



Dimorphic Computing: Sustainable Performance Through Thick and Thin

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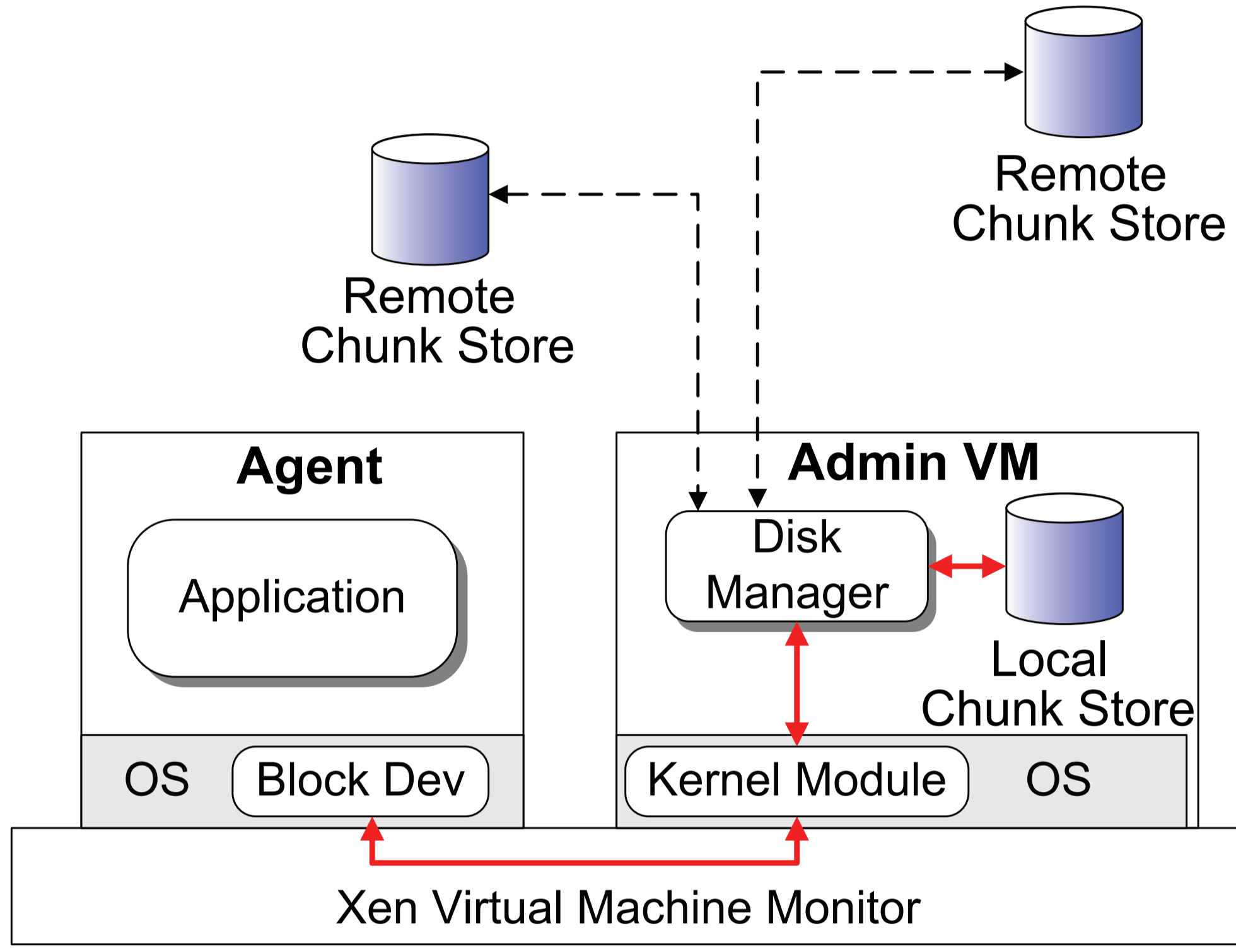
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Overview

