# 1. APPLICATION ARCHITECTURE FOR PERFORMANCE
   REPORTING SYSTEM

The following section describes the hardware and software necessary for the Performance Reporting System application to both operate and to do so nominally. The goals will be to minimize user wait time when accessing the site, to minimize site down time, to minimize the effort needed to update the site content, and finally to make upgrading site components, in the future, as painless as possible. These priorities are considered within the constraints of budget and available local bandwidth.
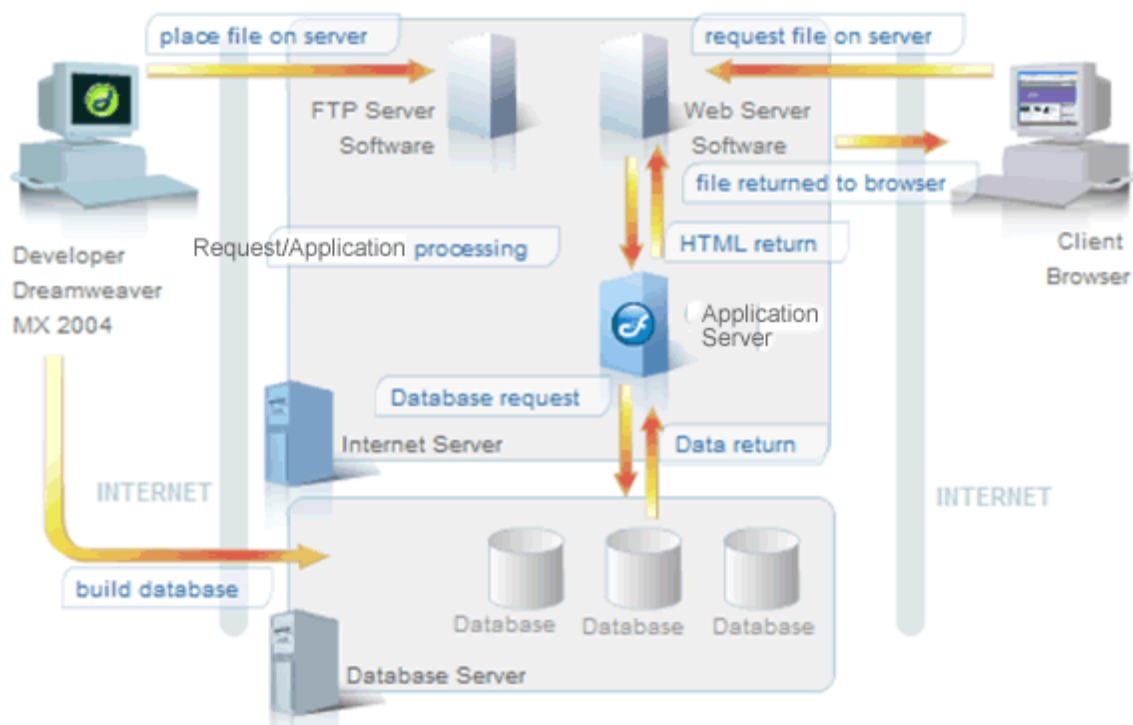
1.1. Hardware Specification
The following section contains a description of the requirements for hosting the Performance Reporting System Application.

1.1.1. Development Environment
To address the priority of both minimizing site down-time and also keeping it easy to update the site , the application development will be performed in a separate 'development' environment. The development environment is differentiated from the 'production' environment both by physical location and by intention: changes are only made to the live production environment after those changes have been fully vetted within the development environment. The development machine will match the

specifications of the production machine as closely as possible. Likewise, the software setup on the production machine will mimic the software setup on the production machine as much as possible. The production server will be run within a secure location such that both nobody will be able to view incomplete versions of the application unless the development team wants them to, and so that if there are security weaknesses in the development version of the application at any point those weaknesses will not be accessible from the internet at –large. The development machine will be physically located inside the office of the developer, as opposed to the production environment which will be located in server farm managed by a hosting company. This dual environment setup – i.e., having a development environment and a production environment – is a standard best practice for web application development.

