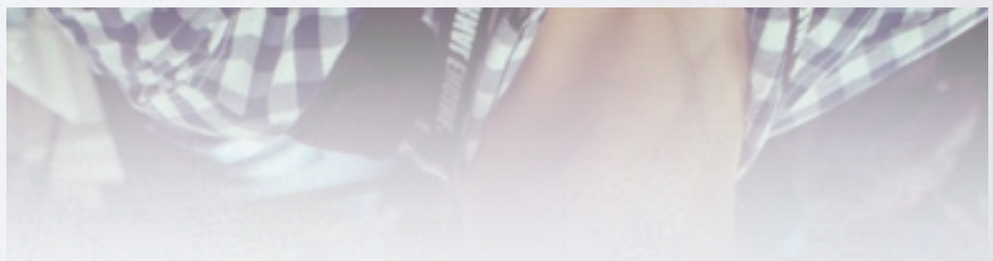
Introduction

GOTO NIGHT

WHO AM I?

- Aalborg University (in Aalborg)
- Work at Trifork A/S



unity studios

software pilots
TRIFORK.

NORDIC
GAMEJAM
2013

DADIU

WHAT IS UNITY?

INTRODUCTION

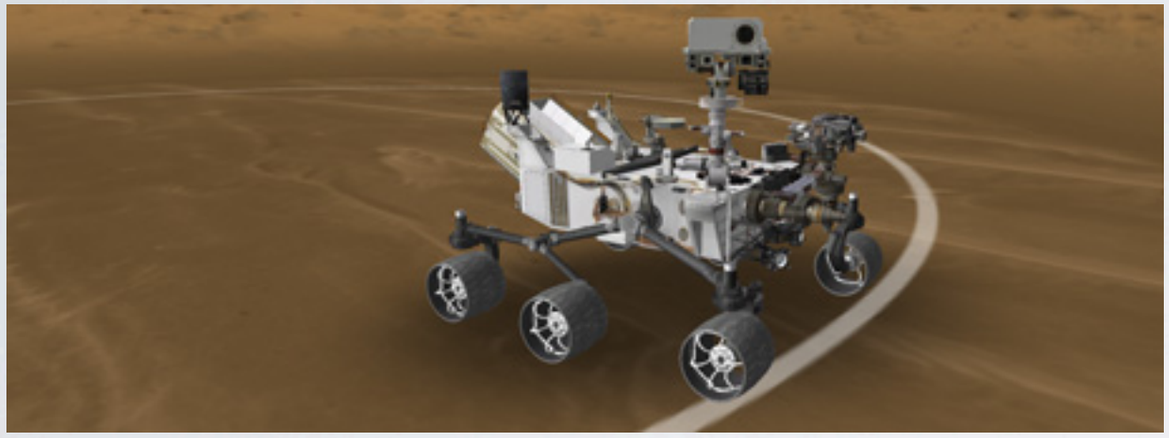
- Unity is a tool for making 3D applications
- “Author once, deploy everywhere”

HISTORY AND FACTS

- Danish company
- HQ in San Francisco
- Unity 1.0 at WWDC 2005
- Unity 4.3 in 2013
- 225M Plugin installs
- 2 mil registered developers

UNITY GALLERY: GAMES

UNITY GALLERY: APPS

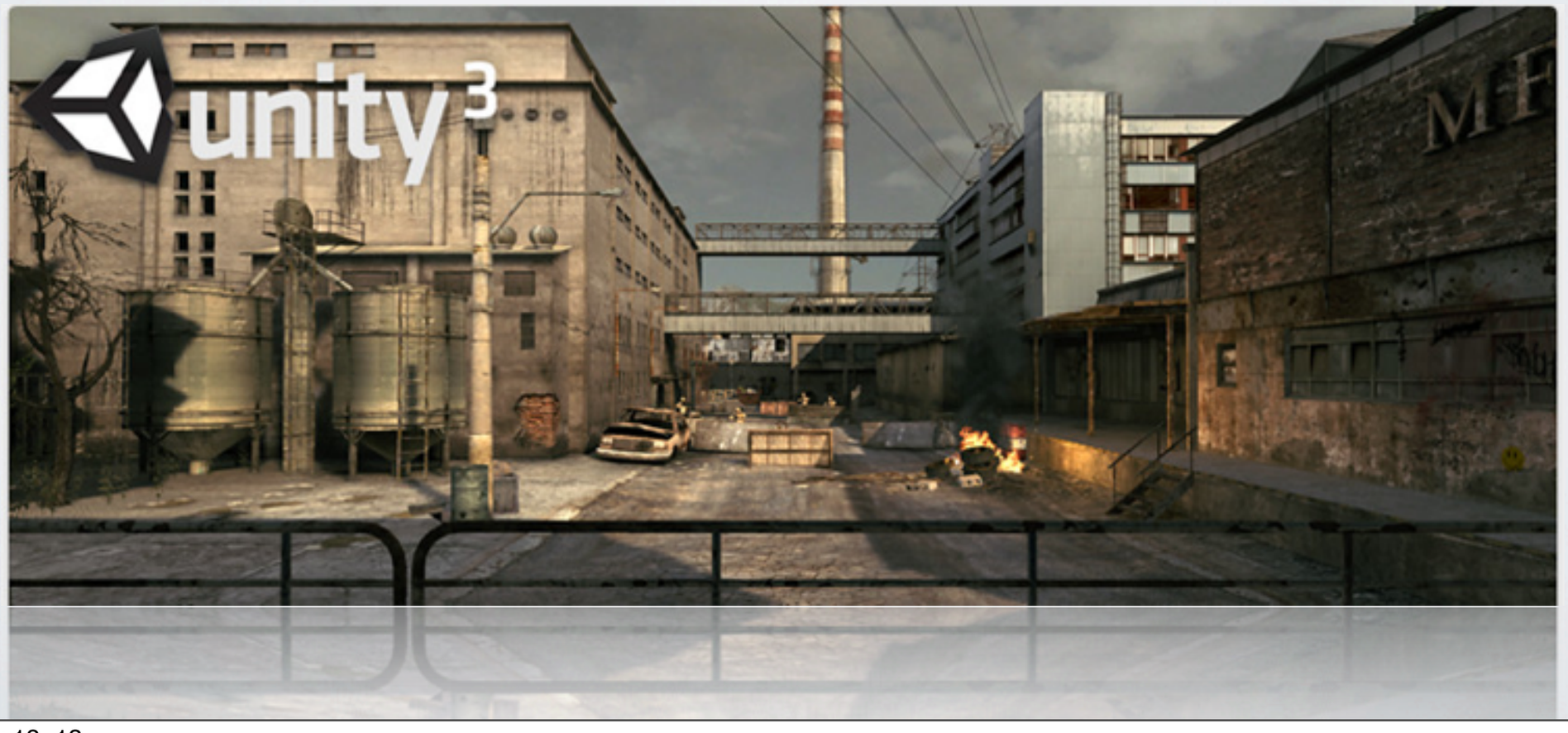


INSIDE THE PACKAGE

- Unity can be divided into three parts
  - Engine packed with expensive tech
  - Intuitive and powerful editor
  - Multiplatform development

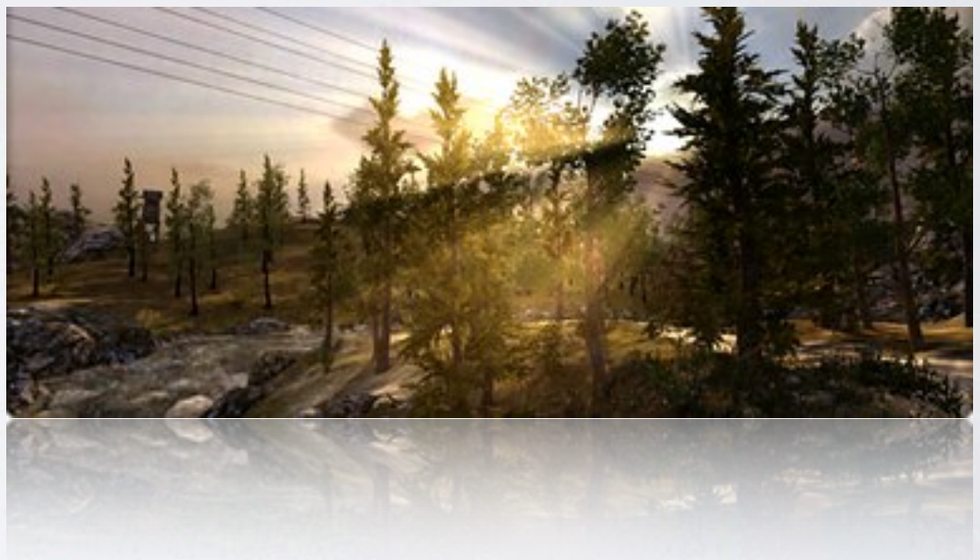
ENGINE

- Rendering
- Lighting
- Networking
- Terrains
- Physics
- Particles
- Audio
- Programming
- Many more..



