ENTERPRISE WLAN AS A SERVICE

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Agenda

- Why Controller-less ?
- Unified centralized Management !
- Centralized Monitoring & Configuration
- Centralized Troubleshooting

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WHY CONTROLLER-LESS ?

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History of Enterprise WLAN

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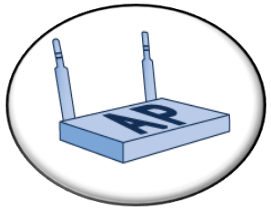
802.11b/a	802.11g	802.11n	802.11ac
1999	2003	2007	2012

Scalability and Reliability

Realized by Moore's Law



Autonomous APs

- ✓ Scales linear (AP per AP)
- ✓ Low Cost (no additional Hardware)
- ➢ Limited Intelligence
- ➢ No Radio-Management/No real Network Integration
- ➢ Hard to manage (AP by AP)

Centralized Control

- Centralized Intelligence
  - ✓ Radio Resource Management (RRM)
  - ✓ Authentication & Key Management
  - ✓ WIPS, Location Services, L3 Roaming and more
  - ➢ More Design- and Complexity effort
  - ➢ Single Point of Failure & Redundancy expensive
  - ➢ Bottleneck and scales not so easy and cheap

Cooperative Control

- Distributed Intelligence
  - ✓ Shared Control- and Data plane
  - ✓ All Enterprise Features
  - ✓ Like a distributed Super-Computer
  - ✓ Best-Path Forwarding & Redundancy
  - ✓ Load Balancing, Band Steering
  - ✓ Linear, unlimited, & cheap scalability
  - ✓ Easy to use and to manage
  - ✓ Private & Public Cloud Mgmt. Options

Security, Manageability & Mobility

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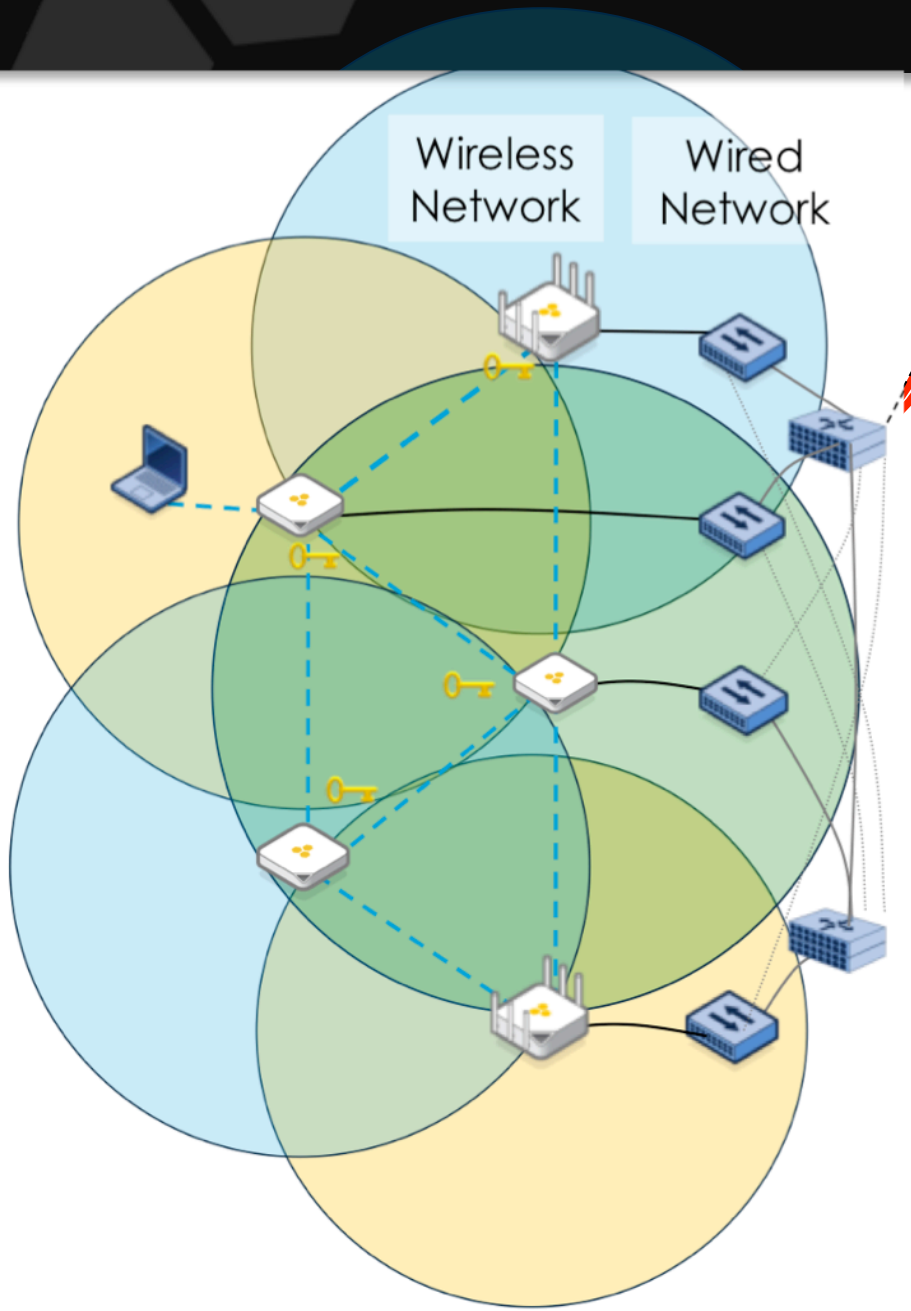
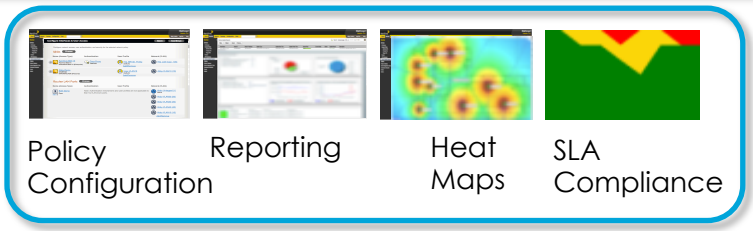
How does it work?





HiveManager NMS

With Cooperative Control, clients can securely and seamlessly roam across the WLAN

Architectural Alternatives

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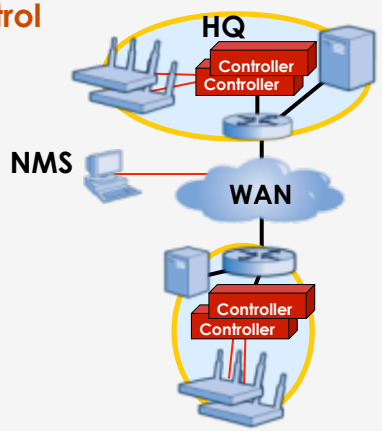
Reliability

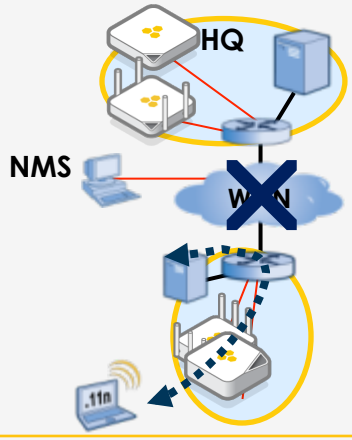
Redundant Centralized Data Forwarding & Control



More Reliable
But Expensive

$

Fully Distributed Forwarding & Control



High Performance
Highly Reliable &
Cost Effective

- Authentication
- Auto RF
- L2/L3 Roaming
- QoS
- WIPS / Rogue Detection

✓

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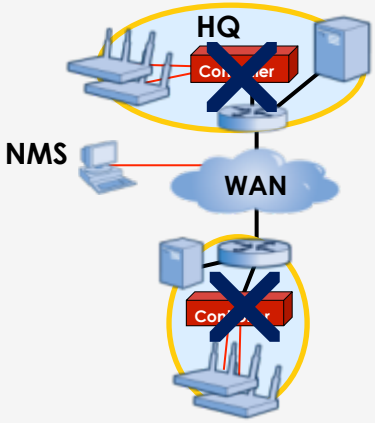
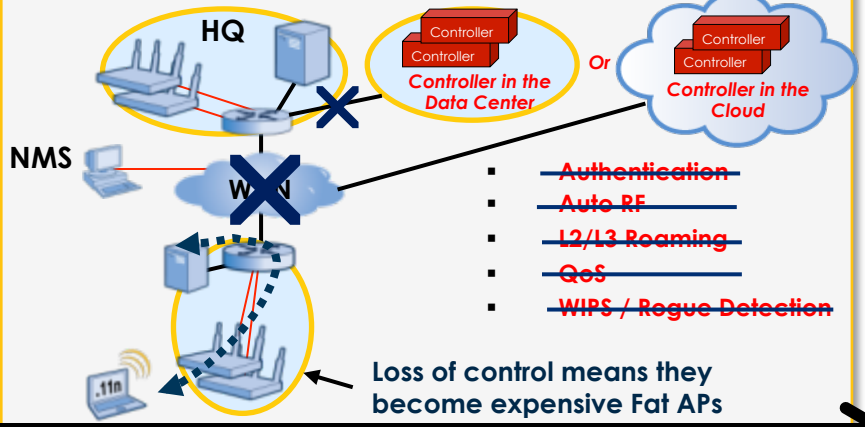
Centralized Data Forwarding & Control



Controller Failure
= WLAN Failure

Distributed Forwarding with Centralized Control



- ~~Authentication~~
- ~~Auto RF~~
- ~~L2/L3 Roaming~~
- ~~QoS~~
- ~~WIPS / Rogue Detection~~

Loss of control means they become expensive Fat APs

Performance & Cost Effectiveness

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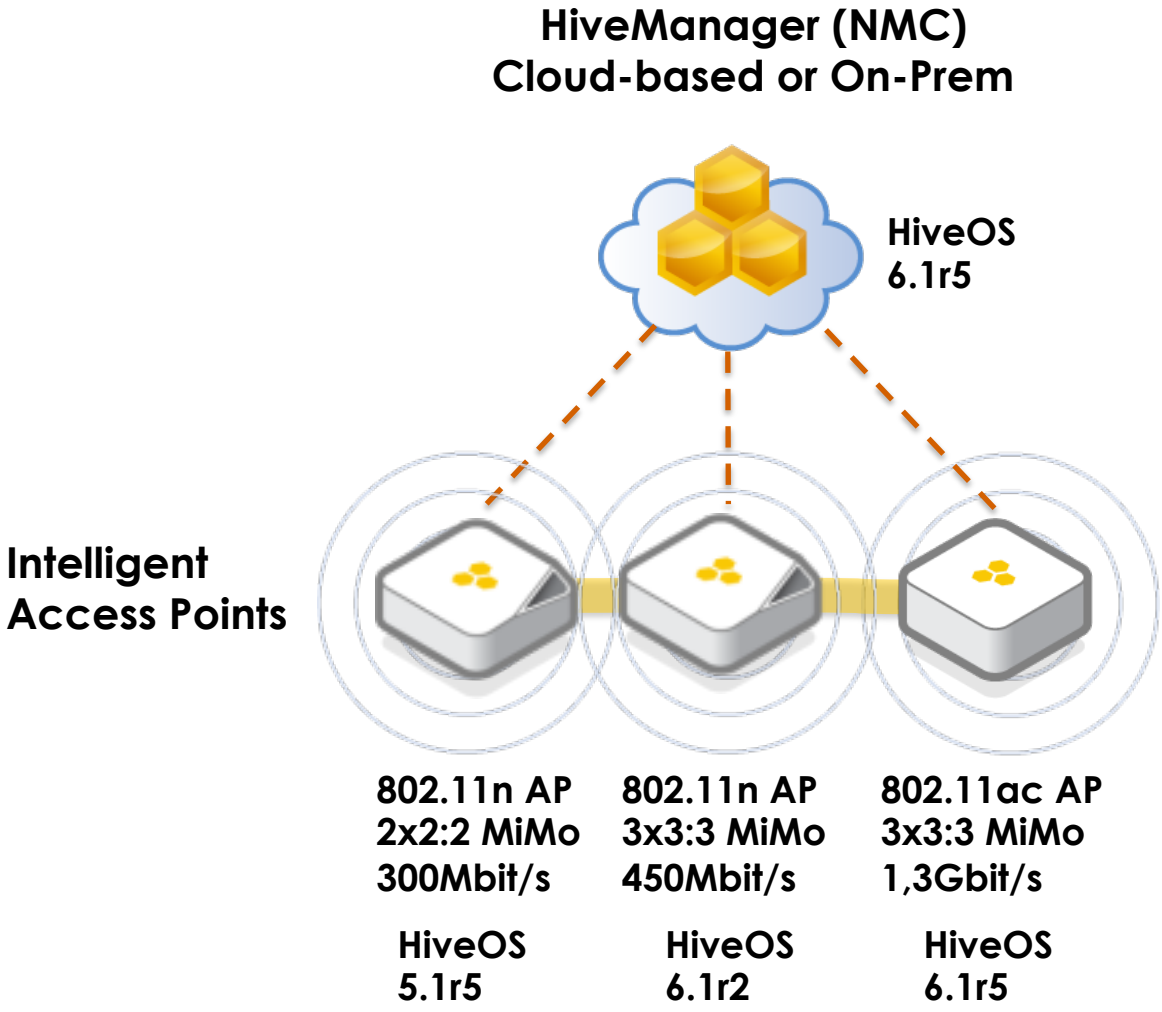
Co-operative Control