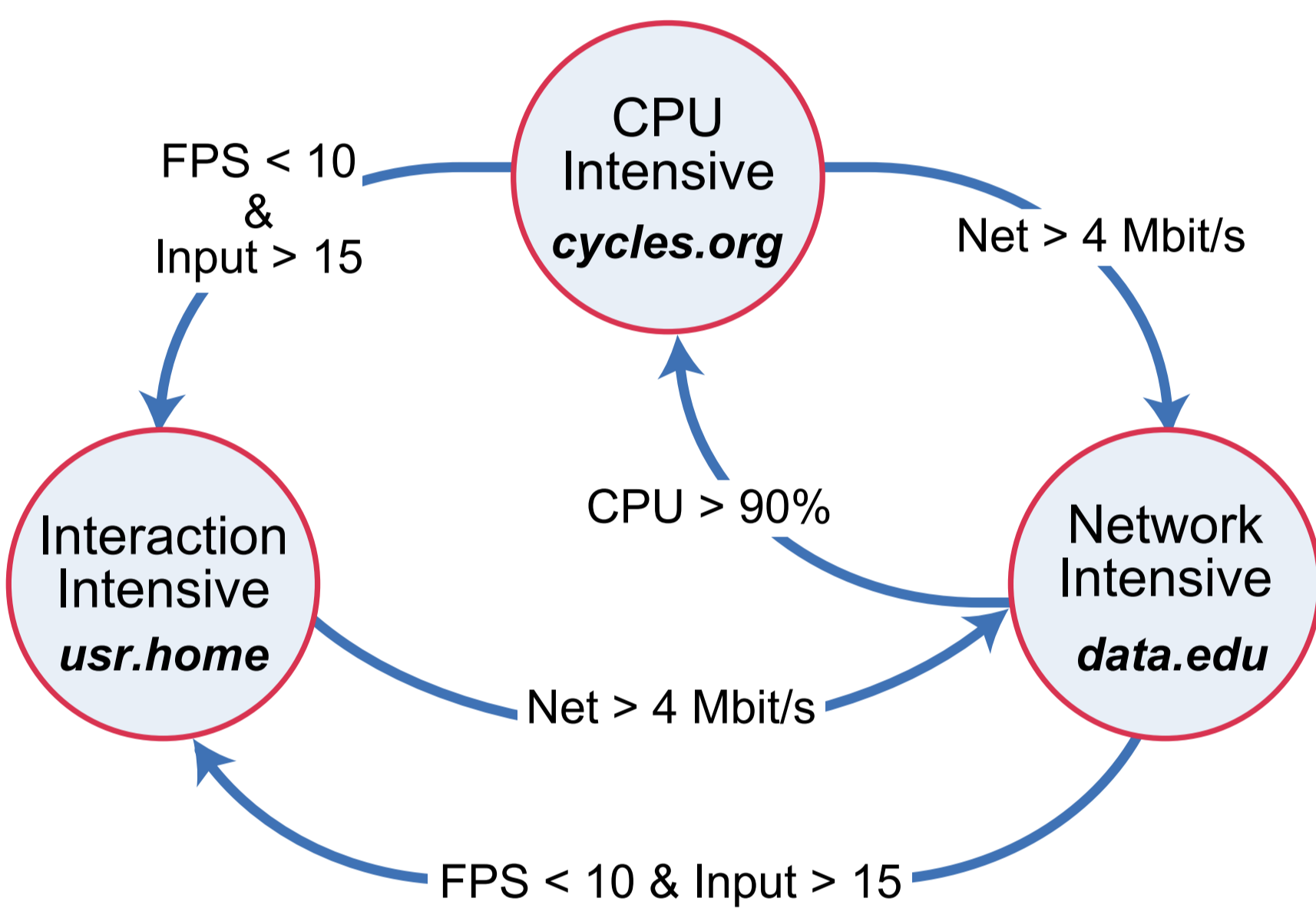
- New model of computing
- Transparently switches between thick and thin client modes of execution
- For apps that alternate between resource-intensive processing and intense user interaction
- Thin client mode allows efficient use of remote resources such as compute servers or large datasets.
- Thick client mode enables crisp interactive performance by eliminating the effects of Internet latency and jitter
- No application or OS modifications required
- No programming language restriction

