

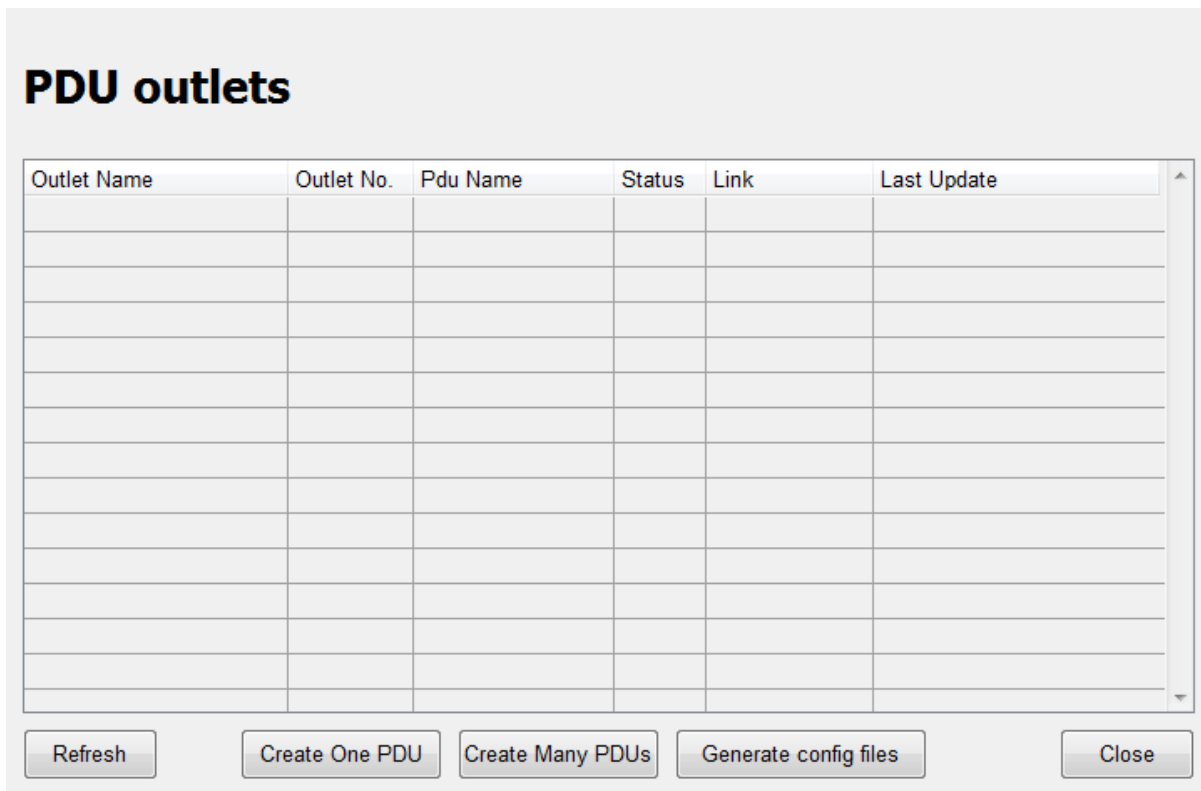
Summer Student 2014 Report

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Project Title : AliPDU Upgrade (ALICE DCS)

This report discusses the “upgrade” of the design of a user interface to create PDUs.

A power distribution unit (PDU) is a device used in data centres to distribute AC power to multiple servers and other equipment. Power distribution units (PDUs) can be managed remotely via the Web browser or other management console, causing outlets to be turned on and off at prescribed times and in a proper sequence for shutting down and powering up equipment.

Panels were designed in WINCC and integrated into a “package” called the AliPdu package. This package allows the user to operate and control as many PDUs from the same master PC. The main panel is shown in figure1, the PDU Outlets panel, displays the name of the PDU outlet, its number , the name of the PDU the outlet belongs to, the status of the outlet i.e. whether it is on or off, the link to the Web browser and the date the outlet was last updated.



