



Library - xzfsdfs

Software Design and Architecture (National University of Computer and Emerging
Sciences)

Software Requirements Specification for DLS SYSTEM

3.1.1 Purpose

This is the Software Requirements Specification (SRS) for the DLS (Digital Library System). The purpose of this document is to convey information about the application's requirements, both functional and non-functional, to the reader. This document provides :

- (a) A description of the environment in which the application is expected to operate.
- (b) A definition of the application's capabilities.
- (c) A specification of the application's functional and nonfunctional requirements.

The document is intended to serve several groups of audiences:

- First, it is anticipated that the SRS will be used by the **application designers**. Designers will use the information recorded here as the basis for creating the application's design.
- Second, the **client** for the project, the library manager in our case, is expected to review this document. The SRS will serve to establish a basis for agreement between the client and development team about the functionality to be provided by the application.
- Third, the **application maintainers** will review the document to clarify their understanding of what the application does.

3.1.2 Scope of Project

The purpose of this software development project is to create a new application called: DLS SYSTEM. The client for this project wishes to enter the PC-based internet environment. The Library Management System will be PC-base with a internet, allowing library users to search for books, seminars and library staff members to manage the book inventory and user database. The application will provide the following capabilities:

The application will be access via a internet on a PC at any place.

Library staff will be able to manage library user accounts including remove, change, and add.

Library staff will be able to manage the book inventory database including remove, change, and add.

The application will generate reports for administrative purposes.

The application will provide search function on books based on ISBN, subject, title, or author.

The project's client has determined that this application will provide the following benefits:

- Provide additional flexibility and convenience to the library users.
- Provide better reliability and security of the library information.
- Provide a more productive environment for the library staff member.
- Reduce the cost of the library operations.

The availability of information at any time in any place.

3.1.3 General Description

3.1.3.1 Product Perspective

DLS SYSTEM is used for Library Manager, Librarian, and Library User. The system is self-contained. However, it is possible to exchange data with other system through external interface if required. The following is a typical system diagram:

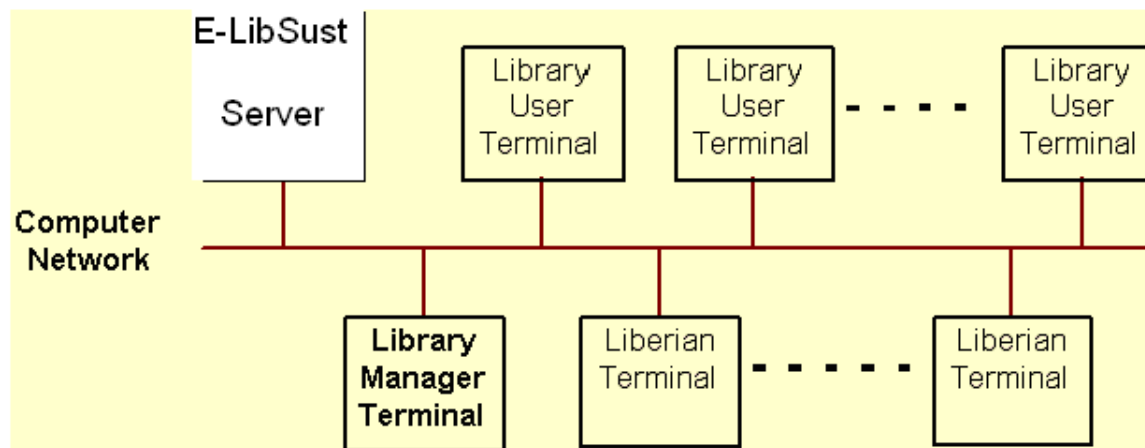


Figure 3-1:system diagram

3.1.3.2 Product Functions

The high level summary of functions in DLSSYSTEM System is described in the following concept map. Detail functional requirements will be described in section 3.

