Ascend MultiVoice
Voice-over-IP Networks

“From Dial-Tone to Data-Tone”

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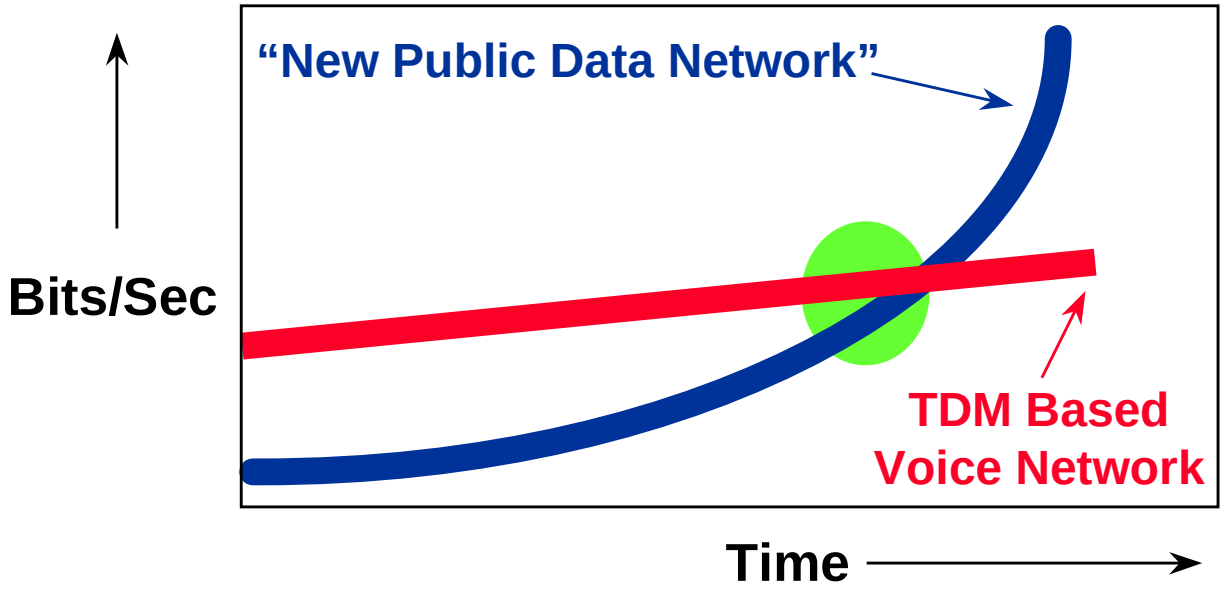
Overview

- Key Trends in the Industry
- MultiVoice Voice-over-IP Product Offering for the MAX
- Network Integration
- MultiVoice for MAX Release 1.0 Specifics
- Applications
- Summary

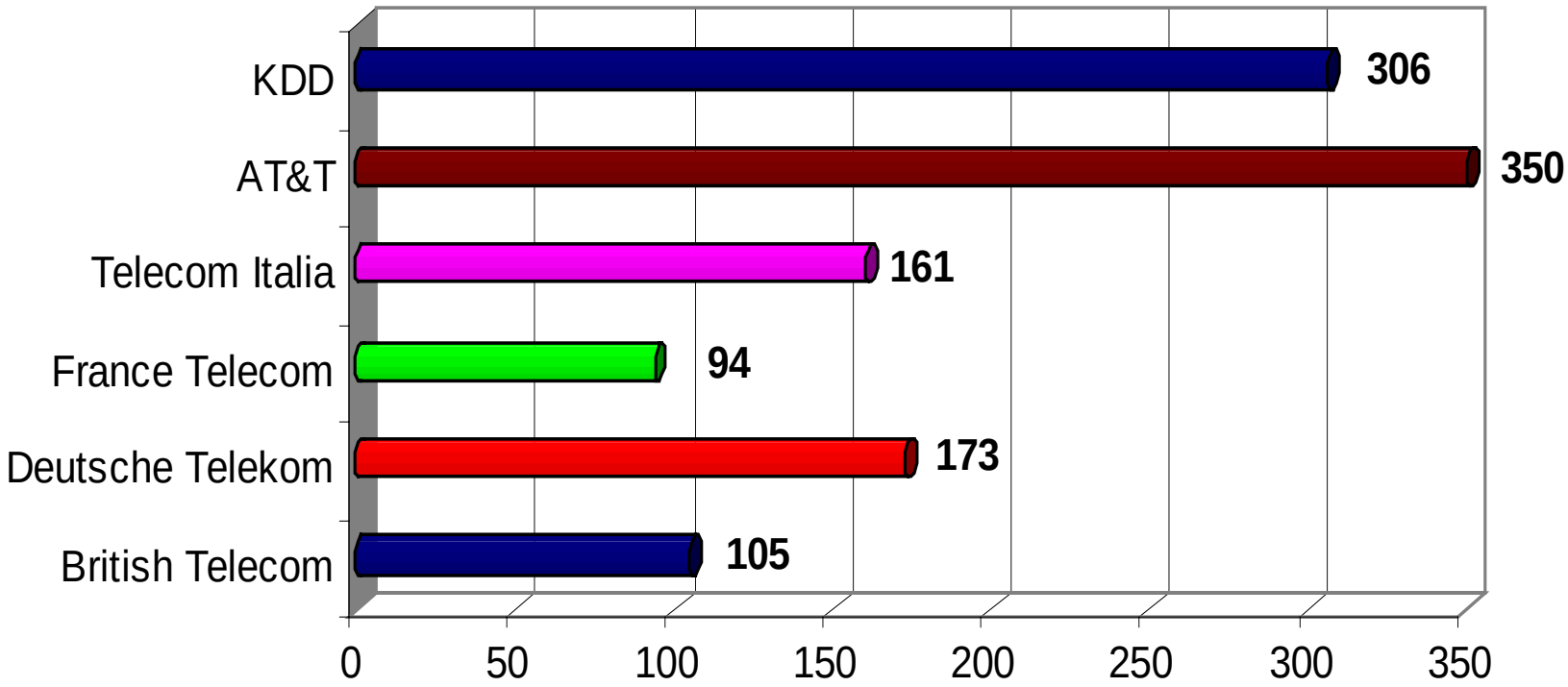
Data Now Drives Networking Architectures

- Network Architectures are Voice Centric



- Data now drives the network rather than Voice
- Envision a network that is packet/cell-focused leveraging high-speed switching with fiber in the Core

Technology Changes Pose a Threat to Incumbents, Moreover...



Revenue Loss in International Calls Market in the Year 2001 (US$ millions)

