

Multicast Hoot 'n' Holler

Leveraging your multiservice network for mission critical communications

Hoot 'n' holler's unique ability to enable instant verbal communications to an entire community is long standing and unparalleled in the communications world. This fact makes hoot 'n' holler the application of choice for Wall Street, Federal, State and local emergency response agencies, news broadcasting companies and a host of other organizations. Packet-based Hoot 'n' Holler systems offer significant cost and operational benefits when compared with legacy systems which are very effective at their assigned task but have become expensive and difficult to operate and maintain. Now that hoot 'n' holler can be enabled over a multiservice data network, packet-based hoot 'n' holler is an option for companies that once considered it cost-prohibitive.

This paper will introduce the nature of hoot 'n' holler networks, business applications and discuss the benefits of migration from a circuit switched hoot 'n' holler network to a packet-based Hoot 'n' Holler network solution.

Hoot 'n' Holler Overview

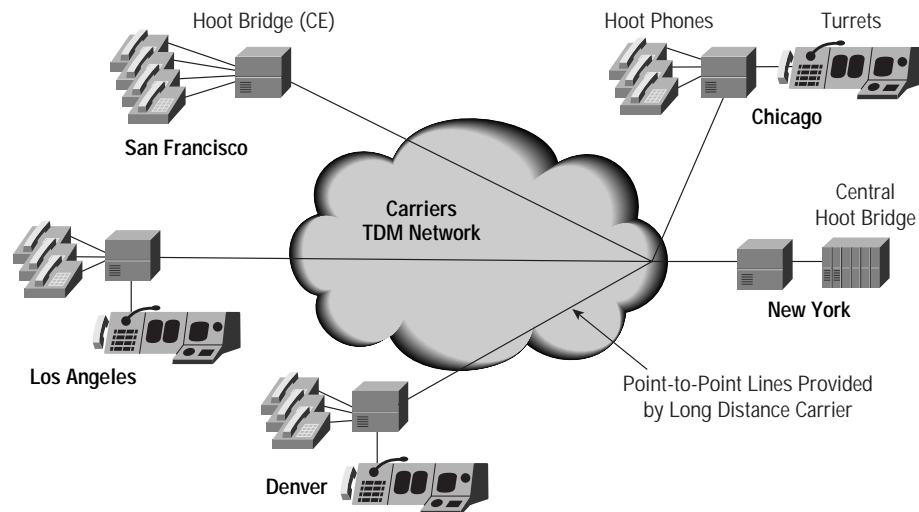
Hoot 'n' holler networks (also known as a Junkyard Circuit, Squawk Box System, Holler Down Circuit, Shout Down Circuit) provide "always on" multiuser conferences without requiring users to dial into a conference bridge. These networks were devised more than 50 years ago when local concentrations of small, specialized businesses needed to communicate common, time-critical information. Junkyard operators up and down the East Coast of the United States were among the first adopters. They began to install their own phone wires, speakers (called "squawk boxes"), and microphones between their businesses to ask each other about parts customers needed. These networks functioned as crude, do-it-yourself, business-to-business intercom systems.

Hoot 'n' holler broadcast audio network systems have since evolved into the specialized leased-line networks used by financial and brokerage firms to trade stocks and currency futures and provide time-critical information such as market updates and morning reports. Users of various forms of hoot 'n' holler networks now include brokerages, news agencies, publishers, government and municipal emergency response agencies, weather bureaus, transportation providers, utility operators, manufacturers, collectibles dealers, talent agencies, airlines, and nationwide salvage yard organizations. A traditional hoot 'n' holler network is depicted in Figure 1 below.

"Dramatic cost savings through and operational efficiencies gained by managing a single network instead of multiple networks."



Figure 1 Traditional Hoot 'n' Holler Network



Hoot 'n' holler is used in these various industries as a way to provide a one-to-many or many-to-many conferencing service for voice communications. The three major components of a hoot 'n' holler system are transport, bridging, and station apparatus. In most cases, transport is accomplished using dedicated point-to-point circuits provided by a network service provider. Typically a branch office (Financial model) or a station on a hoot 'n' holler network consists of a 4-wire Push to Talk (PTT) handset and a loudspeaker. Stand-alone speakers are used as well as combination phone/speaker units. When more phones and speakers are required, common equipment (CE) is necessary to distribute the audio and power feeds to the stations. Because the transmit and receive paths are always separate in a 4-wire circuit, it becomes necessary to mix the audio (local transmit-out and distant end receive-in). The CE also provides this functionality.

