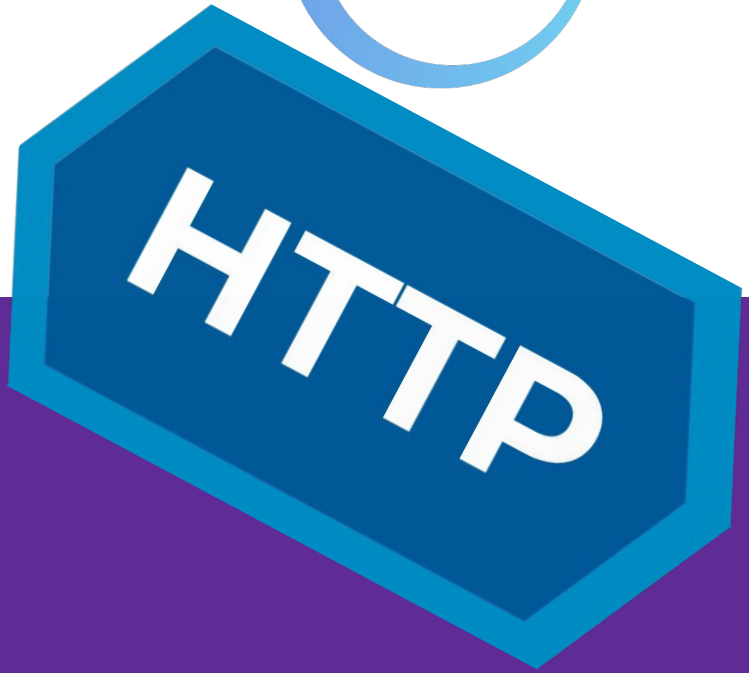
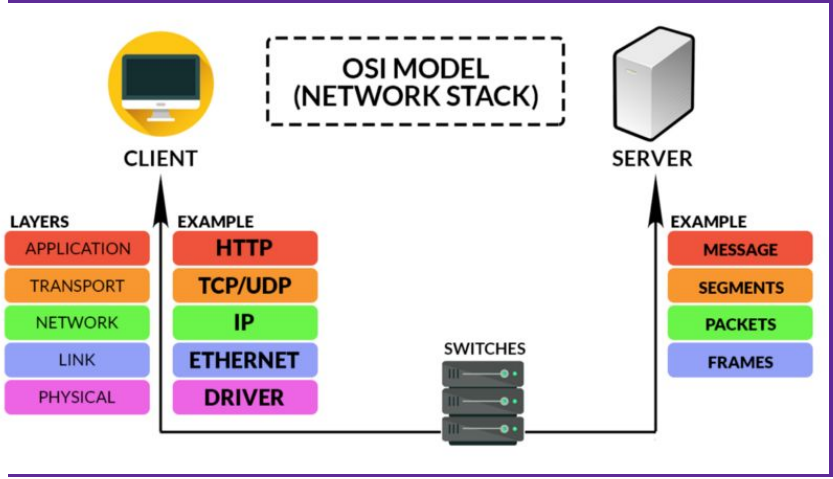
Formation HTTP



didier & lionofinterest

HTTPourquoi ?

