

## The Question of Discovery and Search in the Future Internet

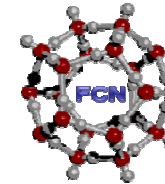
**Caretakers:**

**John Domingue**

**Petros Daras**

OU and STI

CERTH/ITI



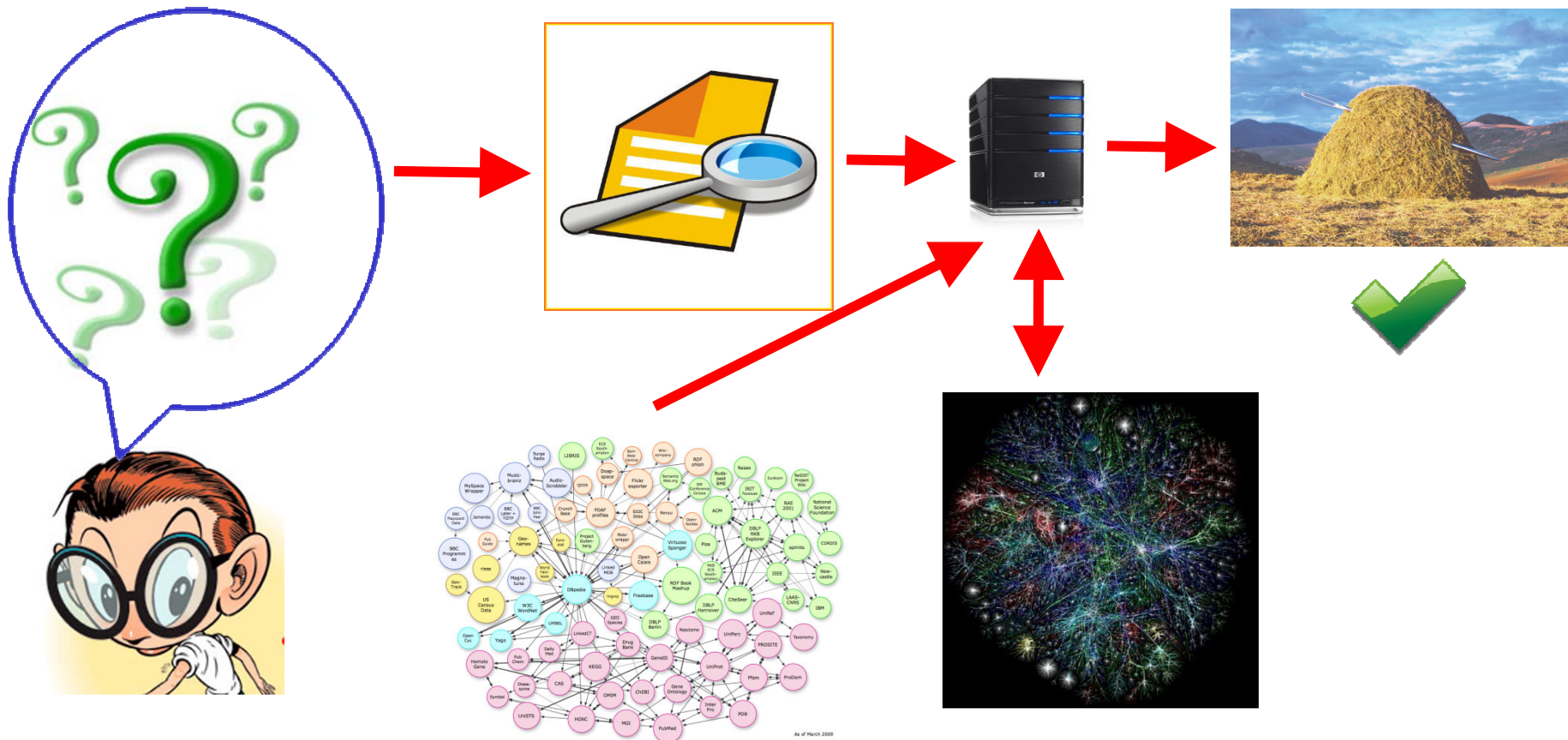
**EC Contacts:**

**Anne-Marie Sassen**

**Isidro