**IMS-Kamailio-Installation in Debian-8.8**

**Step 1: Prerequisites:**

To be able to follow the guidelines from this document you need 'root' access.

The following packages are required before proceeding to the next steps.

* # apt-get install git-core vim gcc flex bison libmysqlclient-dev make libssl-dev libcurl4-openssl-dev libxml2-dev libpcre3-dev dpkg dpkg-dev debhelper iptables-dev libcurl4-openssl-dev libpcre3-dev libxmlrpc-core-c3-dev markdown libavcodec-dev libavfilter-dev libavformat-dev libevent-dev libglib2.0-dev libhiredis-dev libjson-glib-dev libpcap0.8-dev libbencode-perl libcrypt-rijndael-perl libdigest-hmac-perl libio-socket-inet6-perl libsocket6-perl gedit bind9 dkms
* # apt-get install gir1.2-json-1.0 json-glib-tools kamailio-json-modules libjson-c-dev libjson-c2 libjson-glib-1.0-0 libjson-glib-1.0-0-dbg libjson-glib-1.0-common libjson-glib-dev libev-dev libev-perl libev4 libevent-2.0-5 libevent-core-2.0-5 libevent-dev libevent-extra-2.0-5 libevent-openssl-2.0-5 libevent-pthreads-2.0-5

**Step 2: Installation of RTPENGINE following steps are:**

First of all Clone the **RTPengine** project from **GitHub.** To clone the RTPengine use below command.

* # cd /usr/local/src
* # git clone https://github.com/sipwise/rtpengine.git rtpengine

Then enter into **rtpengine** directory and run **./debian/flavors/no\_ngcp** in order to remove any **NGCP** dependencies

* # cd rtpengine/
* # git checkout mr5.5
* # ./debian/flavors/no\_ngcp

Then we need to run the dpkg-buildpackage command. But I got lot of dependencies.. here is the list.

* # dpkg-buildpackage

And next come back to parent directory.

* # cd /usr/local/src

Let’s Install those deb files..

* # dpkg -i ngcp-rtpengine-daemon\_5.4.0.0+0~mr5.4.0.0\_amd64.deb
* # dpkg -i ngcp-rtpengine-iptables\_5.4.0.0+0~mr5.4.0.0\_amd64.deb
* # dpkg -i ngcp-rtpengine-dbg\_5.4.0.0+0~mr5.4.0.0\_amd64.deb
* # dpkg -i ngcp-rtpengine-recording-daemon\_5.5.3.0+0~mr5.5.3.0\_amd64.deb
* # dpkg -i ngcp-rtpengine-kernel-source\_5.5.3.0+0~mr5.5.3.0\_all.deb
* # dpkg -i ngcp-rtpengine-kernel-dkms\_5.5.3.0+0~mr5.5.3.0\_all.deb
* # dpkg -i ngcp-rtpengine-utils\_5.5.3.0+0~mr5.5.3.0\_all.deb

Now Installation is completed need to run the rtp engine. We need to edit the /etc/rtpengine/rtpengine.conf

* # cp rtpengine.sample.conf rtpengine.conf
* # nano /etc/rtpengine/rtpengine.conf

Replace the interface=192.168.1.9 your ip address and save

next run these commands…

* # modprobe xt\_RTPENGINE
* # iptables -I INPUT -p udp -j RTPENGINE --id 0
* # /usr/sbin/rtpengine --table=0 –interface=192.168.1.9(your ipadress) --listen-ng=127.0.0.1:2223 --tos=184 --pidfile=/var/run/rtpengine.pid --no-fallback

Check running process

* # ps -aux | grep rtpengine

**Step 3: Installation of Mysql:**

* # apt-get install mysql-server-5.5
* Mysql root password is 'root'(your choice)

Enable access to mysql from remote hosts (very generous and dangerous in real world):

* # mysql -u root -p
* GRANT ALL ON \*.\* TO root IDENTIFIED BY 'root'; ('root' is password)
* quit;

Replace bind-address in /etc/mysql/my.cnf to your ip-address address (instead of 127.0.0.1) to enable remote access

Restart mysql and check via command "tail -F /var/log/syslog" for errors

* # /etc/init.d/mysql stop
* # /etc/init.d/mysql start

**Step 4: Kamailio-5.0.4:**

First of all, you have to create a directory on the file system where the sources will be stored.

* # mkdir -p /usr/local/src/kamailio-5.0
* # cd usr/local/src/kamailio-5.0
* git source of kamailio download link: <https://www.kamailio.org/pub/kamailio/5.0.4/>

kamailio-5.0.4\_src.tar.gz file is downloaded. And extract the same folder.

