Inova Solutions
A Geomant Company

LightLink Administrator User Guide

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971 2nd ST S.E.
Charlottesville, VA 22902
434.817.8000

www.inovasolutions.com

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1. Inova LightLink Administrator Introduction

Inova LightLink® Administrator provides an interface for configuring and monitoring the Inova LightLink system. LightLink Administrator will connect to the hosts distributed across the Inova LightLink system to configure and monitor LightLink components.

LightLink Administrator is the central tool for configuring the components of the LightLink system. The components of the Inova LightLink system connect to each other via the Object Bus (for data information) and the Data Directory (for configuration information) to gather and monitor the data you wish to analyze and display.

LightLink Administrator is installed with the LightLink Middleware and as such is only available on LightLink Middleware hosts. Permissions for running the Administrator application are set and controlled by the LightLink Security Manager application. Because LightLink Administrator connects directly to the LightLink database, users running Administrator must have LightLink database permissions commensurate with the LightLink Middleware processes. Using the default settings for the LightLink database ensures that users running LightLink Administrator have the correct permissions.

LightLink Administrator provides views into the configuration of the LightLink system at a site. There is a Host View that lists the configuration by the various hosts participating in the system, and there is a Global View that lists the configuration by the types of LightLink connections to the system (client manager, input manager, and output manager connections).

LightLink System Node - At the highest level in each view is the LightLink System node, entitled with the Organization Name that was specified during the primary server middleware installation.

Host View - In the Host View, there are host nodes below the System node. A host node shows the LightLink components currently configured on that host. The LightLink components are: Auditor, Client Manager, Data Directory (Publisher or Uses Remote – the Subscriber type is legacy only), External Input Manager, Input Manager, Object Bus, Output Manager, and Site Monitor.

Global View – In the Global View, the types of LightLink connections across all the hosts in the system are displayed below the System node. This view lists all of the Data Source Managers (DSMs) in the system under the Input Manager node, all of the Output Channel Managers (OCMs) under the Output Manager node, and all of the current connections to the Client Manager(s) in the system under the Client Manager node.

There are numerous sources of input data possible for a LightLink system, including data from various Automated Call Distribution (ACD) systems, database sources, and XML data from files and Universal Resource Locators (URLs, e.g., web servers). In addition, there are two LightLink specific data sources: System Data (system date-time and system monitoring information), and Data Analysis Data (data derived from other data sources, for example, performing statistical functions).

The following Output Device Connections and devices are possible in a LightLink system, depending upon the Inova LightLink License Key:

- Inova TCP/IP Displays (Inova OnTrack displays)
- Inova Desktop Presenter clients:
  - Marquee
  - DataLink
  - TaskLink
- Database Publisher
- XML Publisher
- Email Output
- Inova TCP/IP Displays – Encrypted (Inova OnAlert or Simplex TrueAlert)
- AMS LED Displays

2. Administrator - Navigation

Start LightLink Administrator by completing the following steps for one these methods:

- LightLink Quick Launch > Administrator
- Start > All Programs > Inova Solutions > LightLink Middleware > Administrator

When LightLink security is active, the user account launching the Administrator application will be validated against the user list of the LightLink™ Security Groups. If the user account is not in one of the Inova LightLink Security Groups, or if present but disallowed from running Administrator, the application will display a message to that effect and will shut down. When LightLink security is dormant, this check will not be made. Refer to the *LightLink Security Manager User Guide* for more information.

Select the Host View to see and be able to make changes to the LightLink Administrator system (connections, nodes and components). To navigate through the Inova LightLink system using the Host View:

1. From the Administrator main screen, select Host View from the bottom of the Administrator screen to see the existing connections.
2. To view these connections, if any, click on the plus sign to the left of the connection in the left-hand window of the main screen.
3. Click on the plus sign of a branch point to show more detail and on the minus sign of a branch point to "close" and show less detail.

2.1. Requesting and Releasing Configuration Permission

In order to make changes to the LightLink system tree (e.g., adding or renaming connections and changing entries on the Properties dialogs), you must have configuration permissions at the time that you attempt to make the changes.

To use the Configuration Permission option in LightLink Administrator, select Tools > Config Permissions > Request Configuration Permission.

To check if you have requested configuration permissions, look for the padlock at the bottom of the screen. In Figure 1, the operator has not yet requested permissions; you can tell because the padlock at the bottom is unlocked.

Figure 1

If you still need to obtain configuration permissions, Administrator will display the following:

- The Release Configuration Permission option will be grayed out when you choose Tools > Config.
- The toolbar button on the far right appears to be flush with the toolbar.
- The open lock icon appears on the Status bar at the bottom center of the screen.

If you already have configuration permissions, Administrator will appear as follows (Figure 2):

- The Request Configuration Permission option will be grayed out when you choose **Tools >** Config.
- The toolbar button on the far right appears to be pushed in.
- The message "Configuration Permission Enabled" appears briefly at the bottom right, and the closed lock icon appears on the Status bar at the bottom center of the screen.

Figure 2

2.2. LightLink System Tree

The LightLink system tree shows the hierarchical structure for the Inova LightLink system. Each node in the tree can have one or more sub nodes directly beneath it. For example, the Input Manager node has DSM nodes beneath it, and each DSM node has nodes representing the data groups and data fields it provides to the LightLink system.

There are plus signs and minus signs at each node that contains sub-nodes. Clicking on the plus sign "expands" that node to show more detail; clicking on the minus sign "collapses" that node to show less detail.

An example of the LightLink system tree is shown in Figure 3.

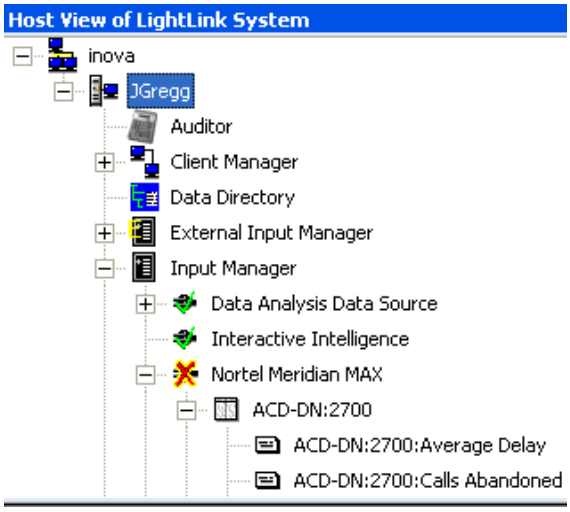


Figure 3

2.2.1. Host View/Global View

You can navigate through LightLink Administrator using the LightLink system tree, which allows you to view the system components across the entire system. There is a tab on this control that allows you to view the system in a host view layout or a global view layout (Figure 4).

Double clicking on a tree node will bring up the properties dialog for that component.

Not all components will always be shown under a Host View; only the components that have been configured for that host will appear.

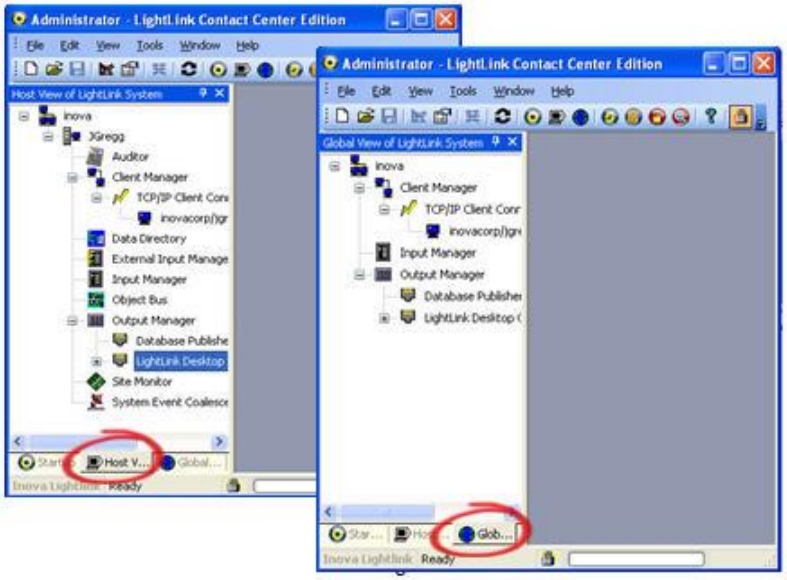


Figure 4

In the **host layout**, all components of the system are organized under a node representing a host. This allows you to see all items associated with a particular host.

In the **global layout**, you can view all items in the system by their type regardless of location. The global view will always show all components displayed. Choose the Global View to see a hierarchical display of your system, grouped by component type (e.g., Servers, Connections, and Items).

- All Client Managers are represented by a single Client Manager icon with all the Client Connections in the system shown on sub-branches.
- All Input Managers are represented by a single Input Manager icon with all the Data Source Connections in the system shown on sub-branches.
- All Output Managers are represented by a single Output Manager icon with all Output Device Connections (and their related devices) in the system shown on sub-branches.

2.3. Administrator Context Menu

LightLink Administrator provides context menus to perform configuration and monitoring actions within the LightLink system. The context menu is content sensitive and will have different items depending on the tree nodes selected. For example, *New* will only be provided in instances where there is an option to add a new item to the LightLink configuration.

To open the context menu, right click on the desired node. *You can also access a context menu by choosing the desired node and then clicking Edit > Node from the menu bar.*

Many operations in LightLink Administrator can be performed through a context menu for the node in the LightLink system tree. The context menu is available by right-clicking on the node as well as through the Edit > Node menu. Sections 2.3.3 through 2.3.6 describe the common context menu items available for most nodes. Later sections in this document discuss the context menu options that apply to the different kinds of system components.

2.3.1. LightLink System Context Menu

Select the Site node and open the context menu. Refer to Table 1 for details about the host context menu items.

Menu Item	Explanation
Start the entire LightLink System...	Issue a command to all LightLink hosts to start the LightLink software
Stop the entire LightLink System...	Issue a command to all LightLink hosts to shutdown the LightLink software
Generate Version Report	Generate a version report for each host.
Properties	Show the License information for this LightLink site.

Table 1

2.3.2. Multiple Selection

LightLink Administrator supports multiple selections in the LightLink system tree. When this is done, the Administrator only shows a context menu that is appropriate to all items selected.

If several components are selected, the context menu would show only the menu functions that are common to all. If you select several server components, the menu would provide only three menu items: Add to View Window, Start Component, and Stop Component (Figure 5).

If a host and a server component item are selected then only the Add to view window item is available (Figure 6).

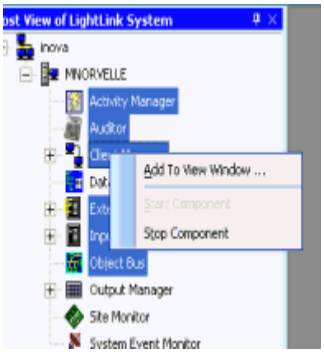


Figure 5

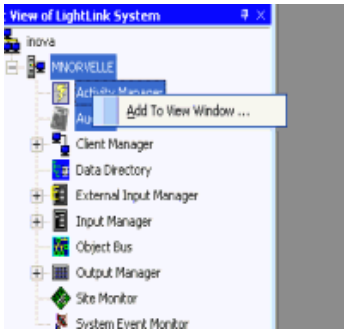


Figure 6

2.3.3. Adding to View Window

Adding an item to a view window provides details about that item, such as its LightLink identifier, current status, or current value. This can be done from either the context menu or by dragging the item to an already-open view window. Refer to Section 4.2 for more information about creating a view window. To add an item:

1. From the LightLink system tree, select the desired node(s) and right click to bring up the context menu.
2. From the context menu, select *Add to View Window*; if only one view window is open the items are added to that window; if none or more than one view window is open, the *Select a View Window* dialog pops up.
3. In the *Select a View Window* dialog, choose the view window to which to add the selected item(s), or create a new view window.

2.3.4. Renaming an Item

Rename an item to change its display name (e.g., to a more meaningful name); not all options will be available for every node. You can rename an item by either:

- Right clicking on the desired node to open the context menu. Select *Rename*.
- Right clicking on the desired node to open the context menu. Select *Properties*. Change the name in the Properties dialog.

2.3.5. Deleting an Item

Delete an item to remove that item from the LightLink configuration. To delete an item:

1. Right click on the item to be deleted.
2. Select *Delete* from the context menu.

Note that different types of items will display different requirements and behaviors. For example, to delete a host node, the launcher on that node must be turned off; you can delete a data field, but that data field will be recreated in LightLink with a new ID if the source delivers an update in the position represented.

If you are attempting to delete a data field, you will receive a warning if that data field is in use by an output device. (For data fields used by DADSM equations, there is a log file, DADSM_Datafield_Usage.log, that lists the data fields in use by DADSM.) If a data field is in use when deleted and the data source continues to provide values, then it will be recreated with a different data field ID, and any output destinations that use it will have to be updated (e.g., if in a LightLink message, then edit the message to use the recreated data field of the same name, and resend the message).

2.3.6. Version Report Dialog

LightLink Administrator allows for the remote reporting of LightLink file versions. You can select the hosts to have a report run and select the Generate Version Report menu item from the context menu or the Edit/Node menu. Alternatively, you can select the same item from the Site-level node and a report will be run on all machines.

When selected, the version_reporter.exe application is launched on each remote machine. This application goes through the Inova LightLink/exe directory and compiles a list of files and file versions. It sends this list back to LightLink Administrator via the object bus and terminates. LightLink Administrator collects all the reports and displays them in the Version Report Dialog.

To access the LightLink Version Report from the Administrator main screen, select the Site node > Generate Version Report.

The LightLink Version Report dialog appears.

The Version Report dialog has a list box on the left side that allows the selection of a particular host that has responded to the version report request. When selected, the host version report is displayed in the right-hand list box with a column header for the file and the version.

The buttons in the lower-left corner allow you to specify if all files should be shown regardless of version number, or to only show files whose version differs from that shown at the upper-left corner of the screen.

2.4. License Properties and the License Key

The Administrator Properties dialog shows the Server ID and license key assigned by Inova to your installation and included with your Inova LightLink license agreement. Both must be entered here for proper Inova LightLink Administrator operation.

The license key includes information that enables certain license-restricted features based on the options you have purchased with your Inova LightLink system. The Details button will activate a dialog that displays these options.

If you purchase additional options for your Inova LightLink system, you will be assigned a new license key by Inova.

To activate your license:

1. Open the Administrator Properties dialog.
2. To activate the new options you have purchased, type in your license key. Note that the Server ID, encoded License Key, and details of your Inova LightLink license will now be displayed as part of this dialog. The License Details dialog describes the allowable configuration of the Inova LightLink system.

   To edit your Server ID, you will need to run setup and repeat installation of the software with a different Server ID.
3. Select *OK* to complete the configuration.

