Interactive Training with High Performance Computers

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Objectives

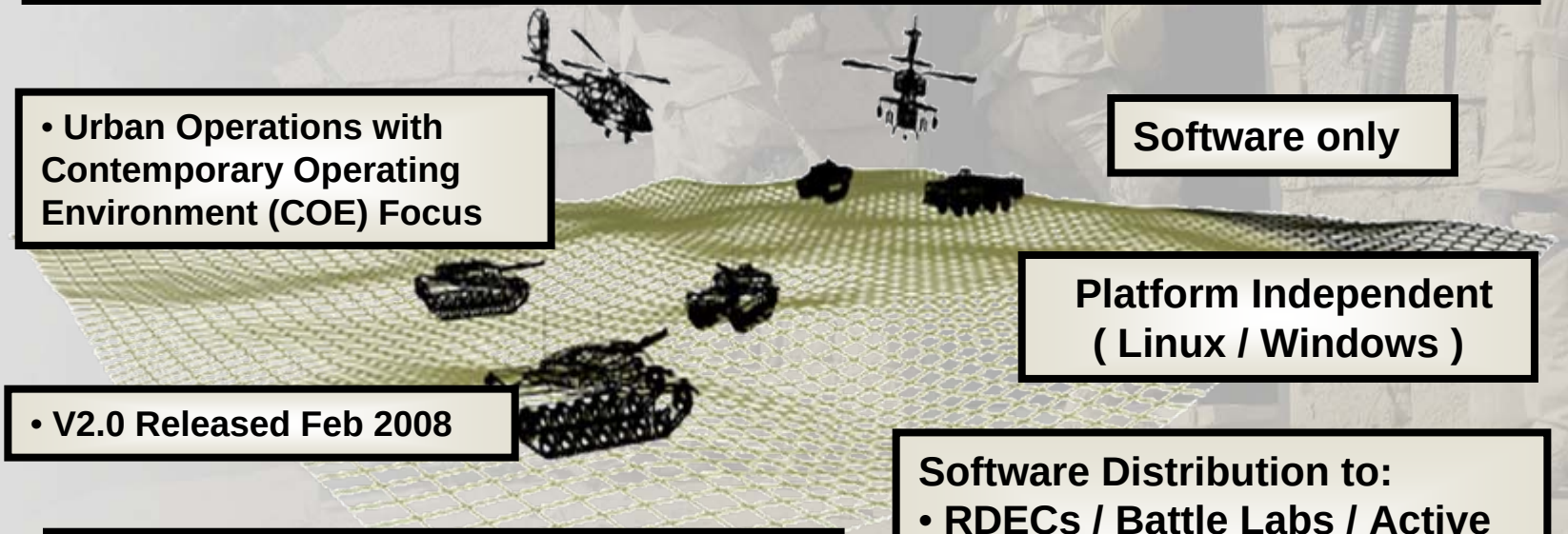
- Leverage the power of HPC as the server farm for interactive simulation for training
  - OneSAF
  - WARSIM
- Multiple simultaneous exercises supported from a single simulation center
- Physics-based object, weather, and terrain modeling (put the “reality” in virtual reality)
- Tighter network connections between applications to eliminate lag

Predecessor Experiments

- Physics-based Environment for Urban Operations
  - HPCMO, STRI, SAIC
- Millennium Challenge Exercise Clutter
  - JFCOM, Maui SCC, Alion
- C4ISR On-the-Move (OTM) program
  - CERDEC, HPTi, SAIC, HPCMO

One Semi-Automated Forces (OneSAF)

- A composable, next generation simulation architecture supporting both Computer Generated Forces (CGF) and SAF operations
- Provides a full range of operations, systems, and control processes (TTP)
- Supports modeling from entity up to brigade level
- Supports DIS, HLA, MSDL, JC3IEDM and USA ABCS interoperability
- Provides variable levels of composability, fidelity and representation
- Supports multiple Army M&S domain (ACR, RDA, TEMO) applications.



