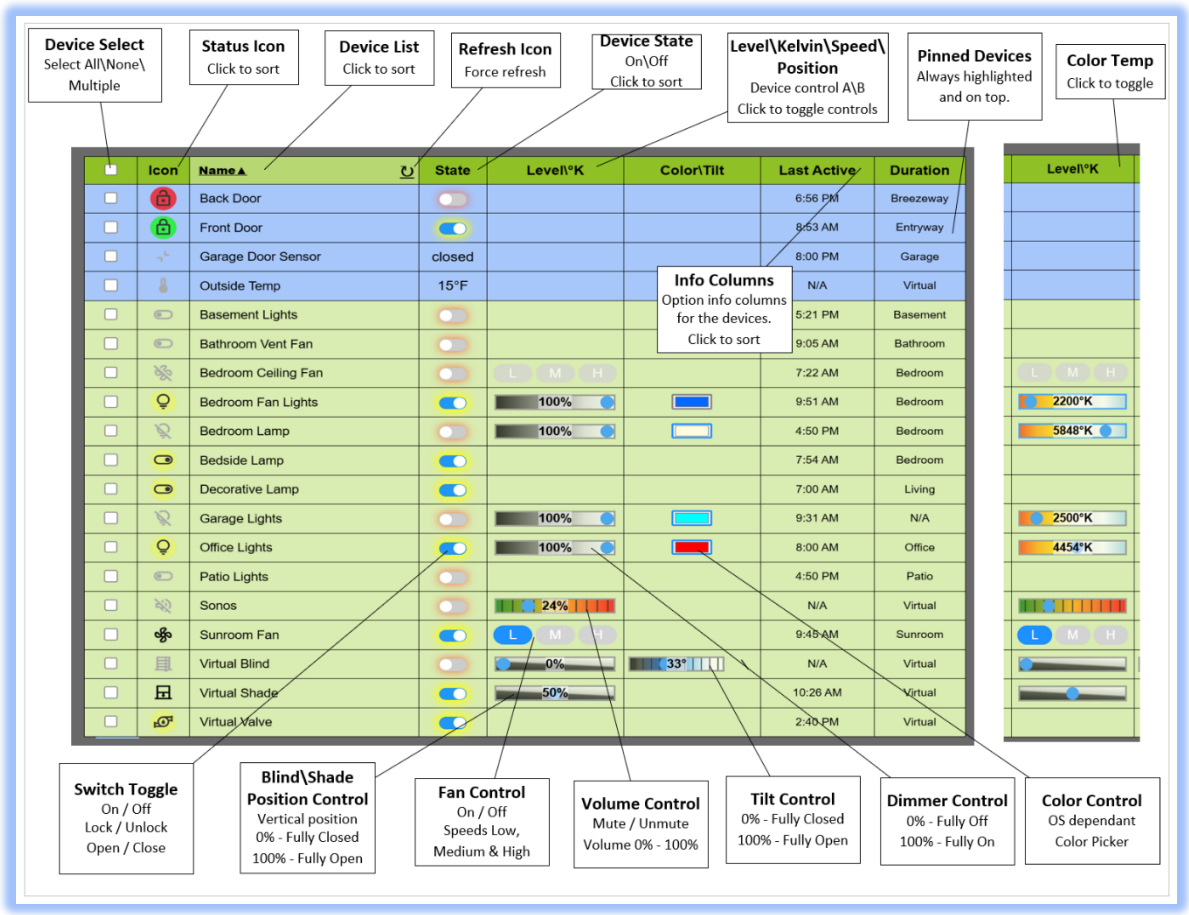
Remote Builder
SmartGrid 3.1.1 Help
(1/10/25)

Table of Contents

Introduction

SmartGrid combines the tabular format of Tile Builder with the ability to control a variety of Hubitat devices via a dense but intuitive interface that can be accessed with a modern browser via phone, gridt or desktop from anywhere in the world. SmartGrid is part of the Remote Builder collection of applets so if you have not already installed the Remote Builder parent and SmartGrid child app please do so now. Installation instructions for the Remote Builder Parent App can be found here.

Typical SmartGrid Appearance

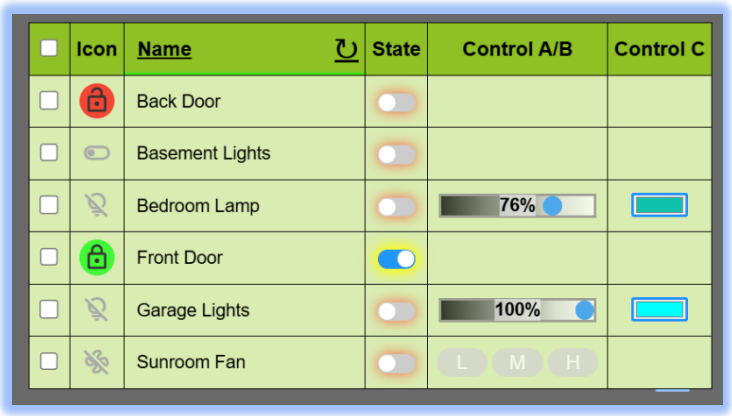


Originally designed for use with bulbs it has since been expanded to handle Valves, Locks, Fans, Garage Doors, Shades, Blinds, Volume plus contact, temperature and water sensors. The ability to multi-select devices and change them all simultaneously is a convenient way to work with groups of devices but especially lights as they are both common and complex.

Create a New SmartGrid

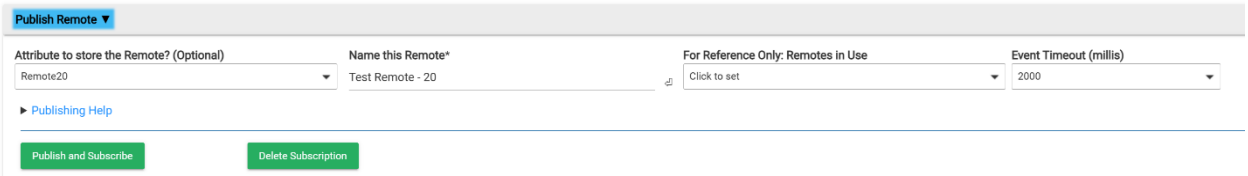
After you have installed the SmartGrid child module you can select to “Add SmartGrid” from the parent.

