Howto: RADIUS Accounting Tickets from Ingate Firewall/SIParator®

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How To Use RADIUS Accounting with Ingate Firewall/SIParator®

This is how to configure your Firewall/SIParator to use RADIUS Accounting for calls to or from local users.
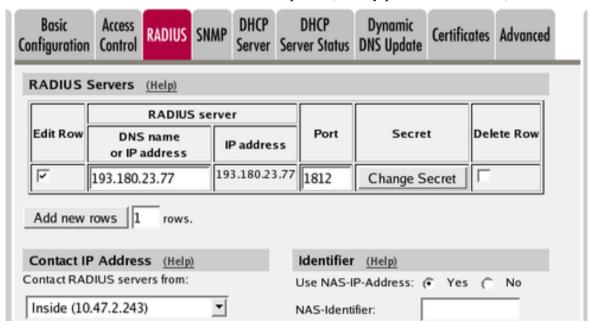
If you are only interested in accounting for calls to other domains, you only have to turn the RADIUS Accounting on.

If you want to bill for local calls too, you will have to force the users to go via the Firewall/SIParator even when they are both on the same side. For this, the Firewall/SIParator will have to act as a back-to-back user agent (B2BUA) for all calls.

This feature is *only available* when the *Advanced SIP Routing* or the *SIP Trunking* module has been installed.

First, define the RADIUS server to receive accounting ticks. This is done on the **RADIUS** page. If the RADIUS server should only be used for accounting, you can enter any port number in the table. The Firewall/SIParator will use port 1813 for accounting.

If you use the Firewall/SIParator as the SIP registrar, and the RADIUS server should be used for SIP authentication as well, you need to enter the port number on which the RADIUS server listens for authentication requests (usually ports 1812 or 1645).
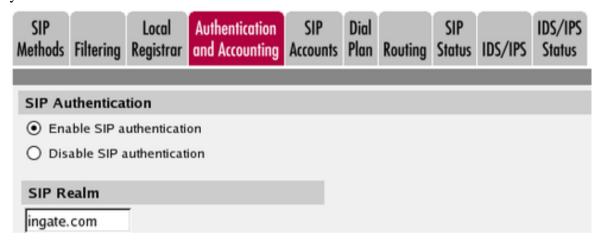

If the Firewall/SIParator should act as the registrar, define a local SIP domain. This can be any domain name you like, as long as it isn't an existing domain somewhere else. A good choice is to use your company www domain, but replace the "www" with "sip", like *sip.ingate.com*. The same domain can also be used in pure SIP-to-SIP calls.

This domain should be entered on the **Local Registrar** page under **SIP Traffic**.

Go to the **Authentication and Accounting** page and turn authentication on. Also enter your SIP domain as the Realm.

If the Firewall/SIParator should be used as registrar, you select to use the RADIUS user database for SIP users and also select which network the SIP users can register from.

On the **Dial Plan** page, you define how calls should be routed through the Firewall/SIParator. First, turn the Dial Plan on.

In the **Matching Request-URI** table, you define call destinations. This is used when matching requests in the **Dial Plan** table below.

In this case, you want to define a **Reg Exp** (regular expression) which matches all Request-URIs. Enter "(.+)@(.+)" in the Reg Exp field.

Matching Request-URI (Help)

| Edit Row | Name | Use This ... | | | | | ... Or This | Delete Row |
		Prefix	Head	Tail	Min. Tail	Domain	Reg Expr	
☐	Any			-			(.+)@(.+)	☐

In the **Forward To** table, you define where calls should be forwarded. This is used in the **Dial Plan** table below.

In this case, the calls should be forwarded to their original destination, but the Firewall/SIParator should forward them as a B2BUA. Enter "$0;b2bua" in the Reg Exp field. This will reuse the incoming Request-URI, but make the Firewall/SIParator act as a B2BUA instead of a proxy.
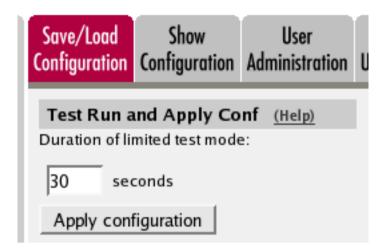
Forward To (Help)

| Edit Row | Name | Subno. | Use This ... | ... Or This | | | | ... Or This | Delete Row |
			Account	Replacement Domain	Port	Transport		Reg Expr	
☐	＋ Same but b2bua	1	-				-	$0;b2bua	☐

At last, you combine these definitions in the **Dial Plan** table. Make a new row in the table and select the definitions from the tables above.

