



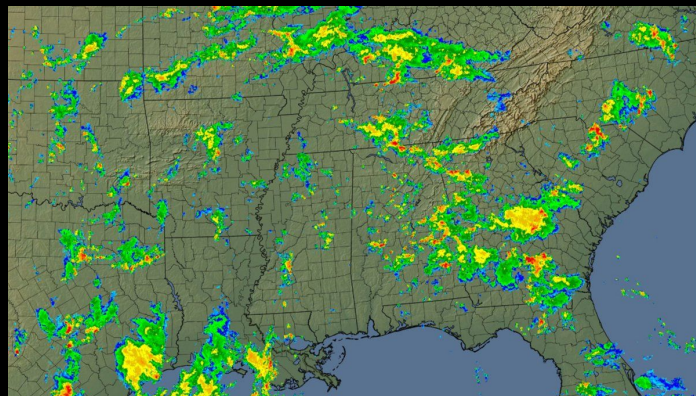
Accelerate Training Digitization with game engines

Seb Loze - Simulations Industry Manager



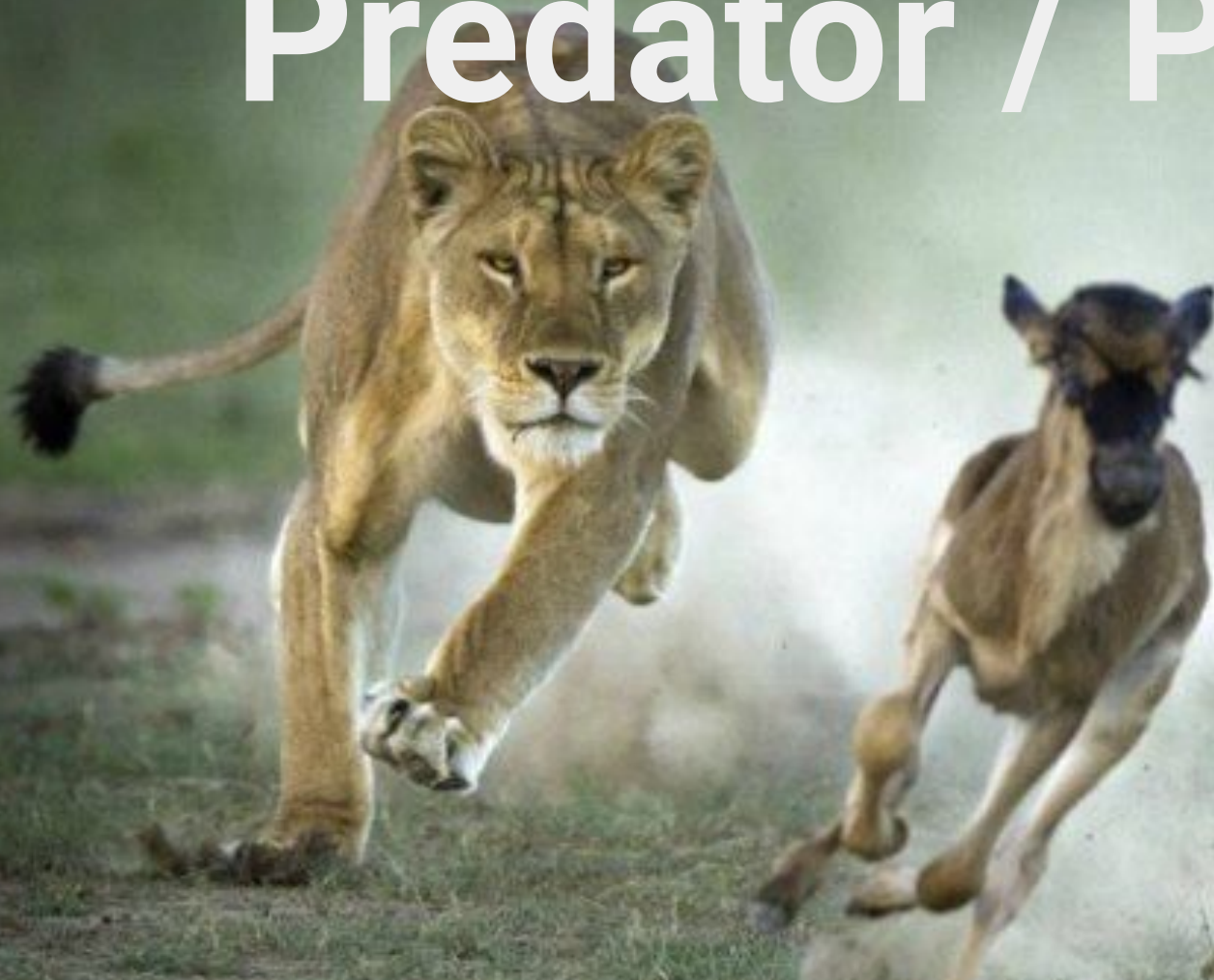
Part I

a new era of digitalization
Two universes inspiring each other



