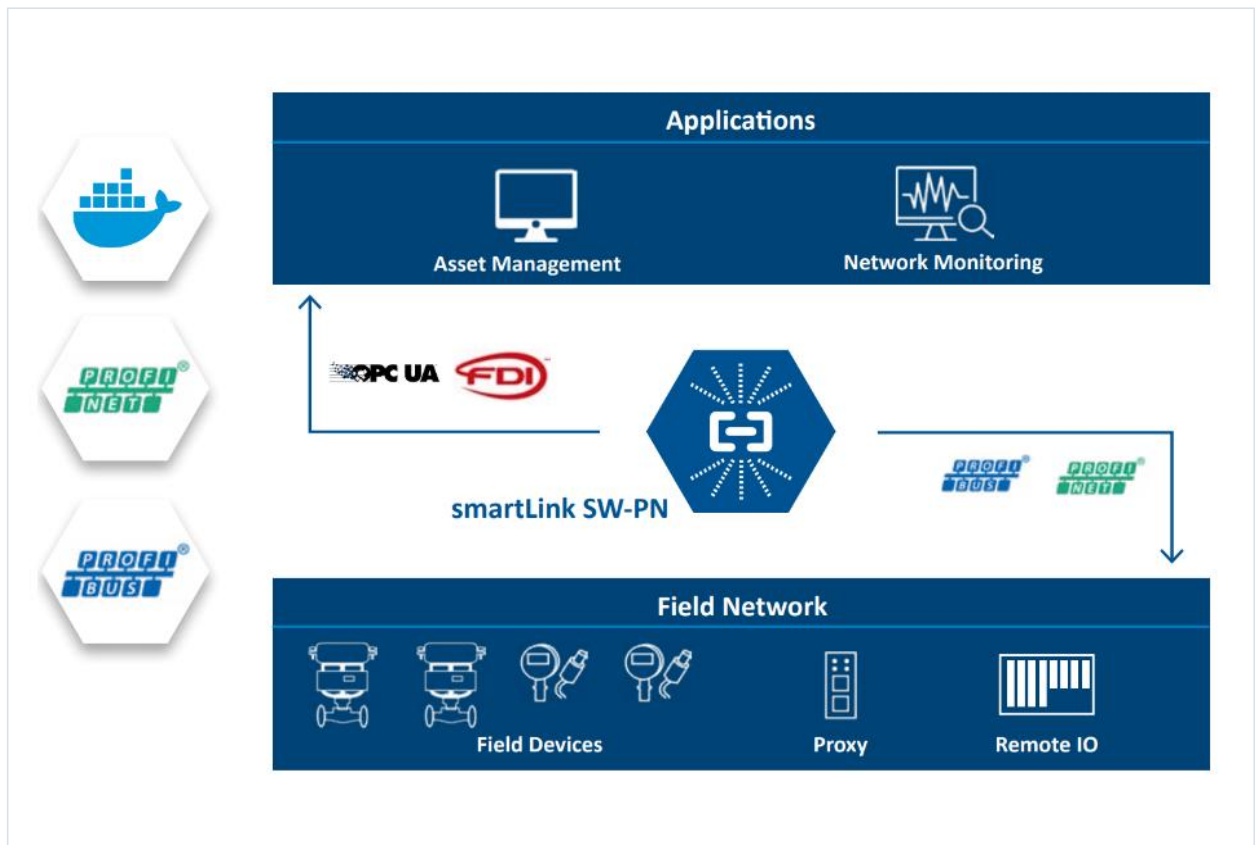


User Guide

smartLink SW-PN



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The information contained in these instructions corresponds to the technical status at the time of printing of it and is passed on with the best of our knowledge. Softing does not warrant that this document is error free. The information in these instructions is in no event a basis for warranty claims or contractual agreements concerning the described products, and may especially not be deemed as warranty concerning the quality and durability pursuant to Sec. 443 German Civil Code. We reserve the right to make any alterations or improvements to these instructions without prior notice. The actual design of products may deviate from the information contained in the instructions if technical alterations and product improvements so require.

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Scan the QR code to find the latest documentation on the product web page under Downloads.

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1 About this guide

1.1 Read me first

Please read this guide carefully before using the device to ensure safe and proper use. Softing does not assume any liability for damages due to improper installation or operation of this product.

This document is not warranted to be error-free. The information contained in this document is subject to change without prior notice. To obtain the most current version of this guide, visit the [product website](#).

