



**PROGRAM EXECUTIVE OFFICE FOR
SIMULATION, TRAINING & INSTRUMENTATION**

Simulation in the Cloud

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Evolving the Simulation Center



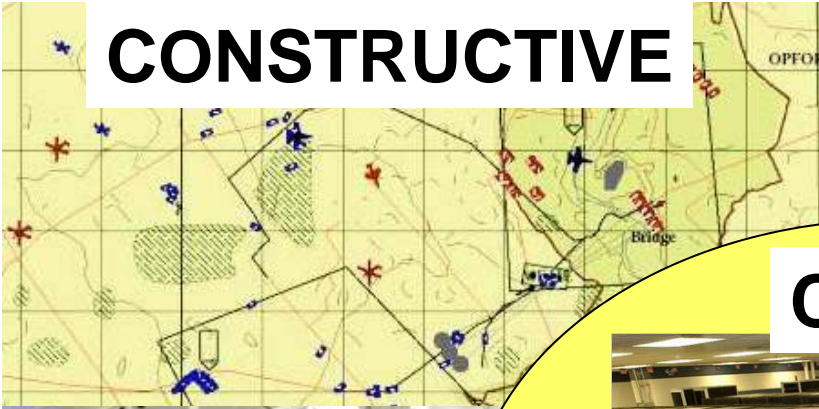
CONSTRUCTIVE

VIRTUAL

Cloud



**Server-side Virtual World
Compute Power**

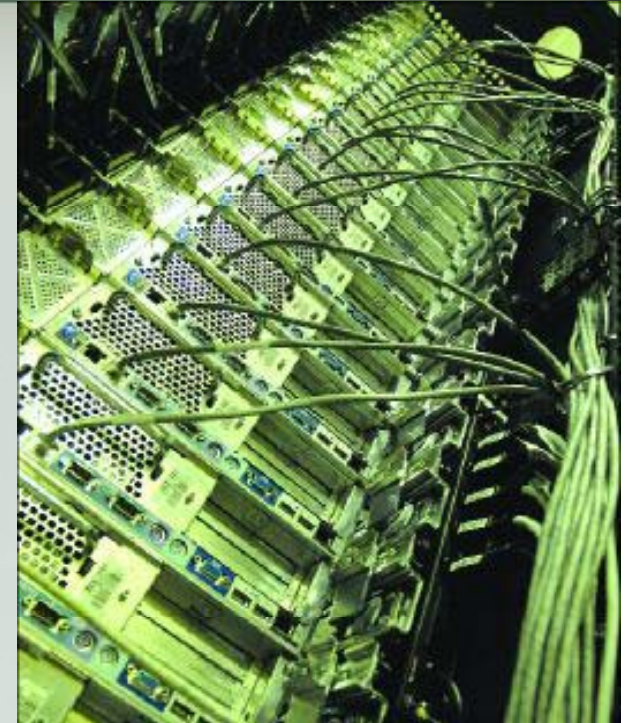


LIVE



Training Event Servers in the Cloud

- High Compute Power in Professionally Managed Centers
 - ❖ Scalable to large exercises and large numbers of exercises
 - ❖ On-demand access to resources
- Power to Model
 - ❖ Finally put the “Reality” in “Virtual Reality”
 - ❖ Tighter system connections reduces lag
- Server-side Computing for LVC
 - ❖ Provide modeling for all types of exercises and experiments
- Heterogeneous System-of-Systems
 - ❖ Multi-site collaboration

