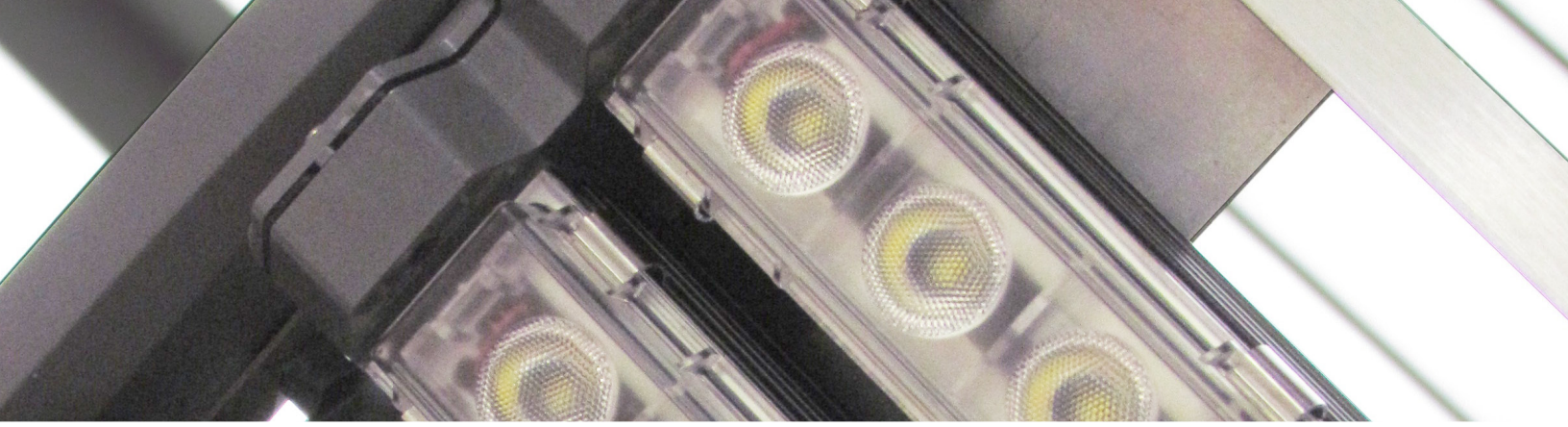


LIGHTRULES® 2.10
ADMIN GUIDE

DIGITAL LUMENS

The Digital Lumens LightRules appliance and software utilize a number of “open source” software components. These components are listed on the License page, accessible via the LightRules dashboard by clicking on the license link. Click on each component’s web link to display complete licensing details.

Table of Contents

Preface
Getting Started

Welcome to LightRules

Purpose

Welcome to the *LightRules® 2.10 Admin Guide*, your resource for using LightRules software. All user and administrator functions are explained here.

This manual does not provide guidance for installing LightRules or servicing the hardware components of your Intelligent Lighting System. Most users will not need to perform these tasks. If you do need installation or advanced troubleshooting information, refer to the documentation located in the Digital Lumens knowledge base (see "Introducing the Digital Lumens Knowledge Base" on page 7).

Who Should Use This Guide?

- ✔ Facility Managers
- ✔ Supervisors
- ✔ Anyone using LightRules reports
- ✔ Digital Lumens Partners

How this Admin Guide is Organized

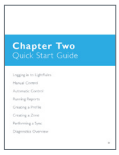
This guide is organized as follows:

Preface

The preface provides an overview of the manual's contents, how they're organized, and the various conventions used throughout the manual. It also includes a list of other types of materials in the Digital Lumens technical library.

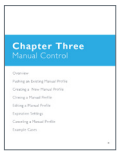
Chapter 1: Overview

This chapter features general descriptions of LightRules software and hardware.



Chapter 2: Quick Start Guide

This chapter provides a walkthrough of the LightRules interface and basic LightRules operations.



Chapters 3 – 11: LightRules Operations

These chapters give step-by-step instructions for all LightRules operations. Each chapter contains a grouping of related functions and subject matter.

In addition to instructions, each chapter also includes one or more of the following:

- General information about a procedure, including user permission considerations.
- Examples of procedures.
- Cross-references to related topics.

Appendices

The appendices provide a glossary of terminology, as well as messages that may display on the screen as you work in LightRules.

Conventions and Symbols

New Terminology

Throughout this document, the first instance of a LightRules word or phrase appears in ***bold italicized*** text. Refer to "Appendix A" on pages 92-95 for definitions of LightRules-related terminology.

Symbols

The following symbols appear throughout this document:

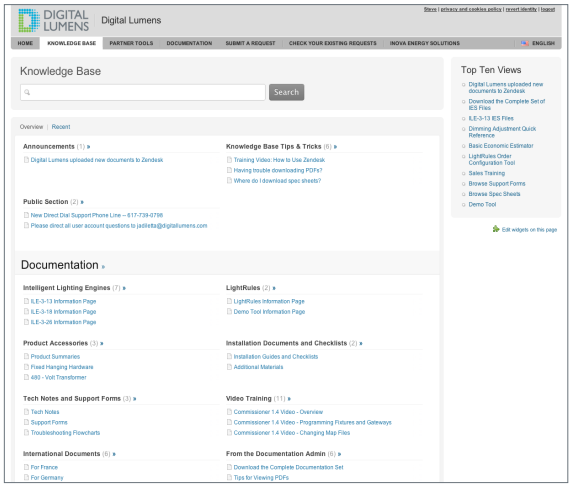
The **NOTE** symbol describes special information about a feature or function.

The **HINT** symbol points out suggestions that can save you time and effort.

The **EXPERT** symbol indicates a message from the LightRules Expert, who explains a LightRules concept in the most concise manner possible.

About the Digital Lumens Knowledge Base

The Digital Lumens knowledge base is the official online technical resource for Digital Lumens partners. If you haven't already, take a moment to visit the knowledge base at **digitallumens.zendesk.com**. Once you create an account, you may perform the following tasks:



- **Download PDFs from the complete library of technical documentation,**
- **Watch video training content,**
- **Access installation FAQs,**
- **Download case studies, product images, IES files, and sales materials,**
- **Access translated materials in multiple languages, and**
- **Submit & review support cases.**

HINT: The knowledge base is your source for all Digital Lumens software downloads, including the Commissioner software used to create the maps files used by LightRules.

What's New in LightRules 2.10?

The following new feature additions and enhancements are available in LightRules version 2.10:

New Features

LightRules 2.10 now supports disabling coordination control and daylight harvesting at the profile level.

Enhancements

The *Product Spec* tab has been renamed to *Product Profile*.

Minimum Browser Requirements

LightRules is compatible with the following web browser versions (and newer):

- Internet Explorer 9
- Chrome 7
- Firefox 12
- Safari 5.1

Reader Response

Your feedback could be instrumental in changing the text included in that next edition.

How to Reach Us

If you can offer any technical or general suggestions, email a note to the following address:

documentation@digitallumens.com

Technical Support Contacts

For support beyond the scope of the technical documentation, contact Digital Lumens technical support via email: **support@digitallumens.com**

In case of emergency, if you need immediate assistance, please contact Digital Lumens technical support by telephone at the following number:

+1 (617) 723-1200, extension 3

If you are a partner, to open a support ticket, go to **digitallumens.zendesk.com**. Once you've created an account, you'll have full access to partner content and technical support features.

Chapter One
Introduction to LightRules

What is LightRules?

An Intelligent Lighting System

LightRules is the lighting management system designed for use with intelligent LED light fixtures and light agents from Digital Lumens. LightRules transforms a commercial or industrial building's lighting system into a network of lights capable of dramatically improving energy efficiency.

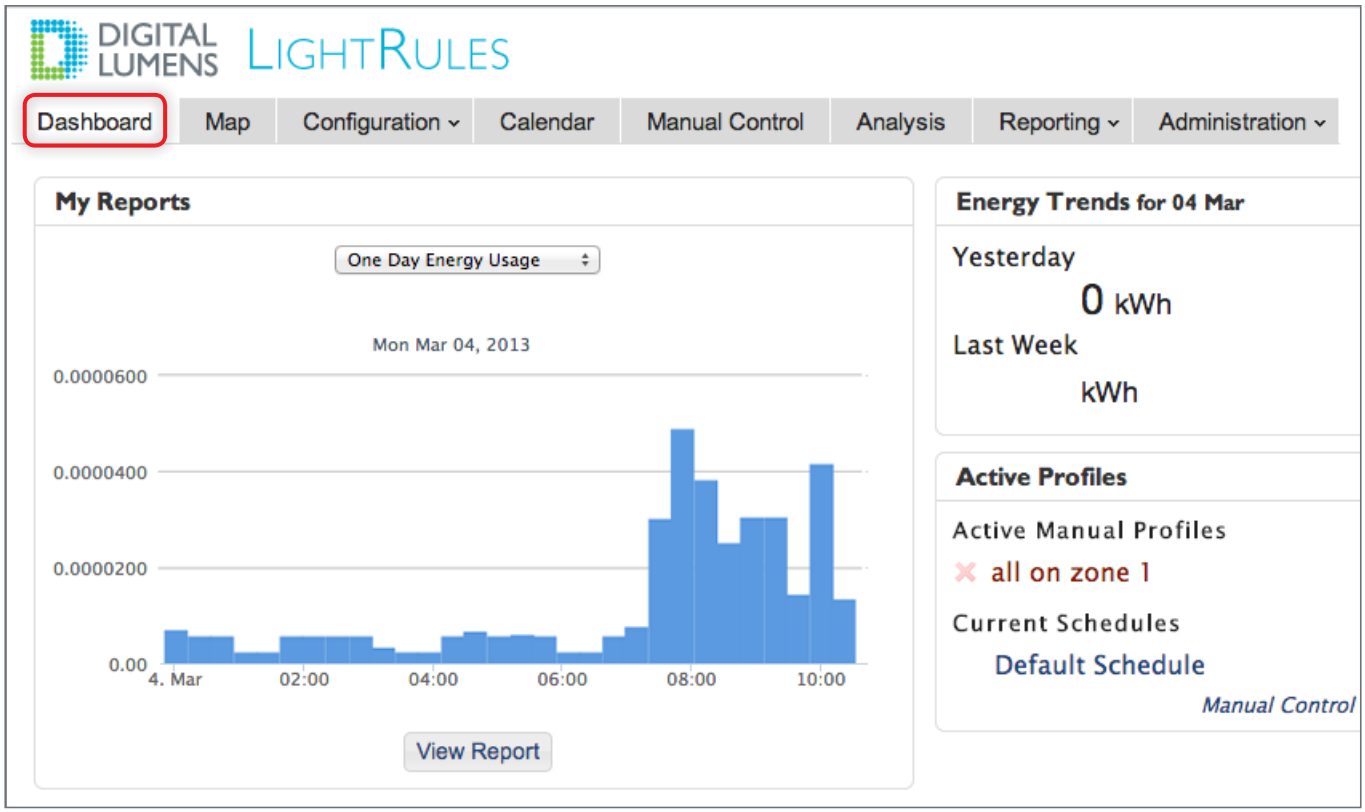
In addition to basic lighting operations like dimming and occupancy sensing, LightRules also gives you:

- A dashboard-style web interface
- Scheduled lighting management
- Manual light control
- Detailed energy usage, energy cost, and occupancy reporting
- Interactive control via a facility map
- Integration with daylight harvesting-enabled lights
- Lighting safety controls

LightRules Software Features

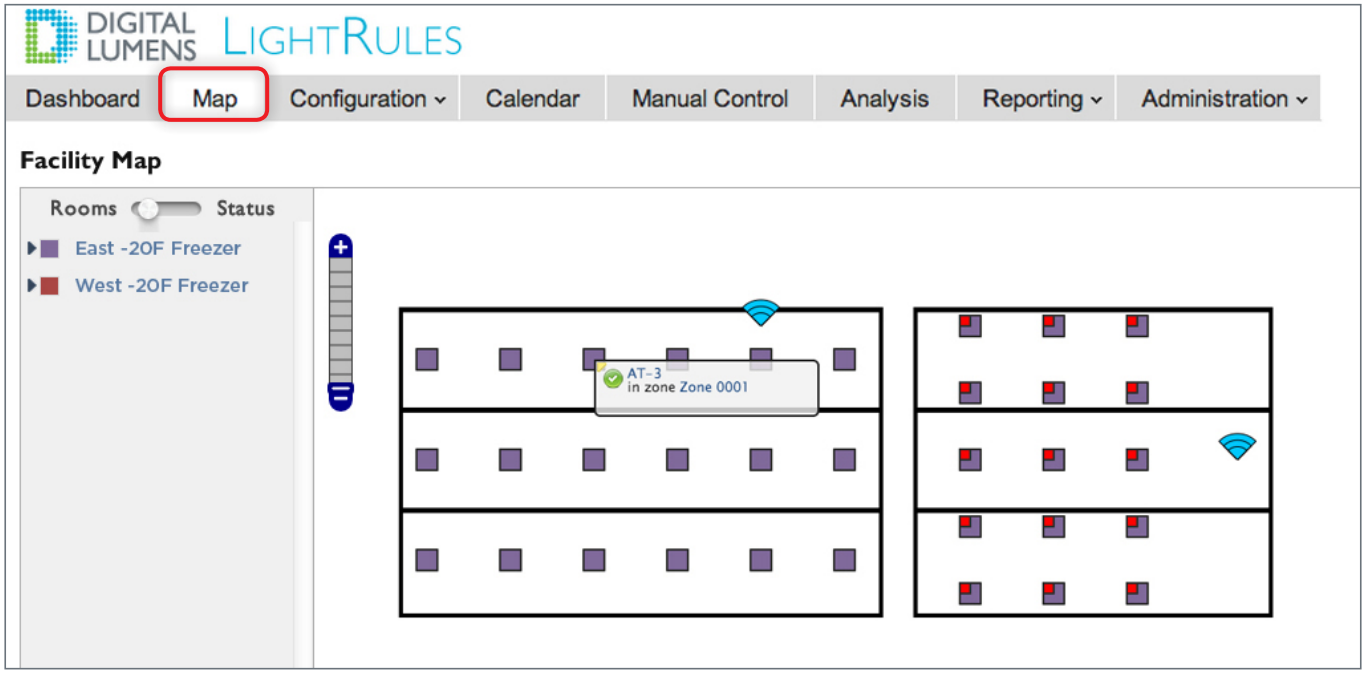
The following features make up LightRules software:

Dashboard



The LightRules interface is accessible via any web browser connected to the facility's enterprise network. Once you log in, the Dashboard appears, providing at-a-glance reporting, energy usage information, and instant access to manual light control. Here, the user can also cancel a Keypad-activated profile.

Facility Map

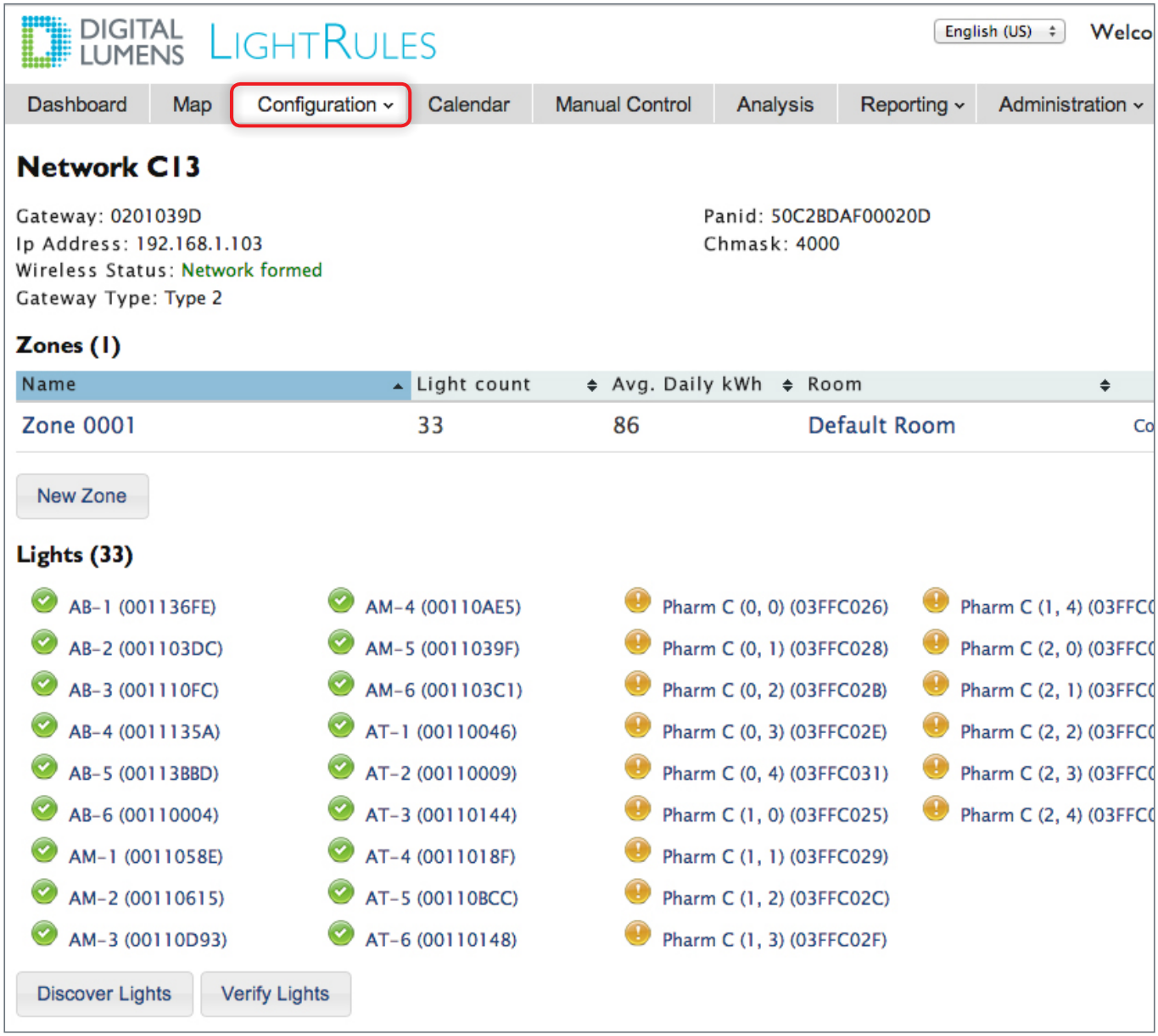


Click the **Map** tab to open the facility map, which displays lighting system information as an overlay on the facility floor plan. With the map, you can

- view and locate all of the lights, gateways, keypads, power meters, and power gateways in the facility,
- toggle between the room/zone assignments and the color-coded statuses of all lights and gateways,
- zoom in and out to the desired level of detail,
- quick-view individual light details,
- ***ping*** lights, gateways, keypads, power meters, and power gateways, and
- access settings.

NOTE: To use the facility map feature in LightRules, the ***map file*** created with Commissioner software must contain the facility drawing (typically a PNG file).

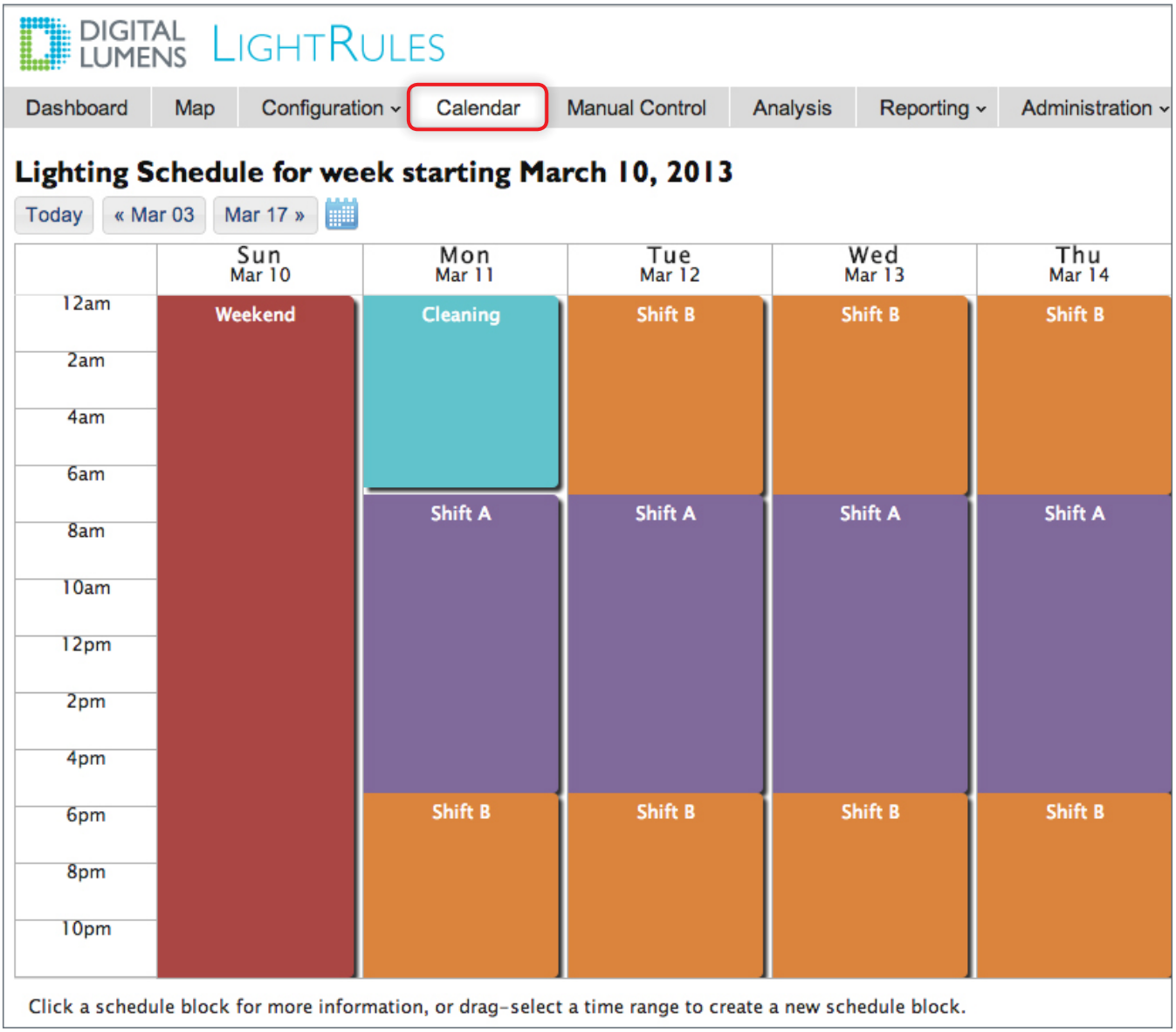
Configuration



To perform configuration tasks, click the **Configuration** tab and then select the desired option from the dropdown menu.

- In configuration mode, you will view each light's assigned zone, room, and network, and respond to your facility's changing needs over time by editing those assignments.
- More frequently, you will create and edit profiles. Profiles control some or all zones and the settings assigned to those zones. To activate a profile, you schedule that profile with the calendar or use the manual control feature.
- Additionally, during or following LightRules System configuration, you may optionally configure power devices, create groups of power devices for reporting purposes, and edit power device groups as the facility's monitoring needs change over time.

Calendar

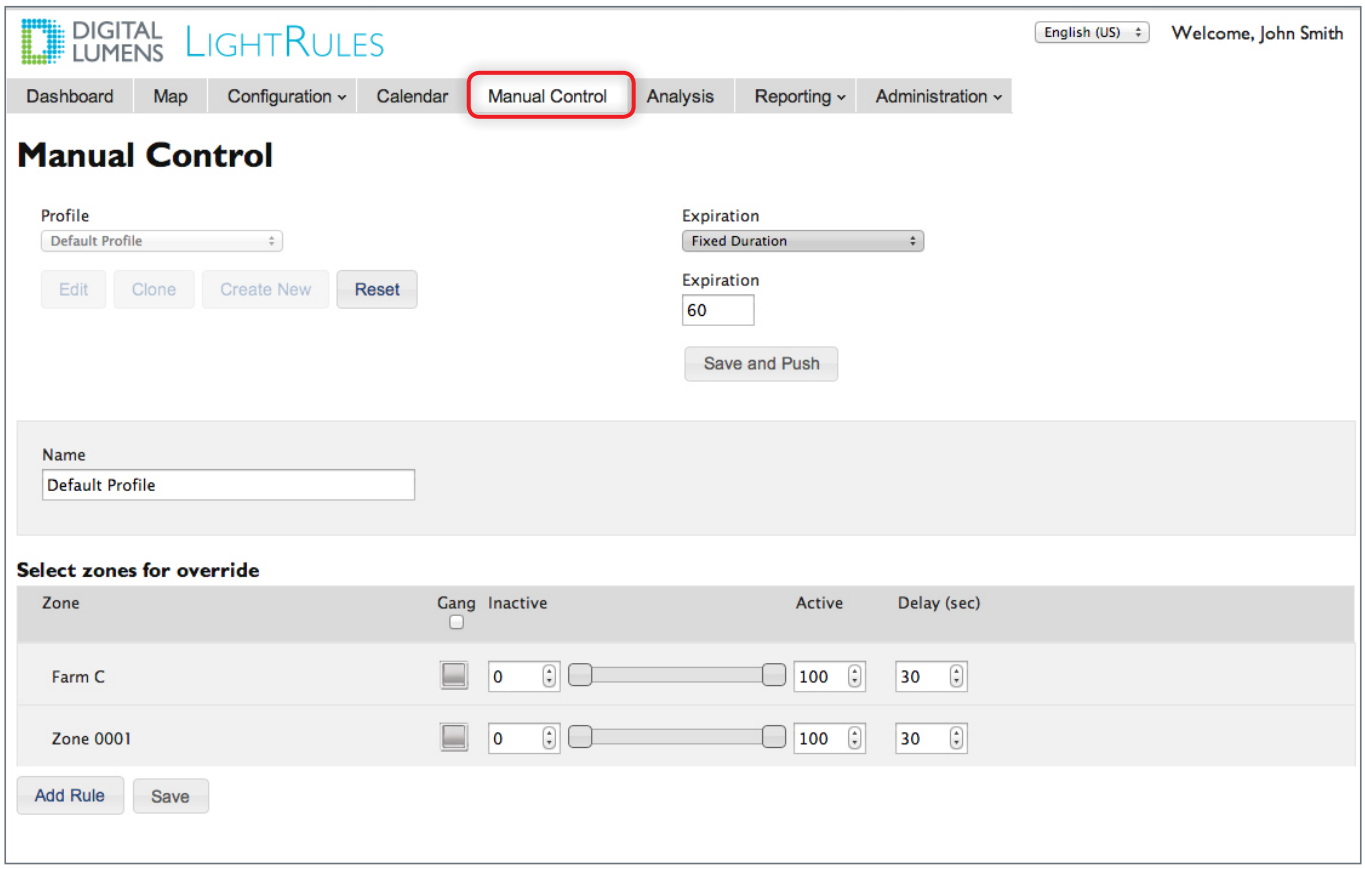


The calendar offers a quick and easy way to set up an automated lighting schedule. Reserve a block of time on the calendar by scheduling a lighting profile for a single event, or schedule a profile that triggers on a recurring basis according to the selected parameters.

