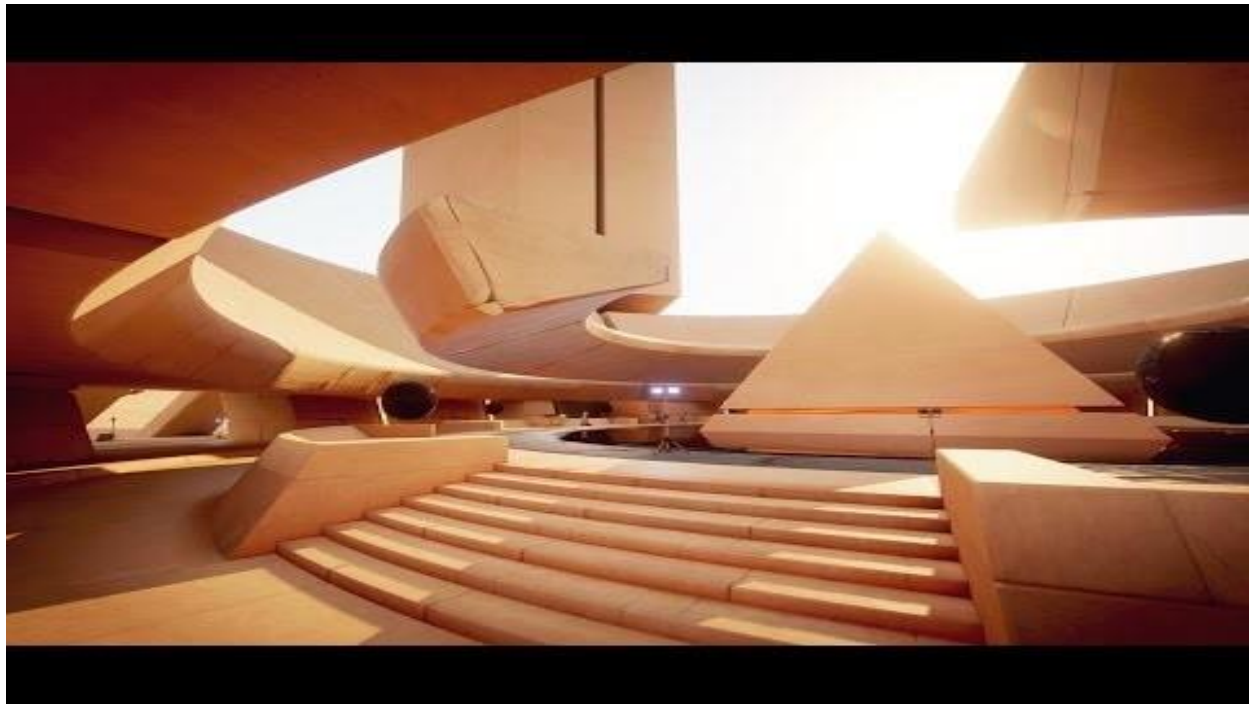
Unity 3D

RAFAEL KUFFNER DOS ANJOS

Now is the moment I draw your attention to this class by showing some cool videos

Demo GDC 2016 - Adam

Demo - Iluminação



Lots of recent games made with Unity

UNITY CRASH COURSE

AGENDA

- What is Unity? Pros and Cons
- Scenes, Game Objects, Components and Prefabs
- Unity Editor
- UI Development
- Project asset folder structure and organization
- Team workflow issues and solutions
- Editor extensions and tooling

- Editor target platform
- Unity Cloud Build

What is Unity?

Unity is a flexible and powerful development platform for creating multiplatform 3D and 2D games and interactive experiences.

It's a complete ecosystem for anyone who aims to build a business on creating high-end content and connecting to their most loyal and enthusiastic players and customers.

This is copied from Unity website

Unity – PROS – Pros and Cons

Extensive target platforms.

One code-base for all platforms.

A lot of out-of-the-box engine features: animation; physics; lighting; etc.

Quick integration of assets: images, audio, 3D models, animations, etc.

IMAGE FORMATS		
.psd	.jpg	.png
.gif	.bmp	.tga
.tiff	.iff	.pict
.dds		

AUDIO FORMATS		
.mp3	.ogg	.aiff
.wav	.mod	.it
.sm3		

VIDEO FORMATS		
.mov	.avi	.asf
.mpg	.mpeg	.mp4

TEXT FORMATS		
.txt	.htm	.html
.xml	.bytes	

Very active developer community.

Integrates whole team into the engine (no need for a test pipeline, e.g., “visual designer waits for programmer to make a build”).

Quick prototyping.

Unity – Pros and Cons

CONS

Web browser WebGL target platform is not fully mature (risks involved).

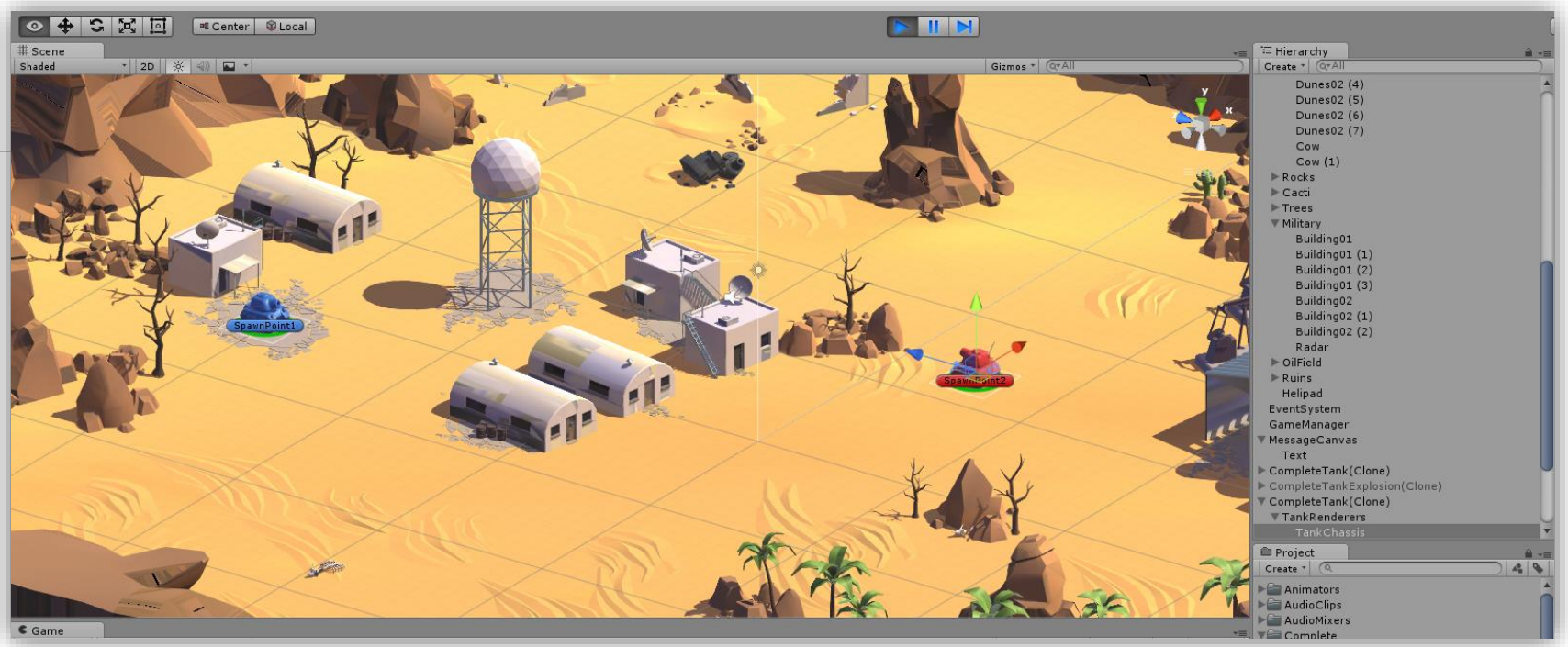
Unity Webplayer has been disabled by Chrome.

In mobile/tablet devices, the Unity app consumes more battery than a native app.

Still needs some effort to make a game fully supported by several platforms (graphics, input, networking, etc).

Requires some team effort to properly manage development with large teams.

Scenes



Scenes contain the objects of the game (Game Objects).

In each Scene the environments, obstacles, and decorations can be placed, essentially designing and building the game in pieces.

The Scene also contains objects that manipulate the game but have no visual representation.

