Bedrock Linux (1.0beta2 Nyla)

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2014-11-19

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Table of Contents

Notice

- The content here describes the as yet unreleased Bedrock Linux 1.0beta2 Nyla.
- Everything is subject to change.

Motivation

Motivation — Debian/RHEL clones

- Debian and RHEL clones are stable.

Motivation — Arch Linux

- Arch Linux provides cutting-edge packages.

Motivation — Ubuntu

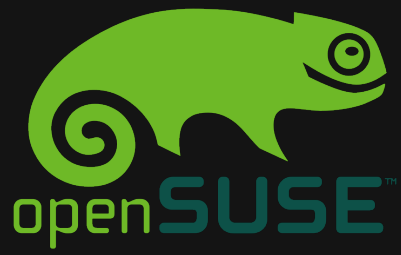
- Ubuntu is very popular.
  - Very commonly supported/targeted by third parties such as Valve.

Motivation — Gentoo

- Gentoo can automatically compile packages from source with various preferences set.

Motivation — OpenSUSE

- OpenSUSE has great out-of-the-box KDE support.



Motivation — Rebecca Black OS

- Rebecca Black OS has/had early support for Wayland.

Motivation — Bedrock Linux

Bedrock Linux can use software from other distros such that most of it "just works".

- ✓ Debian/RHEL rock solid stable base?
- ✓ Arch's cutting edge packages? AUR?
- ✓ Gentoo's compilation automation options?
- ✓ Ubuntu's Unity? Mint's Cinnamon? OpenSuSE's KDE?
- ✓ Your-favorite-distro's your-favorite-feature?

All at the same time, transparently, cohesively.

Real-world examples

Real-world examples — Compiz/Xorg

- Debian's `compiz` works, but `xorg` is to old for new laptop
- Arch's `xorg` is good, but `compiz` is broken?
- So get `compiz` from Debian, `xorg` from Arch
- Yes, that just works under Bedrock Linux

Real-world examples — Easy Update

- New printer, old CUPS
- Get new CUPS
  - `# apt-get remove cups && pacman -S cups`

Real-world examples — Easy Fallback

- GNU `info` 5.2 broke piping
- Stick with 5.1
- `# printf '#!/bin/sh\nbrc heisenbug info\n' > /bedrock/bin/info && chmod a+rx /bedrock/bin/info`

Real-world examples — Rare packages

- The `sage` mathematics package is only in the repos for one distro - Arch
- So get it from Arch.

Terminology

Terminology — Stratum

- All of the files and processes are categorized into strata.
- Strata are *often* one-to-one with distro releases
  - Debian Wheezy stratum
  - Arch stratum
  - Fedora Heisenbug stratum
  - Slackware 14.1 stratum

Terminology — Stratum

- There are four strata attributes:
  - local stratum
    - The stratum providing a given file or processes.
  - pid1 stratum
    - The stratum providing the PID 1 process.
  - global stratum
    - The stratum providing the global files
  - root stratum
    - The stratum providing the /bedrock files
- These are not mutually exclusive - one stratum could have all of these attributes.

Terminology — Local Files

- Files which could potentially conflict
  - `/etc/apt/sources.list`
  - `libc.so.6`
- Bedrock Linux avoids conflicts by having multiple instances of potentially conflicting local files.
- The instances are differentiated by strata
  - wheezy `/etc/apt/sources.list`
  - trusty `/etc/apt/sources.list`

Terminology — Explicit Local Access

- Explicitly specify desired stratum
- Execute:
  - `$ brc <stratum> <command>`
- Read/Write:
  - `/bedrock/strata/<stratum>/<file path>`
  - `/bedrock/clients/` `wheezy` `/etc/apt/sources.list`

