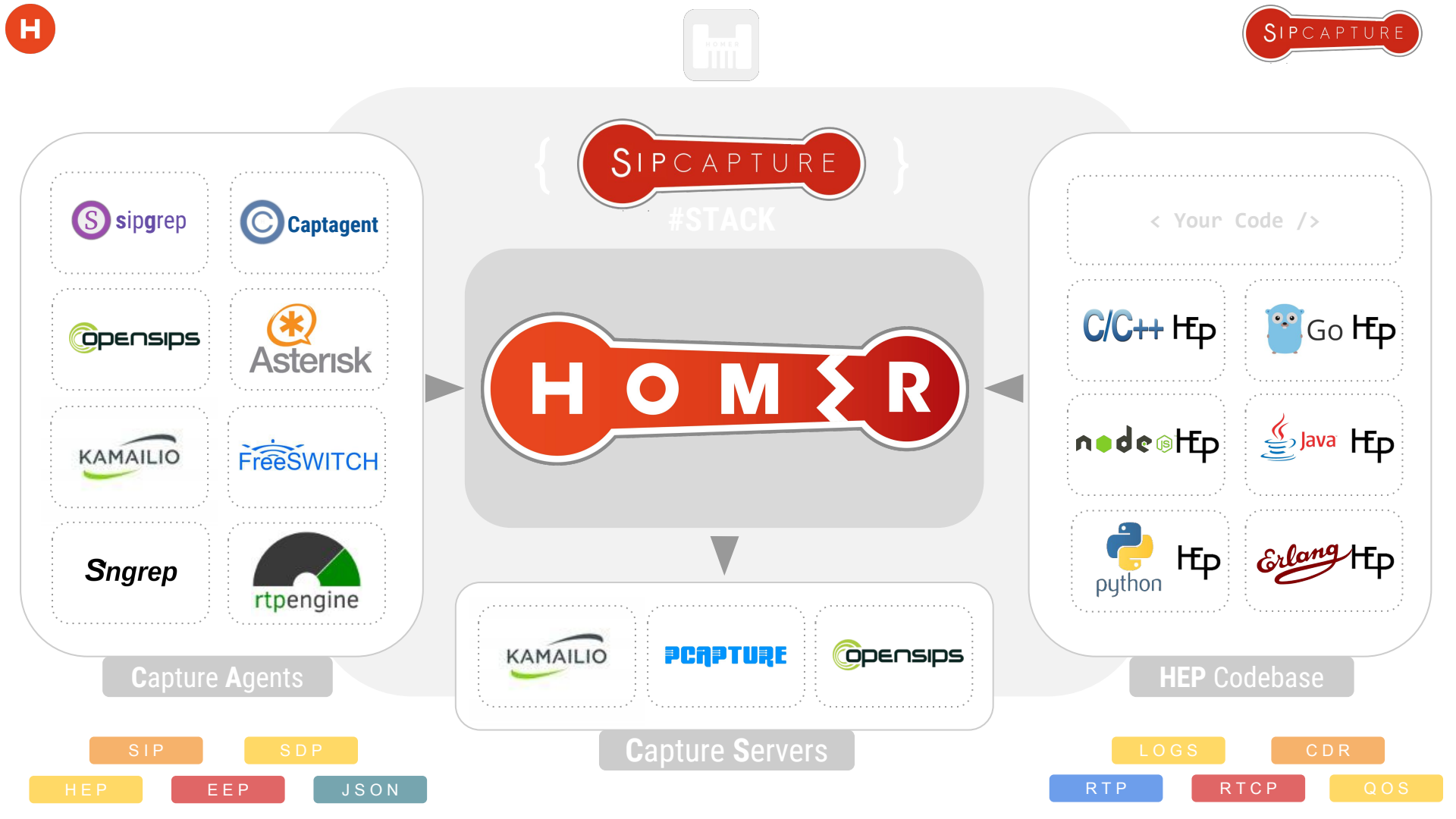

SIPCAPTURE
#STACK
HOMER
sipgrep
Captagent
opensips
Asterisk
KAMAILIO
FreeSWITCH
Sngrep
rtpengine
Capture Agents
KAMAILIO
PCAPTURE
opensips
Capture Servers
< Your Code />
C/C++ HEP
Go HEP
node HEP
Java HEP
python HEP
Erlang HEP
HEP Codebase
SIP
SDP
HEP
EEP
JSON
LOGS
CDR
RTP
RTCP
QOS

Senior Voice Engineer for QSC AG, one of the major German voice and data providers. Alexandr holds a diploma in physics of Odessa State University. He has 20 years of experience in telecommunication techniques and has contributed to many OpenSource projects like FeeSwitch, SER, Kamailio, SEMS, Asterisk, SIPP, Wireshark. Alexandr is the main developer of Homer SIP Capture project. He is also founder of IRC RusNet Network, one of the biggest national IRC networks in the world.

QSC AG is digitising the German SME sector. With decades of experience and expertise in the areas of Cloud, Consulting, Outsourcing, and Telecommunications, QSC accompanies its customers securely into the digital age. Today already, cloud-based procurement models offer increased speed, flexibility, and full service availability. The Company's TÜV and ISO-certified data centres in Germany and its nationwide All-IP network form the basis for maximum end-to-end quality and security. QSC's customers benefit from one-stop innovative products and services that are marketed both directly and via partners. For details visit: http://qsc.de

QXIP BV *{QuickSIP}* is an Amsterdam based R&D Company specializing in Open-Source and Commercial Voice Technology Development - Our flagship projects are SIPCAPTURE **HOMER** and **PCAPTURE** based on our mature and open encapsulation protocol **HEP/EEP** *(Extensible Encapsulation Protocol)* Our Open-Source solutions are deployed and trusted by thousands of businesses worldwide. Our Customers include large telephony and network operators, voice service carriers, voip service providers, cloud service providers, call center operators and voice equipment vendors. Our Capture Technologies are natively implemented in all major OSS voip platforms such as *Kamailio, OpenSIPS, FreeSWITCH, Asterisk, RTPEngine* and many tools such as *sipgrep*, *sngrep* and more. For full details please visit our website at http://qxip.net

Things you already know about #HOMER

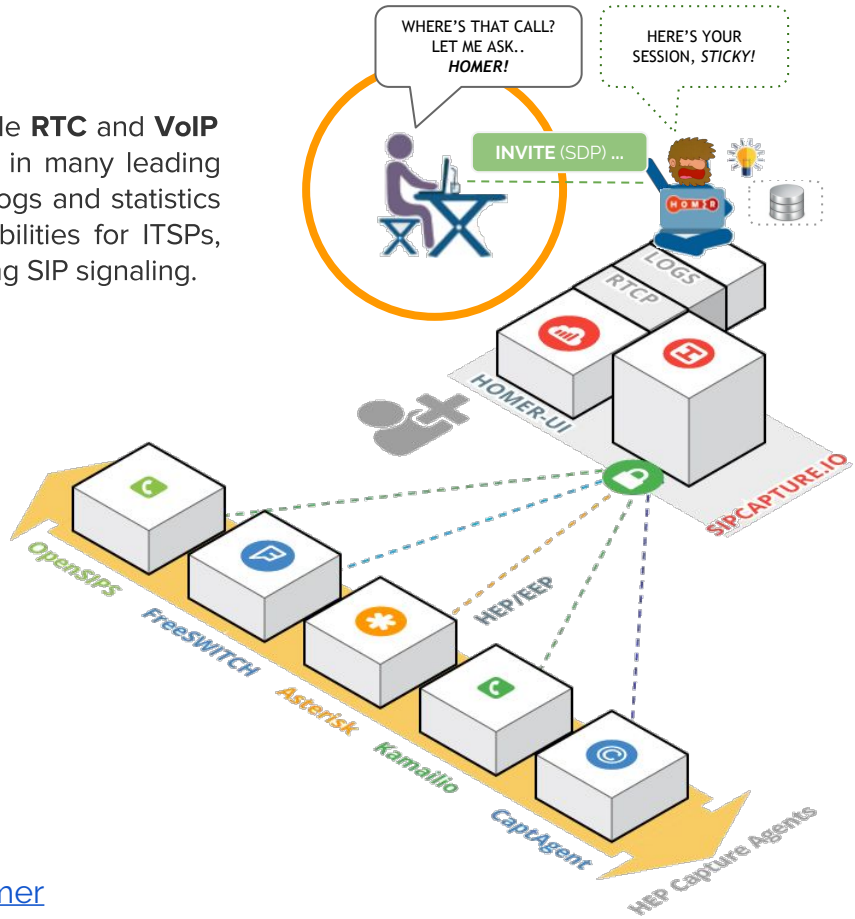
If you missed our Workshop, make sure you grab the PDF!

HOMER is part of the **SIPCAPTURE** stack, a robust, carrier-grade, scalable **RTC** and **VoIP** Capture and Monitoring application with built in support out of the box in many leading platforms, ready to process, index & store insane amounts of signaling, logs and statistics and providing instant search, end-to-end analysis and drill-down capabilities for ITSPs, VoIP Providers Trunk Suppliers as well as Enterprises and Developers using SIP signaling.

HOMER provides many features and advantages, including:

- Instant centralized access to present and past signaling & stats
- Full SIP/SDP payload retention with precise timestamping
- Automatic correlation of sessions, logs and reports
- Support for RTP and RTCP Media statistics and analytics
- Visual representation of multi protocol session call-flows
- Fast detection of usage and system anomalies
- System agnostic view of VoIP and RTC traffic flows
- Unlimited plug & play capture agents and HEP custom data feeds
- Multi-User and Customizable UI based on JS/Angular/D3
- PCAP Exporting and Sharing functionality with 3rd parties

... and much more!



FIND ALL ABOUT HOMER: http://github.com/sipcapture/homer

What is **HEP/EEP** ?

