



The network's impact on student and staff experience

Client-centric Analytics and Assurance

Darren Smith – Aruba Networks

Growing IT Challenges

**More User Devices,
Apps and Services**



**73% of orgs
expected to shift
nearly all apps to
SaaS by 2020**

**Legacy
Tools**



**Little focus on
user / client
perspective**

**Limited Resources
and Bandwidth**



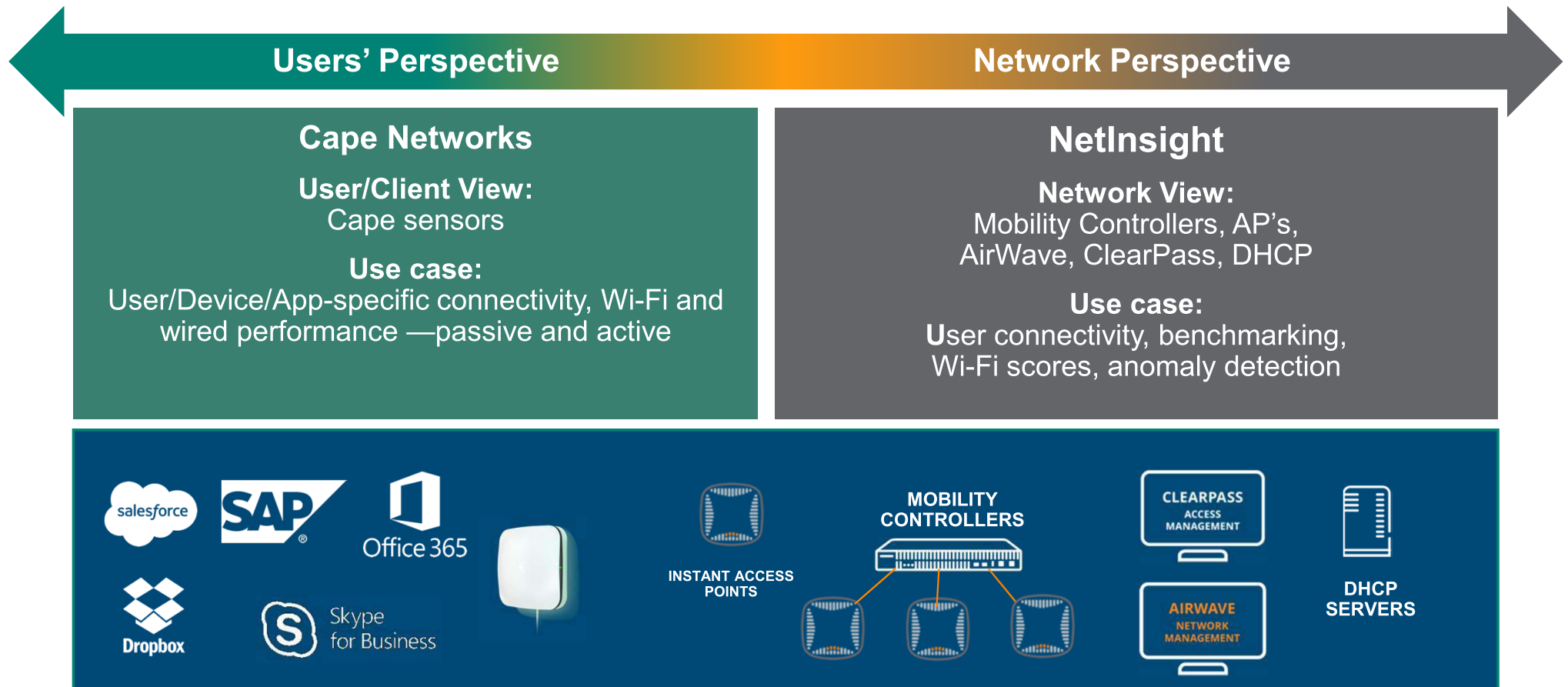
**IT team can't keep
up with user
expectations**

“The Wi-Fi is broken...”

Where to start...?



