

Network Analytics Engine

Channel System Engineer
So-young.Jang

aruba

a Hewlett Packard
Enterprise company



Agenda

- NAE란?
- NAE에서 제공하는 기능
- NAE 데모
- Resources



NAE Overview

Resolve Issues Faster with
Automated Action



EDGE-CLOUD ERA

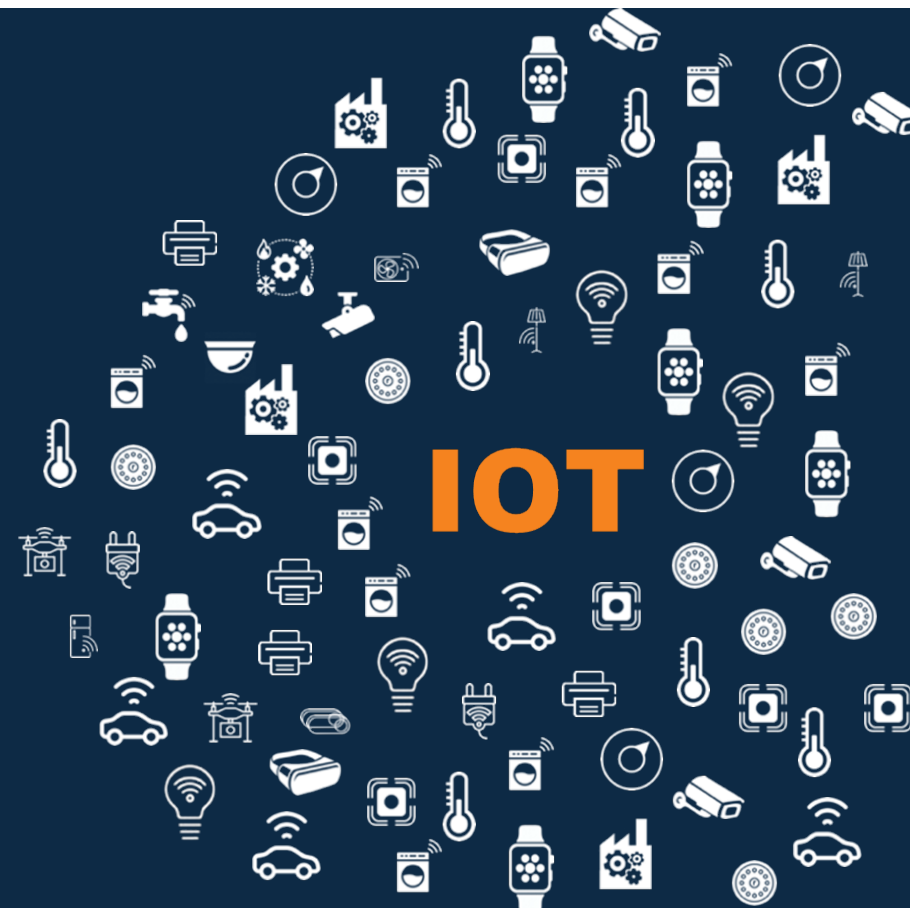
MOBILE



CLOUD



IOT



Network Challenges at the Edge

확장성 및 사일로에 인해
민첩성이 저하

수동 운영과 낮은 가시성

보안 위협이 복잡성을 늘림

75%의

조직은 4개 이상의
네트워크 관리 도구를
사용함¹

70%의

네트워크 구성은
수동으로 작업함²

70%의

IT부서의 시간은
이슈를 확인하고
진단하는데 사용함²

80%의

IT부서는 직접 설치하거나
관리하지 않은 IoT 단말이
네트워크상에서
발견한 적이 있음³

레거시 네트워크는 개선이 어려움

¹Network Management Megatrends 2018: Exploring NetSecOps Convergence, Network Automation, and Cloud Networking

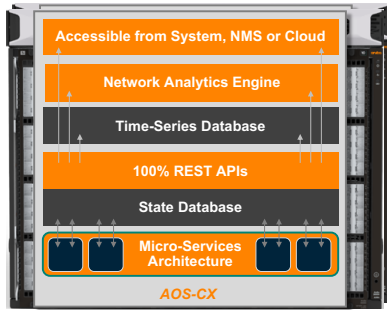
²Gartner, "5 Network Cost Optimization Opportunities," June 2019

³Gartner, "Segmentation or Isolation: Implementing Best Practices for Connecting 'All' Devices," September 2019.

