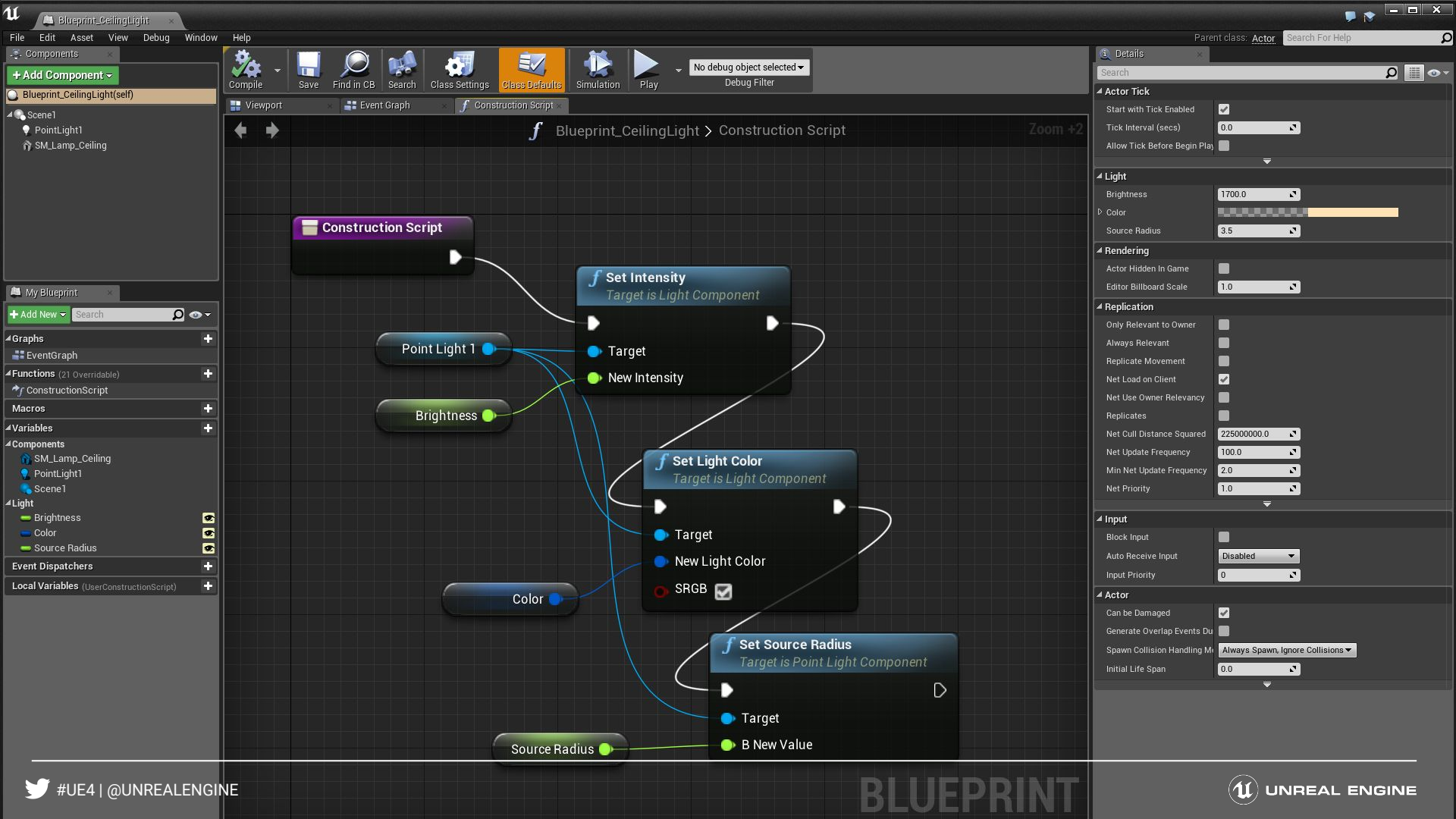
Текущие возможности и перспективы визуализации данных в Unreal Engine 4

Роман Горошкин, Epic Games

Что такое **Unreal Engine 4**?

Мы поговорим о примерах использования движка Unreal Engine 4 вне игровой сферы: **в научных исследованиях**, промышленном производстве и архитектуре.

Но для начала давайте разберемся, что такое движок **Unreal Engine 4** и для чего его можно использовать?