3.1.3.3 User Characteristics

The three types of user for the DLSSYSTEM are:

- Library Manager
- Librarian
- Library User

The following table describe general users characteristics that will affect the functionality of the software product.

| Type of User | User Characteristic | User Technical Expertise | How the user characteristic and technical expertise affect DLSSYSTEM functionality |
|-----------------|---|--|---|
| Library Manager | Good understanding to library operation Responsible for library operation as a whole. Responsible for library staff managing | Average in technical proficiency Used text type terminal in the old DLSSYSTEM | User interface with less input steps. Easy to learn. |
| Librarian | Good understanding to library operation Responsible for library operation. | Average in technical proficiency Used text type terminal in the old DLSSYSTEM | User interface with less input steps. Easy to learn. |
| Library User | (Diverse user characteristic) Student and Faculty tends to find books in their specification and download material Will not have any formal training to use the system. | Student and Faculty has a lot of exposure to Windows type application | GUI interface may be easier to learn than text interface. Provide system help Provide appropriate error messages for invalid user inputs. |

Table3-1: General Users Characteristics

3.1.3.4 General Constraints

This system is **Web based**, there will be a need to provide PC Server hardware connected to the internet.

DLS System can potentially have more than hundreds of users. It is unrealistic to provide training for everyone. Therefore, the system should be designed for easy to use, providing help instructions, and appropriate error messages for invalid user inputs.

Security is important to library operation. Library user is allowed to use the DLSSYSTEM only for searching book records. User should never be able to break into the system and to perform any modification.

Reliability is vital to library operation. The DLSSYSTEM should not have any unscheduled down time during library operation hours. Any down time in operation hours has significant impact to the operation and cause inconvenience to everyone in library.

3.1.3.5 Assumptions and Dependencies

The following is a list of assumptions and dependencies that would affect the software requirements if they turned out to be false:

Users have basic understanding to PC and Windows and internet.

There is a method to convert all book records and library user records from the existing system into the DLSSYSTEM.

3.1.4 Specific Requirements:

This section contains the detailed requirements. In this section, the users of "Search Book Record" are refereed to librarians and patrons (library users). Users of other sections are only refereed to the librarian card holder (librarians and library managers.)

3.1.4 Functional Requirements

3.1.4.1 User Interface

The user interface requirements are concerned with the user interface and how information is presented to the user.

- **Usability**

Interfaces are a critical class of components within the DML that will provide the means by which users interact with the system. As such, all interfaces should provide easy access to help as well as clearly indicate the current state of the user's transaction when the user isn't idle.

Transaction and error status **MUST** be displayed within each interface component.

Cut and paste of text within interfaces and into and out of the interfaces **MUST** be supported.

- **Administrative**

Administrative interfaces will assist Library Staff in building/maintaining collections and controlling access to them. Because of the complexity of the data model, Library Staff will need to be able to edit multiple records simultaneously and create links between them.

Administrative **MUST** be able to have multiple records open for editing
Administrator **MUST** be able to create links (references) between records without needing to type in record identifiers.

Additionally data represented in the administrative interface may be in a different state than that stored in the repository. For example, after a record has been edited, but before it has been "saved" into the repository two versions of the record exist. The interface should clearly indicate the state of the locally edited record relative to the version stored in the repository.

All editors **MUST** clearly indicate the state of the edited record (new,saved, and modified/not yet saved).

3.1.4.2 Library user account manage system

SRS-001: The system shall display the user account information including user ID, last and first name, and user position, privilege.

SRS-002: The system shall use a graphic user interface which allows librarians to choice actions including removing, changing and adding user account and account information..

3.1.4.2.1 Logging

Within the system, logging will be used to provide a trail of transactions that have taken place. This might either be for developer debugging purposes, administrative checks on usage, or research on the usability of interfaces.

SRS-003. Transaction logs **MUST** be kept for each service provided.

SRS-004. Sufficiently detailed client session logs **MUST** be generated to support analysis of user activities. Security and Privacy

SRS-005. The user's password **MUST** never be exposed to compromise.

SRS-006 User session logs stored for usability and other research **MUST** be anonymous.

3.1.4.2.2 Book download

SRS-007: When download e-book , the system shall show all the e-book information and check particular user including:

- the first and last name of the user
- the library card number
- the library card expiring date
- to check valid user or not

- check e-book information
- the ISBN of the book
- the title of the book
- location(url)

SRS-008: When download the books, the system shall display the information of the e-book which is just being downloaded including: ISBN, title, location.

3.1.4.3 Search book record

The system shall display a list of books which are matching the search criteria sorted by book titles including:

- the category
- the ISBN
- the title
- the author

When required by users, the system shall display the information about a particular-book including:

- the category
- the title
- the ISBN
- the publisher

the brief description of the book (if any stored in database) the location

3.1.4.4 Data Entry

The data entry requirements are concerned with how data is entered and validated.