Financial Industry—The Morning Call

A morning call is a traditional event in the financial industry in which market research and other relevant information is broadcast to traders and brokers prior to the market's opening bell. Many types of systems and techniques exist, ranging from podium and trading floor systems to conference room-based broadcast systems. Some firms use a broadcast center while others utilize dial-in conference bridges. Most of these systems have the following in common:

- One or more hoot 'n' holler circuits are bridged during the morning call.
- Analysts must have the capability to call in remotely to relay important information to the conferences.
- The call is recorded and archived for later listening.
- The audience is usually at their desks or in their offices listening to their "squawk boxes" but have the ability of being bridged into the call.

After the morning call, this system can be used throughout the day to advise the trading community within a brokerage firm on market movements, trade executions, and other significant events that affect the market or company. All users can talk simultaneously with each other, if desired. A typical brokerage firm has several of these networks for equity, retail, and bonds with network size and degree of interactivity varying depending on the application.



News Agency—Breaking News Line

A major television-broadcasting network utilizes hoot 'n' holler technology in a slightly different way. In this application it uses hoot 'n' holler as a “Breaking News Line” in its Washington Bureau. This line connects the network’s headquarters with its onsite reporters at the White House, Pentagon, Senate, House of Representatives, Department of Justice, and Department of State. The system allows site reporters to initiate an instantaneous conference call with the studio and all of their Bureau colleagues to alert them of a breaking story. This network is operational 24 hours a day, 365 days a year.

Current Challenges

Today most hoot 'n' holler customers pay for separate leased line charges from a common carrier, such as their telephone service provider, to transport their hoot 'n' holler communications to remote branch offices. This recurring monthly charge is usually significant, some larger firms spend more than \$2 to 3 million per year just to support hoot 'n' holler feeds.

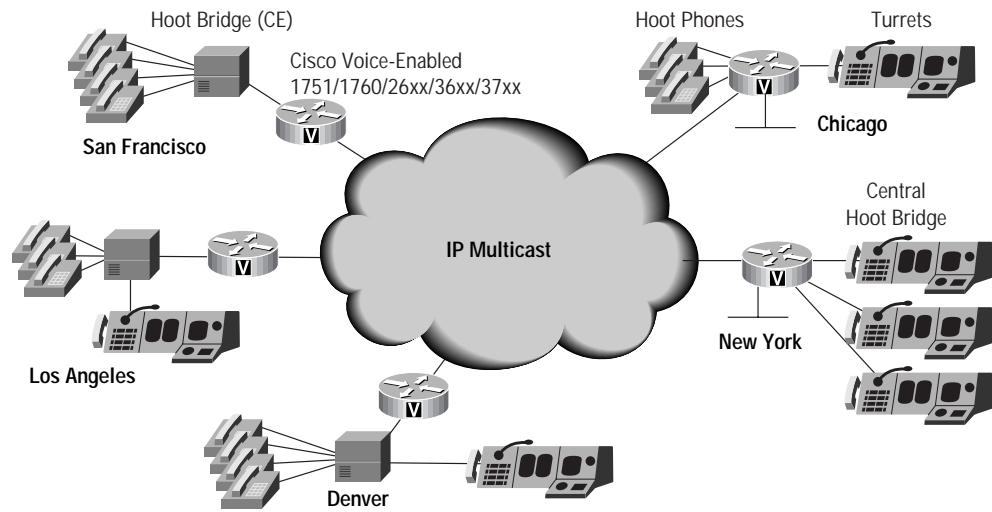
As these networks have grown from 4-wire party lines to global conferencing networks, the sophistication and complexity has increased dramatically. Hoot 'n' holler has proven to be the most cost-effective application for disseminating information across a company in real time. Unfortunately, the technology has not changed much in fifty years. This older technology increasingly fails to meet today’s standards for reliability. Moreover, it is difficult to manage and expensive. Enter packet-based hoot 'n' holler.

Packet Based Hoot 'n' Holler solution

Hoot 'n' holler over IP transports hoot 'n' holler voice traffic over traditional data networking equipment on an enterprise’s existing multiservice network. Hoot 'n' holler can be another packet-based application running on the corporate multiservice network enabling businesses to eliminate the expensive dedicated leased lines while protecting investments in existing hoot 'n' holler equipment such as turrets, bridges and 4-wire phones. In addition to eliminating the leased lines, running hoot traffic over an IP network allows businesses to utilize bandwidth more efficiently. When bandwidth is not being used for hoot 'n' holler traffic, it can be made available for data.



