Introduction to Web, API and Microservice

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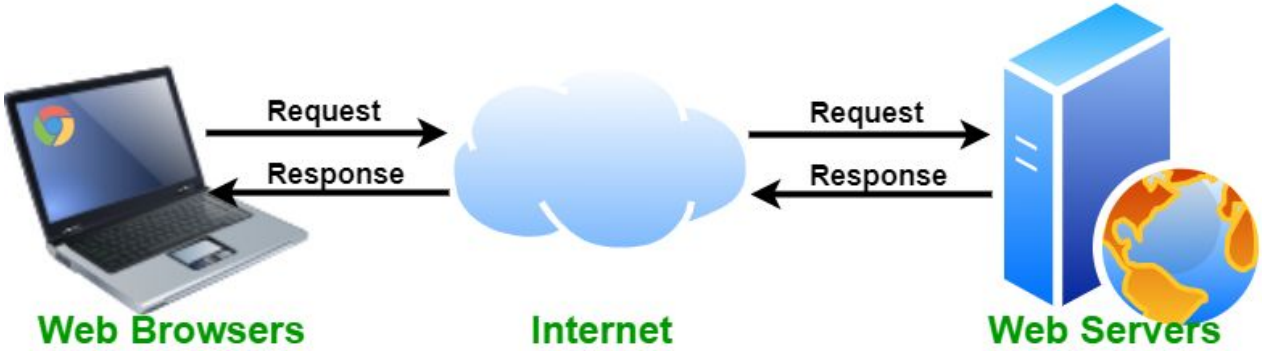
https://docs.google.com/presentation/d/10sS9TjDu87PfTU88C94sjSrGL5PeIHPxii0nKNlrk1w/edit#slide=id.p4

Outline

- **Web Basics**
- Web Pages vs Web Services
- Microservices

Web Server

- Web Server is a computer which runs web server software and serves web component.
  - It is always up and running
  - Its software accepts requests and response with data
  - It communicates with other entity in the network using HTTP



https://www.geeksforgeeks.org/web-server-and-its-type/

HTTP - Hypertext Transfer Protocol

`GET /AFCD8h`

HTTP

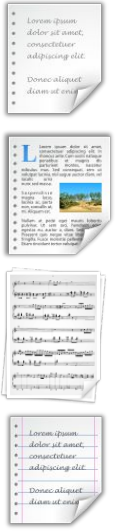
Request

Browser

Request for a document/resource made by client

Server **respond** by returning the resource

Web Server



Response

`200 OK`

HTTP

- HyperText Transfer Protocol (HTTP) is the communication protocol over the internet
  - Allows computers on the WWW to communicate with each other.
- HTTPS
  - The HTTPS is the secured version of HTTP, i.e. communication between server and browser are encrypted

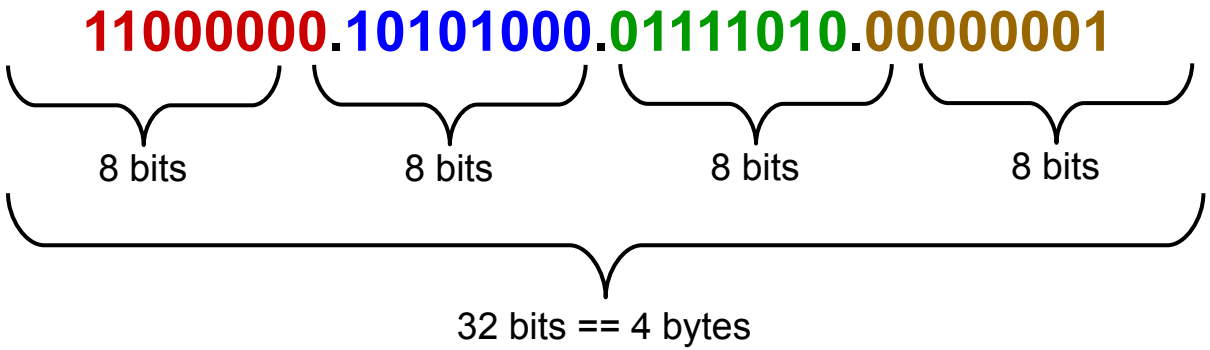
Web Browsers

- Web browsers are the most common clients which interact with web servers.
  - It sends requests to server
  - It displays web content in HTML format

