



Acquisition Research Program:
Creating Synergy for Informed Change

An Open Strategy for the Acquisition of Models and Simulations

Rudolph P. Darken

Director, MOVES Institute

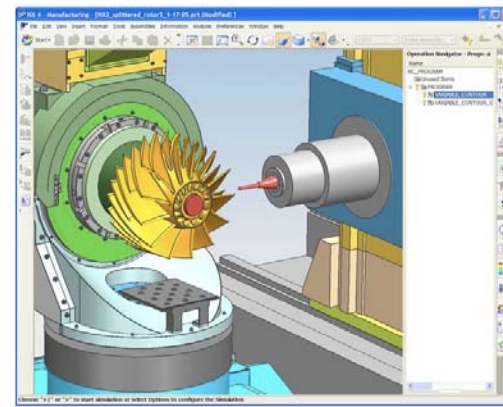
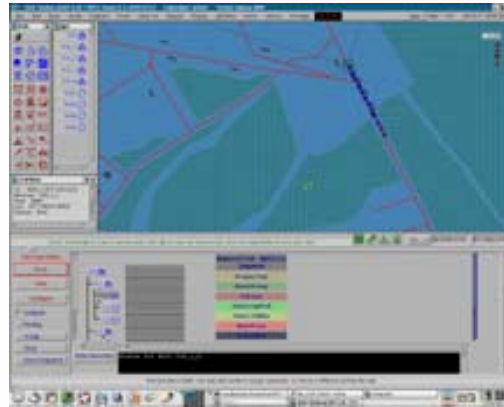
Focus

Not about the use of simulation for acquisition but rather the **acquisition of simulation** itself.

- Estimates of DoD M&S acquisition expenditures range from \$9B to \$15B annually.
- Almost exclusively a proprietary software industry segment.
- Why? Is this good for DoD? Can we do better?



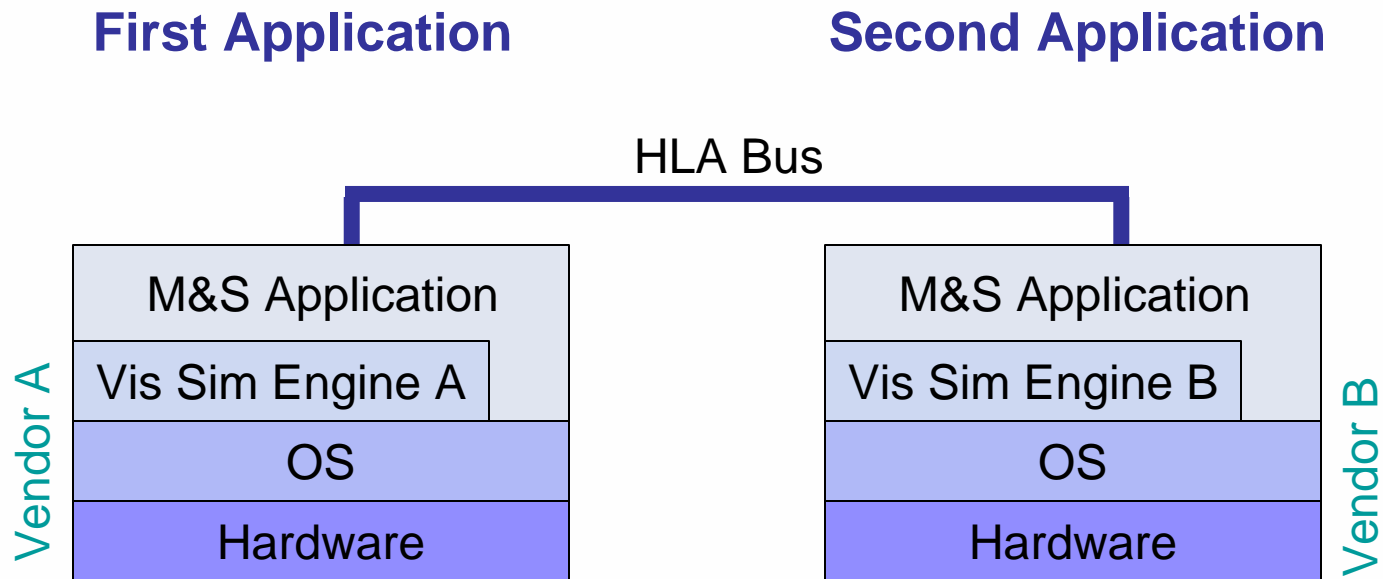
What do these have in common?



A lot actually ... rendering, devices, networking, etc.



