

ASCEND ACCESS CONTROL VS. SHIVA'S UNIVERSAL ACCESSMANAGER

Confidential Release 1.0

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1.0 INTRODUCTION

This document details the differences between Ascend Access Control,[™] a comprehensive network-wide security management and authentication solution and Shiva's recently announced Universal AccessManager, an authentication server.

Ascend Access Control and Access Control Manager are part of Ascend's comprehensive security architecture that includes Secure Access[™] Firewall and encryption. Ascend Access Control is a standards-based (RADIUS), highly secure, flexible and scalable network-wide security and authentication solution. It is ideal for small to large corporations, ISPs and carriers. The ODBC support enables authentication and management of hundreds and thousands of users from central or distributed databases, while the extensive token card security support addresses the security needs of corporate America. Access Control includes accounting information that is necessary to bill customers and to analyze the data traffic across the network. Access Control Manager, a Java-based GUI, simplifies the configuration and management of Access Control. The entire product is priced at \$3,000 for unlimited number of users.

Shiva recently announced its own version of RADIUS product called Universal AccessManager. This product is essentially the same shareware program that was available off of a web site in Hong Kong until late summer 1996. It runs mainly on Windows platforms and does not run on any of the UNIX platforms. Since it was originally a shareware program, it supports only limited RADIUS attributes, making it a basic authentication program at a very high price (\$19,000+). Unless Windows NT domain controller authentication is used in conjunction with Shiva's product, the Universal AccessManager is not scalable since the user information is on a flat text file.

2.0 ASCEND ACCESS CONTROL: COMPETITIVE ADVANTAGES

Ascend Access Control software is based on Merit Networks, Inc. version 3.0 release, a well proven implementation used commercially for years by the University of Michigan. Merit is considered to be a de facto standard for RADIUS and well recognized in the industry. Access Control:

- Runs on a wide range of UNIX platforms (SunOS, Solaris, HP UX and IBM AIX) as well as Windows NT platforms by end 1996.
- Includes Proxy-RADIUS, which is a key requirement for carriers and ISPs who want to offer Virtual Private Networking and intranet services
- Includes Ascend Intranet Authentication, which simplifies intranet and VPN authentication and offers additional flexibility
- Realm-based authentication is ideal for corporations and ISPs who want to segment departments and VPN services in small scale
- It is ODBC-compliant and can communicate with other commercially available databases such as Oracle, Sybase, Informix, IBM DB2 for scalability
- Includes Java-based point-and-click interface for easier configuration and management of users; templates may be created and new users added with a click of a button.
- Offers extensive token card security support, a major requirement for corporate-America; includes support of Security Dynamics' ACE/Server, AssureNet (Digital) Pathways' Defender, Enigma Logic's SafeWord, Bellcore S/Key, Cryptocard
- Includes the necessary client libraries for the token card security and makes it extremely easy on customers
- Support of a wide range of third party authentication servers: RADIUS, TACACS, TACACS+, AFS Kerberos, MIT Kerberos, UNIX password

- NT domain-based authentication is planned for end of December 1996
- Supports Secured Dynamic Bandwidth Allocation (MPP, MP+)
- Includes both analog and digital user authentication
- Includes support for the popular Ascend Dictionary of enhanced attributes.

3.0 COMPETITIVE MATRIX (ACCESS CONTROL VS SHIVA'S UNIVERSAL ACCESSMANAGER)

Feature	Ascend	Shiva	Remark
Software Base	Merit	Shareware	Ascend's product was from a well proven implementation used commercially for years by University of Michigan; Shiva's product was based on a shareware program
Platforms supported			
SunOS	YES	-	
Solaris (Sun Sparc)	YES	-	
Solaris (Intel)	YES	-	
HP-UX	YES	-	
IBM-AIX	YES	-	
Windows NT	End of '96	YES	
Windows '95		YES	
Windows 3.11		YES	
ODBC-compliant	YES	-	
Graphical User Interface	YES	YES	Ascend: Java based GUI Shiva: Windows shareware type GUI
Proxy-Radius	YES	-	
Ascend Intranet Authentication	YES	-	
Realm-based authentication	YES	-	
AFS Kerberos	YES	-	
MIT Kerberos	YES	-	
NT Domain-based Authentication	End of '96	YES	
UNIX Password	YES	YES	