Aruba's Analytics and Assurance Coverage



Automate Operation of Wi-Fi Network for Enterprise Scale

Innovative Data Extraction



- Instrumentation
- Stateful data processing

Analytics Engines



- Anomaly Detection
- Event Clustering
- RF Fingerprinting
- Connectivity Analysis
- Multi-source correlation

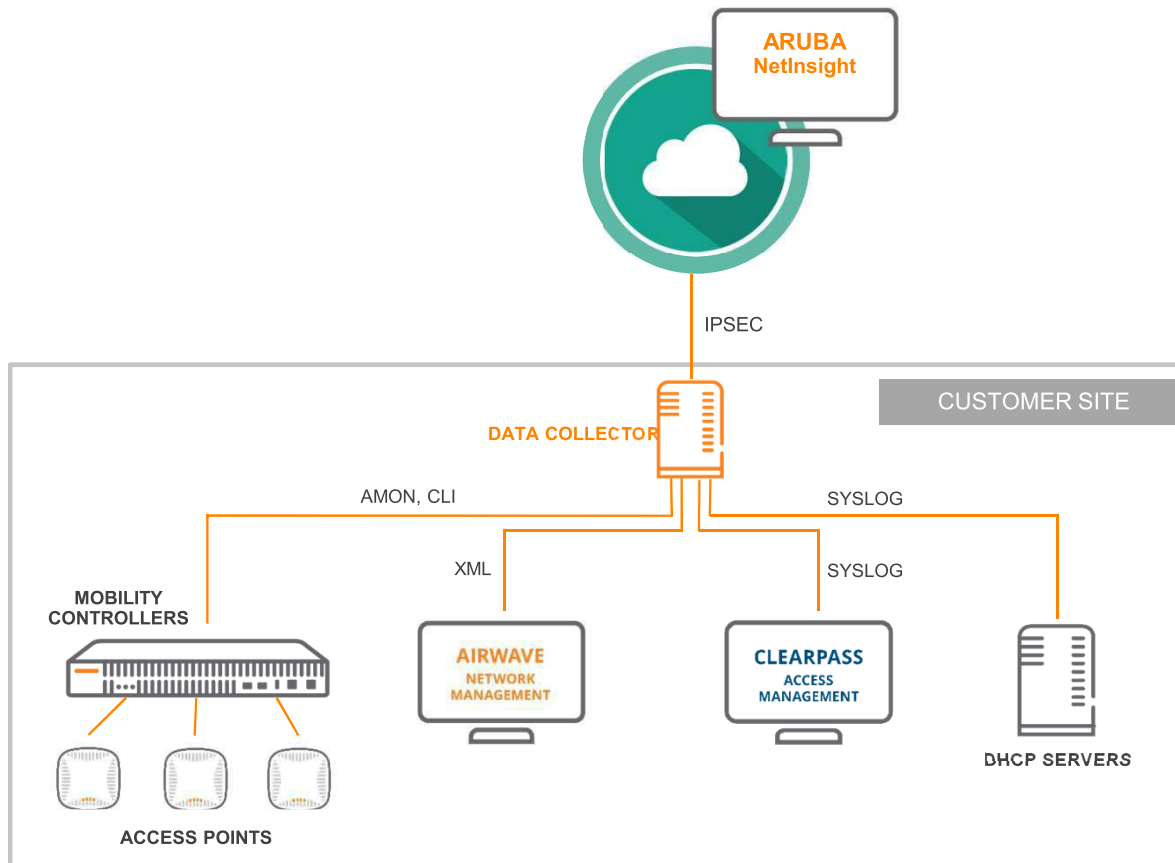
Cognitive Software Layer



- Deep learning algorithms
- Environment Classification
- Configuration recommendation
- Macro trends
- Aruba Wi-Fi know how

Improve user experience over Wi-Fi and wired access networks

How NetInsight Works



- Data feeds from multiple sources gathered via an onsite data collector.
- Compressed data sent via a secure tunnel to NetInsight cloud instance.
- Latest cloud technologies + machine learning + Aruba's Wi-Fi expertise leveraged to analyze network issues.
- NetInsight dashboards built for insights, root causes, and recommendations.

