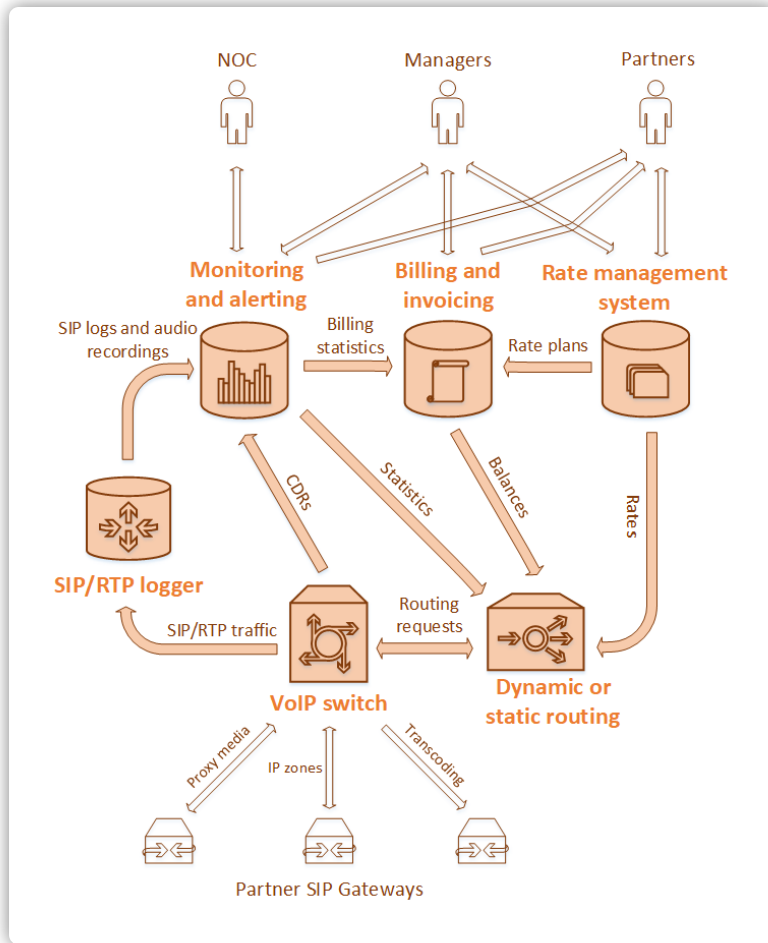




# VoIP switching and billing suite

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Break through your data



- **VoIP switch** - SIP softswitch based on Opensips significantly re-developed by **5g Future**.
- **Dynamic or static routing** - a separate routing engine working with the **VoIP switch**. All routing/rate info is loaded into memory and is updated every 10 seconds, resulting in very high productivity of 500 requests/sec per a CPU core.
- **Rate management system** - a flexible solution, allowing to automatically upload vendor rates, generate customer rates, and send amendments.
- **Billing and invoicing** - a high precision billing solution with invoices automatically sent to partners in your format.
- **Monitoring and alerting** - a quick and easy visual monitoring tool with lots of alerting and anti-fraud options.
- **SIP/RTP logger** - a tool allowing to visually see any Call flows and raw packets right from CDRs, as well as to listen to logged VoIP conversations in any codec.

- SIP softswitch based on re-developed Opensips.
- Works with the external routing engine fully written by 5g Future.
- High productivity and stability with support for redundant configurations.
- Media proxying configured per gateway.

- Codecs restrictions per gateway with support of codec conversion.
- Different IP zones to use for incoming/outgoing traffic.
- Limiting incoming/outgoing gateways and customers/vendors by CPS and by Active calls.
- Disconnect codes translation.

VoIP switch

Routing tree Carriers Gateways Customer trunks Prerouting actions Routing plans Routes Vendor trunks More... ?

