

JSON Web Service

Learning Objective

After studying this module:

- You learn about how data send through JSON services to android mobile phone using Parser class and web services.
- This module explains how to parse the URL and extract necessary information from it.

Web Service

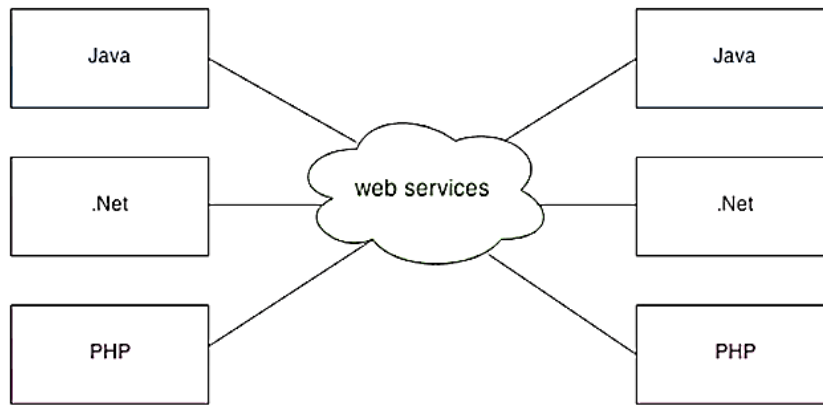
Before we get started with JSON, it is important to understand that what is a web service and how it works.

Web Service:

Web services include any software, application, or cloud technology that provides standardized web protocols such as HTTP/HTTPS to interoperate, communicate, and exchange data messaging usually XML (eXtensible Markup Language) throughout the internet.

Web services are data exchange systems that use the internet application to application communication and interfacing.

A key feature of web services is that applications can be written in various languages and are still able to communicate by exchanging data with one another via a web service between clients and servers as shown in figure given below.



A web service comprises these essential functions:

- Available over the internet or intranet networks
- Standardized messaging system
- Independent of a single operating system or programming language
- Self-describing via standard XML language
- Discoverable through a simple location method

JSON

JSON stands for **J**ava **S**cript **O**bject **N**otation. JSON is used to extract information from the URL.

JSON is a programming language. It is a minimal, textual and a subset of JavaScript. It is an alternative to XML.

Android provides support to parse the JSON object and JSON array, it provides easy and flexible way to work with it.

XML language is also widely used for the representation of arbitrary data structures such as those used in web services. XML and JSON are self-describing and can be parsed and used by lots of programming languages.

Below are few differences between JSON and XML:

JSON	XML
JSON stands for JavaScript object notation .	XML stands for an eXtensible Markup Language .
The extension of json file is .json .	The extension of xml file is .xml .
The internet media type is application/json .	The internet media type is application/xml or text/xml .
The type of format in JSON is data	The type of format in XML is a markup

interchange.	language.
It is extended from JavaScript.	It is extended from SGML.
The data types supported by JSON are strings, numbers, Booleans, null, array.	XML data is in a string format.
JSON document cannot be transformed and presented.	XML document can be transformed and presented using XSS.
JSON has no tags.	XML data is represented in tags, i.e., start tag and end tag.
JSON is quicker to read and write.	XML file takes time to read and write because the learning curve is higher.
JSON can use arrays to represent the data.	XML does not contain the concept of arrays.
It can be parsed by a standard JavaScript function. It has to be parsed before use.	XML data which is used to interchange the data, must be parsed with respective to their programming language to use that.
File size is smaller as compared to XML.	File size is larger.
JSON is data-oriented.	XML is document-oriented.
It is less secure than XML.	It is more secure than JSON.
It does not provide any support for namespaces.	It supports namespaces.
Its files are very easy to read as compared to XML.	Its documents are comparatively difficult to read and interpret.
It doesn't support comments.	It supports comments.
It supports only UTF-8 encoding.	It supports various encoding.

Parsor Class

After learning the classes, it is easy to create your own web service with easy implementation. Let's take a look on classes of services and back end volley library.

Types of Parsor class:

- 1) JSON Array:
- 2) JSON String:
- 3) JSON Object:

The first step is to identify the fields in the JSON data in which you are interested in:

```
{
  "Students":
  [
    {
```

```
        "ID":1,
        "uname":"Himanshu N. Patel",
        "uprog":"MCA"
    },
    {
        "ID":2,
        "uname":"Nikhil N. Patel",
        "uprog":"PGDCA"
    },
    {
        "ID":3,
        "uname":"Vishakha B. Patel",
        "uprog":"M.Sc. (IT) "
    },
    {
        "ID":4,
        "uname":"Saumil Trivedi",
        "uprog":"PGDMAD"
    },
    {
        "ID":5,
        "uname":"Jhony Patel",
        "uprog":"PGDCS"
    }
]
}
```

JSON ARRAY

JSON Array:

JSONArray class is used to create array with values.