Laso-Ballesteros**

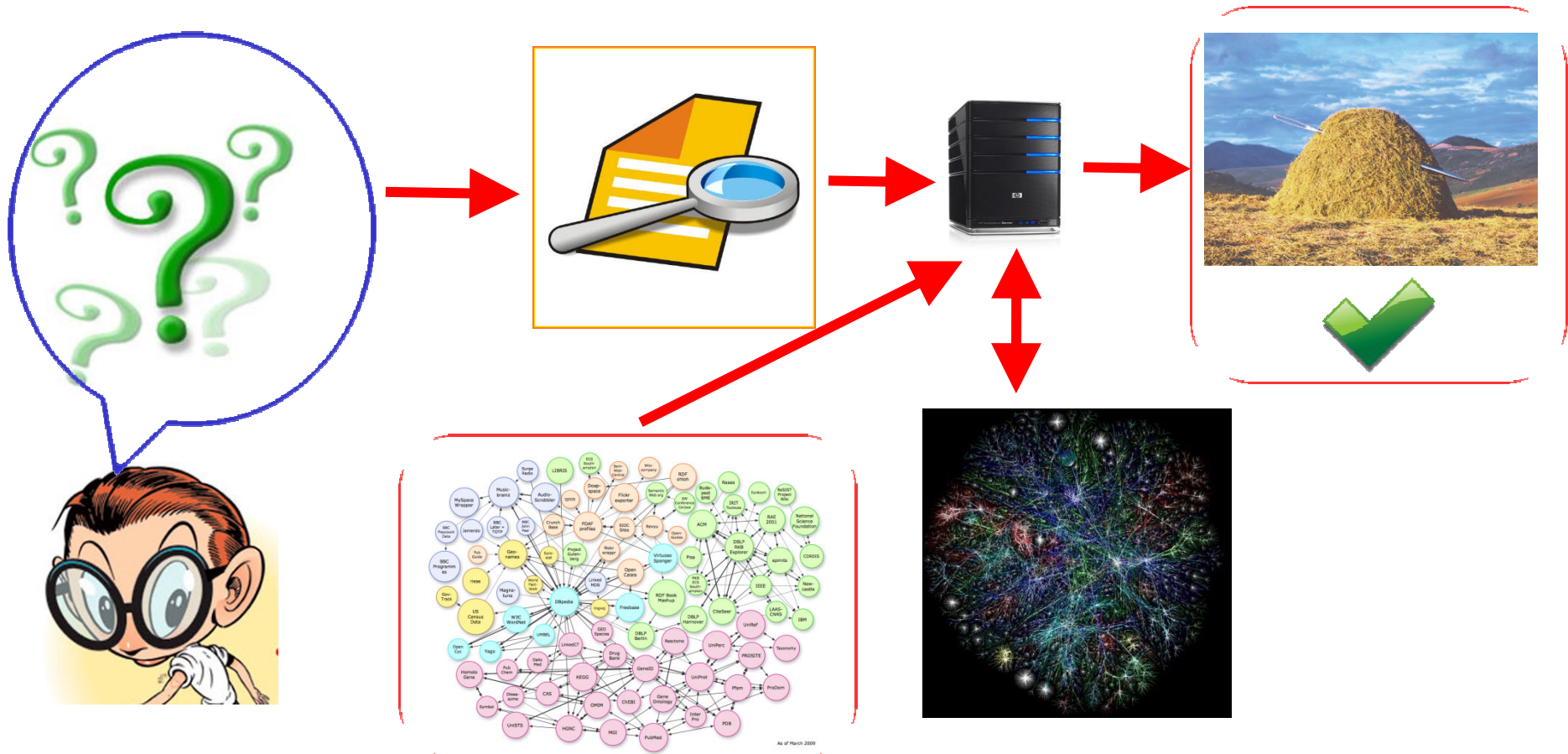
# Search Definition

- 'Best' use of available (human or machine generated) knowledge to provide the user with meaningful information even if his/her request is poorly formulated and typically unanticipated.



