

3(A)TC Web

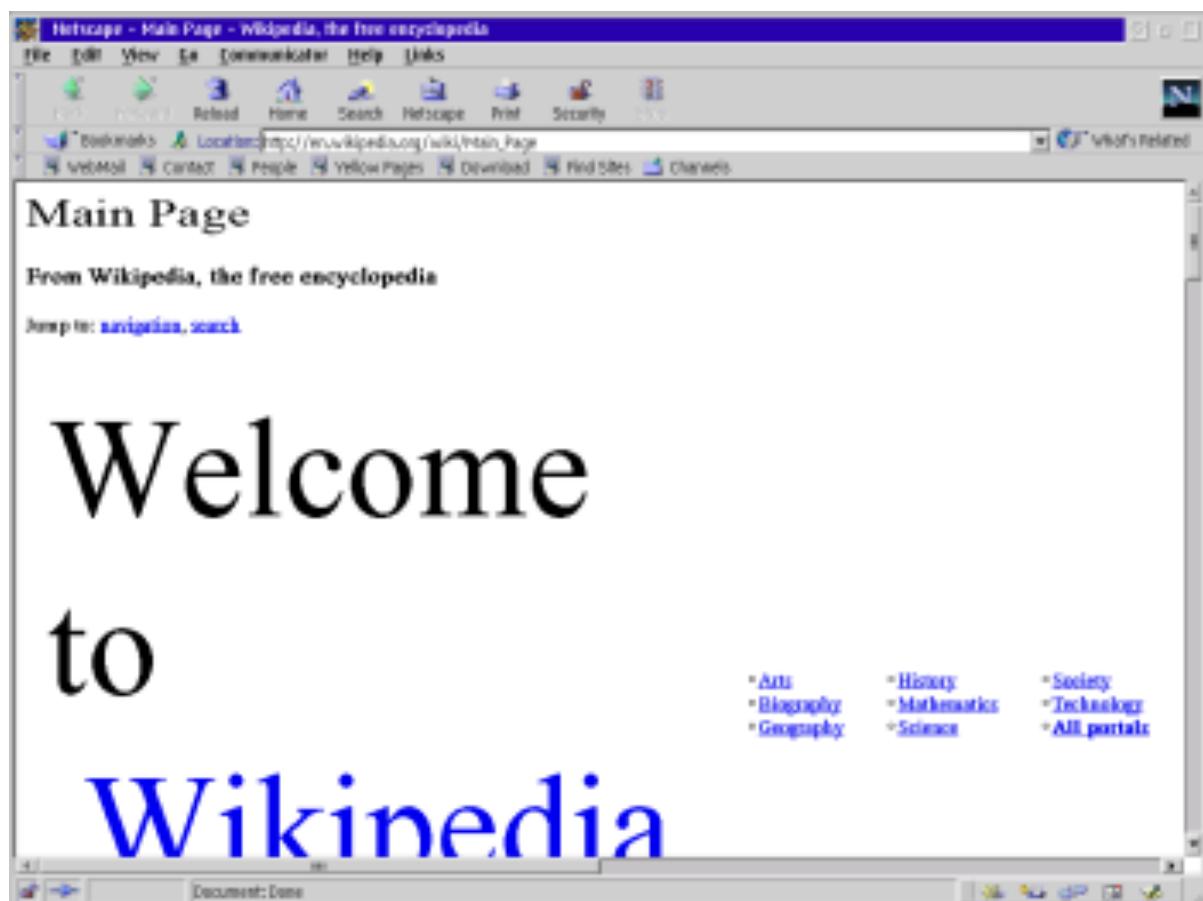
Julien Ponge
julien.ponge@insa-lyon.fr

Plan

- Architectures, serveurs web.
- MVC
- Outilage

Architecture, serveurs web.

HTTP/1.0



GET, POST, HEAD

/doc.html
/cgi-bin/register.pl

HTTP/1.1



GET, POST, HEAD

**PUT, DELETE, TRACE,
OPTIONS, CONNECT,
PATCH, + {extensions}**

WebDAV, CalDAV, Subversion, ...

/doc.html

/cgi-bin/register.pl

```
> <b>GET / HTTP/1.1</b>
> <b>User-Agent: curl/7.30.0</b>
> <b>Host: telecom.insa-lyon.fr</b>
> <b>Accept: */*</b>
>

< <b>HTTP/1.1 302 Found</b>
< Date: Mon, 15 Nov 2013 20:12:22 GMT
< Server: Apache
< X-Powered-By: PHP/5.3.18-pl0-gentoo
< <b>Set-Cookie: SESS21667754618b4ba17a8e101c305ce19a=t9vco4t34abvp812478o5imfi2; expires=Wed, 29-Nov-2013 23:45:42 GMT; path=/; domain=.telecom.insa-lyon.fr</b>
< <b>Expires: Sun, 19 Nov 1978 05:00:00 GMT</b>
< Last-Modified: Mon, 15 Nov 2013 20:12:22 GMT
< Cache-Control: store, no-cache, must-revalidate
< Cache-Control: post-check=0, pre-check=0
< <b>Location: https://telecom.insa-lyon.fr/</b>
< Content-Length: 0
< Content-Type: text/html; charset=utf-8
```

Apache HTTPD

Lighttpd

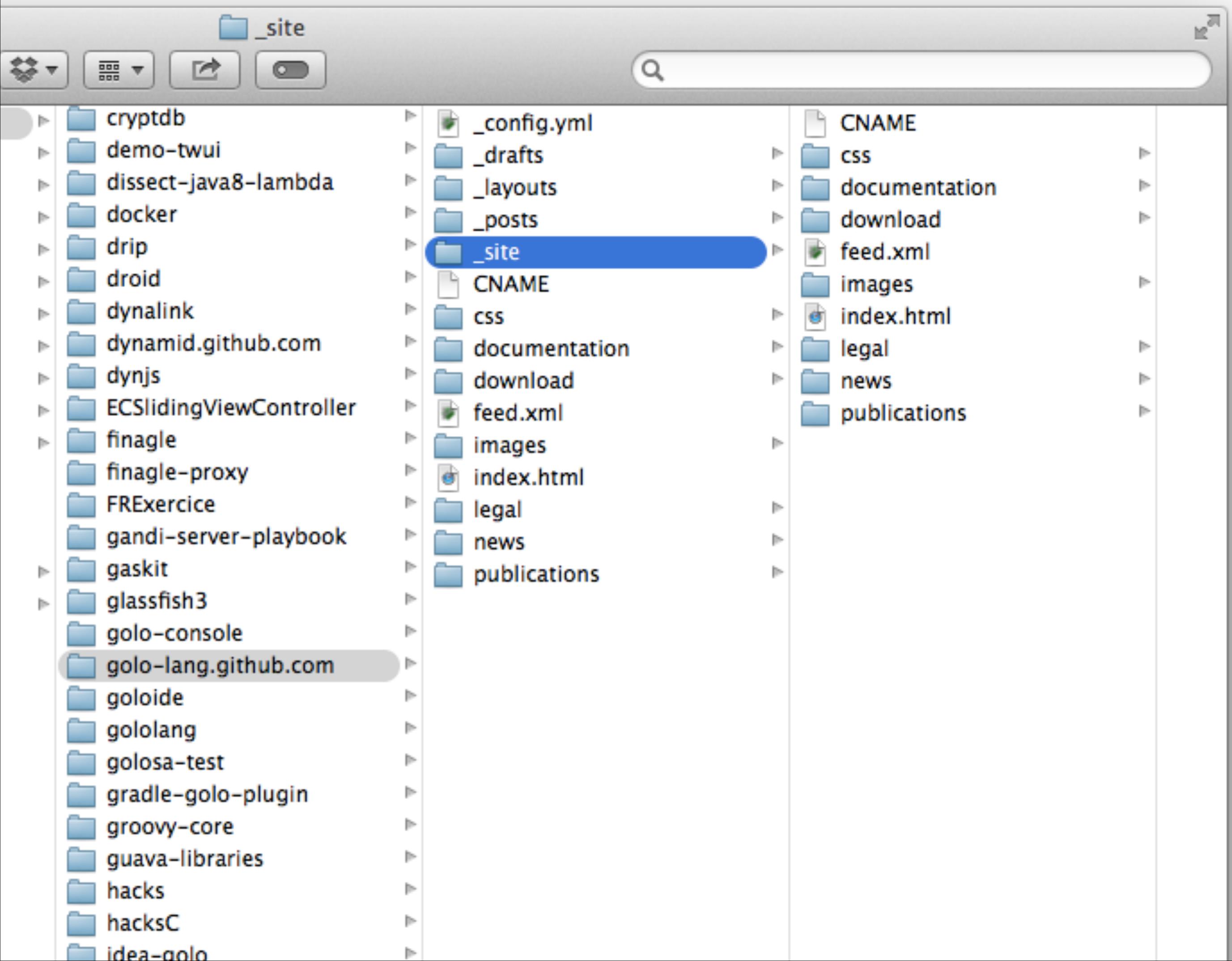
NGInx

IIS

(...)

Rôle(s) ?

foo.org/



- + répertoire source
- + durée cache
- + config SSL
- + restrictions IP
- + authentification
- + logs
- + (...)

Visiteur #

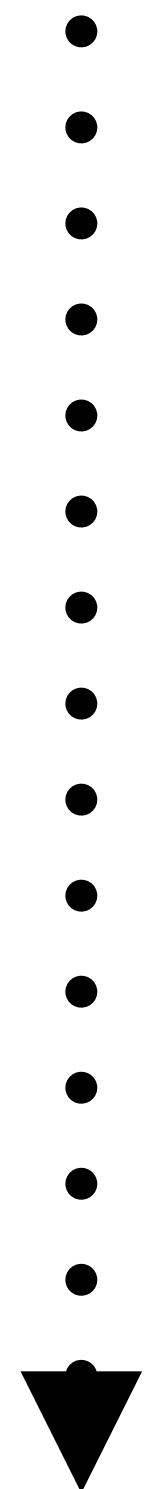
18.678

Comment faire ?

Visiteur #

18.678

PNG, GIF, ...



GET

Email address Enter email**Password** Password**File input** Choose File no file selected

Example block-level help text here.

 Check me out Submit

Email address

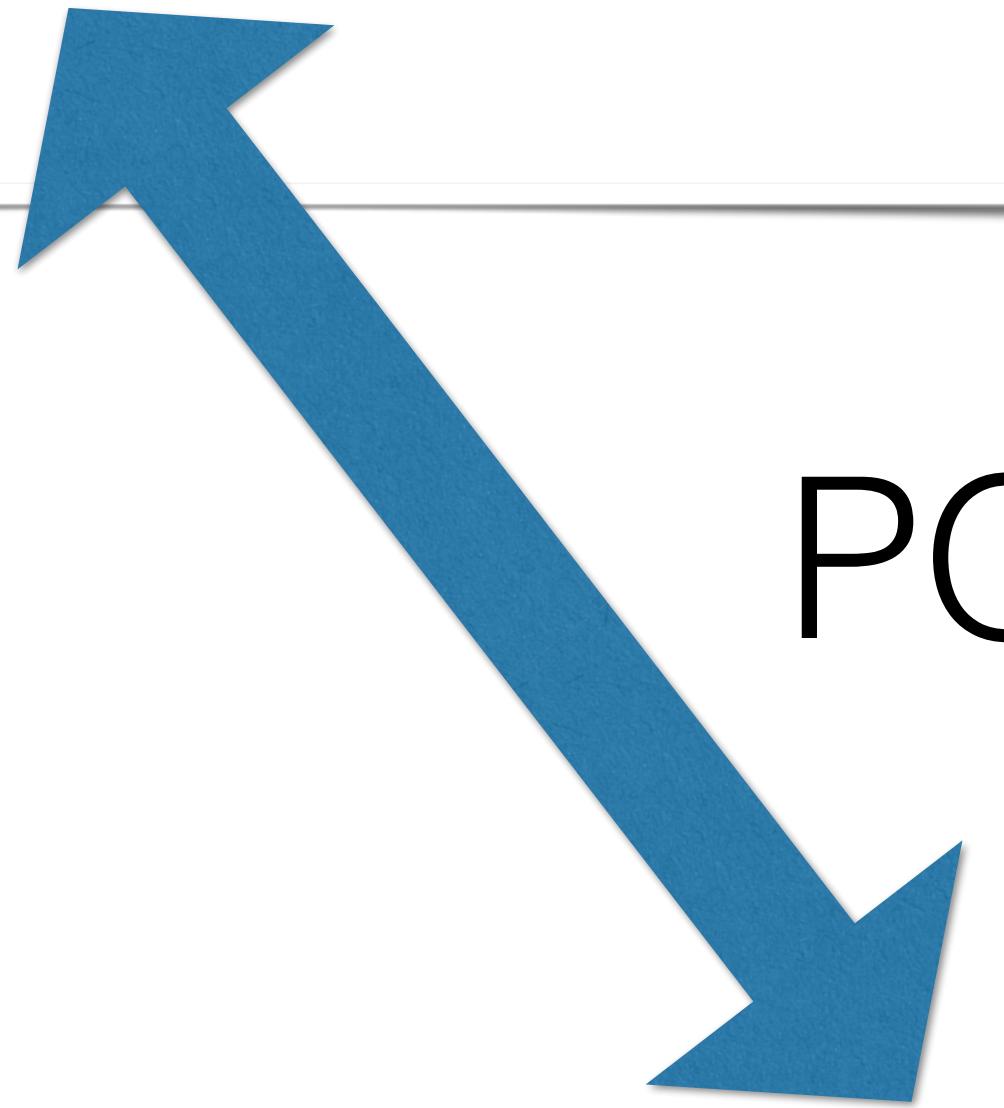
Password

File input

no file selected

Example block-level help text here.

