UNIVERSITÀ DEGLI STUDI DI MILANO
FACOLTÀ DI SCIENZE MATEMATICHE, FISICHE E NATURALI

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Knowledge Representation in Virtual Teams: a perspective approach for Synthetic worlds

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Summary

- Context: VOs & VTs sustainability
- Semantic ladder & approaches to social interaction
- Multi User Virtual Environments (Synthetic Worlds)

- A perspective approach
- Architectural aspects
- Conclusion and future issues/development

Sustainable VTs

- *Socio-cultural misalignement* among units/functions creates barriers against integration:
  - Personality
  - Cultural
  - Language
  - Organizational
  - Physical

- that worsen in Virtual Teams/Organizations

- **socio-economical impact/sustainability**

Sustainable VTs

- Integration often addressed through integration of information systems … and …

- Good interaction ⇔ good social interaction pattern established among actors:

Not only data, but also **social systems** and **social networks** should be integrated

Sustainable VTs

- Key survival factor for VTs: effective communication based on digital technologies

- Understanding **how** ICTs support communication, social interaction and knowledge generation/sharing is crucial

… a quite complex, multidisciplinary problem …

Semiotic ladder

(Stamper 1996)

MUVE

Creation of emotional loci, able to support tacit knowledge sharing

Web2.0

Semantic web

SOCIAL WORLD: beliefs, expectations, commitments, contracts, social law, culture, ...

PRAGMATICS: intentions, communications, conversation, negotiations, speech acts, ...

SEMANTICS: meaning, propositions, validity, truth, signification, denotations, ...

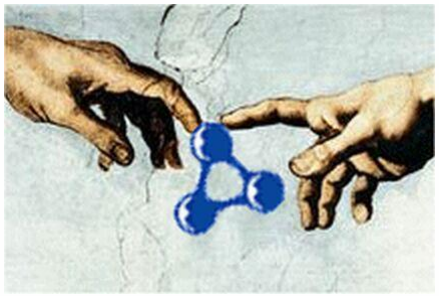
SYNTACTICS: formal structure, language, logic, data, records, deduction, software, files, ...

EMPIRICS: pattern, variety, noise, entropy, channel capacity, codes, efficiency, redundancy, ...

PHYSICAL WORLD: signals, traces, physical distinctions, hardware, physical tokens, component density, speeds, economics, laws of nature, ...

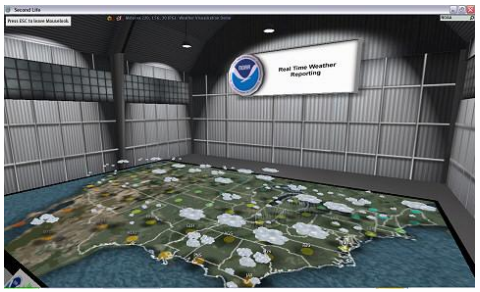
Possible “alternative” approaches …

- Semantic web:
  - + Tools for managing explicit knowledge (ontologies, semantic search, …)
  - – Social interaction and tacit knowledge neglected
  - – Costs …
- Web 2.0:
  - + Knowledge shared on a social basis
  - + Flexible knowledge representations
  - – Limited semantic search
  - – No clear point of aggregation
  - – Mesh-up of different technologies
- MUVEs (synthetic worlds):
  - + Augment actual lives (identity, relations) of users
  - + Supports/Teach patterns related to social interaction and status management
  - – Poor systems to collect/organize/retrieve/share knowledge



Virtual worlds & MUVEs: a definition

- "A VW is any computer-generated **physical space** that can be experienced by many people at the same time" (Castronova, 2005)
- "VWs are places of **human culture** realized by computer programs through the Internet" (Boellstorff, 2007)



- Hence VWs are (at least):
  1. Places
  2. Inhabited by persons
  3. Enabled by online technologies

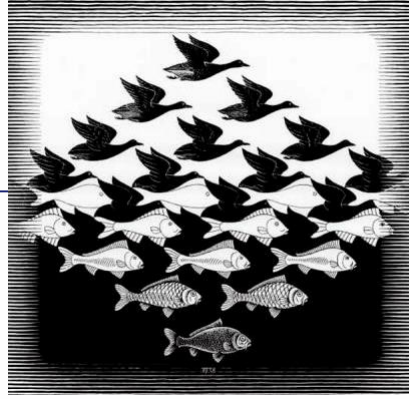
… but NOT necessarily also/only a game …

Several observations on MUVEs …

1. online **identity** is an extension of actual identity, that is a socio-cultural construct evolving in time
2. Online **social networks** emerge in the possibility space offered by the internet, as extension of our actual social networks
3. Online **places** are extensions of "actual" places, both public and private.

