

HOMER 5 & CAPTAGENT 6



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Introduction

About the Authors - Behind the Project



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Lorenzo Mangani

Sr. Voice Engineer and Designer for the largest international cable operator worldwide, founder of Amsterdam based [QXIP BV](#), Co-Founder and Developer of [Homer SIP Capture project](#) and voice specialist of the NTOP Team. Formerly a Sound Engineer, Lorenzo has been deeply involved with telecommunications and VoIP for well over a decade and has contributed ideas, design concepts and code to many voice-related Open-Source and commercial projects specializing in active and passive monitoring solutions.

Introduction

About this presentation

HOMER has been a resident *guest* since the inception of *Kamailio World* and over time the event also became the clock of our major project releases and the stage where we love to introduce the fruit of our hard work to a familiar crowd.

This year is of course no exception and we proudly bring you:

HOMER v5

New Features

- New User-Interface!
- New Core Functionality!
- Easy to Extend and Integrate
- ... and so much More!

CAPTAGENT v6

New Features

- New Internal Architecture!
- Capture Scenarios configuration!
- Multiple sockets, multiple input & outputs!
- Additional Protocols & Statistics!
- ... and so much More!

Proudly Presenting

HOMER 5



HOMER 5

Introduction & History



HOMER 5? *Wait a second!*
... and whatever happened to HOMER 4 ?



A bit of recent history is due...

HOMER 1.x has been our glorious and first embryonal version based on ngrep and MySQL.

HOMER 2.x has been the first version with an embryonal UI based on Joomla CMS and MySQL.

HOMER 3.x has been our master release and top runner for a couple of years now and despite being still able to get the job done, started to show the signs of time on its UI Face, originally handcrafted from scratch using jQuery and lots of custom code and solutions to achieve what we envisioned at the time, resulting in overall simple code being extremely hard for contributors to attach to and extend/improve upon.

HOMER 4.x was developed in 2013-2014, was pretty slick and delivered several design improvements and usage innovations all over the place over a cleaner codebase. Unfortunately we have been naive and did not consider good ideas could be also "borrowed" by those lucky enough to preview them - Long story short, we decided to drop H4 and start over once again to avoid sharing any technical field with possible commercial clones of our application or ideas.

HOMER 5.x is the newest and latest inception of our platform, re-integrating all of our familiar core features and delivering so much more over an Angular JS UI, now hopefully more attractive for both users and developers to adopt and extend. H5 vastly crosses the line of its predecessors and geared towards becoming a more generic packet troubleshooting framework where voice relevant data can come together and empower troubleshooting and investigation to melt and merge without boundaries and with greater flexibility than ever before.

HOMER 5

New to the Project? What is HOMER?

HOMER is a powerful tool enabling Voice Engineers to focus on their actual job without having to spend hours figuring how to get the data they need to work with on each instance by providing a self-contained SIP Analysis and Troubleshooting environment fully customizable based on the preferences of its users:

HOMER is a turnkey solution providing many advantages:

- Instant centralized access to present and past signaling & stats
- Full SIP/SDP payload with precise timestamping
- Automatic correlation of sessions and reports
- Visual representation of multi session call-flows
- Fast detection of usage and system anomalies
- System agnostic view of VoIP traffic flows
- Unlimited plug & play capture agents and HEP data feeds
- Easy data integration with other systems via API
- No Desktop/Mobile client software required
- Ease of installation *(no more 1st setup headaches!)*



Homer 3.x

HOMER: <http://github.com/sipcapture/homer>

HOMER 5

What's New in Homer 5 UI?



HOMER 5 brings many core improvements and module extensions to handle so much more than just signaling, and delivers a complete overhaul of the web User-Interface component migrating to modern JS framework while retaining the simplicity and style many users worldwide rely upon daily.



HOMER's Main Features:

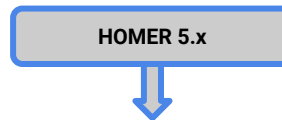
- 100% HTML5 & API Based User Interface
- No Defaults! All Pages and Dashboards fully customizable
- Multiple DB options (*MySQL/MariaDB, PostgreSQL, ElasticS, InfluxDB ...*)
- Modern & Extensible Angular Drag & Drop UI
- User Customizable Widgets for Charts & Analytics
- Powerful SIP Search and Filtering functionality
- Native Canvas Call-Flow display with multi-session correlation
- Native support for PCAP and Text file export of all results
- Supports token Authentication for API and User Interface
- Multi-User support with Local, LDAP, Radius options
- Production Ready, supports high volumes and PPS rates
- Supported by a strong and growing community

ID	Date	Micro TS	Method	Reason	RURI user	From User	CallID	User Agent	Source IP	SPNo	Dest. IP	DPNo	Source IP	Prio	Node
81864	2015-04-25 18:3...	1429987	OPTIONS		147	mod_softa	888ccc78.ab7a...	Botano service	109.69.65.77	5060	212.202.252.157	38768	109.69.65.77	1	homer01.2001
81863	2015-04-25 18:3...	1429987	OPTIONS		109	mod_softa	888ccc78.ab7a...	Botano service	109.69.65.77	5060	94.221.137.2	5090	109.69.65.77	1	homer01.2001
81866	2015-04-25 18:3...	1429987	OPTIONS		121	mod_softa	888ccc78.ab7a...	Botano service	109.69.65.77	5060	2.183.183.63	5060	109.69.65.77	1	homer01.2001
81866	2015-04-25 18:3...	1429987	OPTIONS		104	mod_softa	888ccc78.ab7a...	Botano service	109.69.65.77	5060	212.202.252.157	1024	109.69.65.77	1	homer01.2001
81867	2015-04-25 18:3...	1429987	OPTIONS		204	mod_softa	888ccc78.ab7a...	Botano service	109.69.65.77	5060	78.94.165.3	13823	109.69.65.77	1	homer01.2001
81868	2015-04-25 18:3...	1429987	OPTIONS		145	mod_softa	888ccc78.ab7a...	Botano service	109.69.65.77	5060	92.205.75.178	36166	109.69.65.77	1	homer01.2001
81869	2015-04-25 18:3...	1429987	OPTIONS		101	mod_softa	888ccc78.ab7a...	Botano service	109.69.65.77	5060	92.205.75.178	8799	109.69.65.77	1	homer01.2001
81870	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	ACN IRIS X 1.0...	78.94.165.3	31820	109.69.65.77	5060	78.94.165.3	1	homer01.2001
81872	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	FRTZIOS	78.94.165.7	5060	109.69.65.77	5060	78.94.165.7	1	homer01.2001
81871	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	FRTZIOS	78.94.165.3	5060	109.69.65.77	5060	78.94.165.3	1	homer01.2001
81873	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	ACN IRIS X 1.0...	92.205.75.178	36166	109.69.65.77	5060	92.205.75.178	1	homer01.2001
81874	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	FRTZIOS	94.221.137.2	5060	109.69.65.77	5060	94.221.137.2	1	homer01.2001
81875	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	AVM FRTZIOS	212.202.252.157	1024	109.69.65.77	5060	212.202.252.157	1	homer01.2001
81876	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	FRTZIOS	91.130.200.200	5060	109.69.65.77	5060	91.130.200.200	1	homer01.2001
81877	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	AVM FRTZIOS	151.249.219.93	5060	109.69.65.77	5060	151.249.219.93	1	homer01.2001
81878	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	Polycom99...	212.202.252.157	1024	109.69.65.77	5060	212.202.252.157	1	homer01.2001
81879	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	ACN IRIS X 1.0...	212.202.252.157	38768	109.69.65.77	5060	212.202.252.157	1	homer01.2001
81880	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	AVM FRTZIOS	5.56.106.109	5060	109.69.65.77	5060	5.56.106.109	1	homer01.2001
81881	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	2.53.183.63	5060	109.69.65.77	5060	2.53.183.63	1	homer01.2001	
81882	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	AVM FRTZIOS	93.74.61.198	5060	109.69.65.77	5060	93.74.61.198	1	homer01.2001
81883	2015-04-25 18:3...	1429987	200	OK		mod_softa	888ccc78.ab7a...	snom300/8...	212.202.252.157	2048	109.69.65.77	5060	212.202.252.157	1	homer01.2001

The dashboard includes a search bar with fields for From, To, and Call-ID. Below it are links for CAPTAIN and HOMER. A weather widget shows 'New York (US) Temperature: 7.81'. A random message widget displays: 'BYE: Terminates a call and can be sent by either the caller or the callee. -RFC3261'. The news section features a 'GitHub Public Timeline Feed' with several items related to the project.