LIGHTRULES EXPERT SAYS: Before you use the calendar, you must first set up one or more lighting profiles.

- A ***profile*** is a list of rules for some or all configured zones.
- A ***zone*** corresponds to an area of your facility. For example, one zone may cover a single aisle, a group of aisles, or a loading dock.
- A ***rule*** defines the active power level, inactive power level, and sensor delay for all lights in a zone.

Manual Control

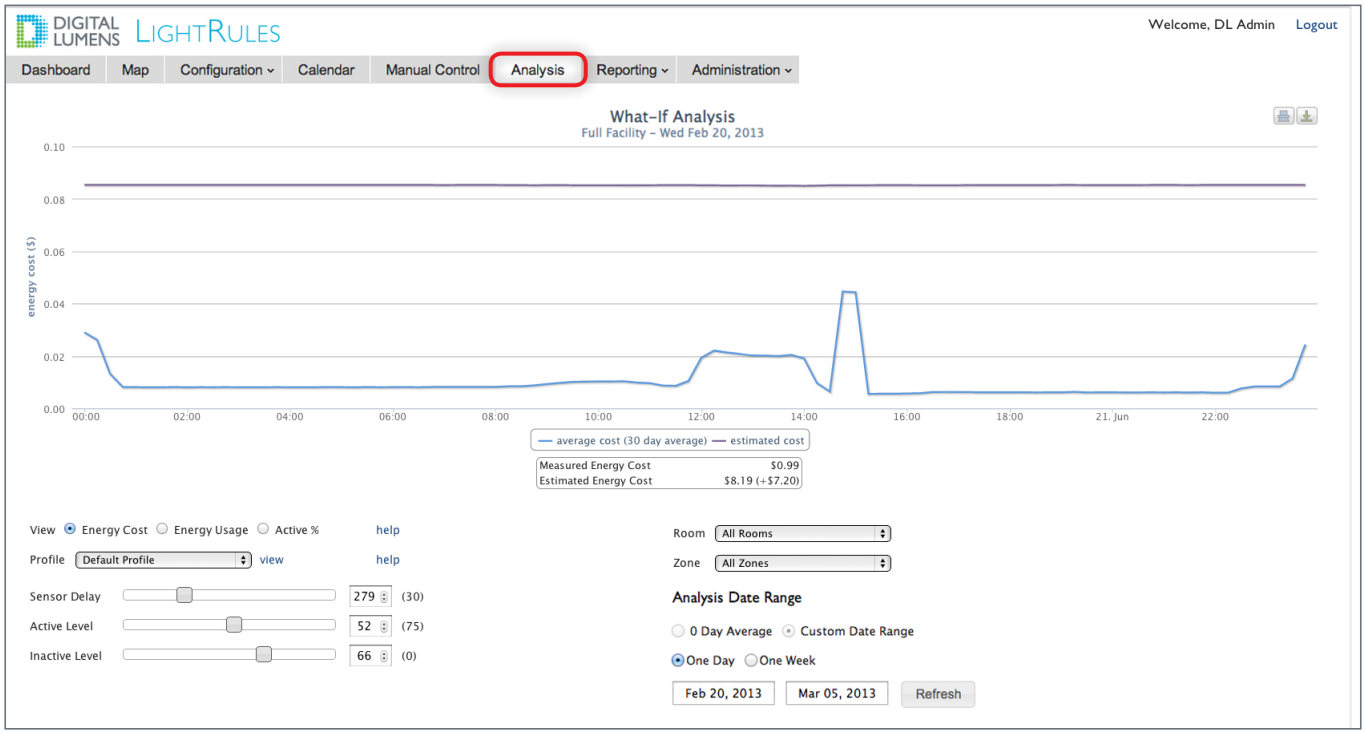


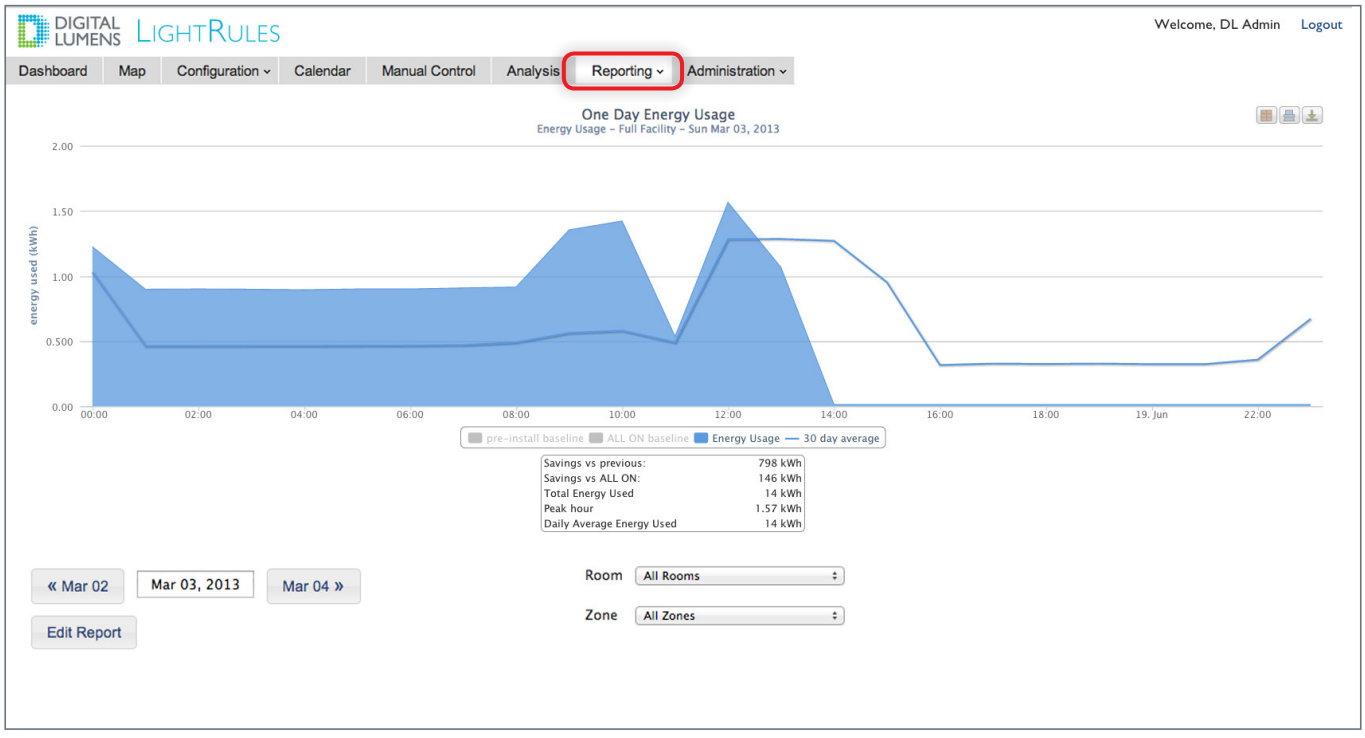
You can set the calendar to automatically trigger profiles based on a schedule. However, you can use the manual control feature to override the lighting schedule and dynamically change the settings for some (or all) of the lights in your facility. Manual control lasts for a fixed duration or indefinitely, until you cancel it.

If the facility is using the optional LightRules Keypads, note that keypads use manual control. For example, when you press button #3 on a keypad, the button press triggers an assigned manual profile.

Manual control can be canceled via the LightRules dashboard.

Comparative Analysis Tools

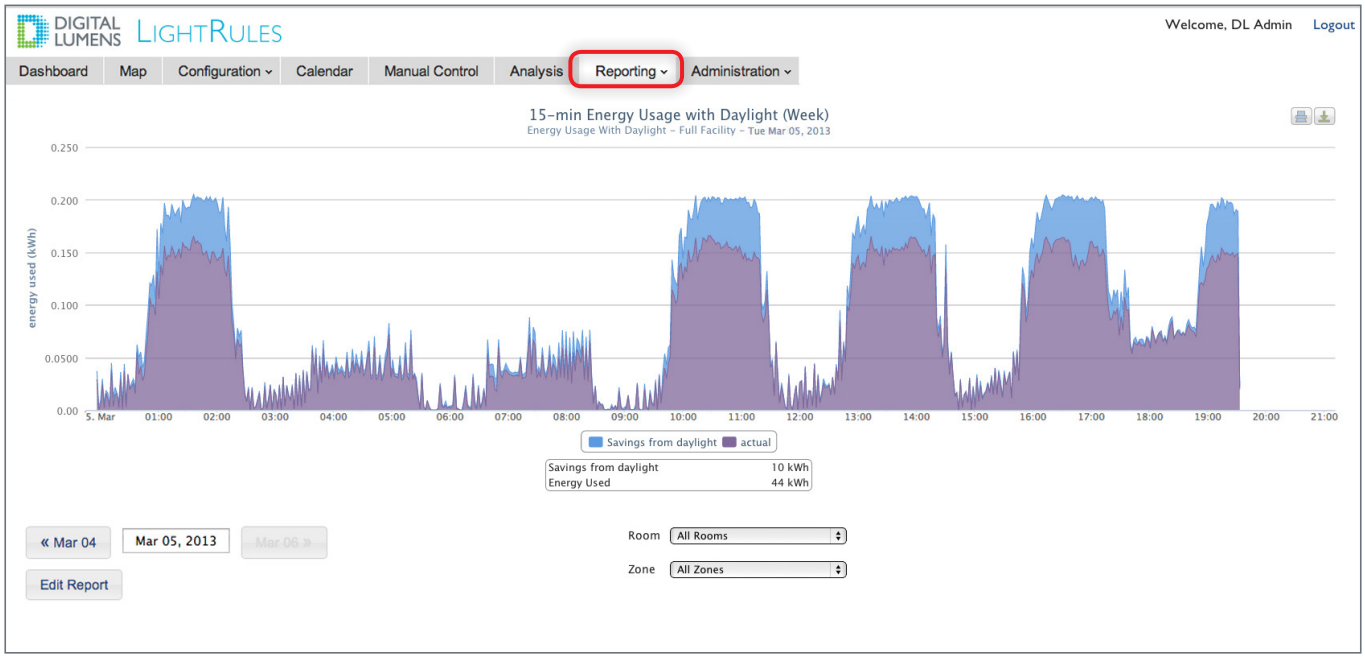




LightRules 2.10 features *what-if* analysis, which estimates the energy savings one would realize if using different settings across a zone, a room or the entire facility. What-if analysis utilizes real, historical data to make what-if predictions.

Likewise, the *baseline* function uses historical data to compare savings from your Digital Lumens Intelligent Lighting System versus the previously installed lighting system or an LED system (without intelligent control) with its lights ALL ON.

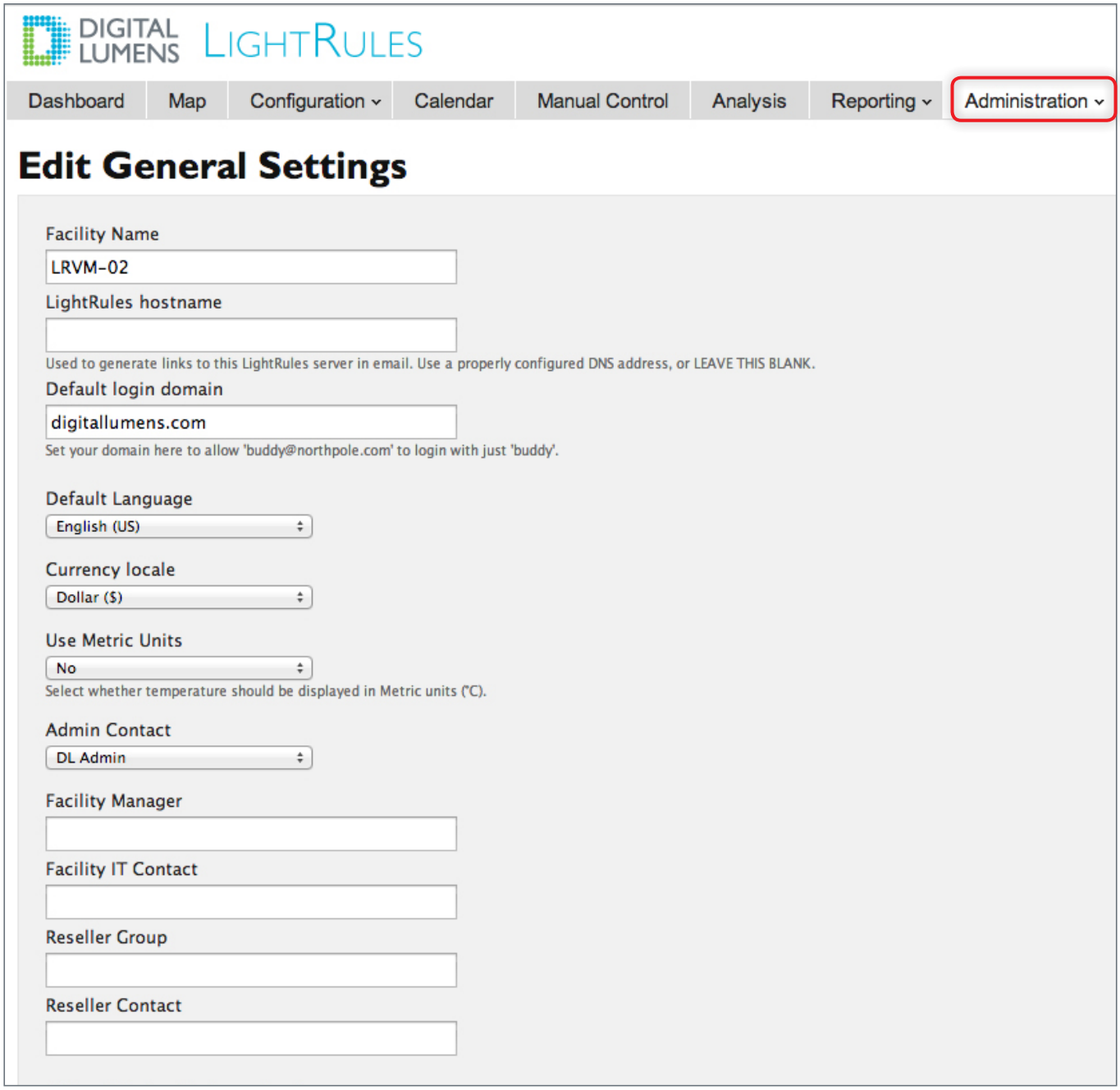
Reporting



LightRules features preconfigured, default report templates to help you start analyzing data right away. The built-in templates are designed to cover the most common occupancy data, energy usage and energy cost requests.

- You can also create custom reports where you specify the time interval between data points, duration, and chart appearance. You can also create reports containing data collected power meters.
- Facility map reports display data as an overlay on the facility floor plan.
- Reportable data in LightRules is available for print and export as a raw CSV file, image, or PDF.

Administration

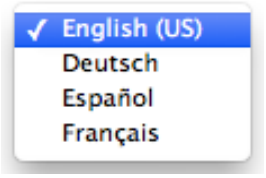


Use the Administration screens to perform standard user setup operations, general site configuration, configure safety features, toggle coordinated control, daylight harvesting, or power metering On/Off and perform data backup tasks.

NOTE: LightRules offers three levels of user permissions, each allowing access to part of the LightRules interface. For example, users set up with "Operations", and "Admin" permissions have access to the entire LightRules web interface, whereas users set up with "Reporting" permissions receive access only to reporting-related features.

Language Selection

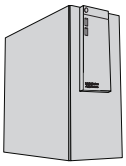
During system installation, the installer specifies a default language setting and also the currency type. If a user wants to change the language setting for his or her individual user session, he or she can make a new language selection at login, and the language selection will remain active until that user logs out:



1. Launch LightRules.
2. Click the drop-down menu in the top right-hand corner of the screen.
3. Select the desired language setting.

NOTE: Language selection and currency type are independent; changing the language does not affect the configured currency type.

LightRules Hardware Components

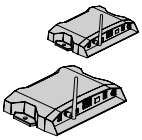


LightRules Appliance

The LightRules Appliance is the central controller for the LightRules Intelligent Lighting System. It stores lighting and sensor data and manages the lighting gateways and control of fixtures throughout the premises.

Ethernet Network Components

Ethernet cables and network switches connect the appliance to the gateways. Typically, the switches are PoE (Power over Ethernet)-enabled devices that supply electrical power to the gateways, eliminating the need to install 120-240 VAC power sources at each gateway location.

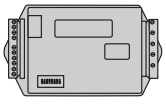


Gateways

Gateways create a network bridge between the Ethernet components in the lighting network and the lights. Each gateway manages communications for up to 50 lights within an unobstructed wireless range.

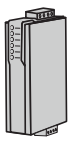
(Optional) Keypads

LightRules keypads are wall-mounted controllers with eight configurable buttons. When a user presses button 1-8, the keypad triggers the assigned manual profile. Typically, one keypad per room in the facility is sufficient.



(Optional) Power Meters

Power meters collect precise energy measurements from any electrical equipment in a facility. LightRules 2.10 accepts data from specific models of third-party power meters supplied by Digital Lumens.



(Optional) Power Gateways

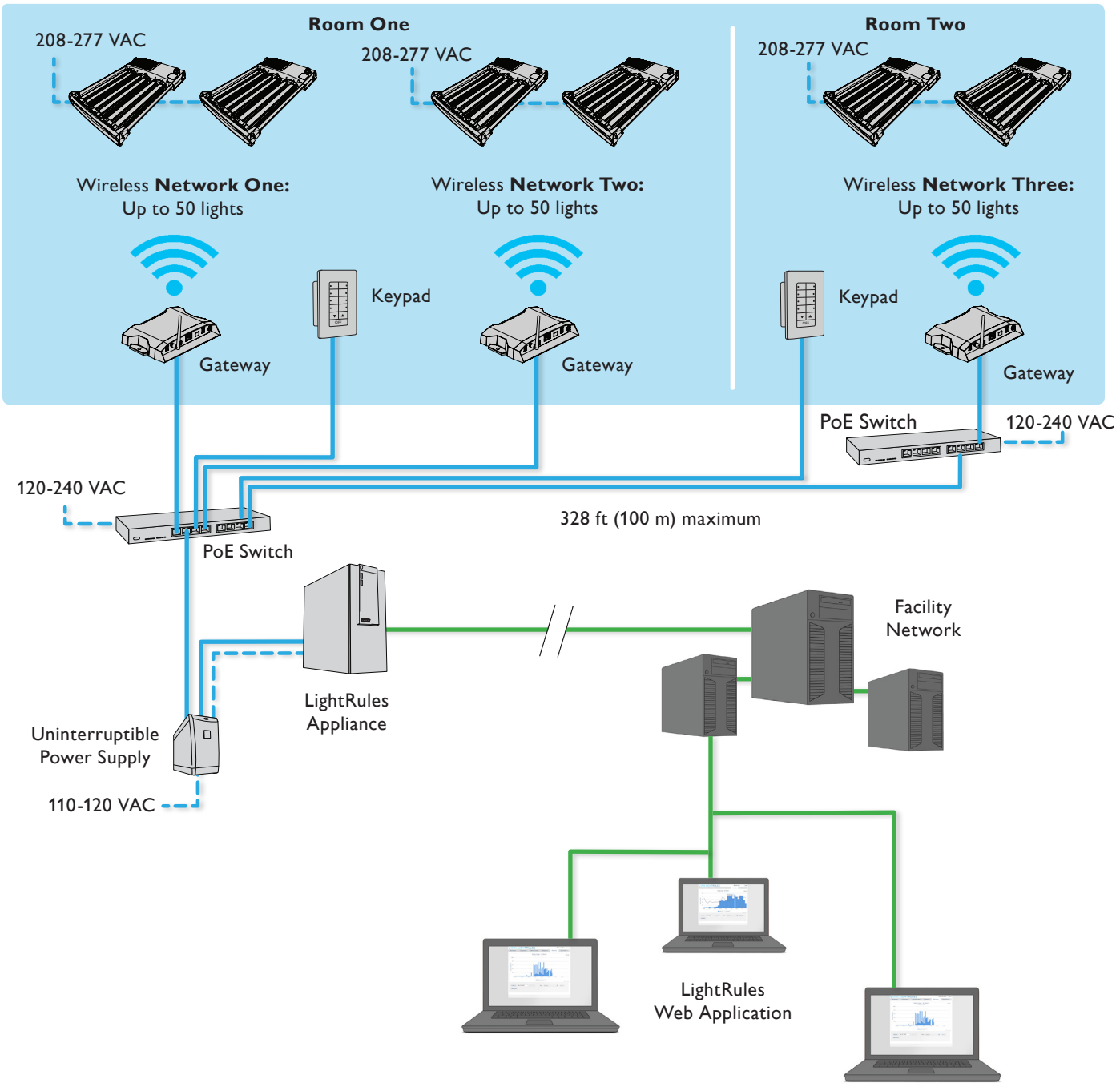
Power gateways are required to facilitate two-way communication between the power meters and LightRules. LightRules is compatible with specific models of third-party power gateways supplied by Digital Lumens.

Example System Diagram

Dedicated LightRules Network (Ethernet cable and Zigbee®/802.15.4 wireless)

Facility Network (Ethernet)

Electrical Power



LIGHTRULES EXPERT SAYS: LightRules runs on a secure, dedicated network within the facility.

About LightRules Configuration

Overview

During system setup, the installer configures LightRules based on a hierarchical structure. There are four levels to the hierarchy:

1. Lights

Each light has a built-in microprocessor that enables software control and assignment to a zone. LightRules identifies lights by their serial numbers.

2. Zones

Zones are groups of lights. When you configure a zone, you assign a ***rule*** that specifies the dimming levels and occupancy sensor settings for the lights assigned to that zone.

3. Rooms

Rooms correspond to the physical spaces in your facility such as "-20F Freezer", "Dry Storage", and so on. Each room contains one or more zones. LightRules uses room assignments to generate reports.

4. Networks

A network is a group of ≤ 50 lights, not separated by any walls, and managed by a single gateway. LightRules uses networks to manage wireless communications and tracks those networks according to unique Network IDs.

LIGHTRULES EXPERT SAYS: The rule assigned to a zone applies to all lights in that zone, controlling all lights' behavior. LightRules does not assign settings to individual lights. However, you can create a zone containing a single light, effectively controlling just that light.

A Quick Note About Map Files

The map file is a configuration file containing all fixtures, zones, gateways, and rule sets. The map is created with Commissioner software.

Networks, rooms, zones, lights, coordinated control settings, and daylight harvesting settings are configured during system installation. All settings are distilled into a map file. In LightRules, when you make changes to zones or lights for example, you are modifying the map file.

HINT: In LightRules, the changes you make to zones and other settings do not instantly migrate to the lights; you have to perform a sync operation in order for the changes to take effect (see page 34 for details).

NOTE: To control daylight harvesting-enabled lights with LightRules, you must first calibrate those lights with Digital Lumens Commissioner software.

