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# About Interact



## Purpose, Scope and Audience

This technical application note describes the configuration of Interact SoftSPOT for the Broadvox GO! SIP Trunking service. This document is suitable for use by anyone deploying the Broadvox GO! SIP Trunking service in conjunction with SoftSPOT. This document has a technical audience in mind – specifically IT professionals skilled in Linux with some experience in PBX administration and familiarity with VoIP technologies. This document is not for business administrators or people in other non-technical careers. In order to successfully use this document to deploy Broadvox GO! SIP Trunking service, you will need to possess the following skills, or have access to professionals or consultants with the following skills:

- Understanding of UNIX or Linux operating systems, including:
  - Understanding of file and directory structure on target OS
  - Understanding of firewall configuration on target OS
  - Understanding of network configuration on target OS
  - Understanding of service configuration on target OS
- Familiarity with network troubleshooting tools, including:
  - Wireshark/Ethereal
  - dig/nslookup
  - ping
  - traceroute
- Familiarity with PBX systems, including:
  - Trunk configuration
  - Calling plan configuration
  - Extension configuration
  - Mailbox configuration
- Familiarity with Session Initiation Protocol (SIP)
- An understanding of all seven layers of the Open System Interconnection (OSI) model
- A complete understanding of your internal network structure, Network Address Translation (NAT) setup, and firewall setup
- A complete understanding of your public Internet connectivity

Broadvox can only provide support for Interact SoftSPOT to the extent covered in this Technical Application Note and the included reference configuration, so if your level of technical expertise does not include the above skills, it is recommended that you obtain the services of an SoftSPOT professional.



## Interact SoftSPOT Deployment Information

Before you begin deploying SoftSPOT, please locate the following information. If you have questions about any item, refer to the descriptions and additional details provided on the pages that follow.

SoftSPOT External IP Address or DNS: \_\_\_\_\_

Preferred Codec: ulaw g729

Alternate Codec: ulaw g729 none

Is SoftSPOT NATd: Yes No

Is SoftSPOT Behind a Firewall: Yes No

Is There a Local Firewall: Yes No

### ***SoftSPOT External IP Address***

Your SoftSPOT will either use a public IP address or a private IP address. If the IP address on your SoftSPOT is of the form 192.168.x.x, 172.16.x.x – 172.31.x.x, or 10.x.x.x, then your SoftSPOT server uses an internal, private IP address. This internal address is not routable on the public Internet. In order for your SPOT server to connect to the Broadvox Session Border Controller, you must either have a public IP address on your SPOT server or you must translate your private IP address into a public IP address using a Network Address Translator (NAT).

If your SoftSPOT is behind a NAT, your public IP address will typically be the public IP address of your NAT. You may also have a static, one-to-one mapping of a public IP address to your private IP address. In this case, your public IP address will not match the IP address of your NAT, but you can look up the correct public IP address in your NAT configuration. If in doubt, you can perform a network packet capture using Wireshark (previously called Ethereal) on the public side of your NAT while simultaneously issuing some form of Internet request on your SoftSPOT server.



## ***Sending Calls to Broadvox***

In your Welcome letter, Broadvox provides DNS records to which you may send calls, and from which you should be prepared to receive calls.

At the top of your technical welcome letter, you will see a table like this one which shows your account number, turn-up ticket number, and trunk number. This information should be provided to Broadvox when you call for assistance to expedite support.

Account Number	Trunk turn-up Ticket Number	Trunk Number

**Figure 1: Welcome Letter Account Information**

The third page of the welcome letter contains a table of the IP addresses and ports you need to allow through your firewall. Note that the table included here is an example and may be out of date.

Traffic Type	IP Addresses	Protocol	Port Range
SIP	208.93.224.224/28 208.93.226.208/28 208.93.227.208/28	UDP and TCP	5060
SIPS (SIP over TLS)	208.93.224.224/28 208.93.226.208/28 208.93.227.208/28	TCP	5061
Media	208.93.224.224/28 208.93.226.208/28 208.93.227.208/28 64.158.162.71 64.158.162.100 64.152.60.71 64.152.60.164 209.249.3.71 209.249.3.81 64.156.174.71 208.93.227.5 208.93.226.5	UDP	1024-65535

**Figure 2: Firewall Configuration Information**

The third page also contains the IP address and DNS information you should use for configuring your trunk.