HOMER 5

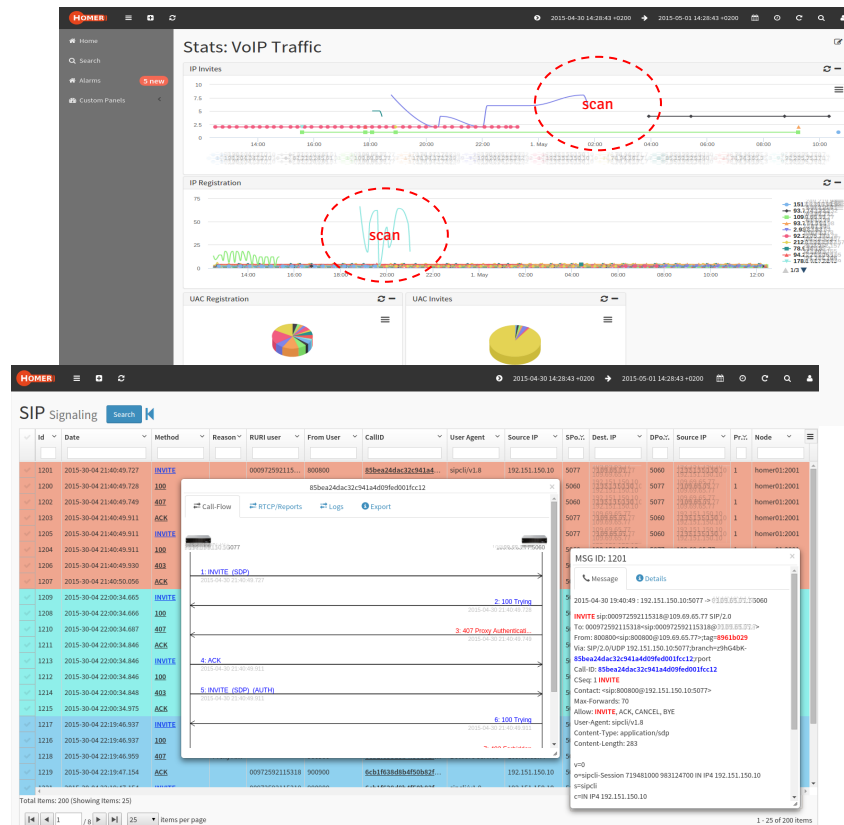
What's New in Homer 5 core?



HOMER's New Core Features:

- Support for multiple database tables by method type
- Support for table sharding (date and transaction methods)
- Support for schema changes without drops (next partition)
- Support for exporting/importing of tables for archiving
- Parsing and Aggregation of external QoS reports (*RTCP-XR/XP-RTP-Stat*) and Logging (*HEP logs*)
- Configurable Alarms and Triggers
- Supports own capture route in *kamailio.cfg*
- Correlation logic can be expressed in *kamailio.cfg*

HOMER: <http://github.com/sipcapture/homer>



HOMER 5

A Brand New UI



HOMER 5

New Interface Layout

The screenshot displays the HOMER 5 interface layout. At the top, there is a dark header bar containing the HOMER logo, navigation icons, and a time range selector showing '2015-05-21 08:58:01 +0200' to '2015-05-21 09:58:01 +0200'. On the left side, a dark sidebar menu lists various sections: Home, SIP Search, Dangerous Demo, Alarms, and Custom Panels. The Custom Panels section is expanded, showing a list of items: Alarms, Custom, Home, SIP Search, Stats: IP Network, SIP Search, Dangerous Demo, System Admin, ES Aggregations Test, and Stats: VoIP Traffic.

Four callout boxes highlight specific interface elements:

- Application Panels**: A blue box with an arrow pointing to the top of the main content area, labeled 'Application Panels Customizable by Admins'.
- Custom User Panels**: A blue box with an arrow pointing to the Custom Panels section in the sidebar, labeled 'Custom User Panels'.
- Time-Range Selector**: A purple box with an arrow pointing to the time range selector in the top header, labeled 'Time-Range Selector'.
- Refresh/Range Control**: A grey box with an arrow pointing to the refresh and range control icons in the top header, labeled 'Refresh/Range Control'.

The main content area is a large, light grey rectangle with a dashed border, containing the text *Your Content Here!*

HOMER 5

Create a Dashboard in seconds

The screenshot shows the HOMER 5 interface with a sidebar on the left and a main dashboard area. The dashboard area is titled "Custom" and contains two modal windows. The "Edit Dashboard" window has a "Dashboard Title" field with "Custom" entered and a "Dashboard Structure" list with radio buttons. The "Add new widget" window shows a list of widget options, with "Quick Search" highlighted. Callouts point to various elements: "Dashboard Preferences" points to the "Edit Dashboard" window; "Dashboard Control" points to the top right of the dashboard area; "Dashboard Distribution" points to the "Dashboard Structure" list; and "Widget Selection" points to the "Quick Search" widget option.

Dashboard Preferences

Dashboard Control

Dashboard Distribution

Widget Selection

Widget Name	Description
Admin Alias	Alias admin
Admin Node	Nodes admin
Admin User	Users admin
Alarm Settings	alarm settings
Alarm List	alarm lists
Clock	Displays date and time
Elastic Aggs	Display Elasticsearch Aggs
Elastic Facets	Display Elasticsearch Facets
Links	Displays a list of links
News	Displays a RSS/Atom feed
QueryCapture Charts	Display QueryCapture API data as charts
Quick Search	Quick Search Widget
Random Method	Display a random SIP Method definition and RFC
RIPE DB Search	Display RIPE Visibility for a given IP/AS
RIPE Whois Search	Display RIPE WHOIS Data for a given IP/AS
SIPCapture Charts	Display SIPCapture API data as charts

HOMER 5

Create a Search Widgets

The screenshot displays the HOMER 5 interface with a custom search widget and its configuration dialog. The widget is titled "Quick Search" and contains three input fields: "From", "To", and "Call-ID". The configuration dialog, titled "Quick Search", allows for customizing the widget's appearance and preferences. It includes a "Title" field set to "Quick Search", an "Add Form Field" button, and a "Search Button" checkbox which is checked. Below these are three dropdown menus for "From", "To", and "Call-ID", each with a clear icon. A "Close" button is located at the bottom right of the dialog.

Annotations in the image highlight key features:

- Widget Appearance:** A grey box with a left-pointing arrow pointing to the top-right corner of the widget, which contains icons for adding, removing, and configuring the widget.
- Widget Preferences:** A blue box with a downward-pointing arrow pointing to the configuration dialog.
- Form Field Control:** An orange box with an upward-pointing arrow pointing to the "Add Form Field" button in the configuration dialog.

HOMER 5

Your new SIP Search Dashboard is ready to use!