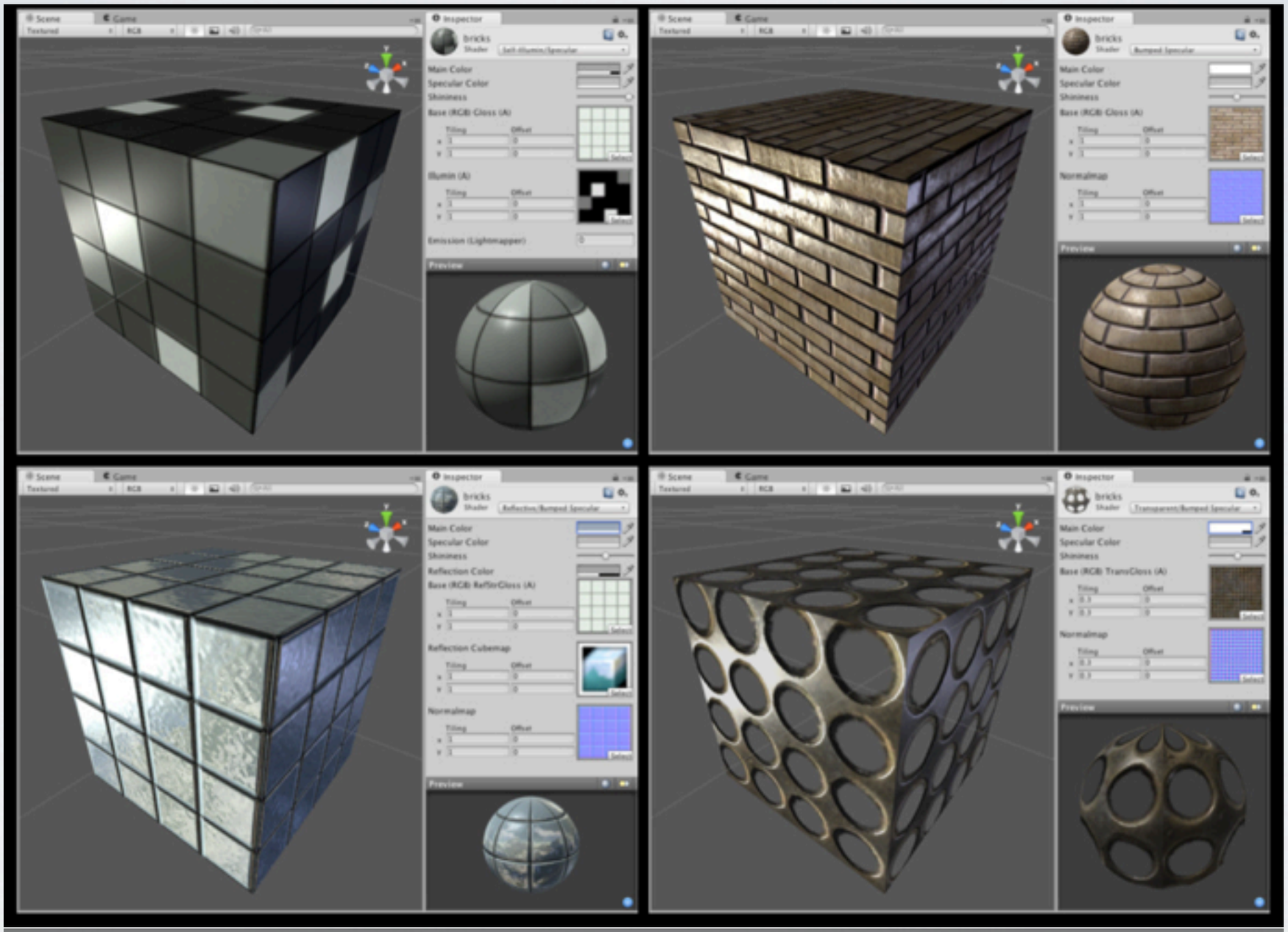
RENDERING

- Generating the graphics
- DirectX and OpenGL
- Surface Shaders
- Scalable for different platforms
- Occlusion Culling and LOD



SURFACE SHADERS

- A lot of Shaders both built-in and on Asset Store
- Do your own shaders
- Mobile shaders


Scene
Game
Inspector
bricks
Main Color
Specular Color
Shininess
Preview
Reflection Color
Reflection Cubemap
Normalmap

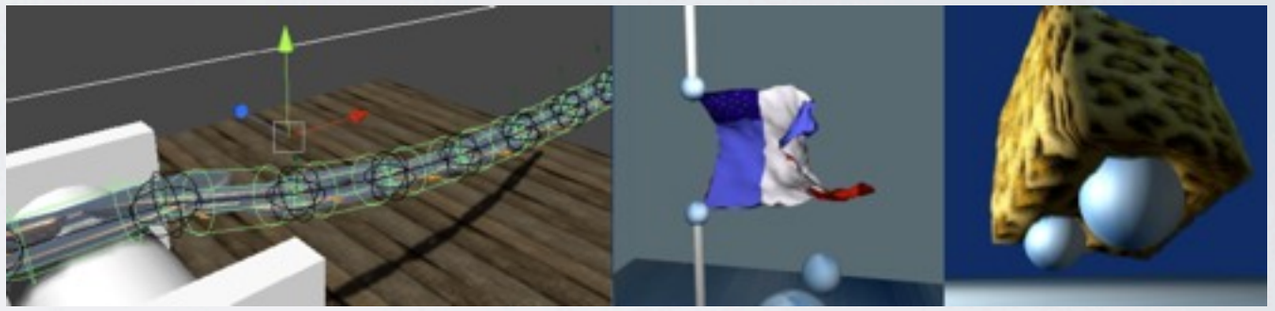
TERRAINS

PHYSICS

- Nvidia PhysX
- Rigidbodies
  - Physics Materials
  - Triggers
- Colliders and collisions
  - Box, Mesh, Sphere, RayCasting, Wheel colliders...