1.2 Target audience

This guide is intended for experienced operation personnel and network specialists responsible for configuring and maintaining field devices in process automation networks. Any person using a smartLink SW-PN must have read and fully understood the safety requirements and working instructions in this guide.

1.3 Typographic conventions

The following conventions are used throughout Softing customer documentation:

Keys, buttons, menu items, commands and other elements involving user interaction are set in bold font and menu sequences are separated by an arrow

Open **Start** → **Control Panel** → **Programs**

Buttons from the user interface are enclosed in brackets and set to bold typeface

Press **[Start]** to start the application

Coding samples, file extracts and screen output is set in Courier font type

MaxDlsapAddressSupported=23

Filenames and directories are written in italic

Device description files are located in C:
 \<Application name>\delivery\software\Device
 Description files



CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in damage or injury.



Note

This symbol is used to call attention to notable information that should be followed during installation, use, or servicing of this device.



Hint

This symbol is used when providing you with helpful user hints.

1.4 Document history

Document version	Changes since last version
1.00	▪ first version

1.5 Related documentation

The following link directs you to additional product information:

<https://industrial.softing.com/products/docker/smartlink-sw-pn.html>

1.6 Document feedback

We would like to encourage you to provide feedback and comments to help us improve the documentation. You can write your comments and suggestions to the PDF file using the editing tool in Adobe Reader and email your feedback to support.automation@softing.com.

If you prefer to write your feedback directly as an email, please include the following information with your comments:

- document name
- document version (as shown on cover page)
- page number

2 About smartLink SW-PN

The smartLink SW-PN is a software solution for accessing PROFINET communication systems via OPC-UA.

2.1 Intended use

Using standardized technologies like FDI (OPC UA), smartLink SW-PN can be used to manage your network assets and configure and monitor network devices, including device identification, health, diagnostics, and process data.

2.2 Features and benefits

- Parameterization, Plant Asset Management and Process Data Provision using Standard Industry Tools
- Independent of configuration tools
- Centralized and time-saving parameterization of PROFINET and PROFIBUS field devices directly from the control room
- Access from Plant Asset Management applications for field devices configuration
- Ethernet Access Point to PROFINET networks
- Provides 2nd channel to access the field devices
- Acts as a PROFINET supervisor
- Support of multiple PROFINET networks
- Needs only standard Ethernet (UDP) connection to the PROFINET networks
- Key Component for Transition to State-of-the-Art Technology
- Re-use of existing PROFINET networks without requiring modification
- Access to acyclic data via FDI communication server (OPC UA)

2.3 System requirements

To parametrize PROFINET devices with your smartLink SW-PN you will need an asset management application.

2.4 Technical data

Supported Communication Protocols	PROFINET, PROFIBUS FDI communication server (OPC UA)
Supported PROFINET/PROFIBUS Proxies	Softing: pnGate PA, aplSwitch Field PA
Minimum Hardware Requirements	Docker Container: 200 MB free disk space, 500 MB RAM Virtual Machine: VMware 3 GB free disk space, 2 GB RAM Hyper-V 5 GB free disk space, 2 GB RAM
Licensing	Node locked license for Docker container

2.5 Software interfaces

2.5.1 OPC UA

The smartLink SW-PN has an OPC UA server integrated. This server implements the TCP based binary OPC UA protocol and allows OPC UA clients to connect to it.

2.5.2 FDI communication server

The FDI communication server supports both PROFINET (FCG_TS62769-103-4) and PROFIBUS (FCG_TS62769-103-1) profiles.

The OPC UA server of the smartLink SW-PN complies with the OPC 30080-7 / FCG TS62769-7 specification V1.3 "FDI Communication Devices". This specification can be found on the FieldComm Group web page (www.fieldcommgroup.org) and for download on the OPC Foundation web page (www.opcfoundation.org).

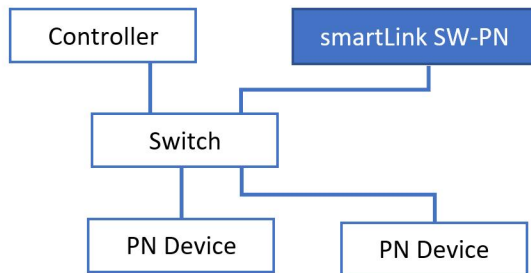
An example of an FDI communication client written in Python is available at: <https://github.com/SoftingIndustrial/FDICommClient>.

3 Installation

The smartLink SW-PN product can be installed in two ways. You can either use the virtual machine images for download from the [product website](#) or install the Docker image directly on a Docker enabled system.

