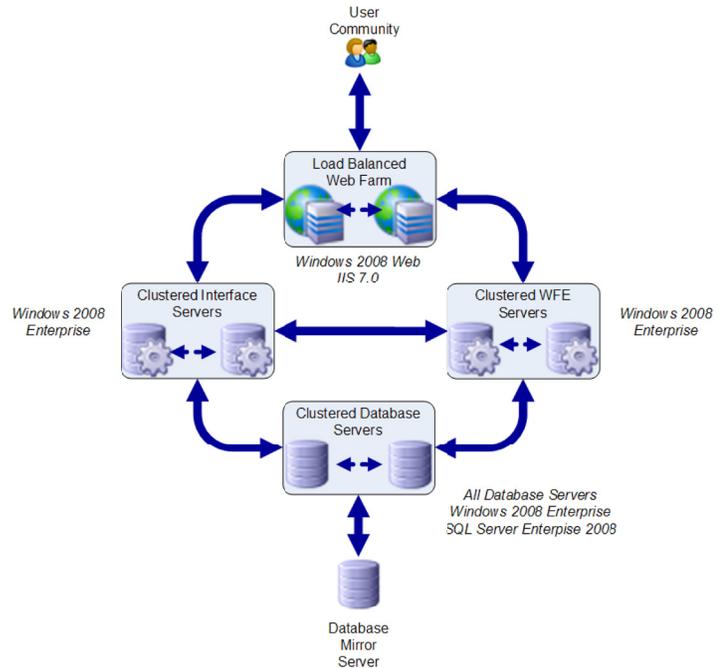# Windows Availability and Scalability

"Better, Faster, and Cooler..."

-RelWare Infrastructure

Experience Unprecedented Uptime of an EMR with OneRecord and Windows Server 2008

Availability

With patient safety on the line, you need an EMR platform that is reliable and always available. When seconds count in your doctors' decision making, performance and accessibility of the patient's EMR can be critical. When OneRecord is deployed in conjunction with the Windows Server™ 2008 operating system, you no longer have to worry that your doctors won't have every available tool they need, when and where they need it.

The enhancements of Windows Server 2008 performance and scalability are taken advantage of with the OneRecord application and its infrastructure architecture. The four server sets of OneRecord are independently scalable to make the entire deployment that much more available.

Web Farm

The OneRecord Web farm is load balanced to ensure optimal performance and availability, regardless of the number of client requests. As the number of clients and/or requests increase, scaling out the Web farm is as easy as adding additional servers–no downtime required.

Continuous availability is increased with the OneRecord Authentication and Preferences Service (APS) SOAP service which ensures that if the server a user's session is authenticated to becomes unavailable, that session can continue uninterrupted.

OneRecord™

Rel Ware ®

Work Flow Engine (WFE) & Interface Servers

Managing the flow of data between third-party HL7 systems, Web clients, and OneRecord are multiple WFE and SOAP Windows services. Duplicating these services allows for redistribution of request loads as needed, based on the activity of end users. This operation model distributes the workload evenly among the servers—additional server load capacity (*scaling*) allows increased service replication to improve system performance.

Both sets of servers are configured utilizing Windows 2008 failover clusters. Should a server in either farm become unavailable, the primary services on that server will failover to their secondary server and continue—service uninterrupted. Once their primary server is online, the services will be failed back, and each of the servers in the farm will once again be responsible for only their set of services.

Database Cluster

The database servers of a OneRecord deployment are configured in a two-node, two-instance failover cluster. Though a different cluster model (see SQL Availability and Scalability Solution Paper), as with the WFE and Interface servers, should either database server fail, the secondary Cluster Service will take over as the primary service for all databases until the failed server comes back online.

A 3rd database server is set up as a mirror site for all databases needed for data mining and reporting. This server also acts as a secondary disaster recovery option should both servers in the database cluster fail.

Performance

Windows Server 2008 has support for more highly specified servers than ever before. Taking advantage of the 64 bit architecture, the WFE, Interface, and Database servers can support up to eight processors and 2 TB of RAM each. This gives a lot of room to grow from initial deployment hardware configurations as system usage increases. The infrastructure architecture of OneRecord is designed so that each set of servers can be scaled at their own pace to address specific performance pain points. For example, if you add additional interface feeds, the interface servers can be scaled to accommodate the extra traffic without adjustment to any other server types. Windows Server 2008 supports scaling up without even taking a server offline, ensuring even higher uptime percentages.

Should scaling up not be enough to support optimal performance of the application, servers can be added to each type of server set without downtime. The cluster configuration of the three backend server sets can be extended to three node instances and beyond. Scaling out the Web farm is even simpler: just add a server to the farm and make it available to handle incoming requests.

Windows IIS7 boasts many improvements that increase front-end Web server performance. HTTP compression makes best use of available bandwidth, thereby increasing response times. Kernel caching is now one of the most effective means of scaling and improving the performance of the front end. Serving cached responses from the kernel increases the number of requests per second that IIS can serve because those cached requests never enter the IIS user mode.

Availability

Continuous availability is increased with the OneRecord Authentication and Preferences Service (APS) SOAP service, which ensures that if the server a user's session is authenticated to becomes unavailable, then that session can continue uninterrupted.

About RelWare Technology

At RelWare, we realized in 1998 that the Internet, and specifically, Web-based technology was the future. We built our company with the continued motto: "Every application is a Web application." This meant that anytime we looked at writing a new application, we first asked ourselves, "Can I write this as a Web application?" What we soon found was the answer was invariably "Yes". . .every time.

It has been 10 years since we started, and we are still saying "Yes". . .every time.