It's all about the nature
of the relationship you choose

Predator / Prey



Predator / Prey



Scavengers



Image source : Quora, Serge Elia

Osmosis



Osmosis

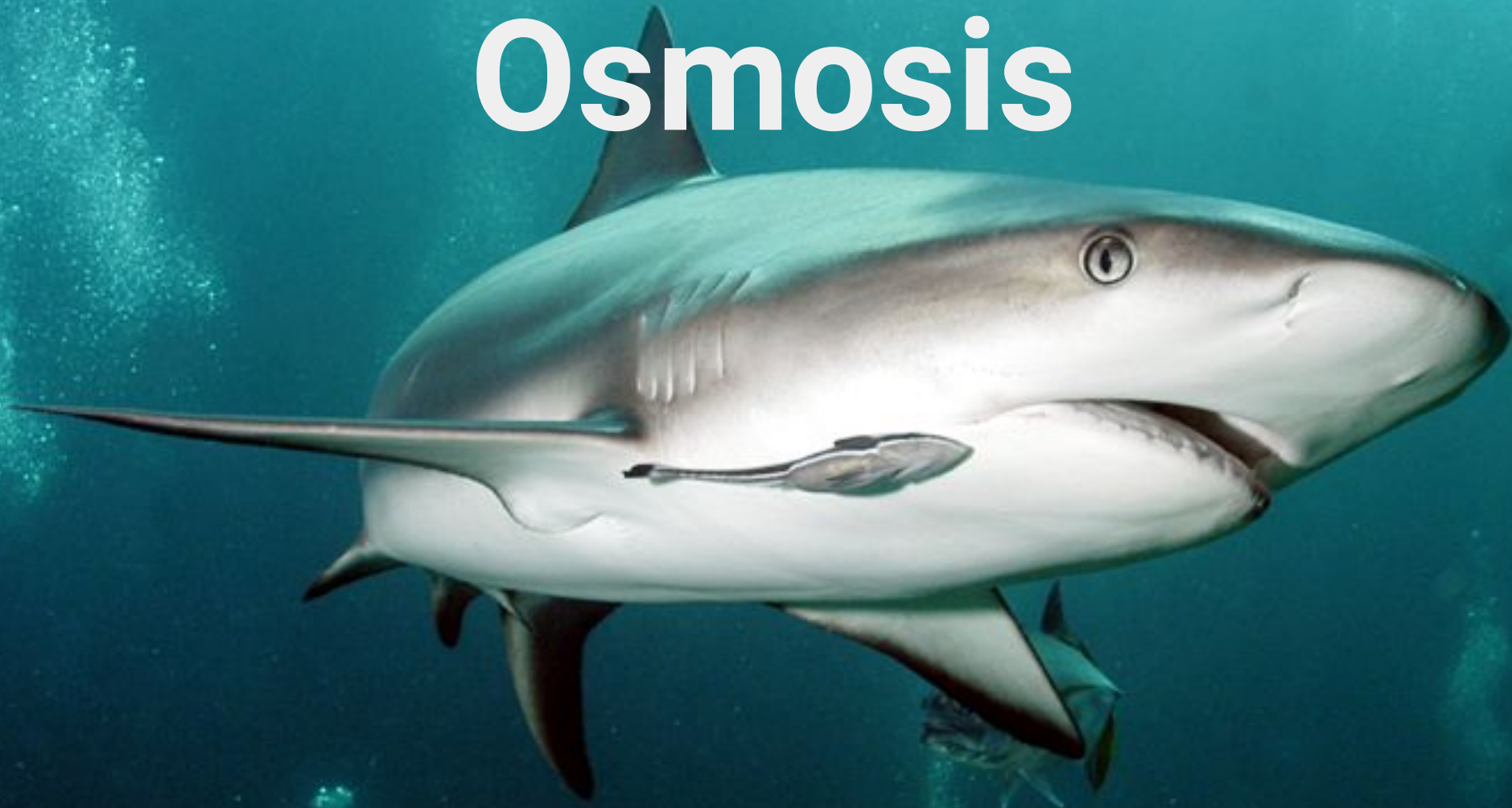
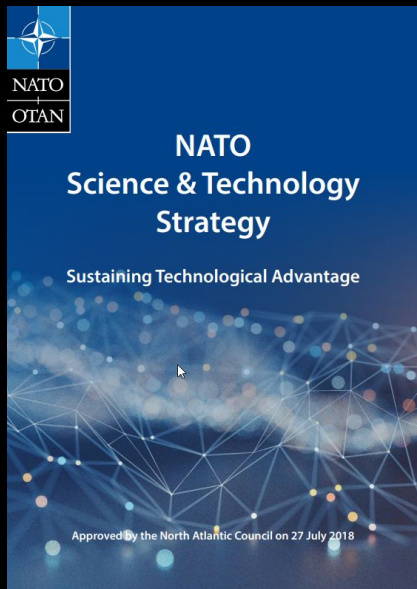


