ZoneFlex™ Overview
Smart Wireless LAN Systems

The Ruckus Smart Wireless LAN (WLAN) system includes the ZoneFlex 802.11b/g/n Smart Wi-Fi access points, ZoneDirector Smart WLAN controllers, Smart O/S, and the FlexMaster Remote Wi-Fi Management System

ZoneFlex is a 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, the 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, all Ruckus Smart Wi-Fi products feature state-of-the-art smart antenna arrays and RF traffic engineering software, dynamic best path signal selection, Automatic Interference Mitigation (AIM), 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 realizes 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

The 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 line of Smart Wi-Fi 802.11 b/g/n access points (APs) for indoor/outdoor deployment, along with a line of scalable ZoneDirector™ Smart WLAN controllers that manage from 6 to 250 ZoneFlex Smart Wi-Fi APs.

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.

RUCKUS WIRELESS

Better range and reliability with adaptive RF controls

Each ZoneFlex AP integrates patented beam forming and beam steering technology called BeamFlex™. This adaptive Smart Wi-Fi 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.

Smart Wi-Fi meshing 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 other than find a power outlet for APs, plug them in and walk away. ZoneFlex does the rest.

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. The Web-based GUI is available with multiple language support.

ZoneDirector Smart WLAN Controllers

ZoneDirector Smart WLAN controllers are the first enterprise-class Smart WLAN solution that delivers a simple, secure, robust and easily expandable 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, ensuring no bottlenecks.

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

Ruckus Smart/OS is a software suite and application engine included in every Ruckus ZoneDirector Smart WLAN controller that delivers breakthrough WLAN features including adaptive wireless meshing (Smart Mesh Networking), advanced RF management (SmartAir), next generation quality of service (SmartCast), robust security capabilities (SmartSec) and secure tunneling and traffic redirection (SmartSpot). In addition, Smart OS/8 offers all the traditional WLAN management tasks — sophisticated authentication, state-of-the-art encryption, fast roaming, guest networking and wireless intrusion detection — standard in centrally-managed WLAN systems.

Robust authentication and security

The Ruckus ZoneDirector centralizes authentication and authorization decisions for all APs, providing secure admission control across the WLAN. The ZoneDirector supports enterprise-class 802.1X with any backend authentication database such as RADIUS and ActiveDirectory and also comes with an internal user database supporting up to 1250 entries.

For robust yet simple to administer wireless security, ZoneDirector provides an innovative, patent-pending technique called Dynamic Pre-Shared Keys (PSK) that automatically generates a unique encryption key for each client and automatically installs the key and the requisite wireless parameters with no human intervention.
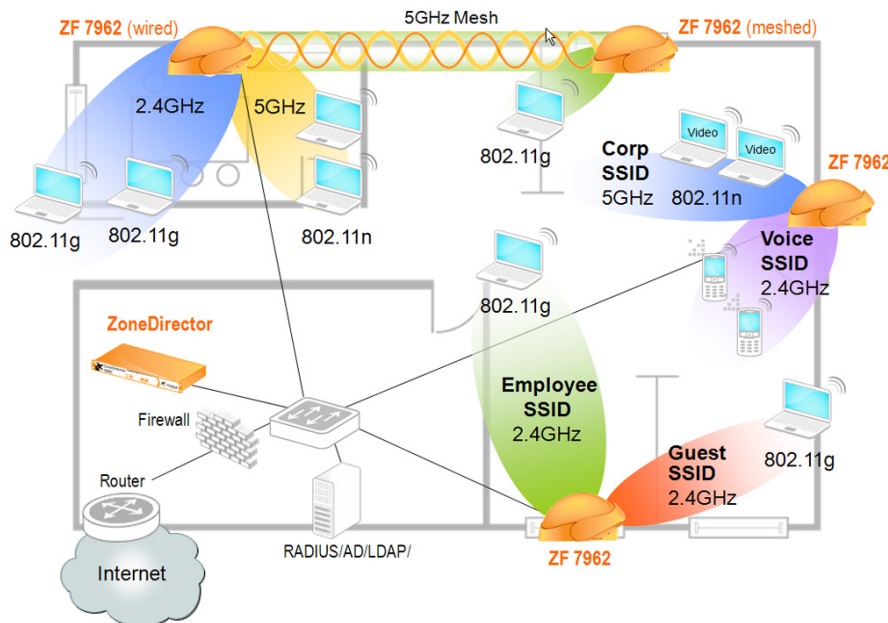
The ZoneDirector can be deployed anywhere within a Layer 2/3 network. All ZoneFlex APs automatically discover the ZoneDirector and are dynamically provisioned.