Implementation

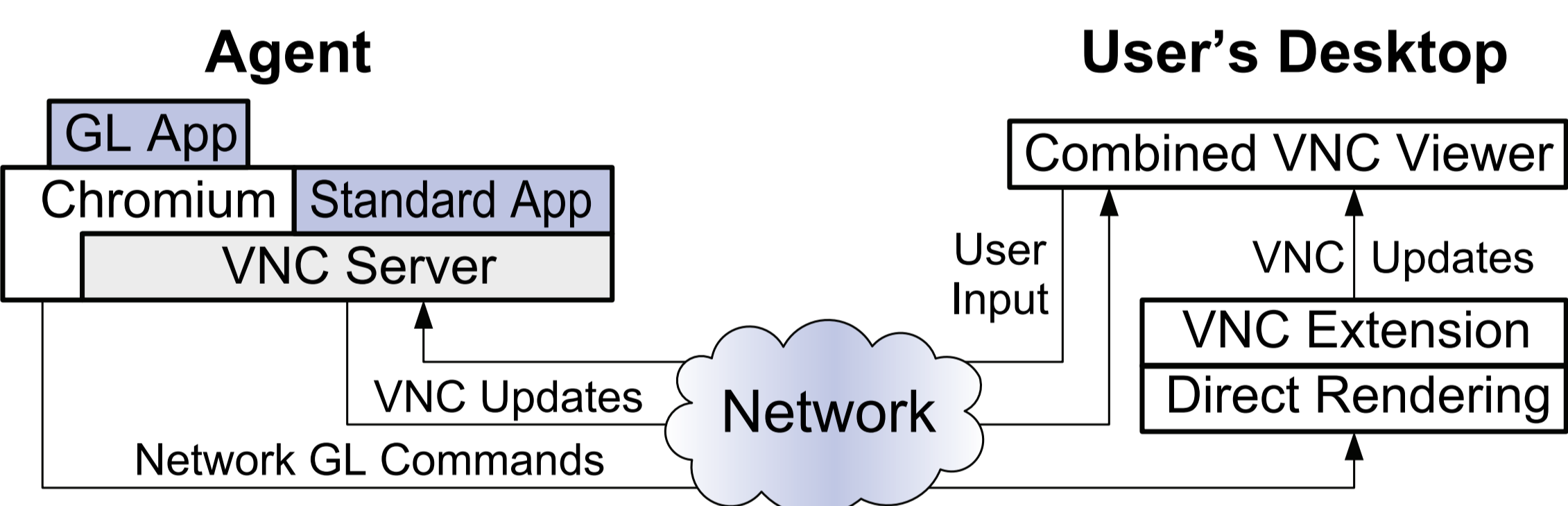
- Uses the Xen 3.0 Virtual Machine Monitor
- Developed WanDisk, a distributed storage system for virtual disk relocation



- Sensor-driven Migration Manager
 - CPU, Network, and Interactivity sensors
 - Transition based on migration profiles
 - Migration profiles define finite state machines

