nuts, the Java Package Manager

https://thevpc.github.io/nuts

https://github.com/thevpc/nuts (git repo)

https://thevpc.github.io/nuts (website)

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thevpc, 2025-01-04

Plan

1. Why a package manager
2. `nuts` features
3. Demo

1. Why a Package Manager

- Popularity of a language is proportional to popularity of its PM
  - `Javascript`: `npm`/`npx`/`yarn`
  - `Python`: `pip`, `conda`
  - `Ruby`: `rubygems`
- Newcomer languages already include a PM
  - `golang` package manager (modules)
- `Java` ecosystem already have more than 7M packages deployed

1.1. Java Package Manager?

- `maven`, `gradle`
  - Build tools
  - Dependency-management tools
  - Poor package/deployment management (`maven` 's `deploy` is a build time stage)
  - Lack of deployment lifecycle (install/uninstall/update)

1.2. Example

Let's take a `hello-world` example with dependencies :

```
package net.thevpc.nuts.doc.baseproject;

import org.slf4j.Logger;
import org.slf4j.LoggerFactory;

public class Main {
private static final Logger LOG = LoggerFactory.getLogger(Main.class);
    public static void main(String[] args) {
        LOG.debug("A simple app with dependencies. Won't work out of the box!,
unless...");
    }
}
```

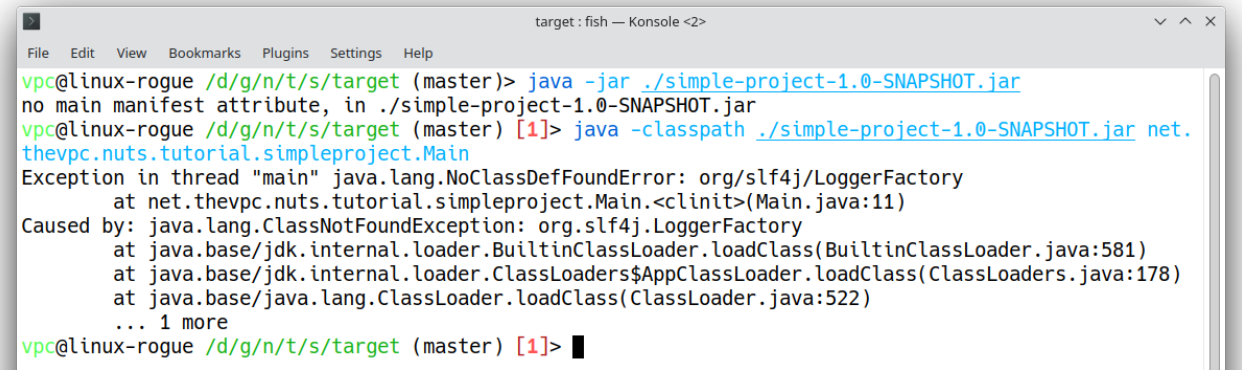
1.3. pom.xml

A minimal `pom.xml` is:

```
<?xml version="1.0" encoding="UTF-8"?><project xmlns="..."><modelVersion>
4.0.0</modelVersion>
<groupId>net.thevpc.nuts.doc</groupId>
<artifactId>base-project</artifactId>
<version>1.0-SNAPSHOT</version>
<dependencies>
<dependency>
    <groupId>ch.qos.logback</groupId>
    <artifactId>logback-classic</artifactId>
    <version>1.2.10</version>
</dependency>
</dependencies>
</project>
```

1.4. Example

- With a minimal `pom.xml` we cannot execute unless we add the transitive `dependencies` to the classpath
- We also need to adjust the pom.xml to include the main class too!



1.5. Alternatives for deployment

- Java Web Start
- System PM / Installers
- jpackage, jlink
- Portable Installers
- Custom Deployments
- Build time Processors (Fat Jars)

1.6. Java Web start

- Run Remote App using `jnlp` file (with all of it dependencies)
- Special packaging
- Execution Sandbox : More Limitations
- Deprecated!! since Java9
- No Shared Dependencies / Centralized Dep Mgt
- The same applies to alternatives : `trivrost`, `OpenJNLP`

1.7. System PM / Installers

- `rpm`, `deb`, `dmg`, `msi`
  - Native integration with OS/Env
  - Centralized management
  - Automatable (cmdline)
  - Not portable
  - Multiple deployment packages for each release
  - Problem with installing multiple versions of the same package

1.8. JPackage jlink

- `rpm`, `deb`, `dmg`, `msi`
  - All System PM / Installers applies
  - Not portable
  - java 8- not supported
  - requires all dependencies to be packaged as rpm/deb or be bundled for each app
  - JRE bundled each time!

1.9. Portable Installers

- `InstallAnywhere`, `GetDown`, `IzPack`, BitRock `InstallBuilder`
  - Good integration with OS/Env
  - No centralized management
  - Disk and network overload of dependencies
  - Graphical! not suitable for automation (most of the time)
  - Still Manual

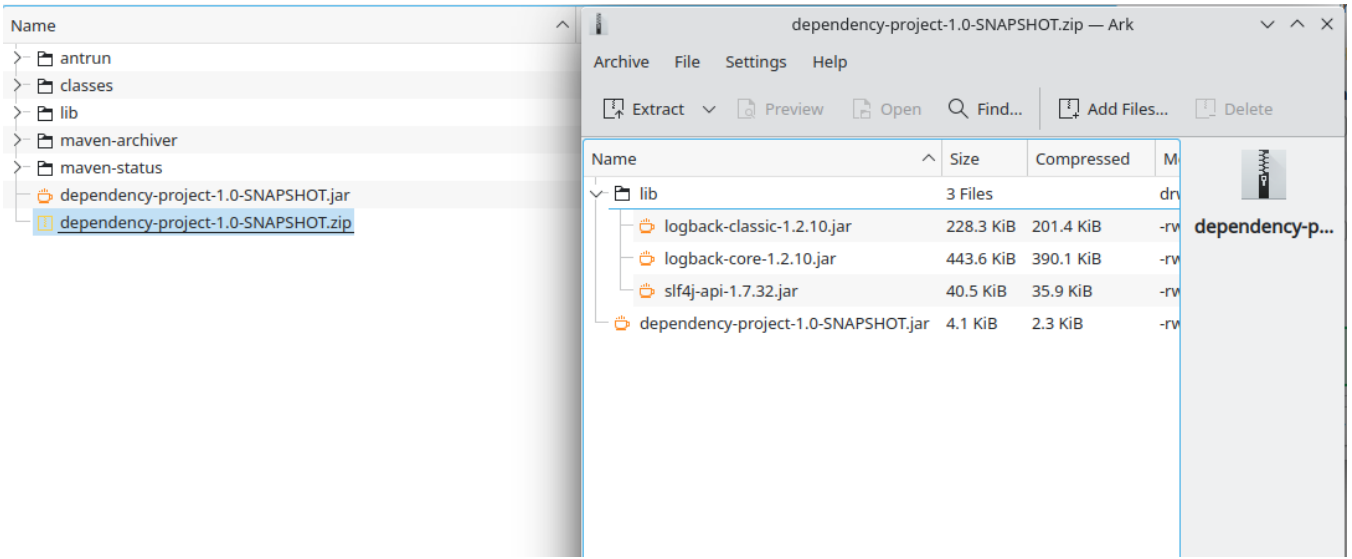
1.10. Custom Deployers

- Custom (tomcat, netbeans) with multiple formats (tarball, zip)
  - Manual
  - No centralized management
  - Difficult to automate
  - Lack of integration with environment
  - Disk and network overload of dependencies

