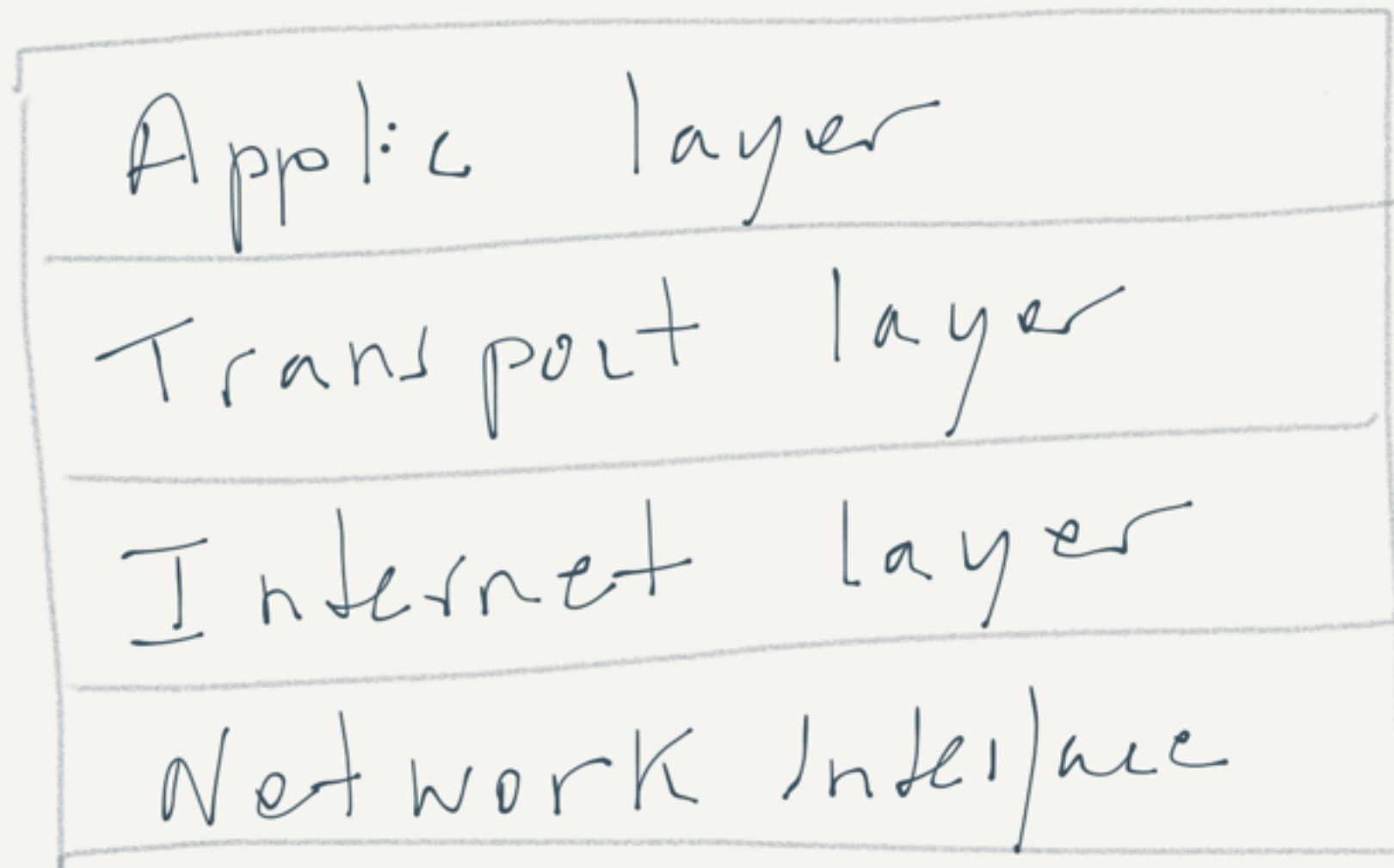


La suite TCP/IP

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IFT3225@Hiver2020

La suite TCP/IP



HTTP, FTP, SSH
Telnet, SMTP, ...

TCP, UDP

IP, ICMP

Ethernet

+ couche « physique » qui gère le transfert physique de bits d'informations entre deux composants

Ports par défaut

| | | |
|--------|-----|--|
| FTP | 21 | File Transfer Protocol |
| SMTP | 25 | Simple Mail Transfer Protocol |
| HTTP | 80 | Hyper Text Transfer Protocol |
| POP | 110 | Post Office Protocol |
| IMAP | 143 | Internet Message Access Protocol |
| Telnet | 23 | Connection à une autre machine |
| Finger | 79 | Récupération d'information des utilisateurs « remote » |

Pour plus d'info: https://fr.wikipedia.org/wiki/Liste_de_ports_logiciels

Finger

% finger felipe

Login: felipe

Name: Philippe Langlais

Directory: /u/felipe

Shell: /bin/psh

On since Fri Nov 29 10:34 (EST) on pts/5 from 132.204.27.168
35 days idle

On since Mon Dec 9 11:03 (EST) on pts/12 from 132.204.27.168
24 days 7 hours idle

On since Mon Jan 6 15:10 (EST) on pts/14 from 132.204.24.140

No mail.

