Ascend

COMPETITIVE ANALYSIS

Ascend MAX 6000 vs. Key Competitor's

Ascend Competitive Marketing Group

ASCEND

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1. MAX™ 6000 Competitive Environment

Key Competitors

Shiva LanRover Access Switch
Cisco AS5300
Livingston PortMaster3
3Com/USR Total Control Hub/HiPer Access system
Bay Networks Adapteon 5000 and 5399 RAC module

2. Key Competitors' Product Description

Shiva LanRover Access Switch

- Modular, 11-slot remote access server with three slots dedicated for internal processing /network interface/control functions and eight slots for integrating digital modems, T1 and PRI
- LAN-to-LAN routing support for IP, IPX and Appletalk
- Support for up to 72 modems and four T1/E1/PRI per box
- Number of ports per modem card is 12; single T1/PRI and dual T1/PRI cards are available
- Remote-node client software for user-to-LAN application
- Multiprocessing architecture over a TDM backplane (256 64 Kbps channels)
- Support for integrated analog/ISDN
- Support for 56K (K56flex technology)

Pricing

List Price per port (maximum 72 modem configuration): $708

Cisco Systems AS5300 Universal Access Server

- Modular, 3-slot system for integrating digital modems, T1 and PRI. The modem technology is available from Microcom (OEM partner) or MICA (from Telebit acquisition)
- LAN-to-LAN routing support for IP, IPX and Appletalk
- Support for up to 96 modems and four T1/PRI cards per box
- Support for integrated analog/ISDN (96 concurrent sessions)
- Supports one Ethernet, one 10/100 Ethernet and two serial interfaces
- Support for K56flex technology

Pricing

List Price per port (maximum modem configuration): $575[1]

[1] Includes modem management and additional DRAM cost

Livingston PortMaster 3 (PM3)

- Support for up to 48 modems and two PRI per box currently; only 46 concurrent sessions due to lack of NFAS
- Number of ports per modem card is eight or ten; single PRI card, upgradable to dual PRI
- Distributed processing based on Intel 486 processors
- Support for integrated analog/ISDN (46 concurrent sessions currently)
- Announced future support for Frame Relay
- 56K modem upgrade based on Lucent chip set (K56flex)

Pricing

List price per port (maximum modem configuration): $508

3Com/US Robotics Total Control

USR's Total Control HiPer Access System is a 16-slot modular product that supports up to 14 T1/PRI ports and up to 336 modem ports. The product is designed to support LAN-to-LAN routing for IP and IPX and user-to-LAN via client application software. With a configuration of four T1/PRI, the Total Control chassis is capable of supporting 96 modems.

The HiPer Access Total Control hub has two hardware components:

1. HiPer DSP Card — 12 DSPs that can process two remote calls each (24 sessions per card)
2. HiPer Access Router Card — routes all incoming calls based on new, internally developed, routing software (replaces old Livingston code)

Fully configured, a Total Control Hub with 14 HiPer DSP cards and two load sharing HiPer Router cards can support up to 336 calls (V.34, 56K or ISDN) and dual 10/100Base-T Ethernet interfaces within the USR Total Control Hub (TCH) chassis.

Pricing

List price per port (96 modem configuration): $652
List price per port (336 modem maximum configuration): $558

Bay Networks Adapteon 5000 and 5399 Remote Access Concentrator Card

The System 5000 Adapteon is the same product as Bay Networks System 5000 intelligent switching hub. It has four modules available for remote access needs: Remote Annex/Asynch (5390), Remote Annex/CT1 (5391), Remote Annex/PRI (5393) and the new Remote Access Concentrator (5399). These modules can be integrated with other routing, switching and bridging modules on the System 5000 Intelligent Hub.

The 5399 module (introduced spring/summer '97) includes the embedded DSP software obtained through Bay's acquisition of Penril's DSP technology. The digital modems support X2 or K56flex.

The 5000 MSX is available as a 14-slot chassis, or an 8-slot chassis (model 5005) — one slot is reserved for the supervisory (controller) module and another slot reserved for the management module. It supports Ethernet, Token Ring, FDDI and ATM connectivity. Four 5000 MSX Chassis comprise a Telco rack.