Image source : elaineou.com

Sometimes ... Osmosis are possible

When between two species goals are different but they converge ...



“Disruptive innovations create a new market and value network which eventually disrupts the existing market and value network, thus displacing established market leading firms, products, and alliances.

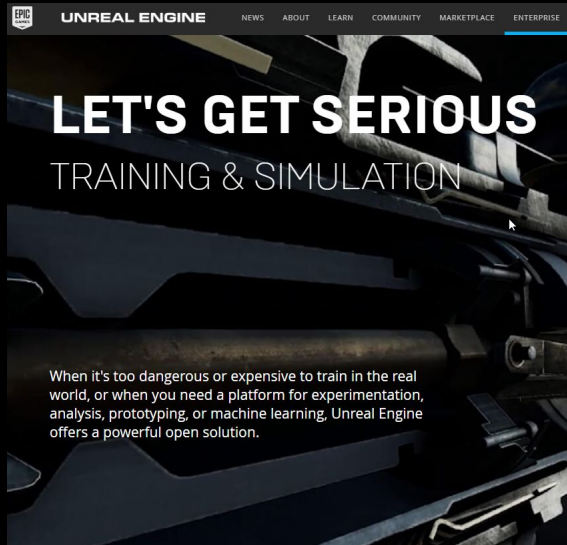
For the military, disruptive technologies transform defence capabilities and methods, shifting the force balance and unhinging opponent capabilities.

These emerging and disruptive technologies are heavily driven by commercial investments and interests, and clearly must be leveraged to meet military capability requirements and minimize vulnerability to potential threats.”

- NATO Science & Technology Strategy

Sometimes ... Osmosis are possible

When between two species goals are different but they converge ...



“When it's too dangerous or expensive to train in the real world, or when you need a platform for experimentation, analysis, prototyping, or machine learning, Unreal Engine offers a powerful open source and free solution”

- Unreal Engine
(Training and Simulation)

<https://www.unrealengine.com/en-US/industries/training-simulation>

Videos Games | Simulation applications

	Video Game	Simulation application
Goal : Entertainment	YES	NO
Goal : Learning	NO	YES
Engaging	YES	YES
Interoperable / Multiplayer	YES	YES
Connected	YES	YES
Visual and physics Realism	YES	YES
Deployability	YES	YES
XR agility / portability	YES	YES
Open	YES	YES
Large open world	YES	YES

Remember Osmosis ?

“When between two species goals are different but they converge ...”



HERE'S YOUR
"BUZZWORD BINGO"
CARD FOR THE
MEETING .

IF THE BOSS USES
A BUZZWORD ON
YOUR CARD, YOU
CHECK IT OFF. THE
OBJECTIVE IS TO FILL
A ROW .

