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Overview
This document outlines the technical requirements for the HL7.org site implementation. The goal for the new HL7 site is to facilitate community and to build a virtual edifice for an organization whose business is conducted almost entirely in a virtual environment. By providing a consistent, positive user experience for members and non-members alike, we hope to build a web presence that better represents the organization and its members, as well as a site that reflects the credibility of the organization.

The technical requirements for the new HL7.org website center around three basic principles: Integration, Performance and Ease of Administration.

Integration
The new HL7.org will provide many integral services to its members. These features may be provided by many individual applications; however this should not be apparent to the average user. The use of consistent navigation and integrated services is a must. At the same time duplication of components or technologies should be kept to a minimum.

Performance
As HL7.org grows its capabilities and its audience, the hardware and software infrastructures selected must scale to meet its evolving needs. Response times must be proven to be within industry norms under a concurrent load of 20 users.

Ease of Administration
The application chosen to manage the content on the HL7.org site must be simple for site managers to use. All applications must provide appropriate administrative functions to allow HL7 to effectively manage their use.

Current Infrastructure
The HL7.org website currently uses ColdFusion 7.0 as its application server, Internet Information Server as its web server and MS SQL Server 2000 as its database. HL7.org also currently supports several ASP applications. All three servers are hosted on a single Windows server running the Windows 2000 Server operating system. A less robust but functionally identical server is used as a test instance.

HL7 hosts two corporate websites written in classic ASP with SQL server as the backend database. These two sites will not be part of the HL7.org redesign project.
Current Metrics
Currently a majority of HL7.org’s daily traffic is derived by its listserv which receives between 50 - 75 new posts a day. Distributing these posts to HL7.org’s users accounts for anywhere from 5,000 to 10,000 emails a day which consumes around 500 megs of bandwidth. Storage of the listserv posts uses approximately 9 gigs of hard drive space. Standards documents hosted on HL7.org account for additional 24 gigs of hard drive space. Storage usage by the HL7 database is a minimal 60 megs. Database storage for the additional corporate websites is less than 100 megs.

Future Metrics
The new HL7.org website is expected to serve over 4000 members with approximately 5% of its membership using the website concurrently.

Technology Selection
Health Level Seven is technology agnostic. A products feature set and its integration into the overall website is more important than what language it is written in. Health Level Seven prefers local server based third party solutions over hosted or turnkey applications. Open Source applications are acceptable if adequate support is available. Custom coded applications can be used where necessary but should be kept to a minimum. All custom code must include automated unit test scripts. Maintenance, administration and upgrade path should be kept in mind when making technology selections for HL7.org. All technologies must run on Windows based servers.
Infrastructure Requirements

The new HL7.org website will greatly expand on the functionality of the current site; as these functional requirements grow so do the requirements on the site infrastructure. The goals in upgrading the current infrastructure are:

- Provide hardware and software that will handle the current request load and scale to meet future growth.
- Provide security for all customer data.
- Provide a clear upgrade path and support plan for all 3rd party solutions.

Hardware Requirements

Health Level Seven’s user base numbers in the thousands. While all of these users will not be accessing HL7.org’s services simultaneously this still represents a significant load. It is important to provide a robust platform that can handle heavy traffic without degrading performance. Hardware recommendations:

- Purchase a new server to host the web server and application server.
- Purchase a new server to host the database server, files and backups.
- Purchase a firewall and/or routing appliance or software to handle security and failover.

Potential Solutions:

Server: Dell PowerEdge 2950
Firewall: Cisco PIX
Watchguard Firebox

Operating System Requirements

Health Level Seven requires Windows based servers. This ensures compatibility and vendor support with most 3rd party applications.

Application Server Software Requirements

Health Level Seven does not require any specific application server. Application server selection will be based on individual application needs.

Database Server Software Requirements

Health Level Seven requires that all applications use Microsoft SQL Server for their database server.
Site Architecture

In order to meet diverse functional requirements, HL7.org must be many things to many users and at the same time unified in look and feel. Some of these functions will be implemented through 3rd party components, and some will require custom development. Integration is the key. Service Oriented Architecture (SOA) provides this integration along with flexibility and security.

SOA is not a technology, but a strategic approach to delivering data and services from disparate systems in a structured and secure manner. A framework is used to tie individual modules or applications together. Each individual application delivers its features to the framework via web services. This makes the overall application extremely flexible as individual modules can be “plugged into” the framework as needed. Secondly this adds stability as individual modules can be modified without affecting the overall application as long as the module’s interface remains static. Finally this adds to the security to the overall application as only the data and services that are needed are delivered without exposing the underlying systems.

Proposed architecture:

![Diagram of site architecture]

- Presentation Layer
- Web Services Layer
- Entitlement & Security Layer
- Common Services

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Presentation Layer
The presentation contains everything the user will see and interact with. The look and feel of the new HL7.org will be CSS driven and will be Priority One W3C compliant for usability. The presentation code will be standards based in order to render well in all browsers.

Web Services Layer
The web services layer establishes the standard Application Program Interface (API) for the sharing of data between systems. It ensures client goals are met and that components can seamlessly work together to deliver a unified user experience. This is the main point of integration for custom applications and 3rd party modules.

Entitlement & Security Layer
The entitlement and security layer provides centralized authentication services to all components of the site. Authentication for HL7.org will be role based.

Common Services Layer
The common services layer provides services such as site monitoring, web analytics and error handling.
### Functional Modules

Each of the functional modules will be implemented as either a custom application or a 3rd party solution. All 3rd party solutions will be implemented as a standard install and will integrate with the overall website via web services. This strategy will protect Health Level Seven’s investment in these solutions and provide a clear upgrade path and support plan. More detail on each function can be found in the Functional Requirements.

