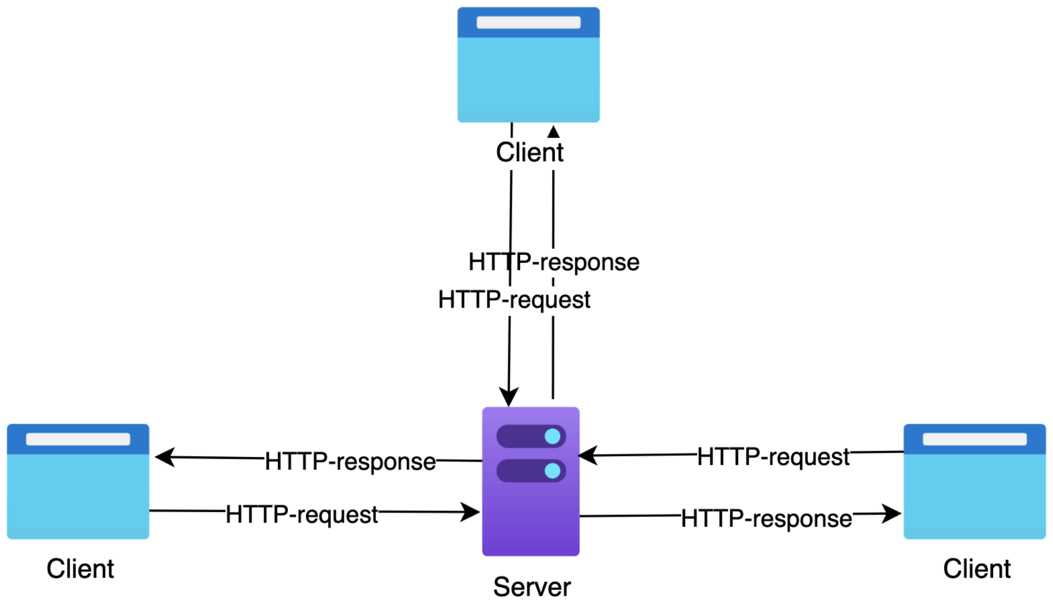
A web server or an HTTP server is a program on a computer that can process client requests and send an answer back to the client. When a server starts, it always waits for requests and answers each request by sending back the requested information. Whenever you visit a website, you send a request over HTTP protocol using the World Wide Web to a server. Then the server sends a response (HTTP-response) back. This is the basic request/response model on which the entire Internet is based. Most web applications and websites work by this model. The main function of an HTTP server is storing, processing, and delivering webpages to clients.

What is an HTTP server?

The HTTP server is a part of the client-server model. Most web applications and websites use this model. The main task of an HTTP server is sending text documents that contain HTML, CSS, and JavaScript. One server can serve multiple clients. And clients are usually browsers (Firefox, Safari, Google Chrome) that can read HTTP responses and web application files.



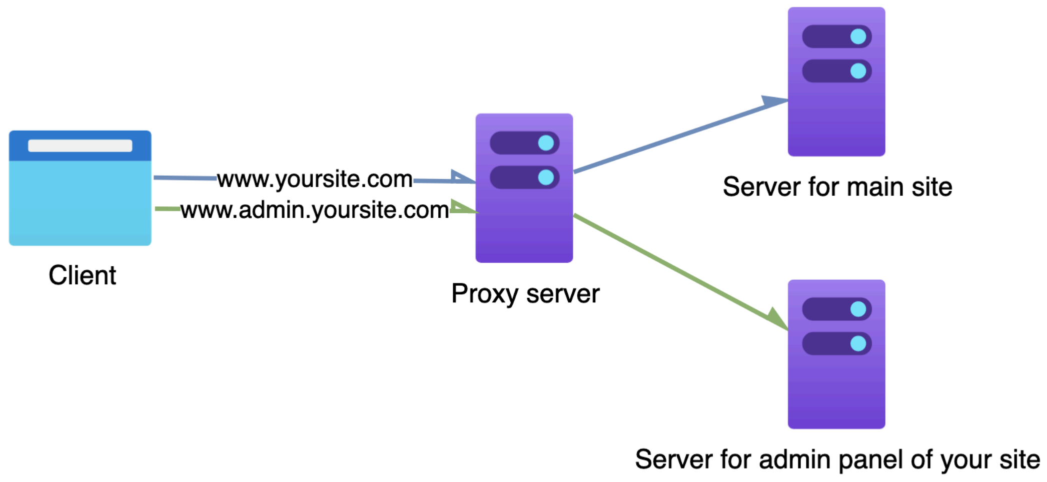
Client-server architecture.

