

Engine Overview

A Programmer's Glimpse at UE4

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The Big Picture

Overview

Directories

Configuration

Modules

Projects

What's Next?

This Is Not Your Grandma's Engine

- UE4 is pretty hot... but also huge!
- 5000+ directories, 40,000+ files
- Bazillions of lines of code
- Hundreds of modules
- Dozens of tools, thousands of features
- Centuries of man years

How To Master All This?

- Start with toes, work your way up
- Most code & content you'll never touch
- Nobody knows everything about UE4
- But you'll see, it's really quite easy!



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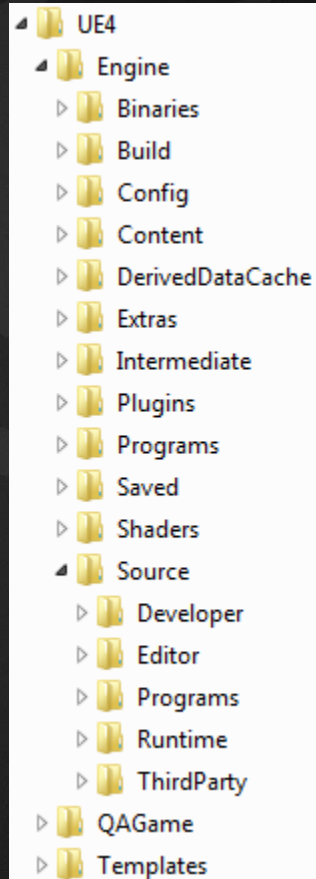
What's Next?

Root Directory

- `/Engine` – All code, content & configuration for the Engine
- `/MyProject` – All files for the game project 'MyProject'
- `/Templates` – Templates for creating new projects

Inside the `/Engine` and Project Directories

- `/Binaries` – Executables & DLLs for the Engine
- `/Build` – Files needed for building the Engine
- `/Config` – Configuration files
- `/Content` – Shared Engine content
- `/DerivedDataCache` – Cached content data files (Engine only)
- `/Intermediate` – Temporary build products (Engine only)
- `/Plugins` – Shared and project specific plug-ins
- `/Saved` – Autosaves, local configs, screenshots, etc.
- `/Source` – Source code for all the things!



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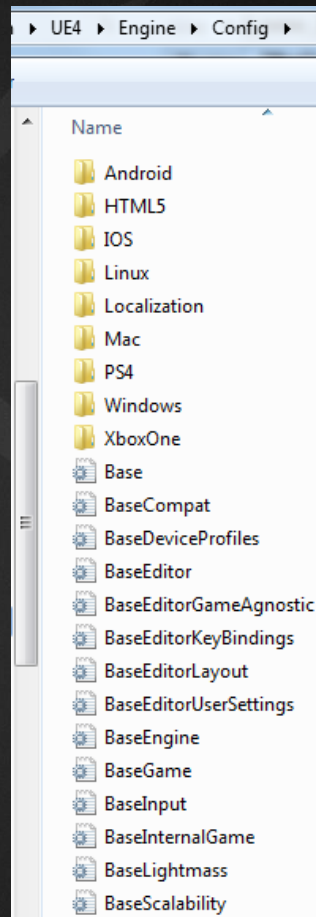
Modules

Projects

What's Next?

INI Files

- Hold class default properties
- Will be loaded into CDOs on startup
- Organized in a hierarchy
- Higher INIs override lower ones
- Organized in sections
- Key-value pairs within sections
- Important ones exposed in Editor UI
- Low-level access with FConfig



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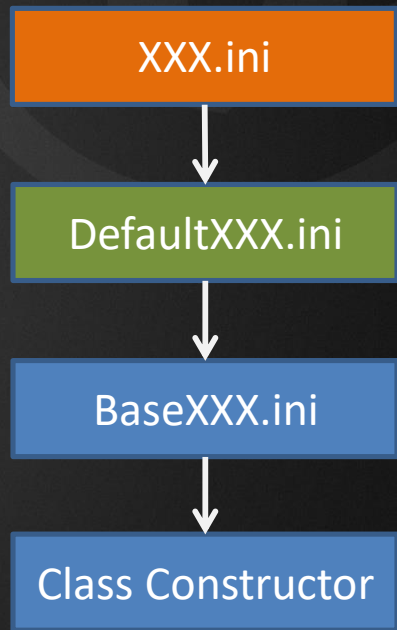
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Editor Preferences



General

- Appearance
- Automation
- Experimental
- Keyboard Shortcuts
- Live Streaming
- Loading & Saving
- Miscellaneous
- Region & Language
- Source Code



Level Editor

- Miscellaneous
- News Feed
- Play
- Viewports



Content Editors

- Content Browser
- Graph Editors

General - Appearance

Customize the look of the editor.

