

The Cloud and your Training & Simulation Infrastructure

Andy
Fawkes



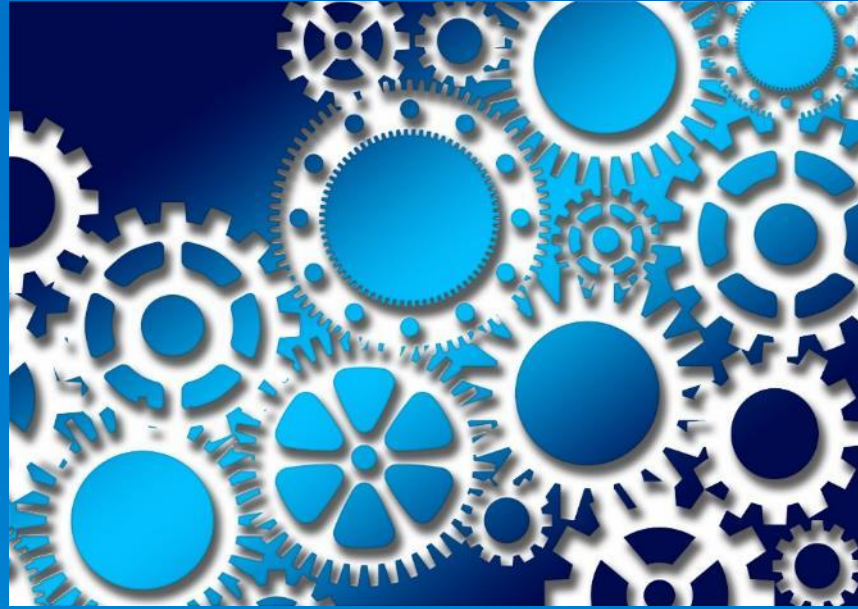
Illustration by Harry Campbell for The New Yorker

Why?

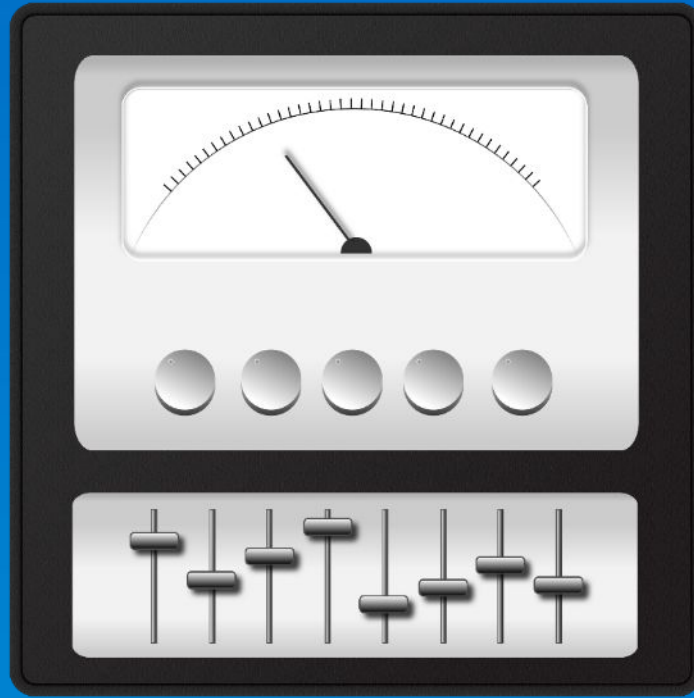


The Cloud is
Transforming and
Disrupting
Organisations and
How We Live





A Whole Enterprise Approach



Understanding Training Effectiveness



Changing Training Needs

The Cloud and Training & Simulation



The Cloud can Inform & Shape
your Training & Simulation
Infrastructure Requirements



The Potential for Data-Driven
Training & Education



Impact of the Cloud on your
Future Training Needs

Presentation Outline

- Cloud Essentials
- The Cloud and
 - The Delivery of Training & Simulation
 - The Analysis of Training & Education
 - Changing Training Needs
- A Cloud Strategy?

Acknowledgements

- Amazon
- Bohemia Interactive Simulations
- Citrix
- Dstl
- Fujitsu
- Novatech
- Nvidia
- Prolinx
- Staffordshire University
- VMware

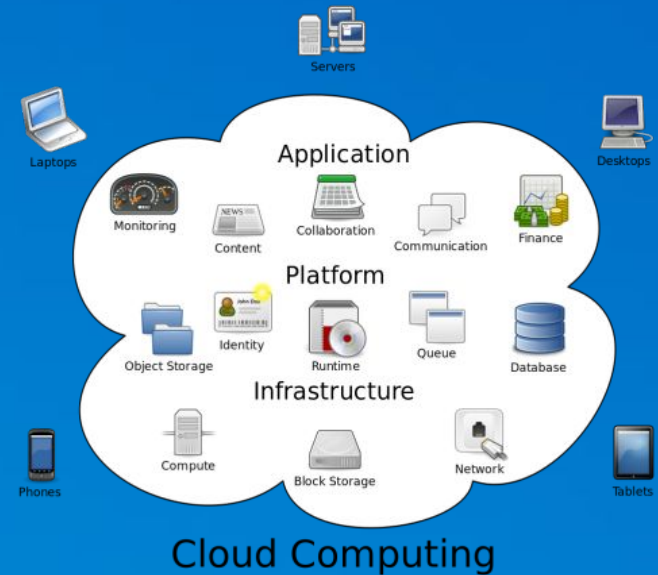


Cloud Essentials

A stylized illustration of various electronic components floating on a light blue cloud-like background. The components include a microcontroller with pins, several RAM modules, a USB drive, a small square component with a red dot, and various connectors and wires. The overall theme is technology and cloud computing.

Cloud Computing Metaphor

For a user, the network elements representing the services are invisible, as if obscured by a cloud.



Some Cloud Computing Attributes

Big Data Scalability Analytics

Security Machine Learning Distributed

Reliability Low Cost 24/7

Disruptive Predictive Analytics

Focus on Service not Technology

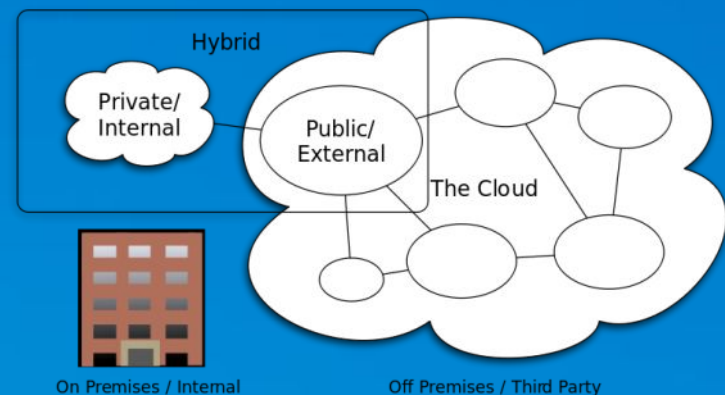
The Cloud Simply Put

- Cloud computing enables users and developers to utilize services without knowledge of, expertise with, nor control over the technology infrastructure that supports them

Barry X. Lynn CEO 3Tera

Cloud Computing

- Cloud computing categories:
 - Infrastructure-as-a-Service (IaaS)
 - Virtual Hardware
 - Platform-as-a-Service (PaaS)
 - Development Tools, eg. Microsoft Azure
 - Software-as-a-Service (SaaS)
 - Web Services, eg. Google Mail
- Cloud computing services:
 - Private
 - Public
 - Hybrid