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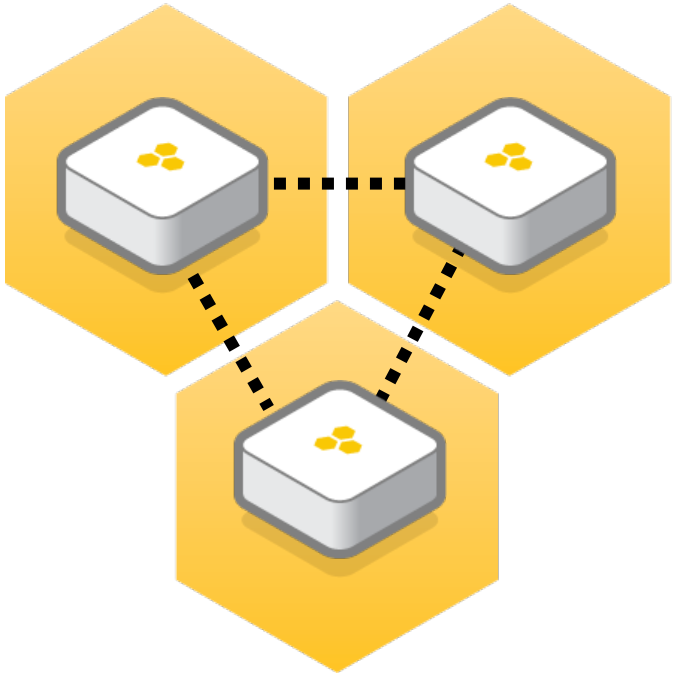
Cooperative Control Architecture

- Control Plane coordination between APs
- Implemented in ***Intelligent*** Software Protocols
- No Hardware Controller available / required



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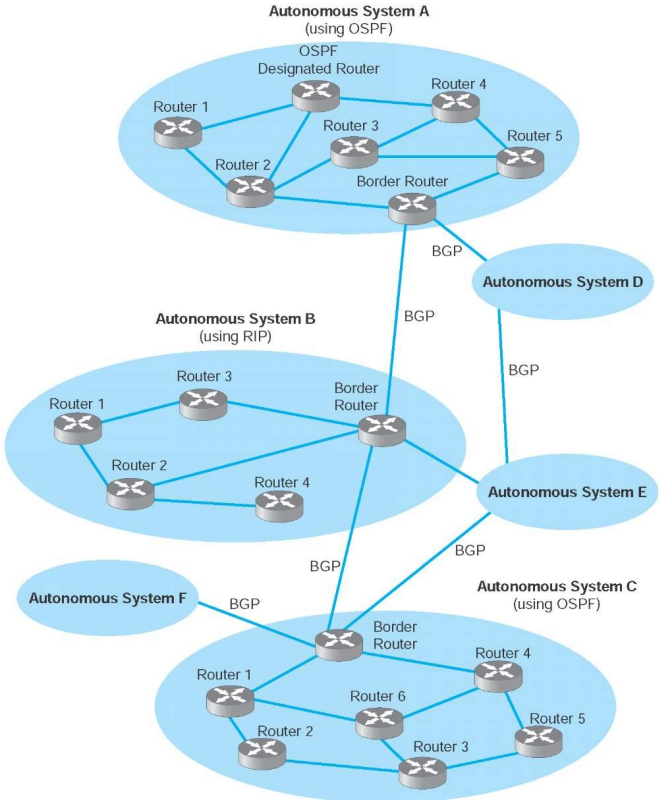

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Centralized versus Distributed Control

Shared Control Plane Processing

Over Provisioning
(Pay too much)

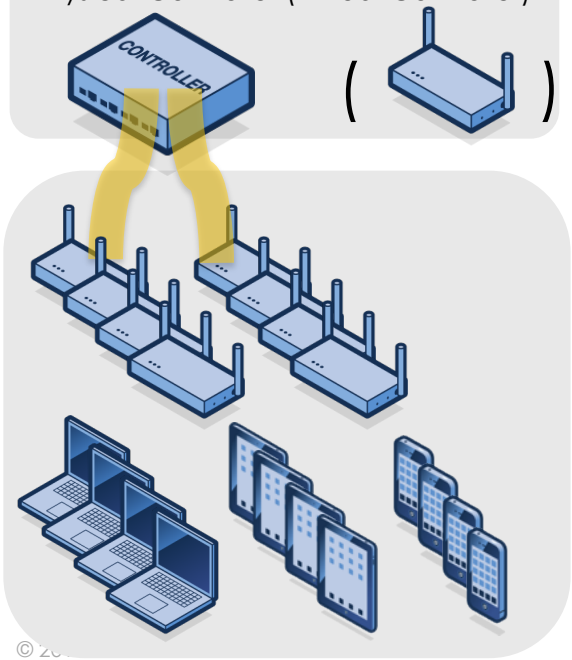
Under Provisioning
(Impact Performance)

Parallel Control Plane Processing

Scalable Processing
(Pay for what you need)

Processing & Cost

Physical Controller (Virtual Controller)



Control Functions

- **User Authentication**
- **Role-based Access Control**
- **Captive Web Portal and Guest Access**
- **Self-Tuning RF Management**
  - Channel selection & power level
  - Client load balancing & band steering
- **RF Threat Protection and WIPS**
- **Secure Fast Roaming (L2 & L3)**
- **Voice over WLAN & QoS support**
- **Dynamic Mesh Failover**

Cooperative Control

Distributed (Controller-less) Wi-Fi Architecture

Delivering simplicity, reliability and affordability

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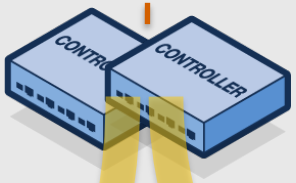
Management

Management *within* the network only

Centralized cloud-based or

Local management

Redundancy



Requires multiple controllers

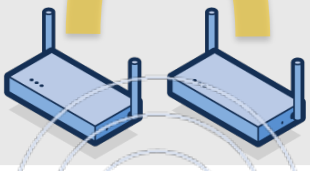
Local data forwarding..what do you lose?

No single point of failure

Self healing mesh architecture

No controller tax

Scalability and future proofing



Controller capacity?

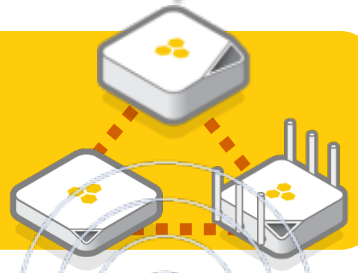
Feature licenses?

No feature licensing

Start small and grow

Distributed intelligence

(FW, RADIUS, CWP, BYOD, Bonjour GW)



Performance

Data bottlenecks

QoS, Spectrum analysis..$$$

No data bottlenecks

Service Level Agreements

QoS & Spectrum analysis included

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Enterprise Wi-Fi Features

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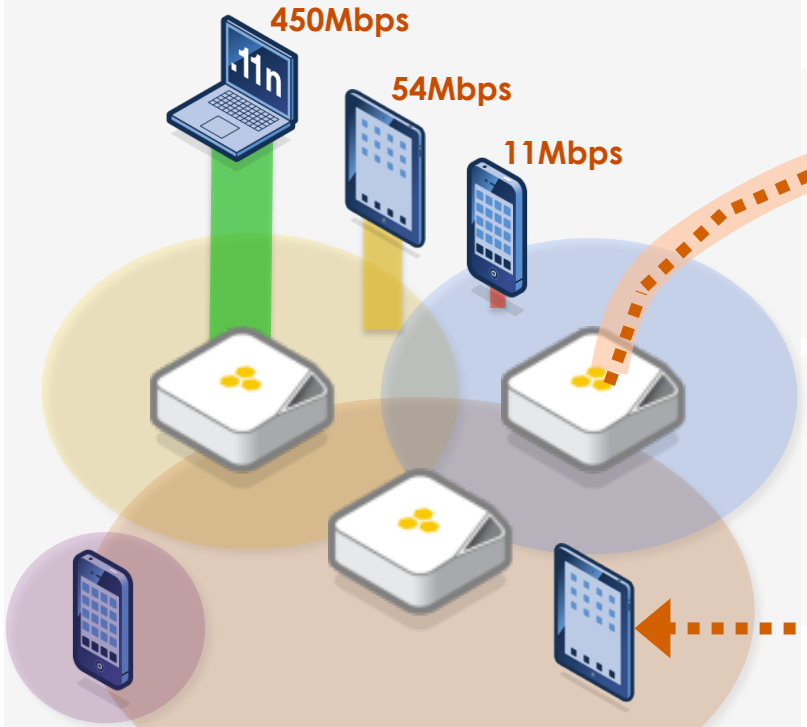
Optimization

SLA, QoS & Dynamic Airtime Scheduling



High Powered Radios, Receive Sensitivity & RRM

Mobility

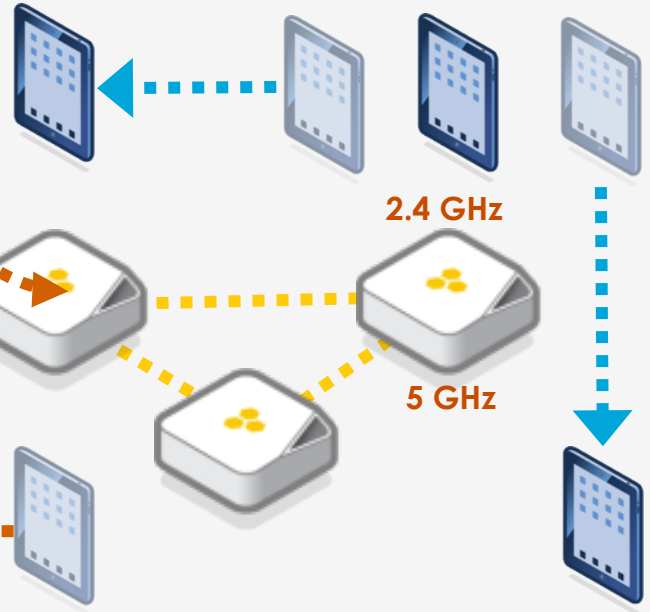
Layer 3 Roaming

Layer 2 Roaming

Distribution

Load Balancing

Band Steering



Resilient Mesh

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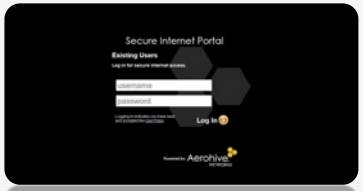
Layer 2/3 Roaming