4. **online identity, relations and places can interact to augment "actual" social life of individuals**

But MUVEs are also “games” …



“Games” are iconic depiction of PATTERNS

- They are more related to the way our brain works, than to the actual world
- Games are iconified representation of human experience that we can (safely!) PRACTICE with and learn patterns from

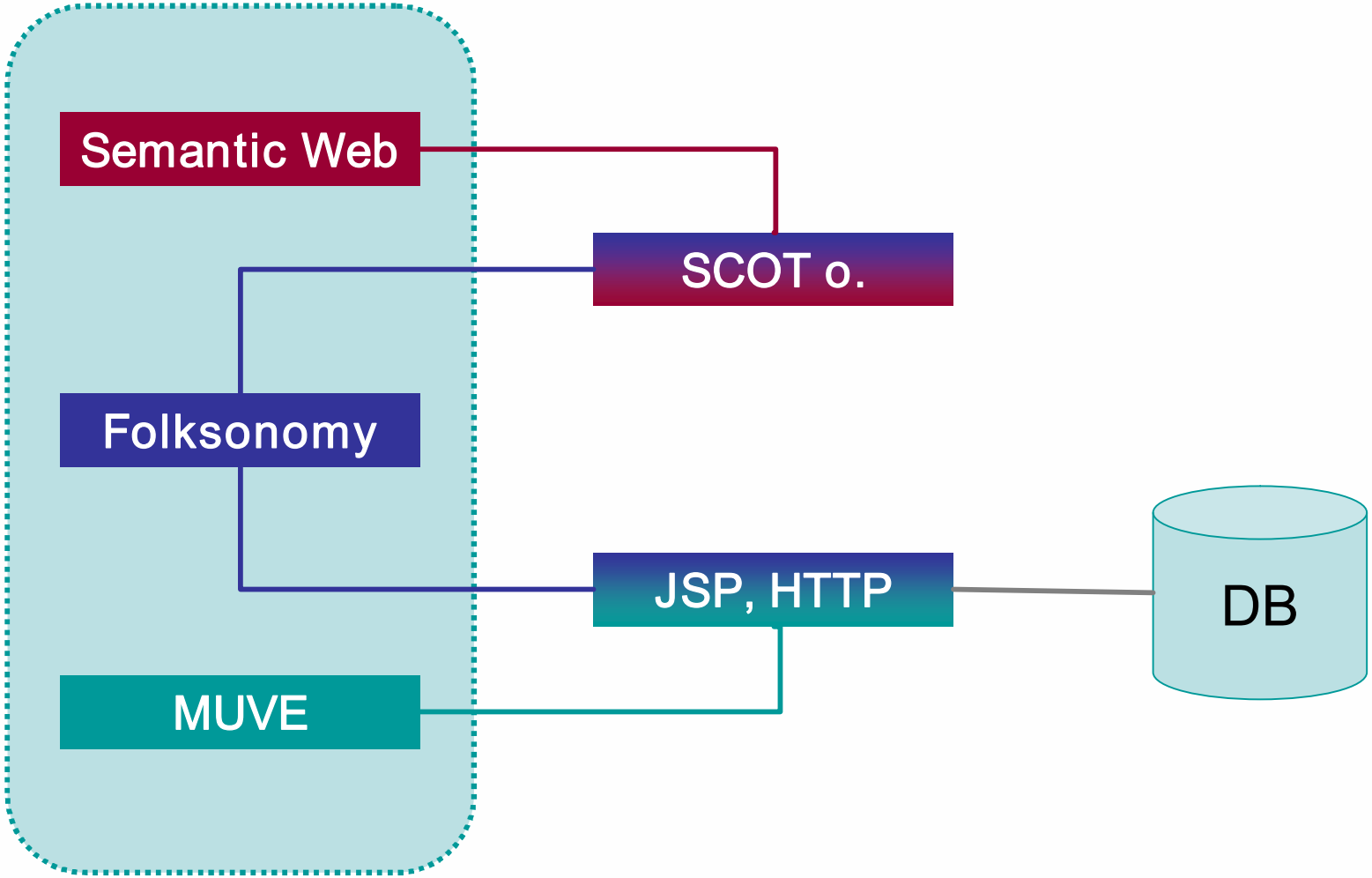
- Social interactions: manoevering for social status, that all humans engage in, is a cognitive exercise => essentially a game! => **SYNTHETIC WORLDS**