S. Adams E-MAIL: SCOTTADAMS@AOL.COM

© 1994 LuLab Feature Syndicate, Inc.

deep learning
future
analytics
human
data-driven
robots
startups
companies
practitioners
banking
ap
chatbot
data
casci
artificial intelligence
humans
startup
network
banking
real-time
neural s
m2m

Let's ~~kill~~ neutralize the buzzwords

1

Artificial Intelligence

2

Big Data

3

Cloud based computing

4

The Rs ... VR / AR / MR / XR

Let's ~~kill~~ neutralize the buzzwords

Artificial Intelligence

The Myth

Skynet / Terminator

The AI will control the humans



Pragmatic use case and redefinition

Agent driven simulation

Pathfinding, Navigation, recognize events and situations, adapt reactions, suggest course of action

Let's ~~kill~~ neutralize the buzzwords

Big Data

The Myth

Privacy concerns

Identity theft, privacy risks

Magic solution to everything



Pragmatic use case and redefinition

"Bring data that's collected from training exercises and bring it back in to replay, improve performance and give feedback to the trainees" Rear Adm. Robb

Basically capture, replay, analyse for AAR

Let's ~~kill~~ neutralize the buzzwords

Cloud based computing

The Myth

Unreliable and Laggy
Security concerns
Inefficient
Expensive



Pragmatic use case and redefinition

A proven and secure mechanism to deploy

Just a fantastic way to deploy and train anywhere anytime

An essential way to access to Simulation As A Service

Let's ~~kill~~ neutralize the buzzwords

VR/AR/MR/...XR

The Myth

Hard to do well

Only for Gamers

Best way to deploy a training ...



Pragmatic use case and redefinition

Remember multimedia ? (The first time you played a video, a video game ...)

This is just a new screen, smaller and closer to your eyes. Just another viewport ... It should be easy to deploy

Game engine = development platform

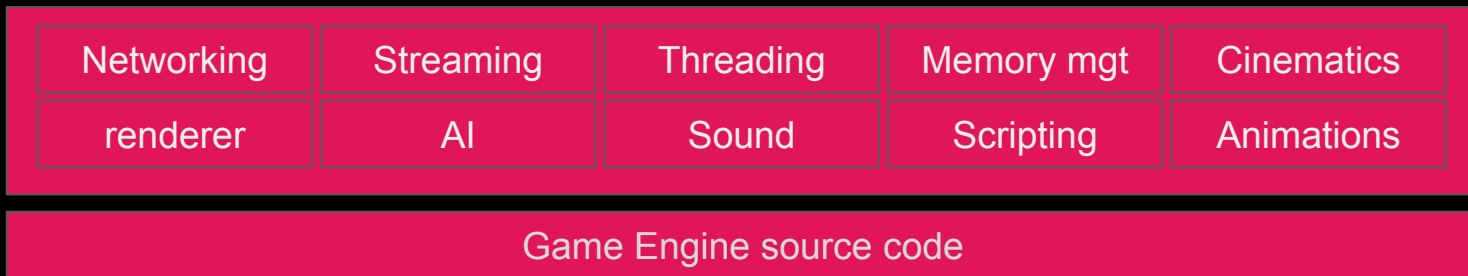
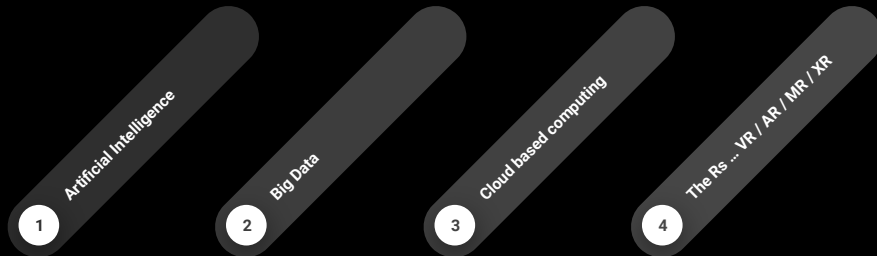
“A game engine is a **software-development environment** designed for people to build video games.