Source: The Net Effect

It Presents a Considerable Opportunity for Growth

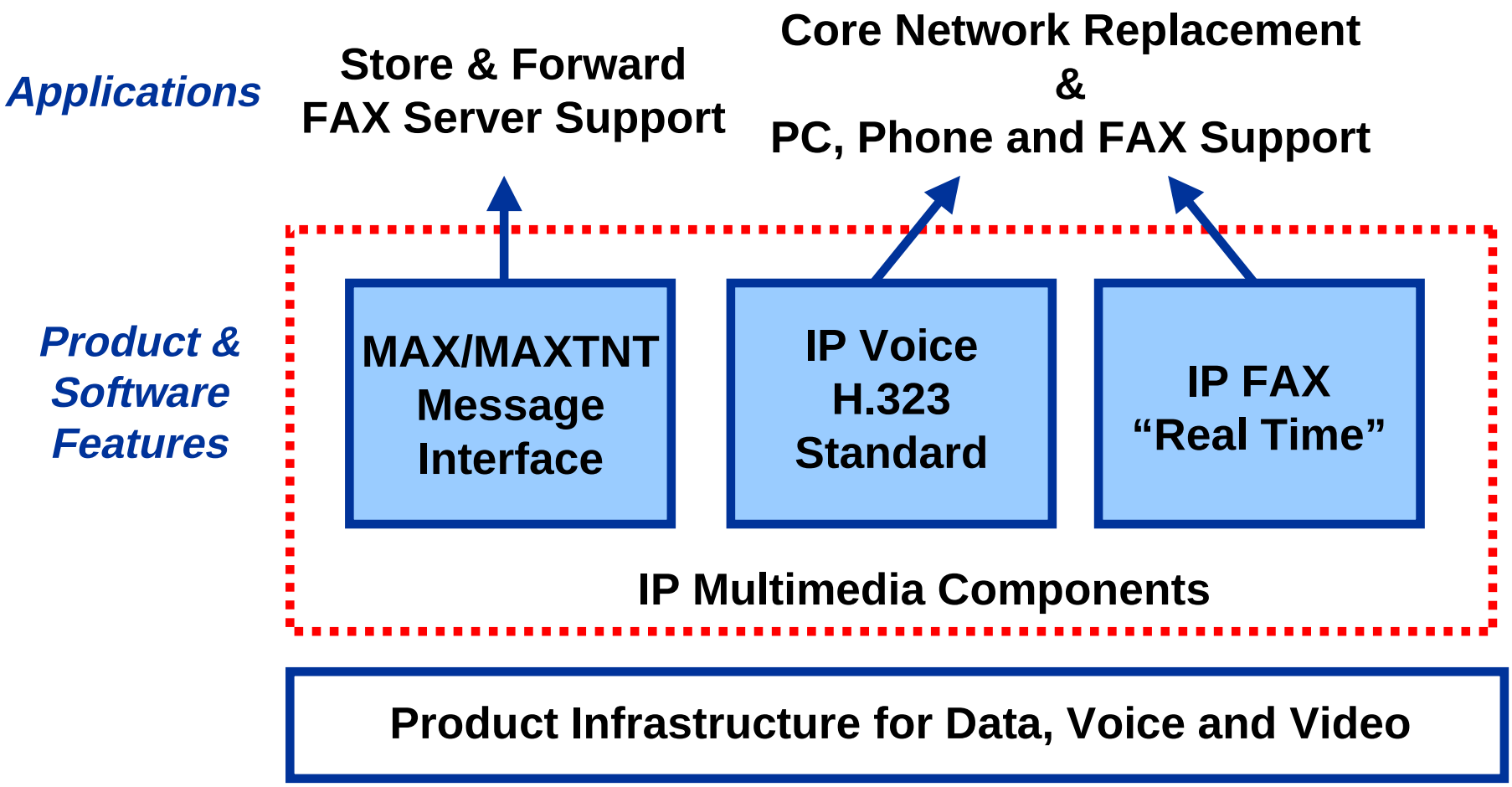
- 60 million PC users will be making voice calls over the Internet by 1999 (1)
- Internet telephony will account for 12.5 billion minutes of use by 2001 (2)
- 25% of all the world's phone calls will travel on the Internet within 12 years (3)
- By 2002, 18.5% of all domestic phone traffic will be carried over data lines (4)

Source 1 & 2: IDC
Source 3: InfroTEST International
Source 4: Probe Research

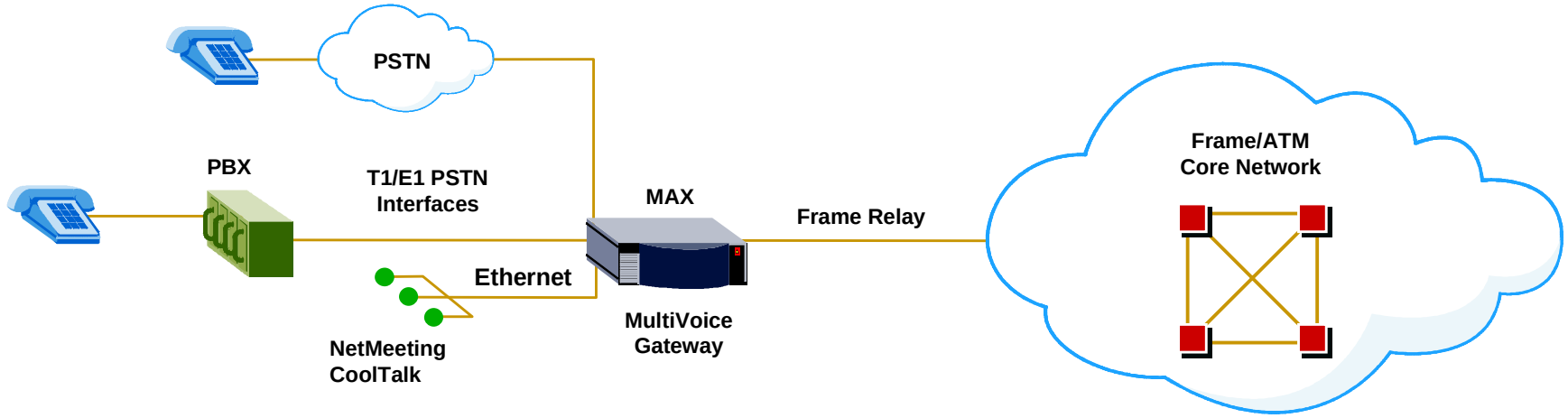
Current Market Initiatives

- **Internet Telephony eXchange Carrier (ITXC)**
  - Offers wholesale access to and settlement of IP-based telephone calls
  - Uses iPass settlement technology
  - Funded by AT&T and VocalTec
- **Qwest Communications International, Inc.**
  - Announced a 7-by-24, 7.5¢/minute telephone service
  - Uses a brand-new, high-capacity, fiber-optic network using VoIP technology
- **AT&T WorldNet Services (AT&T Jens)**
  - AT&T @phone service for internet telephone calling within Japan and to international locations
  - Announced a 7¢/minute IP-based telephone service

Three Components for the IP Voice / Fax Product Offering



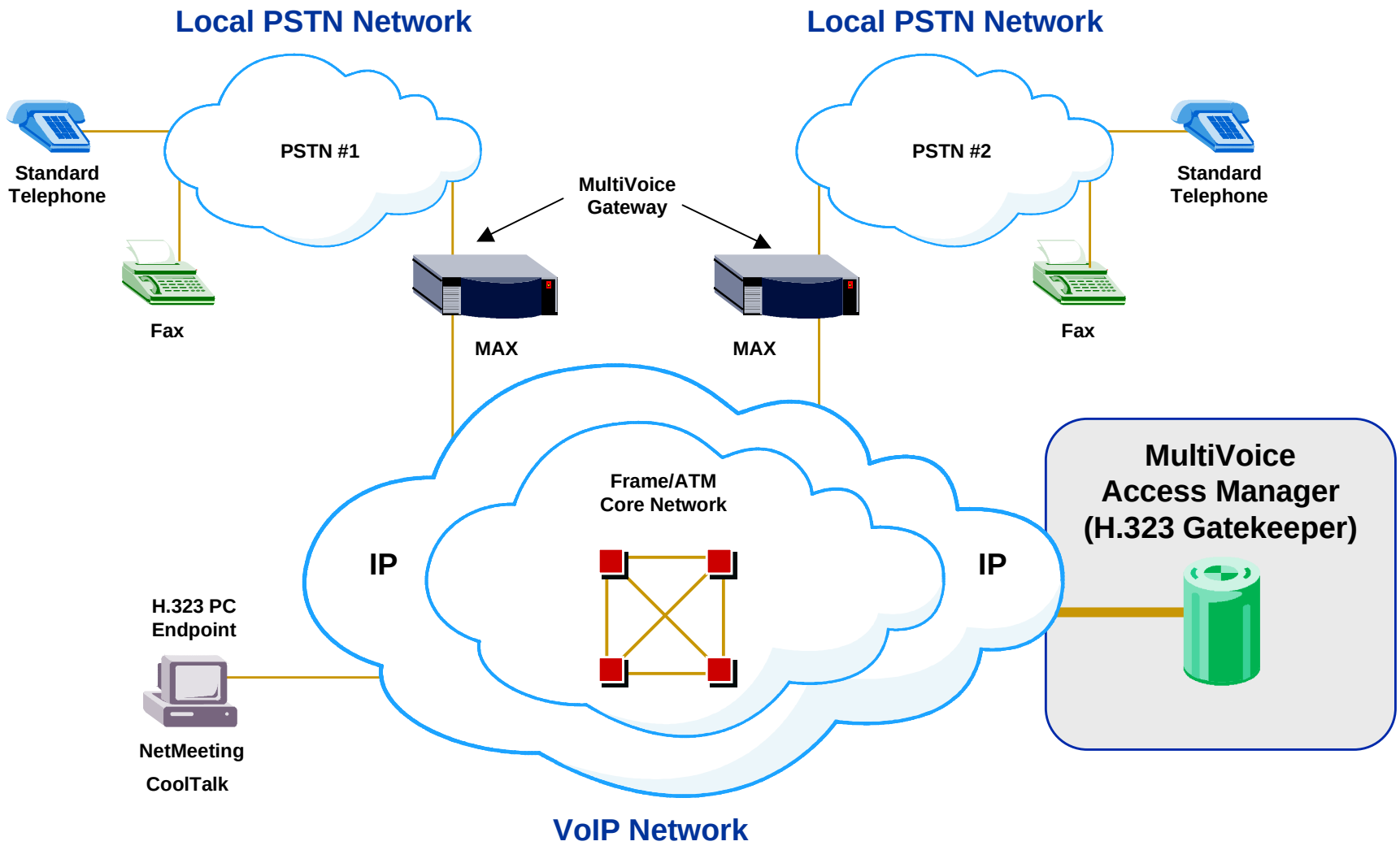
What is the MultiVoice Gateway for the MAX?