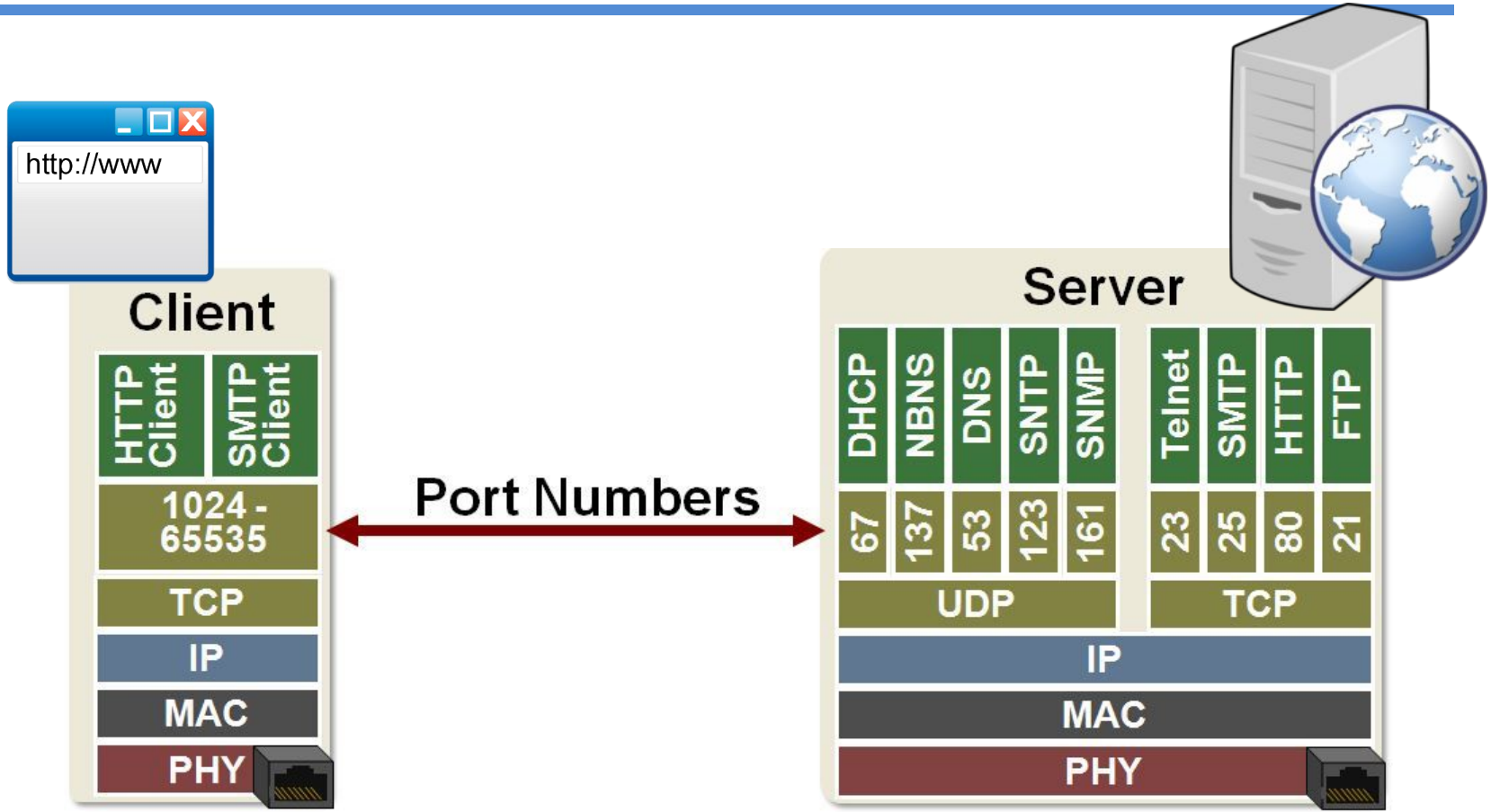
IP Addresses

- Unique identifiers assigned to any device that connects to the Internet
  - Usually assigned by the network provider that you connect to