Game Objects & Components

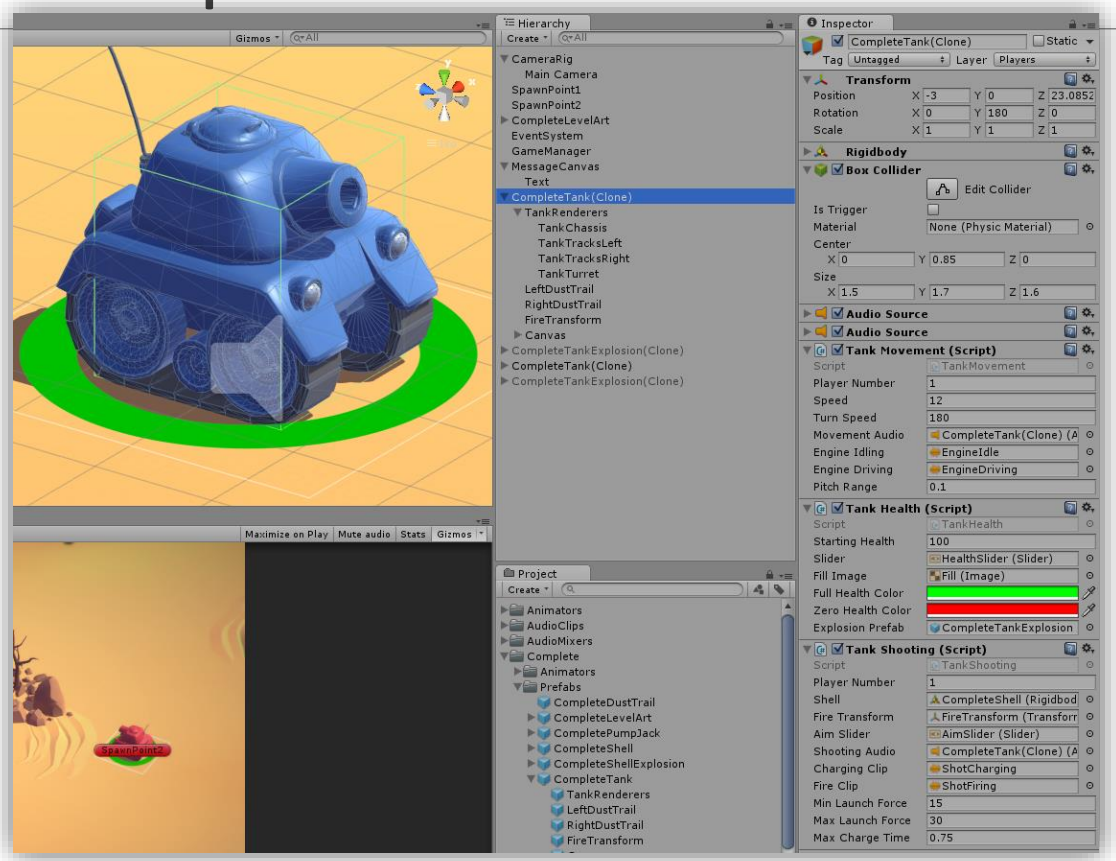
Game Objects are containers for Components.

Components can be:

- Scripts;
- Colliders;
- Mesh Renderer (3D models)
- Audio Sources;
- Etc...

Every Game Object has a Transform component.

Game Objects are structured in a tree fashion (parents and children).



Links:

http://docs.unity3d.com/Manual/class-GameObject.html

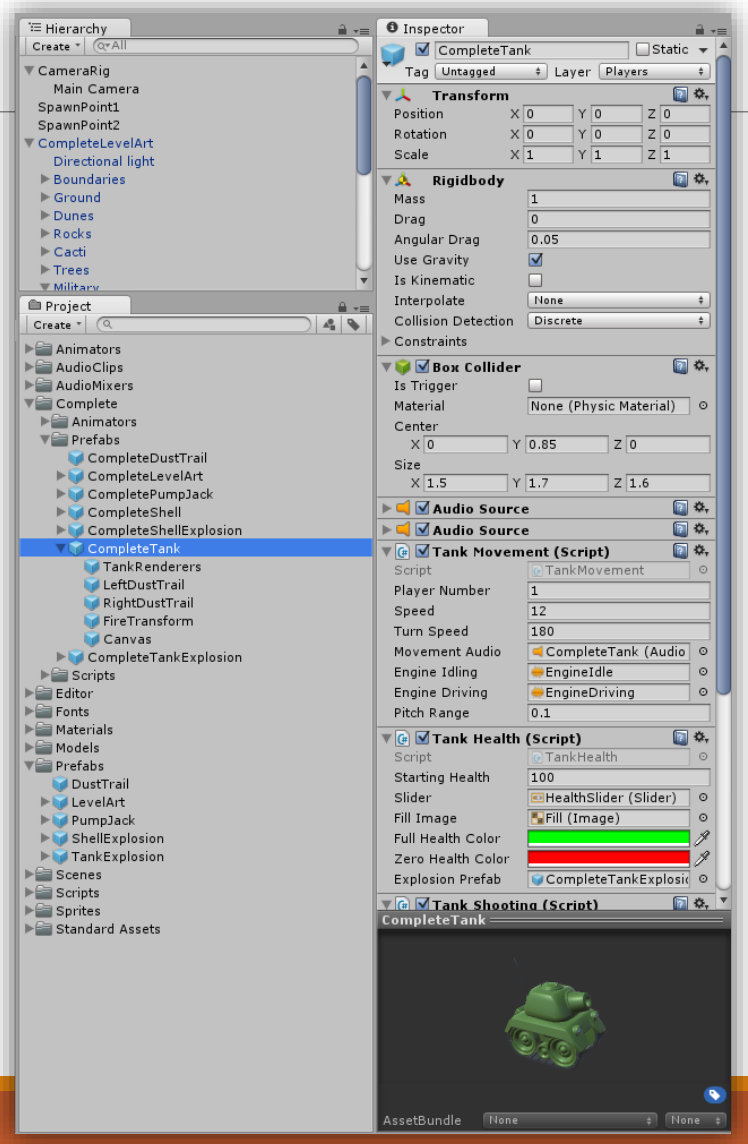
http://docs.unity3d.com/Manual/Components.html

Prefabs

Prefabs are pre-configured Game Objects that can be used as templates in the Scene.

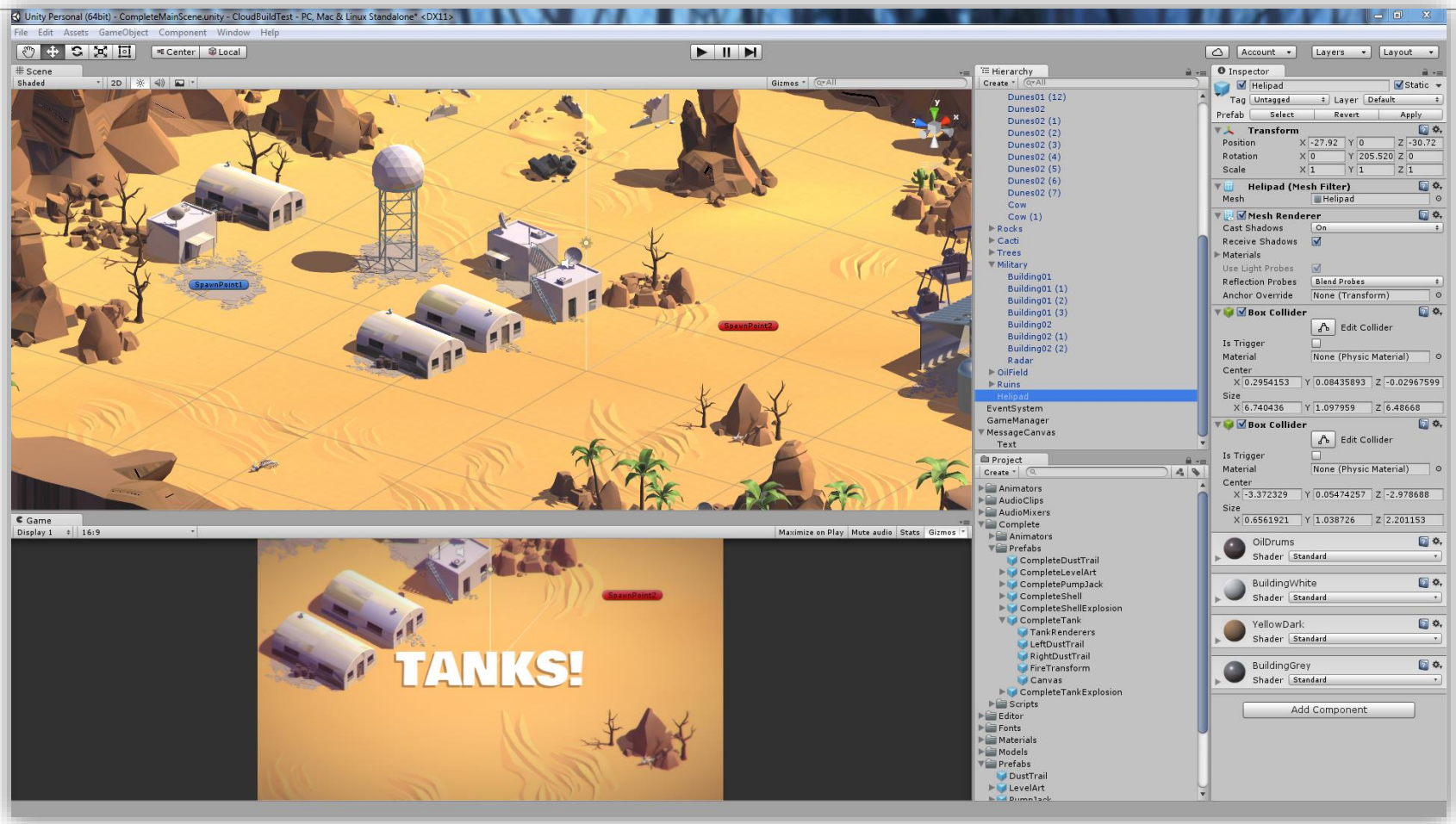
They can be instantiated/cloned into the Scene (in the Editor or at runtime).