3.1 Network architectures

This Section describes the use of smartLink SW-PN in the network.



The smartLink SW-PN is connected to the control network below the controller and has direct access to the PROFINET network and PROFINET devices.

3.2 Software installation

3.2.1 Docker container

The smartLink SW-PN docker image is available on Docker Hub (<https://hub.docker.com/r/softingindustrial/smartlink-sw-pn>) or as download from the [product website](#).

You can pull the image from Docker Hub with the following command:

```
docker pull softingindustrial/smartlink-sw-pn
```

To create and configure Docker container you can use the following commands:

```
mkdir -p /var/lib/smartLinkSW-PN
docker create --name smartlink-sw-pn -p 80:80 -p 443:443 -p 4840:4840 -p
49152:49152/udp -p 49154:49154/udp -v /var/lib/smartLinkSW-
PN:/var/lib/smartLinkSW-PN --restart=always softingindustrial/smartlink-sw-
pn
```

The following ports are used by smartLink SW-PN:

Port	Service
80	HTTP Web Server
443	HTTPS Web Server
4840	OPC UA Server
49152	PROFINET Controller (UDP)
49154	PROFINET Supervisor (UDP)

These ports are mapped in the docker create call above 1:1 to the ports of the host system. Of course, you can map them to different ports on the host system by changing the first number on the -p option (example: -p 1443:443).

To disable HTTP or HTTPS you can call the docker create call without port mapping for port 80 or 443.



Note

You will need access to the Web server to configure the smartLink SW-PN.

smartLink SW-PN creates outgoing TCP connections to the controller or remote I/O devices using the default PROFINET ports 49152/49154 and ports 5000/5001.

The directory `/var/lib/smartLinkSW-PN` is used to persist the configuration of the smartLink SW-PN container. Of course, you can store it in a different folder on the host system by changing the first folder on the `-v` option (example: `-v /home/xxx/sl:/var/lib/smartLinkSW-PN`).

If you have more than one network card, the communication over PROFINET has to be assigned to a network card. You must add the environment variable `PNS_INTERFACE_NAME` with the name of the interface (example: `-e PNS_INTERFACE_NAME='ens192'`).

The option `--restart=always` will start the container on the startup of the system or restart it on failure. With the following command you can start the container:

```
docker start smartlink-sw-pn
```

With the following command you can stop the container:

```
docker stop smartlink-sw-pn
```

With the following command you can remove the container:

```
docker rm -f smartlink-sw-pn
```

Please refer the official Docker documentation for more Details on the Docker command line.

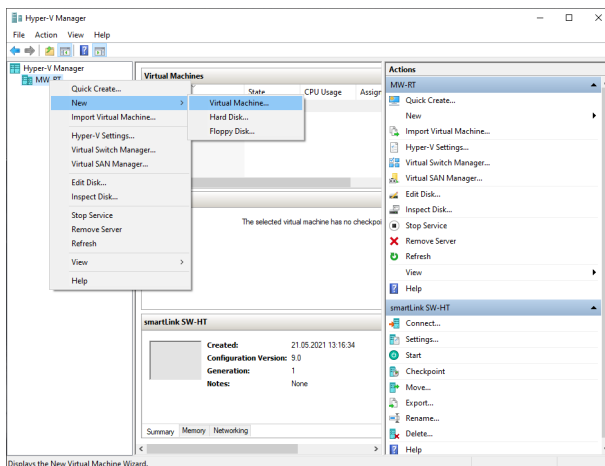
3.3 Virtual machine image

This Section describes the installation with VMware Workstation Pro, VMware Player, VMware ESXi and Hyper-V for Windows 10 Professional. The Virtual machine images should only be used if you run smartLink SW-PN on a Windows machine.

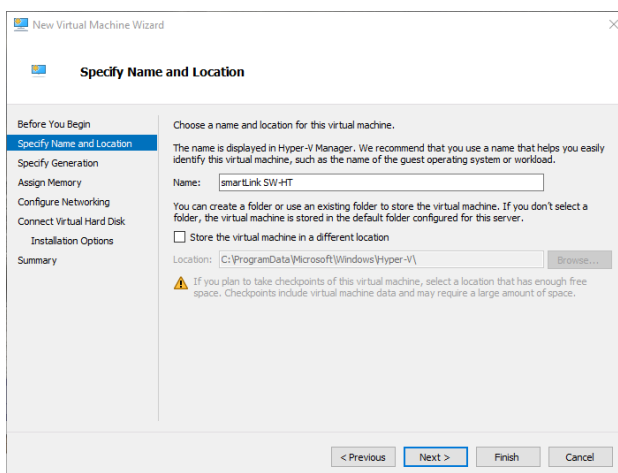
3.3.1 Hyper-V

If you are using Windows 10 Professional or another version of Windows follow these steps to install Hyper-V:

1. Create the folder **smartLink SW-PN** in the directory *This PC\Documents\Hyper-V\Virtual Hard Disks*.
2. Download the **smartLink_SW-PN_HyperV_V1.02.zip** file from the [product website](#) and save it in the created folder.
3. Unzip the file to the folder and delete the zip file.
4. Start the Hyper-V Manager application.
5. Select the **Action → New → Virtual Machine**.



6. Enter **smartLink SW-PN** as the name of your virtual machine.
7. Select the location where you want to store the VM and click **[Next]**.



8. Choose **Generation 1** and click **[Next]**.
9. Enter **2048 MB** in the **Startup memory** input field, disable **Use dynamic memory** and click **[Next]**.

10. Choose **Default Switch** from the **Connection** dropdown and click **[Next]**.
11. Select the radio button **Use an existing hard disk** and **[Browse]** to the location of the extracted **Debian.vhdx** file and click **[Finish]**.

Now you are ready to start the virtual machine and use smartLink SW-PN. If you want to access the Linux console you have to connect to the virtual machine by selecting **Connect...** in the Action menu.

3.3.1.1 VMware Workstation / Player



Note

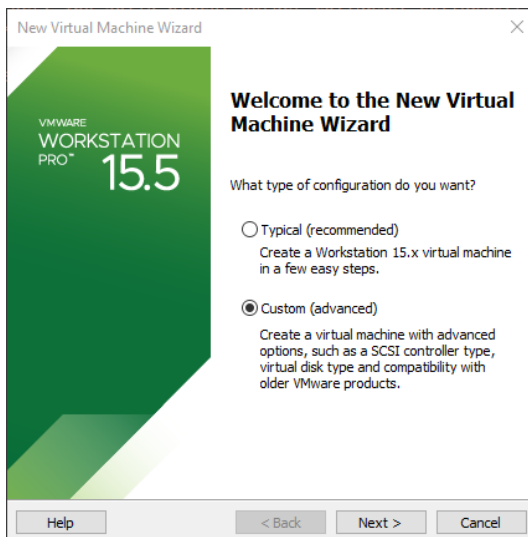
smartLink SW-PN supports only V10 or later of VMware Workstation Pro and VMware Player.

1. Create the folder *smartLink SW-PN* in the directory *This PC\Documents\Virtual Machines*.
2. Download the the latest software version contained in the *smartLink_SW-PN_VMwareV1.02.zip* file from the Softing download area and store it in the created folder.
3. Unzip the contents of the zip file to the folder.
Then delete the zip file.
4. Start the VMware Workstation Pro or VMware Workstation Player application.

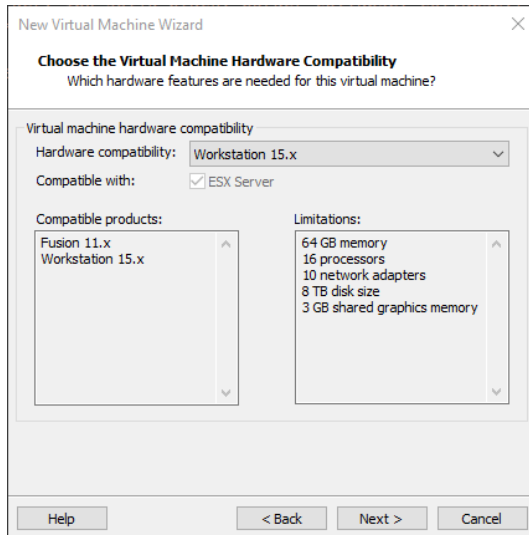
Workstation Pro

If you are using **Workstation Pro**:

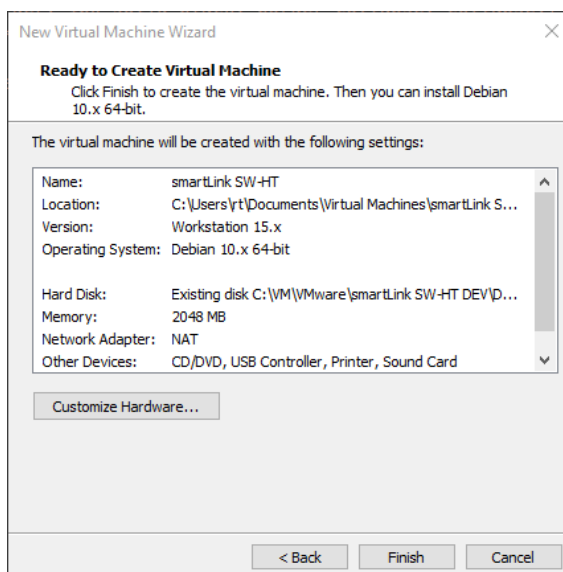
1. Select **File → New Virtual Machine**.
2. Select **Custom (advanced)** and click **[Next]**.



