PROCENTEC





elected d	evice:	Flash Lt	ED on device
# Info	Mac Address	Protocols	Manufact.
	00:0E:8C:87:10:16	PROFINET, LLDP	Siemens /
	00:A0:45:03:F8:23	PROFINET	PHOENIX
	00:30:DE:02:57:F2	PROFINET	WAGO Ko
	00:A0:45:04:11:B4	PROFINET, LLDP	PHOENDX
	08:00:06:68:FE:6A	PROFINET	SIEMENS .
	00 (0E (8C) AD (5E) 90		Siemens A
	08:00:06:68:FE:AB		SIEMENS .
	00:30:DE:02:15:00		WAGO Kor
	00:0E:8C:9D:AD:EF		Siemens /
	00:0E:8C:87:E4:B3		Siemens 4
1	08:00:06:95:0F:4A	PROFINET	SIEMENS .
	00:0E:F0:05:06:AF	PROFINET	Festo AG
	00:0E:F0:05:06:DF	PROFINET	Festo AG
4	00:0E:F0:05:06:E5	PROFINET	Festo AG 8
5	08:00:06:97:A1:26	PROFINET	SIEMENS
6 🗐	00:1A:4B:77:51:F1		Hewlett Pa
7	00:0E:8C:AD:5E:91	PROFINET	Siemens /



Netilities 1.5.5

User Manual

Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning sign and are marked as follows according to the level of danger:



Draws your attention to important information on handling the product, a particular part of the documentation or the correct functioning of the product.

Warranty

Warranty is void if you open the Netilities Appdongle

Disclaimer of Liability

We have checked the contents of this manual as much as possible. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the content in this manual is reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

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Important information

Purpose of the Manual

This user manual provides information how to work with Netilities.

Recycling and Disposal

The parts of the Netilities Appdongle can be recycled. For further information about environment-friendly recycling and the procedure for disposing your old equipment, please contact:

PROCENTEC Klopperman 16 2292 JD WATERINGEN The Netherlands

Tel.: +31-(0)174-671800 Fax: +31-(0)174-671801 Email: info@procentec.com

Document Updates

You can obtain constantly updated information on PROCENTEC products on the Internet at www.procentec.com

You can also contact PROCENTEC Customer Support:

- by phone at +31-(0)174-671800
- by fax at +31-(0)174-671801
- by email at support@procentec.com

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1 Product description

1.1 Introduction

Netilities is a compact and efficient tool to support the user with his PROFINET engineering and troubleshooting tasks. It can generate a live list of the PROFINET/Ethernet network and spot the devices which are in Data Exchange. Statistics provide an overview of the network condition. Netilities also makes it easy to check the difference in actual configuration and PLC-configuration. It utilizes the standard Ethernet/WLAN port on the PC or interfaces with a ProfiTap.

Info fields are displayed to inform the user on actual network problems, like: device missing, double device names, double IP addresses, etc. The Statistics provide an overview over the cycle times, corrupted telegrams, data size, etc.

Netilities is also used to set Device Names and IP addresses and export the detected devices to CSV. The LED test feature can identify the targeted PROFINET device. The best performance of Netilities is achieved when the laptop is directly connected to the mirror port of a switch which is installed directly behind the PLC or other controller.

The licensing and software storage is handled by a USB dongle. The dongle can be used on multiple PCs.

1.2 Product features

- Real time scan / Live List of the complete network
- Info panel for network problems (device missing, double addresses, etc.)
- See difference in real and expected configuration of devices
- Statistics (cycle times, corrupted telegrams, data size, etc.)
- Import GSDML files to display device specific items and diagnostics
- Acyclic reading of information of IO-devices (I&M0)
- Setting Device Names and IP numbers
- Topology scan based on SNMP and LLDP
- PROFINET LED test
- Suitable for other Ethernet systems
- Save and load all captured information

1.3 Application areas

- Troubleshooting & maintenance of PROFINET networks
- Commissioning of PROFINET networks
- Education

1.4 Detectable faults on PROFINET

- General communication faults
- Wrong configuration
- Diagnostics of devices
- Lost/missing device
- Wrong device name
- Double device names
- Double IP addresses

1.5 System requirements

In order to use Netilities and all sub programs, your computer system should include the hardware and software listed below. The software has been tested to work on Windows XP and Windows 7.

Minimum requirements:

- Microsoft Windows XP
- 600 MHz Intel Pentium III processor or equivalent
- 512 MB of RAM
- 1024x768 resolution display
- 1 free USB 2.0 high-speed interface port (for Appdongle)
- 1 free USB 2.0 high-speed interface port (when using ProfiTap)
- 1 free 100Mbit Ethernet port (when connecting directly to a switch)
- 1 mouse or other pointing device

Recommended (differences from minimum):

- Dual core 2 GHz processor or equivalent
- 1024MB of RAM
- 1280 x 1024 resolution display or better

IMPORTANT NOTE:

The performance also depends on the size of the installation. The more devices in the installation, the more processing power is needed.

2 Software installation instructions

This chapter describes the installation for Netilities and the WinPcap drivers. It is assumed that you have a basic knowledge of Windows operating systems. All examples and dialogs are based on a US/UK based Windows installation and may differ slightly based on upgrades, updates and enhancements. Please use the screenshots in conjunction with the description in order to press the appropriate buttons and other user interface items.

2.1 Installation procedure

You can run Netilities directly from the USB stick without having to install it on your PC.

2.2 First use

When Netilities is run for the first time, it checks if the required libraries for WinPcap are installed. If these WinPcap libraries are not present the WinPcap installer will be launched.

2.3 Installing WinPcap Driver

The installation of the WinPcap driver is either started by Netilities when it is launched for the first time or by starting it manually from the USB stick.



Click "Next" to proceed.



Click "Next" to proceed.

You have to accept the terms of the license agreement.

WinPcap 4.1.2 Setup		X
Vin Pcap	License Agreement Please review the license terms before installing WinPcap 4.1	l.2.
Press Page Down to see th	e rest of the agreement.	
Portions Copyright 1989 b	y Carnegie Mellon.	*
without fee is hereby gran on all copies and supportin advertising or publicity per permission, and notice be distribution is by permissio makes no representations	nodify, and distribute this program for any purpose and ted, provided that this copyright and permission notice appear ag documentation, the name of Carnegie Mellon not be used in taining to distribution of the program without specific prior given in supporting documentation that copying and n of Carnegie Mellon and Stanford University. Carnegie Mellon about the suitability of this software for any purpose. It is opress or implied warranty.	•
If you accept the terms of agreement to install WinPc ullsoft Install System v2.46	the agreement, click I Agree to continue. You must accept the ap 4.1.2.	
	< Back I Agree Canc	el

Click "Next" to proceed.

😚 WinPcap 4.1.2 Setup	
Win Pcap	Installation options Please review the following options before installing WinPcap 4, 1, 2
🗹 Automatically start t	ne WinPcap driver at boot time
Nullsoft Install System v2.46	
	< Back Install Cancel

Select "Automatically start the WinPcap driver at boot time.".

Click "Install" to proceed.

😙 WinPcap 4.1.2 Setup	
	Completing the WinPcap 4.1.2 Setup Wizard WinPcap 4.1.2 has been installed on your computer. Click Finish to close this wizard.
	< Back Finish Cancel

Click "Finish" to close the installer.

2.4 Setting colour preferences

The colours of both the Live List and the Statistics can easily be adjusted in the Options/Settings menu.

e	Actio	on Interfaces	Opt	ions Help		
.ive	List	Statistics Bargr		Settings		
	P 14	KE9		GSD catalog		
#	Info	Mac Address	^	Protocols	Manu	ifacturer

Click "Options" followed by "Settings" to proceed.

Live List colors Device in data exchange:	Modify
Generally active device:	Modify
Inactive device:	Modify
Selected device:	Modify
Text color:	Modify
75	

Click on "Livelist" and "Colors" to set the Live List colours. If you wish to adjust the Statistics colours, click on "Statistics".

2.5 Updates

It is the policy of PROCENTEC to release periodic updates.

To update your Netilities version, simply download the new ZIP file from our website and copy the contents of the ZIP file to your Netilities Appdongle. This will overwrite your previous version. If you want to keep the previous you can make a backup of it on the USB stick.

3 License system

3.1 Introduction

For using Netilities you need the "Appdongle" USB stick, on which Netilities is supplied. The Appdongle also provides your license for Netilities.

You purchase a license for the following combination:

• Netilities (Live List) + Statistics + SNMP

3.2 Storage location of the license file

The license file for Netilities is stored in "\Netilities" directory of the USB stick.



The USB stick can be used on different PCs.

4 Quick start guide

4.1 Adding Netilities to the installation

Attach a network cable to the network port of your laptop/PC. Connect the other end of the network cable to the mirror port on the PROFINET switch. The LED of that port should be ON indicating a working link.

When Netilities starts for the first time, a window is displayed with explanation on the different methods of monitoring. This screen can be disabled by de-selecting the checkbox on the bottom of the window.



The window can later be viewed by choosing 'Help – Monitoring Modes' in the main menu, or go to 'Options - Settings' and select the checkbox 'Enable at startup' under Monitoring Modes pop-up.

4.2 Configuring the PROFINET Switch

In order for Netilities to receive network data, a free switch port should be configured to <u>mirror a port</u>. For best results the port on which the PNIO-Controller is attached should be mirrored to the port your computer is connected to. See **Fig. 1** for an example.

🍃 🔊 PROCENTEC Webmail 🧕 pogop	olug Sign In			
PHENIX	phoenix-mcs		last update: 9:31:56	
mananin	Port Mirroring			
	Source Port	16 🔻		
FL SWITCH MCS	Destination Port	15 🔻		
14TX/2FX	Mirroring Status	O Disable	Enable	
General Instructions				
Device Information	Enter password		Apply	
General Configuration				
Switch Station				
Services				
Dorts				
Port Table			2	ř.
Port Cfg Table				
Port Configuration				
Port Statistics				
Mirroring				
Port Security				
Diagnostics				

Fig. 1 - Enabling port mirroring on a PROFINET switch

4.3 Starting Netilities

After starting up the Netilities software, the screen as in Fig. 2 should appear.