First you must select the devices you wish to work with in your grid. If you wish you can select from a filtered list by selecting a required capability like “Color Devices” or “Dimmer”, or you can leave it at the default and all supported device types will be available. Once you have selected devices the SmartGrid will be displayed and show all the current values. It will look something like this depending on the type of devices you select and their state:



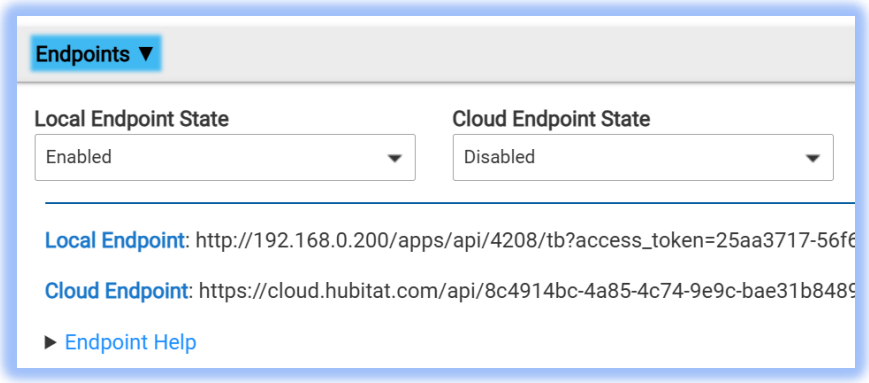
The first 4 columns will always be populated however the content of the two control columns will only be populated as needed. In the above example the **Basement Lights** is a simple switch so the first control column **Control A/B** is not relevant and is therefore empty, as is the **Control C** column. In the case of the **Sunroom Fan** the first control column is filled with a fan speed control and so forth. **Note:** Clicking on the header of a control column will switch between available controls such as Level (dimmer) and Color Temperature.

Before your SmartGrid will work correctly you must perform a Publish and Subscribe. Go to the Publish Remote section and give it a name, then select the Attribute to publish to and click on **Publish and Subscribe.** We will come back to the Event Timeout later, but it functions the same way as it does in Tile Builder.



That is all that you need to do to get your SmartGrid up and running. You can now use the applet to control your devices, and the on-screen version will update automatically when changes are detected.

To access your SmartGrid from any device you simply need access to the Endpoint links which can be found in the Endpoint section as shown below.



By default, only the Local Endpoint is enabled. You can click on the **Local Endpoint** label or simply copy the link and share it or store it as you see fit.

How Updates Work?

SmartGrid gets its updates in one of three possible ways.

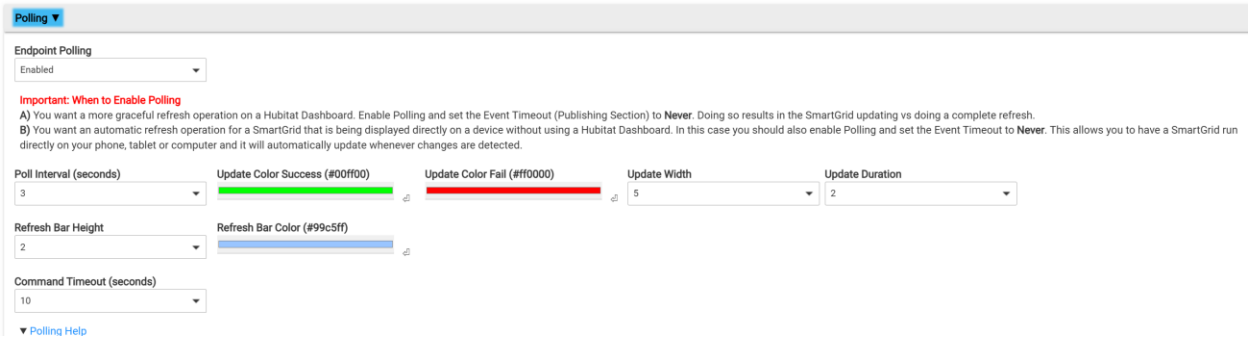
1) You can perform a manual refresh of the device states at any time by clicking on the Refresh icon in the far right of the Device Name column. This does a complete reload of the app and it's data.
2) If you choose to embed a SmartGrid into a Hubitat dashboard then the SmartGrid will be refreshed every time that the underlying data changes because of the event subscriptions. This is controlled by the Event Timeout control in the Publishing section mentioned earlier.
3) SmartGrid can also poll the Hub and ask "Got any changes" to which the Hub will respond "No." or "Yes, and here they are." Polling can be Enabled\Disabled and the polling frequency can be changed within the polling section of the app.

While there are three methods only methods 2 and 3 are completely automatic so we will focus on those. The rule of thumb is if you are using the SmartGrid within a Hubitat dashboard then you would disable Polling and configure a small Event Timeout period (~2000ms). If you plan to launch the SmartGrid mostly from a browser on a phone, gridt or desktop then you would enable polling, configure an appropriate polling period and then set the Event Timeout to "**Never**"

Of course, if you plan to use SmartGrid simultaneously in both scenarios then you would leave both methods enabled. The Event Timeout method is the same one used in Tile Builder so I will skip over that and talk about polling because that is new.

Polling

The polling configuration interface looks like this:



You will find each of these properties explained in the inline Polling Help which is repeated here:

You can configure the SmartGrid to poll the endpoint and apply any changes that are found. If there are no changes the SmartGrid goes back to sleep until the next poll interval.
Poll Interval: The frequency at which the Hub will be contacted to ask if there are any updates available.
Poll Update Success Color: When updates are applied the Grid will be outlined in the selected color.
Poll Update Failure Color: When updates are requested but no changes are received within the command timeout period the Grid will be outlined in the selected color.
Poll Update Width: The width of the outline in pixels when updates are applied.
Poll Update Duration: The duration in seconds that the Success\Failure outline is displayed.

Refresh Bar: The Refresh Bar is displayed beneath the SmartGrid and is a visual indicator of the polling process. When the bar hits either edge then a polling event will occur and any changes will be picked up.
Refresh Bar Height: The height of the bar beneath the SmartGrid that identifies the position in the polling cycle.
Refresh Bar Color: The color of the bar beneath the SmartGrid that identifies the position in the polling cycle.
Command Timeout: The amount of time allowed to pass without a response from the Hub before a command request is deemed to have failed.

You should now be able to create a SmartGrid and configure access according to your own needs.

