



**RAeS Autumn 2018
Flight Simulation Conference
14 Nov 2018**

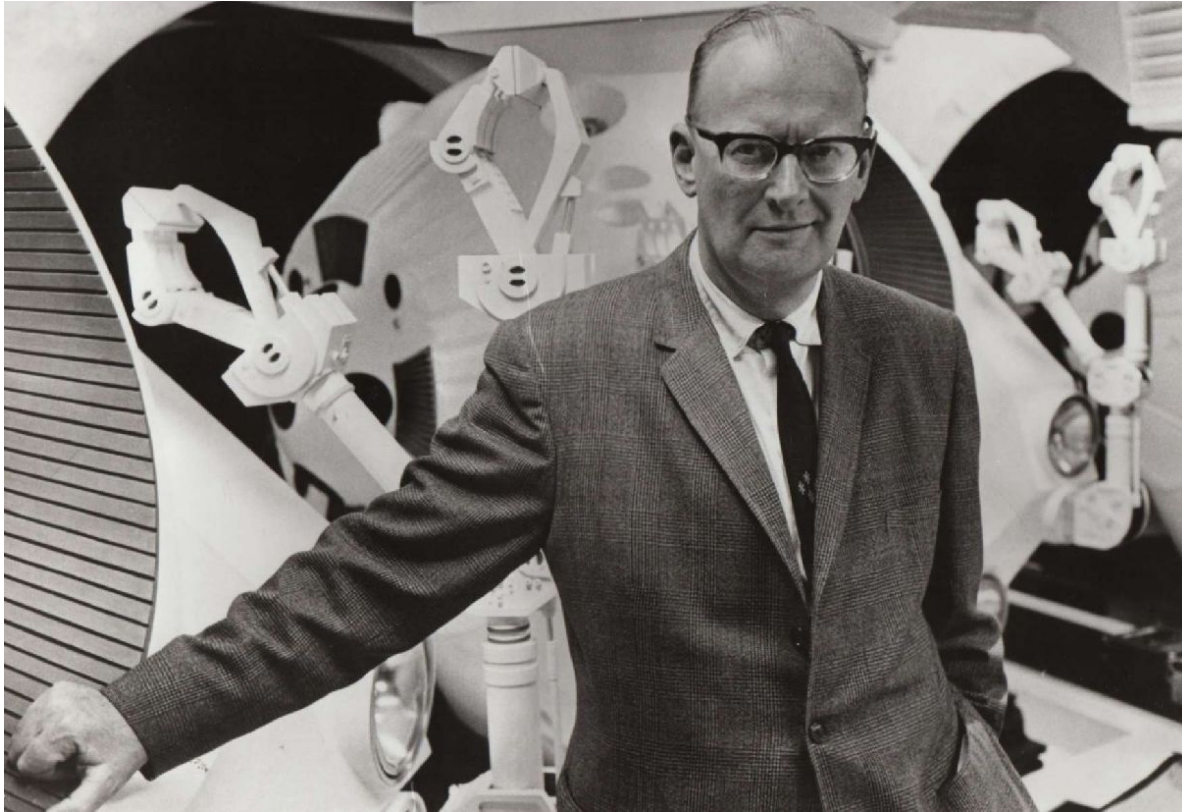
Can We Learn From Cross-Platform Gaming?