Save Cancel Rows: 11 Call simulation SIP simulation

Status	GW name	Carrier	IP zone	Trans-code	IN proxy media	CPS limit IN	Calls limit OUT	Codecs group	OUT Privacy mode	IN SRC number translations	Own IP:port
<input checked="" type="checkbox"/>	New GW	Lion Telecom (4)	Internal (2)	<input type="checkbox"/>	<input checked="" type="checkbox"/>		2	All codecs (1)	Set both From and PAI	^+(*)\$&&ton=1&&npi=1/001	
<input checked="" type="checkbox"/>	Test GW	Zebra Telecom (7)	External (1)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1		g729 (3)			
<input checked="" type="checkbox"/>	Dialer GW	Dialer (27)	External (1)	<input type="checkbox"/>	<input checked="" type="checkbox"/>			All codecs (1)			
<input checked="" type="checkbox"/>	Mouse Telecom GW	Mouse Telecom (20)	External (1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	100	500	All codecs (1)			
<input checked="" type="checkbox"/>	Hare Telecom GW	Hare Telecom (19)	Internal (2)	<input type="checkbox"/>	<input checked="" type="checkbox"/>			All codecs (1)			
<input checked="" type="checkbox"/>	Deer Telecom GW	Deer Telecom (8)	Internal (2)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		70	g729 (3)			
<input checked="" type="checkbox"/>	Zebra Telecom GW	Zebra Telecom (7)	External (1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	55		All codecs (1)			
<input checked="" type="checkbox"/>	Antelope Telecom GW	Antelope Telecom (6)	Internal (2)	<input type="checkbox"/>	<input checked="" type="checkbox"/>			g729-g711 (4)			
<input checked="" type="checkbox"/>	Jaguar Telecom GW	Jaguar Telecom (5)	External (1)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		3	All codecs (1)			
<input checked="" type="checkbox"/>	Lion Telecom GW	Lion Telecom (4)	External (1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	30		PCMU (5)			
<input checked="" type="checkbox"/>	Tiger Telecom GW	Tiger Telecom (3)	Internal (2)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			g711 (2)			

**Call simulation**

**Customer level to start from:** Customer gateway

**Vendor level to stop at:** Vendors IP addresses

**Incoming customer IP:** 192.168.1.1:5060

**Customer gateway:** Antelope Telecom GW (4)

- A **flexible** and **robust** routing engine with **dynamic** routing on both **cost** and **quality**.
- Low **balance** restrictions for customers and vendors.
- Routing is done **in memory** to deliver performance of up to **500 CPS per a CPU core**. Routing info and rates are updated within **10 seconds**.
- **Multiple** routing engines may coexist on the same server, or may be distributed over **several servers**, allowing for practically **unlimited scalability**.
- Full range of routing features supported: static routing, **formulas** on cost/quality, **profitability control**, temporary **gateway blocks**, **%-based** routing, etc.
- **Parent-child** relationships in routing plans.
- Number **translations** at all levels using **regexps**.
- Routing **by numbers** and **by areas**, support for **MNP**.
- Convenient **Call path simulation** and **monitoring** features.

Routing simulation

Route order	Route ID	Error	Vendor	Vendor Rate plan	Customer rate sys cur-cy	Vendor rate sys cur-cy	Profit	Customer area	DST number IN	DST number OUT
1	12		Whale Telecom (17)	Whale Telecom CLI (37)	0.047	0.0411	0.0059	China Mobile	86157433330	3333#86157433330
2	21	Route not selected for percent distribution			0.047		0.047	China Mobile	86157433330	
3	20	Vendor rate denied by markup	Whale Telecom (17)	Whale Telecom PREMIUM (35)	0.047	0.0484	-0.0014	China Mobile	86157433330	
4	19	Vendor rate not found	Enormous Telecom (14)	Enormous Telecom CLI (46)	0.047		0.047	China Mobile	86157433330	
5	16		Oversized Telecom (16)	Oversized Telecom STANDARD (39)	0.047	0.0431	0.0039	China Mobile	86157433330	1111#86157433330
6	18	Route not configured for percent distribution			0.047		0.047	China Mobile	86157433330	
7	15		Whale Telecom (17)	Whale Telecom STANDARD (36)	0.047	0.0408	0.0062	China Mobile	86157433330	1111#86157433330
8	23	Route denied			0.047		0.047	China Mobile	86157433330	
9	24	Vendor rate denied by markup	Crab Telecom (13)	Crab Telecom STANDARD (48)	0.047	0.0507	-0.0037	China Mobile	86157433330	
10	17	Vendor rate denied by markup	Pico Telecom (15)	Pico Telecom CLI (43)	0.047	0.0511	-0.0041	China Mobile	86157433330	
11	25	Vendor rate not found	Enormous Telecom (14)	Enormous Telecom CLI (46)	0.047		0.047	China Mobile	86157433330	

- **Auto-import** of vendor rates **from emails**, as well as **manually**.
- **Auto-recognition** of rate sheet columns. Possibility to **save templates** for patterns of: vendor email address, subject, body; attached file names; excel sheet names.
- Support for **codes** and **area** names split between two columns.
- Support for **compact code formats**, for instance: 1800-1880,1900.
- Support for full **A-Z** or **partial country** replaces.
- **Automatic corrective actions** can be assigned to every column in a rate sheet of each vendor.
- **Duplicate codes** can be automatically removed, or can generate a warning.
- **Auto-comparison** to previously loaded rates, **reports** on all new rates loaded in the last X days.
- Sending **notifications** to vendor on various events (errors, accepting rates, loading to main rate table, etc.)