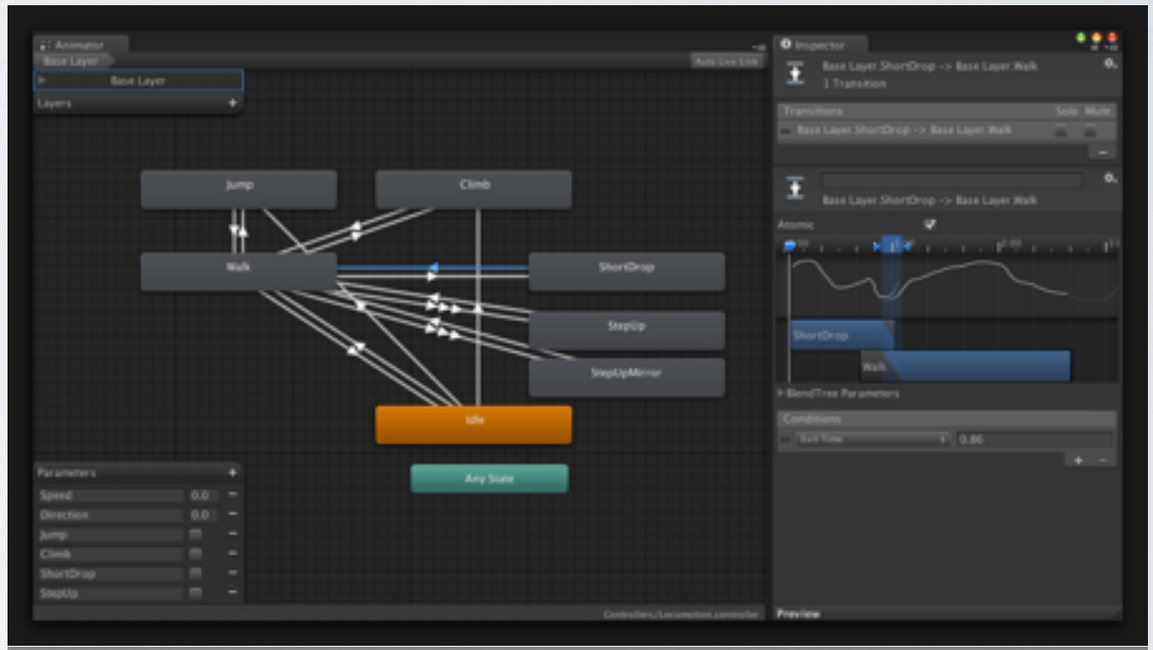
PHYSICS

- Joints
- Softbodies
- Cloth Simulation



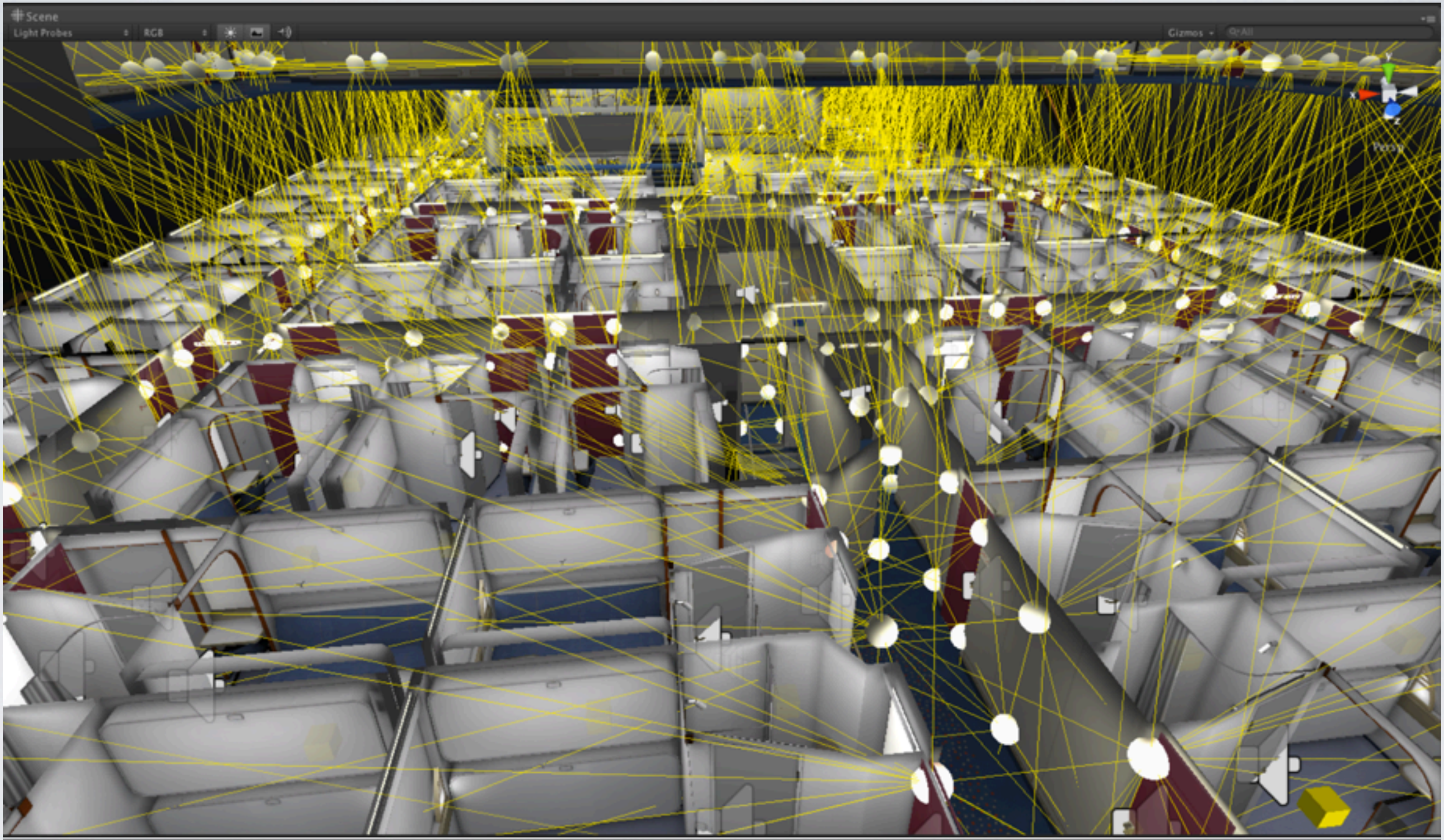
ANIMATION

- Animation Editor
- Animation Clips
- Bones, IK
- Animation & Pose blending



OPTIMIZATION

- Mobile hardware
- Fill rate
- RAM
- Drawcalls!!


Scene
Light Probes
RGB
Gizmos
Persp

Lightmapping — Beast (before)

Lightmapping — Beast (after)

FULLSCREEN POSTPROCESSING FILTERS

- Most interesting filters
  - Bloom + Lens Flare, DOF, Sun Shafts, Color Correction,
  - Glow, SSAO, Motion Blur, Noise, Twirl, Vortex
- Hardware consumption
- Not supported on mobile devices

ARTIFICIAL INTELLIGENCE

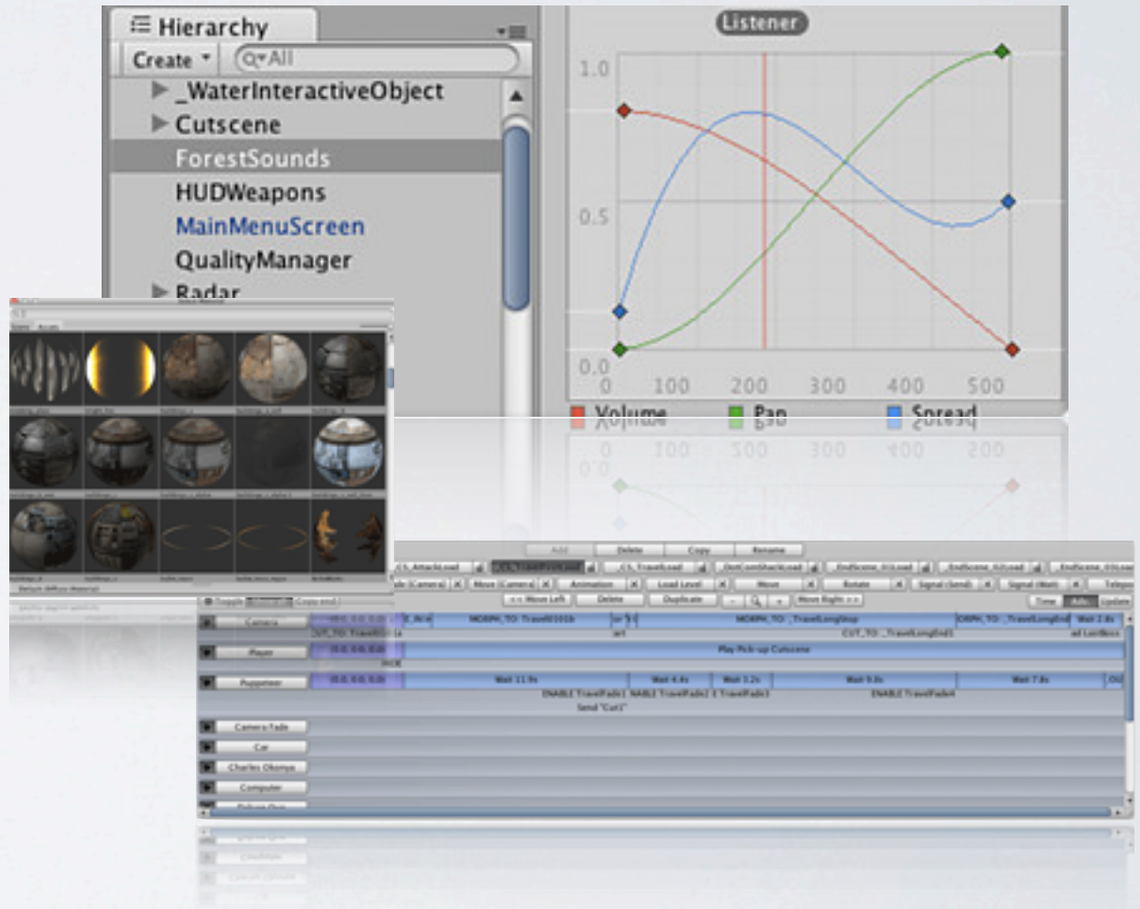
- Built in Pathfinding
- Many more tools on the Asset Store
  - Behaviour Trees
  - Sensoring
  - etc.

EDITOR

- Integrated Editor
- Build your scenes
- The asset pipeline
- Asset Store
- Asset Server

INTEGRATED EDITOR

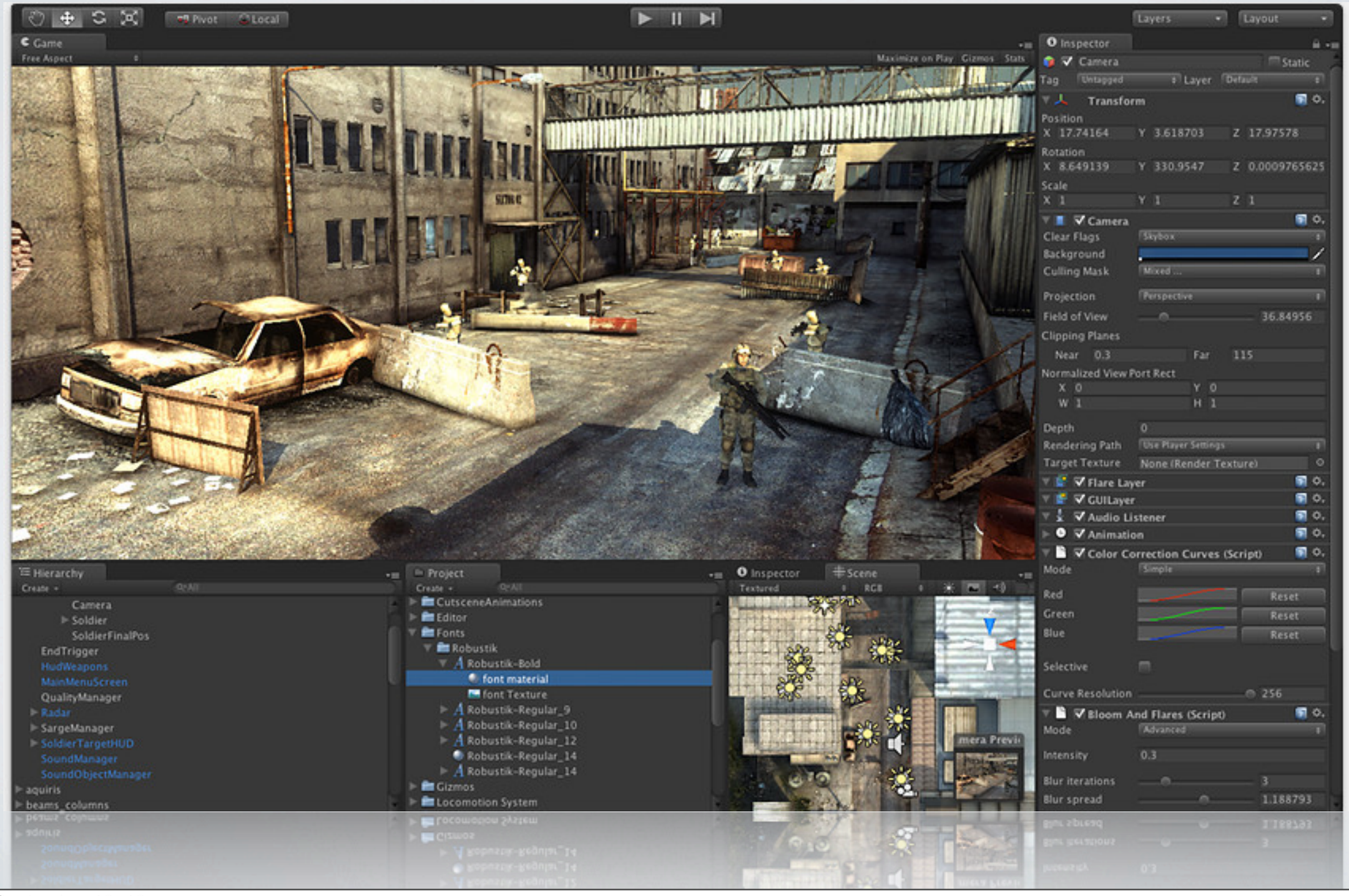
- Mac and Windows
- Live preview of your game
  - Graphic emulation
  - iPhone / Android remote
- Customize your editor
- Use prefabs!