Andy Fawkes



Arthur C. Clarke

1917-2008



**“I don't pretend we
have all the answers.
But the questions are
certainly worth
thinking about.”**

Presentation Emphasis

Civil



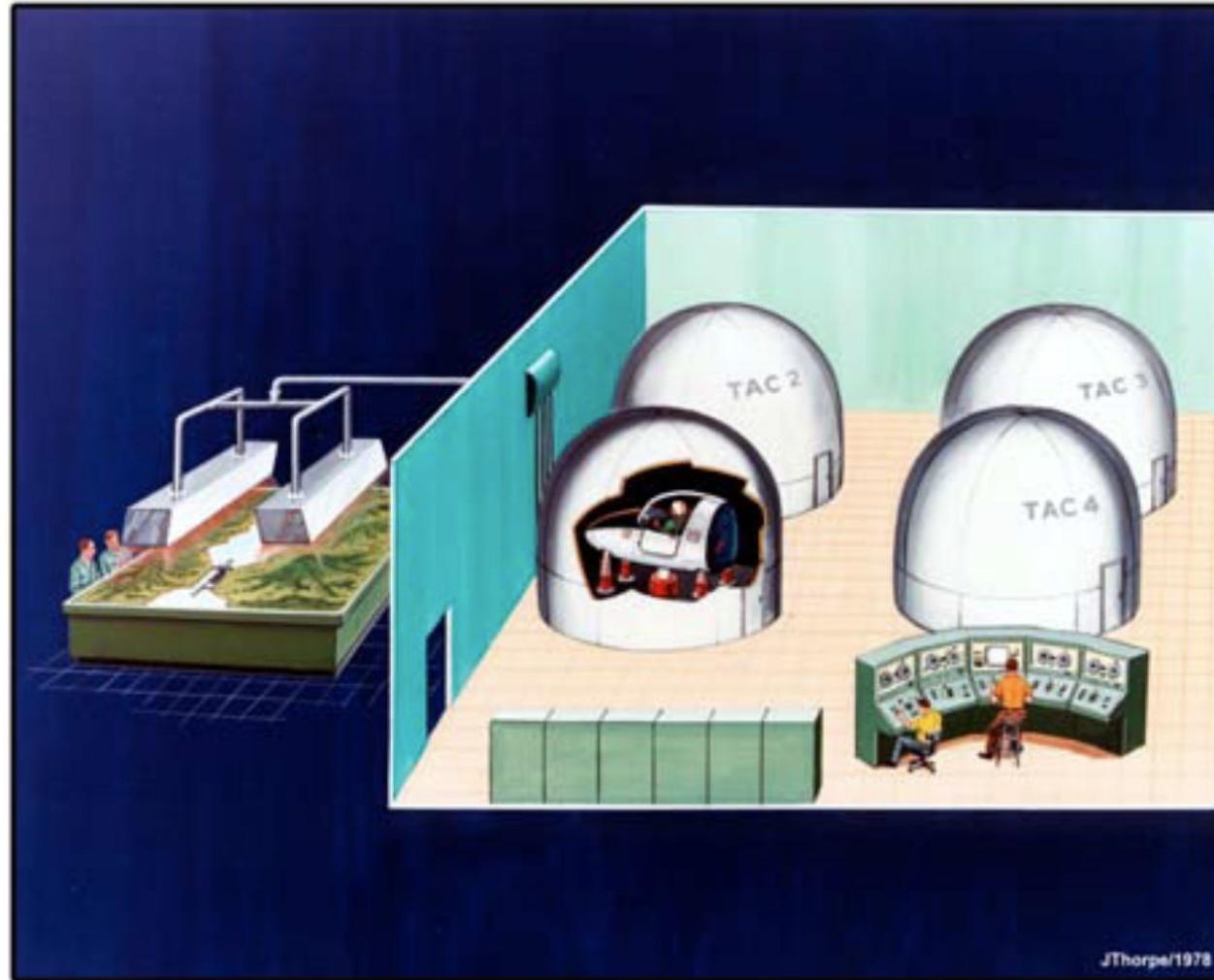
Military

Overview

- **Networked Flight Simulation**
- **What is Cross-Platform Play?**
- **About Fortnite**
- **Anything to Learn?**

Networked Flight Simulation

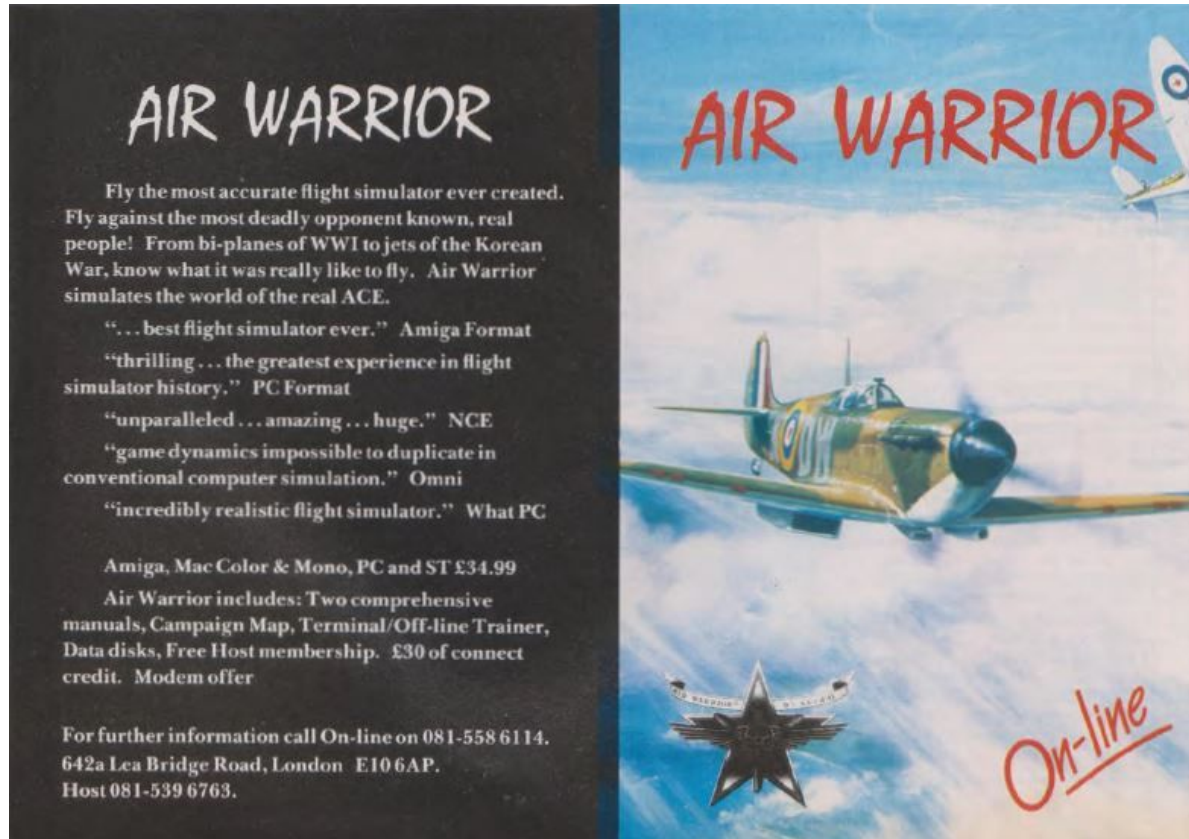
US Air Force Office of Research 1978



Networked Simulators for Training/Mission Rehearsal

Source: - Trends in Modeling, Simulation & Gaming: Personal Observations about the Past 30 Years & Speculation about the Next 10. Jack Thorpe, Ph.D.