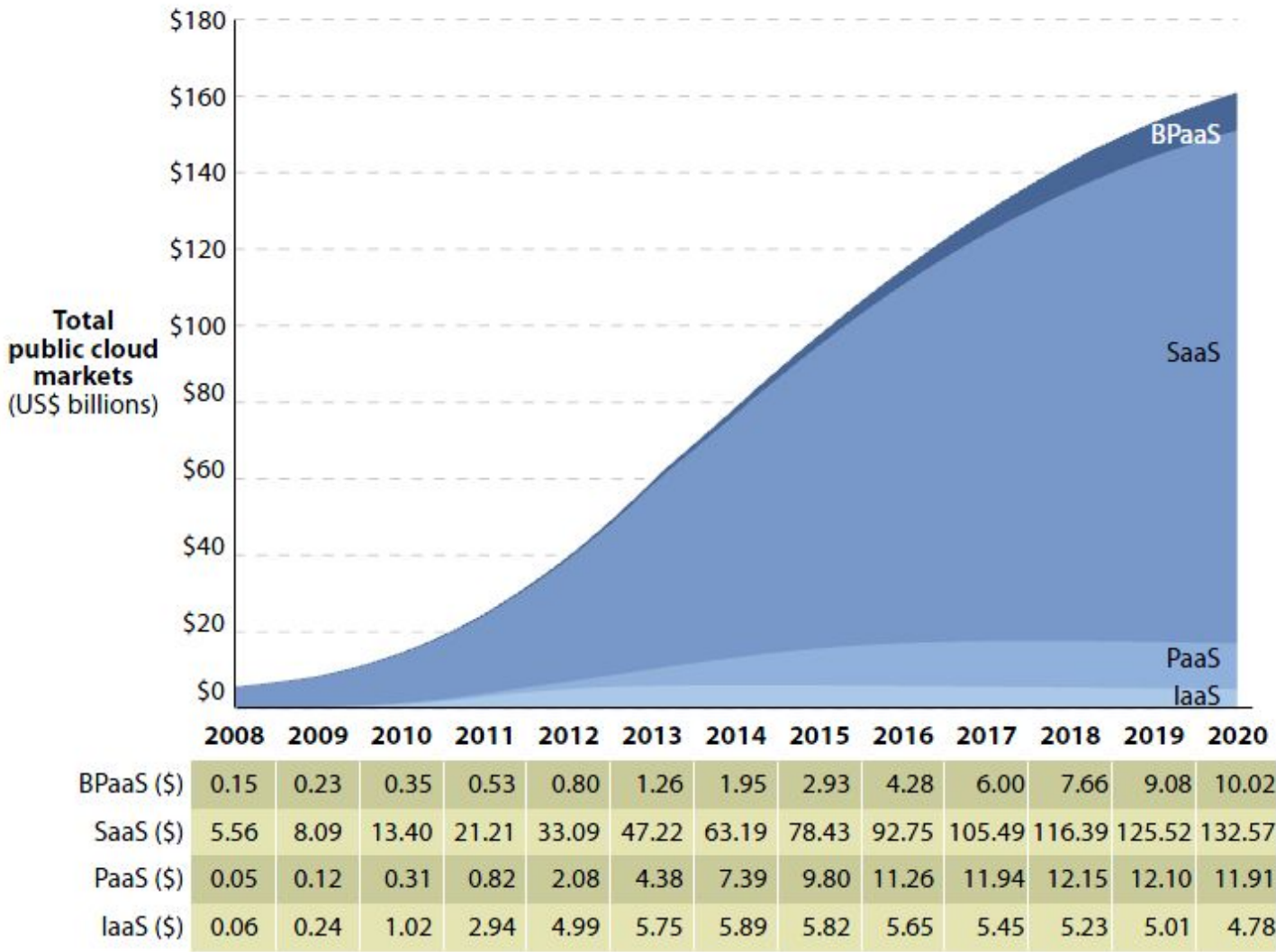


Wikipedia

Figure 3 Forecast: Global Public Cloud Market Size, 2011 To 2020

 The spreadsheet detailing this forecast is available online.

Wikipedia



Global Cloud Market

TECHNOLOGY

The Unbelievable Power of Amazon's Cloud

The company's Web Services—which undergird Netflix, Healthcare.gov, and Spotify—might be the single most important piece of technology to the modern tech boom.



Jeff Bezos speaks at a press conference in New York in 2011. (Shannon Stapleton / Reuters)



ROBINSON MEYER | APR 23, 2015

Cloud Computing – @ Home

The Netflix logo, featuring the word "NETFLIX" in white, bold, sans-serif capital letters on a red rectangular background.

The Dropbox logo, featuring a white, stylized, four-pointed star icon on a blue rectangular background, followed by the word "Dropbox" in white, sans-serif capital letters.

The BBC iPlayer logo, featuring the letters "BBC" in white, bold, sans-serif capital letters on a black rectangular background, followed by the word "iPlayer" in a pink, stylized, lowercase font.

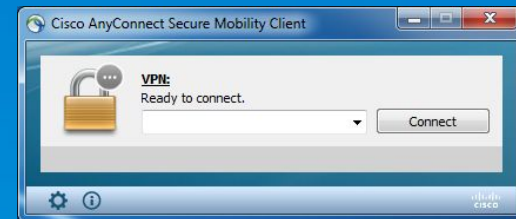
The Huffington Post logo, featuring the words "THE HUFFINGTON POST" in white, sans-serif capital letters on a dark green rectangular background.

The Coursera logo, featuring the word "coursera" in a grey, lowercase, sans-serif font on a white rectangular background.

The Spotify logo, featuring the word "Spotify" in a white, lowercase, sans-serif font on a green rectangular background, with a small white icon above the "i".

The Pinterest logo, featuring the word "Pinterest" in a red, stylized, lowercase font on a white rectangular background.

Cloud Computing – for Business



Amazon looks for UK's next \$1BN business with London startup programme

Amazon's cloud platform AWS, which is used by two thirds of UK startups, launches London programme to help build the next \$1 billion company.



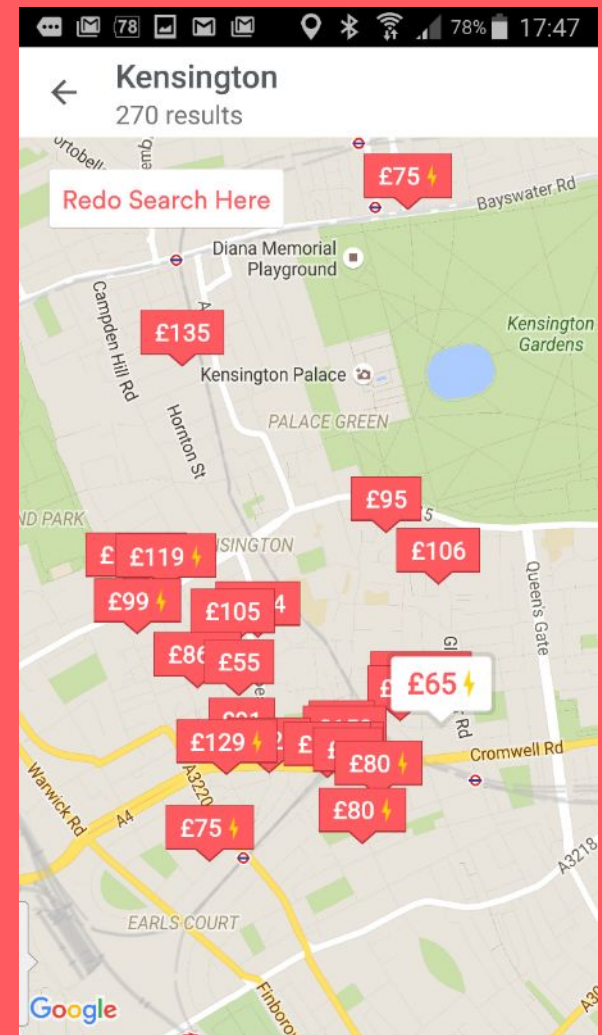
The Cloud as a Catalyst for Business

Ben Rossi

Date: 21 August 2015



500,000



Cloud Computing - Government

NETWORKS SECURITY BUSINESS **HARDWARE** SCIENCE BOOTNOTES VIDEO FORUMS

Microsoft for Google, sends

the taxing for US firm with inside track



106 35 50

oms (HMRC) is the first major department to move to Google Apps, Microsoft's stranglehold on the government's software services.

net Office and Department for Culture, Media and Sport (DCMS) in

uch will be Whitehall's first mass deployment of Google's cloud

Data Ce

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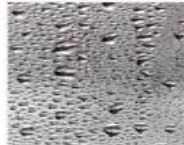
We stand on
warns encryp

Don't believe
seems just to

Spotlight



Private clo
good reas



Hybrid clo

UK G-Cloud



Digital Marketplace

Supplier login

BETA

This is a [beta service](#) – please send your feedback to enquiries@digitalmarketplace.service.gov.uk

Digital Marketplace

Find technology or people for digital projects in the public sector

[Find cloud technology and support](#)

eg web hosting or IT health checks

Procurement framework: [G-Cloud](#)

[Buy physical datacentre space for legacy systems](#)

Procurement framework: [Crown Hosting Data Centres](#)

[Find specialists to work on digital projects](#)

eg technical architects and user researchers

Procurement framework: [Digital Services](#)

G-Cloud 7 is open for applications

Deadline for submissions

3pm BST, 6 October 2015

Register your interest in becoming a G-Cloud 7 supplier.

[Log in to existing supplier account](#)

[Create new supplier account](#)

The Cloud in Your Hand



Wearables and the Cloud



And the technology possibilities are still growing...



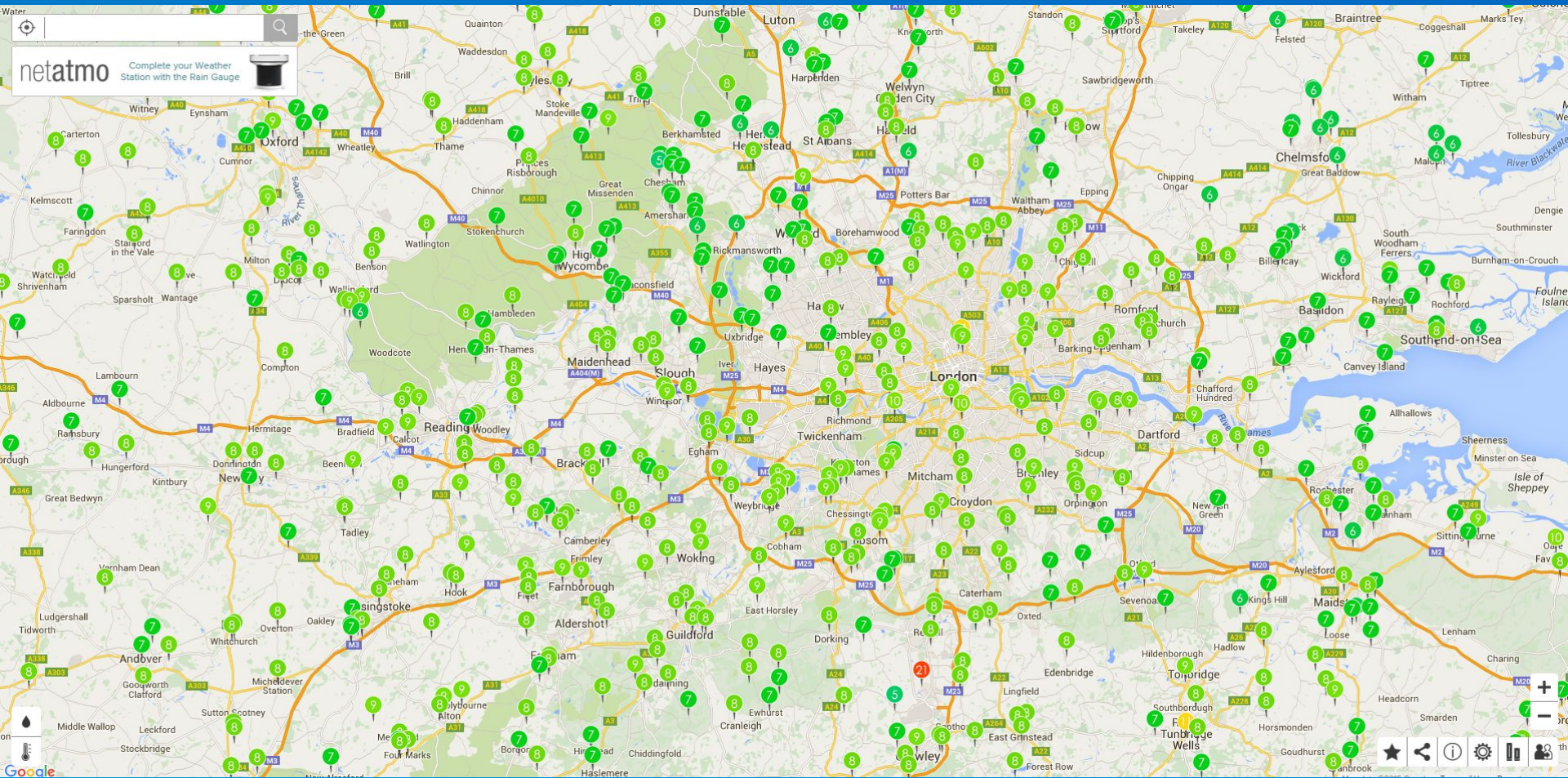
Got network.