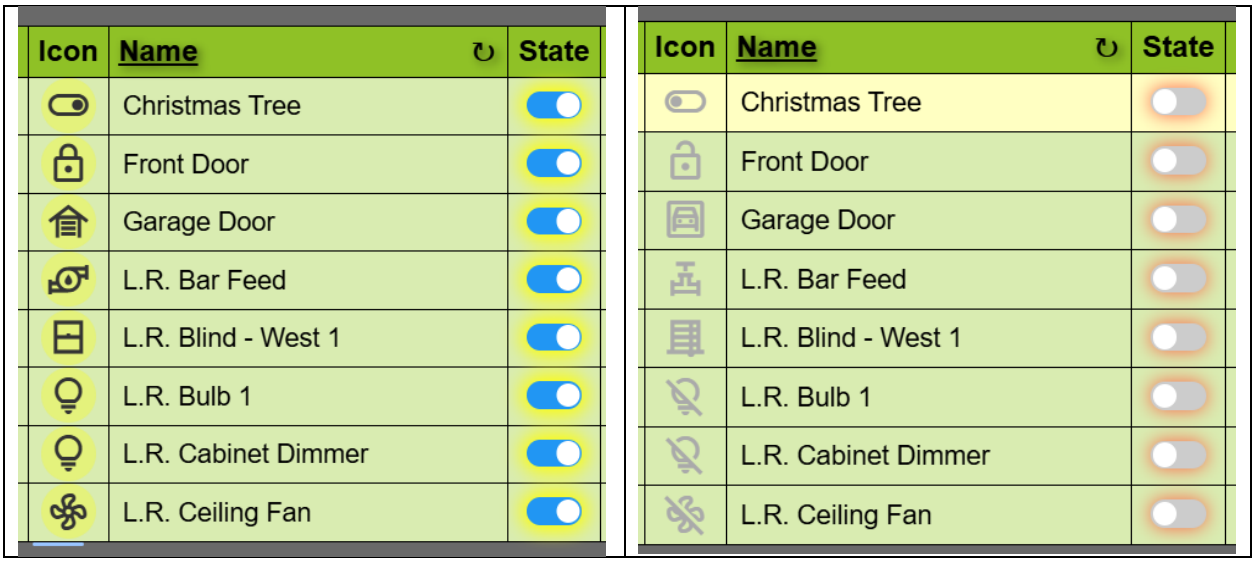
About Device State

The control in the device state column represents an On/Off switch which is common among devices like bulbs and power switches. But what about devices like Locks (Locked\Unlocked), Valves, Blinds and Garage Door Controllers (Open\Closed)?

In Remote Builder all binary controls are mapped to Active or Inactive states in accordance with this grid:

Device Type	Active (On)	Inactive (Off)
Switch	On	Off
Bulb	On	Off
Lock	Locked	Unlocked
Valve	Open	Closed
Blinds & Shades	Open (1%-100%)	Closed (0%)
Garage Door	Closed	!Closed
Fans	Low, Medium, High	Off
Volume	Unmuted	Muted
Contact	open	closed
Water Sensor	Wet	dry

If in doubt you can always refer to the Icon column which depicts the state of the various components as shown below.



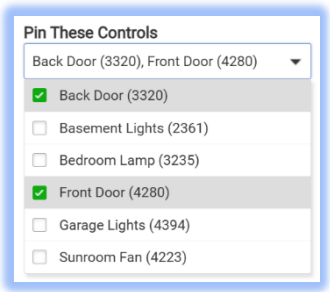
Note: Blinds\Shades have an additional state of 'partially open' and is depicted as a flashing arrow indicating the direction of travel. Garage Doors have two additional states of 'opening' and 'closing' which are also depicted as a flashing arrow in the direction of travel.

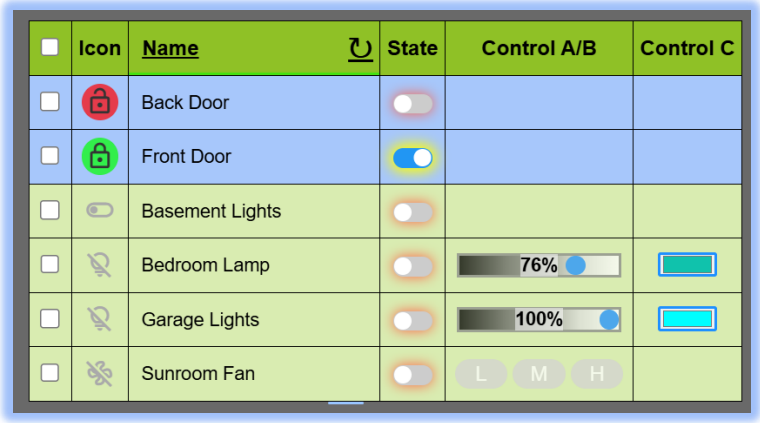
Customizing SmartGrid Content

Pinned Devices

Some devices have a higher priority that others or more frequent use. In these two situations it may be convenient to pin those items to the top of the grid, so they are more readily accessible\viewable.

To do this version 3.1 introduced pinned devices. After you have selected your devices, you can select which devices to pin (if any). In this example I have chosen to pin the Front and Back doors at my house which are both equipped with an electronic lock. The pinned rows will always remain in the same place for consistency.





If you don't like the color of the pinned rows you can change this in the **Customize\Rows** section.

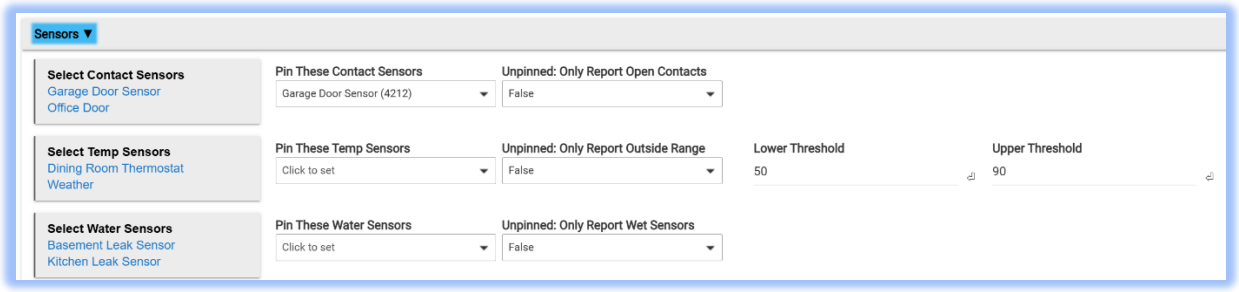
Note: You can also pin sensors which are covered in the next section.

