C language in our world

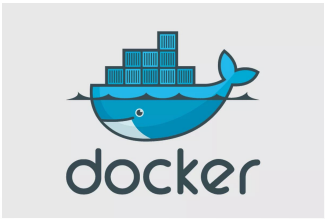
6.5. 2019 FI MUNI
Brno
@jurajmichalek
https://georgik.rocks
https://www.ysofters.com

Grab the source code

https://github.com/ysoftdevs/cpp-examples

Who am I?

YSofters Blog: https://www.ysofters.com



Blog: https://georgik.rocks

C language today

Docker

Console: Minunit, Check, Curl

UI: Allegro5, SDL2, GTK3, QT

Server: CUPS

Gradle

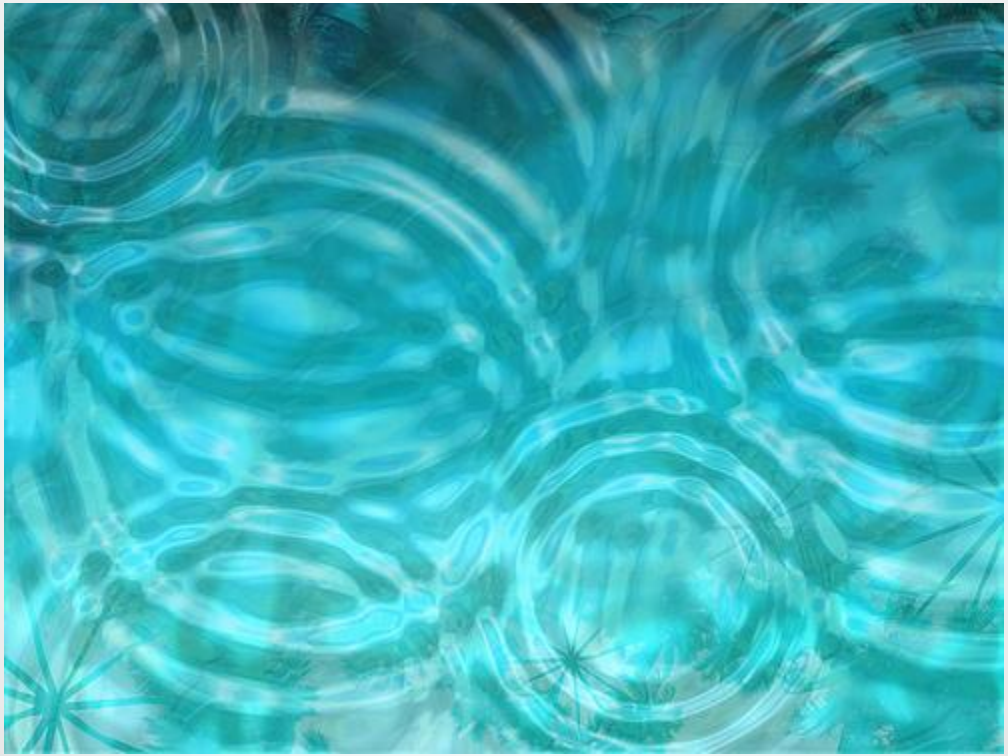
IDEs, NuGet, IoT

Jenkins, Bamboo, TeamCity

Node, Go language

2xFI MUNI theses

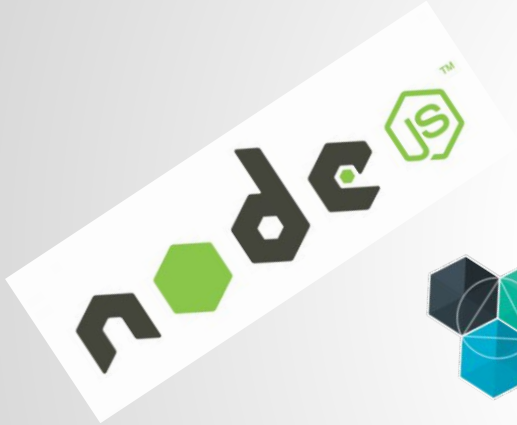
Technologies influencing each other

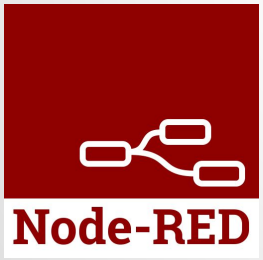


Programming languages we know **strongly** influence the way we think about programming.

- JS Conf 2014 - Jenna Zeigen

Breeze of fresh ideas starts blowing from other technologies...



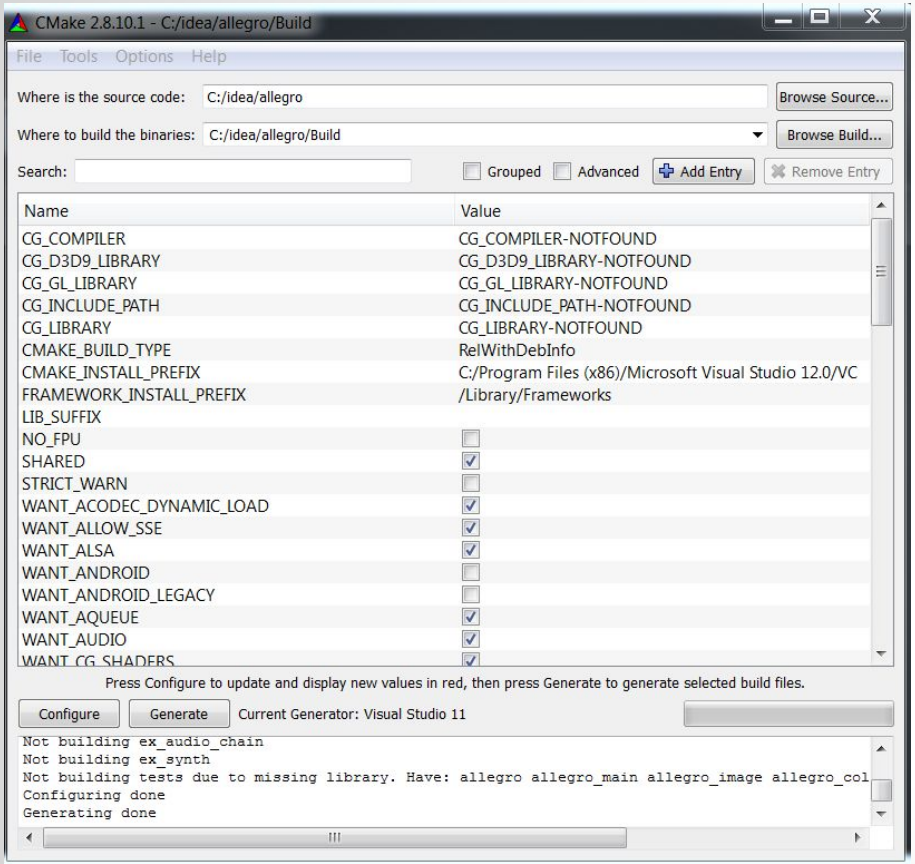


Containers

- Linux based, Windows based
- hub.docker.com


CMake

Allegro


CMake 2.8.10.1 - C:/idea/allegro/Build
File Tools Options Help
Where is the source code: C:/idea/allegro
Browse Source...
Where to build the binaries: C:/idea/allegro/Build
Browse Build...
Search:
Grouped
Advanced
Add Entry
Remove Entry
Name
Value
CG_COMPILER
CG_COMPILER-NOTFOUND
CG_D3D9_LIBRARY
CG_D3D9_LIBRARY-NOTFOUND
CG_GL_LIBRARY
CG_GL_LIBRARY-NOTFOUND
CG_INCLUDE_PATH
CG_INCLUDE_PATH-NOTFOUND
CG_LIBRARY
CG_LIBRARY-NOTFOUND
CMAKE_BUILD_TYPE
RelWithDebInfo
CMAKE_INSTALL_PREFIX
C:/Program Files (x86)/Microsoft Visual Studio 12.0/VC
FRAMEWORK_INSTALL_PREFIX
/Library/Frameworks
LIB_SUFFIX
NO_FPU
SHARED
STRICT_WARN
WANT_ACODEC_DYNAMIC_LOAD
WANT_ALLOW_SSE
WANT_ALSA
WANT_ANDROID
WANT_ANDROID_LEGACY
WANT_AQUEUE
WANT_AUDIO
Press Configure to update and display new values in red, then press Generate to generate selected build files.
Configure
Generate
Current Generator: Visual Studio 11
Not building ex_audio_chain
Not building ex_synth
Not building tests due to missing library. Have: allegro allegro_main allegro_image allegro_col
Configuring done
Generating done

