



aruba

a Hewlett Packard
Enterprise company

MOBILE FIRST NETWORK

클리어패스 6.7/6.8 UPDATE

정규태 이사

Ted Jung(ted.jung@hpe.com)

Security Consulting Engineer

AMFX WW#14





“Customer First, Customer Last”
Dedicated Sales and Support
최고의 세일즈 및 기술지원



HPE's Intelligent Edge Business Unit
Intelligent Edge Networking for
the Mobile, Cloud, and IoT Era

aruba

a Hewlett Packard
Enterprise company



설립: 2002

상장: 2007

Joined HPE: 2015

Innovation Pioneers
Leader in Wired and
Wireless Networking
가트너 유무선 네트워크 리더



Innovation Hubs
Santa Clara, CA -HQ, Portland,
Canada, China, Costa Rica, India



EDGE에서 디지털화



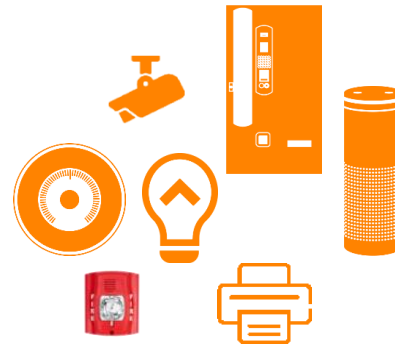
모바일
64억

2020년까지
연결되는 단말 수



클라우드
\$127B

2018년까지
클라우드에 지불하는
비용



IOT
208억

2020년까지
IoT단말 수

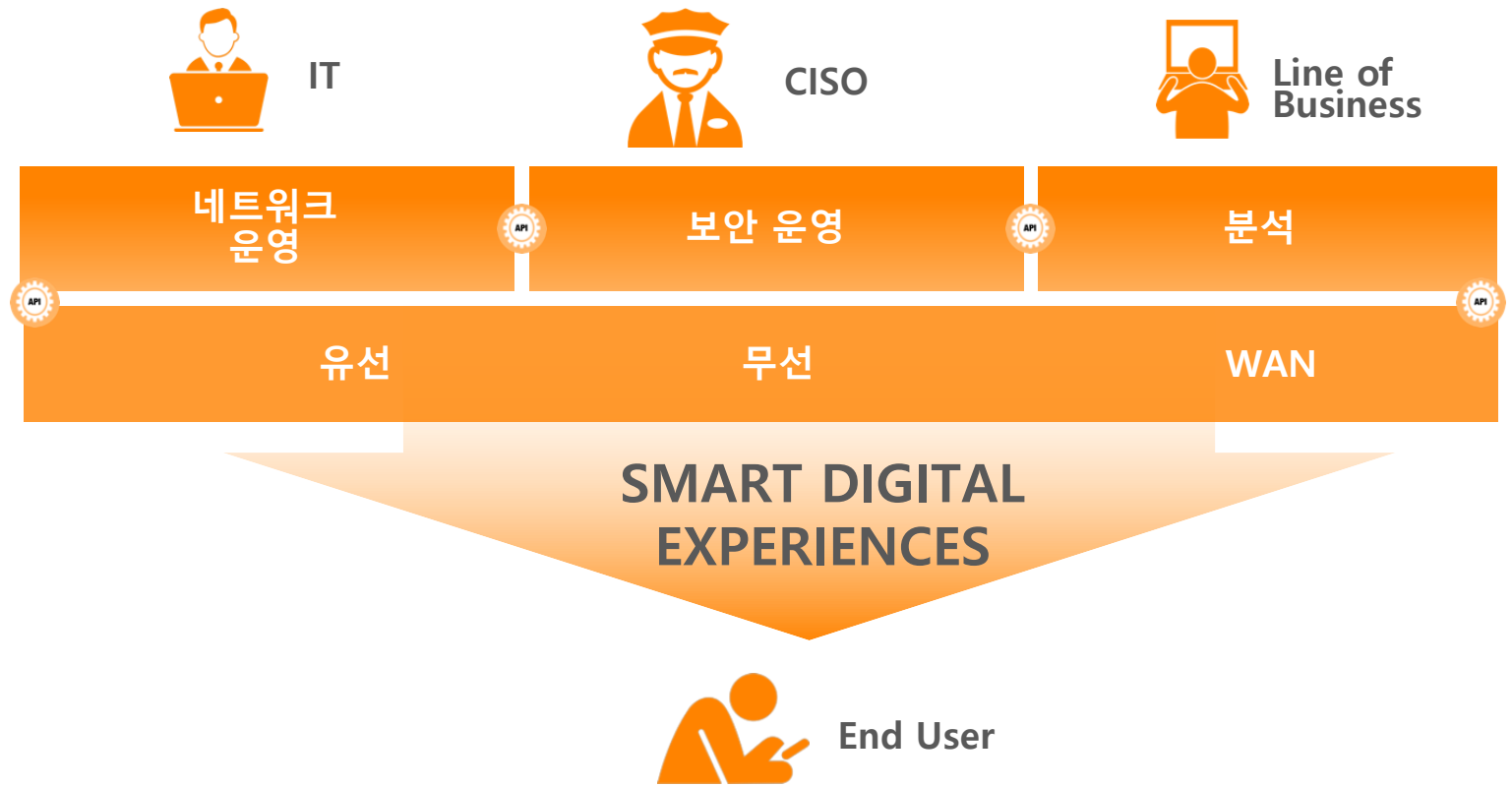
그러나



IT 예산
0-2%
IT예산의 증가율

ARUBA'S
SOFTWARE-DEFINED
EDGE
플랫폼

SECURE. SIMPLE. SMART.



EDGE에서 클라우드 연결을 위한 통합 네트워크

어떤 방식으로 연결하더라도



유선



무선



WAN

사용자 또는 IoT가 어디에서
접속하더라도



캠퍼스



Branch



클라우드

EDGE 환경으로의 연결

개방형 멀티벤더 EDGE SOFTWARE PLATFORM

컨트롤 자동화

Provision | Policies | Tune | Match | AAA | Sense | Learn | Locate

AIRWAVE



CENTRAL



CLEARPASS



INTROSPECT



NETINSIGHT



CAPE



MERIDIAN



네트워크 운영



보안 운영

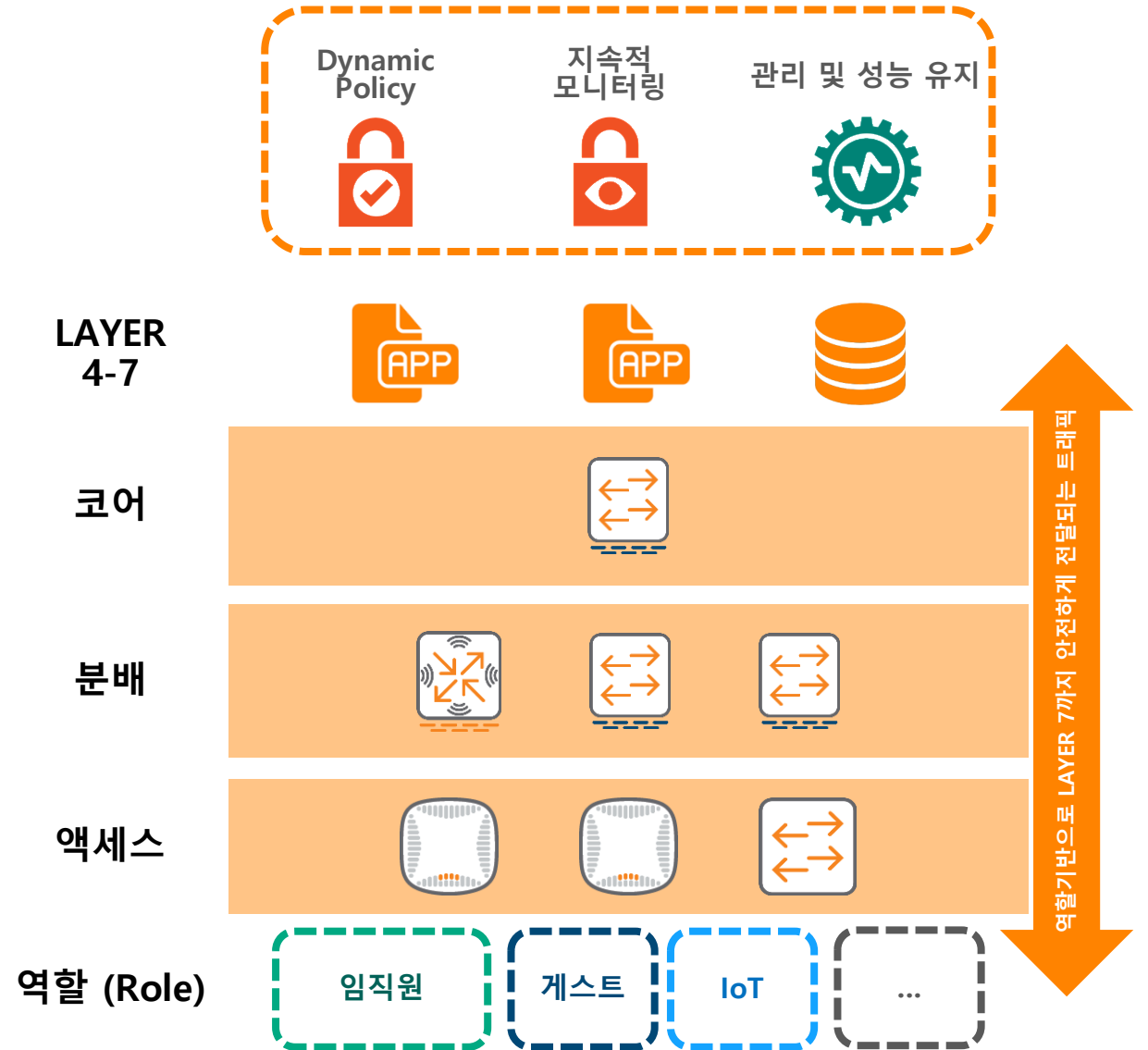


분석

개방형, API 지원 | 표준 기반 | 멀티 벤더

ARUBA EDGE 아키텍처

BUILT TO ADAPT



Why Mobile First Network?

People move. Networks must follow
Mobility First, Security First

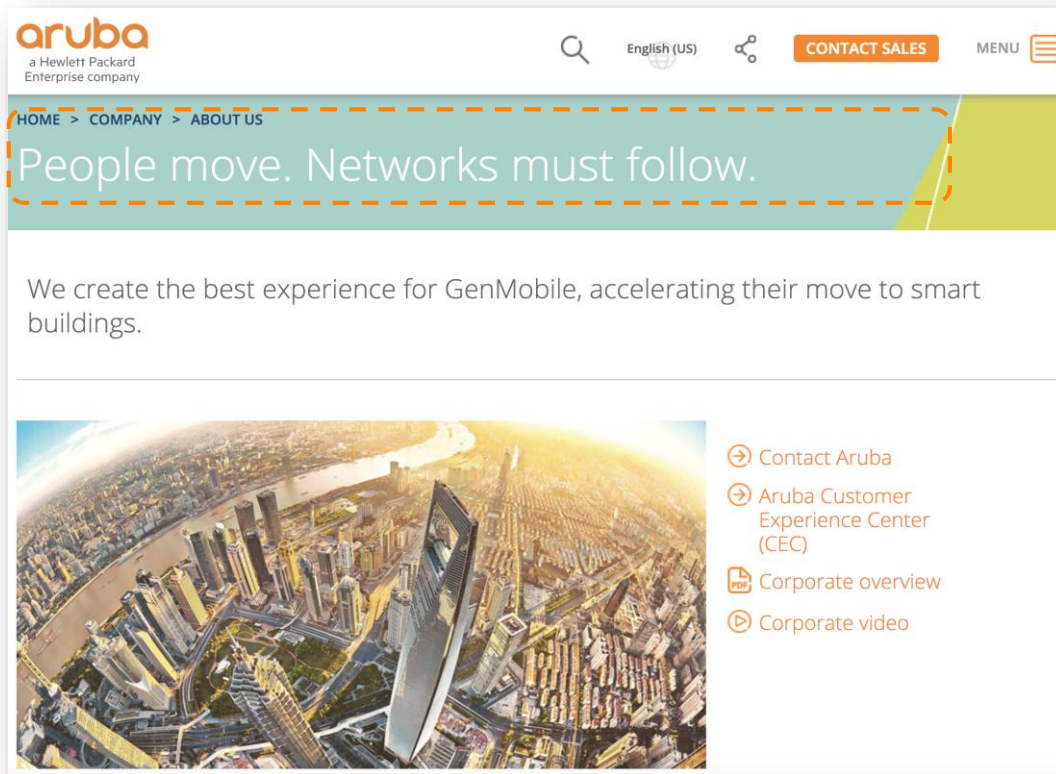


Figure 1. Magic Quadrant for the Wired and Wireless LAN Access Infrastructure



Source: Gartner (July 2018)

As of June 2018

© Gartner, Inc



aruba
a Hewlett Packard
Enterprise company

YOUR FIRST STEPS TO A
MOBILE FIRST EXPERIENCE



Aruba ClearPass Policy Manager

사용자 인증 및 네트워크 제어

ARUBA 360 SECURE FABRIC 소개

Open, Analytics-driven Security for the Mobile, Cloud, and IoT Era

3rd Party Infrastructure



Hewlett Packard Enterprise
JUNIPER NETWORKS
CISCO
Extreme Networks
ARISTA
ARRIS

New Version!