Knows location.

Connects to cloud.

Doesn't need a phone.

Netamo



Microsoft Machine Learning

Google Cloud Vision API (2015)



Google DeepMind AI (2015)

Google DeepMind's Deep Q-learning

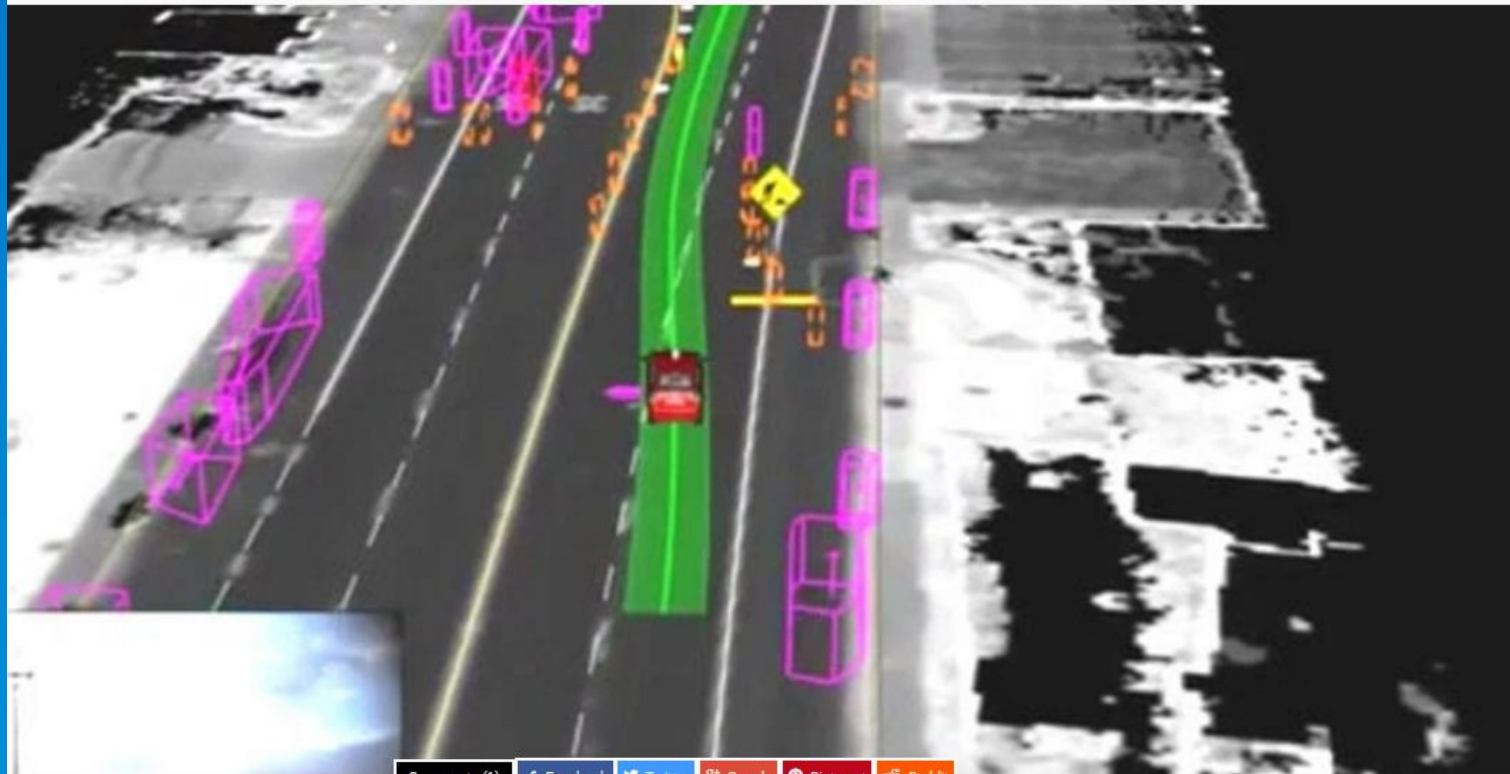
The algorithm will play Atari breakout.

**The most important thing to know is that
all the agent is given is sensory input (what
you see on the screen) and it was ordered
to maximize the score on the screen.**

Google's self-driving cars drive three million miles a day, without leaving the lab

Ben Lovejoy · 11 hours ago @benlovejoy

SELF-DRIVING CAR X



Comments (1)

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Twitter

g+ Google

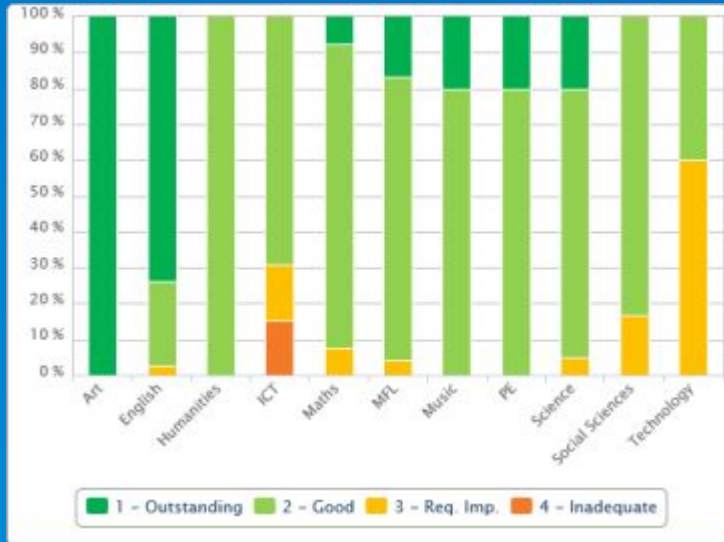
Pinterest

Reddit

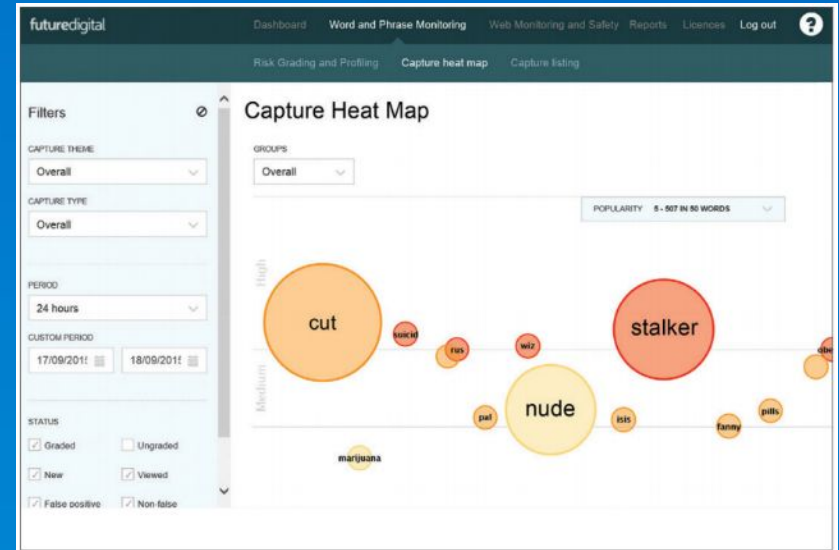
Google's self-driving cars have notched up almost 1.5 million miles in autonomous mode since the project began in 2009 – but they drive twice as many miles every single day in the lab. Google's latest monthly report reveals that every software change is tested by using it to simulate driving the entire driving history of the fleet, autonomous and manual.

