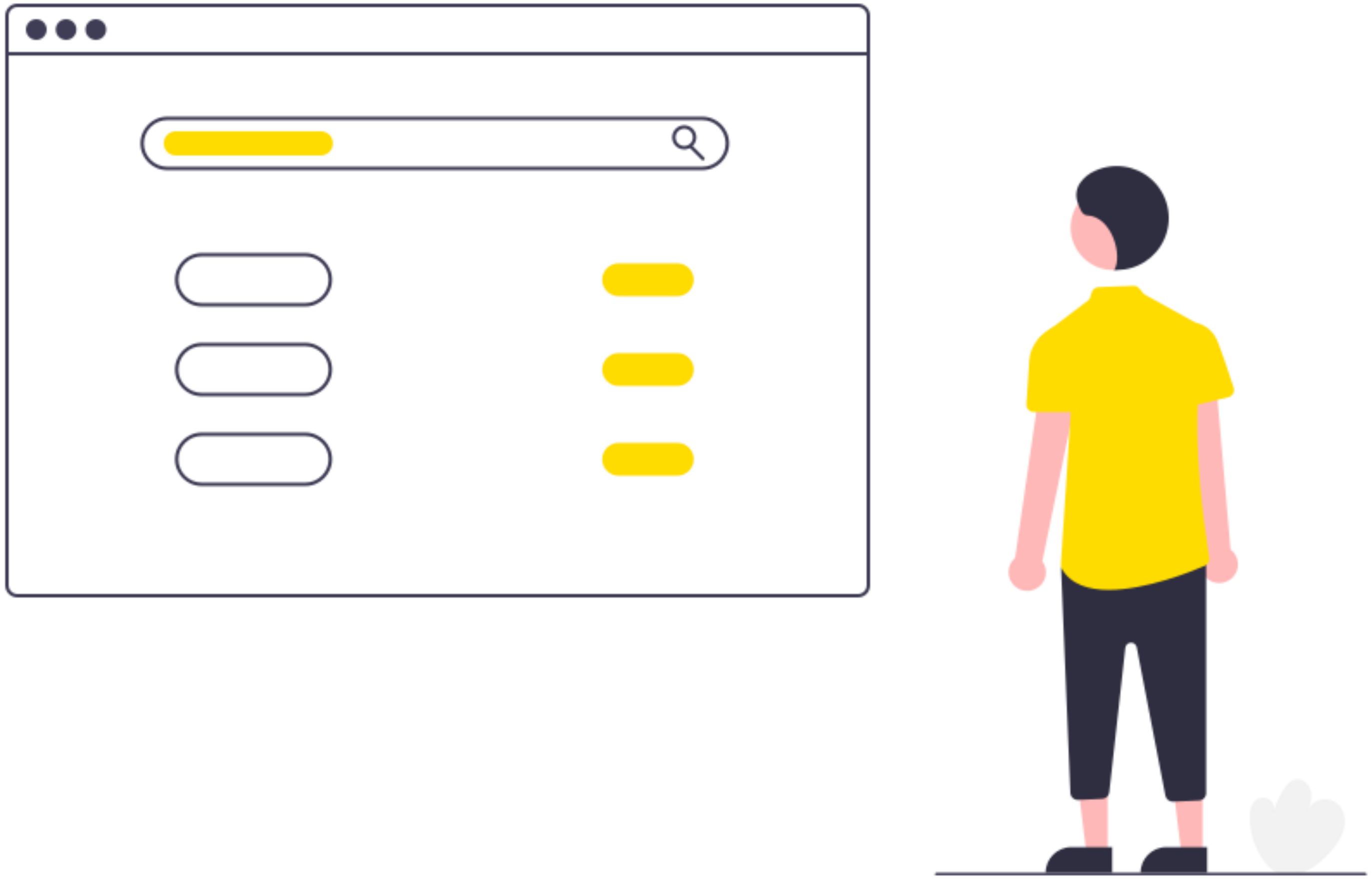
COMP1531

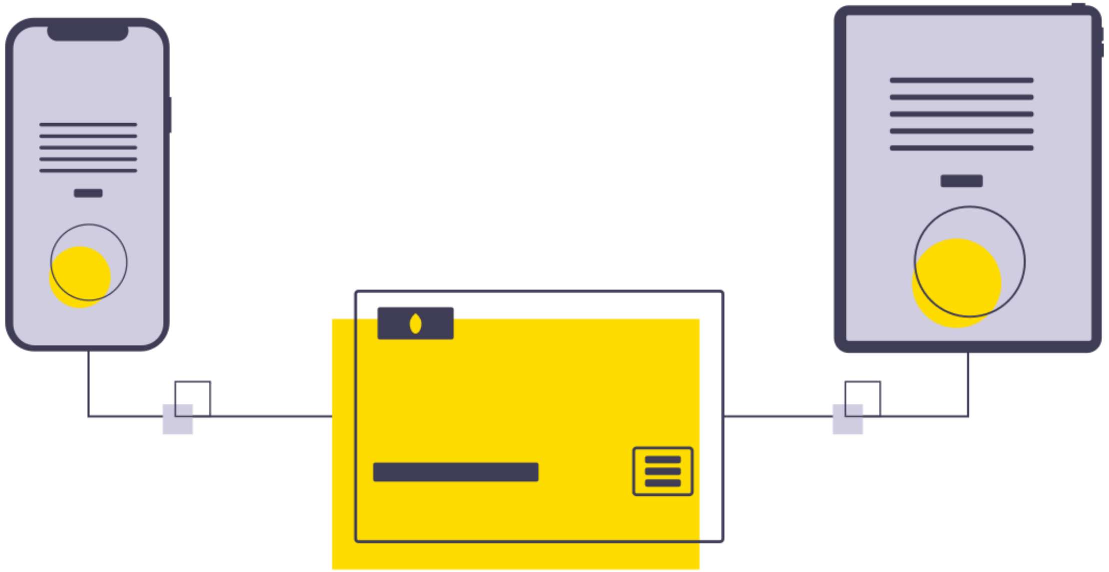
4.2 - Web HTTP & Flask



Computer Networks

A group of interconnected computers that can communicate.

- A LAN (Local Area Network)
- An intranet
- The Internet

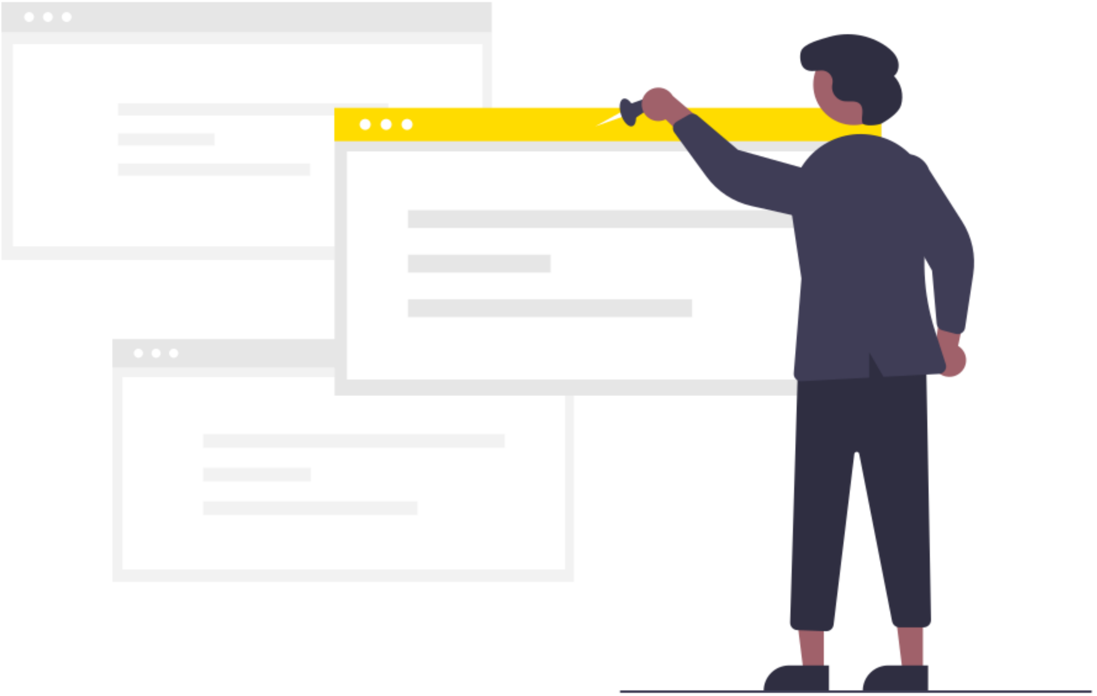


The Internet

A single, large, global network.

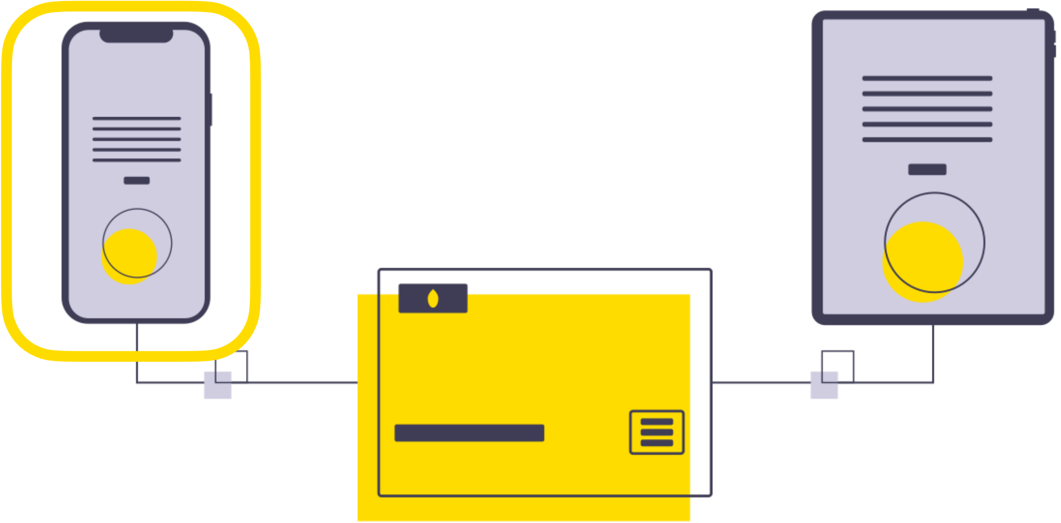
World Wide Web

- A combination of three technologies: HTML, URL, and HTTP.
- All served over a network (the internet).



