# kea_config

*Release 5.2.1*

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# CONTENTS

CHAPTER

ONE

# KEA-CONFIG

## 1.1 Overview

**What is kea?**

kea is a modern dhcp server from ISC (<https://www.isc.org/kea>) which supercedes its older dhcp software.

kea offers a nice feature set including the ability to have a hot standby server to pick up in case the primary is unavailable. Its power also lurks behind a complicated configuration suite that, at least for me, is not terribly human friendly.

Most notably each server requires it's own separate config and keeping them all synchronized can be a bit of a chore and which naturally is prone to human error.

**What is kea-config?**

kea-config provides a tool which takes a single configuration file as its input and it then generates the native kea configuration files needed from that single source of truth. By using a single configuration we can be assured that the configs for the primary, standby and backup servers are consistent with one other.

It also provides the convenience of doing the DNS lookups for any host reservations, meaning the reservation is specified using hostname only not IP as expected by kea.

At the moment kea-config supports kea-dhcp4 and its companion control agent.

Contents



- On Arch you can build using the provided PKGBUILD in the packaging directory or from the AUR. All git tags are signed with arch@sapience.com key which is available via WKD or download from https://www.sapience.com/tech. Add the key to your package builder gpg keyring. The key is included in the Arch package and the source= line with *?signed* at the end can be used to verify the git tag. You can also manually verify the signature

## 1.2 New / Interesting

** 5.2.0**

- Code Reorg
- Switch packaging from hatch to uv
- Testing to confirm all working on python 3.14.2

- License GPL-2.0-or-later

**5.0.0**

- Code re-org/cleanup.
- Code now complies with PEP-8, PEP-257 and PEP-484 style and type annotations

**Older**

- Socket dir now defaults to */var/run/kea*. We prefer */run/kea* per Linux FHS, but current git HEAD now requires the path to to be */var/run/kea/*.

  There is a config option, *socket_dir*, to set this as well.
- Multiple gateway routers. option-data routers can now be a list of gateways.
- Add output option "calculate-tee-times" : true (replaces explicit renew-timer, rebind-timer)
- Add output option: "offer-lifetime": 60
- Add global input options: "min-valid-lifetime", "valid-lifetime", "max-valid-lifetime"

  These can be overriden at the subnet level
- If some lifetimes are set, missing ones are imputed using:

  min-valid-lifetime = valid-lifetime / 2

  max-valid-lifetime = valid-lifetime * 2
- reservations : use FQDN for hostname. Hostname must be requested by client for kea to send it.

### 1.2.1 Breaking Change

kea has deprecated the option *reservation-mode* for versions of kea newer than 2.4. These new versions will error if this option is used.

We have now removed this option from *kea-config* generated output.

Please re-run *kea-config* to generate fresh configs. These new configs are compatible with version of kea newer than 2.4 as well as version 2.4.

Existing file */etc/kea/kea-dhcp4.conf* can also be edited to remove the line with the deprecated option.

## 1.3 Installation

Available on

- Github
- Archlinux AUR

On Arch you can build using the PKGBUILD provided in packaging directory or from the AUR package.

Listing 1: Manual Install

```
rm -f dist/*
/usr/bin/python -m build --wheel --no-isolation
root_dest="/"
./scripts/do-install $root_dest
```

When running as non-root then set root_dest a user writable directory This will install the executable */usr/bin/kea-config* along with a sample config in */usr/share/kea_config*

## 1.4 kea_config application

kea-config is written in python and that is its sole dependency, hence python must be installed.

You can install it or run it out of the cloned repo (src/kea_config/kea-config.py)

### 1.4.1 Using kea-config

Once installed, to use it, copy the sample config file in the *configs* dir, modify for your own setup and simply run it:

```
kea-config -c <your.conf>
```

This will generate pairs of files, one kea config and one control agent config for each of primary, standby and backup - or whatever subset you used in the conf file.

e.g. it will create kea configs in the <conf_dir> which is defined config being used:

```
kea-ctrl-agent-primary.conf
kea-dhcp4-primary.conf
```

and similarly for standby and/or backup if requested. Each pair of files is to be used on the corresponding server. e.g The 2 primary files are used on the kea-dhcp4 primary server.

