



HCA Tech Note 511

Working with NEST

All the products available from NEST that you can view and control from the NEST mobile application can be linked to HCA. When a NEST device reports a change, a message is sent to your HCA Server and that message can then be examined and responded to.

For this to happen you must first have installed the NEST gear and created an account with NEST. Also make sure you can use their application – mobile or web – to view and control the NEST devices. This must all operate before going any further with HCA!

In addition, you must also have a HCA Cloud account and are running HCA Plus in client-server mode as the HCA Server is contacted by the HCA Cloud when an event happens. Be sure that you have configured HCA in client-server mode and that the HCA cloud can correctly access the sever. In the HCA server application window menu there are choices “Tools – HCA Cloud Update” and “Tools - HCA Cloud Access Test”. Make sure you perform the update and then the test operation and that the test reports success.

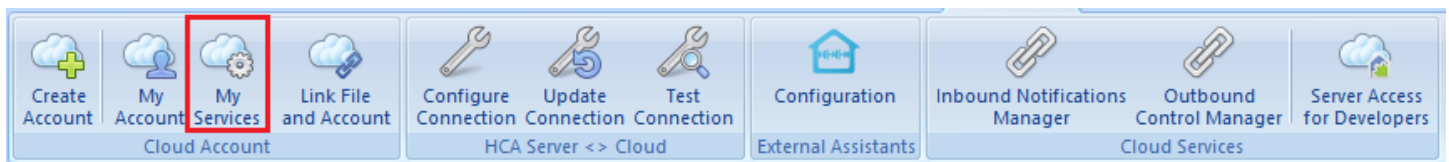
For more information about setting up client-server, please review the HCA Getting Started Guide.

NOTE: If you have NEST thermostat and want to control it, HCA has also supports that. In the “Interfaces” ribbon category there is a “Nest” button that takes you through the process of adding the thermostat to your design. When you add a NEST thermostat to HCA as a device you can poll for status and control its settings.

Connecting to NEST in the way described in this note allows you to receive real-time reports from all your NEST gear not just the thermostat.

Authorizing NEST into your HCA Cloud Account

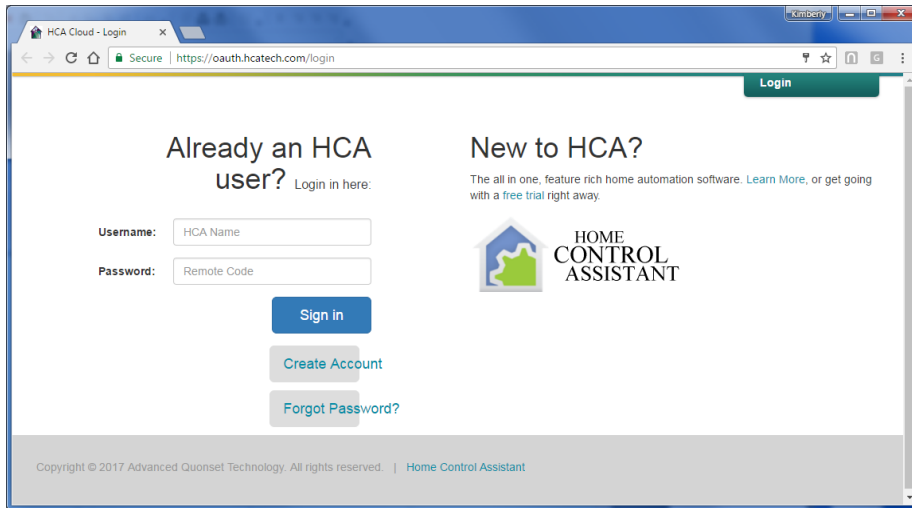
To begin the process with NEST, press the “My Services” button in the “HCA Cloud” ribbon category.