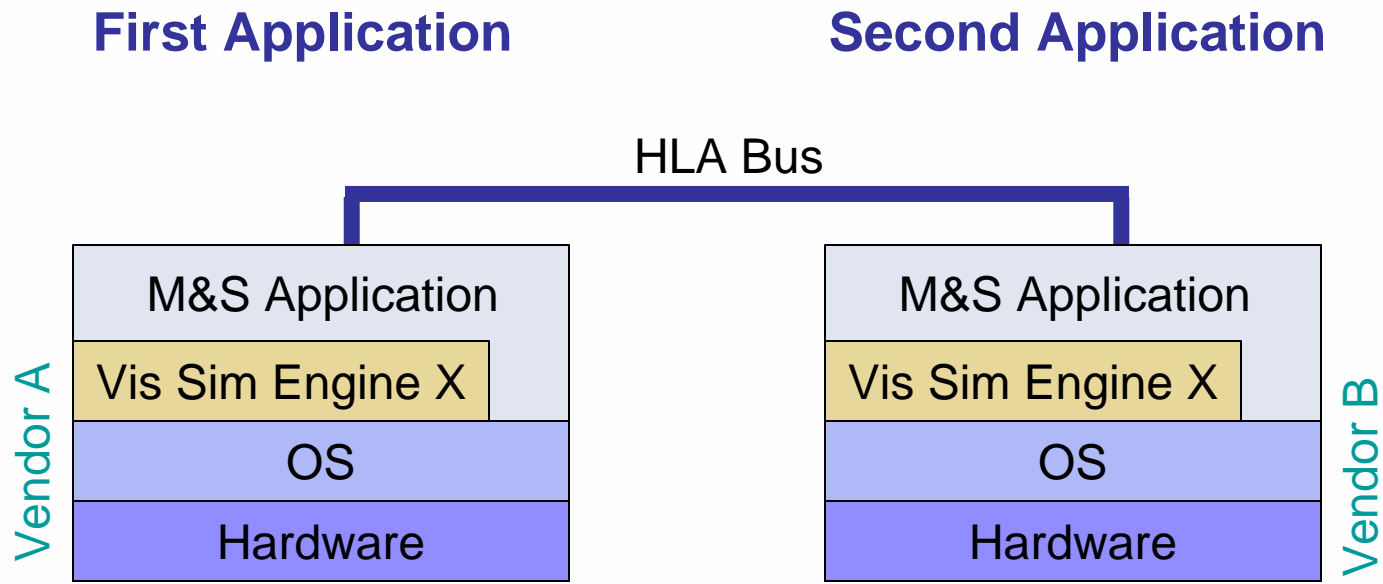
Current practice



Application Level Reusability = 0



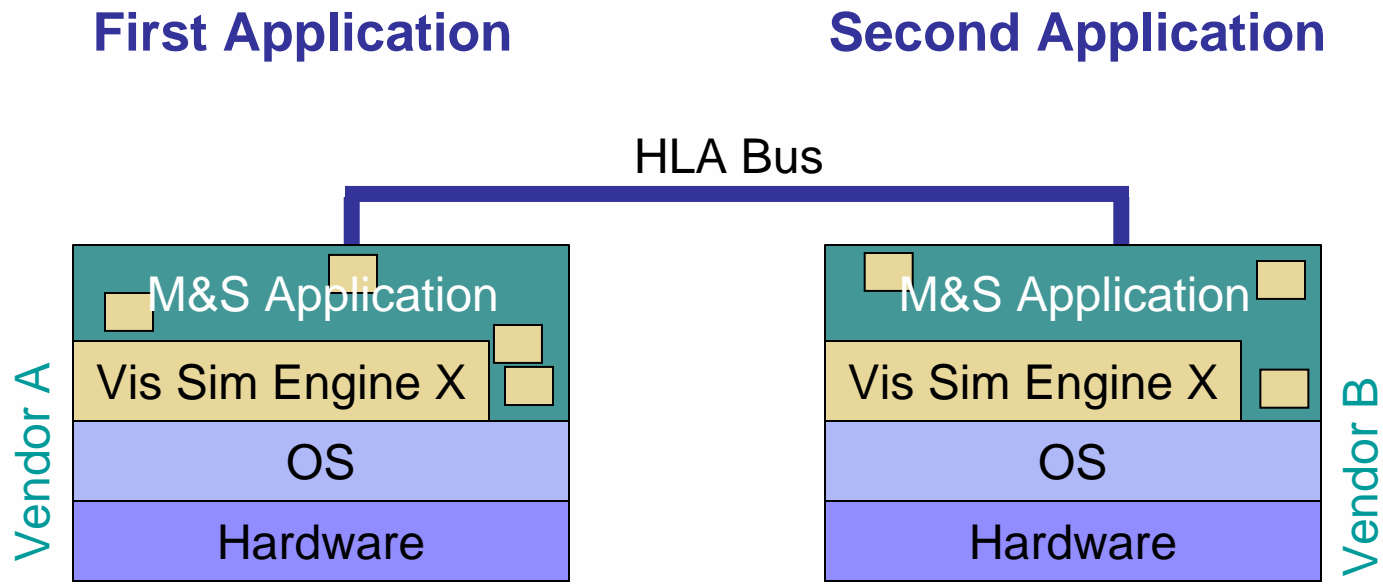
A (slightly) better way



