

## LANforge Server Installation

### Contents

## Overview

Candela Technologies delivers LANforge systems fully installed and configured on our **validated hardware platforms**. If you have a understanding of the Linux operating system, you should be able to install and configure a functional LANforge system on the hardware of your choice. LANforge also can be installed on Windows, Apple<sub>(Intel)</sub>, and has client apps on Android and iOS. LANforge works best on Linux!

**Legal use of the LANforge system is based upon licensed data-generating ports and/or machines. You must own a license for every port or machine configured to generate traffic.**

## Upgrade with Internet Access

If you are upgrading to LANforge 5.4.9 or higher, and are using Fedora 19 to 39, we suggest the **upgrade.bash** options.

The `lf_kinstall.pl` script will take a base install and add the appropriate packages, install or upgrade LANforge server, GUI, kernel and supporting files and tweak the OS to run best with LANforge.

## Configure Web Proxy

If your systems do not have direct Internet access and need to configure a proxy, please use the `/home/lanforge/scripts/config_proxy.bash` script.



## Choose your Upgrade Process

Choose **one method** to upgrade LANforge based on your system needs:

Ensure the script **finishes without errors before you continue**. Please contact support if you have questions.

**A**

Upgrade Script

You have a LANforge system that can reach the Internet.

**B**

Developer upgrade script

You want specific features applied, and can reach the Internet.

**C**

Interop Upgrade

Your systems are in an interop cluster.

**D**

Offline bundle

Upgrade an isolated system by bringing updates to it.

**E**

Run `lf_kinstall.pl` by hand

For old systems that need an updated `lf_kinstall.pl` feature.

### **A:** Upgrading with `/root/upgrade.bash`:

1. If you don't have `/root/upgrade.bash`, you can download it:

1. Close the LANforge GUI application.

```
$ sudo -s
```

2.

```
# wget https://www.candelatech.com/private/downloads/r5.4.9/upgrade.bash
```

3.

```
# chmod +x upgrade.bash
```

4.

```
# ./upgrade.bash
```

2. Upgrade:

3. This script will:

1. Ask if you want to update lf\_install.pl
2. Ask what version you want to upgrade to
3. Ask what server to pull files from
4. Print out the corresponding lf\_install.pl for your reference
5. Start your upgrade.

4. Once the upgrade is finished, you can either:

```
# reboot
```

- o Restart the system with `reboot`. Do this if you installed a new kernel. OR:
- o Restart the LANforge manager service with:

```
# service lanforge restart
```

This script will not do offline bundle installation.

## B: Upgrading to a Specific Build with `/root/upgrade_dev.bash`:

1. If you don't have `/root/upgrade_dev.bash`, you can download it:

1. Close the LANforge GUI application.

```
$ sudo -s
```

2.

```
# wget https://www.candelatech.com/private/downloads/r5.4.9/upgrade_dev.bash
```

3.

```
# chmod +x upgrade_dev.bash
```

4.

```
# ./upgrade_dev.bash
```

2.

3. This script will:

1. Ask if you want to update lf\_install.pl and lf\_install\_dev.pl
2. Ask what version you want to upgrade to
3. Ask what server to pull files from
4. List the builds available (if one is available)
5. Ask for what style of upgrade
6. Print out the corresponding lf\_install\_dev.pl for your reference
7. Start your upgrade using lf\_install\_dev.pl .

4. Once the upgrade is finished, you can either:

```
# reboot
```

- o Restart the system with `reboot`. Do this if you installed a new kernel. OR:
- o Restart the LANforge manager service with

```
# service lanforge restart.
```

This script will not do offline bundle installation.

## C: Interop Upgrade

Your systems are clustered and you want to upgrade LANforge on the manager.

