

Compiling and making

Toward understanding software installation on Linux systems

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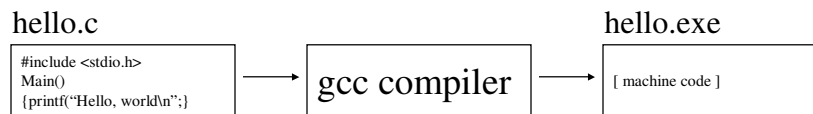
Compilation

- Translates source code to executable code
- Usually operates in several steps
- Steps may each be performed manually
- Or automated and consolidated with “make” utility

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Manual Compilation

```
[root@EMACH1 root]# ls
hello.c
[root@EMACH1 root]# gcc hello.c -o hello.exe
[root@EMACH1 root]# ls
hello.c hello.exe
[root@EMACH1 root]# ./hello.exe
Hello, world
[root@EMACH1 root]#
```



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Automated Compilation

- Uses the “make” utility
- With its script of instructions “Makefile”
- User writes Makefile then runs make
- Special kind of conditional script/batch

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Make utility vs. shell script

- **ordinary shell script**
 - Invocation: type script file's name
 - Conditionality: script language “if” construct
- **make**
 - Invocation: type “make” (reads Makefile)
 - Conditionality: file timestamp relationships

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Operation of make

Contents of Makefile:

```
hello: hello.c
    gcc hello.c -o hello
    gcc hellodolly.c -o hellodolly
    gcc wellhello.c -o wellhello
```

When “make” runs, the block of commands may be executed, according to whether the target file is older than the file(s) it depends on.

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Make can have multiple targets

Contents of Makefile:

```
hello: hello.c
    gcc hello.c -o hello
    gcc hellodolly.c -o hellodolly
    gcc wellhello.c -o wellhello

goodby: goodby.c
    gcc goodby.c -o goodby
```

make hello – triggers evaluation of upper block

make goodby – triggers evaluation of lower block

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Targets can do other things

Contents of Makefile:

```
clean:
    rm -f hello
    rm -f hellodolly
    rm -f wellhello
    rm -f goodby
    ls -l

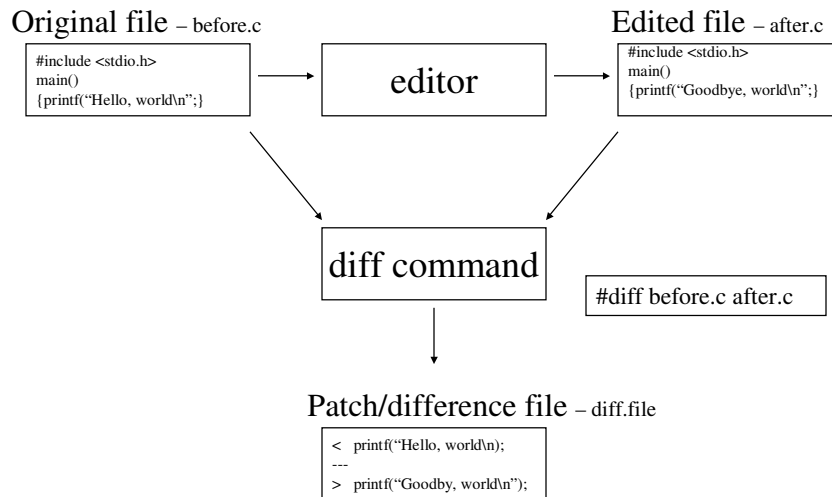
install:
    @if [ -f ./hello ]; then \
        cp ./hello /bin/hello; \
    fi
```

make clean – triggers customized file cleanup

make goodby – triggers “deployment” to executable directory

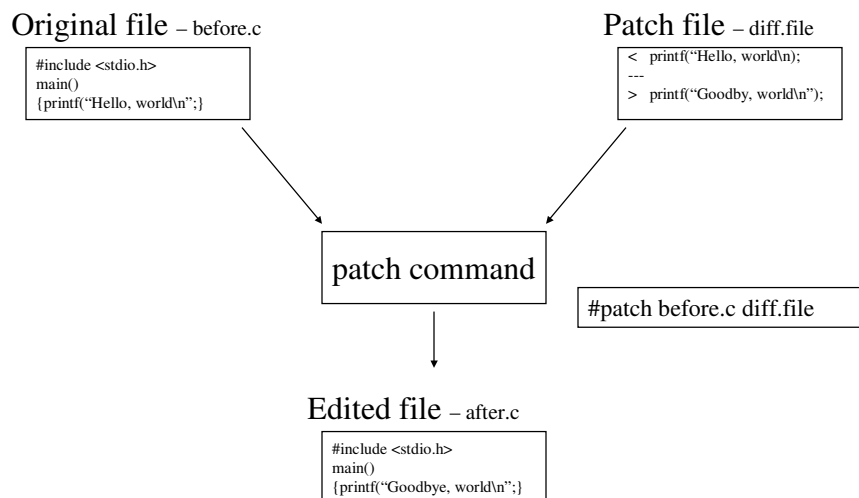
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Frequent precursor: source code patching



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Patching: getting the edited file without editing



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