■ Reused code



A (slightly) even better way



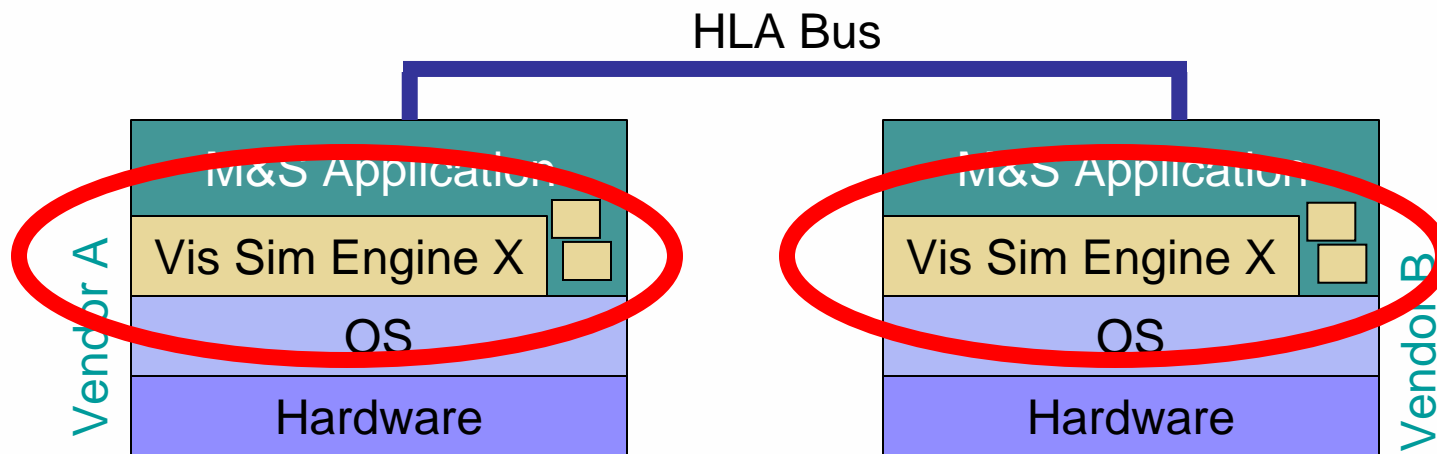
- Government owned source
- Reused code



Still not so great ...