Project:

NLP related

No Plan.

Login: castilaf

Name: Andres Felipe Castilla

Directory: /u/castilaf

Shell: /bin/psh

Never logged in.

No mail.

No Plan.

Login: santosjf

Name: Joao Felipe Santos

SMTP

Envoi de messages

```
% nc -v mail.iro.umontreal.ca 25
```

Utilitaire pour envoyer des données brutes sur le réseau

```
HELO felipe
```

```
MAIL FROM: trudeau@gov.ca
```

```
RCPT TO: felipe@iro.umontreal.ca
```

```
DATA
```

```
354 End data with <CR><LF>.<CR><LF>
```

```
Subject: Cher citoyen
```

```
Nous réalisons une campagne de financement ...
```

```
Merci d'avance,
```

```
Justin-
```

```
.
```

SMTP

```
% curl --url 'smtps://mail.iro.umontreal.ca:465' \  
  --ssl-reqd \  
  --mail-from 'felipe@iro.umontreal.ca' \  
  --mail-rcpt 'felipe@iro.umontreal.ca' \  
  --upload-file mail.txt \  
  --user 'felipe@iro.umontreal.ca:passwd' \  
  --insecure
```

```
% cat mail.txt
```

```
From: "Greta Garbo" <felipe@iro.umontreal.ca>  
To: "felipe" <felipe@iro.umontreal.ca>  
Subject: test
```

Hejsan Felipe,

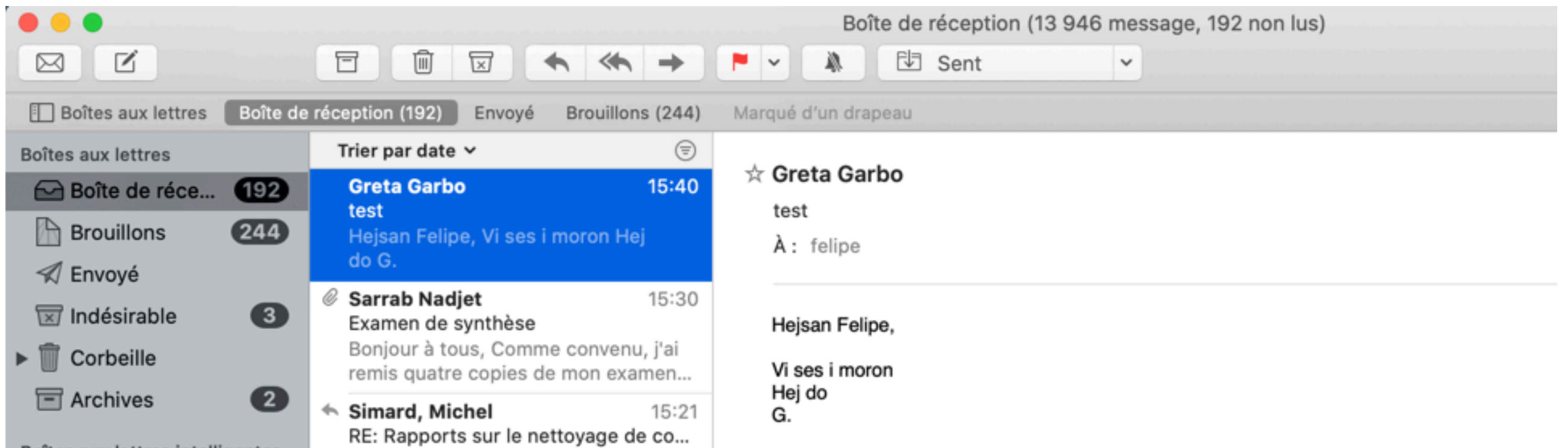
Vi ses i moron

Hej do

G.

