NetMotion® Wireless

Wireless Network Quality of Service

WHITE PAPER

Executive Summary

Most wireless deployments rely on cellular data networks for connectivity, which have bandwidth constraints. The quality of service (QoS) capability which is part of the Mobility XE Policy Management module allows administrators to prioritize use of the wireless network. Critical applications and data, and real-time applications such as streaming media may be granted higher priority than non-essential traffic. While some wireless carriers offer QoS capabilities within their networks, Mobility XE QoS is able to enforce QoS across the entire datapath from the wireless device to the Mobility server. In addition, a sophisticated Packet-Loss Recovery (PLR) technique is able to correct for dropped packets in less-than-optimal network conditions, and is especially important for maintaining call quality for voice-over-IP.

Optimizing Wireless-Network Efficiency

Roughly half of enterprises in North America and Europe have identified more support for mobility among employees as a critical priority. Mobile applications and solutions cut costs, and improve productivity and efficiency.[1]

One limiting factor in realizing productivity gains from a mobile deployment is entirely out of the hands of enterprise IT management — constrained bandwidth on public wireless networks. While there are management tools that allow control over bandwidth usage on private (managed) networks, most mobile workers rely on at least one and often more than one cellular data network to access corporate information and applications. To keep their mobile workers productive, enterprises must employ Quality of Service (QoS) tools to ensure that critical applications and data operate efficiently regardless of the wireless network in use. When implemented properly, QoS solutions:

- Prevent non-critical applications from impeding critical ones
- Keep the mobile worker productive during periods of high network use
- Give priority to real-time streaming applications, such as voice-over-IP and video delivery
- Preserve quality and ensure timely delivery for media streams, by correcting for dropped packets
- Optimize the apparent performance of wireless networks

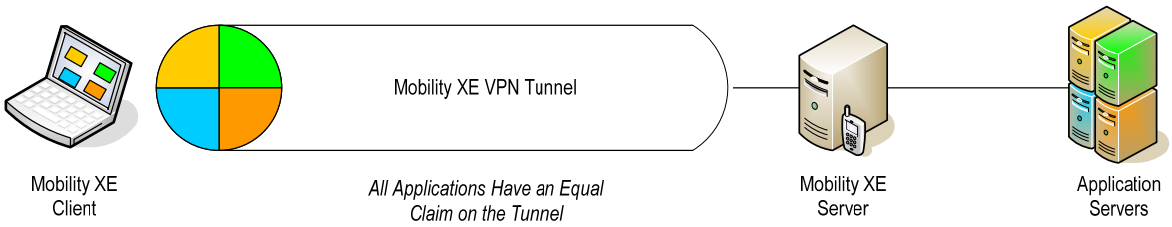
Mobility XE Policy-driven QoS

Mobility XE provides advanced QoS capabilities that let IT managers optimize mobile worker access to applications and data. These capabilities are part of the Mobility XE Policy Management module. By applying QoS policies, administrators can shape the data traffic transmitted through Mobility XE's secure VPN tunnel. They are able to designate which applications and processes receive higher bandwidth based on device, user, user group and more.

[1] Forrester, *Predictions 2009: What's in Store for Enterprise Mobility*

Without QoS

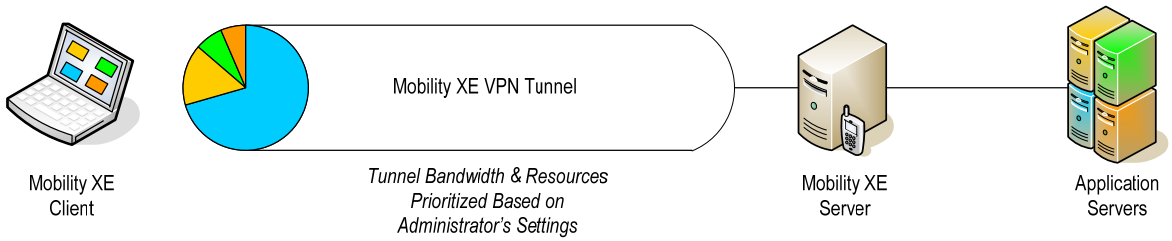
Without QoS, all applications have equal claim on the network bandwidth available between the mobile device and the Mobility XE server. Critical and non-critical applications, OS updates, antivirus updates, NetBIOS file-sharing and other traffic all compete for available bandwidth.