Changes made to the Prefab can be spread to its instances.



Link:
http://docs.unity3d.com/Manual/Prefabs.html
https://unity3d.com/learn/tutorials/modules/beginner/editor/prefabs-concept-usage?playlist=17090

Unity Editor



Links:
http://docs.unity3d.com/Manual/LearningtheInterface.html
http://docs.unity3d.com/Manual/UsingTheEditor.html

Unity Editor – Scene and Game

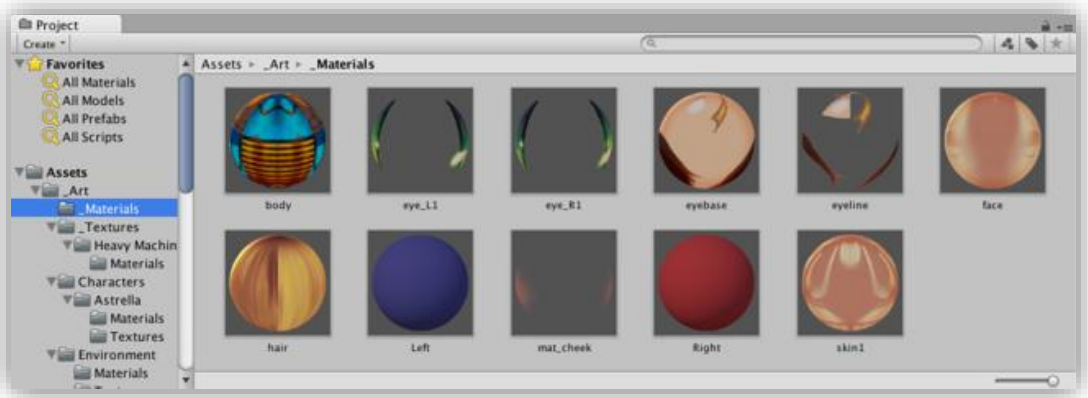
- The Scene view is where the game is visually constructed.
- The Game view displays what the player will see.
- By pressing the Play button, the game will be played in this view.
- Note: During Play mode, any changes to the Game Objects will not be saved.

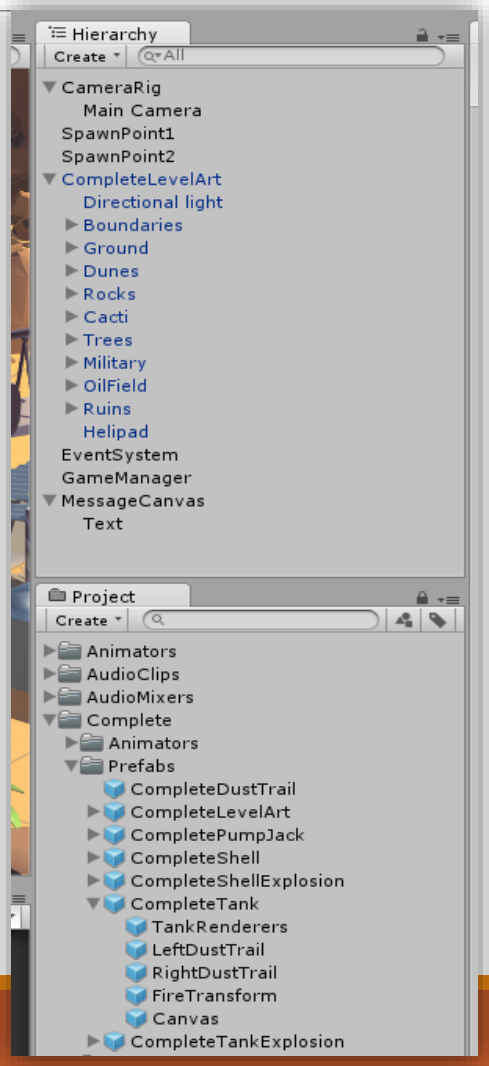
Links:
http://docs.unity3d.com/Manual/UsingTheSceneView.html
http://docs.unity3d.com/Manual/GameView.html

Unity EditoR – Hierarchy and Project

- The Hierarchy contains every Game Object in the current Scene.

- The Project view contains all assets included into the project. It can be used with a single-column or double-column mode.

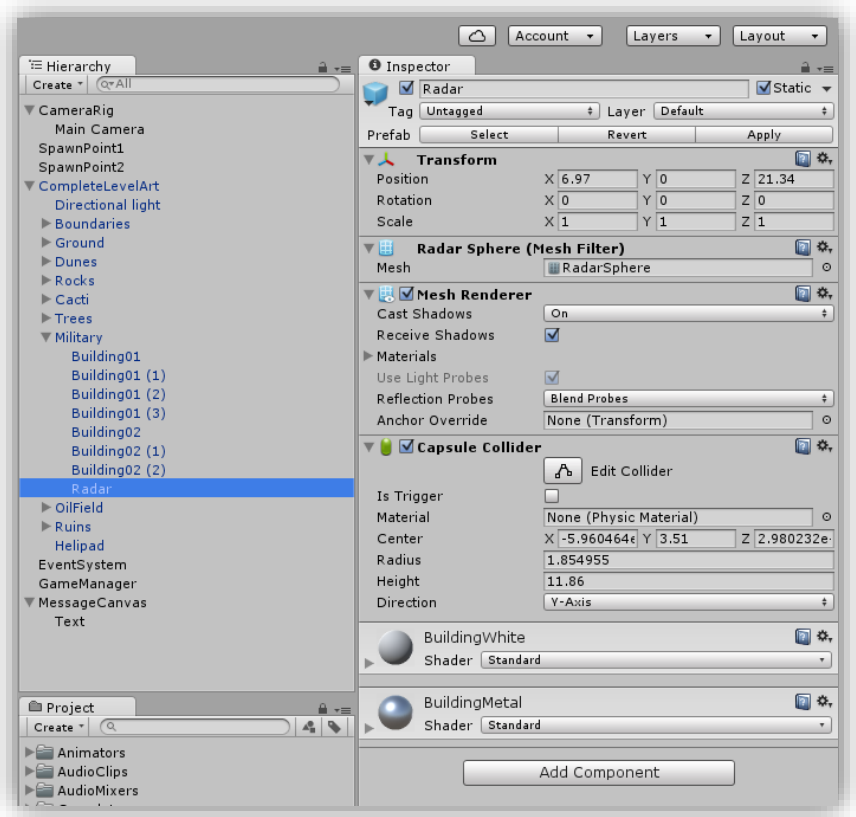


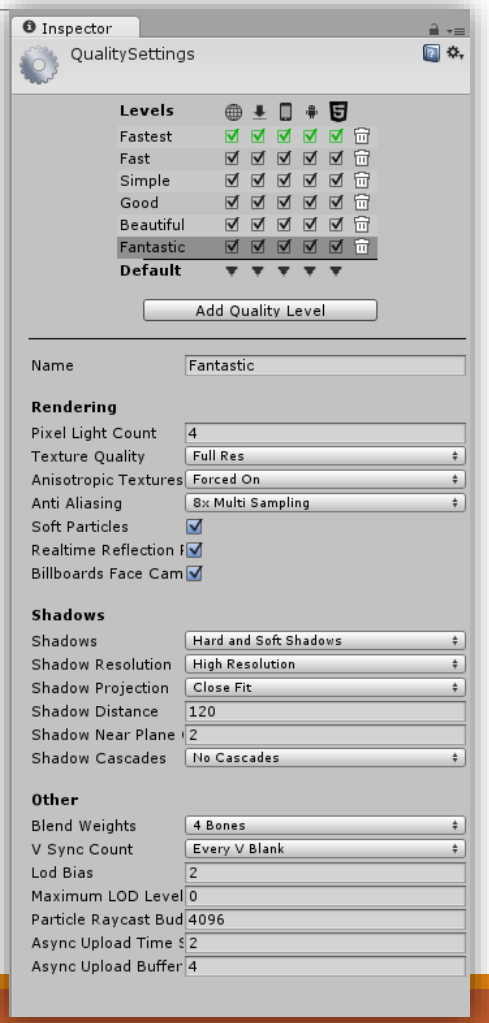


Links:
http://docs.unity3d.com/Manual/Hierarchy.html
http://docs.unity3d.com/Manual/ProjectView.html

Unity Editor - inspector

The Inspector is used to view and edit the properties and settings of Game Objects, Assets, and other preferences and settings in the Editor.

