Rule Responder: An Intelligent Multi-Agent System for Collaborative Teams and Virtual Communities

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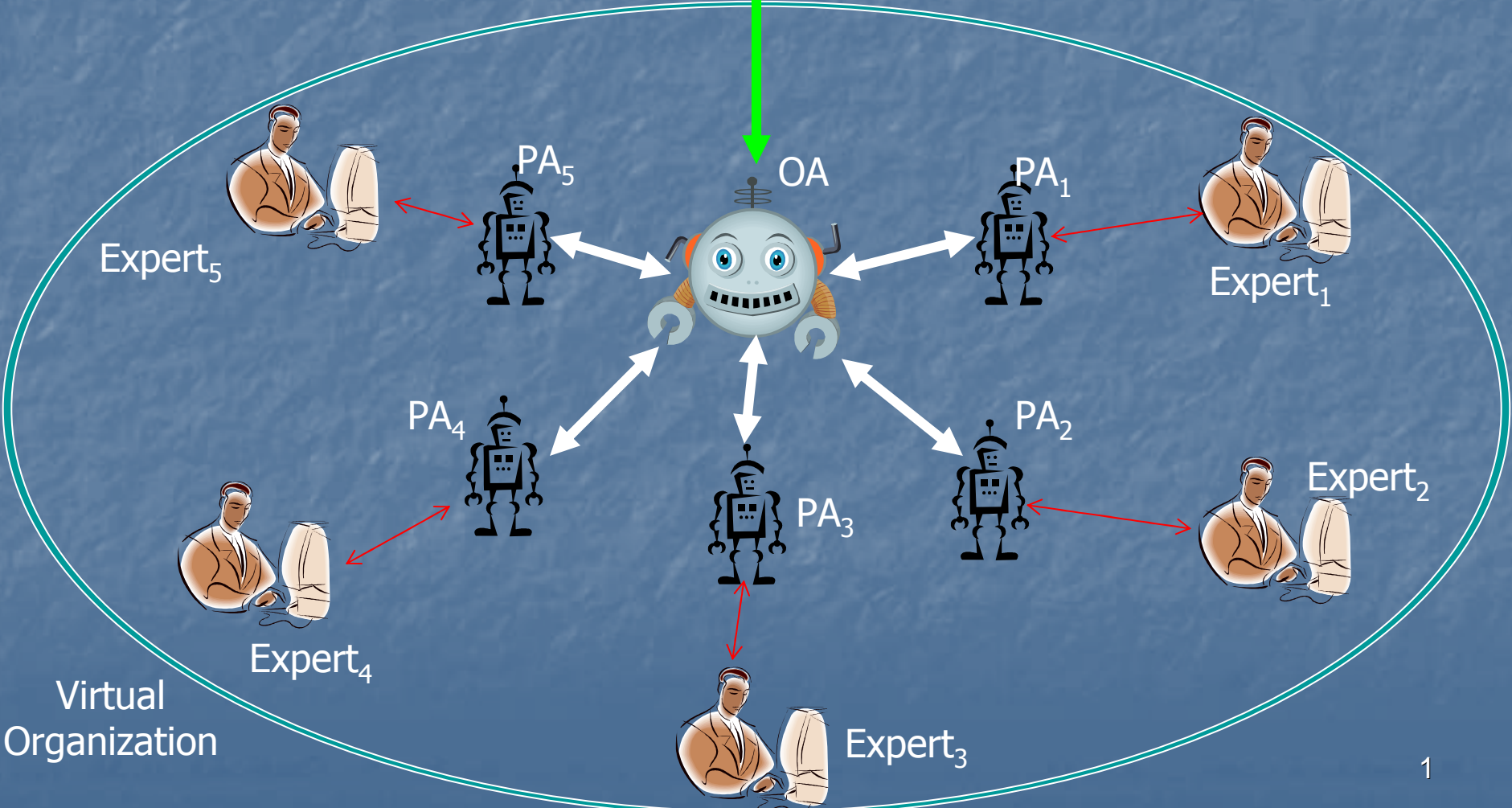St. John New Brunswick
October 28-29, 2008

Star-Like Rule Responder Architecture

EA: External Agent

Hub — OA: Organizational Agent
Spoke — PA: Personal Agent

Virtual Organization

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Existing Auto-Responders

- Mail Clients can act as auto-responders when people are unreachable, as illustrated by "Vacation Programs"

- Other auto-responders engage users in interaction sequences, e.g. to check user identity when subscribing/unsubscribing to/from a mailing list

- Rule Responder extends such auto-responders to intelligent, distributed rule systems such as for symposium planning