Allegro 5

Win, Lin, Mac

iOS, Android

http://alleg.sourceforge.net/a5docs/refman/

Initialization

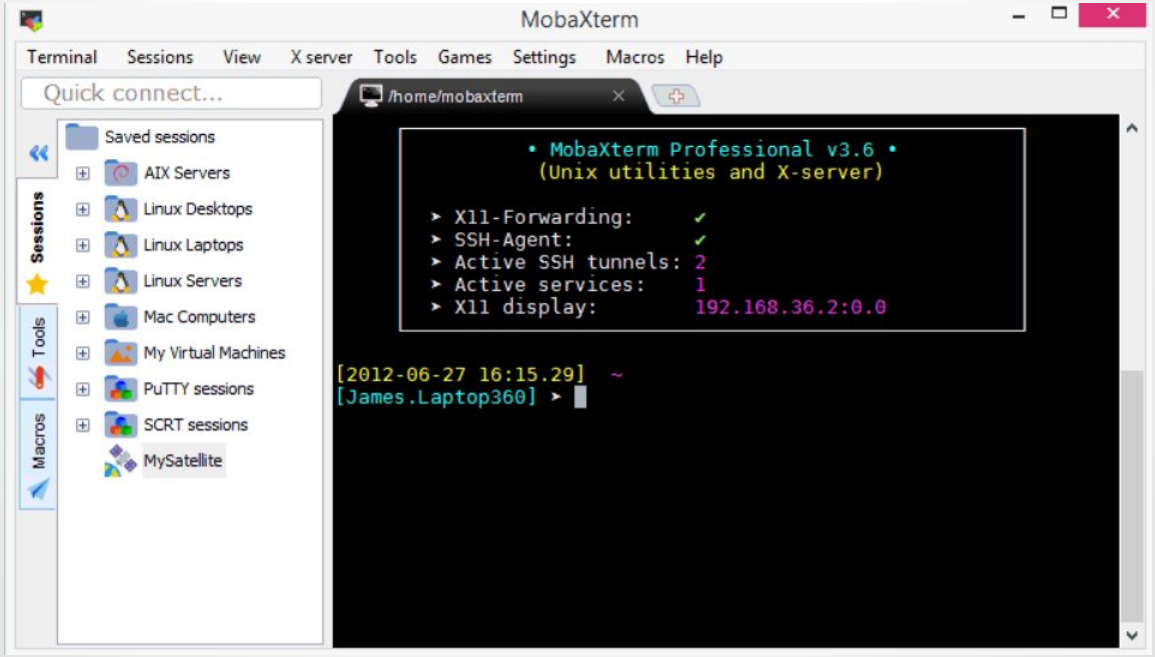
```
al_init();
```

Graphic environment

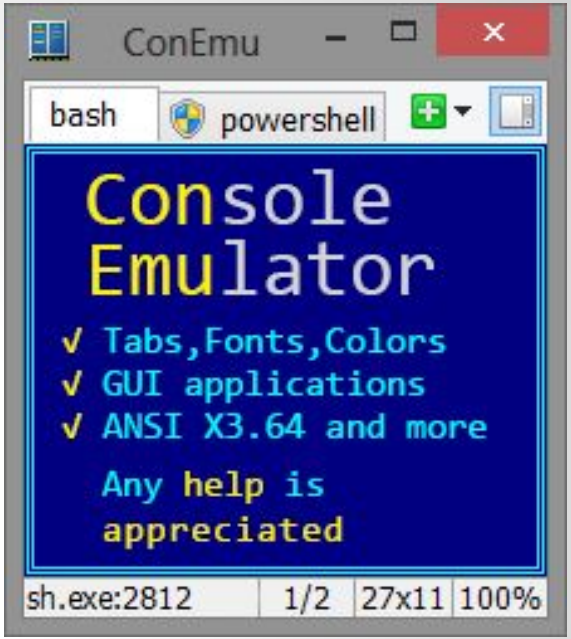
al_create_display(int w, int h)

MobaXTerm

https://mobaxterm.mobatek.net/



Conemu Maximus 5



Powerful terminal for Windows

use with PowerShell, Python, Ruby…

https://code.google.com/p/conemu-maximus5/

chocolatey

CMake 3.0.2

By: scaftw

```
C:\> choco install cmake
```

CMake is a family of tools designed to build, test and package software. CMake is used to control the software compilation process using simple platform and compiler independent configuration files. CMake generates native makefiles and workspaces that can be used in the compiler environment of your choice.

