HyperIP™ Datasheet

IP Data Accelerator

HyperIP™ is a software-based application that enhances application performance when running over long distance IP networks. HyperIP is compatible with RFC3135, which describes techniques used to mitigate TCP performance problems over long-distance wide-area networks and are called TCP “Performance Enhancing Proxies" (PEP).

HyperIP™ provides IP acceleration to corporate mission critical, high-volume data transfer. It provides critical performance advantages for applications such as:

- Remote Replication and/or Disk Mirroring
- Content Distribution & Medical Imaging
- Email Server Remote Synchronization
- Enterprise Application Integration
- Two-way Satellite Transmission
- High-Performance / Technical Computing
- Digital Image Distribution for the Entertainment industry

Performance
HyperIP provides very high performance, supporting speeds from DS3 to GigE. HyperIP delivers dramatic performance improvements at distances of hundreds to thousands of miles.

HyperIP– Application Accelerator for High Speed IP Transport

- Standards Based – RFC 3135
- Very high performance and efficiency – users experiencing 3-10X performance improvements in some applications/network environments
- Mitigates TCP and some UDP issues related to long distance data transmissions
- Minimizes long distance latency effects
- Easy to Implement, complete transparency to applications
- Reduces bandwidth utilization / costs; improves operational efficiencies

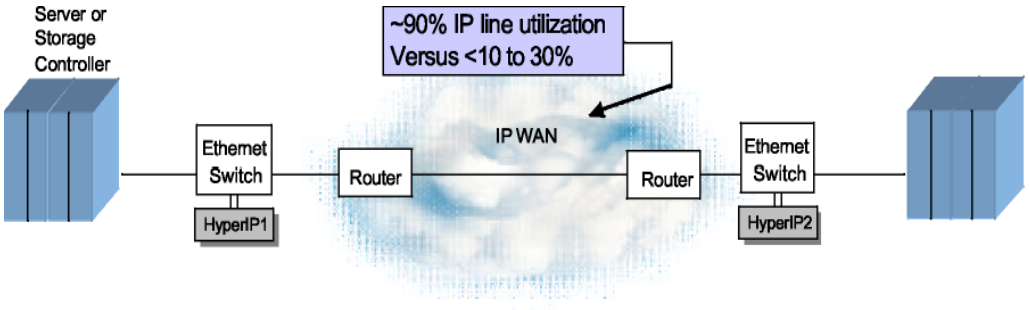

Figure 1. HyperIP Application Acceleration

The Problem

TCP/IP is not optimized for efficient, high-speed data transport over long distances. There are several characteristics of TCP/IP that cause it to perform poorly in these environments:

- Limited Window Size - To utilize the full available bandwidth of a data session, enough data must be passed to "fill the pipe". Generally, TCP implementations are limited to 65KB (a few enhanced versions may use up to 512KB).
- Inefficient Acknowledgement Scheme - TCP causes the entire stream from any lost portion to be retransmitted in its entirety. In high bit-error-rate (BER) scenarios this can cause large amounts of bandwidth to be wasted in resending data that has already been successfully received, all with the long latency time of the path.
- Slow Start - TCP data transfers start slowly to avoid congestion due to possible large numbers of sessions competing for the bandwidth, and ramp-up to their maximum transfer rate, resulting in poor performance for short sessions. Although this feature is important for many network environments where TCP is used, it is another point of inefficiency in meeting high-speed data transport requirements that HyperIP supports.
- Session free-for-all - Each TCP session is throttled and contends for network resources independently, which can cause over-subscription of resources relative to each individual session.

The HyperIP Solution

HyperIP operates as a network device, which may be inserted into the network to provide transparent "acceleration" of TCP/UDP traffic across long distance networks. HyperIP runs on standard, off-the-shelf PCI platforms. A 1U model supports speeds up to OC-3 and a 2U model supports speeds up to OC-12. HyperIP devices are simply connected to networks via standard 100MB or GigE interfaces. Both versions are quickly and easily configured via a browser interface.

Overview

HyperIP's main function is to accelerate selected IP traffic over a wide area network. HyperIP appliances are configured on each side of the WAN in pairs and operate as a gateway for destination IP addresses. HyperIP intercepts TCP packets from the application based upon a set of filtering address rules. The intercepted packets are then aggregated and sent over the network in a more efficient manner that is optimized for achieving greater WAN throughput. A real TCP connection is maintained between each endpoint application server and the local HyperIP node. Literally any application that uses TCP can benefit from the strength of HyperIP.

- As a Performance Enhancing Proxy" (PEP), HyperIP provides the following enhancements to TCP/IP and some UDP transfers:
- Window Size - HyperIP enhanced protocol will keep the available network bandwidth pipe full, resulting in more efficient utilization (minimizing the dead-air situation explained above).
- Acknowledgement Scheme - HyperIP retransmits only nAKed segments and not all the subsequent data that has already been successfully sent.
- Fast Start - Configuration parameters allow HyperIP to start transmissions at a close approximation of the available session bandwidth.
- Dynamic Adjustments - based on feedback from the receiver in the acknowledgement protocol, allows HyperIP to quickly "zero-in" on the appropriate send rate for current conditions.
- Session Pipeline - The HyperIP design allows traffic from multiple TCP sessions to be aggregated over a smaller set of connections between the HyperIP appliances, enabling a more efficient use of the bandwidth and less protocol overhead acknowledging many small messages for individual connections.

