

# Fedora/Red Hat LLVM Toolchain

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# Fedora Linux

- ▶ Community Distribution.
- ▶ Upstream of Red Hat Enterprise Linux (RHEL).
- ▶ New release every 6 months.

# Fedora Linux

## Architectures

x86\_64

i686

ppc64le

s390x

aarch64

arm

# Fedora Linux

## LLVM Packages

- ▶ clang
- ▶ compiler-rt
- ▶ flang
- ▶ libclc
- ▶ libcxx
- ▶ libcxxabi
- ▶ libomp
- ▶ lld
- ▶ lldb
- ▶ llvm
- ▶ llvm-test-suite
- ▶ mlir
- ▶ polly
- ▶ python-lit

# Red Hat Enterprise Linux 8

## Architectures

x86\_64

~~i686~~(multilib)

ppc64le

s390x

aarch64

arm

# Red Hat Enterprise Linux 8

## LLVM Packages

- ▶ clang
- ▶ compiler-rt
- ▶ ~~flang~~
- ▶ ~~libclc~~
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- ▶ ~~libcxxabi~~
- ▶ libomp
- ▶ lld
- ▶ lldb
- ▶ llvm
- ▶ ~~llvm-test-suite~~
- ▶ ~~mlir~~
- ▶ ~~polly~~
- ▶ python-lit

# Fedora Linux

## Packaging Glossary



### RPM

Binary package format used by Fedora Linux and other distributions.

### DNF

Program used for package management on Fedora Linux (e.g. installing, uninstalling, upgrading, etc).

### DNF Repo

Collection of RPMs and package metadata that DNF fetches packages from.

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## Packaging Process

### Source RPM

Spec File + Upstream  
Sources

### Koji Build Server

Produces Binary RPM  
Packages

### Bodhi Updates System

Verifies RPMs before they  
enter the distribution.



## llvm.spec

```
%ifarch s390 s390x %{arm} %ix86
# Decrease debuginfo verbosity to reduce memory consumption during final library linking
%global optflags %(echo %{optflags} | sed 's/-g /-g1 /')
%endif

# force off shared libs as cmake macros turns it on.
%cmake -G Ninja \
    -DBUILD_SHARED_LIBS:BOOL=OFF \
    -DLLVM_PARALLEL_LINK_JOBS=1 \
    -DCMAKE_BUILD_TYPE=RelWithDebInfo \
```

# Fedora Linux

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# Fedora Linux

## Standalone Builds

### PROS

- ▶ Can push out bug fixes more quickly.
- ▶ Parallisable

```
wget github.com/.../clang-12.0.1.src.tar.xz
```

```
tar -xzf clang-12.0.1.src
```

```
cmake -S clang-12.0.1.src -B clang-build
```

### CONS

- ▶ Not well tested configuration.
- ▶ Dynamic Linking

# Fedora Linux

lld example

## Standalone Build

- ▶ lld: 15 minutes

## Monorepo Build

- ▶ lld: 15 minutes
- ▶ clang: 4.5 hours
- ▶ llvm: 3.5 hours
- ▶ flang: 2.5 hours
- ▶ mlir: 1 hour
- ▶ **TOTAL: 12+ Hours**

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## Standalone Builds

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# Fedora Linux

## Compiler For LLVM Packages

### Building with gcc. Why?

- ▶ Fedora policy until Fedora 35 (Oct. 2021)
- ▶ llvm::Any bug

### Reasons To Use Clang

- ▶ Dogfooding.
- ▶ More efficient LTO Builds.

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## Package Versions

### What We Package

- ▶ Release Candidates
- ▶ Major Releases (X.0.0)
- ▶ Bug-fix Releases (X.0.1)
- ▶ No older versions.

### Pre-Release Snapshots?

- ▶ Not yet.
- ▶ Disruptive for library users.

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## Compatibility Packages

### LLVM 12

- ▶ `llvm-12.0.1-1.fc34`
  - `libLLVM-12.so`

### LLVM 13

- ▶ `llvm-13.0.0-1.fc35`
  - `libLLVM-13.so`
- ▶ `llvm12-12.0.1-1.fc35`
  - `libLLVM-12.so`
  - Prefix: `/usr/lib64/llvm12/lib/`



# Fedora Linux

## Testing



### **ninja check**

Run during package builds.

### **CI Testing**

Emphasis on full toolchain integration testing.

### **User Testing**

Users have opportunity to test RPMs before they enter the distribution.

# Fedora Linux

## Future Plans

### COPR

- ▶ User generated DNF repos.
- ▶ Packages not in Fedora.

### Our COPR Project

- ▶ clang-built RPMS for Fedora
- ▶ Nightly LLVM snapshots (Under Development).
- ▶ Testing for upstream LLVM (Under Development).

# Links and Other Info

[Koji Build Server](#)

[Bodhi Update Server](#)

[Spec File Sources](#)

[COPR Project](#)

Enable clang-build-f35 COPR:

```
dnf install 'dnf-command(copr)'
```

```
dnf copr enable @fedora-llvm-team/clang-built-f35
```

# Thank you



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