

What are Web Services?

On the World Wide Web, a web service is a standardized method for propagating messages between client and server applications. A web service is a set of open protocols and standards that allow data to be exchanged between different applications or systems. Any software, application, or cloud technology that uses standardized web protocols (HTTP or HTTPS) to connect, interoperate, and exchange data messages – commonly XML (Extensible Markup Language) – across the internet is considered a web service.

HTTP

HTTP stands for HyperText Transfer Protocol. It is the main way web browsers and servers communicate to share information on the internet. Tim Berner invents it. HyperText is the type of text that is specially coded with the help of some standard coding language called HyperText Markup Language (HTML). HTTP/2 is the new version of HTTP. HTTP/3 is the latest version of HTTP, which is published in 2022. When you visit a website, HTTP helps your browser request and receive the data needed to display the web pages you see. It is a fundamental part of how the internet works, making it possible for us to browse and interact with websites.

What is the Full Form of HTTP?

HTTP stands for “Hypertext Transfer Protocol.” It is a set of rules for sharing data on the World Wide Web (WWW). HTTP helps web browsers and servers communicate, allowing people to access and share information over the internet.

Key Points

Basic Structure: HTTP forms the foundation of the web, enabling data communication and file sharing.

Web Browsing: Most websites use HTTP, so when you click on a link or download a file, HTTP is at work.

Client-Server Model: HTTP works on a request-response system. Your browser (client) asks for information, and the website's server responds with the data.

Application Layer Protocol: HTTP operates within the Internet Protocol Suite, managing how data is transmitted and received.

What is HyperText?

The protocol used to transfer hypertext between two computers is known as HyperText Transfer Protocol. HTTP provides a standard between a web browser and a web server to establish communication. It is a set of rules for transferring data from one computer to another. Data such as text, images, and other multimedia files are shared on the World Wide Web. Whenever a web user opens their web browser, the user indirectly uses HTTP. It is an application protocol that is used for distributed, collaborative, hypermedia information systems.

Working of HTTP [HyperText Transfer Protocol]

First of all, whenever we want to open any website we first open a web browser after that we will type the URL of that website (e.g., www.facebook.com). This URL is now sent to the Domain Name Server (DNS). Then DNS first checks records for this URL in their database, and then DNS will return the IP address to the web browser corresponding to this URL. Now the browser is able to send requests to the actual server. After the server sends data to the client, the connection will be closed. If we want something else from the server we should have to re-establish the connection between the client and the server.

What is an HTTP Request?

HTTP request is simply termed as the information or data that is needed by Internet browsers for loading a website. This is simply known as HTTP Request.

There is some common information that is generally present in all HTTP requests. These are mentioned below.

HTTP Version

URL

HTTP Method

HTTP Request Headers

HTTP Body

HTTP Request Headers

HTTP Request Headers generally store information in the form of key-value and must be present in each HTTP Request. The use of this Request Header is to provide core information about the client's information, etc.

HTTP Request Body

HTTP Request Body simply contains the information that has to be transferred. HTTP Request has the information or data to be sent to these browsers.

HTTP Method

HTTP Methods are simply HTTP Verb. In spite of being present so many HTTP Methods, the most common HTTP Methods are HTTP GET and HTTP POST. These two are generally used in HTTP cases. In HTTP GET, the information is received in the form of a website.

What is HTTP Response?

HTTP Response is simply the answer to what a Server gets when the request is raised. There are various things contained in HTTP Response, some of them are listed below.

HTTP Status Code

HTTP Headers

HTTP Body

HTTP Response Headers

HTTP Response headers are simply like an HTTP Request where it has that work to send some important files and data to the HTTP Response Body.

HTTP Response Body

HTTP Responses are the responses that are received successfully upon the request. Generally, it comes under the requests generated by the web. In most cases, the request is to transfer the HTML data into a webpage.

Characteristics of HTTP

HTTP is IP based communication protocol that is used to deliver data from server to client or vice-versa.

The server processes a request, which is raised by the client, and also server and client know each other only during the current bid and response period.

Any type of content can be exchanged as long as the server and client are compatible with it.

Once data is exchanged, servers and clients are no longer connected.

It is a request and response protocol based on client and server requirements.

It is a connection-less protocol because after the connection is closed, the server does not remember anything about the client and the client does not remember anything about the server.

It is a stateless protocol because both client and server do not expect anything from each other but they are still able to communicate.

Frequently Asked Questions on HTTP – FAQs

What is the difference between HTTPS and HTTP?

HTTPS is the secure version of HTTP. It adds a security layer to the Hyper Text Transfer Protocol.

Is HTTP is stateful or stateless protocol?

HTTP is the stateless protocol that means it does not maintain any state or store any information.

What is the role of cookies in HTTP?

Cookies are the small units of data that are stored on client side rather than server side they are used to maintain information.

HTTPS

HTTPS stands for HyperText Transfer Protocol Secure. It is the most common protocol for sending data between a web browser and a website.

