Web

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https://i.imgflip.com/2uj8rv.jpg

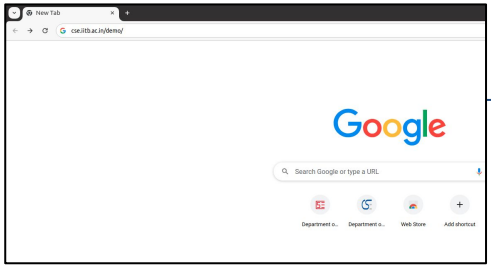
World Wide Web (WWW)

- A service provided over Internet, enabling users to access and interact with a vast array of information and services
- Origins: 1989 Tim Berners-Lee (CERN) proposed mechanism to distribute high-energy physics data (reports, photos, blueprints etc)
  - Proposal eventually lead to World Wide Web (WWW)

Terminology

- Web Server: a software application hosted on a machine, that delivers web content/service
  - Browser requests arrive here
  - Serves **static** content
- Web Client (Browser): Application running on user's device
  - Sends out requests to server, processes received responses and renders web pages

- Web Application: a software program or set of programs that run on a web server
  - Help **dynamically** generates content in response to requests
  - Involve server-side scripting, database interactions, and complex business logic
  - E.g. Amazon, Facebook, Google docs, BodhiTree etc



