A Comparison with Some Sensor Network Storages

Mehdi Gheisari

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A COMPARISON WITH SOME SENSOR NETWORK STORAGES

Abstract:
The swift progression in computing has enabled the growth of low cost wireless sensor networks (WSNs). In the past few years, much research effort has been put into view to implement the physical world with a large number of networked sensor nodes that are cooperating despite the fact of self-configuring. Wireless sensor networks produce a huge quantity of data that needs to be processed, delivered, and measured according to the application objectives. Data storage has become an important issue in sensor networks as a large amount of collected data need to be archived for future information retrieval. This paper review Sensor data Storages to find best of them and use it to control our physical world better.

KEY WORDS
Sensor storage, XML, RDF, SWE

1. INTRODUCTION

The wireless sensor networks of the near future are envisioned to consist of hundreds to thousands of inexpensive wireless nodes, each with some computational power and sensing capability, operating in an unattended mode. Many sensor network applications that are related to pervasive computing, e.g., monitoring learning behaviour of the children, senior care system, environment sensing, etc., generate a large amount of data continuously over a long period of time. The way these data are storing by the sensor nodes is a fundamental issue. Section 2 describe Relational model then describe the advantage and fallacious of the model. Section 3 describes a newer language for storing data. Section 4 also describes a model for data storage named RDF. Section 5 presents a suite of specifications related to sensors, sensor data models, and sensor Web services that will enable sensors to be accessible and controllable via the Web. Section 6 concludes the paper and discusses the future work.

2. RELATIONAL MODEL

The relational model uses a collection of tables to represent both data and the relationships among those data. Each table has multiple columns, and each column has a unique name [7-9].

2.1 ADVANTAGE OF RELATIONAL MODEL

- The Relational Model has survived through the years, though there are those who are always trying to construct a more efficient way, it has managed to come out the victor thus far. One reason may be due to the structure it is big enough to be worthy of optimizing.
- Allows for Data Independence. This helps to provide a sharp and clear boundary between the logical and physical aspects of database management.
- Simplicity. This provides a more simple structure than those that were being before it. A simple structure that is easy to communicate to users and programmers and a wide variety of users in an enterprise can interact with a simple model.
- A good theoretical background. This means that it provides a theoretical background for database management field.

2.2 DISADVANTAGE OF THE RELATIONAL MODEL

- Do not support querying semantically:
- Relational model do not support querying semantically that is done usually with SQL language- in other word it cannot response queries that considers concepts between data's [1-3].
- Do not support inheritance properties between records
- Do not support owned attributes between records.
- Machines can not interpret data's , so it cannot inference from exist data
- In heterogeneous Sensor networks, nodes cannot share the knowledge between agents
- Most RDBMSs have more loads that we have require like transactions control, etc.
- In relational model we cannot define new complex data types like images or videos.

3. EXTENSIBLE MARK-UP LANGUAGE

XML stands for Extensible Mark-up Language (often miscapitalized as eXtensible Mark-up Language to justify the acronym)[6].
XML is a set of rules for defining semantic tags that break a document into parts and identify the different parts of the document. It is a meta-mark-up language that defines a syntax in which other domain-specific mark-up languages can be written. Each XML application has its own semantics and vocabulary, but the application still uses XML syntax. This is much like human languages, each of which has its own vocabulary and grammar, while adhering to certain fundamental rules imposed by human anatomy and the structure of the brain. Each XML application has its own semantics and vocabulary, but the application still uses XML syntax. This is much like human languages, each of which has its own vocabulary and grammar, while adhering to certain fundamental rules imposed by human anatomy and the structure of the brain. [7] . Here is a small, complete XML document, which uses all of these constructs and concepts.

```
<?xml version="1.0" encoding='UTF-8'?>
<painting>
 <img src="madonna.jpg" alt='Foligno Madonna, by Raphael'/>
 <caption>This is Raphael's "Foligno" Madonna, painted in
<date>1511</date>-<date>1512</date>.</caption>
</painting>
```

There are five elements in this example document: painting, img, caption, and both dates. The date elements are children of caption, which is a child of painting. img has two attributes, src and alt[7-9].

3.1 ADVANTAGE OF XML:

- XML is an extremely flexible format for text-based data.
- Learning XML is simple
- Heterogeneous agents can communicate with each other easily. if we use XML for transmission, knowledge is sharable
- With XML format, the system is more scalable

3.2 DISADVANTAGE OF XML

- XML only define syntax of document and we have know idea about semantic of data’s
- XML do not define relationships between element, it only define hierarchy of them
- Xml is good for text data but if we have more complicated data types it maybe not suitable
- We cannot define constraints between elements like cows only eat vegetables.

4. RESOURCE DESCRIPTION FRAMEWORK (RDF)

RDF [3,4,6] is a method for expressing knowledge in a decentralized world and is the foundation of the Semantic Web, in which computer applications make use of distributed, structured information spread throughout the Web. Just to get it out of the way, RDF isn't strictly an XML format, it's not just about metadata, it has little to do with RSS, and it's not as complicated as you think.
What really sets RDF apart from XML and other things is that RDF is designed to represent knowledge in a distributed world. This means RDF is particularly concerned with meaning. Everything at all mentioned in RDF means something, whether a reference to something concrete in the world, an abstract concept, or a fact. Standards built on RDF describe logical inferences between facts and how to search for facts in a large database of RDF knowledge.

