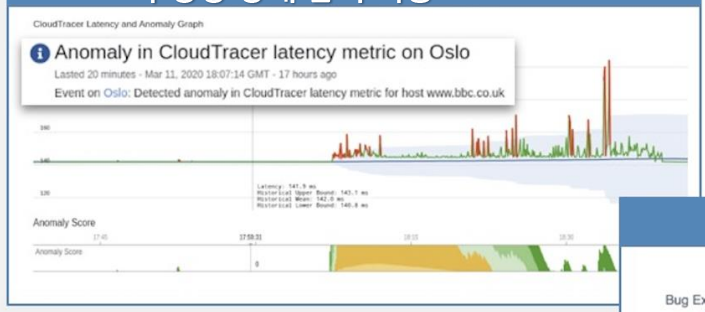
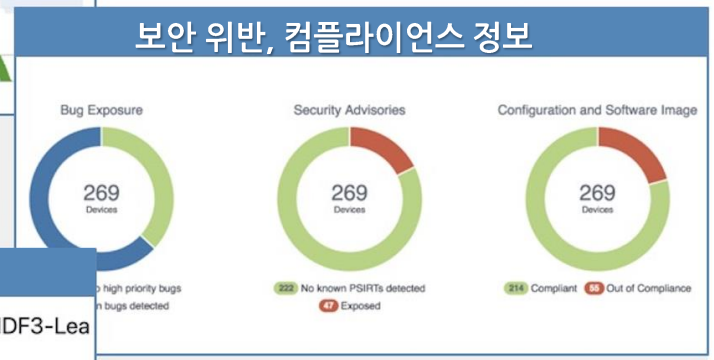
선제적, 사전 예방



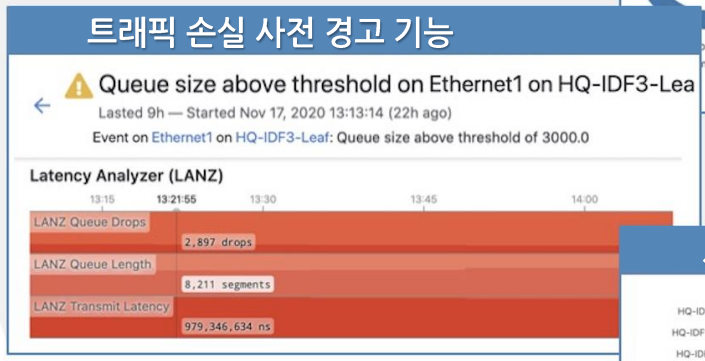
비 정상 상태 감지 기능



보안 위반, 컴플라이언스 정보



트래픽 손실 사전 경고 기능



사용자 품질 모니터링

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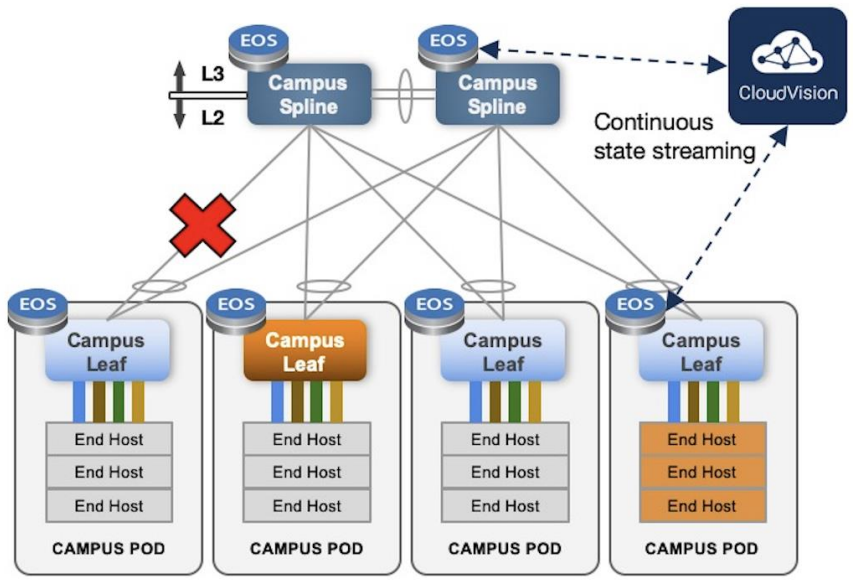
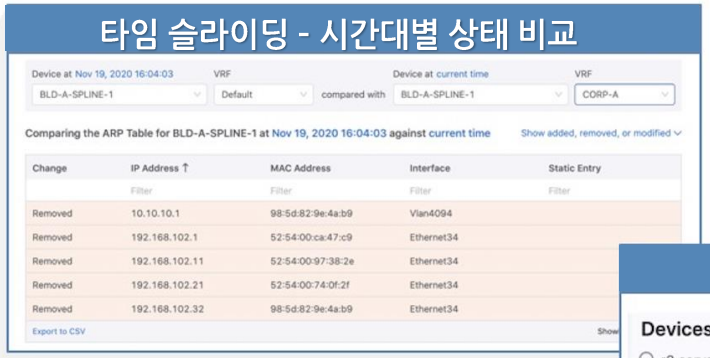
빠른 원인 규명 및 조치 방안



