#### Web 2.0

#### **Lecture 1: Introduction to JavaScript**

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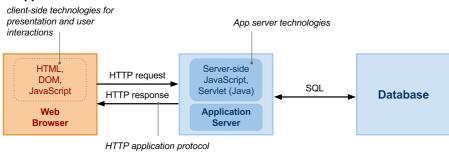


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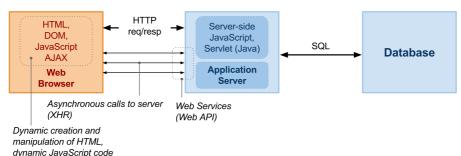
# Web 2.0 Application Architecture

over TCP

#### Web Application



#### Web 2.0 Application



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#### **JavaScript**

- Lightweight, interpreted, object-oriented language
- Standard
  - All major browsers support ECMAScript 6 and 7
- Major characteristics
  - First-class functions
    - → functions as first-class citizens
    - → language supports: passing functions as arguments to other functions, returning functions as values from other functions, assigning functions to variables or storing them in data structures.
  - Anonymous functions
    - → declared without any named identifier to refer to it
  - Closures

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#### **Overview**

- JavaScript Basics
- Server-side JavaScript

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# **Objects and Arrays**

- Objects and Arrays
- Functions

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## **Functions**

- Function Callbacks
  - You can use them to handle asynchronous events occurrences
- Functions as values in object

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#### **Closures**

- Closures
  - A function value that references variables from outside its body

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# **Overview**

- JavaScript Basics
- Server-side JavaScript

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#### **Recall: Application Server**

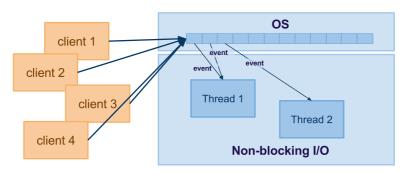
- Environment that runs an application logic
  - Client communicates with AS via an application protocol
  - Client Browser, application protocol HTTP
- Terminology
  - Application Server × Web Server × HTTP Server
    - → AS is a modular environment; provides technology to realize enterprise systems
    - → AS contains a Web server/HTTP server
  - We will deal with Web server only
- Two major models to realize communication
  - Blocking I/O (also called synchronous I/O)
  - Non-blocking I/O (also called asynchronous I/O)
- A technology we will look at
  - Node.js runs server-side Javascript

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## **Non-Blocking I/O Model**

- Connections maintained by the OS, not the Web app
  - The Web app registers events, OS triggers events when occur



- Characteristics
  - Event examples: new connection, read, write, closed
  - The app may create working threads, but controls the number!
    - → much less number of working threads as opposed to blocking I/O

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## Node.js

- Node.js 

  ✓
  - Web server technology, very efficient and fast!
  - Event-driven I/O framework, based on JavaScript V8 engine
    - → *Any I/O is non-blocking (it is asynchronous)*
  - One worker thread to process requests
    - → You do not need to deal with concurrency issues
  - More threads to realize I/O
  - Open sourced, @GitHub ₺, many libraries ₺
  - Future platform for Web 2.0 apps
- Every I/O as an event
  - reading and writing from/to files
  - reading and writing from/to sockets

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# **HTTP Server in Node.js**

- HTTP Server implementation
  - server running at 138.232.189.127, port 8080.
  - Test it using Telnet

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## **Google Apps Script**

#### Google Apps Script

- JavaScript cloud scripting language
- easy ways to automate tasks across Google products and third party services

#### • You can

- Automate repetitive processes and workflows
- Link Google products with third party services
- Create custom spreadsheet functions
- Build rich graphical user interfaces and menus

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#### Rhino

#### Rhino

- open-source implementation of JavaScript written entirely in Java
- managed by the Mozilla Foundation
  - → also provides another implementation of JavaScript engine written in C named SpiderMonkey
- typically embedded into Java applications to provide scripting to end users
- core language only and doesn't contain objects or methods for manipulating HTML documents
- enabling development of webapps with JavaScript in containers like Jetty,
   Tomcat, and Google AppEngine

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