



⇒ Semantic Spaces Tutorial

Jacek Kopecký
STI Innsbruck



Semantic Spaces for Service Bus: Overview

- **Questions to be addressed:**
 - **What are spaces?**
 - **How do they use semantics?**
 - **How are they relevant to SOA?**

- **Goal: to enable everyone to think about how triplespaces are useful in SOA4All**

- **Reference: <http://tripcom.org>**

Space Paradigm: Publication

Humanity:

storytelling → books

Net for people:

email → web

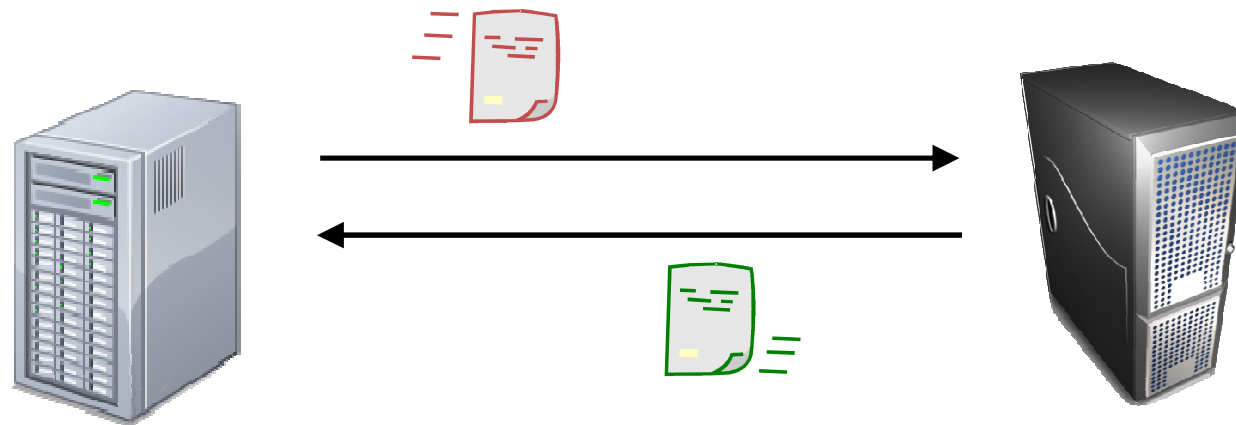
Net for machines:

messaging → spaces

SOA 

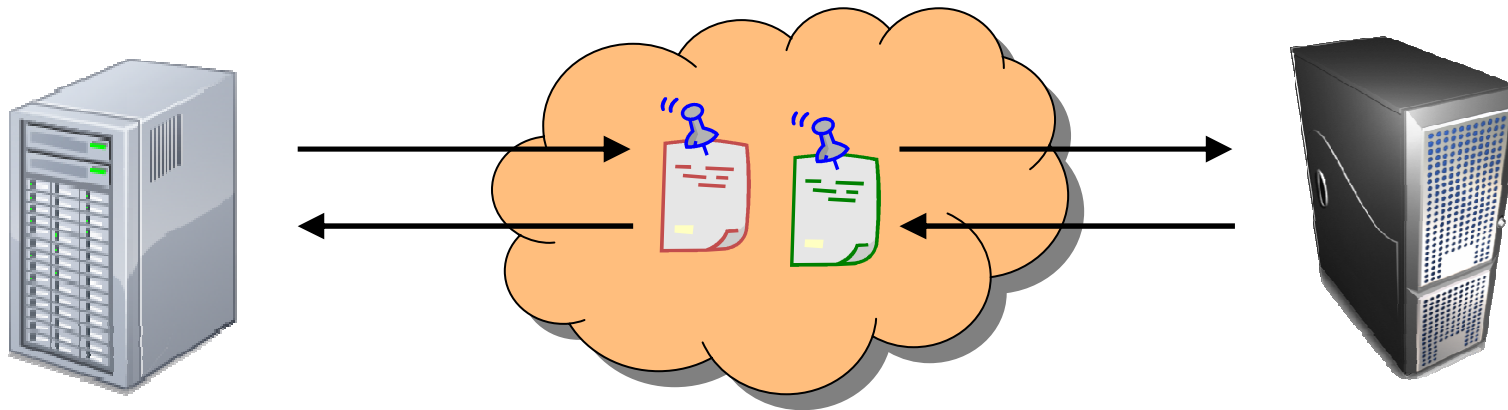
Spaces: Indirection and Decoupling ←

Direct messaging:



