# Cisco AS5300 Universal Access Server

THE AWARD WINNING CISCO AS5300 UNIVERSAL ACCESS SERVER PROVIDES SUPERIOR DENSITY, PRICE, AND PERFORMANCE FOR DIAL POOLS. UTILIZING THE DIFFERENTIATED SERVICES DELIVERED THROUGH CISCO IOS®, CUSTOMERS ARE OFFERED BEST-OF-BREED SCALABILITY AND INVESTMENT PROTECTION VIA THE BROADEST SUPPORT OF WORLDWIDE PROTOCOLS SUCH AS V.90, CHANNELIZED E1 (R2), CHANNELIZED T1 (RBS), SS7, AND VOICE OVER IP (VOIP).

## Universal Access

To further maximize customers' investment protection, the AS5300 is capable of terminating analog modem, ISDN, wireless GSM V.110 and voice calls on the same chassis from the same bearer line. This enables ISPs and enterprise network managers to meet traditional dial in needs while supporting the migration to new world technologies with integrated data, voice, and video.

## Applications

### Service Provider Point of Presence

Frequently, geographic concerns require a service provider to employ a large number of small Points of Presence (POPs) that are geographically dispersed in addition to the traditional large centralized POP. The high density 8 PRI AS5300, with its compact and cost effective design is the optimal choice for implementation in a dispersed or centralized dial infrastructure. With it's four redundant high speed serial WAN ports and two redundant LAN interfaces, the AS5300 provides the maximum flexibility of deployment. Customers can utilize the serial ports for backhaul in a distributed environment, thus removing the need for aggregation switches and routers. For a large centralized POP environment, the AS5300's Fast Ethernet LAN interface provides a high speed data path for integration with other access servers.

### High Density Dial Access

In higher density implementations, the AS5300 can function as a component of the Cisco Dial Access Stack Architecture (DASA), scaling to provide an access point to hundreds of thousands of ports. Through the use of Multichassis Multilink PPP enabled by Layer Two Forwarding Technology (L2F), Layer Two Tunneling Protocol (L2TP) and Cisco developed Stack Group Bidding Protocol (SGBP), Cisco high-density access solutions can grow to meet the requirements of frequently changing dial environments. Since the essential building block is a relatively small investment, providers can scale from very small to very large installations.

### Multiprotocol Dial Access

Increasingly, enterprises and service providers need to extend network access to a broad range of remote users, including employees, customers, and partners. Successful remote access means being able to connect these users from practically any location, almost transparently, as if they were located in company headquarters. Demands of telecommuters and mobile users necessitate not only ISDN and modem connections but also voice and video over the same data connections. Today, users expect to get the same access and quality of service (QoS) they receive when locally connected. To meet this requirement, the remote access server must be part of the total network solution and scale with it to meet the growing remote access needs. The AS5300, combined with IOS, meets these needs by extending the core infrastructure with secure, reliable, high speed dial in connections. The AS5300 also supports the most complete set of access protocols of any access server in the industry including IPCP, IPXCP, G.711, G.729, G.729a, G.723.1, H.323, ARA 1.0 and 2.0, ATCP, X Remote, PPP, and (SLIP).

### VoIP Toll Bypass

A common application for the Cisco AS5300 is VoIP toll bypass. Corporations can now leverage their WAN infrastructure to provide long distance toll-bypass services. Using the Cisco

AS5300 as the aggregation point, along with voice/fax network modules for the Cisco 3600 and 2600 routers, companies can significantly reduce their long distance telephone and fax charges by routing their intracompany voice and fax traffic over their existing IP networks, without compromising voice or fax quality.

In addition, by avoiding the need for expensive telephony switches, ISP's can offer long distance service to their subscribers at a fraction of traditional long distance rates while further utilizing their existing data networks. This allows ISP's to grow their business from plain dial access to multiservice access for subscribers and corporate outsource customers.

## Features

### Performance

Due to the superior design of the original AS5300, Cisco was able to double the modem density of the server from 4 PRI to 8 PRI, add 4 high speed serial WAN ports, and still maintain an average of more than 100 packets per second per port performance. This allows the AS5300 to continue to provide the highest performance of any access concentrator on the market.

### Reliability

When optioned with the internal redundant power supply, the AS5300 becomes the most reliable access concentrator on the market in a 2 rack unit high chassis. With it's true-load sharing capabilities, the internal redundant power supply in the AS5300 provides hot failover, environmental monitoring, variable speed fans, SNMP management, and a mean time between failure of over 500,000 hours!

