

CUSTOMER

Quokka Sports—Web Sport Innovator Turns to Cisco IOS® Software Release 12.0 for Winning High Performance

Named after a rare relative of the kangaroo that has survived in desert conditions on an island off the western coast of Australia, Quokka Sports is a company dedicated to capturing the spirit of rugged determination behind sporting events around the globe. Quokka's Sports Immersion productions bring to the Web in-depth sports coverage, including audio, video, and expert commentary. There are interviews with and email from competitors, statistics, biometrics, GPS data, and more—all combined to immerse fans in the action and spirit of competitive events.

During live events—and these have ranged from the America's Cup yacht race to the first ascent of China's Karakoram mountain range to the Olympics—a flood of multimedia content is sent by Quokka Sports' reporters and crews to Quokka's production studio in San Francisco. There the information is edited and sent back out to the world via <http://www.quokkasports.com> and content distribution partnerships with CNN, Yahoo, NBCOlympics.com, and others.

"All of our network is architected around Cisco equipment and Cisco IOS Software," says Pascal Wattiaux, senior vice president of technology at Quokka Sports. "We're a media company with a network, and Cisco IOS Software

EXECUTIVE SUMMARY**BACKGROUND**

Founded in 1996, Quokka Sports is a digital sports entertainment company and developer of Quokka Sports Immersion™, a high-intensity digital experience that takes sports entertainment to a new level. After establishing a reputation with coverage of the Whitbread round the world sailing race, the company is now creating a comprehensive network of sports programming. Quokka Sports has offices in San Francisco, New York, and London. It produces content for quokka.com, americascup.org, nbcolympics.com, cart.com, motograndprix.com, and btchallenge.com.

CHALLENGE

The Quokka Sports network must support a demanding incoming and outgoing stream of multimedia traffic. Reporters and photographers send an array of text, photography, audio, video, and other types of information from events around the world. Shaped into reports at Quokka's production studio in San Francisco, the network broadcasts multimedia content—Quokka Sports Immersion—to leading sports Web sites. The Quokka Sports network must also support growing traffic volumes as well as new services, such as videoconferencing between offices and remote locations, IP telephony, multicasting, and more.

CISCO IOS SOFTWARE SOLUTION

The rich features of Cisco IOS Software Release 12.0 are being put to work, one by one, for Quokka's network. First to be implemented have been policy routing for bandwidth management, enabling the Quokka network engineers to better manage Internet connections with multiple IPSs. Multicast features of Cisco IOS are also being readied for implementation, to confine videoconference multicast streams to only those participating in the meetings instead of broadcasting network-wide. QoS and multilayer switching are additional features of Cisco IOS Software soon to be operational at Quokka to help prioritize IP traffic and offload routing decisions to the "intelligent network" of switches and routers.

Release 12.0 brings us a lot of key advantages to optimize how we gather and distribute production information."

Quokka Sports is rolling out multicast features for videoconferencing throughout their worldwide office locations. Also, policy routing features of Cisco IOS Software, and features in Cisco routers and switches, such as broadcast limitation and protocol filtering, help bring stability, scalability, and flexibility to the Quokka Sports network.

A Cisco Shop from Day One

The Quokka Sports network was built by a staff of Cisco certified network engineers. There are two core Cisco Catalyst® 5500 ATM switches connected to servers and gigabit fiber between all switches. The Cisco ISL protocol is used to interconnect switches enabling VLANs. Cisco PIX™ firewalls are connected to Cisco 7206 and 7513 routers, with dedicated connections to the Internet and remote partners. Other Cisco 1790 and 3640 routers connect to remote offices in London, New York, and Norwalk. A new headquarters planned for San Francisco will replicate the existing main office topology, including an AS5300 router for dial up services, but will replace the Catalyst 5500s switches with newer 6500s.



“We’ve been a Cisco shop since day one because we want to build a best-of-breed network and production environment,” says Pascal Wattiaux. “As new features of the hardware and Cisco IOS Software arise, our network engineers are looking at them to see how they add value to our operation.”