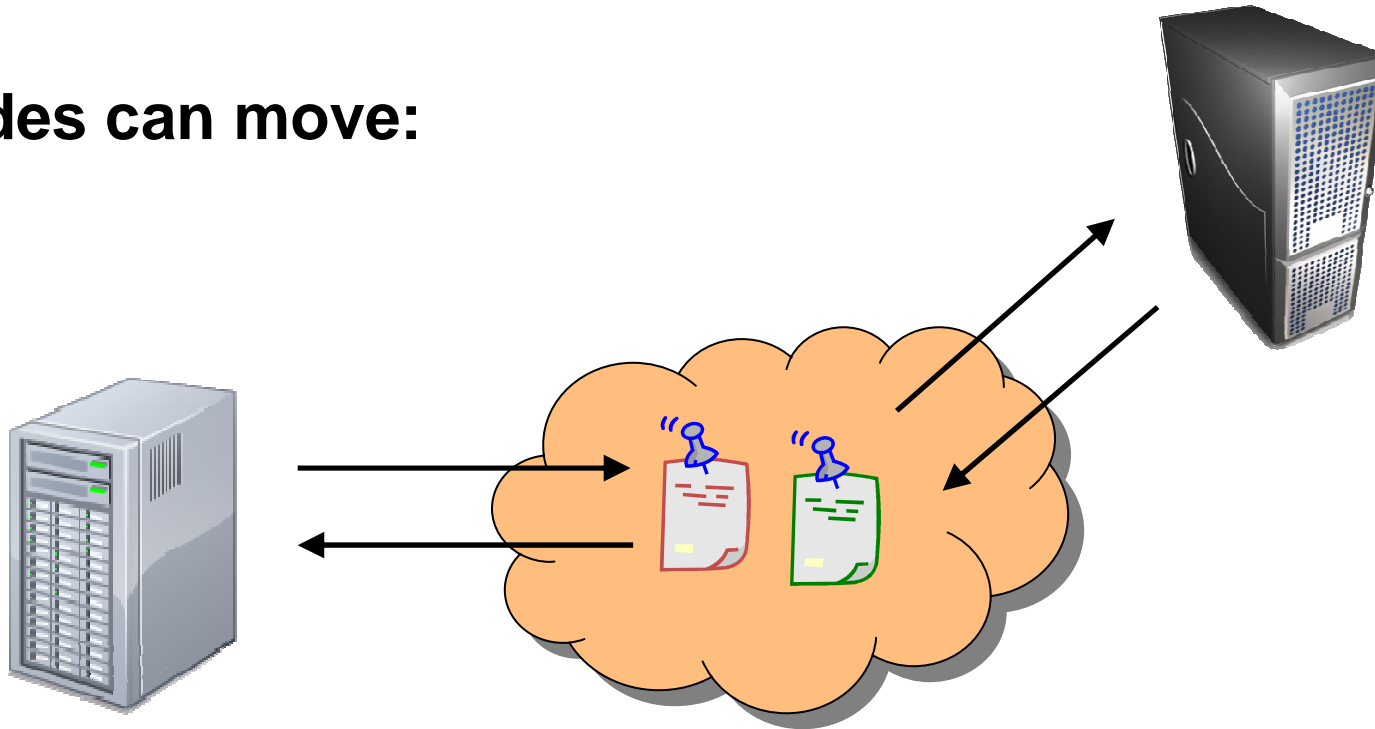
Spaces: Indirection and Decoupling ←

Now with spaces:



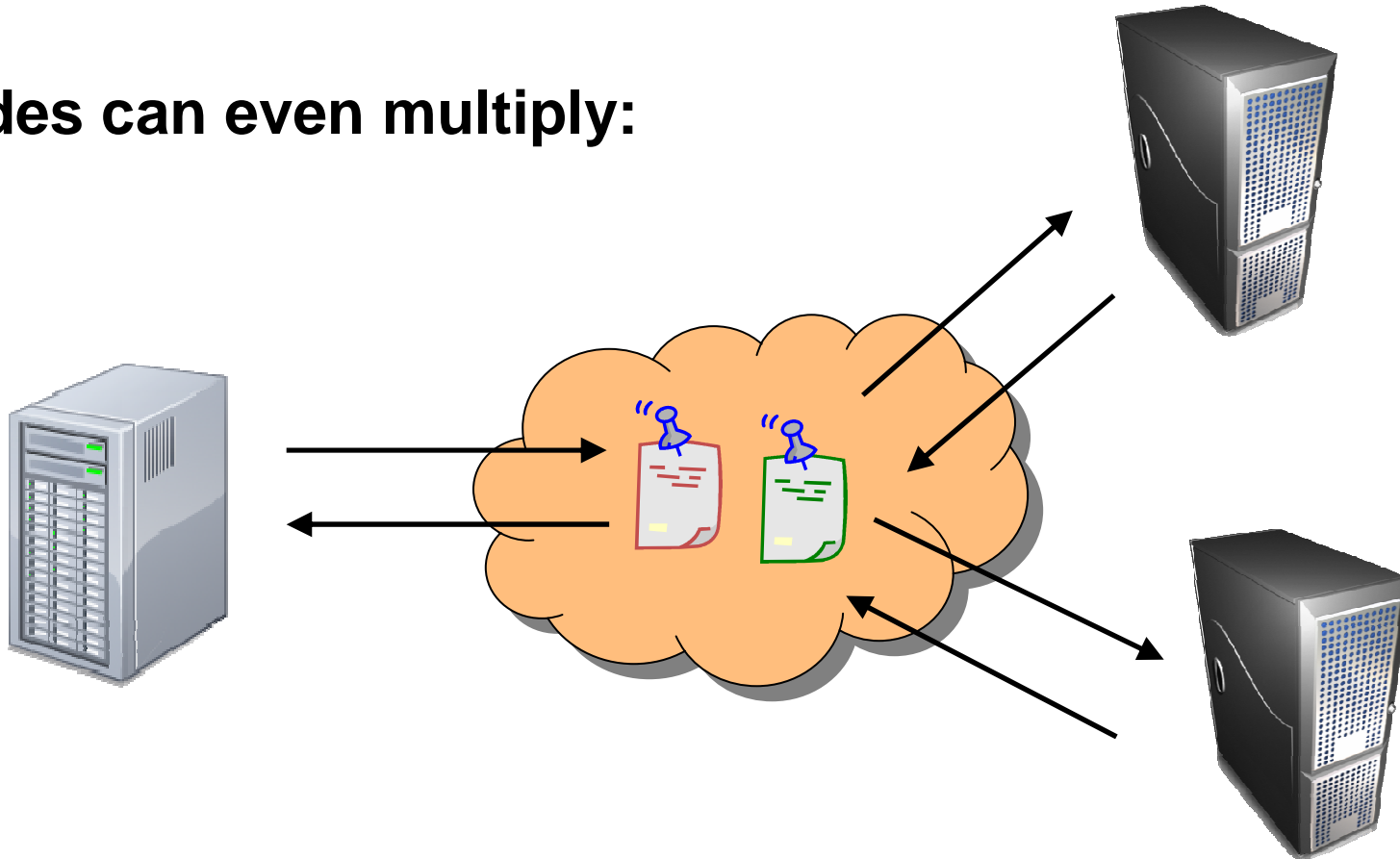
Decoupling in Location ←

Nodes can move:



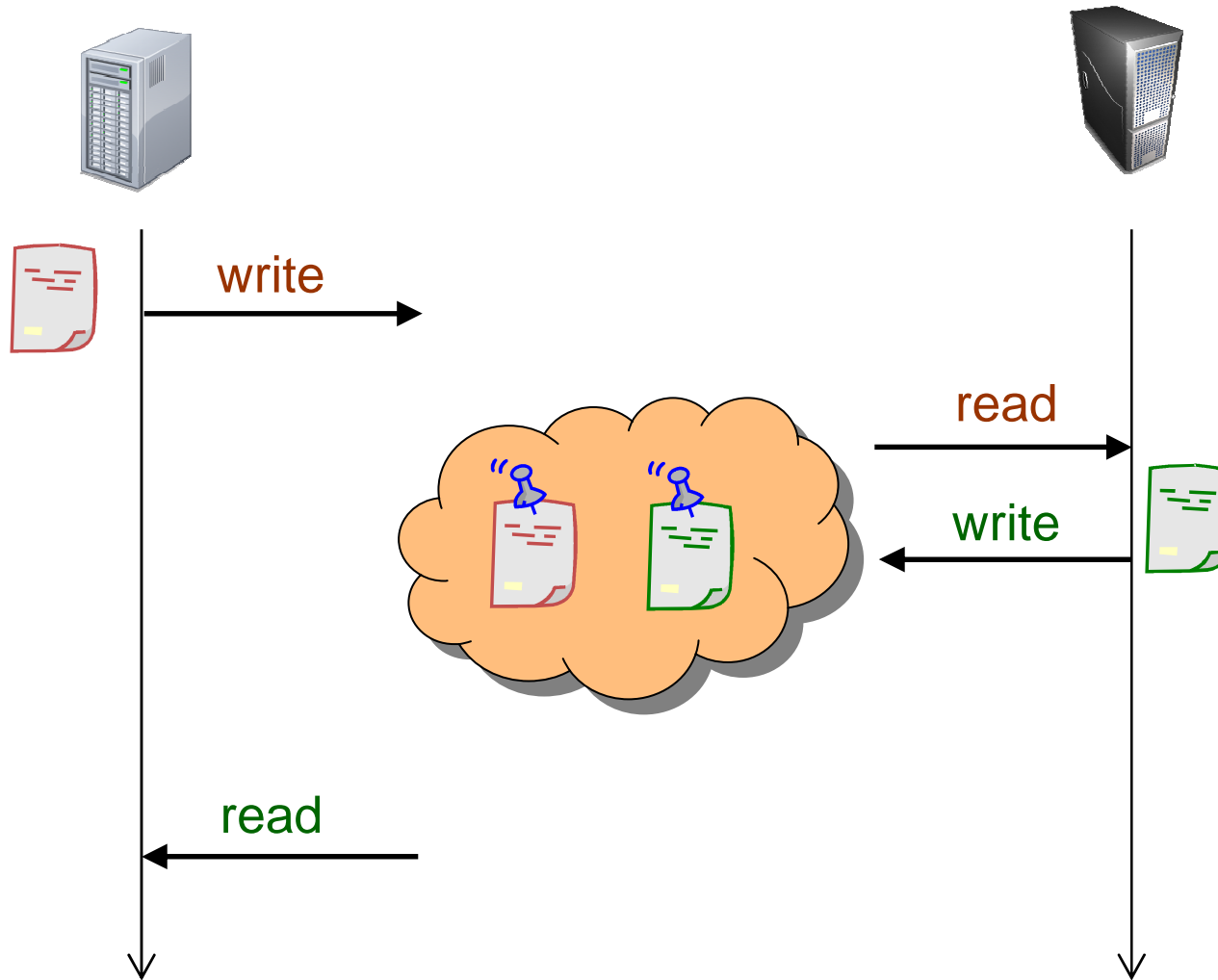
Decoupling in Reference

Nodes can even multiply:

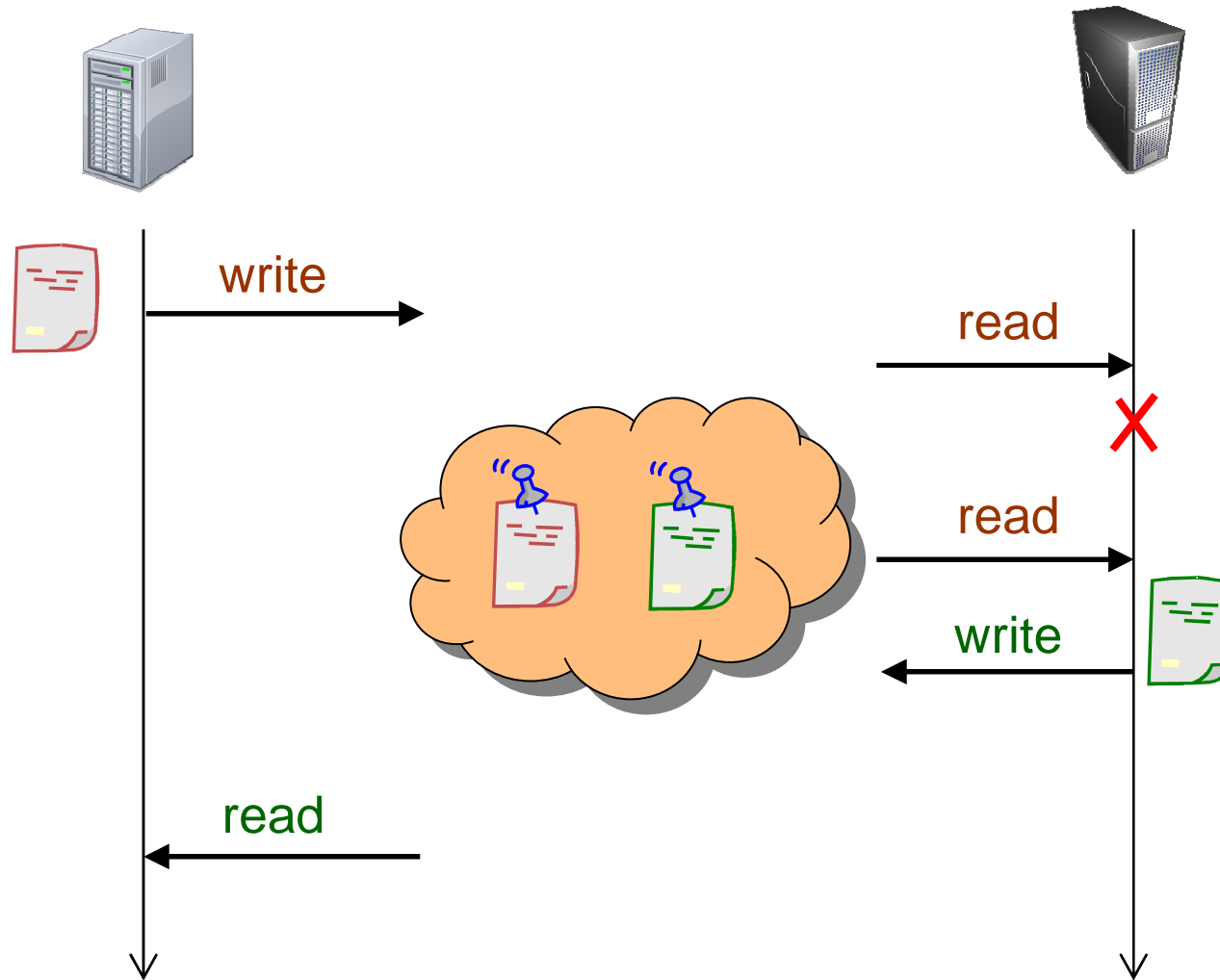


...or be anonymous.

Decoupling in Time ←




Reliability ←



- 1. Out (Tuple, [TimeToLive])**
- 2. Read (Template, [Timeout]) + ReadMulti**
- 3. In (Template, [Timeout]) + InMulti**
 - Because sometimes, delete just is a good idea
- 4. Subscribe (Template), Unsubscribe()**
- 5. Subspace management**
 - Adding a space parameter to the above ones
- 6. Transaction management**