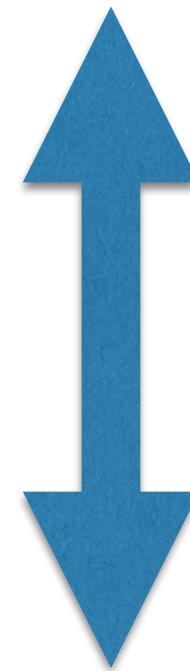
Check me out



POST

/cgi-bin/register.pl

Client HTTP



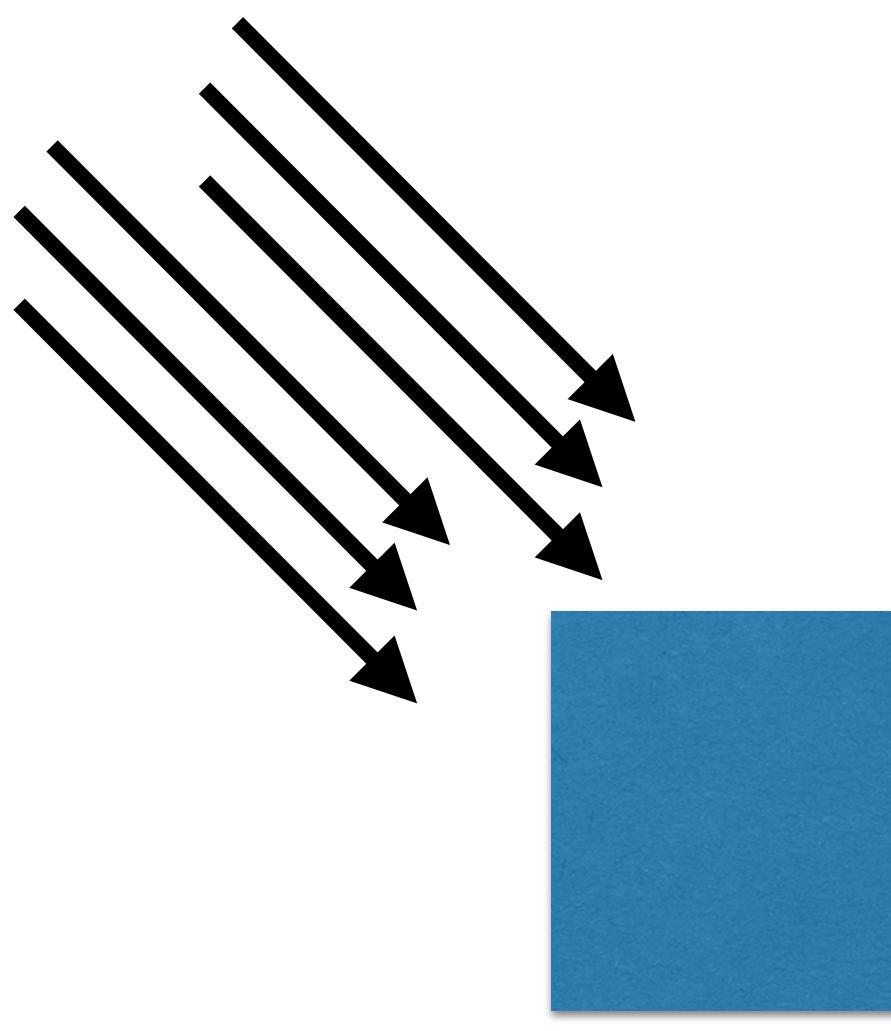
Serveur HTTP



Programme
(C, Python, Java, ...)

Protocoles usuels

- **Proxy HTTP** : le programme lance un serveur HTTP sur un port spécifique (4000, 5000, ...)
- **CGI, FastCGI, WSGI, AJP, ...** : protocoles d'intégration avec un serveur HTTP frontal
- **Modules** : environnement d'exécution intégré dans le serveur HTTP



Frontal HTTP
toto.com:80/



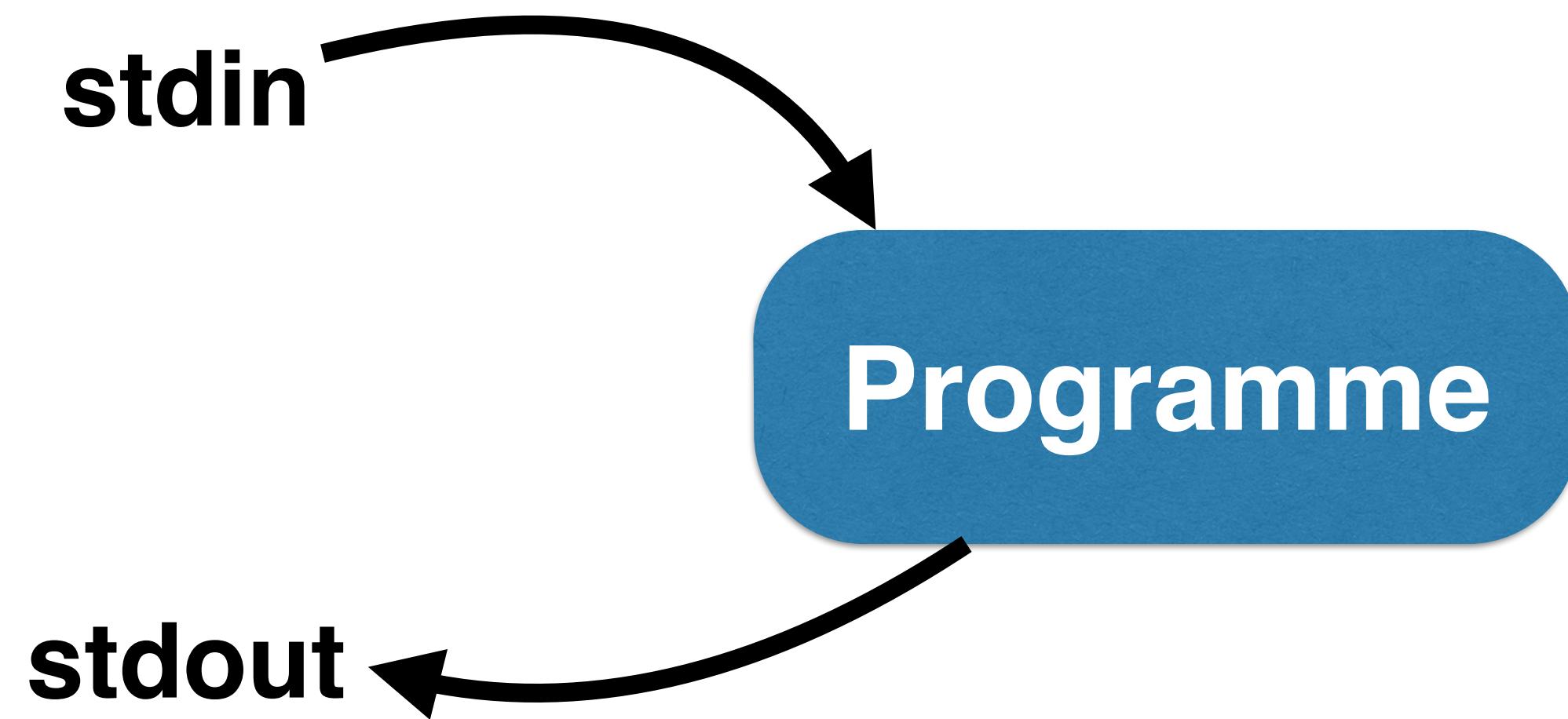
Application
server-interne:8080/app

Proxy Apache vers application Java

```
1 <VirtualHost gitblit.citi.insa-lyon.fr:443>
2   ErrorLog ${APACHE_LOG_DIR}/error.log
3   LogLevel warn
4   CustomLog ${APACHE_LOG_DIR}/ssl_access.log combined
5
6   SSLEngine on
7   SSLCertificateFile /etc/cert/wildcard.citi.insa-lyon.fr.crt
8   SSLCertificateKeyFile /etc/cert/wildcard.citi.insa-lyon.fr.key
9 </virtualHost>
10
11 ProxyPass / http://localhost:8080/
12 ProxyPassreverse / http://localhost:8080/
13 Header edit Location &#94;http://([&#94;:&#8260;]+) / https://&#36;1/
14 RequestHeader set X-Forwarded-Proto https
15 RequestHeader set X-Forwarded-Port 443
```

Common Gateway Interface

```
> GET / HTTP/1.1
> User-Agent: curl/7.30.0
> Host: telecom.insa-lyon.fr
> Accept: */*
>
```

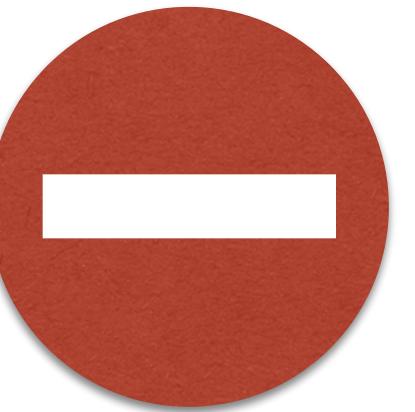
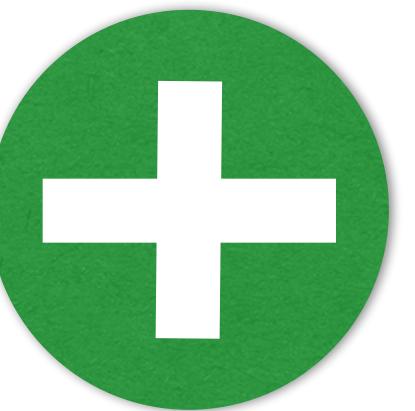


```
< HTTP/1.1 302 Found
< Date: Mon, 15 Nov 2013 20:12:22 GMT
< Server: Apache
< X-Powered-By: PHP/5.3.18-pl0-gentoo
< Set-Cookie: SESS21667754618b4ba17a8e101c305ce19a=t9vco4t34abvp812478o5imfi2; expires=Wed, 29-Nov-2013 23:45:42 GMT; path=/; domain=.telecom.insa-lyon.fr
< Expires: Sun, 19 Nov 1978 05:00:00 GMT
< Last-Modified: Mon, 15 Nov 2013 20:12:22 GMT
< Cache-Control: store, no-cache, must-revalidate
< Cache-Control: post-check=0, pre-check=0
< Location: https://telecom.insa-lyon.fr/
< Content-Length: 0
< Content-Type: text/html; charset=utf-8
```

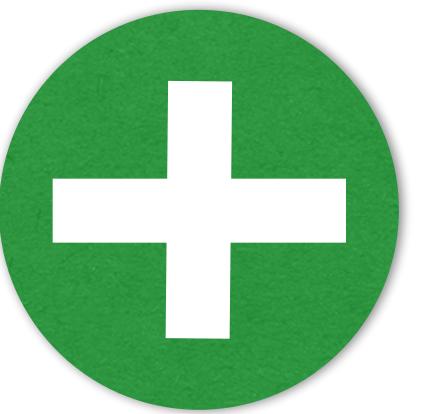
Variables d'environnement

```
HTTP_ACCEPT="text/html"
HTTP_HOST="foo.com"
PATH_INFO="/register"
REQUEST_METHOD="POST"
(...)
```

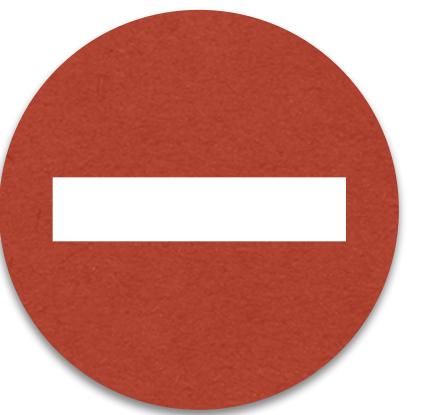
1 Processus / 1 requête



1 Processus / 1 requête



Simple, multi-langages



Peu performant

FastCGI

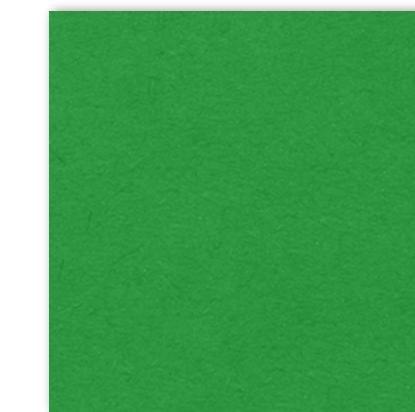
Garde les processus en mémoire
pour plusieurs requêtes en série.

