



SONiC 기반 데이터센터 네트워크 자동화

—

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Software for Open Networking in the Cloud

여러 공급 업체의 스위치 및 ASIC에서 실행되는
Microsoft에서 개발한 Linux 기반의 오픈 소스
네트워크 운영 체제

- 원래는 Microsoft의 Azure 클라우드 플랫폼에서 네트워킹을 운영하기 위해 개발
- 2016년에 Microsoft는 오픈 컴퓨팅 프로젝트 (OCP)에 SONiC를 기부
- 현재 Apstra, Arista, Broadcom, Cisco, Dell-EMC, Juniper, nVIDIA 등을 포함하여 50 개 이상의 참여 회원사

- 궁극적인 오픈 소스 NOS
- 하이퍼 스케일 데이터 센터에서 배포 / 운용 중
- 커뮤니티 주도
- 맞춤형 NOS – 유연성이 높음
- 스위치 벤더 종속 제거
- 완벽한 제어 가능... 그리고 무료

Juniper Jumps Aboard SONiC Train



Matt Kapko | Editor

March 7, 2020 2:27 AM

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The Latest Arista Networks News

Product and Solution Information, Press Releases, Announcements

Arista Extends Open Cloud Networking Software Leadership

Posted: Tue May 05, 2020 03:34:32 PM

ARISTA

Continued Partnership with Microsoft for Open Networking with SONiC

SANTA CLARA, Calif., May 5, 2020 -- Arista Networks (NYSE:ANET) today strengthened its partnership with Microsoft to support the continued growth of SONiC (Software for Open Networking in the Cloud). Enabled by a strategic alliance between the two companies, Arista will now pre-load SONiC software on Arista switching platforms, combining the benefits of both technologies.

"This latest initiative is another proof point of the continued long-term partnership between Arista and Microsoft," said Dave Maltz, Distinguished Engineer, Microsoft. "Arista has a long history of collaboration and support for open networking with Microsoft, and we are excited to continue this relationship for on-premise enterprise datacenters. We are helping customers realize their vision of hybrid cloud networking," said Dave Maltz, Distinguished Engineer, Microsoft.

"Arista has a long history of collaboration and support for open networking with Microsoft, and we are excited to continue this relationship for on-premise enterprise datacenters. We are helping customers realize their vision of hybrid cloud networking," said Anshul Sadana, Chief Operating Officer, Arista Networks.

Cisco Supports SONiC on 8000 Series Routers



Jessica Lyons Hardcastle | Managing Editor

April 30, 2020 1:39 AM

Share this article:



Dell announces suite of open

13 May 2020

Nick Forrester

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Dell

Dell Technologies has today announced a set of open-source networking solutions designed to simplify the management of data centres at scale.

The solutions, jointly known as Enterprise SONiC Distribution by Dell Technologies, builds on the open-source project Software for Open Networking in the Cloud (SONiC), which was headed by Microsoft.

Partners | Convince your org | Contact | Solution emphasises an approach built on open standards, while at the same time

work through the integration of SONiC into the fabric of Dell's EMC PowerSwitch Open

Port for full-stack solutions with enterprise capabilities, as well as access to previously required extensive internal investment tech support teams.

"A hybrid cloud approach is critical to their success, they struggle to maintain and scale effectively avoid multiple points of failure," says Dell Technologies senior vice president of integrated products and solutions Tom Burns.

"With multiple, containerised components, we are providing enterprises the means to build massive and complex networks and increase availability in a cloud model."

well utilising SONiC's capabilities.

The SONiC Phenomenon

What is it and why does it matter?

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Edgecore Networks Offers Commercial Support and Service for SONiC

Published: Oct 07,2020

HSINCHU, Taiwan - Edgecore Networks today announced the availability of its commercial support and service offering for a hardened, tested, and qualified Enterprise SONiC distribution on Edgecore switch platforms.