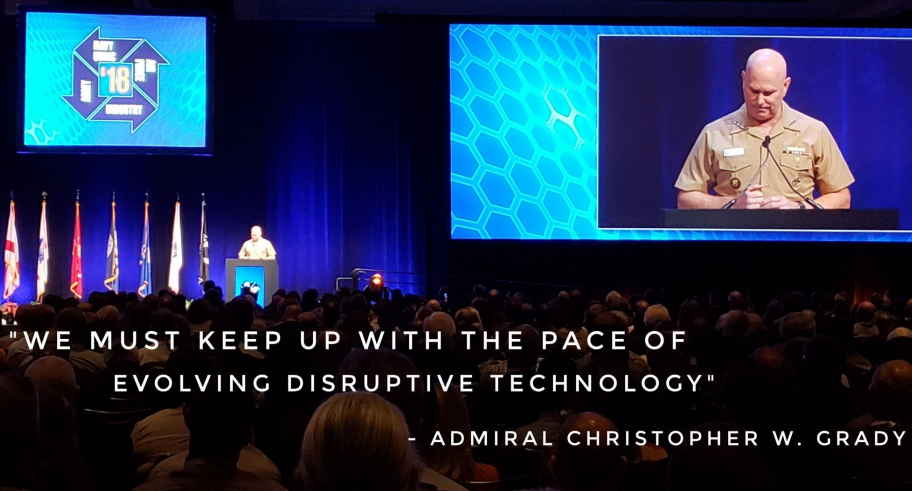
The core functionality typically provided by a game engine includes a **rendering engine** (“renderer”) for 2D or 3D graphics, a **physics engine** or collision detection (and collision response), **sound, scripting, animation, artificial intelligence, networking, streaming, memory management, threading, localization support, scene graph**, and may include **video support for cinematics**.

Implementers often **economize** on the process of game development by reusing/adapting, in large part, the same game engine to produce different games or to aid in porting games to multiple platforms.”

- Wikipedia

Handling the trends ...





"WE MUST KEEP UP WITH THE PACE OF EVOLVING DISRUPTIVE TECHNOLOGY"

- ADMIRAL CHRISTOPHER W. GRADY



"GAMES AND GAMING TECHNIQUES REPRESENT AN UNBELIEVABLE POTENTIAL TO TRANSFORM THE WAY WE TRAIN."

- ADM JAMES ROBB, PRESIDENT NTSA



"COMPARED TO OUR PREVIOUS TRAINING SOLUTIONS , STE WILL BE LESS HARDWARE, MORE SOFTWARE INTENSIVE"

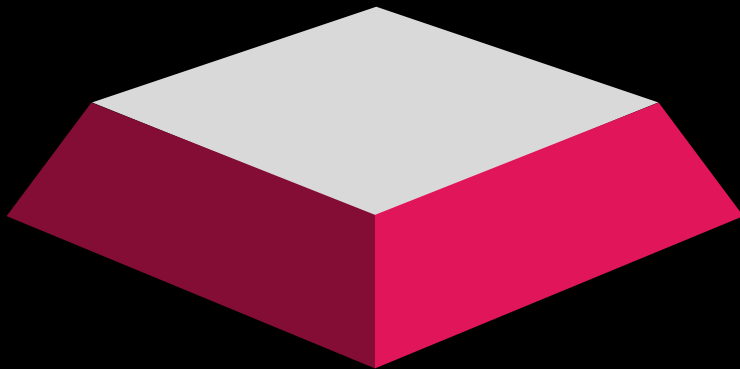
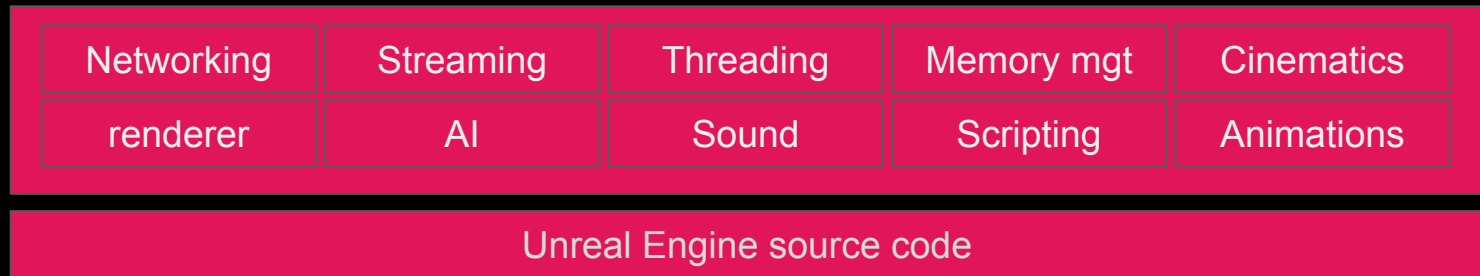
"WE WILL LEVERAGE THE COMMERCIAL/GAMING SECTOR INNOVATIVE TECHNOLOGIES"

MAJOR GENERAL MARIA R. GERVAIS



During #WATS2019 Lt Col Bruce "Buck" Rodger, @usairforce restating the value innovative #VR and #AI technologies will bring to tomorrow's training simulators.