Network Protocols

A standardised structure for communicating data



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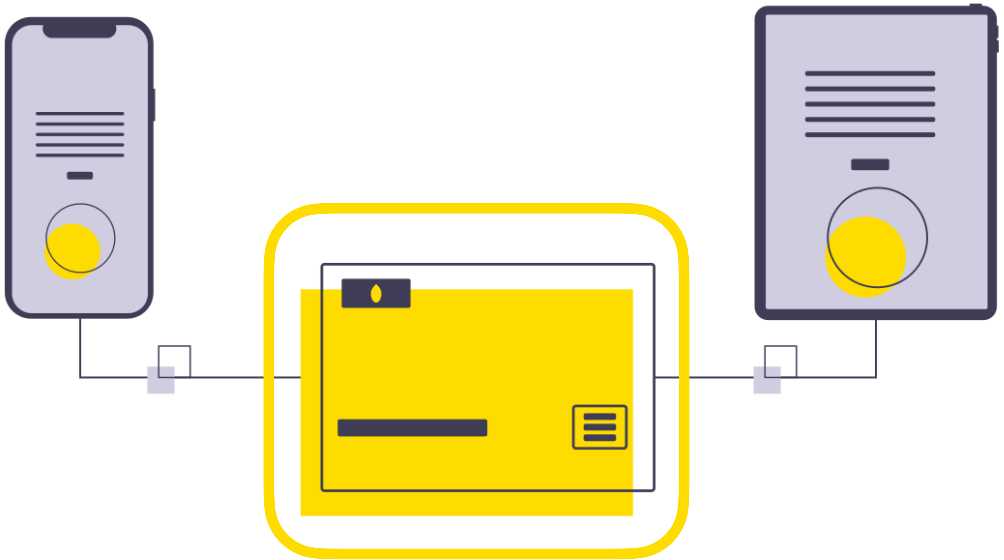
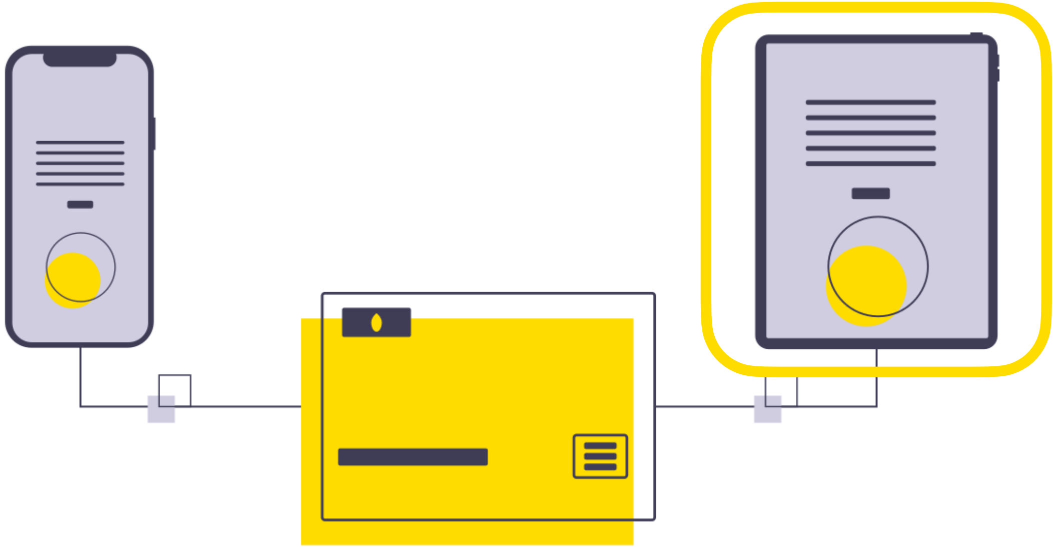


Network Protocols

A standardised structure for communicating data



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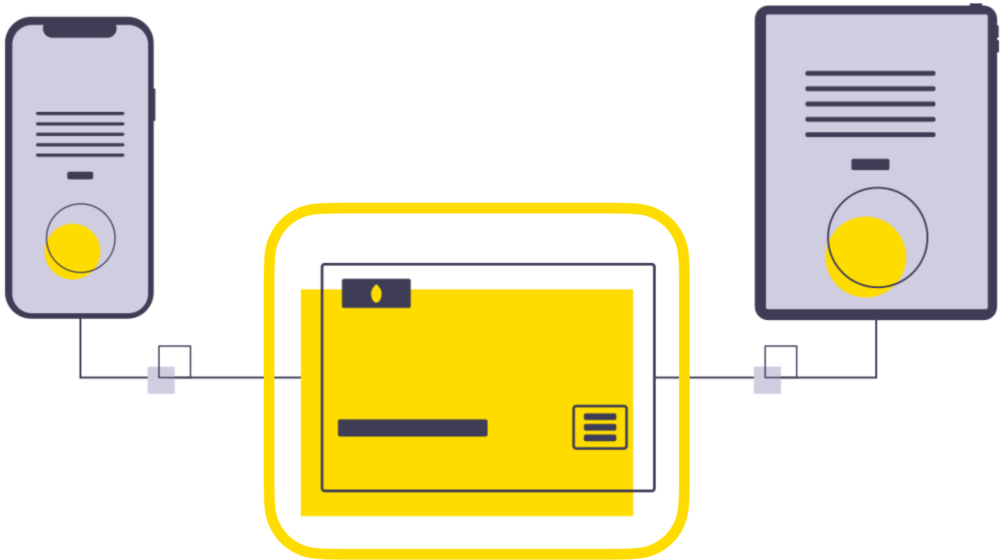
A standardised structure for communicating data



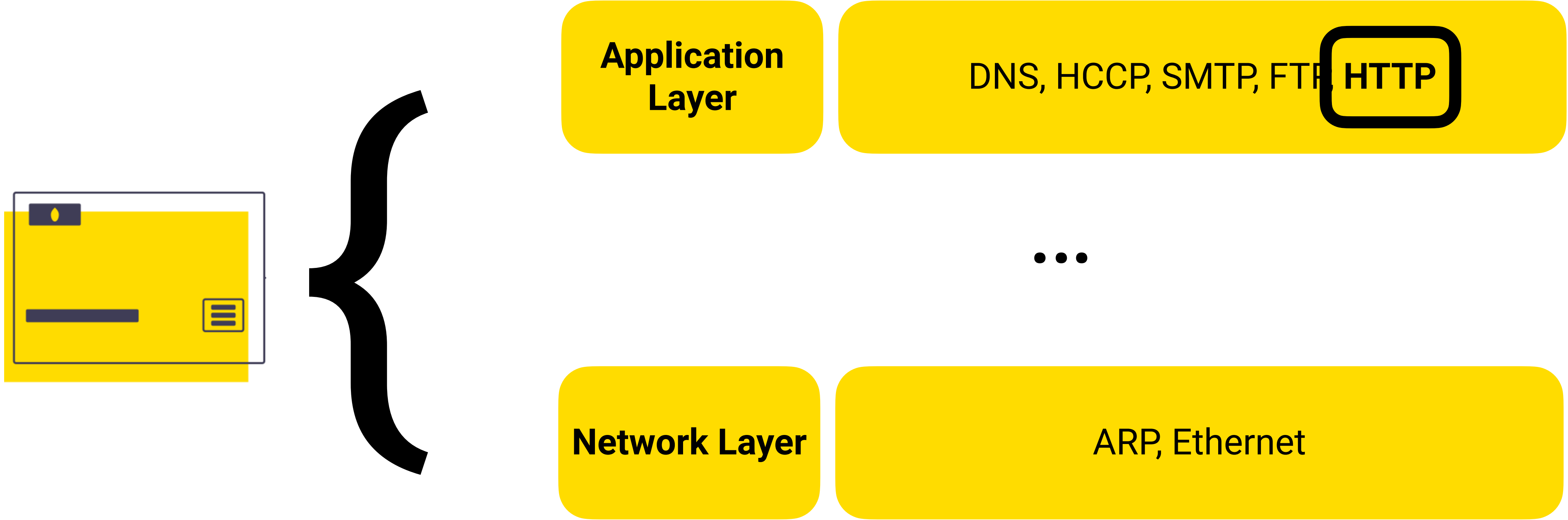
Network Protocols

A standardised structure for communicating data

Application Layer	DNS, HCCP, SMTP, FTP, HTTP
	...
Network Layer	ARP, Ethernet

Network Protocols

A standardised structure for communicating data



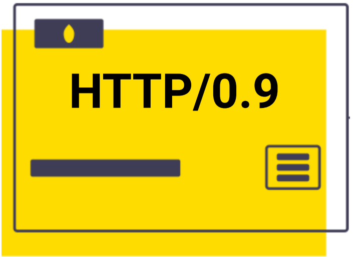
Application Layer

DNS, HCCP, SMTP, FTP, **HTTP**

...