Blueprint_CeilingLight
File Edit Asset View Debug Window Help
Parent class: Actor
Search For Help
Components
+ Add Component
Blueprint_CeilingLight(self)
Scene1
PointLight1
SM_Lamp_Ceiling
Compile
Save
Find in CB
Search
Class Settings
Class Defaults
Simulation
Play
No debug object selected
Debug Filter
Viewport
Event Graph
Construction Script
Blueprint_CeilingLight > Construction Script
Zoom +2
Construction Script
Set Intensity
Target is Light Component
Target
New Intensity
Point Light 1
Brightness
Set Light Color
Target is Light Component
Target
New Light Color
SRGB
Color
Set Source Radius
Target is Point Light Component
Target
B New Value
Source Radius
Details
Search
Actor Tick
Start with Tick Enabled
Tick Interval (secs)
Allow Tick Before Begin Play
Light
Brightness
1700.0
Color
Source Radius
3.5
Rendering
Actor Hidden In Game
Editor Billboard Scale
1.0
Replication
Only Relevant to Owner
Always Relevant
Replicate Movement
Net Load on Client
Net Use Owner Relevancy
Replicates
Net Cull Distance Squared
225000000.0
Net Update Frequency
100.0
Min Net Update Frequency
2.0
Net Priority
1.0
Input
Block Input
Auto Receive Input
Disabled
Input Priority
0
Actor
Can be Damaged
Generate Overlap Events Du
Spawn Collision Handling M
Always Spawn, Ignore Collisions
Initial Life Span
0.0
My Blueprint
+ Add New
Search
Graphs
EventGraph
Functions (21 Overridable)
ConstructionScript
Macros
Variables
Components
SM_Lamp_Ceiling
PointLight1
Scene1
Light
Brightness
Color
Source Radius
Event Dispatchers
Local Variables (UserConstructionScript)

Вертикали **неигрового** направления

- Manufacturing

NASA, Airbus, Ford, BMW, Porsche, Bosch, **Grishin Robotics**

- AEC (Architecture, Engineering and Construction)

Zaha Hadid, IKEA, Knight Frank, Steelcase, NHTB, Texaco, **СИБУР**, **Татнефть**

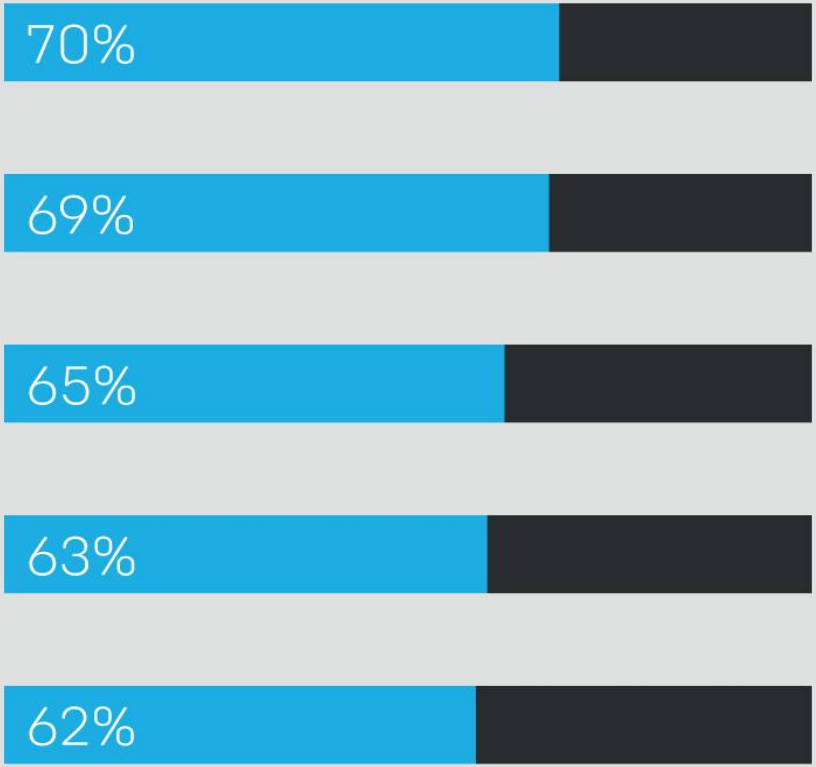
- Media and Entertainment

Disney, ILMxLAB, Fox News, Weather Channel, **Телеканал Звезда**

Визуализация и рендеринг в реальном времени при помощи **Unreal Engine 4**

Исследование Forrester Consulting

Not so obvious was that 70% of respondents need a way to visualize artificial intelligence (AI) data, analytics, and big data, and that they see real-time rendering as the key. We were excited to see this response, since Unreal Engine has the functionality to process data and convert it directly to visuals in real time using C++ or Blueprints.