Comparison results	Codes old/deck	Codes NEW	Rate old	Rate NEW	Rate diff	Rate diff, %
DOWN	722020	722020	0.01	0.0025	-0.0075	-300.0
Added		624004		0.0062		
Removed	621020		0.002	0.002		
UP	602001	602001	0.0035	0.0125	0.009	72.0
Removed	651002		0.0045	0.0045		
UP	510	510	0.0069	0.007	0.0001	1.4
Removed	520004		0.0035	0.0035		
UP	502020	502020	0.0018	0.018	0.0162	90.0
Added		260		0.0072		
DOWN, EarlierDate	262016	262016	0.02	0.012	-0.008	-66.7
DOWN, EarlierDate	262011	262011	0.02	0.012	-0.008	-66.7
Removed	454001		0.0045	0.0045		
DOWN, EarlierDate	262002	262002	0.02	0.012	-0.008	-66.7
Added		235094		0.0094		
UP, EarlierDate	452004	452004	0.01	0.0125	0.0025	20.0
Removed	232		0.0027	0.0027		
UP, EarlierDate	452007	452007	0.01	0.0125	0.0025	20.0
Added, Expanded, DOWN	234	234051	0.0136	0.0094	-0.0042	-44.7
DOWN	234055	234055	0.0136	0.0094	-0.0042	-44.7
Added, Expanded, DOWN	234	234037	0.0136	0.0094	-0.0042	-44.7
DOWN	234032	234032	0.0136	0.0094	-0.0042	-44.7
UP, EarlierDate	452005	452005	0.01	0.0125	0.0025	20.0
Removed	428088		0.0055	0.0055		
DOWN	234008	234008	0.0136	0.0094	-0.0042	-44.7
Added		214022		0.0113		
Added		214021		0.0113		
DOWN	216070	216070	0.0085	0.0077	-0.0008	-10.4
Removed	440011		0.0025	0.0025		
UP, EarlierDate	240020	240020	0.00375	0.01	0.00625	62.5
Removed, Collapsed, UP	240023	240	0.00375	0.00375		
UP	244013	244013	0.0045	0.023	0.0185	80.4

Customer rate generation Shared decks Change deck Verify Change log Amendment

Save Cancel Rows: 27

Clear table Apply changes + Upload Info

Area name in Code deck	Change type	Verification result	Codes ADD / DEL	Rate diff	Rate diff, %
E-Plus(Germany) (10352)	Code delete	CodeDeleted	262077		
ICE(Costa Rica) (10546)	Code delete	CodeDeleted	712001		
GlobalStar(France) (10484)	Code add	CodeAdded	7777968,888		
Claro(Chile) (10223)	Area delete, plan	AreaDeleted			
Africel(Gambia) (9881)	Area delete, plan	AreaDeleted			
Nuevatel(Bolivia) (11104)	Area delete, deck	AreaDeleted	736001		
	Area add, deck	AreaAdded	4444467,555		
	Area add, deck	AreaAdded	4444467,555		
	Area add, deck	AreaAdded	4444467,555		
	Area add, deck	AreaAdded	4444467,555		
Cosmote(Greece) (10273)	Area name	NameChange			
Itisaluna(Iraq) (10636)	Area name	NameChange			
Yoigo(Spain) (11899)	Area add, plan	AreaAdded, RateAdded			
Vivacell(Sudan) (11804)	Area RATE	DOWN		-0.061	-63.4
Xpress(Jordan) (11894)	Area RATE	DOWN		-0.1209	-516.7
Vodafone(Fiji) (11850)	Area RATE	UP		0.0036	4.6
MTN(Sudan) (10869)	Area RATE	DOWN		-0.1423	-164.5
MTS(Belarus) (10905)	Area RATE	DOWN		-0.0531	-80.9
Digicel(Samoa) (10330)	Area RATE	UP		0.0052	22.2
Digicel(Tonga) (10332)	Area				
Vivacell(Sudan) (11804)	Area				
Xpress(Jordan) (11894)	Area				
Vodafone(Fiji) (11850)	Area				
MTN(Sudan) (10869)	Area				
MTS(Belarus) (10905)	Area				
Digicel(Samoa) (10330)	Area				
Digicel(Tonga) (10332)	Area				