Policy Routing for Bandwidth Management

“We have multiple Internet connections with three different ISPs, and policy routing lets us redirect traffic for each user based on their IP address and access policies,” says Phil Pierotti, senior network engineer at Quokka. “With outgoing traffic we can route traffic coming from an FTP server, for instance, to make sure it goes through a particular, dedicated connection to the end user. That way we can guarantee the bandwidth. Policy routing gives us a lot of flexibility in how we manage traffic; we can redirect traffic flows as necessary to take advantage of spare resources.”

Per port protocol filtering, a feature of Cisco switches, enables Quokka network engineers to integrate and manage both PC and Apple Macintosh traffic on the same network. “We can detect which computers are talking IP, which are talking IPX, and which are talking AppleTalk,” says Pierotti, “So AppleTalk only goes to the Macs and IP and IPX to the other PCs. We don’t need a separate subnet to manage them individually.”

Multicast Features

Quokka is rolling out the multicast features available with Cisco IOS Software Release 12.0 for in-house videoconferencing to connect Quokka’s far-flung offices. With IP multicasting, instead of having to broadcast videoconferences throughout the entire switched network,

the Cisco Gateway Multicast Protocol (CGMP) feature in Cisco IOS Software tells the switch exactly who to send the multicast stream to. “We can isolate the traffic very effectively,” says Pierotti. “Instead of having one hundred

20-megabit video stream going throughout the company, we can now send it to those involved and administer QoS for only those transmissions.”


CGMP software components run on both the router and the Catalyst 5000 series switch. A CGMP-capable IP multicast router sees all multicast packets and can inform the Catalyst 5000 series switch when specific hosts join or leave IP multicast groups. When the CGMP-capable router receives an Internet Group Management Protocol (IGMP) control packet, it creates a CGMP packet that contains the request type (either join or leave), the multicast group address, and the actual MAC address of the host. The router then sends the CGMP packet to a well-known address to which all Catalyst 5000 series switches listen. When a switch receives the CGMP packet, the supervisor engine module interprets the packet and modifies the Encoded Address Recognition Logic (EARL) forwarding table automatically, without user intervention.

With the routers communicating directly to the switches with CGMP, the need for the switches to actively inspect every IGMP packet (otherwise known as IGMP snooping) goes away. “It’s much more efficient and effective,” agrees Pierotti.

Quokka is using IP multicast multilayer switching as part of their rollout of multicast throughout the enterprise. Multilayer switching is part switch-driven and part router-driven via Cisco IOS Software. Multilayer switching of multicast packets, which is

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—Pascal Wattiaux,
Vice-President of Technology,
Quokka Sports



RESULTS

a new feature introduced in Cisco IOS Software Version 12.0, helps offload the switching of multicast packets from the main switch CPU, accelerating them via the NetFlow feature card.

QoS at Quokka

Quokka is in the process of rolling out QoS features to enable remote project sites to communicate more efficiently through the Internet and private links. Flow-based weighted early random detection (WRED) detects congestion before it creates a bottleneck. The feature selects TCP streams at random and “fools them into throttling back and giving other TCP sessions some available bandwidth,” explains Pierotti, “so no one TCP session chews your entire bandwidth to the detriment of other TCP sessions.”

“We can now take full advantage of NetFlow switching on the routers for more detailed and more accurate IP traffic accounting, while still taking advantage of policy routing for bandwidth allocation and also WRED for congestion avoidance,” says Pierotti. On the Cisco 7500 series routers, this feature is supported on the VIP intelligent processor cards and so the processing is offloaded from the main router CPU.

