Web Development

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Web Development

- Creating, deploying, and operating.
- Web has grown a number of sites, users, and implementation capabilities since 1989.

Client Server

- Is an architecture.
  - Provides description of software constructions and distribution of different components.
  - A client program that request services of a server.

Client

- Who request the service.
- Waits for answer of the Server.
- Receives the answer.
- Normally is who interacts with the user using a GUI.
- Active entity.

Server

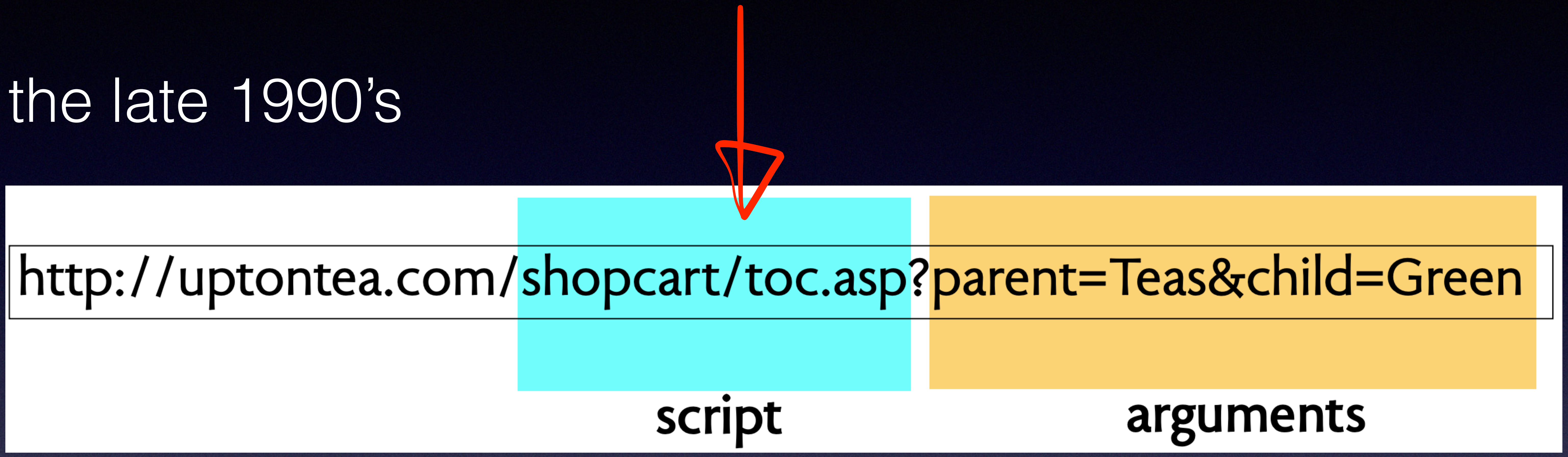
- Waits for any Client request.
- Receives a request.
- Gives an answer.
- Generally accepts many requests.
- Does not interacts with final user.
- Passive entity.

HTTP Editing

- HTTP method
  - GET: get a document from a server.
  - POST: end a document to a server.
  - PUT: update a document at a server.
  - DELETE: delete a document from a server.
- Request component
  - query string.
  - body.

HTTP Editing

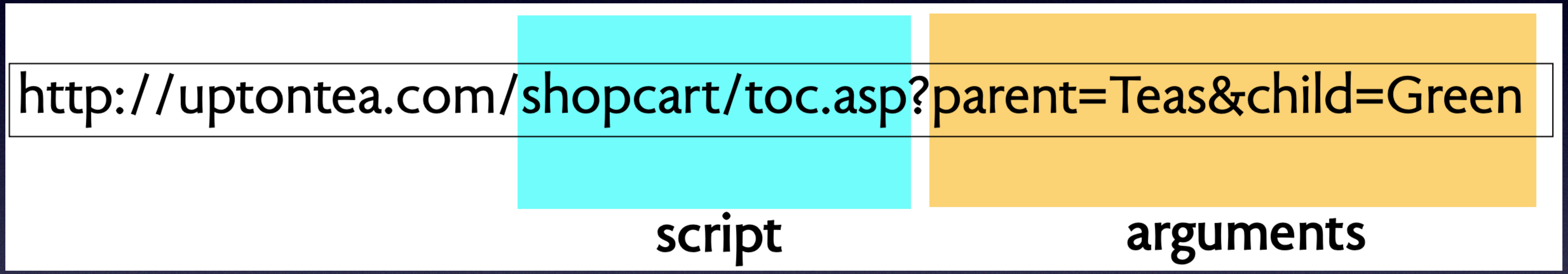
- URLS in the late 1990's



http://uptontea.com/shopcart/toc.asp?parent=Teas&child=Green

HTTP Editing

- URLS in the late 1990’s



http://uptontea.com/shopcart/toc.asp?parent=Teas&child=Green

script

arguments

- Rather than DELETE pages/3
- We see
  - POST /deletePage, GET deletePage?id=3
  - GET /foo.asp?action=delete&page=3