- Urban Operations with Contemporary Operating Environment (COE) Focus

Software only

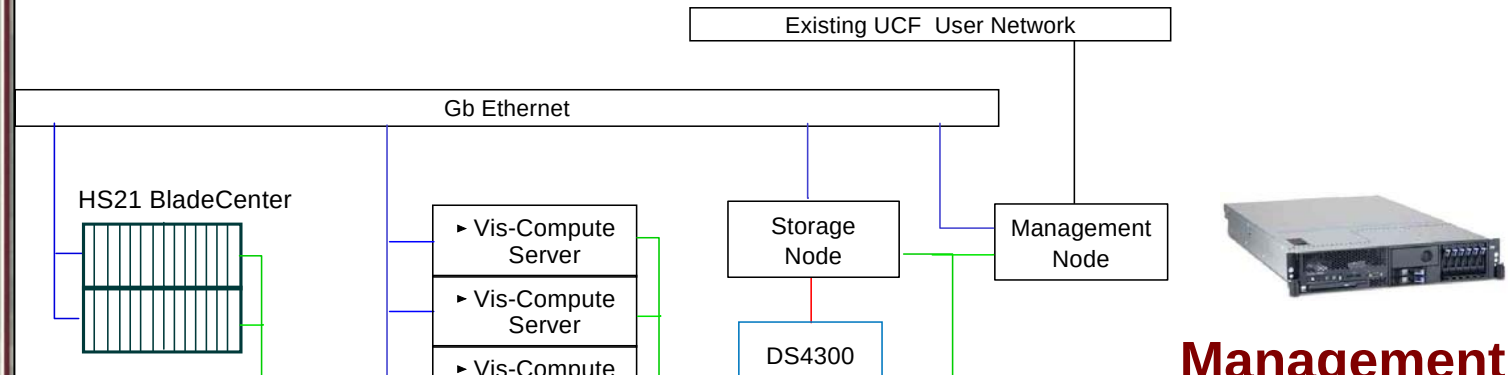
Platform Independent (Linux / Windows)

- V2.0 Released Feb 2008

Capable of replacing US Army legacy entity-based simulations: BBS, OTB / ModSAF, CCTT / AVCATT SAF, Janus (A&T), JCATS MOUT

Software Distribution to:
- RDECs / Battle Labs / Active Duty Brigades & Battalions
- Service / Joint Organizations
- International Partners
- USG / Academia

Team Orlando HPC Server Hardware



Management server

2: chassis
12: blades in each chassis
8: cores in each blade
192: total number of cores