Un couteau suisse
pour gérer sous Unix/
Linux différents
protocoles tcp-ip

SMTP



Fake mails en quelques clics: <http://deadfake.com/>

POP

Récupération de messages

```
% telnet mail.myorg.org 110
```

```
USER usager  
PASS mot de passe  
+ commandes
```

telnet est de plus en plus
banni des env. Unix

LIST : liste de chaque message (numéro) avec sa taille en octet

DELE #num: suppression d'un mail

RETR #num: récupération du message

TOP #num #lignes: affiche les #lignes du message #num

Un client POP fait habituellement:

- Identification
- Comparaison des identifiants de message avec ceux stockés en local
- Retrieve de tous les nouveaux messages
- Suppression de tous les messages lus (sur le serveur)

curl et pop3

```
% curl -o mail.pop -v --ssl-reqd -u 'felipe:passwd' --request UIDL \  
--url pop3://mail.iro.umontreal.ca
```

```
* Rebuilt URL to: pop3://mail.iro.umontreal.ca/
```

```
% Total    % Received % Xferd  Average Speed   Time    Time     Time Current  
          Dload  Upload  Total  Spent    Left  Speed  
0   0   0   0   0   0   0   0  --:--:--  --:--:--  --:--:--  0* Trying 132.204.27.60...
```

```
* TCP_NODELAY set
```

```
* Connected to mail.iro.umontreal.ca (132.204.27.60) port 110 (#0)
```

```
< +OK Dovecot ready.
```

```
> CAPA
```

```
< +OK
```

```
< CAPA
```

```
< TOP
```

```
< UIDL
```

```
< RESP-CODES
```

```
< PIPELINING
```

```
< AUTH-RESP-CODE
```

```
< STLS
```

```
< SASL
```

curl et pop3

% cat mail.pop

```
1 00005a8755fc1908
2 00005a8955fc1908
3 00005a8f55fc1908
4 00005a9155fc1908
5 00005a9255fc1908
6 00005a9355fc1908
7 00005a9755fc1908
8 00005a9955fc1908
9 00005a9a55fc1908
10 00005a9b55fc1908
```

...

curl et IMAP

```
% curl --insecure --url 'imaps://mail.iro.umontreal.ca' --user 'felipe:passwd'
```

- * LIST (\HasChildren) "/" Comites
- * LIST (\HasChildren) "/" Comites/Papers
- * LIST (\HasChildren) "/" Comites/Papers/Reviews
- * LIST (\HasNoChildren) "/" "Comites/Papers/Reviews/JEC 11"
- * LIST (\HasChildren) "/" Comites/Papers/Reviews/ACL

```
% curl --insecure --url 'imaps://mail.iro.umontreal.ca' --user 'felipe:passwd' \  
--request "EXAMINE INBOX"
```

- ...
- * OK [PERMANENTFLAGS ()] Read-only mailbox.
- * 14050 EXISTS
- * 1 RECENT
- * OK [UNSEEN 8073] First unseen.
- * OK [UIDVALIDITY 1442584840] UIDs valid
- * OK [UIDNEXT 78963] Predicted next UID
- * OK [HIGHESTMODSEQ 326327] Highest

curl et IMAP

```
% curl -o mail.imap --insecure --user 'felipe:passwd' \  
--url 'imaps://mail.iro.umontreal.ca/INBOX;UID=14050'
```

```
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current  
          Dload  Upload  Total      Spent    Left     Speed  
  100  6283  100  6283    0     0  6416    0 --:--:-- --:--:-- --:--:-- 6411
```

```
% head -n 8 mail.imap
```

Return-Path: <fastedit@primeproofreaders.com>

Delivered-To: felipe@iro.umontreal.ca

Received: from mail01.iro.umontreal.ca

by mail01.iro.umontreal.ca with LMTP id eE+2E5esE14/DQAASs+2LQ
for <felipe@iro.umontreal.ca>; Mon, 06 Jan 2020 16:54:31 -0500

Received: from mailsScanner.iro.umontreal.ca (pmg2.iro.umontreal.ca [172.31.2.41])

by mail01.iro.umontreal.ca (Postfix) with ESMTPS id 2595E1400D0
for <felipe@iro.umontreal.ca>; Mon, 6 Jan 2020 16:54:26 -0500 (EST)