HEP = Homer Encapsulation Protocol
EEP = Extensible Encapsulation Protocol

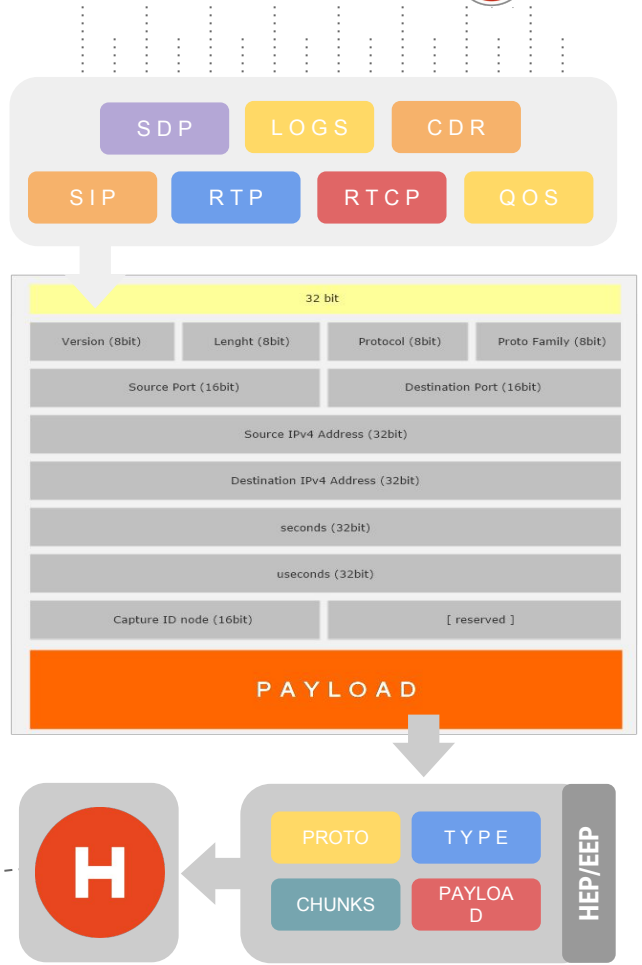
HOMER's *own* Encapsulation protocol *(HEP/EEP)* is used to wrap, argument and transfer captured packets between a capture *Agent* and capture *Server*.

The **HEP/EEP** Extensible Encapsulation protocol was designed to provide an efficient, modular and low--level framework to accurately duplicate passively obtained IP datagrams for remote collection over *UDP/TCP/SCTP* connections, where full retention of original datagram headers, timestamp, correlation pointers and original payload MUST be provided back to the collectors without any alterations or data loss.

The **HEP3/EEP** definition includes both generic *(internal)* and vendor- specific custom defined **chunk types** providing ground for implementors to extend the spectrum of the deliverable data within the HEP protocol alongside the encapsulated IP datagrams with custom data without protocol modifications.

HOMER currently supports HEP encoding/decoding for *SIP, XMPP, RTCP, RTCP-XR, HSP-MOS* and *Custom Logs* or *CDRs* in plain text or JSON format.

Find the full HEP/EEP specs at: http://github.com/sipcapture/hep



HEP/EEP - Native Capture Agents

Integrated Agents in OSS Platforms

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

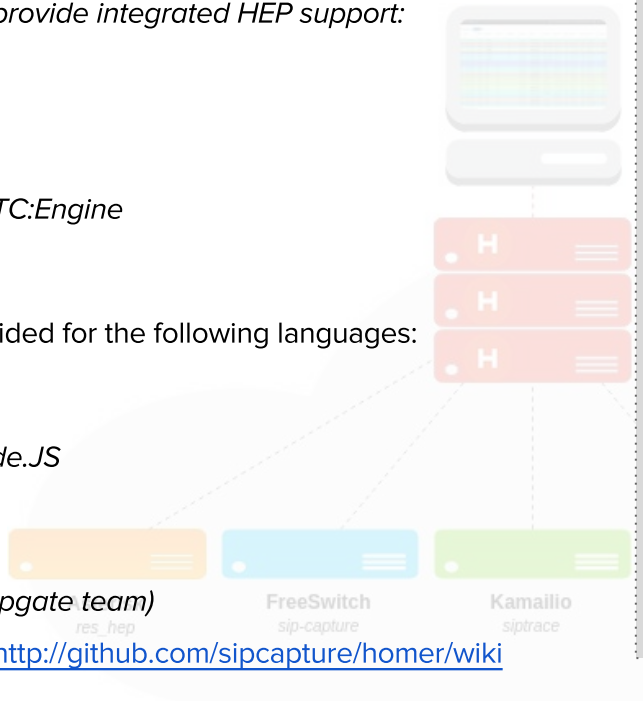
The following projects provide integrated HEP support:

- *Kamailio*
- *OpenSIPS*
- *FreeSWITCH*
- *Asterisk / PJSIP*
- *RTP:Engine + RTC:Engine*
- *sipgrep*
- *sngrep*

Examples are also provided for the following languages:

- *C/C++*
- *Java*
- *Javascript / Node.JS*
- *Erlang*
- *Python*
- *Go*
- *Perl (thanks @sipgate team)*

Find more on our wiki: http://github.com/sipcapture/homer/wiki



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

CaptAgent Example:

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

nProbe VoIP Example:

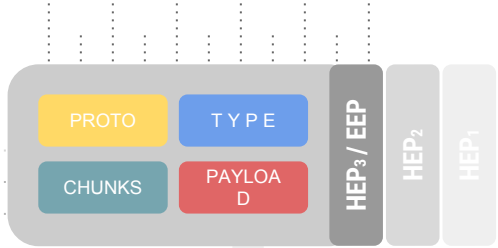
https://github.com/sipcapture/homer/wiki/Examples%3A-nProbe

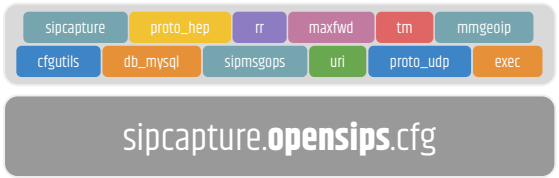
ACME SBC Example:

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

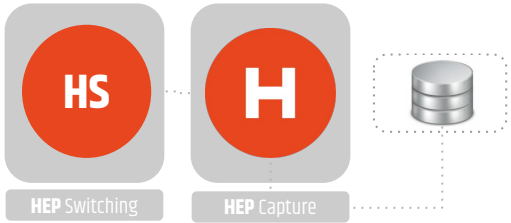
Inside the **CAPTURE SERVER**

Nuts and Bolts behind the **HEP** Sockets



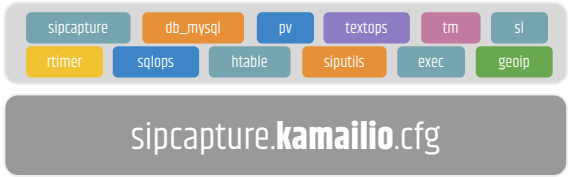


sipcapture.**opensips**.cfg

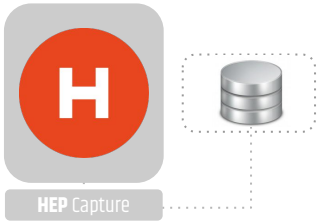


HOMER 5 capture servers can be based on either **Kamailio 4.4**+ or **OpenSIPS 2.2**+ using the **SIPCAPTURE** module supporting **HEP / EEP** functionality in combination with any other available module to provide a programmable and modular **RTC** packet capture framework with no limitations and no presets, ready to extend and customize

*Who's best? Only **YOU** decide!*



sipcapture.**kamailio**.cfg



What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

Recent Developments:

- ★ HEP3 support in FreeSWITCH 1.6.8
- ★ HEP3 support in Kamailio (siptrace)
- ★ HEP3 support in RTPEngine mr4.4.1
- ★ CaptAgent 6.1 with new modules
- ★ New protocols support in HOMER 5

What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

During our previous **workshop** a few questions and ideas from the audience were shared about **HOMER**:

- ★ HEP/EEP Event Socket
- ★ Elasticsearch support
- ★ Postgres SQL support

Now, clearly neither one of those features and/or integrations would be possible to achieve in a single day.

This would require a modular and extensible design upfront, an incredibly flexible set of tools and skills to perform everything on the road - not to mention much more time available and a comfortable desk.

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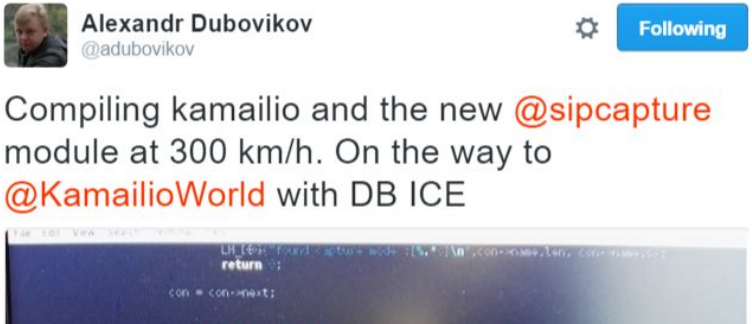
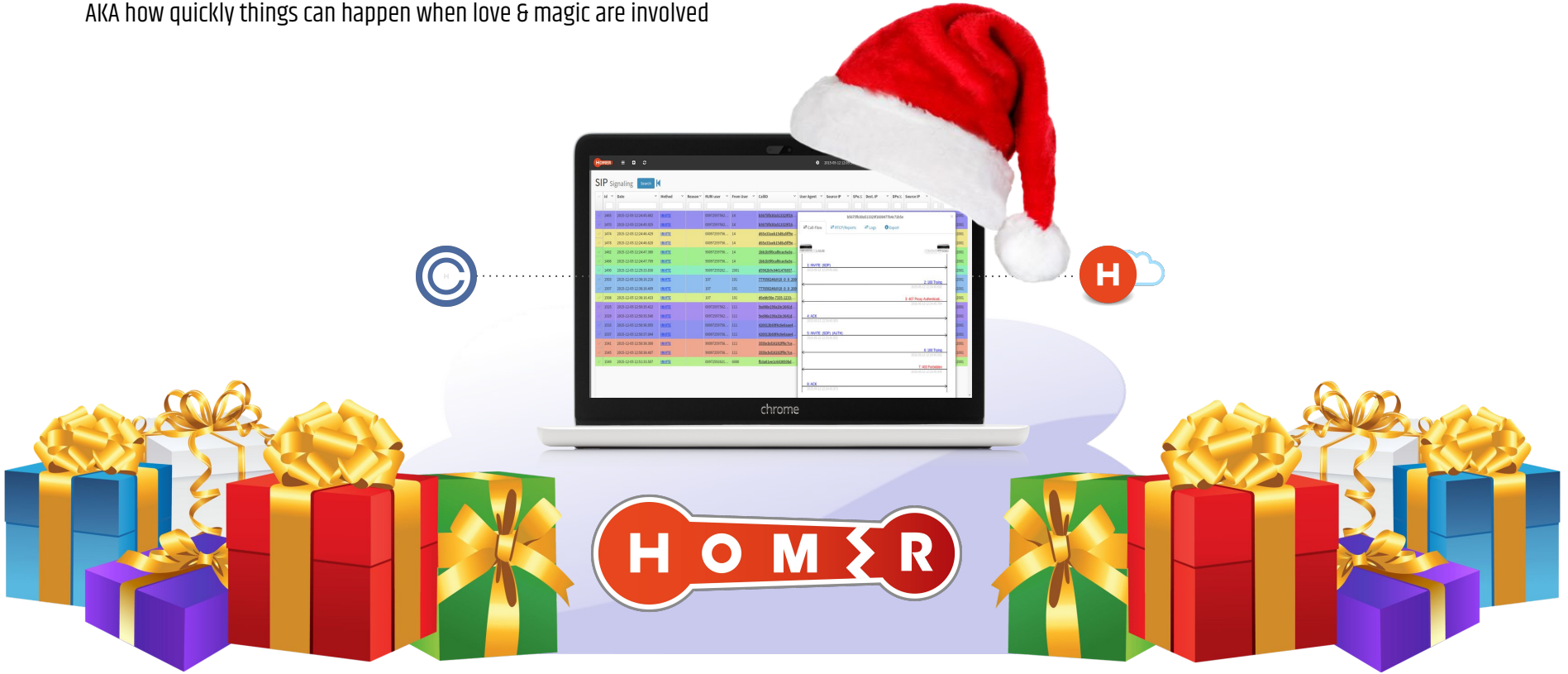
Unless you are like me.....



