pCOWeb TRAPS in firmware release A1.2.3 - B1.1.3
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Introduction

The TRAPs represent a way by which pCOWeb can send a warning – a SNMP coded message – to some receivers when a particular status comes active.

The main reason for this mechanism is useful is that it is an "asyncronous", i.e. a remote host is able to get a status warning from pCOWeb without any active remote polling activity. The only need at the supervisor side is the presence of a running task able to detect the messages that could come from pCOWeb.

pCOWeb is able to send two types of trap:
-system traps
-controller traps

SYSTEM TRAPS

To set these traps you have to click onto the link "SNMP System defaults configurations" of the Web Administrator page.
Note: all the settings in this page will be active from the next reboot of pCOWeb.

SNMP Default traps configuration
    Default trap community
The "Community" in SNMP standard is a string useful to filter the access from a host toward pCOWeb: if the community string of the host is not the same of that of pCOWeb, the access will be denied (it is then somewhat similar to a password).
For the TRAPS, the meaning of the "Community" string is similar, except that the roles pCOWeb-host results inverted: when a pCOWeb generates a TRAP, it puts the "Default trap community" string into the TRAP message. This gives the host a chance to filter some unwanted TRAPS: the host that receives the TRAPS can then decide which TRAPS to show and which ones to ignore.
    Send authfail trap
This flag lets the user to choose if the pCOWeb have to generate a particular TRAP (authfail trap) when an attempt has been detected to access pCOWeb with a wrong community by a host. The trap will be sent to every specified host (see below).

SNMP system traps hosts table
    System trap destination host #N
Each row of that section lets you to to set the IP address of a host. It must have the usual format: A.B.C.D (every number in decimal format). Example: 192.168.10.2.
When a host is set, pCOWeb will send a specific trap EVERY START and EVERY STOP of the SNMP application (usually at boot and at reboot). So, when you power-up pCOWeb or when you reboot it, a *coldstart trap* will be sent to every IP address of the hosts. Similarly, when a reboot is requested, a *[enterprises].8072.4.0.2* trap type will be sent. The only way to disable these traps to a specified host is to clear the corresponding IP address.
Warning: the four IP addresses for the hosts shouldn't be confused with those available in the html page that you can see when you click on the link "SNMP pCO variables traps configuration" of the "WEB Administrator page": in this "SNMP System defaults configurations" page the four IP addresses will be used ONLY in relation to the settings available in this html page.

CONTROLLER TRAPS

This type of TRAPS is sent when some selectable status comes active in the pCO controller into which the pCOWeb was plugged in.
To set these traps you have to use the link "SNMP pCO variables traps configuration" of the Web Administrator page.
Note: all the settings in this page will be active once you have got the rrefresh of the html page after a "Submit" button pressed (it is not necessary to reboot pCOWeb).
Warning: the page is divided into two half pages (top / down). Each of these has its own "Submit" button; please note that a "Submit" button will confirm ONLY the parameters/selections of the related half page, with no effect to those of the other half page.
Let's examine the page.

The top zone of the top half page is devoted to the settings for up to four destination hosts: IP address, Community, enabling flag.

IP address: must have the usual format: A.B.C.D (every number in decimal format). Example: 192.168.10.2.

Community: the "Community" in SNMP standard is a string useful to filter the access from a host toward pCOWeb: if the community string of the host is not the same of that of pCOWeb, the access will be denied (it is then somewhat similar to a password). See also the previous explanation regarding the *Send authfail trap* of the "SNMP Default traps configuration" page.

Enabling flag: when this flag is set to "No", it overrides the settings of the rest of the html page: no controller TRAPS will be sent to that host; when this flag is set to "Yes", the TRAPS sent to that host will depend on the selections of the rest of the html page.

Warning: the four IP addresses for the hosts shouldn't be confused with those available in the html page that you can see when you click on the link "SNMP System defaults configurations" of the Web Administrator page: in this "SNMP pCO variables traps configuration" page the four IP addresses will be used ONLY in relation to the settings available in this html page.