Device Name Modification

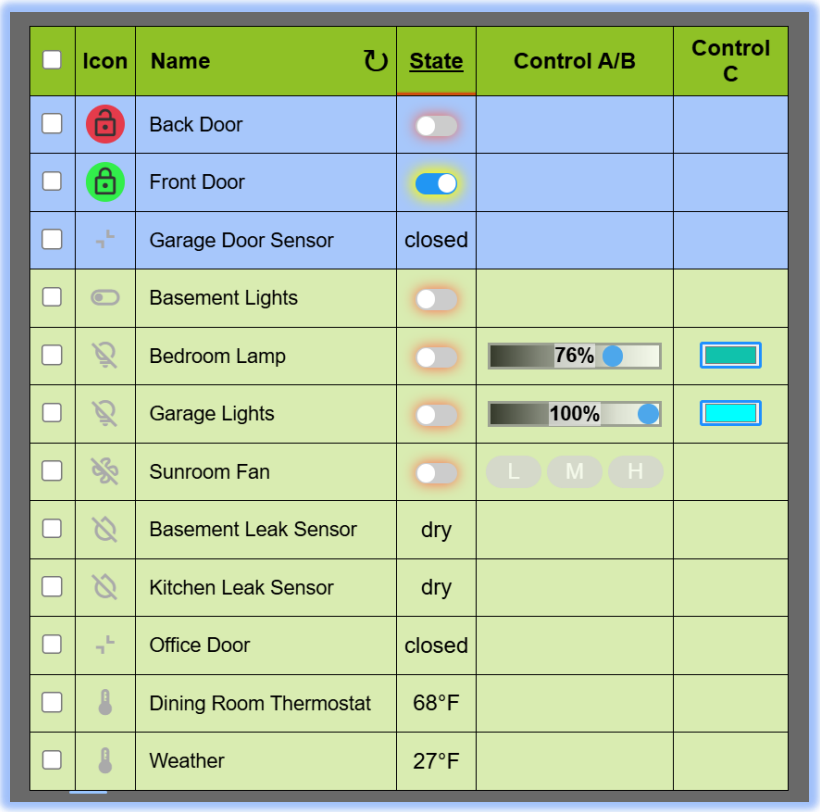
This is a feature borrowed from Tile Builder that allows you to rename the device names within the grid, usually to reduce the length of long names but also to remove unwanted strings: **Patio Light - On Hub1** becomes **Patio Light** for example.

Sensors

In version 3.1 you can also now add contact, temperature and water sensors as shown below.



These can also be pinned as described above. In additional you can opt to only display unpinned sensors if they meet certain conditions. For example, you may select all your contact sensors but choose to only display those which are currently open. With the above sensors added, the Grid now looks like this.



You should now be comfortable creating a grid of controls and sensors and pinning those most useful to you near the top. This gives you a highly functional grid but with minimum customizations. In the following sections we will review the various customization options available to you.

Customizing SmartGrid Appearance

Immediately under the Design SmartGrid heading these options are available.

Endpoint to Display: You can toggle between the local and cloud Endpoints to preview which each of the looks like. Quite often you may choose to only have an Endpoint active when connected to the local network and may leave the Cloud Endpoint disabled.

Max Width: This places an upper limit on the size of the SmartGrid for devices with larger display capabilities. It is not attractive to have the SmartGrid take up the entire width of the browser window on the large screen of a desktop. This setting does not apply to devices with display <= 768px where the SmartGrid will automatically scale to the full width of the browser window.

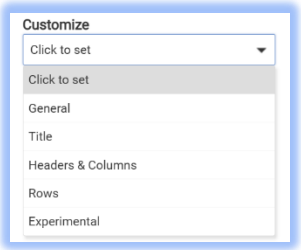
Preview Height: This only affects the size of the preview window so that you can keep the SmartGrid designer controls available without having to scroll. This has no effect on the height of the final SmartGrid on a desktop or mobile device where it will always scale so the entire grid is available to scroll.

Preview Background Color: If you plan to place a SmartGrid within a Hubitat dashboard you can use this control to set the background color to match your existing dashboard to help as a visual aid.

Publish and Subscribe: This button is the same as the button in the publishing section and is placed here for convenience. When changes are made to your SmartGrid it is recompiled automatically. The only time you should need to use this button is if you change the list of devices that are selected.

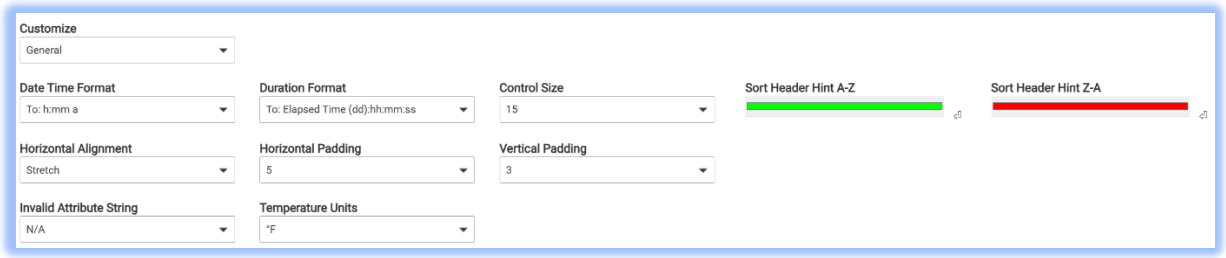
The default settings provide an attractive interface, but you can change many of these settings if you choose. Customizations are performed through the "**Customize**" section as shown below.

We will review each of these sections and discuss the options available in the following sections.



General Settings

The first row of options pertains to how the data will be displayed.



Date Time Format: Any date\time information present in the Info columns will be formatted according to this selection. There are 17 format options available.

Duration Format: Any duration information in the Info columns will be formatted according to this selection. There are two options, either include or exclude seconds.

Control Size: You can adjust the size of the controls on screen from 15px to 30px in height. This can make the interface easier to use on mobile devices.

The second row of options controls some general look and feel of the grid.

Sort Header Hint A-Z: The color that will underline the column header when sorted A-Z.

Sort Header Hint Z-A: The color that will underline the column header when sorted Z-A.

Horizontal Alignment: This controls the horizontal position of the grid on screen for larger format devices (>768 bytes). For smaller format devices such as phones and grids the default will always be **Stretch** which causes the grid to occupy the full width for easiest use.

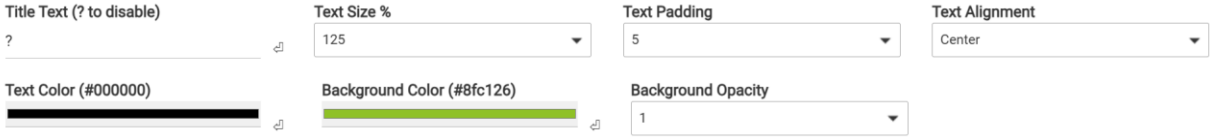
Horizontal Padding: Controls the minimum space between elements within the grid on the horizontal axis. Smaller numbers create a more compact grid. Large numbers create a roomier grid where possible.

Vertical Padding: Controls the minimum space between elements within the grid on the vertical axis. Smaller numbers create a more compact vertical grid. Large numbers create a taller grid.

Invalid Attribute String: This value will be used when the underlying data either does not exist or is of the wrong datatype.

