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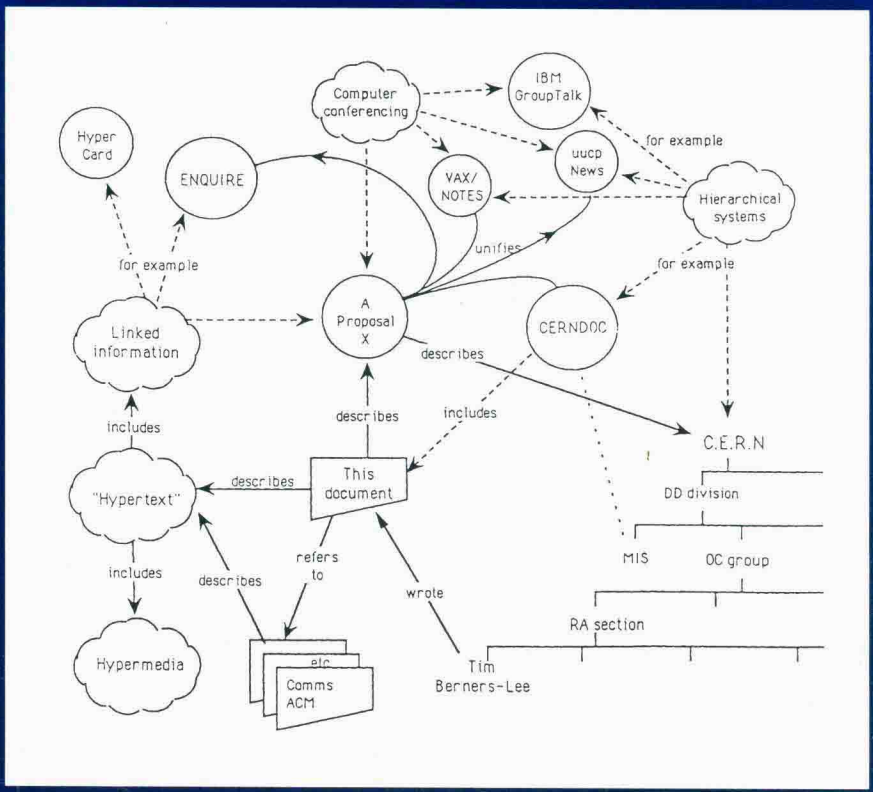
Toward a Philosophy of the Web



Edited by
Harry Halpin and Alexandre Monnin

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Toward a Philosophy of the Web

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350 Main Street, Malden, MA 02148-5020, USA
9600 Garsington Road, Oxford, OX4 2DQ, UK
The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

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NOTES ON CONTRIBUTORS

Tim Berners-Lee invented the World Wide Web while at CERN in 1989. He is director of the World Wide Web Consortium, a Web standards organization he founded in 1994, which develops interoperable technologies to lead the Web to its full potential. He is a professor of engineering at the Laboratory for Computer Science and Artificial Intelligence at the Massachusetts Institute of Technology, and also a professor in the Electronics and Computer Science Department at the University of Southampton, UK.

Selmer Bringsjord is professor of logic and philosophy, computer science, cognitive science, and management and technology at Rensselaer Polytechnic Institute, the oldest technological university in the English-speaking world. He specializes in artificial intelligence and computational cognitive science, including the formal and philosophical foundations of both fields.

Andy Clark is professor of philosophy at the University of Edinburgh, and chair in logic and metaphysics. He previously taught at the Universities of Glasgow, Sussex, Washington (St. Louis), where he was director of the Philosophy/Neuroscience/Psychology Program, and Indiana. His extensive publications on embodied cognition, neural networking, and cognitive science made him one of the key figures in the field. These include the keystone book *Being There* as well as *Supersizing the Mind.*

Naveen Sundar Govindarajulu is a postdoctoral research associate at the Rensselaer AI & Reasoning Lab of Rensselaer Polytechnic Institute. His research continues work in building cognitively robust synthetic characters through formal modeling of self-consciousness in synthetic characters and building characters able to pass the mirror test for self-consciousness. His Ph.D. research overlaps with a Templeton Foundation-funded project, "Toward a Markedly Better Geography of Minds, Machines, and Math," to study and advance the mathematical frontiers of artificial intelligence research.