The screenshot shows the HOMER 5 SIP Search dashboard interface. The top navigation bar includes the HOMER logo, a menu icon, a plus icon, a refresh icon, and a status bar with the date and time '2015-05-21 08:58:01 +0200' and '2015-05-21 09:58:01 +0200'. A left sidebar contains navigation options: Home, SIP Search, Dangerous Demo, Alarms, and Custom Panels (with sub-items: Alarms, Custom, Home, SIP Search, Stats: IP Network, SIP Search, Dangerous Demo, System Admin, ES Aggregations Test, Stats: VoIP Traffic).

The main content area is titled 'SIP Search' and is divided into several sections:

- Session Parameters:** Contains input fields for RURI, From, To, and Call-ID. An orange callout box labeled 'Custom Form Fields' points to this section. Below the fields are 'Clear' and 'Search' buttons.
- Session Headers:** Contains input fields for User-Agent, Method, CSeq, Reason, Message, and Diversion. A purple callout box labeled 'Search Time Range' points to this section.
- Network Parameters:** Contains input fields for Source IP, Source Port, Dest. IP, and Dest. Port. A blue callout box labeled 'Search Control' points to this section.
- Parameters:** Contains a dropdown menu for Transaction (with options CALLS, REGISTRATIONS, OTHER), a Limit Query field, a Result Type dropdown (set to TABLE), and a DB Node dropdown (set to homer01, with external as an option).

HOMER 5

SIP Search Application



HOMER 5

Let's find some SIP traffic next!

The screenshot shows the HOMER 5 SIP Search interface. At the top, a dark navigation bar contains the HOMER logo, a menu icon, a plus icon, a refresh icon, a large circled '1', and a date range selector set to '2015-05-21 08:58:01 +0200' to '2015-05-21 09:58:01 +0200'. On the left is a sidebar with navigation options: Home, SIP Search, Dangerous Demo, Alarms, and Custom Panels (with sub-items: Alarms, Custom, Home, SIP Search, Stats: IP Network, SIP Search, Dangerous Demo, System Admin, ES Aggregations Test, Stats: VoIP Traffic).

The main content area is titled 'SIP Search' and is divided into two sections:

- Session Parameters:** Contains four input fields: RURI, From (circled with '2'), To, and Call-ID. A blue 'Search' button (circled with '4') is located to the right of the Call-ID field.
- Network Parameters:** Contains four input fields: Source IP, Source Port, Dest. IP, and Dest. Port.

Below the Session Parameters is the 'Search Parameters' section, which includes:

- A 'Transaction' dropdown menu (circled with '3') with options: CALLS, REGISTRATIONS, and OTHER.
- A 'Limit Query' input field.
- A 'Result Type' dropdown menu set to 'TABLE'.
- A 'DB Node' dropdown menu with options: homer01 and external.

A large grey rounded rectangle on the right side of the interface contains the following text:

Quick Search:

- 1) Select Time Range
- 2) Select any SIP Header Filter
- 3) Choose Transaction Type
- 4) Search!

HOMER 5

Example: Search Results

1 Find the session of interest

Search Result Filtering

Session Call-ID

SIP Signaling Search

	Id	Date	Method	Reason	RURI user	From User	CallID	User Agent	Source IP	SPo...	Dest. IP	DPo...	Source IP	Pr...	Node
✓	1465	2015-12-05 12:24:45.682	INVITE		00972597562...	14	b5675fb30a513329f16...	sipcli/v1.8	85.521711111	5108	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1470	2015-12-05 12:24:45.925	INVITE		00972597562...	14	b5675fb30a513329f16...	sipcli/v1.8	85.521711111	5108	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1474	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...	sipcli/v1.8	85.521711111	5093	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1478	2015-12-05 12:24:46.620	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...	sipcli/v1.8	85.521711111	5093	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1482	2015-12-05 12:24:47.380	INVITE		90097259756...	14	1bb1b5f0caf8cac6a3e...	sipcli/v1.8	85.521711111	5089	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1486	2015-12-05 12:24:47.709	INVITE		90097259756...	14	1bb1b5f0caf8cac6a3e...	sipcli/v1.8	85.521711111	5089	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1490	2015-12-05 12:29:33.830	INVITE		90097259262...	2001	d5962b9c0461478857...	sipcli/v1.8	1955434015066	5070	1099.65.77.77	5060	1955434015066	1	homer01:2001
✓	1503	2015-12-05 12:38:16.216	INVITE		107	101	777650246@10_0_0_200	S450 IP/0222...	92.520517378	5799	1099.65.77.77	5060	92.520517378	1	homer01:2001
✓	1507	2015-12-05 12:38:16.409	INVITE		107	101	777650246@10_0_0_200	S450 IP/0222...	92.520517378	5799	1099.65.77.77	5060	92.520517378	1	homer01:2001
✓	1508	2015-12-05 12:38:16.433	INVITE		107	101	d6ebb56e-7335-1233-...	Botauro service	1099.65.77.77	5060	212.202.252.252	2048	1099.65.77.77	1	homer01:2001
✓	1525	2015-12-05 12:50:35.422	INVITE		00972597562...	111	9ed46e190a1bc3641d...	sipcli/v1.8	85.521711111	5093	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1529	2015-12-05 12:50:35.540	INVITE		00972597562...	111	9ed46e190a1bc3641d...	sipcli/v1.8	85.521711111	5093	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1533	2015-12-05 12:50:36.955	INVITE		00097259756...	111	420013b69f4c6e6aae4...	sipcli/v1.8	85.521711111	5083	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1537	2015-12-05 12:50:37.044	INVITE		00097259756...	111	420013b69f4c6e6aae4...	sipcli/v1.8	85.521711111	5083	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1541	2015-12-05 12:50:38.300	INVITE		90097259756...	111	355bcdb16282ff6c7ce...	sipcli/v1.8	85.521711111	5078	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1545	2015-12-05 12:50:38.407	INVITE		90097259756...	111	355bcdb16282ff6c7ce...	sipcli/v1.8	85.521711111	5078	1099.65.77.77	5060	85.521711111	1	homer01:2001
✓	1549	2015-12-05 12:51:33.507	INVITE		00972592621...	6000	fb3a61ee1c643850bd...	sipcli/v1.8	1955434015066	5071	1099.65.77.77	5060	1955434015066	1	homer01:2001

HOMER 5

Example: Session and Packet Details

3 Click & Inspect any SIP Message

The screenshot displays the HOMER 5 SIP signaling interface. At the top, there is a search bar and a table of SIP messages. A callout box labeled 'SIP Message Details' points to message 1467. Below the table, two detailed views are shown:

Message 1467 Details:

- MSG ID: 1467
- Message
- Details

Message 1490 Details:

- Date: 2015-05-12 10:24:45
- Source: 85.25.217.111:5108
- Destination: 5.77.5060
- Content: SIP/2.0 407 Proxy Authentication Required
- Via: SIP/2.0/UDP 85.25.217.111:5108;branch=z9hG4bK-b5675fb30a513329f1600477b4c71b5e;port=5108
- From: 14 <sip:14@00972597562926>;tag=f59e1ae0
- To: 00972597562926 <sip:00972597562926@00972597562926>;tag=0ZvUp654vNUQQ
- Call-ID: b5675fb30a513329f1600477b4c71b5e
- CSeq: 1 INVITE
- User-Agent: Botauro service
- Accept: application/sdp
- Allow: INVITE, ACK, BYE, CANCEL, OPTIONS, MESSAGE, INFO, REGISTER, REFER, NOTIFY
- Supported: timer, precondition, path, replaces
- Allow-Events: talk, hold, conference, refer
- Proxy-Authenticate: Digest realm="1111111111111111", nonce="1c51f6a8-f891-11e4-9f7e-4958111f9453", algorithm=MD5, qop="auth"
- Content-Length: 0

Call-Flow Diagram:

- 1: INVITE (SDP) - 85.25.2 to 5.77.5060 (2015-05-12 12:24:45.682)
- 2: 100 Trying - 5.77.5060 to 85.25.2 (2015-05-12 12:24:45.682)
- 3: 407 Proxy Authentication Required - 5.77.5060 to 85.25.2 (2015-05-12 12:24:45.704)
- 4: ACK - 85.25.2 to 5.77.5060 (2015-05-12 12:24:45.925)
- 5: INVITE (SDP) (AUTH) - 85.25.2 to 5.77.5060 (2015-05-12 12:24:45.925)
- 6: 100 Trying - 5.77.5060 to 85.25.2 (2015-05-12 12:24:45.925)
- 7: 403 Forbidden - 5.77.5060 to 85.25.2 (2015-05-12 12:24:45.945)

HOMER 5

Example: Session and Packet Details

4 Click & Inspect RTCP-XR Reports

The screenshot shows the HOMER 5 interface with a table of SIP signaling messages. A call flow is selected, and a pop-up window displays RTCP-XR reports for that call. A green box highlights the 'RTCP-XR QoS Reports' section, with an arrow pointing to the report details.