Air Warrior – Multiplayer Flight Sim - 1988



Hosted on GE's GENie and was one of the first massive online games, hosting hundreds of users during busy periods

Networked Flight Simulation

- **US Air Force Research Lab, Mesa, Arizona – 1997**
 - Prototype Mission Training Center with 8 Networked Simulators
 - 4x state-of-the-art F-16C simulators
 - 2x A-10 simulators
 - 1x C-130 flight simulator
 - 1x AWACS weapons controller console
 - Computer generated air and ground threats in a virtual reproduction of the Nevada ranges
- **UK MoD MTDS Programme 2005-08**
 - 4x Tornado GR4
 - 4x Typhoon simulators
 - 1x AWACS mission crew training system
 - Exercise management capability
 - Virtual role players
 - Computer Generated Forces (CGF)
 - After Action Review (AAR) facilities
 - Air battlespace missions with joint and multi-national collective teams



Dec 2004

MTDS value to NATO

NATO “First Wave” 2003/5

- **First WAVE** successfully demonstrated potential value in NATO of networked simulation
 - to enhance NATO’s readiness for coalition air operations
 - to prepare NATO Response Force
- **Operational community in Nations enthusiastic**

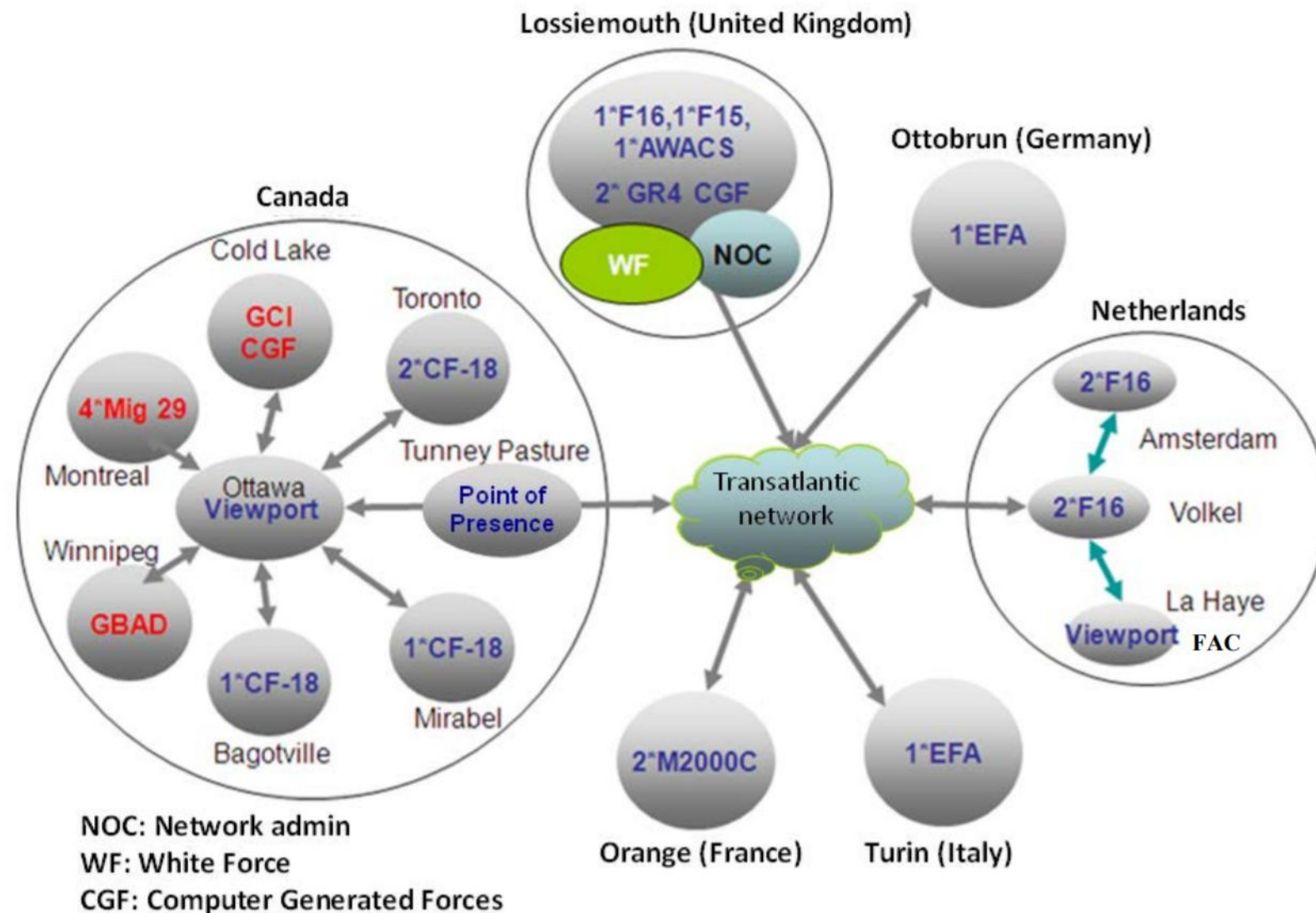




NATO First WAVE



NATO “First Wave” 2003/5





1st Wave Lessons Learned

NATO “First Wave” 2003/5

MSG-143 Symposium,
Bucharest, ROU, 20-21 Sept
2016

Strengths	Weaknesses
1. MTDS can provide relatively low cost training. 2. Time Saving due to use of national sim assets. 3. MTDS can be used as preparation for Live flying exercise. 4. Weapon employment (often not possible in live exercises).	1. Unavailability of a permanent NATO (MTDS) network. 2. Infrastructure required. 3. Limited resources available for MTDS.
Opportunities	Threats
1. Carry out mission rehearsal with MTDS. 2. Unlimited options for the development and execution of varying scenarios. 3. To have actual threat reactions.	1. Network security and site accreditation (caused withdrawal of the USAF assets in EFW and UK Tornado asset)