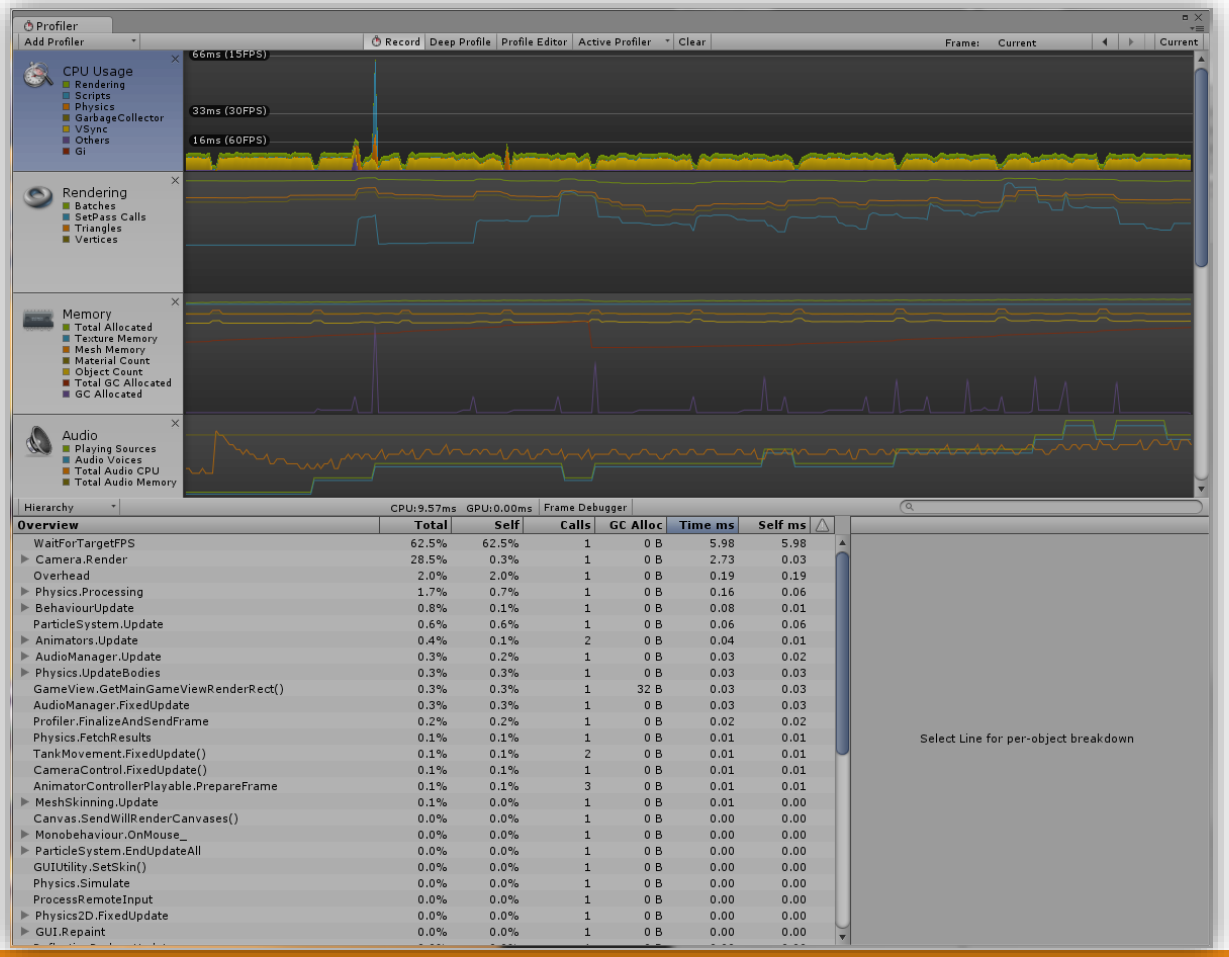




Link:
http://docs.unity3d.com/Manual/UsingTheInspector.html

Unity Editor – Profiler

The Profile Window trace how much is spent in various areas of the game: CPU, rendering, memory, audio, physics, network.

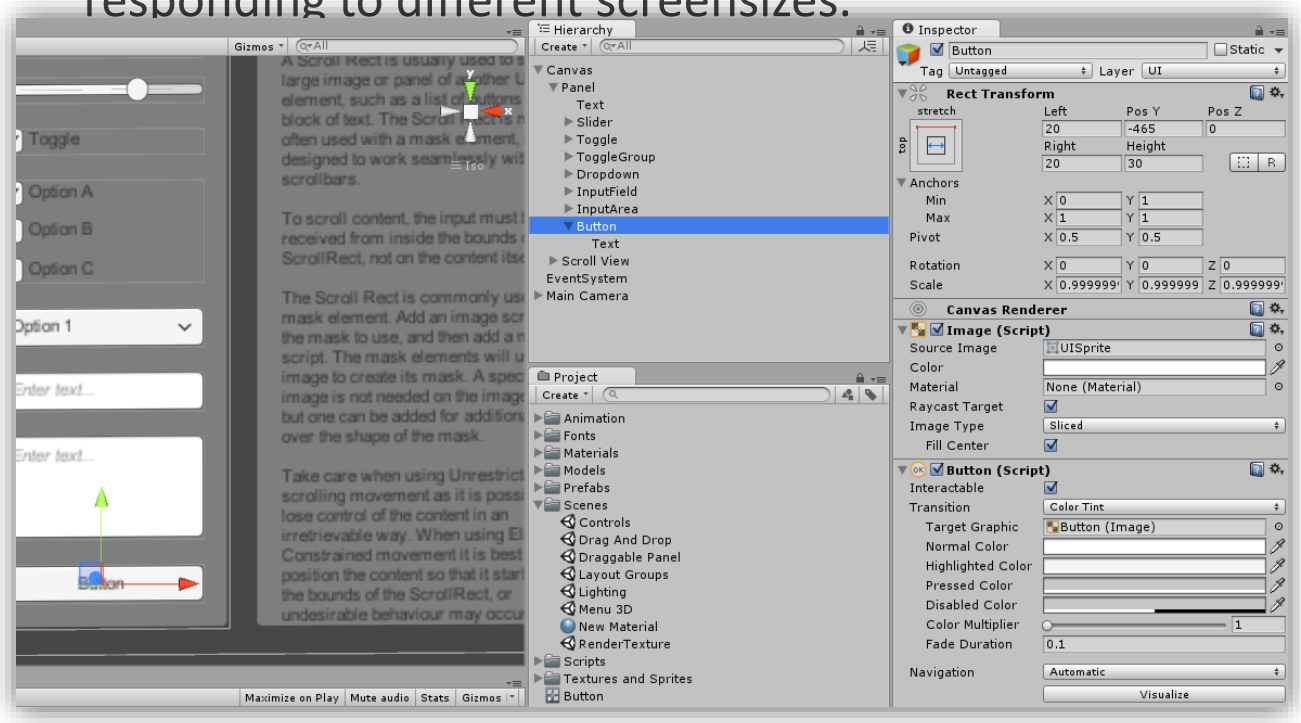


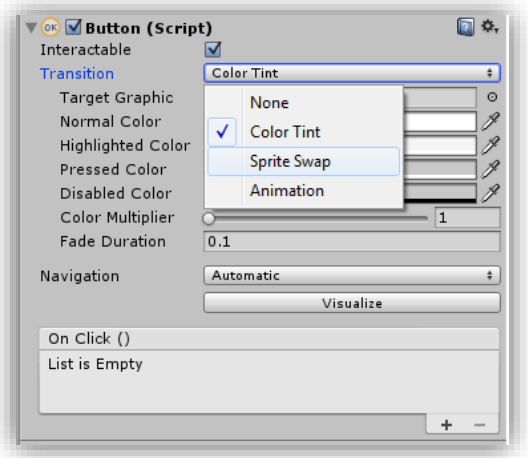
Link: http://docs.unity3d.com/Manual/ProfilerWindow.html

UI development

In Unity the UI can be developed as a set of special Game Objects that contain “Rect Transforms” instead of Transforms.