ARUBA CX SWITCHING

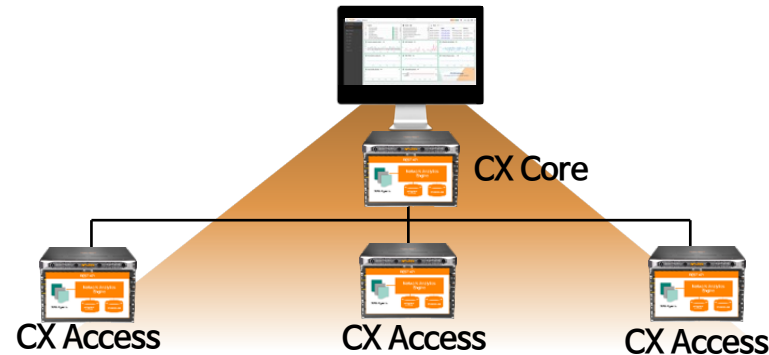
차세대, 클라우드 네이티브 스위치 포트폴리오

AOS-CX 운영체제



클라우드 네이티브
최신의 마이크로서비스
아키텍처 디자인으로
네트워크 프로그래밍 및
워크플로 자동화 제공

Aruba NetEdit 및 네트워크 분석 엔진



네트워크 분석 분산 처리

네트워크 전반의
모든 노드에 대해서
실시간으로 문제를 탐지하고
해결할 수 있는 인사이트를
제공 가능한 분석 기능

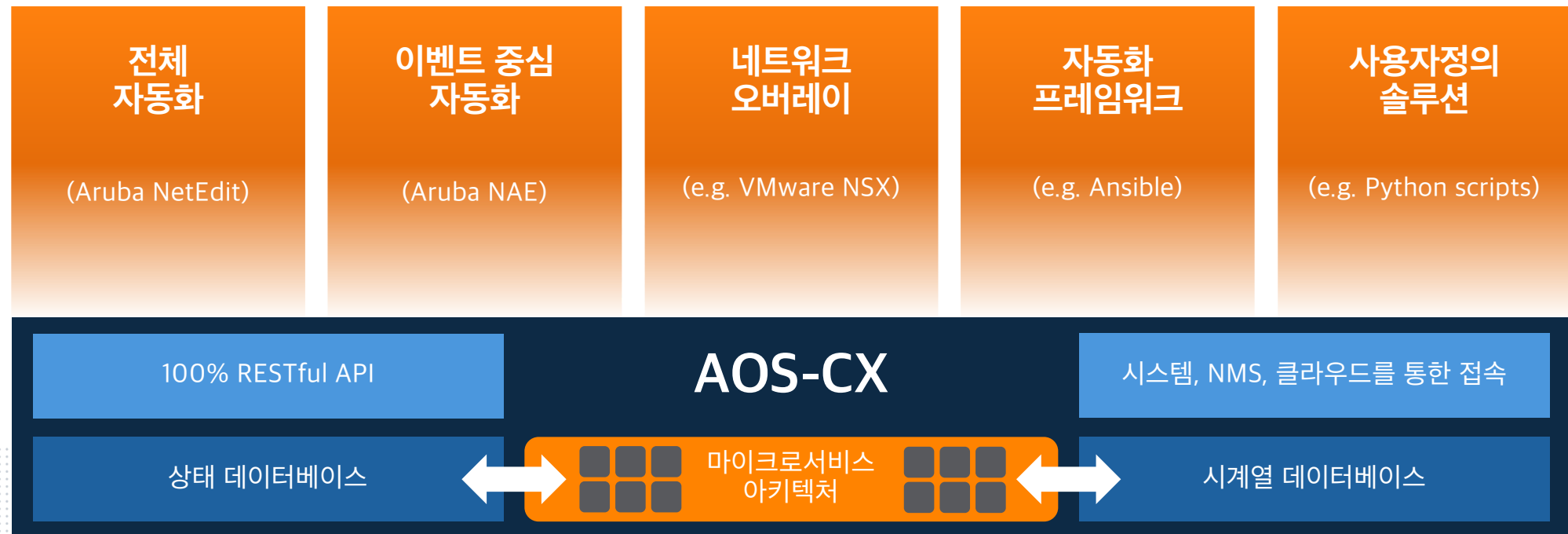
Aruba CX 스위치



엣지 액세스단 부터 데이터센터까지
Flexibility to deploy same hardware
and software for a consistent
operational experience from edge
access to data center