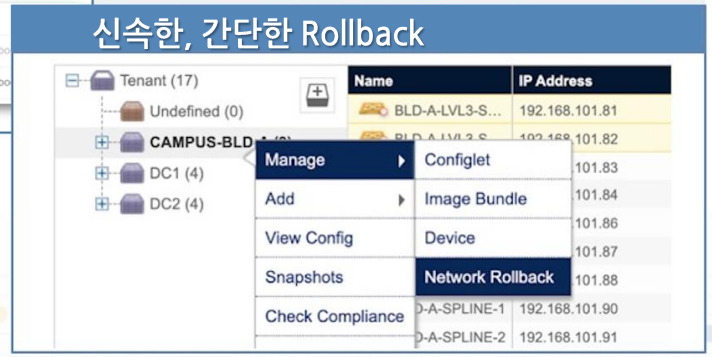
타임 슬라이딩 - 시간대별 상태 비교



엔드 포인트 조회 기능

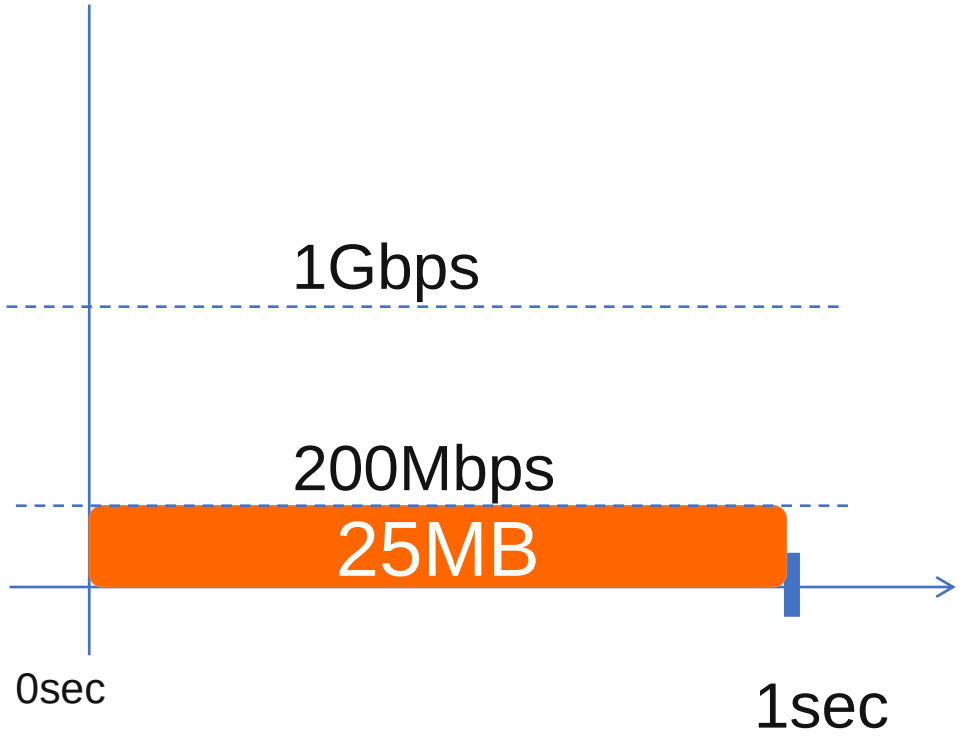
Hitless OS 업그레이드

신속한, 간단한 Rollback

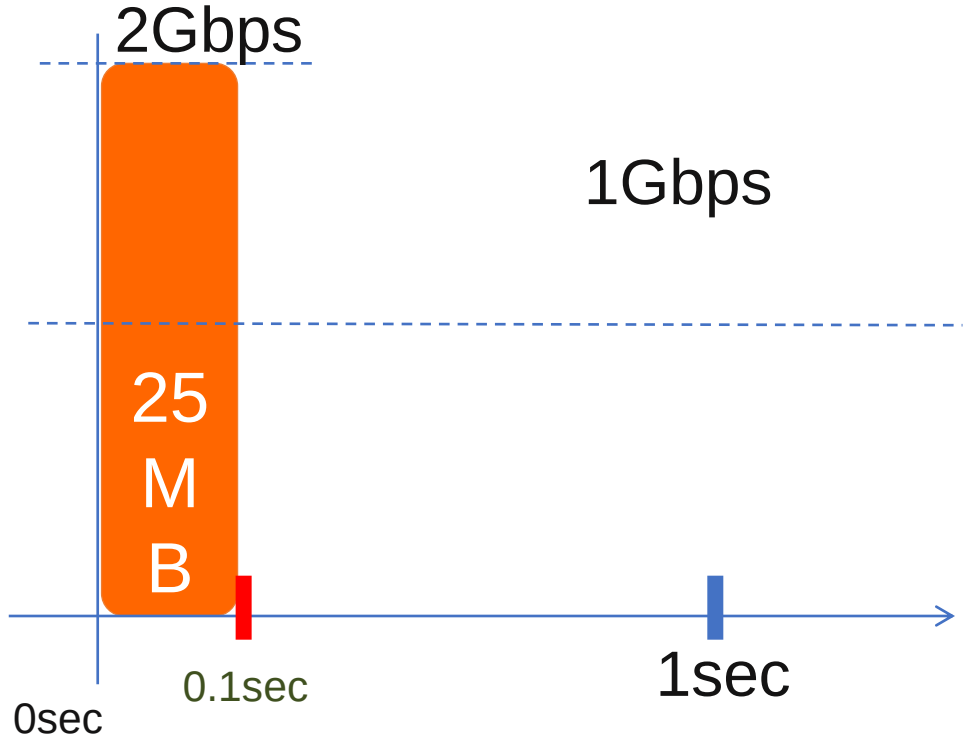


CloudVision

아리스타 Deep Buffer & VOQ 솔루션

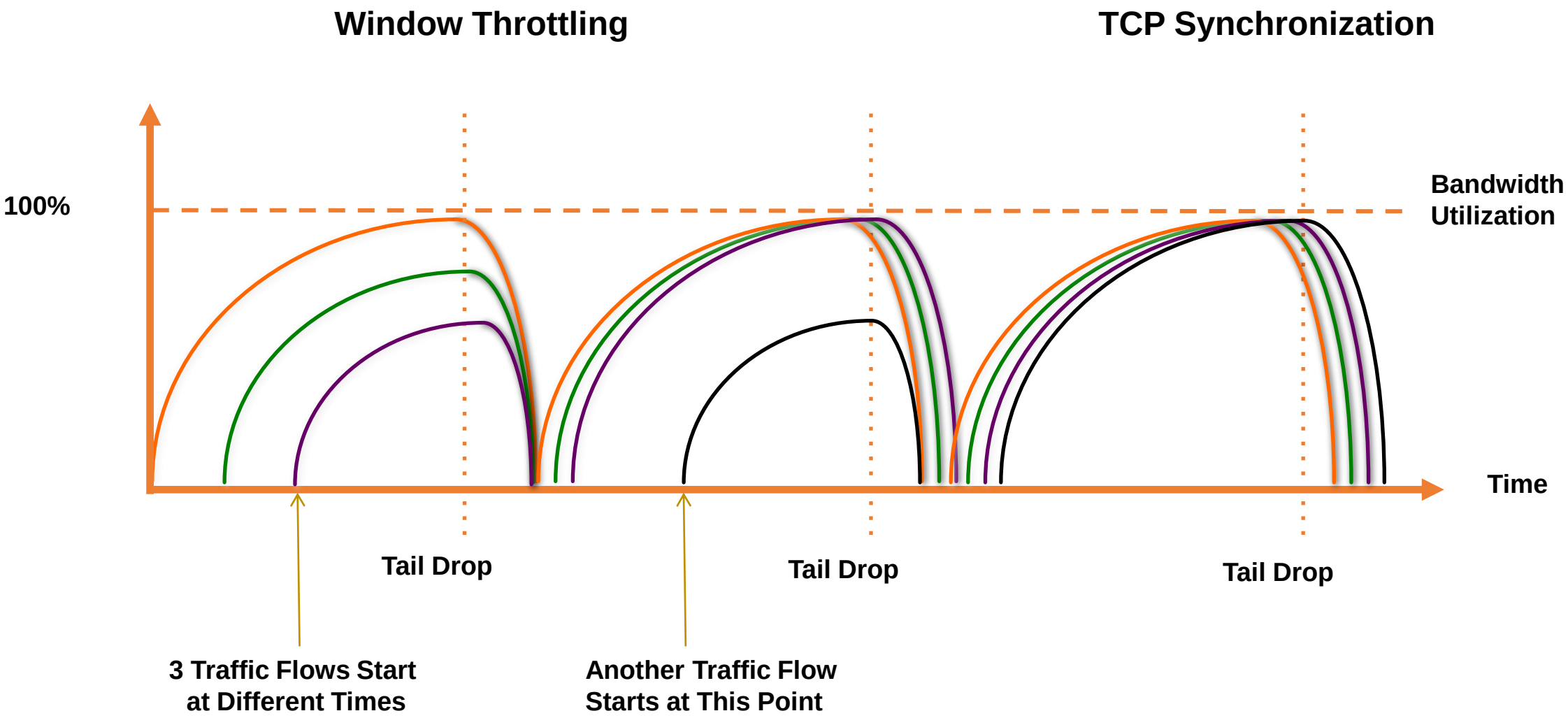


25MB x 8 = 200Mbit /1s = 200Mbps



25MB x 8 = 200Mbit /0.1s = 2000Mbps