which stratum

explicit access

which file/filepath

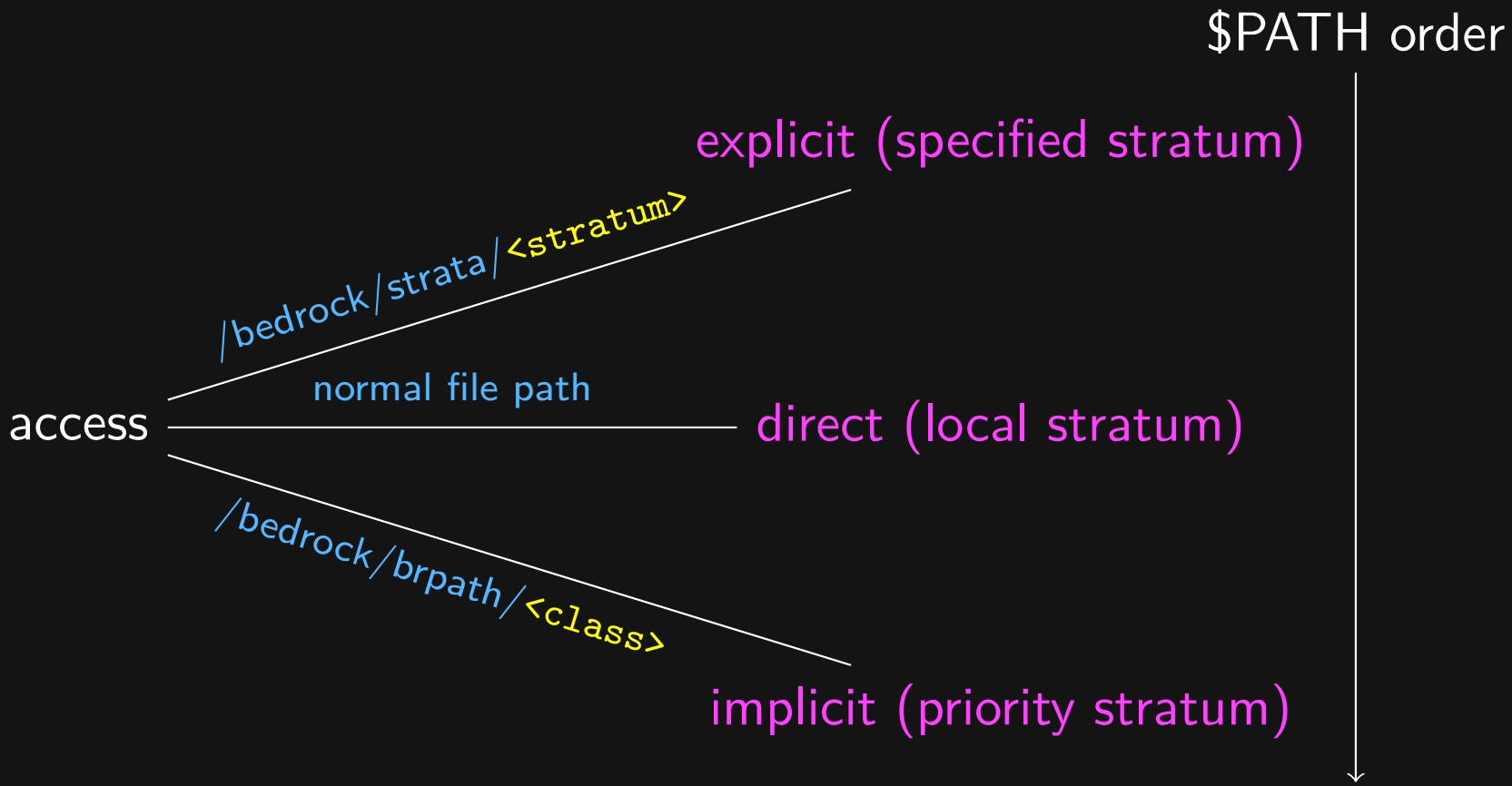
Terminology — Direct Local Access

- Specify local stratum
- Normal file path

Terminology — Implicit Local Access

- Any stratum which can provide local file
- `/bedrock/brpath/<class>/<file name>`
- `/bedrock/brpath/bin/pacman`
  - `/bedrock/brpath/` — implicit access
  - `bin` — class
  - `pacman` — file name
- Optionally specify priority in `/bedrock/etc/brp.conf`

