

The Benefits of Aerohive Networks Cooperative Control Wireless LAN Architecture



Cooperative control architecture provides a simple and logical alternative for deploying wireless LAN infrastructures.

The Genesis of the Wireless LAN

In the beginning there was the autonomous AP. Retail, healthcare, and warehouses were the first to implement these APs, making operations more efficient, and they could see that it was good. But all was not well in paradise. As autonomous APs became less expensive, a stealthy employee could install it right at his desk and enjoy the immediate convenience of wireless LAN access. Then the security guys found out about it and went berserk. But the idea of business benefits from wireless network access had taken root, and IT was tasked with delivering secure wireless for the enterprise.

After struggling to work around the wireless network management and coverage and capacity planning issues inherent in an autonomous AP architecture, IT was ready to invest in a more robust wireless LAN architecture. IT needed a solution that would provide the convenience of wireless connectivity while controlling management costs, and isolating the wireless network to work around the security flaws that were inherent in the early wireless products.

Centralized controller-based architectures emerged to address these issues, adding capabilities for central management, device roaming, coordinated RF management and security policies to the wireless LAN. The advent of this architectural approach solved many of the challenges that originated with autonomous APs.

But by their design, centralized controller-based architectures introduced another set of problems and complexities. With centralized control and data forwarding, all traffic must travel through the wireless LAN controller, which processes the packets, applies firewall and QoS policies, and then forwards the traffic to its final destination, even if the wireless clients communicating are on the same AP. This is not simply inefficient traffic flow; every hop increases the potential for latency, bottlenecks and jitter, and the further from the access point policies are enforced, the less control there is over the traffic. For time-sensitive services such as voice and streaming multi-media over wireless, the quality of these services is diminished and the likelihood of service interruption is increased. Additionally,

Aerohive's cooperative control architecture supports the wide range of wireless LAN deployments that enterprises demand.

with the introduction of centralized control into the network, the possibility of a single point of failure is also introduced.

The Arrival of Cooperative Control

Enter the newest development in wireless LAN architecture: Cooperative Control. The cooperative control wireless LAN architecture provides a simple and logical alternative for deploying wireless LAN infrastructures by enabling APs to communicate and coordinate with each other, without the need for a centralized controller.

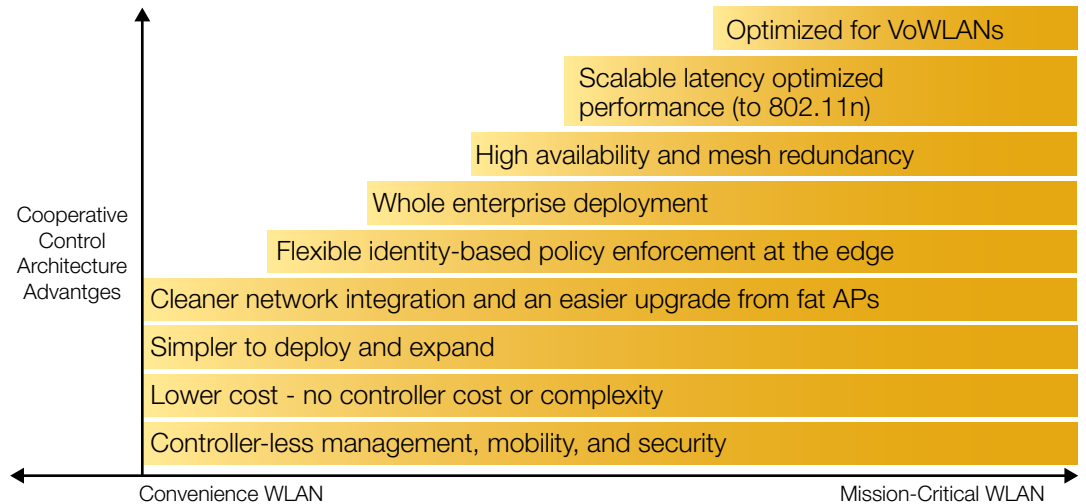
Aerohive Networks is the first enterprise wireless LAN provider to implement cooperative control in its offering. The Aerohive cooperative control AP – the HiveAP – combines an Enterprise-class access point with a suite of cooperative control protocols and functions. The cooperative control functionality enables multiple HiveAPs to be organized into groups, or “hives,” that share control information between HiveAPs to enable functions like fast layer 2/layer 3 roaming, coordinated RF management, security, load balancing, high availability and mesh networking, allowing these functions to be provided in a controller-less architecture.

Centralized configuration, monitoring and reporting is provided by a central management system called

the HiveManager. This management appliance can be located anywhere within the network and is not essential to the network's ongoing operation. For smaller deployments, the HiveAPs can also be managed via the robust command line interface.

Covering the Gamut: From Convenience to Mission-critical

Aerohive's cooperative control architecture supports the wide range of wireless LAN deployments that enterprises demand, from simple convenience applications like guest access in the conference room or training class, to mission-critical applications like transaction processing and voice. What's more, the Aerohive implementation of cooperative control is designed to allow an enterprise to easily and cost-effectively evolve the wireless LAN from convenience-oriented to mission-critical without upgrading equipment or re-architecting the network.



