



Tecnología, Información y Finanzas

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# Discovery and contracting of semantic Web services

*W3C Workshop on Frameworks for Semantic in Web Services*

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# Problem statement

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- Given a requester goal **G**, (semi)automatically find a service **S** fulfilling **G**
  - See [Keller et al. 2005] for a detailed formalization
  - Content of goal **G** can be driven by:
    - some human user objectives
      - Improvement wrt. current possibilities
    - some business objectives (part of a business process)
      - Necessary step towards dynamic integration
  - Semantic Web services are a good candidate technology
    - Framework should support the resolution of this problem
      - Automation of human users' goal resolution
      - Automation of business needs' resolution (dynamic configuration of services –providers- based on some business objectives)

# Services vs. Web services

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- **Service**
  - Provision of value in some domain [Preist, 2004]
    - Booking of a flight ticket from Madrid to Munich on May 8th, 2005
    - Independent on how the supplier and the requester interact
- **Web service**
  - Computational entity accessible over the Internet (using Web service standards and protocols) [Preist, 2004]
    - Software component provided by an airline and accessible via Web service standards to request the booking of flights
    - Means to request a service, not the service itself

# Web service descriptions

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- Web service must (semantically) describe the services it is able to provide
  - Web service will often be used to provide a set of related services
    - E.g. booking of flights from a given airline
  - Accurate description of such services has two major problems:
    - Information volume: duplication of the provider's database
    - Dynamics: continuous updates of the Web service description
- Realistic expectation: static characterization of what services can be requested via a Web service (abstract service description)
  - Complete but not always correct [Preist, 2004]

# Conceptual model – goal discovery

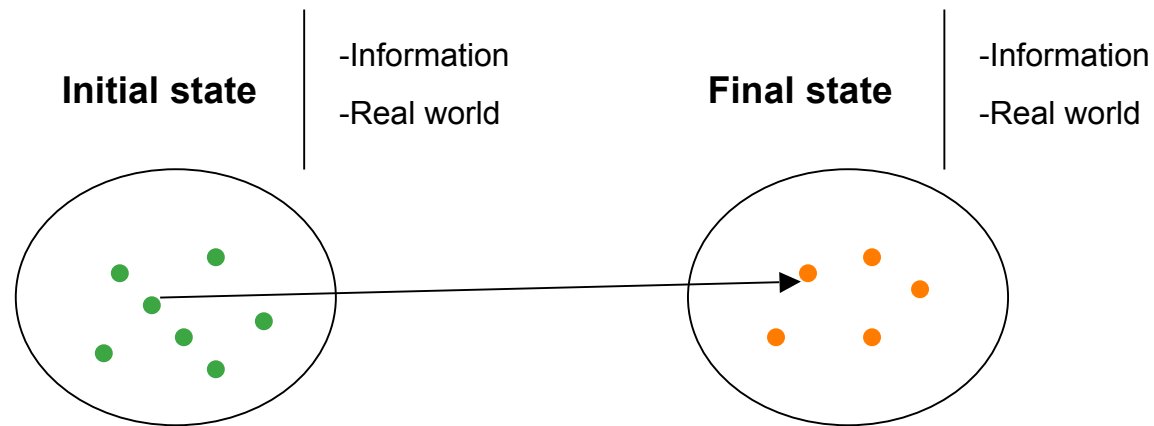
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- **Goals must be semantically described**
  - What concrete service is sought in terms of
    - Information e.g. booking id
    - Real-world effects e.g. booking of a flight ticket
  - Unrealistic to expect user to formalize his goal
    - Pre-defined & generic (canned) goals
    - Goal discovery based on
      - Textual description
      - Goal browsing
    - Goal refinement (parameterization, subclassing)
      - Automatically from textual description
      - Supported by tools

# Conceptual model – WS discovery

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- Services as set of state transitions



- Final state will depend on
  - Initial state (including inputs)
  - Dynamic conditions
- Goals will describe the desired final state

# Conceptual model – WS discovery (2)

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- Determine whether, given an initial state, the final state reached fulfills the goal\*
  - \* Dynamics not taken into account
  - Costly as the set of available services is potentially very big
  - Efficient pre-filtering needed
    - Abstract from state transitions and consider only sets of final states
    - Description logics are a good candidate for this
      - Computing of subsumption relations [Keller et al., 2005]
      - Good response times after classification [Li & Horrocks, 2003]
    - Goals also regarded as sets of desired final states
      - Pre-defined goals also classifiable
  - No guarantees

# Conceptual model – WS discovery (3)

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- Re-introduce state transition view
  - Over a reasonably small set
  - Incorporate input information
    - In most cases will determine the post-state reached
    - Not provided with the goal but kept locally by the requester
  - Incorporate the relation between the pre-state and the post-state in the WS description
    - What post-state will be reached from the pre-state (input included)?
  - F-Logic + TR is seen as a good candidate formalism [Kifer et al., 2004]
  - Still no guarantees

# Conceptual model – service contracting

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- Interact with the provider to have a complete guarantee
  - Dynamic factors and possible incorrectness of WS descriptions
    - Communication needed
  - Communication will follow (formal) choreography interfaces
  - Information disclosure and trust policies become relevant
  - On successful contracting, there is a guarantee of the service provision

# Conclusions

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- Distinction between services and Web services
- Realistic expectations on Web service descriptions
- Distinction between Web service discovery and contracting
- Accurate but efficient discovery
- Frameworks for semantics in Web services should provide appropriate support

# Acknowledgements

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