SRS-009: The system shall allow a user to enter his/her data via a keyboard

SRS-010: The system shall allow a user to enter his/her data via choose an item via a mouse.

SRS-011: Whenever the "date" data is needed, it shall be entered only by choose date from a online calendar.

SRS-012: The system shall allow the user to enter the library card number and ISBN both by typing or scanning.

SRS-013: The system shall allow the user to enter book borrowing, recalling data as frequently as required.

SRS-014: The system shall allow the user to attach notes to each account

SRS-015: The system shall allow the user to add or change information in an account including: last name, first name, user ID, user position, user privilege.

SRS-016: the system shall allow the user to delete an entire account.

3.1.4 .5 Search book record

SRS-017: The system shall allow the user typing in search criteria including book title, key word in title, ISBN, subject, category.

SRS-018: The system shall allow the user choose language option which the searched book is used including English, Arabic

SRS-019: If the search result are a list of books, the system shall allow the user to choose any one of them to see the details.

3.1.4 .6 Update book database

SRS-020: The system shall allow the user to add or change the record information including:

- the category
- the title
- the ISBN
- the publisher
- the brief description of the book
- the location in library
- the purchase date
- the price

SRS-021: the system shall allow the user to put "delete" for a existing e-book and specify the deleting reason.

3.1.4 .7 Report Generation

the report generation requirements are concerned with the report generation capabilities of the Library system.

SRS-01: The system shall have a report feature that will allow the user to generate a report showing the information of a particular patron.

SRS-02: The system shall have a report feature that will allow the user to generate a report showing the information of book purchase information in a period including the book titles, category, the author, the publisher, the price. It also shall give statistic data about the total number of books purchased, the money paid by category.

SRS-03: The system shall be generate those reports to the display, a file or a printer which is linked to the system.

3.1.5 Design Constraints

SRS-040: The system shall be installed in a windows-NT network.

3.1.6 Security Requirements

SRS-04: The account management system shall only be used by managers or users with defined privileges.

SRS-05: The Patron information report shall be generated by users who have librarian account.

SRS-06: The book purchase report shall only be generated by managers or users with defined privileges.

SRS-7: Database update data shall be committed to the database only after the managers have approved.

3.1.7 Reliability

SRS-08: The system shall be recovered within 10 minutes if it is down.

SRS-09: The system shall be recovered without intervention at user terminal if it is down.

SRS-010: The system shall show appropriate messages at terminal when system is down.

SRS-011: The system shall have 99% reliability during library operating hours.

SRS-012: Scheduled down time after library operating hours shall not be more than 1 hour per day.

SRS-013: The system shall generate error messages when the user attempts to enter invalid data.

3.1.8 Extensibility

SRS-014. System must be able to extend to store and deliver new content media types.

SRS-015 System must be able to extend to support synchronization of content

media based on shared work/item structure.

SRS-016. System MUST be able to extend to include music thesaurus in later versions.

SRS-017. System MUST be able to extend support to MMTT components built in later versions.

SRS-018. System MUST be able to extend to support data sharing between records.

SRS-019 System MUST be able to extend to support more sophisticated bookmaking including additional context (e.g. size and configuration of viewer) and book marking of other record types.