1.11. Fat Packages: maven-dependency-plugin

- `maven-dependency-plugin`
  - Maven plugin
  - Jars included in the "lib" folder
  - Still need to bundle the jar and the lib folder (zip with `maven-antrun-plugin`)

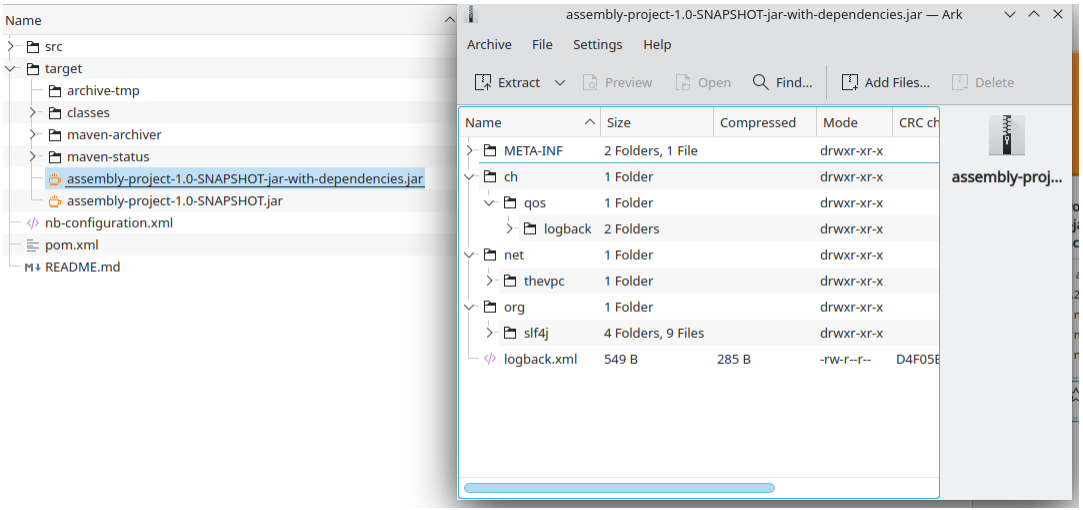
```
<build>
    <plugins>
        <plugin>
            <groupId>org.apache.maven.plugins</groupId>
            <artifactId>maven-jar-plugin</artifactId>
            <version>3.2.0</version>
            <configuration>
                <archive>
                    <manifest>
                        <addClasspath>true</addClasspath>
                        <classpathPrefix>lib/</classpathPrefix>
                        <mainClass>net.thevpc.nuts.doc.mvndepproject.Main</mainClass>
                    </manifest>
                </archive>
            </configuration>
        </plugin>
        <plugin>
            <groupId>org.apache.maven.plugins</groupId>
            <artifactId>maven-dependency-plugin</artifactId>
            <executions>
                <execution>
                    <id>copy-dependencies</id>
                    <phase>prepare-package</phase>
                    <goals>
                        <goal>copy-dependencies</goal>
                    </goals>
                    <configuration>
                        <outputDirectory>${project.build.directory}/lib</outputDirectory>
                    </configuration>
                </execution>
            </executions>
        </plugin>
        <plugin>
            <groupId>org.apache.maven.plugins</groupId>
            <artifactId>maven-antrun-plugin</artifactId>
            <version>3.0.0</version>
            <executions>
                <execution>
                    <id>antrun-archive</id>
                    <phase>package</phase>
                    <goals>
                        <goal>run</goal>
                    </goals>
                    <configuration>
                        <target>
                            <property name="final.name" value="${project.build.directory}/${project.build.finalName}"/>
                            <property name="archive.includes" value="${project.build.finalName}.${project.packaging} lib/*"/>
                            <property name="tar.destfile" value="${final.name}.tar"/>
                            <zip basedir="${project.build.directory}" destfile="${final.name}.zip" includes="${archive.includes}" />
                        </target>
                    </configuration>
                </execution>
            </executions>
        </plugin>
    </plugins>
```


Name
antrun
classes
lib
maven-archiver
maven-status
dependency-project-1.0-SNAPSHOT.jar
dependency-project-1.0-SNAPSHOT.zip
dependency-project-1.0-SNAPSHOT.zip — Ark
Archive
File
Settings
Help
Extract
Preview
Open
Find...
Add Files...
Delete
Name
Size
Compressed
lib
3 Files
logback-classic-1.2.10.jar
228.3 KiB
201.4 KiB
logback-core-1.2.10.jar
443.6 KiB
390.1 KiB
slf4j-api-1.7.32.jar
40.5 KiB
35.9 KiB
dependency-project-1.0-SNAPSHOT.jar
4.1 KiB
2.3 KiB
dependency-p...

1.12. Fat Jars : Uber Jar

- `maven-assembly-plugin`
  - Jars deflated into the same jar
  - Can rewrite classes/resources
- `maven-shade-plugin`
  - Jars deflated into the same jar
  - Rewrites classes/resources
  - Simpler than `maven-assembly-plugin`

