1 Level 3

Level (3)
COMMUNICATIONS

1.1 Warnings

Check the SIP 3rd Party SIP Carrier Matrix for certification status, and supported features. More info about the SIP 3rd Party SIP Carrier Matrix can be found in the SIP Carrier section of the web sites below:

- http://testlab.inin.com
- http://testlab.vonexus.com

This document is created using IC 3.0, which is reflected in some of the configuration steps. If not using IC 3.0, then the same options should still be available, but may be located in different configuration menus.

1.2 Vendor Contact

Vendor Web Site : http://www.level3.com/en/solutions/sip-voice-complete/

1.3 Versions Verified

SIP Carrier status as of February, 15 2008.

1.4 Pre-Install

Level 3 will provide users with an IP address to make contact with their systems, and require a static IP from the customer. These must be exchanged before setup can begin.

1.5 Install

Level 3 requires a fully configured SIP enabled IC server. Two SIP lines must exist on the IC server; one for station connection calls and the other for interoperability to Level 3. The configuration for these lines will be covered in section 2 below.

1.6 Required Post Installation Steps

Confirm capacities and capabilities of purchased service.

2 IC Server Configuration

2.1 Line Configuration

The line page has a vast majority of the configuration options required for SIP Carrier setup.

As stated before, two lines must exist on the IC server. In IC version 3.0 a station connection line is created during installation and must be added to a registration group if using managed phones. The second line must be created for the SIP carrier connection. Each portion of the lines page will be explained as it relates to the SIP carriers. For this document, the SIP carrier connection line will be referred to as Level 3 SIP Line, and the station line will be referred to as stations-TCP. Also, any reference to a menu, while talking about the line configuration, will refer to the options on the left side of the line configuration page, and tabs will refer to the standard tab interface across the top of the line configuration page.

As a note, Level 3 only supports UDP at this time (2/15/08). This does not prevent TCP or TLS connections to the stations; IC will make the signaling conversion dynamically.

2.1.1 Line Menu

2.1.2 Active

The active box should be checked. This activates the line. If this box is not checked, the line will not be available for any function. This can also be affected by right clicking on the line in Interaction Administrator, dropping to the Set Active menu option, and selecting Yes.

2.1.3 Phone Number

The phone number provided by Level 3 should be entered into this box. The number entered is used in the "From" header in outbound SIP calls.

2.1.4 Domain Name

This box should contain the domain information of the SIP Carrier, not the IC server. This is appended to the URL in registration requests.

2.1.5 Remainder of Line Menu Options

These have no major direct impact on the SIP carrier configuration, and should be addressed according to business needs.

The disable T.38 fax option will prevent both T.38 inbound and outbound faxing from working properly. Level 3 supports T.38 faxing with any originating codec. Interactive Intelligence has verified G.711, G.729, and G.729 Annex B can all handle the T.38 re-invite properly.

2.1.6   Audio Menu

2.1.7   Audio Path

This is for the most part, the choice of the client with respect to the business being done on the server. However, there are several important caveats.

1. Dynamic audio for SIP carriers has significantly less delay as compared to Always In audio (~100ms).
2. The audio will be brought into the IC server when set to Dynamic Audio for any call that is recorded (just for that call, not permanently). If using a Media Server recorded calls will not travel through the IC server.

2.1.8   DTMF Type

DTMF has three options, Inband, RFC2833, and RFC2833 Only. These are up to the discretion of the user. When setting the Level 3 SIP Line to use Delayed Media instead of Normal media (the default in 3.0 is Normal Media), codec selection is done by Level 3. Level 3 will offer G.729 as their only codec. Support for this codec needs to exist on the Level 3 SIP Line configured in Interaction Administrator or Level 3 can make the configuration change to their switch.

2.1.9   Remainder of Audio Menu Options

These have no major direct impact on the SIP carrier configuration, and should be addressed according to business needs.

2.1.10 Transport Menu

2.1.10.1 Transport Protocol

This option should be set to UDP, unless an agreement for TCP or TLS support has been agreed upon with Level 3. As of February 15, 2008, Level 3 has support for UDP only.

2.1.10.2 Receive Port

This option should be set to 5060 (the standard SIP port), unless an agreement for an alternative port has been agreed upon with the Level 3.

2.1.10.3 Remainder of Transport Menu Options

These have no major direct impact on the Level 3 configuration, and should be addressed according to business needs.