This allows apply anchors to the UI element or configure it to stretch when responding to different screensizes.





Links:
http://docs.unity3d.com/Manual/UICanvas.html
http://docs.unity3d.com/Manual/UIBasicLayout.html
http://docs.unity3d.com/Manual/UIVisualComponents.html

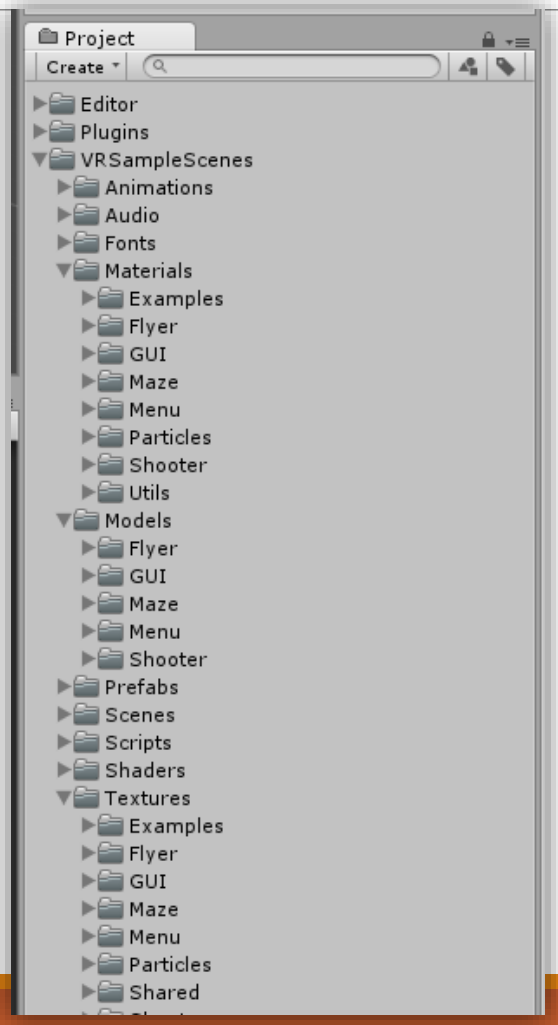
Project asset Folder & ORganization

In an Unity project, the project asset folder is usually structured by the type of assets.

Inside each type folder, the assets can be organized by context/functionality.

Note: There are some asset folder names which are reserved for special behaviours: “Editor”, “Gizmos”, “Plugins”, etc.

Link:
http://www.glenstevens.ca/unity3d-best-practices/#Structure
http://docs.unity3d.com/Manual/SpecialFolders.html



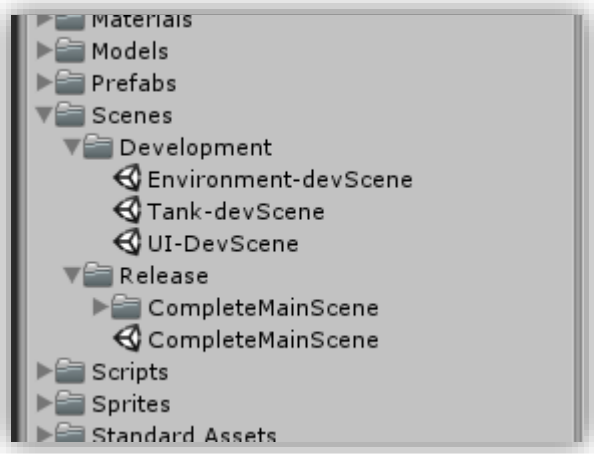
Team workflow Issues and Solutions

Issues:

Scenes are complicated to “share” between developers.

It is not easy (and not recommended) to merge changes in Scenes.

Same thing happens for Prefabs.



Solutions:

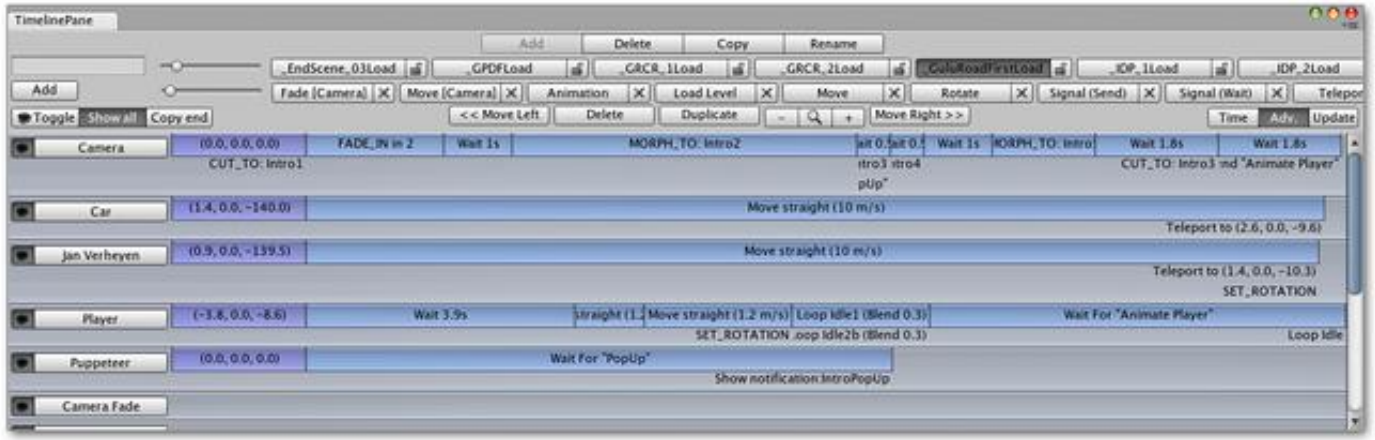
Create as many Scenes and Prefabs as needed.

Separate Scenes for development (e.g., UI development Scene, Puzzle development Scene, ...) and for release.

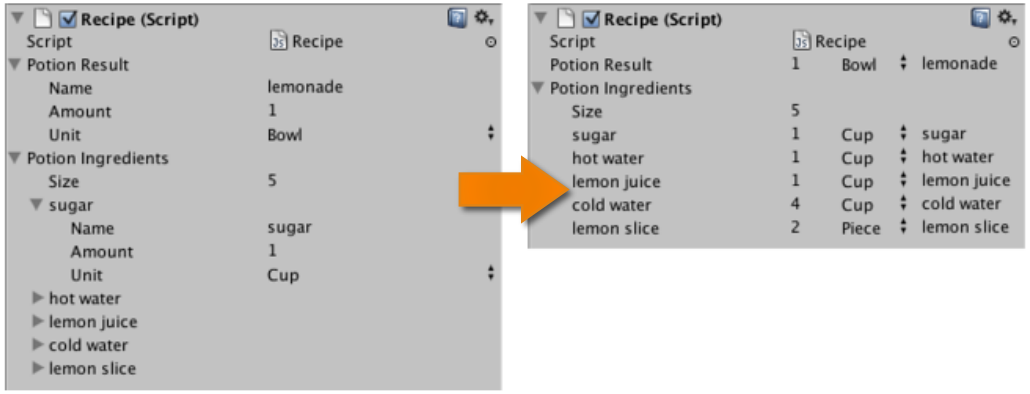
Create Prefabs for development and release.

Editor Extensions and Tooling

It is possible to extend the Unity Editor with custom-made windows.



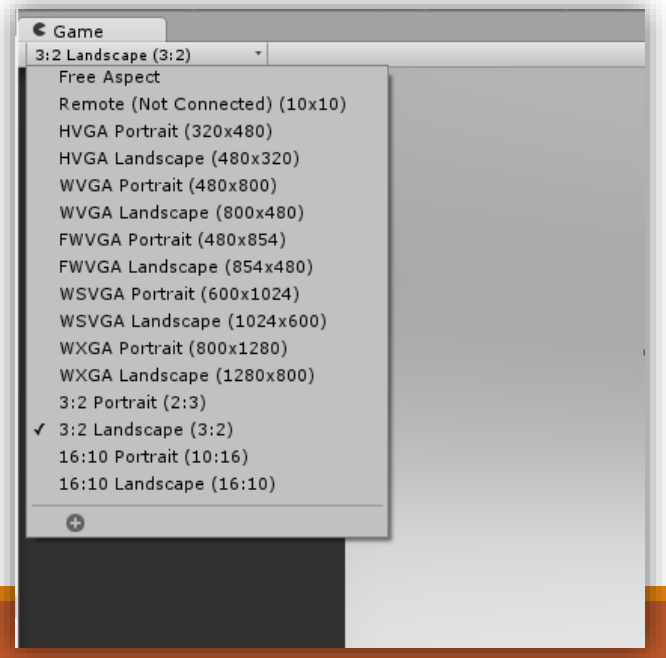
Components can be extended for extra interactions or debug tooling.