Apply changes

Supersede future rates:

Include verification results to amendments:

Get a test .xlsx Rate amendment

Create .xlsx Rate amendments:

- Possibility to **generate rates automatically** based on LCR reports on vendor rates.
- **Several managers** can work with the same **Change deck** to introduce changes, and then the deck can be verified, compared to existing rates, and applied with rate **amendments automatically sent** to customers.
- Support for full **A-Z** or **partial country** replaces.
- **Various options** for the amendments format - **files**, attached to emails or selected areas right in the **email body**.
- Emails to customers can contain **links to accept rates** receipt.
- **Fully customizable** email and amendment file **templates**.
- **Full undo** to unlimited depth for customer and vendor rates.

- **Quick filtering and sorting** of all your rate tables. Color indication of a **rate state**: expired, active, future, void.
- **Comparison** of rates over a **certain interval** to show only the rates that **changed within** this interval.
- **LCR tables** with **unlimited depth** for all or part of your vendor rates.
- **Customer rate generation** based on vendor rates and **statistics**.
- **Rate alerts** in case a vendor **rate increase** requires rate increase for certain customers.
- **Push and target** rates analysis.

Rate analysis Rate plans RateVend RateVend range Rate alerts LCR1 LCR2 Gener. edit Push/target More... ? ✎ ☑ ☒ ✕

E C ↺
Cust 4h 12h **1d** 2d 3d 1w 2w 4w Swap
GO Stats
Rows: 3000 / get 1-3000
Fetch: 10 100 300 1k **3k** 10k
User Sys GMT

Clear table
LCR report
Generate Customer rates
Move to Generated rate edit
Info

Order	Status	Codes in LCR group	Codes in Rate plan	Area in Rate plan	Codes Master	Area in Master Code deck	Generated price	Generated diff	Rate sys currency	Rate diff with pr 1	Priority	Plan type	Rate plan	State
135	✓	732	732	Colombia - ALL (559)	732	Colombia - ALL (559)	0.001177	0.0011681	0.0000089	0.0	1	cust	Customer1 RP (174)	active
136	✓	732	732	Colombia Other	732	Colombia - ALL (559)	0.001177	0.0002761	0.0009009	0.000892	2	vend	Vendor2 RP (170)	active
137	✓	732	732	Colombia Other networks	732	Colombia - ALL (559)	0.001177	-0.000823	0.002	0.0019911	3	vend	Vendor4 RP (168)	active
138	✓	732	732	Colombia Default	732	Colombia - ALL (559)	0.001177	-0.002423	0.0036	0.0035911	4	vend	Vendor1 RP (171)	active
139	✓	732130	732	Colombia - ALL (559)	732	Colombia - ALL (559)	0.001177	0.0011681	0.0000089	0.0	1	cust	Customer1 RP (174)	active
140	✓	732130	732130	Colombia Avantel	732	Colombia - ALL (559)	0.001177	0.0002761						
141	✓	732130	732130	Colombia Avantel S.A.	732	Colombia - ALL (559)	0.001177	-0.000323						
142	✓	732130	732130	Colombia Avantel	732	Colombia - ALL (559)	0.001177	-0.000823						
143	✓	732130	732	Colombia Default	732	Colombia - ALL (559)	0.001177	-0.002423						
144	✓	732101	732	Colombia - ALL (559)	732	Colombia - ALL (559)	0.001177	0.0011681						
145	✓	732101	732101	Colombia Comcel	732	Colombia - ALL (559)	0.001177	0.0002761						
146	✓	732101	732101	Colombia Comcel S.A.	732	Colombia - ALL (559)	0.001177	-0.000323						
147	✓	732101	732101	Colombia Comcel	732	Colombia - ALL (559)	0.001177	-0.000823						
148	✓	732101	732101	Colombia Comcel S.A.	732	Colombia - ALL (559)	0.001177	-0.002423						
149	✓	732102	732	Colombia - ALL (559)	732	Colombia - ALL (559)	0.001177	0.0011681						

**Generate Customer rates**

Rate generation method:

Rate aggregation method, priority 1:

Multiply rate by, priority 1:

Traffic share of priority 1 route, %:

- The **VoIP switch** is writing **CDRs** with full customer/vendor **rate information**, received from the routing.
- In case **CDRs** need to be re-rated due to retroactive rate changes, a **separate re-rating process** processes CDRs, changing the rates and the statistical data.
- Each customer or vendor may have **several Rate plans** assigned, if needed. Several customers may also work under the **same Rate plan**.
- Customer and vendor **balances** are **calculated on the fly** and may be used in routing.

