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THE BASIC CONCEPTS OF SEMANTIC WEB AND ITS ARCHITECTURE

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ABSTRACT

Service Science discovered four key provision modalities for common services: web page mode, local client mode, web service mode, and cloud service mode. Web Service mode is currently the most popular. And, for the most part, every Service Provider's access and discovery strategy is still dependent on UDDI keyword searches. This paper will provide the basic concepts of semantic Web and its architecture. Web Service access and discovery strategy combines with Search Engine technology and Semantic Web technology. Semantic Web technology provides a matching and scoring capability based on semantic information, while search engine technology provides a search capability based on lexical and grammar analysis.

Keywords: XML, RDF, Semantic Search.

I. INTRODUCTION

The Semantic Web's main purpose is to accelerate the evolution of the existing Web so that users may find, share, and join information with less effort. Humans can utilise the Internet to perform a variety of jobs, including booking online tickets, searching for various information, using online dictionaries, and so on. The Semantic Web is a vision for the future in which machines can swiftly analyse data, allowing them to perform a variety of laborious jobs such as discovering, mixing, and acting on information available on the Web.

II. BASIC CONCEPTS

The Semantic Web is a collection of data that has been linked together in such a way that it can be analysed by machines rather than humans. It can be thought of as a more advanced version of the existing World Wide Web, and it serves as a useful data representation tool in the form of a globally linked database. The Semantic Web aims to convert the currently existing Web of unstructured documents into a Web of information/data by allowing semantic content to be included in Web sites.

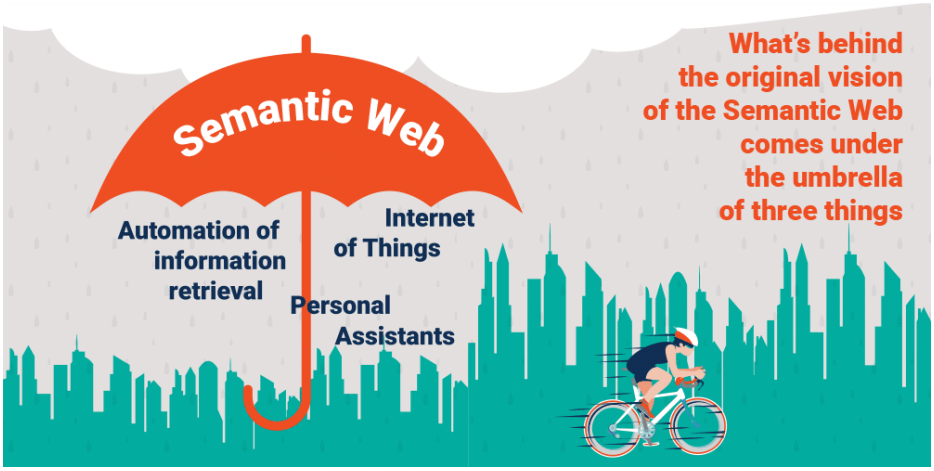

Figure 1: Vision of Semantic web

The ultimate goal of the Semantic Web, according to its creator Tim Berners-Lee, is to allow computers to better manipulate data on our behalf. He further explains that, in the context of the Semantic Web, the word “semantic” indicates machine-processable or what a machine is able to do with the data. The term "web" connotes a navigable space of interconnected objects with URI-to-resource mappings.

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III. ARCHITECTURE OF SEMANTIC WEB

W3C has described a seven-layer architecture for the Semantic Web, from the bottom to the top:

- Unicode and URIs
- XML, XML Schema, and XML Namespaces
- RDF, RDF Schema, and Topic Maps
- Ontologies
- Logic
- Proof