Chapter Two
Quick Start Guide

Logging in to LightRules

LightRules Interface

Manual Control

Automatic Control

Running Reports

Creating a Profile

Creating a Zone

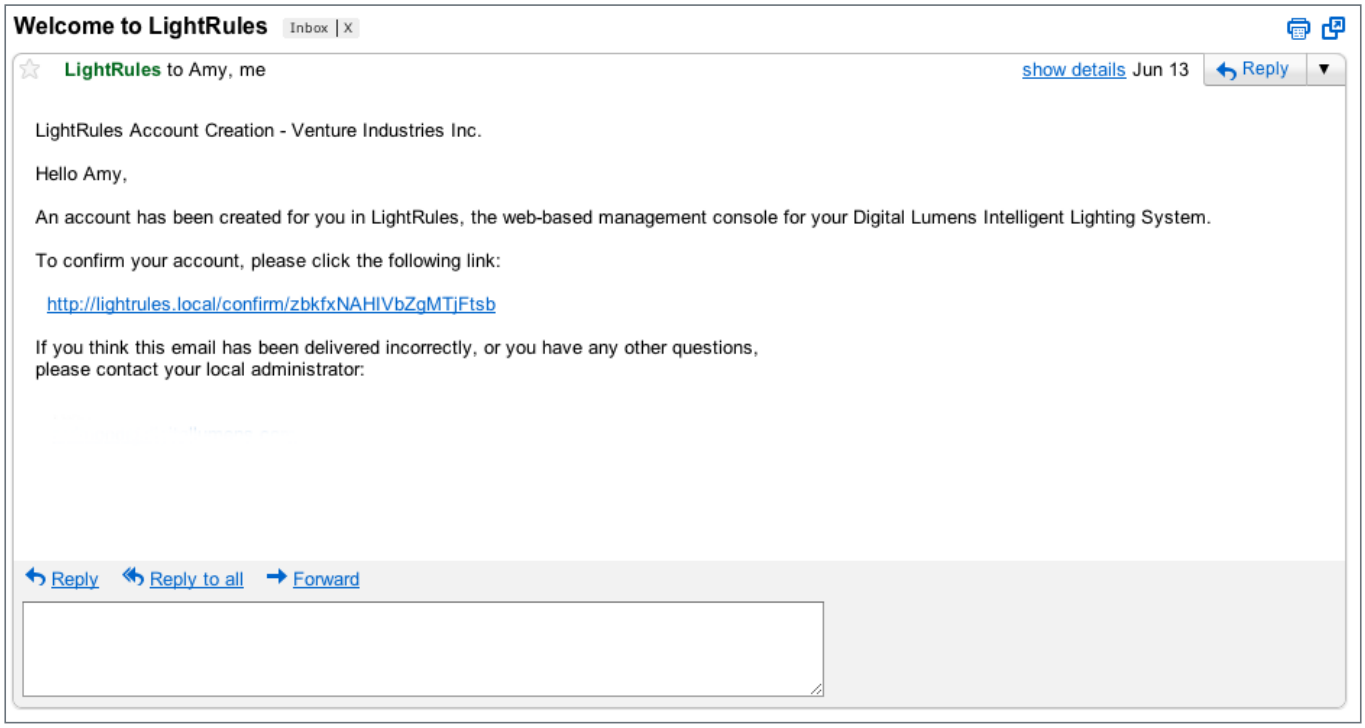
Performing a Sync

Basic Diagnostics

Logging in to LightRules

New Account Registration

When the system admin sets up your account, LightRules automatically generates and sends you an email with confirmation instructions:

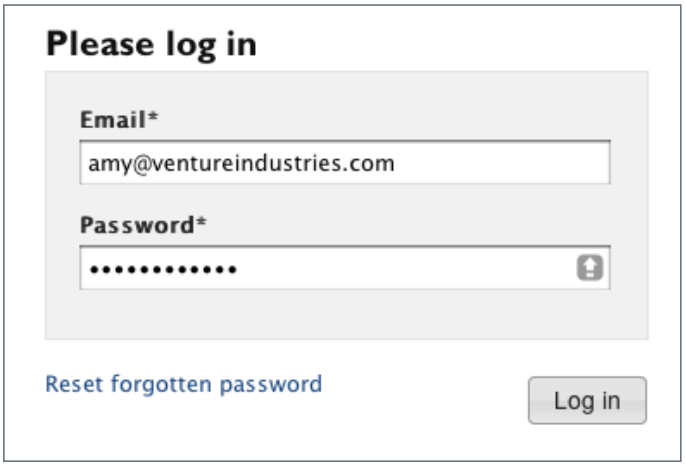


1. Click the link in the email.
2. Enter the desired password in the top field. Your password must contain at least four characters or digits.
3. Enter your password a second time in the bottom field.
4. Click **Change Password**.
5. Read the End-User License Agreement (EULA) and then click **I Agree**.

NOTE: If your network configuration is stand-alone, meaning the LightRules Appliance is not connected to the facility's enterprise network, the system admin will create your password during account creation.

Account Login

1. Open the Login screen by clicking the link in the new account email you received from LightRules.
2. For future use, create a bookmark to the link in your web browser.
3. Enter your email address and password.
4. Click **Log In.**



HINT: During installation, if a default email domain has been configured, then LightRules accepts the first part of a user's email address as a valid login. For example, if the email address is amy.jones@ventureindustries.com, that user can log in using either of the following:

- **amy.jones@ventureindustries.com**
- **amy.jones**

Resetting Your Password

1. At the Login screen, click **Reset forgotten password**.
2. At the Reset Password screen, type your email address, and then click **Reset Password**.
3. Open the auto-generated email from LightRules and click the link.
4. Enter your new password in the top field.
5. Enter the password a second time in the bottom field.
6. Click **Change Password**.

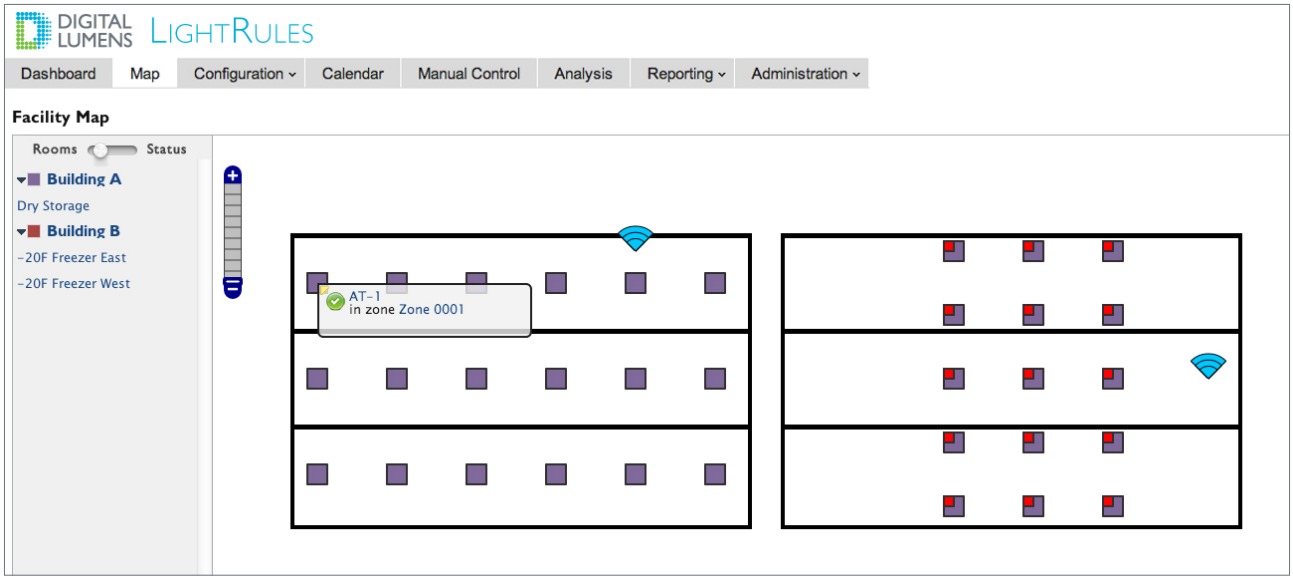
NOTE: If your LightRules configuration does not use email, an admin user can reset your password by logging in and going to the Users screen (see "Change a User's Password" on page 74).

LightRules Interface

Facility Map

Click the **Map** tab to open the facility map, which displays lighting system information as an overlay on the facility floor plan. There are two map views: **Rooms** view and **Status** view.

Rooms View



Rooms view shows all light, zone, and room details at a glance. Each light appears as a square on the map. You can ping lights and access light settings via each light's quick-view popup.

Click the *toggle button* to switch between rooms view and status view.

The *legend* lists each room and zone in the facility. Rooms are color-coded: All lights in the same room appear have the same color on the map. Click a room to expand the zone list for that room. Click a zone to highlight all lights in that zone.

In rooms view, all lights display as square icons.

If a light is calibrated and enabled for daylight harvesting, the icon contains a yellow box.

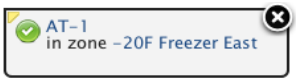
If a light is configured as a coordination master, the icon contains a red box.

All gateways appear as wedge icons.

All keypads appear as boxed circle icons.

Power meters appear as meter dial icons.

Power gateways appear as rectangular icons.



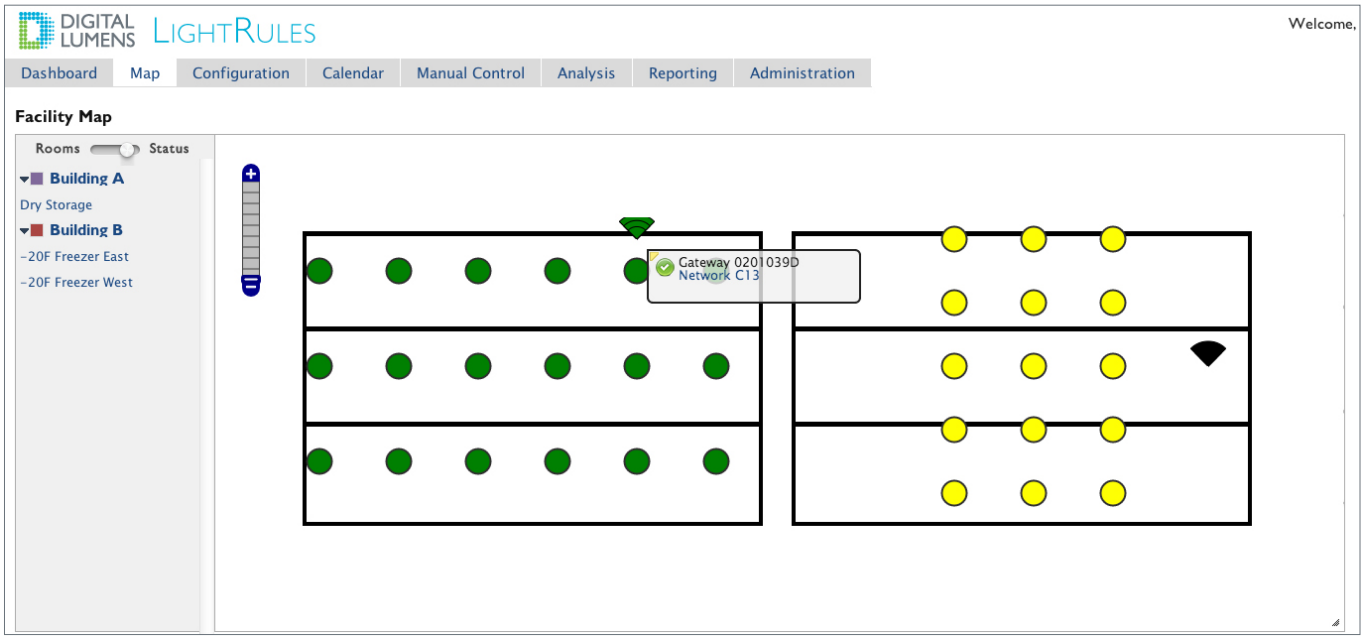
When you click on a light or gateway icon, that device's *quick-view popup* appears. The popup shows the name and zone assignment. The status icon indicates if the device is actively communicating with LightRules (green icon), if the device has not communicated with LightRules in 24 hours (yellow icon), or if the device is out of sync or has never communicated with LightRules (gray icon). Click on the status icon to ***ping*** the device and update its status in the map. Additionally, if you click on the name, the configuration page for that device appears. Note that the yellow tab in the upper-left or upper-right corner of the popup points to the device whose information is being displayed.

Click anywhere on the *zoom control* to zoom in or out.

In the lower-right corner of the map, click-and-drag the *re-size control* to re-size the map window.

Status View

Status view shows the status of each light: a green circle indicates that the light is actively communicating with LightRules, a yellow circle indicates that the light has not communicated with LightRules in 24 hours, and a gray circle indicates that the light is out of sync or has never communicated with LightRules.



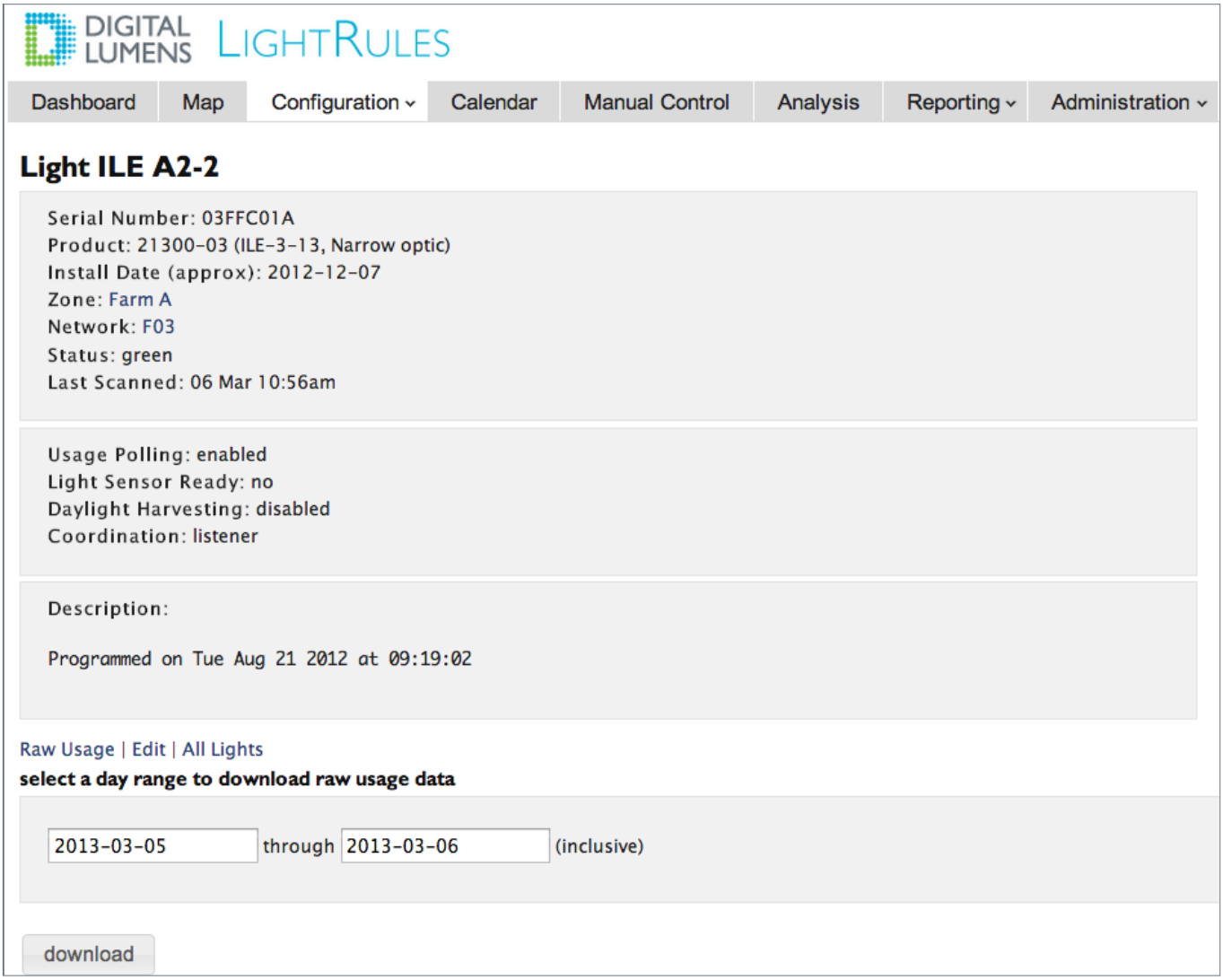
In status view, communicating lights and gateways appear as green icons.

In status view, non-communicating lights and gateways appear as yellow icons.

If a light is out of sync, or if a light has never communicated with LightRules, it appears as a gray icon.

Viewing Detailed Light Information

From either the rooms view or status view, click on a light to open the quick-view popup, and then click on the light name to view that light's information screen.



About Raw Usage Data

LightRules 2.10 features expanded data access on a per-light basis. The raw data file includes the following:

- Total time since the light was last reset.
- Total time the light has been in active mode.
- Total energy usage.

Download Raw Usage Data is CSV File Format

1. Click **Raw Usage**.
2. Enter a date range and then click download.
3. Open the CSV file using a simple text editor or spreadsheet software.

Manual Control

Manual control enables you to override the current lighting schedule via the LightRules dashboard or via buttons 1-8 on a LightRules Keypad (if installed). This feature is useful for testing new settings, for handling unscheduled events, and for safety lighting.

Activating an Existing Manual Profile

1. On the dashboard, click **Manual Control** or click the **Manual Control** tab.

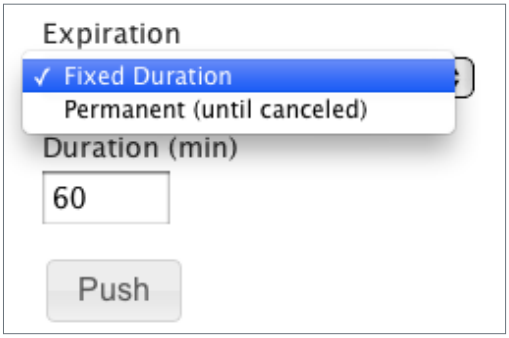
   or

   Press a button (1-8) on a keypad (in the facility, if installed).

2. Select a profile.
3. Select an expiration type:
4. **Fixed Duration** overrides the scheduled profile for a set period of time, in minutes (or until the manual profile is canceled).
5. **Permanent** overrides the current and all future profiles until the manual profile is canceled.
6. Click **Push** to activate the manual profile by broadcasting the settings over the lighting network to the lights.

   When you push (or cancel) a manual profile, LightRules displays a progress bar on the dashboard.

7. At any time, to end a manual profile, click the "X" within the Active Profiles widget on the dashboard, and then click **OK** to confirm.

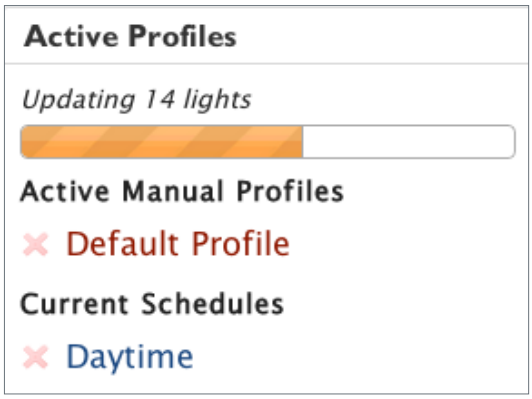


Progress Bar

Active Profiles Widget

The dashboard displays the lighting schedule as a list within the active profiles widget.

- When you activate a manual profile, that manual profile overrides all current schedules and appears at the top of the list.
- When you cancel a manual profile, LightRules reverts to the next profile in the list.



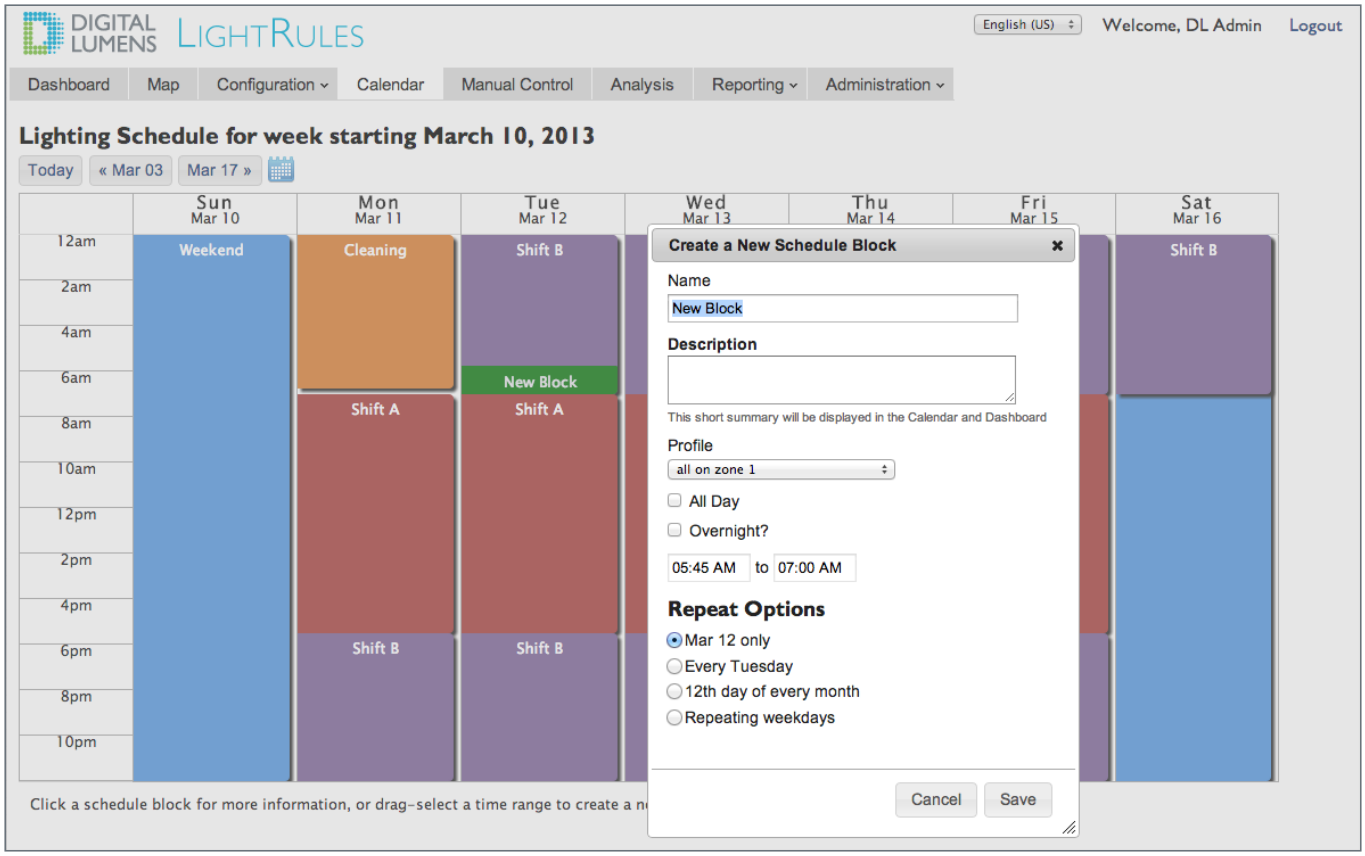
HINT: Because a manual profile may only affect a portion of the facility, you may activate multiple manual profiles at the same time. However, only one button per keypad can be active at one time.

Automatic Control

When you schedule a lighting profile, that profile runs automatically according to the start and end times you specify in the LightRules calendar.

Using the Calendar to Schedule an Existing Profile

1. Click the **Calendar** tab.
2. As needed, navigate ahead in the calendar.
3. Click & drag on the calendar to create a new block.
4. Type a name for the block and then select a profile from the dropdown list.



5. Enter start and end times.
6. (Optional) Select from the Repeat Options:
7. **<date> Only** Triggers the profile at the specified start time and cancels the profile according to the end time. This option runs the profile once.
8. **Every <day of the week>** Triggers the profile on a recurring basis. Specify an end date, as desired.
9. **<day of the week> of every month** Triggers the profile on a day of the month, every month.
10. **Repeating Weekdays** Triggers the profile on a recurring basis, on the checked days of the week. Specify an end date, as desired.
11. Click **Save**.

HINT: LightRules 2.10 permits you to create profiles that don't include all zones. Therefore, you can schedule a profile for a section of the facility. The partial schedule can stack on top of a schedule that covers the entire facility. The most-recently scheduled profile takes priority.

LIGHTRULES EXPERT SAYS: If no profile is scheduled, LightRules runs the default profile, which is configured during system installation. The white background of the calendar represents the default profile. Therefore, if you don't add blocks to the calendar, you are always running the default profile.

LIGHTRULES EXPERT SAYS: If the LightRules network is not operational due to an equipment or network issue, each light will automatically continue to run its last received profile.