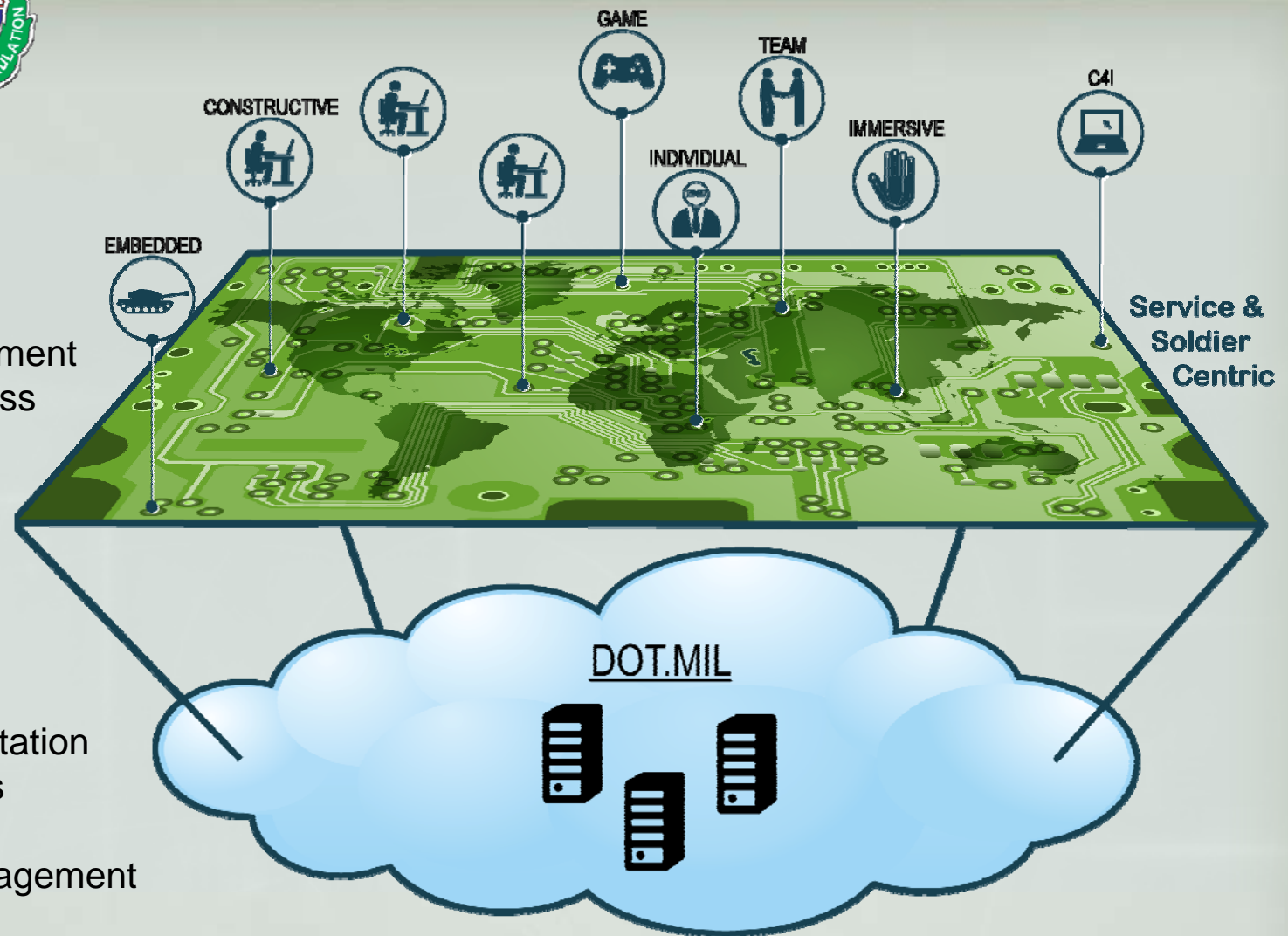




Simulation in the Cloud

NEW WORLD

- Soldier-centric
- Desktop Equipment
- Universal Access



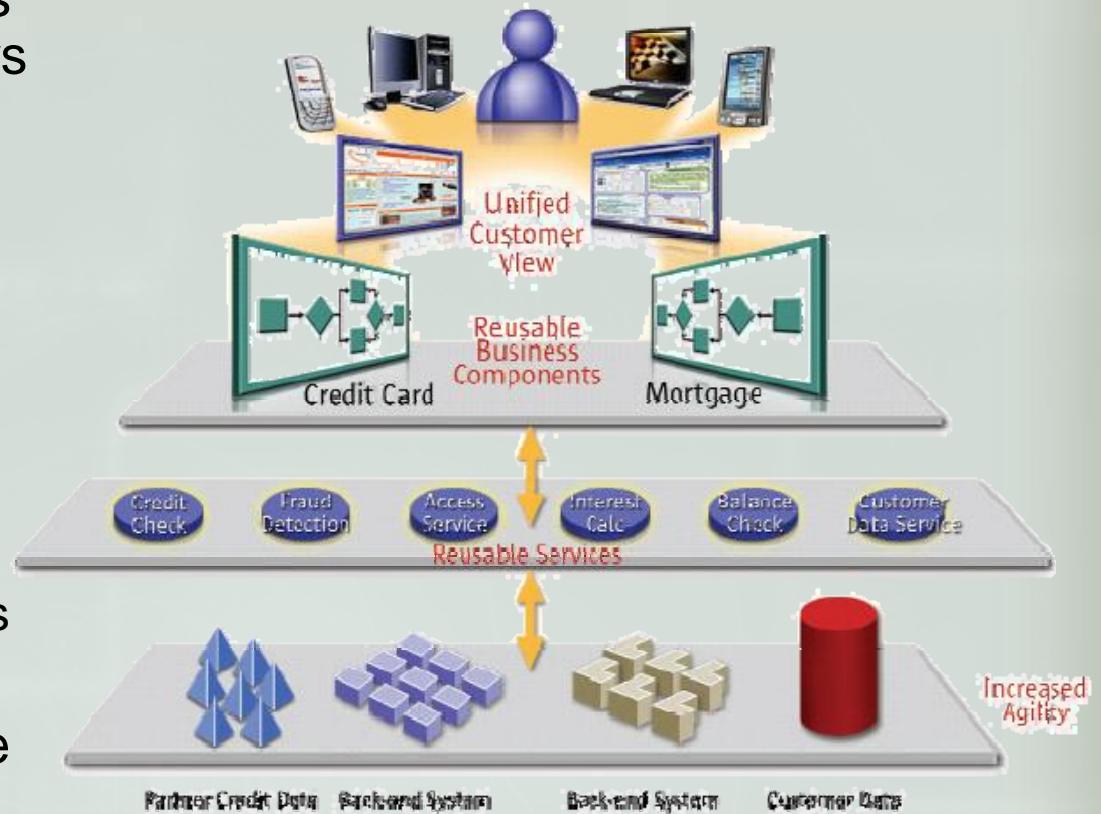
ENABLERS

- Massive Computation
- Global Networks
- Cloud Services
- Distributed Management



Simulation as a Cloud Service

- Scalable Simulation Services provided to remote customers on the customers' schedule
- Break the 1-to-1 relationship between equipment and events
- Light simulation client as an application on any military system
 - ❖ Browser-based
 - ❖ Generic Sim Engine & Tools
 - ❖ Flexible Game Engine
- Evolving Services at the core
 - ❖ Computation on Demand



[Commercial SOA Diagram]



Benefits to Warfighter Training

- Scalable server farm for interactive training simulation
 - ❖ **Constructive:** Primary host for training
 - ❖ **Live & Virtual:** Wrap-around play box
 - ❖ **Games:** Rich server-side models

- Break the “one facility, one exercise” paradigm
 - ❖ Multiple simultaneous exercises supported from a single simulation center
 - ❖ Put the Sim Center in the cloud

- Physics-based objects, weather, and terrain
 - ❖ Put the “reality” in virtual reality

