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SAN FRANCISCO, CA

Cross-Platform Determinism

in Warhammer Age of Sigmar: Realms of Ruin

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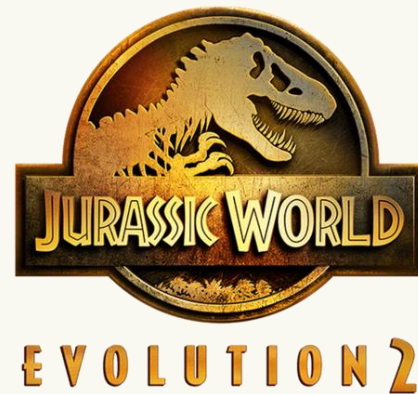
#GDC2024

Outline

- **Introduction**
- Protecting the programmer
- Cross-platform determinism
- Networking
- Post-mortem

Who are Frontier Developments?

- Founded in 1994 by David Braben
- Cobra™ engine
- Best known for park management games



Making our first RTS

- Frontier has never made an RTS before
- Building on prior GDC talks

Determinism:

- Common approach
- High learning curve
- Unfamiliar dev team

Goal: Build a robust deterministic simulation framework (DSim)

Why determinism?

Commands (inputs) generate state

- Network synchronisation
- Replays
- Anti-cheat

Inspired by these talks:

- ['Overwatch' Gameplay Architecture and Netcode – GDC 2017](#)
- [Back to the Future! Working with Deterministic Simulation in 'For Honor' – GDC 2019](#)

Determinism considerations...

Desynchronisations (desyncs):

- Caused by non-deterministic code
 - State will diverge after
 - Hard to debug!
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- Separate gameplay state and visuals
 - Programmers need to adjust

How can we help them?

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- **Protecting the programmer**
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Protecting the programmer

- Built **for** gameplay programmers

Fail fast

- Three steps to prevent desyncs...

Protecting the programmer

About the DSim

Why parallelism?</

