

The Evaluation of Database Web Servers for the RCAS Environment

**M. Cassandra Smith
The MITRE Corporation**

1.0 PROBLEM STATEMENT

This paper presents a plan for evaluating database web servers for use in the Reserve Component Automation System (RCAS) environment for integration and interoperability. Integration and interoperability must be planned between the RCAS integrated database and external databases, which exchange data with it. It must also be planned between the users (or units) at the sites and the integrated database. The purpose of a database web server would be to provide easy-to-use access to RCAS information via the RCAS intranet using a web browser on a user's desktop. The user would point and click to request information. The location, platform, database management system (DBMS) [e.g., Sybase or Oracle], and manner of data distribution would be transparent to the user. The plan described herein focuses on a set of criteria for performing hands-on evaluation of selected database web servers.

The remainder of the paper contains background information in section 2.0, the methodology for the evaluation of the database web servers in section 3.0, the evaluation criteria in section 4.0, a sample hardware and software configuration for executing the experiments in section 5.0, and conclusions in section 6.0.

2.0 BACKGROUND

RCAS is planned to be an organized collection of systems serving the U.S. Army Reserve (USAR) and the Army National Guard (ARNG). RCAS will support commanders, staff, and functional managers in mobilization planning and administration of the Army's Reserve Component (RC) forces. According to the RCAS Operational Concept Description (OCD) [1], the origin of RCAS goes back to the mid 1980s when the Army identified a need to improve automation of the mobilization function during large mobilization exercises directed by the Joint Chiefs of Staff.

The RCAS under development will feature an integrated database deployed at the State Area Commands (STARCs) and Regional Support Centers (RSCs). Figure 1 depicts the RCAS enterprise database. The shading around boxes indicates multiple copies of the database. For example, the integrated database will be distributed at multiple STARCs and RSCs. The National Guard Bureau (NGB) and US Army Reserve Command (USARC) will each have selected, read-only copies of the integrated databases from the STARCs and RSCs within their chains-of-command.

The RCAS environment includes the integrated database, which is currently planned for a Hewlett-Packard (HP) 9000 server running HP Unix. The RCAS program is considering migrating the database to a server running the Microsoft (MS) NT operating system. The RCAS users are the members of the Army Reserve and Army National Guard units. These units have MS Windows platforms running the MS Access DBMS. They will use that configuration to access either the integrated database or the query databases at larger sites. The external systems use a variety of hardware platforms, such as Windows workstations and mainframes, as well as a variety of DBMSs, such as Oracle and IBM's DB2.