City	DNS A Record	DNS SRV Record	IP Address
New York City, NY	nyc01-01.fs.broadvox.net	nyc01-01.fs.broadvox.net	208.93.226.212
Dallas, TX	dfw01-01.fs.broadvox.net	dfw01-01.fs.broadvox.net	208.93.224.228
Los Angeles, CA	lax01-01.fs.broadvox.net	lax01-01.fs.broadvox.net	208.93.227.212

**Figure 3: Trunk Destination Information**

You will also find a section containing information about how your trunk is configured on the Broadvox side. You should carefully review this information to ensure it is configured properly.

Admin E-mail:  
Trunk Type: GO!Local  
BTN & Username:  
Password:  
TCP:   
TLS:   
SRTP:   
Dialed Number In: Request-URI  
NAT Allowed:   
Simultaneous Calls:

**Figure 4: Configuration of Broadvox Side**

The 'Admin E-mail ' lists the E-mail address which will receive alerts from the Broadvox SIP Trunking platform when various recognizable events occur. These events include things such as calls being blocked because they would cause you to exceed the simultaneous call sessions you purchased.

Finally, on the fourth page, you will find two sections that specify how Broadvox is configured to send calls to your SoftSPOT and how Broadvox is configured to receive calls from your SoftSPOT. These two sections are only utilized if you provided static IP address information or DNS information. Broadvox can send calls to entirely separate systems from the ones it is configured to receive calls from. This allows you to split your inbound and outbound traffic for any reason you may have, including but not limited to load distribution over several systems or multiple Internet connections. In addition, Broadvox can randomly load-balance calls across several systems using an identical priority for the Send-To records. These options should allow you to engineer your traffic flow to suite your particular needs.





Static Receive From Records			
Location	Location Type		
	<input type="radio"/> DNS A	<input type="radio"/> DNS SRV	<input type="radio"/> IP
	<input type="radio"/> DNS A	<input type="radio"/> DNS SRV	<input type="radio"/> IP
	<input type="radio"/> DNS A	<input type="radio"/> DNS SRV	<input type="radio"/> IP
	<input type="radio"/> DNS A	<input type="radio"/> DNS SRV	<input type="radio"/> IP
	<input type="radio"/> DNS A	<input type="radio"/> DNS SRV	<input type="radio"/> IP
	<input type="radio"/> DNS A	<input type="radio"/> DNS SRV	<input type="radio"/> IP

Broadvox is set to send calls to the following static locations, in addition to any locations known through registration:

Static Send To Records			
Priority	Location	Location Type	
		<input type="radio"/> DNS A	<input type="radio"/> DNS SRV <input type="radio"/> IP
		<input type="radio"/> DNS A	<input type="radio"/> DNS SRV <input type="radio"/> IP
		<input type="radio"/> DNS A	<input type="radio"/> DNS SRV <input type="radio"/> IP
		<input type="radio"/> DNS A	<input type="radio"/> DNS SRV <input type="radio"/> IP
		<input type="radio"/> DNS A	<input type="radio"/> DNS SRV <input type="radio"/> IP
		<input type="radio"/> DNS A	<input type="radio"/> DNS SRV <input type="radio"/> IP

All locations known through registration will be sent an INVITE **Simultaneously**.

Registered locations will be contacted **Before Static Locations**.

Static locations will be contacted **Sequentially Based on Order**.

**Figure 5: Signaling Configuration**

## ***SRV Records***

Service records (SRV) are a form of Domain Name System (DNS) record. They contain information about where to send requests for a particular service offered at a specific domain. In the case of Broadvox GO! SIP Trunking, they provide the IP addresses, port numbers, and preferences to use for sending SIP calls over UDP, TCP, and TLS to Broadvox. The SRV location to use for sending calls to Broadvox for each of your trunk groups is in your Welcome letter.