1. Your system has Internet access
2. Upgrade the manager first ( See instructions for `upgrade.bash` or `upgrade_dev.bash`.)
3. Create a local package mirror on your manager device. This downloads the necessary packages that other PC-based LANforge resources need to do upgrades. (Upgrades to iPhone and Android apps need updating via the Interop Batch Modify menu.)

```
$ sudo -s
# cd /root
# wget -O lf_kinstall.pl https://www.candelatech.com/lf_kinstall.pl
# chmod +x lf_kinstall.pl
# ./lf_kinstall.pl --lfver 5.4.9 --do_release_mirror
```

This last command will update your Linux LANforge Apache configuration and allow the files in `/home/lanforge/public_html` to be served from it. Those web shares will be visible as `/downloads` and `/private/downloads/5.4.9`

4. Upgrade the resources in the cluster:
  1. Open the GUI
  2. Select the Resource Mgr tab
  3. Select the computer resources you wish to upgrade (Android and iOS devices will not be upgraded)
  4. In the Download From box, enter your management IP (check Port Mgr tab, device `eth0`).
  5. Click **Upgrade**

## D: Offline Upgrade Using Bundle

A bundle is a single tar archive that contains all the downloaded elements of a typical **upgrade of an existing installation**. This reduces effort to copy items to an offline or isolated instance of LANforge.

### You can use the offline-bundle when:

- Your LANforge machine is 64-bit
- Your LANforge machine is Fedora 21 or more recent
- Your LANforge machine already as LANforge installed

### You should avoid the install-bundle when:

- You have reinstalled your OS (please be online and use `lf_kinstall.pl --do_all_ct`)
- Your machine is 32-bit (Please ask for a quote for machine upgrade)
- Your machine has not completed the `lf_kinstall.pl --do_all_ct` step

If you have a LANforge machine you purchased from us and it still runs LANforge, you can use the offline-bundle.

### Steps for using the offline-bundle:

1. Determine what OS you are using: `cat /etc/os-release` Probably you have Fedora 24, 27, 30, 34 or Fedora 36. The matching bundles would have F24, F27, F30, F34 or F36 in their name for these releases.

If you have some other OS release that does not have a bundle packaged for it, contact support.

2. Bundles can be found by looking in the release directory, for instance:  
<https://www.candelatech.com/private/downloads/r5.4.9>
3. Copy the the install bundle for your OS version to /home/lanforge/Downloads/ on the LANforge machine.
4. Copy the [https://www.candelatech.com/lf\\_kinstall.txt](https://www.candelatech.com/lf_kinstall.txt) file to /home/lanforge/Downloads/lf\_kinstall.pl.
5. Log in as root and change to the install directory: cd /home/lanforge/Downloads/
6. Make sure the new lf\_kinstall.pl is executable: chmod a+x lf\_kinstall.pl
7. Use the following command to unpack and install:

```
./lf_kinstall.pl --use_install_bundle /home/lanforge/Downloads/[install-bundle]
```

Please use the **full path** to the bundle.

8. Reboot system with command: reboot

## E: Run lf\_kinstall.pl by hand:

Download lf\_kinstall.pl to /root:

```
# cd /root
# wget -O lf_kinstall.pl https://www.candelatech.com/lf_kinstall.pl
# chmod +x lf_kinstall.pl
```

### Running the lf\_kinstall.pl Script

This script can do offline bundle installation.

For normal upgrades, just use /root/upgrade.bash (if it is available). For **specific kinstall actions** you want to accomplish, please use the lf\_kinstall.pl script you downloaded in /root:

```
# cd /root
# ./lf_kinstall --lfver 5.4.9 --some_action
```

For a full installation of **release 5.4.9**, you can use this command:

```
./lf_kinstall.pl --do_all_ct --lfver 5.4.9
```

For **releases 5.4.1 and earlier** and/or different kernel versions, change the version numbers as needed by using the latest information from the [release download page](#).

**Example:** install with kernel 6.10.14+ with most options enabled:

```
./lf_kinstall.pl --do_all_ct --kver 6.10.14+ --lfver 5.4.9
```

Ensure the script **finishes without errors before you continue**. Please contact support if you have questions.