Receive Sensitivity

Security and Authentication Features

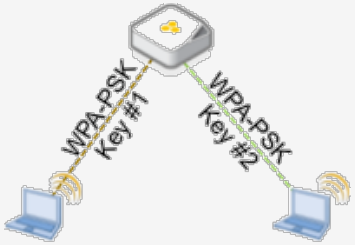
Captive Web Portal



Multiple CWPs able to serve scalably from every AP

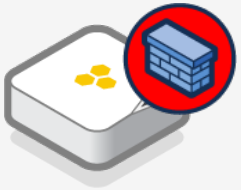
Wireless Intrusion Prevention

Private PSK



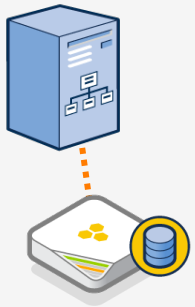
Multiple users, same SSID - easy but unique revocable keys

Stateful L2-L7 Firewall



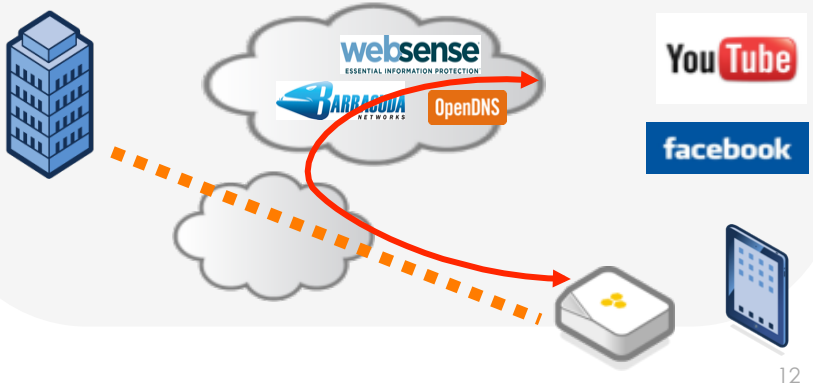
- MAC (L2) based firewall
- Stateful TCP/IP firewall (L3/L4)
- L7 App Visibility & Enforcement
- ALGs for DNS/FTP/SIP
- Policy Based Client Isolation

Directory Integration



- Authentication support for common directory servers
- Eliminates standalone RADIUS server
- Credential caching for remote/branch survivability

Remote Site Content Security



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UNIFIED CENTRALIZED MANAGEMENT

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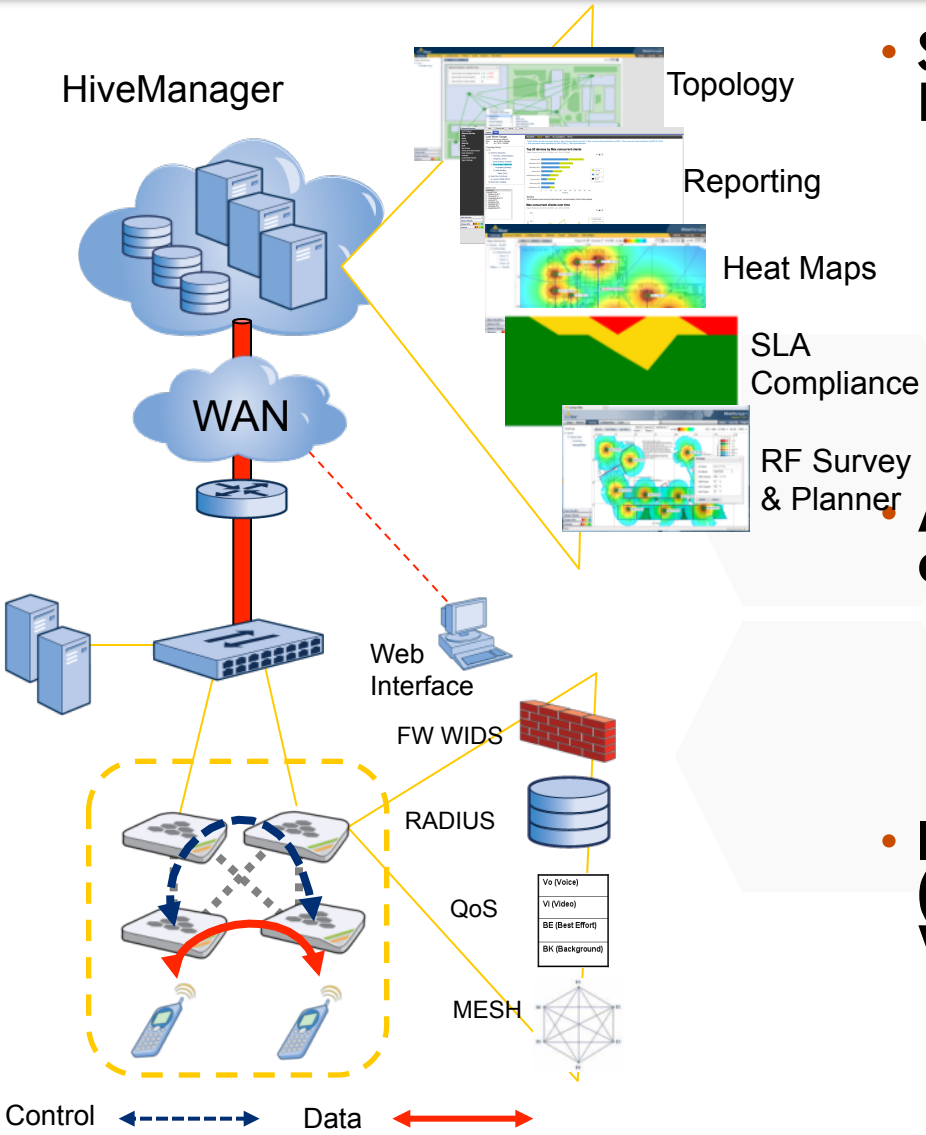
HiveManager



- **SaaS delivery of enterprise Wi-Fi and Branch On Demand Mgmt**
  - Per AP service / Customer domain
  - Policy-based mgmt, topology, reporting, heat maps, SLA compliance, and RF survey and planning tools
  - Virtualized, resilient infrastructure
  - Two modes – Express & Enterprise
  - Role-based customer administration
  - Seamless transition between online and on-premise HiveManager
- **APs with distributed control and data forwarding**
  - Minimal onsite hardware
  - Pay as you go expansion
  - No single points of failure!
    - WAN outage does not impact WLAN Connectivity or Functionality (Roaming, Auto RF, QoS, Authentication)
- **Intelligent APs and branch routers (Integrated Firewall, RADIUS, QoS, VPN, Mesh)**

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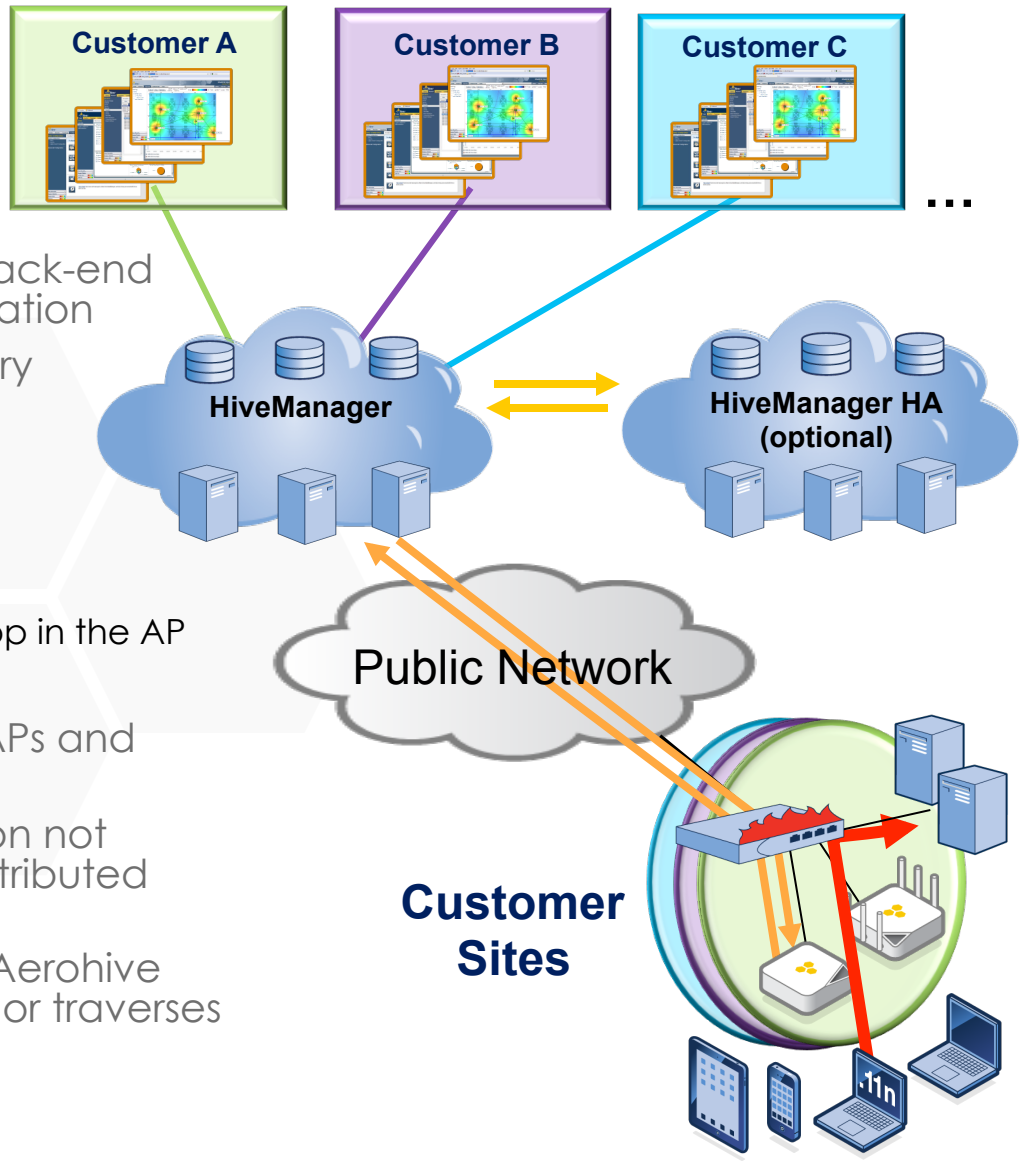
Server Infrastructure and Connectivity

- **Infrastructure**
  - Uses HiveManager
    - AJAX interface
    - Database virtualization
  - Customer and system management back-end provides support and customer automation
  - Automatic system backup and recovery

- **Network Connectivity**
  - AP initiates connection
    - Requires no firewall configuration, just drop in the AP
    - Traffic is secured using SSH and DTLS
  - Policy and configuration is pushed to APs and routers
  - HiveManager monitoring / configuration not essential to WLAN operation due to distributed control and data forwarding
  - No actual **data** traffic from managed Aerohive devices (APs and routers) is forwarded or traverses the Aerohive Cloud Services Platform.