3. Select the hardware compatibility and click **[Next]**.



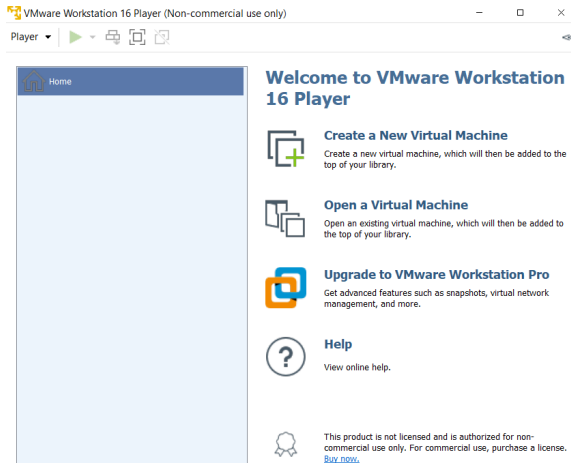
4. Select the Guest Operating System Installation and accept the option **I will install the operating system later**.
5. Select **Linux → Debian 10.x 64-bit** as your guest operating system.
If you cannot select the Debian 10 take the highest Debian number with 64 bit.
6. Enter the smartLink SW-PN as the name of your virtual machine and click **[Next]**.
7. Enter **1** for **Number of Processors**, and **1** for **Number of cores per processor** and click **[Next]**.
8. Enter **2048 MB** for **Memory for this virtual machine**.
9. Select **Use network address translation (NAT) → LSI Logic → SCSI** in the next three setup wizards.
10. Select **Use an existing virtual disk** in the Select a disk window.
11. Select the extracted **Debian.vmdk** file in the Select a disk window.
12. Check the summary of your settings and click **[Finish]** if you want set up a virtual machine based on these entries.



Workstation Player

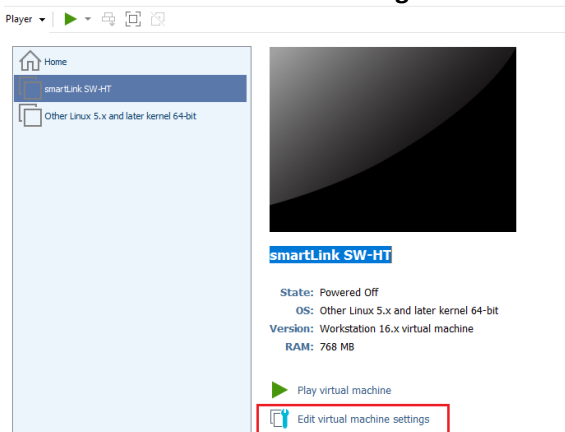
If you are using **Workstation 16 Player**:

1. Select **Create a New Virtual Machine**.



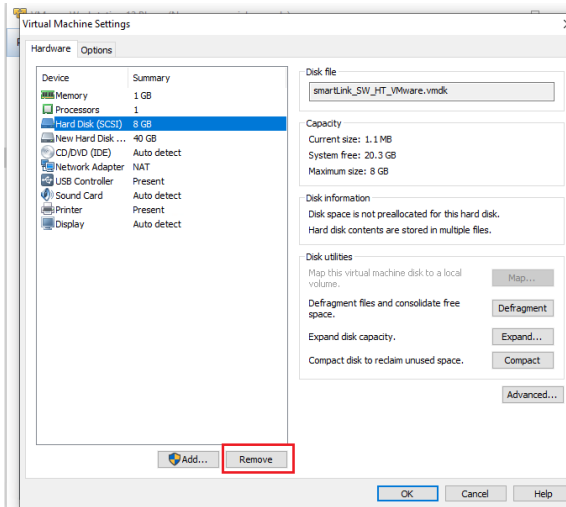
2. Choose **I will install the operating system later** and click **[Next]**.
3. Select **Linux → Other Linux 5.x kernel 64-bit**.
If you cannot select version 5.x take the highest number with 64 bit and click **[Next]**.
4. Enter the smartLink SW-PN as the name of your virtual machine, select the path where the smartLink SW-PN .vmdk file is located and click **[Next]**.
5. Enter 20 GB as the **maximum disk size** and select **Store virtual disk as a single file**.
6. Check the summary of your settings and click **[Finish]** if you want set up a virtual machine based on these entries.
The newly created virtual machine opens.