3.2 System Interaction

3.2.1 Overview of DLS System Interaction

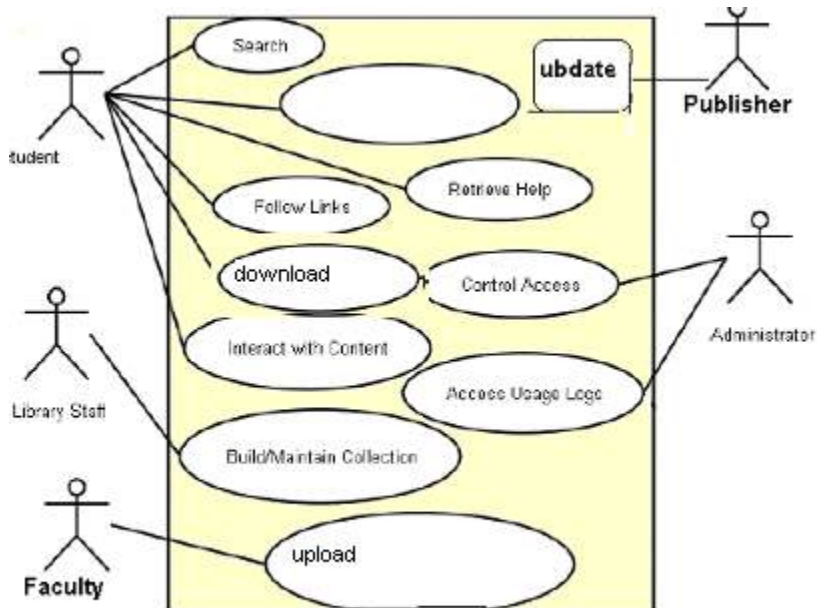


Figure 3-2 System Interaction

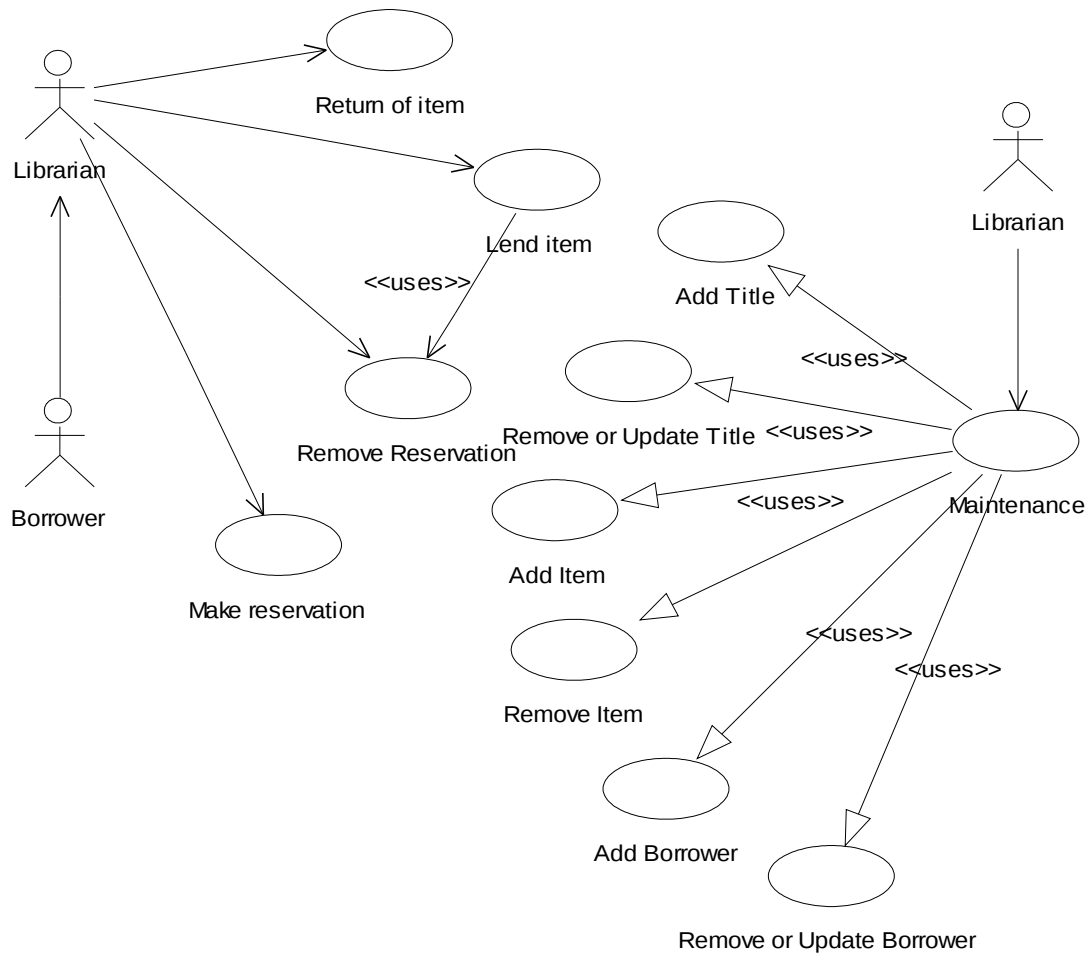


Figure 3-3 Overview of DLS Interaction

3.2.2 Overview of Database Interaction

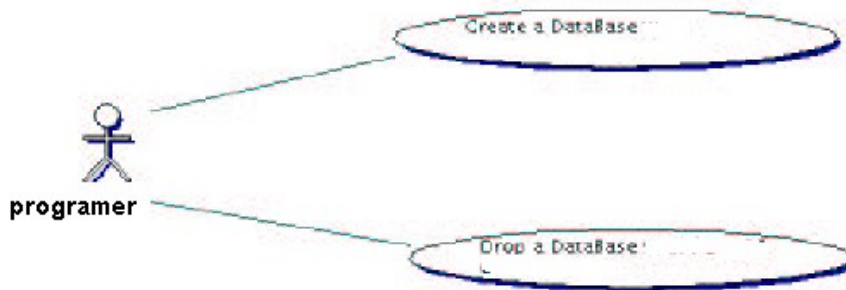


Figure 3-4 DataBase Interaction

3.2.2.1 Create a Database with DLS extension Use Case



Figure 3-5 Create a Database

3.2.2.2 Drop a Database with DLS extension Use Case



Figure 3-6 Drop a Database

3.2.2.3 Perform Search



Figure 3-7 Perform Search

10. Users **MUST** be able to search for content using Work (title, composer name, subject heading, and key), Instantiation (performer names) and Container (title, publisher, editor, type, and format) attributes.

11. Library Staff **MUST** be able to search on record creation and update dates.

12. Simple free text search **MUST** be provided against like records representing containers that will be generated from the metadata stored in the data model.

13. Searches over names and titles **MUST** support matching where diacritical markings are ignored.

14. Users **MUST** always receive feedback on their search in the form of a result set that contains matching entries and/or information to further assist in the query.

3.2.2.4 Perform Retrieve Help

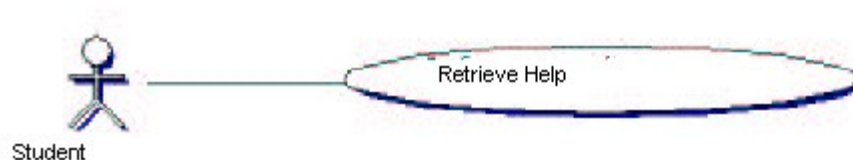


Figure 3-8 Retrieve Help

16.Users MUST be able to retrieve appropriate help in each interface.

3.2.2.5 Provide Web-based Access

Instructors will be using the system in collaboration with Concourse to provide access to course materials and content stored within the DML.
and viewer MUST be inviolable from a web browser.

3.2.2.6 Perform Follow Links



Figure 3-9 Follow Links

3.2.2.7 Perform Download



Figure 3-10 Perform Download

18. .Users MUST be able to download in each e-book

3.2.2.8 Perform Provide Web-based Access