Overview of Rule Responder

- Rule Responder is a prototypical multi-agent system for virtual communities
- Supports rule-based collaboration between the distributed members of community
- Members are assisted by semi-automated **rule-based** agents, which use rules to describe the decision and behavioral logic
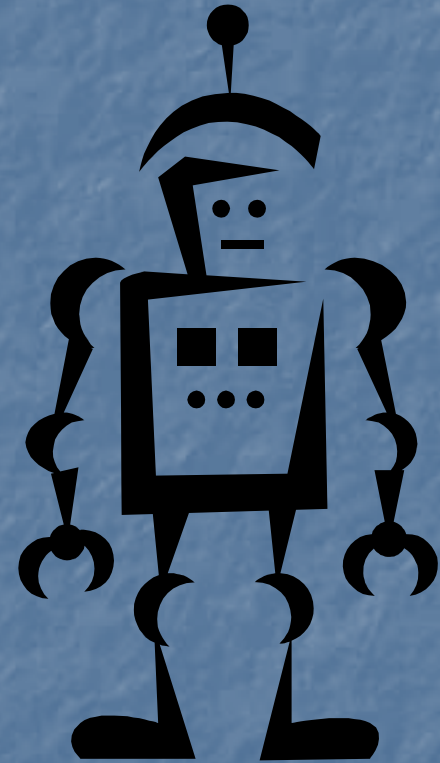
Deployed Use Case: Symposium Planner

- **RuleML-20xy Symposia**
  - An organizational agent acts as the single point of entry to **assist** with symposium planning:
    - Currently, query answering about the symposium
    - Ultimately, preparing and running the symposium
  - Personal agents have supported symposium chairs since 2007 (deployed as Q&A in 2008)
    - General Chair, Program Chair, Panel Chair, Publicity Chair, etc.
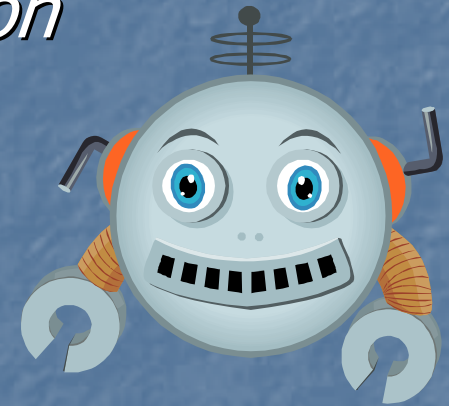
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Personal Agents

- Each PA acts as a Personal Assistant to a human in the organization

- These agents are softbots that help you in working and networking

- You define the rules how your agent shall assist you

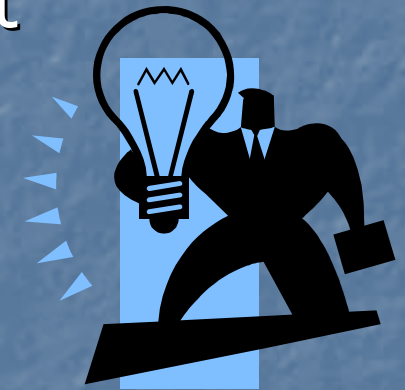- In our deployed use case, symposium chairs are assisted by PAs

Organizational Agent

- The Organizational Agent interconnects all the Personal Agents in our Star-Like Rule Responder Architecture

- The OA channels the right *information* to the right *agent* at the right *time*

- The OA acts as a Mediator, Middleman, or Facilitator

- In our deployed use case, the OA contains general policies & regulations of the RuleML-2008 Symposium

External Agents

- External agents supports clients outside your organization who want to interact with the organization
- An External Agent links clients with the OA of your organization
- The OA will find for them the right PA and Expert for each problem at hand
- **Mediated by the OA, the Expert, their PA, or both together will solve your problem**

Competing/Complementary Work

Intelligent Agents:

- ISI's Electric Elves (e-Elves)
- SRI's Open Agent Architecture^{TM} (OAA)
- FIPA's Agent Communication Language (ACL)
- JADE-Board's Java Agent Development Framework (JADE)

Web Services:

- *Publish*: W3C's Web Services Description Language (WSDL)
- *Find*: OASIS' Universal Description Discovery & Integration (UDDI)

The Symposium

- Who Will Attend
- Highlights
- Keynote Speakers
- Venue
- Business Rule Forum

Authors

- Objectives
- Topics
- Open Calls
- RuleML-2008 Challenge
- Submission Guidelines
- Call for Papers (PDF)
- Important Dates

Organisation

- Organising Committee
- Program Committee
- Sponsorship

RuleML-2008 Organizational Agent:

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                <Expr>
                        <Fun>contact</Fun>
                        <Ind>Mark</Ind>
                        <Ind>JBoss</Ind>
                </Expr>
                <Ind type="integer">500</Ind>
                <Expr>
                        <Fun>results</Fun>
                        <Var>Level</Var>
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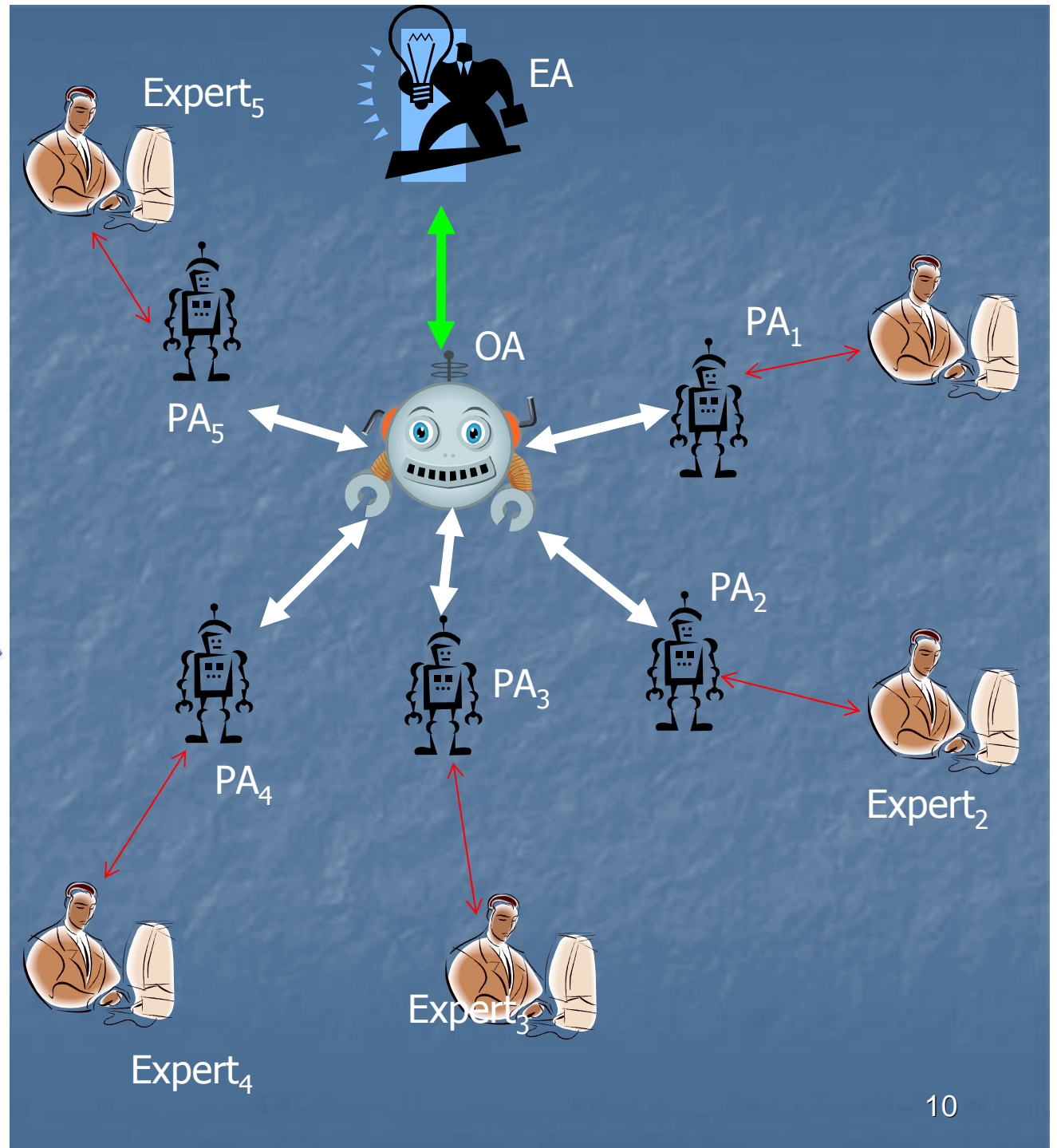
[Send Message]

Query Selection

The drop-down boxes show sample queries you -- as an External Agent -- can send to the RuleML-2008 Organizational Agent. These examples can also act as initial templates that you can edit to create your own queries. Further kinds of queries can be sent as described in papers contained *here*.

```xml
- <content>
  - <Atom>
      <Rel>sponsor</Rel>
    - <Expr>
      <Fun>contact</Fun>
      <Ind>Mark</Ind>
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      <Fun>performative</Fun>
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    </Atom>
  </content>
```

EA

Expert$_5$

OA

PA$_1$

PA$_5$

PA$_2$

PA$_3$

PA$_4$

Expert$_2$

Expert$_3$

Expert$_4$

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Conclusion

- Created *Star-Like Rule Responder Architecture*
- Deployed *Symposium Planning Use Case*
can be adapted to organizing other meetings
and assisting other virtual communities
- Further deployed use cases include the
Health **C**are and **L**ife **S**cience Rule Responder
(HCLS)
- Thanks to RuleML's int'l **Rule Responder**
Technical Group with Adrian Paschke,
Alexander Kozlenkov, and Nick Bassiliades

Rule Responder Opportunities

- **Status of the Business Idea:**
  - **Open Source Prototype with Deployed Use Cases:**
    http://www.ruleml.org/RuleML-2008/RuleResponder/
    http://ibis.in.tum.de/projects/paw/hcls/

- **Desired Cooperations**
  - Partnership for Your Intelligent Agents
  - Partnership for Your Use Cases

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