Select **Edit virtual machine settings**.



7. Click **[Add..]** in the Add Hardware wizard.
8. Select **Hard Disk → SCSI → Use an existing virtual disk → Browse**.
9. Select the extracted **Debian.vmdk** file and click **[Finish]**.

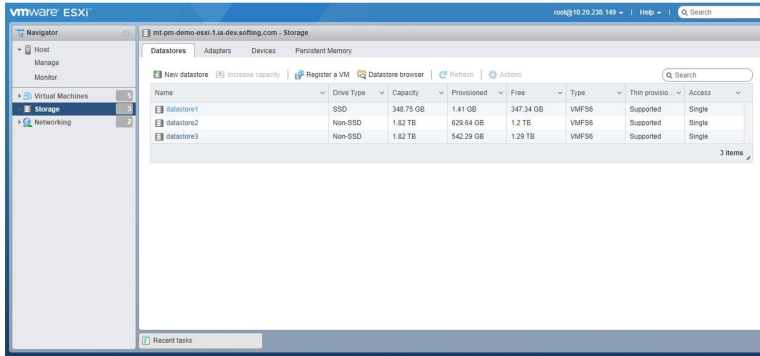
10. After linking to the smartLink SW-PN virtual hard disk remove the default hard disk.

**Note**

Now you are ready to power on the virtual machine and use smartLink SW-PN.

3.3.2 VMware ESXi

1. Connect to the administration web page of your ESXi server.
2. Select the **Storage** menu in the navigator and open the **Datastores** tab.
3. Create a directory named **smartLink SW-PN** for one of your datastores and a *temp* sub-directory in your smartLink SW-PN.



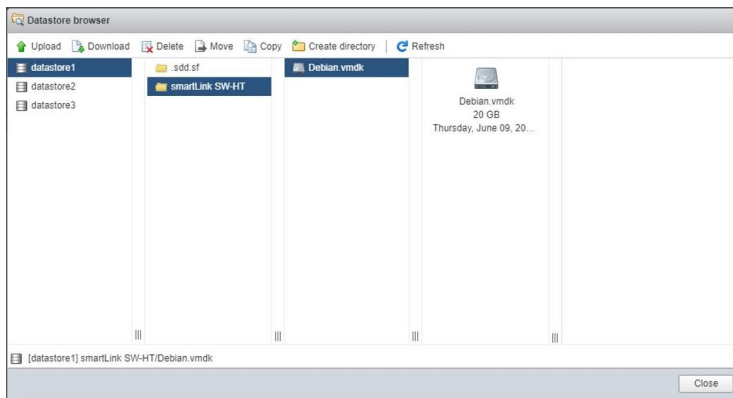
4. Download the latest software version contained in the **smartLink_SW-PN_VMwareV1.02.zip** file from the Softing download page and upload the contained *.vdmk* files to the created folder.
5. Select the *Debian.vmdk* file in the *temp* folder and right-click your mouse to copy and paste it to the **smartLink SW-PN** folder.



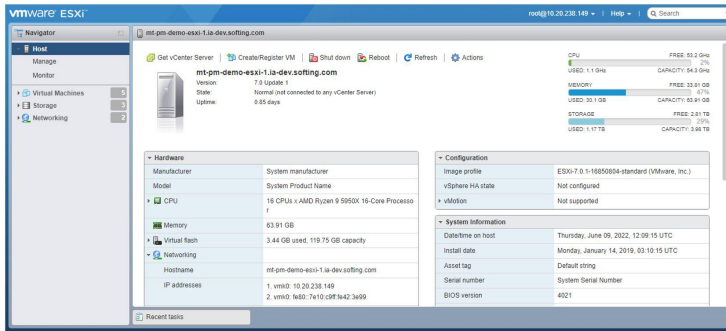
Note

This copy action in the Datastore browser is needed to convert the disk file to the correct format.