Our perspective approach

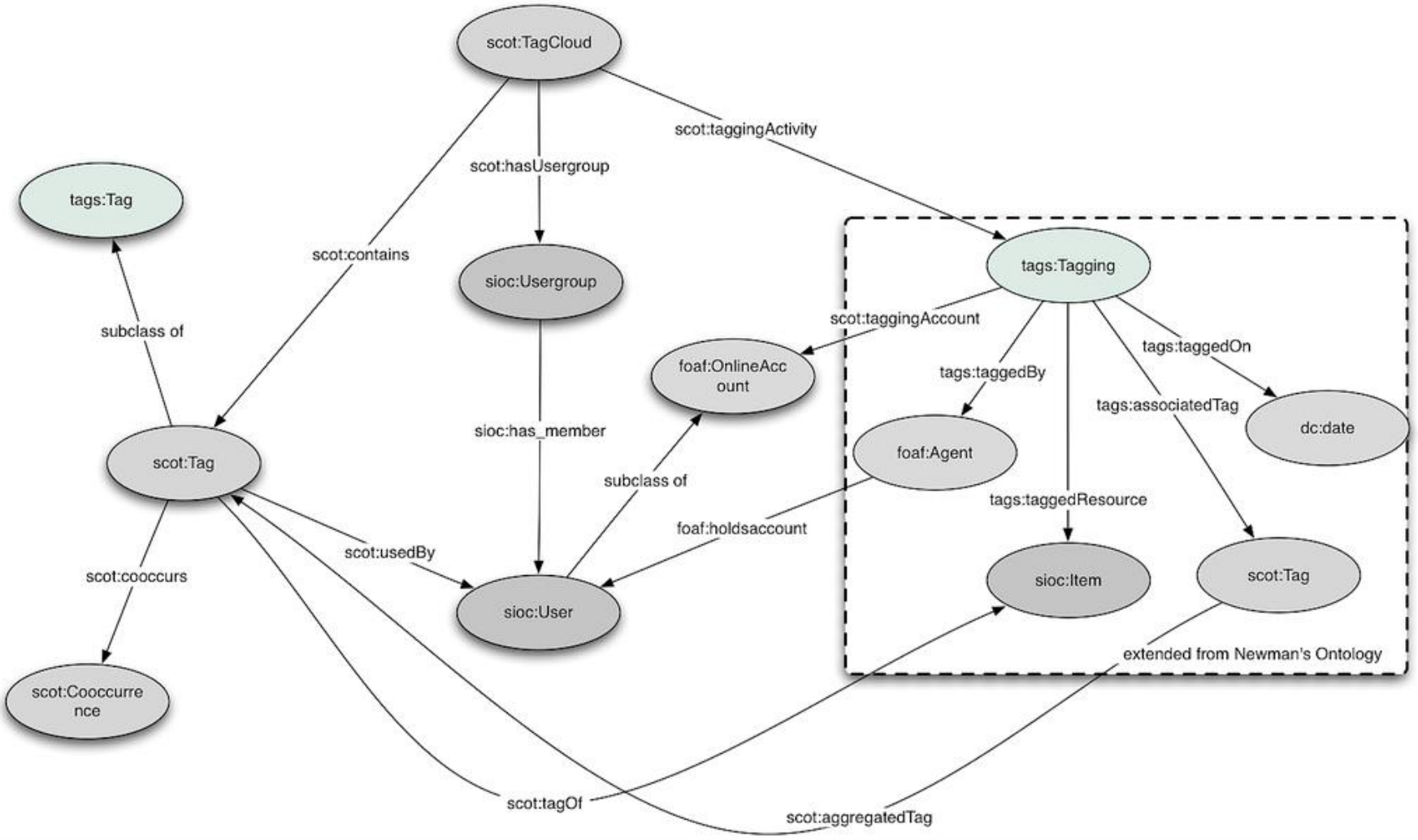
- If none of the previous approaches (SW, folksonomies, MUVEs) ALONE is enough to support the whole semiotic ladder…

… WHY NOT TRY TO INTEGRATE THEM?

