NetInsight Cloud-based Analytics

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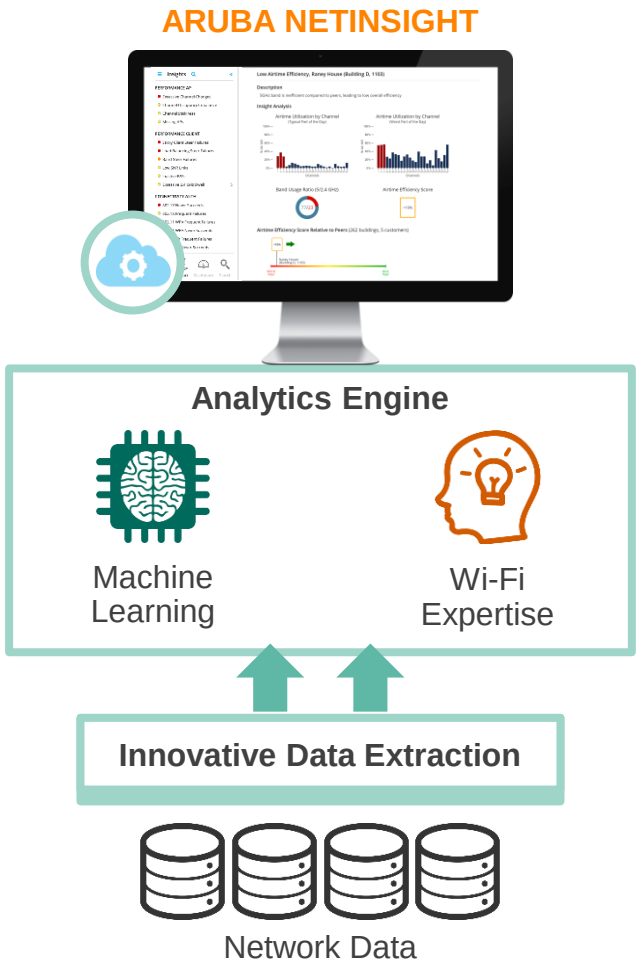
System Engineer

Aruba NetInsight

Introducing Advanced Network Analytics



Insights for improving network performance & user experience

Leveraging Machine Learning, Aruba Wi-Fi expertise & latest Cloud technologies to transform existing network data into advanced network analytics

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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

Key Capabilities of NetInsight

INSIGHTS + ROOT CAUSE + RECOMMENDATIONS

Anomaly Detection

Identification & prevention of performance Issues

Wi-Fi Benchmarking

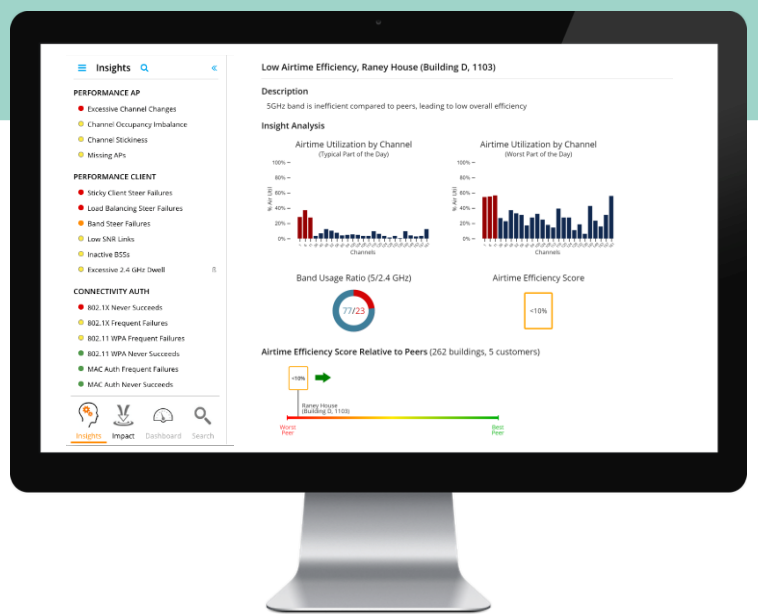
Wi-Fi config recommendations based on peer comparisons

Impact Validation

Before & after view of network changes

User Experience Insights

Connectivity analytics across network services



NetInsight and AirWave

AirWave

Multi-vendor wired
& wired network management

- Monitoring & Config (Wired & Wireless)
- Rogue Detection
- Reporting
- AppRF/ UCC
- Clarity
- VisualRF