3,884 downloads | Tags make build test package

Yum/Apt-like installation of Win packages

https://chocolatey.org


SDL
Simple Directmedia Layer

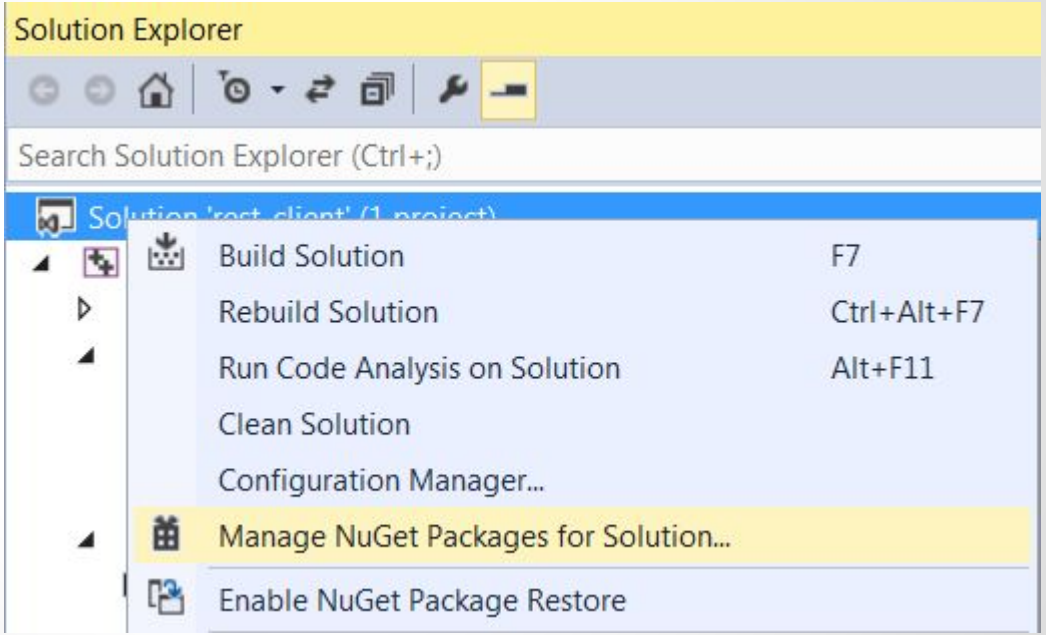
Made with SDL

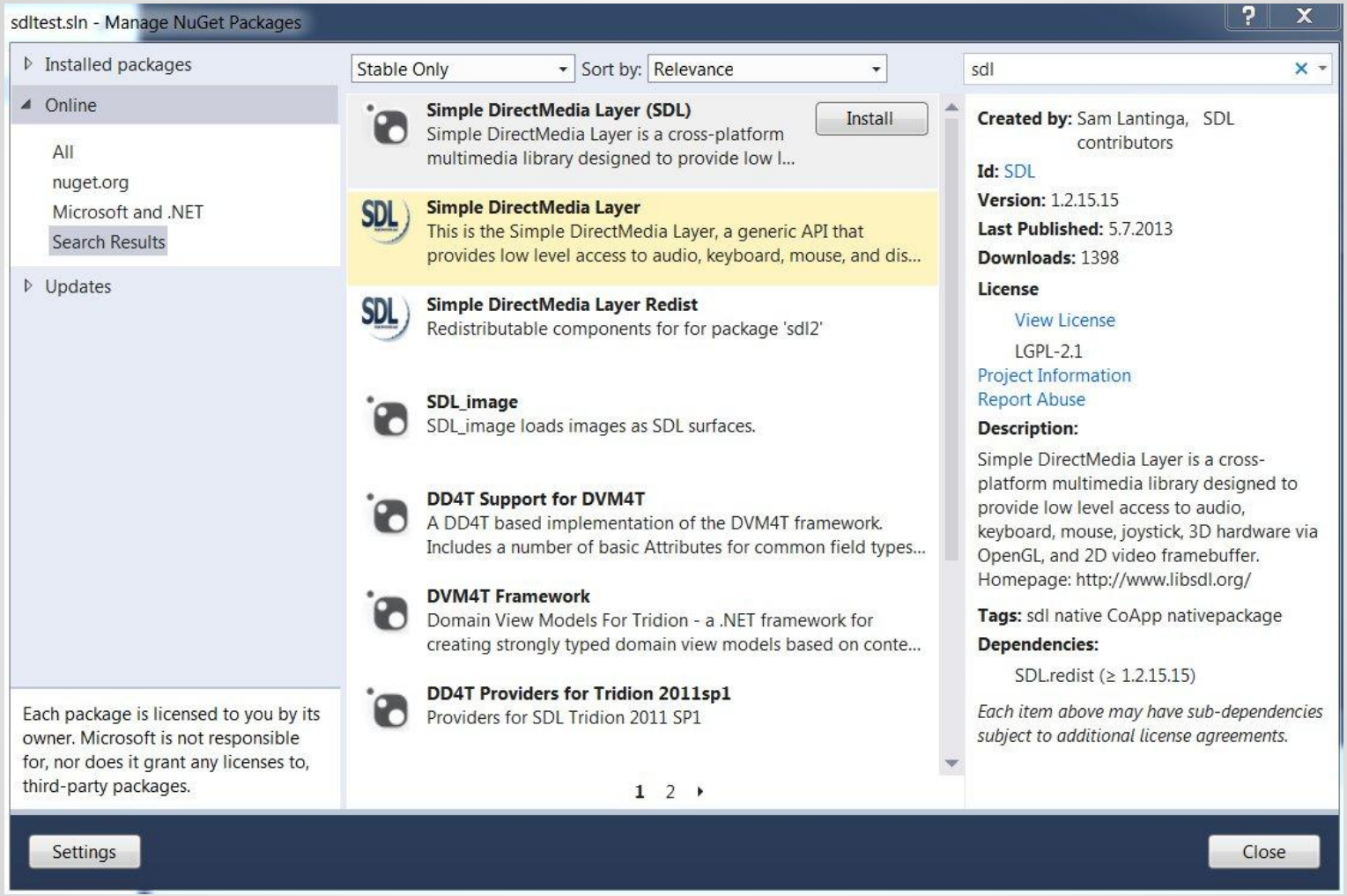
Made with SDL

Made with SDL: Half-Life 2

NuGet - http://www.nuget.org

NuGet.Tools.2013




sdltest.sln - Manage NuGet Packages
Installed packages
Online
All
nuget.org
Microsoft and .NET
Search Results
Updates
Each package is licensed to you by its owner. Microsoft is not responsible for, nor does it grant any licenses to, third-party packages.
Stable Only
Sort by: Relevance
sdl
Simple DirectMedia Layer (SDL)
Simple DirectMedia Layer is a cross-platform multimedia library designed to provide low l...
Install
Simple DirectMedia Layer
This is the Simple DirectMedia Layer, a generic API that provides low level access to audio, keyboard, mouse, and dis...
Simple DirectMedia Layer Redist
Redistributable components for for package 'sdl2'
SDL_image
SDL_image loads images as SDL surfaces.
DD4T Support for DVM4T
A DD4T based implementation of the DVM4T framework. Includes a number of basic Attributes for common field types...
DVM4T Framework
Domain View Models For Tridion - a .NET framework for creating strongly typed domain view models based on conte...
DD4T Providers for Tridion 2011sp1
Providers for SDL Tridion 2011 SP1
1 2
Created by: Sam Lantinga, SDL contributors
Id: SDL
Version: 1.2.15.15
Last Published: 5.7.2013
Downloads: 1398
License
View License
LGPL-2.1
Project Information
Report Abuse
Description:
Simple DirectMedia Layer is a cross-platform multimedia library designed to provide low level access to audio, keyboard, mouse, joystick, 3D hardware via OpenGL, and 2D video framebuffer. Homepage: http://www.libsdl.org/
Tags: sdl native CoApp nativepackage
Dependencies:
SDL.redist (≥ 1.2.15.15)
Each item above may have sub-dependencies subject to additional license agreements.
Settings
Close

Multiplatform

SDL officially supports
Windows, Mac OS X, Linux, iOS, and Android.

Support for other platforms may be found in the source code.

SDL versions

1.2 stable - rock solid

2.x development - new features

SDL_init(flags)

SDL_INIT_TIMER - The timer subsystem

SDL_INIT_AUDIO - The audio subsystem

SDL_INIT_VIDEO - The video subsystem

SDL_INIT_CDROM - The cdrom subsystem

SDL_INIT_JOYSTICK - The joystick subsystem

SDL_INIT_EVERYTHING - All of the above

SDL_INIT_NOPARACHUTE - Prevents SDL from catching fatal signals

SDL_INIT_EVENTTHREAD - Runs the event manager in a separate thread

Quit application

SDL_quit()

Window

```
SDL_CreateWindow("Hello World!", 100, 100,
640, 480, SDL_WINDOW_SHOWN);
```

Load bitmap

```
SDL_Surface *bmp = nullptr;
bmp = SDL_LoadBMP("smajlik.bmp");
```

Visual data

SDL_Renderer

SDL_Texture

Keyboard

SDL_PollEvent(SDL_Event *event)

event.key.keysym.sym

Timer

```
SDL_TimerID SDL_AddTimer(
  Uint32              interval,
  SDL_TimerCallback callback,
  void*               param)
```

Mouse

SDL_GetMouseState(*x, *y);

Text

Not implemented

Extensions

extension for many languages:

C++, Java, PHP, Python, Ruby

PyGame

Power of C and Power of Python

http://www.pygame.org

Kivy.org

iOS
Android
Windows Desktop
Windows Phone
Raspberry Pi

Cross-platform development of smartphone application with the Kivy framework - Master thesis - Mgr. Ondřej Chrastina: http://is.muni.cz/th/430596/fi_m/

