

UMassAmherst

ViSE: Virtualized Sensing Environment

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GENI Spiral 2: Cluster D/Orca



ViSE Testbed Overview

- Experiment with Non-traditional Sensors
 - **Four nodes** - outdoor deployment, weather-proof
 - **Network** - long-distance 802.11b + cellular backplane + Internet2
 - **Acquiring Sensors** - Radar and PTZ Camera
 - **Traditional Sensors** - solar panels, wind turbine, power meter



More Pictures



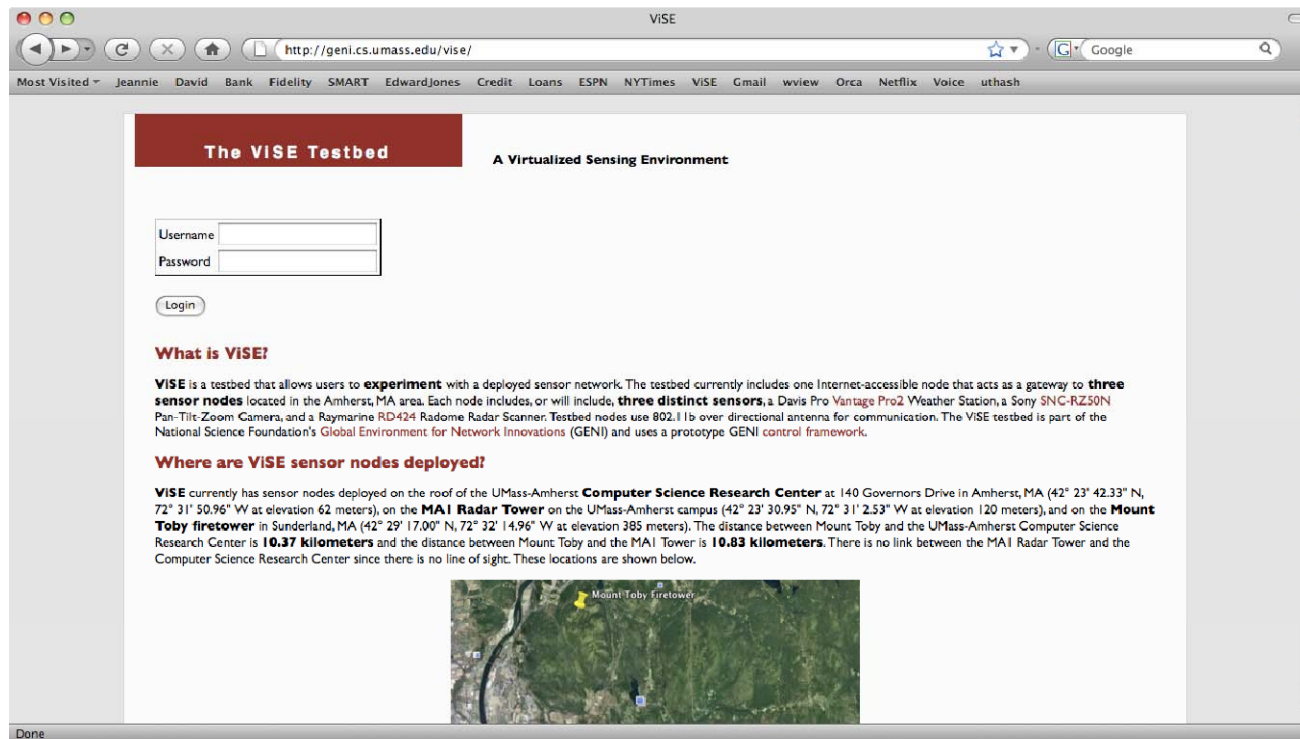
Sensing and Actuators

- ac-tu-a-tor n. A mechanism that causes a device to be turned on or off, adjusted or moved.
 - Nearly every device has actuator(s)
 - E.g., CPUs, NICs, disks, **sensors**
 - Essence of “deeply programmable”
- Actuation key for sensors:
 - Determines data type, quality, quantity, etc.
 - E.g., Sampling rate, Steering, Power
 - Indirectly affects resource usage
 - E.g., energy, bandwidth, storage, processing



