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Purpose, Scope and Audience

This technical application note describes the configuration of Samsung OfficeServ for the Broadvox GO! SIP Trunking service. This document has a technical audience in mind – specifically IT professionals 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:

- Familiarity with PBX systems, including:
    - ° Trunk configuration
    - ° Calling plan configuration
    - ° Extension configuration
    - ° Mailbox configuration
- Familiarity with Session Initiation Protocol (SIP)
- 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 Samsung OfficeServ 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 a software professional.

Introduction to Broadvox

Information for Provisioning Broadvox 'Fusion' SIP Trunk

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 Note that the table included here is an example and may be out of date.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

Also on the third page, you will 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 Samsung and how Broadvox is configured to receive calls from your Samsung. 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. These options may be subject to an additional charge and it is suggested to first speak with a Broadvox sales representative before any changes are pursued.

Static Receive From Records	
Location	**Location Type**
	○ DNS A ○ DNS SRV ○ IP
	○ DNS A ○ DNS SRV ○ IP
	○ DNS A ○ DNS SRV ○ IP
	○ DNS A ○ DNS SRV ○ IP
	○ DNS A ○ DNS SRV ○ IP
	○ DNS A ○ DNS SRV ○ 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**
		○ DNS A ○ DNS SRV ○ IP
		○ DNS A ○ DNS SRV ○ IP
		○ DNS A ○ DNS SRV ○ IP
		○ DNS A ○ DNS SRV ○ IP
		○ DNS A ○ DNS SRV ○ IP
		○ DNS A ○ DNS SRV ○ 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, the query can be performed using the **nslookup** command at a command prompt, as shown in Figure 7.

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, a query can be performed on 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 µLaw (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.

Configure the OfficeServ Phone System

The following describes the necessary steps to configure the OfficeServ 7000 series PBX for use with the Broadvox Go_SIP_Trunking! product. This document is meant to be used in conjuction with the "OfficeServ 7000 Series SIP Trunking Quick Reference Document."

1. Begin by navigating to section 5.2.13. SIP Carrier Options. This is where the connection with Broadvox will be established. The necessary information can be found in Broadvox turn-up technical letter.

   a. For Registration based trunks:
      - **SIP Carrier Name**: Descriptive Trunk Name (Broadvox, Broadvox Fusion, ect.)
      - **SIP Server Enable**: Change to Enable. This makes the trunk active.
      - **Registra Address**: Hostname listed in Broadvox technical letter. Ex: ln01-0x.fs.broadvox.net
      - **Outbound Proxy**: Hostname listed in Broadvox technical letter.
      - **DNS Server 1**: DNS server provided by your ITSP or internal DNS server.
      - **Username**: BTN (Main Telephone Number).
      - **Auth Username**: BTN (Main Telephone Number).
      - **Auth Password**: Broadvox password
      - **Trunk Reg Expire Time**: 180

Item	Value
SIP Carrier Name	Broadvox Fusion
SIP Server Enable	Enable
SIP Service Available	Yes
Registra Address	ln01-0x.fs.broadvox.net
Registra Port	5060
Outbound Proxy	ln01-0x.fs.broadvox.net
Alternative Outband Proxy	0.0.0.0
Outbound Proxy Port	5060
Proxy Domain Name	
DNS Server 1	168.126.63.1
DNS Server 2	0.0.0.0
User Name	5551234567
Auth Username	5551234567
Auth Password	BVX-Password
Regist. Per User	Disable
Session Timer	Re-Invite
Session Expire Time	600
Trunk Reg Expire Time	180
Alive Notify	None
Alive Notify Time	120
IMS Option	Disable
P-Asserted-ID Use	None
Privacy	Disable
SIP Peering	Disable
Send CLI Table	1
Supplementary Type	PBX managed 1
302 Response	Disable
SIP Destination Type	To Header
Codec Auto Nego	Enable
Hold Reinvite	Enable
URI Type	SIP
SIP Signal Type	UDP
E.164 Support	Enable

Figure 7 - Registration Configuration

b. For Static based trunks:
- **SIP Carrier Name**: Descriptive Trunk Name (Broadvox, Broadvox Fusion, ect.)
- **SIP Server Enable**: Change to Enable. This makes the trunk active.
- **Outbound Proxy**: Hostname listed in Broadvox technical letter.
- **DNS Server 1**: DNS server provided by your ITSP or internal DNS server.
- **Alive Notify**: Options (this MUST be enabled to keep the trunk alive)
- **Alive Notify Time**: 180

Item	Value
SIP Carrier Name	Broadvox Fusion
SIP Server Enable	Enable
SIP Service Available	Yes
Registra Address	
Registra Port	5060
Outbound Proxy	ln01-0x.fs.broadvox.net
Alternative Outband Proxy	0.0.0.0
Outbound Proxy Port	5060
Proxy Domain Name	
DNS Server 1	168.126.63.1
DNS Server 2	0.0.0.0
User Name	
Auth Username	
Auth Password	
Regist. Per User	Disable
Session Timer	Re-Invite
Session Expire Time	600
Trunk Reg Expire Time	600
Alive Notify	Options
Alive Notify Time	180
IMS Option	Disable
P-Asserted-ID Use	None
Privacy	Disable
SIP Peering	Disable
Send CLI Table	1
Supplementary Type	PBX managed 1
302 Response	Disable
SIP Destination Type	To Header
Codec Auto Nego	Enable
Hold Reinvite	Enable
URI Type	SIP
SIP Signal Type	UDP
E.164 Support	Enable

Figure 8 - Static Configuration

2. The trunk should now be active, and ready to make and receive calls. In order to do so, some inbound rules will need to be implemented in order for the OfficeServ to know what to do with an incoming DID from Broadvox. To do this navigate to menu 3.2.3 DID Ringing. Input your Broadvox into the table followed by what extension they should ring to.

Entry Number	Incoming digits	Ring Plan					
		1	2	3	4	5	6
1	5551234567	3201	3201	3201	3201		
2	5551234567	3208	3208	3208	3208	3208	3208

Figure 9 - DID Ringing

Illustrations