Training
Autonomous
Systems in
Simulation

School Sector – Cloud Examples

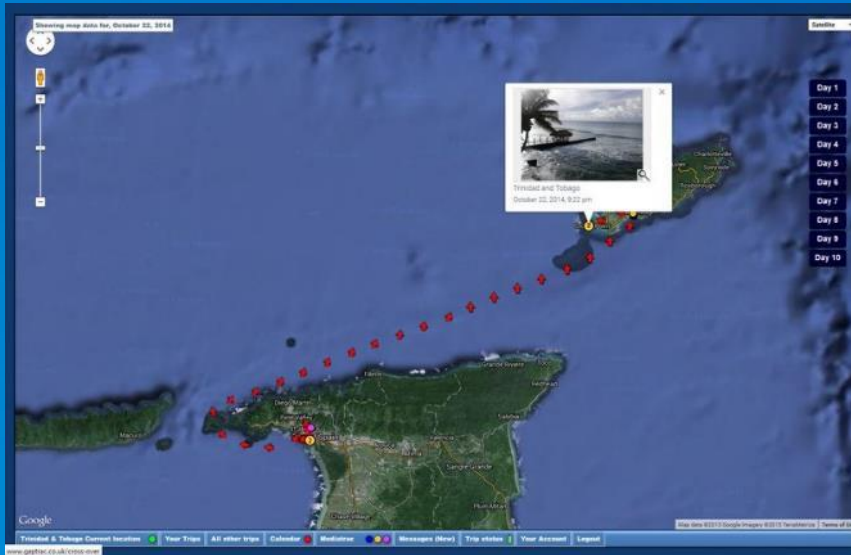


SISRA Observe

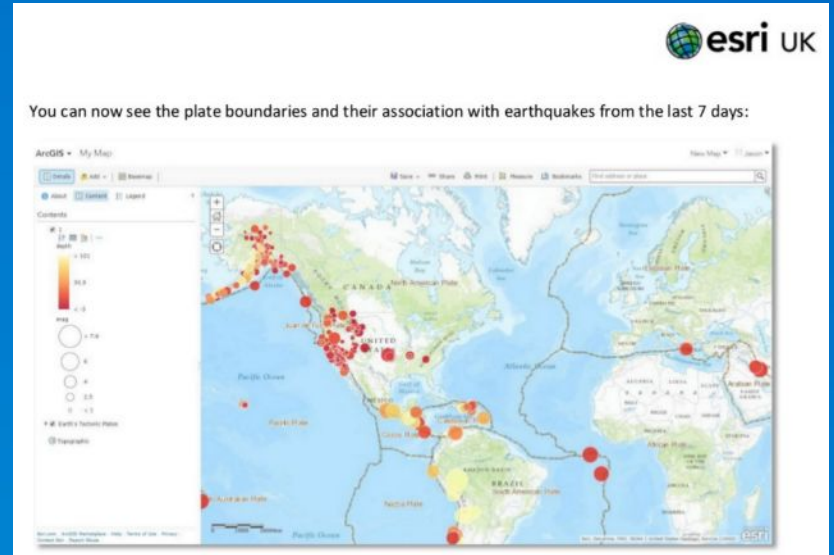


UK "Prevent" - Redstor

School Sector – Cloud Examples



Locuro mobile tracking for school trips



ArcGIS Online for Schools

Business ▶ **Government**

Security fears arise over body-worn plodcam footage

'But is it secure?' experts ask, as forces prepare to sign contracts worth millions



21 Aug 2015 at 13:55, Kat Hall



48



5



13

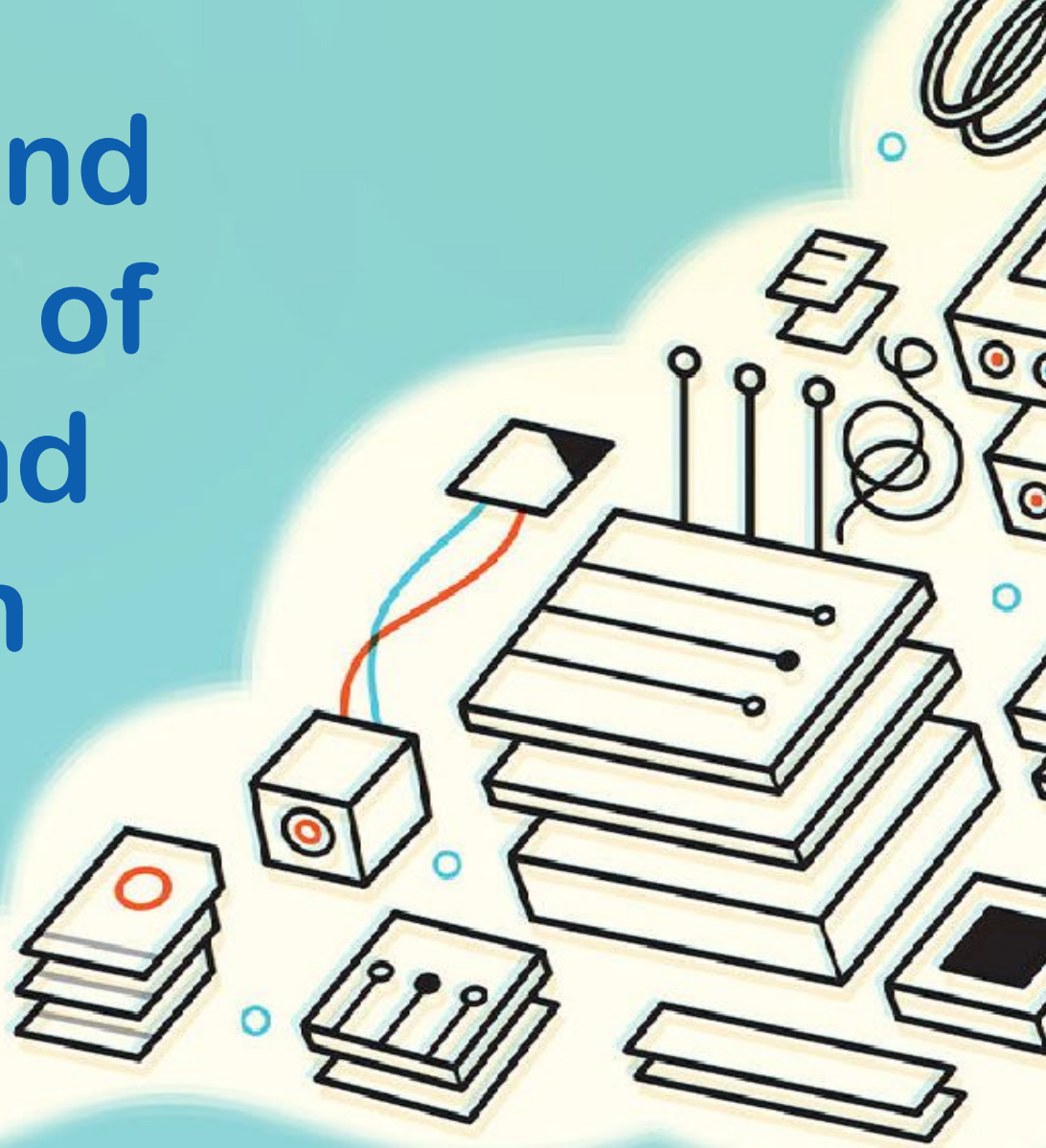
Fears have been raised over the security of information from the new police bodycam recordings held in the public cloud by US company Taser.

Cloud Security Concerns

Google Security

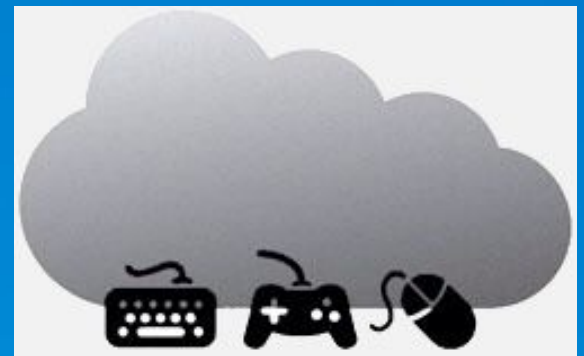


The Cloud and the Delivery of Training and Simulation



Cloud Gaming

- an umbrella term used to describe a form of online game distribution
- the most common methods of cloud gaming currently are:
 - video (or pixel) streaming
 - file streaming





Game Streaming Subscription

All You Can Play. 100+ PS3 Games.

