



A DESIGN AND IMPLEMENTATION OF A LAN-BASED FILE MANAGER USING ASP.NET

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Abstract

File Manager aims to develop an efficient system for managing files across a Local Area Network (LAN). A file manager is a software application that provides a graphical interface for performing essential file operations such as creating, opening, editing, renaming, moving, copying, and deleting files and folders. This project extends traditional file management by integrating additional functionalities, including file downloading, printing, and property viewing. The system follows a modular design, consisting of a home module for navigation and help, a secure login module for authentication, and a processing module for file and folder manipulation. Additionally, the project supports network connectivity through FTP and HTTP protocols, enabling users to manage both local and remote file systems seamlessly. The application is developed using ASP.NET 1.1 as the front end, implemented in Visual Studio 2003, and hosted on an IIS server. Overall, the project provides a practical and user-friendly solution for LAN-based file management, enhancing accessibility and operational efficiency.

Keywords: File Management, LAN, ASP.NET, Network Connectivity, System Design

1. Introduction

Effective file management is essential for maintaining organized and secure digital resources within a Local Area Network (LAN). The File Manager system is designed to streamline file-related operations, allowing users to create, rename, move, or delete files and directories while managing access permissions and password-protected areas. Files are organized within a hierarchical directory structure, where directories can contain multiple subdirectories and files. The system interface displays files and folders within the current directory and allows users to sort listings alphabetically, by creation date, or by file size, thereby enhancing navigational efficiency.

The File Manager project consists of three key modules: Home Page, Login Page, and Processing Page. The Home Page serves as the main navigation interface, providing users with system information and links to help and login pages. The Login Page module ensures secure authentication by allowing only administrators to create user accounts and define access privileges. The Processing Page module facilitates the manipulation of files and folders, enabling administrators to manage all drives and allowing users to interact only with directories permitted by their access level.

2. Literature Review

2.1 Existing System

In the existing system, file management operations are limited to local environments without the use of web-based technologies. File sharing and viewing are possible only when specific systems are in sharing mode, which restricts accessibility and scalability. Although basic file management tasks such as creating, renaming, and setting read, write, or execute permissions are supported, the system lacks centralized control and efficient network-based data management. Administrators assign access rights to users manually, allowing them to share or access specific files or folders. However, sharing large volumes of data remains a challenge due to the absence of a dedicated server-based framework.

Drawbacks of the Existing System

- Only a limited number of systems can participate in file sharing within the current environment.
- The absence of a centralized server results in delays during data transfer.
- There is no password-based user authentication mechanism; users are identified only by access rights such as “read-only” or “read/write.”
- The use of access rights restricts users to reading or modifying specific files only.
- The system relies on the TCP/IP protocol for file transfer within the LAN, which limits flexibility and scalability.

2.2 Proposed System

The proposed File Manager system addresses the shortcomings of the existing approach by introducing a web-based file management solution operating within a Local Area Network (LAN) environment. Users can access files through the Internet Information Services (IIS) server and perform a wide range of file operations, including creating, opening, editing, renaming, moving, copying, and deleting files and folders. Additional features such as file downloading, printing, and viewing properties are also incorporated. Files are displayed in a hierarchical structure, supporting multiple directory levels for organized data management.

The proposed system is divided into three modules: Home Page, Login Page, and Processing Page.

- The Home Page serves as the main interface, presenting system details and providing navigation links to the Help and Login pages.
- The Login Page module ensures secure access by authenticating users through a username and password system. Only administrators can create new user accounts and assign access permissions. These access rights are stored in the database for validation during login.
- The Processing Page module enables file and folder operations based on user privileges. Administrators have full access to all drives, while users are restricted to designated directories. This module allows operations such as browsing, uploading, downloading, renaming, and deleting files within the allowed scope.

Advantages of the Proposed System

- Enables network connectivity through FTP or HTTP, allowing users to browse and connect to servers easily.
- Provides a complete client-side implementation for file server protocols.
- Requires minimal setup, needing only a web browser and an IIS server.
- Allows multiple systems to share files efficiently using the FTP protocol for faster access.
- Incorporates user authentication to ensure secure file sharing and manipulation.

3. Methodology

3.1 System Design

The LAN-Based File Manager adopts a modular architecture consisting of three primary modules:

1. **Home Module:** Serves as the main interface, allowing users to navigate and access files and directories.
2. **File Operations Module:** Handles file-related actions such as creating, editing, moving, copying, and deleting files.

3. **User Control Module:** Manages authentication, permissions, and user activity logs.

3.2 Implementation

The front-end was developed using ASP.NET to provide an interactive user interface, while C# handled server-side logic and network communication. The system uses TCP/IP protocols to facilitate file transfer and access over the LAN. Data integrity and access control were implemented to prevent unauthorized operations and ensure secure transactions.

3.3 Testing Environment

The system was tested in a LAN environment comprising five interconnected computers. Functional testing verified each operation, including file upload, download, and permission-based access. Stress testing ensured that the system remained stable during simultaneous multi-user interactions.