192 . 168 . 122 . 1



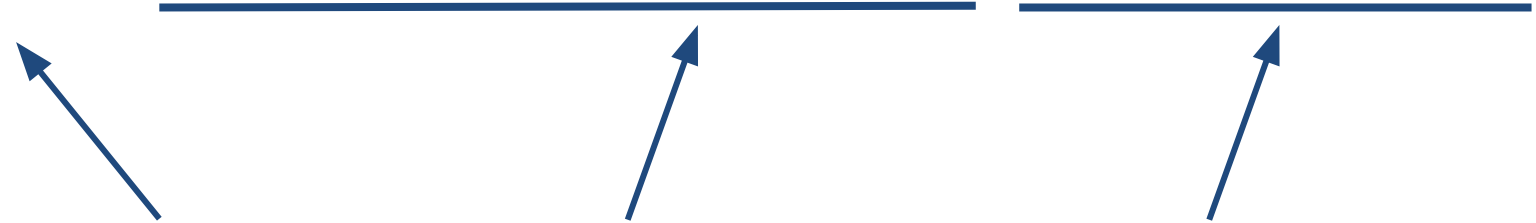
Port Numbers



URL

- URL is a web address pointing to a web resource in a server.

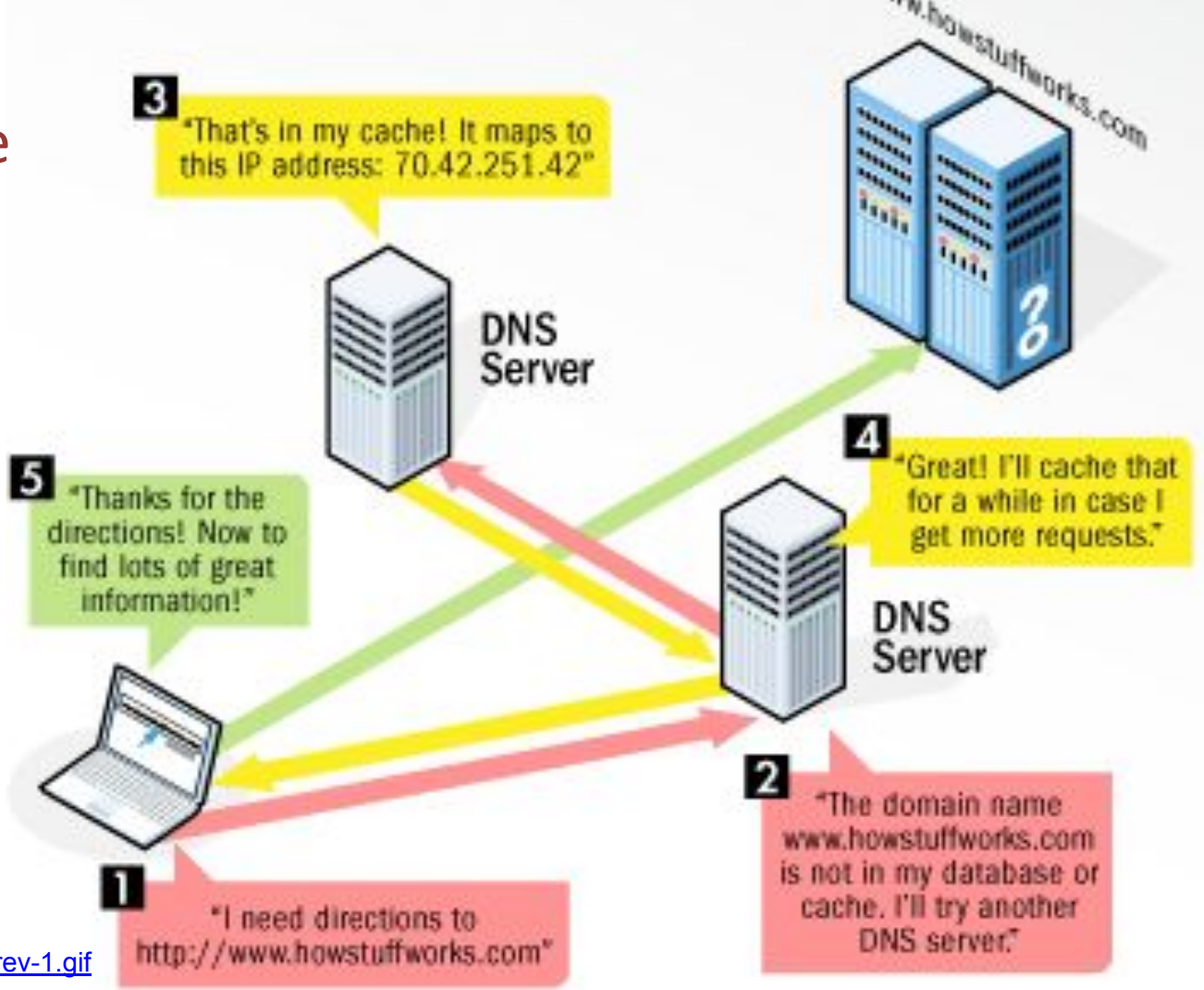
`https://www.howstuffworks.com/web-server.htm`



Domain Name Resolution

- Servers are identified by IP address and port
- We commonly use server name instead of IP address directly
  - Easier for user to remember
  - Flexible for change server, thus change IP
- Clients first need to find out IP address of server through Domain Name Services (DNS)

- Where is the server?

