



ELJEFE

INSTALLATION GUIDE

El Jefe 2.1

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1 Goal of this Document

This document enables you to realize the glory of a full installation of El Jefe 2.1 on various operating systems. You will need to be familiar with administering Linux in order to properly use this document. *Should you require any troubleshooting at anytime during the El Jefe installation please email us at eljefe@immunityinc.com.*

2 Introduction

The first step is to download the last version of El Jefe from Immunity's website: <https://eljefe.immunityinc.com/eljefe/>. The file comes in a tar/gzip format. You should also take the time now to verify the SHA-1 hash with the release email, which is likely archived in many places from being sent to our company mailing list, [DailyDave](#). If you're not subscribed to DailyDave, then you should take the time to subscribe now.

Inside the downloaded package you will find the following components:

- Client: El Jefe client's source code
- Cuckoo: Cuckoo Sandbox v1.0 for automated malware analysis.
- Dependencies : All dependencies needed for the client's installer development.
- Docs: El Jefe documentation.
- Installer: All files needed to create an executable installer for the El Jefe client.
- Webapp: El Jefe server's source code.

A screenshot of a Linux terminal window. The title bar shows the user 'anibal@imm' and the current directory '~/eljefe-2.1'. The terminal prompt is 'anibal@imm:~/eljefe-2.1\$'. The user has entered the command 'tree -d -L 1'. The output shows a directory tree with six entries: 'client', 'cuckoo', 'dependencies', 'docs', 'installer', and 'webapp'. Below the list, it says '6 directories'. The prompt is now 'anibal@imm:~/eljefe-2.1\$' with a cursor.

Illustration 1: El Jefe root's folders.



3 Installation

3.1 El Jefe 2.1 Installation on Ubuntu 13.04 LTS

El Jefe comes with its own shellscript installer inside the webapp folder (webbapp/install_ubuntu.sh) for Ubuntu. The script was created and tested on Ubuntu 13.04 LTS (we highly recommend you to use that version). Run the script to install the El Jefe server. Root privileges are required. The script will install all the dependencies needed for El Jefe 2.1 and configure El Jefe's database.

```
anibal@imm: ~/eljefe-2.1/webapp
anibal@imm:~/eljefe-2.1/webapp$ sudo ./install_ubuntu.sh
[sudo] password for anibal:
Installing El Jefe dependencies ...
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version.
python-chardet is already the newest version.
python-dev is already the newest version.
The following extra packages will be installed:
  libboost-dev libboost-fs1.49.0 libboost-program-options1.49.0
  libboost-system1.49.0 libboost-thread1.49.0 libboost1.49-dev
  libgoogle-perftools4 libpq5 libsnappy1 libtcmalloc-minimal4 libunwind8
  mongodb-clients mongodb-dev mongodb-server postgresql-9.1
  postgresql-client-9.1 postgresql-client-common postgresql-common
  python-bson-ext python-central python-egenix-mxdatetime
  python-egenix-mxtools python-setuptools python-sqlalchemy-ext python-support
Suggested packages:
  libboost-doc libboost1.49-doc libboost-chrono1.49-dev
  libboost-date-time1.49-dev libboost-fs1.49-dev
  libboost-graph-parallel1.49-dev libboost-graph1.49-dev
  libboost-iostreams1.49-dev libboost-locale1.49-dev libboost-math1.49-dev
  libboost-mpi1.49-dev libboost-program-options1.49-dev
  libboost-python1.49-dev libboost-random1.49-dev libboost-regex1.49-dev
  libboost-serialization1.49-dev libboost-signals1.49-dev
  libboost-system1.49-dev libboost-test1.49-dev libboost-thread1.49-dev
  libboost-timer1.49-dev libboost-wave1.49-dev doxygen default-jdk fop oidentd
  ident-server locales-all postgresql-doc-9.1 python-egenix-mxdatetime-dbg
```

Illustration 2: Running the installation script

A list of dependencies installed by the El Jefe installation script include the following:

- build-essential
- python-dev
- python-pip
- python-psycopg2



- postgresql
- mongodb
- django
- django-taggit
- django-bootstrap3
- requests
- numpy
- pymongo