**Note: Today NetInsight is available only as a cloud solution and for controller-managed networks*

Why Aruba NetInsight



Network Ops Without Analytics

Reactive – firefighting mode

Manual analysis – time consuming
& guesswork to fix issues

No learning and validation

Network Ops with Aruba NetInsight: Automating Network Operations

- Network operations / design improves
 - Continuous optimization of Wi-Fi network performance
 - Early warning of problems
 - Validation of impact of network changes
 - Learning from peer networks
- Help-Desk flow improves dramatically
 - Rich per-user context available when user calls
 - Pro-active notification from help-desk to users

Examples of problems found in NetInsight customers

802.1x failures for Apple TVs

Problem: Apple TV's having thousands of auth failures every day

Description

Users connecting to the wireless network never succeed in authenticating via 802.1x.

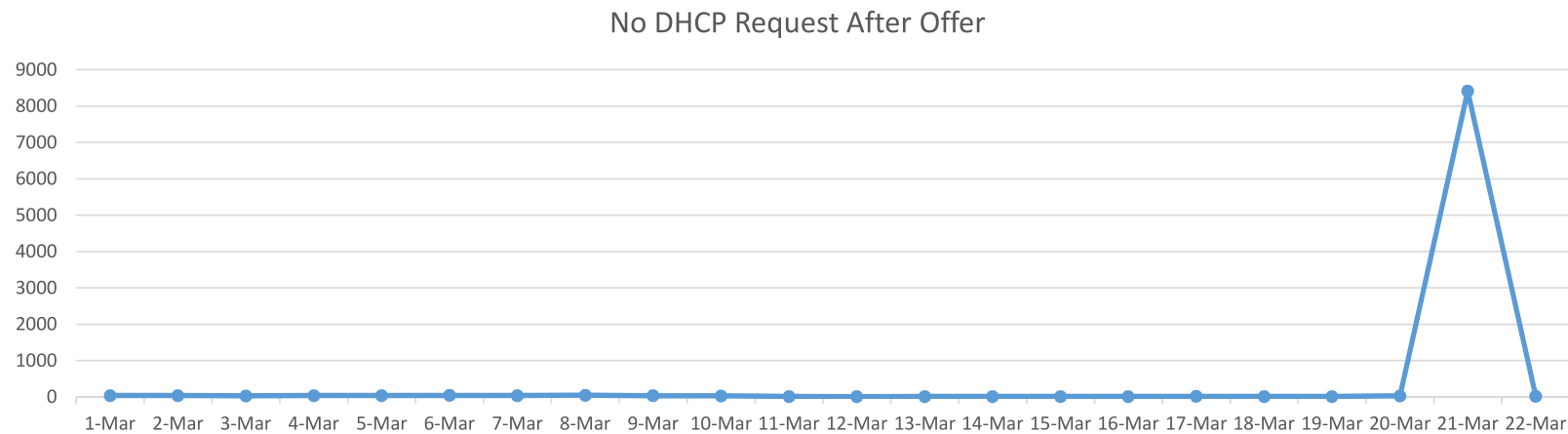
Clients	APs	Buildings	Building-Floors
			
MAC ADDRESS	DEVICE TYPE	FAILURES	BSSID #
C8:69:CD: [REDACTED]	AppleTV	8,540	2
D0:03:4B: [REDACTED]	AppleTV	8,462	1
D0:03:4B: [REDACTED]	AppleTV	7,818	2
08:66:98: [REDACTED]	AppleTV	6,680	5

Root Cause: Certificate validation fails on Apple TV due to incorrect system time

Solution: Connect to wired port, correct time on Apple TVs

DHCP Discover/Offer Loops

Problem: DHCP offers getting dropped and devices in a Discover Offer Loop after a software configuration change and a firmware upgrade of controllers



Root Cause: A change in functionality in the new controller version caused DHCP offer messages to not reach the clients

Solution: Downgrade of controller version while bug is being resolved

Eduroam Issues at Higher-Ed

Problem: Multiple Eduroam Issues

Clients

MAC ADDRESS	FAILED USERS	FAILED #	% FAILURE	SERVER REJECT#	SERVER TIMEOUT#	CLIENT TIMEOUT#	EAP FAILURE#
E8:2A:EA:5B:C9:76	host/FSMPB02R..	152	100	150	0	0	0
60:03:08:41:2E:50	psimon	148	100	129	0	0	0
A4:70:D6:76:59:D4	gcollins1	119	100	107	0	5	0
64:BC:0C:45:B6:AE	kam319	119	100	119	0	0	0