First Application

Second Application

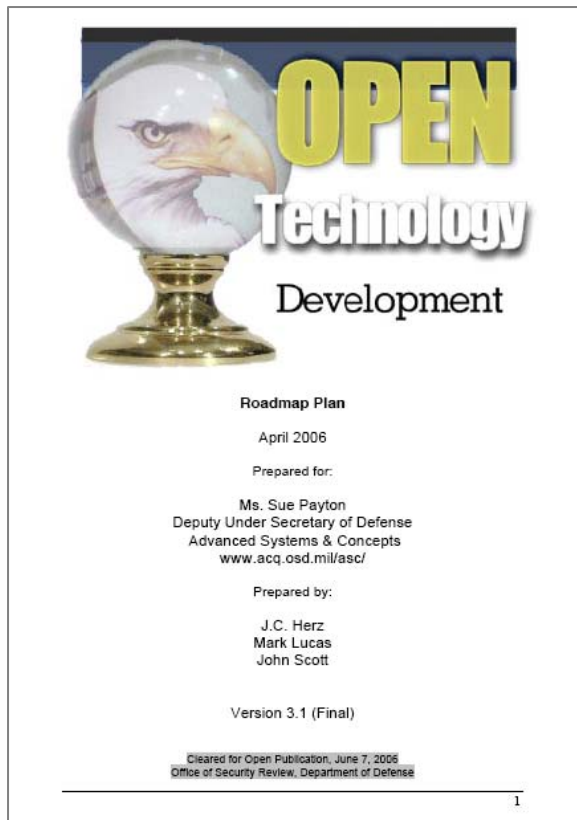


Recurring license fees
“Locked in” to Engine X

- Government owned source
- Reused code



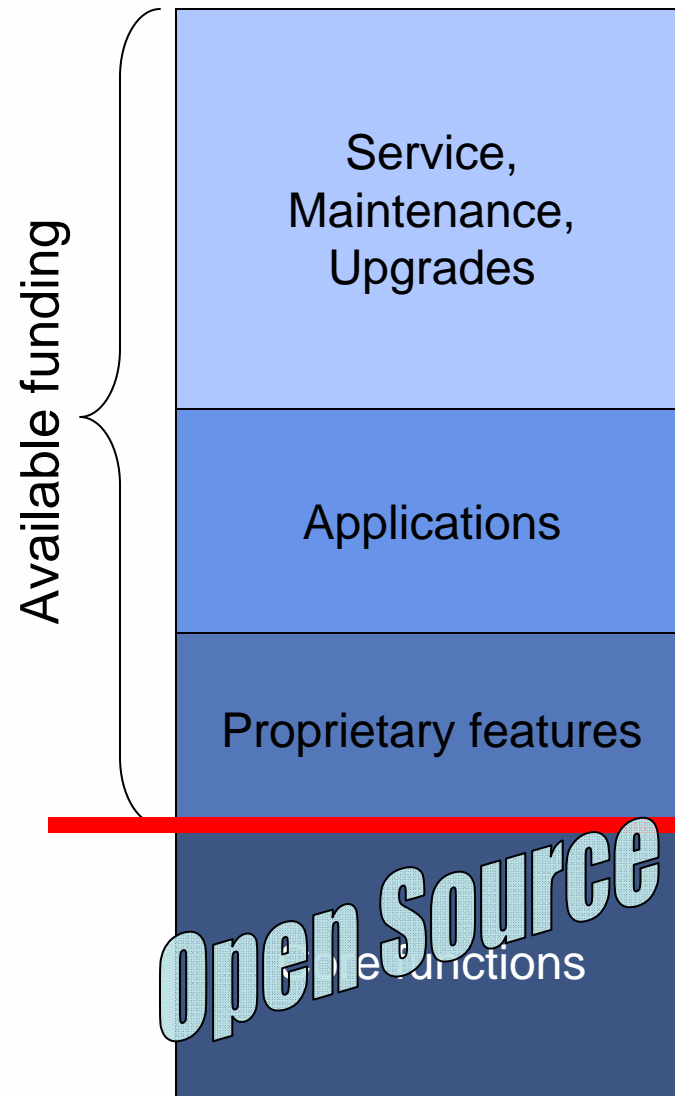
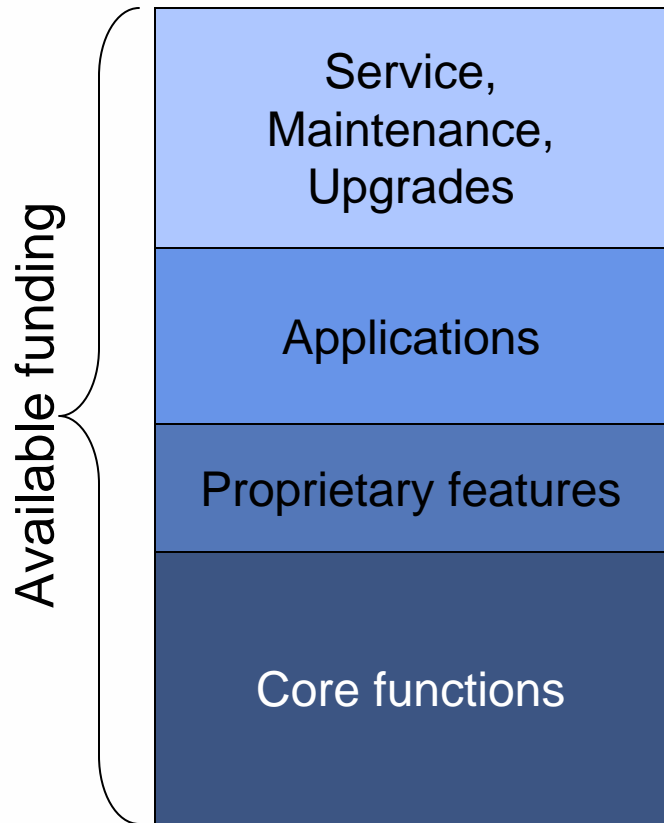
Is open source a candidate solution?



- Recommends the adoption (or full consideration) of OSS in DoD software acquisition.
- Still lacking in policy about **government contribution** to OSS.



Why OSS?



