

## Builder

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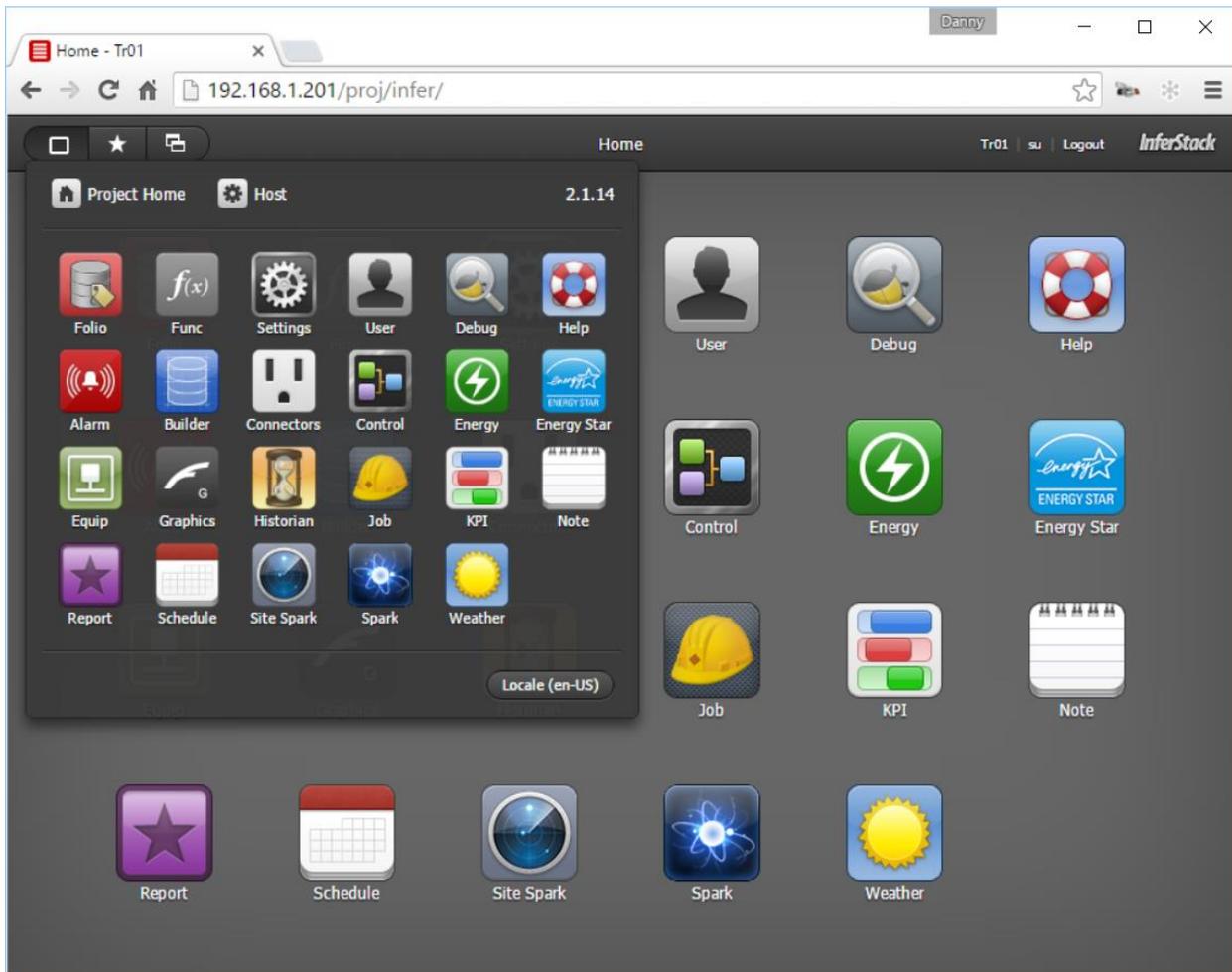
## Introduction

This is an introduction to Builder of InferStack™. We will cover how to access it through the graphical interface, how to create your sites, equipment and points in your tree, how to add connectors so that you can connect to real-world points, how to bind those into points in your tree, messages you may need to look at to see whether things are operating as you expect and then finally reference information that you can use to take you to the next level.

## Overview

Builder provides the capabilities to build and maintain your database. It provides a 3 pane model with the equipment tree on left, record viewing and editing in the middle and a list of connectors or messages on the right.

To begin working with Builder, press Builder in the Home app or App Menu in the top left of your InferStack™ interface.



## Equipment Tree

The Equipment Tree provides a structured view of your database organized by Sites, Equipment and Points. You can expand the tree by pressing the right arrow to the left of an object. You can refresh the Tree and Sites and Equipment have a Refresh Node icon when you hover over them. In addition the Points provide real time values.

The screenshot shows the InferStack Builder web application. The browser address bar displays `192.168.1.201/proj/infer/builder`. The page title is "Builder - Tr01". The main content area is divided into two sections:

- AVAILABLE OBJECTS:** A tree view on the left showing the hierarchy: Carytown (expanded) > ElecMeter-Main, Main Lights, Misc, RTU-1 (expanded) > Tasks (expanded) > Cool-1 (on), Cool-2 (off), DischargePressure (0.01 inH<sub>2</sub>O), DischargeTemp (79.82°F), Fan (off).
- ESSENTIALS:** A form on the right for site configuration. Fields include: SITE-NAME (Carytown), SITE-AREA (3149.00 ft<sup>2</sup>), COUNTRY (United States), WEATHER (Richmond, VA), ADDRESS (3504 W Cary St, Richmond, VA), CITY (Richmond), and STATE (Virginia). A "SITE IMAGE" field shows a "CARYTOWN Welcome!" sign.

**Note: Control variables and tasks appear in the equipment tree. Tasks are at the point level under the equipment with running control programs.**

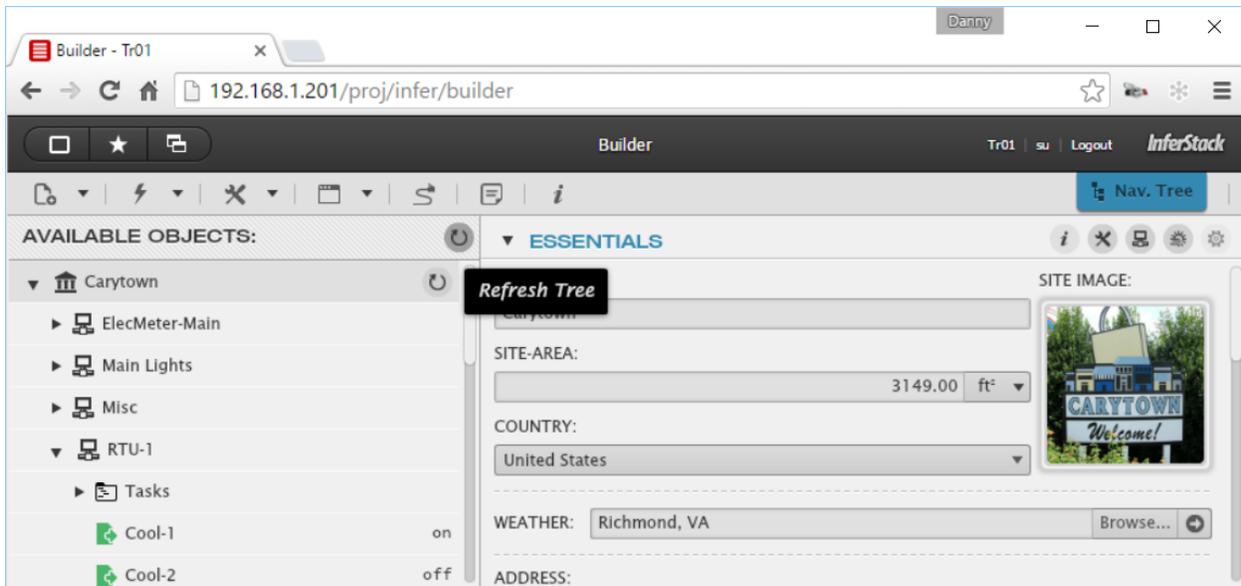
This screenshot shows the same InferStack Builder interface, but with the "Tasks" folder selected in the "AVAILABLE OBJECTS" tree. The right-hand panel now displays configuration options for the selected task:

- MARKER TAGS:** A list containing "children" and "taskFolder".
- PROPERTY TAGS:** A list of key-value pairs: "dis" (Tasks), "id" (@tasks-Carytown.RTU-1), "targetRef" (@Carytown.RTU-1), and "treePath" (equip:/Tasks).

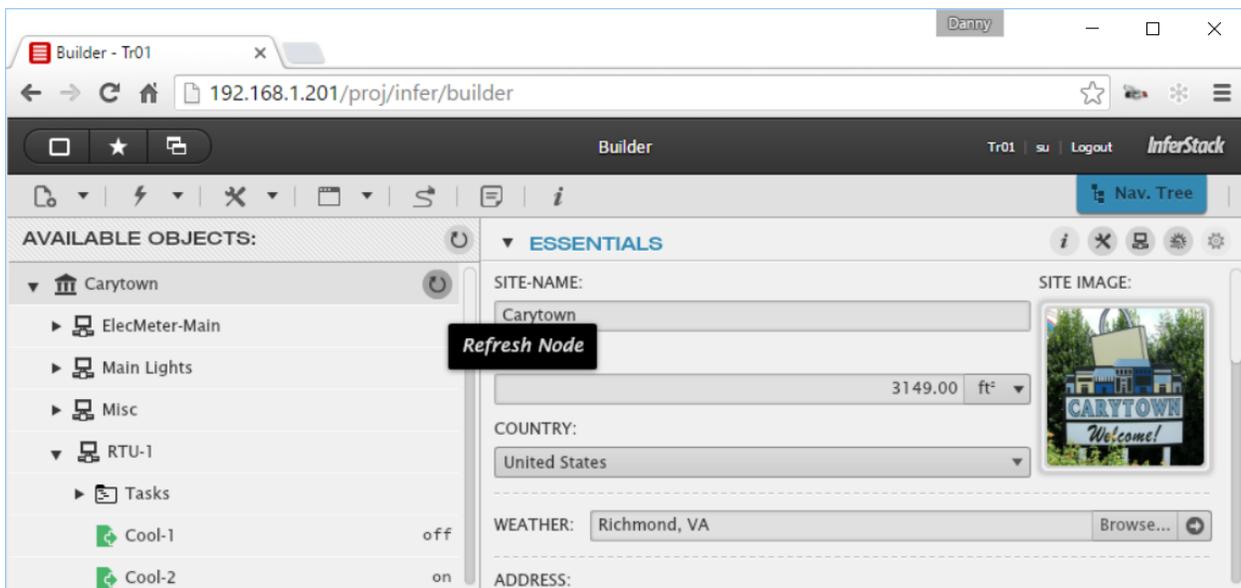
## Available Objects

A Tree of Available Objects provides a structured view of your database organized by the NavTree. By default, the Equip Tree is organized by Sites, Equipment and Points. For more information on customizing NavTrees, see <http://licensing.intellastar.com/doc/docInferStack/NavTrees>.

In addition the Points provide real time values. You can refresh the Tree by pressing the Refresh Tree icon at the top by Available Objects.

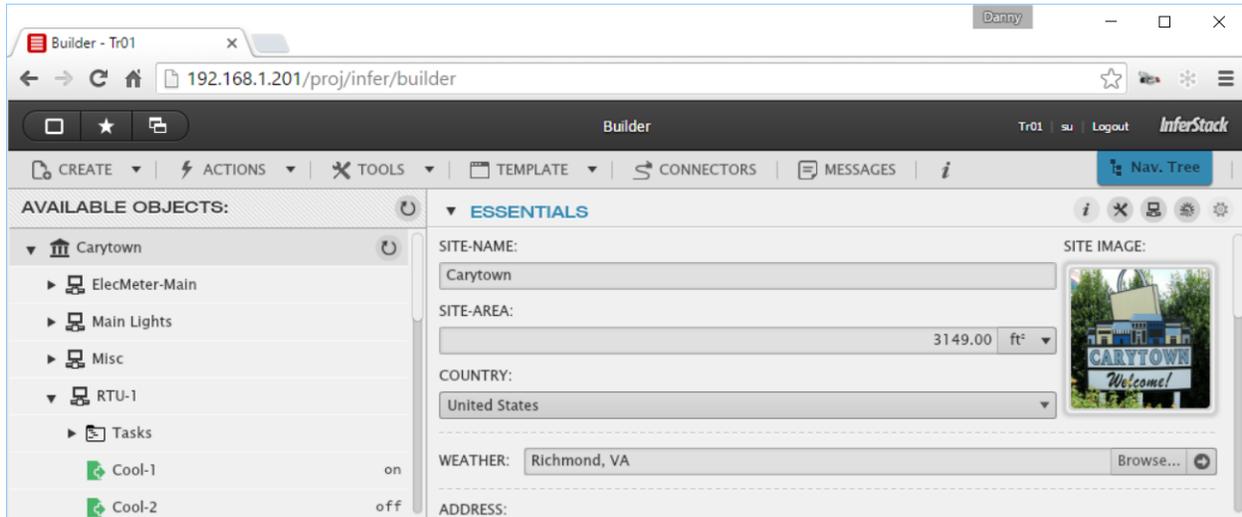


Sites and Equipment have a Refresh Node icon when you hover over them.



## Menu Bar

The Menu Bar across the top provides access to many capabilities of the DB Builder app including Create, Actions, Tools, Template, Connectors and Messages. There is also Help via the *i* icon.

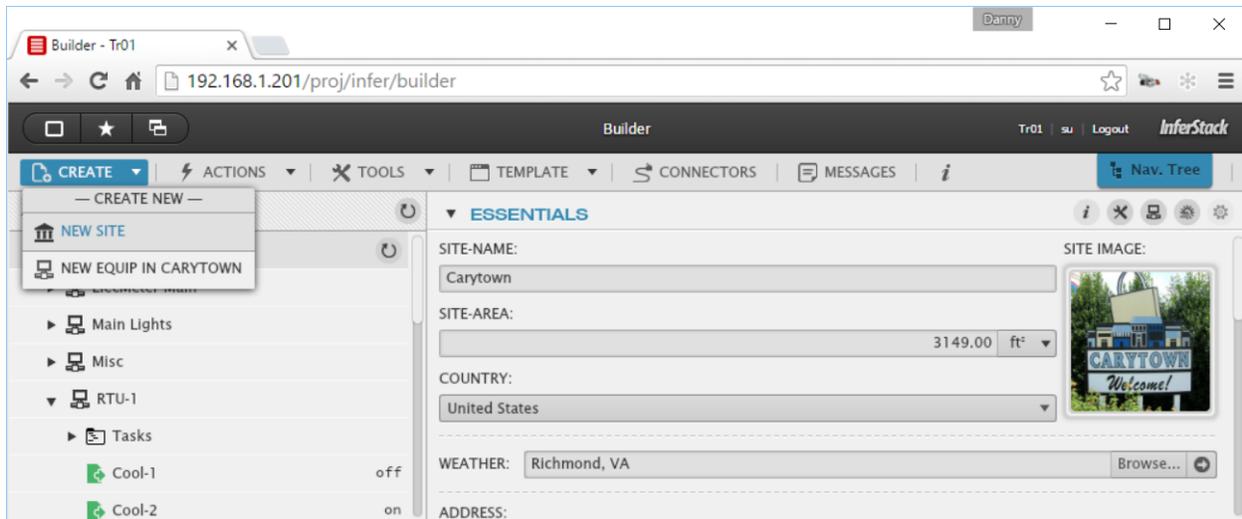


## Create

The Create Menu allows you to create Sites, Equipment or Points based on the current selection in the tree.

### Creating Sites

Press Create New Site in the Menu Bar to create a new site. You can enter information about the site name, the square footage, you can link it to a weather station if you defined one already and provide address information.

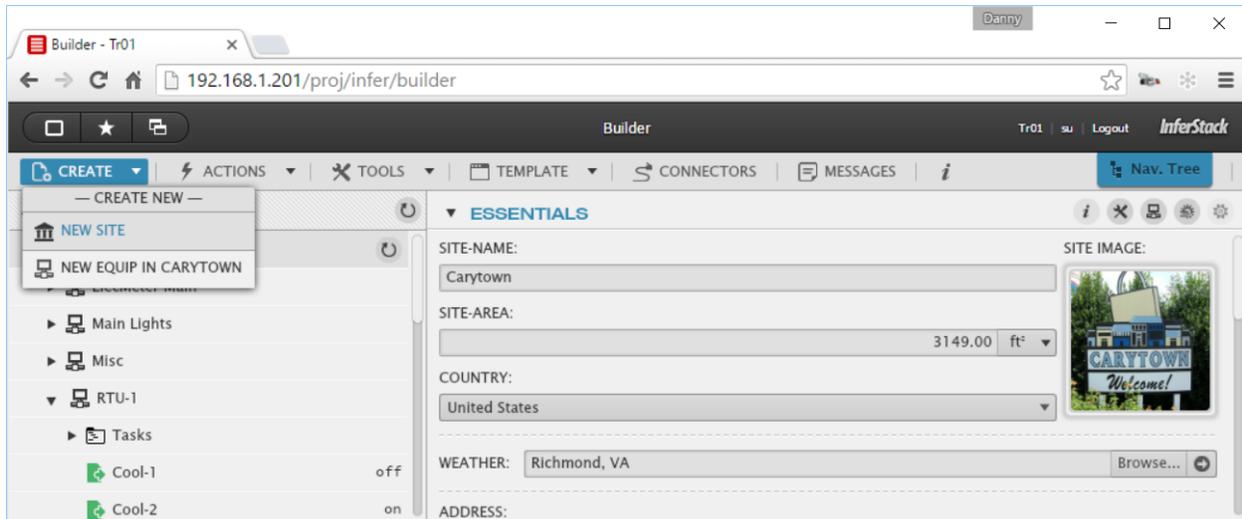


You must have previously defined Weather Sites in the Weather app to reference them here. Be sure there are no commas in your Site area.

Your time zone will default to the time zone of the device. It must be correct so that site histories will be collected properly. There may be other markers for properties that you want to add to your site so that you can find them. Press Create and your site is complete.

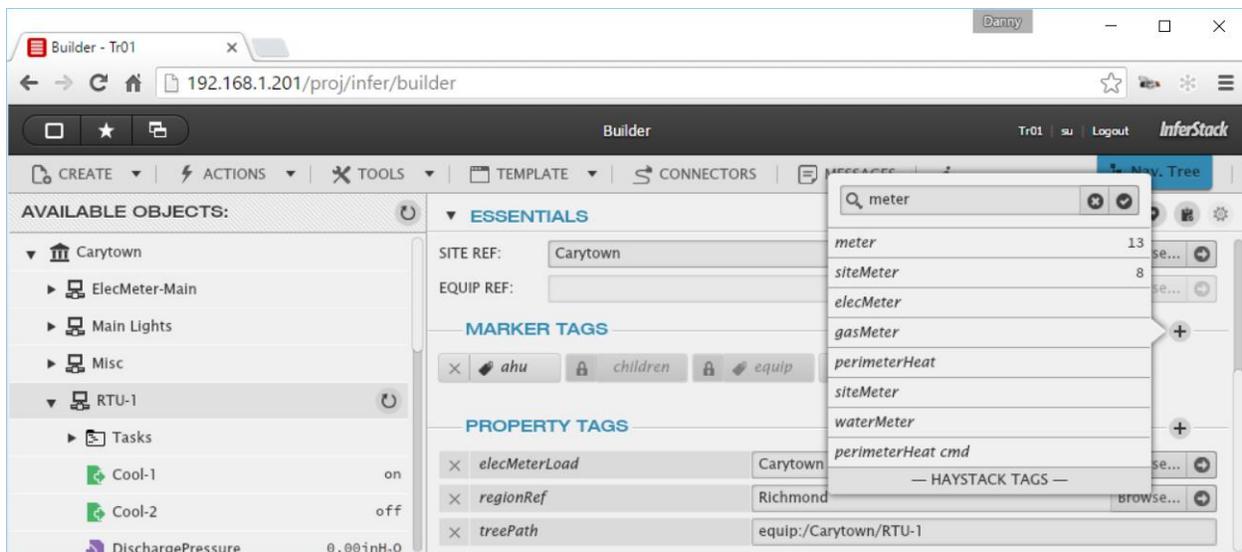
## Create Equipment

Creating equipment is very much like creating sites. Once you have a site selected, the Create menu will now give you an option to create New Equip in that site.