Petit retour sur le modèle OSI



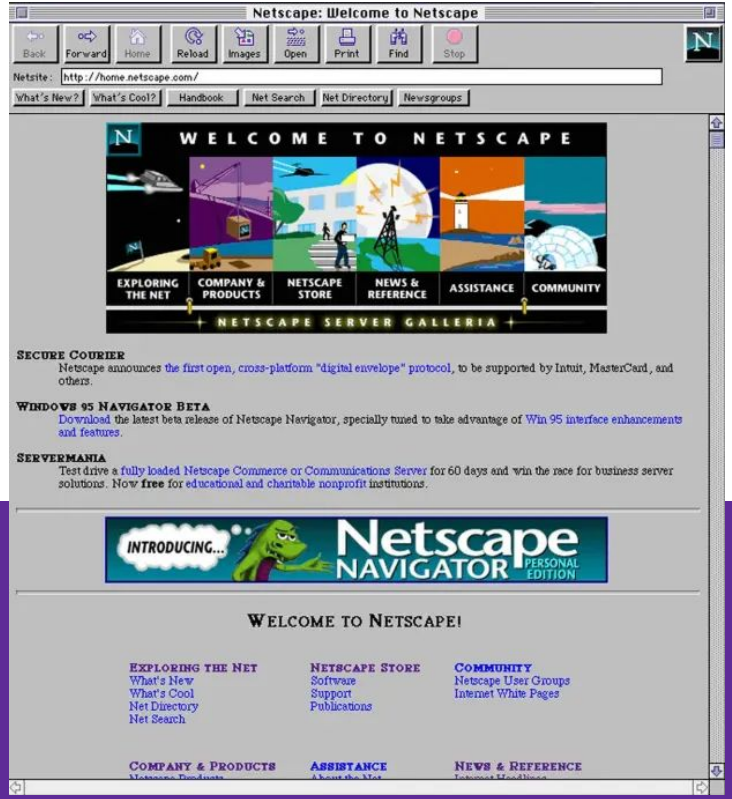
Hyper Text Transfer Protocol

Protocole TCP sur la couche Transport

Port 80 côté serveur

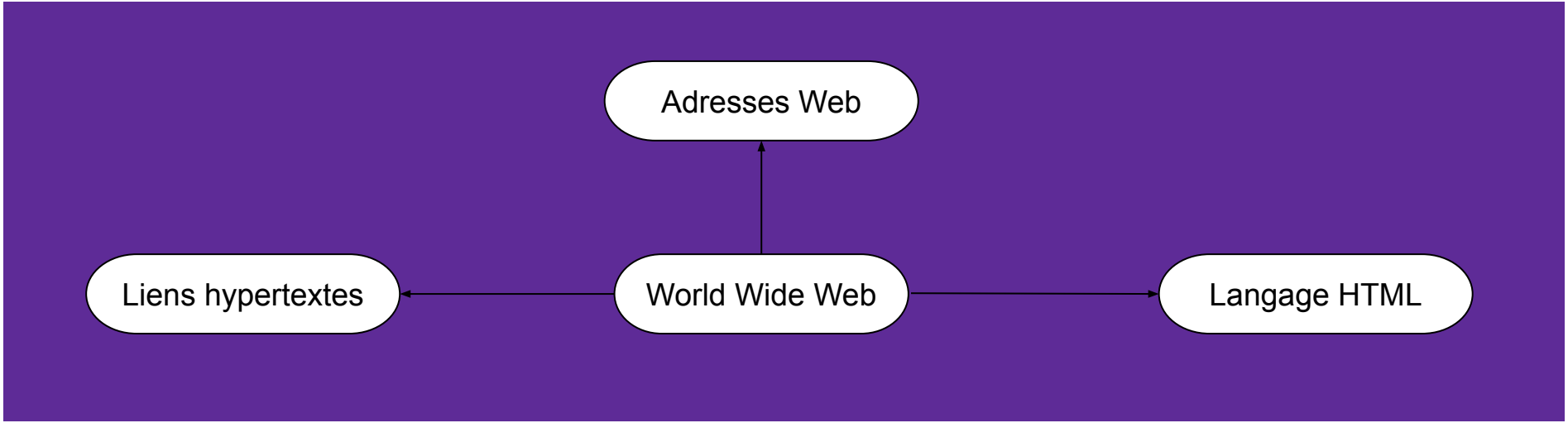
« I just had to take the hypertext idea and connect it to the TCP and DNS ideas and — ta-da! — the World Wide Web. »

Tim Berners-Lee



Premier navigateur Web de l’histoire

Fonctionnalités principales



Déclinaison des versions

Première version : HTTP/0.9
1996 : HTTP/1.0
1997 : HTTP/1.1
2012 : HTTP/2
2014 : Respécification d’HTTP/1.1
2018 : HTTP/3

Quelques statistiques d'utilisation

Usage statistics of HTTP/2 for websites

This report shows the usage statistics of HTTP/2 as site element on the web. See technologies overview for explanations on the methodologies used in the surveys. Our reports are updated daily.