### Content Management

A majority of the content on HL7.org will be managed using a **Content Management System** (CMS). There are many suitable out of the box content management systems which can meet HL7.org’s needs. Building a custom in-house content management system would not be a good use of HL7.org’s budget or resources. The CMS solution selected must run on Window Servers. It must provide an API in order to integrate with the web services layer of HL7.org.

**Additional Requirements:**
- Supports RSS feeds
- Content search
- Allow cookies to be disabled and still works
- Role based security
- Support for workflow

**Potential Solutions:**
- Ektron CMS400.net
- Hot Banana Web Content Management
- Paperthin Commons Content Server
- Sitecore CMS
- Drupal
- Zope

### Document Management

Most content management systems have at least some document management features. This should be kept in mind when evaluating a CMS. HL7’s document management needs include both public and private documents of various formats like .PDF or .DOC. These documents are available to the user based on their membership level.

**Additional Requirements:**
- Supports HTTP and FTP downloads
- Supports filename and topic search
- Role base access (public vs. private)
Polling/Evaluations
Most Content Management Systems have functionality to handle polling, quizzes and form submissions. This should be a factor in evaluating a 3rd party Content Management System.

Global Site Navigation
The global navigation for the site will need to integrate not only with the content management system but also each of the individual sub-applications. Depending on the content management system chosen this may be developed as an extension of the CMS or it may be developed as a stand alone application.

Ecommerce
HL7.org will process credit card orders both for products and also for membership fees. Credit cards will be processed through a payment gateway. A 3rd party solution will be used for both store management and payment gateway interface. The chosen solution will need to integrate with the web services layer of HL7.org

Potential Solutions:
Storefront: Application Dynamics Cartweaver
Miva
VCommerce

Payment Gateway: Cybersource
Authorizenet

Event/Calendar Management
Health Level Seven requires an online calendar and event application to allow users to see and sign up for events. This application will be required to handle event management and registration. This application will be required to integrate with the web services layer of HL7.org.

Additional Requirements:
Event based reminders
Calendar view of events
iCal integration
Conference Call/Calendar Management
Health Level Seven requires uses an online conference call application to allow users to keep track of and search for conference calls. This application will be required to integrate with the web services layer of HL7.org.

Additional Requirements:
Event based reminders
Calendar view of conference calls
iCal integration

Elections/General and Board of Directors
Health Level Seven requires an application to accommodate online elections of working group chairs and the Board of Directors. This application will integrate with the web services layer of HL7.org.

Membership Services
HL7.org will serve seven different types of users. Each of these role types will have different access rights to various services on the site. All of the roles that require authentication will be created using a membership management application. This functionality will be implemented as a new custom application that will interact with the membership database. Authentication and permissions throughout the site’s disparate modules will be handled by the entitlement and security layer.

Job Board
HL7.org will host a job board which will enable members and non-members to post jobs on the website for a fee. Integration with the ecommerce and payment gateway solutions will be required. Further, integration with the entitlement and security layer will be necessary to determine the fee level. This application will also be required to integrate with the web services layer of HL7.org.

Certified User Search
HL7.org will provide functionality to allow users to search for certified users. The search will return the name and certification of the user. This application will be required to integrate with the web services layer of HL7.org.

Site and Document Search
HL7.org will provide functionality to search both the website and static documents on the website. Users will be able to download certain documents returned in a search for a fee. Metadata about static documents combined with information from the entitlement and security layer will be used to determine if a fee is required for download. If purchase is required to
download the document, payment will be handled though integration with the ecommerce and payment gateway services.

**Forums**

Currently Health Level Seven uses a listserv to facilitate user collaboration. On the new HL7.org website, this will be facilitated using online forums with mail functionality. There are many suitable 3rd party forum solutions available. Building a forum system in-house would not be a good use of Health Level Seven’s resources or budget. The forum solution selected needs to run on Windows Servers and will be required to integrate with the web services layer of HL7.org.

**Potential Solutions:**
- FuseTalk Standard Edition
- phpBB
- VBulletin
- Invision Power Board

**Wiki**

Health Level Seven will provide their users with a wiki to capture community knowledge in a user friendly and low barrier to entry manner. The wiki will allow the users to record, edit, and comment on information that might not otherwise be captured.

**Potential Solutions:**
- Canvas
- TikiWiki
- Confluence
- SocialText

**My HL7**

Health Level Seven will offer their users the ability to personalize their HL7 information in the form of the My HL7 portal. This section of the website will help users manage their tasks within HL7 and provide them with the tools to keep up to date and in sync with HL7 events and other users. This application will bring together much of the functionality of the rest of the website but tailored to the users needs. This application will store user preferences in database tables integrated with the authentication layer of HL7.org.
Email Marketing

HL7.org will be integrated with an email marketing system. The email marketing system may be a locally or remotely hosted service. If the email marketing system is hosted locally it will need to run on Windows Servers. The email marketing system will need to have an API that HL7.org can call based on user actions on the website.

Potential Solutions:
Lyris Listmanager
Lyris Listhosting
Constant Contact

Administrative Functions

Most of HL7.org’s administrative functions will be handled via the user interface within the content management system. Adding content, polls, and forms can all be done though the administration functions of a CMS. Administration functions for all of the custom applications should be gathered into one master administration application. Access to this application like the CMS Admin will be restricted to properly authenticated users only.

Web Analytics

Health Level Seven currently uses an older version of WebTrends to provide reporting on website usage. An upgrade to a more current web analytics system is recommended. A web analytics strategy must be agreed upon prior to implementation of any of other modules of HL7.org in order to ensure effective coverage across the entire site. The web analytics solutions system may be a locally or remotely hosted service. If the solution is hosted locally it will need to run on Windows Servers.

Potential Solutions:
WebTrends 8 Commerce Package
WebTrends On Demands
Google Analytics