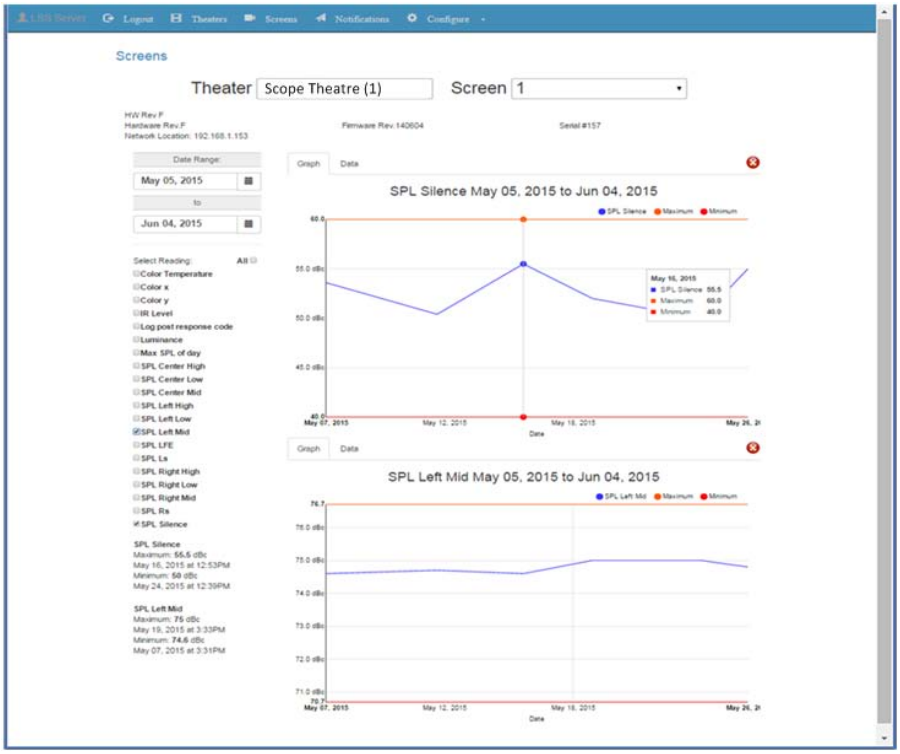
LSS-DB
User Manual



USL, Inc., 181 Bonetti Drive

Precision Sound • Light • Color

San Luis Obispo, CA 93401-7397

USA

Phone: +1 805 549 0161 Fax: +1 805 549 0163 www.uslinc.com

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1. System Overview

1.1 System Description

The LSS Database (LSS-DB) is designed to provide a collection point for LSS (Light and Sound Sensor) data transmitters and an observation platform for reviewing the results of the collected data.

Remote LSS-100P devices that have been installed in theaters will post the results of each test to a URL (Uniform Resource Locator) where the LSS-DB collects the data. The LSS Database provides a mechanism to collect the LSS-100P data and store it in a database. This operation is performed automatically and requires no intervention by the end user.

The received data is stored in an SQL database that also stores additional information such as Users, tables connecting users to the data and tables that are associated with the automated sending of email alerts to users.

The LSS Database includes PHP and JavaScript scripts that drive the web-based user interface with database data.

The LSS Database provides a secure method for users and groups of users to log in and examine the collected data in a meaningful visual method that includes tables and charts. Once a company has provided external access to the LSS Database, the remote user is free to access the web site at any time to review any alerts that might have been received or to just examine the recorded history of any attached device. User access to data is restricted based on Organization Keys (OrgKey). The use of OrgKeys prevents users in organization from viewing data for another organization on a shared database system (such as an LSS-DB operated by an independent service company). The OrgKey is entered during LSS configuration. The association of users and OrgKeys is done by the LSS-DB administrator.

The LSS-DB sends email notifications if a reported measurement is out of tolerance or an LSS-100P fails to report in (typically because test content was not run).

**** To quickly get familiar with the operation of the system, see the Quick Start in Appendix A of this manual.**

**** There are a number of details including installation of the LSS-DB in section 2, user screens in section 3, and email notifications in section 4. Additional information for Apache web server is available in Appendix C and MySQL Database in Appendix D.**

1.2 Block Diagrams

A typical LSS-DB installation is shown in figure 1.1.

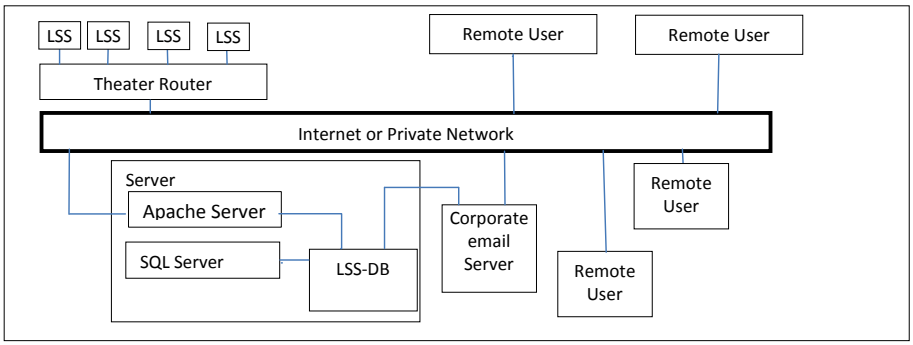


Figure 1.1 LSS Database Overview

Note in the upper left corner of the diagram the LSS devices individually connected to a theater router. There is usually one LSS-100P per screen. The router, in turn, can be connected either to the Internet or a private network. This setup may be repeated for multiple theaters.

The LSS-DB consists of a group of PHP and JavaScript scripts. The web server (Apache) executes the scripts in response to HTTP(S) requests it receives. The "post.php" script receives measurement data from LSS-100P units and adds the data to the database. The remainder of the scripts handle user interface via a web browser and sever side requests. These scripts collect the appropriate data from the database and prepare the data for presentation to the user. These scripts also handle email notifications of out of tolerance conditions.

2. Installation and Configuration

Requirements
LSS-DB is available as a complete virtual machine image that can be installed on most servers. LSS-DB is also available as tar file containing all the required scripts plus an initial database export. In most cases, the virtual machine installation is simpler, but user may wish to do a "native install" to utilize their existing web and MySQL servers.

The supplied virtual machine runs on platforms and was designed as an appliance on the Oracle-based VirtualBox or VMware Workstation. There are a number of other virtual machines such as Boxes and QEMU for Linux operating systems. At the time of publication, these platforms are available at no cost for Linux, Windows and OSX environments.

2.1 Virtual Machine installation and configuration

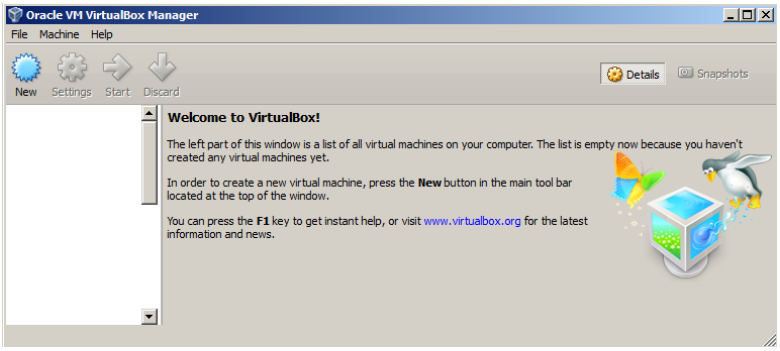
A virtual machine (VM) installation consists of a host operating system running on the computer hardware and a "type 2 hypervisor" that creates another machine environment under which another operating system (the "guest" operating system) and applications are installed. For VM installations, LSS-DB is delivered as a VM image that contains all the

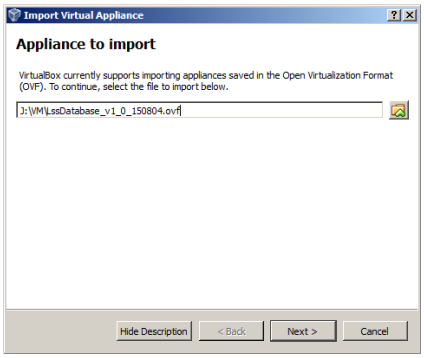
required applications plus the operating system. The LSS-DB VM image has been tested on VMWARE Workstation and Oracle VirtualBox. VMware or VirtualBox needs to be installed on the system before starting the installation procedure.

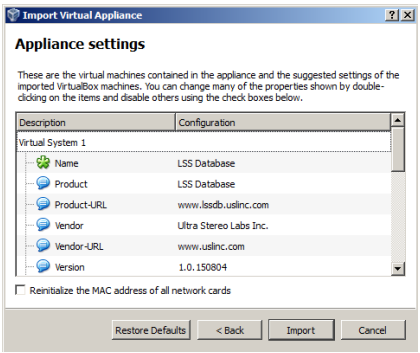
2.1.1 LSS-DB Installation with Virtualbox

First ensure that you have available locally (on your server, desktop or in portable mass storage) the LSS Database virtual machine image which will have a name similar to "LssDatabase_vNN_XX_YYMMDD.ova" where NN version major, XX is version minor, and YYMMDD are year, month and day of the release.

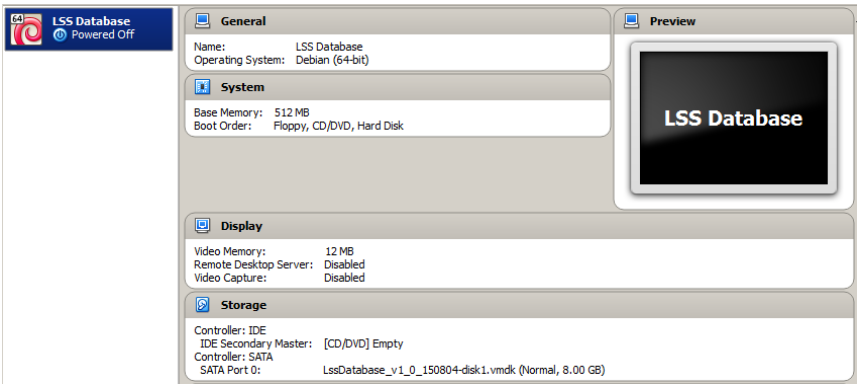
The screenshot below shows the startup screen for VirtualBox.







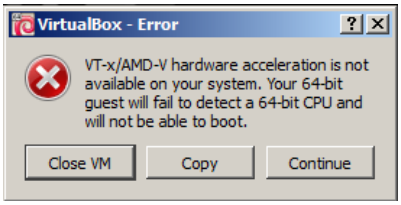
The VirtualBox the options are File/Import Appliance. You will see a screen similar left picture above. Selecting the file and pressing "Next" will display a screen showing the details of the product. Information should be similar to the information shown in the right picture. Pressing the "Import" button will install the product. A progress bar will be displayed and the image should install without further messages. The following screen is displayed:



Comment [HH1]: Update image to use lssdbYYMMDD instead of LssWebServer and LSS-DB on the left side of the image also.

Pressing "->" Start will usually bring up a few dialog boxes about equipment in your computer that may not be the same as the image. Usually the question concerns Network Adapters but may include questions about video or storage devices. Answer the questions by selecting the options that best matches your computer. In most cases the VM will provide the most optimized solution. Once the equipment questions are answered, the Linux version of LSS-DB will install and show completion by displaying an IP Address. This is the IP address that the individual LSS units will post reports to and for users to access the LSS Database to review the reports. Use the Advanced menu to change this IP address as required.

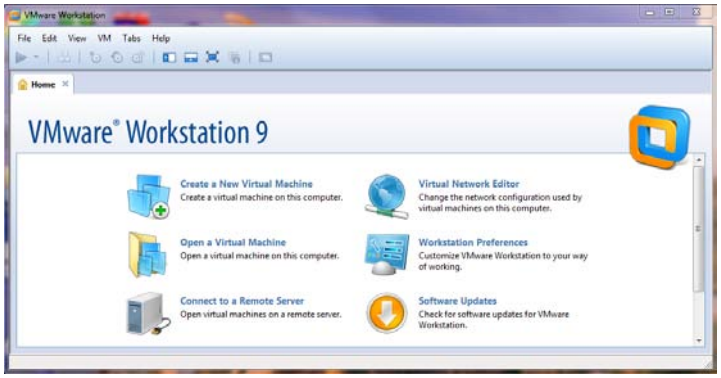
The host computer requires virtualization to be enabled in the BIOS settings. If the setting is disabled or the hardware doesn't support virtualization, then a VirtualBox Error message is displayed.



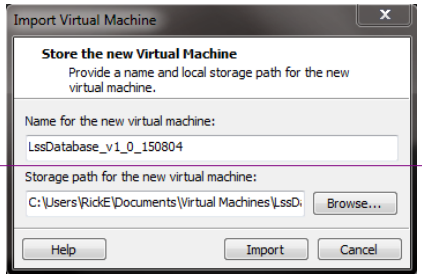
When VirtualBox LSS Database completes the boot-up process a console screen is displayed. The user can then configure the virtual machines IP settings via the Advanced Menu settings. As shown the virtual machine is hosting the LSS Database application at 192.168.1.131. With the host system's firewall settings configured to allow TCP/IP communications with the World Wide Web (WWW), Wide Area Network (WAN), or Local Area Network (LAN), the respective users will have access to the LSS Database using a browser. Your system administrator will have to configure the network to grant access to the Web application.

2.1.2 LSS-DB Installation with VMWare Workstation

When WMware Workstation is launched on the host operating system the following user interface screen is displayed.



To import the LSS Database virtual machine image, the File drop-down menu option is selected as shown above in the top tool bar. Then by selecting Open an Import Virtual Machine dialog will be displayed. Use the Browse button to navigate to the where the desired VM image is stored on the host computer. The selected the LSS Database virtual machine image, in the import window is presented to the user. Activate the Import button and a dialog message will appear describing incompatibility issues. Answering "Retry" in the warning dialog will cause the operation to correct itself and continue.

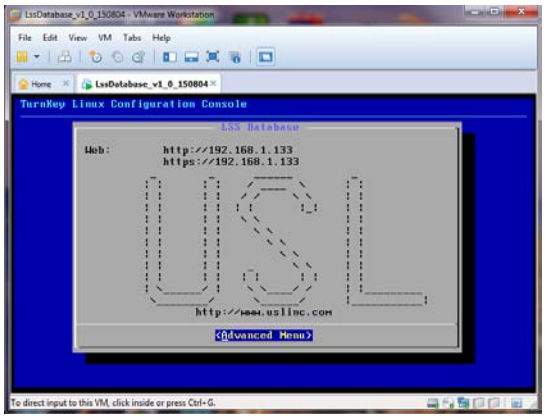


Comment [HH2]: Update image to show lssdb instead of LssWebServer.

Once the import operation completes, your VM workstation will appear similar to the following screen capture below.

Comment [HH3]: Update image to use lssdb.

Clicking on the green arrow bottom at the top or middle of the screen will start loading the Linux virtual machine image of the LSS Database Server. In certain cases an incompatibility message appears that can usually be dismissed by pressing the "OK" button. The operation completes with a display of the current virtual machines IP Address in a console view. The address can be retained or changed by selecting the Advanced Menu. The displayed or new IP address is the address that the LSS-100P will be configured to for sending measurement reports. The same address will be used to access the LSS Database by the user's browser. The LSS-100P reports can be reviewed after the user logs into and is authenticated by the LSS Database Web application. Your system administrator will need to configure the network to grant access to the LSS Database application being served by Apache web server.



2.2 Quick Start Guide

Appendix A is a Quick-Start Guide that may be used to navigate through the LSS Database application quickly to check all the features and ensure proper operation of your installation using the test database entries supplied with the virtual machine image.

The user is encouraged to read the entirety of this manual and then return to the test database to clean out the test items and prepare the system, users and groups for intended operation.

3. User Displays

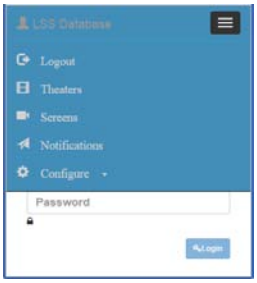
Website Viewable

LSS Database is viewable with any standard web browser supporting HTML5. It was designed and tested using Google Chrome but the language incorporated should not preclude other browsers. The following screens are depicted with Chrome, Fire Fox, and Edge.

When the website is accessed, a menu will appear. It shows all the available areas of interest. Depending on the type of device used for access the menu may appear as a long horizontal bar or a blue bar labeled only as LSS Database on the left and a button on the right.

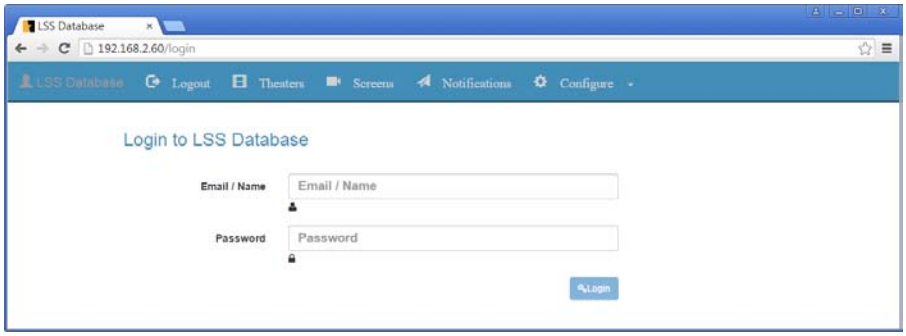
The following screen may appear on a phone device or small tablet.

Clicking the button on the right corner will expand the menu vertically so that you may select any of the full screen pages pointed to by the menu. In the case of logging in, you will need to keep the menu collapsed or collapse it again by pressing the same right hand button. Access to menu items is not allowed unless you are logged in.



3.1 Login

The first screen presented for system access is the Login screen. If you are already a registered user of the system, you can gain access to the data by entering a user name or email address and a password.