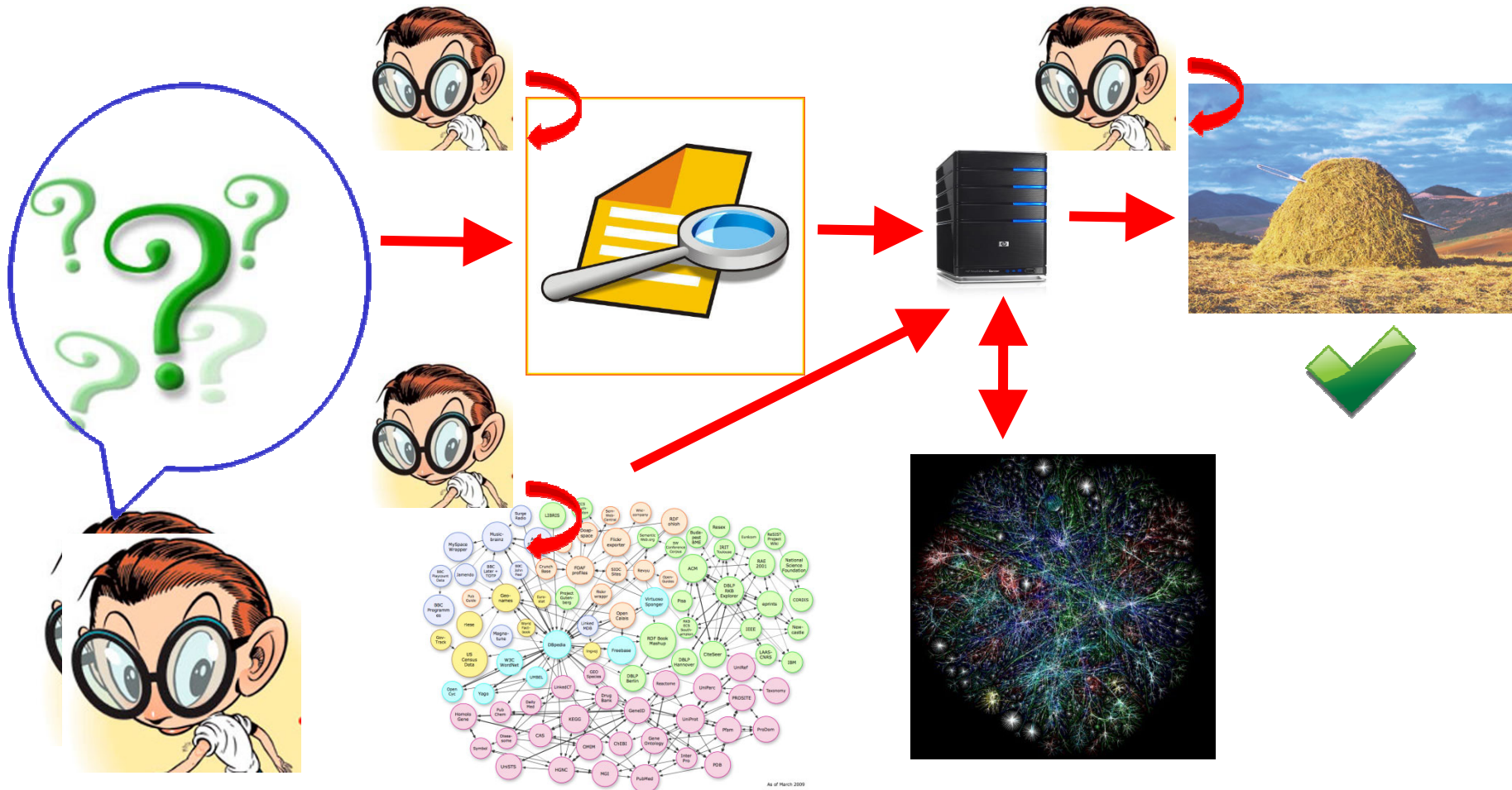
# Value and Efficiency

- The value of a search engine depends on how efficiently the knowledge is managed and how easily the information is accessed and understood by the end user.



# User in the Loop

- Maximises a SE's efficiency when it can learn and accommodate user preferences (through online and off-line learning) from user interactions



# Search: a cross-disciplinary topic

Search involves a number of different disciplines within the FI, including:

- ❑ **FCNs:** a) content as the main ingredient of media, and b), networks in terms of improving the user's experience and satisfaction;
- ❑ **IoT:** resource and information discovery from a sea of heterogeneous devices and sensors;
- ❑ **IoS:** service discovery approaches range from keyword search over service directories to semantic approaches which delineate between a service capability (what the service does), non-functional properties, and descriptions of service behaviour.