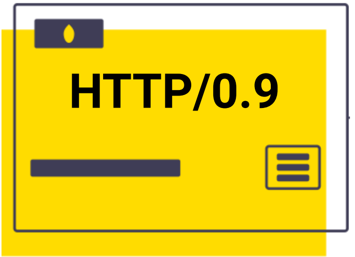
Network Layer

ARP, Ethernet



HTTP/0.9

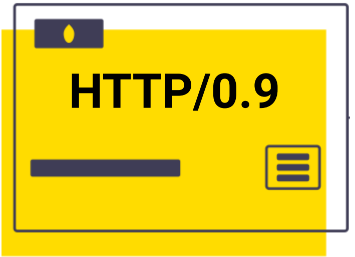
The one-line protocol



HTTP/0.9

The one-line protocol

```
GET /page.html
```

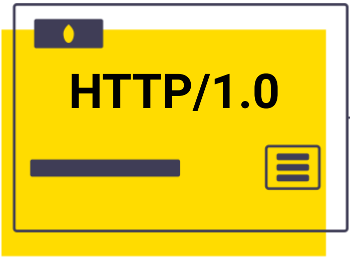


HTTP/0.9

The one-line protocol

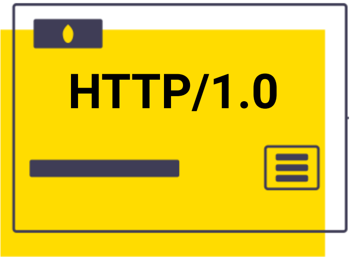
```
GET /page.html
```

```
<html>
A very simple HTML page
</html>
```



HTTP/1.0

Time to extend

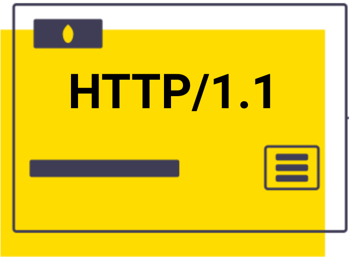


HTTP/1.0
Time to extend

```
GET /mypage.html HTTP/1.0
User-Agent: NCSA_Mosaic/2.0 (Windows 3.1)
```

```
200 OK
Date: Tue, 15 Nov 1994 08:12:31 GMT
Server: CERN/3.0 libwww/2.17
Content-Type: text/html
<HTML>
A page with an image
  <IMG SRC="/myimage.gif">
</HTML>
```

https://developer.mozilla.org/en-US/docs/Web/HTTP/Basics_of_HTTP/Evolution_of_HTTP



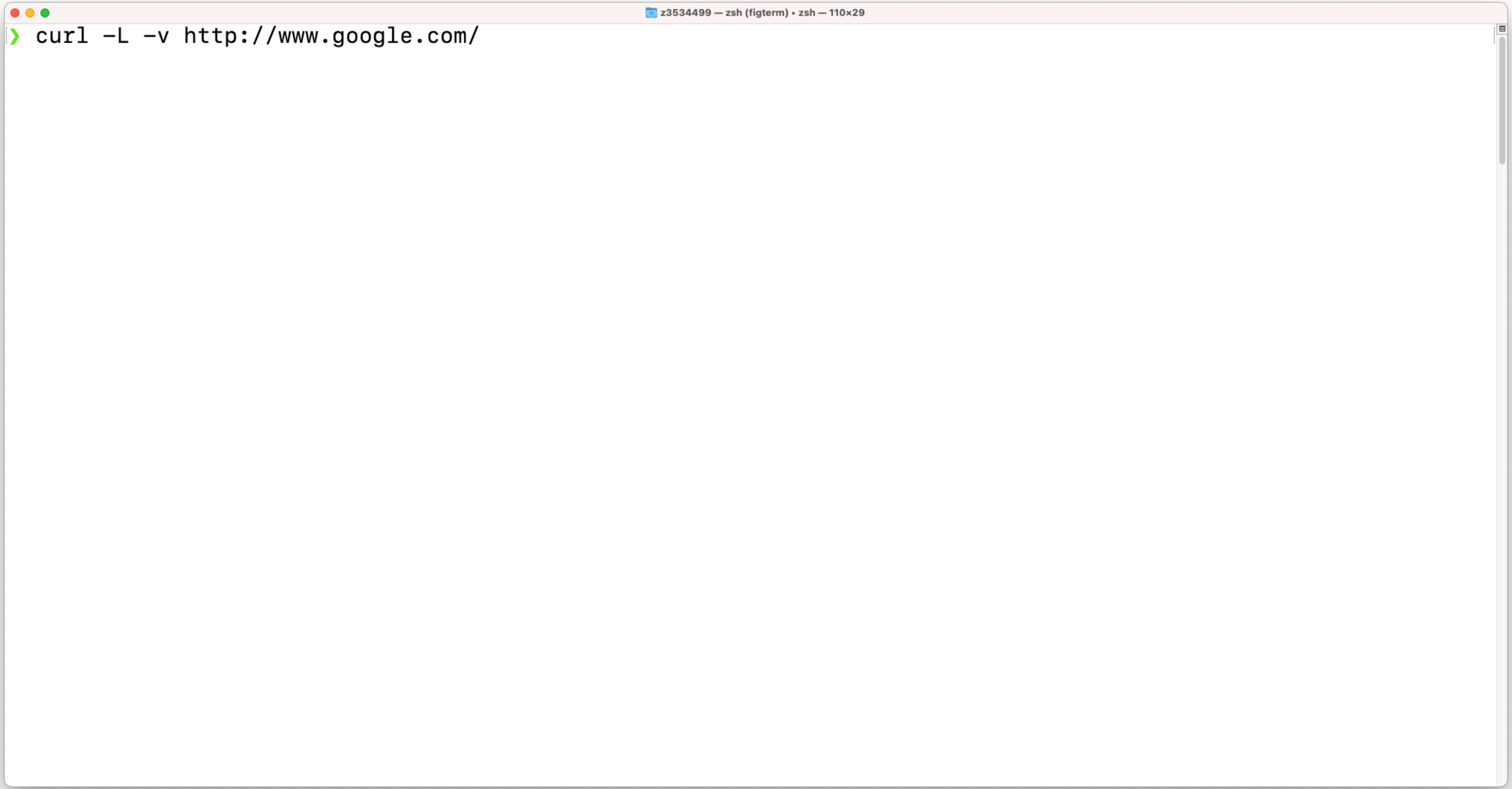
HTTP/1.1

Today's Protocol

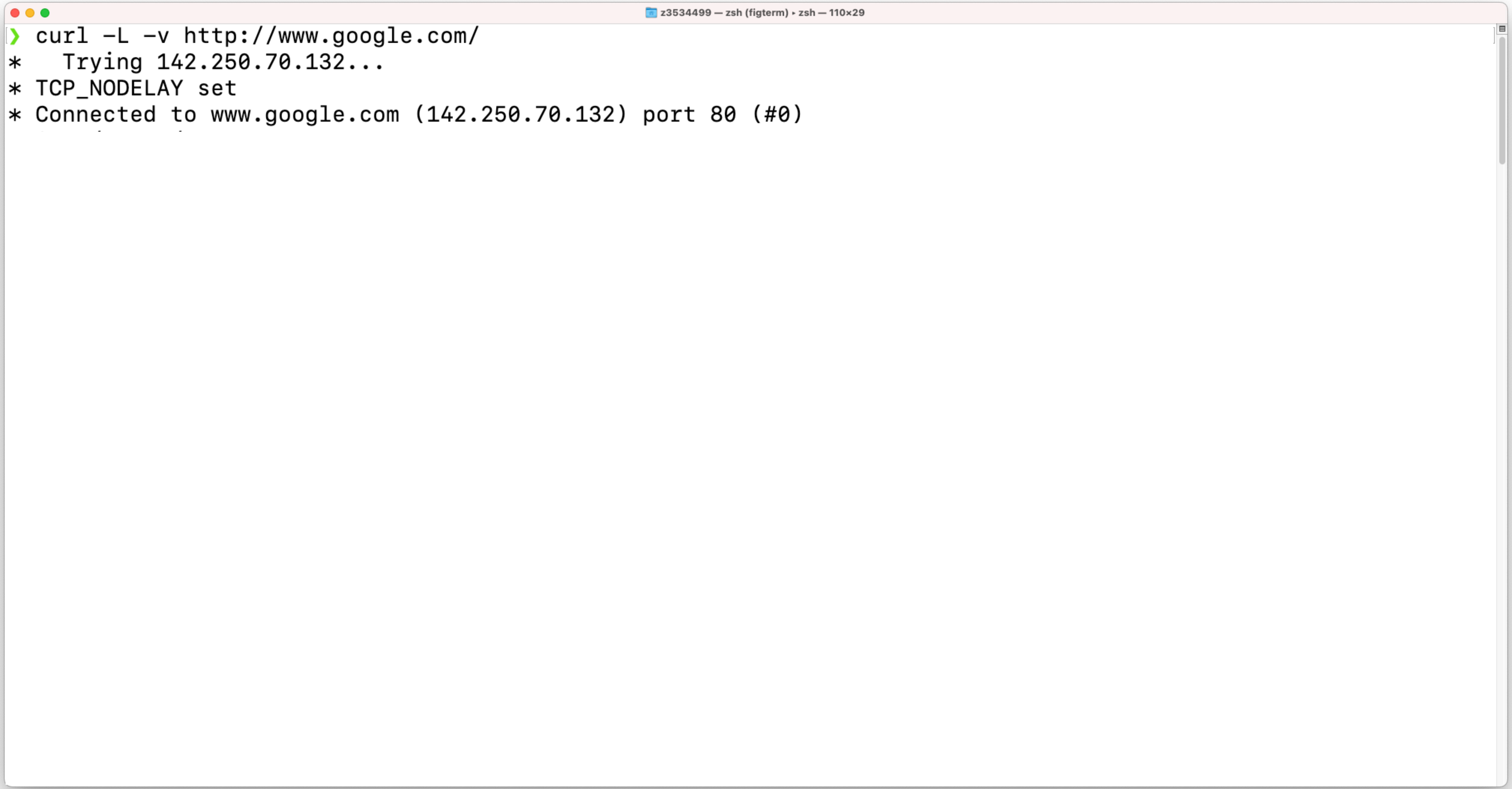
- Content Encoding
- Chunked Responses
- Host Header
- Cache Mechanisms
- Multi-requests