AJP, WSGI, ...

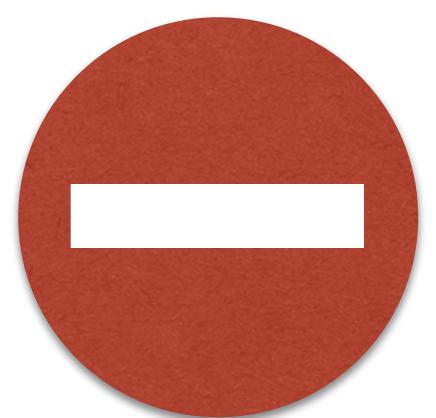
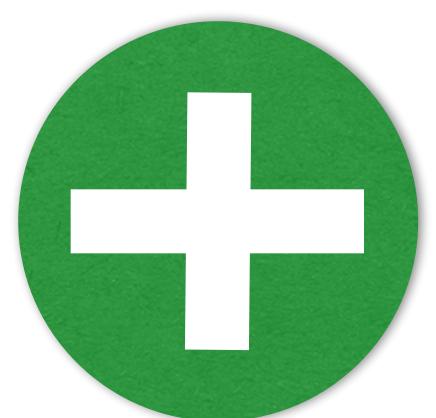
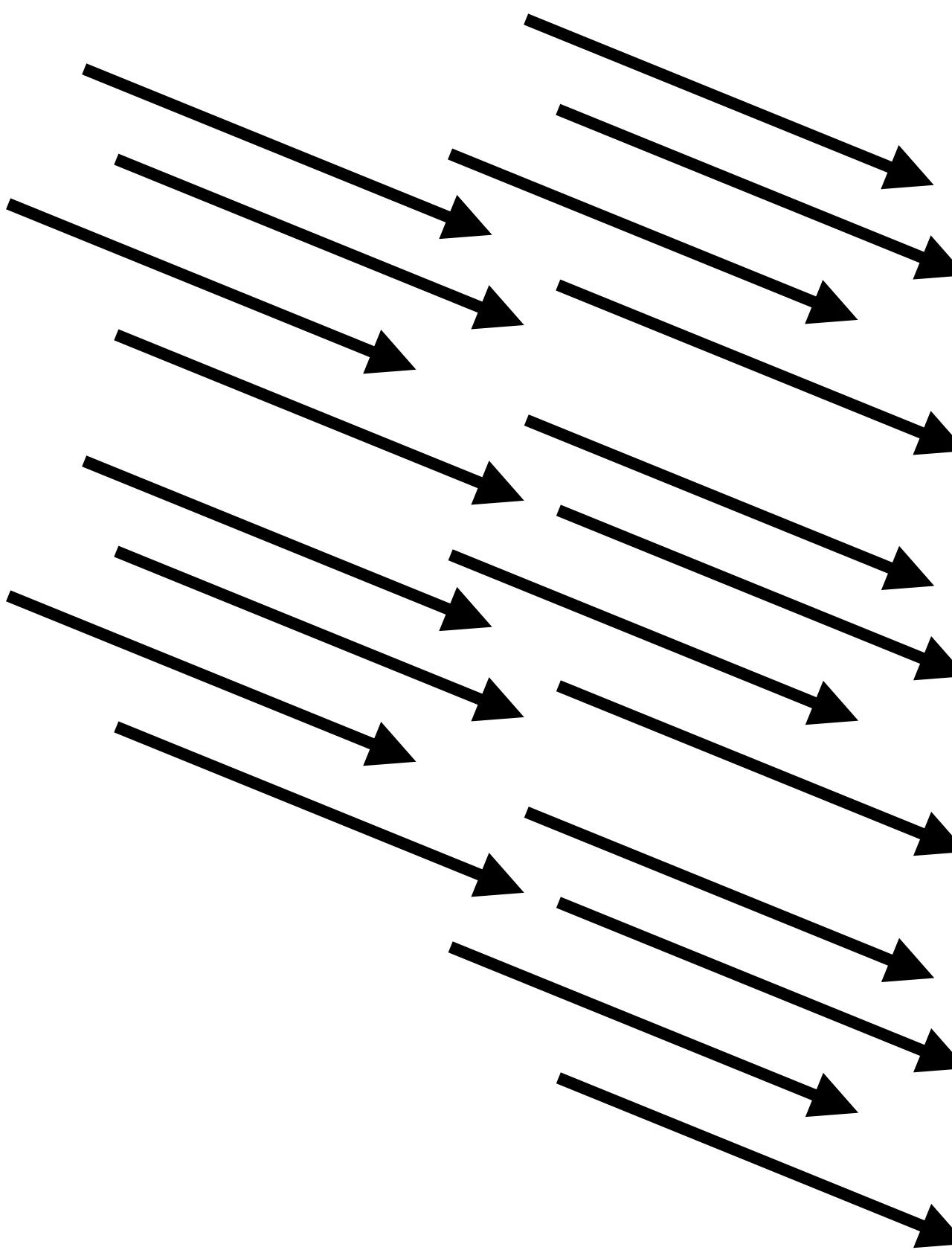
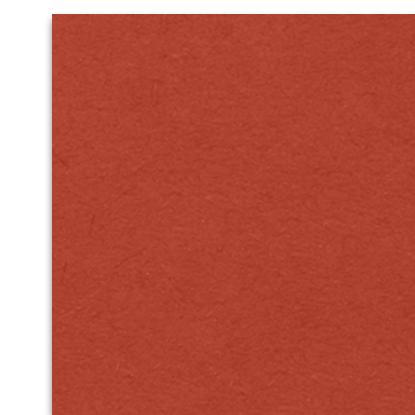
Pour des technos spécifiques
(Java, Python, ...).

Serveur Apache (ou autre)

mod_php

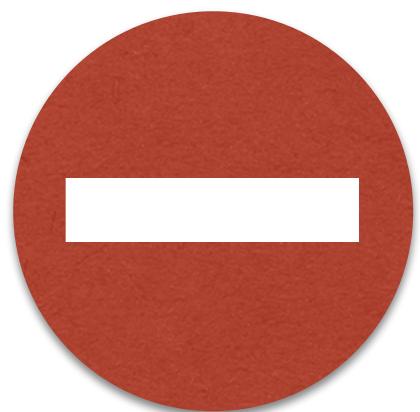


mod_perl

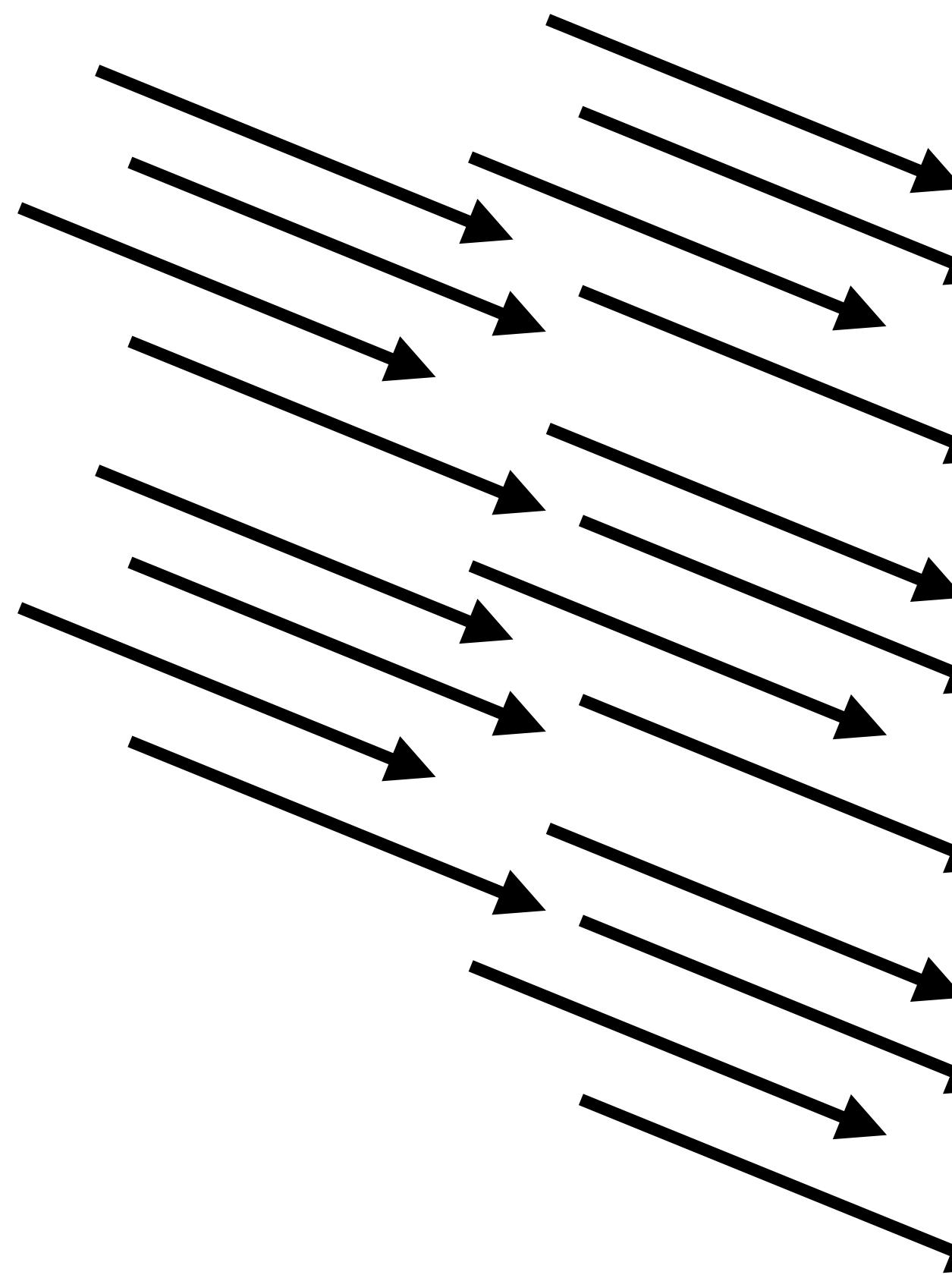




Simple (serveurs LAMP)