To see all **available options** use the following command:

```
# ./lf_kinstall.pl --help
```

For 19 and higher systems (gnome-3 based systems), the script will tweak the desktop settings if you are logged into the graphical desktop. If you are not logged in currently, just run the tweak commands next time you do log in (as user lanforge): /usr/local/bin/ctgnome.bash

## Reboot the machine

After a fresh (first time) installation, or any time you upgrade the Linux kernel, reboot the LANforge machine.



The machine will reboot to a black screen with a white login prompt.

Contact [Support](#) if you have any questions or notice problems with the install script.

## Installation Options

**i** You need Internet access to install LANforge for the first time.

### Installation Preparation:

**i** If you are installing LANforge on a pre-installed Linux system, your partition layout will have already been decided.

**You can only install an Interop system in this case.**

The partitions might be BTRFS or one large / **(root)** filesystem, and a LANforge kernel is no longer an option.

Fedora MATE 39 is currently the suggested OS. Please use this [Fedora MATE Spin ISO](#) to install Fedora. It has the most preinstalled packages.

During installation, format the system in ONE of these ways:

#### A

##### UEFI

Most modern computers default to UEFI. Some newer networking hardware might only be compatible with UEFI boot modes. UEFI can use GPT partitions.

#### B

##### BIOS

Many servers and embedded systems are configured as BIOS Compatibility Mode, which disables many UEFI features. Compatibility mode ensures that the Kernel signing and Trusted Platform Security are disabled, and uses only MBR partitions.

#### A:

##### UEFI Partitions

- 128 MB /boot/efi EFI partition
- 2 GB /boot partition (format ext4)
- 50 GB / partition (format ext4)
- 10+ GB /home partition (format ext4)

#### B:

##### BIOS Partitions

- 2 GB /boot partition (format ext4)
- 50 GB / partition (format ext4)
- 10+ GB /home partition (format ext4)

## Check network access

1. Log into LANforge machine as the `root` user, and open a terminal window.

```
# ping www.candelatech.com
```

2. Make sure you can reach `www.candelatech.com`:

If you are unable to reach `www.candelatech.com`, then possibly your machine:

- Did not get a DHCP address.
- Does not have the correct nameserver set.
- Lacks an Internet connection.

Please contact support.

## Have Perl Installed

```
# which perl
```

1. Check that you have `perl` installed:

If `perl` does not exist, you can install it:

- On Fedora: `yum install perl`
- On Ubuntu: `apt-get install perl`

```
# cd /root
```

2. Go to `root`'s home directory:

For CentOS 6, see [CentOS 6 Instructions](#).

For Ubuntu, see [Ubuntu Instructions](#).

## Choose one installation method:

### A

#### Interop Linux System

Able to run Layer 3-7 traffic without a special kernel or WiFi drivers.

### B

#### Full Kernel Linux System

Boots a custom LANforge kernel and comes with special WANlink modules and radio firmware.

### A: Interop Linux System:

An Interop LANforge system is can be any version of Linux and is recommended for machines that do not need a special kernel, WAN emulation, packet generation, or special radio firmware features.

**Choose Interop if you are unsure.**

1. Download `lf_kinstall.pl`:

```
$ wget https://www.candelatech.com/lf_kinstall.pl
```

2.

```
$ chmod +x lf_kinstall.pl
```

3.

```
$ sudo ./lf_kinstall.pl --lfver 5.4.9 --do_interop
```

### B: Install a Full Kernel Linux System

This option will transform your Linux system into the kind of LANforge system that resembles the systems we would ship you, including specialized kernel, radio firmware, and WAN emulation modules. This system must be **formatted correctly** beforehand.

1. Download `lf_kinstall.pl`:

```
$ wget https://www.candelatech.com/lf_kinstall.pl
```

2.

```
$ chmod +x lf_kinstall.pl
```

3.

```
$ sudo ./lf_kinstall.pl --lfver 5.4.9 --kver 6.11.11+ --do_all_ct
```

## Detailed Install Instructions

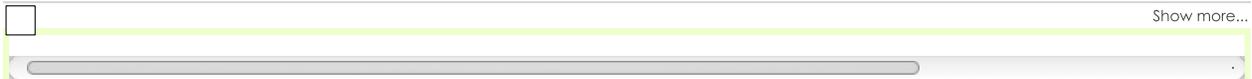
### Offline Install

**i**  The `lf_kinstall.pl` script will **stop with errors** when installing the first time without Internet access.

Do not attempt to install LANforge on a fresh system without Internet access.