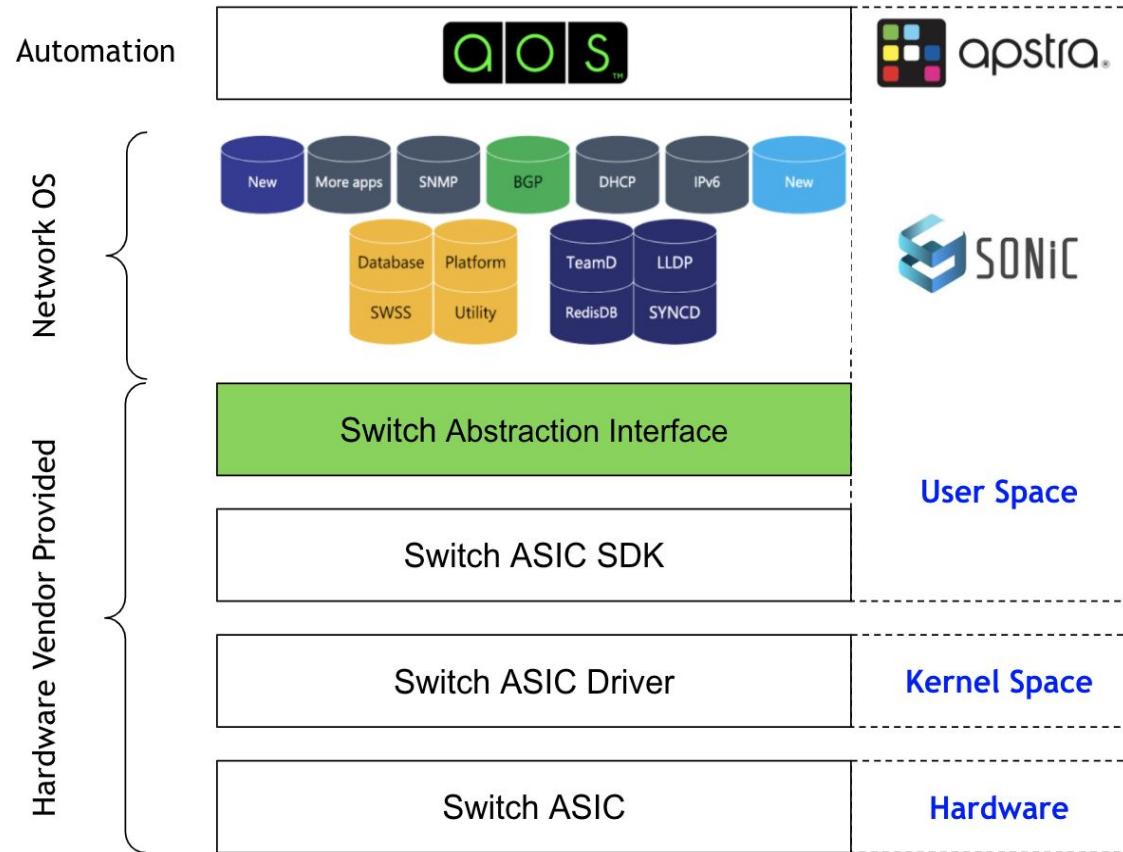
More on This

Edgecore Networks Unveils ecCLOUD – Cloud Controller for Wired and Wireless Devices

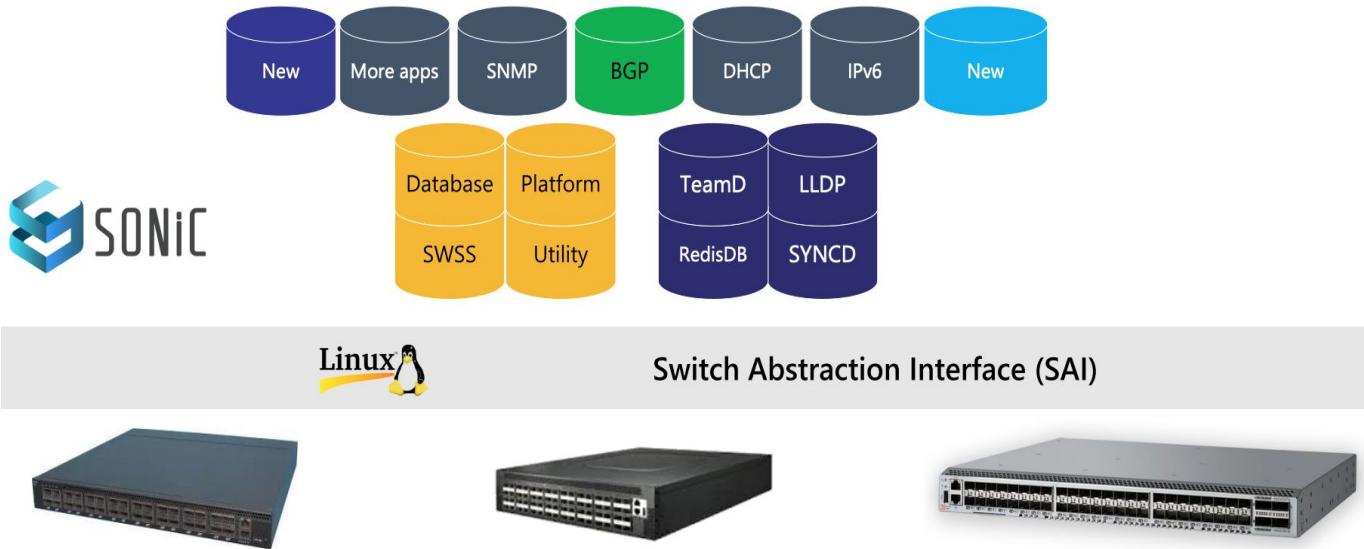
HSINCHU, Taiwan - Edgecore Networks announced a major addition to its product family - ecCLOUD, a comprehensive cloud controller featuring an intuitive user interface...

SONiC (Software for Open Networking in the Cloud) is the open-source network operating system, led by Microsoft and many key players, including Edgecore, which delivers a robust proven software infrastructure enabling customers to deploy highly scalable data center networks. Through the open community, developers around the world continuously contribute to the software development forming a fast-growing ecosystem.