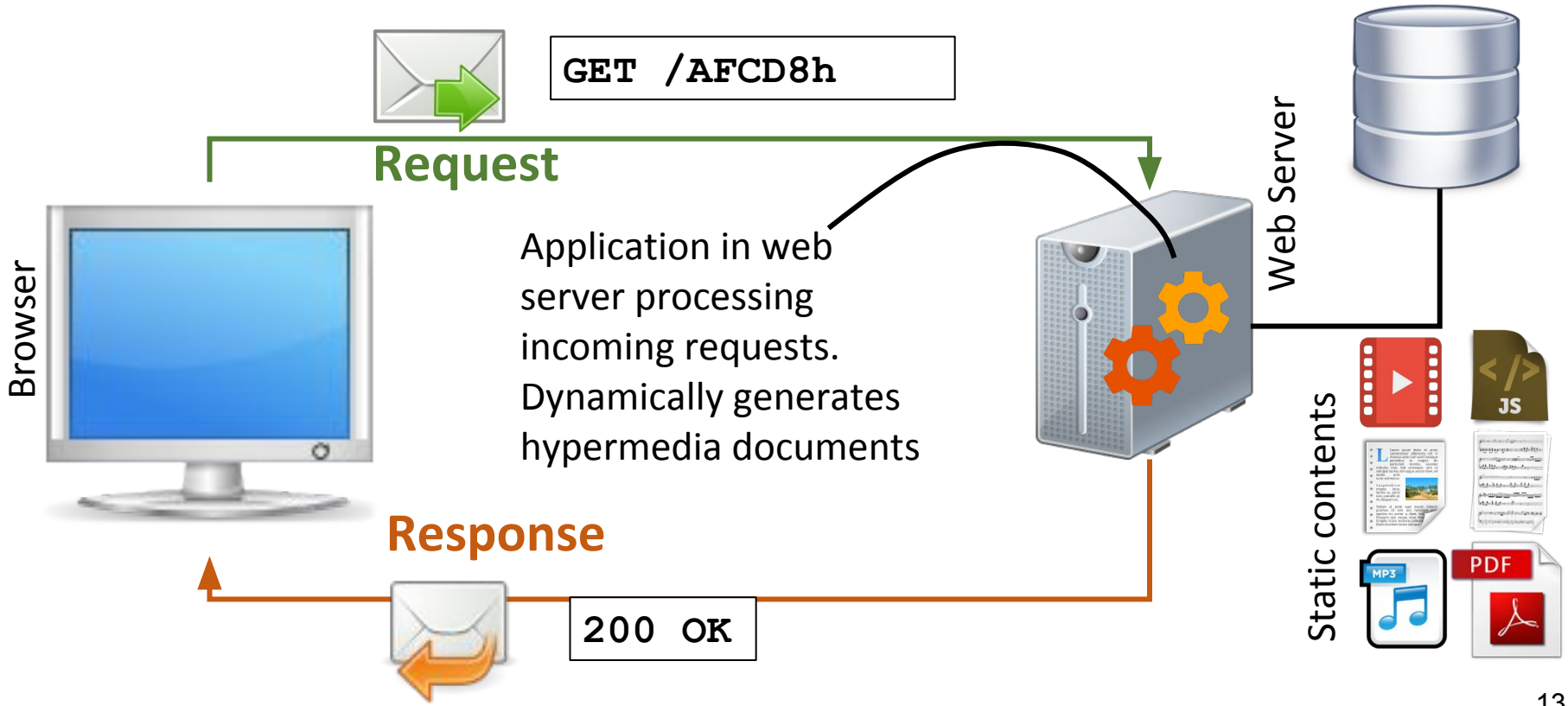


https://commons.wikimedia.org/wiki/File:Dns-rev-1.gif

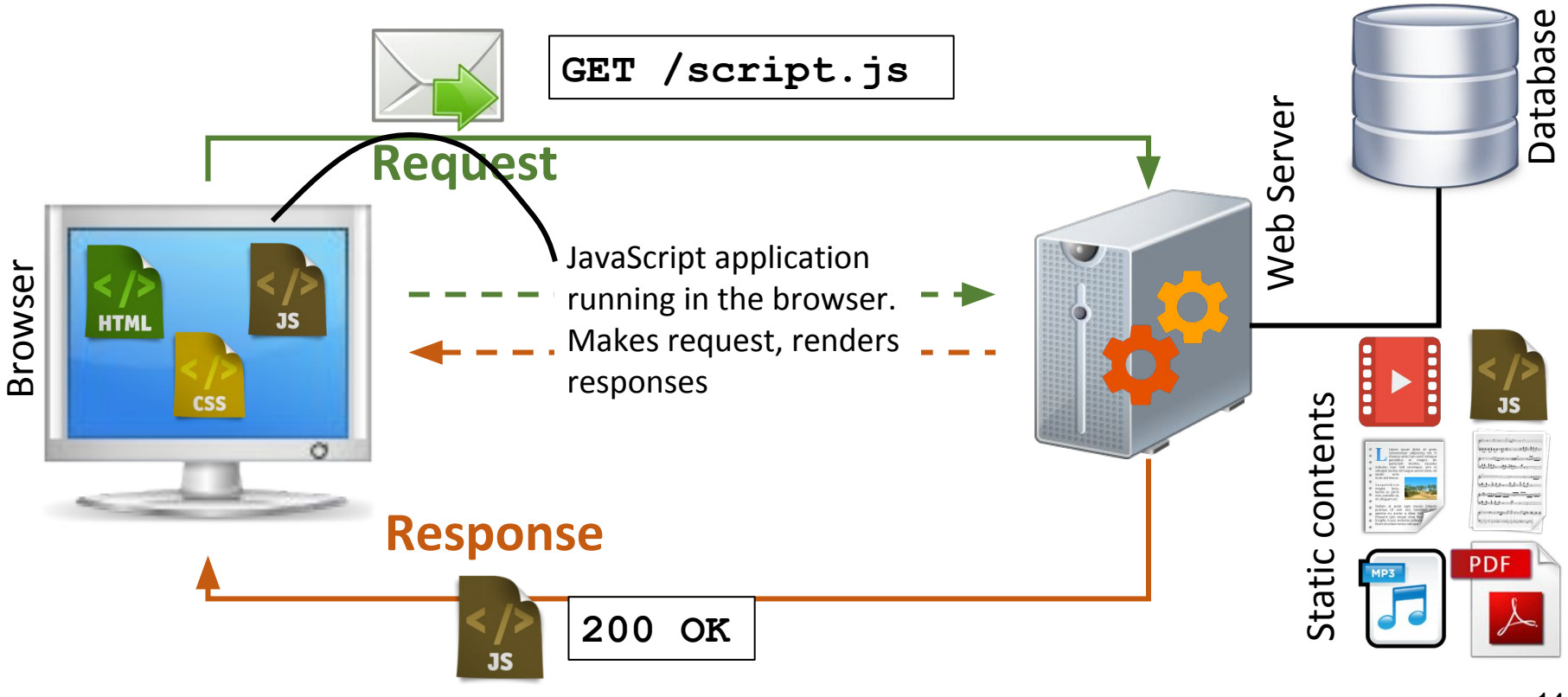
Static vs Dynamic Content

- Web server can serve either static or dynamic content.
- Static Content
  - Contents are stored in file in server. The file is served as it is.
  - Files are commonly stored in HTML format.
- Dynamic Content
  - Server generates or processes the content on the fly upon requests.
  - Sometimes the content will be further processed in the client.
  - It is commonly done by scripting languages, e.g. ASP, JSP, PHP