Using the Calendar Edit a Scheduled Profile

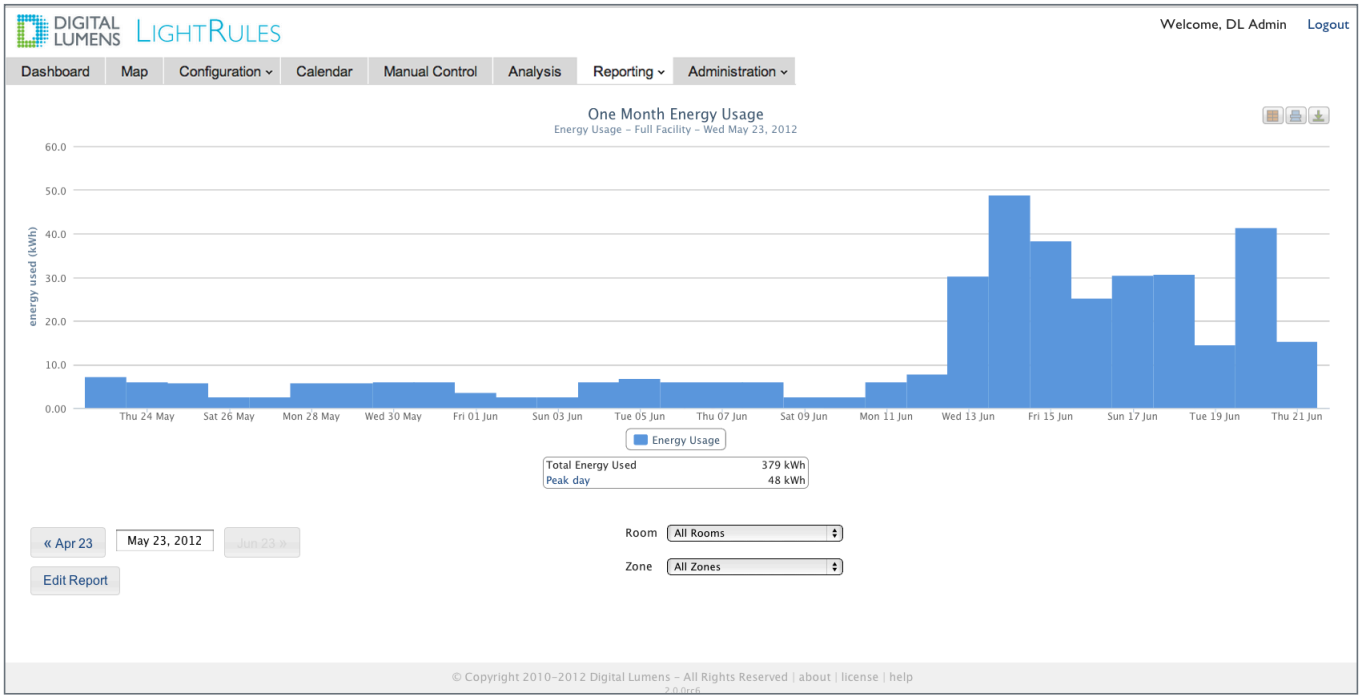
1. Click the **Calendar** tab.
2. Navigate to the block you wish to modify and then click on that block.
3. Click **Edit**.
4. Enter new parameters then click **Save**.

Running Reports

LightRules captures four categories of data, displayed in graph format or facility map format:

- Energy Usage
- Energy Cost
- Occupancy
- Energy usage and Cost (with Daylight Harvesting factored in)

You can run reports from the set of preconfigured reports or customize the existing templates to suit your needs.



Running a Preconfigured Report

1. Click the **Reporting** tab and then select a template from the dropdown list.

   or

1. On the Dashboard, select a template from the dropdown list.
2. Click **View Report**.

Create a New Report Template

1. Click the **Reporting** tab and select **Manage Reports** from the dropdown list.
2. Select **Graph Report** or **Facility Map Report**.
3. Click **New Report**.
4. Type a name for the report and then modify one or more of the following parameters:
   - Report name
   - Displayed data type: Occupancy, Energy Usage, Energy Cost, and Energy Usage with Daylight Harvesting
   - Data point interval: 15-minutes, hourly, or daily
   - Duration: One day, one week, one month, or custom duration (in days)
   - Chart style: Line, Area, Bar, Stacked (overlays multiple area charts)
5. (Optional) Check the Favorite box to add the report template to the favorites list that appears on the dashboard.
6. Click **Create Report**.

Creating a Profile

A profile is a list of rules for some or all configured zones. To take effect, the profile must be pushed manually (see page 29) or scheduled as a block in the calendar (see page 46).

1. Click the **Configuration** tab and select **Profiles** from the dropdown list.
2. Click **New Profile**.
3. Type a name for the profile.
4. Select a zone from the dropdown list.
5. As desired, modify the default rule for the selected zone:
6. Use the right slider to adjust the active power level (20 – 100).
7. Use the left slider to adjust the inactive power level (0 – 100).
8. Enter the desired sensor delay (minimum 30 seconds).
9. Click **Add Rule** and then repeat step 5 for each desired zone.
10. Click **Save**.

Rule Definitions

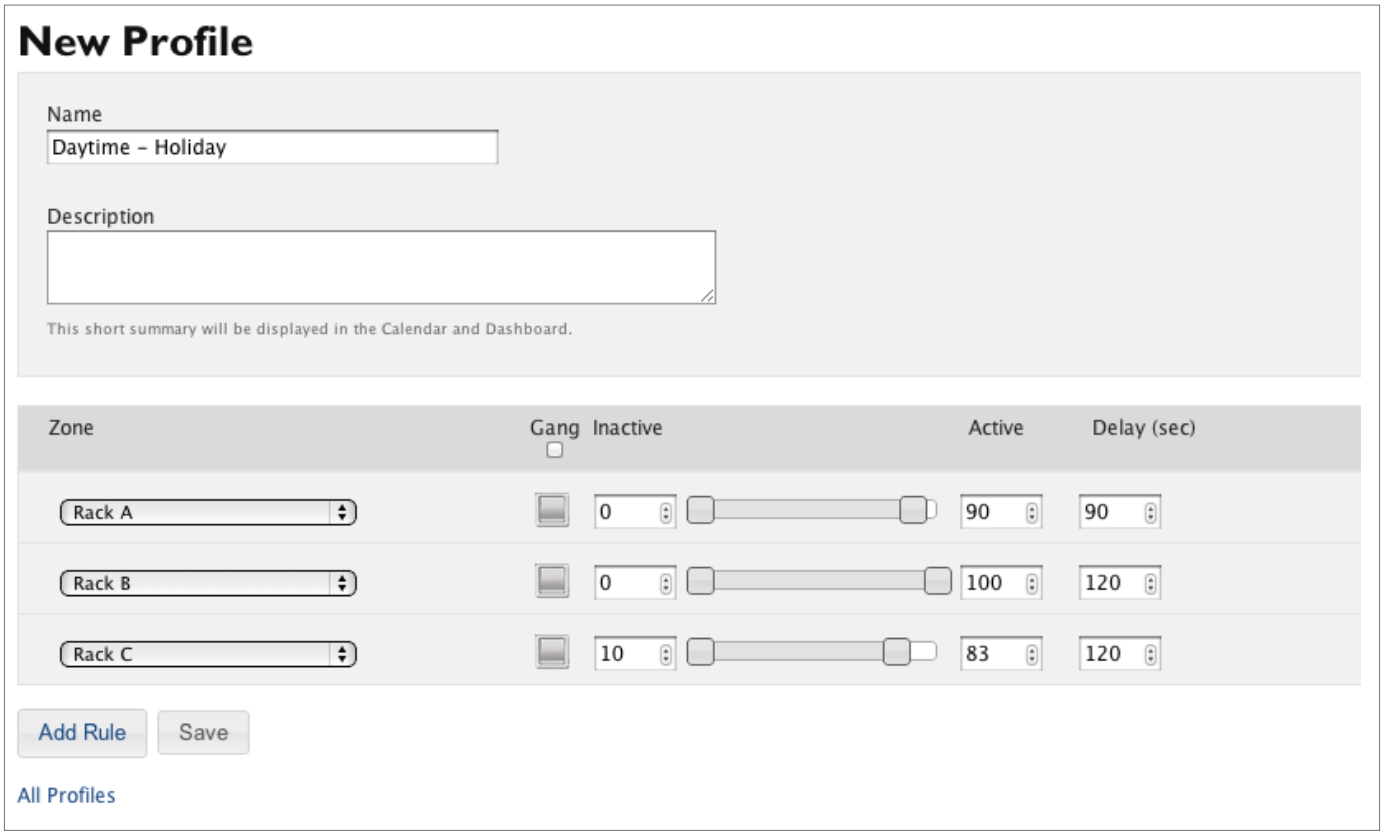
Active Power Level: The amount of illumination delivered by a light when there is activity detected below that light.

Inactive Power Level: The amount of illumination delivered by a light then there is no activity detected below that light.

Sensor Delay: The length of time in which no activity is detected before a light switches from active power mode to inactive power mode.

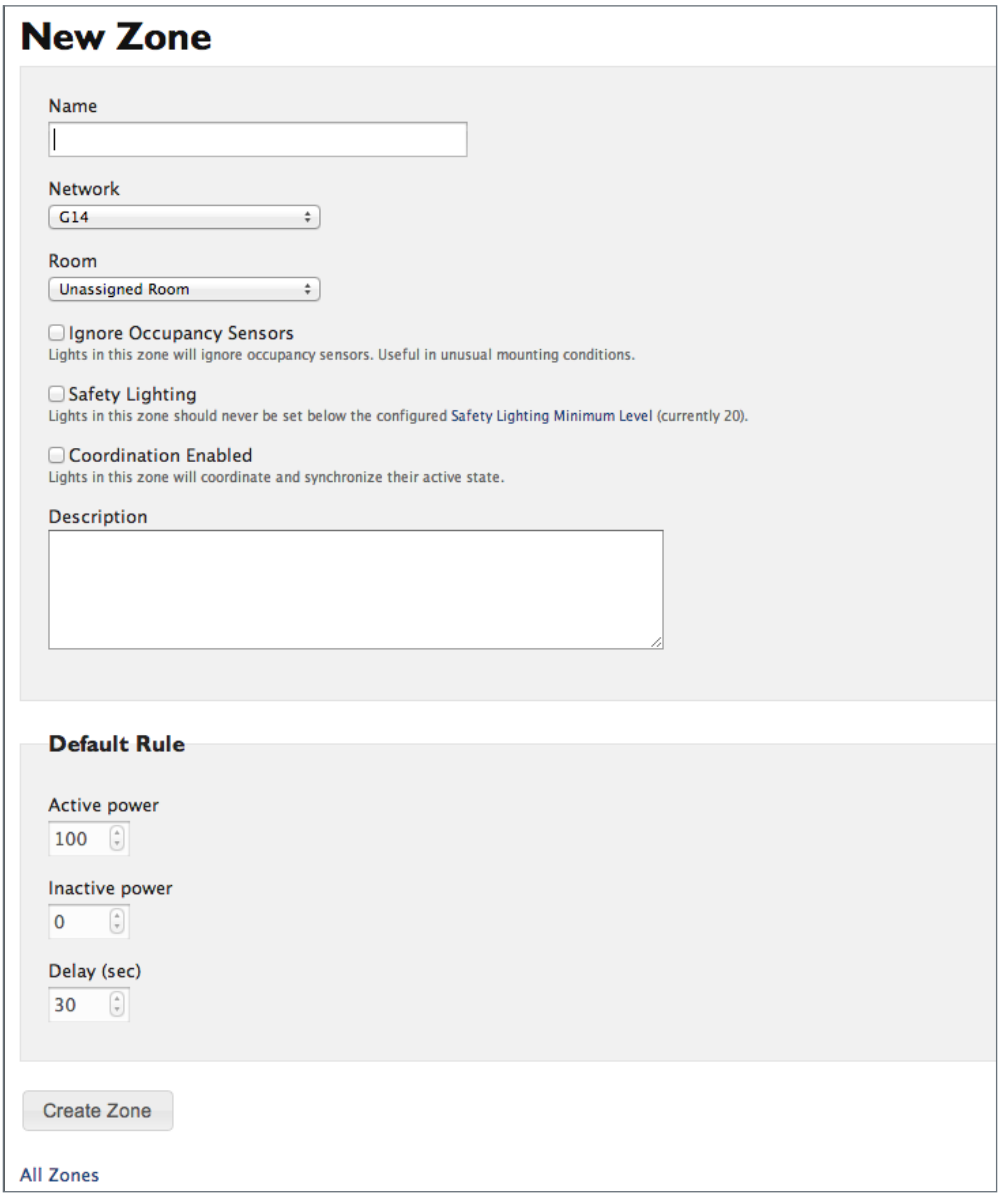
HINT: To rapidly change power level rules in unison across multiple zones, click the gang toggle switch for those zones and then move the left and/or right slider in one of the selected zones.

HINT: See "Appendix B" on pages 96-98 for examples of typical profiles and their assigned rules.



Creating a Zone

A zone contains a portion of the lights in the facility and corresponds to a physical area. You can create a new zone from scratch or by splitting an existing zone. When you create a zone from scratch, you need to add lights — otherwise that zone will be empty.



1. Click the **Configuration** tab and select **Zones** from the dropdown list.
2. Click **New Zone**.
3. Type a name for the zone.
4. Select a **Network ID** from the dropdown list (use the same Network ID as used by the gateway in that zone).
5. Select the room in which the zone resides from the dropdown list.
6. (Optional) Check **Ignore Occupancy Sensors** only if facility has opted not to use occupancy sensing. For example, some aircraft hangers do not use occupancy sensing.

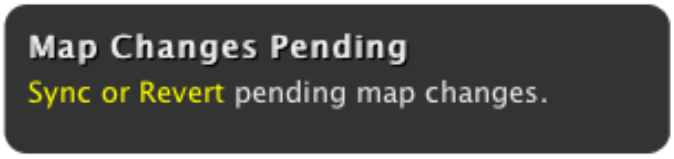
7. (Optional) Check **Safety Lighting** to activate minimum active power/inactive power levels for this zone (see page 75 for additional information).
8. (Optional) Check **Coordination Enabled** to permit coordinated control for this zone (see page 63).
9. (Optional) Enter descriptive text.
10. Enter the active and inactive power levels.
11. Enter the desired sensor delay.
12. Click **Create Zone**.
13. Click the **Configuration** tab and select Lights from the dropdown list.
14. For each light you wish to add to the new zone, click **Edit**, select the newly created zone name from the dropdown list, and then click **Update Light**.
15. Perform a sync.

Performing a Sync

When you update a room, zone, or light, you have changed the map file and LightRules requires a sync operation to push the new settings over the lighting network to the lights in the facility. LightRules displays a prompt when one or more pending map file changes require syncing; you can sync more than one change at a time.

Syncing the Map File

1. When the sync prompt appears, click **Sync or Revert**.



2. Review the description of the pending map file changes.
3. Click **Sync** to push the new settings to the lights

   or

4. Click **Revert** to cancel all changes.
5. Click **OK**.

Basic Diagnostics

Overview

LightRules continually checks the lighting network for connectivity and/or changes to the map file that have not been received by the lights or other devices. If there is an issue, LightRules identifies the affected portion of the network and displays an alert icon:

The network or device is communicating normally.

LightRules has not communicated with the network or device in the last 24 hours.

LightRules is out of sync or has never communicated with the network or device.

See pages 80-83 for additional details about diagnostics.

Chapter Three
Manual Control

Overview

Pushing an Existing Manual Profile

Creating a New Manual Profile

Cloning a Manual Profile

Editing a Manual Profile

Expiration Settings

Canceling a Manual Profile

Example Cases

NOTE: The manual control feature requires "Operations" user permissions.

Overview

What is a Manual Profile?

With the manual control feature, LightRules enables you to override part or all of the currently running scheduled profile and implement one or more temporary profiles for a specified period of time, or indefinitely until canceled.

- Manual profiles can be set to change the light settings of a single zone, a set of zones, or the all zones in the facility.
- The dashboard displays the manual profile(s) in use and allows you to cancel each manual profile separately, at any time.

LIGHTRULES EXPERT SAYS: A manual profile does not automatically override all other running profiles. To completely override all profiles (and therefore all lights) the manual profile must contain all zones in the facility.

Why Use Manual Profiles

Manual profiles are helpful for testing new settings. For example, to test a new occupancy sensor setting, you can push a manual profile, walk out into the facility and check the new settings, and then cancel the manual profile. Manual profiles are also useful for handling one-time or non-scheduled events, including facility maintenance and demand-response events. Additionally, the optional LightRules Keypad activates a manual profile when a user presses button 1-8.

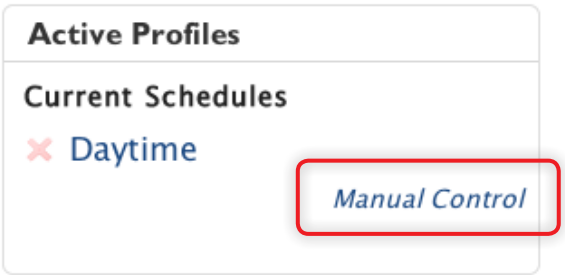
HINT: Create and save manual profiles for future use so you can instantly access and push a profile on-demand, when it is needed.

What Happens when I Push a Manual Profile to the Lights?

When you push a manual profile over the lighting network to the lights, the profile requires several seconds or minutes to become fully active, depending on how many lights are affected. The progress bar displays the percentage of the operation that is complete.

Pushing an Existing Manual Profile

1. Out in the facility, press button 1-8 on a keypad.
   or
1. Click the **Manual Control** tab, or click **Manual Control** in the Active Profiles widget on the dashboard.
2. Select an existing profile from the dropdown menu.
3. Select an expiration type from the dropdown menu, and then click **Push** to activate the manual profile.

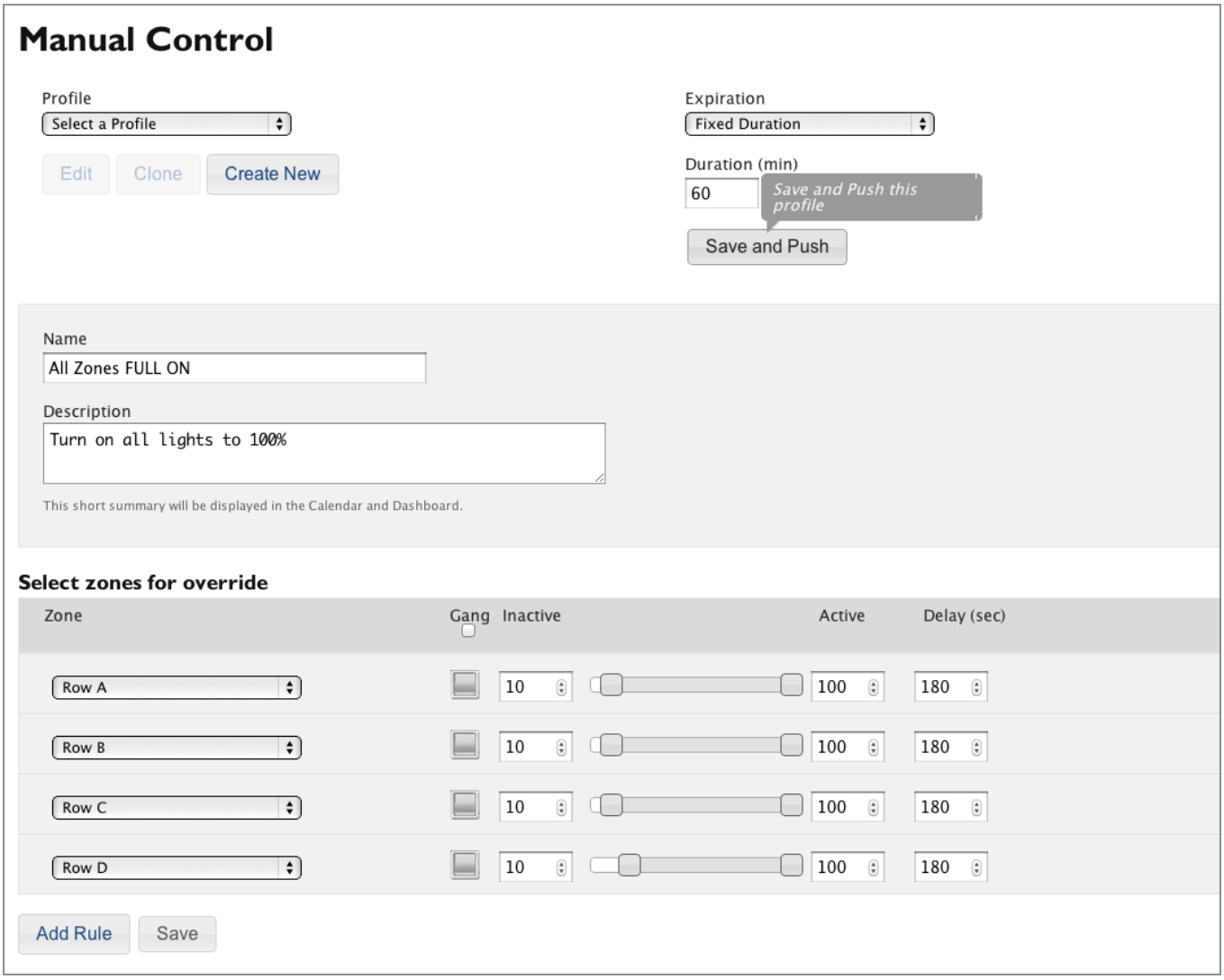


Creating a New Manual Profile

1. Click the **Manual Control** tab.
2. Click **Create New**.
3. Using a logical naming convention, type a new name for the manual profile.
4. Click **Add Rule** to add one or more zones.

NOTE: When you create a manual profile, you do not have to include all zones. For example, a manual profile can contain a single zone that you wish to control manually while the rest of the facility continues running the scheduled profile.

5. Edit the zone rules, as desired.

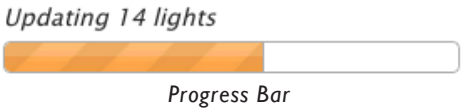


6. Click **Save** to save the manual profile for future use, without activating it.

   or

   Select an expiration setting from the dropdown menu and then click **Save and Push** to save and instantly activate the manual profile.

NOTE: The push operation takes from seconds to several minutes to complete. Most lights update instantly. When you push a manual profile, LightRules displays the progress bar on the dashboard.

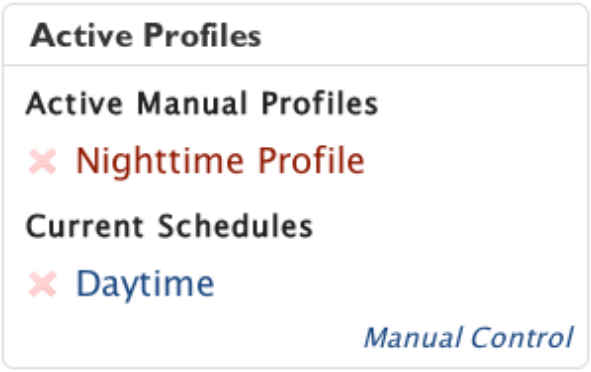


Progress Bar

Active Profiles Display

The dashboard displays the current lighting schedule and any running manual profiles. If you activate a manual profile, that manual profile overrides all other profiles, manual and scheduled. On the dashboard, the new manual profile appears above all other profiles.

When you cancel the manual profile, LightRules reverts to the next profile shown in the list.



Cloning a Manual Profile

1. Click the **Manual Control** tab.
2. Select any existing profile from the dropdown list and then click **Clone**.
3. Using a logical naming convention, type a new name for the manual profile.
4. Click **Add Rule** to add zones, as needed; or, click the "X" next to a zone to delete that zone.
5. Edit the zone rules, as needed.
6. Click **Save** to save the manual profile for future use without activating it.

   or

   Select an expiration setting from the dropdown menu and then click **Save and Push** to save and instantly activate the manual profile.

Editing a Manual Profile

1. Click the **Manual Control** tab.
2. Select any existing manual profile manual from the dropdown list and then click **Edit**.
3. Click **Add Rule** to add zones, as desired; or, click the "X" next to a zone to delete that zone.
4. Edit the zone rules, as desired.
5. Click **Save** to save the manual profile for future use without activating it.

   or

   Select an expiration setting (see next page) from the dropdown menu and then click **Save and Push** to save and instantly activate the manual profile.

Expiration Settings

Before you push a manual profile, you first select an expiration setting:

- **Fixed Duration** runs the manual profile for a set period of time, in minutes.
- **Permanent** runs the manual profile indefinitely, until you cancel that profile.

Canceling a Manual Profile

An active manual profile de-activates when you click the "X" next to that manual profile in the Active Profiles widget on the dashboard. If you are running multiple manual profiles, you may cancel each profile individually.

Example Cases

Example Case 1: Temporarily Turning Lights All On

For an unscheduled event, you wish to temporarily set all lights to active power level 100 and inactive power 100 (all lights fully on, without any dimming):

1. Clone the default profile.
2. Create a logical name like: "Entire Facility, all lights ON 100", or similar.
3. Across all zones, specify active and inactive power levels of 100, and then run the manual profile.
4. Cancel the manual profile when the event is over.

HINT: Create and save an "all lights ON 100" manual profile for future use. Then, activate the manual profile when needed so you don't have to spend time performing setup.

Example Case 2: Power Limiting

Power limiting enables a facility to drop a portion of the wattage used by the lighting system. For example, during summer months when HVAC compressors are running at high levels, reducing the active power level of all lights (for example, from 100 to 90) is an effective way to temporarily limit total facility power consumption. This practice may be especially beneficial when a facility is facing peak demand surcharges or demand-response calls from electrical utilities.

Use the following method to perform power limiting:

- First test and determine minimum safe/satisfactory illumination levels.
- Create a manual profile with the tested settings for use at a later time.
- Run the manual profile when facing peak demand surcharges or a demand-response call occurs.

General Steps for Power Limiting

1. Create and activate a manual profile for a portion of the facility that reduces the active power level, starting with a reduction of 10.
2. Using a light meter, evaluate the new illumination level. Make sure that new illumination level is adequate to meet facility operations safety requirements.
3. If the illumination level is adequate, try reducing the active power level by another 5 and then re-evaluate. Repeat the process until the maximum reduction is achieved.

HINT: Click the gang toggle next to multiple zones, and then use a single slider to make simultaneous changes across those zones (instead of changing them one-by-one).

4. Apply the final settings across all zones.
5. Activate the manual profile for a measurable period of time and then run LightRules reports so as to compare the reduction in both energy use and cost.
6. Save the manual profile and energy metrics for future use.

