

ZoneFlex™ Overview

Smart Wireless LAN Systems



The Ruckus Smart Wireless LAN (WLAN) system includes the ZoneFlex 802.11a/b/g/n Smart Wi-Fi access points and bridges, ZoneDirector Smart WLAN controllers with Smart/OS, ZoneSwitch Power over Ethernet switches and the FlexMaster Remote Wi-Fi Management System

ZoneFlex is the centrally-managed Smart Wireless LAN (WLAN) system designed for enterprises that need robust, reliable and adaptable Wi-Fi at the lowest total cost of ownership. Unlike conventional WLAN systems that are costly, complex and cumbersome, Ruckus ZoneFlex system is perfect for enterprises with limited IT staff and budgets but still require a high performance, centrally-managed WLAN that is simple to install and simpler to manage.

ZoneFlex is the only “Smart” WLAN system available today that combines advanced Wi-Fi signal routing with wireless meshing and centralized management. The smarts come from patented hardware and software technologies that deliver predictable performance, extended range and real-time adaptability to changing Wi-Fi environments.

Completely standards-based, Ruckus Smart Wi-Fi access points feature state-of-the-art smart antenna arrays and RF traffic engineering software, dynamic best path signal selection, Automatic Interference Mitigation (AIM), ChannelFly dynamic channel management, Smart Mesh Networking, per client, per traffic-flow based Quality of Service (QoS), and robust automated security.

The unique combination of these capabilities helps enterprises realize two to four times the Wi-Fi coverage with fewer access points that deliver wire-like connections to clients — automatically adapting to environmental changes in real time. The result is simple: more consistent Wi-Fi performance at range. What’s more, ZoneFlex is widely considered the easiest-to-use WLAN system on the market today.

The First Smart Wireless LAN Solution

Ruckus’ flagship enterprise product line, ZoneFlex is the industry’s first centrally- controlled Smart WLAN system.

ZoneFlex was purposely-designed to fill the market gap between costly and complex high-end WLAN switching systems and cheap, low-end consumer-grade Wi-Fi products.



An affordable, purpose-built “Smart” WLAN

ZoneFlex is a simple but feature-rich WLAN system purposely designed for enterprises that need an easy-to-use Wi-Fi system that is reliable, extensible and economical — often competing requirements, until now.

The ZoneFlex family includes a full line of Smart Wi-Fi 802.11 a/b/g/n access points (APs), bridges and wireless wall

switches for indoor/outdoor deployment, a line of scalable ZoneDirector™ Smart WLAN controllers that manage from 6 to 1,000 ZoneFlex APs, ZoneSwitch enterprise-class PoE Gigabit Ethernet Switches for Layer2 networking, and FlexMaster Remote Wi-Fi management system for centralized management of multiple WLAN deployments.

ZoneFlex is ideal for hotels, hospitals, schools, branch offices, retail environments, warehouses, airports and any enterprise environment where high user densities and Wi-Fi reliability are fundamental concerns.

Better range and reliability with adaptive RF controls

Each ZoneFlex Smart Wi-Fi AP integrates patented adaptive antenna technology and beam steering technology called BeamFlex™. This adaptive technology automatically and continuously routes Wi-Fi signals over the best performing signal paths to each client, ensuring the highest possible performance and lowest packet error rates.

Ultra simple configuration, deployment, management

Designed for simplicity and ease of use, ZoneFlex can be deployed and operated by non-wireless experts. Any organization with little or no IT staff can quickly and easily deploy a robust and secure multimedia WLAN using the Web-based management console in under five minutes.

ZoneDirector Smart WLAN Controllers

ZoneDirector Smart WLAN controllers are the first enterprise-class Smart WLAN solutions that deliver a simple, secure, robust and highly scalable WLAN at an unmatched total cost of ownership.



Based on a distributed forwarding architecture, ZoneDirectors can be installed anywhere within an Ethernet (Layer 2) or IP (Layer 3) routed network without requiring all wireless traffic to flow through it, eliminating bottlenecks. Support for tunneling ensures seamless, delay- and jitter-free mobility for VoIP traffic.

As a classic centrally managed WLAN system, ZoneDirector automatically monitors and controls ZoneFlex APs, including configuration, channel assignments, power levels and the health of ZoneFlex APs.