같은 크기를 전송해도 짧은 기간에 전송하게 되면 Microburst가 될 수 있음


Window Throttling
TCP Synchronization
100%
Bandwidth Utilization
Time
Tail Drop
Tail Drop
Tail Drop
3 Traffic Flows Start at Different Times
Another Traffic Flow Starts at This Point

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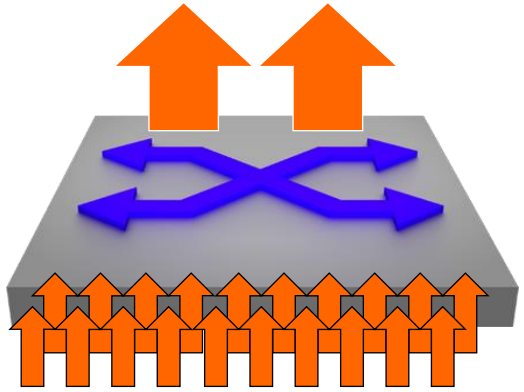
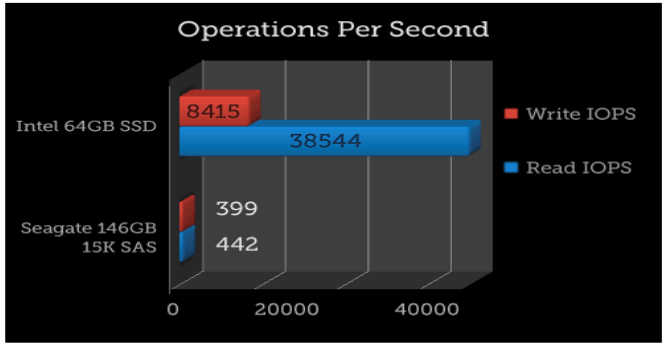