Example Case 3: Fine-tuning Night Lights to Improve the Facility's Energy Efficiency

Most LightRules facilities use night lights. Night lights never turn completely off — they dim when not in use, creating spatial reference points within large rooms where some or all of the other lights are off. Night lights are also useful for partially illuminating cross-aisles in large warehouse areas.

General Steps for Fine-Tuning Night Lights

In some instances, you can reduce the amount of light produced by night lights, so as to improve your facility's energy efficiency:

1. Create a manual profile that, for example, reduces the night lights' inactive power level from 30 to 20.
2. During facility downtime, activate the manual profile and evaluate the new settings, using a light meter. Make sure that new light levels are adequate to meet facility operations safety requirements.
3. Tune the manual profile until the inactive power level is desirable. Record the new rule settings.
4. Create and block a scheduled profile that automatically uses triggers new night light settings.

For additional details about night lights, see "Example Case 2: Scheduling Weekend Night Lights" on page 48.

Chapter Four
Calendar Control

Overview

Reviewing the Calendar

Using the Calendar to Schedule a Block

Using the Calendar to Edit a Block

Deleting a Block

Repeat Options

Example Cases

NOTE: The calendar feature requires "Operations" or "Admin" user permissions.

Overview

About your Lighting Schedule

LightRules automatically controls the lighting levels in your facility based on a lighting schedule. The default lighting profile configured during system installation populates the calendar.

- When you click & drag a time range on the calendar, LightRules schedules a profile, which is represented by a solid-colored block.
- You can create a block for a single calendar date or specify repeat options so that the block recurs on a specific day of the week, a day of the month, and so on.
- If you stack one profile block on top of another, the most recently created block has priority.

LIGHTRULES EXPERT SAYS: The white background on the calendar represents your default lighting profile. When you add a block to the calendar, you are effectively overriding the default profile by scheduling a profile for a period of time. The default profile resumes when the block expires.

General Strategy for Creating a Lighting Schedule

Use the following guidelines when creating your facility's lighting schedule:

- Maximize lighting levels for safety and comfort while the facility is occupied during a typical workday.
- Identify time periods where the facility, or areas of the facility, are unoccupied and schedule accordingly.
- If any areas of the facility require elevated lighting levels on a regular basis, schedule accordingly.

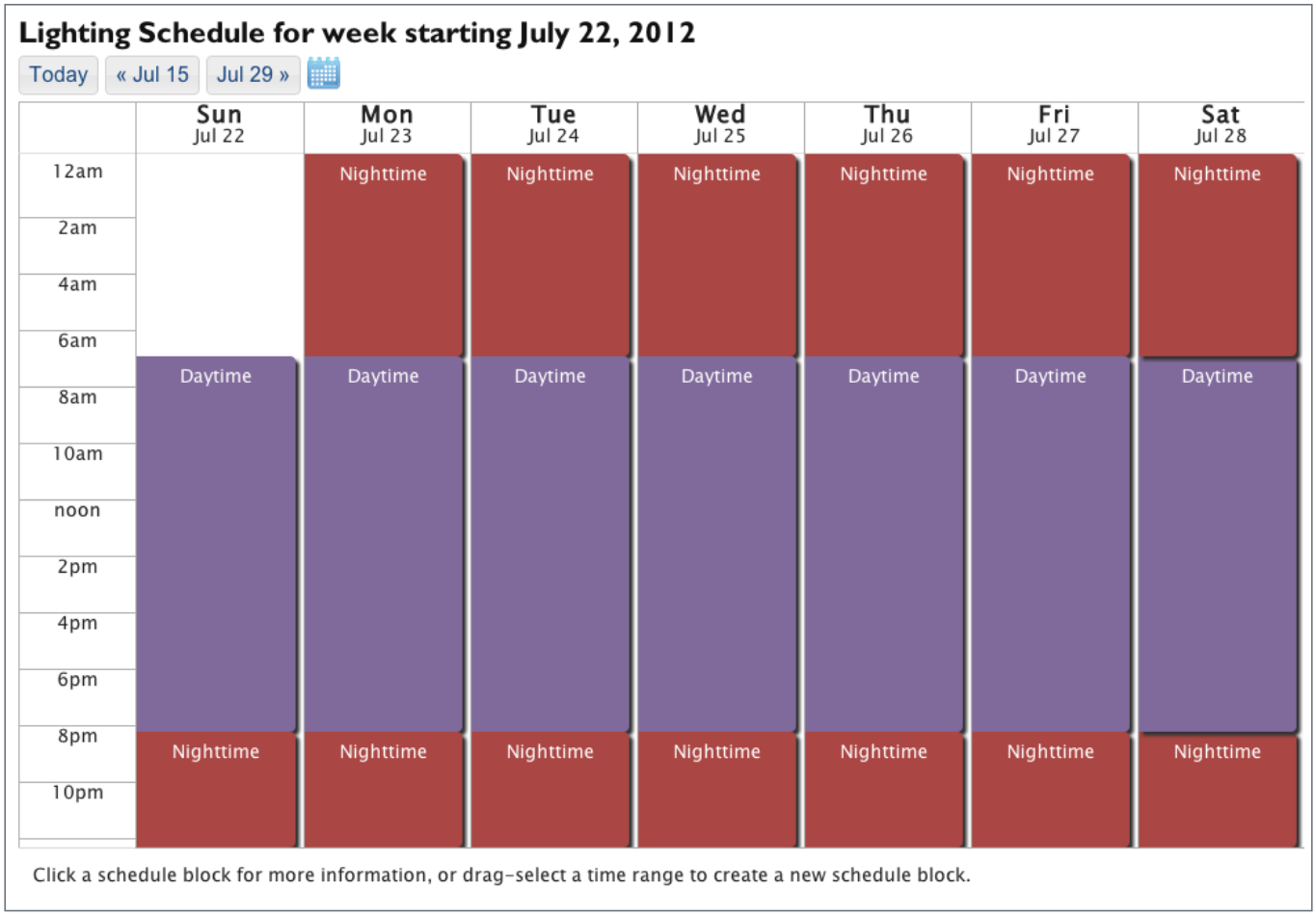
Typical Lighting Schedule

A typical facility will block the following profiles on the calendar:

1. *Day Schedule:* M-F, 6am to 7pm, full occupancy profile.
2. *Night Schedule:* Nightly, 7pm to 6am, reduced occupancy profile.
3. *Weekend Schedule:* Sat + Sun, 6am to 7pm, reduced occupancy profile.

Reviewing the Calendar

Click the **Calendar** tab to open and review the calendar. Each block represents a scheduled profile. Click a block to review its settings and then click **Cancel** to exit.

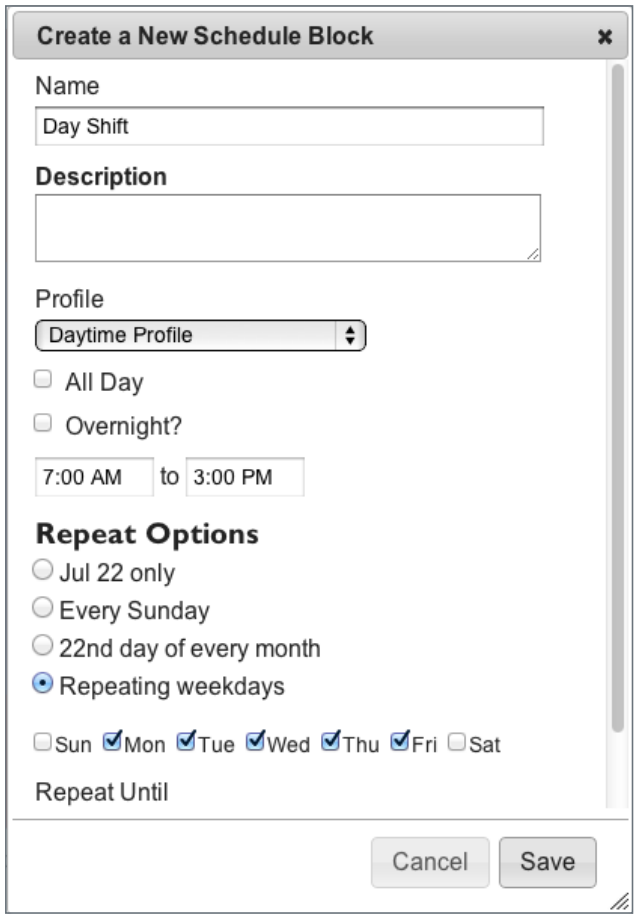


The calendar provides standard navigation controls for scrolling to the next/previous week. You can also click on the mini calendar icon and jump to a specific day, month and year.

HINT: By default, the calendar starts each week on Sunday. You can configure a different day as the start of the week, as needed (see "Modify the First Calendar Day" on page 73).

Using the Calendar to Schedule a Block

1. Click the **Calendar** tab.
2. As desired, scroll ahead to a different week in the calendar or jump to a specific day, month, and year.
3. Click & drag on the calendar to create a new block.
4. Type a name for the block and then select a profile from the dropdown list.
5. Specify start and end times.
6. Select from the Repeat Options (see below)
7. Click **Save**.



Repeat Options

When you schedule a profile on the calendar, you must select a repeat option:

- **<date> Only** LightRules triggers the profile according to the start and end times.
- **Every <day of the week>** Triggers the profile on a recurring basis. Specify an end date, as desired.
- **Every <day of the month>** Triggers the profile on a recurring basis. Specify an end date, as desired.
- **Repeating Weekdays** Triggers the profile on a recurring basis, on the checked days of the week. Specify an end date, as desired.

HINT: Use the **Repeating Weekdays** repeat option and check all of the days of the week to repeat a profile every day.

Additional Options

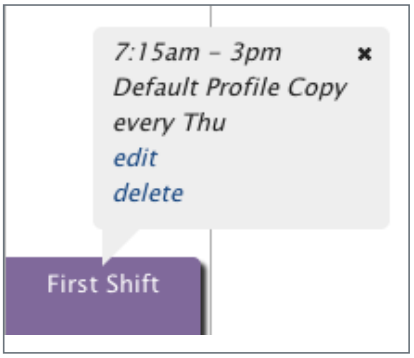
When you schedule a profile, you may also check one of the following:

- **All Day** To create a block automatically starts at 12:00am and ends at 12:00pm, check the All Day box.
- **Overnight** To create a block that carries over into the next day, check the Overnight box.

If applicable, to specify an end date, enter a **Repeat Until** date.

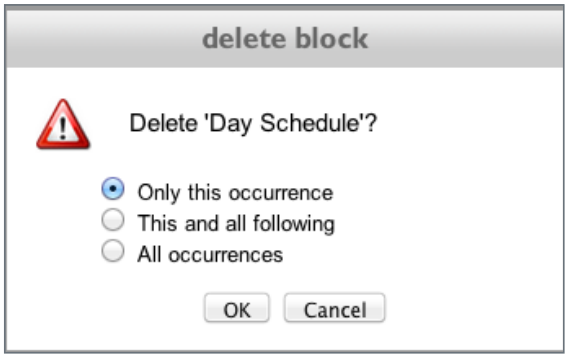
NOTE: It is preferable not to create blocks that span multiple days. Instead, use the repeat options described above to accomplish the desired result. For example, if you create a separate block for each weekday, you can then edit just that weekday rather than the span of days.

Using the Calendar Edit a Block



1. Click the **Calendar** tab.
2. Navigate to and click on the block you wish to modify.
3. Click **edit**.
4. Enter new settings and then click **Save**.

Deleting a Block



1. Click the **Calendar** tab.
2. Navigate to and click on the block you wish to delete.
3. Click **delete**.
4. Select a delete option: just the current block on the calendar, the current block and all following, or the entire series.
5. Click **OK**.

Example Cases

Example Case 1: Scheduling Lights to All On

On a recurring basis, it may be necessary to set all lights to active power level 100 / inactive power level 100 (fully on, no dimming). For example, to accommodate weekly inspection on Friday mornings from 9am to 11am, you can schedule a recurring block:

General Steps for Scheduling Lights to All On

1. Create a new profile.
2. Name the profile "Inspection", or similar.
3. Specify active and inactive power levels of 100 across all zones in the facility.
4. Save the profile and open the calendar.
5. Click & drag to create a block on the calendar, select the "Inspection" profile you just created, and then specify the following settings:
   - Start time: **9:00am**
   - End time: **11:00am**
   - Repeat option: **Every Friday**
6. (Optional) Enter an end date.
7. Save the block.

Example Case 2: Scheduling Weekend Night Lights

Night lights never turn completely off — they dim when not in use, creating spatial reference points within large rooms where the other lights are off. Night lights are also useful for illuminating cross-aisles.

On the weekends when there is less building occupancy, turning down night lights can reduce energy consumption.

General Steps for Scheduling Weekend Night Lights

1. Create a new profile.
2. Re-name the profile Weekend Night Lights, or similar.
3. Using a known value that is acceptable, specify an inactive power level lower than the existing setting across some or all zones containing night lights.

NOTE: To identify a safe and acceptable inactive power level, test settings first by creating and running a manual profile.

4. Save the profile and open the calendar.
5. Click & drag to create a block on the calendar, select the "Weekend Night Lights" profile you just created and then specify the following settings:
   - Start time: **12:00am**
   - End time: **12:00am**
   - Repeat option: **Every Saturday and every Sunday.**
6. (Optional) Enter an end date.
7. Save the block.

Example Case 3: Scheduling Maintenance in One Room for the Following Week

Use the following steps to, for example, schedule a period of maintenance in one room for each weekday in the following week.

General Steps for Scheduling Maintenance

1. Clone the weekday full occupancy profile and rename it "Maintenance", or similar.
2. For zones that are located in the desired room, adjust the light power levels to override the occupancy sensor: set both the active and inactive power levels to 100.
3. Save the profile and open the calendar.
4. Click & drag to create a block on Monday of the following week, and then select the "Maintenance" profile you just created.
5. Select the Repeating Weekdays option and then check Mon, Tue, Wed, Thu, and Fri.
6. Save the block.

Chapter Five
Reporting

Overview

Standard Report Templates

Running Reports

Example Cases

NOTE: Running reports requires “Reporting” user permissions.Editing reports requires "Administrator" user permissions.

Overview

The LightRules reporting feature charts the facility’s occupancy, energy usage, energy cost, and daylight harvesting-related data. You can choose among several chart styles, export data to CSV file, and export graph in image format. Additionally, the new ***facility map*** feature presents data as a visual overlay on top of the facility floor plan.

Standard Report Templates

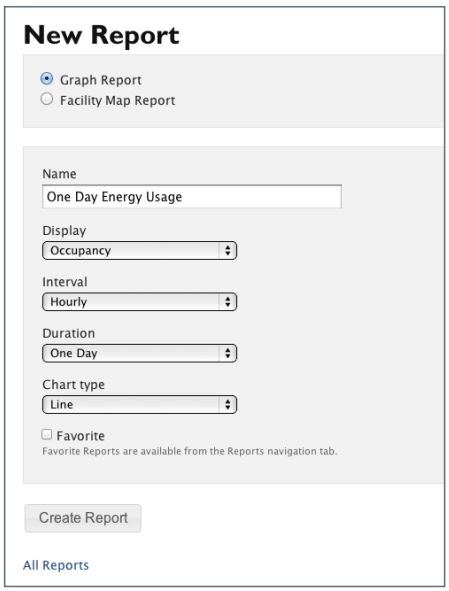
LightRules installs with a set of preconfigured standard reports to help you start analyzing data right away. The built-in templates are shared among all users and designed to cover the most common requests.

Creating New Reports

You can also create reports from scratch. There are two report types: graph reports and facility map reports.

Graph Reports

The following reporting parameters are fully editable for traditional ***graph reports***:



Displayed Data Type

- Occupancy
- Energy usage
- Energy cost
- Energy usage, with daylight harvesting data included
- Average power (in kilowatts rather than kilowatt hours)

Data Point Interval

- 15-minute interval
- Hourly
- Daily

Report Duration

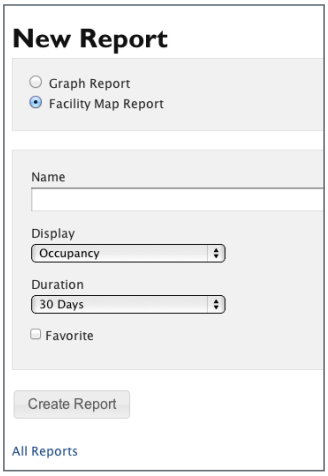
- Daily
- Weekly
- Monthly
- Custom (specify a custom duration, in days)

Chart Style

- Line
- Area
- Bar
- Stacked (shows the usage or cost that each room contributes to the total)

Facility Map Reports

The following reporting parameters are fully editable for ***facility map reports***:



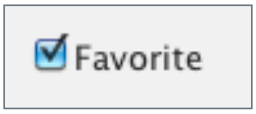
Displayed Data Type

- Occupancy
- Energy usage
- Energy cost
- Energy usage, with daylight harvesting data included
- Energy cost, with daylight harvesting data included
- Average power (in kilowatts rather than kilowatt hours)

Report Duration

- 30 days
- 60 days
- 90 days
- Custom (specify a custom duration, in days)

Favorites

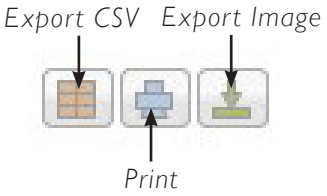


On the dashboard, the *My Reports* widget contains a favorites list. You can customize the favorites list. To add a report to the list, check the Favorite box when creating a new report or editing an existing report.

Exporting Reports

Graph reports are printable and exportable to the following file types:

- CSV raw data (export data to a format usable by spreadsheet software)
- PDF document
- JPEG image
- PNG image
- SVG vector image (print-quality image)



To output a report, click the icon corresponding to the desired output type: print, export CSV data export, or export image (PDF, JPG, PNG, SVG).

Running Reports

There are three ways to run reports:

- Select a report template from the **Favorites** dropdown list in the Reports dashboard widget
- Select a report template from the dropdrown list under the **Reporting** tab
- Create or clone a report, and then click **Run** in the Report Templates screen

Hints for Viewing Reports

HINT: Mouse-over a time interval in a chart to display data for that interval in a pop-up bubble.

HINT: Click & drag on a horizontal area of a chart to zoom in on the data. Click **Reset Zoom** to cancel.

HINT: Reports scale to the size of the browser window. If you want a wider graph so as to view a custom duration, stretch your browser window.

HINT: Graph reports may display a main graph and one or more overlay graphs, based on the parameters specified in the report template. You can toggle the main graph and the overlay graph(s) On/Off by clicking their corresponding buttons (the text describing each graph is a clickable button).

HINT: To enable energy cost reporting, you must enter an average dollar cost per kWh in the Administration General Settings. For example, enter $.11/kWh to use $.11 as the cost setting for all energy reports (see page 75 for details).

HINT: All cost and usage graph reports — if the chart style is line or area — show baseline analysis data. The baseline analysis feature compares historical data from the Intelligent Lighting System versus the energy usage of the previously installed lighting system, and versus an LED system with lights ALL ON.

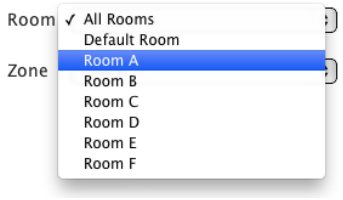
HINT: To enable baseline reporting, you must enter a value, in total watts, for the previously installed lighting system in the Administration General Settings. For example, enter 11,160 W if the previous system comprised 24 x 465 W lights (see page 75 for details).

Running and Customizing *Graph* Reports

Filter a Report By Room

1. Run a report.
2. In the Room panel of the report screen, select the room by which you want to filter results.

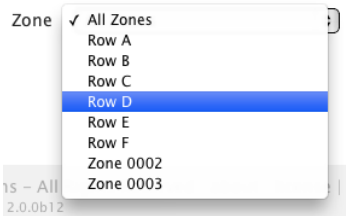
   LightRules auto-refreshes the results.



Filter a Report By Zone

1. Run a report.
2. In the Zone panel of the report screen, select the zone by which you want to filter results.

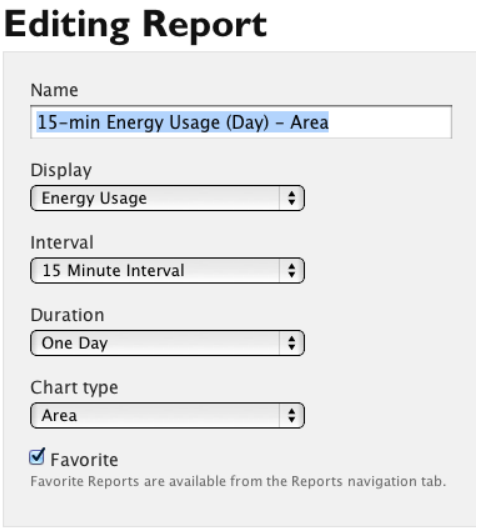
   LightRules auto-refreshes the results.



NOTE: To clear the room or zone filter, select **All Rooms** or **All Zones**, accordingly.

Edit a Report Template

1. Click the **Reporting** tab and select **Manage Reports**.
2. Click **Edit** for the desired report.
3. Modify one or more of the parameters.
4. (Optional) Check the Favorite box to add the report template to the favorites list on the dashboard.
5. Click **Update Report**.



Create a New Report Template

1. Click the **Reporting** tab and select **Manage Reports**.
2. Click **New Report**.
3. Select **Graph Report**.
4. Type a name for the report.
5. Modify one or more of the parameters.
6. (Optional) Check the Favorite box.
7. Click **Create Report**.

Clone an Existing Report Template

1. Click the **Reporting** tab and select **Manage Reports**.
2. Click **Clone** for the desired report template.
3. Click **Edit** for the newly created template.
4. Change the report name.
5. Modify one or more the parameters.

6. (Optional) Check the Favorite box to add the report template to the favorites list on the dashboard.
7. Click **Update Report**.

Delete a Report Template

1. Click the **Reporting** tab and select **Manage Reports**.
2. Click **Delete** for the desired report template.
3. Click **OK** to confirm deletion.

Add a Report Template to the Favorites List

1. Click the **Reporting** tab and select **Manage Reports**.
2. Click **Edit** for the desired report.
3. Check the Favorite box.
4. Click **Update Report**.

Run an Energy Cost Report

1. To run an energy cost report, you first have to enter a flat rate energy cost in the Administration feature.
2. Click the **Administration** tab and select **General Settings**.
3. Click **Edit General Settings**.
4. In the Energy Cost field, enter a flat rate amount ($/kWh), for example type **.11** for eleven cents/kWh.
5. Click **Save Settings**.
6. Click the **Reporting** tab and select an Energy Cost report template from the dropdown list.

Run a Energy Usage Report with Daylight Harvesting Data

1. Click the **Reporting** tab and select an Energy Usage "With Daylight" report template from the dropdown list.

LIGHTRULES EXPERT SAYS: Graph reports with daylight harvesting data contain two chart lines:

- **Savings from Daylight:** The top line charts the difference between the amount of energy that would have been used without daylight harvesting implemented and the actual amount of energy used, in kWh.
- **Actual:** The bottom line charts the amount of energy used, in kWh.

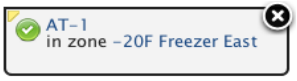
Running and Customizing *Facility Map* Reports

Facility Map Controls

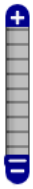
Use the following controls to customize a facility map report:

Click the *toggle button* to switch between rooms view and status view.

The legend lists each room and zone in the facility. Rooms are color-coded: All lights in the same room appear have the same color on the map. Click on a room to expand the list of zones contained within that room. Click a zone to highlight all lights in that zone.



When you click on a light or gateway, that device's *quick-view popup* appears. The popup shows the light name and zone assignment. The status icon indicates if the device is actively communicating with LightRules (green icon), if the device has not communicated with LightRules in 24 hours (orange icon), or if the light has never communicated with LightRules (gray icon). Click on the status icon to ping the device and update its status in the map. Additionally, if you click on the name, the configuration page for that device appears. Note that the yellow tab in the upper-left or upper-right corner of the popup points to the light whose information is being displayed.

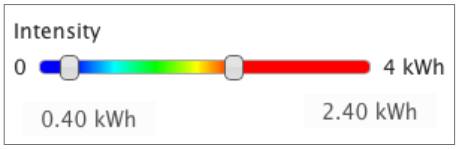


Click anywhere on the zoom control to zoom in or out.

In the lower-right corner of the map, click-and-drag the re-size control to re-size the map window.

Adjust the Facility Map Color Scheme

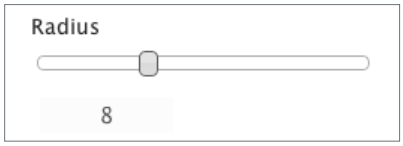
In some instances, to enhance the clarity of the data in a facility map report, you may want to increase or decrease the intensity of the color saturation:



1. Click the **Reporting** tab and select a *Facility Map* report template from the dropdown list.
2. Use the left slider handle to adjust the blue saturation.
3. Use the right slider handle to adjust the red saturation.

Adjust the Facility Map Data Radius

To enhance the clarity of the data in a facility map report, you may want to increase or decrease the radius of the data displayed for each light:



1. Click the **Reporting** tab and select a *Facility Map* report template from the dropdown list.
2. Use the radius slider to adjust the radius of the data for each light until you reach the desired level.

NOTE: Use a screen capture or print screen utility to print facility map reports.