Figure 2 Cisco Hoot 'n' Holler over IP Solution



Hoot 'n' holler is an excellent foundation for a corporation's voice and data convergence initiative. Convergence is a strategy to eliminate multiple networks within a company by "converging" to a single IP-based data network that can handle voice, video and data. The result is dramatic cost savings and operational efficiencies gained by managing a single network instead of multiple networks. A single converged IP network also allows for enterprise-wide sharing of information and applications further increasing productivity and enhancing the organization's ability to serve customers.

The Hoot 'n' Holler over IP solution can be configured to support multiple "hoot groups" on a single connection. A hoot group is a separate hoot 'n' holler session, which broadcasts and receives voice traffic to distinct endpoints. This is particularly important in the financial industry where there are several different classes of investment with separate morning calls. (domestic equities, international equities, municipal bonds, government bonds, and so on.)

The packet-based hoot 'n' holler solution leverages existing technology to conserve bandwidth and processing resources in the network. From a network perspective, the hoot 'n' holler solution is designed to run hoot 'n' holler as an application on the existing or future data network with as little impact to the standard applications (market data, transaction processing, e-mail, internet and so on.) as possible. The primary bandwidth conserving technologies utilized in Hoot 'n' Holler over IP are:

- Bi-Directional Protocol Independent Multicast (Bi-Dir PIM)
- Standard Voice over IP (VoIP) Compression codecs
- Voice Activity Detection (VAD)
- Quality of Service (QoS)



Bi-Directional Protocol Independent Multicast (Bi-Dir PIM)

Bi-directional PIM enables a scalable, dependable solution that does not impact other applications running on the network. Bi-Dir PIM conserves bandwidth by replicating packets in the network at the point where paths are diverged, resulting in the most efficient delivery of data to multiple receivers. Bi-Dir PIM is optimized for many-to-many applications such as hoot 'n' holler and gaming by using a simplified forwarding algorithm. Bi-Dir PIM also provides reduced configuration, easier management and simplified network architecture design and overhead. While BiDIR PIM is the recommended forwarding algorithm for running Hoot n' Holler over IP networks, Sparse mode PIM can also be used with careful attention to network design.

Bandwidth conservation

Through voice compression techniques, a voice stream that would use a standard 64k channel in the legacy hoot 'n' holler application can take as little as 14k when active and zero bandwidth when silent. Industry standard VoIP codecs (g.711, g.726, g.729 and g.729a) are utilized by hoot 'n' holler as the primary means of bandwidth conservation. To gain further bandwidth efficiencies Header compression or Compressed Real Time Protocol (CRTP) can be utilized. Voice activity detection (VAD) saves additional bandwidth by not sending packets when there is no voice traffic present.

QoS

Quality of services (QoS) allows network administrators to achieve high voice quality from low bandwidth links by prioritizing latency-sensitive traffic over traffic that is not time sensitive. This is very important for remote sites where over-provisioning is cost-prohibitive. In the packet-based solution where the hoot 'n' holler traffic shares the same connection as data traffic, QoS is enabled to ensure that voice traffic gets priority over all other types of traffic. This ensures the integrity of the hoot 'n' holler traffic.

Advantages of packet based hoot 'n' holler

The difference between traditional hoot 'n' holler solutions and packet-based hoot 'n' holler is primarily the means of transport. There is no need for changes to user equipment because the IP solution is designed to support legacy hoot 'n' holler equipment. The end user will notice very little difference between the packet-based and legacy hoot 'n' holler solution. However, from a corporate IT perspective, there are significant differences in the two solutions which make Hoot 'n' Holler over IP a very attractive option.

Better bandwidth utilization

The Hoot 'n' Holler over IP architecture allows dynamic bandwidth utilization and also reduces the amount of bandwidth that the application uses through standard compression technologies. Dynamic bandwidth utilization means that the network transmits voice traffic only when there is voice present. In the absence of voice traffic the bandwidth can be used by other applications. This increases the apparent bandwidth when hoot 'n' holler traffic is not active. When hoot 'n' holler traffic is active, packet-based Hoot 'n' Holler applies standard VoIP compression technologies to reduce the bandwidth hoot 'n' holler uses. Depending on the compression technology used, reductions in bandwidth resulting from compression can amount to as much as 80 percent.



