



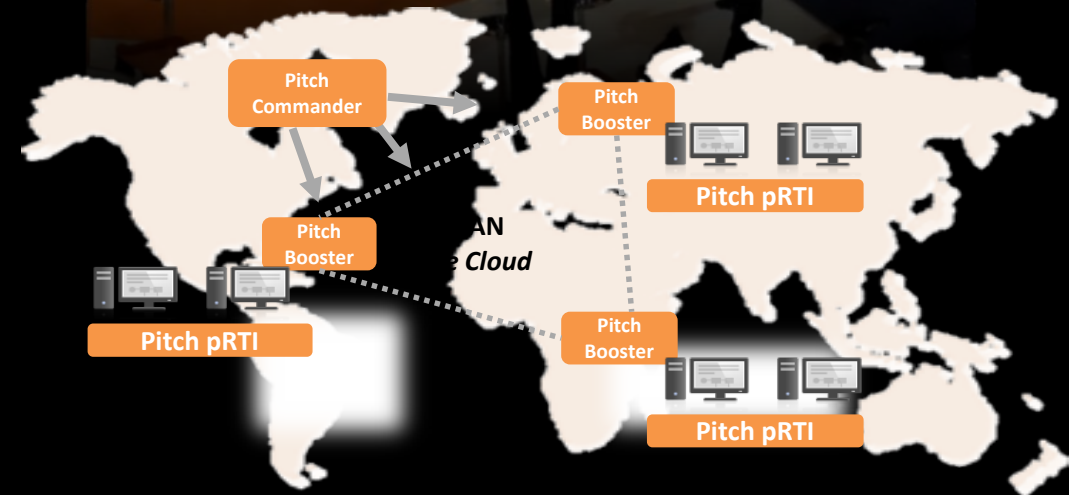
NATO MSG-197 Symposium - 20<sup>th</sup> / 21<sup>st</sup> Oct 2022

Enabling Disruptive Technologies Through Open Standards

Tom Gray, Jonathan Denny, Suranga Wickramasekera, Garratt Weblin

# About Pitch

- World leader in distributed simulation
  - Defence, Space, ATC, Medical
- Expert in making simulations work together using open standards
- Active in modelling & simulation standardisation
- Offer COTS simulation interoperability products



# Introduction



# Ecosystems / Value of Interoperability Standards

## Proprietary Ecosystems

Use my proprietary architecture!

Use my proprietary architecture!

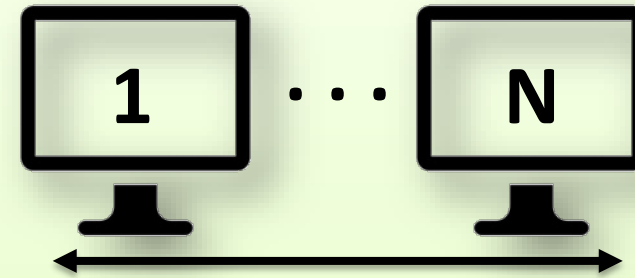


- Single-function, inflexible, “stovepipe” system
- Limited use/value/innovation and soon obsolete
- Single supplier based community
- Vendor lock-in

Use my proprietary architecture!

Good for me right now

## Open Ecosystems



- Service Oriented Architecture
- Flexible data models
- International open standard
- Community buy-in, collaboration
- Vendor neutral, large diverse supply chain with interoperable components

Good for all now and in the future

# Scalable Platforms

- Frameworks offering scalable constructive simulations are emerging
- Modern LVC Simulations require more
  - Higher Fidelity
  - Complex AI behaviours
  - Audio, video, datalinks
  - Cross Domain Security
  - Record / Playback



