DATA SHEET

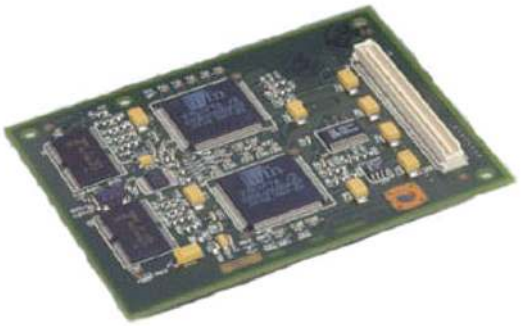
DATA COMPRESSION ADVANCED INTEGRATION MODULES (AIM-COMPR2-V2 AND AIM-COMPR4)

The Data Compression Advanced Integration Modules (AIMs) deliver cost-effective options for reducing recurring wide-area network (WAN) costs and maximizing the benefit of the advanced bandwidth management features of Cisco IOS® Software. The Data Compression AIM takes advantage of the internal AIM slots of the Multi-service Access Routers and Integrated Services Routers, ensuring that external slots remain available for other interfaces.

Data compression technology maximizes bandwidth and increases WAN link throughput by reducing frame size and thereby allowing more data to be transmitted over a link. This feature enables network managers to increase application performance and service availability for end users without costly infrastructure upgrades. Data compression enables service providers to maximize available bandwidth and deliver more services to customers over their existing infrastructure, enhancing their return on investment.

While software-based compression capabilities can support fractional T1/E1 rates, hardware based compression off-loads the platform's main processor to deliver even higher levels of throughput. With a compression ratio of up to 4:1, the Data Compression AIMs support 8 Mbps or 16 Mbps of compressed data throughput without imposing additional traffic latency—enough to keep two or four T1 or E1 circuits full of compressed data in both directions simultaneously. Because the Data Compression AIM is fully integrated with the router, network managers are not forced to provision and manage a separate external device at a remote site. The Data Compression AIM supports industry standard LZS and Microsoft Point-to-Point Compression (MPCC) algorithms and ensures compatibility with all Cisco products supporting hardware or software based compression.

Figure 1. Data Compression AIM AIM-COMPR4



KEY BENEFITS

- Maximizes System Resources
  - Frees the platform's CPU for other tasks, improving performance
  - Provides simultaneous support for multiple circuits
  - Provides maximum compression performance where required
- Reduces Costs
  - Reduces packet traffic on a link when tariffing is usage based (resulting in WAN cost reduction)

  - Shrinks frame lengths, allowing more data to be transmitted using the same amount of bandwidth and reducing the need for costly additional WAN links or circuits
  - Enables customers to deploy additional services such as voice/data integration without increasing bandwidth
- Improves WAN Bandwidth Efficiency
  - Maximizes WAN data throughput on all WAN interfaces (avoiding the expense of additional or higher-speed links)
  - Improves application response time on congested links
  - Maximizes the advanced bandwidth management capabilities of Cisco IOS Software
- Improves Branch-Office Network Manageability
  - Eliminates costly external third-party products
  - Single management view for platform and compression services
- Supports Industry Standards
  - STAC (QIC122) compression algorithms
  - Microsoft Point-to-Point Compression algorithm
  - FRF.9 Frame Relay Payload Compression
  - Compression Control Protocol (CCP) RFC