	Vetilities V1.4.0 -										
	Action Inte										
Liv	e List Statistics	Bargraph SI	VMP								
	★ 같 ビ 3	・ 9 苗 /	• A # ×) 							
#	Info Mac Add	ress 🔺 Pi	rotocols	Manufacturer	IP Address	Device Name	Device Model	Device Role	Vendor/Device ID	Last received packet	*
											-
											Î
											~
S/N:	1150600221	Incoming: 0	Packets/s	Buffer OK							

Fig. 2 - Startup screen of Netilities

Click on "Interfaces" and "Enable/disable interfaces" to start the software.

1: Bluetooth Network Connection [0.0.0.0/255.0.0.0] (Microsoft)	
2: Local Area Connection [192, 168		introller)
3: Wireless Network Connection [1	92.168.1.60/255.255.255.0] (Microsoft)	15
	ol.	
	Oh.	

After an interface is enabled, a Live List as in Fig. 3 should be visible.

	Statistics Bargraph									
† 12	(ビビク) #	t 🔊 🗄 🚿 🛛 🛪	< *)							
Info	Mac Address	 Protocols 	Manufacturer	IP Address	Device Name	Device Model	Device Role	Vendor/Device ID	Last received packet	
	00:0E:8C:8A:A4:D4	ARP, PROFINET, LLI	Siemens AG A&D ET	192.168.0.1	pn-io	S7-300	IO-Controller	002A/0101	12-2-2013 9:36:28	
	00:30:DE:02:57:F2	PROFINET	WAGO Kontakttechnik GmbH	192.168.0.10	device1	WAGO-I/O-SYSTEM 75x	IO-Device	011D/02EE	12-2-2013 9:36:28	
	00:A0:45:36:92:A7	PROFINET	PHOENIX CONTACT GMBH & CO.	. 192.168.0.12	device3	ILB PN 24 DI 16 DIO 16-2TX	IO-Device	0080/0004	12-2-2013 9:36:28	
	08:00:06:68:FE:AB	PROFINET	SIEMENS AG	192,168.0.11		IM151-3	IO-Device	002A/0301	12-2-2013 9:36:28	
	08:00:06:97:A1:26	PROFINET	SIEMENS AG	192.168.0.150	switch-PTK-D	INC	IO-Device	002A/0A01	12-2-2013 9:11:25	
			Hewlett-Packard Company	192.168.0.100		S7 -P C	IO-Controller	002A/0202	12-2-2013 9:36:28	
	9C:B2:06:10:03:2D	PROFINET	PROCENTEC	192.168.0.14	COMbricks-3	PND-001	IO-Device	4000/0001	12-2-2013 9:36:28	
	9C:B2:06:10:03:3F	PROFINET	PROCENTEC	192.168.0.13	COMbricks-1	PND-001	IO-Device	4000/0001	12-2-2013 9:36:28	

Fig. 3 - Screen of Netilities after correct network has been enabled

4.4 Analyzer

Netilities itself is an analyzer to display a Live List and to view statistics. A quick overview of this is given in the next sections.

4.4.1 Main window notification bar

On the bottom of the Netilities window is a notification bar with information about the application and memory status of your laptop/PC. Is displays the following information:

- Serial number of your Appdongle
- Number of incoming packets per second
- Packet buffer state

If you are monitoring a high-speed PROFINET network where the cycle-time of devices is very high, or there are many devices in the network, it can happen that the memory buffer of the computer is flooded with PROFINET packets. This means that not all packets can be processed and data will be lost. If this happens, Netilities will indicate this with a red notification:

<u> </u>		
S/N: 1328600308	Incoming: 13701 Packets/s	Packet buffer overflow. Click here for details.

Clicking the red warning brings up the following window:

Internal buffer status	×
Lost packet count	
Lost packets in interface:	0
Lost packets in driver:	46462
Lost packets in internal buffer:	0
Incoming packets are buffered at several locations before b If the PC/Laptop does not have enough processing power for of incoming data packets, packets can get lost. If this is the data within Netilities becomes unreliable. This does not mean network is unreliable.	or the number case, internal
To solve this, you can do the following: - Run Netilities on a PC/Laptop with more processing power. - Reduce the number of applications running on the PC/Lapt - Reduce the number of messages coming in at the Ethernet	op.
Close and confirm Close without co	nfirm

Follow the instructions to reduce the lost packets.

4.4.2 Live List



The Live List is a table which continuously lists all the available devices. It is directly visible which devices are active, in data exchange and which devices are inactive. With different background colours, the status of the devices is displayed.

- Yellow: inactive device
- Light blue: Generally active device
- Green: Device in data exchange

ve List	Statistics Bargraph	SNMP								
		. <i></i>	্প							
		Protocols		IP Address	Device Name	Device Model	Device Role	Vendor/Device ID	Last received packet	
	00:0E:8C:8A:A4:D4	ARP, PROFINET, LL	[Siemens AG A&D ET	192.168.0.1	pn-io	S7-300	IO-Controller	002A/0101	12-2-2013 9:36:28	
	00:30:DE:02:57:F2	PROFINET	WAGO Kontakttechnik GmbH	192.168.0.10	device1	WAGO-I/O-SYSTEM 75x	IO-Device	011D/02EE	12-2-2013 9:36:28	
	00:A0:45:36:92:A7	PROFINET	PHOENIX CONTACT GMBH & CO	. 192.168.0.12	device3	ILB PN 24 DI 16 DIO 16-2TX	IO-Device	0080/0004	12-2-2013 9:36:28	
	08:00:06:6B:FE:AB	PROFINET	SIEMENS AG	192.168.0.11	device2	IM151-3	IO-Device	002A/0301	12-2-2013 9:36:28	
	08:00:06:97:A1:26	PROFINET	SIEMENS AG	192.168.0.150	switch-PTK-D	INC	IO-Device	002A/0A01	12-2-2013 9:11:25	
QB	98:4B:E1:C6:C0:96	IPv4, ARP, IPv6, PP	R Hewlett-Packard Company	192.168.0.100	joost-hp	S7-PC	IO-Controller	002A/0202	12-2-2013 9:36:28	
	9C:B2:06:10:03:2D	PROFINET	PROCENTEC	192.168.0.14	COMbricks-3	PND-001	IO-Device	4000/0001	12-2-2013 9:36:28	
	9C:B2:06:10:03:3F	PROFINET	PROCENTEC	192.168.0.13	COMbricks-1	PND-001	IO-Device	4000/0001	12-2-2013 9:36:28	

4.4.3 Statistics



The statistics matrix is the most powerful feature of the analyzer. This field can really indicate what the condition of an installation is. It displays the important information that a user, especially a maintenance technician is really interested in:

- Current cycle time
- Minimum cycle time
- Maximum cycle time
- Transfer status error count
- Alarms (device/controller)
- Absolute traffic (PROFINET/Non PROFINET)
- Relative traffic (PROFINET/Non PROFINET)

Because of this feature, the user does not have to inspect messages or do difficult operations to ensure the quality of the installation.

- Light blue: Changed statistic
- Yellow: Device is not active

ist Statistics SNMP	raffic, PN / non-PN (P	advate)	•					b			
panel		192.168.0.X									
em selected.		0	1	2	3	4	5	6	7	8	9
	0		599 / 124	2	32 / 17	265 / 6	5	270 / 4	7	8	9
	10	10	11		13	14		16		18	19
	20					24		26		28	
	30					34		36		38	39
	40	40	41	42	43	44	45	46	47	48	49
	50					54		56		58	59
	60		61		63	64	65	66	67	68	69
	70					74		76		78	79
	80	80	81	82	83	84	85	86	87	88	89
	90	90				94	95	96		98	
	100					104		105		108	109
	110					114				118	
	120					124					
	130	130				134		136		138	139
	140	1.40	141	142	143	144	145	146	147	148	149
	150					154		156			
	160					164					
	170	170				174	175	176		178	179
	180					184					189
	190	190				194		195			
	200	0/31				204					
	210					214				218	
	220					224				228	
	230					234		236		238	239
	240	2.40				244		2.46		248	249
	250					254					

If the statistics do **NOT** show deviations, the installation is on the 1st degree OK.

4.4.4 Bargraph

The Bargraph shows the individual cycle times of each device in the network range. This is divided in two bars; one for Controller to Device, and one for Device to Controller. It is also possible to see the cycle time by MAC-address instead of IP-address. When bars have a red colour, this means that at least one cycle has been missed. If the Bargraph do **NOT** show deviations, the installation is on the 1st degree OK.



"Management made easy ... "

The SNMP functionality can detect the devices in the network. Depending on what a device supports, information like System Uptime, System description, MAC-address, IP-address is displayed.

💓 Netilities V1.0.10 - (• ×
File Action Interfac		s Help										
Live List Statistics S	NMP											1
9												
Station interface info	Topology de	tection										
IP Devices: 192.168.0.1	IP address	:	192.168.0.6						L.	5		
192.168.0.3 192.168.0.4	MAC addre	ISS:	00:0E:8C:AD:5E:9	D								
192.168.0.5 192.168.0.6 192.168.0.151	System de	scription:	Siemens, SIMATIC	S7, IM151-3P	N, 6ES7 151-3AA2	3-0AB0,	HW: V4.0.0, FW	: V7.0.1, SN: S C	-X4UP74712009			
192.168.0.200	System up	time:	0 days 0:09:13									
	System na	me:	[
	System cor	ntact:					-					
	System loc	ation:					-					
			1.				-		,			
	Index	Description		Link speed	Phys. addr.	Link	Octets (in)	Discards (in)	Errors (in)	Octets (out)	Errors (out)	
	1 2		MATIC S7, inter MATIC S7, Ether		000E8CAD5E90 000E8CAD5E91	UP	0 225979	0	0	0 165211	0	
	3	Siemens, SI	MATIC S7, Ether	100Mbps	000E8CAD5E92	UP	39041	0	0	134394	0	
	T Auto	update statisti	cs									
S/N: 1150600226						_						 //

This information can be updated automatically. It depends on the devices if their information can be updated automatically.

Netilities is also able to detect the topology of the network without shutting down the installation! The Topology detection creates a clear network structure that contains the location of the devices. The result depends on the information supplied by the devices.

- Green: Topology information is available from the device.
- Yellow: Some topology information is available from the device.
- Red: No topology information is available from the device.