Root Cause: Incorrect format for username

Solution: Proactively inform users about the need to use a FQDN format

Uplink usage per device type anomalies

Individual device doing BitTorrent

- Uplink traffic over 7 days exceeds 1,463 GB
- Device classification: OS X
- Session breakdown by AppRF:
 - Large number of destination IP addresses
 - Traffic classified as BitTorrent

Description

Anomalous Client Uplink Traffic

Clients	BSSIDs	Building-Floors	Device Type	Hour Of Day
MAC ADDRESS	DEVICE TYPE	DURATION	RX DATA BYTES	DEVIATION
A0:99:9B:████████	OS_X	23h 36m 07s	252,223.86 M	131.7x
██████████	-	23h 00m 48s	3,613.55 M	6.0x
██████████	OS_X	21h 15m 58s	89,144.68 M	33.2x

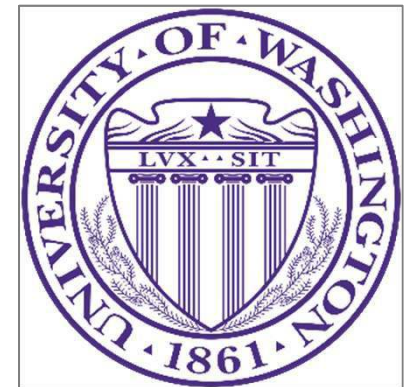


Dropbox bug on many devices

- Multiple Windows devices generating 10 to 20 GB uplink traffic per day
- Caused by known bug in Dropbox client software

NetInsight @ UofW

- Pinned down “Clicker” (Student Reponse System) issue
- Analyzed large volumes of data from:
 - APs
 - DHCP Logs
 - Wi-Fi Controllers
 - Etc.
- Detected anomalies
- Peer comparisons
- Recommended config changes
- Showed before/after change verification



