

# The Web, APIs, & Data

Creating with **WEB** APIs

What is the **WEB**?



WIKIPEDIA  
The Free Encyclopedia

## World Wide Web

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The World Wide Web (WWW) is an information space where documents and other web resources are identified by URLs, interlinked by hypertext links, and can be accessed via the Internet.[1]... It has become known simply as the Web... The World Wide Web was central to the development of the Information Age and is the primary tool billions of people use to interact on the Internet.[2][3][4]



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# HTTP



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# Hyper Text Transfer Protocol

So how does it work?



# WORLD WIDE WEB

---

**CLIENT**



**SERVER**



# WORLD WIDE WEB

---

**CLIENT**



Request



**SERVER**



# WORLD WIDE WEB

---

**CLIENT**



Request



Response

**SERVER**



# WORLD WIDE WEB

---

**CLIENT**



**FRONTEND**

Request



Response

**HTTP**

**SERVER**



**BACKEND**

# WORLD WIDE WEB

---

**CLIENT**



**FRONTEND**

**SOME FILES**

Request



Response



**HTTP**

**GET/POST**

**SERVER**



**BACKEND**

**ALL THE FILES!!!**

# THE BACKEND

---

# THE BACKEND

---

**HOST**  
Computer + OS



Heroku,  
DreamHost, Local

# THE BACKEND

---

## HOST

Computer + OS



NYU, Heroku,  
DreamHost, Local

## SERVER

Code + Application Files



Apache - PHP, Python - Flask,  
Ruby - Sinatra, Node.js - Express  
+ .html, .css, + .js files



# THE BACKEND

---

## HOST

Computer + OS



NYU, Heroku,  
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## SERVER

Code + Application Files



Apache - PHP, Python - Flask,  
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+ .html, .css, + .js files

## DATABASE

Data Files + Query Language



ORM, non-ORM  
mySQL, mongo  
SQL, mongoose  
tables, XML, JSON

What is an **API**?

# Application Programming Interface

*A set of requirements that govern how one application can talk to another*

# PROCESSING API



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[Foundation](#)

[Shop](#)

[» Forum](#)

[» GitHub](#)

[» Issues](#)

[» Wiki](#)

[» FAQ](#)

[» Twitter](#)

[» Facebook](#)

**Reference.** The Processing Language was designed to facilitate the creation of sophisticated visual structures.

## Structure

() (parentheses)  
, (comma)  
. (dot)  
/\* \*/ (multiline comment)  
/\*\* \*/ (doc comment)  
// (comment)  
; (semicolon)  
= (assign)  
[] (array access)  
{ } (curly braces)  
catch  
class  
draw()  
exit()  
extends  
false  
final  
implements  
import  
loop()  
new  
noLoop()  
null  
popStyle()  
private  
public  
pushStyle()  
redraw()  
return  
setup()  
static  
super  
this  
true  
try  
void

## Environment

## Shape

createShape()  
loadShape()  
PShape  
  
2D Primitives  
arc()  
ellipse()  
line()  
point()  
quad()  
rect()  
triangle()  
  
Curves  
bezier()  
bezierDetail()  
bezierPoint()  
bezierTangent()  
curve()  
curveDetail()  
curvePoint()  
curveTangent()  
curveTightness()  
  
3D Primitives  
box()  
sphere()  
sphereDetail()  
  
Attributes  
ellipseMode()  
noSmooth()  
rectMode()  
smooth()  
strokeCap()  
strokeJoin()  
strokeWeight()

## Color

Setting  
background()  
clear()  
colorMode()  
fill()  
noFill()  
noStroke()  
stroke()  
  
Creating & Reading  
alpha()  
blue()  
brightness()  
color()  
green()  
hue()  
lerpColor()  
red()  
saturation()

## Image

createImage()  
PImage  
  
Loading & Displaying  
image()  
imageMode()  
loadImage()  
noTint()  
requestImage()  
tint()

## Textures

texture()  
textureMode()  
textureWrap()

# MENU ANALOGY



# API LANDSCAPE

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OS API - cut and paste from Adobe Illustrator to MS Word

DEVICE API - access accelerometer data

FRAMEWORK API - use Processing functions to execute Java

SERVICE API - use twilio to facilitate web to phone communication

RESOURCE API - embed a Google map on a web page

DATA API - return a list of images from Flickr

API FOR APIs - use the temboo SDK to access 100+ APIs

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**“Public Web” APIs**

## PUBLIC WEB APIs

URLs that give access to data and resources from a public server



## PUBLIC WEB APIs

**URLs** that give access to data and resources from a public server

<http://api.nyu.edu/courses/mashups>

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**URLs** that give access to data and resources from a public server

