LAB - Cách Cài Đặt Và Sử Dụng cURL Trên Windows

1) cURL là gì?

cURL viết tắt của Client URL. Đây là một công cụ dòng lệnh (command line tool) và thư viện dùng để kiểm tra kết nối từ URL và cho phép truyền dữ liệu thông qua nhiều giao thức khác nhau.

HTTP, HTTPS, FTP, FTPS, SCP, SFTP, FILE, IMAP, SMTP, POP3, … là những giao thức cURL được sử dụng thường xuyên.

Chức năng của cURL:

- Giao thức HTTP giúp cURL hỗ trợ việc gửi đi một request với tất cả các phương thức hiện có như GET, POST, PUT, DELETE, …
- Hỗ trợ người dùng tải xuống máy một trang web trên mạng Internet. Đây là một trong những chức năng cơ bản nhất của cURL.
- Vận chuyển các tập tin, hình ảnh, dữ liệu,… từ nơi khác đến máy chủ hoặc từ máy chủ đến nơi khác.
- Kiểm tra cookies nào đã được tải trên URL.

2) Cách cài đặt

Để kiểm tra máy tính của bạn đã có cURL hay chưa bạn có thể kiểm tra bằng cách

nhấn tổ hợp phím Windows + R sau đó nhập cmd và gõ lệnh sau để kiểm tra: curl - -version

```
C:\Users\huynh>curl --version
curl 7.79.1 (Windows) libcurl/7.79.1 Schannel
Release-Date: 2021-09-22
Protocols: dict file ftp ftps http https imap im
Features: AsynchDNS HSTS IPv6 Kerberos Largefile
```

Thông thường, nếu máy tính bạn chạy hệ điều hành Windows 10 bản mới nhất hoặc đã thực hiện tải Git thì mặc định cURL đã có. Nếu chưa có thể thực hiện tải tại : https://curl.se/download.html và cài đặt sau đó thực hiện path đường dẫn thích hợp.

3) Các lệnh sử dụng

- Có thể nhấn lệnh: curl - - help để xem các lệnh hoặc curl - - help all để xem tất cả.

```
C:\Users\huynh>curl --help
Usage: curl [options...] <url>
 -d, --data <data>    HTTP POST data
 -f, --fail           Fail silently (no output at all) on HTTP errors
 -h, --help <category>  Get help for commands
 -i, --include        Include protocol response headers in the output
 -o, --output <file>  Write to file instead of stdout
 -O, --remote-name    Write output to a file named as the remote file
 -s, --silent         Silent mode
 -T, --upload-file <file>  Transfer local FILE to destination
 -u, --user <user:password>  Server user and password
 -A, --user-agent <name>  Send User-Agent <name> to server
 -v, --verbose        Make the operation more talkative
 -V, --version        Show version number and quit

This is not the full help, this menu is stripped into categories.
Use "--help category" to get an overview of all categories.
For all options use the manual or "--help all".
```

- Ở đây mình sẽ giới thiệu một vài lệnh cơ bản:

curl <url>	# url ở đây là đường dẫn đến trang web mạng

Ví dụ: curl www.google.com sẽ cho kết quả trang HTML như hình bên dưới:

```
C:\Users\huynh>curl www.google.com
<!doctype html><html itemscope="" itemtype="http://schema.org/WebPage" lang="vi"><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="JQ7HHAUJ7hXirMGO0iHTig==">(function(){window.google={kEI:'ajU_YuHlNPrE4-EP3Y
Kp-A0',kEXPI:'0,1302536,56873,1710,4348,207,2415,2389,925,1391,383,246,5,1354,4013,1237,1122516,1197696,726,16,380053,16
111,17447,11240,17572,4858,1362,9290,3029,17588,4990,13226,3849,4192,6430,22741,5081,1593,1279,2742,149,1103,840,6297,10
9,3405,606,2023,1777,520,14670,3227,2845,7,17450,16320,1850,2615,13142,3,576,6459,149,13975,4,1528,656,1648,1237,5226,57
6,20309,4764,2658,7355,32,13628,4437,9358,7428,5770,2587,4097,14,4035,3,3541,1,16807,38,10338,14971,2,14022,1931,5589,74
3,5853,10463,1160,4192,1487,1021,2380,2719,18233,9,2,6,7773,2123,2444,6259,6717,14083,2618,1252,5835,11862,3106,1550,278
2,24,6066,1394,445,2,2,1,1509,4886,6689,10442,223,877,153,1430,10,1,412,8049,106,113,2453,3071,945,98,700,1,462,2,1016,9
68,318,276,3528,23,4299,2852,936,3816,3525,3286,135,2,6,874,318,1450,2,1,2747,889,2190,75,13,140,2,1144,1411,291,2,620,4
15,371,1878,112,2780,839,97,481,436,843,739,219,127,621,18,36,553,54,748,34,2218,255,969,4,747,90,2,187,382,1987,70,232,
6,104,87,968,390,647,375,709,19,7,108,484,124,94,552,1227,5454784,953,246,118,8796694,882,444,3,1877,1,2562,1,748,141,79
5,563,1,4265,1,1,2,1331,4142,2609,155,17,13,72,139,4,2,20,2,169,13,19,46,5,39,96,548,29,2,2,1,2,1,2,2,7,4,1,2,2,2,2,2,2,
353,513,186,1,1,158,3,2,2,2,2,4,2,3,3,269,1601,141,1002,167,18,16,72,7,2,24,2,4,24,23951643,4038574,3,3112,3,450,1964,
```

- Hiển thị request header, response header và response:

> curl –v <url>

Ví dụ: curl -v google.com

```
C:\Users\huynh>curl -v google.com
*   Trying 2404:6800:4003:c0f::8a:80...
* Connected to google.com (2404:6800:4003:c0f::8a) port 80 (#0)
> GET / HTTP/1.1
> Host: google.com
> User-Agent: curl/7.79.1
> Accept: */*
>
* Mark bundle as not supporting multiuse
< HTTP/1.1 301 Moved Permanently
< Location: http://www.google.com/
< Content-Type: text/html; charset=UTF-8
< Date: Sat, 26 Mar 2022 15:55:14 GMT
< Expires: Mon, 25 Apr 2022 15:55:14 GMT
< Cache-Control: public, max-age=2592000
< Server: gws
< Content-Length: 219
< X-XSS-Protection: 0
< X-Frame-Options: SAMEORIGIN
<
<HTML><HEAD><meta http-equiv="content-type" content="text/html;charset=utf-8">
<TITLE>301 Moved</TITLE></HEAD><BODY>
<H1>301 Moved</H1>
```

- HTTP Request header:

> curl <url> -H "…"

- Nếu sử dụng nhiều header:

> curl <url> -H "…" –H "…" …

Ví dụ: curl https://www.google.com ^-H "Accept:application/xml" ^-H "Content Type:application/xml"

```
C:\Users\huynh>curl https://www.google.com ^-H "Accept:application/xml" ^-H "Content Type:application/xml"
<!DOCTYPE html>
<html lang=en>
  <meta charset=utf-8>
  <meta name=viewport content="initial-scale=1, minimum-scale=1, width=device-width">
  <title>Error 400 (Bad Request)!!1</title>
  <style>
    *{margin:0;padding:0}html,code{font:15px/22px arial,sans-serif}html{background:#fff;color:#222;padding:15px}body{mar
gin:7% auto 0;max-width:390px;min-height:180px;padding:30px 0 15px}* > body{background:url(//www.google.com/images/error
s/robot.png) 100% 5px no-repeat;padding-right:205px}p{margin:11px 0 22px;overflow:hidden}ins{color:#777;text-decoration:
none}a img{border:0}@media screen and (max-width:772px){body{background:none;margin-top:0;max-width:none;padding-right:0
}}#logo{background:url(//www.google.com/images/branding/googlelogo/1x/googlelogo_color_150x54dp.png) no-repeat;margin-le
ft:-5px}@media only screen and (min-resolution:192dpi){#logo{background:url(//www.google.com/images/branding/googlelogo/
2x/googlelogo_color_150x54dp.png) no-repeat 0% 0%/100% 100%;-moz-border-image:url(//www.google.com/images/branding/googl
elogo/2x/googlelogo_color_150x54dp.png) 0}}@media only screen and (-webkit-min-device-pixel-ratio:2){#logo{background:ur
l(//www.google.com/images/branding/googlelogo/2x/googlelogo_color_150x54dp.png) no-repeat;-webkit-background-size:100% 1
00%}}#logo{display:inline-block;height:54px;width:150px}
  </style>
  <a href=//www.google.com/><span id=logo aria-label=Google></span></a>
  <p><b>400.</b> <ins>That's an error.</ins>
```