Seize Your Moment™



1 Month \$19.99 / 3 Months \$44.99

Cloud Gaming



PlayStation™ LIBRARY OF GAMES



PlayStation®4



PlayStation®Vita



PlayStation®3



Televisions



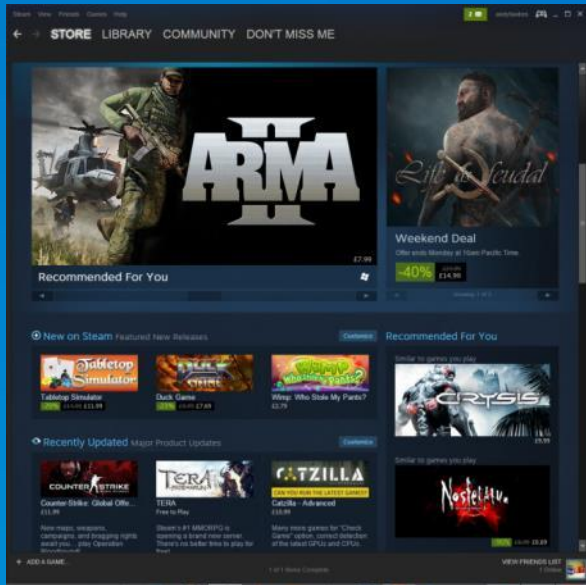
Tablets



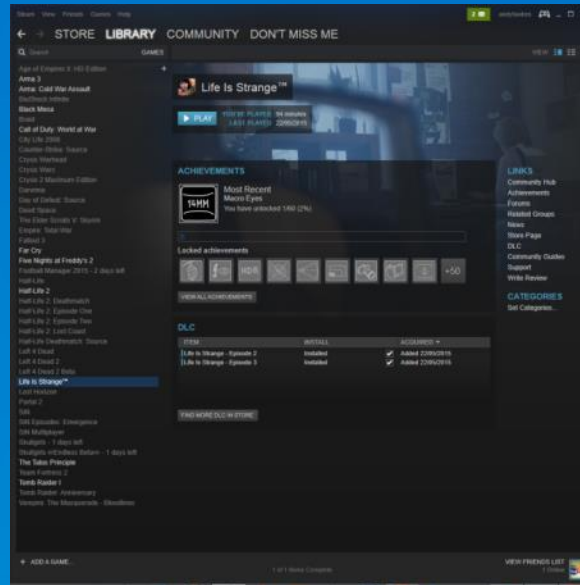
Smartphones

THINKE

Cloud Gaming



new
games



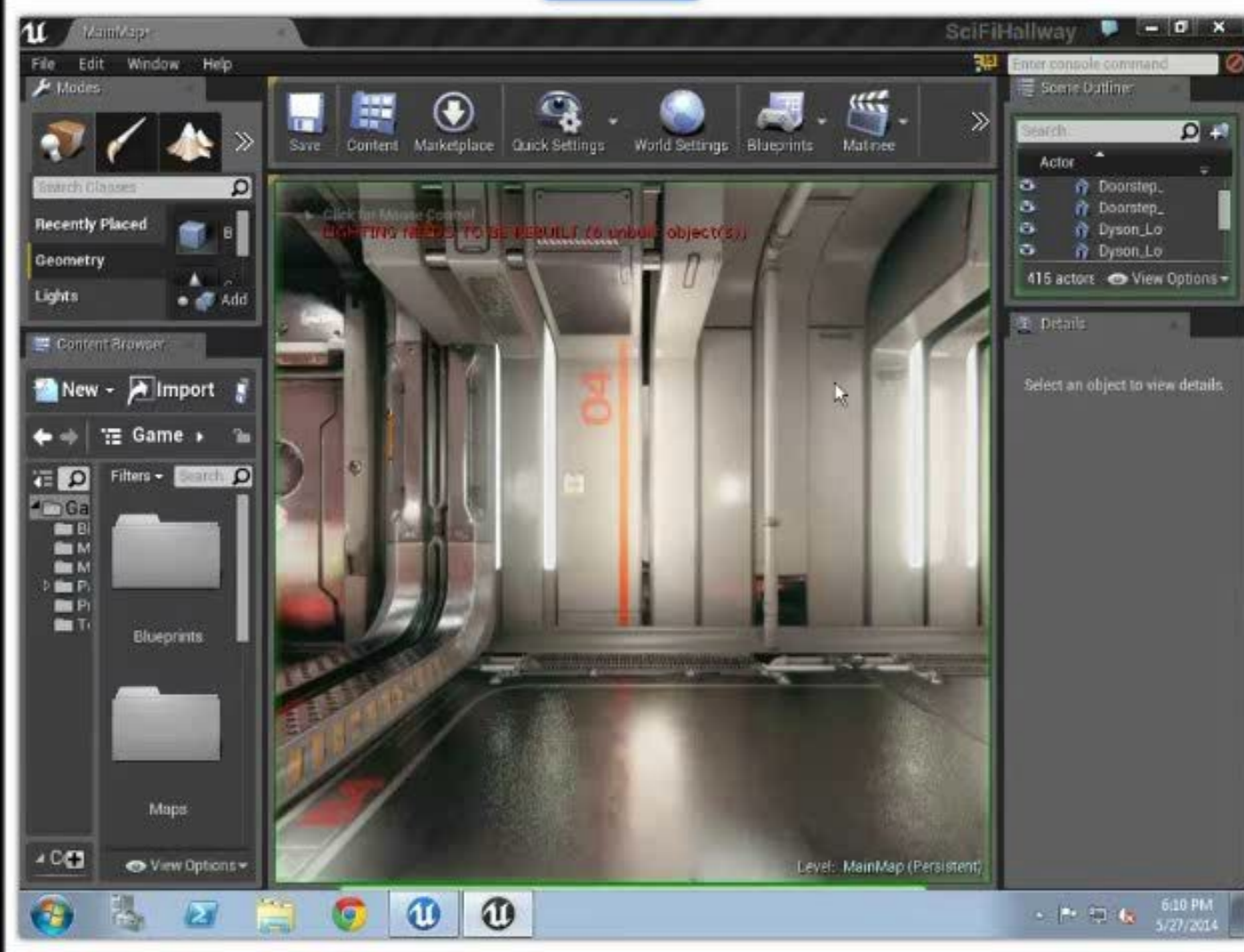
my
games



my
profile

Unreal 4 on Amazon Cloud PC

Wikipedia



Run your own high-end cloud gaming service on EC2

Apr 12, 2015

How to use EC2 GPU machines + Steam In-Home Streaming + a VPN to play AAA titles on a shitty laptop



(DIY) Cloud Gaming

Cost

Playing games this way is actually quite economical – especially when comparing to purchasing a full-on gaming rig. Here are the costs you'll need to consider:

- GPU Instance runs about \$0.11/hr (on a Spot instance, regularly around \$0.70/hr)
- Data transfer will be around \$0.09/GB, and at a sustained ~10mbit, it'll cost you \$0.41/hr (4.5GB/hr)
- **Updated Apr 25:** Hard drive (EBS General Purpose SSD) storage of 100GB is \$12.00/mo, or a bit under \$0.02/hr

This comes out to around \$0.54/hr (**Updated Apr 25**), not bad, for the cost of a \$1000 gaming pc, you get ~1900 hours on much higher-end hardware!

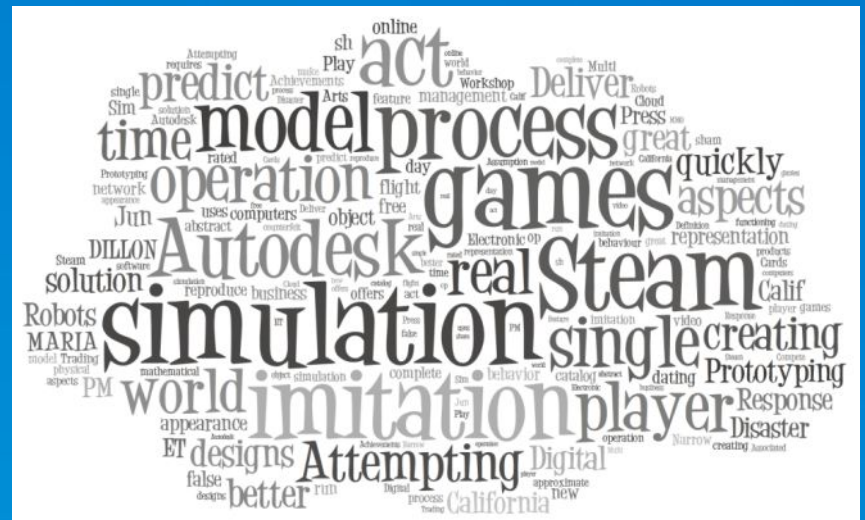
The catch?

This is all fun and games, but you need to make sure of two things:

1. You are within 40ms to the closest AWS datacenter ([test here](#)) and has GPU instances (**Updated Apr 25** brought this up from 20ms, many people reporting it's just fine at slightly higher latencies)
2. You have at least a 10mbit connection and it's unmetered

Cloud Simulation

- **Key Features**
 - Centralisation of Computing and/or Data
 - Transparent to User(s)
- **Human in the Loop and/or Analytical**

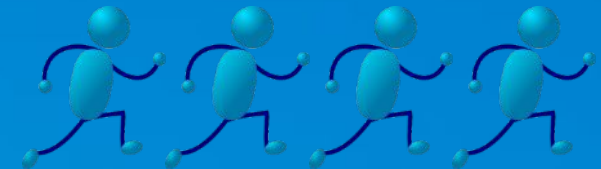


Over Multiple Training Devices



Simulation Network/Computing Demands

easier $\longleftrightarrow$ harder



Fujitsu/VBS3 DSEi Sep 15



Zero Client
Shared 20MB + WiFi
55 miles



Cloud Simulation Benefits

- Simulation as a Service
- Centralised Software and Data
- Secure Login
- Player Data
- Big Training Data
- Multiple Hardware Platforms
- Centralised Management
- Efficient Allocation of Computing Power



Cloud Simulation Challenges

- Network Capacity
- Security
- Do Training Enterprises Scale?
- Compatibility with Other Simulation?
- Transition Challenges



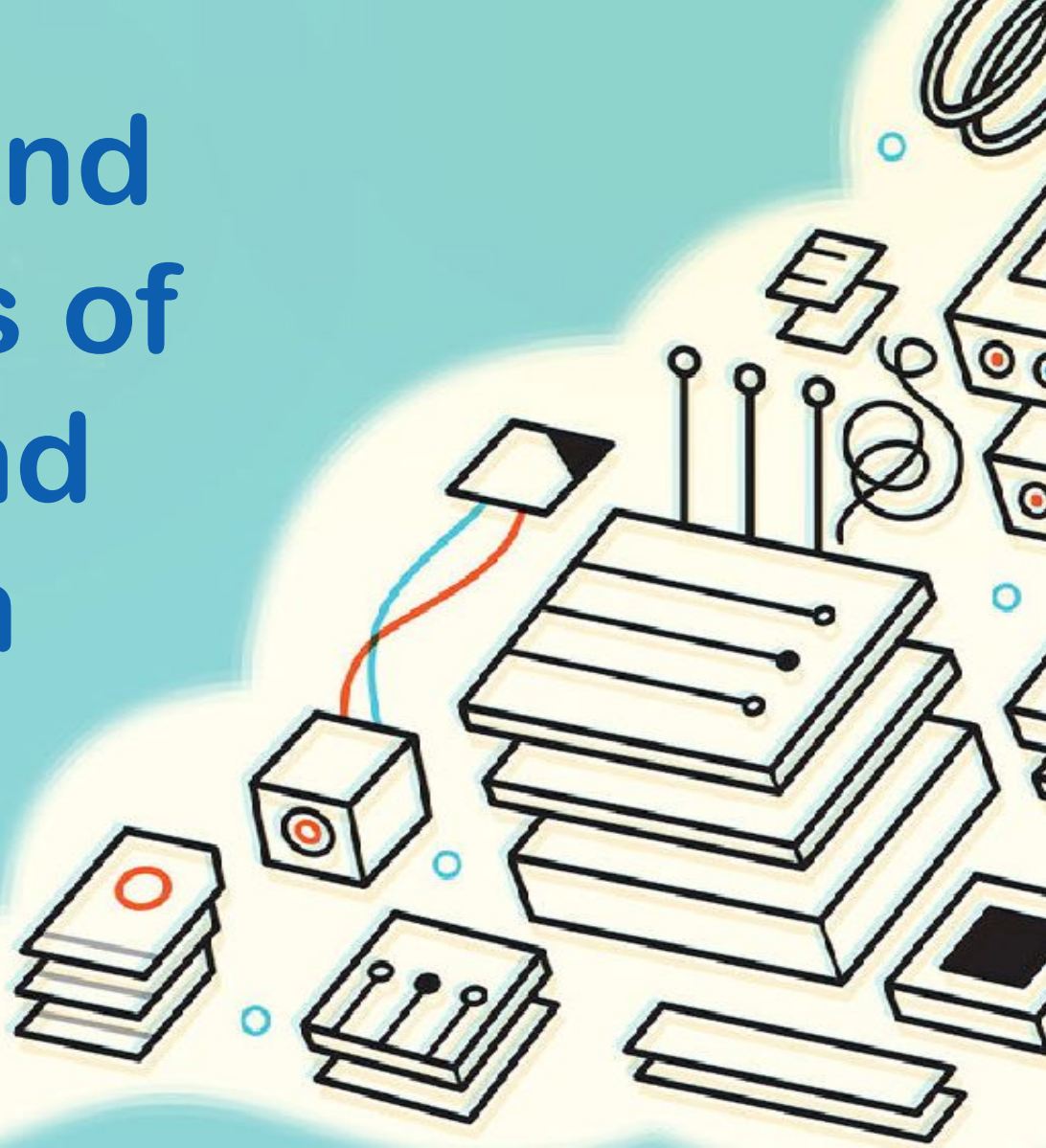
Cloud (Asynchronous) Tutoring



Definition

Cloud Tutoring is an online education model in which all student-teacher interaction takes place virtually on
“The Cloud”