ClearPass | IntroSpect

Discover, Authorization and Integrated Attack Detection and Response

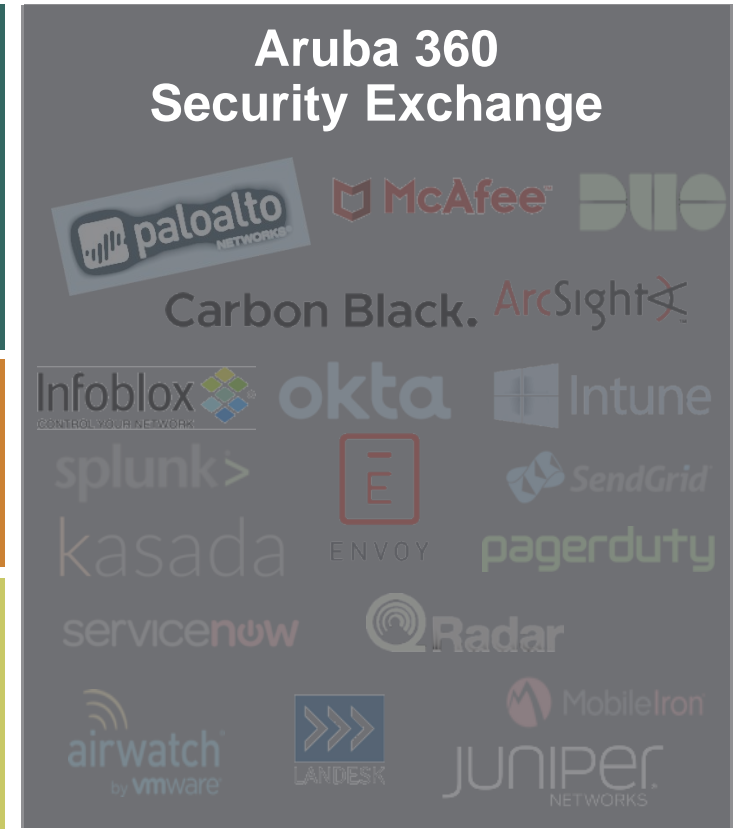
Analytics

Supervised and Unsupervised Machine Learning

Aruba Mobile First Infrastructure with Aruba Secure Core

Secure Boot | Encryption | DPI | VPN | IPS | Firewall

Aruba 360 Security Exchange



paloalto NETWORKS McAfee DUO
Carbon Black. ArcSight
Infoblox okta Intune
splunk> SendGrid
kasada ENVOY pagerduty
servicenow Radar
airwatch by vmware LANDESK MobileIron
JUNIPER NETWORKS

ClearPass at a Glance



VISIBILITY - 가시성

- Know what's connected, connecting in your wired & wireless multivendor environment



CONTROL - 네트워크 제어

- Reduce risk and workload through Automation
- All devices are Authenticated or Authorized – NO UNKNOWN DEVICES



RESPONSE – 보안 대응

- Adaptive response brokering best of breed security solutions



ClearPass Policy Manager – 제공되는 기능!

Over 100+ Partners

Services

- Policy Engine
 - 802.1X
 - MAC Auth
 - Guest
 - TACACS+
 - Profiling
- Context Database
 - +100 RADIUS dictionaries

IT Tools

- Policy Simulation
- Access Tracking
- Template-based policy creation
- LDAP Browser
- Per Session Logs
- Advanced Reporting
- AirGroup
 - Bonjour/DLNA*

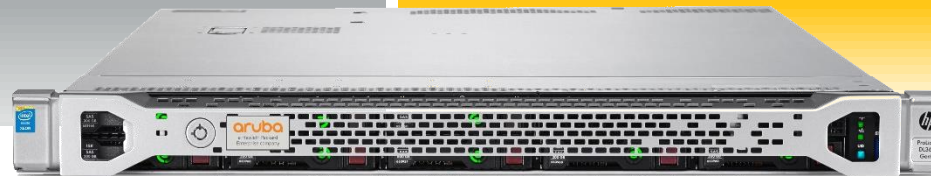
Security Exchange

(3rd Party Integration)

- API's
- Syslog Feeds
- Extensions
- Ingress Events



servicenow



ClearPass 확장 가능한 기능

자동화된 워크플로우

BYOD 및 게스트를
위한 강화된 보안

사용자 또는 디바이스
기반 정책

Onboard



Guest



OnGuard

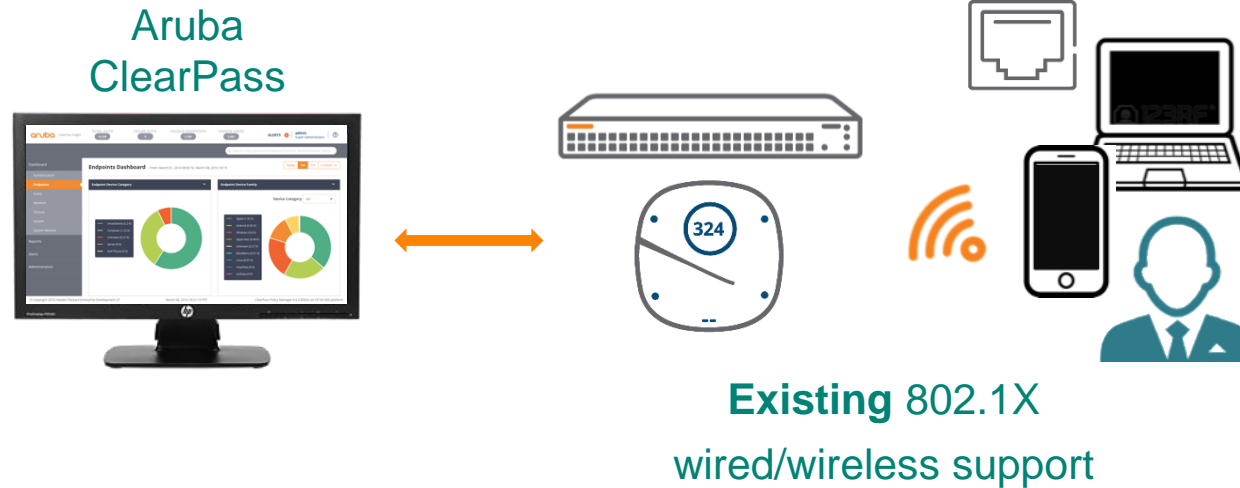


액세스 라이선스에
포함



안전한 연결 : 액세스 허용전 인증 필수

Secure Connections: Authentication Before Access



- 802.1X 기반 멀티 벤더 유선 무선 지원
- 무선 트래픽 암호화 (WPA3지원)
- 프로파일링 기능 내장 - IoT, PC, 핸드폰 구분
- 템플릿 기반의 쉬운 정책 적용

다양한 프로파일링 방식 지원

Helps ensure accurate fingerprints

Passive Profiling

- DHCP Fingerprinting (MAC OUI & Certain Options)
 - AOS IF-MAP Interface, DHCP Relay or SPAN
- HTTP User-Agent
 - AOS IF-MAP Interface, SPAN, Guest and Onboard Workflows
- TCP Fingerprinting (SYN, SYN/ACK)
 - SPAN
- ARP
 - SPAN
- Cisco Device Sensor
- Netflow/IPFIX/sFlow
 - Identifies open ports

Active Profiling

- Windows Management Instrumentation (WMI)
- Nmap
- MDM/EMM
- SSH
- ARP Table
 - SNMP
- MAC/Interface Table
 - SNMP
- CDP/LLDP Table
 - SNMP



네트워크 디스커버리를 통한 향상된 Visibility

Network Device Details

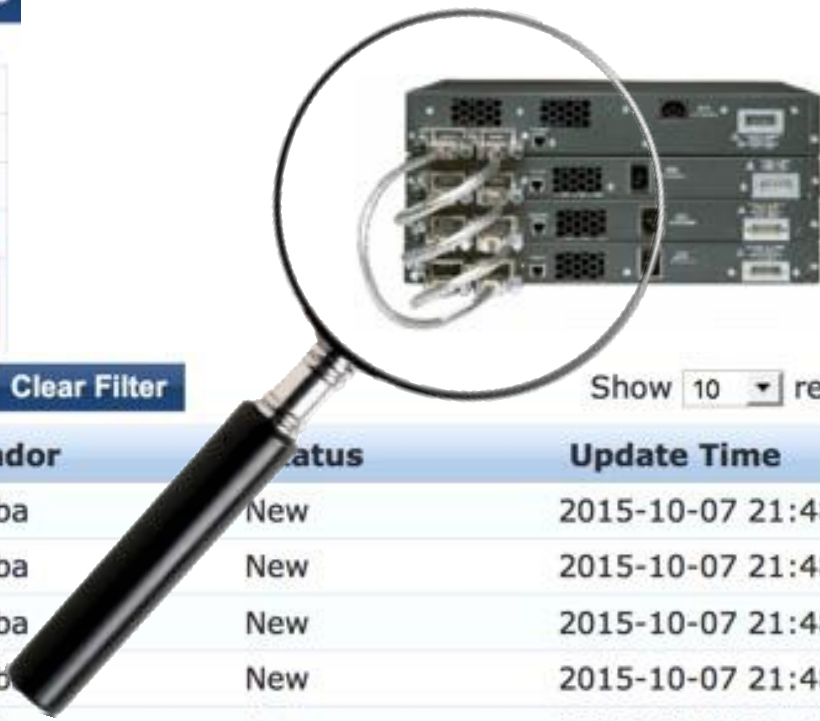
Sys Name: Cisco-switch-51.202
Vendor: Cisco
Sys Location: #1344#ROW2#Rack1"
Sys Contact: dl-cnpm-ga@arubanetworks.com
Sys Description: Cisco IOS Software, C3750E Software (C3750E-UNIVERSALK9-M), Version 15.2(1)E, RELEASE SOFTWARE (fc3)

Filter: Name contains [] + Go Clear Filter Show 10 records

#	Name	IP Address	Vendor	Status	Update Time
1.	<input type="checkbox"/> ArubaController-51.241	10.2.51.241	Aruba	New	2015-10-07 21:48:46
2.	<input type="checkbox"/> ArubaController-51.243	10.2.51.243	Aruba	New	2015-10-07 21:48:46
3.	<input type="checkbox"/> ArubaSwitch-10.2.51.244	10.2.51.244	Aruba	New	2015-10-07 21:48:46
4.	<input type="checkbox"/> Arubaswitch-50.4	10.2.50.4	Aruba	New	2015-10-07 21:48:46
5.	<input type="checkbox"/> Arubaswitch-51.242	10.2.51.242	Aruba	New	2015-10-07 21:48:46
6.	<input type="checkbox"/> Aruba-Switch-51.254	10.2.51.254	Aruba	New	2015-10-07 21:48:46
7.	<input checked="" type="checkbox"/> Cisco-Switch-48.1	10.1.93.20	Cisco	New	2015-10-07 22:03:09
8.	<input checked="" type="checkbox"/> Cisco-Switch-48.250	10.2.48.250	Cisco	New	2015-10-07 21:48:46
9.	<input checked="" type="checkbox"/> Cisco-Switch-51.201	10.2.50.201	Cisco	New	2015-10-07 21:48:46
10.	<input checked="" type="checkbox"/> Cisco-switch-51.202	10.2.51.202	Cisco	New	2015-10-07 22:03:09

Showing 1-10 of 15

Import Ignore



환경 적응형 네트워크 정책 제공

사내 PC

개인 폰 (BYOD)

1. 동일한 ID 및 인증 방식 사용
2. 프로파일링 및 외부DB연동
3. SSID를 분리 할 필요 없음
4. 사내 및 VPN에 동일한 환경 제공

Authentication

SSID

EAP-TLS

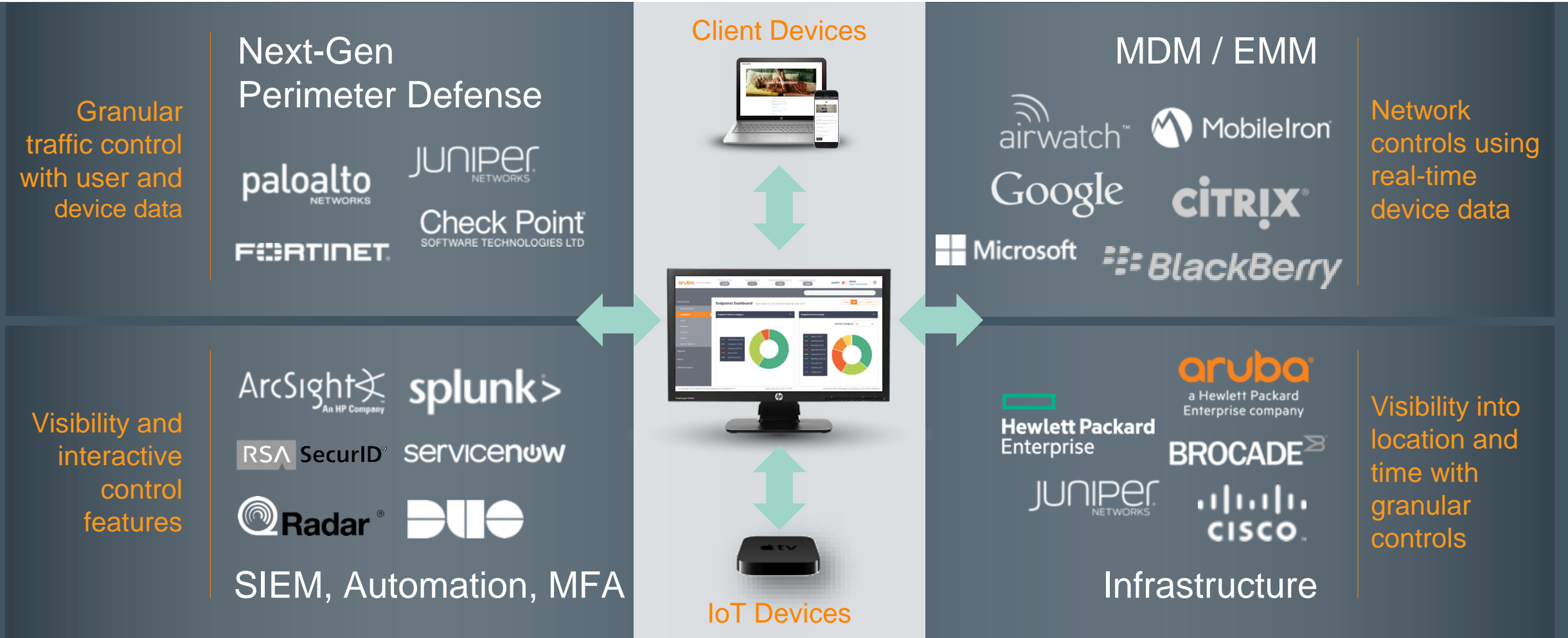
Authentication

EAP-TLS

CORP-SECURE



ClearPass Exchange는 신규솔루션과 지속적으로 연동



환경적응형 정보 공유

Adaptive Trust Context Sharing

- Thomas
- Mac OS 10.9.3
- Marketing
- 10.0.1.12



Check Point
SOFTWARE TECHNOLOGIES LTD

JUNIPER
NETWORKS

FORTINET

Employee access

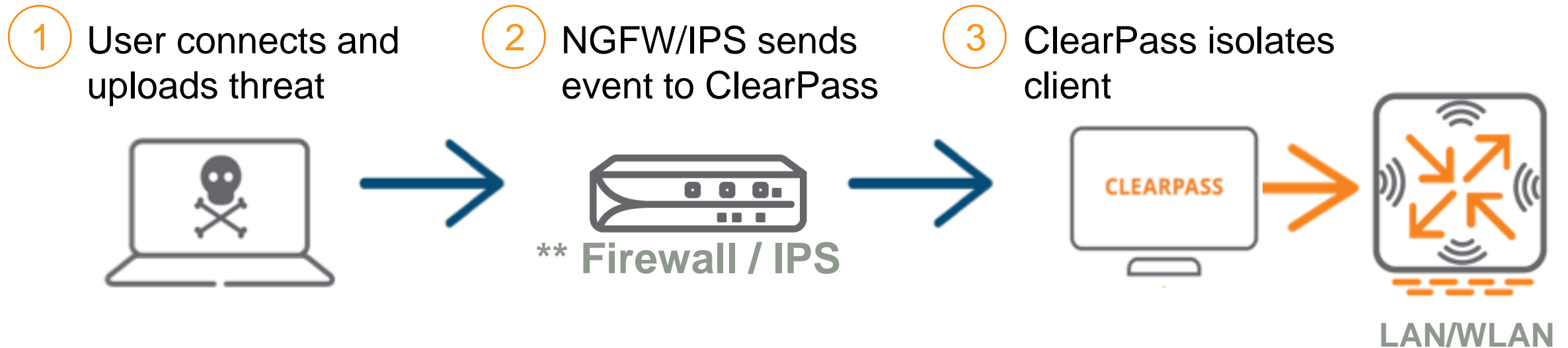
Context shared

Firewall policy
adapts to need

Works with AD, LDAP, ClearPass dB, SQL dB

에이전트 및 클라이언트 필요 없이 원하는 형태로 Context 제공 가능

Ingress Engine Third-party Threat Protection



Adaptive Trust Defense based on real-time threat detection

- Offers enhanced user experience as ClearPass can initiate user notifications, help-desk tickets, and update third-party security solutions
- ** Device in step 2 can be an on-premises MDM/EMM, SIEM, etc.