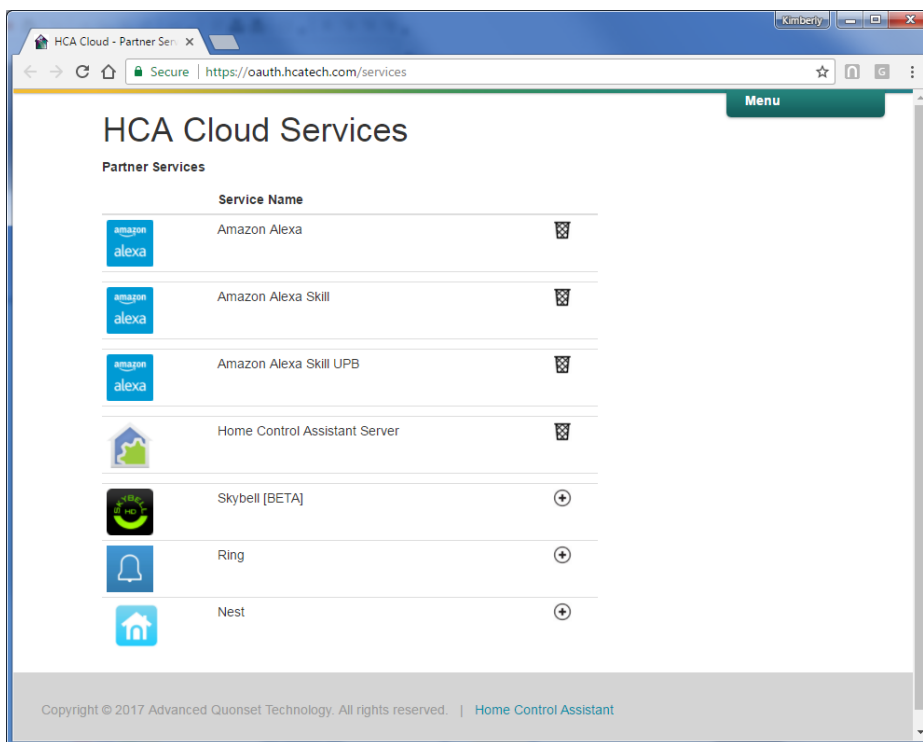
You are first asked to login to your Cloud account.



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After a successful login, the services page displays.



To the right of each service is a “Plus” icon or a “trash can” icon. The “Plus” icon adds this service to your account and the “Trash can” icon removes it. Press the “Plus” icon to add “Nest” to your account.



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Once you do that, the browser redirects to the NEST site and you must log into your NEST account after which the authorization pages appear.

Works with Nest | Nest x Kimberly

Secure | https://home.nest.com/login/oauth2?state=STATE&response_type=code&client_id=6a8ab45f-52c9-4497

Works with Nest

Advanced Quonset Technology, Inc would like to do the following:

- See when your home is set to Away.
When status changes, HCA Cloud will notify your HCA application.
- See your camera's settings, show images or video when there's sound or motion, and share your video stream if it's public.
When status changes, HCA Cloud will notify your HCA application
- See your Nest Protect's smoke, carbon monoxide, and battery info.
When status changes, HCA Cloud will notify your HCA application
- See and set your Nest home name.
When status changes, HCA Cloud will notify your HCA application
- See the temperature and settings on your thermostat(s).
When status changes, HCA Cloud will notify your HCA application
- See when you're on your way home.
When status changes, HCA Cloud will notify your HCA application

Want Nest to stop working with Advanced Quonset Technology, Inc? Go to account settings in the Nest app.

At Nest, we take your privacy seriously. And we believe in being open and honest about using your data.

[Learn more >](#)

ACCEPT

Advanced Quonset Technology, Inc and Nest will use this information in accordance with their respective terms of service and privacy policies.

You are responsible for making sure that the way you use Nest Cam complies with law, including any applicable privacy or data protection laws.

You can only connect Works with Nest to homes owned by you. [Learn more >](#)



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This page asks you to authorize NEST to contact the HCA Cloud whenever any events happen. Press the “Accept” button to continue.

Once complete, the browser redirects back to your cloud account and you can see that NEST is now authorized.



Nest



Creating a handler program for NEST events

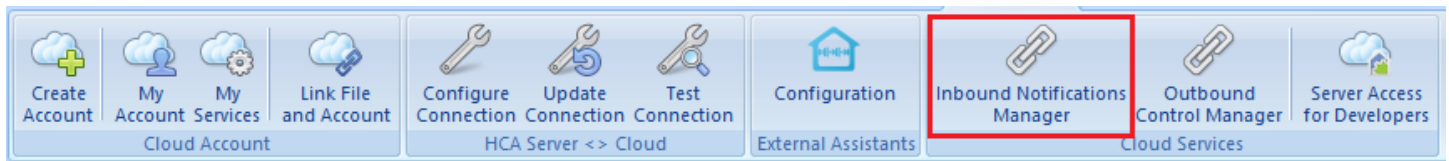
The next step is to add to your design a program that is started each time NEST reports an event. An event handling program must have the “Supports Parameters” option enabled. This is on the “Advanced” tab of the program properties.

This program supports parameters and/or local variables

Parameters are defined in the Begin-Here element. When started from another program using the Start-Program element, the actual objects or data are selected to use when elements in this program operate upon one of its parameters.

The data passed from NEST to the HCA Cloud and then on to your server, arrives in the handler program through these parameters and is described below.

In the HCA Cloud ribbon category, press the “Inbound Notifications Manager” button.