2.1.11 Session Menu

2.1.11.1 Media Type

This drop down (IC version 3.0) controls who offers the SDP information first on outbound calls; Delayed Media will let Level 3 determine the codec and Normal Media will send the SDP in the INVITE message. Refer to section 2.1.9 for DTMF type requirements.

2.1.11.2 Remainder of Session Menu Options

These have no major direct impact on the SIP carrier configuration, and should be addressed according to business needs.

2.1.12 Authentication Menu

This box must be checked to enable authentication to the SIP Carrier. At the moment, Level 3 uses a static IP model with no authentication, so nothing should be done with this page.

2.1.13 Proxy Menu

2.1.13.1   Prioritized list of Proxy IP addresses

Level 3, by default will supply the customer with a single IP address for which all signaling must be directed too. A second backup destination proxy address can be requested to support redundancy. A Fully Qualified Domain Name (FQDN) to a cluster is not supported by Level 3. When configuring the proxy for Level 3, this **IP Address** should be entered completely with the port (generally 5060 unless otherwise directed) to enable the service to work properly.

2.1.13.2   Remainder of Proxy Menu Options

These have no major direct impact on the Level 3 configuration, and should be addressed according to business needs.

2.1.14 Registrar Menu

2.1.14.1   External Phone Numbers

This box is not currently used by Level 3's configuration. In most cases it would be used to register multiple numbers to the same IC server. However as Level 3 uses a static IP method, they do the registration/routing setup on their end and do not require the IC server to request the various numbers itself.

2.1.14.2   Prioritized list of Registrar IP addresses

This box is not used in Level 3's current configuration. The current system of providing static IP or FQDN makes registration messages unnecessary.

2.1.15 Access Menu (Access Control lists)

If your business needs require that your endpoints (i.e. phones) use port 5060, Access Control lists are recommended. These lists are recommended because separate lines allow better tracking of resource utilization. The default ports of the station connection lines (stations-TCP) are as follows:

UDP = 8060

TCP = 8060

TLS = 8061

If these defaults are used access lists are unnecessary and the following two sections can be skipped (2.1.15.1 and 2.1.15.2).

2.1.15.1   Level 3 SIP Line

For the access menu, the radio button should be shifted to the value:

By default, all computers will be: Denied Access.

In the access list below the radio button, the resolved IP address for each proxy server **MUST** be added. The "add menu" has a DNS lookup option if the only information provided by the carrier were FQDNs. This allows the IC server to talk to all the required elements of the SIP carrier.

2.1.15.2   Stations Line

In the case of the stations line, this is up to the discretion of the user. It is possible to enter in single IP's, IP groups (using subnet masks), or allow everything. The user has several options based on business needs and security requirements. However note that only one line can be selected to "Granted Access" per port per IC server.

The reason why the SIP Carrier Line was selected to be Denied Access was because it has far fewer and less complicated entries than the line that will be supporting all the local endpoints.

2.2   Regionalization Container

This should be set at the user discretion; however the user should take care to assure the location supports the proper codecs supported by the Level 3. At this time G.711 and G.729 can be offered by Level 3.

3   SIP Proxy Support

Note: If using a NAT/PAT type solution with Level 3, a SIP Proxy can be used to provide redundancy and/or load balancing. The tested configuration consisted of:
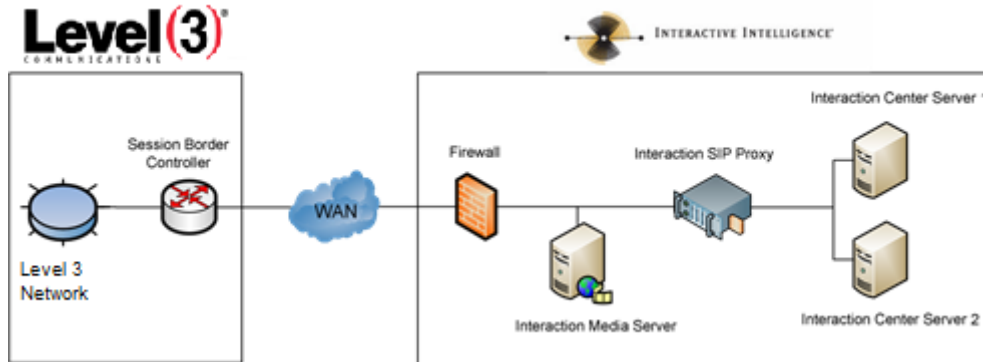
The external address of the firewall is the IP address given to Level 3 to verify the origination of the call, the customer, and services being supplied. As a reminder, Level 3 uses a static IP address to identify an end user and will deny the call if this IP address does not match.

