Semantic Web: Models and Services in Support of e-science

MIND SWAP

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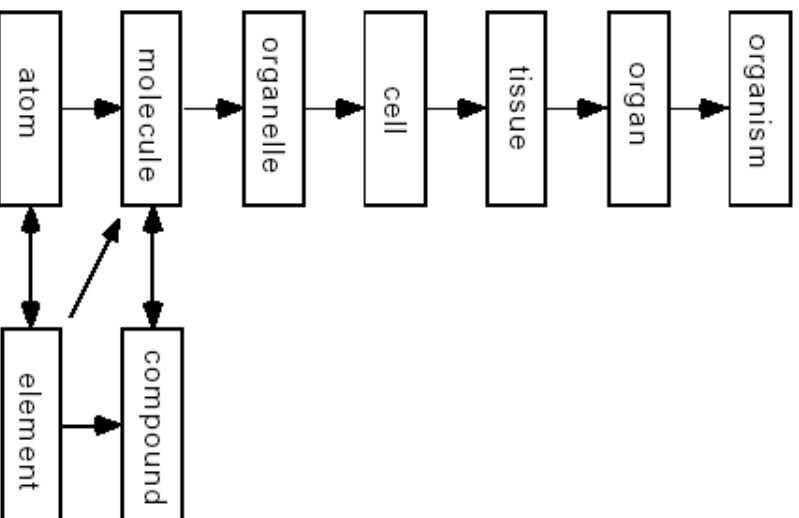
Semantic Web Agents Project (SWAP)
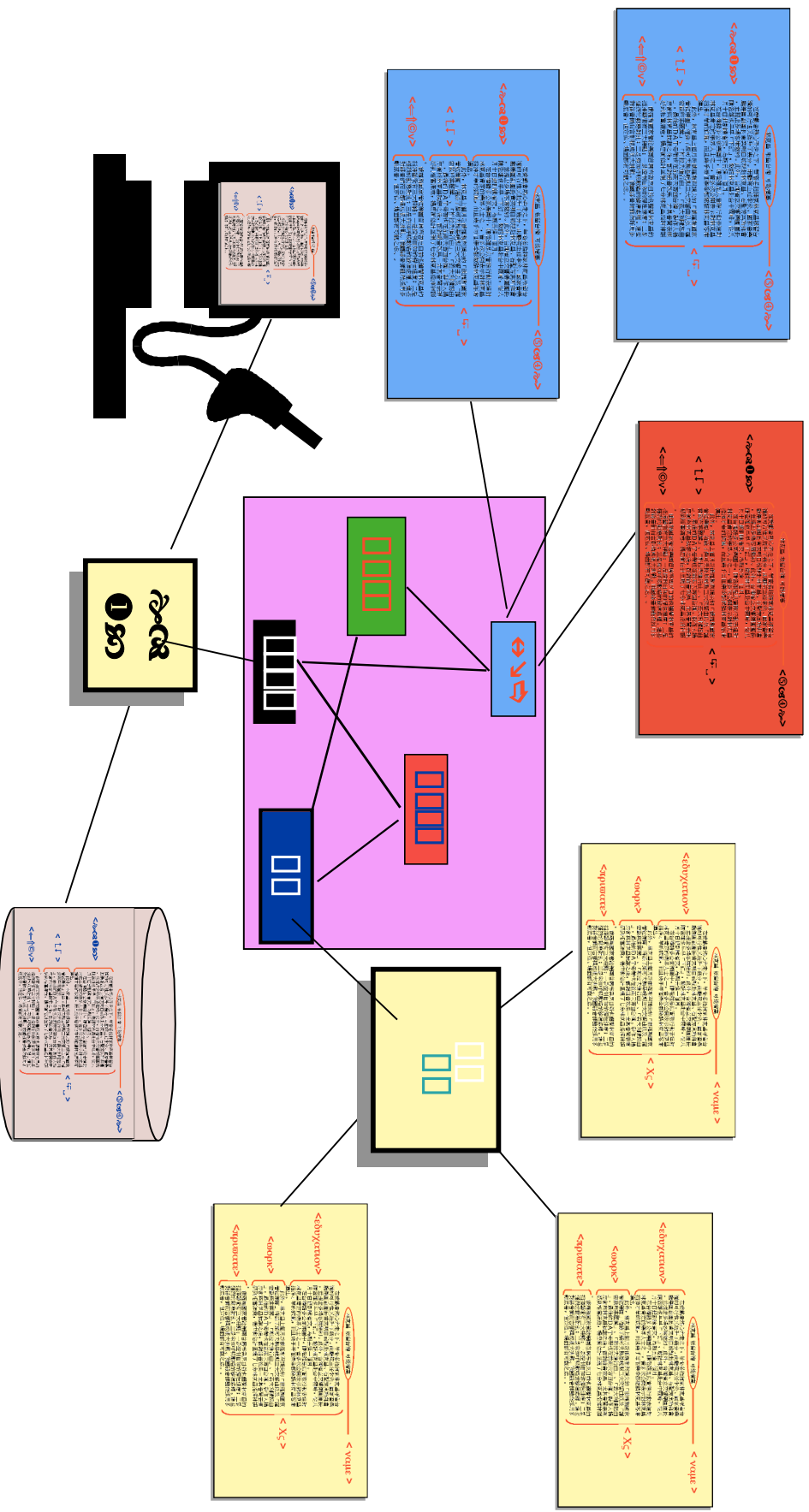
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"Use the links"