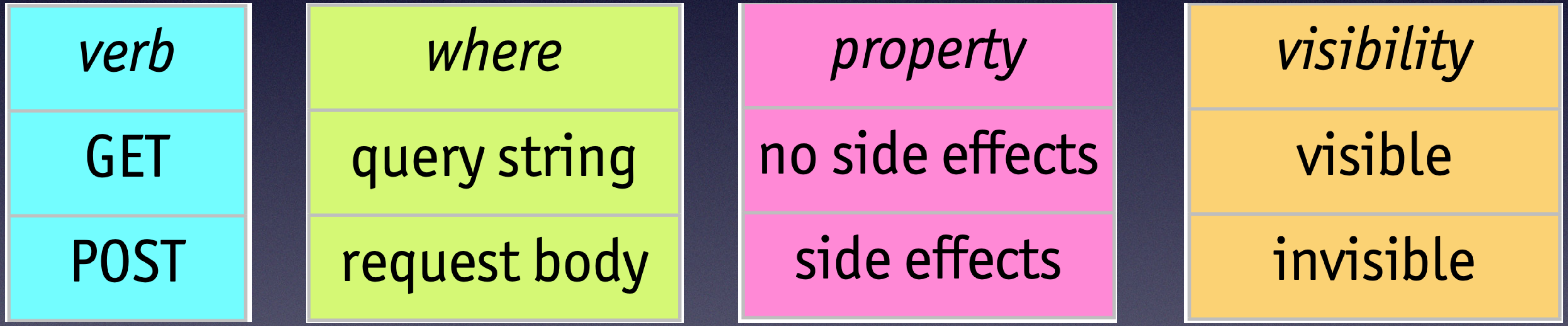
Compare GET POST

	GET	POST
BACK button/Reload	Harmless	Data will be re-submitted (the browser should alert the user that the data are about to be re-submitted)
Bookmarked	Can be bookmarked	Cannot be bookmarked
Cached	Can be cached	Not cached
Encoding type	application/x-www-form-urlencoded	application/x-www-form-urlencoded or multipart/form-data. Use multipart encoding for binary data
History	Parameters remain in browser history	Parameters are not saved in browser history
Restrictions on data length	Yes, when sending data, the GET method adds the data to the URL; and the length of a URL is limited (maximum URL length is 2048 characters)	No restrictions
Restrictions on data type	Only ASCII characters allowed	No restrictions. Binary data is also allowed
Security	GET is less secure compared to POST because data sent is part of the URL Never use GET when sending passwords or other sensitive information!	POST is a little safer than GET because the parameters are not stored in browser history or in web server logs
Visibility	Data is visible to everyone in the URL	Data is not displayed in the URL

Arguments in HTTP Request

- Helps focus
  - Easier to pay attention to one thing at a time.
  - Put some complexities aside.
- Encourages decoupling.