Voice and Fax Traffic

- Uses ITU-T H.323 to encode Voice into IP packets
- Can output IP voice onto Ethernet or Frame Relay
- Uses RFC1490 IP over Frame Relay
- Works on the industry-proven and market-leading MAX Platform

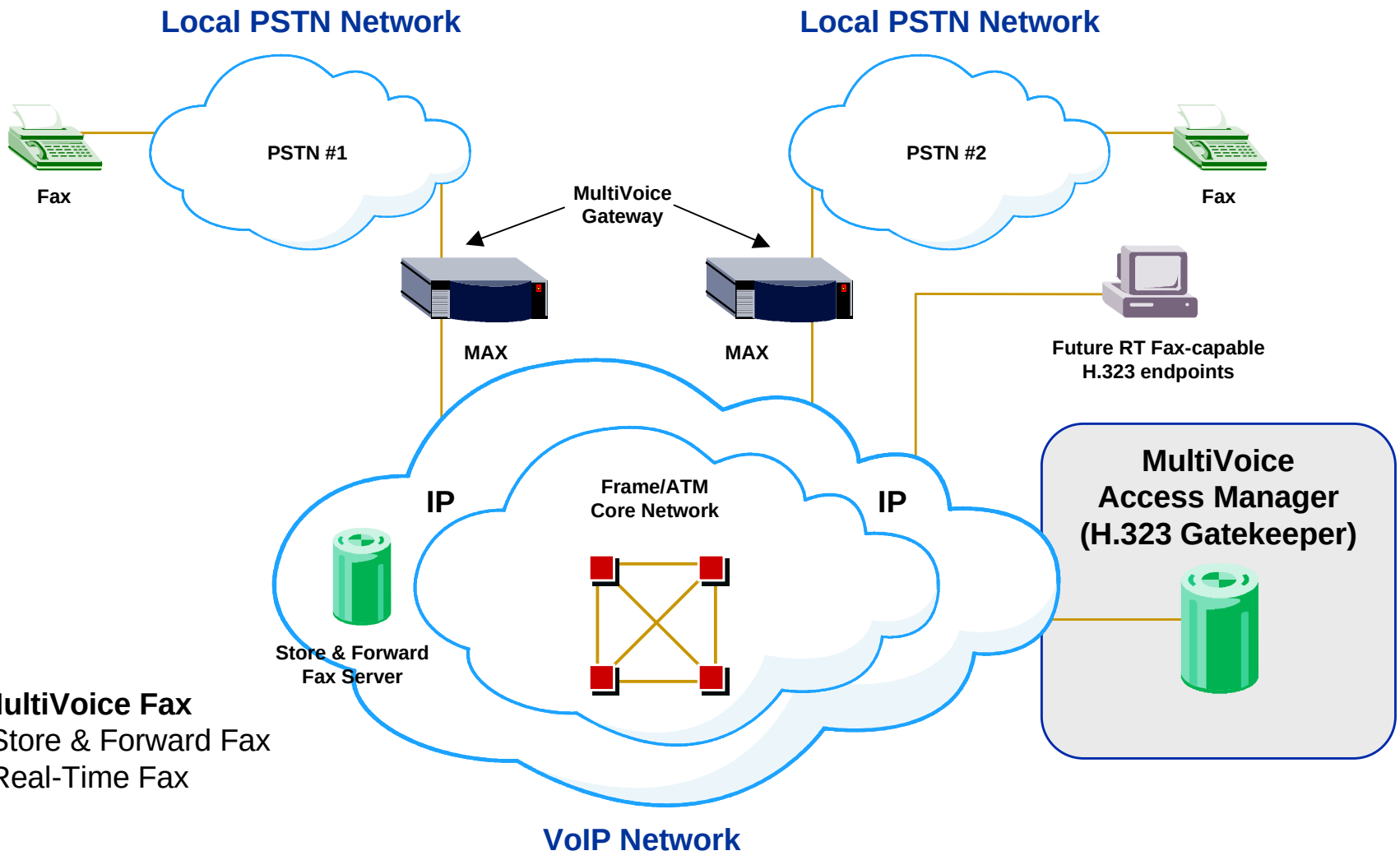
MultiVoice for the MAX - Configuration



MultiVoice Component Overview

- **MultiVoice Gateway for the MAX**
  - Terminates the native PSTN network interfaces (e.g. T1, PRI, E1 and BRI)
  - Supports various voice compression codecs
  - Support ITU-H.323 protocol for Phone-to-Phone and Phone-to-PC communications over the IP packet network
- **MultiVoice Access Manager (H.323 Gatekeeper)**
  - Manages the H.323 zone(s) for a set of gateways and PC endpoints
  - Provides address translation (E.164 telephone address to IP address)
  - Supports client registration (authentication)
- **PC Endpoints**
  - Any standard H.323-compliant PC software that supports voice calls (e.g. NetMeeting or CoolTalk)

MultiVoice Fax - Configuration



MultiVoice Fax

- Store & Forward Fax
- Real-Time Fax

Why Fax over IP?

