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Getting Started with Linux Game Development

# A few notes...

- Feel free to interrupt!
- Slides are at <https://icculus.org/SteamDevDays/>
- Today is a high-level overview.

# Who am I?

- Hacker, game developer, porter
- Port games, build tools
- Freelance
- 15 years experience





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TEAM MEAT



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Games

mode7



EPIC  
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klei entertainment



TRIPWIRE  
INTERACTIVE



КРАНХ  
productions



LAZY 8 STUDIOS.









# Why Linux?

- New, unsaturated market
- Low barrier to entry
- No walled garden
- SteamOS and Steam Machines

# MythBusting

- Distro fragmentation isn't real
- Most hardware is supported
- GPU drivers are good
- Linux users spend money on software
- Tech you need is available for Linux

# The Good News

- Middleware is largely available
- Engines you use (Unity3D, etc) work
- Tools you use (Perforce, etc) work
- Cool new tech (Oculus, etc) work



# The Bad News

- If you need Visual Studio, this is harder.

# So wait...no Visual Studio?!

- Emacs and vi
- Sublime Text
- QtCreator
- Code::Blocks
- Eclipse
- Many other options



# The Porting Process

# Start with Windows

- Move to SDL2 on Windows
- Move to OpenGL on Windows
- *Then* start port to Linux



# Get it compiling

- GCC, Clang, Intel C++
- Makefiles, CMake, Premake, scons

# Mining from VS2008 .vcproj

```
<File  
  RelativePath="src\audio\player.cpp"  
>
```



# Mining from VS2010 .vcxproj

```
<ClCompile Include="src\audio\player.cpp" />
```

# When in doubt, stub it out

```
#define STUBBED(x) printf("STUBBED: %s\n", x)
```



# When in doubt, stub it out

```
#define STUBBED(x) do { \  
    static bool seen_this = false; \  
    if (!seen_this) { \  
        seen_this = true; \  
        fprintf(stderr, "STUBBED: %s at %s (%s:%d)\n", \  
            x, __FUNCTION__, __FILE__, __LINE__); \  
    } \  
} while (0)
```

# When in doubt, stub it out

```
MessageBox(hwnd, “Out of memory”, “Error”, 0);
```



# When in doubt, stub it out

```
#if WINDOWS
```

```
MessageBox(hwnd, “Out of memory”, “Error”, 0);
```

```
#else
```

```
STUBBED(“Need a Linux msgbox”);
```

```
#endif
```

# Don't do this.

```
#if LINUX  
    some_non_windows_thing();  
#endif
```

# Do this!

```
#if !WINDOWS  
    some_non_windows_thing();  
#endif
```



# Definitely don't do this.

```
#if WINDOWS  
    some_windows_thing();  
#elif PLAYSTATION  
    some_ps_thing();  
#endif
```

# Do this!

```
#if WINDOWS
```

```
    some_windows_thing();
```

```
#elif PLAYSTATION
```

```
    some_ps_thing();
```

```
#else
```

```
    #error Oh no.
```

```
#endif
```

# Inline assembly

```
_asm {  
    mov ecx, 1  
    mov eax, ecx  
}
```



# Inline assembly

```
__asm__ __volatile__ (  
    “movl $1, %%ecx \n”  
    “movl %%ecx, %%eax \n”  
    : “a”  
      : /* no inputs */  
    : “ecx”  
);
```

# Inline assembly

- Don't use inline asm. Ever.
- Seriously, don't do it.
- Compiler intrinsics
- SDL2 atomics, `SDL_GetTicks()`, `SDL_GetPerformanceCounter()`, etc.
- `nasm`

# Get it compiling

- Stub out problem code
- Fix simple things now
- Don't touch anything else (for now)



# Get it linking

- Middleware
- System dependencies

# Get it running

- Use SDL2!
- Use OpenGL!
- (maybe) Use OpenAL!
- Use the Steam Runtime!

# Filesystem gotchas

- Its paths are '/' instead of '\\'
- It's single root, no drive letters
- It's more locked down
- It's multiuser
- It's always Unicode (sort of)
- It's case-sensitive!



# Unicode

- All system calls and filenames are UTF-8
- “wchar\_t” is UCS-4 (32 bits per codepoint)
- Memory bloat isn’t usually an issue, serialization is
- iconv, or roll your own

# Get it debugged

- GDB 7
- UndoDB
- WinGDB
- VisualGDB
- QtCreator
- Valgrind
- LLVM's AddressSanitizer
- See next two talks in this room!

# Debugging OpenGL

- ApiTrace
- gDebugger
- See Jason/Rich/Dan's talk, immediately following this one.

# Get it optimized

- perf
- Zoom
- ApiTrace
- Telemetry



# Get it shipping

- Simple tarballs
- MojoSetup
- Ship it on Steam!
- Avoid distro packages

# Contact me

- <https://icculus.org/SteamDevDays>
- [icculus@icculus.org](mailto:icculus@icculus.org)
- @icculus on Twitter
- <http://gplus.to/icculus>
- (If you hire me, you can forget this whole talk!)

# Other talks to see

- Moving your game to OpenGL: 3pm today, this room
- Getting started Debugging on Linux: 4pm today, this room
- Breakout: Programming on Linux, OpenGL: 5pm today, this room
- Beyond Porting: 3pm tomorrow, this room
- Game Development with SDL 2.0: 5pm tomorrow, Room 611/613