Dial Plan (Help)

| Edit Row | No. | From Header | Request-URI | Action | Forward To | Add Prefix | | ENUM Root | Time Class | Comment | Delete Row |
						Forward	ENUM				
☐	1	-	Any	Forward	Same but b2bua			-	-	Use the built-in B2BUA	☐

Now, when a SIP user calls another SIP user, the Firewall/SIParator will step in and always stay in the path for the call. Both SIP clients will signal to the Firewall/SIParator only, and the Firewall/SIParator will forward signaling between them. Media will still go directly between the clients.

Finally, go to the **Save/Load Configuration** page under **Administration** and apply the new settings by pressing **Apply configuration**.

Ingate RADIUS Accounting

Ingate Firewall/SIParator® supports RADIUS Accounting as described in RFC 2866.

RADIUS Accounting adds the ablility to deliver accounting information about SIP calls from a Firewall/SIParator to a RADIUS Accounting server.

RADIUS Accounting is enabled or disabled by a GUI setting. The configuration of RADIUS servers is shared with RADIUS authentication. This means that accounting and authentication uses the same list of servers, and that there is no way to use a specific server for only one or the other of the services. RADIUS Accounting always uses port 1813.

Accounting attributes used by Ingate Firewall/SIParator®

Attribute	No.	Format of value or text	Sample
User-name	1	String of UTF-8 characters	sip:alice@ingate.com
NAS-IP-Address	4	Four octet IP address	193.45.23.245
NAS-Identifier	32	One or more octets	
Acct-Session-Id	44	String of UTF-8 characters	ea1bba66464748908df9f7....
Acct-Status-Type	40	Four octets (32 bit unsigned value) - Integer	2
Called-Station-Id	30	String of UTF-8 characters	sip:bob@ingate.com 10.17.244.14
Calling-Station-Id	31	String of UTF-8 characters	sip:alice@ingate.com 193.45.23.1
Acct-Session-Time	46	Four octets (32 bit unsigned value) - Integer	180

Attribute	No.	Format of value or text	Sample
Acct-Terminate-Cause	49	Four octets (32 bit unsigned value) - Integer	1
Acct-Input-Octets	42	Four octets (32 bit unsigned value) - Integer	1800000 (number of octetts to the calling endpoint, including the IP-header
Acct-Output-Octets	43	Four octets (32 bit unsigned value) - Integer	1800000 (number of octetts from the calling endpoint
Acct-Input-Packets	47	Four octets (32 bit unsigned value) - Integer	9000 (number of packets to the calling endpoint)
Acct-Output-Packets	48	Four octets (32 bit unsigned value) - Integer	9000 (number of packets from the calling endpoint)
IG-Acct-Input-Jitter	128	Four octets (32 bit unsigned value) - Integer	1 (average jitter in msec)
IG-Acct-Output-Jitter	129	Four octets (32 bit unsigned value) - Integer	1
IG-Acct-Input-Missing	130	Four octets (32 bit unsigned value) - Integer	1 (total number of missing packets)
IG-Acct-Output-Missing	131	Four octets (32 bit unsigned value) - Integer	1
IG-Acct-Input-Missing-Max	132	Four octets (32 bit unsigned value) - Integer	1 (max. number of consecutive missing packets)
IG-Acct-Output-Missing-Max	133	Four octets (32 bit unsigned value) - Integer	1
IG-Acct-Output-Missing-Max	133	Four octets (32 bit unsigned value) - Integer	1
IG-Acct-Input-Est-Mos	134	Four octets (32 bit unsigned value, should be divided by 100)	440 (this means Mean Opinion Score = 4.40)

Attribute	No.	Format of value or text	Sample
IG-Acct-Output-Est-Mos	135	Four octets (32 bit unsigned value, should be divided by 100)	393
IG-Acct-Input-Last-Payload-Type	136	Four octets (32 bit unsigned value) - Integer	0 (value of field .payload-type. in last seen RTP packet)
IG-Acct-Output-Last-Payload-Type	137	Four octets (32 bit unsigned value) - Integer	0
IG-Acct-Input-Reordered	138	Four octets (32 bit unsigned value) - Integer	3 (number of reordered packets)
IG-Acct-Output-Reordered	139	Four octets (32 bit unsigned value) - Integer	1
IG-Acct-Input-Comfort-Noise	140	String of UTF-8 characters	Yes (if there was any comfort noise packet with payload-type 13)
IG-Acct-Output-Comfort-Noise	141	String of UTF-8 characters	No
IG-Acct-Input-Codec-Name	142	String of UTF-8 characters	PCMU (codec name as present in SIP SDP; if sample rate is other than 8000, then this is also shown (e.g. .BV32/16000.)
IG-Acct-Output-Codec-Name	143	String of UTF-8 characters	PCMU
IG-Acct-Input-Jitter-Max	144	Four octets (32 bit unsigned value) - Integer	9 (max. jitter in msec)
IG-Acct-Output-Jitter-Max	145	Four octets (32 bit unsigned value) - Integer	3
IG-Acct-Remote-Party-Id	146	String of UTF-8 characters	"User" <sip:1989@example.com>
IG-Acct-P-Asserted-Identity	147	String of UTF-8 characters	<sip:1989>