When you enter a domain name in the address line of a browser, you send a request to the server that listens for connections on that domain name. Then the HTTP server processes the HTTP request and sends back a response. Usually, the response contains headings and the body of the request (HTML document). So when you receive the response, you can see the site that you wanted to enter.

A server stores **static**, **dynamic,** or **hybrid** web pages. Static pages are prebuilt. When a client requests a page, the server returns a pre-built document that is fully complete. Dynamic pages have a prebuilt part that the server can send to the client. Then, JavaScript on the client side generates other parts of the webpage by requesting additional information from another server, like a REST API server. Hybrid pages such as server-side rendered pages are built while the client requests a page. This means that the server doesn't have ready-to-use web pages. It needs to process the request and collect all required data(for example, JSON from the API server) to build a page based on the client's request.

Proxy

HTTP servers can not only respond to requests but also redirect requests to other servers. Such servers are known as proxy servers. A proxy server will be beneficial if you have several web servers behind one domain name and want to redirect requests to the right server. For example, you have your site on the main web server. You also have an admin panel for your site on another server. You can fill in the content, and edit something on your site using that admin panel. Proxy servers can control which server will receive client requests depending on the domain name.



A client can send requests to one server via two different domain names. But it will receive a response from the server behind the proxy.

Load balancing

As a proxy, HTTP servers can work as load balancers. An HTTP server can send the client's request to separate servers to reduce the load on the end server. So if a service has many clients, it is good to place a load-balancing server to decrease the load on servers that process client requests. HTTP servers provide an administrator to configure the balance settings for flexible balancing.

Encoding

When your request is sent to a server, it usually passes through many nodes, before reaching the server. And anyone on these nodes can look at the data that you sent. They can also read the server's responses. So, HTTP servers can secure connections by using certificates. If you look at the browser address line left to the domain name; you can see a "lock" symbol. When you click on it, you can see if the connection is secure or not. A secure connection means that all the data that you send and receive from the server is encoded, and no one else can read your data.

Secure HTTP connection is called

HTTPS

(S stands for Secure). The HTTPS protocol is not a completely different protocol from the HTTP protocol. The difference is that HTTPS works by TLS and SSL transport mechanisms. TLS – Transport Layer Security, is based on SSL (Secure Socket Layer). TLS gives instructions and rules to create truly secure and safe data transferring over the Internet.

All the data you send and receive is encoded by SSL certificates. Certificates are issued by special organizations and certification authorities. They sign certificates with their own digital signature. The browser can see the certificate sign and verify that the certificate is valid.

This is one of the most common security schemes on the Internet. When you send something to a server, the browser verifies the certificate first, then you encode your data with an "public key". And the server has a "private key" that is needed to decode the data you send. When a server sends an answer, it also encodes data with that "public key". Then your browser can decode them by using the "private key".

To be more secure, an HTTP server can demand your authentication. For authentication, your request headings must have an authenticate parameter that contains "login" and "password".

Compressing

Nobody loves slow page download speeds. HTTP servers can compress data that is sent. Just like you can compress a folder with documents into an "archive", then send it to someone by one file by email. The server compresses all responses to the client, then the client (browser) decompresses the data. Compressed data size is lower than decompressed, so you need to download fewer bytes to open the web page.