APPLICATIONS

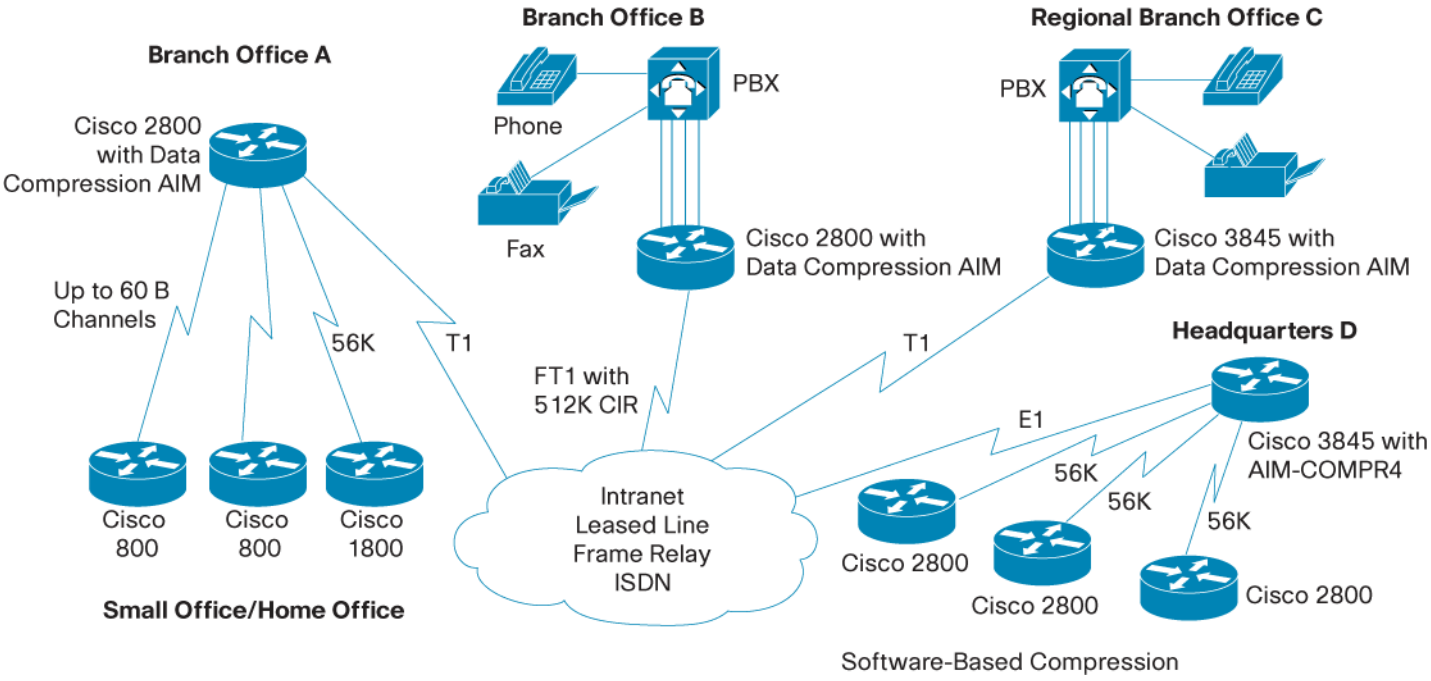
Today's enterprise networks have become increasingly complex. As companies grow, the diversity of protocols, LAN media, WAN services, and networking equipment required to provide mission-critical network services increase dramatically. Requirements for new network applications and services are growing much faster than the size of the IT organization required to support them. With extensive support for security, multiprotocol data routing, voice/data integration, and dial access services, the Cisco Multi-service Access Routers and Integrated Services Routers provide a flexible, integrated solution that simplifies the process of deploying and managing the branch office network solution.

Data compression is highly dependent on the content being compressed, with small packets such as those found in online transaction processing (OLTP) applications generally being more compressible than larger packets. Using the LZS compression algorithm, compression ratios of 4:1 or more are possible. Based on a broad spectrum of data streams and packet sizes, 2:1 is a typical compression ratio observed with the Data Compression AIM.

Compared to software-based compression services, hardware-based compression can compress a larger number of high-speed WAN links at wire speed, up to an aggregate of 16-Mbps of compressed data throughput using the Data Compression AIM. This bandwidth can be utilized for a single channel or circuit, or spread across as many as 120 separate full duplex connections. Examples range from four E1 or four T1 leased lines to 120 ISDN B-channels or Frame Relay virtual circuits. As part of a Cisco end-to-end solution, the Data Compression AIM can be used in a branch office to reduce WAN costs, increase manageability, and allow deployment of new services such as voice or video.