You'll be able to name that equipment, tell it what kind of equipment it is, whether it's normal or supplemental equipment, and any other markers for properties that are important to you like whether it's a meter, for example. You can add siteMeter marker to your meter.

**Note that it shows you haystack tags as you type.**



## Creating Sub-Equipment

If you want to place Sub-Equipment under equipment in the tree, just create them as previously described and drag them to an existing equipment and they will be placed under it in the tree.

If you want the Graphics App to show your Sub-Equipment as a level also, the marker tag: "hasSubEquips" has to be put on the parent equipment.

## Creating Points

Creating points is very much the same scenario as creating sites and equipment. You select a piece of equipment and then you can add a new point to that equipment. Many of our connectors allow you to directly create the points by dropping them from the connector tree into your equipment tree so that may be an easier way to create points for many of them, but you can create them directly here and then fill in the same type of information: the point name, the point kind, whether it's Numeric, Boolean, String or Enumeration. You need to assign the units, whether it has a current value, a history, whether it's writeable, and then other markers and tags as appropriate.

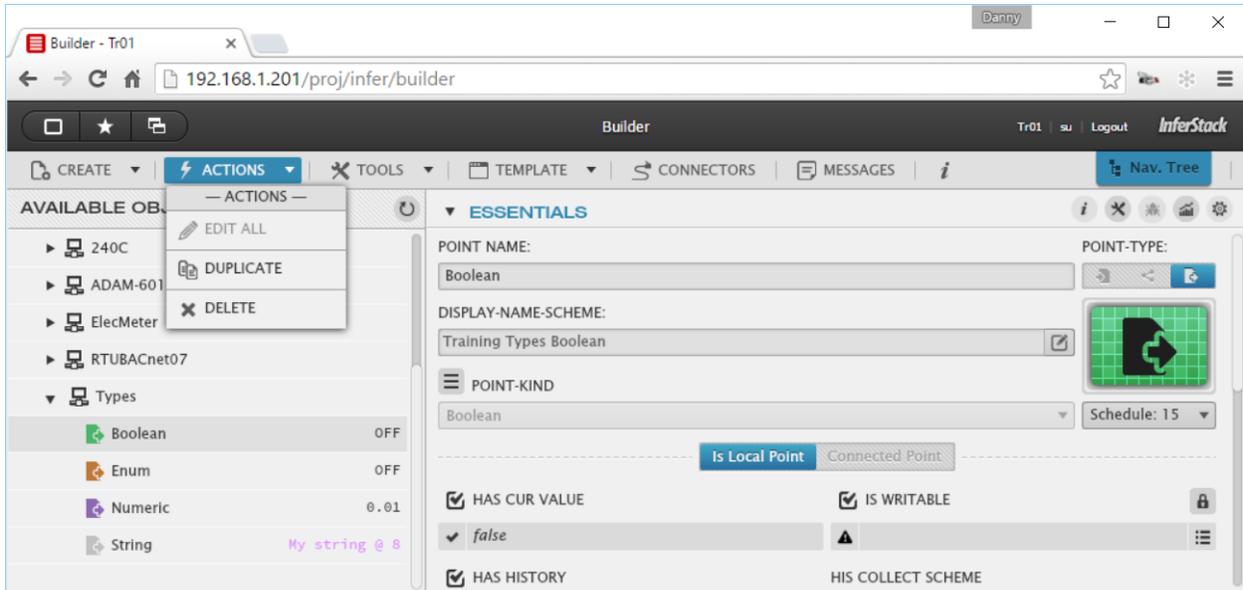
The screenshot shows the InferStack Builder web application. The browser address bar displays '192.168.1.201/proj/infer/builder'. The application header includes 'Builder', 'Tr01', 'su', 'Logout', and the 'InferStack' logo. A toolbar contains 'CREATE', 'ACTIONS', 'TOOLS', 'TEMPLATE', 'CONNECTORS', 'MESSAGES', and 'Nav. Tree'. The 'AVAILABLE OBJECTS' panel on the left shows a tree structure with 'Training' expanded to show 'Types', which includes 'Boolean', 'Enum', 'Numeric', and 'String'. The main configuration area is titled 'ESSENTIALS' and includes fields for 'POINT NAME' (Boolean), 'DISPLAY-NAME-SCHEME' (Training Types Boolean), 'POINT-KIND' (Boolean), and 'POINT-TYPE' (a grid icon). Below these are checkboxes for 'HAS CUR VALUE' (checked, true), 'IS WRITABLE' (checked), 'HAS HISTORY' (checked), and 'HIS COLLECT SCHEME' (Every 24 hrs). There are also 'RUN TIME' and 'RUN STARTS' sections. The 'SITE REF' is 'Training' and 'EQUIP REF' is 'Training Types'. The 'MARKER TAGS' section at the bottom shows a list of tags: 'cmd', 'cur', 'curTracksWrite', 'his', 'point', and 'writable'.

There are many point tags and properties that can be added to easily provide more features. See the Reference.

**Note: The simplest way to create connected points is to drag them from the connector to the equipment in the tree. See Point Binding.**

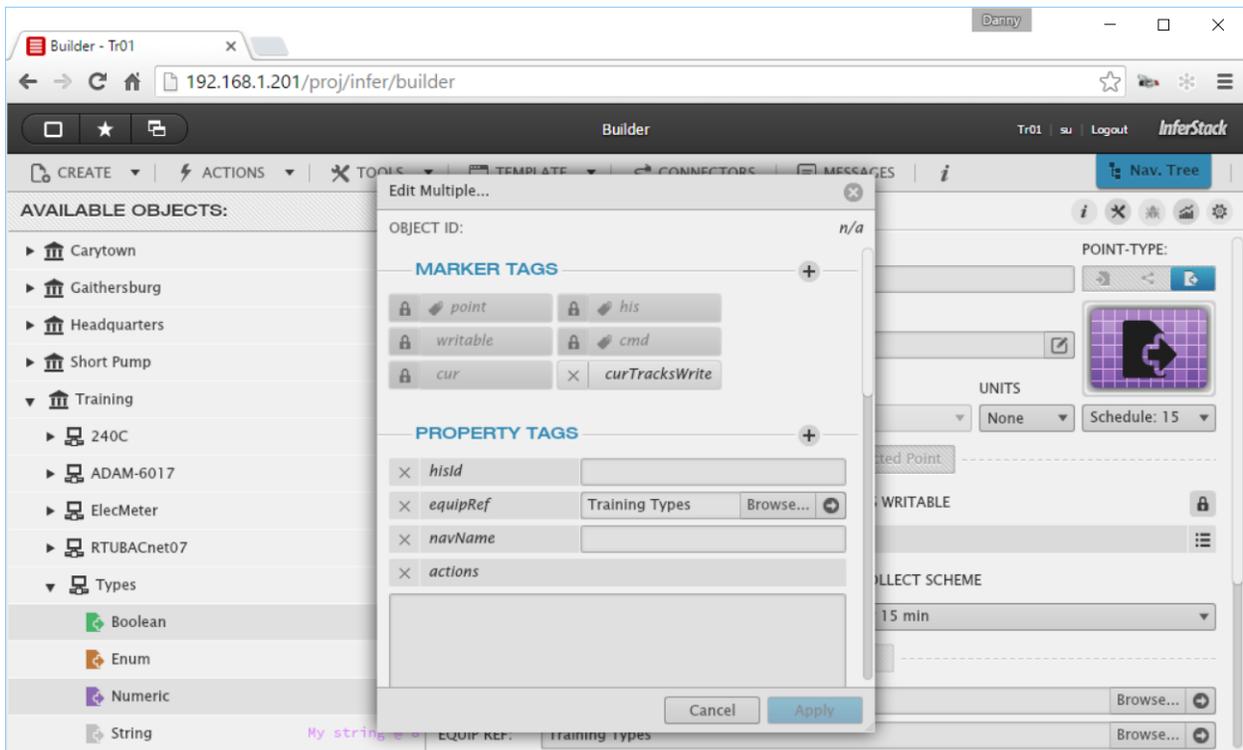
## Actions

The Actions menu allows you to Edit All, Duplicate and Delete.



## Edit All

Edit All allows you to batch edit more than one object. In this example, two objects were selected by holding down Shift or Control. Edit All was then selected.



Edits will be applied to the selected objects.

## Duplicate

You can select one or more objects to be duplicated. For example, you can duplicate your meter to create site meters for other sites.

Duplicate your meter and drag the copy to the appropriate site. Edit the name. You may have to add your siteMeter Marker again.

### Note: Do not duplicate the following tags:

"id", "mod", "curVal", "curStatus", "curDis", "curErr", "hisId", "hisSize", "hisStart", "hisEnd", "hisEndVal", "hisStatus", "hisErr", "writeVal", "writeStatus", "writeLevel", "writeErr"

## Delete

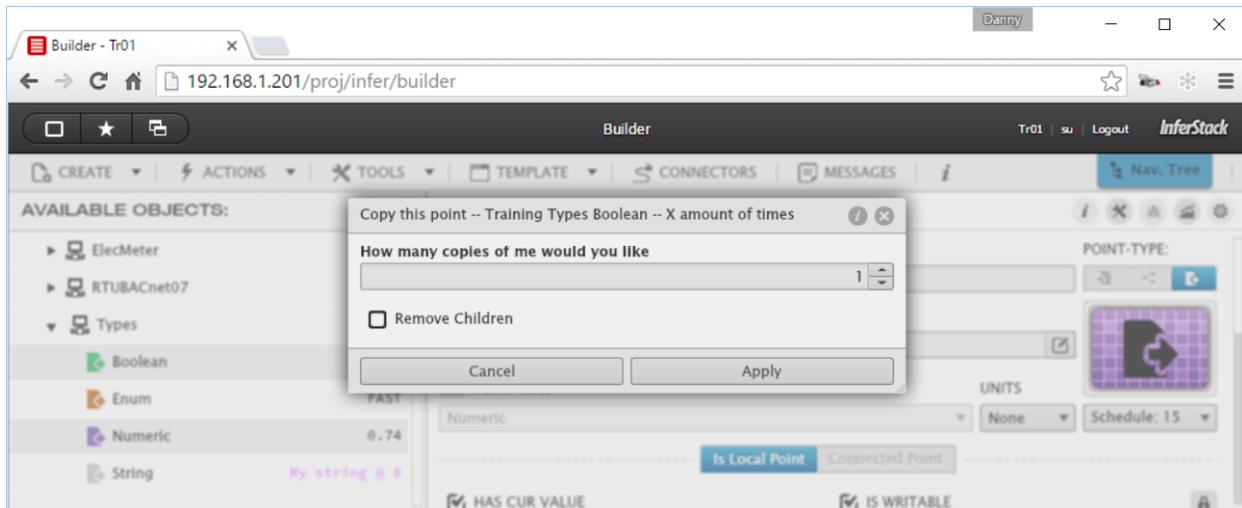
You can delete one or more objects. Deleted objects go to the Trash that is accessible in Folio.

## Tools

You can select Tools from the main menu to access appropriate tools. You must enable FIN Tools in Settings and the tools available will be based on your selection.

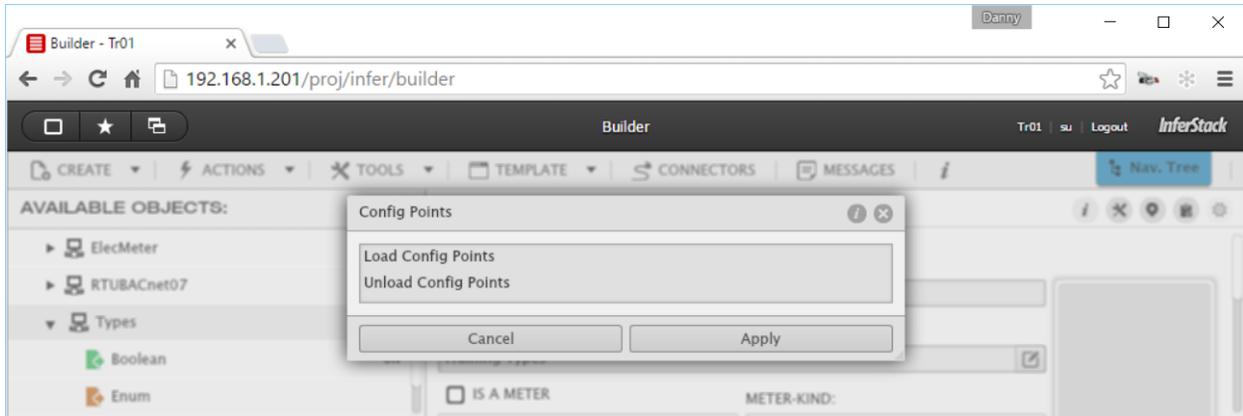
## Duplicate X Times

Duplicate the site, equipment or point the number of times specified.



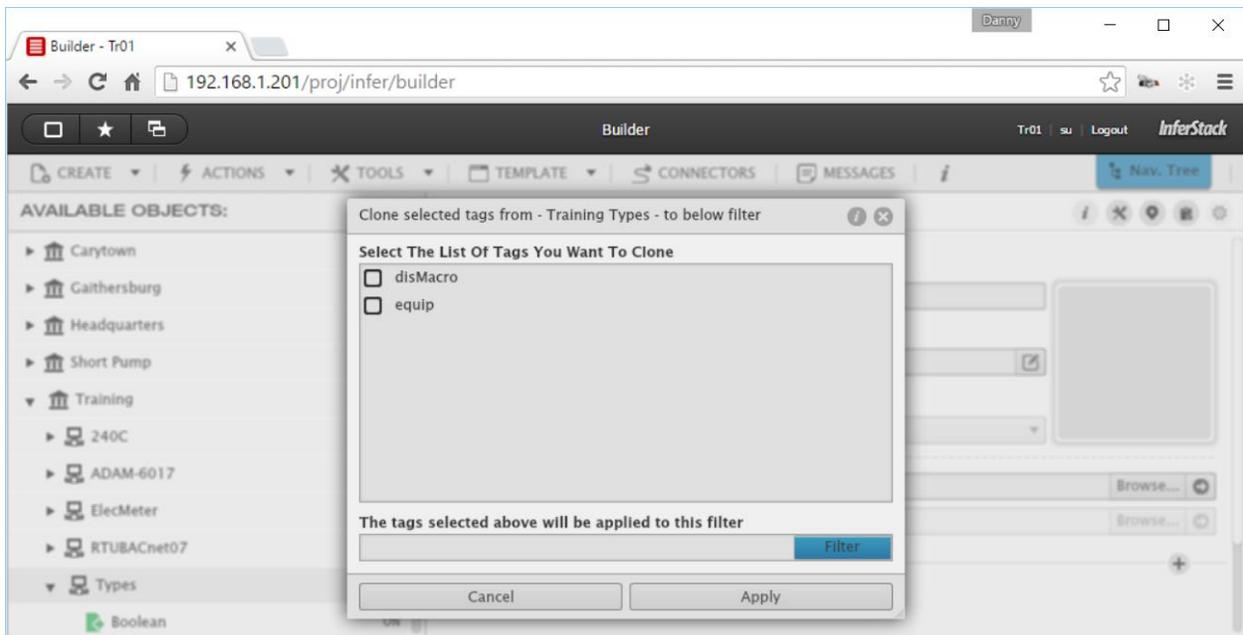
## Config Points

You can Load Config Points to Folio and Unload Config Points to Disk.



## Clone Tags

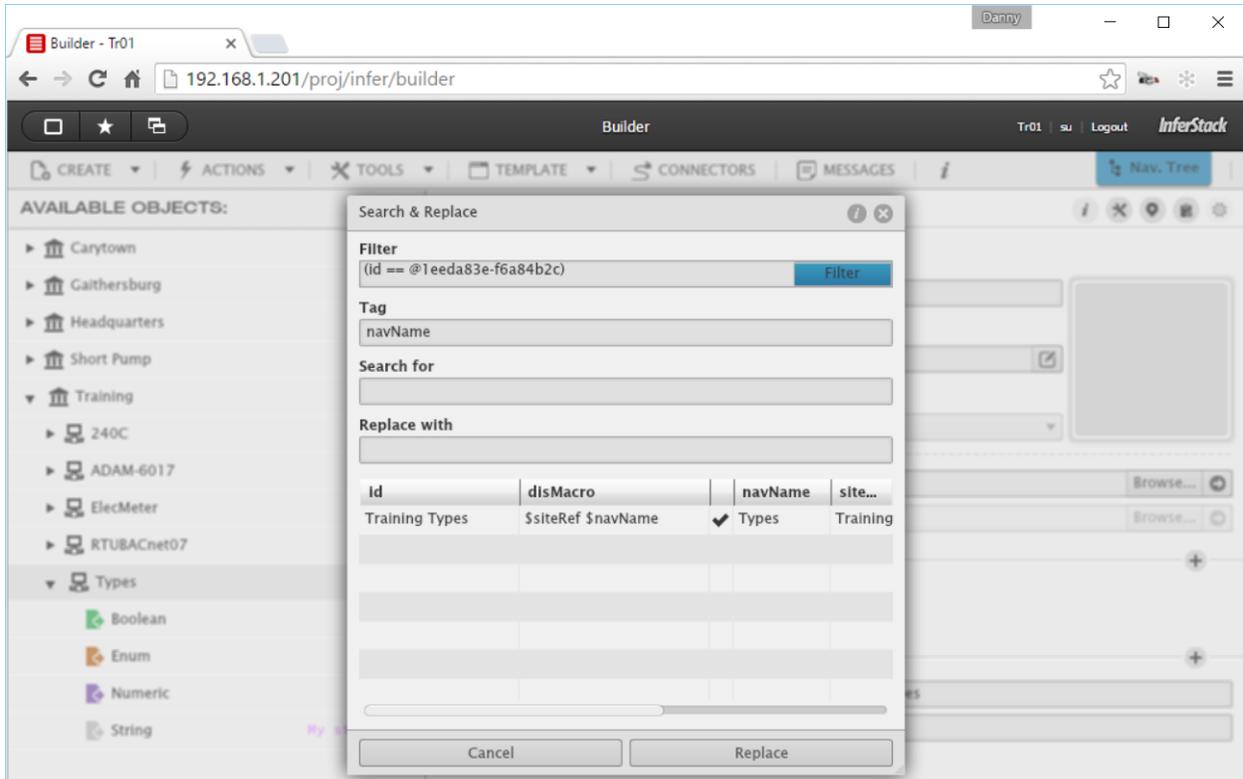
Clone tags for the site, equipment or point specified.