System traps
This table actually contains only one system trap: its name is "pCO protocol failure".
When enabled, the TRAP will be sent to all the hosts set in the above section of the html page (see above for the explanation) in occurrence of the continuous communication between pCOWeb and pCO becomes impossible. This evenience shouldn't normally happen; if yes, it is possible that some hardware or connection problems caused the permanent missing answer by the pCO or the permanent missing request from pCOWeb. You can also check this situation in the left LED ("status") of pCOWeb: it will appear red with dark flashing every time a request generated from pCOWeb is not followed by the right answer from pCO.

Enabled
Enabling flag (only for "pCO protocol failure" trap).

Trap OID
Trap Object Identifier (a sort of name of the trap). This information will be embedded inside the message when the TRAP SNMP message is formatted before to be sent to the hosts.
This information is requested by the syntax of all the TRAP messages, except for the system TRAPS, for which the OID is predefined. If you didn't specify anything inside this field, the TRAP will not be generated.
The form of the Trap OID is, accordingly to the rules of SNMP, a sequence of numbers separated by periods. This syntax is the basic form by which SNMP describes every object.
A example for this field is:
`1.3.6.1.4.1.9839.3.1`
By this information the receiver will be able to distinguish each TRAP from each other. So the Trap OID represents the type of the TRAP.
See also the document describing the SNMP tree for pCOWeb: in that document you can find the reading / writing objects recognized by pCOWeb.

Acknowledge – Ack interval
By these selection tools you can decide to activate (or not) the Acknowledge feature for the pCO protocol failure trap.
Suppose that you have enabled this feature to *Acnowledge*=5 (times) with a *Ack interval*=10 seconds.
When pCOWeb sends the trap to Host1, it will begin to wait for a special reply from the corresponding Host1 saying "ok, I received this trap". If pCOWeb is not able to get this Acknowledge within 10 seconds from the first sending, it will send the same trap one more time, and then it will start waiting for the Acknowledge.
This mechanism will stop as soon as pCOWeb will get the Acknowledge, or after a maximum of 5 further traps after the first sending.

BOTTOM HALF PAGE

This half page lets you to configure the traps related to state changes of each digital variable of the pCO controller.

Variable: 1 ↓SELECT
When you enter the page, you will be able to see the settings of the Digital Variable #1, as reported by the selector "Variable:" set to 1 by default.

The configuration of the traps for this Digital Variable is contained in the table below the Variable selector. By these selectors you can change the configuration of the traps for the Digital Variable #1. If you want to check/change the Configuration of another digital variable, you first have to select another Variable number, then you have to click on the "SELECT" button and wait for the half page refresh.
The configuration table shows in the most left column the number of the Digital variable selected.

Columns: *Enabled - Destination*

If Enabled "NO" is selected, the state changes of the currently selected Digital Variable will never generate traps;
if Enabled "YES" is selected, the traps generation and sending will depend on the "Destination" enabling flags; thus to let a trap to be sent – for instance – to the Host1, at the same time all the three Enabling flags ("Enabled" for the Host1 in the top half page, "Enabled" in the bottom half page, Destination - Host1 in the bottom half page) have to be set to "YES".

Trigger

Let you to select which state transition will generate the trap:
Positive: from 0 to 1 transition
Negative: from 1 to 0 transition
Pos & Neg: every transition
Note: at pCOWeb power-up and after every revive of a previously failed communication state with pCO, pCOWeb will send a trap for each digital enabled variable accordingly to the Trigger selection and the following rules:
Trigger selection= Positive: a trap will be sent if the value of the variable is found to be 1
Trigger selection= Negative: a trap will be sent if the value of the variable is found to be 0
Trigger selection= Pos & Neg: a trap will be sent regardless the value of the variable. Note that this selection together with the enabling of several traps & hosts could result in a delay from the power-up to the complete acquisition of all the values of the pCO controller variables. Until the acquisition you will read "U" (undefined) as the reslut of a read of a not acquired variable. You can realize the slowering of the refresh by checking the "status" led in pCOWeb: slow or no blinking means slow or no refresh.