The user name should be entered as originally registered using proper spacing and capitalization. If an email address is used, it must be entered exactly as it was when the account was created. Similarly, the password must be entered exactly as it was when the account was created. Passwords can be modified by an administrator, manager, or the individual user (once logged in). The LSS-DB has three access levels: Administrator, Manager, and User. The Administrator has complete access to everything on the system. The administrator can create managers and users. Managers can see data within one company (identified by an organization key or OrgKey). The manager can create users that can see data within a certain group of theaters, often a regional group. For more information on access levels, see Appendix A.

When the default database is loaded, there are user entries with passwords that match the user name. For example, the user “admin” has a password “admin.” These default users are assigned to ‘USL’ organization (OrgKey). In addition to the default users the database contains a few LSS-100P reports. These reports can be viewed by selecting the Theaters view and expanding the date rage to early 2015.

Once the administrator has familiarized them self with the web application, it is recommended to use the Modify Users configuration option to change the passwords. As a backup account the administrator has the capability to create an additional administrator account and then testing it by logging out and logging back in with those credentials.

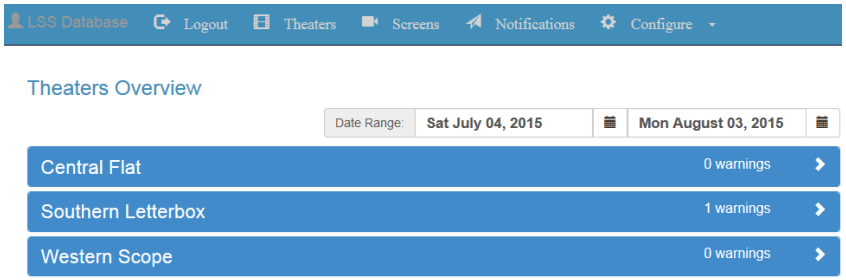
Modify Users

User ID	User Name	Company	Email Address	Notification	Created	Level	Phone
2	technician	USL	tech@uslinc.com	None	2015-02-05 08:00:...	User	1+805-549-0161
11	demo	USL	demo@uslinc.com	None	2015-06-09 00:57:...	Manager	1+805-549-0161
12	admin	USL	admin@uslinc.com	None	2015-06-09 01:00:...	Administrator	1+805-549-0161
13	manager	USL	manager@uslinc.c...	None	2015-06-09 01:01:...	Manager	1+805-549-0161
14	user	USL	user@uslinc.com	None	2015-06-09 01:02:...	User	1+805-549-0161

3.2 Theaters Overview

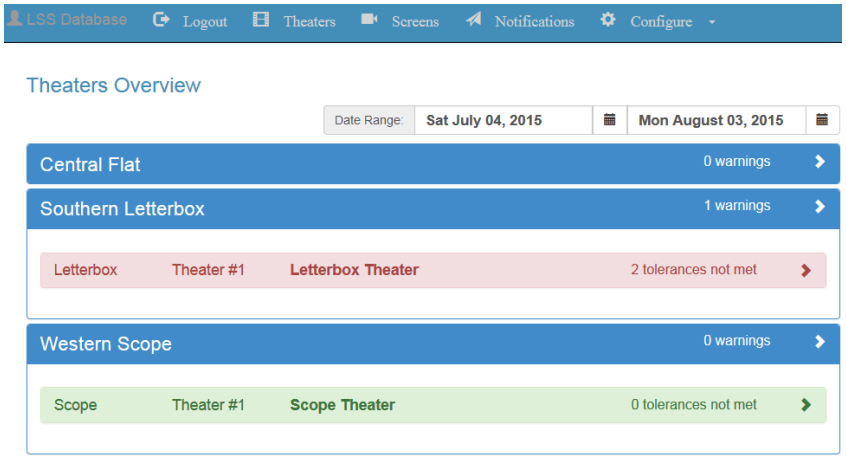
The Theaters Overview page displays a list of theaters. The list of theaters is limited to those defined by the manager for those particular users. Access to data is controlled by the company affiliation (limited by the OrgKey) and the Groups you belong to. A System Administrator has capabilities to assign a user to a group that can contain multiple organizations with their theaters (a type of grouping view). In this scenario a parent service company will have access to multiple organizations that will contain subgroups representing individual organizations. The LSS Database uses a parent/child tree modal that supports various ways to control access to the collected data from a single organization to a regional service view.

The pages that present data use the concept of "drilling down" for details concerning events that have been collected with individual organizational groups. When first viewed, the page will provide a general high level view of the collection. As you select each viewable object you are presented with a closer view of the collected data. The end result is a detailed graphical analysis of data that will cover a specific facet of the collection. For Simplicity the following organizations were created, Flat, Letterbox, and Scope. A user can be granted access to multiple organizations and will display them as shown in the following overview screens.



In the screen above, three organizations are available because the user was assigned to them by the LSS Database system administrator. In this case the first group is "Central Flat" and the second group is "Southern Letterbox". Each group can contain more than one theater but for ease of understanding, there is a single theater in each group.

In this example there is a warning for a screen as indicated by the "1 warnings" label on the right side of the bar. The arrow pointer at the far right will open the bar in accordion style and display the screens within that group.

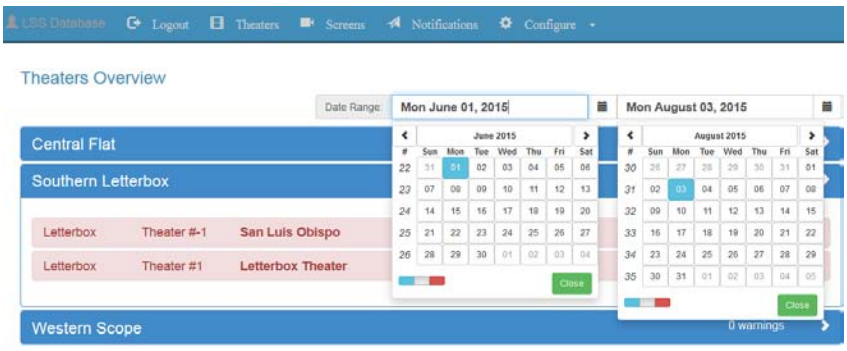


The Theater within a group will appear green if no errors have been detected and will appear red if one or more measurements fall outside the limits. On the right hand side is the number of infractions within the specified date range. In this case both theaters displayed have infractions and are red with the Letterbox Theater having 2 tolerances not being met and the Scope Theater showing 2 tolerances not met.

At the top of the screen you are provided with a date range for the start and end of the data. The default amount of data displayed is usually set at a one month period. You may adjust to any date range. The graphs begin and end dates will be adjusted as necessary to show the collected data of interest for that period. For example, if the date range starts on June 1, but the received data starts on July 28th, the graph will start on July 28th.

Dates may be selected by entering the date manually or using the graphical date picker. Clicking on the picture of the small calendar will display a larger calendar with options.

The LSS Database has a built in feature to generate simulated LSS-100P report data that will be assigned theater number -1 (minus one) with the name of "San Luis Obispo." As a note the simulated theater data is included with actual LSS-100P report data for Letterbox organization (OrgKey) in the following Theaters Overview screen capture.

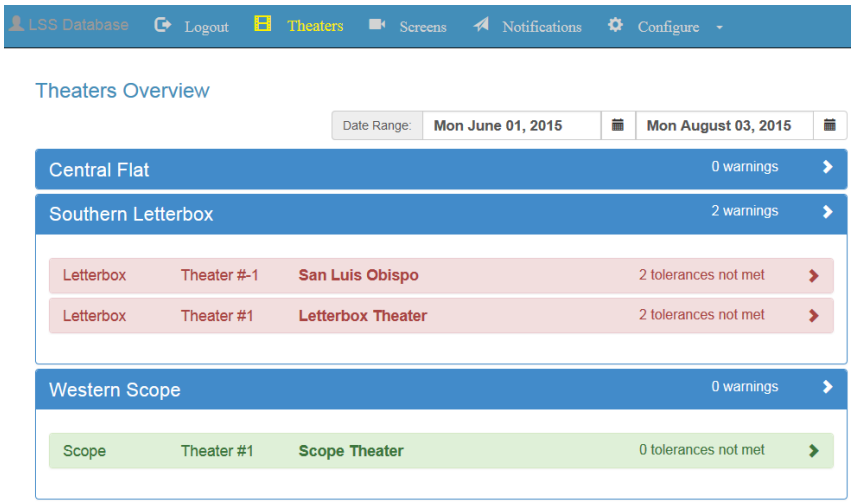


In the overview screen there are two available calendars for the start date and the end date. Note the multi-colored bar on the bottom left of the calendar. Clicking the white center portion will display a value on the left side of the calendar that corresponds to the week of the year starting with 1 and ending with 52. Clicking the white portion again removes the weeks from the edge. Clicking on the blue portion will accept the date and close the displayed calendar. Clicking the red part of the bar will dismiss the calendar and no date will be shown.

The specific day you wish to start or end on is selected by clicking the day on the calendar. You may advance the date by one month increments using the arrows on the top left and right corner of the calendar. To change by increments larger than a month, click on the month and year in the center of the calendar. The display will cycle from a year in months to a display of 20 years and back to the Month and Year.

The larger the span of data you wish to view, the longer it will take to retrieve the data. Under normal use a one month window should be fine, but if you need to research for a longer period choosing dates very far apart will assure that all data available is displayed. The factory default of time period may be changed in the Display Options under the Configuration tab.

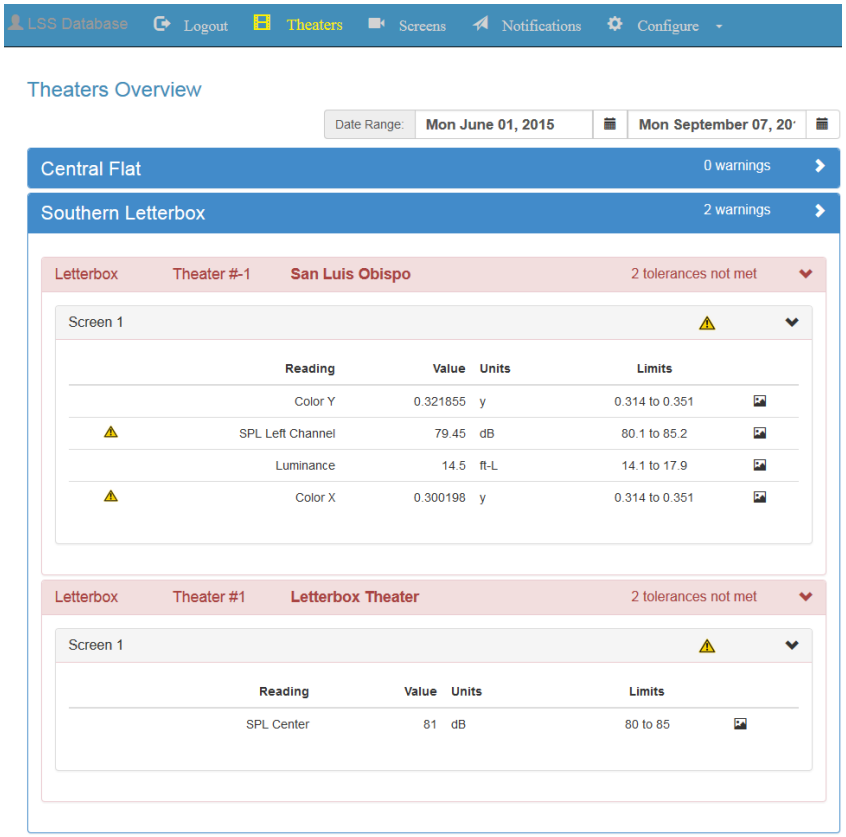
In the following screen, we see data displayed for a certain date range. If there is no data available for the specific date range you are notified of the fact with a message where the data would normally reside.



If data is available, you will see a list of screens available to you for the specific theater. In this case the Letterbox Theater #1 and the Scope Theater #1 each have one screen with LSS-100P associated with the screens.

In most cases only variances out of a normal range should cause concern by indicating to the user the number of out of tolerances. In the figure above there's a theater group called Southern Letterbox that has two theater locations with out of tolerance reporting's. When the group is expanded the two theaters are shown to the user. As shown Theater -1 has a couple out of tolerance measurements. The second theater number 1 also has out of tolerance measurements as well.

When an out of Tolerance Theater is selected, its contents in the group box are expanded to display details. In this case the reported measurements will have a caution icon located next to them. As a note if the selected time span is not large enough, captured data may not be presented to the user and can be corrected by expanding the date range. A good example of this condition is shown for theater 1, Letterbox Theater showing details for a good audio level and yet there's a caution icon displayed in Screen 1 expander's header near the right side.



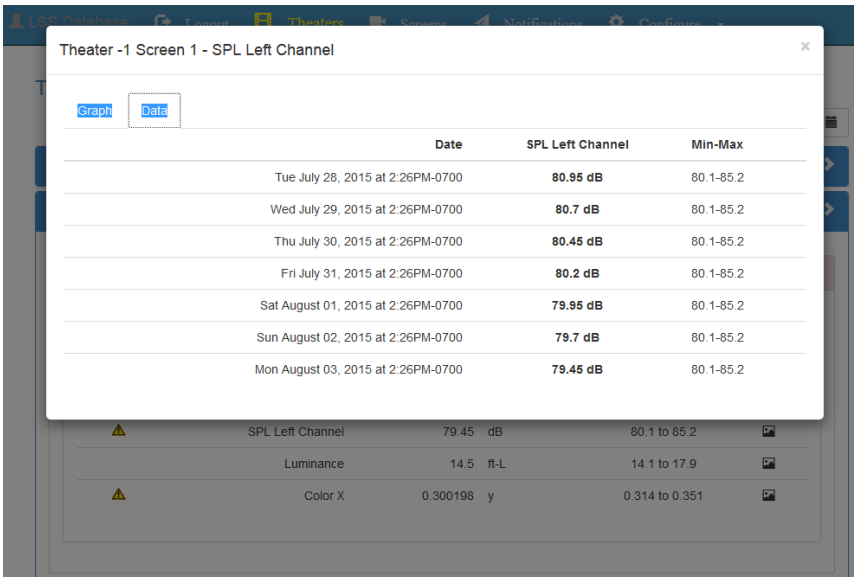
In this case the SPL Left Channel and Color x display a problem. The titles defined for a reading is a text input field that is entered by the technician performing the installation. The measurement titles should be uniform in that all data reports from other screens follow the same naming convention such as those shown in this manual. Therefore the titles may have a different name or be in a different language as required. Whatever title was assigned in the installation it will be displayed and if there is concern with the item, the yellow triangle warning sign will appear on the left column. Next to the title is the value of the reading in units based on the type of measurement. On the right are the limits that are used to qualify if the measurement in question is good or bad. On the far right is a link to take you to a graph that will display the

data in your requested range for the measurement shown on that line. In this case the SPL Left Channel has a level of 79.45 where the normal range is 80.1 to 85.2.

If we drill deeper and examine the graph of the SPL Left Channel we will see the following:

The graph above shows the values of SPL Left Channel data for the range selected by the user (Jun-01-2015 to Aug-03-2015). The legend is attached to the mouse and will travel along the data from left to right displaying the nearest actual measurement as indicated by the orange and blue balls on the graph lines. The legend also shows the limit values. Limit values can be adjusted by the installation technician or by remote control of the LSS on the script definition page. The normal method of use is to set what is considered the best values for high and low. Then take some readings on an automatic basis and adjust limits to provide margin. For example, take a data item such as silence. Because of fans, air conditioning, acoustics, lobby noise, etc. all theaters will have different settings and there is no norm. The installing technician would need to set limits to a best guess, take a few samples and then adjust the min and max levels to provide a warning when the value changes too high or too low.

Next to the Graph Tab is a Data Tab. Clicking the Data Tab will display collected data in tabular form. As shown next:



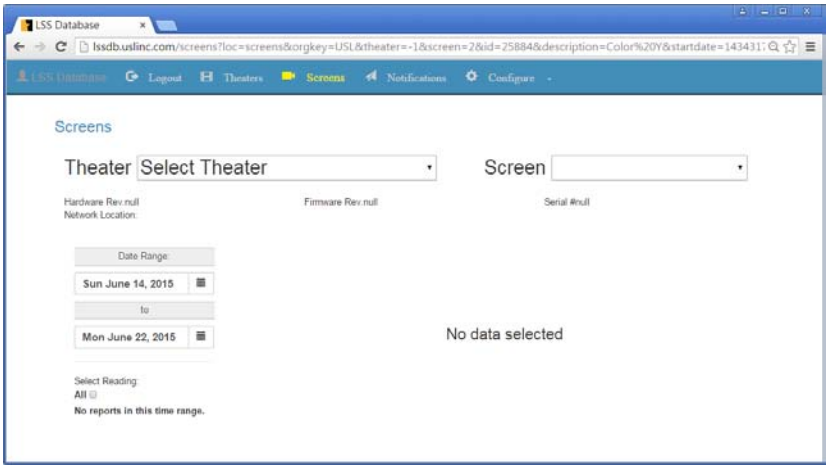
While not as exciting to look at as the graph you can examine the details about a specific data point.

3.3 Screens View

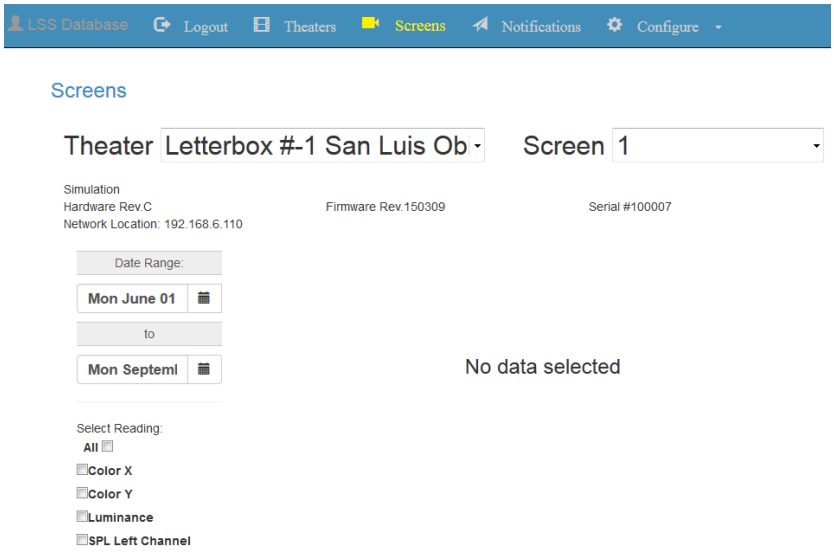
The Screens view provides information on a single screen in a particular theater. Keeping with the essence of the LSS Database product it allows you to drill even deeper into the collected data.