What is Hypertext Transfer Protocol Secure?

Hypertext Transfer Protocol Secure is a protocol that is used to communicate between the user browser and the website. It also helps in the transfer of data. It is the secure variant of HTTP. To make the data transfer more secure, it is encrypted. Encryption is required to ensure security while transmitting sensitive information like passwords, contact information, etc.

How Does HTTPS Work?

HTTPS establishes the communication between the browser and the web server. It uses the Secure Socket Layer (SSL) and Transport Layer Security (TLS) protocol for establishing communication. The new version of SSL is TLS(Transport Layer Security).

HTTPS uses the conventional HTTP protocol and adds a layer of SSL/TLS over it. The workflow of HTTP and HTTPS remains the same, the browsers and servers still communicate with each other using the HTTP protocol. However, this is done over a secure SSL connection. The SSL connection is responsible for the encryption and decryption of the data that is being exchanged to ensure data safety.

Secure Socket Layer (SSL)

The main responsibility of SSL is to ensure that the data transfer between the communicating systems is secure and reliable. It is the standard security technology that is used for encryption and decryption of data during the transmission of requests.

As discussed earlier, HTTPS is basically the same old HTTP but with SSL. For establishing a secure communication link between the communicating devices, SSL uses a digital certificate called SSL certificate.

There are two major roles of the SSL layer

Ensuring that the browser communicates with the required server directly.

Ensuring that only the communicating systems have access to the messages they exchange.

Components of Web Service

XML and HTTP is the most fundamental web services platform. The following components are used by all typical web services:

SOAP (Simple Object Access Protocol)

SOAP stands for “Simple Object Access Protocol.” It is a transport-independent messaging protocol. SOAP is built on sending XML data in the form of SOAP Messages. A document known as an XML document is attached to each message. Only the structure of the XML document, not the content, follows a pattern. The best thing about Web services and SOAP is that everything is sent through HTTP, the standard web protocol.

A root element known as the element is required in every SOAP document. In an XML document, the root element is the first element. The “envelope” is separated into two halves. The header comes first, followed by the body. The routing data, or information that directs the XML document to which client it should be sent to, is contained in the header. The real message will be in the body.

What is UDDI (Universal Description, Discovery and Integration)?

We can say that Uddi (universal description, discovery and integration) is a kind of database created for web services. It is used to store the descriptions and addresses of web services.

UDDI, or Universal Description, Discovery and Integration, is an Extensible Language Markup (XML)-based standard to describe, publish and find information about web services. It is also a registry for businesses providing web-based services to list themselves and find partners on the Internet. The project lets businesses list themselves by name, product, location or web services offered.

WSDL (Web Services Description Language)

If a web service can't be found, it can't be used. The client invoking the web service should be aware of the location of the web service. Second, the client application must understand what the web service does in order to invoke the correct web service. The WSDL, or Web services description language, is used to accomplish this. The WSDL file is another XML-based file that explains what the web service does to the client application. The client application will be able to understand where the web service is located and how to use it by using the WSDL document.

How Does Web Service Work?

Remote procedure calls are what are used to make these requests. Calls to methods hosted by the relevant web service are known as Remote Procedure Calls (RPC). Example: Flipkart offers a web service that displays prices for items offered on Flipkart.com. The front end or presentation layer can be written in .Net or Java, but the web service can be communicated using either programming language.

The data that is exchanged between the client and the server, which is XML, is the most important part of a web service design. XML (Extensible markup language) is a simple intermediate language that is understood by various programming languages. It is a counterpart to HTML. As a result, when programs communicate with one another, they do so using XML. This

creates a common platform for applications written in different programming languages to communicate with one another.

For transmitting XML data between applications, web services employ SOAP (Simple Object Access Protocol). The data is sent using standard HTTP. A SOAP message is data that is sent from the web service to the application. An XML document is all that is contained in a SOAP message. The client application that calls the web service can be created in any programming language because the content is written in XML.

Features/Characteristics Of Web Service

Web services have the following features:

(a) XML Based: The information representation and record transportation layers of a web service employ XML. There is no need for networking, operating system, or platform binding when using XML. At the middle level, web offering-based applications are highly interoperable.

(b) Loosely Coupled: A customer of an internet service provider isn't necessarily directly linked to that service provider. The user interface for a web service provider can change over time without impacting the user's ability to interact with the service provider. A strongly coupled system means that the patron's and server's decisions are inextricably linked, indicating that if one interface changes, the other should be updated as well.

A loosely connected architecture makes software systems more manageable and allows for easier integration between different structures.

(c) Capability to be Synchronous or Asynchronous: Synchronicity refers to the client's connection to the function's execution. The client is blocked, and the client has to wait for the service to complete its operation, before continuing in synchronous invocations. Asynchronous operations allow a client to invoke a task and then continue with other tasks.

Asynchronous clients get their results later, but synchronous clients get their effect immediately when the service is completed. The ability to enable loosely linked systems requires asynchronous capabilities.

