



# HCA Tech Note 604

## Open Weather Map (updated 27-May-2023)

To use this internet weather provider you must first establish an account with them. This is done from their website at [www.openweathermap.org](http://www.openweathermap.org)

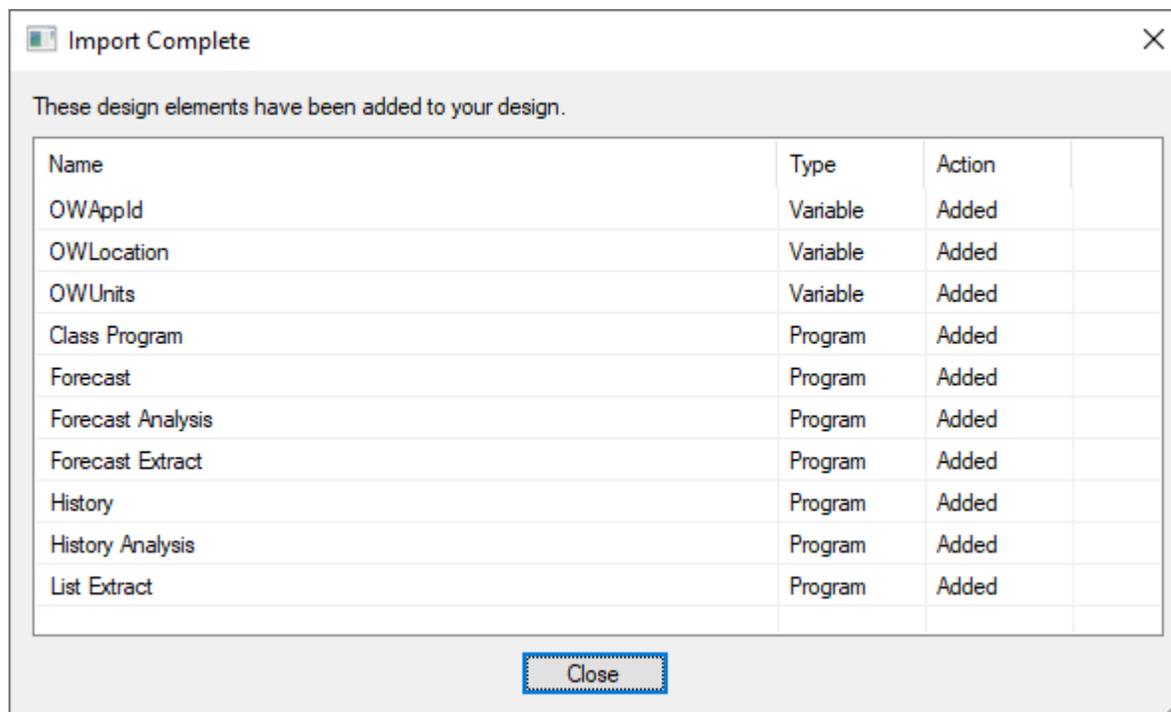
Complete the account signup process and then go to the API “How to start” page to request an application id. It takes a bit before it arrives as they say. I got mine within an hour. [www.openweathermap.org/appid](http://www.openweathermap.org/appid)

For a single user it is all free if you don’t access more than 60 requests a minute, which you are unlikely to do.

Next, familiarize yourself with the way that they designate a location. There are many ways to do this from a simple zip code or by location coordinates. This is all explained on this page of their website: [www.openweathermap.org/current](http://www.openweathermap.org/current)

The HCA Weather class supports all the location specification options. To operate correctly, you must enter it in the format OpenWeather expects it and is documented on their website.

Next, import the Open Weather Map class either from the online library or from a file. The class program is added in a folder called “OW” (for OpenWeather).



Before doing anything else, open the variable inventory and update the three global variables.

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OWAppId is the application ID you received from Open Weather Map when you signed and got started with their API.

OWUnits specifies the units that the data comes in. It only effects temperature readings and is one of two strings: "Imperial" or "metric". Make sure you set to one of these.

OWLocation specifies the location to use. You can use any of the methods that OpenWeather uses to specify a location.

For example:

```
OWLocation = "zip=98102,us"
```

```
OWLocation = "lat=47.60&lon=-122.33"
```

If using latitude and longitude, it follows the usual conventions so North America longitude is a negative number.

If you want, you can look at the OpenWeather website for all their city codes and use those if you want.