**Billing** Carriers Accounts Payments Requests Invoices

Save Cancel Rows: 8 Balances

Account name	Status	Currency	Balance total	Balance customer	Balance vendor
Cod Telecom	✓	USD	-727,169.56	-727,169.56	0.00
Clam Telecom	✓	USD	-1,182,492.96	-1,182,492.96	0.00
Salmon Telecom	✓	USD	-1,276,010.21	-1,276,010.21	0.00
Crab Telecom	✓	USD	553,125.81	0.00	-553,125.81
Enormous Telecom	✓	USD	810,725.78	0.00	-810,725.78
Pico Telecom	✓	USD	-478,301.39	-952,715.50	-474,414.10
Oversized Telecom	✓	USD	668,091.09	0.00	-668,091.09

**Billing** Carriers Accounts Payments Invoice templ. Requests Invoices

Save Cancel Cust 1h 24h 7d 30d 180d All GO

Generate invoices manually Info

Request type	Template IDs	# of invoices	Generation results	Customer / vendor	Carriers
Auto timeline	Test (every day) (1)	3	Not generated:3	Customer	Salmon Telecom (12);
Auto timeline	Test (every day) (1)	3	Not generated:3	Customer	Salmon Telecom (12);
Manual overlay		1	OK:1	Customer	Salmon Telecom (12)
Auto timeline	Test (every day) (1)	3	OK:2, Error:1	Customer	Salmon Telecom (12);
Auto timeline	Test (every day) (1)	3	OK:2, Error:1	Customer	Salmon Telecom (12);
Auto timeline	Test (every day) (1)	3	OK:2, Error:1	Customer	Salmon Telecom (12);
Auto timeline	Test (every day) (1)	3	OK:2, Error:1	Customer	Salmon Telecom (12);
Auto timeline	Test (day of month) (2)	1	OK:1	Customer	Cod Telecom (10)
Auto timeline	Test (every day) (1)	2	OK:1, Error:1	Customer	Salmon Telecom (12);

Invoice files Invoice files

Save Cancel Rows: 1

Import XLSX invoice Generate invoice

Invoice ID	User	XLSX file	PDF file	XLSX status	PDF status	Email to carrier status
28	Auto (9999)	201805/28/Invoice_201805/28/Invoice_OK, generated		OK	OK	

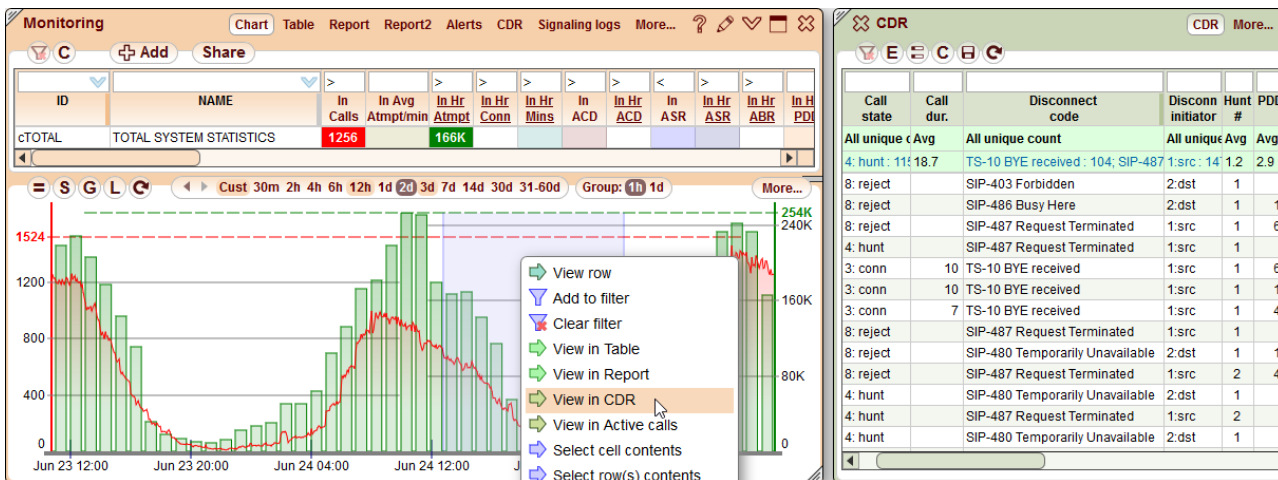
- Generating invoices in **different currencies**.
- **Invoices** can be generated and sent to partners **automatically or manually**.
- **Fully customizable** invoice format. Any **taxes** and their calculations can be accommodated.