In the following screen the Theater field is used to select a specific theater that contains the screens we are interested in. The items in the list contain organization, theater number, and theater name. The theaters shown in the select list are controlled by the Group for which you belong to as assigned by the System Administrator or Manager. You may not view any theaters or screens that are not in your Group.

The Screen field is used to select a single screen that we are interested in. The date fields work in a manner similar to the previously described Theater Overview screen.



Selecting data will result in a screen similar to the following:



Once a screen has been selected, data will be displayed below the entry. On the far left top are three fields. The topmost field is the Comment Field that may have information supplied by the installing technician. In the example shown it contains the text “HW Rev C”. Other uses might include Installer Name, theater dimensions or a friendlier version of Screen 1 such as “Letterbox Theater 1” or “Scope Theater 2”. Under the comment field is the Hardware Revision Field and will contain the revision number of the current hardware in the LSS-100P. USL convention is to use alphabetic letters to

signify hardware revisions and numeric descriptors for firmware or software versions. Below the Hardware Revision is the IP Address of the LSS-100P. This was programmed into the LSS-100P when installed and is the address of the device on the theater's network.

At center top is the Firmware Revision. This is a numerical representation of the current operating version of firmware loaded into the LSS-100P.

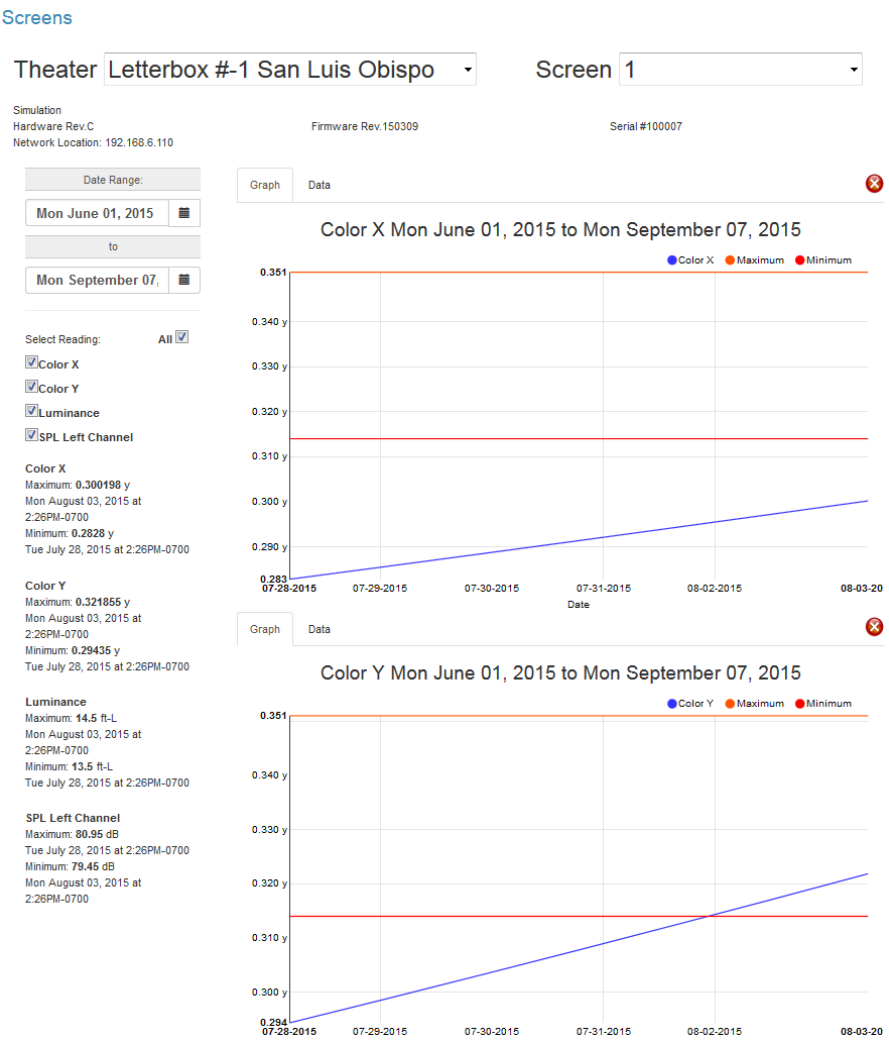
Under the date pickers on the left side is a list of the data items recorded by the LSS-100P. As explained earlier, the names of the fields represent the names programmed into the LSS-100P by the installer. They may not be the same as displayed here and may possibly be in the native language. Note that the data items are listed in alphabetical order by name. The order can be changed by preceding the name with a number, noting that the numbers also face an alphabetic sort. For example, if the measurement names in the script are similar to these, the readings will be in the specified order:

01 – SPL Left Low

02 – SPL Left Mid

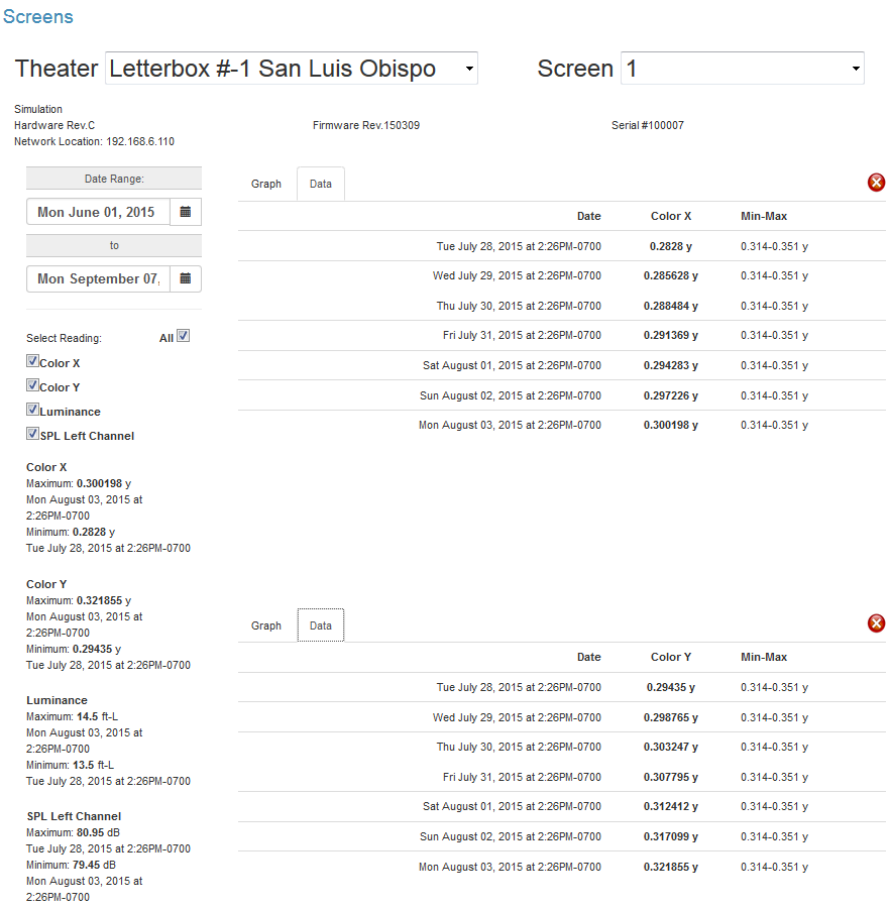
03 – SPL Left High

Each of the named fields have a checkbox on the left side of the field name. Checking this box will cause a data chart to be displayed containing the data points defined by the start and end dates. Each chart appears in the order of the list and one, several or all charts may be displayed on the same web page. Note that a checkbox has been supplied to allow examining all data without selecting each item individually. Selecting a few items will provide the following page:



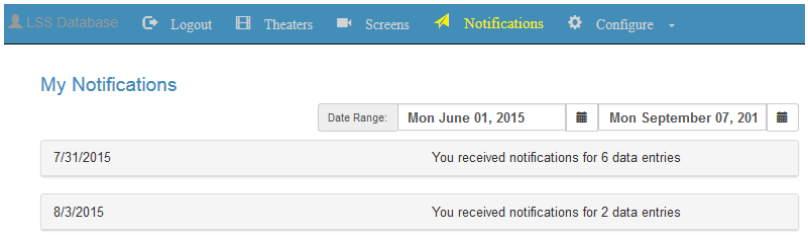
As the cursor is moved over the graph, the values at the point in time corresponding to the cursor position are shown. Since the graph has three lines (value, min, max), these three values are shown.

Note that for each graph there is a tab to display data in a tabular format. Selecting individual Data Tabs will result in something like the following:



3.4 Notifications

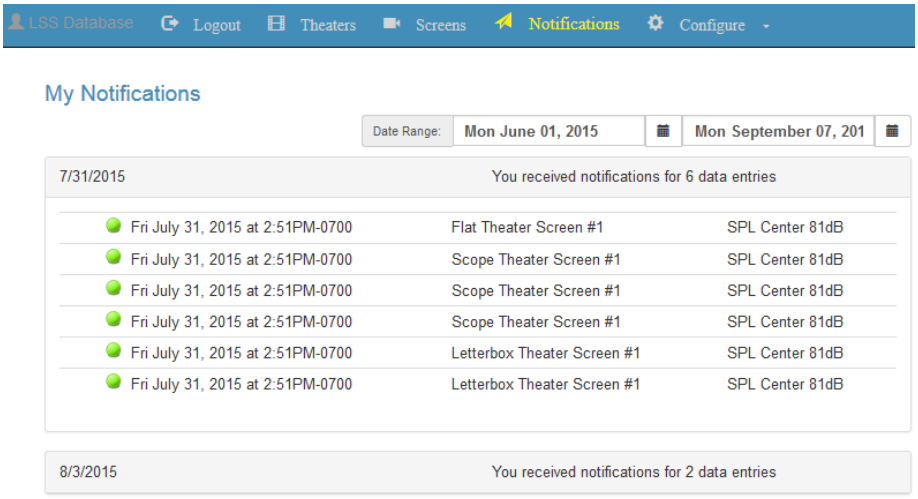
The Notifications screen will allow you to see any Notifications that have been sent to you. This screen is available for instances where you may not have received or somehow lost the Email notification that was sent to you. The Administrator has control over what Notifications are saved and what is purged, but there is ample room in the database to maintain a year's worth of the Notifications. In the following screen we see three Notifications that have been sent in a 1 week range.

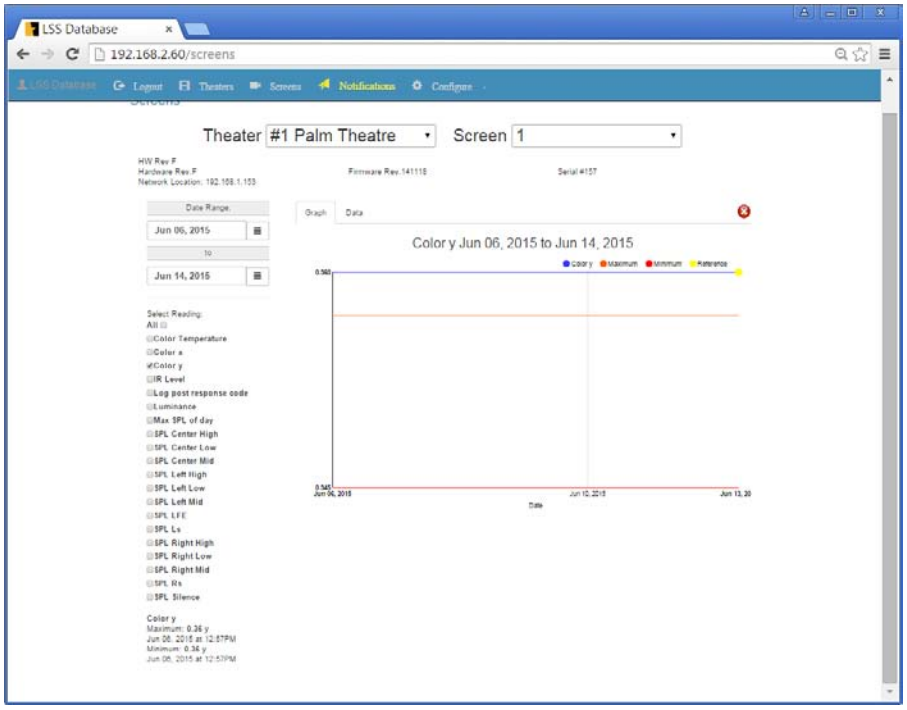


Note that the entries are grouped with a certain number of data entries per notification. Notifications are delivered as a batch process and accumulated for a single email event. Exactly when this batch operation is performed is determined by the System Administrator and is usually performed during off hours when results from the day's business can be accumulated and filtered.

In the following screen we depict the events that were recorded in a truncated view of the list for 6/01/2015. Each entry contains the date and time of the event and the values associated with that event. Note that this user elected to receive ALL notifications meaning that any result from a test is sent whether the test was good or bad. Below the good tests are depicted by the green dot while the bad results are indicated by the yellow warning sign.

Towards the bottom of the list note the yellow warning sign on the far left side of the entry. Clicking on this will take the user to a Screens display that shows exactly what the event is referring to. The event matching the notification is highlighted with a yellow dot.





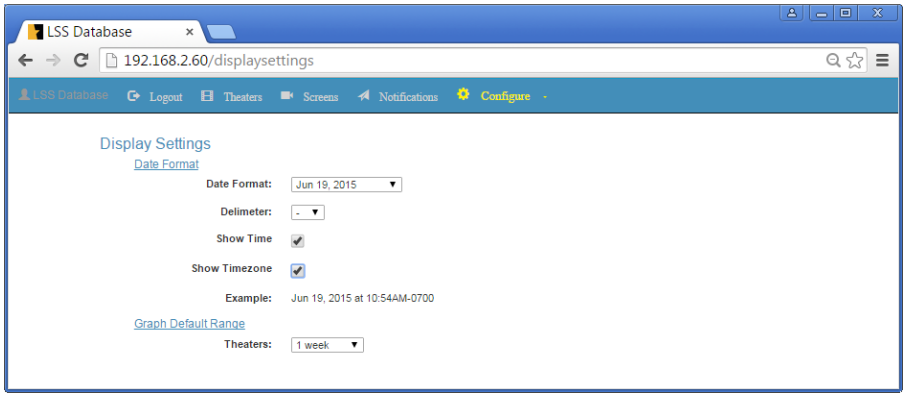
Note the yellow dot in the upper right corner marking the notification event. Only two test points are displayed in this graph. You may use the "X" to return to the Screens regular page to view additional data points.

3.5 Configure

The Configure menu contains different options depending on your User Level. Those with a User Level of Administrator will have the full menu while those with a User Level of Manager or User will have only functions that relate to their needs. All menu options are described here for completeness.

3.5.1 Display Settings

Display Settings control the way data is displayed on the Theater and Screen menu functions. Date Format and Graph Default Range are the provided options and will appear as in the following screen shot.



The **Date Format** pulldown menu allows you to select from several different date formats. Some options include European style DD-MM-YYYY and year first options.

The **Delimiter** pulldown provides three options. Either "/", "." or "-".

The **Show Time** checkbox is used to control whether the time of day is displayed. Checking the box will cause the time of day to appear. Unchecking the box will display the date only.

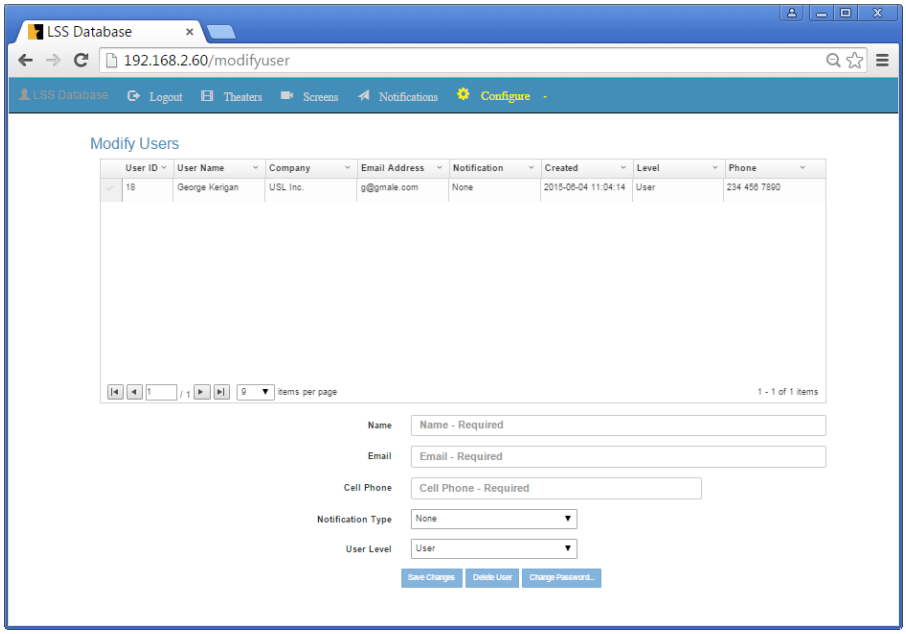
Show Timezone is used to display the UTC offset if the time is displayed. The format of the time is controlled by the browser you are using and may be adjusted using browser options.

The **Graph Default Range** sets the amount of time displayed between the start and end date pickers. The factory setting is 1 month of data causing the end date picker to display the current date and the start date picker to display the date one month in the past. The minimum amount you may set is 1 day and the maximum amount is 10 years.