NetInsight (1.0)

Network Analytics for improving network performance & user experience

- Wi-Fi Optimization + Benchmarking
- Impact Analysis
- Anomaly Detection
- User Connectivity

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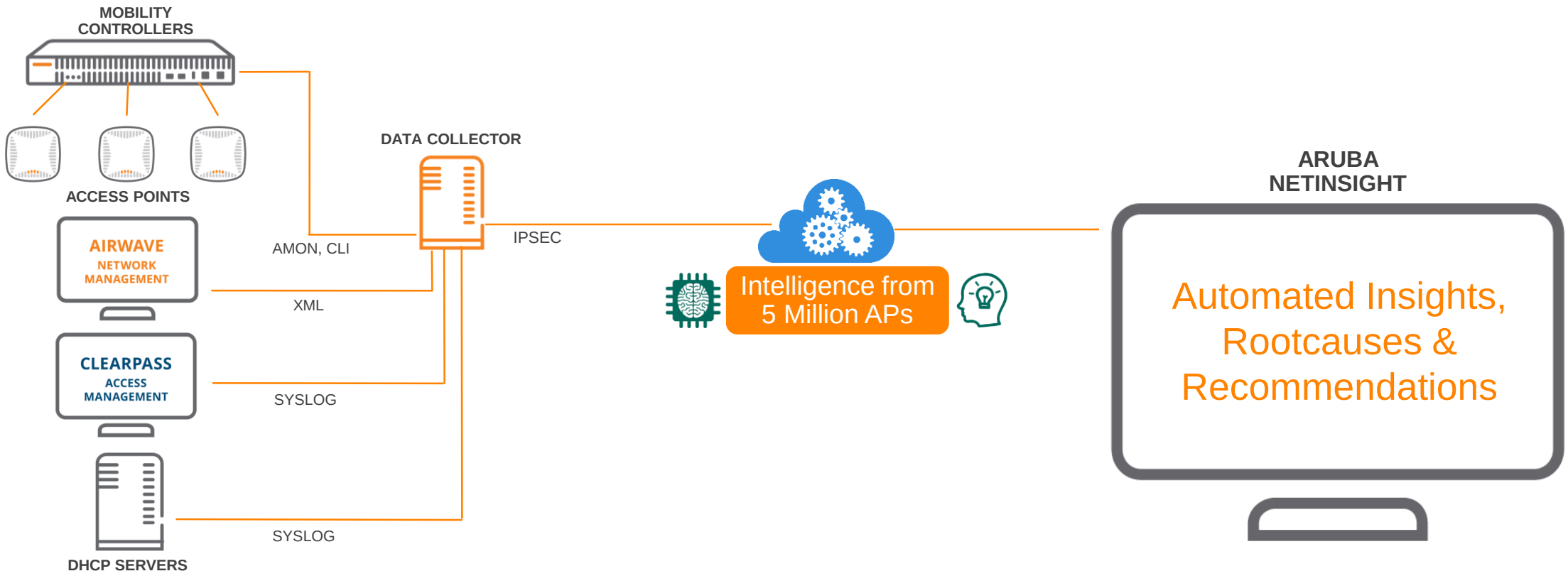
How NetInsight Works



Data extraction from multiple sources > Compression & security > Analysis applying Machine Learning & Aruba expertise

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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