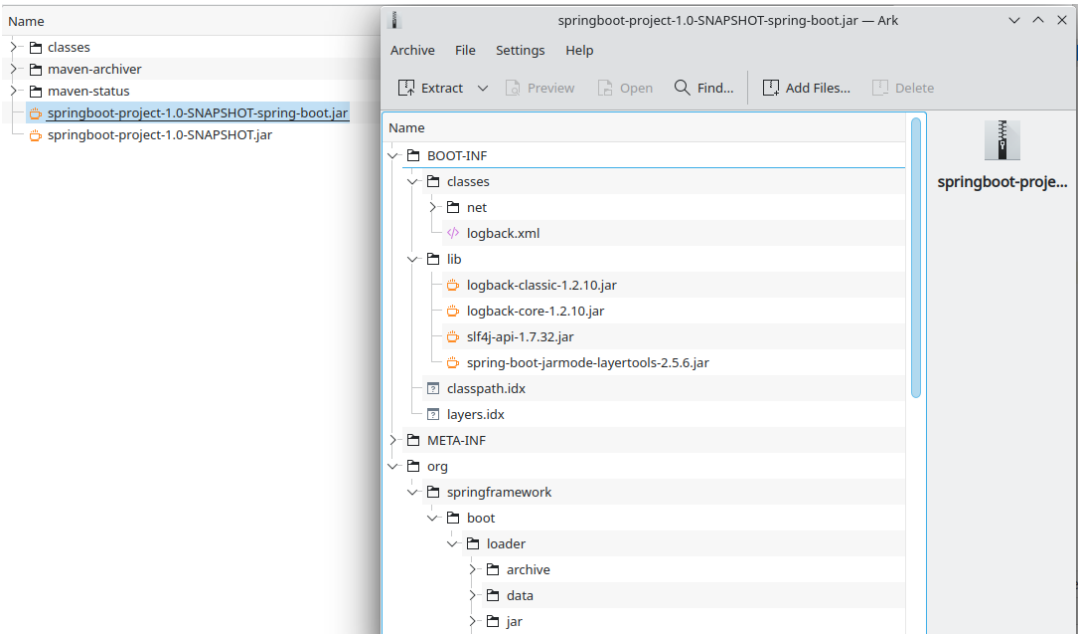
```
<build>
    <plugins>
        <plugin>
            <groupId>org.apache.maven.plugins</groupId>
            <artifactId>maven-assembly-plugin</artifactId>
            <executions>
                <execution>
                    <phase>package</phase>
                    <goals>
                        <goal>single</goal>
                    </goals>
                    <configuration>
                        <archive>
                            <manifest>
                                <mainClass>net.thevpc.nuts.doc.mvnassproject.Main</mainClass>
                            </manifest>
                        </archive>
                        <descriptorRefs>
                            <descriptorRef>jar-with-dependencies</descriptorRef>
                        </descriptorRefs>
                    </configuration>
                </execution>
            </executions>
        </plugin>
    </plugins>
</build>
```


Name
src
target
archive-tmp
classes
maven-archiver
maven-status
assembly-project-1.0-SNAPSHOT-jar-with-dependencies.jar
assembly-project-1.0-SNAPSHOT.jar
nb-configuration.xml
pom.xml
README.md
assembly-project-1.0-SNAPSHOT-jar-with-dependencies.jar — Ark
Archive
File
Settings
Help
Extract
Preview
Open
Find...
Add Files...
Delete
Name
Size
Compressed
Mode
CRC ch
META-INF
2 Folders, 1 File
drwxr-xr-x
ch
1 Folder
drwxr-xr-x
qos
1 Folder
drwxr-xr-x
logback
2 Folders
drwxr-xr-x
net
1 Folder
drwxr-xr-x
thevpc
1 Folder
drwxr-xr-x
org
1 Folder
drwxr-xr-x
slf4j
4 Folders, 9 Files
drwxr-xr-x
logback.xml
549 B
285 B
-rw-r--r--
D4F05E
assembly-proj...

1.13. Fat Jars : Jar Jar

- `onejar-maven-plugin`
  - Rewrites jar to include dependencies as jars!
  - Adds bootstrap classes
  - Changes classloader
- `spring-boot-maven-plugin`
  - Rewrites jar to include dependencies as jars!
  - Adds bootstrap classes
  - Changes classloader

```
<build>
    <plugins>
        <plugin>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-maven-plugin</artifactId>
            <version>2.5.6</version>
            <executions>
                <execution>
                    <goals>
                        <goal>repackage</goal>
                    </goals>
                    <configuration>
                        <classifier>spring-boot</classifier>
                        <mainClass>net.thevpc.nuts.doc.springbootproject.Main</mainClass>
                    </configuration>
                </execution>
            </executions>
        </plugin>
    </plugins>
</build>
```


Name
classes
maven-archiver
maven-status
springboot-project-1.0-SNAPSHOT-spring-boot.jar
springboot-project-1.0-SNAPSHOT.jar
springboot-project-1.0-SNAPSHOT-spring-boot.jar — Ark
Archive
File
Settings
Help
Extract
Preview
Open
Find...
Add Files...
Delete
Name
BOOT-INF
classes
net
logback.xml
lib
logback-classic-1.2.10.jar
logback-core-1.2.10.jar
slf4j-api-1.7.32.jar
spring-boot-jarmode-layertools-2.5.6.jar
classpath.idx
layers.idx
META-INF
org
springframework
boot
loader
archive
data
jar
springboot-proje...

1.14. So...

- All alternatives are poor and/or ugly
- `pom.xml` polluted with +16-20 lines of code
- ~~Why do we need a package manager for `Java`~~
- Why don't we already have a package manager for `Java`!

2. nuts Package Manager for Java

Main Idea:

- Little to no Intrusion and Backward compatibility to support existing apps and repos
- Good Integration with Java ecosystem and popular build/deploy/devops tools
- Solid enough to support multiple platforms
- Simple but extensible
- Open Source

2.1. nuts: A Package Manager for Java

- Centralized package manager for Java Apps and Libs (not only)
  - `install`, `uninstall`, `update`, `search` and `exec` for packages
  - Optimized dependency resolution solver
  - Cache for dependencies across installed apps
- Automation/devops friendly commandline tool
- Portable across Architectures, OSes, OS Distibs, Desktop Environments, Platforms (Java versions)
- Libre and Open Source, developed in java

2.2. nuts: A Package Manager for Java

Is Not:

- a replacement for `maven`, `gradle` or any build tool (used at deploy time)
- a plugin for `maven`, `gradle` or any build tool (do not change the build process)
- a replacement for `spring` framework or any other framework
- a replacement for `IzPack` or `InstallAnywhere` (but can do pretty much of it)
- a replacement for `ansible` or `chef` (but is conceptually driven by automation)
- a mere download tool

2.3. nuts: Maven & Gradle

- Integrates seamlessly with `maven`
  - No required modification of the build process
  - Does not alter/rewrite the package
  - No special `maven`/`gradle` plugin needed
- Supports local Jars, public packages (maven central), and private packages (local .m2, nexus repos,...)
- Solves at runtime what `maven`/`gradle` solve at build time
  - Supports `maven` and `gradle` dependency resolution algorithms, scopes, ...