Rename this file kamailio-5.0.4 to kamailio use below commands

* # tar xvzf kamailio-5.0.4\_src.tar.gz
* # mv kamailio-5.0.4 kamailio

(OR)

Download the sources from GIT using the following commands.

* # cd usr/local/src/kamailio-5.0
* # cd kamailio/
* # git clone --depth 1 --no-single-branch git://git.kamailio.org/kamailio kamailio
* # git checkout -b 5.04 origin/5.0

## **Tuning Makefiles:**

## The first step is to generate build config files.

* # make cfg

To set include\_modules variable to the extra modules to be included for compilation when building Makefile cfg:

* # make includeinclude\_modules=”db\_mysql ims\_usrloc\_pcscf ims\_registrar\_pcscf ims\_auth ims\_charging ims\_icscf ims\_isc ims\_qos ims\_registrar\_scscf ims\_usrloc\_scscf ims\_dialog cdp cdp\_avp pua outbound rr ctl jsonrpcs presence xmlrpc evapi json” cfg

## **Compile Kamailio:**

## Once you added the mysql module to the list of enabled modules, you can compile Kamailio:

## # make all

## **Install Kamailio:**

## # make install

### What And Where Was Installed

## The binaries and executable scripts were installed in:

## /usr/local/sbin

These are:

* kamailio - Kamailio SIP server
* kamdbctl - script to create and manage the Databases
* kamctl - script to manage and control Kamailio SIP server
* kamcmd - CLI - command line tool to interface with Kamailio SIP server

## To be able to use the binaries from command line, make sure that /usr/local/sbin is set in PATH environment variable. You can check that with echo $PATH. If not and you are using bash, open /root/.bash\_profile and at the end add:

* # PATH=$PATH:/usr/local/sbin
* # export PATH

Create the directory for pid files:

* # mkdir -p /var/run/kamailio\_pcscf/
* # mkdir -p /var/run/kamailio\_icscf/
* # mkdir -p /var/run/kamailio\_scscf/

Default setting is to run Kamailio as user kamailio and group kamailio. For that you need to create the user:

* # adduser --quiet --system --group --disabled-password \

--shell /bin/false --gecos "Kamailio" \

--home /var/run/kamailio kamailio

**Step 5: Creating Mysql Database for PCSCF, ICSCF and SCSCF following commands below:**

* # mysql -u root -p
* CREATE DATABASE `pcscf`;
* CREATE DATABASE `icscf`;
* CREATE DATABASE `scscf`;

To create the MySQL database, you have to use the database setup script. First edit following below files to set the database server type:

* # nano /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/ims\_usrloc\_pcscf-create.sql

modifications are:

* add at the top: USE pcscf;
* change: INSERT INTO to REPLACE INTO
* insert before CREATE TABLE `location`;
* DROP TABLE IF EXISTS `location`;
* # nano /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/ims\_usrloc\_scscf-create.sql

modifications are:

* add at the top: USE scscf;
* Ex. change: INSERT INTO to REPLACE INTO
  + insert before CREATE TABLE `contact`;
  + DROP TABLE IF EXISTS `contact`; Similar changes to all tables.
* # cp /usr/local/src/kamailio-5.0/kamailio/misc/examples/icscf/icscf.sql /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/
* # nano /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/icscf.sql
  + - add at the top: USE icscf;

**Create the tables:**

* # nano /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/standard-create.sql
  + - add at the top: USE pcscf;
* # mysql -u root -p < /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/standard-create.sql
* # mysql -u root -p < /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/ims\_usrloc\_pcscf-create.sql
* # nano /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/standard-create.sql
  + - add at the top: USE scscf;
* # mysql -u root -p < /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/standard-create.sql
* # mysql -u root -p < /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/ims\_usrloc\_scscf-create.sql
* # nano /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/presence-create.sql
  + - add at the top: USE scscf;
* # mysql -u root -p < /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/presence-create.sql
* # nano /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/icscf.sql
  + - add at the top: USE icscf;
* # mysql -u root -p < /usr/local/src/kamailio-5.0/kamailio/utils/kamctl/mysql/icscf.mysql.sql

adapt permissions/privileges of users:

* # mysql -u root -p
* grant delete,insert,select,update on pcscf.\* to pcscf@103.211.109.229 identified by 'pcscf';
* grant delete,insert,select,update on icscf.\* to icscf@103.211.109.230 identified by 'icscf';
* grant delete,insert,select,update on scscf.\* to scscf@(p-server adress) identified by 'scscf'; (this is not required for single server)
* grant delete,insert,select,update on scscf.\* to scscf@103.211.109.231 identified by 'scscf';