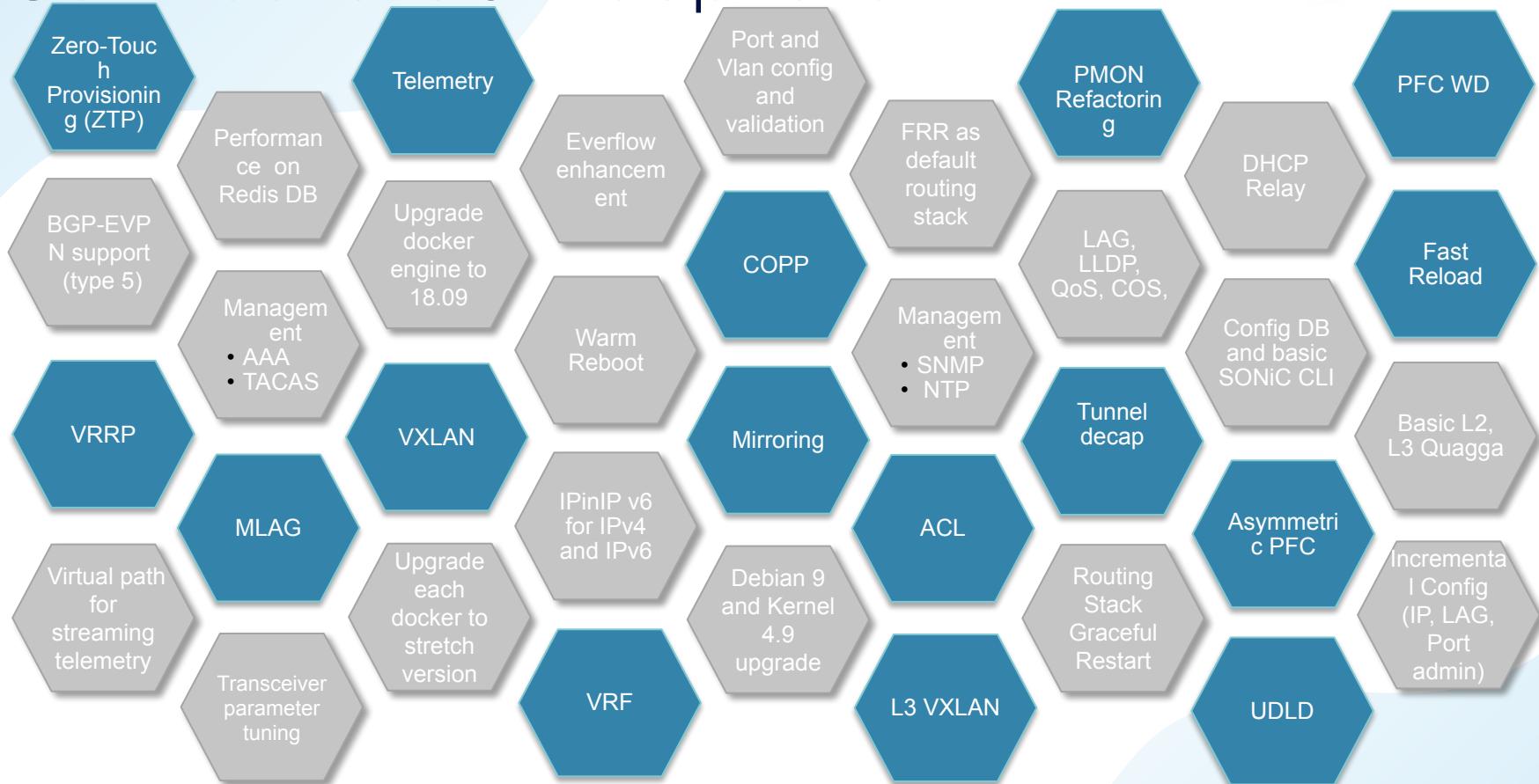
SONiC Architecture



SONiC Architecture



Contributions & Adoptions



Contributions & Adoptions



```
Help: http://azure.github.io/SONiC/
```

```
Last login: Thu Jul  9 03:11:38 2020 from 10.1.252.30
admin@leaf1:~$ docker ps
CONTAINER ID        IMAGE
60cdbec0ece5      docker-snmp-sv2:latest
8ba4cae9f1f0       docker-stp:latest
43aa38243ed8       docker-udld:latest
f4d9b8835bb2       docker-lldp-sv2:latest
4af87a9e2738       docker-tam:latest
5c7976475e15       docker-nat:latest
2448fd24d2d5       docker-sflow:latest
bf8d38353726       docker-sonic-telemetry:latest
18a16aee36cf       docker-router-advertiser:latest
7cf2707b5667       docker-l2mcd:latest
948c34e00be3       docker-dhcp-relay:latest
f453d339c1ea       docker-syncd-brcm-ent-base:latest
a2a6a2bb5c18       docker-iccpd:latest
2eda5fbce248       docker-teamd:latest
8846526c5750       docker-sonic-mgmt-framework:latest
71df117416c2       docker-fpm-frr:latest
9e9c0029d02e       docker-swss-brcm-ent-base:latest
fa468322bfac       docker-vrrp:latest
0a15cab6b00e       docker-broadview:latest
b126e291f56b       docker-platform-monitor:latest
e3985478b850       docker-database:latest
admin@leaf1:~$
```

SONiC management

SONiC management models

- Config_db.json
- Minigraph.xml
- Linux shell
- Python-based SONiC CLI
- FRR (Free Range Routing)
- SNMP(Simple Network Management Protocol)

SONiC Management framework

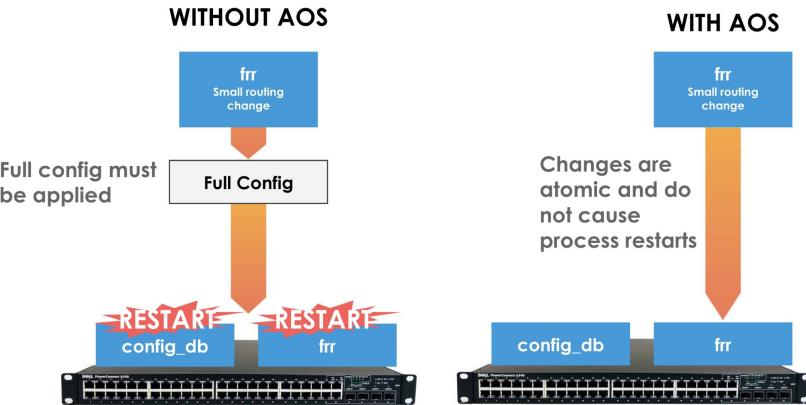
- CLI
- REST
- OpenConfig Yang model
- gRPC Network Management Interface (gNMI)
- gRPC Network Operations Interface (gNOI)