2.4. nuts: Dependency Optimization

- Downloads, Caches and Installs only relevant dependencies according to
  - `arch` (hardware architecture: x86, x64, relevant for native dependencies)
  - `os` (operating system: Win/Linux/Mac, relevant for specific tasks)
  - `osDist` (operating distribution : Ubuntu/OpenSuse,...)
  - `desktop` (desktop environment, relevant for icon/shortcut creation and environment integration)
  - `platform` (java SE versions installed to know what dependencies to use)

2.5. nuts: Integration

- Solid integration with environments
  - Uses OS's File System Layouts (XDG for Linux, ...)
    - separate folders per app
    - separate folders for log, config, lib, cache, etc.
    - portable across OSes (~/.config versus ~/AppData)
  - Supports cmdline and gui apps (installs scripts, icons, menus, ...)
  - Supports `jar` and `zip` based apps

2.6. nuts: Toolbox

- Terminal Coloring on Linux/Windows
- Supports Windows `cmd`/`PowerShell` and *NIX `sh`, `bash`, `csh`, `zsh` and `fish` and their relative `rcfiles`
- Bundles a `bash`/`GNU binutils` compatible (still incomplete) but enhanced java implementations
  - ls, cp, touch, mkdir, rmdir, ...
  - works on windows
  - adds some extra goodies (ssh, json, support ...)

2.7. nuts: Existing Apps

- Supports out of the box
  - `maven` 's repos (including central, spring, google, ...), more than 7M dependencies
  - Apache repos (`netbeans`, `tomcat`, `derby`, etc...)

2.8. nuts: Automation

- Powerful toolbox with customizable output formats
  - `props`
  - `xml`
  - `json`
  - `yaml`
  - `table`
  - `tree`

2.9. nuts: Unique features

- Is statically built and has (almost) no dependencies
- Can be used as a library to support transitive ClassPath resolution
- Has a clean and rich API

2.10. nuts: Stability

- Tested:
  - over 160 regression tests with 3500+ lines of test-code in the repository.
  - `opensuse`, `ubuntu`, `docker`, `windows7`, `windows10`
  - `sh`, `bash`, `csh`, `zsh`, `fish`

2.11. 'nuts'... really?

- N etwork U pdatable T hings S ervices
- The `nuts` (fool) companion for the `maven` (sage) in the Software Kingdom's Palace!

3. Demonstration

3.1. Install Nuts

1. Download `nuts.jar`
2. Run `java -jar nuts.jar -Zy`
3. Restart your terminal

3.2. Install Nuts (Linux)

- Install for Preview/Evaluation, most `recent`

```
$ wget https://thevpc.net/nuts/nuts-preview.jar -o nuts.jar
$ java -jar nuts.jar -Zy -r=+preview
$ exit
```

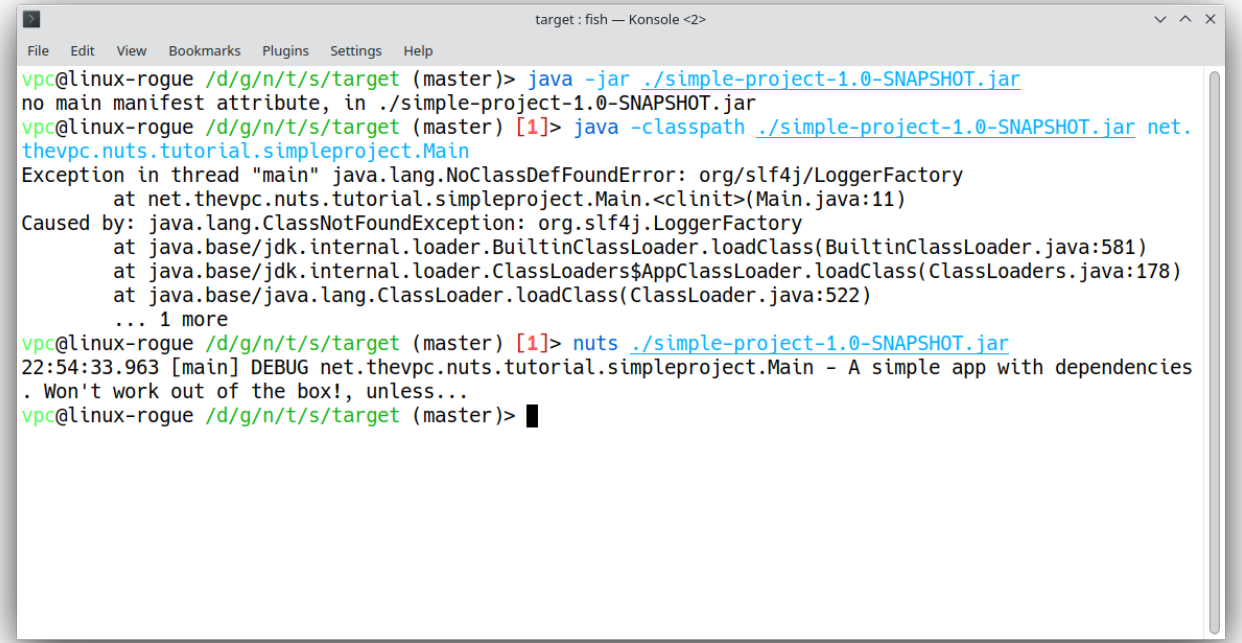
- Install for Production, most `stable`

```
$ wget https://repo.maven.apache.org/maven2/net/thevpc/nuts/nuts/0.8.3/nuts-0.8.3.jar
-O nuts.jar
$ java -jar nuts.jar -Zy
$ exit
```