Mixing the approaches …



Scot Ontology

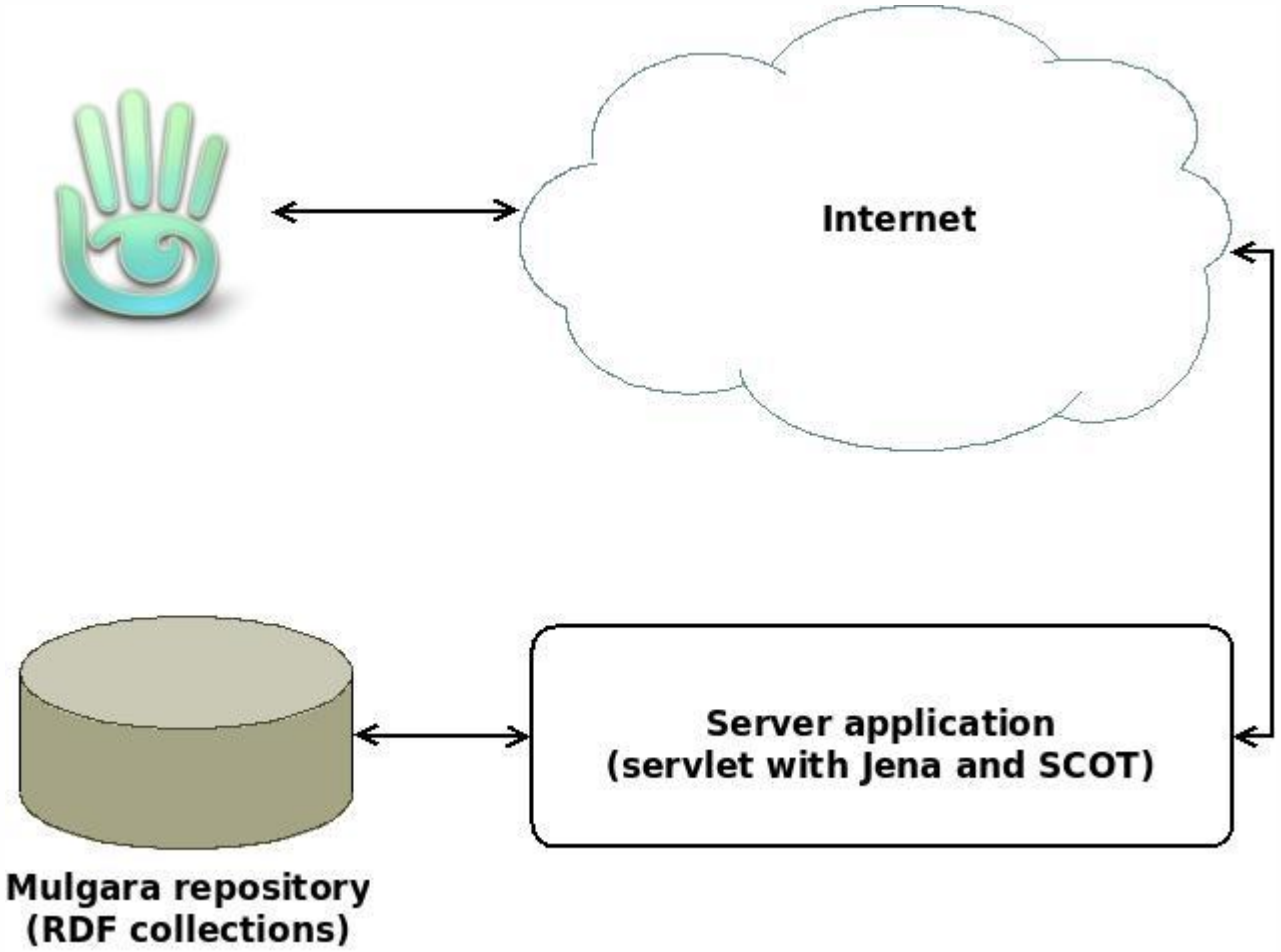


Pros and cons of Second Life

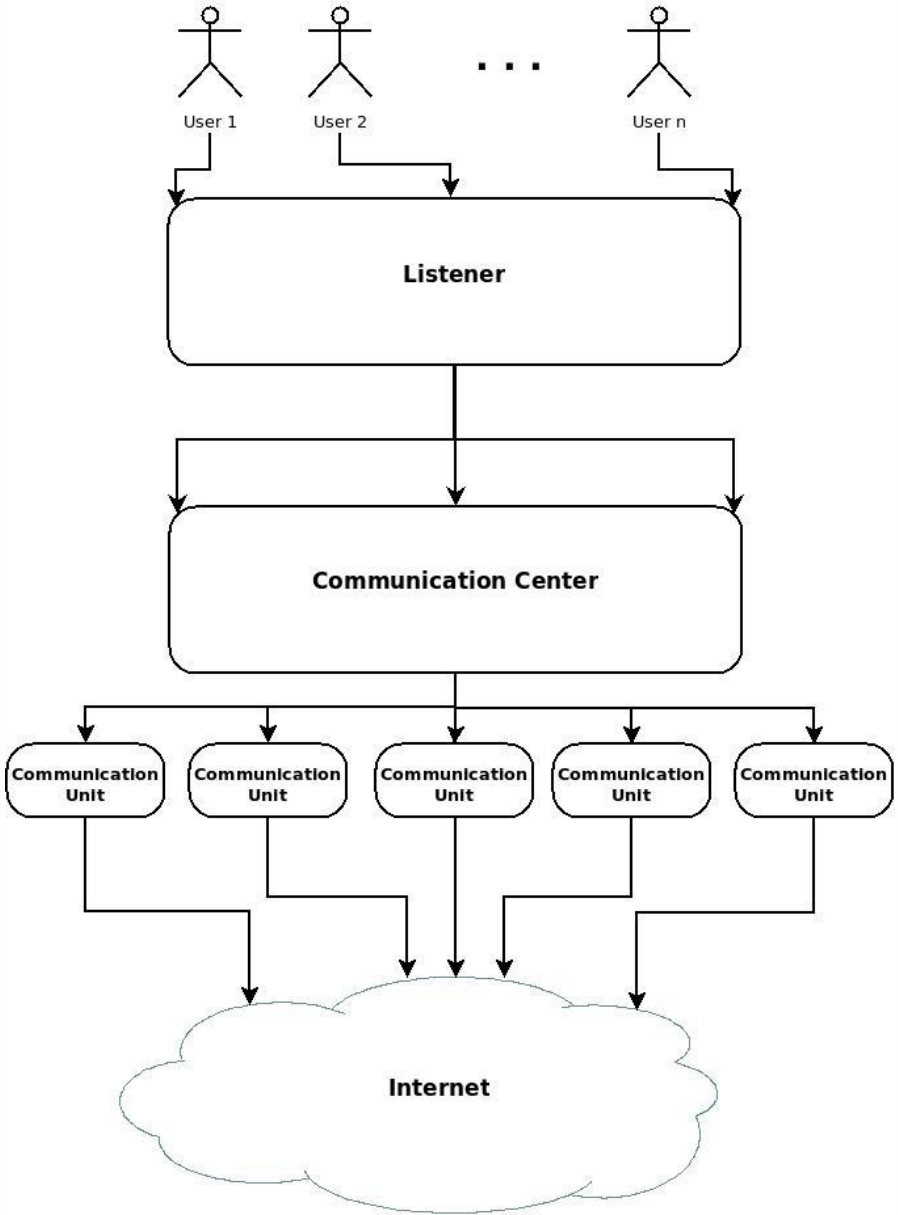
+ Immersive/social environment
+ Easy to use
+ Learning curve not steep
+ Interactive
+ Several great players already present
+ Widely diffused
+ Not (only) a game
+ Lots of academic & research activities