Trap OID

Trap Object Identifier. This information will be embedded inside the message when the TRAP SNMP message is formatted before to be sent to the hosts.
This information is requested by the syntax of all the TRAP messages, except for the system TRAPS, for which the OID is predefined. If you didn't specify anything inside this field, the TRAP will not be generated.
The form of the Trap OID is, accordingly to the rules of SNMP, a sequence of numbers separated by periods. This syntax is the basic form by which SNMP describes every object.
A example for this field is:
`1.3.6.1.4.1.9839.3.1`
By this information the receiver will be able to distinguish each TRAP from each other. So the Trap OID represents the type of the TRAP.
See also the document describing the SNMP tree for pCOWeb: in that document you can find the reading / writing objects recognized by pCOWeb.

Acknowledge – Ack interval

By these selection tools you can decide to activate (or not) the Acknowledge feature for all the traps of the selected digital variable.
Suppose that you have enabled this feature to *Acnowledge*=5 (times) with a *Ack interval*=10 seconds.
When pCOWeb sends the trap to Host1, it will begin to wait for a special reply from the corresponding Host1 saying "ok, I received this trap". If pCOWeb is not able to get this Acknowledge within 10 seconds from the first sending, it will send the same trap one more time, and then it will start waiting for the Acknowledge.
This mechanism will stop as soon as pCOWeb will get the Acknowledge, or after a maximum of 5 further traps after the first sending.

Vars OID (optional)

A trap message can carry some additional informations: pCOWeb can fill the trap message with the values of up to five variables of the pCO controller read at the time the trap was generated.
By the fields *Vars OID (optional)* you can specify the OIDs for these variables. At the moment the trap will be generated, pCOWeb will get the values of the variables whose (valid) OIDs are specified within the fields and will fill the trap message with them. By this, the host that receives the trap can also report these informations, normally useful to better understand the reasons the trap was generated by the application in pCO.
To select the OIDs you can see also the document describing the SNMP tree for pCOWeb: in that document you can find the reading / writing objects recognized by pCOWeb.

NOTE for release A1.2.3 – B1.1.3

The trap mechanism actually has a problem in the Acknowledge option, and, until the problem will be fixed, the use of this option is not advisable.
    The problem arises when pCOWeb is configured as to send traps with Acknowledge and some host is not able to send back the requested Acknowledge. In that situation a pending process will stand active in pCOWeb, waiting for the Acknowledge. As in pCOWeb the maximum number of trap active processes is 3, if pCOWeb already generated three processes waiting for the Acknowledge, further trap processes will be not launched until all the three slot are busy. So, if no slot is free no more trap will be sent. Further (the most undesiderable behaviour) when trap is to be generated and no slot is available, the process that continuously enquires the pCO to get variations in the pCO values of the variables, freezes until all the traps needed are generated.
You can realize that this situation occurred by checking the "status" led of pCOWeb: during the traps generation the enquiring process is slowered and you can note that the normal dark blinking is slower than in normal situations; if the blinking is suspended for tenths of seconds, it could mean that many traps are to be generated, or it could be a freeze situation; in this second case, you will get no more blinking.

Then, if you configure the Acknowledge mechanism, there is a risk of a freeze in the reading of the values of the pCO variables, and you equally won't be no more able to write new values into the variable via pCOWeb.

We hope to solve this problem as soon as possible. We encourage you to try the Acknowledge mechanism as your feedback will be in every case very useful.

NOTE for release earlier than A1.2.3 – B1.1.3

In these releases the TRAPS mechanism has a problem. The result of the problem is that pCOWeb could block and reboot when many simultaneous traps are to be generated.
Tipically this situation occur when you able three-four hosts and you enable various traps with the Pos & Neg type of trigger selected; then at power-up pCOWeb will try to generate several traps to the hosts.
This problem has been fixed in the A1.2.3 – B1.1.3 release.