The Manager opens:



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The Inbound Notifications Manager shows the services HCA is authorized to receive notifications from. In this way, when a notification is received, an event handler program starts supplied with the event details and you can process it in any way you choose.

Listed below are all the services that HCA can use and the event handler program for each if one exists.

There are two steps to configuring this. Typically, these services require that you authorize HCA to receive events. In the Cloud ribbon category use the "My Services" button to perform that authorization. In this manager dialog, select the service you want to create an event handler program and press the "Assign" button.

Service name	Handler Program
Ring Service	Services - Ring Handler
Nest Service	
HCA Developer Service	

Assign Notification Handler

NEST

This service responds to the message when a NEST device reports an event.

Instructions for connecting your NEST devices and NEST account to your HCA Server is available on the HCA Support web site in the [Nest service note](#). You should review this before going further.

The parameters to the handler program are:

1. Service name

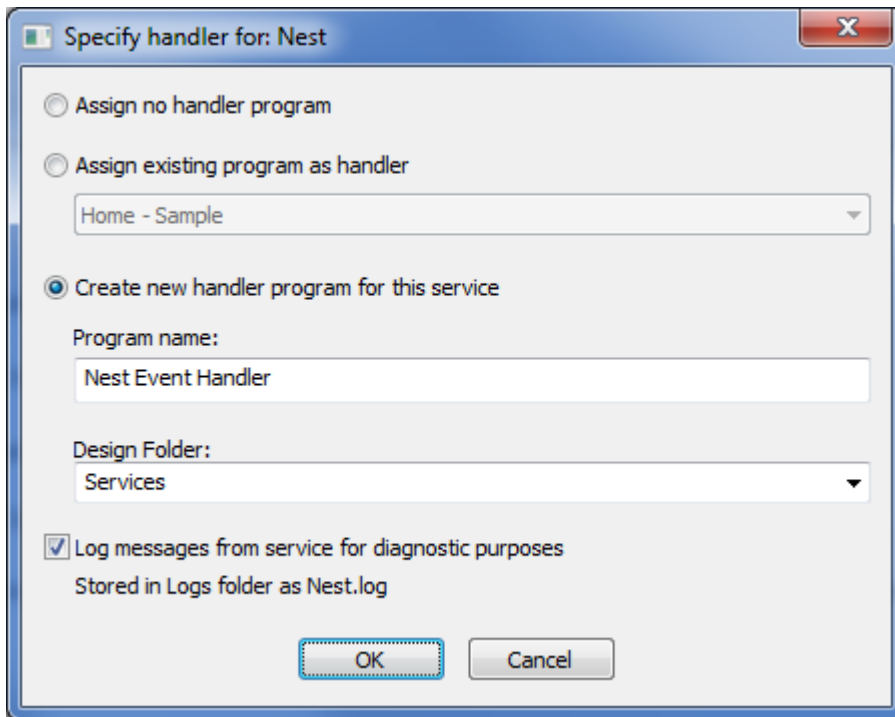
Close

The online library is queried and the shows information about all the currently available services that can send notifications. In the manager is also where you assign a handler program for that service.

Select "Nest" and then click the "Assign Notification Handler" button.



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In this dialog you have an option of removing the handler program (“Assign no handler program”), selecting an existing program, or creating a new program where you provide its name and folder. If a new program is created it is automatically be created with the necessary “Support parameters” option enabled.

The data the program receives is as described in the information in the Manager dialog. For the case of NEST there are two parameters. The first is the name of the service (“Nest”) and the second is the JSON object given to the HCA Cloud by NEST.

If you are unfamiliar with JSON and the facilities in HCA for its support, please review the JSON support technical note.

The handler program uses the JsonOpen, JsonClose, and Json functions in the Compute and Compute-Test Visual Programmer elements to extract pieces and test them and respond it in whatever way it wants to.

Once you complete the handler dialog, the service manager updates to show the program selected.



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Service name	Handler Program	
Ring Service	Services - Ring Handler	
Nest Service	Services - Nest Handler	
HCA Developer Service		

If you want to change the assignment of the handler program or any option for it, double-click on the line to open it for editing.

Example

The most important question at this point is what is in the JSON that NEST sends and how to use it. There is an online reference on what is in the JSON and that can be found at the NEST Developer site.

<https://developers.nest.com/>

A suggestion is to enable logging for the NEST service. Open the service manager and edit the properties of the NEST service – where you specified the handler program – and tick the “Log messages” checkbox. This creates a log of all the JSON that is sent to your server. Look in the HCA Documents area in the “Logs” subfolder for the “Nest.log” file.

If you want to decode the JSON into a more readable format, copy it from the log file and then use one of the online JSON decoders to view it. The one we use is: <http://json.parser.online.fr/>

The disadvantage of the NEST reports is that each report includes everything. They don’t just tell you what’s changed so you must figure it out yourself. The advantage is all the data is there.