Bladecenter Cluster

4: servers
8: cores in each server
32: total number of cores

Visualization & Compute Servers

27: number of disk drives
750: disk capacity in GB
20250: total capacity in GB

Storage Subsystem

IBM HS21 Bladecenter Cluster

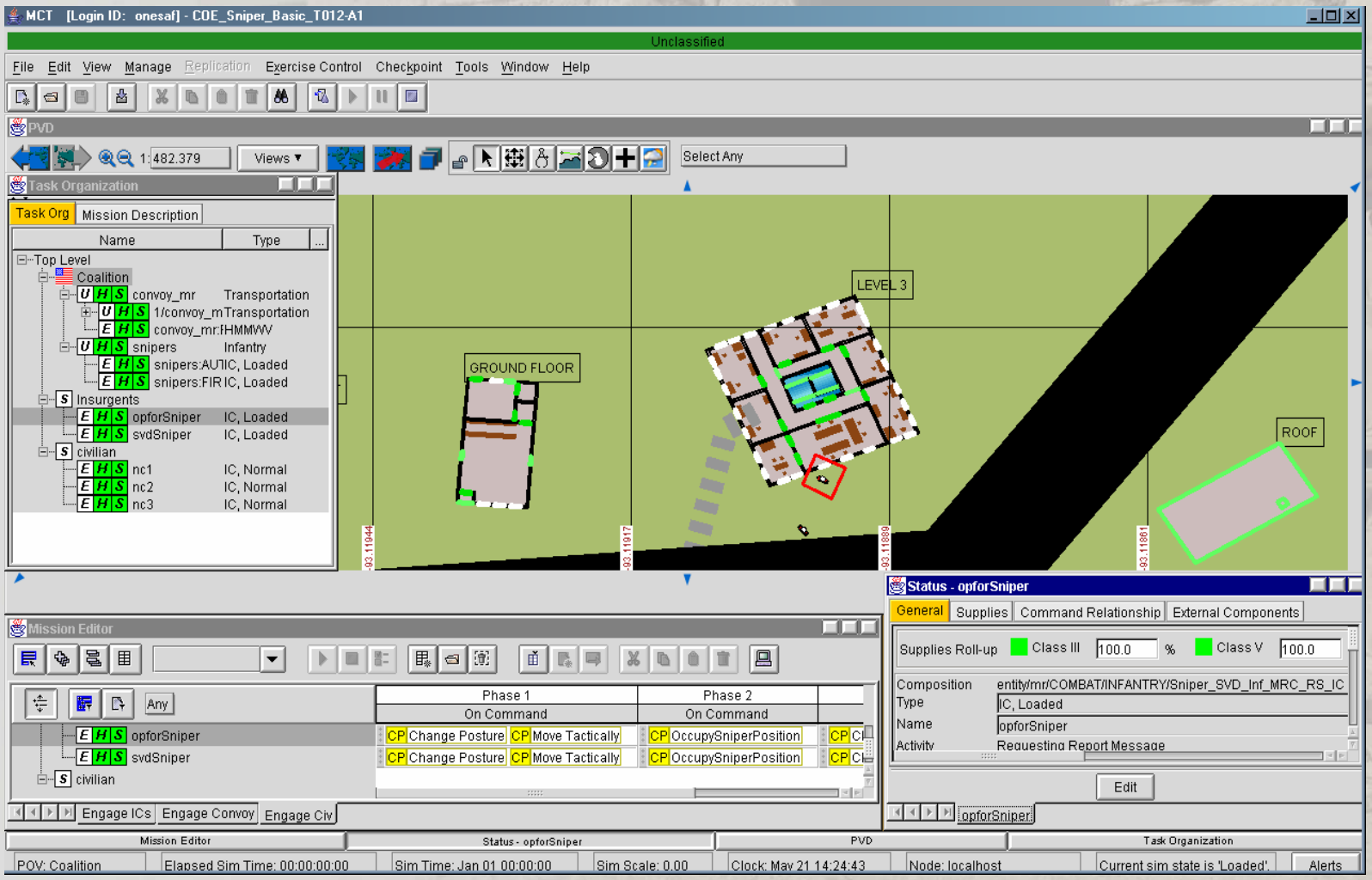
	Installed in Each Blade
Intel Xeon Processor	2 quad-core E5450 (Harpertown) 8 cores @ 3.0 GHz
L2 Cache	2 X 2 X 6144 KiB
Memory	8 GB, 667 MHz, DDR2
Front Side Bus	1333 MT/s
internal disk	73 GB, 10K RPM SAS
Power	80 W
Ethernet	1 Gb Ethernet
InfiniBand	Single-port 4X DDR IB PCI-E HCA (Cisco)
Linux OS	Red Hat V5
Compilers	GCC Intel Fortran V10.1 Intel C++ V10.1 PGI V7

Orlando HPC: 24 Blades, 192 cores

OneSAF HPC Research Problems

- Porting
  - Host OneSAF Sim Core and MCT on HPC
- Computational Distribution
  - Efficiency of thread distribution in HPC environment
  - Function of JVM, Node/Process/Core availability
- MCT Interface
  - Internal to HPC with VNC video exported
  - External with efficient network comms
- Light Interface
  - Operate via light GUI interface outside of HPC (e.g. Aries game interface, Browser interface)
- Infiniband Network
  - Multiple instances using Infiniband vs. Ethernet to communicate

MANAGEMENT AND CONTROL TOOL



Conclusion

- Reduce operational costs for hardware, shipping, set-up time, travel, staffing
- Increase soldier/unit access to training systems
- Increase exercise reliability and availability
- Increase model fidelity
- Increase model synchronization