- **Use common infrastructure for data, voice, and fax**
- **Fax is 40% of all PSTN traffic**
- **Fax is better suited to transport over IP**
- **Provide new services**
  - Fax broadcast
  - Fax to e-mail conversion
- **Save big bucks**

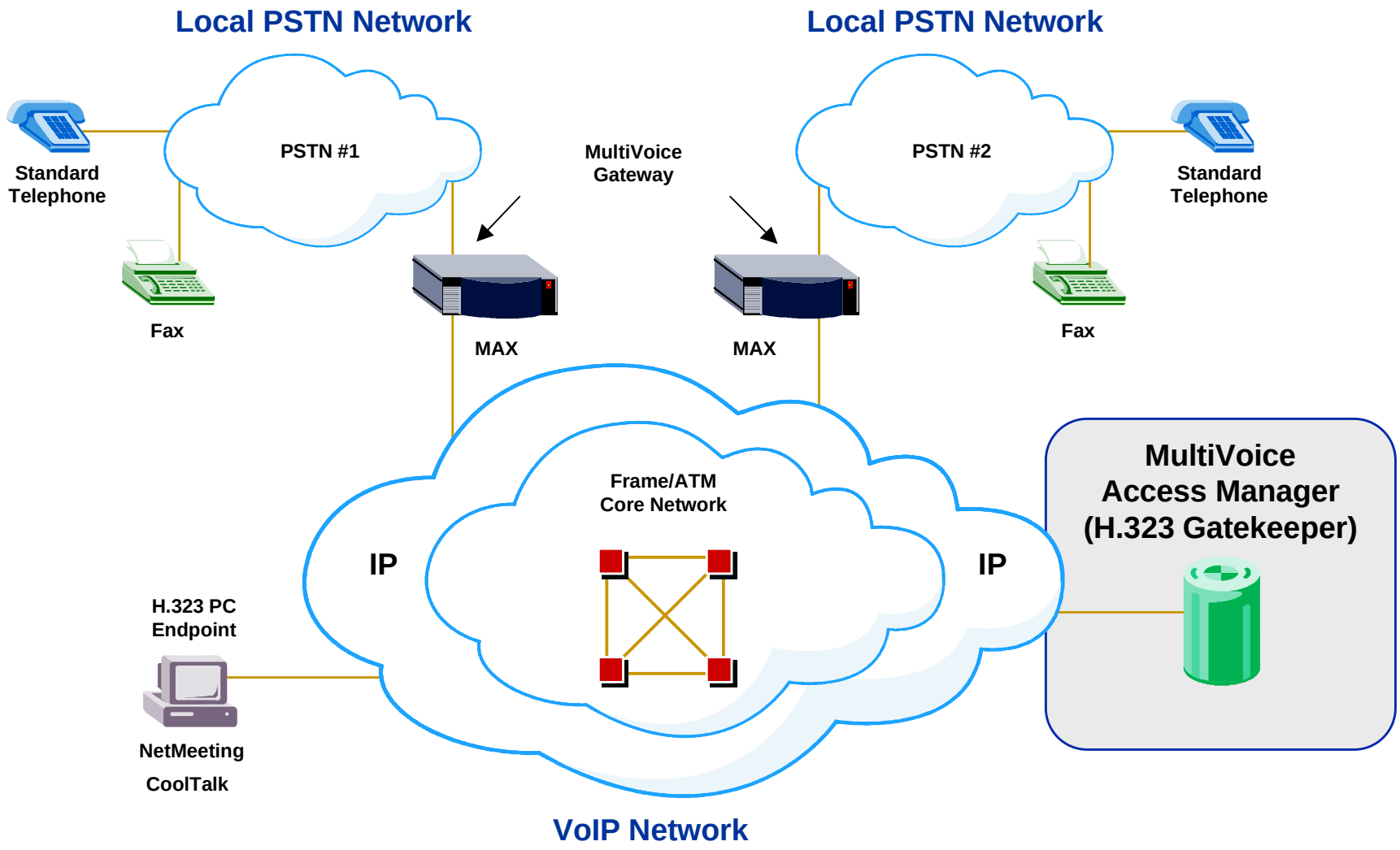
Real-Time vs Store and Forward

- **Real-Time (RT) Fax over IP**
  - When it's sent, it is REALLY sent!
  - No storage in the network
  - No looking for "lost e-mail/faxmail"
  - Takes about the same amount of time as fax over PSTN
  - Replaces existing fax service
- **Store & Forward (S&F) Fax over IP**
  - Faxes are stored on a server in a network
  - Enables group broadcast of fax
  - Enables new services, But, ... Like e-mail, there may be ...
    - Lost faxes
    - Delays of an unpredictable length
  - Not suitable for critical documents, contracts, etc.

General Characteristics of the Fax Gateway

- **Supports both S&F and Real-Time operation**
- **Three models**
  - S&F only solution
  - Combined S&F / RT Fax gateway (RT-A)
  - Combined RT Fax / Voice gateway (RT-B)
- **Supports E1 and T1 signaling direct from MAX product**
  - R2,Robbed Bit, PRI etc.
- **Supports standards**
  - Will support finalized ITU-T T.ifax2 and IETF RFCs
  - Will be available in pre-standard versions
- **RT solution shares infrastructure with Ascend MultiVoice Gateway**
  - Uses same Gatekeeper, CDR, etc. technology

MultiVoice Access Manager



Importance of the … MultiVoice Access Manager

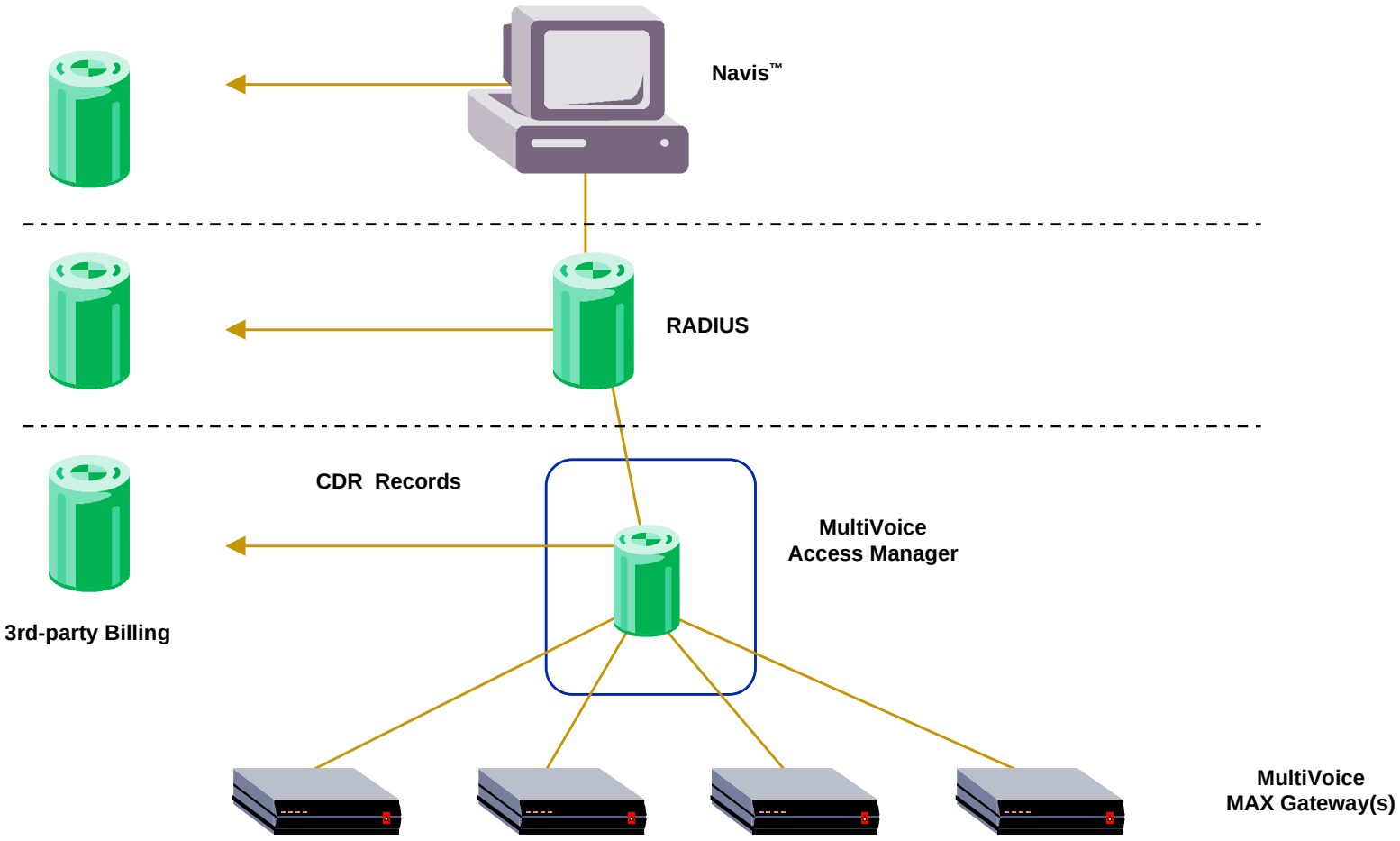
- **VoIP Vision – "The Packet Network is the future PSTN"**
- **The Access Manager for the MAX plays an important role in this vision**
  - Future versions of the MultiVoice Access Manager will support advanced telephony services and applications
  - These applications provide functions that allow ISPs to offer telco-like services in addition to value-added, integrated multimedia applications
  - Tighter-integration with existing PSTN features, e.g. SS7 integration – important for PSTN / VoIP co-existence in carrier networks