SONiC management Challenges

- 흥미롭고 유연하지만 SONiC를 배포하고 운영하는 데는 문제점
- SONiC 관리 프레임 워크는 사용자에게 개별 장치 수준에서 친숙하고 중앙 집중식 CLI
- 통합되고 안정적이며 자동화 된 방식으로 SONiC 데이터 센터를 운영하는 방식 부재
- 사용자는 동시에 여러 구성 파일과 프로그래밍 인터페이스를 탐색하고 조정
- VXLAN/EVPN, 네트워크 전체 룰백 프로비저닝하는 작업이 규모에 따라 어렵고 기하급수적으로 더 복잡 해짐
- 사용자와 운영자는 JSON 및 Python에 대한 지식 외에도 높은 수준의 Linux 역량 필요

SONiC 개선 필요 사항 제시

- 실시간 상태 파악?
- 변경되는 상황별 분석?
- 새로운 서비스 추가시 VN, VRF 추가/수정이 기존 서비스에 주는 영향은?



라우팅 복원력 (Routing Resilience)

- 라우팅 구성에서 비 라우팅 구성을 분할 할 수 있는 고유 구성 모드 제공
- docker_routing_config_mode를 사용하여 frr.conf의 모든 라우팅 구성과 config_db.json의 비 라우팅 구성을 제어
- frr 구성 변경 사항이 config_db.json에 적용되고 더 방해가 됨
- 엔터프라이즈 수준의 고 가용성 기능을 제공.

설정 추가 (Incremental Configuration)

- 표준 OpenConfig와 SONiC 특정 YANG 모델을 모두 활용
- 라우팅 중단없이 증가되는 구성을 추가
- 경로 추가와 같은 단순한 변경을 포함하여 BGP에 대한 모든 변경이 라우팅 프로세스에 영향 방지

데이터센터 네트워크의 시작점에 서 있는 SONiC

- 레퍼런스 디자인과 표준 설정은?
- 방대한 자동화 및 분석 포트폴리오를 갖춘 경쟁 제품
- 개방형 네트워킹에 대한 전문성 부족
- 장애가 나면 누가 해결하지?

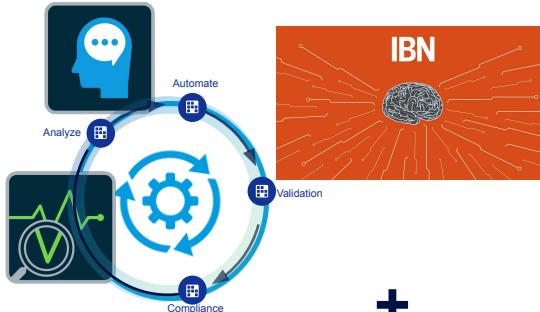


vs.



시작점이지만 동반자와 함께하는 SONiC

- 기존의 네트워크 운영자에게 부담되지 않는 쉬운 운용 방식
- 자동화 및 분석을 갖춘 Turn-key solution 제공
- 네트워크 자동화와 분석을 동시에 제공하는 Intent-Based Network 솔루션



+



vs.