- In all cases, do not forget to `restart` your terminal

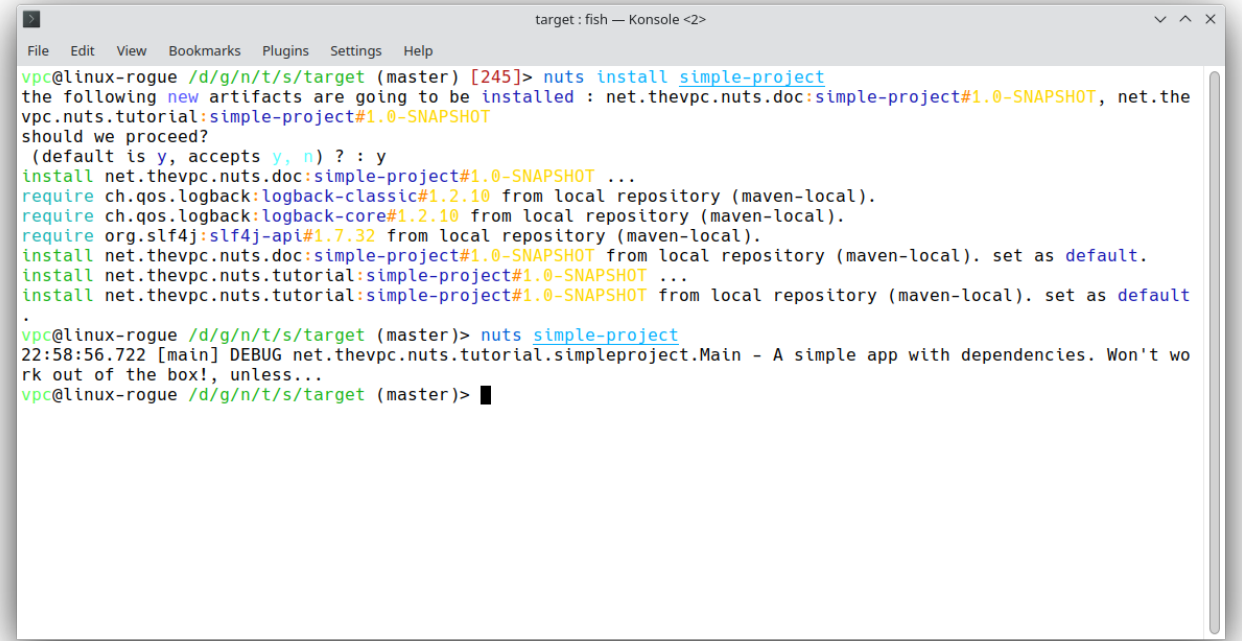
3.3. Run the app

- We just run the app
- No modification is required
- We use the already built (by maven) jar
- The "artifactId" is (almost) sufficient to resolve the application to install


target : fish — Konsole <2>
File Edit View Bookmarks Plugins Settings Help
vpc@linux-rogue /d/g/n/t/s/target (master)> java -jar ./simple-project-1.0-SNAPSHOT.jar
no main manifest attribute, in ./simple-project-1.0-SNAPSHOT.jar
vpc@linux-rogue /d/g/n/t/s/target (master) [1]> java -classpath ./simple-project-1.0-SNAPSHOT.jar net.thevpc.nuts.tutorial.simpleproject.Main
Exception in thread "main" java.lang.NoClassDefFoundError: org/slf4j/LoggerFactory
at net.thevpc.nuts.tutorial.simpleproject.Main.<clinit>(Main.java:11)
Caused by: java.lang.ClassNotFoundException: org.slf4j.LoggerFactory
at java.base/jdk.internal.loader.BuiltinClassLoader.loadClass(BuiltinClassLoader.java:581)
at java.base/jdk.internal.loader.ClassLoaders$AppClassLoader.loadClass(ClassLoaders.java:178)
at java.base/java.lang.ClassLoader.loadClass(ClassLoader.java:522)
... 1 more
vpc@linux-rogue /d/g/n/t/s/target (master) [1]> nuts ./simple-project-1.0-SNAPSHOT.jar
22:54:33.963 [main] DEBUG net.thevpc.nuts.tutorial.simpleproject.Main - A simple app with dependencies. Won't work out of the box!, unless...
vpc@linux-rogue /d/g/n/t/s/target (master)>

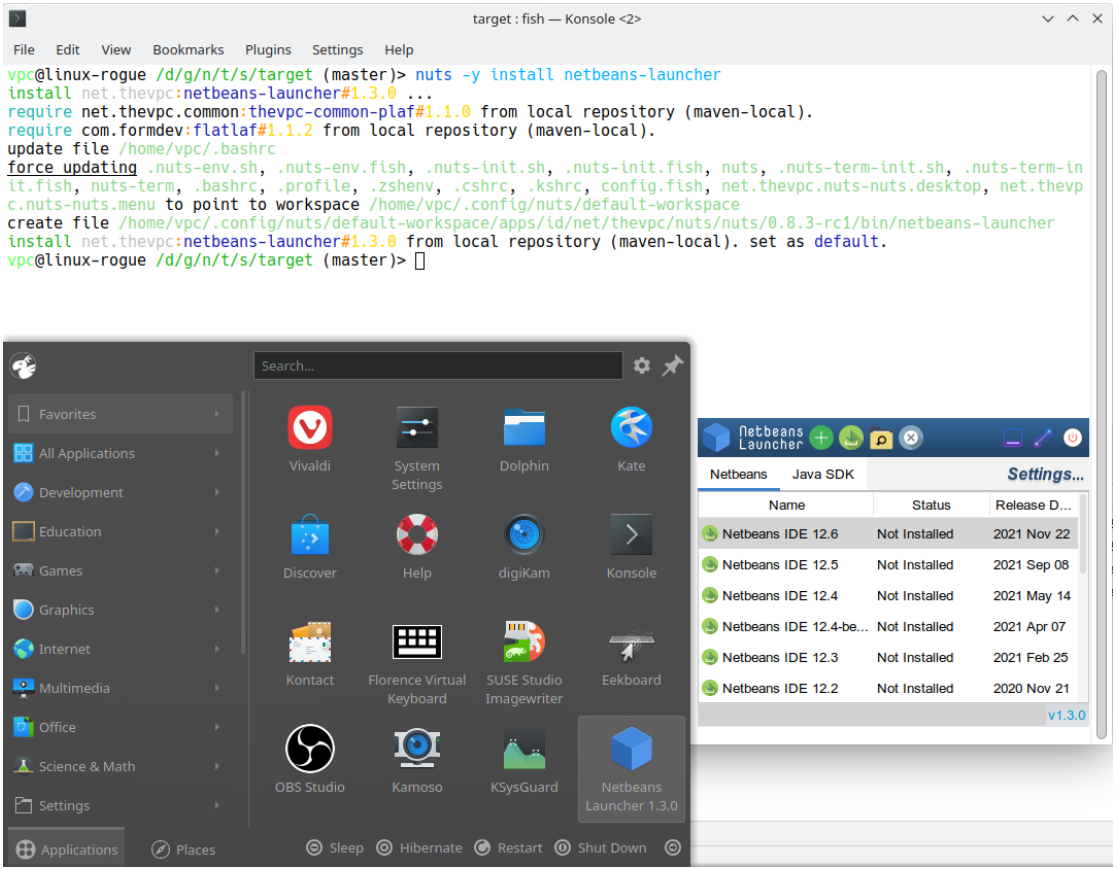
3.4. Demonstration : Install Application

- Or we can install the app
  - All `required` dependencies will be resolved and downloaded
  - dependencies are shared across multiple apps
  - multiple versions of the same dependencies can coexists (required by different apps)
- And then we run it


target : fish — Konsole <2>
File Edit View Bookmarks Plugins Settings Help
vpc@linux-rogue /d/g/n/t/s/target (master) [245]> nuts install simple-project
the following new artifacts are going to be installed : net.thevpc.nuts.doc:simple-project#1.0-SNAPSHOT, net.the
vpc.nuts.tutorial:simple-project#1.0-SNAPSHOT
should we proceed?
(default is y, accepts y, n) ? : y
install net.thevpc.nuts.doc:simple-project#1.0-SNAPSHOT ...
require ch.qos.logback:logback-classic#1.2.10 from local repository (maven-local).
require ch.qos.logback:logback-core#1.2.10 from local repository (maven-local).
require org.slf4j:slf4j-api#1.7.32 from local repository (maven-local).
install net.thevpc.nuts.doc:simple-project#1.0-SNAPSHOT from local repository (maven-local). set as default.
install net.thevpc.nuts.tutorial:simple-project#1.0-SNAPSHOT ...
install net.thevpc.nuts.tutorial:simple-project#1.0-SNAPSHOT from local repository (maven-local). set as default
.
vpc@linux-rogue /d/g/n/t/s/target (master)> nuts simple-project
22:58:56.722 [main] DEBUG net.thevpc.nuts.tutorial.simpleproject.Main - A simple app with dependencies. Won't wo
rk out of the box!, unless...
vpc@linux-rogue /d/g/n/t/s/target (master)>