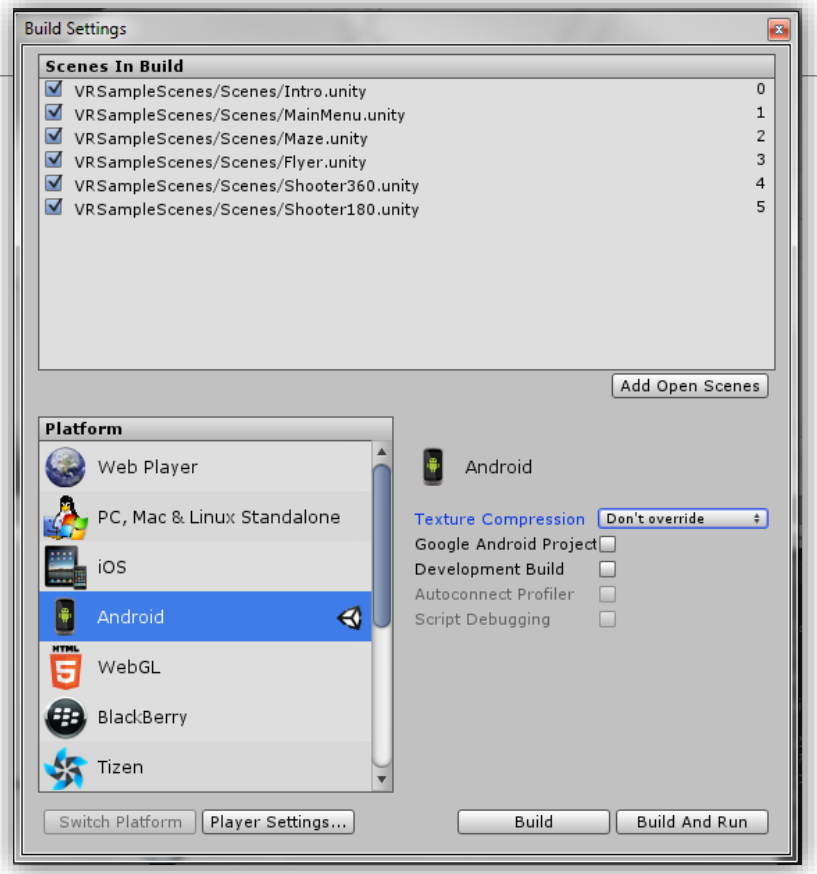


Editor target platform

In Unity, it is possible to change which platform the project will be developed in.

This allows to simulate some constraints from the target platform, such as, graphical constraints, screen sizes, etc.





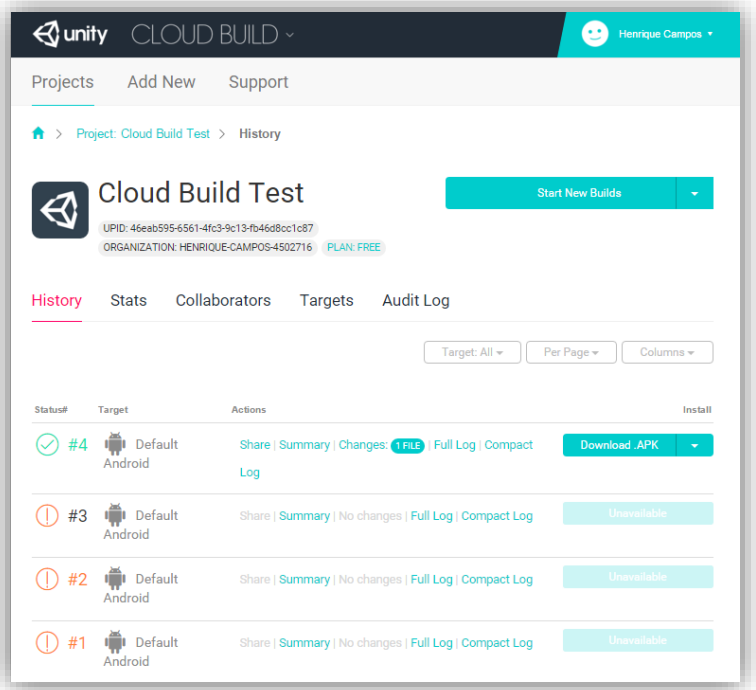
Unity Cloud Build

Unity Cloud Build is a continuous-integration platform that allows developers to perform builds directly from the project's repository.

This platform is web-based, therefore there is no need for the Unity Editor to make a new build of the game.

- It allows to share build links to external parties.
- Has a mobile webpage which allows to directly download and install any build version.
- After the project is configured, any collaborator can issue a build!

Link:
https://unity3d.com/services/cloud-build

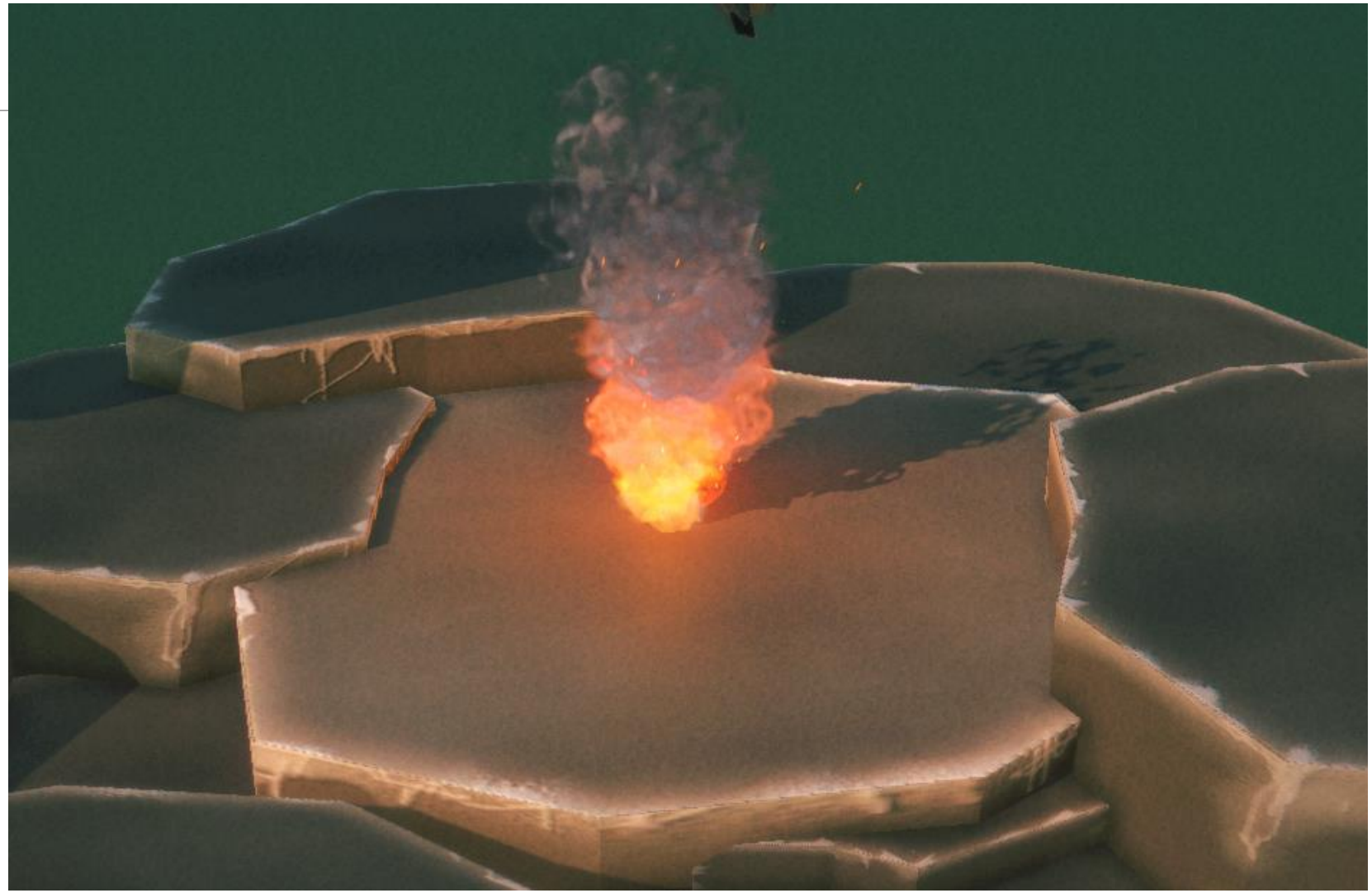


End.