You must shut down and restart Administrator for these new options to become activated.

3. Host Configuration

You can configure which components run on a LightLink Host. The most common reasons to configure a Middleware host are to specialize a secondary Middleware host as an Input Manager host only or an Output Manager host only. An Input Manager host would only acquire data for other Middleware hosts to consume; an Output Manager host would only send messages and data to output destinations. Another reason is to unassign the External Input Manager if it is not put into use on a given host.

3.1. Host Configuration

To configure which services are to run on a given host, you must configure that host using LightLink Administrator:

1. Select the Host View tab.
2. Right-click on the selected host to bring up the host context menu.
3. Select Configure Components.

   You must have configuration permissions to begin (see Section 2.1).

   The Host Component Configuration dialog appears (Figure 7). The services that are available for the user to configure appear in the left window. The services that are already configured appear in the right window.

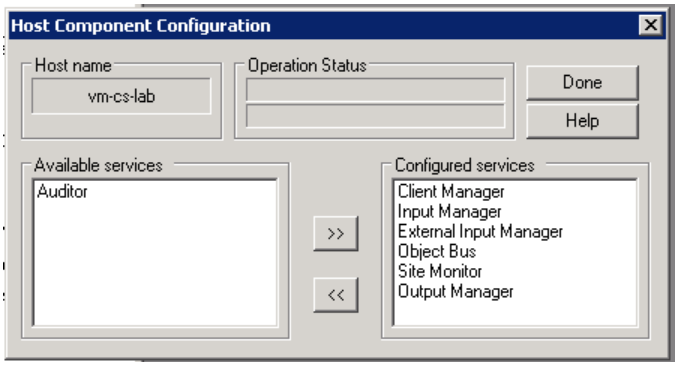


Figure 7

4. To assign Available Services:
   a. Select the desired service in the left window.
   b. Click >> to add that service to the right-hand pane window.
5. To unassign Configured Services:
   a. Select the desired service in the right window.

b. Click << to unassign that service and return it to the left window.

c. *To remove components, the components must first be stopped using the Stop Server item on the item menu*. If it is running when you attempt to remove it from the configured services list, a dialog pops up stating that the component must be stopped before removing it; if you click *OK*, the component will be stopped for you.

6. Select *Done* to complete the initial configuration.

3.2. Host Context Menu

Select a Host and open the context menu. Refer to Table 2 for details about the host context menu items.

Menu Item	Explanation
Add to View Window	Add this to an open view window
Configure Components	Display the Host Component Configuration dialog to edit the server components running on this host
Delete	Remove this host from the system
Start all LightLink Software ...	Start the LightLink software on this host
Stop all LightLink Software ...	Shutdown the LightLink software on this host
Generate Version Report	Generate a version report for this host
Properties	Display the Host Configuration dialog to modify the Display name and configure the Object Bus and Client Manager for this host

Table 2

4. Monitoring and Modifying System Components

4.1. Administrator Options

1. Select *Tools* > *Options.*
2. The Administrator Options dialog appears. Complete the system configuration options :
   - Enable System Configuration Permission:
     - **Always request at startup tab –** select to have the system automatically try to obtain the config lock when Administrator starts running.
     - **Request Timeout (seconds)** - number of seconds after which a request for config permission will timeout if it is not successful.
     - **Release lock after (mins)** - number of minutes after which Administrator will automatically release config permission so indicated by the unlocked icon that appears at the bottom center of the screen.
   - Timeouts:
     - **Garbage Collect every (seconds) -** Select this option to specify how long in seconds Inova LightLink will keep times associated with a closed node.
     - **Update Items every (seconds) -** How often Administrator refreshes information about visible nodes in the LightLink system tree.
   - Startup settings:
     - **Always show Startup Page -** Select to show the startup page.

     To improve system efficiency during startup, select this option to launch Administrator with the Startup Page instead of the Host View tab visible.
3. Select *OK* to complete the configuration.

4.2. Creating and Managing View Windows

The view window is a panel to which a user can drag an item from the LightLink system tree and view its attributes.

To create a new View Window, select *File* > *New.* On the View Window Attributes dialog, enter the name of your new View Window and click *OK.* The new View Window will appear on the right side of your Administrator screen.

You can navigate among multiple View Windows either by using the Window menu item at the top of the screen or by using the tabs under the menu icons (Figure 8). Note that the Window menu option allows you to select cascade or tile view for multiple windows.

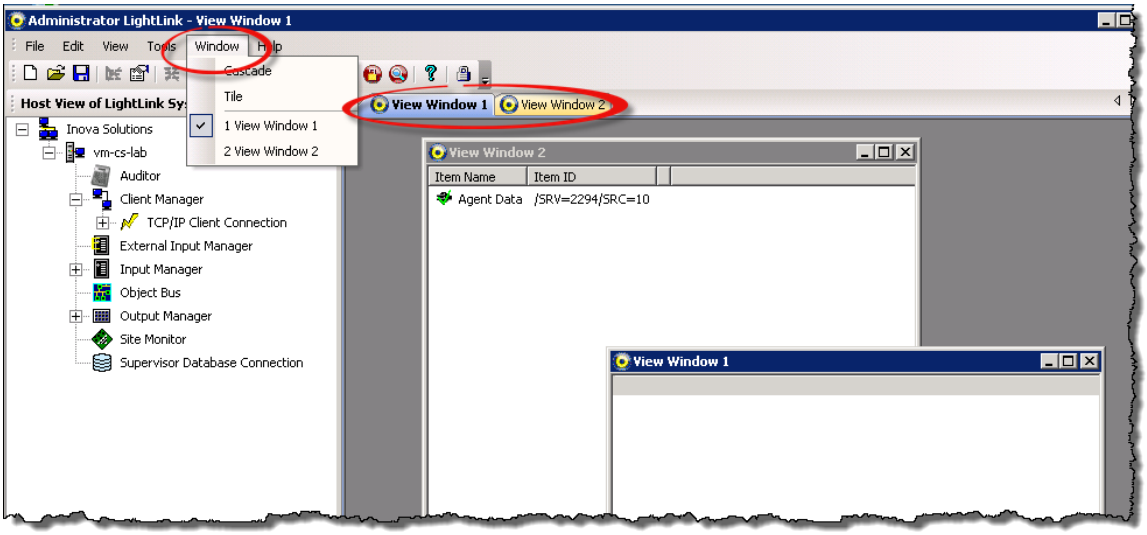


Figure 8

View Windows provide basic windowing functionality:

- Minimize and maximize using the buttons at the top right of each window.
- Save / Save As using the *File* > *Save / Save As* path.
- Open a saved View Window using the *File* > *Open* menu option.

You can add an item to the View Window through the context menu for the item or by dragging and dropping the item into the desired View Window.

5. Auditor

LightLink Auditor is an event monitoring component that logs events related to Inova LightLink system performance. It can provide up-to-date information for immediate use and log events for historical reports. LightLink Auditor will:

- Collate the various entries in each LightLink host computer's `local_system_event.log` file and enter them into the system-wide `system_event.log` on the primary host computer.
- Record audit events to the Audit database. Refer to Section 5.4 for more details of this feature.
- Generate a snapshot of the current LightLink configuration and record it to the Audit database. Refer to Section 5.3 for more details of this feature.
- Generate a report of system usage compared to the license allocations. Refer to Section 0 for more details of this feature.
- Use Desktop AutoSweep to remove Desktop Presenter Clients that are inactive for specified periods of time. Refer to Section 5.6 for more details of this feature.

5.1. Auditor Context Menu

Refer to Table 3 for details about the context menu items.

Menu Item	Explanation
Add to View Window	Add the Auditor component to the open view window
Generate Snapshot	Generate a snapshot of the current state of the audited components in the LightLink system
View License Report	View the License Report that lists the LightLink components licensed for this system and their current usage
Start Component	Start the Auditor component
Stop Component	Stop the Auditor component
Properties	Set the properties for the Auditor component

Table 3

5.2. Auditor Properties

To set the properties for LightLink Auditor:

1. Open the Auditor Pro*perties* dialog; it will have two tabs: Settings and Desktop AutoSweep.
2. Complete the following fields on the Settings tab:
   - **Record Events:** - Check the box to enable recording of audit events.

     Modify **Keep events for ___ days** to specify how many days to keep events; events that were recorded more than the specified number of days previously will be periodically deleted.
   - **Run Periodic Snapshot**- Check the box to enable periodic snapshot recording.

     Choose a **Daily Snapshot Time** to select the time of day that the snapshot should be taken every day.
3. Complete the following fields on the Desktop AutoSweep tab (Figure 9):
   - **Number of days** – Click on each Output Channel and then enter a number of days, between 30 and 365. Any Desktop Client added to this Output Channel will be removed after this number of days without being logged in.

     Specifying zero (0) for a channel turns off this feature so that no Desktop Client users are removed from the Output Channel. Refer to Section 7.5 for more details of this feature.
   - **Evaluation Settings** - Choose to either report expired desktop clients or to report and remove expired desktop clients. The report is written to the auditor log (i_auditserver.log), which you can review by using the Log Viewer tool.

     Select *Report expired desktop clients* to generate a report of inactive desktop clients that have not logged in for your specified number of days.

     If you select *Report and remove expired desktop clients*, the system will generate a report and will remove inactive desktop clients that have not logged in for your specified number of days.

     Note that if you enter zero in the Number of Days field, then the Evaluation Settings are not implemented for that output channel.

- **Perform Evaluation Now** – Select this box to perform the evaluation for expired desktop clients at this time. Regardless of the setting of this checkbox, an evaluation occurs at 5:00 am every day.

  If you choose to perform the evaluation now and you have selected *Report and remove expired desktop clients,* the system will remove expired desktop clients after you click *OK*.

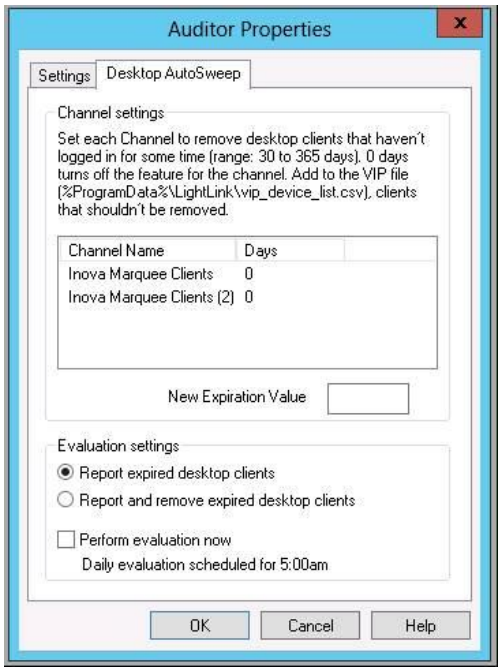


Figure 9

4. Click *OK* to complete the Auditor properties configuration.

5.3. Audit Snapshots

LightLink Auditor will record to the audit database the current configuration of the LightLink system as a snapshot in time. Information for all messages, data sources, data fields, output channels, and output devices configured in the Inova LightLink system will be recorded. The following information will be recorded:

- Type of component (i.e. message, data source, data field, output channel, output device)
- Timestamp of snapshot
- Appropriate Inova LightLink object ID
- Description of component (optional)

To generate a snapshot, from the Administrator main menu:

1. Right click on *Auditor* to open the context menu.
2. Select Generate Snapshot.

A snapshot can also be scheduled to run at a given time daily. Refer to Section 0 for more information.

5.4. Audit Event Content

Audit Events are recorded in the Audit database. The Audit database is in Microsoft Access format and resides in the Server\srvcfg\audit folder within the LightLink installation location. Table 4 lists details about triggering events and information included in audit database records.

Information Type	Triggering Event	Details in audit record
Data Source	When a Data Source is: • created • modified • deleted	• Data Source Name (description) • Data Source ID within Inova LightLink • Timestamp of event • User that initiated the event (if applicable) • Event (create, modify, delete)
Data Field	When a data field is: • created • modified • deleted	• Field description (optional) • Field ID within Inova LightLink • Timestamp of event • User that initiated the event (if applicable) • Type of event (creation, modification, deletion)
Display Group	When a Display Group is: • created • modified • deleted	• Display Group name • ID within Inova LightLink • Timestamp of event • User that initiated the event (if applicable) • Type of event (creation, modification, deletion)
Message	When a message is: • sent • modified • deactivated • deleted	• Message title and message ID within LightLink • Timestamp of event • User that initiated the event (if applicable) • Event (send, modify, deactivate, delete) • Any textual explanation to accompany the event (optional)
Output Device	When an output device is: • created • modified • deleted • logged in • logged out	• Device Type • Device ID within Inova LightLink • Timestamp of event • User that initiated the event (if applicable) • Event (create, modify, delete, login, logout) • Any textual explanation to accompany the event (optional)

Output Channel	When an output channel is: • created • modified • deleted	• Channel Type • Channel ID within Inova LightLink • Timestamp of event • User that initiated the event (if applicable) • Event (create, modify, delete) • Any textual explanation to accompany the event (optional)
Security Group	When a security group is: • created • deleted • modified	• Name of the group • Security Group ID within Inova LightLink • Timestamp of event • User that initiated the event (if applicable) • Type of event (creation, deletion, membership modification, privilege modification, access rights modification) • Any textual explanation to accompany the event (optional)
Security User	When a user account: • is created • is deleted • has its privileges or access rights modified • logs in or out • has a login failure	• Name of the user • User ID within Inova LightLink • Timestamp of event • User that initiated the event (if applicable) • Type of event (creation, deletion, privilege or access rights modification, login, logout, or login failure) • Any textual explanation to accompany the event (optional)

Table 4

5.5. License Report

Upon request, LightLink Auditor will open a report of LightLink usage compared to licensed features. The License Report is generated from the latest snapshot in the audit database; as such, you may want to generate a snapshot before generating a license report to get the most current usage.

To view the report, select *View License Report* from the Auditor context menu.

Administrator will launch an application to view the license report (e.g., Excel or a text viewing application such as Word Pad, depending on the computer file mapping setup). The license report is a comma-separated values list written to the file, named "LL_license_report.csv", in the folder, "Server\srvcfg\audit", within the LightLink installation location. Figure 33 shows an example License Report, as viewed in Excel.

Description	Current Count	Maximum Count	Remaining
Branding Level	0	2 - LightLink Enterprise Edition	2
Supervisor Packs	3	5	2
DataLink Users	57	100	43
Marquee Users	57	100	43
TCP/IP Displays	5	5	0
TaskLink Users	0	50	50
Database Output Devices	5	10	5
XML Publisher Devices	0	10	10
Server Hosts	1	1	0
Data Field Blocks	74	100	26
Broadcast Viewer Clients	0	10	10
Streaming Channels	0	1	1
Data Sources	4	5	1

Figure 10

5.6. Desktop AutoSweep

The Desktop AutoSweep feature automatically reports and removes from the Output Channels any registered Desktop Presenter users that have not logged in for a specified period of time. The Desktop AutoSweep deletion process will remove the registered user, all virtual displays associated with the user, and all message activities associated with the user; it will also remove the user and associated virtual displays from any Display Groups of which it was a member.