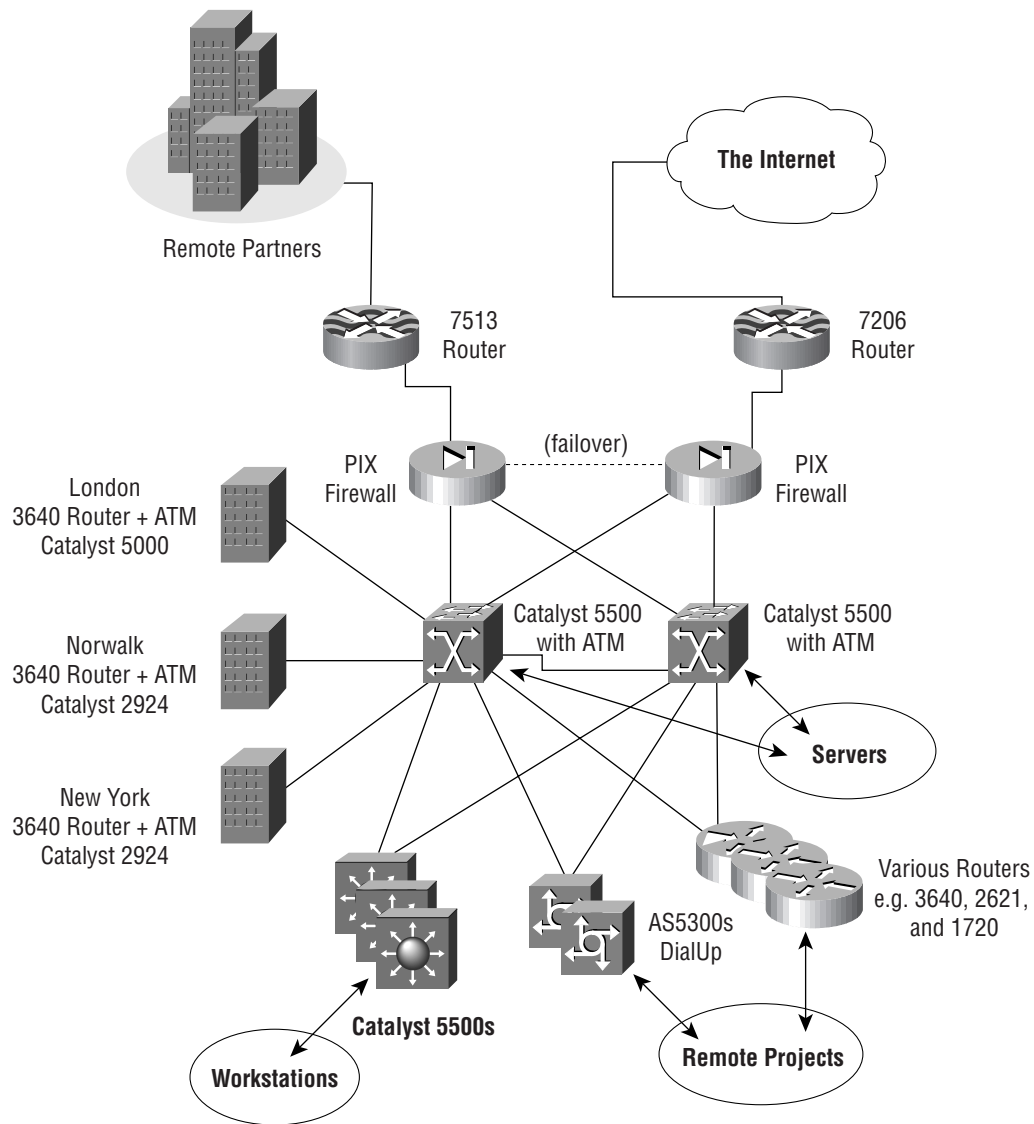
“When a reporter wants to send a stream of telemetry data, for example, with QoS we can configure the network to receive a guaranteed packet every five or ten seconds, so nothing is lost or garbled,” Pierotti says.

With Cisco IOS QoS, Quokka can configure the routers to tag each packet as it comes into the network, giving it IP precedence. Both the routers and switches are QoS aware, and apply precedence asymmetrically.

“Everything talks the same language, because we’re a Cisco house, so it’s easier to implement multilayer switching features, offloading routing decisions to the routers and switches via Cisco IOS.”

The broadcast limitation feature on Cisco switches let Quokka network engineers limit the bandwidth, as needed. This is particularly important in the event of a “broadcast storm” where a server erroneously broadcasts an endless stream of packets, which if unchecked can shut the entire network down.

Nothing like that has happened. Instead, the network supporting Quokka Sports continues growing in leaps and bounds, capably supporting a company that *Popular Science* called “ESPN2 for the Internet, only better.”



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