Instructors will be using the system in collaboration with Concourse to provide access to course materials and content stored within the DML

3.2.2.9 Perform Build and Maintain Collections

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Figure 3-11 Perform Build and Maintain Collections1

Library Staff will populate the repositories with both metadata records and media content. They must necessarily be able to generate and modify metadata and content in records as well as create references between the records.

19. Library Staff MUST be able to create/delete/edit records.
20. Library Staff MUST be able to load new or update old content.
21. Library Staff MUST be able to create/delete/edit structural declarations and bindings and associate them with records.



Figure 3-12 Perform Build and Maintain Collections2

Additionally data represented in the administrative interface may be stored in a different database. For example, after a record has been edited, but before it has been “saved” into main database. The librarian should clearly indicate data should be saved

3.2.2.10 Perform Control Access



Figure 3-13 Perform Control Access

- 22. Administrative users **MUST** be able to create, edit, and delete groups.
- 23. Administrative users **MUST** be able to create, edit, and delete users.
- 24. Authorization to play/view/update/add/delete media content **MUST** be controllable based on location and/or properties associated with the user and/or group.
- 25. All completed descriptive metadata records within the system **MUST** be readable by all users.
- 26. Authorization to update/add/delete metadata **MUST** be controllable based on location and/or properties associated with the user and/or group.
- 27. Authorization to update/add/delete users and groups **MUST** be controllable based on location and/or properties associated with the user and/or group.
- 28. Mechanisms for updating group membership information (course enrollment) **MUST** be provided to instructors.