This feature applies only to Desktop Presenter users; it does not affect TCP/IP Displays, or other types of output devices.

Each Desktop Presenter Output Channel must be separately configured with a specific number of days of inactivity after which Desktop users are considered expired.

Specifying zero for the number of days (the default value) for an Output Channel turns off this feature for that Channel. If you enter zero for the Number of Days, then the Evaluation Settings are not implemented for that Channel.

Upon a desktop client login, LightLink will register a 'last logged in' timestamp in the Inova database. When enabled, the autosweep tool checks once a day for desktop clients that have a last logged in timestamp in excess of the number of days defined in the autosweep interface. The last logged in timestamps are not reset when settings are changed in the autosweep interface, so any clients already in excess of the defined value will be purged upon next execution of the 'report and remove' process. The autosweep operation runs by default at 5:00 a.m. every day, but an Administrator user can invoke it explicitly to run on demand via the *Perform evaluation now* option in the Auditor properties dialog.

Desktop Autosweep has a VIP list capability so that a specified set of occasional Desktop Presenter users will not be removed for lack of use. The VIP list is specified in the file, %ProgramData%\LightLink\vip_device_list.csv. This file basically follows the csv format (comma-separated values), specifying the usernames of those Desktop Presenter users not to be removed, with optional comments specified by the semi-colon character. Desktop Presenter users who are specified in the VIP list and are expired will not be removed by Desktop Autosweep; they will be reported in the i_auditserver log as separate log entries before the Desktop Autosweep report (see Figure 11).

Note that a reasonable option would be to create a separate OCM, and not have any of its users removed. With this option, a LightLink administrator can put all the VIPs into a separate OCM and set its Expiration Value to zero (0). The VIP list is good for a quicker method of adding a user to the *do not remove* list. Using the VIP list feature, the designated VIP user doesn't lose any messages, whereas if that user is put into a new OCM the administrator has to make sure the user is added to the right Display Groups and receives the right messages.

The Desktop AutoSweep report can be found in the `i_auditserver` log file. Refer to Figure 11 to see the log from a *report only* operation. This log lists five expired desktop users found in the VIP list and six expired desktop users that are not in the VIP list; the six not in the VIP list will be removed.


```
09 2014 15:46:25:438 LLDatabaseClient.cpp [line 79]: Database connection is Active.
09 2014 15:46:46:248 Ignoring Expired VIP User Name: inovacorp\swbuild:90 (CHN:1 DSP:90) - inovacorp\swbuild
09 2014 15:46:46:248 Ignoring Expired VIP User Name: inovacorp\swbuild:91 (CHN:1 DSP:91) - inovacorp\swbuild
09 2014 15:46:46:248 Ignoring Expired VIP User Name: inovacorp\swbuild:92 (CHN:1 DSP:92) - inovacorp\swbuild
09 2014 15:46:46:248 Ignoring Expired VIP User Name: inovacorp\swbuild:93 (CHN:1 DSP:93) - inovacorp\swbuild
09 2014 15:46:46:248 Ignoring Expired VIP User Name: inovacorp\swbuild:94 (CHN:1 DSP:94) - inovacorp\swbuild
--------------------------------------------------------------------------
Sweep: Starting Report of Expired Devices [no modification] at Sep 09 2014 15:46:46:217
ning channel /SRV=2023/CHN=1 (30 day inactive limit):
active Marquee Desktop: inovacorp\swbuild:95 (CHN:1 DSP:95) - inovacorp\swbuild:95
active Marquee Desktop: inovacorp\swbuild:96 (CHN:1 DSP:96) - inovacorp\swbuild:96
active Marquee Desktop: inovacorp\swbuild:97 (CHN:1 DSP:97) - inovacorp\swbuild:97
active Marquee Desktop: inovacorp\swbuild:98 (CHN:1 DSP:98) - inovacorp\swbuild:98
active Marquee Desktop: inovacorp\swbuild:99 (CHN:1 DSP:99) - inovacorp\swbuild:99
active Marquee Desktop: inovacorp\swbuild:100 (CHN:1 DSP:100) - inovacorp\swbuild:100
ning channel /SRV=2023/CHN=2 (30 day inactive limit):
 devices expired.
Sweep: Finished Report of Expired Devices [no modification] at Sep 09 2014 15:46:46:280
--------------------------------------------------------------------------
09 2014 15:46:46:280 Cleaning old messages now... [PeriodicJanitor::clean_old_messages]
09 2014 15:46:46:280 Finished cleaning out old messages [PeriodicJanitor::clean_old_messages]
09 2014 15:47:25:544 LLDatabaseClient.cpp [line 79]: Database connection is Active.
```

Figure 11

The log in Figure 12 is from a *report and remove* operation and shows the six devices that have been removed.

```
09 2014 15:49:25:692 LLDatabaseClient.cpp [line 79]: Database connection is Active.
09 2014 15:49:46:392 Ignoring Expired VIP User Name: inovacorp\swbuild:90 (CHN:1 DSP:90) - inovacorp\swbuild:
09 2014 15:49:46:392 Ignoring Expired VIP User Name: inovacorp\swbuild:91 (CHN:1 DSP:91) - inovacorp\swbuild:
09 2014 15:49:46:392 Ignoring Expired VIP User Name: inovacorp\swbuild:92 (CHN:1 DSP:92) - inovacorp\swbuild:
09 2014 15:49:46:392 Ignoring Expired VIP User Name: inovacorp\swbuild:93 (CHN:1 DSP:93) - inovacorp\swbuild:
09 2014 15:49:46:392 Ignoring Expired VIP User Name: inovacorp\swbuild:94 (CHN:1 DSP:94) - inovacorp\swbuild:
--------------------------------------------------------------------------
Sweep: Starting Cleaning Run [removing expired clients] at Sep 09 2014 15:49:46:377
ning channel /SRV=2023/CHN=1 (30 day inactive limit):
emoving Marquee Desktop: inovacorp\swbuild:95 (CHN:1 DSP:95) - inovacorp\swbuild:95
emoving Marquee Desktop: inovacorp\swbuild:96 (CHN:1 DSP:96) - inovacorp\swbuild:96
emoving Marquee Desktop: inovacorp\swbuild:97 (CHN:1 DSP:97) - inovacorp\swbuild:97
emoving Marquee Desktop: inovacorp\swbuild:98 (CHN:1 DSP:98) - inovacorp\swbuild:98
emoving Marquee Desktop: inovacorp\swbuild:99 (CHN:1 DSP:99) - inovacorp\swbuild:99
emoving Marquee Desktop: inovacorp\swbuild:100 (CHN:1 DSP:100) - inovacorp\swbuild:100
Sweep: Deleted 6 devices from channel /SRV=2023/CHN=1
ning channel /SRV=2023/CHN=2 (30 day inactive limit):
 devices expired.
Sweep: Finished Cleaning Run [removing expired clients] at Sep 09 2014 15:49:47:484
--------------------------------------------------------------------------
09 2014 15:49:47:484 Cleaning old messages now... [PeriodicJanitor::clean_old_messages]
09 2014 15:49:47:500 Finished cleaning out old messages [PeriodicJanitor::clean_old_messages]
09 2014 15:50:25:781 LLDatabaseClient.cpp [line 79]: Database connection is Active.
```

Figure 12

Note: When a large number of expired users is removed in one sweep, it can take significant system resources and clock time to complete. For example, in our test system with 500 expired users out of 1000 total users, and 230 messages (4000 activities), it took 4 minutes on a quad-core CPU; all remaining users continued playing their messages correctly and the supervisor users on the server were responsive. Inova Solutions recommends performing a Desktop AutoSweep with actual deletions at a time when business activities are lowest (e.g., at the scheduled time of 5:00 a.m.).

6. Client Manager

6.1. Overview

Client Manager handles all of the client connections for a LightLink host. Connections are made to the Client Manager over the TCP/IP protocol. Client Manager provides services to LightLink client programs. These services include security checking via client login, user profile management, service location in the distributed Inova LightLink system, and command routing between LightLink components.

Types of clients connecting to the Client Manager Server (CMS) include:

- System Manager
- Message Editor
- Administrator
- Marquee
- DataLink
- TaskLink

6.2. Client Manager Context Menu

Table 5 describes the Client Manager context menu items.

Menu Item	Explanation
Add to View Window	Add this to an open view window
Start Component	Start the selected component
Stop Component	Stop the selected component

Table 5

7. Supervisor Database Connection

This node has no configuration; it represents the service that connects Supervisor applications to the LightLink database. The LightLink middleware applications, including Administrator and Security Manager, connect directly to the LightLink database and do not use this connection service.

8. External Input Manager

8.1. Overview

The External Data Source Manager provides a mechanism to connect to a data source for which LightLink doesn't provide a specific interface. In general, one configures an EDSM to connect to such a data source, and then one connects a LightLink custom DSM to the EDSM to bring the data into LightLink. Contact LightLink Technical Support for assistance in configuring an External Data Source Manager.

8.2. Adding a New External Data Source Manager

To add a new External Data Source Manager (EDSM):

1. Open the New External Data Source menu item on the desired Input Manager node in Administrator.
2. Select the type of EDSM to add. A Properties dialog will appear for configuring the EDSM.
3. On the Properties dialog, give the EDSM a meaningful name or accept the default name.
4. Next, select the configuration ini file for the EDSM by clicking the Browse button or merely entering the name of the file in the available text box.

   The ini file must reside in the exe directory of the Inova LightLink installation.

   To edit the configuration ini file, click the Edit button to open an edit window containing the file content. No default name for an ini file will be assumed.
5. Once the EDSM configuration is finished, select *OK* on the Properties dialog to complete the configuration

   The EDSM server can be configured for any of the following data sources:

   - Aspect RTB
   - Genesys GIS
   - Interactive Intelligence
   - Avaya Aura
   - Nortel Symposium

You can change the EDSM properties at any time by selecting Properties from the EDSM context menu.

8.3. External Input Manager Context Menu

Table 6 describes the External Input Manager context menu items.

Menu Item	Explanation
Add to View Window	Add this to an open view window
Start Component	Start the selected component
Stop Component	Stop the selected component
Delete	Delete the selected component
Properties	Open the Properties dialog

Table 6

From the LightLink Administrator popup menu of a given EDSM GUI, the EDSM can be shutdown and launched by clicking the Stop Component or Start Component menu items respectively. The LightLink system tree view icon for the EDSM will reflect whether or not the EDSM is running. The External Input Manager node can also include multiple external data sources, if so configured. Each data source can be started and stopped.

In addition, LightLink and external sources will each have options from the context menu: connect and disconnect.

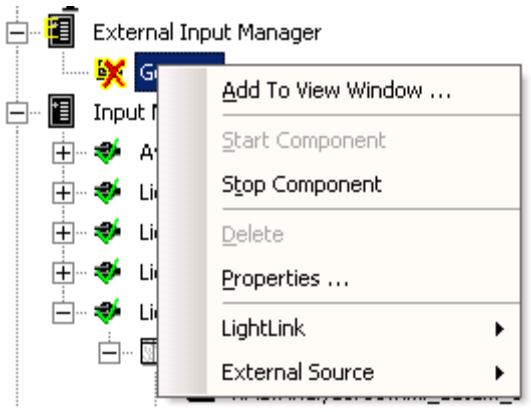


Figure 13

9. Input Manager

9.1. Overview

LightLink data source connections provide the LightLink interface to *your* real-time data. A data source connection is the communications link between a real-time data source and the LightLink system. You make these connections via the Input Manager component.

The Input Manager establishes and monitors the connection between your data and LightLink, thereby providing a real-time flow of raw data into the LightLink system. Multiple data sources can be configured via an Input Manager; each one is known as a Data Source Manager (DSM). Multiple Input Manager components can be configured in the LightLink system to distribute the input data processing load among multiple servers.

Once the raw data has been captured, you can use System Manager and Message Editor to direct the data to specific output destinations of your choice, once those destinations have been configured in Administrator. You can also monitor the data and overall system health using these applications.

9.2. Adding a New Data Source

Though there are a number of different data source options, the process for adding and configuring a new data source is the same for each type of data source.

To add a new data source, right click on Input Manager and select *New Data Source Connection* from the context menu.

The New Data Source dialog (Figure 14) appears with the currently-licensed data sources for your system displayed. Choose a data source type and the data source properties dialog will open. From here, you can set the configuration for the data source. Refer to the specific data source sections below to see how to configure each one.

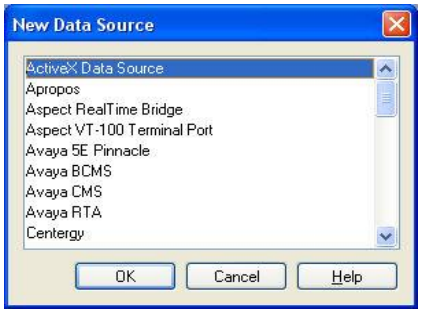


Figure 14

9.3. Data Source Connection – Context Menu

Once you have created a data source, you can access a number of options from its context menu. To access the data source context menu:

1. Expand the *Input Manager* node to show the configured data sources.
2. Right click on the desired data source. The Data Source Context menu appears. Table 7 describes the context menu items.

Menu Item	Explanation
Add to View Window	Add this data source to an open window
Begin Diagnostics	Start diagnostic logging in Log Viewer
End Diagnostics	Stop logging to Log Viewer
Login	Execute Login to the Data Source Connection
Logout	Execute Logout of the Data Source Connection
Delete	Delete the selected Data Source Connection
Properties	This option allows viewing and, if configuration permissions are enabled, editing data source properties

Table 7

Note that the diagnostics are viewed in the data source .ivt log using Log Viewer. Refer to the LightLink Log Viewer Solution Guide for more details.

9.4. Input Manager – Context Menu

The context menu is content sensitive and will have different items depending on the tree nodes selected. Refer to Table 8 for more details about the context menu.

Menu Item	Explanation
Add to View Window	Add Input Manager to an Administrator window
New Data Source Connection	Add a new external data source connection
Start Component	Start the selected component
Stop Component	Stop the selected component
Properties	Modify the diagnostic level and the expired/canceled messages interval settings
Configure Contracts	Configure contracts

Table 8

9.5. Input Manager Properties

With the Input Manager Properties dialog, you can change the logout timeout and the status report interval. You can also adjust the advanced properties settings on the advice of Inova personnel.

