Will XML technologies and Web services solve the interoperability problem?

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Overview

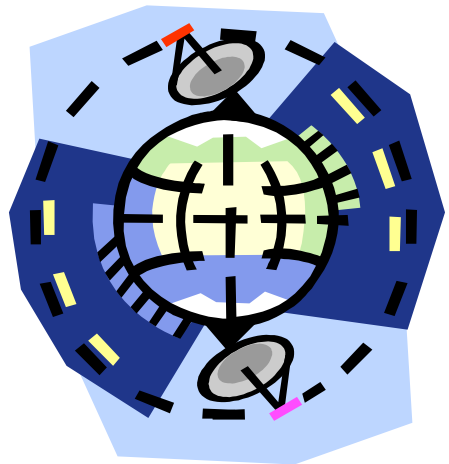
- Introduction and motivation
- The nature of interoperability
- A model of interoperability
- XML technologies and web services
- Increasing interoperability
- Progress to date
- Future directions

Need for Interoperability

- **Web services**
- **Nomadic computing**
- **Pervasive computing**

Nature of Interoperability

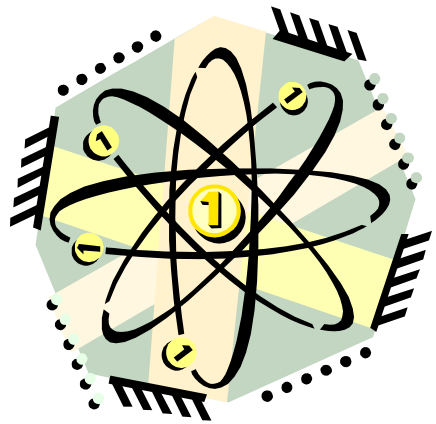
Two machines possess the property of interoperability when they can interact with each other to attain a desired objective.



A model of interoperability

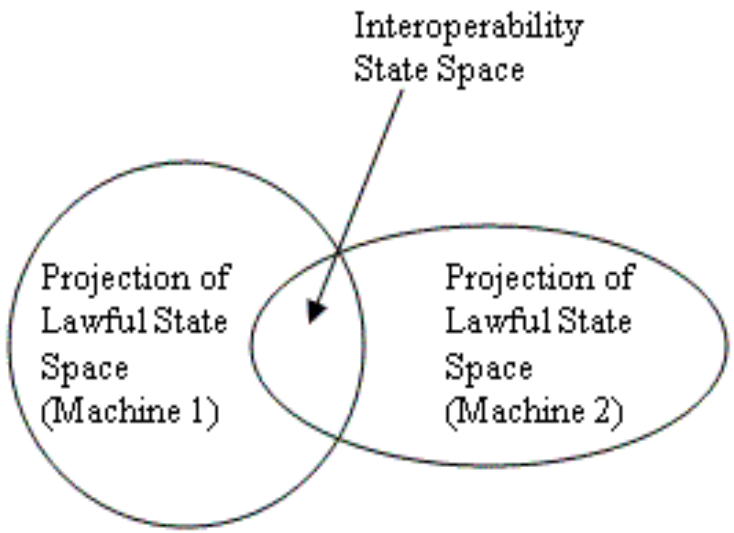
- **A machine can be described via a set of state functions, where each state function represents a property of the machine.**

- **Some definitions**
  - **Conceivable state space**
  - **Law statement**
  - **Lawful state space**