Set as Default

Export...

Import...

Reset to Defaults

Search

Colors

- Selection Color
- Pressed Selection Color
- Inactive Selection Color
- Color Vision Deficiency Preview

User Interface

- Use Small Tool Bar Icons
- Enable Window Animations
- Show Friendly Variable Names



Project Settings



Game

- Description
- Maps & Modes
- Movies
- Packaging
- Supported Platforms



Engine

- Audio
- Collision
- Console
- Cooker
- General Settings
- Input
- Navigation Mesh
- Navigation System
- Physics
- Rendering



Platforms

Editor & Project Settings

Game - Description

Descriptions and other information about your game.

Set as Default

Export...

Import...

Reset to Defaults



These settings are always saved in the default configuration file, which is currently not writable.

Search

Homepage

Support Contact

Epic Games, Inc.

www.epicgames.com

About

Project Thumbnail



Description

Project ID

{6CAED3B0-4D67-0B21-67EB-ABA685ED3600}

```
[Internationalization]  
+LocalizationPaths=%GAMEDIR%Content/Localization/Game
```

```
[/Script/Engine.GameMode]
```

```
[DefaultPlayer]  
Name=Player
```

```
[/Script/Engine.GameNetworkManager]  
MaxIdleTime=+0.0  
DefaultMaxTimeMargin=+0.0  
TimeMarginSlack=+1.35  
DefaultMinTimeMargin=-1.0  
TotalNetBandwidth=32000  
MaxDynamicBandwidth=7000  
MinDynamicBandwidth=4000
```

```
[/Script/Engine.GameSession]  
MaxPlayers=16  
MaxSpectators=2  
MaxSplitscreensPerConnection=4  
bRequiresPushToTalk=true
```

```
[/Script/EngineSettings.GeneralProjectSettings]  
CompanyName=  
CopyrightNotice=  
Description=  
LicensingTerms=  
PrivacyPolicy=  
ProjectVersion=  
Homepage=  
SupportContact=
```

```
[/Script/Engine.HUD]  
ConsoleMessageCount=4
```

Sections for UObject

- [/Script/ModuleName.ClassName]

Sections for Custom Settings

- [SectionName]

Supported Value Types

- Numeric values, strings, enums
- Structured data
- Static and dynamic arrays

Automatic serialization for UObject properties

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What's Next?

Modularity Promotes

- Reusability
- Extensibility
- Maintainability
- Decoupling
- Efficiency

Monolithic builds are still possible though!



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What's Next?

Module Types

- Developer – Used by Editor & Programs, not Games
- Editor – Used by Unreal Editor only
- Runtime – Used by Editor, Games & Programs
- ThirdParty – External code from other companies
- Plugins – Extensions for Editor, Games, or both
- Programs – Standalone applications & tools

Module Dependency Rules

- Runtime modules must not have dependencies to Editor or Developer modules
- Plug-in modules must not have dependencies to other plug-ins

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What's Next?

Module Type	UnrealEd	App	Game
Runtime	✓	✓	✓
ThirdParty	✓	✓	✓
Plugins	✓	✓	✓
Developer	✓	✓	✗
Editor	✓	✗	✗

Module usage across different types of applications

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What's Next?

Important Modules for Beginners

- Core – Fundamental core types & functions
- CoreUObject – Implements the UObject sub-system
- Engine – Game classes & engine framework
- OnlineSubsystem – Online & social networking features
- Slate – Widget library & high-level UI features



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What's Next?

Interesting Modules for Advanced Programmers

- DesktopPlatform – Useful APIs for Windows, Mac & Linux
- DetailCustomizations – Editor's Details panel customizations
- Launch – Main loop classes & functions
- Messaging – Message passing sub-system
- Sockets – Network socket implementations
- Settings – Editor & Project Settings API
- SlateCore – Fundamental UI functionality
- TargetPlatform – Platform abstraction layer
- UMG – Unreal Motion Graphics implementation
- UnrealEd – Unreal Editor main frame & features



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Interesting Modules for Cool Features