🖉 Netilities V1.0.10 - (C) 2011 PROCENTEC	
File Action Interfaces Options Help	
Live List Statistics SNMP	
Ø	
Station interface info Topology detection	
□ Managed Compact Switch (MCS) (192.168.0.151) [00:A0:45:03:C5:05] □ (5)	
(a -(2))	
- 192.168.0.5[00:30:DE:02:15:0C] ⊟· (?)	
PROFINET ILB with 16 IN and 16 IN/OUT (192.168.0.3) [00:A0:45:36:93:06]	
Generes, SIMATIC S7, IM151-3PN , 6ES7 151-3AA23-0AB0 , HW: V4.0.0, FW: V7.0.1, SN: S C-X4UP74712009 (192.168.0.6) [00:0E:8C:AD:SE:90] G	
È-(?)	
Siemens, ET200S, IM151-3PN, 6ES7 151-3AA10-0A80, FW: V2.0.0 (192.168.0.4) [08:00:06:68:FE:6A]	
E (2) Semens, SIMATIC S7, CPU315-2 PN/DP, 6ES7 315-2EH13-0A80 , HW: 4, FW: V2.6.5, S C-IDF92004200 (192, 168.0.1) [00:0E:80:87:10:16]	
- 3elielis, alivini c.27, c.03122 millor, e.27, 21120400, milli 7, mill 72012, 2010 5200420 (122, 2000) [Unitedication 10, 10]	
La La	
Legend:	
🔲 Topology info is available from this device 📃 Some topology info is available from this device	
\$/N:1150600226	

5 Live List

The Live List is a table which continuously lists all the available devices. It is directly visible which devices are active, in data exchange and which devices are inactive. With different background colours, the status of the devices is displayed.

• Yellow: inactive device

This is because the device is not sending any messages. The problem could be that a device has been lost, or a device has not yet been in data exchange.

Another possibility for a yellow live list is that the computer is not fasts enough to process all packages. The Live List will display all devices as yellow for a short time. Refer to paragraph 4.4.1 for more information.

- Light blue: Generally active device
- A device is sending messages, but it is not in data exchange with a PNIO-Controller.
- Green: Device in data exchange

A device is active and it is in data exchange with a PNIO -Controller.



5.1 Live List Actions

The Live List offers several actions to the user. These actions can be accessed via the Action menu or via the buttons on the Toolbar. The following actions are available:



Action	Description
Flash LED on device	Flashes a LED on the selected device. Which LED starts to blink on the
	device, is dependent on the device. Mostly the Link LED(s) will start
	blinking.
Browse to website	Opens the default webbrowser and navigates to the IP-address of the
	selected PROFINET station.
Modify IP-address	Used to modify or clear the IP-address of the selected device. The IP-
	address can only be changed when the selected device is not in Data
	Exchange.
Modify device name	Used to modify or clear the device name of the selected device. The
	device name can only be changed when the selected device is not in
	Data Exchange.
Set to factory defaults	Resets all settings of the selected PROFINET station to the factory
	defaults. Name, IP address and other settings will be cleared. Note:
	This can be done while devices are in Data Exchange.
Search for PROFINET devices	Used to search for PROFINET devices in the network only once.
Continuously search for PROFINET	Used to continuously search for PROFINET devices in the network.
devices	
Search for IP devices	Used to search for IP devices in the network only once.
Continuously search for IP devices	Used to continuously search for IP devices in the network.
Remove selected device from list	Removes the selected device from the Live List. Used for instance to
	remove devices from the list that are no longer active in the network.
Freeze the screen	Pauses the information on the screen; no data will be added or
	removed.

5.2 Live List columns

The Live List shows a number of columns.

ile	Acti	ion Interfaces Op	tions Help							
	-	· · ·								
Liv	e List	Statistics Bargraph	SNMP							
	Ŧ 1	* ピピッ 🛛 🕯	b 🔊 👬 🚿	× +						
#	Info	Mac Address	Protocols	Manufacturer	IP Address	Device Name	Device Model	Device Role	Vendor/Device ID	Last received packet
1		00:0E:8C:8A:A4:D4	ARP, PROFIN	ET, LLI Siemens AG A&D ET	192.168.0.1	pn-io	S7-300	IO-Controller	002A/0101	12-2-2013 10:09:53
2		00:30:DE:02:57:F2	PROFINET	WAGO Kontakttechnik GmbH	192.168.0.10	device1	WAGO-I/O-SYSTEM 75x	IO-Device	011D/02EE	12-2-2013 10:09:53
3		00:A0:45:36:92:A7	PROFINET	PHOENIX CONTACT GMBH & CO.	192.168.0.12	device3	ILB PN 24 DI 16 DIO 16-2TX	IO-Device	00B0/0004	12-2-2013 10:09:52
4		08:00:06:97:A1:26	PROFINET	SIEMENS AG	192, 168.0, 150	switch-PTK-D	INC	IO-Device	002A/0A01	12-2-2013 9:59:42
5	QB	98:4B:E1:C6:C0:96	IPv4, ARP, IP	v6, LLI Hewlett-Packard Company	192, 168.0, 100	joost-hp				12-2-2013 10:09:52
6		9C:B2:06:10:03:2D	PROFINET	PROCENTEC	192.168.0.14	COMbricks-3	PND-001	IO-Device	4000/0001	12-2-2013 10:09:52
7		9C:B2:06:10:03:3E	PROFINET	PROCENTEC						12-2-2013 10:09:53

Column	Information
#	The number of a row in the Live List.
Info	In this column icons are used to indicate the type of device, or to warn the user about a
	problem. The following icons are used:
	The device in this row encountered a problem.
	Pl Indicates the device in this row is a network device of the PC on which Netilities is
	running.
	Clicking on the row shows a message in the bottom area of the Netilities user interface.
MAC-address	The MAC-address of the device.
Protocols	Displays the protocols used by the device. Commonly used protocols are:
	 IPv4 Internet Protocol v4 (uses 32-bit addresses)
	 IPv6 Internet Protocol v6 (uses 128-bit addresses)
	LLDP Link Layer Discovery Protocol
	ARP Address Resolution Protocol
	• PROFINET
Manufacturer	Displays the name of the manufacturer of the device.
IP-address	The IP-address in use by the device.
Device name	The configured name of the device.
Device model	The model or type of the device.
Device role	Displays the role of the device. The role can be either PNIO-Controller or PNIO-Device,
	PNIO-Multidevice or an PNIO-Supervisor.
Vendor/Device	Displays both the ID of the vendor and the ID of the device. Both ID are displayed in
ID	hexadecimal notation.
Last received	Displays the date and time when the last packet was received from the device. When
packet	loading from PCAP-file, the date and time of import will be displayed.

The following table details the information to be found in these columns.

5.3 Importing GSD files

Netilities offers the option of importing GSD files. This is very helpful when analysing problems on PROFINET. Device parameters and module names can be interpreted and text from the GSD is displayed.

Vetilities V1.4.0 - (C File Action Interfac) 2011-2013 PROCENTEC	
Live List Statistics E	· · · · · · · · · · · · · · · · · · ·	
THEF	O GSD catalog	
# Info Protocols	Manufacturer	Mac Address 🔺 IP

Open the GSD import window by choosing 'Options – GSD catalog':

SSD File	Manufacturer	Group	Product	VendorID/DeviceID	Status
SDML-V1.0-Siemens-002A-SCALANCE_X200-20050713.xml SDML-V1.0-Phoenix Contact-FL II 24 BK-PN-V1.0-20070306.xml SDML-V1.0-Phoenix Contact-ILB PN 24 D116 DI016-2TX-V1.0-2005 SDML-V1.0-Phoenix Contact-ILB PN 24 D116 DI016-2TX-V1.1-2007		Drives General I/O I/O I/O Valves	SCALANCE X-200 Switches	002A / 0501 002A / 0A01 00B0 / 0003 0060 / 0004 00B0 / 0004 014D / 0101	OK OK OK OK OK
Add file(s) Recreate GSD lib	prary				Close

Fig. 4 - GSD Catalog with several GSDs

Next, click 'Add file(s)...'.

A Windows Explorer window appears, and you can select the GSDs you wish to import.

After the GSD files have been imported, the GSD catalog may look like **Fig. 5**: the recently imported GSDs are still unknown. The catalog needs to be recreated, so that all information from the GSDs is read and categorised into Netilities. Press the button 'Recreate GSD library'.

GSD File	Manufacturer	Group	Product	VendorID/DeviceID	Status
jsdml-v1.0-siemens-et200s-20050802.xml jsdml-v2.0-wago-series_750_753-20061030.xml jsdml-v2.1-wago-series750_753-20080520.xml jsdml-v2.1-wago-series767-20080717.xml jsdml-v1.0-siemens-sinamics-cbe20PilotRT-20070726.xml jsdml-v1.0-Siemens-oiD2A-SCALANCE_X200-20050713.xml jsdML-v1.0-Phoenix Contact-TL II 24 BK/N-V1.0-2002036.xml jsDML-V1.0-Phoenix Contact-TL II 24 BK/N-V1.0-2002 jsDML-V1.0-Phoenix Contact-TL B PN 24 DI16 DI016-2TX-V1.0-200 jsDML-V2.1-Festo-CPX-20071107.xml		Drives General I/O I/O Valves	SCALANCE X-200 Switches	002A / 0501 002A / 0A01 0080 / 0003 0080 / 0004 0080 / 0004 0080 / 0004 0140 / 0101	Unknown (Recreate GSD library) Unknown (Recreate GSD library) Unknown (Recreate GSD library) Unknown (Recreate GSD library) Unknown (Recreate GSD library) OK OK OK OK OK OK OK
Add file(s) Remove file(s) Recreate G	SD library				Close

Fig. 5 - Incomplete GSD catalog

5.4 Acyclic information

Clicking the icon in the menu-bar or double-clicking on a device in the Live List brings up additional device information. The 'General info' tab shows general system information such as device name and model, IP address and I&MO information. The button 'Update once' refreshes all the displayed data once. The checkbox 'Auto update' continuously updates all the displayed information.

Additional device info (Onlin	ne)		
Device: 08:00:06:6B:FE:AB		Update onc	e
General info Module configur	ration	Auto update:	
System info:			
Device name:	device2		
Device model:	IM151-3		
Device role:	IO-Device		
Vendor/Device ID:	002A/0301		
IP address info:			
Device IP address:	192.168.0.11		
Device netmask:	255.255.255.0		
Device router:	192.168.0.11		
I&M0 info:			
System serial:			
System order code:			
System hardware version:			
System software version:			
System revision counter:			
		Clos	e
Finished OK	21-2-2013 16:15:32		11.

