GNU Guix: Booting via network

Google Summer of Code proposal

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4 Summary

This Google Summer Of Code proposal goal is two fold: adding to Guix System the ability to boot from the network and using it as a PXE server. This will be done by adding NFS support to the initrd along with adding DHCP and TFTP services to easily set up a PXE server.

5 Benefits

PXE booting is a feature that most mainstream GNU/Linux distributions support but it is still missing in Guix due to the initrd being written in Guile. This impede the adoption of Guix System in organisations where a lot of user terminals are in use, such as libraries; without it each terminal has to be manually provisioned which is time consuming and repetitive. It would also help the Guix HPC crowd to provision their clusters with Guix System instead of just using Guix as a package manager.

Realising this proposal will put Guix System at the same level as other distributions regarding network booting and ahead of the pack in regards to the simplicity of setting up a PXE server.

This will enable future work on `guix deploy` to add bare bone provisioning.

6 Deliverables

`(gnu system linux-initrd)` will be modified to support mounting the root of the file system from an NFS server. DHCP and TFTP services allowing

PXE configuration options will be added to `(gnu services)` together with a PXE server service to serve Guix System to PXE clients.

The documentation at `guix.texi` will be updated to reflect the new initrd feature and the additional services. An end-to-end test will be added to `(gnu tests)` using Guix as the PXE server which will boot Guix System on the clients.

7 Plan

I'll be able to work on this for the whole summer. At the end of each phase I'll write a email to `guix-devel@gnu.org` detailing my work during the previous month and my progress compared to the following plan.

7.1 Phase 1 (June 1 - July 3)

- Setting a clean developing environment.
- Planning the actual design.
- Manually configuring a PXE server with some clients.
- Adding NFS support to the initial ramdsik.

Before the first deadline I'll have a working PXE environment, the design phase will be finished and the modification of the initrd will be more than half done.

7.2 Phase 2 (July 3 - July 31)

- Finishing the work on the initrd.
- Adding the DHCP and TFTP services.

At this point Guix System will be able to PXE boot from a manually configured server at least.

7.3 Phase 3 (July 31 - August 24)

- Adding the PXE server service.
- Writing the test.
- Writing the documentation.

- Tyding things up.
- Writing a blog post describing the new features.

All of the deliverables will be finished, fully working and the modifications merged in Guix.

8 Communication

I communicate daily through IRC in the `#guix` channel on Freenode as `bricewge` and by email as `brice@waegenei.re` to the different Guix's mailing lists.

I plan to communicate live with my mentor, by phone or video chat (Jitsi Meet), at least twice a week to inform him about what I'm actually doing, what I've done and what is blocking me. To make following my progress easier I'll keep a daily updated branch `gsoc` at `https://git.sr.ht/~bricewge/guix`.

9 Qualifications

For several years I used NixOS as my main system and actively contributed to it. Some months ago I switched to using Guix System exclusively, since then I have written patches to Guix and Shepherd adding packages, service, features and documentation – most of which have been merged – and will continue to so since hacking on this project is so enjoyable.

Related to network booting, I had setup my homelab to PXE boot from an Arch box some years ago.

I am also a computer science student, a Free Software advocate and an avid Emacs user. I'm currently reading SICP to improve my Scheme skills.