(d) Coarse-Grained: Object-oriented systems, such as Java, make their services available through individual methods. At the corporate level, a character technique is far too fine an operation to be useful. Building a Java application from the ground, necessitates the development of several fine-grained strategies, which are then combined into a rough-grained provider that is consumed by either a buyer or a service.

Corporations should be coarse-grained, as should the interfaces they expose. Web services generation is an easy approach to define coarse-grained services that have access to enough commercial enterprise logic.

(e) Supports Remote Procedural Call: Consumers can use an XML-based protocol to call procedures, functions, and methods on remote objects utilizing web services. A web service must support the input and output framework exposed by remote systems.

Enterprise-wide component development Over the last few years, JavaBeans (EJBs) and .NET Components have become more prevalent in architectural and enterprise deployments. A number of RPC techniques are used to allocate and access both technologies.

A web function can support RPC by offering its own services, similar to those of a traditional role, or by translating incoming invocations into an EJB or .NET component invocation.

(f) Supports Document Exchanges: One of XML's most appealing features is its simple approach to communicating with data and complex entities. These records can be as simple as talking to a current address or as complex as talking to an entire book or a Request for Quotation. Web administrations facilitate the simple exchange of archives, which aids incorporate reconciliation.

The web benefit design can be seen in two ways: (i) The first step is to examine each web benefit on-screen character in detail. (ii) The second is to take a look at the rapidly growing web benefit convention stack.

Advantages Of Web Service

Using web services has the following advantages:

(a) Business Functions can be exposed over the Internet: A web service is a controlled code component that delivers functionality to client applications or end-users. This capability can be accessed over the HTTP protocol, which means it can be accessed from anywhere on the internet. Because all apps are now accessible via the internet, Web services have become increasingly valuable. Because all apps are now accessible via the internet, Web services have become increasingly valuable. That is to say, the web service can be located anywhere on the internet and provide the required functionality.

(b) Interoperability: Web administrations allow diverse apps to communicate with one another and exchange information and services. Different apps can also make use of web services. A .NET application, for example, can communicate with Java web administrations and vice versa. To make the application stage and innovation self-contained, web administrations are used.

(c) Communication with Low Cost: Because web services employ the SOAP over HTTP protocol, you can use your existing low-cost internet connection to implement them. Web services can be developed using additional dependable transport protocols, such as FTP, in addition to SOAP over HTTP.

(d) A Standard Protocol that Everyone Understands: Web services communicate via a defined industry protocol. In the web services protocol stack, all four layers (Service Transport, XML Messaging, Service Description, and Service Discovery) use well-defined protocols.

(e) Reusability: A single web service can be used simultaneously by several client applications.

Sample Questions

Question 1. What exactly do you mean when you say you're going to upload a file on the internet? The name of the protocol that was utilized for it.

Uploading a file to a server is the process of transferring a file from your computer to a server through the Internet. FTP(File Transfer Protocol) is the

protocol that is used for this. An FTP client application allows a user to communicate with an FTP server program in order to gain access to data and services on the server machine. Users must be able to connect to the Internet or communicate with an FTP client application in order to use the FTP server program.

Question 2. Why do we need a web service?

Web-based apps are developed using a range of programming platforms in today's corporate world. Some applications are written in Java, others in .Net, and still others in Angular JS, Node.js, and other frameworks. Most of the time, these diverse programs require some form of communication to work together. Because they are written in separate programming languages, ensuring accurate communication between them becomes extremely difficult. Web services have a role in this. Web services provide a common platform for several applications written in different programming languages to connect with one another

Question 3. For web services, what kind of security is required?

Web services should have a higher level of security than the Secure Socket Layer (SSL) (SSL). Entrust Secure Transaction Platform is the only way to attain this level of security. This level of security is required for web services in order to assure dependable transactions and secure confidential information.

Soap Project

A SOAP project tests the web service based on the SOAP protocol. You can import a WSDL in a SOAP project, and it will list all the request*(s)* or endpoints exposed by that WSDL. A Web Service Description Language (WSDL) is an XML based language that specifies the functionality of a SOAP-based web service. A WSDL defines the contract between the provider and the consumer of the service. The client application and the web

service share a contract in a WSDL format and communicates with each other using SOAP-based messages.

REST Project

REST, or REpresentational State Transfer, is an architectural style for providing standards between computer systems on the web, making it easier for systems to communicate with each other. REST-compliant systems, often called RESTful systems, are characterized by how they are stateless and separate the concerns of client and server.

In the REST architectural style, the implementation of the client and the implementation of the server can be done independently without each knowing about the other. This means that the code on the client side can be changed at any time without affecting the operation of the server, and the code on the server side can be changed without affecting the operation of the client.

Systems that follow the REST paradigm are stateless, meaning that the server does not need to know anything about what state the client is in and vice versa. In this way, both the server and the client can understand any message received, even without seeing previous messages.