Before finishing the installation you must insert the username and password needed for the first login to El Jefe's WebUI. You will want to use a strong password here as some of the information may be considered sensitive and El Jefe also has the ability to download executables from the remote machines.

```
Creating tables ...
Creating table auth_permission
Creating table auth_group_permissions
Creating table auth_group
Creating table auth_user_groups
Creating table auth_user_user_permissions
Creating table auth_user
Creating table django_content_type
Creating table django_session
Creating table django_site
Creating table django_admin_log
Creating table django_comments
Creating table django_comment_flags
Creating table home_xmlusers
Creating table home_stations
Creating table home_binaries
Creating table home_privileges
Creating table home_events_privileges
Creating table home_events
Creating table home_unique_executions
Creating table home_binary_requests
Creating table taggit_tag
Creating table taggit_taggeditem
Creating table alerts_action
Creating table alerts_executionfilter_actions
Creating table alerts_executionfilter
Creating table alerts_testfilter_actions
Creating table alerts_testfilter

You just installed Django's auth system, which means you don't have any superusers defined.
Would you like to create one now? (yes/no):
```

Illustration 3: Installation script will request to create an account



```
You just installed Django's auth system, which means you don't have any superusers defined.
Would you like to create one now? (yes/no): yes
Username (leave blank to use 'root'): anibal
Email address: admin@immunityinc.com
Password:
Password (again):
Superuser created successfully.
Installing custom SQL ...
Installing indexes ...
Installed 0 object(s) from 0 fixture(s)
All done.
anibal@imm:~/eljefe-2.1/webapp$
```

Illustration 4: Installation Complete

3.2 El Jefe 2.1 Installation on Red Hat Enterprise 7

Aside from the Ubuntu Installer, El Jefe comes with a second installer shellsript for Red Hat Enterprise 7 in the webapp folder `webbapp/install_rhel.sh`. Run the script to install the El Jefe server. Root privileges are required.

A terminal window titled "immunity@localhost:~/Desktop/eljefe-2.0" with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the execution of the script `sudo ./install_rhel.sh`. The output includes: "Checking architecture ...", "Adding MongoDB repository ...", "Installing El Jefe dependencies ...", "Loaded plugins: langpacks, product-id, subscription-manager", "Unit d0aflb99-7c58-49bc-b426-03826ef0b330 has been deleted", a progress bar for "mongodb" showing 951 B at 00:00 and 27 kB at 00:01, and a list of missing packages: `libffi-devel`, `python-setuptools-devel`, `python-psycopg2`, `postgresql`, `postgresql-server`, `python-devel`, `gcc`, `gcc-c++`, and `openssl-devel`. The script ends with "Resolving Dependencies".

```
immunity@localhost:~/Desktop/eljefe-2.0
File Edit View Search Terminal Help
[immunity@localhost eljefe-2.0]$ sudo ./install_rhel.sh
[sudo] password for immunity:
Checking architecture ...
Adding MongoDB repository ...
Installing El Jefe dependencies ...
Loaded plugins: langpacks, product-id, subscription-manager
Unit d0aflb99-7c58-49bc-b426-03826ef0b330 has been deleted
mongodb | 951 B 00:00
mongodb/primary | 27 kB 00:01
mongodb 175/175
No package libffi-devel available.
No package python-setuptools-devel available.
No package python-psycopg2 available.
No package postgresql available.
No package postgresql-server available.
Package mongo-10gen is obsoleted by mongodb-org, trying to install mongodb-org-2
.6.1-2.x86_64 instead
Package mongo-10gen-server is obsoleted by mongodb-org-server, trying to install
mongodb-org-server-2.6.1-2.x86_64 instead
No package python-devel available.
No package gcc available.
No package gcc-c++ available.
No package openssl-devel available.
Resolving Dependencies
```

Illustration 5: Installing El Jefe using RHEL shellsript

The script will require a username and password for the El Jefe's WebUI login.



```
immunity@localhost:~/Desktop/eljefe-2.0
File Edit View Search Terminal Help
Creating table home_xmlusers
Creating table home_stations
Creating table home_binaries
Creating table home_privileges
Creating table home_events_privileges
Creating table home_events
Creating table home_unique_executions
Creating table home_binary_requests
Creating table taggit_tag
Creating table taggit_taggeditem

You just installed Django's auth system, which means you don't have any superusers defined.
Would you like to create one now? (yes/no): yes
Username (leave blank to use 'root'): admin
Email address: admin@immunityinc.com
Password:
Password (again):
Superuser created successfully.
Installing custom SQL ...
Installing indexes ...
Installed 0 object(s) from 0 fixture(s)
Add the corresponding rules for iptables to allow incoming connection for postgresql (default port 5432) and ElJefeXMLServer (default port 5555).
All done.
[immunity@localhost eljefe-2.0]$
```

