Installing Snort 3 Alpha 4 on openSUSE Leap 42.3 64 bits

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About This Guide

This guide has been tested on openSUSE Leap 42.3 64 bits, using DAQ 2.2.2 for Snort 3 and Snort 3 Alpha 4.

Snort 3 is still in the early testing phase (Alpha version) so it should not be installed on production systems.

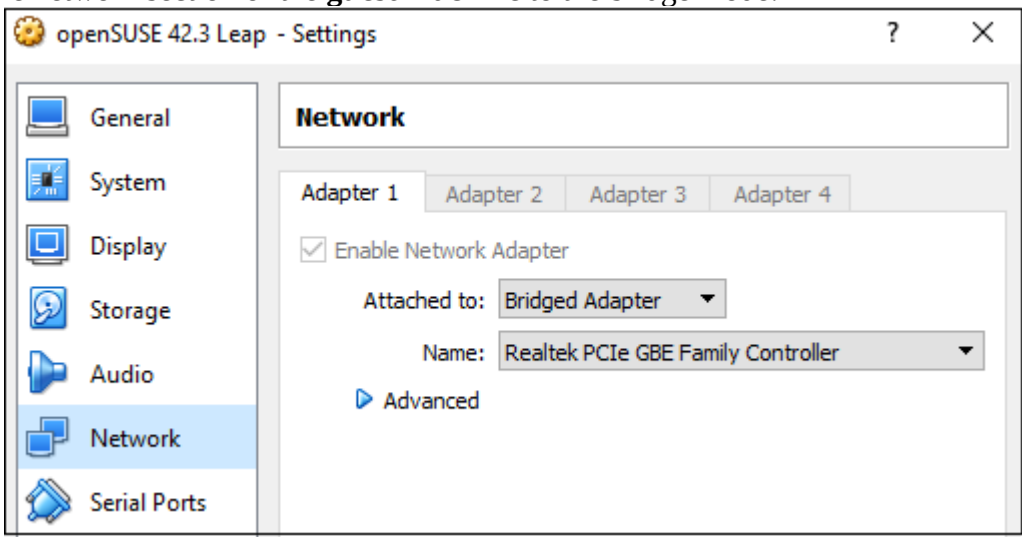
Our Snort 3 was installed in a virtual machine:

Virtual Machine Manager: VirtualBox 5.1.30
HOST operating system: Windows 10, 64 bits
GUEST operating system: openSUSE Leap 42.3

This guide is based on "Installing Snort++ in Ubuntu (Version 3.0 Alpha 4 build 240)" by Noah Dietrich.

VirtualBox - Network Configuration

Configure the network section of the **guest machine** to the bridge mode:



Guest Machine

Run the guest machine and set its network interface card to a static IP, for example 192.168.99.10.

then check settings:

sudo ifconfig

```
eth1   Link encap:Ethernet  HWaddr 08:00:27:04:F6:F0
       inet addr: 192.168.99.10  Bcast:192.168.99.255  Mask:255.255.255.0
```

Verify that you can access internet by accessing any web page, for example: https://snort.org

Required Packages
Use YAST to install the following packages:

cmake 3.5.2	for managing the build process
gcc-c++ 4.8, libgcc_s1 7.1.1, libgcc_s1-32bit 7.1.1	the system GNU C++ Compiler and libraries
libdnet1 1.12, libdnet-devel 1.12 (faltaban)	for network utility functions
hwloc 1.10.1, hwloc-devel 1.10.1	provides portable abstraction across platforms
lua51-luajit 2.0.4, lua51-luajit-devel 2.0.4	Just-In-Time Compiler for Lua language
openssl 1.0.2j, libopenssl-devel 1.0.2j	toolkit for Transport Layer Security (TLS) and Secure Sockets Layer (SSL) protocols
libpcap1 1.8.1, libpcap-devel 1.8.1	portable C/C++ *library* for network traffic capture
libpcre1 8.39, pcre-devel 8.39 and libpcre1-32bit 8.39	set of functions that implements regular expression pattern matching
pkg-config 0.28	used to retrieve information about installed libraries in the system
php7-zlib 7.0.7, zlib-devel 1.2.8	for decompression
flex 2.5.37	DAQ pre-requisite
bison 2.7	DAQ pre-requisite
tree 1.7.0	to produce an indented list of files within a directory