CISCOTM



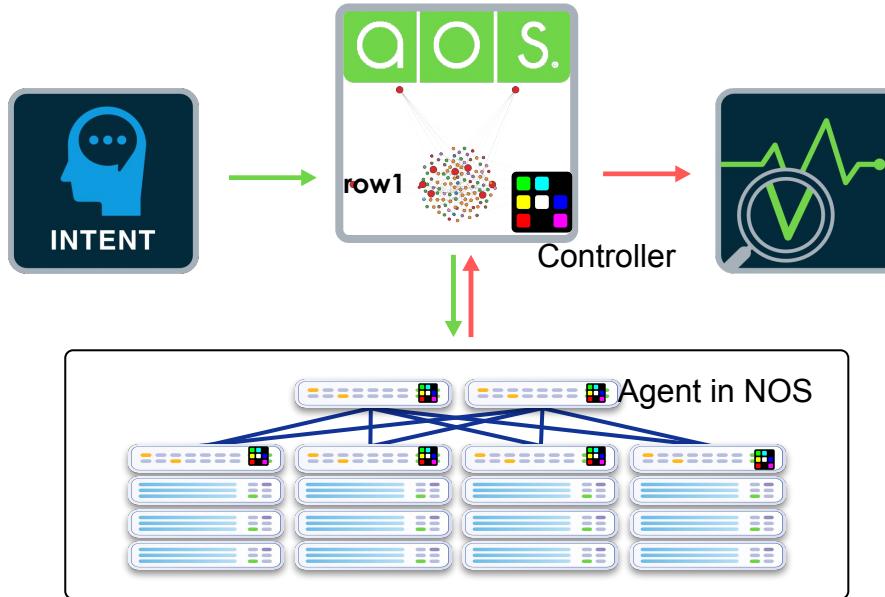
SONiC를 지원하는 서로 다른 플랫폼



<https://azure.github.io/SONiC/Supported-Devices-and-Platforms.html>

Apstra AOS®

Intent-Based • Closed-Loop • Multi-Vendor



ARISTA

CISCO™

JUNIPER
NETWORKS

NVIDIA®

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NETWORKS

CUMULUS

SONiC

네트워킹 업계 리더로 구성된 경영진



David Cheriton
Founder, Investor, CEO



Mansour Karam
President & Founder



Jeff Jones
VP, Global Sales



Sasha Ratkovic
CTO & Founder



Sean Hafeez
VP, Product Management



Herb Schneider
VP, Engineering

apstra의 강점

Networking & Distributed Systems

데이터 센터 네트워킹 및 분산 시스템에 대한
50년 이상의 경험

Automation and Abstraction

벤더 디바이스 및 아키텍처 전반에 걸쳐 확장이
가능하고 일관되게 관리되도록 설계된 플랫폼

Headquartered in California, USA
Founded in 2014

Arista, Juniper Networks, VMware, BigSwitch 및 Extreme Networks와 같은 회사에서 광범위한 경험을 제공

최고 전문가 Livestream

Between 0x2 Nerds

This weeks topic:

EVPN: Exploring Route Types



Jeff Tantsura



Thursday 12:15 PM EST



Jeff Doyle

Datatracker Groups Documents Meetings Other User

Roles

Chair of Routing Area Working Group (rtgwg)

Chair of Routing In Fat Trees (rtft) Cited by 1 REC

Member of Internet Architecture Board (iab)

RFCs (16)

rfc7246 Jun 2014 Multipoint Label Distribution Protocol In-Band Signaling in a Virtual Routing and Forwarding (VRF) Table Context Cited by 1 REC

rfc7438 Jan 2015 Multipoint LDP (mLDP) In-Band Signaling with Wildcards Cited by 1 REC

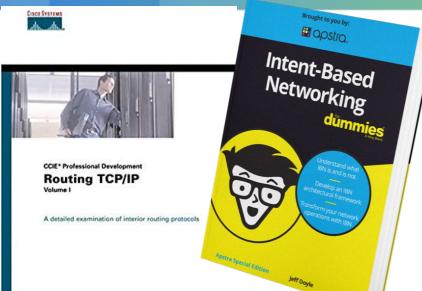
rfc7684 Nov 2015 OSPFv2 Prefix/Link Attribute Advertisement Cited by 9 RECs

rfc7715 Jan 2016 Multipoint LDP (mLDP) Node Protection Cited by 2 RECs

rfc7734 Jan 2016 Encapsulation for Bit Index Explicit Replication (BIER) in MPLS and Non-MPLS Networks Cited by 5 RECs

rfc8320 Feb 2018 LDP Extensions to Support Maximally Redundant Trees Cited by 1 REC

rfc8408 Jul 2018 Conveying Path Setup Type in PCE Communication Protocol (PCEP) Messages Cited by 1 REC



Between 0x2 Nerds - BGP in the Datacenter - ECMP

426 views · Streamed live on Jun 25, 2020

1 like 23 dislike SHARE SAVE

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Jeff and Jeff continue the conversation around BGP in the datacenter and turn their attention to ECMP.

2 Comments SORT BY

Add a public comment...

lifelost1 12 hours ago
Really good tech talk. Many thanks.
REPLY

MTC 1 month ago
How can I get a copy of the slides?
REPLY

네트워크 설계부터 운영 & 모니터링까지

Design & Build

Deploy

Operations

Operations

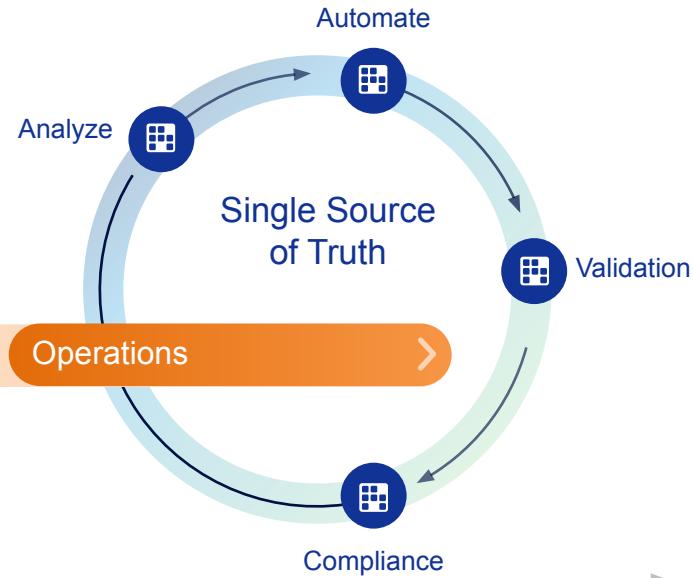
Day 0

- Reference Design
- Pre-validation

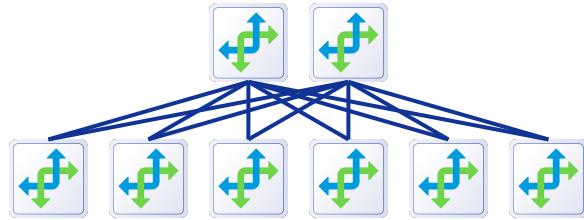
Day 1

- Testing

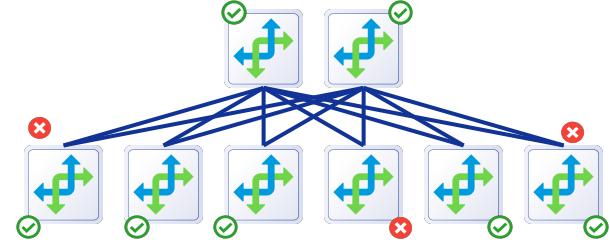
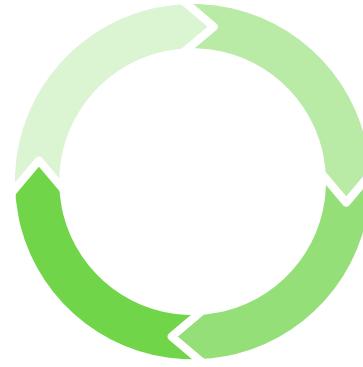
Day 2