Attribute	No.	Format of value or text	Sample
IG-Acct-Diversion	148	String of UTF-8 characters	<sip:+123456789>
IG-Acct-Input-Jitter-Avg-Rtcp	149	String of UTF-8 characters	5.11 (average jitter . as reported from the endpoint via RTCP - in msec)
IG-Acct-Input-Jitter-Max-Rtcp	150	String of UTF-8 characters	10.11 (max. jitter . as reported from the endpoint via RTCP - in msec)
IG-Acct-Input-Missing-Rtcp	151	(32bit unsigned value)-Integer	43 (total number of missing packets, as reported from the endpoint via RTCP)
IG-Acct-Output-Jitter-Avg-Rtcp	152	String of UTF-8 characters	6.11
IG-Acct-Output-Jitter-Max-Rtcp	153	String of UTF-8 characters	10.11
IG-Acct-Input-Missing-Rtcp	154	(32bit unsigned value)-Integer	78
IG-Acct-Rtd-Avg-Rtcp	155	String of UTF-8 characters	39.6 (total round trip delay . calculated based on RTCP monitoring . in msec; obsolete, replaced by No. 156 and 157 below)
IG-Acct-Rtd-Avg-RtcpIn	156	String of UTF-8 characters	1.7 (round trip delay between Ingate and calling enpoint . calculated based on RTCP monitoring . in msec)
IG-Acct-Rtd-Avg-RtcpOut	157	String of UTF-8 characters	37.9 (round trip delay between Ingate and called endpoint . calculated based on RTCP monitoring . in msec)
IG-Acct-Input-DscpIn	158	Four octets (32 bit unsigned value) - Integer	16 (a value between 0 and 63, from the 6 DSCP bits in the IP header of the packets as they enter the Ingate box)
IG-Acct-Input-DscpOut	159	Four octets (32 bit unsigned value) - Integer	16 (a value between 0 and 63, from the 6 DSCP bits in the IP header of the packets as they leave the Ingate box)

Attribute	No.	Format of value or text	Sample
IG-Acct-Output-DscpIn	160	Four octets (32 bit unsigned value) - Integer	16
IG-Acct-Output-DscpOut	161	Four octets (32 bit unsigned value) - Integer	16
IG-Acct-Input-IfIpIn	162	String of UTF-8 characters	192.168.4.13 (the IP adress of the interface on which the packets for this direction are entering the Ingate box)
IG-Acct-Input-IfIpOut	163	String of UTF-8 characters	211.111.111.111 (the IP adress of the interface on which the packets for this direction are leaving the Ingate box)
IG-Acct-Output-IfIpIn	164	String of UTF-8 characters	211.111.111.111
IG-Acct-Output-IfIpOut	165	String of UTF-8 characters	192.168.4.13
IG-Acct-Input-Mtype	166	String of UTF-8 characters	audio RTP/AVP (the media-type and -protocol, as in the SIP SDP)
IG-Acct-Output-Mtype	167	String of UTF-8 characters	audio RTP/AVP
IG-Acct-Video-Input-Octets	176	Four octets (32 bit unsigned value) - Integer	220000
IG-Acct-Video-Output-Octets	177	Four octets (32 bit unsigned value) - Integer	220000
IG-Acct-Video-Input-Packets	178	Four octets (32 bit unsigned value) - Integer	236
IG-Acct-Video-Output-Packets	179	Four octets (32 bit unsigned value) - Integer	236
IG-Acct-Video-Input-Jitter	180	Four octets (32 bit unsigned value) - Integer	0.9