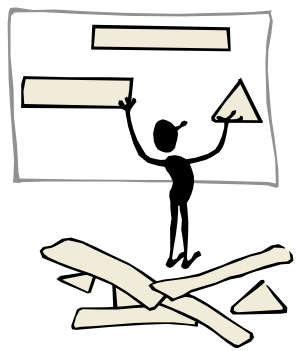
Interoperability state space

- **When are two machines considered to have the property of interoperability?**

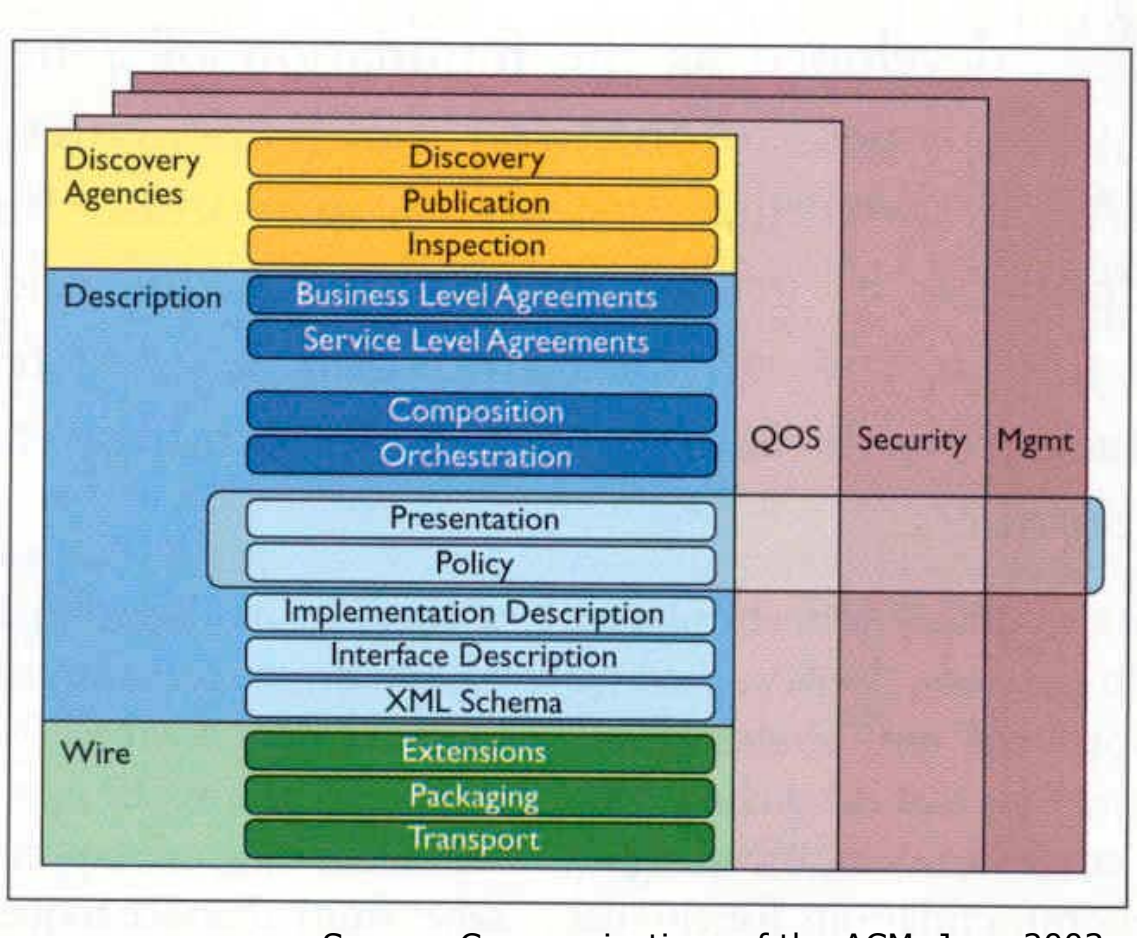


Increasing interoperability

- **Increase the number of projection states**
- **Increase the *utility* of the projection states**
- **Refine the total interoperability state function.**
  - **Decrease state variable components**
  - **Choose a less ambitious interoperability goal**
  - **Decompose goal into multiple sub-goals**