Scaling MultiVoice for MAX

- **Start with MAX 6000-based Gateway**
  - Supports 16 to 96 voice ports per MAX chassis
- **Access Manager is standard NT / SOLARIS based**
  - Cheap PC up to massive, duplicated server
  - H.323 supports “backup” gatekeepers if primary fails to respond
  - Support for multiple Access Managers in the same network
- **Endpoints find Access Manager via**
  - Fixed administration
  - Multi-cast (LAN)
  - DNS (Internet / H.323 V2)
- **Access Manager send calls to foreign Gateways via DNS**
  - Ascend value-add – use of common DNS server
  - Simple provisioning

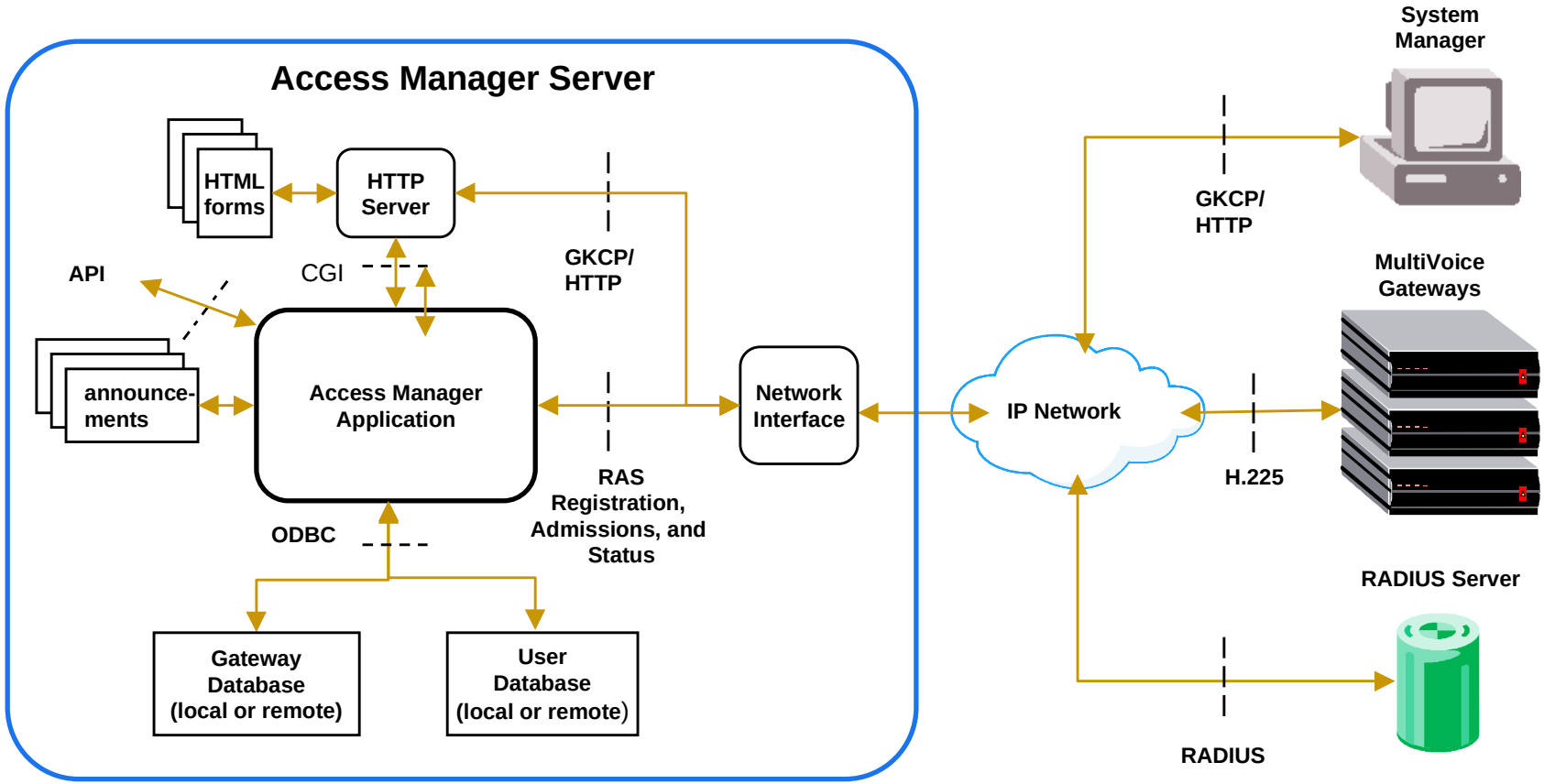
MultiVoice for MAX - Accounting / Billing