Select the list of tags you want to clone.

## Search and Replace

Search for and Replace with tools are included here.

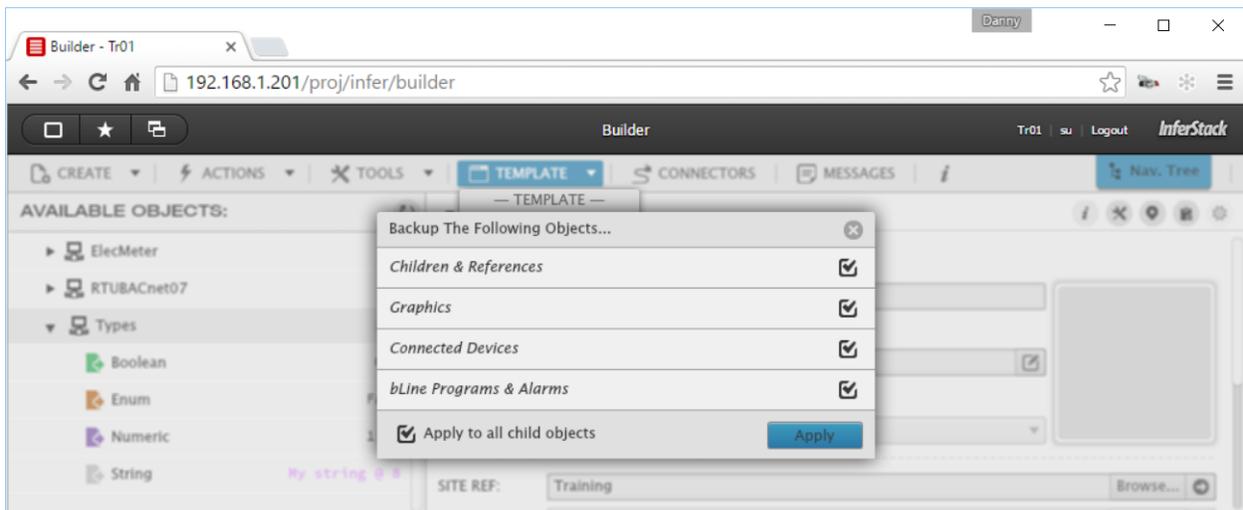


## Template

You can select Template from the main menu to Save or Restore Templates.

## Save

You can use Template Save to backup objects including child objects.

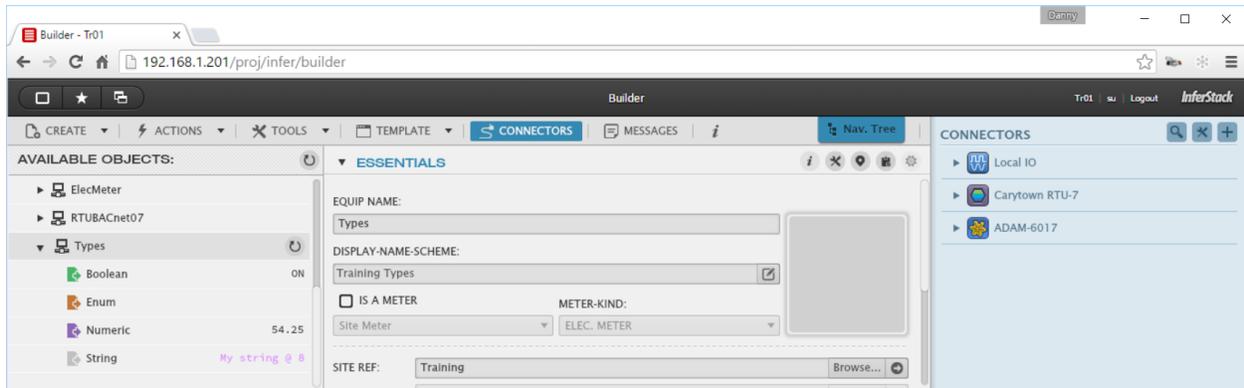


## Restore

Restore allows you to select a fst template file to restore. It will give an error if it already exists.

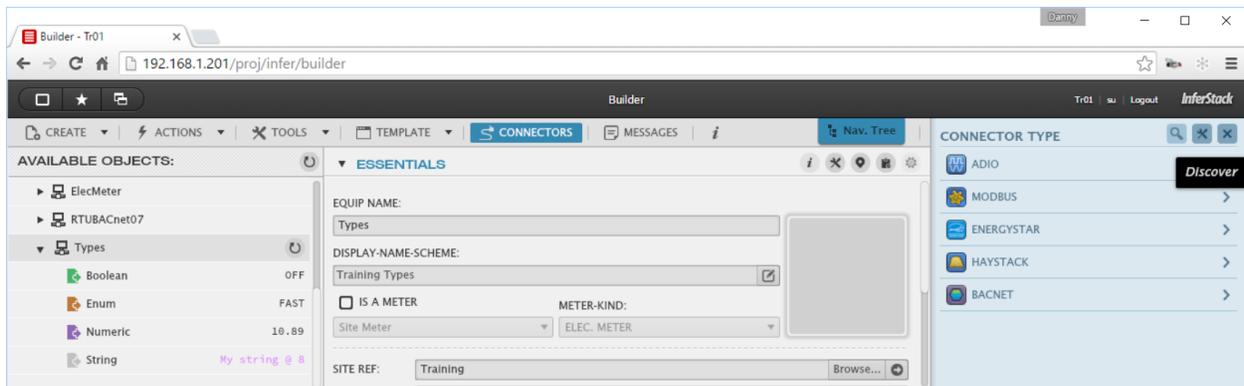
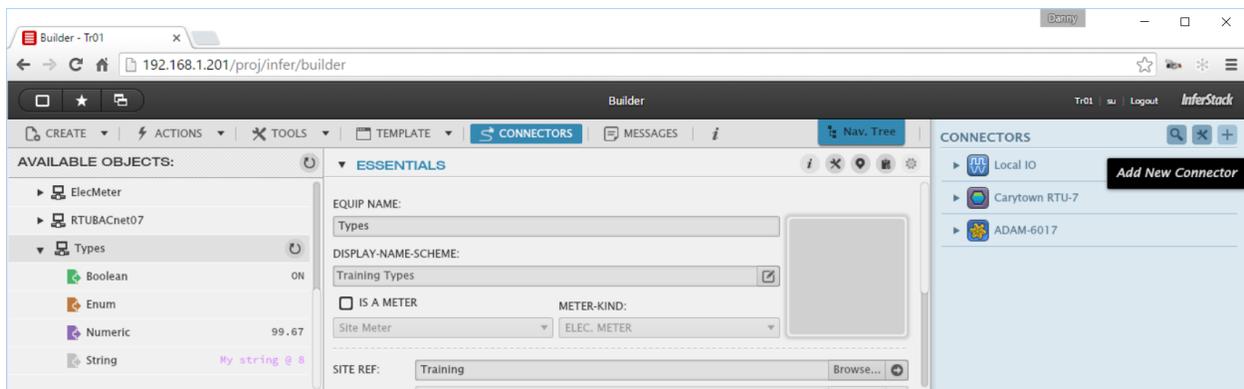
## Connectors

You can select Connectors from the main menu to toggle whether Connectors are shown in the right column. The existing connectors are now visible in the right panel.



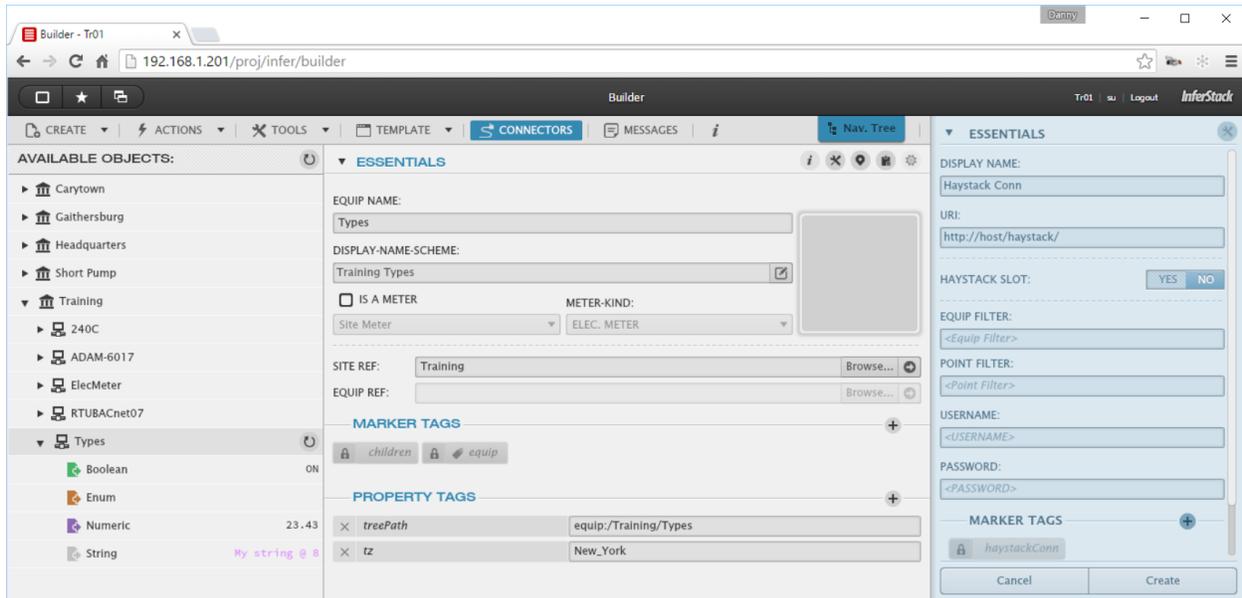
## Adding Connectors

Adding connectors lets you attach your points to real-world equipment. The plus sign lets you add new connectors and you can select from any of the connector types that you have enabled in your settings.



**Note: If you don't see a connector type that you're looking for, go check the Settings App to ensure that it is enabled.**

Press a connector type to add a connector.

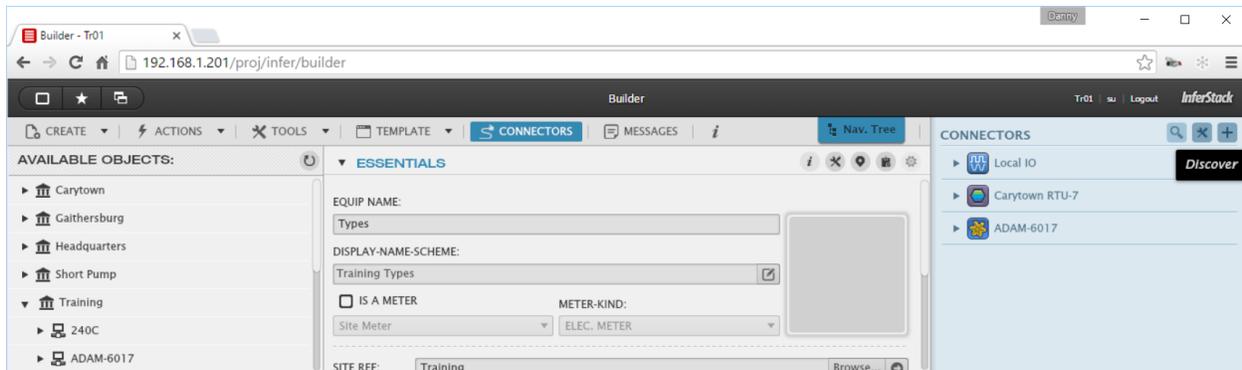


Enter the necessary information and press Create.

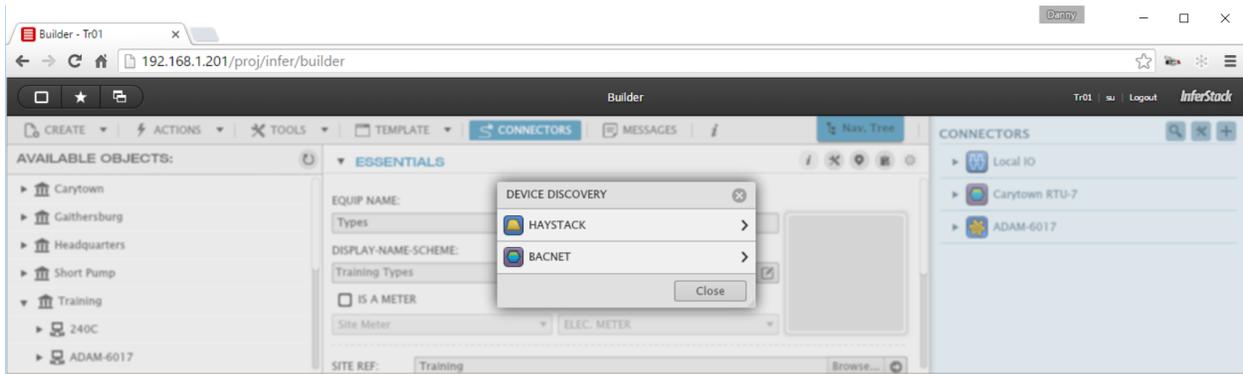
**Note: If you need to refresh your connectors, press the Connectors menu twice.**

## Discover

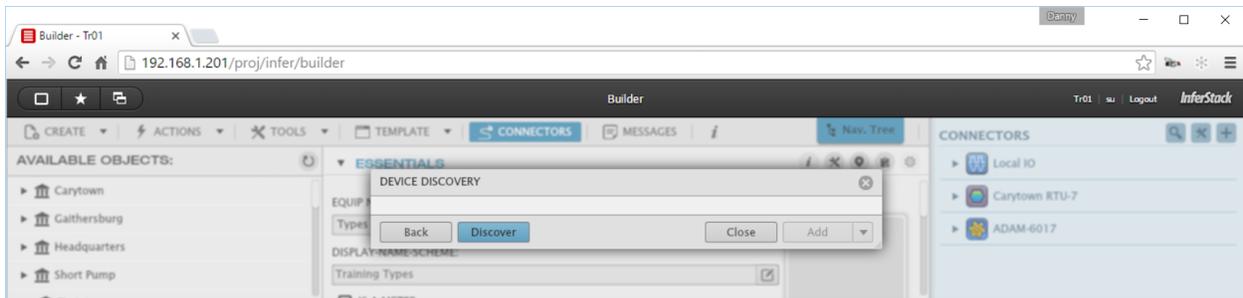
Some connectors allow you to discover devices. Press the discover icon .



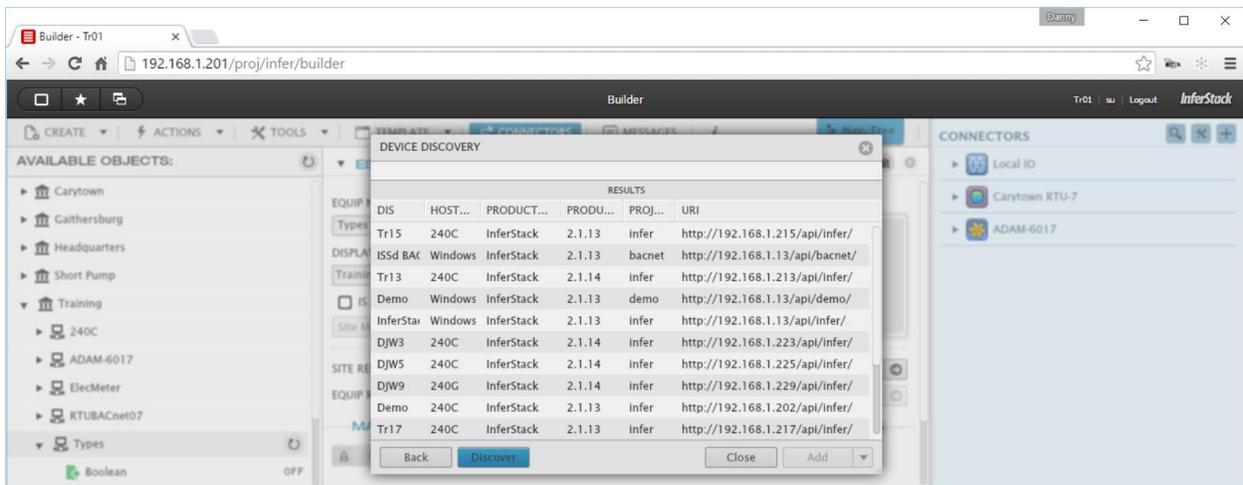
This will provide a list of enabled and discoverable connectors.



Select the type you want to discover. Currently only BACnet and Haystack support discovery.



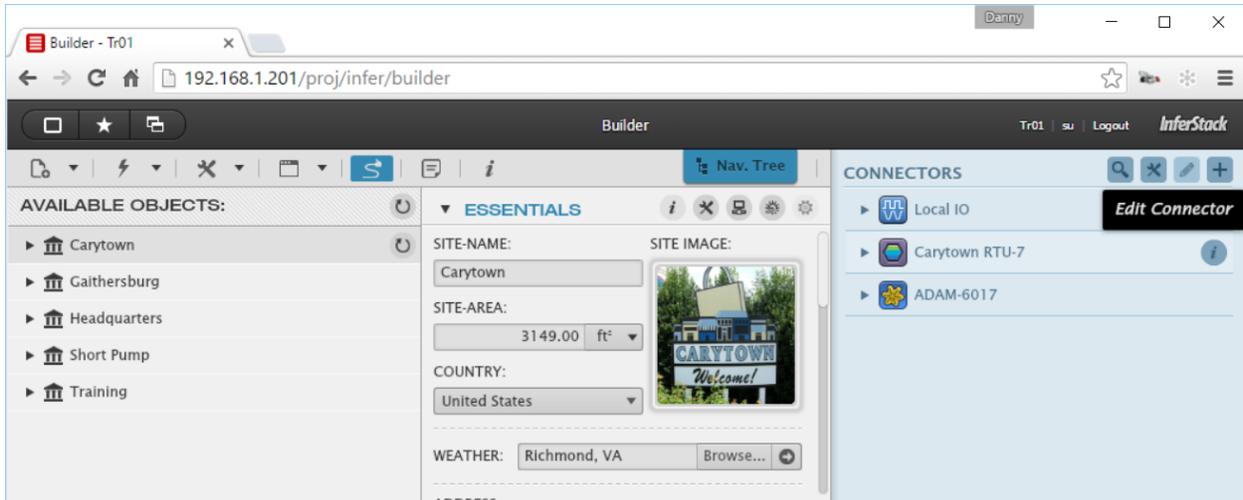
Press Discover to see what it can discover on your local subnet.



Select the appropriate devices. More information on Connectors can be found in the Reference.