Harry Halpin is a visiting researcher at Institut de Recherche et d'Innovation du Centre Pompidou (PHILOWEB EU Marie Curie Fellowship). He is also a postdoctoral associate at Massachusetts Institute of Technology with the World Wide Web Consortium. He received his Ph.D. in Informatics from the University of Edinburgh under the supervision of Andy Clark and Henry Thompson. He published his thesis under the title *Social Semantics*. He is president of LEAP (LEAP Encryption Access Project), which works on providing open-source secure tools for activists.

Yuk Hui is a postdoctoral researcher at the Centre for Digital Cultures at Leuphana University, Lüneburg. He holds a Ph.D. in philosophy from Goldsmiths, University of London, and a B.Eng. in computer engineering from the University of Hong Kong. His Ph.D. thesis, "On the Existence of Digital Objects," proposes a new philosophical understanding of data and experience by bridging the works of Martin Heidegger, Edmund Husserl, and Gilbert Simondon.

Pierre Livet was formerly professor at the University of Franche-Comté and the University of Provence, and is now professor emeritus at the University of Aix-Marseille. His areas of research are the epistemology and ontology of social sciences (sociology and economics), the theory of action, the theory of emotions, and the epistemology of cognitive sciences. He is a member of CEPERC and IMÉRA at the University of Aix-Marseille.

Alexandre Monnin holds a Ph.D. in philosophy from Paris 1 Panthéon-Sorbonne, on the philosophy of the Web. He is associate researcher at Inria Sophia-Antipolis, where he co-initiated the francophone DBpedia project and the SemanticPedia platform, and co-chair of the W3C "Philosophy of the Web" Community Group. He was named one of the twenty-five experts of Etalab, the French government's open-data agency under the responsibility of the prime minister. He was previously visiting fellow at Internationales Kolleg für Kulturtechnikforschung undMedienphilosophie (Bahaus University, Weimar) and head of Web Research at Institut de Recherche et d'Innovation, Centre Georges Pompidou for three years.

Thomas W. Simpson is University Lecturer in Philosophy and Public Policy at the Blavatnik School of Government, University of Oxford. After completing his doctoral thesis entitled "Trust on the Internet" in the Faculty of Philosophy at the University of Cambridge, he took up a research fellowship at Sidney Sussex College, Cambridge. His research interests are in testimony and social epistemology, trust, applied ethics in the philosophy of technology, and the ethics of war.

Paul R. Smart is a senior research fellow in the School of Electronics and Computer Science at the University of Southampton. His main area of research is the Semantic Web, but he is also involved in research activities that sit at the interface of the network, Web, and cognitive sciences. He is currently involved in research that seeks to further our understanding of the effect that network-enabled technologies have on cognitive processes.

Johnny Hartz Søraker is assistant professor in the Department of Philosophy at the University of Twente, where he received his Ph.D. cum laude, on virtual worlds and their impact on quality of life. He has published extensively on topics within computer ethics and the philosophy of technology, and is currently working on a project that aims to synthesize the ethics of technology and positive psychology.

Petros Stefaneas is a lecturer in the Department of Mathematics at the National Technical University of Athens. He has studied at the University of Athens, the University of Oxford (in Programming Research Group), and the National Technical University of Athens. His research interests include logic and computation, formal methods, the Web and philosophy, the information society, and new media.

Bernard Stiegler, philosopher, is president of the Association Ars Industrialis, director of the Institut de Recherche et d'Innovation du Centre Pompidou, and professor at the University of London (Goldsmiths College). He is associated with the Technical University of Compiègne (UTC) and is a visiting professor at the University of Cambridge as well as ETH Zurich. Currently a member of the French national advisory board on digital matters (Conseil National du Numérique); he is the author of twenty-five books.

Michalis Vafopoulos is an adjunct professor at the National Technical University of Athens and previously taught in the Department of Cultural Informatics at the University of the Aegean. In 2009 he served as local chair of the First Web Science Conference and cofounded the master in Web science program at Aristotle University, Thessaloniki. In 2010 he introduced the official Web Science Subject Categorization. His research interests include Web economics, business, economic networks, open data, Web philosophy, and didactics.

