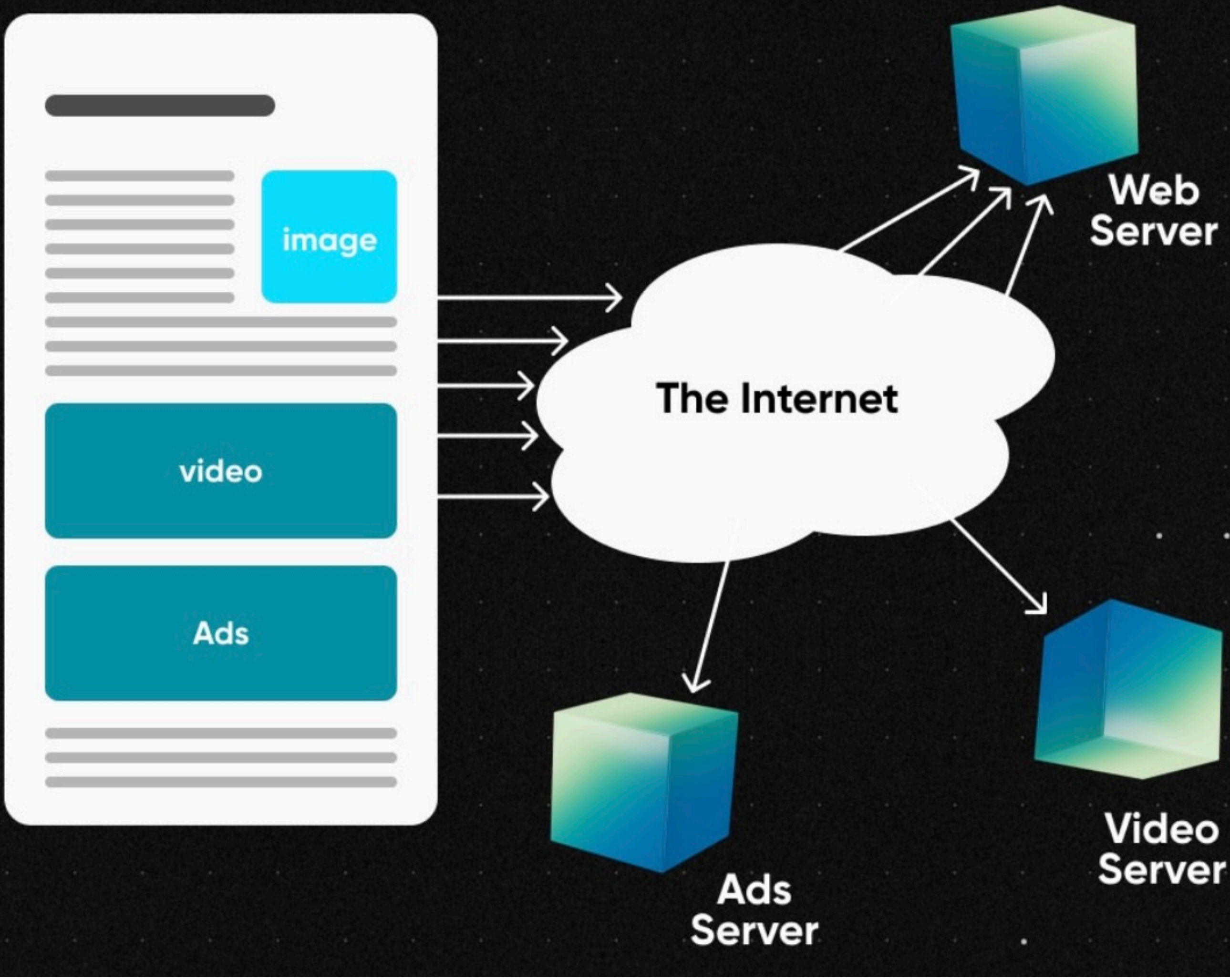
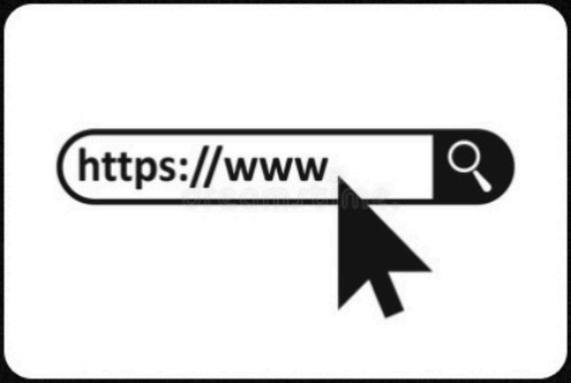
HTTP Overview