Mele Kalikimaka with **HOMER** 5

AKA how quickly things can happen when love & magic are involved



Mele Kalikimaka with **HOMER** 5

AKA how quickly things can happen when love & magic are involved

WARNING: Beer consumption might have affected the rest of the presentation @2AM

What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

History of HEP/EEP Support in Kamailio:

As the HEP encapsulation protocol evolved, so did the features of sipcapture module and Kamailio:

Generation 1:	No handling, all HEP messages directly sent to default DB table *Kamailio 3.x*
Generation 2:	No handling, HEP messages can be sent to arbitrary DB table from config *Kamailio 4.x*
Generation 3:	Full handling, messages can be manipulated and sent according to any parameter *Kamailio 5.x*

What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

Kamailio 5.x: HEP/EEP Event Socket

What could make HEP/EEP even more useful? An Event Socket of course! Some awesome things you can do:

- Parse, Process and Extract HEP/EEP header values and types
- Handle and Process non-SIP Messages (no parsing) directly and dynamically from the config script
- Generate custom statistics and Metrics based on the Capture Agent ID, Source, etc
- Forge and handle your very own HEP/EEP type in seconds for development and testing

Some of our common Types:

0x01	SIP
0x02	XMPP
0x03	SDP
0x05	RTCP (json serialized)
0x06	MGCP
0X29	WSS (webRTC)
0x64	LOGS (text or JSON)

KAMAILIO EVENT SOCKET

Example Usage of the Integrated Capture Agent (sipcapture module)


```
event_route[sipcapture:request] {

    xlog("received sipcapture request from $si:$sp\r\n");
    xlog("non-sip packet received - content [[$mb]] from [$si:$sp]\n");
    /* get proto type id  from HEP header */
    hep_get("0x0B", "0x0000", "$var(data)");
    hep_get("0x0F", "0x0000", "$var(payload)");
    hep_get("0x11", "0x0000", "$var(correlation_id)");
    hep_get("0x0C", "0x0000", "$var(capture_id)");

    /* Statistics for capture id */
    if($sht(a=>captureagent::$var(capture_id)) == $null) $sht(a=>captureagent::$var(capture_id)) = 0;
    $sht(a=>captureagent::$var(capture_id)) = $sht(a=>captureagent::$var(capture_id)) + 1;
    /* you can make statistics here */

    $var(proto) = $(var(data){s.int});

    if($var(proto) == 100) {
        /* send this data to logs_capture */
        report_capture("logs_capture", "$var(callid)");
        //dont send data to route/onreply_route
        drop;
    }
    else if($var(proto) == 50) {

        /* send this data to RTCP */
        report_capture("rtcp_capture", "$var(callid)");
        //dont send data to route/onreply_route
        drop;
    }
    else if($var(proto) == 1) {
        /* SIP */
        /* send this data to reply or onreply route, sipcapture will call parse_sip after payload will be extracted  */
        return;
    }
}
```

What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

Elasticsearch (deeper) **Integration**

HOMER 5 natively supports querying *Elasticsearch* data from *Dashboard* widgets/charts, but not for session data... until now! Thanks to the power of our **HEP Event Socket** you can now ship selected packets to your powerful Elasticsearch Cluster or any other JSON store. Here' s a fully working example using **sipcapture + jansson + http_client_async** modules

```
event_route[sipcapture:request] {

    xlog("received sipcapture request from $si:$sp\r\n");

    /* get proto type id  from HEP header */
    hep_get("0x0B", "0x0000", "$var(data)");
    hep_get("0x0F", "0x0000", "$var(payload)");
    hep_get("0x11", "0x0000", "$var(correlation_id)");

     $var(proto) = $(var(data)(s.int));

     if($var(proto) == 100) {

        # create a transaction to be paused, and resumed in route[HTTP_REPLY]
         t_newtran();
        #Create json object for ElasticSearch
        jansson_set("string", "body", "$var(payload)", "$var(json)");
        jansson_set("string", "postDate", "2016-05-20", "$var(json)");
        jansson_set("string", "title", "Data from Homer", "$var(json)");
        #Send to ES
        http_async_query("http://elasticsearch:9200/homer/logs", "$var(json)", "HTTP_REPLY");
        drop;
        }
```

```
    else if($var(proto) == 1) {
            /* SIP */
            # create a transaction to be paused, and resumed in route[HTTP_REPLY]
            t_newtran();
            #Create json object for ElasticSearch
            jansson_set("string", "body", "$var(payload)", "$var(json)");
            jansson_set("string", "postDate", "2016-05-20", "$var(json)");
            jansson_set("string", "title", "SIP from Homer", "$var(json)");
            #Send to ES
            http_async_query("http://elasticsearch:9200/homer/sip", "$var(json)", "HTTP_REPLY");
            drop;
        }

        drop;
}


route[HTTP_REPLY] {
    if ($http_ok) {
        xlog("L_INFO", "route[HTTP_REPLY]: status $http_rs\n");
        xlog("L_INFO", "route[HTTP_REPLY]: body   $http_rb\n");
    } else {
        xlog("L_INFO", "route[HTTP_REPLY]: error  $http_err)\n");
    }
}
```

What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

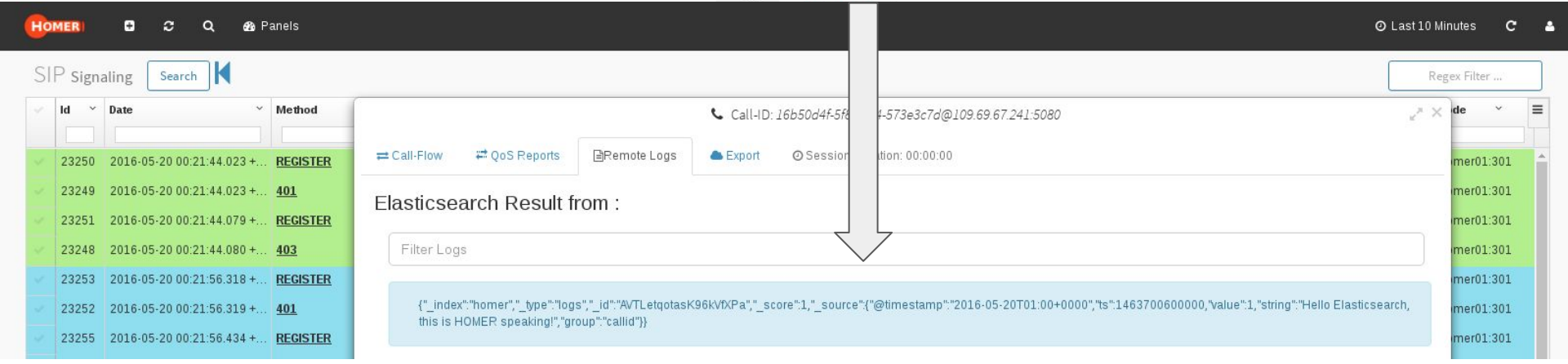
Here's a quick example we created around 2AM last night - make it your own and start pairing data in your **SIPCAPTURE** stack to **Elasticsearch**!

Have a good Idea or good business case?
Send us a mail and help us shape the future of this feature to be as flexible as we can make it! ;)

#opensource

Table | JSON


```
{
  "_index": "homer",
  "_type": "logs",
  "_id": "AVTLetqotasK96kVfXPa",
  "_score": null,
  "_source": {
    "@timestamp": "2016-05-20T01:00+0000",
    "ts": 1463700600000,
    "value": 1,
    "string": "Hello Elasticsearch, this is HOMER speaking!",
    "group": "callid"
  },
```

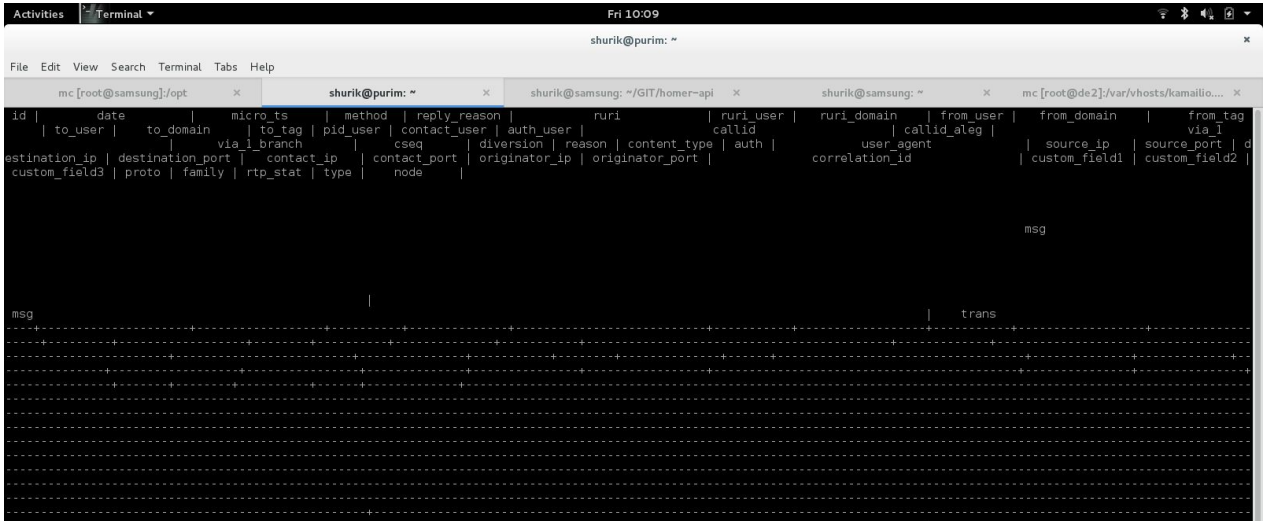
What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

Postgres SQL

HOMER 5 natively ships with an “agnostic” database module virtually supporting multiple database backends, but in reality only the **MySQL** connector was fully developed.... Until last night!