Intelligent, Adaptive Compression

By using Hyper/IP's adaptive compression features, performance for so applications is further enhanced. Compression rations range from 2:1 to 4:1 depending on data type and compressibility.

Transparency
HyperIP is completely transparent to the network applications. The behavior of the application remains unchanged except for much higher performance across the infrastructure. Whether the application was designed to operate on a peer-to-peer level, or client/server level, it will continue to function in that manner over HyperIP. The application will not be aware of the fact that the packets are intercepted and optimized.

Data Integrity and Guaranteed Data Delivery
HyperIP provides an extremely efficient recovery mechanism for lost packets. As an end-to-end protocol, HyperIP guarantees data integrity and delivery. In the event of a network failure, HyperIP finds an alternate path, or notifies the application if one is not available. Many of the world's largest financial, telecommunications, transportation and government organizations use HyperIP's core technology to move massive amounts of mission-critical data over vast distances everyday.

Reduced Equipment Costs, Simplified Solution
As compared with existing techniques associated with high performance IP transport, HyperIP offers a solution that is much simpler to install and manage and dramatically less expensive.

Changing Paradigm for Storage Application

- HyperIP simplifies connectivity
- Less hardware required to purchase and manage

In summary, HyperIP is a robust, standards-based solution that enables IT organizations to make efficient use of their IP infrastructure. The performance gains delivered by HyperIP can provide direct financial savings as well as improvements in operational efficiencies. Simply, HyperIP's value-add is:

- **Application Acceleration over the WAN** - (2x to 10x) overcomes the effects of latency, over any distance, on TCP/IP traffic.

- **Data Compression** - ***block*** level compression (2:1 to 10:1) is highly efficient even at speeds of 10Mbs - OC3+

- **Production Hardened Shield** - protects applications from variations in circuit conditions that may be occasional, but are often disruptive:
    a. Latency
    b. Jitter
    c. Bit Error Rate
    d. Distance
    e. Bandwidth changes

Product Specifications

Form Factor	
1U rack-mount server chassis for EIA Standard 310-D racks, validated with Intel® Server Board SE7501WV2	
Dimensions and Color	
1.7" (height) x 16.9" (width) x 24" (depth) (chassis without handles); 1.7" (height) x 18.9" (width) x 25.1" (depth) (chassis with handles); black trim	
Hard-Drive Bay Support	
LVD SCSI Backplane	Fast, Ultra, Ultra 80, Ultra160, and Ultra320 support for up to three one-inch hot-swap SCSI drives or two one-inch hot-swap SCSI drives and one slim-line CD-ROM/floppy or DVD/floppy module
ATA Backplane	ATA/100 support for up to two one-inch cold-swap hard drives and one CD- ROM/floppy or DVD/floppy module
System Cooling	
Five 40mm fans mounted in the middle of the chassis and instrumented to provide RPM data for fan-failure prediction and detection and two 40mm power-supply fans	
Front Panel	
Buttons and Switches	Power/sleep, reset, NMI, and ID
LEDs	Power, hard-drive status, network activity, system ID, and general system status
Connectors	Video (switched video with rear video connector), USB port
Security	
A mechanical lock on the optional front bezel and an intrusion switch that can be monitored by Intel® Server Management software	
Environment	
Ambient Temperature	
Operating (system): 5°C to 35°C, with maximum change not to exceed 10°C; non-operating (system): -40°C to +70°C	
Relative Humidity	
Non-operating: 95% @ +35°C non-condensing	
Accoustics	
<55 dba (rack-mount) in an idle state in a normal office environment (23°c)	
Electrostatic Discharge	
15 kV per Intel test specification	
Safety / EMC Regulatory Compliance (Class A)[1]	
Argentina	IRAM Certificate
Canada	UL60950 – CSA 60950 (UL and cUL)
China	GB4943 (CCC Certification)
Europe CE/Mark	EN60950 (Complies with 73/23/EEC)
Germany	GS License
International	IEC60950 (CB Report and Certificate)
Nordic Countries	EMKO-TSE (74-SEC) 207/94
Russia	GOST 50377-92
United States	UL60950 – CSA 60950 (UL and cUL)
Electromagnetic Capability (EMC)[1]	
Australia, New Zealand	AS/NZS 3548 (Based on CISPR 22)
Canada	ICES-003
China	GB9254 & 17625 (CCC Certification)
Europe CE/Mark	EN55022, EN55024 & EN61000-3-2/-3-3 (complies with 89/336/EEC)
International	CISPR 22
Japan	VCCI
Korea	RRL, MIC 1997-41 & 1997-42
Russia	GOST 29216-91 and 50628-95
Taiwan	CNS13438
United States	FCC, Part 15
Standard Power Supply	
AC Power Supply	One fixed 350W PFC
AC Voltage	4.96A at 115V, 2.48A at 220V
+5V	12A max
+5V standby	2A max
+12V1	16 A sustained
+12V2	16 A sustained
-12V	0.5 A max
+3.3V	16A max

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