AAMAS 2002

Featuring

6th International Conference on Autonomous Agents

5th International Conference on MultiAgent Systems

9th International Workshop on Agent Theories, Architectures, and Languages

JULY 15-19, 2002
PALAZZO RE ENZO
BOLOGNA, ITALY

bringing people and agents together

The First International Joint Conference on

AUTONOMOUS AGENTS

&

MULTIAGENT SYSTEMS

ENTER

Do you want to …

- Add AAMAS 2002 schedule to your calendar?
- Set up your travel to AAMAS 2002?
  - ○ Reserve your flight to AAMAS 2002?
  - ○ Reserve your hotel for AAMAS 2002?
  - ○ Reserve a rental car for AAMAS 2002?
  - ○ More …
- Add AAMAS 2002 Committee members to your contacts?
- More …

The "scientific community"

atom → molecule → organelle → cell → tissue → organ → organism

element → compound

(with element and compound connecting to molecule)

> " … countries separated by a common language "
> -- (Shaw 1942 after Wilde, 1887)

Functional genomics, Structural Genomics, Genome sequence, Clinical Data, Clinical trial, Genetics, Population, Tissue, Disease

(Genome World - from Goble, 01)

New Semantic Web Languages

- New SW languages add **models** to provide mappings and structure.
- XML necessary, not sufficient.

Science must "use the links"

Web

Burkitt's Lymphoma
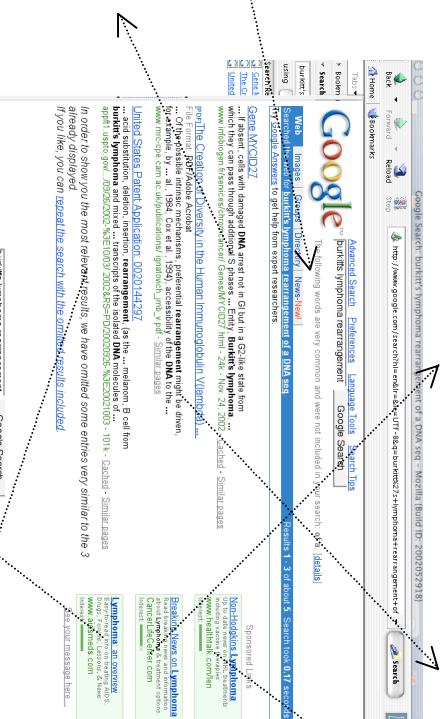
PVT
Rearrangement of a DNA sequence homologous to a cell-virus junction fragment in several Moloney murine leukemia virus-induced rat thymomas

PubMed

Semantic Web

Burkitt's Lymphoma

8q24
PVT1

Oncogene(**MYC**):
Found_In_Organism(Human).
Gene_Has_Function(Transcriptional_Regulation).
Gene_Has_Function(Gene_Transcription).
In_Chromosomal_Location(8q24).
Gene_Associated_With_Disease(Burkitts_Lymphoma).
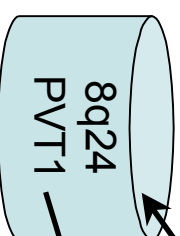
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PubMed

W3C Web Ontology Working Group

- Web Ontology Working Group in the W3C Semantic Web Activity aimed at "extending the semantic reach of current XML and RDF meta-data efforts."