XML technologies and web services



Source: Communications of the ACM, June 2003

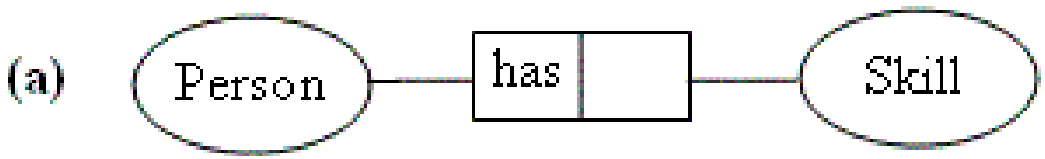
Increasing the cardinality of the interoperability state space

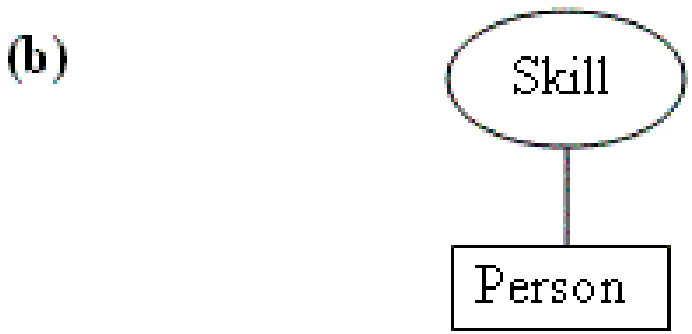
- **A priori agreement on the tags allows *some* level of interoperability**

- **More extensive interoperability requires agreement in two areas**
  - **the general ontology used to describe domains**
  - **the mapping between real-world phenomena and the general ontology**