Now to some other awesome things that were not on those slides

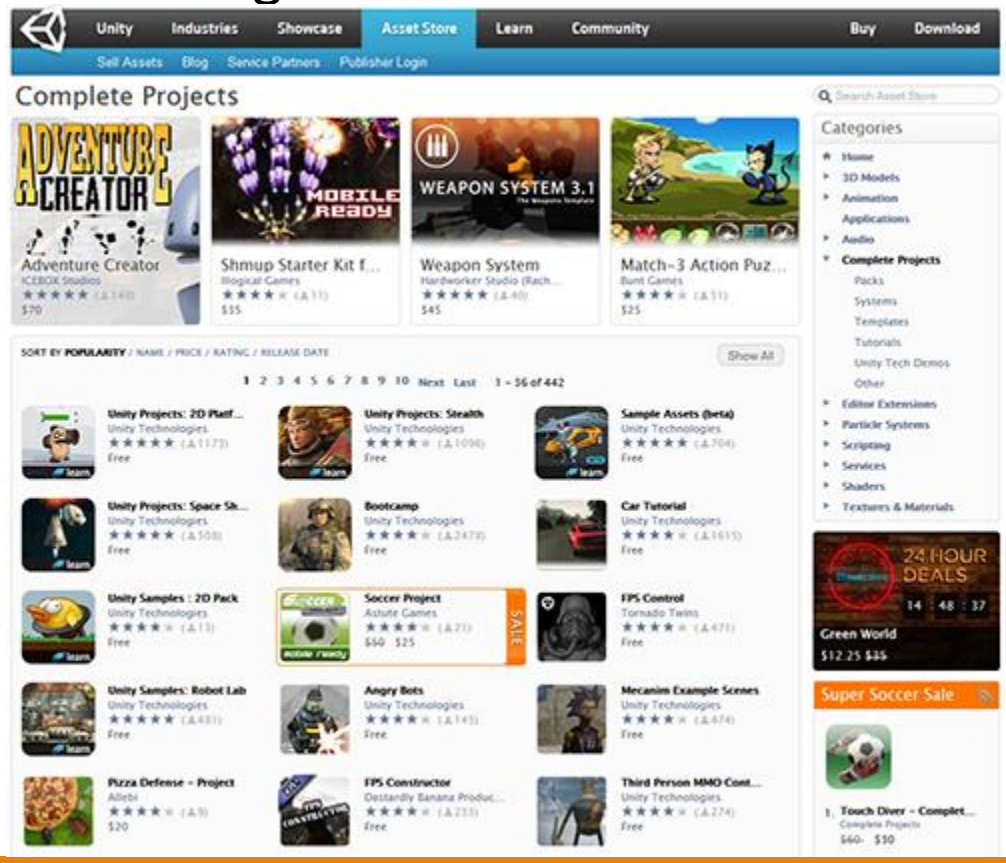
Particles

- Objects that emit small particles in diferent shapes
- Can be fine tuned to create effects such as smoke, fire, trails, etc.
- Accessible through code so can be activated on special events.



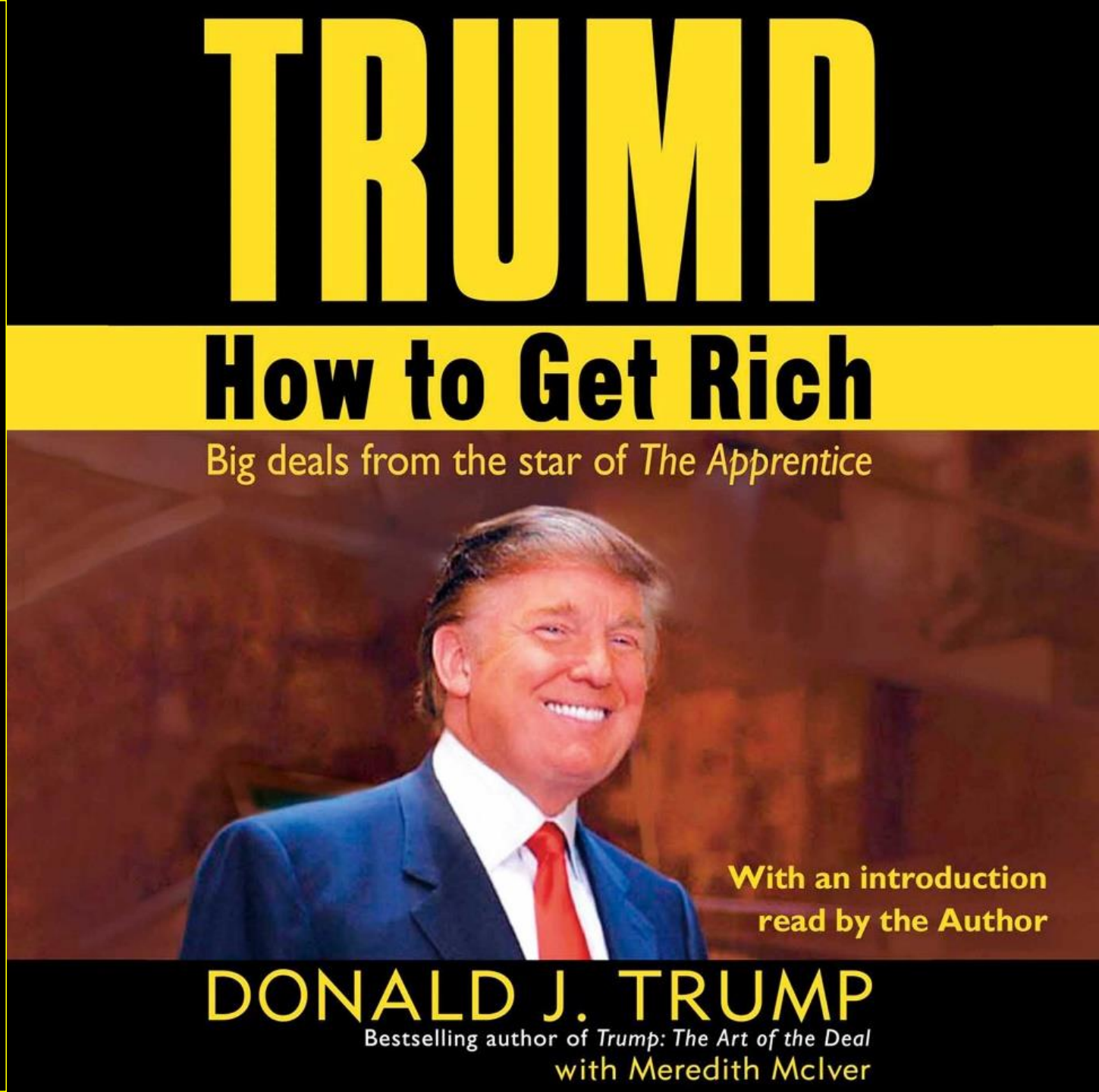
Asset Store

- Lots of basic models so you can get started with something
- Tutorials added by Unity people
- Tools to help you develop things.
- You can sell your tools and make some Money.
- Cons: The best things are incredibly expensive



Recommended Literature

(this is a joke)



