



## TCP/IP CHALLENGES OVER SATELLITE

With convergence of voice, data and video over satellite becoming more common, some organizations are encountering TCP/IP performance limitations. Typical satellite links exhibit both high latency and bit error rates (impaired links), which can be challenging for the transmission of TCP. With this connection-oriented protocol, a number of factors contribute to its performance degradation over impaired links, including:

- The time required for an acknowledgement can severely limit the ramp up in transmission rate
- Sender's small window size reduces throughput
- Delay that is interpreted as network congestion versus propagation causes reduced transmission rates
- Packet loss that is interpreted as network congestion versus corruption causes reduced transmission rates

## TRANSPARENT TCP ACCELERATION

Comtech EF Data's *turboIP* Performance Enhancement Proxies were designed to combat the inherent challenges of transmitting TCP over satellite links. Two models are available, *turboIP-45* and *turboIP*, offering the same features and functionality but with different levels of throughput. The units provide transparent acceleration of TCP sessions, increasing throughput over satellite links while requiring minimal topology changes. The Performance Enhancement Proxies are standards-based, supporting the Space Communications Protocol Standard Transport Protocol (SCPS-TP). They provide reliable connection-oriented, end-to-end data transfer for user applications. *turboIP* and *turboIP-45* can also overcome the deficiencies that exist with TCP, including slow start and congestion control. Since they interoperate with TCP/IP networks and devices, *turboIP* and *turboIP-45* can be seamlessly integrated into existing networks in a staged manner, avoiding the need for network-wide upgrades.

## THROUGHPUT (Bi-Directional)

- Maximum single session
  - *turboIP-45* ~ 45 Mbps
  - *turboIP* ~ 15 Mbps
- Maximum aggregate throughput
  - *turboIP-45* ~ 45 Mbps
  - *turboIP* ~ 15 Mbps

## BENEFITS OF ACCELERATION

The feature set in *turboIP* can deliver performance gains for your network, including:

- Increases network throughput for TCP sessions
- Restores network efficiency
- Overcomes the inherent limitations of TCP/IP traffic on impaired links
- Interoperates with TCP/IP networks and TCP devices
- Enables staged deployment
- Provides flexibility to bypass where applications cannot benefit

## FEATURES

- Implements Open Standards (SCPS-TP)
- Intelligent Congestion Control
- Rate Pacing or Dynamic Bandwidth (Per Connection Support)
- HTTP and SNMPv1/v2/v3 Network Management
- Quick Start
- Automatic Window Scaling
- Selective Acceleration
- Data and Header Compression
- Enhanced Configuration & Management
- Black Hole Detection & Recovery
- Path Maximum Transmission Unit (MTU) Discovery
- Tolerates packet reordering
- Supports large queues
- Up to 3200 simultaneous accelerated sessions with bypass of additional sessions
- Asymmetrical Route Management

## turboIP® & turboIP-45® Performance Enhancement Proxies

### Seamless Integration

- Enables seamless integration into existing links without impacting non-TCP traffic and requiring device reconfiguration
- Simplifies new installations by not requiring additional subnets
- Forwards IP multicast and non-IP traffic, and can be placed directly between the existing LAN and router

### Implements Open Standards

- SCPS-TP May 1999
- ISO standard (15893)
- CC SDS standard (714.0-B-1)
- MIL-STD (MIL-STD-2045-44000)
- RFCs 768, 793, 1122 & 1323

### Intelligent Congestion Control

- Optimized for real-world, mixed-loss environments; distinguishes data corruption from congestion-induced data loss, prevents unnecessary activation of congestion control mechanisms

### Rate Pacing

- Meters out bursty traffic based on rate configured for WAN link, preventing channel congestion
- Dynamic Bandwidth Support (Per Connection)
  - Ensure accelerated traffic optimization when multiple paths exist and those paths contain different bandwidths or delay characteristics

### Black Hole Detection & Recovery

- Supports detection and forwarding of non-accelerated traffic to users that do not support the SCPS option

### Path Maximum Transmission Unit (MTU) Discovery

- Adjusts MTU per connection based on receipt of ICMP messages

### Tolerates packet reordering & Large Queues

- Out-of-order packets not interpreted as lost packet
- Adjusts retransmission timeout (RTO) based on the round-trip time (RTT) to support large queues