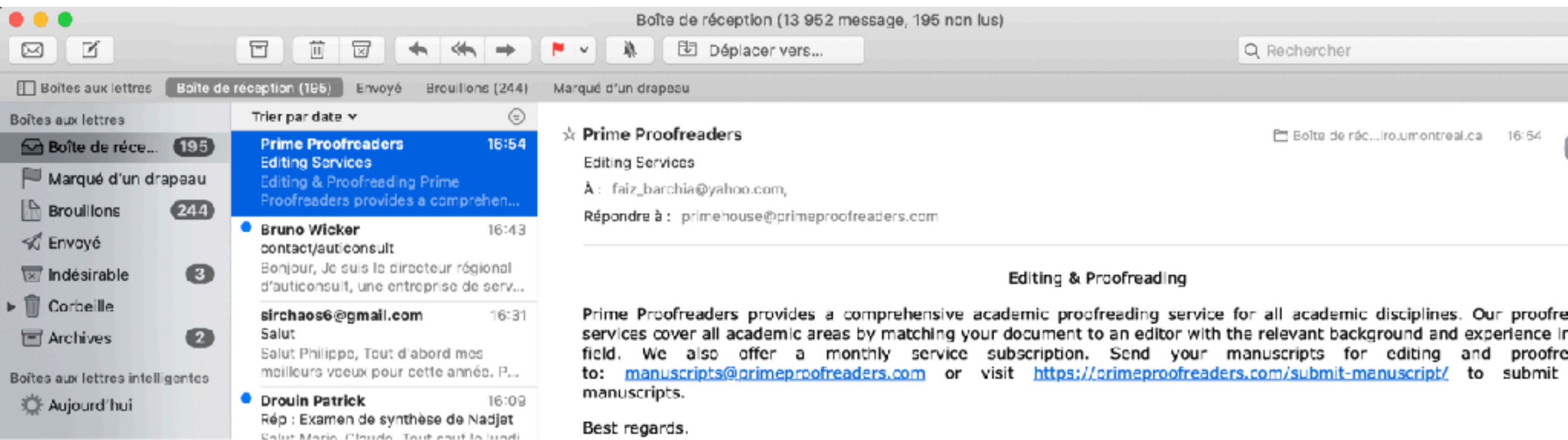
curl et IMAP

```
% tail -n 20 mail.imap
```

```
<html><head><meta http-equiv=3D"Content-Type" content=3D"text/html; charset=
=3DUTF-8" /></head><body style=3D'font-size: 10pt; font-family: Verdana,Gen=
eva,sans-serif'>
<p style=3D"text-align: center;">Editing & Proofreading</p>
<p style=3D"text-align: justify;">Prime Proofreaders provides a comprehensi=
ve academic proofreading service for all academic disciplines. Our proofrea=
ding services cover all academic areas by matching your document to an edit=
or with the relevant background and experience in your field. We also offer=
a monthly service subscription. Send your manuscripts for editing and proo=
freading to:&nbsp;<a href=3D"mailto:manuscripts@primeproofreaders.com">manu=
scripts@primeproofreaders.com</a> or visit&nbsp;<a href=3D"https://primepro=
ofreaders.com/submit-manuscript/">https://primeproofreaders.com/submit-manu=
script/</a> to submit your manuscripts.</p>
<p>Best regards.</p>
<p><br /></p>

</body></html>
```

curl et IMAP



Scriptage

```
% cat tut
```

```
#!/bin/csh -f
```

```
set id = 14050
```

```
while (1) curl --insecure \
```

```
  --url "imaps://mail.iro.umontreal.ca/INBOX;UID={id};SECTION=HEADER.FIELDS%20(SUBJECT)" \
```

```
  --user "felipe:passwd" || exit
```

```
@ id --
```

```
end
```

```
% csh ./tut
```

```
Subject: Prime Proofreaders
```

```
Subject: contact/auticonsult
```

```
Subject: Salut
```

```
Subject: =?utf-8?B?UmU6IEV4YW1lbiBkZSBzeW50aMOoc2UgZGUgTmFkamV0?=  
Subject: =?iso-8859-1?Q?Examen_de_synth=E8se_de_Nadjet?=  
Subject: =?utf-8?B?UmU6IEV4YW1lbiBkZSBzeW50aMOoc2U=?=  
Subject: test  
Subject: =?utf-8?B?RXhhbWVuIGRlIH5bnRow6hzZQ==?=  
Subject: RE: Rapports sur le nettoyage de corpus  
Subject: [Pourriel Potentiel] partenariat crsh
```

WWW

Web = URI + HTTP + HTML

1989: Tim Berners-Lee + Robert Cailliau (CERN)

WorldWideWeb : Proposition pour un projet hypertexte

1990: nav. Web en ligne de commande

1993: ~50 sites avec serveur HTTP

1994: W3C (fondé par TBL)

2018: TBL quitte W3C

note:

URI = nom

URL = moyen de localiser la ressource

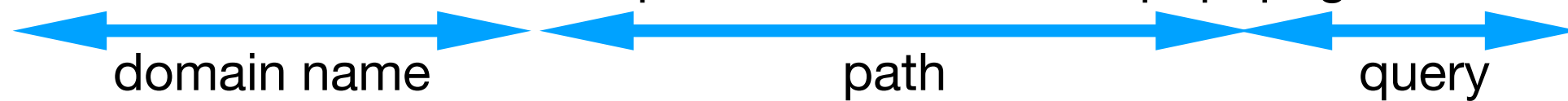
plus à ce sujet

Uniform Ressource Identifier (URI)

URI = scheme:[//authority]path[?query][#anchor]

authority = [user@]host[:port]

<http://www.iro.umontreal.ca/~felipe/new-home/frontal.php?page=resume>



% nslookup www.iro.umontreal.ca

Server: 10.0.1.1
Address: 10.0.1.1#53

Non-authoritative answer:

www.iro.umontreal.ca canonical name = tartan.iro.umontreal.ca.