AUTOMATION

고객의 운영 모델에 맞춤 가능한 유연성

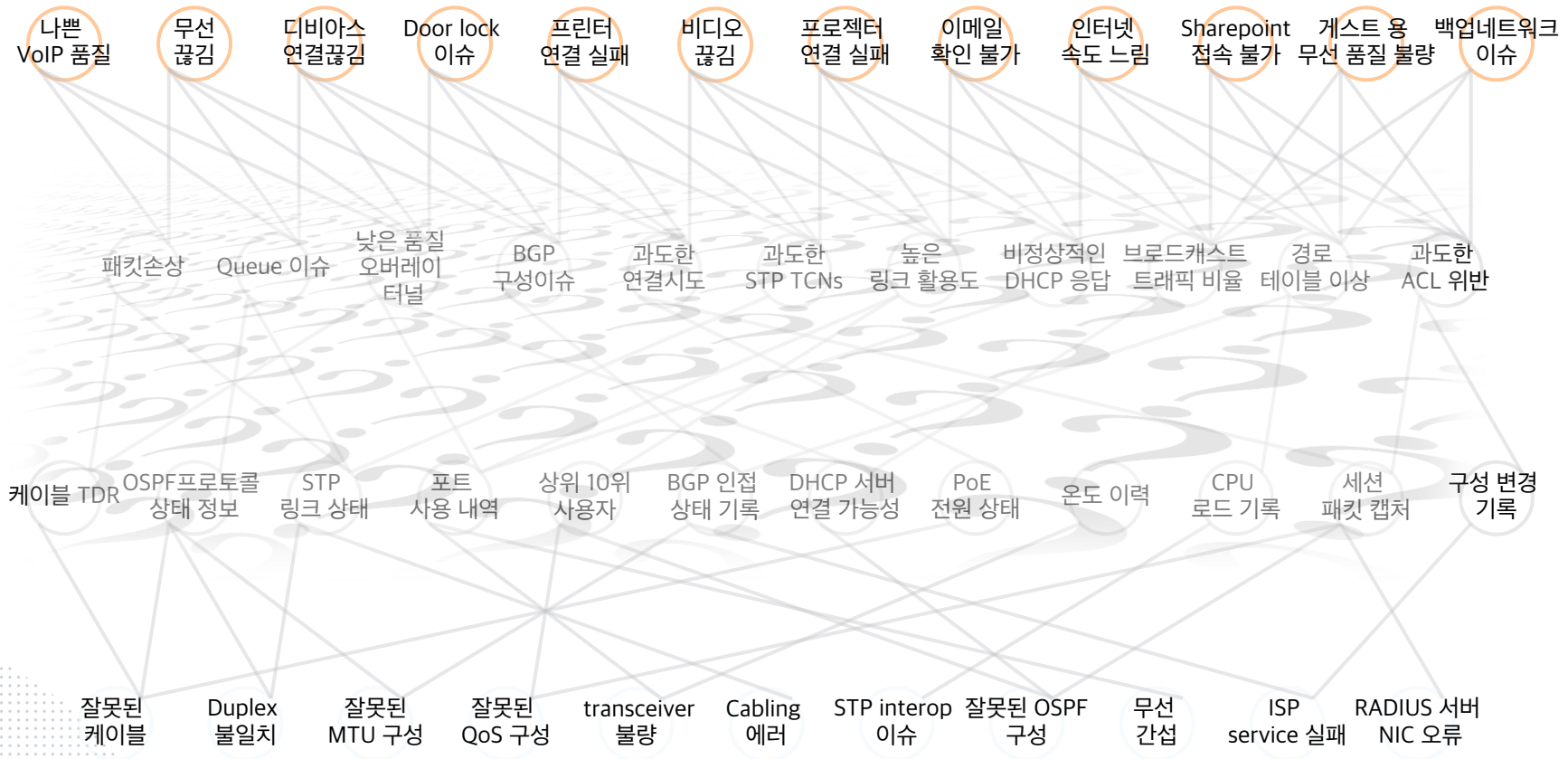


클라우드 네이티브 운영체제를 기반으로 구축



Root Cause Analytics

Problem



Root Cause



Resolution Process

Monitor

Determine Service Impact

Check client service health scores

Collect Root Cause Information

Identify what changed

Inspect devices via command line interface

Turn on logging / inspect log files

Review configurations

Perform traceroute, ping, packet capture

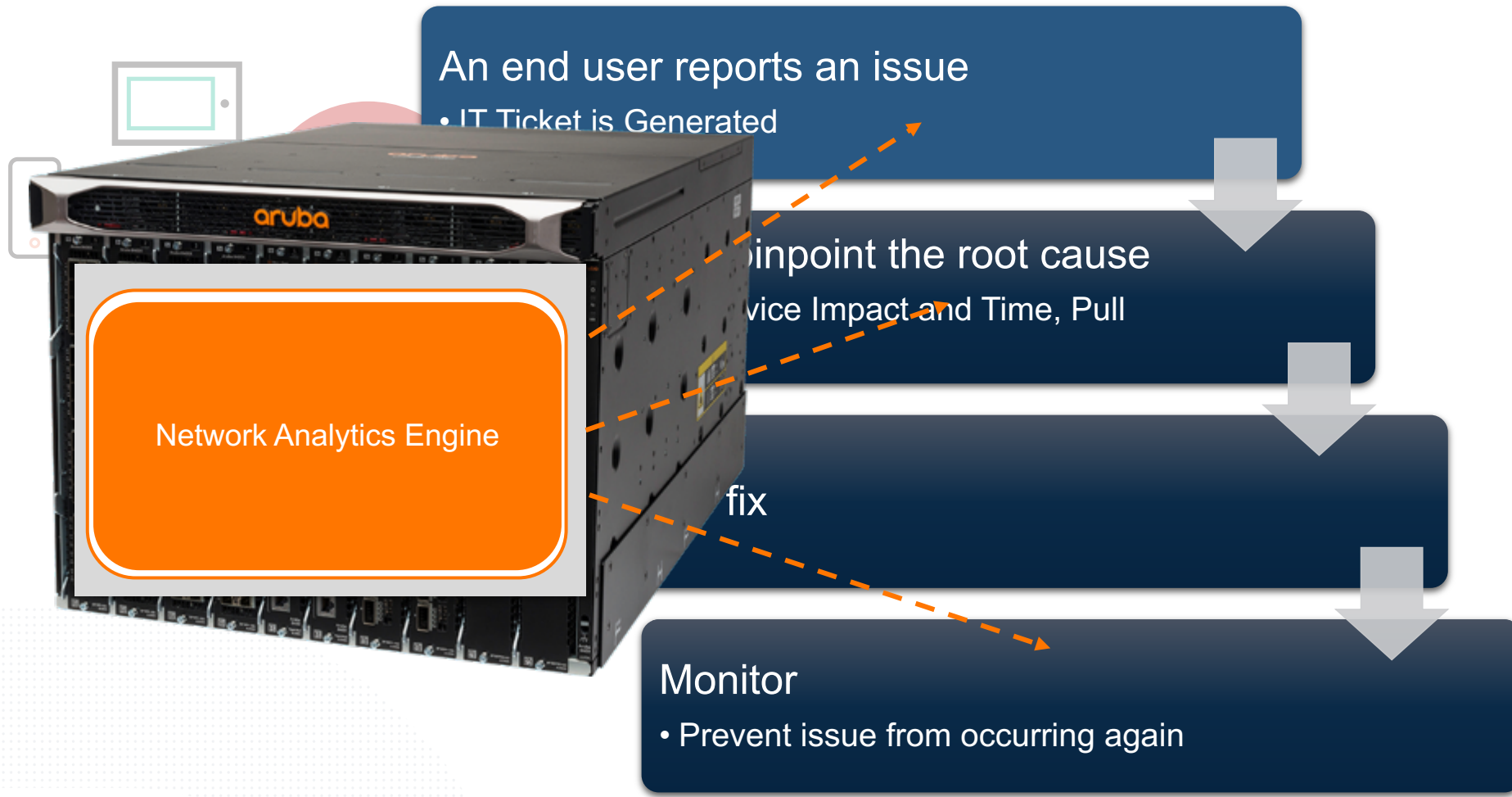
**Formulate and test
root cause hypothesis**

**Verify
Correct
Operation**

Deploy change

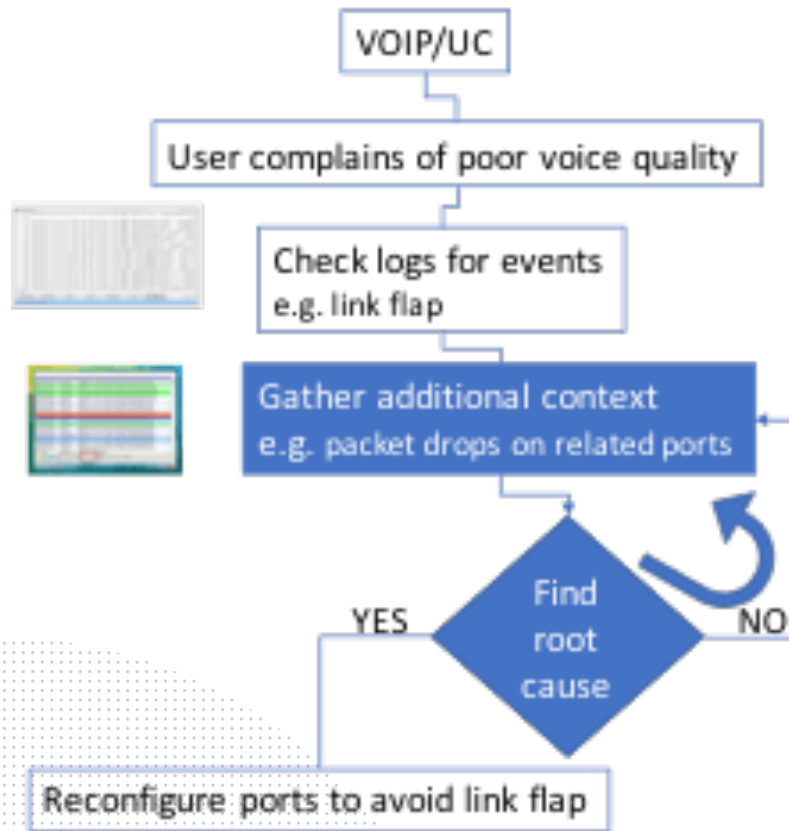


NAE 란?