PDU outlets

Outlet Name	Outlet No.	Pdu Name	Status	Link	Last Update

Refresh Create One PDU Create Many PDUs Generate config files Close

Figure 1 : PDU Outlets Panel

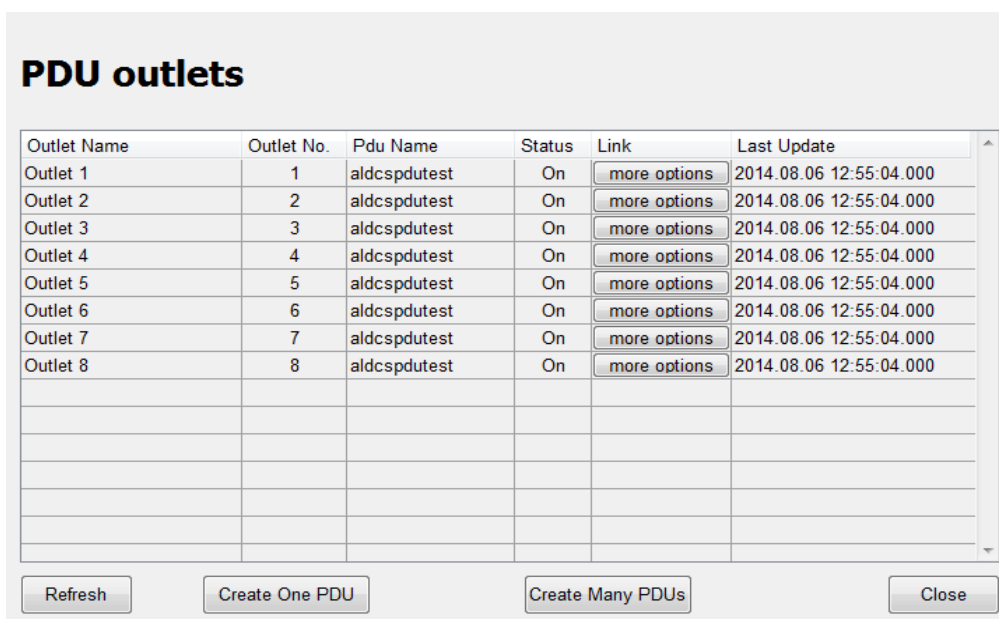
At the bottom of the PDU Outlets Panel is the refresh, create one PDU, create many PDUs, Generate config files and close button. When the user clicks on the create one PDU button, a new panel pops out, the New PDU panel, shown in figure 2.



The 'New PDU' panel is a light gray rectangular window. At the top, it has a title 'New PDU' in bold black font. Below the title, there is a label 'Name:' followed by a white text input field. Underneath that is a label 'No. of outlets:' followed by a dropdown menu showing the number '8'. At the bottom of the panel, there are two buttons: 'Create a new Pdu' on the left and 'Close' on the right.

Figure 2 : New PDU Panel

This panel allows the user to write the name of the new PDU and select the number of outlets the PDU will have and create it. In this design the number of PDU outlets is fixed at eight outlets because all the PDUs being used currently have eight outlets. The user may then close the the new PDU panel and click the refresh button on the PDU outlet panel to update it and the newly created PDU will show with all its outlets and information as shown in figure 3.



The 'PDU outlets' panel is a light gray rectangular window. It features a table with the following columns: 'Outlet Name', 'Outlet No.', 'Pdu Name', 'Status', 'Link', and 'Last Update'. The table contains 8 rows of data, each representing an outlet. Below the table, there are four buttons: 'Refresh', 'Create One PDU', 'Create Many PDUs', and 'Close'.