### Increased session support

- Up to 3200 simultaneous accelerated sessions

### Asymmetrical Route Management

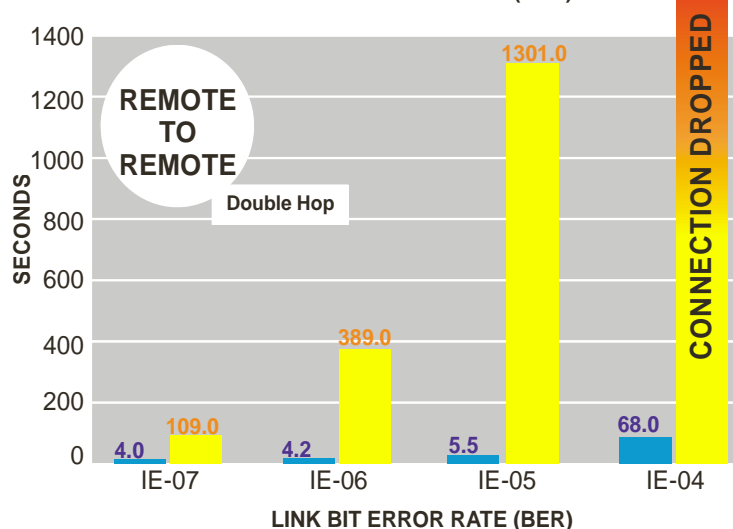
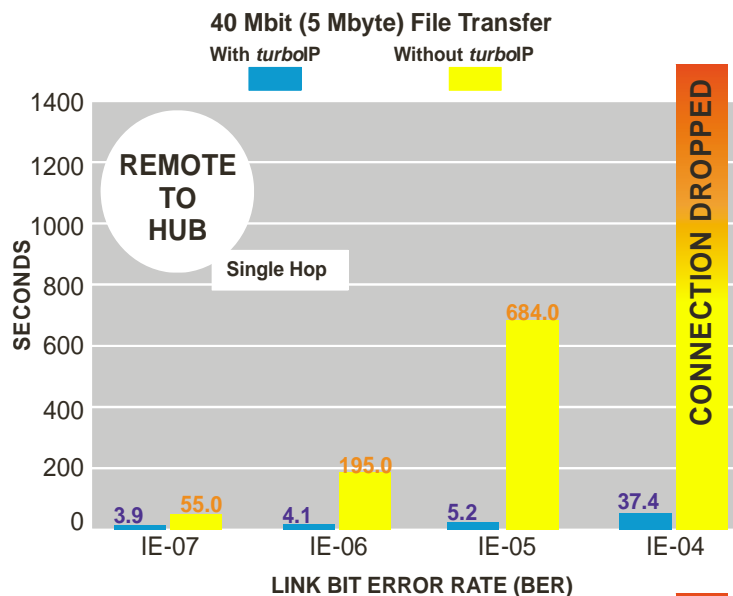
- Enables accelerated traffic to pass thru a different pair of *turboIP* or *turboIP-45* units in each direction (forward and return link)

### Flexible Management Interfaces

- Web-based interface
- SNMP v1/v2/v3 – supports Management Information Base (MIB) II (RFC 1213) and private MIB
- Command Line Interface (CLI) via serial port and emulation program
- Secure Shell (SSH) management interface security

The charts below illustrate the advantage of using *turboIP* to accelerate TCP performance.

Results charted are for a single session file transfer over a 10 Mbps full duplex link on a Microsoft Windows 2000™ Professional FTP server and client with factory default settings for TCP.



### Selective Acceleration

This powerful feature provides a method of Quality of Service (QoS) for IPv4 datagrams that are received on the local area network (LAN) interface and forwarded to the wide area network (WAN) interface.

Rules are established to control the processing, including acceleration, compression and filtering for all IP packets. Up to 255 rules can be established. Rule parameters can include source and destination IP address and mask, protocol (TCP, UDP or any), and TCP or UDP source and destination ports. Each rule is assigned 1 of 8 priority levels plus a maximum data rate.

### Data and Header Compression

Data and header compression functionality is applicable to accelerated TCP traffic, and is enabled/disabled on a session-by-session basis. The compressibility of each segment payload is evaluated individually and only those payloads where the impacts would be beneficial are compressed. Enabling data and header compression on *turboIP* or *turboIP-45* can reduce both bandwidth and transmission time over wide area network links. If disabled, no sessions are compressed.