## ***Testing SRV Records***

Most Broadvox GO! SIP Trunking customers like to ensure the DNS entries are functioning or they like to look up the actual IP addresses, however, performing a standard DNS query on the SRV records will fail. In a Windows environment, you can perform the query using the `nslookup` command at a command prompt, as shown in Figure 1.



```
Command Prompt - nslookup
C:\>nslookup
Default Server: clehbdc01.broadvox.local
Address: 172.16.5.10

> set type=srv
> _sip._udp.nyc01-01.fs.broadvox.net
Server: clehbdc01.broadvox.local
Address: 172.16.5.10

_sip._udp.nyc01-01.fs.broadvox.net      SRU service location:
      priority      = 10
      weight        = 0
      port          = 5060
      svr hostname  = nyc01-01.fs.broadvox.net
fs.broadvox.net nameserver = ns03.broadvox.net
fs.broadvox.net nameserver = ns04.broadvox.net
nyc01-01.fs.broadvox.net      internet address = 208.93.226.212
ns03.broadvox.net      internet address = 66.243.109.10
ns04.broadvox.net      internet address = 66.243.109.11
> _sip._tcp.nyc01-01.fs.broadvox.net
Server: clehbdc01.broadvox.local
Address: 172.16.5.10

_sip._tcp.nyc01-01.fs.broadvox.net      SRU service location:
      priority      = 10
      weight        = 0
      port          = 5060
      svr hostname  = nyc01-01.fs.broadvox.net
fs.broadvox.net nameserver = ns04.broadvox.net
fs.broadvox.net nameserver = ns03.broadvox.net
nyc01-01.fs.broadvox.net      internet address = 208.93.226.212
ns03.broadvox.net      internet address = 66.243.109.10
ns04.broadvox.net      internet address = 66.243.109.11
>
```

Figure 6: SRV Lookup in Windows XP

As you can see, a SRV record consists of a service type definition (`_sip`), a transport definition (`_udp`), and the domain (`nyc01-01.fs.broadvox.net`). The query returns a priority, weight, port and hostname for each entry. The query also returns the “A record” entries for each hostname, which provides the IP address for each host.

In a UNIX or Linux environment, you can perform a query on our SRV records using the `dig` command:

```
$ dig srv _sip._udp.nyc01-01.fs.broadvox.net

; <<>> DiG 9.3.4-P1 <<>> srv _sip._udp.nyc01-01.fs.broadvox.net
;; global options: printcmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 26443
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 1

;; QUESTION SECTION:
;_sip._udp.nyc01-01.fs.broadvox.net. IN SRV

;; ANSWER SECTION:
_sip._udp.nyc01-01.fs.broadvox.net. 600 IN SRV 10 0 5060 nyc01-
01.fs.broadvox.net.

;; AUTHORITY SECTION:
fs.broadvox.net.      600      IN       NS       ns03.broadvox.net.
fs.broadvox.net.      600      IN       NS       ns04.broadvox.net.

;; ADDITIONAL SECTION:
nyc01-01.fs.broadvox.net. 600      IN       A        208.93.226.212

;; Query time: 95 msec
```



```
;; SERVER: 10.128.6.4#53(10.128.6.4)
;; WHEN: Thu Jul 30 13:59:26 2009
;; MSG SIZE rcvd: 150
```

## ***Preferred and Alternate Codecs***

Broadvox allows you to select preferred and alternate codecs to simultaneously meet your bandwidth requirements and provide greater end-to-end support. In the event that your destination party or your destination party's carrier cannot support your preferred codec or alternate codecs, Broadvox will automatically transcode your call to a supported codec.

When configuring codecs, please keep in mind that G.711  $\mu$ Law (ulaw) consumes approximately 87.2 Kbps of bandwidth per simultaneous call over Ethernet. G.729 Annex A (g729) will consume approximately 31.2 Kbps of bandwidth per simultaneous call over Ethernet. Also, keep in mind that G.711 offers superior call quality when compared to G.729, but only if you have enough bandwidth to support all of your simultaneous calls.

