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 proxy was designed to combat the inherent challenges of transmitting TCP over satellite links. It provides transparent acceleration of TCP sessions, or the increase in throughput over satellite links while requiring minimal topology changes. And, being standards-based, supporting the Space Communications Protocol Standard (SCPS) Transport Protocol (SCPS-TP), it can provide reliable connection-oriented, end-to-end data transfer for user applications. turboIP can also overcome the deficiencies that exist with TCP, including slow start and congestion control. Since it interoperates with TCP/IP networks and devices, turboIP can be seamlessly integrated into existing networks in a staged manner, avoiding the need for network-wide upgrades.

Available in a 1RU platform, turboIP is deployed in government and military agencies plus commercial environments around the globe. Common applications for this performance enhancement proxy are supporting organizations utilizing satellite links for Internet backbone trunking services and organizations with large or evolving satellite bandwidth requirements for Internet traffic.

THROUGHPUT (Bi-Directional)
- Maximum single session ~ 15 Mbps
- Maximum aggregate throughput ~ 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
- easyConnect™
- Implements Open Standards
- Intelligent Congestion Control
- Rate Pacing
- Selective Negative Acknowledgments (SNACKs)
- Quick Start
- Automatic Window Scaling

Now Available In Version 3.0
- Selective Acceleration
- Data and Header Compression
- Enhanced Configuration & Management
  - New Operational Statistics
  - New Event Log
  - New Configuration Wizard
  - SNMP v3

EXPANDED FUNCTIONALITY
Software version 3.0 for the turboIP provides significant new features and further enhances this powerful acceleration solution. A summary of features follows.
**easyConnect**
- 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
- Prevents channel congestion

**Selective Negative Acknowledgments (SNACKs)**
- Identifies specific lost or damaged packets and retransmits only those packets
- Provides for quicker recovery and better bandwidth utilization in lossy environments

**Quick Start**
- Enables full utilization of bandwidth, eliminating inefficiencies of the TCP slow-start algorithm

**Window Scaling**
- Supports window sizes up to 1 GByte, far exceeding standard TCP window size of 64 kBytes

**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

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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 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 turboIP systems were added with Version 3.0.

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.
## SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear Connectors (3)</td>
<td>RJ-45, 10BaseT/100BaseTX Ethernet, Auto-sensing (1 for LAN and 1 for WAN)</td>
</tr>
<tr>
<td>Front Panel Status LEDs</td>
<td>Link and activity for LAN, WAN and Power indication</td>
</tr>
</tbody>
</table>
| Temperature                   | Operating: 5° to 45° C  
Storage: 0° to 75° C                                                      |
| Humidity                      | Operating: 5 to 95% @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                        | UL/CSA/TV/CE/FCC                                                         |
| EMI                           | Meets FCC/VDE Class A                                                   |
| Power Supply                  | 90~132 VAC or 180~260 VAC @ 47~63 Hz, 150W max                           |
| Chassis Dimensions            | Heavy duty steel with aluminum front panel  
19.0" x 1.75" x 18.4" (W x H x D)  
(483 x 44.5 x 467 mm)  
12 lbs (5.44 kg)                                                      |
| Cooling Fans (2)              | 6.3 CFM sleeve cooling fans (rear)                                      |