While you were enjoying the drinks kindly offered by the conference, we were busy making this happen!
(Thanks William King for the onsite assistance fine tuning!)



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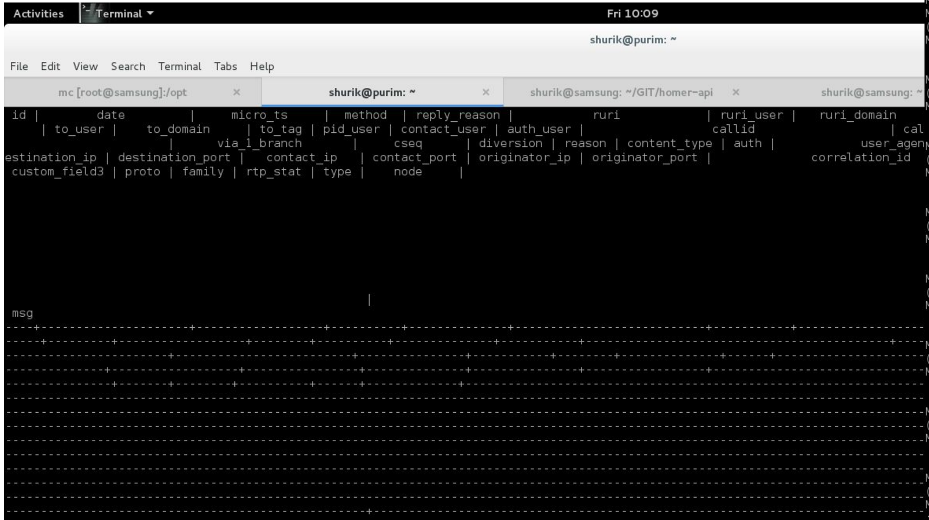

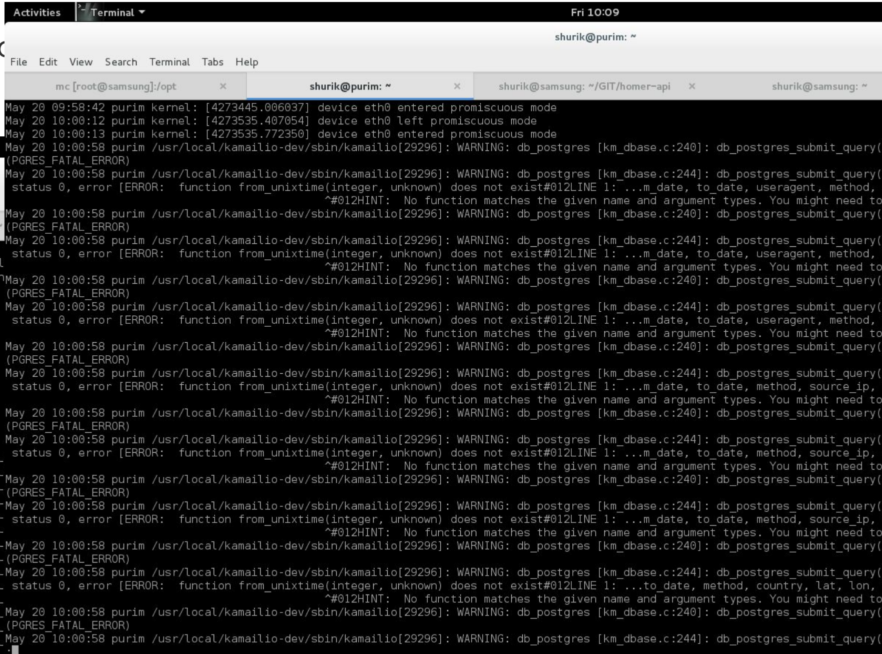

What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

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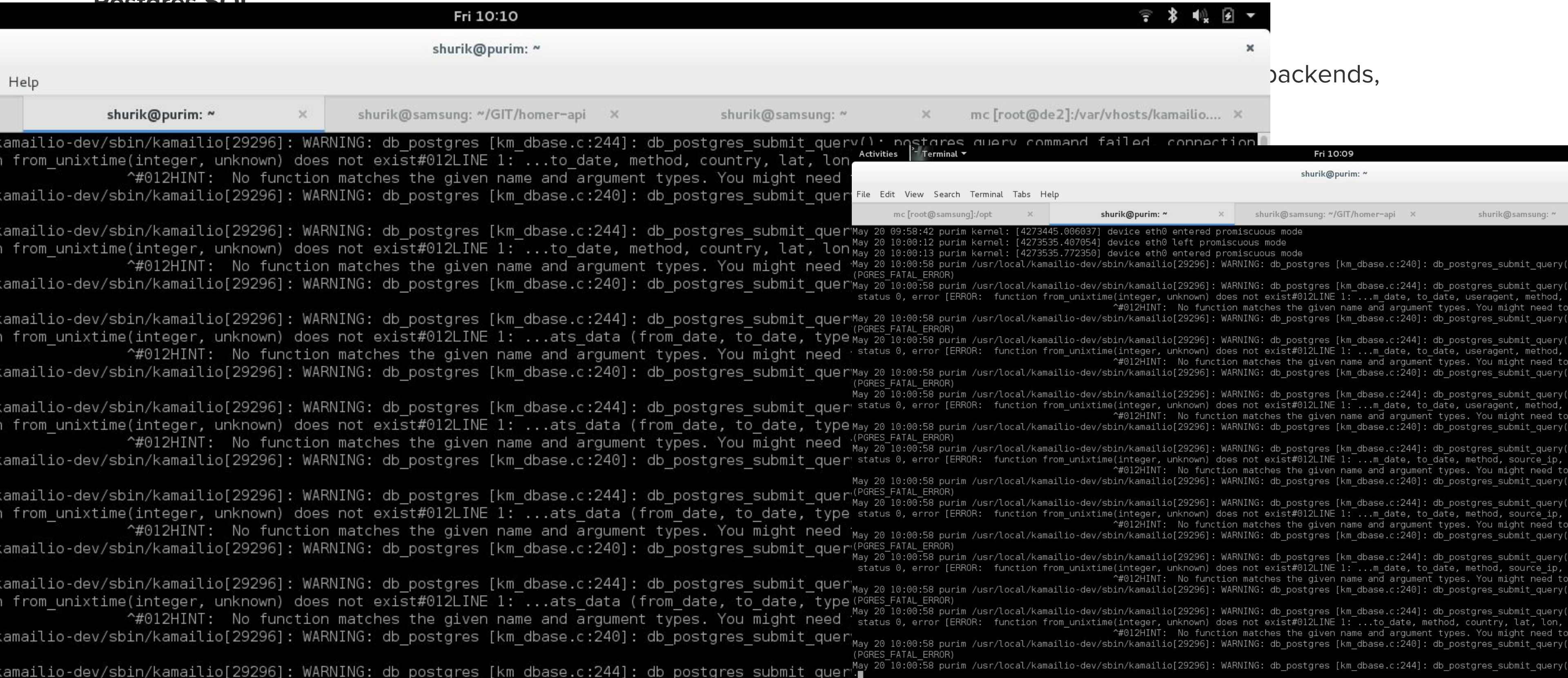

backends,

Activities Terminal ▾ Fri 10:11

shurik@purim: ~

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mc [root@samsung]:/opt | shurik@purim: ~ | shurik@samsung: ~/GIT/homer-api | shurik@samsung: ~ | mc [root@de2]:/var/vhosts/kamailio....

```
ay 19 18:42:06 purim /usr/local/kamailio-dev/sbin/kamailio[28239]: WARNING: db_postgres [km_dbase.c:240]: db_postgres_submit_query(): postgres result check failed with code 7
PGRES_FATAL_ERROR)
ay 19 18:42:06 purim /usr/local/kamailio-dev/sbin/kamailio[28235]: WARNING: db_postgres [km_dbase.c:590]: db_postgres_insert(): unexpected result returned
ay 19 18:42:06 purim /usr/local/kamailio-dev/sbin/kamailio[28239]: WARNING: db_postgres [km_dbase.c:244]: db_postgres_submit_query(): postgres query command failed, connection
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ine numbers turned off  (press RETURN)
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Activities Terminal ▾ Fri 10:09

shurik@purim: ~

File Edit View Search Terminal Tabs Help

mc [root@samsung]:/opt | shurik@purim: ~ | shurik@samsung: ~/GIT/homer-api | shurik@samsung: ~