Since these values are unlikely to change after you configure them, I suggest that you enter the value as the "Current Value" and in the "Set it to this value" with the "When HCA loads the design file" option selected. That way each time HCA starts and loads your file, the variables have the right values.

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**Variable Inventory**

Name	Value
_Dark	No
_Light	Yes
degrees	No
hPA	No
mm	No
mph	No
OWAppld	"25464b7e106..."
OWLocation	"zip=98376.us"
<b>OWUnits</b>	<b>"imperial"</b>
Pressure	No
temp	"39.97"

**Name:**  
OWUnits

**Current Value:**  
"imperial"

**Usage Info:**  
Open Weather units for temperature. Choices are imperial or metric

**When HCA loads the design file**

Set its value to what it was when the design file last saved

Set it to this value

imperial

Save changes Delete

**Referenced in these locations**

Open Weather - Class Program

Create New Export Delete all unused Close

## Periodic class execution

Now that the class is added and configured, there are two final steps: Getting weather data periodically and using the data.

To retrieve weather data periodically, one way is to cause the Open Weather class to execute periodically using the Auto Start option on the Advanced Options tab.

Auto Start

Once started automatically run again in: 0 days 1 hours 0 minutes

This way you can choose how often the class runs to collect weather data: Once an hour, every 30 minutes, etc. Also, you may want to add a trigger on the class to start it running when HCA loads your design.



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Trigger

Trigger Type: Special Condition

Start the program when this condition happens:

HCA started normally

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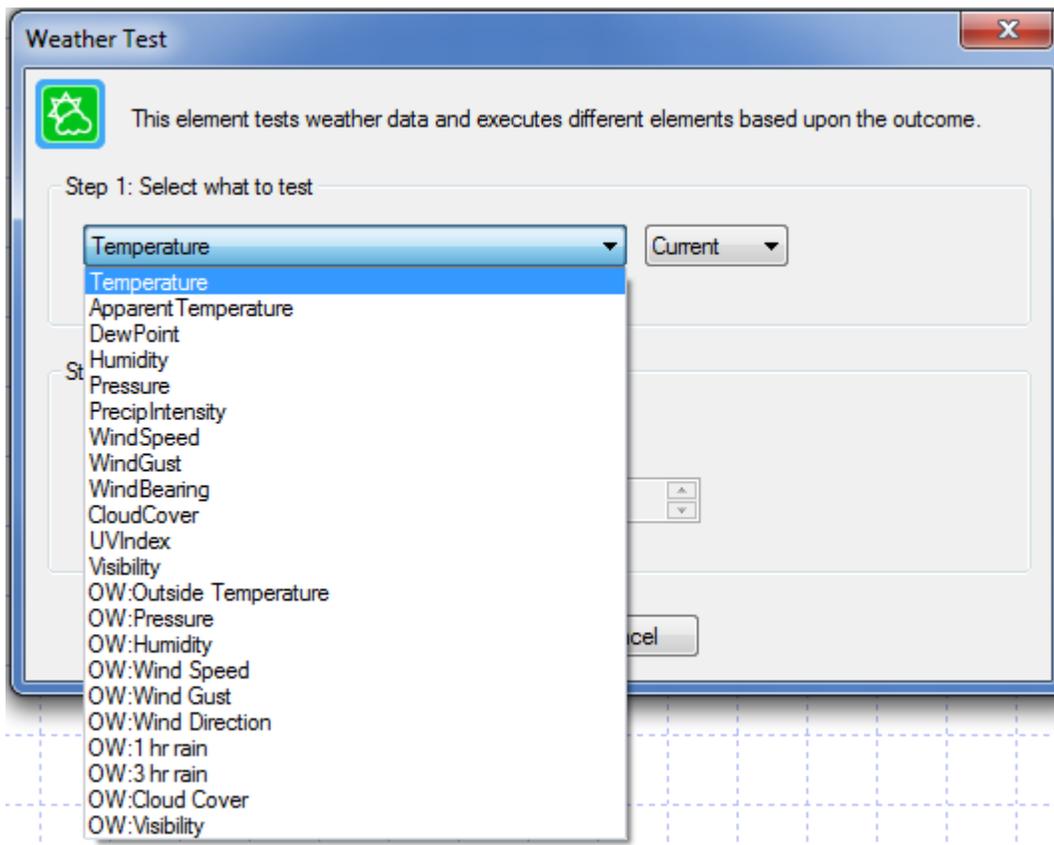
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## Using the weather data

Now that the class has been added, and executed at least once, when you use the Weather-Test element or create a weather trigger, then OpenWeather data is available to choose from.