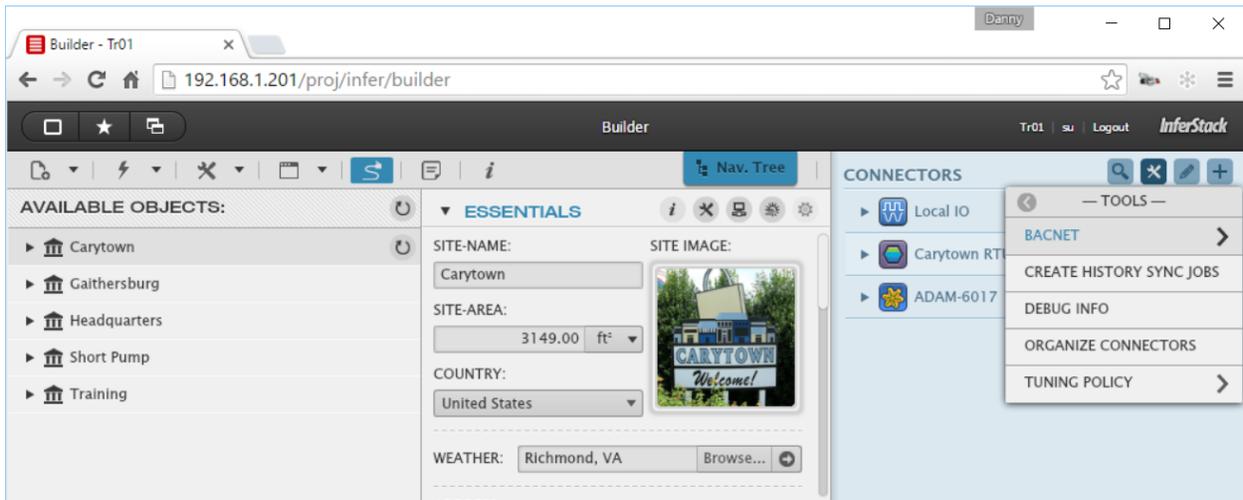
## Edit Connectors

Once you select a connector, the Edit Connectors icon will appear so that you can edit the connector.



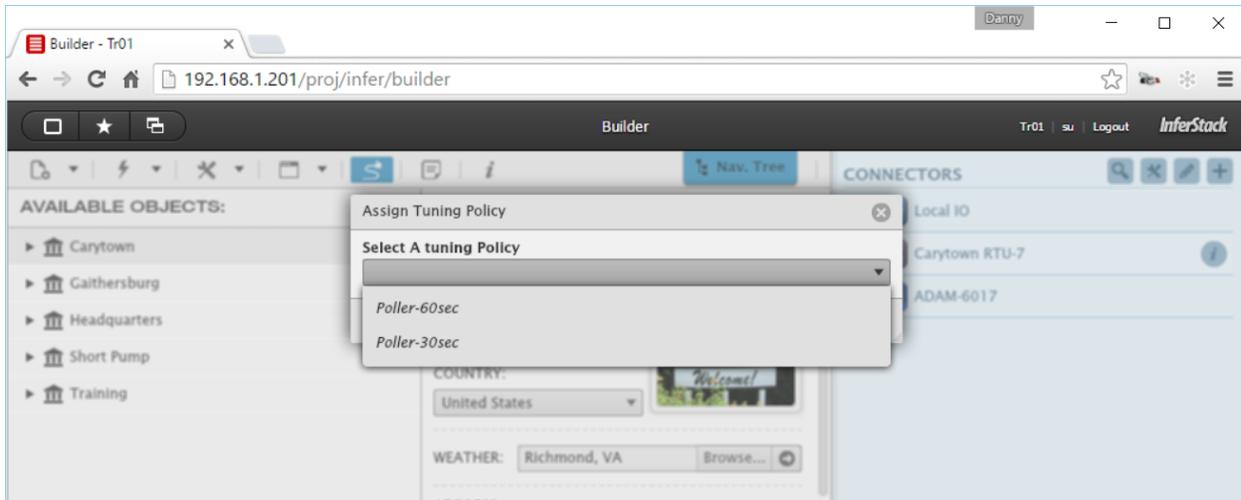
## Connector Tools

Connector Tools provides tools for your connectors.



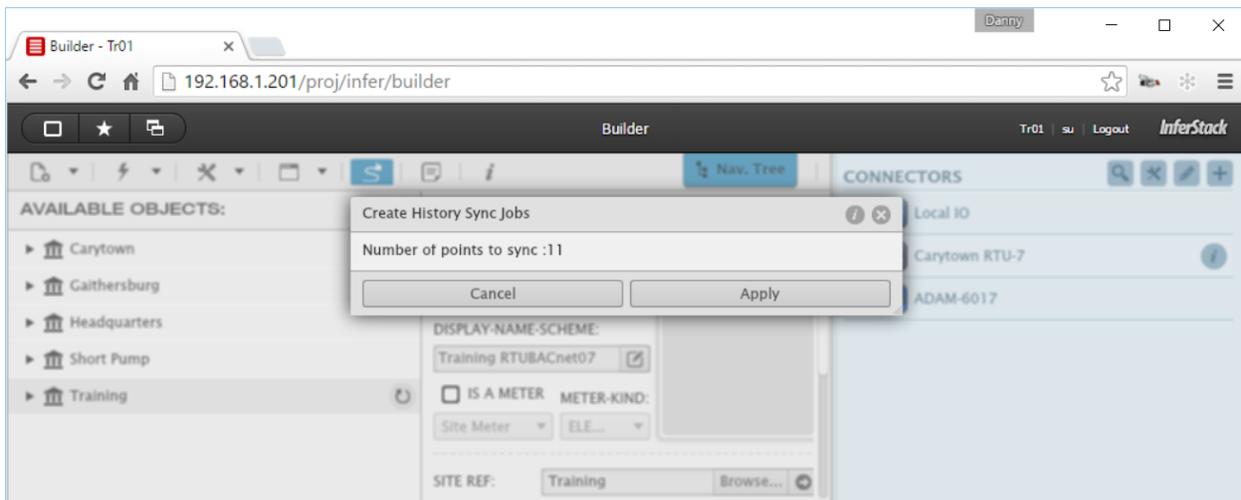
## Select Tuning Policy

This allows you to select a tuning policy for your connector.



## Create History Sync Jobs

This allows you to create history sync jobs for your connector. It will determine the number of points that need to be synced.



Press Apply to create the job.

dis	job	jobSchedule	disabled	jobLastRuntime	jobLastStatus	jobLastTime
Database Compact	jobFolioCompact()	at 02:00:00		710 ms	doneOk	10-Aug-2016 Wed
sync bacnet and haystack points job	finSyncPoints(["1f2e3c54-f94bf635"],0,10)	at 00:00:10				

## Point Binding

Once you have your connector defined, you can then expand it with that little right arrow to see the points that are available within it.

AVAILABLE OBJECTS:

- Carytown
- Demo
- Gaithersburg
- Headquarters
- Short Pump
- Training

ESSENTIALS

SITE-NAME: Carytown

SITE-AREA: 3149.00 ft<sup>2</sup>

COUNTRY: United States

WEATHER: Richmond, VA

ADDRESS: 3504 W Cary St, Richmond, VA

CITY: Richmond

STATE: Virginia

POSTAL CODE:

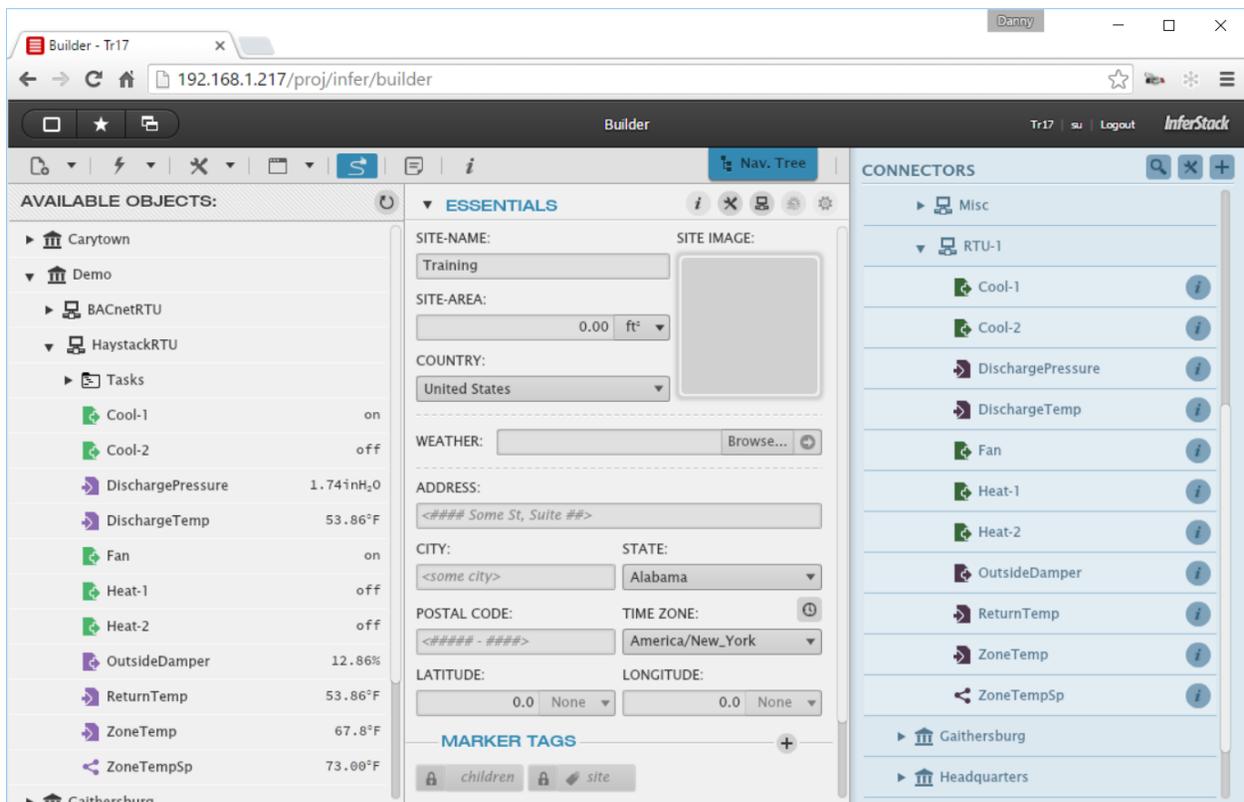
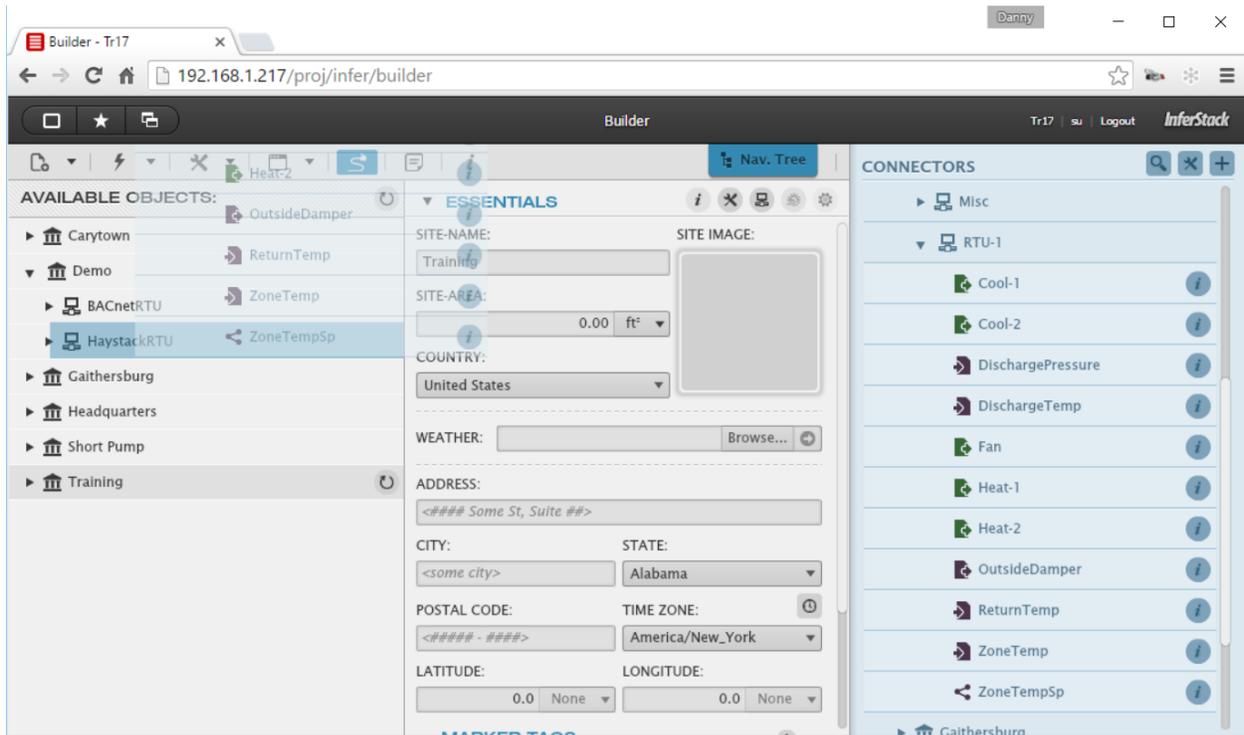
TIME ZONE:

CONNECTORS

- Local IO
- Carytown RTU-1
- EnOcean Rocker Switch 1
- VT8600U5x 1
- c d7e5
- Tr16
  - Carytown
    - ElecMeter-Main
      - Cost
      - kW
      - kWh

From here you can select one or more, drag it over to any equipment in your tree and when it changes color dropping it will then cause it to add the point that you request.

**Note: There is a problem where dragging site(s) or equip(s) from the connector to the tree causes errors by copying many extra items. You should only copy points.**



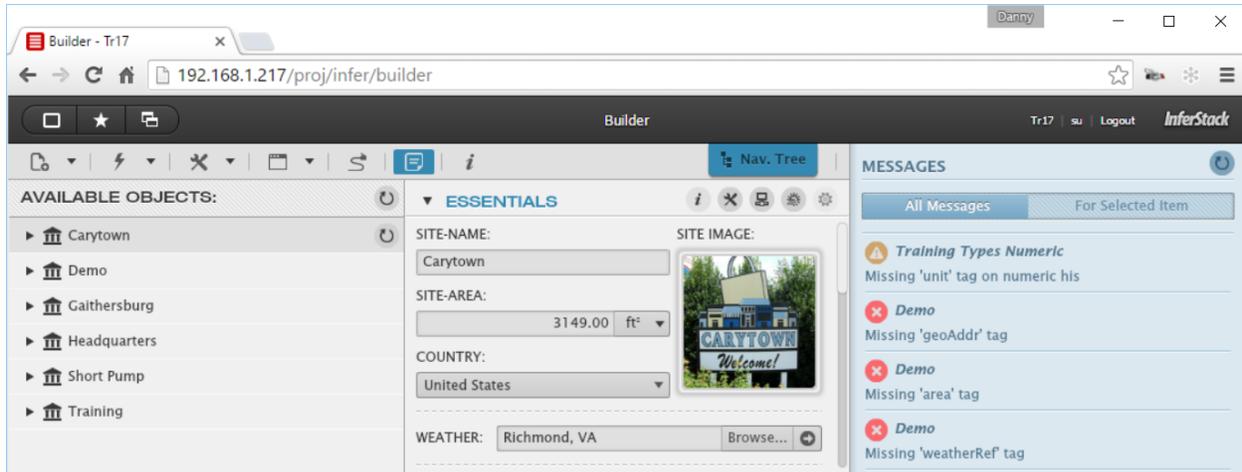
More information on Connectors and Points can be found in the Reference.

## Messages

Messages are available to let you see important information about your system. You can select Messages from the Menu Bar at the top to see messages in the right column. You can view All Messages or For Selected Item.

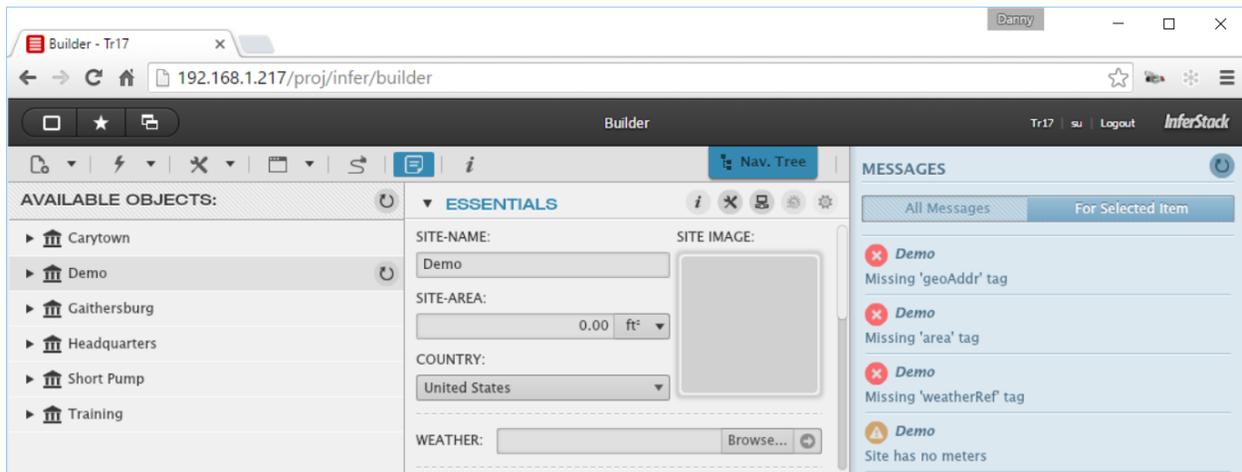
### All Messages

When you select Messages, the default is to see All Messages.



### Messages For Selected Item

You can press For Selected Item to see the messages for the selected item.



## Essentials

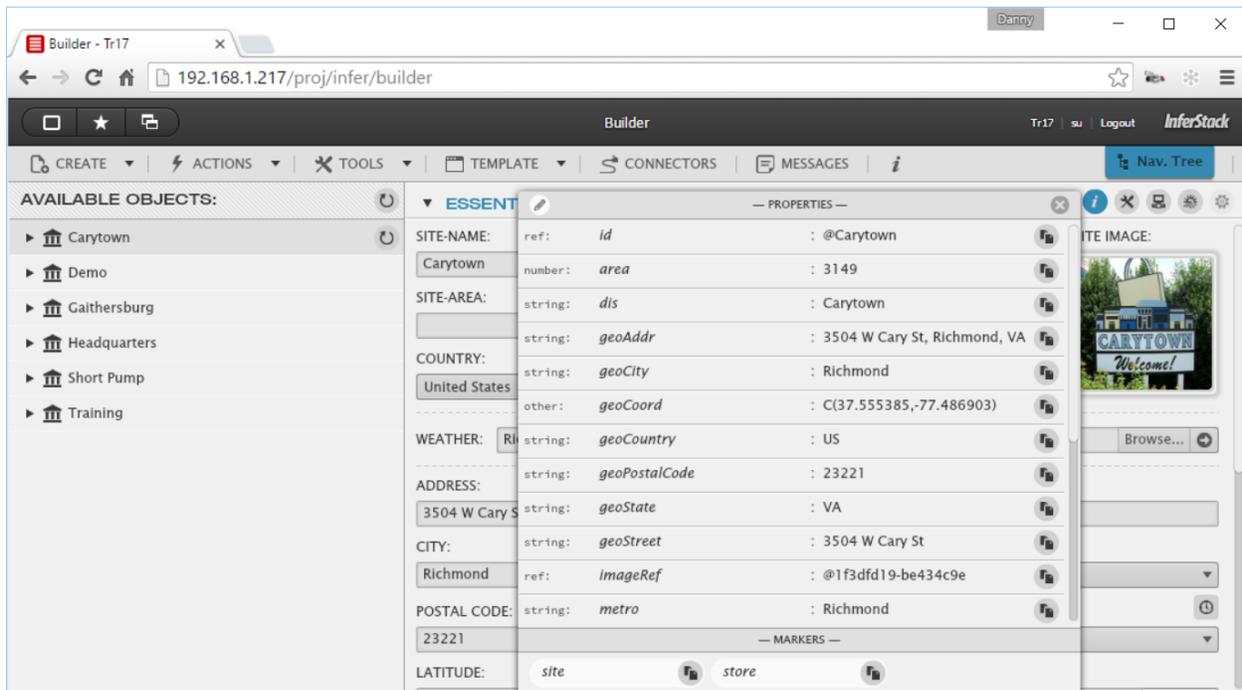
Once you select an object in the tree, you can see the essentials of the record in the main window.