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Current Trial Customers

University of Washington
8500 APs

University of Illinois
11,000 APs

Ohio State University
10,000 APs

University of New Hampshire
3800 APs

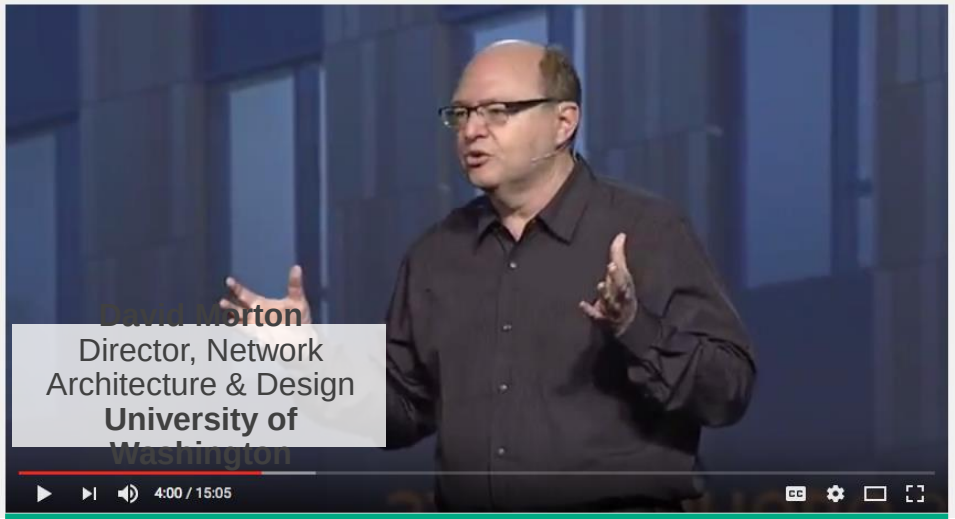
Northwestern
5800 APs

University of Buffalo
4500 APs

CSU Sacramento
1200 APs

Aruba
450 APs

Gaylord Convention Center
1600 APs



https://www.youtube.com/watch?v=CQySPqECWmw

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UNIVERSITY of WASHINGTON

Over

12,000

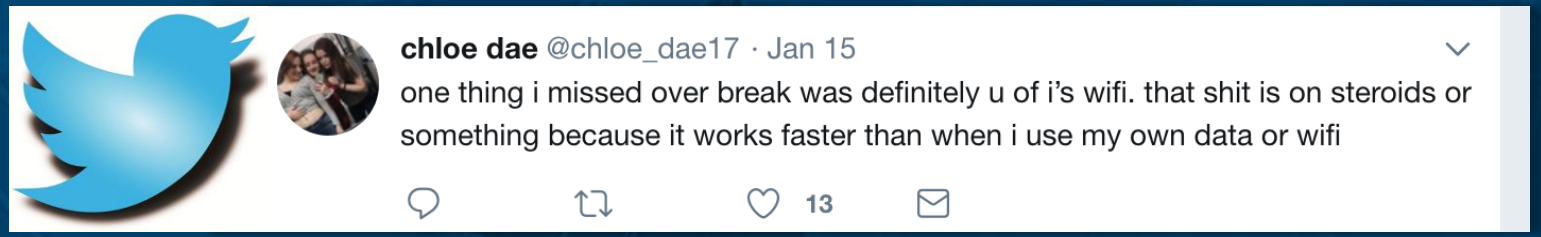
Wi-Fi APs and

150,000

devices on the network daily

”Performance management at our scale is a real concern and challenge. With Aruba NetInsight we can proactively deliver the best possible user experience.”

David Morton, Director, Networks and Telecommunications, University of Washington



ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

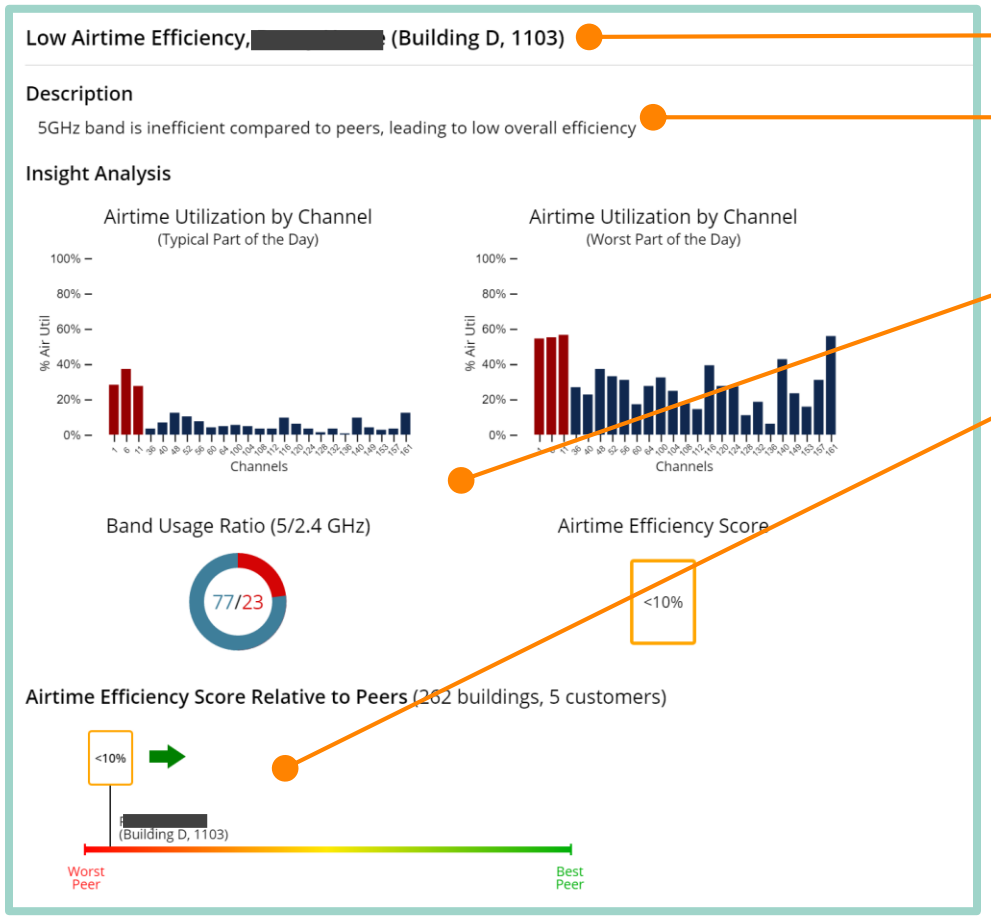
Over
650
Buildings with
47,000+
Students