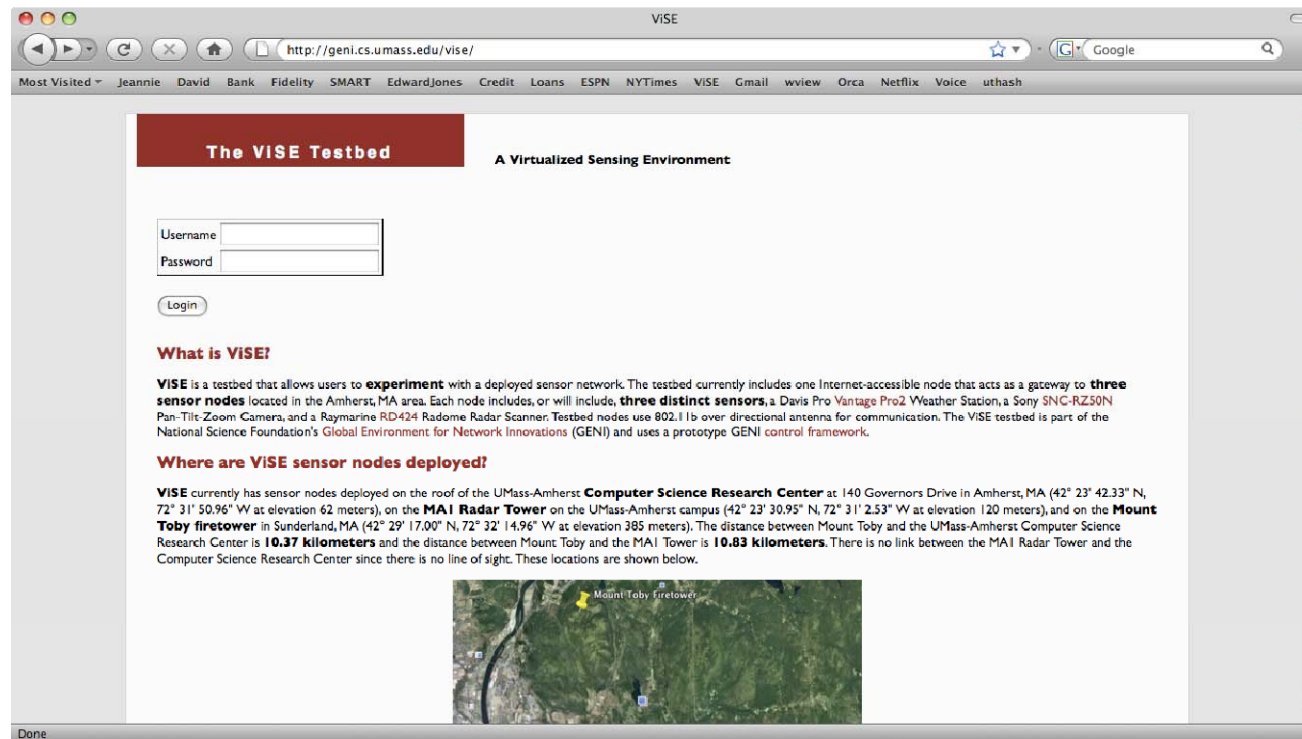
ViSE Screenshot

- Currently portal-based access
 - Give users username/password to login
 - Associate user with a public key
 - Request leases to ViSE resources using Orca
 - Documentation for interfacing with sensors