The next tab 'Module configuration' is also divided in two tabs: 'Configuration reported by IO-Device' and 'Configuration expected by IO-Controller. This is very useful information during commissioning or troubleshooting because it clearly displays the difference in real and expected configuration of devices.

5.4.1 Configuration reported by IO-device

Additional devic	e info (Online)					
evice: 08:00:0	06:6B:FE:AB			U	Ipdate once	2
General info Mo	dule configuration			Auto (update:	
Include sub	modules in configuration lists					
Cconfiguration re	eported by IO-Device Configuration expected by IO	-Controller				
			IO-Devic	e API:)	•
Slot/Subslot	Module	Input data	 Output data			
0 1 2 3 4	IMISI-3PN / 6ES7 I5I-3AA10-0AB0 PM-E DC24-49/ AC24.2007 (4ES7 I32-4BD00-0AA0 4D0 DC24V/0.5A ST / 6ES7 I32-4BD00-0AA0 4D0 DC24V/0.5A ST / 6ES7 I32-4BD00-0AA0 2D0 DC24V/0.5A HF / 6ES7 I32-4BB01-0AB0		4A 4A 53			
				No.	Clos	e
hed OK	21-2-2013 1	6:46:15				

Fig. 6 - Configuration reported by IO-device

The displayed IO-Device has 3 bytes of output data, so only output modules are installed. The module list displays the type numbers of installed modules; this information is read from the imported GSD file (see **paragraph 0**). The captured output bytes are also displayed in the 'Output data' column.

The IO-Device API selector can be used for devices which support multiple APIs, but these are very rare.

5.4.2 Configuration expected by IO-Controller

If a controller and device both indicate a problem with the 'SF' LED, there might be a problem with the configuration of the device. In Netilities it is very easy to compare the real configuration (see **Fig. 6**) with the configuration that was entered into the PROFINET Controller. Click on the tab 'Configuration expected by IO-Controller' as shown in **Fig. 7**.

Additional devic	e info (Online)				- 0	×
Device: 08:00:	16:68:FE:AB				Update once Auto update:	
General info Mo	dule configuration				Auto update.	-
Tindude sub	nodules in configuration lists					
Cconfiguration re	ported by IO-Device Configuration expected by IO-C	Controller				
	IO-Controller for data exchange: pn-io)	•	IO-Device	API: 0	
Slot/Subslot	Module	Module state				-
0 1 2	PM-E DC2448V/ AC24230V / 6ES7 138-4CB 0	ok ok ok				
3		OK				
4		OK				
5	2DO DC24V/0.5A HF / 6ES7 132-48801-0A80 N	No module			Close	
Finished OK	21-2-2013 16:	46.15				
rinished UK	21-2-2013 16:	040:10				

Fig. 7 - Configuration expected by IO-Controller

The controller is expecting a 2DO module in slot 5. It also reads that there is no module available in slot 5. Either the module is missing, or it is not working.

When multiple IO-Controllers exist in one network, you can select the correct IO-Controller in the drop-down list: 'IO-Controller for data exchange:'.

5.4.3 Alarms

The Live List will indicate a problem with a device with the exclamation mark icon . Clicking the line once will display information about this problem in the information window below the Live List.

4			1 M # M # X							
-	In	fo MAC address	Protocols	Manufacturer	IP address		Device model	Device role		Last received packet
1			82 IPv4, ARP, PROFINET, LLD A3 IPv4, ARP, PROFINET	P Siemens AG ABD ET Siemens AG ABD ET	192.168.0.1 192.168.0.8	pn-io im151-boven	\$7-300 TM1E1-2	IO-Controller IO-Device	002A/0101 002A/0301	2-10-2014 12:59:39 2-10-2014 12:59:39
3	۵		F8 IPv4, ARP, PROFINET	Siemens AG ASD ET	192.168.0.3	im 151-test	IM151-3	10-Device	002A/0301	2-10-2014 12:59:39
4	~	00:0E:8C:8C:8B:		Siemens AG A&D ET	192.168.0.2	ie-pb-link	IE/P8 Link	IO-Multidevice		2-10-2014 12:59:39
5		00:30:DE:03:11:4	C IPv4, ARP, PROFINET	WAGO Kontakttechnik GmbH	192.168.0.7	wago-750-370	WAGO-L/O-SYSTEM 75x	IO-Device	011D/02EE	2-10-2014 12:59:39
6		00:A0:45:5D:87:	12 IPv4, ARP, PROFINET, LLD	P PHOENEX CONTACT GMBH & CO.	192.168.0.152	phoenix-switch	FL SWITCH SMCS 8TX-PN	IO-Device	00B0/004€	2-10-2014 12:59:36
7	0	00:E0:4C:50:0B:0	17 IPv4, ARP, IPv6, PROFINE	REALTER SEMICONDUCTOR CORP.	192.168.0.101					2-10-2014 12:59:36
8		90:82:06:10:03:2	M IPv4, ARP, PROFINET	PROCENTEC	192.168.0.6	COMbricks-1	PND-001	IO-Device	4000/0001	2-10-2014 12:59:39
9	A	9C:82:06:10:03:3	0 IPv4, ARP, PROFINET	PROCENTEC	192.168.0.5	combricks	PND-001	IO-Device	4000/0001	2-10-2014 12:59:39
W	ARN	ENG: '00:0E:8C:AD:55	:FB' has one or more alarm mess	ages. See details in Additional device	info/Alarms for m	ore information				

If the device indicates that it has one or more Alarms, double-click on the device in the Live List or click the button and open the tab 'Alarms'.

Additional device info (Online)	- 🗆 ×
Device: 10076E-8C-AD-59F8 General Information Module configuration Alarms	Update once
Attrie Date APT Bot Saddist Mode//SaModele Altern Type Description Yes 2-10-2014 12:8-8-634 0 5 0 00004222 /- Pud Ne additional information pr Yes 2-10-2014 12:8-8-634 0 5 1 00004222 /- Pud Ne additional information pr Date and time of Alarm event Alarm event Type of alarm	sent sent
Deactivate Delete Deactivate	All Delete All
Finished OK [2-10-2014 12:32:24	Close

Fig. 8 - Alarms window

This window shows all the Alarm events which have been captured by Netilities (or which have been read by opening a .PCAP file).

The leftmost column in the Alarm list is the column 'Active'. It indicates if an alarm is acknowledged or not.

Acknowledgement in this case means only that the exclamation mark icon will no longer be displayed in the Live List. So if all Alarms have been deactivated for a specific device, the icon will disappear in the Live List. Deactivation has no other effects or consequences. The Alarms will still be counted in the Statistics and will also appear in the Report and in the Device Details.

Deleting the Alarm (with the 'Delete' button or with the 'Delete All' button) will remove the Alarm from the list. The Alarm will then no longer be visible in the Report and in the Device Details.

Please note that one Alarm event can consist of multiple Alarm messages. These Alarm messages belong to the same event. What you see in the Alarms window is an interpretation of the actual alarm messages. That is why the number of Alarms in this window deviates from the number of alarms in the Statistics.

The Description column shows any extra text that concerns this Alarm. It can be standard Alarm texts, or manufacturer-specific texts. This helps you to investigate the problem further. The same text is also displayed below the Alarms window, because it provides more space for longer texts; this makes it easier to read.

To read the manufacturer-specific Alarm texts, the Vendor-ID and DeviceID need to have been read by Netilities. This happens automatically when you open the Alarms window. But in the situation where you only have a Wireshark-trace file, this is not possible if you do not have the option to go online on the PROFINET-network. In that case you need to enter the Vendor and Device ID manually. Simply open the corresponding GSDML file (with Internet Explorer for example) and look for "DeviceID=" or "VendorID=".

e		Ne	tilities V1.5.4	a - (C) 2011-	2014 PROCENTEC				- 🗆 🗡
File Action Interfa	ces Options Report Help								
Live List Statistics	Bargraph SNMP								
TEKE	95 品原品原 ×	+							
# Info MAC addre		Manufacturer	IP address	Device name	Device model	Device role	Vendor/Device ID	Last received packet	A
1 00:0E:8C:0	37:10:16 PROFINET, LLDP	Siemens AG ABD ET	192.168.0.1	pn-io				15-10-2014 13:26:07	
2 00:0E:8C:	ID:AD:EF PROFINET	Siemens AG A&D ET						15-10-2014 13:26:07	
	F:CE:8F PROFINET	Siemens AG,						15-10-2014 13:26:07	
	Auties at	MAGD Kontakttechnik GmbH						15-10-2014 13:26:07	
5 00:A0:4	Assign as Assign Vendor ID / Device ID	NEX CONTACT GMEH & CO.						15-10-2014 13:26:07	
6 gg 00:E0:-4		0	192.168.0.10					15-10-2014 13:26:07	
7 90:82:0	Browse to website	PROF		~			-	15-10-2014 13:26:07 5-10-2014 13:26:07	
		U U			e device a r ID / De			J	
WARNING: '00:30:DE	:02:15:0C' has one or more alarm mess	ages. See details in Additional device	info/Alarms for n	nore information					-
S/N: 1328600369	Incoming: 0 Packets/s	Packet buffer Ok							
S/N: 1328600369	Incoming: 0 Packets/s	Packet buffer Ok							

Then right-click the device with Alarms in the Netilities Live List and choose "Assign Vendor ID / Device ID".

Fig. 9 - Entering a Vendor and Device ID manually

Enter the 4-digit Vendor and Device ID. After this step, you will be able to read the manufacturer-specific Alarms information.

6 Statistics

The statistics matrix is the most powerful feature of the analyzer. This field can truly indicate what the condition of an installation is. It displays the most important information for a maintenance technician. The different statistics are detailed in the following sections.