Ioannis M. Vandoulakis is a lecturer in the History and Philosophy of Science at the Hellenic Open University. He holds a Ph.D. in the history of mathematics from Lomonosov Moscow State University and was research fellow at the Russian Academy of Science (Moscow) and CNRS (Paris). He has published on the history and philosophy of Greek mathematics, the history of mathematical logic, and the foundations of mathematics, including "Plato's Third Man Paradox: Its Logic and History."

Michael Wheeler is professor of philosophy at the University of Stirling. His primary research interests are in philosophy of science (especially cognitive science, psychology, biology, artificial intelligence, and artificial life) and philosophy of mind. He also works on Heidegger, and is particularly interested in developing philosophical ideas at the interface between the analytic and the continental traditions. His book *Reconstructing the Cognitive World: The Next Step* was published by MIT Press in 2005.

There are excellent philosophers of physics, philosophers of biology, philosophers of mathematics, and even of social science. I have never even heard anybody in the field described as a philosopher on engineering—as if there couldn't possibly be enough conceptual material of interest in engineering for a philosopher to specialize in. But this is changing, as more and more philosophers come to recognize that engineering harbors some of the deepest, most beautiful, most important thinking ever done.

—Daniel C. Dennett, *Darwin's Dangerous Idea: Evolution and the Meanings of Life* (1995), p. 120

We are not analyzing a world, we are building it. We are not experimental philosophers, we are philosophical engineers.

—Tim Berners-Lee, Message to W3C Technical Architecture Group mailing list (2003)

Computer scientists have ended up having to face all sorts of unabashedly metaphysical questions. . . . More recently, they have been taken up anew by network designers wrestling with the relations among identifiers, names, references, locations, handles, etc., on the World Wide Web.

—Brian Cantwell Smith, *On the Origin of Objects* (1995), pp. 44–45

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CHAPTER 1

TOWARD A PHILOSOPHY OF THE WEB: FOUNDATIONS AND OPEN PROBLEMS

ALEXANDRE MONNIN AND HARRY HALPIN

Introduction

What is the philosophical foundation of the World Wide Web? Is it an open and distributed hypermedia system? Universal information space? How does the Web differ from the Internet? While the larger ecology of the Web has known many a revolution, its underlying architecture in contrast remains fairly stable. URIs (Uniform Resource Identifiers), protocols like HTTP (HyperText Transfer Protocol), and languages such as HTML (HyperText Markup Language) have constituted the carefully evolved building blocks of the Web for more than two decades. As the particular kind of computing embodied by the Web has displaced traditional proprietary client-side applications, the foundations of Web architecture and its relationship to wider computing needs to be clarified in order to determine the Web's roots and boundaries, as well as the historical reasons for its success and future developments. Crafting a philosophy of the Web is especially urgent, as debate is now opening over the relationship of the Web to platform computing on mobile devices and cloud computing.

The scope of the questions that the philosophy of the Web provokes is quite wide-ranging. These questions begin with the larger metaphilosophical issue of whether or not there are unifying principles underlying the architecture of the Web that justify the existence of a philosophy of the Web. Tim Berners-Lee, widely acclaimed as the inventor of the Web, has developed in his design notes various informal reflections over the central role of URIs (Uniform Resource *Identifiers*, previously *Locators*) as a universal naming system, a central topic in philosophy since at least the pioneering works of Barcan Marcus. URIs such as http://www.example.org/ identify anything on the Web, so the Web itself can be considered the space of all URIs. Thus, in brief, we would say that there is indeed at least one unifying principle to the architecture of the Web, that of URIs. The

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various architects of the Web, including Berners-Lee, made a number of critical design choices, such as creating a protocol-independent universal naming scheme in the form of URIs as well as other less well-known decisions, such as allowing links to URIs to not resolve (leading to the infamous "404 Not Found Message," a feature not allowed in previous hypertext systems) that—little to the knowledge of everyday users of the Web—do form a coherent system, albeit one that has not yet been explicated through a distinctively philosophical lens.