NIAG Sub-Group 215

Future Combined/Joint Distributed Tactical

Training through Simulation – Feb 18

- **“NATO and Nations need Mission Training through Distributed Simulation (MTDS) to provide mission rehearsal and operational assessment of Air and C2 systems in all core air power roles.”**
- **“Many high level governance, operational and technical gaps remain in order to achieve the ambition of an Air and Joint MTDS capability.”**

Medium Support Helicopter Aircrew Training Facility RAF Benson

- Six full-mission simulators (stand-alone or networked)



- Tactical Control Centre



THE



UK Defence Operational Training Capability (Air)

- The DOTC(A) Programme (Pg) will establish a series of networked synthetic mission training facilities (a system of systems) to fill the long-standing gaps in Air Force Elements (FE) Team and Collective postgraduate mission training.
- FE simulators at Main Operating Bases (MOBs) will connect to a Core Systems & Services (CS&S) located at RAF Waddington.
- The CS&S will provide Team and Collective training that can be tailored to the prevailing Operational environment and the Training Objectives (TOs) of the FE.
- Initial capabilities
 - Integration with Typhoon, Sentry E-3D Rear Crew Training system, Joint Fires Synthetic Trainer (JFST) and the UK F-35B Lightning mission simulators
- Subsequent capabilities
 - Focus on remaining Air force elements, and other Land/Maritime synthetic capabilities once their requirements and associated benefits have been articulated, to meet Jt collective training requirements
- Later capabilities
 - Distributed links to NATO, other coalition partners and potentially component level organisations.

Training Challenge of the Next Decade?

C2



4th Gen



+

5th Gen

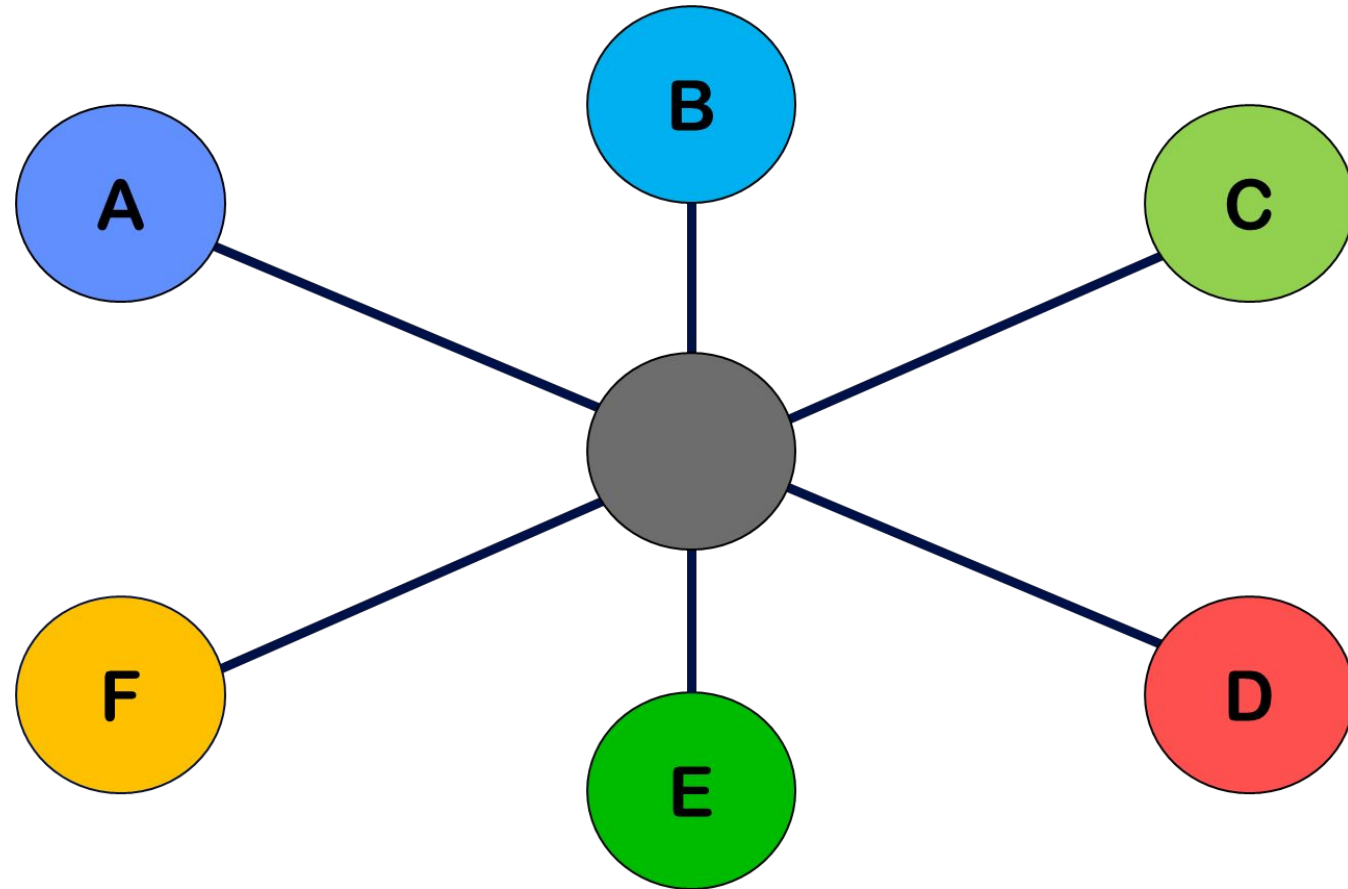


Vs

Anti-Air



- * How Important is Networked Flight Simulation to you?
- * How Easy is it to Set Up?



What is Cross-Platform Play?