Name: tartan.iro.umontreal.ca

Address: **132.204.26.36**

adresse IP (format IPV4)

<http://132.204.26.36/~felipe/new-home/frontal.php?page=resume>

Encodage URI

<http://www.iro.umontreal.ca/~felipe/frontal.php?nom=éric&âge=10>

<http%3A%2F%2Fwww.iro.umontreal.ca%2F~felipe%2Ffrontal.php%3Fnom%3D%C3%A9ric%26%C3%A2ge%3D10>

En particulier:

= %3D

& %26

https://www.w3schools.com/tags/ref_urlencode.ASP

Domain Name System (DNS)

- conversion IP@ / domain name
- réalisé le plus souvent par un [Internet Service Provider](#) (ISP)
 - qui du coup sait quelle ressource nous souhaitons consulter
 - d'où l'intérêt d'avoir un [Virtual Private Network](#) (VPN)

```
% scutil --dns
```

DNS configuration

resolver #1

```
nameserver[0] : 10.0.1.1
if_index : 4 (en0)
flags : Request A records
reach : 0x00020002 (Reachable,Directly Reachable Address)
```

resolver #2

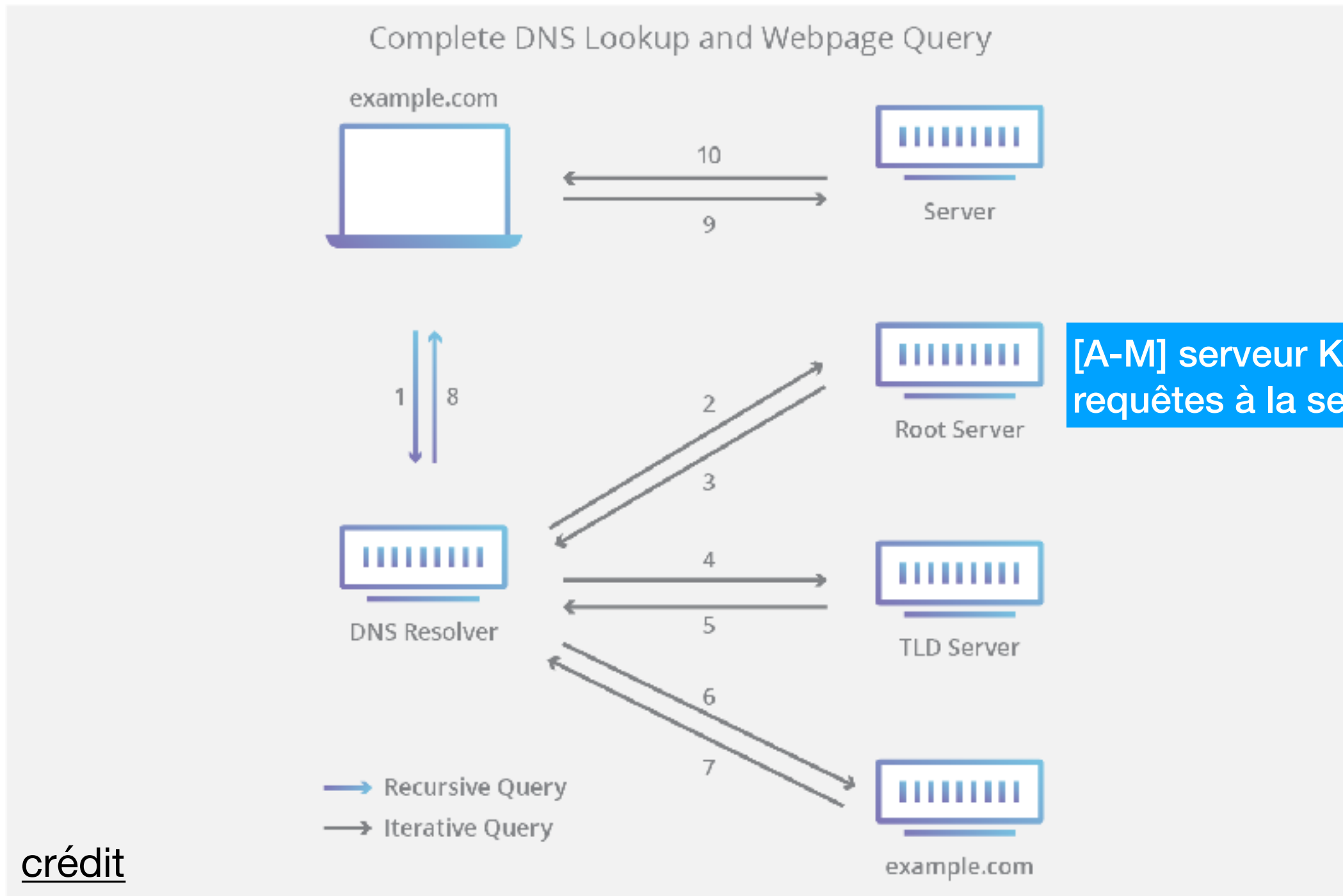
```
domain : local
options : mdns
timeout : 5
flags : Request A records
reach : 0x00000000 (Not Reachable)
order : 300000
```