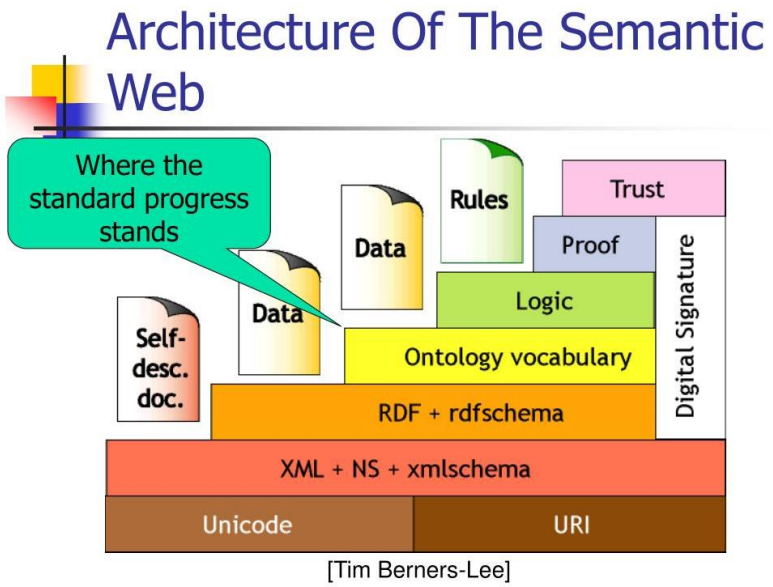

Figure 2: Semantic Web Architecture

Unicode and URIs

Specifications for the characters used by documents on the Semantic Web (Unicode) and for identifying documents are at the bottom layer of the Semantic Web (URIs).Unicode built the bigger code space. It converts characters (such as "LATIN CHARACTER CAPITAL A," a Japanese Hiragana syllable, or a Chinese ideogram) to code points (such as "U+0041" for Latin "A"), which are unique numeric values, and then to byte serializations or encodings. In turn, rendering engines convert byte serializations to glyphs, which are visual representations of characters (such as the capital "A" in the font Garamond). Unicode does not standardize glyphs. Unicode encodings include UTF-32 (one 32-bit code unit per code point), UTF-16 (one or two 16-bit code units per code point), and UTF-8 (one to four 8-bit code units per code point). UTF-8 is the Unicode subset used to encode XML documents.

URIs

The first part of level 1 of the Semantic Web is Unicode; the second part is the URI. Now, URIs are made out of characters, so the issues of internationalizing character sets, potentially impact URI interoperability.

XML Specifications

XML specification consists XML Topic Maps (XTM), that addresses the issues that bubble up to the middle layers of the Semantic Web architecture from the Unicode and URI layers.

Ontology

Ontology (like semantics) is another of those phrases that has taken on new meanings as a result of its adoption by the software community. Ontology is the study of being in philosophy; it is a formal description of what exists. Ontology combines taxonomy with inference rules for the Web.

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Resource Description Framework (RDF)

The Resource Description Framework (RDF) is a standard for encoding metadata and other structured data in the Semantic Web. RDF offers small bits of data in a way that allows meaning to be inferred. This can include criteria for how data should be interpreted, resulting in a considerably higher overall informative value because context or intent can be deduced. RDF is generally used to supply data on the Internet with information or metadata. RDF specifies, structures, and transfers metadata, as well as providing the basic XML syntax for software programmes to interchange or use that data; URI/URL specifies where that data is located. RDF often gives fundamental information and attributes about an Internet-based object, such as the author's identity, Web page keywords, object creation/editing data, and a sitemap, among other things.

IV. SEMANTIC SEARCH

Semantic search is a data searching strategy in which a search query seeks to determine not only the intent and context meaning of the words a person is searching for, but also the intent and context meaning of the words a person is searching for. Semantic search finds the most relevant results in a website, database, or other data repository by assessing and interpreting the search word and identifying the most relevant results.

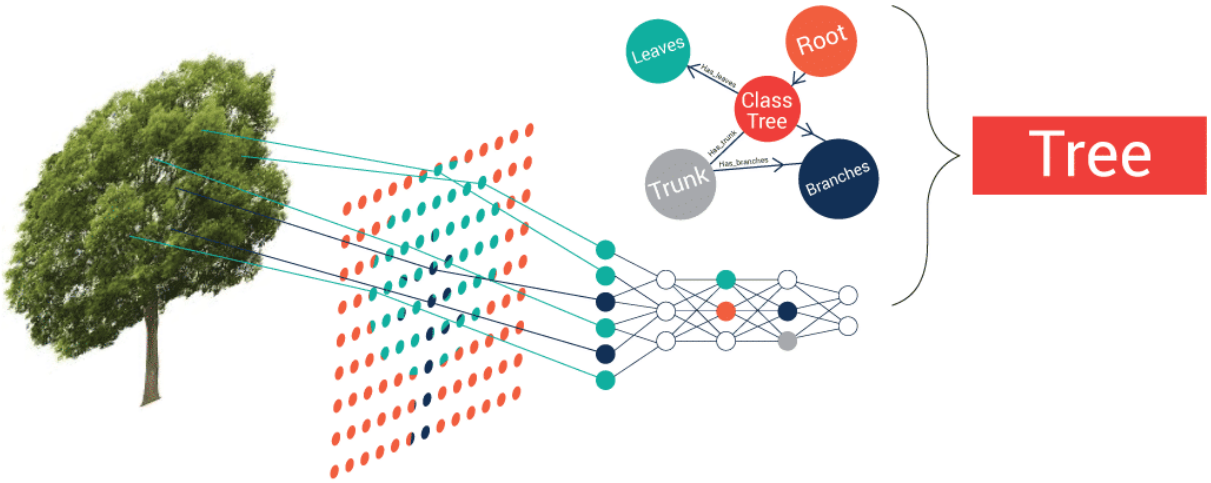

Figure 3: Semantic Search

Semantic search is based on the semantics of language. Semantic search, unlike traditional search engines, is based on the context, substance, intent, and notion of the sought phrase. Location, synonyms of a keyword, current trends, word variants, and other natural language aspects are all included in semantic search. Keyword-to-concept mapping, graph patterns, and fuzzy logic are some of the search algorithms and approaches that have led to semantic search concepts.

V. CONCLUSION

The Semantic Web is a vision for an expansion of the existing World Wide Web that gives machine-interpretable metadata of published information and data to software programmes. To put it another way, we add more data descriptors to material and data on the Web that already exists. As a result, computers can make meaningful interpretations in the same way that humans do to achieve their objectives.

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