Closed-Loop 보장

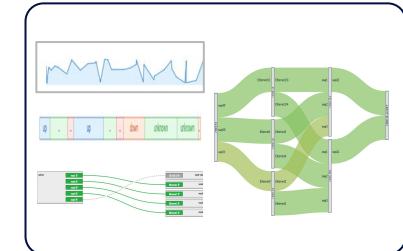


Intended



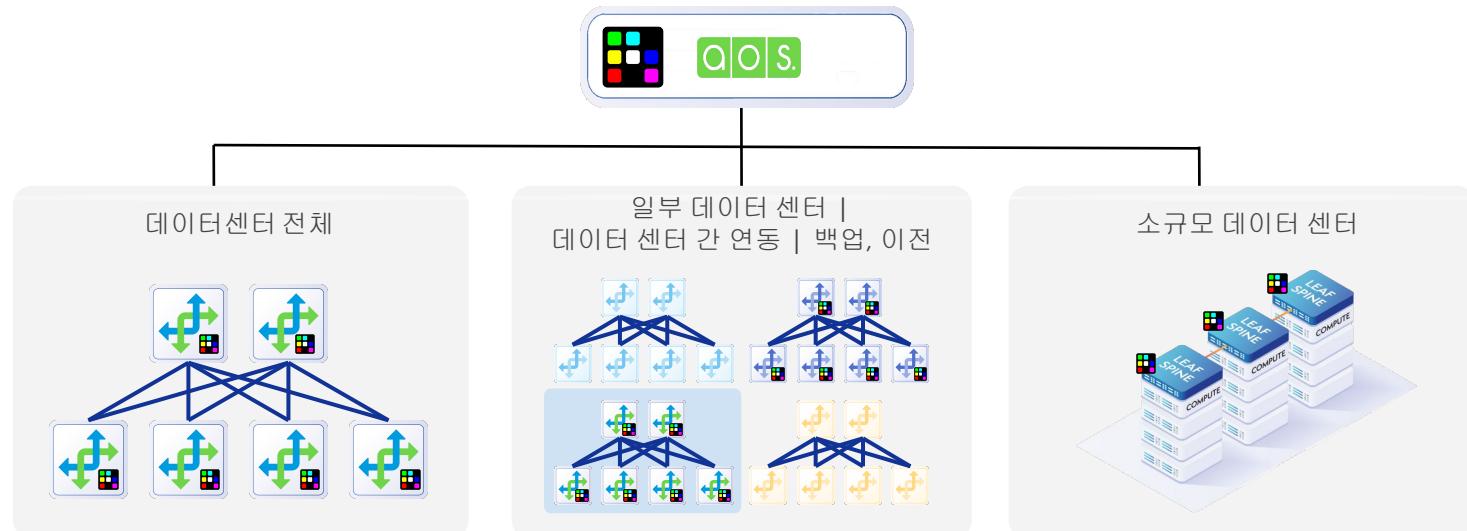
Operational

- 지속적인 실시간 검증
- 구성 및 상태 감시
- 사전 및 사후 조건 검증
- 근본적 원인 및 영향 분석
- 정책 충돌 자동 해결
- 관리, 감독 및 표준 이행

