SMARTCAST™

Advanced Wi-Fi quality of service engine

FEATURES

- Traffic queuing on a per-client basis (voice, video, best-effort, background)
- Automatic heuristics-based traffic classification
- 802.11e/WMM support
- TOS and 802.1p classification
- Airtime fairness
- Band balancing
- Rate limiting
- WLAN prioritization
- Client load balancing
- Power save (U-APSD and legacy)
- IP multicast-to-unicast conversion
- IGMP snooping

BENEFITS

- Provides precision bandwidth management and traffic shaping to help IT teams meet SLAs for video, voice and data
- Eliminates jitter and delay for video and voice to ensure outstanding user experience
- Delivers video traffic to each user at the highest data rate the client can support
- Optimizes use of available spectrum in high-density and diverse client environments with airtime fairness
- Increases efficiency and capacity by distributing client load across all available channels and APs
- Automatically provisions QoS services with smart heuristic-based classification

Smart traffic management maximizes reliability and wireless performance

SmartCast™ is a sophisticated quality of service (QoS) engine deigned to maximize the reliability and performance of delay-sensitive applications, such as IP-based voice and video over 802.11 networks. Based on patented technology, SmartCast delivers a collection of unique capabilities—such as packet inspection, automatic traffic classification, advanced queuing and scheduling.

Unlike any other 802.11 system, RUCKUS SmartCast algorithms automatically schedule and pre-queue traffic in software on a per-client basis. This enables more advanced classification and scheduling that can be applied for each client on a per-traffic-class basis. SmartCast is a superset of the IEEE 802.11e/WMM hardware-based queuing standard, ensuring uncompromised performance while remaining standards compliant.

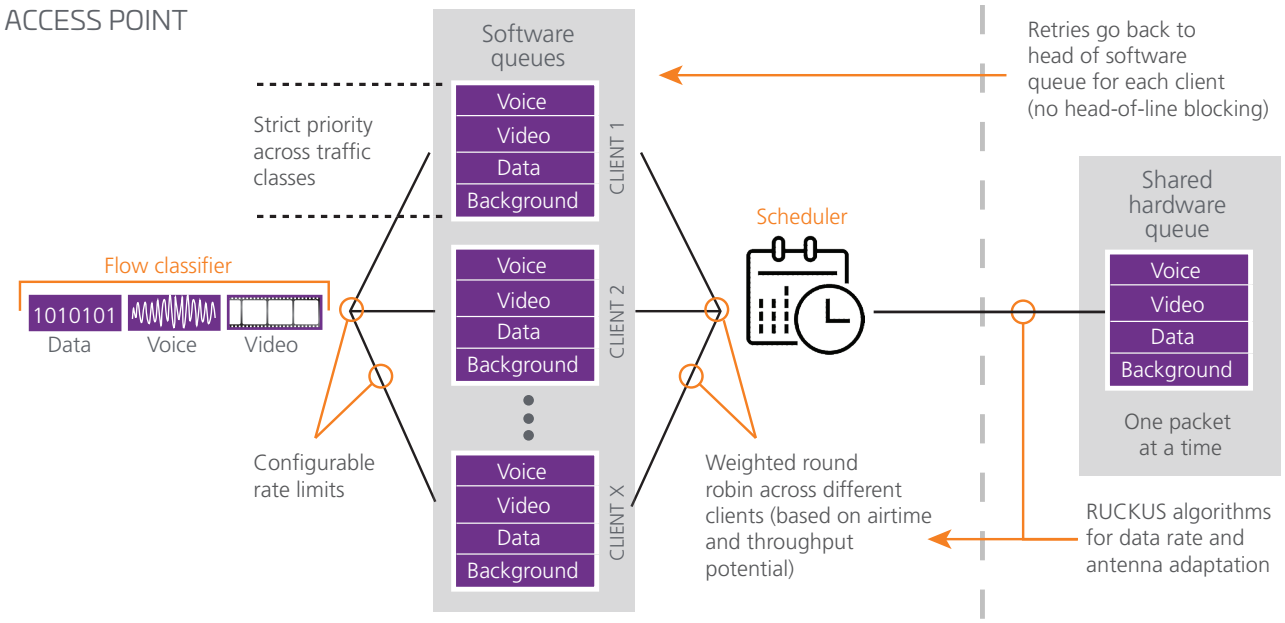
With per-client queuing, SmartCast is ideal for video and voice over Wi-Fi applications because it ensures disruptive clients don't negatively affect the performance of other clients on the network (no head-of-line blocking).

SmartCast further optimizes spectrum usage with innovative band balancing and airtime fairness technologies. It is essential in high-density and diverse client environments such as conference facilities, classrooms and auditoriums. SmartCast works with RUCKUS BeamFlex® smart antenna array technology to deliver greater network throughput and more predictable performance for latency-sensitive applications.

To deliver high-definition video streaming over Wi-Fi, SmartCast uses patented multicast traffic handling. Proven in millions of subscriber homes around the world, providers are using SmartCast to deliver multiple concurrent broadcast-quality video streams to subscribers without having to wire or rewire homes or offices.