HTTP Request Body:

```
POST /endpoint_1 HTTP/1.1
User-Agent: Mozilla/5.0
…
{
  “key”: “value”
}
```



```
❯ curl -L -v http://www.google.com/
```



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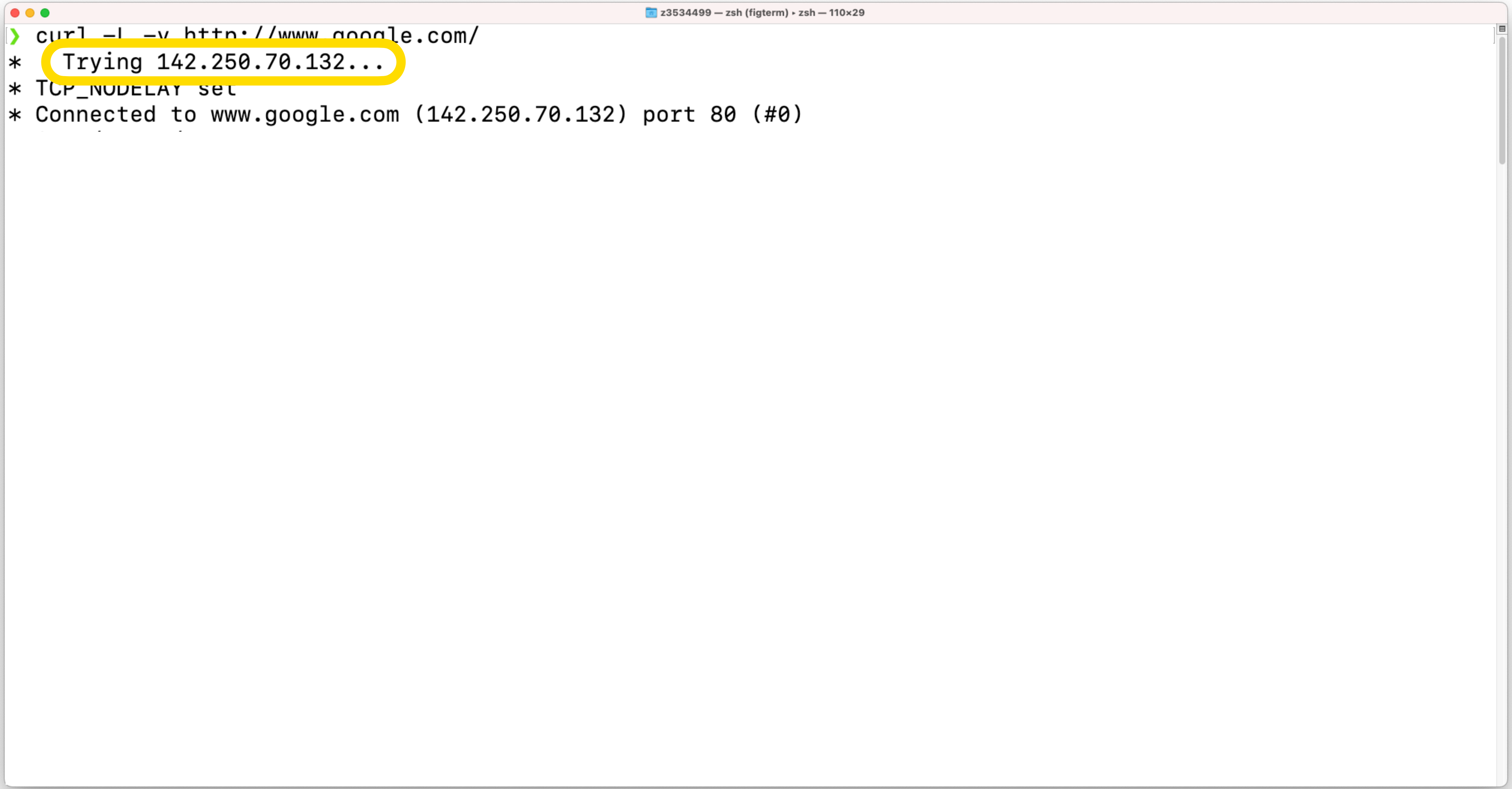
❯ curl -L -v http://www.google.com/
*   Trying 142.250.70.132...
* TCP_NODELAY set
* Connected to www.google.com (142.250.70.132) port 80 (#0)
```