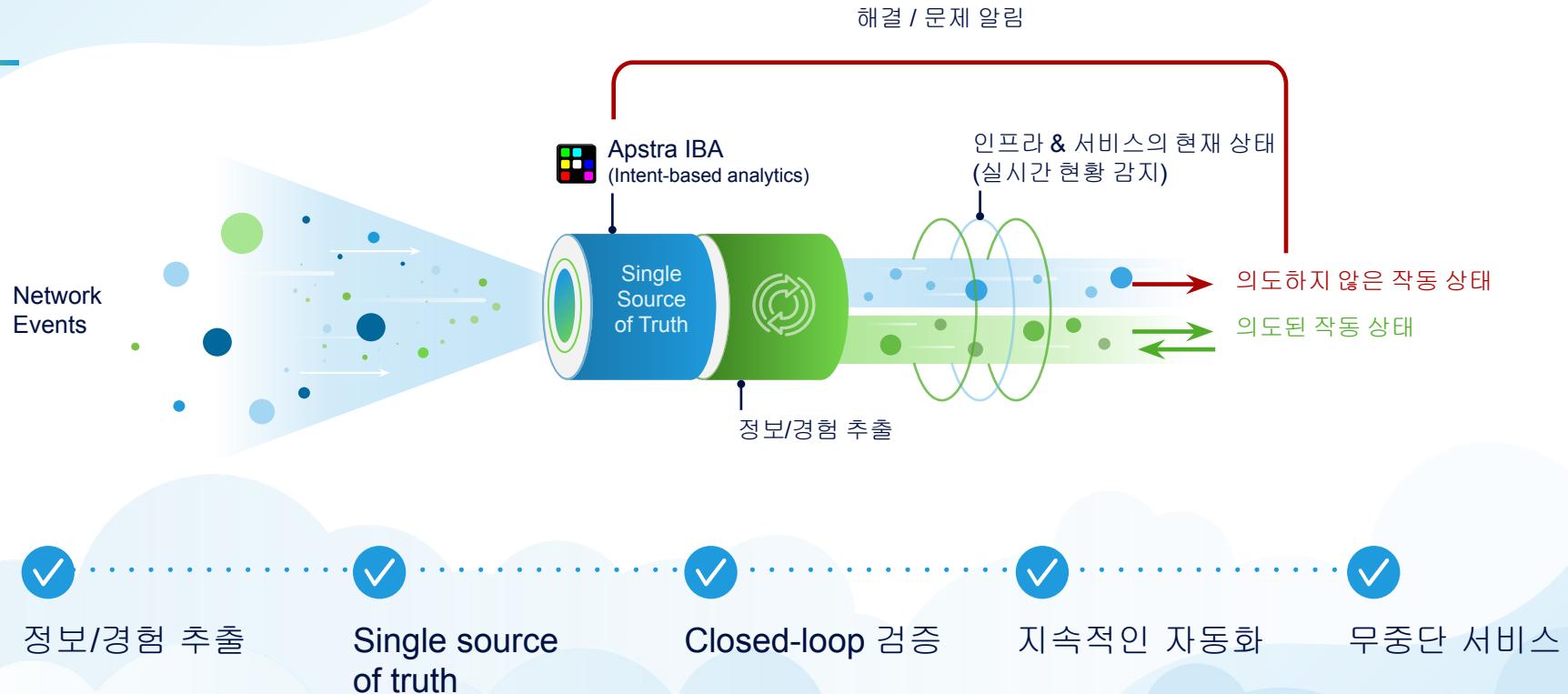


어떤 네트워크 환경에서 Apstra가 유용한가?

- Any BGP based Spine-Leaf Network (IP Clos, IP Fabric, IPv4 & IPv6)
- VXLAN / EVPN Overlay 구성
- 스위치 벤더 종속성 탈피 - C사 기존 Pod에 D사 service leaf 증설, E사 신규 Pod 확장 연동
- 높은 확장성 – 수천여 노드를 연결
- Layer 2,3 Server 연결이 용이

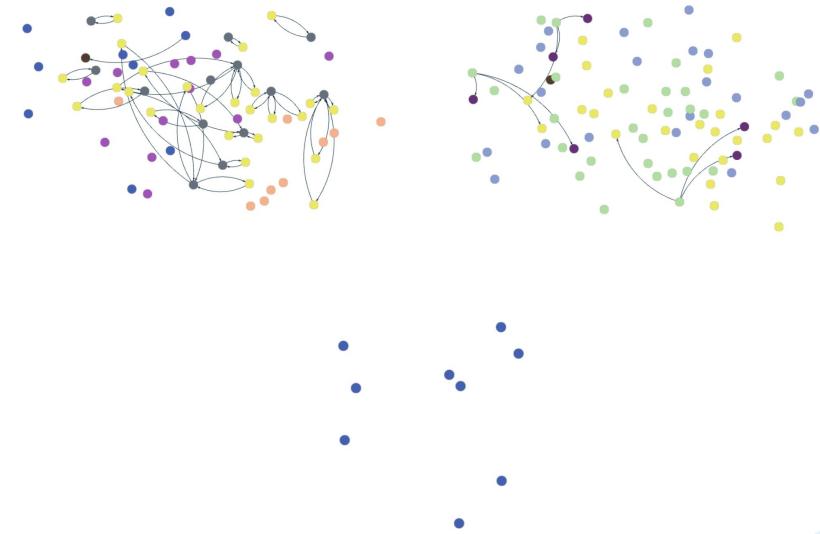


Intent-Based Analytics



기존에 방식들은?

- ✓ 장애 시 네트워크에 대한 신뢰가 어려움
- ✓ 기존 모니터링과 독립적인 자동화 툴은 그림의 일부만을 제공
- ✓ 특정 네트워크에서 단지 트래픽의 흐름만을 실시간 제공



“무엇인가 나타났다!!!”

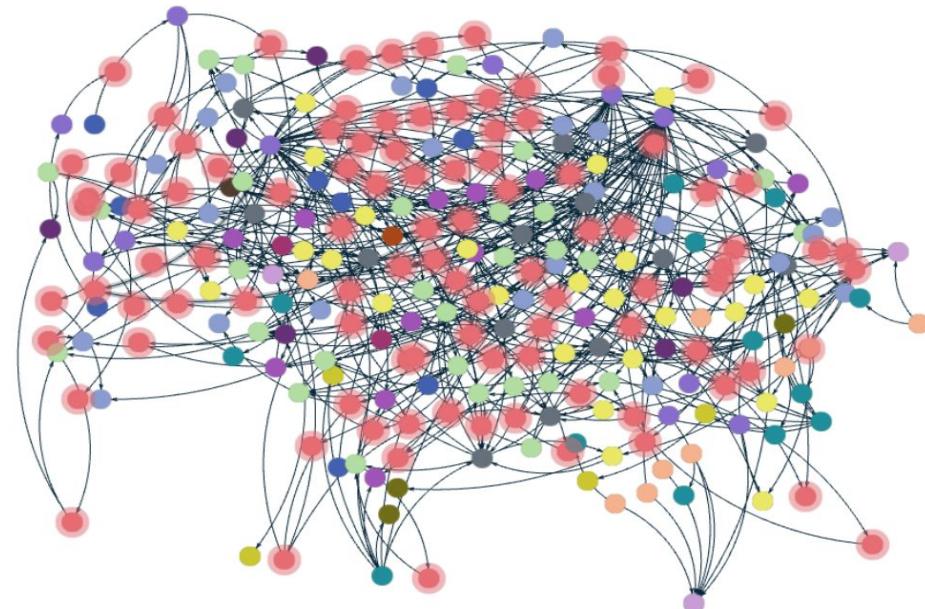
벽?뱀?창?나무?로프?부채?