Simplified network

The packet-based Hoot 'n' Holler over IP solution eliminates the need for dedicated hoot lines to each office location. By running Hoot 'n' Holler over the existing data network, management is simplified through using a common set of network management tools. Using management and provisioning tools already a part of the data network makes configuration, provisioning, troubleshooting, moves, adds, and changes much more straight forward, allowing for rapid deployment of new sites to the network.

Reliability is an additional advantage in a converged IP network. Redundant connections can be configured. In the case of line or device failure, IP traffic is dynamically routed around the failure. This eliminates vulnerabilities created by single points of failure in the legacy hoot 'n' holler solution.

Ease of troubleshooting and problem isolation

Both traditional and IP-based hoot 'n' holler networks are prone to disruption in several ways. The most common modes of interference result from crossed pairs or equipment degradation at a remote site. Problems can also occur as a result of end user behavior. Isolation of these problems in traditional hoot 'n' holler networks frequently requires that whole groups of users are taken off-line for hours or days in an effort to locate and resolve the source of disturbance.

With a packet-based Hoot 'n' Holler solution, use of familiar network troubleshooting tools can isolate problems remotely in a matter of minutes not hours. The problem site can then be removed from the network until the issue is resolved, reducing the impact to the other users. This results in higher service availability and shorter time to resolution of service effecting problems.

Investment protection

In a packet-based solution, the intent is to transparently interoperate with the existing hoot 'n' holler equipment while eliminating redundant and expensive circuits. Consequently, investments in all of the specialized gear (handsets, squawk boxes, turrets, and so on.) are protected.

Conclusion

Traditional hoot 'n' holler technology has evolved over the years but packet-based Hoot 'n' Holler offers the first breakthrough from a network management or corporate IT perspective. Packet-based Hoot 'n' Holler is a cost effective solution that eliminates redundant circuit costs, supports legacy hoot 'n' holler equipment, leverages existing network management and troubleshooting tools, and can run over an existing multiservice network.

The main reasons to consider upgrading your existing hoot 'n' holler network to a packet based Hoot 'n' Holler solution are cost reduction and network preparation. The cost savings from eliminating the leased lines required to support hoot 'n' holler is straightforward and can be the cornerstone of an overall convergence strategy. By enabling high availability, security, scalability, QoS, and manageability to support hoot 'n' holler, the architectural building blocks will already be in place to support future additional applications such as toll bypass, IP telephony and video. Because the infrastructure is already in place, subsequent convergence initiatives become much easier to justify.

Hoot 'n' Holler over IP represents a opportunity to reduce telecom expenditures. Current market conditions require an increased focus on productivity as well as cost controls. Companies are increasingly looking to the benefits of convergence to accomplish these goals. Packet-based Hoot 'n' Holler is consistent with the convergence strategy as it eliminates the cost of maintaining a separate network infrastructure while preparing the network to handle

applications that will drive productivity or increased revenue but are difficult to cost-justify on their own. The simplicity of the hoot 'n' holler ROI makes it an excellent starting point for a convergence initiative. The dedicated leased lines required to support the legacy hoot 'n' holler application represent "low hanging fruit" on the tree of convergence.

Cisco is uniquely positioned to deliver the functionality of packet-based hoot 'n' holler while simultaneously addressing the concerns of the converged network in one platform. The Cisco standards-based Hoot 'n' Holler over IP conserves bandwidth, scales to hundreds of remote offices, increases reliability, and offers flexible interfaces for end-terminals. The Cisco multiservice routers that enable packet based Hoot 'n' Holler offer state of the art security, reliability, and have the ability to prioritize various forms of traffic in the network. The packet-based Hoot 'n' Holler over IP features are implemented in Cisco IOS software and are supported over voice-enabled Cisco 1700, 2600, 3600, and 3700 multiservice platforms available around the world.

Further Reading

For more detailed information on Cisco Hoot 'n' Holler over IP solution please refer to the following Web sites:

Cisco Hoot'n' Holler over IP

Cisco Hoot 'n' Holler over IP information page: <http://www.cisco.com/go/hoot>

Technology

IP Multicast: <http://www.cisco.com/warp/public/732/Tech/multicast/>



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