Software Development on Linux Systems

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By

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Today

- Software Development Tools
- Frameworks
- Portability
- IDES

Software Development Tools

- Software development tools are tools designed to aid in the production, testing and debugging of software

- These tools can be anywhere from very low level (hardware tools) to very high level (GUI designing tools)

- These tools may be APIs, code libraries, debuggers, testing tools, scripting tools, compilers, code generation tools, UI designers, etc

Software Development Tools

- The open source community mostly deals with software and has built excellent software development tools for it
- There are thousands of software development tools in the open source world designed for various purposes
- Leveraging other open source technologies, these tools can be combined together and keep growing on each other

Software Development Tools

- As Linux is an open source platform, most of the open source software development tools are designed for Linux

- Most software tools can be installed through your distribution's repository and are integrated directly into the system with little or no configuration

- Many of the software development tools are designed to leverage others if they are installed;

  Many standard tools are included in Linux by default, such as the Python compiler

Software Development Tools

- In Lab 4, you will install some standard software development tools including frameworks and IDES

- We will be discussing open source software development tools, such as OpenGL, SDL, Mono and various frameworks

Compilers

- Most high level languages require compilers to create binary/bytecode output

- The standard open source ones are
  - C/C++ - gcc / g++
  - Java - openJDK (Not as optimized as Sun's as Java is not open source)
  - Python - CPython
  - C# - Mono
  - OpenGL - Mesa

Compiling Code

- On Linux, most code can be execute from the command line or in scripts with ./

- Examples of execution

C	-	./hello.c
C++	-	./hello.cpp
Perl	-	./hello.pl
Python	-	./hello.py
Bash	-	./hello.sh
PHP	-	php hello.php
C#	-	mono hello.exe
Ruby	-	ruby hello.rb
Java	-	java hello

Compiling Code

- If you installed compilers from the repositories or they were already installed in your Linux distribution, the classpaths have been set for you

- Examples of Compiling

C	-	gcc hello.c
C++	-	g++ hello.cpp
Perl	-	-
Python	-	Automatically compiled
Bash	-	-
PHP	-	-
C#	-	gmcs hello.cs
Ruby	-	-
Java	-	javac hello.java

Frameworks

- You are probably familiar with frameworks and may have used some in the past

- Frameworks are architectural APIs that allow you to build applications and application architectures within the bounds of the framework

- Some frameworks are very flexible and allow you to design your own architecture and applications while some are fairly rigid and only allow you to do set tasks or make pre-designed GUIs

Frameworks

- When we discuss frameworks, we are specifically referring to application frameworks or web application frameworks

- Application frameworks are application structures to allow you to produce installable machine software, such as applications in Android, Gnome, QT or SDL

- Web frameworks are programming structures to allow you to produce server/client side web applications;

  Common web frameworks are: Django, Codeigniter and Ruby on Rails

Frameworks

- Some compiled languages require flags to use frameworks as they may have multiple installation environments/drivers on a machine;

  Some of these are Java, C and C++

  C++ Example:

[compiler]	[-o output_name]	[cpp file]	[libraries with -l]	
g++	-o	hello	hello.cpp	-lSDL -lSDL_image

- Languages like Python, PHP and Perl do not require flags as long as the packages are imported

Portability

- Portability can sometimes be an issue depending your programming language and the frameworks used

- Some languages and frameworks are much more portable than others

  For example, Java is much more portable than C out of the box

- Pretty much any language can be designed to be portable if done correctly, but not all frameworks are easily portable

Portability

- Portability from Linux to other operating systems can sometimes be an issue depending on the languages/frameworks used

- The Windows and Mac environments are very different from Linux;

  Each has their own type of window environment and UI system and are really only consistent in Java

- Executable environments are also very different between each OS

  Examples: Window's C++ execution/parameters are different than gcc
  Mac's Unix environment/shell is almost 10 years behind Linux

Portability

- It is also important to note that portability from one Linux distribution to another can also be an issue

- Not all Linux distributions run the same environment, though most of the time they are completely cross-compatible with one another;

  You may find that certain distributions may not install frameworks to the same location, have libraries installed by default or run the same graphical environment

- In these events, you may need to tweak code and define installation requirements in the installer package, though it is usually much less cumbersome that porting to a different operating system

Integrated Development Environments (IDEs)

- Integrated development environments are programming applications designed to minimize the difficult of development and integrate frameworks and kits

- Though compiling with flags from the command line is good, it may be troublesome, especially when many libraries and frameworks are being used simultaneously

- IDEs allow you to include frameworks and libraries into your "development environment" so you can compile and test easily

IDEs

- IDEs also have common programming features and allow you to compile with multiple languages

- Most IDEs have automation tools and debuggers built in for various languages;

  They may also have support for version control and other plug-ins

- You can usually find an IDE for most purposes and with a varying degree of complexity

  Examples: VIM, Eclipse, NetBeans, Mono, Anjuta, Bluefish