Game engine = development platform



A pragmatic training capability development process ...



A pragmatic training capability development process ...



Remember Osmosis ?

“When between two species goals are different but they converge ...”

3 images to remember





Accelerate Training Digitization with game engines

Seb Loze - Simulations Industry Manager

Part II

RetEx Unreal Engine Simulations use-cases and vision

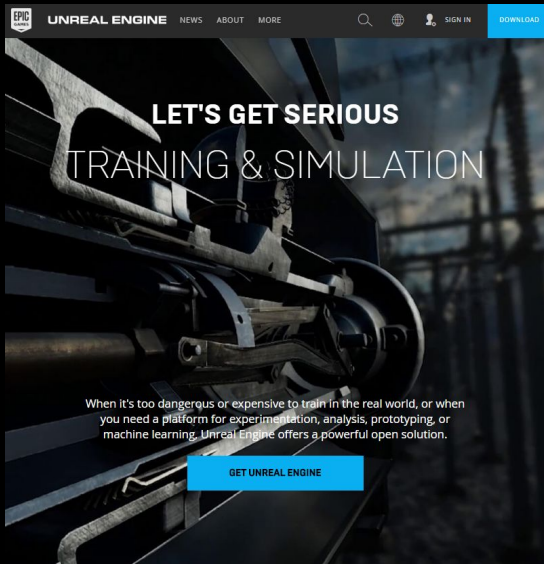
Previously ...



A pragmatic training capability development process ...



First step : Get access



UNREAL ENGINE NEWS ABOUT MORE

LET'S GET SERIOUS
TRAINING & SIMULATION

When it's too dangerous or expensive to train in the real world, or when you need a platform for experimentation, analysis, prototyping, or machine learning, Unreal Engine offers a powerful open solution.

GET UNREAL ENGINE



UNREAL ENTERPRISE PROGRAM

The **Unreal Enterprise Program (UEP)** is designed for companies that would benefit from a closer relationship with Epic Games, along with the potential for custom license terms, dedicated support, custom training, and more.

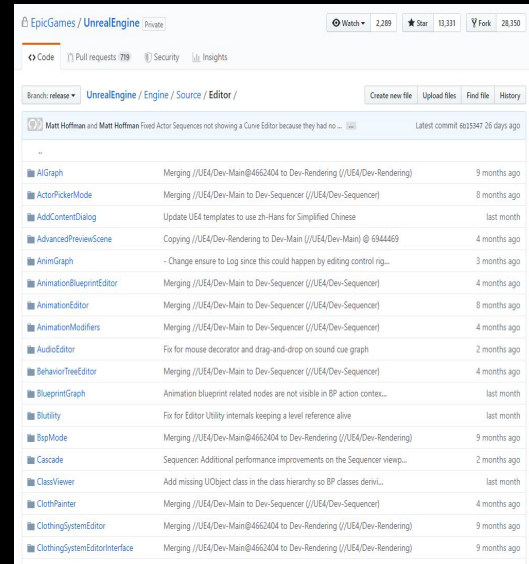
BENEFITS

- Flexible Licensing Options**
Epic Games will work with UEP members to meet their unique business, technical, and procurement requirements for licensing and using Unreal Studio.
- Unreal Developer Network Support**
Under the UEP, Members get access to enterprise-level support through the Unreal Developer Network (UDN). This is a private, restricted forum, monitored and administered by Epic Games staff and engineers.
- Direct Relationship with Epic**
Depending on the size and nature of the account, certain UEP members are assigned a Technical Account Manager (TAM), providing a direct line of contact to an engineer at Epic Games. At their discretion, the TAM may organize technical calls, project reviews, and site visits. TAMs can also provide information about new tools in development. In addition, all UEP members are assigned a Sales Account Manager (SAM) who provides information on benefit entitlements, handles any required paperwork, and processes other applicable services.
- Enterprise Tools**
The Enterprise team is constantly developing new tools to enhance Unreal Engine for use in architecture, product design, manufacturing, and other projects. These include feature sets such as Enterprise for seamless CAD, 3ds Max, and SketchUp data import. UEP members also exclusively receive the DataSmith Plus toolset, offering support for importing content from HEDS, DEXTRAGEN, and A&E files.
- Custom Training**
UEP members are eligible to purchase customized, on-site training courses for their teams. Epic Games will work with you to define the content, curriculum, subject, timing, and location of the training.
- Online Seat Management**
UEP members can manage their Unreal Studio seat allocations online and effect changes immediately, without the need to contact Support or a Sales Account Manager.