One System for Voice and Fax

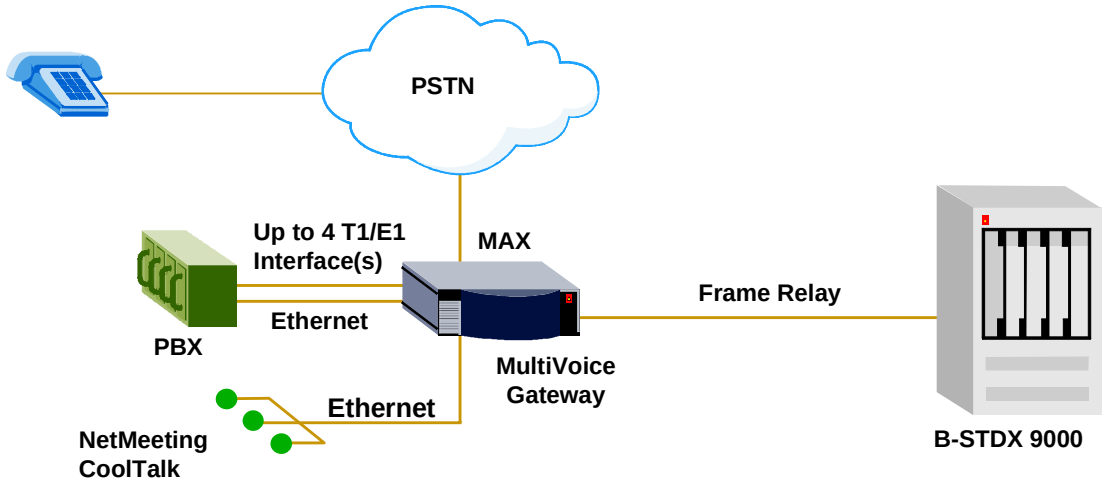


MultiVoice Access Manager

System Architecture

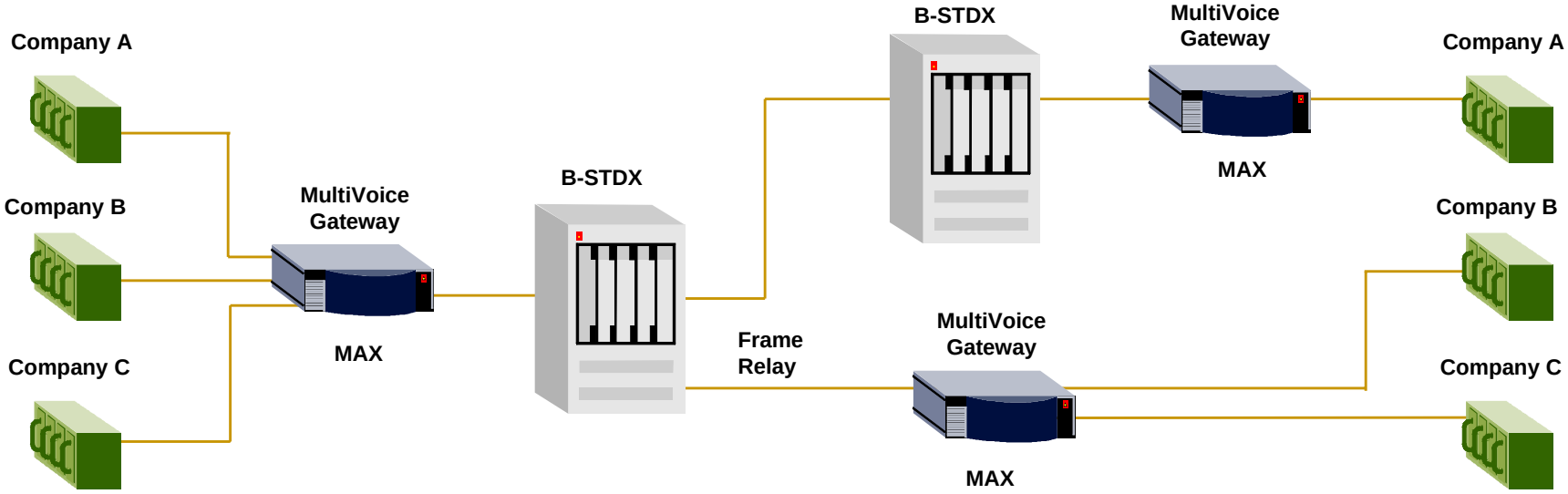


Application: MultiVoice for MAX with B-STDX and Frame Relay



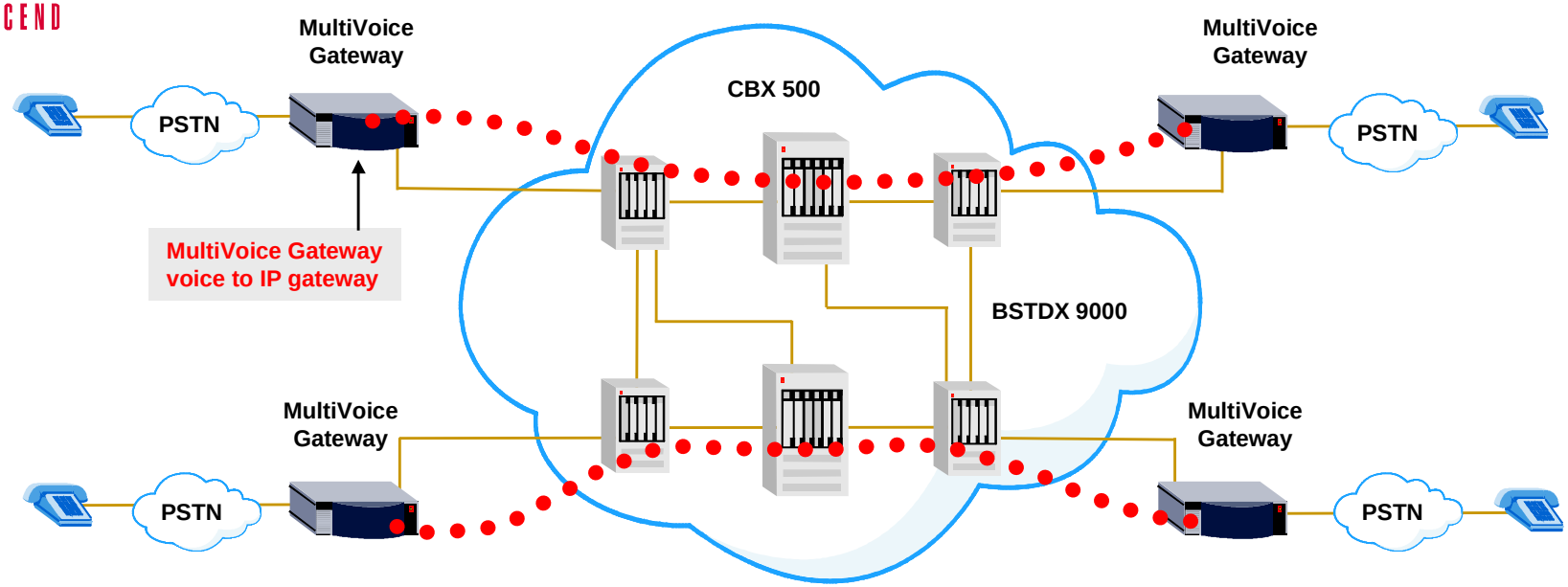
- **Packet Voice Access shelf for B-STDX 6K, 8K, 9K**
- **Conforms to RFC1490 for switching by IP Navigator or generic Frame Relay**
- **Support for Type-of-Service (ToS) bits for QoS**
- **Frame Relay SVC Support**

Application:
ISP Voice Bandwidth Provider



- Use ISPs existing IP Network to transport voice
- Packet voice access for B-STDX core switch
- IP Navigator QoS guarantees delivery and quality
- Offers new ISP Revenue opportunities

Absolute QoS : Toll-Quality Voice over IP



IP Navigator Network Set-up Circuit Guaranteeing Toll-Quality

- **IP WAN QoS Capabilities via IP Navigator**
  - Best effort service
  - Relative type of service (ToS) in IP header
  - Absolute QoS using “on demand” guaranteed bandwidth

MultiVoice for MAX Release 1.0 Product Specifics

MultiVoice for MAX Release 1.0 Key Features

- **MultiVoice Gateway for the MAX - Release 1.0**
  - Phone-to-Phone H.323 operations – standard gateway operation
  - Telephony WAN interfaces – support for T1, T1/PRI, E1, E1/PRI, BRI
  - Packet network interfaces – Ethernet and Frame Relay
  - Voice codec support – support for G.711 and G.729(A)
  - Voice VPN support – for enterprise deployment that do not required user authentication
  - Hybrid-line echo cancellation – remove echo created by 4/2-pair network interfaces
  - DTMF detection and generation – emulation of PSTN capabilities

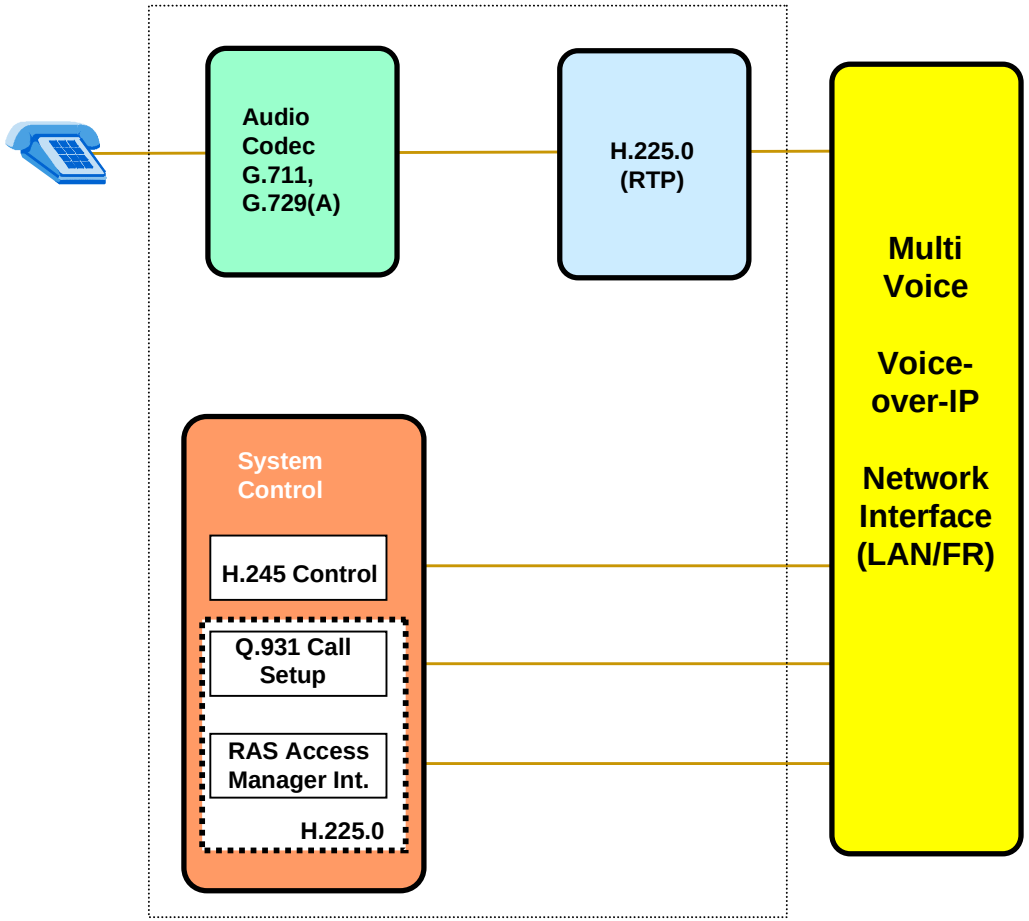
MultiVoice for MAX Release 1.0 Key Features

