Cross-platform architecture

Cross-platform platform

www.libretro.com
RetroArch

- A cross-platform architecture
- The reference frontend to an API
- An app library/ecosystem of its own
- A no-strings-attached enduser program
- A project with multiple stakeholders
  - Open source development community
  - Hardware vendors
  - Allied open source projects (XBMC, OpenEmu)
RetroArch

- Goals/ambition
  - Create an all-encompassing platform on top of all existing platforms/operating systems/ecosystems
  - Any time, any place, any device
  - Backend and frontend compartmentalization
  - 1 Codebase per app
Libretro

- A lightweight C/C++ API
- Works according to backend/frontend principle
  - Backend application talks with frontend by way of API
- Facilitates input/audio/video/camera/location streams
  - for use in games/media players/graphics applications
  - Augmented reality
• Runs on nearly all available platforms/operating systems
  • Apps run on every platform
    • With added value (shaders, rewinding, input support, etc)
    • Are loaded in as module inside the frontend app
      • Dynamic library (Position Independent Code)
    • No recompilation of the frontend (RetroArch) necessary
Libretro

Application → Libretro core → RetroArch

Libretro API

Dynamic or static library
Libretro frontend

- Reference implementation
  - RetroArch
    - Platform agnostic
    - Performance-focused
    - Advanced features (shaders, overlays, rollback, etc)
    - Implements new features of the API first
    - Puts a heavy emphasis on performance and code clarity

Other implementations

- XBMC (RetroPlayer)
- Arcan
- Minir (upcoming)
Shaders

- Three totally different implementations
  - 1 Codebase
    - Can convert Cg to GLSL through off-line conversion script
    - Cg maps mostly to raw HLSL
Audio driver context

- OpenSL
- OpenMAX
- Xaudio (Microsoft)
- CoreAudio

Operating Systems:
- Android
- Windows (desktop)
- Windows RT
- iOS
- OSX
Input driver context

- XInput
- DirectInput
- SDL
- Android
- iOS
- Proprietary
RetroArch

- Overlay context
- OpenGL
  - Android
  - iOS
  - Windows (Desktop)
  - Blackberry
- Direct3D
  - Windows (Desktop/Metro)
  - Windows RT/Phone
Has its own software library of apps

- Made possible by libretro API
- Collection:
  - Games
  - Emulators
  - Media players
  - 3D apps
  - Augmented reality
Usecase

- Playing games
  - Game ports
  - Emulators
- Movies/music/media
  - Media player implementations
- Streaming
- Augmented reality

Userbase

- Mobile (Android/iOS)
- PC (Windows/OSX)
- Game consoles
- Embedded
What RetroArch/libretro is trying to achieve

- A platform / ecosystem made available on top of all other pre-existing platforms
- A real-time, open-source alternative for rapid-deployment, cross-platform development
- Non-game/emulator usecases
  - Gaming is going to meet CAD, home automation, augmented reality, and more
- A bare-bones, non-restrictive alternative to more restrictive would-be competitors
- Is already in use worldwide, now up to 300,000 hits on Google Play Store)
Extension to libretro

- 3D rendering
  - By way of OpenGL / OpenGL ES
  - Crossplatform abstraction layer – Libretro GL
    - Is OpenGL not already crossplatform?
What do most platforms have in common nowadays?

- Allows us to write 3D graphics-based applications -
  - In a platform-agnostic way
  - Hardware-accelerated
  - A universal language/API used worldwide by CAD developers, game developers, app developers, etc.
What do these platforms NOT have in common?

- Audio
- Input
- Shader
- Windowing implementations
- User interfaces
- Touchscreen overlays
- Camera
- Sensors
- Development environments
- And more…
What is not-so portable about OpenGL?

• Symbol wrapper lookup (necessary on Windows)
• Divergent subsets of API functionality (GLES 1/2/3, GL 1.5/2/3/4)
• Windowing interfacing context drivers per platform
• Display frontend for each platform
• Post-processing by way of shaders

What does Libretro GL provide?
• A solution to all this and more…
- Continuously growing app library
- 47+ libretro cores
  - C/C++ codebases
  - Crossplatform
Gifts

- Hardware products and accessories
  - For the purposes of porting RetroArch to it, enhancing support, features, etc.
Also on the web

- Every app from the libretro ecosystem available on a web-browser
  - Using Javascript

Webbrowsers

- New platforms in their own right
  - Every platform has its own Javascript implementation

Recompiling C/C++ code into Javascript

- Emscripten
- Native apps running inside webbrowser with decent performance
Windows RT/Phone support
- Being everywhere
  - On any device
- A big online services presence
  - Matchmaking
  - Chatlobby’s
  - Live streaming
  - Augmented reality services
  - Etc
Retro Arch

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