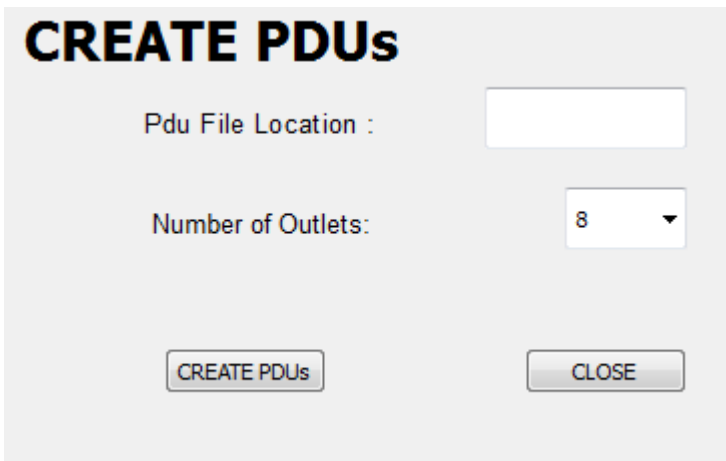
Outlet Name	Outlet No.	Pdu Name	Status	Link	Last Update
Outlet 1	1	aldcspdutest	On	more options	2014.08.06 12:55:04.000
Outlet 2	2	aldcspdutest	On	more options	2014.08.06 12:55:04.000
Outlet 3	3	aldcspdutest	On	more options	2014.08.06 12:55:04.000
Outlet 4	4	aldcspdutest	On	more options	2014.08.06 12:55:04.000
Outlet 5	5	aldcspdutest	On	more options	2014.08.06 12:55:04.000
Outlet 6	6	aldcspdutest	On	more options	2014.08.06 12:55:04.000
Outlet 7	7	aldcspdutest	On	more options	2014.08.06 12:55:04.000
Outlet 8	8	aldcspdutest	On	more options	2014.08.06 12:55:04.000

Figure 3 : PDU Outlets Panel after creating one PDU

This method was used in the previous design and it allows the user to create one PDU at a time and is obviously tedious and slow if there are so many PDUs to be included in the main panel.

The new method proposed to create the PDUs which is referred to in this report as the “upgrade” of the interface described above is to create as many PDUs simultaneously on a single click. This would require the user to have a text file that has a list of all PDUs to be created. This file can be created on notepad and saved as a .txt file (e.g. pdus.txt).

The user interface is then designed in such a way as to allow the user to insert the location of the PDU list file. It also allows the user to specify the number of outlets the PDUs will have. The new panel designed for this proposal is shown in figure 4 below.



CREATE PDUs

Pdu File Location :

Number of Outlets:

Figure 4: Create PDUs Panel

When the user specifies the path to the PDU list file and the number of outlets, they can click on the Create PDUs button. This will allow the PDUs on the file to be created with the number of the outlets as specified by the user. The User can then close this panel and refresh the main panel to show the new PDUs created with their relevant information.

PDU outlets

Outlet Name	Outlet No.	Pdu Name	Status	Link	Last Update
outlet7	0	aldcspdu002		more options	2014.08.06 12:22:51.000
outlet8	0	aldcspdu002		more options	2014.08.06 12:22:51.000
outlet1	0	aldcspdu004		more options	1999.11.30 00:00:00.000
outlet2	0	aldcspdu004		more options	1999.11.30 00:00:00.000
outlet3	0	aldcspdu004		more options	1999.11.30 00:00:00.000
outlet4	0	aldcspdu004		more options	1999.11.30 00:00:00.000
outlet5	0	aldcspdu004		more options	1999.11.30 00:00:00.000
outlet6	0	aldcspdu004		more options	1999.11.30 00:00:00.000
outlet7	0	aldcspdu004		more options	1999.11.30 00:00:00.000
outlet8	0	aldcspdu004		more options	1999.11.30 00:00:00.000
Outlet 1	1	aldcspdutest	On	more options	2014.08.06 13:22:44.000
Outlet 2	2	aldcspdutest	On	more options	2014.08.06 13:22:44.000
Outlet 3	3	aldcspdutest	On	more options	2014.08.06 13:22:44.000
Outlet 4	4	aldcspdutest	On	more options	2014.08.06 13:22:44.000

Refresh Create One PDU Create Many PDUs Close

Figure 4 : PDU Outlets Panel after creating many PDUs (3 in this case)

The user may also check the log messages, if the path to the file was correct and the file could be opened, then the PDUs will be created and a log message, “**created**” will be printed at the end of each PDU name. If however, there was a problem and the PDUs could not be created the log message will be “**WARNING, 82, File not Open**”. This failure may result from inserting the wrong path to the PDU list file.