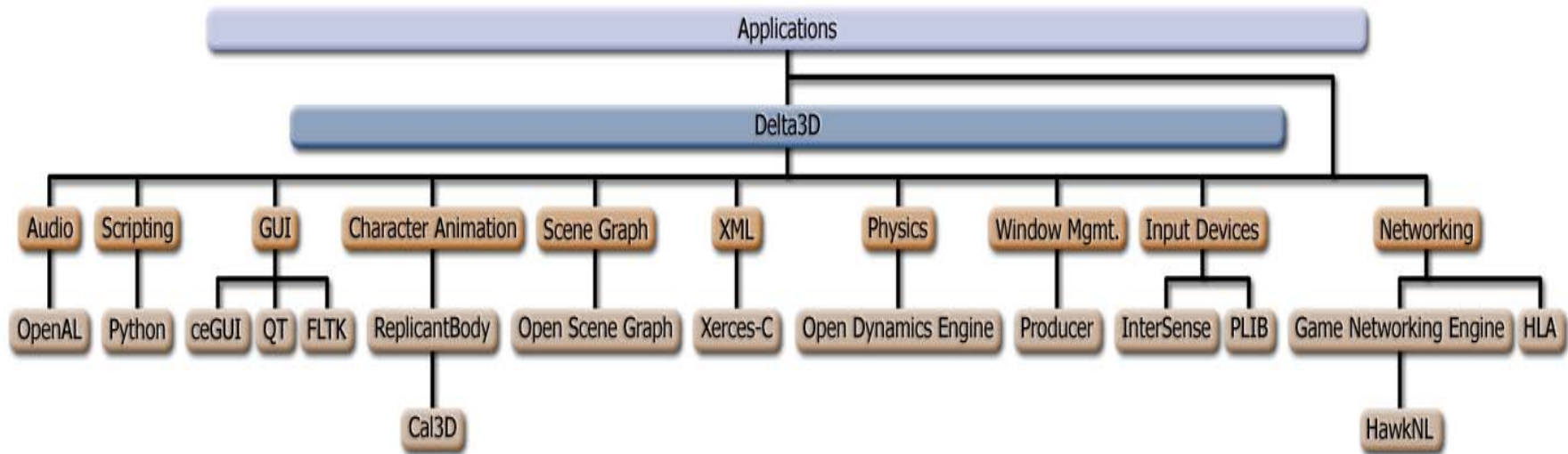
Four design tenets



1. Keep everything open to avoid lock-ins and increase flexibility
2. Make it multi-genre since we never know what app it's going to have to support next
3. Make it modular so we can swap anything out as technologies mature at different rates
4. Build a community (or leverage existing ones) so the military doesn't have to pay all the bills



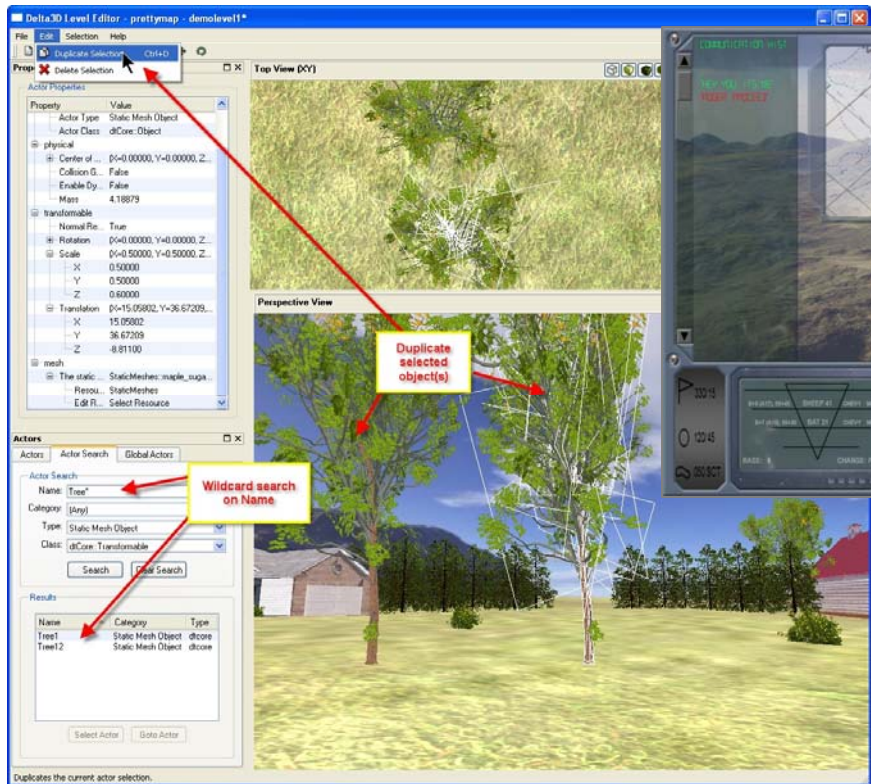
Detailed breakdown



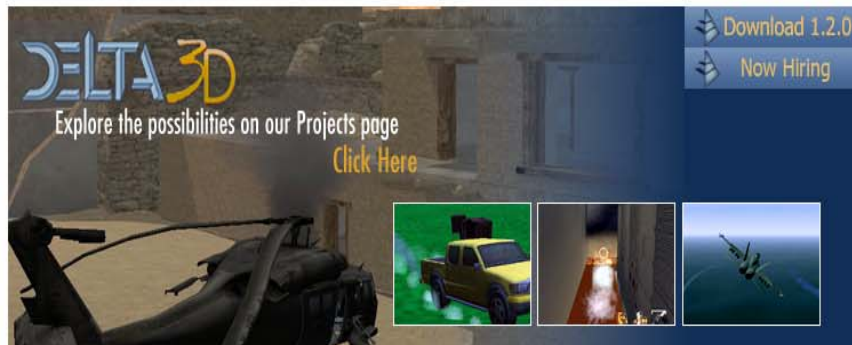
Over 90% of the source code was written by someone else, not paid for by the government.