Action Interfaces Options															
and the second se															
品 ⑦ ⑦ 別 Alernes, from device / controller															
nfo panel	192.168	192.168.0.X													
1AC address:		0	1	2	3	4	5	6	7	8	9				
08:00:06:6B:FE:6A	0		0/0		0/0	4/0	0/0	0/0	7	8	9				
anufacturer:	10					14		16		18	19				
SIEMENS AG	20					24		26		28					
endor/device ID: 002A/0301	30					34		36		38	39				
evice type:	40	40	41	42	43	44	45	46	47	48	49				
IM151-3	50					54		56		58	59				
ievice role: IO-Device	60		61	62	63	64	65	66	67	68	69				
10 DEVICE	70	70				74		76		78	79				
evice name:	80	80	81	82	83	84	85	86	87	88	89				
device2g	90	90	91	92	93	94	95	96	97	98	99				
address:	100					104		106		108					
192.168.0.4	110					114				118					
letmask: 255.255.255.0	120					124				128					
outer:	130					134		136							
192.168.0.4	140	140	1418	142	143	144	145	146	147	148	149				
	150					154		156							
	160					164									
	170					174		176		178					
	180					184									
	190					194		196							
	200	0/0				204									
	210	210	211			214									
	220					224	225								
	230					234									
	240	2:40	241		243	244	245	246		248	249				
	250		251			254	- 14	- 10	~ ~ ~	~ 10	2.12				

The user interface of the Statistics matrix is split into two parts: one part displaying the actual Statistics matrix, and the Info Panel, providing extra information about a station or statistic.

The information part, Info Panel, displays extra information of the selected device in the statistics matrix. The information that is displayed depends on what information is available for the selected device. The MAC-address and IP-address are displayed for both PROFINET and IP devices.

The statistics matrix displays the statistics for each device in a matrix representation. The place of a device in the matrix is based on its address, namely the last byte of its IP address. Therefore the matrix can display 254 devices at once.

When more IP-ranges are used, a new tab will be added to the statistics matrix. Each tab corresponds to a certain address range as indicated by the title of a tab.

6.1 Statistics Actions

The Statistics offer several actions to the user.



These actions can be accessed via the Action menu or via the buttons on the Toolbar. The following actions are available:

Action	Description
Search for PROFINET devices	Used to search for PROFINET devices in the network only once.
Reset statistics for this station	Used to reset all statistics for the selected device.
Reset this statistic	Used to reset the selected statistic for all devices.
Reset all statistics	Used to reset all statistics for all devices.
Remove selected device	Used clear all statistics of this device
Freeze the screen	Used pause the information on the screen; no data will be added or
	removed.

6.2 Current Cycle Time

With PROFINET the cycle times can be configured per device. This statistic continuously shows and updates the current cycle time for the inputs and outputs of each single device. The exact timing of PROFINET messages is difficult to determine because it depends on network load and delays that may be added by switches in the network. Therefore Netilities bases its Cycle Time calculation on the Cycle Counter value of PROFINET messages. Simplified this means that Netilities calculates the difference of the Cycle Counter between received messages. When a message has been missed, it means the difference between the Cycle Counters of the last received message and the current message increases. In this statistic this is shown in multiples of the configured send cycle for a PNIO-Device. For instance a PNIO-Device is configured with a send-cycle of 2ms. A message of the PNIO-Device goes missing. The current Cycle Time will then become 4ms instead of 2ms.



In a configuration the following cycle time values are possible:

- 1 ms
- 2 ms
- 4 ms
- 8 ms
- 16 ms
- 32 ms
- 64 ms
- 128 ms
- 256 ms
- 512 ms

6.3 Minimum Cycle Time

This statistic shows the shortest cycle time that has been measured for the inputs and outputs of the device. It is continuously measured and updated when a shorter cycle time has been found.

6.4 Maximum Cycle Time

This statistic shows the longest cycle time that has been measured for the inputs and outputs of the device. It is continuously measured and updated when a longer cycle time has been found.

6.5 Transfer status error count

This statistic shows how many input and output messages have had a CRC error and have been marked by a switch as faulty. The last byte of the PROFINET specific data part on an RT and IRT Data Exchange message contains the Transfer Status.

IMPORTANT NOTE only PROFINET switches (cut-through) will forward faulty messages.

6.6 Alarms

This statistic shows the alarms from a device to the controller and from the controller to the device. The alarms can have a low or a high priority. This statistic does not distinguish between the priorities and counts all alarm messages, and also counts the acknowledge of an alarm. An alarm for instance can be:

- Device lost (controller to device)
- Pull alarm (device to controller)
- Plug alarm (device to controller)
- Plug wrong module alarm (device to controller)
- Diagnosis (generally from device to controller)

An extensive list of alarms can be found in the PROFINET Standard.

If an alarm has been registered, refer to paragraph 5.4.3 for a description how to read the alarm.

6.7 PN Data size

This statistic shows the size of the PROFINET specific data part of Data Exchange messages, for both inputs and outputs.

6.8 Absolute Traffic

This statistic gives an indication of traffic on the network by showing the number of packets for both PROFINET and non-PROFINET traffic.

6.9 Relative Traffic

This statistic gives an indication of the network usage for both PROFINET and non-PROFINET traffic by expressing their share as a percentage of the total traffic.

7 Bargraph

The Bargraph shows a graphical representation of the measured cycle times of individual devices in the network. As described in **paragraph 6.2** the cycle time of each device in a PROFINET network can be configured individually. **Fig. 10** shows an example of four devices with different cycle times.



Fig. 10 - Bargraph with different cycle times

The Bargraph displays the current measured cycle times and the largest cycle times. Each device has two bars; one for communication from device to controller, and one from controller to device.

If the Max Cycle Time (see **paragraph 6.4**) has been higher than the current cycle time, the Bargraph will turn red to indicate a problem.



Fig. 11 - Station 11 indicates an increased cycle time

The example in **Fig. 11** shows that the cycle time of station 11 (both directions) is increased, so this indicates that the communication has been disturbed both ways. The cable may have been disconnected, the switch had a problem, or the device was switched off.

7.1 Bargraph options

The following actions can be accessed via the Action menu or via the buttons and drop-down list on the Toolbar:

Action	Description
Search for PROFINET devices	Used to search for PROFINET devices in the network once.
Reset Bargraph for this station	Used to reset all statistics for the selected device.
Reset entire Bargraph	Used to reset the Bargraph for all devices.
Sorting by IP-address (ascending	Used to sort the Bargraph by IP address from low to high or vice
and descending)	versa.
Sorting by cycle time current	Used to sort the Bargraph by current cycle time from low to high or
(ascending and descending)	vice versa.
Sorting by cycle time min	Used to sort the Bargraph by min cycle time from low to high or vice
(ascending and descending)	versa.
Sorting by cycle time max	Used to sort the Bargraph by max cycle time from low to high or vice
(ascending and descending)	versa.

The Bargraph can also be viewed by MAC-address instead of IP-address by clicking the tab 'MAC Address'.

Netilities V1.4.0 - (C) 2011-2013 PROCEN	ITEC
<u>File Action Interfaces Options H</u> elp)
Live List Statistics Bargraph SNMP	
👬 🖙 🍰 IP-Address (ascending)	- X +
Info panel	IP Address MAC Address
No item selected.	192.168.0.X

8 SNMP

The SNMP functionality of Netilities allows you to retrieve management information from devices in the network. The information can for instance be the uptime, its MAC- or IP-address of a device. It also enables Netilities to create a topology of the network indicating who is connected to who. This part of Netilities does not show any data by default. You must start SNMP detection manually in order to see results in Netilities. The user interface of SNMP consists of two parts, a part providing station information and a part displaying the network topology based on information retrieved through SNMP. The following sections detail what you can do with SNMP in Netilities.

8.1 SNMP Actions

The SNMP action menu offers a single action to the user.



This action can be accessed via the Action menu or via the buttons on the Toolbar. The following action is available:

Action	Description
Start detection	Used to start the detection of devices in the network using SNMP.

The following dialog appears before SNMP detection:

	SNMP detection
Scan sources Scan devices currently in the database: Scan IP address range:	 ✓ Disable this checkbox to scan only the known devices (speeds up the scan)
Selected IP address range:	Ethernet 2 (192.168.0.101 / 255.255.255.0) (256 addresse Manage range(s)
Scan options Timeout (milliseconds): Save extra logging info	<u>5000</u> <u>↓</u> ✓
Calculate topology after scan	v
	Ok Cancel

Choose the correct IP range to scan. Use the 'Manage range(s)' button to manually enter a specific IP range. Next you can select the timeout in milliseconds (default is 5000).

As an extra option, extra logging information can be saved for debugging purposes, and you can choose to disable the topology calculation after scan.

The default value for the detection timeout can be changed in the settings menu 'Options – Settings – SNMP – Default detection timeout'.
8.2 Station interface info

The station interface info shows a list of detected IP devices on the left side of the user interface. The right side of the user interface shows the information of the device selected in the list of detected IP devices. A device can be selected by clicking on it.

👹 Netilities V1.4.0 - (C)												
File Action Interfac												
Live List Statistics Ba	argraph SNMP											
G												
Station interface info	Topology detection											
IP Devices:	IP address:	192.168.0.13										
192.168.0.1 192.168.0.10	MAC address:	9C:82:06:10:03:3	F									
192.168.0.11 192.168.0.12		1										
192.168.0.13	SNMP info: System description:	PND-001, OrderId	101-200114	. HW: 1. S	N: V 1.1.0, SN: 1302							
192.168.0.14 192.168.0.100	System uptime:	0 days 0:04:08		,								
192.168.0.150	System name:	COMbricks-1										
	System contact:	COMBRIDES-1										
	System location:											
	System location.	1										
	I&M0 info: System serial:	1302										
	System order code:	101-20011A										
	System hardware version:	1										
	System software version:	V 1.1.0										
	System revision counter:	2										
	Port statistics table:											
	Index Description		Link speed	Media type	Phys. address	Octets (in)	Discards (in)	Errors (in)	Octets (out)	Errors (out)	Line delay	
	1 Ethernet Switchport 2 Ethernet Switchport		100 Mbps FD 100 Mbps FD	Copper Copper	9C:B2:06:00:03:40 9C:B2:06:10:03:41	8.723.065	0	0	8.891.613 8.794.510	0	1 ns (0.2 meters) Unknown	
	2 Colemer Switchport	2 00	1001-1005110	copper	90.02.00.10.03.41	0.923.714			0.754.510		OTINIOWIT	
	Auto update port statistics	s 🔽 Update po	rt statistics on o	levice select						La	st port update: 21-2-20	13 13:15:40
S/N: 1150600221	ncoming: 285 Packets/s	Buffer OK	Not active.									