■ Tuple spaces: Templates by values, types

<"request", integer, string>

<"request", 1, "apple"> 

<"request", 2, "apple", "today"> 

<"solicitud", "manzana", 1> 

<"response", 1, "apple", 0.75, "Euro"> 

Triplespace Templates Use Semantics

■ Triple spaces: queries for reasoner

{ ?x a Request; quantity ?y; product ?z }

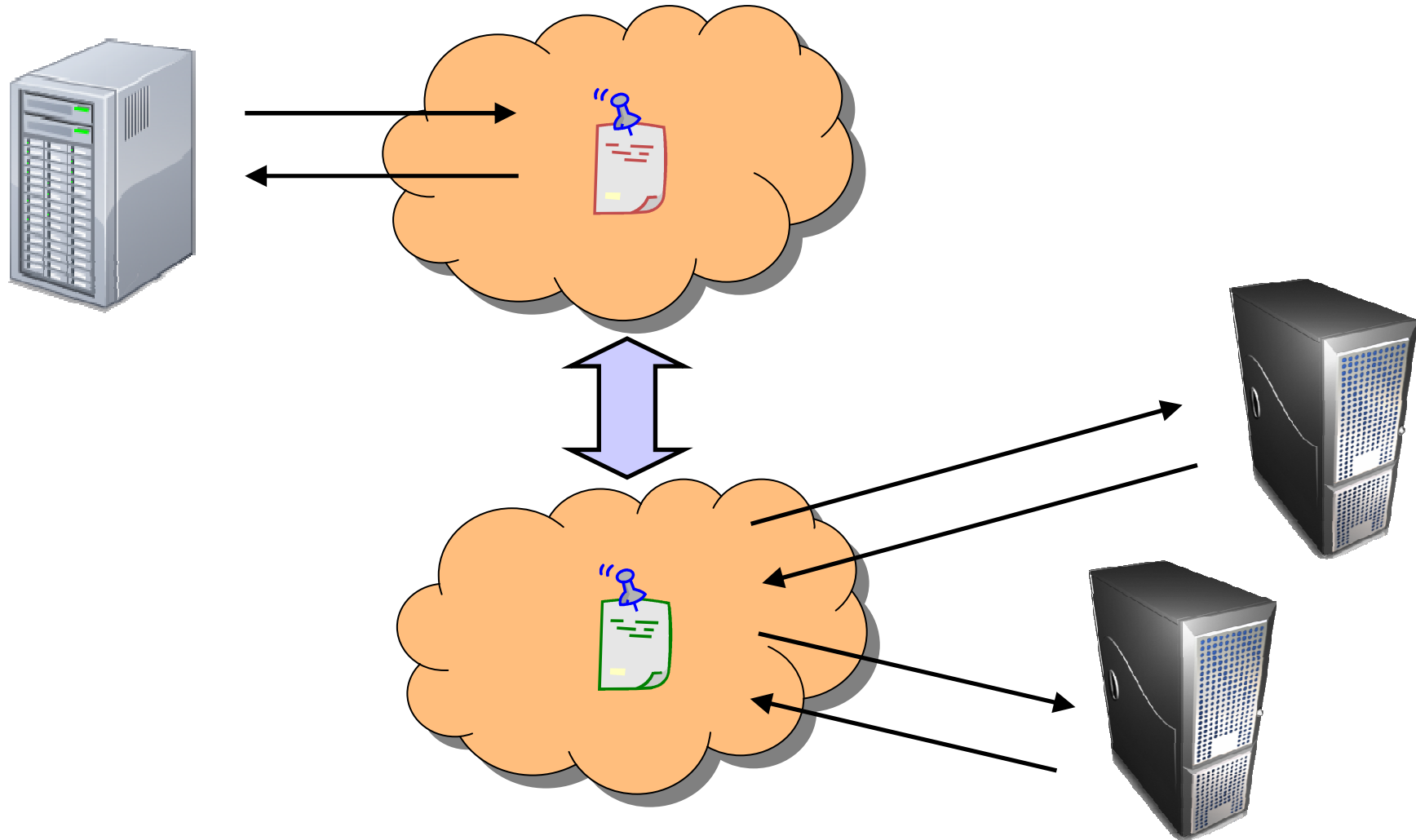
{ a1 a Request; quantity 1; product **Apple** . } 