Cookies

Web servers can also read your browser data, like cookies. Cookies are small data files that a website stores on a user's computer through their web browser. They allow the website to remember information about the user, such as their preferences or login status, from one visit to the next. Cookies help improve the user experience while using some web applications. For example, it helps sellers/shops know what products they can recommend to you based on your search history.

Cookies can potentially be insecure because they store information on the user's computer that can be accessed by a website or attackers gaining access to the user's computer or network. If the cookie contains sensitive information, such as the user's login credentials, this information can be stolen and used to impersonate the user. In addition to this, cookies can be used to track user activity on the Internet. This can cause privacy concerns among many users. Some websites may use cookies to store information about user preferences and use this information for targeted advertising. This can also be considered as an invasion of privacy. It is important to be careful about what information is stored in cookies and regularly clear them to maintain both privacy and security.

Cache

Servers can cache the most frequent requests. If your current request is the same as the previous one, the server just returns you a saved copy of the answer. Also, a server can set a special heading property to store some data in your browser's local cache. So if your cache has a response for your request, the browser won't have to send any request to the server.

Conclusion

HTTP servers have plenty of tools to communicate with clients and other servers. An HTTP server is a complicated system to create secure and optimized connections with clients. It can help store and distribute static content and dynamic web pages as well. An HTTP server is the basis of the Internet and the communication rules in it. Knowing how HTTP servers work while developing even the simplest applications or web pages will be a great help. Any developer should have the skills to create basic HTTP servers for their targets.

Why are cookies used?

Cookies store some data that web developers can use to improve user experience.

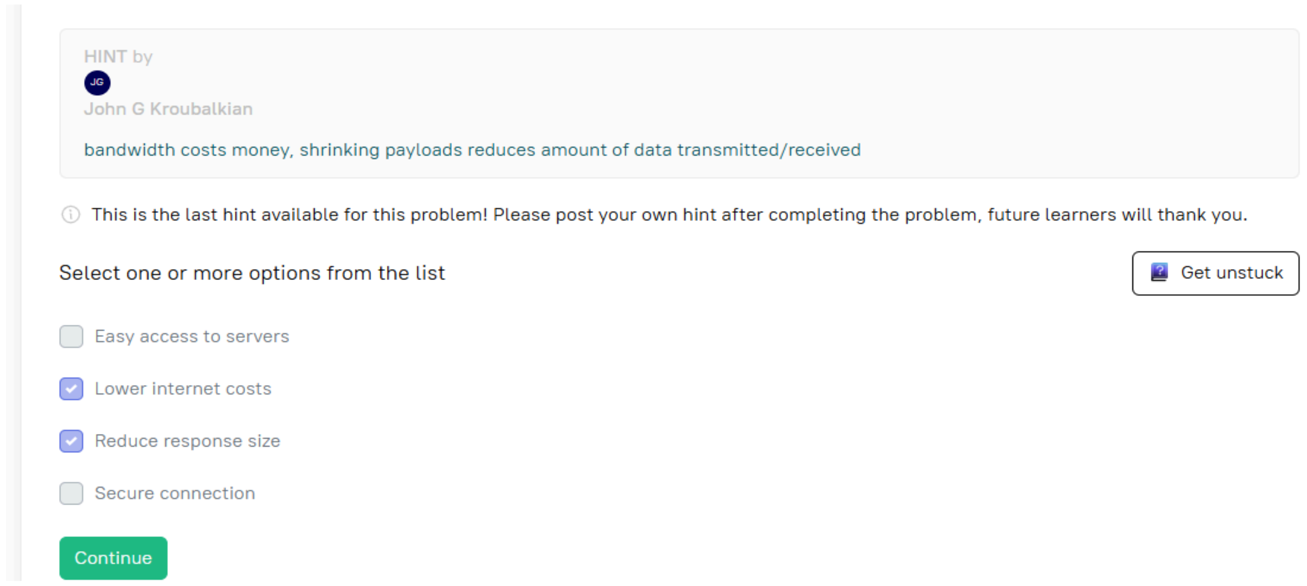
What is the function of a proxy?

