

ARUBA AIRWAVE CLARITY

Technical Climb Webinar

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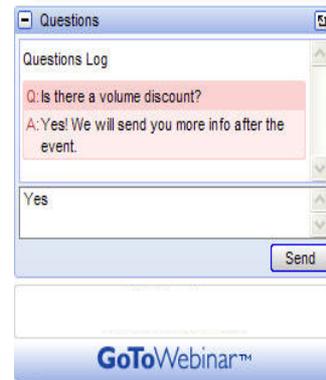
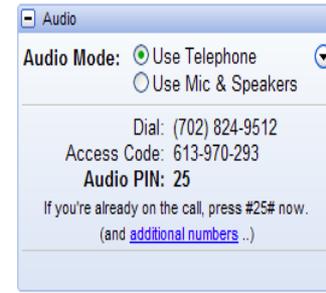


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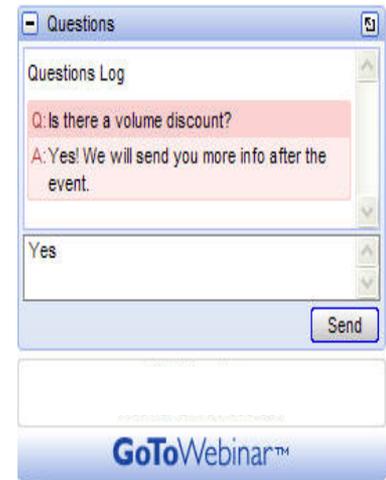
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Identify problems before they impact users

Introducing Aruba Clarity, a new module in AirWave

**Complete visibility into end-user
experience... beyond RF.**

LIVE

real-time user
experience

SYNTHETIC

proactive testing using
existing, deployed APs

Agenda

- **Clarity Live**
 - Introduction to Clarity-Live
 - Topology
 - Configuration
 - Feature Description
 - Trigger for AMON messages
 - Clarity-Live in Airwave

Agenda Cont.

- **Clarity Synthetic**
 - Introduction to Clarity Synthetic
 - Clarity Synthetic Deployment and Transactions.
 - Running Test from AirWave UI
- **Questions and Answers**

CLARITY - LIVE

Clarity Live Prerequisite

- Airwave running version 8.2.x or greater
- AOS running 6.4.3.x or greater – advisable to run 6.4.3.7 or greater
- Instant OS version 6.5.1.0 – 4.3.1.0

The Problem

- Limited visibility into how the end users experience the network
- For the end users “network does not work”
- For the IT admins “ it’s a complex problem”
- Manual, cost prohibitive & reactive solutions to troubleshoot
- IT admins have to find the needle in a haystack

The Aruba Solution : Aruba Airwave Clarity

- **IT'S ALL ABOUT THE USER**
 - Real time monitoring of metrics beyond RF
 - Predict issues before users start complaining
 - Pro-active Insight into patterns and trends
 - Recommended actions and alerts
 - User empowerment and remediation
 - End-to-end visibility

Why we need Clarity “Live” ?

Client can't connect

- AP is bogged down, or has hit the max association limit

Wireless doesn't work

- Client is not getting an IP since DHCP server has run out of leases

Radius server load issues

- one server goes unusable slow and requests fall to second server

NAS issue

- Controller was not added as a NAS on server 3

'Radius auth is Slow'

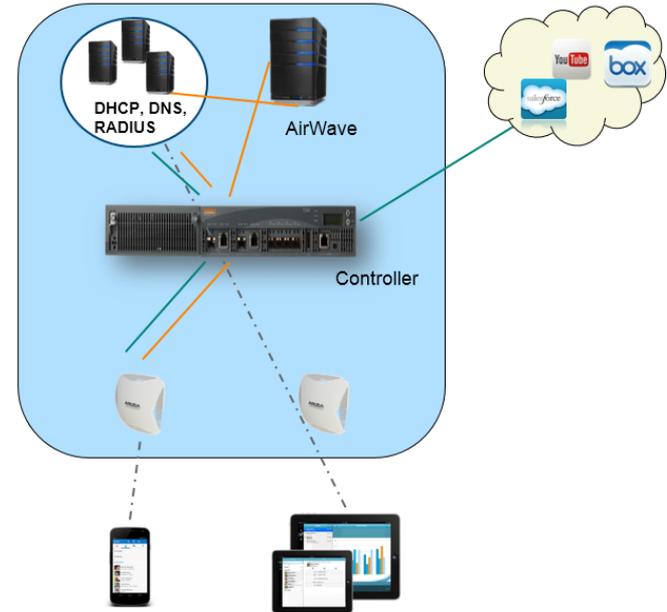
- IT admins cannot determine if it is a network or client issue