...

resolver #7

```
domain : b.e.f.ip6.arpa
options : mdns
timeout : 5
flags : Request A records
reach : 0x00000000 (Not Reachable)
order : 301000
```

Domain Name System (DNS)



Certains serveurs DNS (notamment ceux de l'ISP) peuvent *cacher* des requêtes (ce sont des serveurs non autoritaires)

HTTP

- Pas le seul protocole que connaît votre navigateur
- C'est un protocole **sans état**
 - contrairement par exemple à ftp ou pop
- Un client (ex: navigateur) émet une requête HTTP à un serveur qui retourne une réponse. La connection est alors (ou peut être) rompue.
 - simple, mais pas très efficace
- Plusieurs **proxy** entre un client et un serveur peuvent intervenir
 - chaque acteur (proxy, client, serveur) peut *cacher* des réponses

Syntaxe d'une requête HTTP:

METHOD /path HTTP/version

Header name: valeur

Header name: valeur

[request body]

Méthodes populaires:

- GET demande d'une ressource
 - pas de corps
- POST envoi de paramètres dans le corpus de la requête
 - souvent utilisé pour uploader une information
- HEAD seulement les entêtes sont retournées

HTTP GET

```
% curl https://www.google.ca/
```

```
<!doctype html><html itemscope="" itemtype="http://schema.org/WebPage" lang="en-CA"><head><meta content="text/html; charset=UTF-8" http-equiv="Content-Type"><meta content="/images/branding/googleg/1x/googleg_standard_color_128dp.png" itemprop="image"><title>Google</title><script nonce=« wKnWa9fmJpJ5V0IAIKgm7w==»>(function() {window.google={kEI:'qPoTXr3bFaXX5gKZsKbABQ',kEXPI:'0,1353747,5662,731,223,4726,378,207,1245,1709,250,10,289,424,338,175,364,671,483,3,209,69,4,60,315,427,208,10,795,1128673,143,1197728,421,38,329080,1294,12383,4855,32692,15247,867,6056,13342,9286,369,3314,5505,8384,1700,3159,1361,284,4039,4968,773,2253,2818,1923,3118,4524,1672,1719,1808,1976,2044,8909,5297,2974,873,37,1180,2975,6430,7432,3254,620,2883,21,318,1980,1192,975,1,369,2777,520,399,992,1285,8,2142,1,1538,84,610,14,1279,2212,202,328,149,1103,327,513,517,317,1149,8,50,156,4100,108,152,52,1136,3,2063,...
```

par défaut, curl effectue une requête HTTP/GET

HTTP GET

```
% curl -v https://www.google.ca/
```

```
GET / HTTP/1.1
```

```
Host: www.google.ca
```

```
User-Agent: curl/7.58.0
```

```
Accept: */*
```

↑
entêtes
↓

le texte commençant par >

Le serveur répond par:

```
HTTP/1.1 200 OK
```

```
Date: Tue, 07 Jan 2020 03:31:31 GMT
```

```
Expires: -1
```

```
Cache-Control: private, max-age=0
```

```
Content-Type: text/html; charset=ISO-8859-1
```

```
Set-Cookie: 1P_JAR=2020-01-07-03; expires=Thu, 06-Feb-2020 03:31:31 GMT; path=/;  
domain=.google.ca; Secure
```

```
...
```

le texte commençant par <

HTTP GET

```
% curl -v www.iro.umontreal.ca
```

```
< HTTP/1.1 301 Moved Permanently  
< Date: Tue, 07 Jan 2020 03:40:45 GMT  
< Server: Apache  
< Location: http://diro.umontreal.ca/  
< Content-Length: 351  
< Content-Type: text/html; charset=iso-8859-1  
...
```

```
% curl -v http://diro.umontreal.ca
```

```
< HTTP/1.1 301 Moved Permanently  
< Location: https://diro.umontreal.ca/  
< Server: BigIP  
< Connection: Keep-Alive  
< Content-Length: 0  
<
```


HTTP GET

```
% curl -v https://diro.umontreal.ca
```

```
< HTTP/1.1 307 Temporary Redirect
```

```
< Date: Mon, 06 Jan 2020 05:50:18 GMT
```

```
< Vary: Host
```

```
< Location: https://diro.umontreal.ca/accueil/
```

```
< Content-Length: 0
```

```
< Content-Type: text/html; charset=UTF-8
```

```
< X-Server-By: web1
```

```
< Age: 0
```

```
< grace: none
```

```
< X-Cache: MISS
```

```
< Connection: keep-alive
```

```
< Set-Cookie: BIGipServerCms.dgtic-pool=1076201482.20480.0000; path=/; Httponly; Sec
```

```
<
```