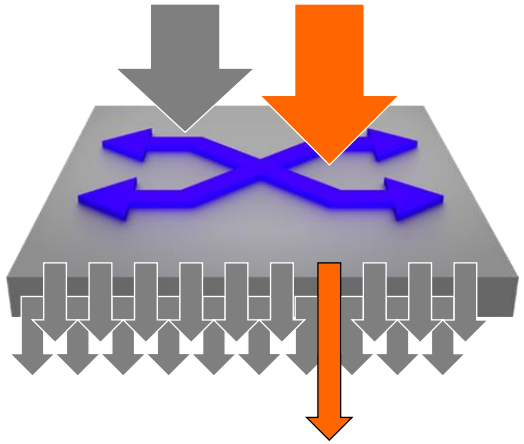


Modern Storage Connectivity

10-100x higher performance than traditional disk storage

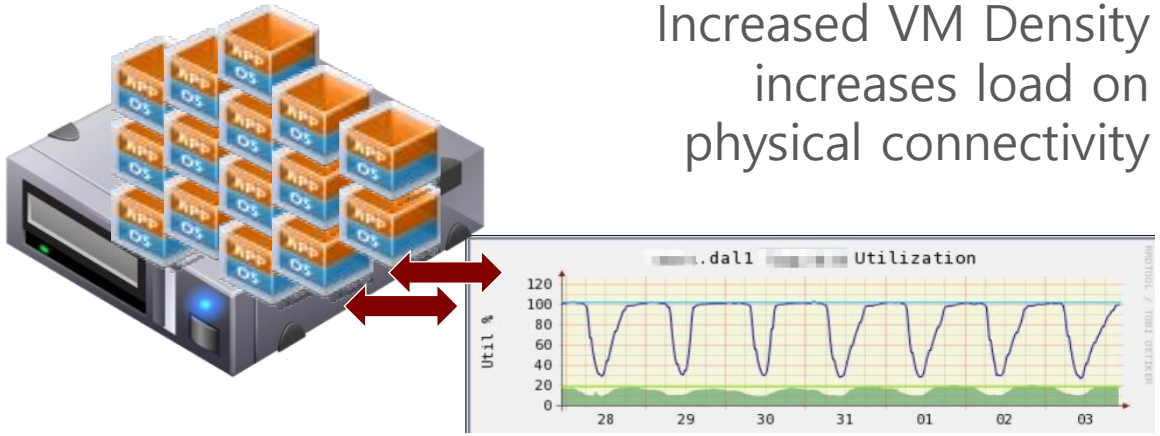
Incast (Many to Fewer)

Speed Change (Faster to Slower)



Modern Server Connectivity