A second difficulty with the NEST report is that, in the general case, it’s hard to extract out information. That is, any extraction scheme must know in advance how many thermostats, cameras, and other gear you have and in what order they appear in the report. You know what gear you have and a quick look at the JSON from the Nest log will show you in what order they report, but it’s hard to create a general-purpose program that everyone can use.

As an example, here is a Compute element that extracts out some useful info from the event JSON. In the example it is known that there is one thermostat and one camera.



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```
hJson = _JsonOpen($json);

ThermostatHumidity = _int(_json(hJson, "devices", "thermostats", 0, "humidity"));
ThermostatAmbientTemp = _int(_json(hJson, "devices", "thermostats", 0, "ambient_temperature_f"));

// NestState will be either "home" or "away"
thisReportNestState = _json(hJson, "structures", 0, "away");

// CameraStreaming will be either "true" or "false"
cameraStreaming = _json(hJson, "cameras", 0, "is_streaming");

// Time of last camera event encoded in the NEST time format
thisReportEventTime = _json(hJson, "cameras", 0, "last_event", "start_time");

void = _JsonClose(hJson);
```

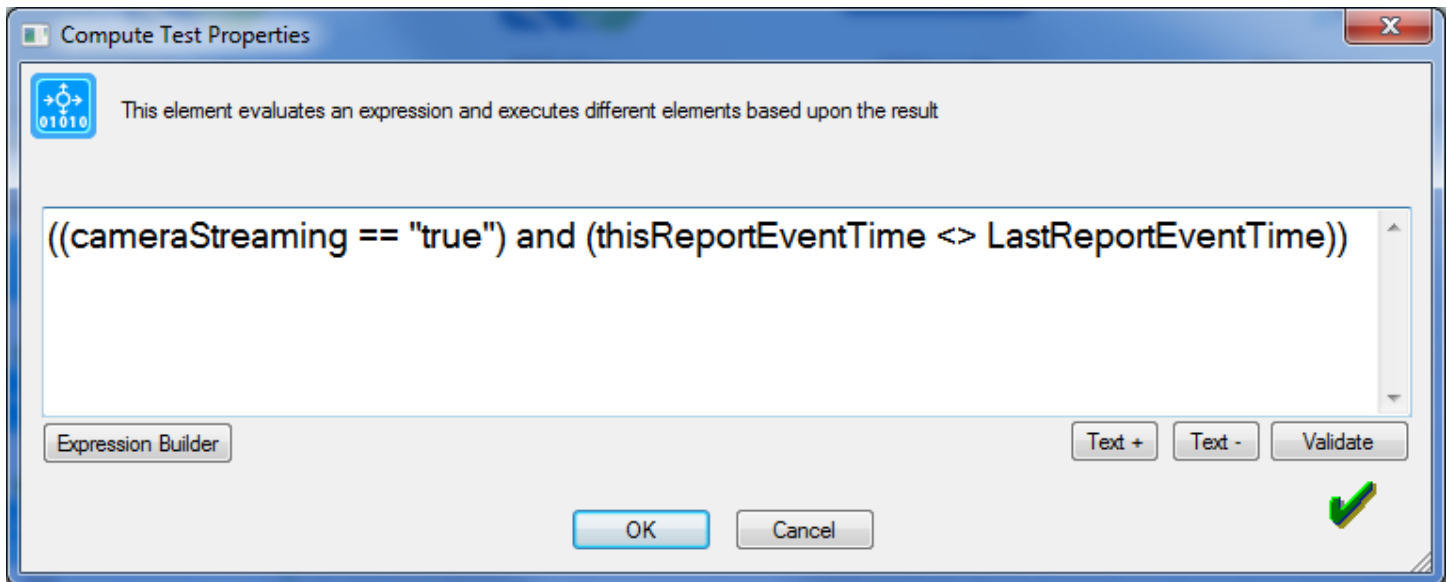
As this Compute element is part of the NEST handler program that executes when anything changes, the global variables ThermostatHumidity and ThermostatAmbientTemp always have the most current values and you can use them in other programs.

The Camera data can be used to see if the camera is streaming and if it is then something happened when the time of the last camera event changes from the previous report. If the program detects that something happened, then you can do something like send a message to yourself or turn on lights or whatever.

In this example, a global variable called "LastReportEventTime" holds the extracted value from the last event. That can be compared with "thisReportEventTime" extracted from the JSON like this:



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If this Compute-Test element takes the “yes” path then the camera has reported that something has happened and you can take action.

There is much you can do with the NEST event reports. All it takes is learning what NEST sends and coming up with ways to use it.

##end##