” Aruba NetInsight is equal to 6 full-time senior engineers dedicated to data analysis / insight recommendation / post change analysis.”

IT Operations Team, University of Illinois at Urbana-Champaign

NetInsight – Automating Network Ops

Example: Current Beta Customer - Configuration optimization



Flagged problem, specific to a location

Root cause

Detailed analysis

Peer comparison

Recommended changes

Recommended Configuration

	Current Configuration	Recommended Configuration
2.4GHz Transmit power range:	6 - 9 dBm	6 - 15 dBm
2.4GHz Beacon rate:	12 Mbps	12 Mbps
2.4GHz fraction of radios enabled:	100%	100%
2.4GHz ARM ideal coverage index:	6	10
2.4GHz 40MHz Support:	false	false
5GHz Transmit power range:	9 - 12 dBm	12 - 21 dBm
5GHz Beacon rate:	12 Mbps	12 Mbps
5GHz fraction of radios enabled:	100%	100%
Number of 5GHz channels, in 20MHz units:	22	22
5GHz 40MHz Support:	false	false
5GHz 80MHz Support:	false	false
5GHz ARM ideal coverage index:	6	10

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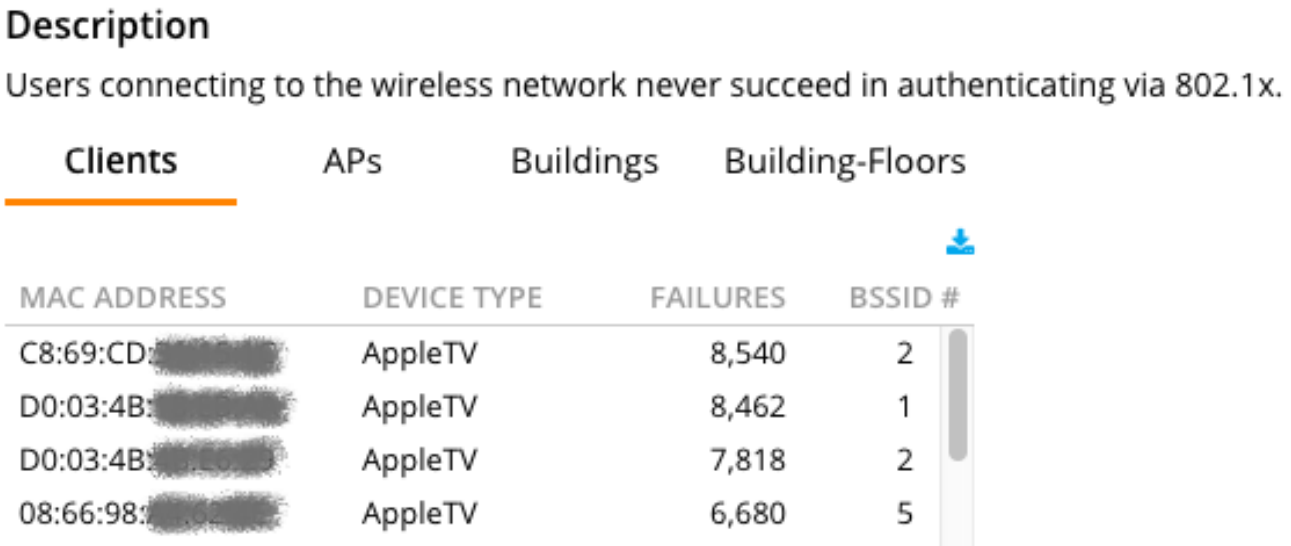
802.1x failures for Apple TVs