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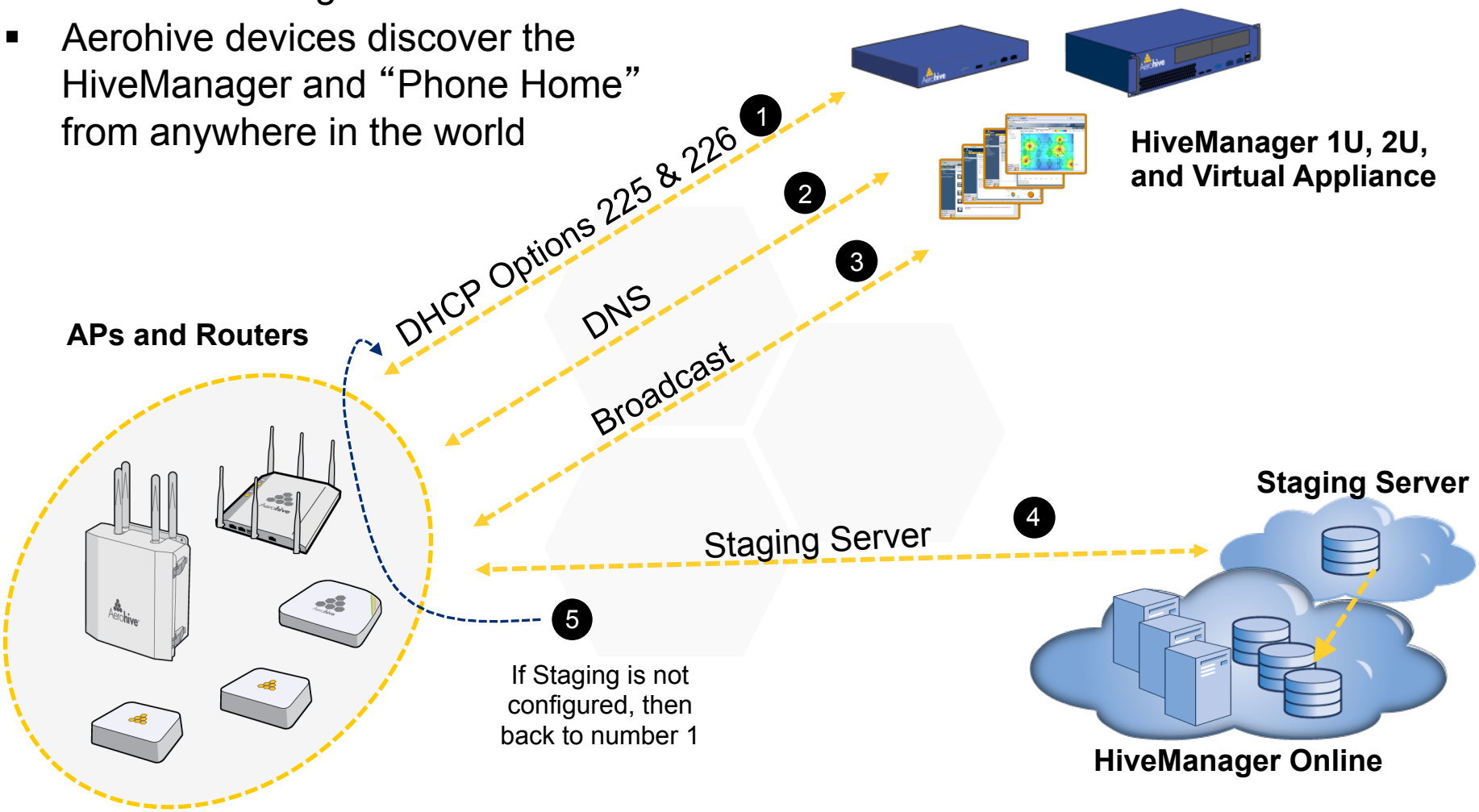
HiveAP Auto-Discovery Functionality

- Zero Pre-Configuration Needed!
- Aerohive devices discover the HiveManager and “Phone Home” from anywhere in the world



*Note: It is also possible to statically configure the HiveManager information, which disables the auto-discovery functionality

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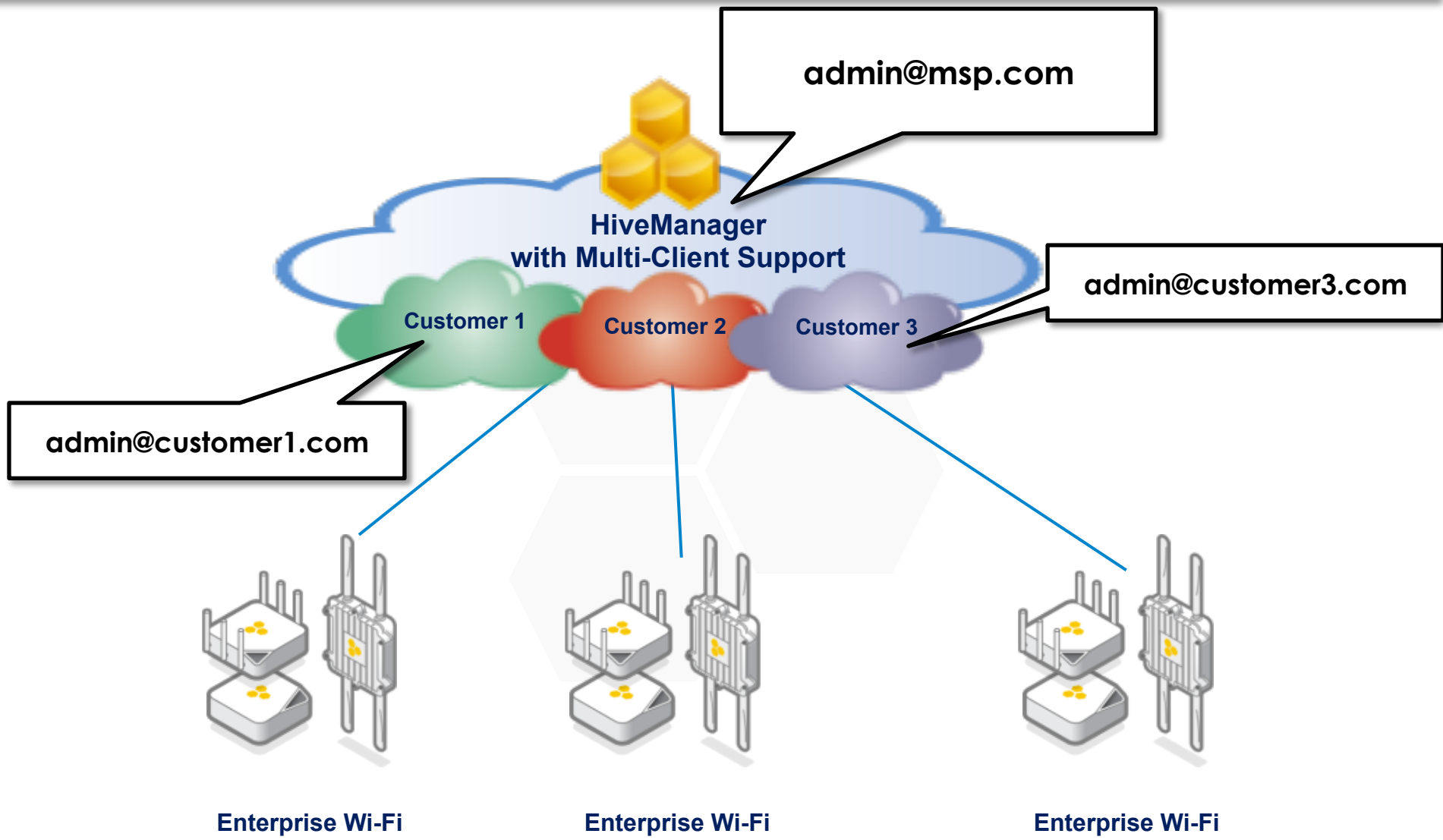
Centralized Management



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CENTRALIZED MONITORING & CONFIGURATION

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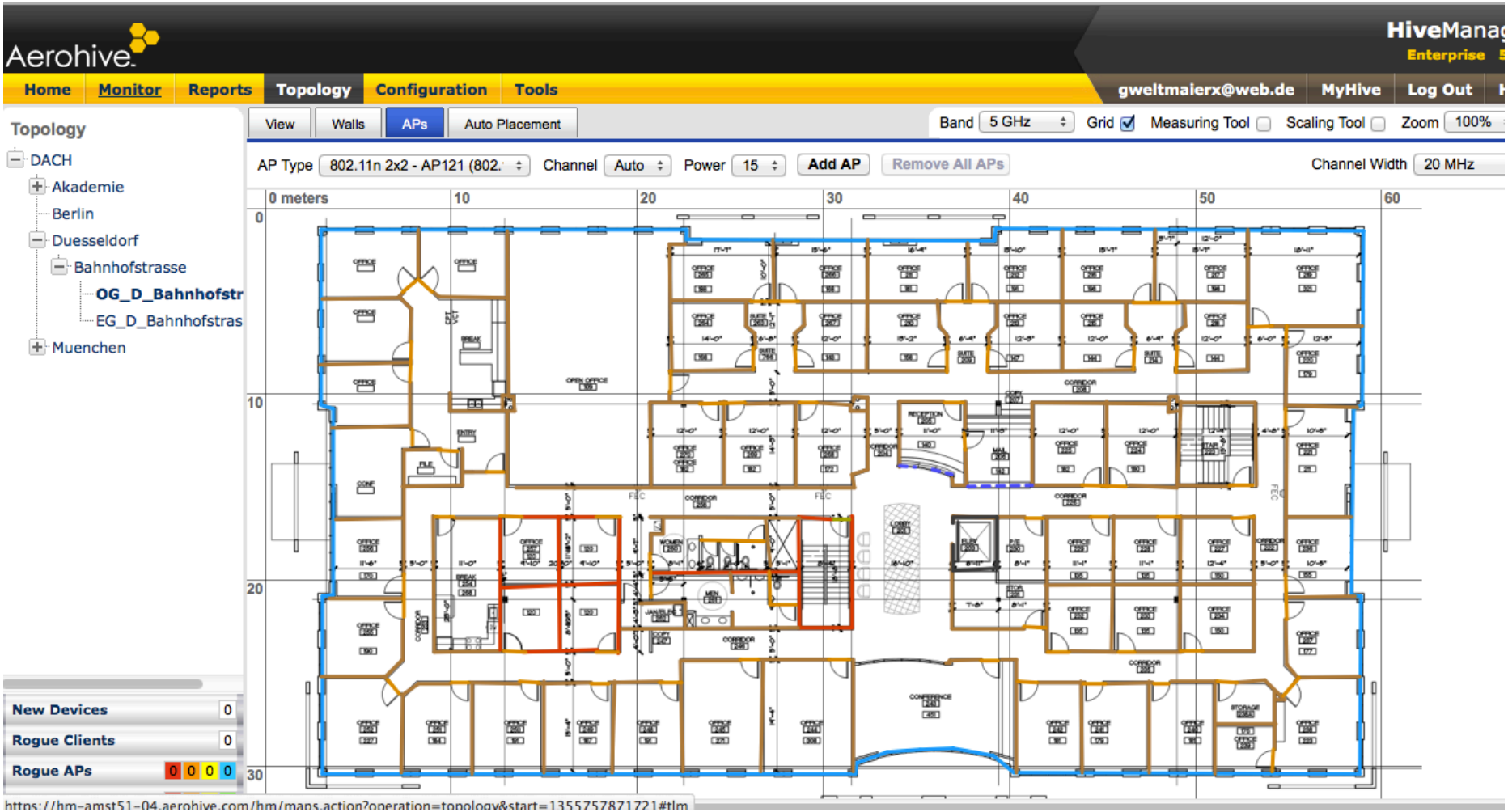
Planning & Monitoring