**HOW WOULD YOU LIKE
TO PLAY?**



PLAYSTATION



XBOX



SWITCH



PC/MAC



MOBILE

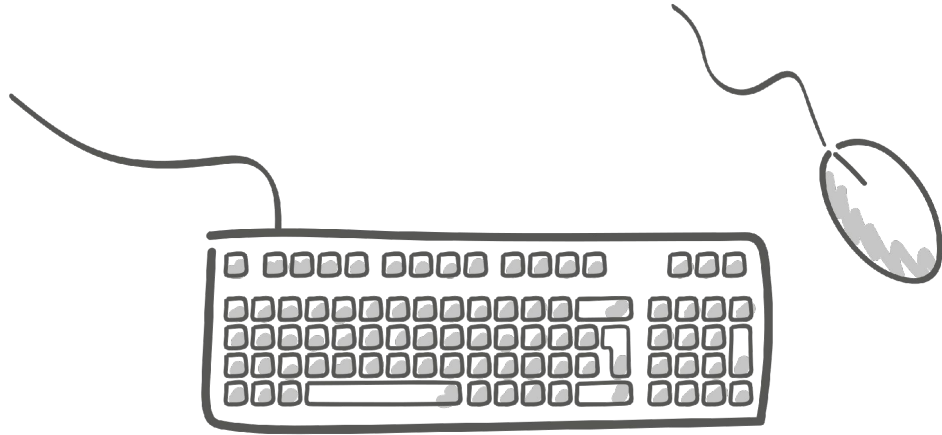
What is Cross-Platform Play?

- A term used to describe the ability of a video game with an online gaming component that allows players using different game hardware to play with each other simultaneously.
- It is commonly applied to the ability for players using a game on a specific game console to play with a player on a different hardware platform such as another console or a PC/mobile.
- Most games with online components and developed for multiple platforms generally use standard TCP/IP-type functions for communication between players' clients, or between a client and a game server, nullifying the intrinsic differences between hardware platforms.
- *The term is related to but distinct from the notion of cross-platform development, which use software languages and tools to enable deployment of software on multiple platforms.*

Cross-Platform Play Incentives

- **Game Developers**
 - Can keep game's player base large over a period of time providing ongoing sources of income
- **Console Providers**
 - Increases attractiveness of console
- **Gamers**
 - Can more easily play with friends and increases usefulness of console/PC

Cross-Platform Play Challenges #1 - Gameplay



VS



Refresh rate: 240Hz | Response time:
1ms
240 FPS



Refresh rate: 60Hz | Response time:
4ms
60fps FPS

Cross-Platform Play Challenges #1 - update

THE VERGE TECH SCIENCE CULTURE CARS REVIEWS MORE f t r u

MICROSOFT GAMING TECH

Xbox keyboard and mouse support launches next week for Fortnite, Warframe, and more

14 games supported at launch

By Tom Warren | @tomwarren | Nov 10, 2018, 5:38pm EST

f t ↗ SHARE



Xbox One S | Photo by Tyler Pina / The Verge

Cross-Platform Play Challenges #2 - Technical

Join PlayStation™ Network

Create Your Profile.

Other players will see your online ID, while Close Friends see your real name.



Choose Avatar

Online ID

xxsluutEkittyxx ✓

First Name

Jack ✓

Last Name

Goff ✓

Next

Enter Back OPTIONS Health / Privacy / Terms

DS9345's Profile

View your Xbox One profile, friends, achievements, and more now available on Xbox One SmartGlass.



Offline

ADD FRIEND

NAME: 3345

LOCATION:

BIO:

GOLD MEMBER

Recent Activity



Call Of Duty 3



Call of Duty 4



Rock Band



Halo 3



DEAD RISING

Style (3)



Cross-Platform Play Challenges #3 - Business



A Little History

- 2002 - PlayStation 2 and PC cross-platform play enabled for Final Fantasy 11
- 2012 - PS3 and PS Vita support cross-platform play
- 2016 – Microsoft announce cross-network play for Xbox One and Windows 10
- 2018 – Sony announce cross-platform beyond Sony ecosystem (Fortnite)
- 2018 – some 200 games support cross-platform play

Xbox Play Anywhere (2018)

Order today: [Surface Pro 6](#) | [Surface Laptop 2](#) | [Surface Studio 2](#)

Windows Central

ANYWHERE, ANYTIME

Xbox Play Anywhere games list

These are all of the Play Anywhere titles available for Xbox One and Windows 10, alongside what's on the horizon for the program.

MATT BROWN 18 Jul 2018 55



In an attempt to unify its gaming ecosystem, Microsoft created the Play Anywhere program. In it, both purchases and features can be shared between [Xbox One](#) consoles and [Windows 10](#) PCs.

The biggest feature is undoubtedly a cross-platform marketplace, with a single purchase providing access to both Xbox One and Windows 10 versions of the game. Progress and achievements also sync between platforms, by automatically saving to your Microsoft account. Multiplayer titles have the option to offer cross-platform play, allowing for shared cooperative and competitive experiences. However, as this feature comes with its own complications, it isn't forced upon all Play Anywhere titles.