3.3 SDD (System Design Diagram)

- **Database structure**

All times are in the form YYYYMMDDHHMMSS

Languages currently supported include: English

Every table contain four columns firsts one is a name of column and second column display data type and third column display constraint and last column description any column

Table 3-1: E-Thesis Table

| Column Name | Data Type | Null Value | Description and Recommendations |
|-------------|-----------|------------|---------------------------------|
| Thno | Number | PK | |
| Title | Varchar | | |
| Subject | Varchar | | |
| Author | Varchar | | |
| Year | Varchar | | |
| Publisher | Varchar | | |
| Version | Number | | |

Table 3-2 User Table

| Column Name | Data Type | Null Value | Description and Recommendations |
|-------------|-----------|------------|---|
| ID | Number | Pk | Sequence number. |
| First Name | Varchar | | First name for the user |
| Last Name | Varchar | | Last name for the user |
| Subject | Varchar | | Subject that the user access or has |
| Password | Varchar | | Password that is used to authenticate the user. |
| Address | Varchar | | Address of the user. |
| Phone | Number | | Telephone number of the user number. |
| DOB | Date | | Date of birth. |
| SSN | Varchar | | Social Security number |
| Typid | Number | | Match to list of user type in user_type table |

Table 3-3 User_type Table

| Column Name | Data Type | Null Value | Description and Recommendations |
|-------------|-----------|------------|--|
| Typeid | Number | Pk | Unique id for the user. |
| User Type | Varchar | Not null | Nickname for the User type author, librarian, administrator, publisher, student and faculty. |

Table 3-4 Account Table

| Column Name | Data Type | Null Value | Description and Recommendations |
|-------------|-----------|------------|--|
| ID | Number | Pk | Match to value in id field in the user table |
| Login name | Varchar | | Login name for the user. |
| Password | Varchar | | Password for this user (authenticates the user). |

Table 3-5 Keyword Table

The RDB administrator, who will be able to select an existing word or add a new one (hence it is a less controlled list than the Subjects, suggests keywords.

| Column Name | Data Type | Null Value | Description and Recommendations |
|-------------|--------------|------------|---------------------------------|
| Keyword_id | Integer | Not null, | Unique id for the keyword |
| Keyword | Varchar (30) | Not null, | Text of the keyword |

Table 3-6 Resource keyword table

Join table linking resources and keywords.

| Column Name | Data Type | Null Value | Description and Recommendations |
|-------------|-----------|------------|---------------------------------|
| Keyword_id | Integer | Not null, | Unique id for the keyword |
| Resource_id | Integer | Not null | Text of the keyword |

Table 3-7 Resource tables

| Column Name | Data Type | Null Value | Description and Recommendations |
|---------------------|---------------|------------|---|
| Resource_id | Integer | Not null | Unique ID of a resource (machine generated). |
| Name | Varchar | Not null | Title of the resource as displayed to users |
| Type_id | Varchar | | Match to list of resource types in resource type table |
| Standard_identifier | Varchar | | Unique code for resource specified by external Authority e.g. ISSN, ISBN */ |
| Summary | Text | | Description of the resource displayed to users (paragraph Length) */ |
| Language code | Char (3) | | Identifier for the language of the resource |
| About_url | Varchar (300) | | Url of page about resource generally (help_url in location table) |
| About_url_text | Varchar (40) | | Title to display with link to about_url |
| Manager_persid | Varchar (60) | | Unique id of the person responsible for the resource (E_mail) |
| Ad_creator_persid | Varchar | | Unique id of the person who created the record |
| Ad_create_time | Char (14) | | Time when the resource record was created |
| Ad_last_mod_persid | Varchar (60) | | Unique id of the person who most recently edited the Record */ |
| Ad_last_mod_time | Char (14) | | Time when the resource record was most recently edited |
| Type_id | Integer | Not null | Unique identifier (reference to resource type) |

Table 3-7-1 Resource type Table

Classifies resources by function (not medium)

| Column Name | Data Type | Null Value | Description and Recommendations |
|-------------|-----------|------------|---|
| Type_id | Integer | Not null | Unique identifier |
| Name | Number | Not null | Nickname for the resource type journal, website, e-book, page, seminar, subject ... |

