Reproducible interpreted scripts

Contents

In this tutorial, you will learn how to use Nix to create and run reproducible interpreted scripts, also known as shebang scripts.

Requirements

- A working Nix installation
- Familiarity with Bash

A trivial script with non-trivial dependencies

Take the following script, which fetches the content XML of a URL, converts it to JSON, and formats it for better readability:

```
#! /bin/bash

curl https://github.com/NixOS/nixpkgs/releases.atom | xml2json | jq .
```

It requires the programs `curl`, `xml2json`, and `jq`. It also requires the `bash` interpreter. If any of these dependencies are not present on the system running the script, it will fail partially or altogether.

With Nix, we can declare all dependencies explicitly, and produce a script that will always run on

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The script

A shebang determines which program to use for running an interpreted script.

We will use the shebang line `#!/usr/bin/env nix-shell`.

`env` is a program available on most modern Unix-like operating systems at the file system path `/usr/bin/env`. It takes a command name as argument and will run the first executable by that name it finds in the directories listed in the environment variable `$PATH`.

We use `nix-shell` as a shebang interpreter. It takes the following parameters relevant for our use case:

- `-i` tells which program to use for interpreting the rest of the file
- `--pure` excludes most environment variables when the script is run
- `-p` lists packages that should be present in the interpreter's environment
- `-I` explicitly sets the search path for packages

More details on the options can be found in the `nix-shell` reference documentation.

Create a file named `nixpkgs-releases.sh` with the following content:

```
#!/usr/bin/env nix-shell
#! nix-shell -i bash --pure
#! nix-shell -p bash cacert curl jq python3Packages.xmljson
#! nix-shell -I nixpkgs=https://github.com/NixOS/nixpkgs/archive/2a601aafdc5605a5133a2

curl https://github.com/NixOS/nixpkgs/releases.atom | xml2json | jq .
```

The first line is a standard shebang. The additional shebang lines are a Nix-specific construct.

We specify `bash` as the interpreter for the rest of the file with the `-i` option.

We enable the `--pure` option to prevent the script from implicitly using programs that may already exist on the system that will run the script.

With the `-p` option we specify the packages required for the script to run. The command `xml2json` is provided by the package `python3Packages.xmljson`, while `bash`, `jq`, and `curl` are provided by packages of the same name. `cacert` must be present for SSL authentication to

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> **Tip**
>
> Use search.nixos.org to find packages providing the program you need.

The parameter of `-I` refers to a specific Git commit of the Nixpkgs repository. This ensures that the script will always run with the exact same packages versions, everywhere.

Make the script executable:

```
chmod +x nixpkgs-releases.sh
```

Run the script:

```
./nixpkgs-releases.sh
```

Next steps

- Nix language basics to learn about the Nix language, which is used to declare packages and configurations.
- Declarative shell environments with shell.nix to create reproducible shell environments with a declarative configuration file.
- Garbage Collection – free up storage used by the programs made available through Nix