To configure the Input Manager Properties Settings options:

1. Complete the following fields from the Properties dialog:
   - **DSM Logout Timeout (seconds) -** The number of seconds allotted to a Data Source Manager (DSM) to logout. If the DSM has not logged out in that time, its connection to the data source switch is abruptly cut.
   - **DSM Status Report Interval (seconds)** The interval at which each DSM reports its status on the Info Bus
2. If you wish to access the advanced properties, click on the *Advanced* button. *The Advanced button settings should only be changed on the advice of Inova personnel.*
3. Select *OK* to complete the configuration.

10. Data Set Contracts

10.1. Overview

Data set contracts provide a mechanism for grouping multiple data items into a unit based on a topic name. All systems that need to know about a unit can use the same contract. In a topic-based publish and subscribe environment, the topic name is the name of the bus topic by which the data will be available. The Input Manager will send data to this name, and subscribers will receive data on this name.

Data Set Contracts provide a way to bring data into LightLink that will only be managed as a set; individual data values acquired in a Data Set Contract are not available within LightLink. For example, a Data Set Contract can be set up to acquire data from a data source and exported to a database where it can be re-acquired in a different format by another LightLink data source manager (DSM) that then provides the data as distinct data fields.

From the Data Set Contract Properties screen, you can Edit, View, Delete, and create a New Contract. You can also Import or Export files specifying Data Set Contracts details. See the following sections to see how to edit, view, delete, and create a new contract.

10.2. Creating a New Contract

Each Data Set Contract is identified by a unique Topic Name.

The basic rules for creating a Topic Name include:

- Topics must always begin with the separator character, which is a forward slash character (/).
- A topic may have one or more components, each separated from the others by the separator.
- Some examples of valid topics include "/root/deva/teflon", "/server_3/data_sources/NT_Max" and "/dow/stocks/IBM/mainframes".
- Some examples of invalid topics include "dell/web", "/fox/trot/alpha/" and "/canton//news/current". These examples are invalid because the first does not start with a separator (it is considered non-rooted), the second has a trailing separator and the third has two separators in a row with no component between them

To create new Data Set Contracts from the Data Set Contract Properties dialog:

1. From the Data Set Contract Properties dialog, select *New Contract*.

2. The Define Contract Properties dialog appears. There are three tabs to complete when creating a new contract: Header, Attributes, and Validation Checks.
3. Complete the fields on the Header tab of the Define Contract Properties dialog.
4. Click on the Attributes tab of the Define Contract Properties dialog and click *New*.

   The Attribute Information dialog appears. Attributes displays the list of data values that will be packaged together and published as a single entity.

   Complete the following fields:

   - **Name -** This is probably the most important attribute property. This name will be the identifier that components use to reference the data. Publishers will fill data sets based on this name, and subscribers will retrieve data from a data set based on this name. The name attribute allows for name based mapping between subsystems and data being moved on the bus.
   - **Data Type -** The data type identifies the expected type for this attribute. It is possible the publisher could provide the data with a different type. Subscribers will either use the published type, or transform the data to this type if necessary for their operation. This type will be used in generating the default value.

     Types are based on those supported by the Expression library and include: INT16, UINT16, INT32, UINT32, DOUBLE, CHAR, STRING, BOOL, DATE, TIME, DATETIME, and REALTIME
   - **Comment** (optional) - description or comment about the purpose or usage of this attribute.
   - **Maximum Length** (optional) - the maximum amount of data that is meaningful in this attribute. Generally this only applies to strings, but could also specify the number of significant digits in numbers.
   - **Default Value -** value that will be returned automatically if no value was provided in the publication. The value will be typed with the specified Data Type.

     Time values should be specified as: hh:mm:ss. By default hours should be 0-23. It is also valid to specify the hours as 0-12 and put either am or pm after the time value.

Date values must be specified as mm/dd/yyyy for proper parsing.

DateTime values must be specified with the date first, a space character, and the time last.

RealTime values are specified as the amount of time to offset from the current time. The time can be formatted as hh:mm:ss, mm:ss, or as just seconds. The offset can be negative to specify times before the current time, or positive for times after the current time.

- **Pack Default Values** – Check this box to specify whether the publisher should pack default values for submission. Normally default values are resolved at the subscriber and are not included as part of the transmission. If this value is specified as true, then default values will be generated at the publisher and included in the transmitted data.

Select *OK* to complete the configuration.

5. Click on the Validation Checks tab to see the Validation Checks screen.

   Validation checks allow for one or more checks to determine whether the data set is considered valid. Validation checks are specified in the form of an expression that returns a true or false result. The attributes in the publication can be used within the expression through named references.

   To create a new validation check, select New. The Data Field Expression dialog appears. Create an expression that returns a boolean (true/false) result.

6. The contract data values will only be published if the expression result is true when a new set of data values are received by the system.

   See the Data Field Expression Solution Guide to learn how to create data field expressions.

   Select *Save* to complete the configuration.

7. Once you have completed the fields on the three tabs, select *OK* to complete the configuration.

10.3. Viewing a Data Set Contract

To use the View button to view existing Data Set Contracts:

1. Select *Input Manager* > *Configure Contracts* to open the Data Set Contract Properties dialog.
2. Select the contract you want to view. *If there is only one contract, it will already be selected.*

3. Select *View Contract*. The Contract Details screen appears. *This screen is view only. It is not editable.*
4. Click *OK* to return to the Data Set Contract Properties screen.

10.4. Exporting a Data Set Contract

To export existing Data Set Contracts to a specific folder:

1. Select Input Manager > Configure Contracts to open the Data Set Contract Properties dialog.
2. Select the file you want to export.
3. Select *Export*.
4. The Save the Data Set Contract File As screen appears. Locate the folder where you want to save the existing .ini file and select *Save*. The file is saved to the targeted folder.

10.5. Importing a Data Set Contract

To import existing Data Set Contracts for editing, viewing, deleting, or exporting:

1. Select Input Manager > Configure Contracts.
2. Select *Import*.
3. The Select a Data Set Contract File dialog appears. Locate the folder where the existing .ini file is located.
4. Select *Open*.
5. The file opens in the Data Set Contract Properties screen so you can edit, view, or delete the contract.

11. Managing Data Sources

Refer to the individual Data Source Installation Guides for more information about managing specific data sources.

11.1. Data Field Naming

For Middleware versions 5.12 and later:

LightLink data fields are composed of a group name and a field name, separated by a colon. For many DSMs, the group name is composed of a Table name and a Key name separated by a colon. In such cases, if the group name exceeds the 30-character limit (including the colon between Table name and Key name), the Key name will be truncated to achieve the limit of 30 characters; if the Key name is truncated to one character and the resulting group name still exceeds 30 characters, LightLink will leave the Key name at one character and will truncate the Table name to bring the group name down to 30 characters.

For example, if the table name is "Workgroup_Test_Long_Name" (24 characters) and the Key name is "Express" (7 characters), the Key name will be truncated to 5 characters and the Table name will not be truncated, so that with the colon between Table name and Key name, the group name will be within the 30 character limit.

The data field name is also limited to 30-characters in size; if it comes in to LightLink larger than that, it will be truncated to 30 characters.

Both the group name and the data field name cannot contain these characters:

```
* ? # % [ ] ^ + / & ' ( ) " : , .
```

If any disallowed characters are present when the data field comes in to LightLink, they will be removed and the data field name will be created without them.

The Data Source Manager log will record any time that these restrictions are encountered, the group and field name size limits, and the disallowed characters.

11.2. Configuring Data Sources

The information below is generic and may not apply to all data sources. To configure a new Data Source:

1. Right-click the Input Manager icon to open the context menu.
2. Select *New Data Source Connection*.
3. From the New Data Source dialog, select a Data Source type.

4. Select *OK*.
5. The selected Data Source Properties dialog appears. The General tab will be pre-selected; select if it is not.

   The Name, Preferred ID, and Hostname may be pre-populated. Some fields may be grayed out, which means they cannot be edited.

   You can edit any fields that are not grayed out.
6. Select the Connection tab from the Properties dialog.
7. Complete the data source connection protocol and settings on this dialog.

   Note that the COM port selection is exposed if you are configuring a serial port on the host PC. The COM port setting must be a valid serial port number (e.g., 1) and must be the physical or logical serial port to which your data source is connecting on the host.
8. Select the Settings tab from the Properties dialog and complete the fields. *Not all Data Source Dialogs are exactly the same.*
9. Select the *Advanced* button on the Settings tab to view the advanced options. *The Advanced button settings should only be changed on the advice of INOVA personnel.*

   Inova strongly recommends that you make changes to these settings only upon the advice from or with the assistance of an Inova technician. Please call Inova for customer service and technical support.
10. If you need to allow secure remote access, select the SSH tab on the Properties dialog. Refer to Section 11.2.1 for further detail about SSH.
11. Select *OK* to complete the configuration.

11.2.1. SSH Configuration

Secure Shell (SSH) allows secure remote access for those who need it by employing public key encryption. To enable SSH:

1. Select the SSH tab on the Properties dialog and then select the SSH checkbox.
2. Complete the data source SSH options on this dialog. You must at least provide the correct Login ID and Password parameters.

   The Switches field can be blank if no switches are needed for the SSH connection. If switches are needed to get a proper connection, some possible switches are listed in Table 9.

Switch	Explanation

-X -x	enable / disable X11 forwarding
-A -a	enable / disable agent forwarding
-t -T	enable / disable pty allocation
-1 -2	force use of particular protocol version
-4 -6	force use of IPv4 or IPv6
-C	enable compression
-i key	private key file for authentication
-s	remote command is an SSH subsystem (SSH-2 only)
-N	don't start a shell/command (SSH-2 only)

Table 9

3. Return to the Connection tab. Complete the following on this tab:
   - Select TCP/IP Connection for the protocol type.

     Selection of SSH changes the way the Connection tab address specification works, which can be a bit misleading.
   - In the Hostname or IP address field, enter the hostname or IP address of the system to which you wish to make the SSH connection.
   - Enter the port number at which the LightLink DSM will receive the data from the data source

     *The Listening port for the SSH configuration **is not** the SSH port on the remote address (the address/hostname you entered in the Hostname or IP address field).* It is the port on the LightLink server (the one hosting the DSM) for the tool used to wrap SSH communications to connect to the DSM. It must be unique and unused on the Input Manager server hosting the DSM. It is best to use a high-numbered ephemeral port number, 49152 through 65535.

   These changes to the Connection tab are an override of the labeled configuration elements on that tab. If you are configuring more than one SSH DSM on this Input Manager host, it is important that each such DSM have a unique port number not already in use by another DSM or other service running on the Input Manager host.

12. Object Bus Configuration

12.1. Overview

Object Bus Configuration allows advanced users to configure alternate bus segments for distributing the object bus load. This function is rarely needed; please contact Inova technical support for additional help configuring object bus properties.

13. Site Monitor

13.1. Introduction

The LightLink Site Monitor allows Inova Solutions customers who have purchased our cloud solutions to activate an uplink that will send real-time contact center data to the Inova Solutions cloud site.

13.2. Purpose

Inova Solutions is building real-time contact center dashboard products to handle a wide array of information, perform more analysis, and present reporting in a web browser. Customers who purchase cloud solutions can optionally activate the Site Monitor uplink in the premises LightLink middleware server that will send real-time contact center data to our cloud based data center. We will offer web dashboards served from that data center in a variety of formats and user options so that contact center managers and agents have access to the best information for managing their centers, including access to messaging and historical data. Hosting the web applications in the cloud will allow Inova to seamlessly provide real time data to mobile devices as well.

13.3. Data Security

We are aware that contact center data is confidential. The data transferred to and from the cloud site is encrypted via HTTPS. Only a LightLink Administrator can use Site Monitor to authorize real-time data transfer to the cloud.

13.4. Internet Access

The premises LightLink server will need persistent access to the InovaSolutions.com and InovaSolutionsData.com internet domains and associated subdomains to ensure real-time data updates.

13.5. Site Monitor Context Menu

Table 10 describes the Site Monitor context menu items.

Menu Item	Explanation
Add to View Window	Add Site Monitor to an Administrator window
Start Component	Start the selected component (it will try to restart itself if found to be off)
Properties	Turn on or off the upload of LightLink data to the Inova Solutions cloud site

Table 10

13.6. Configuring Site Monitor

The only configuration point for Site Monitor is to turn on/off the sending of LightLink data to the Inova Solutions Cloud Site. You can also view the Inova Solutions' Terms of Service by clicking on the link in the Properties dialog.

To access the Site Monitor Server Properties Status Monitor options (Figure 15):

1. Select Site Monitor > Properties.
2. Check or uncheck the *Send Data to Inova Cloud* box to activate or deactivate the sending of LightLink data to the Inova Solutions Cloud Site.
3. Select *OK* to complete the configuration.

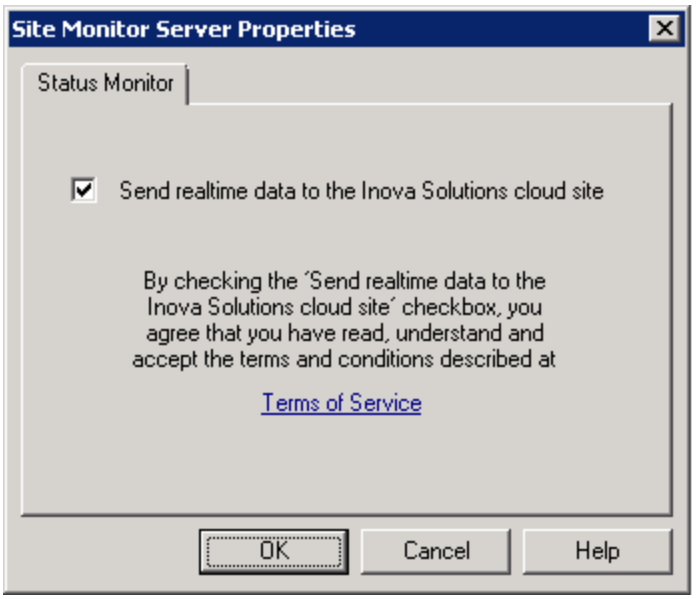


Figure 15

14. Output Manager

The LightLink O*utput Manager is res*ponsible for starting and stopping output channels and for sending device connection requests and messages to active output channels.

14.1. Overview

LightLink Output Channels send real-time data and messages to any type of output device that the LightLink system supports (e.g, LED Displays, Inova Desktop Presenter Clients, email output, and Database Publisher output). The Output Manager is used to create and modify those connections.

Output Manager interfaces with the LightLink Object Bus, the Data Directory, and other LightLink system components to manage the channels and messages, and to publish channel status.

It may be deployed:

- On the same machine as the other LightLink server components.
- On a separate machine that is reachable from the Clients via some sort of network connection.

More than one instance of the Output Manager component may exist on the network, allowing the processing load to be distributed.

Some device connections require separate licenses from Inova.

14.2. Creating Output Channels

You must have configuration permissions to create an output device connection (see Section 2.1).