Full development environment



Welcome to the Delta3D website!



DELTA3D
OPEN SOURCE GAMING & SIMULATION ENGINE
BACKED BY THE U.S. MILITARY

Explore the possibilities on our Projects page
[Click Here](#)

Download 1.2.0
Now Hiring

<http://www.delta3d.org>

About Delta3D

well-supported and ly-funded open source object, Delta3D is a l-function game engine appropriate for a wide variety of modeling & simulation applications. [MORE](#)

Features

Delta3D's modular design integrates other well-known Open Source projects such as [Open Scene Graph\(OSG\)](#), [Open Dynamics Engine\(ODE\)](#), [Character Animation Library\(CAL3D\)](#), and [OpenAL](#), integrating them in an easy-to-use API. [MORE](#)

Get Started

Why not start working with the open source Delta3D engine today?

Download Delta3D and go through the [Tutorials](#) now. 

User Login

Username:
Password:

Don't have an account yet? Sign up as a [New User](#).

Forgot your password? [Recover it](#)

News

Headline	Intro Text	Date
Nightly snapshot is down for maintenance.	SourceForge has changed the CVS processes and in doing so, made our scripts inoperable. So until we... More ...	➔ 05/24/06
Knowledge Base: looking for user-developed documents	The Knowledge Base is a place to share information on the development and usage of Delta3D. More ...	➔ 05/23/06
Welcome Chris Clark!	Delta3D has hired game designer Chris Clark..... More ...	➔ 05/18/06
Building Something Cool yet Serious?	If you're building a "serious game" with Delta3D, you can win cash and prizes for it!! Enter it in More ...	➔ 04/20/06
Jobs at Delta3D	Delta3D is adding a programmer/software engineer to our team. Maybe it's you!!... More ...	➔ 03/08/06

Latest Forum Posts

Forum	Topic	Date Posted
Questions and Answers	Using geotiff on terrain	➔ 06/01/06 07:24
Questions and Answers	STAGE questions	➔ 06/01/06 02:58
Questions and Answers	3DS or OSG model control with Delta3D (textures and parts of model)	➔ 06/01/06 01:55
Questions and Answers	problem with AddDrawable and extended classes	➔ 05/31/06 18:02
Developers Corner	Object Degrees of Freedom	➔ 05/31/06 16:41

Did we meet our goals?

... almost, but not quite.



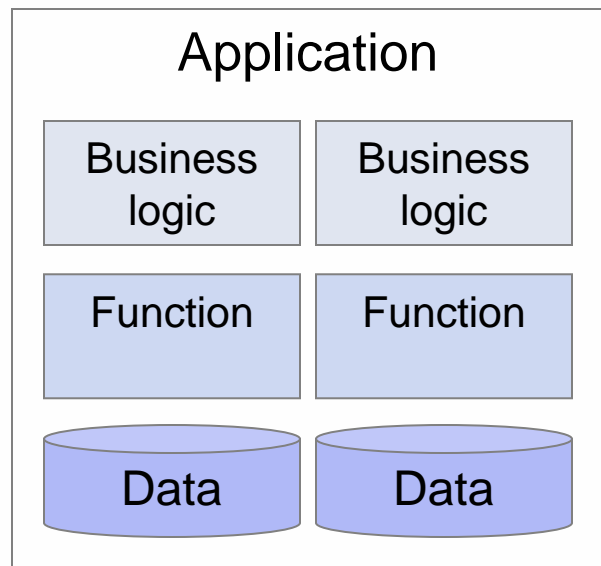
Four design tenets



- ✓ Keep everything open to avoid lock-ins and increase flexibility
- ✓ Make it multi-genre since we never know what app it's going to have to support next
- ? Make it modular so we can **swap anything out** as technologies mature at different rates
- ✓ Build a community (or leverage existing ones) so the military doesn't have to pay all the bills