> **HTTP/2 is used by 46.6%** of all the websites.

Historical trend

This diagram shows the historical trend in the percentage of websites using HTTP/2.
Our dedicated trend survey shows more site elements usage trends.

Usage of HTTP/2 for websites, 14 Feb 2022, W3Techs.com

Usage statistics of HTTP/3 for websites

This report shows the usage statistics of HTTP/3 as site element on the web. See technologies overview for explanations on the methodologies used in the surveys. Our reports are updated daily.

> **HTTP/3 is used by 25.1%** of all the websites.

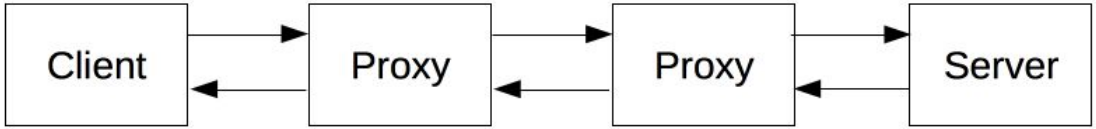
Historical trend

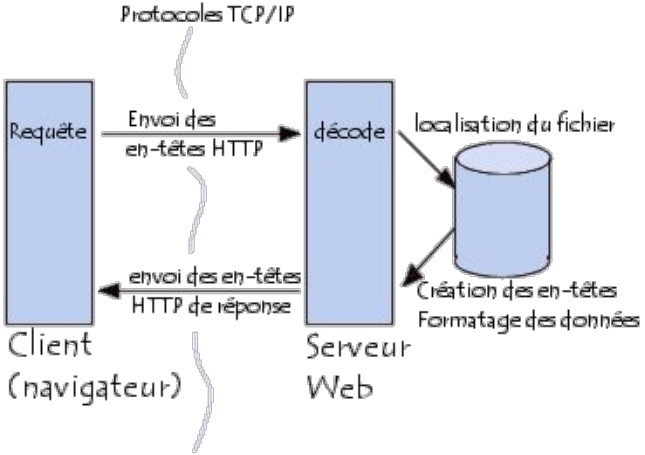
This diagram shows the historical trend in the percentage of websites using HTTP/3.
Our dedicated trend survey shows more site elements usage trends.

Usage of HTTP/3 for websites, 14 Feb 2022, W3Techs.com

HTTPlaît-il ?