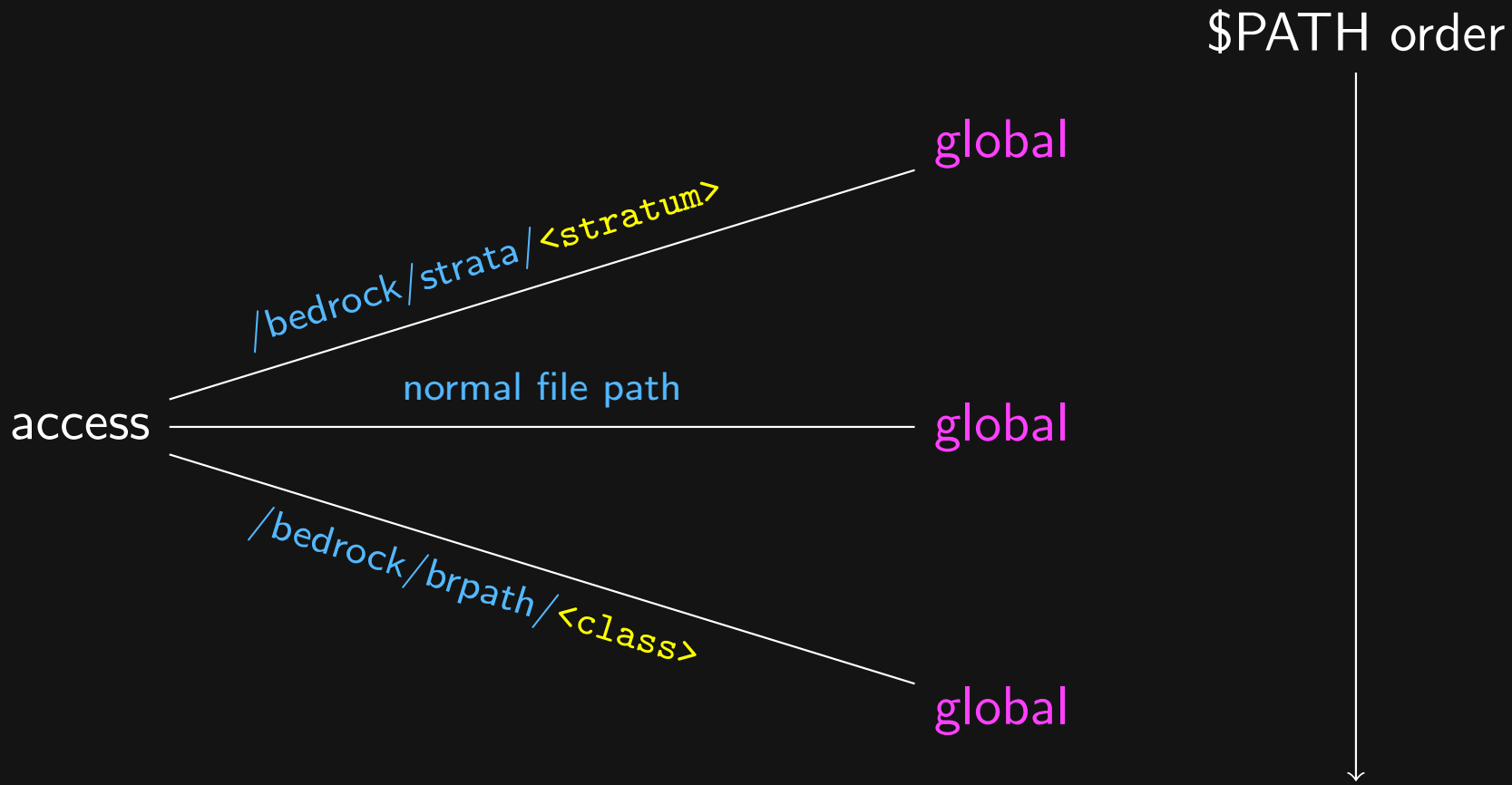
Terminology — Access local graph



Terminology — Global Files

- Files which need to be accessible everywhere for things to "just work".
  - `/etc/passwd`
  - `/var/run/`
  - `/home/`

Terminology — Access global graph



Terminology — Singletons

- Singletons are things which you can only have one of at a time.
- Examples:
  - kernel
  - PID 1 (init)
  - bootloader
- Can use a singleton from any stratum, but only one at a time.
- Switch with a reboot.

Terminology — Singletons

- Don't like `systemd`?
  - `openrc` straight from Gentoo
  - `bsd-style init` straight from Slackware.
  - Or `runit`, `s6-init`, `cinit`, `uselessd`, `nosh`, etc
- Like `systemd`?
  - Use a cutting-edge one from `Arch` or `Fedora`
  - If it breaks, reboot into a more proven release from Debian or CentOS
    - while keeping everything but the init the same - same home files, same DE, same everything.

General usage

General usage

- Day-to-day usage “feels” like every other distro.
- Run commands, edit files. Don’t have to do anything differently for Bedrock Linux.
- However, there are Bedrock Linux-specific things every so often.