Illustration 6: Installation Complete

3.3 Cuckoo Installation

Cuckoo is an open source sandbox that automates malware analysis. Version 2.1 of El Jefe includes Cuckoo to help analysts by providing further in-depth information about potentially harmful processes. ***The installation of Cuckoo is optional***, but we think you will find it quite useful once completed. Keep in mind that Cuckoo **cannot be installed from WITHIN a virtual machine**, unlike El Jefe itself.

The reason Cuckoo is so useful is that El Jefe will download a suspicious binary from any event upon the analyst's request. Then El Jefe will task Cuckoo with running that binary in a virtual machine. Cuckoo will then produce a complete report with the results and these results are then made available through the El Jefe WebUI.

The Cuckoo Sandbox is already inside El Jefe version 2.1 package release so there is no need for extra downloads (Check out the cuckoo folder for more information).

Cuckoo supports VirtualBox, KVM and VMWare for virtualization. We are using VMWare Workstation 9.0 in this guide as our virtualization software, but it should be rather trivial to install it in others. You can follow the guidelines in the following URL for assistance with other virtualization software (<http://docs.cuckoosandbox.org/en/latest/installation/guest/>).

4 Configuring the Virtual Machine

It is time to setup the virtual machine where we are going to run and analyze our binaries. First, we will need to create a new virtual machine. The preferred operating system by Cuckoo is Windows XP, but other Windows versions are also supported. We are using Windows 7 x64 in this guide.

We need to install Python and Python Imaging Library (PIL) (<http://www.pythonware.com/products/pil/>). If you are using Windows x64 you need to install a 32 bits Python version to support PIL.