HTTP Request

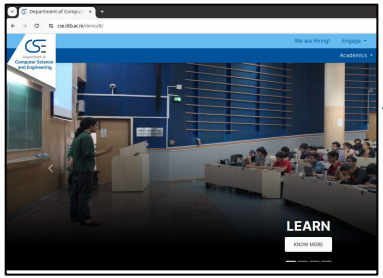
Time

Browser

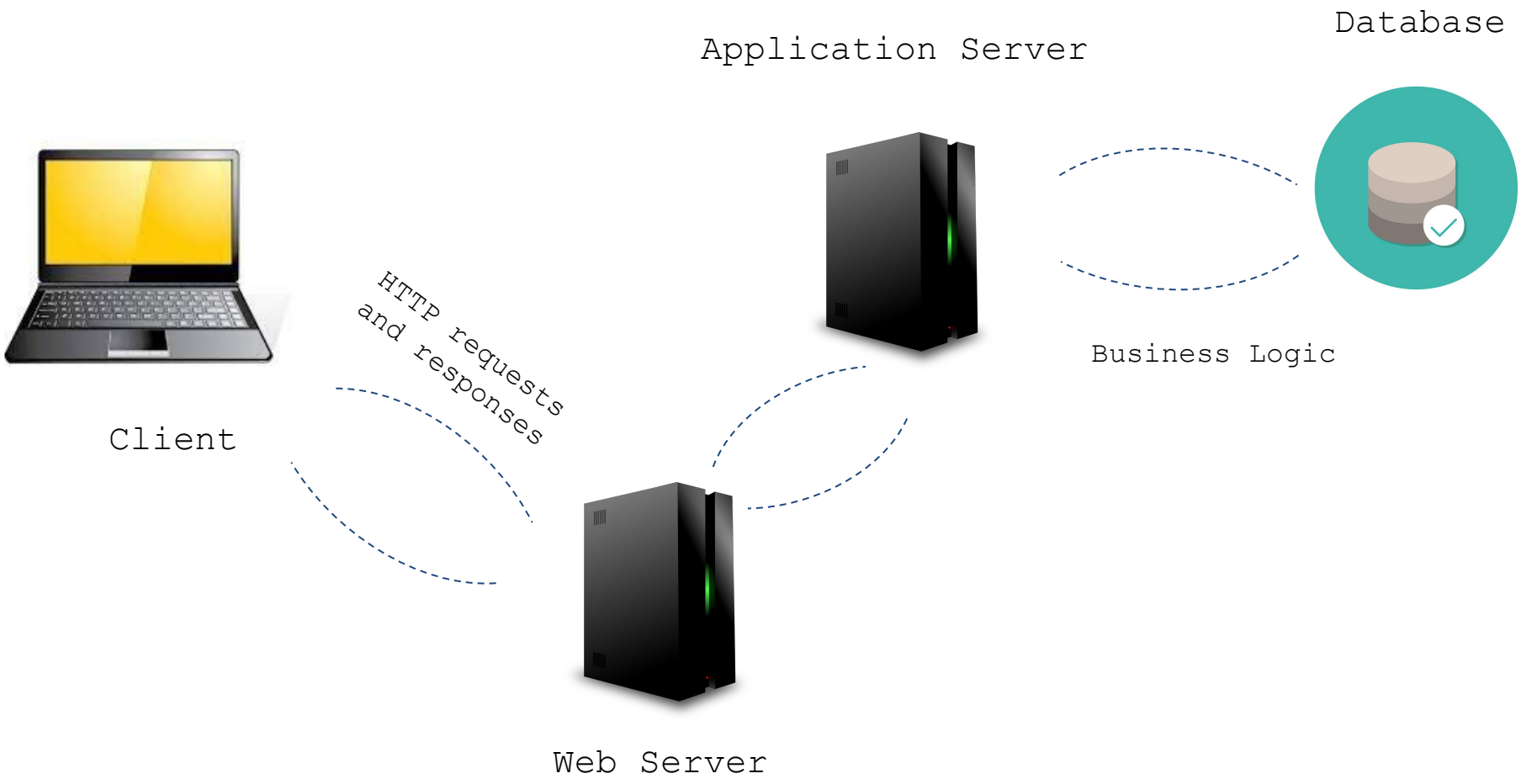
WWW

CRUNCH!!
CRUNCH!!
CRUNCH!!

Web Server



HTTP Response


Database
Application Server
HTTP requests
and responses
Business Logic
Client
Web Server

Outline

- What is a web page?
- How does a browser interact with server to download web pages?
- How do servers serve web pages?

Web Page

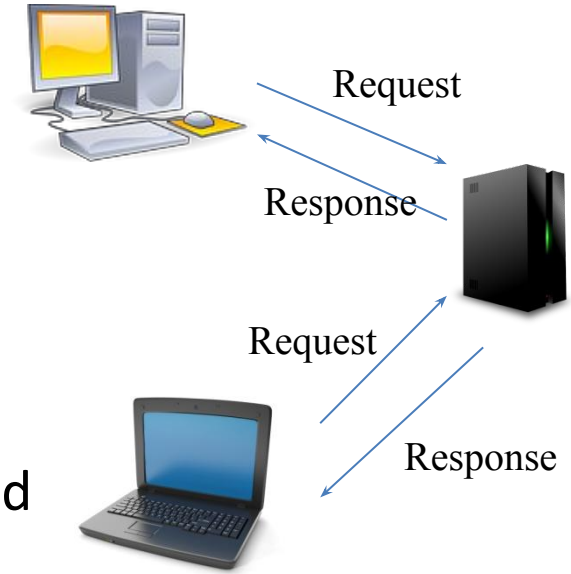
- Website made of Web Pages
- Web pages are written in HyperText Markup Language (HTML)
- **Web page** consists of base **HTML** file which includes several referenced **objects**
  - Object can be other HTML files, image files, Java applets, audio files etc
  - Text/Image that links to another page is called a **hyperlink** (often highlighted by some means)

- Each object is addressable by a **URL** (Uniform Resource Locator)
  - E.g. http://www.iitb.ac.in/images/header/iitb_logo.gif

- Browsers send requests for HTML and referenced objects
- Browsers interpret received responses and displays content aesthetically

