



CS 50011: Introduction to Systems II

Lecture 12: Web Applications

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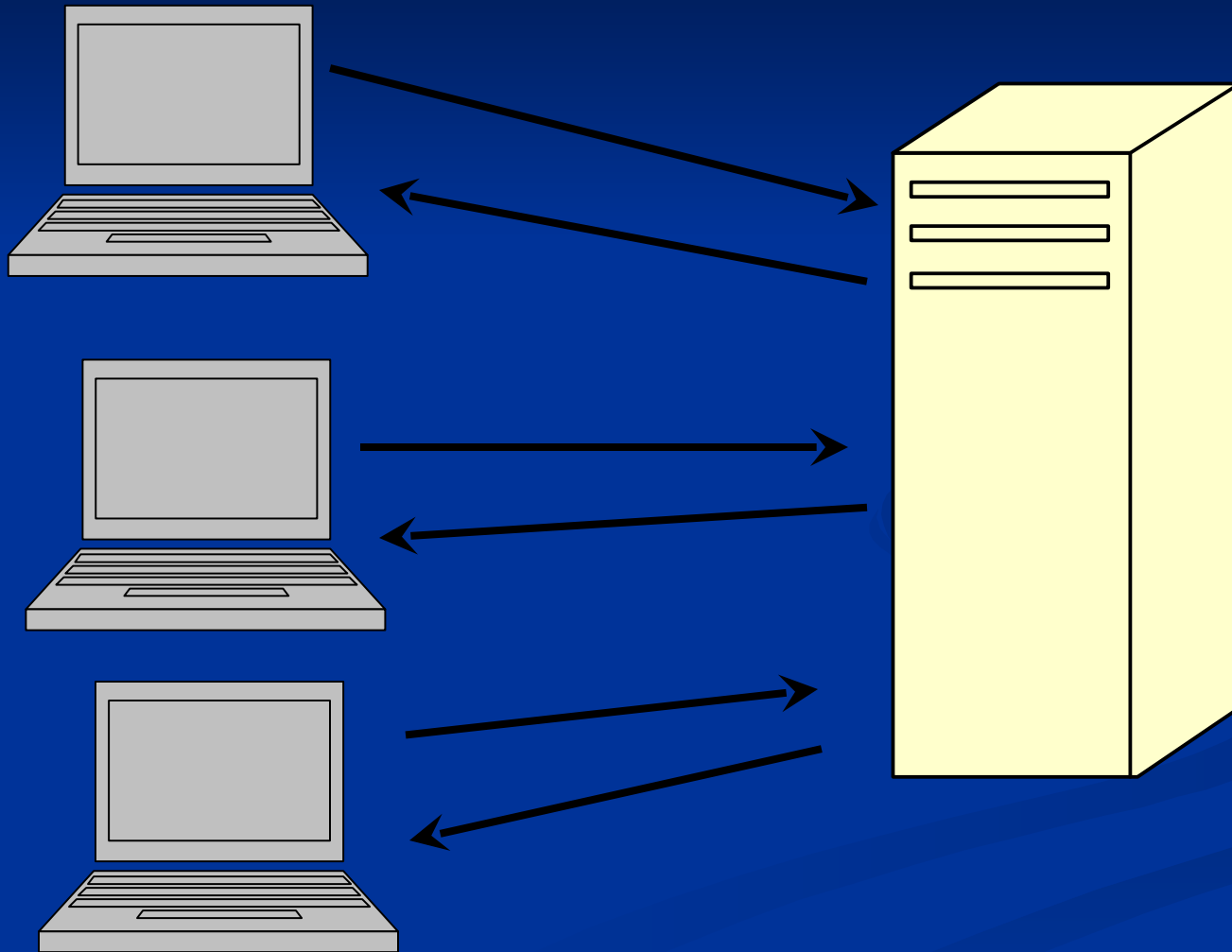


Lecture 12

- Overview
- Model view controller
- Sessions and cookies
- Cloud computing
- Real web app walkthrough



Client Server Model



Web application

- Client is the web browser
- Common applications
 - Webmail
 - Purchasing sites
 - Youtube
 - etc



CGI

- Computer Gateway Interface
 - “CGI Scripts”
- One of the first mechanisms for generating web pages dynamically
- RFC 3875
- Provides a server-side execution environment with access to certain client-transmitted data
 - And of course, the server’s data



- SERVER_SOFTWARE
SERVER_NAME
REQUEST_METHOD
QUERY_STRING
REMOTE_HOST
etc

- Usually involves starting another process
 - Easy to run out of resources
- FastCGI
 - Prefork
- mod_perl
- mod_php

Alternatives

- ASP
- ColdFusion
- Dart
- JSP/Java
- Node.js
- PHP
- Python
- ...



What about the data?

