

Grid Computing: A Web Services Approach



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Agenda

- Introduction to Grid Computing
- Grid Applications
- How UVic is involved
 - GridX1
- More about Grids
 - Middleware
 - Service Orientation
 - Web Services
- The CANARIE Project test Grid

Introduction to Grid Computing

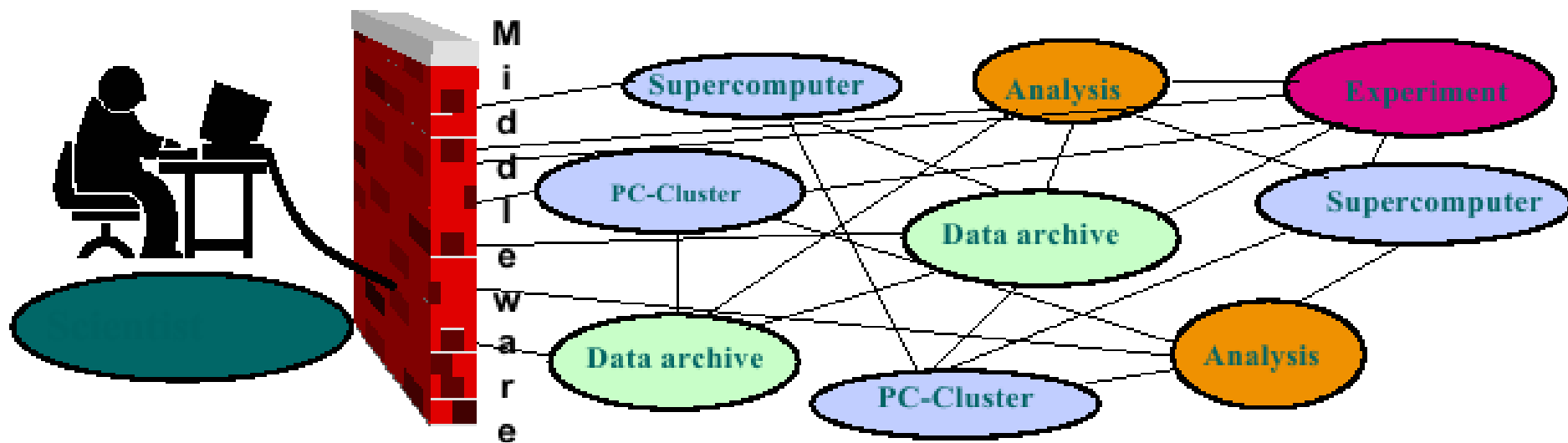
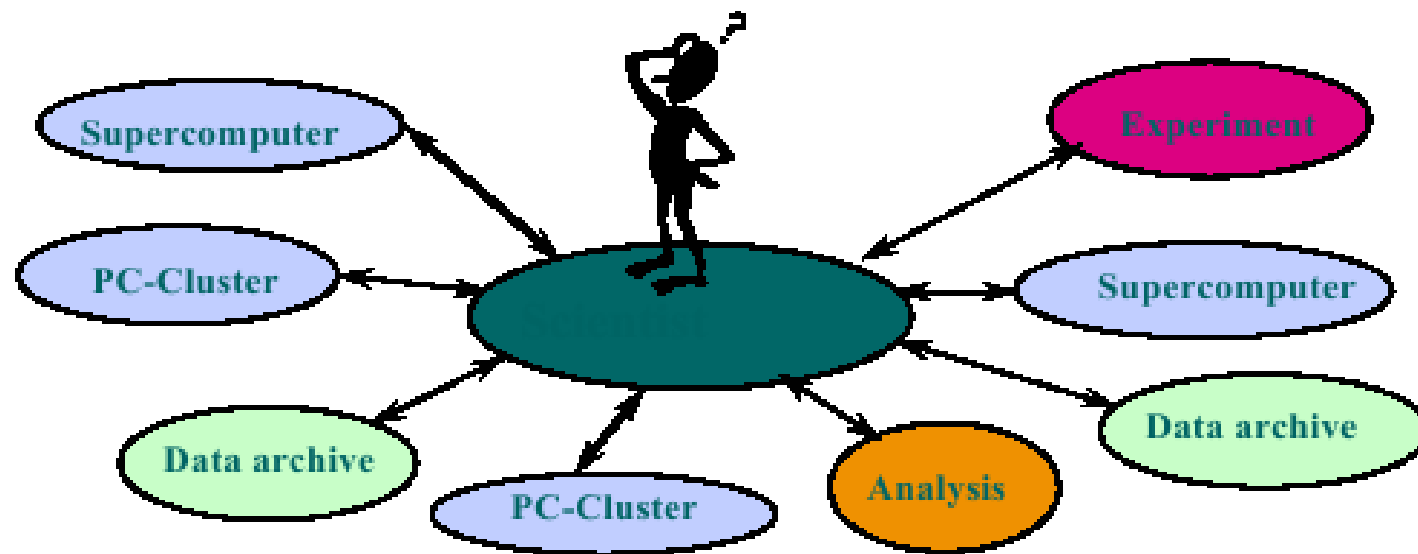
- What is Grid Computing?
 - When the resources of many computers in a network are applied to solve a single problem
- Types of Grids
 - Computational
 - Data
- Ubiquitous access to the combined computing resources of institutions across the globe
- The Internet
 - World-wide network for the sharing of information
- The Grid
 - World-wide network for the sharing of computer resources