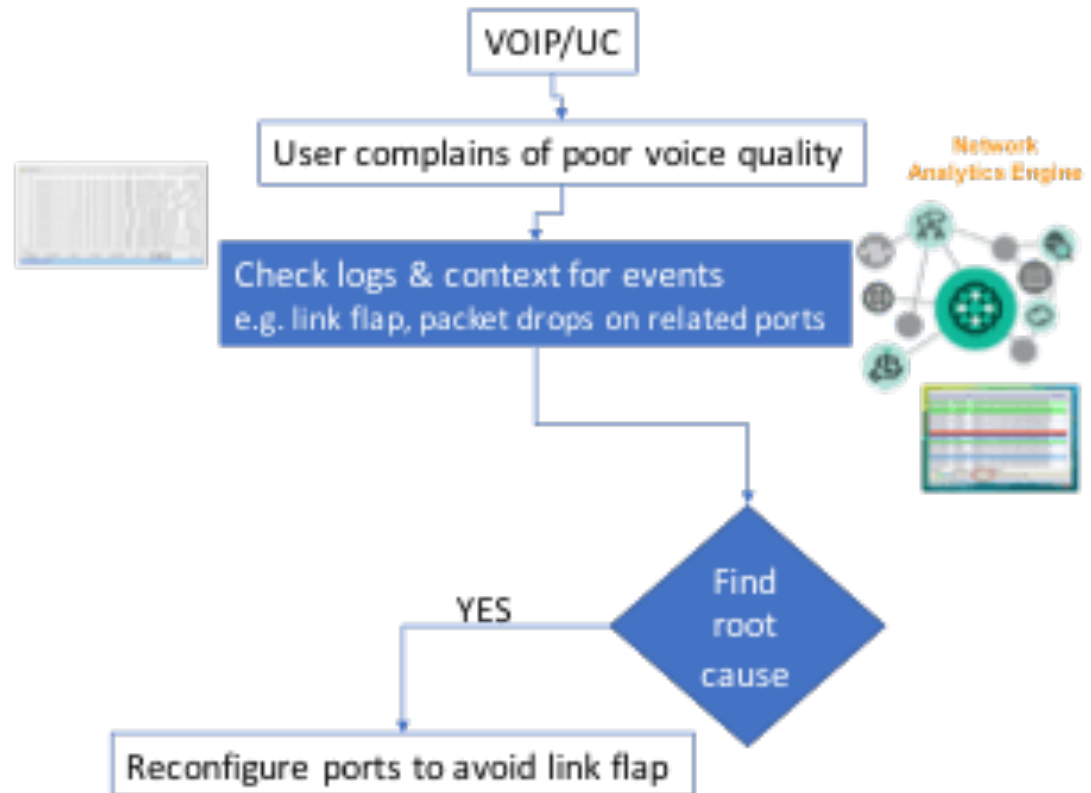


Root Cause Analytics w/NAE

기존 방식



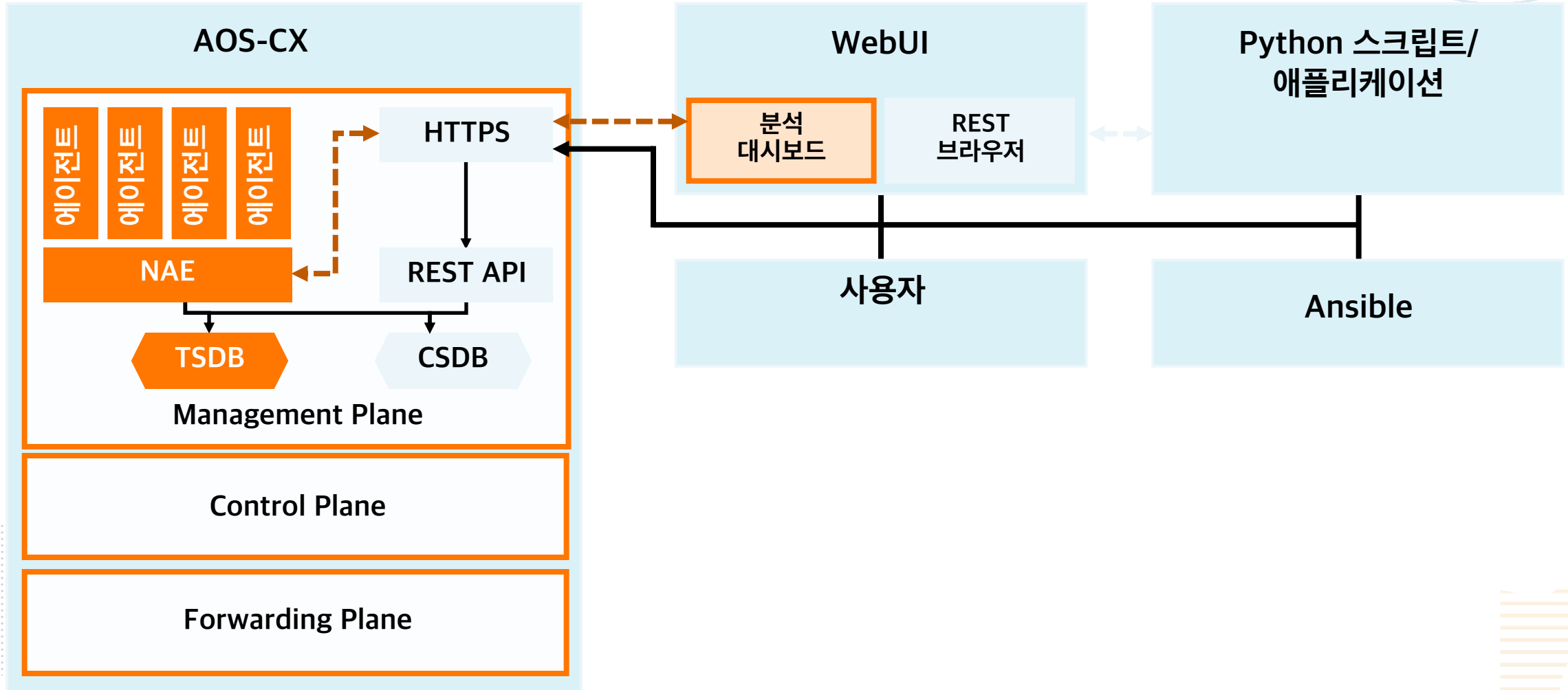
NAE의 방식



NAE Component

- **NAE Agent** : 에이전트는 특정 이벤트가 발생 시 관련 네트워크 정보를 수집하는 사용자 정의 스크립트
- **NAE Rule (condition)** : 에이전트는 사용자가 정의한 규칙에 의해 트리거
- **NAE DB (구성 및 상태 DB/ 시계열 DB)**
 - 구성 및 상태 데이터베이스 : 장비 구성, 프로토콜과 시스템 상태/정보, ASIC/ACL/QoS 등의 내용 모니터링 제공
 - 시계열 데이터베이스 : 장비 상태를 시계열로 저장하며, 저장 기간은 400일 제공
- **REST API** : NAE는 보안 정보 및 이벤트 관리(SIEM) 툴 및 로그 분석 엔진과 같은 외부 시스템과의 통합을 위한 REST API 제공
- **Web UI** : 가시성 제공. 자동생성 그래프는 네트워크 문제 해결에 필요한 추가 정보 제공

AOS-CX를 이용한 네트워크 자동화



NAE (Network Analytic Engine)

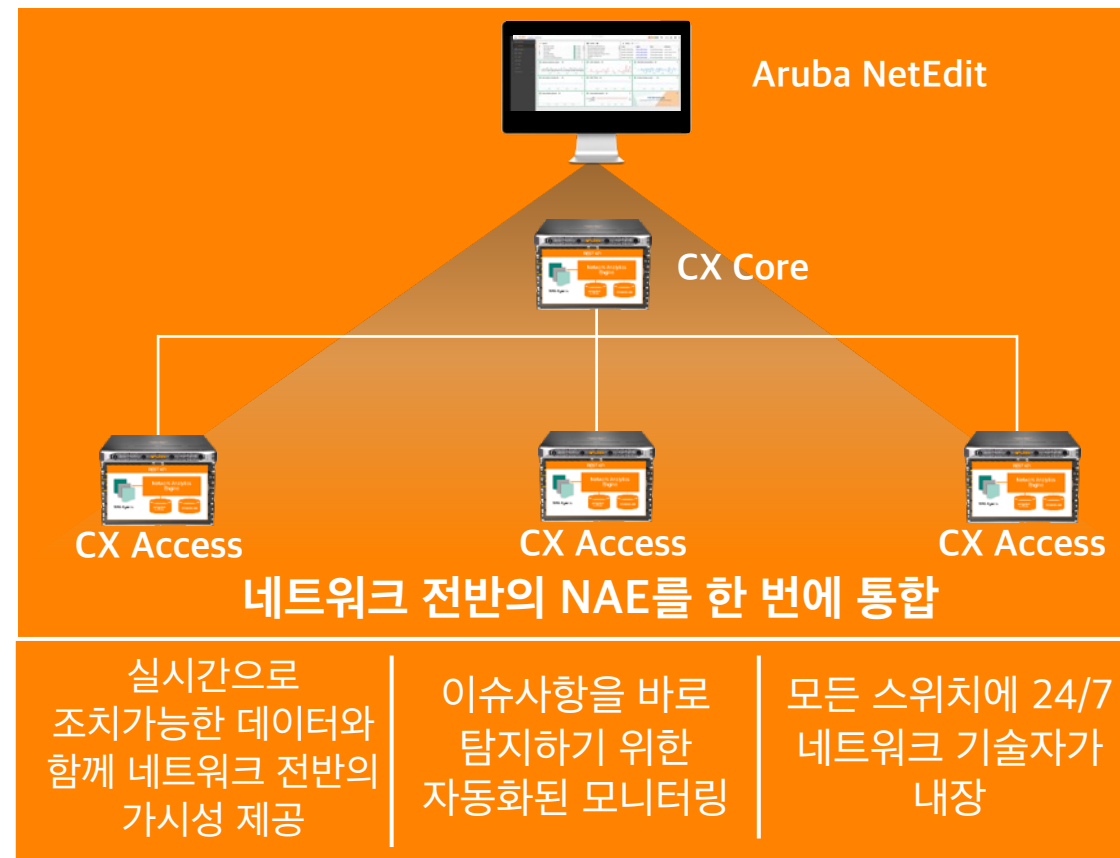
ARUBA 네트워크 분석 엔진을 사용한 완벽한 모니터링

기존 모니터링 방식



VS

Aruba CX의 방식



NAE의 장점

높은 문제해결속도

- 실시간 정보 수집을 통해 높은 문제 해결 속도
- 내장된 NAE는 이벤트 발생 시 추가 정보 수집을 트리거하여 자동적으로 제공
- 조건 기반 프레임워크는 문제를 해결하기 위한 확인할 메일 작업 트리거