Gradle Native Builds
C/C++, Objective-C

http://gradle.org/getting-started-native/

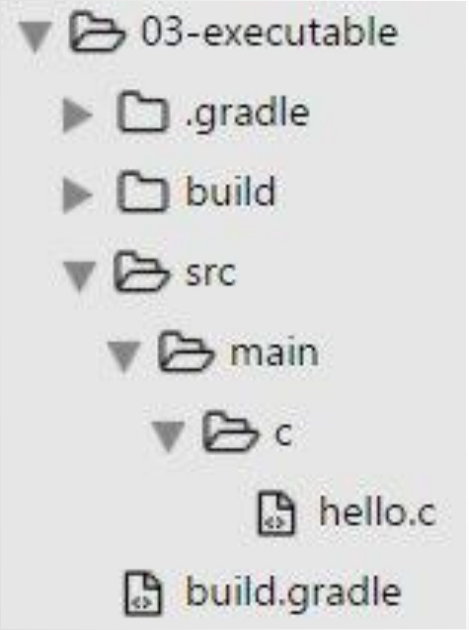
Build tool

Exensible by plugins

Power of Domain Specific Language

http://plugins.gradle.org

Project structure



Convention over configuration

Decrease number of decisions that developers need to make

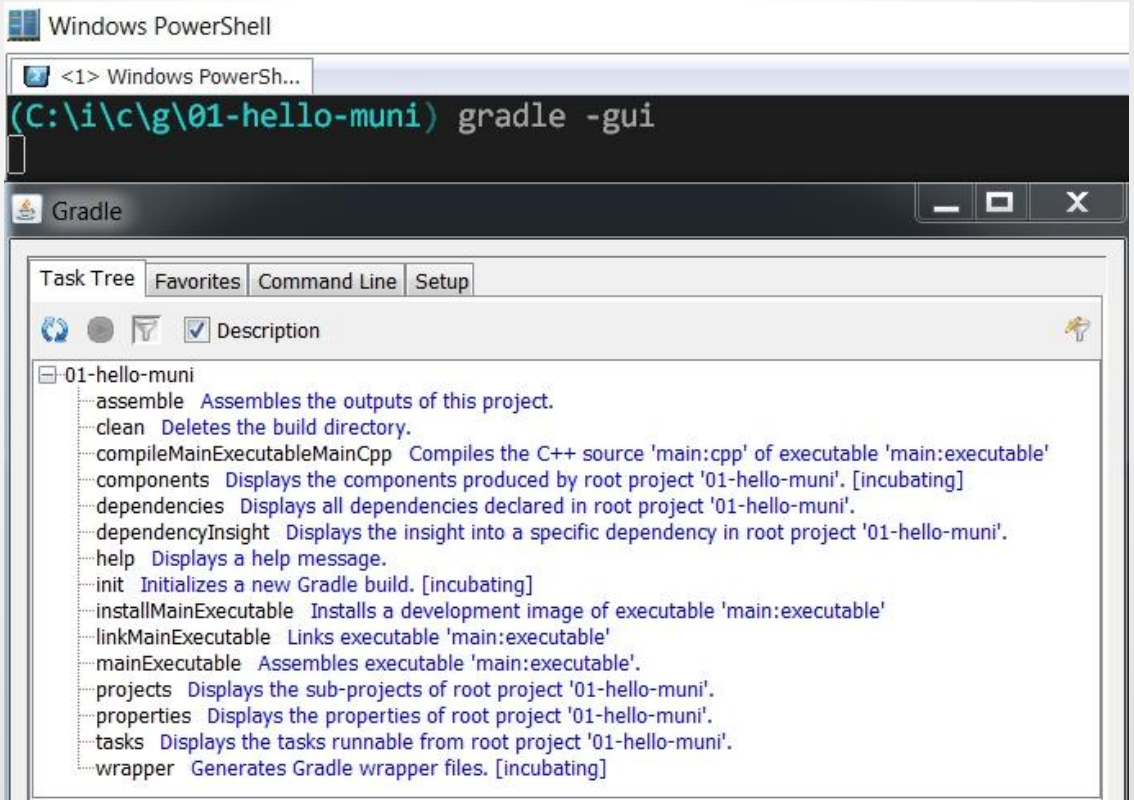
http://en.wikipedia.org/wiki/Convention_over_configuration

C plugin

build.gradle

```
1  apply plugin: 'c'
2
3  model {
4      components {
5          main(NativeExecutableSpec) {
6
7          }
8      }
9  }
```

Gradle command line & GUI



gradle components

```
(C:\i\c\g\03-executable) gradle components
:components

------------------------------------------------------------
Root project
------------------------------------------------------------

Native executable 'main'
------------------------

Source sets
    C source 'main:c'
        src\main\c

Binaries
    Executable 'main:executable'
        build using task: :mainExecutable
        install using task: :installMainExecutable
        platform: windows_x86
        build type: debug
        flavor: default
        tool chain: Tool chain 'visualCpp' (Visual Studio)
        executable file: build\binaries\mainExecutable\main.exe
```

Gradle build Linux package

Netflix Nebula OS Package plugin:

http://plugins.gradle.org/plugin/nebula.os-package

```
plugins {
  id "nebula.os-package" version "2.0.3"
}

apply plugin: 'c'

model {
    components {
        hello(NativeExecutableSpec) {

        }
    }
}

ospackage {
    packageName = "hello"
    version = "1.0"
    release = 1
    os = LINUX
    packageDescription = "Linux Gradle hello package"
    summary = "contains binary with hello world example"

    from("build/binaries/helloExecutable") {
        into "/usr/bin/"
    }
}

buildDeb {
    requires("libc6")
}

buildRpm {
    requires("libc6")
}
```

Build package

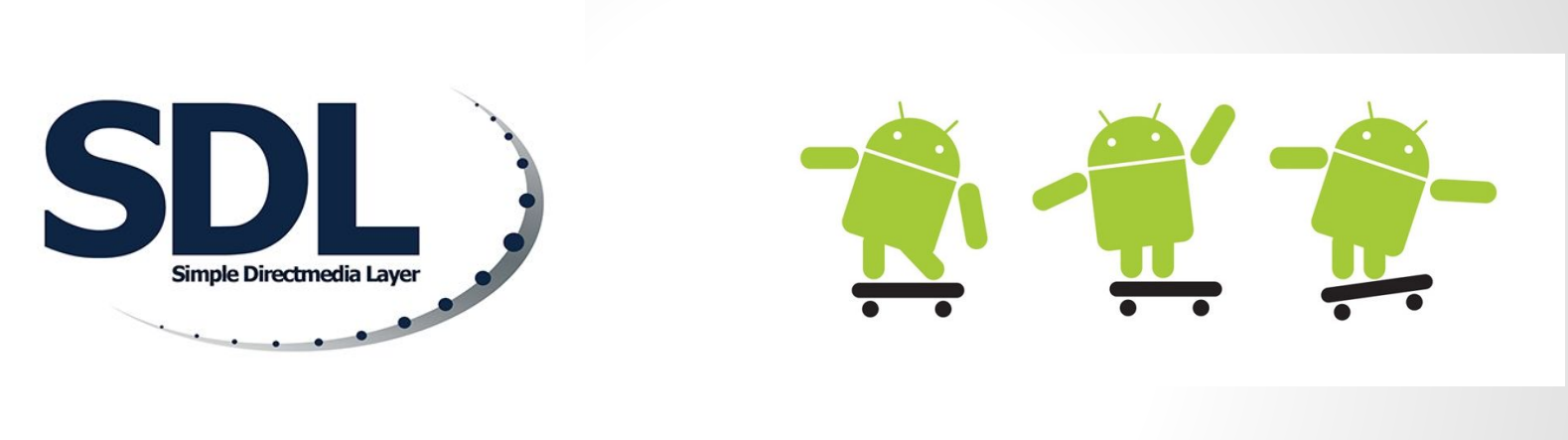
```
┌─(georgik@pidi:pts/5)──(...-plugin/04-hello-linux-package)─┐
└─(17:33:%)── gradle hE bD                          ──(Sat,Dec06)─┘
:compileHelloExecutableHelloCpp
:linkHelloExecutable
:helloExecutable
:buildDeb

BUILD SUCCESSFUL

Total time: 7.12 secs
┌─(georgik@pidi:pts/5)──(...-plugin/04-hello-linux-package)─┐
└─(17:33:%)── dpkg -c build/distributions/hello_1.0-1_all.deb
drwxr-xr-x georgik/0         0 2014-12-06 17:33 ./usr/
drwxr-xr-x georgik/0         0 2014-12-06 17:33 ./usr/bin/
-rwxr-xr-x georgik/0      6367 2014-12-06 17:33 ./usr/bin/hello
```