Feature	Ascend	Shiva	Remark
Token Card Security Support			
Security Dynamics	YES	-	
Enigma Logic	YES	-	
AssureNet (Digital) Pathways	YES	-	
Cryptocard	YES	-	
Bellcore S/Key	YES	-	
Client Libraries Included	YES	-	
Includes TACACS+/ TACACS Modules	-	Optional	Ascend Access Control can talk to TACACS+, TACACS servers
Accounting	YES	Optional	
Integration with MS Excel/Access	Future	YES	
Analog User Authentication	YES	YES	
Digital User Authentication	YES	limited	Shiva doesn't support MPP, MP+ etc.
Per User Authorization			
Data Filters	YES	-	
Call Filters	YES	-	
Generic Filters for IPX, NetBuei etc.	YES	-	
Immediate Telnet	YES	-	
Pricing			
Unlimited Number of Users (Authentication/Accounting)	\$3,000	\$19,000	
Security Dynamics Support	Included	\$1,000	Shiva has announced it for the future
AssureNet Pathways Support	Included	\$1,000	Shiva has announced it for the future
Enigma Logic Support	Included	\$1,000	Shiva has announced it for the future
Bellcore S/Key Support	Included	-	
Cryptocard Support	Included	-	

Feature	Ascend	Shiva	Remark
Network Features			
Framed MP+ (incoming)	YES	-	
Framed MP+ (outgoing)	YES	-	
Framed Protocol EURAW	YES	-	
Framed protocol EUUI	YES	-	
Framed Protocol - Frame Relay (RFC 1490)	YES	-	
Callback	YES	YES	
Calling Line ID	YES	YES	
Global IP Address Management	YES	-	
Routing/Bridging Selection	YES	-	
Secured Dynamic Bandwidth Allocation	YES	-	
IP-direct	YES	-	
Frame Relay Direct	YES	-	
Async Control Map Management	YES	-	
Password Expiry	YES	-	
Framed IPX network #	YES	-	
Configurable Banner Messages	YES	-	

4.0 SHIVA'S UNIVERSAL ACCESSMANAGER

Shiva's Universal AccessManager was based on the shareware program that was available through a Web site in Hong Kong until late summer 1996. It includes RADIUS, TACACS/XTACACS and TACACS+. It runs on Windows 3.X, Windows '95 and Windows NT platforms. It does offer a shareware style GUI.

The product is targeted mainly at corporate organizations and (start-up) ISPs.

Shiva has separated the product into various modules:

1. Primary Universal AccessManager (RADIUS-based software)
2. Optional secondary Universal AccessManager
3. Optional RADIUS/TACACS module (for primary/secondary servers)
4. Optional accounting module
5. Installation and configuration module for authentication
6. Installation and configuration module for accounting
7. Optional modules for Security Dynamics' ACE/Server
8. Optional modules for Enigma Logic's SafeWord server
9. Optional modules for AssureNet Pathways' Defender support
10. Customization of Optional Accounting Module

The currently released product includes the following features:

- Platforms supported: Windows 3.X, Windows '95 and Windows NT
- Windows GUI for configuration
- Integration of Microsoft Access/Excel to allow exporting of accounting data to Access/Excel
- Windows NT domain authentication and UNIX password
- Installable as Windows NT service
- Authentication based on 'Time of Day' through Windows NT

Features planned for 1996

- Token card security (Security Dynamics, Enigma Logic and AssureNet Pathways)
- Netware Bindery and NDS
- External accounting tool set based on MS Access database
- ODBC interface to support external databases
- Graphical management statistics

Features planned for March 1997

- UNIX version of RADIUS
- Remote management
- Hot redundancy through distributed databases
- Web integration

Pricing***Primary Universal AccessManager without TACACS module:***

No. of users	List price
500	\$4,000
2,500	\$5,000
5,000	\$7,000
7,500	\$9,000
10,000	\$12,500
Unlimited	\$15,000

Primary Universal AccessManager with TACACS module:

No. of users	List price
500	\$6,000
2,500	\$7,000
5,000	\$9,000
7,500	\$11,000
10,000	\$14,500
Unlimited	\$17,000

Secondary Universal AccessManager without TACACS module:

No. of users	List price
500	\$3,000
2,500	\$3,750
5,000	\$5,250
7,500	\$6,750
10,000	\$9,375
Unlimited	\$11,250

Primary Universal AccessManager with TACACS module:

No. of users	List price
500	\$4,500
2,500	\$5,250
5,000	\$6,750
7,500	\$8,250
10,000	\$10,875
Unlimited	\$12,750

Accounting Module:	\$4,000
Security Dynamics Module:	\$1,000
AssureNet Pathways Module:	\$1,000
Enigma Logic Module:	\$1,000

Support (contract) and Service charges:

Up to 5 incidents per year: \$1,500

Up to 10 incidents per year: \$2,850

Up to 20 incidents per year: \$5,100

Upgrade pricing

Upgrade from one user-license to another (i.e. 500 users to 2,500 users) is the difference in price times 1.25.