Ruckus Smart/OS, the software suite and application engine running every ZoneDirector Smart WLAN controller, delivers breakthrough WLAN features including easy to use but uncompromising secure user provisioning (FlexConnect), advanced RF management, next generation Quality of Service (SmartCast), adaptive wireless meshing (Smart Mesh Networking), and robust network resiliency. In addition, Smart/OS offers all the traditional WLAN management tasks — encryption, authentication, guest access, wireless intrusion detection and fast roaming — standard in centrally-managed WLAN systems.

Highly scalable, super easy to manage

Supporting up to 1,000 APs, 20,000 clients and over 2,000 WLANs in a single controller, and capable of IPv6 networking, ZoneDirector delivers scalability without compromising manageability. Automatic AP provisioning and resource optimization, self-forming and self-healing Smart Mesh Networking, and user provisioning with Ruckus patented Dynamic Pre-Shared Keys, Zero-IT, and dynamic VLANs means less time setting up, more time to focus on more important things. AP and WLAN groups simplify configuration and deployment, while a highly intuitive and customizable dashboard and intelligent search tools aid monitoring and troubleshooting.

Robust authentication and security

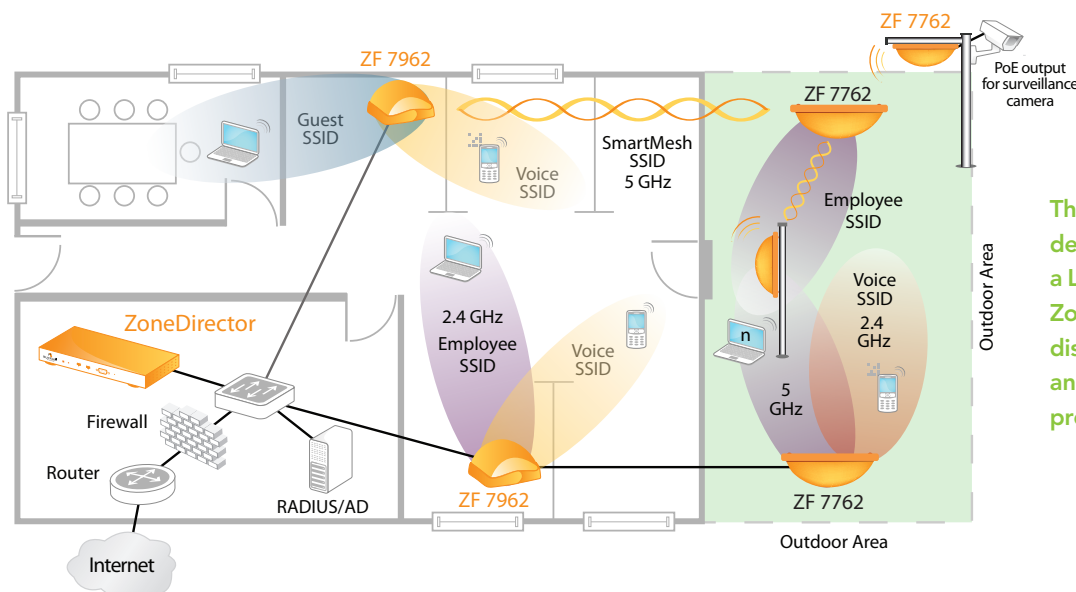
Ruckus ZoneDirector centralizes authentication and authorization decisions for all APs, providing secure admission control across the WLAN. ZoneDirector supports enterprise-class 802.1X and WISPr authentication with any backend authentication database.

For robust yet simple to administer wireless security, Ruckus' innovative, patented Dynamic Pre-Shared Key and Zero-IT automatically generates a unique 63-byte encryption key for each client and automatically configures the client with no human intervention.

Key caching techniques when roaming across ZoneFlex APs, role-based user access and Layer 2-4 Access Control Lists, Layer 2/3 client isolation, robust link layer encryption, and wireless intrusion detection are all supported.

Maximize system-wide performance

With the view of the entire wireless network, ZoneDirector optimizes system performance across the entire WLAN. ZoneDirector continually controls radio channel and power settings for all APs, maximizing coverage while minimizing co-channel and adjacent channel interference. Steering stations to less congested APs, Ruckus client load balancing puts under utilized APs to work. With bandsteering, Ruckus drives



The ZoneDirector can be deployed anywhere within a Layer 2/3 network. All ZoneFlex APs automatically discover the ZoneDirector and are dynamically provisioned.

dual-band clients to the freer 5GHz band, while airtime fairness gives fast 802.11n clients equal time on the shared air as 802.11b clients, allowing them to push more data through the network. It all adds up to better use of available resources and greater overall performance.

