

2.2 Leveraging High Performance Computing to meet today's simulation density needs



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Leveraging High Performance Computing to meet today's simulation density needs

Sebastien Loze

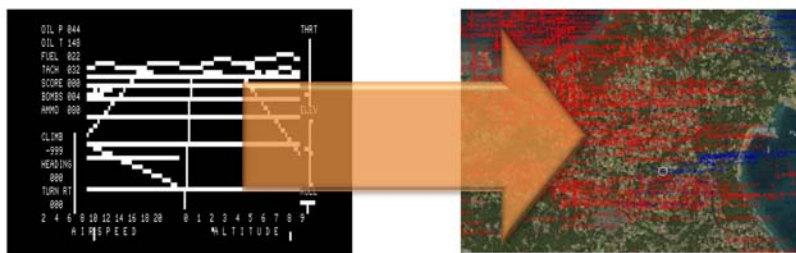
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October 15, 2010



Simulation Training History

- One to many to plenty
- More intelligent scenarios
- More accurate calculations based on more complex algorithms



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Context / Challenge

- The evolution of warfare is introducing the need for more dense training or analysis scenarios
- The density of simulation applications is growing due to the following parameters :
 - Complexity of simulated models
 - Number of entities
 - Simulation refresh rate
- Generic software applications which do not leverage all the capabilities of today's hardware are often a bottleneck

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Cloud Computing Approach

- To run dense simulations, users will generally split a scenario between multiple computers leveraging :
 - Cloud computing
 - distributed exercises classic network tricks
 - Communication protocol specific services
- This approach constrains performance and introduces additional risks and costs such as:
 - Larger hardware pool, higher maintenance/ support costs
 - Large quantity of licenses to distribute the simulation
 - Data not correlated across the environment
 - Non repeatable nor reliable results from the simulation

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COTS Simulation tool

- Powerful, open and flexible simulation software
- Already a proven and adopted solution to simulate thousands of complex entities at real-time rates with no frame overruns, leveraging distributed exercise techniques

"STAGE can handle on the order of 10,000 entities.
This is the going requirement to support VF-size events."

Major d'Artagnan R. de Anda
Chief of the Distributed Warfare Center

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INNOVATIVE APPROACH

- Based on parallel computing and high performance software optimization
- A solution to build, manage and execute simulation scenarios that are 10x more dense
- No change for traditional end users
- Removing the burden, costs and risks of the classic cloud computer approach

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STAGE High Density

- STAGE High Density :