- Reduce sim-to-sim lag
 - ❖ Host multiple sims on the same computer



OneSAF vs. World of Warcraft

World of Warcraft

Visual Detail: 100X

Algorithm Detail: 1X

Heavy Client Demand

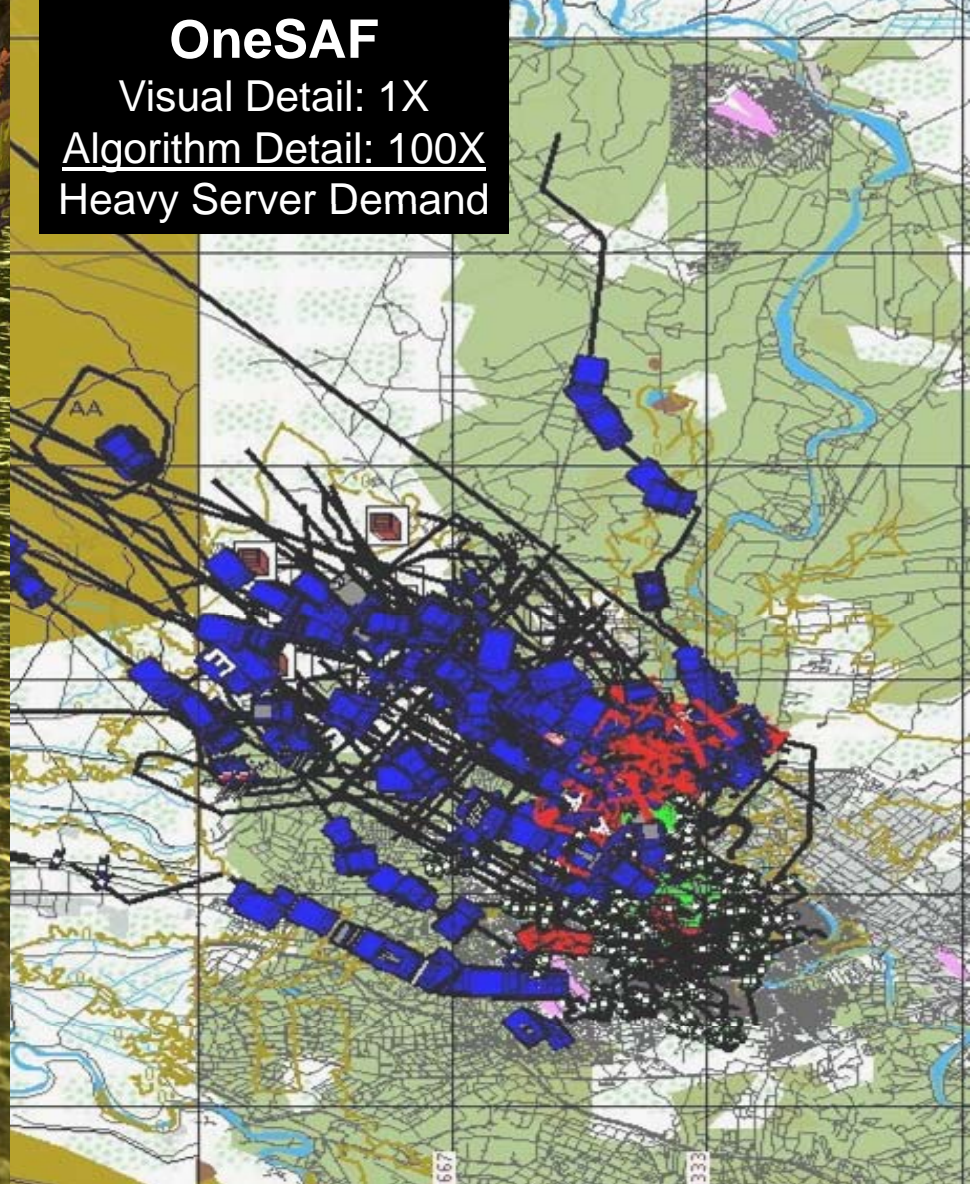


OneSAF

Visual Detail: 1X

Algorithm Detail: 100X

Heavy Server Demand



Conclusion



- Increase soldier/unit access to training systems
 - ❖ Open connection on the dot.mil network
- Reduce operational costs for hardware, shipping, set-up time, travel, staffing
 - ❖ Connect from home station, stop traveling
- Increase model fidelity
 - ❖ Power to enrich the virtual world
- Increase model synchronization
 - ❖ Tight connections between processors
- Increase exercise reliability and availability
 - ❖ Multiple redundant resources