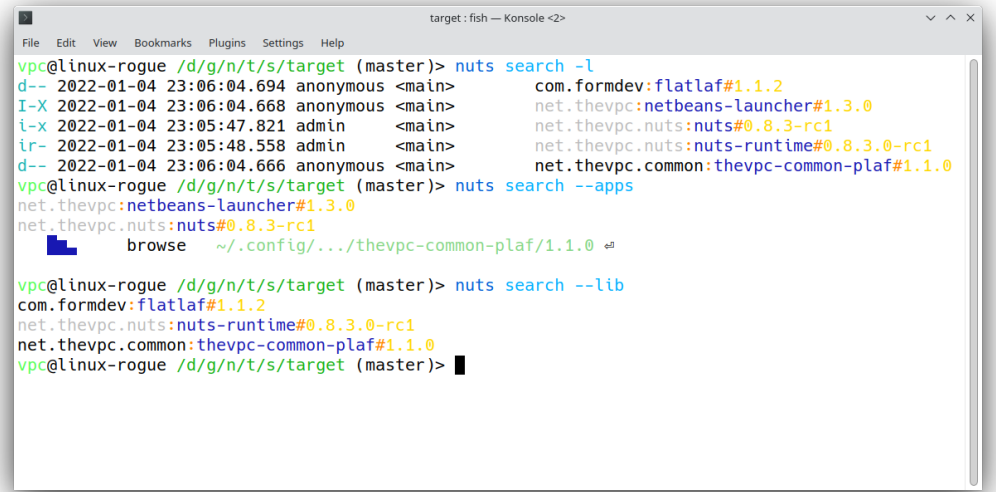
3.5. Install Gui App

- We can run a gui app of course
- `nuts` will create for it
  - a Desktop Shortcut (Icon)
  - a Menu Item


target : fish — Konsole <2>
File Edit View Bookmarks Plugins Settings Help
vpc@linux-rogue /d/g/n/t/s/target (master)> nuts -y install netbeans-launcher
install net.thevpc:netbeans-launcher#1.3.0 ...
require net.thevpc.common:thevpc-common-plaf#1.1.0 from local repository (maven-local).
require com.formdev:flatlaf#1.1.2 from local repository (maven-local).
update file /home/vpc/.bashrc
force updating .nuts-env.sh, .nuts-env.fish, .nuts-init.sh, .nuts-init.fish, nuts, .nuts-term-init.sh, .nuts-term-init.fish, nuts-term, .bashrc, .profile, .zshenv, .cshrc, .kshrc, config.fish, net.thevpc.nuts-nuts.desktop, net.thevpc.nuts-nuts.menu to point to workspace /home/vpc/.config/nuts/default-workspace
create file /home/vpc/.config/nuts/default-workspace/apps/id/net/thevpc/nuts/nuts/0.8.3-rc1/bin/netbeans-launcher
install net.thevpc:netbeans-launcher#1.3.0 from local repository (maven-local). set as default.
vpc@linux-rogue /d/g/n/t/s/target (master)>
Search...
Favorites
All Applications
Development
Education
Games
Graphics
Internet
Multimedia
Office
Science & Math
Settings
Vivaldi
System Settings
Dolphin
Kate
Discover
Help
digiKam
Konsole
Kontact
Florence Virtual Keyboard
SUSE Studio Imagewriter
Eekboard
OBS Studio
Kamoso
KSysGuard
Netbeans Launcher 1.3.0
Applications
Places
Sleep
Hibernate
Restart
Shut Down
Netbeans Launcher
Netbeans
Java SDK
Settings...
Name
Status
Release D...
Netbeans IDE 12.6 Not Installed 2021 Nov 22
Netbeans IDE 12.5 Not Installed 2021 Sep 08
Netbeans IDE 12.4 Not Installed 2021 May 14
Netbeans IDE 12.4-be... Not Installed 2021 Apr 07
Netbeans IDE 12.3 Not Installed 2021 Feb 25
Netbeans IDE 12.2 Not Installed 2020 Nov 21
v1.3.0

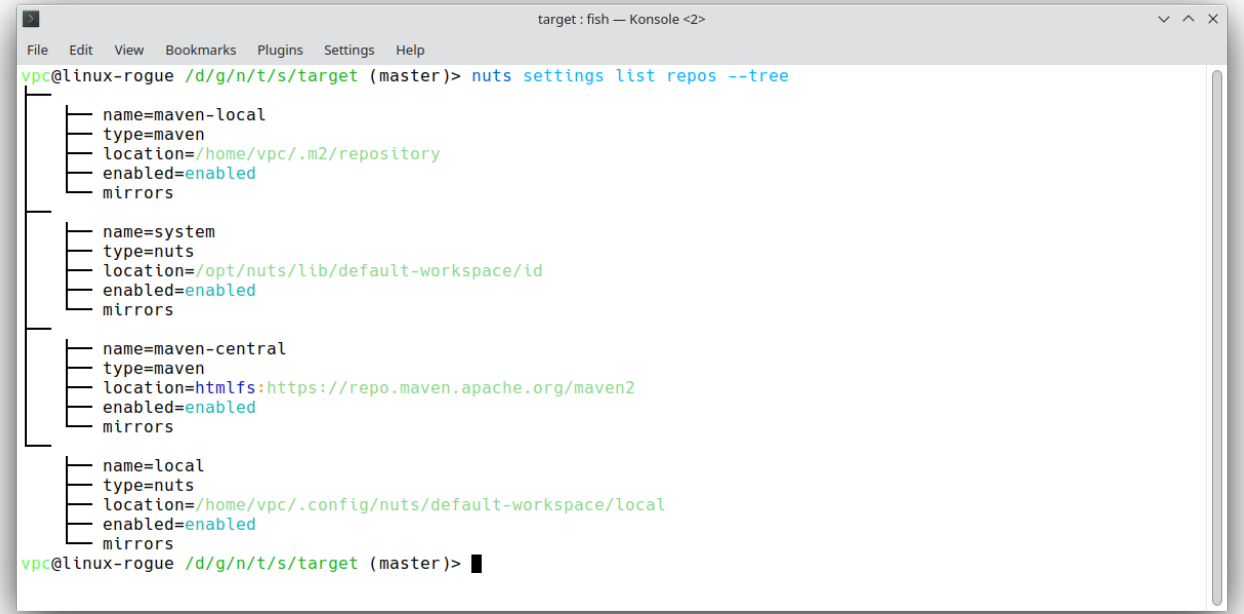
3.6. Search for available applications

- We can search for installed or available (local/remote) apps
- We can search for apps and/or libs