The Cloud and the Analysis of Training and Education

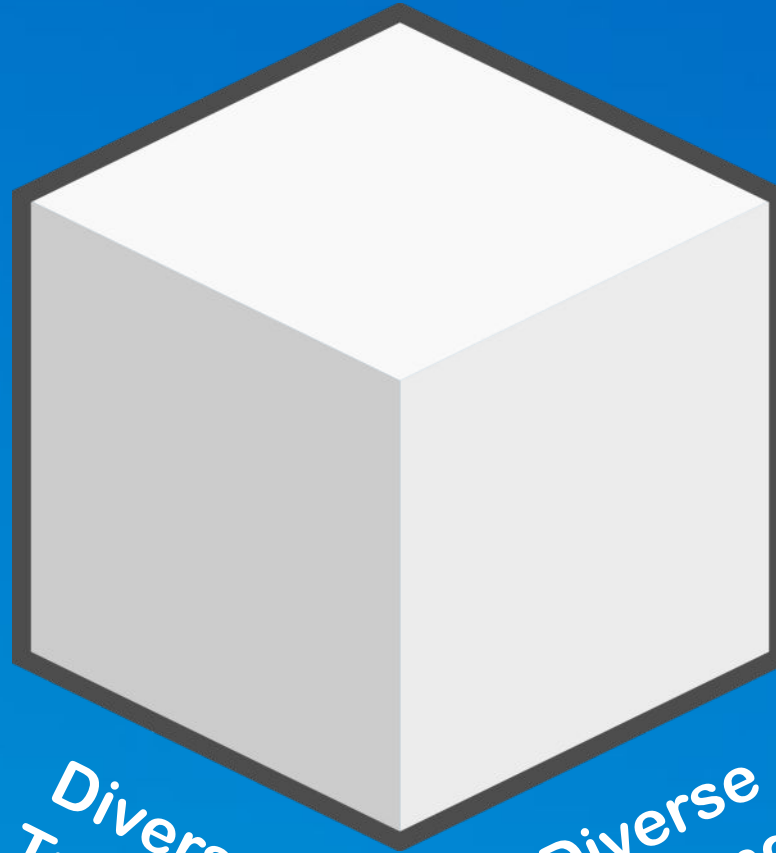


Military Training & Education Challenge

Diverse
Training
Needs

Diverse
Training
Audience

Diverse
Training
Theories

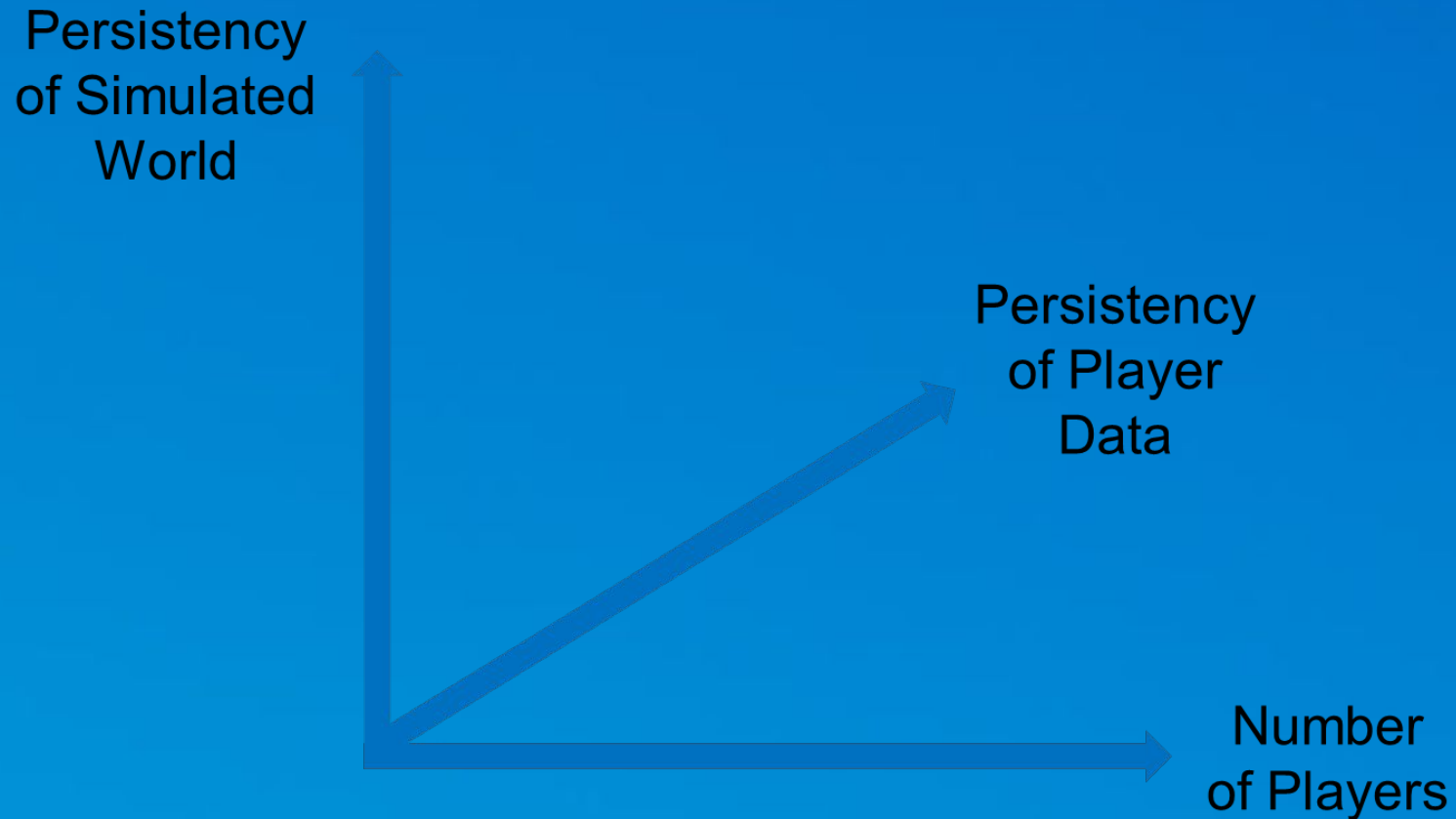


Can We Learn from Massively Multiplayer Online Games? (MMOGs)



MMOG - Massively Multiplayer Online Game

- An online video game which can be played by a very large number of people simultaneously



Typical MMOG Characteristics

- Persistent interactive world that can be accessed 24/7
- Millions of Concurrent Users
- Player data that tracks and rewards performance
- In game communication and interaction with other players
- Online Communities and Support
- Supports thin client approach
- Secure login
- Ranked/Unranked Worlds