3.5.2 Modify User

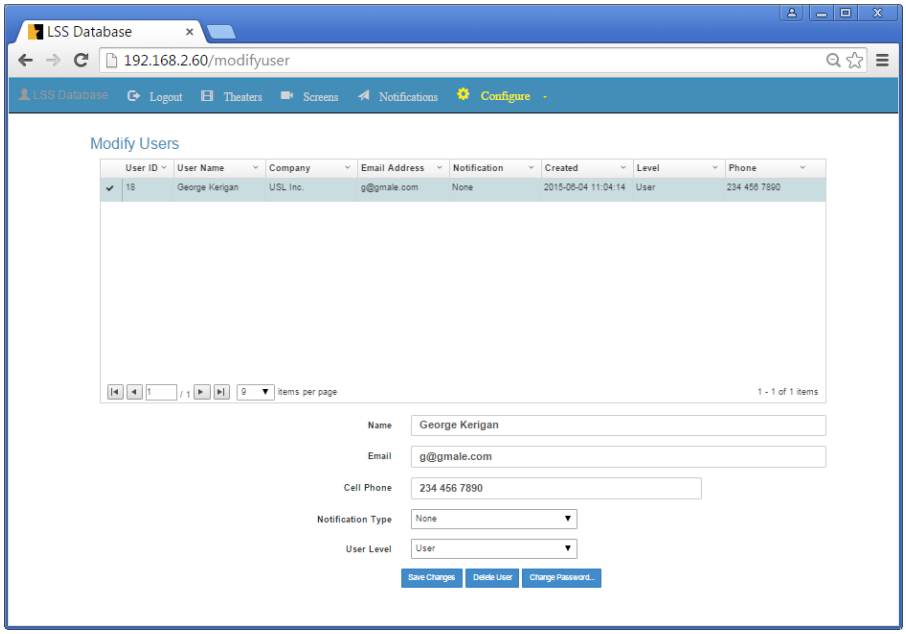
The Modify User screen is the second of the two screens available to a standard user. The operation of the screen is similar for the Administrator, Manager and User except that modify options reduce as the User Level is reduced. For example, all users are displayed for Administrator and the Administrator may change all data while the Manager may view and modify Users with the same company. The User can see and modify only his own data.

Below is the Modify User screen for a standard User:



Note that when the screen is first displayed no user is selected, even if only one user is visible. The user that will be modified is selected by clicking the checkbox on the left side of the data grid. Selecting a user will cause the user's current data to be entered into the fields at the bottom of the page.

The following page shows the fields when the user is selected:



User information is stored by a unique User ID which is never changeable and never reused if the user is deleted. This allows all data pertaining to a user to be modified without changing the User ID on the system. Any groups that have been associated with a user will remain even though the User Name and Email Address of user have been changed.

The **Name** field holds the user's proper name. It is used for login and can be a nickname if desired.

The **Email** field contains the email address that the user will get notifications at. It must be a proper email address or errors will be generated at notification time. It is also used for login if desired.

The **Company** field is a pull down menu of the current companies registered in the system. Operators having a User or Manager level cannot change this field. The Administrator may select from any company on the pull-down list. If the desired company is not in the list, the Administrator must enter the company in the New Company option elsewhere on the menu.

The **Cell Phone** field is used to enter the phone number of the user. The number can have any format and need not be a cell phone but may instead be a land line that is unique to the user.

The **Notification** field defines the type of notification of events the user wants to receive. The values are: ***None*** – No notifications are sent, ***All*** – The user is notified about every event, and, ***Error*** – Notifications are sent only for conditions that fall outside a limit.

The **User Level** field indicates the status of the selected User. Values are: Administrator, Manager or User. A User level cannot change the User Level field. A Manager may change a User to a Manager or a User. An Administrator can set the selected user to any of the three levels.

There is a set of three buttons at the bottom of the screen. From left to right they are:

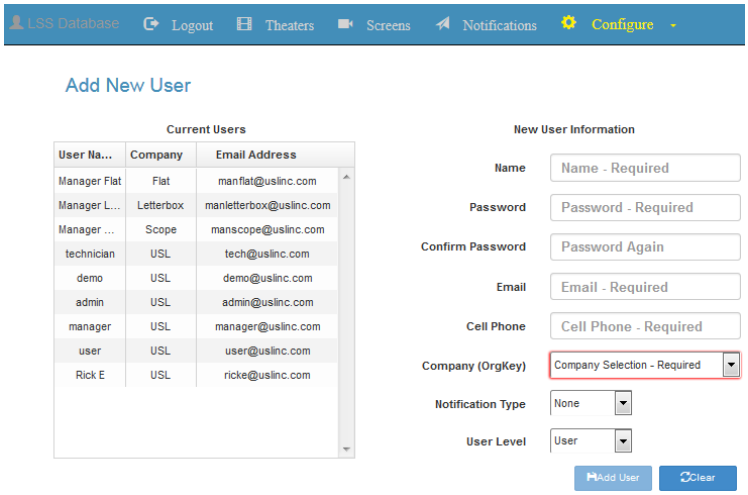
Save Changes – Saves any changes made to the selected user. If all fields are correctly completed when the user is selected, the button is enabled. If any required fields are not correct or not filled, the button is not enabled.

Delete User – This button is available to all levels and will allow a user to be permanently deleted from the list of users. Once a user is deleted, there is no way to recover the deleted user information. If the user was removed in error, all information must be replaced using the Add User function. The User ID of the deleted user cannot be used again, and if the user is added again later all group associations must be performed again.

Change Password – This button is used only to change the user's password. It is available at all User Levels. No other user information can be changed at the same time. You will be required to enter a new password and to confirm the new password by entering it again. Pressing the **Save New Password** button will save the new password. This button is a toggle button and will switch screens to allow a new password. If a new password is not saved and the Change Password button is pressed, returning to the Change Password screen will require the new password to be entered again.

3.5.3 Add User

The Add User screen allows new users to be added to the system. This screen is available only to Administrators and Managers. The left portion of the screen provides a list of current users to help in preventing duplicate entries. Administrators are presented a list of all users in the database while a Manager may only view those users that are associated with his company or OrgKey. The required fields are displayed on the screen in the placeholder of each field.



The **Name** field holds the user's proper name. It is used for login and can be a nickname if desired.

The **Password** field allows entry of a user password. When adding a new user, it is a required field but can be changed by the user once that user has logged in. Hashes of passwords are stored in the database. User entered passwords are hashed and compared with the hashed password. The password itself is not stored and cannot be recovered from the database. If the user has forgotten the password, a manager or administrator may issue a new password using the Modify User option.

The **Confirm Password** field allows you to verify that the password you entered above was correct. Since there is no way to see the password as plain text, this ensures that the correct intended password will be saved with the new user information.

The **Email** field contains the email address that the user will get notifications at. It must be a proper email address or errors will be generated at notification time. It is also used for login if desired.

The **Cell Phone** field is used to enter the phone number of the user. The number can have any format and need not be a cell phone but may instead be a land line that is unique to the user.

The **Company (OrgKey)** field is a pull down menu of the current companies registered in the system. The Administrator may select any of the companies on the pull-down list. If the desired company is not in the list, the Administrator must enter the company in the New Company option elsewhere on the menu. Managers will only be able to enter the company they are affiliated with.

The **Notification** field defines the type of notification of events the user wants to receive. The values are: ***None*** – No notifications are sent, ***All*** – The user is notified about every event, and, ***Error*** - Notifications are sent only for conditions that fall outside a limit.

The **User Level** field indicates the status of the selected User. Values are: Administrator, Manager or User. A User level cannot change the User Level field. A Manager may change a User to a Manager or a User. An Administrator can set the selected user to any of the three levels.

The **Add User** button on the lower right corner will become active once all the required fields have been entered.

The **Clear** button on the lower right corner is used to reset all fields to blank.

3.5.4 Modify Groups

To use this function the concept of groups needs to be presented.

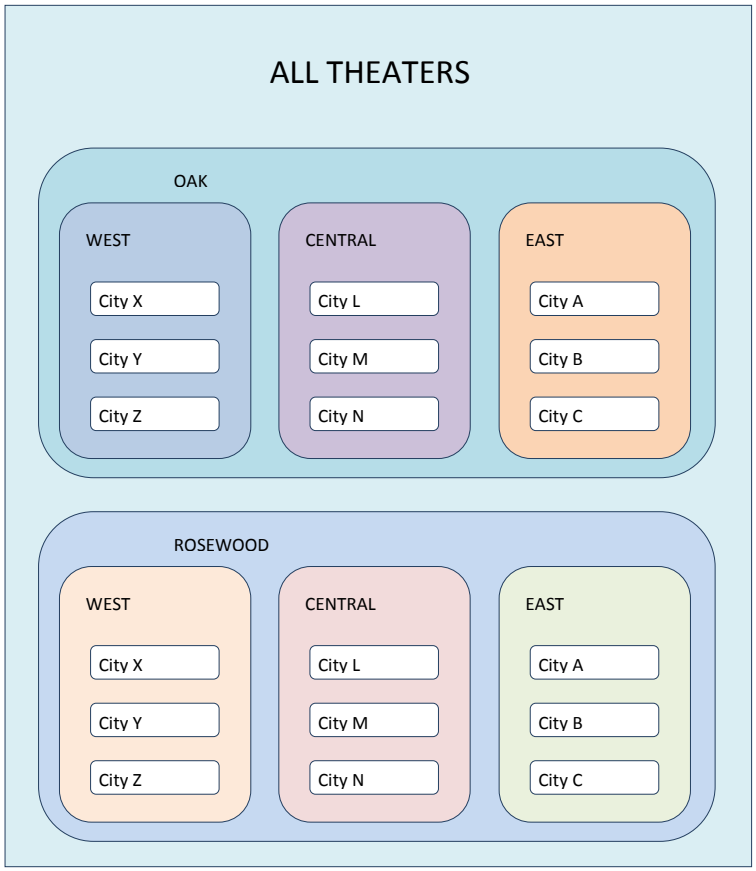
3.5.4.1 Group Access Control

Groups are used to protect company data and allow that company to work with and display data only related to that specific company or a portion of the company. Additionally, within the company protection, there are additional groupings that allow the company to control which persons in the company see specific data. User groups and theater groups permit users to see data collected from certain theaters and not others. A group contains theaters, users, and possibly other groups. Users in a group can access data from theaters in the same group.

LSS data is uniquely identified by the OrgKey, Theater Number, and Auditorium Number. Within a theater, the auditorium number is unique. Within an OrgKey (within a theater chain), the Theater Number is unique. A manager or user is allowed to see data within a single OrgKey and, thus, may not see data from other theater chains. The OrgKey for each LSS is set during its installation. Managers and users that are assigned with an individual organization will only be capable of viewing data for that company only. In retrospect a Manage or user can been configured by a system administrator to allow viewing data from multiple organizations, as would be the case with a theater service company.

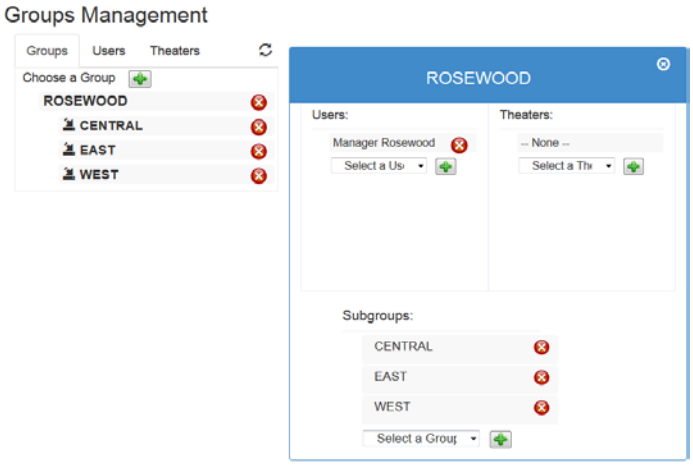
At a lower level than the OrgKey protection is a concept of nested groups that further protects the data. In general operations the Administrator will create managers that are responsible for creating and maintaining groups and assigning users to those groups. Managers have full control of the LSS data within their OrgKey unless they are granted access by the system administrator.

Imagine a theater service company that has two national theater chains. The chains are Oak Theaters and Rosewood Theaters. Both chains overlap each other throughout the country. To keep costs down, the service company employs freelance technicians that cover both theater chains in remote areas and corporate technicians that handle theaters in high density city areas. To track costs for each chain the corporate technicians work either for Oak Theaters or Rosewood Theaters but not both.

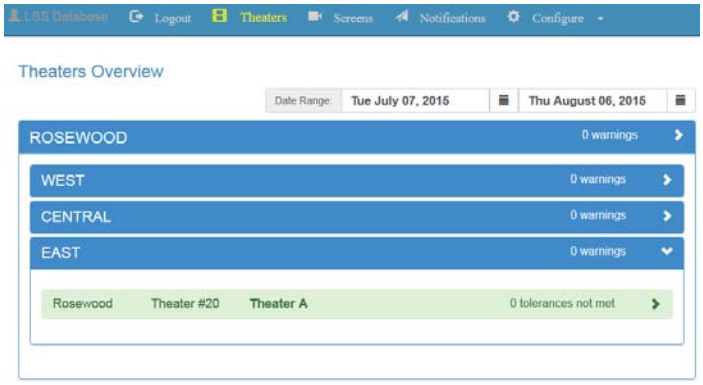


The theater service company has decided to use the LSS Database application to track all theaters with regions called East, Central, and West. Managers for each chain will get to view all theaters in their chain that are in their regions. The theater service company has technicians with the ability to view all theaters in their section so that they can access the same data available to the local chain's technicians. The theater chain's technicians will only see their respective region that they are assigned to.

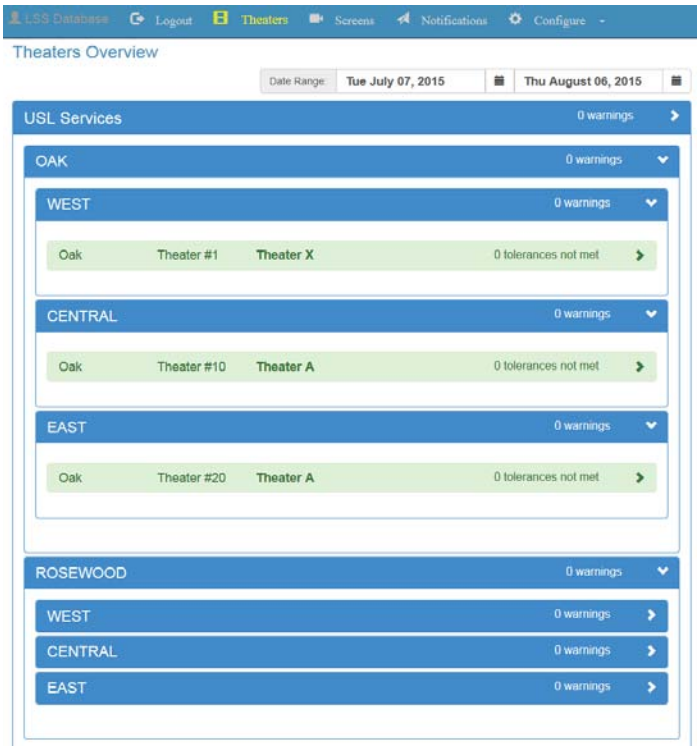
As an example, an organization can have theaters located within various regions in the country and are serviced by cinema technicians. For instance the Rosewood theater chain can have theaters in the western, central, and eastern parts of the country with a manager that can view any of the theaters within the organization. The manager for the organization would first create the groups and then add them as subgroups for the organization. Then for each group the theaters are added with service technicians.



When the manager logs into the LSS Database, the regions are shown and by expanding them individually the theaters in that region are displayed. As shown below a status for Rosewood theater chain has an overview that contains a status for all the theaters with the 0 warnings status located on the right side of the expander items.



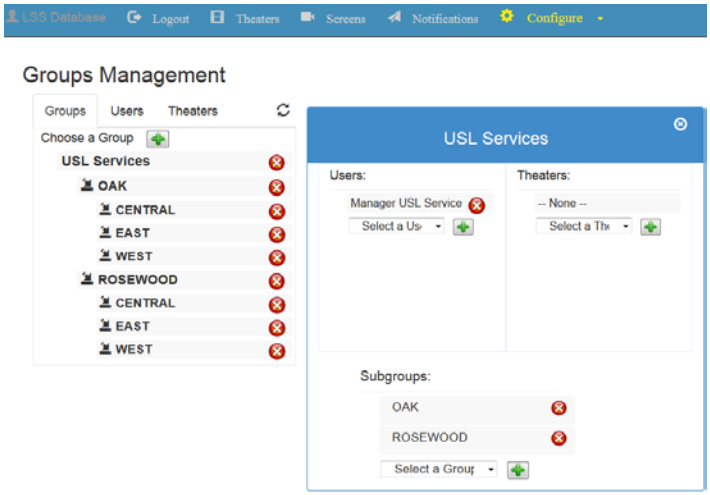
A service copy would be an organization that has access to multiple companies. As shown a USL Services company has a couple of theater chains that oversees cinema technicians in different regions of the country. As with a single organization the items can be expanded to view their details. As shown Oak and Rosewood have theaters in the Western, Central, and Eastern regions of the country. Note that USL Services has a status for both Oak and Rosewood theater chains.



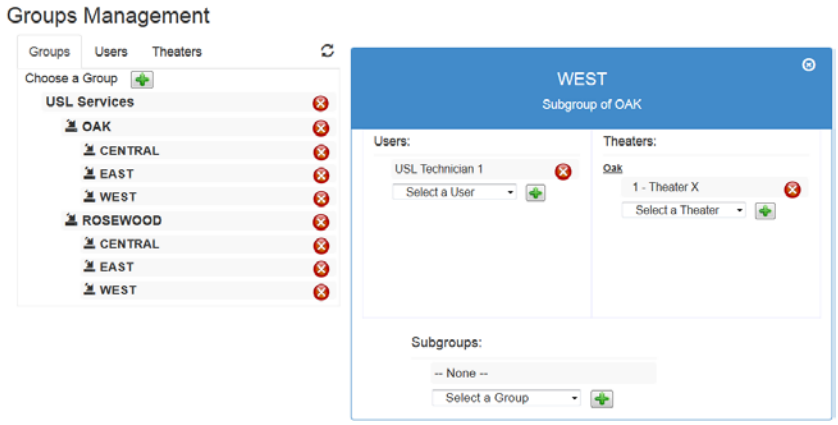
As a note the LSS Database for a manager and user has restricted access to LSS-100P data unless they have been granted by the system administrator. The manager has the ability to add and create local and regional users. For a service company the administrative rights are required to grant access to a user to view more than one organization's data.