In Figure 2, a Cisco 2800 router equipped with the Data Compression AIM in Branch-Office A compresses eight 128-kbps ISDN connections, a 56-kbps link and a T1 WAN link. Remote ISDN and 56-kbps leased line sites can use software-based compression. Meanwhile, in Branch-Office B, a Cisco 2800 with the Data Compression AIM frees up available bandwidth on a 512-kbps CIR Frame Relay permanent virtual circuit (PVC) to enable the transmission of voice, fax, and data over the existing connection, reducing long-distance toll charges. In Regional Branch-Office C, a Cisco 3845 with a hardware-based Compression AIM is handling a full T1 worth of compression. In the headquarters location D, a Cisco 3845 is handling up to 4 x T1 or 4 x E1 worth of compression.

Figure 2. Routing with Bandwidth Management



THE ADVANCED INTEGRATION MODULE ARCHITECTURE

To enhance versatility, integration, and performance capabilities, the Cisco Multi-service Access Routers and Integrated Services Routers support internal AIM slots. The slots connect to both the main system bus and a secondary TDM bus running between the WAN interface card slots and network module slot. This flexible architecture enables the Data Compression AIM to offload processor-intensive tasks from the platform's CPU. By supporting CPU-intensive applications such as data compression on a dedicated coprocessor, customers can obtain significantly higher throughput rates and enable new services and applications using existing network interfaces.

COMPRESSION PERFORMANCE

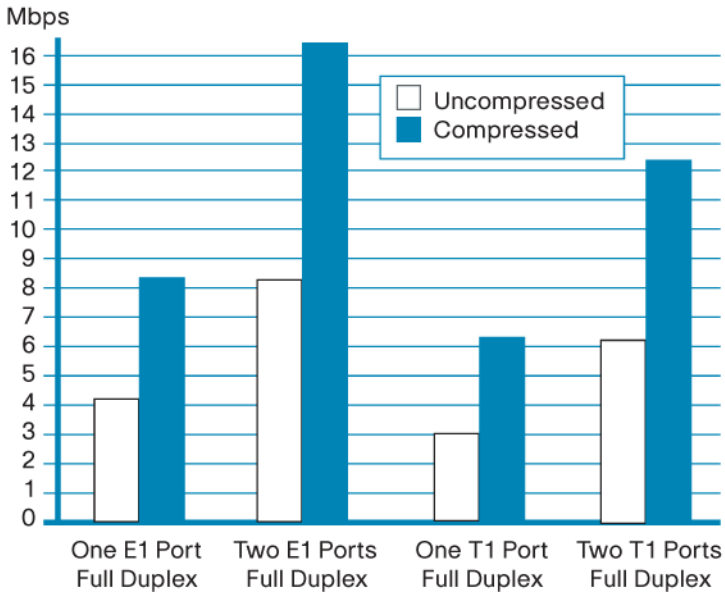
Compression in can be supported in both software and hardware. Table 1 below quantifies the differences.

Table 1. Compression Performance Comparison

Type	Compressed Data Throughput
Software-Based	2600XM Series: Up to 256 Kbps 2691: Approximately 800 Kbps 2800: Ranges from 1 Mbps to 1.5 Mbps 3660, 3725: Approximately 1 Mbps 3745: Approximately 1.5 Mbps 3800: Ranges from 1.5 Mbps to 3 Mbps
Hardware-Based with Data Compression AIM	AIM-COMPR2-V2: 8.192 Mbps AIM-COMPR4: 16.384 Mbps

The advantage of using the Data Compression AIM is that it offloads the compression activity from the platform's CPU. It frees the CPU for other tasks such as security, IP Telephony, and application optimization. Additionally, the Data Compression AIM can execute compression at a significantly higher throughput, allowing compression to be used on higher WAN bandwidth links (up to four T1s or four E1s).

