Write a blog on Difference between HTTP1.1 vs HTTP2

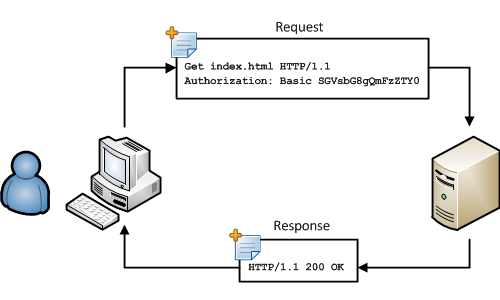
**The Beginnings of HTTP & The Internet**

Our story begins in 1969, with a program called Advanced Research Projects Agency Network (ARPANET). ARPANET used packet switching and allowed multiple computers to communicate with each other on a single network. However, this was just a by-product. The original intention behind ARPANET was to design a time-sharing system that allowed research institutes to share their computer resources for effective utilization of processing power.

Before then, sometime during the 19th century, the seeds for the existence of the internet as we know it today had already been sown with the invention of electricity and the telegraph. With Morse sending the first telegraphic message in 1844 and the first cable being laid across Atlantic, the telegraph network infrastructure had spread its roots through continents and across oceans. In years to come, this would become the very foundation on which the internet was built. In 1973, Kahn and Cerf designed the TCP/IP protocol suite which was adopted by ARPANET a decade later, and from this point on, we witness the development of an interconnected network. The internet took a more recognizable form with the invention of the World Wide Web (that used HTTP as its underlying protocol) by Tim Berners-Lee and the Commercial Internet eXchange (CIX) that allowed a free exchange of TCP/IP traffic between ISPs.

## Evolution of HTTP

HTTP (Hypertext Transfer Protocol) is a set of rules that runs on top of the TCP/IP suite of protocols and defines how files are to be transferred between clients and servers on the world wide web.



## HTTP/1.1

HTTP/1.1, the first standardized version of HTTP, was introduced in 1997. It presented significant performance optimizations (over HTTP/0.9 and HTTP/1.0) and transformed the way requests and responses were exchanged between clients and servers.

## Key Features of HTTP/1.1:

* It was no longer required for each connection to be terminated immediately after every request was served with a response; instead, with the keep-alive header, it was possible to have persistent connections. It allowed multiple requests/responses per TCP connection.
* The Upgrade header was used to indicate a preference from the client that made it possible to switch to a more preferred protocol if found appropriate by the server.
* HTTP/1.1 provided support for chunk transfers that allowed streaming of content dynamically as chunks and for additional headers to be sent after the message body. This enhancement was particularly useful in cases where values of a field remained unknown until the content had been produced. For example, when the content had to be digitally signed, it was not possible to do so before the entire content gets generated.
* Other features that reinforced its stability were introduced such as:
  + pipelining (the second request is sent before the response to the first is adequately served)
  + content negotiation (an exchange between client and server to determine the media type, it also provides the provision to serve different versions of a resource at the same URI)
  + cache control (used to specify caching policies in both requests and responses)

**HTTP/2**

At the beginning of 2010, Google introduced an experimental protocol, SPDY, which supported multiplexing (multiple requests/responses sent and received asynchronously over a single TCP connection) but as it gained traction IETF’s HTTP Working Group came up with HTTP/2 in 2015, which is based on the SPDY protocol.

**Key Features of HTTP/2:**

* It introduces the concept of a server push where the server anticipates the resources that will be required by the client and pushes them prior to the client making requests. The client retains the authority to deny the server push; however, in most cases, this feature adds a lot of efficiency to the process.
* Introduces the concept of multiplexing that interleaves the requests and responses without head-of-line blocking and does so over a single TCP connection.

|  |  |  |
| --- | --- | --- |
| **Differentiator** | HTTP/1.1 | HTTP/2 |
| Year | 1997 | 2015 |
| Key Features | It supports connection reuse i.e. for every TCP connection there could be multiple requests and responses, and pipelining where the client can request several resources from the server at once. However, pipelining was hard to implement due to issues such as head-of-line blocking and was not a feasible solution. | Uses multiplexing, where over a single TCP connection resources to be delivered are interleaved and arrive at the client almost at the same time. It is done using streams which can be prioritized, can have dependencies and individual flow control. It also provides a feature called server push that allows the server to send data that the client will need but has not yet requested. |
| Status Code | Introduces a warning header field to carry additional information about the status of a message. Can define 24 status codes, error reporting is quicker and more efficient. | Underlying semantics of HTTP such as headers, status codes remains the same. |
| Authentication Mechanism | It is relatively secure since it uses digest authentication, NTLM authentication. | Security concerns from previous versions will continue to be seen in HTTP/2. However, it is better equipped to deal with them due to new TLS features like connection error of type Inadequate\_Security. |
| Caching | Expands on the caching support by using additional headers like cache-control, conditional headers like If-Match and by using entity tags. | HTTP/2 does not change much in terms of caching. With the server push feature if the client finds the resources are already present in the cache, it can cancel the pushed stream. |
| Web Traffic | HTTP/1.1 provides faster delivery of web pages and reduces web traffic as compared to HTTP/1.0. However, TCP starts slowly and with domain sharding (resources can be downloaded simultaneously by using multiple domains), connection reuse and pipelining, there is an increased risk of network congestion. | HTTP/2 utilizes multiplexing and server push to effectively reduce the page load time by a greater margin along with being less sensitive to network delays. |

**2. Write a blog about objects and its internal representation in Javascript**

Objects, in JavaScript, is it’s most important data-type and forms the building blocks for modern JavaScript. These objects are quite different from JavaScript’s primitive data-types(Number, String, Boolean, null, undefined and symbol) in the sense that while these primitive data-types all store a single value each (depending on their types).