- Gửi kèm username và password:

> curl https://username:password@abc.com hoặc
>
> curl –u username:password https://abc.com

- Đưa dữ liệu vào yêu cầu GET để gửi đi:

> curl –d name=admin <url> hoặc
>
> curl - -data name=admin <url> hoặc
>
> curl –d @file   #@truyền data từ file

- Tắt kiểm tra chứng chỉ SSL:

> curl –k <url>

- Thay đổi phương thức request:

> curl –X POST/PUT/DELETE/PATCH

Ví dụ: Để xin một token của DNAC sandbox ta có thể thực hiện như sau:

curl https://sandboxdnac.cisco.com/dna/system/api/v1/auth/token ^-H "Content-Type:application/json" ^-H "Authorization:Basic ZGV2bmV0dXNlcjpDaXNjbzEyMyE=" -X POST

```
C:\Users\huynh>curl https://sandboxdnac.cisco.com/dna/system/api/v1/auth/token ^-H "Content-Type:application/json" -H "
Authorization:Basic ZGV2bmV0dXNlcjpDaXNjbzEyMyE=" -X POST
{"Token":"eyJhbGciOiJSUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiI2MGVjNGU0ZjRjYTdmOTIyMmM4MmRhNjYiLCJhdXRoU291cmNlIjoiaW50ZXJuY
WwiLCJ0ZW5hbnROYW1lIjoiVE5UMCIsInJvbGVzIjpbIjVlOGU4OTZlNGQ0YWRkMDBjYTJiNjQ4ZSJdLCJ0ZW5hbnRJZCI6IjVlOGU4OTZlNGQ0YWRkMDBjY
TJiNjQ4NyIsImV4cCI6MTY0ODM0NTMzNiwiaWF0IjoxNjQ4MzQxNzM2LCJqdGkiOiI3NzFjYmY2Ni1kYmUxLTQzYWEtYWViNC04NjJlZGZjM2UwZjUiLCJ1c
2VybmFtZSI6ImRldm5ldHVzZXIifQ.fuTdZFwq-zDJpTSD6EC1wwWNXJeFGD1g0NXwEv-WxEZ5YHp1-siuzz7mcUDPYhhFjGYnp-5p147aoCyuwmHGIAiNFm
kvRsq-5fYb-BCptmUL4jDw6pmq2Whf3wXT-6vihJrnoNzHgF3FtZz3nJ3u-lo7HZEhdN8K6amgzFIem7TAID7pSll0KcN8oBrJ4GyyVdE-y8XAnKFfl-ItOF
pNeLteOTHrgdueBispdfK_4NSCxQgsIddJyHOtMbnjqksHdxsmocniD1pl-mkhfXCVPEaZFI-BAhhTKTDifdsw4JLv_Tq8rjpXIbzFcGXJH6sTGNr5BiaAd_
wUH3WB4JImwQ"}
```

- Sau đó có thể lưu kết quả sang dạng khác để dễ đọc hơn bằng lệnh:

curl -o results.json https://sandboxdnac.cisco.com/dna/system/api/v1/auth/token ^-H "Content-Type:application/json" ^-H "Authorization:Basic ZGV2bmV0dXNlcjpDaXNjbzEyMyE=" -X POST

```
C:\Users\huynh>curl -o results.json https://sandboxdnac.cisco.com/dna/system/api/v1/auth/token ^-H "Content-Type:applica
tion/json" ^-H "Authorization:Basic ZGV2bmV0dXNlcjpDaXNjbzEyMyE=" -X POST
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   734  100   734    0     0    779      0 --:--:-- --:--:-- --:--:--   779
```

```
{} results.json 4 ×
C: > Users > huynh > {} results.json > ...
  1  {"Token":"eyJhbGciOiJSUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiI2MGVjNGU0ZjRjYTdmOTIyMmM4MmRhNjYiLCJhdXRoU291cmNlIjoiaW50ZXJuYWwiLCJ0ZW
  2  5hbnROYW1lIjoiVE5UMCIsInJvbGVzIjpbIjVlOGU4OTZlNGQ0YWRkMDBjYTJiNjQ4ZSJdLCJ0ZW5hbnRJZCI6IjVlOGU4OTZlNGQ0YWRkMDBjYTJiNjQ4NyIsImV4cCI6MT
  3  Y0ODM0NTQ0NiwiaWF0IjoxNjQ4MzQxODQ2LCJqdGkiOiI0ZTFhMDIzOS0xZGI2LTQ0M2ItOTVkYi1hMjE2MTQxYmNjODUiLCJ1c2VybmFtZSI6ImRldm5ldHVzZXIifQ.pII6
  4  ahxqIL6hpykyjJOr9g7kn9DLEVZpfzuePmtxE11nl10LQs9tPa5HdHLtqvZ47eal7J6SGuSEF41NJ5CMtx-8Uo7rlsbmdWL1bJa4ugyA9vij-26QBp26NPdGGVQgA0wv_i7Y4
  5  5XnUDQaT3otWKNDkFQT2js-Q3vrnhpYnSsD5xnSzZuC0KuPRNHEnRYX6lZSNoZwz2s2sBrvxiQdZn9-5k9MIK0RFw527JgyrFsTcrfhVmNXW9gkd1h9I5_jRwKuzc-TZdTMH
  6  rhlvcO5eEI-yBSi8FVcuOQFPcswtTkZkF-qUsY7yxe92knX9AF7UVKw13c58I2wUgrsMawPpw"}
```

4) Áp dụng đối với lấy thông tin từ Meraki API

• Lấy thông tin Organizations

curl https://api.meraki.com/api/v1/organizations ^-H "X-Cisco-Meraki-API-Key: 6bec40cf957de430a6f1f2baa056b99a4fac9ea0" ^-H "Accept: application/json" -X GET

```
C:\Users\huynh>curl https://api.meraki.com/api/v1/organizations ^-H "X-Cisco-Meraki-API-Key: 6bec40cf957de430a6f1f2baa05
6b99a4fac9ea0" ^-H "Accept: application/json" -X GET
<html><body>You are being <a href="https://n392.meraki.com/api/v1/organizations">redirected</a>.</body></html>
```