HOW TO APPLY

If you would like to join the Unreal Enterprise Program, speak to your Epic Games Sales Account Manager (if applicable) or fill in this brief contact form: <https://www.unrealengine.com/en-US/enterprise/contact-us>.

Copyright © 2024 Epic Games, Inc. All rights reserved.



EpicGames / UnrealEngine (Private)

2,208 Stars 13,331 Forks 28,350

Code Pull requests 719 Security Insights

Branch: release UnrealEngine / Engine / Source / Editor /

Create new file Upload files Find file History

Matt Hoffman and Matt Hoffman Fixed Actor Sequences not showing a Curve Editor because they had no...

Commit	Message	Time ago
Merging //UE4/Dev-Main@4662404 to Dev-Rendering (/UE4/Dev-Rendering)		9 months ago
Merging //UE4/Dev-Main to Dev-Sequence (/UE4/Dev-Sequence)		8 months ago
Update UE4 templates to use zh-Hans for Simplified Chinese		last month
Copying //UE4/Dev-Rendering to Dev-Main (/UE4/Dev-Main) @ 6344469		4 months ago
- Change ensure to Log since this could happen by editing control rig...		3 months ago
Merging //UE4/Dev-Main to Dev-Sequence (/UE4/Dev-Sequence)		4 months ago
Merging //UE4/Dev-Main to Dev-Sequence (/UE4/Dev-Sequence)		8 months ago
Merging //UE4/Dev-Main to Dev-Sequence (/UE4/Dev-Sequence)		4 months ago
Fix for mouse decorator and drag-and-drop on sound cue graph		2 months ago
Merging //UE4/Dev-Main to Dev-Sequence (/UE4/Dev-Sequence)		4 months ago
Animation blueprint related nodes are not visible in BP action context...		last month
Fix for Editor Utility internals keeping a level reference alive		last month
Merging //UE4/Dev-Main@4662404 to Dev-Rendering (/UE4/Dev-Rendering)		9 months ago
Sequence: Additional performance improvements on the Sequencer viewp...		2 months ago
Add missing UObject class in the class hierarchy so BP classes deri...		last month
Merging //UE4/Dev-Main to Dev-Sequence (/UE4/Dev-Sequence)		4 months ago
Merging //UE4/Dev-Main@4662404 to Dev-Rendering (/UE4/Dev-Rendering)		9 months ago
Merging //UE4/Dev-Main@4662404 to Dev-Rendering (/UE4/Dev-Rendering)		9 months ago

<https://www.unrealengine.com/en-US/industries/training-simulation>

Free - Open Source - Supported - Simulation focused

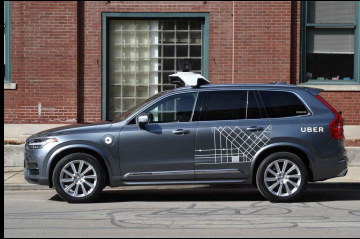
Implementation examples

A small autonomous vehicles detour ...

MSaaS

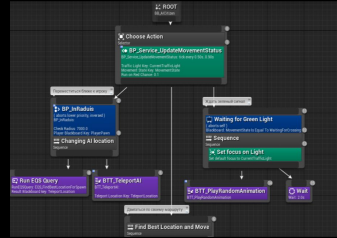
Unreal Engine | Driving Simulation use cases examples

Inside a self-driving Uber



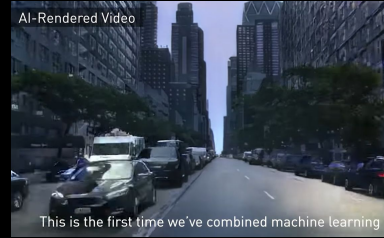
<https://www.infoq.com/presentations/uber-self-driving-software/>

Development of Pedestrian Artificial Intelligence Utilizing Unreal Engine 4



<https://www.iri.tec.org/wp-content/uploads/papers/v811/A7288058119.pdf>

Nvidia AI Can Render Complete Urban Environments in Unreal Engine 4



This is the first time we've combined machine learning

<https://www.extremetech.com/extreme/281649-nvidia-ai-can-render-complete-urban-environments-in-unreal-engine-4>