Attribute	No.	Format of value or text	Sample
IG-Acct-Video-Output-Jitter	181	Four octets (32 bit unsigned value) - Integer	2.1
IG-Acct-Video-Input-Jitter-Max	182	Four octets (32 bit unsigned value) - Integer	1.3
IG-Acct-Video-Output-Jitter-Max	183	Four octets (32 bit unsigned value) - Integer	3.6
IG-Acct-Video-Input-Missing	184	Four octets (32 bit unsigned value) - Integer	0
IG-Acct-Video-Output-Missing	185	Four octets (32 bit unsigned value) - Integer	4
IG-Acct-Video-Input-Missing-Max	186	Four octets (32 bit unsigned value) - Integer	0
IG-Acct-Video-Output-Missing-Max	187	Four octets (32 bit unsigned value) - Integer	2
IG-Acct-Video-Input-Last-Payload-Type	190	Four octets (32 bit unsigned value) - Integer	124
IG-Acct-Video-Output-Last-Payload-Type	191	Four octets (32 bit unsigned value) - Integer	124
IG-Acct-Video-Input-Reordered	192	Four octets (32 bit unsigned value) - Integer	0
IG-Acct-Video-Output-Reordered	193	Four octets (32 bit unsigned value) - Integer	1
IG-Acct-Video-Input-Codec-Name	194	String of UTF-8 characters	H264/90000
IG-Acct-Video-Output-Codec-Name	195	String of UTF-8 characters	H264/90000

Attribute	No.	Format of value or text	Sample
IG-Acct-Video-Input-Jitter-Avg-Rtcp	196	String of UTF-8 characters	1.4
IG-Acct-Video-Input-Jitter-Max-Rtcp	197	String of UTF-8 characters	6.6
IG-Acct-Video-Input-Missing-Rtcp	198	Four octets (32 bit unsigned value) - Integer	0
IG-Acct-Video-Output-Jitter-Avg-Rtcp	199	String of UTF-8 characters	2.5
IG-Acct-Video-Output-Jitter-Max-Rtcp	200	String of UTF-8 characters	9.3
IG-Acct-Video-Output-Missing-Rtcp	201	Four octets (32 bit unsigned value) - Integer	6
IG-Acct-Video-Rtd-Avg-RtcpIn	202	String of UTF-8 characters	0.9 (in msec)
IG-Acct-Video-Rtd-Avg-RtcpOut	203	String of UTF-8 characters	5.4 (in msec)
IG-Acct-Video-Input-DscpIn	204	Four octets (32 bit unsigned value) - Integer	40
IG-Acct-Video-Input-DscpOut	205	Four octets (32 bit unsigned value) - Integer	40
IG-Acct-Video-Output-DscpIn	206	Four octets (32 bit unsigned value) - Integer	40
IG-Acct-Video-Output-DscpOut	207	Four octets (32 bit unsigned value) - Integer	40
IG-Acct-Video-Input-IfIpIn	208	String of UTF-8 characters	192.168.4.13

Attribute	No.	Format of value or text	Sample
IG-Acct-Video-Input-IfIpOut	209	String of UTF-8 characters	211.111.111.111
IG-Acct-Video-Output-IfIpIn	210	String of UTF-8 characters	211.111.111.111
IG-Acct-Video-Output-IfIpOut	211	String of UTF-8 characters	192.168.4.13
IG-Acct-Video-Input-Mtype	212	String of UTF-8 characters	video RTP/AVP
IG-Acct-Video-Output-Mtype	213	String of UTF-8 characters	video RTP/AVP
IG-Acct-Other-Input-Octets	224	Four octets (32 bit unsigned value) - Integer	2203
IG-Acct-Other-Output-Octets	225	Four octets (32 bit unsigned value) - Integer	45004
IG-Acct-Other-Input-Packets	226	Four octets (32 bit unsigned value) - Integer	40
IG-Acct-Other-Output-Packets	227	Four octets (32 bit unsigned value) - Integer	623
IG-Acct-Other-Input-DscpIn	228	Four octets (32 bit unsigned value) - Integer	24
IG-Acct-Other-Input-DscpOut	229	Four octets (32 bit unsigned value) - Integer	24
IG-Acct-Other-Output-DscpIn	230	Four octets (32 bit unsigned value) - Integer	24
IG-Acct-Other-Output-DscpOut	231	Four octets (32 bit unsigned value) - Integer	24

Attribute	No.	Format of value or text	Sample
IG-Acct-Other-Input-IfIpIn	232	String of UTF-8 characters	192.168.4.13
IG-Acct-Other-Input-IfIpOut	233	String of UTF-8 characters	211.111.111.111
IG-Acct-Other-Output-IfIpIn	234	String of UTF-8 characters	211.111.111.111
IG-Acct-Other-Output-IfIpOut	235	String of UTF-8 characters	192.168.4.13
IG-Acct-Other-Input-Mtype	236	String of UTF-8 characters	image udptl (this is what you get for fax over T.38 connections)
IG-Acct-Other-Output-Mtype	237	String of UTF-8 characters	image udptl

The attributes follow RFC 2865 and RFC 2866, where more information can be found.