Grid Applications

- SETI@Home <http://setiathome.berkeley.edu/>
- fightAIDS@Home <http://fightaidsathome.scripps.edu/>
- Earth Observational Satellite Imaging
- Climate Modeling
- Particle Physics
 - BaBar experiment (SLAC)
 - ATLAS experiment (CERN)
 - Large Hadron Collider Computing Grid being assembled
 - ~15 Petabytes of data annually
 - ~100,000 CPU's

- UVic spearheaded this collaborative project between Institutions across Canada
 - Currently 9 Clusters
 - 2500+ CPU's
 - UVic accounts for 2 Clusters
 - 450+ CPU's
 - UVic maintains Data Storage for GridX1
 - ~600 TB Tape
 - ~160 TB Disc





Goal: Improving Grid Middleware

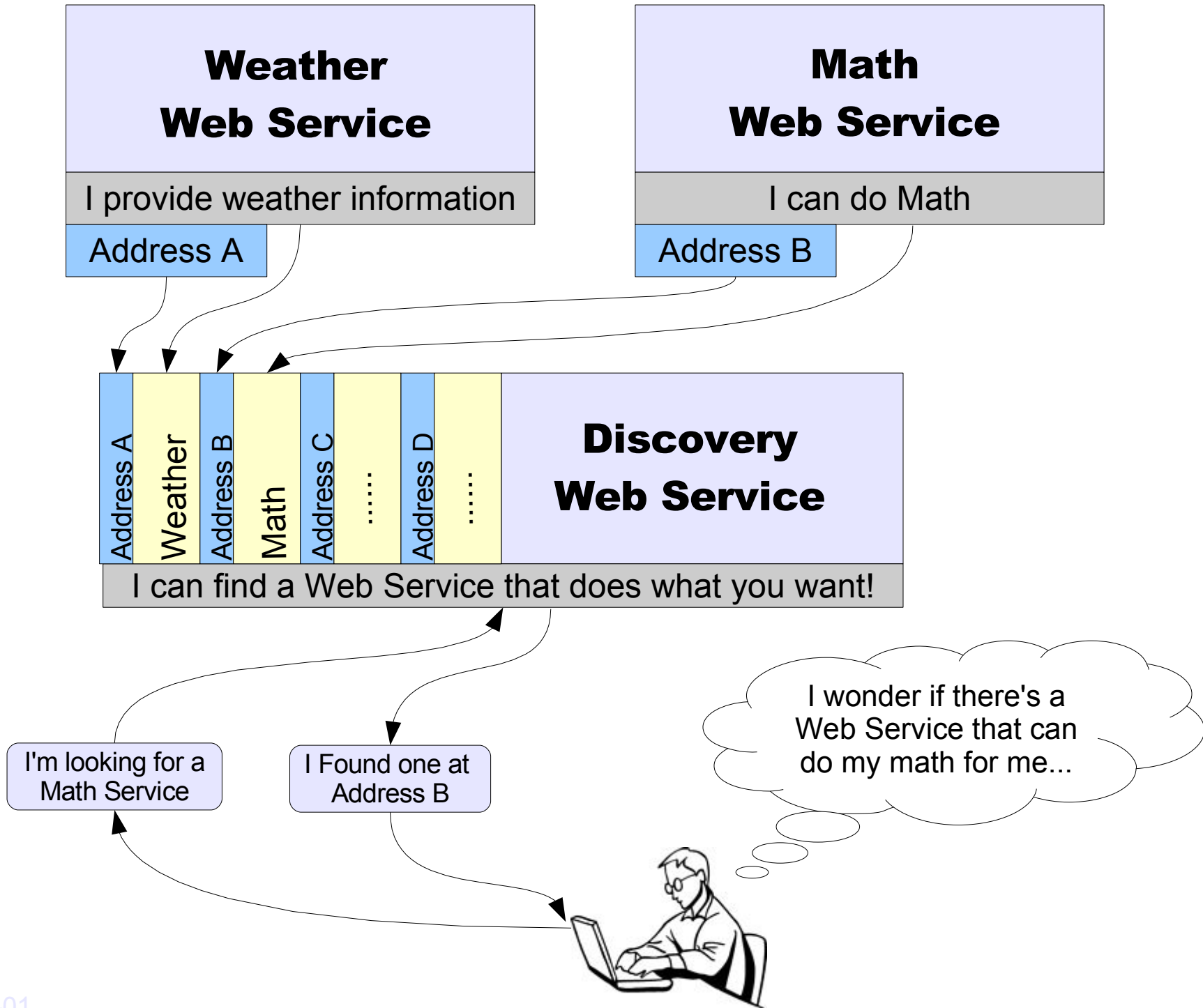
- Moving towards Service Oriented design
- Software components are represented as Services