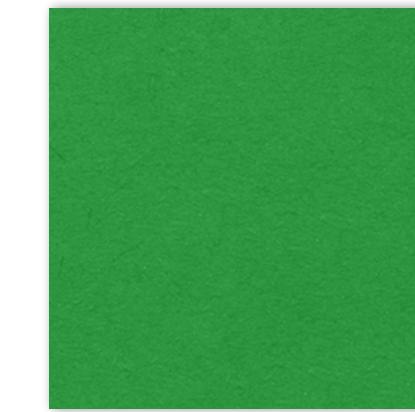


Sécurité, performance

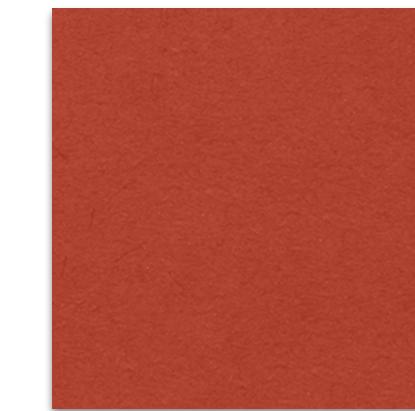


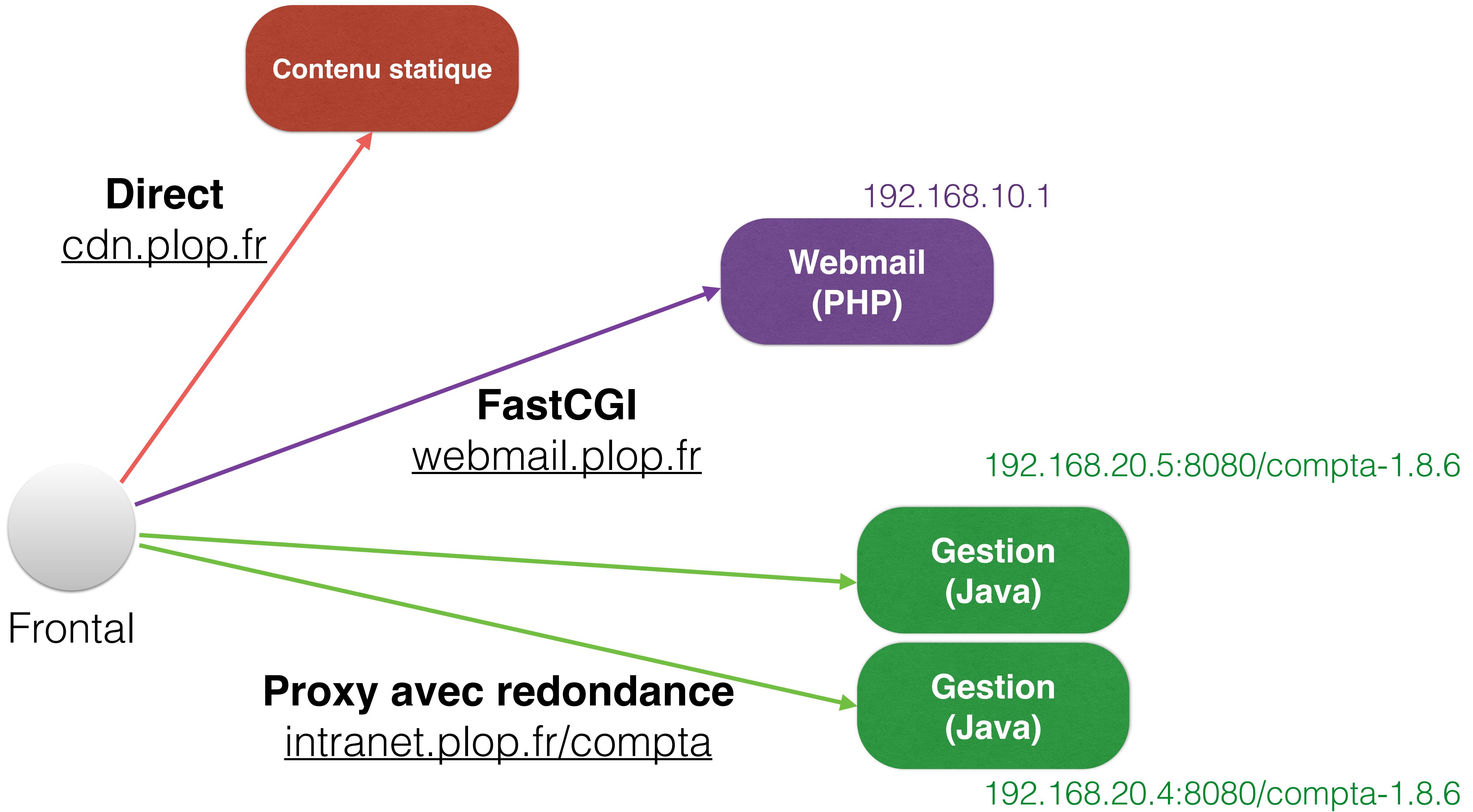
Serveur Apache (ou autre)

mod_php



mod_perl





Plan

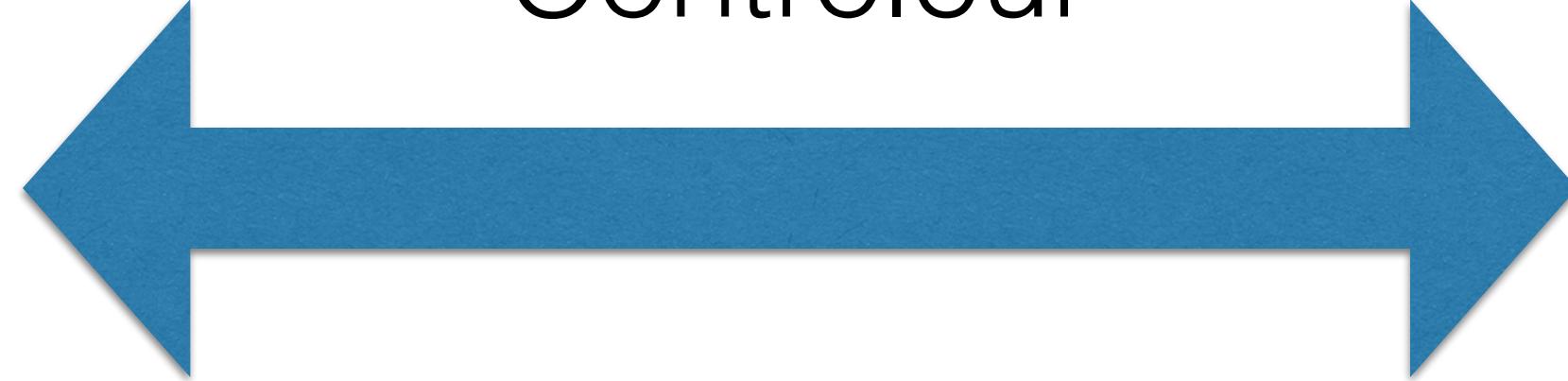
- Architectures, serveurs web.
- MVC
- Outilage

MVC

Personne

- nom
- email
- age

Contrôleur



Formulaire d'édition

Fiche d'un individu

PDF

Tableau de contacts

“Syndrome PHP”

```
<!DOCTYPE HTML>
<html>
<head><title>Macaronic Code</title></head>
<body>
    <?php
        $ip = $_SERVER['REMOTE_ADDR'];
        $dbh = new PDO('mysql:host=localhost;dbname=mydb', 'username', 'password');
        $statement = $dbh->query("SELECT lastlog FROM logins WHERE ip = '$ip'");
        $row = $statement->fetch(PDO::FETCH_ASSOC);
        $dbh->query("INSERT INTO logins VALUES ('$ip', CURRENT_TIMESTAMP) ON
DUPLICATE KEY UPDATE lastlog = CURRENT_TIMESTAMP");
    ?>
    <p>Hello, <?php print $ip; ?>.</p>
    <script>
        var lastlog = "<?php print $row['lastlog']?>";
        if (lastlog > "") alert("You last visited "+lastlog);
        else alert("You've never been here before.");
    </script>
</body>
</html>
```

GET /contact/6

Routage HTTP

Modèle de données

Persistence
(BD, fichiers, ...)

Contrôleur

Rendu HTML
(ou autre ...)

GET

http://foo.com/contacts/**edit**/15

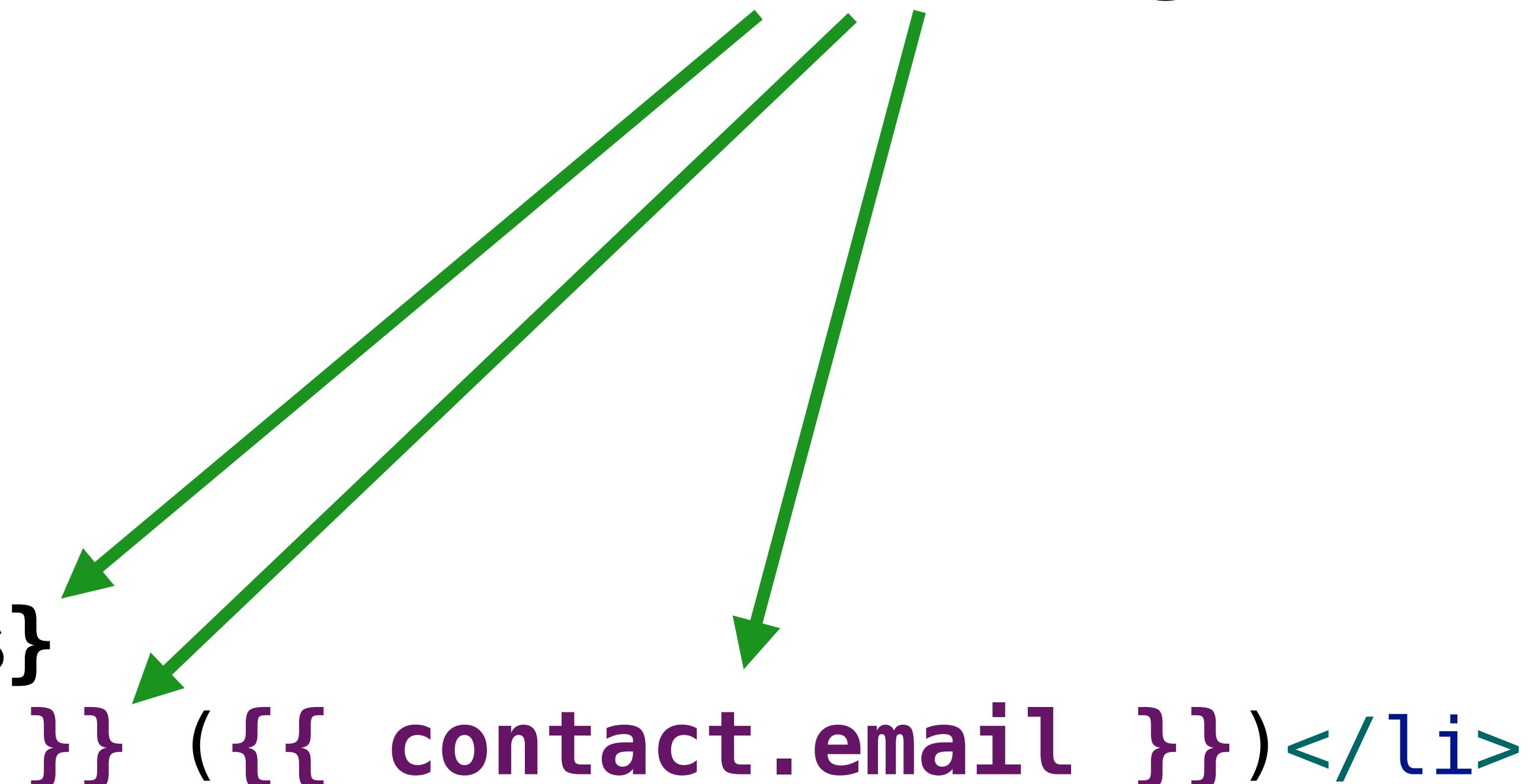
Routage

“Contrôleur”

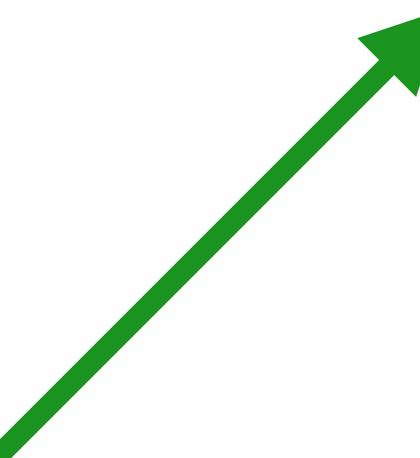
```
1 @app.route('/contacts/<action>/<id>', methods=['GET', 'HEAD'])
2 def contact(action, id):
3     if action is 'edit':
4         contact = contact_from_db(id)
5         return render_template('edit.html', data=contact)
6     else:
7         # (...)
```