About Fortnite

PlayerUnknown's Battlegrounds - 2017



Fortnite Battle Royale



Fortnite Battle Royale

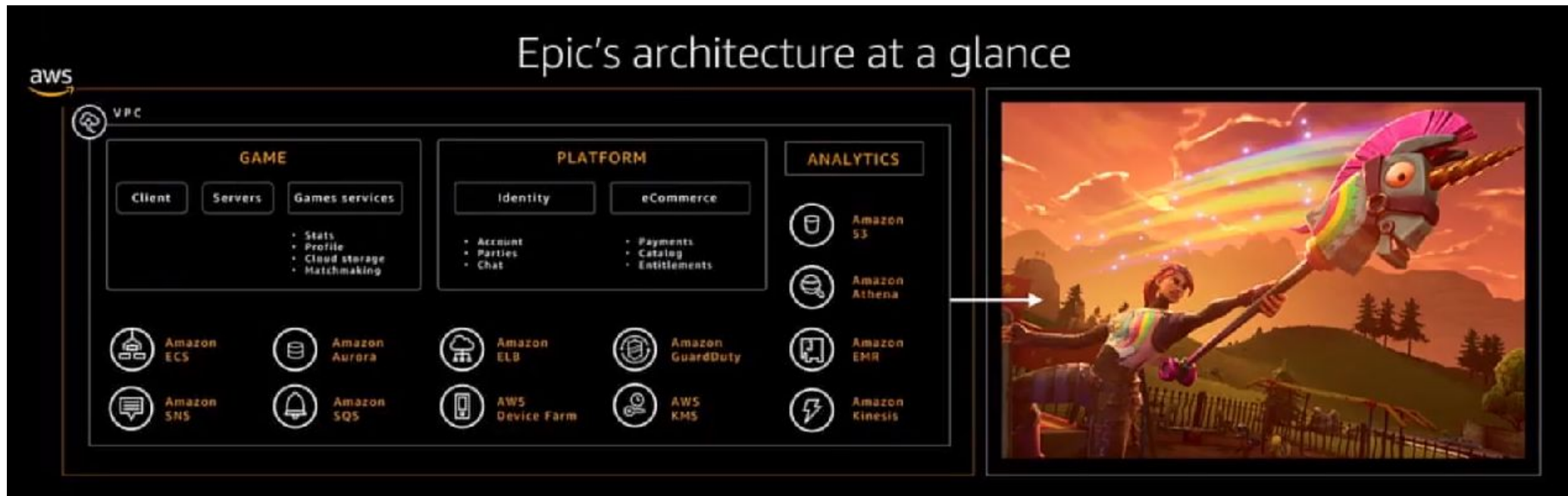


- Online video game released Mar 17
- As of July 2018, the game had seen over 125 million players and estimated to have earned more than US\$1 billion in microtransactions
- The goal is to be the last player alive out of 100 by eliminating or avoiding other players
- Nearly all objects in the game can be harvested for materials (e.g. wood), to build fortifications, such as walls and ramps, which can be used for protection, to help move, or slow down progression of other players
- In Fortnite, players have the option to spend money on in-game currency, called “V bucks,” which can be used to make in-game purchases. The currency is used to purchase cosmetic skins, dances, and pre-released game modes for their characters, which range from 200 to 2,000 V-bucks (\$2 to \$20) (but which do not affect game play). Average spend \$84.67 each player.
- Game refreshed through “Seasons” (now no 7)

Fortnite Hosting



- Epic Games exploits Amazon Web Services (AWS)
- Fortnite servers around the world to reduce ping
- Each month Epic deals with two petabytes of data



Fortnite Cross-Platform Play



- All platforms require an Epic Games account
- Platform accounts must be linked to Epic
- Progress and purchased content travels with Epic account
- Becoming friends through Epic enables cross-platform play

FORTNITE CROSS-PLATFORM COMPATIBILITY

Platforms	Mac and Windows PC	Mobile	Xbox One	PlayStation 4	Nintendo Switch
Mac and Windows PC	Yes	Yes	Yes	Yes	Yes
Mobile	Yes	Yes	Yes	Yes	Yes
Xbox One	Yes	Yes	Yes	Yes (beta)	Yes
PlayStation 4	Yes	Yes	Yes (beta)	Yes	Yes (beta)
Nintendo Switch	Yes	Yes	Yes	Yes (beta)	Yes

Fortnite Cross-Platform Play for PC, PS4, Xbox One, Switch, Mac and mobile



- Party Finder searches for Epic Games friends across platforms



Fortnite Battle Royale - Growing



By Lauren Aitken, Thursday, 8 November 2018 16:49 GMT

Share on: [f Facebook](#) [t Twitter](#) [r Reddit](#) [G+ Google+](#)

Fortnite launched in South Korea this week, complete with a new set of challenges.

This week saw the introduction of Fortnite's Battle Royale mode in South Korea, where players were encouraged to play at [PC Bang cafes to complete PC Bang challenges](#).

[Epic Games Korea gave an interview](#) where its spokesperson, Sung Chul Park, stated that Fortnite now has **8.3 million concurrent players worldwide**.

Yep. You heard us: 8.3 million people playing Fortnite simultaneously.

VG247 has verified the numbers with a spokesperson from Epic Games, twice.