Arguments in HTTP Request



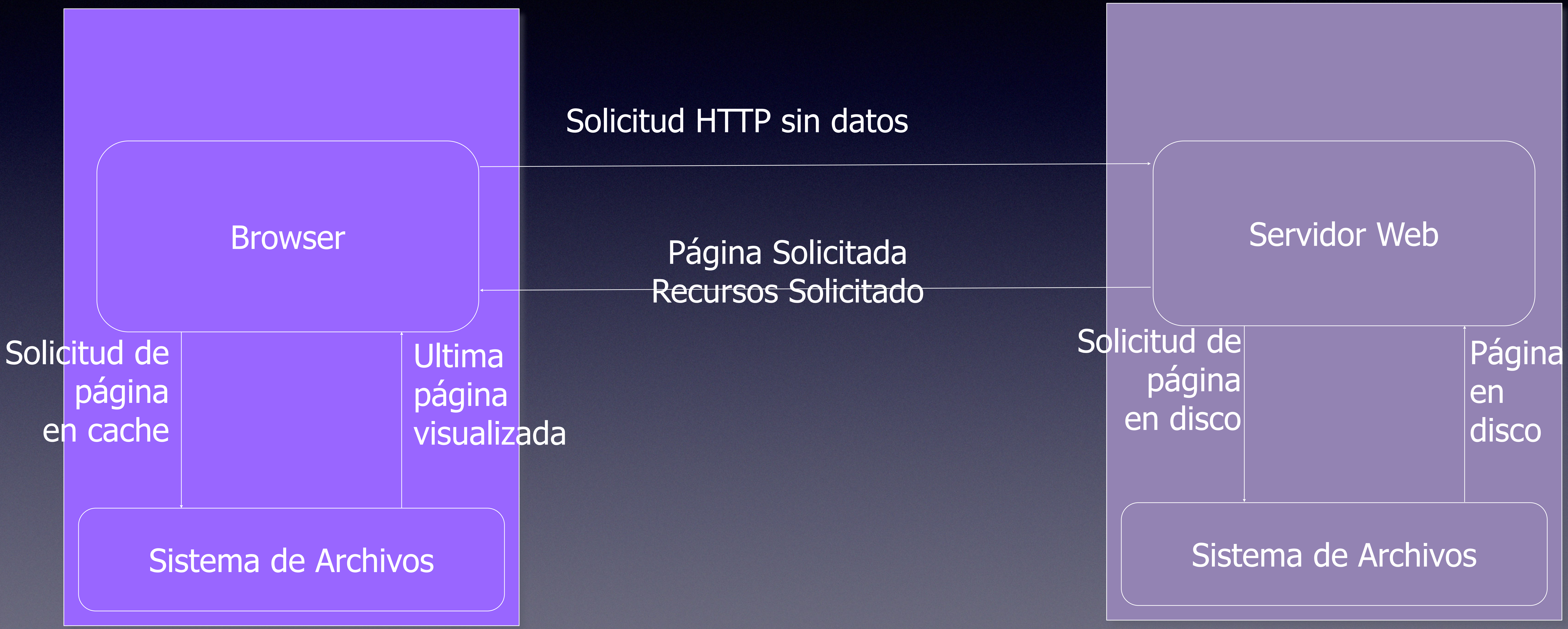
verb
GET
POST

where
query string
request body

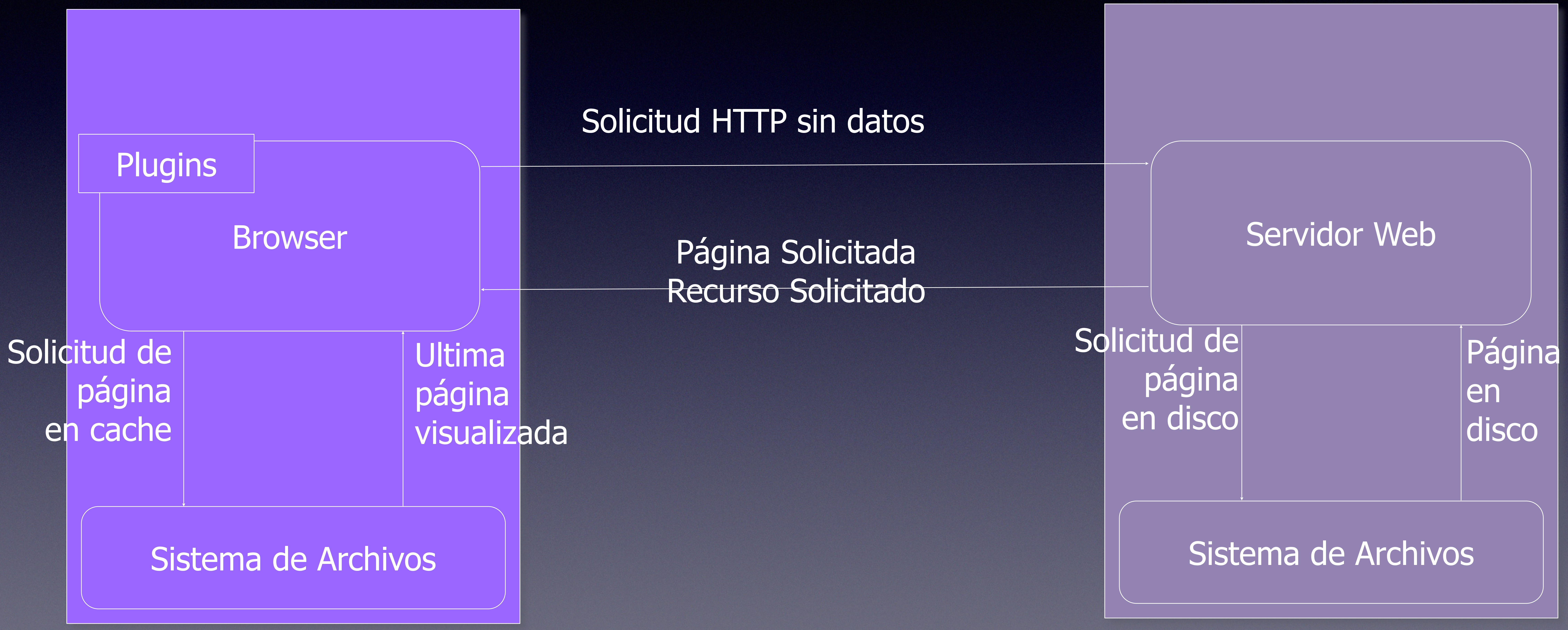
property
no side effects
side effects

visibility
visible
invisible

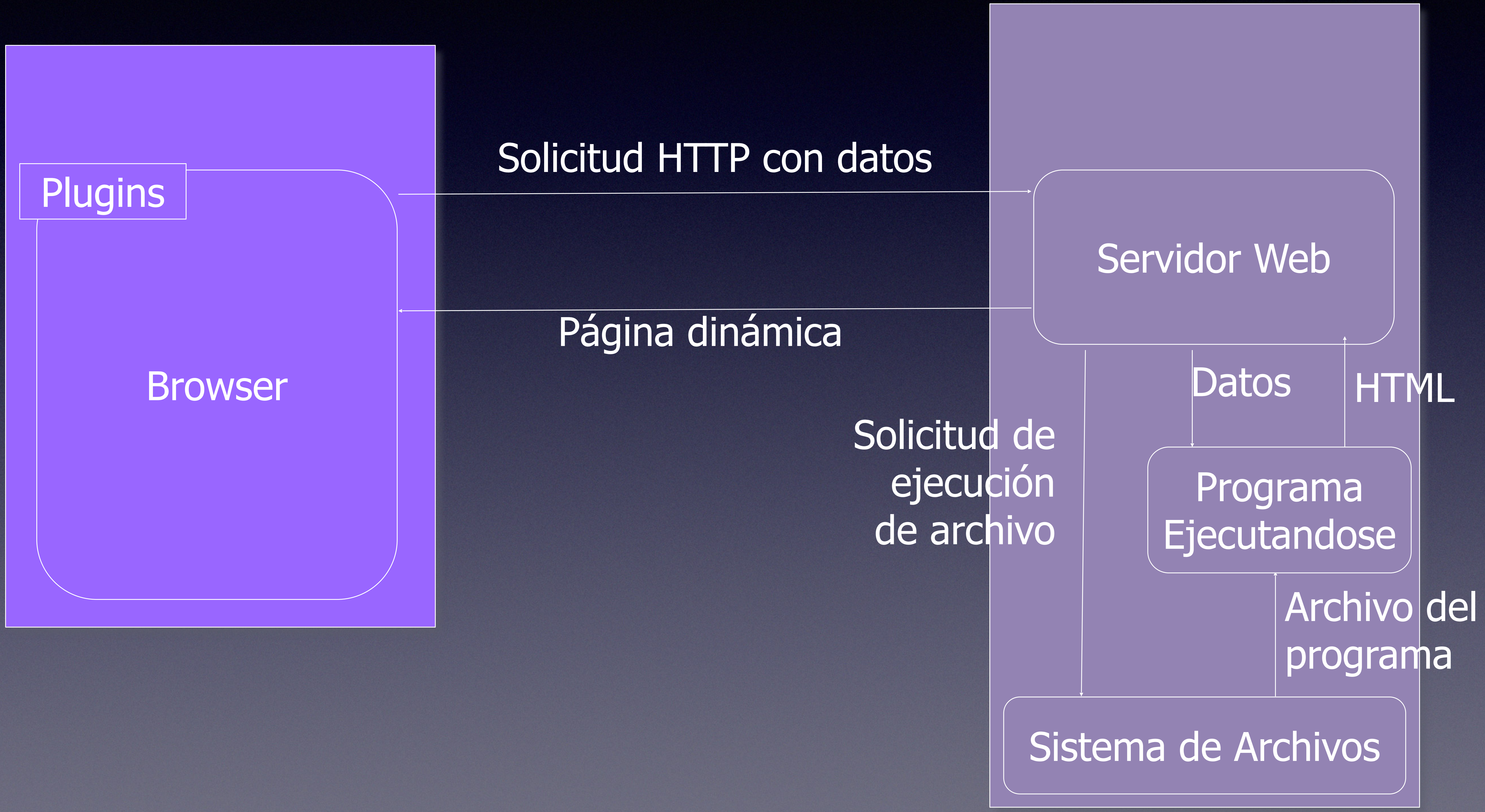
Client Server



Client Server



Client Server



Browser

- Allows us visualize web pages.
- Pages could be stored in:
  - Internet.
  - Locally.
- Interprets HTML.
- Needs to have HTPP protocol.
- Also: FTP, HTTPS, Applets

Web Servers

- Is a program that runs continuously in a computer.
- The computer is known as web server.
- Implements the HTTP protocol.
- Keeps waiting for HTTP request.
- Search for a response and send to the client.