Array ([]):

In a JSON, square bracket ([]) represents JSON array.

Example:

["January", "February", "March", "April", "May", "June", "July"]

Constructor:

Constructor	Description
JSONArray()	Creates a JSONArray with no values.
JSONArray(String json)	Creates a new JSONArray with values from the JSON string.
JSONArray(Object array)	Creates a new JSONArray with values from the given array.

Table-4 Constructors of JSON Array

Methods:

- onResponse
It will return a JSON array that contains the web service response.
- onErrorResponse
It will be called when any error is generated and / or request is send.

JSON OBJECT

JSON Object:

JSON Object is class with name/value mappings.

Objects ({ }):

In a JSON, curly bracket ({}) represents a JSON object.

A JSON object contains key/value pairs same as map. The keys are strings and the values are the JSON types. Keys and values are separated by comma.

For example:

```
{  
  "employee": {  
    "name":    "John",  
    "salary": 53000,  
    "married": true  }  
}
```

Constructor:

Constructor	Description
JSONObject()	Creates a JSONObject with no name/value mappings
JSONObject(String json)	Creates a new JSONObject with name/value mappings from the JSON string.

Table-5 Constructors of JSON Object

Methods:

onResponse:

It will return a JSON object that contains the response of web service.

onErrorResponse:

It will be called when any error is generated.

Key:

A JSON object contains a key that is a string. Pairs of key/value make up a JSON object.

Value:

Each key has a value and It is not necessary that the value is always in String format, value that could be string, integer or double etc.

Data in JSON are based on key / value pairs. The key is a string, the value can be a numerical value, a boolean value (true or false) or an object.

The difference between [and { (Square brackets and Curly brackets):

As you can see in below figure, in general all the JSON nodes will start with a square bracket or with a curly bracket. The difference between [and { is, the square bracket ([) represents starting of an **JSONArray** node whereas curly bracket ({) represents **JSONObject**.

So while accessing these nodes we need to call suitable method for the data.

If your JSON node starts with [, then we should use *getJSONJSONArray()* method. Same as if the node starts with { , then we should use *getJSONJSONObject()* method.

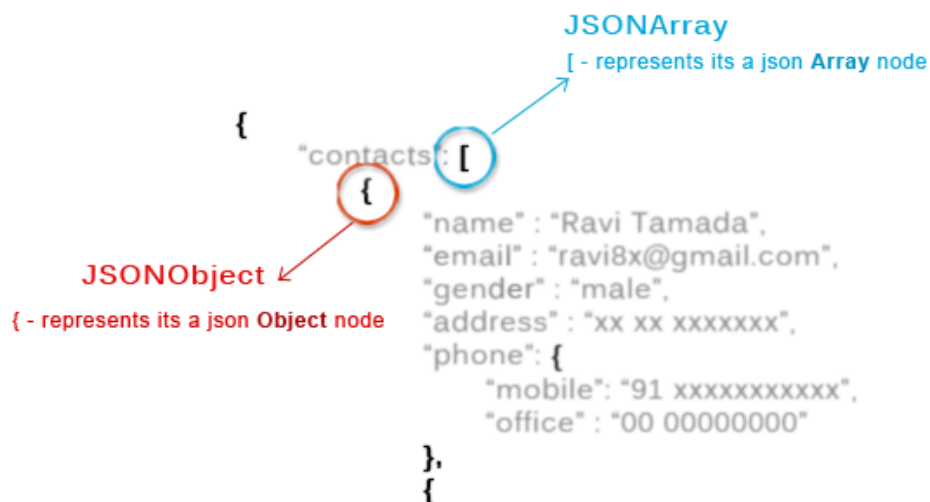


Figure-5 JSON nodes

JSON STRING

JSON String:

onResponse

It will return a JSON string that contains the web service response.

onErrorResponse

It will be called when any error is generated.

Let Us Sum Up

- JSON (Java Script Object Notation) is easy extension of XML.
- There parser class namely :JSONArray, JSONObject and JSONString.
- **Array ([])** In a JSON, square bracket ([]) represents a JSON array.
- **Objects ({ })** In a JSON, curly bracket ({ }) represents a JSON object.
- **Key** A JSON object contains a key that is string. Pairs of key/value make up a JSON object.
- **Value** Each value that could be string, integer or double.

Further Reading

1. <https://www.json.org/json-en.html>
2. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd (2011)
3. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education
4. Teach Yourself Android Application Development in 24Hours 2nd.Edition.

Assignments

1. Enter your details for example name, address, phone no., pin and email. And pass this data through web services and print it on your screen.

Activities

Solve this question(s):

1. Mention which function is used to convert a JSON text into an object?
2. Can we use double quote in JSON String?

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