Grid Computing

&

Semantic Web

Grid Computing

Then what computing resources?

• Computer processors or clusters;
• Networks;
• Data storage devices;
• Scientific instruments;
• Most importantly, they should be reached via Internet.

Why Grid Computing

Good things:

• The increasing availability of computing resources;
• Yet not fully used;
• Internet is everywhere.

Why Grid Computing

Challenges

• Too much data;
• Scalable?
• Multi-disciplinary collaboration;
• Security issues.

A Definition

“The Grid is a software infrastructure that enables flexible, secure, coordinated resource sharing among dynamic collection of individuals, institutions and resources” (Foster, Kesselman and Tuecke 2001)
The Development

- From mid 1990s;
- Maturing in the 2000s;
- The tools, projects, and discussions.

Major Challenges

Design widely accepted protocols for
- Job status monitoring and execution management;
- Data management;
- Resource coordination and discovery;
- Security (authentication and authorization).

Define application programming interfaces (APIs) and Software Development Kits (SDKs)

Grid Application Examples

- Faster, more secure and more flexible;
- Facilitate collaboration,

GIS Grids

- Grid for GIS applications;
- A few related projects (GEON, GISolve, LEAD);

Semantic Web

- Proposed to facilitate web-based information sharing;
- Aims at automated machine-based information processing;

Why Semantic Web

Current web
- HTML dominates the web;
- Designed for human to digest;
- No semantics embedded;
Why Semantics Matter

- Semantics: the meaning of data?
- Semantic heterogeneity (e.g. naming);
- Need formal description?

Again, Why Semantic Web

- New generation of WWW;
- New representation of www data;
- As a global-scale intelligent database;
- How? (Enhance HTML by adding semantics)

How to Build A Semantic Web

- Use URI (Uniform Resource Identifier);
- Similar to URL;
- Also with RDF (Resource Description Framework): Three URIs.

An RDF Example

Source: http://infomesh.net/2001/swintro/

- The triples: Creator, title, name;
- Formatted so can be processed easily.

More…

- Can use RDF schema to model data;
- May need to conduct reasoning tasks;
- Web Ontology Language (OWL).

GIS Semantic Web

- GIS has similar semantic problems;
- The problem of interoperability;
- Geospatial ontologies.
The End

Thanks!