

iBasis Accommodates Growing Volume of High-Quality, International Voice Calls

EXECUTIVE SUMMARY

CUSTOMER NAME

- iBasis, Inc., Burlington, Massachusetts, United States

INDUSTRY

- Telecommunications

BUSINESS CHALLENGE

- Keep up with rapid growth and enable high volumes of voice-over-broadband traffic.

NETWORK SOLUTION

- Upgraded network to provide the high density required to support peak traffic flows, and to allow range of applications.
- Improved features to help ensure network security.

BUSINESS RESULTS

- Generated 40–50 percent annual growth.
- Deployed successful retail prepaid voice service.

iBasis uses a Cisco network to deliver traditional TDM and IP voice calls with superior voice quality—over the public Internet.



BUSINESS CHALLENGE

iBasis is one of the 10 largest carriers of international long-distance telephone calls. More than 390 customers around the world outsource their international voice traffic to iBasis to reduce their transport and support costs while preserving high service quality. Calls are delivered over iBasis' global voice over IP (VoIP) network and the public Internet at a run rate of more than 8 billion minutes per year. In addition to its wholesale business, iBasis offers retail prepaid calling cards and its Pingo Web-based long-distance calling service to consumers.

iBasis is also qualified as a Cisco® Powered Network provider for Internet telephony. The Cisco Powered Network designation tells customers that the iBasis network is built end-to-end with Cisco products and technologies, and meets a high standard of reliability and performance.

“iBasis has experienced 40–50 percent growth, year after year,” says Ajay Joseph, Vice President of Network Architecture and Engineering for iBasis. “The Web-based calling card business grew from zero to almost US\$80 million annually in two years, while the wholesale call termination business has also grown substantially, generating peak traffic flows of more than 40 million minutes on Christmas day and other holidays.”

Voice-over-broadband companies, such as Skype, Yahoo, and others are responding to rapidly growing demand for making telephone calls over the Internet. With iBasis, those providers can terminate calls at more than 1000 iBasis points of presence in more than 100 countries at a reasonable cost. These companies can also expand their offerings beyond standard PC-to-PC connectivity services, offering opportunities for customers to use their PCs for making regular telephone calls, reaching mobile phone users, and extending videoconferencing communications.

As carriers increasingly need to connect softphone applications to the Public Switched Telephone Network (PSTN) or mobile phone networks, they need the sophisticated connectivity capabilities that iBasis provides. To help the company meet growing demands and enable interconnectivity between dozens of protocols, vendor platforms, and networks, iBasis began to upgrade its gateways to gain even more scalability and service flexibility.

NETWORK SOLUTION

The iBasis network includes eight Internet central offices (ICOs) and numerous Internet branch offices (IBOs), connected over the public Internet. When an end-user places a phone call, the user's carrier routes the call to an iBasis IBO or ICO, which converts the call into IP packets carrying the voice information. The packets are then sent over the Internet through a connection to a Tier-1 Internet service provider (ISP), such as UUNET, and reassembled at the iBasis ICO or IBO closest to the call's destination.

iBasis ICOs range in size from 10,000 to 30,000 DS0 (64 Kbps) connections. Eight ICOs are deployed in the United States, Europe, and Asia. At each ICO, incoming time division multiplexing (TDM) calls arrive through a Cisco AS5400HPX universal gateway, which provides the high density required to support peak traffic flows and supports a wide range of applications, including voice over broadband, long distance, prepaid calling card, and TDM switching. The Cisco AS5400HPX gateways are connected to redundant Cisco Catalyst® 6509 switches, which are deployed with Cisco Catalyst Supervisor Engine modules and Cisco Catalyst 6500 Series Enhanced FlexWAN modules. iBasis uses Catalyst 6509 switches for core routing and as a switching aggregation layer in the ICOs to deliver high performance, scalability, and rich quality of service (QoS) features.

IBOs are located worldwide and support 100 to 300 DS0 connections each. The iBasis IBOs typically deploy Cisco AS5300 or AS5400HPX gateways, which are connected to Cisco Catalyst 2950 Series switches. Traffic is switched to Cisco 7200 Series or Cisco 3600 Series routers for connection to local ISPs. The company is in the process of migrating to Cisco AS5400XM universal gateways to further enhance performance.

“We have worked with Cisco on many mutually beneficial development efforts. We have observed that Cisco has been willing to support many of the capabilities that we need to operate our wholesale business and we have been able to build a product around those capabilities. That has been more important than anything else.”