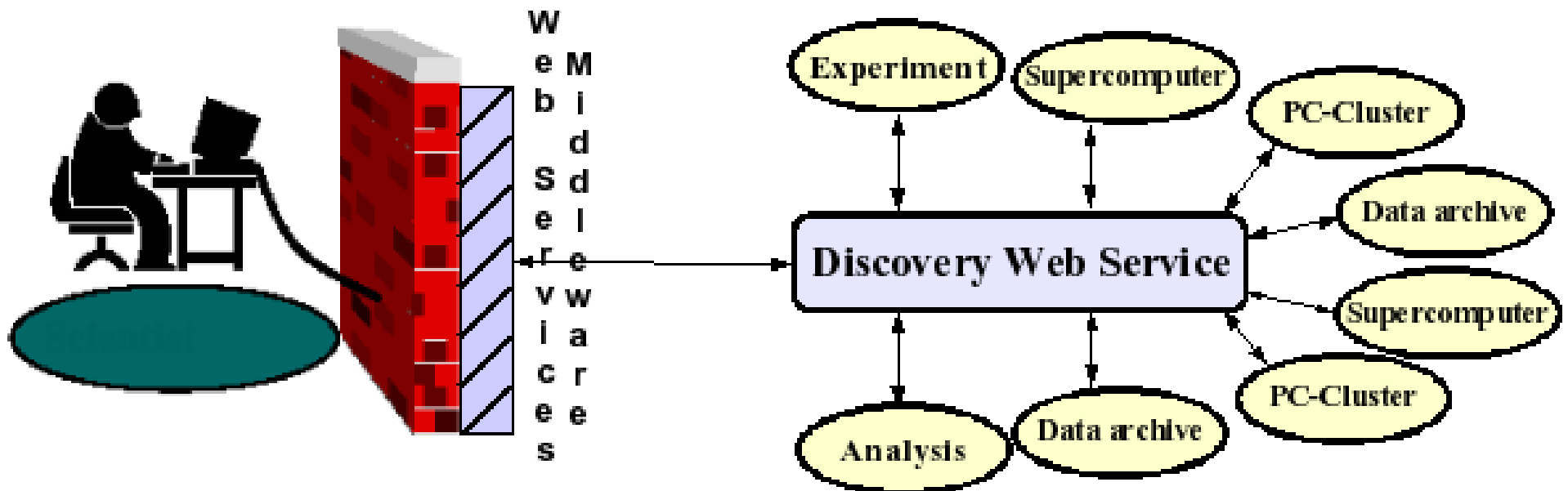
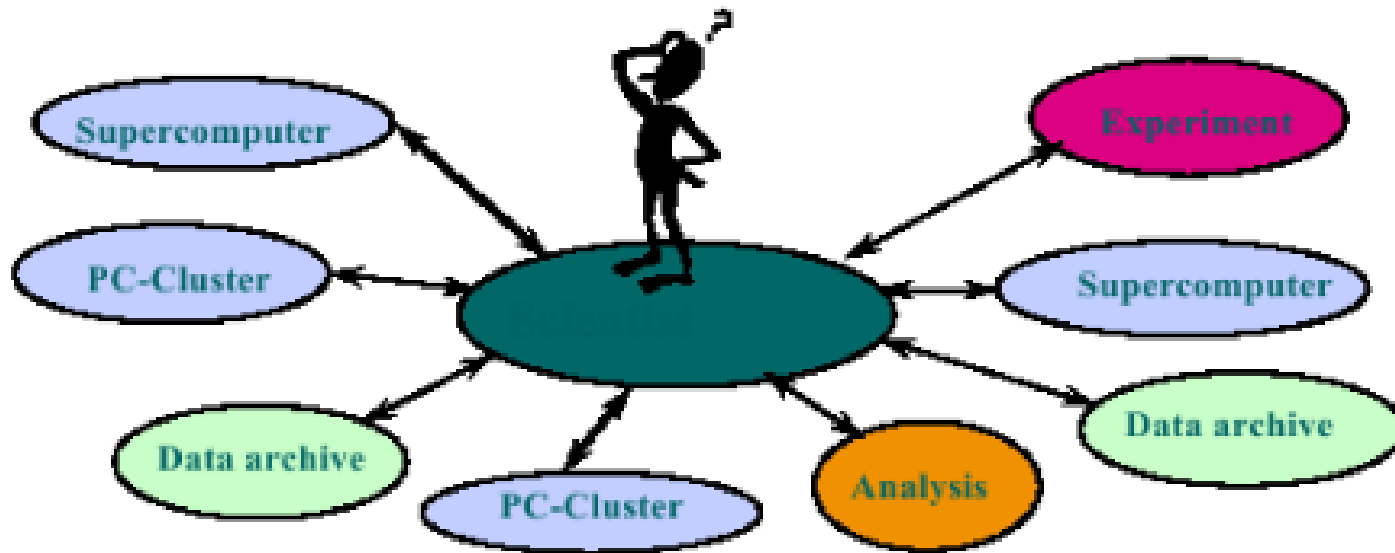
Service Oriented Design Principles

- Services are:
 - Abstract, Autonomous
 - Hide logic from the outside world
 - Not dependent on each other
 - Maintain a loose awareness
 - Reusable
 - Commonality of service requests

- **Web Services** can be used to implement a Service Oriented Architecture
- Use XML
 - Not platform specific
 - Not application specific
- Allow dissimilar applications to communicate with each other