Training Data

Cloud

Learning
Management
System

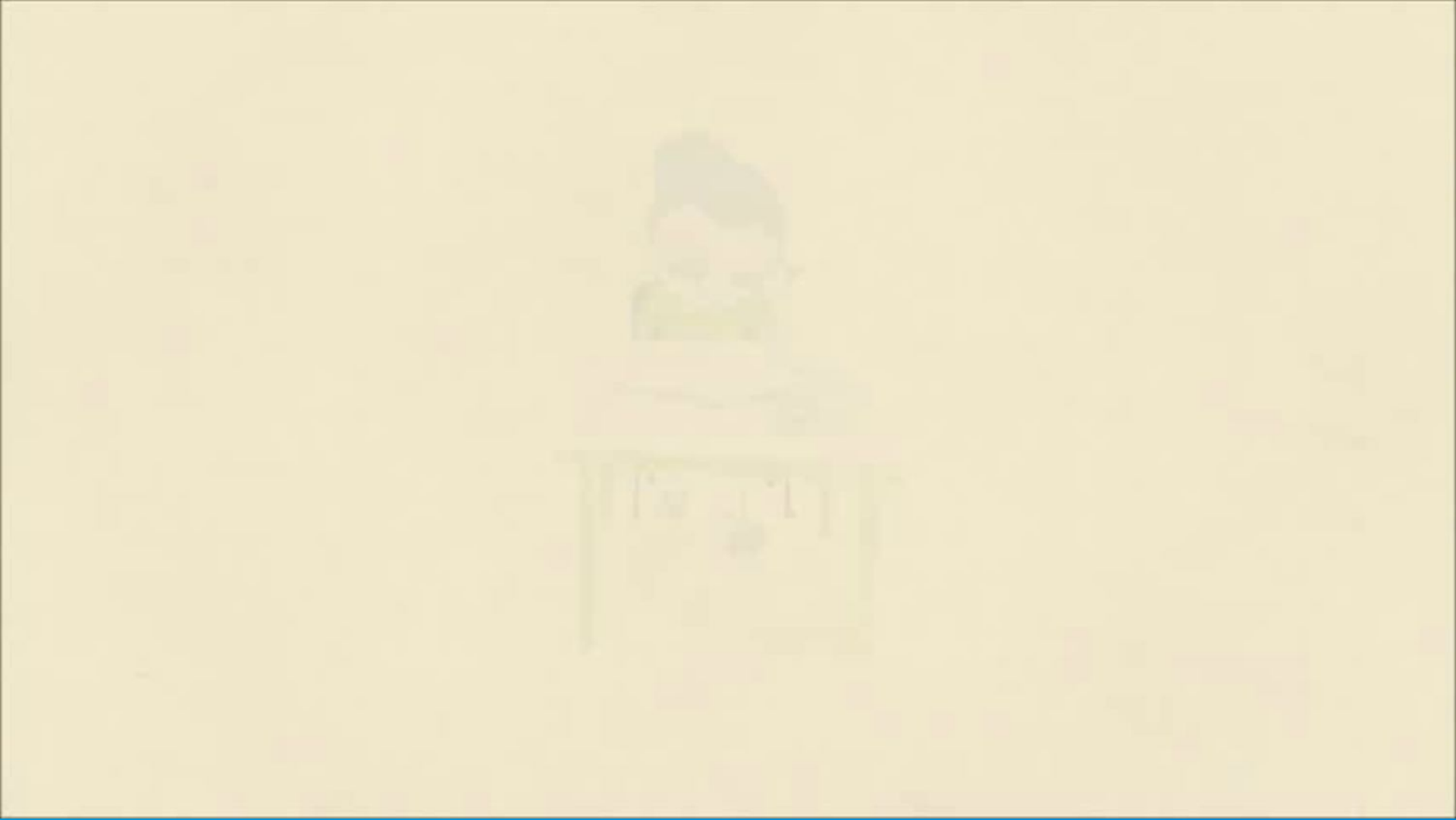
Learning
Record Store



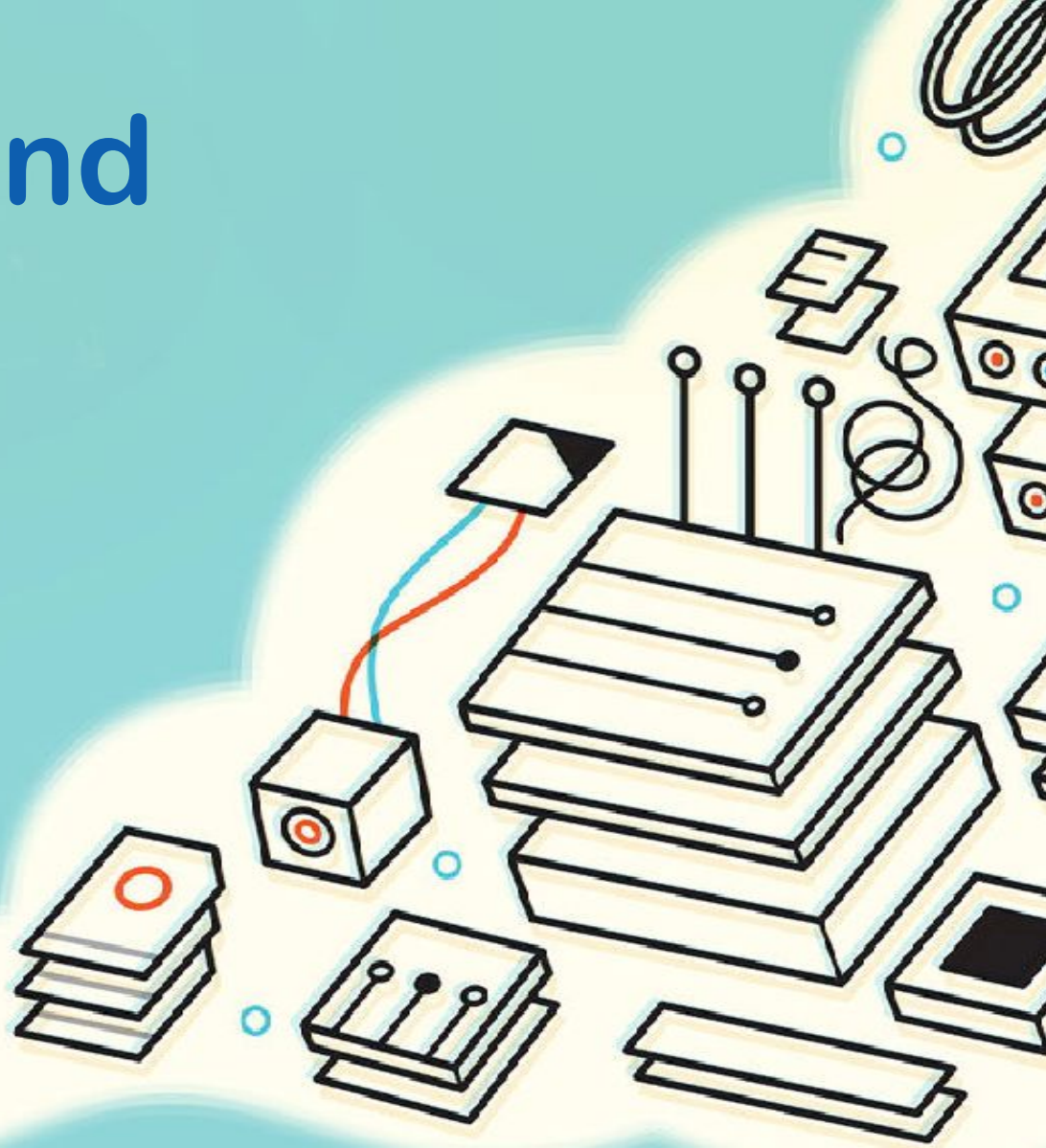
example
trg. sys.



IBM – Personalised Education



The Cloud and Changing Training Needs





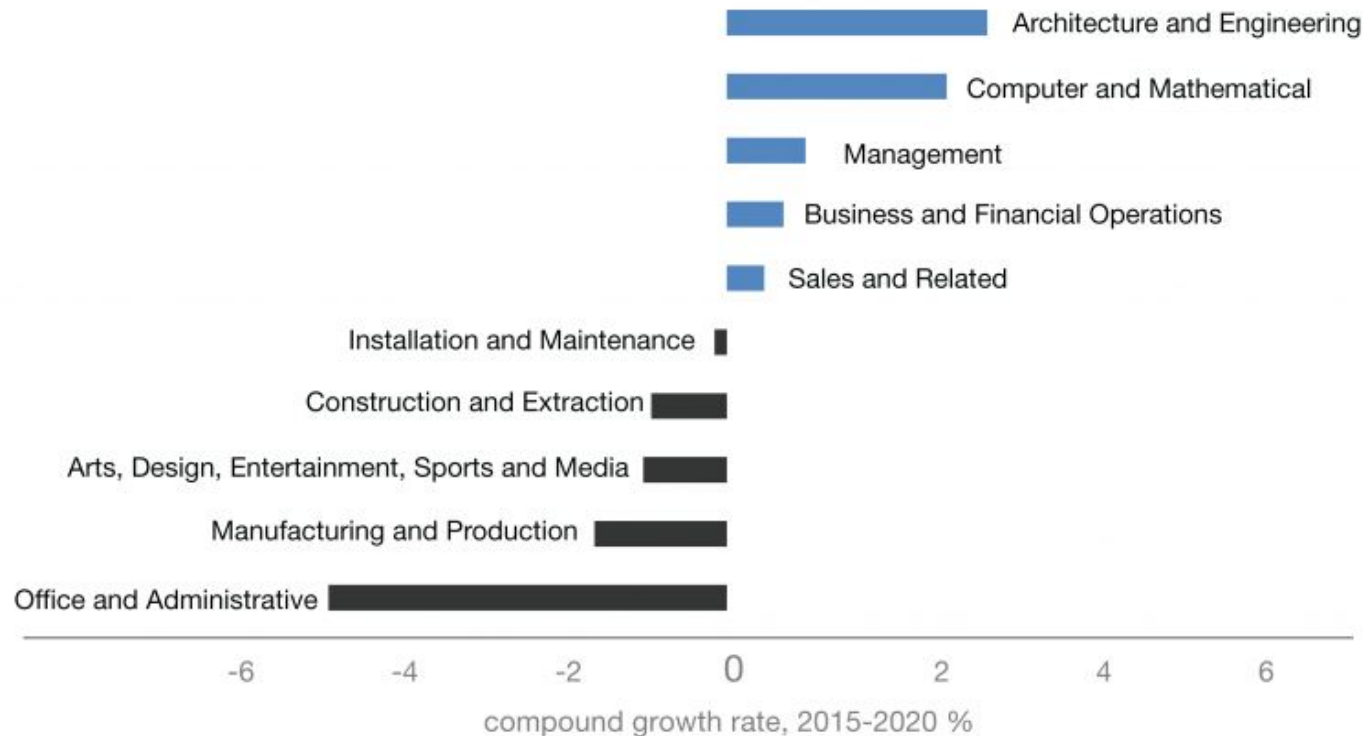
THINKE

World Economic Forum - 2015

- The Future of Jobs
 - The Fourth Industrial Revolution is interacting with other socio-economic and demographic factors to create a perfect storm of business model change in all industries, resulting in major disruptions to labour markets.
 - New categories of jobs will emerge, partly or wholly displacing others.
 - The skill sets required in both old and new occupations will change in most industries and transform how and where people work.