### Site Essentials

Site Essentials provides essential attributes and Markers and Properties. In addition in the upper right are icons for Record Info, Tools, Equipments and Show Weather.

### Record Info

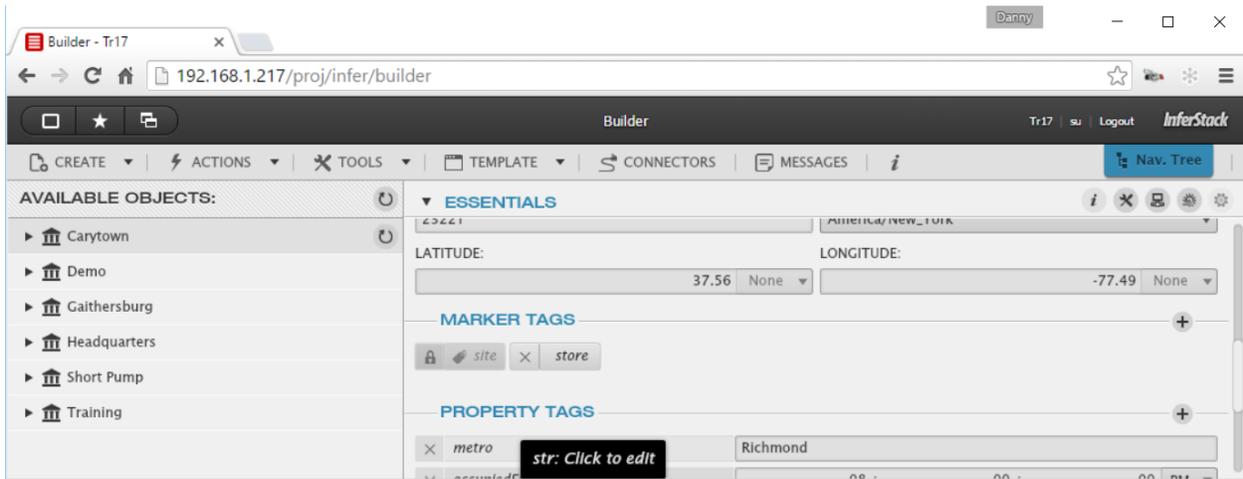
Displays record information.



### Text Highlightable

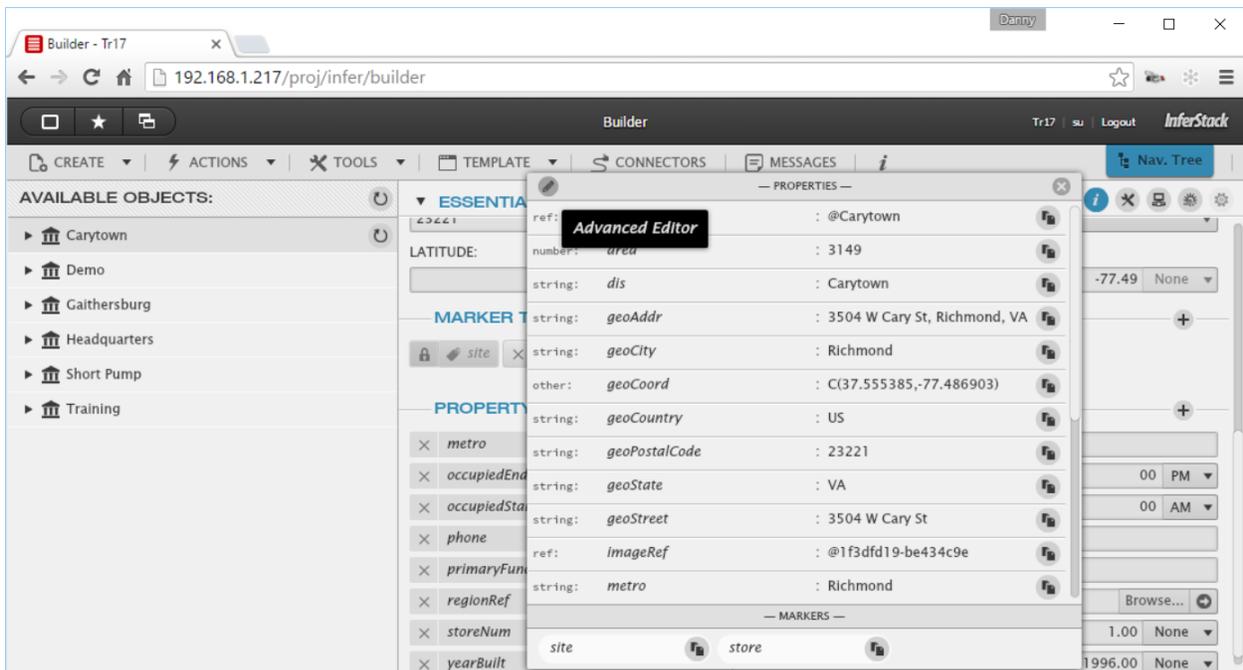
Text is highlightable and can be copied.

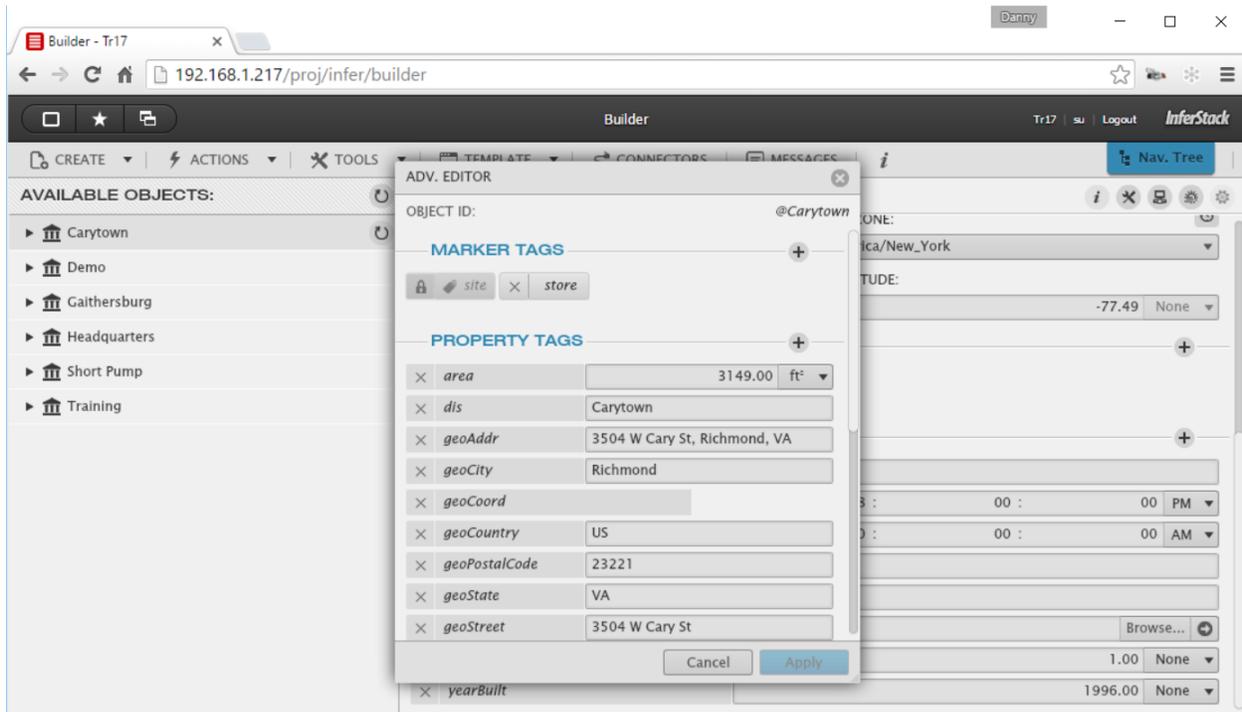
You can see the tag type both in the info window, and just in the property tags in the normal editor.



## Advanced Editor

There is an advanced editor so that you can see and edit all tags.



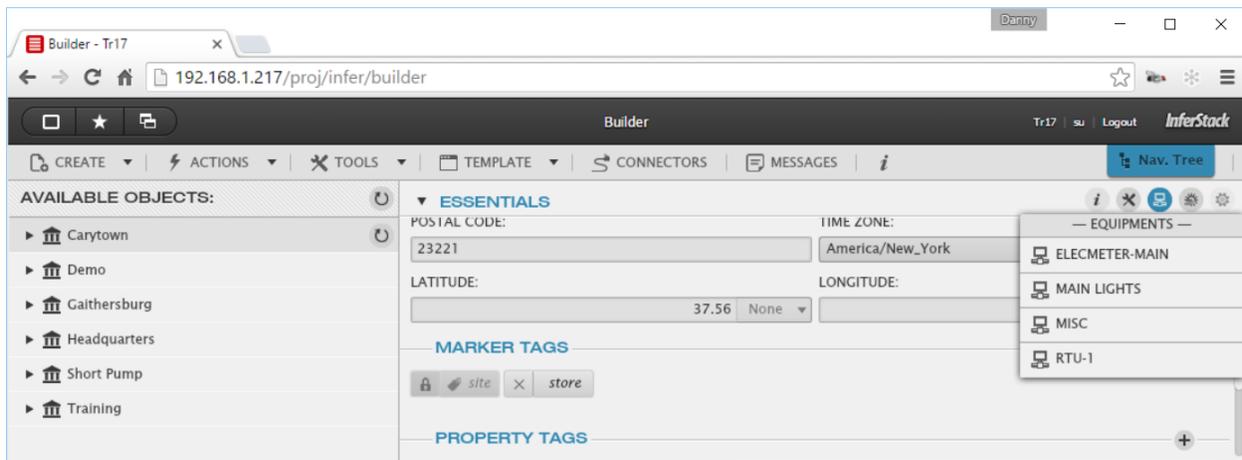


### Tools

Displays Tools like Clone Tags, Config Points and Duplicate X Times.

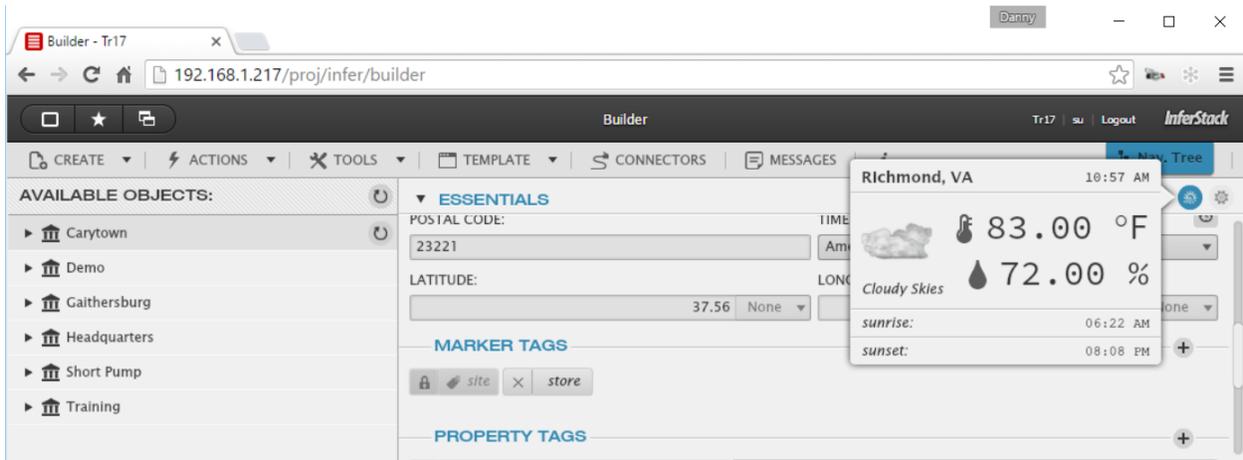
### Equipments

Displays Equipment in the site.



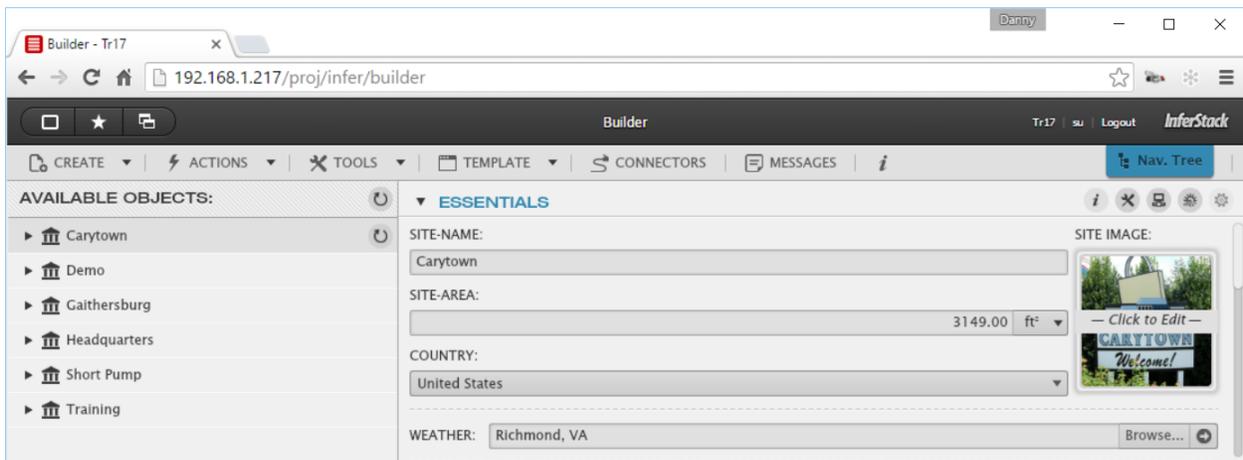
### Show Weather

Displays weather information.



### Site Image

This allows you to add a site image.

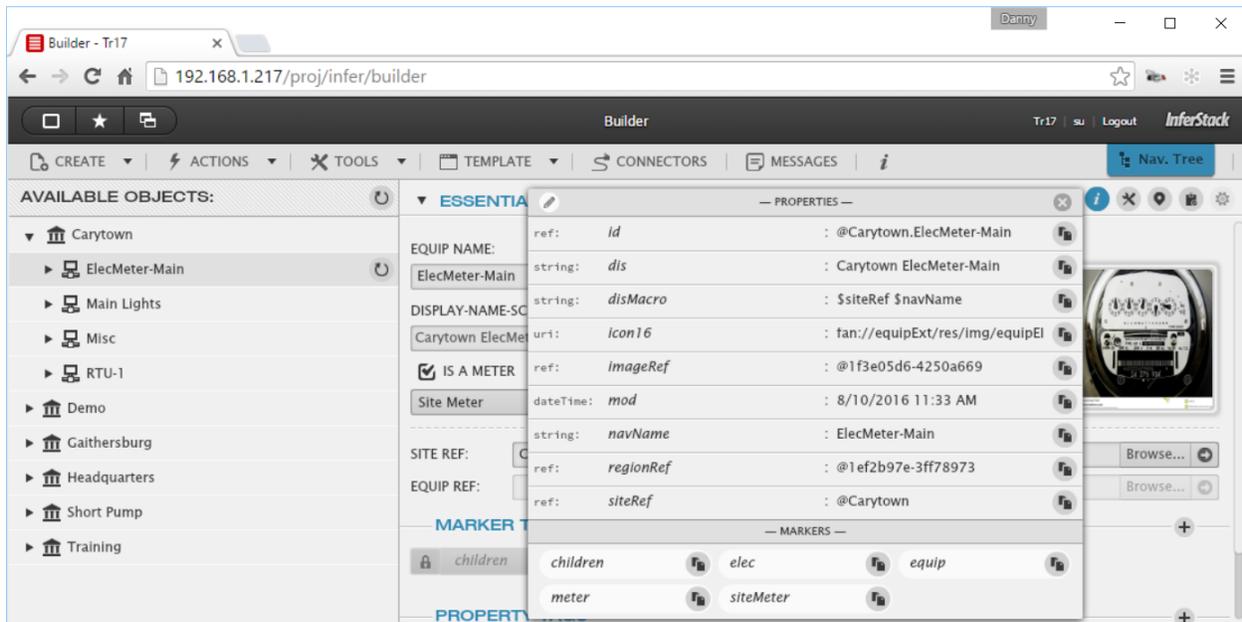


## Equipment Essentials

Equipment Essentials provides essential attributes and Markers and Properties. In addition in the upper right are icons for Record Info, Tools, Points and Clone Equipment.

### Record Info

Displays record information.

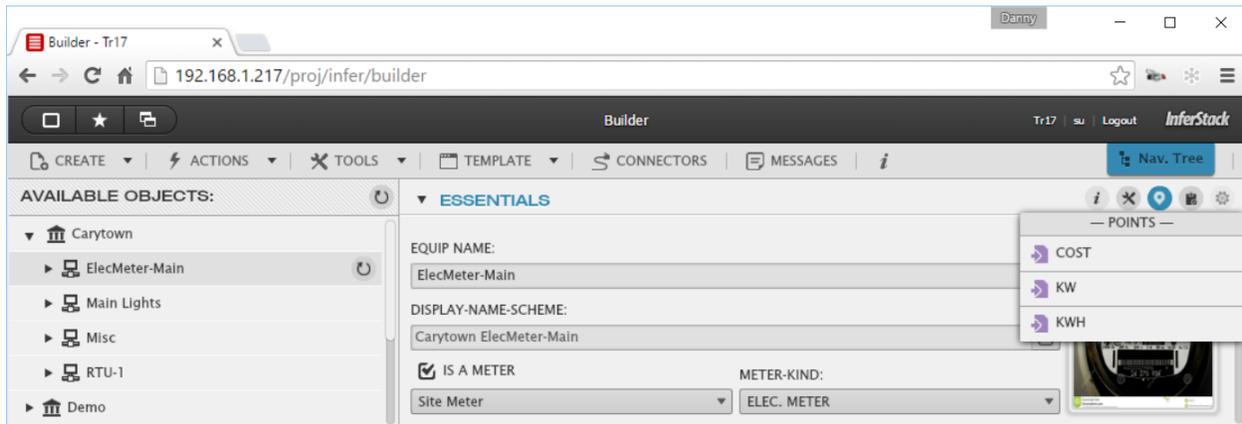


### Tools

Displays Tools like Duplicate X Times, Config Points and Create Summary.

### Points

Displays Points in the Equipment.