어떠한 Context 를 공유 가능한가?

Context/Feature	Palo Alto	Juniper SRX	Check Point	Fortinet	SonicWall	Intel MLC
Source IP	✓	✓	✓	✓	✓	✓
Username	✓	✓	✓	✓	✓	✓
ClearPass Role	✓	✓	✓	✓	✗	✗
Domain	✓	✓	✓	✗	✗	✓
Device Type	✓	✓	✓	✗	✗	✗
Machine OS	✓	✓	✓	✗	✗	✗
Machine Name	✓	✓	✓	✗	✗	✓
Health/Posture	✓	✓	✓	✗	✗	✗
Ingress Event Engine Dictionary	✓	✓	✓	✓	✗	✗

사용성과 보안의 조화

Security and Usability Coordination



Who: **Bob**
 Group: **Faculty**
 Device: **Personal iPad**
 Location: **Room 104**
 Time: **9am, Monday**
 Compliance: **Healthy**
 Mac Address: X
 IP Address: Y
 Airgroup **Permissions**



사전 문제 인지 및 해결

Proactive Problem Identification and Resolution

- 클리어패스에서 헬프데스크 업데이트
 - The right teams with the right information
 - As soon as a problem happens
- Not just Syslog/SNMP
 - Email
 - HelpDesk Ticketing Systems
 - SMS/Voice

EMM Profile Removed
 seel@arubanetworks.com
 Sent: Monday, February 23, 2015 at 2:17 PM
 To: SEEL Demo Alerts

The following device has attempted to connect to the Ethersphere network:

Mac Address: bc:3b:af:04:cf:f4
Enrolled User: jonh
MDM ID: a0088dab-e827-4899-ab4b-a65ffb63ab56
Mobile: iPhone 5
OS Version: iOS 8.1
Location: jonh-rap109-1

The EMM Profile has been detected as being removed by the user

* Description

The following device has had its EMM agent removed and attempted to connect to the Ethersphere WiFi network:
 Mac Address: 90:b9:31:ca:53:c7
 Enrolled User: mowen
 MDM ID: 58d59e22-ea12-47a3-9a32-6a5816c18a24
 Mobile: iPad Air
 OS Version: iOS 8.1
 Location: mowen-rap3-1

Problems			
New		Go to	Number
Number	Short description	Problem s	
PRB0001437	MobileIron Agent Removed	New	
PRB0001436	MobileIron Agent Removed	New	
PRB0001435	MobileIron Agent Removed	New	
PRB0001434	MobileIron Agent Removed	New	
PRB0001433	MobileIron Agent Removed	New	
PRB0001432	Compromised Device WiFi Connection Attempt	New	
PRB0001431	Compromised Device WiFi Connection Attempt	New	
PRB0001430	Compromised Device WiFi Connection Attempt	New	
PRB0001429	Compromised Device WiFi Connection Attempt	New	

서비스 체이닝 예제

Request Details x

Summary

Input

Output

Session Identifier:	R00040084-02-547ef57e
Date and Time:	Dec 03, 2014 03:35:28 PST
End-Host Identifier:	F0F61C87D23A Open in AirWave
Username:	tpedersen
Access Device IP/Port:	10.79.100.104:0
System Posture Status:	UNKNOWN (100)

Policies Used -

Service:	here
Authentication Method:	EAP-MSCHAPv2
Authentication Source:	dc-05.arubanetworks.com
Authorization Source:	[Endpoint Repository], Corp AD
Roles:	Aruba E, EMM Profile Removed, Smart Device, [Employee], [User Authenticated]
Endpoint:	Send MI Force Enrollment Message, EMM Not Enrolled Admin Alert Email, Open Help Desk Ticket - Device Need Enrollment, Turn on the Hue light, Update SEEL AD Display Name, Update Partner AD Display Name, Update Corp AD Display Name, PANW_Trigger_Profile, Clear MAC Caching, Update Aruba Wireless Endpoint Location, Force MDM Enrollment
Service Monitor Mode:	Disabled

◀ Showing 2 of 1-100 records ▶▶

Change Status

Export

Show Logs

Close

More Ways to Talk To ClearPass

ClearPass 6.7 has even more APIs

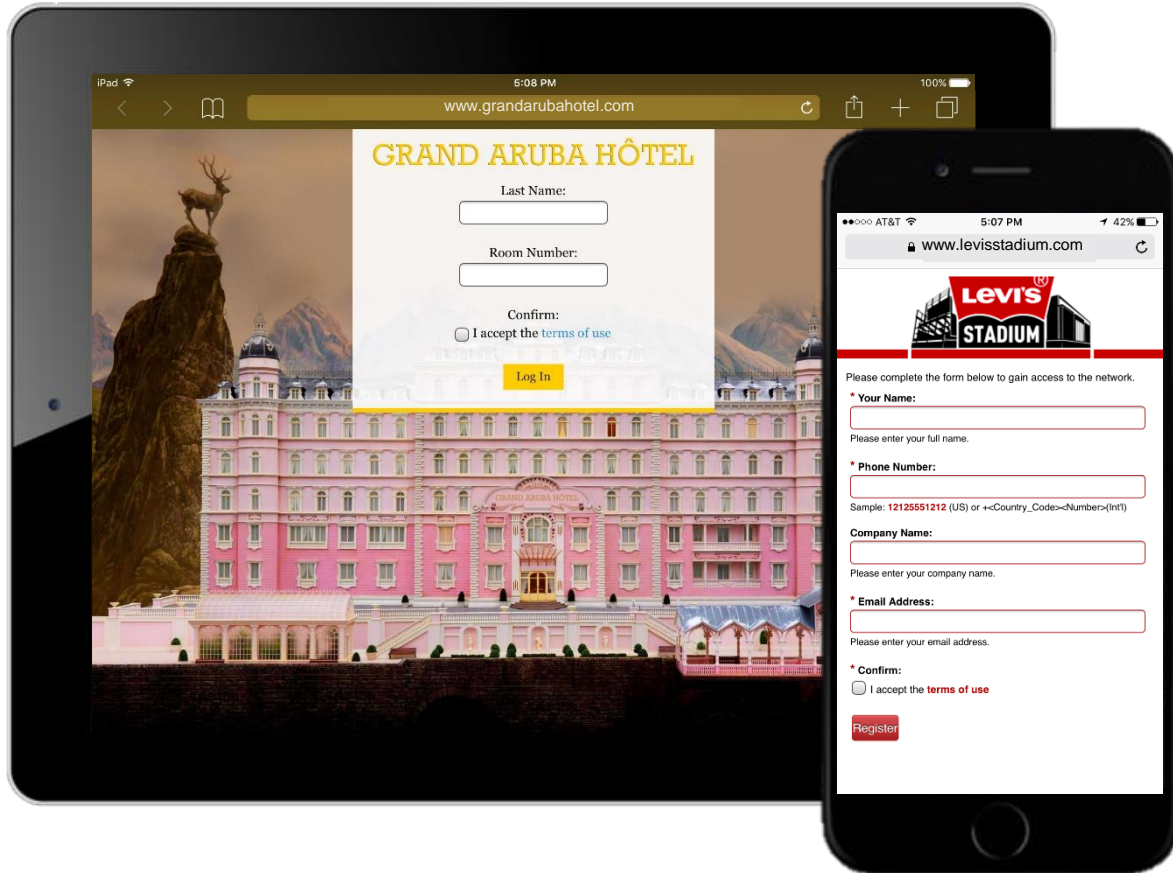
API Explorer

API	Services	
ApiFramework	ApiClient	
Authentication	AuthMethod	
Dictionaries	Attribute, ContextServerAction, Fingerprint	
Extension	Instance, InstanceConfig, InstanceLog, InstanceRestart, InstanceStart, InstanceStop, Store	
GuestManager	ActiveSession, ActiveSessionDisconnect, ActiveSessionReauthorize, Configuration, Device, Guest	
Identity	Endpoint, LocalUser, Role, StaticHostList	
Insight	Endpoint	
Network	NetworkDevice, NetworkDeviceGroup, ProxyTarget	
Onboard	Certificate, CertificateChain, CertificateExport, CertificateImport, CertificateNew, CertificateReject, CertificateRequest, CertificateRevoke, CertificateSign, Device, User	v1
OperatorLogins	ApiAuthentication, GetAccount, GetPrivileges, ListAllPrivileges, OperatorProfile	v1
Platform	ClusterDbSync, ServerConfiguration	v1
SmsServices	SmsSend	v1
UsersAndPrivileges	AdminPrivilege, AdminUser	v1

AuthMethod : Manage authentication methods [Show/Hide](#) [List Operations](#) [Expand Operations](#)

GET	/auth-method	Get a list of authentication methods
POST	/auth-method	Create a new authentication method
GET	/auth-method/{auth_method_id}	Get an authentication method
PATCH	/auth-method/{auth_method_id}	Update some fields of an authentication method
PUT	/auth-method/{auth_method_id}	Replace an authentication method
DELETE	/auth-method/{auth_method_id}	Delete an authentication method
GET	/auth-method/name/{name}	Get an authentication method by name
PATCH	/auth-method/name/{name}	Update some fields of an authentication method by name
PUT	/auth-method/name/{name}	Replace an authentication method by name
DELETE	/auth-method/name/{name}	Delete an authentication method by name

클리어패스 게스트 Customizable Portal Features



- ✓ Your branding and data fields
- ✓ Advertising – mobile app, more...
- ✓ Integration with 3rd party billing & property management systems
- ✓ Portal per department, location
- ✓ Social login, MAC cache, QoS

게스트 셀프서비스 포탈 with Sponsor

New Visitor



Access Network



ClearPass Guest



Sponsor



aruba NETWORKS

Please complete the form below to gain access to the network.

Visitor Registration	
* Sponsor's Email:	mad@arubanetworks.com <small>Email of the person sponsoring this account.</small>
* Your Name:	Joe Aruba <small>Please enter your full name.</small>
* Company Name:	Acme Company <small>Please enter your company name.</small>
* Email Address:	joe.aruba@acme.com <small>Please enter your email address.</small>
Phone Number:	14085551234 <small>Sample: 12125551212 (US) or ++<Country_Code><Number> [(INT)]</small>
I am a...	Customer

The details for your guest account are shown below.

Visitor Registration Receipt	
Sponsor's Name:	mad@arubanetworks.com
Guest's Name:	Joe Aruba
Phone Number:	14085551234
Company Name:	Acme Company
Account Username:	joe.aruba@acme.com
Guest Password:	8486
Activation Time:	2015-09-16 21:45
Expiration Time:	Thursday, 17 September 2015, 9:45 PM
Log In	

1 방문객 정보 입력

aruba NETWORKS

A guest has requested your confirmation for guest access

Visitor Registration Receipt	
Sponsor's Name:	mad@arubanetworks.com
Visitor's Name:	Joe Aruba
Phone Number:	14085551234
Company Name:	Acme Company
Account Username:	joe.aruba@acme.com
Activation Time:	Wednesday, 16 September 2015, 9:50 PM
Expiration Time:	Thursday, 17 September 2015, 9:50 AM <small>Date and time at which the visitor accounts will expire and be deleted.</small>
<input type="button" value="Confirm"/> <input type="button" value="Reject"/>	

2 스폰서 승인

3 계정 활성화 - 이메일 전송

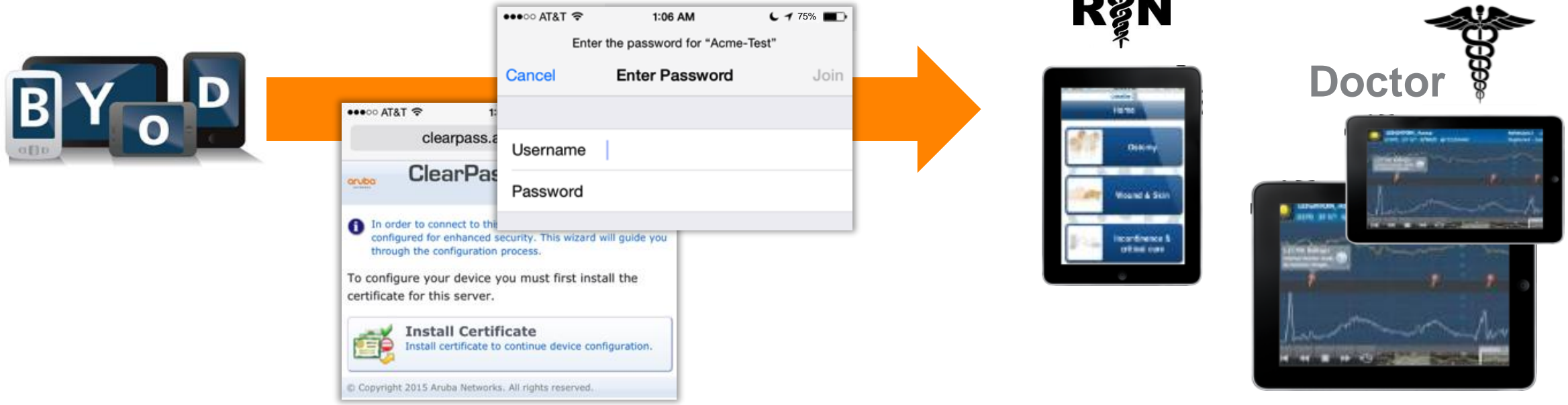
클리어패스 온보드(Add-on 라이선스)

