debuginfod

and its interaction with the Yocto Project

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debuginfod

- What is debuginfod? debuginfod is a daemon turns a machine that holds debug artifacts into file server for easier debugging. Tools such as gdb, valgrind, and systemtap utilize debuginfod.

- Why use it? Debug info is too big to be stored locally on the target devices. Different versions of binaries exist, so corresponding debug info is fethced automatically with gdb.

Installing debuginfod

There are two ways to install on a Ubuntu machine:

- Upgrade to Ubuntu 22.04
- append the "impish" package to `/etc/apt/sources.list` by appending the following line:

```
deb http://archive.ubuntu.com/ubuntu impish main restricted universe multiverse
```

Setting up and using debuginfod

Starting the debuginfod server:

- To start the file server, simply run `debuginfod -F`. Different arguments will search for different debug artifacts (`-F -R -U`)
  - -F sets file scanning for ELF/DWARF artifacts.
  - -R sets file scanning for RPMs
  - -U sets file scanning for .deb
- Providing a path to a directory will point debuginfod where to scan for the debug artifacts.
- debuginfod must initially scan the pointed directory for debug artifacts. A rescan is done every 300 seconds but this can be changed with the `-t` option

```
debuginfod -t 30 -F /home/dylan/debug_info
```

Setting up and using debuginfod (cont.)

On the developers machine:

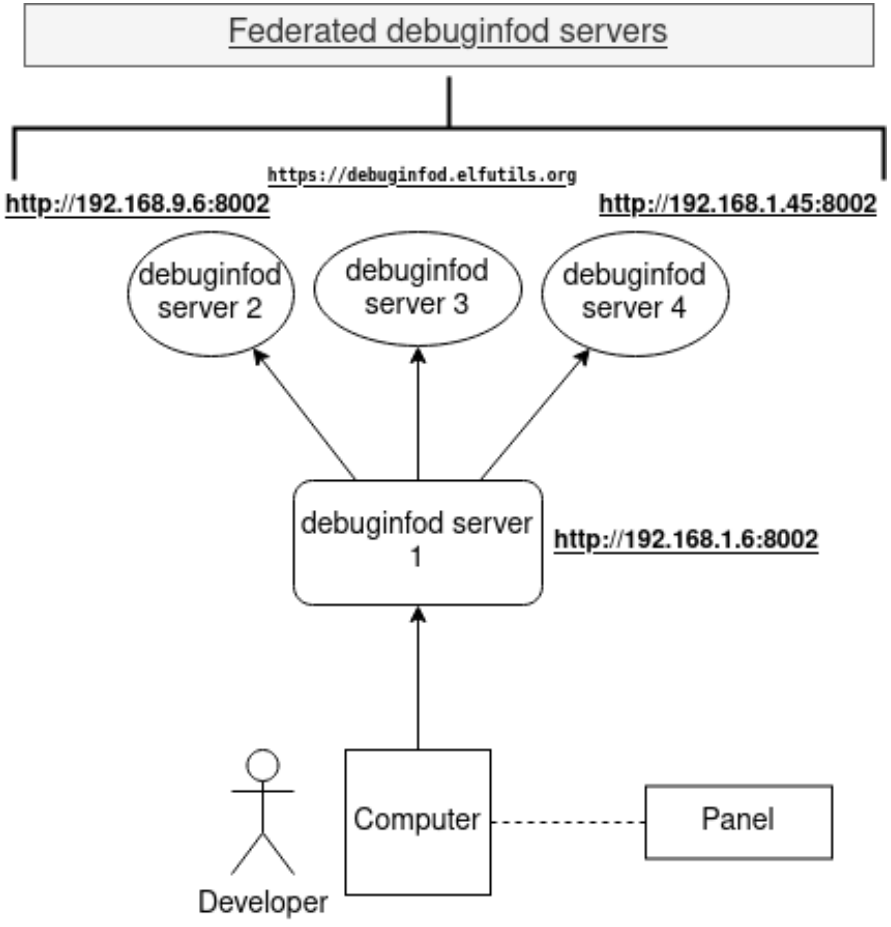
- set environment variable `DEBUGINFOD_URLS`to the ip address of the file server, prefixed by `http://` and suffixed by the port number defaulted to `:8002`, which can be changed by `-p [port num]`

```
export DEBUGINFOD_URLS="http://ip_addr:8002"
```