Figure 3. Aggregate Compression Performance



The above figure reflects performance testing using a Cisco 3660 equipped with the Data Compression AIM. These results represent the typical performance seen using the LZS data compression, depending on the data content. The aggregate uncompressed value and the compressed value are used as a baseline and the difference between the uncompressed value and the compressed value represents the link utilization gain. For example, the second data set on the above graph shows four E1 ports. Uncompressed, the aggregate throughput is 16.384-Mbps (four full duplex E1s). Compressed, this test provided an effective link speed of more than 32 Mbps—roughly a 2x link throughput improvement.

Table 2. Data Compression AIM Features and Benefits

Feature	Benefit
Dedicated Hardware for Data Compression	Offloads compression functions from the platform's CPU to improve overall platform performance and efficiency
High-Performance Compression Engine	Offers compression performance of speeds up to 64 times that of software-based solutions
Network Interface Independence	Provides investment protection—as serial link requirements change, the same AIM can be used without hardware modifications
Uses the available internal AIM Slots	External interfaces (WAN Interface Cards and Network Modules) remain free for other applications
Field Upgradable	Easy to upgrade by inserting into available AIM slot.
Onboard Memory on AIM for Maintaining Compression Sessions	Supports 120 full-duplex sessions, no additional memory required
Frame Relay and PPP Simultaneous Support	Reduces overall cost of hardware-based compression; eliminates the need to have multiple compression devices

Feature	Benefit
Interoperable with Cisco IOS STAC and MPPC Compression on All Compression Enabled Platforms	Allows mix of hardware-based and software-based compression to create an overall WAN solution tailored for performance and cost
Automatic Compression Configuration Selection	Simplifies platform configurations
Manual Compression Configuration Selection	Allows fine-tuning of WAN and platform performance on a per-interface basis using S/W based compression on some links, H/W based on other links, and uncompressed data on the remaining links
Cisco IOS Commands for Monitoring Compression Activity	Provide detailed statistics and diagnostics for compressed links
Works with Cisco IOS Quality of Service Mechanisms	Provides a total solution for bandwidth management and optimization
Multiple Compression Modes—Packet-by-Packet (PPC) and Linear-Packet Compression	With PPC, optimizes throughput on a specific application; with linear packet compression, maintains compression history across multiple packets for maximum compression ratio

Refer to the router data sheets for additional information on mechanical, environmental, and agency certifications.

Table 3. Specifications for the Data Compression AIM

Feature	AIM-COMPR2-V2	AIM-COMPR4
Hardware/Platform Requirements	All Cisco 2600XM Series, 2811, 2821, and 2851	All Cisco 2691, Cisco 3660 series, Cisco 3725, Cisco 3745, Cisco 3825 and Cisco 3845
Maximum Number of AIMs	Cisco 2600XM Series—One Cisco 2811, 2821, and 2851—Two	Two
Minimum IOS Version	Cisco 2600XM Series: 12.2(23), 12.3(6), 12.3(7)T Cisco 2811, 2821, and 2851: all IOS versions	Cisco 3660: 12.0(5)T Cisco 2691, Cisco 3725, Cisco 3745: 12.2(11)YT, 12.2(13)T Cisco 3825 and 3845: all IOS versions
Compression Algorithms	STAC (QIC-122), MPPC (Microsoft Point-to-Point Compression), Frame Relay Forum FRF.9	
WAN Interfaces	All WAN interfaces, including ISDN Basic Rate Interface (BRI) and Primary Rate Interface (PRI), serial ports with integrated CSU/DSUs, serial, channelized T1/E1	
WAN Encapsulation	PPP and Frame Relay	PPP and Frame Relay
Maximum Number of WAN Links (VCs)	120 full-duplex links (VCs) using LZS (STAC, QIC-122) or Microsoft Point-to-Point-Compression (MPPC)	
Compression Throughput	8.192 Mbps aggregate	16.384 Mbps aggregate

Table 4. Ordering Information

Part Number	Product Description
AIM-COMPR2-V2	8 Mbps Compression Adv. Integration Module
AIM-COMPR4	16 Mbps Compression Adv. Integration Module

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