To create new Output Channels,

1. Choose New Output Device Connection from the Output Manager context menu.
2. Select the type of Output channel you want from the New Output Device Connection dialog.
3. The Properties dialog for the output device you selected appears. The dialogs will vary depending on the device selected.

   Complete the dialog options for the output device.
4. Select *OK* to complete the configuration.

Output Channels are based on the types of devices available, which include:

- Inova TCP/IP Displays (Inova OnTrack® displays)
- Inova Desktop Presenter Clients:
  - Inova Marquee Clients
  - Inova DataLink Clients
  - Inova TaskLink Clients
- Database Publisher Output
- XML Publisher Output
- Email Output
- Inova TCP/IP Displays - Encrypted (Inova OnAlert® displays or Simplex® TrueAlert® displays)
- AMS LED Displays

Refer to the following Sections 21 – 18 for details on the configuration properties of the various types of Output Device Connections.

14.3. Configuring Output Manager Properties

To configure the Output Manager Properties:

1. Complete the following fields from the Output Manager Properties dialog:
   - **Send Date and Time Interval (seconds) -** time, in seconds, after which Inova LightLink resends the date and time
   - **Status Publish Interval (seconds**) - time, in seconds, between status reports
2. To configure the advanced properties, click the *Advanced* button on the Properties dialog. *Only a knowledgeable technician should access the Output Manager Advanced Options.*

   Complete the following field in the *Output Manager – Advanced* dialog:
   - **MinSystemLogInterval** - how often, in minutes, a given system_event.log message is allowed to be printed.

     If the same system_event.log message is generated two or more times within this amount of time, only the first will be printed. *Some messages may override this setting.*
3. Select *OK* to complete the configuration.

14.4. Output Manager Context Menu

Table 11 describes the Site Monitor context menu items.

Menu Item	Explanation
Add to View Window	Add to an Administrator window
New Output Device Connection	Add a new output device connection
Start Component	Start the selected component
Stop Component	Stop the selected component
Import OCM	Import a new output channel manager
Properties	Open the Properties dialog

Table 11

15. Inova TCP/IP Displays

15.1. Overview

The Inova TCP/IP Displays output channel type allows LightLink to connect to Inova OnTrack® LED displays manufactured by Inova Solutions®, and thereby to display real-time data and messages on those displays. The Inova TCP/IP Displays support multi-region, multi-page messages that can contain data fields that are updated with new values in real-time. *The Inova TCP/IP Displays OCM is not compatible with OnAlert display firmware; it is only compatible with OnTrack display firmware 1.1.11 with update 1.2.39 applied.*

15.2. Configuring Inova TCP/IP Displays Output Properties

The following steps detail how to configure the Inova TCP/IP Displays Output Properties:

1. Select *Inova TCP/IP Displays* from the New Output Device Connection dialog.
2. Select *OK*.
3. The Inova TCP/IP Displays Output Properties dialog appears. Select the General tab.

   Complete the following Inova TCP/IP Displays Output General tab options:

   - **Name** - name of this OCM, which appears in the LightLink system tree view. The default is Database Output Connection.
   - **Server ID** - name of the Inova LightLink system server of which this OCM is a part.
   - **Preferred ID -** numeric ID assigned to this output channel. The system normally assigns this value, but the user can override the assignment at initial configuration.
   - **Remote Host** - name of the host this channel will reside on. If Administrator is in Host View this will be disabled and show the host that is being configured on. If Administrator is in global view this will present a list of the hosts the channel can be created on.
   - **Disable –** If checked the connection is disabled and all devices will be inactive.
   - **Add Devices –** Allows the configuration of new devices.
   - **Delete Devices** - Allows the deletion of devices.

The Add Devices and Delete Devices buttons appear after you have created and reopened a connection to edit it.

4. Select the Connection tab from the Properties dialog. Enter the connection port, hostname or IP Address, and listening port on the Inova TCP/IP Displays Connection tab.

   The Listening Port field specifies which particular TCP/IP port number will be used by clients to connect to the Inova LightLink Server. A unique listening port number must be assigned by your network administrator for use by the Inova LightLink system.

   This Listening Port number must be a decimal number in the range 0 to 32767, excluding those port numbers that are in use by network services. For more information, consult your network administrator.

5. Select the Default Display Settings tab from the Properties dialog. Complete the following Inova TCP/IP Displays Default Display Settings tab options:

   - **Time Between Commands (ms) -** minimum amount of time in milliseconds that LightLink will wait after sending a command before it sends another command.
   - **Data Field Update Interval (ms)** - rate in milliseconds at which Inova LightLink sends data field updates. The range is 500 to 60,000.
   - **Response Timeout (ms) -** time in milliseconds that Inova LightLink will wait for a Display to respond to a query command before timing out and reporting an error.
   - **Automatic Query Interval (ms) -** time in milliseconds that Inova LightLink will wait between sending status queries to Displays to verify proper operation of the devices. The range is 60 to 3,600**.**

6. Select the Monitor Connection tab from the Properties dialog. Complete the following Inova TCP/IP Displays Monitor Connection tab options:

   - **Enable -** Select to configure and enable the connection.
   - **Connection port** - Only TCP/IP Connections are allowed any more.
   - **Hostname or IP Address** - Enter the hostname or IP address of the computer on which the Output Manager for this channel is running.
   - **Listening Port -** Specify the listening port – any port number is allowed**.**

7. Select the Settings tab from the Properties dialog. Only the Direct Channel Type is provided at this time; the default value of 60 seconds for Cast Interval is usually sufficient.
8. Select *OK* to complete the configuration.

15.3. Adding Devices

Once you have created a new output device for Inova TCP/IP Displays Output, the Add Devices option becomes available from the General dialog.

1. Select the *General* tab from the Inova TCP/IP Displays Properties dialog.
2. Select *Add Devices*.
3. The Inova TCP/IP Display Properties dialog appears. Select the Address tab. Enter the display ID Address, discovery port, and preferred ID in the Inova TCP/IP Display Properties Address tab. You can also select Use Default Discovery Port to use the default settings. If un-checked, then you must enter the port number.
4. Select the Settings tab and complete the Inova TCP/IP Display Properties *Settings* tab options:
   - **Time Between Commands (ms) -** the minimum amount of time in milliseconds that Inova LightLink will wait after sending a command before it sends another command.
   - **Data Field Update Interval (ms) -** rate in milliseconds at which Inova LightLink sends data field updates. The range is 500 to 60,000.
   - **Response Timeout (ms) -** time in milliseconds that Inova LightLink will wait for a response from a Display before timing out and reporting an error.
   - **Automatic Query Interval (ms) -** time in milliseconds that Inova LightLink will wait between sending queries to output devices to verify proper operation of the devices. The range is 60 to 3,600.
5. Select *OK* to accept the configuration changes.

16. Inova Desktop Presenter

16.1. Overview

The Inova Desktop Clients output devices display real-time data and messages on Microsoft Windows workstations. These software applications are available in the Inova Desktop Presenter product suite.

- Inova Marquee® Clients
- Inova DataLink Clients
- Inova TaskLink Clients

To connect clients of these various types to the LightLink system, create an OCM for each specific type of client desired. Multiple OCMs of each type can be configured on any of the servers in the LightLink system.

When upgrading from an earlier version of LightLink (Server version 5.7.327.2 or earlier), any previously configured LightLink Desktop Clients OCMs will continue to exist with the clients configured at the time of the upgrade. Clients can be added or removed; no new OCMs of the "LightLink Desktop Clients" type can be created.

There are four tabs to complete for LightLink Desktop Client Properties: General, Connection, Address Ranges and Settings.

16.2. Configuring Inova Desktop Presenter Channels

To configure an Inova Desktop Presenter Channel:

1. Select Output Manager > New Output Device Connection.
2. The New Output Device Connection dialog appears. Select the particular type of Desktop Client OCM required (for this example, we will choose Inova Marquee Clients).
3. Select *OK*.
4. The OCM Properties dialog appears. Select the General tab.

   The OCM Name, Server ID, Preferred ID, and the Hostname of the (remote) PC on which the Output Manager for this connection resides are pre-populated.

Complete the following General tab options:

- **Name** - name of the Output Channel (OCM).
- **Server ID** - the ID number of the Server
- **Preferred ID** - allows you to specify the preferred ID; however, you should generally leave the Preferred ID at the default value provided by the system. If the default is changed, ensure that it is a unique value.
- **Host -** name of the host on which the Output Channel is managed.
- **Disable** - select the check box to stop OCM processing; in this state clients are disconnected and do not receive messages or data field updates. Clients will automatically reconnect when the OCM is enabled by unchecking the Disable checkbox.
- **Add / Delete Devices** - allow you to add and/or delete output devices from the channel. These buttons are only available after you create a connection.

5. Select the Connection tab from the Properties dialog (Figure 16).

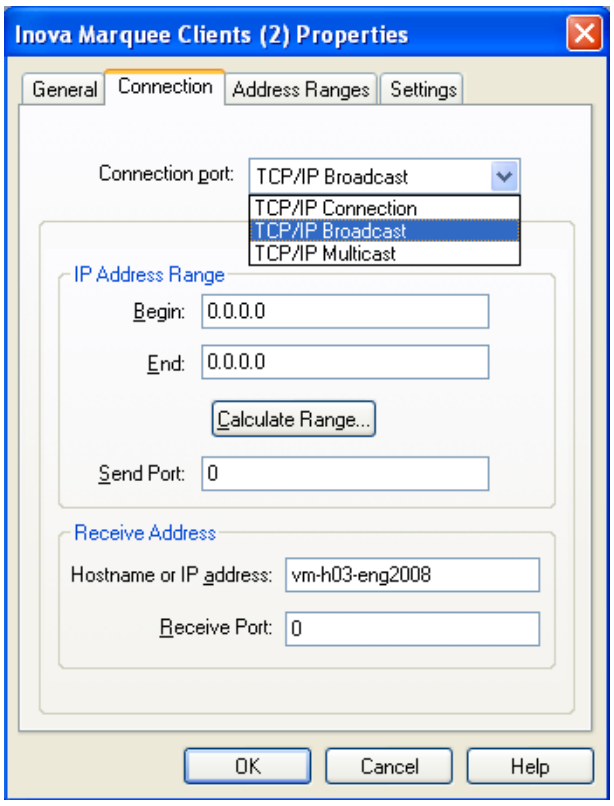


Figure 16

Complete the following Desktop Clients Properties Connection tab options:

- **Connection Port** - Depending upon the type of connection you are establishing, one or more Connection Port options will be displayed on the drop-down menu. There are three types of connections for Inova Desktop output channels: TCP/IP Connection, TCP/IP Multicast, and TCP/IP Broadcast. The three connection types have different sets of properties on the Connection tab.
  - **TCP/IP Connection –** This connection type can serve the Inova Marquee, Inova DataLink, and Inova TaskLink clients. It makes a direct connection to each client for data transfer. On the connection tab, specify the following:
    - **Hostname or IP address:** the name or address of the host on which the Output Channel is managed.
    - **Listening port:** the number of the port on the specified host at which the output channel will listen for connection requests; must be unique on the output channel server.
  - **TCP/IP Broadcast –** This connection type can serve all five of the Inova Desktop clients. It broadcasts messages and data to the clients rather than making a direct connection. The broadcasts are limited to the subnet on which the output channel resides, unless the "unicast" mode is configured (where the begin and end address are the same). On the connection tab, specify the following:
    - **IP address Range**
      - **Begin:** the starting IP address of the subnet (e.g., 125.5.12.0), or the unicast address (e.g., 125.5.12.78).
      - **End:** the ending IP address of the subnet (e.g., 125.5.12.255), or the unicast address (e.g., 125.5.12.78).
      - **Send Port:** the port at which clients will listen for data; must be unique across all broadcasting output channels running against the same subnet.
    - **Receive Address**
      - **Hostname or IP address:** the name or address of the host on which the Output Channel is managed

- **Receive port:** the number of the port on the server to which the clients will send connection requests; must be unique on the server host.

– **TCP/IP Multicast –** This connection type can serve all five of the Inova Desktop clients. It sends messages and data to the multicast group with which clients register interest, rather than making a direct connection. The combination of IP Address and Send Port must be unique for these messages and data. On the connection tab, specify the following:

- **Multicast Group**
  - **IP Address:** the IP address of the multicast group, in the range 224.0.0.0 to 239.255.255.255.
  - **Send Port:** the port at which clients will listen for data.
- **Receive Address**
  - **Hostname or IP address:** the name or address of the host on which the Output Channel is managed
  - **Receive port:** the number of the port on the server to which the clients will send connection requests; must be unique on the server host.

You can change the type of connection for an OCM after its initial configuration; however there are some caveats:

- When changing to or from the TCP/IP Connection type to another connection type, all of the connected clients must be restarted
- When changing to the TCP/IP Connection type for an OCM that was upgraded from a previous version of LightLink (5.7.327.2 or earlier), that OCM can only have one entry for each registered user (i.e., delete any extra entries before changing the connection type).

6. Select the Address Ranges tab from the Properties dialog if you want to restrict the IP addresses from which clients can connect to this channel. *Refer to Section 16.3 for more information about the optional Address Ranges.*

   Complete the following Address Ranges tab options:

- When selecting either the Add tab or the Edit tab, the IP Address Range dialog appears. Enter the starting and ending IP Addresses for your range.
- You can select a configured address range and click Edit or Delete, to perform those actions as needed.

  Select *OK* to accept your changes and return to the Properties dialog.

7. Select the Settings tab from the Properties dialog.

   Complete the following Desktop Clients Properties Settings tab options:

   - **Don't Report Message Errors for Offline Users** – check this box to avoid having message status in the error state because of registered users that are not connected.
   - **Time Between Commands (ms) -** amount of time in milliseconds that Inova LightLink will wait after sending a command before it sends another command.
   - **Data Field Update Interval (ms) -** rate in milliseconds at which Inova LightLink sends data field updates. The range is 500 to 60,000.
   - **Device Status Timeout (ms) -** amount of time in milliseconds that Inova LightLink will wait for a response from a display before timing out and reporting an error. *Inova recommends that the default Timing Values be accepted unless there is good reason to change them.*
   - **Number of Rows** - number of LED rows in the Marquee client.
   - **Number of Columns** - number of LED columns in the Marquee client.

8. Select OK to complete the Output Channel configuration.

16.3. Address Ranges Tab

This properties tab applies only to the TCP/IP Multicast and TCP/IP Broadcast connection types. If this tab contains no entries, then anyone whose IP Address is compatible with the multicast address or subnet specified on the Connection tab of the Properties dialog may connect to this Output channel. If you have only one channel total, or only one output channel that is compatible with any given user, then it is best to leave this tab blank.

If you have more than one output channel that is compatible with a given user, then the possibility exists that they might connect to one channel at one time and some other channel at another time. To prevent this ambiguity, specify non-overlapping Address Ranges, one for each output channel of the same type, such that each user's computer is in only one of the address ranges.