Made Network Admins Heros

A User Perspective Approach

One that is application focused

SIMPLE

to deploy solution
that directly measures
the user experience

PROACTIVE

and ongoing
validation of access
and app
responsiveness

AGNOSTIC

Wi-Fi and wired
testing capabilities for
any environment

AI-POWERED ANALYTICS AND ASSURANCE



Cape Networks Acquired in March, 2018

Active (synthetic) Testing

For SaaS, application, and
network service
assurance—for any network

SOFTWARE AS
A SERVICE



CAPE NETWORKS SENSOR

CAPE NETWORKS SOLUTION OVERVIEW

**Proactive troubleshooting
and support**

**Intelligent network & app
performance analysis**

**Visual Setup and
Validation from anywhere**



**1 Easy to setup
sensors where
users are most
active**



**2 Simple way to test
the network and
apps from user
perspective**

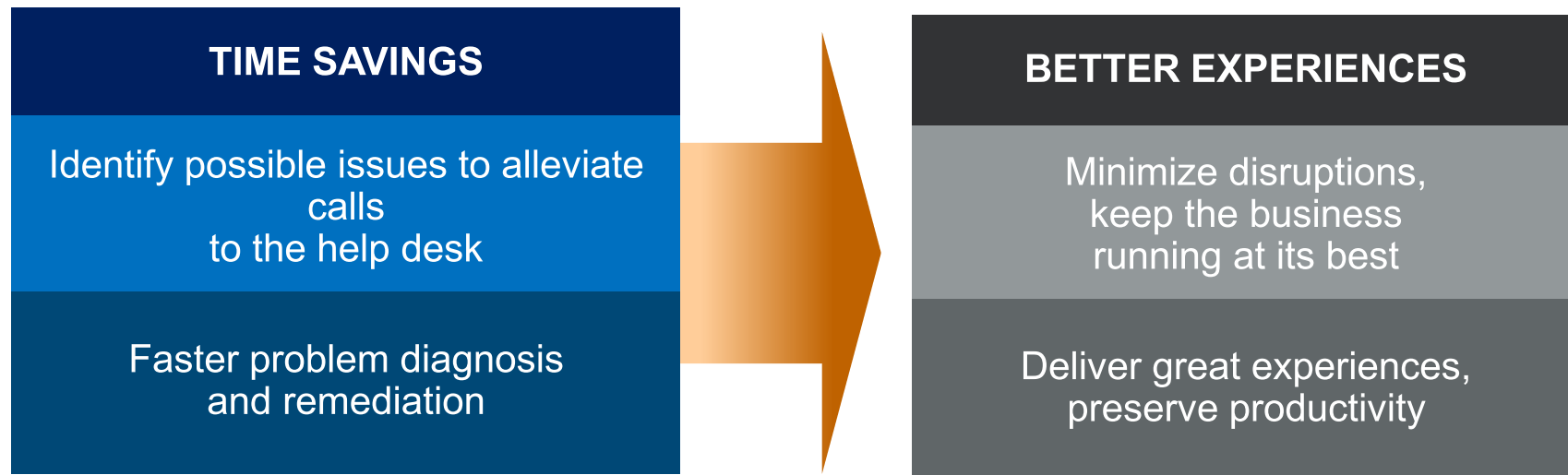


**3 Proactive alerts and
troubleshooting
help**

Intuitive 1-Click Drilldown and Visibility



Customer Outcome Example



57%

of the time users
detect issues before IT

Cape @ US Open

- Deliver great guest experience
- Guests want:
 - Connectivity
 - View tournament info
 - Access to email, SoMe, etc.
 - Take pictures/video, send to friends

Results:

2017	2018
8 Sensors	83 Sensors
On-site Management	Remote Management (from St. Louis, MO)

1. Captive Portal – Continuously run captive portal tests and ID improperly configured AP. **WIN**
2. Custom Script – Sensor detected and notified that SP's custom script worked on the captive portal configuration, but improperly configured short guard. **WIN**
3. Known Cisco Bug – APs were sporadically stopping DHCP due to known Cisco bug. Sensor helped pinpoint source.- **WIN**



Value Proposition

Un-boxed and running in
< 5mins

Out of band connectivity

Easily customizable tests

Consistent proof of network
performance



Reduced site visits

Saves up to \$2K per site for
sensor installs

True user/client perspective

Delivers enhanced user
experience

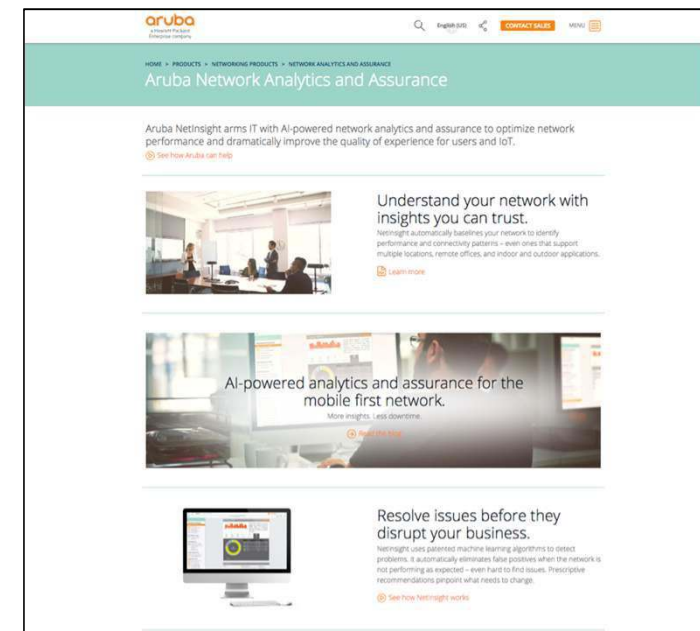
More Information

Cape Networks Website



capenetworks.com

Analytics and Assurance Website



www.arubanetworks.com/products/networking/analytics-and-assurance/

The image features a group of business professionals in silhouette, standing and walking on a high-rise office floor. They are positioned in front of a large glass window that offers a panoramic view of a city skyline at dusk. The silhouettes of the people are reflected on the polished floor. The text "Thank You" is centered in the middle of the image in a white, sans-serif font.

Thank You