Templating

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <title>Contacts</title>
</head>
<body>
  <h1>Contacts</h1>
  <ul>
    {%- for contact in data %} ({{ contact.email }})
      <li>{{ contact['name'] }} ({{ contact.email }})</li>
    {%- endfor %}
  </ul>
</body>
</html>
```

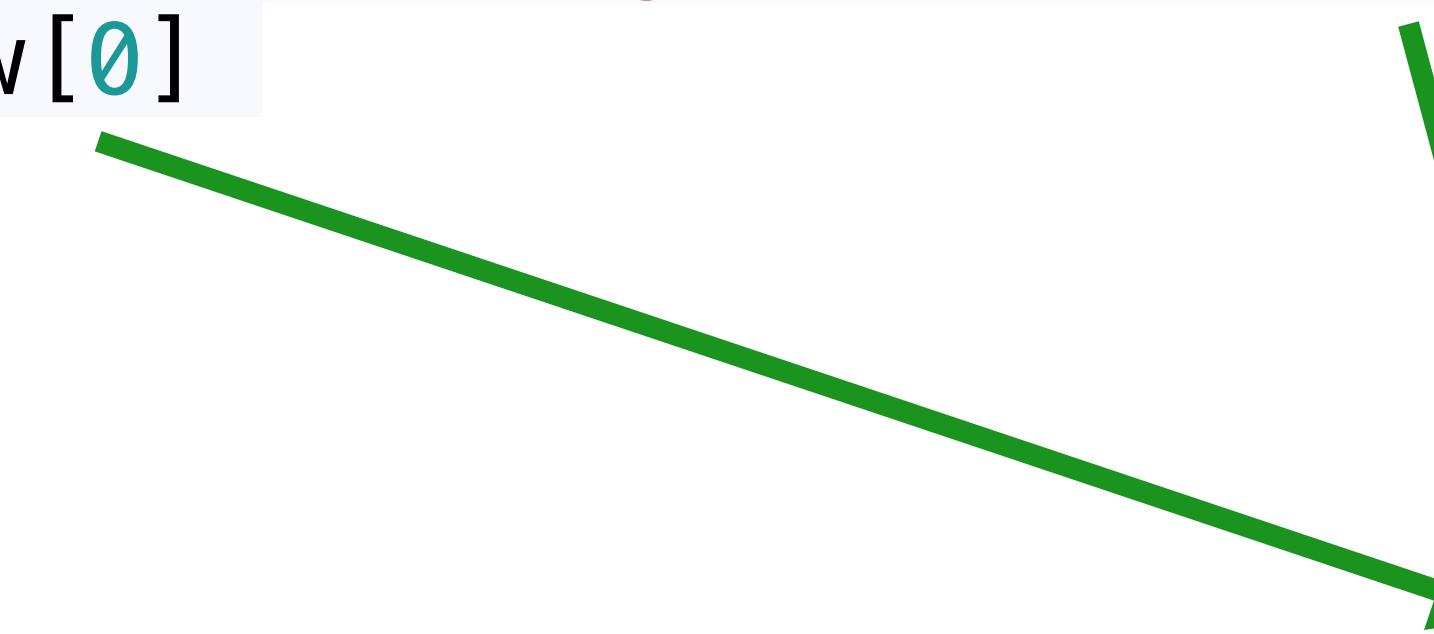


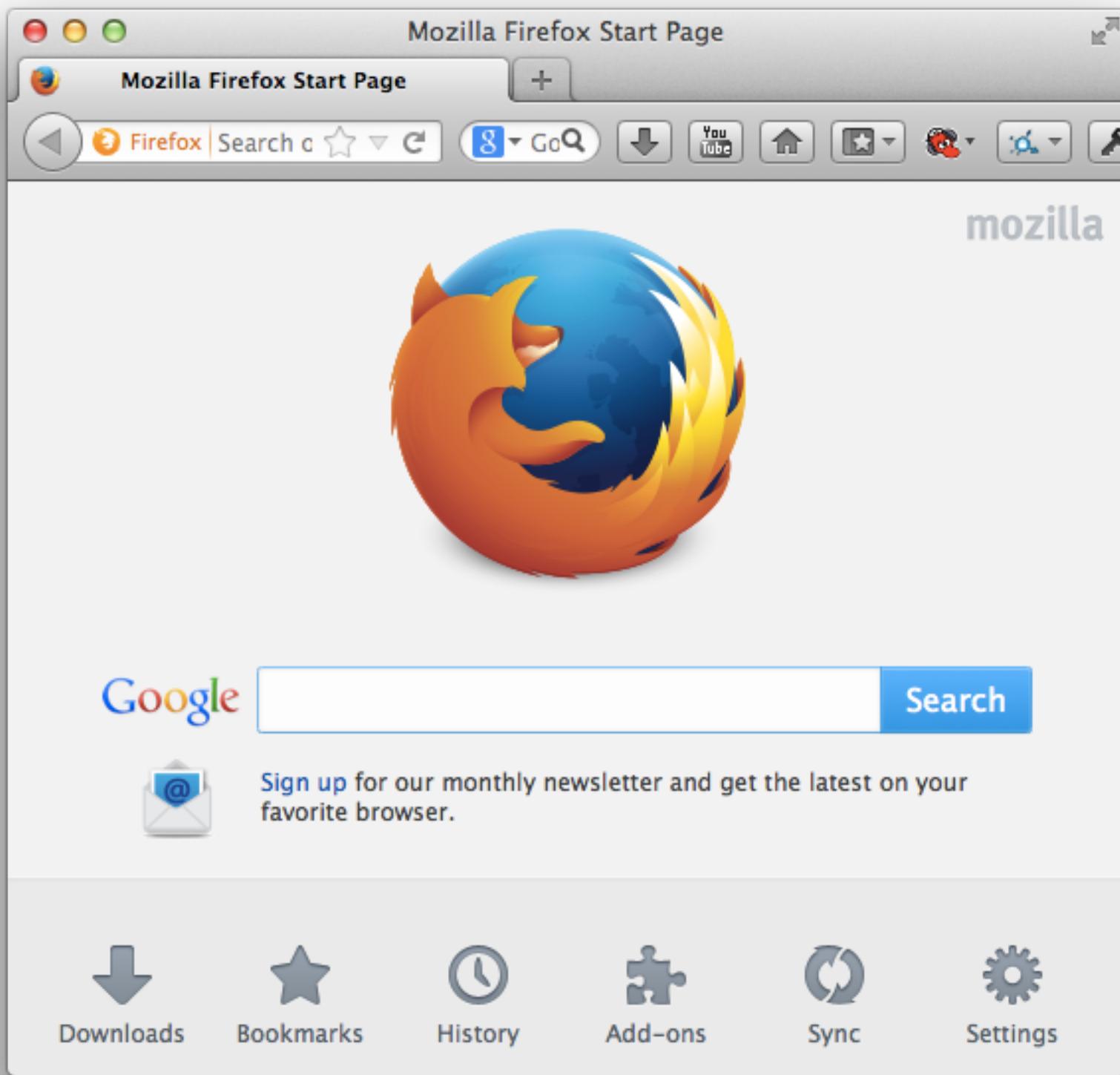
Base de donnée



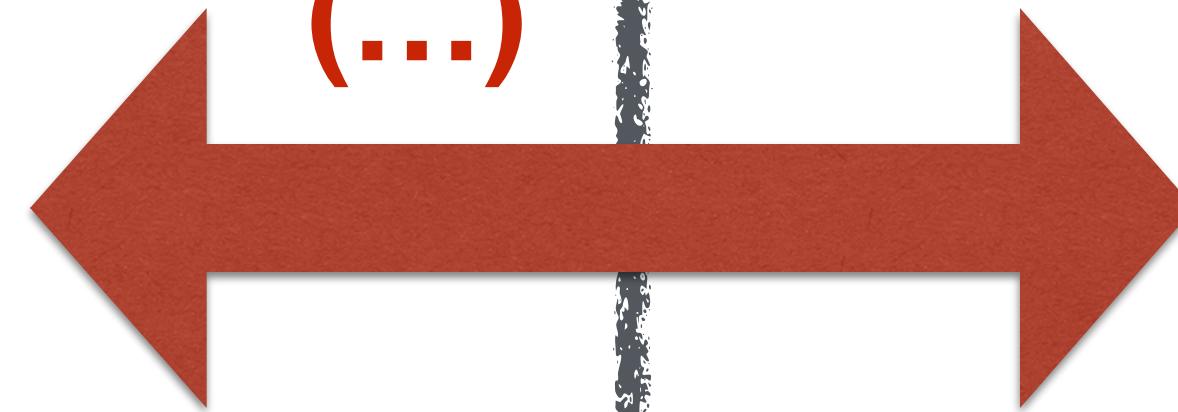
```
1 def page_content(name):  
2     db = engine.connect()  
3     row = db.execute(select([pages.c.text]).where(pages.c.name == name)).fetchone()  
4     db.close()  