• Lấy thông tin Network cụ thể

curl https://api.meraki.com/api/v1/organizations/681155/networks ^-H "X-Cisco-Meraki-API-Key: 6bec40cf957de430a6f1f2baa056b99a4fac9ea0" ^-H "Accept: application/json" -X GET

```
C:\Users\huynh>curl https://api.meraki.com/api/v1/organizations/681155/networks ^-H "X-Cisco-Meraki-API-Key: 6bec40cf957de430a6f1f2baa056b99a4fac
9ea0" ^-H "Accept: application/json" -X GET
[{"id":"L_566327653141843049","organizationId":"681155","name":"Lyoli","productTypes":["appliance","camera","switch","wireless"],"timeZone":"Amer
ica/New_York","tags":[],"enrollmentString":null,"url":"https://n392.meraki.com/Lyoli-switch/n/kjwRabg/manage/usage/list","notes":""},{"id":"L_566
327653141846927","organizationId":"681155","name":"Vegas Apartment","productTypes":["appliance","camera","switch","wireless"],"timeZone":"America
/Los_Angeles","tags":[],"enrollmentString":null,"url":"https://n392.meraki.com/Vegas-Apartment-/n/YreSWdg/manage/usage/list","notes":""},{"id":"L_
566327653141856854","organizationId":"681155","name":"DNEAlertsNet","productTypes":["appliance","camera","switch","wireless"],"timeZone":"US/Pac
ific","tags":["tag1","tag2"],"enrollmentString":null,"url":"https://n392.meraki.com/DNEAlertsNet-swi/n/vUktkag/manage/usage/list","notes":""},{"i
d":"L_783626335162466320","organizationId":"681155","name":"DevNetLab","productTypes":["appliance","camera","switch","wireless"],"timeZone":"Amer
ica/Los_Angeles","tags":["tag1"],"enrollmentString":null,"url":"https://n392.meraki.com/DevNetLab-applia/n/xaNlkcig/manage/usage/list","notes":nu
ll},{"id":"L_783626335162466514","organizationId":"681155","name":"DevNetLab2","productTypes":["appliance","cellularGateway","environmental","sen
sor","switch","wireless"],"timeZone":"America/Los_Angeles","tags":[],"enrollmentString":null,"url":"https://n392.meraki.com/DevNetLab2-switc/n/se
lmycig/manage/usage/list","notes":null},{"id":"L_783626335162466515","organizationId":"681155","name":"DevNetLab3","productTypes":["appliance","c
ellularGateway","environmental","sensor","switch","wireless"],"timeZone":"America/Los_Angeles","tags":[],"enrollmentString":null,"url":"https://n
392.meraki.com/DevNetLab3-wirel/n/e5u4ibig/manage/usage/list","notes":null},{"id":"N_566327653141899127","organizationId":"681155","name":"Nolan"
,"productTypes":["wireless"],"timeZone":"America/Los_Angeles","tags":[],"enrollmentString":null,"url":"https://n392.meraki.com/Nolan/n/9qi_yag/ma
nage/usage/list","notes":""},{"id":"N_566327653141902646","organizationId":"681155","name":"Lyoli MDM","productTypes":["systemsManager"],"timeZon
e":"America/Los_Angeles","tags":[],"enrollmentString":null,"url":"https://n392.meraki.com/Lyoli-MDM/n/-JaAJcg/manage/usage/list","notes":null}]
```

- Lấy thông tin Device cụ thể

curl   https://api.meraki.com/api/v1/networks/L_566327653141843049/devices   ^-H   "X-Cisco-Meraki-API-Key: 6bec40cf957de430a6f1f2baa056b99a4fac9ea0"   ^-H   "Accept: application/json" -X GET

```
C:\Users\huynh>curl https://api.meraki.com/api/v1/networks/L_566327653141843049/devices ^-H "X-Cisco-Meraki-API-Key: 6bec40cf957de430a6f1f2baa056
b99a4fac9ea0" ^-H "Accept: application/json" -X GET
[{"lat":37.4180951010362,"lng":-122.098531723022,"address":"","serial":"Q2SW-SWQ2-HZ9L","mac":"ac:17:c8:24:4f:68","wan1Ip":"192.168.1.74","wan2Ip
":null,"tags":["recently-added"],"url":"https://n392.meraki.com/Lyoli-appliance/n/6X278ag/manage/nodes/new_list/189218142048104","networkId":"L_5
66327653141843049","name":"BigCat","model":"MX250","firmware":"wired-16-16","floorPlanId":null},{"lat":37.4180951010362,"lng":-122.098531723022,"
address":"","serial":"Q2QW-W2W4-MCNR","mac":"34:56:fe:88:c2:f8","lanIp":"192.168.128.8","tags":["recently-added"],"url":"https://n392.meraki.com/
Lyoli-switch/n/kjwRabg/manage/nodes/new_list/57548242207480","networkId":"L_566327653141843049","name":"Big Office Switch","model":"MS250-48FP","
switchProfileId":null,"firmware":"switch-14-33","floorPlanId":null},{"lat":37.4180951010362,"lng":-122.098531723022,"address":"","serial":"Q2HP-U
EUW-2PQD","mac":"e0:55:3d:d2:48:3f","lanIp":"192.168.128.90","url":"https://n392.meraki.com/Lyoli-switch/n/kjwRabg/manage/nodes/new_list/24665672
4033215","networkId":"L_566327653141843049","tags":[],"name":"Bedroom Switch","model":"MS220-8P","switchProfileId":null,"firmware":"Not running c
onfigured version","floorPlanId":null},{"lat":37.4180951010362,"lng":-122.098531723022,"address":"","serial":"Q2HP-225A-XA5C","mac":"e0:55:3d:d2
4b:4c","lanIp":"192.168.128.206","url":"https://n392.meraki.com/Lyoli-switch/n/kjwRabg/manage/nodes/new_list/246656714033996","networkId":"L_566
327653141843049","tags":[],"name":"Basement switch","model":"MS220-8P","switchProfileId":null,"firmware":"switch-14-33","floorPlanId":null},{"lat
:41.4767987071101,"lng":-81.5780361515379,"address":"","serial":"Q2LD-GYL3-KEHX","mac":"e0:55:3d:c0:76:f4","lanIp":"192.168.128.202","tags":["LTV
"],"url":"https://n392.meraki.com/Lyoli-wireless/n/WdPtFdg/manage/nodes/new_list/246656712865524","networkId":"L_566327653141843049","beaconIdPar
ams":{"uuid":"a543206b-7dc8-44d0-9d72-1d43d92aafd4","major":2,"minor":1},"name":"1st Floor AP","model":"MR52","firmware":"wireless-27-7-1","floor
PlanId":null},{"lat":41.4768218172221,"lng":-81.5779959184027,"address":"","serial":"Q2LD-AN9B-S6AJ","mac":"e0:55:3d:c0:5e:2e","lanIp":"192.168.1
28.15","tags":["KTV"],"url":"https://n392.meraki.com/Lyoli-wireless/n/WdPtFdg/manage/nodes/new_list/246656712859182","networkId":"L_566327653141
43049","beaconIdParams":{"uuid":"a543206b-7dc8-44d0-9d72-1d43d92aafd4","major":2,"minor":1},"name":"2nd Floor AP","model":"MR52","firmware":"Not
running configured version","floorPlanId":null},{"lat":41.30627,"lng":-81.61507,"address":"","serial":"Q2EK-UKGM-XSD9","mac":"e0:55:3d:10:5e:b2"
"lanIp":"192.168.128.99","tags":["recently-added"],"url":"https://n392.meraki.com/Lyoli-wireless/n/WdPtFdg/manage/nodes/new_list/246656701324978
,"networkId":"L_566327653141843049","beaconIdParams":{"uuid":"a543206b-7dc8-44d0-9d72-1d43d92aafd4","major":2,"minor":1},"name":"Sun Room","mode
```