APPENDIX-A: LIST OF ATTRIBUTES - ASCEND ACCESS CONTROL

```
#
# This file pertains to Ascend MAX/Pipeline software
# version 4.5 and later.
#
# This file contains dictionary translations for parsing
# requests and generating responses. All transactions are
# composed of Attribute/Value Pairs. The value of each attribute
# is specified as one of 4 data types. Valid data types are:
#
# string - 0-253 octets
# abinary - 0-254 octets
# ipaddr - 4 octets in network byte order
# integer - 32 bit value in big endian order (high byte first)
# date - 32 bit value in big endian order - seconds since
# 00:00:00 GMT, Jan. 1, 1970
#
# Enumerated values are stored in the user file with dictionary
# VALUE translations for easy administration.
#
# Example:
#
# ATTRIBUTE VALUE
# -----
# Framed-Protocol = PPP
# 7 = 1 (integer encoding)
#
ATTRIBUTE      User-Name      1      string
ATTRIBUTE      Password      2      string
ATTRIBUTE      Challenge-Response 3      string
ATTRIBUTE      NAS-Identifier 4      ipaddr
ATTRIBUTE      NAS-Port      5      integer
ATTRIBUTE      User-Service   6      integer
ATTRIBUTE      Framed-Protocol 7      integer
ATTRIBUTE      Framed-Address 8      ipaddr
ATTRIBUTE      Framed-Netmask 9      ipaddr
ATTRIBUTE      Framed-Routing 10     integer
ATTRIBUTE      Framed-Filter  11     string
ATTRIBUTE      Framed-MTU     12     integer
ATTRIBUTE      Framed-Compression 13    integer
ATTRIBUTE      Login-Host     14     ipaddr
ATTRIBUTE      Login-Service  15     integer
ATTRIBUTE      Login-TCP-Port 16     integer
ATTRIBUTE      Change-Password 17     string
ATTRIBUTE      Reply-Message  18     string
ATTRIBUTE      Callback-Number 19     string
ATTRIBUTE      Callback-Name  20     string
ATTRIBUTE      Ascend-PW-Expiration 21    date
ATTRIBUTE      Framed-Route   22     string
ATTRIBUTE      Framed-IPX-Network 23    integer
ATTRIBUTE      State         24     string
ATTRIBUTE      Class         25     string
```

ATTRIBUTE	Vendor-Specific	26	string
ATTRIBUTE	Client-Port-DNIS	30	string
ATTRIBUTE	Caller-Id	31	string
ATTRIBUTE	Acct-Status-Type	40	integer
ATTRIBUTE	Acct-Delay-Time	41	integer
ATTRIBUTE	Acct-Input-Octets	42	integer
ATTRIBUTE	Acct-Output-Octets	43	integer
ATTRIBUTE	Acct-Session-Id	44	string
ATTRIBUTE	Acct-Authentic	45	integer
ATTRIBUTE	Acct-Session-Time	46	integer
ATTRIBUTE	Acct-Input-Packets	47	integer
ATTRIBUTE	Acct-Output-Packets	48	integer
#			
#	Ascend defined attributes used for MAX/Pipeline configuration		
#			
#	Connection Profile items		
#ATTRIBUTE	Ascend-Station	see	User-Name
#ATTRIBUTE	Ascend-Encaps	see	Framed-Protocol
#ATTRIBUTE	Ascend-IP-Address	see	Framed-Address
#ATTRIBUTE	Ascend-Netmask	see	Framed-Netmask
#ATTRIBUTE	Ascend-IPX-Network	see	Framed-IPX-Network
#			
ATTRIBUTE	Ascend-Bridge-Address	168	string
ATTRIBUTE	Ascend-TS-Idle-Limit	169	integer
ATTRIBUTE	Ascend-TS-Idle-Mode	170	integer
ATTRIBUTE	Ascend-DBA-Monitor	171	integer
ATTRIBUTE	Ascend-Base-Channel-Count	172	integer
ATTRIBUTE	Ascend-Minimum-Channels	173	integer
#	IPX Static Routes		
ATTRIBUTE	Ascend-IPX-Route	174	string
ATTRIBUTE	Ascend-FT1-Caller	175	integer
ATTRIBUTE	Ascend-Backup	176	string
ATTRIBUTE	Ascend-Call-Type	177	integer
ATTRIBUTE	Ascend-Group	178	string
ATTRIBUTE	Ascend-FR-DLCI	179	integer
ATTRIBUTE	Ascend-FR-Profile-Name	180	string
#			
ATTRIBUTE	Ascend-Ara-PW	181	string
ATTRIBUTE	Ascend-IPX-Node-Addr	182	string
ATTRIBUTE	Ascend-Home-Agent-IP-Addr	183	ipaddr
ATTRIBUTE	Ascend-Home-Agent-Password	184	string
ATTRIBUTE	Ascend-Home-Network-Name	185	string
ATTRIBUTE	Ascend-Home-Agent-UDP-Port	186	integer
#			
ATTRIBUTE	Ascend-Multilink-ID	187	integer
ATTRIBUTE	Ascend-Num-In-Multilink	188	integer
ATTRIBUTE	Ascend-First-Dest	189	ipaddr
ATTRIBUTE	Ascend-Pre-Input-Octets	190	integer