Real-time applications (RTAs) such as VoIP and video are especially prone to quality problems because they are more susceptible than traditional "data" applications to deteriorated performance when bandwidth is constrained, or when there is appreciable latency or jitter. In addition to the quality challenges, real-time data flows are especially challenging for IT departments to manage as they typically use randomly available ports to send and receive traffic. This makes it difficult to know in advance which ports to block/allow for specifying QoS when using traditional router-based techniques.

With QoS

Using QoS policies that are centrally administered and automatically deployed, Mobility XE sets the traffic-shaping priorities for each application over any wireless network. This allows the most critical application traffic to supersede all other data traffic, ensuring mobile worker productivity. Non-critical applications only receive bandwidth as it becomes available.



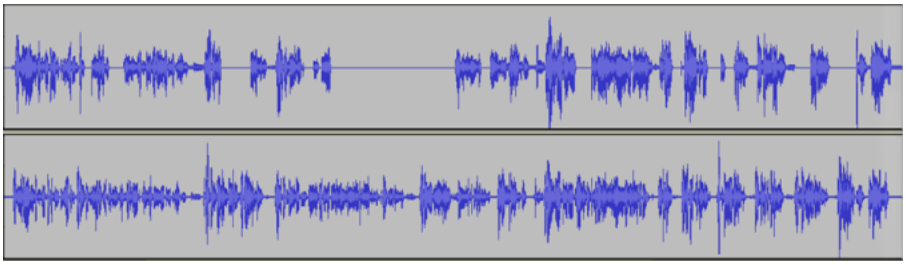
QoS policies are particularly well-suited for managing real-time applications because they can be applied based on application name so that they receive priority even though the ports they use may change.

Device to DMZ

Mobility XE's QoS traffic shaping is enforced from the mobile device to the Mobility XE server, regardless of which wireless (or wired) networks are in between, and whether they are public or private. By contrast, QoS settings implemented by a wireless carrier in their network or as part of a WLAN are only active within that discrete network, representing only a portion of the path between the mobile device and the Mobility XE server. As a mobile deployment expands and workers connect to available wired, Wi-Fi or cellular data networks, maintaining control over quality and prioritization of the users' access to applications and data ensures their continued productivity.