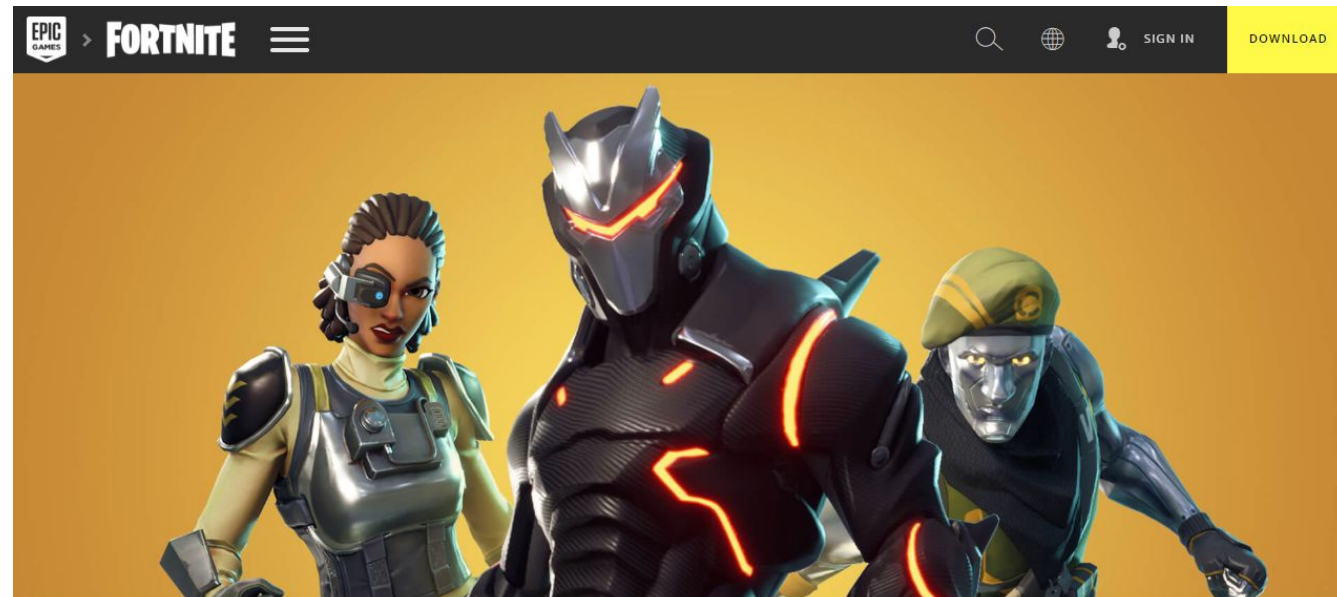
This is a meteoric rise in numbers considering that [Fortnite previously hit a peak of 3.4 million concurrent players in February](#) which caused major service disruptions.

Fortnite Battle Royale – Next - eSports

The global eSports industry is
\$905m (2018/Newzoo)

Top Fortnite player “Bizzle” -
Earnings \$322k (Oct 18)

On March 14, a game of Fortnite
pulled in 630,000 concurrent
viewers on Twitch TV, a service
for watching competitive video
game streams



EPIC GAMES WILL PROVIDE \$100,000,000 FOR FORTNITE ESPORTS TOURNAMENT PRIZE POOLS IN THE FIRST YEAR OF COMPETITIVE PLAY

5.21.2018

By The Fortnite Team



Fortnite Competitors!

Grab your gear, drop in and start training. Since the launch of Fortnite Battle Royale we've watched the passion for community competition grow and can't wait to empower you to battle with the best.

In the 2018 - 2019 season, Epic Games will provide \$100,000,000 to fund prize pools for Fortnite competitions. We're getting behind competitive play in a big way, but our approach will be different - we plan to be more inclusive, and focused on the joy of playing and watching the game.

Fortnite company Epic Games - Growing

Fortnite company Epic Games valued at nearly \$15bn after cash boost

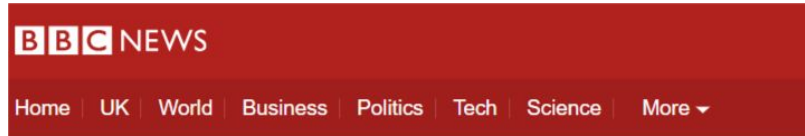
Investment means value of firm behind popular game has risen threefold in six months



▲ Fortnite is free to download and makes money by charging players for costumes and other extras. Photograph: Chesnot/Getty

The company behind the [Fortnite video game](#) has been valued at almost \$15bn (£11.7bn) after receiving a \$1.25bn cash injection led by the private equity firm KKR.

Fortnite Battle Royale - Addictive?



Fortnite is now even being blamed for divorce

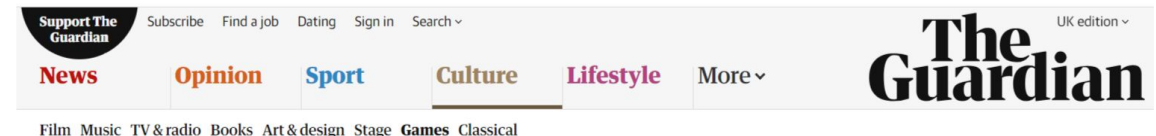
17 September 2018 | Newsbeat



Fortnite has been blamed for violence, students missing school and now apparently divorce.

The survival video game's been cited in a number of recent break-ups, according to a new survey.

According to research by divorceonline.co.uk, 200 divorces since January 2018 mentioned addiction to Fortnite and other online games as one of the reasons for the relationship breakdown.



Fortnite

Why can't people stop playing Fortnite?

How the latest video game craze mixes up the fundamentals of game design and human psychology to make itself compelling

Will Luton

Wed 29 Aug 2018 12.00 BST



510 188



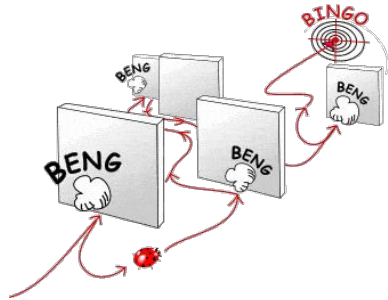
▲ Keeps you coming back for more ... Fortnite. Photograph: Epic Games

Fortnite Battle Royale - Addictive?