Its corresponding information is then displayed in the fields on the right side. Depending on available information from a device, the following information can be displayed:

Field	Description				
IP address	The IP address of the selected device.				
MAC address	The MAC address of the selected device.				
System description	A short description of the device.				
System uptime	The time the device has been up and running.				
System name	The name of the device.				
System contact	A name or telephone number of a contact person.				
System location	The location of the device.				
I&M0 info					
System serial	The serial number of the device				
System order code	The order code of the device				
System hardware version	The hardware version number of the device				
System software version	The software version number of the device				
System revision counter	The revision number of the device				
Link information	 A table displaying information about the link(s) of the device. The following columns are presented: Index A sequential number. Description Link speed Physical address Link Status of the link: UP or DOWN Octets in Discards in Errors in Octets out Errors out 				

8.3 Topology detection

The Topology detection gives an overview of the topology of your network. It is however dependent on the information provided by the devices in the network. The level of support for topology information is indicated with colours in the topology.

- Green Topology information available.
- Yellow Some topology information available.
- Red No topology information available.

Wetilities V1.0.10 - (C) 2011 PROCENTEC	
File Action Interfaces Options Help	
Live List Statistics SNMP	
Ø	
Station interface info Topology detection	
E Managed Compact Switch (MCS) (192: 168.0.151) [00:40:45:03:C5:03]	
⊟ (5) ⊟ (7)	
□ <u>192.168.0.5[00:30:DE:02.15:0C]</u> □ (?)	
PROFINET ILB with 16 IN and 16 IN/OUT (192.168.0.3) [00:A0:45:36:93:06]	
⊡·(7) □ □·(2)	
Evenens, SIMATIC \$7, IM151-3PN , 6E\$7 151-3AA23-0A80 , HW: V4.0.0, FW: V7.0.1, SN: S C-X4UP74712009 (192.168.0.6) [00:0E:8C:AD:5E:90] È-(?)	
Semens, ET200S, IM151-3PN, 6ES7 151-3AA10-0AB0, FW: V2.0.0 (192.168.0.4) [08:00:06:68:FE:6A] ⊟- (16)	
E (2)	
Simmers, SIMATIC S7, CPU315-2 PN/DP, 6ES7 315-2EH13-0A80 , HW: 4, FW: V2.6.5, S C-VDF92004200 (192.168.0.1) [00:0E:8C:87:10:16]	
Legend:	
🔲 Topology info is available from this device 📃 Some topology info is available from this device	
S/N: 1150600226	

Use the buttons 'Expand selected node' and 'Expand selected tree' to quickly see all items of the selection:

Expand selected node	Collapse selected node
Expand selected tree	Collapse selected tree
]

The presentation of the topology is schematically drawn up in the following figure.



The switch in the figure is a PROFINET switch and provides Netilities with Topology information. Netilities is therefore able to determine which device is connected to which port of the switch. A switch can normally only have one link on a port. However the figure does show a port with two links, to device A and device B. When this is shown in the topology, it means messages from both devices are received through this port of the switch. Probably one of these devices also has a built-in switch, however it does not provide SNMP topology information.

Device C on the other hand is able to provide some SNMP topology information. Therefore Netilities can now distinguish that device D is connected to device C.

IMPORTANT NOTE:

SNMP must be supported by all devices <u>and</u> it must be possible to retrieve a MAC-list and/or LLDP information. If the LLDP protocol is not supported, the topology will be built up starting with devices providing the most information, i.e. having the most connections. They will be presented <u>above</u> other devices.

9 Reporting

The information gathered by Netilities about the PROFINET installation can be saved to PDF with the Reporting tool. This feature creates a detailed report which contains Network Properties, the Live List, Statistics, Bagraph, SNMP and I&M information and device configuration.

No PDF generator is required on the host computer; simply save the report to a PDF.

9.1 Creating a Report

If you are satisfied with the information that Netilities has collected and want to generate a report, click on 'Report' in the upper menu, and then choose 'Generate Report' as shown in **Fig. 12**.

e	Netilities V1.5.0 BETA - (C) 2011-2013	3 PROCENTEC								
F	ile Action Interfaces Options 🖡	Report Help								
	Live List Statistics Bargraph S	Generate report								
	TERES	8 × *								
	# Info Protocols		Manufacturer	IP Address	Device Name	Device Model	Device Role	Vendor/Device ID	Last received packet	
	1 A IPv4, ARP	00:0E:8C:8A:A4:D4			profinet	\$7-300	IO-Controller	002A/0101	5-7-2013 11:11:55	
	2		ttechnik GmbH	192.168.0.10	device1	WAGO-I/O-SYSTEM 75x	IO-Device	011D/02EE	5-7-2013 11:11:47	- II
	3		ACT GMBH & CO	. 192.168.0.48	device3	ILB PN 24 DI 16 DIO 16-2TX	IO-Device	00B0/0004	5-7-2013 11:11:54	
	Onent	the Report	-	192.168.0.49	device2	IM151-3	IO-Device	002A/0301	5-7-2013 11:11:54	
	s Openi	the hepoin	-	192.168.0.150	SCALANCE-X208	INC	IO-Device	002A/0A01	5-7-2013 11:11:47	
	6	indow	Company	192, 168, 0, 100		S7-PC	IO-Controller	002A/0202	5-7-2013 11:11:55	
	7 W	indow		192.168.0.2	COMbricks-1	PND-001	IO-Device	4000/0001	5-7-2013 11:11:46	
	× 📄									× ×
S/	N: 1150600221 Incoming: 10 Pac	ckets/s Buffer OK								

Fig. 12 – Open the Report dialog

Next, a window appears where details can be entered about the site, company and network. Some fields are mandatory.

Print report General information ection selection Custom logo		
Location: Dairy Factory 1 Network name:	(mandatory)	
Milk Pasteuriser ✓ Project details: Commissioning phase 2	(manda) vu	
♥ Remarks: Wago device not online		Required fields
Engineer name: John Doe Company name: [PB/PN Experts	(mandatory)	
		d settings Save settings
Generate report		Close

Fig. 13 - Report details

settings' button to easily load them.

Now you can hit the 'Generate Report' button, or customize the report by clicking on the other tabs described in **paragraph 9.2** and **9.3**.

9.2 (De-)selecting sections

The Report is customizable. You can select or deselect different sections of Netilities. If you wish to leave out the Bargraph for example, simply deselect the corresponding checkbox. See **Fig. 14** for an example.



Fig. 14 - Section selection and visualization

This screen also offers the option of reporting station information based on IP-address or on MAC-address. It is also possible to disable chapter numbering, if required.

9.3 Adding company logo

If you want to add a company logo to every page, you can choose a file in one of these formats:

- .GIF (transparent GIFs not supported)
- .JPG, .JPEG, .JPE
- .BMP
- .WMF, .EMF

Choose 'Load' to select an image. Next you can select the alignment and scale of the image. Use the 'Clear' button to delete it from the report if you do not want to use it.

After you have generated the Report, use the You can also print it using

 $t \blacksquare$ on to save the Report directly to PDF.

10 Saving and loading

Netilities offers the ability to save all recorded network information into a file, and load it for later analysis.

10.1 Saving network information

When information has been read into Netilities, all information can be saved by choosing 'File – Save file...' and selecting a location. Then enter the filename and choose 'Save'. The file must have the extension .NDB.



Netilities will also ask to save information before exiting the program, if the information has not been changed or if the information has been changed since the last save.

10.2 Loading network information without active network interface

Loading a saved information file can be done by choosing 'File – Load file...' and choosing a saved .NDB file.

	Vetilities V1.4.0 - (C) 20:		
File	Action Interfaces	Options Help	
	Export livelist	h SNMP	
	Clear all		× +
	Load file	 Protocols 	Manufacturer
	Save file		
	Exit		

After loading, the following dialog appears to confirm correct loading of the information. The screen is put to 'Freeze' so that loaded information will stay on

screen as if it was real-time information. If you unfreeze the screen, the live list will turn yellow because the devices have not shown activity.

Netilities - (C) 2011-2013 PROCENTEC
File loaded OK. Display has been frozen.
ОК

10.3 Loading network information with active network interface

If a network interface is active when loading a .NDB file (i.e. live list is being updated), you will be prompted to save or discard the information the Netilities has captured so far.

You will also be prompted if you wish to disable the currently active network interface:

Confirm	
?	There are interfaces enabled, do you wish to disable them prior to loading?
	Yes No Cancel

If you choose 'No', then all loaded information will be added and merged to the currently captured network information. This may cause information conflicts (IP, device name).

If you choose 'Yes', the network interface will be disabled and you will only see the loaded information.

11 Processing a PCAP file

When a packet analyzer like Wireshark is used, you can save the captured packets into a file. This is called a PCAP file. With Netilities you are able to import and process the packets of a PCAP file. The packets are processed in a similar fashion as if they came from a network interface. Therefore the action can be found in the Interfaces menu.

File	Action	Interfaces	Options Help	1
Live	List Sta		e/disable interfa	ces
#	Info Ma	Proce	ss PCAP file	N ifa

The first step in processing a PCAP file is to select the file to process. Once the file has been selected you can start processing the file by clicking on the "Start" button in the dialog.

PCAP File:	D:\Data\temp\temp.pcap	
🗸 Use int	er-packet delay from file	
File statis	tics	
Number	of packets processed:	0
Current	state of file processor:	Idle

The information provided in File statistics is updated during processing. As the packets from the file are processed the Live List and statistics are also updated.

Vetilities V1.1.0 - (C) 2011-2012 PROCENTEC			G		2777	-		×
Live List Statistics SNMP								
								1
		1	- L-		1	1		
Info Mac Address Protocols 00:0E:8C:87:10:15 PROFINET	Manufacturer Siemens AG A&D ET	IP Address	Device Name	Device Model	Device Role	Vendor/Device ID	Last received packet 28-2-2012 9:11:47	^
2 00:0E:8C:AD:5E:90 PROFINET	Siemens AG A&D ET						28-2-2012 9:11:47	
3 00:30:DE:02:15:0C PROFINET	WAGO Kontakttechnik GmbH						28-2-2012 9:11:47	
4 00:A0:45:36:93:06 PROFINET	PHOENIX CONTACT GMBH & O						28-2-2012 9:11:47	
5 08:00:06:68:FE:6A PROFINET	SIEMENS AG						28-2-2012 9:11:47	
	1	✓ Use inter-pace File statistics Number of pace	ata (temp \temp \t	94 Active				*
No AppDong active Incoming: 16 Packets/s	Buffer OK							A V

Therefore the Live List shows the devices as if the packets came from a live installation.