Microsoft Road-Runner photo-realistic simulation and deep learning to train autonomous driving algorithms



<https://www.microsoft.com/en-us/garage/blog/2018/04/project-road-runner-train-autonomous-driving-algorithms-for-road-safety/>

Reikko and Vertechs create Auto City



<https://www.vertechs.jp/autocity>

OTSL strengthens 3D Real-Time Sensor Simulator Framework COSMOSim (R) Ecosystem



<https://www.premiswire.com/news-releases/otsl-strengthens-its-3d-real-time-sensor-simulator-framework-cosmosim-r-ecosystem-for-autonomous-driving-300883916.html>

Zoox merging Simulation & Reality



<https://zoox.com/journal/>

GM's Cruise is preparing for a self-driving future in the cloud



<https://venturebeat.com/2019/04/20/gms-cruise-is-preparing-for-a-self-driving-future-in-the-cloud/>

GM - Cruise AV



“Cruise runs lots of simulations across its suite of internal tools — about 200,000 hours of compute jobs each day in Google Cloud Platform (25 times the number of hours 12 months ago) — one of which is an end-to-end, three-dimensional Unreal Engine environment that Cruise employees call “The Matrix.” Macneil says it enables engineers to build any kind of situation they’re able to dream up, and to synthesize sensor inputs like camera footage and radar feeds to autonomous virtual cars.

According to Macneil, Cruise spins up 30,000 instances daily across over 300,000 processor cores and 5,000 graphics cards, each of which loops through a single drive’s worth of scenarios and generates 300 terabytes of results. It’s basically like having 30,000 virtual cars driving around in parallel, he explained, and it’s a bit like Waymo’s Carcraft and the browser-based framework used by Uber’s Advanced Technology Group.”

... Back to how the nations can leverage a
game engine ...

A maintenance trainer : LCS by Cubic



Image courtesy of Cubic Global Defense

“Unreal’s application of Blueprint, having a visual scripting tool that you don’t have to be an engineer to use, you can be a designer or subject-matter expert to use, and create content, has been huge,” he says. “And it’s been huge in two ways. One, it’s really given technical creators a seat at the table with engineers in the DoD industry. The other thing is it’s let veterans who are recently out of the military pick up high-fidelity technology and essentially become game developers, and write code without knowing it, using Blueprint. Unreal 4 has reshaped our industry.”

- Andre Balta, CTO Cubic Defense

<https://www.youtube.com/watch?v=k-aT90ehH8Y>

Pilot Training Next - HTX Labs work



"HTX has provided us an immersive emergency procedure trainer that filled an essential gap in our pilot training program. They are a responsive and attentive company, that have been great to work with!"

Paul "Slew" Vicars, Lead for the Pilot Training Next (PTN) Program, U.S. Air Force

"We are very excited to collaborate with them on the next generation of EMPACT and look forward to further developing our state-of-the-art VR training platform that will unlock an entirely new way to influence and analyze the human learning process. This is one of the many advantages of utilizing virtual reality for training and will be the catalyst to an infinite number of possibilities for measuring the effectiveness of corporate learning and development programs,"

Chris Verret, CTO of HTX Labs.

https://www.youtube.com/watch?v=_AyrBoI7aZM

The Infantry trainer - the Squad example

“Right now, our focus is on proving the framework—prototype quickly, prove the capabilities, then look at the future where we can develop platforms together using Unreal Engine. We want to teach them to fish rather than for them.”

“The goal here is to be able to grow it, and grow it, and grow it, and eventually provide all the tools that anybody might need to do military research on top of Unreal Engine.”

Chris Greig



Image courtesy of Offworld Industries

Last year ...

- Communications HLA / DIS
- Terrain DBs integrations (from OpenFlight to building pipelines)
- Simulation as a service (pixel streaming, Stadia, AWS, Google Cloud services, Epic Games online services)
- Multi viewport displays (display for blending and warping)
- Chaos Physic Engine / destructions and particles
- Motion cueing universal interface

Launched the MegaGrants

Many more features, unreal engine based applications, integrations of plugins will be revealed during I/ITSEC (Databases, Vehicles, Motion cueing implementation...)

Coming next ...