Programming on the server

- PHP
  - Personal Home Page.
  - Hypertext Pre Procesor.
  - Interpreted language.
  - Embebed with html.
  - Released in 1995

Programming on the server

- JSP
    - Java Server Pages.
    - Servlets (applications Java in the server)
    - Interpreted.
    - Possible web servers: Apache, Java System.

Programming on the server

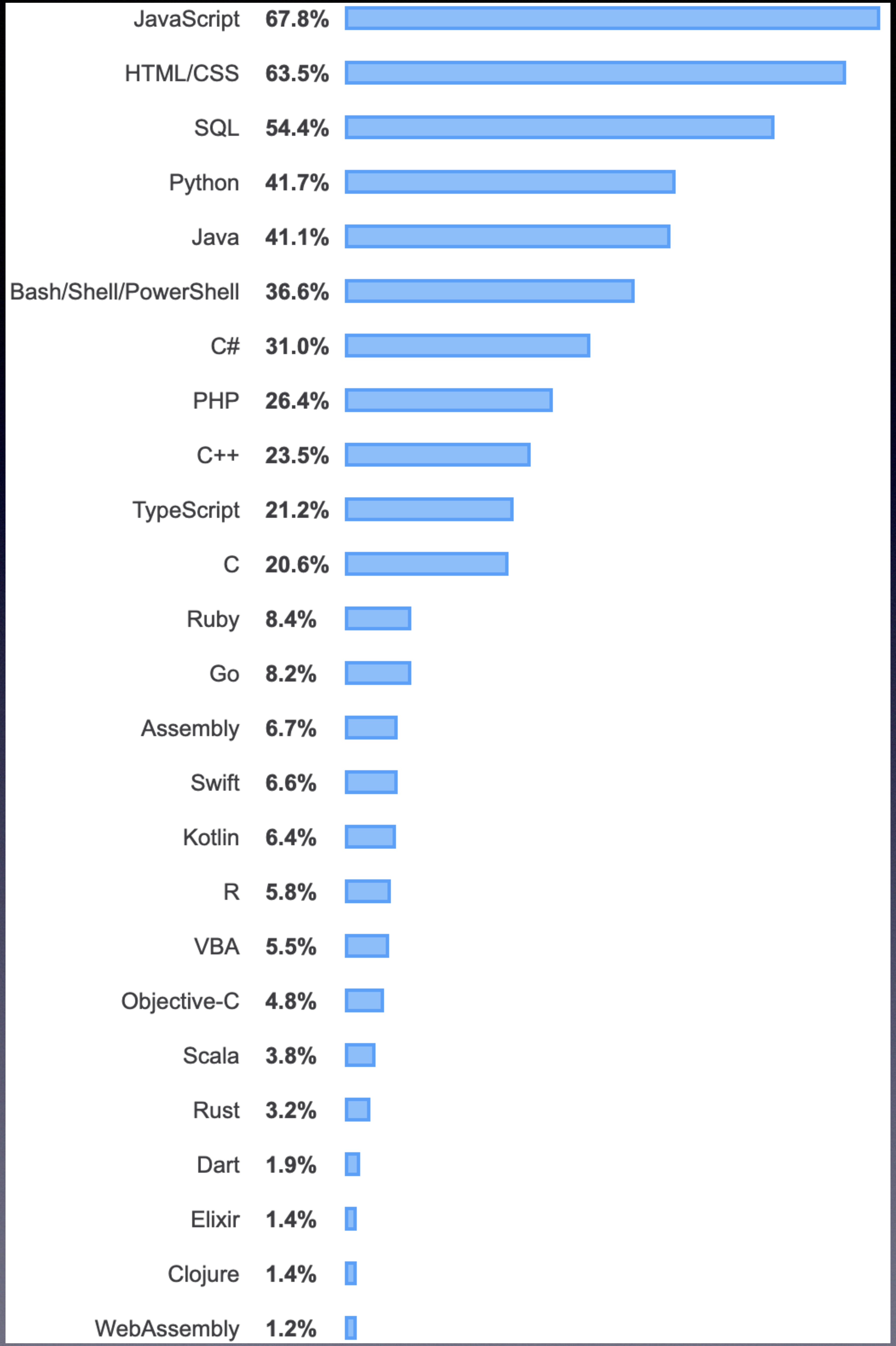
- ASP
  - Active Server Pages. Microsoft.
  - Visual Basics Alike.
  - Internet Information Server.

Programming on the server

- Python.
  - Multipurpose language .
  - Interpreted: CPython, IronPython, Jython.
  - Released in 1991.

Which Language

- Expressiveness.
  - Easy to understand.
- Reliability.
- Performance.
  - Probably the most important factor.


