

Equipment Room Database and Web-Based Inventory Management

System Block Diagram

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System Overview

The inventory management system consists of three main software components: the database, the user interface(s) and the bridge software between the user interface(s) and the database. The bridge software is required because current web servers and browsers do not have the ability to communicate directly with a database.

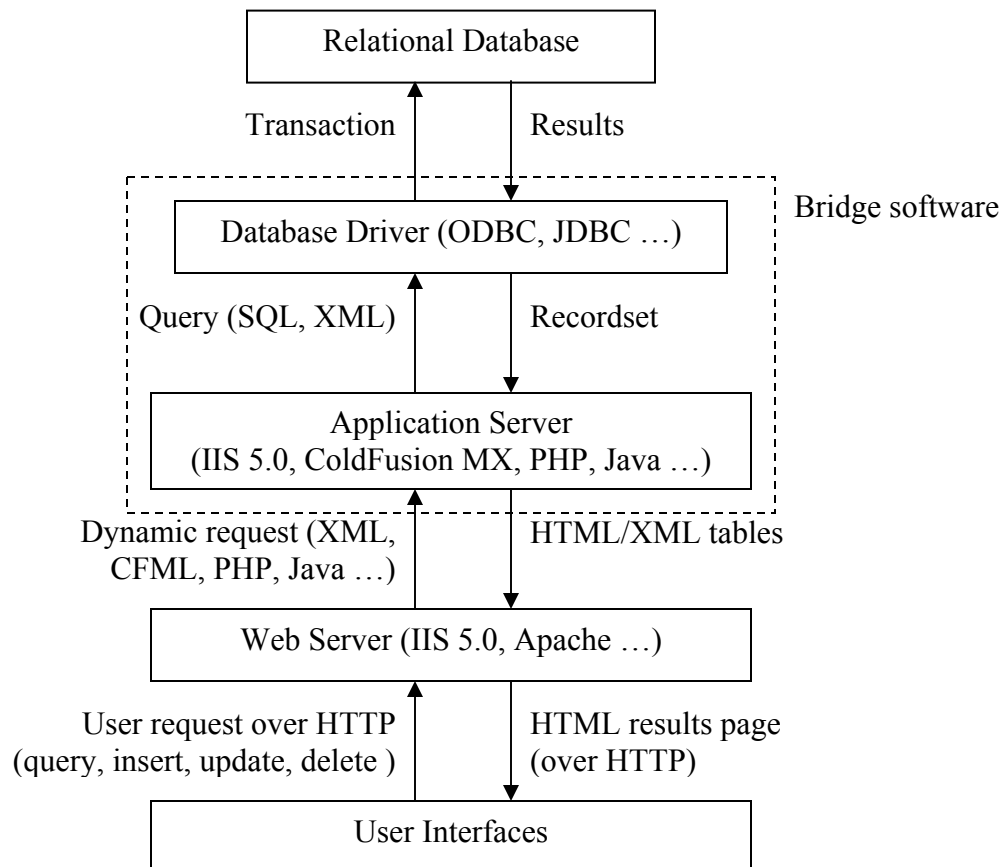


Figure 1 – System block diagram for an inventory management system. The data flow shown represents a user searching for parts.

Relational Database

The relational database contains all of the information needed to track the equipment room inventory. The database can be searched or changed. Searching the database (called a *query*) causes it to return a subset of the data (called a *recordset*) that matches the search criteria. Changing the database by inserting, updating or deleting information causes the database to return status information regarding the success or failure of the change. Any operation on a database is called a *transaction*.

Database Driver

The relational database is usually stored in a proprietary format and cannot be interpreted by the user or other software without the assistance of a database driver. The driver takes incoming SQL or XML transactions and converts them to a form understood by the database. The driver also passes recordsets and the status of attempted database changes back to the requesting application.

Two of the most prevalent drivers are ODBC (Open DataBase Connectivity) and JDBC (Java DataBase Connectivity).

Application Server and Web Server

When a web server receives a request for a web page, it normally retrieves the page and passes it back to the browser. Web pages that retrieve or manipulate data from a database, however, contain sections of non-HTML code (such as JavaScript or PHP) that browsers cannot interpret on their own. Therefore, web servers pass such pages to application servers, which interpret the non-HTML code, retrieve the data and return the results in HTML for display in the browser.

In general, application servers may be implemented as actual server software, such as Macromedia ColdFusion MX Server, or they may be as simple as small Java applets.

User Interfaces

Each class of user will have a separate user interface appropriate for the functions that user class requires. This separation helps enforce security and data integrity.

All I/O shown in the block diagrams below is between the user's browser and the web server, conducted over HTTP (Hypertext Transfer Protocol), as illustrated in Figure 1, unless otherwise noted. In addition, all user interface blocks assume the presence of basic human interface devices (keyboard, mouse and display).

