APX® 1000 Universal Gateway

The APX® 1000 Universal Gateway is a flexible, efficient and extensible access platform that simplifies your delivery of high-demand IP services. A cost-effective solution for converged voice and data, this compact, carrier-grade switch supports diverse services including port wholesaling for dial-up IP with SS7-based Internet call diversion (ICD), as well as VoIP. Uniform capacity ensures consistent performance and density for all of your applications. And universal port technology lets you switch any service on any port at any time.

Applications

Supports IP-based access services such as:

- Wireline and wireless
- Port wholesaling
- VoIP

Features

- Highest throughput and most universal ports in its class per 7-foot rack (10,800 DS0s)
- Universal port technology for "any service, any port, any time" versatility
- Uniform capacity for consistent application performance and density, up to platform's maximum port capacity
- SS7-based ICD for dial-up IP port wholesaling
- Feature-rich True Access® Operating System (TAOS) — over 35 million ports installed worldwide
- Lucent Voice.Natural technology from Bell Labs for enhanced VoIP call quality
- Multiple IP protocol support including H.323, IPDC, V.92 (with V.90), PIAFS (PHS), SIP, H.248, V.110, WORMARQ, M2UA, IUA

Benefits

- **Enhanced customer satisfaction** — maximize IP applications performance and capacity
- **Flexibility** — turn on revenue-generating IP services whenever and wherever you want them
- **Scalability** — deploy your choice of high-speed ingress and egress modules; implement access solutions with support for 96 to 720 DS0s per chassis
- **Reduced capital expenditures** — deliver port wholesaling, VoIP, dial-up IP access and voice services from the same platform
- **Reduced operating and ownership costs** — universal port technology and high port density in a small footprint optimize CO space utilization
- **Carrier-class network reliability** — redundant components maximize uptime and serviceability; stable, carrier-proven TAOS helps sustain high availability
- **Easy to upgrade** — processing modules interchange among Universal Gateway platforms
- **Unmatched investment protection** — universal port capability and a wide range of IP protocols support emerging applications

Lucent Technologies
Bell Labs Innovations

APX® 1000 Universal Gateway

Software Technical Specifications

1. **Operating System**
   True Access® Operating System (TAOS) embedded software technology for edge access platforms including Lucent MAX TNT® and APX® family of Universal Gateway and combines multi-platform support with hardware-specific capabilities

2. **Protocol Support**
   WAN/LAN
   TCP/IP, UDP/IP, SCTP/IP, TCP Clear, PPP, Sync/Async-PPP, HDLC, GRE
   T1: PRI, RBS: Loop-Start, Wink-Start, R1, MF FG-D
   E1: PRI, E1 R2 MF (country-specific call progress tones)
   Routing
   RIP, RIP2, OSPF, BGP4, IGMP
   VPN/tunneling
   ATMP, L2TP, IP in IP, L2F, PPTP, Virtual Routers
   SS7 call control and signaling
   IPDC, E1/T1 tunneling using IPDC, H.248
   Non-SS7 call control and signaling
   H.323v2, SIP, M2UA, IUA
   Fax-over-IP/modem-over-IP
   Group III Fax, T.38, Transparent Fax, Transparent Modem
   Modem termination/data transfer
   V.92: Modem on Hold, QuickConnect, PCM Up-stream V.90, K56Flex, V.34bis, V.34, V.32bis, V.32, V.22bis, V.22A/B,
   V.23, V.21, V.44, V.42, V.42bis, V.110,
   V.120, (PHS) PIAFS,
   Administrative
   FTP, TFTP, SNTP, DNS
   ATM
   UNI 3.1, PVC (CBR, VBR)
   ISDN
   AT&T, Northern Telecom, Q.931 GloBanD, Japan-PRI, VN3-PRI,
   OneTR6-PRI,
   Net5-PRI, Danish-PRI, Australia-PRI, National ISDN 2
   NFAS with D channel back-up
   Network and user-side ISDN

3. **Voice over IP Support –**
   with Lucent Voice.Natural
   CODECs supported: G.711 a-law & μ-law,
   G.729 (a and b), G.723.1
   DTMF support: in-band, RFC 2833, via H.245 (H.323)
   Tone generation and detection
   IPDC/H.248 out of band DTMF
   Announcement storage and generation
   Echo cancellation: G.168-2000, G.165 – Up to 64 ms echo tail
   Voice activity detection, comfort noise generation, silence suppression
   Dynamic/static jitter buffer
   Frame loss concealment/frame repeat
   Bell Labs Speech Normalization (inverse IRS filtering)
   Packet fragmentation – for greater QoS with VoIP client Applications