**Step 6: Installation of FHoSS**

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**Precondition for FHoSS:**

install Java JDK and ant (required for OpenIMSCore FHoSS)

* # apt-get install openjdk-7-jdk
* # apt-get install ant

Download FhoSS

* # apt-get install subversion

Create working directories for OpenIMSCore:

* # mkdir /opt/OpenIMSCore
* # cd /opt/OpenIMSCore

Download:

* # svn checkout svn://svn.code.sf.net/p/openimscore/code/FHoSS/trunk

Rename the trunk folder use command below:

* # mv trunk/ FHoSS

compile:

* # cd FhoSS
* # ant compile deploy

adapt all configuration files:

from kamailio source get configurator.sh file

* directory:/opt/OpenIMSCore/FhoSS/deploy
* copy configurator.sh to this directory and mark it executable
* # chmod +x configurator.sh
* # ./configurator.sh

Domain Name:koffee-ims.in

IP Address:10.0.0.9(your ip adress)

File to change ["all" for everything, "exit" to quit]:all

changing: c3p0.properties DiameterPeerHSS.xml hibernate.properties hss.properties log4j.properties

* directory: /opt/OpenIMSCore/FhoSS/scripts
* cd ../scripts; cp ../deploy/configurator.sh .; ./configurator.sh
* # chmod +x configurator.sh
* # ./configurator.sh

Domain Name:koffee-ims.in

IP Address:10.0.0.9(your ip address)

File to change ["all" for everything, "exit" to quit]:all

changing: hss\_db\_migrate\_dsai.sql hss\_db.sql userdata.sql

* directory: /opt/OpenIMSCore/FhoSS/config
* cd ../scripts; cp ../deploy/configurator.sh .; ./configurator.sh
* # chmod +x configurator.sh
* # ./configurator.sh

Domain Name:koffee-ims.in

IP Address:10.0.0.9(your ip address)

File to change ["all" for everything, "exit" to quit]:all

changing: hss\_db\_migrate\_dsai.sql hss\_db.sql userdata.sql

**Prepare mysql database:**

In case of OpenIMSCore update drop old databases: hss\_db

* # mysql -u root -p
* drop database hss\_db;
* quit:

Create new HSS database: go to directory /opt/OpenIMSCore

* # mysql -u root -p < FhoSS/scripts/hss\_db.sql
* # mysql -u root -p < FHoSS/scripts/userdata.sql

Modify mysql access rights at first time installation (not covered by configurator):

* # mysql -u root -p
* grant delete,insert,select,update on hss\_db.\* to hss@103.211.109.228 identified by 'hss';

check database with MySQL Workbench if domain names are okay in various entries and privileges

(or)

manually: e.g.

* show databases;
* use hss\_db;
* select \* from impu;

Prepare script-file, last modifications and start ...

* copy startup.sh to hss.sh in root directory
* # cp /opt/OpenIMSCore/FHoSS/deploy/startup.sh /root/hss.sh

and add to hss.sh:

* cd /opt/OpenIMSCore/FhoSS/deploy
* JAVA\_HOME="/usr/lib/jvm/java-7-openjdk-amd64"

start HSS from /root: # ./hss.sh

access the web-interface of HSS:

* <http://192.168.1.9:8080/hss.web.console/>
* user: hssAdmin
* password: hss

**Step 7: Bind Server Setup:**

Go to the following path folder

* # cd /etc/bind

edit dnszone file:

Ex: koffee-ims.dnszone file

* # gedit koffee-ims.dnszone

chaneges in required servers ip addresses

add following lines at the end of named.conf file

* # gedit named.conf

zone "koffee-ims.in" {

type master;

file "/etc/bind/koffee-ims.dnszone";

notify no;

};

**Step 8: Edit configure IMS files:**

first copy from kamailio source in example folder to /usr/local/etc/

modify pcscf, icscf and scscf configuration-files accordingly

- set the ip addresses

**P-CSCF:**

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- use modified files: pcscf.cfg, kamailio.cfg, distpacher.list, and pcscf.xml with Ip addresses and domain name.

