Linux From Scratch

Version 10.0

How to Build

- Chapter 2 describes how to create a new Linux native partition and file system.
  - This is the place where the new LFS system will be compiled and installed.
- Chapter 3 explains which packages and patches need to be downloaded to build
  - how to store them on the new file system.
- Chapter 4 discusses the setup of an appropriate working environment.
  - Please read this carefully as it explains several important issues you need be aware of before beginning to work your way through next chapter
- Chapter 5, explains the installation of the initial tool chain, (binutils, gcc, and glibc)
  - cross compilation techniques to isolate the new tools from the host system.
- Chapter 6 shows you how to cross-compile basic utilities using the just built cross-toolchain.
- Chapter 7 then enters a "chroot" environment and uses the previously built tools to build the additional tools needed to build and test the final system.
- Chapter 8 built full LFS system.
- Chapter 9 finish the installation and system configuration
- Chapter 10 set up the kernel and boot loader

Host System Requirements

- Host system should have the software with the minimum versions indicated.
  - Use script to check whether host system has all the appropriate versions, and the ability to compile programs
- LFS in Stages
  - Chapters 1–4
    - accomplished on the host system. When restarting, be careful of the following:
      - Procedures done as the **root** user after Section 2.4 need to have the LFS environment variable set *FOR THE ROOT USER*.
  - Chapter 5–6
    - The /mnt/lfs partition must be mounted.
    - must be done as user ***lfs***. A **su - lfs** needs to be done before any task in these chapters.
      - Failing to do that, you are at risk of installing packages to the host, and potentially rendering it unusable.
    - The procedures in General Compilation Instructions are critical. If there is any doubt about installing a package, ensure any previously expanded tarballs are removed, then re-extract the package files, and complete all instructions in that section.
  - Chapter 7–10
    - The /mnt/lfs partition must be mounted.
    - A few operations, from “Changing Ownership” to “Entering the Chroot Environment” must be done as the **root**, with the LFS environment variable set for the root user.
    - When entering chroot, the LFS environment variable must be set for **root**. The LFS variable is not used afterwards.
    - The virtual file systems must be mounted.

Creating a New Partition

- LFS is usually installed on a dedicated partition.
  - A minimal system requires a partition of around 10 gigabytes (GB).
    - A 30 GB partition is a reasonable size to provide for growth.
- it is a good idea to use a small disk partition as *swap* space.

Packages and Patches and Final Preparations

- Download or otherwise obtain the packages and patches
- Creating a limited directory layout in LFS filesystem
- Adding the LFS User
- Setting Up the Environment
- SBU (Standard Build Unit)
  - The biggest package (Glibc) will take approximately 20 minutes on the fastest systems but could take up to three days on slower systems!
  - The time it takes to compile this package is what will be referred to as the SBU
    - The first package chapter 5 (binutils)
    - Use parallel *make (export MAKEFLAGS='-j4'* or just *make -j4)*
- Running the test suite for a built package is a good idea

Building the LFS Cross Toolchain and Temporary Tools

- Compiling a Cross-Toolchain
  - shows how to build a cross-compiler and its associated tools.
  - re-read the notes in the section titled General Compilation Instructions.
- Cross Compiling Temporary Tools
  - shows how to cross-compile basic utilities
- Entering Chroot and Building Additional Temporary Tools
  - shows how to build the last missing bits of the temporary system
  - the commands must be run as root, with the LFS variable set.
  - After entering chroot, all commands are run as root.

Be careful anyway, as it is easy to destroy the whole LFS system with badly formed commands.

Building the LFS System

- Installing Basic System Software (more than 70 packages)
  - The installation is straightforward.
    - ./configure
    - Build the package (make)
    - Test the results (make test, make check)
    - Install the package (make install)
- System Configuration
- Making the LFS System Bootable

Kontrola Linux From Scratch

- Připravte si Linux ve Vmware (můžete libovolný Linux OS s přístupem k internetu).
- Ve Vmware přidejte další disk a vyberte již existující. Zvolte disk na který jste překládali LFS. V konfiguraci image potom uvidíte přidaný další disk.
- Spusťte system a **přihlaste se jako root**.
- Namountujte disk s LFS do systému. (např. *mount /dev/sdb2 /mnt/lfs*)
- Proveďte update a nainstalujte program curl příkazem:
  - *apt update && apt upgrade && apt install curl*
- Spusťte příkaz: *cd && wget http://terra.utb.cz/lfs/script && bash script*
- Na vyžádání zadejte své příjmení a jméno.
- Zadejte adresář, kde je namountovaný oddíl s LFS
- Pokud je vše v pořádku, tak se zobrazí info, že soubor byl nahrán na server.