The data items prefixed by “OW” are the Open Weather ones, the un-prefixed ones are the standard built-in DarkSky observation data.

You can also use OpenWeather data in expressions using the `_WeatherGet` function like this:

```
_WeatherGet("OW:Outside Temperature")
```

Again, the name of the data is the same text as is shown in the Weather-Test element with the “OW:” prefix.

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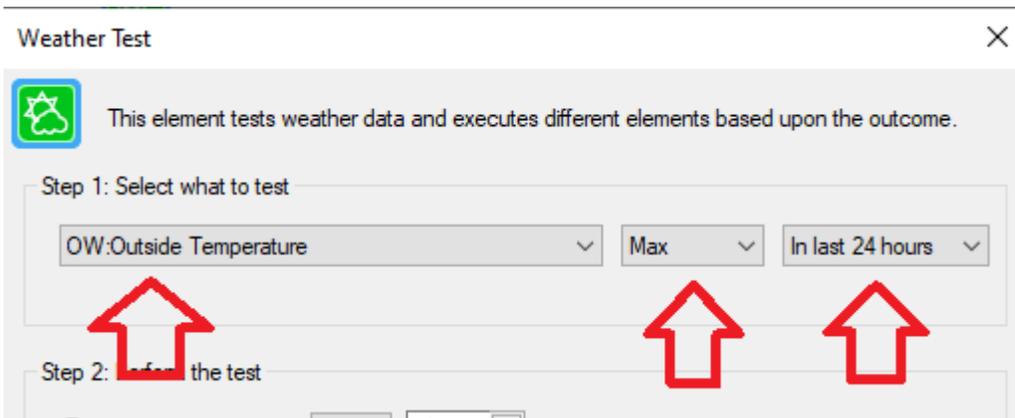
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IMPORTANT NOTE: The Visual programmer Weather-Test element, when used with data from any weather class, **only works for current data**. The options in that element configuration to test with past or future data will not function as expected.

The options as shown in this Weather-Test element **will not work**.



However, there are new ways to accomplish the same things. Just continue reading!



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## Current Weather conditions

Each time the weather class program runs it updates tags on the program that provide current weather conditions. For example:

Tag Name	Current Value
KeepHistory	0
HistoryFolder	
LastDataTime	20-Apr-23 03:51 PM
Weather-main	Rain
Weather-description	moderate rain
Weather-icon	<a href="https://openweathermap.org/img/wn/10d@2x.png">https://openweathermap.org/img/wn/10d@2x.png</a>

The “Weather-main” and “Weather-description” tags are what Open Weather Map reports. The “Weather-icon” is a URL to an image that represents the description.



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## Forecast Data

The Open weather map package also contains two programs for accessing forecast data. The first of which is: “OW – Forecast”.

The program accepts two parameters: A time in the future and the data item wanted. For example, to get the forecasted temperature in 12 hours from now this Start-Program element can be used.

The screenshot shows the 'Start Program Properties' dialog box for the 'OW - Forecast' program. The dialog has a title bar with a close button. Below the title bar is a blue circular icon with a right-pointing arrow and a text description: 'This element starts another program and waits until it finishes before continuing the current program unless the "don't wait" option enabled.' Below this is a dropdown menu for 'Start this program:' set to 'OW - Forecast' and a 'Show Notes' button. There are two checkboxes: 'Don't wait for this program to complete before continuing to the next element' (unchecked) and 'Delay program start for:' (unchecked). The delay section has three spinners for '0' hours, '0' minutes, and '0' seconds. An 'Arguments' section contains two text boxes: 'TimeInTheFuture' with the value '%\_Now() + \_Hours(12)%' and a tooltip 'Time in the future to find forecast data for'; and 'WhatData' with the value 'temp' and a tooltip listing available data items: 'temp', 'pressure', 'humidity', 'wind-speed', 'wind-deg', 'wind-gust', 'pop', 'rain-3h', 'weather-main', 'weather-description'. At the bottom, there is a field for 'The started program returns a result. Variable that hold result when the program completes:' with the value '[value]'.