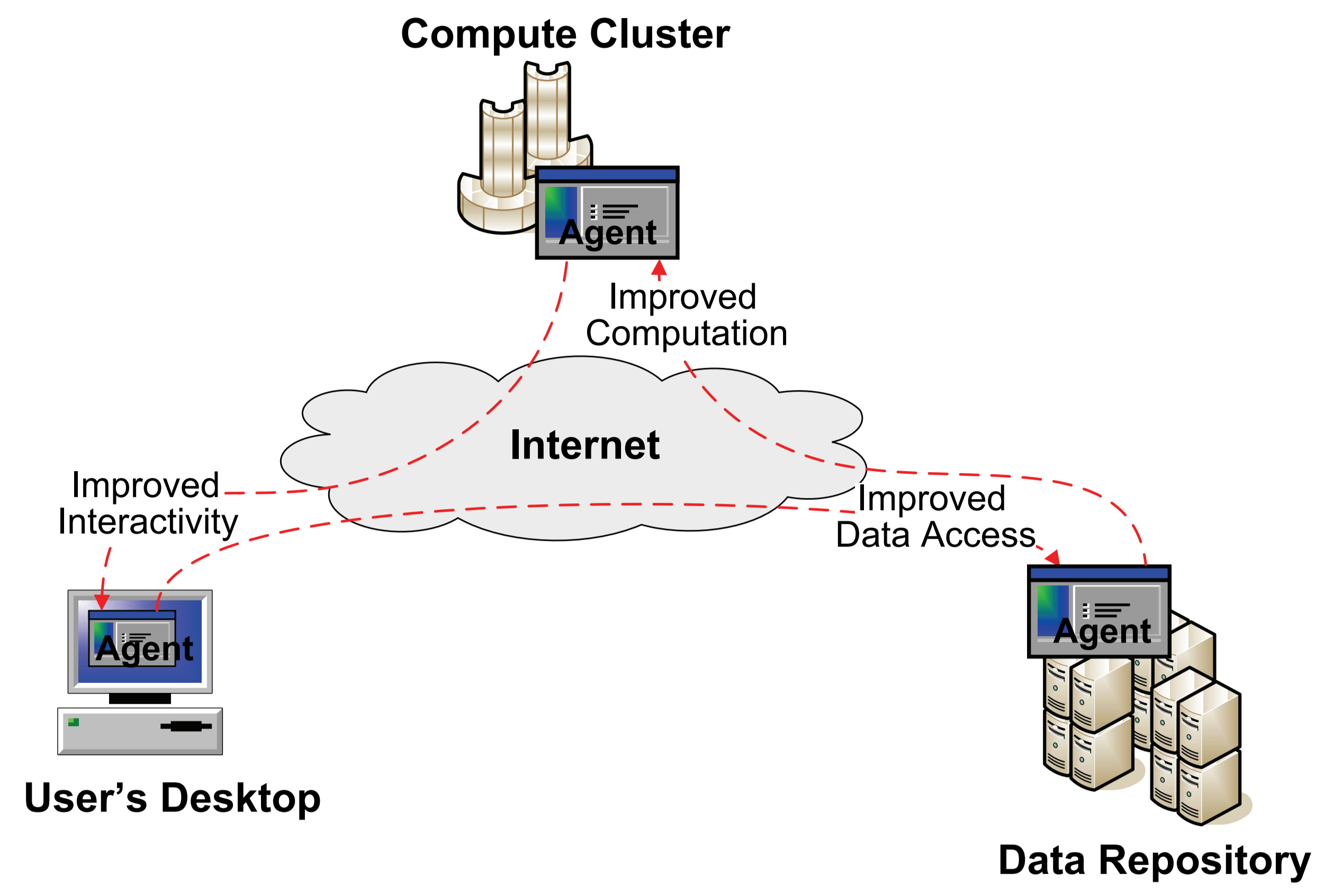


- Unified Graphical Interface
 - Seamless across state changes
 - Based on an enhanced Thin Client
 - Allows for use of hardware-accelerated rendering