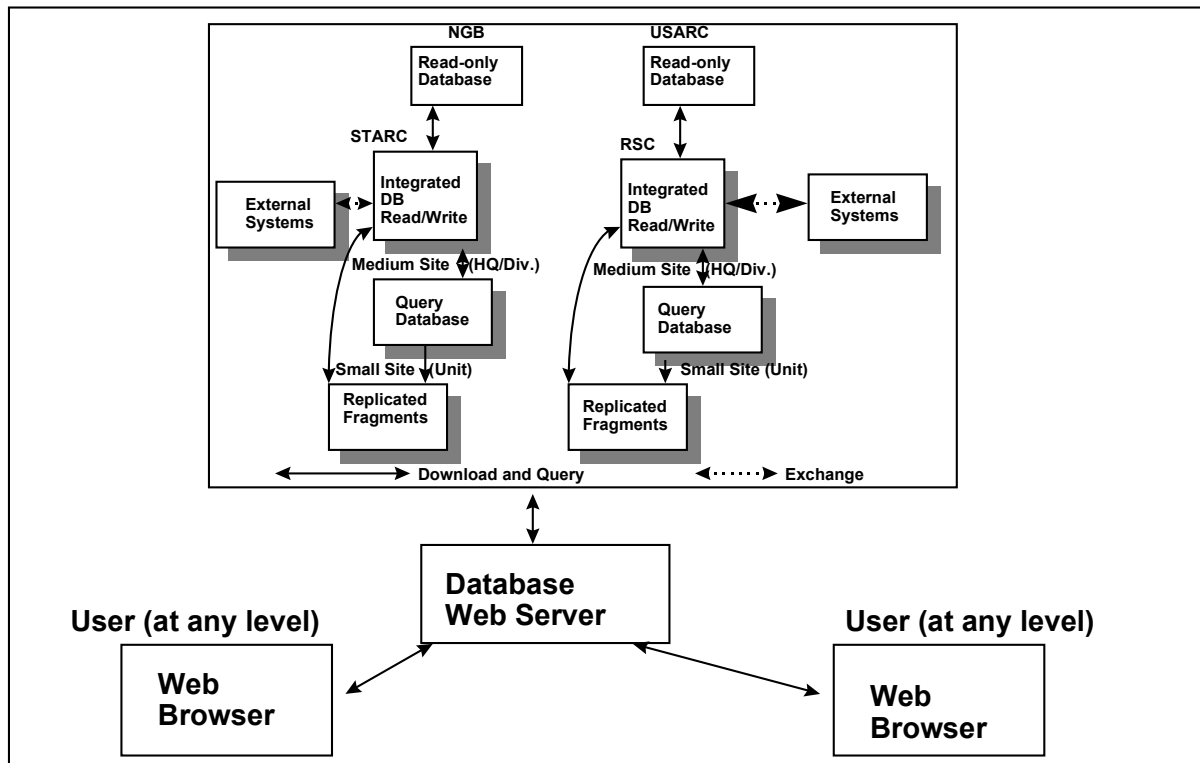


Figure 1. Planned RCAS Enterprise Database

3.0 STUDY METHODOLOGY

Figure 2 presents an overview of the methodology for the evaluation of database web servers in the RCAS environment. The steps in the methodology are discussed below.

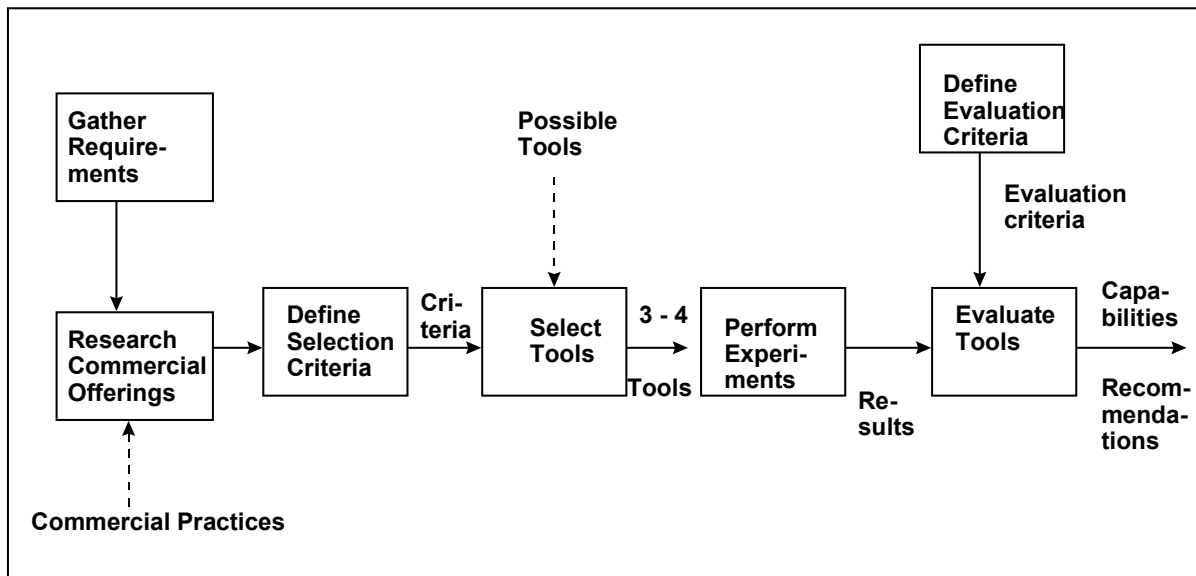


Figure 2. Overview of Study Methodology

The requirements gathering step will reflect both general requirements of a database web server and the specific needs of the RCAS environment. In researching commercial offerings we will observe existing implementations and talk to web masters within the Department of Defense (DOD). The selection criteria will reflect that the RCAS de facto standard for server operating systems is Windows NT. A hardware platform using that operating system will be the host for the database web servers. This restricts the number of database web servers selected for evaluation. We anticipate a Pentium platform running Windows NT 4.0 with approximately 48 megabytes (MBs) of memory as the specific configuration.

