Developing Unity Games for SteamOS/Linux

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Unity is a 2D and 3D content creation toolkit and runtime.

Unity is most commonly used to make video games, but is also used in simulation, education, and other spaces where 2D and 3D content has an important role.



#### 5.5M USERS

have registered with Unity

#### 238K UNIQUE TITLES

downloaded in Q2 2016

#### 770M PEOPLE

playing Unity-made games

#### **1.7B** MOBILE DEVICES

running Unity-made games



# But first, who is this woman, and why is she talking to me?

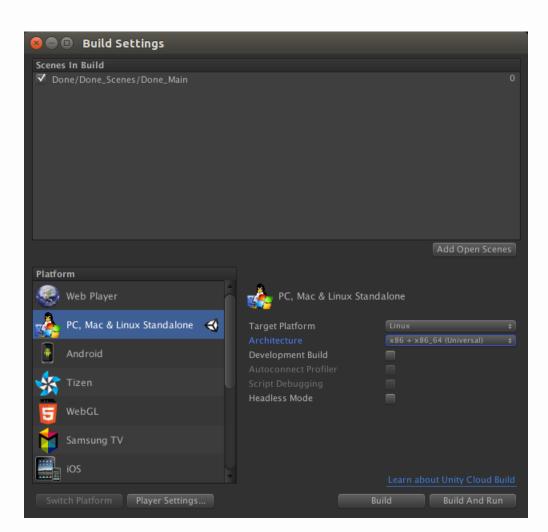




#### Na'Tosha Bard

Technical Director for R&D Unity Technologies





#### Building for Linux/SteamOS

#### Just click the build button.



# Building for Linux/SteamOS

- What can I build?
  - x86, x86\_64, and "Universal" Builds available
  - Headless Option
- What's needed to run the game?
  - Basically only a C++ runtime and sufficient OpenGL capabilities
  - We minimize dependencies and link most things statically
  - We only ship what we actually need (like our bundled subset of the Mono runtime and framework, which is heavily customized)
  - If you're using plugins that require other dependencies, the system will require them

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# Building for Linux/SteamOS

What systems does Unity support?

- Ubuntu 12.04+
- OpenGL core profile 3.2+
  - Unity switched to a different OpenGL implementation in 5.3
  - Unity 5.3 / 5.4 have option to force legacy OpenGL (2.1+)
  - Unity 5.5 and later do not have this
- Vendor-supported drivers
  - NVIDIA
  - AMD
  - Intel



# Building for Linux/SteamOS

What about other Linux distributions?

- Usually it just works
  - System needs compatible C++ runtime version (can use the Steam Runtime) and OpenGL capabilities
- Feel free to report issues
  - No guarantees, but we try to respond to issues reported on non-Ubuntu systems (as long as setting up an environment is not too costly)





How to avoid the traps.



Case Sensitivity

• Usually around the area of trying to load resources or assets in a case-blind manner



Gamepads

- Gamepad layouts are different on Linux than they are on Windows
- In addition to configuring input with Unity's input manager, we support configuring game pads through:
  - Steam Big Picture
  - SDL\_GAMECONTROLLERCONFIG



Locale

- Unity Quirk: On Linux, Unity respects locale of its parent shell, whereas on OS X it doesn't
- Most commonly results in Linux-specific problems when parsing floats
  - 1.53 gets interpreted as 1530
- If problem goes away when setting LC\_ALL=C, this is your problem
  - Test other locales by setting locale in the shell before running your game (example: LC\_ALL=FR\_fr)



OpenGL vs. Direct3d

- Unity handles most of the differences
- Users and user code may be relying on undefined behavior
- Sometimes specs are ambiguous
  - Ambiguous specs are generally interpreted in the most convenient way by each driver team
  - Problems often show up with shaders (no good diagnostics for shaders)







Unity 5.x ships with newer OpenGL support

- Lots of new OpenGL goodies
  - OpenGL 4.3 with compute, tessellation and geometry shader cross compilation from HLSL/Cg
  - Rendering quality parity with Direct3d11
  - GPU Skinning
  - Texture 2D array
  - GPU copy texture (directly on the GPU)
  - BC7 texture compression format
- Support for OpenGL 4 was a very common request when we first released Linux support



Switch to SDL2

- We've been using X11 directly
- Motivation: Prepare to support alternate display managers without maintaining multiple implementations (like Wayland and Mir)



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Vulkan Support

- Coming soon
- Preview build with experimental Vulkan support shipped in September





#### Our Thoughts on Linux as a Gaming Platform



# Progress in Linux Gaming

- ~2750 Linux Games on Steam now
  - A large percentage of these are Unity games
- Steam and Valve's push behind Linux
- SDL2 shipped with better licensing
  - Unity can use LGPL libraries on the desktop, but we prefer not to if possible
- Wayland and Mir are coming along
  - Not there yet.



#### Problem Areas

GPU Drivers

- Standard Stuff
  - Bugs
  - Competing implementations for ambiguous specs
- Graphical debugging tools are still poor





#### The Linux Editor



### The Linux Editor

- The editor for Linux is shipping as an experimental build
  - Older versions were released from a fork of our mainline codebase, so Linux builds lagged main releases a bit
  - For 5.5+, the Linux editor code is integrated into the main codebase, which has decreased the lag
    - Not yet planned to ship it with non-experimental status
- Can be used to reduce iteration times when building/testing Unity games on Linux



#### Questions?

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