Id	Date	Method	Reason	RURI user	From User	CallID	User Agent	DPO	Source IP	Pr...	Node
1465	2015-12-05 12:24:45.682	INVITE		00972597562...	14	b5675fb30a513329f16...					
1470	2015-12-05 12:24:45.925	INVITE		00972597562...	14	b5675fb30a513329f16...					
1474	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1478	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1482	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1486	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1490	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1503	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1507	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1508	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1525	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1529	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1533	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1537	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1541	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1545	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					
1549	2015-12-05 12:24:46.429	INVITE		00097259756...	14	d65e33aeb15d8a5ff9e...					

RTCP-XR QoS Reports

Call-ID: b5675fb30a513329f1600477b4c71b5e

Reports:

- 2015-05-26 18:44:30: [117d5412-7e7a-1233-21a5-0030487e5dc6]
- 2015-05-26 18:44:35: [117d5412-7e7a-1233-21a5-0030487e5dc6]
- 2015-05-26 18:44:40: [117d5412-7e7a-1233-21a5-0030487e5dc6]
- 2015-05-26 18:44:45: [117d5412-7e7a-1233-21a5-0030487e5dc6]
- 2015-05-26 18:44:50: [117d5412-7e7a-1233-21a5-0030487e5dc6]
- 2015-05-26 18:44:55: [117d5412-7e7a-1233-21a5-0030487e5dc6]
- 2015-05-26 18:45:00: [117d5412-7e7a-1233-21a5-0030487e5dc6]

1. Delay:

- ESD: 114
- IAJ: 9
- RTD: 0

2. LocalAddr:

- IP: 212.1.1.1

3. PacketLoss:

- JDR: 1.1
- NLR: 2.3

4. QualityEst:

- MOSQ: 3.4
- MOSLQ: 3.5

HOMER 5

Statistics & Charts Widgets



HOMER 5

Create a Stats Dashboard in seconds

The screenshot shows the HOMER 5 interface with a sidebar on the left containing navigation items: Home, SIP Search, Dangerous Demo, Alarms, and Custom Panels. The main area is titled 'Custom' and contains two modal windows:

- Edit Dashboard**:
 - Dashboard Title: Custom
 - Promote to Menu:
 - Dashboard Structure:
 - 12
 - 12/4-4-4
 - 12/6-6
 - 12/6-6/12
 - 4-4-4
 - 4-8 (selected)
 - 6-6

- Add new widget**:
- QueryCapture Charts: Display QueryCapture API data as charts (highlighted in red)
- Other widgets include Admin Alias, Admin Node, Admin User, Alarm Settings, Alarm List, Clock, Elastic Aggs, Elastic Facets, Links, News, Quick Search, Random Method, RIPE DB Search, RIPE Whois Search, and SIPCapture Charts.

Annotations with arrows point to:

- Dashboard Preferences**: Points to the top of the 'Edit Dashboard' modal.
- Dashboard Control**: Points to the top-right corner of the dashboard area.
- Widget Selection**: Points to the 'QueryCapture Charts' widget in the 'Add new widget' modal.
- Dashboard Distribution**: Points to the '4-8' widget in the 'Dashboard Structure' list.

HOMER 5

Create a Stats Dashboard in seconds

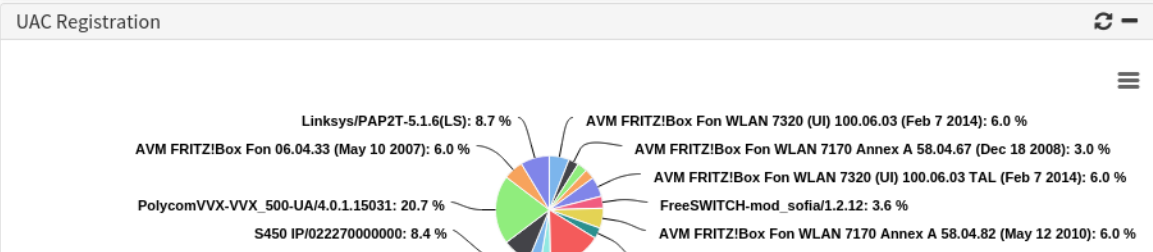
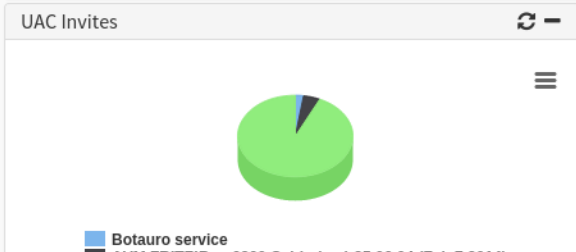
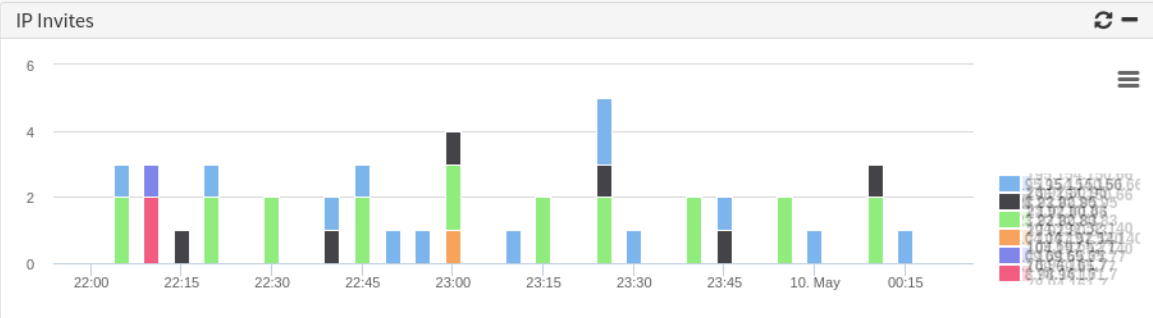
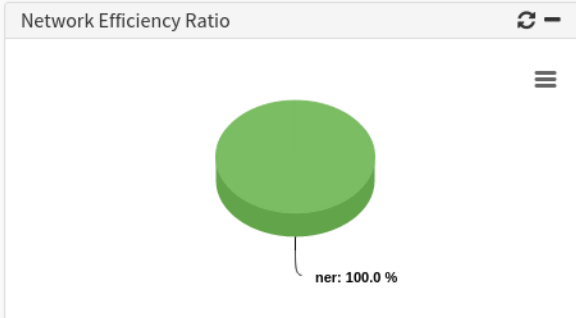
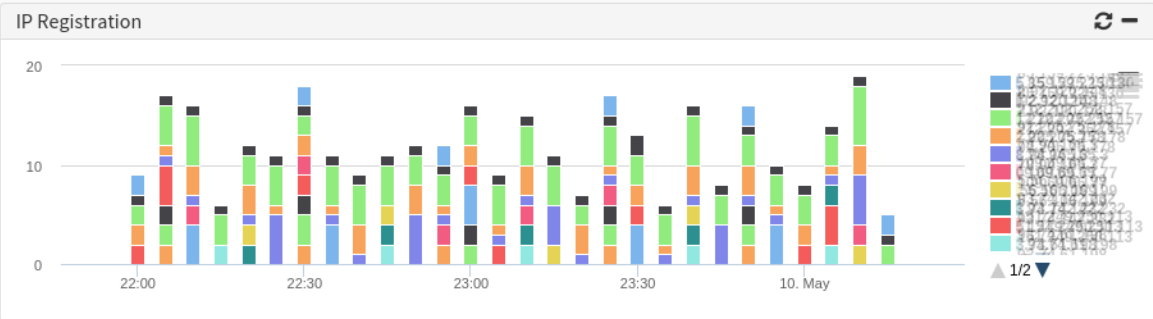
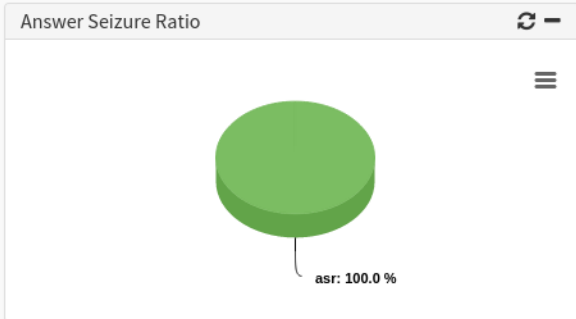
The screenshot shows the HOMER 5 interface with three numbered steps for creating a stats dashboard:

- 1 Chart Type Preferences:** A dialog box titled "Chart Type Preferences" is open. It has tabs for "Chart Type", "Fields", "Queries", and "Debug". The "Chart Type" tab is selected. Fields include:
 - Title: IP Registration
 - Width: Enter width (0) - default
 - Height: 200
 - Type: Bar
 - 3D:
 - Stacked: %
- 2 Chart Query Fields:** A dialog box titled "Chart Query Fields" is open. It has tabs for "Chart Type", "Fields", "Queries", and "Debug". The "Fields" tab is selected. Fields include:
 - Ext Legend:
 - Align: right
 - API Query Fields:
 - Timefield: to_ts
 - Fieldname (single or semicolon separated): source_ip
 - FieldValue (single or semicolon separated): total
 - FieldValue sum:
- 3 Query Details:** A dialog box titled "SIPCapture Charts" is open. It has tabs for "Chart Type", "Fields", "Queries", and "Debug". The "Queries" tab is selected. Fields include:
 - API Query Path: statistic/ip
 - API Query Value:

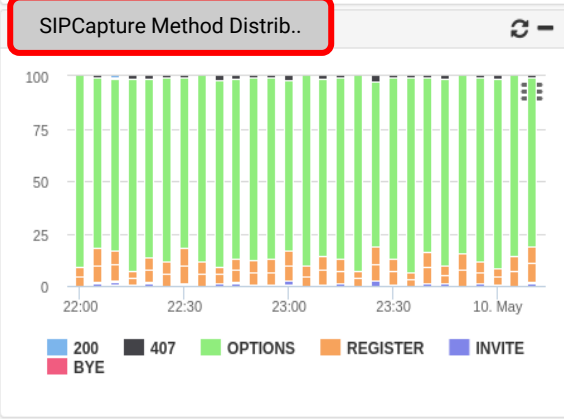
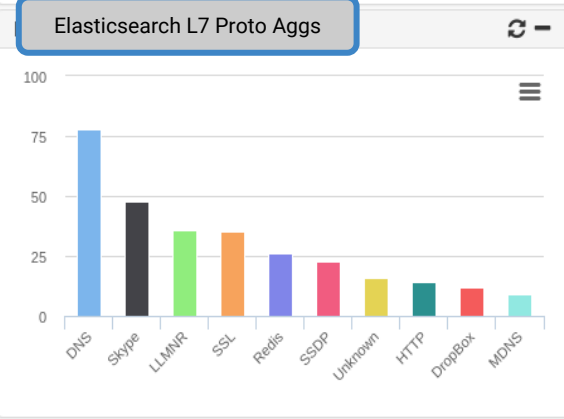
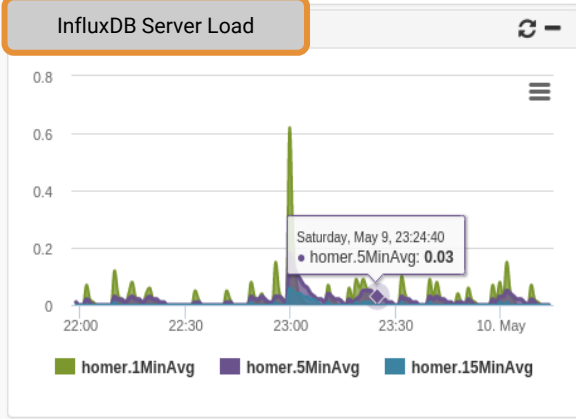
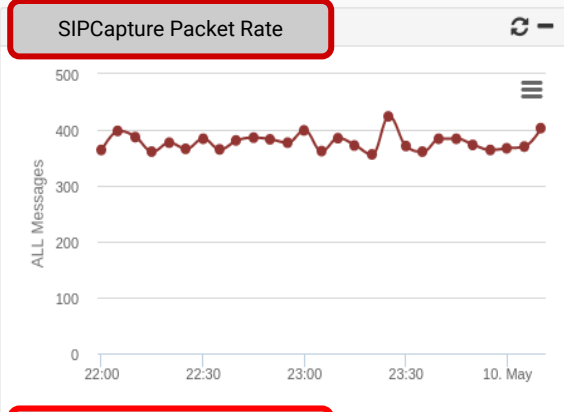
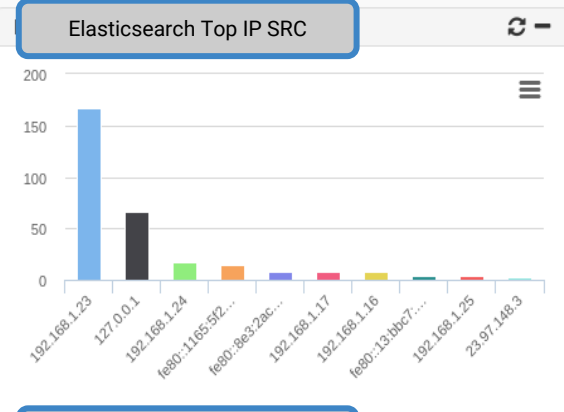
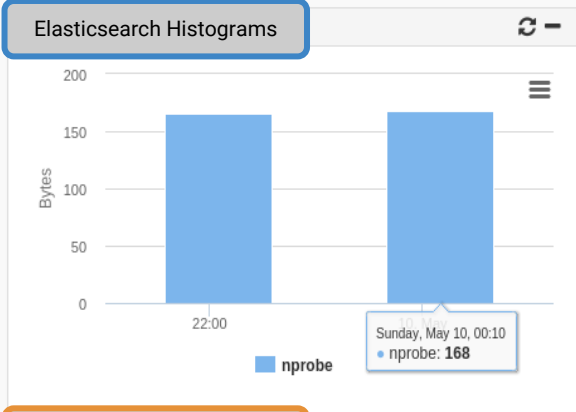

```
{
  "timestamp": {
    "from": "@from_ts",
    "to": "@to_ts"
  },
  "param": {
    "filter": [
      { "method": "REGISTER" }
    ],
    "limit": 200,
    "total": false
  }
}
```