JavaScript 67.8%
HTML/CSS 63.5%
SQL 54.4%
Python 41.7%
Java 41.1%
Bash/Shell/PowerShell 36.6%
C# 31.0%
PHP 26.4%
C++ 23.5%
TypeScript 21.2%
C 20.6%
Ruby 8.4%
Go 8.2%
Assembly 6.7%
Swift 6.6%
Kotlin 6.4%
R 5.8%
VBA 5.5%
Objective-C 4.8%
Scala 3.8%
Rust 3.2%
Dart 1.9%
Elixir 1.4%
Clojure 1.4%
WebAssembly 1.2%

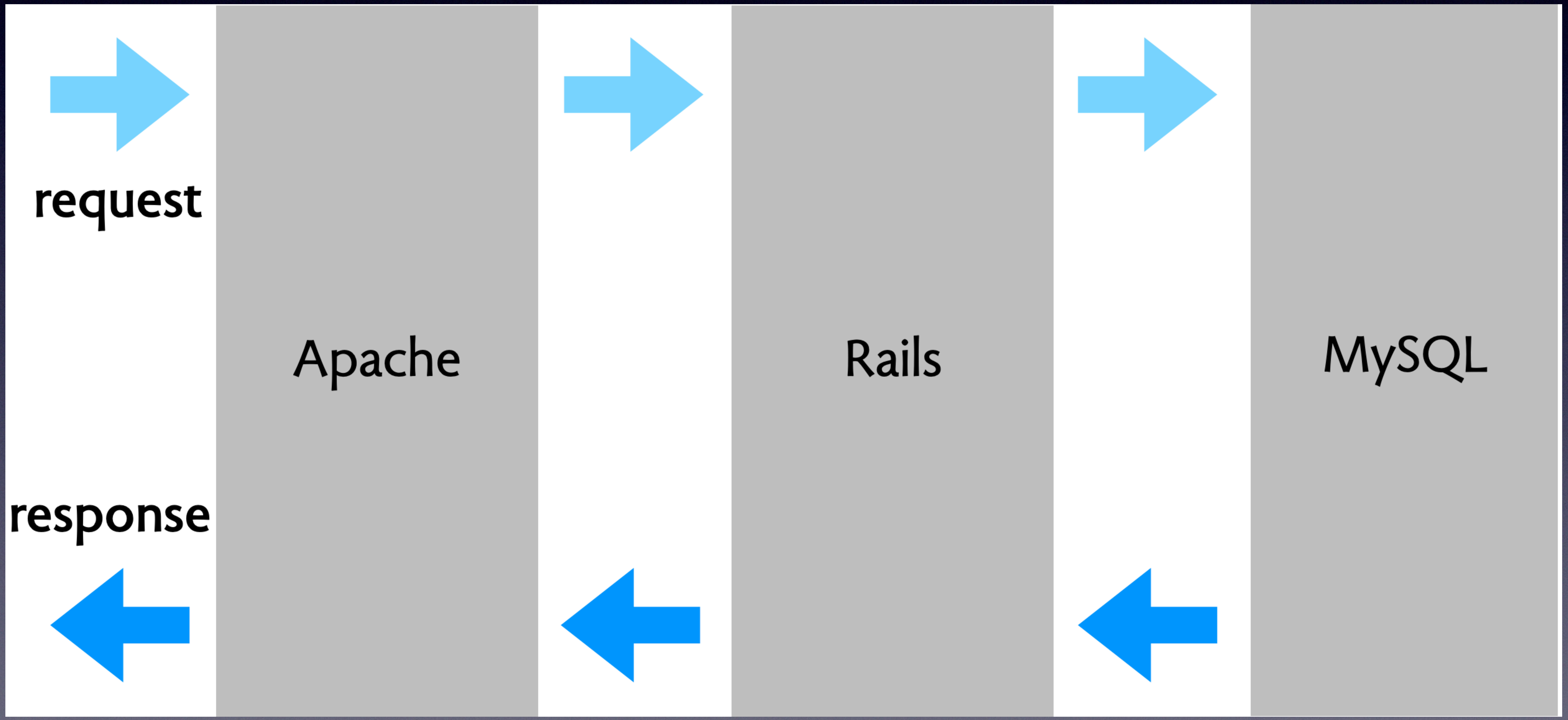
Python

- Build server-side web applications.
  - Web framework is not required.
- Not used in web browser.
  - pyjs can compile Python to Javascript.

Web Framework

- Code Library.
  - Faster an easier.
  - Common patterns.
- After 2000 professional web development always use framework.

Web Framework



Web Framework

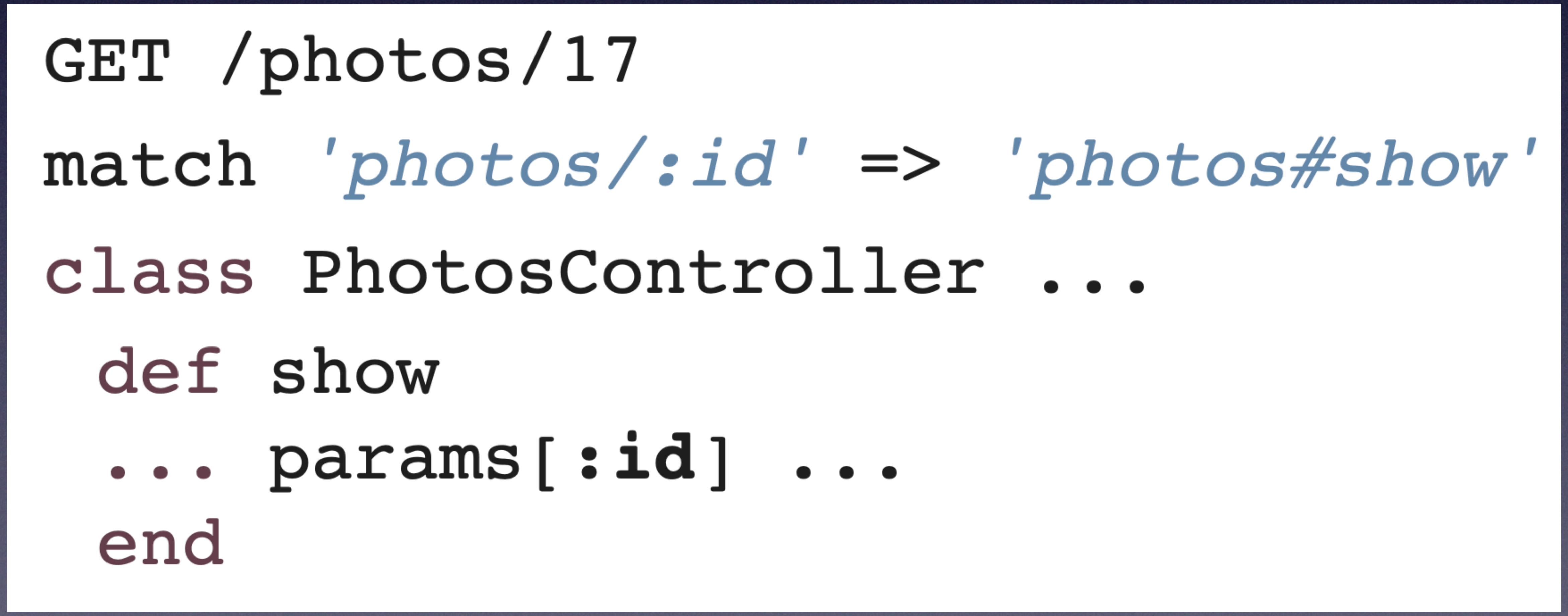
- Why are useful?
    - Encapsulate what developers have learned over 20 years.
    - Easier to reuse code.
    - Structure projects.