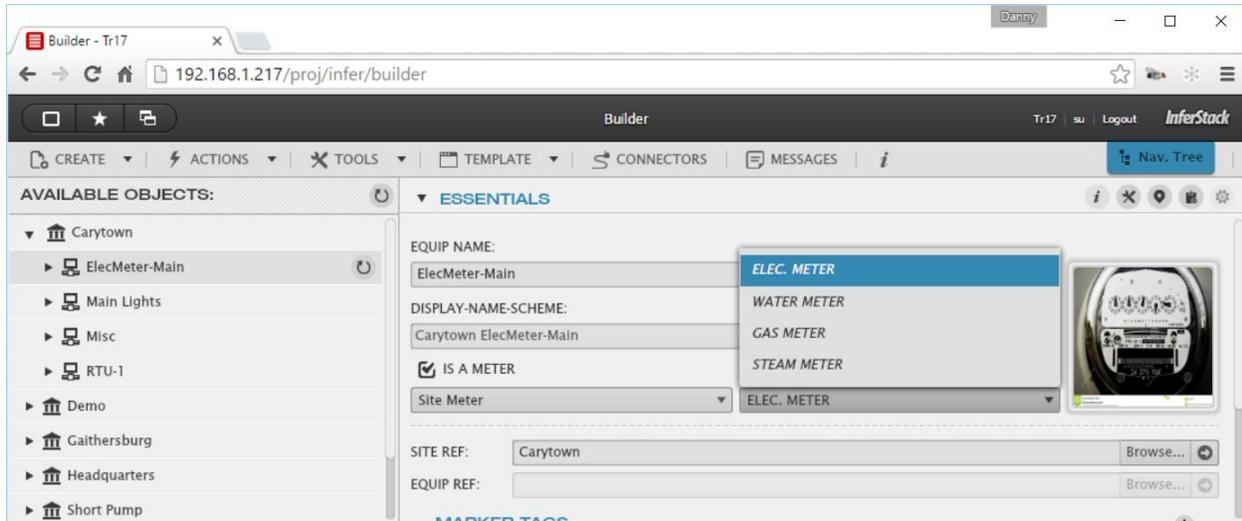


### Clone Equipment

This allows you to make a template to copy the tags of the equipment and points. Once you have a sample equip with equip and points tagged as desired, you can drag the sample equip into the Base URL and then drag the other equip into the targets and press Create.

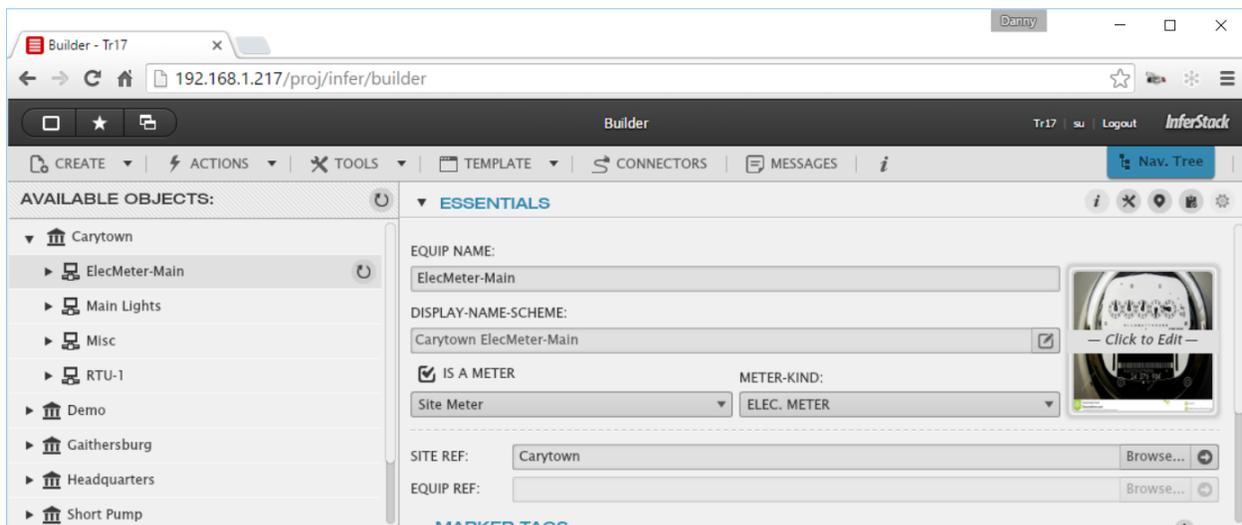
## Is a Meter

This allows you to select if this is a meter and choose type (Elec, Water, Gas or Steam).



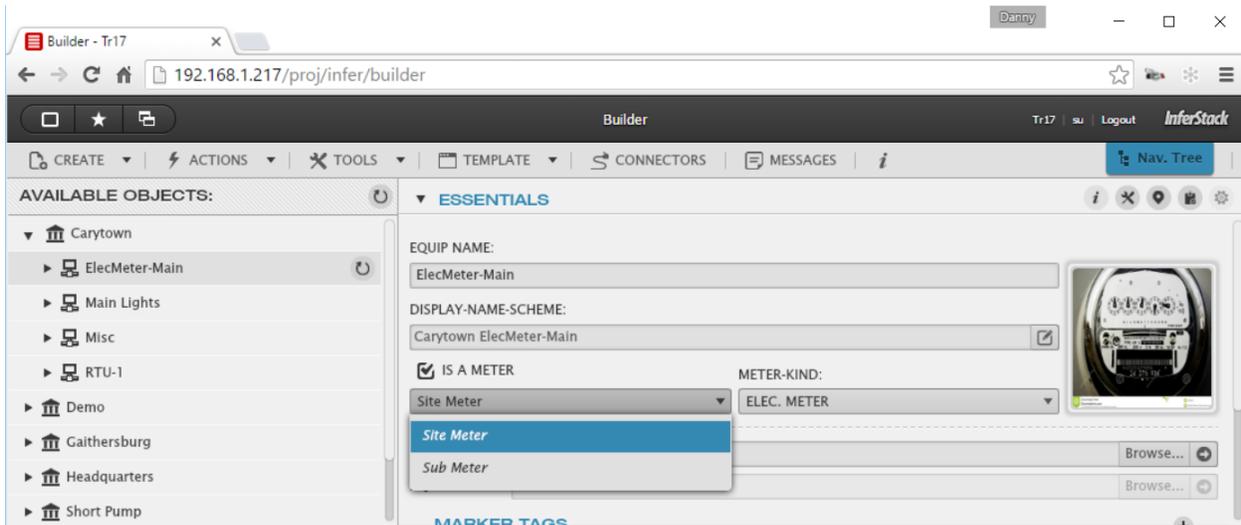
## Equipment Image

This allows you to add an equipment image.



## Equipment Kind

This allows you to choose whether this is a Site Meter or Sub Meter.

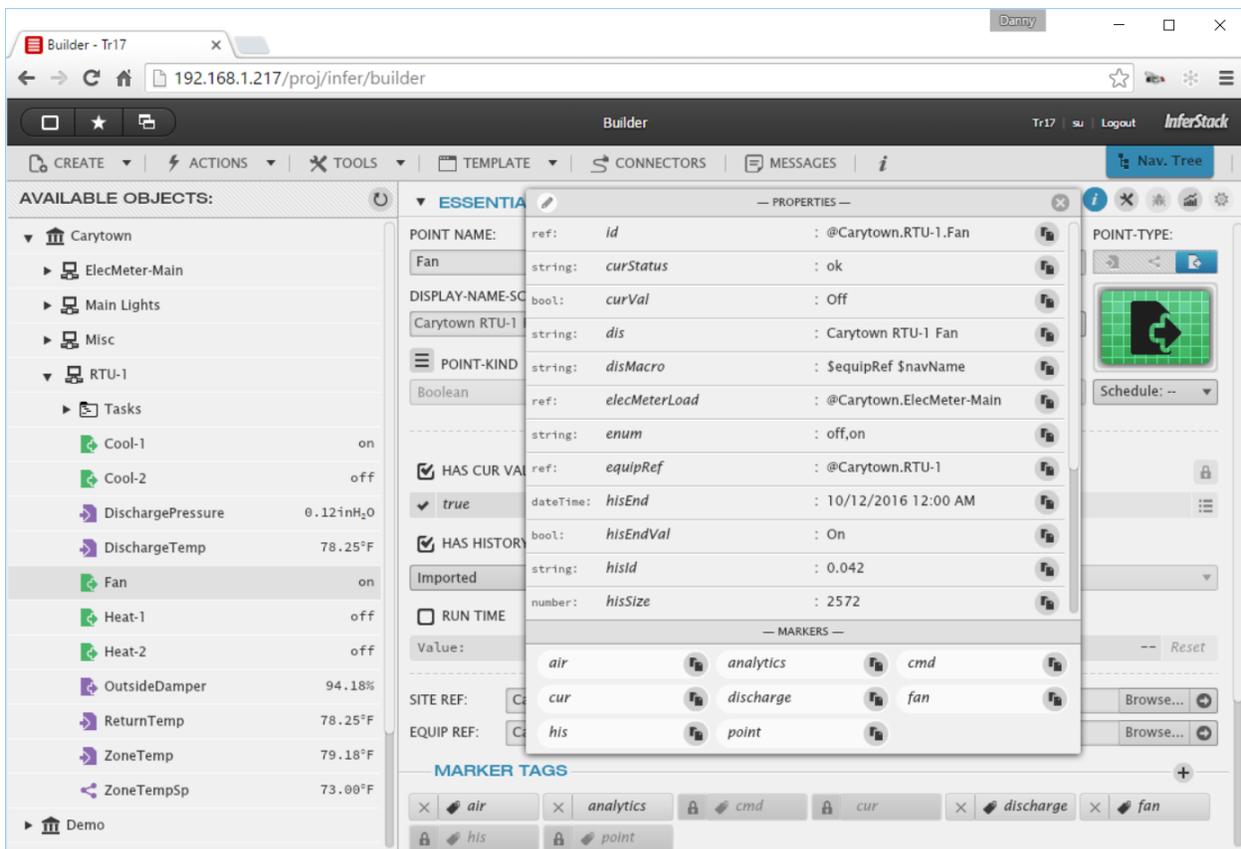


## Point Essentials

Point Essentials provides essential attributes and Markers and Properties. In addition in the upper right are icons for Record Info, Tools, Point Debug Info, Show Trend and Actions.

## Record Info

Displays record information for the point.



## Tools

Displays Tools like Duplicate X Times, Copy Points and Clone Tags.

## Point Debug Info

This displays the Debug Info for the Point.

The screenshot shows the InferStack Builder web interface. On the left, a tree view shows the project structure: Carytown > Demo > HaystackRTU > Tasks > Fan. The 'Fan' point is selected, and its configuration is shown in the center. The 'POINT NAME' is 'Fan', 'DISPLAY-NAME-SCHEME' is 'Demo HaystackRTU Fan', and 'POINT-KIND' is 'Boolean'. It is currently 'Connected'. A 'DEBUG INFO' window is open over the configuration, displaying the following details:

```
id: 1f2cf22c-ac5f6e9c
dis: Demo HaystackRTU Fan
conn: Tr16
connType: haystackExt::HaystackConn [2.1.13]
connStatus: ok
kind: Bool
unit: null
tz: New_York
isWatched: true

haystackCur: @Carytown.RTU-1.Fan
haystackWrite: -
haystackHis: @Carytown.RTU-1.Fan

Watches (1)
-----
FIN | Infer [192.168.1.217] (lastPoll: 696ms ago)

Conn Cur
-----
curVal: true [sys::Bool]
curRaw: true [sys::Bool]
curStatus: ok [conn=ok, pt=ok]
curLastOk: 1562ms ago
curLastFail: never
curConvert: n/a
curCalibration: n/a
curErr: null
```

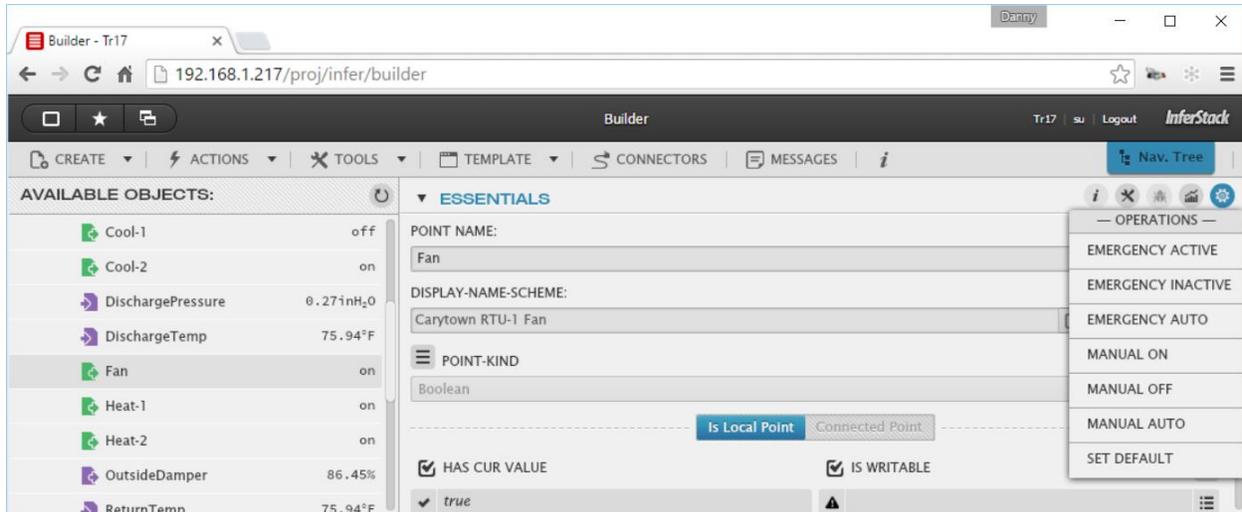
## Show Trend

Displays trend for the point.

The screenshot shows the InferStack Builder web interface with the 'DischargePressure' point selected. A 'Trend For: DischargePressure (inH<sub>2</sub>O)' window is open, displaying a line graph of the point's value over time. The y-axis ranges from 0.045 inHO to 0.085 inHO. The x-axis shows the time '06:00'. The graph shows a fluctuating trend with several peaks reaching approximately 0.08 inHO.

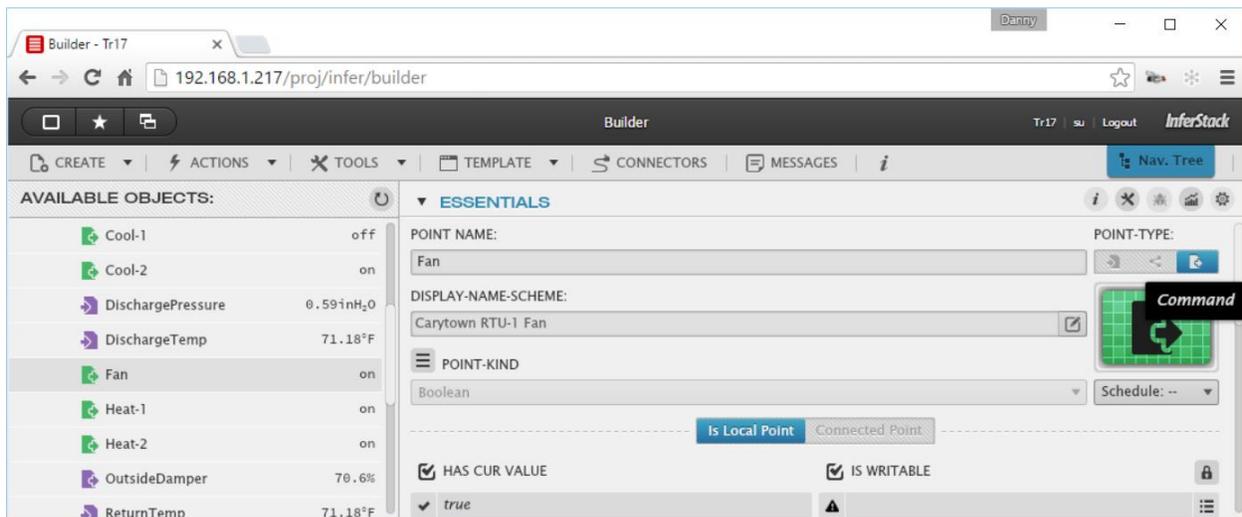
## Actions

Provides access to actions (typically Commands like Manual On, Off & Auto for Boolean).



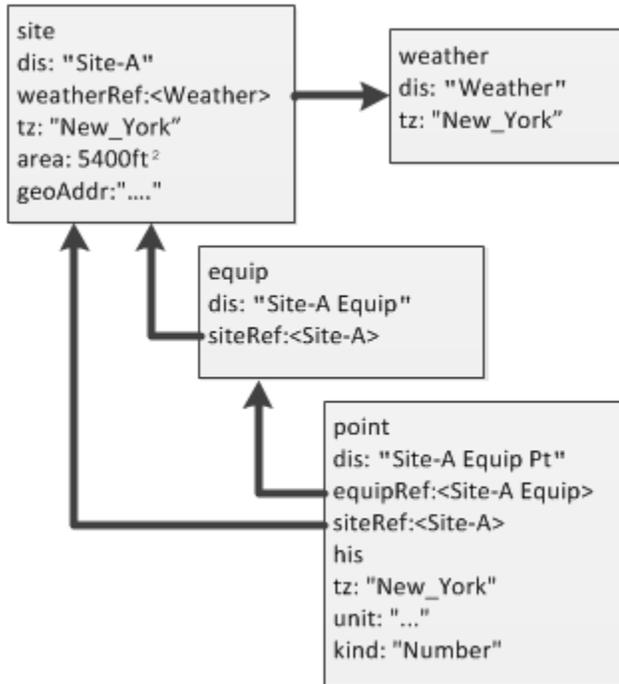
## Point Type

This allows you to select Haystack point type (Sensor, Set-point or Command).



## Display Name Scheme

This allows you to view or change the display name scheme. By default it is site, equip, point.

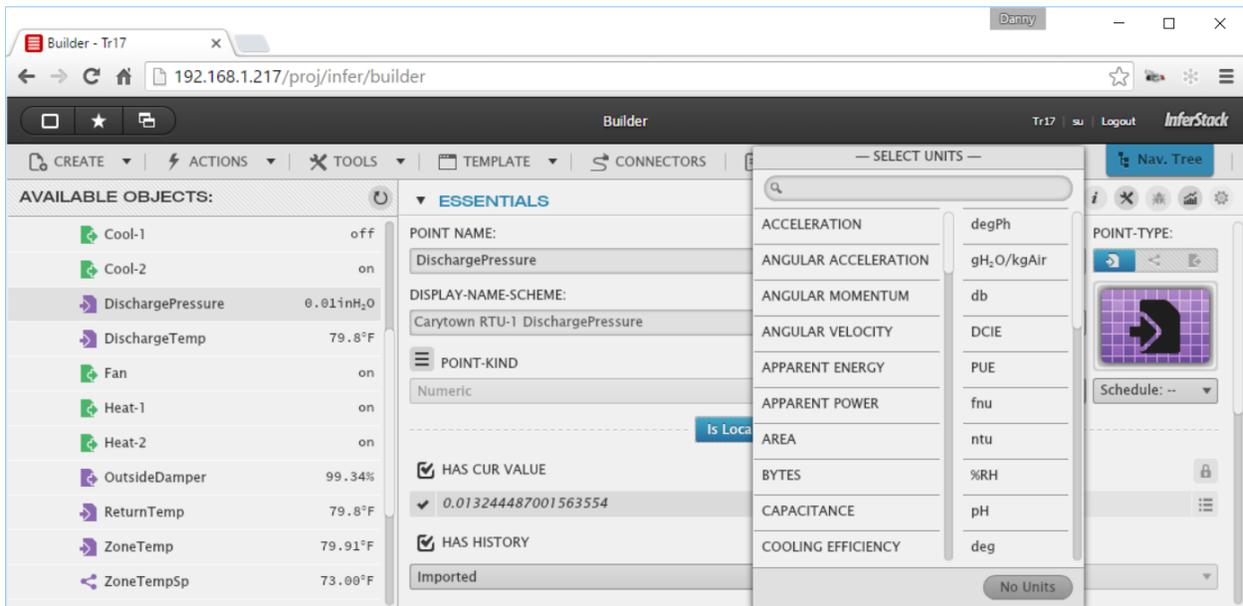


### Point Kind

This allows you to select point kind (Numeric, Boolean, String or Enumeration).