- Analytics – Collects usage statistics from Editor & games
- AssetRegistry – Database for assets in Unreal Editor
- GameLiveStreaming – Twitch Streaming
- HeadMountedDisplay – HMD Support API (Oculus, etc.)
- JsonUtilities & XmlParser – Handle Json & XML files
- SourceControl – API for custom source control providers

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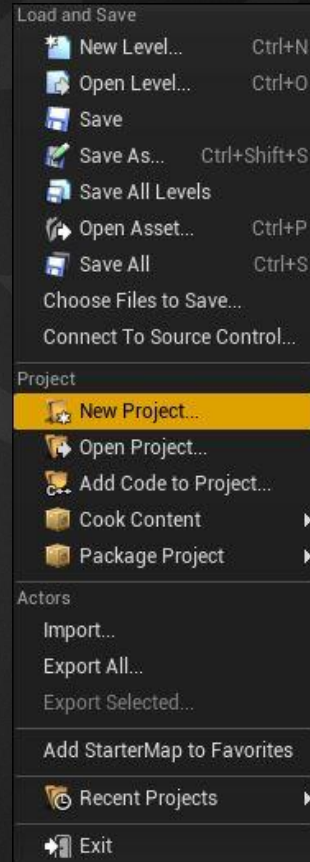
What's Next?

Your Game Projects can...

- Use Blueprints, C++ Code or both
- Contain any number of modules & plug-ins
- Be moved around and shared with others

Project Templates to Get You Started

- Blank (with or without sample content)
- First Person Shooter
- Side scroller, top-down & puzzle games
- Flying & driving games
- They all come in Blueprint and C++ flavors
- More to come, and make your own!





Projects

New Project



Marketplace

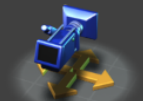
Choose a template for your project. If you choose a C++ template, you must have Visual Studio 2013 installed to compile. Blueprint templates use only visual scripting, and do not require additional software.

**Blank**

A clean empty project with no code.

**Basic Code**

An empty project with some basic game framework code classes created.

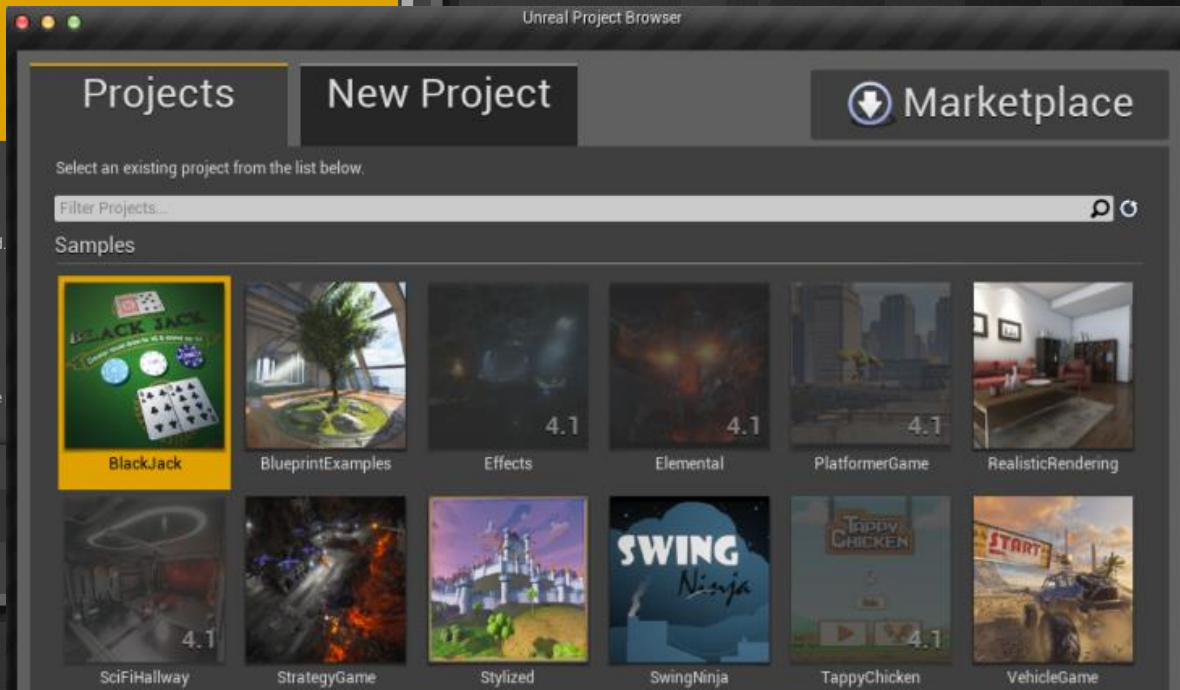
**Code First Person**

A project that features a first person perspective camera, with a movable projectile weapon.

