# Upskilling Plan Schedule

After the proposal is submitted on Friday 4th April 2025, and assuming it is accepted at the proposal presentation during the following week, the team will have approximately two weeks of uninterrupted time for upskilling.

This upskilling plan covers the two-week period following proposal acceptance (approximately 5th-19th April 2025). Team members should self-study using these resources and collaborate to share knowledge where individual expertise exists.

## Plan

**Weekly Schedule**

**Week 1: Fundamentals & Environment Setup**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Day | Focus Area | Resources | Priority | Expected Outcomes |
| 1 | **Environment Setup** | * WSL (Windows users): <https://learn.microsoft.com/en-us/windows/wsl/install> * Homebrew (Mac users): <https://brew.sh/> * Asahi Linux (Mac users): <https://asahilinux.org/> | High | Working Linux environment ready for practice |
| 2-4 | **Linux Fundamentals** | * Linux Journey: <https://linuxjourney.com/> * LinuxCommand.org: <https://linuxcommand.org/> * Command Line for Beginners: <https://www.freecodecamp.org/news/command-line-for-beginners/> | High | Comfortable with basic Linux navigation and commands |
| 5 | **Networking Basics** | * <https://www.freecodecamp.org/news/computer-networking-how-applications-talk-over-the-internet/> * <https://www.freecodecamp.org/news/linux-networking-commands-for-beginners/> * <https://www.freecodecamp.org/news/osi-model-networking-layers-explained-in-plain-english/> | Medium | Revised understanding of basic networking concepts |

**Week 2: Advanced Topics & Tool Familiarisation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Day | Focus Area | Resources | Priority | Expected Outcomes |
| 6-8 | **Linux as a Router** | * <https://fedoramagazine.org/use-fedora-server-create-router-gateway/> * <https://www.ibm.com/docs/en/linux-on-systems?topic=3-linux-as-router> * <https://www.computernetworkingnotes.com/linux-tutorials/how-to-configure-and-use-linux-as-a-router.html> * <https://www.baeldung.com/linux/server-router-configure> * <https://medium.com/@lfoster49203/setting-up-ubuntu-as-a-router-with-advanced-routing-features-4511abc5e1eb> * <https://www.tecmint.com/setup-linux-as-router/> * <https://wiki.archlinux.org/title/Router> | High | Ability to configure basic routing between subnets |
| 9-10 | **Testing Tools** | * D-ITG: <https://github.com/jbucar/ditg> * iPerf: <https://iperf.fr/> | High | Familiarity with installing and using network testing tools |

**Focus Linux Distributions**

|  |  |  |  |
| --- | --- | --- | --- |
| Distribution | Description | Use Case | Package Manager |
| Ubuntu | Based on Debian Unstable; beginner-friendly | Desktop use, beginners | APT |
| Fedora | Upstream for Red Hat Enterprise Linux; bleeding edge | Desktop use, beginners | DNF |
| Kali | Based on Debian Testing; security-focused, for penetration testing | Penetration testing | APT |

**Extended Learning (Optional)**

For team members who complete the core curriculum ahead of schedule:

|  |  |  |  |
| --- | --- | --- | --- |
| Resource | Description | Value | Time Investment |
| Linux From Scratch | Build your own Linux distro  <https://www.linuxfromscratch.org/lfs/> | Deep understanding of Linux internals | High |
| GNU/Linux Desktop Survival Guide | Desktop Linux usage guide  <https://www.togaware.com/linux/survivor/> | Improved daily workflow | Medium |
| Red Hat Certifications | Industry-recognised qualifications  <https://www.redhat.com/en> | Professional development | High |

**Collaboration Guidelines**

* **Daily Check-ins**: Brief daily updates on progress and challenges
* **Knowledge Sharing**: Schedule sessions where team members can teach others about areas of expertise
* **Troubleshooting**: Document common issues and solutions for team reference
* **Practical Testing**: Set up small test networks to apply theoretical knowledge

**Progress Tracking**

Team members should track their progress through this plan in their logbook, noting:

* Completed resources
* Skills mastered
* Areas requiring additional focus
* Questions for team discussion

This approach ensures a structured yet flexible learning experience that prepares the team for successful project implementation.

## Resources

General Resources:

Linux From Scratch: <https://www.linuxfromscratch.org/lfs/>

Build your own Linux distro to learn more about how Linux works.   
Tangentially related to the project, time-consuming, but might be worth your time.

Linux Journey: <https://linuxjourney.com/>

Beginner guides and tutorials for Linux. A good free resource with which to start.

Arch Wiki: <https://wiki.archlinux.org/>

The Arch Linux wiki houses a ton of useful Linux information.

A lot of the information isn’t Arch-specific and can easily be applied to other distros.

FreeCodeCamp: <https://www.freecodecamp.org/>

Contains tons of free tutorials from industry professionals. Videos and written guides on many subjects, including Linux and networking.