Software Download
cd ~/Downloads
wget -c https://www.snort.org/downloads/snortplus/daq-2.2.2.tar.gz
wget -c https://snort.org/downloads/snortplus/snort-3.0.0-239-cmake.tar.gz
wget -c https://www.snort.org/downloads/openappid/6329 -O OpenAppId-6329

Snort3 rules have more options than Snort 2 rules, and while the normal rules downloaded with PulledPork or manually will work, for testing you will probably want to download the set of community rules specifically created for Snort 3. You can manually download Snort 3 specific community rules from the snort website:
wget -c https://www.snort.org/downloads/community/snort3-community-rules.tar.gz

Install DAQ
Data AcQuisition library (DAQ) for Snort 3 is a different DAQ than for the 2.9.9.x series of Snort.

Open a Konsole terminal and switch to root:

su

Password:

enter root password.

```
cd /usr/local/src
tar -xzf /home/<user>/Downloads/daq-2.2.2.tar.gz
```

where <user> is your user name.

```
cd daq-2.2.2
./configure
```

```
pc16:/usr/local/src/daq-2.2.2 # ./configure
configure: loading site script /usr/share/site/x86_64-unknown-linux-gnu
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
.
.
Build AFPacket DAQ module.. : yes
Build Dump DAQ module..... : yes
Build IPFW DAQ module..... : yes
Build IPQ DAQ module..... : no
Build NFQ DAQ module..... : no
Build PCAP DAQ module..... : yes
Build netmap DAQ module.... : no
```

If result is different, check the config.log file:

```
tail /usr/local/src/daq-2.2.2/config.log
```

```
#define HAVE_SOCKET 1
#define HAVE_STRCHR 1
#define HAVE_STRCSPN 1
#define HAVE_STRDUP 1
#define HAVE_STRERROR 1
#define HAVE_STRRCHR 1
#define HAVE_STRSTR 1
#define HAVE_STRTOUL 1

configure: exit 0
pc16:/usr/local/src/daq-2.2.2 #
```

Some errors may show up in the log but, in general, the final line = exit 0, indicates that the configuration went well.

```
make
```

```
pc16:/usr/local/src/daq-2.2.2 # make
make  all-recursive
make[1]: Entering directory '/usr/local/src/daq-2.2.2'
Making all in api
```

```
make[2]: Entering directory '/usr/local/src/daq-2.2.2/api'
/bin/sh ../libtool  --tag=CC   --mode=compile gcc -DHAVE_CONFIG_H -I. -I..   -I/usr/include -Wall
-Wwrite-strings -Wsign-compare -Wcast-align -Wextra -Wformat -Wformat-security -Wno-unused-
parameter -fno-strict-aliasing -fdiagnostics-show-option --pedantic -std=c99 -D_GNU_SOURCE -g
-O2 -fvisibility=hidden -MT daq_base.lo -MD -MP -MF .deps/daq_base.Tpo -c -o daq_base.lo
daq_base.c
.
.
make[2]: Leaving directory '/usr/local/src/daq-2.2.2/os-daq-modules'
make[2]: Entering directory '/usr/local/src/daq-2.2.2'
make[2]: Leaving directory '/usr/local/src/daq-2.2.2'
make[1]: Leaving directory '/usr/local/src/daq-2.2.2'
pc16:/usr/local/src/daq-2.2.2 #
```