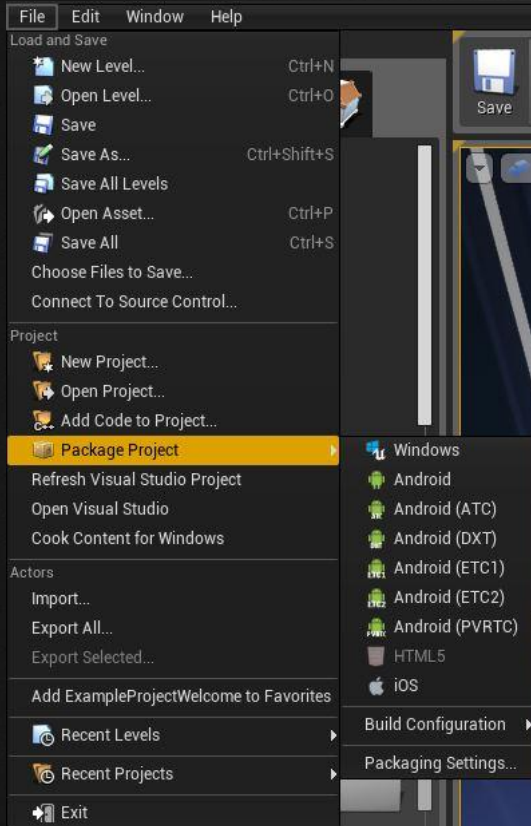
Name

MyProject

Project Templates & Samples



Project Packaging & Deployment



Game - Packaging

Fine tune how your project is packaged for release.

Set as Default

Export...

Import...