Planning & Monitoring

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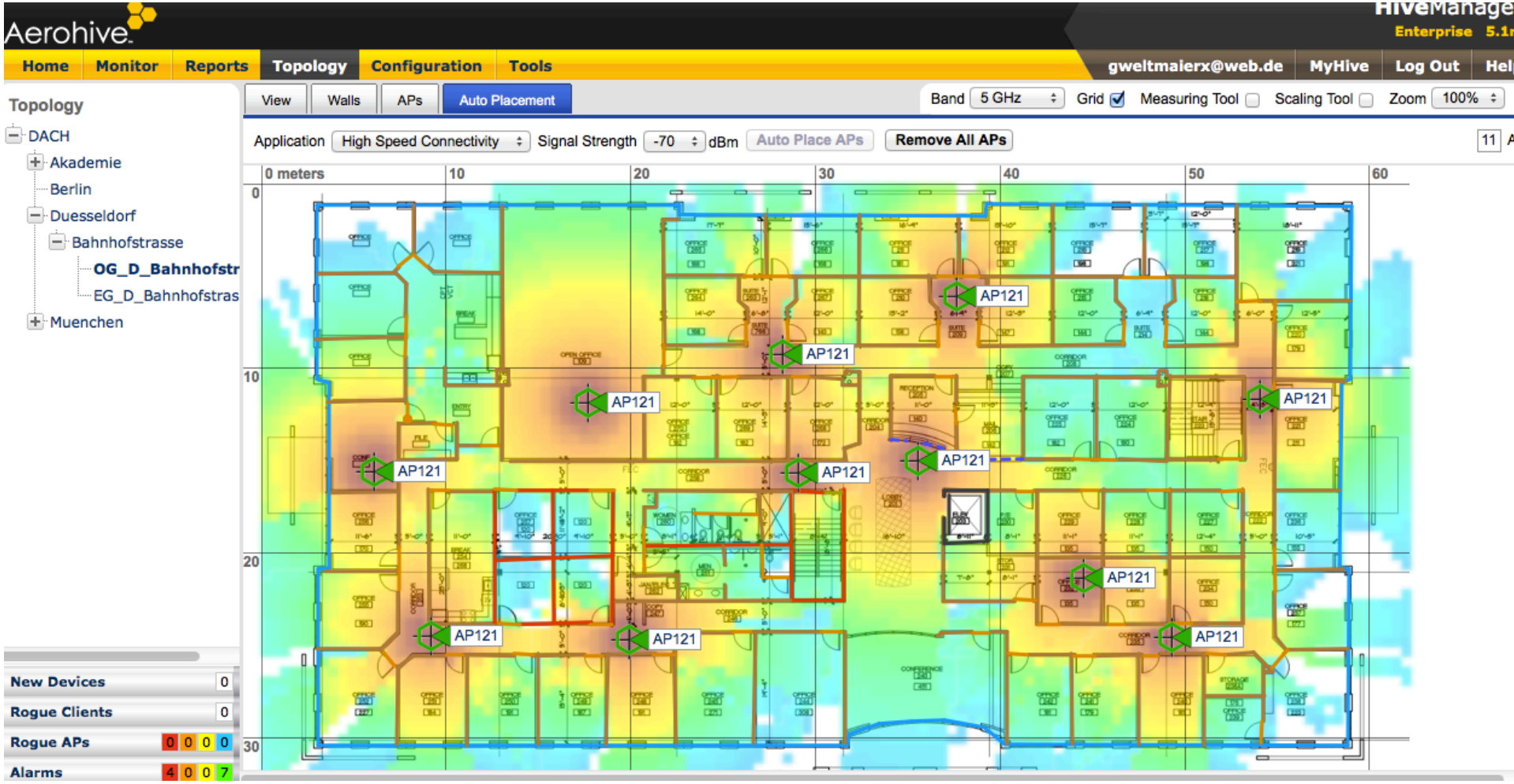

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Planning & Monitoring

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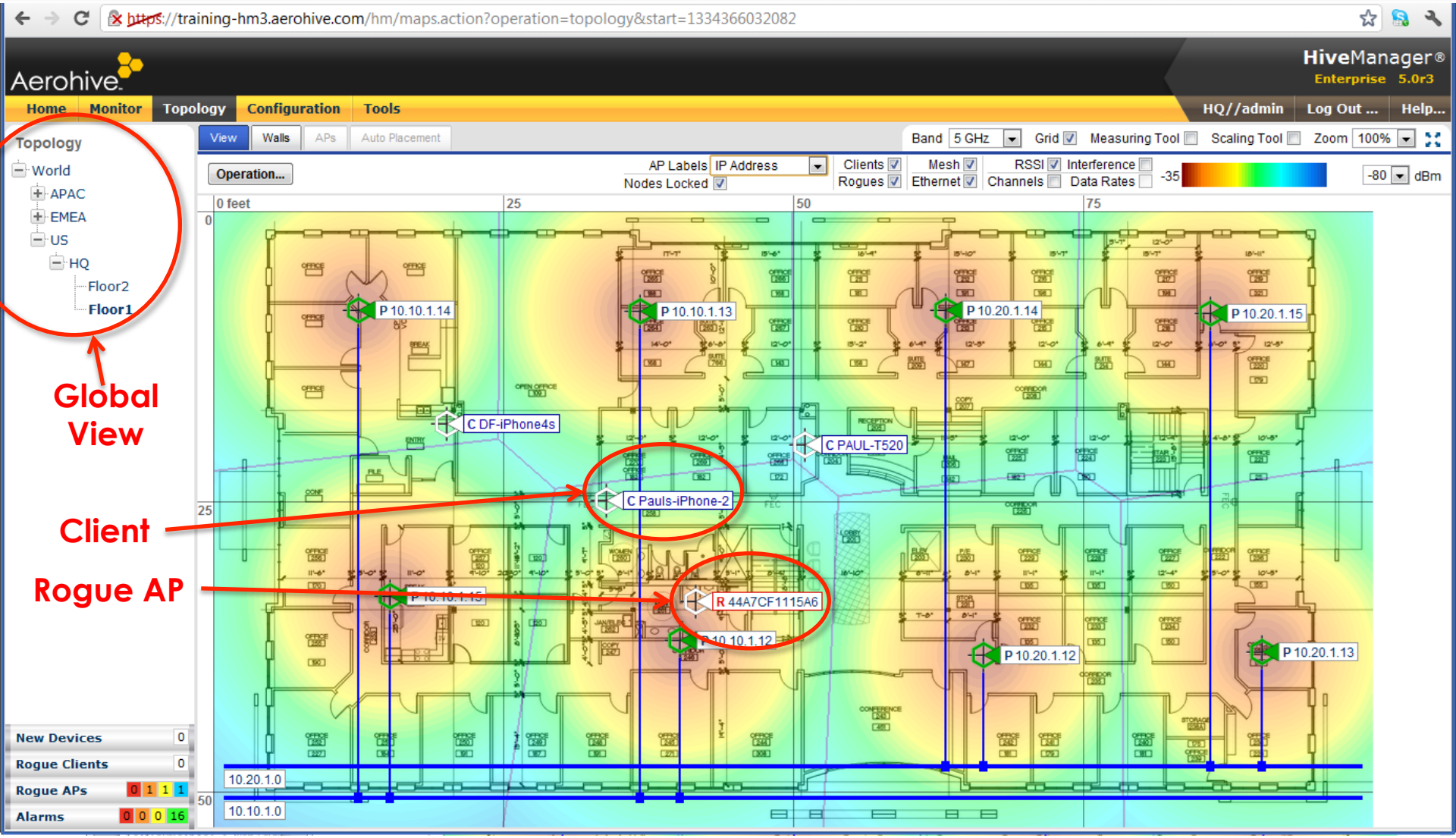

Global View

Client

Rogue AP

Auto RF Airtime Scheduling L2/L3 Roaming Load Balance User Policy Security Location …

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Dashboard - Network Summary

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Device Groups

- Device Groups
  - Locations
    - Aerohive
      - Sunnyvale, CA
        - 328 Gibraltar
          - Floor 1
        - 330 Gibraltar
          - Floor 1
      - Surrey, UK
        - 16-18 West
          - Floor 1
  - Network Policies

Data Filters

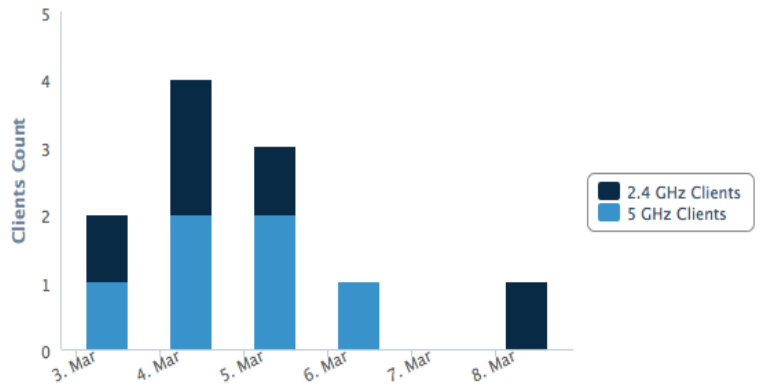
- Data Filters
  - SSIDs
    - AVC_Demo
  - User Profiles
    - Contractors
    - Employees
    - Executives

New Devices	3
Rogue Clients	1
Rogue APs	0 0 0 0
Alarms	7 1 0 2

Last Hour | Last Day | Last Week | Custom | Last Update: 2013-03-10 10:14PM | Edit | Schedule a Report | Export | Email

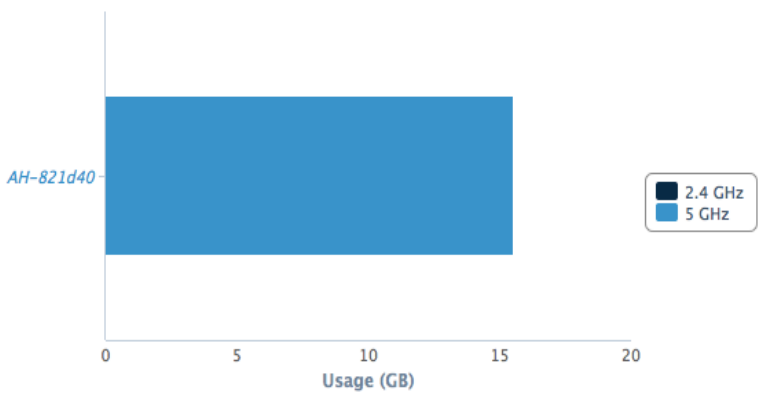
Unique Clients over Time

Report Period: Mar 3, 2013, 12:00AM - Mar 10, 2013, 12:00AM



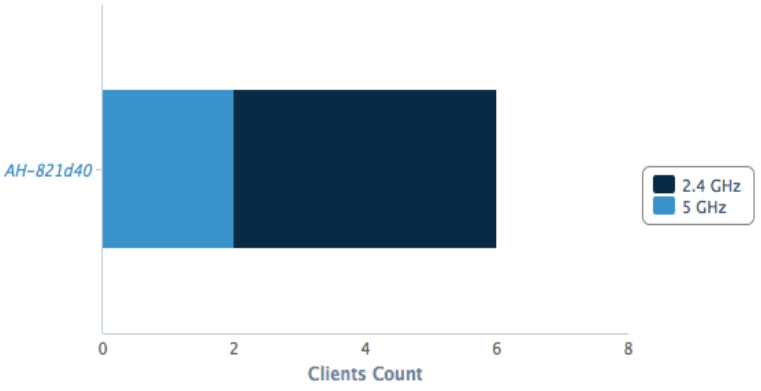
Top 10 Aerohive APs and BRs by Client Usage

Report Period: Mar 3, 2013, 12:00AM - Mar 10, 2013, 12:00AM



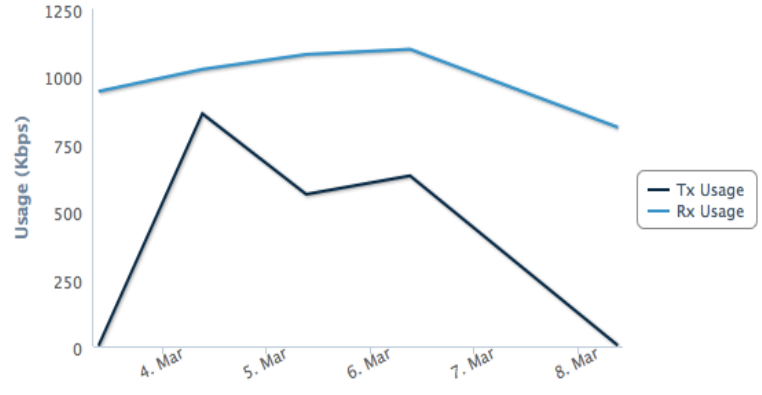
Top 10 Aerohive Devices by Unique Clients