Interaction HTTP





HEAD

PUT

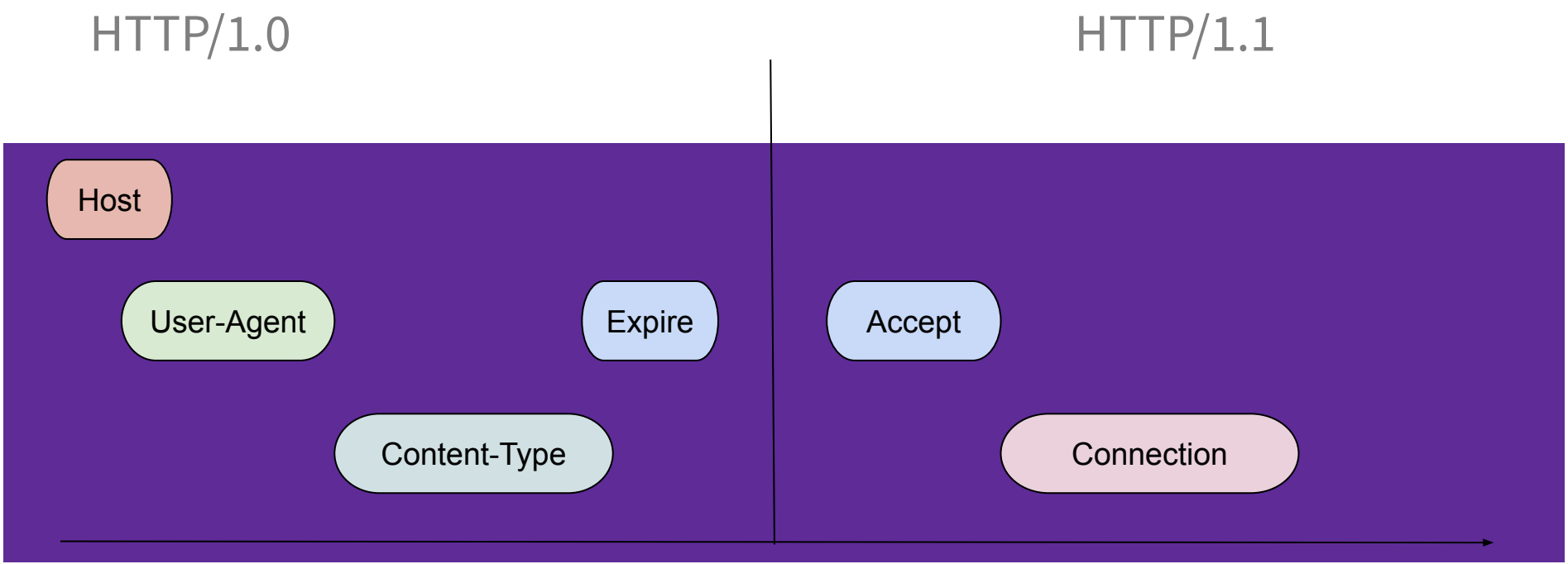
GET

POST

PATCH

MIME : un standard internet qui étend le format de données des courriels pour supporter des textes en différents codage des caractères autres que l'ASCII, des contenus non textuels, des contenus multiples, et des informations d'en-tête en d'autres codages que l'ASCII.

En-tête HTTP



Requête HTTP

```
METHODE URL VERSION<crlf>
EN-TETE : Valeur<crlf>
.
.
.
EN-TETE : Valeur<crlf>
Ligne vide<crlf>
CORPS DE LA REQUETE
```

```
rlwrap netcat www.google.com 80
GET / HTTP/1.1
Host: www.google.com

HTTP/1.1 200 OK
Date: Tue, 15 Feb 2022 18:05:03 GMT
Expires: -1
Cache-Control: private, max-age=0
Content-Type: text/html; charset=ISO-8859-1
P3P: CP="This is not a P3P policy! See g.co/p3phelp for more info."
Server: gws
X-XSS-Protection: 0
X-Frame-Options: SAMEORIGIN
```

Code de retour

418 I'm a teapot (je suis une théière)

Le statut erreur client HTTP **`418 I'm a teapot`** qui signifie « Je suis une théière » informe que le serveur refuse de préparer du café, car il s'agit d'une théière. Cette erreur est une référence au protocole « *Hyper Text Coffee Pot Control Protocol* » qui est le poisson d'avril des RFCs en 1998.

Certains sites web utilisent ce code de réponse pour les requêtes qu'ils ne souhaitent pas traiter (par exemple des requêtes automatiques).

Statut

```
418 I'm a teapot
```

1XX Informational	
100	Continue
101	Switching Protocols
102	Processing

2XX Success	
200	OK
201	Created
202	Accepted
203	Non-authoritative Information
204	No Content
205	Reset Content
206	Partial Content
207	Multi-Status
208	Already Reported
226	IM Used

3XX Redirectional	
300	Multiple Choices
301	Moved Permanently
302	Found
303	See Other
304	Not Modified
305	Use Proxy
307	Temporary Redirect
308	Permanent Redirect

4XX Client Error	
400	Bad Request
401	Unauthorized
402	Payment Required
403	Forbidden
404	Not Found
405	Method Not Allowed
406	Not Acceptable
407	Proxy Authentication Required
408	Request Timeout

4XX Client Error Continued	
409	Conflict
410	Gone
411	Length Required
412	Precondition Failed
413	Payload Too Large
414	Request-URI Too Long
415	Unsupported Media Type
416	Requested Range Not Satisfiable
417	Expectation Failed
418	I'm a teapot
421	Misdirected Request
422	Unprocessable Entity
423	Locked
424	Failed Dependency
426	Upgrade Required
428	Precondition Required
429	Too Many Requests
431	Request Header Fields Too Large
444	Connection Closed Without Response
451	Unavailable For Legal Reasons
499	Client Closed Request