AgentSR

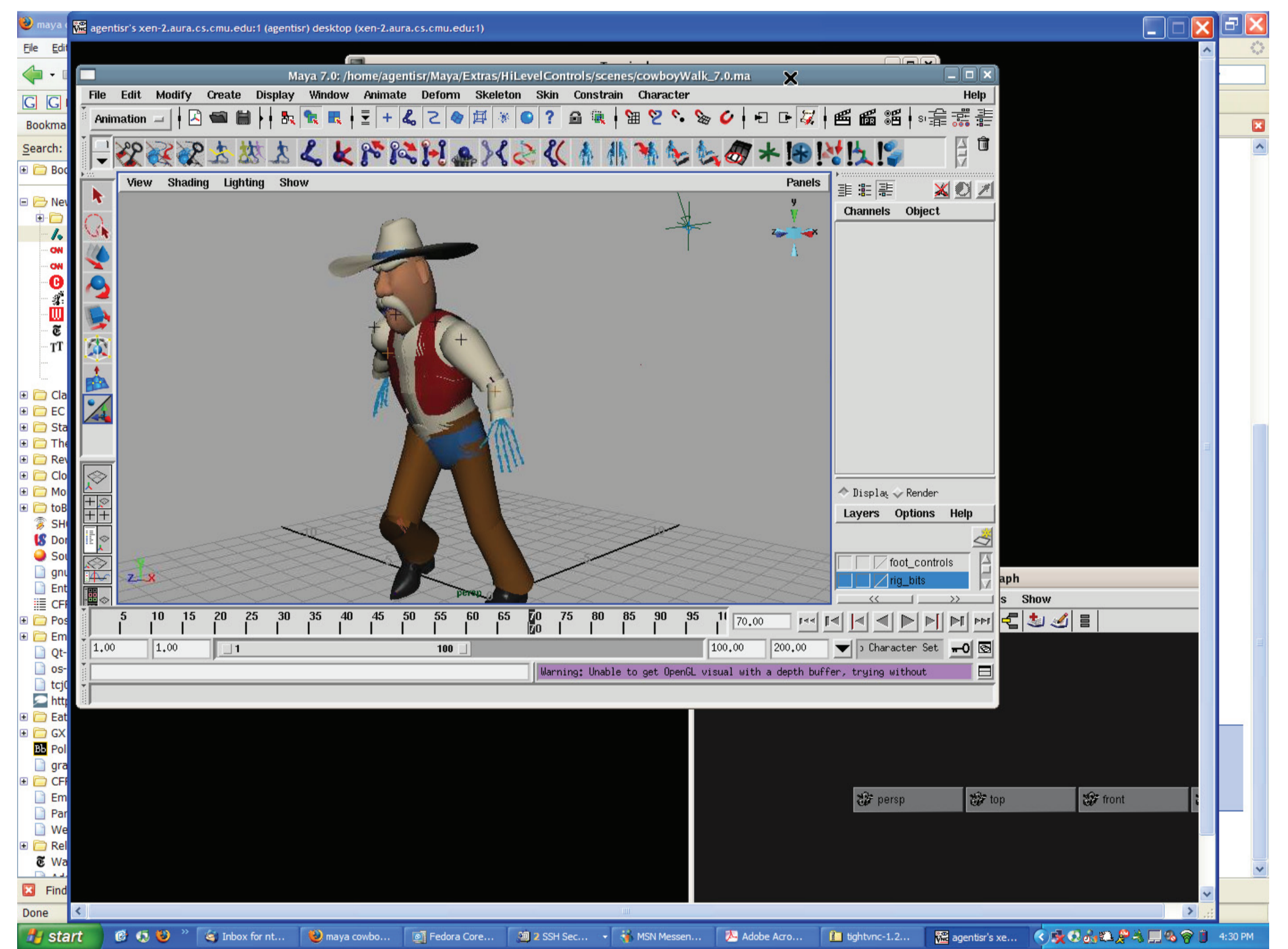
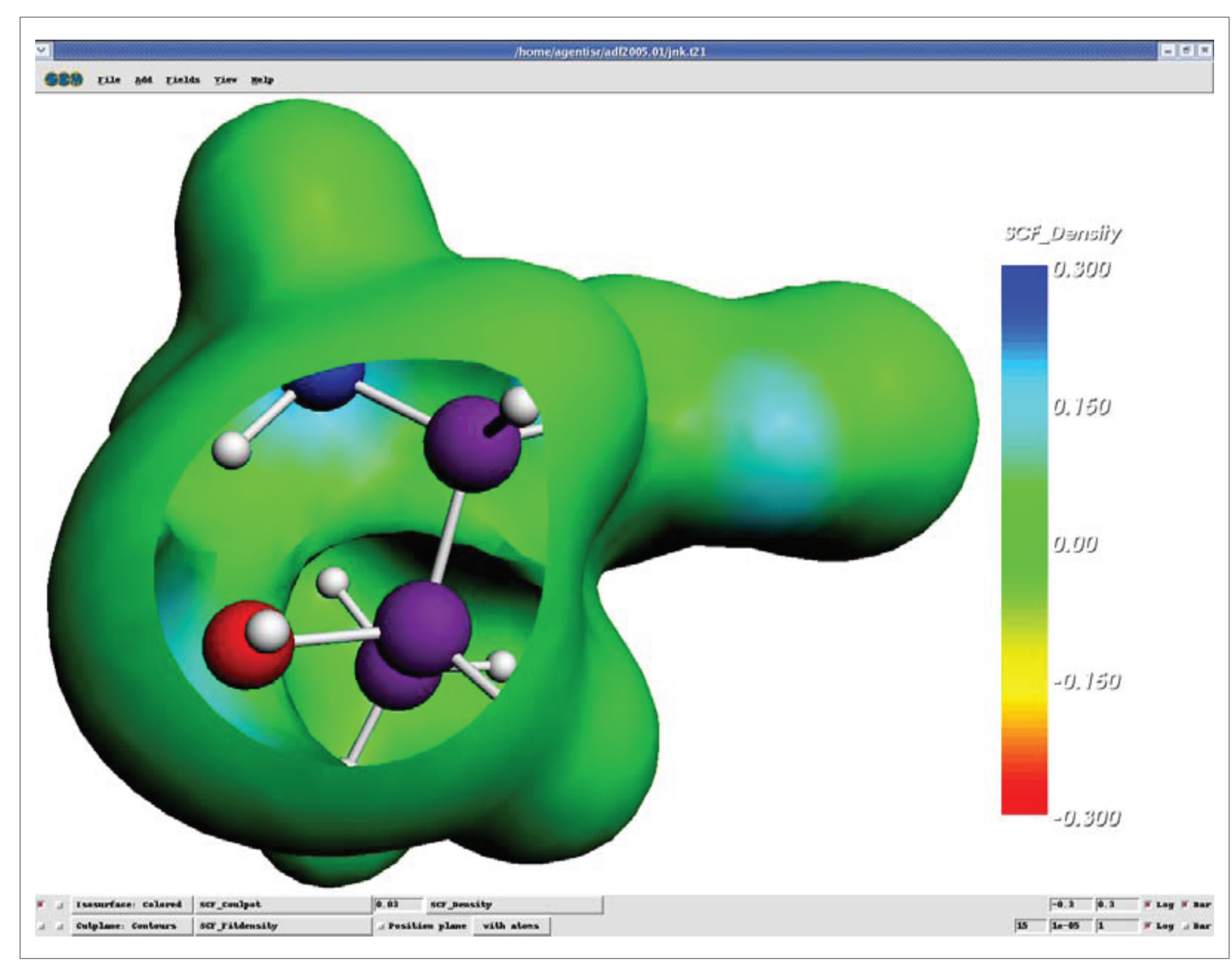
- Virtual Machine-based dimorphic computing prototype
- Uses an Agent abstraction
 - Transparently and seamlessly relocates to achieve optimal performance