ATTRIBUTE	Ascend-Pre-Output-Octets	191	integer
ATTRIBUTE	Ascend-Pre-Input-Packets	192	integer
ATTRIBUTE	Ascend-Pre-Output-Packets	193	integer
ATTRIBUTE	Ascend-Maximum-Time	194	integer
ATTRIBUTE	Ascend-Disconnect-Cause	195	integer
ATTRIBUTE	Ascend-Connect-Progress	196	integer
ATTRIBUTE	Ascend-Data-Rate	197	integer
ATTRIBUTE	Ascend-PreSession-Time	198	integer
ATTRIBUTE	Ascend-Token-Idle	199	integer
ATTRIBUTE	Ascend-Token-Immediate	200	integer
ATTRIBUTE	Ascend-Require-Auth	201	integer
ATTRIBUTE	Ascend-Number-Sessions	202	string
ATTRIBUTE	Ascend-Authen-Alias	203	string
ATTRIBUTE	Ascend-Token-Expiry	204	integer
ATTRIBUTE	Ascend-Menu-Selector	205	string
ATTRIBUTE	Ascend-Menu-Item	206	string
#	Radius Password Expiration Options		
ATTRIBUTE	Ascend-PW-Warntime	207	integer
ATTRIBUTE	Ascend-PW-Lifetime	208	integer
ATTRIBUTE	Ascend-IP-Direct	209	ipaddr
ATTRIBUTE	Ascend-PPP-VJ-Slot-Comp	210	integer
ATTRIBUTE	Ascend-PPP-VJ-1172	211	integer
ATTRIBUTE	Ascend-PPP-Async-Map	212	integer
ATTRIBUTE	Ascend-Third-Prompt	213	string
ATTRIBUTE	Ascend-Send-Secret	214	string
ATTRIBUTE	Ascend-Receive-Secret	215	string
ATTRIBUTE	Ascend-IPX-Peer-Mode	216	integer
ATTRIBUTE	Ascend-IP-Pool-Definition	217	string
ATTRIBUTE	Ascend-Assign-IP-Pool	218	integer
ATTRIBUTE	Ascend-FR-Direct	219	integer
ATTRIBUTE	Ascend-FR-Direct-Profile	220	string
ATTRIBUTE	Ascend-FR-Direct-DLCI	221	integer
ATTRIBUTE	Ascend-Handle-IPX	222	integer
ATTRIBUTE	Ascend-Netware-timeout	223	integer
ATTRIBUTE	Ascend-IPX-Alias	224	integer
ATTRIBUTE	Ascend-Metric	225	integer
ATTRIBUTE	Ascend-PRI-Number-Type	226	integer
ATTRIBUTE	Ascend-Dial-Number	227	string
#	Connection Profile/PPP options		
ATTRIBUTE	Ascend-Route-IP	228	integer
ATTRIBUTE	Ascend-Route-IPX	229	integer
ATTRIBUTE	Ascend-Bridge	230	integer
ATTRIBUTE	Ascend-Send-Auth	231	integer
ATTRIBUTE	Ascend-Send-Passwd	232	string
#ATTRIBUTE	Ascend-MRU	see	Framed-MTU
ATTRIBUTE	Ascend-Link-Compression	233	integer
#			
ATTRIBUTE	Ascend-VJ-Compression	see	Framed-Compression
ATTRIBUTE	Ascend-Target-Util	234	integer