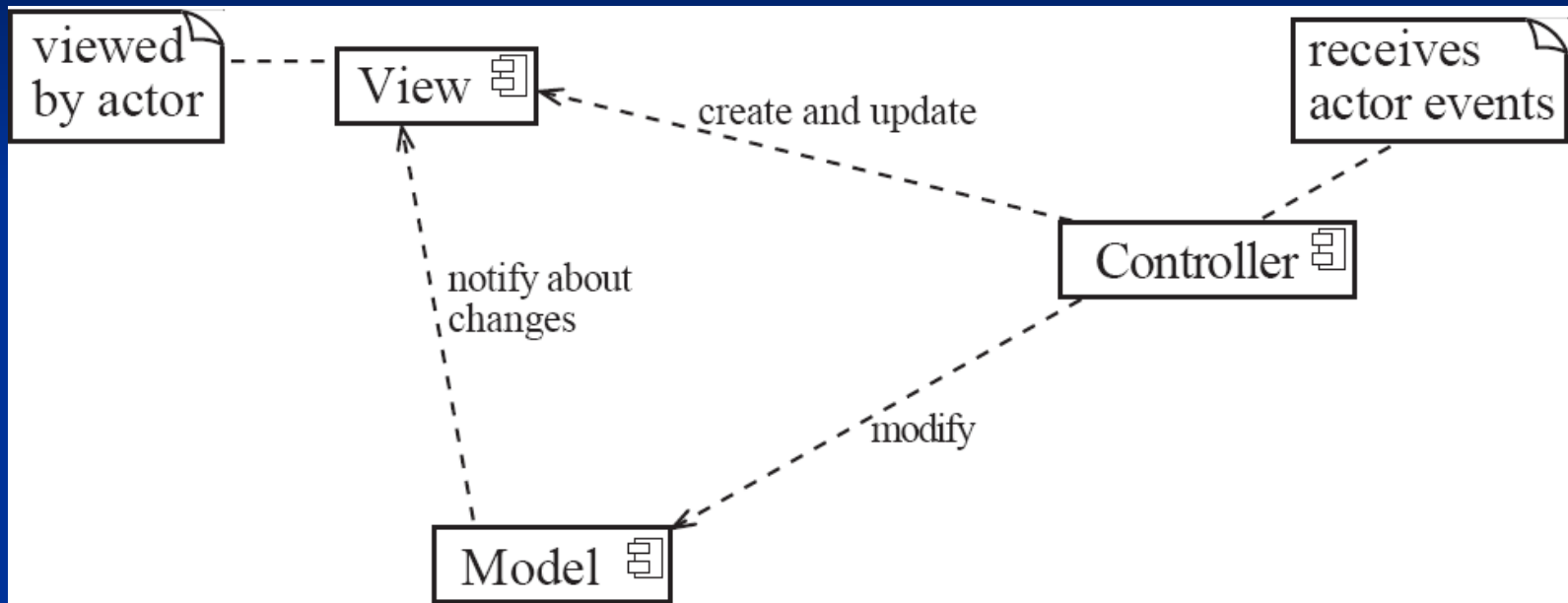
- Multi-tier web applications
- 3-Tier: Client, Webserver, Database
 - Presentation, Application, Data

Model-View-Controller (MVC)

- **Problem** – UI needs frequent modification without impacting system's functionality
- **Solution** – break system into three components – model, view, and controller
 - controller mediates between the model and the view

MVC

- Model contains underlying classes
 - Instances are viewed and manipulated
- View contains objects that render the appearance (UI) of data from the model
- Controller contains objects that control and handle user's interaction with the view and the model



MVC on the WWW

- View component generates HTML
 - Displayed by browser
- Controller interprets HTTP POSTs from the browser
- Model is the underlying system
 - Manages the information

Ajax

- Historic: something changes, reload the page
- AJAX: Asynchronous Javascript and XML
- ~2005, allows client to be more interactive
 - Dynamic interaction with the DOM
 - Asynchronous interactions with server
 - Decouples data and presentation
 - Often JSON instead of XML now



JSON

- JavaScript Object Notation
- Attribute-value pairs
- Human readable
- Serializes data

Sessions

- Session token sent from server to client
 - Usually stored as a HTTP cookie
 - Or a parameter in GET/POST
- Session data stored on the server
 - Sometimes in a database, sometimes elsewhere
 - PHP `session_start()` puts something in `/var/lib/php/session` (CentOS)



Cookies

- Data stored on client
- Mechanism for clients to remember state
- Log in somewhere and choose to have it remember you?
 - That's a cookie
 - Authentication cookie

Tracking cookies

- Often used by advertisers
- Website loads an ad from some other domain
 - Sets up a cookie
- Other sites that also load ads from that domain reference the cookie
 - Allows advertisers to identify an entity and track their browsing habits

Cloud Computing

- Bzzzzzzzzzzzzzzzzzzzzz bzz bzzzzz
- Pay someone else to run your server
- Don't have to worry about hardware/infrastructure costs
 - They're included
- Depending on the offering, system administration may be included
- Or even applications

...as a Service

- Content
- Database
- Infrastructure
- Network
- Platform
- Software
- ...etc

Web application demo



Questions?