Note that the value is assigned to a variable, in this case the variable named “value”. As the helpful text for the “WhatData” parameter shows, you can also request pressure, humidity, wind speed, wind gust, wind direction, probability of precipitation, and the forecast in text – main and description – and even though it is cut off in this display,

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you can also get the weather icon by asking for “weather-icon”. Just use the names as shown in the program notes and in the Start-Program help text.

The second program is named “**OW – Forecast Analysis**”. Instead of getting a single value at a specified time, this program aggregates data over time. For example, to find out **the maximum temperature** over the next 24 hours, this Start-Program element can be used.

The screenshot shows the 'Start Program Properties' dialog box for the 'OW - Forecast Analysis' program. The dialog has a title bar with a close button (X) and a description: 'This element starts another program and waits until it finishes before continuing the current program unless the "don't wait" option enabled.' Below the description, there is a dropdown menu for 'Start this program:' set to 'OW - Forecast Analysis' and a 'Show Notes' button. There are two checkboxes: 'Don't wait for this program to complete before continuing to the next element' (unchecked) and 'Delay program start for:' (unchecked). The delay settings are 0 hours, 0 minutes, and 0 seconds. The 'Arguments' section contains four fields: 'StartDateTime' with the value '%\_Now()%' and a tooltip 'Time in the future to start aggregation'; 'EndDateTime' with the value '%\_Now() + \_Hours(24)%' and a tooltip 'Time in the future to end aggregation'; 'Op' with the value 'max' and a tooltip 'Operations are: "max", "min", "avg", "total". Note that total only applies to "rain-3h"'; and 'WhatData' with the value 'temp' and a tooltip 'Data to get: "temp", "pressure", "humidity", "wind-speed", "wind-deg", "wind-gust", "pop", "rain-3h"'. At the bottom, there is a field for 'The started program returns a result. Variable that hold result when the program completes:' with the value '[max]' and a dropdown arrow.

Simply specify the start and end times, the data item wanted and the operation. The forecast is accessed, and the data is aggregated and then assigns the result to a variable.

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One final note: The forecast data that Open Weather provides is in 3-hour blocks. Be aware that if you request forecast data or aggregation of forecast data within the same 3-hour block you will get the same result.

## Historical Data

The Open Weather package also provides facilities for accessing historical weather data. For this to operate you must enable the class program in the package to periodically collect and log data. To do this open the properties of the Class Program and on the “Tags” tab these changes must be made:

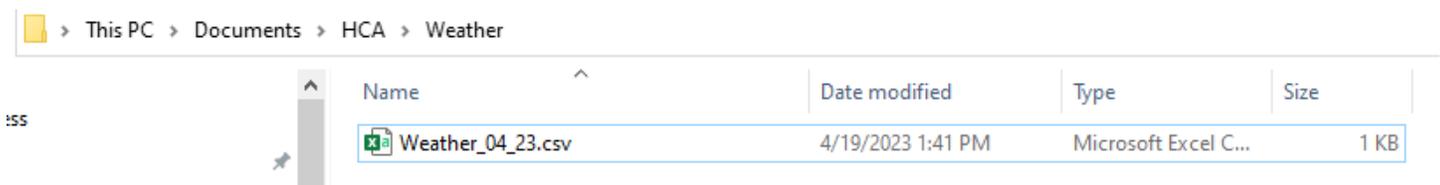
“OW - Class Program” Properties

Name	Notes	Triggers	Visual Programmer	Advanced Options	Restart	Icon
Tag Name	Current Value					
KeepHistory	1					
HistoryFolder	C:\Users\kham\Documents\HCA\Weather					

Modify the tag “Keep History” to have a value of 1. Next create a folder someplace on your drive and put the path to that as the value of the tag named “HistoryFolder”.

You must also have the Class Program periodically execute as described above on page 3.

Over time this folder will hold files that contain historical weather data. Each file is in comma separated format and the filename contains the month and year. For example:



This file contains data from April 2023.



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The first of the two history programs is named “OW – History”.

The program accepts two parameters: A time in the past and the data item wanted. For example, to get the historical temperature 12 hours ago this Start-Program element can be used.

**Start Program Properties**

This element starts another program and waits until it finishes before continuing the current program unless the "don't wait" option enabled.