- 55 members from 30+ organizations
  - Large companies, small companies, Govt (US and EU), Res, orgs
- Language based on Government-funded efforts
  - DAML+OIL (DARPA, EU IST)
  - US/EU ad hoc Joint Committee on Agent Markup Langauges
  - Based on XML/RDF (industrial "standards")
- Language drafts published, undergoing review
  - Http://www.w3.org/ "Web Ontology"

Unique example of govt to industry transition Planned in from the beginning!

Converging or diverging visions?
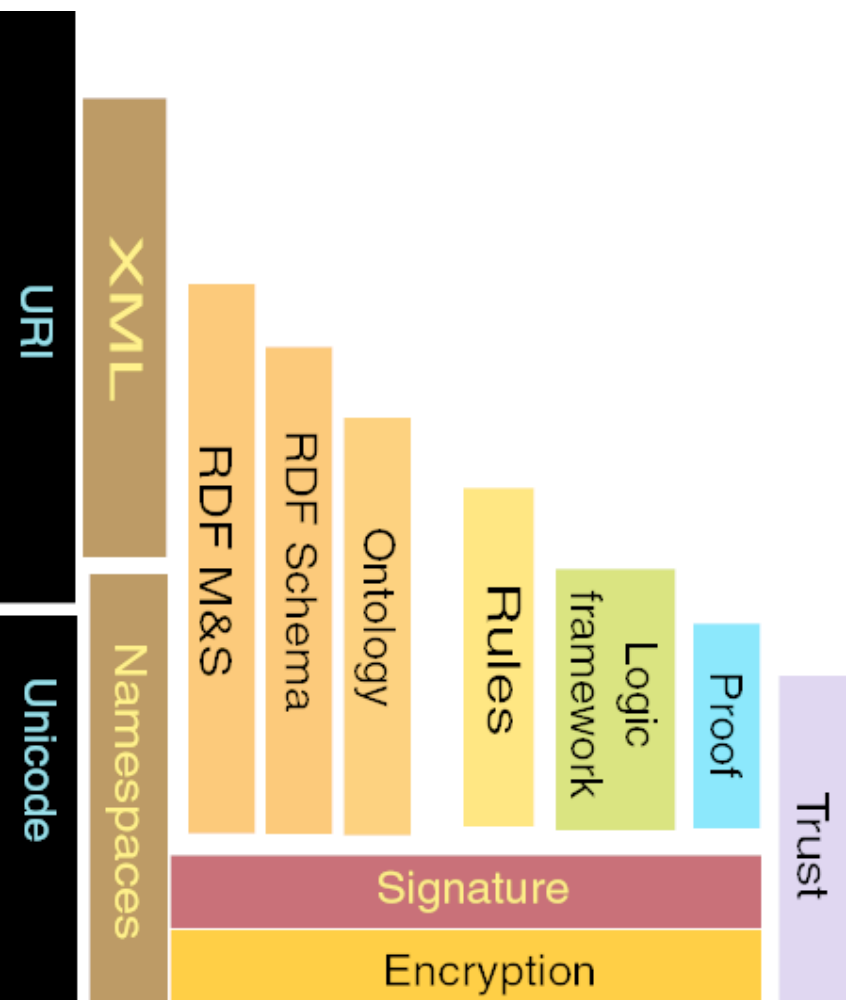
Semantic Web