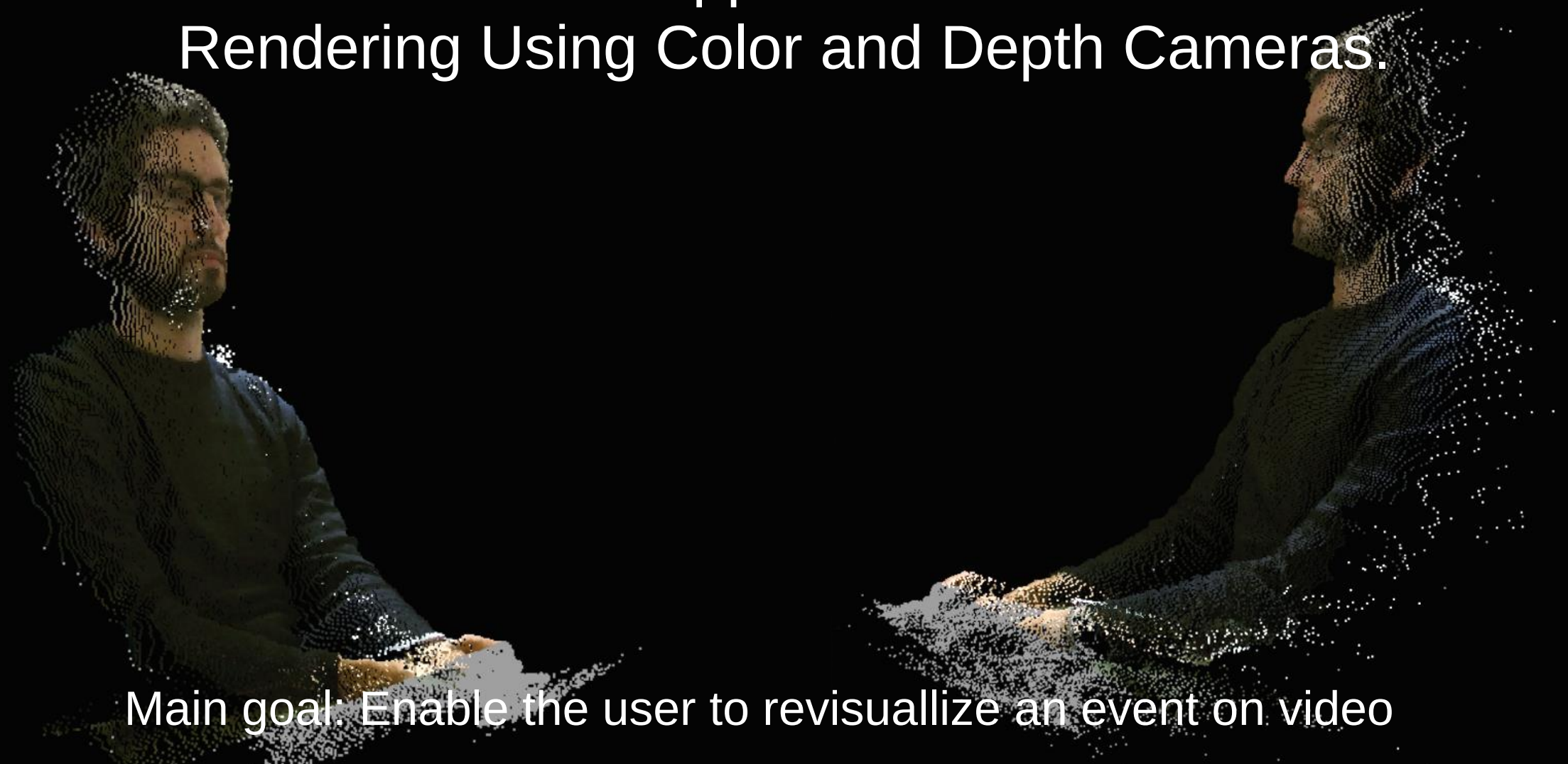
Virtual Reality

- Supports all popular headsets.
- Your camera object uses orientation (and possibly position) information from device.
- Setup is litteraly a couple of clicks, your programming won’t change.

The End of what I had to tell you guys about Unity.

Now I will talk about myself and what I've been doing in order to persuade you to do some really cool things with us.

3D Flashback: an Application for Video-Based Rendering Using Color and Depth Cameras.

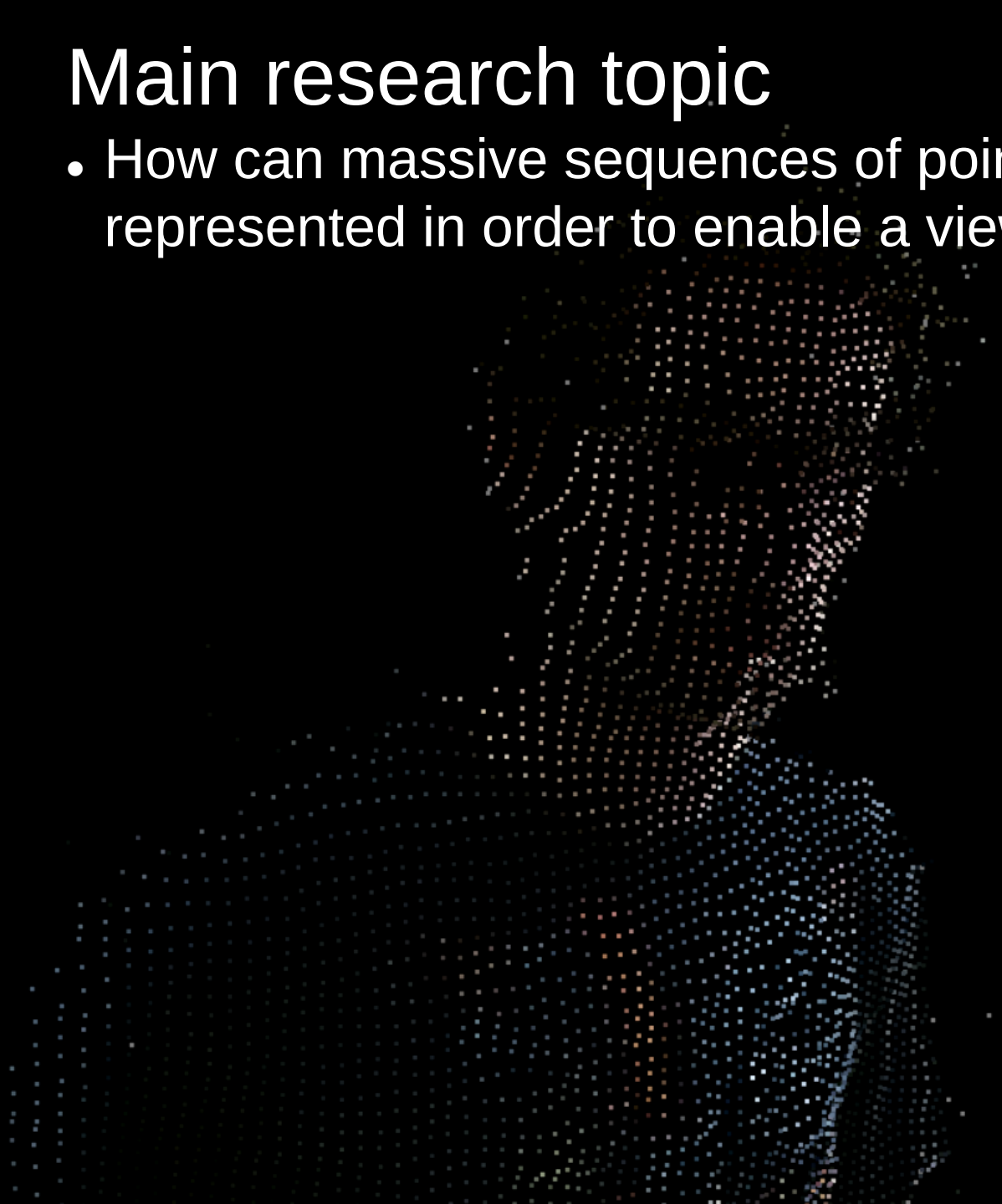


Main goal: Enable the user to revisuallize an event on video from a new freely chosen point of view.

Rafael Kuffner dos Anjos

Main research topic

- How can massive sequences of point clouds be efficiently represented in order to enable a viewpoint-free interaction?



Related topics

- Image segmentation
- 3D reconstruction
- Point cloud visualization
- Depth Layered images

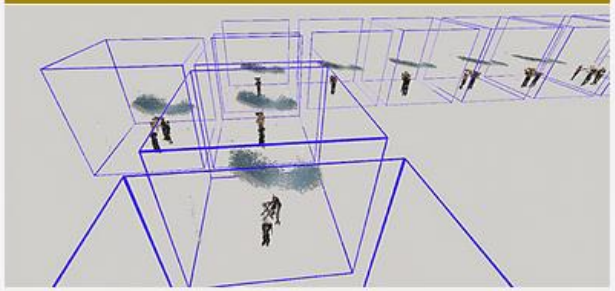
Visualization and Motion Tracking Studies

Annotated videos have been used in the context of dance performance not only as a way to record and share compositions and knowledge between different choreographers, but also as a powerful learning tool. Restraining the viewpoint of the user to the recorded point of view can be an obstacle in several scenarios.

3D Annotator

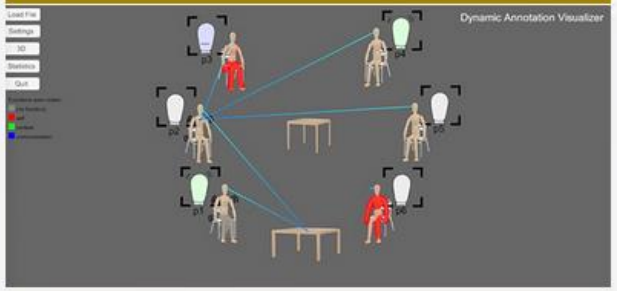
Annotated videos have been used in the context of dance performance not only as a way to record and share compositions and knowledge between different choreographers, but also as a powerful learning tool. More »

CTR concepts & visualization



Information Visualization is concerned with providing (interactive) visual representations of abstract data to reinforce human cognition; thus enabling the viewer to gain knowledge about the internal structure of the data and causal relationships in it. More »

Dynamic Annotation Vizualizer



Annotating body movements in gesture research is a recurring task for researchers which has already motivated the development of several specialized tools, such as ELAN (Brugman & Russel 2004) and ANVIL (Kipp 2012). More »

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We are currently working on virtual reality applications for Dance.

We are currently working with making this algorithm run in real time with Kinect video data.

Maybe we (you) can create a Van Gogh painting in real time!

The End.