Increased VM Density increases load on physical connectivity



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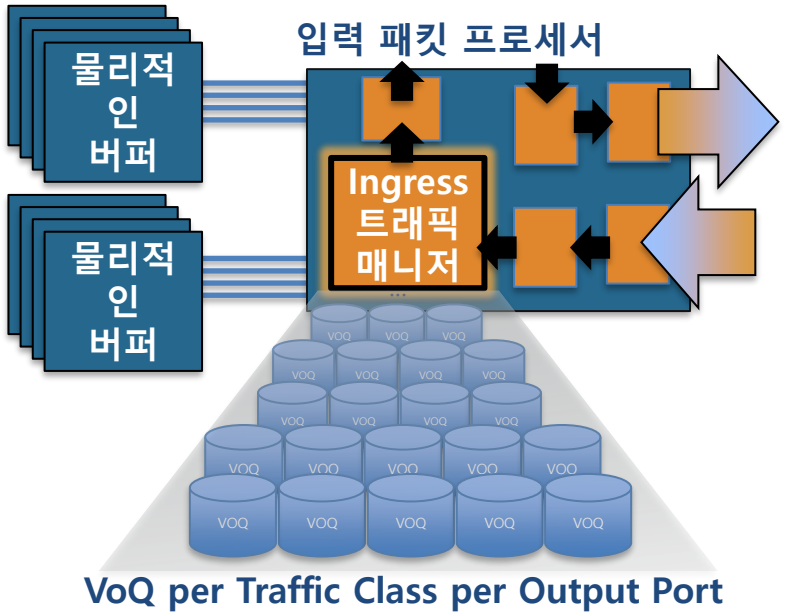
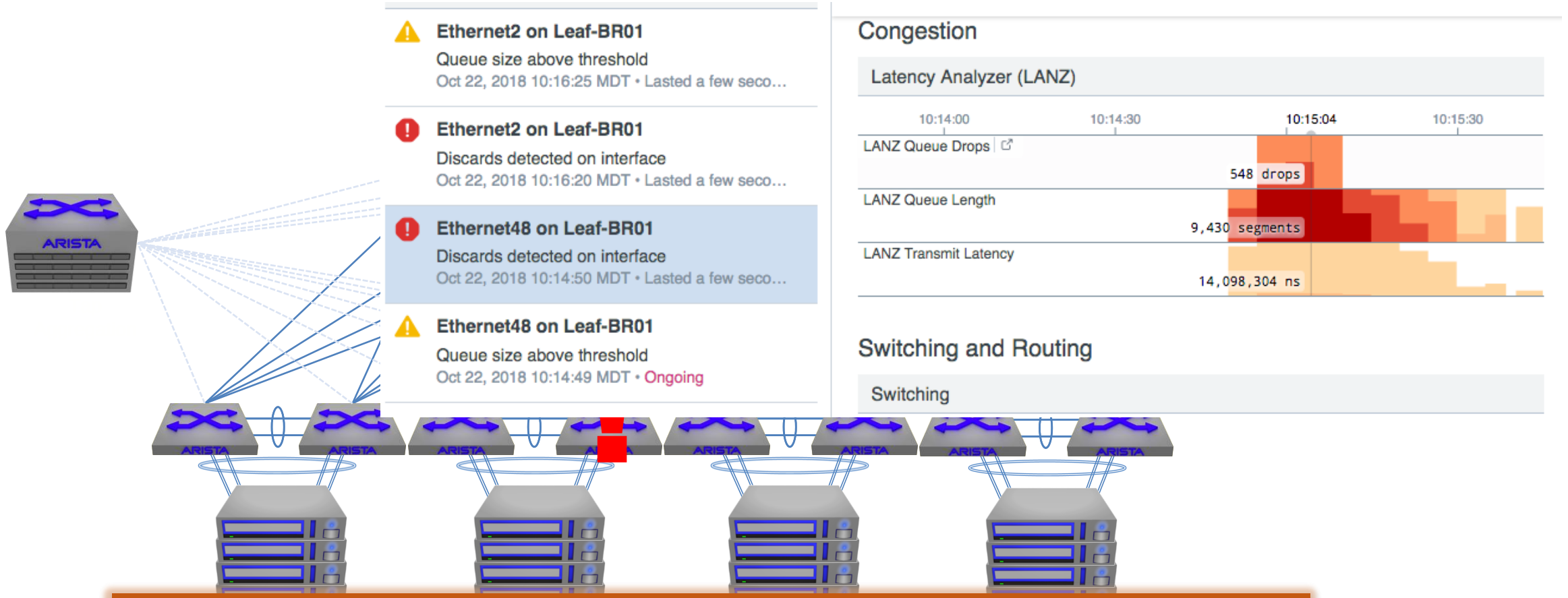
업무 트래픽에 직적 영향을 주는 HOL(Head of Line Blocking) 이슈