### SNMP Support

Simple Network Management Protocol (SNMP) is a widely used network monitoring and control protocol. *turboIP* supports SNMP versions 1, 2 and 3 to enable network monitoring and control functions, including:

- Access Control
- Security Access Control
- Read/write capabilities for any configuration parameter

This expanded support offers greater security and flexibility to accommodate virtually any network environment deploying SNMP.

### Configuration and Management

#### Operational Statistics

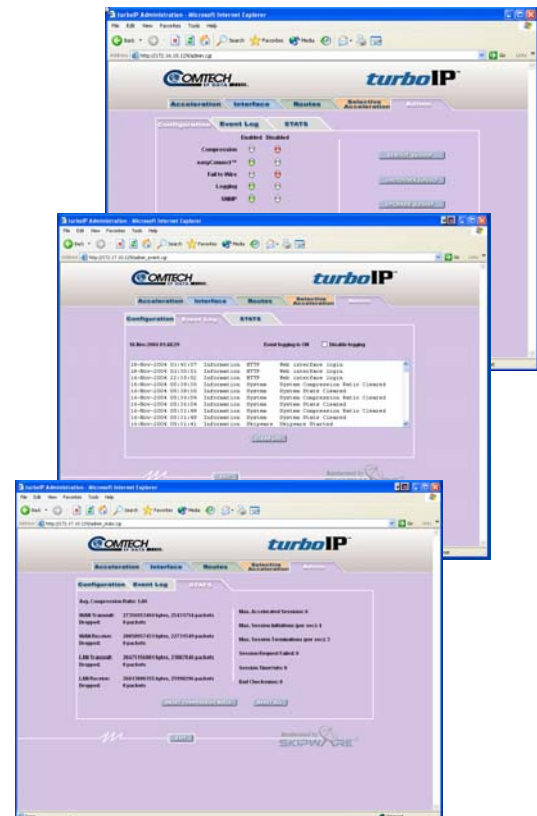
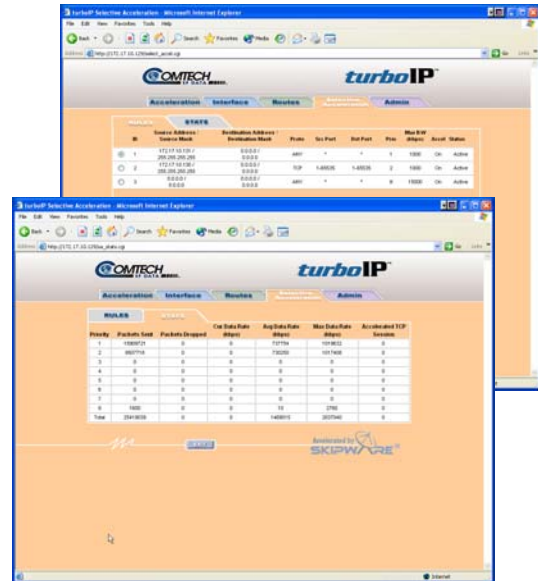
Multiple operational statistics indicating the status of the *turboIP* or *turboIP-45* systems are available.

#### Event Log

This management feature captures a listing of informational, warning and error events that have occurred.

#### Configuration Wizard

A configuration wizard helps to simplify setup of network and SNMP parameters.



# turboIP<sup>®</sup> & turboIP-45<sup>®</sup> Performance Enhancement Proxies



## SPECIFICATIONS

Rear Connectors (3)	RJ-45, 10BaseT/100BaseTX Ethernet, Auto-sensing (1 for LAN and 1 for WAN) EIA-232 (CONSOLE)
Front Panel Status LEDs	Link and activity for LAN, WAN and Power indication
Temperature	Operating: 5° to 60° C Storage: 0° to 75° C
Humidity	Operating: 5 to 90% @40° C, non-condensing
Vibration	Operating: 5 to 17 Hz, 0.1" double amplitude displacement 17 to 500 Hz, 1.5G acceleration peak-to-peak (max.)
Shock	Operating: 15G acceleration peak (1 ms duration)
Safety	EN-60950 (CE)
EMC	FCC Part 15 Class B / EN55022-EN55024 (CE)
Power Supply	90-132 VAC or 180-260 VAC @ 47-63 Hz, 250W max
Chassis	Heavy duty steel with aluminum front panel
Dimensions	16.8" x 1.6" x 12.3" (W x H x D) (427 x 41 x 312 mm)
Weight	12 lbs (5.44 kg)
Cooling Fans (2)	6.3 CFM sleeve cooling fans (rear)