- Lấy thông tin Device_Infor cụ thể

curl https://api.meraki.com/api/v1/networks/L_566327653141843049/devices/Q2SW-SWQ2-HZ9L ^-H "X-Cisco-Meraki-API-Key:

6bec40cf957de430a6f1f2baa056b99a4fac9ea0" ^-H "Accept: application/json" -X GET

```
C:\Users\huynh>curl https://api.meraki.com/api/v1/networks/L_566327653141843049/devices/Q2SW-SWQ2-HZ9L ^-H "X-Cisco-Meraki-API-Key: 6bec40cf957de
430a6f1f2baa056b99a4fac9ea0" ^-H "Accept: application/json" -X GET
{"lat":37.4180951010362,"lng":-122.098531723022,"address":"","serial":"Q2SW-SWQ2-HZ9L","mac":"ac:17:c8:24:4f:68","wan1Ip":"192.168.1.74","wan2Ip"
:null,"tags":["recently-added"],"url":"https://n392.meraki.com/Lyoli-appliance/n/6X278ag/manage/nodes/new_list/189218142048104","networkId":"L_56
6327653141843049","name":"BigCat","model":"MX250","firmware":"wired-16-16","floorPlanId":null}
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- Lấy thông tin SSID cụ thể

curl https://api.meraki.com/api/v1/networks/L_566327653141843049/wireless/ssids ^-H "X-Cisco-Meraki-API-Key: 6bec40cf957de430a6f1f2baa056b99a4fac9ea0" ^-H "Accept: application/json" -X GET

```
C:\Users\huynh>curl https://api.meraki.com/api/v1/networks/L_566327653141843049/wireless/ssids ^-H "X-Cisco-Meraki-API-Key: 6bec40cf957de430a6f1f
2baa056b99a4fac9ea0" ^-H "Accept: application/json" -X GET
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k","splashTimeout":"30 minutes","walledGardenEnabled":true,"walledGardenRanges":["*.ngrok.io"],"minBitrate":11,"bandSelection":"5 GHz band only",
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