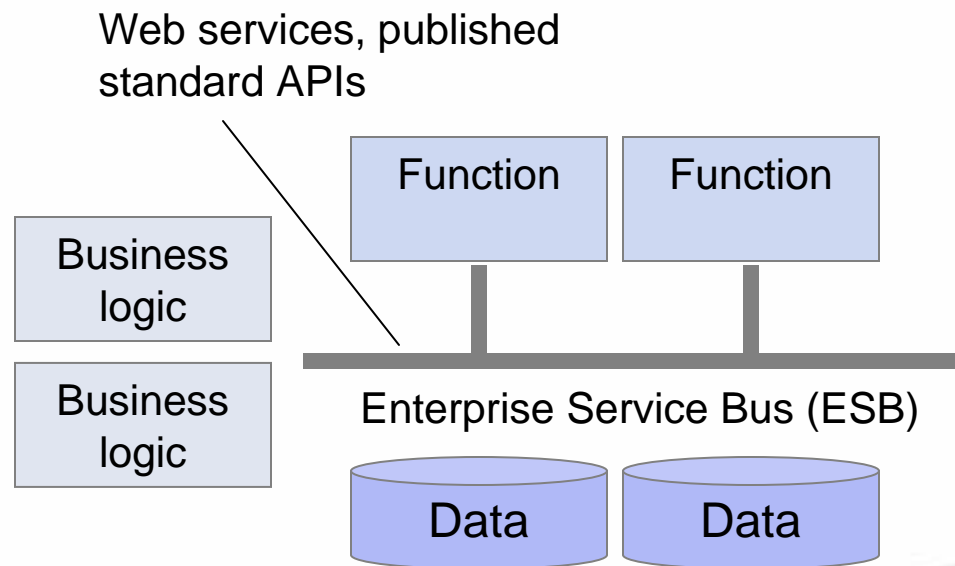


An even better way



From monolithic ...

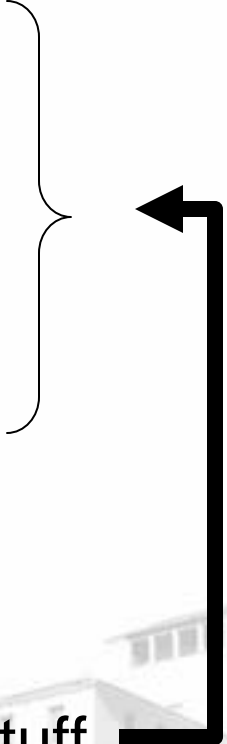
Service Oriented Architecture



... to distributed.

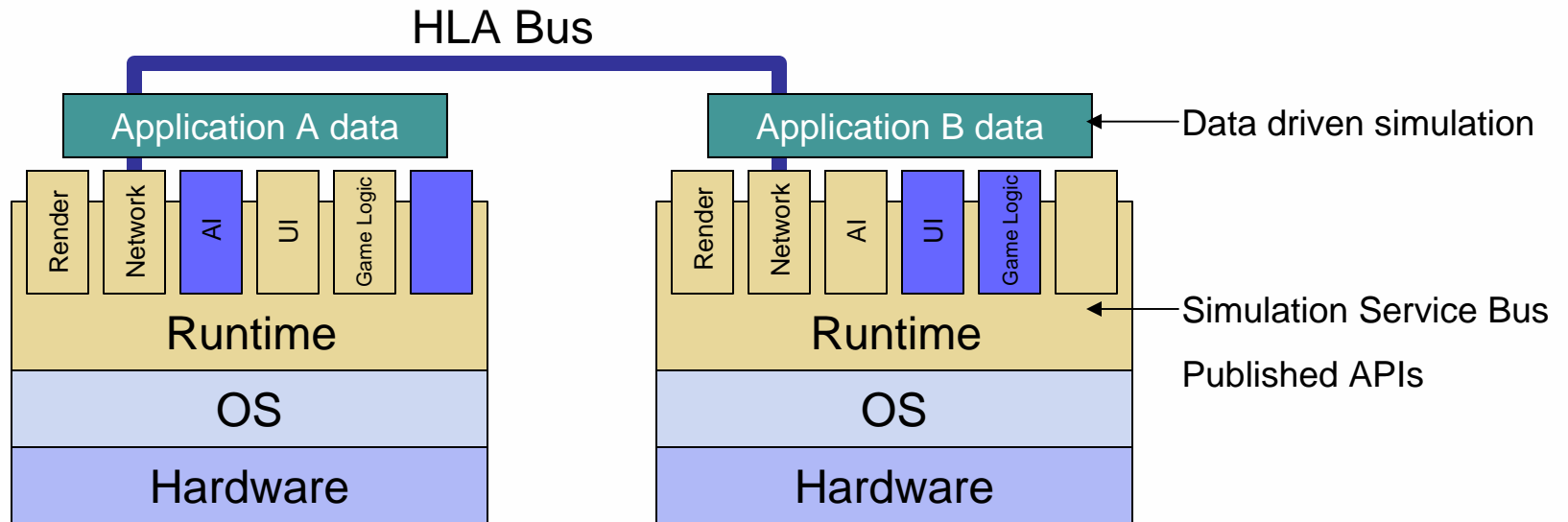


Why SOA?