When the USL Services group was created, the two organizations with their regional groups had already been defined. As mentioned the manager for each organization created the subgroups representing the regions. The manager for USL Services created a single group "USL Services" and will require a system administrator to organize their relationship as shown on the next page.

The LSS Database administrator creates two subgroups representing the two organizations. A group is created with the Choose a Group add button and then with the Subgroups add button, the group is added under the parent group, and it's more like a move.



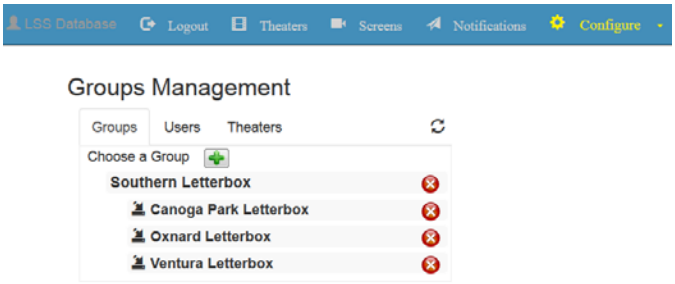
By selecting a region within an organization's group, the theater for that region can be assigned via the "Select a Theater" dropdown list box control. As with all theaters the LSS-100P must first post a report to the LSS Database for it to be an item ready for assignment (theater to be assigned). Note that Theater X has been assigned to the western group in the Oak theater chain (company).



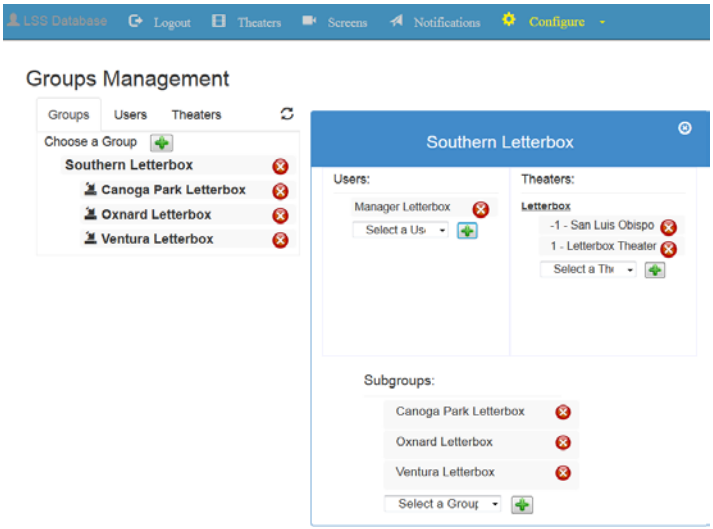
3.5.4.2 Groups Management

Access to this menu function is limited to Managers and Administrators. Managers have access to only the groups defined for their company (within their OrgKey) and can only make groups for their own company. Administrators can create and manage groups for any company.

In the Modify Groups option the following screen is presented:



In the screen above we show a Parent Group (Southern Letterbox Group) and three subgroups (Canoga Park Letterbox, Oxnard Letterbox, and Ventura Letterbox). The green "+" is used to add a new group and will present the following pop ups:

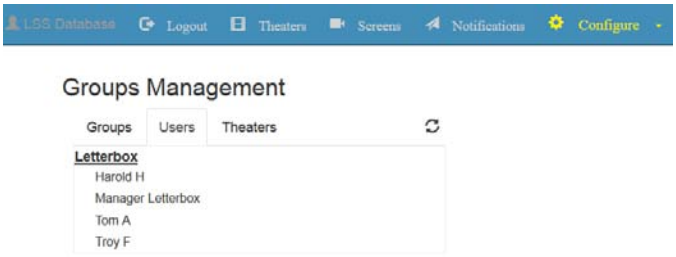


On the left hand side we see a Managers view for Add Group while on the right side a group overview for Southern Letterbox. The Manager may only add a new group to his existing Company or Organization Key. An Administrator may add a new Group to any of the existing companies.

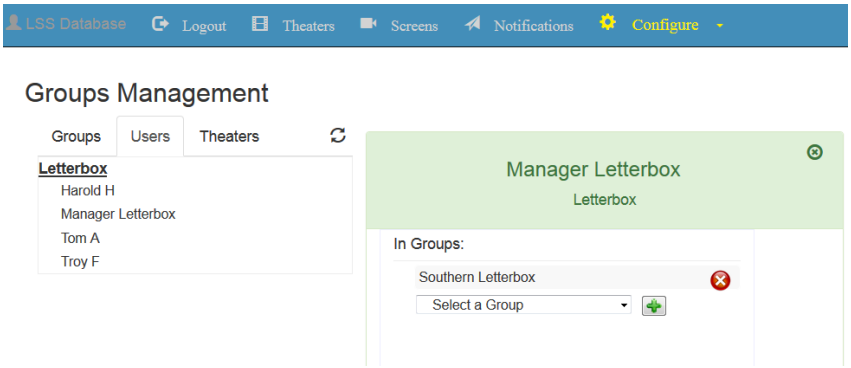
Entering a name different from an existing group will allow you to add a new group. Pressing the "X" allows you to skip adding a new group and return to the original screen.

On the right side of each group name is an "X" that will delete a group if it is no longer needed.

The second tab is Users and controls the assignment of users to groups. Selecting the Users tab provides a screen similar to the following:

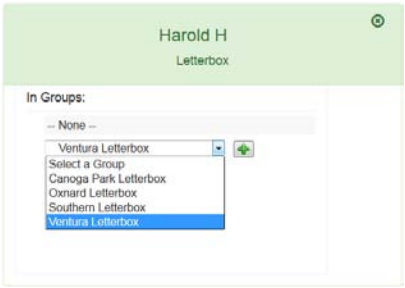


The screens will appear different for Administrators than the Manager screen shown here. Administrators have access to all companies in the database while a manger has access only to his/her own company. In the screen shot above, "Letterbox" has a group of users assigned to the organization (OrgKey). Selecting a name from the list on the left hand side will present a screen with groups associated for that person.



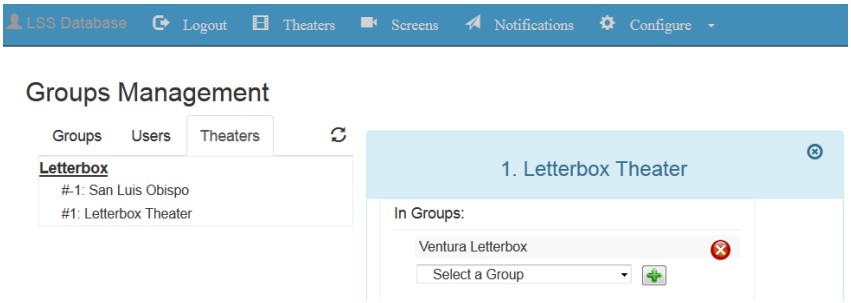
The right portion of the screen will show the selected name at the top of the green header followed by the associated company (OrgKey). In the lower right portion of the screen are names of groups that the user belongs to. In this case Manager Letterbox was selected indicating the group assignment to Southern Letterbox. Any user can be assigned to multiple groups by the manager and system administrator. As a note the group Southern Letterbox has subgroups that will allow the manager to have access to Canoga Park Letterbox, Oxnard Letterbox, and Ventura Letterbox.

Next to the group name is an "X" that will remove the user from a group association. Below the assigned group, a drop-down shows "Select a Group" that will present a list of available groups.



Selecting the name of the group followed by pressing the "+" button will add and assign the selected group. In this example Canoga Park Letterbox, Oxnard Letterbox, Southern Letterbox, and Ventura Letterbox are subgroups of the Southern Letterbox. The Manager Letterbox can assign a user to multiple or a single subgroup of theaters.

The right-most Theaters tab will be used for assigning a theater to a group. In the theater there can be multiple LSS-100's installed that are identified by an organization (OrgKey), theater numbers, and screen. All screens within a theater location (theater number) will be associated with the selected group. The organization is shown as Letterbox and the individual theater numbers (locations) are listed as "#number." By selecting a theater number (location) the assignment box appears in the right side of the screen. Within the assignment box a list of theater groups is available including the theater's current group assignment. As shown theater #1 with it name Letterbox Theater is in the Ventura group.

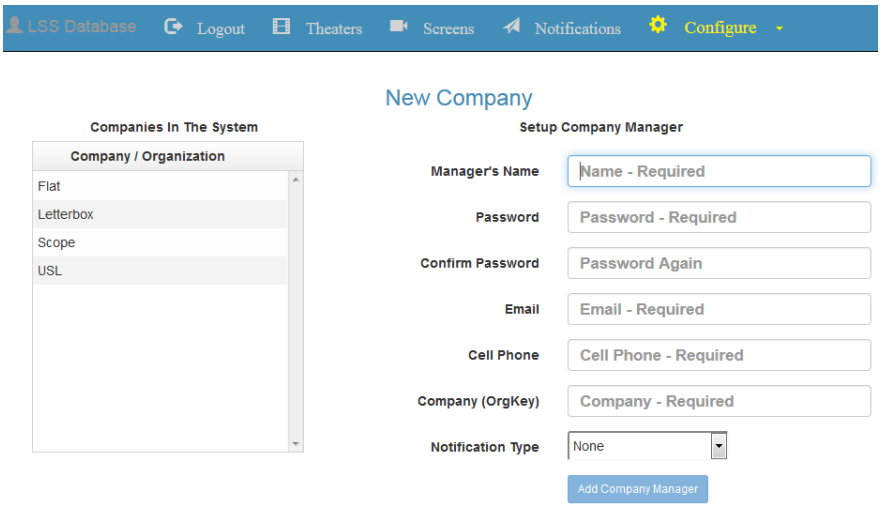


The operation of this screen is similar to the Users screen except that the list on the left side now presents Theater Names instead of user names. As in the previous screen, "Letterbox" at the top of the left column is the OrgKey. 0 and 1 are theater numbers that are set in the LSS-100P units during installation. The "Letterbox Theatre" is the theater name set in the LSS-100P units during installation. These will typically be different for each theater but need not be. The LSS-DB uniquely identifies an LSS-100P by its OrgKey and Theater Number assignment. The theater name is only for user convenience.

For Letterbox Theater the screens equipped with an LSS-100P will be reporting measurements to users that are assigned to either the Ventura Letterbox or parent Southern Letterbox group.

3.5.5 New Company

The New Company option allows an Administrator to add a company to the list of companies by adding a Manager for that company. Once the manager and new company have been added, the new company will appear in the list of companies currently in the system as shown in the left side of the screen. This list is to help the system administrator to ensure that duplicate companies are not added. The system administrator can create multiple administrators and must be careful to ensure that the organization key matches the installed LSS-100P. It's recommended that a single manager account is created and then to log into the system using that managers credentials and then using the add user options to create other managers for the same organization.



Company names are derived from two sources. The normal flow is to have the LSS-100P installed in the theater and programmed with the new company name (OrgKey). Once at least one record is received from the LSS-100P it is stored in the database with its OrgKey matching one of companies in the list. Without a matching organization key (OrgKey), the theater assignment cannot be done. Since the reporting LSS-100P needs to have an OrgKey correlation with the reported data it will not be available until either the system administrator or manager changes its group and user assignments. It is important to have both manager's organization and LSS-100P match to complete the user assignments.

If adding the company name here, care must be taken to ensure the organization name (OrgKey) is identical to expected OrgKey LSS-100P configuration settings. This includes any capitalization that takes place in the organization names.

The **Manager's Name** field allows entry of the username of the manager for this company. This may be a full name or a nickname as desired. The manager's name (username) is case sensitive. If it is capitalized one way here and another way during login, the login will be denied.

The **Password** field allows entry of the new Manager's password. When adding a new manager, it is a required field but can be changed by the manager once that manager has logged in. The database holds hashes of the passwords and not

the passwords themselves. If a manager forgets his or her password, an administrator will need to set a new password for that manager using the Modify User dialog.

The **Confirm Password** field allows you to verify that the password you entered above was correct.

The **Email** field contains the email address that the manager will get notifications at. It must be a proper email address or errors will be generated at notification time. The email address may also be used for login if desired.

The **Cell Phone** field is used to enter the phone number of the manager. The number can have any format and need not be a cell phone but may instead be a land line that is unique to the manager.

The **Company** field is where the name of the new company is entered into the system. Care must be taken to ensure that the name being added will be identical to the name being used in the LSS-100P. This name is sometimes referred to as the Organizational Key or OrgKey.

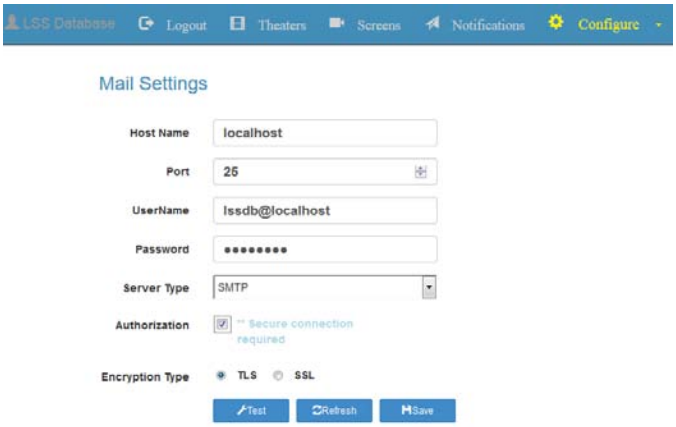
The **Notification** field defines the type of notification of events the user wants to receive. The values are: ***None*** – No notifications are sent, ***All*** – The user is notified about every event, and, ***Error*** - Notifications are sent only for conditions that fall outside a limit.

The **Add Company Manager** button on the bottom will become active once all the required fields have been entered.

3.5.6 Mail Admin (Administrator Only)

The Mail Admin option allows the Administrator to connect the LSS Database to an email server (Mail Transfer Agent). The MTA may reside on the same server as the LSS-DB or may be on a different server. If the MTA is on the same server, the type of MTA is selected (PHP Mail, Send Mail or Qmail). If a remote MTA server is used, SMTP (Simple Mail Transport Protocol) is used to transfer the notifications to that server.

Email server access is required to allow the LSS Database server to send Notifications to the Users that have requested them. If a valid email server is not specified, Notification delivery will not be possible.



The **Host Name** field is used to specify the domain name MTA server.

The **Port** field specifies the port number the external MTA server receives mail on. Most MTAs accept authenticated mail submissions on port 587. Some may also accept mail submissions on port 25, though port 25 is normally used for MTA to MTA transfers.

The **UserName** field holds the MTA username required for authentication.

The **Password** field holds the MTA password associated with the above username.

The **Server Type** pulldown will list the various email MTAs supported by LSS-DB. As discussed above, an external MTA server will be accessed using SMPT. An internal server is accessed directly, and the name of MTA program is selected here.

The **Authorization** checkbox should be checked if the selected email system requires authorization to send mail. If this is checked, the communications with the MTA server will be encrypted.

The **Encryption Type** radio buttons determine whether the MTA communications is encrypted using TLS or SSL.

There are three buttons at the bottom of the screen that allow you to test, verify current settings and to save them.

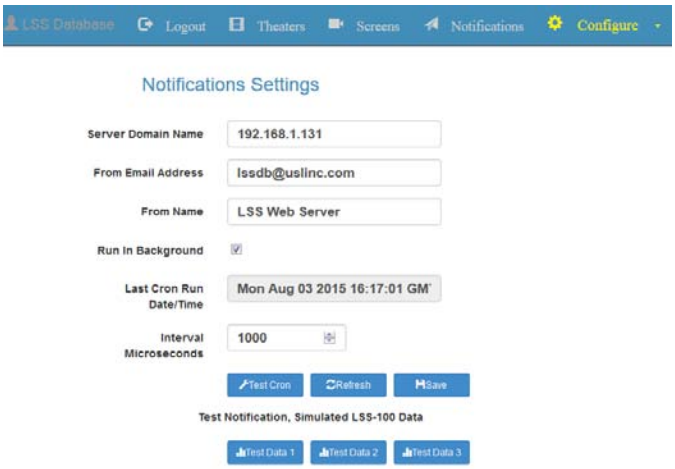
The **Save** button must be used first to save any settings you have made to the data on the screen. The Test button uses only the saved settings and will give incorrect results if changed data is not saved.

The **Test** button is used to test the connection to your email server and will send an email to the Administrator based on the current user login credentials, typically the system administrator (user email address). A successful test will result in a green message being displayed indicating the test was successful and an email received at the destination mailbox for that users email account. A failed test will display a red warning and usually no email is sent.

The **Refresh** button is used to refresh the data on the screen in case you have made changes that might be in error. The screen will be refreshed to currently saved data.

3.5.7 Notification Admin (Administrator Only)

The Notifications Settings options allows specifying information to control the sending of Notifications that indicate data has been received from the LSS-100P that has report data with capability to notify when measurements exceed the upper or lower limits set by the installer.



The **Server Domain Name** is the fully qualified name of the email server that handles the corporate email. The email server may reside onsite or can be located remotely. It used in the creation of a link within the email to the LSS Database with information about the report data storage for retrieval and viewing.

The **From Email Address** is the username and domain name that will be used as the return address for Notification email. It is normally in the form of somebody@someplace.com. It is useful to make this address an actual address so that any problems in the system can be made known via a return email from the receiver of the notification. If for example, the address is an alias that eventually gets to the administrator; the administrator is made aware of some type of problem.

The **From Name** is the friendly name that can optionally be included in email messages. For most email systems this would allow the "from" address to be in the form of "LSS Web Server <root123@localhost.com>" for data shown above.

Run In Background allows the server to execute email tasks when time is available. Checking this box will improve overall performance. If it is necessary that Notifications be sent out immediately and all other LSS processes can be suspended then unchecking this box will ensure Notifications are sent in the foreground process.

