

# NAT3 Daemon User Manual

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## 1 Introduction

NAT3 Daemon allows for connectivity to machines that operate in a private network, under a NAT box.

## 2 Building/Installing NAT 3 Daemon

### 2.1 Installing the developer tools on a Mac OS X

To run NAT3 Daemon on a Mac, you need to install the Mac developer tools found at the Apple Developer Connection site: <http://developer.apple.com/products/membership.html>.

Downloading and installing the free ADC Online Membership will suffice.

### 2.2 Installing TUN/TAP drivers for Mac OS X

Mac does not come with these drivers. Drivers are provided in the folder *"libs/TunMacOSX.tar.gz"*.

Alternately, you may download and install them from <http://tunaposx.sourceforge.net/>. Failure to do so will result in errors that prevent the NAT3 Daemon from running such as - Unable to open /dev/tun0

### 2.3 Installing the MiniUPnP library

The MiniUPnP library is found under the folder *"libs"*. Install the MiniUPnP library (miniupnpc-x.x.tar.gz) as you would install any other tool from source (./configure, make, make install).

### 2.4 Testing if UPnP works on your NAT box

Run upnptest from the bin folder. Pass to it the address of the machines interface that contains the NAT box you wish to traverse.  
*upnptest <address of interface>*

If the application reports an error, you must manually forward the port on the NAT box to the machine running the NAT3 Daemon. For further information, please look here: <http://portforward.com>.

## 3 The configuration file

You need to create a configuration file with the following format.

*option = value*

Name of option/Field	Meaning
ip	IP Address of your machine on the interface/network on which the NAT box is connected (Do not enter 127.0.0.1)
port	The port to listen for incoming connections <sup>a</sup>
resolver	The IP Address of the DNS resolver set up to answer our NAT3 DNS requests

<sup>a</sup>Assumes you forwarded the port, as mentioned in Section 2

## 4 Running the NAT3 Daemon

The command to run the NAT3 Daemon is:

```
./nat3d <config file>
```

The NAT3 Daemon will print a message telling you if UPnP Portforwarding succeeded or failed.

Please note that you need to be administrator use to run the daemon. To do this, use *sudo <NAT3 daemon run command>*.

## 5 Setting up the DNS Resolver

You must use BIND9 to resolve DNS queries. The reason is that the application uses custom DNS Record Type, which is in a format only BIND will understand.

### 5.1 Custom Resource Record (RR) Type

In *dns.rr.h:12*, The number tells NAT3 which RR Number to query for.

```
#define DNS_RR_NAT3          65324
```

If need be, change the number to any number between 65280-65535 (Private use numbers). The corresponding DNS RR Type in BIND9 will be *TYPE6xxxx*. In the example above, it would be *TYPE65324*. This is the type you should use in test queries (in section 5.4).

### 5.2 Generating the DNS RR

To generate the DNS RR in a way NAT3 Daemon will understand it, use *scripts/gen\_nat3.pl*. The format for the script is:  
*./gen\_nat3.pl <name> <external> <port> <internal>*

Where:

name	Name of the DNS record <sup>a</sup>
external	External IP Address of the NAT box <sup>b</sup>
port	The port forwarded to the machine running the daemon <sup>c</sup>
internal	The machine (under the NAT's network) which you wish to reach

<sup>a</sup>Must be a Fully Qualified Domain Name, ending with a period(.)

<sup>b</sup>For now, the daemon only works with one level of NAT

<sup>c</sup>Assumes that either UPnP Worked, or you manually forwarded the port as in Section ??

The result of the script can be copy-pasted in the DNS Zone File.

Also note that the script in section assumes the presence of the header *dns.rr.h* (see section 5.1). It looks for the RR type number from the header file.

### 5.3 Setting up the DNS Zone

On the DNS Server, you need to set up a zone that is authoritative for names that will return a NAT3 Record.

A good source of information is: <http://www.debuntu.org/book/export/html/85>.

Once that is done, paste the result of the script from section 2.3 in the db file for the zone.

### 5.4 Testing the DNS resolver

You can use the following command to make sure the DNS resolver works as we want it to:

```
dig @<DNS Server hostname> <Name of target host> <DNS Type>
```

Where,

DNS Server hostname	Name of the machine on which the DNS resolver is running.
Name of target host	The name which will corresponds to the NAT3 Record Type <sup>a</sup>
DNS Type	The type of the DNS Record <sup>b</sup> .

<sup>a</sup>See section 5.2

<sup>b</sup>See section 5.1

#### Results of test:

Ideally, when you query for a DNS Type record of “A” with the above command, you should get either an NXDOMAIN, or a response with no answer section. Also, when you query for the NAT3 Record Type (as in section 5.1), you should get the result of what you pasted from the script (see section 5.2).

## 6 Problems faced while running NAT3 Daemon

### 6.1 Unknown Ethertype FE0A

The problem is that NAT3 Daemon expects to open a TAP device, but opened a TUN device instead. Add the following flag to the makefile CFLAGS:  
*-DNAT3\_TAP*.

### 6.2 NXDOMAIN not returned by BIND9 on “A” Record query

In several documents associated with the daemon, it is mentioned that the application expects NXDOMAINs (Non-Existant Domains) to be returned by BIND9 when the user application attempts to do a DNS query, at which point the NAT3 daemon takes over and re-issues the query with the custom DNS Record type <sup>1</sup>.

This is not required, as the NAT3 daemon checks for either a NXDOMAIN or for the absence of an answer section in the reply to the application’s query.

### 6.3 BIND9 complains about unknown RR type with the custom RR type

This was an issue that came up with a version of BIND9 unexpectedly. The solution followed at that time was to upgrade the version of BIND9 to the latest version.

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<sup>1</sup>See section 2.3