For example:

- Channel A has Address Range 11.4.56.0 - 11.4.56.120
- Channel B has 11.4.56.121 - 11.4.56.255

Any given user will fall within only one of the specified ranges and therefore will get connected with Inova LightLink on one output channel only.

16.4. Adding Devices

For the five Inova Desktop OCM types, authorized client connections (also known as Devices on the Channel) are specified in advance of the clients attempting to connect.

This is true regardless of the configured connection type (TCP/IP Broadcast, TCP/IP Multicast, and TCP/IP Connection). Specify the allowed clients for each OCM in the form of "Domain Name\User Name" for each account under which the application will be run.

Only one client will be allowed at any given time for each entry in the OCM. If multiple clients on a given OCM will be run under the same user account at the same time, one can differentiate each such use with a unique name modifier parameter that can be specified for each type of client. The unique name modifier is added to the allowed client names for the OCM and on the command line for starting the client application (refer to the client user guide for more details).

To enter allowed client names for the OCM, open the Add Devices dialog after creating the OCM. You can reach this dialog either through the context menu (right clicking on the device node) or through the OCM properties dialog (Output Manager > LightLink Desktop Clients > Properties > Add Devices)

The Add Desktop Devices dialog opens. Enter a single allowed client name or multiple allowed client names at the same time. Each name is of the form "`MyDomain\MyUserAccount:name-modifier`", where "`:name-modifier`" is optional. Separate each allowed client name with commas or enter them on separate lines; if a name is to include a space character, enclose it in double-quotes.

17. Database Publisher Output

17.1. Overview

The LightLink system contains components for Data Capture, Data Analysis, and Data Delivery.

The LightLink system makes its connection to databases via the ADO.net data base interface standard. This allows just about any database to be used to receive real time data from the Inova LightLink system as long as it has the proper provider or driver. At the present time this includes Microsoft SQL Server, Oracle Database, and Microsoft Access among others.

Inova LightLink connects to ADO, which then connects to the target database via either a native Object Linking and Embedding (OLE) DB provider, or an Open Data Base Connectivity (ODBC) driver. The method using a native OLE DB provider is preferred because it presents a newer and more full-featured interface. ODBC is an older method which may not be supported as well in the future. For this reason, an ODBC driver should be used only when no native OLE DB provider is available.

The required OLE DB provider or ODBC driver is configured by the same IT or systems administration groups that administer and maintain the target database. These personnel are familiar with their organizations' best practices regarding database interfaces, as well as with the required naming conventions and passwords.

The Inova LightLink system supports the following Data Source types:

- User Specified
- OLE DB connection string
- OLE DB Data Link File
- ODBC Data Source Name (DSN)

Of these, preference should be given to the native **OLE DB provider** or **connection string**. This will typically be named something like OLE DB provider for Oracle. Note that there is an OLE DB provider for ODBC, but this provider carries with it the limitations of the ODBC driver.

The Database OCM will require the channel (database connection information) to be created and configured, before devices (tables or procedures) can be added. After the channel has been defined, then tables or stored procedures can be defined for the channel.

17.2. Configuring the Database Connection

To set up a Database Publisher Output:

1. Select *Database Publisher Output* from the New Output Device Connection dialog.
2. Select *OK*.
3. The Database Publisher Output Properties dialog appears. Select the General tab. This page collects general information that is common to all OCMs.

   Enter the name, Server ID, preferred ID, and remote host on the Database Publisher Output Properties General tab. If Disable is checked, all devices will be inactive.
4. Select the Settings tab from the Properties dialog.

   Complete the following Database Publisher Output Properties Settings tab options:

   - **Connection String** - the connection string that specifies how to connect to the external database.
   - **Connection String Type:**
     - **User Specified** - enables the Connection String edit box, giving the user full control to enter the desired connection string.
     - **OLE DB Connection String** - If clicked, this option changes the button on the right side of this panel to *Build*. Clicking the *Build* button launches the standard Microsoft OLE DB Data Link Properties connection dialog, allowing the user to configure a connection string. Click the *Help* button to access the Microsoft help files.
     - **OLE DB Data Link File** - If clicked, this option changes the button on the right side of this panel to *Browse*. Clicking the *Browse* button launches the standard Microsoft data link browser dialog, to allow the user to see or browse to existing data link files and tells how to create and define new ones. Click the *Help* button to access the Microsoft help files
     - **ODBC DSN** - If clicked, this option changes the button to *Browse*. Clicking the *Browse* button launches the standard ODBC Manager Browser dialog, allows the user to see all existing configured DSNs, and provides the option for creating a new one. Click the *Help* button to access the Microsoft help files.

Note: One can create a DSN outside of LightLink; however, on 64-bit Windows operating systems, because LightLink Middleware applications are still 32-bit apps, the DSN must be set up with the 32-bit ODBCAD tool, which is available as Windows\SysWOW64\odbcad32.exe.

- **Update Timeout Interval** - maximum time in seconds LightLink will wait for an update operation to complete.
- **Disconnect Between Updates** – select to cause a connection to the database to be made when updates need to occur. After the update is complete, the database is disconnected. *If database updates are sporadic, the option should be checked.*

  If unchecked, the connection to the database is established and held indefinitely. *If database updates are frequent, it is recommended that this option be unchecked.*

5. Select *OK* to complete the configuration.

17.3. Adding New Devices

Once you have created a new output device for Database Publisher Connection, the Add Devices option becomes available from the General tab.

To access the Add Device option for Database Publisher Output:

1. Select *Add Devices* from the Database Publisher Output Properties dialog.
2. The *Create Database Updater* dialog appears.

Refer to Section 17.4 for more information about how to create a new table, use an existing table, and use a stored procedure.

17.4. Creating and Accessing a Table

Once you have established a database connection, the LightLink system can be configured to connect to the database and write real time data into one or more tables. To begin this process from Inova LightLink Administrator:

1. Select Output Manager > Database Publisher Output > New Device.
2. The Create Database Updater dialog appears.

There are three options from this dialog:

- Create a New Table (Section 17.5)
- Use an Existing Table (Section 17.6)
- Use a Stored Procedure (Section 17.7)

17.5. Creating a New Table

When Create a New Table is selected from the Create Database Updater dialog, the user is defining a new table to be created in the external database. After the table is created, the OCM will update the fields in the new table.

To complete the process of creating a new table:

1. Enter the table name in the New Table Name field.

   This specifies the name used for the table in the database. By default the new table will be empty, with no defined columns.

   If tables already exist in the database you can choose to select one as a template for the new table. The column structure from the existing table will be copied as the starting point for defining the new table.

2. Select *OK* to complete the configuration and go to the Field Mappings.

Refer to Section 17.8 to see how to complete the Field Mappings screen.

17.6. Using an Existing Table

When Use an Existing Table is selected from the Create Database Updater dialog, the user wants to send updates to a table that already exists in the external database. This means the table already has a specific set of column attributes.

To use an existing table:

1. Select the table name in the *Select Table to Use* list.

   You will only be able to map values into the existing columns. New columns cannot be added. A table will only be available for use if it exists in the database and is not already in use by another Inova LightLink device on this channel.

2. Select *OK* to complete the configuration and go to the Field Mappings.

Refer to Section 17.8 to see how to complete the Field Mappings screen.

17.7. Using a Stored Procedure

Select *Use a Stored Procedure* from the Create Database Updater dialog when you want to send updates to an external database via a stored procedure call. You are presented with a list of all the non-system stored procedures in the external database. You are then able to define what values to map into each parameter of the stored procedure call.

To use a stored procedure:

1. Select the stored procedure in the *Select Stored Procedure to Use*: list.

You will only be able to map values into the existing columns. New columns cannot be added. A table will only be available for use if it exists in the database, and is not already in use by another Inova LightLink device on this channel.

2. Select *OK* to complete the configuration and go to the Field Mappings.

Refer to Section 17.8 to see how to complete the Field Mappings screen.

17.8. Configuring and Maintaining a Table

After you have established a database connection and named a new table, accessed an existing table, or accessed a stored procedure on the *Create Database Updater* dialog, the Create Database Updater dialog appears.

When you select OK, the *Field Mappings Dialog* appears.

After the updater target is defined, a second dialog is presented for you to configure the Field Mappings for this updater. The Field Mappings Dialog is the heart of configuring a Database OCM device. This dialog contains all the column and field information for a Database device.

This Field Mapping Dialog provides a rich interface for configuring the information that is written to the database table or sent as parameters to a database stored procedure.

Not every part of the UI is available in all cases. When configuring a new table, all options are available. When working with existing tables or stored procedures, the options are limited. Each operation will specify limitations for that operation.

17.9. Update Options

1. When you click the *Update Options* button (Figure 17) on the Field Mappings dialog, the Update Settings dialog appears.

Figure 17

This dialog is used to specify when to perform updates and whether updates use the snapshot or historical style. The read-only edit field provides a textual description of the current settings.

2. Select from the options under *Perform Updates*:

   - **On Reception of Contract Data Set Values** - An update will be done for every set of data that is received on a Data Set Contract bus

topic. In this mode updates are triggered by the reception of a new set of data values.

Selecting this type also enables the selection of Data Set Contract data fields in the Data Field Expressions Dialog when doing field mappings. When data set contracts are used the table will not be validated unless this option is selected. Additionally each row in the table must reference one and only one contract. Multiple fields from the same contract are allowed within a row.

- **Periodically** - Perform an update on the Update Period interval. Enter a value and select Seconds, Minutes, or Hours with the Update Period drop-down list.
- **Periodically if Data Values have Changed** - Perform an update on the Update Period interval, but only if data values have changed since the last update.
- **Periodically based on Conditions** - Perform an update on the Update Period interval, but only if one of the conditional triggers is true. If any of the triggers are true, then the entire table will be updated.

  When you select this option, the Conditional Updates Expressions List dialog appears. The dialog will be blank if there are no saved expressions available. The Add be will be active, but not Modify or Delete. Modify or Delete will be available when a saved expression is available.

  This dialog allows for the definition of expressions that will trigger an update to occur. A conditional expression has a Boolean result. If any of the events cause a true result, then an update will occur. All rows and values in the table will be eligible for updating, not just the values involved in the conditional expression. Events can be added, modified, or deleted. Refer to Sections 17.10, 17.11, and 3 for more information about data field expressions.

3. Select from the two options under *Update Method:*
   - **Overwrite Last Record (Snapshot)** - Each update overwrites the previous values that were written.
   - **Append Values (Historical) –** Each update appends a new row of values to the table. This creates a historical collection of data values over time.

   These options will not be available for Stored Procedures
4. Select *OK* to complete the configuration.

17.10. Adding an Expression

1. Select *Add* from the Conditional Updates Expressions List dialog.
2. The Data Field Expression dialog appears. Complete the Data Field Expression box. Then return to the Conditional Update Expressions List.
3. Select *OK* to complete the configuration.

17.11. Modifying an Expression

With a saved expression displayed, the Modify button is available.

1. Select *Modify.*
2. The Data Field Expression dialog appears with the values displayed for that expression. Fill in the expression box at the bottom. Then return to the Conditional Update Expressions List.
3. Select *OK* to complete the configuration.

17.12. Maintenance Options

When you click the *Maintenance Options* button on the Field Mappings dialog, the Maintenance Settings dialog appears.

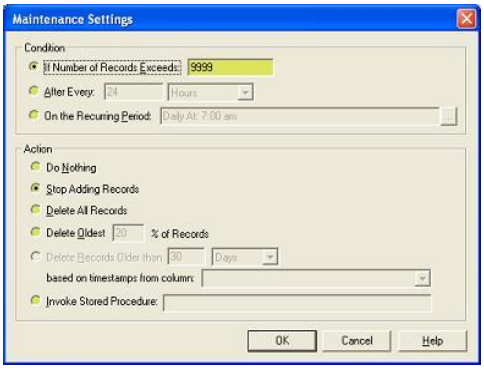


Figure 18

This is only available when doing Historical updating for tables. It is used to configure options for limiting table sizes. The read-only edit field provides a textual description of the current settings. Stored procedures and snapshot updating do not support maintenance.

1. Select one of three options under **Condition**:
    - **If Number of Records Exceeds –** The maintenance action will be performed if the number of records in the database exceeds the configured setting. Enter a number in the text field.

- **After Every** – The maintenance action will be performed on the period specified. The start of the period is when the Output Manager Server is started (or the updater is created). Enter a number in the text field and choose Hours, Minutes, or Seconds from the drop-down list.
- **On the Recurring Period** – The maintenance action is performed on a specific recurring period.

2. Select one of six options under Action:
   - **Do Nothing** – disable maintenance; no action will be taken.
   - **Stop Adding Records** – updates will halt and no more updates to the database will occur.
   - **Delete All Records** – deletes all records in the table.
   - **Delete Oldest X% of Records** – deletes some percentage of the oldest records in the table. Enter a percentage in the text field.
   - **Delete Records Older than X <time> based on timestamps from column: Y** – deletes records older than the configured time period based on the specified date/time column. All columns that use an ExpDATETIME type can be used for reference.
   - **Invoke Stored Procedure** – Invokes the stored procedure with the specified name. This must be a zero parameter procedure. Enter the name of the procedure in the text field.
3. Select *OK* to complete the configuration.

17.13. Edit Recurring Action Schedule

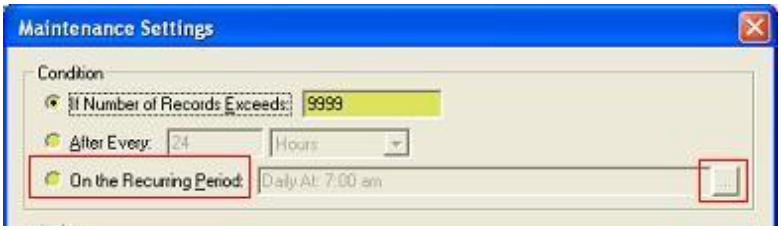


Figure 19

On the Maintenance Options dialog, when you select *On the Recurring Period* option and the *additional options* button (Figure 19), the Edit Recurring Action Schedule dialog appears.

The Edit Recurring Action Schedule dialog is used to define a recurring schedule that will be used for the maintenance action. A recurring schedule combines both a specification for what days to trigger on, and when to occur within a day.

1. Select one of the three options under *Occurs:*
   - **Daily** – The action will happen every day.
   - **Weekly** – The action will only happen on the specified days of the week. Select one or more days.
   - **Monthly** – The action will happen on a specified day of the month. Select the day from the drop-down list.
2. Select one of the two options under Daily Frequency:
   - **Occurs once at:** - The action will occur once a day at the specified time. Select a time using the pick list.
   - **Occurs every:** - The action can occur multiple times. Within the day the action will reoccur every so many hours between the starting and ending times. Select the number of hours, beginning time, and end time.
3. Select *OK* to complete the configuration.