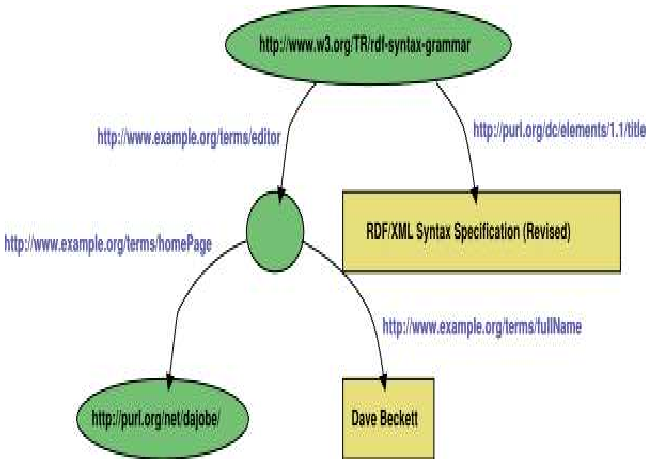

Fig. 1 Graph for RDF/XML Example

An RDF graph is given in Figure 1 where the nodes are represented as ovals and contain their RDF URI references where they have them, all the predicate arcs are labeled with RDF URI references and plain literal nodes have been written in rectangles.
You can write RDF in XML, and many people do.

4.1 COMPARISON BETWEEN RDF AND XML:

What really sets RDF apart from XML and other things is that RDF is designed to represent knowledge in a distributed world. This means RDF is particularly concerned with meaning. Everything at all mentioned in RDF means something, whether a reference to something concrete in the world, an abstract concept, or a fact. Standards built on RDF describe logical inferences between facts and how to search for facts in a large database of RDF knowledge.
What makes RDF suited for distributed knowledge is that RDF applications can put together RDF files posted by different people around the Internet and easily learn from them new things that no single document asserted. It does this in two ways, first by linking documents together by the common vocabularies they use, and second by allowing any document to use any vocabulary. This flexibility is fairly unique to RDF.

5.SENSOR WEB ENABLEMENT (SWE)

The relational model uses a collection of tables to represent both data and the relationships among those data. Each table has multiple columns, and each column has a unique name. The OGC recently established
Sensor Web Enablement (SWE) to attain situation awareness by developing a suite of specifications related to sensors[1], sensor data models, and sensor Web services that will enable sensors to be accessible and controllable via the Web [7-9]. The core suite of language and service interface specifications includes the following:

- Observations and Measurements (O&M)
  These are standard models and XML schema for encoding archived and real-time observations and measurements from a sensor[5].
- Sensor Model Language (SML)
  These are standard models and XML schema for describing sensors systems and processes; they provide information needed for discovering sensors, locating sensor observations, processing low-level sensor observations, and listing task able properties.
- Transducer Model Language (TML)
  These are standard models and XML schema for describing transducers and supporting real-time streaming of data to and from sensor systems.
- Sensor Observation Service (SOS)
  This is the standard Web service interface for requesting, filtering, and retrieving observations and sensor system information [10]. It's also the intermediary between a client and an observation repository or near real-time sensor channel.

The following example shows a timestamp encoded in O&M and semantically annotated with RDFa.
The timestamp's semantic annotation describes an instance of time:Instant (here, time is the namespace
for an OWL-Time ontology):

```
<swe:component rdfa:
about="time_1" rdfa:
instanceof="time:Instant">
<swe:Time rdfa:property=
"xs:date-time">2008-
0308T05:00:00</swe:Time>
</swe:component>
```

This example generates two RDF triples. The first, time_1 rdf:type time:Instant, describes time_1 as an instance of time:Instant (subject is time_1, predicate is rdf:type, object is time:Instant). The second, time_1 xs: date-time "2008-03-08T05:00:00," describes a data-type property of time_1 specifying the time as a literal value (subject is time_1, predicate is xs:date-time, object is "2008-03-08T05:00:00")[11].

6.Summaries

The wireless sensor networks of the near future are envisioned to consist of hundreds to thousands of inexpensive wireless nodes, each with some computational power and sensing capability, operating in an unattended mode. Many sensor network applications that are related to pervasive computing, e.g., monitoring learning behaviour of the children, senior care system, environment sensing, etc., generate a large amount of data continuously over a long period of time. The way these data are storing by the sensor nodes is a fundamental issue. When we gathering data from different sources, we can store them in some models like relational model or XML model or RDF model. For sensor networks, choosing a good Sensor data storage have an impressive affect on the life time of network. In this paper we introduce and compare data storages that use for sensor networks to find best. Besides simulate and evaluate these models, future work includes find newest sensor data storage that have better effect on sensor network life time.

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