General usage — Managing strata

To add a stratum <foo>

1. Get stratum's files into: /bedrock/strata/<foo>
   - Install distro in a VM or bare metal, then copy or move or mount over.
   - Use something like debootstrap/pacstrap/febootstrap/gentoo-stage3.
   - Use brg utility (planned for future release).
2. Create stratum's configuration file.
   - Create default: # echo "framework = default" > /bedrock/etc/strata.d/foo.conf.disabled
   - Don't have to use default, can configure as desired.
3. Enable stratum
   - # brs up <foo>

Can now use files commands from stratum.

General usage — Managing strata

Removing a stratum <foo>.

1. Disable stratum.
   - `# brs down <foo>`
2. Remove stratum's files.
   - `# rm -r /bedrock/strata/<foo>`

General usage — Managing strata

What are the enabled strata?

- `$ bri -l`
  - `arch`
  - `heisenbug`
  - `jessie`
  - `sid`
  - `trusty`
  - `trusty32`
  - `wheezy`

General usage — Managing strata

Which stratum's executable will run if I just run the executable?

- `$ bri -w vim` (or just `$ brw vim`)
  - `wheezy (direct)` → running directly, will run Debian Wheezy's version (i.e. calling process is also from Debian Wheezy).

General usage — Managing strata

Which stratum is providing current process?

- `$ bri -n` (or just `$ brw`)
  - `wheezy` → calling process is from Wheezy stratum.
  - Bedrock Linux users often put this in their shell prompt.

General usage — Managing strata

Which stratum is providing the running process 3944?

- `$ bri -p 3944`
  - `3944 xterm (wheezy)` → Wheezy is providing process with pid 3944, which is `xterm`.
- Can also give executable name (will use `pidof` behind-the-scenes).
- `$ bri -p xterm`
  - `1679 xterm (wheezy)`
  - `3944 xterm (wheezy)`
  - `4810 xterm (wheezy)`

General usage — Managing strata

What processes are provided by the Arch stratum?

- `$ bri -P arch`
  - `2237 dbus-launch (arch)`
  - `2239 dbus-daemon (arch)`
  - `2900 firefox (arch)`

General usage — Managing strata

Lots of other things available, see `$ bri -h`

General usage — Managing strata

Run command in/from all strata: use brl

brl-implied explicit

- e.g.: `$ brl sha1sum /path/to/file`

  direct access

  - Check for file duplication across strata
- e.g.: `# brl -c "bri -w apt-get|grep \"(direct)\$\"" apt-get update`
  - Has every available version of `apt-get` run with `update` option.
- e.g.:
  `# bri -c "[ -e /var/lib/dpkg/statoverride ]" sh -c "echo -n \"\" > /var/lib/dpkg/statoverride"`
  - Empties the contents of `/var/lib/dpkg/statoverride` associated with every stratum that has one.

Planned for Nyla

Planned for Nyla — init

- Get init from any distro
  - `openrc`
  - `systemd`
  - `upstart`
  - `bsd-style`
  - `runit`
  - `s6-init`
  - `cinit`
  - etc
- Functional proof-of-concept done.

Planned for Nyla — Hijack install

- Convert a pre-existing traditional distro install into Bedrock Linux
- Will turn original install into a stratum
- Will *probably* support reverting to original install.
- Or drop original install's files and continue with Bedrock Linux
  - not installed "onto" pre-existing install

Planned for future

Planned for future — tab-completion

- Bedrock Linux comes with numerous (≈ 8) utilities which currently do not have tab completion support.
- We're working on tab completion for `bash` and `zsh`.
  - Should be quite possible to add support for other shells (e.g.: `fish`) if there is interest.

Planned for future — brg

`brg`: "BedRock linux Get stratum"

- Acquiring files for a stratum a bit of work.
- `brg` will automate the process.
- Ideally, one command to acquire stratum, setup, and enable stratum. Next command can then be command from stratum.

Planned for future — pmm

`pmm`: "package manager manager"

- Will abstract away differences between package managers.
- Examples:
  - `$ pmm install arch firefox`
    - Install `firefox` from Arch stratum.
  - `$ pmm install any sage-mathematics`
    - Install `sage-mathematics` from first stratum found which provides `sage-mathematics`.
  - `$ pmm install newest libreoffice`
    - Install `libreoffice` from stratum which provides newest version of `libreoffice`.

More information

- Website: `http://bedrocklinux.org`
- IRC: #bedrock on freenode