Report Period: Mar 3, 2013, 12:00AM - Mar 10, 2013, 12:00AM



Bandwidth Usage over Time

Report Period: Mar 3, 2013, 12:00AM - Mar 10, 2013, 12:00AM



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Dashboard - Troubleshooting

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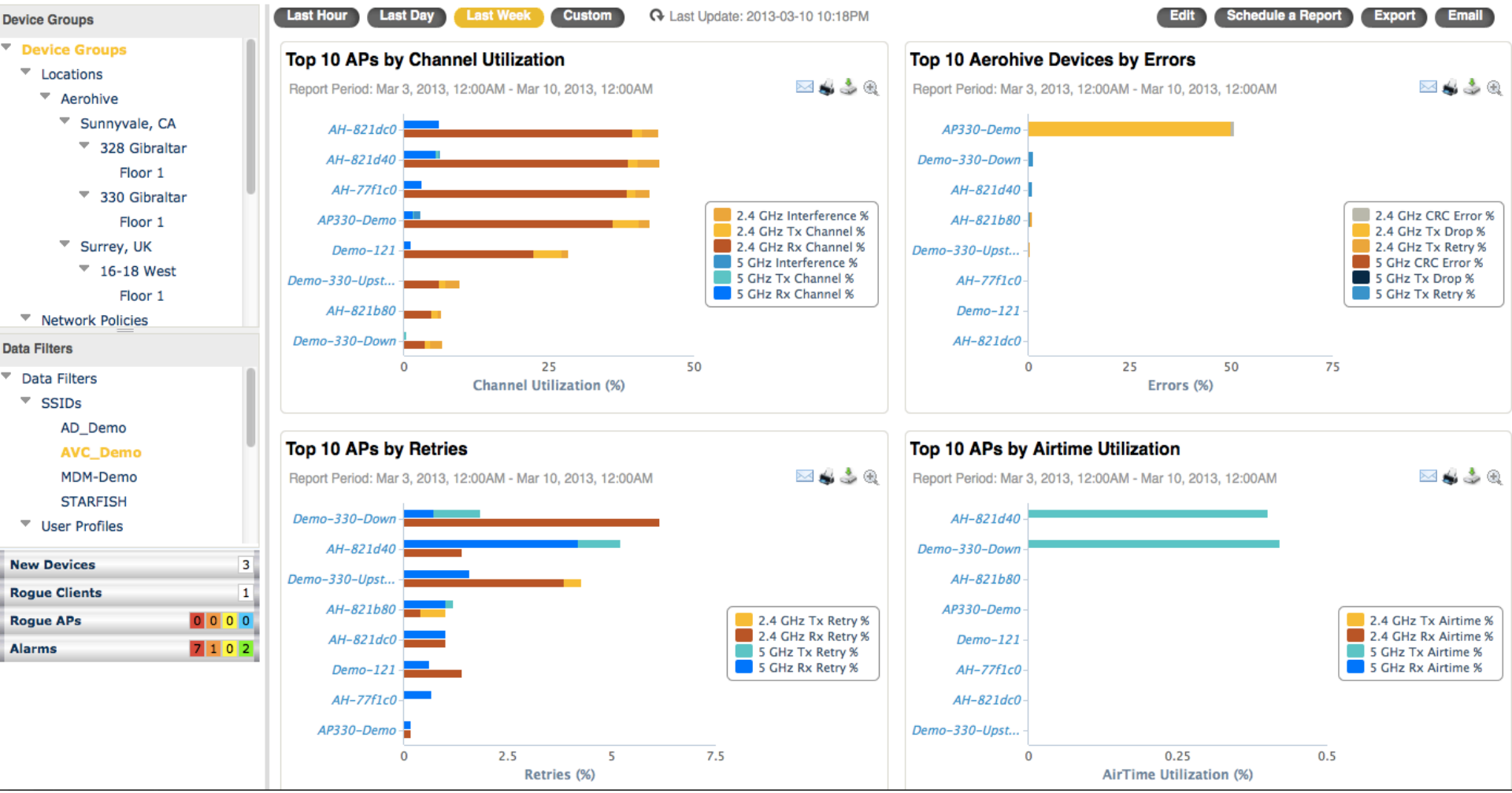

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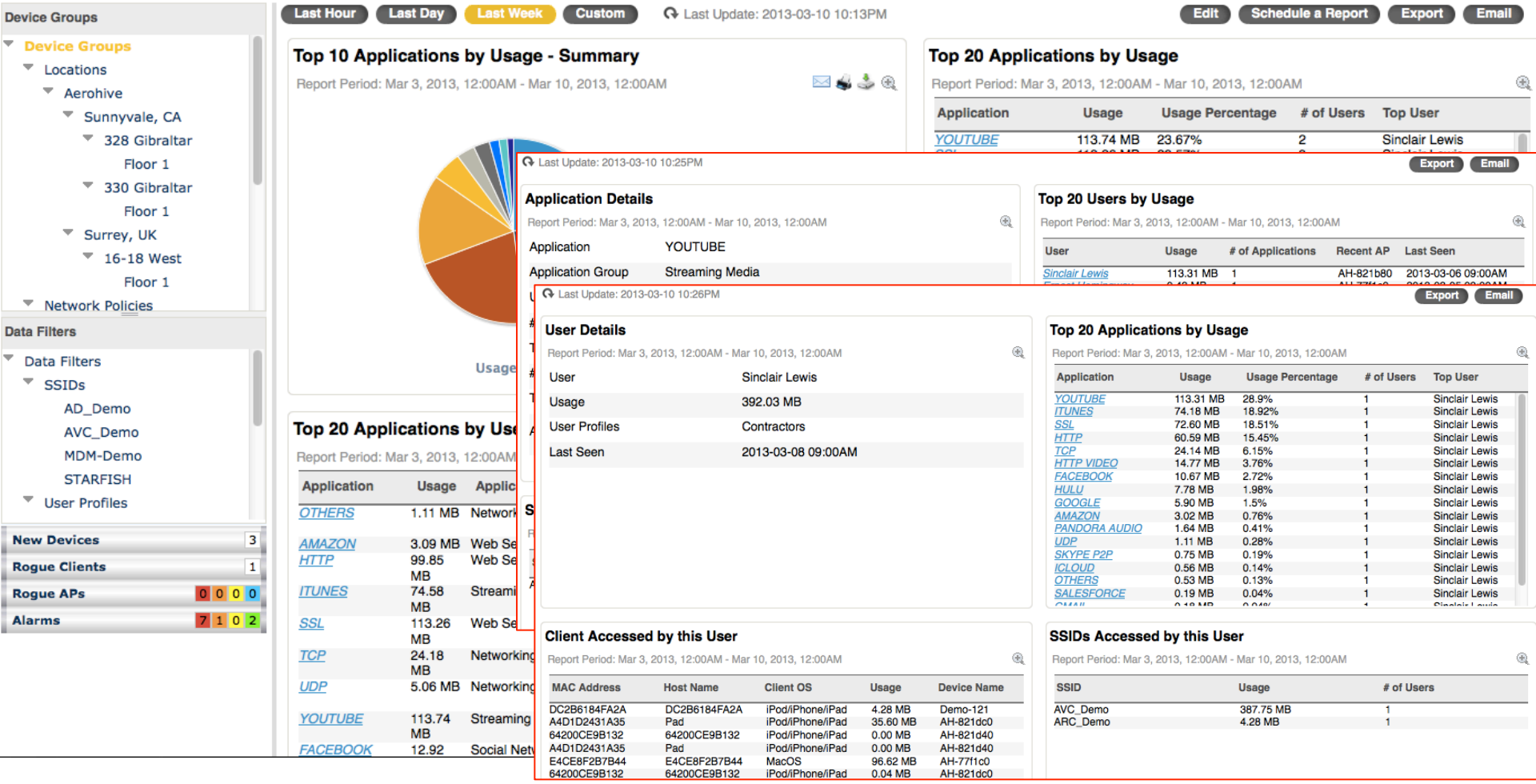
Dashboard – Application Visibility



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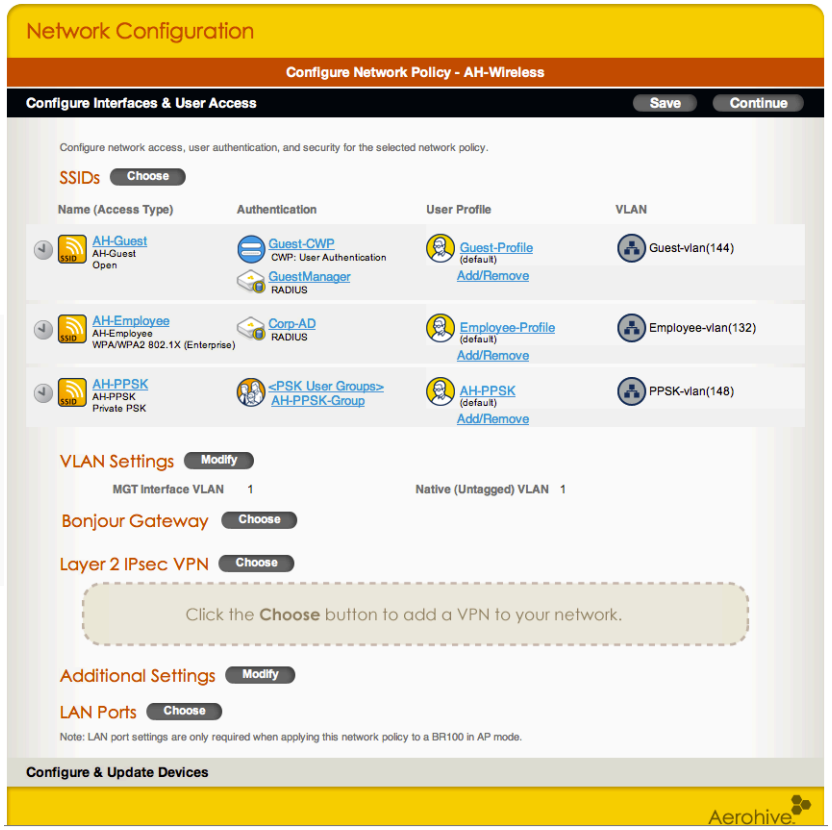
Powerful User-Centric Configuration

- **Flexible mapping of SSIDs and Users access to the network**
  - › QoS Policy
  - › Firewall Policy
  - › Mobility Policy
  - › VLAN and Tunnel mapping
  - › Routing policy
- **Configurations can be applied across any number of APs and routers**
- **Enables easy large scale management – a wide reaching change can be pushed across a network in seconds**



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Unified Wired and Wireless Policy