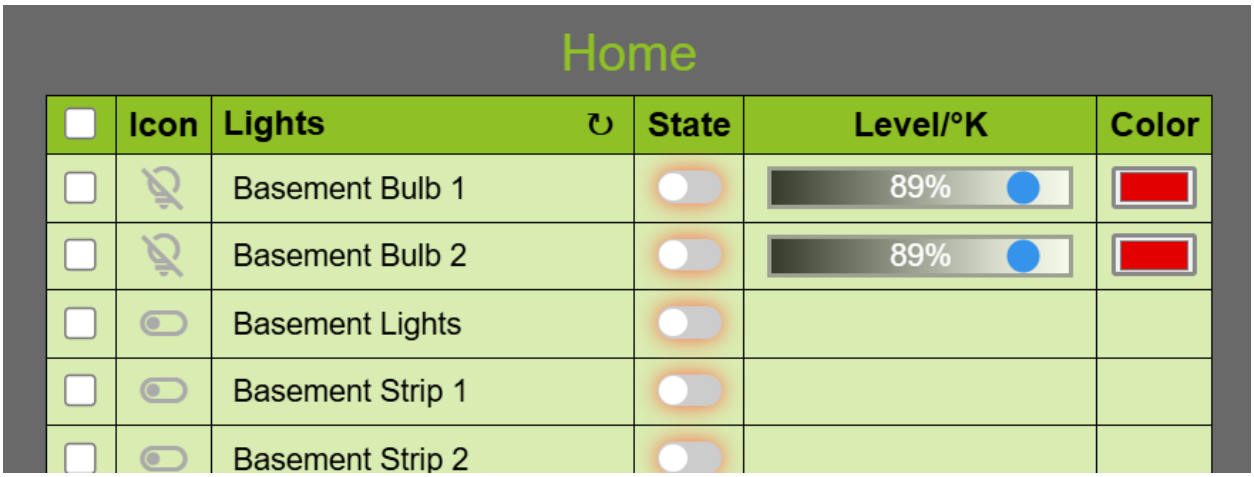
Temperature Units: Used when temperature is selected as an Info column.

Adding a Grid Title



You can add an optional Title to the grid by entering some text in the Title field. Most of the settings are self-explanatory. By changing my settings to these values:

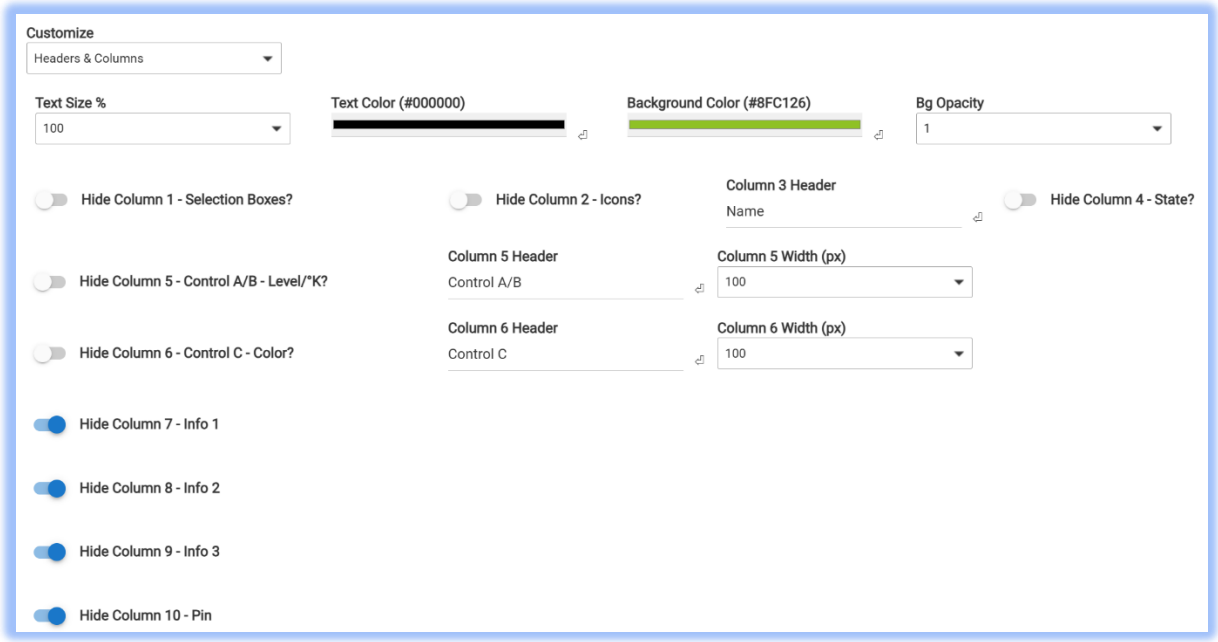
The top of my SmartGrid now looks like this:



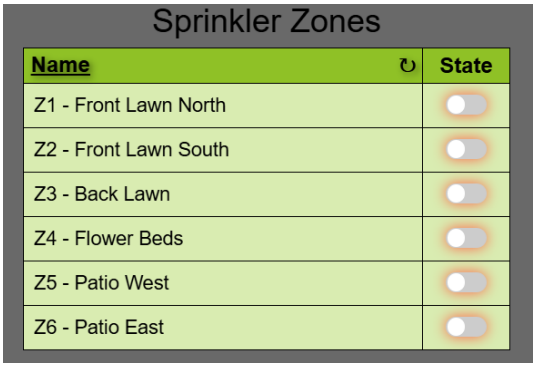
To remove a Title field just delete the text from the **Title Text** field.

Headers & Columns

Here you can control the appearance of the column headers in terms of size, color, background and opacity. These don't need any explanation.



You don't always need to see all the columns so there is the option to hide any of them except for the device name.



Column Headers: You can modify the column header text for columns 3 – 9 to whatever you wish.

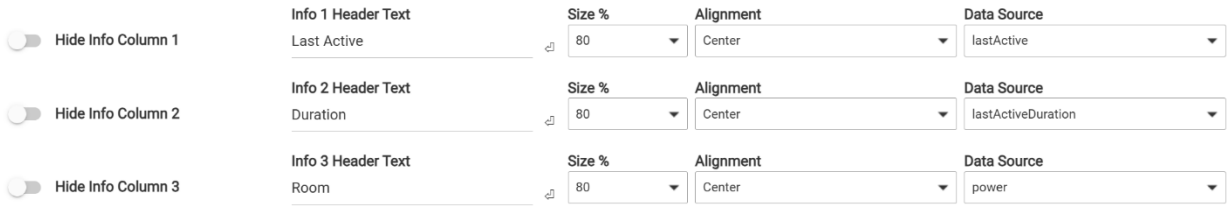
Column 5 & 6 Width: You can stipulate a width for these to columns to ensure they are adequately sized for the controls that they contain. This may vary with your case as a touch control is typically larger than a control that will only be used by a mouse.

Info Columns 1-3: See the next section on Info Columns.

Pin Column: You can choose to show a column with the pinned status if preferred.