- Way more flexible
 - Faster implementation (once infrastructure is in place)
 - Maximize reuse
 - Create a **MARKET** for your business
- 
- Will never work (in its literal form) for real-time simulation
 - Web services are too slow ... but I want all this stuff



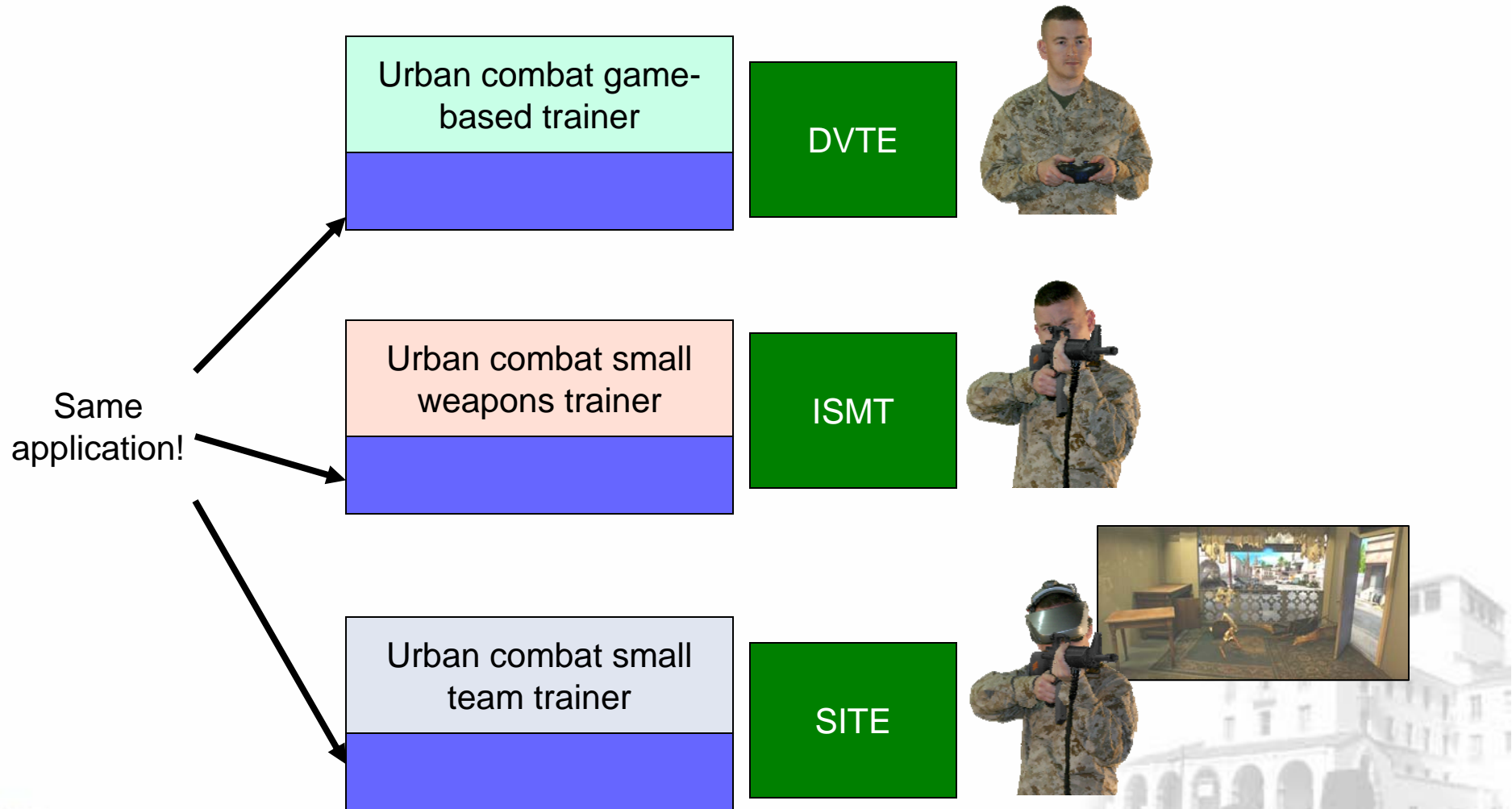
A “real time” SOA for simulation



- Government owned
- Open source
- Proprietary



A test case for USMC infantry training



Take aways ...

- Open source has a place in Defense Modeling and Simulation
- Open source encourages vendor innovation by concentrating effort on what's new
- DoD **must architect simulation frameworks** to create a marketplace for our business
- This helps build the commercial defense simulation industry
- Reusability is key
- We want what an SOA offers ... but we need it in real time.



Thank you for your attention

Rudy Darken
Director, MOVES Institute
Naval Postgraduate School
darken@nps.edu
831-656-7588