On Fig 4 it can also be seen that there is a red highlight on the date updated for the first two PDUs this shows the user that the PDU has stopped working or is disconnected from the PC. In this case the two PDUs were not connected to the PC.

The “more options” button on each PDU Outlet allows the user to access the Web User Interface. The Web interface displays the information of the sensors connected to the PDU. It allows the user to create alarms with desired conditions of the inputs read from the sensors. It also logs and stores the sensor measurement data and allows the user to view a graphical representation of the logs.

The Web Interface also allows the user to control the status of each PDU outlet. Figure 5 shows the control section of the Web User Interface. The outputs shown are from aldcspdutest. Eight outlets are shown. The user may select the option desired for the device connected to the particular output.

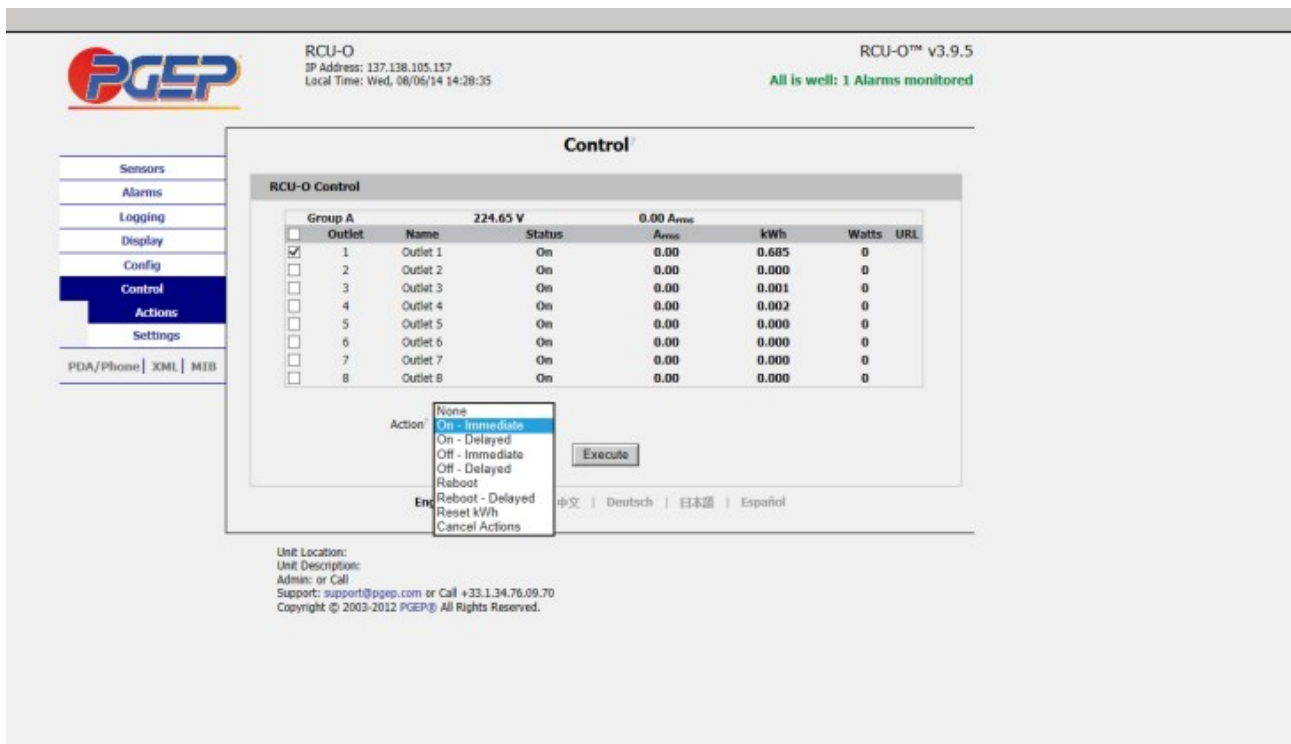


Figure 5 : The Control Part of the User Interface

As can be seen in figure 5, the names of the outputs are not customized. A “generate configs” panel was created to allow the user to configure the outlets as desired. This would require the user to create a PDU map file, which is a file that contains the customized name of each outlet. This file may be created in MS Excel and saved as a “Comma Separated Values” file (.csv). The user will then point to the file on the “generate configs Panel” (figure 6) and generate an XML file.

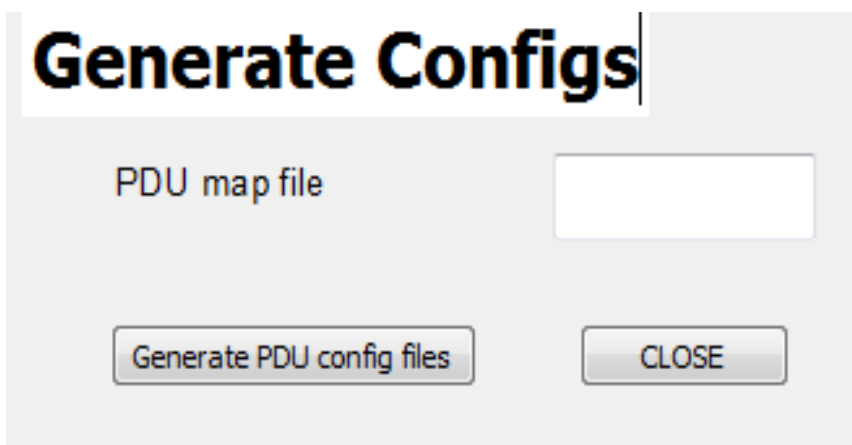