Info Columns

Info columns let you add up to three extra columns to a grid that shows additional information about the device in that row. The options under Info Columns are as follows:



When these are turned off the respective info column will be hidden. Things like the Title, Size and Alignment are self-explanatory and need no discussion. What is interesting though is the **Data Source**.

Data Sources

The available info column content is as follows:

Name	**Description** - See **About Device State** for state information.
lastActive	The time at which the device was last in an **Active** state.
lastInactive	The time at which the device was last in an **Inactive** state.
lastActiveDuration	The amount of time in dd:hh:mm(:ss) that the device was last in an **Active** state. If the device is currently **Active** this text will be green and the **lastActiveDuration** is still incrementing. If it is off the text will be in black and the **lastActiveDuration** is fixed.
lastInactiveDuration	The amount of time in dd:hh:mm(:ss) that the device was last in an **Inactive** state. If the device is currently **Inactive** this text will be red and the **lastInactiveDuration** is still incrementing. If it is **Active** the text will be in black and the **lastInactiveDuration** is fixed.
roomName	This is the name of the room that the device is assigned to.
colorName	The value of the colorName attribute. This is the name closest to the current color of the bulb if the device supports this function.
colorMode	The value of the colorMode attribute if present. This indicates the color mode for any color bulb. These are typically RGB or CT but may be EFFECTS.
power	The value of the power attribute if present.
healthStatus	The value of the healthStatus attribute if present.
ID	This it the 4-digit ID that Hubitat assigns to each device.
Network	Display the type of network the device is attached to. Possible values are Zigbee, Z-Wave, LAN, Virtual and Other.
Energy	The value of the energy attribute if present. This is the cumulative energy, typically measured in kWh that a powering monitoring has consumed since the last time the value was reset. The device must support the
lastSeen	The date on the lastActivity attribute.
lastSeenElapsed	The amount of time since the lastActivity attribute has changed.
Battery	The value of the battery attribute if present.
Temperature	The value of the temperature attribute if present.

Going back to our Sprinkler grid we can make it more useful by adding **lastActive** and **lastActiveDuration** columns to the grid so that I can check in on my scheduled watering. The grid on the right shows a change to the time format to also display the day of week..

Sprinkler Zones

Name	State	Last On	Duration
Z1 - Front Lawn North	On	8:29 AM	1h 47m 7s
Z2 - Front Lawn South	Off	5:00 AM	40m 0s
Z3 - Back Lawn	Off	6:00 AM	9m 59s
Z4 - Flower Beds	Off	7:00 AM	29m 59s
Z5 - Patio West	Off	8:00 AM	20m 0s
Z6 - Patio East	Off	8:30 AM	19m 59s

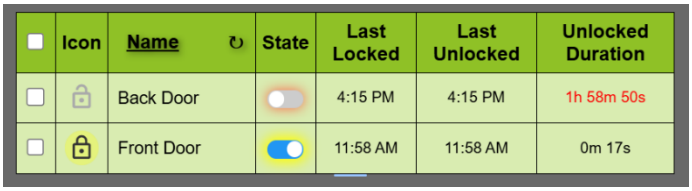
Sprinkler Zones

Name	State	Last On	Duration
Z1 - Front Lawn North	On	Wed @ 8:29 AM	2h 10m 48s
Z2 - Front Lawn South	Off	Wed @ 5:00 AM	40m 0s
Z3 - Back Lawn	Off	Wed @ 6:00 AM	9m 59s
Z4 - Flower Beds	Off	Wed @ 7:00 AM	29m 59s
Z5 - Patio West	Off	Wed @ 8:00 AM	20m 0s
Z6 - Patio East	Off	Wed @ 8:30 AM	19m 59s

Here is an example for my automated lights at home so I can know they are going off and on at expected times. I have had some issues with automated lights I recently resolved but this was very helpful during that time.

Icon	Automated Lights	State	Level/°K	Color	Last On	Last Off
	Porch Light	Off	25%		4:28 PM	7:50 AM
	Garage Right	Off	25%		4:28 PM	7:42 AM
	Garage Left	Off	25%		4:28 PM	7:42 AM
	Bedside Lamp	Off			7:30 AM	7:35 AM
	Kitchen Cabinet	On	78%		6:50 AM	10:02 PM
	Tiffany Lamp	Off			4:28 PM	10:00 PM
	Rock Salt Lamp	Off			4:28 PM	10:00 PM
	Patio Right	Off	100%		4:23 PM	10:00 PM
	Patio Left	Off	100%		4:23 PM	10:00 PM
	Decorative Lamp	On			7:00 AM	10:00 PM
	Bedroom Lamp	Off	100%		4:28 PM	10:00 PM

Below is a small grid for door locks. In this case we are using **lastActive** (locked)**, lastInactive** (unlocked) and **lastInactiveDuration** (unlocked duration) as our Info Columns and re-titling them as **Last Locked**, **Last Unlocked** and **Unlocked Duration**. In this case we can see the status of the door lock, when it was last locked and for how long it was unlocked. Because the back door lock is unlocked (the Inactive state) then the duration shows in red, otherwise they would show in black. These values will update whenever the grid is updated either through normal device activity or by clicking the Refresh button.

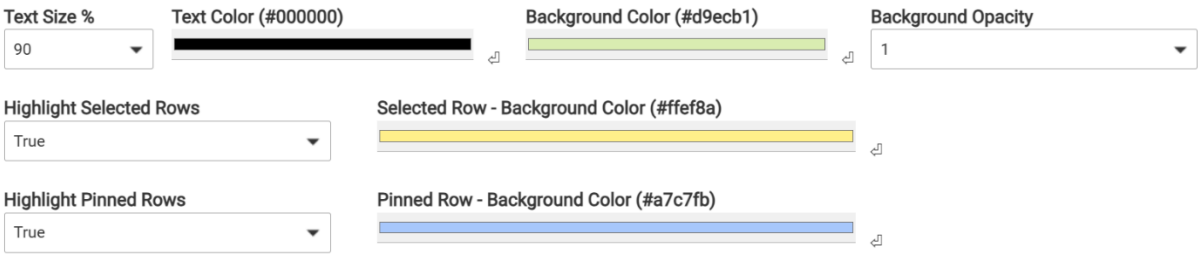


	Icon	Name ↻	State	Last Locked	Last Unlocked	Unlocked Duration
☐		Back Door		4:15 PM	4:15 PM	1h 58m 50s
☐		Front Door		11:58 AM	11:58 AM	0m 17s

When a selected info attribute does not apply to a given device the field will display the **invalidAttribute** property. The default value is **N/A** but this can be changed in the **Customize\General** section to something more to your liking.

Rows

The available options under rows are shown below and are mostly self-explanatory.