SIPcapture API Charts

Stats: VoIP Traffic



Stats: IP Network



HOMER 5

Kamailio 4.x



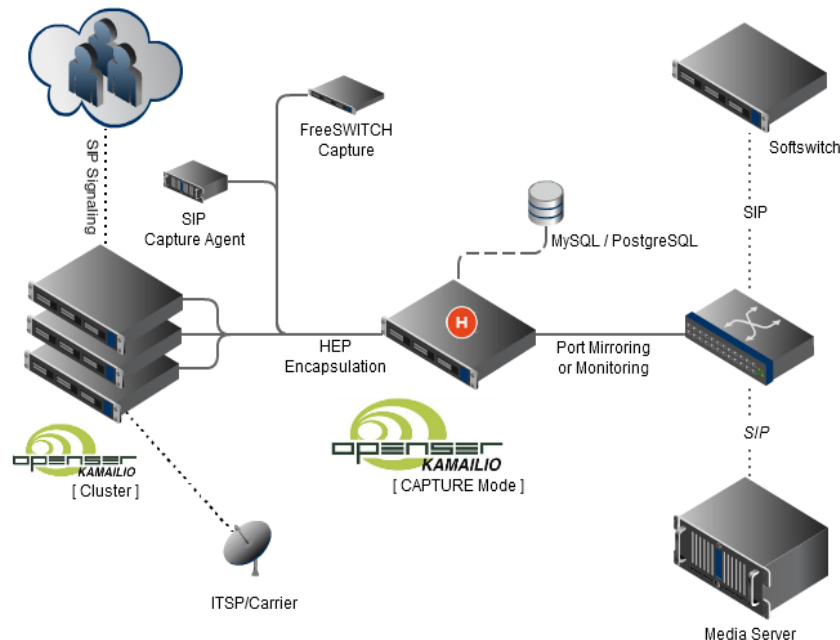
HOMER & Kamailio 4.x

Build your own HOMER Capture Appliance using Kamailio

HOMER *sipcapture* module allows **Kamailio** to operate as a robust and scalable SIP Capture Server with native support for *HEP*, *IPIP* Encapsulation protocols and raw switch mirroring or monitoring port.

Kamailio can be configured to cover the following roles:

- **CAPTURE AGENT**
(*siptrace* module)
 - Captures and sends HEP encapsulated packets to a server
- **CAPTURE SERVER**
(*sipcapture* module)
 - Collects, Indexes and Stores SIP packets received from Capture Agents using (HEP v1/2/3), SBCs (IPIP) or Raw SIP from ethernet interface(s) and mirrored switch port(s) according to the capture plan configuration and rules.



Capture Agent role can be covered by different elements running on different platforms or architectures and distributed in a completely modular fashion, allowing it to support any network topology and complexity and to easily scale with the monitored architectures, as displayed in the illustration on the right.

HOMER Capture Server using Kamailio: QoS Reports and Logging

```
# PUBLISH REPORT

if(is_method("PUBLISH") && has_body("application/vq-rtcpxr"))
{
    $var(table) = "report_capture";
    $var(callid) = $(rb{re.subst,/(.*)CallID:([0-9A-Za-z@-]{5,120})(.*)$/\2/s});

    $var(temp) = $(rb{re.subst,/^(.*)JitterBuffer:(.*)JBN=([0-9]{1,5})(.*)$/\3/s});
    if(float2int("$var(temp)", 1)) $var(jbn) = $rc;

    #Mos
    $var(temp) = $(rb{re.subst,/^(.*)QualityEst:(.*)MOSQ=([0-9.]{1,4})(.*)$/\3/s});
    if(float2int("$var(temp)", 10)) $var(mos) = $rc;

    statsd_set($var(customer)+"Mos", $var(mos));
    statsd_set($var(customer)+"JBN", $var(jbn));

    #save to db
    report_capture("$var(table)", "$var(callid)");

    drop;
}
```

More Examples: <https://github.com/sipcapture>

RTCP-XR provides a range of VoIP call and network quality metrics generated by user agents and devices supporting the protocol. The reports can be very useful to debug the user quality of a given session and are supported by HOMER. RTCP-XR packets can be handled in two different ways by a capture agent:

- **STORE** Mode
Using HEP proto_id 99 QoS reports are sent to DB and presented in HOMER UI
- **FORWARD** Mode
Using HEP SIP proto_id 1, QoS reports are forwarded to kamailio.cfg where users can parse and extract relevant information for statistical purposes and store to hashmap, Homer DB or statsd module

HINT: Don't miss our QoS Dangerous Demo!

References:

- RFC 3611 (*RTP Control Protocol Extended Reports*)
- RFC 6035 (*SIP Package for Voice Quality Reporting*)

HOMER Capture Server: Alarms and Statistic Logic

Routing Logic

```

if(is_method("REGISTER")) {
    $var(table) = "sip_capture_registration";
}
else if(is_method("INVITE|BYE|CANCEL|UPDATE|ACK|PRACK|REFER"))
{
    $var(table) = "sip_capture_call";
}
else if(is_method("INFO"))
{
    $var(table) = "sip_capture_call";
}
else if(is_method("OPTIONS"))
{
    $var(table) = "sip_capture_rest";
}
else {
    $var(table) = "sip_capture_rest";
}

$var(a) = $var(table) + "_%Y%m%d";

sip_capture("$var(a)");

```

More Examples: <https://github.com/sipcapture>

Alarms & Statistic Parameters

```

if (is_method("INVITE|REGISTER")) {

    if($ua =~ "(friendly-scanner|sipvicious)") {
        sql_query("cb", "INSERT INTO alarm_data_mem
(create_date, type, total, source_ip, description) VALUES(NOW(), 'scanner', 1,
'$si', 'Friendly scanner alarm!') ON DUPLICATE KEY UPDATE total=total+1");
        route(KILL_VICIOUS);
    }

    #IP Method
    sql_query("cb", "INSERT INTO stats_ip_mem ( method, source_ip,
total) VALUES('$rm', '$si', 1) ON DUPLICATE KEY UPDATE total=total+1");

    if($au != $null) $var(anumber) = $au;
    else $var(anumber) = $fU;

    #hostname in contact
    if($sel(contact.uri.host) =~ "^\d{1,3}\.\d{1,3}\.\d{1,3}\.\d
{1,3}$") {
        if($sht(a=>alarm::dns) == $null) $sht(a=>alarm::dns) =
0;
        $sht(a=>alarm::dns) = $sht(a=>alarm::dns) + 1;
    }
}
}

```

Introducing...

CAPTAGENT 6



CAPTAGENT 6

Introduction & History



CAPTAGENT 6? Hem...
... and whatever happened to CAPTAGENT 5 ?



A bit of history is due... AGAIN!

Captagent has an even version stepping, so there are no odd versions released. Now you know ;)

CAPTAGENT 0.x was the first, simple SIP capture agent enabling the initial concept of HOMER using *HEP v1/2*

~~**CAPTAGENT 2.x**~~ remained an internal development version and laid the foundations of *HEP v3* concepts

CAPTAGENT 4.x was a complete redesign delivering a powerful, flexible, completely modular capture framework ready for virtually any kind of protocol, transport and encapsulation method, past, present and future. This version shipped with *HEP v3* support, universal protocol capture suitable for *SIP*, *XMPP* plus *HEP* encryption and compression.

CAPTAGENT 6.x is the latest generation of our flagship agent once again delivering key core improvements over its internal design and leaping forward from the technology standpoint delivering unprecedented performance. continue....