ATTRIBUTE	Ascend-Maximum-Channels	235	integer
ATTRIBUTE	Ascend-Inc-Channel-Count	236	integer
ATTRIBUTE	Ascend-Dec-Channel-Count	237	integer
ATTRIBUTE	Ascend-Seconds-Of-History	238	integer
ATTRIBUTE	Ascend-History-Weigh-Type	239	integer
ATTRIBUTE	Ascend-Add-Seconds	240	integer
ATTRIBUTE	Ascend-Remove-Seconds	241	integer
#	Connection Profile/Session options		
#ATTRIBUTE	Ascend-RIP	see	Framed-Routing
ATTRIBUTE	Ascend-Data-Filter	242	abinary
ATTRIBUTE	Ascend-Call-Filter	243	abinary
ATTRIBUTE	Ascend-Idle-Limit	244	integer
ATTRIBUTE	Ascend-Preempt-Limit	245	integer
#	Connection Profile/Telco options		
ATTRIBUTE	Ascend-Callback	246	integer
ATTRIBUTE	Ascend-Data-Svc	247	integer
ATTRIBUTE	Ascend-Force-56	248	integer
ATTRIBUTE	Ascend-Billing-Number	249	string
ATTRIBUTE	Ascend-Call-By-Call	250	integer
ATTRIBUTE	Ascend-Transit-Number	251	string
#	Terminal Server Attributes		
#ATTRIBUTE	Ascend-Terminal-Banner	see	Reply-Message
ATTRIBUTE	Ascend-Host-Info	252	string
#	PPP local address Attribute		
ATTRIBUTE	Ascend-PPP-Address	253	ipaddr
#	MPP percent idle Attribute		
ATTRIBUTE	Ascend-MPP-Idle-Percent	254	integer
#			
#	Integer Translations		
#			
#	User Types		
VALUE	User-Service	Login-User	1
VALUE	User-Service	Framed-User	2
VALUE	User-Service	Dialback-Login-User	3
VALUE	User-Service	Dialback-Framed-User	4
VALUE	User-Service	Dialout-Framed-User	5
VALUE	User-Service	Shell-User	6
#	Framed Protocols		
VALUE	Framed-Protocol	PPP	1
VALUE	Framed-Protocol	SLIP	2
VALUE	Framed-Protocol	ARA	255
VALUE	Framed-Protocol	MPP	256
VALUE	Framed-Protocol	EURAW	257

VALUE	Framed-Protocol	EUUI	258
VALUE	Framed-Protocol	X25	259
VALUE	Framed-Protocol	COMB	260
VALUE	Framed-Protocol	FR	261
#	Framed Routing Values		
VALUE	Framed-Routing	None	0
VALUE	Framed-Routing	Broadcast	1
VALUE	Framed-Routing	Listen	2
VALUE	Framed-Routing	Broadcast-Listen	3
#	Framed Compression Types		
VALUE	Framed-Compression	Van-Jacobsen-TCP-IP	1
#	Login Services		
VALUE	Login-Service	Telnet	0
VALUE	Login-Service	Rlogin	1
VALUE	Login-Service	TCP-Clear	2
VALUE	Login-Service	PortMaster	3
#	Status Types		
VALUE	Acct-Status-Type	Start	1
VALUE	Acct-Status-Type	Stop	2
#	Authentication Types		
VALUE	Acct-Authentic	None	0
VALUE	Acct-Authentic	RADIUS	1
VALUE	Acct-Authentic	Local	2
#	Ascend FR Direct values		
VALUE	Ascend-FR-Direct	FR-Direct-No	0
VALUE	Ascend-FR-Direct	FR-Direct-Yes	1
#	Ascend IPX Handling		
VALUE	Ascend-Handle-IPX	Handle-IPX-None	0
VALUE	Ascend-Handle-IPX	Handle-IPX-Client	1
VALUE	Ascend-Handle-IPX	Handle-IPX-Server	2
#	Ascend IPX Routing Peer Mode		
VALUE	Ascend-IPX-Peer-Mode	IPX-Peer-Router	0
VALUE	Ascend-IPX-Peer-Mode	IPX-Peer-Dialin	1
#	Ascend Call Type Values		