HOL(Head of Line Blocking) 이슈를 완화하기 위한 VOQ(Virtual Output Queue) 아키텍처

아리스타 스위치의 Big Buffer & VOQ 아키텍처





- IP Storage Systems 의 성능 감소에 대한 정확한 실시간 모니터링 제공
- 스위치 상의 Queue depths and buffer drops 정보 실시간 제공
- 버퍼 모니터링을 통해 네트워크 인프라에 대한 사전 상태 확인 및 대응

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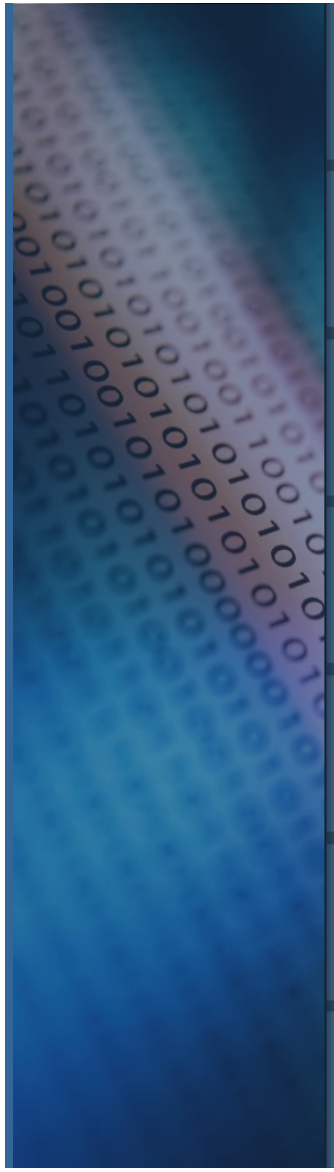

1. 클라우드/대형 데이터센터를 위한 혁신 기술 제공
2. HPC/빅데이터와 같은 대용량, 고성능 인프라 서비스 제공
3. 모든 라인 업에서 단일 이미지를 이용한 운영 위험성 최소화
4. 고 성능, 고 밀도 10GE/25GE/40GE/50GE/100GE 확장성
5. 데이터센터 최적화를 위한 전 포트 Wire-rate 제공
6. 획기적인 클라우드 서비스 자동화/관리 편리성 제공
7. 빅 버퍼 스위치를 통한 네트워크 안정성 확보

Thank You

ABLESTOR
Dynamic Value Creator

ABLECLOUD
All about data & cloud