Grid

Semantic Grid Services
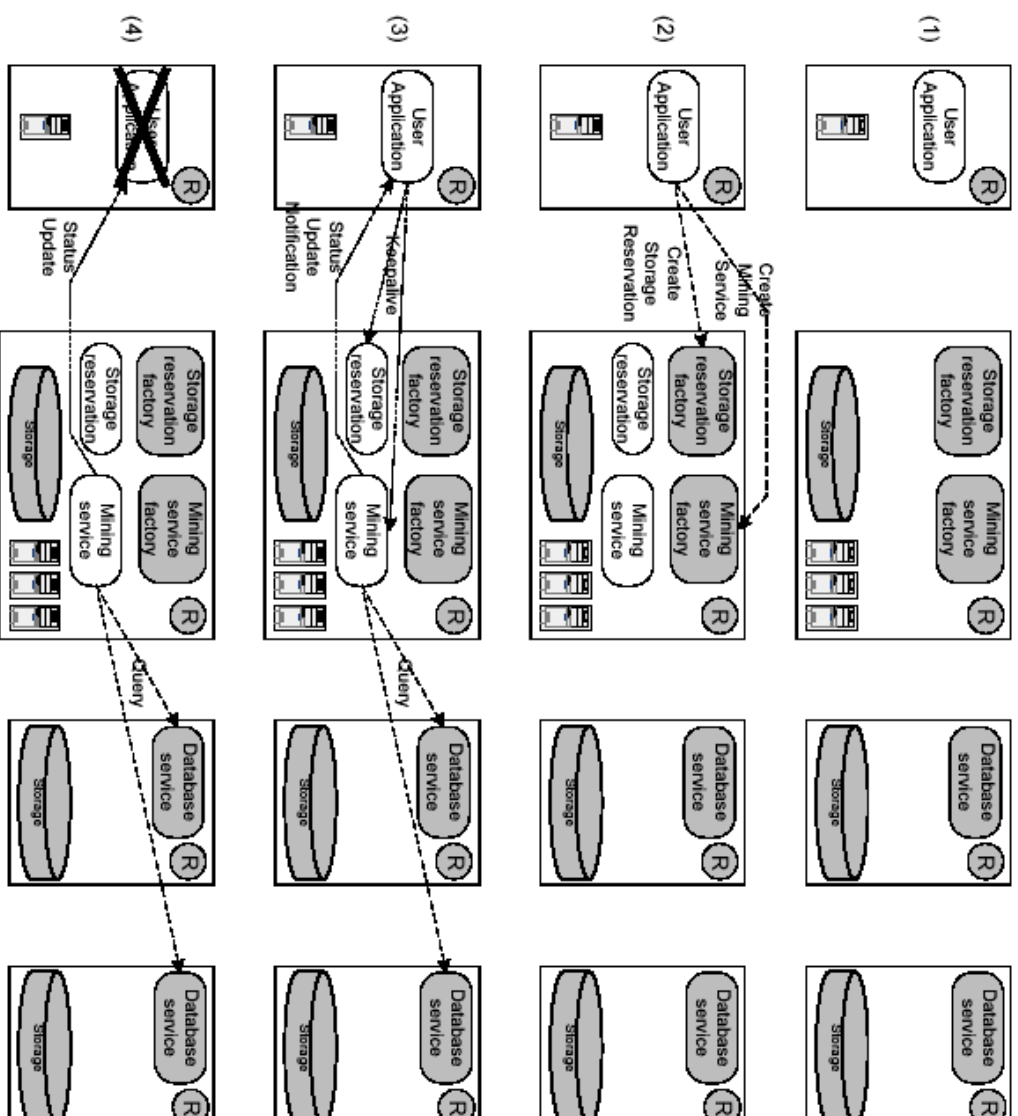
COMBINE

Open Grid
Services
Architecture

Figure 3: An example of Grid services at work. See text for details.

