Databases, Networks And The Web
Course Notes

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Contents

Week 1

Key Concepts

- recognise the tools available for this module to edit a node.js file and run it
- describe what static and dynamic web applications are.

1.201 What is a web application?

Data is everywhere around us. For example our account balance is a form of data which gets checked and updated during a commercial transaction.

Web application is a client-server software application in which the user interface runs in a browser[1]. It could be a computer program which allows the user to submit and retrieve data to and from a database.

Static Web Applications

Web applications with little or no interaction with the user.

Dynamic Web Applications

Web applications which allow the user to input, change, and manipulate data.

Desktop vs Web Applications

Desktop	Web
Accessed through OS	Accessed through Web Browser
Different appearance in each OS	Consistent appearenc accross platforms
Fast access to system resources	Slow access to system resources
Lower risk of data loss	Higher risk of data loss
Different version for each OS	Same version accross all platforms
Multiple updates required	Single update for all users

1.203 Further reading

Some useful Further reading is:
`https://techterms.com/definition/web_application`

[1] `https://en.wikipedia.org/wiki/Web_application`

1.205 The life and times of a web request

What happens when we call a web application? We know everything starts with typing the URL in the web browser, but what happens then?

Calling a Web Application

This better shown with the flowchart 1 below.

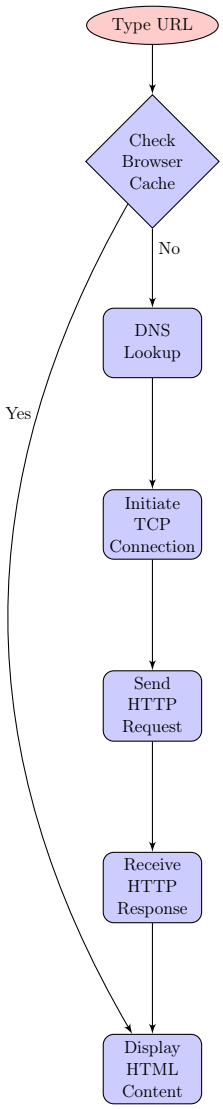

Figure 1: Calling a Web Application

HTTP Protocol

The HTTP Protocol is based on a Request/Response architecture. The client, i.e. the web browser, makes a request for a particular resource. The server returns a response to the browser. This response may or may include the requested resource. This is because errors may occur.

After the browser receives the response, it will evaluate it and decide what and how to display it on the screen.

What if we're dealing with a dynamic web application? Where will the content for the web page come from?

Dynamic web sites are based on programs which run on the web server when an HTTP Request comes in. These programs will generate the content on the fly for the user. One major source of such content is a database.

1.207 Accessing remote resources, HTTP

Ceri, S. et al. Designing data-intensive web applications. (San Francisco, CA: Morgan Kauffman Publishers, 2003). [ISBN 9780080503936].

Chapter 1, p.5-8, Accessing remote resources: the hypertext transfer protocol.

Accessible from here.

Week 2

Key Concepts

- describe what 3-tier web application architecture is.

1.301 Three-tier web application architecture

A three-tier web application architecture is a specialization of the more generic n-tier architecture.

In three-tier architecture, the three modules are as follows:

Presentation Tier Commonly referred to as the *Front-end*, it is responsible for receiving input and displaying output. In general, this part is written in HTML, CSS, JavaScript.

Application Tier Commonly referred to as the *Middleware*, it is responsible for the business logic and calculations. In general, this part is written in JavaScript, PHP, Ruby, Python, and many others.

Data Tier Commonly referred to as the *Back-end*, it is responsible for storing and managing the data the application requires. In general, this part is written in SQL.

The main idea is to keep presentation, application logic and data store separate from each other. This allows each part to be developed and maintained as separate modules.

A web application can be split into two main blocks, depending on where they run:

Client Side The part of the application that runs on the client's computer. Commonly, only the Front-end runs on the client.

Server Side Composed of both the Middleware and the Back-end, it runs on servers (or cloud instances) owned by whoever made the application.

1.304 Information retrieval activity

Ceri, S. et al. Designing data-intensive web applications. (San Francisco, CA: Morgan Kauffman Publishers, 2003). [ISBN 9780080503936].

Chapter 1, section 1.5.7 p.54-55, Three-tier architectures.

Accessible from here.