The *Acct-Session-Time* and *Acct-Terminate-Cause* are sent when the *Acct-Status-Type* is "Stop".

RADIUS dictionary file with Ingate content example

```
#

VENDOR  Ingate   13465
BEGIN-VENDOR Ingate

ATTRIBUTE IG-Admin-Account 1 integer


#
#   Type of administrator account.
#
VALUE  IG-Admin-Account Full-Access-Admin 1
VALUE  IG-Admin-Account Backup-Admin  2
VALUE  IG-Admin-Account Read-Only-Admin  3
VALUE  IG-Admin-Account VPN-Admin   4
VALUE  IG-Admin-Account SIP-Admin    5
VALUE  IG-Admin-Account VPN-Reneg-Admin  6


#
#   Accounting attributes.
#
ATTRIBUTE IG-Acct-Input-Jitter 128 integer
```

```
ATTRIBUTE IG-Acct-Output-Jitter 129 integer
ATTRIBUTE IG-Acct-Input-Missing 130 integer
ATTRIBUTE IG-Acct-Output-Missing 131 integer
ATTRIBUTE IG-Acct-Input-Missing-Max 132 integer
ATTRIBUTE IG-Acct-Output-Missing-Max 133 integer
ATTRIBUTE IG-Acct-Input-Est-Mos 134 integer
ATTRIBUTE IG-Acct-Output-Est-Mos 135 integer
ATTRIBUTE IG-Acct-Input-Last-Payload-Type  136 integer
ATTRIBUTE IG-Acct-Output-Last-Payload-Type 137 integer
ATTRIBUTE IG-Acct-Input-Reordered 138 integer
ATTRIBUTE IG-Acct-Output-Reordered 139 integer
ATTRIBUTE IG-Acct-Input-Comfort-Noise 140 string
ATTRIBUTE IG-Acct-Output-Comfort-Noise 141 string
ATTRIBUTE IG-Acct-Input-Codec-Name 142 string
ATTRIBUTE IG-Acct-Output-Codec-Name 143 string
ATTRIBUTE IG-Acct-Input-Jitter-Max 144 integer
ATTRIBUTE IG-Acct-Output-Jitter-Max 145 integer
ATTRIBUTE IG-Acct-Remote-Party-Id 146 string
ATTRIBUTE IG-Acct-P-Asserted-Identity 147 string
ATTRIBUTE IG-Acct-Diversion 148 string
ATTRIBUTE IG-Acct-Input-Jitter-Avg-Rtcp 149 string
ATTRIBUTE IG-Acct-Input-Jitter-Max-Rtcp 150 string
ATTRIBUTE IG-Acct-Input-Missing-Rtcp 151 integer
ATTRIBUTE IG-Acct-Output-Jitter-Avg-Rtcp 152 string
ATTRIBUTE IG-Acct-Output-Jitter-Max-Rtcp 153 string
ATTRIBUTE IG-Acct-Output-Missing-Rtcp 154 integer
ATTRIBUTE IG-Acct-Rtd-Avg-Rtcp 155 string


END-VENDOR Ingate
```

When Ingate Firewall/SIParator® Generates Accounting Data

The Ingate Firewall/SIParator® generates accounting information when accounting is enabled in the configuration and at least one of the following conditions is true:

- Media is handled by the Firewall/SIParator, i.e. every case when the media traverses through the Firewall/SIParator, or when Remote SIP Connectivity is used for the specific call.

- The Firewall/SIParator acts as a B2BUA. This requires that the SIP Trunking or the Advanced SIP Routing module is installed, and that at least one of the criteria below is met:

  - An XF or B2BUAWM account is used for the specific call.

  - Regular Expressions are used in the **Matching Request-URI** and **Forward To** tables, and the Regular Expression in the **Forward To** table ends with a ";b2bua".

  - **Local REFER Handling** is used for the call.

- **Force Record-Route for All Requests** is used.

To test RADIUS Accounting with Ingate Firewall/SIParator®, FreeRADIUS (http://freeradius.org/freeradius-url.sgml) or any commercial RADIUS server supporting RFC 2866 can be used.