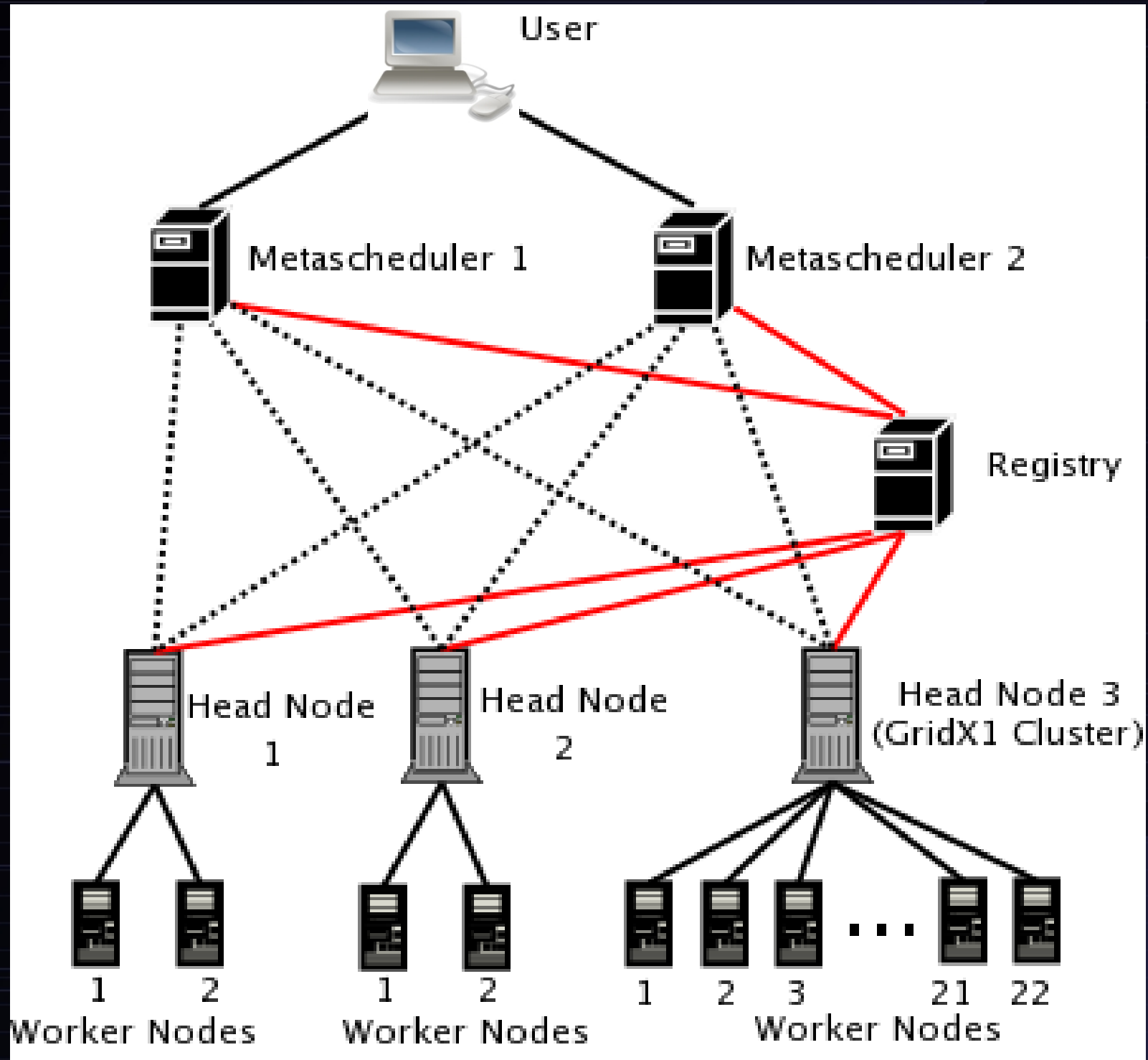
Web Services





CANARIE Project Test Grid

- **Objective:** To evaluate a Web Services based implementation of the Grid.
 - **Funded by CANARIE**
 - The Canadian Network for the Advancement of Research, Industry, and Education
 - **Project Lifetime:** January-December (2006)
 - **The Grid Community** awaits such research as ours before deciding to implement this new technology...or not.



CANARIE Project Test Grid

- Project Status

- Fully functional end to end system
- Preliminary Results are positive about the use of Web Services, in terms of:
 - Performance
 - Security
 - Scalability
- Future work on developing a monitoring system