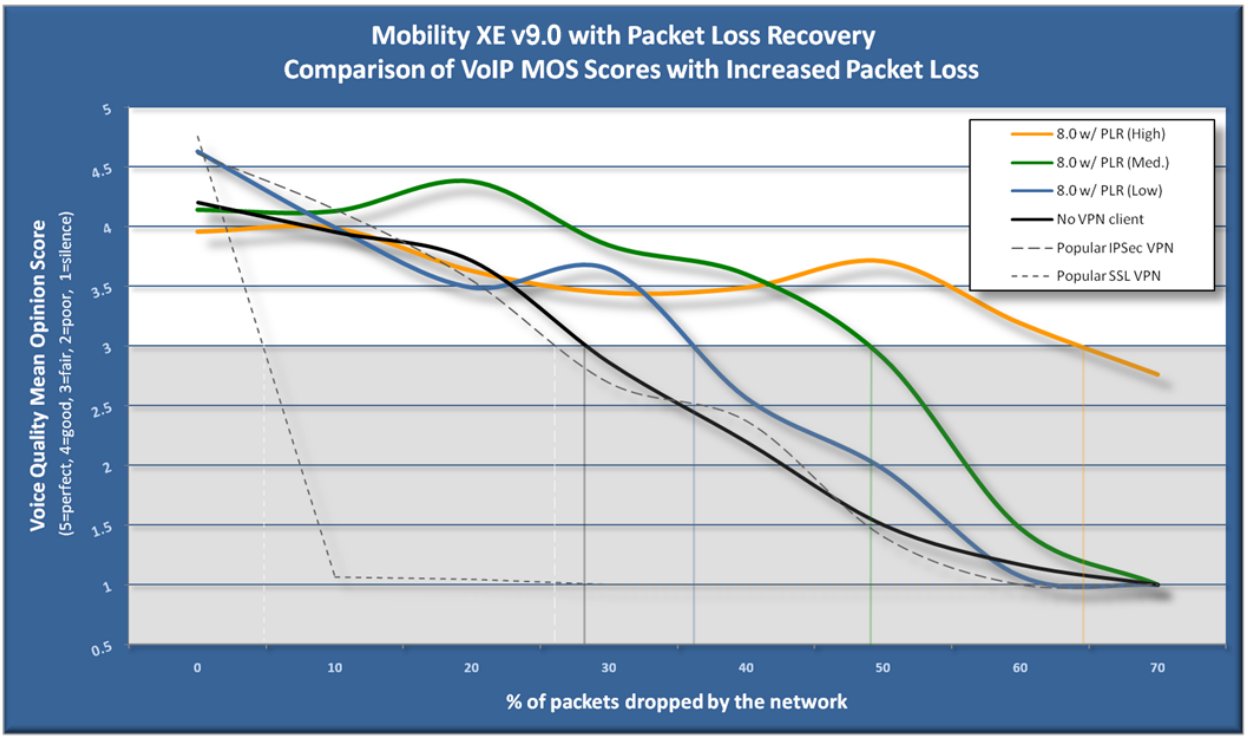
Packet-Loss Recovery

QoS policies also include the ability to perform Packet-Loss Recovery (PLR) for real-time applications. The PLR technique applied by Mobility XE uses a sophisticated mathematical technique that adds some additional payload to each packet. When packets are lost, PLR reconstructs them using information from the packets that were received.



The top waveform, of a voice conversation, exhibits 10% packet loss. Multiple words and an entire phrase are missing. Bottom, packet-loss reduction applied through Mobility XE QoS replaces the missing packets.

Using PLR for real-time application streams guards against breaks in the conversation or momentary picture loss, and improves the overall quality of the communication when networks lose packets or experience high latency or jitter.



Impact of packet-loss recovery on call quality as packet loss increases, at various PLR settings and in comparison with non-mobile VPNs.

Dissemination and Enforcement

The QoS settings in the Policy Management module are created and managed centrally via Mobility XE's management console and enforced on the remote devices. Should the settings need to be changed, administrators can modify them once (at the server) and they are automatically sent out to all subscribed mobile devices.

QoS Example: Field Service

A field service organization has five key applications: billing, systems management for remote devices, corporate IM, a Web-based CRM application and e-mail. The field technicians carry laptops throughout the day, and use them occasionally at home and in a branch office. The laptops have a number of background applications which have been installed by the operating system, such as Windows Update, or come from third parties, such as automated antivirus or printer-driver updates.

The field technicians typically spend 32 hours a week in the field and 8 hours at a regional office. While in the field they are connected via a wireless carrier's data network. At the regional office they connect via an in-building wireless LAN.

QoS Solution using Mobility XE

Using Mobility XE's Policy Management module, the IT managers specify QoS priorities for each application. They give the billing application and remote-device systems management application the highest priority. A moderate priority is given to Web CRM, corporate instant messaging and e-mail. All other applications are given a background priority — the lowest setting. This set of policies prevents the field technician's productivity from being disrupted because some non-essential application is siphoning off bandwidth.

For example: The technician begins his workday in the field, boots his device and antivirus software attempts to download a large signature file over a cellular data network. QoS policies step in. The policy can either throttle back the download so it doesn't sap bandwidth from key working applications, or block the download temporarily. In the latter case, the policy prevents the download over the cellular data network, but allows it when the technician is at the corporate office connected to the wireless LAN.

Furthermore, QoS policy settings can be defined to behave differently depending on the time of day, the device, the user, login status, etc. Executives, for example, may want e-mail set to high priority when using Windows Mobile devices. Or the field service organization might want certain applications such as file synchronization to only happen during off-hours.

If the organization has deployed a device-management system, policies may allow software updates or patches only when the authenticated device is running in "unattended" mode, outside of productive hours while a user is not actively logged in.

Conclusion

Quality of Service capability is one of the key building blocks for a successful mobile deployment. By implementing policies to prioritize access to enterprise data, IT management can better manage and enhance the productivity of their workers. QoS gives IT managers complete power to shape and control traffic, throughout the entire mobile deployment and over any network their users may employ. QoS also lets IT management handle the ever-growing population of mobile workers with tools that make even the largest deployment manageable.

For More Information

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