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Microsoft Knowledge Base Article - 316666

Windows XP Quality of Service (QoS) Enhancements and Behavior

The information in this article applies to:

- Microsoft Windows XP Home Edition
- Microsoft Windows XP Professional

This article was previously published under Q316666

SUMMARY

Networking Quality of Service (QoS) refers to a variety of techniques that prioritize one type of traffic or program when these operate across a network connection rather than relying solely on "best effort" connectivity. QoS mechanisms are built into both Microsoft Windows 2000 and Windows XP. This article describes the enhancements in QoS that are available in Windows XP. References to the QoS features that were first introduced in Windows 2000 are also provided in this article.

QoS for Internet Connection Sharing (ICS)

When one network is connected to another network through a slow link or connection (such as a dial-up line), a situation can exist that will increase the delay of traffic that is traversing the slow link. This delay can occur because of the speed mismatch between what the end stations in the communication are aware of, and the slow link, which results in a bottleneck in the network path. This applies to connection-oriented communication (using TCP) only.

If the receiving client is running on a relatively fast network (for example, 100 Mb/s Ethernet) behind a computer that is running Windows XP with the ICS service, and the server this receiver is communicating with is behind a remote access on a fast network, the mismatch exists. In this scenario, the receiver's receive window is set to a large value that is based on the speed of the link it is connected to. The sender starts out sending at a slow rate, but if packets aren't lost, eventually increases to sending nearly a full windows size of packets.

This can affect the performance of other TCP connections that traverse the same network, making their packets wait in a potentially large queue waiting to be transmitted over the slow

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the receiver's specification. This setting will not adversely affect traffic as the window size is being set as it would be if the receiver were connected directly to the slow link. The QoS packet scheduler component that is running on the ICS computer makes this window adjustment.

QoS for Modems and Remote Access

As of January 2002, many people still connect to the Internet through slow links, for example, connections with speeds of 56 kilobits per second. Even with the limitations on the speed of the link, many users will run several programs at once that access the network. This can include browsing, downloads, e-mail, chat, and even audio or video streaming. Most of these programs are using TCP as the underlying protocol for the transfer, each using its own connection or connections.

The first program to use the link will initially have exclusive use, allowing its connection to reach a steady state, which can result in a full TCP window of data in transit. When the next program starts transferring data, the connection it uses will be subject to a slow start algorithm that limits the amount of unacknowledged data that can be in transit. Because of the amount of data that is being transmitted by the already established program, the second program will take much longer to reach a steady state, and the transfer will be much slower for similar data sizes.

Windows XP implements a Deficit Round Robin (DRR) fairness scheme when it is operating on a slow link. This scheme was available in Windows 2000, but in Windows XP it is turned on by default when a slow link is detected. This scheme allocates several data flows and assigns new application data streams to these flows. These flows are automatically serviced in a round robin fashion, resulting in better responsiveness and performance for network communications without requiring the user to do any manual configuration.

Clarification about QoS in End Computers That Are Running Windows XP

As in Windows 2000, programs can leverage QoS through the QoS application programming interfaces (APIs) in Windows XP. One hundred percent of the network bandwidth is available to be shared by all programs unless a program specifically requests priority bandwidth. This "reserved" bandwidth is still available to other programs unless the requesting program is sending data. By default, programs can reserve up to an aggregate bandwidth of 20 percent of the underlying link speed on each interface on an end computer. If the program that reserved the bandwidth is not sending enough data to utilize it completely, the unused portion of the reserved bandwidth is available for other data flows on the same host.

For more information about the QoS packet scheduler, refer to Windows XP Help. Additional information about Windows 2000 QoS is available in the Windows 2000 technical library.

Correcting Some Incorrect Claims About Windows XP QoS Support

There have been claims in various published technical articles and newsgroup postings that Windows XP always reserves 20 percent of the available bandwidth for QoS. These claims are incorrect. The information in the "Clarification about QoS in End Computers That Are Running Windows XP" section of this article correctly describes the behavior of Windows XP systems.

MORE INFORMATION

For more information about the QoS packet scheduler, refer to Windows XP Help. Additional information about Windows 2000 QoS is available at the following Microsoft Windows 2000 Technical Library Web site:

<http://www.microsoft.com/windows2000/technologies/communications/default.asp>

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