Web Framework

- Functionality
  - Url routing.
  - Input for handling and validation.
  - HTM, XML, JSON and other formats with template engine.
  - Database Connection.
  - Web security. Cross-site request, SQL Injection, etc.
  - Session storage and retrieval.

Routing

- Request routes rb call



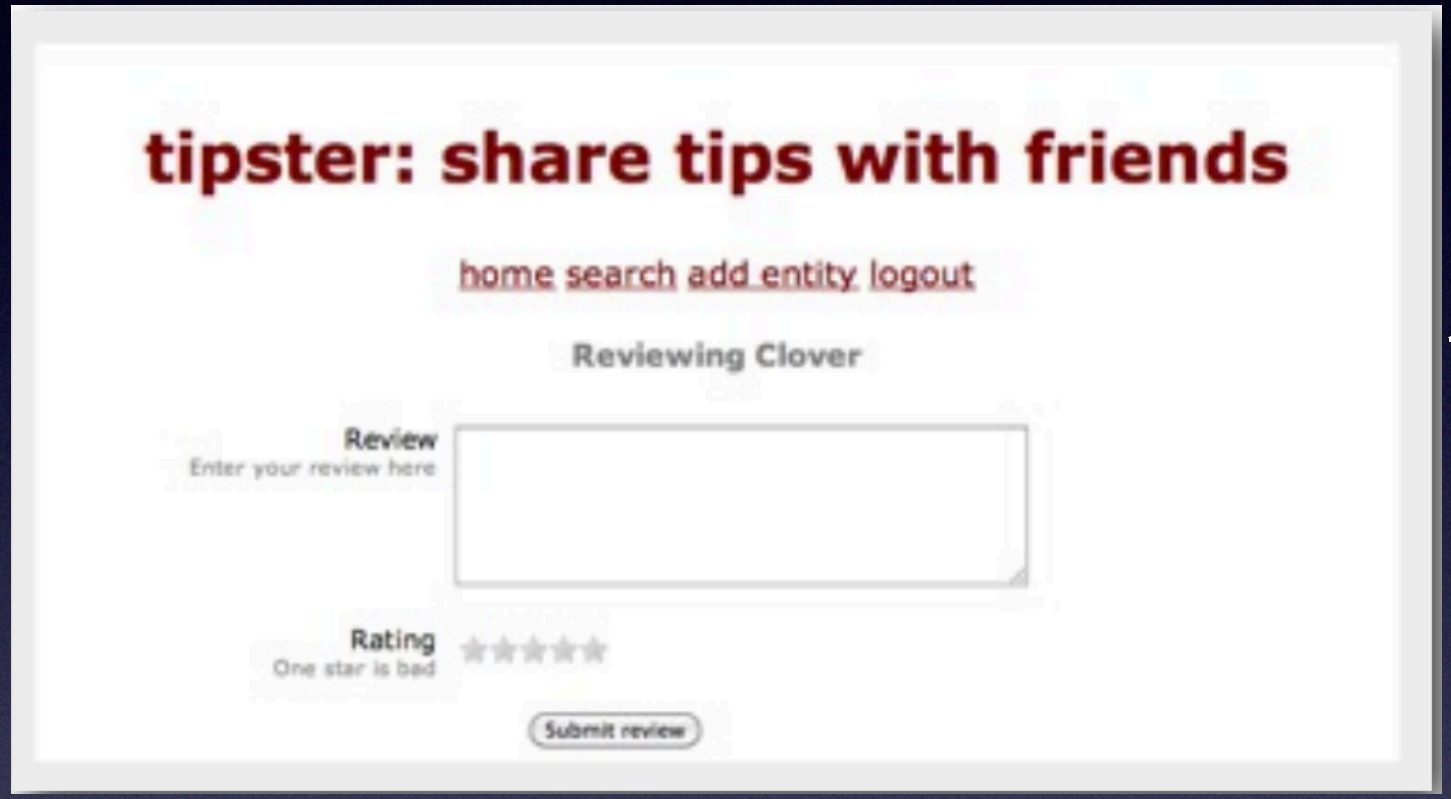
```
GET /photos/17
match 'photos/:id' => 'photos#show'
class PhotosController ...
 def show
 ... params[:id] ...
 end
```

Request Data

- Two kinds of request data:
    - Query strings from GETs.
    - Form data from POSTs.