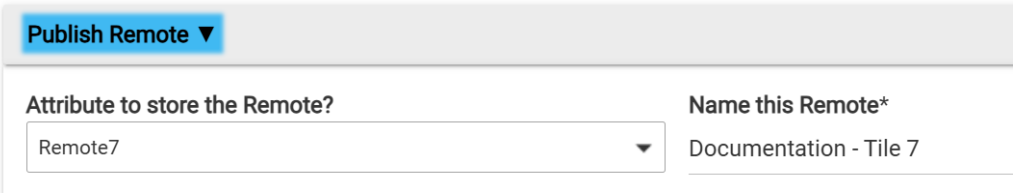


Highlight Selected Rows: If you have a pointing device like a mouse or a stylus hovering over a row will cause the row background color to change to this color. This helps confirm the focus of any actions. In addition, any rows which have the checkbox checked will display in this color to indicate the device is currently selected.

Highlight Pinned Rows: Any pinned controls of sensors will have this background color. If you do now wish to have a different background color and prefer to use the Pin column then just set this color to match the regular background color using the color picker.

Publishing

To publish a dashboard simply select an attribute to store the link and give the remote a name as shown below and click on the **Publish and Subscribe** button.



When a remote is published onto the dashboard it will automatically refresh when any of the control values on the grid change. Even if you don't plan on using your SmartGrid on a dashboard but instead you plan to use the Endpoints you must still perform the Publish and Subscribe step as this is what creates the event subscriptions and causes the grid to be updated.

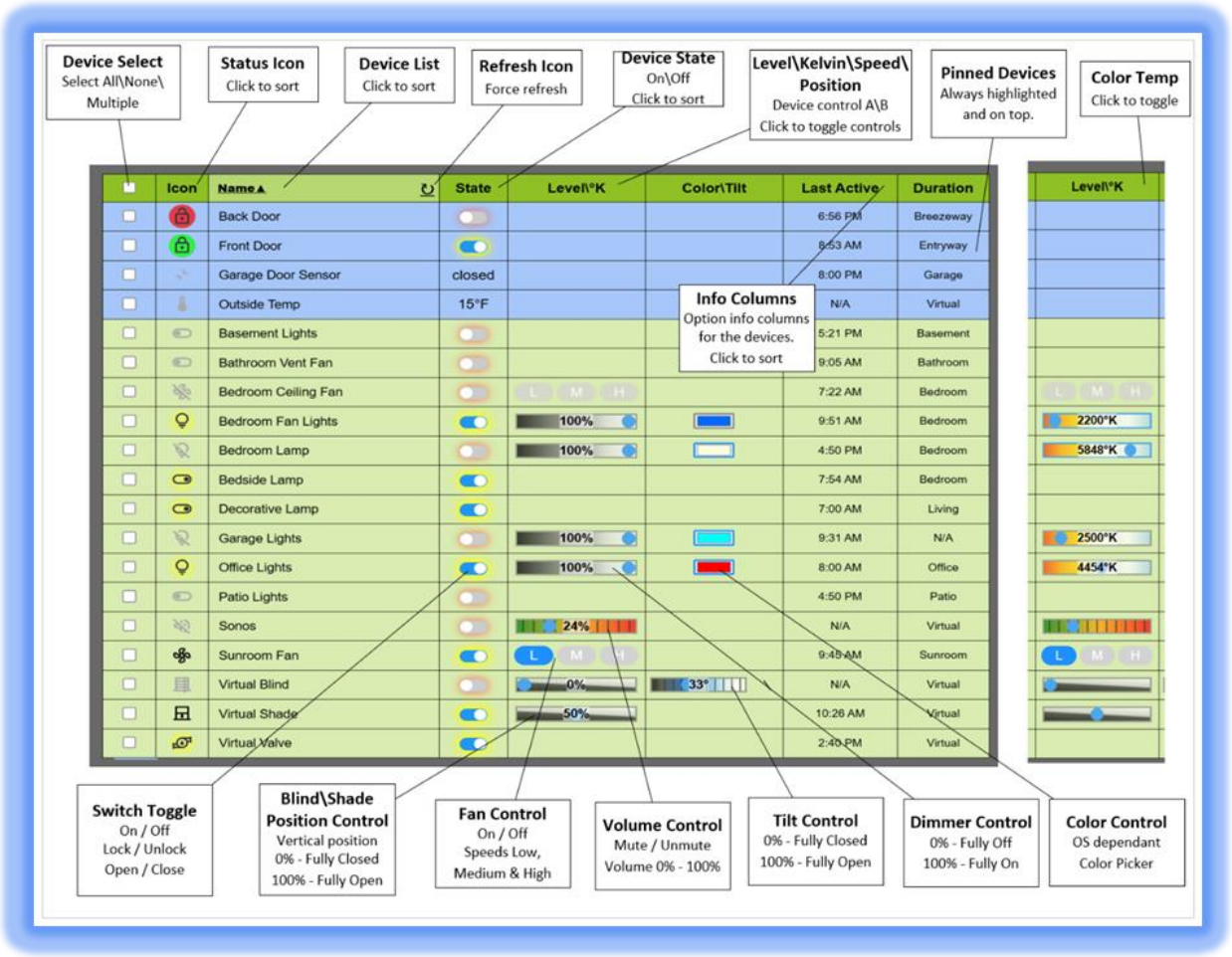
Event Timeout

You can adjust the refresh frequency by changing the **Event Timeout** period to something that matches your personal preferences. The default value is 2 seconds which means that after 2 seconds without any changes the grid on the dashboard will refresh automatically. If you wish you can set this value to never and use the refresh icon update the grid.

If you only plan on using the Endpoints you should set the Event Timeout value to **Never** as this reduces the amount of work that the Hub must perform.

Using SmartGrid

So far, we have mostly covered the Remote Builder – SmartGrid creation interface and configuration options. In this section we will review the features inherent in the SmartGrid app. This is a repeat of the graphic from the beginning of the document.



Feature Overview

Multi-Select - Column 1: You can select multiple devices at once and send the same commands to each one. If you have a group of 4 lights and you want to change them all to a certain color, you will check the boxes in the first column for each of the devices and then adjust the color on any one of the four selected devices. Clicking the header of this column will toggle between all the checkboxes being selected or deselected.

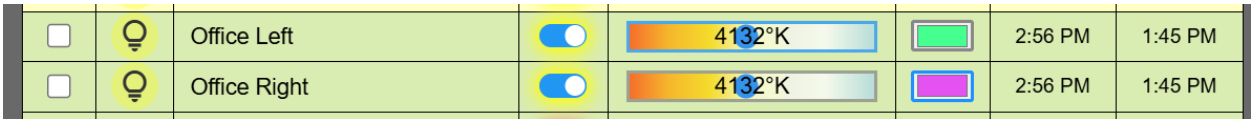
Dynamic Icons – Column 2: The icons change as the device changes between Active and Inactive state. Additionally, icons will show up greyed out and dim when a device is inactive. When active it will appear with normal intensity and be highlighted in yellow. Blinds\shades and garage doors have intermediate states so when they are moving up or down they will have a flashing arrow to indicate the direction until fully open or closed. You can also click on the header to sort by Icon but remember that if you change the state of a device the grid will sort differently because the icon will change.

