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Data

A **Data** event trigger executes when a device variable's data value meets a defined condition.

The conditions available include being equal to, greater than or less than a value. The conditions also include concepts of dead band and tolerance.

The trigger component handles the periodic reading of the device variable's value and applying the defined condition. If the condition is met, the data event trigger is scheduled to execute. This alleviates the trigger's application logic from reading the variable's value and comparing it to the condition before deciding to execute the application logic in the trigger's actions.

Defining a data event trigger

To define a data event trigger, follow these steps:

1. From the Workbench left pane, expand the node where you want to define the data event trigger.
2. Select the **Project** icon to display the **Projects** window, right click a specific project tab to display its pop-up menu, and then select **New**.
You also can select the **New** button at the bottom of the **Projects** window when a specific project tab has already been selected.
3. The new **Trigger** window appears.
Name the trigger. The trigger name can be up to 64 characters and include letters, numbers, and the underscore character. Spaces are allowed.

4. From the **Event** tab, select the **Trigger Event Type** down-arrow, and then select **Data**.

The screenshot shows the 'Event' configuration window. The 'Event' tab is active. The 'Trigger Event Type' dropdown menu is open, showing a list of options: Data, Listener, On-Demand, Schedule, SubTrigger, User Operation, Variable Group, Asset, CloudLINK, Enterprise, Experimental, Internal, Management Portal, Networking, and PLC Logic Events. The 'Data' option is selected. The 'Variable Name', 'Variable Type', 'Condition', 'Value', 'Tolerance Range', and 'Deadband Range' fields are visible but empty.

The **Event** tab becomes active with parameters that accommodate the data event.

The screenshot shows the 'Event' configuration window with the 'Data' event type selected. The 'Variable Name' field is empty. The 'Variable Type' dropdown is set to 'Count', and the 'Count' field is empty. The 'Condition' dropdown is set to 'Value changed'. The 'Value' field is empty. The 'Tolerance Range' and 'Deadband Range' fields are empty. The 'Priority (ms)' field is set to 500. The 'On Edge' checkbox is unchecked.

5. Select the device variable that will be monitored to determine when the trigger should be executed.

On the **Event** tab, use the down-arrow next to **Variable Name**.

A list of the currently started devices on this node appears.

New Trigger

Name: MyDataTrigger

Event Local Variables Static Variables Settings Details

Trigger Event Type: Data

Variable Name:

Variable Type:

- ControlLogix_1_67
- Local CPU 1
- StoreAndForwardVariables

Condition:

6. Expand the list, and then select the variable you want to use.

For this example, Local CPU 1.D[1].

The name of the device variable is displayed in the **Variable Name** parameter.

Event Local Variables Static Variables Settings Details

Trigger Event Type: Data

Variable Name: Local CPU 1.D[1]

Variable Type:

- Local CPU 1
 - D
 - [0 - 999]
 - [0]
 - [1]

Condition:

Value:

7. Use the **Variable Type** down-arrow to display a list of device data types.

For this example, accept the default INT2.

Variable Name: Local CPU 1.D[1]

Variable Type: INT2 Count:

- INT2
- INT4
- FLOAT4
- STRING

Condition:

Value:

8. Now that you have added the device variable and specified the variable data type, your next step is to select the condition to be evaluated.

Use the **Condition** down-arrow to display a list of conditions.

For this example, **Value changed** is selected. Therefore, whenever the Local CPU 1.D[1] device variable 's value changes, the trigger will execute.

Variable Name:	Local CPU 1.D[1]
Variable Type:	INT2 <input type="button" value="Count :"/>
Condition:	Value changed
Value:	Value changed
Tolerance Range:	On start or value changed
Deadband Range:	Greater than
	Greater than or equal to
	Equal to
	Less than or equal to
	Less than

The condition can be specified as follows:

Condition	Description
Value changed	The value of a device variable changed from its previous value.
On start or value changed	The value of the device variable changed from its previous value. Also, the trigger is executed once as soon as it is loaded.
Greater than	The device variable is greater than a defined value.
Greater than or equal to	The device variable is greater than or equal to a defined value.
Equal to	The device variable is equal to a defined value.
Less than or equal to	The device variable is less than or equal to a defined value.
Less than	The device variable is less than a defined value.