1.1.2. Physical Server Hardware Requirements
We will obtain a dedicated server 'machine' on which to host the Performance Reporting System.
The minimum physical server hardware requirements for the Performance Reporting System application are as follows:

- The system will require enough storage space for the operating system, SQL database, ColdFusion application server and ColdFusion software programs.

- The system will require at least 8 gigabytes of RAM

- The system will require at least 1 quad-core CPU, or two dual-core CPUs. The speed of the CPU(s) should exceed 2 ghz.

1.1.3. Hosting Location
The Performance Reporting system application will be hosted on a server hosted in the US. This will minimize hardware maintenance and operating system updating issues that often plague locally hosted servers. It will also ensure nearly 100% hardware uptime, and the broadest reaching internet connectivity available. Finally, the dedicated hosting will allow expansion of the production environment to include infinitely more memory, storage, and processing resources, if we determine we need them.

1.1.4. Physical Hardware Maintenance Responsibility
The contracted hosting company in conjuction with Hennice/TMG will be responsible for physical hardware maintenance.

1.1.5. Responsibility for Monthly Costs (Power, Bandwidth, etc.)
Monthly costs associated with running the Performance Reporting System production environment will be covered as a monthly hosting and maintenance fee. This will include costs associated with backups, hosting and server maintenance. the end of the project.

1.2. Software Specification
The following sections describe the minimum software specifications for the operation of the Performance Reporting System application.

1.2.1. Operating System on PRS Server, and License Responsibility
- OS: Windows Server 2003 or newer

- Internet Information Server IIS
- Assumption: This software installed on Hosting server

1.2.2. Database Software on PRS Server, and License Responsibility

- RDBS: Microsoft SQL Server 2005 or newer
- Assumption: This software installed on server

1.2.3. Application Server

- Adobe ColdFusion 9 or newer
- Assumption: This software installed on server

1.2.4. Web Application Client System Requirements

- **Browser:** System user must have at least Internet Explorer version 8.0 or newer, or Firefox v3.6 or newer. Testing will be performed with Chrome and Safari v5 as well, but these two latter browsers will not be priorities for compatibility purposes.
- **Screen Size:** System user must have a screen resolution of at least 1024x768 pixels.
- **Operating System:** Web application user must be running an operating system compatible with the Adobe Flash Player plugin. In general this means the user must be running Windows, Mac OS X, or Linux.
- **Internet Access Speed:** It will be assumed that users of this system will be using a low-end DSL level connection (512kbps synchronous), or faster, for access to the internet.
- **Accessibility:** The maps, buttons, and general color scheme will be tested for accessibility to color blind persons. No other plans for accessibility features are planned.

1.3. Administration/Security
There are two primary security aspects to the PRS server setup: server/administration security, and application security.

1.3.1. Server/Administration Security
The PRS server will be its own server environment. Remote login to the OS, databases, and server software will all be limited in various ways:

1) Remote logins will only be allowed to originate from certain known-safe IP addresses or address ranges.
2) Server login procedures will be encrypted – server login will not be done by transmitting a password or other authentication token in plain text. Users will be managed as standard Windows users.
3) A VPN connection will be used to tunnel all administrative traffic to and from the server through an encrypted channel.

4) The development server will be hosted inside of a firewall's DMZ and thus public access to the server will be very limited.

1.3.2. Application Security
The Performance Reporting System server will authenticate and authorize users based on credentials. Each user account in PRS will have some specific credential information updated over a one-way encrypted link starting at the SQL Server database and ending at the PRS server's SQL Server database. The result will be that the PRS server's SQL Server database contains a table of core user credential information that can be used to confirm if user credentials submitted to the PRS server are valid for a given purpose (login, view, data edit, etc.). The one way link will not be kept connected at all times. A user session will become inactive in thirty minutes after which the user will have to re-authenticate
At first release, the web PRS application will only allow authenticated users to view data, so there will be no focus on authorization of certain actions in the PRS application aside from can the user view the data. If yes, then they can see it all. If no, then the viewer will not be accessible. This security at the PRS server is coupled with the basic principle that users in theory should only be able to launch the viewer once they have already logged into the PRS and been properly vetted by that system as users that can access the system. A user's access will be based and limited to the role of the user. Performance reporting system will use URL encryption throughout the system. The physical server will be located in a secure server farm and a daily backup will be implemented so as to avoid data loss.