A critic could easily respond that there is no a priori reason any particular technology deserves its own philosophy. After all, there is no philosophy of automobiles or thermostats. Why would one privilege a philosophy of the Web over a philosophy of the Internet? These questions can be answered by looking at the nature of the design choices made in the formation of the Web: namely, in so far as the Web is based on URIs, the architecture of the Web exists on the level of naming and meaning, both of which are central to semantics and so are traditionally within the purview of philosophy. What the Web adds to the traditional philosophical study of natural language is both the *technically* engineered feat of a universalizing naming scheme in the form of URIs and the fact that such names can be accessed to return concrete bits and bytes, a distinctive feature of naming on the Web. However, the Web itself is agnostic over how the concrete low-level bits that compose something like a web page are transmitted across the network in response to an access request to a URI, as this is determined by protocols such as the Internet's TCP/IP (Transmission Control Protocol/Internet Protocol). Thus, the Web can be considered an abstract information space of names above the networking protocol layer, up to the point that it could have been (or could still be) built on top of another networking protocol layer (such as OSI [Open Systems Interconnection] or the "Future Internet"). Likewise, the Internet can also host applications other than the Web that do not use URIs, such as peer-to-peer file sharing or the Web's early rivals (the Gopher system, for instance). So in response to our critic, the Web does have its own architecture, and—unlike the case with automobiles and even the Internet—this architecture uncontroversially deals with philosophical concepts of naming and meaning, and this justifies the existence of a philosophy of the Web, at least insofar as names and meaning on the Web differ from natural language (or the philosophical way to conceptualize it!), a topic worthy of further exploration (Monnin 2012a).

The Web is not all protocols and naming schemes; it is also a wide-ranging transformation of our relationship to the wider world "out there," to the ontology of the world itself. It is precisely this engineering aspect that makes the philosophy of the Web differ qualitatively from traditional philosophy of language, where it has been assumed that natural language is (at least for philosophical purposes) stable and hence "natural." In

contrast, the nature of the growth of both the Web and digital technologies undoubtedly calls into question the contemporary transformation of our entire form of life. Bringing scrutiny to bear on Wittgenstein's naturalistic concept of the "form of life," American sociologist Scott Lash takes into account the anthropological upheaval caused by the evolution of various mediums of thought on our technological forms of life (Lash 2002), a subject that has been abundantly discussed in the context of the Web (Halpin, Clark, and Wheeler 2014). Our main focus here, however, is less the future of humanity than that of philosophical research and philosophy itself. The architecture of the Web reveals a process of continuation and regrasping (which precisely needs to be properly assessed) of the most central of philosophical concepts: object, proper name, and ontology. On the Web, each concept of philosophy in its own way then gains a new existence as a technical artifact: objects turn into resources, proper names into URIs, ontology into Semantic Web ontologies.

Such a transition from philosophical concepts to technical objects isn't a one-way process and cannot remain without consequences for the original concepts that have been uprooted from their normal context, and accordingly this transition warrants careful examination. Do we philosophize today as we did in the past? With the same subject matter? Or in the same manner? Does it still make sense to locate oneself within established traditions, such as phenomenology and analytic philosophy, when their very own concepts freely cross these boundaries, and the real conversation is taken up elsewhere, using a language that only superficially seems identical to the one that preceded it? These kinds of questions have always been central to metaphilosophy, yet the advent of the Web—and so the philosophy of the Web—brings to these questions both a certain renewed importance and impetus. In the essays collected here, we bring together a number of authors who have offered some key contributions to this initial foray into the tentative realm of the philosophy of the Web. In order to guide philosophers through this nascent philosophical field, in the next section we delve deeper into the philosophical role of URIs and engineering as these two subjects serve as the twin foundations of the philosophy of the Web, and we then put each of the contributions in this collection within its philosophical context before reaching some tentative conclusions for next steps for the field.

1. URIs: "Artifactualization" of Proper Names

On the Web, the analogue of proper names is found in URIs, given by the standard IETF RFC 3986 to be "a simple and extensible means for identifying a resource," a definition in which resources are left crucially underdefined to be "whatever might be identified by a URI" (Berners-Lee,

Fielding, and Masinter 2005). URIs are everywhere: everything from mailto:harry@w3.org (for identifying an e-mail address of Harry Halpin) to http://whitehouse.gov (for identifying the page about the White House) qualifies as a URI. What quickly becomes apparent is that URIs are kinds of proper names for objects on the Web.