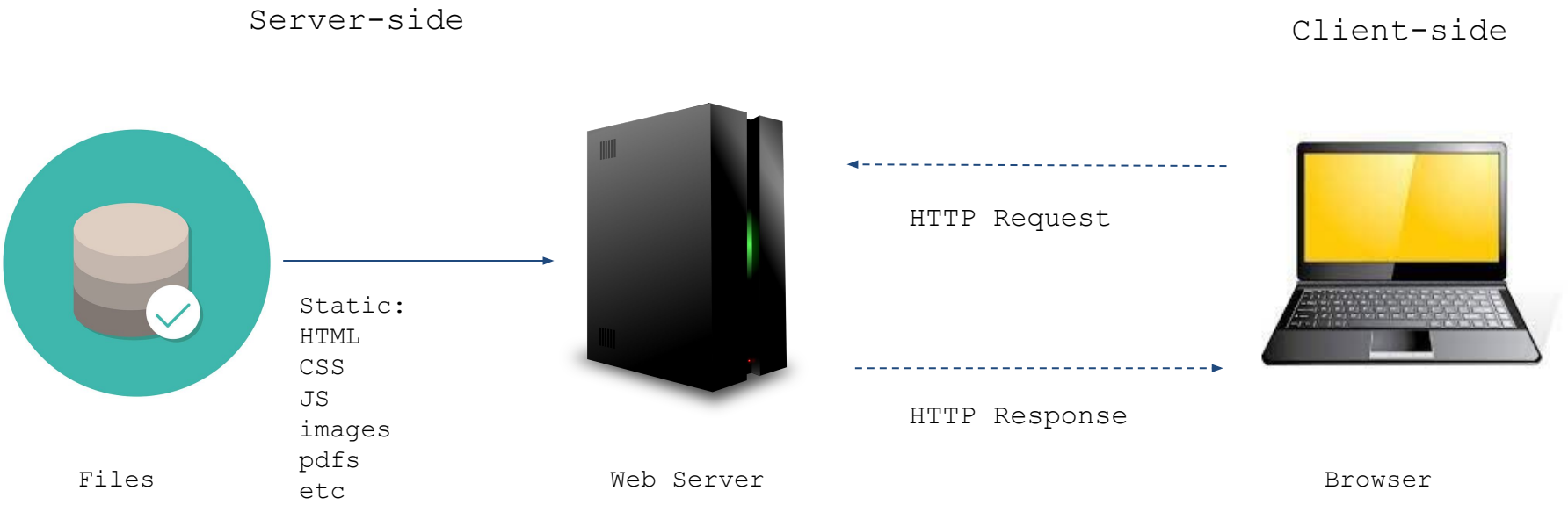
Hyper Text Transfer Protocol (HTTP/HTTPs)