턴키 솔루션

- NAE는 즉시 사용할 수 있는 사전 패키지 솔루션
- 통합 데이터베이스 및 일반 사용 사례를 위한 사전 패키지 스크립트와 함께 제공
- GitHub 또는 Aruba Solutions Exchange에서 스크립트 및 사용 사례 형태의 지원 확인 가능



Seamless Integration with Current Network Technology

애플리케이션 연동

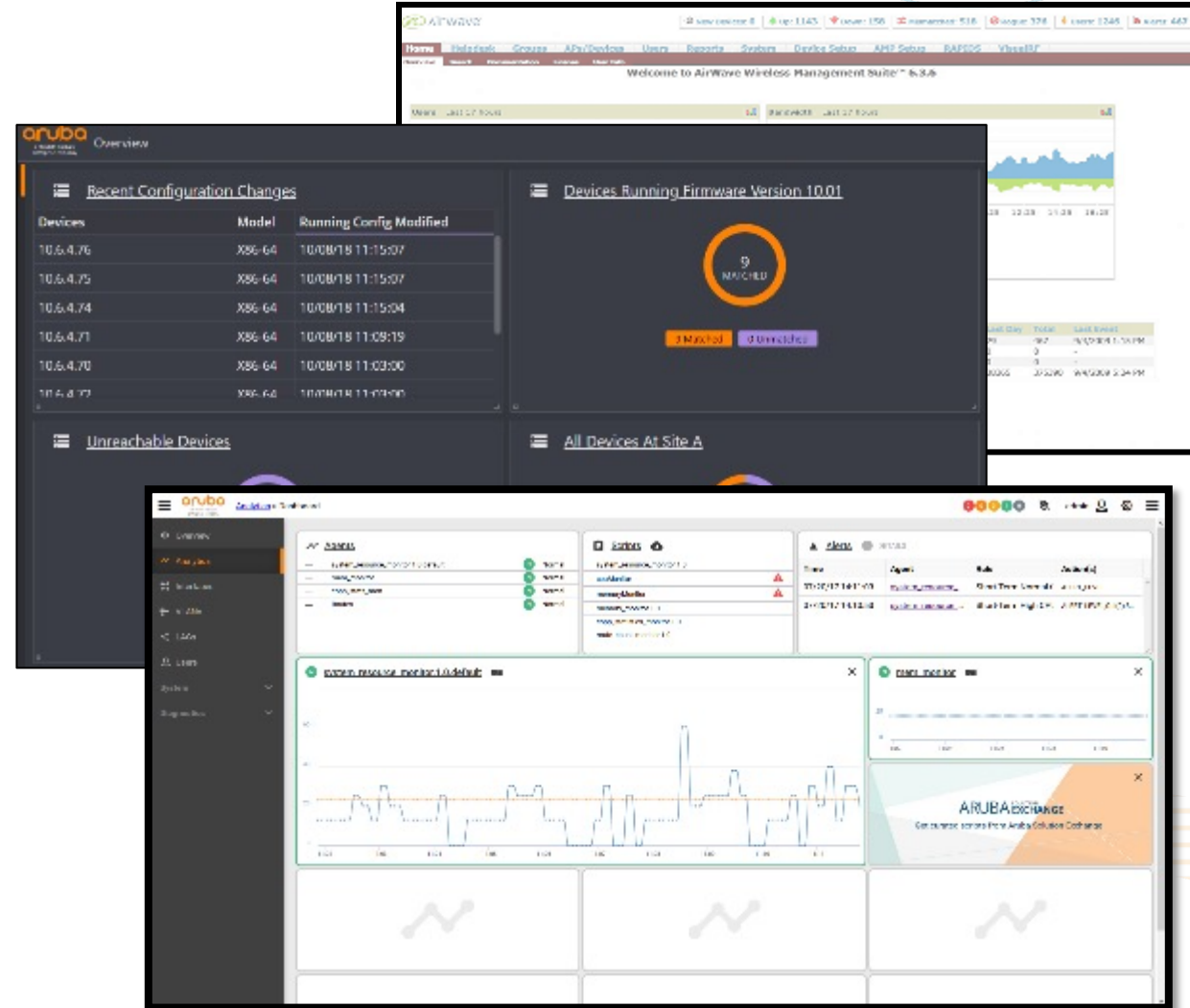
- Aruba NetEdit, AirWave 및 기타 애플리케이션 보안
- 3rd party tool이 REST API를 사용하여 연동
- 레거시용 Syslog 메시지를 생성

Web UI와 REST API

- REST API를 통해 각 정책에 대해 자동으로 생성
- GUI를 전환하여 스크립트 업로드 및 에이전트 활성화
- 스위치 사용자 인터페이스에 내장된 Aruba Solutions Exchange 통합