Key caching techniques when roaming across ZoneFlex 802.11 APs, role-based user access, Layer 2/3 client isolation, robust link layer encryption, and wireless intrusion detection are all supported.

Secure mobility for voice over Wi-Fi
The Ruckus Mobility Module, a licensed software module for ZoneDirector controllers, eliminates delay and jitter from disrupting voice calls. When a client roams across an Layer 3 boundary, VoIP traffic is tunneled from the handset back to the original subnet, thus preserving its IP address. Voice sessions are maintained without interruption as users roam across Layer 3 boundaries. In addition, the ZoneFlex system is optimized for voice through support of industry standard protocol, Unscheduled Automatic Power Save Delivery (U-APSD).

Maximize system-wide performance
Redundant and secure, ZoneDirectors provide central management and real-time RF optimization of the entire WLAN. APs are automatically discovered by the ZoneDirector and managed as a unified system. A customizable Web 2.0 dashboard provides instant access to a variety of client and network information and events. And a real time heat map displays AP locations and signal coverage, as well as the topology of wired APs and Smart Mesh Networking nodes.

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
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 APs utilize an integrated miniaturized smart antenna array that allows each AP to automatically avoid interference and obstacles by continuously steering Wi-Fi traffic over the best performing signal path. This enables unmatched and unprecedented Wi-Fi reliability. Together with the ZoneDirector Smart WLAN controller, ZoneFlex APs plug-and-play with minimal operational overhead.

ZoneFlex APs can be deployed in standalone mode without a ZoneDirector controller or in a classic "split-MAC" mode with the controller. All ZoneFlex APs integrate Ruckus' BeamFlex smart antenna array technology and support advanced Smart Mesh Networking.
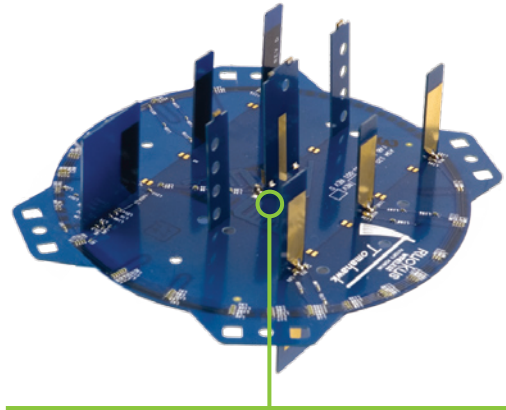
A patented smart antenna array integrates six high-gain vertically-polarized and six horizontally-polarized antenna elements. This enables up to 4096 potential antenna combinations, up to 9 dBi gain and up to 17 dB of interference rejection, thereby delivering unprecedented range extension and signal 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

Improved user experience with adaptive beam-steering

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 reconfiguring itself in real-time to bypass interference and physical barriers. This eliminates Wi-Fi dead spots and significantly extends the range and performance of the Wi-Fi network.

Highly sensitive antenna elements provide 9dBi of signal gain, 17dB of interference rejection and offer industry's most sensitive Wi-Fi receiving capabilities (up to -98dB). This translates into fewer APs, more satisfied users, and a cost-effective system.

High availability — intelligent smart mesh networking

Smart Mesh Networking uses Ruckus-patented BeamFlex and expert RF routing technologies to create long- range, reliable and adaptive Wi-Fi trunk connections between Smart Wi-Fi APs — changing the conventional economics of WLAN deployment by obviating the need for cabling Ethernet to every AP and cutting in half the time to install and deploy conventional wireless LANs.

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.

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, TR-069, 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.

ABOUT RUCKUS WIRELESS

- Based in Sunnyvale, California
- Formed in 2004
- Funded by Motorola, T-Online, Sequoia Capital
- 140 employees
- Over one million "Ruckus Smart Wi-Fi systems shipped worldwide
- Over 30 patents in the area of adaptive RF signal path selection, beam steering, beam forming, and quality of service

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