Bedrock Linux (1.0beta2 Nyla)

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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.
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 too 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
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.
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`
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`
- Optionally specify priority in `/bedrock/etc/brp.conf`
Terminology — Access local graph

- **Access**
  - **normal file path**
    - `/bedrock/strata/<stratum>`
  - **direct (local stratum)**
  - **implicit (priority stratum)**
    - `/bedrock/brpath/<class>`

**$PATH$ order**

- **explicit (specified stratum)**
Files which need to be accessible everywhere for things to “just work”.

- /etc/passwd
- /var/run/
- /home/
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.
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.
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.
Removing a stratum `<foo>`.

1. Disable stratum.
   - `# brs down <foo>

2. Remove stratum’s files.
   - `# rm -r /bedrock/strata/<foo>`
What are the enabled strata?

▶ $ bri -l
  ▶ arch
  ▶ heisenbug
  ▶ jessie
  ▶ sid
  ▶ trusty
  ▶ trusty32
  ▶ wheezy
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).
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.
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)
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
Run command in/from all strata: use brl

brl-implied explicit

▶ e.g.: $ brl sha1sum /path/to/file

▶ 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
Bedrock Linux comes with numerous ($\approx 8$) 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