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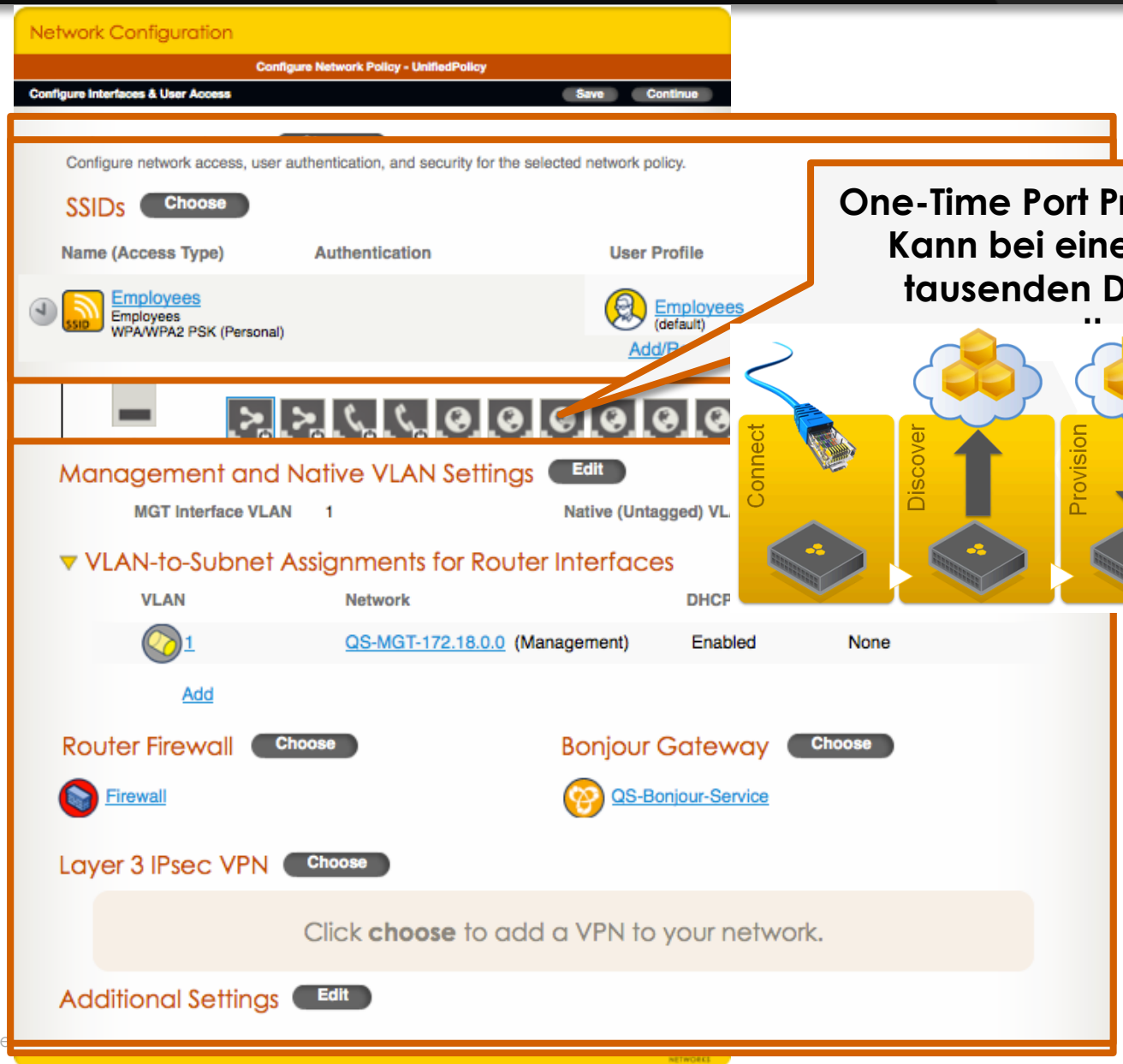
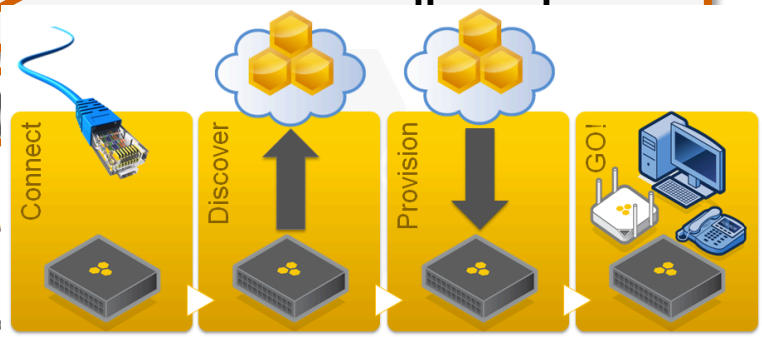
Wi-Fi

Switching

Routing
VPN
Firewall
Bonjour



One-Time Port Provisioning
Kann bei einem oder tausenden Devices



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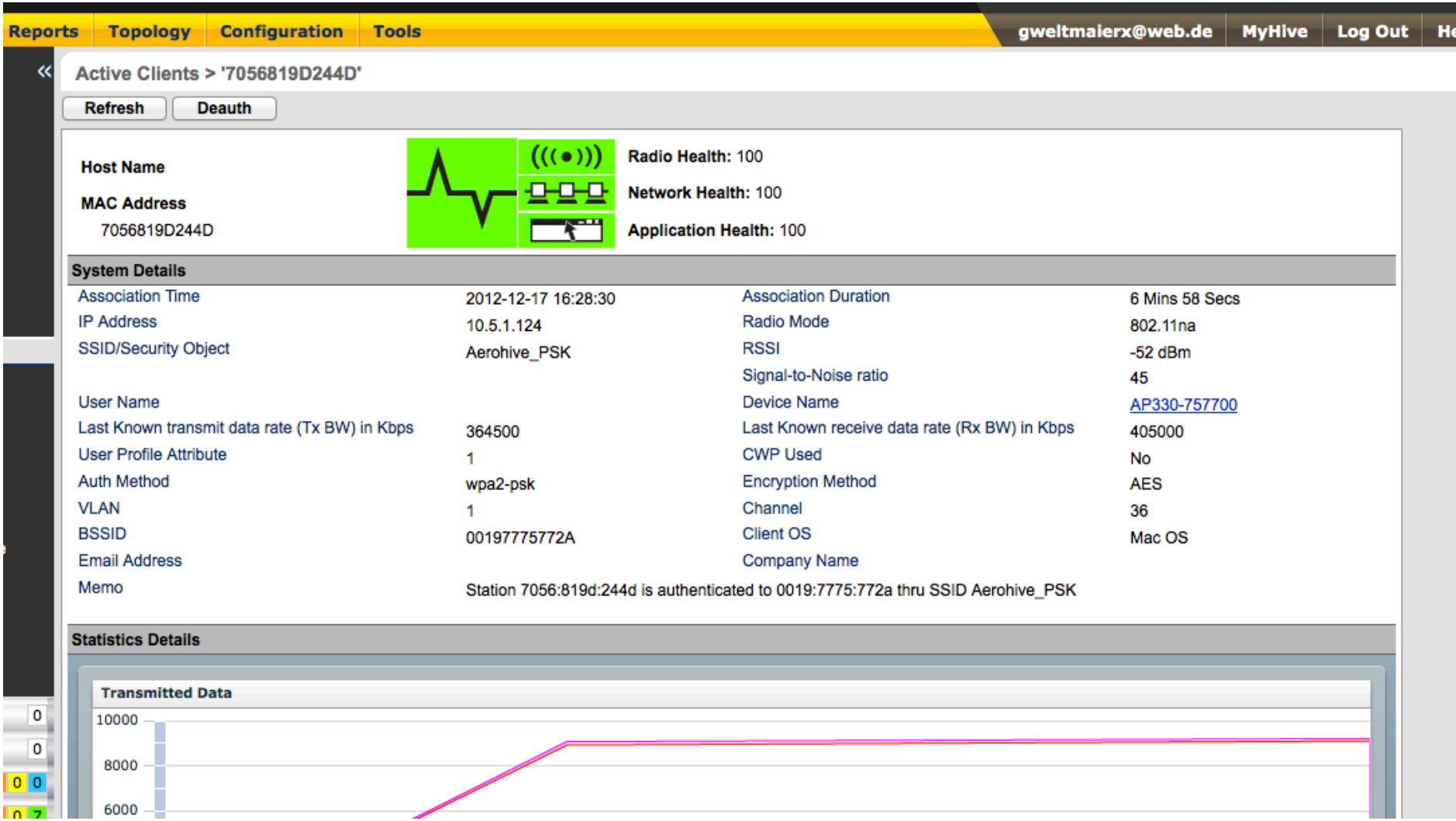
Simpli-Fi Client Troubleshooting



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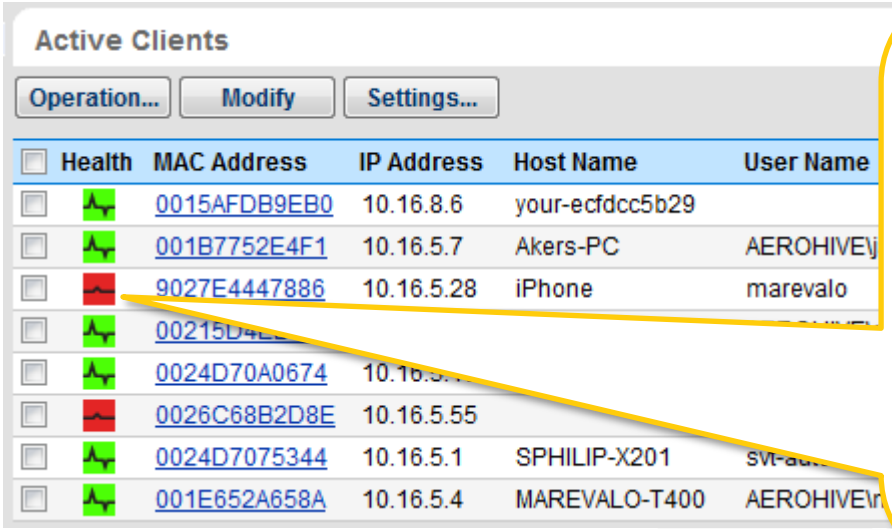
Handling the Client Explosion: RF Guru on the Help Desk?

Client Health Score at a glance…understanding a client's health.



Good connection

High data rates & high successful transmission rates

Marginal connection

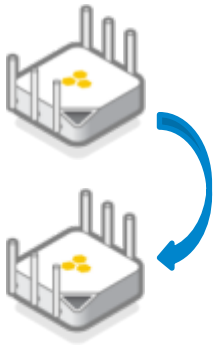
Lower data rates / lower successful transmission rates

Poor connection

Low data rates / low successful transmission rates

Automatically Remediate Client & Network Issues

- **Move Clients**
  - Band steer or load balance clients triggered by low client health score
- **Airtime Boost**
  - Boosts clients' airtime if unable to hit performance target



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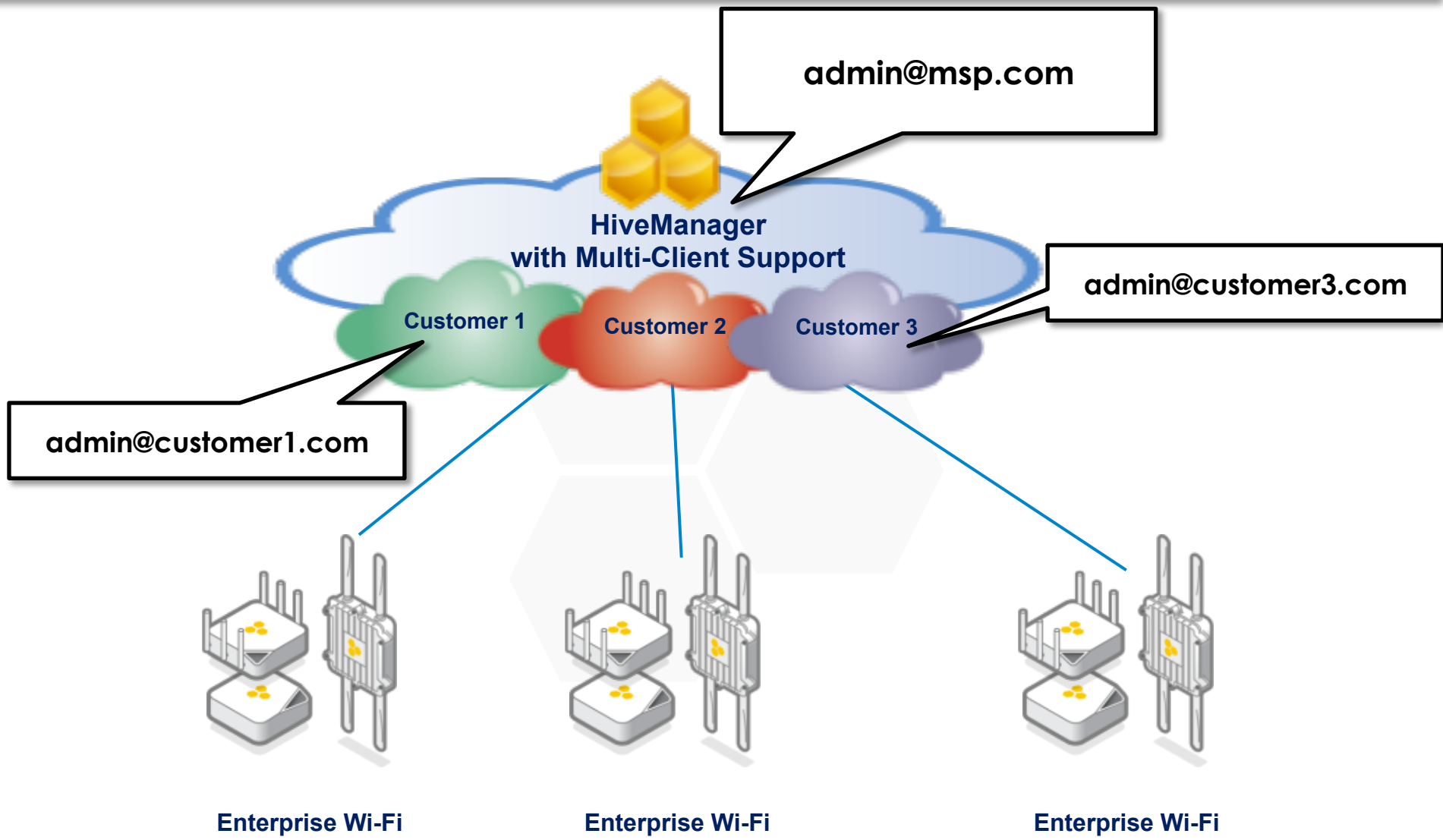
Centralized Management