Start this program: **OW - History** Show Notes

Don't wait for this program to complete before continuing to the next element

Delay program start for: 0 hours 0 minutes 0 seconds

**Arguments**

TimeInThePast:   
Time in the past to find historic data for

WhatData:   
"temp", "pressure", "humidity", "wind-speed", "wind-deg", "wind-gust", "pop", "rain-3h", "weather-main", "weather-description",

The started program returns a result. Variable that hold result when the program completes:

Note that the value is assigned to a variable, in this case the variable named “temperature”. As the helpful text for the “WhatData” parameter shows, you can also request pressure, humidity, wind speed, wind direction, wind gust, probability of precipitation, and the forecast in text – main and description – and even though it is cut off in this display, you can also get the weather icon by asking for “weather-icon”. Just use the names as shown in the help text.

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The historical log file doesn't have to contain a record at the exact time you are requesting. If the program doesn't find a log file record for the exact time you requested, what it does is to find a record past the requested time but within 'n' minutes. That value of 'n' comes from a tag on the program called "UsefulTime" and defaults to 60 minutes.

The second program is named "**OW – History Analysis**" which instead of getting a single value at a specified time, aggregates data over time. For example, to find out **the maximum temperature** over the previous 24 hours, this Start-Program element can be used.

**Start Program Properties**

This element starts another program and waits until it finishes before continuing the current program unless the "don't wait" option enabled.

Start this program: **OW - History Analysis** Show Notes

Don't wait for this program to complete before continuing to the next element

Delay program start for: 0 hours 0 minutes 0 seconds

**Arguments**

StartDateTime:   
Time in the past to start aggregation

EndDateTime:   
Time in the past to end aggregation

Op:   
Operations are: "max", "min", "avg", "total". Note that total only applies to "rain-3h"

WhatData:   
Data to get: "temp", "pressure", "humidity", "wind-speed", "wind-deg", "wind-gust", "pop", "rain-3h"

The started program returns a result. Variable that hold result when the program completes:

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Simply specify the data item wanted, the operation, the number of hours over which to aggregate the data, and then assign the result to a variable.

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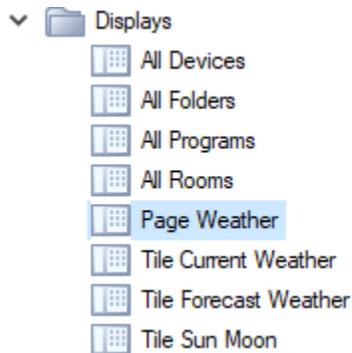


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## Weather Displays

In addition to the programs in this package, there is another library package that can be downloaded from the library called “Weather Display”. That package contains several displays that you may find useful.



**Huge note: There is some important setup to do before these will function for you!**

The “Tile Current Weather”, “Tile Forecast Weather”, and “Tile Sun Moon” are each HTML displays. It is necessary to make sure the HTML template files are available in the correct location.

First download this zip file:

[www.homecontrolassistant.com/download/Library/WeatherDisplay.zip](http://www.homecontrolassistant.com/download/Library/WeatherDisplay.zip)

This file contains these items:

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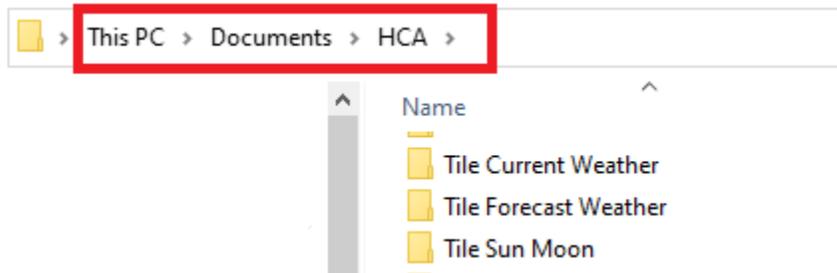
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WeatherDisplay.zip 4/26/2023 10:30 AM

```
Files/Folders in Zip file: 20
Tile Current Weather/
Tile Current Weather/icons/
Tile Current Weather/icons/baro.png
Tile Current Weather/icons/dew.png
Tile Current Weather/icons/hum.png
Tile Current Weather/icons/vis.png
Tile Current Weather/icons/wind.png
Tile Current Weather/index.html
Tile Current Weather/index.htx
Tile Current Weather/style.css
Tile Forecast Weather/
Tile Forecast Weather/index.html
Tile Forecast Weather/index.htx
Tile Forecast Weather/style.css
Tile Sun Moon/
Tile Sun Moon/img/
Not Shown: 4 files/folders
```