### Scalability

The Cisco implementation of the Multichassis, Multilink Point-to-Point Protocol (MMP) allows customers to start small and scale additional access servers as required, while still being able to dial into one call center. ISPs and enterprise network managers with large dial in pools can easily scale and integrate their access infrastructure to aggregate multiple calls across servers, providing a higher bandwidth solution to their end users. These scalability features are critical for service providers and enterprise customers as they build resilient systems that leverage distributed network reliability.

### Signaling System #7

Carriers worldwide are seeking innovative ways to integrate dial access into their network infrastructures—to off-load voice switches, realize new revenue opportunities, reduce operations costs, and scale their networks cost effectively. Common channel signaling system #7 (SS7) interfaces are key elements of this strategy. By supporting common channel signaling on the AS5300, Cisco provides the ability to fully integrate dial-access capabilities within the circuit-switched network infrastructure—saving up to 50 percent on switching interface costs and taking dial-access solutions to a new level of scalability and cost effectiveness.

### Full Power of IOS Software

The AS5300 is a key component of the complete end-to-end Cisco solution set for dial connectivity. No other vendor can offer remote users as many options for Internet access and enterprise extension. This is also boosted considerably by the power of Cisco IOS software, the de facto standard in internetworking. Cisco IOS software gives customers the opportunity to affordably deploy virtual private dial networks utilizing payload compression and data encryption. Scalability is enabled via MMP, which allows call aggregation across multiple chassis in the same dial pool.

### VoIP

The Cisco AS5300 with voice/fax feature cards offer toll-quality voice to customers. Cisco AS5300 voice/fax feature cards are coprocessor cards with a powerful RISC engine and dedicated high-performance digital signal processors (DSPs) for each voice channel. This ensures predictable, real-time voice processing for each channel. The card's design couples this coprocessor with direct access to the Cisco AS5300 routing engine for streamlined packet forwarding. Incoming calls are terminated on the voice/fax feature card, where the voice is encoded, using standard algorithms including G.711 and G.729, compressed, and encapsulated in Real-Time Protocol (RTP) packets. A call is placed to the remote voice gateway using the standard H.323 protocol and the remote gateway decodes the voice and delivers it to the receiver. High-performance DSP architecture delivering 50 MIPS per DS0 to support high-compression/low delay codecs; Adaptive Jitter Buffer, voice activity detection, comfort noise generation echo cancellation, and concealment fax carriage make packet telephony gateway calls sound just like PSTN calls.

### Security

The primary concern for most network managers today is security. The AS5300, along with the popular and robust Cisco IOS software, provide comprehensive security throughout customer core networks. For remote user environments, the AS5300 extends that proven core security to hybrid dial in locations. Among the security features supported by the Cisco

IOS software are access lists, violation logging, RADIUS, Kerberos V, and TACACS+ with authentication, authorization, and accounting.

**Management**

The Cisco AS5300 provides several levels of management, from the FastStep™ configuration utility to get the box up and running quickly to the extensive MICA modem management capabilities, the CiscoWorks, Cisco Access Manager, and Cisco Voice Manager SNMP management platforms.

FastStep for the AS5300 is a GUI application that runs on any Windows95 or Windows NT workstation and provides a step by step guide to getting the AS5300 up and running quickly. FastStep also provides an automated GUI tool for updating IOS and portware images.

Modem management on the AS5300 provides centrally managed modem capabilities, key requirements for service providers and enterprises building large dial in pools. The modems can be managed via the same tools used to manage the rest of the network, providing network managers with one solution at a central management point. With Cisco IOS, the AS5300 provides the most extensive access server modem management on the market. This includes the ability to directly access the modem at anytime (including when the modem is connected and online) to capture statistics, force a reset or check a modem's configuration.

Lower operating costs are achievable with Cisco's centralized management capabilities. For smaller installations the AS5300 can be managed with the GUI based CiscoWorks software. CiscoWorks provides comprehensive management, configuration, and reporting of each server. In large or dispersed installations, Cisco Access Manager (CAM) provides the ability to pool groups of servers as one POP and provide extensive call detail reporting on the whole pool. In addition, CAM configuration management capabilities provide network managers with complete control over network statistics and the ability to configure and tune network operations from a central location.

When configuring the AS5300 for voice applications, Cisco Voice Manager (CVM) provides the most comprehensive voice management of any vendor. The CVM GUI interface is used to configure large or small dial plans for VoIP routing from a central location to multiple gateways. CVM also provides real time monitoring of the voice network, complete with call quality measures and utilization statistics. In addition, CVM has extensive reporting capabilities to allow network managers to track utilization and call statistics for increased network management control.

These applications coupled with the comprehensive debugging tools in Cisco IOS software substantially reduce the time and cost associated with problem isolation and correction and allow network managers to effectively plan and grow their network infrastructures with maximum reliability.