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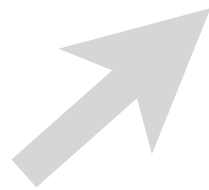


Network Protocol

## PUBLIC WEB APIs

**URLs** that give access to data and resources from a public server

http://[api.nyu.edu/courses/mashups](http://api.nyu.edu/courses/mashups)



Network Protocol



Host Name/Address  
(IP - DNS)

## PUBLIC WEB APIs

**URLs** that give access to data and resources from a public server

http://api.nyu.edu/courses/mashups

Network Protocol

Host Name/Address  
(IP - DNS)

File/Resource Location  
uri / route / path / endpoint

## PUBLIC WEB APIs

URLs that give access to **data and resources** from a public server

<http://api.nyu.edu/courses/mashups>



```
{  
  "school" : "NYUAD",  
  "dept" : "Interactive Media",  
  "level" : "undergraduate",  
  "instructor" : "Craig Protzel",  
  "units" : 4  
}
```

# JSON - JavaScript Object Notation

```
var mashups = {  
  "school" : "NYUAD",  
  "dept" : "Interactive Media",  
  "level" : "undergraduate",  
  "instructor" : "Craig Protzel",  
  "units" : 4  
}
```

## API DATA

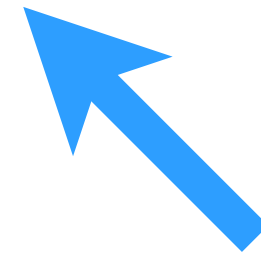
---

<http://api.nyu.edu/courses/mashups?year=2016&semester=fall>

# API DATA

---

<http://api.nyu.edu/courses/mashups?year=2016&semester=fall>



**Parameters**

query params



<http://api.nyu.edu/courses/mashups?year=2016&semester=fall>



```
{
  "school" : "NYUAD",
  "dept" : "Interactive Media",
  "level" : "undergraduate",
  "instructor" : "Craig Protzel",
  "units" : 4,
  "location" : "C3 Room 029",
  "schedule": [
    {
      "day" : "Tuesday",
      "time" : 1440,
      "duration" : 75
    },
    {
      "day" : "Thursday",
      "time" : 1440,
      "duration" : 160
    }
  ]
}
```

<http://openweathermap.org/>

# ESSA BAGEL ANALOGY





# ESSA BAGEL ANALOGY

**ESSA BAGEL “NORMAL” BIZ**





# ESSA BAGEL ANALOGY

ESSA BAGEL API

ESSA BAGEL “NORMAL” BIZ



# MORE EXAMPLES



# OPEN API SPECTRUM

---

URL ONLY

HealthCare.gov

URL + KEY



The New York Times

URL + KEY *or*  
URL + KEY + AUTHENTICATION

Instagram



URL + KEY + AUTHENTICATION





# OPEN API SPECTRUM

---

URL ONLY

HealthCare.gov

URL + KEY



The New York Times

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Instagram



URL + KEY + AUTHENTICATION





IN ACTION

---

<http://howmanypeopleareinspacerightnow.com>

# MASHUPS FLOW

---

# MASHUPS FLOW

---

1)



Client

**REQUEST** - spacemashup.com



SpaceMashup Server  
(local)

# MASHUPS FLOW

---

1)



Client

**REQUEST** - spacemashup.com



SpaceMashup Server  
(local)

2)



Client

**RESPONSE** - HTML, CSS, JS, & media



SpaceMashup Server  
(local)

# MASHUPS FLOW

1)



Client

**REQUEST** - spacemashup.com



SpaceMashup Server  
(local)

2)



Client

**RESPONSE** - HTML, CSS, JS, & media



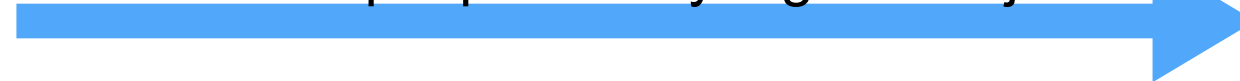
SpaceMashup Server  
(local)

3)



Client

**REQUEST**- api.open-notify.org/astros.json



Open-Notify Server

# MASHUPS FLOW