Web Applications



HTML5 Application



Outline

- Web Basics
- **Web Pages vs Web Services**
- Microservices

Web Apps vs Web Services

Web Browsers

Request

HTML Code

Web Apps

Apps and Programs

Request

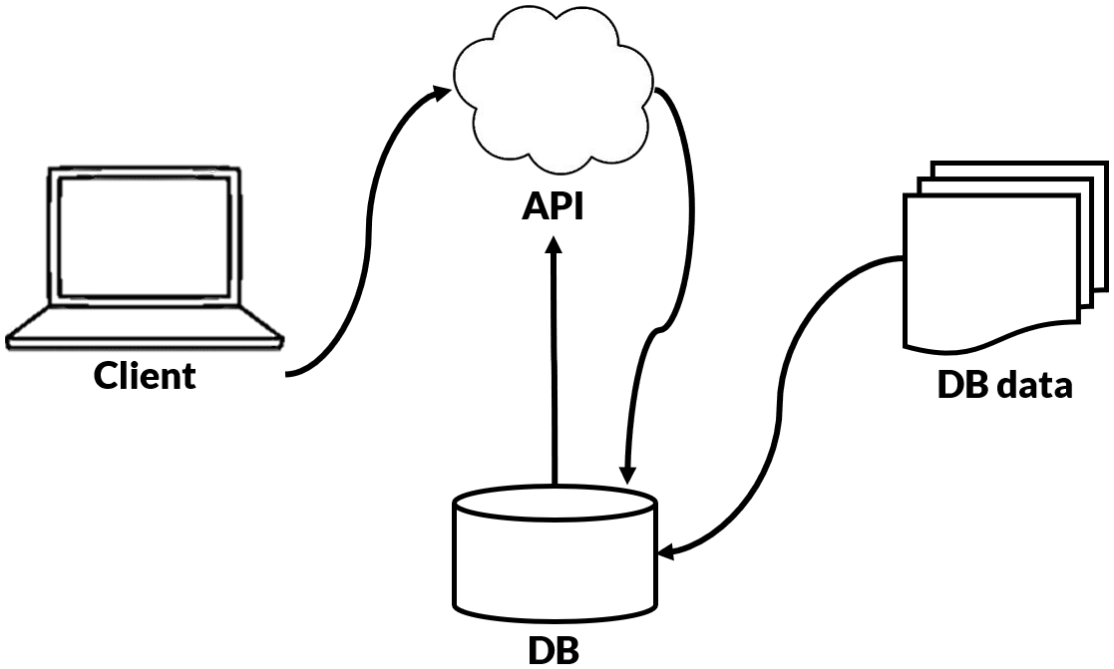
JSON / XML

Web Services

What is API?

- Application Programming Interface
- A HTTP server which produces data in different media types
- Client sends it a message to request for data
- Message causes the HTTP server to produce the required data
- Client needs to know the interface (request and response) in order to get the data that you want