### Historical Offline Upgrade

**Offline upgrade** means the LANforge system lacks access to the Internet. **We encourage you use modern LANforge Bundles for offline installation.** These instructions are a more detailed method of using `lf_kinstall.pl`, specifically how to download LANforge software for old releases.



### Most Recent Fedora Releases

If you get the latest version of Fedora, it will often be more recent than our validated Fedora target. If you are installing LANforge on the latest version of Fedora, you will probably discover that our packages are labeled one release behind the most recent Fedora release. Below is an example of doing an offline installation on Fedora 45:

**i** The installer has a switch for this: `--force_osver`

```
./lf_kinstall.txt --do_all_ct --force_osver F45 --lfver 5.4.9 --kver 6.11.11+ --source_dir /home/lanforge/Downloads
```

LANforge Server and GUI software is tested on recent Fedora versions, but it is not always possible to keep up with the latest version. In some cases, versions of Fedora have been inappropriate and those releases get skipped.

### CentOS 6 Installation



### Installing LANforge OpenWRT

With LANforge 5.3.8 and higher releases, LANforge has beta support for running on OpenWRT. So far, we only have images for the Netgear r7800 platform (dual 4x4 MU-MIMO radios). These platforms may be useful for testing with many lower-speed appliances to act like a full room of users, for instance.



### Upgrading LANforge OpenWRT



## Hardware Requirements

The LANforge-FIRE Network Traffic Generator configuration typically requires at least two Ethernet ports: one for network management and one for data-generation. The LANforge-ICE Network Emulator works best using a minimum of three Ethernet ports. Your unit's performance will be directly related to the CPU and memory as well as the quality of the ethernet hardware and PCIe bus. Candela Technologies suggests a minimum of 4GB RAM and a 1.2Ghz processor.

## Software Requirements

LANforge is best supported by Fedora Linux. For interop-style setups, we have packages for:

- Windows 10+
- Mac OS X
- Android
- iOS

Versions of Linux that lack brctl are not compatible as full LANforge resources. This means such systems would perform only as interop resources, not use a full LANforge kernel, and might have limitations on creating network interfaces.

- Red Hat 8, CentOS 8, CentOS Stream 8
- Red Hat 9, CentOS Stream 9

## Manually Installing a LANforge Linux Kernel

In offline environments this is occasionally necessary. Normally we suggest using the command `./lf_kinstall.pl --lfver VER --kver KVER --do_kern` command.

[See more...](#)

1. Download an appropriate pre-built kernel from the [downloads page](#).

## Manually Installing LANforge Server on Linux

### 1. Become root user

```
$ sudo su
```

Other commands work well: `sudo -s`, `su - root`

### 2. On Ubuntu, Redhat, CentOS

```
# ./lf_kinstall.pl --do_interop --lfver 5.4.9
```

Please use `./lf_kinstall.pl --do_interop --lfver 5.4.9`. That command will:

1. Create the lanforge account
2. Install required libraries
3. Install package dependencies.
4. Configure the desktop to use MATE.
5. Install xrdp and vnc servers.
6. Install LANforge GUI

### 3. Other Linux Systems

Follow these instructions if you have a Linux system installed and you want to run LANforge Server on it, but do not want to run `lf_kinstall.pl` to install all the required dependencies. **This is unlikely to work well.** If this doesn't work well, you might need to reinstall your OS to get it back to its former state. We suggest you:

1. Maintain current CandelaTech support so we can help you.

2. Backup your machine using a disk-image program like Ghost.

## Manual Steps

### 1. Create LANforge Accounts

You should create a lanforge user and install the LANforge software in that user's home directory. Use your preferred method, or use mine:

```
# adduser lanforae  
# passwd lanforae
```