MacBook started taking 20 seconds to accept the server cert

- caused network connection issues and complaints of broken wireless

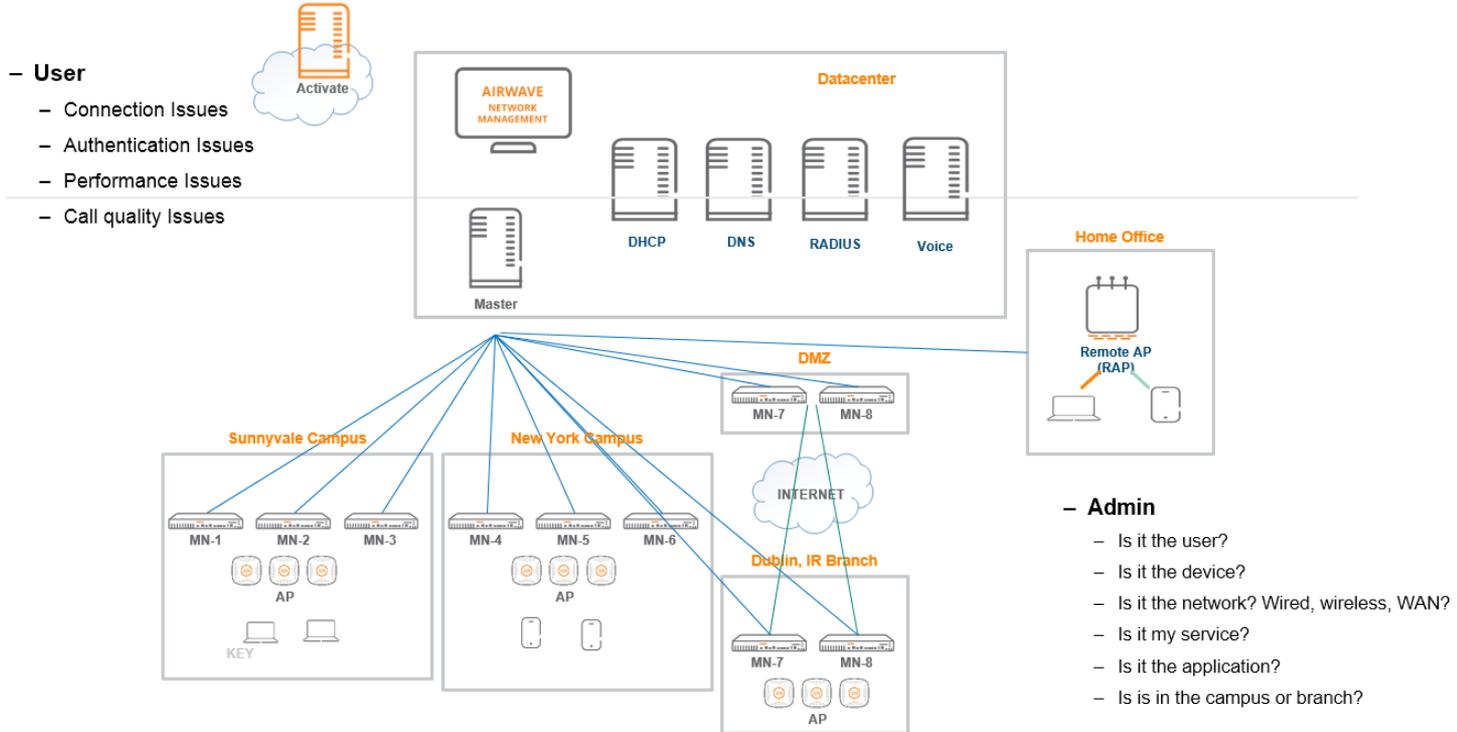
Clarity Live How it helps

- **Inline Monitoring for associated clients**
- **Ability to monitor**
 - Association time
 - Authentication time
 - DHCP time
 - DNS time
- **New dashboards for Live**
 - Network and Client level Live views
 - Trends and patterns based on KPI/SLAs



Clarity Live - Topology

Typical Large Distributed Network



Clarity-Live- Configuration

- Create a mgmt. profile and enable the interested logs based on the requirement
- Configure a management server and link it to the Profile created

```
(Aruba7005-Ouzo-10.15.60.34) (config) #mgmt-server profile Test
(Aruba7005-Ouzo-10.15.60.34) (Mgmt Config profile "Test") #!

(Aruba7005-Ouzo-10.15.60.34) (config) #show mgmt-server profile Test

Mgmt Config profile "Test"
-----
Parameter          Value
-----
Stats              Disabled
Tag                Disabled
Sessions           Disabled
Monitored Info    Disabled
Misc               Disabled
Location           Disabled
UCC Monitoring     Disabled
AirGroup Info     Disabled
Inline DHCP stats  Enabled
Inline AP stats    Enabled
Inline Auth stats  Enabled
Inline DNS stats   Enabled
(Aruba7005-Ouzo-10.15.60.34) (config) #

(Aruba7005-Ouzo-10.15.60.34) (config) #mgmt-server type amp primary-server 10.15.60.204 profile Test
(Aruba7005-Ouzo-10.15.60.34) (config) #
```

Clarity Live- Configuration From UI

- **Create Management Profile:**

- Navigate to Configuration ->Advanced Services -> All Profile ->Controller ->Mgmt Config
- Provide a profile name and save the config
- All inline stats are enabled by default

Advanced Services > All Profile Management

Profile Details	
Mgmt Config profile > Clarity-Live Show Reference Save As Reset	
Stats	<input type="checkbox"/>
Tag	<input type="checkbox"/>
Sessions	<input type="checkbox"/>
Monitored Info	<input type="checkbox"/>
Misc	<input type="checkbox"/>
Location	<input type="checkbox"/>
UCC Monitoring	<input type="checkbox"/>
AirGroup Info	<input type="checkbox"/>
Inline DHCP stats	<input checked="" type="checkbox"/>
Inline AP stats	<input checked="" type="checkbox"/>
Inline Auth stats	<input checked="" type="checkbox"/>
Inline DNS stats	<input checked="" type="checkbox"/>

All Inline options enabled by default



Clarity Live- Configuration From UI Cont...