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CENTRALIZED TROUBLESHOOTING

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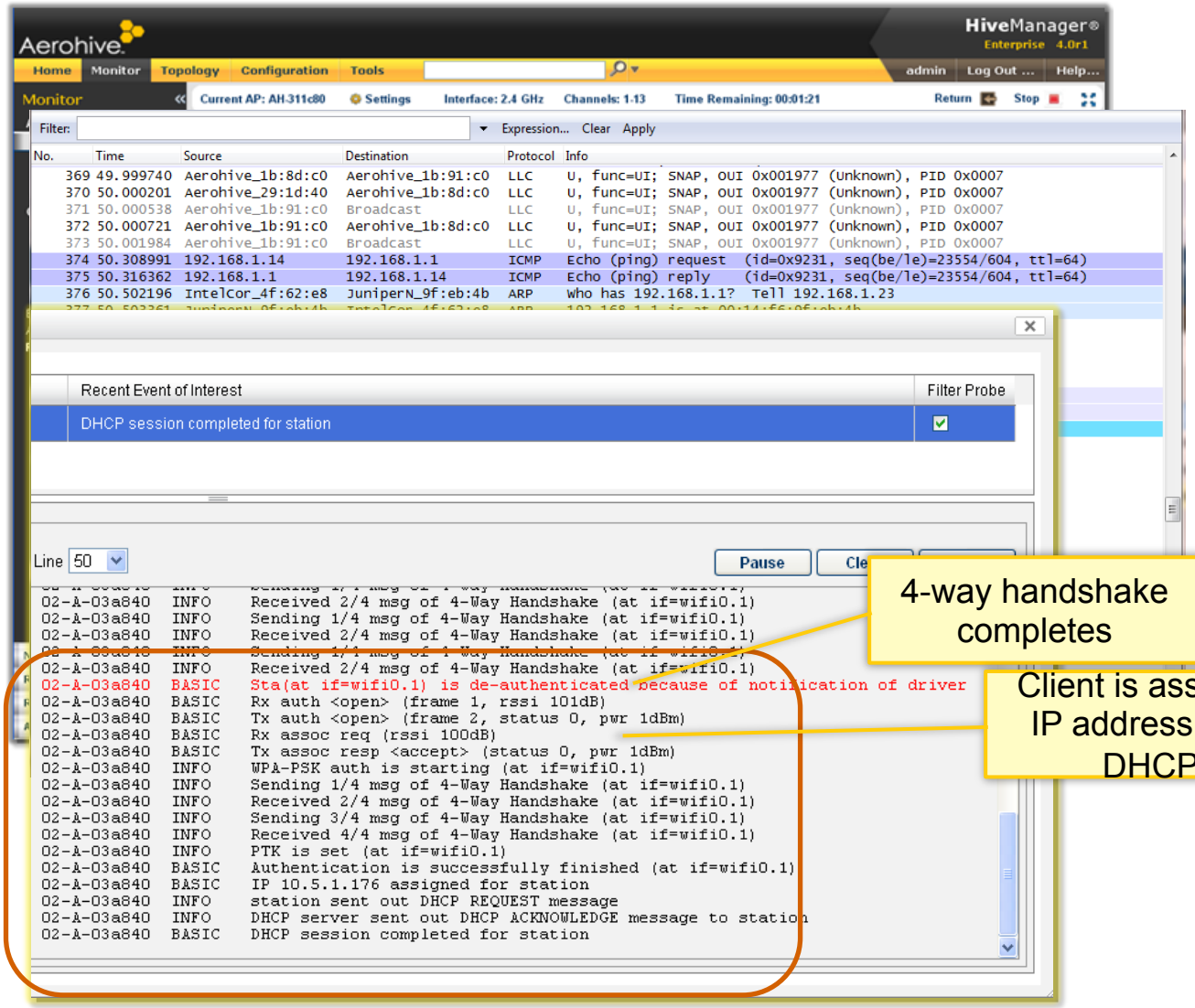
Simpli-Fi Troubleshooting

Troubleshoot

- **RF Problems**
  - › Spectrum Analyzer
- **Application Problems**
  - › Remote Sniffer
- **Authentication Problems**
  - › Client Monitor
- **VLAN Probe**
  - › Network Setup



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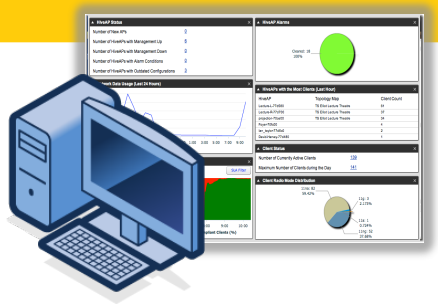
Monitoring and Reporting Features

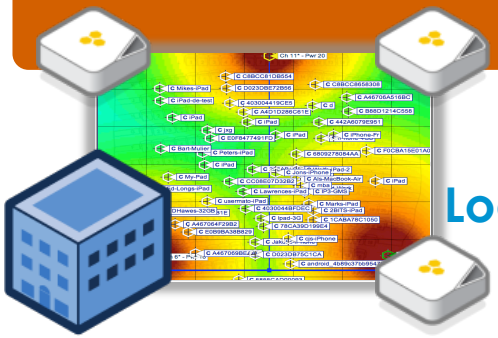
Manage

Cloud Management

Simple GUI

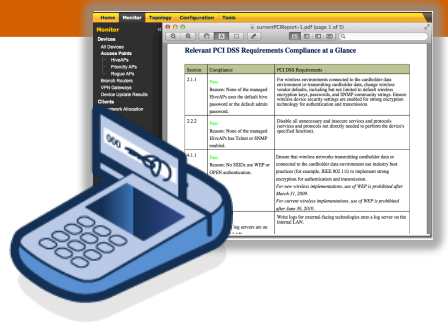


Monitor

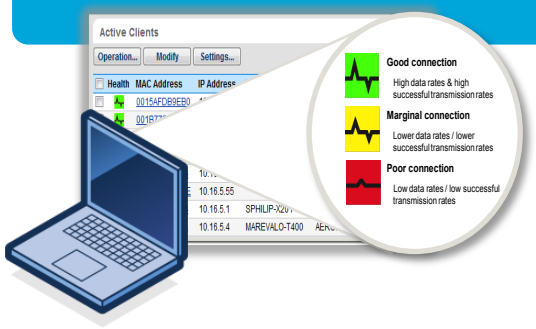


Topology & Location Tracking

PCI Compliance

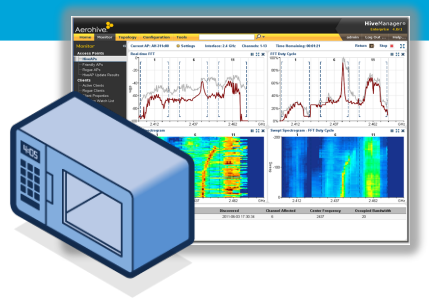


Support



Client Health Score

Spectrum Analysis



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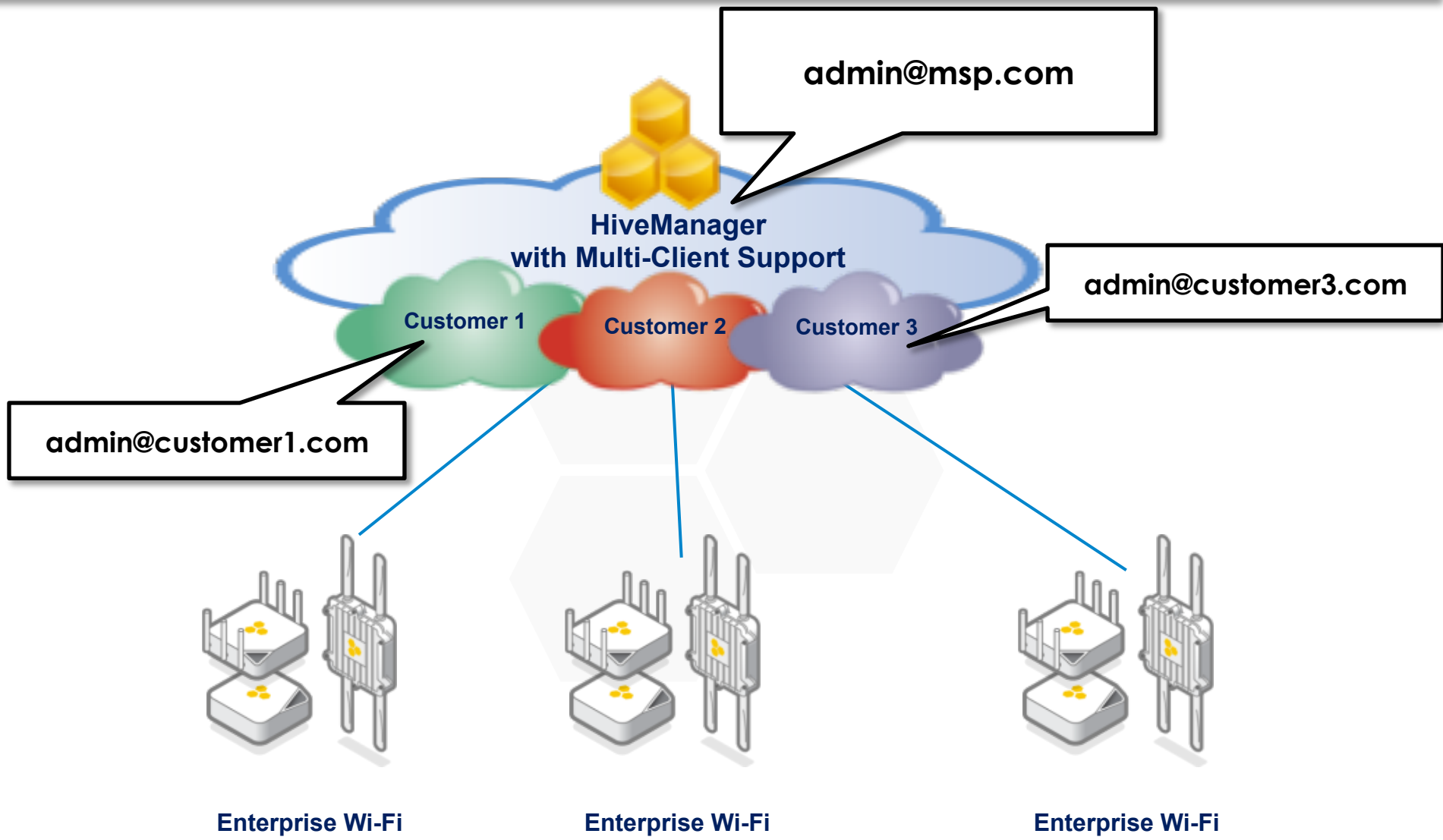
Centralized Management



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THANK YOU!

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