손쉬운 자동화

- Python을 사용하여 REST API 호출 가능
- REST API를 통해 인터페이스 연동



NAE에서 제공하는 기능



Aruba NAE Areas of Focus

시스템 상태

- 시스템 통계 모니터링

네트워크 분석

- 네트워크 통계를 모니터링하여 문제 해결
- 상태를 추적하여 변경에 대한 insight 수집

보안

- 네트워크 트래픽 분석 이상 징후 학습

응용 프로그램 가시성

- 애플리케이션 성능, 클라우드 또는 사내에서 이상 징후를 확인

네트워크 최적화

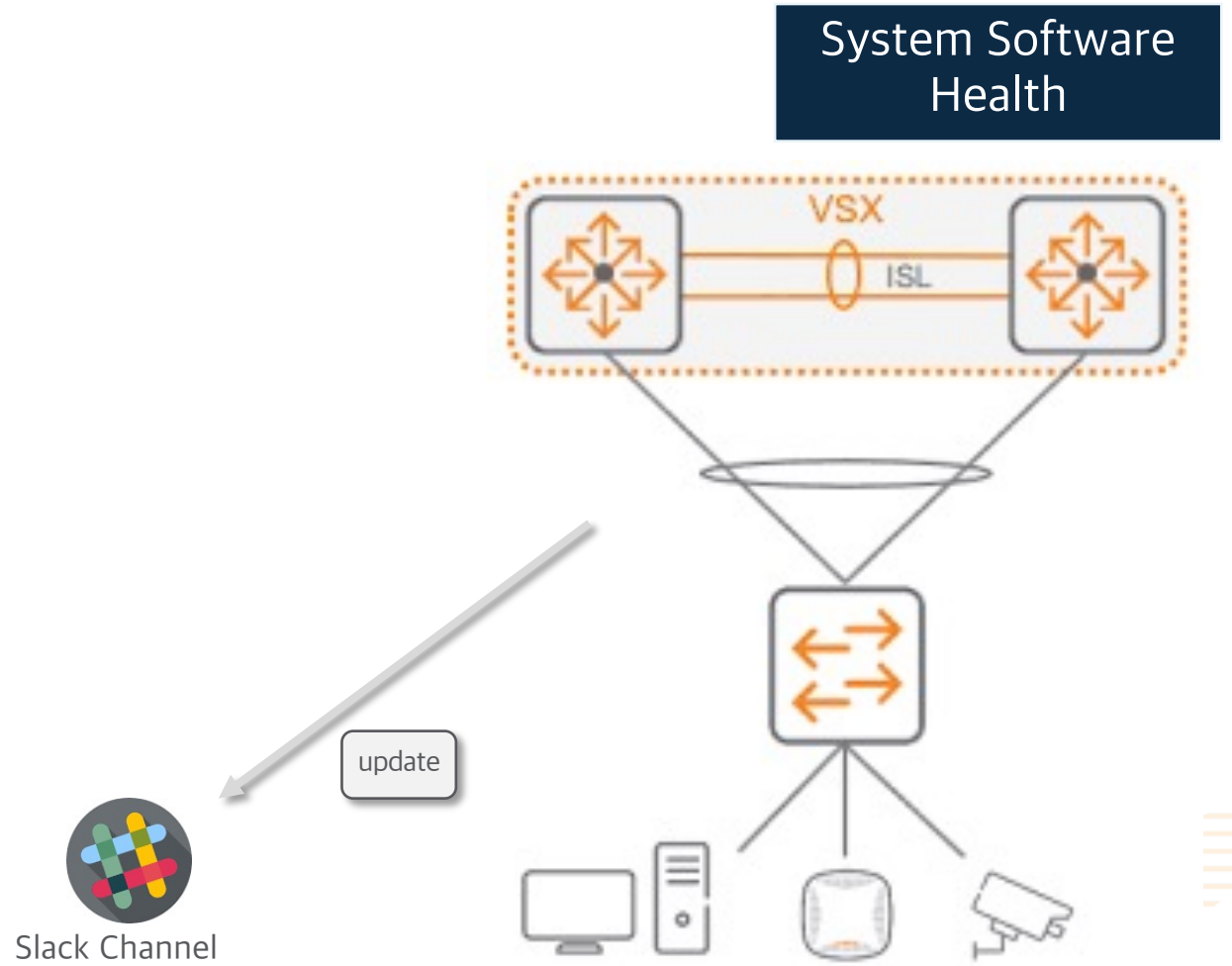
- 최적화를 위한 정책을 자동적으로 수정
- 트래픽 리디렉션



Device Health Monitor

전체 시스템 소프트웨어 상태

- 모니터링
- 데몬 리소스
- CPU 사용량 및 메모리 사용량(총 리소스의 백분율)
- Mac 주소
 - 주소 합계 수
 - 카운트의 변화율, 문제가 있는 이웃 확인
- VSX 상태
 - VSX 의 경로 수
 - VSX 의 Mac 주소 수
 - VSX 의 인접 항목 수



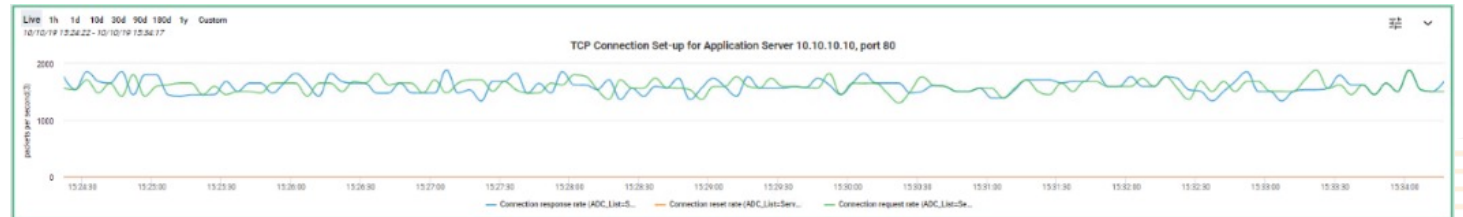
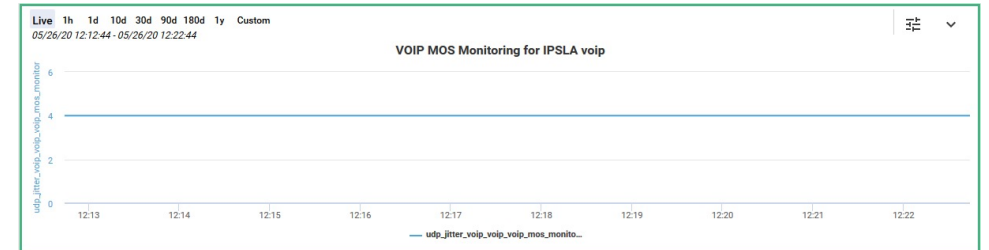
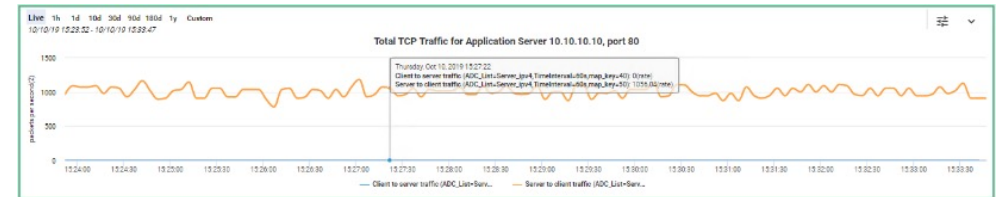
Application Client Health

응용 프로그램 서버에 대한 연결

클라이언트와 애플리케이션 서버 간의 통신을 모니터링합니다.

Application Visibility

- TCP 연결 설정 핸드셰이크 모니터링
 - 고객이 구성한 IPSLA 세션 모니터링:
 - VoIP MOS 점수
 - HTTP
- 이상이 감지된 경우:
 - SLA 세션 통계에 대한 CLI 명령
 - 마지막 정상 경로와 비교하여 서버에 대한 현재 경로의 다른 보기



Demo

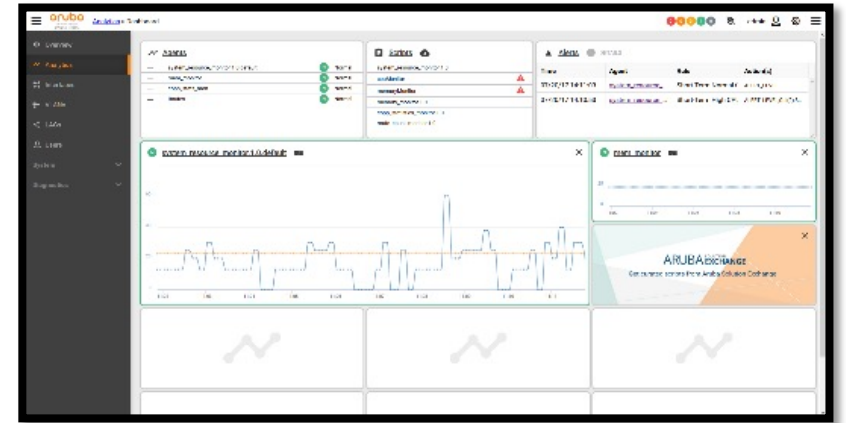


데모 내용

- CX스위치의 기본 dashboard 소개
- Script download 방법 - Aruba Exchange
- Agent 생성 및 Script 설치
- NAE 응용
 - : NAE Script change ; configuration change LineMessenger