Figure 6 : The Generate Configs Panel

The new XML file may then be loaded on the Web User Interface under “Admin ” on the Config tab. When the file has successfully loaded, the control tab will show the customised names of the outlets as shown in figure 7.



RCU-O
 IP Address: 137.138.105.157
 Local Time: Thu, 08/07/14 10:57:07

RCU-O™ v3.9.5
 All is well: 1 Alarms monitored

Sensors
 Alarms
 Logging
 Display
 Config
Control
 Actions
 Settings

PDA/Phone | XML | MIB

Control

RCU-O Control

Group A		226.90 V		0.00 A _{max}			
☐	Outlet	Name	Status	A _{max}	kWh	Watts	URL
☐	1	server1	On	0.00	0.698	0	
☐	2	server2	On	0.00	0.000	0	
☐	3	system1	On	0.00	0.001	0	
☐	4	system2	On	0.00	0.002	0	
☐	5	server3	On	0.00	0.000	0	
☐	6	server4	On	0.00	0.000	0	
☐	7	server5	On	0.00	0.000	0	
☐	8	server6	On	0.00	0.000	0	

Action: None

Execute

English | Français | 中文 | Deutsch | 日本語 | Español

Unit Location:
 Unit Description:
 Admin: or Call
 Support: support@pgep.com or Call +33.1.34.76.09.70
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Recommendations

The user interface may be further modified to check for a duplication of the PDUs in the PDU list file and only create each PDU once. Also taking care that adding new PDUs on the list file and creating them does not affect the operation of the ones that have already been created.

Conclusion

Learning programming and the WINCC environment was a very interesting challenge. Starting from the very basics of using the tools to producing a useful prototype was the most exciting experience.