Last Cron Run Date/Time is an information only field that displays the last time a batch job to send out Notifications was executed. The actual time of the Cron job is set in the set up configuration files at time of installation. This field provides a wellness check on Cron process relating to the LSS-DB.

Interval Microseconds provides a timer value that limits the rate in which email Notifications are sent. This is used when the email server has spam protection that causes it to ignore the sender if emails are delivered at a high rate. In that event the server considers the emails are spam mail and tries to prevent their forwarding. Setting this value to an interval of 1000 will fix the problem in most cases. This causes the LSS-DB to wait the specified time before sending the next message.

There are six buttons at the bottom of the screen. Before running any tests the Save button should be used to save any changes made to the screen.

The **Save** button will cause any changes to the screen to be stored in the database. A green message will indicate a proper save operations while a red message indicates some type of error.

The **Refresh** button will restore the saved data to the screen. This may be used in the event that you have made changes you are not certain about.

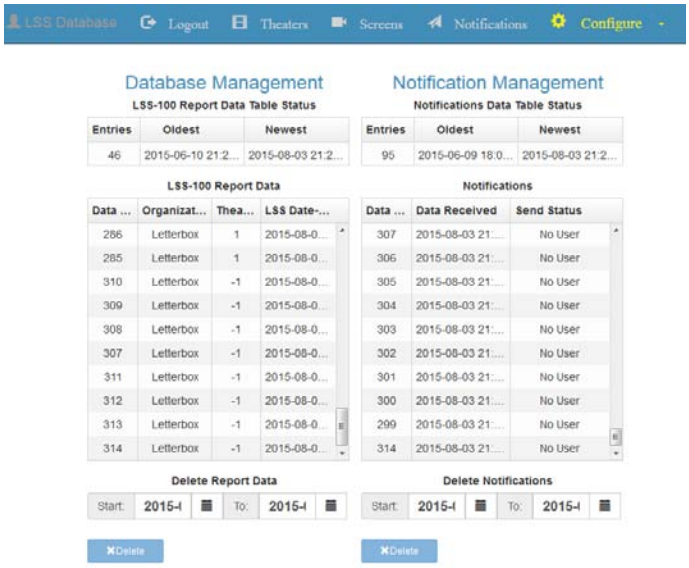
Pressing the **Test Cron** button simulates a cron operation by running the script that sends notifications. This allows testing of notification settings without having to wait for the next scheduled run

The three test buttons at the bottom are used to emulate an LSS-100P's data measurements and reporting with different severity levels and data points that are entered into the database. Care should be taken when using these buttons as email Notifications for those requesting them will be sent if the simulated LSS-100P is assigned to a user that is assigned to the group. The simulated measurement data is assigned a theater number of "-1" with the administrator's organization key assigned to him/her via login credentials.

3.5.8 Database Admin (Administrator Only)

The Database Admin option is used to remove old data reports from the database. This should rarely be required but if performance is hindered by many LSS-100P operating over an extended period of time, the removal of old and useless data may be warranted.

This operation is available only to the system administrator, and the removal of data is non-reversible.



The left half of the screen is devoted to LSS-100P report data while the right portion is used for Notification data.

Report Data is collected on a periodic basis where remote LSS-100P units port measurement data to the LSS Database. While the LSS-100P will retain some history data, the data saved in each LSS-100P is a sliding window with older data

continually being discarded (FIFO). The collected data is retained in the LSS-DB database until it is manually removed. Once removed, this data cannot be replaced.

At the left side bottom of the screen is a **Delete Report Data** field where the starting report time and the ending report time is specified. Two date pickers are supplied to set the dates and operate similar to date pickers in other parts of the application.

When valid start and end dates are specified the Delete button will be enabled. Pressing the delete will purge all entries from the start date to the end date.

Notification data accrues each time notifications are sent through the email delivery system. A copy of each notifications data is stored as a record in the database. Date spans of notifications can be deleted usually without repercussions because the data has already been sent to the user, and the data is old.

At the right side bottom of the screen is a **Delete Notifications** field where the starting report time and the ending notification time is specified

When valid start and end dates are specified the Delete button will be enabled. Pressing the delete will purge all notification records from the start date to the end date.

4. Emailed Notifications

4.1 Notifications

The LSS Database provides Notifications of events that are above or below the required values. The notifications are sent via email and will have a structure similar to the following notifications being viewed on Microsoft Outlook.

LSS-100 Notification 2015-08-02 20:59:30 UTC

Notification Level: All
Company: Letterbox
Theater Name: Letterbox Theater
Theater Number: 1
Screen: 1
Serial Number: 2
Comments: Letterbox Test Report
Firmware: 150309

Report Data

Date Time	Description	Value	Minimum	Maximum	Record	Data ID	Link
2015-08-02 20:59:30	SPL Center	89.3dB	80	85	1002	285	View
2015-08-02 20:59:30	SPL Center	88.7dB	80	85	1002	286	View

Comment [HH4]: Conceal theater name.

Shown is a portion of the email.

In the "from" field is the information placed by the Administrator in the LSS Database Notifications Settings option. Here we show both the "From Name" and the "From Email Address" entries.

In the subject field is an indicator that this email is an "LSS-100P Notification". An email client can filter based on this subject, if desired.

At the top of the body the details of the notification are listed. They include the UTC time of the notification, the level of this particular notification, the theater name, number and screen number, and details of the specific LSS-100P.

In the body of the Notification we see several lines with specific details about events. Event fields are listed in red to show they are measurement that contains items out of limits. Note in this example that Luminance and Color y are the reasons this notification was sent.

From left to right an event contains the following fields:

Time and Date – This field indicates the time and date in local time, based on where the LSS-100P is located, that the event happened (data timestamp).

Description – A short description of the variable that is being monitored. This description is defined in the script run in the LSS (the LSS Script). The installer may change this description as desired, including the use of other languages.

Value – The value of the variable at the time of the event.

Minimum – The minimum limit value that was set by the installer in the LSS-100P Script.

Maximum – The maximum limit value that was set by the installer in the LSS-100P Script. The Maximum and Minimum values allow you to identify which limit was exceeded.

Record – This field is generated by the LSS-100P providing an internal incrementing number that can be used to retrieve the raw data in the log and database should it become necessary.

Data ID – This field is used by the LSS Database to identify the exact notification sent with regards to the stored item (record) in the database. The data id is also a reference to the raw data for the notification being sent and or logged. This is useful for tracking the data flow through the system and to aid in debugging miss-configured settings.

Link – This is a hyperlink to the exact event for which this Notification was issued. It is an important field for the User that wishes easily view data and drill down to details. Depending on the type of mail receiver used, it may be possible to double click on the link to bring up a web page taking you directly to the reported measurement(s). Some email packages require that you perform a control-click combination to follow the hyperlink. Text based emails will require you to copy and paste the link into a browser.

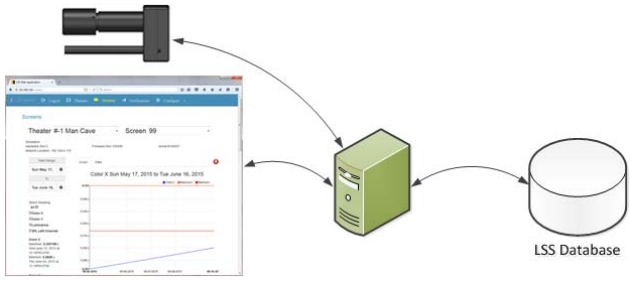
A. Appendix A – Quick Start Guide

A.1 Quick Start Guide introduction

This Quick Start Guide guides the user through basic configuration of the LSS-100P and the LSS-DB (creating a company, assigning a manager, etc.).

A.1.1 System Overview

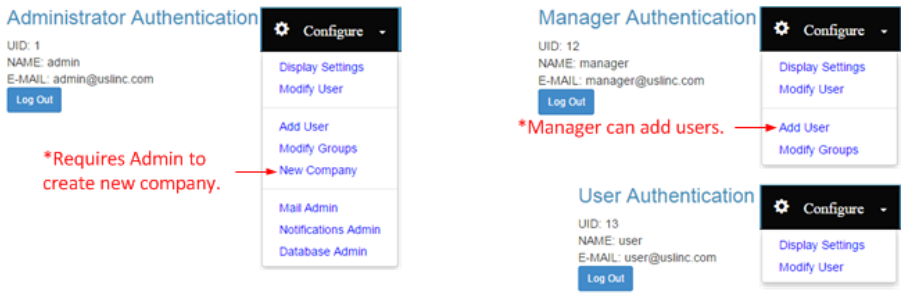
The LSS-100P Database is a served web application that is available to users, managers, and system administrators to review performance data collected from auditoriums. The data contains limits and measurements available for review. When the media server executes a test show, the LSS-100P executes a script that captures and logs various measurements. The script then posts the log (HTTP POST in XML) to the LSS Database. When the data arrives at the server, LSS-DB parses the XML and appends the resulting data to the database. The data contains an organization identifier (OrgKey) and theater number that is used to identify and generate notifications to designated users assigned or part of the company's personnel. The data is kept private to the organization's users and managers. It is only the system administrator that has visibility of the world and access privileges to install the web application on server hardware that will be hosting the site.



LSS-100P Database Web Server System Overview

A.1.2 User Levels

The default database contains an administrator, manager, and user accounts. Each account type has a respective access level that enables a list of available options such as creating a new company, and adding new users. The image below shows the configuration options available to each user level. For more information about the configuration see the information in prior chapters.

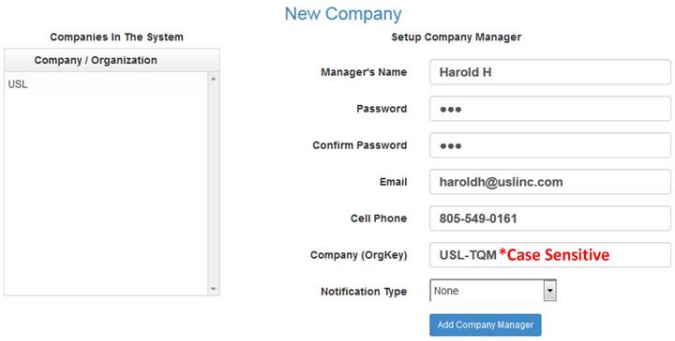


LSS Database User Levels

A.1.3 New Company

To add a new company which has a unique OrgKey not already in the system requires that an Administrator create a new Manager Position. It is important that the Administrator only adds the manager and DOES NOT add any new groups. Administrators should never add groups because Administrators can see across company OrgKey boundaries, and any groups created by the Administrator will not work properly in systems that contain multiple companies, all users require an OrgKey assignment.

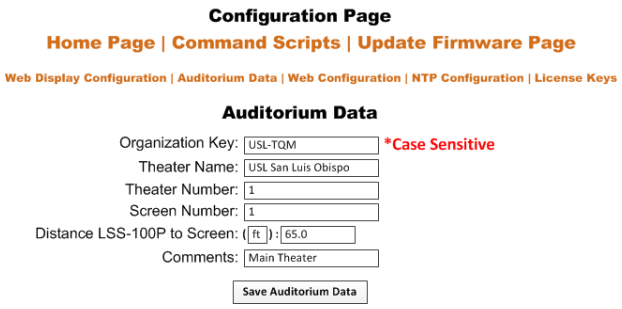
Each company is required to have a manager that will be able to add theaters, users, and define groups. A user group is formed to create a pool of users that are notified when the reported data contains measurement that are out of limits. Adding a manager requires system administrator privileges. The administrator is reminded of the existing companies in the list shown in the left side of the view. In this example we are adding a company called “USL-TQM.”



LSS Database Add Company

A.1.4 LSS-100P Configuration

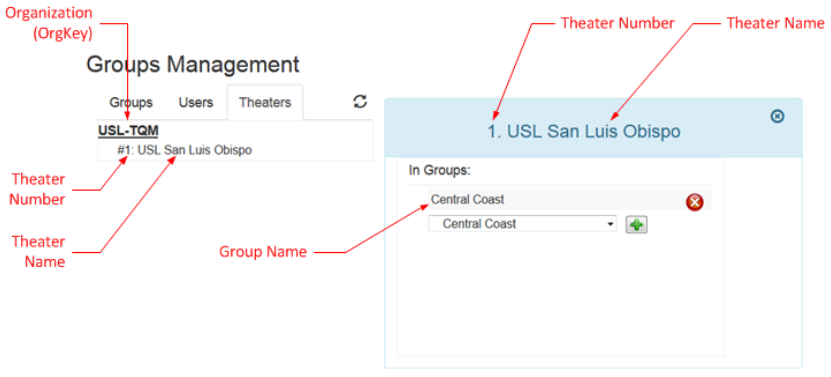
The LSS-100P has a configuration web page that is accessible via a web browser. As a note, access may be limited to within the theater complex's location. Many theaters use network address translation (NAT) where multiple addresses on the local network are mapped to a single address on the public Internet. The LSS-100P units can originate connections to external resources (like the LSS-DB), but the LSS-100P units cannot be accessed from the Internet unless port forwarding is set up in the router. To minimize security risks, Internet access to the LSS-100P is not recommended. As shown in the screen capture the Organization Key, Theater Number, and Screen Number are used to uniquely identify a particular LSS-100P. Theater and User groups in the LSS-DB allow users access to data from specific theaters and allow those users to receive notifications about these theaters. Once the LSS-100P reports measurements to the LSS Database, it is logged and available in the Groups Management settings. It's important that the LSS-100P is configured with the correct Organization Key and Theater Number to identify the data source. Without the LSS-100P report, group management is not available.



LSS-100P Configuration

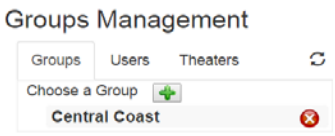
A.1.5 Group Management

When the LSS-100P report data is received, the organization key (company) and theater number identify its source and will be available for group assignment. By assigning a user to a group and then a theater to a group, the notifications generated will be emailed to those in the group who have notifications enabled. User notification control is an option available in the modify user and new user screens. The image below shows assignment of theaters to a group.



LSS Database Group Management

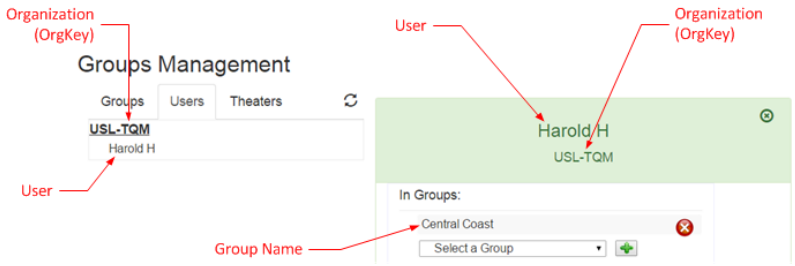
As previously described Harold H is the manager for company USL-TQM, and an LSS-100P report was received from the theater. The database logs the report and will use it in the group management.



The manager will access the Group Management screen via the Configure drop down menu in the navigation bar. Select "Modify Groups" to manage groups of theaters and users.

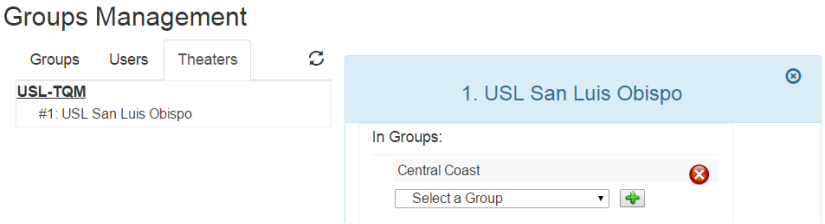
The manager can create a group by clicking the green plus sigh to the right of "Choose a Group." A group can be destroyed by clicking the red X to the right of the group name. In this example USL-TQM has theaters that are to be assigned to the Central Coast region.

The Users tab will be used to assign a user to a group. In this example Harold H was selected, and the group assignment box appears in the right side of the view. Using the Select a Group drop down menu, the Central Coast region was selected. As shown in this next example Harold H is assigned to the Central Coast.



User Group Management

Next a theater is added to the group. This operation requires data from the same organization be received and is stored in the database before seeing the items (theaters) for selection.

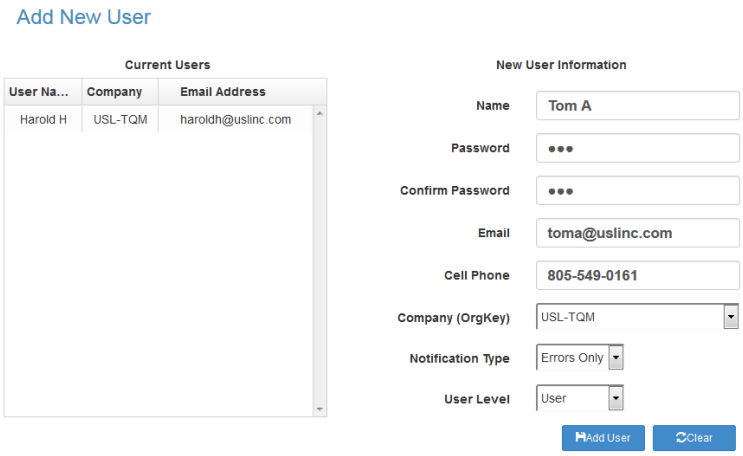


Theater Group Management

When the Theaters tab is selected, a list of theaters for the organization (company) will appear. The # indicates the theater number followed by its name. When the theater number/name is selected an input selection box appears on the right. Again to assign it to a group, use the drop down and chose a regional group. Since the assignment has already been made, the current group assignment it appears as Central Coast with the delete red x button.