—Ajay Joseph, Vice President of Network Architecture and Engineering

BUSINESS RESULTS

“We have worked with Cisco on many mutually beneficial development efforts,” says Joseph. “We have observed that Cisco has been willing to support many of the capabilities that we need to operate our wholesale business and we have been able to build a product around those capabilities. That has been more important than anything else.” With the ability to build a product around Cisco network capabilities, iBasis has become one of very few companies that successfully delivers high-quality voice calls over the public Internet.

PRODUCT LIST

- Cisco AS5400HPX Universal Gateways
- Cisco Multiservice IP-to-IP Gateway
- Cisco PGW 2200 Softswitch
- Cisco Catalyst 6509 switches
- Cisco 7200 Series routers
- Cisco PIX firewalls
- Cisco CNS access registrar

- Cisco content service switches
- Cisco Catalyst 2950 Series switches
- Cisco 3600 Series routers

NEXT STEPS

iBasis continues to scale its wholesale business to meet demand, and is deploying new, higher-performance Cisco AS5400XM universal gateways in its ICOs. The company also sees growing opportunities for its Web-based prepaid calling service and is planning to migrate a portion of its network that serves retail customers to an IP Multimedia Subsystem (IMS) approach. An IMS approach to network design will help the company ensure a reliable foundation from which to deploy rich multimedia communication services, including mixed telecom and data services.

“We have a framework to deploy whatever we want, based on the kinds of services we need to deliver,” says Joseph. “With Cisco, we have found a strong partner, and that relationship has been extremely successful. You can see it in the growth that we are experiencing and in our ability to deliver a retail service with the highest quality of service for voice. These successes are the result of our partnership with Cisco.”



TECHNICAL IMPLEMENTATION

The majority of voice traffic enters the iBasis network from carrier and mobile operators’ networks as TDM traffic using the Signaling System 7 (SS7) protocol. iBasis uses the Cisco PGW 2200 Softswitch as a signaling converter, providing SS7 interconnect for the Cisco AS5400 series gateways. An increasing volume of IP trunk and voice-over-broadband traffic also enters the network and is terminated on Cisco Multiservice IP-to-IP gateways in the iBasis network. Designed to meet enterprise and service providers’ Session Border Controller (SBC) needs, the Cisco Multiservice IP-to-IP Gateway is an integrated Cisco IOS® Software application that operates on a wide range of Cisco routers.

An important element of the iBasis network is its patent-pending Assured Quality Routing® (AQR) and PathEngine™ quality management technologies. With AQR, the iBasis network can select the best available route for every call. It directs traffic to and from the Internet or PSTN over the fastest and most secure routes with the highest quality. A probe system continuously probes network nodes to ascertain IP quality level with results fed continuously into the AQR system. This is how iBasis achieves voice call quality that is equal to, or better than, the PSTN. To route calls through the iBasis core network, the iBasis AQR technology exchanges messages with the Cisco Gatekeeper running on a Cisco 7200 Series Router with an NPE-G1 high-performance processor. The AQR technology also provides digit analysis and the necessary back-end accounting and billing.

Therefore, the call flow through the network would occur as follows. Incoming SS7 calls enter the network through a Cisco PGW 2200. The PGW 2200 sends these calls to the Cisco AS5400 series gateways, which also accept ISDN, MF, and E1/R2 signaling, where they are converted to IP. The Cisco AS5400 series gateways query AQR through the H.323 gatekeeper. Incoming IP calls are terminated on the Cisco IP-to-IP gateways, which also query AQR through the H.323 gatekeepers. Cisco AS5400 series gateways packetize voice calls using G.711, or compressed codecs G.729 or G.723.1. Using a compressed codec enables iBasis to send more calls over its network bandwidth, which helps ensure maximum bandwidth utilization.

iBasis also uses Cisco PIX® security appliances and access control lists (ACLs) on core routers in conjunction with a proprietary security solution to ensure that only iBasis customers can communicate through the network.

Call detail records (CDRs) are sent in real-time from the Cisco AS5400 series gateways to Remote Authentication Dial-In User Service (RADIUS) servers in the iBasis traffic monitoring system, giving the iBasis operations center current views of traffic. Operations staff can view traffic between customers and providers, between sites, and numerous other views—down to the trunk group level. Operations staff also review logs from the Cisco gateways, routers, and switches. Logs are collected in a central repository where proprietary iBasis software is used for monitoring. Regular scripts query gateways for CPU utilization, number of calls received, available memory, and digital signal processor (DSP) status. Data gathered from the network is used for capacity planning.

Different members of the operations staff have different levels of access to view various aspects of system activity through a command line interface.

FOR MORE INFORMATION

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To learn more about Cisco universal gateway solutions, visit: <http://www.cisco.com/go/iad>

To learn more about iBasis, Inc. visit: <http://www.ibasis.net>

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