- 디바이스별 인증서를 사용한 인증

1 사용자가 포털로 자동 접속

2 사용자 계정 입력 후 온보딩
- 인증서 발급
- 네트워크 프로파일

3 자동으로 적절한 네트워크로 연결



Easy



Secure



No Passwords

클리어패스 온가드 (Add-on 라이선스)



Endpoint Health

- 네트워크 액세스 전 단말 상태 체크
- 다양한 OS 지원(WIN,OSX, Linux)
- Agent 또는 웹플러그인 방식 지원
- AD에 조인된 경우 Agent-less 방식 지원

Automate Device Health Checking



네트워크 접속



ClearPass OnGuard



ClearPass Windows Universal System Health Validator

Enable checks for Windows 10

Product-specific checks (Uncheck to allow any product)

Select the antivirusproduct: Symantec Endpoint Protection

Product version check: At Least, Version is At Least 12.1

Engine version check: Is Latest

Data file version check: Is Latest

Data file has been updated in: 8 Hour(s)

Last scan has been done before: 7 Day(s)

Real-time Protection Status Check: No Check On Off

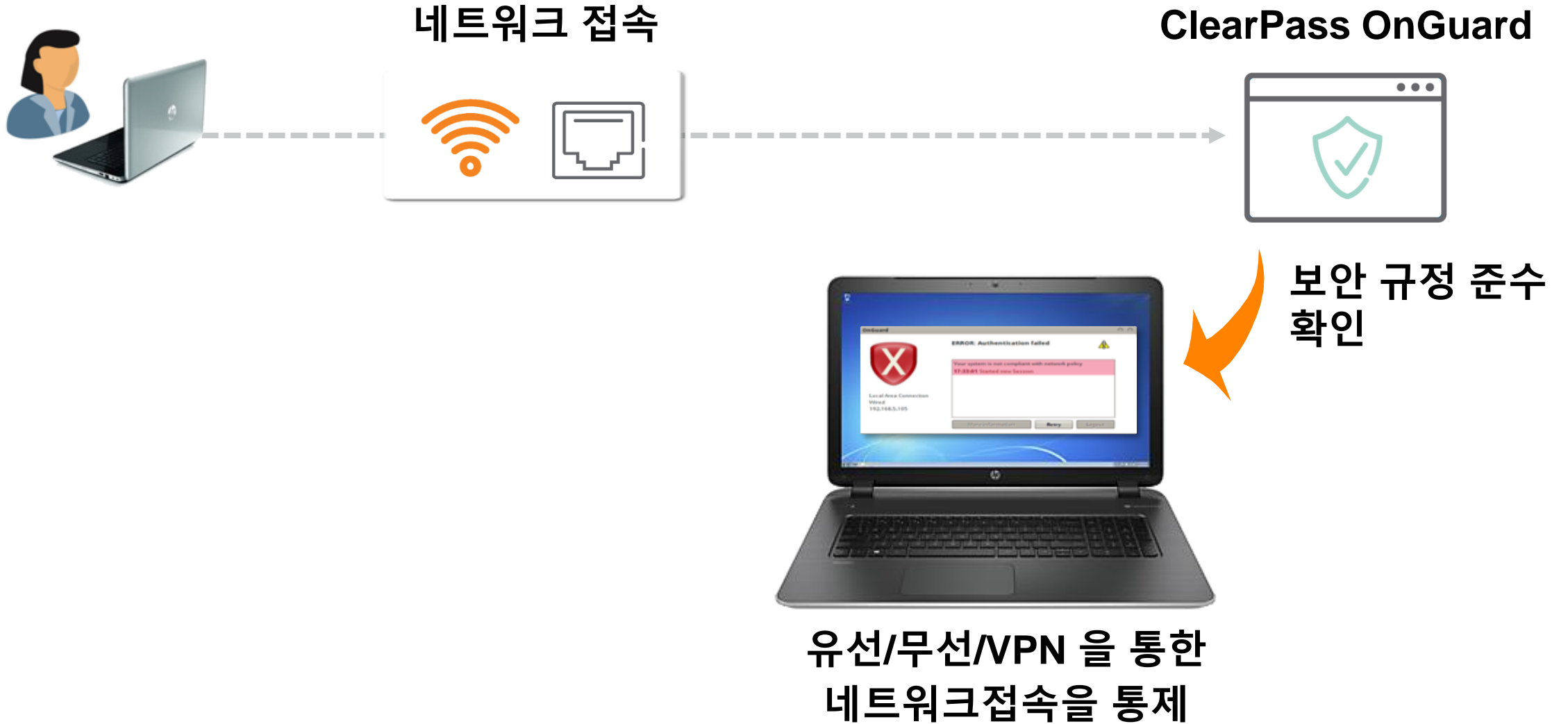
Save Cancel

Quarantine Message

Reset Save Cancel

보안 규정 준수
확인

Automate Device Health Checking



Automate Device Health Checking



네트워크 접속



ClearPass OnGuard



네트워크 위협을 최소화



보안 정책
자동 복구



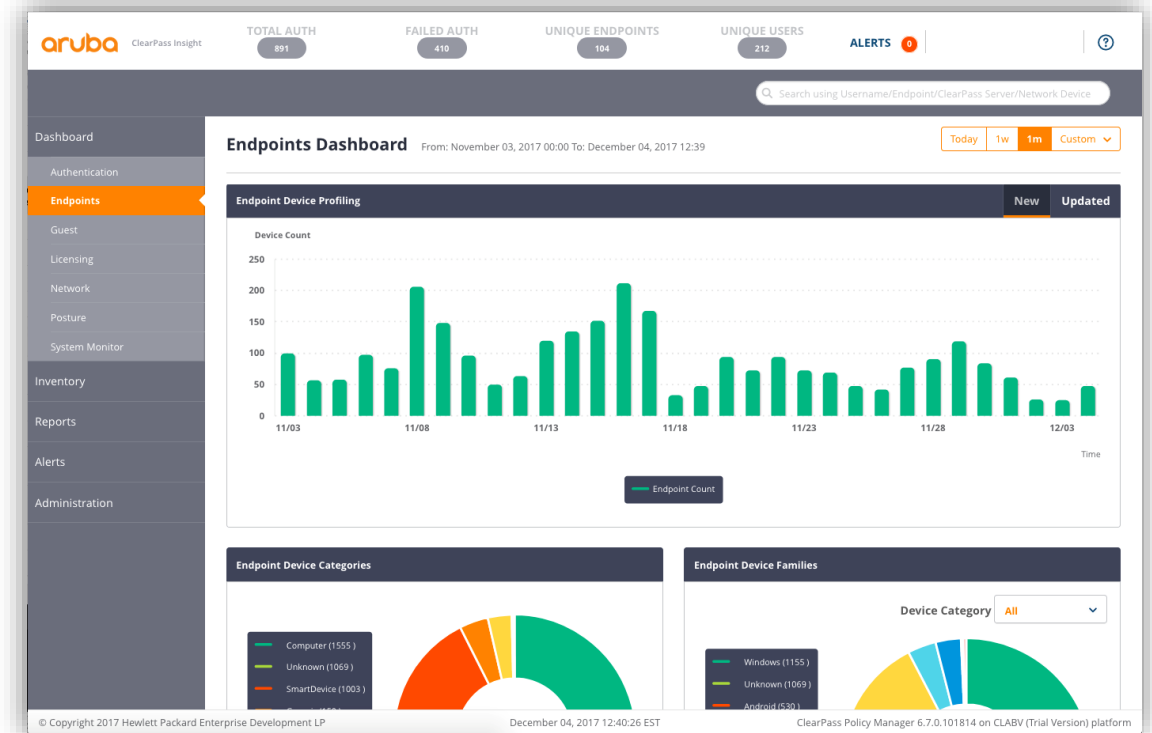
보안 규정 준수
확인



유선/무선/VPN 을 통한
네트워크접속을 통제

ClearPass Insight – 내장된 리포팅 툴

- One stop shop for all your reporting needs
- New Inventory dashboard
 - Customizable inventory view of all learned devices
- New custom alerting options and filters
 - Improves the ability for ClearPass to proactively notify admins/users of certain events
- Ability to import/export report templates
 - Allows admins to create any template they want without needing a feature enhancement.
- Emailed reports now include the HTML version of the report as well as the raw CSV



What's New In ClearPass 6.7?

ClearPass 6.7 New Licensing Model

Subscription Or Perpetual	<p style="text-align: center;">OnGuard (Endpoint Health/Posture)</p>	<p style="text-align: center;">Onboard (BYOD/CA)</p>	<ul style="list-style-type: none"> • Sold as 100, 500, 1K, 2500, 5K, 10K • Perpetual and 1/3/5* year Subscription based offerings
Subscription Or Perpetual	<p style="text-align: center;">Access (802.1X, MAC-Auth, Guest, TACACS+, OnConnect, Endpoint Profiling & Security Exchange)</p>		<ul style="list-style-type: none"> • 100, 500, • 1K, 2500, 5K, • 10K • Perpetual and 1/3/5 year Subscription based offerings
Perpetual	<p style="text-align: center;">VM Appliance / Hardware Appliances</p>		<ul style="list-style-type: none"> • C1000 - Small • C2000 - Medium • C3000 - Large Sizes • CX000V - Perpetual VM license

* OnGuard will no longer be offered as a 5 year subscription

라이선스 무엇이 변경 되었는가?

- AAA 라이선스를 하드웨어 및 VM 어플라이언스에서 분리함
- 새로운 액세스(Access)라이선스 출시 (포함기능: 802.1X, MAC Auth, TACACS, Guest, OnConnect, Security Exchange and Endpoint Profiling)
- 액세스 라이선스를 인증/인가된 동시접속 device수로 계산 (최소 100개부터)
- Subscription 방식의 액세스 라이선스 옵션 제공
- 온보드 라이선스를 Per 디바이스에서 Per사용자 로 변경

동시 접속자란?(Concurrency)?

Method	Session Begins	Session Ends
802.1X	RADIUS Accounting START	RADIUS Accounting STOP
MAC-Auth	RADIUS Accounting START	RADIUS Accounting STOP
Guest (anonymous, self-reg, social, etc)	RADIUS Accounting START	RADIUS Accounting STOP
VPN	RADIUS Accounting START	RADIUS Accounting STOP
TACACS	TACACS Accounting START	TACACS Accounting STOP
OnConnect	MAC Learned (mac-notify or switch link-up)	MAC Removed/Aged (mac-notify or switch link-down)

concurrency 모델에서는 RADIUS Accounting을 통해 "Active Session"에 대해서만 라이선스를 소모함

A,B,C,D,E connect시 license count = 5 → A disconnect시 license =4 → F connect시 license = 5

Accounting이 없어서 세션을 확인하기 어려운 경우 세션별 24시후 초기화 한다.

전환 계획

HOW IT WORKS

- 업그레이드 과정에서, 기존 라이선스(Policy Manager license 500, 5K, 25K)를 pre-activated키로 유지
- 6개월의 신규 라이선스 제공 (pre-install 6 month license keys for Access, Onboard and OnGuard)
- MNP will be the first method to convert licenses but functionality will also be present in ASP at launch
 - 아루바 고객은 직접 변환이 가능할것임(Aruba customers will be able to convert at launch.)
- Enterprise and Subscription-based 라이선스는 복잡하므로, Welcome Center (TAC)의 라이선스 변환 지원이 필요함

IN SUMMARY

With the **six month** licensing buffer, customers do not need to worry about converting their licenses the day of upgrade.

There is plenty of time to convert them without alarm.

전환계획 (계속)

HOW IT WORKS

- 기존 고객은 1:1 라이선스 교체
 - Legacy ClearPass 25K (e.g. CP-VA-25K) = 25,000 Access Licenses
 - Also includes one set of 25 licenses for each feature (Access, Onboard, OnGuard)
 - Legacy ClearPass Guest 500 = 500 Access Licenses
 - Legacy ClearPass Onboard 10K = 10K Onboard Licenses (new key)
 - Legacy ClearPass OnGuard 5K = 5K OnGuard Licenses (new key)

6.7 Update

Feature
24025

Resizable Columns in Access Tracker

OVERVIEW

- Columns in access tracker are now resizable
- Click white line in column header and drag
- NOTE: resizing does not currently persist across sessions

#	Server	Source	Username	Service	Login Status	Request Timestamp
1.	10.2.100.138	Application	timc@hpe.com	SAML_CLEARPASS_ADMIN-UI	ACCEPT	2017/11/14 19:55:43
2.	10.2.100.138	Application	angel.vidal@hpe.com	SAML_CLEARPASS_ADMIN-UI	ACCEPT	2017/11/12 19:13:50
3.	10.2.100.138	Application	djump@hpe.com	SAML_CLEARPASS_ADMIN-UI	ACCEPT	2017/11/09 16:48:22
4.	10.2.100.138	Application	djump@hpe.com	SAML_CLEARPASS_ADMIN-UI	ACCEPT	2017/11/08 15:27:39

Showing 1-4 of 4

6.7 Update

New SNMP Traps for HPE Hardware Appliances

OVERVIEW

- Fan, power and disk status for HPE appliances
 - C2000 (HW-5K)
 - C3000 (HW-25K)

Name	OID	Description
cppmHardwareFanStatus	.1.3.6.1.4.1.14823.1.6.1.1.1.1.1.19	Fan Status
cppmHardwarePowerStatus	.1.3.6.1.4.1.14823.1.6.1.1.1.1.1.20	Power Status
cppmHardwarePowerStatusDetails	.1.3.6.1.4.1.14823.1.6.1.1.1.1.1.21	Power Status Details
cppmHardwareDiskStatus	.1.3.6.1.4.1.14823.1.6.1.1.1.1.1.22	Disk Status

6.7 Update

Feature
39716

Subscription ID Replaced with HPE Passport

OVERVIEW

- The subscription ID has been replaced with HPE Passport credentials
- Passport credentials are required for:
 - software updates
 - custom skin downloads
 - profile and posture signatures
 - Extension store
- Manual signatures downloads from clearpass.arubanetworks.com now require HPE Passport credentials

The screenshot shows a web interface titled "Software Updates". A red message box at the top states: "You are not signed up for live updates; enter your HPE Passport Credentials and save." Below this, there is a section titled "HPE Passport Credentials" with two input fields: "Username:" and "Password:". Each field has a small blue icon of a person with a checkmark to its right, indicating a login or registration action.

