(TR-102)
MASTERING THE SEMANTIC WEB

Training Day 4 Report:

14 June 2024

The fourth day of the training focused on introducing key concepts of the Semantic Web and data interoperability, including RDF, RDF triples, metadata exchange, linked data, FOAF, and relationship building: JSON and XML.

RDF (Resource Description Framework):

- RDF is a standard model for data interchange on the web.
- It facilitates the merging of data even if the underlying schemas differ, and it specifically supports the evolution of schemas over time without requiring all the data consumers to be changed.
- Created an RDF using Visual Paradigm Online.

RDF Triples:

- RDF data is structured in triples, each consisting of a subject, predicate, and object. This format allows data to be linked and queried in a structured way, enhancing interoperability across different systems and applications.
  1. **Subject:** The entity or resource being described.
  2. **Predicate:** The property or attribute of the subject.
  3. **Object:** The value or another resource that the predicate points to.
- Created RDF triples to describe web resources.

RDF Graph:

An RDF (Resource Description Framework) graph is a visual representation of RDF data, which is composed of RDF triples.

The key aspects of an RDF graph are:

1. **Nodes:** The subjects and objects of the RDF triples are represented as nodes in the graph. These nodes can be:
2. **IRIs** (Internationalized Resource Identifiers) - to identify resources
3. **Literals** - to represent data values like strings, numbers, etc.

4. **Blank nodes -** to represent anonymous resources without an IRI
5. **Edges:** The predicates (properties) of the RDF triples are represented as directed edges (arrows) connecting the subject and object nodes.
6. **Triples:** Each triple is represented as a directed edge (the predicate) connecting the subject node to the object node.

Metadata Exchange:

This process involves sharing data that provides information about other data. Metadata exchange improves the ability to search, organize, and understand data, making it a critical aspect of web development and data management.

Linked Data:

- Linked data refers to a method of publishing structured data so that it can be interlinked and become more useful through semantic queries.
- It leverages standard web technologies to connect related data across the web.

FOAF (Friend of a Friend):

- FOAF is a machine-readable ontology describing persons, their activities, and their relations to other people and objects.
- It allows data to be linked across different sites and applications, enabling richer and more interconnected datasets.

Introduction to JSON and XML:

JSON:

JSON (JavaScript Object Notation) is a lightweight, text based data interchange format used to transmit data between web application clients and servers. It is a subset of JavaScript and is used for exchanging data between different systems and languages.

JSON Data types:

1. String
2. Number
3. Boolean
4. NULL
5. Array

XML:

XML (Extensible Mark-up Language) is a mark-up language and file format for storing, transmitting, and reconstructing arbitrary data. It is a text-based language that uses tags to define the structure and

content of a document. XML is designed to be platform-independent, meaning that it can be used on any operating system and with any programming language.

Conclusion:

Day 4 of the TR-102 training provided participants with critical insights into the Semantic Web and data interoperability. By mastering RDF, metadata exchange, linked data, and relationship building with JSON and XML, attendees are now equipped to create more interconnected and semantically rich web applications. This session has laid the groundwork for advanced data management and web development techniques, preparing participants to tackle complex challenges in the evolving digital landscape.