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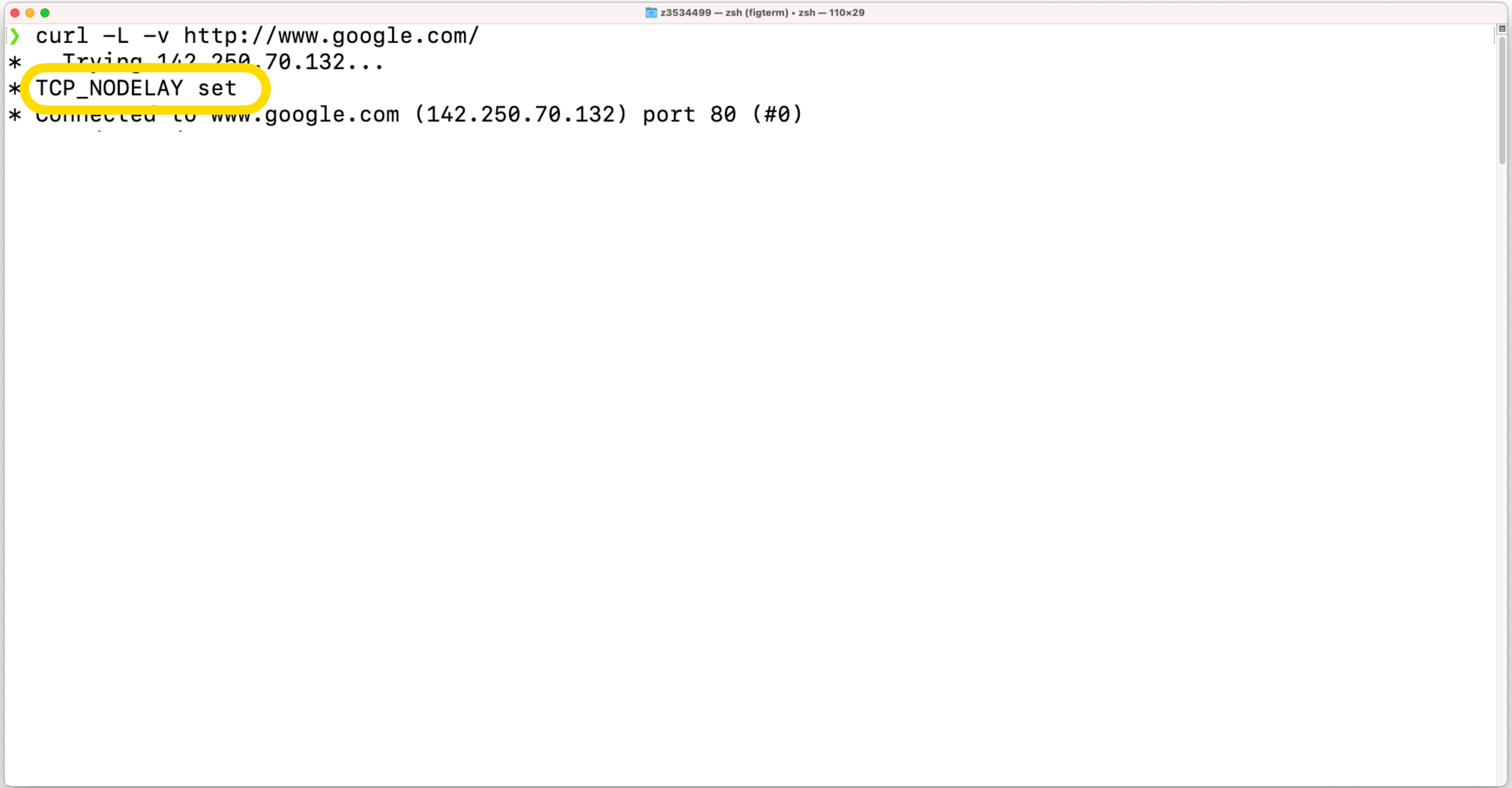

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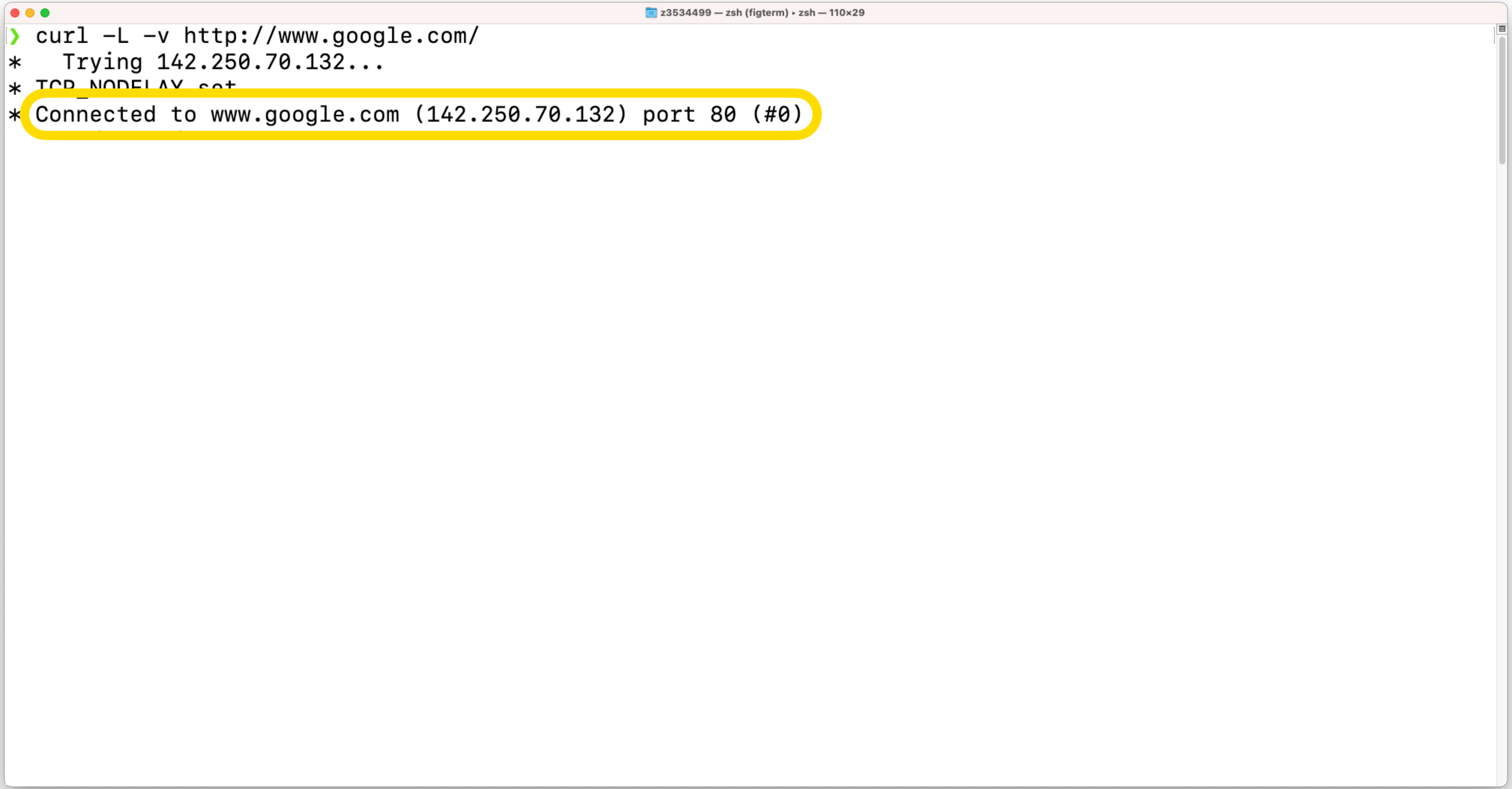

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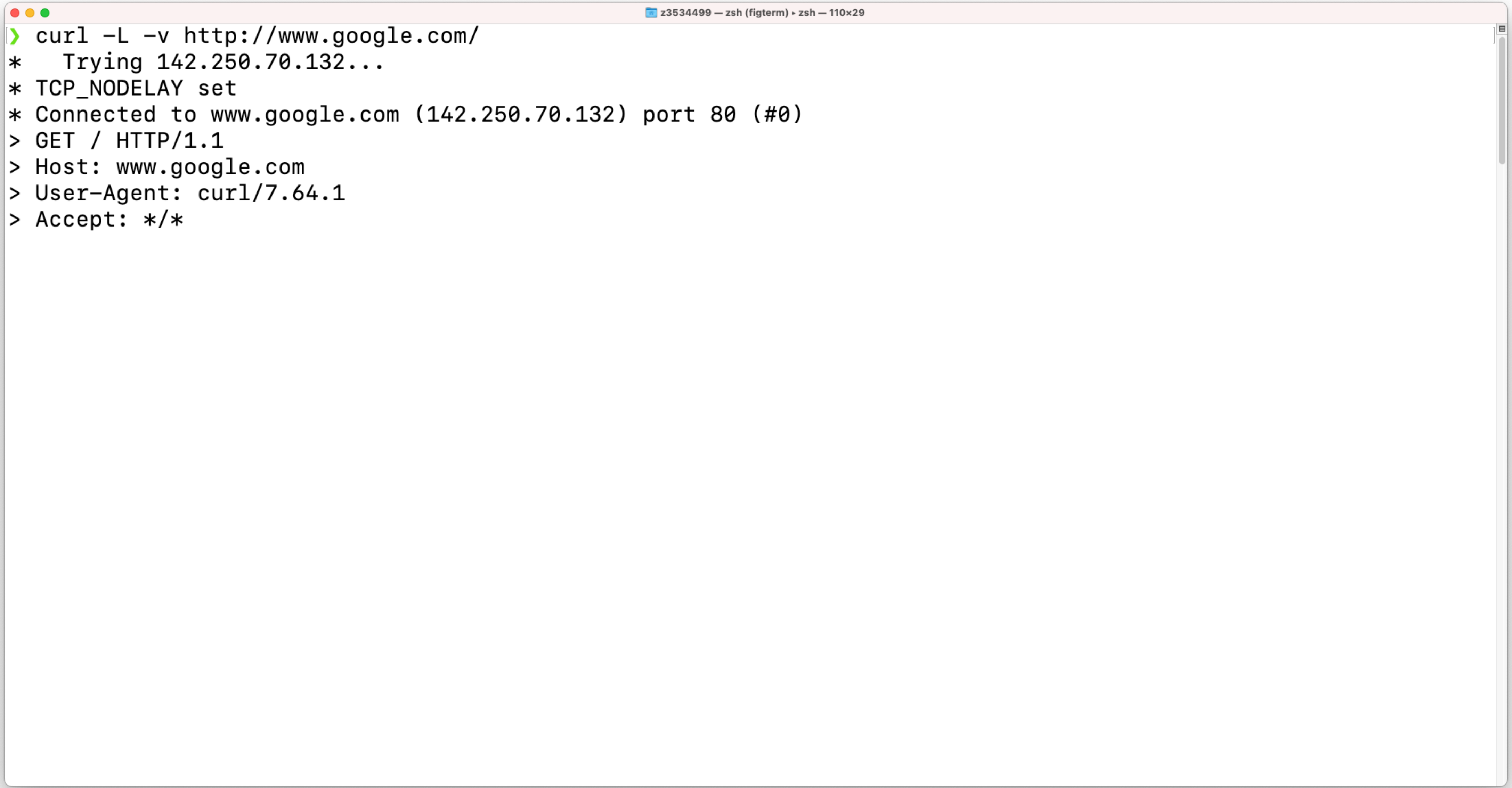

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> GET / HTTP/1.1
> Host: www.google.com
> User-Agent: curl/7.64.1
> Accept: */*
```