6.7 Update

Feature
41555

Default DM / CoA Enf Profile & Template Updates

OVERVIEW

- To make things more clear, the Aruba and HPE CoA enforcement profile and DM/CoA templates have been renamed and have updated descriptions

Profile:	
Name:	[ArubaOS Switching - Bounce Switch Port]
Description:	System-defined profile to bounce the switch port on ArubaOS Switching products.
Type:	RADIUS_CoA

Profile:	
Name:	[ArubaOS Wireless - Terminate Session]
Description:	System-defined profile to disconnect the user on ArubaOS Mobility Controllers, Aruba Instant APs & Mobility Access Switches.
Type:	RADIUS_CoA

Profile:	
Name:	[H3C - Bounce Host-Port]
Description:	System-defined profile to bounce the switch port on H3C products (including HPE FlexNetwork / Comware).
Type:	RADIUS_CoA

6.7 Update

Feature
34690

Device Name Displayed in Device Groups

OVERVIEW

- When adding a network access device to a device group, the device name is now displayed along with the IP

The screenshot shows a dialog box titled "Add New Device Group". It has fields for "Name:" and "Description:". Under "Format:", there are radio buttons for "Subnet", "Regular Expression", and "List" (which is selected). Below are two lists: "Available Devices -" and "Selected Devices -". The "Available Devices" list contains: 10.17.4.100 [10.17.4.100], a [1.1.1.1], SWITCH_1 [10.0.0.1], SWITCH_10 [10.0.0.10], SWITCH_1000 [10.0.3.232], and SWITCH_10000 [10.0.39.16]. The "Selected Devices" list contains: SWITCH_1_0 [20.0.0.0], 10.17.4.250 [10.17.4.250], SWITCH_0 [10.0.0.0], and SWITCH_100 [10.0.0.100]. There are "Filter" buttons for both lists and navigation arrows between them. At the bottom right are "Save" and "Cancel" buttons.

6.7 Update

Feature
38568

Capture HTTP UA from SPAN Port

OVERVIEW

- Adds span port support for HTTP User-Agent extraction and processing from HTTP headers

Endpoint	Attributes	Fingerprints
Endpoint Fingerprint Details		
Host Open Ports:	2054	
Host User Agent:	Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/51.0.2704.79 Safari/537.36 Edge/14.14393	
DHCP Option60:	MSFT 5.0	
DHCP Options:	53,61,50,12,60,55	
DHCP Option55:	1,3,6,15,31,33,43,44,46,47,121,249,252	

PolicyManagerLogs >> async-netd >> DeviceProfiler.Log

```
2017-11-06 20:19:33,050 DEBUG Endpoint: {mac: dc536090bdc0, ip: 192.168.1.6, static_ip:False, hostname: desktop-dms25t2, mac_vendor: Intel Corporate, device: <Computer, Windows, Windows>, other: <None, None, None>, conflict:False, fp: {"dhcp": {"option55": ["1,3,6,15,31,33,43,44,46,47,121,249,252"], "option60": ["MSFT 5.0"], "options": ["53,61,50,12,60,55"]}, "host": {"user_agent": "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/51.0.2704.79 Safari/537.36 Edge/14.14393"}}, added_at: 2017-11-03 15:22:54.219900+00:00, updated_at: 2017-11-06 19:44:07.588004+00:00} loaded from tipslogdb
```

6.7 Update

Feature
15276

New Translation Functionality

DETAILS

Name	Page Title	Page N
Wired - ArubaOS-Switch		
wired_aos-s		
Edit Duplicate Delete Translations Launch		
Default	Download	Edit
Arabic Translations / العربية	Download	Edit
Basque Translations / Euskara	Download	Edit
Chinese Translations / 中文	Download	Edit
Danish Translations / Dansk	Download	Edit
Dutch Translations / Nederlands	Download	Edit
French Translations / Français	Download	Edit
German Translations / Deutsch	Download	Edit
Japanese Translations / 日本語	Download	Edit
Korean Translations / 한국어	Download	Edit
Norwegian Translations / Norsk	Download	Edit
Russian Translations / Русский	Download	Edit
Spanish Translations / Español	Download	Edit
Upload		

Page Customizations	
* Language:	(Default) Select the language for custom translations.
Item:	Wired - ArubaOS-Switch Select the item for custom translations.
Load File:	<input type="checkbox"/> Upload an edited translation Files downloaded from the Translations action can be uploaded here.
Username Label: The form label for the username field. Leave blank to use the default (Username:).	
Translation Pack ID:	24
English:	Username:
form_username_label:	The form label for the username field. Leave blank to use the default (Username:).
Password Label: The form label for the password field. Leave blank to use the default (Password:).	
Translation Pack ID:	23
English:	Password:
form_password_label:	The form label for the password field. Leave blank to use the default (Password:).
Pre-Auth Error: The text to display if the username and password lookup fails. Leave blank to use the default (Invalid username or password).	
Translation Pack ID:	27
English:	Invalid username or password
login_pre_auth_error:	The text to display if the username and password lookup fails. Leave blank to use the default (Invalid username or password).
Terms Label:	

6.7 Update

Feature
31343

Context Server Action Change for Palo Alto Integration

OVERVIEW

- Provides flexibility to customize the context server action content for Palo Alto Firewalls
- In future if Palo Alto requires additional attributes they can be easily accommodated with new actions or by modifying the existing action

<input type="checkbox"/>	Palo Alto Networks Firewall	Send Login Info	POST	Send Login info for the user
<input type="checkbox"/>	Palo Alto Networks Firewall	Send HIP Report (Global Protect)	POST	Send HIP report data for the user enabled by GlobalProtect feature on Palo Alto
<input type="checkbox"/>	Palo Alto Networks Firewall	Register Device	POST	Register device category info
<input type="checkbox"/>	Palo Alto Networks Firewall	Register Posture	POST	Register posture status for the endpoint
<input type="checkbox"/>	Palo Alto Networks Firewall	Register Role	POST	Register Role info for the user
<input type="checkbox"/>	Palo Alto Networks Firewall	Send Logout Info	POST	Send Logout info for the user
<input type="checkbox"/>	Palo Alto Networks Firewall	Unregister Device	POST	Unregister device category info
<input type="checkbox"/>	Palo Alto Networks Firewall	Unregister Posture	POST	Unregister posture status for the endpoint
<input type="checkbox"/>	Palo Alto Networks Firewall	Unregister Role	POST	Register Role info for the user

6.7 Update

Inventory

Inventory										
#	MAC ADDRESS	IP ADDRESS	HOSTNAME	CATEGORY	FAMILY	DEVICE NAME				
1	000c2932bc2e	10.1.3.102	cppm2.apollo89.com	Server	ClearPass	ClearPass VM				
2	000c299e0152	10.1.3.101	cppm.apollo89.com	Server	ClearPass	ClearPass VM				
3	68dbcab4ed05	10.1.2.233	teds-iphone	SmartDevice	Apple	Apple iPhone				
4	e4e0a69f4454	10.1.3.247	teduiapplewatch	SmartDevice	Apple	Apple iOS Device				
5	503eaa3205b3	10.1.5.226	win7-1-pc	Computer	Windows	Windows Vista/7/2008				
6	0050c50047b5	10.1.3.245	win7-2-pc	Computer	Windows	Windows Vista/7/2008				
7	000f0044755a	10.1.3.242	win7-2-pc	Computer	Windows	Windows Vista/7/2008				

6.7 Update

Feature
33430

Revoke all OAuth 2.0 Access Tokens OVERVIEW

Home » Administration » API Services » API Clients

API Clients

[Create API client](#)
[Revoke all access tokens](#)
[API Explorer](#)

The API clients you have defined are listed below.

Filter:

Client ID	Grant Types	Access Token	Operator Profile
Client1	client_credentials	8 weeks	Super Administrator

[Back to API services](#)
[Back to administration](#)
[Back to main](#)

API Clients

✓ API: Revoked 10 access token(s)

The API clients you have defined are listed below.

Filter:

Client ID
Client1

Home » Administration » API Services » API Clients

Revoke All Access Tokens

Use this form to revoke all OAuth2 access tokens, for all API clients.

Revoke All Access Tokens

Confirm: Revoke all issued OAuth2 access tokens

Note: After this operation, all clients of the API will need to reauthenticate in order to make API requests.

[Revoke Access Tokens](#)

[Back to API clients](#)
[Back to API services](#)

What's New In ClearPass 6.8?

ClearPass 6.7 Licensing Model

Subscription Or Perpetual	<p>OnGuard (Endpoint Health/Posture)</p>	<p>Onboard (BYOD/CA)</p>	<ul style="list-style-type: none"> • Sold as 100, 500, 1K, 2500, 5K, 10K • Perpetual and 1/3/5* year Subscription based offerings
Subscription Or Perpetual	<p>Access (802.1X, MAC-Auth, Guest, TACACS+, OnConnect, Endpoint Profiling & Security Exchange)</p>		<ul style="list-style-type: none"> • 100, 500, • 1K, 2500, 5K, • 10K • Perpetual and 1/3/5 year Subscription based offerings
Perpetual	<p>VM Appliance / Hardware Appliances</p>		<ul style="list-style-type: none"> • C1000 - Small • C2000 - Medium • C3000 - Large Sizes • CX000V - Perpetual VM license

* OnGuard will no longer be offered as a 5 year subscription

ClearPass 6.8 Licensing Model

CPPM 6.7 Licensing Model

Subscription Or Perpetual	<h2>Access</h2> <p>802.1X, MAC-Auth, Web Based User Registration and Authentication, MFA, TACACS+, OnConnect, System APIs, Security Exchange, and Endpoint Profiling</p>
Perpetual	<h2>Virtual Appliance / Hardware Appliances</h2>

CPPM 6.8 Licensing Model

Perpetual	<h2>Access Upgrade</h2> <p>TACACS+, Security Exchange, and Endpoint Profiling</p>
Perpetual	<h2>Entry</h2> <p>802.1X, MAC-Auth, Web Based User Registration and Authentication, MFA, OnConnect, System APIs</p>
Perpetual	<h2>Virtual Appliance / Hardware Appliances</h2>


ClearPass 6.8 Licensing Model

–Onboard

– Available for both Entry or Access licenses.

–OnGuard

– Requires Access licenses.

Subscription Or Perpetual	 <p>OnGuard (Endpoint Security Posture)</p>	Onboard (BYOD/CA)
Perpetual	<p>Entry</p> <p>802.1X, MAC-Auth, Web Based User Registration and Authentication, MFA, OnConnect, System APIs</p>	
Perpetual	<p>Virtual Appliance / Hardware Appliances</p>	

Improved Endpoint Conflict Detection



– Who is this feature for?

- Customers using profiling to detect conflicts/spoofing

– What does this feature deliver?

- ClearPass conflict detection was previously heavily tied to DHCP information and limited to Category changes. The new implementation is no longer profiler source dependent and will look for both category and family changes.
- A new cluster wide parameter to ignore conflicts from Network Boot Agents (aka PXE Clients) to another category.

– Why did we do it?

- To improve ClearPass's conflict detection

– Conflict Examples

- HTTP-DHCP-Conflicts (Family change: Smartdevice->Windows/Apple)
- DHCP-DHCP-Conflicts (Family change: Smartdevice->Windows/Apple)
- HTTP-HTTP-Conflicts (Family change: Smartdevice->Windows/Apple)
- SNMP-DHCP-Conflicts (Category & Family change: HP Switch --> HP Windows-Laptop)
- SNMP-Onguard-Conflicts (Category & Family change: HP Switch --> HP Windows-Laptop)
- SNMP-NMAP-Conflicts:(Family change: Cisco Router --> Cisco Firewall)
- DHCP-SSH-Conflicts:(Family change: Windows --> CentOS)
- DHCP-WMI:(Family change: Ubuntu --> Windows)

– Non-Conflict Examples

- SSH-DHCP-No-Conflict:[Device Name change: Ubuntu --> CentOS]
- DHCP-No-Conflict:[Generic Device to Valid Fingerprint]

Agentless OnGuard



– Who is this feature for?

- Customers who require in-depth endpoint posture and application visibility with remediation but want to deploy it in a non-intrusive and **touchless** manner or end users.

– What does this feature deliver?

- Agentless OnGuard will copy small executable file to managed Windows endpoints then use the Windows Management Instrumentation (WMI) to trigger the download of the rest of the components needed to support posture
 - No UI for end users
 - No need to manually install software or 3rd party management tools
 - Maintains control channel to provide continuing interactions to ClearPass until no longer on the network
- Uses endpoint DB to identify recently connected Windows systems to attempt to manage
 - Not tied to PostAuth event
 - Not tied to 802.1X

– Why did we do it?

- To simplify deployment and management of posture services for customers

Aruba Multi Pre-Shared Key (MPSK)



– Who is this feature for?

- Customers who want to have individual WPA2-PSK for each **device** for improved security

– What does this feature deliver?

- MPSK device registration interface
 - Allow management of PSK to per-device level in WPA2 networks
- MPSK is supported with AOS 8.4 Mobility Controllers and Instant.

– Why did we do it?

- IoT devices typically fall into a category known as headless-devices that are unable to support advanced network security functionality such as 802.1X. Aruba MPSK helps to overcome that lack of network security by generating a unique WPA2-Personal passphrase for each device.
- Leveraging the existing Device Registration capabilities, this release adds support for MPSK generation and management (supported with Entry or Access, no Onboard required) so that end users can create keys on their own without IT involvement.
- MPSK does not replace secure authentication methods like EAP-TLS for standard end-user devices like laptops, tablets and smartphones.

WPA3



– Who is this feature for?

- Customers who want to use WPA3 Enterprise functionality

– What does this feature deliver?

- ClearPass will add support for WPA3 Enterprise related attributes that are used in WPA3 connections only
 - Requires ArubaOS/other devices to support WPA3
 - Additional fields tracked to validate Suite B crypto used
 - Requires Suite B enabled WPA3 supplicants

– Why did we do it?

- Aruba played a key role in WPA3 standard development
 - WPA3 can be used without ClearPass (similar to WPA2)
 - WPA3 Enterprise support requires ClearPass

Access Tracker – 인증방법, NAS-IP 항목 추가

Select Server/Domain: CP68-B.clearpass.boston (100.65.30.73)

Select Filter: [All Requests] Add

Select Date Range: Last 1 day before ... or Show Latest

Select Columns:

Available Columns	Selected Columns
Alerts Present	Source
Auth Type	Username
Enforcement Profiles	Service
Error Code	Auth Method
Host MAC Address	Login Status
Monitor Mode	Request Timestamp

Save Cancel

Filter: contains Go Clear Filter Show 20 records

#	Name	Service	Auth Method	Login Status	Request Timestamp
1.	@clearpass.local	6.8 TOI - Wireless	EAP-TTLS,PAP	ACCEPT	2019/02/21 13:09:...