NAE 응용을 통한 Line 애플리케이션 Demo



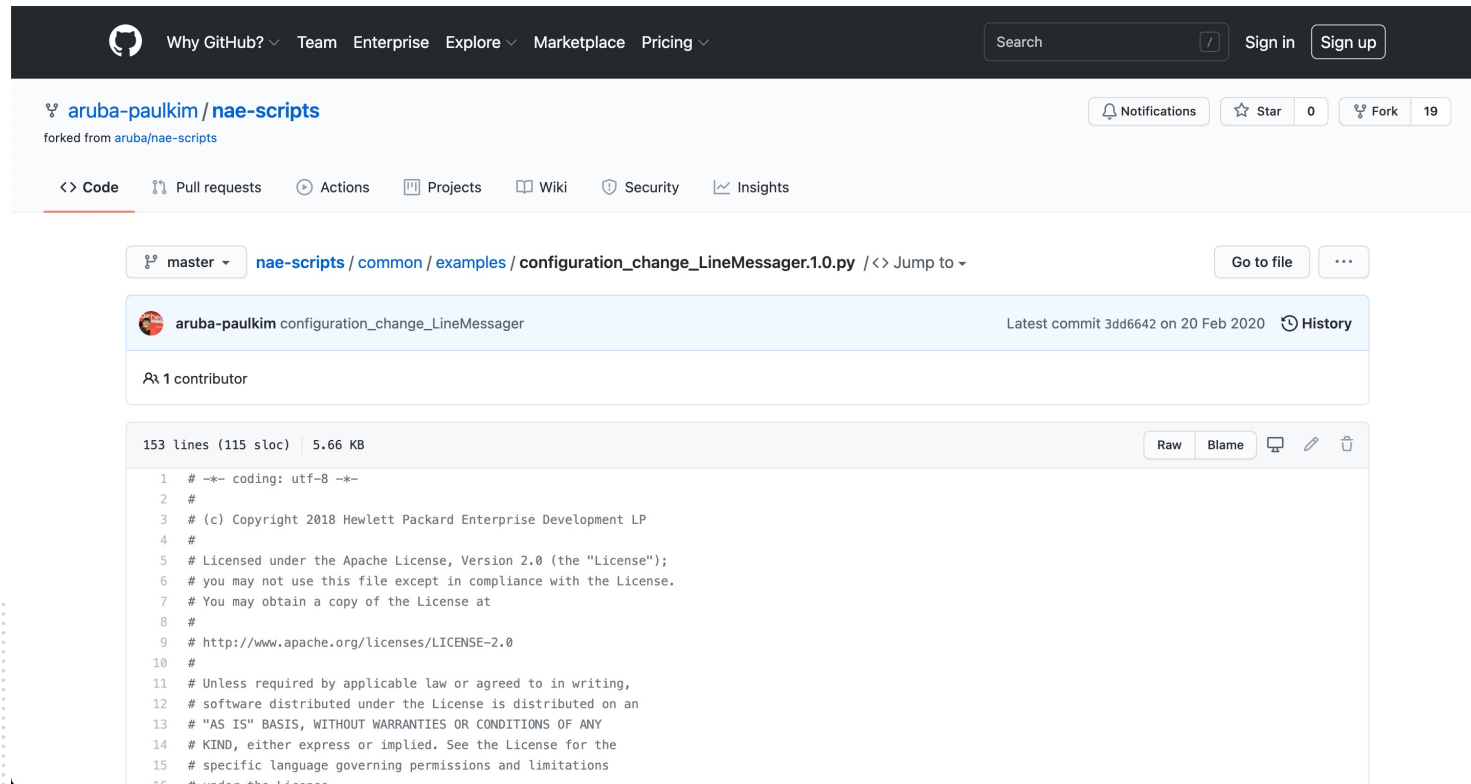
라인 어플리케이션

Network Analytics Engine

NAE 응용을 통한 Line 애플리케이션 Demo

- Source Download

https://github.com/aruba-paulkim/nae-scripts/blob/master/common/examples/configuration_change_LineMessenger.1.0.py



The screenshot shows the GitHub interface for the repository 'aruba-paulkim/nae-scripts'. The file path is 'nae-scripts / common / examples / configuration_change_LineMessenger.1.0.py'. The file is 153 lines long (115 sloc) and 5.66 KB in size. The content of the file is a license notice:

```
1 # -*- coding: utf-8 -*-
2 #
3 # (c) Copyright 2018 Hewlett Packard Enterprise Development LP
4 #
5 # Licensed under the Apache License, Version 2.0 (the "License");
6 # you may not use this file except in compliance with the License.
7 # You may obtain a copy of the License at
8 #
9 # http://www.apache.org/licenses/LICENSE-2.0
10 #
11 # Unless required by applicable law or agreed to in writing,
12 # software distributed under the License is distributed on an
13 # "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY
14 # KIND, either express or implied. See the License for the
15 # specific language governing permissions and limitations
16 # under the license
```



Resources



Enhancing the Impact w/ Community Participation

Join the NAE Community Today!



개발자 커뮤니티

- 모든 Aruba NAE 스크립트가 GitHub에 게시
- 개발자에게 친숙한 포럼에서 NAE 개발 수용

Primary Hub

- 주 스크립트 포털
- 네트워크 엔지니어를 위해 설계됨
- 공용 솔루션이 NAE UI와 직접 통합됨
- 아루바 큐레이션 및 테스트된 스크립트

Airheads

- NAE, Aruba 솔루션 Exchange 및 GitHub
- 전용 아루바 개발 리소스

NAE on ASE:

<https://ase.arubanetworks.com/solutions>

Network Analytic Engine GitHub:

<https://github.com/aruba/nae-scripts>

Airheads:

<https://community.arubanetworks.com/t5/Developer-Community/bd-p/DeveloperCommunity>



Aruba Solutions Exchange Integration

ARUBA SOLUTION EXCHANGE

HOME SOLUTIONS RECIPES IDEAS ABOUT

Search solutions

CONFIGURATION MADE SIMPLE THROUGH INTELLIGENT WIZARDS.

GET STARTED

BUILD + LEARN

As you go through the interactive wizard in each solution, the live preview feature shows you the exact CLI configuration getting built in real-time. You may just learn a new CLI command or two.

MULTI-DEVICE SUPPORT

A solution can generate configuration for more than one device to complete a particular task. For example, the IAP VPN Tunnel to Aruba Mobility Controller solution will build the necessary IAP configuration and controller configuration.

TASK-ORIENTED

Each solution targets one specific configuration use-case. Solutions do not try to touch every nuance of the product configuration and will instead use best practice options when possible. If you need help with advanced config outside a solution, additional reference material is provided.