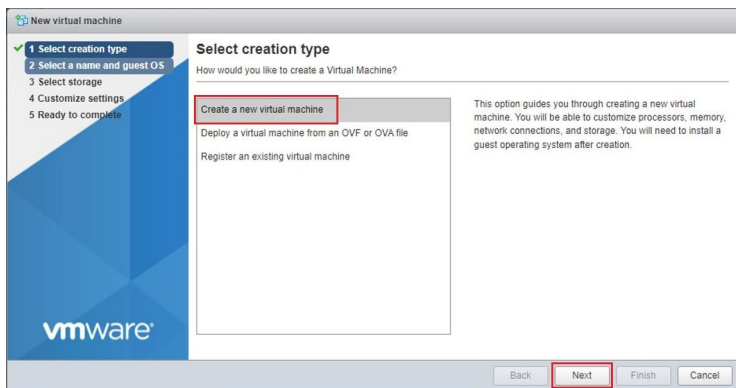
6. Select the *temp* folder and right-click to delete it.



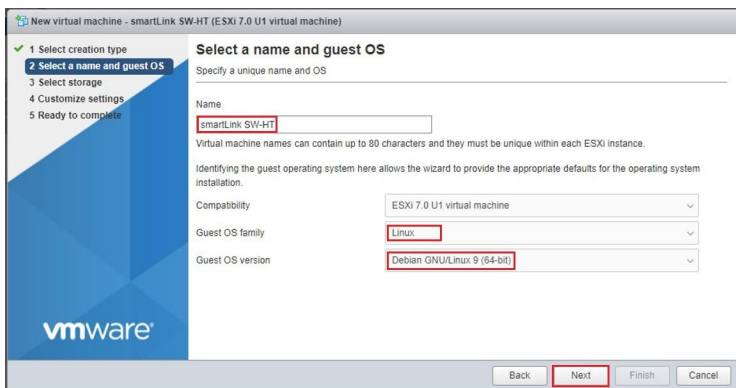
7. Select the **Host** menu in the navigator and click **[Create/Register VM]** to create the virtual machine.



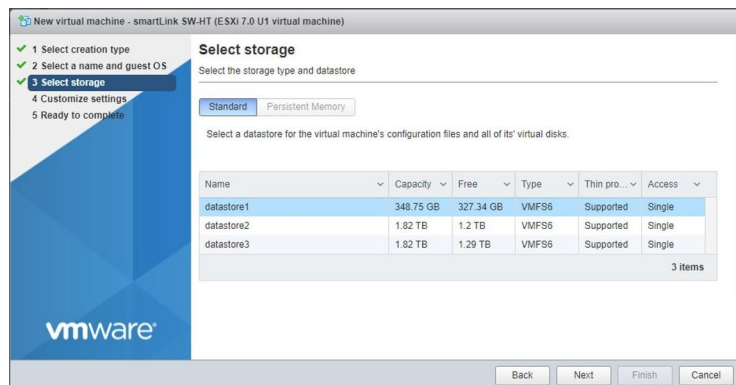
8. Select **[Create a new virtual machine]** and click **[Next]**.




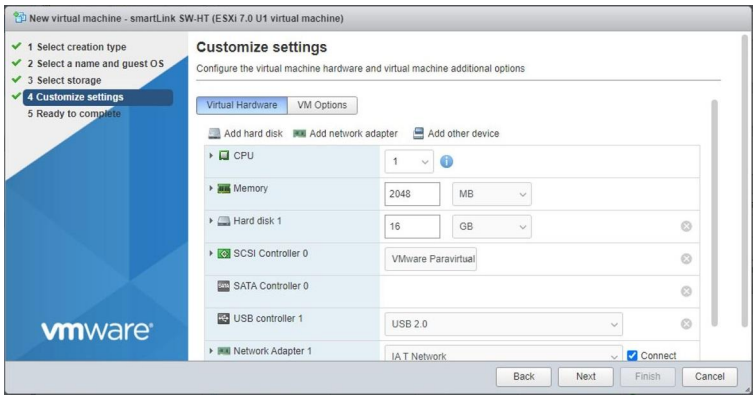
9. Insert *smartLink SW-PN* as name, select **Linux** and **Debian GNU/Linux 9 (64-bit)** in the dropdown menus and press **[Next]**.