AOS는?

- ✓ 모든 네트워크 정보/경험을 수집
- ✓ 네트워크 설계, 배포, 운용, 감시
- ✓ 설정, 상태, 기대치 관리

Be better and
do more

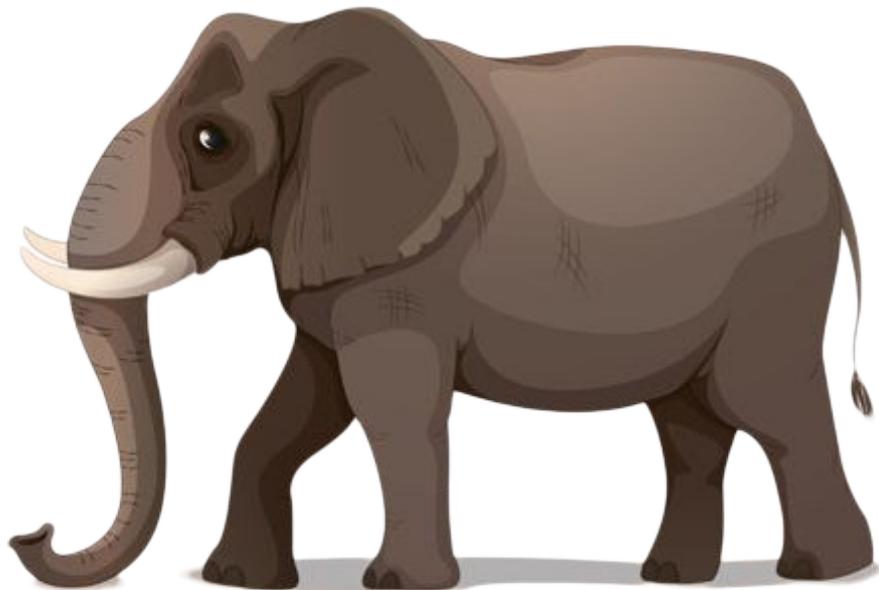
“마치 코끼리와 같은데...”



그래서 네트워크 설계자와 운용자는...

- ✓ 장애 시 네트워크에 대한 모든 정보/경험을 토대로 진단 가능
- ✓ 하나의 솔루션에서 설계, 배포, 운용, 감시까지 모든 부분을 제공
- ✓ 네트워크에 설정, 상태, 기대치 등 전체의 흐름을 파악

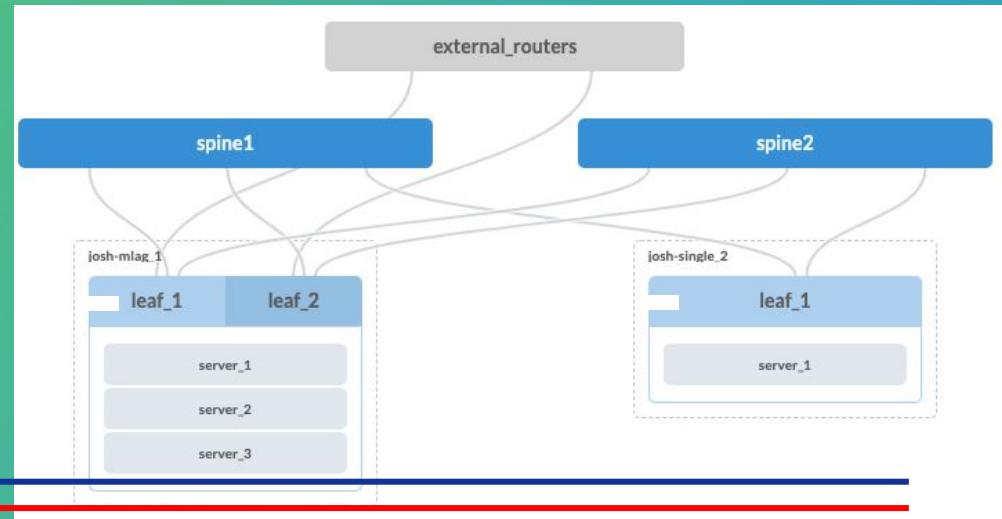
“아하 코끼리!!!”



CloudLabs Demo

Blue 서비스

Red 서비스





Apstra 조금 더 알아보기-

<http://apstra.com/korea>

OCP

<https://www.opencompute.org/projects/sonic>

Github

<https://azure.github.io/SONiC/>

wiki

<https://github.com/Azure/SONiC/wiki>

Techfieldday

<https://techfieldday.com/appearance/apstra-presents-at-networking-field-day-23/>

AOS Github

<https://github.com/Apstra>

슬라이드쉐어

<https://www.slideshare.net/LucidLee/presentations>



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