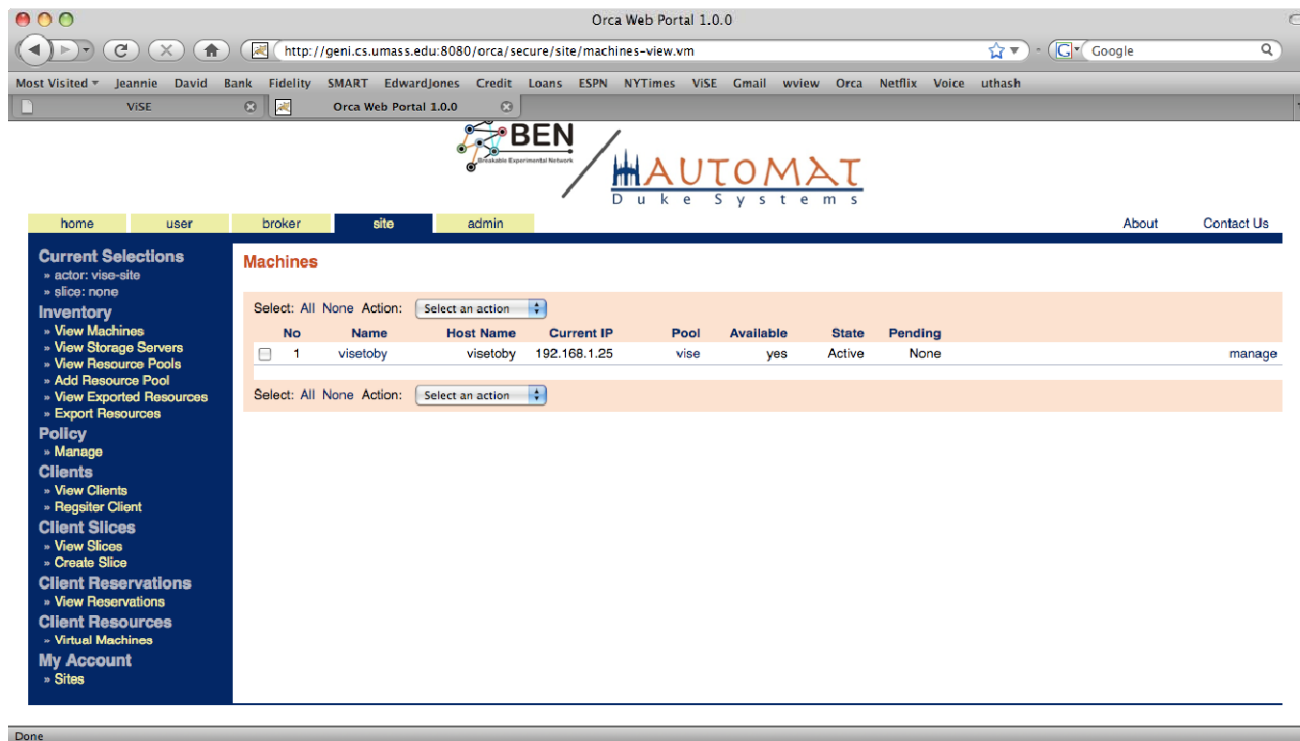
ViSE Screenshot

- Portal is a simple extension of Orca Slice Controller
 - Sends resource requests to RENCI Clearinghouse for approval
 - Administrator uses Orca console to monitor testbed
 - Goal of the portal is to keep everything simple for users
 - Simple == Very few degrees of freedom



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The screenshot shows the Orca Web Portal 1.0.0 interface. The browser address bar displays the URL <http://geni.cs.umass.edu:8080/orca/secure/site/machines-view.vm>. The page features a navigation menu with tabs for 'home', 'user', 'broker', 'site', and 'admin'. The 'site' tab is currently selected. On the left side, there is a sidebar menu with categories such as 'Current Selections', 'Inventory', 'Policy', 'Clients', 'Client Slices', 'Client Reservations', 'Client Resources', and 'My Account'. The main content area is titled 'Machines' and contains a table with the following data:

No	Name	Host Name	Current IP	Pool	Available	State	Pending	
1	visetoby	visetoby	192.168.1.25	visc	yes	Active	None	manage



Example Experiments

- Bus Tracking
 - Detect DOME buses passing and track with the PTZ camera
- Long-distance Multicast
 - Topology exposes a large hidden terminal
- Other
 - Affect of weather on long-distance wireless
 - Radar data feature detection algorithms
 - Energy-centric experiments based on wind turbine, solar panel, and power meter data



Spiral 2

- Add more nodes
 - Pelham firetower, campus building
- Integrate Sensor Virtualization
 - Radar + camera
- Leverage Internet2 Connection
 - To what end?
- Increase number of users/experiments
 - Continue cross-substrate experiment with DOME



Questions?