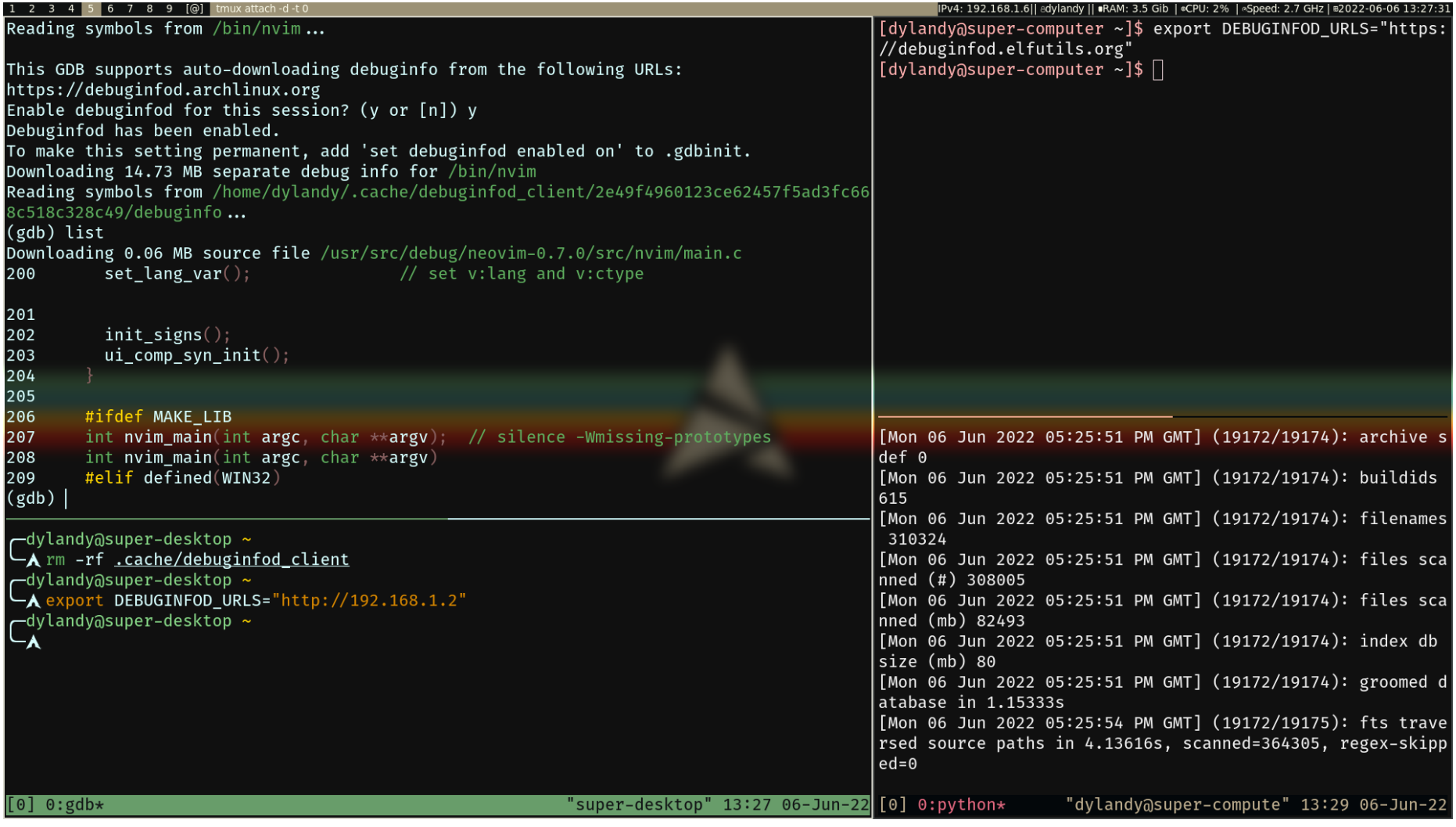
- gdb will now query the given debuginfod server for the debug info via Build-ID and download it to the machines `~/.cache/debuginfod_client/` directory, where it will be sorted by Build-ID

Federating debuginfod servers

Adding multiple URLs to the environement variable can become cumbersome. Federating debuginfod servers can simplify the proccess by having one debuginfod server query other servers if it does not contain the requested artifacts.



Federeating debuginfod servers (cont.)



debuginfod-find

- The `debuginfod-find` command allows the retrieval of debug artifacts, binary executables, or sources without the use of gdb. The command simply calls for the type of file to query and retrieve and the path to the binary or Build-ID. Additionally if a source is requested the path to the source also must be provided.

```
debuginfod-find [debuginfo/executable/source] [path/to/file or Build-ID] [path/to/source]
```

- The requested file will be stored in the same directory as a normal successful debuginfod query.
- Source files will be named by their path, with "##" in place of "/".

```
~/.cache/debuginfod_client/[Build-ID]/path##to##source.c
```

debuginfod with the Yocto Project

For versions after 3.4(honister) debuginfod is built into the Yocto Project. Only 2 changes need to be made to `local.conf` in order for debuginfod to

1. `PACKAGECONFIG_pn-elfutils-native="debuginfod libdebuginfod"`
    - From the elfutils package that is for the target device, enable the recipe feature of debuginfod and libdebuginfod.
2. `DISTRO_FEATURES += "debuginfod"`

debuginfod with the Yocto Project (cont.)

- Yocto has a built-in wrapper script around debuginfod that ensures the same versions are used so that the target device is able to query the server properly.
- Source paths is the concatination of `usr/src/debug/..` (which is set by standard) and the binary's `$WORKDIR/[package]` or simply `$PKGD`
- An easy way to find the source path is to use gdb to retrieve the binary with debug symbols. Then run the `list` in gdb in which the source path will be displayed.

Demo

Demo