**XpressPath**

Optimized Media Functionality

For *VoiceFlow* Session Border Controllers
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Introduction

Kagoor Networks® is implementing its VoiceFlow® session border control family of products worldwide with carriers, VoIP service providers, ISPs, cable companies, wireless communications suppliers and other service providers delivering VoIP services. Session border controllers (SBCs) are a recognized VoIP infrastructure element that addresses key IP peering issues regarding security, network address translations (NAT), service assurance, QoS, interworking, regulatory and emergency services compliance, and overall control at the borders of IP/VoIP networks.

The continued rapid pace of carrier and enterprise VoIP build-outs requires SBCs to adapt and evolve an ever-increasing amount of functionality. Recently, Kagoor announced the availability of a new functionality called XpressPath, which is a response to carrier requirements for efficient processing of media for improved performance, cost, scalability and quality of service. XpressPath exemplifies Kagoor’s continued technical leadership in session border control design and implementation.

XpressPath Description

XpressPath is new VoiceFlow functionality that enables direct media flow between endpoints residing in a customer LAN behind a local data firewall/NAT device and gateways residing in the wide area network (WAN). The WAN functionality is designed to work with gateways supporting the connection-oriented media (Comedia) IETF draft enhancement for SIP.

XpressPath incorporates two important functions to help service providers improve the performance, quality, scalability, and cost of their VoIP networks. The first function allows direct media exchange between VoIP endpoints that reside on the same LAN behind a data NAT/firewall. This is very useful in preventing ‘hair-pinning’ of the media and since a high percentage of calls can be between users on the same LAN, it can provide significant bandwidth and network resource conservation. Kagoor has implemented the functionality for use with its hosted NAT traversal solution; whereby the VoiceFlow SBC automatically recognizes calls between VoIP endpoints (IP telephones, integrated access devices, etc.) on the same LAN and after initial call setup, instructs the endpoints to send media directly to each other. XpressPath operates with SIP, MGCP and H.323 NAT traversal applications.

The second XpressPath function addresses calls between VoIP endpoints on a LAN and a media gateway in the WAN. In this case, a VoIP endpoint is calling from behind a firewall using the VoiceFlow hosted NAT traversal application. The call setup is facilitated by VoiceFlow, which upon recognizing that it is an off-net call to the PSTN, instructs the VoIP endpoint and the media gateway to exchange media directly. This can conserve bandwidth and also reduce latency since the media does not have to return to the VoiceFlow SBC and cross the WAN multiple times to reach the gateway destination. This functionality, currently available with SIP, requires that the media gateway support the Comedia enhancement for SIP. When VoIP endpoints are located behind a symmetric NAT device, a VoiceFlow SBC media relay can be optionally located with the media gateway to enable the function. Kagoor’s unique 3-way architecture accommodates this distributed media approach by being able to split signaling and media into separate systems.
**XpressPath Between VoIP Endpoints**

Figures 1 and 2 illustrate a before and after description of how XpressPath improves media exchange between VoIP endpoints located on the same LAN behind a NAT/firewall device. While SIP is used as the example, Kagoor provides support for MGCP and H.323 NAT traversal as well. XpressPath is an option that can be easily configured with the VoiceFlow network-hosted NAT traversal application.

**Figure 1. Before XpressPath: Media exchange between VoIP endpoints**
Signaling and media both travel to the SBC.

**Figure 2. After XpressPath: Direct media exchange**
After enabling XpressPath, direct media exchange between SIP Phone A and SIP Phone B takes place. Note that a Kagoor VoiceFlow has replaced the generic SBC in Figure 1.
**XpressPath** benefits for VoIP endpoint direct media routing

- Media ‘hair pinning’ is eliminated
- WAN bandwidth required for RTP media is eliminated between the customer premise and the VoIP service provider resulting in cost savings
- Incremental delay due to media routing back and forth to the VoiceFlow SBC is eliminated.
- The VoiceFlow SBC can scale and support incremental calls since it is freed up from processing media for all VoIP calls.

**XpressPath Between VoIP Endpoint and Media Gateway**

The Comedia enhancement for SIP allows media gateways to check the media source of incoming Real-Time Transport Protocol (RTP) packets and allows the endpoint to advertise its presence inside or outside of NAT. This new feature enables symmetric NAT traversal by supporting the capability to modify and update an existing RTP session remote address and port. Since most enterprise firewalls incorporate a symmetric NAT, the XpressPath feature should be compatible in most business environments as well as smaller SOHO/residential NAT environments.

Media gateways need to support the IETF Comedia draft for SIP. Currently, Cisco supports this feature with its IOS software release 12.2 T and on the following platforms:

- Cisco 2600, 3600, 7200, AS5300, AS5350, AS5400, AS5850 and CVA120 series.

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**Figure 3. Before XpressPath: Media exchange between VoIP endpoint and media gateway**

*In this example from an existing Kagoor VoIP service provider, SIP User A is placing a call to the PSTN phone in the bottom left.*
A network using the VoiceFlow SBC with XpressPath enabled functionality has a significantly abbreviated media route, detailed below and in Figure 4:

1. SIP User A is using an analog phone connected to an Analog Terminal Adapter (ATA) and the ATA registers with the VoiceFlow session border controller located in the customer office. The ATA and phone could also be a SIP telephone.

2. SIP signaling/call control messages (with private address 10.1.1) are NAT’ed by the premise NAT/router device and forwarded to the ISP.

3. The SIP messages are received by the ISP’s NAT/router, re-NAT’ed and forwarded to the Internet (nested or double NAT’ing).

4. VoiceFlow receives the NAT’ed SIP call control messages; where, the embedded private address (10.1.1) appearances are translated and sent to the application server.

5. The application server resolves the destination phone number to a proper media gateway. VoiceFlow will then exchange call control messages with the media gateway and detect if it supports Comedia protocol.

6. VoiceFlow instructs SIP phone/ATA to exchange media streams directly with the media gateway.

**Figure 4. After XpressPath: Abbreviated media route**

XpressPath abbreviates the media route as SIP User A’s telephone is instructed by the VoiceFlow SBC to send its RTP media directly to the media gateway. Kagoor’s VoiceFlow has replaced the generic SBC in Figure 3.
**XpressPath benefits for VoIP endpoint and media gateway direct media routing**

- Media network routes to and from SBC are eliminated.
- WAN bandwidth required for RTP media returning to the SBC is eliminated resulting in cost savings.
- Incremental delay due to media routing back and forth to VoiceFlow is eliminated.
- The VoiceFlow SBC can scale and support incremental calls since it is freed up from processing media for all VoIP calls.

**Conclusion**

XpressPath is the next evolution in session border control functionality. It provides carriers and VoIP service providers with the highest efficiency in VoIP media routing. In both XpressPath scenarios, media exchange between VoIP endpoints or an endpoint and a media gateway, the benefits are tangible – improved performance, cost, quality of service, and scalability via increased bandwidth efficiencies, decreased latency, and reduced session border control processing.

Kagoor offers XpressPath as part of its network-hosted NAT Traversal software application available on VoiceFlow 4000, 3000 and 1000 series products.