CAPTAGENT

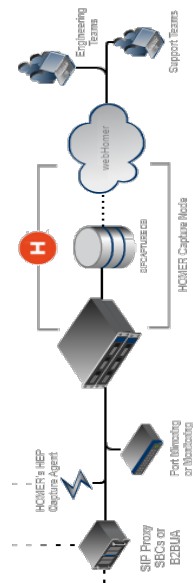
What's new in version 6

CAPTAGENT has been completely redesigned from the ground up and ships with new internal architecture expanding its performance range and core capabilities to handle more network protocols, the ability to relay and aggregate traffic for remote agents, parse and handle RTCP-XR and RTP statistics, RPC centralized control and much more.

© CAPTAGENT 6

NEW New Core Features:

- Multiple incoming sockets (*PCAP, RAW, PF_RING, RX-RING, FILE*)
- Multiple outgoing types (HEP, JSON, CSV)
- HTTP JSON API for statistics, config changes etc
- RTCP-XR collector module
- RTCP output module (output in raw or json format)
- Capture scenario configuration (pseudo scripting via flex, bison)
- Call transaction tracking
- TCP/UDP reassembling and defragmentation.
- applying and change capture filter on demand
- LUA scripting (JITLua) (experimental)
- V7 Javascripting sandbox (experimental)
- SIPFIX Support (experimental)



CAPTAGENT 6

Modular Capture Agent w/ HEP3 Support

Captagent started as a SIP-only capture agent for HOMER. The codebase over time has been completely redesigned from the ground up to follow the evolution of the **HEP** protocol and **Captagent** grew to become a powerful, flexible, completely modular capture agent *framework* ready for virtually any kind of protocol and encapsulation method, past, present - *and future*.

Currently available modules:

- UNI Proto Module
 - SIP, XMPP and other text signaling Protocols
- RTCP Module
 - RTCP and RTCP-XR Parser and Collector
- CLI Module
 - CLI Shell Access and control of Captagent
- HEP Module
 - HEP Encapsulation output (v1/2/3)
- SSL/TLS Module
 - Encryption and Compression Module for HEP3

Upcoming modules:

- Remote API Module
 - Configure and Control a feet of Captagents from a Central server

CAPTAGENT: <https://github.com/sipcapture/captagent>

```

<!-- CORE MODULES -->

<configuration name="core_hep.conf" description="HEP Socket">
  <settings>
    <param name="version" value="3"/>
    <param name="capture-host" value="capture.server.org"/>
    <param name="capture-port" value="9060"/>
    <param name="capture-proto" value="udp"/>
    <param name="capture-id" value="2001"/>
    <param name="capture-password" value="myHep"/>
    <param name="payload-compression" value="false" />
  </settings>
</configuration>

<!-- PROTOCOLS -->

<configuration name="proto_uni.conf" description="UNI Proto Basic
capture">
  <settings>
    <param name="port" value="5060"/>
    <!-- <param name="portrange" value="5060-5090"/> -->
    <!--
      use -D flag for pcap import
      use "any" for all interfaces in your system
    -->
    <param name="dev" value="eth0"/>
    <param name="promisc" value="true"/>
    <!-- comment it if you want to see all IPProto (tcp/udp) -->
    <param name="ip-proto" value="udp"/>
    <param name="proto-type" value="sip"/>
    <!-- <param name="filter" value="not src port 5099"/> -->
  </settings>
</configuration>

```


Example: Captagent Scenario programming

```
<module name="socket_pcap" description="HEP Socket" serial="2014010402">
  <profile name="socketspcap_sip" description="HEP Socket" enable="true"
  serial="2014010402">
    <settings>
      <param name="dev" value="any"/>
      <param name="promisc" value="true"/>
      <param name="reasm" value="false"/>
      <param name="capture-plan" value="sip_capture_plan.cfg"/>
      <param name="filter">
        <value>portrange 5060-5091</value>
      </param>
    </settings>
  </profile>
  <profile name="socketspcap_rtcp" description="RTCP Socket" enable="true"
  serial="2014010402">
    <settings>
      <param name="dev" value="any"/>
      <param name="promisc" value="true"/>
      <param name="reasm" value="false"/>
      <param name="capture-plan" value="rtcp_capture_plan.cfg"/>
      <param name="filter">
        <value>portrange 30000-50000</value>
      </param>
    </settings>
  </profile>
</module>
```



```
#sip_capture_plan.cfg
capture[pcap] {

  # here we can check source/destination IP/port, message size
  if(msg_check("size", "100")) {

    #Do parsing
    while(parse_sip()) {

      /* many packets */
      clog("NOTICE", "parsing SIP message ");

      if(source_ip("10.0.0.1")) {
        #Can be defined many profiles in transport_hep.xml
        if(!send_hep("hepsocket_homer01")) {
          clog("ERROR", "Error sending HEP!!!!");
        }
      }
      else {
        #Can be defined many profiles in transport_hep.xml
        if(!send_hep("hepsocket_homer02")) {
          clog("ERROR", "Error sending HEP!!!!");
        }
      }

      #Duplicate all INVITES to JSON transport
      if(sip_is_method() && sip_check("method","INVITE")) {

        #Can be defined many profiles in transport_json.xml
        if(!send_json("jsonsocket")) {
          clog("ERROR", "Error sending JSON");
        }
      }
    }
  }
}
drop;
}
```

More Examples: <https://github.com/sipcapture>

HEP Agents



HEP - Homer Encapsulation Protocol

Integrated Capture Agents in OSS Platforms

HOMER's own encapsulation protocol (*HEP/EEP*) is used to transfer your packets unmodified and carries several key information in its headers designed for perfect capturing.

HEP has been consistently integrated across the leading OSS solutions - chances are you have one in your fleet already!

The following projects provide integrated HEP support:

- Kamailio
- OpenSIPS
- FreeSWITCH
- Asterisk
- sipXecs

Examples are also provided for the following languages:

- Java
- C/C++
- Erlang
- Go

The *HEP/EEP* Protocol is defined in a mature Draft pending submission and is freely available for developers to integrate.

Find more about HEP: <http://hep.sipcapture.org/>

Kamailio Example:

<https://github.com/sipcapture/homer/wiki/Examples%3A-Kamailio>

OpenSIPS Example:

<https://github.com/sipcapture/homer/wiki/Examples%3A-OpenSIPS>

FreeSWITCH Example:

<https://github.com/sipcapture/homer/wiki/Examples%3A-FreeSwitch>

ACME SBC Example:

<https://github.com/sipcapture/homer/wiki/Examples%3A-ACME-Packet>

CaptAgent Example:

<https://github.com/sipcapture/homer/wiki/Examples%3A-Captagent4>

nProbe VoIP Example:

<https://github.com/sipcapture/homer/wiki/Examples%3A-nProbe>

SIPGREP₂

Sigprep as disposable HEP3 Agent

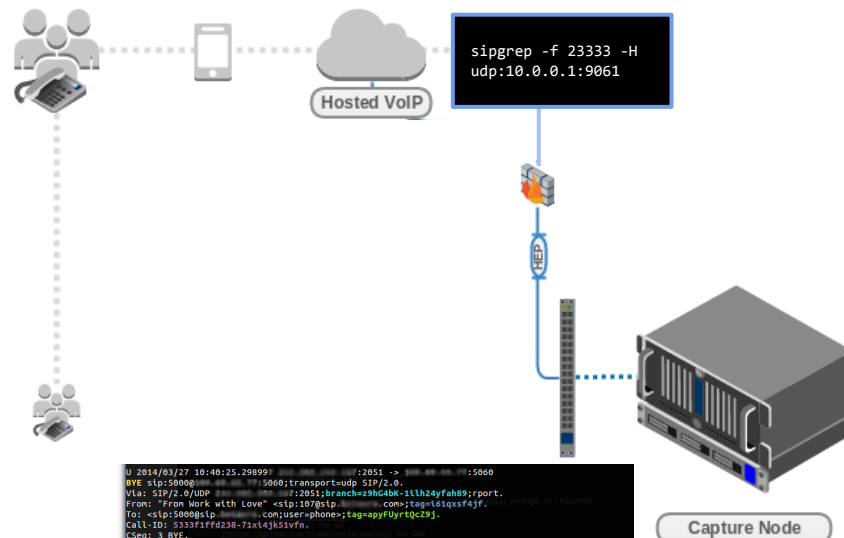
Sigprep is able to act as a quick on-demand HEP3 capture agent and forward packets to a collector very easily when a simple terminal check does not suffice.