VALUE	Ascend-Call-Type	Nailed	1
VALUE	Ascend-Call-Type	Nailed/Mpp	2
VALUE	Ascend-Call-Type	Perm/Switched	3
#	Ascend FT1 Caller Values		
VALUE	Ascend-FT1-Caller	FT1-No	0
VALUE	Ascend-FT1-Caller	FT1-Yes	1
#	Ascend PRI Number Type Values		
VALUE	Ascend-PRI-Number-Type	Unknown-Number	0
VALUE	Ascend-PRI-Number-Type	Intl-Number	1
VALUE	Ascend-PRI-Number-Type	National-Number	2
VALUE	Ascend-PRI-Number-Type	Local-Number	4
VALUE	Ascend-PRI-Number-Type	Abbrev-Number	5
#	Ascend Route IP Type Values		
VALUE	Ascend-Route-IP	Route-IP-No	0
VALUE	Ascend-Route-IP	Route-IP-Yes	1
#	Ascend Route IPX Type Values		
VALUE	Ascend-Route-IPX	Route-IPX-No	0
VALUE	Ascend-Route-IPX	Route-IPX-Yes	1
#	Ascend Bridge Type Values		
VALUE	Ascend-Bridge	Bridge-No	0
VALUE	Ascend-Bridge	Bridge-Yes	1
#	Ascend TS Idle Modes		
VALUE	Ascend-TS-Idle-Mode	TS-Idle-None	0
VALUE	Ascend-TS-Idle-Mode	TS-Idle-Input	1
VALUE	Ascend-TS-Idle-Mode	TS-Idle-Input-Output	
#	Ascend Send Auth Values		
VALUE	Ascend-Send-Auth	Send-Auth-None	0
VALUE	Ascend-Send-Auth	Send-Auth-PAP	1
VALUE	Ascend-Send-Auth	Send-Auth-CHAP	2
#	Ascend Link Compression Values		
VALUE	Ascend-Link-Compression	Link-Comp-None	0
VALUE	Ascend-Link-Compression	Link-Comp-Stac	1
#VALUE	Ascend-Link-Compression	Link-Comp-Stac-Draft-5	2
VALUE	Ascend-Link-Compression	Link-Comp-MS-Stac	3

#	Ascend History Weigh Type Values		
VALUE	Ascend-History-Weigh-Type	History-Constant	0
VALUE	Ascend-History-Weigh-Type	History-Linear	1
VALUE	Ascend-History-Weigh-Type	History-Quadratic	2
#	Ascend Callback Values		
VALUE	Ascend-Callback	Callback-No	0
VALUE	Ascend-Callback	Callback-Yes	1
#	Ascend Data Svc Values		
VALUE	Ascend-Data-Svc	Switched-Voice-Bearer	0
VALUE	Ascend-Data-Svc	Switched-56KR	1
VALUE	Ascend-Data-Svc	Switched-64K	2
VALUE	Ascend-Data-Svc	Switched-64KR	3
VALUE	Ascend-Data-Svc	Switched-56K	4
VALUE	Ascend-Data-Svc	Switched-384KR	5
VALUE	Ascend-Data-Svc	Switched-384K	6
VALUE	Ascend-Data-Svc	Switched-1536K	7
VALUE	Ascend-Data-Svc	Switched-1536KR	8
VALUE	Ascend-Data-Svc	Switched-128K	9
VALUE	Ascend-Data-Svc	Switched-192K	10
VALUE	Ascend-Data-Svc	Switched-256K	11
VALUE	Ascend-Data-Svc	Switched-320K	12
VALUE	Ascend-Data-Svc	Switched-384K-MR	13
VALUE	Ascend-Data-Svc	Switched-448K	14
VALUE	Ascend-Data-Svc	Switched-512K	15
VALUE	Ascend-Data-Svc	Switched-576K	16
VALUE	Ascend-Data-Svc	Switched-640K	17
VALUE	Ascend-Data-Svc	Switched-704K	18
VALUE	Ascend-Data-Svc	Switched-768K	19
VALUE	Ascend-Data-Svc	Switched-832K	20
VALUE	Ascend-Data-Svc	Switched-896K	21
VALUE	Ascend-Data-Svc	Switched-960K	22
VALUE	Ascend-Data-Svc	Switched-1024K	23
VALUE	Ascend-Data-Svc	Switched-1088K	24
VALUE	Ascend-Data-Svc	Switched-1152K	25
VALUE	Ascend-Data-Svc	Switched-1216K	26
VALUE	Ascend-Data-Svc	Switched-1280K	27
VALUE	Ascend-Data-Svc	Switched-1344K	28
VALUE	Ascend-Data-Svc	Switched-1408K	29
VALUE	Ascend-Data-Svc	Switched-1472K	30
VALUE	Ascend-Data-Svc	Switched-1600K	31
VALUE	Ascend-Data-Svc	Switched-1664K	32
VALUE	Ascend-Data-Svc	Switched-1728K	33
VALUE	Ascend-Data-Svc	Switched-1792K	34
VALUE	Ascend-Data-Svc	Switched-1856K	35
VALUE	Ascend-Data-Svc	Switched-1920K	36
VALUE	Ascend-Data-Svc	Switched-inherited	37