```
May 20 09:58:42 purim kernel: [4273445.006037] device eth0 entered promiscuous mode
May 20 10:00:12 purim kernel: [4273535.407054] device eth0 left promiscuous mode
May 20 10:00:13 purim kernel: [4273535.772350] device eth0 entered promiscuous mode
May 20 10:00:58 purim /usr/local/kamailio-dev/sbin/kamailio[29296]: WARNING: db_postgres [km_dbase.c:240]: db_postgres_submit_query(
(PGRES_FATAL_ERROR)
May 20 10:00:58 purim /usr/local/kamailio-dev/sbin/kamailio[29296]: WARNING: db_postgres [km_dbase.c:244]: db_postgres_submit_query(
 status 0, error [ERROR:  function from_unixtime(integer, unknown) does not exist#012LINE 1: ...m_date, to_date, useragent, method,
                                                ^#012HINT:  No function matches the given name and argument types. You might need to
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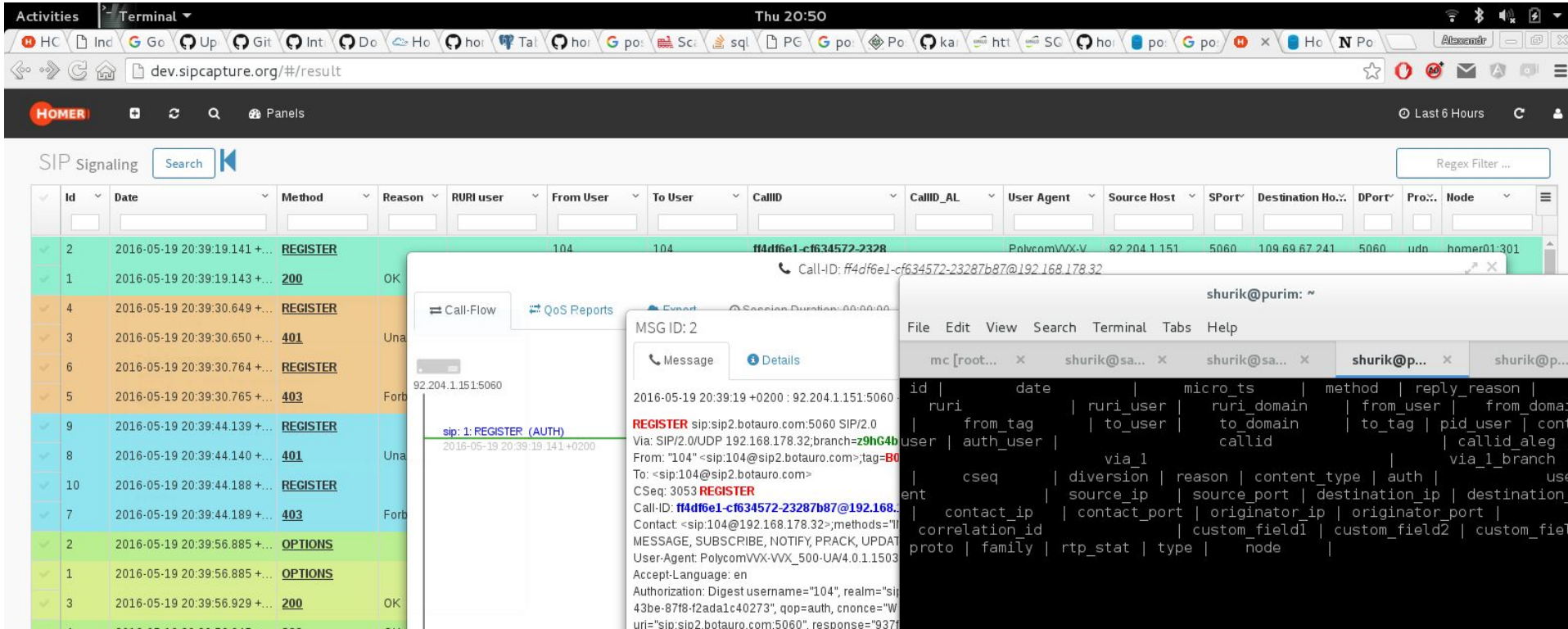
```

What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

SIPCAPTURE

Postgres SQL



What's **NEXT** with **HOMER** 5

A brief look into the future development and roadmap

SIPCAPTURE

HOMER ALARMS HOW-TO

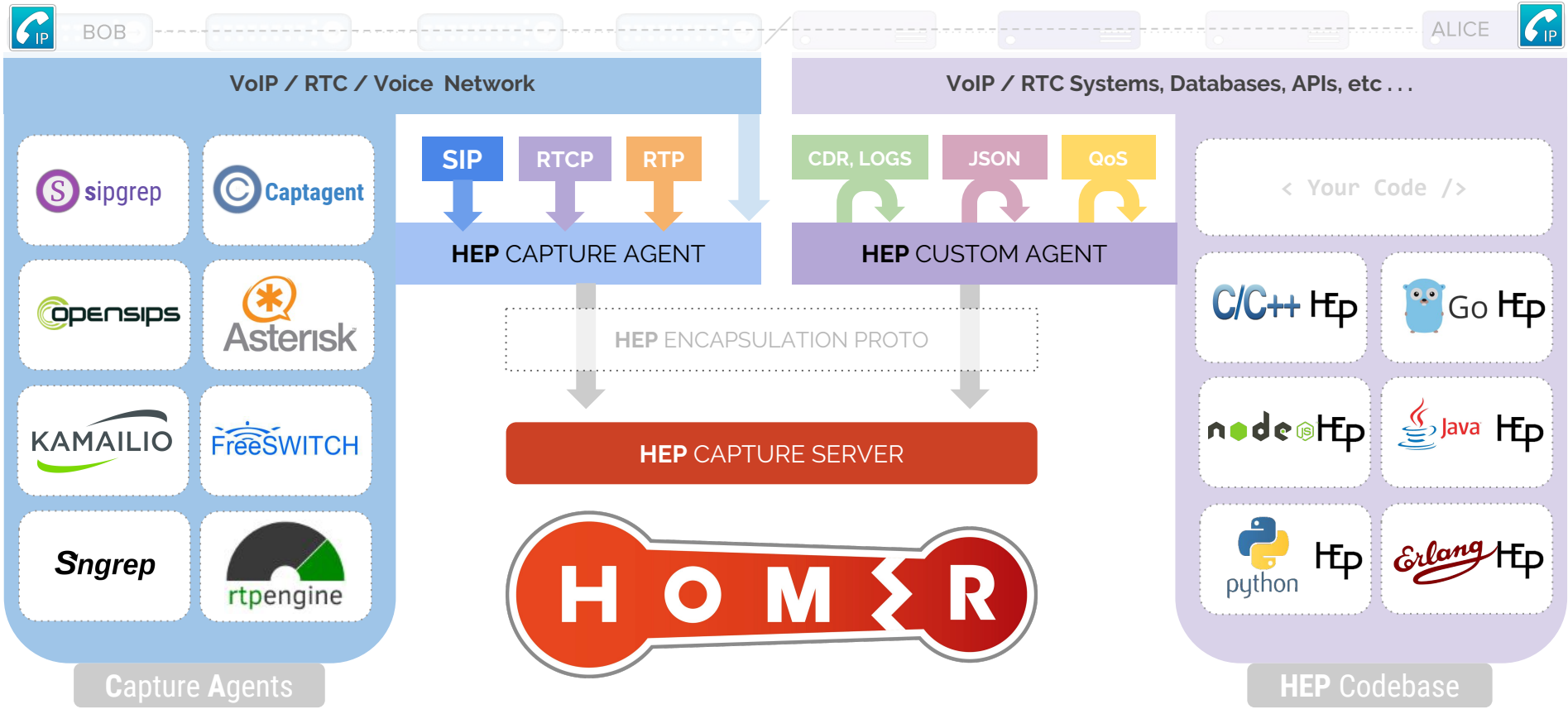
Members of the audience asked us to add a few examples for Alarms creation and management - in a nutshell:

1) Create alarms in kamailio.cfg
2) Create notification block in kamailio.cfg
3) Create UI trigger in H5 user-interface admin