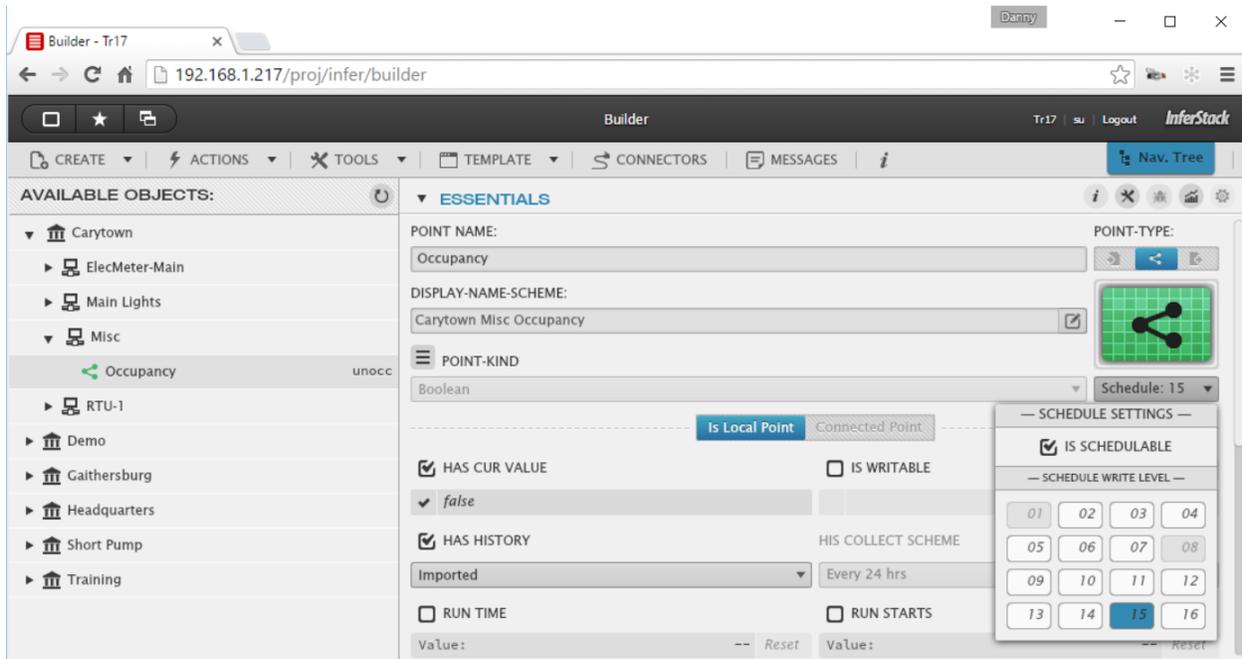
### Units

This allows you to select point units.



### Schedule Settings

This allows you to select whether the point is schedule-able and its write level.



### Connected or Local

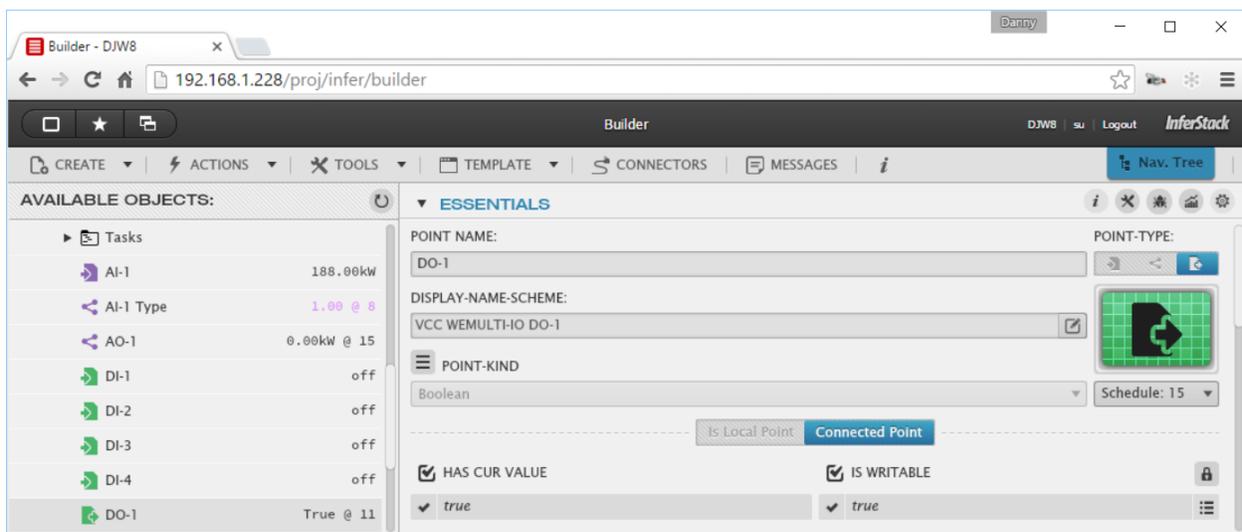
This allows you to select whether the point is Connected or Local.

### Has Cur Value

This allows you to select whether this point has a current value.

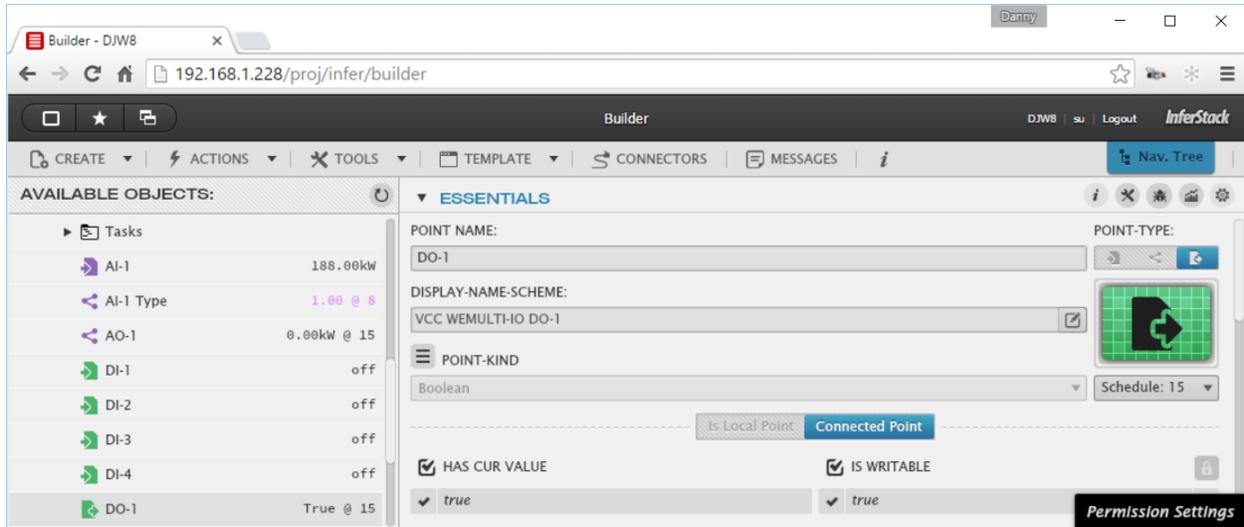
### Is Writable

This allows you to select whether the point is writable. It also lets you access the action permission settings (🔒) and the priority array (☰) for who is commanding the point.

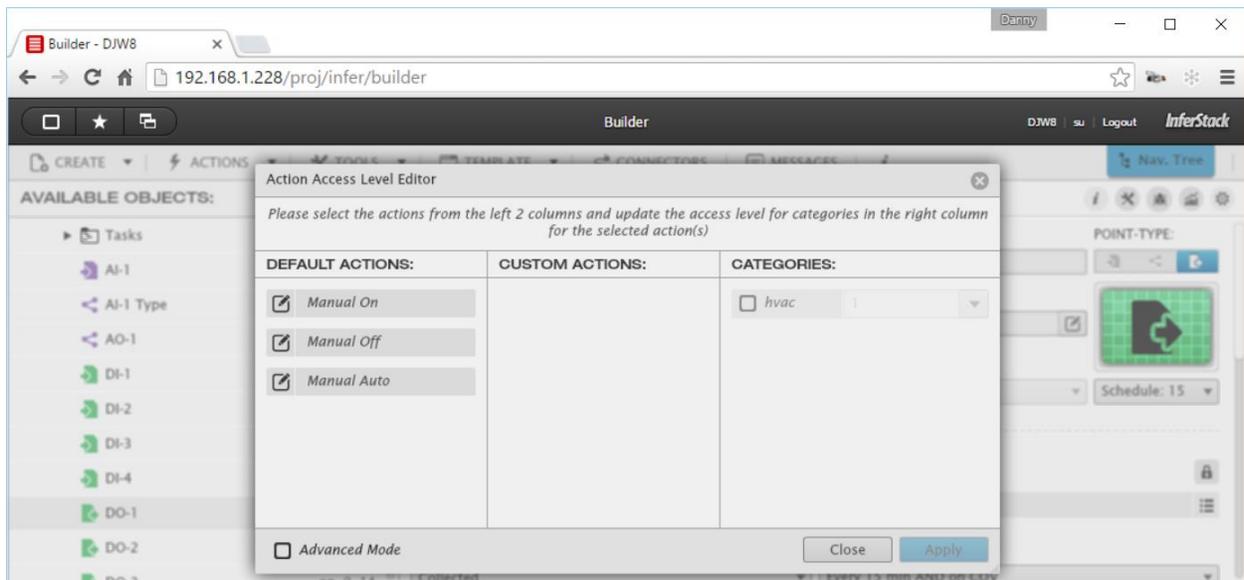


## Action Permission Settings

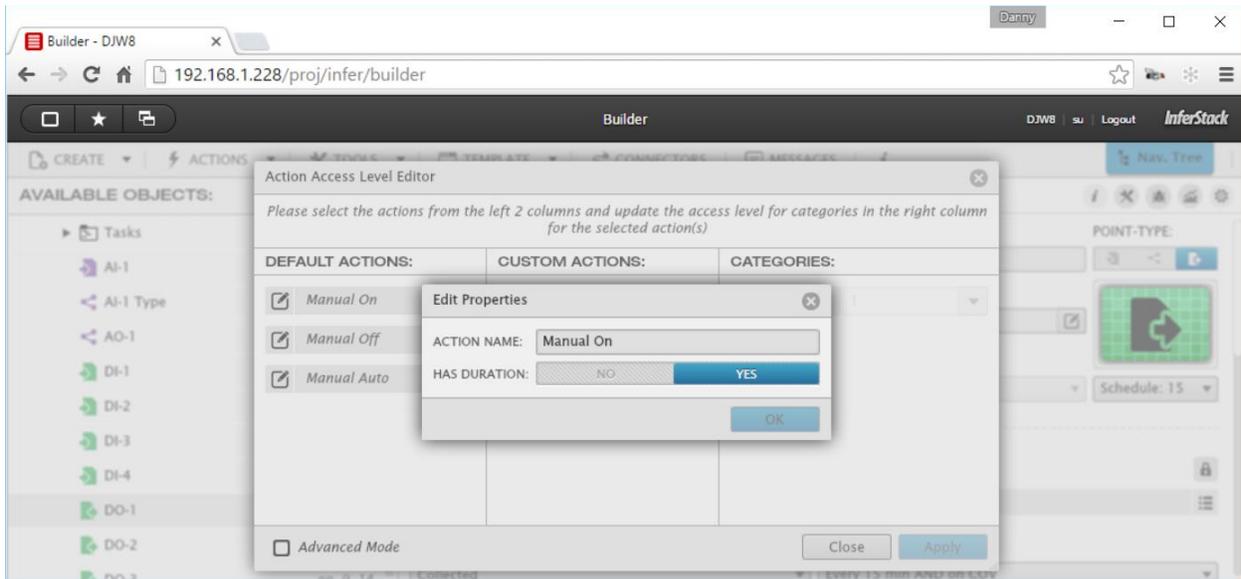
The lock icon (  ) to the right of Is Writable provides access to the Action Permission Settings.



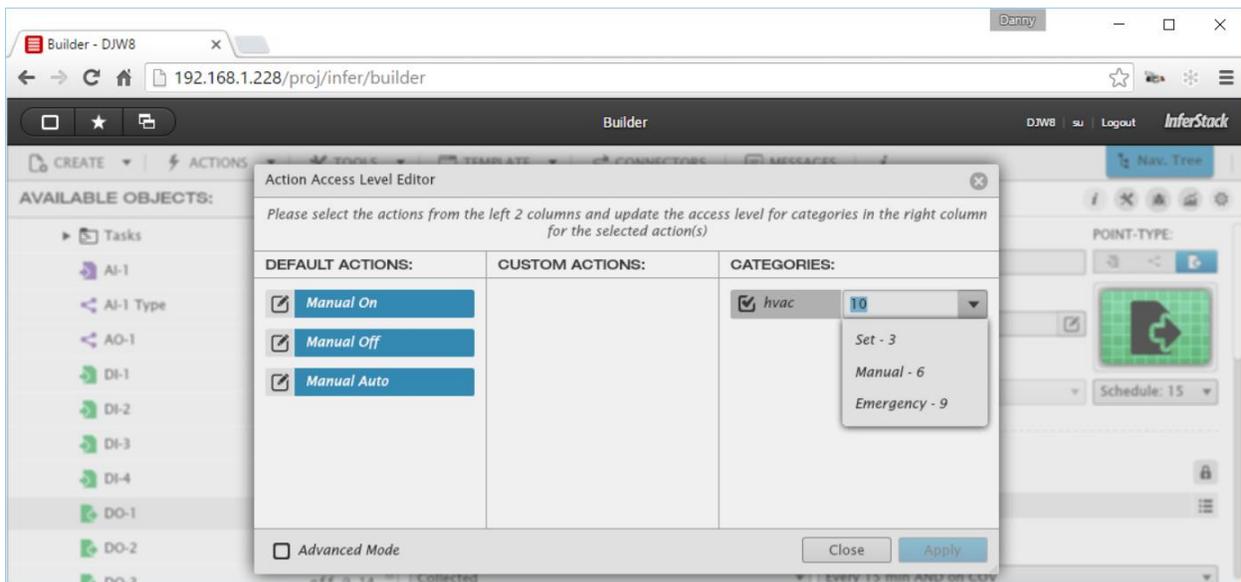
Press the Permission Settings icon (  ) to access them.



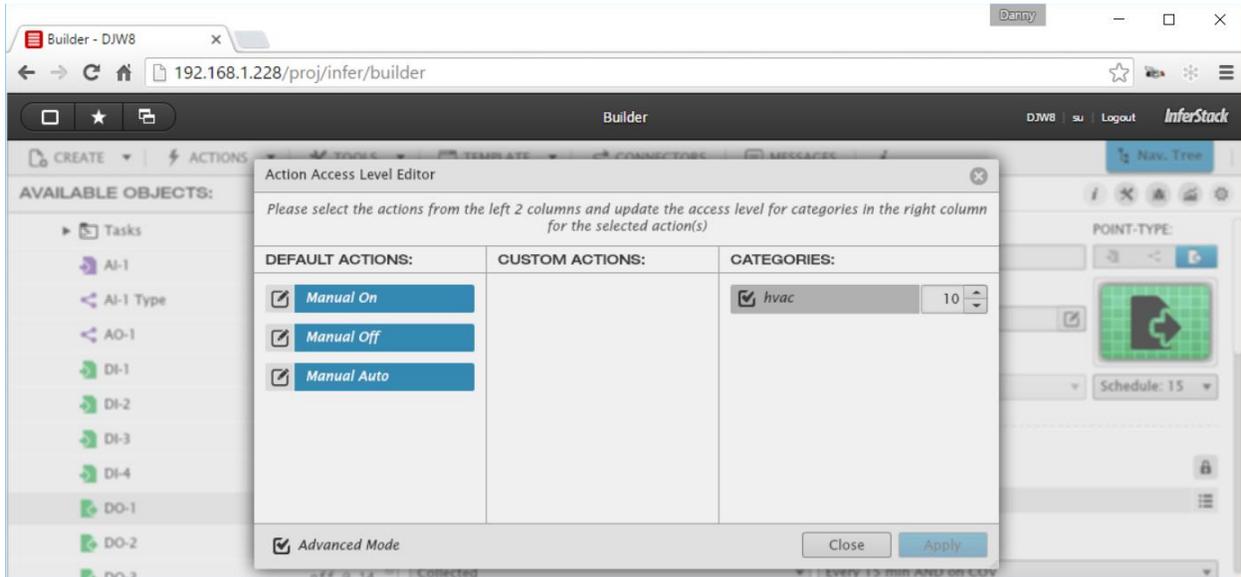
The Action Access Level Editor let you edit the existing actions including changing the name and whether it has duration.



You can also select the actions that you want assigned to a category by selecting them and checking the category box.



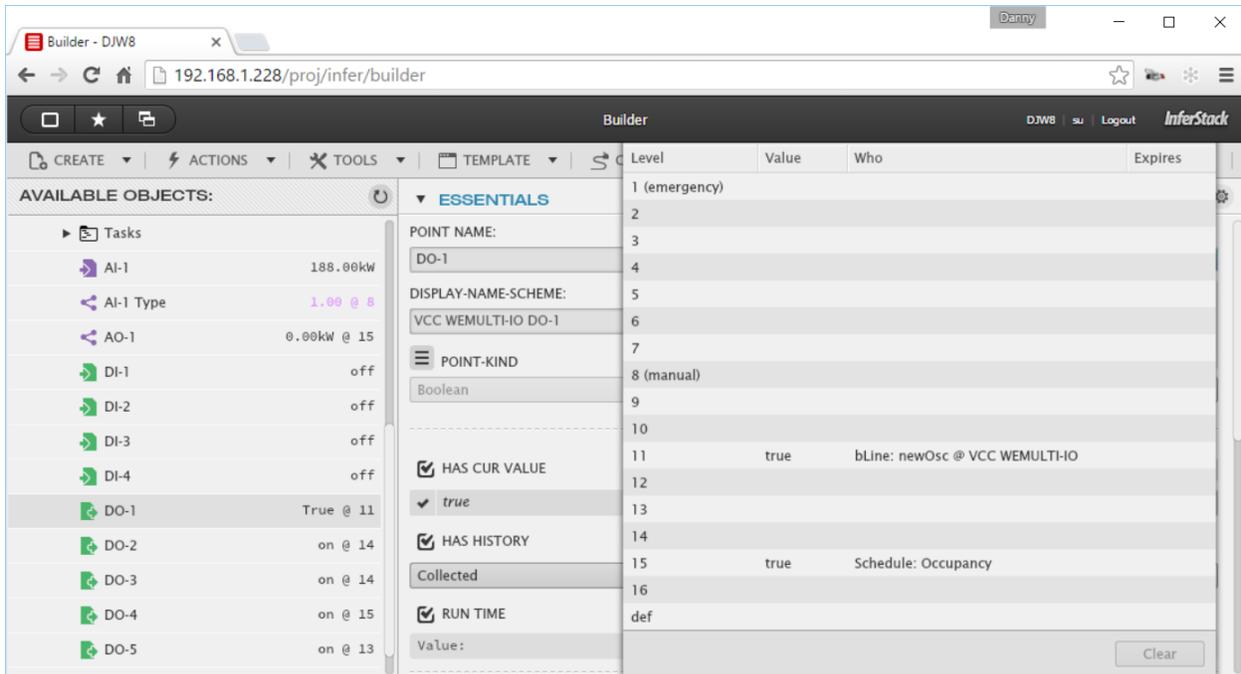
Check the Advanced Mode to have access to all write levels.