Example Cases

Example Case 1: Using Reports to Improve Energy Efficiency: *Active Power*

Every zone has an active power level setting. You can improve your facility's energy efficiency by identifying areas with low occupancy and adjusting the active power rule for those zones.

General Steps for Tuning the Active Power Level in a Low-Occupancy Area

1. Run a **One Month Occupancy** report and look for patterns showing low occupancy. For example, look for certain days of the week that have substantially lower occupancy levels.
2. Run a **One Day Occupancy** report and look for hours of the day where the occupancy levels are lower.
3. Based on the information gathered in steps 1 and 2, note any patterns of low occupancy.
4. Validate with facility operations that the patterns in fact correspond to lower occupancy.
5. Create a manual profile that, for example, reduces the active power level setting from 100 to 90.
6. During facility downtime, or preferably during an actual time period as identified in steps 1–4, activate the manual profile and evaluate the illumination level using a light meter.
7. Tune the manual profile until the active power level setting is desirable. Record the new setting.
8. Create and schedule a profile for the time periods identified in steps 1–4, and then apply the active power level setting recorded in step 7.

Example Case 2: Using Reports to Improve Energy Efficiency: *Sensor Delay*

Every zone has a sensor delay setting that specifies the delay used by a light before that light switches to the inactive power level. You can improve the facility's energy efficiency by identifying areas with low occupancy and adjusting the sensor delay setting for that zone.

General Steps for Tuning the Sensor in a Low-Occupancy Area

1. Run a One Month Occupancy report and look for patterns showing low occupancy. For example, look for certain days of the week that have substantially lower occupancy levels.
2. Run a One Day Occupancy report and look for certain hours of the day where the occupancy levels are substantially lower.
3. Based on the information gathered in steps 1 and 2, note the patterns of low occupancy.
4. Validate with facility operations that the patterns in fact correspond to lower occupancy.
5. Create a manual profile that, for example, reduces the sensor delay from **1 minute down to 30 seconds**.
6. During facility downtime, or preferably during an actual time period as identified in steps 1–4, activate the manual profile and evaluate the sensor delay setting.
7. Tune the manual profile until the sensor delay setting is desirable. Record the new setting.
8. Create a scheduled profile for the time periods identified in steps 1–4, and apply the sensor delay setting recorded in step 7.

Chapter Six
Configuration

Overview

Working with Profiles

Working with Zones

Editing Light Settings

Working with Coordinated Control-Enabled Lights

Working with Daylight Harvesting-Enabled Lights

Working with Rooms

Working with Control Stations

Downloading the Map File

Adding a Monitor, Keyboard, and Mouse

Example Cases

NOTE: The configuration features require "Operations" or "Administration" user permissions. For configuration instructions covering the optional LightRules Keypad see Chapter 10, and for instructions covering the optional LightRules Power system, see Chapter 11.

Overview

What Configuration Steps Occur During Installation?

During LightRules installation, the installer uses building drawings and information gathered during the planning process to create a ***map file*** specific to your facility. The map file contains all of the configurable settings LightRules needs to perform manual control, automated control, and reporting.

What Will I Typically Configure in LightRules?

Following installation, with your lighting system up and running, you will most likely perform these configuration tasks:

- Work with profiles
- Work with zones
- Move lights from one zone to another zone

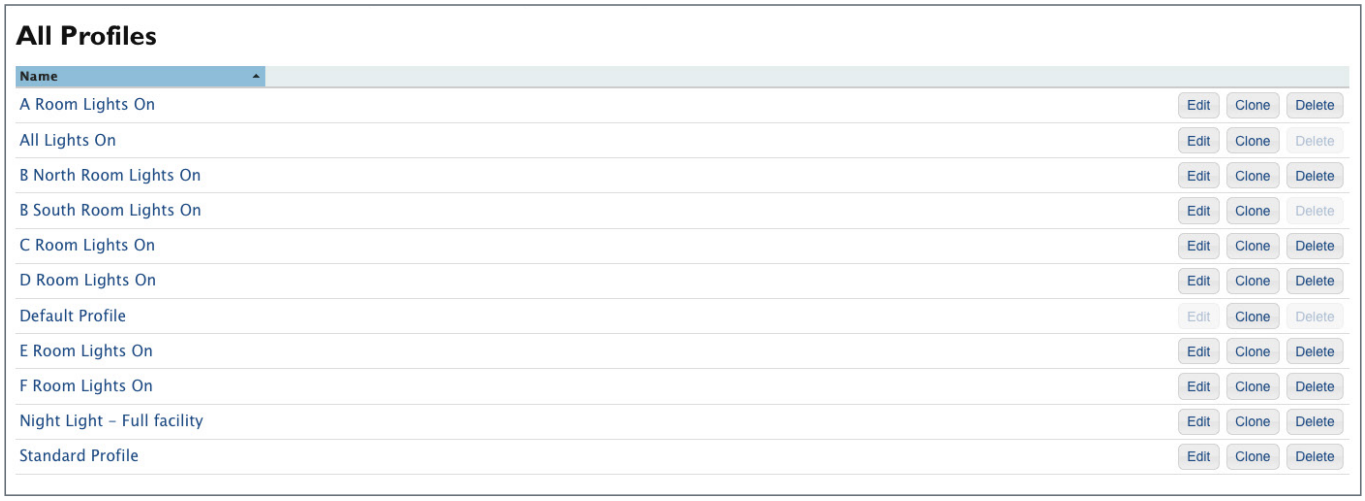
Optionally, over time, you may also perform these configuration tasks:

- Add, edit or delete rooms
- Download (save) the map file

LIGHTRULES EXPERT SAYS: Certain changes do not instantly migrate to the lights; you have to perform a ***sync operation*** in order for the changes to take effect out in the facility. LightRules automatically prompts you when you need to perform a sync.

Working with Profiles

Each light is set up with a default profile during commissioning. To use the LightRules calendar and create a lighting schedule that automates your facility's lighting management, you first have to set up one or more additional profiles.



Creating a New Profile

1. Click the **Configuration** tab and select **Profiles** from the dropdown list.
2. Click **New Profile**.
3. Type a name for the profile.
4. Select a zone.
5. Modify the rule set for the selected zone:
   - Use the right slider to adjust the active power level (20* – 100).
   - Use the left slider to adjust the inactive power level (0 – 100).
   - Enter the desired sensor delay (minimum 30 seconds).
6. Click **Add Rule** and then repeat step 5 for all desired zones.
7. Click **Save**.

* The active power level has a minimum level of 20, for safety purposes.

Creating a New Facility-wide Profile

1. Click the **Configuration** tab and select **Profiles**.
2. Next to the default profile, click **Clone Profile**.
3. Modify the rule set, as desired, for each zone.
4. Click **Save**.

Editing or Cloning an Existing Profile

1. Click the **Configuration** tab and select **Profiles**.
2. Within the row of the profile you wish to modify, click **Edit** or **Clone**.
3. Modify the rules for each zone, as desired
4. Click **Save**.

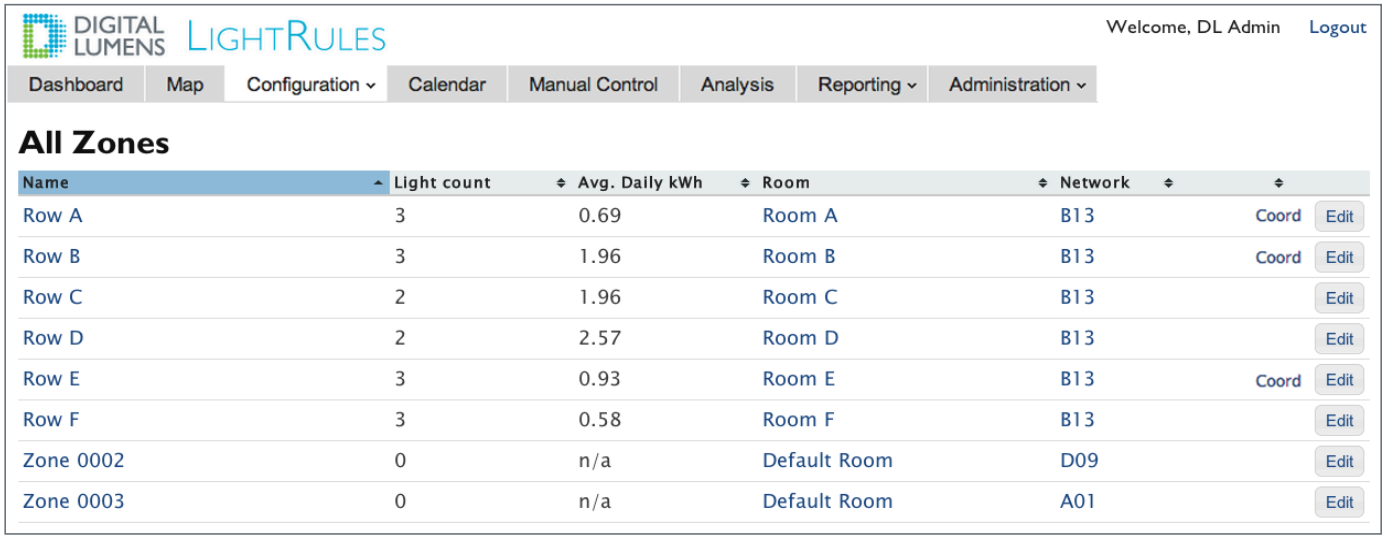
Deleting a Profile

1. Click the **Configuration** tab and select **Profiles**.
2. Within the row of the profile you wish to modify, click **Delete**.
3. Click **OK** to confirm deletion.

NOTE: You cannot delete a profile that is in use or scheduled in the calendar.

Working with Zones

To create a profile, you first have to create zones.



Creating a New Zone

1. Click the **Configuration** tab and select **Zones**.
2. Click **New Zone**.
3. Type a name for the zone.
4. Select the appropriate **Network ID** (gateway) from the dropdown list.
5. Select the appropriate room from the dropdown list.
6. (Optional) Check ***ignore occupancy sensors*** if a set of lights have sensors that must be disabled due to an unusual installation circumstance (such as large fans moving within the range of the motion). For zones with this flag, the profile editor shows a single slider to set both active and inactive lighting levels.
7. (Optional) Check ***safety lighting*** to activate the minimum active/inactive light level specified in Administration General Settings (see page 75).
8. (Optional) Check ***coordination enabled*** to permit coordinated control for the zone (for more information on coordinated control, see page 60).
9. (Optional) Type a text description of the zone.
10. Click **Create Zone**.

The new zone becomes active when you (a) add lights to it and (b) schedule a profile containing the new zone.

Editing an Existing Zone

1. Click the **Configuration** tab and select **Zones**.
2. Within the row of the zone you wish to modify, click **Edit**.
3. (Optional) Change the zone's room assignment.
4. (Optional) Check ***ignore occupancy sensors*** if the facility chooses not to use occupancy sensing.
5. (Optional) Check ***safety lighting*** to activate the minimum active/inactive light level specified in Administration General Settings.
6. (Optional) Check ***coordination enabled*** to permit coordinated control for the zone (for more information on coordinated control, see page 60).

NOTE: When a zone is coordination enabled, "coord" appears in that zone's row within the All Zones list. This setting locally enables/disables coordinated control for all lights assigned to the effected zone. Note that there is a global setting that enables/disables coordinated control for the entire system (see "Editing General Settings" on pages 74-76).

LIGHTRULES EXPERT SAYS: Maps with coordinated control generally have a greater number of zones because the light(s) designated as coordination master within a zone trigger all of the other lights in that zone. Therefore, if a zone — with coordinated control enabled — has 500 lights, all 500 lights are triggered by a single coordination master. This may or may not be preferable to the facility.

7. (Optional) Change the text description.
8. Click **Update Zone**.
9. Perform a sync:
   - On the dashboard, in the Map Changes Pending prompt, click **Sync or Revert**.
   - Review the list of pending changes.
   - Click **sync**.

Merging Two Zones

With the merge feature, you can combine two zones with the same Network ID into a single zone:

1. Click the **Configuration** tab and select **Zones**.
2. Within the row of the zone you wish to merge into another zone (the zone you select here will disappear after the merge), click **Edit**.
3. Click **Merge**.
4. Select the destination zone from the dropdown list on zones with the same Network ID.
5. Click **Merge**.
6. Perform a sync:
   - On the dashboard, in the Map Changes Pending prompt, click **Sync or Revert**.
   - Review the list of pending changes.
   - Click **sync**.

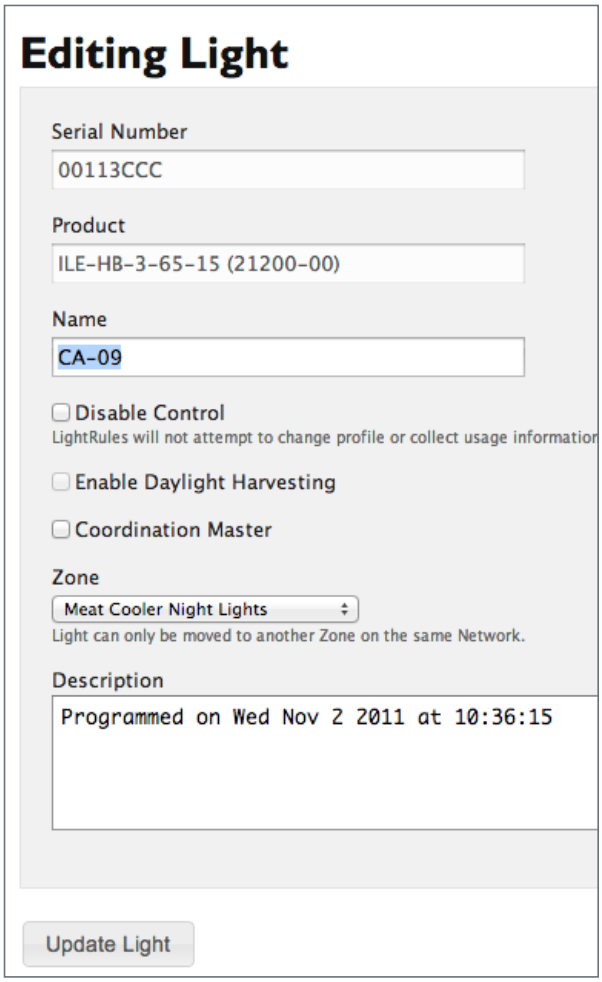
NOTE: When you merge zones, the rule of the destination zone is retained.

Splitting a Zone

With the split feature, you can split a single zone into two separate zones. This is a quick way to change the zone rule for a subset of a zone:

1. Click the **Configuration** tab and select **Zones**.
2. Within the row of the zone you wish to split, click **Edit**.
3. Click **Split**.
4. Name the new zone and select the lights you want to add to that zone.
5. Click **Split**.Perform a sync:
   - On the dashboard, in the Map Changes Pending prompt, click **Sync or Revert**.
   - Review the list of pending changes.
   - Click **sync**.

Editing Light Settings



Move a Light to a Different Zone

1. Click the **Configuration** tab and select **Lights**.
2. Within the row of the light you wish to modify, click **Edit**.
3. Select a new zone from the dropdown list.
4. Click **Update Light**.
5. Perform a sync:
   - On the dashboard, in the *Map Changes Pending* prompt, click **Sync or Revert**.
   - Review the list of pending changes.
   - Click **sync**.

NOTE: You can move a light between zones with the same Network ID. If the desired destination zone has a different Network ID, you must use Commissioner software to make the change.

Rename a Light

1. Click the **Configuration** tab and select Lights from the dropdown list.
2. Within the row of the light you wish to modify, click **Edit**.
3. Type a new light name.
4. Click **Update Light**.
5. On the dashboard, in the Map Changes Pending prompt, click **Sync or Revert**:
   - On the dashboard, click **sync**.
   - Review the list of pending changes.
   - Click **sync**.

Disable Control

The **Disable Control** feature increases network speed when a light in the map is known to be missing, powered off, or experiencing connectivity issues. Only check this option for lights meeting the aforementioned conditions.

Working with Coordinated Control-Enabled Lights

LightRules is compatible with coordinated control-enabled lights. During installation, installers enable coordinated control and assign coordination masters using Digital Lumens Commissioner software.

In LightRules, you must perform the following two steps to enable coordinated control and then designate lights as coordination masters.

Step 1: Enable Coordinated Control at the Global Level

1. Click the **Administration** tab and select **General Settings**.
2. Check the **Enable Coordinated** feature.
3. Click **Save Settings**.

Step 2: Enable Coordinated Control at the Zone Level

1. Click the **Configuration** tab and select **Zones**.
2. Within the row of the light you wish to modify, click **Edit**.
3. Check the **Coordination Enabled** feature.
4. Click **Update Zone**.
5. Perform a sync:
   - On the dashboard, in the Map Changes Pending prompt, click **Sync or Revert**.
   - Review the list of pending changes.
   - Click **sync**.

Step 3: Designate a Light as a Coordination Master

A light designated with a coordination master flag will trigger all lights in its zone. After enabling coordinated control at the local and global levels, you can designate a light as a coordination master:

1. Click the **Configuration** tab and select **Lights**.
2. Within the row of the light you wish to modify, click **Edit**.
3. Check the **Coordination Master** feature.
4. Click **Update Light**.
5. Perform a sync:
   - On the dashboard, in the Map Changes Pending prompt, click **Sync or Revert**.
   - Review the list of pending changes.
   - Click **sync**.

NEW Disable Coordinated Control at the Profile Level

Once enabled for a fixture or zone, coordinated control is operating at all times by default. To turn off coordinated control for certain times, disable the function in a specific profile:

1. Click the **Configuration** tab and select **Profiles**.
2. Within the row of the profile you wish to modify, click **Edit**.
3. Check the **Disable CC** feature.
4. Click **Save**.

Working with Daylight Harvesting-Enabled Lights

LightRules is compatible with daylight harvesting-enabled lights. During installation, installers perform daylight calibration on each enabled fixture using Digital Lumens Commissioner software.

In LightRules, you must perform both of the following steps to enable daylight calibrated lights:

Step 1: Enable Daylight Harvesting at the Global Level

1. Click the **Administration** tab and select **General Settings**.
2. Check the **Enable Daylight Harvesting** feature.
3. Click **Save Settings**.

Step 2: Enable Daylight Harvesting at the Fixture Level

1. Click the **Configuration** tab and select **Lights**.
2. Within the row of the light you wish to modify, click **Edit**.
3. Check the **Enable Daylight Harvesting** feature.
4. Click **Update Light**.
5. Perform a sync:
   - On the dashboard, in the Map Changes Pending prompt, click **Sync or Revert**.
   - Review the list of pending changes.
   - Click **sync**.

NOTE: Once you perform both steps, LightRules displays a "DH" next to each light that is actively daylight harvesting.

NEW Disable Daylight Harvesting at the Profile Level

Once enabled for a fixture or zone, daylight harvesting is operating at all times by default. To turn off daylight harvesting for certain times, disable the function in a specific profile:

1. Click the **Configuration** tab and select **Profiles**.
2. Within the row of the profile you wish to modify, click **Edit**.
3. Check the **Disable DH** feature.
4. Click **Save**.

Working with Rooms

As your facility floor plan changes over time, you may need to edit rooms in LightRules. LightRules utilizes the room designations you create in order to create detailed room reporting.

Create a New Room

1. Click the **Configuration** tab and select **Rooms**.
2. Click **New Room**.
3. Type a new room name and/or text description.
4. Click **Create Room**.

5. Edit one or more zones by assigning those zones to the new room.
6. On the dashboard, in the Map Changes Pending prompt, click **Sync or Revert**:
   - On the dashboard, click sync.
   - Review the list of pending changes.
   - Click sync.

Edit an Existing Room

1. Click the **Configuration** tab and select **Rooms**.
2. Within the row of the light you wish to modify, click **Edit**.
3. Type a new room name and/or text description.
4. Click **Update Room**.
5. On the dashboard, in the Map Changes Pending prompt click **Sync or Revert**:
   - On the dashboard, click **sync**.
   - Review the list of pending changes.
   - Click **sync**.

Managing the Map File

When you make changes to zones, lights, rooms, keypads, power meters, or power gateways, you are effectively changing the map file. Commissioner software from Digital Lumens is used during installation to create the map file. Later, when you add lights or gateways, Commissioner is used again to perform the programming.

LIGHTRULES EXPERT SAYS: You will need to use Commissioner software to move lights from one network to another, move the visual position of a light in the facility map, and/or update the facility map background image.

Downloading the Map File

Commissioner requires the latest version of the map file before any new programming work can occur. To download (save) the map file, follow these steps:

1. Click the **Configuration** tab and select **Download Map File**.
2. Browse to the desired save location, and then click **Save**.

Uploading the Map File

After editing the map file in Commissioner, you must upload the updated file to LightRules:

1. Click the **Configuration** tab and select **Upload Map File**.
2. Browse to the desired save location, and then click **Upload**.
3. On the dashboard, in the Map Changes Pending prompt, click **Sync or Revert**:
   - On the dashboard, click **sync**.
   - Review the list of pending changes.
   - Click **sync**.

Adding a Monitor, Keyboard, and Mouse

LightRules is a web-based application accessible via any web browser on the facility's enterprise network. The system can also be set up in a stand-alone configuration with a keyboard, monitor, or mouse.

1. Press and release the power button. The LightRules appliance will power down in about 15-20 seconds. If the system has not powered down after one minute, press and hold the power button until the appliance turns off.
2. Connect the keyboard, monitor, and mouse devices.
3. Press the power button to reboot the appliance.

Example Cases

Example Case 1: Designing Zones

Be thoughtful when creating or editing the zones in each area of the facility. Think about the way each area of the facility is used and design the zones accordingly.

For example, to create visual cues corresponding to the beginning and end of each aisle (where the rest of the lights are off if there is no occupancy), create zones for those areas when the lights are configured as night lights. Similarly, create a zone with night lights if there is a cross-aisle running through the middle of a warehouse area.

Guidelines for Designing and Editing Zones

- Create night light zones at the beginning and end of each aisle.
- If there are cross-aisles, create night light zones containing the lights in those cross-aisles.
- In freezer areas, or any areas with low occupancy, create zones with shorter occupancy sensor delays.
- In busy warehouse storage areas, or any area with high occupancy, create zones with longer occupancy sensor delays.

Example Case 2: Designing Profiles

Think about occupancy on weekdays versus weekends and also occupancy by shift. Design profiles accordingly. For example, create profiles with the night lights inactive power level turned down. Similarly, you can adjust occupancy sensor delays to match the lower occupancy.

Guidelines for Designing and Editing Profiles

- Create and schedule profiles for weekdays versus weekends.
- Create and schedule profiles according to the time of day/shift.
- Create and schedule holiday profiles.

Chapter Seven
Analysis

Overview

How it Works

Running a What-if Report

NOTE: The analysis features requires "Reporting" user permissions.

Overview

LightRules utilizes scheduled profiles to automate lighting. Each profile contains a set of zones, which in turn specify the settings — active power level, inactive power level, and sensor delay — that are designed to optimize energy usage.

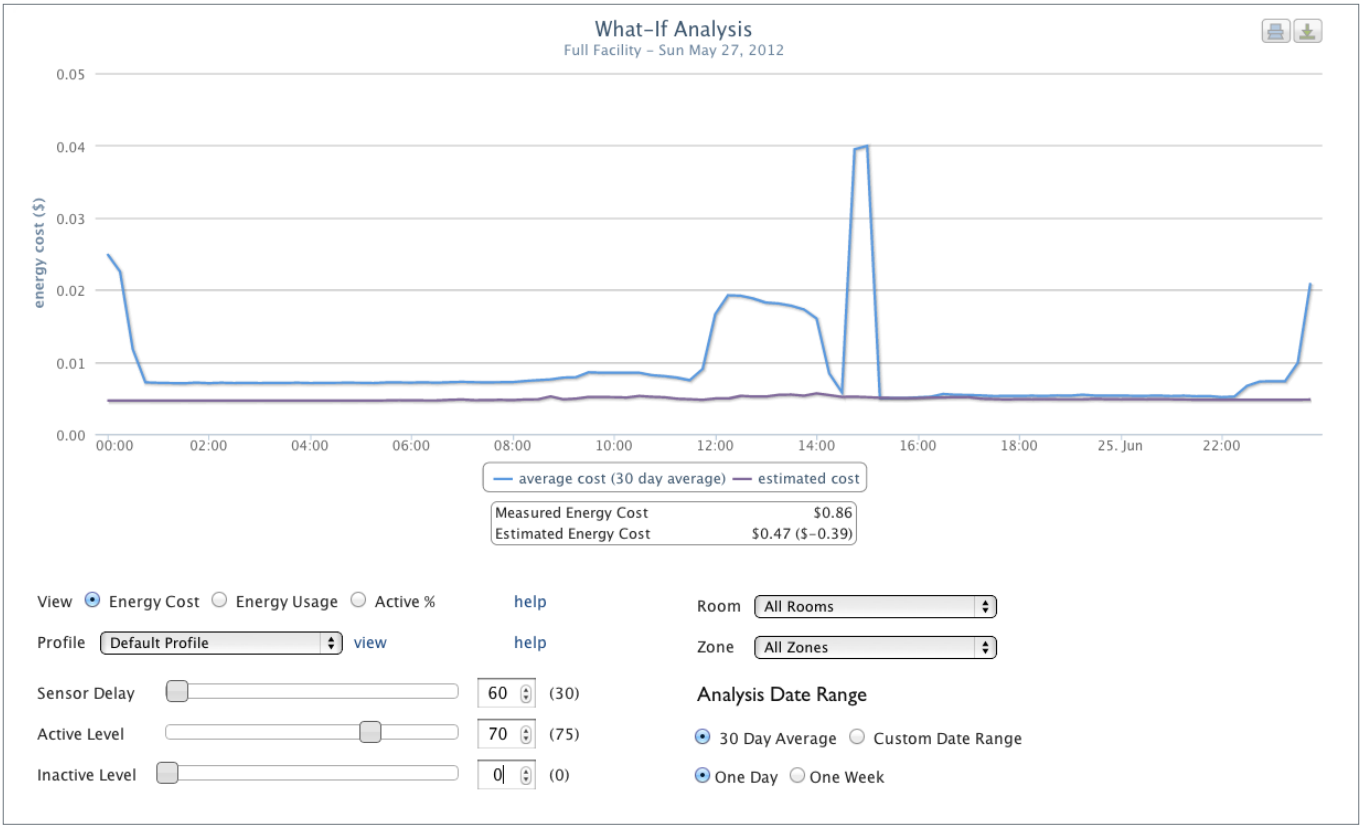
Using historical data, the analysis tool provides predictive insights that help LightRules administrators further refine the active power level, inactive power level, and sensor delay settings and thus reduce energy usage.