Advantages of a Cooperative Control Architecture over Existing Wireless Architectures

The management, mobility, and security of controller-based systems, without the controller

Aerohive Networks HiveAP cooperates with neighboring HiveAPs to support control functions, such as dynamic RF management, layer 2/layer 3 roaming, and station load balancing. HiveAPs also support an array of access and security functions such as IEEE 802.11i, wireless IDS, 802.1X authentication, firewall policy and guest captive web portal, and integrate with third-party solutions such as Microsoft NAP and TNC-based systems to enforce endpoint compliance checking. The Hive Manager is a central management appliance that provides wireless LAN configuration, monitoring and reporting, but is not essential to the network's ongoing operation.



Lower cost

The controller-less cooperative control architecture provides for a more cost-effective wireless LAN solution able to provide all the functionality of a controller-based solution without the costs associated with implementing controllers.

Simpler to deploy and expand

Aerohive's cooperative control approach to wireless LANs is simple to deploy and expand because it's not constrained by controller capacity limits or wireless overlay planning. There is never the unfortunate requirement of needing to upgrade to a higher capacity controller just because you need to add one more AP or want to migrate to IEEE 802.11n for higher performance.

Cleaner network integration and an easier upgrade from fat APs

Legacy autonomous access points can be swapped out and replaced with HiveAPs with no need to change IP addressing, VLANs, security infrastructure or other network configurations. Once the HiveAPs are installed the IT department gets the management, mobility and security

they need without re-architecting the network to accommodate the opaque overlay network created by backhauling to controllers.

Powerful and flexible identity-based policy enforcement at the edge

With cooperative control architecture, HiveAPs can enforce powerful and flexible identity-based security, access control and quality-of-service (QoS) policies at the edge of the network. Applying those policies to the traffic at the local HiveAP allows the QoS engines to instantaneously respond to the real-time variations in wireless throughput inherent to a dynamic RF environment.

Enforcing QoS, access control and security policies at the HiveAP also allows traffic to be controlled right when it enters the network, rather than after the traffic has traversed multiple hops to reach a central controller.

Whole enterprise deployment

Aerohive's implementation of cooperative control architecture provides for a single wireless architecture that meets the technology and business requirements of both convenience and mission-critical network applications. It's the first single wireless architecture that is cost effective for a small branch office, or even a single AP site, yet meets the availability and manageability requirements of a large campus. Using Aerohive Networks' cooperative control architecture, the wireless network can also be extended to cover open spaces and hard-to-wire locations using wireless mesh networking.

High availability

HiveAP cooperative control access points support predictive stateful roaming, dynamic RF management, client load balancing, wireless mesh redundancy and sub-second stateful failover/rerouting, achieving new levels of availability and resiliency in mission-critical wireless LANs. Unlike controller-based solutions where there is a single

point of failure, HiveAPs work together to recover from component failures without the need to deploy redundant systems. Additionally, wireless mesh redundancy can be used to recover from wired network failures ensuring there is no single point of failure within the wireless or the wired infrastructure.

Scalable latency-optimized performance (to IEEE 802.11n)

To maximize scalability for enterprise deployments, Aerohive Networks' cooperative control architecture does not route network traffic to a centralized wireless LAN controller which can introduce latency and jitter or become a bottleneck. Instead, cooperative control and distributed data planes determine the most optimal path for traffic, providing non-blocking performance today and an architecture that can scale to handle the throughput of IEEE 802.11n and beyond.

Optimized for Voice-over-wireless LANs (VoWLAN)

Successfully deploying an application like VoWLAN requires the underlying infrastructure to be highly available, provide low latency and have sophisticated QoS capabilities. The stateful high availability, mesh redundancy and sub-second stateful failover that is unique to Aerohive Networks ensures that

the network is always up. Best path forwarding allows the data path to be continuously optimized, providing the lowest latency possible. The absence of a centralized controller means there is no added latency or jitter due to backhauling the wireless traffic. Of course standards-based IEEE 802.11e/WMM (Wireless Multi-Media) extensions are also implemented, but WMM isn't enough. To manage the flow of traffic into the WMM queues, Aerohive implements sophisticated QoS, with eight queues per client station right at the network edge where they can immediately respond to the dynamically changing RF link, rather than at a centralized controller multiple hops away from the radio.

Aerohive's Cooperative Control Architecture

Aerohive's cooperative control wireless LAN architecture eliminates the need for wireless LAN controllers, providing all the management, mobility, and security of controller-based architectures without the cost, capacity, performance and availability issues associated with controller deployments.

Aerohive Networks cooperative control is the simple and logical next generation of wireless LAN architecture.



Aerohive Networks, Inc
3150-C Coronado Avenue
Santa Clara, California 95054
Phone: 408.988.9918
Toll Free: 1.866.918.9918
Fax: 408.492.9918
www.aerohive.com