4. Results and Discussion

4.1 System Performance

The implemented File Manager system was evaluated within a Local Area Network (LAN) environment using the ASP.NET framework and Internet Information Services (IIS) server. The system demonstrated stable and efficient performance in executing concurrent file operations such as creation, renaming, copying, and deletion. During testing, response times remained consistent even when multiple users accessed the system simultaneously, indicating that the modular architecture effectively optimized processing load and resource utilization. File uploads and downloads were completed with minimal latency, validating the reliability of the integrated FTP and HTTP protocols for network connectivity.

4.2 Usability and Interface Evaluation

Usability testing was conducted to assess user interaction and satisfaction. Feedback indicated that the graphical user interface (GUI) was intuitive and user-friendly, facilitating easy navigation through the Home, Login, and Processing modules. Users found the hierarchical file structure and sorting options—by name, date, or size—particularly beneficial for efficient file management. The design of the system interface minimized user effort, thereby enhancing operational efficiency and reducing training requirements for new users.

4.3 Security and Access Control

The authentication and authorization components were tested to ensure secure user access. The login mechanism effectively restricted unauthorized users and validated credentials through a database-driven verification process. Administrator accounts demonstrated full control over access management, including

assigning or revoking permissions dynamically. Role-based access control (RBAC) was successfully implemented, ensuring that users interacted only with authorized directories. This hierarchical access structure provided a balance between usability and data confidentiality, reinforcing the system's reliability in a multi-user environment.

4.4 Reliability and Scalability

The system exhibited strong reliability during operational testing. Even under heavy file transfer conditions, there were no system crashes or data integrity issues. Scalability was verified by introducing additional users within the LAN, which did not significantly affect performance. The modular design supports future scalability, enabling integration of enhanced features such as encryption, cloud connectivity, or multi-platform compatibility without substantial redesign of the core architecture.

4.5 Comparison with Existing Systems

Compared with traditional LAN file-sharing systems, the proposed File Manager system offers several advantages. Existing systems often depend on manual permission settings and direct system access, which limit scalability and security. In contrast, the File Manager employs a centralized, web-based control mechanism through the IIS server, ensuring efficient file access and administration. Features such as file downloading, printing, and property viewing enhance the system's functionality beyond basic file manipulation. These advancements demonstrate how the integration of ASP.NET and .NET framework technologies can improve the efficiency and manageability of networked environments.

4.6 Discussion

The overall results affirm that the File Manager system successfully meets its objectives of providing secure, efficient, and user-friendly file management within a LAN environment. The use of a modular architecture facilitates maintenance, enhances system flexibility, and allows for future scalability. The integration of authentication, authorization, and centralized control mechanisms ensures secure operations and data integrity. However, the study also revealed opportunities for improvement. The absence of real-time synchronization limits simultaneous editing of files, and while the current security model is effective, it can be further strengthened through the adoption of encryption protocols and multi-factor authentication. These findings align with the proposed future enhancements discussed in the subsequent section, emphasizing the need for cloud integration, enhanced encryption, and cross-platform accessibility.

4.7 Summary of Findings

In summary, the File Manager system achieved its intended goals of enhancing file management efficiency and security within a LAN environment. The combination of ASP.NET framework, IIS server, and role-based

access control contributed to improved system reliability, usability, and scalability. Performance tests confirmed that the system can manage multiple users and large file operations effectively without compromising speed or data integrity. The user-centered design and modular structure provide a foundation for further advancements, such as cloud integration and advanced encryption, positioning the File Manager as a practical and scalable solution for network-based file management.

5. Conclusion

The File Manager system provides a secure and efficient solution for file sharing and manipulation within a Local Area Network (LAN) environment. Developed using the ASP.NET framework and deployed through the Internet Information Services (IIS) server, the system enables users to access and manage files indirectly through a centralized platform. User authentication is handled through a database-driven validation process, ensuring that only registered users with valid credentials can access their designated directories and drives.

The administrator plays a key role in maintaining system control by managing user accounts and defining specific access rights. This flexibility allows for dynamic adjustments to user privileges and the allocation of additional drives or folders as necessary. Once authenticated, users are granted access to the Processing Page, where they can perform essential file operations such as creating, renaming, deleting, uploading, and downloading files.

Overall, the File Manager system demonstrates an effective approach to LAN-based file management by combining authentication, authorization, and server-based access control. It enhances data security, supports multi-user accessibility, and simplifies administrative management. Future improvements could include integrating advanced encryption techniques, real-time file synchronization, and enhanced logging mechanisms to further strengthen system security and efficiency.

6. Future Work

While the File Manager system effectively supports secure file management within a Local Area Network (LAN), several enhancements can be introduced to further improve its functionality, scalability, and user experience. Future developments could include the integration of cloud-based storage to enable remote file access and synchronization across multiple devices. Implementing advanced encryption techniques and multi-factor authentication would strengthen system security and protect sensitive data during file transfer and access.

Additionally, incorporating real-time file activity monitoring and audit logging would allow administrators to track user actions and maintain system transparency. The introduction of role-based dashboards could provide a more personalized interface for both administrators and users. Expanding the system to support cross-platform compatibility—including mobile and web applications—would further enhance accessibility.

These future enhancements aim to transform the File Manager into a more robust, flexible, and intelligent file management solution capable of meeting the evolving needs of networked and distributed environments.

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