## ***Is SoftSPOT NATd***

If your *SoftSPOT* uses an Internet-facing IP address of the form 192.168.x.x, 172.16.x.x – 172.31.x.x, or 10.x.x.x, then it is almost certainly behind a Network Address Translation (NAT) device. If your server uses an address of that form and is not behind a NAT, then it has no connectivity to the Internet. Even if your server uses an IP address that does not match the forms above, it is still possible (though very unlikely) that it is behind a NAT. If *SoftSPOT* is behind a NAT, you may need to perform *port forwarding*, set up a *DMZ host* or configure a *one-to-one static IP map*.

## ***Is SoftSPOT Behind a Firewall***

If SPOT is behind a NAT, then it is almost certainly behind a firewall. It is also possible that *SoftSPOT* uses a public IP address but is still behind a firewall. If you use a Cisco PIX, SonicWALL, Shorewall, Firebox, or any other brand of firewall, you may need to perform additional configuration steps on the firewall device to allow *SoftSPOT* to function properly. Additionally, you may be using an Application Gateway such as an Ingate SIParator. These devices will also need additional configuration to allow *SoftSPOT* to function properly. Configuring your firewall or application gateway is beyond the scope of this document. In general, you will need to allow UDP port 5060 in both directions, as well as UDP ports 1024 to 65535 for RTP. However, you may need a larger range of ports for RTP.

## **Configuring *SoftSPOT***

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The following entails how to configure your XML file for provisioning a trunk to allow you to send and receive calls from Broadvox.

1) Broadvox requires the "telephone-event" payload to be 101.

On SPOT versions V6.14 and earlier this requires listing various dynamic codecs (unused by broadvox) before the "telephone-event" so that the "telephone-event" will be dynamically assigned number 101. Since the dynamic payload range begins at 96, this means listing 5 codecs. For example:

```
<media type="audio" ptime="20">
  <codec name="PCMU"/>      <!-- use PCMU, static payload number -->
  <codec name="G726-32"/>  <!-- dynamic codec # 96 -->
  <codec name="iLBC"/>     <!-- dynamic codec # 97 -->
  <codec name="AMR-NB"/>   <!-- dynamic codec # 98 -->
  <codec name="TETRA"/>   <!-- dynamic codec # 99 -->
  <codec name="ISAC"/>    <!-- dynamic codec # 100 -->
  <codec name="telephone-event"/> <!-- dynamic codec # 101! -->
</media>
```

On SPOT versions V6.15 and onwards telephone-event is always assigned the number 101, so you do not need to list the extra codecs. For example:

```
<media type="audio" ptime="20">
  <codec name="PCMU"/>      <!-- use PCMU, static payload number -->
  <codec name="telephone-event"/> <!-- will get payload 101 -->
</media>
```

2) You must register with multiple Broadvox peers. Broadvox registration information is placed in sipstack.xml. To support Dynamic NAT traversal, use a short expiry if necessary. For example:

```
<registrars>
  <registrars>
    <registrars>
      sipurl="sip:4028586168@nyc01-01.fs.broadvox.net"
      password="PASSWORD"
      id="4028586168"
      expires="600"
      isPrivacyServer="false" />
    </registrars>
    <registrars>
      sipurl="sip:4028586168@dfw01-01.fs.broadvox.net"
      password="PASSWORD"
      id="4028586168"
      expires="600"
      isPrivacyServer="false" />
    </registrars>
    <registrars>
      sipurl="sip:4028586168@lax01-01.fs.broadvox.net"
      password="PASSWORD"
      id="4028586168"
      expires="600"
      isPrivacyServer="false" />
    </registrars>
  </registrars>
</registrars>
```

To direct calls via a particular peer, use the OBCALL.hints.route parameter to <createcall> (see the SPOT Application Developer Reference).

3) To use G711U, simply list "PCMU" as the first codec in the codec



list, and omit "G729" (see above for example). To use G729A, simply list "G729" as the first codec and omit "PCMU".