Device List – Column 3: This is the list of devices that you selected with the device label showing. This column is also sorgrid A-Z and Z-A. Because the device label does not change this is a consistent sort order regardless of any device properties. At the far right of the column 3 header is a refresh button which causes the whole grid to reload.

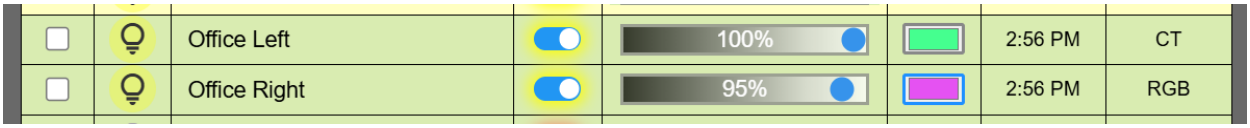
State – Column 4: This is a simple switch that toggles a device between Active and Inactive mode. For example, On\Off, Locked\Unlocked, Open\Close etc. Clicking on the switch will immediately request a change in state from the Hub. Notice that the Icon does not change UNTIL confirmation of the change has been received. If the request times out the switch will go back to its prior position. Clicking on the header will cause the grid to be sorted by State.

Control Group 1 – Column 5: This is a dynamic cell that populates with controls specific to the device type. In the case of lights, you can toggle this field between level (dimmer) and color temperature by clicking on the header. If the field is blank then the device does not have that capability. For example, a bulb might be dimmable and have color change capabilities but not support color temperature.

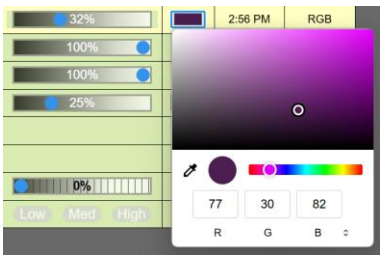
Control Group 2 – Column 6: This is also a dynamic cell that populates with controls specific to the device type but so far it is only populated by the color selector for bulbs. Notice in the below graphic that whichever controls is used last is outlined in blue CT vs Color.



You could also turn on the colorMode info column as shown below if you prefer.



Important: There is a correlation between the color displayed and the level of the dimmer. In the graphic below the Y axis represents the level (dimmer) while the X axis represents the Hue. Changing the dimmer will change the effective color and changing the color may affect the dimmer.



Info Columns – Column 7, 8 & 9: These are text values and can be sorted alphanumerically by clicking on the header. Times and numbers will not sort the way you might expect them to.

Pin Columns – Column 10: If display this column shows which rows have been pinned as an alternate to using the background color.

Questions and Answers

Question 1: I'm sending commands and they are working O.K., but then I get the red border around the SmartGrid indicating that something isn't right.

Answer: I do this all the time. Either A) You forgot to do a **Publish and Subscribe** when setting up a new SmartGrid, B) You added some new devices to your SmartGrid and forgot to update the subscriptions with a **Publish and Subscribe**.

Question 2: The commands send right away and work, but it takes a while before I get the green border confirmation.

Answer: Commands are sent immediately but changes that occur on the Hub only get picked up at the polling interval. The polling query occurs whenever the polling shuttle hits either end. There are three possibly improvements: A) Your polling interval is too high for your response preference. B) If you want faster response you can place the SmartGrid into a Hubitat dashboard. C) Have a look at the device and see if it has any options that influence the response time. For example, Sengled has **Transition Time** and **Attribute Reporting Interval** that delay the completion of events.

Question 3: What happens if two people access the same SmartGrid at the same time.

Answer: Changes made to one SmartGrid will be picked up at the other at the next polling interval and update automatically. If two people try to send commands to a device at the same time the last writer will win.

Question 4: One of my Info columns shows the last time something was active (date time). But when I click on the header it does not sort properly.

Answer: The sort order is based on alphanumeric sort order because the various info columns may contain text, numbers, date time or elapsed time. Numeric data will sort in the order 0, 1, 10, 11, 12, 2, 3 etc. Using a 24-hour time format will correct this for absolute time but durations will still sort incorrectly.

Question 5: When I change the state of a device the order jumps around and is confusing.

Answer: You are using the **State** column, or an Info column as your sort order. Click on the device column header to change it back. Changing the sort order is useful for reviewing things but not the best as a persistent setting.

Question 6: Why can't I put device XYZ onto the SmartGrid?

Answer: In version 3.1.X of SmartGrid only the following devices are supported. Switches, valves, bulbs (all kinds), fans, shades, blinds, garage door controller and volume. In addition, you can also place contact sensors, temperature sensors and water sensors. Others may be added in the future.

Question 7: Why is there a delay before the Icon updates after I make changes.

Answer: When you change a device the request is sent immediately to the Hub but the Icon is not updated until the change is confirmed by the Hub, which won't happen until the next polling interval if using polling or until the even notification come through if using SmartGrid on a dashboard.

Question 8: Sometimes when I drag a slider from one value to another it will jump to other values before finally settling on the correct number.

Answer: This has to do with the type of device. A good example is a blind\shade. If you drag a shade from 0% to 100% it will report back at different points along the way and those numbers are considered device changes that are reported back to SmartGrid and this effect will be noticeable because of the long transition time. Bulbs that are configured with a long transition time will respond the same way during dimming or CT changes, but they may be modified via the device driver to improve this. But eventually they device will settle on the correct number.

Question 9: Isn't it dangerous to be able to control devices via these Endpoints.

Answer: You have full control over which Endpoints are active, which devices are in the SmartGrid and to whom you share these Endpoints. Using Local Endpoints gives you a little extra security in that the device running SmartGrid must already be authenticated to your WiFi. If you are putting locks or garage doors on a Cloud Endpoint you must be very intentional about who you give that to. SmartGrid uses the same Endpoint security mechanism as the MakerAPI, it's just more convenient.

Question 10: I don't know what question 10 will be but I'll answer it when I do.

It's a Wrap

Well, if you made it this far you are ready to build your own SmartGrids and get the most out of them. I look forward to seeing some of the designs that people come up with and share on the community forums.

“Love is patient, love is kind. It does not envy, it does not boast, it is not proud. It does not dishonor others, it is not self-seeking, it is not easily angered, it keeps no record of wrongs. Love does not delight in evil but rejoices with the truth. It always protects, always trusts, always hopes, always perseveres.”

1 Corinthians 13:4-8