5     if row is None:  
6         return '**(This page is empty or does not exist.)**'  
7     return row[0]
```

Donnée pour le contrôleur



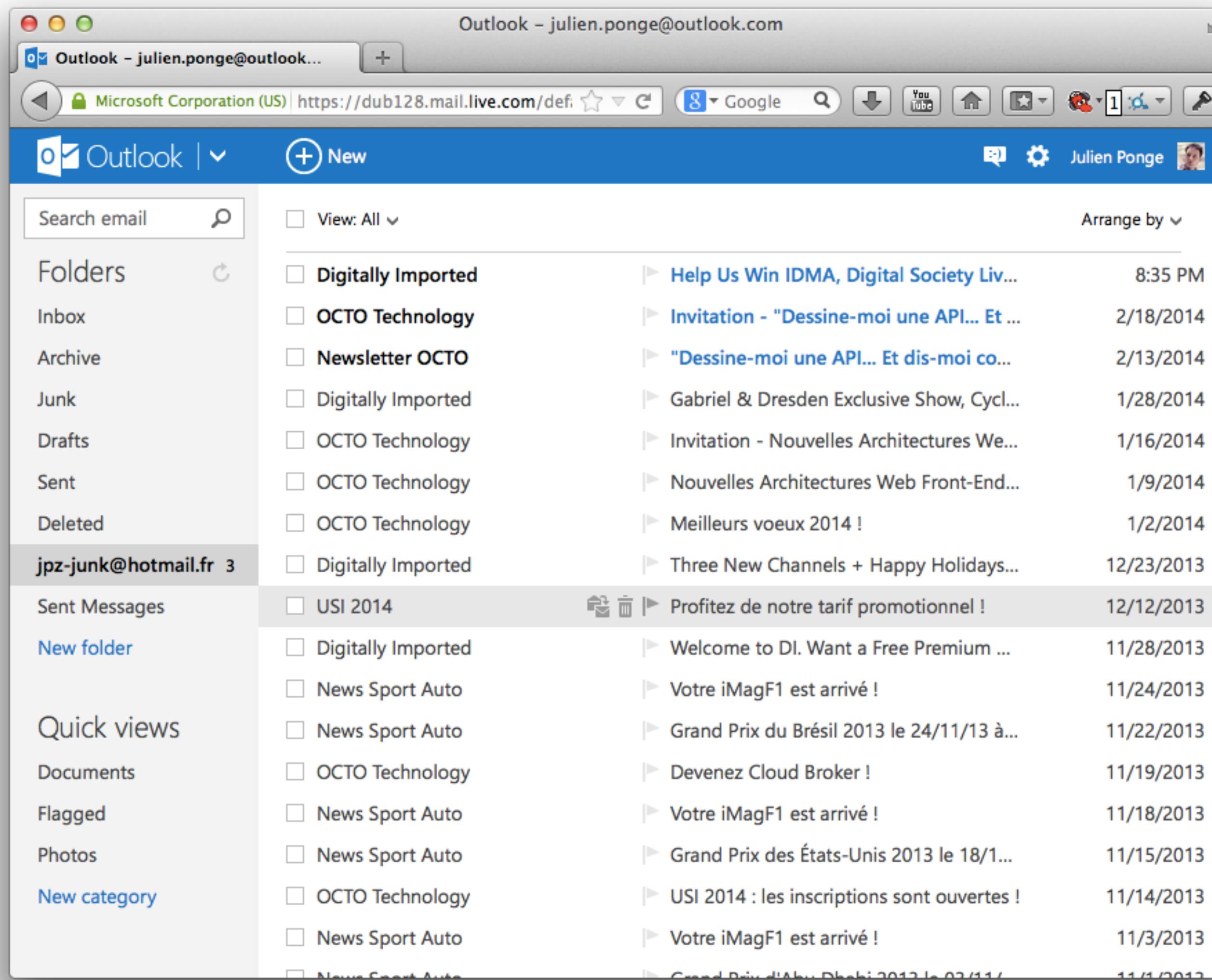


HTML
CSS
JS
PNG
(...)

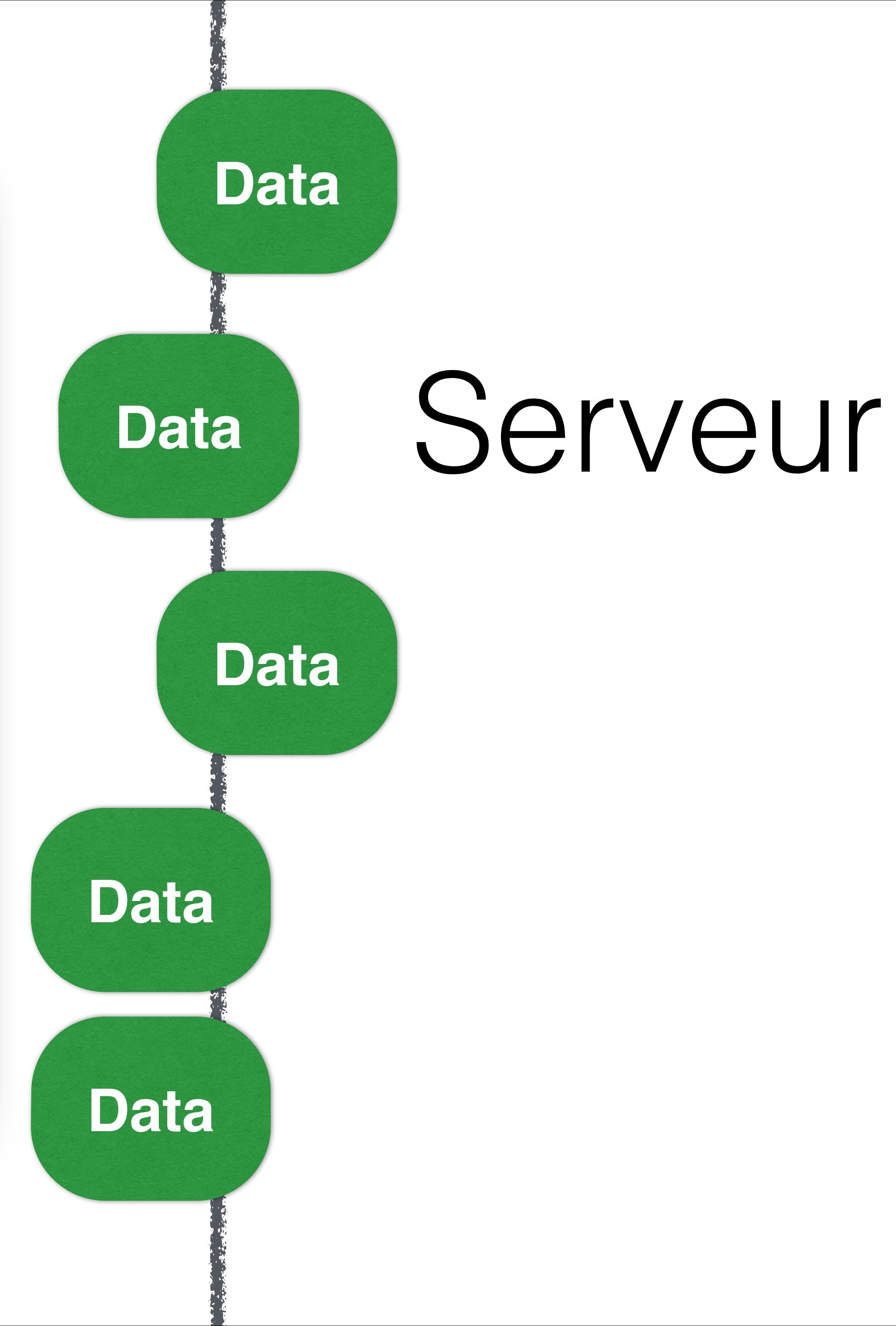


Rendu coté
serveur

Classique
Cache / statique si fort traffic
Rechargement de page



Rendu côté client



1

Statique

Bootstrap

HTML

CSS

JS

2

3

...

Pull / Push

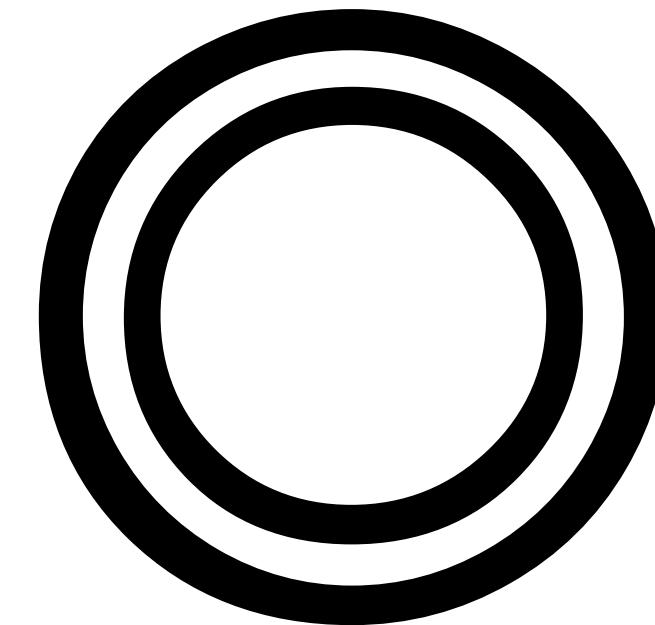
Requêtes async

HTTP

JSON

HTML

CSS



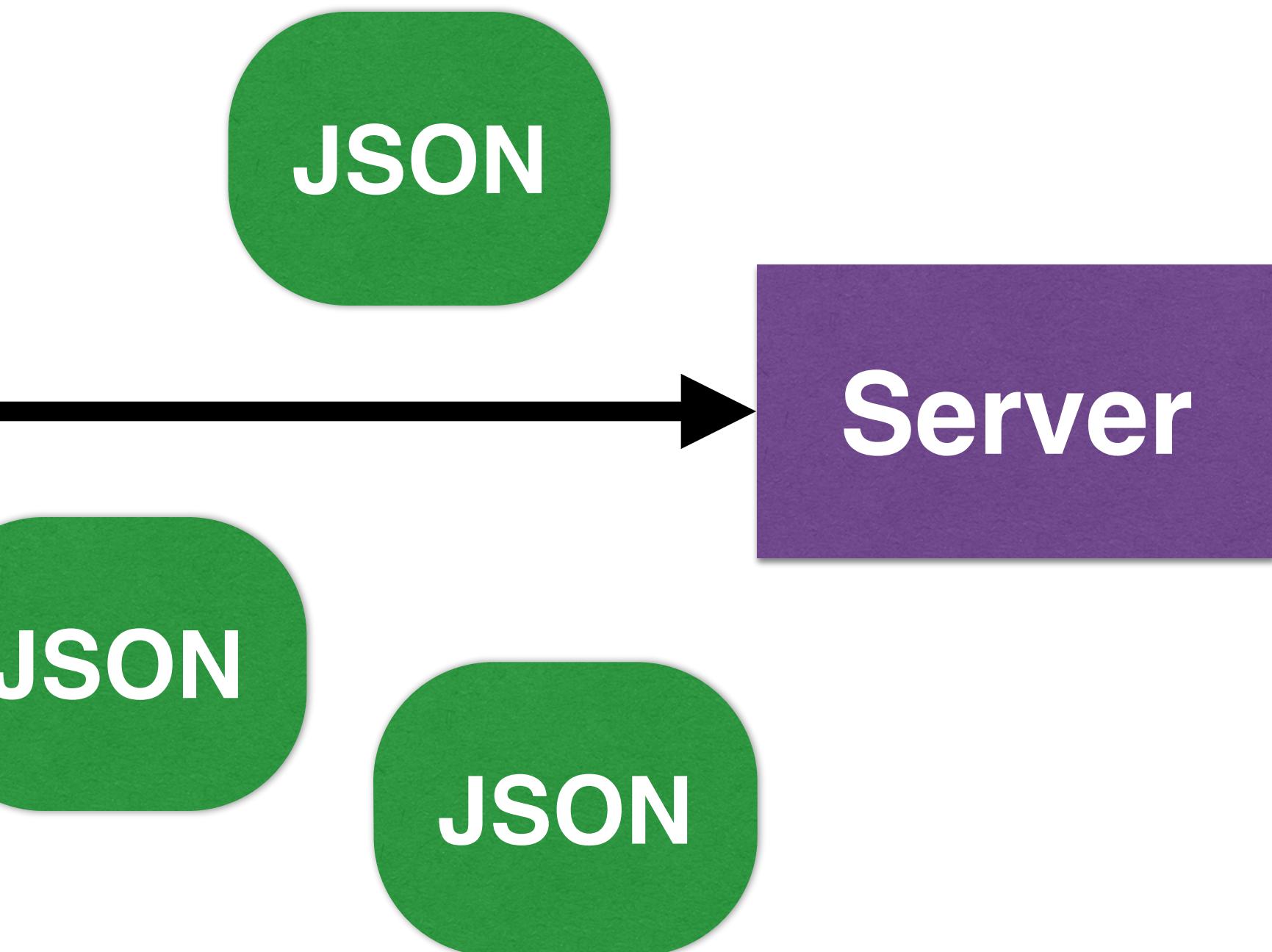
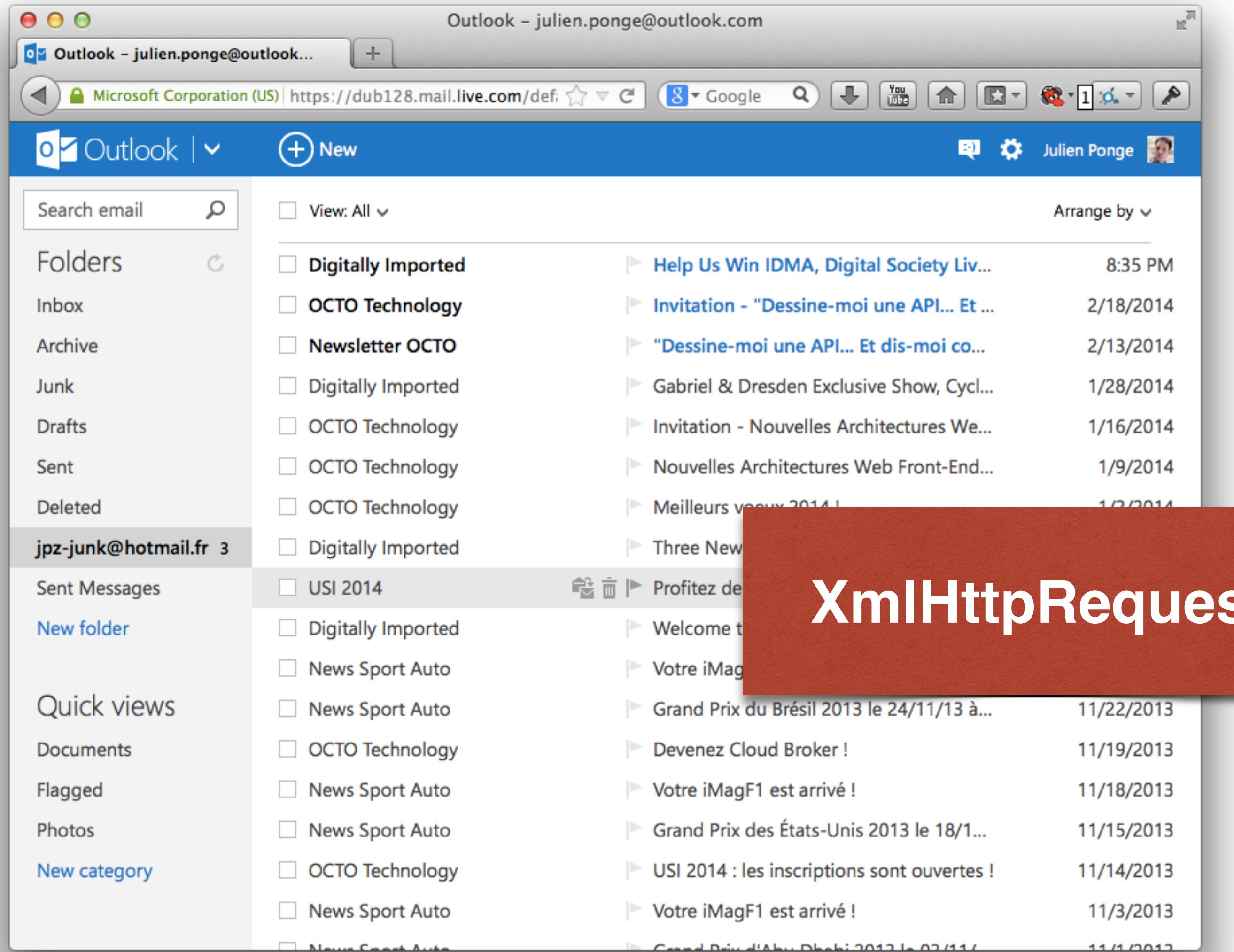
JavaScript