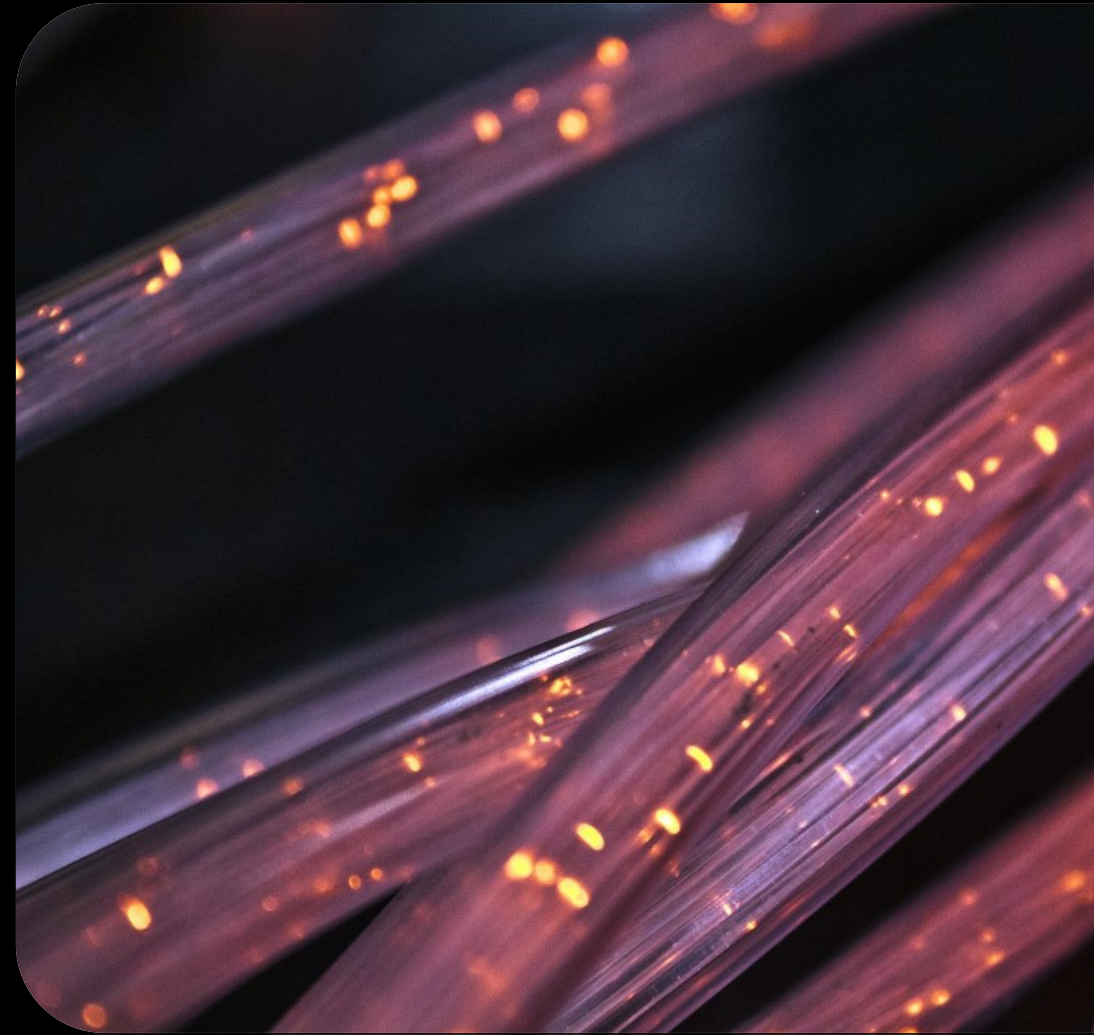
# Digital Twins

- Re-discovering modelling and simulation as a critical capability
- No single vendor will be able to provide an entire complex simulation