When all the packets from the file are processed the file statistics show how many packets have been processed and that the processor is back in its idle state.

Vetilities V1.1.0 - (C) 2011-2012 PROCENTEC File Action Interfaces Options Help		6						
Live List Statistics SNMP								
TESS NAMA X								
# Info Mac Address A Protocols	Manufacturer	IP Address	Device Name	Device Model	Device Role	Vendor/Device ID	Last received packet	*
1 00:0E:8C:87:10:16 PROFINET	Siemens AG A&D ET						28-2-2012 9:12:09	
2 00:0E:8C:AD:5E:90 PROFINET	Siemens AG A&D ET						28-2-2012 9:12:08	
3 00:30:DE:02:15:0C PROFINET	WAGO Kontakttechnik GmbH						28-2-2012 9:12:09	
4 00:A0:45:36:93:06 PROFINET	PHOENIX CONTACT GMBH & CO						28-2-2012 9:12:08	
5 08:00:06:68:FE:6A PROFINET	SIEMENS AG						28-2-2012 9:12:09	
6 @8 E8:11:32:98:F8:27 IPv4	Samsung Electronics Co.,LTD	192.168.0.200					28-2-2012 9:11:52	
		Use inter-packet File statistics Number of pack Current state o Start		386 Idle Close				×
Vo AppDong active Incoming: 0 Packets/s	Buffer OK							*

To speed up the loading of a Wireshark-file, uncheck the 'Use inter-packet delay from file' checkbox. This will load all packets into Netilities immediately, otherwise the packets are loaded in the same speed as they have been recorded originally.

12 IP Configuration

To start the IP configuration, go to the menu: Interface -> IP Configuration. When you start the configurator, a popup box will appear, see **Fig. 15** (Windows XP) or **Fig. 16** (Windows 7).

Run As	X	
Which user account do you want to use to run this program?		
⊙ ⊆urrent user Protect my computer and data from unauthorized program activit	🛞 User Account Control	
This option can prevent computer viruses from harming your computer or personal data, but selecting it might cause the progr	Do you want to allow the following program from	
to function improperly.	J Program name: AutolpCfg.exe Publisher: Unknown File origin: Removable media on this computer	
User name; 🖸 Administrator 🔽 🛄		
Password:	Show <u>d</u> etails	<u>N</u> o
OK Cancel	Change when these notification	ns app

Fig. 15 - Popup in Windows XP



Please make sure the configurator is granted full administrator rights. If you cannot grant administrator rights to the configurator, due to restrictions on your laptop or PC, this function will not work.

When the configurator is started, there will be an icon in your Windows tray (2). Netilities will communicate with this application to configure your Ethernet interfaces.

When the configurator has been started, a window will pop up as shown in **Fig. 17**. In this window you can create new and modify existing profiles. You can also activate or deactivate them. When a profile has been activated, the selected Ethernet interface will adapt to the settings of the profile. An Active profile has a green circle in front of it; an inactive profile has a grey circle in front of it.

Profile name	Interface	IP Address	Netmask	Gateway	
Business network	Broadcom NetLink (TM) Gigabit Ether	DHCP			
Oil and Gas installation	Broadcom NetLink (TM) Gigabit Ether	192.168.100.250	255.255.255.0	192.168.100.1	
Packaging installation	Broadcom NetLink (TM) Gigabit Ether	10.0.0.200	255.0.0.0		
Wastewater installation	Broadcom NetLink (TM) Gigabit Ether	192.168.2.250	255.255.255.0	192.168.2.1	
Add profile	Delete profile			A <u>c</u> tivate profile	Deactivate profi

Fig. 17 - IP Configurator user interface

When adding a new profile, you have to enter a profile name and select which interface should be used for it. If you select DHCP, the IP Address, Netmask and Gateway can be left blank. If you don't select DHCP, you have to enter an IP address and Netmask. The Gateway is optional.

If you have created one or more profiles and you run Netilities on another laptop or PC, the profiles interfaces should be altered to the interfaces on the new system. A popup window will appear which allows you to fix the interface of each profile. The popup window is shown in **Fig. 18**.

Select alternative interface:				
Profile 'Oil and Gas	installation':			
DHCP Enabled:	No			
IP Address:	192.168.100.250			
Netmask:	255.255.255.0			
Gateway:	192.168.100.1			
Please select an alte	profile is not found on the system. ernative interface to use for this profile: TM) Gigabit Ethernet Driver			
,	_			
	ОК			

Fig. 18 - Select interface popup

When you close Netilities, all active profiles will be disabled and the original settings of your Ethernet interfaces will be restored.

NOTE: When you change the IP address of an interface, you have to refresh the interfaces' IP addresses in the interfaces window (menu: Interfaces -> Enable/Disable interfaces, then click Refresh).

13 Using ProfiTap

A characteristic of PROFINET is that in the data exchange telegram there is no distinction possible between controller and device telegrams when only sniffing is done using ProfiTap. This makes it impossible to determine certain information.

Normally the "Search for PROFINET devices" button in Netilities can be used to ask all PROFINET devices to identify themselves and to indicate which functionality they have. For this functionality telegrams need to be sent, which is not possible if you only have a ProfiTap.

Therefore it is possible to manually assign functionality to a certain MAC address/device. For the statistics visualization in combination with a ProfiTap, it is necessary to correctly assign the PNIO-Controller. To do this, click on a station in the Live List and then press the right mouse button. A popup will appear in which a functionality can be assigned to the device, see **Fig. 19**. These functionalities can be assigned to a device:

- Controller
- Device
- Multidevice
- Supervisor

	Net	tilities	V1.0.11 - (C) 201	11 PROCENTEC		di Tan Inda	-		PROFIN	T Munification	and and and			×
	ile .	Actio	n Interfaces (Options Help										
	Live I	List	Statistics SNMP											
	(10	12	2 # #	***										
	# 1	Info	Mac Address	Protocols	Manufact	urer	IP Addres	s	Device Name	Device Model	Device Role	Vendor/Device ID	Last received packet	
	1		00:0E:8C:87:10:1		NE Siemens A	IG A&D ET	192.168.0	0.1	pn-io				21-2-2012 15:29:21	
	2		00:0E:8C:AD:5E:9	A sector and		IO-Controller							21-2-2012 15:29:21	
	3		00:30:DE:02:15:0	4		IO-Controller IO-Device	12	0.3	device3g	WAGO-I/O-SYSTEM 750	IO-Device	011D/02EE	21-2-2012 15:29:20	
	4		00:A0:45:36:93:0		PHOE		8.0	0.5	device 1g	ILB PN 24 DI 16 DIO 16-2TX	IO-Device	0080/0004	21-2-2012 15:29:21	
	5		08:00:06:68:FE:6/		SIEM	IO-Multidevice							21-2-2012 15:29:22	
	6 1	98	E8:11:32:9B:F8:23	7 IPv4, IPv6	(Unkr	IO-Supervisor	8.0	0.200	ļ.				21-2-2012 15:29:06	
														*
S	N: 11	50600	1226 Incom	iming: 12 Packets/s		Buffer OK								

Fig. 19 - Assigning device roles in the Live List

IMPORTANT: There are different modes of operation & situations when doing Ethernet diagnostics, for using ProfiTap this is detailed in the next section.

13.1 Set-up

13.1.1 Only ProfiTap

- All telegrams can be seen, but no telegrams can be sent.
- If the startup procedure of the PNIO-Controller is not captured, the information visible is limited.
- A connection must be broken to insert the ProfiTap cabling
- Basically only a list of devices in data-exchange can be seen.
- Manually assigning functionality is needed.
- SNMP info can NOT be retrieved

Steps:

- 1. Connect ProfiTap to the USB port.
- 2. Start Netilities and select the Ethernet interface.
- 3. Connect the Ethernet cables.
 - Preferred location: On PNIO-Controller port.
- You have to manually assign a MAC address to a functionality: Controller, Device, Multidevice, Supervisor in order for the statistics to be visualized correctly.

13.1.2 ProfiTap + PC/Laptop connected to a free port on the PROFINET Switch

- All telegrams can be seen.
- Telegrams can be sent.
- (useful to identify all PROFINET devices & controllers, e.g. DCP functionality)
- A connection must be broken to insert the ProfiTap cabling
- SNMP information can be retrieved.

Steps:

- 1. Connect ProfiTap to the USB port.
- 2. Start Netilities and enable both Ethernet interfaces.
- 3. Connect the Ethernet cables.

Preferred location: The ProfiTap on the PNIO-Controller port and the PC on a free port of the switch.

14 Tutorial

This chapter contains some exercises to enhance the practical knowledge of Netilities. In order to do these exercises:

- it is required to connect Netilities, the PC it runs on, to a working installation with a PNIO-Controller that has at least two PNIO-Devices in Data Exchange.
- to have a tool with which configurations can be created or modified, and uploaded to the PNIO-Controller.

14.1 First steps

14.1.1 Assignment 1: First steps

- Insert the Netilities dongle in your PC.
- If Netilities is run for the first time on the PC, or the PC does not have Wireshark installed, install the WinPcap driver supplied with Netilities.
- Start Netilities from the dongle.
- Go to menu Interfaces -> Enable/disable interfaces.
- Select the interface that is connected to the PROFINET installation.

When the software is running, the Live List of the PROFINET installation should be visible.

- Check the Live List by switching the PLC ON/OFF.
- <u>Close Netilities when this assignment is ready.</u>

14.1.2 Assignment 2: Create a network drawing

- Create a drawing of the PROFINET network (finish it within 15 minutes). Remarks:
- Clearly indicate the location of the devices on the ports of the switch(es). If you want to know which device is on which port, just switch OFF a device and look at the LEDs on the switch.
- Register the MAC addresses of the devices.

14.1.3 Assignment 3: Assessment of the connected devices

- Start Netilities and enable the network interface.
- How many IO-Controllers and/or PNIO-Devices does the installation have?
- Does the Live List correspond with your drawing?