Smart Wi-Fi Mesh Networking saves time and money

Smart Mesh Networking, a standard feature, allows reliable and adaptive connections to be automatically created between ZoneFlex Smart Wi-Fi APs using only wireless (RF) connections. This allows enterprises to extend or create WLANs without having to pull Ethernet cables to every AP, thereby speeding deployment times and reducing traditional operational costs. Nothing to configure, nothing to do, plug them in to power and walk away. ZoneFlex does the rest.

Instantly determine remote client performance

Each ZoneDirector integrates SpeedFlex, a unique diagnostic tool that lets administrators quickly determine the wireless performance of any remote client. From the central console, SpeedFlex can be invoked on any client to determine wireless link performance in real-time. SpeedFlex then displays a graphical speedometer that shows the actual throughput of a given client to the wireless network.

ZoneFlex 802.11 Smart Wi-Fi Access Points and Bridges

Ruckus ZoneFlex Smart Wi-Fi APs are the first centrally-managed, multimedia Wi-Fi APs capable of extending Wi-Fi signals two to four-times farther than a conventional AP.



ZoneFlex Smart Wi-Fi APs utilize an integrated, miniaturized smart antenna array that continuously steers Wi-Fi traffic over the best performing signal paths, automatically avoiding interference and obstacles. This enables unmatched and unprecedented Wi-Fi reliability. Unique Ruckus ChannelFly dynamic channel management combines with adaptive antenna interference mitigation techniques to automatically choose the channel that delivers the most network capacity.

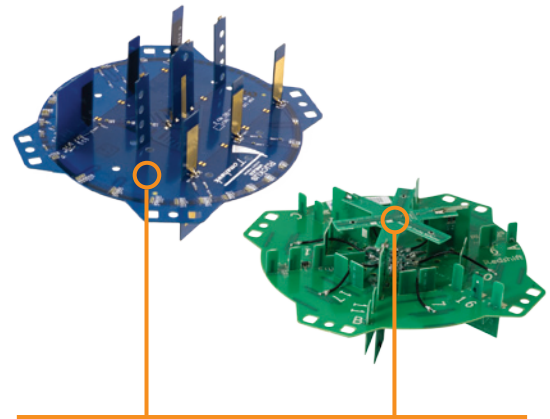
ZoneFlex APs can be deployed in standalone mode without a ZoneDirector controller, or in a classic "split-MAC" mode with the controller. Together with ZoneDirector, ZoneFlex APs plug and play with minimal operational overhead.

Improved user experience with adaptive beamsteering

Ruckus BeamFlex™, a patented Wi-Fi smart antenna implementation, enables consistent, high performance multimedia support by continuously ranking the antenna configurations for each receiving device and re-configuring itself in real-time to bypass interference and physical barriers. Highly sensitive antenna elements provide up to 9dBi of antenna gain, 17dB of interference rejection and offer the industry's most sensitive Wi-Fi receiving capabilities (up to -98dBm). This translates into fewer APs, more satisfied users, and a cost-effective system that eliminates Wi-Fi dead spots and significantly extends the range and performance of the Wi-Fi network.

Channel changing done right

Ruckus ChannelFly channel selection engine runs in every ZoneFlex Smart Wi-Fi AP to automatically select the channel providing the greatest client capacity. Most other channel selection algorithms scan channels in the background, taking a snapshot of interference on alternative channels.



Patented smart antenna arrays integrate up to nine high-gain vertically-polarized and nine horizontally-polarized antenna elements. This enables up to 4224 potential antenna combinations, up to 9 dBi gain and up to 17 dB of interference rejection, thereby delivering unprecedented range extension and signal reliability. The dual polarized smart antenna increases the effectiveness of spatial-multiplexing, resulting in higher data rates.



802.11n and BeamFlex™: A Winning Combination

A fundamentally new approach to Wi-Fi, 802.11n exploits advances and new techniques such as spatial multiplexing, channel bonding and frame aggregation to deliver higher data rates.