- Combines the strength of thick and thin clients
- Transitions are completely automated and transparent

Applications

- Application Domains: CAD, Digital Animation, Scientific Computing, Video Editing, etc...

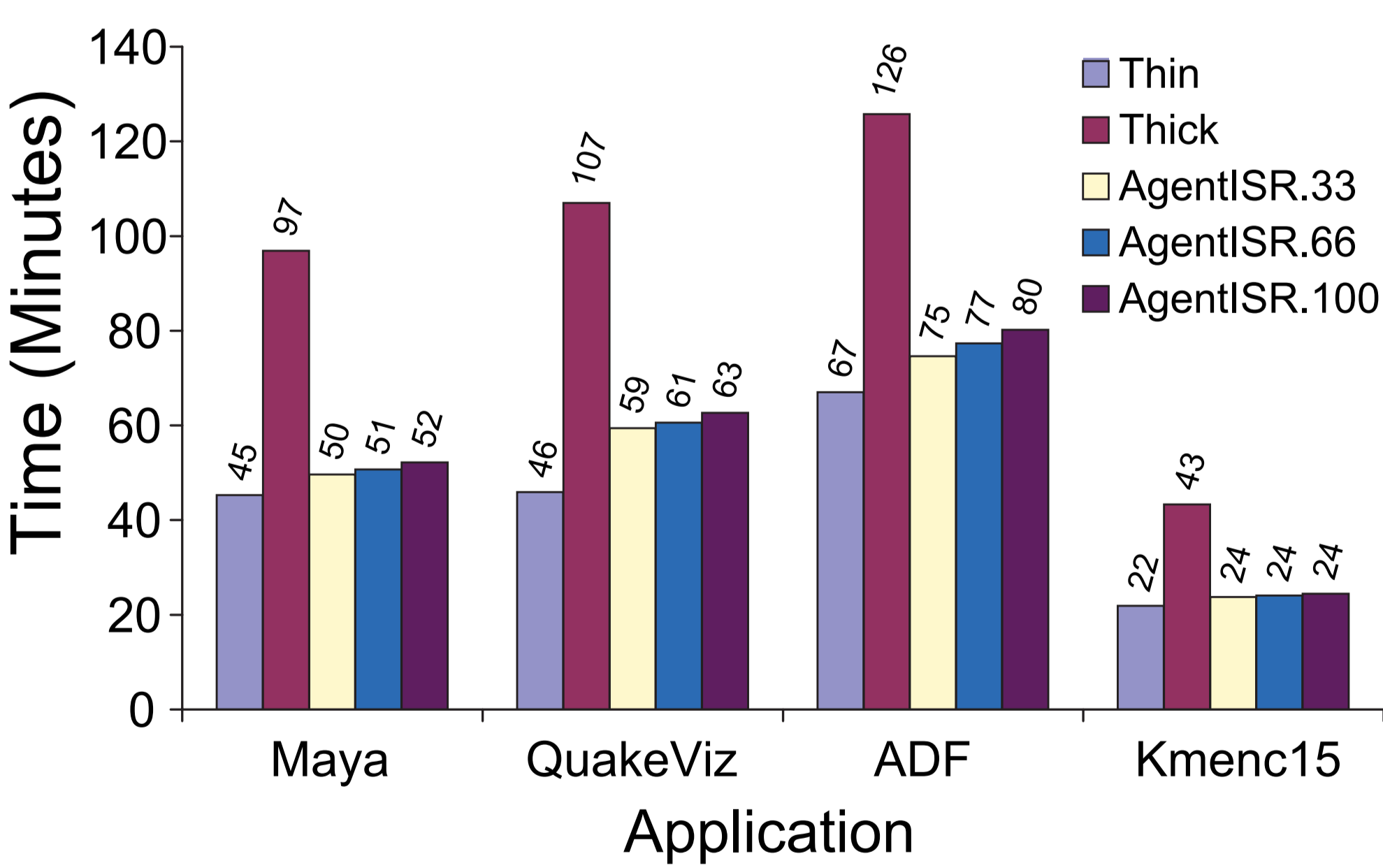


Evaluation

- Evaluated using 4 applications

Applications	Domain	Source
Maya	Digital Animation	Closed
QuakeViz	Simulation Visualization	Open
ADF	Quantum Chemistry	Closed
Kmenc15	Video Editing	Open

Crunch Results



Interactive Results