Random Rewards

- Random “loot” or “variable-ratio schedule”, like a slot machine
- The hope of finding something desirable paired with occasional reward is exciting
- The gap between high- and low-skill players is also reduced making the game less punishing and more difficult to dominate



Finding Order in Chaos

- The instinctive need to find order in chaos
- Players must build a mental model of the game’s mechanics building their intuitive judgement
- If their intuition leads to success this is pleasurable whilst unexpected failure leads to a need to learn and play more



Social Status

- The need to signal social status
- Impressing other players through “skins” or visual customisations of player’s avatars or weapons, that are also restricted to “Seasons”, signalling success, much like in Fashion



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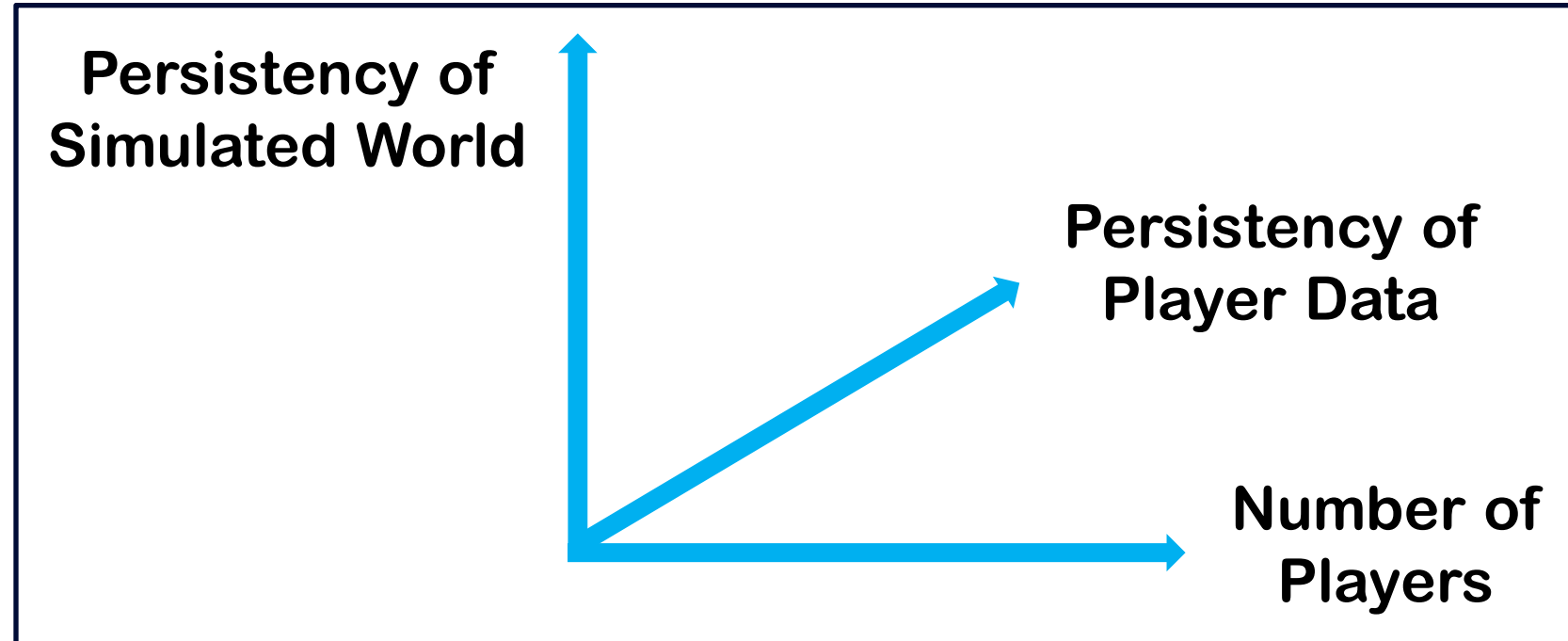
Andy Fawkes

Some Questions

- Will gaming platform interoperability be the norm in future?
- Do we need a Epic Games-like integrator and is the customer, a prime or a collaboration?
- What will new recruits think about current training system interoperability?
- Would a Single Login account for trainees be of value?
- Can or should training be as compulsive as some games?
- Is there anything more to learn about “fair fight” in networked simulation-based training?
- How badly does the training and simulation community want networked training?



Massively Multiplayer Online Games (MMOGs)



**MMOGs offer a way of thinking
about data and communities**

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

Cloud Gaming

NEWZOO TREND REPORT

CLOUD GAMING: THE PERFECT STORM



THE NEXT ERA OF GAMING IS IN THE CLOUDS

Foreword

The gaming world is poised to undergo a transformation not seen since the introduction of mobile gaming.

Just as mobile gaming has expanded the market by making games accessible to billions of people across the globe via smartphones and tablets, cloud gaming has the potential to expand the market for premium games beyond the current console and PC audience by making them accessible to anyone on any device.

The concept of cloud gaming (as cloud computing) has been around for decades, but the first implementation of a dedicated cloud-gaming service was launched by G-cluster in 2004 for the Japanese market. The United States saw its first service in 2010 when OnLive launched. However, its uptake was held back by a number of factors, primarily internet speed and latency. Faced with instability and mixed reviews, OnLive sold most of its technology to Sony (which then shut it down) after just two years on the market. Sony also purchased similar service Gaikai in 2012 and used the technology for its own streaming products.

The year is now **2018** and internet speeds have improved since OnLive. According to Akamai, we have gone from an average of **4.7 Mbps** internet connection speed in the United States in 2010 to **18.7 Mbps** in 2017. We have gone from iPhone 4 to iPhone XS and from the first-generation iPad to the sixth. We are within reach of 5G, which will enable high-bandwidth, low-latency mobile connections, though there are still multiple hurdles to clear before it can reach its true potential.

As the tech continues to improve and cloud gaming grows, we expect an increase in the overall demand for games as new consumer groups enter the ecosystem. We also expect to see challenges and innovations in business models, game development, content discovery, engagement options, and even shakeups to gameplay itself. In this report, we take a look at the state of the industry and explore the potential impacts across the ecosystem.



40M

Lapsed gamers represent approximately 4% of a population comprising 1Bn active online (urban) users.

CANDICE MUDRICK
Sr. Market Analyst