**Life Cycle-Focused Support Solutions**

The comprehensive Cisco support portfolio delivers solutions that enhance the network throughout its life cycle. From design and installation to preventive and scheduled maintenance, to performance optimization, Cisco solutions promote network reliability, efficiency and flexibility. Designed to function as an integral product component, these programs deliver seamless support. Together, they proactively help organizations sharpen their competitive edge. Through access to the Cisco Connection Online web site, customers can both use and market expanded functionality and add new features as soon as they become available. Moreover, access to Cisco technical expertise is available around the clock and around the globe. This virtual team of the world's top networking engineers is equipped to address every need from troubleshooting to network design and planning.

**Summary**

Through the rich features available in the Cisco IOS software, combined with the AS5300 universal access platform and other industry-leading Cisco remote access router and switching products, enterprises and service providers can for the first time deploy massive access infrastructures that are universally accessible, completely scalable, and cost effective. Customers can protect and leverage their Cisco infrastructure investments in training and expertise across new Cisco platforms. This true end-to-end solution differentiates Cisco from its competition.

## Features and Benefits

| Features | Benefits |
|---|---|
| 8 PRI density in 2 rack units | Providing the most dense access server per rack unit on the market. This brings tremendous cost savings when co-locating servers in leased rack space. |
| Integrated CSUs, channel bank, router, and asynchronous modems accommodate ISDN Primary Rate Interface (PRI) T1/E1 lines or channelized T1/E1 lines | Services and terminates modem, digital ISDN, wireless GSM V.110 and voice calls with one trunk line as a simple, cost-efficient migration path from today's analog dialup environment to the fast-growing multiservices environment. Integrated CSU/DSU enables use of T1/E1 ports for backhaul directly from server. |
| 12-in-1 protocol, 4-2MB, serial ports on quad and octal PRI cards | 12 different protocols supported for backhaul or lease line termination. In a distributed environment, 8 PRI can be used for incoming call termination with the serial ports used for backhaul to a central location. Eliminates the need and cost for external switches and routers. |
| Modem management including modem statistics, real-time call-in-progress, monitoring modem activity log, modem time hard/soft busy out, modem firmware up-grade, and so on | Monitors modem call progress and statistics in real time to reduce problem detection and resolution. |
| Redundant internal power supply | The load sharing, internal, redundant power supply has an MTBF of over 500,000 hours which provides network managers with unmatched reliability and confidence that their Cisco remote access network will stay working 100% year after year. |
| Flexible, dual-bank Flash architecture | Reduces software upgrade time and allows the storage of multiple software images in the same chassis |
| Full Cisco IOS support | Provides the widest array of networking and routing protocol support in the industry for large scale deployment |
| Remote management of CSU, router, and modem components | Centralizes network management to reduce operating cost |
| Scalable chassis with Multilink Multichassis PPP capable of carrying increased density and higher-speed traffic | Allows customers to start small and stack additional servers as required, while still being able to dial into one call center |
| Virtual private network (VPN) with Layer 2 Forwarding (L2F) and Layer 2 Tunneling Protocol (L2TP) | Enabling ISP's to offer VPN services to corporations and other ISP's, thus allowing:<br>• Increased revenue through an outsourced vendor offering<br>• The sharing of large dial pools and core infrastructure costs<br>• Secured transactions across a public network<br>• Support investments in non-IP protocol applications |
| WAN optimization including compression, routing filters, snapshot routing, and dial-on-demand routing | Helps customers to reduce WAN costs the single largest cost of internetwork operation |
| Security management including TACACS+, RADIUS, access lists, and violation logging | Provides comprehensive security throughout customer's core network infrastructure |
| R2 signaling in Channelized E1 Environments global | Enables worldwide deployment for global service providers |

Figure 1 AS5300 Front Panel

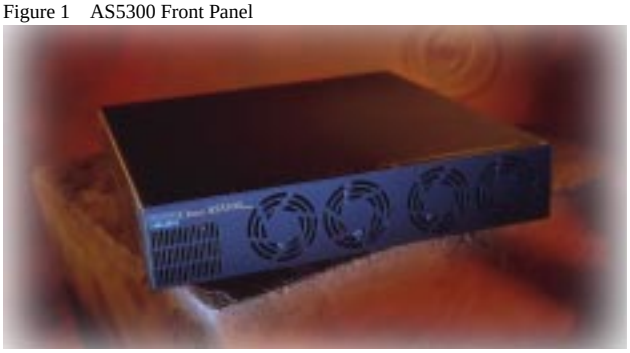

Figure 2 AS5300 Rear Panel

## AS5300 Technical Specifications

| | |
|---|---|
| Processor Type | 150-MHz R4700 |
| Memory | Up to 128 main DRAM and 16M Packet DRAM |
| Flash Memory | Up to 8M boot Flash<br>Up to 16M system Flash, single or dual bank 32m |
| Chassis Slots | 3 |
| Ethernet (RJ45) | 2 (one 10MB, one 10/100MB) |
| ISDN PRI/T1 or ISDN PRI/E1 | Up to 8 trunks |
| Channelized T1/E1 | Up to 8 trunks |
| Other Standard Components | Power Supply and cord, console cable, two RJ-48C cables, carrier card tool |