4. **Bandwidth Management and Data Compression**
   MLPPP, MP/MP+, MPPC, BACP, TCP header compression, ATM traffic shaping, STAC, MS-STAC, STAC-9

5. **QoS**
   RFC 2474 – Differentiated Services Code Point (DSCP) support
   RFC 791/1349 type of service (ToS) support
   VoIP call statistic generation

6. **Security and Authentication**
   RADIUS, TACACS/TACACS+, PAP, CHAP, MSCHAP v1+v2, DNIS, CLID, callback, token, local password, call-type pre-authentication

7. **Management**
   SNMPv2, NavisAccess™ System, SSHv1 for Telnet, console, COT testing

Hardware Technical Specifications

8. **Physical Dimensions**
   14.8" (D) x 17.2" (W) x 5.20" (H) (3 rack units) 3RU
   Loaded system weight: 39 lbs. (approximate)

9. **Chassis Architecture**
   6 slots total
   1 dedicated slot for system controller module
   1 dedicated slot for channel ingress card
   4 general purpose slots for port processing, circuit and packet modules

10. **Universal Port Density**
    576 voice/data calls – via Channelized T1
    672 voice/data calls – via Channelized DS3
    720 voice/data calls – via Channelized E1

11. **Serviceability/Redundancy**
    Packet, circuit and processing modules hot-swappable
    All modules and fan tray field-replaceable
    Three (3) independent cooling fans with system monitored fan-fail signals removable fan tray
    AC and DC power supply units
    - Hot-swappable, 1+1 redundant, load sharing, AC input and DC input power supplies
    - Mixed AC & DC supplies supported in the same chassis

12. **APX® 1000 Universal Gateway Module Options**
    WAN Access Modules
    Circuit switching (ingress)
    – 24-port Channelized T1/E1
    – 8-port Channelized E1
    – 8-port Channelized T1
    – 1-port Channelized DS3
    Packet switching (egress)
    – 1-port OC3/STM-1 ATM (copper or short-haul fiber or long-haul fiber)
    – 2- and 4-port 10/100 fast Ethernet
    Processor Modules/CODEC Support
    288-port MultiDSP / G.711, G.729 (a and b), G.723.1
    240-port MultiDSP / G.711, G.729 (a and b), G.723.1
    96-port MultiDSP / G.711, G.729 (a and b)
    2nd- generation HDLC

13. **Power Requirements**
    Power budget AC
    Total typical values per fully loaded chassis:
    Input power per chassis: 381 W
    Heat dissipation: 959 BTU/h
    Current intake @ 100Vac input: 9.6 A*
    Current intake @ 115Vac input: 7.0 A*
    Current intake @ 230Vac input: 3.5 A*
    Recommendations:
    Input power per chassis: 337 W
    Heat dissipation: 1150 BTU/h
    Current intake @ 100Vac Input: 9.6 A*
    Current intake @ 115Vac Input: 8.5 A*
    Current intake @ 230Vac Input: 4.2 A*
    Power budget DC
    Total typical values per fully loaded chassis:
    Input power per chassis: 301 W
    Heat dissipation: 1027 BTU/h
    Current intake @ -48Vdc input: 16.0 A*
    Current intake @ -40Vdc input: 20.0 A*
    Recommendations:
    Input power per chassis: 361 W
    Heat dissipation: 1233 BTU/h
    Current intake @ -48Vdc input: 20.0 A*
    Current intake @ -40Vdc input: 24.0 A*
    Configuration:
    1 x controller module, 3 x 288-port MultiDSP modules,
    1 x DS3,
    1 x Ethernet, 1 fan tray

    * Per power supply

14. **Operating Characteristics**
    Ambient operating temperature:
    -0 C to 40 C (-5c to +55c for short term per GR63-CORE)
    Ambient storage temperature:
    -40 C to +65 C
    Relative humidity:
    10% to 95% non-condensing
    Operating altitude:
    to 10,000 feet (3,050 M)

15. **Regulatory Compliance**
    NEBS: Level 3 compliant, GR-63-CORE, GR-1089-CORE, CLEI coded, available in TIRKS database
    EMC/EMI: FCC 15 Class A, R&TTE Directive (EN 55022, EN 300 386), Class A, EN 61000-3-2, EN 61000-3-3, AS/NZS 3548, Class A, CISPR 22 Class A, VCCI Class A, CNS 13438 Class A
    Safety: CSA NRTL (UL 1950, Third Edition), CSA C22.2, No. 950, Third Edition, R&TTE Directive EN 60950 Including Amendments 1, 2, 3, 4, 11, IEC 60950 including Amendments 1, 2, 3, 4
    Telecom: FCC Part 68, IC CS 03, JATE

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