Select Columns:

Available Columns	Selected Columns
Host MAC Address	Source
Monitor Mode	Username
NAS IP Address	Service
NAS Port	NAS Name
Request ID	Login Status
Server	Request Timestamp

Move Up ↑ Move Down ↓

Filter: contains Go Clear Filter Show 20 records

#	Name	Service	NAS Name	Login Status
1.	@clearpass.local	6.8 TOI - Wireless	boston-fmc-1	ACCEPT

Guest Galleria new skin

Galleria 2.0 Guest

Feature
{{CP-31415}}

- A new version of Galleria is available
- Upgrades will continue using Galleria 1.0 while new installs will default to Galleria 2.0



Why ClearPass



Multivendor & 3rd Party integration

User-experience driven applications

Scalability and cost advantages

Business oriented policy services

– building blocks, roles, troubleshooting tools

aruba

a Hewlett Packard
Enterprise company

Thank You



AMAZING EXPERIENCES WITH AMAZING SIMPLICITY

aruba

a Hewlett Packard
Enterprise company

Backup

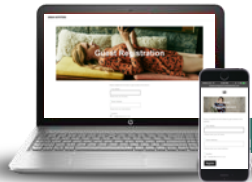
Mobile First Network with ClearPass



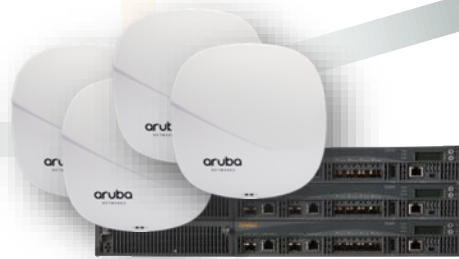
Internet of Things (IoT)



Multi-vendor switching



BYOD and corporate owned



Multi-vendor WLANs



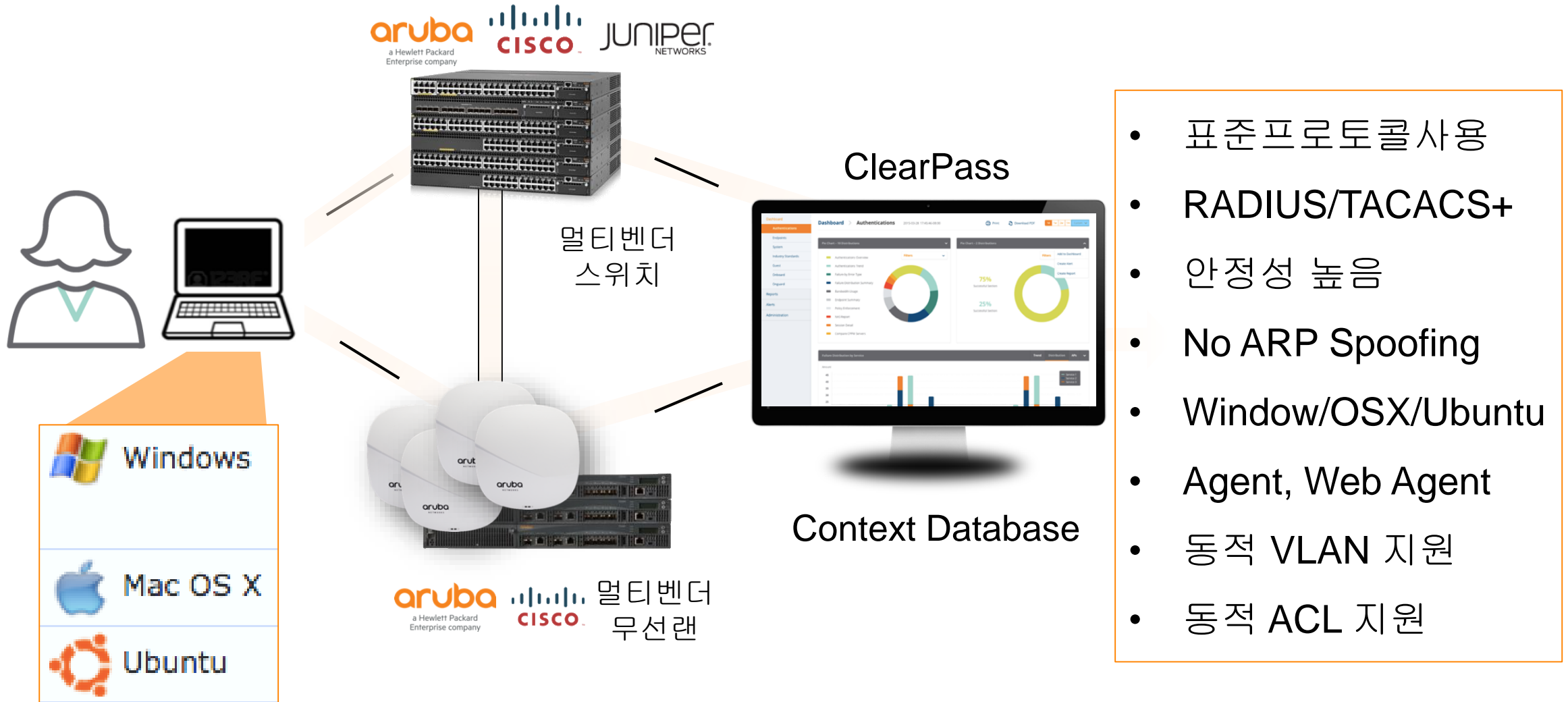
User/Device Profiling

Who: **Bob**
Group: **Faculty**
Device: **Personal iPad**
Location: **Room 104**
Time: **9am, Monday**
Compliance: **Healthy**
Mac Address: X
IP Address: Y
Airgroup **Permissions**

Aruba ClearPass

- RADIUS
- TACACS+
- 802.1x
- MAC 인증
- OnConnect for IOT

Mobile First Network with ClearPass



Dynamic Network with Multi-Vendor



Dynamic VLAN

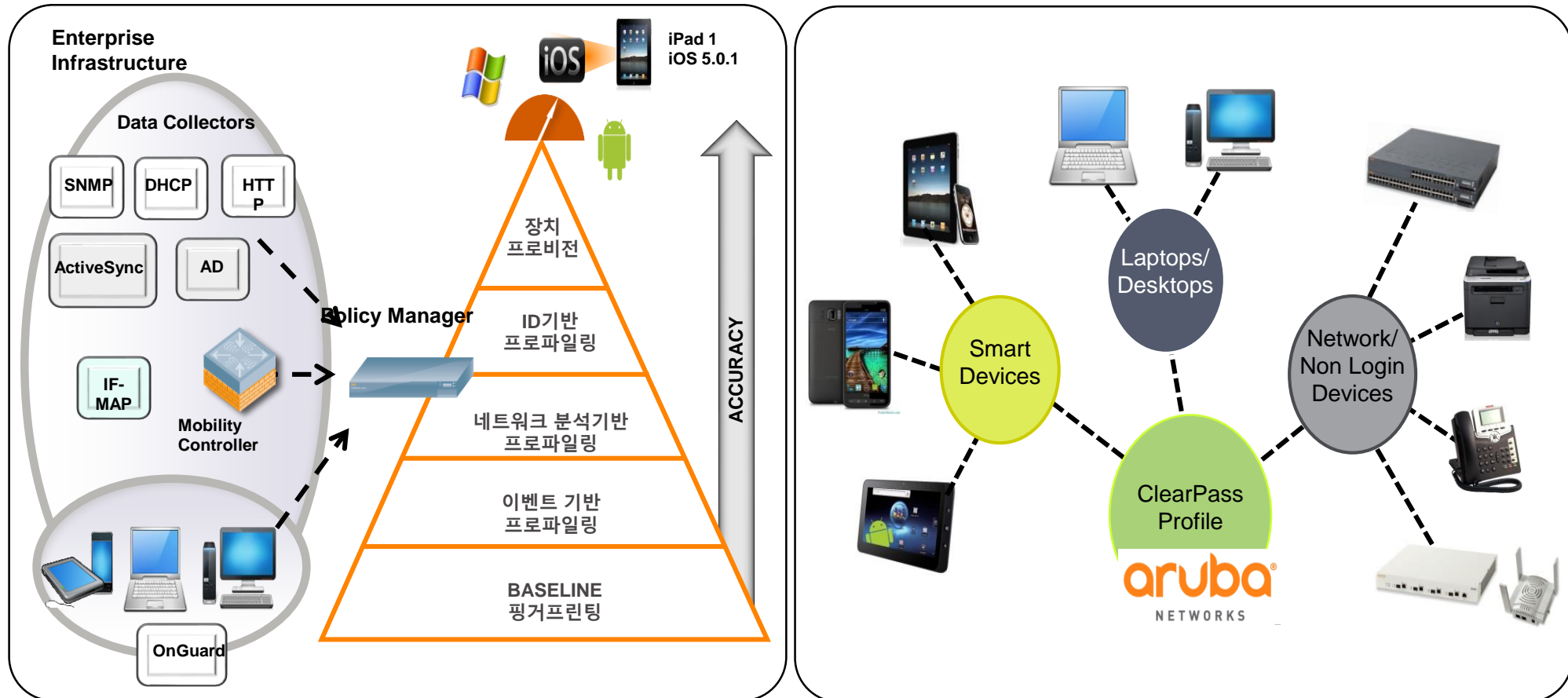
- HPE Aruba, Brocade, Cisco, Alcatel 등 802.1x를 지원하는 모든 스위치에 적용 가능
- 사용자 인증 성공시 부서에 따른 VLAN 할당
- 매년 최소 1회 이상의 조직 변경

Dynamic ACL

- HPE Aruba, Cisco, Alcatel 등의 벤더에서 사용자 인증 결과에 따라 네트워크 접근 권한을 할당 (NAC)
- 사용자 인증 성공시 부서에 따른 ACL 할당
- 사용자 세션별 ACL이 적용 되어 보안 향상

자동 프로파일링 및 카테고리 변경 탐지

- 사용자, 부서에 따른 차별화된 권한 할당
- 프로파일링을 통한 디바이스 종류별 권한 할당



프로파일링이 핵심!

The screenshot displays the Aruba View Endpoint interface, which is used for managing and monitoring network endpoints. It features several overlapping windows and panels:

- View Endpoint (Top Left):** A summary table for endpoint information.

Endpoint	Fingerprints
MAC Address	b8e8562
Description	
Status	Known
MAC Vendor	Apple
Added by	Policy M
- View Endpoint (Middle Left):** A detailed view of the endpoint fingerprint.

Endpoint	Fingerprints
Endpoint Fingerprint Details	
Host OS Type:	Ma
Host User Agent:	Mc Fir (K Int Sa
Device Name:	T2
Device Category:	Co
Device Family:	Ap
DHCP Options:	53
DHCP Option55:	1,
- View Endpoint (Bottom Left):** A list of endpoints with a search filter.

#	Endpoint
1.	<input type="checkbox"/> b8e85627ab72

Showing 1-1 of 1
- View Endpoint (Right):** A detailed view of the endpoint attributes.

Endpoint	Fingerprints	Attributes
Attribute		
Value		
1.	AD_Name	= Guetae Jung
2.	Device Name	= T2's MacBook Air
3.	Device Type	= OS X
4.	Device UDID	= C3A737CD-C6BA-5F32-8BE8-A506CEDCF1CC
5.	Guest Role ID	= 0
6.	Last_Known_Location	= 10.79.100.104:ted.jung@hpe.com-ArubaRAP-108-RW-1
7.	Owner	= gjung
8.	Product Name	= MacBookAir6,2
9.	Product Version	= 15G31
10.	Username	= ted.jung@hpe.com

유/무선랜 인증 강화 방안 - 지식기반 인증



2. department

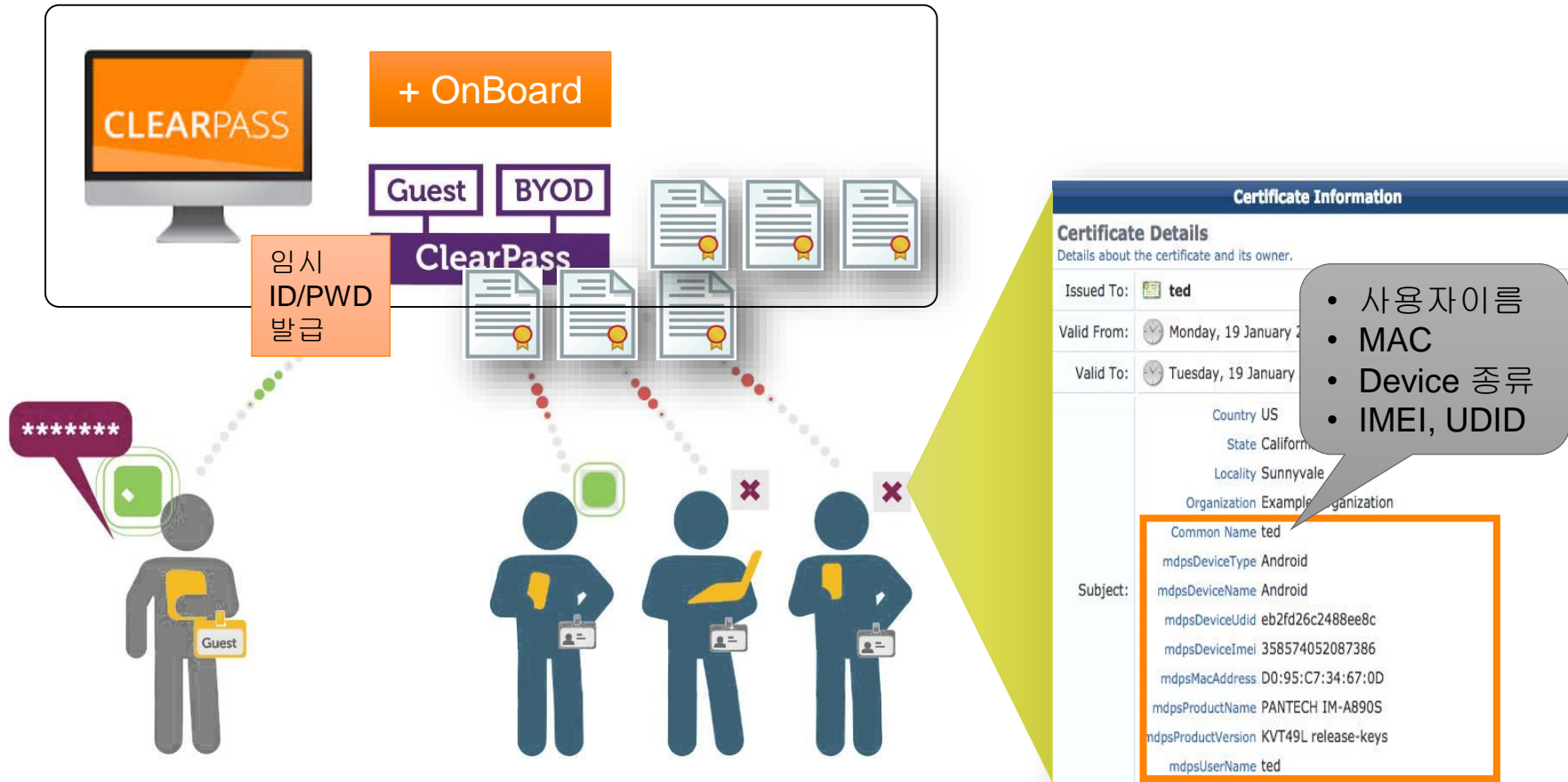
Department

String

Role, Attribute

- 아루바 CLEARPASS는 AD, LDAP, SQL 등 다양한 DB를 연동하여 사용자 인증을 수행할 수 있습니다.
- 내부자가 ID/PWD를 공유 하는 것을 어떻게 막을 것인가? (Abuse case)