VALUE	Ascend-Data-Svc	Switched-restricted-bearer-x30	38
VALUE	Ascend-Data-Svc	Switched-clear-bearer-v110	39
VALUE	Ascend-Data-Svc	Switched-restricted-64-x30	40
VALUE	Ascend-Data-Svc	Switched-clear-56-v110	41
VALUE	Ascend-Data-Svc	Switched-modem	42
VALUE	Ascend-Data-Svc	Switched-atmodem	43
#	Ascend Force 56 Values		
VALUE	Ascend-Force-56	Force-56-No	0
VALUE	Ascend-Force-56	Force-56-Yes	1
#	Password Expiration		
#	- Sets global password timeout values		
VALUE	Ascend-PW-Lifetime	Lifetime-In-Days	0
VALUE	Ascend-PW-Warntime	Days-Of-Warning	0
#	Ascend PPP VJ 1172		
VALUE	Ascend-PPP-VJ-1172	PPP-VJ-1172	1
#	Ascend PPP VJ Slot compression		
VALUE	Ascend-PPP-VJ-Slot-Comp	VJ-Slot-Comp-No	1
#	Addition authentication		
VALUE	Ascend-Require-Auth	Not-Require-Auth	0
VALUE	Ascend-Require-Auth	Require-Auth	1
VALUE	Ascend-Token-Immediate	Tok-Imm-No	0
VALUE	Ascend-Token-Immediate	Tok-Imm-Yes	1
#	Ascend Dynamic Bandwidth Allocation Monitor		
VALUE	Ascend-DBA-Monitor	Transmit	0
VALUE	Ascend-DBA-Monitor	Transmit-Recv	1
VALUE	Ascend-DBA-Monitor	None	2
#			

APPENDIX-B: LIST OF ATTRIBUTES - SHIVA'S UNIVERSAL ACCESSMANAGER

#			
#	This file contains dictionary translations for parsing		
#	Radius Attribute/Value Pairs. The value of each attribute		
#	is specified as one of 4 data types. Valid data types are:		
#			
#	string - 0-253 octets		
#	ipaddr - 4 octets in network byte order		
#	integer - 32 bit value in big endian order (high byte first)		
#	date - 32 bit value in big endian order		
#			
#			
VENDOR	Spider	24	
VENDOR	Shiva	166	
ATTRIBUTE	Shiva-User-Attributes		1 string
Shiva			
ATTRIBUTE	Nortel-User-Attributes	51	string
ATTRIBUTE	User-Name	1	string
ATTRIBUTE	User-Password	2	string
ATTRIBUTE	CHAP-Password	3	string
ATTRIBUTE	NAS-IP-Address	4	ipaddr
ATTRIBUTE	NAS-Port	5	integer
ATTRIBUTE	Service-Type	6	integer
ATTRIBUTE	Framed-Protocol	7	integer
ATTRIBUTE	Framed-IP-Address	8	ipaddr
ATTRIBUTE	Framed-IP-Netmask	9	ipaddr
ATTRIBUTE	Framed-Routing	10	integer
ATTRIBUTE	Filter-Id	11	string
ATTRIBUTE	Framed-MTU	12	integer
ATTRIBUTE	Framed-Compression	13	integer
ATTRIBUTE	Login-IP-Host	14	ipaddr
ATTRIBUTE	Login-Service	15	integer
ATTRIBUTE	Login-TCP-Port	16	integer
#ATTRIBUTE	Old-Password	17	string
ATTRIBUTE	Reply-Message	18	string
ATTRIBUTE	Callback-Number	19	string
ATTRIBUTE	Callback-Id	20	string
#ATTRIBUTE	Unassigned	21	string
ATTRIBUTE	Framed-Route	22	string
ATTRIBUTE	Framed-IPX-Network	23	integer
ATTRIBUTE	State	24	string
ATTRIBUTE	Class	25	string
ATTRIBUTE	Vendor-Specific	26	string
ATTRIBUTE	Session-Timeout	27	integer
ATTRIBUTE	Idle-Timeout	28	integer
ATTRIBUTE	Termination-Action	29	integer