- Programming tools
- Costs
- Data secrecy, QoS, continuity of services, legacy
- Connections with the Web
- Client based

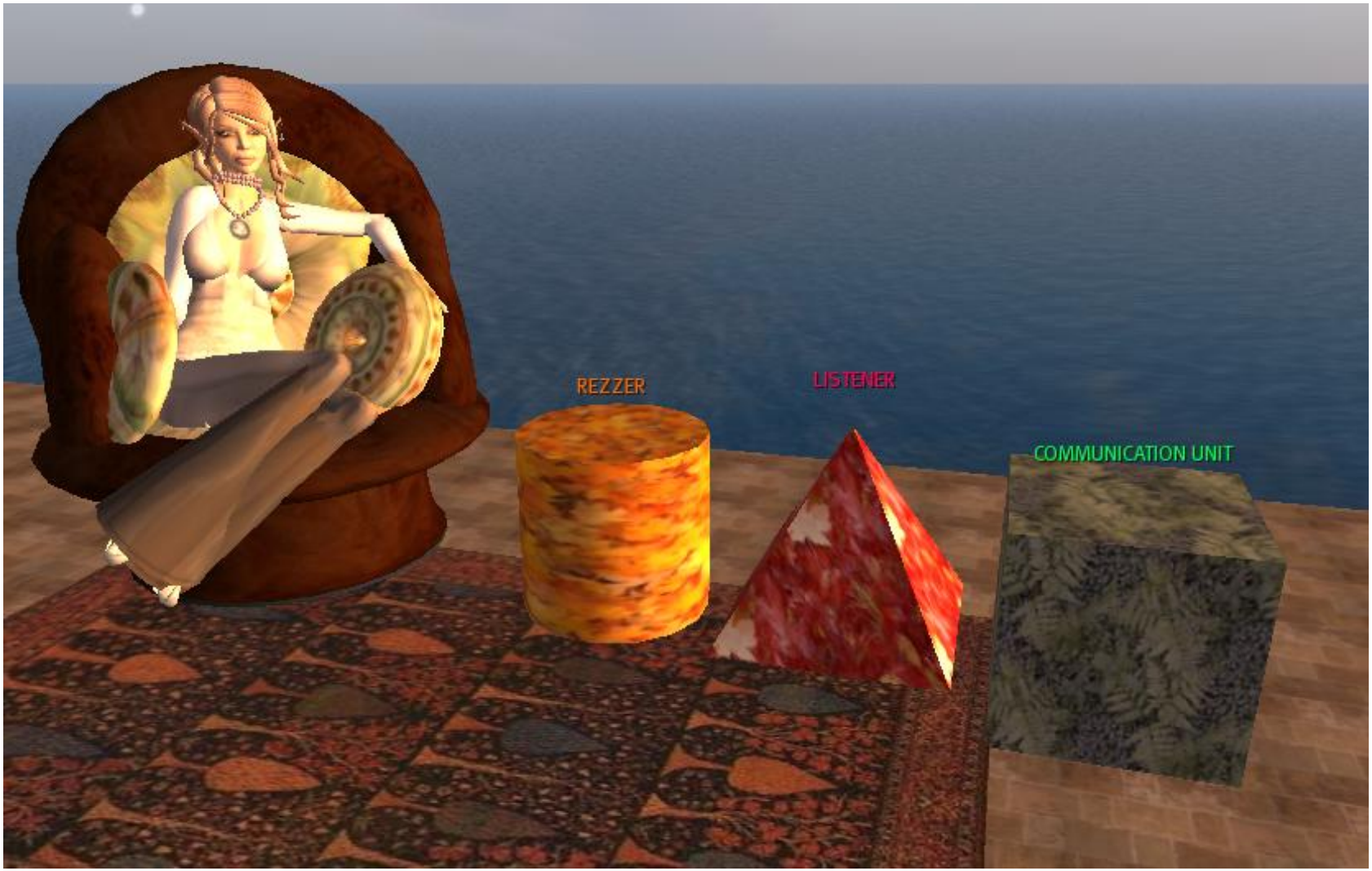
The architecture of our application



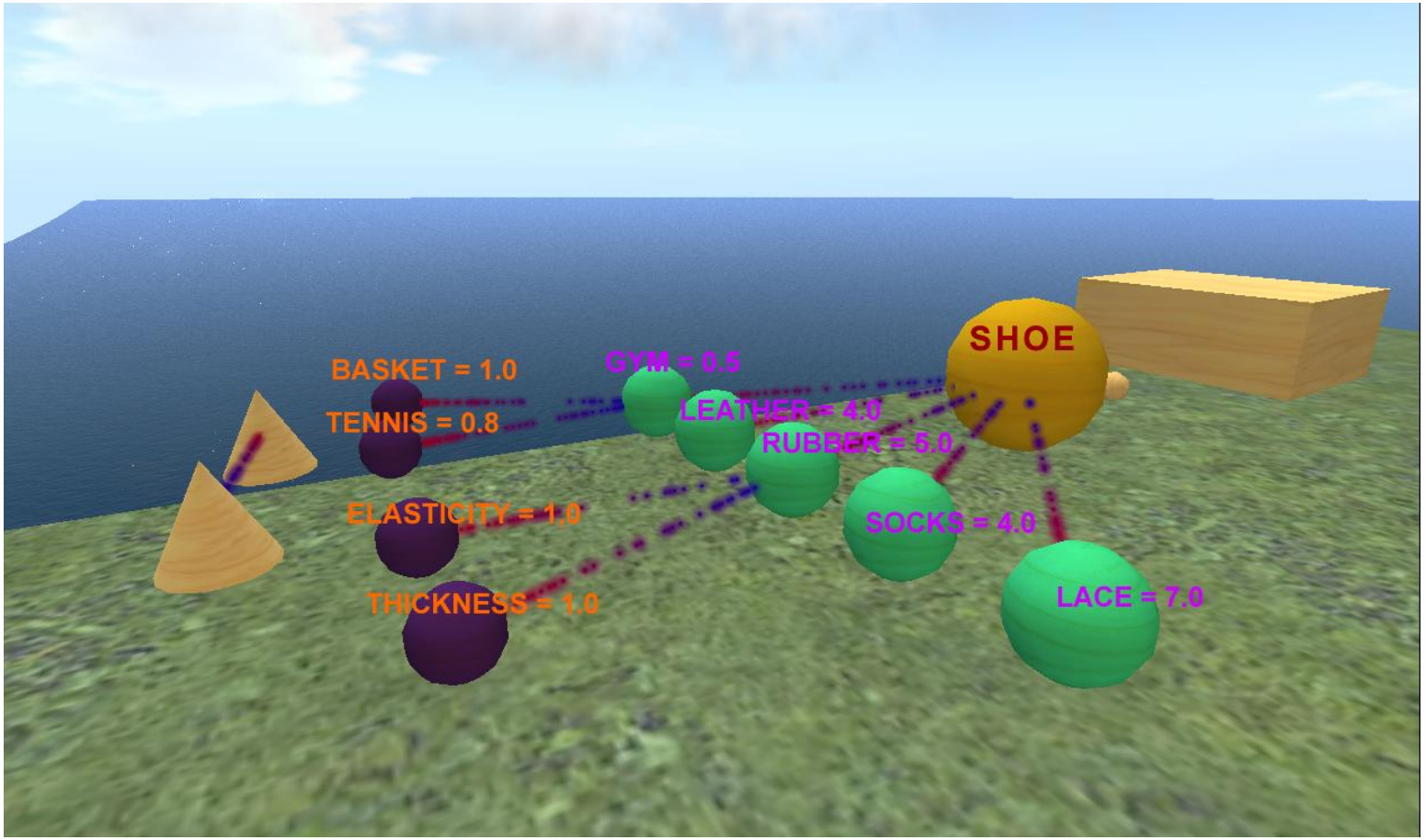
The architecture of our application



The interface



The application



Conclusions and future issues

- From our proof-of-concept to a deployed application
- Scalability
- Authentication/security
- Porting to other MUVE platforms (e.g. Unity)

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PRO-VE

THANK YOU FOR YOUR ATTENTION