Proxy for Inbound calls only:

If using an Interaction SIP Proxy as outlined in the diagram above for inbound calls, the primary and backup IC servers will be added to a Server Plan and a route will need to be created to link the incoming DID(s) from Level 3 to the Server Plan. The proxy defined in IC for the Level 3 SIP Line should remain pointed at Level 3.

If using a PIX or other firewall device, the IP address given to Level 3 will be the external side of the firewall. Otherwise the Interaction SIP Proxy's IP address should be given.

Proxy for Outbound calls:

If using an Interaction SIP Proxy as outlined in the diagram above for outbound calls, then the IP Address of the Interaction Center SIP Proxy must be entered in the Level 3 SIP Line configuration on the IC server instead of the Level 3's IP address. A server plan, with Level 3's IP address, and a route will need to be created on the proxy. The route will consist of all outbound dialed numbers needing to be directed to Level 3's network.

If using a PIX or other firewall device, the IP address given to Level 3 will be the external side of the firewall. Otherwise the Interaction Center's IP address should be given.

Proxy for both Inbound and Outbound:

If a SIP Proxy is to be used for both inbound and outbound calls both of the two previous sections will need to be followed. Two Server Plan's will be created, one for inbound and one for outbound. The Inbound server plan consists of the IC server IP addresses and the outbound server plan consists of Level 3's addresses. The Level 3 SIP Line on the IC server will be directed at the Interaction SIP Proxy.

If using a PIX or other firewall device, the IP address given to Level 3 will be the external side of the firewall. Otherwise the Interaction SIP Proxy's IP address should be given and Record Route selected on the Interaction SIP Proxy "Settings" page.

4 Fax Support

Level 3 supports T.38 faxing. Fax stations, both soft faxing and fax machines connected to an AudioCodes FXS module, have been verified.

4.1 AudioCodes Media Pack Configuration

Aside from the standard configuration options that must be entered for general SIP to analog usage (e.g. proxy name, IP address, etc…) two additional features must be set to enable the Media Pack to properly pass the fax.

One is the Fax Signaling Method. This must be set to T.38 Relay, and can be found by selecting the following links from the main page of the Media Pack configuration.

- Protocol Management
  - Protocol Definition
    - General

General

PRACK Mode	Supported
Channel Select Mode	By Dest Phone Number
Enable Early Media	Enable
183 Message Behavior	Progress
Session-Expires Time	0
Minimum Session-Expires	90
Session Expires Method	Re-Invite
Asserted Identity Mode	Disabled
Fax Signaling Method	T.38 Relay
! Detect Fax on Answer Tone	Initiate T.38 on Preamble
SIP Transport Type	UDP
SIP UDP Local Port	5060
SIP TCP Local Port	5060
SIP TLS Local Port	5061

The other required configuration setting is Fax Transport Mode, which must be set to T.38 Relay. This configuration option can be found by selecting the following links from the main page of the Media Pack configuration.

- Advanced Configuration
  - Media Settings
    - Fax/Modem/CID Settings

Fax/Modem/CID Settings

Fax Transport Mode	T.38 Relay
Caller ID Transport Type	Mute
Caller ID Type	Bellcore
V.21 Modem Transport Type	Disable
V.22 Modem Transport Type	Enable Bypass
V.23 Modem Transport Type	Enable Bypass
V.32 Modem Transport Type	Enable Bypass
V.34 Modem Transport Type	Enable Bypass
Fax Relay Redundancy Depth	0
Fax Relay Enhanced Redundancy Depth	4
Fax Relay ECM Enable	Enable
Fax Relay Max Rate (bps)	14400
Fax/Modem Bypass Coder Type	G711Mulaw
Fax/Modem Bypass Packing Factor	1
CNG Detector Mode	Disable

Submit

5   E911 Support

Level 3 has installed dedicated facilities from their network to the proper PSAP in all markets that they serve. They provide the PSAP both ALI and ANI information on all calls.   They require the customers provide the proper ALI and ANI information for the location beings served as well as any location change information that may occur.