17.14. AutoFill

Autofill is an option in the Field Mapping menu bar that contains commands for filling tables automatically (Figure 20).

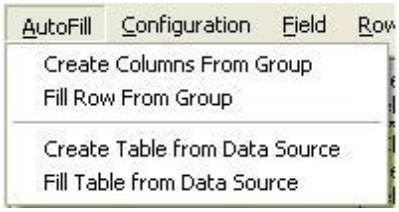


Figure 20

17.15. Create Columns from Group

When you select Create Columns from Group from the AutoFill option, the Automated Column Creation dialog appears (Figure 21).

Figure 21

Columns are automatically created for every field in the group you select. If there are no columns configured, this will automatically populate the first row with the fields in the selected group. This is only available when configuring new tables.

To complete this dialog:

1. Choose *Select a Group*.
2. The Create Columns From Group dialog appears. Columns in the table will be created based on the fields in the selected group. If there are no columns previously configured in the table, a single row is automatically created and populated with the fields in the selected group.
3. Once you have selected a group, click *OK* to return to the Automated Column Creation dialog
4. The next step is to select whether to specify table columns in addition to the default columns. The dialog will initialize with Record Number, Date and Time Stamp, and Group or Row Name selected if there are no columns in the table. If columns are already in the table then all the additional columns will default to unchecked.
5. Select none, one, or any combination of the four options under *Create Additional Columns For:*
   - The **Record Number** column has its values set by the OCM when the record is written.
   - The **Date/Time Stamp** columns have their values set by the OCM when the record is written.
   - The default value for **Group or Row Name** columns will be Data Field Group Names.

- The default value for **Source or Row Name** columns will be Data Source Names.

6. Enter a Default String Length. The Default String Length field defines the string width to use if a column is given a String type. This will be the maximum width of the string values. Invoking this command multiple times will only create new columns provided columns with matching names do not already exist.
7. Select *OK* to complete the configuration and return to the Field Mapping dialog.

17.16. Fill Row From Group

The selected Data Field Group is used to populate all fields in the current row by matching column names with data field names.

When you select Fill Row From Group, the Use Fields From Group dialog appears.

To complete this dialog:

1. Search the directory for the group.
2. Choose Select a *Group.*
3. Select *OK* to return to the Field Mapping dialog.

The table is populated with data from the group you selected (Figure 22).

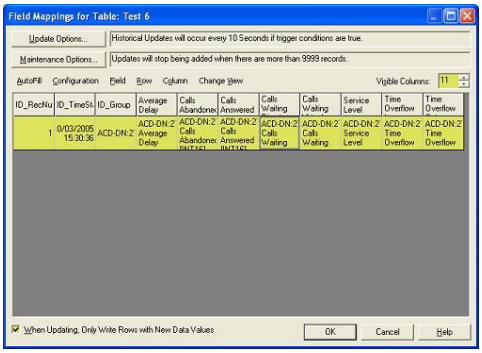


Figure 22

17.17. Replacing Existing Entries

The following steps detail how to replace existing entries from the Group dialog. When you select the option Fill Row From Group from the menu bar, the Use Fields from Group dialog appears.

After you select the group and click OK, if the fields in the row already have values the user is prompted to replace the entry.

The options include:

- **Yes –** Replaces just this entry.
- **Yes to All –** Replaces this entry and automatically answers yes to any other replace conflicts during this operation. The "Replace existing entry?" Dialog will not get shown again for this operation.
- **No –** Do not replace. Applies to just this entry.
- **No to All –** Does not replace this entry and automatically answers no to any other replace conflicts during this operation.
- **Cancel –** Cancels the operation completely.

17.18. Create Table From Data Source

The option to *Create Table from Data Source* is similar to Create Columns From Group except it also automatically adds and fills in rows for all groups within the data source. This is only available when configuring new tables.

This option will be grayed out if the Update Option has been set for "On Reception of Data Set Contracts". Each contract acts more like its own group, so the concept of Data Sources does not apply with contract updates.

When you select Create Table from Data Source, the Automated Column Creation dialog appears.

Figure 23

Columns are automatically created for every field in the group selected by the user. If there are no columns configured, this will automatically populate the first row with the fields in the selected group. This is only available when configuring new tables.

To complete this dialog:

1. Choose *Select a Group*.
2. The Create Columns From Group dialog appears. Columns in the table will be created based on the fields in the selected group. If there are no columns previously configured in the table, a single row is automatically created and populated with the fields in the selected group.
3. Search the *directory* for the group.
4. Select a *group*.
5. Select *OK* to return to the Field Mapping dialog.

   Select *Refresh* to update the list of groups.
6. The next step is to select whether to specify table columns in addition to the default columns. The dialog will initialize with Record Number, Date and Time Stamp, and Group or Row Name selected if there are no columns in the table. If columns are already in the table then all the additional columns will default to unchecked.
7. Select none, one ,or any combination of the four options under Create Additional Columns For:
   - The **Record Number** column has its values set by the OCM when the record is written.
   - The **Date/Time Stamp** columns have their values set by the OCM when the record is written.
   - The default value for **Group or Row Name** columns will be Data Field Group Names.
   - The default value for **Source or Row Name** columns will be Data Source Names.
8. Enter a Default String Length. The Default String Length field defines the string width to use if a column is given a String type. This will be the maximum width of the string values. Invoking this command multiple times will only create new columns provided columns with matching names do not already exist.
9. Select *OK* to complete the configuration and return to the Field Mapping dialog.

17.19. Fill Table From Data Source

When *Fill Table from Data Source* is chosen, the selected data source is used to fill in all empty locations in the table based on matching row names to group names and column names to field names.

When you select Fill Table from Data Source, the Use Fields From Source dialog appears.

To complete this dialog:

1. Search the *directory* for the group.
2. Select a *Source.*
3. Select *OK* to return to the Field Mapping dialog.

   Select *Refresh* to update the list of groups.

The empty locations in the table are filled in based on matching row names to group names and column names to field names.

17.20. Configuration

Configuration is an option in the Field Mapping menu bar that contains commands for loading, saving, and validating table data.

This option will be grayed out if the Update Option has been set for "On Reception of Data Set Contracts". Each contract acts more like its own group, so the concept of Data Sources does not apply with contract updates.

Load from File – Initializes the update options, maintenance options, and field mappings based on a previously saved file. This uses the standard File Open dialog. This is currently only available for new tables.

Save to File – Saves the existing configuration, including the update options, maintenance options, and field mappings to a file. This uses the standard File Save Dialog.

Validate – Runs all the validation checks for the configuration. The validation rules include:

- At least one column exists in the configuration.
- All columns have a storage type specified.
- Each column has a unique name.
- All fields in columns that do not support NULL values are defined.
- All columns marked as primary keys do not have duplicated values.

- If doing snapshot style updating, at least one column is defined as a primary key.
- If doing snapshot style updates, no columns are set for TimeStamps and as a Primary Key.
- If doing historical style updates, there is at least one primary key column in addition to the group name and/or source name column.
- If Update Option is set for Contract Data Sets then there must be at least one contract field configured in each row.
- If Update Option is not Contract Data Sets then there cannot be any contract fields configured in any rows.
- Each row can only utilize contract fields from a single contract. Fields from multiple contracts cannot be mixed within a row.

17.21. Field

Field is an option in the Field Mapping menu bar that contains commands related to individual fields in the table. The commands are very similar to standard editing commands found in most software.

You can select the command from the menu or use the corresponding short cut keys. The options in the Field menu include:

- **Undo (Ctrl + Z)** – Undo the last field mapping related change. The AutoFill actions cannot be undone.
- **Redo (Ctrl + Y)** – Redo the last undo change.
- **Cut (Ctrl + X)** – Cut the current field into the paste buffer.
- **Copy (Ctrl + C)** – Copy the current field into the paste buffer.
- **Paste – Autofill Data Fields (Ctrl + V)** – Fill the current location with the contents of the paste buffer. All data fields used in the field buffer are AutoFilled based on matching row names to group names and column names to field names. If there is no AutoFill match (group/column names do not match), then the originally copied value is pasted.
- **Paste – As Originally Copied** – Fill the current location with the contents of the paste buffer in its exact form.
- **Delete (Del)** – Delete the contents of the current location.
- **Set Field (Spacebar)** – For Data Field / Expression columns this launches the Data Field Expression dialog. For Group or Row Name

Columns this will launch the Select a Group Name dialog. For Location or Row Name Columns this will launch the Select a Data Source Name dialog. Double clicking within the grid will also invoke this command.

- **Edit Field –** Launch the Specify Field Value dialog. This supports the ability to specify a constant value, along with the Set Field functionality.

17.22. Field - Data Field Expression

On the Field Mapping dialog, when the cursor is in a data field, pressing the space bar opens the Data Field Expression dialog.

Refer to the Data Field Expression User Guide to learn how to use this tool.

17.23. Field - Select a Group Name

On the Field Mapping dialog, when the cursor is in *Group* or *Row Name* Columns, pressing the space bar opens the Select a Group Name dialog.

Using this dialog you can insert data from the group into the group or row column.

1. Select the *group*.
2. Select *OK*. The group name is inserted in the group or row column.

17.24. Field - Select a Data Source Name

On the Field Mapping dialog, when the cursor is in *Location* or *Row Name* Columns, pressing the space bar opens the Select a Data Source Name dialog.

Using this dialog you can insert data from the data source into the location or row column.

1. Select the data source.
2. Select OK.
3. The data source is inserted in the location or row column.

17.25. Specify Field Value

When you select Edit Value from the Field menu items, the Specify Field Value dialog appears. This dialog has can display slightly different functionality depending what is chosen in the table.

When a *Data Field, Expression, or Constant* value column is selected, the Specify Field Value Dialog (Figure 24) is presented to allow you to specify the value to be written in the column.

Figure 24

When a *Row Name column* is selected, the Specify Field Value dialog (Figure 25) is presented to allow you to specify the value to be used for the row name. A Row Name is always constant, and always has the fixed type that was assigned in the column configuration.

Figure 25

To complete this dialog:

1. Select Set Row Name or Select Datafield Expression.
    - For *Group* or *Row Name* columns, this presents the Select a Group Name dialog which lists the Data Groups in the system.
    - For *Location* or *Row Name* columns, this presents the *Select a Data Source Name* dialog which lists the Data Sources in the system.
    - For Data Field, Expression, or Constant value column, this presents the Data Field Expression dialog.
2. Select a Group Name, Data Source Name, or complete the Data Field Expression dialog.
3. Once you have completed any of these dialog options, select OK to return to the Specify Field Value dialog.

    The users can also manually enter a typed name in the Edit box.

4. Complete the rest of the options on the dialog :
    - **Clear Field –** Resets the value to be NULL
    - **Make Constant/Fixed Value –** This allows the user to enter a value by hand. The Select Data Field or Expression and Clear Field Buttons will be disabled. The Inova LightLink Type will be enabled.
    - **Inova LightLink Type –** This will default to be the type specified by the column. When setting a constant value, this defines the type that is associated with the constant value.

When the dialog is OKed, the value (either the constant or the type of the data field or expression) must be compatible with the type of the column. If the types are not compatible an error is presented and the dialog remains open.

17.26. Row

Row is an option in the Field Mapping menu bar that contains commands related the rows in the Field Mapping table.

There are two commands available in Row.

- **Add Blank Row –** Adds an additional empty row to the bottom of the table.
- **Delete Row –** Deletes the currently selected row and all its values.

17.26.1. Column

Column is an option in the Field Mapping Menu bar. The Column Configuration dialog is used to specify the properties for a new Column or to change the properties of an existing column.

During creation of a new database table, all properties will be active. When the OCM creates the table in the database the format will be based on this configuration.

When configuring an existing database table only the Storage Type, Is a Key Field, and Allow Null Values selections will be active. Changing the Is a Key Field and Allow Null Values properties will not cause the table format in the database to be changed. It will only affect the validation rules for the configuration. When configuring a stored procedure only the Storage Type will be active.

You can also access the same commands by right clicking in a column to open the Column context menu.

17.26.2. Create Column

When you select Create New Column or Edit Column from the Column menu commands, the Column Configuration dialog appears (Figure 26).

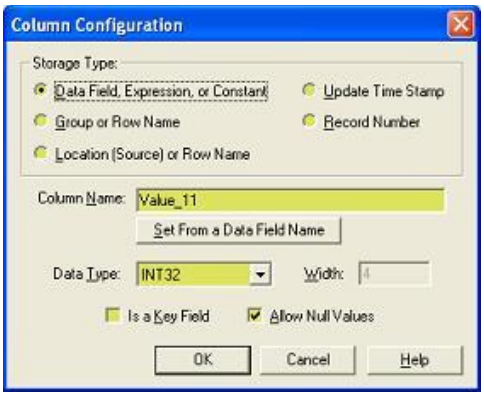


Figure 26

Once this dialog is completed, the system adds a new column to the right side of the table. To complete the Column Configuration dialog:

1. Select one of the five options from the Storage Type:
    - **Data Field, Expression, or Constant –** This column will store either a Data Field value, an Expression, or a constant value. The user can specify what to store for each row in the table.
    - **Group or Row Name –** This tells the OCM that this column is a row name column and should be associated with Inova LightLink Datafield Group Names. The association is used for doing the Data Field AutoFill operations. For each row in the table the user is able to specify a unique row name field. By default this column is considered to be a Primary Key field.
    - **Location (Source) or Row Name –** This tells the OCM that this column is a row name column and should be associated with Inova LightLink Data Source Names.
    - **Update Time Stamp –** This tells the OCM to store the current date and time when the update occurs.
    - **Record Number –** This tells the OCM to store the current record number at the time of updating. When doing snapshot (overwrite) updating the record number will never change and will increment for each row in the configuration. When doing historical updating, if the record number is the only primary key then its value will increment with every row updated. If there are other primary key columns then

the record number increments each time an update occurs, but each row written within one update cycle will have the same record number.

2. Enter a column name. You can either simply type the name of the column or select the name from a data field by clicking *Set From a Data Field Name.* This opens the Select a Field Name dialog.
3. Select a name from this dialog:
    a. **Navigate** through the data hierarchy
    b. Select a field name
    c. Click *OK.*
4. On the Column Configuration dialog, enter a Data Type. This specifies the Inova LightLink type for the field. Only the known Inova LightLink types that can be universally supported as a database column type are available. The specific database column type is determined based on what the database supports. If the DB Admin wants the column to have a specific type non-Inova LightLink supported type, then the table should be pre-created in the database and a LightLink Database Updater can be mapped onto the table.
5. Select a Width from the pick list. If the Type is specified as String, then this specifies the width of the string field.
6. Select or deselect the *Is a Key Field* check box. If this is checked then this column is treated as a primary key field. This means that all values in the column must be unique, and it is useable for identifying a particular row in the database table. If this is checked then May Be Null is false and disabled.
7. Select or deselect the *Allow Null Values* check box. If this is checked, then it is valid for a field within this column to have an undefined value. If unchecked then all rows within the column must have a value defined for them.
8. Select *OK* to accept configuration changes.