General ontology

- **Lack of agreement on general ontology limits machine interoperability.**





General ontology

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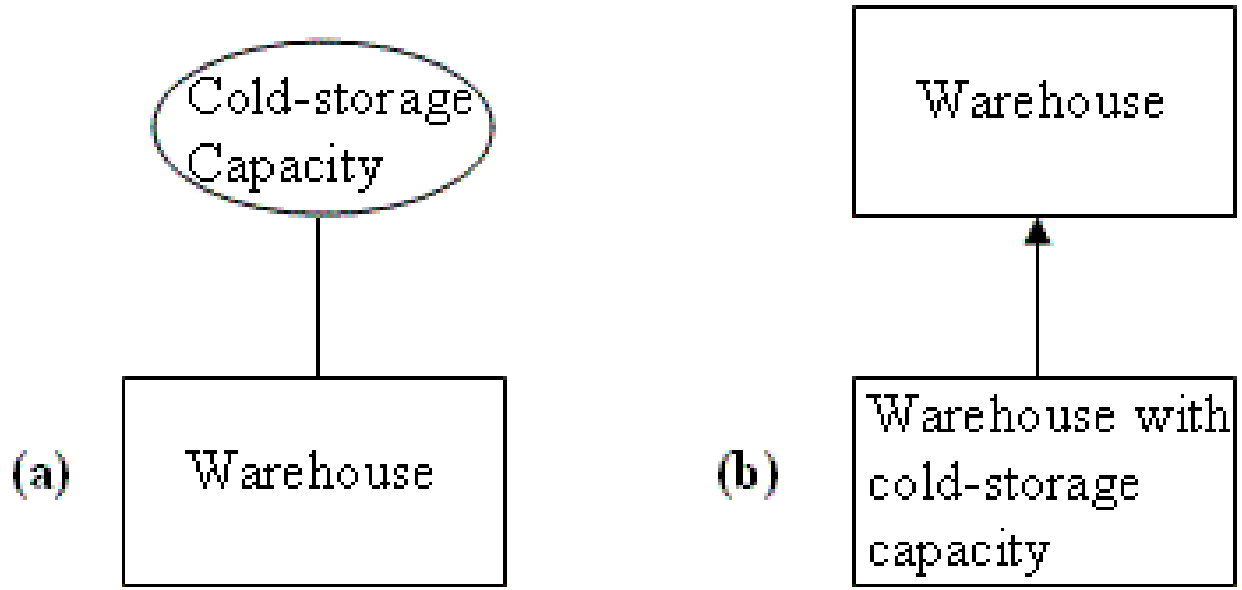
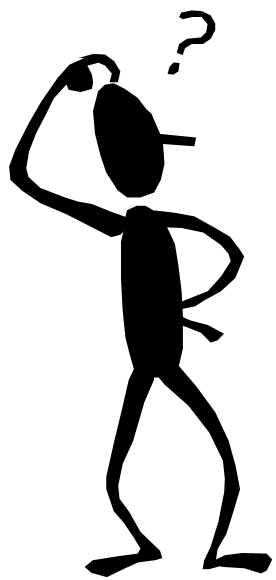
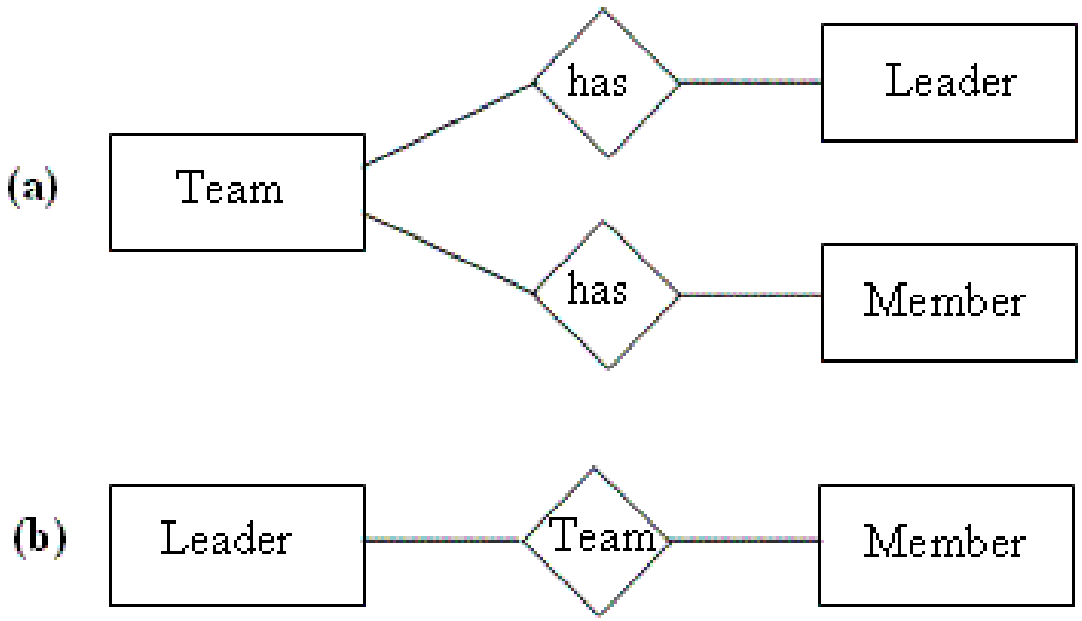
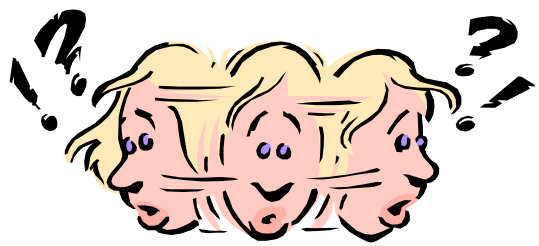




Domain phenomena – general ontology mapping

- **Agreement on the general ontology alone is not sufficient**





Progress to date

- **Work to date focuses on two areas**
  - **Selection of domain phenomena**
  - **Agreement on XML tags for each phenomenon**

- **Limitations**
  - **Much work on proposed standards has been atheoretical**
  - **Standards do not address need for general ontology and mapping agreement**

Future directions

- **Agreement on general ontology**
- **Agreement on domain phenomena – general ontology mapping**
- **Embedding constructivist capabilities in machines**

Comments and Questions

The End!!