```
{  
  'contact': {  
    'name': 'Mr Bean',  
    'email': 'mrbean@bean.com',  
    'friends': [  
      'Mary', 'John'  
    ]  
  }  
}
```

JavaScript Object Notation (JSON)

```
{  
  'contact': {  
    'name': 'Mr Bean',  
    'email': 'mrbean@bean.com',  
    'friends': [  
      'Mary', 'John'  
    ]  
  }  
}
```

JSON.stringify(obj) → string
JSON.parse(string) → obj



```
$ .ajax( {
    url: "/api/sum/" + a + "/" + b,
    success: function(data) {
        alert(data.result);
    },
    error: function() {
        alert("Fail!");
    }
});
```

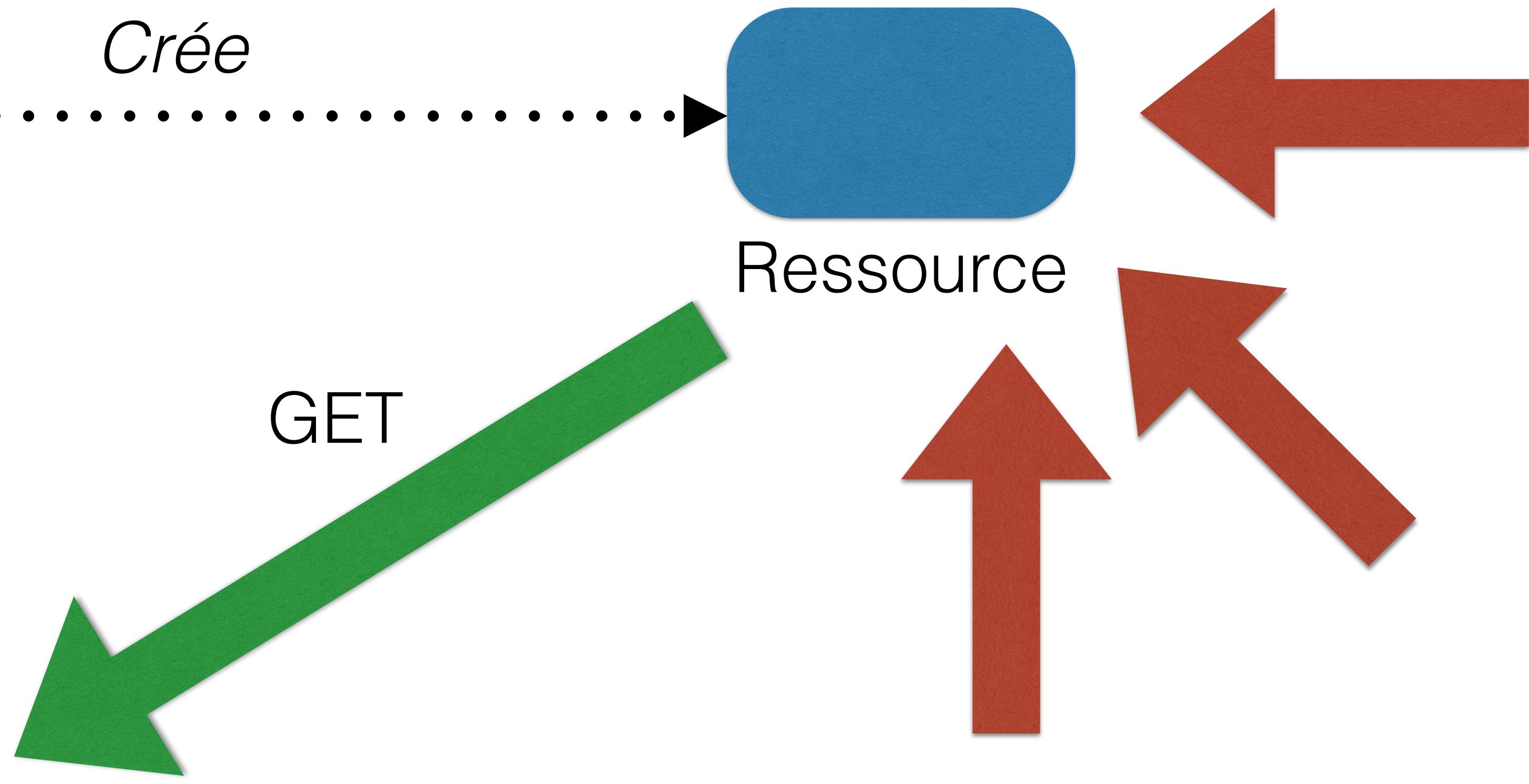
```
$.ajax( {
    type: 'POST',
    url: '/api/register',
    data: JSON.stringify({
        'login': form.login,
        'password': form.password,
        'country': 'FRA'
    }),
    dataType: 'json',
    contentType: 'application/json; charset=utf-8',
    success: function(data) {
        // ...
    },
    error: function() {
        // ...
    }
});
```

/contacts



Crée

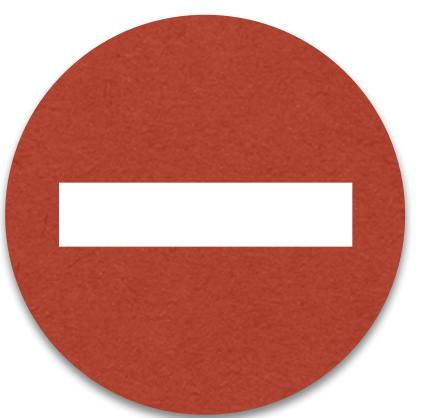
/contact/10



PUT, DELETE, PATCH, ...



Parfait pour des applications métier
Pas de rechargements, allège le serveur



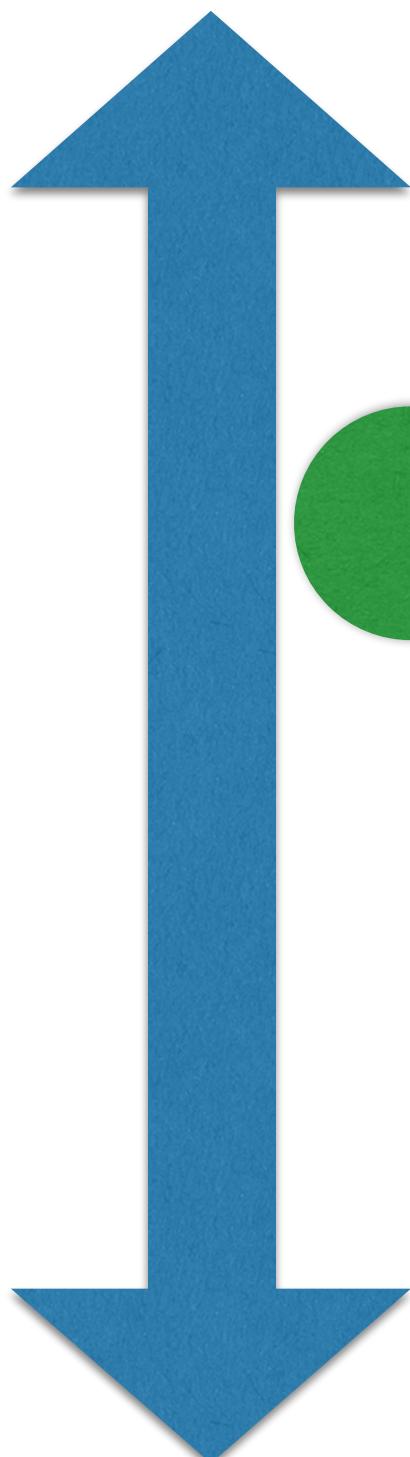
Code client complexe
Indexation dans les moteurs de recherche

HTTP est sans état ...
comment avoir des sessions
applicatives ?

> HEAD / HTTP/1.1
> User-Agent: curl/7.30.0
> Host: www.cnn.com
> Accept: */*

< < HTTP/1.1 302 Moved Temporarily
< Server: nginx
< Date: Wed, 18 Nov 2013 11:03:42 GMT
< Content-Type: text/html
< Content-Length: 154
< Connection: keep-alive
< **Set-Cookie: CG=FR:B9:Tr?voux; path=/**
< Cache-Control: private, no-cache
< Vary: *
< Location: http://edition.cnn.com/

Serveur



Client

Cookie

- + clés / valeurs
- + domaine
- + expiration
- + chemin

Problème(s) ?

login=johnb
role=admin

`md5(valeurs + sel_serveur)`

login=johnb

role=admin

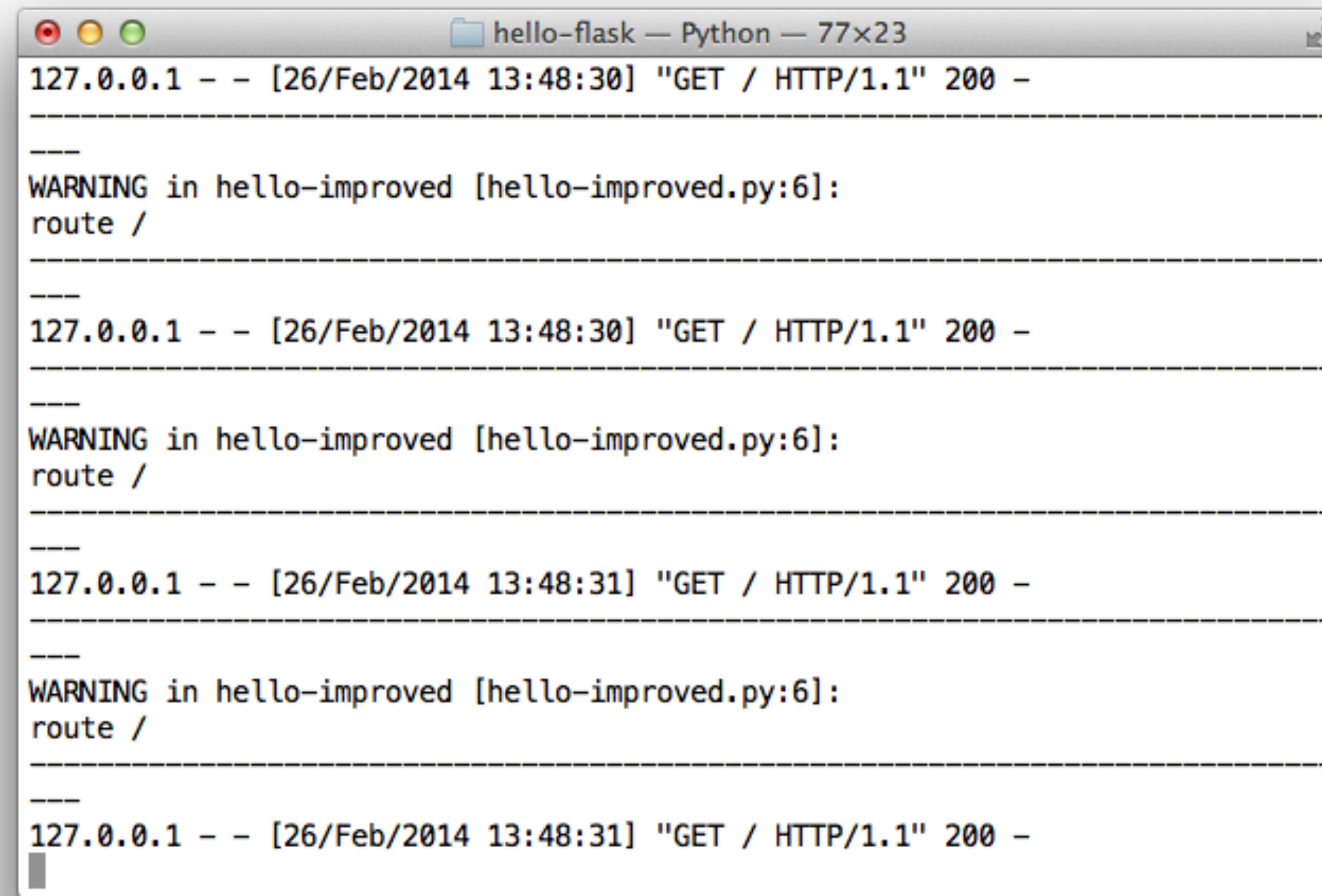
hash=3c734a8be0bcfe85a9e283127df12723

Plan

- Architectures, serveurs web.
- MVC
- Outilage

Outillage

Toujours garder un oeil sur les logs du serveur ...



A screenshot of a terminal window titled "hello-flask — Python — 77x23". The window displays a log of HTTP requests and Flask application warnings. The log shows three identical requests from 127.0.0.1 at [26/Feb/2014 13:48:30] for the root route, each resulting in a 200 OK response. Between the first and second requests, there is a warning message from the "hello-improved" application, indicating a duplicate route definition.