70%
The need to visualize results from big data, analytics, and artificial intelligence applications
69%
Growth in complexity of enterprise computing workloads
65%
A need to reduce the time taken to create high-fidelity rendered images and/or animations
63%
Employee feedback that current tools were outdated
62%
Increased career satisfaction and interest

81%

Специалистов будет использовать технологии **рендеринга в реальном времени**

ATLASRift

Наглядная VR-визуализация детектора ATLAS в институте CERN

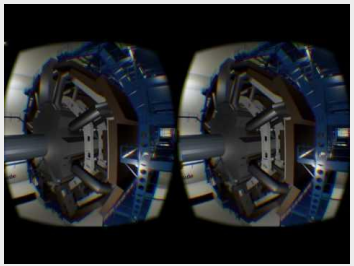


Image courtesy of CERN

ATLASRift в институте CERN

Interactive 3D data visualization plays a key role in HEP experiments, as it is used in many tasks at different levels of the data chain. Outside HEP, for interactive 3D graphics, the game industry makes heavy use of so-called “game engines”, modern software frameworks offering an extensive set of powerful graphics tools and cross-platform deployment. Recently, a very strong support for Virtual Reality (VR) technology has been added to such engines. In this talk we explore the usage of game engines and VR for HEP data visualization, discussing the needs, the challenges and the issues of using such technologies. We will also make use of ATLASRift, a VR applications developed by the ATLAS experiment, to discuss the lessons learned while developing it using the game engine Unreal Engine, and the feedback on the use of Virtual Reality we got from users while using it at many demonstrations and public events.

NRC

Визуализация сети медицинских заведений в ЮАР

Image courtesy of National Renal Care

Визуализация данных сети больниц

To create a flexible financial analysis tool, Commin designed a Blueprint to hold a standard facility cost/income statement. An Unreal Engine Blueprint serves as a container for scripts, actions, and events. For Commin, the Blueprint is structured to store and retrieve data on facilities' financial and operational performance, supplier details, and per-item costing. "This is probably an unusual use for a Blueprint, but it fit the bill perfectly," says Commin.

MS AirSIM

Симулятор для тренировки автономных автомобилей и дронов

Image courtesy of AirSim

Плагин **Microsoft AirSim** для UE4

Microsoft’s AirSim plug-in for Unreal Engine empowers AI researchers to train and test their autonomous vehicle algorithms in a safe, dynamic virtual environment.

In a training-driven scenario, ensuring the AI brain is learning based-on correct and accurate data and sensor information is vital to the success and safety of the technology. Microsoft’s goal for the research project is continue adapting AirSim as a tool for AI experimentation, deep learning, and reinforcement learning.

Boeing

Разработка физически корректных систем симуляции

Программы разработки **Boeing** и **NASA**

The final presenter of the day was a Boeing guest from Australia: Leighton Carr, Research Program Lead for Boeing Research & Technology in Brisbane. Carr's teams are working on projects for NASA, using Unreal Engine to create full solar system simulations and spacecraft training tools, complete with Keplerian dynamics.

C4X

Визуализация и моделирование молекулярных структур в фармацевтике

Image courtesy of C4X Discovery

Исследовательские работы для **фармацевтики** C4X

UK-based Pharmaceutical research firm C4X Discovery recently starting using Unreal Engine technology to visualize and manipulate 3-D molecules in virtual reality, with the potential to let scientists collaborate remotely in the virtual environment.

Бесплатно для учебных заведений

Free to use, Unreal Engine 4 can be downloaded and installed to classroom computers as well as personal systems at no cost. With full access to the complete source code and tools, Unreal Engine 4 levels the playing field to give everyone the resources needed to learn professional-quality development. In addition, schools and students receive regular updates, making it easy to stay current with the latest in development for games, cinematic content, visualization and real-time production.

Спасибо!