Note: Gradle supports abbreviation. You can write hE instead of helloExecutable

SDL2 and Android



Android Studio + NDK + Gradle

https://github.com/georgik/sdl2-android-example

https://georgik.rocks/tag/sdl2/

GTK

https://www.gtk.org/

YSoft + CUPS + QT

Thesis:

Dávid Kaya - Linux client for YSoft SafeQ

https://is.muni.cz/th/409878/fi_b/

CUPS

https://github.com/apple/cups

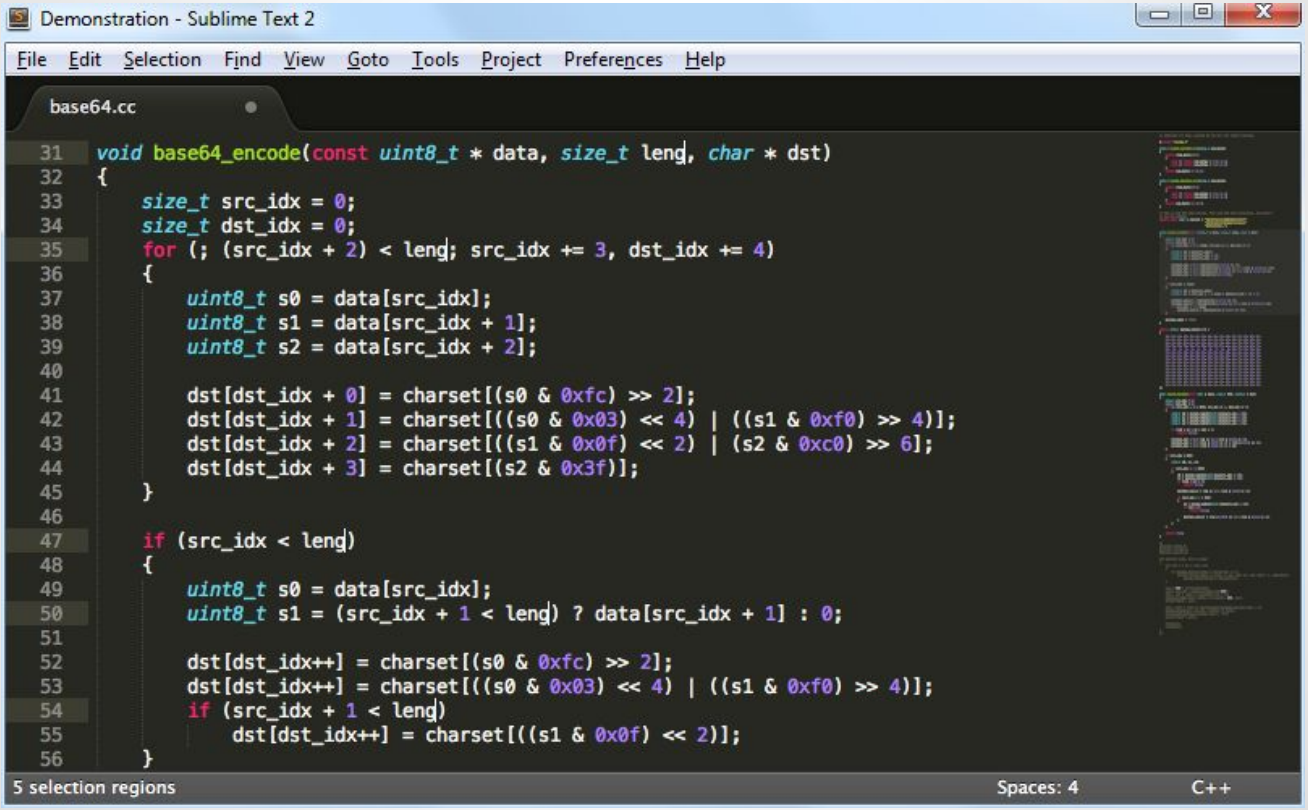
Server, backend, filter

IDE & Text editors

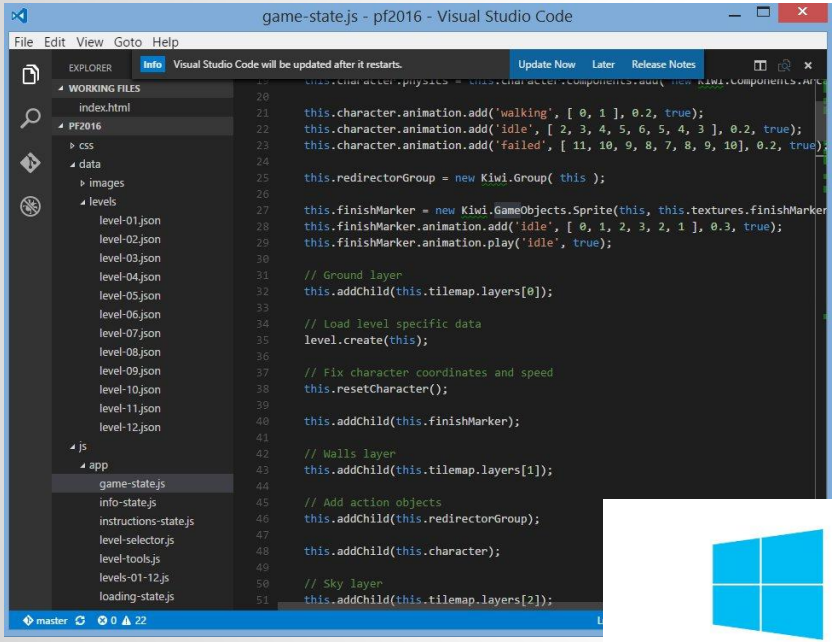
A hackable text editor
for the 21st Century