유/무선랜 인증 강화 방안- 소유기반 인증



- 협력직의 경우 기간이 고정된 ID/PWD 발급

방화벽 연동 기술 - CheckPoint

Previous Next Copy Details

Identity Awareness Log In Severity

Log Info	
Product	Identity Awareness
Date	9Feb2015
Time	17:28:14
Number	263422
Type	Log
Origin	IArest

Log In	
Action	Log In
Authentication Status	Successful Login
Authentication Method	User/Machine Authentication (Identity Awareness API)
Description	---
Identity Source	Aruba ClearPass Policy Manager

Traffic	
Source	10.2.100.169
	djump
Service	---
Protocol	---
Interface	---
Source Port	---

User Information	
Source User Group	All Users
Source Machine Group	---
Associated Roles	---

More	
Product Family	Network
Information	---

방화벽 연동 기술 - PaloAlto

BYOD환경에서의 방화벽 정책
- 안드로이드는 페이스북 허용

Source User	Destination	To Port	Application	Action	Rule	Bytes
marc	216.74.41.14			allow		
marc	216.74.41.14			allow		
marc	54.241.126.35	443	ssl	allow		
marc	10.1.8.200	443	incomplete	allow	Allow_FB_Android	
marc	10.1.8.200	443	incomplete	allow	Allow_FB_Android	
marc	10.1.8.200	443	incomplete	allow	Allow_FB_Android	
marc	10.1.8.200	443	incomplete	allow	Allow_FB_Android	
marc	54.235.161.76	443	ssl	allow	allow	

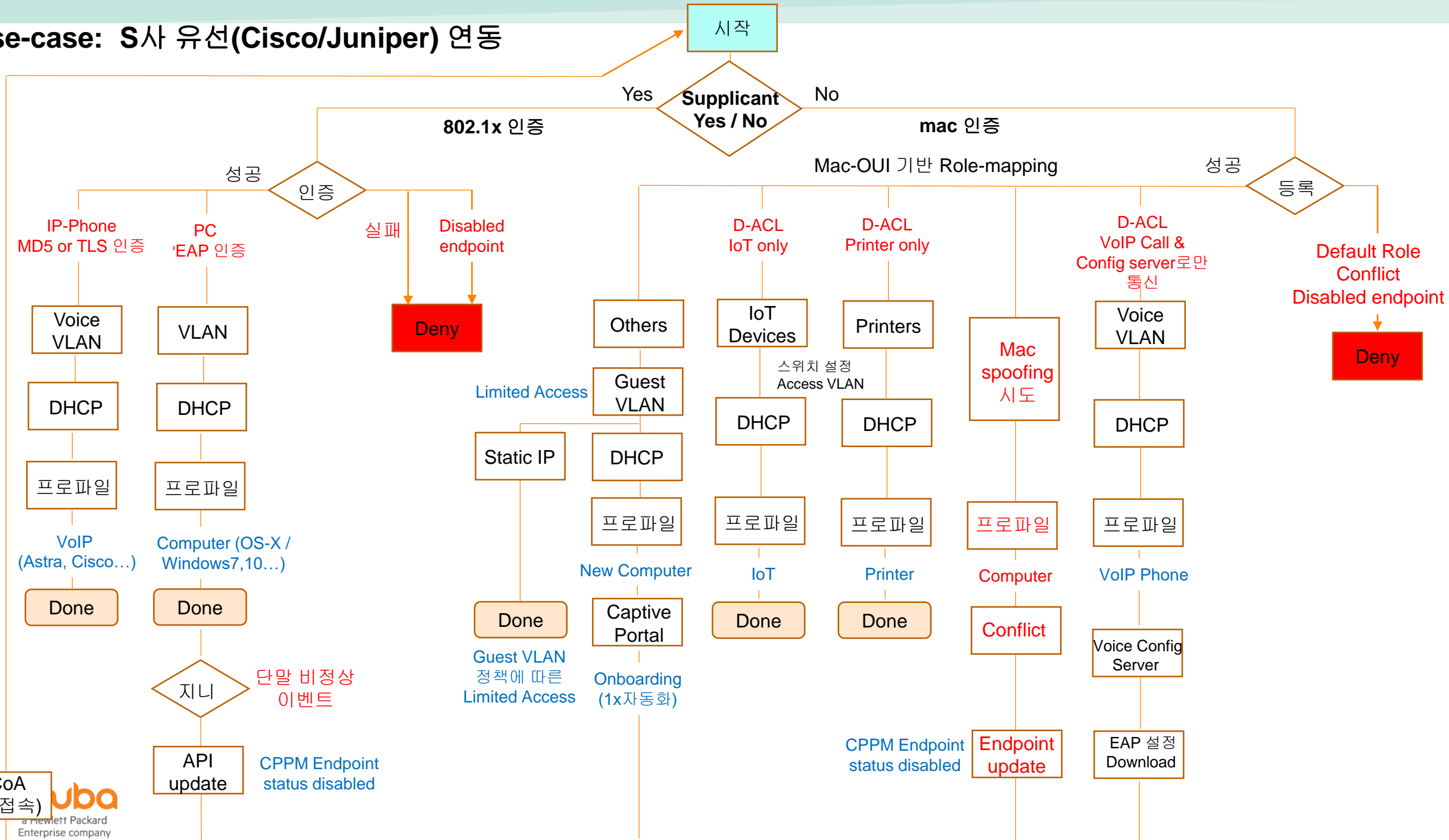
사용자 'marc'의 안드로이드 디바이스만 Facebook 접속 허용

BYOD환경에서의 방화벽 정책
- 업무용 PC는 페이스북 차단

Source User	Destination	To Port	Application	Action	Rule	Bytes
marc	74.125.224.37	80	incomplete	allow	allow	432
marc	74.125.224.59	80	incomplete	allow	allow	432
marc	10.1.1.50					244
marc	173.223.232.153					432
marc	10.1.1.50					228
marc	74.125.224.32	80	web-browsing	allow	allow	19.0 K
marc	69.171.237.20	443	facebook-base	deny	Block_FB_Corporate	437
marc	74.125.224.32	80	youtube-base	allow	allow	34.5 K

사용자 'marc'의 업무용 디바이스는 Facebook 접속 차단

Use-case: S사 유선(Cisco/Juniper) 연동



Mobile First Architecture

사용자 기반 터널링(UBT)

Aruba Campus Switching – Comprehensive **Mobile First Portfolio**

Core

Aggregation

Access



Aruba 8325



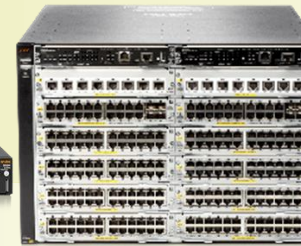
Aruba 8320



Aruba 8400



Aruba 3810



Aruba 5400R



Aruba 2930F



Aruba 2930M



Aruba 2540



Aruba 2530

Future proof wired infrastructure
Wired is aggregation for WLAN and IoT

User, device aware “colorless” ports
with Aruba ClearPass

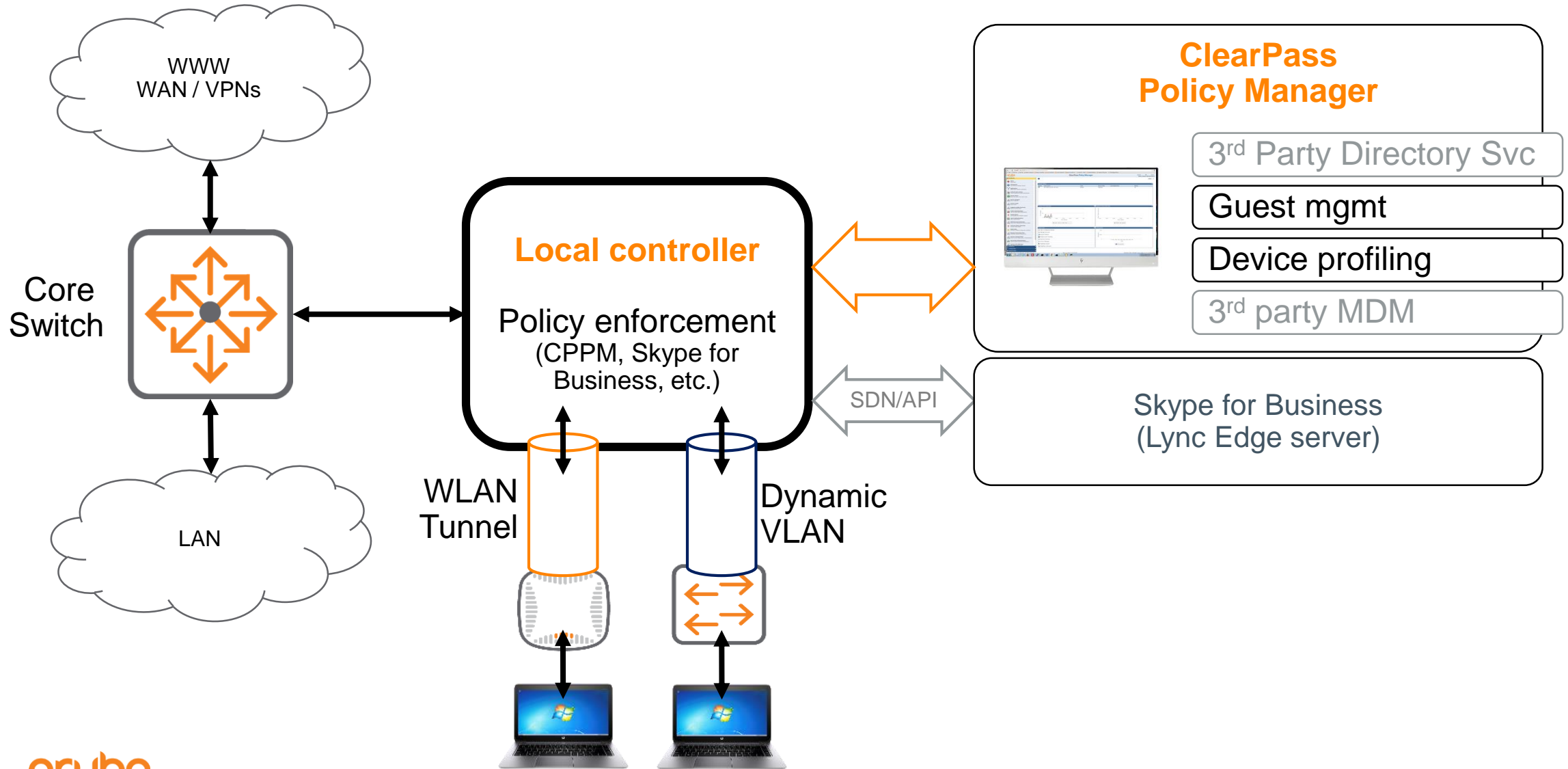
Zero touch provisioning at the branch
with Aruba AirWave and Central

ArubaOS-Switch 소개

- **ArubaOS-Switch:** HPE Aruba의 Switch OS 이름
 - Aruba의 Mobile-First solution(AirWave, ClearPass 등) 지원
- 유무선 Networking 분야에서 30년 이상 Leader 역할
- 지속적으로 Ethernet switching 분야에서 연구 개발 진행
- 끊임없는 노력을 통한 혁신
- REST API 프로그래밍 기능
- 스위치 성능의 지속적인 개선을 수행
- 엔터프라이즈 고객의 Needs에 맞춘 고급기능 추가
 - 향상된 모니터링 및 측정, 효과적인 지원