17.26.3. Edit Column

When you select *Edit Column* from the Column menu commands, the *Column Configuration* dialog appears.

This dialog displays the values of the column selected in the Field Mapping dialog.

Double-clicking on the column also opens the Column Configuration dialog.

Refer to Section 17.26.2 for details about the fields on the Column Configuration dialog.

17.26.4. Move Column

To move a column using the Move Column menu command:

1. Select the *column* you want to move.
2. Select *Move Column* from the Column menu commands.
3. The Enter New Column Position dialog appears. Enter the number corresponding to the *column position* for the new column. Movement is based on a numerical ordering of the columns where the first (left-most) column is number one.
4. Select *OK* to move the currently selected column and all its values.

17.27. Change View

Change View is an option in the Field Mapping menu bar that you can use to change the view of the Field Mapping table.

Field Mappings – The grid displays all field mappings. Columns represent the columns in the database; rows represent the rows that will get written.

Columns Definitions – The grid displays just the information about the columns. This view gives a quick overview of all the column properties without having to launch the Column Configuration Dialog for each column. (Figure 27)

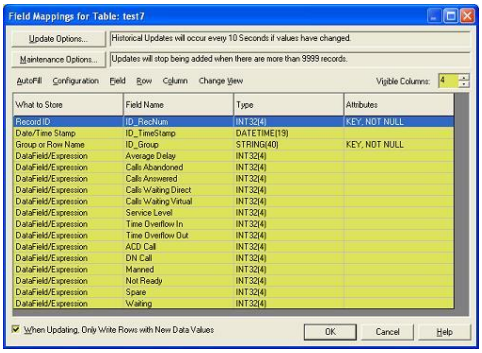


Figure 27

This option is not available for stored procedures.

17.27.1. Visible Column

The Visible Columns attribute provides an easy way to specify the number of visible columns shown in the grid (Figure 28).

Figure 28

Choose a number from the pick list. Column widths are automatically formatted to fill the available window width.

17.27.2. Updating Check Box

The *When Updating, Only Process Rows with New Data Values* option is used to limit the number of updates that are performed.

Each row in the configuration represents an update statement or stored procedure call. When this option is checked an update is only performed for a row if its values have changed since the last update. When unchecked, updates for all rows will always be written when the update condition is true.

18. XML Publisher Output

18.1. Overview

The XML Publisher Output is the Output Channel Manager (OCM) for publishing LightLink data into a XML format. XML devices manage the publishing of configured data for immediate viewing in raw XML format and transformed into other formats using XSLT technology.

The XML OCM allows you to distribute Inova LightLink data and messaging to the web or to a corporate intranet. Because it employs XML technology, XML OCM is capable of dynamically refreshing the information that appears. For example, XML OCM can take a customized DataLink View and publish it as an XML file suitable for display on the company intranet. The XML OCM also supports publishing a set of LightLink messages into an XML file.

18.2. Configuring XML Publisher Channel Properties

To configure the XML Publisher Output Properties:

1. Select *XML Publisher Output* from the New Output Device Connection dialog.
2. Select *OK*.
3. Select the General tab on the XML Publisher Output Properties dialog.

   Enter the name, server ID, preferred ID, and remote host on the XML Publisher Output Properties General tab. If Disable is checked, all devices are inactive.
4. Select the Settings tab on the Properties dialog.

   Complete the XML Publisher Output Properties Publishing Mode Settings. Click the Browse button to select a different directory in the drop down for Default Output Directory. The *server\srvcfg\odms* directory is commonly used for this directory location.

   The only configuration supported by the channel is an optional default location for the files to be written. This will be the default output location when creating devices for the channel. The default location for XML files to be written is the server\srvcfg\pub directory in the LightLink installation directory. This directory does not exist, but you can create this directory if needed.
5. Select *OK* to complete the configuration.

18.3. Adding a Device

Once you have created a new output device for Inova LightLink XML Publisher, the Add Devices option becomes available from the General dialog.

1. Select Output Manager > XML Publisher Output > Properties > Add Devices.
2. The XML Publisher Output Properties dialog appears. Select the General tab.
3. Select *Add Devices*.
4. The XML Device Properties dialog appears (Figure 29).

Figure 29

Complete the File Settings options for adding a device:

- **Device Type** - Choose from Data Table XML or Simple Messaging XML. To use a DataLink View as your source, select Data Table XML.
- **Output XML File Location -** Click *Browse* to browse to the location where the XML file will be published. The default is the `server\srvcfg\pub` directory under the installation folder.
- **Device Name** - enter the name for the device.
- **File Update Interval (ms)** - number of milliseconds Inova LightLink will wait before checking for data field updates to the DataLink View file. Inova recommends you keep this default setting.
- **Data Table (LLD) File Location -** Click *Browse* to locate the stored Data Table file. You can recognize it by the .lld file extension. The default directory is your My Documents folder, but you may have already created a special folder for DataLink Views.

5. Select the Transformation Settings tab.

   Complete the Transformation Settings options for adding a device:

   - **(XSL) File Location** - enter the (XSL) file location or click B*rowse* to choose the file location.
   - **Transformed File Location** - enter the transformed file location or click B*rowse* to choose the file location.

6. Select *OK* to complete the configuration.

18.4. Context Menu

The XML Publisher Output context menu (Table 12) is content sensitive and will have different items depending on the tree nodes selected.

Menu Item	Explanation
Add to View Window	Adds this to an open view window
New Device	Add a new Device
Rename	Allows you to rename XML Publisher
Delete	Allows you to delete XML Publisher
Properties	Modifies the diagnostic level and the expired/canceled messages interval settings (Access Advanced Settings for use by Inova Technical Support)

Table 12

19. LightLink Email Output

19.1. Overview

The Inova Email OCM supports sending LightLink messages via Email. The Email OCM uses the common SMTP standard to send LightLink messages to your email server and from there to desired email destinations. The complete message scheduling capability of LightLink is available for these messages, making them ideal as notification emails for various types of events.

The Email OCM will only have one top-level "device", named "To: Address", which is a placeholder for the email addresses to which messages can be sent. Destination email addresses can be created in System Manager as virtual devices in the same way as virtual devices are created for other types of output devices.

You can also create additional email addresses in the Message Editor destination dialog when editing a message. Note that when you enter new addresses in this way, these addresses will not be retained as virtual devices for later use. The only references to these additional email addresses will be in the message destinations as viewed in System Manager.

Each Email OCM will have a log stream that can be viewed in Log Viewer. The log will retain diagnostic information about the sending of email messages.

19.2. Configuring an Email Output Channel

To configure an Email Output Channel:

1. Select Output Manager > New Output Device Connection.
2. The New Output Device Connection dialog appears. Select Email Output.
3. Select OK.
4. The Email Output Properties dialog appears. Select the General tab. Enter the name, server ID, preferred ID, and host on the following Email Output Properties General tab. Check the Disable option to disable the OCM.
5. Select the Settings tab on the Properties dialog.

   Complete the following Email Output Properties Settings tab options:

   - **Server** - name of SMTP Server address that provides mail sending services. This can either be a numeric IP Address or a machine name.
   - **From Address** - the address the email recipient will see as having sent the email. The following formats are valid: `Joe Rice <joe@acme.com>` or `joe@acme.com` or `joe @ Acme.com`.

- **Port** - Internet server port designated for SMTP mail service; this is usually set at 25 for SMTP mail which is the default value of the property.
- **Connection Timeout** - timeout in milliseconds to be used in SMTP server connections. This includes the period of time from the beginning of the first mail event until a connection is established. The default is 30000 (30 seconds). The minimum value is 2000 and the maximum value is 60000.
- **User name** – optional user name for authentication with the mail server.
- **Password** – optional password for authentication with the mail server.

6. Select *OK* to complete the configuration changes.

19.3. Configuring Email Addresses in LightLink

There are two methods for creating email addresses in LightLink for use in sending messages via the Email Output Channel: creating email addresses as virtual devices in System Manager and adding email addresses in the message destination dialog in Message Editor.

In System Manager, select the "To: Address" node in the LightLink system tree, right-click, and select Virtual Devices > Define. Enter up to five email addresses; repeat these steps to enter additional email addresses. Refer to the System Manager User Guide for more details.

In Message Editor, bring up the Select Destination dialog for a message (refer to the Message Editor user Guide for details), open the Email OCM node in the LightLink system tree, and click on the "To: Address" node. This brings up the "Enter Email Addresses" dialog, with which you can create up to five email addresses (repeat to create more email addresses).

20. Inova TCP/IP Displays – Encrypted

20.1. Overview

The Inova TCP/IP Displays - Encrypted OCM type allows LightLink to connect to the Inova OnAlert® family of LED displays manufactured by Inova Solutions, and thereby to display messages on those displays. The connections to these displays are encrypted, protecting the data in transit from the LightLink system to the displays. Only one TCP/IP Displays – Encrypted OCM is supported per LightLink Output Manager.

The Inova Displays connecting to this output channel must be in the Inova OnAlert display family with firmware version 1.4.140. This functionality is no longer supported by Inova Solutions. Customers who still use this tool can refer to the Display Connector Installation Guide for assistance.

21. AMS LED Displays

21.1. Overview

The AMS LED Displays output channel type allows LightLink to connect to LED displays manufactured by Adaptive Micro Systems (AMS), and thereby to display real-time data and messages on AMS LED displays.

21.2. AMS LED Displays Output Device Connection

As an Output Device Connection, AMS LED Displays support multi-region messages and multi-page messages. However, message regions must cover the entire width of the display, and all message regions on a page must have the HOLD presentation mode.

21.3. Configuring AMS LED Displays

To configure the AMS LED Displays:

1. Select Output Manager > New Output Device Connection.
2. The New Output Device Connection dialog appears. Select AMS LED Displays.
3. Select *OK*.
4. The AMS LED Displays Properties dialog appears (Figure 30). Select the *General* tab.

Figure 30

Enter the name, server ID, preferred ID, and remote host on the AMS LED Displays Properties General tab.

5. Select the Connection tab on the Properties dialog.

   Complete the following AMS LED Displays Connection tab:

   - **Connection Port** - This selection configures the connection to use a serial port, or COM port, on the PC.

     Inova LightLink Displays, with the exception of the Inova LightLink IP-Addressable Display (TCP/IP Display), may be connected only via serial connection.

   - **COM port** - This specifies the serial port for this connection. The "COM port" setting must be a valid serial port number, e.g., "1", and must be the serial port that is connected to the Display network.

   - Select the baud, parity, data bits, and stop bits from the drop down lists to specify the serial port parameters for this connection.

     Examples:

     – If the display network is sub-only (i.e., there is no main Display), the proper settings are:

     ```
     Baud: 9600
     Parity: Space
     Data bits 8
     Stop bits 1:
     ```

     – If the display network is not sub-only (i.e., there is a main Display), the proper settings are:

     ```
     Baud: 9600
     Parity: None
     Data bits 8
     Stop bits 1:
     ```

6. Select *OK* to complete the configuration.

21.4. Adding AMS LED Displays

Once you have created a new output device for AMS LED Displays, the Add Devices option becomes available from the General dialog.

The Add Device Dialog specifies the display Address (1-255) and the display dimensions in rows and columns. Additionally, in the case of TCP/IP signs, also specified are the IP Address and port of the display to which the control makes a socket connection.

To set up an AMS LED Displays Output Device Connection:

1. Select Output Manager > AMS LED Displays > Properties.
2. The AMS LED Displays Properties dialog appears. Select the General tab.
3. Select *Add Devices*.
4. The AMS Display Properties dialog appears. Complete the following AMS Display Properties options:
   - **Display ID -** enter the ID number from the range of 1-255.
   - **Rows -** enter the number of rows using the arrow keys (increments of 8).
   - **Columns** - enter the number of columns using the arrow keys (increments of 8).
   - **IP Address or Hostname** - enter the IP Address or Hostname for this display.
   - **Port** - enter the port number.
5. Select *OK* to complete the configuration.

21.4.1. Adding Additional Devices

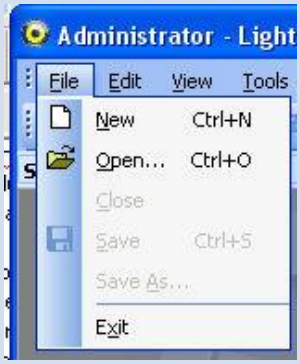
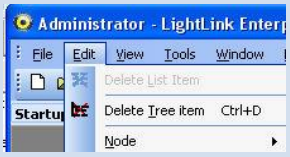
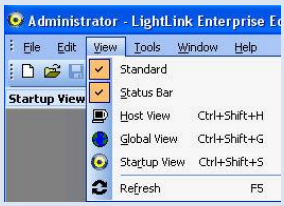
After you have added one device to the AMS Display, you can go return to add additional devices using the *New Device* option.

To access and configure the AMS LED Display New Device option, select Output Manager > AMS LED Displays > New Device.

The AMS Display Properties dialog appears, which you can configure following the steps in Section 21.4.

22. Administrator Menu Commands

Refer to Table 13 for information about the Administrator menus.

Administrator Menu	Menu Item	Explanation
File Menu 	New	Create a view window
	Open	Open a previously saved view window file
	Close	Close a view window
	Save	Save the items in the selected view window to a file
	Save As	Save the items in the selected view window to a file using another filename
	Exit	Exit Inova LightLink Administrator.
Edit Menu 	Delete List Item	Select this menu option to delete the selected item from a list of items in a view window
	Delete Tree Item	Delete the currently selected item from the LightLink system tree
	Node	Select a node and choose Edit | Node. The cascade menu appears. Depending upon the item you have selected, the Node menu varies
View Menu 	Standard	Display the Toolbar buttons when checked
	Status Bar	Display the Status bar at the bottom of the main screen when checked
	Host View	Shows the Host View of Server Components selected
	Global View	Shows the Global View of Server Components selected
	Startup View	Shows the Startup View
	Refresh	Refreshes the LightLink system tree image to reflect any changes that have been made
Tools Menu	System Manager	Launches System Manager
	Message Editor	Launches Message Editor
	Security Manager	Launches Security Manager

	Log Viewer	Launch the Inova LightLink Log Viewer to display diagnostic information
	Config Permissions	Select Config Permissions to release or request permission to modify the current system configuration
	Options	Use this feature to adjust timeout, garbage collection, and update settings.
Window Menu 	Cascade	This option arranges open view windows one behind the other and overlapped, as in Solitaire
	Tile	This option arranges open view windows side by side, edges touching with no overlap

Table 13