HTTP GET

```
% curl -o out -v https://diro.umontreal.ca/accueil/
```

```
> GET /accueil/ HTTP/1.1
> Host: diro.umontreal.ca
> User-Agent: curl/7.58.0
> Accept: */*
>
< HTTP/1.1 200 OK
< Date: Mon, 06 Jan 2020 05:51:26 GMT
< Vary: Accept-Encoding
< Content-Type: text/html; charset=utf-8
< X-Server-By: web4
< Age: 39
< grace: none
< X-Cache: HIT
< Accept-Ranges: bytes
< Content-Length: 41147
< Connection: keep-alive
< Set-Cookie: BIGipServerCms.dgtic-pool=1076201482.20480.0000; path=/; Httponly; Secure
<
```

HTTP GET

% cat out

```
<!DOCTYPE html>
<html lang="fr">
<head>
<meta http-equiv="X-UA-Compatible" content="IE=edge" />
<meta name="viewport" content="width=device-width, initial-scale=1" />

<meta charset="utf-8">
<!--
    This website is powered by TYPO3 - inspiring people to share!
    TYPO3 is a free open source Content Management Framework initially created by Kasper
Skaarhoj and licensed under GNU/GPL.
    TYPO3 is copyright 1998-2016 of Kasper Skaarhoj. Extensions are copyright of their
respective owners.
    Information and contribution at http://typo3.org/
-->
```

www.iro.umontreal.ca

The screenshot shows a web browser window with the URL `diro.umontreal.ca/accueil/`. The page header includes the University of Montreal logo and the text "Faculté des arts et des sciences" and "Département d'informatique et de recherche opérationnelle". A search bar is present with the text "Rechercher" and radio buttons for "Ce site" and "Tout UdeM". A navigation menu contains items: "PROGRAMMES ET COURS", "LA RECHERCHE", "RESSOURCES ET SERVICES", "RÉPERTOIRE DU DÉPARTEMENT", "NOTRE DÉPARTEMENT", and "VOUS ÊTES...".

The main content area features a large image of a woman, Teodora Dan, with a blue overlay containing the following text:

Félicitations à Teodora Dan!
Étudiante au doctorat, DIRO
Lauréate 2019
Prix de la meilleure thèse des études supérieures et postdoctorales dans le secteur Sciences naturelles

A dark blue bar at the bottom of the image area contains the text "Félicitations à Teodora Dan!" and a right-pointing arrow.

On the right side, there are two sections:

- NOUVELLES**: A green header with a right-pointing arrow. Below it, a news item dated "1 janvier 2020" with the title "Un honneur pour Yoshua Bengio et deux diplômés".
- ACTIVITÉS**: A green header with a right-pointing arrow. Below it, the text "Cette liste ne contient présentement aucun élément."

www.iro.umontreal.ca

The image shows a web browser window displaying the website www.iro.umontreal.ca. The browser's address bar shows the URL `diro.umontreal.ca/accueil/`. The website header includes the text "de Montreal | Departement d'Informatique et de recherche operationnelle" and a navigation menu with items like "PROGRAMMES ET COURS", "LA RECHERCHE", "RESSOURCES ET SERVICES", "RÉPERTOIRE DU DÉPARTEMENT", "NOTRE DÉPARTEMENT", and "VOUS ÊTES...". A "NOUVELLES" button is visible on the right side of the page.

The browser's developer tools are open, showing the Network tab. The network traffic table is as follows:

| Nom | Domaine | Type | Taille de transf... | Durée | 20,00 ms | 40,00 ms | 60,00 ms | 80,00 ms | 100,00 ms |
|---|-------------------|----------|---------------------|-------|----------|----------|----------|----------|-----------|
| accueil | diro.umontreal.ca | document | — | — | | | | | |
| merged-981601de909e7f3e03e633aa... | diro.umontreal.ca | css | — | — | | | | | |
| lessphp_b1e03bff115a87a58f09d9a015... | diro.umontreal.ca | css | — | — | | | | | |
| martin-granger-piche-emric-.jpg | diro.umontreal.ca | jpg | — | — | | | | | |
| outliner.min.js | diro.umontreal.ca | js | — | — | | | | | |
| csm_rapport-annuel_6b83003e07.jpg | diro.umontreal.ca | jpg | — | — | | | | | |
| csm_classementQS_aa3b5cb5ab.jpg | diro.umontreal.ca | jpg | — | — | | | | | |
| udem-bootstrap.js | diro.umontreal.ca | js | — | — | | | | | |
| jquery.fancybox.min.js | diro.umontreal.ca | js | — | — | | | | | |
| udem-instagram.js | diro.umontreal.ca | js | — | — | | | | | |
| Dispo_DIRD_-_IA_ici_maintenant.jpg | diro.umontreal.ca | jpg | — | — | | | | | |
| udem-alertes.js | diro.umontreal.ca | js | — | — | | | | | |
| mem5YaGs126MIzPBA-UN7rgOUunpK... | fonts.gstatic.com | woff2 | — | — | | | | | |
| udem-bootstrap-video.js | diro.umontreal.ca | js | — | — | | | | | |
| Dispo_DIRD_-_Bengio_Prix_Nobel_de_Li... | diro.umontreal.ca | jpg | — | — | | | | | |