- Configure the ip address of the Airwave as Management Server
 - Navigate to Configuration ->Management ->General
 - Scroll down to Airwave Servers
 - Configure the Airwave server ip and specify the mgmt profile created

Management > General

AirWave Servers		
Primary Server	Profile	Action
10.15.60.103	TestPatchDNS	Delete
10.15.60.106	default-amp	Delete
10.15.60.136	blk_sessions	Delete
New		

Clarity Live- Sample Use Case Scenarios

- To know how long the client takes to associate with Wlan and reason for disassociation.
- To know the time taken for the client to get the IPaddress
- Client not able to resolve the DNS due to invalid DNS configured or due to delay in network
- To diagnose user Authentication failures which are triggered due to wrong password input from user or Server rejected request

Clarity Live- Feature Description

- The Association, Authentication, DHCP and DNS info is being sent to Airwave from Controller/AP using below AMON messages.
- The Airwave accumulates the data from AMON messages, processes the data, store the data to the database and display in the Clarity-Dashboard
- The Inline AMON messages are:
 - AMON_DHCP_STATION_INFO_MESSAGE
 - AMON_MACAUTH_MESSAGE
 - AMON_DOT1X_MESSAGE
 - AMON_WPA_KEY_HANDSHAKE_MESSAGE
 - AMON_CP_MESSAGE
 - AMON_PASSIVE_AP_STATION_STATS_MESSAGE
 - AMON_DNS_SERVER_INFO_MESSAGE

Clarity Live- Trigger for each of the inline Messages

Association

- AP STM Messages gets generated destine to Controller. Controllers SoS will have Airwave server configuration and relay to Airwave

AMON_PASSIVE_AP_STATION_STATS_MESSAGE

Client Completes
Authentication

Authentication

- Once the Client Completes Authentication ,based on the Auth Type Dot1x ,MacAuth or CP AMON messages are sent

AMON_DOT1X_MESSAGE or
AMON_MACAUTH_MESSAGE or
AMON_CP_MESSAGE

- AMON_WPA_KEY_HANDSHAKE_MESSAGE sent wherever 4-way handshake is involved

Client gets IP

DHCP and DNS

- DHCPDWRAP process in control plane receives all the DHCP packets and send info pertaining to client DHCP transactions directly to Airwave

AMON_DHCP_STATION_INFO_MESSAGE

- Per DNS server data collected in controller datapath

AMON_DNS_SERVER_INFO_MESSAGE

Clarity Live- Trigger for each of the inline Messages

AMON_PASSIVE_AP_STATION_STATS_MESSAGE

```
msg_type => 'AMON_PASSIVE_AP_STATION_STATS_MESSAGE',
rows => [
  {
    CL_P_AP_STA_ASSOC_RESP_DURATION => 4,
    CL_P_AP_STA_ASSOC_RX_TIME => '1462856621035',
    CL_P_AP_STA_BSSID => '04:BD:88:5F:31:50',
    CL_P_AP_STA_CTRL_STA_UP_ACK_DURATION => 5,
    CL_P_AP_STA_DEAUTH_ARUBA_REASON => 0,
    CL_P_AP_STA_DEAUTH_REASON_CODE => 0,
    CL_P_AP_STA_DEAUTH_RX_REASON_CODE => 0,
    CL_P_AP_STA_DOT11_KEY_EXCH_FAILED => 0,
    CL_P_AP_STA_EVENT_REPEAT_COUNT => 0,
    CL_P_AP_STA_FT_AUTH_RESP_DURATION => 0,
    CL_P_AP_STA_FT_AUTH_STATUS_CODE => 0,
    CL_P_AP_STA_FT_RIDATA_MISS_ON_AP => 0,
    CL_P_AP_STA_FT_RIDATA_RX_DURATION => 0,
    CL_P_AP_STA_FT_RIDATA_RX_STATUS_CODE => 0,
    CL_P_AP_STA_MAC => 'C8:F7:33:A4:5A:33',
    CL_P_AP_S_MAC => '04:BD:88:CD:F3:14'
  }
]
```

The highlighted fields are only considered in Clarity-Live currently

ECL_P_STA_DEAUTH_REASON_CODE: Standard de-auth Reason-code send to client according 802.11 standard

Eg: Deauth Leaving (Reason Code 3)

Disassoc Sta Has Left (Reason Code 8)

CL_P_STA_DEAUTH_ARUBA_REASON: Internal error code generated by AP-STM

Eg: AAA Deauth (35), AP Going Down (27)

Clarity Live- Sample AMON AUTH Message

AMON_DOT1X_MESSAGE:

Sent by AUTH for Failed DOT1X Authentication Attempt

```
msg_type => 'AMON_DOT1X_MESSAGE',
rows => [
  {
    CL_DOT1X_BSSID => '6C:F3:7F:7C:64:50',
    CL_DOT1X_CLIENT_ELAPSED_TIME => 38,
    CL_DOT1X_CLIENT_RETRY_COUNT => 1,
    CL_DOT1X_FINISH_TIMESTAMP => '1462370775268',
    CL_DOT1X_REASON => 1,
    CL_DOT1X_RESULT => 0,
    CL_DOT1X_SERVERIP => '10.15.60.101',
    CL_DOT1X_SERVER_ELAPSED_TIME => 1003,
    CL_DOT1X_SERVER_RETRY_COUNT => 0,
    CL_DOT1X_START_TIMESTAMP => '1462370774229',
    CL_DOT1X_STATION_MAC => 'C8:F7:33:A4:5A:33',
    CL_DOT1X_USERNAME => 'Student'
  }
]
```

AMON AUTH Result:

AMON_AUTH_FAILURE = 0,
AMON_AUTH_SUCCESS = 1

AMON_UNKNOWN_FAILURE_REASON, = 0
AMON_AUTHSERVER_REJECT, = 1
AMON_AUTHSERVER_TIMEOUT, = 2
AMON_DOT1X_CLIENT_TIMEOUT, = 3
AMON_EAP_FAILURE, = 4

- Here CL_DOT1X_RESULT=0, stands for AUTH Failure and CL_DOT1X_REASON =1 stands for Auth Server Reject
- Similar AUTH Result and Reason codes are present in MACAUTH and CP AMON messages

Clarity Live- Sample AMON DHCP Message

AMON_DHCP_STATION_INFO_MESSAGE:

Tracks total of 9 DHCP packets to/from client

This message is sent

- When there are 5 DHCP sequence packets to Server from client
- When there is complete DHCP transaction which includes DHCP REQUEST followed by DHCP ACK
- Each DHCP packets are identified with decimal number

```
msg_type => 'AMON_DHCP_STATION_INFO_MESSAGE',
rows => [
  {
    CL_CLIENT_ADDRESS => '00:50:56:A7:4D:01',
    CL_DHCP_SERVER_IP => '198.168.0.1',
    CL_EVENT_SEQUENCE => 1235,
    CL_TIMESTAMP => '1462862869525',
    CL_TIME_DIFF1 => 801,
    CL_TIME_DIFF2 => 10,
    CL_TIME_DIFF3 => 26,
    CL_TIME_DIFF4 => 0
  }
]
```

DHCPDISCOVER	1
DHCPOFFER	2
DHCPREQUEST	3
DHCPDECLINE	4
DHCPACK	5
DHCPNAK	6
DHCPRELEASE	7
DHCPINFORM	8

Clarity Live- Sample AMON DNS Message

AMON_DNS_SERVER_INFO_MESSAGE :

Controller Sps will measure minimum, maximum and average response time of each DNS server up to 15 DNS Server

```
msg_type => 'AMON_DNS_SERVER_INFO_MESSAGE',
rows => [
  {
    CL_ANOMALY_CNTR => 0,
    CL_AVG_RESP_DELAY => 535,
    CL_LAST_ANOMALY_IP => '0.0.0.0',
    CL_MAX_RESP_DELAY => 8724,
    CL_MIN_RESP_DELAY => 230,
    CL_RCODE0_CNTR => 2,
    CL_RCODE1_CNTR => 0,
    CL_RCODE2_CNTR => 6,
    CL_RCODE3_CNTR => 4,
    CL_RCODE4_CNTR => 0,
    CL_RCODE5_CNTR => 0,
    CL_RCODE_HISTORY => '^E',
    CL_SAMPLES_MEASURED => 12,
    CL_SVR_IP => '10.42.10.10'
```

Rcode 0: No Error

Rcode 2: Server Failure

Rcode 3: Non-Existent Domain

Clarity Live Dashboard in Airwave

Summary			
AP NAME	ASSOCIATION	AUTHENTICATION	DHCP
AP_274_K2	●	●	●
Tomatin30-7020	●	●	●
Ardmore-225	●	●	●
Tomatin23-30	●	●	●
Springbank-1/18	●	●	●
Tomatin29-7019	●	-	●
AP105cage-1/7	●	●	●
Springbank-7003	●	●	-
Tomatin-27	●	-	-
Total Records: 10 Details			

DHCP	
SERVERS	DHCP TIME (MS)
10.15.85.20	2600
198.168.0.1	315
193.168.10.253	3
194.168.10.1	2
Total Records: 4 Details	

Association		
APS	ASSOC. FAILURES(%)	ASSOC. TIME(MS)
Tomatin30-7020	0% (0/4)	5
Tomatin29-7019	0% (0/2)	4
AP105cage-1/7	0% (0/8)	3
Tomatin-27	0% (0/1)	2
Springbank-1/18	0% (0/5)	2
Ardmore-225	0% (0/8)	2

Authentication			
SERVERS	TYPE	AUTH. FAILURES(%)	AUTH. TIME(MS)
10.15.60.101	Captive Portal	100% Rejected: 2	-
10.15.80.103	Dot1x	0% (0/8)	9815
10.15.60.101	Dot1x	10% (1/10)	1586
10.15.60.115	WPA 4-Way Handshake	5% (1/18)	196
Total Records: 4 Details			

