ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

**The University of Bologna
AI group @ Faculty of Engineering
Contribution to the NESSI WG on
Services Sciences and Systems Engineering**

**Web Services Specification and Verification
Discovery and Composition**

- Vision of Web Services
    - ✓ Ubiquitous, off-the-shelf solutions
    - ✓ Specified in terms of interface behaviour
- Our research directions
    - ✓ Declarative conceptual models
    - ✓ Platforms and tools based on computational logic
    - ✓ Monitoring, specification and verification
    - ✓ Service composition, choreographies
    - ✓ Applied technology, e.g. health-care
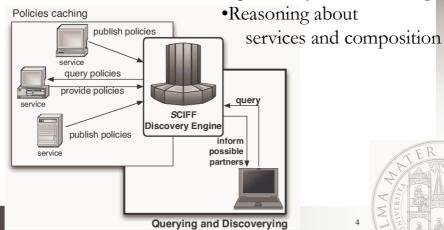
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Current and Future Research Directions

- **Smart engines** (discovery, contracting and composition of web services)
- Computational logic-based **semantics** for standards like WS-BPEL, BPMN, and RuleML
- Automatic **reasoning** on specifications
- Run-time **verification** of compliant behaviour
- A-priori verification of **interoperability** (choreographies)
- Formal proof of **properties**

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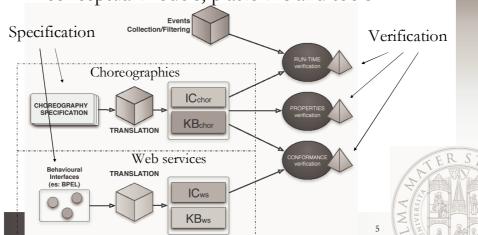## Ongoing research:
Contracting in Service Discovery Engines

Automatic reasoning on specifications (policies)

- Specifically on contracting
- Reasoning about services and composition

Policies caching

publish policies
service
query policies
provide policies
service
publish policies
service

SCIFF
Discovery Engine

query
inform possible partners

Querying and Discovering

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Ongoing research: Web Services/Choreographies Specification, Semantics, and Verification

Development of computational logic-based conceptual models, platforms and tools

Applications: health care

- Service-oriented applications in health care
- Knowledge-based systems (logic-/rule-based)
- Aims/Services:
    - ✓ Managing patient care
    - ✓ Assisting the doctors (monitoring, diagnosis)
    - ✓ Supporting health care
        - Quality assessment and assurance
        - Clinical decision
        - Workflow (computerized medical guidelines)

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