### 2. Install LANforge Server

Copy the LANforaeServer-X.X.X Linux-XX.tar.gz file to some temporary directory and un-tar it with a command like:

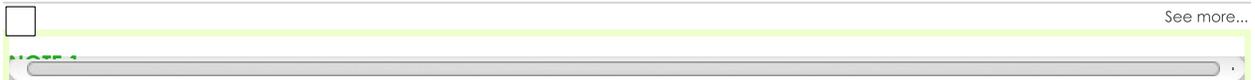
```
# tar -xvzf LANforaeServer-*_Linux-x86.tar.gz
```

That command should create a LANforaeServer-X.X.X directory, in which the distribution exists. Change to that directory as root, and you will find an install.bash file. Run this script:

```
# ./install.bash
```

## Configure LANforge Server using lfconfig

Use the /home/lanforge/lfconfig script to configure LANforge realm settings.



## Start LANforge Server

To start the LANforge server, **choose one** of the these methods as root:

- ```
# service lanforge start
```
- ```
# cd /home/lanforge; ./serverctl.bash start
```

## Installing LANforge Server on MacOS X

Installing LANforge server on Mac OS X



## Installing LANforge Server on Microsoft Windows



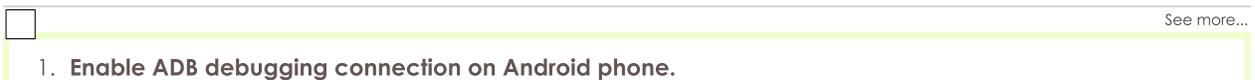
## Historical Windows Installation

Many LANforge traffic generation and network emulation features are available on Microsoft Windows operating systems. This section has details pertinent to the old install process on Windows.



## Installing LANforge Interop App on Android Devices

The LANforge Interop App running on an Android device gives ability to control the WiFi settings on most Android devices, generate TCP and UDP traffic, as well as do specialized traffic tests like using the Android web browser to download files and play movies.



## Installing LANforge Interop App on iOS Devices

The LANforge Interop App running on an iOS device gives ability to control the WiFi settings, generate TCP and UDP traffic, and do some types of Layer 4-7 generation. This functionality is offered for the iPhone 11 and all following generations. But has not yet been tested with the Apple iPad.

See more...

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1. **Connecting the iPhone to a LANforge System**

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## Upgrading LANforge Server Offline

The Candela Technologies Linux kernel can be downloaded and expanded from archive. We prefer you to use `upgrade.bash` for normal upgrading.

See more...

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1. **Check the release notes for special instructions:**

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## Upgrade the Linux Kernel Offline

Sometimes it is necessary to upgrade the Linux kernel in an offline environment.

See more...

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1. **Upgrade the LANforge kernel as root:** Generally, the kernel version should be upgraded to match the

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## Upgrading LANforge Server on Microsoft Windows

See more...

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To upgrade your LANforge server from an existing Windows installation, follow these instructions:

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## Appendix

Various techniques below.

### Discover Interface Names

```
# ip -br link show
```

You can learn your interface names with the command:

For fresh installs, on Fedora 15 and higher, you may wish to change the network device names from the bus enumeration style (`p1p2`) to classic Linux style (`eth0`). If so, edit the `/etc/udev/rules.d/70-persistent-net.rules` file. You will also need to rename and edit the corresponding `/etc/sysconfig/network-scripts/ifcfg-*` files to match the new names. When done, reboot to make sure the system comes back up with the specified kernel and with properly named network interfaces.

### Configure the Management Network Interface

Choose one of the methods below to configure your management interface:

See more...

---

1. **Using ifconfig**

---

#### Using `if_install.pl` one-liner:

Show more...

---

It is possible to run `if_install.pl` using a `perl/curl` one-liner. This syntax is noted for reference, and we don't encourage this.

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## Support

If you have a problem not answered here, please contact Candela Technologies technical support at [support@candelatech.com](mailto:support@candelatech.com).