One simple way to manage these is to copy the entire <conf_dir> to each kea server /etc/kea then use sym links for kea config - linking to appropriate primary, standby or backup.

e.g. /etc/kea on primary would have

```
kea-dhcp4.conf -> <conf_dir>/kea-dhcp4-primary.conf
kea-ctrl-agent.conf -> <conf_dir>/kea-ctrl-agent-primary.conf
```

### 1.4.2 Summary of config variable

Comments begin with '#' and are ignored. The conf file in standard TOML format and as usual sections are denoted by square brackets. e.g.:

```
some_variable = 'xxx'
[section_1]
    a_variable = 'hi'
    a_list = ['1', 'two', 'three']
```

See the sample config for additional details. We summarize the main pieces here:

- *title*

  For human use only - not used by kea-config.

- *conf_dir*

  Directory where generated kea configs reside. What I do is rsync this directory to /etc/kea/ on each kea server. Each server then has a soft link to its own specific config. For example on my primary server I have

```
ln -s <conf_dir>/kea-ctrl-agent-primary.conf kea-ctrl-agent.conf
ln -s <conf_dir>//kea-dhcp4-primary.conf kea-dhcp4.conf
```

And similarly for standby and backup.

- *server_types*

  The list of servers used - should contain at least 'primary'. e.g. server_types = ['primary', 'standby', 'backup']

- [*global_options*]

  This section has some common dhcp information shared with dhcp clients:

  - domain-name-servers - list of DNS server IPs
  - domain-name - what is sounds like
  - domain-search - list of (sub)domains to search (if any)
  - ntp-servers - list of local ntp server IPs (if any)

- *[server.primary]*

  Provides the information needed for the primary server interface, hostname, port, auth_user and auth_password

- *[server.standby] [server.backup]*

  Same format as primary server section. Optional and only used if turned on in *server_types* list.

- *[net]*

  This section describes the standard dhcp information including host IP reservations.

  - dns_net

    internal domain, used to lookup IP for host reservations.

  - pools

    list of IP ranges to use

  - subnet

    what it sounds like

  - max-valid-lifetime

    as usual in seconds

  - *[net.option-data]*

    sub section with:

    * *broadcast-address*
    * *routers*

      Default gateway(s) / route(s). May be list of ips [“ip1”, “ip2”,…] or a single ip “ip1”.

    * *ntp-servers*

      A list

      · *[net.reserved.XXX]*

        Reservation for hostname *XXX*:

        hardware-address = “mac address”

        Will reserve the IP for *XXX* based on dns lookup of XXX. Can be as many host reservations as needed.

## 1.5 Discussion and Next Steps

This version is for kea-dhcp4 (IPv4).

Not all kea options are supported by kea-config. For example the high availibilty component of kea allows for either hot-standby or load balancing. At moment we only support hot standby. Hot standby has one server at a time actively serving clients, whereas in load balancing case both servers are servicing clients at same time.

To create a version for kea-dhcp6, for example where a firewall is responsible for passing prefix delegation to the internal hosts, one needs an IPV6 internet connection; I am unable to work on this at the moment.

While kea-config is distro agnostic, I do provide an Archlinux package available on the AUR.

CHAPTER

TWO

# APPENDIX

## 2.1 Dependencies

- Run time
- python
- Building Package:
  - git
  - poetry (aka python-poetry)
  - wheel (aka python-wheel)
  - build (aka python-build)
  - installer (aka python-installer)
  - rsync
- Optional for building docs:
  - sphinx
  - texlive-latexextra (archlinux packaguing of texlive tools)

## 2.2 Philosophy

We follow the *live at head commit* philosophy as recommended by Google's Abseil team[1]. This means we recommend using the latest commit on git master branch.

## 2.3 License



[1] https://abseil.io/about/philosophy#upgrade-support

CHAPTER

THREE

# LICENSE

kea_config: Manage kea dhcp4 configs from single source config