In the following example, Sigprep is used to display the traffic of interest as well as log it to a remote location, useful for instance when troubleshooting issues on hosted platforms or disposable instances on the cloud.

HEP3 Example:

Display dialogs and duplicate all traffic to HOMER sipcapture in HEPv3:

```
sigprep -f 23333 -H udp:10.0.0.1:9061
```



```
U 2014/03/27 10:40:25.29899f 2051 -> 5060 :5060
BYE sip:5000@10.0.0.1:5060;transport=udp SIP/2.0
Via: SIP/2.0/UDP 10.0.0.1:5060;branch=z9hG4k-llh24yFah89;rport.
From: 'From Work with Love' <sip:1078sip@10.0.0.1>;tag=16iqsf4jf.
To: <sip:5000@10.0.0.1>;com=user-phone;tag=appfUyrTQC29j.
Call-ID: 5333f1ff0238-71x14jK51vfn.
CSeq: 3 BYE.
Max-Forwards: 70.
Contact: <sip:1070@10.0.0.1>;branch=z9hG4k-llh24yFah89;rport.
User-Agent: snon360/B.7.3.25.
RTP-mxStat: Total_Rx_Pkts=316,Rx_Pkts=0,Rx_Pkts_Lost=0,Remote_Rx_Pkts_Lost=0.
RTP-TXStat: Total_Tx_Pkts=415,Tx_Pkts=415,Remote_Tx_Pkts=0.
Content-Length: 0.
.

U 2014/03/27 10:40:25.302154 2051 -> 5060 :5060
SIP/2.0 OK.
Via: SIP/2.0/UDP 10.0.0.1:5060;branch=z9hG4k-llh24yFah89;rport:2051.
From: 'From Work with Love' <sip:1078sip@10.0.0.1>;tag=16iqsf4jf.
To: <sip:5000@10.0.0.1>;com=user-phone;tag=appfUyrTQC29j.
Call-ID: 5333f1ff0238-71x14jK51vfn.
CSeq: 3 BYE.
User-Agent: snon360/B.7.3.25.
Supported: timer, precondition, path, replaces.
Content-Length: 0.
.
```

RTCP Statistics

Asterisk RTCP Statistics

The latest **Asterisk** patch developed by Alexandr Dubovikov and Matt Jordan implements module `res_hep_rtcp`

The module performs RTCP packet capturing for the internal RTP engine in Asterisk and transmits HEP3 encapsulated call quality metrics & statistics in HEP encapsulated JSON format.

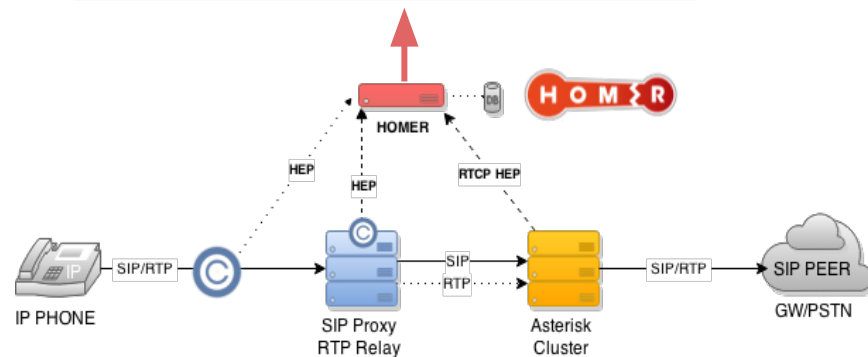
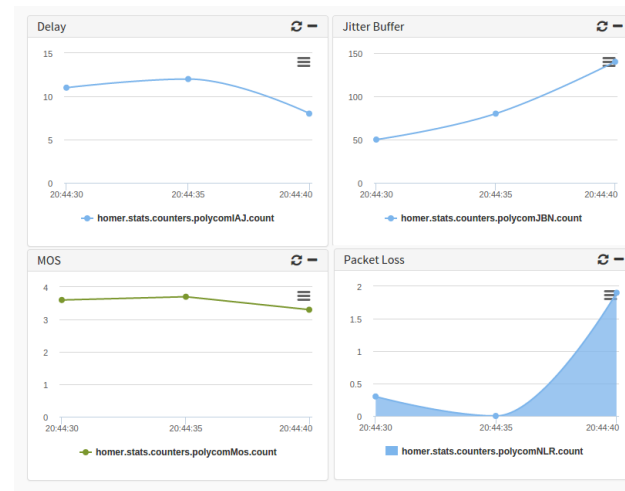
The module can be coupled with `res_hep` to build a full HEP capture node and send SIP signaling as well as call QoS.

With the above setup, statistics can be observed historically and in real time as they reach the server when observing a call including pseudo-MOS score calculated on the client-side.

Example HOMER integration is presented on the side slide:

For more information and patch details:

https://github.com/sipcapture/homer/tree/master/asterisk_rtcp_patch



Voice CDRs & LOGS

Experiment with HEPipe

Troubleshooting is not all about network packets - many times system logs will hold valuable pointers at internal issues not expressed at the protocol level. There are many tools able to forward syslog/rsyslog to notorious collectors but for those looking to build their own voice data collection, we have developed a HEP3 playground utility called **HEPipe**

HEPipe (*pronounced HEP-pipe*) is an application for logging arbitrary data (*ie: logs, cdrs, debug lines*) to a HEP/EEP capture server such as [HOMER](#) or [PCAPTURE](#) via command pipe.

The utility can be used to prototype HEP3 implementations as well as to feed real data into a HEP Collector for real life usage, for instance by using the session Call-ID as correlation parameter.

INPUT FORMAT:

```
timestamp_sec; timestamp_usec; correlation_id; source_ip; source_port; destination_ip; destination_port; payload in json
```

USAGE EXAMPLE:

```
echo '1396362930;1003;18731b65be;127.0.0.1;5060;10.0.0.1;5060;{"pl": 10, "jt": 10}'|./hepipe -s hepserver -p 9061 -t 100
```

Install & Run a **HOMER** Capture Server & Capture Agent in a snap!

Setup **HOMER** in just a few minutes using a fresh Debian (preferred) or CentOS setup using our installer:

```
# wget https://raw.githubusercontent.com/sipcapture/homer/master/scripts/extra/homer_installer.sh
# chmod 775 homer_installer.sh
# ./homer_installer.sh
```

The Installer will prompt for minimal user preferences and complete a basic server setup for your operating system. Within minutes (*depending on your network speed*) your HOMER instance will be accessible:

```
http://<hostname>/webhomer
```

Setup of a **CAPTAGENT** is just as easy using the provided installer:

```
# wget https://raw.githubusercontent.com/sipcapture/homer/master/scripts/extra/captagent_installer.sh
# chmod 775 captagent_installer.sh
# ./captagent_installer.sh
```

Adjust the capture agent configuration with your HOMER details in `/usr/local/etc/captagent/captagent.xml`
Service can be managed using standard init scripts:

```
# /etc/init.d/captagent start/stop
```

SIP Troubleshooting

“That’s all Folks!”

Time’s UP!

HOMER 5 will be released in the coming hours (*or as soon as we recover from the event!*) Please keep your eyes on our GitHub "sipcapture" account or visit our official website at:

<http://sipcapture.org>