{ a2 a Request; quantity 1; product Apple; date today . } 

{ a3 a Solicitud; cantidad 1; producto Manzana . } 

{ b1 a Response; request **a1**; price **0.75^^Euro** . } 

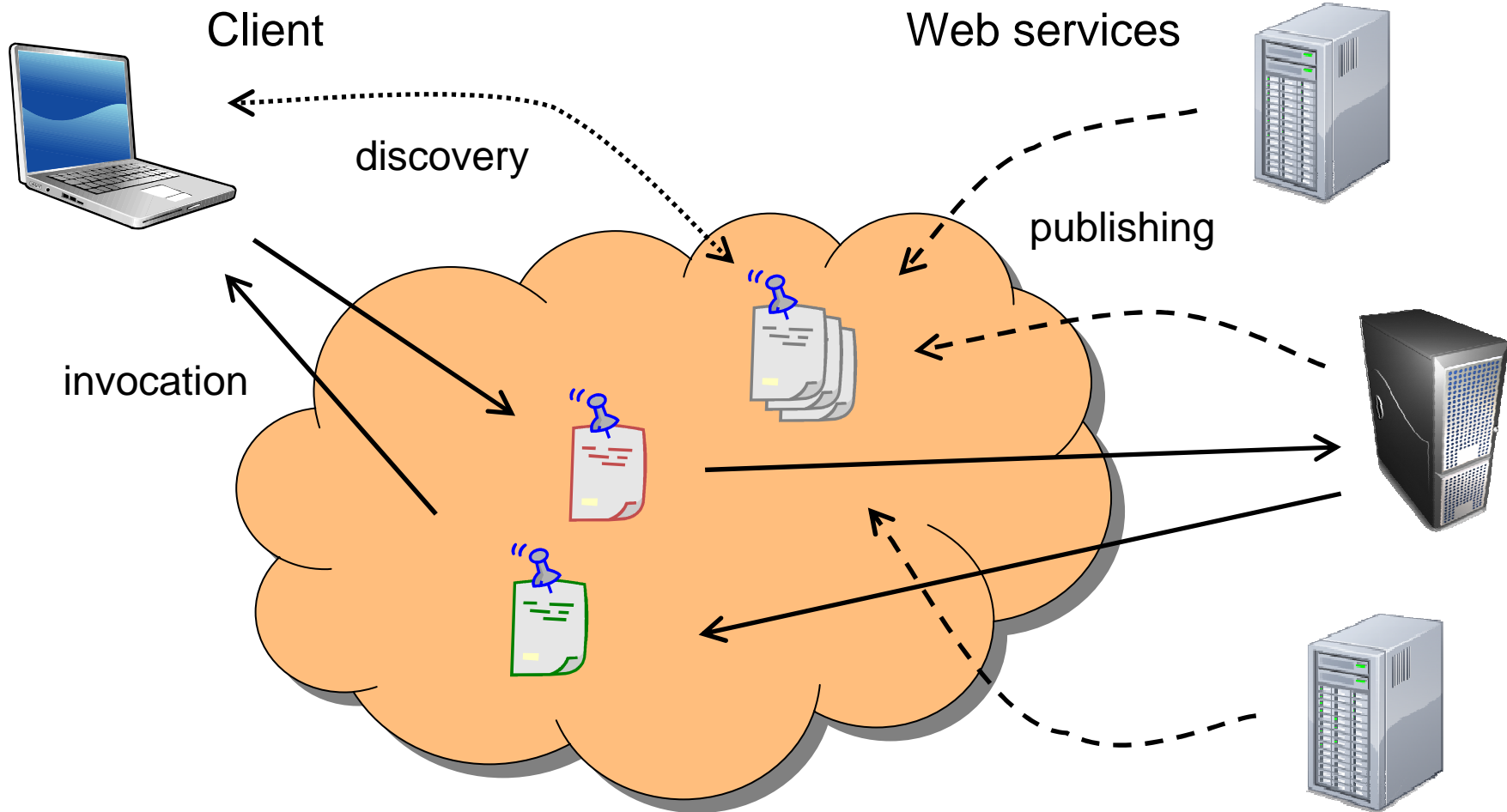
Peer-to-peer Distributed Spaces



Triple Space Functions Summary

- **Persistent publication** of semantic data
- Retrieval by **semantic matching**
- **Mediation** of data between heterogeneous services
- Semantics-aware **distribution** of data
- **Coordination** of concurrent access situations
- Appropriate **security and trust** mechanisms
- Use of **Web service protocol stack** and **Semantic Web** technologies

Space as a Service Bus ←



Semantic Spaces: Conclusions

- **Spaces are:**
 - **Communication medium**
 - **Means of coordination**
 - **An indirection in space and time**
- **Semantics enable:**
 - **Powerful data access**
 - **Mediation in face of heterogeneities**
- **Semantic Spaces underlie Service Bus**

Thank You! ←

SOA + ALL

Semantics
Web2.0
Web Services
Context

The logo for SOA4All features the words 'SOA' and 'ALL' in large, bold, black, 3D-style letters. Between them is a plus sign formed by four overlapping, rounded rectangular bars: a purple bar for 'Semantics', an orange bar for 'Web2.0', a green bar for 'Web Services', and a yellow bar for 'Context'. The text is written vertically on each bar.

www.soa4all.eu