DNS		
SERVERS	DNS FAILURES(%)	DNS TIME(MS)
10.3.5.200	100% (1/1)	-
10.13.6.110	100% (4/4)	-
10.42.10.10	0% (23/4135)	357
10.13.5.200	0% (11/1911)	105
Total Records: 4 Details		

Clarity Live Airwave Dashboard Events

The Different Events are:

- Summary

Consists of Association, Authentication and DHCP info on per AP

Summary					
AP NAME	ASSOCIATION	AUTHENTICATION...	DHCP		
Tomatin30-7020					
Ardmore-225					
Tomatin-24					
Tomatin29-7019					
Tomatin-25					
AP_274_K2					
AP225-Ardmore-1...					
Tomatin23-30					
Tomatin-26					
Total Records: 21				Details	

Avg. Time(ms): **368**
Failures: **69% (36/52)**
Dot1x: Rejected: **3**
WPA: Client Timeout: **14**
WPA: Replay Counter Mismatch: **10**
CP: Rejected: **9**

Clarity Live Airwave Dashboard-Authentication

Authentication

- Shows info on Authentication Server, Type of Auth , Auth Failure Reason in % and Average Time taken in per server basis.
- The Auth Failure Reason can be
 - Server Timeout
 - Server Reject
 - Client Timeout

Authentication				☰	🔍
SERVERS	TYPE	AUTH. FAILURES(%...	AUTH. TIME(MS)	☰	
10.20.21.71	Dot1x	100% (9/9) Rejected: 9	–		
110.2.13.1	Dot1x	100% (4/4) Server Timeout: 4	–		
10.15.60.101	Dot1x	0% (0/6)	742		
10.15.60.115	WPA 4-Way Hand...	25% (2/8)	208		

Replay Counter Mismatch: 1
Client Timeout: 1

Total Records: 4 [Details](#)

Clarity Live Airwave Dashboard-DHCP

- DHCP
 - DHCP server and the average Time per Server

DHCP		☰	W
SERVERS	DHCP TIME (MS)		☰
10.20.105.1	1474		
10.20.102.1	1199		
10.20.104.1	932		
10.20.103.1	905		
Total Records: 4		Details	

Clarity Live Airwave Dashboard-DNS

- DNS

- Per DNS Server Average Response Time and the DNS Failure codes

- Failure Codes can be :

- Request Timed out
 - Non-Existing Domain
 - Server Failure

DNS			☰	📄
SERVERS	DNS FAILURES(%)	DNS TIME(MS)	☰	
10.42.10.10	4% (248/5007)	260		
10.15.60.101	3% (38/1018)	185		
10.13.6.110	4% (26/530)	126		
10.13.5.200	3% (102		
		Request Timed Out: 42 Non-Existent Domain: 4 Server Failure: 1		
Total Records: 4				Details

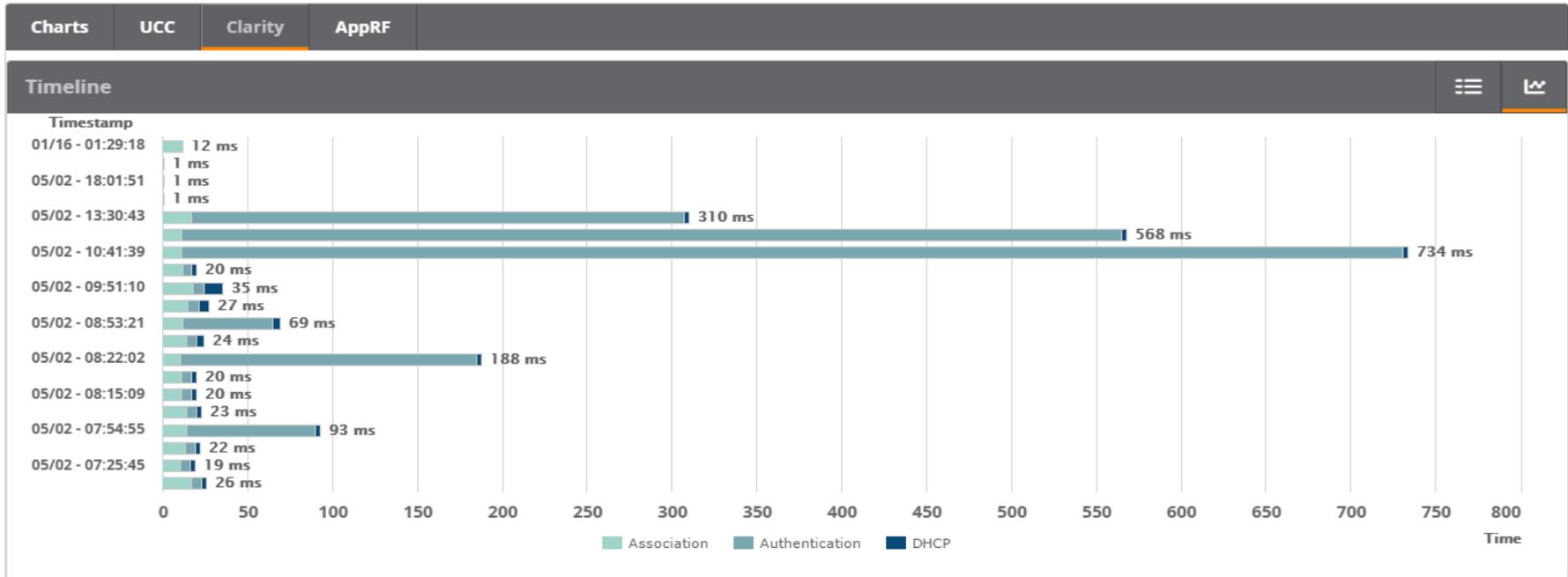
Clarity Live Airwave Dashboard-Association