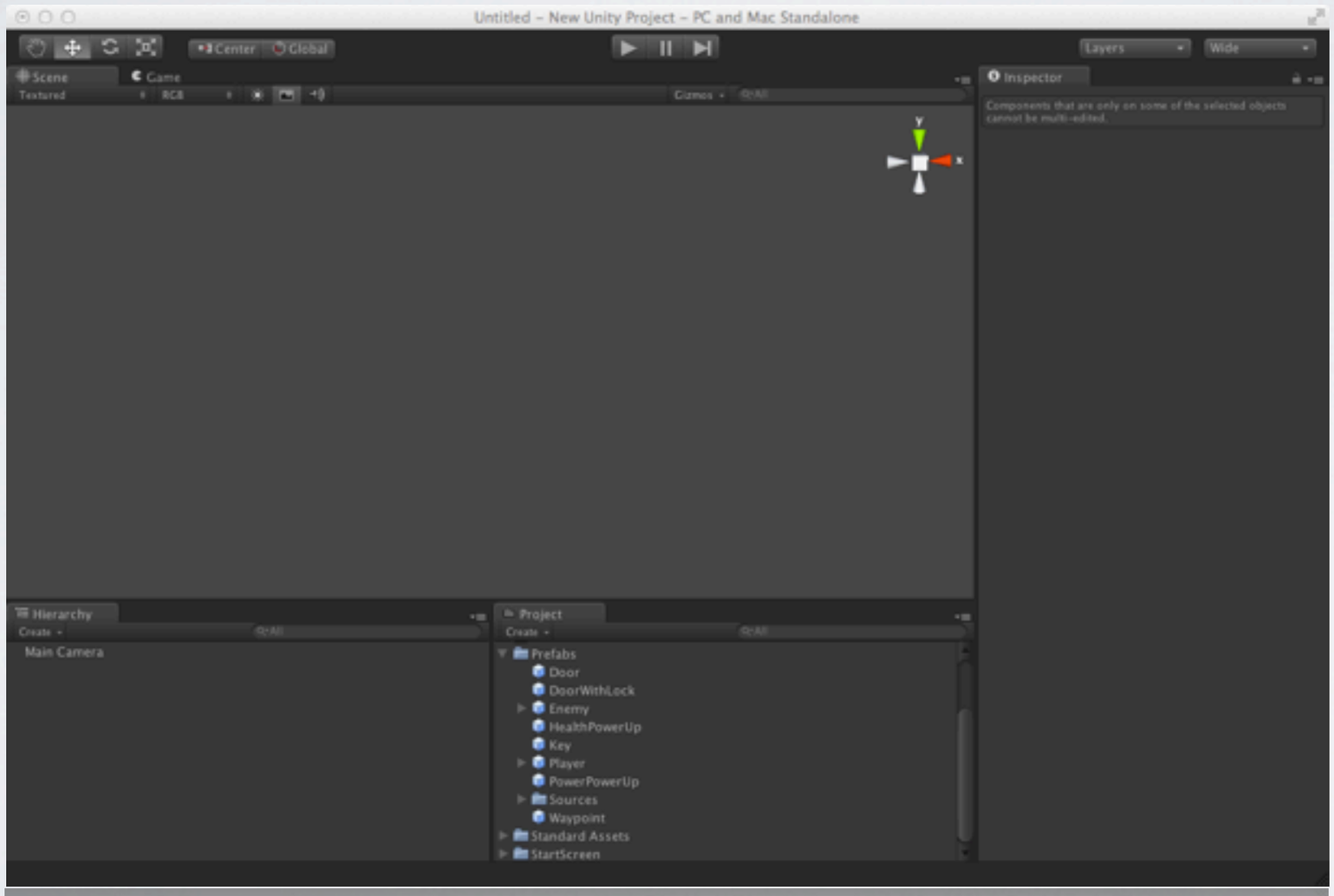
PLAY / PAUSE

- Debugging & Profiling
  - Instant launch, recompilation in background
- No need to recompile
- Debugging & Profiling
  - Unity MonoDevelop, Visual Studio and Xcode

SCENE CREATION



ANATOMY OF UNITY GUI



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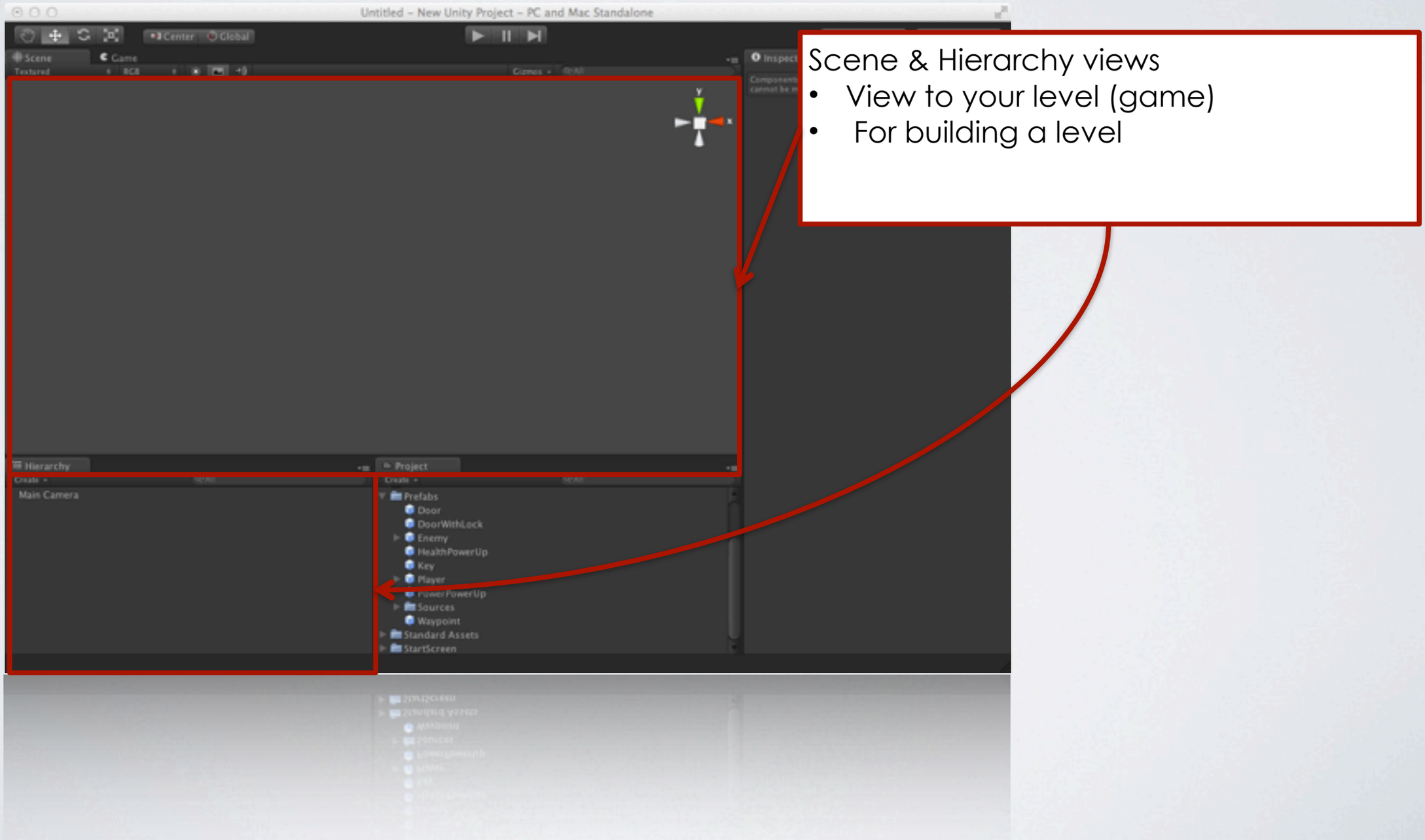