UNDO CONFIGURATION

Applied a configuration from Solution Exchange and now need to revert back? Use the automatically generated undo configuration to apply on the target device(s) and get you back to where you were.

COMMON

The collection powers Solutions encouraged existing one Users can already have tested

VALIDATION

Common configurations validating configurations. Additionally possible to need to pro

SOLUTIONS - ASE

ARUBA SOLUTION EXCHANGE

HOME SOLUTIONS RECIPES IDEAS ABOUT

Search solutions

Register Login

Search solutions Found 52 results, showing 1 - 20. Create Solution Clear All

KUDOS	VIEWS	DETAILS	PRODUCTS	CREATED	MODIFIED
0	15	topdesk_configuration_change_monitor.1.1 The purpose of this script is to alert the user when system configuration changes. A ticket is created in TOPDesk® with the diff of changes and other details.	NAE	24 days ago by madhusudan-pranav.venugopal	24 days ago by madhusudar
0	12	Servicenow configuration change monitor.1.1 This script detects configuration changes, shows the change and posts a request to ServiceNow to open a ticket	NAE	24 days ago by madhusudan-pranav.venugopal	24 days ago by madhusudar
0	59	copp.3.0 The purpose of this script is to detect anomalous traffic that is getting dropped by Control Plane Policing (CoPP)	NAE	3 months ago by lakshmi.manikandan	2 months ago by dgdadila
0	19	adc_hit_counters_monitor.1.1 The purpose of this script is to monitor ingress/outgress Office 365 traffic.	NAE	2 months ago by dgdadila	2 months ago by dgdadila
1	43	NAE IPSLA Script with Thresholds NAE script to monitor and threshold	Aruba Switch NAE	3 months ago by krutarth.rao	3 months ago by krutarth.rao
2	121	fault_finder_monitor.1.1 This script does automatic fault detection which helps protect against network loops.	NAE	7 months ago by lakshmi.manikandan	3 months ago by lakshmi.rao

PRODUCTS:

- AOS (67)
- NAE (53)
- ClearPass (37)
- MM (18)
- Aruba Switch (12)
- MAS (7)
- IAP (6)
- Other (6)
- Cisco Switch (4)
- AirWave (3)
- JUNOS (2)
- HPS (2)
- BLE (2)
- Cisco WLC (1)

TAGS:

- nae-aruba-certified (53)
- nae (49)
- 8400x (48)
- 8320 (43)
- arubaos-cx-min-10.01 (40)
- mm (11)
- interface (9)
- arubaos-cx-min-10.00 (9)
- aruba instant (iap) (8)
- Aruba Mobility Access Switch (MAS) (7)



NAE Details in the Aruba Solution Exchange

The screenshot shows a web browser window displaying the Aruba Solution Exchange page for a solution titled 'Servicenow_configuration_change_monitor.1.1'. The page layout includes a navigation bar with 'ARUBA SOLUTION EXCHANGE' and links for 'HOME', 'SOLUTIONS', 'RECIPES', 'IDEAS', and 'ABOUT'. A search bar and 'Register'/'Login' buttons are also present. The main content area features a 'Description' tab and an 'Actions' dropdown. The solution details are organized into sections: 'SUMMARY', 'PLATFORMS SUPPORTED', 'SOFTWARE VERSION REQUIREMENTS', and 'SCRIPT DESCRIPTION'. The 'SCRIPT DESCRIPTION' section contains a list of parameters and a list of monitors. A right-hand sidebar provides 'SOLUTION INFO' (including Kudos, Views, Created/Modified dates, Contributors, Products, and Tags) and 'RECENT CHANGES'.

Servicenow_configuration_change_monitor.1.1 This script detects configuration changes, shows the change and posts a request to ServiceNow to open a ticket

Description Servicenow_configuration_change_monitor.1.1

Actions 0 Kudos Compatibility Previous Next Finish

SUMMARY

The purpose of this script is to alert the user when system configuration changes. A ticket is created in ServiceNow® with the diff of changes and other details.

PLATFORMS SUPPORTED

8400X
8320

SOFTWARE VERSION REQUIREMENTS

ArubaOS-CX 10.02.000X

SCRIPT DESCRIPTION

The main components of the script are Manifest, Parameter Definitions and python code.

- 'Manifest' defines the unique name for this script.
- 'Parameter Definitions' defines the input parameters to the script. This script requires the following parameters:
 - username - Username of the ServiceNow® account instance.
 - password - Password of the ServiceNow® account instance.
 - domain_name - Domain name of the ServiceNow® account instance.
 - short_description - Short description for the configuration change event.
 - web_proxy - Web proxy IP address
 - urgency - Urgency of the configuration change event.
 - severity - Severity of the configuration change event.

The script defines Monitor Resource URI(s), Monitor condition and Action :

- Monitors:** This script specifies the monitoring URI(s) to monitor the following:
 - Rate of system last configuration time over 10 seconds.

Note: The monitored data is plotted in a time-series chart for analysis purpose.

- Conditions:** This script specifies monitoring condition as following:
 - Rate of system last configuration time over 10 seconds is greater than zero.
- Clear condition:** Rate of system last configuration time is equal to zero.
- Actions:** This script specifies monitoring action as following:
 - When the monitoring condition (1) specified is hit, the following action is executed:
 - Store the last checkpoint (if available) in a script variable called 'base_checkpoint'. If the last checkpoint is not available, the 'base_checkpoint' is startup-config.
 - When the clear condition specified is hit, the following actions are executed:
 - CLI to show system is executed.

SOLUTION INFO

Kudos: 0
Views: 12
Created: 24 days ago by [madhusudan-pranav.venugopal](#)
Modified: 24 days ago by [madhusudan-pranav.venugopal](#)
Contributors: [madhusudan-pranav.venugopal](#), [ctang](#)
Products: NAE
Tags: 8400, arubaos-cx-min-10.02, 8320, 8400x, nae-aruba-certified

Modify this Solution

View Source

RECENT CHANGES

#3802 24 days ago by [madhusudan-pranav.venugopal](#)
Initial Creation [More Details](#)



AOS-CX 연동 가능한 목록

<https://developer.arubanetworks.com/aruba-aoscx>

Python SDK

- Available functions
 - ACL
 - BGP
 - DHCP
 - EVPN
 - OSPF
 - Interface
 - Lag
 - LLDP
 - MAC
 - Loop protect
 - QoS
 - VRF
 - VSX
 - VxLAN
 - System

Ansible

- CX Modules
 - ACLS
 - L2 Interfaces
 - L3 Interfaces
 - Static Routes
 - VLANs
 - VRFs
 - DNS
 - Banner
 - Firmware Upgrade
 - Config backup & restore
 - Config Audit
 - Config command
 - Get Facts

NAPLAM

- Available functions
 - Get Facts
 - Get interfaces
 - Get LLDP
 - Get BGP
 - Get ENV
 - Get ARP
 - Get NTP
 - Get mac table
 - Get route
 - Get SNMP
 - Ping
 - Traceroute
 - Get users
 - Get optics
 - Get config
 - Compliance report

StackStorm

- Sensors/Actions
 - Interface Admin Status
 - Link Status
 - Websocket Port Sensor



Thank you

Channel System Engineer
So-young.Jang

aruba

a Hewlett Packard
Enterprise company