Data Conversion

Update Request



tipster: share tips with friends

home search add entity logout

Reviewing Clover

Review
Enter your review here

Rating ☆☆☆☆☆
One star is bad

request form

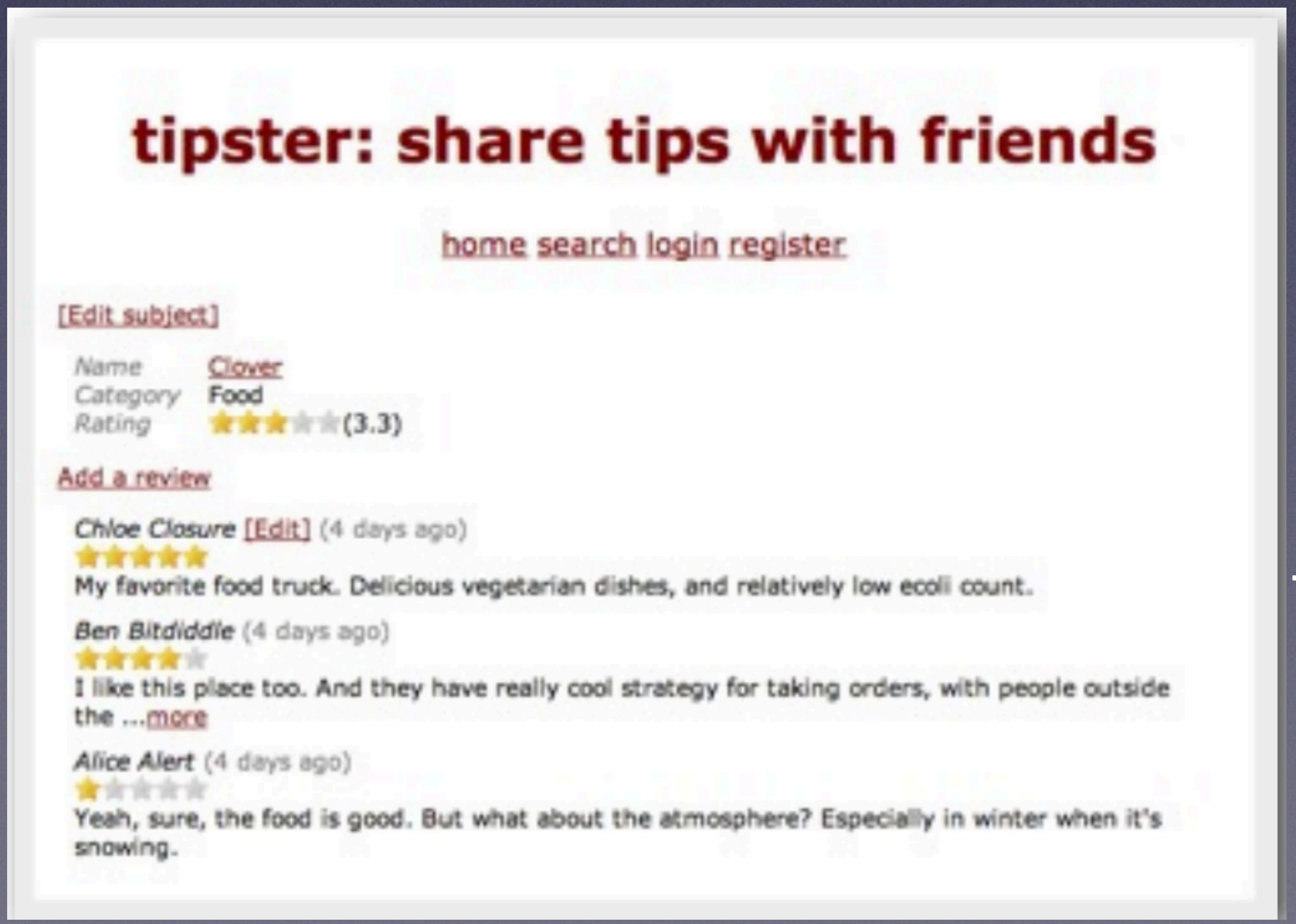
id	2
rating	5
content	yummy!

database table

reviews

id	*by*	*content*	*rating*	*about*
1	3	yummy!	5	2
2	2	neat	4	1

Show Request



tipster: share tips with friends

home search login register

[Edit subject]

Name	Clover
Category	Food
Rating	★★★☆☆(3.3)

Add a review

Chloe Closure [Edit] (4 days ago)
★★★★★
My favorite food truck. Delicious vegetarian dishes, and relatively low ecoli count.

Ben Bitdiddle (4 days ago)
★★★★☆
I like this place too. And they have really cool strategy for taking orders, with people outside the ...more

Alice Alert (4 days ago)
★☆☆☆☆
Yeah, sure, the food is good. But what about the atmosphere? Especially in winter when it's snowing.