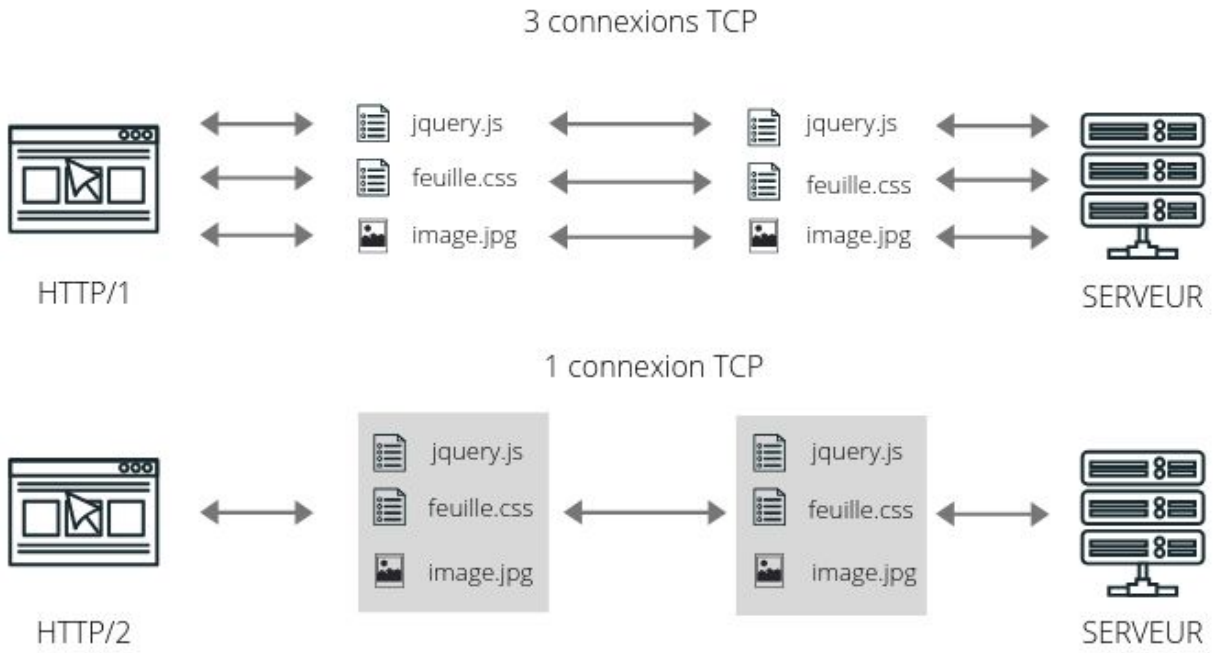
5XX Server Error	
500	Internal Server Error
501	Not Implemented
502	Bad Gateway
503	Service Unavailable
504	Gateway Timeout
505	HTTP Version Not Supported
506	Variant Also Negotiates
507	Insufficient Storage
508	Loop Detected
510	Not Extended
511	Network Authentication Required
599	Network Connect Timeout Error

HTTP STATUS CODES

When a browser requests a service from a web server, an error may occur.
This is a list of HTTP status messages that might be returned.