- **MultiVoice Access Manager Release 1.0**
  - ITU-T H.323-compliant Gatekeeper implementation – support for RAS protocol
  - Phone-to-IP address translation – call routing within the IP network
  - Web-based administration interface – remote administration via a standard browser
  - PIN-based user authentication – user authentication for network access
  - Voice VPN support – for enterprise deployment that do not required user authentication
  - Telephone number aliases – support for private numbering plans

MultiVoice for MAX Release 1.0 Key Features

- **MultiVoice Access Manager Release 1.0**
  - Call Accounting Records (CDR) – detailed call record for billing system integration
  - Gateway and user database support – flat file or ODBC database integration
  - Third-party billing system support – interfaces for supporting third-party billing applications
  - Microsoft Windows NT v4.0 support – Access Manager runs as a NT application

MultiVoice for MAX Release 1.0 Gateway H.323 Implementation

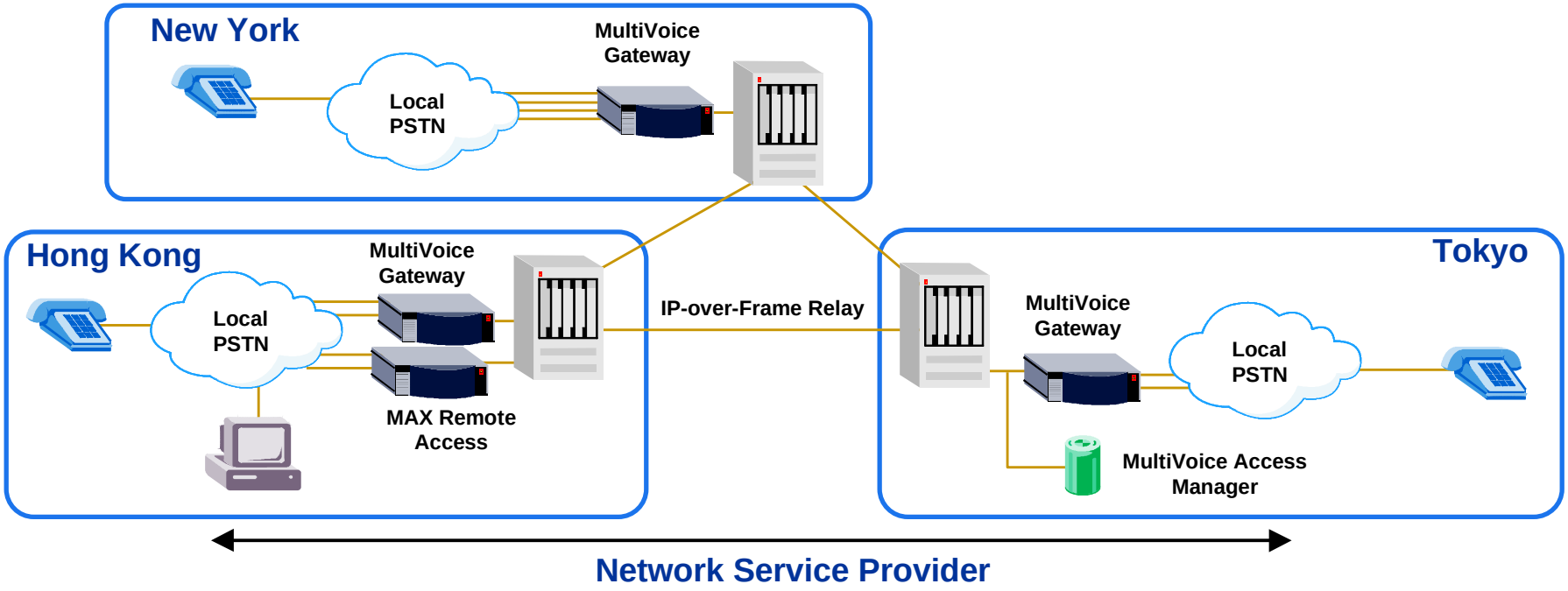


MultiVoice for MAX Release 1.0 Configurations

- **MAX 6000-based Bundles**
  - 48-port T1 System
  - 96-port T1 System
  - 60-port E1 System
  - 90-port E1 System
- **MAX 6000-based QuickStart Bundle**
  - 16-port T1 System
  - 16-port E1 System
  - 16-port E1/BRI System

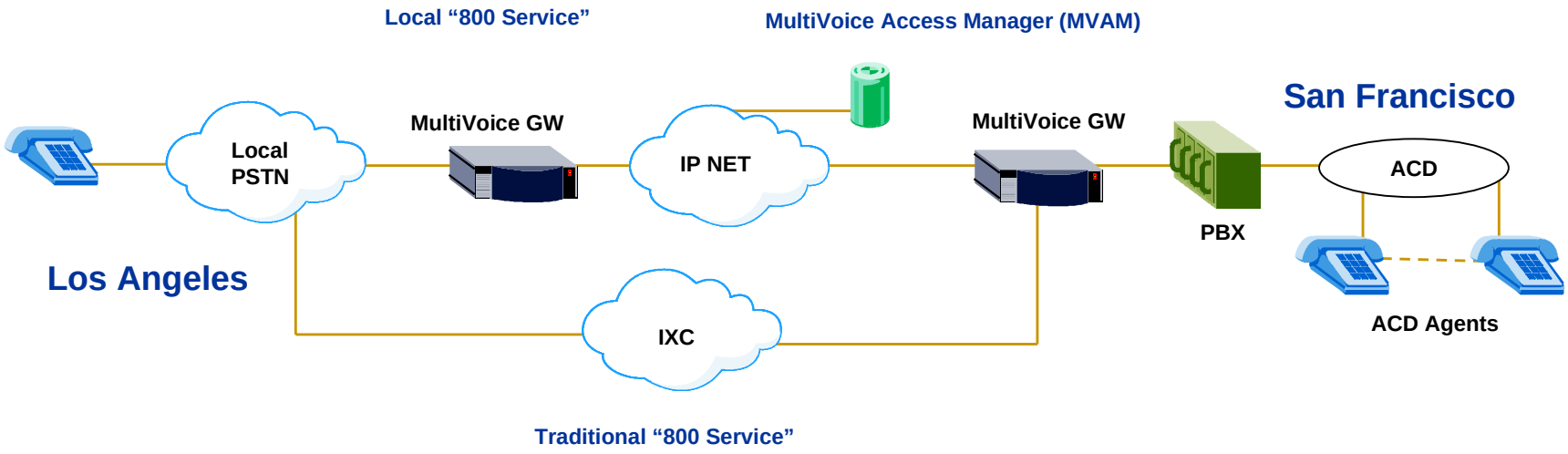
- **MAX 400x-based Upgrade**
  - MAX 400x T1 SW Upgrade
  - MAX 400x E1 SW Upgrade
- **MultiVoice DSP Slot Cards**
  - DSP16
  - DSP12
  - DSP8
- **MultiVoice Access Manager**
  - 4 GW System
  - 32 GW System
  - 128 GW System