response

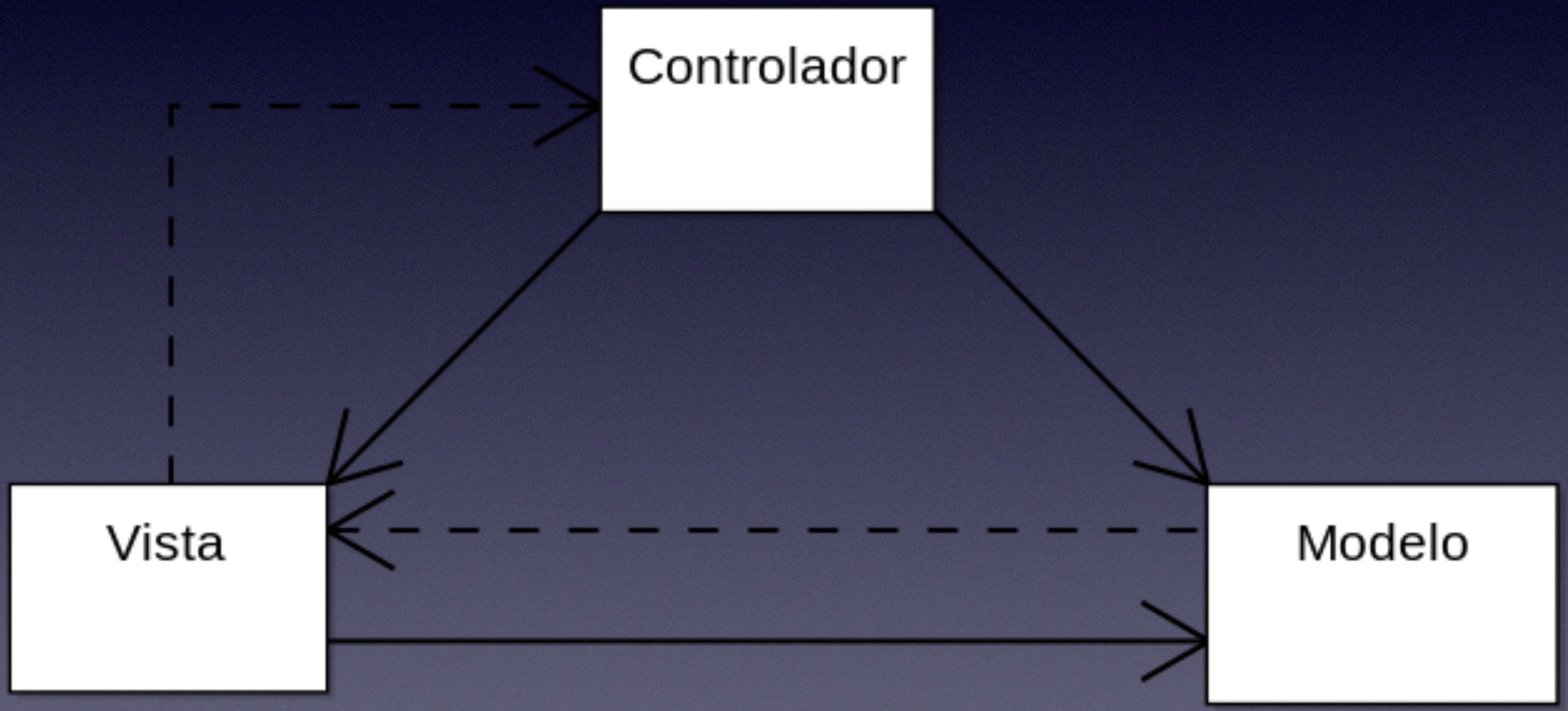
Web Framework

django
Gotta go fast!

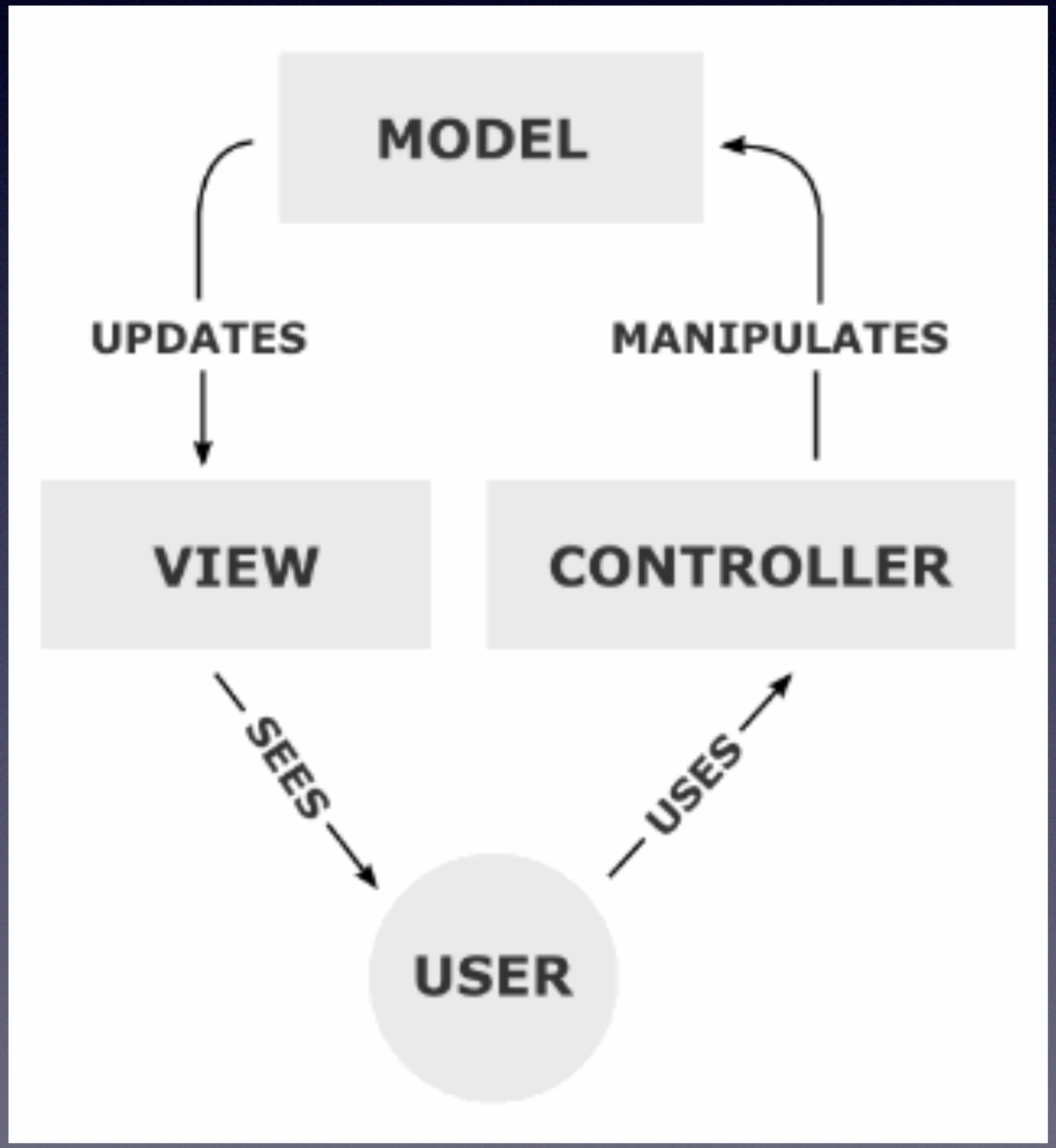
Web Framework

- Choose a major Python web framework (Django or Flask)
- Work through a tutorial.
- Study open source.
- Build first simple iteration.

Model View Controller



Model View Controller


MODEL
UPDATES
MANIPULATES
VIEW
CONTROLLER
SEES
USES
USER