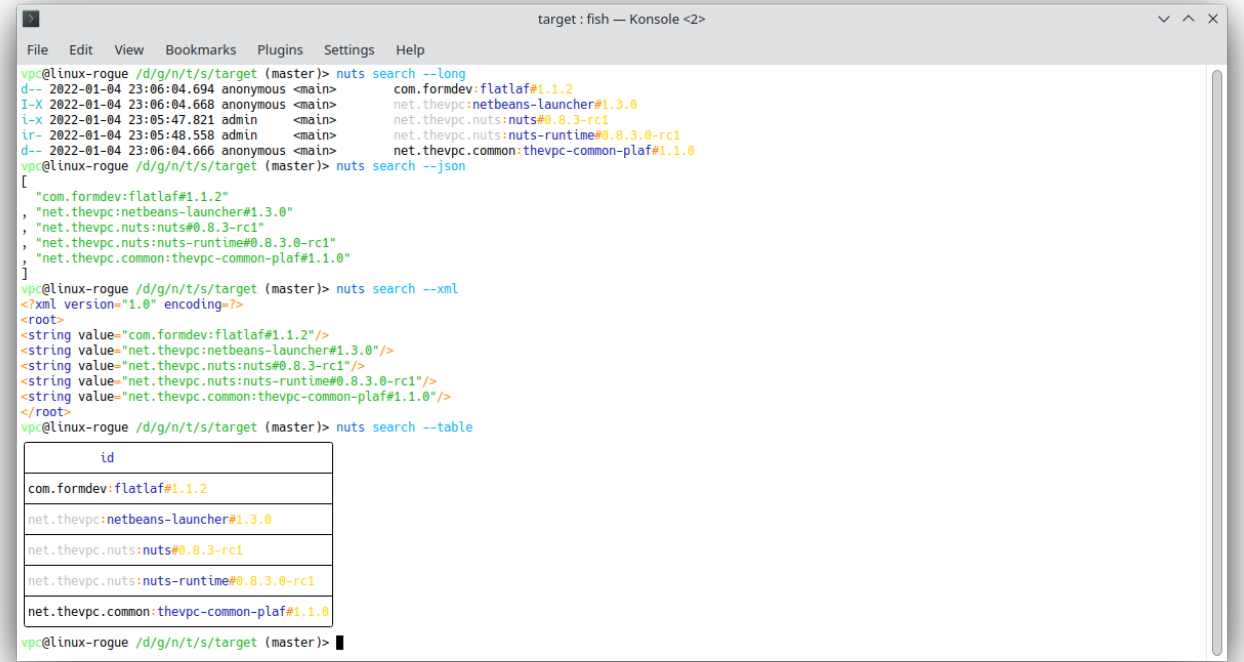
3.7. Repositories

- We can configure Repositories used to install/update packages
- We can list Repositories used to install/update packages
- Supports
  - Standard Maven Repositories
  - Plain Folders
  - Browsable HTTP folders (Parses HTML for common Webserver Directory Lists)


target : fish — Konsole <2>
File Edit View Bookmarks Plugins Settings Help
vpc@linux-rogue /d/g/n/t/s/target (master)> nuts settings list repos --tree
name=maven-local
type=maven
location=/home/vpc/.m2/repository
enabled=enabled
mirrors
name=system
type=nuts
location=/opt/nuts/lib/default-workspace/id
enabled=enabled
mirrors
name=maven-central
type=maven
location=htmlfs:https://repo.maven.apache.org/maven2
enabled=enabled
mirrors
name=local
type=nuts
location=/home/vpc/.config/nuts/default-workspace/local
enabled=enabled
mirrors
vpc@linux-rogue /d/g/n/t/s/target (master)>

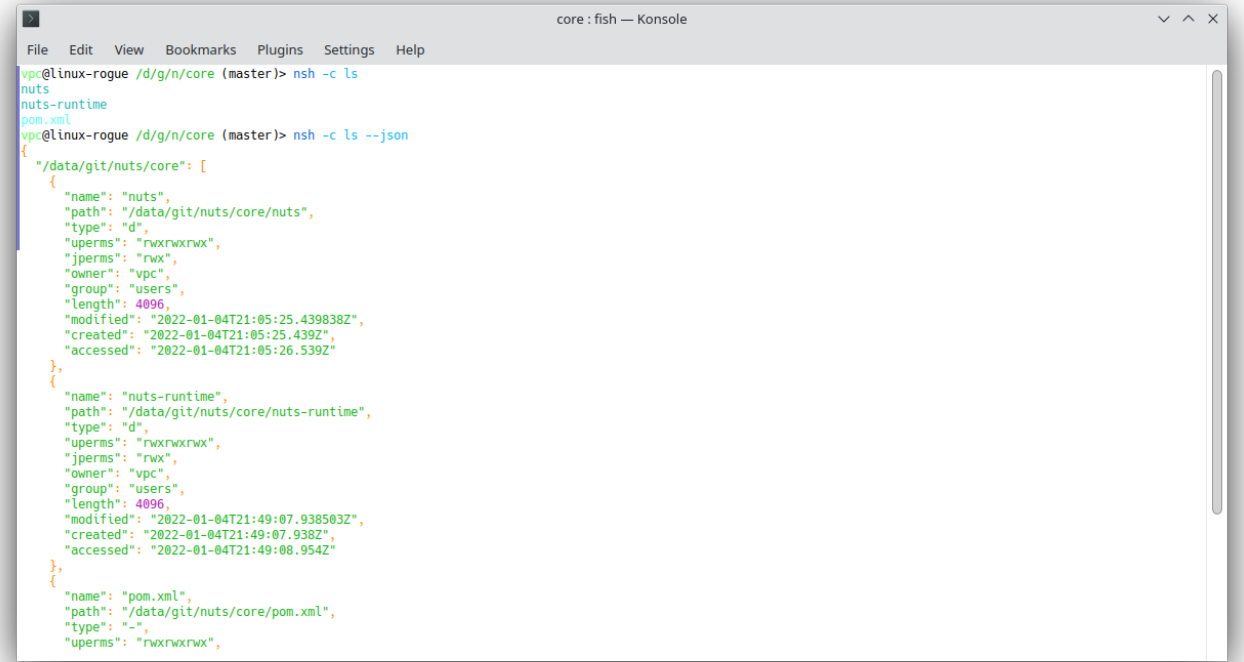
3.8. Integration and Formats

- Customize any command's output to use structured/parsable or user friendly output formats
- All Commands support options!
  - structured (parsable) : `--json`, `--xml`, `--props`, `--yaml`
  - unstructured : `--plain`, `--table` , `--tree`