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



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

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

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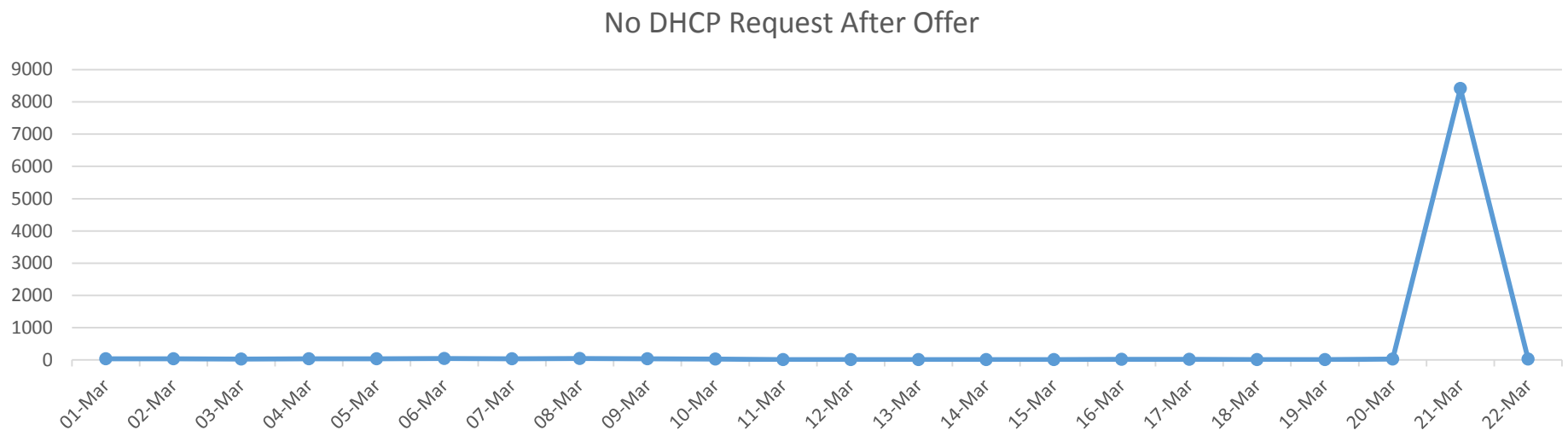
DHCP Discover/Offer Loops

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

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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