```
127.0.0.1 - - [26/Feb/2014 13:48:30] "GET / HTTP/1.1" 200 -  
---  
WARNING in hello-improved [hello-improved.py:6]:  
route /  
---  
127.0.0.1 - - [26/Feb/2014 13:48:30] "GET / HTTP/1.1" 200 -  
---  
WARNING in hello-improved [hello-improved.py:6]:  
route /  
---  
127.0.0.1 - - [26/Feb/2014 13:48:31] "GET / HTTP/1.1" 200 -  
---  
WARNING in hello-improved [hello-improved.py:6]:  
route /  
---  
127.0.0.1 - - [26/Feb/2014 13:48:31] "GET / HTTP/1.1" 200 -
```

Bienvenue au Département Télécommunications | Département Télécommunications, Services & Usages

Bienvenue au Département Télé...

https://telecom.insa-lyon.fr

Présentation Formation Recherche Entreprises International Vie Etudiante

Département Télécommunications, Services & Usages

INSA LYON

Accueil

Mot du directeur Historique Actualités Equipes

Connexion

Nom d'utilisateur : *

Bienvenue au Département Télécommunications

Le département Télécommunications, avec des promotions de 75 élèves-ingénieurs, répond au formidable développement des Technologies de l'Information et de la Communication. Il couvre les domaines des réseaux d'entreprises, des systèmes de communications voix / données / images et des outils au service de la mobilité.

Le Département Télécommunications forme ses ingénieurs sur un socle de connaissances

Actualités

- 13/01/2014 - L'équipe féminine de rugby de l'INSA aux couleurs de TC !
- 11/12/2013 - Participation Concours International en Sécurité
- 20/11/2013 - Un robot en TC ! et ..

Console Inspector Debugger Style Editor Profiler Network

Net CSS JS Security Logging Clear Filter output

```
13:50:08.091 ▲ Use of getUserData() or setUserData() is deprecated. Use WeakMap or element.dataset instead. requestNotifier...  
13:50:08.198 GET https://telecom.insa-lyon.fr/sites/default/files/css/css_e3671b7e30f49e871eca4b2c967473e5.css [HTTP/1.1 200 OK 23ms]  
13:50:08.198 GET https://telecom.insa-lyon.fr/sites/default/files/css/css_0656ffa4c1692dba1d19e3979174b780.css [HTTP/1.1 200 OK 59ms]  
13:50:08.199 GET https://telecom.insa-lyon.fr/sites/default/files/js/js_a02ea201e99ebb5ffaa5c55fb95a400.js [HTTP/1.1 200 OK 59ms]  
13:50:08.199 GET https://telecom.insa-lyon.fr/sites/default/files/images/ImageChappeNord.png [HTTP/1.1 200 OK 88ms]  
13:50:08.200 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/contenu/img_contact.jpg [HTTP/1.1 200 OK 88ms]  
13:50:08.200 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/contenu/logo_bw.gif [HTTP/1.1 200 OK 89ms]  
13:50:08.792 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/contenu/bt_search.png [HTTP/1.1 200 OK 1ms]  
13:50:08.463 ▲ Unknown property 'background-position-y'. Declaration dropped. 11 telecom.insa-ly...  
13:50:08.798 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/contenu/img_bg_1.jpg [HTTP/1.1 200 OK 85ms]  
13:50:08.798 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/logo_blank.png [HTTP/1.1 200 OK 82ms]  
13:50:08.799 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/css/bandeau_2_fr.gif [HTTP/1.1 200 OK 84ms]  
13:50:08.799 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/css/puce.png [HTTP/1.1 200 OK 84ms]  
13:50:08.800 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/css/puce_atout.png [HTTP/1.1 200 OK 119ms]  
13:50:08.800 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/css/bg_contact.png [HTTP/1.1 200 OK 121ms]  
13:50:08.801 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/css/bg_footer.png [HTTP/1.1 200 OK 120ms]  
13:50:16.459 GET https://telecom.insa-lyon.fr/sites/all/themes/insatc/img/css/bg_menu.png [HTTP/1.1 200 OK 1ms]
```

- ▶ Mot du directeur
- ▶ Historique
- ▶ Actualités
- ▶ Equipes

Connexion

Nom d'utilisateur : *

Bienvenue au Département Télécommunications

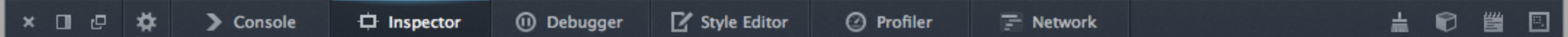


Le département Télécommunications, avec des promotions de 75 élèves-ingénieurs, répond au formidable développement des Technologies de l'Information et de la Communication. Il couvre les domaines des réseaux d'entreprises, des systèmes de communications voix / données / images et des outils au service de la mobilité.

Le Département Télécommunications forme ses ingénieurs sur un socle de connaissances

Actualités

- 13/01/2014 - L'équipe féminine de rugby de l'INSA aux couleurs de TC !
- 11/12/2013 - Participation Concours International en Sécurité
- 20/11/2013 - Un robot en TC ! et



body.sidebars > div#main > div#content > div#col_centre.node.arg.sb > div.node > p

Rules Computed Fonts Box Model

```
div class="sb-gen" style="position: absolute; width: 8px; height: 8px; overflow: hidden; margin: 0px; padding: 0px; right: 0px; bottom: 0px;"></div>
<div class="sb-gen" style="position: absolute; width: 100%; height: 8px; top: 0px; left: 0px; overflow: hidden; margin: 0px; padding: 0px;"></div>
<div class="sb-gen" style="position: absolute; top: -8px; left: 0px; width: 100%; height: 100%; overflow: hidden; padding: 0px; margin: 0px;">
  <div class="sb-inner" style="position: relative; top: 16px; height: 2048px; margin: 0 0px 0 -8px; padding: 0; overflow: hidden; background-position: 0 -8px;"></div>
</div>
<div class="sb-gen" style="position: absolute; left: 0px; bottom: 0px; width: 100%; height: 8px; overflow: hidden; margin: 0px; padding: 0px;"></div>
<h2></h2>
<!-- les tab2 sont contenu dans $content --&gt;
&lt;div class="node"&gt;
  &lt;p&gt;&lt;/p&gt;
  &lt;p&gt;&lt;/p&gt;
  &lt;p&gt;&lt;/p&gt;
  &lt;span style="text-align: left;"></span>
```

color: #333
font-family: arial
font-size: 12px
line-height: 18px
position: relative
text-align: justify
z-index: 1

Method	File	Domain	Type	Size	0 ms	1280 ms	2560 ms	3840 ms	5120 ms
GET	/	outlook.com	html	0 KB	0 ms → 92 ms				
GET	owa	www.outlook.com	html	0 KB	0 ms → 157 ms				
GET	login.srf?wa=wsignin1.0&ct=13934...	login.live.com	html	9.56 KB	0 ms → 562 ms				
GET	R3WinLive1033.css	auth.gfx.ms	css	32.36 KB	0 ms → 945 ms				
GET	Login_Strings_JS1033.js	auth.gfx.ms	js	4.79 KB	0 ms → 971 ms				
GET	Login_Core.js	auth.gfx.ms	js	106.48 KB	0 ms → 209 ms				
GET	EN-US.html?id=64855&mkt=EN-US...	sc.imp.live.com	html	0.44 KB	0 ms → 14 ms				
GET	EN-US.html?id=64855&mkt=EN-US...	sc.imp.live.com	html	1.12 KB	0 ms → 61 ms				
GET	controls.png	auth.gfx.ms	png	4.85 KB	0 ms → 62 ms				
GET	LiveID16nc.gif?1393419132516	login.live.com	gif	0.48 KB	0 ms → 633 ms				
GET	header.css	sc.imp.live.com	css	0.19 KB	0 ms → 8 ms				
GET	logo_mail.png	sc.imp.live.com	png	6.64 KB	0 ms → 17 ms				
GET	style.css	sc.imp.live.com	css	5.58 KB	0 ms → 13 ms				
GET	mbox.js	sc.imp.live.com	js	27.53 KB	0 ms → 24 ms				
GET	mobile_ps_475x340.jpg	sc.imp.live.com	jpeg	36.43 KB	0 ms → 38 ms				
GET	style_win8.css	sc.imp.live.com	css	1.58 KB	0 ms → 12 ms				
GET	13157?id=1D79DE656A056C240A4...	stags.bluekai.com	gif	0.08 KB	0 ms → 632 ms				
GET	event?d_stuff=1&d_dst=1&d_rtbd=j...	msft.demdex.net	plain	0.01 KB	0 ms → 707 ms				
GET	bk-coretag.js	tags.bkrtx.com	js	27.46 KB	0 ms → 196 ms				
GET	standard?mboxHost=sc.imp.live.co...	windowslive.tt.omtrdc.net	js	2.41 KB	0 ms → 285 ms				
GET	14441?ret=html&phint=page=PRO...	stags.bluekai.com	html	0.07 KB	0 ms → 98 ms				
GET	OneDrive_SISU_2-19.jpg	sc.imp.live.com	jpeg	1450.66 KB	0 ms → 243 ms				
GET	zag.gif?Log=1&tntcalltype=1&tntPC...	s.imp.microsoft.com	gif	0.05 KB	0 ms → 721 ms				

All

HTML

CSS

JS

XHR

Fonts

Images

Media

Flash

23 requests, 1718.89 KB, 6.07 s

Method	File	Domain	Type	Size	Headers	Cookies	Params	Response	Timings
GET	/	outlook.com	html	0 KB	Request URL: https://sc.imp.live.com/content/dam/imp/surfaces/m... Request method: GET Status code: 200 OK Edit and Resend	Filter headers Response headers (0.268 KB) Accept-Ranges "bytes" Connection "keep-alive" Content-Length "1476621" Content-Type "image/jpeg" Date "Wed, 26 Feb 2014 12:52:14 GMT" Etag ""80de68bbb23cf1:0"" Last-Modified "Fri, 07 Feb 2014 04:17:43 GMT" Server "Microsoft-IIS/7.5" X-Powered-By "ASP.NET"			
GET	owa	www.outlook.com	html	0 KB					
GET	login.srf?wa=wsignin1.0&ct=13934...	login.live.com	html	9.56 KB					
GET	R3WinLive1033.css	auth.gfx.ms	css	32.36 KB					
GET	Login.Strings_JS1033.js	auth.gfx.ms	js	4.79 KB					
GET	Login_Core.js	auth.gfx.ms	js	106.48 KB					
GET	EN-US.html?id=64855&mkt=EN-US...	sc.imp.live.com	html	0.44 KB					
GET	EN-US.html?id=64855&mkt=EN-US...	sc.imp.live.com	html	1.12 KB					
GET	controls.png	auth.gfx.ms	png	4.85 KB					
GET	LiveID16nc.gif?1393419132516	login.live.com	gif	0.48 KB					
GET	header.css	sc.imp.live.com	css	0.19 KB					
GET	logo_mail.png	sc.imp.live.com	png	6.64 KB					
GET	style.css	sc.imp.live.com	css	5.58 KB					
GET	mbox.js	sc.imp.live.com	js	27.53 KB					
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GET	style_win8.css	sc.imp.live.com	css	1.58 KB					
GET	13157?id=1D79DE656A056C240A4...	stags.bluekai.com	gif	0.08 KB					
GET	event?d_stuff=1&d_dst=1&d_rtbd=j...	msft.demdex.net	plain	0.01 KB					
GET	bk-coretag.js	tags.bkrtx.com	js	27.46 KB					
GET	standard?mboxHost=sc.imp.live.co...	windowslive.tt.omtrdc.net	js	2.41 KB					
GET	14441?ret=html&phint=page=PRO...	stags.bluekai.com	html	0.07 KB					
GET	OneDrive_SISU_2-19.jpg	sc.imp.live.com	jpeg	1450.66 KB					
GET	zag.gif?Log=1&tntcalltype=1&tntPC...	s.imp.microsoft.com	gif	0.05 KB					

Q&A