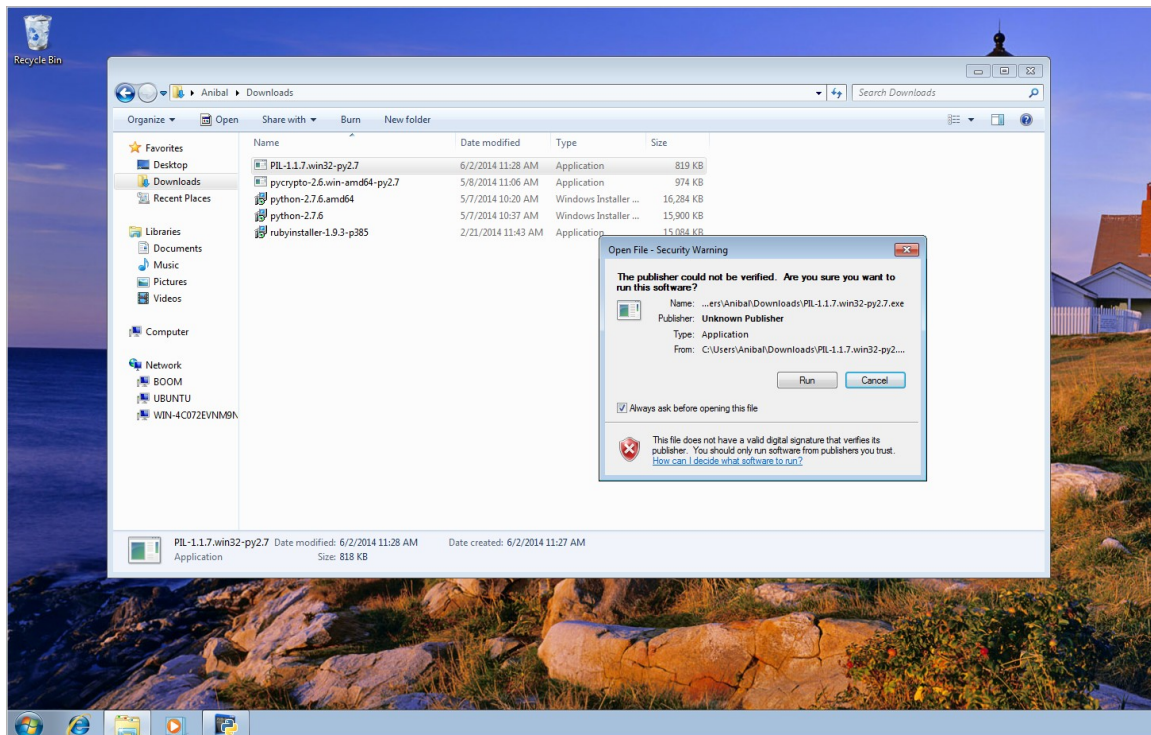


Illustration 7: Installing Python and PIL on the guest virtual machine

5 Network Setup

It is time to configure the virtual machine's networking. First, disable the Windows Firewall after that create a virtual host-only network for the guest and the host.

Customize settings for each type of network

You can modify the firewall settings for each type of network location that you use.

[What are network locations?](#)

Home or work (private) network location settings



☐ Turn on Windows Firewall

☐ Block all incoming connections, including those in the list of allowed programs

☒ Notify me when Windows Firewall blocks a new program



☒ Turn off Windows Firewall (not recommended)

Public network location settings



☐ Turn on Windows Firewall

☐ Block all incoming connections, including those in the list of allowed programs

☒ Notify me when Windows Firewall blocks a new program



☒ Turn off Windows Firewall (not recommended)

Illustration 8: Turning the Windows Firewall off on the guest virtual machine

To do this you will need to open the Virtual Network Editor and create a virtual host-only network for the guest and the host to communicate.

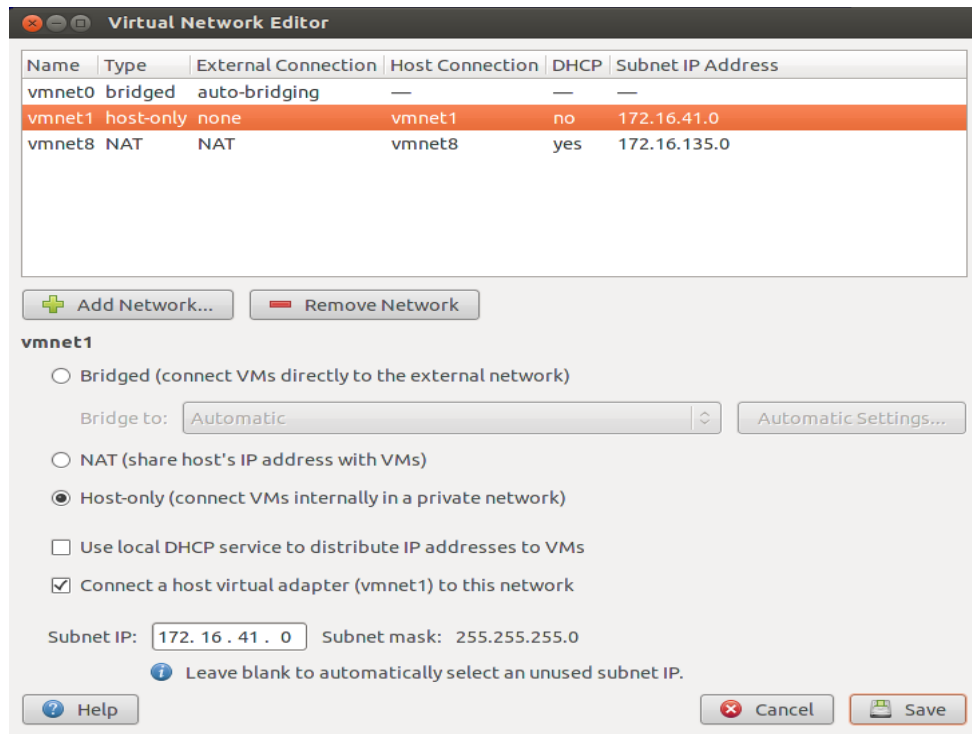


Illustration 9: Configuring Virtual Network Editor

We are using the 172.16.41.0 network which makes the guest configuration as follows:

IP Address: 172.16.41.159
Netmask: 255.255.255.0
Gateway: 172.16.41.1

Cuckoo supports DNS resolution so you can choose 172.16.41.1 as your DNS server. In our experience, we get better analysis results by using a public DNS server (for example the Google DNS: 8.8.8.8 and 8.8.4.4).