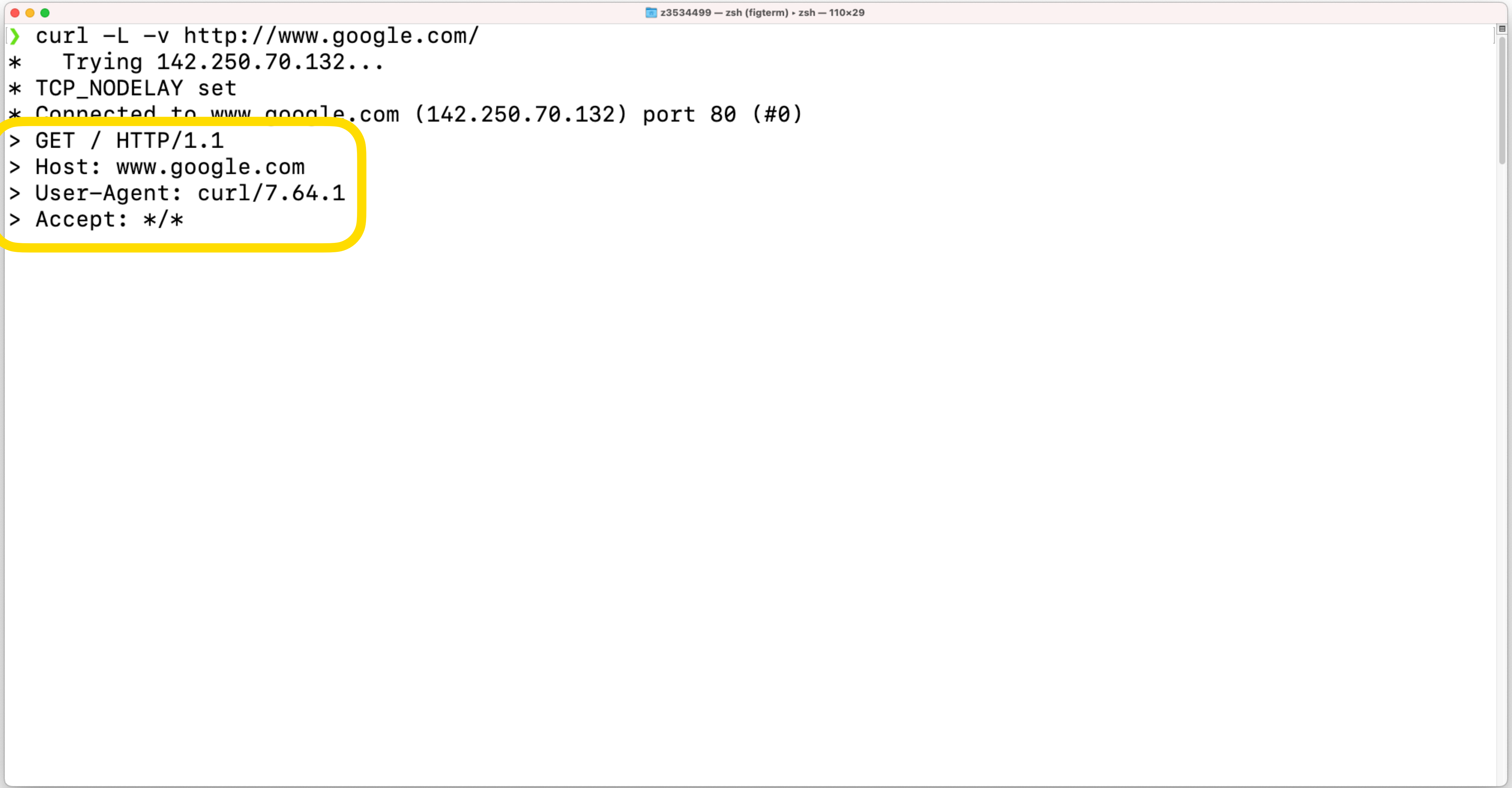

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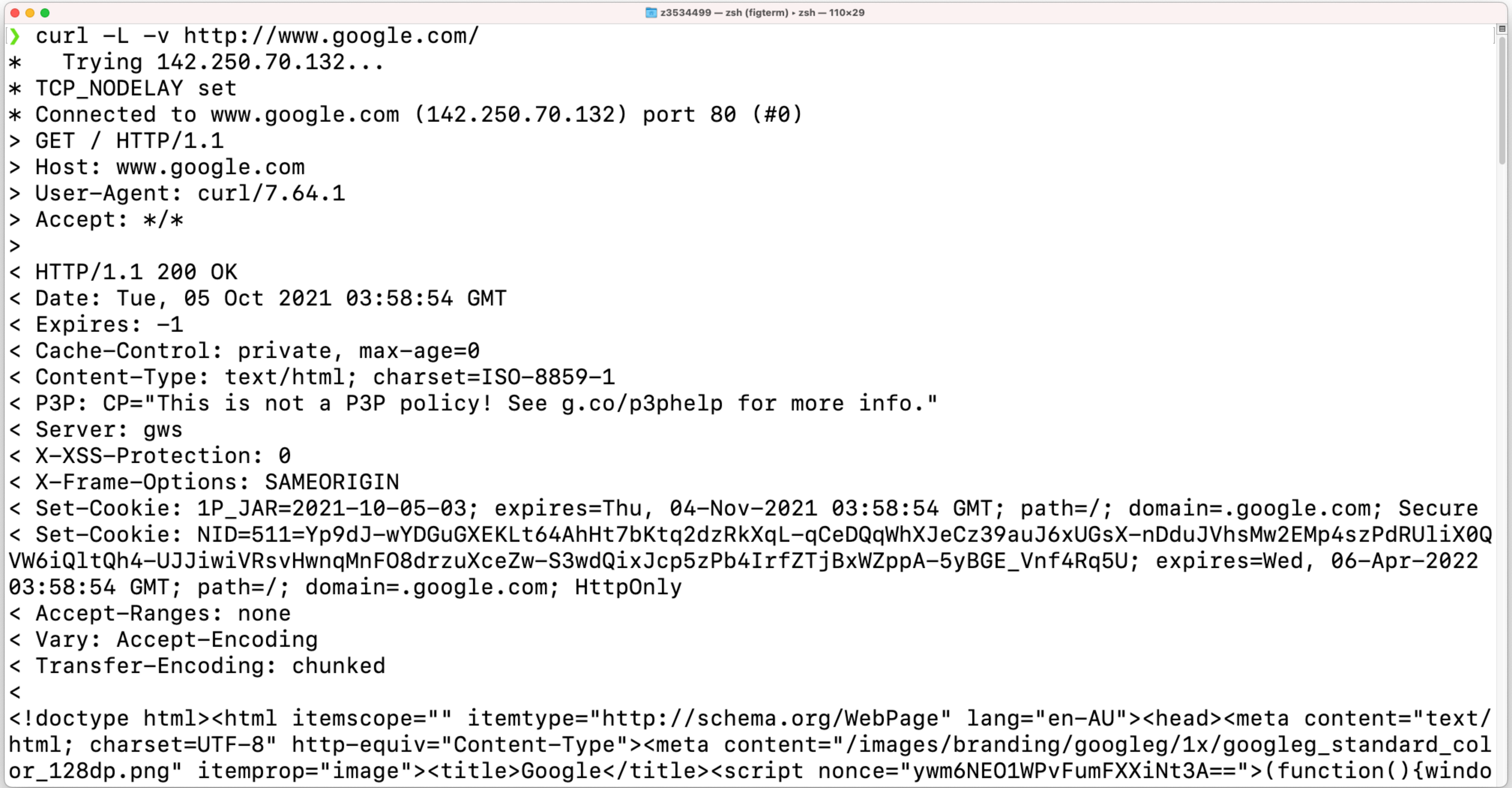

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> User-Agent: curl/7.64.1
> Accept: */*
>
< HTTP/1.1 200 OK
< Date: Tue, 05 Oct 2021 03:58:54 GMT
< Expires: -1
< Cache-Control: private, max-age=0
< Content-Type: text/html; charset=ISO-8859-1
< P3P: CP="This is not a P3P policy! See g.co/p3phelp for more info."
< Server: gws
< X-XSS-Protection: 0
< X-Frame-Options: SAMEORIGIN
< Set-Cookie: 1P_JAR=2021-10-05-03; expires=Thu, 04-Nov-2021 03:58:54 GMT; path=/; domain=.google.com; Secure
< Set-Cookie: NID=511=Yp9dJ-wYDGuGXEKLt64AhHt7bKtq2dzRkXqL-qCeDQqWhXJeCz39auJ6xUGsX-nDduJVhsMw2EMp4szPdRUliX0Q
VW6iQltQh4-UJJiwiVRsvHwnqMnFO8drzuXceZw-S3wdQixJcp5zPb4IrfZTjBxWZppA-5yBGE_Vnf4Rq5U; expires=Wed, 06-Apr-2022
03:58:54 GMT; path=/; domain=.google.com; HttpOnly
< Accept-Ranges: none
< Vary: Accept-Encoding
< Transfer-Encoding: chunked
<
<!doctype html><html itemscope="" itemtype="http://schema.org/WebPage" lang="en-AU"><head><meta content="text/
html; charset=UTF-8" http-equiv="Content-Type"><meta content="/images/branding/googleg/1x/googleg_standard_col
or_128dp.png" itemprop="image"><title>Google</title><script nonce="ywm6NEO1WPvFumFXXiNt3A==">(function(){windo
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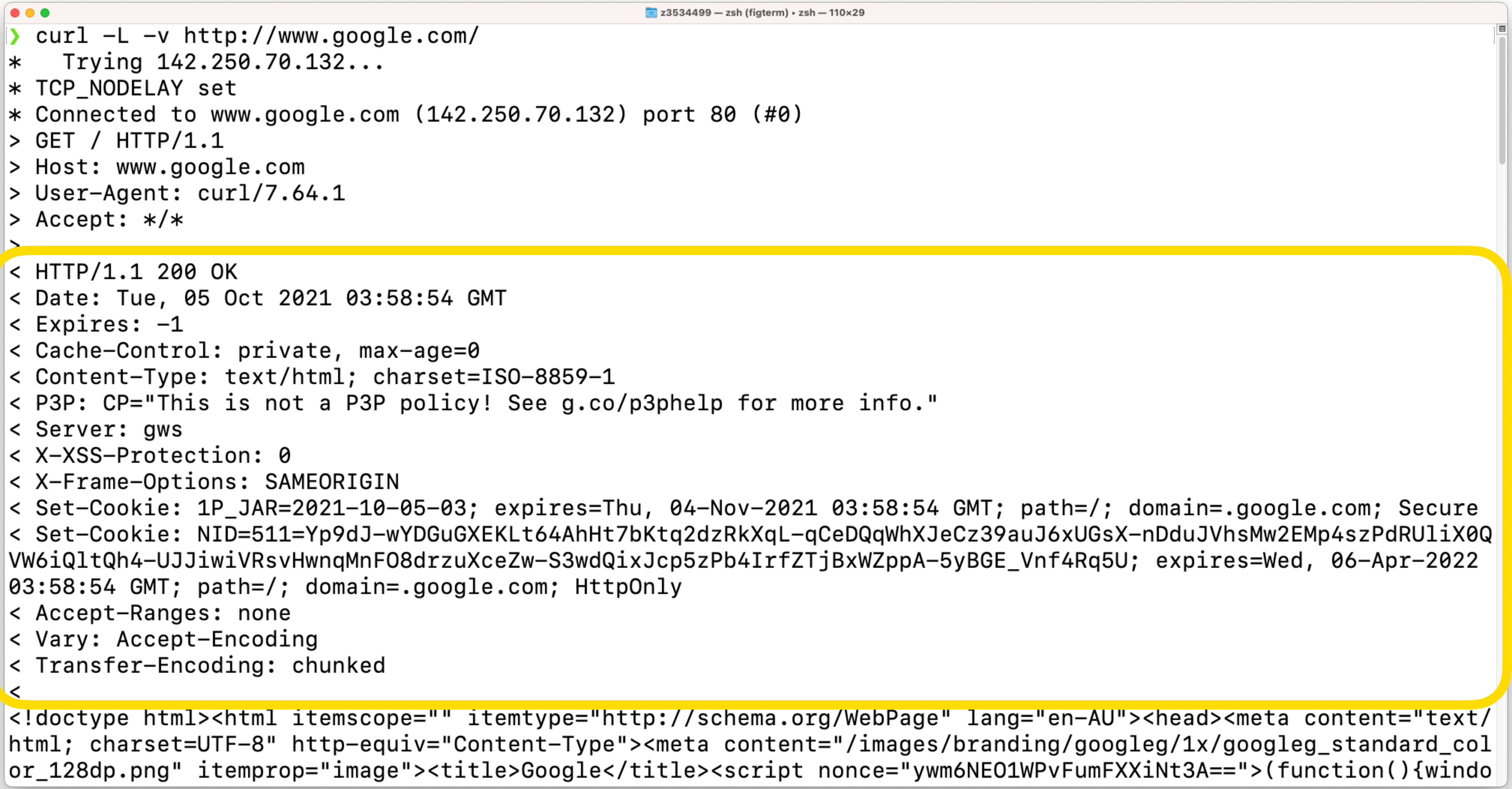