Table 3-9 Location Table**A location is a way to access a resource**

| Column Name | Data Type | Null Value | Description and Recommendations |
|------------------|---------------|------------|--|
| Location_id | Integer | Not null | Unique id of a location (machine generated) |
| Resource_id | Char (20) | Not null | Unique id of the resource |
| Name | Char | Not null | Title of the location - used to group locations together mainly for the administrators (to answer questions like "Which resources are on Decomate?") |
| Url | Varchar (300) | Not null | Where to access the at this location |
| Available | Char (1) | | Switch to enable location to be temporarily removed from user Display (e.g. if it's on a machine which is down) |
| Comment | Varchar (60) | | Very short description of location (e.g. to display as ALT text for link to location) |
| Access_method_id | Integer | | Match to access method table to describe how user can see resource |

| | | | |
|----------------------|---------------|----------|---|
| Supplier_id | Integer | | Match to supplier table |
| Helpful | Varchar (300) | | Title to display with link to help_url |
| Help_url_text | Varchar (40) | | One of list of values describing storage method for resource at This location |
| Media_type | Varchar (8) | | |
| Search_protocol | Varchar (10) | Not null | Values: none, z3950, whoop, sol, www, ... |
| Historic_range_start | Char (8) | | One of list of values describing storage method for resource at This location |
| Historic_range_end | Char (8) | | Where location is time specific, when its coverage Begins (e.g. for database of journals issues from 19920101) */ |
| Content depth | Varchar (13) | | One of list of values describing how detailed contents of Resource at location are (e.g. full text) |
| Licence_url | Varchar (300) | | Location of license agreement for the resource at this Location |
| Licence_start_date | Varchar (8) | | When license starts |
| Licence_end_date | Varchar (8) | | When license end |
| Availability message | Varchar (40) | | Switch to enable location to be temporarily removed from user Display (e.g. if it's on a machine which is down) |
| Manager_persid | Varchar (60) | | As in resource table |
| Ad_last_checked_time | Char (14) | | As in resource table |
| Ad_creator_persid | Varchar (60) | | As in resource table |
| Ad_create_time | Char (14) | | As in resource table |
| Ad_last_mod_persid | Varchar (60) | | As in resource table |
| Ad_last_mod_time | Char (12) | | As in resource table |

Table 3-10 Access method Table

Information needed to provide direct access to a resource - details to be Filled in later

| Column Name | Data Type | Null Value | Description and Recommendations |
|------------------|-----------|------------|---------------------------------|
| Access_method_id | Integer | Not null | |

Table 3-11 Resource_subject

Information needed to provide direct access to a resource - details to be filled in later

| Column Name | Data Type | Null Value | Description and Recommendations |
|------------------|-----------|------------|---------------------------------|
| Access_method_id | Integer | Not null | |
| resource_id | Integer | Not null, | |
| Subject_id | Integer | Not null | |

Table 3-12Subject table

Used to classify resources by a controlled list of subject terms

| Column Name | Data Type | Null Value | Description and Recommendations |
|-------------------|--------------|------------|--|
| Subject_id | Integer | Not null | Local unique identifier for this subject term |
| Term | Varchar | Not null | Term taken from the external schema |
| Origin_schema | Varchar (10) | | Name of the schema being used |
| Origin_identifier | Varchar (20) | | Unique key of the term in the schema definition, if it Has them */ |
| Relevance | Integer | | How much the resource is relevant to the subject |

Table 3-13 Icon table

Contains information about the icon to display with a resource (e.g. logo)

| Column Name | Data Type | Null Value | Description and Recommendations |
|-------------|---------------|------------|---|
| Icon_id | Integer | Not null | Unique identifier |
| Url | Varchar (300) | Not null | Location of the icon graphic |
| Alt_text | Varchar (30) | | Text to display in the ALT attribute for the IMG tag accessing the Icon graphic |

Table 3-14 Group_right table

Matches resource_locations against user group names to determine levels of access to the resource

| Column Name | Data Type | Null Value | Description and Recommendations |
|--------------|--------------|------------|---|
| location_id | Integer | Not null | - Unique id of the location involved |
| Group_id | Varchar | Not null | Unique id of the group (determined by the auth broker) |
| access_right | Varchar (10) | Not null | Level of access allowed to members of the group - ordered List |