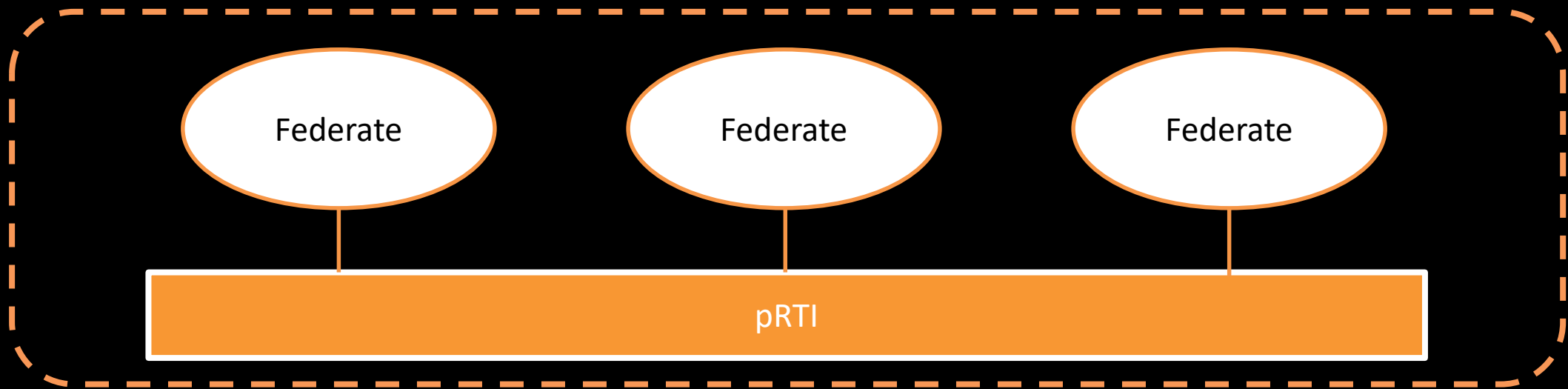
# Modelling and Simulation as a Service

- Truly disruptive procurement and acquisition model in Defence
- Requires novel architectures compared to traditional Defence simulation



# High Level Architecture (HLA) Primer

- HLA is an open standard for connecting simulators to each other
- The simulators are called *federates* and when they run together, we call that a *federation*
- The thing that provides the connectivity is an *RTI*.
- A federation is typically illustrated using a *Lollipop Diagram*





# HLA 4

- Cloud Deployment
- Security
- Improved Developer Options
- More Flexible Object Model



# FOMs / Data Models

- Air / Land / Sea Domains
  - RPR FOM 3.0
  - NETN FOM 4.0
- Space
- Cyber
- Command and Control
- Live
- Future Capabilities
  - Comms and Datalink effects, Cross Domain Security, After Action Review



# Certification / Standards Adherence

- Enabler for creating simulation ecosystem
- Clear, independent proof of interoperability
  - Reduce integration efforts
  - Promote ecosystem of interoperable components
  - Lower barriers to market



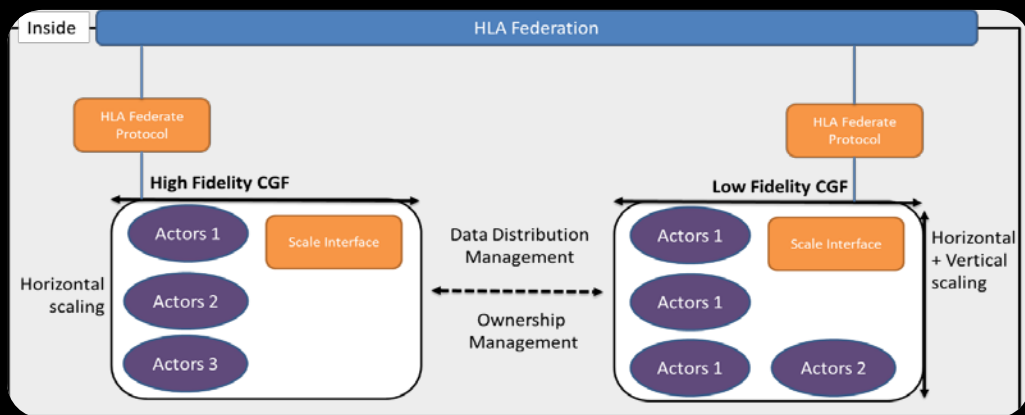
# Game Engine Interoperability

- Utilise vast amounts of effort in gaming
  - Graphics, physics, audio etc
- Unreal Engine plugin for HLA
- Further Integration and Interoperability Challenges
  - Coordinate systems
  - Standards for models / terrain



# Scalable Demonstration using HLA

- Demonstrating a scalable CGF concept using new HLA4 features



# Standards Certification in Simulation

- Following examples in wider industry
- SISO / NATO standardisation efforts
  - Capability Badges
  - HLA Certification
  - Simulation Interoperability Readiness Levels



# Conclusions

- Defence leading the way again?
- Meaningful effort to create open systems
- Invest in standards
- Open standards form the path of the future defence modelling and simulation ecosystem.





# Questions

NATO MSG-197 Symposium - 20<sup>th</sup> / 21<sup>st</sup> Oct 2022

Enabling Disruptive Technologies Through Open Standards

Tom Gray, Jonathan Denny, Suranga Wickramasekera, Garratt Weblin