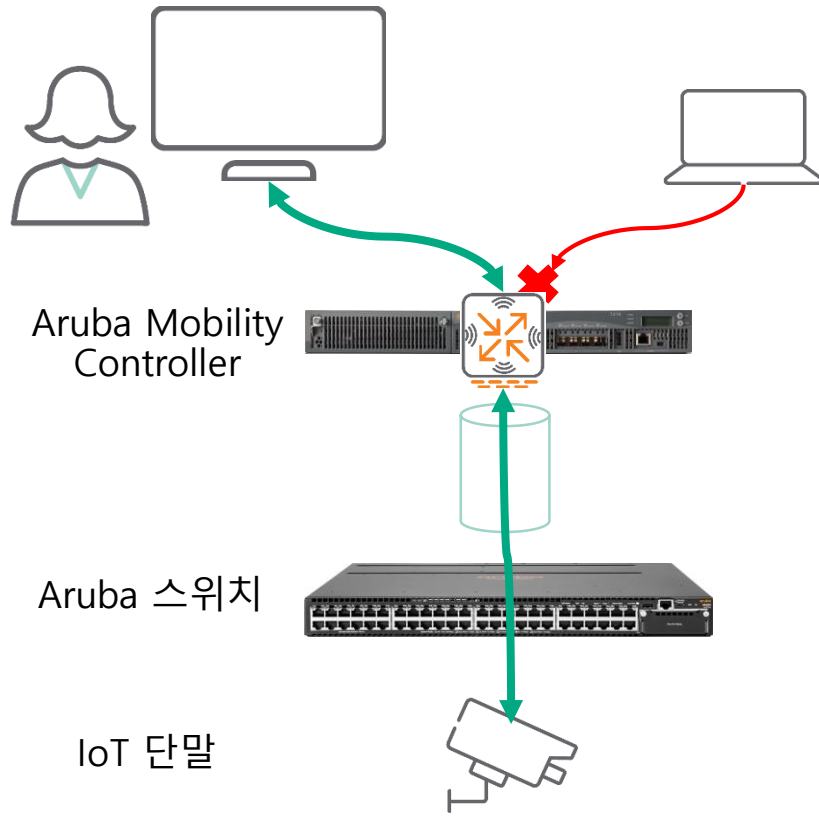


이해하기 쉬운 Mobility First Network

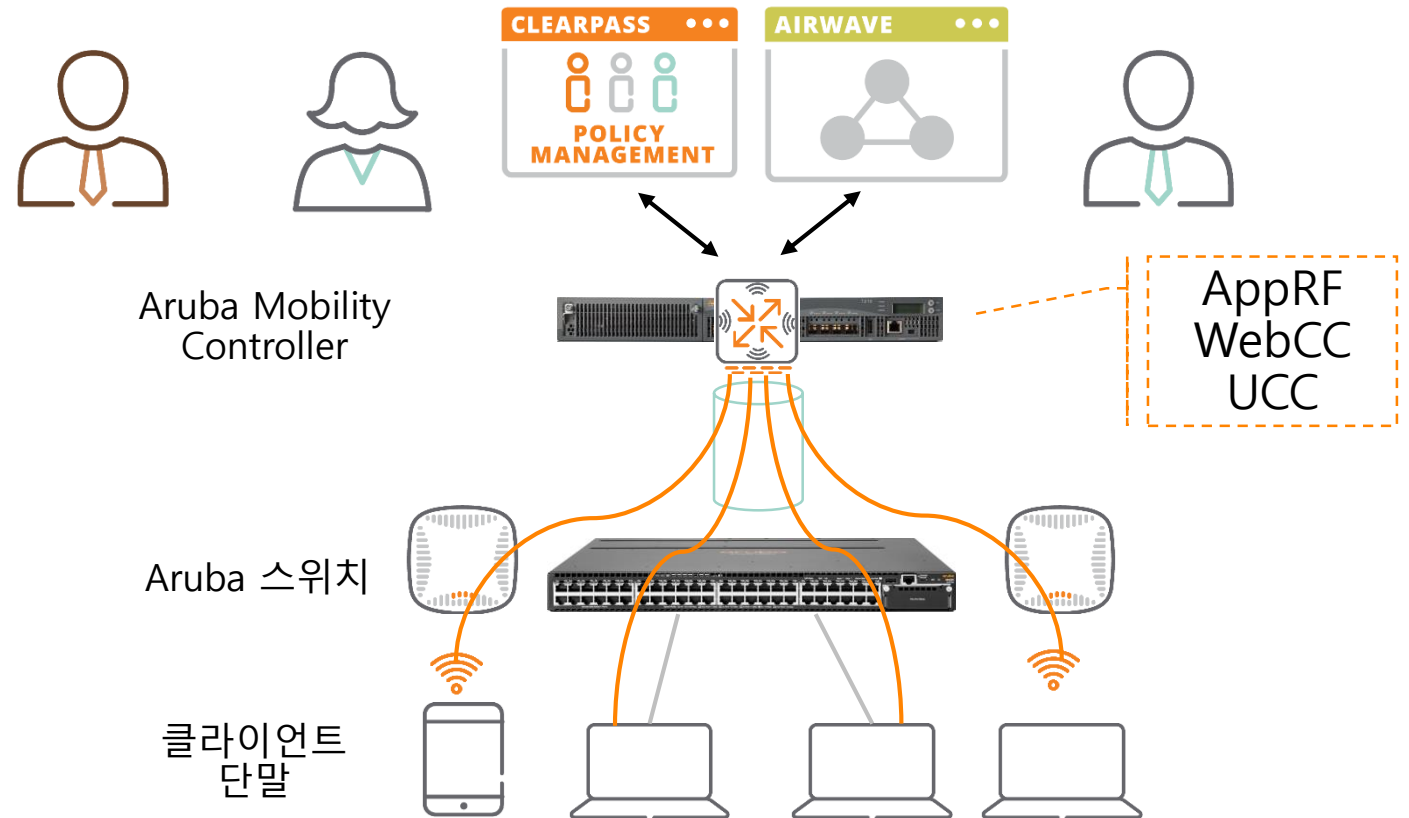


Dynamic Segmentation

고객의 주요 자산 보호



통합 정책 및 가시성



Downloadable User Roles

단일의 정책 관리 시스템

- ClearPass를 통해서
단말 인증시 자동으로 정책 적용

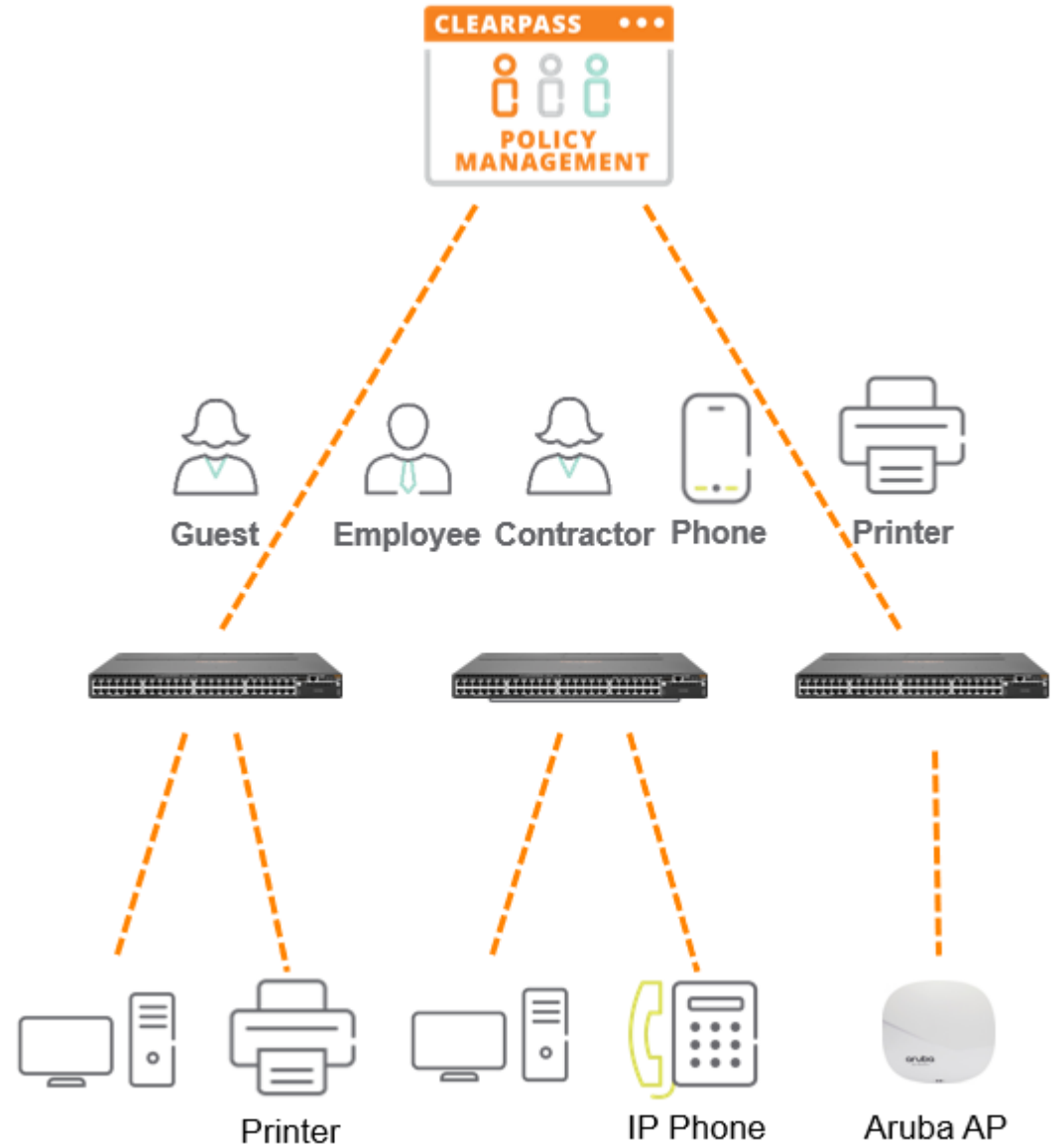
기존 사용자/단말 위에 Role(역할) 생성

- 모든 사용자와 단말에 Role을 할당
- Role에 따른 정책(QoS, VLAN, ACL, Rate Limits)
적용

유무선 통합 정책 관리

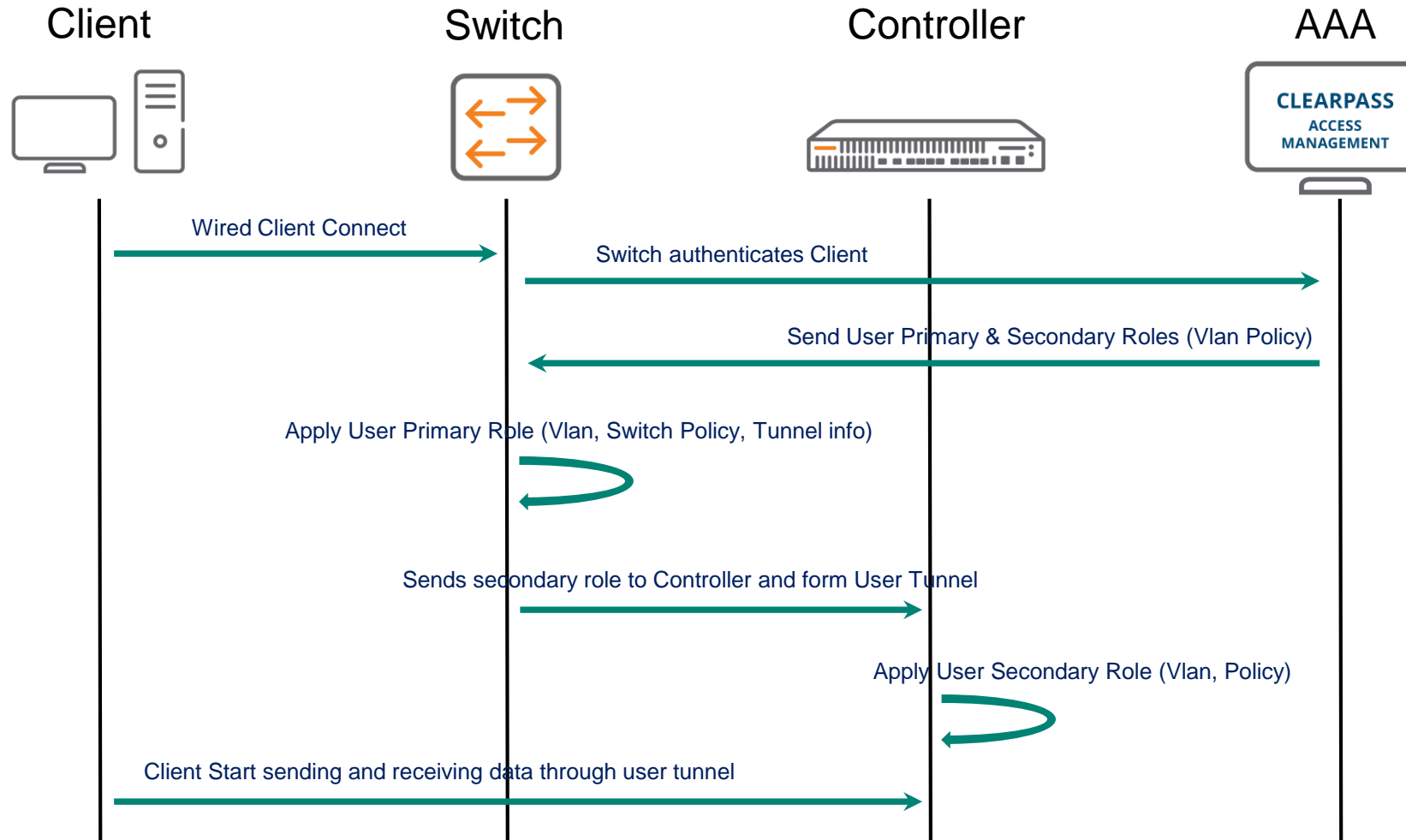
- 무선 AP와 마찬가지로 간단한 정책 구성 및 관리

*ArubaOS-Switch 16.04 이후부터 가능



User-Based Tunneling (UBT)

Wired Client Flowchart



Mobile-First Switching

- 액세스 환경의 주요 기능

Gigabit Access



Aruba 2530



Aruba 2540



Aruba 2930F

Multi-Gig Access



Aruba 2930M




Aruba 3810



Aruba 5400R

	Aruba 2530	Aruba 2540	Aruba 2930F	Aruba 2930M	Aruba 3810	Aruba 5400R
Switching	L2	L2 + RIP/static	L3 + RIP, Access OSPF	L3 + RIP, Access OSPF	Advanced L3	Advanced L3
Modular Power & Uplinks				●	●	●
Smart Rate Multi-Gig Ports				●	●	●
Stacking			VSF	●	●	VSF
SDN-OpenFlow			●	●	●	●
SDN-REST APIs	●	●	●	●	●	●
AirWave, ClearPass, Central	●	●	●	●	●	●
PoE+	●	●	●	●	●	●
PoE Class 6 (60W)				●		

New Higher Power PoE Devices Drives New IEEE Standard



	2003	2009	New higher power standard (in 2018)			
Standard	IEEE 802.3af	IEEE 802.3at	IEEE 802.3bt			
Acronym	PoE	PoE+	No consistent acronym Proprietary implementations: UPoE, PoE++			
Power	15.4 W	30 W	15.4 W	30 W	60 W	100 W

Why? More power without an electrical outlet.
Devices: Security cameras - New APs with power forwarding – Lighting

Aruba 2930M Switch Series Smart Rate 802.3bt compatible models

Back of all 2930M switches include 2 modular power supply slots, 1 stacking module slot and 1 modular uplink slot



All front panel ports are able to push up to 60W of PoE per port**

Smart Rate Ports:

- 1,2.5,5GbE with PoE
- 10GbE not supported on R0M68A Smart Rate ports. (use Smart Rate module for 10GbE uplink)



R0M68A – Aruba 2930M with 24 Smart Rate (1,2.5,5GbE) ports

Management Ports:

- Dual Personality RJ-45 or Micro USB console port
- 100BASE-T
- OOB Ethernet port
- USB-A storage port for memory stick (upload/download files)

Smart Rate Ports:

- 1,2.5,5,10GbE with PoE



R0M67A – Aruba 2930M with 8 Smart Rate (1,2.5,5,10GbE) ports and 40 x 1GbE ports (36 x RJ-45 and 4 x dual personality ports)

기존 케이블을 활용한 대역폭 확장

HPE **Smart Rate Multi-gigabit** Ethernet (IEEE 802.3bz)



Faster

Simple

Future proof