Introduction to HTTP

Hypertext Transfer Protocol (HTTP) is the foundation of data communication on the web.

It is a stateless and connectionless protocol.

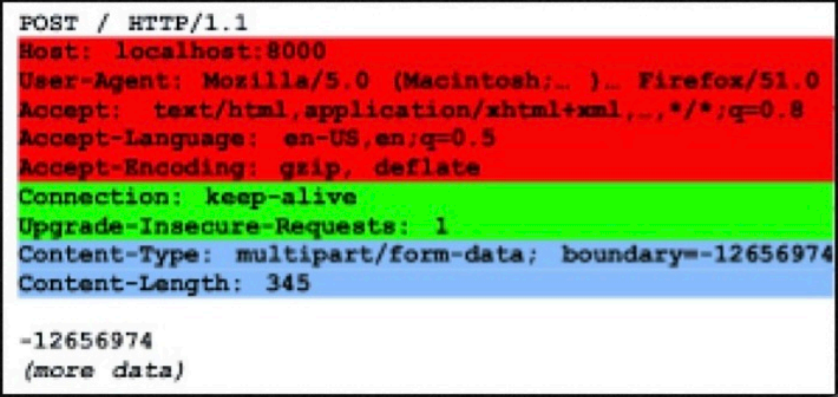


HTTP Messages

There are two types of messages in HTTP: requests and responses.

Request methods such as GET, POST, PUT, DELETE, etc. are used to specify the desired action.

Status codes like 200 OK, 404 Not Found, 500 Internal Server Error, etc. indicate the outcome of the request.



```
POST / HTTP/1.1
Host: localhost:8000
User-Agent: Mozilla/5.0 (Macintosh;… )… Firefox/51.0
Accept: text/html,application/xhtml+xml,…,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
Content-Type: multipart/form-data; boundary=-12656974
Content-Length: 345

-12656974
(more data)
```

HTTP Request Structure

The request line consists of the method, URI (Uniform Resource Identifier), and protocol version.

Headers are key-value pairs that contain metadata.

An optional message body can carry data sent to the server.

```
GET /api/products HTTP/1.1
Host: example.com
```

HTTP Response Structure

The status line includes the **protocol version**, **status code**, and **reason phrase**.

Headers are **key-value pairs** that contain metadata.

The message body contains **data returned** from the server, such as HTML, JSON, etc.

```
Status Line:
HTTP/1.1 200 OK

Headers:
- Content-Type: application/json
- Cache-Control: no-cache
```

HTTP Connections

HTTP supports both **persistent** and **non-persistent** connections.

Persistent connections allow **multiple** requests and responses per connection, **reducing overhead**.

Non-persistent connections require a new connection for each request/response pair, which **can increase latency**.

HTTPS (Secure HTTP)

HTTPS is an encrypted version of HTTP that uses TLS/SSL.

It provides confidentiality, integrity, and authentication of data transmission.

HTTPS protects sensitive data from eavesdropping and tampering.

HTTP Cookies

HTTP cookies are small pieces of data stored on the client-side.

They are used for session management, personalization, and tracking.

Cookies are sent with each relevant HTTP request to maintain stateful communication.

HTTP/2 and HTTP/3

HTTP/2 is a binary, multiplexed protocol that uses header compression to improve performance.

HTTP/3 is built on the QUIC protocol, which enhances connection setup and congestion control.

Both HTTP/2 and HTTP/3 offer improved performance and security compared to HTTP/1.1.