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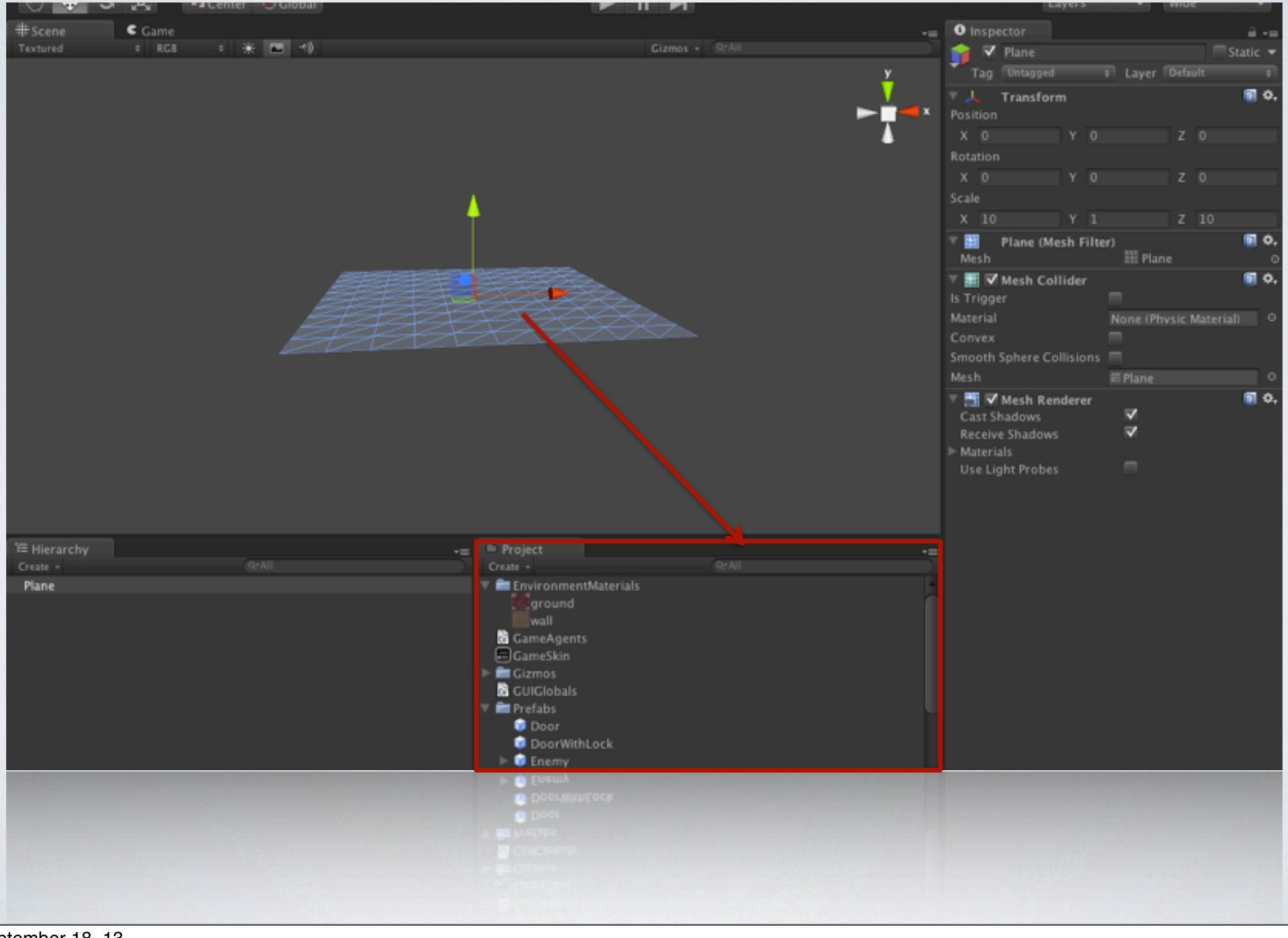

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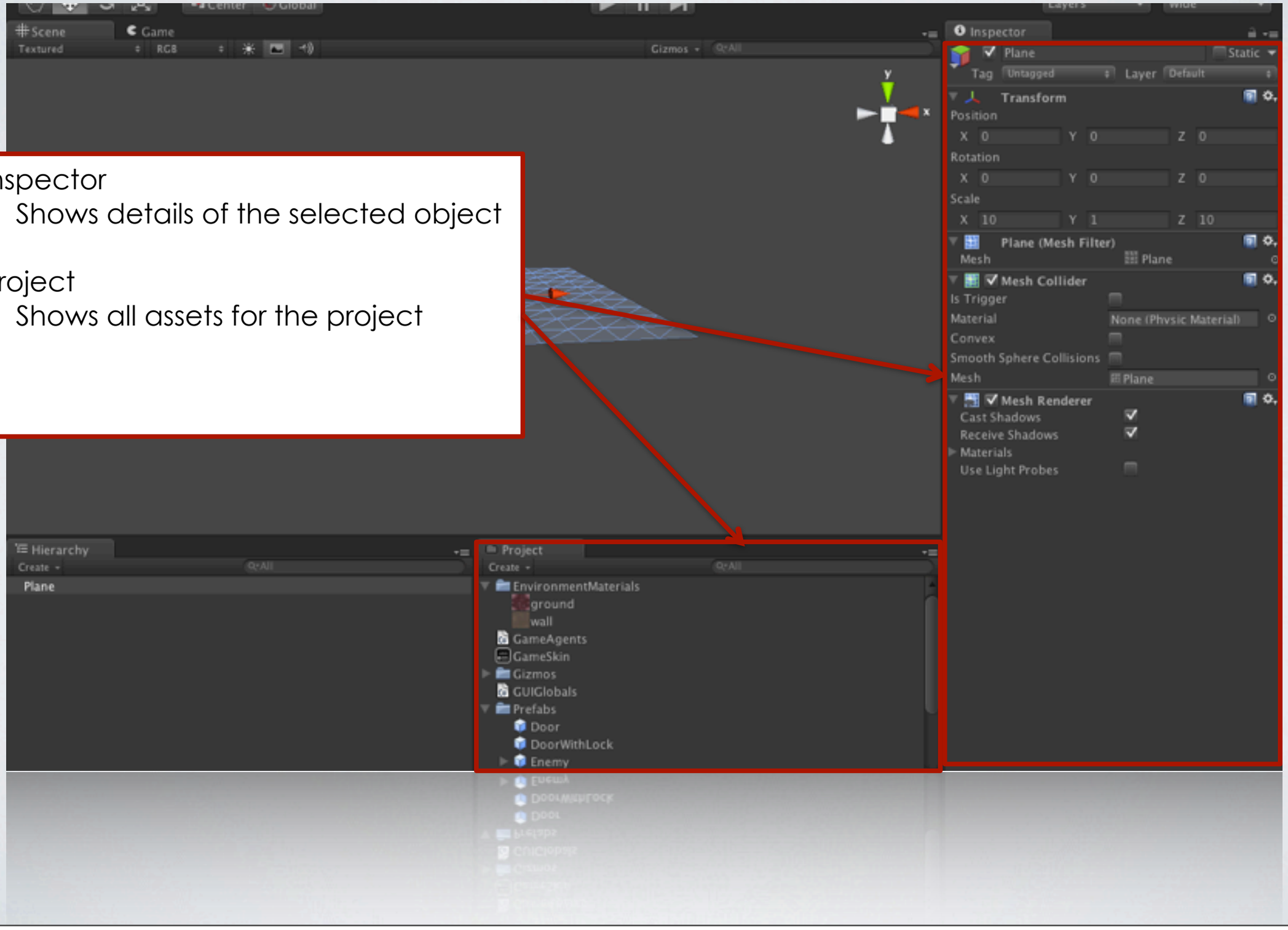


