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A Case Study: Performance Evolution Using JavaScript Object Notation Technology

Computer Science

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ABSTRACT

JSON (JavaScript Object Notation) is Document Oriented Database technique which is used primarily to transmit data between a server and web application. Earlier XML (Extensible Markup Language) is used to transmit the data between a server and web application. JSON is the alternative to XML.JSON has good performance and easy to implement comparison to the XML.

Here, we discuss the example of XML and JSON and conclude that how JSON has better performance than XML.

1. Introduction To Document Oriented Database (DOD)

Basically the document has the unstructured or semi structured data unlike a structured data in relational database management system. So it is important to categorized, organized and managing data in a particular manner. Document Oriented Database is use to do so.

A document-oriented database is a computer program designed for storing, retrieving, and managing document-oriented information, also known as semi-structured data. Document-oriented databases are one of the main categories of NoSQL databases and the popularity of the term "document-oriented database" [1].

The DOD is designed to notation of Document in contrast to notation of Relation in RDBMS. The key concept of DOD is documents; a document in this case refers to a data record that is self-describing as to the data elements it contains. For example, a "person" record might consist of first and last names, address, city, phone, and so on.

The advantages of DOD:

Documents are independent units which makes performance better.

Application logic is easier to write. You don't have to translate between objects in your application and SQL queries; you can just turn the object model directly into a document.

Unstructured data can be stored easily, since a document contains whatever keys and values the application logic requires.

2. Introduction to JSON

JavaScript Object Notation, is an open standard format that uses human-readable text to transmit data objects consisting of attribute–value pairs[2].

JSON is lightweight data interchange format which is derived from the JavaScript. The code of JSON derived in JavaScript as object, attributes and its values. Earlier XML is popular for developing this type of application. But, now a day JSON became popular for its easiness and performance. The main advantage of JSON over the XML is it is support the array. Thus it shorter compare to XML.

Earlier XML is use to transmit the formatted data between server and web application but its mechanism is some lengthy and lacking of some features. So the JSON is developed to remove this.

The reasons which makes JSON popular:

JSON doesn't use end tag

JSON is shorter

JSON is quicker to read and write

JSON can use arrays[3]

3. Methodology

For AJAX applications, JSON is faster and easier than XML:

The XML first fetch the XML document, creates a DOM of throughout the document and then extract the value and store it in the variable. It converts every attributes to tag and store its value between the start and end tag. For each object it will create separate tags.

The methodology of JSON is;

Fetch a JSON string

JSON.Parse the JSON string

Thus JSON do not required to create start and end tab like XML. It will parse the string and convert it into object and sets its all attributes value.

4. Application and Experiment

4.1 create XML code for the personal details of the persons.

```
<persons>
<person>        <firstName>Ashish</firstName>
                    <lastName>Joshi</lastName>
                <city>vvn</city>
                <phone>8888888888</phone>
</person>
<person>        <firstName>Chetan</firstName>
                <lastName>Dudhagara</lastName>
                <city>anand</city>
                <phone>9999999999</phone>
</person>
<person>        <firstName>Akshar</firstName>
                <lastName>Parekh</lastName>
                <city>baroda</city>
                <phone>8989898989</phone>
</person>
</persons>
```

4.2 create JSON code for the personal details of the persons.

{"persons":

```
[
{
“firstName”:”Ashish”, “lastName”:”Joshi”,
“city”:”vvn”;
”phone”:”8888888888”
}                                                    ,
    {
“firstName”:”Nirmal”, “lastName”:”Patel”,
city”:”anand”,
”phone”:”9999999999”
}                                                    ,
    {
“firstName”:”Akshar”,
“lastName”:”Parekh,
city”:”baroda”,
”phone”:”8989898989”
}
]}
```

4.3 JSON implementation in HTML document and access the object.

```
<!DOCTYPE html>
<html>
<body>
<h2>JSON Object Creation in JavaScript</h2>
<p id=”demo”></p>
<script>
var persons=
[
{“firstName”:”Ashish”,
“lastName”:”Joshi”,
“city”:”vvn”,
“phone”:”8888888888”},
{“firstName”:”Chetan”,
“lastName”:”Dudhagara”,
“city”:”anand”,
“phone”:”9999999999”},
{“firstName”:”Akshar”,
“lastName”:”Parekh”,
“city”:”baroda”,
“phone”:”8989898989”}
];
//changing the firstname of Akshar
persons[2].firstName=”Hitesh”;
document.getElementById(“demo”).
innerHTML =
persons[0].firstName+” “ +
persons[0].lastName+ “<br>” +
persons[0].city + “<br>” +
persons[0].phone + “<br>” + “<br>” +
persons[1].firstName+ “ “ +
persons[1].lastName+ “<br>” +
persons[1].city + “<br>” +
persons[1].phone + “<br>” + “<br>” +
persons[2].firstName+ “ “ +
persons[2].lastName+ “<br>” +
persons[2].city + “<br>” +
persons[2].phone;
</script>
</body>
</html>
```

4.4 output of above code:

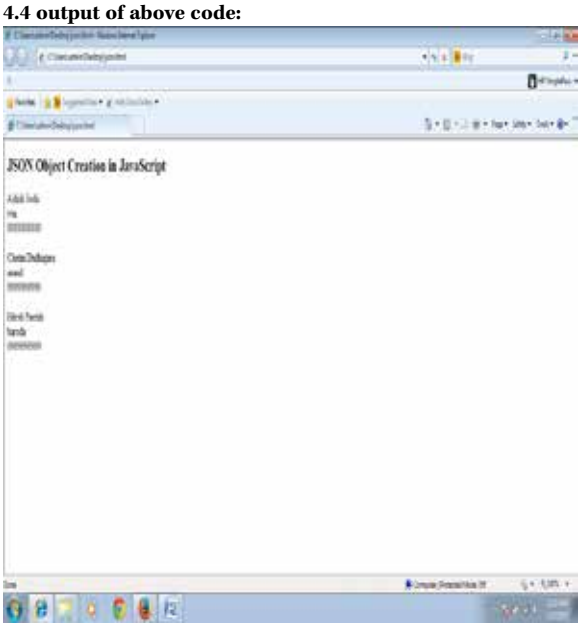

Fig. Experimental Result

5. Process and Conclusion

It is conclude here that document oriented database JSON is simple compare to the XML. In above practical example it is clearly seen that XML code is comparatively lengthy and more line of coding is required while JSON code is very simple, easy and comparatively reduce line of code than XML. So, it concludes that JSON is better than XML for development of web based application.

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