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3.1.2 Hardware Interfaces
In the context of the City Council project, which primarily operates as an online platform, the interaction between the software and hardware components is minimal. However, if there are hardware interfaces involved, such as servers, client devices (like PCs, tablets, or smartphones), or any other peripheral devices, these interfaces need to be clearly defined.

Server Hardware Interface:-
1. Logical Characteristics:
• The server hosts the application, database, and API layers. It handles all incoming requests from clients (users, employees, admins) and processes them.
• The software interacts with the server hardware to manage data storage, processing, and network communication.
• Data interactions include reading and writing user data, handling service requests, managing feedback, and processing payments.
• Control interactions involve managing user sessions, request processing workflows, and ensuring proper execution of background tasks (e.g., updating request statuses).
2. Physical Characteristics:
• The server hardware may consist of physical or cloud-based infrastructure (e.g., AWS, Azure).
• Supported device types include standard server configurations, capable of running web servers (e.g., Apache, Nginx) and database management systems (e.g., MySQL, PostgreSQL).
• The server hardware should support Ethernet or Wi-Fi connections for communication over the internet.
3. Special Libraries:
• If cloud services are used, libraries such as AWS SDK for PHP or Azure SDK for PHP may be utilized to interact with cloud resources.
• For data storage, libraries like PDO (PHP Data Objects) or MySQLi might be used to interact with the MySQL database on localhost.
Client Devices Interface:-
1. Logical Characteristics:
• Client devices (PCs, smartphones, tablets) access the platform via a web browser or possibly a mobile app.

• The software interacts with the client hardware primarily through the device's web browser or operating system to display the UI, process user inputs, and handle data transmission.
• Data interactions include sending requests to the server, receiving responses, and rendering web pages.
• Control interactions involve managing user inputs (e.g., form submissions) and ensuring secure communication with the server.
2. Physical Characteristics:
• Supported devices include any internet-enabled device with a modern web browser (e.g., Chrome, Firefox, Safari).
• The client devices should have a stable internet connection (Wi-Fi, 4G/5G, Ethernet) to interact with the server.
• No special hardware is required beyond standard computing devices.

3. Special Libraries:

- The front-end may utilize libraries such as React.js or Angular.js to enhance the user experience.
- If developing a mobile app, libraries like React Native or Flutter could be used to build the interface.
- For secure communication, HTTPS protocols are implemented, possibly using libraries like OpenSSL.

3.1.3 Software Interfaces

The City Council platform is designed to work across various operating systems to ensure compatibility and reliability. Below is a description of how the platform interfaces with the operating system it runs on, focusing on the key aspects of process management, file handling, and network communication.

1. Operating System Interface:

Supported Operating Systems:

- Linux (e.g., Ubuntu, CentOS)
- Windows Server
- macOS (for development purposes, if necessary)

2. Process Management: The City Council platform relies heavily on the operating system to manage the execution of various processes. These include the web server, database server, and any background tasks that may be necessary for the operation of the platform. The operating system's ability to schedule processes and allocate resources is crucial to maintaining optimal performance and ensuring that all tasks are carried out efficiently.
3. File System Interaction: Interaction with the file system is another critical aspect of the platform's operation. The software reads and writes several types of files, including configuration files, log files, and temporary data. These files are stored on the operating system's file system, and proper management of these files is essential for smooth operation. For example, log files generated by the application are crucial for tracking user activities and troubleshooting issues.
4. Network Communication: Network communication is handled through the operating system's network stack. This includes processing all incoming and outgoing HTTP/HTTPS requests, interacting with external APIs, and managing secure connections. The operating system manages the network interfaces and handles the transmission of data between the server and the clients, ensuring that all communication is secure and efficient.

3.1.4 Communications Interfaces

The City Council platform uses standard communication protocols to manage data exchanges between users, employees, and the system. The primary protocol for web communication is HTTPS, which ensures that all interactions between the user's browser and the server are encrypted. This encryption helps

protect sensitive information like user credentials and service requests from being accessed by unauthorized parties.
In addition to web communications, the platform also handles email notifications using the SMTP protocol. To keep these email communications secure, the system uses encryption (like TLS) to ensure that emails are protected while being sent. These measures ensure that both web and email communications are secure, reliable, and in line with common industry practices. The system is also designed to handle data transfers smoothly over typical network speeds, making sure that all necessary information is synchronized effectively between users and the platform.

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