

Web Server Using ARM-7

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Abstract—computer communication systems and especially the internet are playing an important role in the daily life. Using this knowledge many applications are imaginable. Home automation, utility meters, security systems, card readers and many other appliances which can be easily, controlled using either special front-end software or a standard internet browser client from anywhere around the world. A web server can be embedded into any appliance and connected to the internet so the appliance can be monitored and controlled from remote place through the browser in a desktop.

Keywords—web server, ARM-7, embedded web server, SPI Ethernet, FRC cable, embedded C.

I. INTRODUCTION

A web server is a system which hosts a web site and provides services for requesting clients. The general purpose web servers compose of an operating system, the web pages or the application and huge amount of memory and sometimes a special hardware. The aim of the project is to control the devices or equipment's from the remote place through a web page.

Here all the devices which are to be controlled are connected to the ARM-7 evaluation board. Initially connect 9V adaptor with ARM-7 evaluation board and connect the SPI Ethernet board using 10 pin FRC cable, the program the ARM-7 with flash magic. The web server circuit is connected to LAN or internet. The client or a person on the PC is also connected to same LAN or internet. By typing the IP address of LAN on the web browser the user gets a web page on the screen which contains all the information about the status of the device.

A. Objective

A web server is a computer that runs websites. It's a computer program that distributes web pages as they are requisitioned. A web server is a device which provides access to the user interface functions for the device through a device web page. The basic objective of the web server is to store, process and deliver web pages to the users.

B. Design of Web Server using ARM-7

This project aims at implementing

embedded web server for temperature measurements, LED and switch control. Here the embedded microcontroller is programmed to act as the web server. The web page is designed and uploaded in the embedded microcontroller. Since, the internet is the network of networks we can access this web server from anywhere in the world. If anyone wants to access the web server for device control automation, they has to enter the domain name of the web page in the browser of their PC. Each PC, which has internet connection, is identified by the unique address called IP addresses. The communication within this network is established with the help of the IP addresses. The Ethernet controller receives the request from the user PC.

The Ethernet controller is the stand-alone device in which the function of the Ethernet protocol is written. The Ethernet controller checks whether the incoming information corresponds to it, the information is conveyed from Ethernet controller to embedded microcontroller, otherwise it is ignored. After receiving the requisition from the user can see the web page in their PC the web page designed in the web server is sent. So, the user can see the web page in their PC. The software model for device control automation is developed in the web page. The user can control the device control unit from their PC by accessing with web page. If the user accesses the web page the commands to control the automation unit is sent to the web server. The embedded microcontroller process the information.

C. Components Required

Hardware Components:

- ARM-7 (LPC 2148) Microcontroller (ARM-7 evaluation board)
- Power supply (9V adaptor, 5V adaptor)
- SPI Ethernet board
- 10 pin FRC cable
- LAN cable
- Software Components:
 - Programming Language: Embedded C
 - KIEL micro vision IDE
 - Flash magic

D. System Architecture

Web server architecture is the logical layout or design of a web server based on which a web server is designed, developed and deployed. A web server is a system that delivers content or services to end users over the internet. A web server consists of a physical server, server operating system and software used to facilitate HTTP communication. When client sends request for a web page, the web server search for the requested page if requested page is found then it will send it to client with an HTTP response.

E. Identification of System Components

The two key components of a web application architecture are client-side and server-side. Under the client-side, the front-end development and building components that form the UI visual of an application. Under the server-side, we understand the structural components, communication and correlations of the servers with browsers, databases, micro services etc. Web application architecture defines the logic of how client and server sides will communicate with each other.

F. Demonstration of Prototype

Prototype of web page showing the status of devices is the simple web page design. The client can know the status of the sensors and devices connected to the server and then control the devices via its own browser from remote location. The status of the connected device is shown on the web page by typing the IP address of the server board.

G. Probles Encountered

The most common problems of web application are:

- DNS issues and network connectivity
- Slow servers and loading time
- Poorly written code
- Lack of load balancing
- Traffic spikes

- Specific HTML title tags
- Failing to optimize bandwidth usage

H. Solutions

1. DNS issues and network connectivity: The best way to tackle these issues is by implementing DNS monitoring safeguards to identify what's causing them.
2. Slow servers and loading time: If your servers are particularly slow, they could be hosted using a shared account, which means that your site is sharing the server with hundreds, possibly thousands of other web sites.
3. Poorly written code: You can tackle this issue by ensuring that your developers are using the optimal coding practices, as well as some automated tools such as profilers and code reviews.
4. Lack of load balancing: Slow response time can also be caused by poor load distribution. This design tool causes application components to provide services to the site's other components through the communication protocol.
5. Traffic spikes: One solution is by setting by an early warning system using stimulated user monitoring system.
6. Specific HTML title tags: You can tackle this issue by doing a name search as "site:yourdomain.com" go to Google search console (which used to be known as Google Webmaster Tools) to analyse your website.
7. Failing to optimise bandwidth usage: This may not seem like an issue at first because adding visual, audio, video or other high- volume data may not affect your local network.

I. Advantages

- The amount of knowledge and skills needed to create a web application may be large.
- Simplifies system management.
- Web pages can be used to monitor, control and update the embedded web server system.

J. Limitations

- The speed is limited in some processors which might create problems.
- There must be proper execution of instructions by programmer. This is because entire performance of ARM processors depends upon their execution.

K. Applications

- Traffic monitoring
- Video monitoring
- Power Infrastructure monitoring

L. Expected Outcome

A web server provides access to user interface functions for a device through a device web page. A web server can be embedded into any appliance and connected to the internet so the appliance can be monitored and controlled from remote places through the browser in a desktop.

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