Press Apply to complete your changes or Reset to remove them.

### Priority Array

The settings icon (  ) to the right of Is Writable provides access to the Priority Array.



### Has History

This allows you to select whether history is synchronized, collected, imported or computed.

The screenshot shows the InferStack Builder web interface. On the left, there is a list of 'AVAILABLE OBJECTS' under the 'Tasks' category, including AI-1 (188.00kW), AI-1 Type (1.00 @ 8), AO-1 (0.00kW @ 15), DI-1 through DI-4 (all off), and DO-1 through DO-5 (DO-1 is True @ 11, DO-2 is on @ 14, DO-3 is on @ 14, DO-4 is on @ 15, DO-5 is on @ 13). The main panel is titled 'ESSENTIALS' and shows the configuration for 'POINT NAME: DO-1'. Other fields include 'DISPLAY-NAME-SCHEME: VCC WEMULT-HO DO-1', 'POINT-KIND: Boolean', and 'POINT-TYPE: Schedule: 15'. A dropdown menu for 'HIS COLLECT SCHEME' is open, showing options: Synchronized, Collected (selected), Imported, and Computed. Below the dropdown, there are checkboxes for 'RUN TIME' (checked) and 'RUN STARTS' (unchecked), and a 'Value:' field with a 'Reset' button. The 'IS WRITABLE' checkbox is also checked.

## Synchronized History

This allows you to synchronize point history data from the connector.

## Collected History

This allows you to collect history using the History Collection Scheme.

## Imported History

You can import history from another source anytime you need history that you do not have, either from another system or out-of-band data like energy data from your utility provider.

## Computed History

A normal history record stores its samples as a set of timestamp/value pairs to disk. But on occasion it is preferable to compute a history's samples on demand using a function. Histories which generate their samples on demand are called *computed histories*. A computed history is configured just like a standard history with the addition of a [hisFunc](#) tag which is an Axon expression which evaluates to a function

## History Collect Scheme

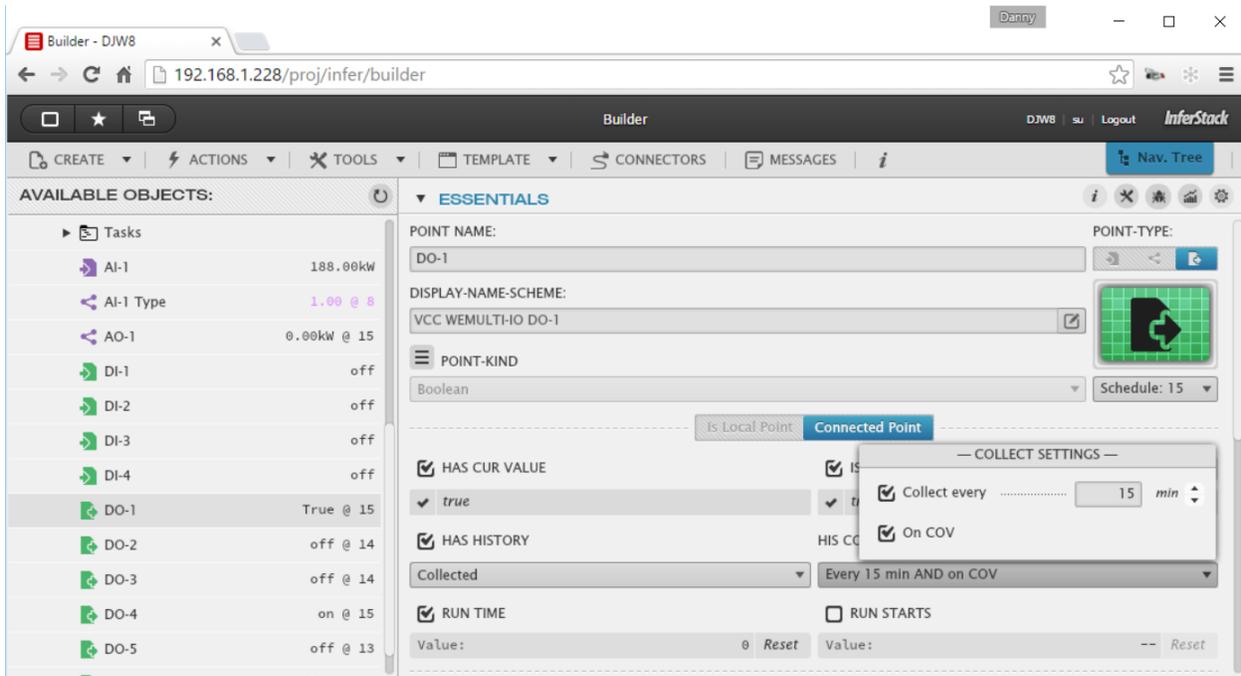
This allows you to select when to collect history. You can choose how often to collect and/or on change of value.

## Time Based Collection

Time Based Collection allows you to choose the time period for collecting histories. This can be in seconds, minutes or hours and has a minimum value of 10 seconds.

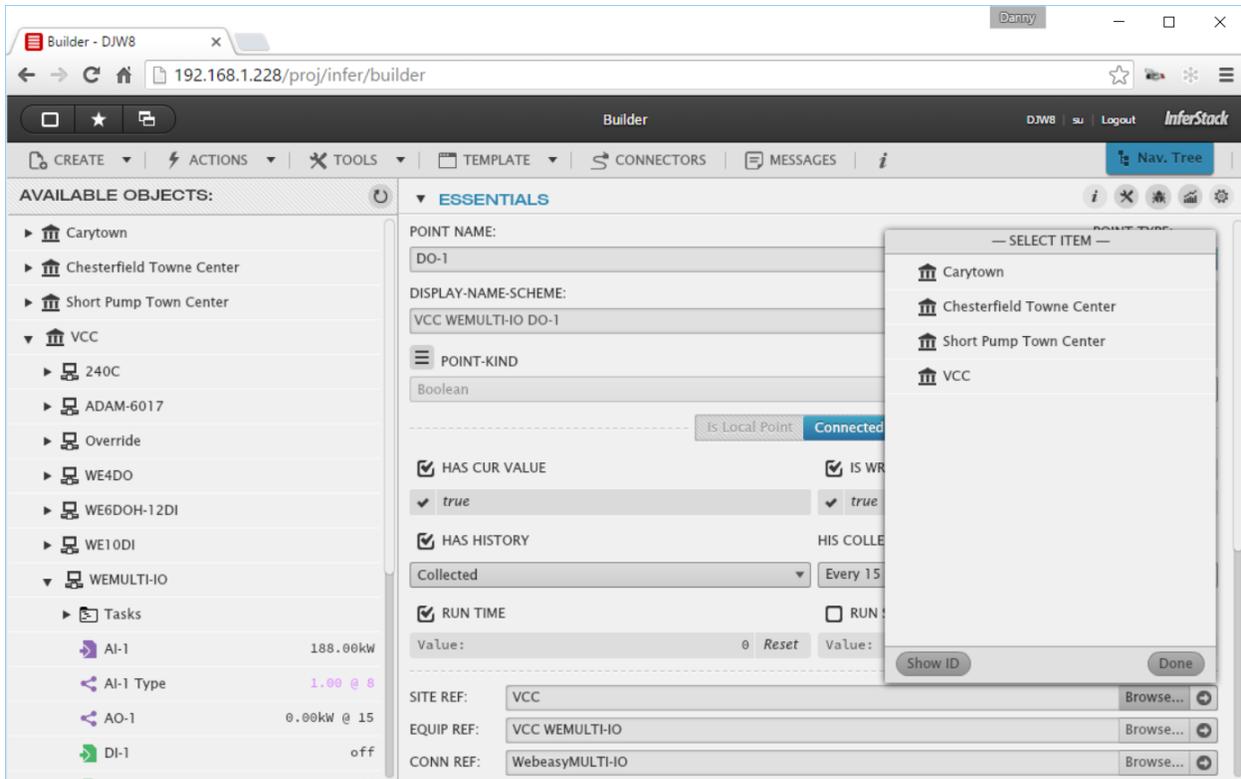
## COV Based Collection

If you set the On COV more than on an analog point to a very small or zero collection tolerance, you can essentially log as fast as the connector can poll. You just need to have a plan in place to keep these from filling up you flash disk space.



## References

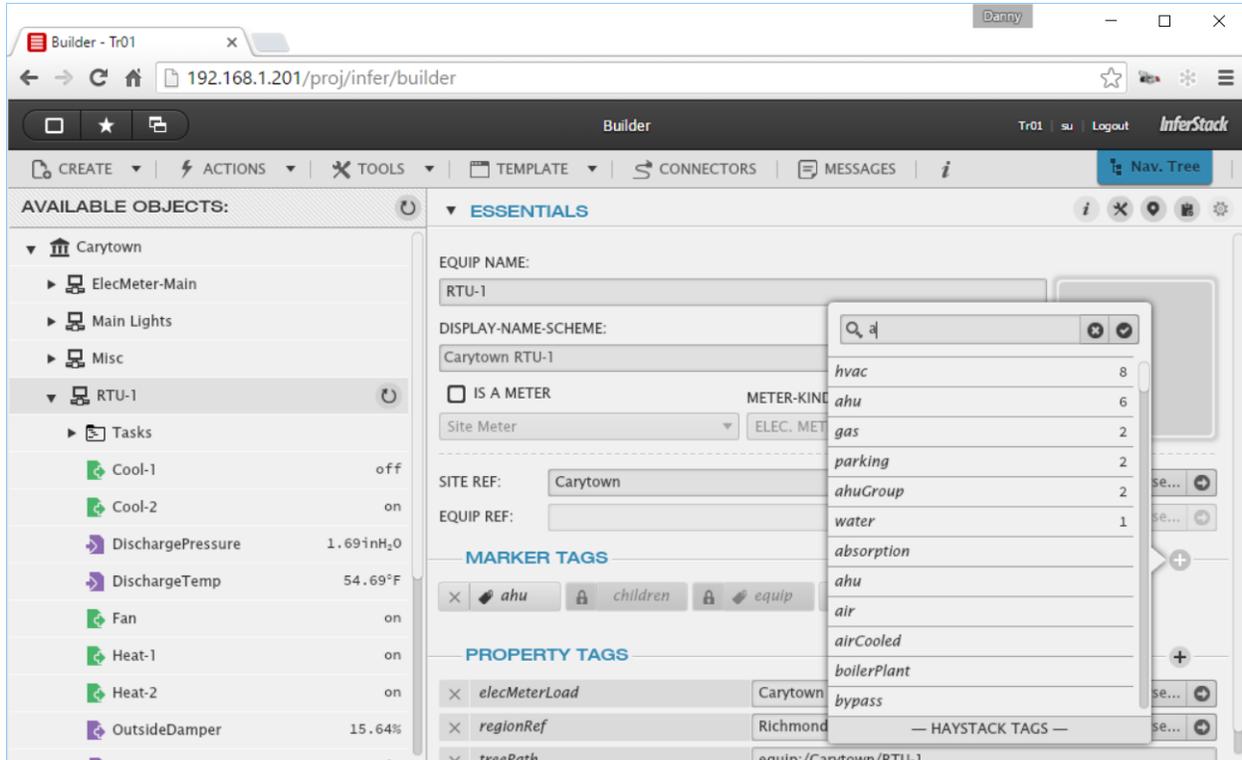
References allow you to browse for site, equip and conn references.



You can also drag points from the connector and drop to fill in the reference or select them in the field.

## Marker Tags

This allows you to view, add and delete Markers. Press the plus (+) to the right of Marker Tags to add a marker.



**Note that some markers are greyed out. These are system tags that cannot be deleted.**

Markers must follow standard rules for naming.

Programmatic names use `camelCaseNaming` as follows:

- first char must be ASCII lower case letter: `a - z`
- rest of chars must be ASCII letter or digit: `a - z, A - Z, 0 - 9, or _`

## Haystack tags

Available Haystack markers will display as you type or you can press Haystack Tags. See <http://project-haystack.org/> for more information on Haystack Tags.

The screenshot shows the InferStack Builder web interface. On the left, there is a list of 'AVAILABLE OBJECTS' including Cool-1, Cool-2, DischargePressure, DischargeTemp, Fan, Heat-1, Heat-2, OutsideDamper, ReturnTemp, ZoneTemp, and ZoneTempSp. The main area is titled 'ESSENTIALS' and shows a configuration for 'Carytown' with 'Carytown RTU-1' as the equipment reference. A search dropdown is open, showing a list of tags starting with 'air'. The tags include 'air' (43), 'air' (1), 'air' (1), 'air', 'airCooled', 'discharge air temp sensor', 'discharge air humidity sensor', 'discharge air pressure sensor', 'discharge air flow sensor', 'discharge air fan cmd', 'return air temp sensor', and 'return air humidity sensor'. Below the search dropdown, there are sections for 'MARKER TAGS' and 'PROPERTY TAGS'. The 'MARKER TAGS' section includes 'air', 'analytics', 'curTracksWrite', 'effective', 'temp', and 'writable'. The 'PROPERTY TAGS' section includes 'histd' (0.033), 'regionRef' (Richmond), and 'treePath' (equip:/Carytown/RTU-1/ZoneTempSp).

**Note: If you select a group of tags like “discharge air fan cmd”, you will need to delete the cmd tag before you confirm and add, since it already exists.**

### Property Tags

This allows you to view, add and delete Properties. Press the plus (+) to the right of Property Tags to add a property.

The screenshot shows the InferStack Builder web application. The browser address bar displays '192.168.1.228/proj/infer/builder'. The application header includes the user name 'Danny' and the 'InferStack' logo. The main interface is divided into several sections:

- AVAILABLE OBJECTS:** A tree view on the left showing a hierarchy of objects including 'Carytown', 'Chesterfield Towne Center', 'Short Pump Town Center', 'VCC', and 'WEMULTI-O'.
- ESSENTIALS:** A section for configuring basic object properties, including 'RUN TIME' and 'RUN STARTS' checkboxes, and fields for 'SITE REF', 'EQUIP REF', 'CONN REF', 'CUR PATH', and 'WRITE PATH'.
- MARKER TAGS:** A section for defining marker tags, showing tags like 'cmd', 'cur', 'his', 'hisCollectCov', 'occupancy', 'point', and 'writable'.
- PROPERTY TAGS:** A section for defining property tags, showing tags like 'hisId', 'occupiedRef', 'scheduleRef', and 'treePath'.

A tooltip labeled 'Add Property' is positioned over the 'treePath' property tag, which has a value of 'equip:/VCC/WEMULTI-O/DO-1'.

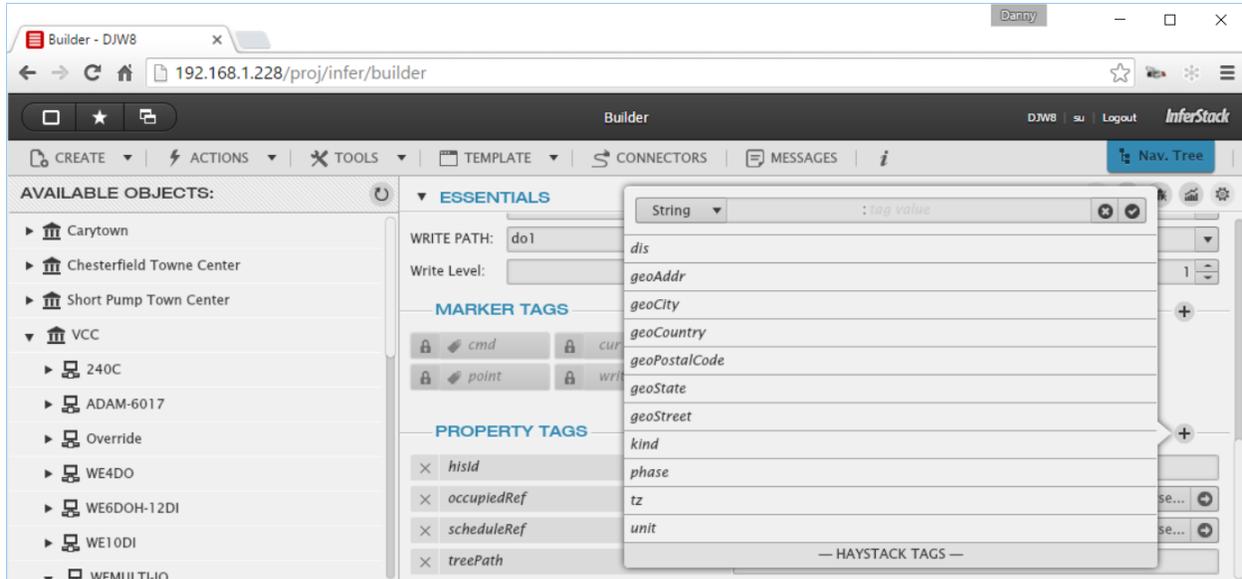
**Note that some markers are greyed out. These are system tags that cannot be deleted.**

You can select the type (Boolean, String, URI, Numeric, RefID, Date, Time or DateTime), tag name and value, Properties must follow standard rules for naming. See Reference for more information.

This screenshot shows the same InferStack Builder interface as the previous one, but with a dropdown menu open over the 'PROPERTY TAGS' section. The dropdown menu lists the following property types: Boolean, String, URI, Numeric, RefID, Date, Time, and DateTime. The 'Boolean' type is currently selected. Below the dropdown, a new property tag is being added with the name 'Tag Name' and the value 'true'. The 'treePath' property tag is also visible below it.

## Haystack tags

Available Haystack properties will display as you type or you can press Haystack Tags. See <http://project-haystack.org/> for more information on Haystack Tags.



## Point Conversion

One use of properties is to scale connected points with point conversion. Point conversions are used to convert between the representations of external systems and InferStack™. They are used by the connector framework with the curConvert, writeConvert, and hisConvert tags. Use cases include:

- mathematical conversions of raw modbus registers
- sensor voltage resets
- sensor thermistor tables
- unit conversion from fieldbus devices

See the Point extension for more information.

## Reference

There are a number of references available on your device or server.

In the Help app, scroll down to Extensions and select from these:

conn – Connector Extension Framework

equip – Equipment Extension

his – Historian Extension

point – Point Extension

The Standard Rules for Naming can be found in docInferStack™ Folio under naming

Online docs are available at <http://licensing.intellastar.com/doc/>.