```
if($ua =~ "(friendly-scanner|sipvicious|sipcli)") {
        $var(atype) = 'scanner';
        sql_query("cb", "INSERT INTO alarm_data_mem (create_date, type, total, source_ip, description) VALUES(NOW(), '$var(atype)', 1, '$si', 'Friendly
        scanner alarm!') ON DUPLICATE KEY UPDATE total=total+1");
        route(KILL_VICIOUS);
}
#Alarm for Scanner;
           if($var(atype) == "scanner") {
                  sql_query("cb", "DELETE FROM alarm_data_mem WHERE type='scanner' AND total < $var(avalue)");
                  if($var(anotify) == 1) {
                     sql_query("cb", "SELECT * FROM alarm_data_mem WHERE type='scanner' AND total  >= $var(avalue) LIMIT 2", "rd");
                     if($dbr(rd=>rows) > 0) {
                           route(SEND_ALARM);
                     } sql_result_free("rd");
                  }
           }
```

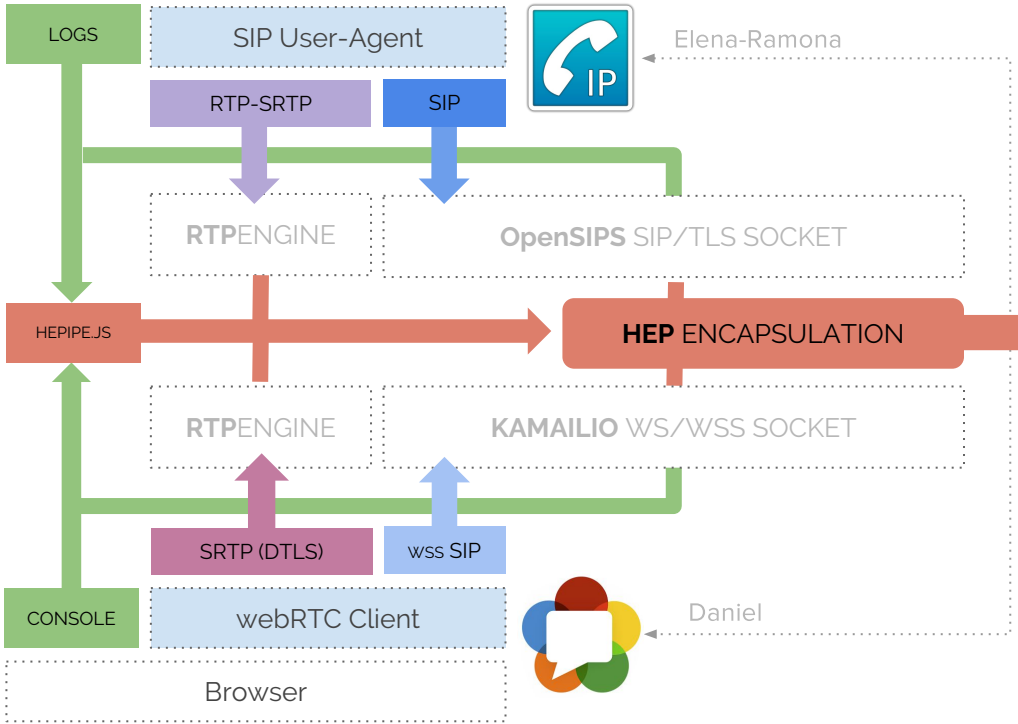
```
route[SEND_ALARM] {
        exec_msg('echo "Value: $var(thvalue), Type: $var(atype), Desc: $var(aname)" | mail -s "HOMER ALERT $var(atype) - $var(thvalue)" $var(aemail)') ;
}
```

SIPCAPTURE HEP/EEP Stack



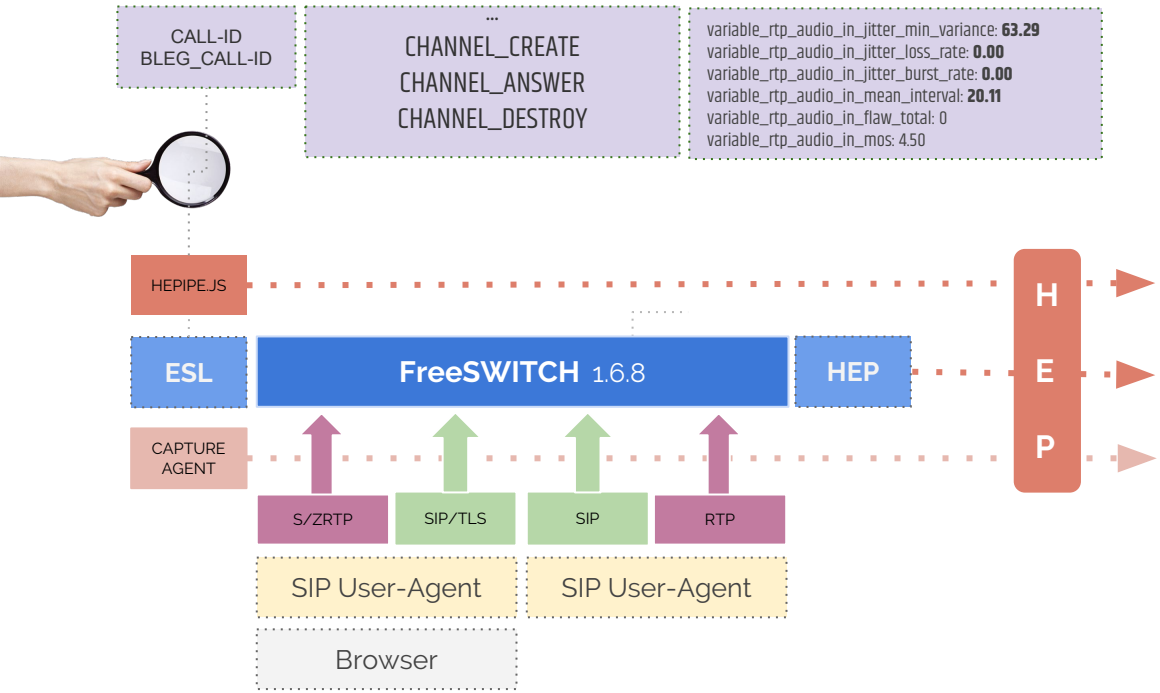
Kamailio/SER Monitoring

Example Illustration SIP to SIP/WSS via SER Proxies and RTP Relays



FreeSWITCH Monitoring

Example Illustration of Multi-Level Monitoring in FS HEP + ESL



FreeSWITCH HEP/EEP Configuration

Example Usage of the Integrated Capture Agent for Monitoring

FreeSWITCH ships with a built-in HEP agent used to mirror/transfer packets unmodified and carries timestamp and several session key values in its headers, designed for capturing simple and complex scenarios with minimal configuration efforts.

To enable **HEP** capturing, open *sofia.conf.xml* and set capture-server param:

```
<param name="capture-server" value="udp:10.0.0.1:9060" />
```

NEW! Freeswitch v1.6.8 *(master git)* now supports **HEPv2** + **HEPv3/EEP** encapsulation & parameters:

```
<param name="capture-server" value="udp:10.0.0.1:9060;hep=3;capture_id=100" />
```

To enable the **HEP** capture agent globally, open *internal.xml* and change sip-capture param to *"yes"*

```
<param name="sip-capture" value="yes" />
```

To enable/disable the **HEP** capture agent on demand, you can use CLI commands:

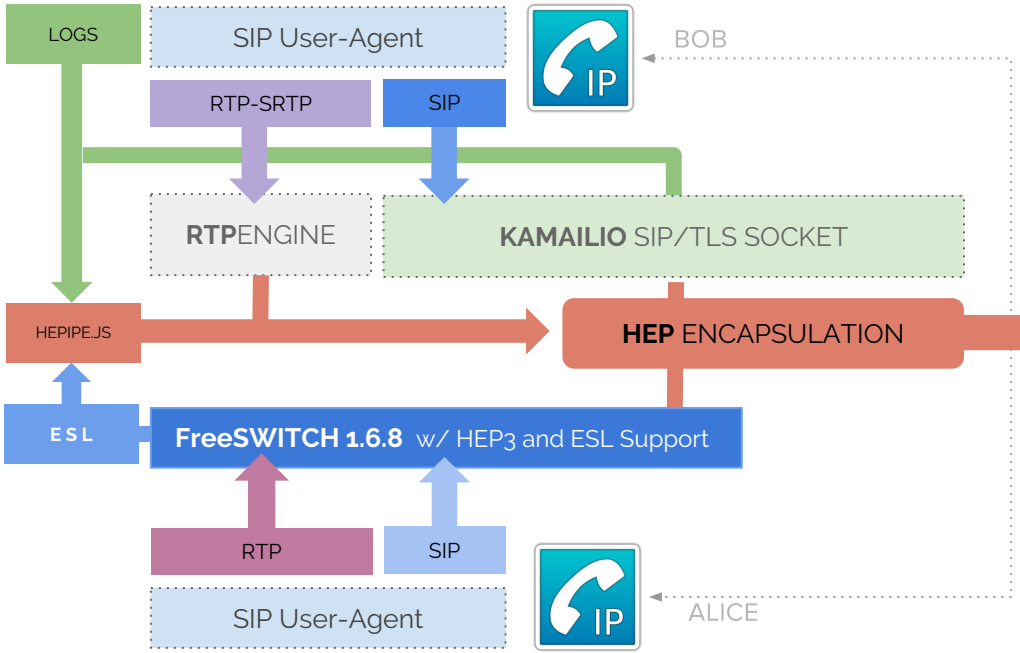
```
freeswitch@fsnode04> sofia global capture on
+OK Global capture on
freeswitch@fsnode04> sofia global capture off
+OK Global capture off
```

To enable/disable the **HEP** capture agent on a specific profile:

```
freeswitch@fsnode04> sofia profile internal capture on
```

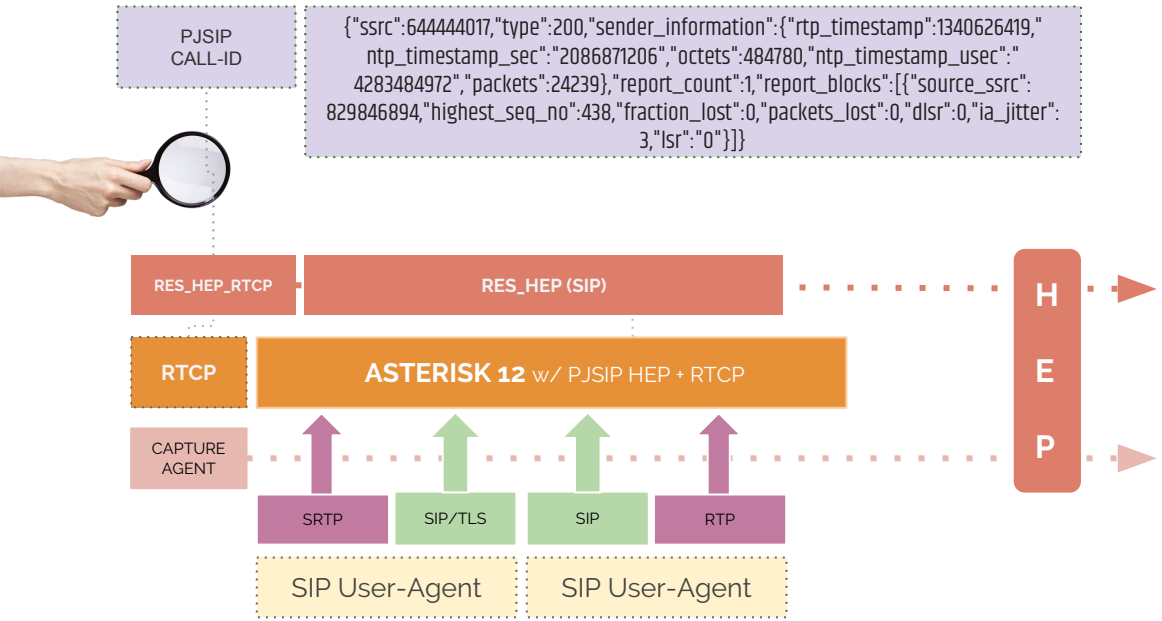
FreeSWITCH + **Kamailio** Monitoring

Example Illustration SIP + RTCP via Load Balancer w/ Correlation



Asterisk Monitoring

Example Illustration of Multi-Level Monitoring in Asterisk 12+

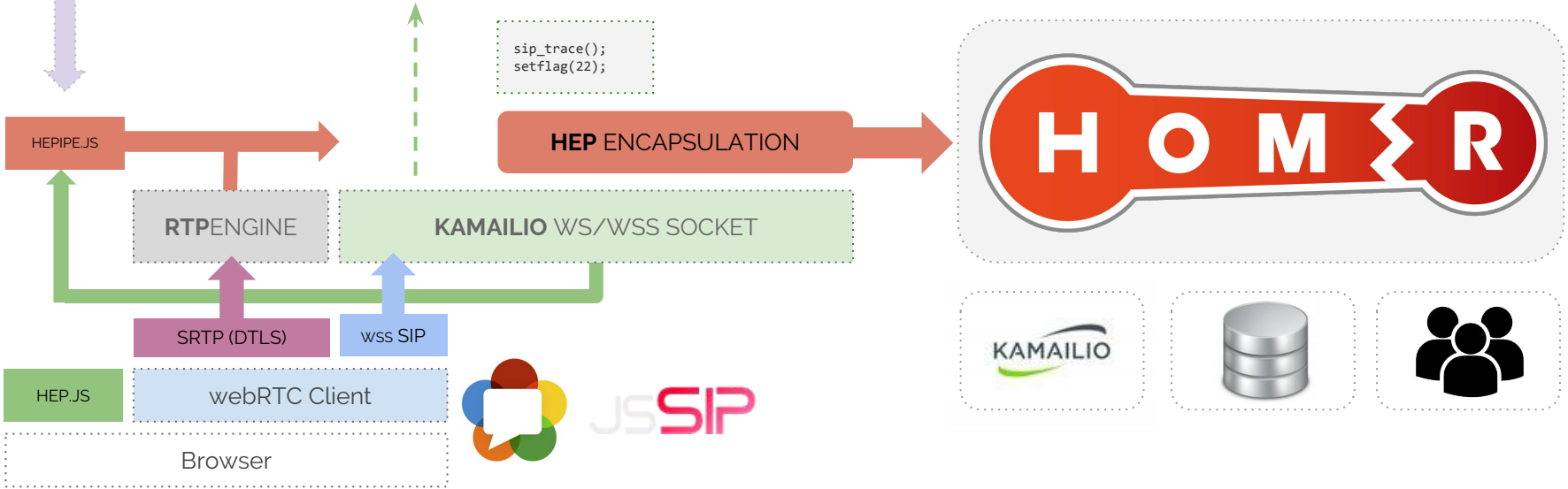


Kamailio WSS Monitoring

http://github.com/sipcapture/wiki

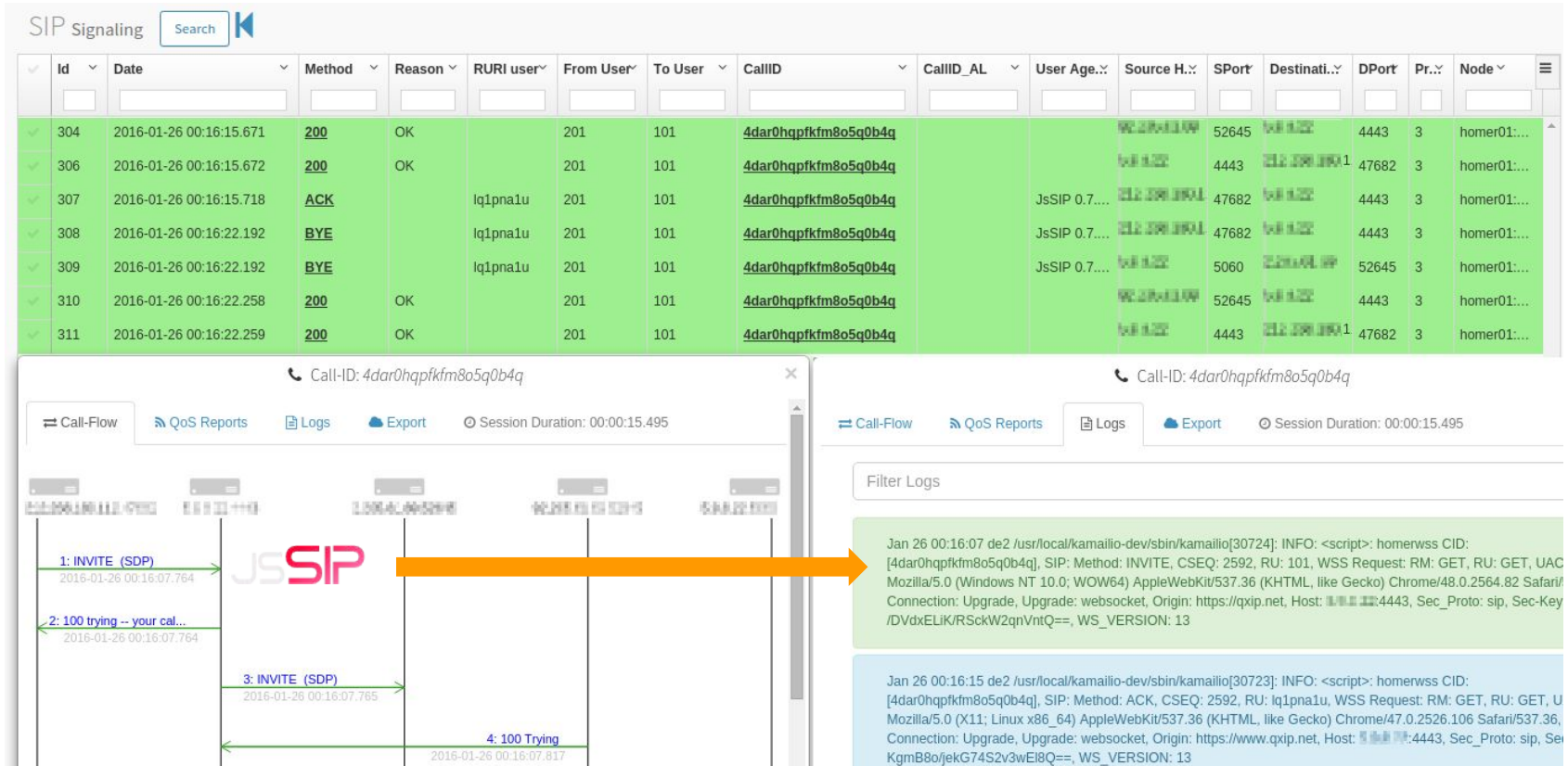
```
if (proto == WS || proto == WSS) {   setflag(SRC_WS);

        xlog("L_INFO", "homerwss CID: [$ci], SIP: Method: $rm, CSEQ: $cs, RU: $rU, WSS Request: RM: $var(wss_rm), RU: $var(wss_ru),
                UAC: $var(wss_uac), Connection: $var(wss_connection), Upgrade: $var(wss_upgrade), Origin: $var(wss_origin),
                Host: $var(wss_host), Sec_Proto: $var(wss_sec_proto), Sec-Key: $var(wss_sec_key), WS_VERSION: $var(wss_sec_version)");
}
```



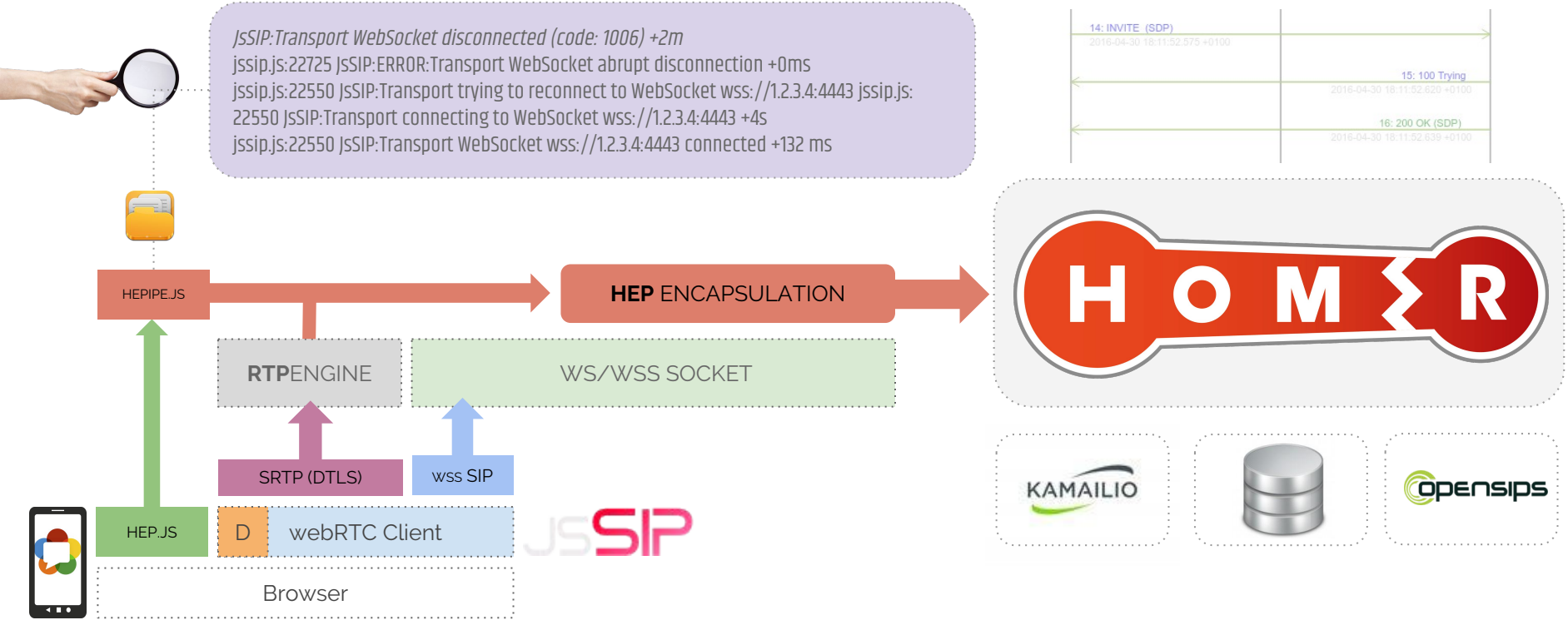
HOMER 5: **WSS** Call Flow

WSS to SIP Call Troubleshooting



UA Remote Log Monitoring

http://github.com/sipcapture/hepipe-js



CAPTAGENT 6.1

Universal Modular Capture Agent w/ HEP3 Support

Captagent is 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:

- ★ **SOCKET** Modules
  - Socket PCAP, Socket RAW, Socket RTCP-XR, Socket PF_RING
- ★ **PROTOCOL** Modules
  - SIP, RTCP and other signaling and controlling Protocols
- ★ **API** Module
  - HTTP JSON REST API for Control and Statistics
- ★ **TRANSPORT** Modules
  - HEP Encapsulation output (v1/2/3)
  - JSON Serialization output
- ★ **ENCRYPTION** Modules
  - Encryption and Compression Module for HEP3
  - TLS Decryption pipeline for supported key exchange methods
- ★ **DATABASE** Modules
  - HASH Table
  - Redis interface
  - MySQL interface

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