World Economic Forum - 2015

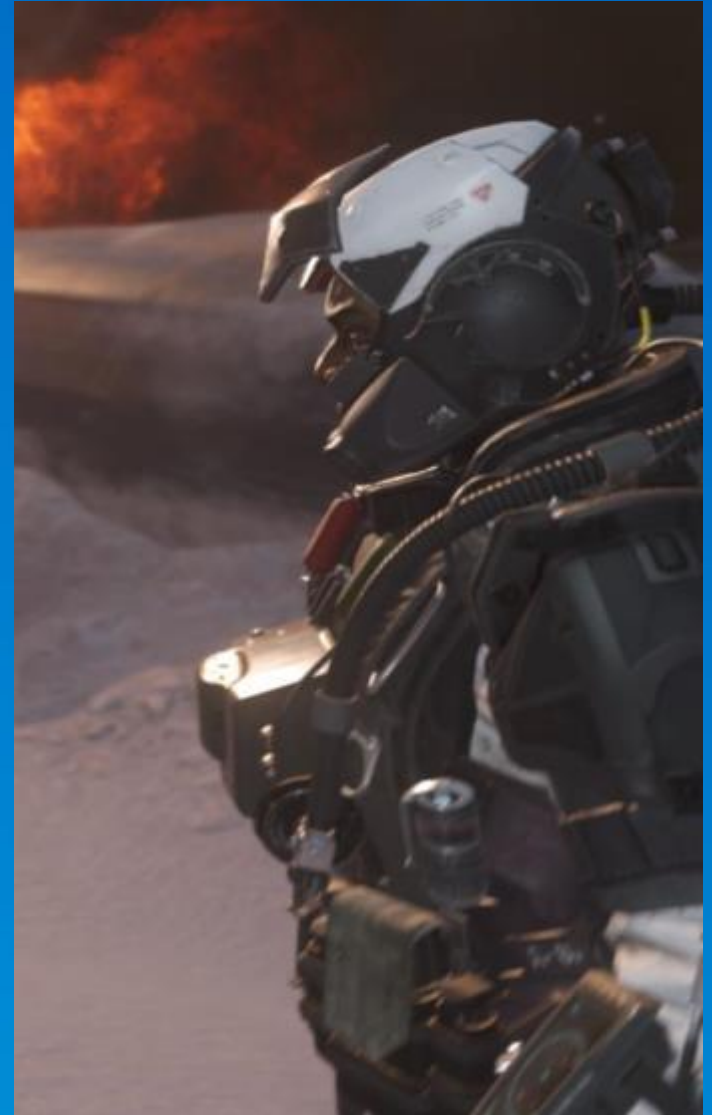
Job families in decline and on the rise



Source: Future of Jobs Report, World Economic Forum

Military of the Future?

- What will they do?
- Who will they be?
- Where will they be?
- How will they train?
- Will we need them?



A Cloud Strategy?

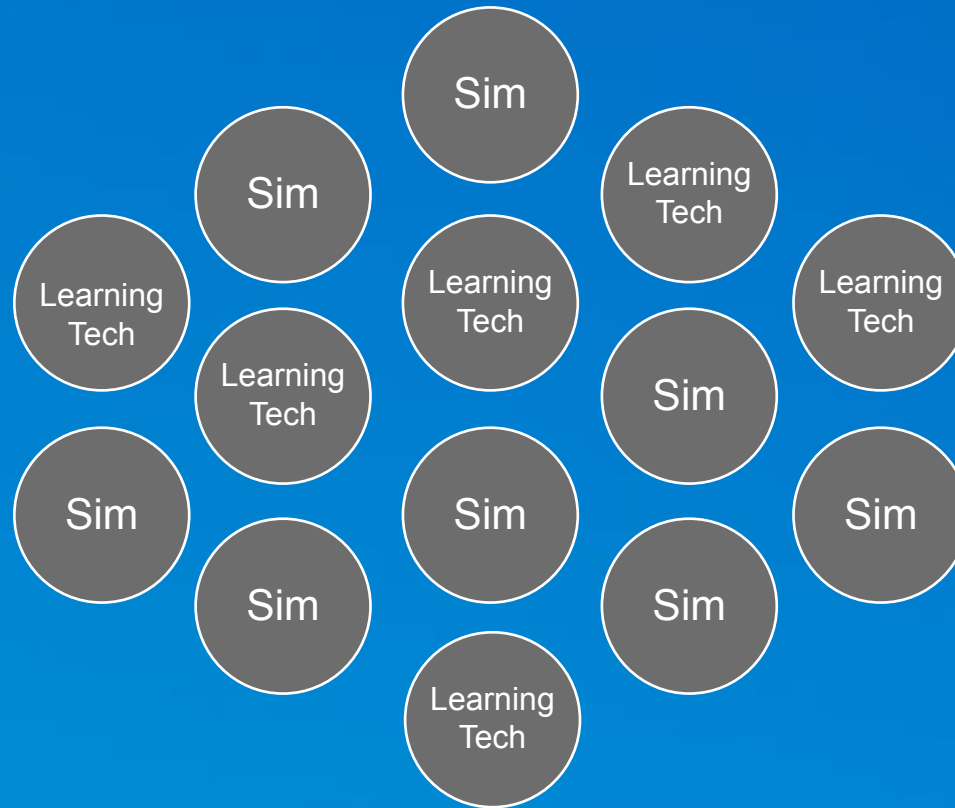




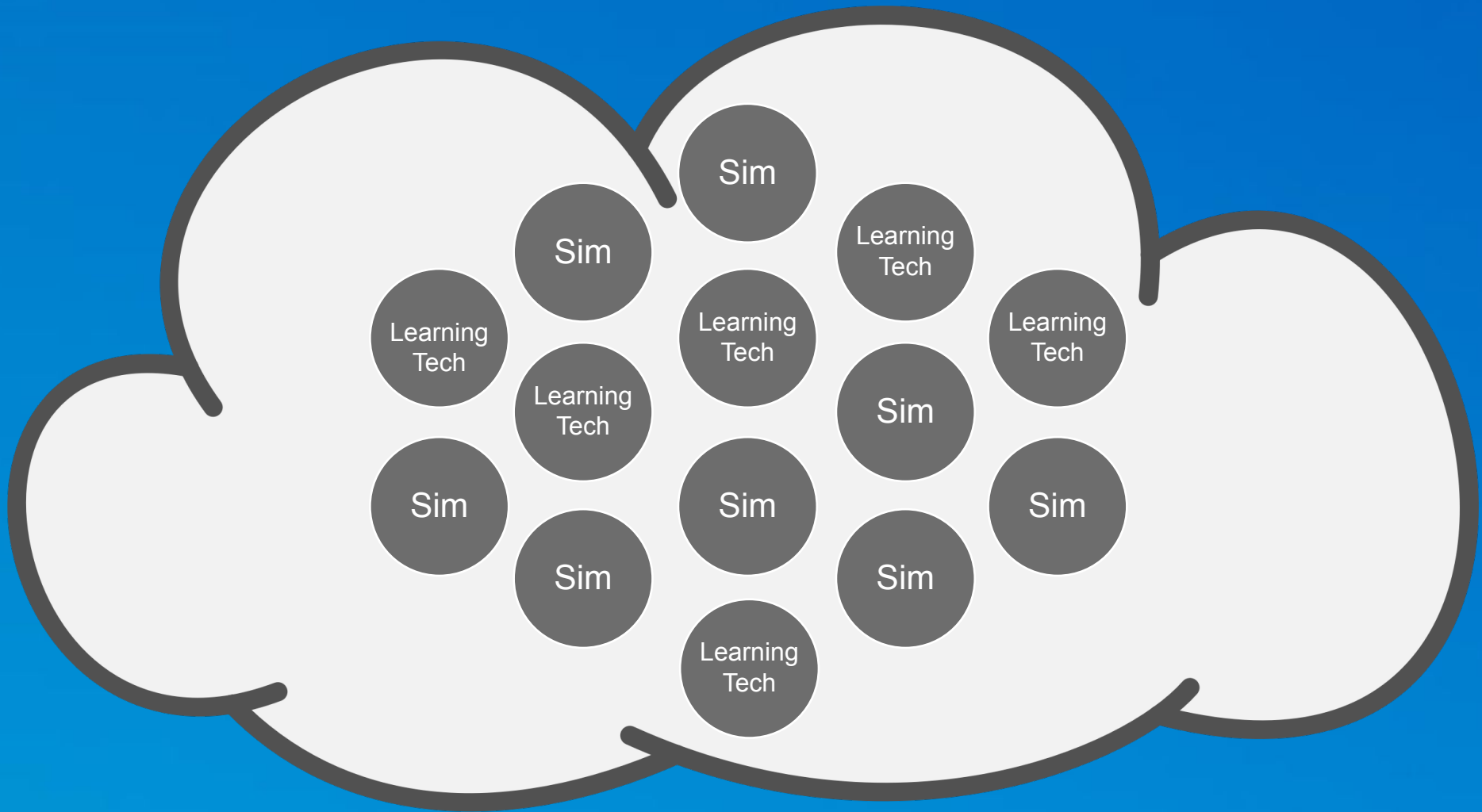
Multiple Beneficiaries – a Benefit and a Challenge

- Enterprise
- Instructor
- Trainee
- Analysts

Islands of Training Capability and Data



Unifying Cloud as a Metaphor



Cloud Stakeholder Benefits

Trainee	Trainer/Instructor
• Training environment that tracks and compares performance • Easy discovery of other players and training scenarios • Ranked/Unranked Worlds for Formal Training and Practice/Play	• Persistent interactive world that can be accessed 24/7 across the Enterprise • Training data that tracks and compares performance • Easy discovery of training scenarios • Ranked/Unranked Worlds for Formal Training and Practice/Play
Analysts	Enterprise
• Assess and compare Training Effectiveness through Big Data and machine learning	• Reduced Client Hardware requirements and upgrading • Secure login • Highly autonomous and centralised • Commonality of Systems

Cloud Training & Simulation Take Away



The Cloud should Inform & Shape your Training & Simulation Infrastructure Requirements



Data-Driven Training & Education



Impact of the Cloud on your Future Training Needs



Do you have a path to the Cloud?

THINKE

Questions?