- Association
 - List of Aps and the respective Assoc. Failures and the Average Assoc. Time in millisecond
 - The Assoc. Failure reason codes are the Standard de-auth Reason-code send to client and the internal error codes generated by the AP-STM

Association		
APS	ASSOC. FAILURES(%)	ASSOC. TIME(MS)
AP_274_K2	8% (1/12) PTK Challenge Failed: 1	15
AP105cage-1/7	0% (0/3)	4
Tomatin30-7020	0% (0/1)	4
Springbank-7002	0% (0/2)	3
Springbank-1/18	0% (0/26)	2
Ardmore-225	22% (5/22) EAP Challenge Failed: 5	2
AP225-Ardmore-1/19	0% (0/3)	2
Tomatin-24	20% (1/5)	2
Ardmore-32	0% (0/2)	2
Total Records: 11		Details

Clarity Live - Client specific Clarity Data

- Client Specific Data is located under Client Diagnostics Page
 - Clients ->Connected ->Click Client MAC Address ->Clarity Tab



Clarity Live - Client specific Clarity Data Cont...

Detailed Client data showing Association Timestamp, Association Death reasons, Authentication and DHCP Events.

Different Failure codes

Charts				UCC				Clarity				AppRF			
Timeline															
TIMESTAMP			ASSOCIATION (MS)			AUTHENTICATION (MS)			DHCP (MS)						
04/28 - 10:01:23			AP225-Ardmore-1/19 1ms VLAN: New Assignment			Aruba7210-10.15.60.115 WPA 4-Way Handshake 5926ms Client Timeout									
04/28 - 09:59:47			Ardmore-225 2ms PTK Challenge Failed			Aruba7210-10.15.60.115 WPA 4-Way Handshake 4667ms Replay Counter Mismatch									
04/28 - 09:59:36			AP225-Ardmore-1/19 2ms Disassoc STA Left												
Total Records: 20															

Successful Events

05/03 - 15:46:43	AP_274_k2 2ms	Success	10.15.80.103 Dot1x 6820ms Aruba7210-10.15.60.115 WPA 4-Way Handshake 13ms	Success	198.168.0.1 3ms	Success
05/03 - 15:07:57	Springbank-7005 4ms	Success	10.15.80.103 Dot1x 6940ms Aruba7210-10.15.60.115 WPA 4-Way Handshake 51ms	Success	198.168.0.1 3ms	Success

CLARITY - SYNTHETIC

Clarity Synthetic Prerequisite

- **Airwave running version 8.2.3 or greater**
- **AOS running 6.5.x.x or 8.x.x.x**
 - AOS 6.5.0.0 or later supports AP 2XX series.
 - AOS 6.5.1.0 or later supports AP 3XX series.
- **Aruba AP type (at least one) AP 2xx or 3xx**
- **Visualrf Enabled on Airwave to run Clarity test from Visualrf**
- **Clarity Engine**

Clarity Synthetic

- **Ability to simulate network traffic using synthetic clients**
- **Run tests on-demand**
- **Pro-active alerts to boil up trends**
 - Built-in KPIs to track the health of the network
- **New Dashboard for Clarity Synthetic**
 - Ability to correlate synthetic results with other network data on AirWave
- **NBAPI to export test results to 3rd party collectors**

Why do we need “Synthetic”?

Customer reports “wireless is slow”

- What they really mean is that the key enterprise service they need to get access to is slow. And they can't differentiate on their end. Running some kind of perf test to that application (ping?) would help solve that issue.

Validating network upgrade without IT staff during the middle of the night.

- Make sure the firmware upgrade took and that users will be able to associate and auth to the network when they show up in the morning.

Customer X wants to troubleshoot issues from central location without sending an IT guy on-site post.

- Does not want to send an IT guy to every site

University X wants to place laptops in strategic places that validate the network is up and running plus the wireless works well.

- They could decommission those if the APs can associate to each other and validate that the network is functioning

Google built Raspberry pi units to associate to their APs

- validate that certain services are performing up to par.

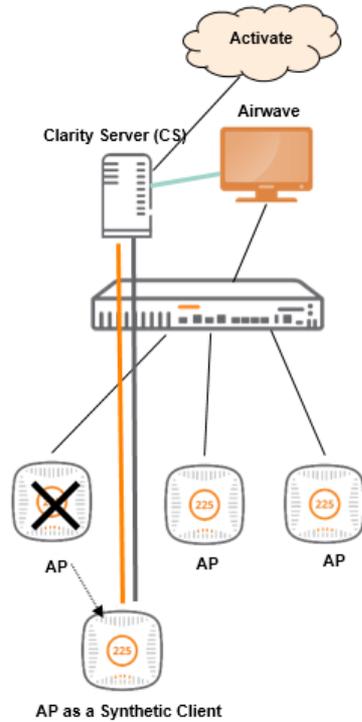
Problem occurs at 2pm only.