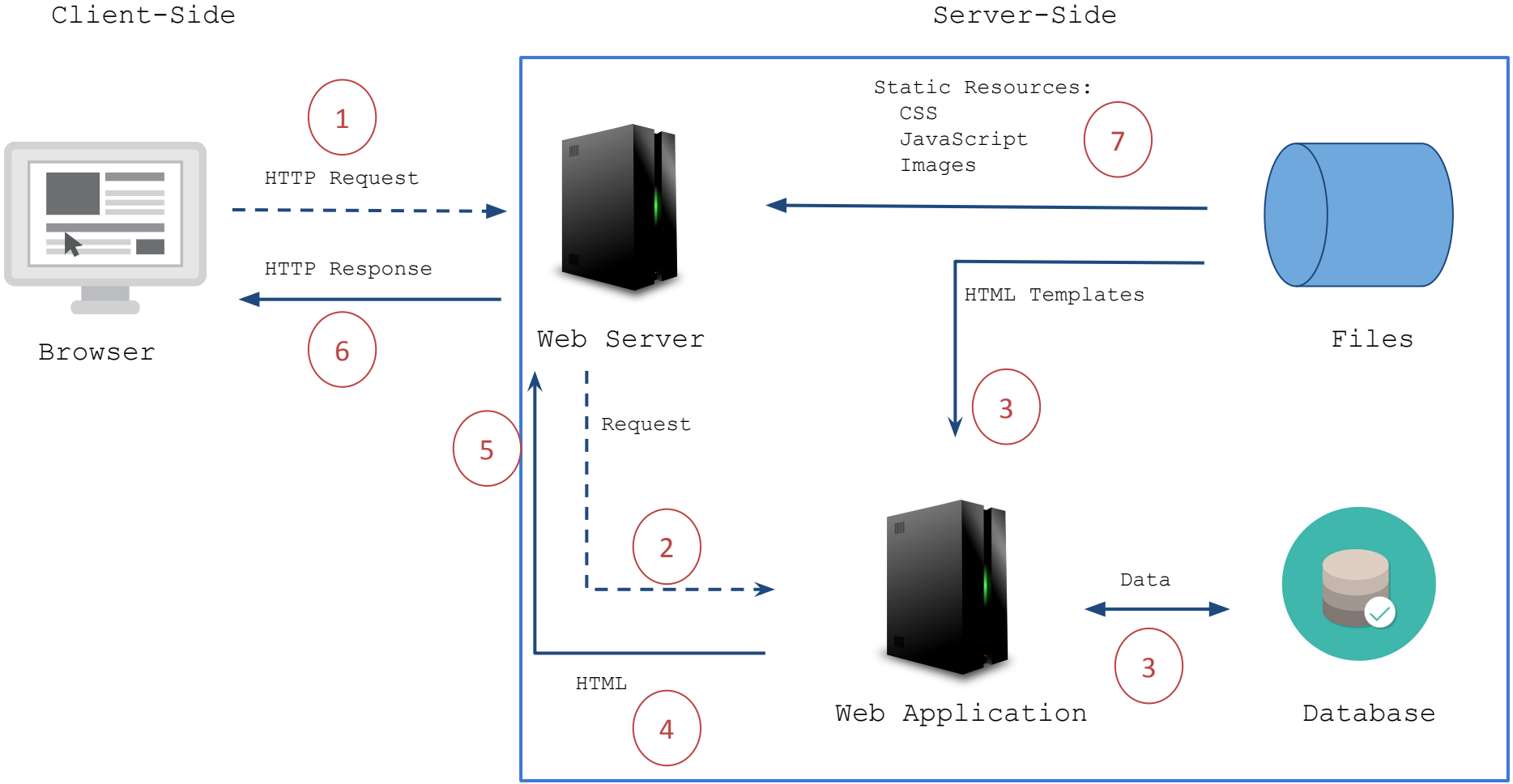
- The protocol employed by Web application
- Based on client-server model
  - Client (browser) requests web objects
    - GET and POST method
  - Server responds with status code and requested object (if present)
    - 200 OK, 404 not found etc
- Operates over TCP, server port 80 (http), 443 (https)



Server Internals

- Servers serve two types of content: Static and Dynamic
- Static
  - HTML files, image files, javascript files
  - Locate the requested file on file system and return unaltered in HTTP response


Server-side
Client-side
Static:
HTML
CSS
JS
images
pdfs
etc
HTTP Request
HTTP Response
Files
Web Server
Browser


Client-Side
Server-Side
1
HTTP Request
HTTP Response
6
Browser
Web Server
Static Resources:
CSS
JavaScript
Images
7
HTML Templates
3
Files
5
Request
2
HTML
4
Web Application
Data
3
Database

Client-side Programming

- Code that runs in the browser
  - E.g. Javascript
    - Note: HTML, CSS are for markup/styling
- Primarily concerned with improving the appearance and behavior of a rendered web page
  - Selecting and styling UI components, creating layouts, form validation etc

Server Side Programming

- Code that runs in the server
  - Helps create dynamic pages
  - E.g. PHP, Python, Ruby, C#, and JavaScript (NodeJS)
- Developers typically write their code using web frameworks (Django/Python, Flask etc)
  - Collections of functions, objects, rules and other code constructs
  - Helps solve common problems, speed up development etc

Our Focus: Static Pages and Client Side Programming!