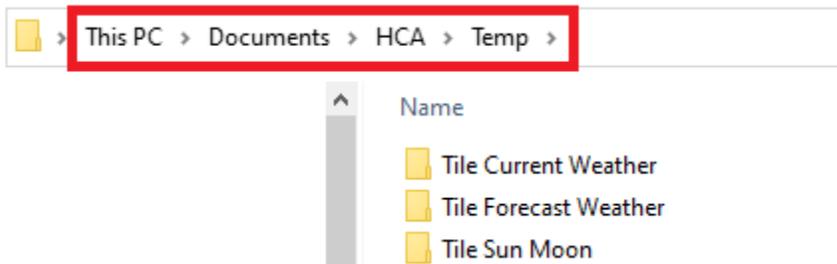
If you are using HCA stand-alone (that is, NOT client-server)

Unzip the file into the same folder as your .HCA file. Generally, that would be in the HCA documents area.



If you are using HCA in client/server mode:

Unzip the file into the HCA documents area "Temp" folder.



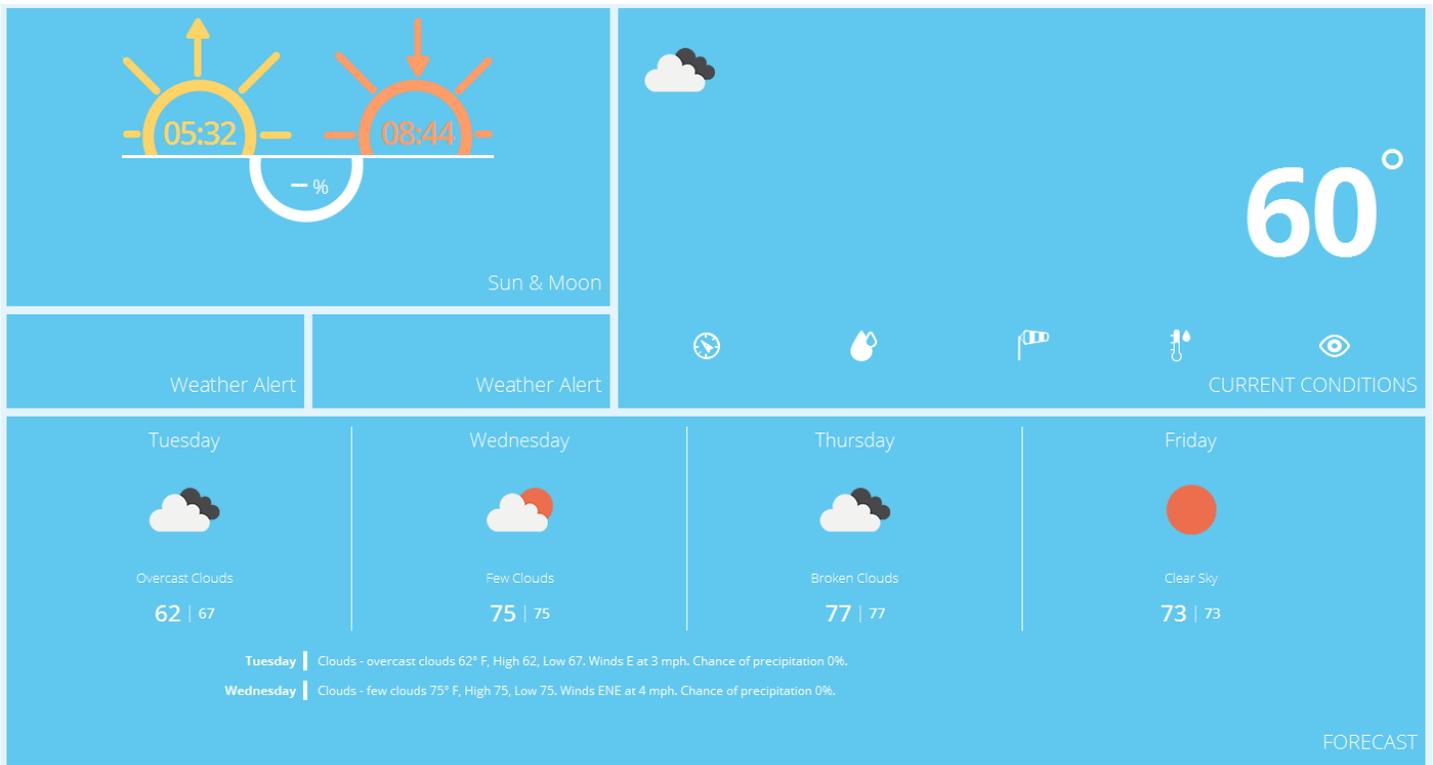
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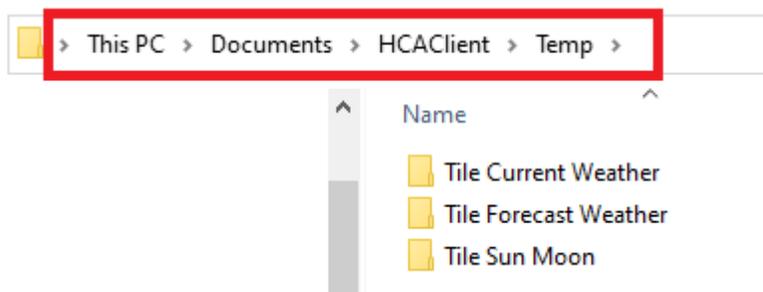
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Make sure that you have executed the open weather class program at least once and then try selecting any of these displays and see if they look reasonable. If they have no background, make sure you put all the required files in the right location. If you have it correct the "Page Weather" should look approximately like this:



Note that currently the weather alert tiles are non-functional.

If you are using the HCA Windows client, unzip the file into the "temp" folder of the HCA Windows client documents area:



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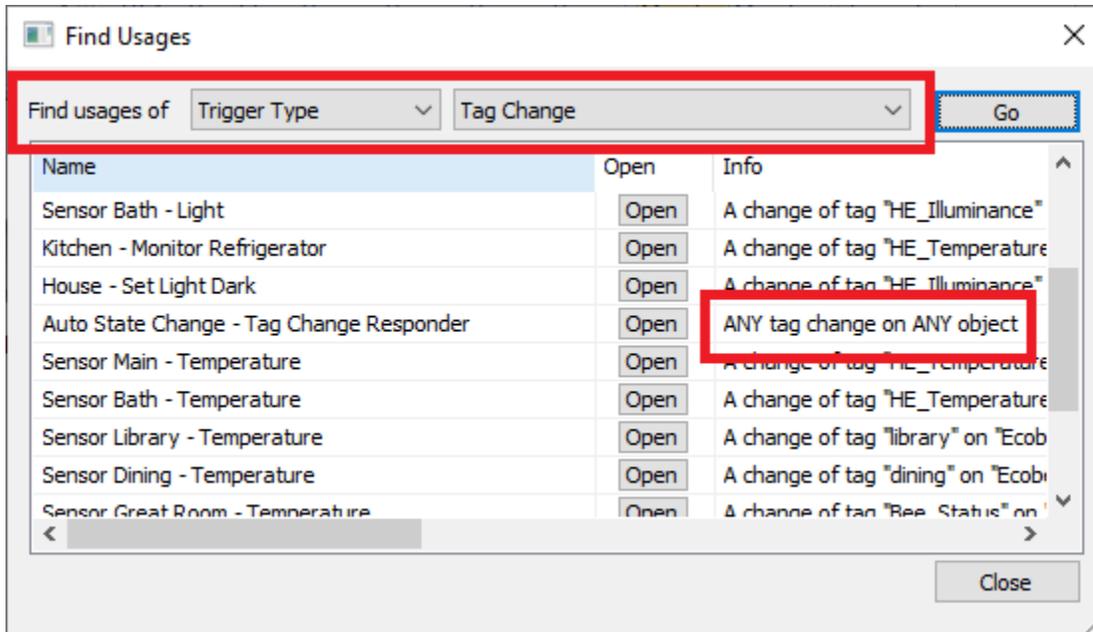
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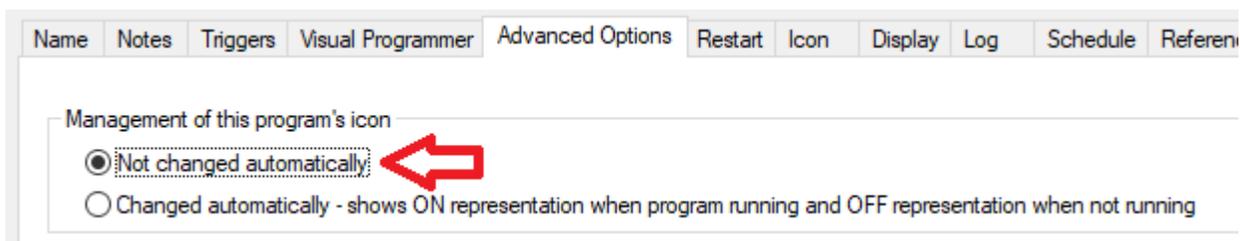
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## What happens if it is very slow and how to fix that?