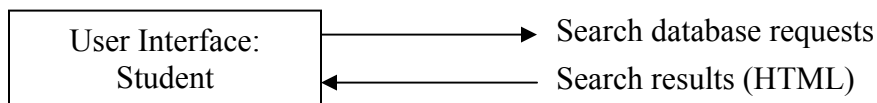


Figure 2 – Block diagram for student interface

Student Interface

The student needs to be able to search the database for the availability of a given part or type of part, and also for what parts the student currently has checked out. Preferably, he should be able to do this from any computer with a suitable web browser.

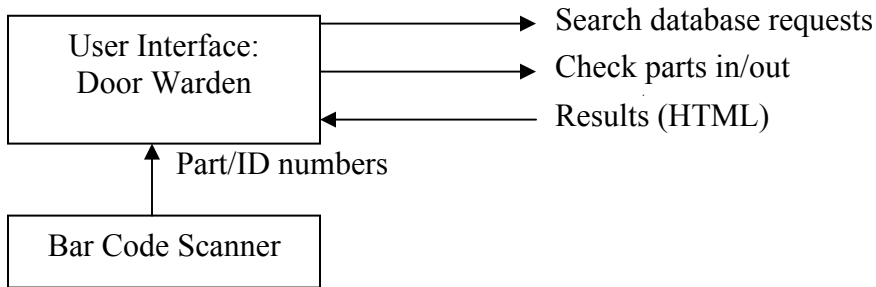


Figure 3 – Block diagram for door warden interface

Door Warden Interface

The door warden’s primary function is to check parts in or out of the equipment room. To aid this process, the door warden will be given a bar code scanner to streamline part number and ID number entry. The warden can search the database for part availability and can display the list of parts checked out by any student or set of students.

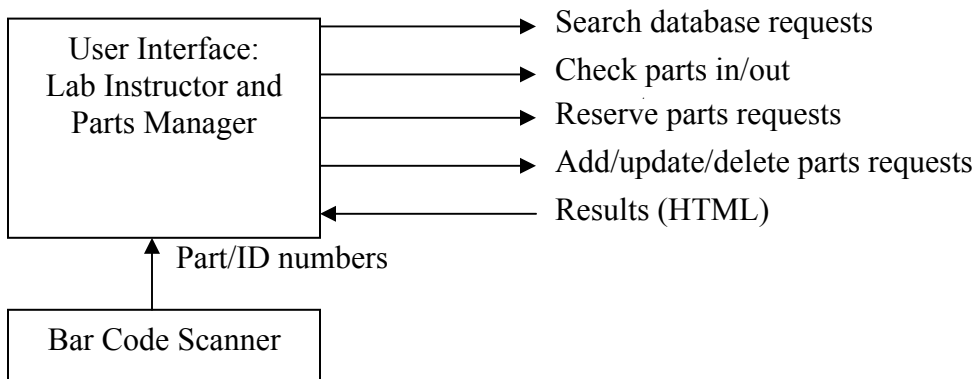


Figure 4 – Block diagram for lab instructor and parts manager interface

Lab Instructor and Parts Manager Interface

The lab instructor and parts manager can do everything the door warden can, plus they can also reserve parts, preventing them from being checked out. A lab instructor could do this to ensure availability of parts for a particular experiment. The parts manager may reserve parts to reflect damaged parts that are not suitable for use but are expected to be repaired in the future.

The lab instructor has the limited ability to update the parts count in the database to reflect parts destroyed beyond repair in the laboratory. The parts manager has the more

general ability to add parts to reflect received part orders, to delete parts that are no longer used, and to change the quantity or description of parts currently in the database.

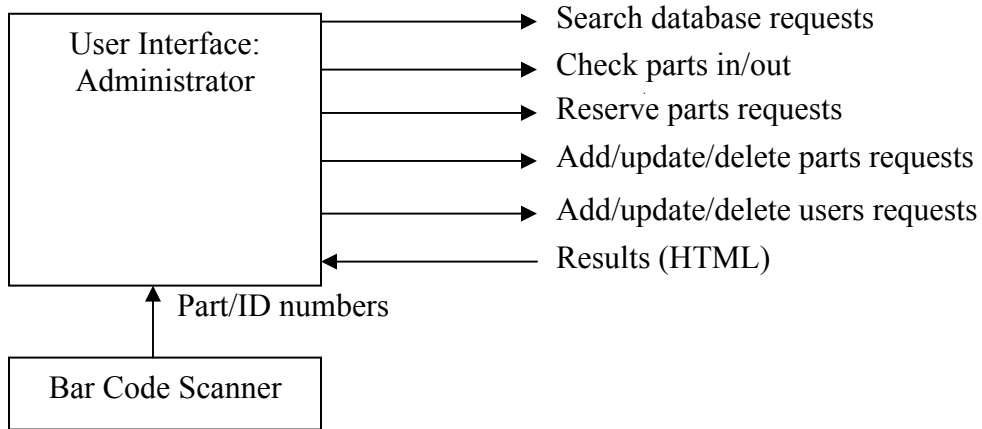


Figure 5 – Block diagram for administrator interface

Administrator Interface

The administrator is in complete control of the system and can perform any and all functions associated with the system. The administrator is the only user capable of adding, editing and deleting other users from the system.