The host configuration (for the vmnet adapter) is as follows:

IP Address: 172.16.41.1
Netmask: 255.255.255.0

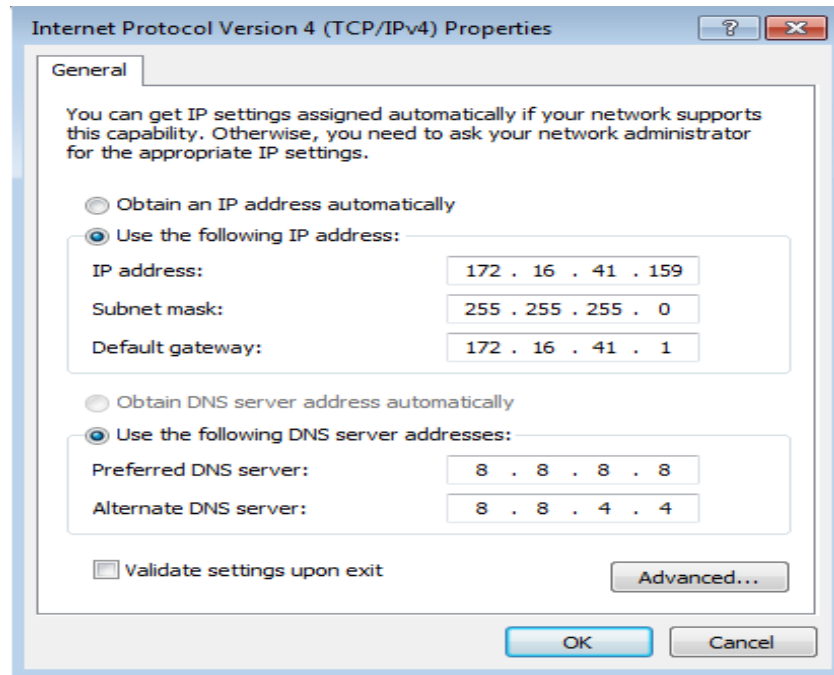


Illustration 10: Setting-up the network on the guest virtual machine

5.1 Configuration of Networking

The next step is to configure packet forwarding on the host machine to give the guest machine Internet access. We can do this with the following commands (replacing eth0 with your outgoing interface and vboxnet0 with your virtual interface):

```
$ iptables -A FORWARD -o eth0 -i vmnet1 -s 172.16.41.0/24 -m conntrack --ctstate NEW -j ACCEPT
$ iptables -A FORWARD -m conntrack --ctstate ESTABLISHED,RELATED -j ACCEPT
$ iptables -A POSTROUTING -t nat -j MASQUERADE
$ sysctl -w net.ipv4.ip_forward=1
```

This concludes the networking setup.



6 Agent Installation

We need to install the Cuckoo agent on the guest by copying *agent.py* (located in *cuckoo/agent* folder) to the Windows Startup folder.