Application:
Basic Voice Services



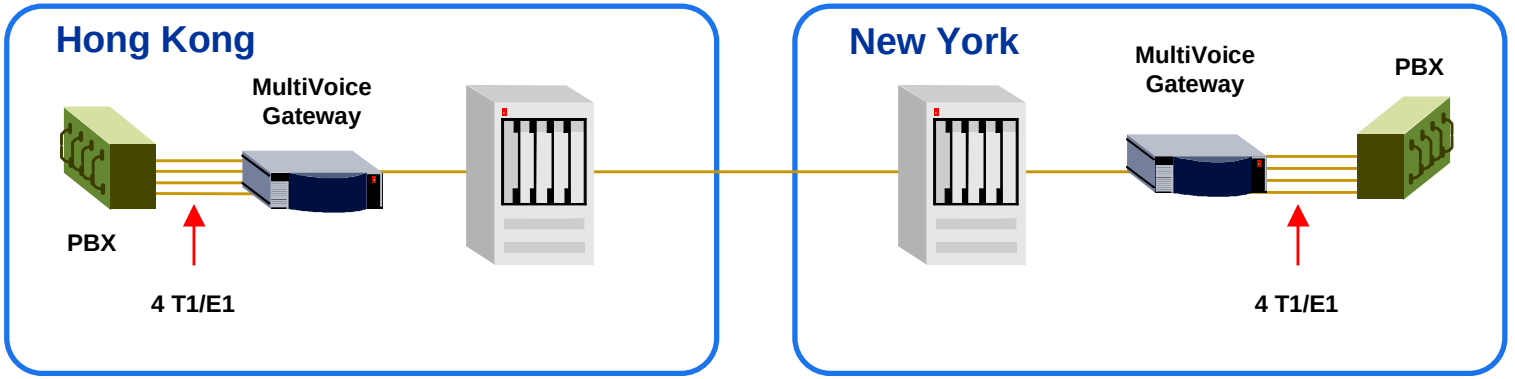
- **Single Network Design**
  - Use of a single data network to provide both data and voice based services
- **Billing that scales with network usage**
  - Per minute billing (e.g. ¢/min) for long distance voice services
- **New network service revenues for non-traditional services**

Application:
Local 800 Services



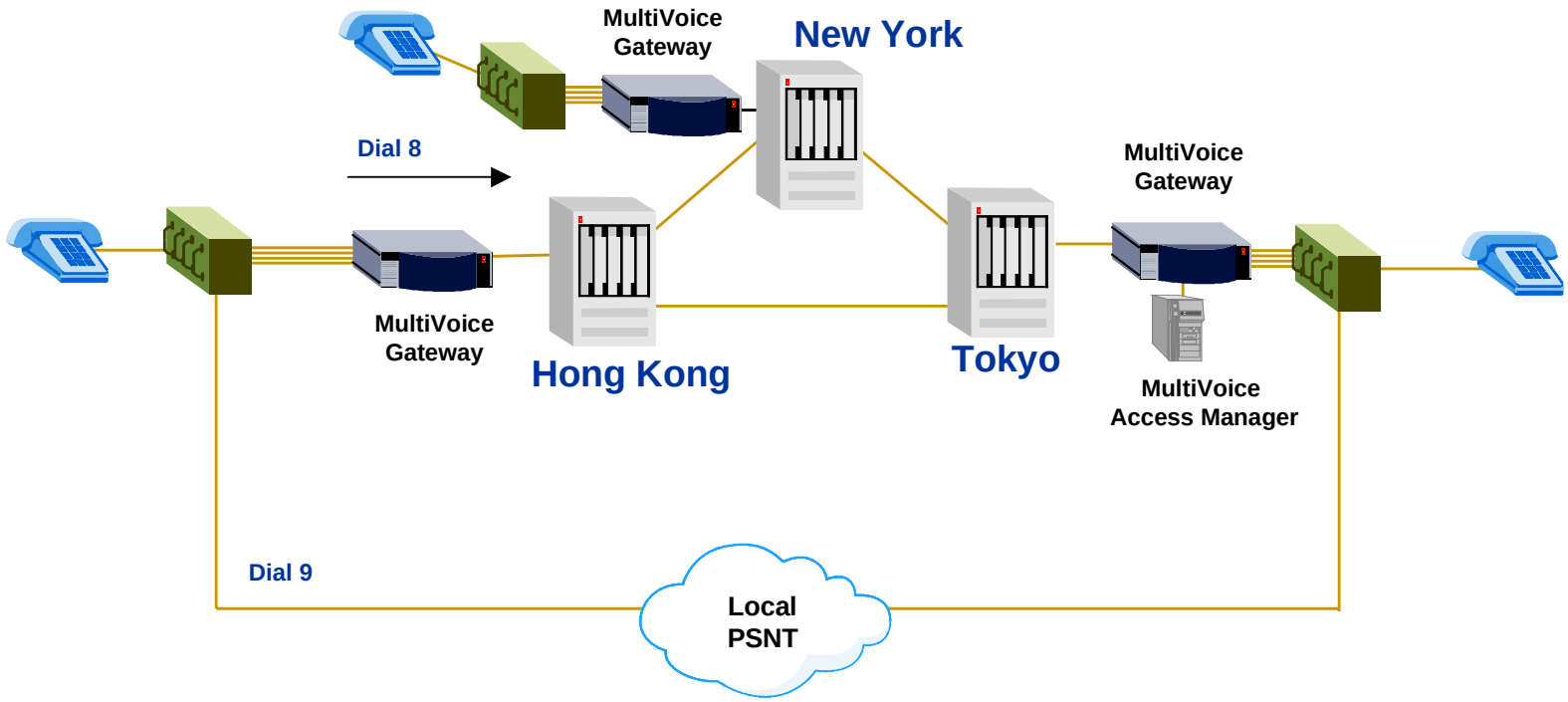
- Lower operational costs
- Use existing ISP Point-of-Presence (POP) to provide a voice network for customer support
- End-user dials a local number for access to customer support agents
- Calls are routed to ACD via the existing data network in order to reduce long distance 800 service costs

Application:
PBX Trunk Extension



- Enterprise private networking
- Point-to-Point PBX trunk replacement
- Use QoS capabilities to insure toll quality voice calls

Application:
PBX Trunk Intraflow



- Alternate route for voice calls across packet data network
- Automatic intraflow for PSTN (Dial 9 access)
- Operational cost savings

MultiVoice for the MAX – Advantages for Different Markets

- **Advantages to ISPs**
  - New service offering and revenue from existing customer base
  - Obtain a higher return on existing network by using existing infrastructure
  - Cost justify increased internet access capacity (higher speed Pipeline® for SOHO locations)
  - Transaction-based billing which scales with network usage
- **Advantages to Telcos**
  - Backbone provider revenues
  - Revenues from leased lines
  - Revenues from local calls (call completion – phone doubler-application)
  - Two-tier pricing system (circuit-switched services / packet-switched services)

MultiVoice for the MAX – Advantages for Different Markets

- **Enterprise**
  - Use spare capacity in internal packet network (Intranet) to carry voice between PBXs in private networks (Intraflow)
  - Backup for existing voice truck (Tie-lines)
  - Support small or branch office locations over a single packet network
  - Can deploy MAX on the premise (Local gateway)