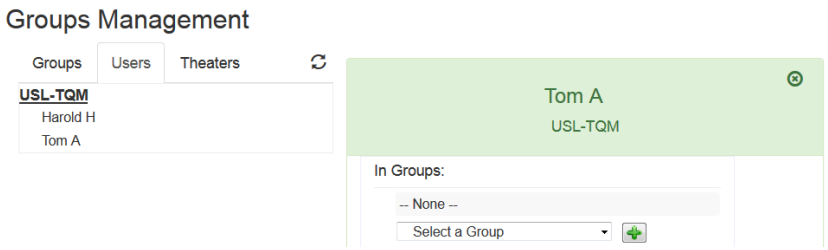
A.1.6 Add User

After the manager has created the groups including theater assignments, the system is ready to set up additional user accounts. In the example shown, information about the new user is being provided. When complete, the Add User button will update the database with the Current Users list including the newly added user. The LSS Database supports the concept of a service company handling multiple organizations and when defined via the group management a list of them will be available via the Company drop down list. For simplicity a single organization is the focus here. The Notification Type is a drop down selector for None, Errors Only, and All. When an LSS-100P report is received, the users assigned to the theater with the respective notification type will get emailed accordingly. A selection of 'None' will result in no notification emails for that user.



Add New User

Be sure to assign users to a group. Otherwise there will be no data available, and the user will not receive notifications. In the example below, the new user Tom A has not been assigned. Use the drop down to select a group followed by the add button activation.

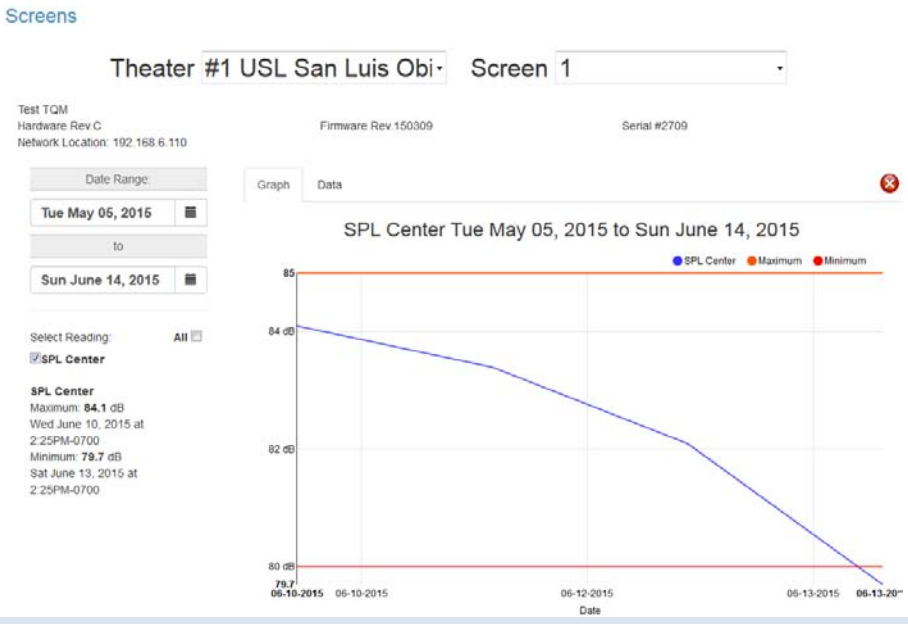


Users Group Management

A.1.6 User Access

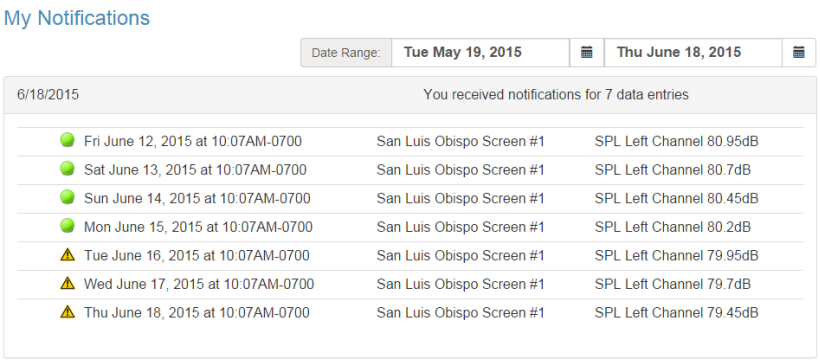
When the user logs into the LSS Database, the user is restricted to data within his/her groups. As shown below, a theater in the central coast region has a problem with the center audio channel.

To see a graph of this parameter versus time, click the chart icon to the right of the limits. As the user moves the mouse over the graph, measurements for a sample period are displayed. In the Screens view, the user can view a group of measurements for a selected auditorium.



A.1.7 User Notifications

Users are notified once a day of all the issues discovered by the LSS Database. Notifications are collected prior to being sent. Each notification will have a status of pending, sent, or error. The error indicates that the email could not be delivered. As shown below, a summary of the notifications is presented to the user. By selecting the item a graph view will be shown for review.



The notification email contains both text and HTML formats. They can be viewed on a cell phone or computer's email application. The screen capture below is a desktop version of the notification.

LSS-100 Notification 2015-06-17 17:07:42 UTC

Notification Level: All
Theater Name: San Luis Obispo
Theater Number: 1
Screem: 1
Serial Number: 100007
Comments: Simulation
Firmware: 150309

Report Data

Date Time	Description	Value	Minimum	Maximum	Record	Data ID	Link
2015-06-17 17:07:42	SPL Left Channel	79.7dB	80.001	85.002	10211	5114	View
2015-06-18 17:07:42	SPL Left Channel	79.45dB	80.001	85.002	10213	5115	View
2015-06-16 17:07:42	SPL Left Channel	79.95dB	80.001	85.002	10209	5113	View
2015-06-15 17:07:42	SPL Left Channel	80.2dB	80.001	85.002	10207	5112	View
2015-06-14 17:07:42	SPL Left Channel	80.45dB	80.001	85.002	10205	5111	View
2015-06-13 17:07:42	SPL Left Channel	80.7dB	80.001	85.002	10203	5110	View
2015-06-12 17:07:42	SPL Left Channel	80.95dB	80.001	85.002	10201	5109	View

B. Appendix B – LSS-DB Linux Installation

B.1 Using LSS-DB Linux Setup

This program comes as multiple Python scripts packed in an archive file along with the LSS-DB program also packed in an archive.

If you already have a work folder or some type of temporary folder, this will suffice; all contents can be deleted when the process is complete. If you do not have a folder to work in, create one. Import the tar file and unpack the all files. Leave the "LssDatabase_vX_X_Build.tar.gz" program inside its file archive. You should have a total of ten files outside the tar file, seven python scripts, the tar.gz database file and two documents.

At the command line enter: **python LssDBsetup.py**

If your system does not have the python database connector, you will be prompted to load it. It must be installed before the rest of the program can operate. If you do not wish to load the connector, answer N or return and proceed to the portion of this document concerning manual installation.

The program will check for each component required and if a specific component is missing, you will be prompted to either load that component automatically or exit the program and install it manually. If you elect the manual option you must restart the program to continue checking for the remaining components.

The program will pause each time you answer Y to loading a component. This pause is caused by the apt-get, yum, or dnf command issued to the operating system. Please allow enough time for the load to complete. If the setup program appears to be stalled at any time you may use a control-C to exit and rerun the program. It will resume at the beginning and continue checking for installed components.

If your system already has the components installed, the setup program will run very quickly.

At the completion of the program you should follow the directions provided on the screen. If the results have scrolled off the screen, they may be viewed by opening the **lssdb_log.txt** file.

If you have created a prototype virtual host directive you must edit the directive to put in the name of the host website (your base website) and the name of the lssdb extension if you do not wish to use lssdb. After editing you must enable the virtual host directive if on a Debian system and restart the Apache server on all systems.

Success will be indicated by using a browser and entering the command http://lssdb.yourwebsitename.com.

If you are not successful, re-examine the screen output looking for yellow or red warnings or closely examine the log file for warnings. Your system administrator should be able to determine the problem from log information or examination of the system configuration files. Should it be necessary to contact USL to resolve a problem, the log file will be useful to have available.

B.1 Manually setting up LSS-DB

The following instructions define what is required for proper installation of the LSS-DB product.

While CentOS and Fedora are basically the same, Debian systems use different console commands. To define each command the line will start with a C: for CentOS, F: for Fedora and D: for Debian. If only one command is shown it is common for all three systems

1. Check for MySQL. It is known as mysql and maria and is interchangeable in systems. Either database will suffice as long as the major revision number is 5 or higher.
   find / -noleaf –type f –name mysql
   find / -noleaf –type f –name mariadb
2. If mysql or maria does not exist, install the server with the following command:
   C: sudo yum install mariadb-server
   F: dnf install mariadb-server
   D: apt-get install mysql-server
3. Determine the revision number of the database.
   mysql –V
   If you do not get a result for the command ensure the service is running. A revision level of 5.X or higher is sufficient.
4. Check for Apache2 or httpd.
   C: find / -noleaf -type f -name httpd
   F: find / -noleaf -type f -name httpd
   D: find / -noleaf -type f -name apache2ctl
5. If Apache2 or httpd do not exist, install with the following command:
   C: sudo yum install httpd
   F: dnf install httpd
   D: apt-get install apache2
6. Ensure the Apache service is running and retrieve the version.
   C: httpd -v
   F: httpd -v
   D: apache2ctl –v
   Version 2.2 to 2.4 have been tested. If you have less than 2.2 you might consider an update.
7. Retrieve the modules installed in Apache.
   C: httpd -M
   F: httpd -M
   D: apache2ctl –M
   The required modules are rewrite_module and ssl_module if you wish to do a secure site. The httpd versions usually already has the rewrite_module enabled. For Debian the module can be enabled with the following command:
   D: a2enmod rewrite
8. Ensure that PHP5 is installed. On all systems use the following command:
   php – i
   In the results of the command look for “PHP Version => 5.X.X” and “Mysqll Support => enabled”.

9. If PHP or php-mysql are not present they may be added with the following commands:
   C: sudo yum install php
   C: sudo yum install php-mysql
   F: dnf install php
   F: dnf install php-mysql
   D: apt-get install php
   D: apt-get install php-mysql
10. Unpack the lssdb_default_YYMMDD.sql database from the gz release package.
11. Using either the PHPadmin webtool or MySQL create a user with the username **lssdb** having the password **lssdb**. Provide this user with all privileges.
12. With the same application import the lssdb_default_YYMMDD.sql database by executing it as a SQL command.
13. In the **/var/www** directory create the **lssdb** folder. You can create the lssdb folder in any other directory path that you want but remember its location for use later when defining the virtual host. Extract from the release gz all the folders and files in the LssDatabase folder in place them in the lssdb folder.
14. Locate the Apache conf file and open it in an editor. Search for the XML tag <IfModule dir_module>. Inside the tag are the accepted index files for Apache. Ensure that index.php exists. If not, add the file name with a space delimiter. Type filenames look like:
    `index.html index.htm index.php`. Save the conf file but do not exit the editor.
15. Towards the end of the file, the way the HTTP server accesses virtual host definitions is defined. Virtual Host definitions are defined as an "Include". On Apache2 installations the virtual hosts are usually defined as sites-enabled and the following statement is present:

```
# Include the virtual host configurations:
Include sites-enabled/
```

    On httpd installations the virtual hosts are usually defined as conf files that are contained in the conf.d folder. The conf file usually contains the following statement:

```
# Load config files in the "/etc/httpd/conf.d" directory.
IncludeOptional conf.d/*.conf
```

    Remember the method used by your server.

    If your server uses the sites enabled method you must create a virtual host file in the **sites-available** folder and link the file to the **sites-enabled** folder. This file will have a name that matches your website name or extension. In this case 'lssdb'.

    If your server uses the conf.d folder then you will create the virtual host file directly in the conf.d folder. And this file can have any name you like but must have a .conf extension. In this case 'lssdb.conf'

    A typical virtual host definition file defines the name of the web site and the location of the files used by the web server. For httpd servers it also defines some directory access rights if desired. The use of directory access rights depends on what rights files in general have on your server. It is good practice to keep rights local to a specific site. A xxx.conf file has a form similar to the following:

```
<VirtualHost *:80>
    ServerName lssdb.webtest.com
    ServerAlias *.webtest.com
    DocumentRoot /var/www/lssdb
</VirtualHost>

<Directory "/var/www/lssdb">
    #
    # Possible values for the Options directive are "None", "All",
    # or any combination of:
    #   Indexes Includes FollowSymLinks SymLinksifOwnerMatch
```

```
        #
        # Note that "MultiViews" must be named *explicitly* ---
        # "Options All" doesn't give it to you.
        #
        # The Options directive is both complicated and important.
        #
        Options Indexes FollowSymLinks MultiViews
        #
        # AllowOverride controls what directives may be placed in
        # .htaccess files.
        # It can be "All", "None", or any combination of the keywords:
        #   Options FileInfo AuthConfig Limit
        #
        AllowOverride All
        #
        # Controls who can get stuff from this server.
        #
        Require all granted
    </Directory>
```

While an Apache virtual host configuration has a format similar to the following:

```
<VirtualHost *:80>
    ServerName lssdb.webtest.com
    ServerAlias *.webtest.com
    DocumentRoot /var/www/lssdb
</VirtualHost>
```

In the above examples you must set the webtest.com definition to that matching your website. The document root must point to the location of the web files in case you have moved them from the default location.

16. You should either reboot the system or restart the SQL server and the HTTP server before testing.
17. The site can be tested using a browser and directing it to: lssdb.yourwebsite.com.

The following errors may be observed for improper installation.

1. Funny characters appearing at the top left corner of the webpage.
    a. This is due to the PHP5 installation being wrong or not enabled.
2. Web page does not appear and default Apache page appears:
    a. Virtual Host definition is missing or improper.
    b. The document directory specified in the Virtual Host definition points to the wrong location.
    c. The index.php initial page directive is not in the conf file.
3. The web page appears but does nothing.
    a. The rewrite module in not included in the Apache setup.
    b. The SQL server is not running.
    c. The php-mysql module is not installed.

C. Appendix C – Apache 2 Detailed Configuration

C.1 Apache2 Configuration introduction

The following is an example setup for Apache2 running on a Debian type system. It is provided as a suggestion for setting up an existing Linux system when the Virtual Image copy is not used and files have been moved manually. Your system administrator my wish to install the Web application (LSS-Database) in a different root folder.

C.1.1 Access rights and file access

The LSS-100P Web Application site with a file structures contains an index.php and post.php at the web server's root directory with the hidden .htaccess file. This site requires re-write modification to be enabled and requires a server configuration command "a2enmod rewrite" with the following .htaccess file. The web server's configuration file will need to be modified using an editor or a utility such as the "a2enmod rewrite" command.

.htaccess

```
<IfModule mod_rewrite.c>
    RewriteEngine On
    RewriteBase /
    RewriteCond %{REQUEST_FILENAME} !-f
    RewriteCond %{REQUEST_FILENAME} !-d
    RewriteRule . /index.php [L]
</IfModule>
```

For simple single website the following root files and directories are as shown below:

```
drwxr-xr-x  4 root root 4096 Jun 15 20:55 api
drwxrwxr-x  2 root root 4096 Jun 15 20:55 app
drwxrwxr-x  2 root root 4096 Jun 15 20:55 components
drwxrwxr-x  2 root root 4096 Jun 15 20:55 controllers
drwxrwxr-x  2 root root 4096 Jun 15 20:55 css
drwxrwxr-x  2 root root 4096 Jun 15 20:55 directives
drwxrwxr-x  2 root root 4096 Jun 15 20:55 fonts
drwxrwxr-x  2 root root 4096 Jun 15 20:55 images
drwxrwxr-x  2 root root 4096 Jun 15 20:55 includes
drwxrwxr-x  2 root root 4096 Jun 15 20:55 lib
drwxrwxr-x  2 root root 4096 Jun 15 20:55 partials
drwxrwxr-x  3 root root 4096 Jun 15 20:55 serverservices
drwxrwxr-x  2 root root 4096 Jun 15 20:55 services
-rw-r--r--  1 root root 6303 Jun 15 20:55 index.php
-rw-r--r--  1 root root 5190 Jun 15 20:55 post.php
```

C.1.2 Post Operation

When the LSS-100P is commanded to execute a measurement(s) the results are sent as a post to the web site's post.php file. This is done by defining a script in the LSS-100P that executes measurements and sends an "lss100.sys.log_post" command with the pipe and url as shown below in the example:

```
lss100.sys.log_post|http://lssdb.uslinc.com/post.php
```

When the post is received, the XML contains a number of records that are parsed and appended to the database. The data is stored in the RawData table and generates email notifications that are then batched to be sent when the cron process executes. The cron process is located within the "serverservices" folder as shown in the following screen capture:

```
-rw-r--r--  1 root root   3420 Jun 15 20:55 cron.php
```

C.1.3 CRON Operation

The Linux operating system has an application scheduling feature called “cron” that can be set up to execute at either a set interval or time. For defining an exact time, use crontab and for a daily execution use the cron.daily method. To see the exact time that daily is executed enter the following in the command shell:

```
~# cat /etc/crontab
```

For the simplest implementation, create a file in /etc/cron.daily as shown:

```
-rwxr-xr-x  1 root root    48 Jun 15 22:53 lsscron
```

The lsscron is a shell script as follows that will be executed daily that then invokes the LSS-100-DB cron.php script. When invoked, the notification entries are then processed to send emails to the users that are assigned to the theater.

```
#!/bin/sh
php /var/www/serverservices/cron.php
```

Comment [HH5]: Remainder of script is missing.

D. Appendix D – Apache2 HTTPS Configuration

D.1 Apache2 HTTPS Configuration Introduction

The following text provides a method of setting up a currently operational Apache2 web server for secure HTTPS. There are several options in this example. Your System Administrator may have different procedures depending on system configuration.

While Debian and Red Hat have some similarities they are still very different with regards to setting up the configuration.