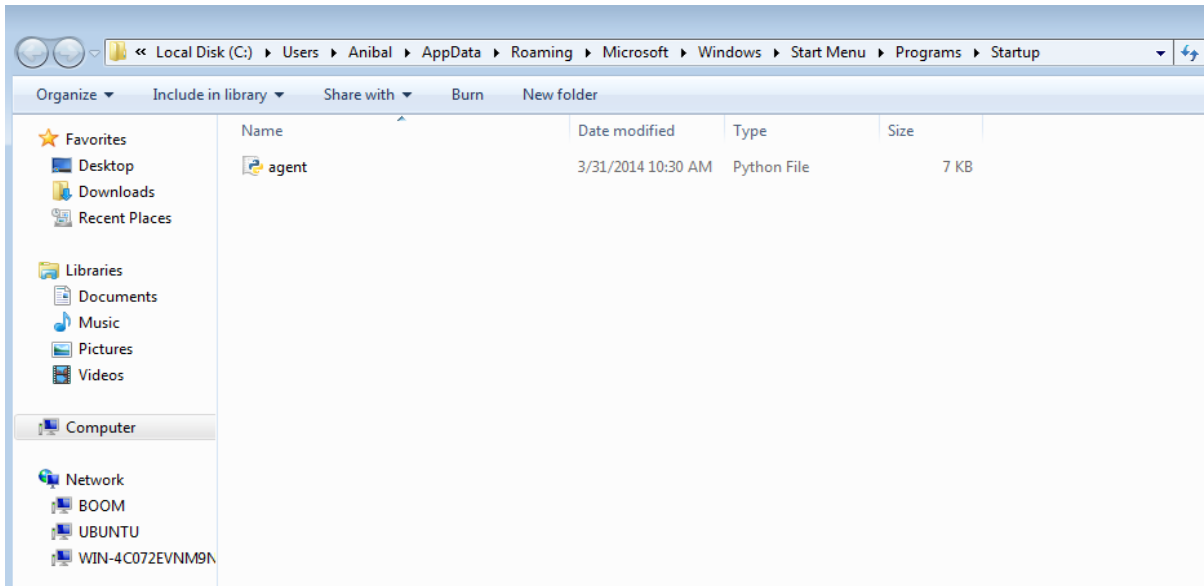


Illustration 11: Coping the agent on the startup folder

The next step is reboot the virtual machine and the agent will be started!

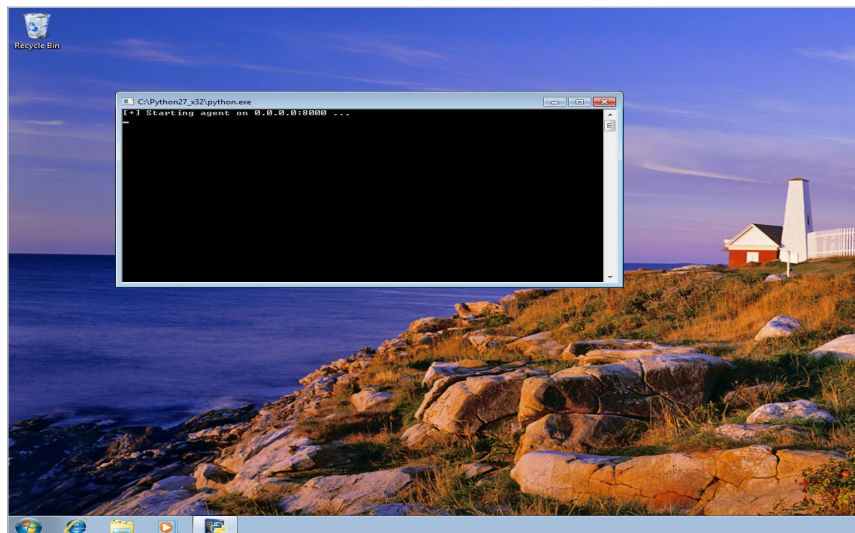


Illustration 12: MISSING CAPTION



Now it is time to make a snapshot. Before executing a malware binary the snapshot is reverted and then the binary is executed and analyzed.

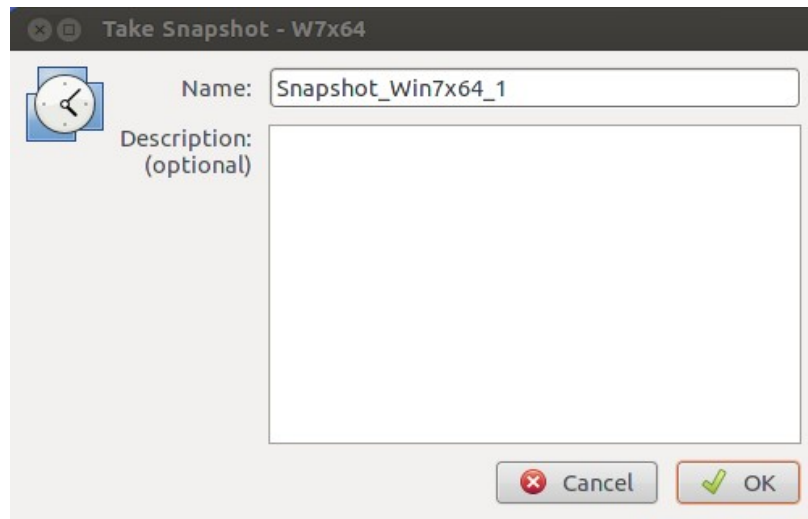


Illustration 13: Taking a snapshot of the guest virtual machine

Summary:

vm path = \$HOME/vmware/W7x64/W7x64.vmx

vm snapshot = Snapshot_Win7x64_1

vm IP = 172.16.41.159

7 Final Configuration

If you opted to install Cuckoo, you will need to configure the files in Cuckoo which is running on our El Jefe server. First, modify the *cuckoo/conf/auxiliary.conf* and change the interface to the one that you will use to communicate with the guest virtual machine.

```
1 [sniffer]
2 # Enable or disable the use of an external sniffer (tcpdump) [yes/no].
3 enabled = yes
4
5 # Specify the path to your local installation of tcpdump. Make sure this
6 # path is correct.
7 tcpdump = /usr/sbin/tcpdump
8
9 # Specify the network interface name on which tcpdump should monitor the
10 # traffic. Make sure the interface is active.
11 interface = vmnet1
12
13 # Specify a Berkeley packet filter to pass to tcpdump.
14 # bpf = not arp
```

Illustration 14: Configure the interface to be used



Next, modify `cuckoo/conf/cuckoo.conf` to set the result server IP address on the `[resultserver]` section (in our case it is the El Jefe Server (172.16.41.1)).

```
39
40 # Minimum amount of free space (in MB) available before starting a new task.
41 # This tries to avoid failing an analysis because the reports can't be written
42 # due out-of-diskspace errors. Setting this value to 0 disables the check.
43 # (Note: this feature is currently not supported under Windows.)
44 freespace = 64
45
46 [resultserver]
47 # The Result Server is used to receive in real time the behavioral logs
48 # produced by the analyzer.
49 # Specify the IP address of the host. The analysis machines should be able
50 # to contact the host through such address, so make sure it's valid.
51 # NOTE: if you set resultserver IP to 0.0.0.0 you have to set the option
52 # 'resultserver_ip' for all your virtual machines in machinery configuration.
53 ip = 172.16.41.1
54
55 # Specify a port number to bind the result server on.
56 port = 2042
57
```

Illustration 15: Set up the result server IP

Finally, modify `cuckoo/conf/vmware.conf`. If you are planning to use just one virtual machine then you will just need to modify everything inside `[cuckoo1]`. Otherwise, you will have to create an additional section for each extra virtual machine used. Inside these sections you will have to set the virtual machine path, snapshot name and IP address of the machine (in our example it is 172.16.41.159).

```
28
29 # Specify a comma-separated list of available machines to be used. For each
30 # specified ID you have to define a dedicated section containing the details
31 # on the respective machine. (E.g. cuckoo1,cuckoo2,cuckoo3)
32 machines = cuckoo1
33
34 [cuckoo1]
35 # Specify the path to vmx file of the current machine
36 # If you are using remote mode the path is relative to the shared vms folder
37 label = /home/anibal/vmware/W7x64/Wx64.vmx
38
39 # Specify the snapshot name to use.
40 snapshot = Snapshot_Win7x64_1
41
42 # Specify the operating system platform used by current machine
43 # [windows/darwin/linux].
44 platform = windows
45
46 # Specify the IP address of the current virtual machine. Make sure that the
47 # IP address is valid and that the host machine is able to reach it. If not,
48 # the analysis will fail.
49 ip = 172.16.41.159
50
```

Illustration 16: Setting-up the last configuration details

We are done setting Cuckoo for El Jefe!



8 Optional Settings (recommended)

When Cuckoo is analyzing submitted files there are some extra modules and libraries that will improve the analysis which will provide the analyst with a better report. **These modules are optional but their installation is highly recommended.**

Run setcap to give tcpdump root privileges without needing to have Cuckoo run as root.

```
$ sudo setcap cap_net_raw,cap_net_admin=eip /usr/sbin/tcpdump
```

9 Starting El Jefe

Now you are ready to start up El Jefe. We recommend running these commands inside a screen session.