make install

```
pc16:/usr/local/src/daq-2.2.2 # make install
Making install in api
make[1]: Entering directory '/usr/local/src/daq-2.2.2/api'
make[2]: Entering directory '/usr/local/src/daq-2.2.2/api'
 /usr/bin/mkdir -p '/usr/local/lib64'
.
.
make[2]: Nothing to be done for 'install-data-am'.
make[2]: Leaving directory '/usr/local/src/daq-2.2.2/os-daq-modules'
make[1]: Leaving directory '/usr/local/src/daq-2.2.2/os-daq-modules'
make[1]: Entering directory '/usr/local/src/daq-2.2.2'
make[2]: Entering directory '/usr/local/src/daq-2.2.2'
make[2]: Nothing to be done for 'install-exec-am'.
make[2]: Nothing to be done for 'install-data-am'.
make[2]: Leaving directory '/usr/local/src/daq-2.2.2'
make[1]: Leaving directory '/usr/local/src/daq-2.2.2'
pc16:/usr/local/src/daq-2.2.2 #
```

Run “ldconfig –v” to create the necessary links and cache to the most recent shared libraries found:

ldconfig -v

```
        libzvbi-chains.so.0 -> libzvbi-chains.so.0.0.0
        libplds4.so -> libplds4.so
        libplc4.so -> libplc4.so
        libnspr4.so -> libnspr4.so
pc16:/usr/local/src/daq-2.2.2 #
```

Install Snort

Use cmake with DCMAKE_INSTALL_PREFIX option to install the entire Snort structure to **/usr/local**:

```
cd /usr/local/src
tar -xzf /home/<user>/Downloads/snort-3.0.0-239-cmake.tar.gz
cd snort-3.0.0-a4
cmake -DCMAKE_INSTALL_PREFIX=/usr/local
```

```
pc16:/usr/local/src/snort-3.0.0-a4 # cmake -DCMAKE_INSTALL_PREFIX=/usr/local
-- The CXX compiler identification is GNU 4.8.5
-- The C compiler identification is GNU 4.8.5
-- Check for working CXX compiler: /usr/bin/c++
.
.
-- Performing Test RESTRICT - Success
-- Looking for lzma_code in /usr/lib64/liblzma.so
-- Looking for lzma_code in /usr/lib64/liblzma.so - found
-- Configuring done
-- Generating done
-- Build files have been written to: /usr/local/src/snort-3.0.0-a4
pc16:/usr/local/src/snort-3.0.0-a4 #
```

```
make clean
```

```
   <no messages>
```

```
make
```

```
pc16:/usr/local/src/snort-3.0.0-a4 # make
Scanning dependencies of target tcp_connector
[  0%] Building CXX object
src/connectors/tcp_connector/CMakeFiles/tcp_connector.dir/tcp_connector.cc.o
[  0%] Building CXX object
src/connectors/tcp_connector/CMakeFiles/tcp_connector.dir/tcp_connector_module.cc.o
[  0%] Linking CXX static library libtcp_connector.a
[  0%] Built target tcp_connector
.
.
Scanning dependencies of target daq_hext
[100%] Building C object daqs/CMakeFiles/daq_hext.dir/daq_hext.c.o
[100%] Linking C shared module daq_hext.so
[100%] Built target daq_hext
Scanning dependencies of target daq_file
[100%] Building C object daqs/CMakeFiles/daq_file.dir/daq_file.c.o
[100%] Linking C shared module daq_file.so
[100%] Built target daq_file
pc16:/usr/local/src/snort-3.0.0-a4 #
```

make install

```
pc16:/usr/local/src/snort-3.0.0-a4 # make install
[  0%] Built target tcp_connector
[  0%] Built target ips_actions
[  1%] Built target codec_module
[  2%] Built target search_engines
.
.
-- Installing: /usr/local/lib/snort/daqs/daq_file.so
-- Installing: /usr/local/lib/snort/daqs/daq_hext.so
-- Installing: /usr/local/include/snort/daqs/daq_user.h
pc16:/usr/local/src/snort-3.0.0-a4 #
```