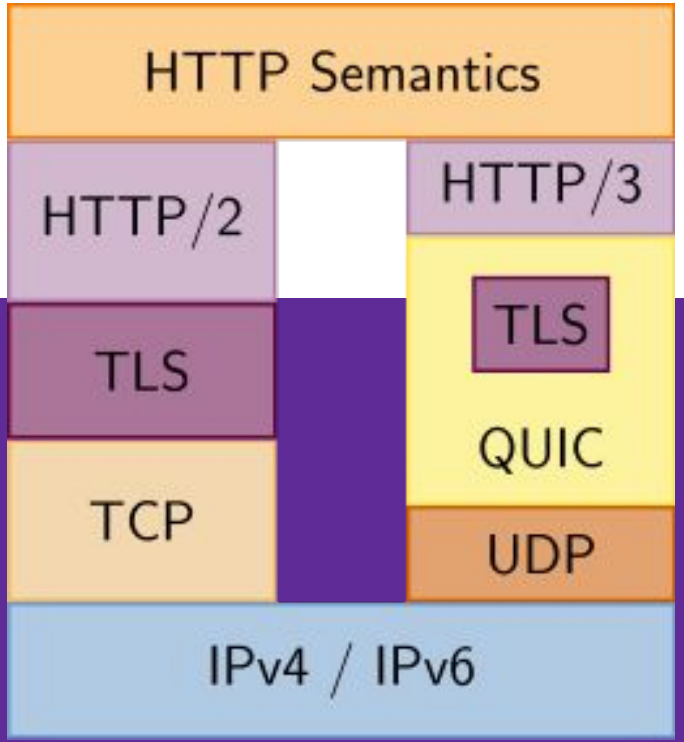
HTTP/2

- RFC 7540 (2015)
- Flux multiplexé



HTTP/3

Anciennement HTTP over QUIC



- Basée sur QUIC
- RFC 9113 (Janvier 2022)
- Qu'est-ce qu'apporte HTTP 3 ?

1. Initialisation de la connexion plus rapide
2. HTTPS obligatoire
3. L'échange des données est plus rapide

HTTPS

HyperText Transfer Protocol **Secure**

Pourquoi sécuriser les échanges HTTP ?

No.	Time	Source	Source Port	Destination	Destination Port	Protocol	Length	Transmission Control Protocol	Info
4	0.000835069	127.0.0.1	53300	127.0.0.1	8080	HTTP	2519	✓	GET /
8	0.026385548	127.0.0.1	53300	127.0.0.1	8080	HTTP	744	✓	GET /
12	0.193023997	127.0.0.1	53300	127.0.0.1	8080	HTTP	574	✓	GET /
16	0.227080750	127.0.0.1	53300	127.0.0.1	8080	HTTP	978	✓	GET /
20	0.254408800	127.0.0.1	53300	127.0.0.1	8080	HTTP	1255	✓	GET /
24	7.635342608	127.0.0.1	53300	127.0.0.1	8080	HTTP	113	✓	POST
28	7.681027277	127.0.0.1	53300	127.0.0.1	8080	HTTP	770	✓	GET /
31	7.799046847	127.0.0.1	53300	127.0.0.1	8080	HTTP	574	✓	GET /
34	7.838637425	127.0.0.1	53300	127.0.0.1	8080	HTTP	2480	✓	GET /
37	7.889779680	127.0.0.1	53300	127.0.0.1	8080	HTTP	456	✓	POST
40	7.911758473	127.0.0.1	53300	127.0.0.1	8080	HTTP	1757	✓	GET /
42	7.922795554	127.0.0.1	53300	127.0.0.1	8080	HTTP	589	✓	GET /
53	7.983182942	127.0.0.1	53300	127.0.0.1	8080	HTTP	2322	✓	GET /
55	8.012170776	127.0.0.1	53300	127.0.0.1	8080	HTTP	1766	✓	GET /

```
▸ Frame 24: 113 bytes on wire (904 bits), 113 bytes captured (904 bits) on interface lo, id 0
▸ Ethernet II, Src: 00:00:00_00:00:00 (00:00:00:00:00:00), Dst: 00:00:00_00:00:00 (00:00:00:00:00:00)
▸ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
▸ Transmission Control Protocol, Src Port: 53300, Dst Port: 8080, Seq: 7739, Ack: 16256, Len: 47
▸ [2 Reassembled TCP Segments (2045 bytes): #23(1998), #24(47)]
▸ Hypertext Transfer Protocol
▾ HTML Form URL Encoded: application/x-www-form-urlencoded
  ▾ Form item: "username" = "tototo"
      Key: username
      Value: tototo
  ▾ Form item: "password" = "minet123"
      Key: password
      Value: minet123
  ▾ Form item: "credentialId" = ""
      Key: credentialId
      Value:
```

HTTPS

HyperText Transfer Protocol **Secure**

- Port 443
- SSL/TLS
- Garantie la confidentialité et l’intégrité des données
- Redirection HTTP vers HTTPS

HTTPourensavoirplus

https://developer.mozilla.org/fr/docs/Web/HTTP/

KAHOOT ?