```
<!-- CORE MODULES -->

  <module name="transport_hep" description="HEP Protocol" serial="2014010402">
         <profile name="hepsocket" description="Transport HEP" enable="true"
serial="2014010402">
              <settings>
                   <param name="version" value="3"/>
                   <param name="capture-host" value="127.0.0.1"/>
                   <param name="capture-port" value="9061"/>
                   <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>
         </profile>
    </module>

<!-- PROTOCOLS -->

 <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="eth0"/>
                   <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>
</module>
```

captagent..xml

CAPTAGENT 6.1 *(continued)*

```
<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="tcpdefrag" 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>
```

socket_pcap.xml

Full examples: https://github.com/sipcapture/captagent

Cascading **Capture Plan** example for **SIP**

```
#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()) {

           /* packet processing pipeline */
           clog("NOTICE", "parsing SIP message ");

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

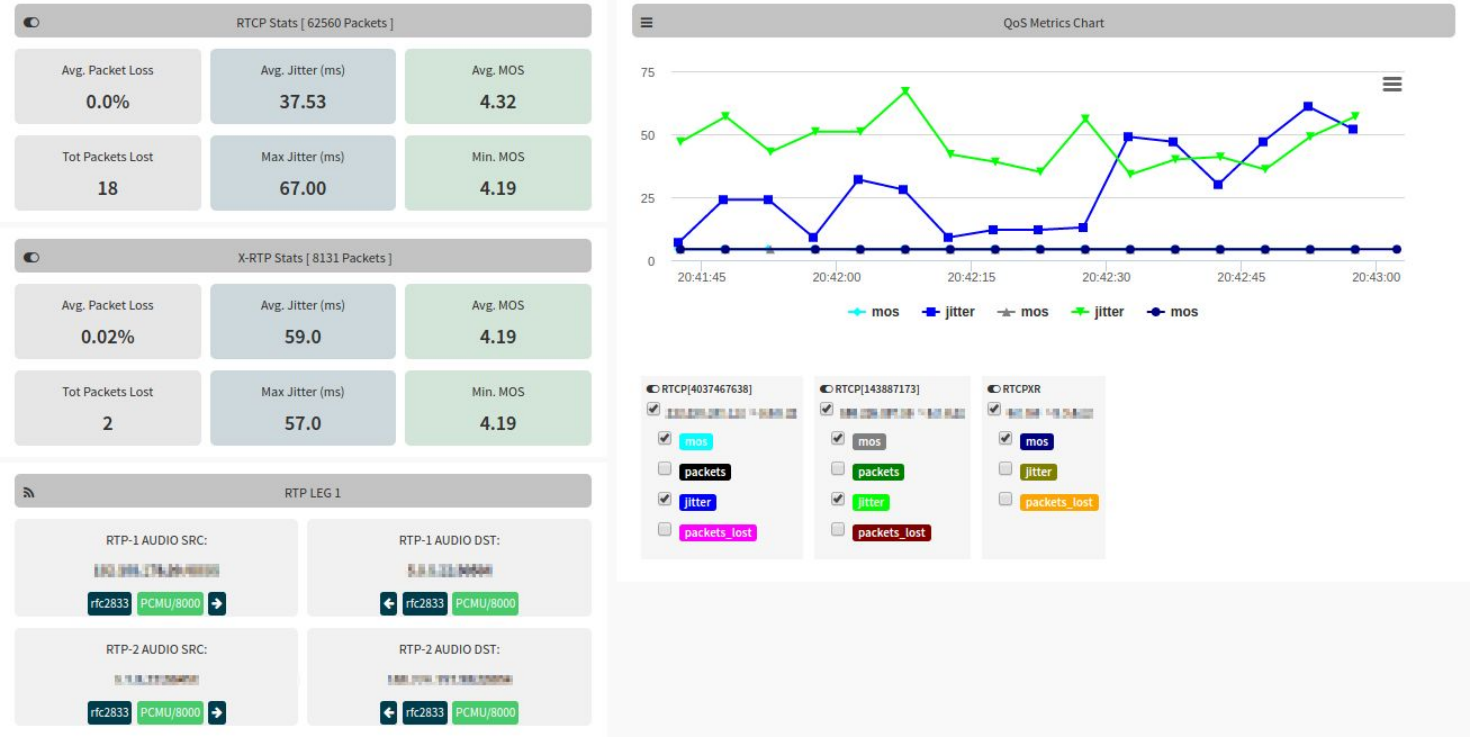
       }
  }
  drop;
}
```

sip_capture_plan.xml

CAPTAGENT 6.1 HEP/EEP RTCP + SIP Mirroring

Example Usage of the Universal Capture Agent for Monitoring

If you configured everything correctly, your HOMER 5 **QoS statistics** will start being populated:



RTPAGENT PRO Modules

Commercial Capture Extensions with Advanced Functionality

RTPAgent is a “privacy-friendly” Analytics and Reporting probe for **HOMER 5** performing wire-speed RTP session and network packet analysis in-transit and in real-time *without storing any data to disk* (unless desired) and delivers granular periodic and final reports with a full stack of dedicated metrics at each interval:

- Source/Destination *IP/PORT/MAC*
- Bytes/Packets Total, Expected
- Packet Loss
- Jitter (min/man/mean)
- RTT Delta/Skew (min/man/mean)
- Codec ID, Clock Rate
- MOS Estimation
- R-Factor Estimation

RTP Reporting frequency can be defined by the integrator or self-adjusted by the probe to send higher number of periodic QoS reports for sessions where suspect quality issues are identified and to automatically reduce the number of reports for those delivering high scores in order to minimize the bandwidth overhead.

RTPAgent is designed to deal with multi-party and multi-codec calls including video sessions and can automatically detect/report a vast number of conditions.

Additional Modules:

- ★ On-Demand, Filtered Stream Recording to Disk (SIP/RTP/RTCP)
- ★ Lawful Interception (X1/2/3 ETSI 232)


```
{
"CORRELATION_ID":"56a211936328-fgbtmubkimot",
"RTP_SIP_CALL_ID":"56a211936328-fgbtmubkimot",
"DELTA":19.980,
"JITTER":0.023,
"REPORT_TS":1453461919,
"TL_BYTE":0,
"SKEW":-0.180,
"TOTAL_PK":510,
"EXPECTED_PK":510,
"PACKET_LOSS":0,
"SEQ":0,
"MAX_JITTER":1.892, "MEAN_JITTER":0.126,
"MAX_DELTA":35.547, "MAX_SKEW":-15.615,
"MIN_MOS":4.385, "MEAN_MOS":4.394, "MOS":4.394,
"RFACTOR":92.449, "MIN_RFACTOR":92.013, "MEAN_RFACTOR":92.444,
"SRC_IP":"192.168.178.34", "SRC_PORT":58320, "DST_IP":"192.168.60.70","DST_PORT":
32728,
"SRC_MAC":"00-04-13-29-64-22","DST_MAC":"34-31-C4-38-24-0D",
"CODEC_PT":9,"CLOCK":8000, "CODEC_NAME":"g722", "DIR":1,
"REPORT_NAME": "192.168.178.34:58320", "PARTY":0 ,"TYPE":"PERIODIC"
}
```

Q & A

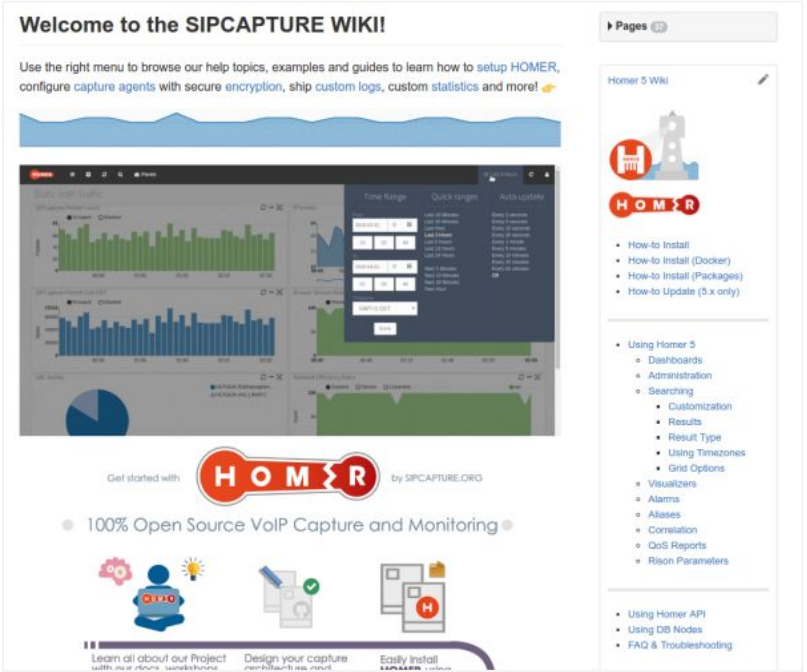
HOMER 5

Dashboard and Widget management

Homer 5 brings a lot of changes and much more flexibility in line with other popular data-mining platforms around
Our evergreen **Wiki** on **Github** provides a number of useful resources to get started (or refreshed) including:

- ★ How to Install and Update Homer
- ★ How to get started with the User-Interface
- ★ How to customize Panels and Widgets
- ★ How to manage Users and Aliases
- ★ How to configure HEP Capture Agents
- ★ How to configure HEP Custom Agents
- ★ How to correlate Sessions and Reports
- ★ How to make your own Statistics and Widgets

. . . . . and much more !



"Just HEP Yourself, to my SIPs... "

https://github.com/sipcapture/homer/wiki/

"Thats all Folks!"

Time's UP! Want to go further? "HEP" Yourself!

SIPCAPTURE @GITHUB	http://sipcapture.org + http://sipcapture.io
HOMER @GITHUB	http://github.com/sipcapture/homer
CAPTAGENT @GITHUB	http://github.com/sipcapture/captagent
HEPIPE.JS @GITHUB	http://github.com/sipcapture/hepipe.js
MAILING-LIST @USERS	https://groups.google.com/forum/#!forum/homer-discuss