SmartCast was designed for simplicity—requiring no manual tuning or configuration. SmartCast automatically classifies traffic based on Layer 2 or 3 priority tags and performs an advanced heuristic analysis on untagged traffic.

SmartCast queuing and scheduling



Auto traffic Inspection, classification and queuing

At the heart of SmartCast is a sophisticated traffic inspection, classification and optimization engine that works in software to provide per-client, per-traffic-class queuing. The SmartCast QoS engine inspects each packet and automatically classifies it into one of four queues—voice, video, best effort, and background. SmartCast can inspect a variety of headers, including those of Ethernet frames (both TCP and UDP), VLAN tags, and IPv4 and IPv6 packets.

If the type of service or 802.1p priority field is used, SmartCast maps packets to an equivalent internal field. If no tag is provided, SmartCast employs heuristics to classify traffic. Once classified and queued, traffic is scheduled using a weighted round robin method based on airtime and throughput potential as well as prioritization defined for the WLANs. Rate limits can also be applied on a per-WLAN basis for every client.

Once SmartCast classifies, schedules and queues traffic, the RUCKUS-patented BeamFlex smart antenna array takes over. BeamFlex is a combination of RUCKUS-designed smart, adaptive antennas and a fast-converging optimization algorithm to control them. BeamFlex dynamically chooses antenna patterns to deliver Wi-Fi packets over the air at the highest possible data rates, and mitigates interference in the network by transmitting energy only where it is needed.

Always looking for patterns in the packet flow, SmartCast is automatically enabled on every AP—no configuration is necessary.

Patented multicast voice and video support

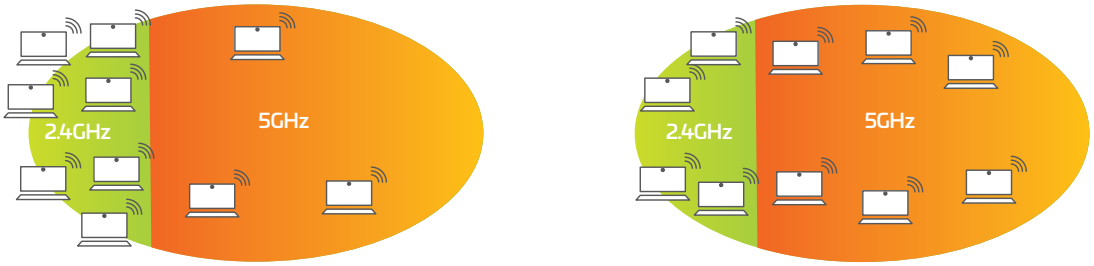
When transported over 802.11 networks, multicast transmissions typically use a best-effort technique that requires no acknowledgment from the receiving devices. To ensure the delivery of multicast and broadcast traffic, often used in voice and video applications, SmartCast employs a patented multicast technique that converts multicast to unicast packets. Converting multicast to unicast traffic enables the use of 802.11 acknowledgments to ensure transmissions are forwarded at the highest possible data rate and are properly received. Receipt acknowledgment provides the guaranteed delivery necessary for streaming broadcast-quality video over wireless. Through IGMP snooping, all APs and mesh nodes are aware of multicast group membership tables—ensuring consistent service anywhere in the wireless network.

Increased efficiency and capacity with load balancing and band balancing

SmartCast employs sophisticated load balancing and band steering techniques to enable clients to efficiently use the AP and spectrum resources. Operating on a per-WLAN basis, load balancing can be selectively disabled (for instance, disabling on voice WLANs) only to ensure seamless roaming. Available on RUCKUS dual-band APs, band balancing intelligently steers clients between the 2.4 GHz and 5 GHz bands—maximizing the available use of these spectrum resources to ensure higher availability and throughput for all users. This is ideal for high-density client environments such as auditoriums, conference halls and public venues where many users concurrently connect to the WLAN.

With only three non-overlapping channels within the 2.4 GHz band, it is preferable, when possible, to automatically steer dual-band clients to the 5 GHz band—where 24 non-overlapping channels are available. However, for dual-band clients with a poor signal to the 5 GHz radio, the 2.4 GHz band would be used instead. This results in both a better distribution of traffic across available channels and a better use of RF resources. Performance is further improved because there are fewer users sharing (and colliding) on a given channel in either band.

Band balancing in action



Before After

- Ideal for high-capacity environments
- Automatically balances the client load across the 2.4 GHz and 5 GHz domains to optimize performance
- Takes into consideration RSSI levels across both bands
- Supported in RUCKUS dual-band APs

More efficient use of spectrum with airtime fairness

Airtime fairness is a scheduling technique that ensures no Wi-Fi client is slowed down by another client taking an extended amount of airtime—for example, a legacy client or a very distant client with slow rates. With airtime fairness enabled, transmit queues are scheduled based on the airtime constraints per station using a weighted round robin algorithm. This ensures consistent and reliable performance for every client in high-density environments.

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Visit our website or contact your local RUCKUS representative for more information.

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