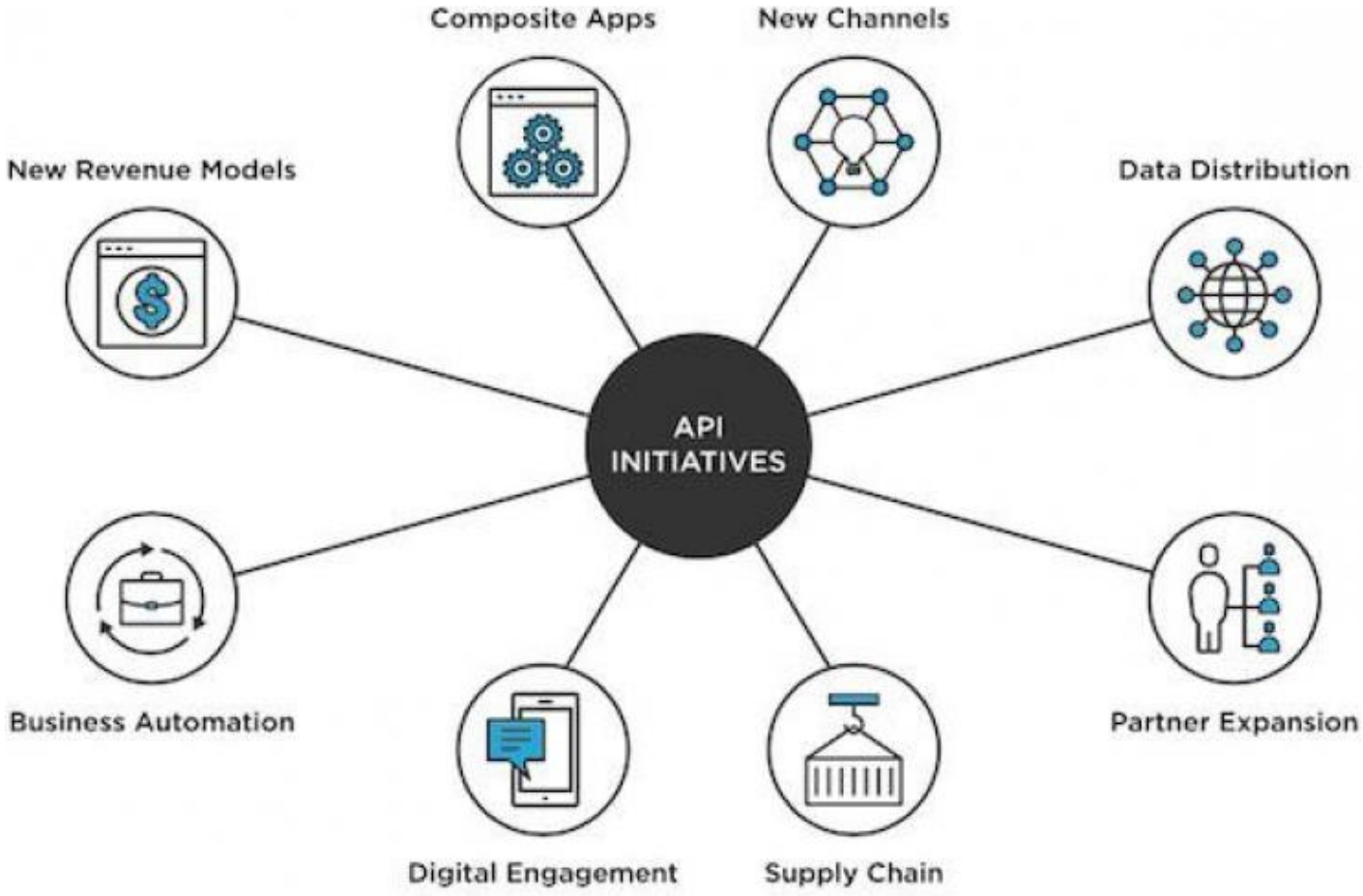
Why API



https://blog.yellowant.com/rest-api-calls-made-easy-7e620e4d3e82

Why API?

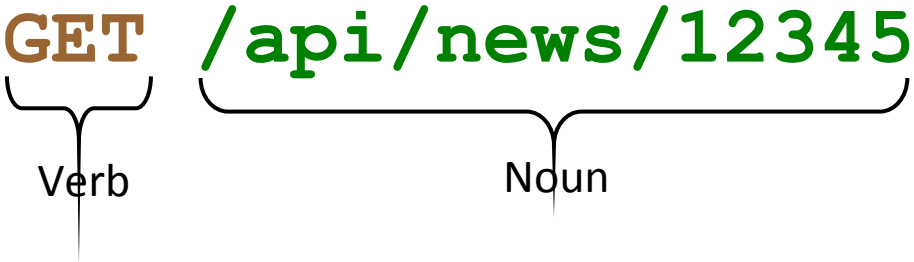
- Implemented at one place and used at many places
- Serve multiple clients of different nature
- Serve multiple business groups



https://www.itwire.com/cloud/australian-organisations-recognise-importance-of-api-management.html

Endpoint


http://acme.com/api/news/12345
How to retrieve the resource
Container that holds some resource
Resource identifier unique within the container