How it Works

- LightRules takes historical data from a specified period of time, for a selected profile and graphs a chart line showing the *measured* energy cost, energy usage, or active %.
- In order to get the best estimates, you should select the profile which best represents how the selected lights were configured during the Analysis Date Range. This may be the Default Profile, or possibly a different profile.
- LightRules displays sliders for sensor delay, active power level, and inactive power level. The initial values are obtained by averaging the settings across all the lights in the selected profile.
- As the user changes the slider settings, LightRules graphs a new chart line showing what the *estimated* energy cost, energy usage, or active % would be if those settings were implemented.
- The user can then refine the report by selecting a specific room or zone.
- Based on the settings identified in the analysis, an administrator could then evaluate existing profile settings edit some or all profiles accordingly.

LIGHTRULES EXPERT SAYS: When adjusting the active level, keep in mind that there is a minimum acceptable light level for the facility. Use a light meter to identify the minimum acceptable light level before making permanent changes to zones.

Running a What-if Report



1. Click the **Analysis** tab.
2. Select one of the following report types:
   - **Energy Cost:** Creates a comparative analysis of measured data versus predicted data, in dollars.
   - **Energy Usage:** Creates a comparative analysis of measured data versus predicted data, in kWh.
   - **Active %:** Displays the amount of time that lights will be in active mode, based on the sensor delay.
3. Select the most frequently used profile.
4. Adjust the sliders to graph the estimated difference with the new settings applied.

HINT: The numbers in parentheses indicate the starting settings.

5. (Optional) Enter a new date range.
6. (Optional) Click the print icon to print the report.
7. (Optional) Using the settings on the printed report, edit the profile accordingly.

Chapter Eight
Administration

Overview

Working with User Accounts

About General Settings

Editing General Settings

Editing Date & Time Settings

(Optional) Setting Up SMTP Email Settings

Editing Networks & Firmware

Backup and Restore

Upload Product Spec File

Shutdown

NOTE: Administration features require "Administration" user permissions.

Overview

User Permissions Levels

There are three user permission levels — a user may have one, two, or all three levels. Each level grants access to a portion of the user interface, as follows:

The following actions require Reporting permission:

- All report actions
- What-if Analysis

The following actions require Operations permission:

- Push profiles via manual control
- Cancel manual control
- Ping a light or gateway
- Operator Override - view stations page, start override, cancel override

The following actions require Admin permission:

- All user setup functions
- Network, room, zone, and light configuration
- Data backup
- Site configuration
- Discover operation
- Upload/Download map files
- Operator Override - edit stations, view stations

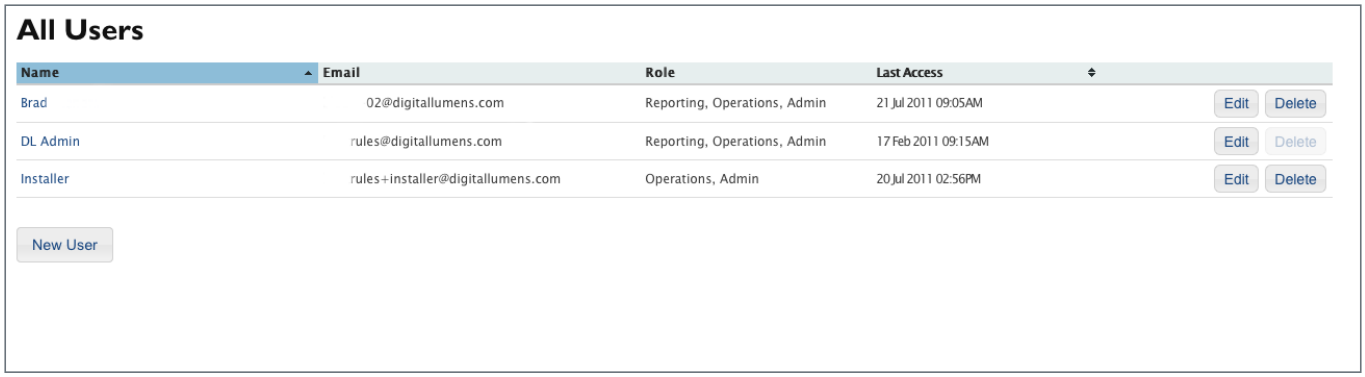
The following actions require Operations or Admin permission:

- View and modify the calendar
- View networks, rooms, zones, and lights via the Configuration tab
- View and edit profiles

The following actions require Station Operator permission:

- Start Override
- Cancel Override

Working with User Accounts



Create a User Account

1. Click the **Administration** tab and select **Users**.
2. Click **New User**.
3. Type a user name.

HINT: Use a consistent naming convention for all LightRules users.

4. Type the user's email address.
5. (Optional) Select **Set a password now** if the LightRules system is stand-alone and not connected to the facility's enterprise network.
6. Select one or more permission levels by checking the corresponding boxes.
7. Enter the user's phone number for future reference by the system administrator (optional).
8. Click **Create User**.

After creating the account, the new user will receive an invitation email from LightRules. The invitation email contains login details and a link to the LightRules login page.

Edit an Existing User's Permissions

1. Click the **Administration** tab and select **Users**.
2. In the row of the user account you wish to modify, click **Edit**.
3. Edit user parameters as desired.
4. Click **Update User**.

Change a User's Password

1. Click the **Administration** tab and select **Users**.
2. In the row of the user account you wish to modify, click **Edit**.
3. Click **Change password**.
4. Enter the new password and then re-enter to confirm.
5. Click **Update User**.

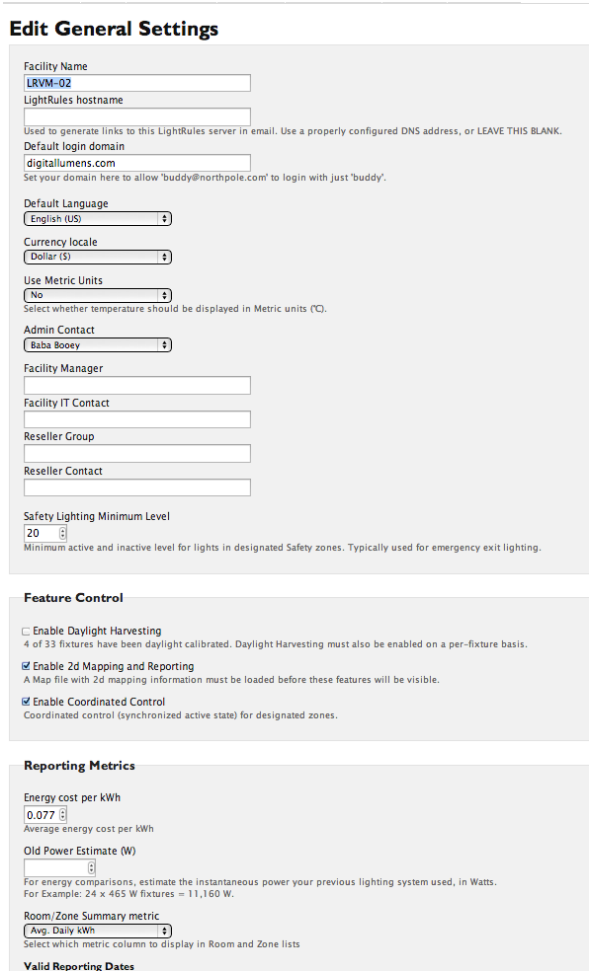
Delete a User Account

1. Click the **Administration** tab and select **Users**.
2. In the row of the user account you wish to modify, click **Delete**.
3. Click **OK** to confirm deletion.

Editing General Settings

1. Click the **Administration** tab.
2. Select **General**.
3. Click **Edit General Settings**.
4. Modify settings as desired.
5. Click **Save Settings**.

Most of the general settings should be configured during installation. However you may modify the following:



Default Language

Select a default system-level language.

NOTE: At login, users may select a language other than the default language. At logout, the language reverts to the default language settings (see page 24 for details).

Currency Locale

Select the desired default currency from the list.

NOTE: Language and currency are independent. For example, a changing the language from English (US) to Français does not alter the default currency.

Admin Contact

All user-related messages are sent from the Admin Contact's email address. For example, the invitation email sent to every new user is sent from the Admin Contact. The Admin Contact is editable.

(Optional) Site Config

If not imported from the map file, enter the names of the facility manager, IT contact, reseller corporate name, and reseller contact person.

Safety Lighting

Enter the global minimum light level, which sets the inactive and active light levels for a zone and prevents lights from turning fully off. To activate the Safety Minimum Level, check the Safety Level feature when editing a zone.

Feature Control

- Check **Enable Daylight Harvesting** to toggle this feature On/Off at the global level. To activate daylight harvesting-enabled lights, you must first enable daylight harvesting at the global level, and then check the **Enable Daylight Harvesting** feature at the fixture level. Once enabled, this option is available at the profile level, where you can view and disable it (see page 63 for details).
- Check **Enable 2D Mapping and Reporting** to toggle the feature On/Off. Unless the facility floor plan has changed, do not un-check this feature.
- Check **Enable Coordinated Control** to toggle this feature On/Off at the global level. To activate coordinated control at the zone level, you must first enable the feature at the global level, and then check the **Coordination Enabled** feature at the zone level. Once enabled, this option is available at the profile level, where you can view and disable it (see page 62 for details).

Energy Cost ($)

Enter an estimation of the facility's *average energy cost* to enable LightRules to report energy cost over time.

NOTE: LightRules does not currently support variable energy rates such as time-of-use or peak demand rates.

Old Power Estimate (W)

To enable baseline reporting, you must enter a value in *total watts*, for the previously installed lighting system. For example, enter 11,160 W if the previous system comprised 24 x 465 W lights.

HINT: The Old Power Estimate feature requires an entry of W (Watts), rather than an entry of kWh (kilowatt hours). Note that this function assumes 24 x 7 operation at constant power.

Room/Zone Summary Metric

Change this value to change what appears in the Configuration tab, under rooms and zones. For example, by default, LightRules displays **<Avg. Daily kWh>** for each room and zone.

Editing Date & Time Settings

1. Click the **Administration** tab.
2. Select **General**.
3. Click **Edit Date/Time Settings**.
4. Modify settings as desired.
5. Click **Save Settings**.

Set Time Zone

Select the appropriate time zone from the dropdown list.

Modify the First Calendar Day

Change this value specify the day of the week on which the calendar begins each week. By default, the week starts on Sunday.

Set Weekdays

Un-check certain days disable those days as weekdays. This feature affects the calendar. For example, if you un-check **Sunday**, Sunday will no longer be available in the **Repeating Weekdays** repeat option.

Set System Clock

As needed, enter the correct time and date.

(Optional) Setting Up SMTP Email Settings

NOTE: By default, LightRules uses the cloud-based Digital Lumens email server to send emails to users. Therefore, in most cases, the email server settings should be left blank. When you enter email server settings, you are effectively overriding the default email configuration.

If the facility requires custom SMTP email server settings, use the following steps:

1. Click the **Administration** tab.
2. Select **General**.
3. Click **Email Server**.
4. Modify settings as desired, based on information supplied by the facility IT department.
5. Click **Save Settings**.

Editing Networks and Firmware

During installation, for instructions on configuring network settings and firmware, refer to the *LightRules 2.10 Installation Master Checklist*, available at **digitallumens.zendesk.com**. Post-installation, contact Digital Lumens technical support before altering the network or firmware settings.

Do not use the "Custom Settings" option to create a static IP address unless instructed to do so by Digital Lumens support or application engineering staff.

Backup and Restore

LightRules offers a backup feature with which you can save data to an external hard drive, and then recover that data if, for some reason, the LightRules Appliance fails.

How to Prepare a Backup Drive for Use with LightRules

1. Choose a USB hard drive that is at least 8 GB (preferably 16 GB) and supports USB 2.0.
2. Plug the hard drive into a Windows® or Macintosh computer.
3. Verify that the hard drive is formatted for a **EXFAT** file system (this is typical for USB drives).
4. Set the Volume Name of the drive to "LRA-BACKUP". This is typically done in the Windows® *Properties* dialog or the MacOS *Get Info* dialog (refer to your operating system help documentation for details).
5. Create a folder at the top level of the hard drive named "Backups".
6. Eject the hard drive from the computer.
7. Plug the hard drive into any open USB port on the LRA. Note that there are USB ports on both the front and back of the computer. The ports on the back may be less likely to be accidentally disconnected.
8. Try a manual backup (see next page) to verify that the disk drive is configured correctly.

Backup Process

Overview

If a backup drive is connected to the LightRules appliance, then LightRules automatically performs nightly backups at 3:30am. To keep the backup disk from filling up, backups older than 30 days may be automatically removed from the backup disk.

Creating a Manual Backup

1. Click the **Administration** tab and select **Backups** from the dropdown menu.
2. Click **Backup Now**. The backup process typically takes 15-30 minutes, but may take longer for large databases.
3. The backup has finished when the **State** column indicates "Complete".

Restore Process

Restoring from a Backup

Only restore from a backup for full system recovery. We do not recommend restoring for the sole purpose of reverting configuration changes, as restoring will permanently discard usage history.

1. Click the **Administration** tab and select **Backups** from the dropdown menu.
2. In the list, select the backup from which you would like to restore, and then click **Restore**. Click **Yes** when prompted. The maintenance screen appears, signifying the beginning of the restore process, which takes about 15-30 minutes.
3. Once the restore has completed, the LightRules Appliance will automatically reboot and you will be directed to the login screen. You may now continue using LightRules.
   - Network configuration will be restored (i.e., IP address)
   - Log in using the restored email and password login information from the original backup.

Upload Product Spec File

Digital Lumens offers a range of lighting products and gateways. To ensure that LightRules has latest product information in its database, you can upload the latest version of the product spec file. Contact Digital Lumens to request the latest product spec file.

Shutdown

To ensure that your LightRules database is not damaged, contact Digital Lumens technical support prior to using the LightRules Appliance shutdown administrative command.

Chapter Nine
Diagnostics

Overview

Diagnostics Screen

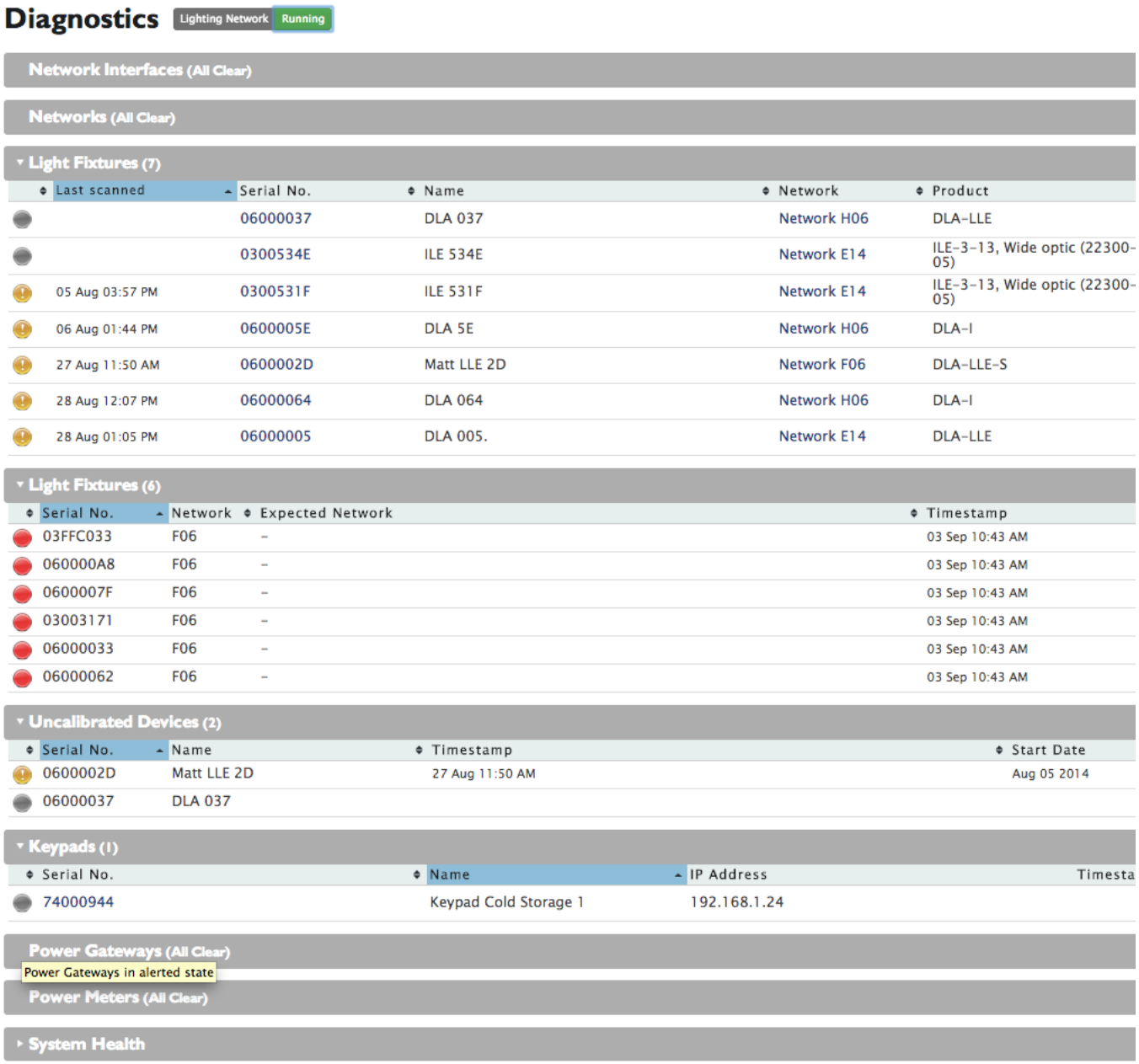
Discovering Lights, Gateways, Keypads, and Power Gateways

NOTE: The diagnostic features require “Admin” and “Operations” user permissions.

Overview

LightRules continually checks the lighting network for connectivity and/or changes to the map file that have not been received by the lights. If there are no issues, LightRules displays "All Clear" on the diagnostics screen.

If there is an issue, LightRules identifies the affected portion of the network and displays an alert icon. Additionally, if LightRules Power is in use, LightRules checks the connectivity of all power meters and gateways.



Diagnostics Screen

Alerts

The diagnostics screen displays seven categories of alerts:

1. **Network Interfaces –** Summarizes any issues with the Ethernet portion of the lighting network. An alert indicates an issue with a network switch or cable.
2. **Networks –** Summarizes any communication issues with the wireless portion of the lighting network. An alert indicates a gateway hardware issue or a change to the map file that has not been synced.
3. **Lights –** Summarizes any communication issues with individual lights. An alert indicates a light hardware issue or a change to the map file that has not been synced.
4. **Uncalibrated Devices –** Lists all DLA devices requiring additional programming. DLA programming is performed using Digital Lumens Commissioner 2.10 software.
5. **Keypads –** Displays any communication issues with the keypads. An alert indicates a hardware issue.
6. **Power Gateways –** Displays any communication issues with individual power gateways. An alert indicates a hardware issue (power gateway configuration changes do not require a sync).
7. **Power Meters –** Displays any communication issues with individual lights. An alert indicates a hardware issue (power meter configuration changes do not require a sync).

What Action Should I Take?

In many instances, pinging the device will refresh its state and clear the alert:

1. Mouse over the alert icon for a description of the alert state.
2. Click the icon to ping the affected network or device.
3. When the icon refreshes, if the alert state changes to a green check mark, then the network or device is functioning normally and no further action is required.

   If the alert state does not change, then do the following:
   - Verify that the device is powered (by observing the device's indicator LED).
   - Use the discover feature to determine if there has been a hardware change (see next page). If a new device is discovered by LightRules, you must update the map file using Commissioner software from Digital Lumens.

     or

     If the hardware has not changed, reboot the hardware associated with the alert.

If the alert still appears after you perform the above steps, contact Digital Lumens technical support via email: **support@digitallumens.com**

If you need immediate assistance, please contact Digital Lumens technical support by telephone:

+1 (617) 723-1200, extension 3

Discovering Lights, Gateways, Keypads, and Power Gateways

When new light, gateway, keypad, or power gateway has been installed, you can identify the new hardware via the discover diagnostic feature.

NOTE: A new light from the factory will be assigned the default Network ID, "Factory Default Network". Prior to installation, the light must be configured with a new Network ID via Commissioner software (see the *Commissioner 2.10 Admin Guide* for details).

Discover a New Light

1. Click the **Configuration** tab.
2. Select **Networks** from the dropdown list and click on the Network ID you believe contains the light.
3. Click **Discover Lights**.
4. LightRules indicates a newly discovered light (return to step 2 if no lights are discovered).
5. The map file needs to be updated. Use Commissioner software to update the map file.

Discover a New Gateway

1. Click the **Configuration** tab.
2. Select **Networks** from the dropdown list and click on the Network ID you believe contains the gateway.
3. Click **Discover Gateway** and then click **OK**.
4. LightRules lists the serial numbers of all found gateways. Compare the quantity of serial numbers and the serial number strings to the information displayed on the All Networks screen:
   - *A* If the quantity of serial numbers is the same, and the strings are the same, then no new gateways have been discovered. Verify proper hardware installation.
   - *B* If the quantity of serial numbers is the same, but the strings are different, then a gateway has been replaced with a new device.
   - *C* If the quantity of serial numbers is greater, then a gateway has been added.
5. For *B* and *C*, the map file needs to be updated. Use Commissioner software to update the map file (see the *Commissioner 2.10 Admin Guide* for details).

Discover a New Keypad

1. Click the **Configuration** tab.
2. Select **Keypads** from the dropdown list.
3. Click **Discover Keypads** and then click **OK**.
4. LightRules indicates a newly discovered keypad (return to step 2 if no keypads are discovered).
5. The map file needs to be updated. Use Commissioner software to update the map file.

Discover a New Power Gateway

1. Click the **Configuration** tab.
2. Select **Power Gateways** from the dropdown list.
3. Click **Discover Power Gateways** and then click **OK**.
4. LightRules indicates a newly discovered power gateway (return to step 2 if no keypads are discovered).
5. The map file needs to be updated. Use Commissioner software to update the map file.

Chapter Ten
LightRules Keypad

Overview

Working with Keypads

NOTE: Keypad configuration features require "Operations" or "Administration" user permissions. Keypads are an optional accessory that allows users to push a lighting profile to a zone or zones of lights from a physical keypad.

Overview

What Keypad Configuration is Performed with Commissioner Software?

During LightRules installation, the installer creates a map file. The map file contains all of the configurable settings LightRules needs to perform manual control, automated control, and reporting. Additionally, the map file contains basic keypad information, including serial numbers, IP addresses, and physical locations (refer to the *Commissioner 2.10 Admin Guide* for details).

What Keypad Configuration is Performed in LightRules?

Each keypad needs to be configured with manual profile assignments for buttons 1-8. This step is done in LightRules.

LIGHTRULES EXPERT SAYS: When adding or removing keypads, the map file must be updated; use Commissioner software to update the map file. However, if you are making changes to the button assignments, Commissioner software is not needed.

NOTE: When you change keypad settings in LightRules, a sync operation is not necessary.

Working with Keypads

Control a Keypad via LightRules

You can "press" the buttons on any keypad virtually via LightRules:

1. Click the **Configuration** tab.
2. Select **Keypads** from the dropdown list and click on the serial number of the keypad you wish to control.
3. The currently selected button appears highlighted in blue.
4. Click on any button to activate the manual profile associated with that button, *as if you were pressing the same button on the actual keypad hardware.*
   The newly selected button will appear highlighted in blue after a few seconds.

Cancel a Keypad-Activated Manual Profile

From the LightRules dashboard, you can cancel any manual profile activated by a keypad:

1. If not viewing the dashboard, click the **Dashboard** tab.
2. In the Active Profiles list, identify the manual profile you wish to cancel.
3. Click the "X" to the left of that manual profile.
4. Click **OK**.

Edit Keypad Button Assignments

Each keypad has eight configurable buttons. Assign a manual profile to each button:

1. Click the **Configuration** tab.
2. Select **Keypads** from the dropdown list and click on the serial number of the keypad you wish to edit.

3. Click **Edit**.
4. For each button, select a manual profile from the dropdown list. You can also leave one or more buttons unassigned.
5. (Optional) To specify a duration, in minutes, use to up and down arrows or type in a number.