# Search and the FI

❑ Internet evolution: rich content, immersive experiences, interaction, networked sensors, services, new applications...

❑ Text-based search is not any more the best choice...



❑ Content/context-based search seems to be a solution...

## **Main Current Issue**

**Towards common understanding  
between the different communities**

## **Common objectives (categories of questions)**

- ❑ **Heterogeneity and diversity issues, concerning resources, information sources, infrastructure, user communities, etc;**
- ❑ **Human factors, concerning “the user in the loop”, feedback, personalisation, recommendations, interaction with the information, emotional characteristics, etc;**
- ❑ **Real time issues, concerning content/media indexing and retrieval, visibility, aggregation, re-composition of services, etc;**
- ❑ **Security and privacy issues; (FIA Valencia)**
- ❑ **Evaluation and benchmarking issues. (FIA Valencia)**





<b>Heterogeneity &amp; Diversity</b>	<b>Human Factors</b>	<b>Real Time Issues</b>	<b>Security &amp; Privacy</b>	<b>Evaluation &amp; Benchmarking</b>
<p>Q1.1: How do we best support the formulation of search queries over possibly rich FI artefacts, over a set of different types of devices and modalities?</p> <p>Q1.2: Given the Polymorphic facets of the Internet how a SE should look like? Are the open, federated search services a/the solution</p> <p>Q1.3: Do we need specific infrastructures and representations to support search by agents?</p> <p>Q1.4: Can we chain (interoperate) search and discovery engines?</p>	<p>Q2.1: how do we support discovery using social/emotional cues, individual vs group (is the group an average over the individuals?).</p> <p>Q2.2: How do we best take into account the diversity of the user community?</p> <p>Q2.3: How do we address ranking, user feedback about the relevance of search results, and quality of the recovered information?</p>	<p>Q3.1: How do we manage service &amp; discovery in the FI in real-time when everything (producers, consumers, networks) is recomposing and moving in real-time?</p> <p>Q3.2: How do we manage the visibility of services in real-time?</p> <p>Q3.3: How do balance visibility and real-time requirements?</p> <p>Q3.4: How do we manage changing relationships?</p> <p>Q3.5: Should we discern between different types of urgency?</p>	<p>Q4.1: How do we manage privacy, trust and security within search?</p>	<p>Q5.1: How can we evaluate our SEs in FIRE facilities?</p>

Heterogeneity & Diversity	Human Factors	Real Time Issues	Security & Privacy	Evaluation & Benchmarking
<p>Q1.5: How can we implement/architect search and discovery over a range of information artifacts including services, sensor networks and rich multimedia content? What types of indexing/caching could support FI search and discovery?</p> <p>Q1.6: What types of representations (meta-data) could we use to support Future Internet search across the heterogeneous resources? How would these be created and maintained?</p>	<p>Q2.4: How do we best incorporate human computation into search and discovery engines?</p> <p>Q2.5: How can we provide better recommendation systems based on SEs?</p>			

# What we want to achieve

- ❑ **Common understanding**
- ❑ **Types of representations or meta-data models that could be used to support FI search.**
- ❑ **Architectural considerations (centralised vs. distributed search, fixed & mobile devices, etc.)**
- ❑ Standards
- ❑ Evaluation, benchmarking
- ❑ Security and trust

# Agenda

16:30 - 16:40	<b>BO Session goals</b>	Petros Daras, CERTH/ITI	
16:40 – 17:00 ~05 min talk ~15 min Q&A	<b>Perspective of the FCN group</b>	Ralph Trapfoener, EMPOLIS	
17:00 – 17:20 ~05 min talk ~15 min Q&A	<b>Perspective of the FISO group</b>	Dieter Fensel, UIBK	
17:20-17:40 ~05 min talk ~15 min Q&A	<b>Perspective of the RWI group</b>	Neeli Prasad, Un. of Aalborg	
17:40 - 18:00	<b>Round Table Discussion</b>	Chair: John Domingue, OU	