**Example:** **In pcscf.cfg file:**

listen=udp:115.98.3.93:5060

alias=pcscf.koffee-ims.in

#!define PCSCF\_URL "sip:pcscf.koffee-ims.in"

#!subst "/NETWORKNAME/koffee-ims.in/"

#!subst "/HOSTNAME/pcscf.koffee-ims.in/"

#!define DB\_URL "con1=>mysql://pcscf:pcscf@115.98.3.93/pcscf"

#!define SQLOPS\_DBURL "pcscf=>mysql://pcscf:pcscf@115.98.3.93/pcscf"

**In pcscf.xml file:**

FQDN="pcscf.koffee-ims.in"

Realm="koffee-ims.in"

<Peer FQDN="pcrf.kofee-ims.in" Realm="koffee-ims.in" port="3868"/>

<Acceptor port="3871" bind="115.98.3.93"/>

<DefaultRoute FQDN="pcrf.koffee-ims.in" metric="10"/>

**In distpatcher.list file:**

1 sip:115.98.3.93:6060

**In kamailio.cfg file:**

modparam("ims\_usrloc\_pcscf", "db\_url", "mysql://root:CGRateS.org@115.98.3.93/pcscf")

modparam("pua", "db\_url", "mysql://scscf:scscf@115.98.3.93/scscf")

mpath="/usr/local/src/kamailio-5.0/kamailio/src/modules/"

**I-CSCF:**

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- use modified files: icscf.cfg, icscf.xml and kamailio.cfg with Ip addresses and domain name.

**Example: In icscf.cfg file:**

listen=udp:115.98.3.93:4060

alias=icscf.koffee-ims.in

#!define NETWORKNAME "koffee-ims.in"

#!define HOSTNAME "icscf.koffee-ims.in"

#!define DB\_URL "mysql://icscf:icscf@115.98.3.93/icscf"

**In icscf.xml file;**

FQDN="icscf.koffee-ims.in"

Realm="koffee-ims.in"

<Peer FQDN="hss.koffee-ims.in" Realm="koffee-ims.in" port="3868"/>

<Acceptor port="3869" bind="115.98.3.93"/>

<DefaultRoute FQDN="hss.koffee-ims.in" metric="10"/>

**In kamailio.cfg file:**

listen=tcp:115.98.3.93:4060

mpath="/usr/local/src/kamailio-5.0/kamailio/src/modules/"

**S-CSCF**

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- use modified files: scscf.cfg , scscf.xml, distpacher.list, and kamailio.cfg with Ip addresses and domain name.

**Example: In scscf.cfg file:**

listen=udp:115.98.3.93:6060

#!define NETWORKNAME "koffee-ims.in"

#!define HOSTNAME "scscf.koffee-ims.in"

#!define URI "sip:scscf.koffee-ims.in"

alias=scscf.koffee-ims.in

alias=koffee-ims.in

#!define ENUM\_SUFFIX "koffee-ims.in."

#!define DB\_URL "mysql://scscf:scscf@115.98.3.93/scscf"

**In scscf.xml file:**

FQDN="scscf.koffee-ims.in"

Realm="koffee-ims.in"

<Peer FQDN="hss.koffee-ims.in" Realm="koffee-ims.in" port="3868"/>

<Acceptor port="3870" bind="115.98.3.93"/>

<DefaultRoute FQDN="hss.koffee-ims.in" metric="10"/>

**In kamailio.cfg file:**

mpath="/usr/local/src/kamailio-5.0/kamailio/src/modules/"

**Step 9: changes in all servers in hosts file...**

* nano /etc/hosts

103.211.109.229 pcscf.apsfl-ims.in pcscf

103.211.109.230 icscf.apsfl-ims.in icscf

103.211.109.231 scscf.apsfl-ims.in scscf

103.211.109.228 hss.apsfl-ims.in hss

103.211.109.228 presence.apsfl-ims.in presence

and in HSS server for login changes in the hss.conf file.

* nano /etc/apache2/sites-enabled/hss.conf

add these two line are:

ProxyPass / http://103.211.109.228:8080/

ProxyPassReverse / http://103.211.109.228:8080/

**Now run the IMS:**

before running set resolv.conf file... /etc/resolv.conf

ipaddress and gateway...

Just run the **initims.sh** script,

in this script-file runs bind server, RTPENGINE and kamailio pid file creation.

Initims.sh run command is

firtst give a executable permissions use bellow command:

* # chmod +x initims.sh
* # ./initims.sh

**Now run the IMS configuration files:**

**p-cscf:**

* # kamailio -f /usr/local/etc/pcscf/kamailio.cfg

**i-cscf:**

* # kamailio -f /usr/local/etc/icscf/kamailio.cfg

**s-cscf:**

* # kamailio -f /usr/local/etc/scscf/kamailio.cfg

in client pc set the dns setting in network configuration

prefered dnd server:- “192.168.1.9”(ims proxy server ip)

alternate dnd server:-”191.168.0.1”(main server ip)