- Need a system that can attempt to be on the network at that time to verify that things are healthy when the problem occurs.

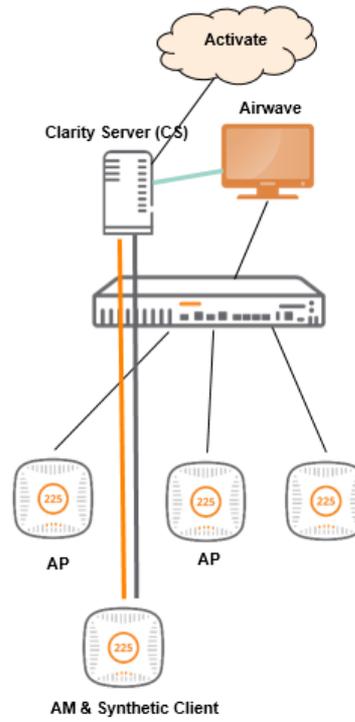
Validate the quality of the new controller image with key trends over time.

- Automate tests

Clarity Synthetic Client - Options



AP



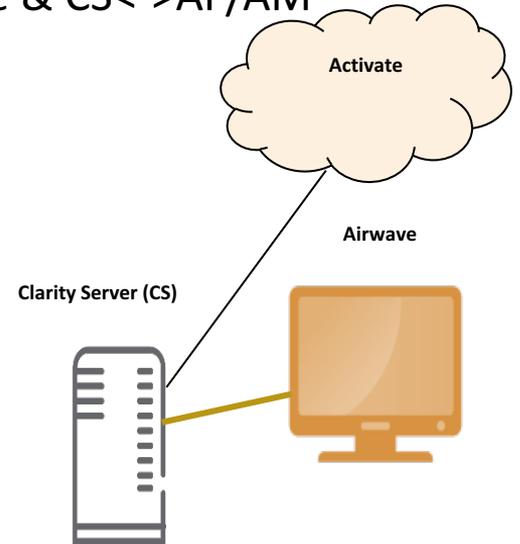
AM

Clarity Synthetic server Functionality

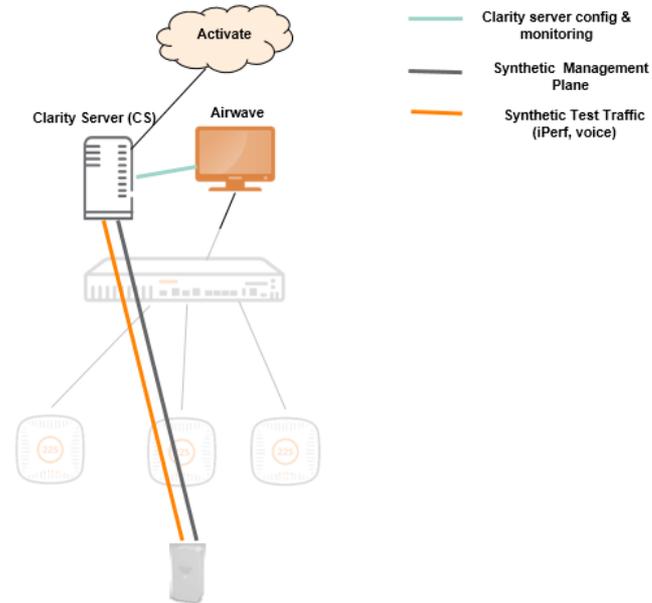
- Simulates the client stack for AP & AM based synthetic
 - It is like a laptop connected to the AP!
- Simulates network and application traffic
- Acts as an endpoint for performance tests

Clarity Synthetic deployment

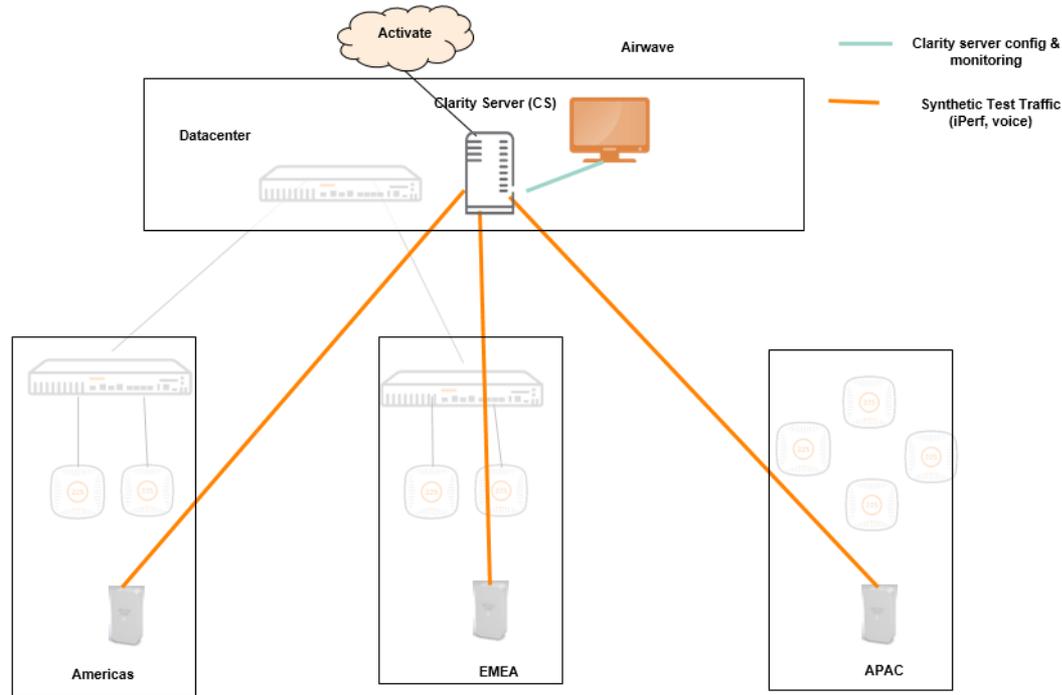
- Can be installed on a VM
- AirWave will be the front end of the Clarity server
 - No UI, only limited CLI
 - Secure web sockets are leveraged between CS \leftrightarrow AirWave & CS \leftrightarrow AP/AM
- 3rd party consumers can leverage JSON data for visualization