Reset to Defaults

Search

Project

Build Configuration

Staging Directory

Full Rebuild

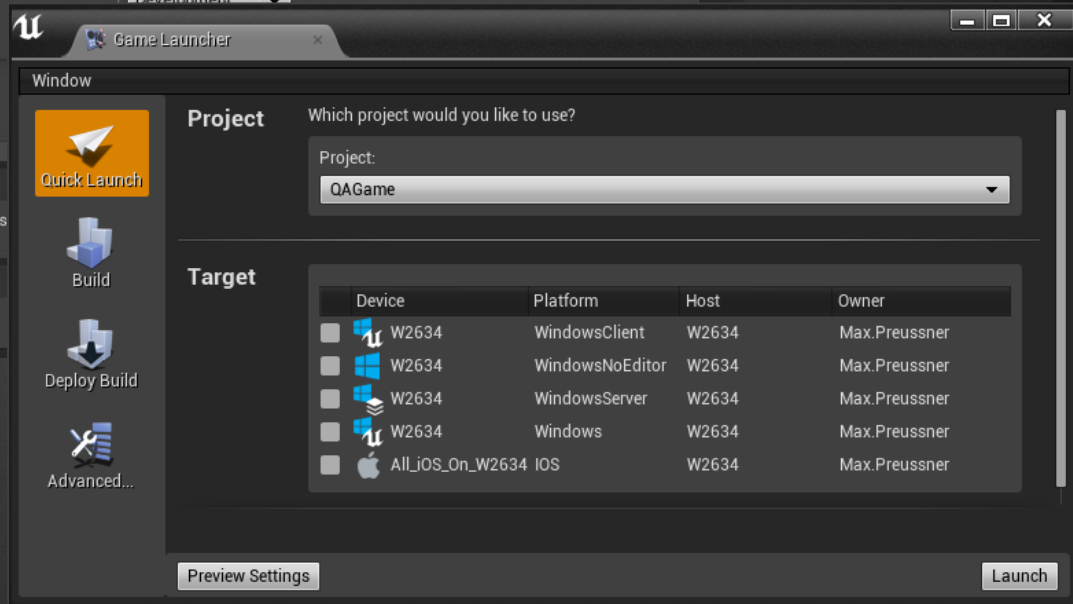
For Distribution

Cooking

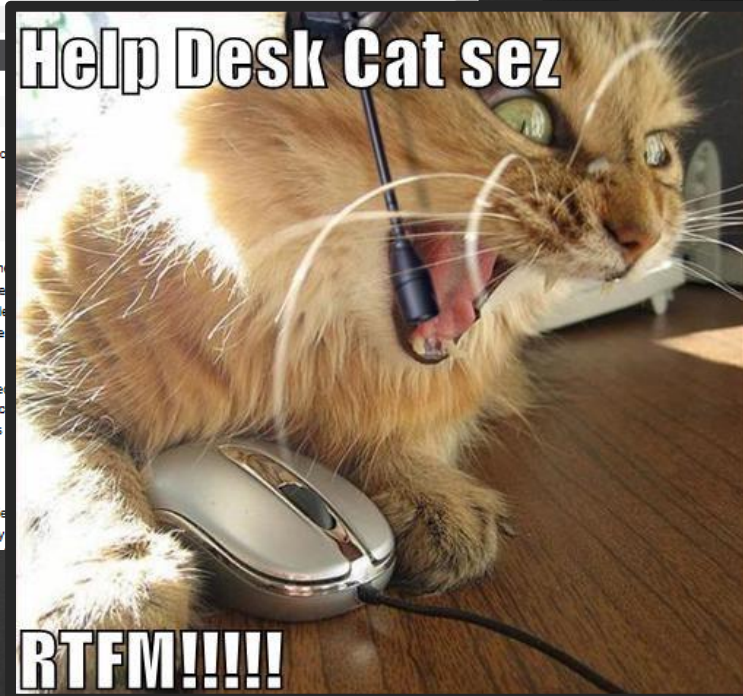
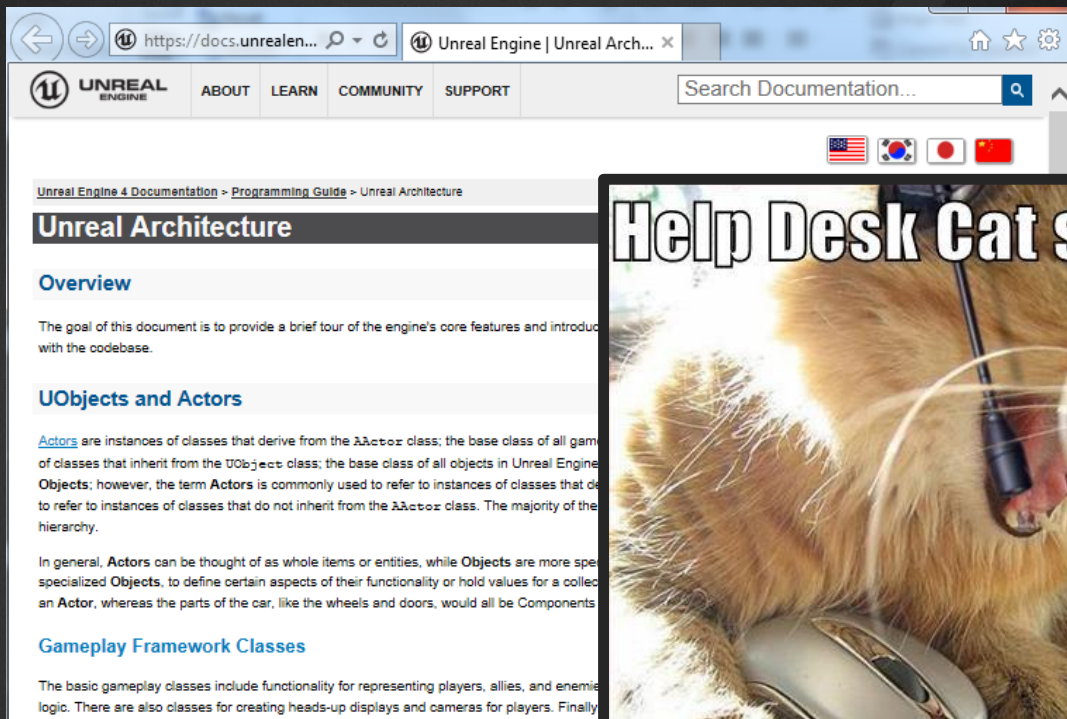
Directories to Always

Packaging

Use Pak File



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Questions?

Documentation, Tutorials and Help at:

- AnswerHub: <http://answers.unrealengine.com>
- Engine Documentation: <http://docs.unrealengine.com>
- Official Forums: <http://forums.unrealengine.com>
- Community Wiki: <http://wiki.unrealengine.com>
- YouTube Videos: <http://www.youtube.com/user/UnrealDevelopmentKit>
- Community IRC: [#unrealengine](#) on FreeNode

Unreal Engine 4 Roadmap

- imgtfy.com/?q=Unreal+engine+Trello+