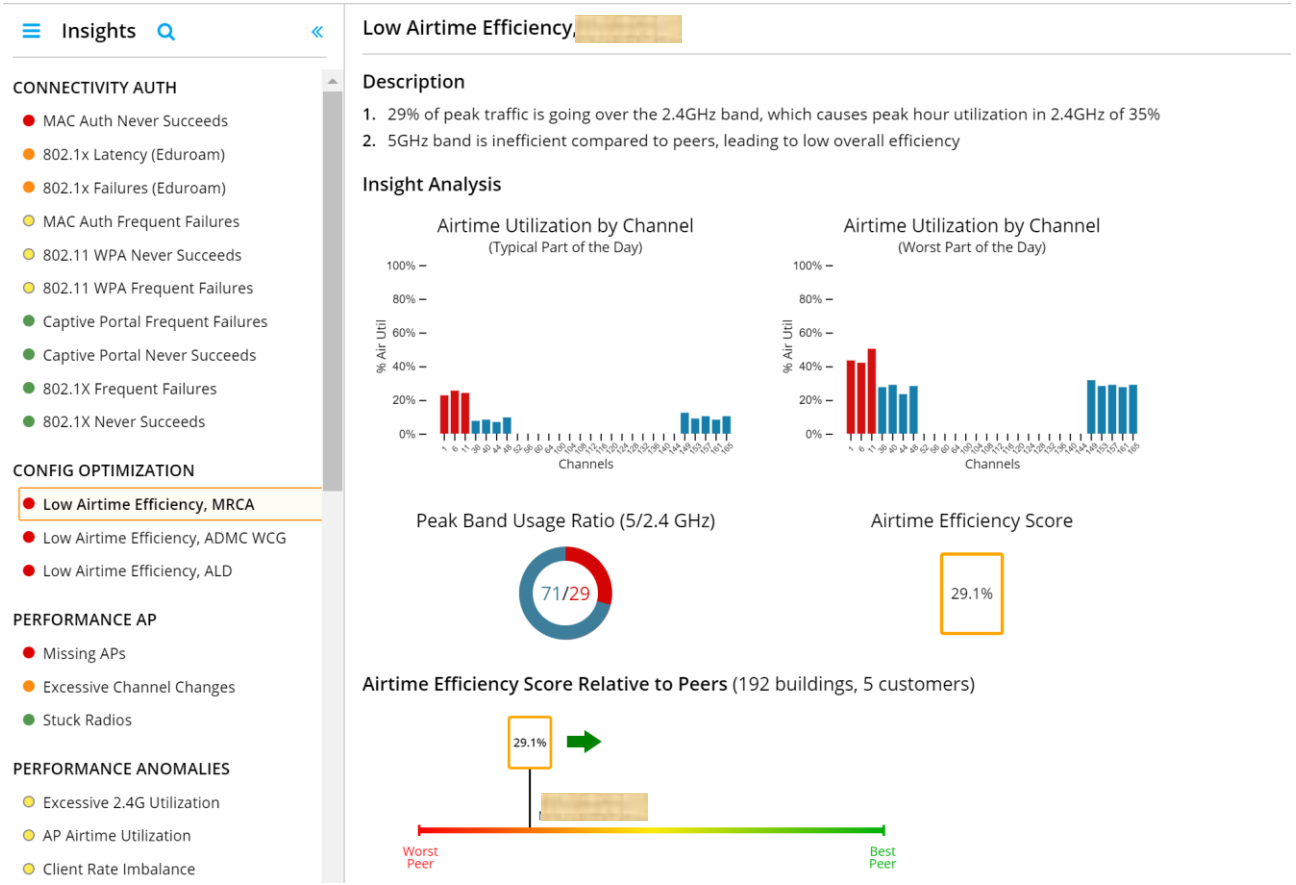
Clients | BSSIDs | Building-Floors | Device Type | Hour Of Day

MAC ADDRESS	DEVICE TYPE	DURATION	RX DATA BYTES	DEVIATION
A0:99:9B:[redacted]	OS_X	23h 36m 07s	252,223.86 M	131.7x
[redacted]	-	23h 00m 48s	3,613.55 M	6.0x
[redacted]	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

Configuration optimization – GUI



Recommended Configuration

	Current Configuration	Recommended Configuration
2.4GHz Transmit power range:	15 - 24 dBm	9 - 15 dBm
2.4GHz Beacon rate:	5 Mbps	5 Mbps
2.4GHz fraction of radios enabled:	100%	100%
2.4GHz ARM ideal coverage index:	10	10
2.4GHz 40MHz Support:	false	false
5GHz Transmit power range:	9 - 24 dBm	12 - 18 dBm
5GHz Beacon rate:	6 Mbps	6 Mbps
5GHz fraction of radios enabled:	100%	100%
Number of 5GHz channels, in 20MHz units:	9	22
5GHz 40MHz Support:	false	false
5GHz 80MHz Support:	false	false
5GHz ARM ideal coverage index:	10	10

