



URI and HTTPS

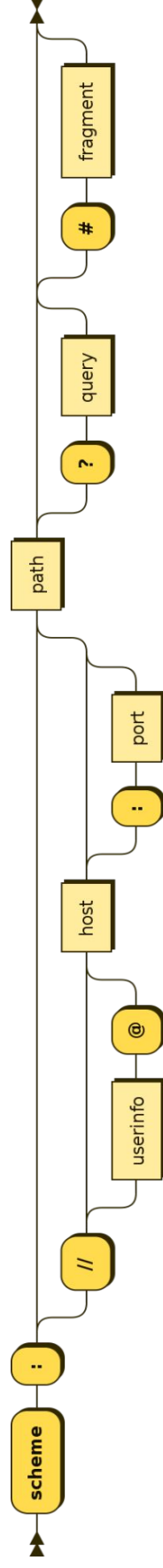
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URI

- Uniform Resource Identifier
- A unique combination of characters used to find resources by associating a resource with a name or a location
- Can provide the means of locating and accessing information for a resource
- Is made up of different parts: scheme and path, each having subcomponents that are not all required
- Two types: URN, URL

Parts of a URI



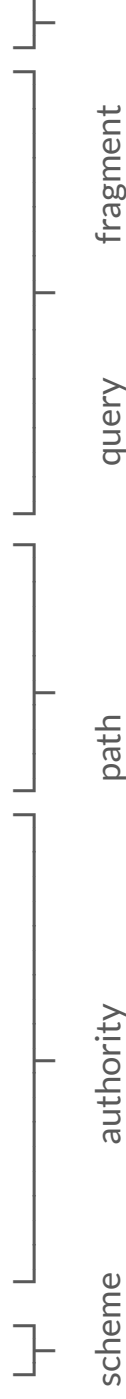
- Scheme - Protocol used to understand the resource identity
 - Authority - General location of resource
 - User info - username:password
 - Host - name or ip address
 - Port - port number
- Path - exact path to resource
 - Query - string of information that resource can additionally use for some purpose
 - Fragment - identifier for subsection of resource



URI example



<https://john.doe@www.example.com:123/forum/questions/?tag=networking&order=newest#top>





URI and information transfer

The scheme of the URI specifies what protocol is used to access the requested resource. Some well-known schemes are

- **file**: Files
- **ftp**: File Transfer Protocol
- **git**: Version management with Git
- **mailto**: Email addresses
- **sftp**: SSH File Transfer Protocol
- **ssh**: [Secure shell](#)



URI and information transfer examples

```
git clone git@github.com:<account>/<repository>.git
```

```
curl -o ftp://ftp.example.com/file.zip
```



HTTPS

- Hypertext Transfer Protocol Secure
- Secure extension of HTTP
- HTTP is a protocol built on top of TCP for transferring information on the web through request and response messages
- HTTPS encrypts communication using the Transport Layer Security (TLS)/Secure Sockets Layer (SSL)



Security in HTTPS

- Based on private and public key model to encrypt and decrypt information
 - Private key is controlled by site owner and lives on the webserver
 - Public key is available to everyone that interacts the webserver
- SSL certificate containing public key is sent over to user to initiate secure connection and then client and server then perform a SSL/TLS handshake
 - SSL certificate is a data file on the server with public key and identification information
- SSL certificates are obtained from a certificate authority (CA) that creates the certificate and digitally signs it. You can purchase a SSL certificate from select services,



HTTP requests

- Request line
 - HTTP method to be used
 - URI of the request (/api/books?genre=sci-fi)
 - HTTP protocol (1.1, 2.0)
- Header - metadata for the request
 - Host name
 - User agent
 - Cache-control
- Body - Optional, appropriate for certain HTTP methods



HTTP method types

- Controls interaction between client and server
- GET request - gets information from a server
- POST request - sends information to a server
- PUT request - replaces information on a server
- DELETE request - deletes information on a server



HTTP request example

Let's try an example in code



Citations

<https://www.ionos.com/digitalguide/websites/web-development/uniform-resource-identifier-uri/>

<https://www.cloudflare.com/learning/>

<https://developer.mozilla.org/en-US/docs/Web/HTTP>