14.2 Netilities Live List

14.2.1 Assignment 4: Interpretation of the Live List colours

Fix each fault after a specific step

- Switch a PNIO-Device OFF or remove the PROFINET connector and investigate the Live List.
- Fix all faults after this assignment!

14.2.2 Assignment 5: Changing a device name

- Change the device name of a PNIO-Device while it is in Data Exchange. *Does this work?*
- Change the device name of a PNIO-Device in your configuration and use CAPITAL LETTERS and upload the new configuration to the IO-Controller.
- Investigate the Live List.
- Change the device name of the PNIO-Device to match the new configuration, but don't use the CAPITAL LETTERS. Investigate the Live List (don't forget to switch the PNIO-Controller OFF/ON).
- Is the device name case sensitive or not?
- Change the device name of a PNIO-Device to match another PNIO-Device and investigate the Live List (don't forget to switch the PNIO-Controller OFF/ON).
- Fix all faults after this assignment!

14.2.3 Assignment 6: Changing an IP-address

- Change the IP-address of a PNIO-Device while it is in Data Exchange. Does this work?
- Change the IP-address of a PNIO-Device and investigate the Live List (don't forget to switch the PNIO-Controller OFF/ON).
- Change the IP-address of a PNIO-Device to match another PNIO-Device and investigate the Live List (don't forget to switch the PNIO-Controller OFF/ON).
- Fix all faults after this assignment!

14.2.4 Assignment 7: Set to factory defaults

• Reset a device in the Live List. Observe the Live List and see what happens.

14.3 Netilities Statistics

14.3.1 Assignment 8: Current cycle time

- Investigate the Live List and check if your installation is running according to your configuration.
- Open the Netilities Statistics. When no devices are listed, click on the "Search for PROFINET devices" button.
- Select "Current cycle time, inputs / outputs (ms)" as the statistic.
- Investigate the statistics for each device and check whether or not the cycle times correspond with your configuration.

14.3.2 Assignment 9: Alarms

- Reset all the statistics.
- Select "Alarms, from device / controller" as the statistic.
- Investigate the statistics and check they all are 0 / 0.
- Generate an alarm event (Device lost, Pull/Plug alarm, Plug wrong module) and investigate the statistics.
- Check if the Live List shows a warning for this device. Read the Alarm in the Alarms window.
- Fix all faults after this assignment and check it with the Live List!

14.4 Netilities SNMP

IMPORTANT NOTE:

SNMP must be supported by all devices and it must be possible to retrieve a MAC-list and/or LLDP information.

14.4.1 Assignment 10: Station interface info

- Investigate the Live List and check if your installation is running according to your configuration.
- Open the Netilities SNMP.
- Start detection.
- Check if the results of the detection in the Station Interface info correspond with your network drawing.
- Check the system uptime of your PNIO-Controller.

14.4.2 Assignment 11: Topology detection

- Open the Topology detection.
- Expand all nodes.
- Check if the information displayed at the nodes corresponds with your network drawing.

15 Technical data Netilities Appdongle

To be defined.

16 Frequently asked questions

Why can't Netilities locate any network interfaces?

This probably is because the WinPCap Driver is not started. The easiest way to solve this is to uninstall the WinPCap Driver and to reinstall it again. This time making sure the checkbox "Start WinPCap upon Windows Startup" is checked at the last step before you press Install.

SNMP

SNMP Detecting devices remains at 0%

- This could be because of the TCP/IP settings of your network interface that is used to connect to the PROFINET switch. Check if a correct and free IP-address is configured for the interface, and it is in the same range as the PROFINET installation. An indication for this is the IP-range shown in Netilities is set to 0.0.0.0/255.255.255.0.
- The mirror port of the switch does not have the capability to send telegrams. In this situation Netilities is unable to retrieve SNMP information. This can be fixed by using a ProfiTap and connecting your PC to a free port on the PROFINET Switch, see chapter 8 "Using ProfiTap" for more information.

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SNMP Topology detection does not show a topology

This could be because of one or more switches that have not been assigned an IP-address. Most probably the PROFINET switch the Netilities PC is attached to. Check if a correct and free IP-address is configured for each switch in the installation, or check if it is a managed switch (a PROFINET switch).

Hardware requirements

Which USB version is supported? Netilities Appdongle supports high speed USB 2.0.

For the latest FAQ list check out our website!

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For the up to date list of the Sales Offices and Distributors see www.procentec.com/company/distributors/.

18 Products and spare parts

Component	Order code	Remarks
Netilities basic	39020	 USB Appdongle containing Netilities and license.
Profitap	513-00011A	 ProfiTap USB cable Hookup cable Software and drivers Manual

19 Glossary

CRC	Cyclic Redundancy Check.
CSV	Comma Separated Values. A file format frequently used for exporting information in an easy to understand format.
Data Exchange	The state of a PNIO-Device after parameterization and configuration has been completed, in which it cyclically exchanges I/O data with an IO-Controller. Normally the PNIO-Device stays forever in Data Exchange until the bus communication or device are stopped.
DIN	German Institute for Standardization (www.din.de).
Electromagnetic Compatibility	See EMC.
EMC	The extent to which an electric or electronic device will tolerate electrical interference from other equipment (immunity), and will interfere with other equipment. Within the European Community as well as in other countries it is regulated by law that electric and electronic components and equipment comply with basic standards such as IEC 61000-6-2 or IEC 61326 or corresponding individual product standards.
End Delimiter	This byte identifies the end of a PROFIBUS message and has a fixed value of 16 Hex.
FCS	See Frame Check Sequence.
Frame Check Sequence	It is a field in the PROFIBUS message that holds a checksum to check the integrity of the message. It is simply the sum of the bytes. Checksum = (DA + SA + FC + DU) mod 256. This is simply the bytes added together and divided by FF Hex (255). This is an integrated function that is normally performed by the PROFIBUS ASIC.
GSD file	Generic Station Description. It is provided by the device manufacturer and contains a description of the PROFIBUS or PROFINET device. GSD files provide a way for an open configuration tool to automatically get the device characteristics.
GSDML file	A GSD file based on XML. This is always used for PROFINET.
IRT	Isochronous Real Time.

Jitter	The cycle times may differ slightly from one to another. This phenomenon is called jitter . For PROFINET Jitter is the unwanted variation in the cycle time that could jeopardize real-time performance. For IRT communication the jitter must be less than 1 μ s, for all cycle times. For RT communication the jitter must be below 15% of the cycle time.
LAN	Local Area Network.
Live List	The Live List is a matrix that lists all the available devices. It is directly visible which devices are active, in data exchange and which devices are inactive. With different background colours, the status of the devices is displayed.
MAC address	Media Access Control address, a unique identifier assigned to network interfaces for communications on the physical network segment.
PCB	Printed Circuit Board.
PI	PROFIBUS International. The International PROFIBUS Organization based in Karlsruhe.
PNO	PROFIBUS Nutzer Organization. The German PROFIBUS Organization based in Karlsruhe.
ProfiTap	ProfiTap Industrial is an interface to perform monitoring on PROFINET networks.
SNMP	Simple Network Management Protocol (SNMP) is an Internet-standard protocol for managing devices on IP networks.
Switch	A computer networking device that connects network segments.
Topology	In a communications network, the pattern of interconnection between network nodes; e.g. bus, ring, star configuration.
WinPcap	WinPcap is the industry-standard tool for link-layer network access in Windows environments: it allows applications to capture and transmit network packets bypassing the protocol stack, and has additional useful features, including kernel- level packet filtering, a network statistics engine and support for remote packet capture.
WLAN	Wireless LAN.
XML	eXtensible Markup Language.



20 About PROCENTEC

PROCENTEC is a specialist in PROFIBUS and PROFINET technology and develops products to optimize the production processes of end users. Our innovative solutions ensure that our customers successfully operate in the world of industrial automation and enjoy maximum results from their process.

PROCENTEC globally supplies all the components required to install a measurable and steerable network. We develop and produce all products in the Netherlands and they are exported through our worldwide distribution network. At PROCENTEC, we have a professional team of qualified support engineers who provide technical support on-site and online. Our professionals have more than 20 years of experience with PROFIBUS and PROFINET technology. They provide the necessary support to end users during implementation procedures, certification processes, audits and malfunctions. PROCENTEC also is the international accredited Competence and Training centre for PROFIBUS and PROFINET. We provide training courses that help employees using those techniques optimally for their business objectives.

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- PROFIBUS training courses
- PROFINET training courses
- Product training courses



21 Certificates



certificate

Date of original approval10-02-2003Date of issue10-04-2013Valid until10-02-2016Certificate numberNL 6313uk

On behalf of Stichting QualityMasters,



N.B. The failure to meet the conditions as set forth in the certification agreement, or non-compliance with the given standard and/or guidelines, may lead to the suspension or cancellation of the certificate. This certificate remains the property of Stichting QualityMasters, Nieuwland Parc 157, 3351 LJ Papendrecht.

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This authorization is valid until December 31, 2014.

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Board of PROFIBUS Nutzerorganisation e. V.

P. Lind

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22 Revision History

Version 2.0

- Updated screenshots to the latest version of Netilities
- Added chapter 'Bargraph'
- Added chapter 'Saving and Loading'
- Updated chapter 'Sales offices and Distributors'

Descriptions for new functionality:

- Freeze button
- Buttons in Topology Scan to easily expand and collapse the tree
- MAC-address sorting method for statistics and Bargraph
- Webbrowser-button to easily navigate to the webpage of a device
- Import feature for GSDML-files
- Acyclic reading of info from PN-devices (I&M. configuration etc.)

Version 2.1

NEW chapter 'Reporting'. Some minor textual changes. Changes for Word processor version compatibility issues.

Version 2.2

- New paragraph 'Main window notification bar' in paragraph 4.4
- Updated paragraph 4.1 'Adding Netilities to the installation'
- Updated paragraph 5.4 'Acyclic information'
- Updated paragraph 8.3 'Topology detection'
- Updated chapter Fout! Verwijzingsbron niet gevonden. 'Certificates'

Version 2.3.0

- Updated chapter 'Live List'
- Updated chapter 'Tutorial'
- Updated chapter 'Processing a PCAP file'
- Updated some Tutorial assignments
- Minor textual changes
- Updated some screenshots to the latest version

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23 Next versions

• Update all screenshots to the latest version

24 Notes



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