While theoretical data rates of 300 Mbps or higher are advertised by vendors, actual and consistent user throughput is an order of magnitude less. This is because current 802.11n products don't make optimal use of these new techniques. Ruckus BeamFlex makes it happen.

- Dual polarized smart antenna array increases the effectiveness of spatial multiplexing
- Beamsteering provides active interference avoidance to ensure spatial multiplexing and the best possible paths used for spatial streams
- Signal path selection control and interference mitigation make channel bonding likely
- Optimizing the path to each client reduces packet loss and better receive sensitivity increases effective throughput, enabling more frames to be aggregated

However, interference offers only a limited assessment of channel suitability. On the other hand, ChannelFly measures channel capacity and interference over time. By evaluating trends in capacity, ChannelFly can quickly and intelligently react to drops in capacity. This results in performance improvements up to twice what systems selecting based on background scanning alone can achieve.

Faster downloads — high performance 802.11n

The IEEE 802.11n standard carries the promise of high data rates and throughput. Ruckus ZoneFlex APs deliver on this promise through the addition of BeamFlex and Automatic Interference Mitigation (AIM) technologies that combine to mask the complexity of 802.11n, dramatically simplifying deployment while amplifying its performance and coverage. This advanced smart antenna provides complete control of Wi-Fi signal paths ensuring that the highest performing, “cleanest” signal path is used for each packet that traverses the system to increase the likelihood that new 802.11n techniques, such as spatial multiplexing, channel bonding and frame aggregation, deliver huge performance gains at range.

Converged wired and wireless services

The ZoneFlex wired/wireless wall switch delivers sleek in-room networking. 802.11n Wi-Fi, Ethernet and digital PBX ports are squeezed into a small, unobtrusive box that fits a standard wall plate. 802.3af Power over Ethernet both powers and connects devices like IP phones over a single cable, while digital phones can be connected to the PBX pass through port. Centrally manageable by ZoneDirector, the ZoneFlex Wi-Fi wall switch provides guest networking and captive portal services. Ethernet services like port-based or dynamic 802.1Q VLANs are managed along with radio services through a single device.

Reach remote locations — outdoor bridges

Ruckus ZoneFlex Smart Bridges enable enterprises and service providers to expand their Smart Wi-Fi wireless networks to remote locations. With industry leading 802.11n performance and high-gain antennas, the ZoneFlex Smart Bridge delivers over 100 Mbps throughput and distances up to 20 kilometers for point-to-point or point-to-multipoint deployments.

With purpose-built antennas and sophisticated LED-based aiming software, as well as automatic pairing, ZoneFlex Smart Bridges can be installed in minutes, saving on deployment costs and letting you get your network up and running quickly.

ZoneSwitch Enterprise-Class PoE Switches



Fully manageable, the Ruckus ZoneSwitch combines enterprise class Layer 2 networking with industry standard Power over Ethernet.

Compliant with 802.3af and 802.3at, ZoneSwitch streamlines deployment of Ruckus ZoneFlex access points and other PoE capable devices, reducing cables and equipment clutter and lowering installation costs. Twenty-four Gigabit Ethernet ports deliver non-blocking throughput for Ruckus' high-performing 802.11n APs.

With support for Telnet, TACACS+ and SNMP, ZoneSwitch supports 802.1p/Q with up to 256 VLANs, enabling seamless integration into an existing network. DSCP and TOS traffic priority marking, shaping and policing, along with IGMP snooping provides advanced Quality of Service needed for voice and video over today's multi-services networks.



FlexMaster Remote Wi-Fi Management System

FlexMaster Management System is the industry's only complete management platform for building and managing Enterprise Wi-Fi infrastructures.

FlexMaster, a Linux-based management platform, uses industry-standard protocols (SNMP, SOAP, XML, TCP, and HTTP/S) to access devices on networks that otherwise might be blocked by local firewalls or NAT devices. The network manager can delegate administrative support, remotely control, monitor and upgrade the ZoneFlex Smart WLAN system worldwide over the Internet or any private, public or hybrid IP wide area network.

At-a-glance network dashboard

The network manager performs all critical administration and control functions from a single intuitive, web-based interface. Advanced capabilities lets companies build networks, create unique configuration parameters on a bulk basis, load different versions of firmware for each group of devices, monitor events, generate trend reports, and upgrade devices individually or in groups with a simple click of the mouse in 5 minutes or less.

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