Objects are more complex and each object may contain any combination of these primitive data-types as well as reference data-types.  
An object, is a reference data type. Variables that are assigned a reference value are given a reference or a pointer to that value. That reference or pointer points to the location in memory where the object is stored. The variables don’t actually store the value.

Loosely speaking, objects in JavaScript may be defined as an unordered collection of related data, of primitive or reference types, in the form of “key: value” pairs. These keys can be variables or functions and are called properties and methods, respectively, in the context of an object.

For Eg. If your object is a student, it will have properties like name, age, address, id, etc and methods like updateAddress, updateNam, etc.

# **Objects and properties**

A JavaScript object has properties associated with it. A property of an object can be explained as a variable that is attached to the object. Object properties are basically the same as ordinary JavaScript variables, except for the attachment to objects. The properties of an object define the characteristics of the object. You access the properties of an object with a simple dot-notation:

objectName.propertyName

Like all JavaScript variables, both the object name (which could be a normal variable) and property name are case sensitive. You can define a property by assigning it a value. For example, let’s create an object named myCar and give it properties named make, model, and year as follows:

var myCar = new Object();  
myCar.make = 'Ford';  
myCar.model = 'Mustang';  
myCar.year = 1969;

Unassigned properties of an object are [undefined](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/undefined) (and not [null](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/null)).

myCar.color; // undefined

Properties of JavaScript objects can also be accessed or set using a bracket notation (for more details see [property accessors](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Operators/Property_Accessors)). Objects are sometimes called associative arrays, since each property is associated with a string value that can be used to access it. So, for example, you could access the properties of the myCar object as follows:

myCar['make'] = 'Ford';  
myCar['model'] = 'Mustang';  
myCar['year'] = 1969;

An object property name can be any valid JavaScript string, or anything that can be converted to a string, including the empty string. However, any property name that is not a valid JavaScript identifier (for example, a property name that has a space or a hyphen, or that starts with a number) can only be accessed using the square bracket notation. This notation is also very useful when property names are to be dynamically determined (when the property name is not determined until runtime). Examples are as follows:

// four variables are created and assigned in a single go,   
// separated by commas  
var myObj = new Object(),  
 str = 'myString',  
 rand = Math.random(),  
 obj = new Object();  
myObj.type = 'Dot syntax';  
myObj['date created'] = 'String with space';  
myObj[str] = 'String value';  
myObj[rand] = 'Random Number';  
myObj[obj] = 'Object';  
myObj[''] = 'Even an empty string';console.log(myObj);

You can also access properties by using a string value that is stored in a variable:

var propertyName = 'make';  
myCar[propertyName] = 'Ford';propertyName = 'model';  
myCar[propertyName] = 'Mustang';

You can use the bracket notation with [for...in](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Statements/for...in) to iterate over all the enumerable properties of an object. To illustrate how this works, the following function displays the properties of the object when you pass the object and the object's name as arguments to the function:

function showProps(obj, objName) {  
 var result = ``;  
 for (var i in obj) {  
 // obj.hasOwnProperty() is used to filter out properties from the object's prototype chain  
 if (obj.hasOwnProperty(i)) {  
 result += `${objName}.${i} = ${obj[i]}\n`;  
 }  
 }  
 return result;  
}

So, the function call showProps(myCar, "myCar") would return the following:

myCar.make = Ford  
myCar.model = Mustang  
myCar.year = 1969

# **Creating Objects In JavaScript :**

# **Create JavaScript Object with Object Literal**

One of easiest way to create a javascript object is object literal, simply define the property and values inside curly braces as shown below

let bike = {name: 'SuperSport', maker:'Ducati', engine:'937cc'};

# **Create JavaScript Object with Constructor**

Constructor is nothing but a function and with help of new keyword, constructor function allows to create multiple objects of same flavor as shown below

function Vehicle(name, maker) {  
 this.name = name;  
 this.maker = maker;  
}  
let car1 = new Vehicle(’Fiesta’, 'Ford’);  
let car2 = new Vehicle(’Santa Fe’, 'Hyundai’)  
console.log(car1.name); //Output: Fiesta  
console.log(car2.name); //Output: Santa Fe

# **Using the JavaScript Keyword new**

The following example also creates a new JavaScript object with four properties:

Example

var person = new Object();  
person.firstName = “John”;  
person.lastName = “Doe”;  
person.age = 50;  
person.eyeColor = “blue”;

# **Using the Object.create method**

Objects can also be created using the [Object.create()](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Object/create" \t "_blank) method. This method can be very useful, because it allows you to choose the prototype object for the object you want to create, without having to define a constructor function.

// Animal properties and method encapsulation  
var Animal = {  
 type: 'Invertebrates', // Default value of properties  
 displayType: function() { // Method which will display type of Animal  
 console.log(this.type);  
 }  
};  
// Create new animal type called animal1   
var animal1 = Object.create(Animal);  
animal1.displayType(); // Output:Invertebrates  
// Create new animal type called Fishes  
var fish = Object.create(Animal);  
fish.type = 'Fishes';  
fish.displayType(); // Output:Fishes