Snort 3 requires a few environmental variables, we store them temporarily in the current session so we can continue working, and save them permanently to the **~/.bashrc** file:

```
export LUA_PATH=/usr/local/include/snort/lua/\?.lua\;\;
export SNORT_LUA_PATH=/usr/local/etc/snort

sh -c "echo 'export LUA_PATH=/usr/local/include/snort/lua/\?.lua\;\;' >> ~/.bashrc"
sh -c "echo 'export SNORT_LUA_PATH=/usr/local/etc/snort' >> ~/.bashrc"
```

The last step of our Snort installation is to test that the Snort Binary runs. Execute Snort with the **-V** flag, which causes Snort to print the current version:

```
snort -V
```

You should see output similar to the following:

```
pc16:/usr/local/src/snort-3.0.0-a4 # snort -V

   ,,_     -*> Snort++ <*-
  o"  )~   Version 3.0.0-a4 (Build 239) x86_64
   ""    By Martin Roesch & The Snort Team
         http://snort.org/contact#team
         Copyright (C) 2014-2017 Cisco and/or its affiliates. All rights reserved.
         Copyright (C) 1998-2013 Sourcefire, Inc., et al.
         Using DAQ version 2.2.2
         Using libpcap version 1.8.1
         Using LuaJIT version 2.0.4
         Using PCRE version 8.39 2016-06-14
         Using ZLIB version 1.2.8
         Using LZMA version 5.2.2
         Using OpenSSL 1.0.2j-fips  26 Sep 2016
```

```
pc16:/usr/local/src/snort-3.0.0-a4 #
```

A note on install locations:
When you install snort in **/usr/local**, you get the following folder structure:

tree /usr/local -L 3

```
pc16:/usr/local/src/snort-3.0.0-a4 # tree /usr/local -L 3
/usr/local
├── bin
│   ├── daq-modules-config
│   ├── snort
│   ├── snort2lua
│   ├── u2boat
│   └── u2spewfoo
├── etc
│   └── snort
│       ├── file_magic.lua
│       ├── snort_defaults.lua
│       └── snort.lua
├── games
├── include
│   ├── daq_api.h
│   ├── daq_common.h
│   ├── daq.h
│   ├── sfbpf_dlt.h
│   ├── sfbpf.h
│   └── snort
│       ├── actions
│       ├── codecs
│       ├── daqs
│       ├── decompress
│       ├── detection
│       ├── events
│       ├── file_api
│       ├── flow
│       ├── framework
│       ├── hash
│       ├── log
│       ├── lua
│       ├── main
│       ├── managers
│       ├── mime
│       ├── packet_io
│       ├── profiler
│       ├── protocols
│       ├── search_engines
│       ├── sfip
│       ├── stream
│       ├── time
│       └── utils
├── lib
│   ├── pkgconfig
│   │   └── snort.pc
│   └── snort
│       ├── daqs
│       ├── snort.cmake
│       └── snort-noconfig.cmake
├── lib64
```

```
|   ├── daq
|   |   ├── daq_afpacket.la
|   |   ├── daq_afpacket.so
|   |   ├── daq_dump.la
|   |   ├── daq_dump.so
|   |   ├── daq_ipfw.la
|   |   ├── daq_ipfw.so
|   |   ├── daq_pcap.la
|   |   └── daq_pcap.so
|   ├── libdaq.a
|   ├── libdaq.la
|   ├── libdaq.so -> libdaq.so.4.0.2
|   ├── libdaq.so.4 -> libdaq.so.4.0.2
|   ├── libdaq.so.4.0.2
|   ├── libdaq_static.a
|   ├── libdaq_static.la
|   ├── libdaq_static_modules.a
|   ├── libdaq_static_modules.la
|   ├── libsfbpf.a
|   ├── libsfbpf.la
|   ├── libsfbpf.so -> libsfbpf.so.0.0.1
|   ├── libsfbpf.so.0 -> libsfbpf.so.0.0.1
|   └── libsfbpf.so.0.0.1
├── man
|   ├── man1
|   ├── man2
|   ├── man3
|   ├── man4
|   ├── man5
|   ├── man6
|   ├── man7
|   ├── man8
|   ├── man9
|   └── mann
├── sbin
├── share
|   └── doc
|       └── snort
└── src
    ├── daq-2.2.2
    |   ├── aclocal.m4
    |   ├── api
    |   ├── ChangeLog
    |   ├── compile
    |   ├── config.guess
    |   ├── config.h
    |   ├── config.h.in
    |   ├── config.log
    |   ├── config.status
    |   ├── config.sub
    |   ├── configure
    |   ├── configure.ac
    |   ├── COPYING
    |   ├── daq.dsp
    |   ├── depcomp
    |   ├── install-sh
    |   ├── libtool
    |   ├── ltmain.sh
    |   ├── m4
    |   ├── Makefile
```

```
    │   ├── Makefile.am
    │   ├── Makefile.in
    │   ├── missing
    │   ├── os-daq-modules
    │   ├── README
    │   ├── sfbpf
    │   └── stamp-h1
    └── snort-3.0.0-a4
        ├── ChangeLog
        ├── cmake
        ├── CMakeCache.txt
        ├── CMakeFiles
        ├── cmake_install.cmake
        ├── CMakeLists.txt
        ├── cmake_uninstall.cmake
        ├── cmake_uninstall.cmake.in
        ├── config.cmake.h.in
        ├── config.h
        ├── config.h.in
        ├── config.h.in~
        ├── configure
        ├── configure_cmake.sh
        ├── COPYING
        ├── CPackConfig.cmake
        ├── CPackSourceConfig.cmake
        ├── cppcheck.out
        ├── crusty.cfg
        ├── cxx11_auto
        ├── cxx11_auto_fail_compile
        ├── cxx11_auto_ret_type
        ├── cxx11_class_override_final
        ├── cxx11_constexpr
        ├── cxx11_cstdint
        ├── cxx11_decltype
        ├── cxx11___func__
        ├── cxx11_initializer_list
        ├── cxx11_long_long
        ├── cxx11_nullptr
        ├── cxx11_nullptr_fail_compile
        ├── cxx11_rvalue-references
        ├── cxx11_sizeof_member
        ├── cxx11_sizeof_member_fail
        ├── cxx11_static_assert
        ├── cxx11_static_assert_fail_compile
        ├── daqs
        ├── doc
        ├── install_manifest.txt
        ├── LICENSE
        ├── lua
        ├── Makefile
        ├── Makefile.in
        ├── piglet
        ├── README.md
        ├── snort.pc
        ├── snort.pc.in
        ├── src
        ├── test-driver -> /usr/share/automake-1.13/test-driver
        └── tools

82 directories, 86 files
```

```
pc16:/usr/local/src/snort-3.0.0-a4 #
```

Install rules

```
cd /usr/local/src
tar -xzf /home/<user>/Downloads/snort3-community-rules.tar.gz
cd snort3-community-rules
mkdir /usr/local/etc/snort/rules
cp snort3-community.rules /usr/local/etc/snort/rules
cp sid-msg.map /usr/local/etc/snort/rules
```

Now test that snort can load these rules:

```
snort -c /usr/local/etc/snort/snort.lua -R /usr/local/etc/snort/rules/snort3-community.rules
```

your output should contain something similar to:

```
Loading rules:
Loading /usr/local/etc/snort/rules/snort3-community.rules:
Finished /usr/local/etc/snort/rules/snort3-community.rules.
Finished rules.
-------------------------------------------------
rule counts
      total rules loaded: 3462
            text rules: 3462
          option chains: 3462
          chain headers: 264
-------------------------------------------------
```

you may want to run Snort with the following flags to detect issues: the **warn-all** and **pedantic** flags. From the Snort3 manual:
Warnings are not emitted unless –warn- is specified. –warn-all enables all warnings, and –pedantic makes such warnings fatal.*

Installing OpenAppID

OpenAppID allows for the identification of application layer traffic. The Snort team has put together a package of detectors, with assistance from the community that you can download and install, called the Application Detector Package which needs to be installed:

```
cd /usr/local/src
tar -xzf /home/<user>/Downloads/OpenAppId-6329
```

It creates a directory called "odp"

```
cp -R odp /usr/local/lib
```

Now we need to edit our snort configuration file to point to this odp directory:

```
vi /usr/local/etc/snort/snort.lua
```

Note: snort.lua is equivalent to snort.conf in Snort 2.