STAGE 6.0

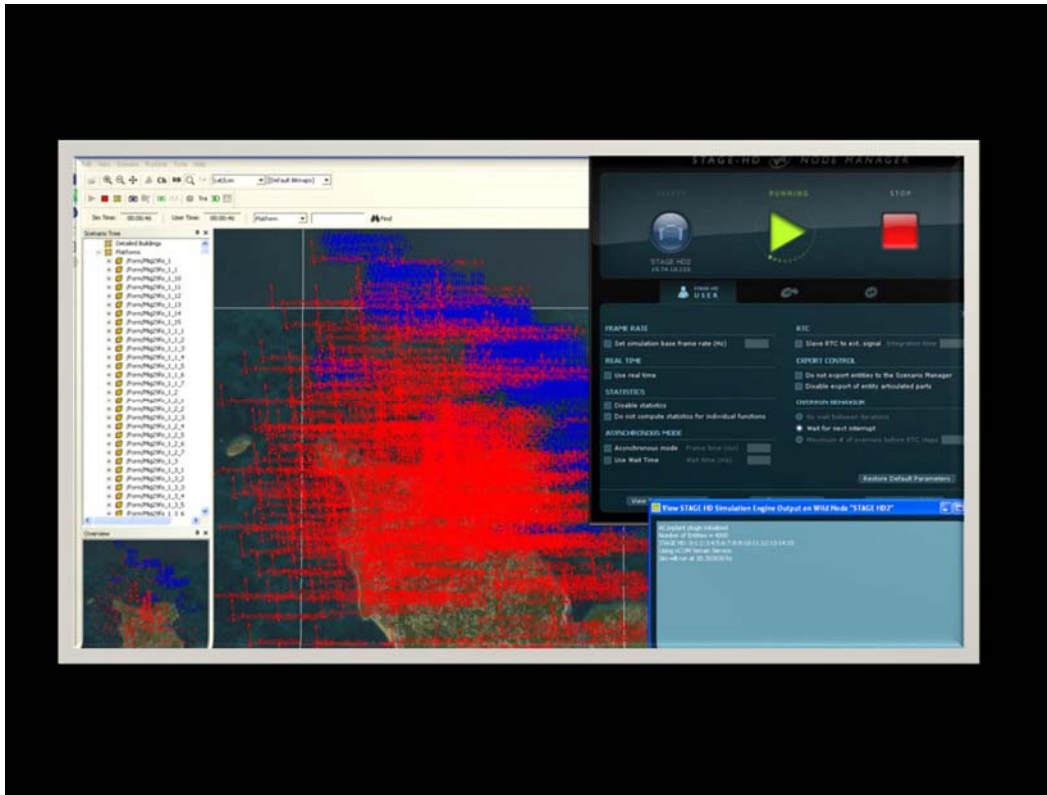
+

Dedicated software libraries and
targeted software optimizations

+

Customized version of STAGE targeted for
a high performance hardware device

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Performance goals

- Create and run scenarios that are 10x more dense
 - higher fidelity simulation models
 - larger-scale simulation exercises
 - Limited frame overrun with same simulation rate
 - More model updates in asynchronous mode



Flexibility

"Only a COTS-based software with its inherent flexibility, scalability and ease-of-use could allow us to deliver such a mature solution in such a short space of time (...) and STAGE met all of these requirements"
Eric Bouvier, Director of simulation, CS

- STAGE offers proven flexibility
- Create user modules(extensions) as before
- Leverage existing STAGE 6.0 user modules in STAGE High Density.

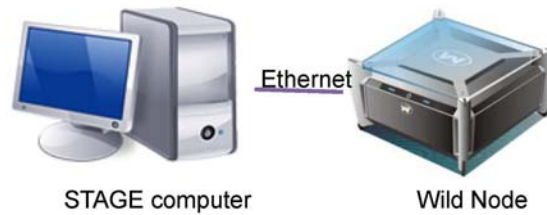
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Ease Of Use

- Connect the turnkey appliance
- Install the STAGE HD Node Manager on PC to configure and monitor execution
- Increased performance while working within the same STAGE environment
- No additional training costs required to use STAGE HD

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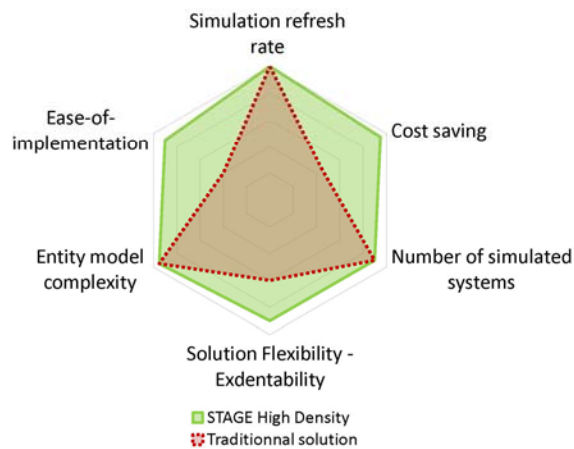
Software optimization



- 30 years expertise in simulation, parallel computing and computer architecture are leveraged in the STAGE SIM application running on the Wild Node.
- Custom libraries and targeted software optimizations provide acceleration beyond what could be obtained using pure hardware acceleration

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Benefits



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