First, run the web interface. Inside *webapp/* you must type :

```
$ python manage.py runserver
```

```
anibal@imm:~/eljefe-2.1/webapp$ python manage.py runserver
Validating models...

0 errors found
June 23, 2014 - 09:34:06
Django version 1.6.5, using settings 'webapp.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
```

Illustration 17: Running the WebUI

The next step is start the XML Server. You must set the IP address of El Jefe Server in *webapp/xmlserver/settings.py*



```
#settings for xml server
LOGHOST = "192.168.1.127"
LOGPORT = 5555

#logging options
LOGGING_FILENAME="ElJefeXMLServer.log"
LOGGING_LEVEL="INFO"

#be sure to use your own certs
KEYFILE='certs/server.key'
CERTFILE='certs/server.pem'
CA_CERTFILE='certs/cacert.pem'

# Email alert settings
ENABLE_EMAIL_ALERTS = False
EMAIL_ACCOUNT = "youraccount@domainthatshouldreallybeset.com"
SMTP_SERVER = "127.0.0.1"
SMTP_PORT = 25
~
~
~
~
~
```

Illustration 18: Setting XML Server IP address

Now you can start the XML Server. In `webapp/xmlserver` you must type:

```
$ python ElJefeXMLServer.py
```

```
anibal@imm:~/eljefe-2.1/webapp/xmlserver$ python ElJefeXMLServer.py
[*] Starting server....
[*] Serving HTTPS on 192.168.1.127 port 5555
```

Illustration 19: Running the XML Server

Finally, run the Cuckoo sandbox server. Inside `cuckoo/` run:

Immunity Inc. 1130 Washington Ave. 8th Floor Miami Beach, FL 33139
(p) 786-220-0600 (f) 786-513-8100 (web) www.immunityinc.com



```
$ python cuckoo.py
```

```
anibal@imm:~/eljefe-2.1/cuckoo$ python cuckoo.py

  _____
 /  _  _  _  \
(  (  (  (  (  (
 \  _  _  _  /
  (  (  (  (  (
   \  _  _  /
    \  _  /
     \  /
      \

Cuckoo Sandbox 1.0
www.cuckoosandbox.org
Copyright (c) 2010-2014

Checking for updates...
Outdated! Cuckoo Sandbox version 1.1 is available now.

2014-06-23 11:36:08,722 [lib.cuckoo.core.scheduler] INFO: Using "vmware" machine manager
2014-06-23 11:36:09,503 [lib.cuckoo.core.scheduler] INFO: Loaded 1 machine/s
2014-06-23 11:36:09,504 [lib.cuckoo.core.scheduler] INFO: Waiting for analysis tasks...
```

Illustration 20: Running Cuckoo

You should now be able to log into El Jefe using the username and password created during the installation by going to *http://ElJefeIP:8000/*.

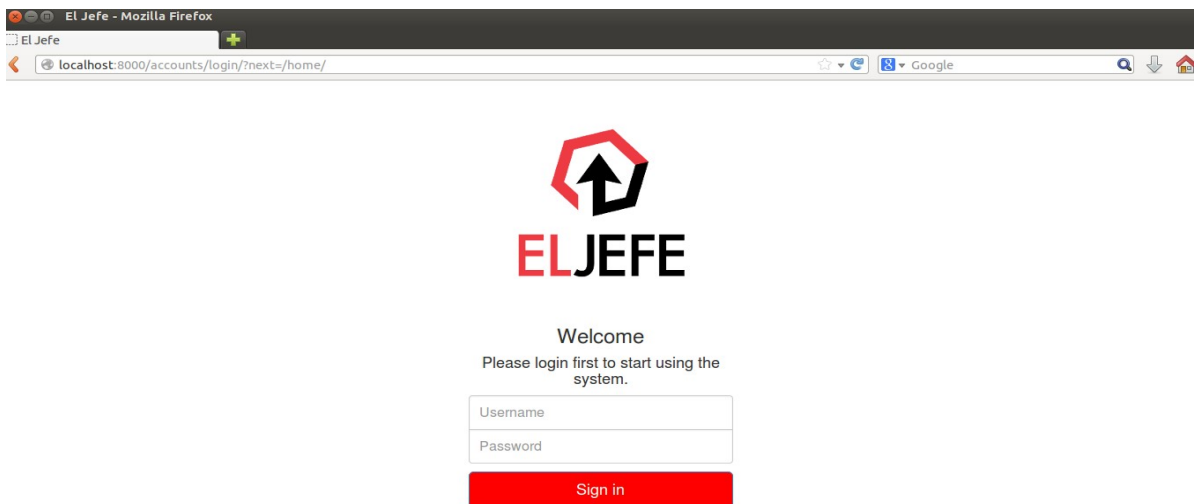


Illustration 21: Log-in into El Jefe UI

Now that you are logged in it is now time to catch some threats. Enjoy the ride!