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VW6iQltQh4-UJJiwiVRsvHwnqMnFO8drzuXceZw-S3wdQixJcp5zPb4IrfZTjBxWZppA-5yBGE_Vnf4Rq5U; expires=Wed, 06-Apr-2022
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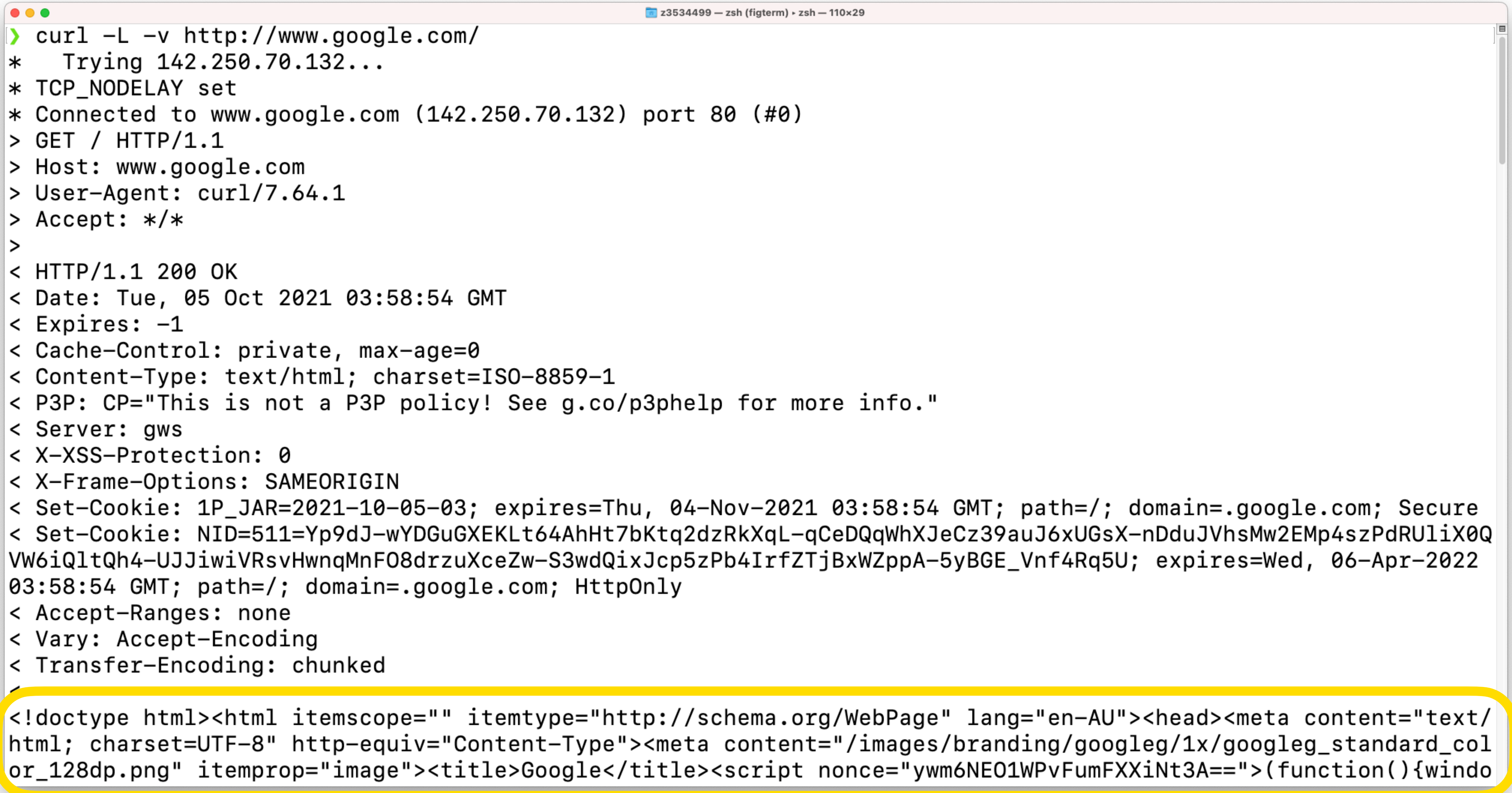

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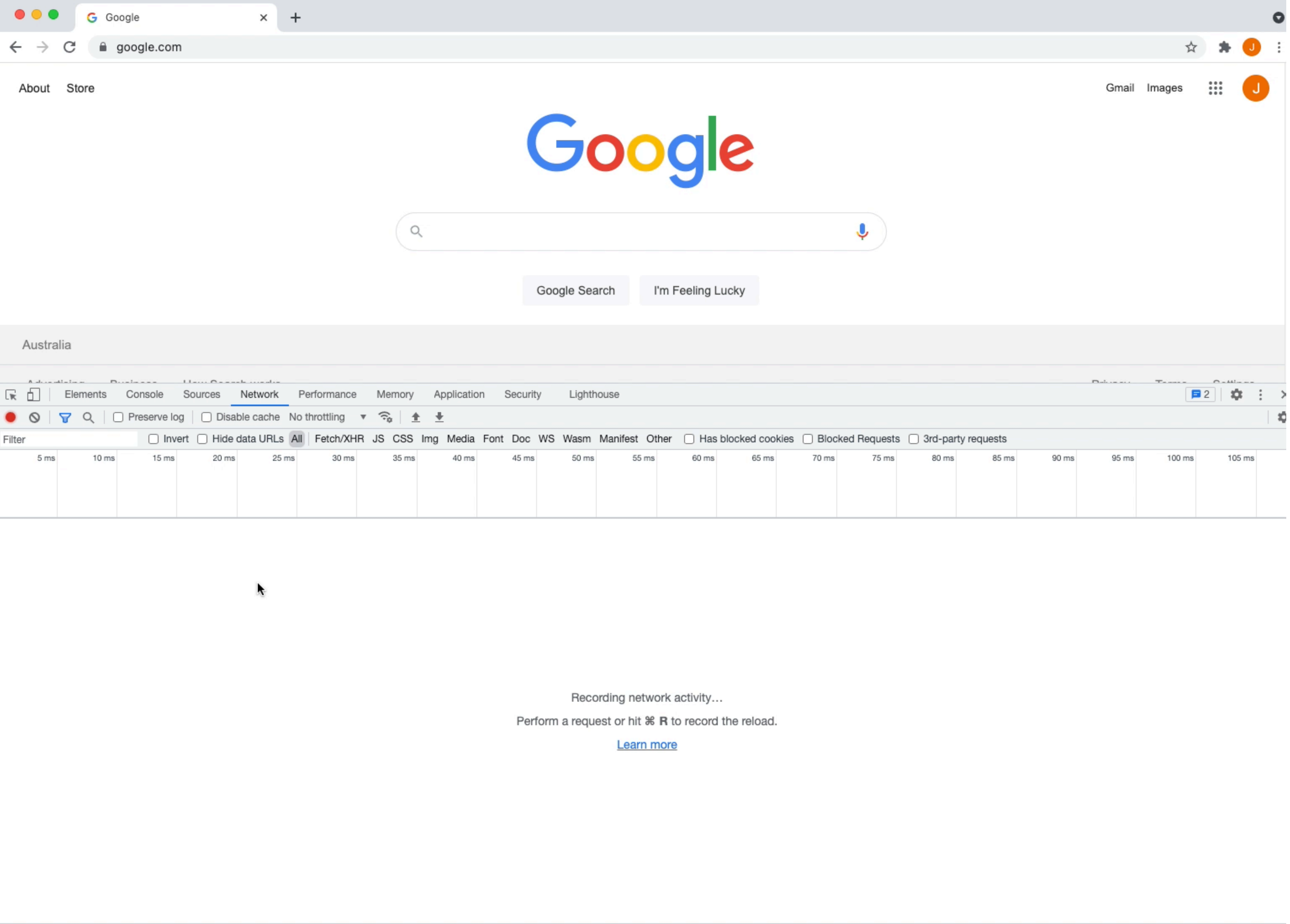


Recording network activity…

Perform a request or hit ⌘ R to record the reload.

Learn more

HTTP/2.0

HTTP/2.0
Performance

Server Push

HTTP/3.0

HTTP/3.0
QUIC

HTTP/2.0

HTTP/2.0
Performance

Server Push

HTTP/3.0

HTTP/3.0
QUIC (Doesn’t use TCP/IP)

Flask

web development,
one drop at a time

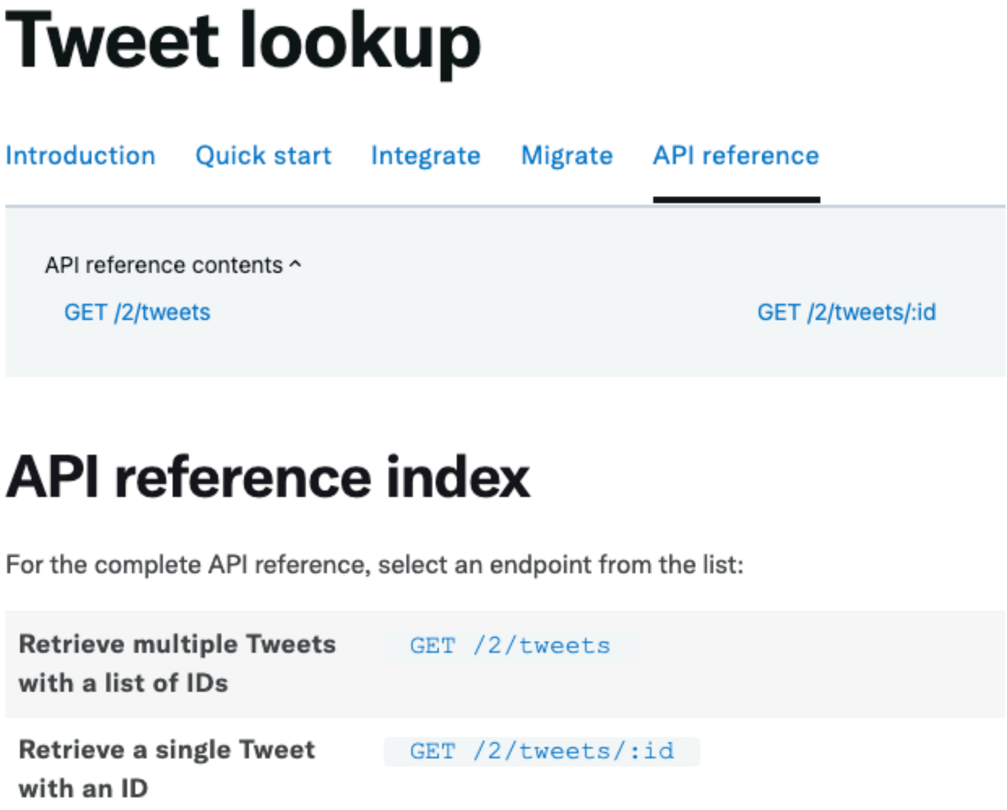
A Python Library for creating and handling HTTP requests.