Jouons avec jsonplaceholder



 [Announcement: You can now support JSONPlaceholder on GitHub Sponsors!](#)

Resources

JSONPlaceholder comes with a set of 6 common resources:

| | |
|---------------------------|--------------|
| /posts | 100 posts |
| /comments | 500 comments |
| /albums | 100 albums |
| /photos | 5000 photos |
| /todos | 200 todos |
| /users | 10 users |

Note: resources have relations. For example: **posts** have many **comments**, **albums** have many **photos**, ... see below for routes examples.

HTTP GET

```
% curl -o x.json -v https://jsonplaceholder.typicode.com/users
```

```
> GET /users HTTP/1.1  
> Host: jsonplaceholder.typicode.com  
> User-Agent: curl/7.58.0  
> Accept: */*  
>
```

```
% cat x.json
```

```
[  
  {  
    "id": 1,  
    "name": "Leanne Graham",  
    "username": "Bret",  
    "email": "Sincere@april.biz",  
    "address": {  
      "street": "Kulas Light",
```

```
< HTTP/1.1 200 OK  
< Date: Mon, 06 Jan 2020 06:26:19 GMT  
< Content-Type: application/json; charset=utf-8  
< Transfer-Encoding: chunked  
< Connection: keep-alive  
< Set-Cookie:  
  __cfduid=db32fd20bf0feabd40f20d7028735ece515  
  78291979; expires=Wed, 05-Feb-20 06:26:19 GMT;  
  path=/; domain=.typicode.com; HttpOnly;  
  SameSite=Lax  
  ...
```


HTTP POST

```
% cat x.json
```

```
{  
  « title »: « foo »,  
  « body »: « bar »,  
  « userId » : 1  
}
```

```
% curl -v -d @x.json https://jsonplaceholder.typicode.com/posts
```

```
> POST /posts HTTP/1.1  
> Host: jsonplaceholder.typicode.com  
> User-Agent: curl/7.58.0  
> Accept: */*  
> Content-Length: 60  
> Content-Type: application/x-www-form-urlencoded  
>
```

```
% curl -v -d @x.json https://jsonplaceholder.typicode.com/posts \  
-H 'Content-Type: application/json'
```

```
> POST /posts HTTP/1.1  
> Host: jsonplaceholder.typicode.com  
> User-Agent: curl/7.58.0  
> Accept: */*  
> Content-Type: application/json  
> Content-Length: 60  
>
```

```
< HTTP/1.1 201 Created  
< Date: Tue, 07 Jan 2020 04:23:24 GMT  
< Content-Type: application/json; charset=utf-8  
< Content-Length: 65
```

```
...  
<  
{  
  "title": "foo",  
  "body": "bar",  
  "userId": 1,  
  "id": 101  
}
```

Réponse

POST est ici simulé
jsonplaceholder.typicode.com/posts/101
Ne fonctionnera pas

HTTP POST

```
% curl -d '{"title": "foo","body": "bar","userId": 1}' \  
  https://jsonplaceholder.typicode.com/posts \  
  -H 'Content-Type: application/json'
```

```
POST /posts HTTP/1.1  
Host: jsonplaceholder.typicode.com  
User-Agent: curl/7.58.0  
Accept: */*  
Content-Type: application/json  
Content-Length: 42
```

```
{  
  "title": "foo",  
  "body": "bar",  
  "userId": 1,  
  "id": 101  
}
```

HTTP PUT

```
% curl -X PUT -v -d '{"id": 101, "title": "foo", "body": "bar", "userId": 1}' \  
https://jsonplaceholder.typicode.com/posts/1 \  
-H 'Content-Type: application/json'
```

```
> PUT /posts/1 HTTP/1.1  
> Host: jsonplaceholder.typicode.com  
> User-Agent: curl/7.58.0  
> Accept: */*  
> Content-Type: application/json  
> Content-Length: 53  
>  
< HTTP/1.1 200 OK  
< Date: Mon, 06 Jan 2020 06:58:53 GMT  
...  
{  
  "id": 1,  
  "title": "foo",  
  "body": "bar",  
  "userId": 1  
}
```

Demande de modification d'une entrée