Application Note:

Network Requirements for Internet Video

Overview

This application note lists some of the basic network requirements for using QVidium products for streaming live video content. These recommendations assume H.264 (MPEG4-AVC) video encoding and using the QVENC encoder.

Stream Bit Rate

* For Standard Definition video, NTSC (525i/480i) or PAL (625i /576i), we recommend a minimum Stream Bit Rate of 2 Mbps and, optimally, 3 to 5 Mbps.

* For 720p - High Definition video, we recommend a minimum bit rate of 2 Mbps for "talking-head" or low complexity content, and ideally 6 to 8 Mbps for "standard" video content, such as television shows, up to 10-12 Mbps for high-action sports content, such as soccer matches or content that involves panning and zooming and detailed background with motion.

* For 1080i - High Definition video, we recommend a minimum of 4 Mbps for talking-head content, 8-10 Mbps for standard content, and 12-15 Mbps for sports or high-action/complexity content

Internet Connection

We recommend measuring the capacity of your network using a service such as http://www.speedtest.net to be certain that your connection has sufficient upstream bandwidth. We recommend allowing about 20% overhead for packetization and error handling and the inherent dynamic variability in the link capacity due to link sharing with other users and applications.

MPLS Service

Many Internet connections employ dynamic load balancing that causes routes from a source to a destination to vary as loading on the network changes as a way to balance the loading among routers and other network equipment. Because different routes may involve different numbers of hops and/or different delays, such load balancing can cause packets to lose their ordering, thereby scrambling video. In addition, switching packets to a congested node may result in packet losses.

QVidium's patented ARQ error correction will help to correct packet ordering and recover lost packets. However in more extreme circumstances, the impairment may be greater than the size of the ARQ buffers or beyond the constraints of the ARQ mechanism,

so that even ARQ may not always be able to correct the problem. In such cases, we recommend contacting your ISP to see whether they can configure you MPLS (Multi-Protocol Labeled Switching) service. MPLS will force all packets from your stream to follow a fixed, static path from encoder to decoder through the Internet, thereby eliminating the problems caused by dynamic load balancing.

Firewalls

When video equipment is exposed directly to the Internet, it leaves them vulnerable to hacking and abuse, which can cause reliability problems and the potential for your equipment to be hijacked to send spam and malicious content, which can also create congestion on your network We therefore strongly suggest placing your QVidium encoders and decoders behind a firewall. For video stream bitrates of 10 Mbps and lower, you can download and install free firewall software into your QVENC, QVPRO, and QVDEC products from http://www.qvidium.com/qvpro/Firewall, to eliminate the need for an external firewall.

A good way to check whether there is a firewall between your encoder or decoder and the Internet is whether the IP address of your device is set to the same IP address as the public IP address. If you have a QVPRO or QVSD codec, and have installed version 51 or newer of the codec firmware, then you can click on IP Address under the Network menu and click on "Contact Server." If you have connectivity to the public Internet from the codec, then it will tell you its external, or **public,** IP address. Another way to find the public IP address is from going to certain web sites from a PC connected to the same local-area network (LAN) as the codec. Certain web sites, such as http://www.ipchicken.com, will tell you your **public** IP address. If you have a PC running Microsoft Windows® then you can click Start/Run and type "cmd" to bring up a DOS command prompt. From there, type "ipconfig." It will then tell you your local IP address. If this address is different than the address printed out from IP Chicken, then this is a "**private**" IP address.

Note: You **cannot** use a **private** IP address as the Destination address in the encoder for Push Mode, or as the Server address in the decoder for Pull Mode. Instead, you must us the **public** IP address and add a **port-forwarding** or **network address translation** rule in the associated firewall leading from the private address to the Internet.