## Modem Specifications

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|---|---|
| 56K Modems | Up to 192 (T1) or 240 (E1) |
| Modem Protocols Supported | V.90 standard supporting rates of 56000 to 28000 in 1,3333-bps increments<br>Fax out (transmission) Group 3, standards EIA 2388 Class 2 and EIA 592 Class 2.0, at modulations V.33, V.17, V.29, V.27ter, and V.21<br>Rockwell K56flex at 56000 to 32000 in 2000 bps increments ITU-T V.34 Annex 12 at 33600 and 31200 bps<br>ITU-T V.34 at 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400 bps<br>V.32bis 14400, 12000, 9600, 7200, 4800; V.32 9600, 4800; V.22bis 2400, 1200; V.21 300; Bell 103, 300; V.22 1200; V.23 1200/75<br>ITU-T V.42 (including MNP 2-4 and LAPM) Error Correction<br>ITU-T V.42bis (1K nodes) and MNP 5 Data Compression<br>async mode PPP |
| **ISDN Protocols Supported** | sync mode PPP<br>V.120<br>V.110 at rates up to 38400 bps<br>X.75 (a.k.a. dial-up X.25 and LAPB TA) |

## Dimensions/Weight

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|---|---|
| Dimensions (H x W x D) | 3.4 in. x 17.5 in. x 18.25 in. |
| Weight | 32 lb. (12 kg) |

## Environmental Conditions and Power Requirements

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|---|---|
| Operating temperature | 32 to 104oF (0 to 40oC) |
| Non-operating temperature | -40 to 185oF (-40 to 85o C) |
| Operating humidity | 5 to 95%, noncondensing |
| Noise level | 34 dB1 @ 3 feet (0.914 m) |
| Input voltage, AC power supply | 100 to 240 VAC2 |
| Current | 1.5 to 3.0A |
| Frequency | 50/60 Hz |
| Power Factor | 0.80 to 0.95 |
| Input AC Power | 200 to 400W (maximum) |
| Input voltage, DC power supply | -48 to -68 VDC |
| Maximum input current | 6.0A |
| Typical input current | 3.0 to 4.0A |
| Efficiency | 63% |
| Input DC Power | 200 to 400W (maximum) |
| Protection | Current limit, over power, over temperature |
| Output voltage | (latch off) |
| Output voltage | 3.3 VDC |
| Output voltage | 5.0 VDC |
| Output voltage | 12.0 VDC |
| Peak Output Power | -12.0 VDC |
| Typical Output Power | 320W |
| Ripple and noise | 250W under 200 mv at board level |
| WAN interface options | Quad T1/PRI (RJ-45) w/ four 12-in-1 serial (mini SCSI)<br>Quad E1/PRI (RJ-45) w/ four 12-in-1 serial (mini SCSI)<br>Octal T1/PRI (RJ-45) w/ four 12-in-1 serial (mini SCSI)<br>Octal E1/PRI (RJ-45) w/ four 12-in-1 serial (mini SCSI) |
| Console and auxiliary ports | Asynchronous serial (RJ-45) |
| Power supply options | Single internal AC power supply<br>Single internal DC power supply<br>Dual redundant internal AC power supply<br>Dual redundant internal DC power supply |

## Regulatory Compliance

**Safety Certifications**

- UL 1950, third edition
- CSA 950, third edition
- EN 60950, with amendments 1, 2, and 3
- IEC 950
- AS/NZS 3260
- TS 001

**Electromagnetic Emissions Certifications**

- EN 55022B
- NZ/AS3548B
- VCCI II
- FCC A

**Immunity**

- 1000-4-2 (electrostatic discharge)
- 1000-4-3 (radiated immunity)
- 1000-4-4 (electrical fast transients)
- 1000-4-5 (surge)
- 1000-4-6 (conducted immunity)

**PTT Certifications**

- CTR 4
- CTR 12/13
- JATE
- TS 014
- SS 63 63 34
- PD 7024
- BE/SP-103
- HKT CR11 and CR13
- FCC Part 68
- CS-03


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