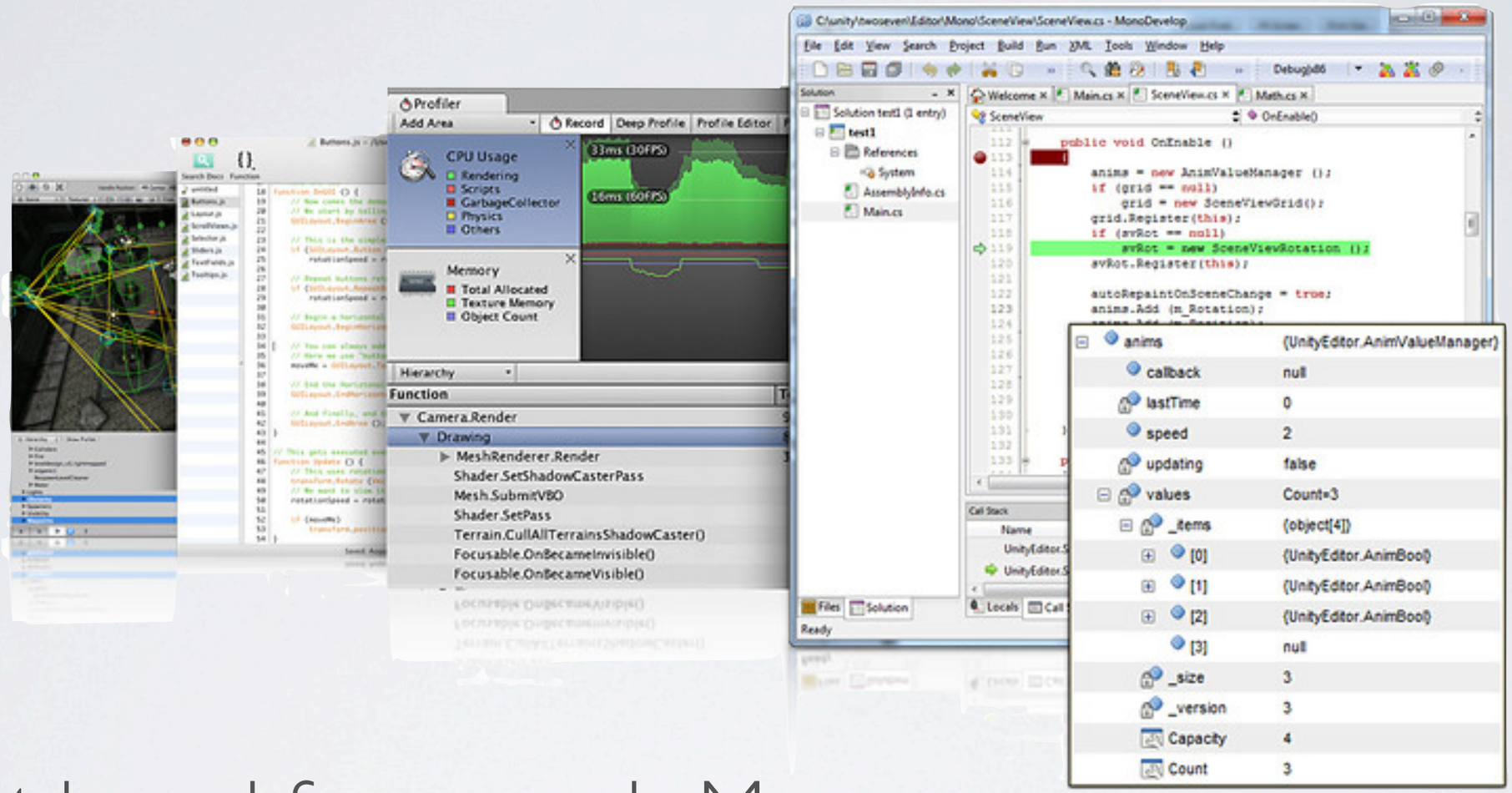
Inspector
- Shows details of the selected object

Project
- Shows all assets for the project

ASSET PIPELINE

- Automatic Asset Import
- Automatic file change detection
- Instantaneous Import
- Use Application for importing
- Great when working with art

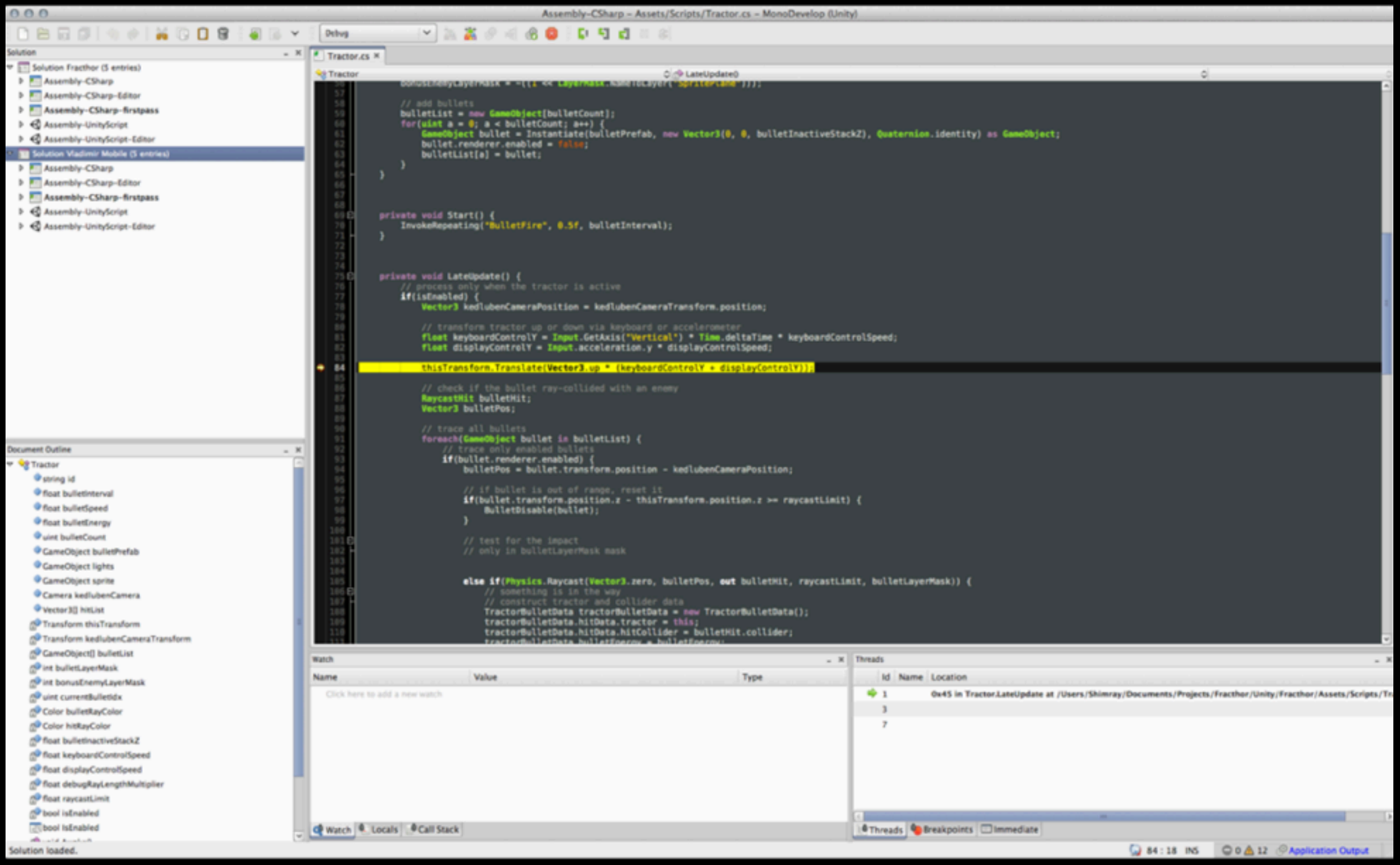
PROGRAMMING



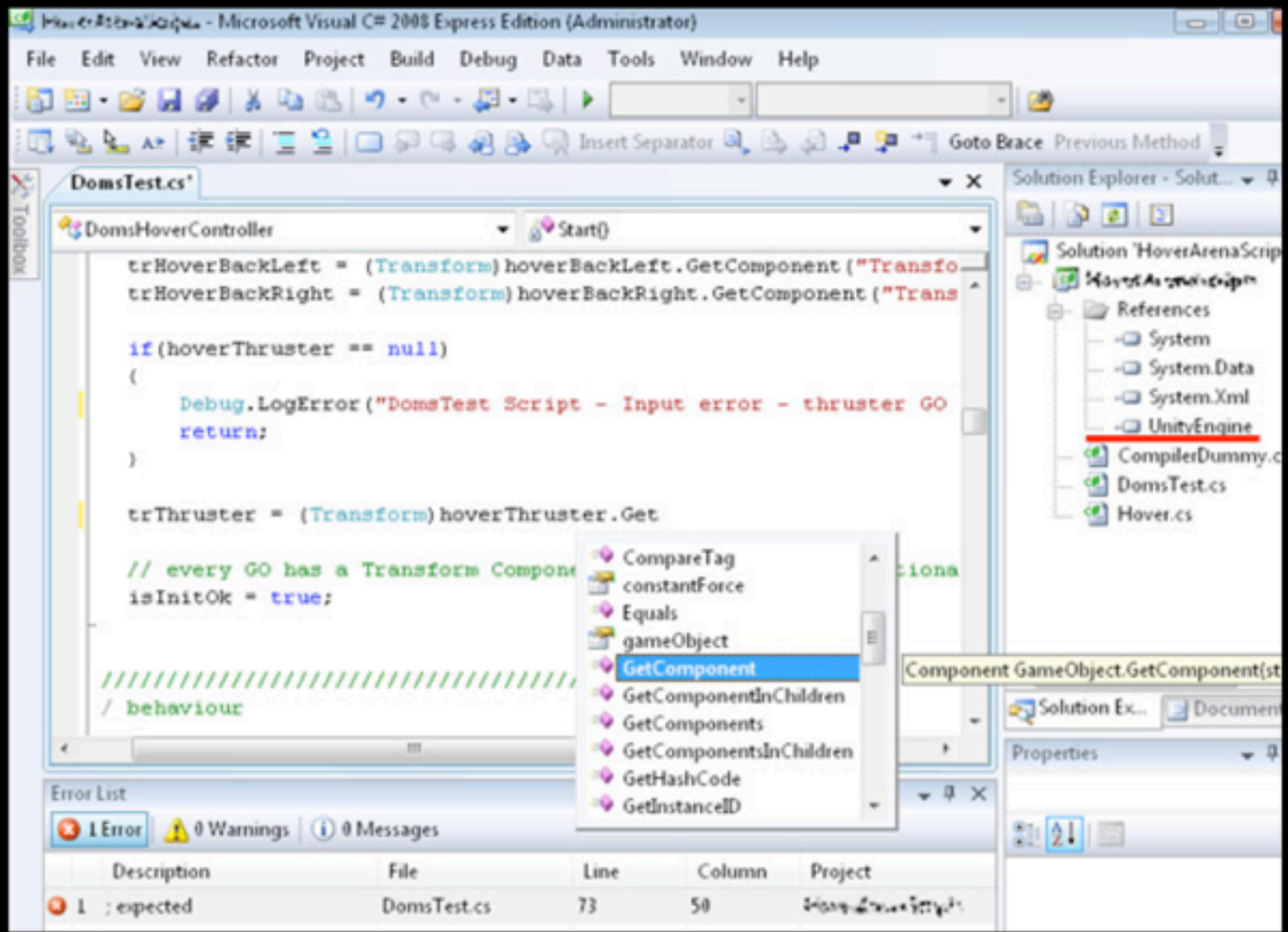
- .Net based framework; Mono
- MonoDevelop as main IDE
- Profiling your game