The experiments on each server under evaluation will incorporate inserting the tool into the RCAS environment and performing standard database access (queries and updates) as well as a limited number of typical RCAS applications. We will obtain access to one or more external databases to both pull and send data via the RCAS data exchange servers. Using the evaluation criteria, each tool will be evaluated, and findings on the current capabilities of this class of tools along with a specific tool choice will be made.

4.0 EVALUATION CRITERIA

Below is a list of general criteria for evaluating the database web servers and a brief description of each criterion. The criteria, on the whole, reflect functional capabilities desired in the tool. The list also includes some critical performance capabilities.

- Multidatabase access—The RCAS environment includes an integrated database as well as external databases. The selected tool must be able to access multiple databases.
- Interoperability—The selected tool must support an environment that includes system components on various computer hardware platforms.
- Access control—Just as a DBMS can restrict access to tables, rows, and columns of data, the database web server must support the same types of access control.
- Scalability—The RCAS database will be deployed to sites in increments. The database starts out small, but it will grow with each increment. The selected tool must be capable of maintaining performance as the database and system grow.
- Performance—The performance level for a specific task must reflect what is reasonable to a user who regularly performs the task.
- Transparency—The server must shield the user from knowledge of the underlying code, the distribution of data, the location of system components, etc.
- Ease of use—The web server must require minimum programming for the constructor of the web site. The interface for the user must be, on the whole, point and click.
- Dynamic reconfiguration—This criterion reflects, among other things, the need to not bring the total system down to add sites or users.
- Cost—The cost should be reasonable. For example, requiring the purchase of software for each client is an unreasonable cost burden.
- Ease of installation—This should be accomplishable in a reasonable time, for example, less than one hour.
- Documentation—The documentation should be easy to use and provide step-by-step instructions for constructing a web site and troubleshooting problems.
- Technical support—This should be readily accessible, for example an 800 number that is available 16 hours per day. The support should be inexpensive.
- Error handling and recovery—The system should provide graceful degradation in the event of a problem.
- Availability/reliability—The web server should ideally have high mean times between failures.

- Multimedia support—RCAS is increasingly requiring non-traditional data, such as images, or pictures, of soldiers in its database. The database web server must support that capability.
- Web browser support—The web server must be capable of being accessed using popular web browsers. It must not be limited to a single web browser.

5.0 SAMPLE HARDWARE AND SOFTWARE CONFIGURATION

Below is a list of system hardware and software that might be used for executing the experiments on database web servers.

- Pentium platform
- 48 megabytes (MB) memory [32 MB minimum, the more the better]
- Approximately 1 gigabyte (GB) direct access storage (i.e., hard disk) [more is better]
- A connected CD -ROM drive
- MS Windows NT 4.0 operating system
- CD-ROM device driver
- TCP/IP
- Appropriate network transport protocol software
- Web enabled

6.0 CONCLUSIONS

Using the study approach depicted in the work plan and the evaluation criteria, we anticipate choosing a tool that is optimum for the RCAS environment. This approach can also be used by others who wish to evaluate database web servers. In addition, we anticipate contributing to the determination of the state-of-the-art of the class of tools known as database web servers.

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BIOGRAPHY

Cassandra Smith is a senior information systems engineer at the MITRE Corporation in Reston, VA. Her interests include database management systems, especially object-oriented and relational, and hardware and software systems design. She holds a Ph.D. in computational linguistics. Cassandra can be reached as follows:

The MITRE Corporation
1820 Dolley Madison Boulevard
Mail Stop W544
McLean, VA 22102
(703) 983-6703

fax (703) 983-7762
mcsmith@mitre.org