ATTRIBUTE	Called-Station-Id	30	string
ATTRIBUTE	Calling-Station-Id	31	string
ATTRIBUTE	NAS-Identifier	32	string
ATTRIBUTE	Proxy-State	33	string
ATTRIBUTE	Login-LAT-Service	34	string
ATTRIBUTE	Login-LAT-Node	35	string
ATTRIBUTE	Login-LAT-Group	36	string
ATTRIBUTE	Framed-AppleTalk-Link	37	integer
ATTRIBUTE	Framed-AppleTalk-Network	38	integer
ATTRIBUTE	Framed-AppleTalk-Zone	39	string
ATTRIBUTE	Acct-Status-Type	40	integer
ATTRIBUTE	Acct-Delay-Time	41	integer
ATTRIBUTE	Acct-Input-Octets	42	integer
ATTRIBUTE	Acct-Output-Octets	43	integer
ATTRIBUTE	Acct-Session-Id	44	string
ATTRIBUTE	Acct-Authentic	45	integer
ATTRIBUTE	Acct-Session-Time	46	integer
ATTRIBUTE	Acct-Input-Packets	47	integer
ATTRIBUTE	Acct-Output-Packets	48	integer
ATTRIBUTE	Acct-Terminate-Cause	49	integer
ATTRIBUTE	Acct-Multi-Session-Id	50	string
ATTRIBUTE	Acct-Link-Count	51	integer
ATTRIBUTE	CHAP-Challenge	60	string
ATTRIBUTE	NAS-Port-Type	61	string
ATTRIBUTE	Port-Limit	62	integer
ATTRIBUTE	Login-LAT-Port	63	string
#			
#	Integer Translations		
#			
#	Service Type		
VALUE	Service-Type	Login	1
VALUE	Service-Type	Framed	2
VALUE	Service-Type	Callback-Login	3
VALUE	Service-Type	Callback-Framed	4
VALUE	Service-Type	Outbound	5
VALUE	Service-Type	Administrative	6
VALUE	Service-Type	NAS-Prompt	7
VALUE	Service-Type	Authenticate-Only	8
VALUE	Service-Type	Callback-NAS-Prompt	9
#	Framed Protocols		
VALUE	Framed-Protocol	PPP	1
VALUE	Framed-Protocol	SLIP	2
VALUE	Framed-Protocol	ARAP	3
VALUE	Framed-Protocol	Gandalf-SL/ML	4
VALUE	Framed-Protocol	Xylogics-IPX/SLIP	5

#	Framed IP Address		
VALUE	Framed-IP-Address	Select-by-NAS	255.255.255.254
VALUE	Framed-IP-Address	Select-by-User	255.255.255.255
#	Framed Routing Values		
VALUE	Framed-Routing	None	0
VALUE	Framed-Routing	Send	1
VALUE	Framed-Routing	Listen	2
VALUE	Framed-Routing	Send-Listen	3
#	Framed Compression Types		
VALUE	Framed-Compression	None	0
VALUE	Framed-Compression	VJ-TCP/IP-Header	1
VALUE	Framed-Compression	IPX-Header	2
#	Login Service		
VALUE	Login-Service	Telnet	0
VALUE	Login-Service	Rlogin	1
VALUE	Login-Service	TCP-Clear	2
VALUE	Login-Service	PortMaster	3
VALUE	Login-Service	LAT	4
#	Login IP Host		
VALUE	Login-IP-Host	Select-by-NAS	0.0.0.0
VALUE	Login-IP-Host	Select-by-User	255.255.255.255
#	Termination Action		
VALUE	Termination-Action	Default	0
VALUE	Termination-Action	RADIUS-Request	1
#	NAS Port Type		
VALUE	NAS-Port-Type	Async	0
VALUE	NAS-Port-Type	Sync	1
VALUE	NAS-Port-Type	ISDN-Sync	2
VALUE	NAS-Port-Type	ISDN-Async-V.120	3
VALUE	NAS-Port-Type	ISDN-Async-V.110	4
VALUE	NAS-Port-Type	Virtual	5
#	Status Types		
VALUE	Acct-Status-Type	Start	1
VALUE	Acct-Status-Type	Stop	2
#	Authentication Types		

VALUE	Acct-Authentic	None	0
VALUE	Acct-Authentic	RADIUS	1
VALUE	Acct-Authentic	Local	2
VALUE	Acct-Authentic	Remote	3
#	Acct Terminate Cause		
VALUE	Acct-Terminate-Cause	User-Request	1
VALUE	Acct-Terminate-Cause	Lost-Carrier	1
VALUE	Acct-Terminate-Cause	Lost-Service	1
VALUE	Acct-Terminate-Cause	Idle-Timeout	1
VALUE	Acct-Terminate-Cause	Session-Timeout	1
VALUE	Acct-Terminate-Cause	Admin-Reset	1
VALUE	Acct-Terminate-Cause	Admin-Reboot	1
VALUE	Acct-Terminate-Cause	Port-Error	1
VALUE	Acct-Terminate-Cause	NAS-Error	1
VALUE	Acct-Terminate-Cause	NAS-Request	1
VALUE	Acct-Terminate-Cause	NAS-Reboot	1
VALUE	Acct-Terminate-Cause	Port-Unneeded	1
VALUE	Acct-Terminate-Cause	Port-Preempted	1
VALUE	Acct-Terminate-Cause	Port-Suspended	1
VALUE	Acct-Terminate-Cause	Service-Unavailable	1
VALUE	Acct-Terminate-Cause	Callback	1
VALUE	Acct-Terminate-Cause	User-Error	1
VALUE	Acct-Terminate-Cause	Host-Request	1



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