Create the directory where Apache will retrieve the key and certificate.

```
mkdir -p /etc/ssl/localcerts
```

Generate the root certificate with key.

```
openssl req -new -x509 -days 365 -nodes -out /etc/ssl/localcerts/apache.pem -keyout
/etc/ssl/localcerts/apache.key
```

Use the key to create a certificate.

```
openssl req -x509 -new -set_serial 1 -key apache.key -out apache.crt
```

Protect the keys by applying the following permissions.

```
chmod 600 /etc/ssl/localcerts/apache*
```

Install the module is required by using package installer. To view current modules installed enter: apachectl -M

```
yum install mod_ssl
```

Note the following modules as a result of apachectl -M:

```
rewrite_module (shared)
ssl_module (shared)
```

Bind the http port 80 to all interfaces:

```
Listen 80
```

The following is the virtual host entry that can either be entered at the bottom of the httpd.conf file or as noted in the "conf.d" directory as a text file with an extension of .conf:

```
<VirtualHost *:80>
DocumentRoot /var/www/lssdb
ServerName www.lssdb.com
</VirtualHost>
```

* Depending on the Apache 2 package version a second virtual host entry will be required. In our test case the yum installation created the vhost file.

```
<VirtualHost *:443>
SSLEngine On
SSLCertificateFile /etc/ssl/localcerts/apache.crt
SSLCertificateKeyFile /etc/ssl/localcerts/apache.key
DocumentRoot /var/www/lssdb
ServerName www.lssdb.com
</VirtualHost>
```

When using a package installer version of "mod_ssl" a ssl.conf file is loaded at /etc/httpd/conf.d/ssl.conf. To use this file edit the following items:

```
##
## SSL Virtual Host Context
##

<VirtualHost _default_:443>
# General setup for the virtual host, inherited from global configuration
DocumentRoot "/var/www/lssdb"

#   Server Certificate:
# Point SSLCertificateFile at a PEM encoded certificate.  If
# the certificate is encrypted, then you will be prompted for a
# pass phrase.  Note that a kill -HUP will prompt again.  A new
# certificate can be generated using the genkey(1) command.
SSLCertificateFile /etc/ssl/localcerts/apache.crt

#   Server Private Key:
#   If the key is not combined with the certificate, use this
#   directive to point at the key file.  Keep in mind that if
#   you've both a RSA and a DSA private key you can configure
#   both in parallel (to also allow the use of DSA ciphers, etc.)
SSLCertificateKeyFile /etc/ssl/localcerts/apache.key

</VirtualHost>
```

D.2 Apache2 DEBIAN Specific HTTPS Configuration

The Debian approach uses Apache console command line utilities that control which modules to load and selecting site configurations. An overview for the Debian Appache 2 directory structure is described in "/etc/apache2/apache2.conf" file. With their approach to enable modules the a2enmod and a2dismod command line utilities are available. For the web sites use a2ensite and a2dissite utilities. A list of the available module files are located in "/etc/apache2/mods-available" directory.

/etc/apache2/

- ***apache2.conf***
  - ***ports.conf***
- ***mods-enabled***
  - ****.load***
  - ****.conf***
- ***conf.d***

```
│        └── *
└── sites-enabled
         └── *
```

To determine if Open SSL is installed, enter the following command:

```
openssl version
OpenSSL 1.0.1e 11 Feb 2013
```

If there's a need to create a certificate then execute the following:

```
openssl req -new -x509 -days 365 -nodes -out /etc/ssl/localcerts/apache.pem -keyout
/etc/ssl/localcerts/apache.key
```

Use the key to create a certificate.

```
openssl req -x509 -new -set_serial 1 -key apache.key -out apache.crt
```

Change the certificate files access permissions with the following command:

```
chmod 600 /etc/ssl/localcerts/apache*
```

Install the module is required by using package installer. To view current modules installed enter:

```
apachectl -M
rewrite_module (shared)
ssl_module (shared)
```

To add a module enter the following command: `a2enmod ssl`

As a note in sites-enabled folder you will find links to the current configuration file in use:

```
lrwxrwxrwx 1 root root 26 Oct 15 2013 000-default -> ../sites-available/default
```

The current LSS Database virtual machine has default with the following virtual host definitions:

```
NameVirtualHost *:80
NameVirtualHost *:443

<VirtualHost *:80>
    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/
</VirtualHost>

<VirtualHost *:443>
    SSLEngine on
    SSLCertificateFile /etc/ssl/localcerts/apache.crt
    ssLCertificateKeyFile /etc/ssl/localcerts/apache.key
    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/
</VirtualHost>

<Directory /var/www/>
```

```
    Options Indexes FollowSymLinks MultiViews
    Order allow,deny
    allow from all
</Directory>
```

To setup the site name use the following command with the desired name:

```
a2ensite sitename
```

In the files “index.php” uncomment the following to use only https:

```
// Redirect to https
if(window.location.protocol !== 'https:') {
location.href = location.href.replace("http://", "https://");
}
```

When apache has been configured enter the following command:

```
service apache2 restart
```

In the following are some helpful debugging tips for getting the web site up and running.
To ensure that the modules and configuration files are loaded execute:

```
/etc/init.d/apache2 reload
```

To verify the configuration enter: `apachectl configtest`

The command utility is in the /usr/sbin directory and require root user (su) to access it.

For error check review the log at:

```
tail -f /var/log/apache2/error.log
```

To expand the amount of data being logged enable debug mode by editing the /etc/apache2/apache2.conf file as root user rights (su command recommended). Within the file look for the following section and edit as shown.

```
# LogLevel: Control the number of messages logged to the error_log.
# Possible values include: debug, info, notice, warn, error, crit,
# alert, emerg.
#
LogLevel debug
```

To verify the Virtual Hosts enter the following command:
`apache2ctl -S`

- Remember that included files are read at the point of their inclusion, before the rest of the original file is read.
- `<Directory>` settings are read whenever the server starts or is reloaded. `.htaccess` files, on the other hand, are read before resources are served. As a result, `.htaccess` files can override directory configurations. To test whether this is occurring, temporarily disable `.htaccess` files.
- `<Location>` directives are read after `<Directory>` and `<Files>` sections, so settings here might override other earlier settings.
- Configuration files are read serially. For example, an option set in the beginning of the `apache2.conf` or `httpd.conf` file could be overridden by a setting in the `conf.d/` file or a virtual host file.

- When an entire directory is included, the files from that directory are included sequentially (alphabetically) based on name.
- Debian and Ubuntu systems have a file called `/etc/apache2/ports.conf`, where the `NameVirtualHost` and `Listen` directives are set. These values determine the IP address or addresses to which Apache binds, and on which port(s) the web server listens for HTTP requests. This can sometimes conflict with settings in other files.

When SE Linux is installed and running there can be a case where policies are blocking the web server's operation. By checking the SE Linux status as root and using the following commands:
`selinux` or `check-selinux-installation`

The default Apache webserver listen on port 80 (http) and port 443 (https i.e. secure http). The Apache webserver uses the TCP protocol to transfer information/data between server and browser. The default Iptables configuration does not allow inbound access to the HTTP (80) and HTTPS (443) ports used by the web server.

Another item that could block communications is the iptables configuration and iproute2. These utilities can block inbound and outbound communications. Use the ifconfig command to review interface status and then review the iptables and iprout2 configurations. The configuration files for iproute can be found in the /etc/iproute2 directory. The current startup routes are located in /etc/iptables.up.rules file.

The use of the iptables can effectively serve as a method to firewall an interface.

```
root@lamp /etc# cat iptables.up.rules
*nat
:PREROUTING ACCEPT [0:0]
:POSTROUTING ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
COMMIT
*mangle
:PREROUTING ACCEPT [0:0]
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
:POSTROUTING ACCEPT [0:0]
COMMIT
*filter
:FORWARD ACCEPT [0:0]
:INPUT DROP [0:0]
:OUTPUT ACCEPT [0:0]
-A INPUT -i lo -j ACCEPT
-A INPUT -p icmp -m icmp --icmp-type echo-request -j ACCEPT
-A INPUT -m state --state ESTABLISHED,RELATED -j ACCEPT
-A INPUT -p tcp -m tcp --dport 22 -j ACCEPT
-A INPUT -p tcp -m tcp --dport 80 -j ACCEPT
-A INPUT -p tcp -m tcp --dport 443 -j ACCEPT
-A INPUT -p tcp -m tcp --dport 12320 -j ACCEPT
-A INPUT -p tcp -m tcp --dport 12321 -j ACCEPT
-A INPUT -p tcp -m tcp --dport 12322 -j ACCEPT
COMMIT
root@lamp /etc#
```

E. Appendix E – MySQL Database Configuration

E.1 MySQL Database Configuration introduction

To access MySQL database server, a user account is required with permissions to gain access. The database uses special tables to control access and requires a couple configuration commands as described in the following to load the default data set provided. Keep in mind that the Linux root account is not the same with regards to MySQL root account, they are totally separate.

To setup a MySQL user for the first time, a root account is typically created via the "mysqladmin" command. After the creation of the root account it will be used to add user accounts to the database as described in the following steps.

```
~# mysqladmin -u root password lssdb
```

After the creation of the root account, log into the database:

```
~# mysql -u root -p
```

After creating the user account and logging in with the 'mysql>' prompt, enter the following command:

```
~# mysql> CREATE DATABASE lssdb;
```

With root logged in, create a user for the database "lssdb.*" to user "lssdb@localhost" with a password of "'lssdb'" in the GRANT command. To create an lssdb user with database access set the enter the following command:

```
~# mysql> GRANT ALL ON lssdb.* TO lssdb@localhost IDENTIFIED BY 'lssdb';
```

The password and user name are stored in the LSS-DB include folder. The config.php file contains the definitions to access the database and will need to match MySQL user settings. As shown below the section of php code that defines database access:

```
$DB_HOST = '127.0.0.1';
$DB_USER = 'lssdb';
$DB_PASS = 'lssdb';
$DB_NAME = 'lssdb';
```

Before running the web application the database must be loaded with a set of tables that contains configuration information. This done by importing a default database using the following command at the shell prompt:

```
~# mysql -u lssdb -p lssdb < lssdb_default_150715.sql
```

To confirm that the database is loaded log into MySQL and select the database by entering the following command:

```
~# mysql> USE lssdb;
```

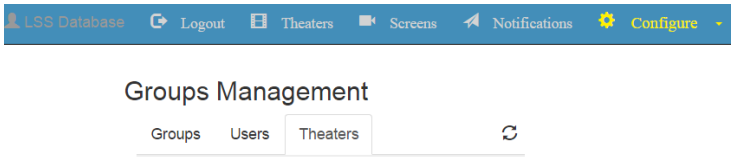
With the selected database enter the following command and it will show you the database tables

```
~# mysql> SHOW TABLES;
+-----------------------+
| Tables_in_lssdb       |
+-----------------------+
| RawData               |
| groups                |
| mailsettings          |
| notificationadmin     |
| notifications         |
| theatergroups         |
| usergroups            |
| users                 |
+-----------------------+
8 rows in set (0.00 sec)
```

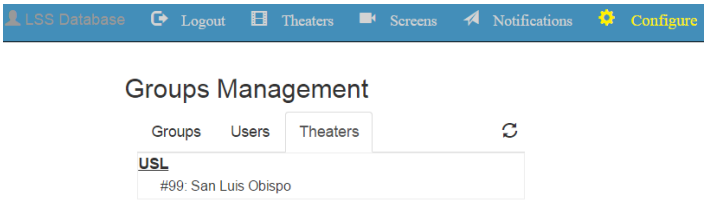
F. Appendix F – Adding A New Theater

F.1 Adding a New Theater introduction

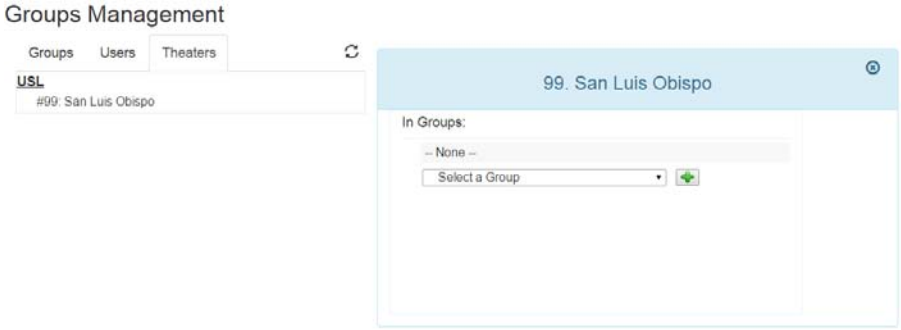
A post from the LSS-100P contains an OrgKey (Organization Key) and theater number that are used in defining groups. When adding a new theater to the LSS Database, a post (report) from the LSS-100P is required. In the following case the database has no theaters.



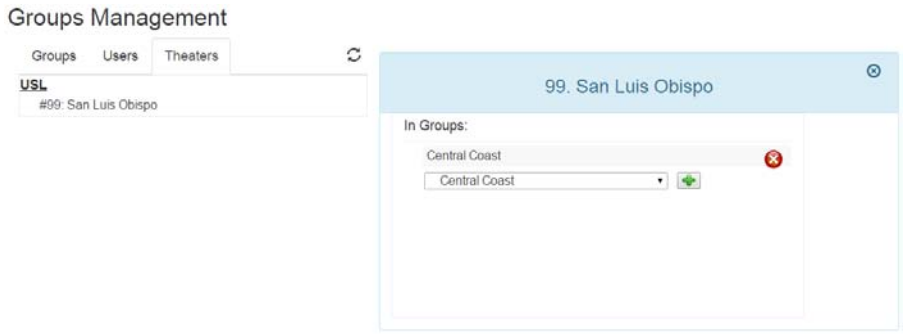
When an LSS-100P post is received, the OrgKey is used to identify the organization that has access to the data and will be in the Theaters tab view as shown below.



When the theater is selected, its group assignment information is displayed in the right side of the view below. Since theater number 99 has yet to be assigned, the “In Groups” list reflects this (--None--).

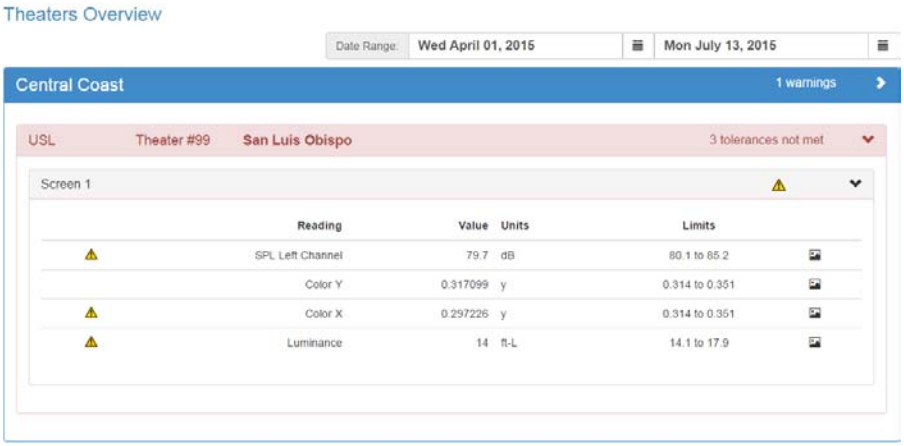


The Groups tab is where regional groups are created and are available in the dropdown list in the right side of the view. The manager will then assign the theater to a group by selecting it and then activating the plus add button.



To verify that there are users assigned to the group containing the new theater, select the Users tab and click on the user. The group assignment for that user is displayed. In the following case the manager of USL (organization/OrgKey) was selected and from the dropdown can be assigned to the group. All assignments for Theater, Users, and Groups are only available to the system administrator and managers.

Once a theater (defined by OrgKey and Theater Number) and a user are within the same group, the user will be able to view the LSS-100P data for that theater. In addition, the user will receive email notifications for theaters within the group if the user has notifications enabled.



The following check list should be reviewed when adding a theater to the system:

- Define a Group(s) for the organization.
- Add users and assigned them to the respective group.
- LSS-100P install and test with a post report(s) to the LSS Database.
- Manager will assign the LSS-100P to a group.
- Review user to ensure notifications can be received.
- Review LSS-100P data to verify reception.

G. Appendix G – Security Considerations

When installing the LSS-100P using directions from this manual or by using the set up program, it should be noted that the same passwords are used for installation. Therefore any other user that follows the same directions will have knowledge of the passwords used in your system. For this reason it is good practice to change either username and passwords or just passwords to system parts.

G.1 Change Administrator and Manager Passwords

The easiest to change items are the passwords of the default admin and manager users. You can accomplish this with by logging in with the default user: admin password: admin. Once logged in go to the Configure tab and select the Modify User option. From that page you can do any of the following:

1. Change the admin and manager passwords.
2. Create a new Administrator using a name other than admin.
3. Create a new Manager using a name other than manager.
4. Delete all demonstration users supplied with the startup database.

G.2 Securing the database

Securing the database is a two-step process. If you are using the LssDBsetup.py program, the program will automatically ask if you want to change the default password to the database. Answering Y and following the prompts will perform the task quickly.

If you wish to change the database password manually you should have knowledge of MySQL commands. To change the password log into you linux os as root or use the superuser function if you cannot log in as root.

1. Enter myql on the command line.
2. Enter: USE mysql;
3. Enter: UPDATE user SET password = PASSWORD('newpassword') WHERE user = 'lssdb';
4. Enter: FLUSH PRIVILEGES;
5. Exit mysql with a control-c.

Then you must change the config.php file to incorporate the new password. The file will be contained in the /includes directory of the website. If you have installed the website in the standard directory this would be located at: /var/www/lssdb/includes/config.php.

The section of the file that must be edited appears as follows:

```
//------------------------------------------------------------------------
//                          Database Definitions
//------------------------------------------------------------------------
    $DB_HOST = 'localhost';
    $DB_USER = 'lssdb';
    $DB_PASS = 'lssdb';
    $DB_NAME = 'lssdb';
```

It needs to be changed to match your new password and will appear as:

```
//------------------------------------------------------------------------
//                          Database Definitions
//------------------------------------------------------------------------
    $DB_HOST = 'localhost';
    $DB_USER = 'lssdb';
    $DB_PASS = 'newpassword';
    $DB_NAME = 'lssdb';
```

Once config.php has been edited the database is now secure.

G.2 Securing HTTPS

If you have set up HTTPS using the certificate supplied with the Apache or httpd server you should consider using getting and using your own Certificate of Authentication. These are available at cost and free from various sources. If you continue to use the default certificate, the connection will still be encrypted but anyone having knowledge of the default certificate can access the messages or emulate the website.