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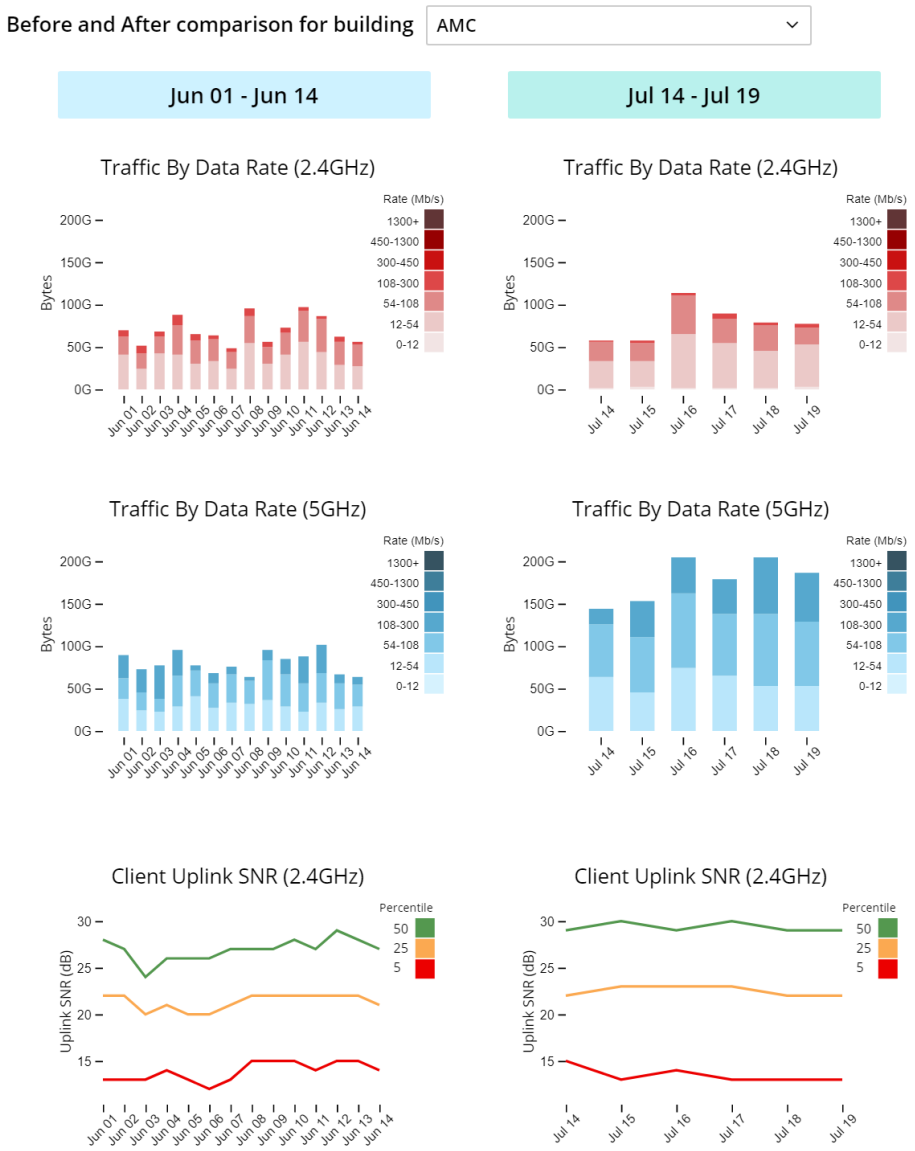
Impact Analysis – Before/After Comparison



R1.0 Product Features

RF Performance Management

- Environment-based configuration tuning
- Wireless performance anomaly detection
- ARM and Client Match tuning

Impact Analysis

- Config changes, firmware upgrades and other network changes
- Before/After comparison on connectivity and performance metrics
- Breakdown by building

Search

- Client and building

Peer Comparison

Connectivity Insights

- Basic: 802.1x, Mac-auth, Eduroam, DHCP
- Advanced: Clustering, Passer-by detection, Correlation across data sources, Device Inter-op

Integrated with Aruba Cloud Platform

- Customer onboarding flow
- Users and Roles

Pricing of NetInsight

1 yr subscription
$50.00
List USD per
Network Device
(AP, Controllers)

3 yr subscription
$100.00
List USD per
Network Device
(AP, Controllers)

5 yr subscription
$150.00
List USD per
Network Device
(AP, Controllers)

Includes Data Collector and Support

Example Order

Customer has 3000 APs, and 3x 7280 Controllers

Requests 5 year subscription

Sample Quote

JZ117AAE x 3003 (5 yr subscription)

Cost = $450,450 List

$90,000 per year

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NetInsight
Looking for EMEA trial customers

Criteria

- Focus is on higher Education
- At least 1000 APs
- Multiple Buildings / Campuses
- Customer needs to have BUDGET
  - $150 per AP for 5 yr subscription
- Need to become a reference customer
- Nomination form on NetInsight Arubapedia
- I can help with customer demos and engagements

- **Plan is to GA end of CY18**
  - Likely to be a vetted white glove process

Requirements & Issues

- **Controller** based deployment
- **AirWave** with VisualRF configured
- **ClearPass**
- **DHCP** only supports today
  - BlueCat
  - ISC
  - Infoblox
- Potential issues
  - No AWS Cluster in EMEA today but being worked on
  - GDPR
  - No MS DHCP support