GET /api/news/12345
Verb
Noun

Resource Name & Resource Path

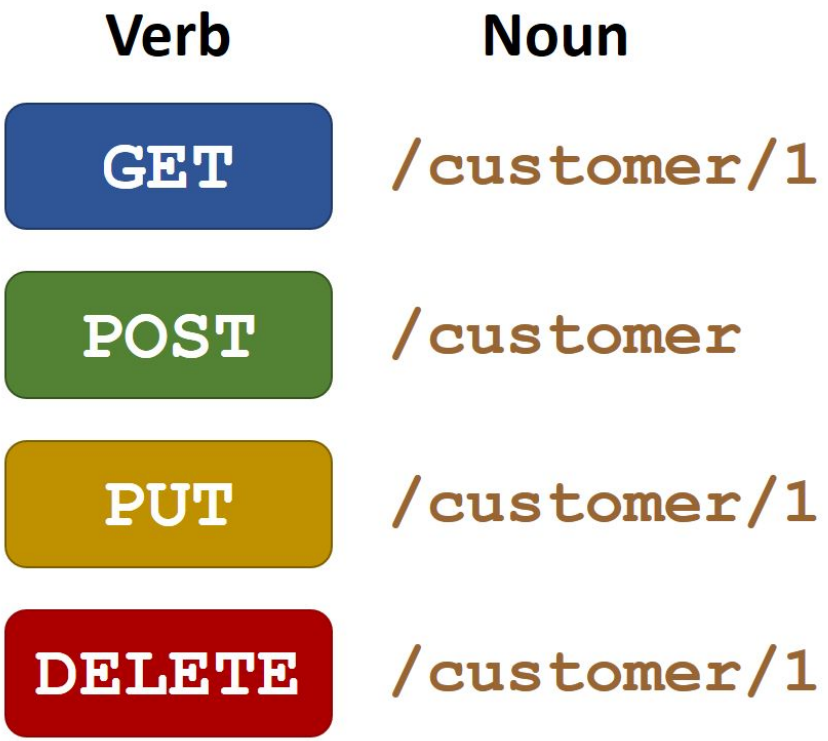
- Use plurals for resource collection
  - Eg. /api/employees
- Individual resource should be uniquely identifiable
  - Should have a ‘primary key’
  - Eg. /api/employee/1
- Resource path are unique - like a primary key in data database
- Use to uniquely identify a specific resource or collection of resources

Resource Path

- Resource path are unique - like a primary key in data database
- Use to uniquely identify a specific resource or collection of resources
- Resource path can be have meaning unlike primary key
  - /api/customer/1 customer with id 1, returns a single resource
  - /api/customer/1/orders list all of customer 1's orders - a collection of resources
- Sub resource may be used to define relationships between

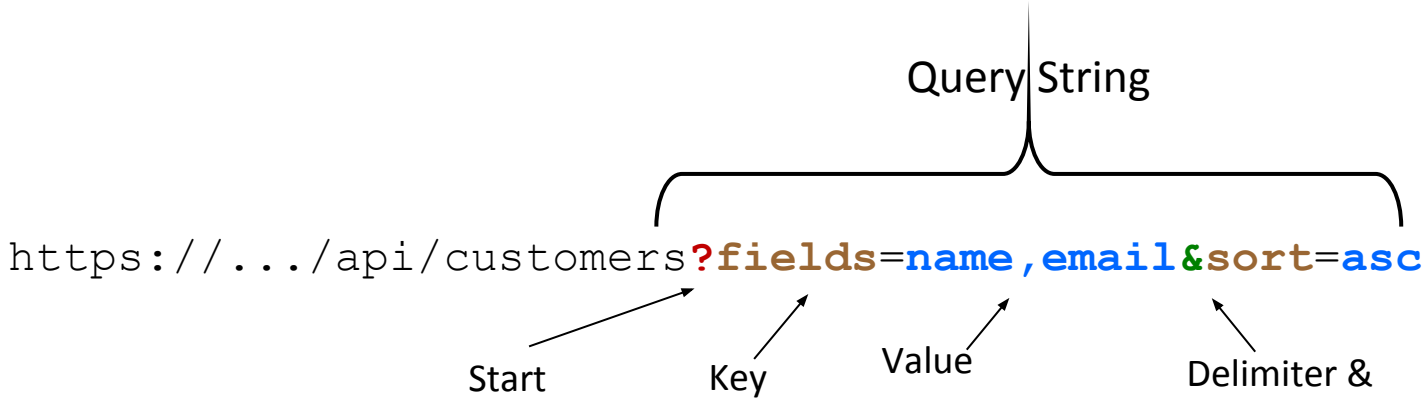
Resource Name

- Use nouns for resource names
  - Eg. /api/employee not /api/getEmployee
  - Latter is RPC style
- Use HTTP methods to express intent on the resource



Query String

- Key value pair that is part of the URL
- Used to provide additional information to the resource
  - E.g. Used to narrow the result
- Mostly used in GET but applicable to other methods



Query String as Context

- Query string can be thought of as providing some context or filters to the resource
  - Eg. Find all January's purchase orders

```
/api/orders?month=jan&year=2019
```

  - Eg. Find all male employees in engineering department

```
/api/engineering/employees?gender=male
```

Common Uses for Query String

- Searching

```
/api/engineering/employees?name=fred
```

- Paging a collection

```
/api/engineering/employees?offset=10&limit=20
```

- Filtering

```
/api/engineering/employees?gender=male
```

- Provide additional information eg. identity

```
/api/engineering/employees?client_id=abc123
```