At line 74 (yours line number may be slightly different) you will see the **appid** = entry. You will want to add the app detector dir option here, pointing to the parent folder of the odp folder. It should look like this:

```
appid = { app_detector_dir = '/usr/local/lib' }
```

Now we want to test that the configuration file loads correctly:
snort -c /usr/local/etc/snort/snort.lua --warn-all

you should see output similar to:

```
Finished /usr/local/etc/snort/snort.lua.
--------------------------------------------------
pcap DAQ configured to passive.

Snort successfully validated the configuration.
o")~   Snort exiting
```

Note: there will be some warnings in this and following tests. You can ignore them if Snort validates the configuration.

Now to load Snort with the OpenAppID detectors, as well as all rules:

snort -c /usr/local/etc/snort/snort.lua -R /usr/local/etc/snort/rules/snort3-community.rules --warn-all

```
pcap DAQ configured to passive.

Snort successfully validated the configuration.
o")~   Snort exiting
```

Create a simple rule to test that OpenAppID is working correctly:
touch /usr/local/etc/snort/rules/local.rules
vi /usr/local/etc/snort/rules/local.rules

with the following content:

```
alert tcp any any -> any any ( msg:"Facebook trafic Seen"; appids:"Facebook";sid:10000001; )
```

Test to make sure the rule loads correctly:

snort -c /usr/local/etc/snort/snort.lua -R /usr/local/etc/snort/rules/local.rules --warn-all

```
pcap DAQ configured to passive.

Snort successfully validated the configuration.
o")~   Snort exiting
```

You should see one rule loaded successfully. Now let’s run snort in detection mode on an interface (change eth1 below to match your interface name), printing alerts to the console:

snort -c /usr/local/etc/snort/snort.lua -R /usr/local/etc/snort/rules/local.rules -i eth1 -A alert_fast -k none

the **-k none** flag tells Snort to ignore bad checksums. the Stream and Frag decoders will drop packets that have bad checksums, and the packets will not get processed by the OpenAppID detectors. By including this flag, we ensure that a packet with a bad checksum still gets processed.

you should see output similar to:

```
AppInfo: AppId 418 has no entry in application info table
AppInfo: AppId 418 has no entry in application info table
AppInfo: AppId 439 has no entry in application info table
```

and the system will stay in this state until a new event happens.

Now from another window on that computer (open a new Konsole terminal), check that Snort is running:

```
ps aux | grep snort
```

```
root      5081  2.2 40.3 420556 255896 pts/0   Sl+  16:51   0:01 snort -c /usr/local/etc/snort/snort.lua -R /usr/local/etc/snort/rules/local.rules -i eth1 -A alert_fast -k none
root      5120  0.0  0.2  10540  1596 pts/3    S+   16:52   0:00 grep --color=auto snort
```

Now use wget to connect to facebook:

```
wget facebook.com
```

in the first console window you will see alert outputs similar to the following:

```
11/09-07:34:51.009665 [**] [1:10000001:0] "Facebook trafic Seen" [**] [Priority: 0] [AppID: Facebook] {TCP} 192.168.99.10:58892 -> 31.13.67.35:80
11/09-07:34:51.059716 [**] [1:10000001:0] "Facebook trafic Seen" [**] [Priority: 0] [AppID: Facebook] {TCP} 31.13.67.35:80 -> 192.168.99.10:58892
```

use ctrl-c to stop Snort.

Note: if you are collecting packets with a larger MTU that the standard MTU for your adapter (VLAN tagged packets, MPLS Packets, packets from a different network type with a larger MTU), you may need to use the –snaplen flag to adjust snort to process larger packets).