EDITORS

- MonoDevelop
- Microsoft Visual Studio
- TextMate
- any many others



MonoDevelop (OS X / Windows)



Microsoft Visual C# (Windows)

COMPONENTS & OOP

- Languages
  - C#, JavaScript, Boo
- Scripts as components
- Prefabs
- Rich API

JavaScript

```
// To access public variables and functions
// in another script attached to the same game object.
var script : ScriptName;
script = GetComponent("ScriptName");
script.DoSomething ();
```

C#

```
using UnityEngine;
using System.Collections;

public class example : MonoBehaviour {
    public ScriptName script;
    void Awake() {
        script = GetComponent("ScriptName") as ScriptName;
        script.DoSomething();
    }
}
```

Boo

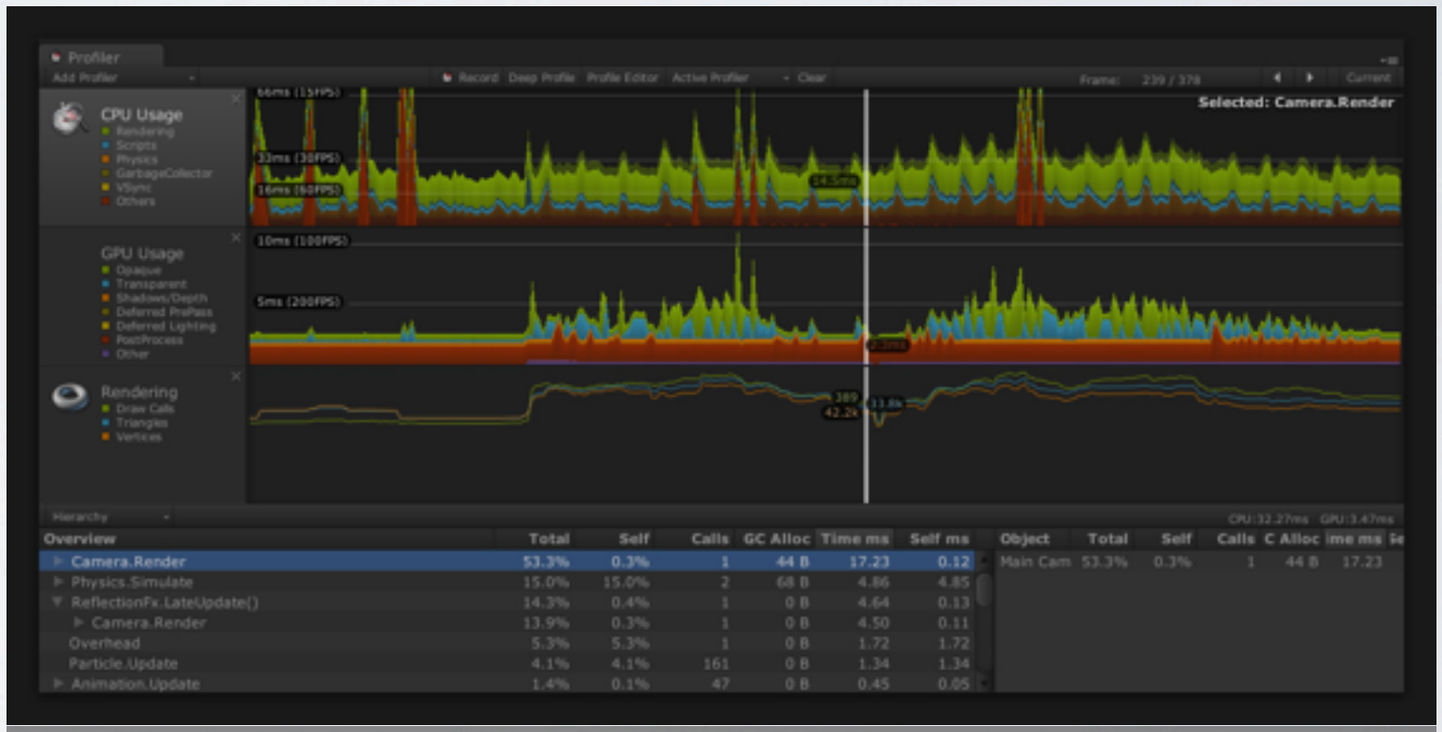
```
import UnityEngine
import System.Collections

class example(MonoBehaviour):

    public script as ScriptName

    def Awake():
        script = (GetComponent('ScriptName') as ScriptName)
        script.DoSomething()
```

Ball > ShootBall ()

```
using UnityEngine;
using System.Collections;

public class Ball : MonoBehaviour {

    private Player player;

    public GameObject chargeUp, ballLauch, ballCollision, ballCollision2, otherCollision, otherCollision2, gatePickup, gateDrop, powerUpPic
    public int soundDif = 20;
    public KeyCode key;

    void Start()
    {
        player = gameObject.GetComponent<Player>();
    }

    void Update ()
    {
        if(Input.GetKeyDown(key))
        {
                if(!dirLocked)
                    LockDirection();
                else
                    ShootBall ();
            }
        //Debug.Log ("Velocity: " +rigidbody.velocity.magnitude );
        if(rigidbody.velocity.magnitude > maxVelocity)
        {
            rigidbody.velocity = rigidbody.velocity.normalized*maxVelocity;
        }
    }

    void ShootBall()
    {
        Vector3 dir = - new Vector3(ballHeading.forward.x, 0, ballHeading.forward.z);
        if(useChargedShot)
        {
            rigidbody.AddForce( dir * baseShootForce*chargedForce);
            UnlockDirection();
        }
        else
        {
            rigidbody.AddForce(dir * baseShootForce);
            UnlockDirection();
        }
        ballLauch.audio.Play();
    }
}
```