Semantic Grid Services

COMBINE

Open Grid Services Architecture
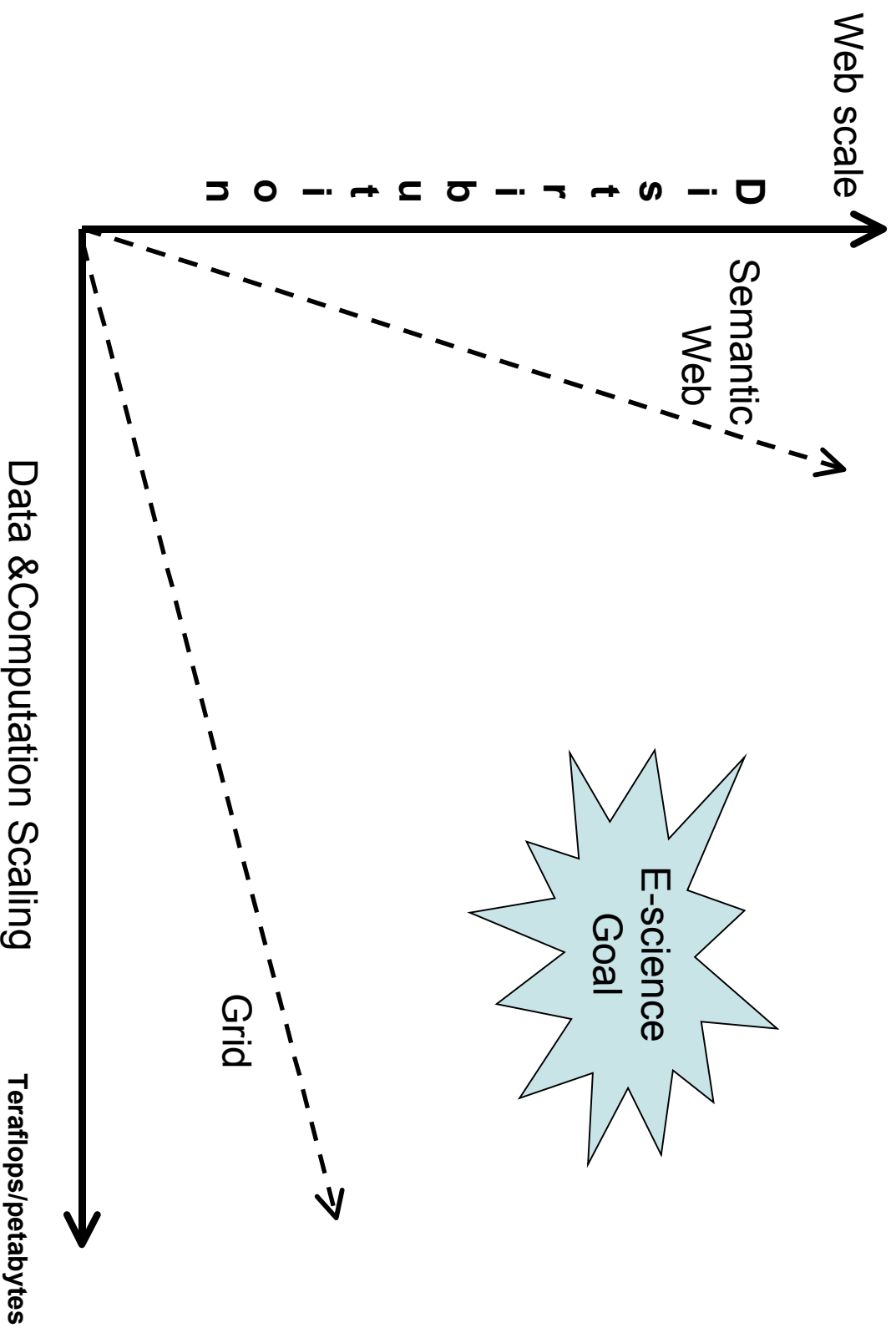
WITH

Semantic Web Services

Advanced information management capabilities
Discovery, Filtering, Composition

Service composition

File   Options

Select a category: Sensor/Service (14)

Quality   Excellent

Location   Latitude   in the range ▼
            Longitude   greater than ▼
            Altitude   equals ▼

Advanced...

RMS Calculator   SoundIntensity
    InputWaveFile
    SoundOutput

FIR Filter

WindowType   User Input   User input ▼   Rectangular ▼

LowerFreqLimit   - User Input -   User input ▼

UpperFreqLimit   - User Input -   User input ▼

SoundInput   - Services (4/5) -   ▼
    - Services (4/5) -
    - User Input -
    Acoustic Sensor 1
    Acoustic Sensor 2
    Acoustic Sensor 3
    Acoustic Sensor 4

Run

The Grid and the Semantic Web

Web scale

D
i
s
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i
b
u
t
i
o
n

Semantic Web

Data &Computation Scaling

Teraflops/petabytes

E-science Goal

Grid

Conclusion

- Semantic Web offers powerful new web technologies for e-science and collaboration

- Grid and Internet2 capabilities bring e-science community to the web

  – Growing emphasis on services and information management -- the Semantic Web's key competencies

- Promising long-term research directions

  – Information **models** on the Web/Grid

  – Integration of Grid/Sem Web services

If we don't integrate future Web technologies with large-scale computing, e-science will not succeed