If when you click on any of the displays it seems to take forever to appear, there is a small fix you can do. First find any program you may have that has a trigger of “Any tag change”. An easy way to do that is to use the “Find” tool. Like this:



In this design, there is an “ANY” tag change. Open the properties of that program and on the “Advanced Options” tab and make this change:



Save the changes to that program and once you have done this for all programs that have an “ANY” tag change, the weather displays should appear quicker.



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## What to do if the displays don't look anything like the image above?

The answer is you probably didn't put the necessary files in all the correct locations. If you have a complex installation – that is, you didn't take the defaults when you installed HCA or you have your HCA file not in the usual place – you may need to figure out what is wrong yourself. To help here is an explanation of how HCA handles files in client-server mode. Probably more info than you wanted but this may be necessary for you to know.

## The Weather display tiles, HTML files, and relative paths

Let's discuss how client-server works with files as it is a bit complex but maybe once you understand the theory it can assist with any potential problems.

In general, when you use a non-absolute path in a place where a pathname is specified, it determines its location in the file system relative to where the .HCA file is stored.

Suppose your HCA file is stored here:

```
C:\Users\Home Automation\Documents\HCA\HCA Designs\MyHome.hca
```

If you have a program that creates a file using a simple filename, it should be created in the same folder as your design file. For example, if a program creates a file with the name as "ForecastData.dat" it gets created here:

```
C:\Users\Home Automation\Documents\HCA\HCA Designs\ForecastData.dat
```

This is because the HCA file is in that folder.

The same mechanism applies to any non-absolute file paths in all places – files creation in programs or in HTML displays.

Pause for a moment here to understand relative paths that are not just a filename. These are usually used in HTML displays. For example, there is a folder called "Tile Sun Moon" that contains an HTX and a CSS file. It is also where the html file is created. In the HTML display the path to the HTX and HTML are given not as full paths and start with the sub-folder name. In this case instead of the path being specified as "index.htx" it is instead as "Tile Sun Moon\index.htx". But again, the same rules apply, and HCA will build internally the full path it needs to open the file as:

```
C:\Users\Home Automation\Documents\HCA\HCA Designs\Tile Sun Moon\index.htx
```

## What happens on the server?

The server has it easy as it creates files using the rules I showed above. It will be relative to the .HCA file location. This means that on the server machine for the weather display you must have the three HTML sub-folders in the same folder

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as your HCA file. Even though the generated HTML file isn't ever viewed directly from the server – that happens on the client machine – it still gets created in that location when the HTX file is used as a template to create the HTML file.

## What happens on the client?

The client is harder. When the client connects to the server it first requests the HCA file from the server. It puts that file, with a new name, in the “temp” folder. For example, the HCA design file “MyHome.HCA” on the server winds up as the client as:

```
C:\Users\Home Automation\Documents\HCA\Temp\HCAClientTempx_XXXXXXXXXXXX.hca
```

The x's are replaced with numbers to make the file unique.

All the relative path rules apply again to the location of this HCA file. Let's again take that “sun moon” tile. Here is where the HTML file will go:

```
C:\Users\Home Automation\Documents\HCA\Temp\Tile Sun Moon\index.html
```

Here is what happens: The client asks the server to generate the HTML from the HTX. The server does so, storing the HTML on the server machine in the same folder as the HTX. The client then requests the server to send it the generated HTML file and it stores it in the same place as it would get created if it was generating it itself. It should wind up in here below the “temp” folder because that is where the HCA file, as retrieved by the client, resides.

```
C:\Users\Home Automation\Documents\HCA\Temp\Tile Sun Moon\index.html
```

Then when the display happens, HCA just finds the file in the same way as before, resolving the relative path from where the .HCA file is stored.

## Important points:

On the server machine you must put the three HTML display sub-folders in the same folder as your HCA file.

On all client machines you must put the three HTML display sub-folders in the “temp” sub-folder.

If you are using the Windows Client application, then put the three HTML displays in the “temp” folder of the HCA Client documents area.

##end##

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