Redirect requests

An HTTP server can also work over the HTTPS protocol.

What is the basis of trust between a web server and a client(browser) over an HTTPS connection? SSL certificate

Why should servers compress data before they return it to clients?



HINT by

JG

John G Kroubalkian

bandwidth costs money, shrinking payloads reduces amount of data transmitted/received

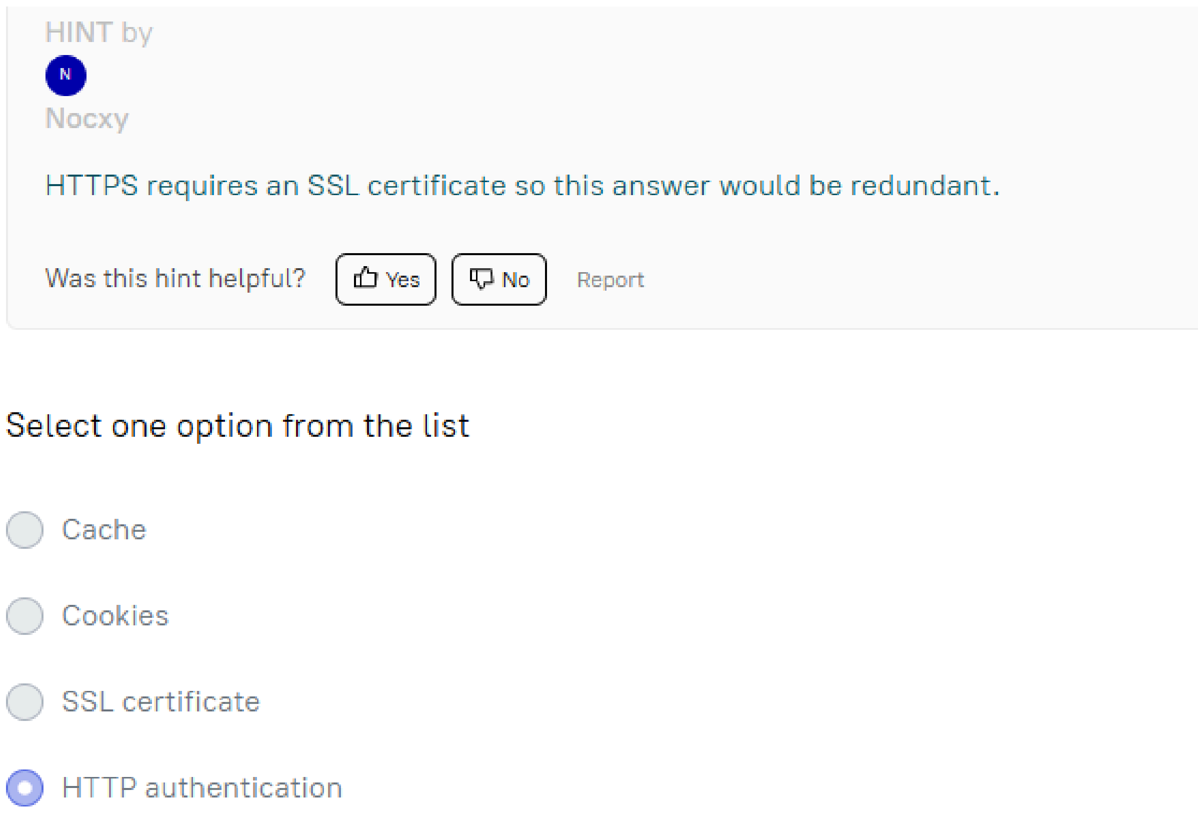
ⓘ This is the last hint available for this problem! Please post your own hint after completing the problem, future learners will thank you.

Select one or more options from the list

- [ ] Easy access to servers
- [✓] Lower internet costs
- [✓] Reduce response size
- [ ] Secure connection

What is an HTTP server?
A computer program in the network that can process client requests over HTTP.