target : fish — Konsole <2>
File Edit View Bookmarks Plugins Settings Help
vpc@linux-rogue /d/g/n/t/s/target (master)> nuts search --long
d-- 2022-01-04 23:06:04.694 anonymous <main> com.formdev:flatlaf#1.1.2
I-X 2022-01-04 23:06:04.668 anonymous <main> net.thevpc:netbeans-launcher#1.3.0
i-x 2022-01-04 23:05:47.821 admin <main> net.thevpc.nuts:nuts#0.8.3-rc1
ir- 2022-01-04 23:05:48.558 admin <main> net.thevpc.nuts:nuts-runtime#0.8.3.0-rc1
d-- 2022-01-04 23:06:04.666 anonymous <main> net.thevpc.common:thevpc-common-plaf#1.1.0
vpc@linux-rogue /d/g/n/t/s/target (master)> nuts search --json
[
"com.formdev:flatlaf#1.1.2"
, "net.thevpc:netbeans-launcher#1.3.0"
, "net.thevpc.nuts:nuts#0.8.3-rc1"
, "net.thevpc.nuts:nuts-runtime#0.8.3.0-rc1"
, "net.thevpc.common:thevpc-common-plaf#1.1.0"
]
vpc@linux-rogue /d/g/n/t/s/target (master)> nuts search --xml
<?xml version="1.0" encoding=?>
<root>
<string value="com.formdev:flatlaf#1.1.2"/>
<string value="net.thevpc:netbeans-launcher#1.3.0"/>
<string value="net.thevpc.nuts:nuts#0.8.3-rc1"/>
<string value="net.thevpc.nuts:nuts-runtime#0.8.3.0-rc1"/>
<string value="net.thevpc.common:thevpc-common-plaf#1.1.0"/>
</root>
vpc@linux-rogue /d/g/n/t/s/target (master)> nuts search --table
id
com.formdev:flatlaf#1.1.2
net.thevpc:netbeans-launcher#1.3.0
net.thevpc.nuts:nuts#0.8.3-rc1
net.thevpc.nuts:nuts-runtime#0.8.3.0-rc1
net.thevpc.common:thevpc-common-plaf#1.1.0
vpc@linux-rogue /d/g/n/t/s/target (master)>

3.9. Companions

- We can use `nsh` instead of `bash` / `cmd`
- Implements common internal bash commands (`cd`,...) and constructs (`pipes`,...)
- Implements common `binutils` commands (`ls`,`mkdir`,....)
- All commands support `json` (and `yaml`, ...) out of the box
- All commands support `ssh` and extended path format (including URLS) out of the box, so that `cp` can be used as a simple alternative to `wget`

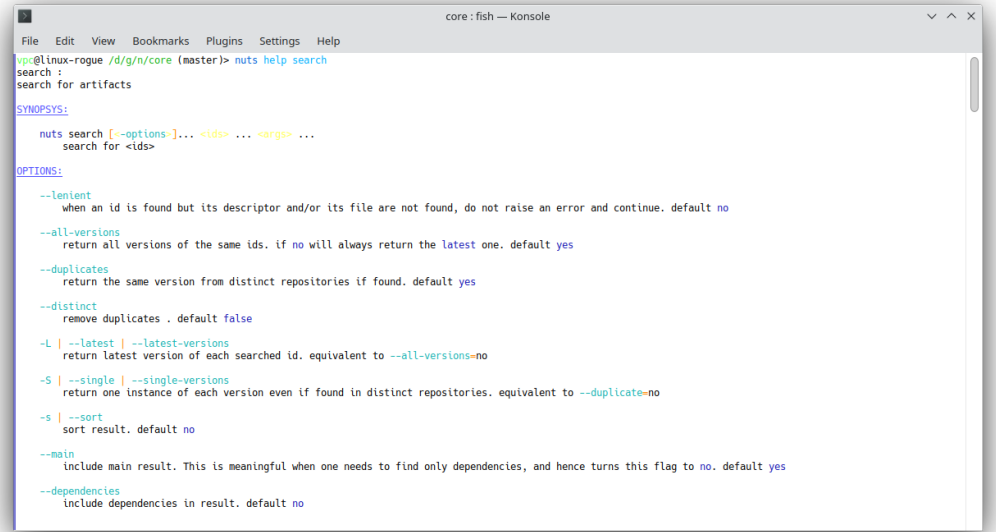

core : fish — Konsole
File Edit View Bookmarks Plugins Settings Help
vpc@linux-rogue /d/g/n/core (master)> nsh -c ls
nuts
nuts-runtime
pom.xml
vpc@linux-rogue /d/g/n/core (master)> nsh -c ls --json
{
"/data/git/nuts/core": [
{
"name": "nuts",
"path": "/data/git/nuts/core/nuts",
"type": "d",
"uperms": "rwxrwxrwx",
"jperms": "rwx",
"owner": "vpc",
"group": "users",
"length": 4096,
"modified": "2022-01-04T21:05:25.439838Z",
"created": "2022-01-04T21:05:25.439Z",
"accessed": "2022-01-04T21:05:26.539Z"
},
{
"name": "nuts-runtime",
"path": "/data/git/nuts/core/nuts-runtime",
"type": "d",
"uperms": "rwxrwxrwx",
"jperms": "rwx",
"owner": "vpc",
"group": "users",
"length": 4096,
"modified": "2022-01-04T21:49:07.938503Z",
"created": "2022-01-04T21:49:07.938Z",
"accessed": "2022-01-04T21:49:08.954Z"
},
{
"name": "pom.xml",
"path": "/data/git/nuts/core/pom.xml",
"type": "-",
"uperms": "rwxrwxrwx",

3.10. Bot Mode

- Running with `--bot` will disable all interaction and terminal coloring

3.11. Help

- An extensive help is available from within the command line



3.12. Conclusion

- `nuts` tries to be for `java` what `npm` is for javascript
- `nuts` is a versatile toolbox
- `nuts` is `2800+` classes, `600ko+` boot jar
- I invite you to
  - Take a shot, try to use it and give feedback
  - `Star(*)` the repository https://github.com/thevpc/nuts
  - Spread the word
  - Join the Core Team to enhance `nuts`

Thank you

please support us by starring our repo at

https://github.com/thevpc/nuts (git repo)

https://thevpc.github.io/nuts (website)

nuts.packagemanager@gmail.com