Initial thoughts about existence in the Web

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The Web emerged as an antidote to the rapidly increasing quantity of accumulated knowledge and become successful because it facilitates massive participation and communication with minimum costs. Despite the fact that the enormous impact, scale and dynamism of the Web in time and space make very difficult to anticipate the effects in human society, we demand it to be fast, secure, reliable, all-inclusive and trustworthy. It becomes the time for science to pay back the debt to the Web and provide an epistemological "antidote" to these issues. On this campaign, Philosophy should be in the front line by forming the main questions and setting the research framework.

The scope of our research is to initiate the dialogue for a theory about existence and the basic functions in the Web that will serve as a bridge between philosophical thinking/engineering and applied science (e.g. economics, computer science).

Being in the Web: initial definitions

Various names describe the underpinning unit of the Web ecosystem as "resource", "object", etc. Responding to Alexandre Monnin's call for a more precise description of "resources" we propose the concepts of "Beings" and "Web Beings" and their basic functional framework.

It is important to introduce *existence* in the Web, based on a clear, minimal and pragmatic definition, which describes the Web as an integral part of the world and could be useful for Web scholars and engineers. The following definitions are in initial form and open to debate and improvements.

Beings: A Being exists for a User if and only if there is a communication channel linking the User to it. Particularly, in this way we define existence and ontologies for classes of Users like the Web Users. This definition is not only practical but also general enough to include the most abstract metaphysicians.

Web Beings (WBs): Web Beings are the Beings that can be communicated through the Web. The URI is the invariant element characterizing unambiguously the WB. It is like the "fingerprint" of the WB. All the other characteristics of the WB may change in time. A change in URI means the creation of a new WB.

WBs can be information-based (e.g. hypertext) or non-information-based Beings (e.g. car), but in both cases are named, referred, identified through at least one URI, which constitutes the minimum amount of information. The discussion about non-information-based Web Beings will become useful in the case of massification of Internet/Web of things. For the moment, we will focus on information-based WBs.

These two fundamental definitions will enable us to communicate and model, across related disciplines, emerging concepts like artifactualization, network individualism, privatised space and peer production.

Linking and virtualization

The two most innovative and important properties of WBs is *linking* and *virtualization*. The ease to form links between WBs and Beings and WBs themselves, has been facilitated the description, access, understanding and use of complex relations.

Apart from massive navigation, aggregation and recombinance, the Web extends *aspatiality* of Beings. Aspatiality of WBs is not identical to the definition of aspatiality in Plato's theory of Forms Ideas, which refer to the absence of spatial dimensions, and thus no orientation in space. WBs are real bits located in physical devices (e.g. Web server). Furthermore, aspatiality of WBs does not connote that physical space is not an important factor. In economy, geography still matters and especially in the production of knowledge-intensive industries, which synchronous

face-to-face interactions and critical mass in human capital are critical inputs. The major implication of aspatiality is that transportation costs are negligible, creating a new rage of possibilities.

WBs are also accessible *anytime*. Actually, the Web expands aspatiality and *atemporality* of Beings from local level (e.g. hard disk) to global level (e.g. downloadable file). Intuitively, every Web User can access all available WBs anytime from anywhere. We are all "potential" (or "quasi") owners of each WB, in the sense that may not reside in our memory device but can be downloaded almost instantly. This fundamental expansion of property and existence can be better captured by the concept of *virtualization*. According to Lévy: *"Virtualization is not derealization (the transformation of a reality into a collection of possibles) but a change of identity, a displacement of the center of ontological gravity of the object considered…. The real resembles the possible. The actual, however, in no way resembles the virtual. It responds to it….Rigorously defined, the virtual has few affinities with the false, the illusionary, the imaginary. The virtual is not at all the opposite of the real. It is, on the contrary, a powerful and productive mode of Being, a mode that gives free rein to creative processes."*

The Being-Query ontological model

These emerging properties of linking and virtualization create new possibilities and redistribute existing human efforts, resulting more complex relations in the personal and social level. We propose to address this new form of complexity by describing the core functions of Beings and WBs under a single framework. The following analysis builds on results of mental models and cognitive processes.

Let us assume that our initial objects of study are *Beings* and *Queries*. A Query is the phrasing of a question by a Being, usually in terms of a code. The questions are messages expressed as sequences of symbols in the query language. Beings have Queries that address them to other Beings. For instance, plants ask for water and scholars search for information. Queries create connections among Beings. A useful description of the class of Queries is in terms of semantic networks. By this way we can include discussions in term of Topics. Queries are organized in Topics in order to be tractable and processable. Beings under investigation (Users) are separated from the rest of Beings. Beings, Queries, Topics and Users are described by the contraction of four interconnected networks (Figure 1).

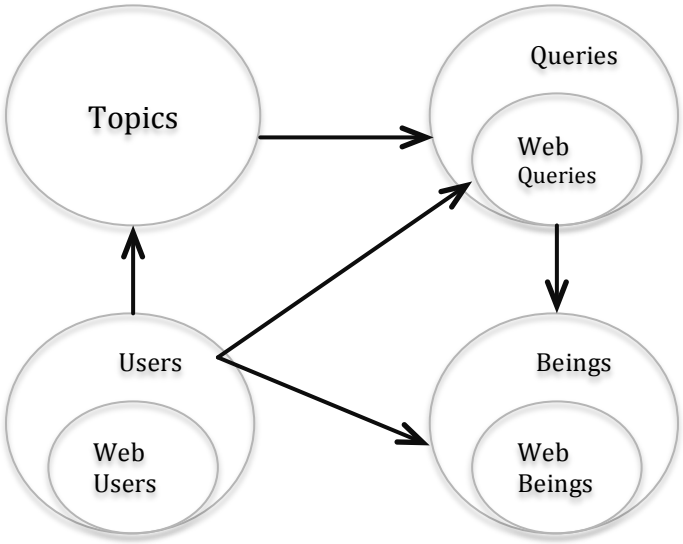

Figure 1: The Being-Query quad graph is defined to be a contraction of four interconnected networks: Users, Topics, Queries and Beings.

The Web expands Beings to include WBs, Queries to include Web Queries and Users to include Web Users. Web Users are explicitly or implicitly interested in specific Topics to navigate and edit the Web. The concept graph is defined with concepts as nodes and semantic relations as links and includes the Topics used in the assessment of WBs. Search Engines are considered to be mechanisms that get as inputs Queries and produce results as collections of WBs. The Web graph is formed by WBs as nodes and hyperlinks as links. The Web network accrues from the Web graph in the case of assigning random variables in order to assess nodes and links. For instance, WBs can be assessed by content (e.g. TF-IDF). Hyperlink assessment is usually called weight and may be deterministic or random. Modeling and analysis of co-evolution of all four interconnected networks (Users, Topics, Queries and Web Beings) is a difficult task and an important challenge to anticipate in a complex network as the Web. There is not yet a model, to the best of our knowledge, which explicitly models all the four interconnected networks and their connections in the Web (existing models in economics, marketing and computer science analyze at most three of the four components).

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