5gVision Monitoring solution is extremely quick in delivering data over very long intervals and consists of the following main modules:

- **Charts** to instantly view real-time, auto-refreshed information.
- **Reports** for per-hour parameters over a long period of time.
- **CDR viewer** to quickly access raw CDRs and open charts, logs, and raw packets from them.
- **Alerts** to get notifications on anything that happens in your VoIP switch.

Please refer to a separate presentation on the [5gVision monitoring suite](#).



- Collection of all SIP and RTP packets from the VoIP switch, the storage period depends only on the HDD capacity.
- Opening a log or a Call flow right from the CDRs with all hunts.
- Display of raw collected packets in a table with possibility to filter packets by SRC/DST IPs, numbers, call IDs, etc.
- Display of contents of individual packets. Convenient packet comparison tools.
- Display of an SIP packet flow as an easy-to-understand chart.
- Ability to listen to recorded calls in any codec.
- Full RTP statistics.
- Sharing Call flows with your partners via a powerful 5gVision data sharing mechanism.
- Exporting logs as .pcap files.

The screenshot displays the SIP/H323/SMPP flow interface. At the top, a table lists packet details:

SRC address	DST address	Customer from CDR	Vendor from CDR	Leg	Dir	Packet size	Packet data
48.251.120.70	95.216.26.213	Tiger Telecom		1	src->	1096	INVITE sip:22#19256940050@95.216.26.213
95.216.26.213	148.251.120.70	Tiger Telecom		1	<-dst	368	SIP/2.0 100 Giving it a try Via: SIP/2.0/UDP 148.251.120.70
27.0.0.1	127.0.0.1			2	src->	989	INVITE sip:22#19256940050@127.0.0.1

Below the table, the interface shows a call flow chart for a call between 407-26812@148.251.120.70 (Tiger Telecom) and DLGCH\_e0BSQ2F.aGJ9M (Mouse Telecom). The flow includes:

- INVITE (PCMU) from Tiger Telecom to Mouse Telecom.
- 100 Giving it a try from Mouse Telecom to Tiger Telecom.
- 180 Ringing from Mouse Telecom to Tiger Telecom.
- 200 OK (PCMU) from Mouse Telecom to Tiger Telecom.
- ACK from Tiger Telecom to Mouse Telecom.
- RTP (PCMU) 42.0 sec - 0% from Tiger Telecom to Mouse Telecom.
- RTP (G729) 37.9 sec - 47.4% from Tiger Telecom to Mouse Telecom.
- RTP END from Tiger Telecom to Mouse Telecom.
- RTP END from Mouse Telecom to Tiger Telecom.

A Packet viewer window is open, showing the raw log of the selected packet:

```

2020-06-26 08:33:56.992554 == 0.000000
INVITE sip:22#19256940050@95.216.26.213
Via: SIP/2.0/UDP 148.251.120.70:7070;brar
From: 13544385599 <sip:13544385599@135.44.38.59>
To: 22#19256940050 <sip:22#19256940050@95.216.26.213>
Call-ID: 407-26812@148.251.120.70
CSeq: 1 INVITE
Contact: sip:13544385599@148.251.120.70
    
```

Please refer to a separate presentation on the [5gVision VoIP/SMPP packet sniffer](#).



## Thank you for your time

If you wish to request  
a fully functional trial  
or get more information,  
please contact:

Demo: [demo.5gfuture.com](http://demo.5gfuture.com)

Web: [www.5gfuture.com](http://www.5gfuture.com)

Skype: [support\\_5gfuture](https://www.skype.com/join/support_5gfuture)

Email: [sales-team@5gfuture.com](mailto:sales-team@5gfuture.com)