LinuxCommand.org: <https://linuxcommand.org/>

A guide to the Linux Command Line and shell scripts.

GNU/Linux Desktop Survival Guide: <https://www.togaware.com/linux/survivor/>

Tangentially related to the project but contains some good information if you want to use Linux as a regular operating system on your machine.

Linux as a router (Fedora): <https://fedoramagazine.org/use-fedora-server-create-router-gateway/>

A guide on configuring Fedora Server as a router gateway.

Windows Users:

WSL: <https://learn.microsoft.com/en-us/windows/wsl/install>

Virtual machine package that runs Linux on and integrates into Windows.

WSL terminals can then be run to use Linux packages like a native OS.

Can be installed from the Windows Store for ease, and multiple distros can be installed at once.

Mac Users:

Homebrew: <https://brew.sh/>

Linux-like package manager that runs in Terminal and allows CLI (“Command LIne”) packages such as iPerf or nmap to be installed easily.

Asahi Linux: <https://asahilinux.org/>

Dual-boot Linux support for Apple Silicon Macs. There are multiple distros to choose from, with the flagship being Fedora Asahi Remix, based on Fedora Linux.

Linux Distros:

Distros in bold are the focus operating systems for this project. However, it is worth researching their derivates and upstream versions where applicable, as this may give you a better understanding of these Linux distros.

**Fedora Linux**: <https://fedoraproject.org/>

Fedora is effectively the unstable version of Red Hat Enterprise Linux (which is owned by IBM). It has become Red Hat’s testbed and upstream distro in recent years. Works well for general users.

Uses the DNF package manager, which is considered slow but powerful.

Debian: <https://www.debian.org/>

A stable, point-release Linux distro often used for servers. Binaries and packages on Debian aren’t usually the latest versions as a trade-off for stability.   
Uses the APT (“Advanced Package Tool”) package manager, which is used by many other distros.  
Its versions are named after Toy Story characters.

Rocky Linux: <https://rockylinux.org/>

Based on Fedora and Red Hat Enterprise Linux; the spiritual successor to CentOS. Often used for servers and has long-term support.

**Ubuntu**: <https://ubuntu.com/>

Based on Debian Unstable (aka Debian Sid), Ubuntu is a popular distro for general use and great for beginners. It is also a commercialised distro – while it is free to use, Ubuntu’s parent company Canonical offers various upsells, especially for enterprise.

Red Hat Enterprise Linux: <https://www.redhat.com/en>

Also known as RHEL (pronounced “rall”, as in “rally”), Red Hat Enterprise Linux has been the de-facto enterprise server OS for many years.   
Red Hat was purchased by IBM, with both companies earning a controversial reputation over the years.   
Red Hat Enterprise Linux is typically a paid-only Linux distro.  
Despite all of this, you can make a free Red Hat account, earn industry-recognised Red Hat certifications, and even get a free individual subscription (i.e. not for commercial use) to use RHEL.

**Kali Linux**: <https://www.kali.org/>

Designed for penetration testing. Usually comes pre-installed with a lot of hacking tools, making it quick and easy to start penetration testing.

Based on Debian Testing, which is the stage between Debian Stable and Debian Unstable.

Tools:

Tools in bold are the focus of this project. However, D-ITG may cause problems (particularly on Fedora) because it is outdated by 8 years. Other tools are listed to give you points of comparison in terms of how networking tools work and when to use which tool.

**iPerf**: <https://iperf.fr/>

“iPerf3 is a tool for active measurements of the maximum achievable bandwidth on IP networks.”  
Could be a good choice for the primary tool.

**D-ITG**: <https://github.com/jbucar/ditg>

“D-ITG is a platform capable to produce traffic at packet level accurately replicating appropriate stochastic processes for both IDT (Inter Departure Time) and PS (Packet Size) random variables.”

Nmap: <https://nmap.org/>

“Nmap ("Network Mapper") is a [free and open source](https://nmap.org/npsl/) utility for network discovery and security auditing.”

qperf: <https://github.com/rbruenig/qperf>

“A performance measurement tool for [QUIC](https://quicwg.org/) similar to iPerf.”

Netperf: <https://hewlettpackard.github.io/netperf/>

“Netperf is a benchmark that can be used to measure the performance of many different types of networking. It provides tests for both unidirectional throughput, and end-to-end latency.”  
Could be a good choice for the primary tool.

sockperf: <https://github.com/Mellanox/sockperf>

“sockperf is a network benchmarking utility over socket API that was designed for testing performance (latency and throughput) of high-performance systems.”  
Could be a good choice for detailed latency and jitter analysis.

My Traceroute: <https://www.cloudflare.com/learning/network-layer/what-is-mtr/>

“My Traceroute, or MTR, combines traceroute and ping to measure a network path's health.”

Wireshark: <https://www.wireshark.org/>

“The world's most popular network protocol analyser.”