During the past fifteen years, philosophical discussions around the notion of a proper name have seamlessly followed in a business-as-usual manner, without any significant breakthrough. Yet during that same period, the architects of the Web have taken hold of the idea of proper names, and without purposefully altering its definition, have made naming the first supporting pillar of the Web, thus formulating an answer to the ages-old question of the relationship between words and things by combining in an original—and unintentional!—fashion the thoughts of Frege, Russell, Wittgenstein, and Kripke. For philosophy to take the URI, an engineered system of universal and accessible names, as a first-class philosophical citizen is then the first task of the philosophy of the Web.

While at first URIs may seem to be just a naming system for ordinary objects on the Web like e-mail addresses and web pages, the plan of Berners-Lee is to extend URIs as a naming scheme not just for the Web but for all reality—the Semantic Web will allow URIs to refer to literally anything, as "human beings, corporations, and bound books in a library can also be resources" (Berners-Lee, Fielding, and Masinter 2005). This totalizing vision of the Web is not without its own problems. In a striking debate between Berners-Lee and the well-known artificial intelligence researcher Patrick Hayes over URIs and their capacity to uniquely "identify" resources beyond web pages, Berners-Lee held that engineers decide how the protocol should work and that these decisions should determine the constraints of reference and identity, while Hayes replied that names have their possible referents determined only as traditionally understood by formal semantics, which he held engineers could not change but only had to obey (Halpin 2011). This duality can be interpreted as an opposition between a material and a formal a priori. Interestingly enough, recently, Hayes and other logicians such as Menzel have begun focusing on adopting principles from the Web into logical semantics itself, creating new kinds of logic for the Web (Menzel 2011). Unlike philosophical systems that reflect on the constraints of the world, the Web is a world-wide embodied technical artifact that therefore creates a whole new set of constraints. We suggest that they should be understood as a material a priori—in the Husserlian sense—grounded in history and technology.

Thus the Web, when it comes to its standards, breaks free from French philosopher Jules Vuillemin's definition of a philosophical system as built on the logical contradictions between major philosophical schools of thought (Vuillemin 2009). Yet the Web doesn't lead either to the collapse

of the transcendental and the ontological into the empirical, a new kind of "technological monism" as suggested by Lash (2002). *Logical contradiction* is overcome not by *factual opposition* (two words that Vuillemin highlighted) but through an *artifactual composition*, associating through the mediation of the artifact the virtues of competing philosophical positions. As the functions of concepts become functionalities, it is becoming increasingly easier to make them coexist for the sake of a *tertium datur*, without having to give up on consistency (Sloterdijk 2001).

The material a priori of technical systems such as the Web is brought about by what we call "artifactualization" (Monnin 2009), a process where concepts become "embodied" in materiality—with lasting consequences, as the result trumps every expectation, being more than a mere projection of preexisting concepts (which would simply negate the minute details of the object considered). While such a process clearly predates the Web, we can from our present moment see within a single human lifetime the increasing speed at which it is taking place, and through which technical categories (often rooted in philosophical ones) are becoming increasingly dominant over their previously unquestioned "natural" and "logical" counterparts. At the same time, the process of having philosophical ideas take a concrete form via technology lends to them often radically new characteristics, transforming these very concepts in the process. Heidegger posited a filiation between technology and metaphysics, with technology realizing the Western metaphysical project by virtue of technology inscribing its categories directly into concrete matter. Yet if technology is grounded in metaphysics, it is not the result of a metaphysical movement or "destiny" (*Schicksals*), but a more mundane contingent historical process, full of surprises and novelties. For all these reasons, it must be acknowledged that the genealogy of the Web, as a digital information system, differs from traditional computation with regard both to the concepts at stake and to our relation to them. The scientific *ethos* is indeed being replaced by an engineering one, something Berners-Lee dubbed "philosophical engineering" (Halpin 2008)—and this difference even holds true with regard to the (mainly logical, thanks to the Curry-Howard correspondence) *ethos* of computer science itself.

As already mentioned, URIs form the principal pillar of Web architecture, so it shouldn't be surprising that they also constitute our gateway into the aforementioned problematic between engineering and philosophy. From its inception, the Web was conceived as a space of names, or "namespace," even if the historical journey to URIs led through a veritable waltz of hesitations as the engineers who built the Web tried to pin down standardized definitions to various naming schemes. The numerous Web and Internet standards around various kinds of names bear witness to that ambivalence: URL (Uniform Resource Locator), URN (Uniform Resource Name), and even URC (Uniform Resource Characteristic or Citation). Each of these acronyms matches a different conception of the

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