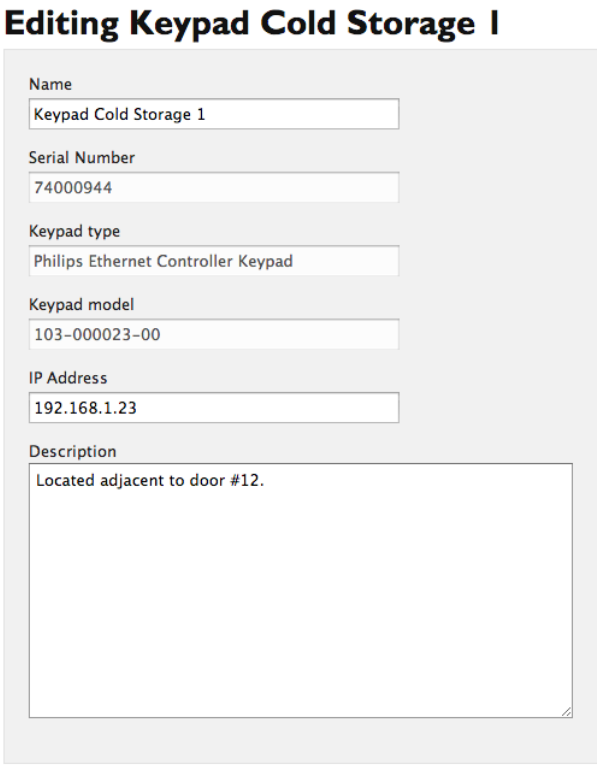
NOTE: If a duration is specified, then the manual profile activated with that button will expire after the specified number of minutes. If no duration is specified ("0"), the manual profile will remain active until canceled.

6. Click **Update Keypad**.

Edit Keypad General Settings

In general, you will use Commissioner software to edit keypad general settings. However, in some instances — for example, an IP address conflict — you may need to edit certain keypad general settings right away.

1. Click the **Configuration** tab.
2. Select **Keypads** from the dropdown list and click on the serial number of the keypad you wish to edit.
3. Click **Edit**.
4. Click **Edit** again**.**
5. Edit the keypad name, description, or IP address.
6. Click **Update Keypad**.



Chapter Eleven
LightRules Power

Overview

Working with LightRules Power

Power Reporting

NOTE: LightRules Power configuration features require "Operations" or "Administration" user permissions.

Overview

What LightRules Power Configuration Steps are Performed with Commissioner Software?

LightRules Power is non-lighting electrical load metering equipment that is purchased, installed, and integrated with LightRules. Without a license key, LightRules will display Power functionality in the user interface, but the system will not collect or report on power data.

During LightRules installation, the installer creates a map file. The map file contains all of the configurable settings the system needs to perform manual control, automated control, and reporting. Additionally, the map file contains basic power meter and power gateway information, including serial numbers, IP addresses, MAC addresses, DHCP settings, and physical locations (refer to the *Commissioner 2.10 User's Guide* for details).

What LightRules Power Configuration is Performed in LightRules?

The map file contains device serial numbers, IP addresses, and physical locations. However, each power meter needs to be configured with a group assignment (for reporting purposes, the meters are grouped). This step is done in LightRules.

LIGHTRULES EXPERT SAYS: When adding or removing power meters or power gateways, the map file must be updated; use Commissioner software to update the map file. However, if you are making changes to the power meter group assignments, Commissioner software is not needed.

NOTE: When you change power-related settings in LightRules, a sync operation is not necessary.

Working with LightRules Power

Create a New Meter Group

LightRules creates energy reports based on how the power meters are grouped together. For example, you can keep each power meter separate by creating a new group for each meter, or, you can group certain meters together so as to aggregate the data.

1. Click the **Configuration** tab.
2. Select **Power Meter Groups** from the dropdown list and then click **New Meter Group**.
3. Enter a *Name* and *Description*.
4. Click **Create Power Meter group**.

Assign a Power Meter to a Meter Group

1. Click the **Configuration** tab.
2. Select **Power Meters** from the dropdown list and then click on the serial number of the power meter you wish to edit.
3. Select the desired meter group from the dropdown menu.
4. Click **Update Power Meter**.

Move a Power Meter to a Different Meter Group

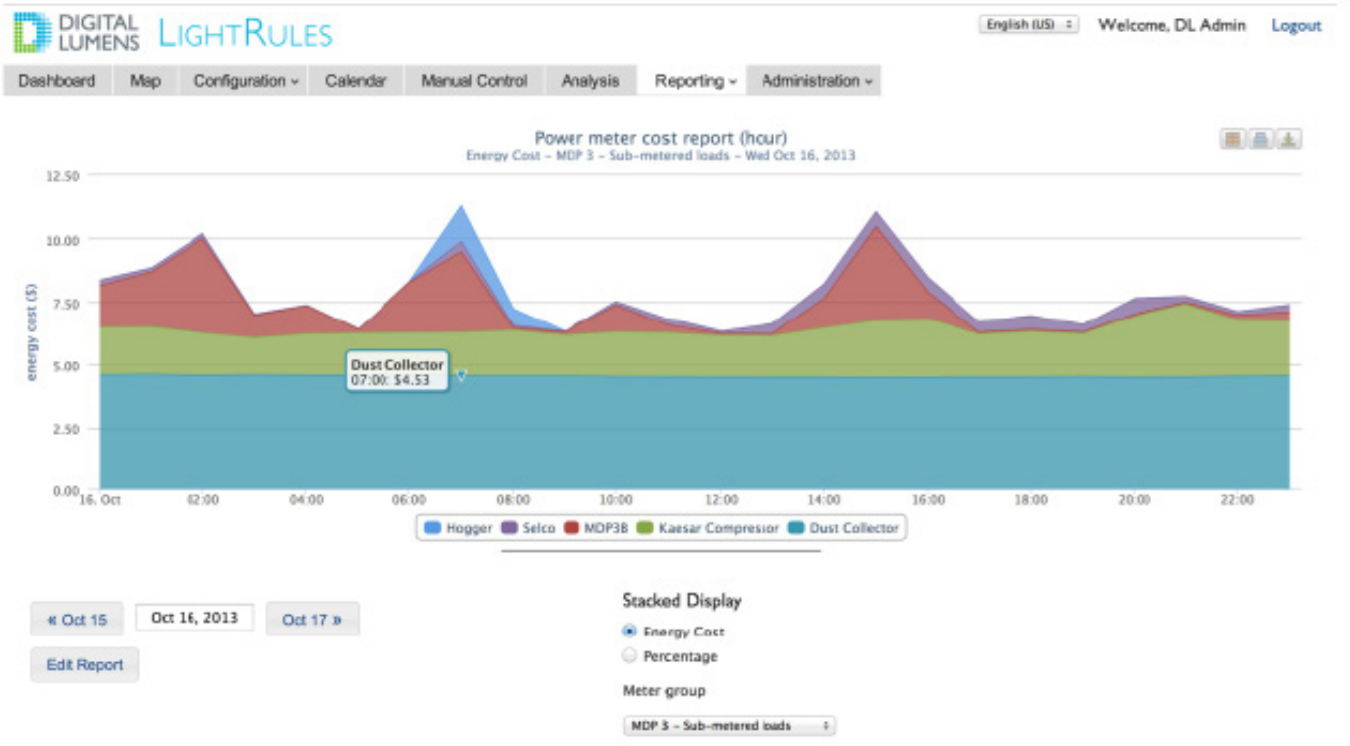
1. Click the **Configuration** tab.
2. Select **Power Meters** from the dropdown list and then click on the serial number of the power meter you wish to edit.
3. Select the new meter group from the dropdown menu.
4. Click **Update Power Meter**.

LightRules Power Reporting

Overview

When LightRules Power is configured, additional energy use and energy cost reports appear in the Reporting menu. Additionally, you can create custom energy use and energy cost reports.

Data is reported according to meter group; if only one piece of electrical equipment is assigned to a group, then data will be reported for just that equipment. If multiple pieces of equipment are assigned to a group, then the aggregate data for that equipment will be reported.



Running and Customizing Metered Power Reports

Filter a Report By Meter Group

1. Run a LightRules Power report; for example, "Metered Power - One Day Cost".
2. In the Meter Groups panel of the report screen, select the meter group by which you want to filter results.
3. LightRules auto-refreshes the results.

Edit a Metered Power Report Template

1. Click the **Reporting** tab and select **Manage Reports**.
2. Click **Edit** for the desired LightRules Power report.
3. Modify one or more of the parameters.
4. (Optional) Check the Favorite box to add the report template to the favorites list on the dashboard.
5. Click **Update Report**.

Create a New Template

1. Click the **Reporting** tab and select **Manage Reports**.
2. Click **New Report**.
3. Select **Metered Power Report**.
4. Type a name for the report.
5. Modify one or more of the parameters.
6. (Optional) Check the Favorite box.
7. Click **Create Report**.

Clone an Existing Template

1. Click the **Reporting** tab and select **Manage Reports**.
2. Click **Clone** for the desired report template.
3. Click **Edit** for the newly created template.
4. Change the report name.
5. Modify one or more the parameters.
6. (Optional) Check the Favorite box to add the report template to the favorites list on the dashboard.
7. Click **Update Report**.

Delete a Metered Report Template

1. Click the **Reporting** tab and select **Manage Reports**.
2. Click **Delete** for the desired report template.
3. Click **OK** to confirm deletion.

Appendices

Appendix A: Glossary

Appendix B: Examples of Typical LightRules Profiles

Appendix C: LightRules Reporting Theory of Operation

Appendix A: Glossary

Active Power Level

The light intensity level used when occupancy has been detected.

Alert Icon

Graphically displays the network connectivity status of a light or gateway.

Baseline Analysis

A comparative reporting function in LightRules that compares real, historical data from LightRules versus the energy usage of the previously installed lighting system and versus an LED system without intelligent control.

Block

A scheduled profile on the LightRules calendar.

Calendar

The visual interface via which you create a lighting schedule and automate lighting management.

Calibration

See below, daylight harvesting calibration.

CAT-5/5e/6 Cable

Standard Ethernet cable used to connect the LightRules appliance in a server room or office to the gateways in the facility ceiling.

Commissioner Software

The software toolset used to create a map files and calibrate daylight harvesting lights during system installation.

Configuration Hierarchy

To create lighting profiles and enable detailed reporting, LightRules uses a hierarchical system containing the following: lights, zones, rooms, and networks.

Coordinated Control

Links the occupancy sensor activity of one light fixture to all other fixtures within the same zone. For example, when a fixture designated as a coordination master detects motion and turns On, the rest of the fixtures in the zone also turn On.

Coordination Master

One or more fixtures in a zone whose occupancy sensors trigger all of the other fixtures in the same zone when an occupancy event is detected.

CSV (Comma-Separated Value) File

A simple, plain text file format for data that can be read by spreadsheet software, warehouse management systems, and more.

Daylight Harvesting

Lights that use sensors to detect daylight and reduce output accordingly.

Daylight Harvesting Calibration

Daylight-harvesting-enabled lights must be calibrated using the Commmissioner software to integrate with LightRules.

Demand-Response (drop call)

Some facilities participate in demand response programs to limit their energy use during periods of peak demand on the electrical grid.

DLA

Intelligent node that transforms a Digital Lumens LLE fixture, or third-party fixture, into a LightRules-ready fixture. Each DLA houses the sensing, dimming, and wireless communications components found in Digital Lumens intelligent fixtures.

Discover

A diagnostic feature that searches a network for new light or gateway hardware that does not match the map file.

Enterprise Network

The facility's corporate network. LightRules connects to the facility network so that users can access the LightRules web interface and receives LightRules email.

Facility Map

The facility map display lighting system settings and statuses as a graphical overlay on top of the facility floor plan.

Facility Map Report

Facility map reports display occupancy data, energy usage, and energy cost data in a graphical overlay on top of the facility floor plan.

Gateway

The network bridge that enables communication between the wired Ethernet portion of the LightRules system and the wireless lights.

Gang Toggle Switch

A convenience feature that enables a user to change multiple zone rules in unison.

Graph Report

Graph reports are traditional LightRules reports (compared to facility map reports, which are graphical overlays on top of the facility floor plan).

Inactive Power Level

The amount of light delivered by a light when the area under the light is not occupied (no motion, or the delay after end of detected motion expires).

Keypad

The LightRules Keypad is an optional, wall-mounted accessory device that enables lighting profile button control from within the facility, rather than via LightRules. The keypad has eight configurable buttons.

Lighting Network

The dedicated network in a facility that contains the LightRules appliance, Ethernet components (CAT-5/5e/6 cable and network switches), gateways, and lights.

Light Meter

A device used to measure illumination at the task level (floor level).

LLE

The LLE is a linear LED light fixture from Digital Lumens. The LLE requires a DLA for intelligent operations.

Map File

The settings file containing all lights, zones, rooms, and networks. Commissioner software creates the map file and LightRules can edit some aspects of the map file.

Manual Profile

A profile that overrides the lighting schedule for a temporary period of time.

Map Changes Pending

System message indicating configuration changes have been made in LightRules that need to be applied to fixtures, network, and the map file.

Network ID

Each gateway is given a unique Network ID. Up to 50 lights can be assigned to each Network ID.

Network Switch

An Ethernet component that connects CAT-5/5e/6 cable from the LightRules appliance to the gateways.

Night Light

A light that never turns completely off. During periods of inactivity, a night light dims to a level of illumination still visible from a distance.

Peak Demand Surcharge

Commercial and industrial electricity consumers typically pay a peak demand charge in addition to a consumption charge to account for maximum power use at some point in a billing period.

Ping

An attempt by LightRules to test network connectivity with a light or gateway. Following the ping, LightRules updates the device's alert icon.

PoE (Power over Ethernet)

Means of transmitting power over Ethernet cables to devices, eliminating the need for additional AC wiring and use of power adapters.

Power Gateway

If configured with LightRules Power functionality, the power meters in the facility communicate to and from the LightRules Appliance via power gateways.

Power Meter

If configured with LightRules Power functionality, LightRules reads precise eletrical consumption data from power meters. Power meters can be connected to any electrical equipment in the facility.

Power Meter Group

Every power meter must belong to a power meter group, otherwise LightRules will not report the data for that power meter. A single power meter can comprise a meter group, or multiple power meters can comprise a group.

Profile

Defines the various allowed behavior states of zone lighting fixtures within a facility. This includes active and inactive light levels, zone group behaviors, coordinated control, and response to daylight conditions.

Push

Send new settings over the lighting network to the lights and/or gateways.

Revert

Cancel pending map changes.

RF (radio frequency) Range

The wireless range of wireless devices not separated by any walls.

Room

Every zone is assigned to a room. Rooms correspond to the actual physical spaces in the facility, enabling detailed reporting.

Rule

The settings applied to a zone (and all lights within that zone). The rule specifies active power level, inactive power level, and the sensor delay.

Safety Lighting

An admin setting that specified the minimum active and inactive light levels and prevents lights from turning fully Off.

Scheduled Profile

A profile that automatically triggers based on the lighting schedule set up in the LightRules calendar.

Sensor Delay

The amount of time before a light switches to inactive power level.

Stand-Alone System

A LightRules system that is not connected to the facility's enterprise network.

Sync Operation

The function that pushes new settings over the lighting network to the lights and/or gateways, updating those devices.

User Permissions

LightRules users receive one or all three of the following user permissions, each of which enables access to a different area of the LightRules interface: • Reporting • Operations • Administration

What-if Analysis

Predict the impact of various lighting settings on the facility's overall energy use.

Zone

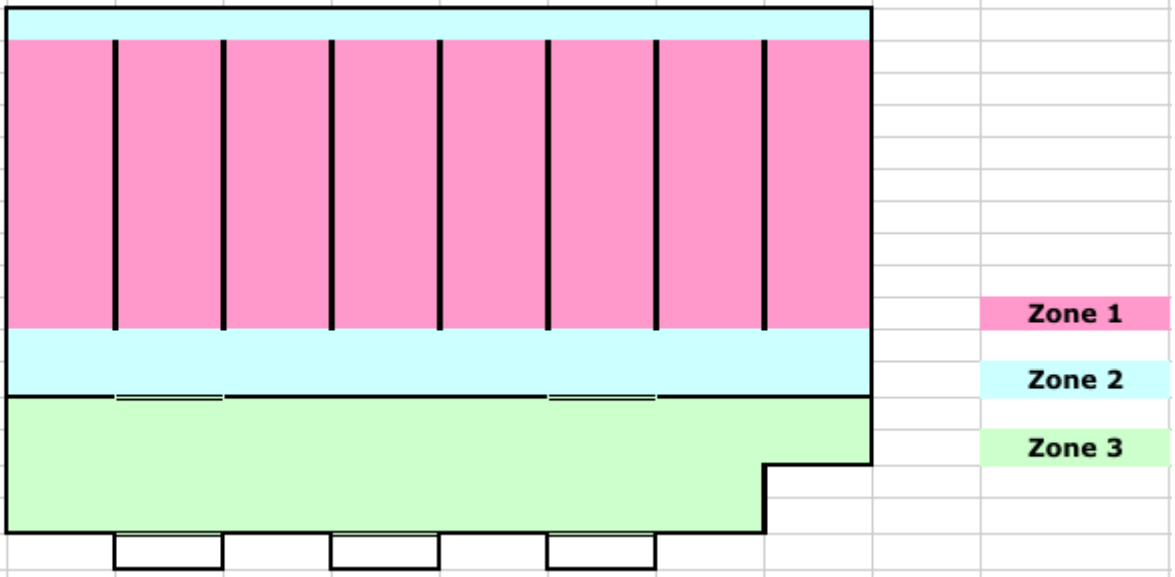
A group of lights within wireless range of each other to which you want to assign the same settings (active power level, inactive power level, and sensor delay). The lights in the same zone have identical behaviors.

Appendix B: Examples of Typical Profiles

A profile is a list of rules for some or all configured zones. To take effect, the profile must be pushed manually (see page 29) or scheduled as a block in the calendar. The following pages provide examples of typical profiles and their assigned rules.

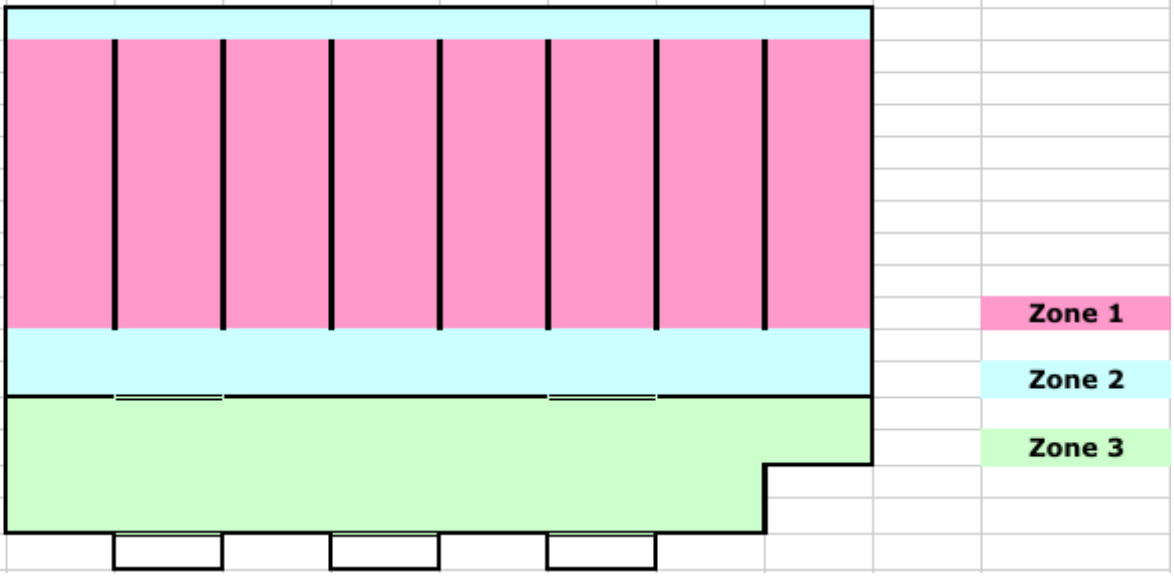
Example One: *Normal Operations* Profile

Profile	Normal Operations			Backshift			Maintenance		
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
Active	100	100	100	80	80	80	100	100	100
Inactive	0	5	20	0	0	0	30	30	30
Sensor Delay	60	30	180	30	30	30	300	300	300



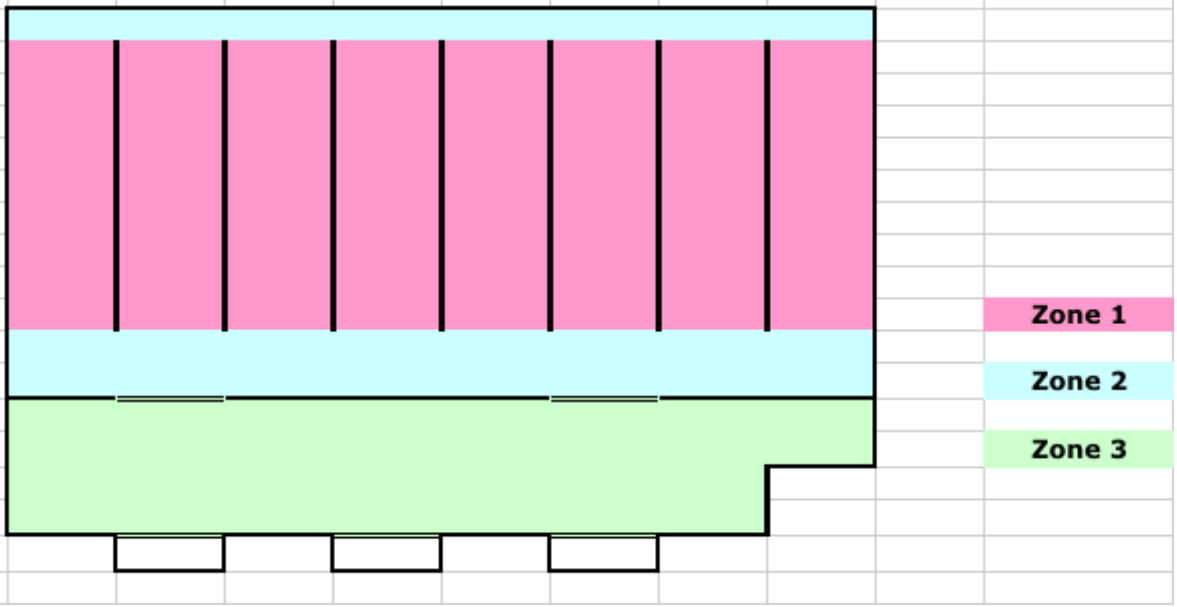
Example Two: *Backshift* Profile

Profile	Normal Operations			Backshift			Maintenance		
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
Active	100	100	100	80	80	80	100	100	100
Inactive	0	5	20	0	0	0	30	30	30
Sensor Delay	60	30	180	30	30	30	300	300	300



Example Three: *Maintenance* Profile

Profile	Normal Operations			Backshift			Maintenance		
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
Active	100	100	100	80	80	80	100	100	100
Inactive	0	5	20	0	0	0	30	30	30
Sensor Delay	60	30	180	30	30	30	300	300	300



Appendix C: LightRules Reporting Theory of Operation

This appendix describes how LightRules gathers data from the lights and reports on that data:

- Lights record detail about when they are in active power level and inactive power level modes.
- Lights record detail about occupancy sensor events.
- LightRules polls all lights, retrieving detailed log information on a 15-minute cycle.
- Each time LightRules successfully communicates with a light, it remembers the "last seen" time.
- After each polling cycle, LightRules examines the detail from each light, counting the time the light was in the active and inactive modes. LightRules also uses the occupancy sensor events to count the time during which the area under each light was occupied.

NOTE: In some instances, a light may be configured with a dimming level above 0 for its inactive mode setting. For example, some lights — "night lights" — are configured this way for safety.

- From the recorded information, LightRules calculates the light's total Energy Usage (kWh) for each 15-minute interval. All reporting is based on either Energy Usage or Occupancy (time occupied as a percentage of total time).
- If the Average Energy Cost (dollars per kWh) is configured (see page 75 for details), LightRules can also display reports in Energy Cost by multiplying the Energy Usage (kWh) by Average Energy Cost ($/kWh) to get an estimation of the Energy Cost for the given time.

NOTE: The Energy Cost calculation does not take into account variable energy cost or peak usage billing. It is meant as a convenience for LightRules users who are more comfortable viewing reports in monetary amounts than kilowatt-hour.

- Energy Usage and Occupancy values for each light per 15-minute interval are then aggregated into Zone/Interval, Room/Interval, and Total Facility/Interval values.
- Room/Interval and Facility/Interval values are aggregated into One Hour and One Day durations, resulting in Room/Hour, Room/Day, Facility/Hour, and Facility/Day values.

In LightRules 2.10, the following aggregated values are exposed in the reporting system:

Room/Interval

Room/Hour

Room/Day

Zone/Interval

Zone/Hour

Zone/Day

Facility/Interval

Facility/Hour

Facility/Day

- Each light may be designated in one zone, and each zone may be designated in one room. Only the current light:zone zone:room mapping is used in aggregation, so aggregation includes only data captured since the last mapping change, whereas historical mappings are not aggregated.

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www.digitallumens.com
374 Congress Street, Suite 600
Boston, MA USA 02210
+1 (617) 723-1200

DOC-000367-00 Rev A 04-15