- When **Value changed** or **On Start or Value Changed** are specified as the condition, the **Value**, **Tolerance Range**, and **Deadband Range** parameters are not used.
- When **Equal to** is specified as the condition, the **Tolerance Range**, and **Deadband Range** parameters are not used.

9. Use the **Priority** parameter to select a value in milliseconds. The **Priority** parameter is used to specify the frequency to read the value of the device variable. Values are in milliseconds.

For the example bellow, the device variable is read **at least once** within 500 milliseconds, and evaluated against the condition.

For this example, the condition is Value Changed from the last value read.

Variable Name: Local CPU 1.D[1] Priority (ms): 500

Variable Type: INT2 Count :

Condition: Value changed

Value:

Tolerance Range: On Edge: ☐

Deadband Range: 0

Note

If two different priorities are defined, one of them **X ms**, the second **Y ms**, where $Y < X$, the device variable will be read at least once within **Y ms**. In conclusion, it will be read at least once within the minimal time-span defined.

10. For other conditions, select values for the remaining condition parameters:

Parameter	Description
On Edge	Limits the number of times a trigger executes. Used in conjunction with Greater than and Less than conditions and Tolerance Range.
Tolerance Range	Limits the number of times the trigger executes. The interpretation of the value is based on the selected event condition (Greater than, Less than, Greater than or equal to, and Less than or equal to). The value that you specify will indicate how much you want to allow the value of the device variable to fluctuate before the system acts on it. The value can be either a constant value or device variable.
Deadband Range	Specify a deadband range value when you want to filter insignificant changes. If the value read does not differ from the last stored value by at least the deadband range value, the trigger is not executed. The value can be either a constant value or device variable. Works in conjunction with Value changed, On Start or Value Changed, Greater than, Less than, Greater than or equal to, and Less than or equal to conditions.
Value	A numeric value used in conjunction with Greater than , Less than , Equal to , Greater than or equal to , Less than or equal to conditions. The value can be either a constant value or device variable.

Data event type trigger event variables

The input event variables available to a data event trigger are:

Event variable	Data type	Description
DATA	The data type of the device variable	The data value from the device variable.
PREVIOUS_DATA	The data type of the device variable	The data value from the device variable on the previous read.
PREVIOUS_TIME	TIMESTAMP	The date and time from the previous read.

Complete the trigger definition

Complete the definition of the trigger, including the follow trigger components:

- The trigger's [actions](#)
- The trigger's [local variables](#), [static variables](#), [macros](#) and [event variables](#)
- The trigger's [settings](#).

Use the **Validate** button to check the parameters and then the **Save** button to save the trigger's definition. The trigger will be listed in the Project's tab list of triggers in the **Stopped** state.

Data event trigger priority parameter considerations

The **Priority** parameter is used to specify the frequency, in milliseconds, to read the value of the device variable. Since this reading of the device variable takes system resources, the requirements of the application and the capability of the system need to be understood. Considerations include:

- Every data event trigger defines a device variable that will be read by the system at the defined priority (frequency).
- Every data mapping defines a device variable that will be read by the system at the defined priority (frequency).
- Every device variable has an expected change rate. This may be constant or it may be variable. For example:
 - Once every 5 minutes at the end of a manufacturing process is relatively constant.
 - Every time a sensor's temperature value changes .1 degrees is most likely a variable rate.
- The application logic's latency requirement for the data event's condition being met. For example:
 - The end of the 5 minute manufacturing process needs to be recognized within 10 seconds.

- The change in the temperature value needs to be recognized within 1 second.
- The more frequent the device variable is read, (a lower priority value) the lower the latency for the data event trigger's condition being met and the data trigger logic being executed.
- The more frequent the device variable is read, (a lower priority value) the higher the load on system resources.

The overall application's requirements and the capability of the system need to be monitored while the application is being developed and while it is in production.

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Variable Group

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