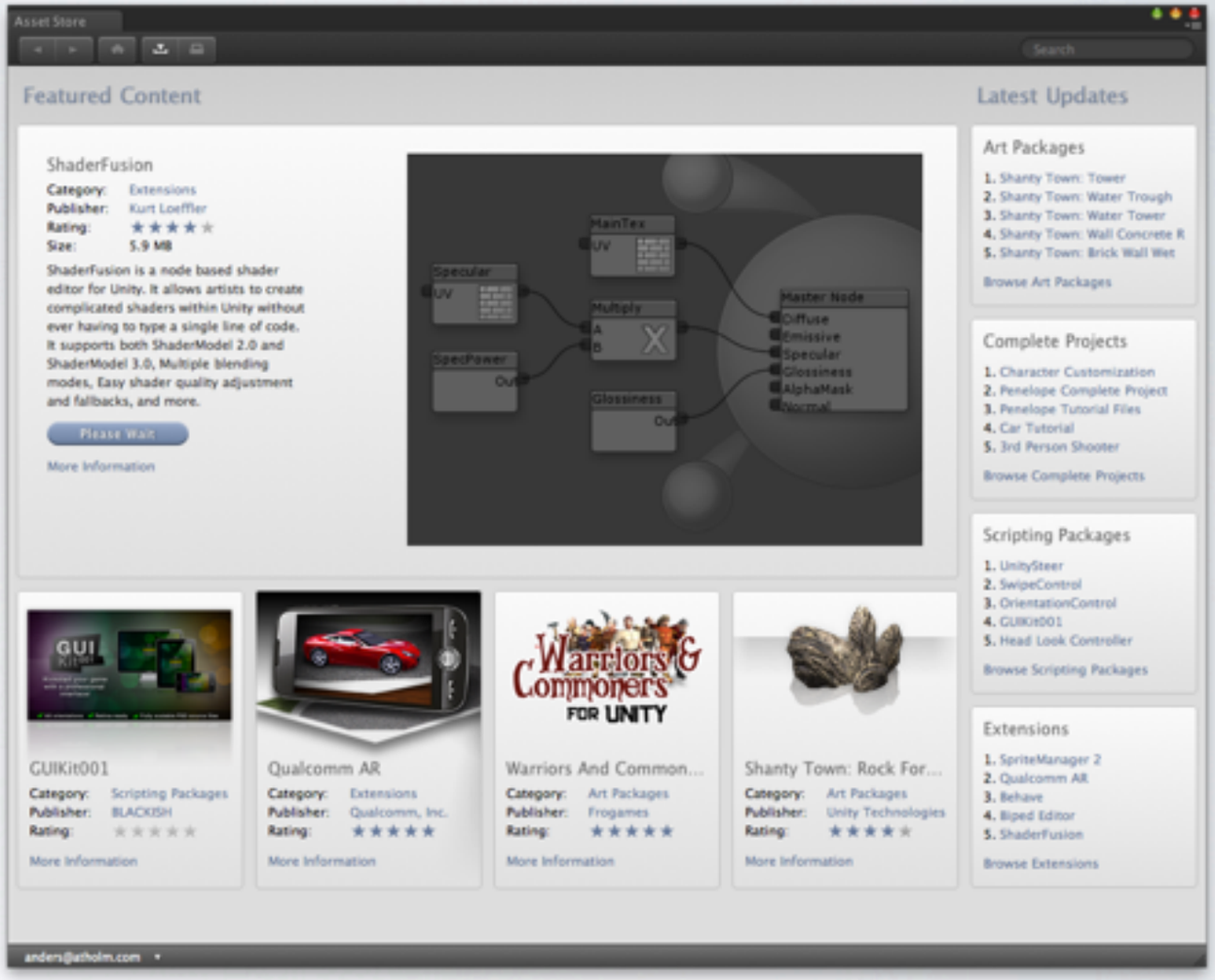
PROFILING DEBUGGING

- Deep profiling
- Attach to process



ASSET STORE

- Sell and buy assets
- Lots of extensions
  - Save time

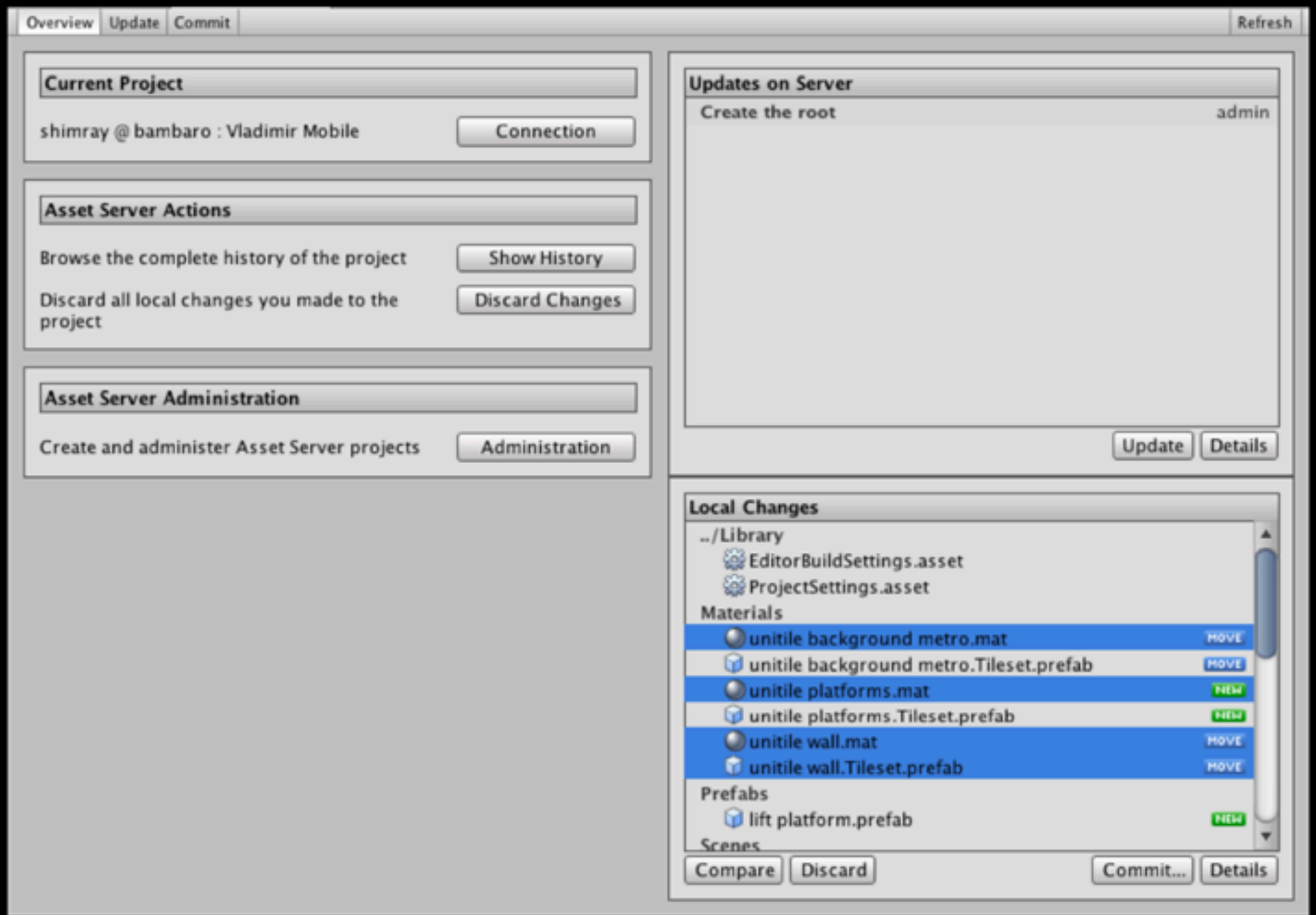


ASSET STORE

- Buy 3rd party assets
- 3D Models
  - Characters, environments, vehicles, vegetation...
- Textures
- Shaders, bricks, fabric, metal, nature, paper, road..
- Audio
- Music, sound FX, ambient sounds...
- Example projects
- Tutorials, templates, demos, games..

ASSET SERVER

- Large teams, versioning
- Integrated
- Needs a free server, but a separate client license
- Supports other systems
  - SVN
  - Perforce
  - git



Asset server

WHICH PLATFORMS?

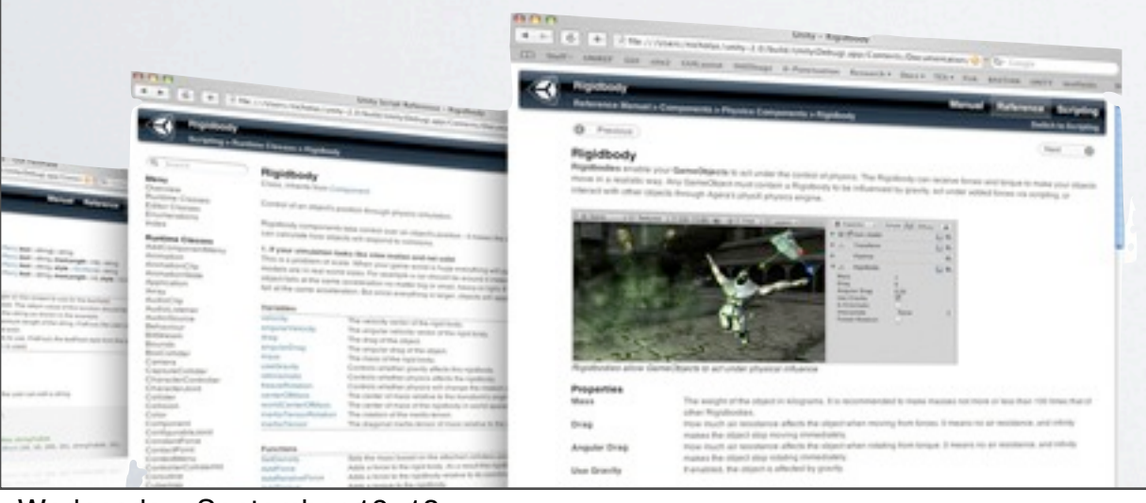
PLAYSTATION 3
Wii
Wii

UNITY REMOTE

- Realtime preview
- Mobile device features transferred to Unity
- Multitouch
- Accelerometer / gyroscope
- Lower FPS and visual quality

DOCS & COMMUNITY

- Good Documentation, Build in Editor and IDE
- A lot of resources; Tutorials, Sample Projects and Presentations
- Big Community; Forum and IRC
- UNITE



UNITY 4.3

- New GUI System
- 2D Support
- Unity Cloud

Anders Tankred Holm

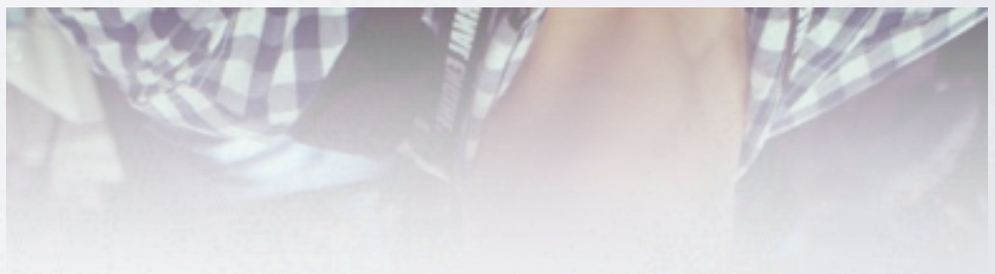
CONTACT:

anders@atholm.com

mobile: 23 49 73 29

skype: atholm.com

twitter: @atholm



DEMO TIME