Demo

APIs Application Programming Interface

- A specification of how a software system accessed programmatically.
- Many forms for APIs are around, such as RESTful web APIs, or software library APIs.

Twitter’s Web API



Tweet lookup

Introduction Quick start Integrate Migrate API reference

API reference contents ^

GET /2/tweets

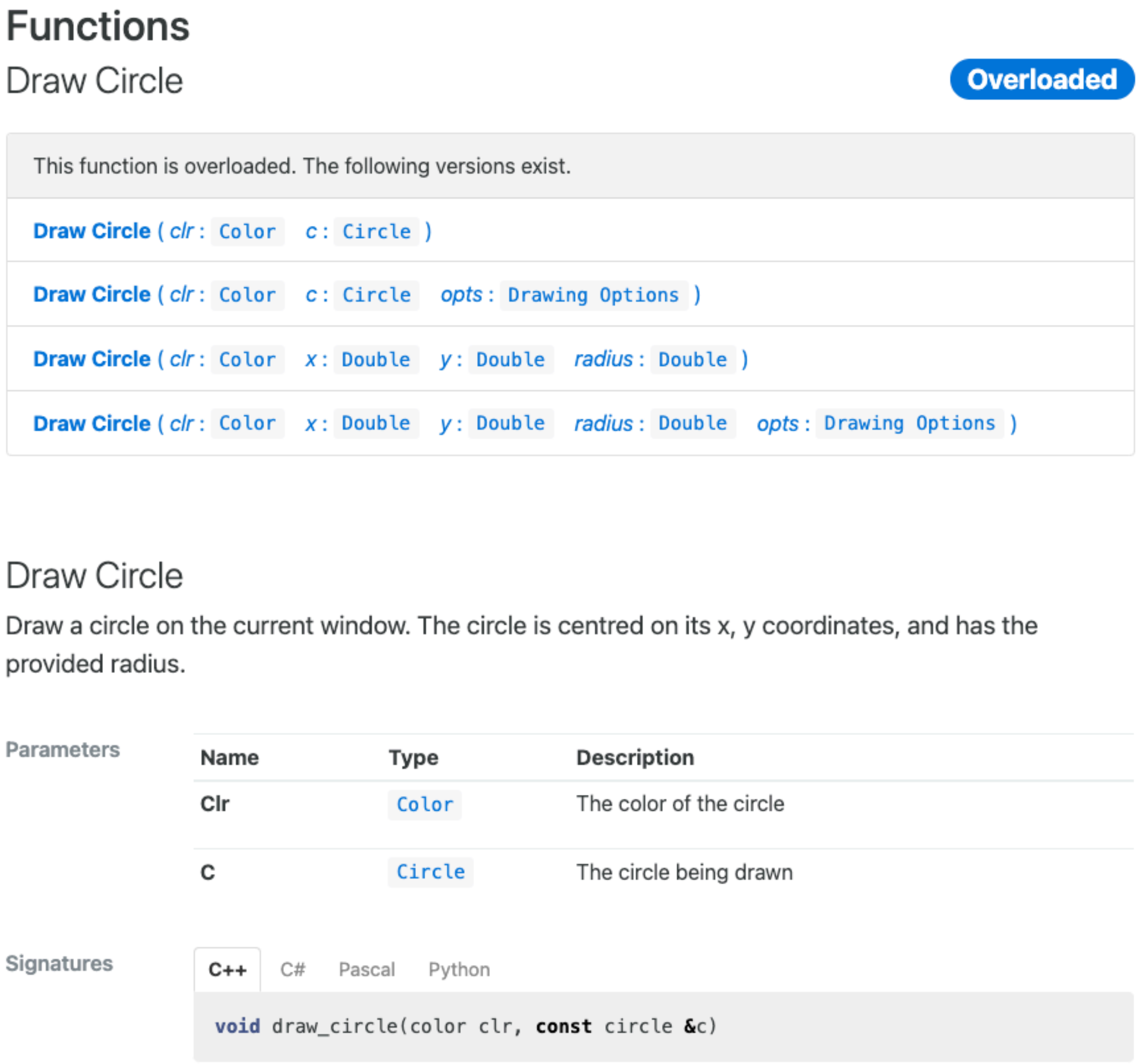
GET /2/tweets/:id

API reference index

For the complete API reference, select an endpoint from the list:

Retrieve multiple Tweets with a list of IDs	`GET /2/tweets`
Retrieve a single Tweet with an ID	`GET /2/tweets/:id`

APIs: Not just for the web



Functions

Draw Circle

This function is overloaded. The following versions exist.

Draw Circle (*clr* : `Color` *c* : `Circle`)

Draw Circle (*clr* : `Color` *c* : `Circle` *opts* : `Drawing Options`)

Draw Circle (*clr* : `Color` *x* : `Double` *y* : `Double` *radius* : `Double`)

Draw Circle (*clr* : `Color` *x* : `Double` *y* : `Double` *radius* : `Double` *opts* : `Drawing Options`)

Draw Circle

Draw a circle on the current window. The circle is centred on its x, y coordinates, and has the provided radius.

Parameters

Name	Type	Description
Clr	`Color`	The color of the circle
C	`Circle`	The circle being drawn

Signatures

```
void draw_circle(color clr, const circle &c)
```

RESTful APIs

(representational state transfer)

Method	**Operation**
POST	**C**reate
GET	**R**ead
PUT	**U**pdate
DELETE	**D**elete

RESTful APIs

(representational state transfer)

```
GET /heroes

GET /heroes/<id>

DELETE /all_heroes

POST /heroes
{“name”: “superman”}

GET /heroes/<id>
```

RESTful APIs

(representational state transfer)

Heroes Demo

Wrapping Iteration 1

Wrapping Iteration 1

```
def channels_listall_v1():
    return datastore.get_all_channels()
```

Wrapping Iteration 1

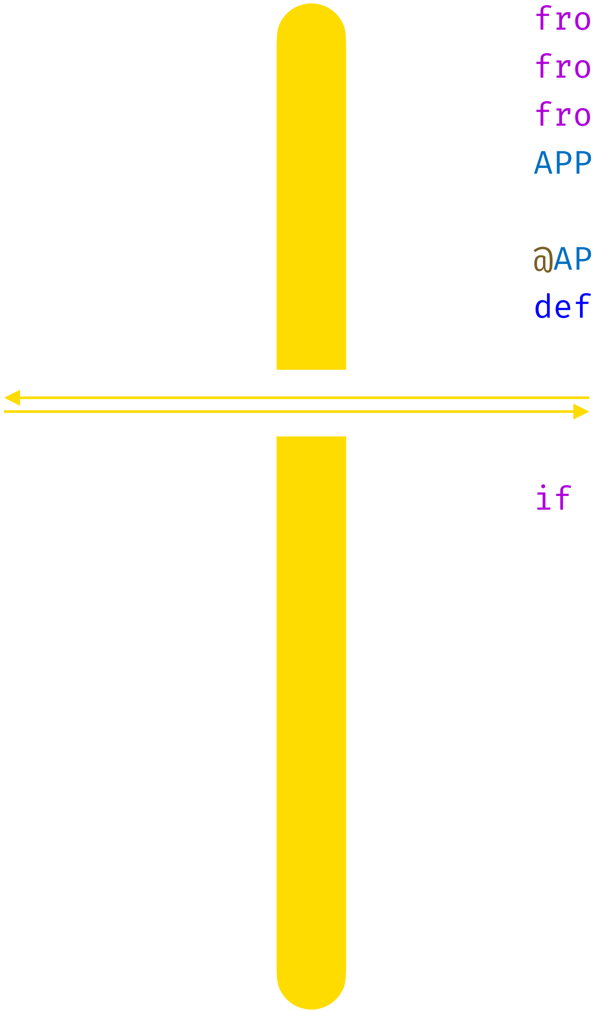
```python
def channels_listall_v1():
    return datastore.get_all_channels()
```

```python
from json import dumps
from flask import Flask, request
from search import search_fn
APP = Flask(__name__)

@APP.route('/channels', methods=['GET'])
def search_channels():
    # check auth
    return dumps(channels_listall_v1())

if __name__ == '__main__':
    APP.run()
```

Wrapping Iteration 1



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```

Wrapping Iteration 1

```python
def channels_listall_v1():
    return datastore.get_all_channels()


def __some_other_function():
    return {
        # can’t be called from API directly
    }
```

```python
from json import dumps
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Q&A

- When should request data be in the query string, or the request body? Does it matter?

Feedback