- Remote Access Concentrator (5399) module
  - T1 version supports 48 digital modems or two channelized T1/PRI interfaces per module, 576 sessions per chassis, 2,304 sessions per Telco rack
  - E1 version supports 62 digital modems or two channelized E1/PRI interfaces per module, 744 sessions per chassis, 2,880 per Telco rack

Pricing

List price per port (96 port modem configuration): $556
List price per port (576 port modem maximum configuration): $440

3. Ascend MAX 6000 Competitive Advantages

- High-performance, multiservice, multiprotocol WAN access concentrator at a low entry price
- Optional software for multiprotocol support, remote-node client software, LAN-based desktop out-dial and Firewall; software includes ease-of-use GUI configurator
- Ability to mix and match old and new digital modem cards within the same chassis providing total investment protection
- High-density modem integration and mixed analog/ISDN sessions: Ascend's MAX line can integrate up to a maximum of 96 modems and provide up to 96/120 concurrent sessions of analog/ISDN.
- Most comprehensive set of security features including extended RADIUS dictionary (over 120 enhancements)
- Proven track record and investment protection: Ascend has the largest installed base of integrated access switches and has been shipping high density access concentrators for over three years. Ascend has installed over 3 million digital ports and over 1.5 million digital modems worldwide. Customers can be assured of investment protection because of Ascend's commitment to developing scalable, compatible and high-performance platform solutions.
- Support for all WAN access protocols – V.34, K56Flex, Switched 56, DDS 56, T1/FT1, E1, ISDN BRI and PRI, and Frame Relay
- Support for voice over IP, voice over Frame Relay and videoconferencing
- Dynamic, integrated firewall capability
- Support for standards-based VPN including PPTP, IPSec and L2TP
- MP+ and Multi-chassis MP+ support with the introduction of MAX Stack — a feature which maximizes bandwidth availability by enabling multiple MAX WAN access switches to function together as one logical switch for Multilink PPP calls, Ascend has clearly established itself as the only remote access vendor providing comprehensive bandwidth management features.
- Support for IDSL technology
- Comprehensive network management with Ascend's NavisAccess™ multi-vendor solution

4. Major Weaknesses of Competitor's Products

Shiva LanRover Access Switch

- High entry price; higher on a per port basis for most configurations vs. the Ascend MAX 6000. The MAX 6000 provides low-entry solution, lower per-port prices while adding substantially higher value in terms of features and functionality.
- Incomplete WAN access protocol support set — cannot support Frame Relay, ISDN BRI
- Lower modem density compared to the MAX 6000 (72 Vs.96) in its current offering
- No dynamic firewall capability and provides limited RADIUS capability (very limited RADIUS implementation compared to the MAX 6000)
- Not capable of doing transparent bridging for non-routable protocols
- Shiva has no track record with high-end access switches and has very limited ISP experience. It has no proven record in the field, whereas the MAX product line has a track record of 3+ years with the largest installed base of integrated WAN access systems.
- The LanRover product line has a history of reliability problems with its integrated modems. A recent survey of end-users by a major market research firm revealed this concern with the Shiva LanRover products.
- No xDSL support yet
- No end-to-end multi-device/multi-vendor network management: Limited management capabilities for managing a single device only

Cisco AS5300

- Cisco AS5300 is a loosely integrated solution — mix of technologies from different vendors (modems from Microcom or Telebit and terminal server technology from Livingston)
- No dynamic firewall capability and provides limited RADIUS capability compared to the MAX 6000
- Cisco has no track record with high-end access switches. It has no proven record in the field, whereas the MAX product line has a track record of 3+ years with the largest installed base of integrated WAN access systems
- Modem management software is separate from IOS and requires extra memory
- MultiChassis MP requires an external router to work (Cisco recommends this)
- No DSL support yet
- No 56K support yet
- No end-to-end multi-device/multi-vendor network management: Limited management capabilities for managing a single device only

Livingston PortMaster 3 (PM3)

- Lower product capacity compared to the MAX 6000. The PM3 supports up to two PRI — a maximum 46 ISDN or analog channels (no NFAS yet). The MAX supports up to 96 analog modems.
- Upgrading from a single PRI to dual PRI requires replacement of the motherboard — an extremely tedious process and may require set-up and configuration from scratch. In the case of the MAX 6000, the upgrade does not require any hardware change-out.
- Limited routed protocol support; PM 3 does not yet support RIP2, which allows ISPs to support Variable Length Subnet Masks (VLSM). Without support for VLSM, ISP's cannot segment or concatenate Class C address subscribers. Livingston's forte has not been in developing routing software. It will take a few iterations for Livingston to develop this code and get it right.
- No Support for D-Channel Sharing (NFAS) - The MAX allows multiple PRIs to share D-channel signaling. This allows for cost-effective addition of B channel per PRI.
- Livingston supports stand-alone firewall and static filters only; it does not have built-in (integrated) firewall and dynamic filtering capability.
- No comprehensive RADIUS extensions as in the Ascend MAX solution. Overall, Livingston provides very limited security options.
- Not an industrial strength, reliable system — no redundant power supplies and NEBS compliance
- No support for DSL technology
- No end-to-end multi-device/multi-vendor network management: Limited management capabilities for managing a single device only