https://atom.io/

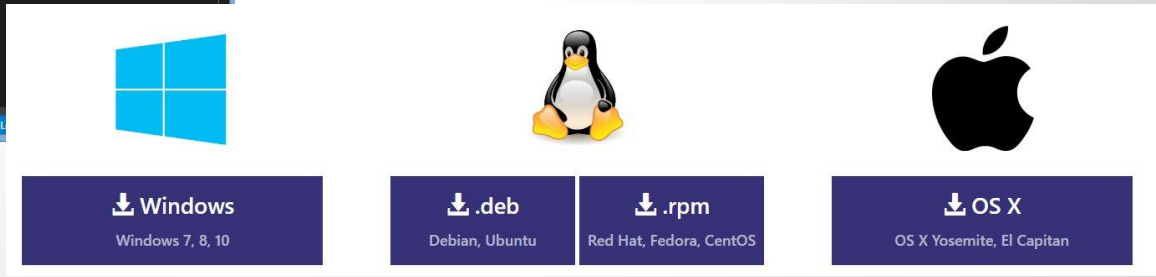
Sublime Text



Visual Studio Code

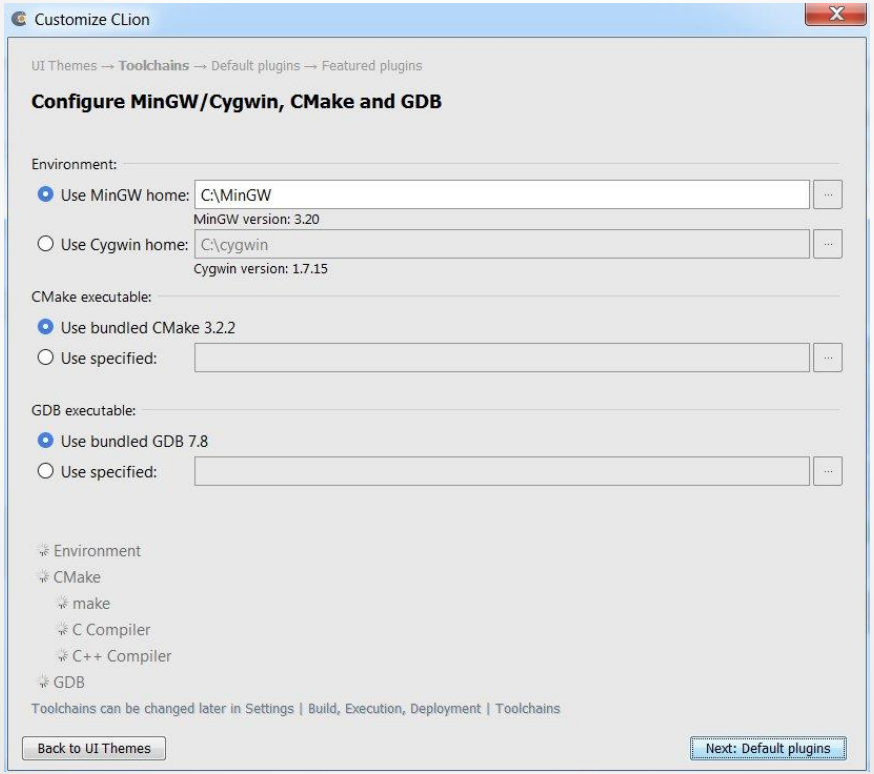


Code editing. Redefined.
- https://code.visualstudio.com/



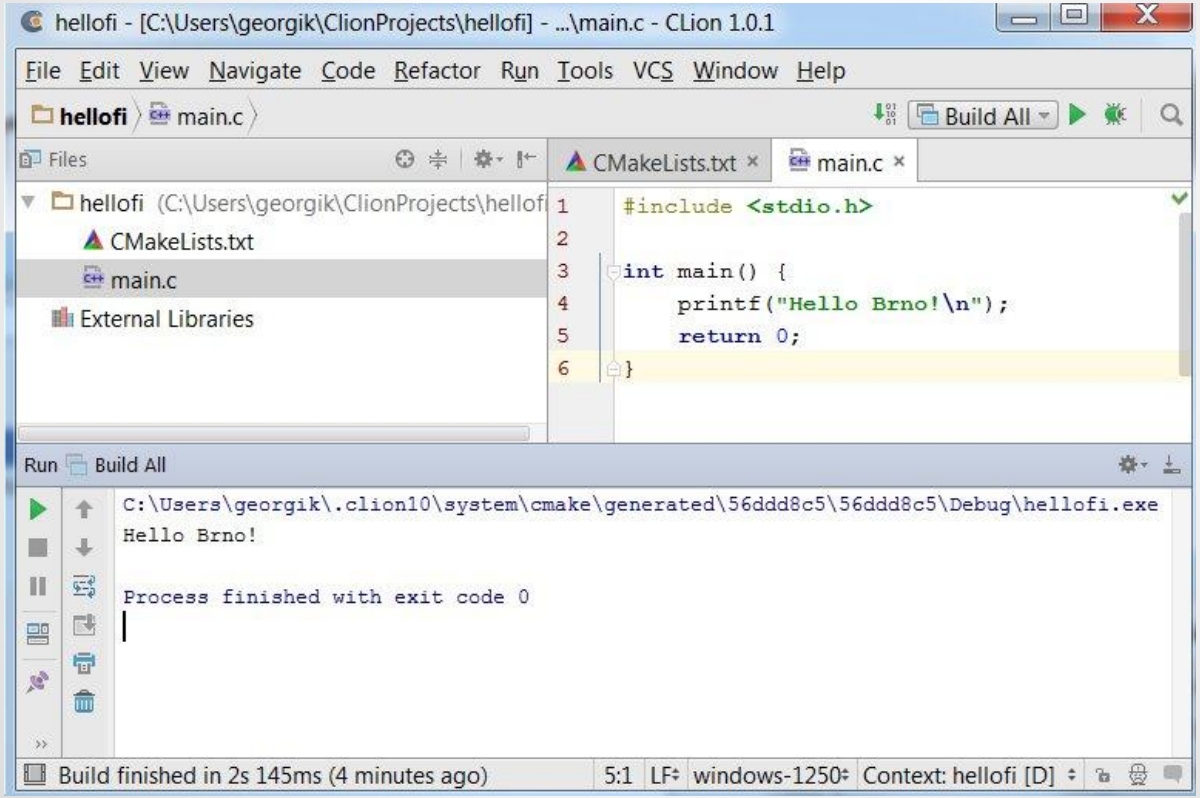

CLion

Toolchain detection



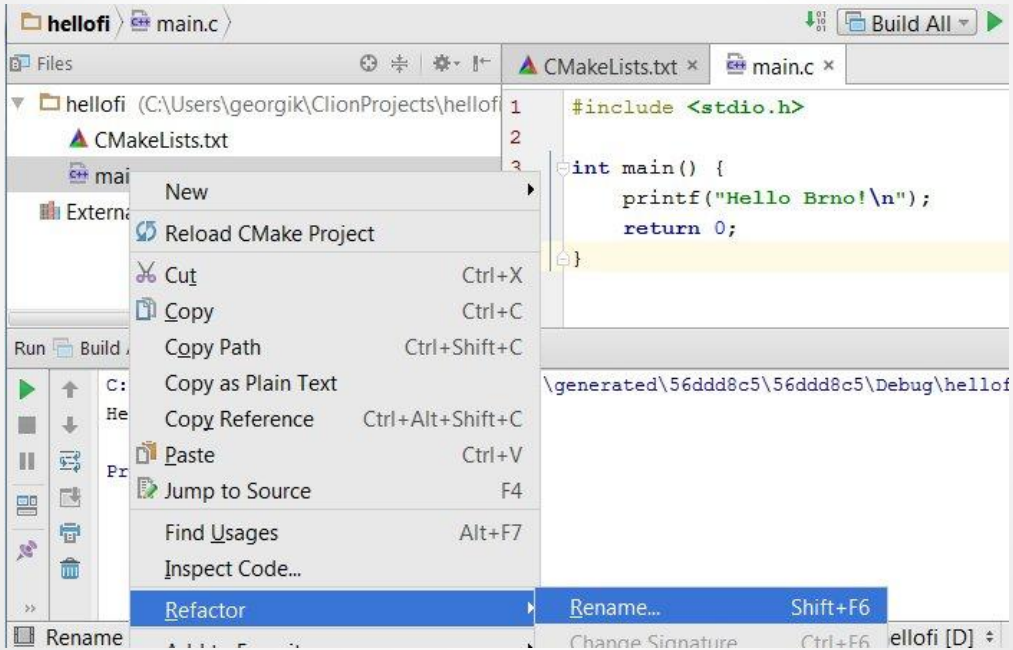
Edit project

CLion



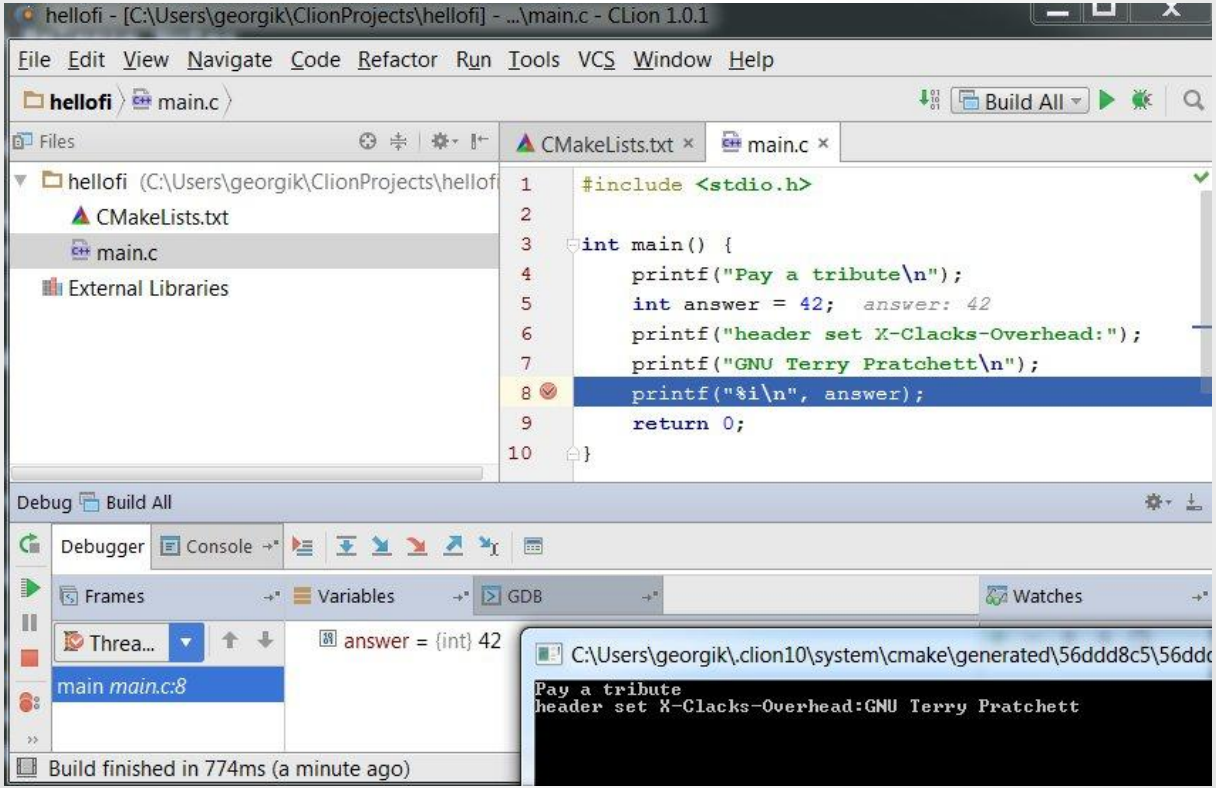
Leverage Refactor

CLion



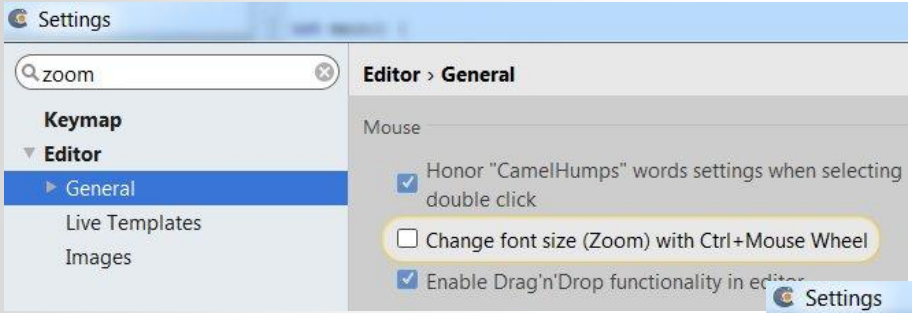
Use Debugger

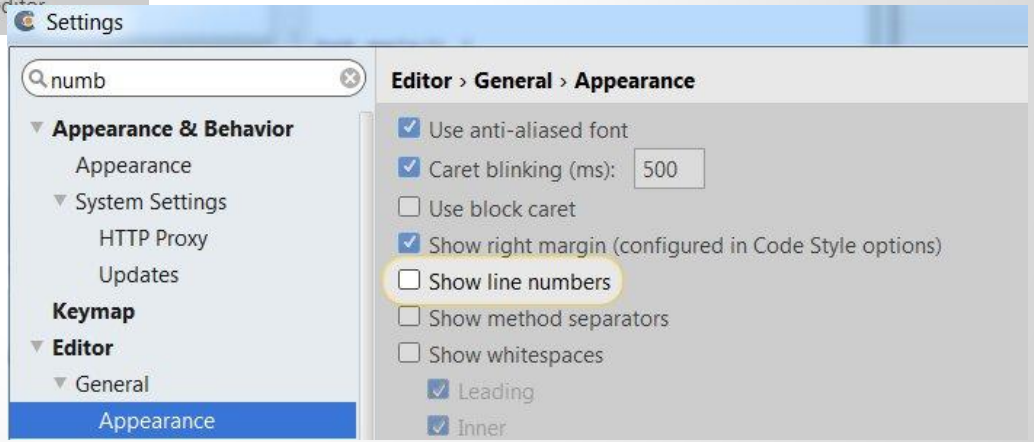
CLion



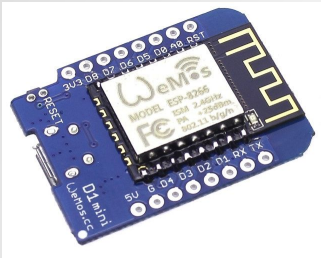
Fine tune

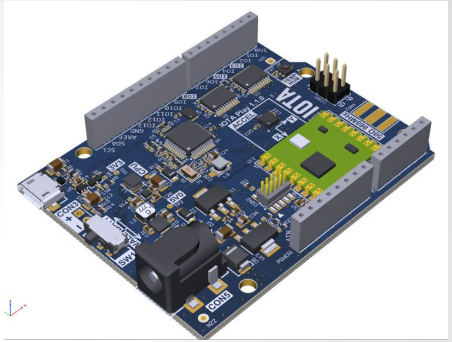
CLion





Disabled by default for all JetBrains tools :-(





C in embedded and IoT world

Arduino + Platform IO

http://platformio.org/

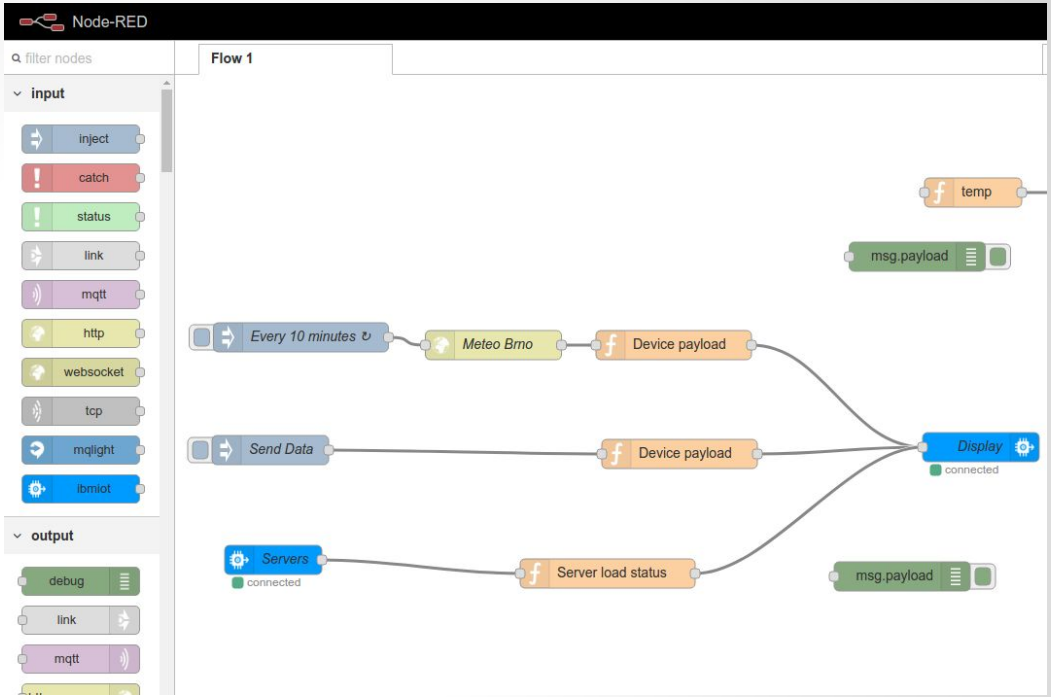
LampESP example

https://github.com/georgik/LampESP

- OTA
- WifiManager
- Web Server
- MQTT Client (works also with Bluemix)
- TaskScheduler (async style)

More info: http://georgik.rocks/category/iot/

Node-RED



https://nodered.org/

Monkey C

Garmin Connect IQ

- https://developer.garmin.com/connect-iq