Besides HTTPS, what else can be used to increase security?


HINT by

N

Nocxy

HTTPS requires an SSL certificate so this answer would be redundant.

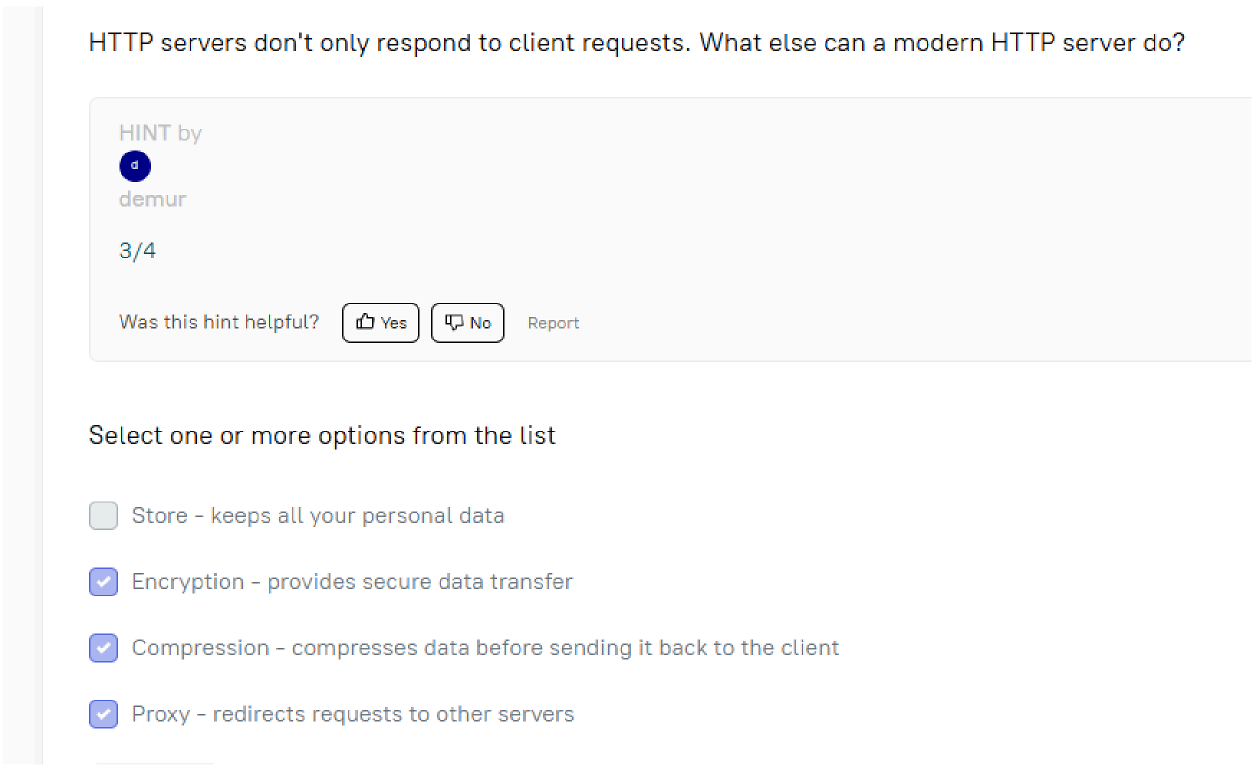
Select one option from the list

- Cache
- Cookies
- SSL certificate
- [✓ HTTP authentication]

Why is cache important?

Stores a response associated with a request and reuses the stored response for further requests

HTTP servers don't only respond to client requests. What else can a modern HTTP server do?


HTTP servers don't only respond to client requests. What else can a modern HTTP server do?

HINT by

demur

3/4

Was this hint helpful? Yes No Report

Select one or more options from the list

- [ ] Store - keeps all your personal data
- [✓] Encryption - provides secure data transfer
- [✓] Compression - compresses data before sending it back to the client
- [✓] Proxy - redirects requests to other servers