3Com/US Robotics Total Control

- Incomplete WAN access protocol support set — cannot support ISDN BRI
- Limited RADIUS support, the MAX product family provides over 120 extensions
- Not capable of doing transparent bridging for non-routable protocols
- No support for MP+
- No integrated, dynamic firewall capability
- Proprietary 56K (x2) architecture
- No end-to-end multi-device/multi-vendor network management: Limited management capabilities for managing a single device only

Bay Networks Adapteon 5000 with 5399 RAC Module

- Bay has no track record with high-end access switches and has limited ISP/Carrier experience — the MSX5399 with Penril digital modems is new to market with no track record.
- Limited WAN connectivity: No support for ISDN BRI, Frame Relay
- Limited Carrier Network support: No PRI to T1 signaling conversion and D4 to ESF conversion
- No bonding of B-channels between multiple modules or chassis
- Limited security: No dynamic, integrated firewall capability (supports stand-alone firewall and static filters only), no TACACS/TACACS+, no CLID, no extended RADIUS
- No end-to-end multi-device/multi-vendor network management: Limited management capabilities for managing a single device only and Optivity software is premium priced (can add to the per port cost by up to $300)
- No support for DSL technology

5. Comparison of Key Features

Feature	MAX 6000	Shiva LanRover Access Switch	Cisco AS5300	Livingston PM3	USR Total Control HiPer Access	Bay Networks Adapteon
List Price per Port/Density						
Modems/box	8 to 96	12 to 72	12 to 96	48**	24 to 336	8 to 576
Price/modem at maximum configuration or as stated	$571	$708	$575*	$508	$652 (96 port) $558 (max config.)	$556 (96 port) $440 (max config.)
WAN Connectivity/Bandwidth Management						
T1/E1	Yes	Yes	Yes	Yes	Yes	Yes
V.34	Yes	Yes	Yes	Yes	Yes	Yes
ISDN BRI	Yes	No	No	No	No	No
ISDN PRI	Yes	Yes	Yes	Yes	Yes	Yes
PPP	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay option	Yes	No	Yes	No	Yes	No
MP	Yes	Yes	Yes	Yes	Yes	Yes
MPP	Yes	No	No	No	No	No
MultiChassis MP	Yes	No	Yes	Yes	No	No
MultiChassis MP+	Yes	No	No	No	No	No
Hardware data compression	Yes	No	No	Yes	No	No
K56Flex compatible	Yes	Yes	Yes	Yes	No (x2)	Yes
LAN Interface Support						
10/100Base-T	Yes	No	No	No	Yes	Yes
Security						
PAP/CHAP	Yes	Yes	Yes	Yes	Yes	Yes
Dynamic Firewall	Yes	No	No	No	No	No
RADIUS	Yes	Yes	Yes	Yes	Yes	Yes
Extended RADIUS	Yes	No	No	No	No	No
Integrated Firewall	Yes	No	No	No	No	No
VPN Tunneling Support						
ATMP	Yes	No	No	No	No	No
PPTP	Yes	Yes	No	No	Yes	No
L2TP	Yes	No	No	No	No	Yes
L2F	Future	Yes	Yes	No	No	No
IPSec	Future	No	Yes	No	No	Yes

Management and Control						
Full SNMP MIB support	Yes	Yes	Yes	Yes	Partial	Yes
Modem round-robin allocation	Yes	No	No	No	No	No
GUI configurator	Yes	Yes	Yes	Yes	Yes	Yes
Total network management	Yes	No	No	No	No	No
QoS reporting	Future	No	Yes	No	No	Yes
Multivendor router/switch support	Yes	No	No	No	No	No
Complete discovery and mapping	Yes	No	No	No	No	No
Multi-user, client server	Yes	No	No	No	No	No
Enterprise Support						
IP	Yes	Yes	Yes	Yes	Yes	Yes
IPX	Yes	Yes	Yes	Yes	Yes	Yes
AppleTalk	Yes	Yes	Yes	No	No	No
Client software	Yes	Yes	No	No	Yes	Yes
Dial-out	Yes	Yes	No	Yes	No	No

**includes modem management software/DRAM)*

***46 concurrent sessions*

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