Iot-inc - podcast

http://www.iot-inc.com/category/mediatype/podcasts/

Continuous integration

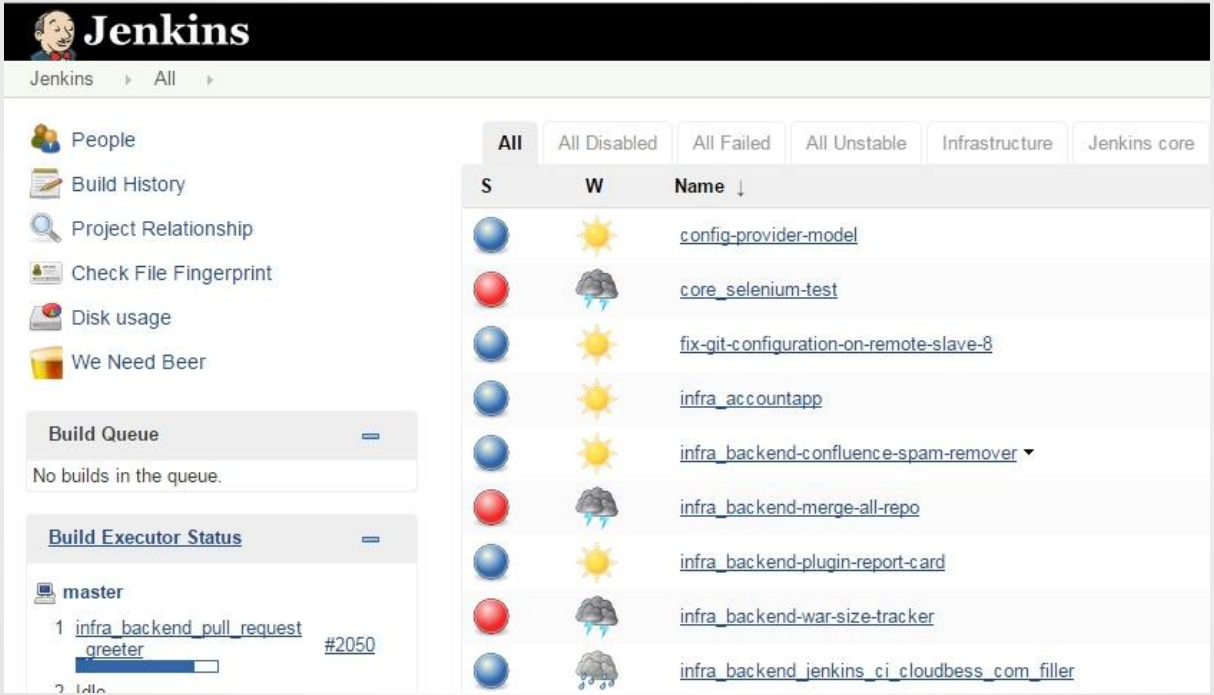
Jenkins

Atlassian

Bamboo

TeamCity

Jenkins



Hit for Windows users: Do not install Jenkins into path with special characters and blank space.
E.g: Wrong: C:\Program Files (x86)\Jenkins. Correct: Use C:\projects\jenkins

From desktop to cloud

Software is slow

Software is hard to write

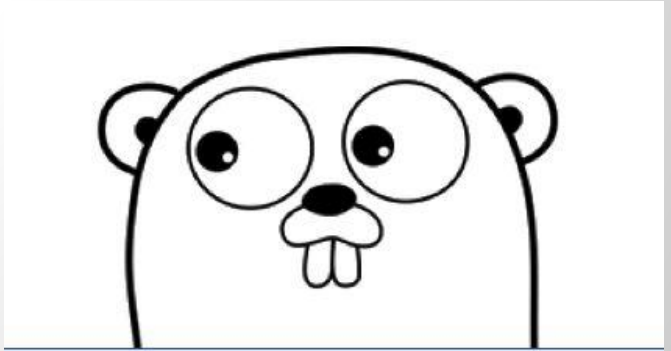
Software is hard to scale

Go

http://golang.org

Authors:

- Ken Thompson - known for Unix
- Rob Pike - known for UTF-8
- Robert Griesemer



Main features of language

syntax patterns from dynamic languages

performance of C

blazing fast compilation

output one binary

concurrency

libraries from internet (e.g. Github)

works on: Mac, Linux, Windows and more...

Materials

Andreas Krennmair

http://synflood.at/tmp/golang-slides/mrmcd2012.html#1

Steve Francia

http://spf13.com/presentation/first-go-app/

Thanks to artists

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http://www.flickr.com/photos/teveve/6301993588/
http://www.flickr.com/photos/stevewilhelm/6242822362/
http://en.wikipedia.org/wiki/Chess
http://www.flickr.com/photos/akosma/9486807123/
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http://commons.wikimedia.org/wiki/File:Dark_Sky_(3274525313).jpg
http://www.elfwood.com/~arknott/Red-Dragon.2539297.html
http://commons.wikimedia.org/wiki/File:Wolf-River-swamp-North-Mississippi.jpg
http://pako0007.deviantart.com/art/Zombie-Imp-2-267822507
http://www.flickr.com/photos/bogenfreund/367091428/
http://www.flickr.com/photos/infinite-magic/4016608841/
http://www.flickr.com/photos/lennysan/4403695597/
http://www.flickr.com/photos/avaverino/4870587458/

L10N - verify your translations

http://www.microsoft.com/Language

Swiss knife tool for web https://curl.haxx.se/

Generate source code:

curl http://www.ysoft.com -o index.html --libcurl download.c

The future is already here — it's just not very evenly distributed.

YSofters

Twitter: @ysoftdevs

GitHub: github.com/ysoftdevs

Blog: www.ysofters.com

Thesis: Andrij.Stecko@ysoft.com