Clarity Synthetic Server in a Campus Deployment



Clarity Synthetic in a Distributed Deployment



Clarity Synthetic Transactions

Network Traffic	Config	Result
Connectivity	SSID/BSSID	Scan response time, association response time
Authentication (Open, PSK, EAP-PEAP, EAP-TLS)	Credential/Certificate	Auth time, 4 way handshake
DHCP	None	# of servers, response times, active server
DNS	V4 or v6	IP address, response time
ICMP	Destination, packet size	Loss, success/fail, response time
Tracert	Destination, TCP/UDP/ICMP	Hop count, response time

Clarity Synthetic Transactions cont.

Application Traffic	Config	Result
Web page load time	URL, http/https	Success/fail, response time
iPerf	Server IP, UDP (MTU, BW, duration), TCP (MTU, window size, duration)	Loss, jitter, BW, throughput

Clarity Synthetic- Run a test

- **Two ways**
 - From Clarity dashboard
 - From VRF

Clarity Synthetic

Synthetic Tests

Basic Info

DNS

Ping

Page Load

Traceroute

iPerf3

Select a Profile

SSID*

Selected Client (s)

AP-205

Selected Target(s)

AP225

Authentication

Open

Band

2.4 GHz

Cancel

Back

Next

Run

Synthetic Tests

Basic Info

DNS

Ping

Page Load

Traceroute

iPerf3

Select a Profile

Create a Profile

SSID*

Inventory

Selected Client (s)

AP-205

Selected Target(s)

AP225

Username*

Profile Name (alphanumeric only)*

Aruba-test

Authentication

EAP/PEAP

Band

2.4 GHz

Password*

Cancel

Back

Next

Run

Clarity Synthetic – Running Test

Synthetic Tests

Basic Info **DNS** Ping Page Load Traceroute iPerf3

DNS

DNS + -

Cancel Back Next Run

Synthetic Tests

Basic Info DNS **Ping** Page Load Traceroute iPerf3

Packet Size ▼ Name

Packet Size ▼ Name + -

Cancel Back Next Run

Clarity Synthetic – Running Test

Synthetic Tests

Basic Info DNS Ping **Page Load** Traceroute iPerf3

URL

URL (+) (-)

Cancel Back Next Run

Synthetic Tests

Basic Info DNS Ping Page Load **Traceroute** iPerf3

Test Mode **ICMP** Destination

Test Mode **UDP** Destination

Test Mode **TCP** Destination (+) (-)

Cancel Back Next Run

Clarity Synthetic – Running Test

Synthetic Tests ✕

Basic Info DNS Ping Page Load Traceroute **iPerf3**

iPerf3 Server
Use Clarity Engine iPerf3 Server ▼

Test Mode
TCP ▼

Duration
10 seconds ▼

Bandwidth (1-850) Mbps
200 **Mbps**

Cancel **Back** Next **Run**

Clarity Synthetic – Test Results

Results ✕

Timestamp [REDACTED]

Selected Client(s) [REDACTED]

Selected Target [REDACTED]

● WPA Test		166 ms
● Ping Test	www.google.com	17.51 ms
● DHCP Test		1007 ms
● DNS Test	www.hpe.com	23.86 ms
● Page Load Test	http://www.hpe.com	161.46 ms
Traceroute Test		Click here for more details
● iPerf3 Test		71.8 Mbps

[Collect Logs](#) [Done](#)

Clarity Synthetic – Thresholds

Analysis Module	Green (GOOD) Response Time	Green Failure Rate	Orange (FAIR) Response Time	Orange Failure Rate	Red (POOR) Response Time	Red Failure Rate
Association	<10 ms	<10%	10 - 20 ms	10% - 20%	>20 ms	>20%
Authentication	<500 ms	<10%	500 - 800 ms	10% - 20%	>800 ms	>20%
DHCP	<500 ms	<10%	500 - 600 ms	10% - 20%	>600 ms	>20%
DNS	<100 ms	<10%	100 - 200 ms	10% - 20%	>200 ms	>20%
PING	<300 ms	<10%	300 - 600 ms	10% - 20%	>600 ms	>20%
Webserver Test	<500 ms		500 - 1500 ms		>1500 ms	



Questions

THANK YOU!