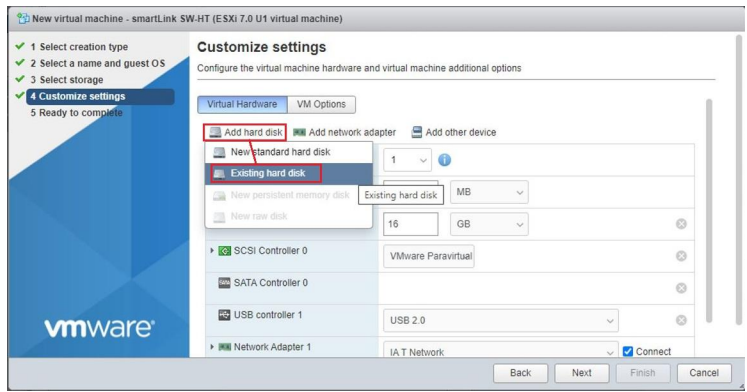
10. Select the datastore to which you copied the disk files previously and click **[Next]**.



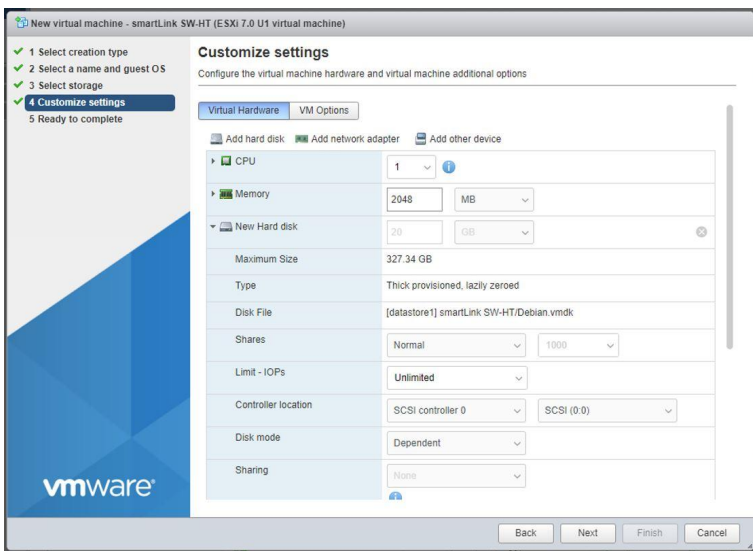
11. Press the  icon to remove **Hard disk 1**.



12. Select **Add hard disk** → **Existing hard disk** and select the copied *Debian.vmdk* in the datastore browser dialog.



13. Now you have the **New Hard disk** in the settings. Ensure that the **Controller location** is set to **SCSI (0:0)**.



14. Press **[Next]** and **[Finish]** to complete the installation.

3.3.3 Good to know

- **After VM import**

After the import of the VM you should change the default passwords and the host name in the user interface of the virtual machine.

Default User	Default Password
root	Softing1!
softing	Softing1!

- **Finding the hostname or IP address of your smartLink SW-PN**

The IP address and hostname are printed in the Linux console window on startup. If you installed the Hyper-V VM and are using the Default Switch you can use the hostname *smartlink-sw-pn.mshome.net* to access the IP interfaces of smartLink SW-PN.

- **Accessing smartLink SW-PN outside of the VM host**

To get access to the interfaces of smartLink SW-PN from outside the host running the VM you must change the network type of the VM.

VMware

Change the network connection in the Network Adapter settings to **Bridged**.

Hyper-V

Create a new virtual switch which is connected to an external network. Change the virtual switch in the Network Adapter settings to this switch.

- **Adding a second network card**

To add a second network card you first have to add it to the VM in the settings of VMware or Hyper-V and connect it to the correct network. In addition, you must configure the network settings in the user interface of the virtual machine.

- **Starting smartLink SW-PN with Windows system**

Hyper-V

Select *Always start this virtual machine automatically* in the *Automatic Start Action* of the virtual machine settings.

3.4 Commissioning

smartLink SW-PN comes with an integrated web server which is used to configure the software.

3.4.1 Prerequisites

- The smartLink SW-PN is connected with a PC which runs a Chrome, Microsoft Edge or Firefox web browser supporting JavaScript.

3.4.2 Login to user interface

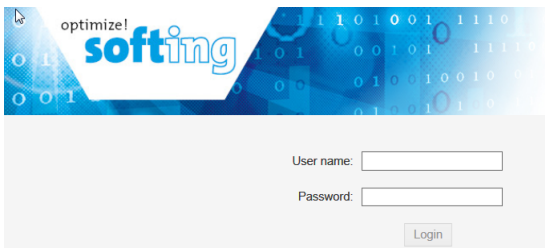
1. Open your Internet browser and enter the IP address of the smartLink SW-PN.



Note

If you are using VM images and you can't recall the IP address, open the VM console window to get the IP address.

2. Enter **administrator** in the user field and enter **SLadmin!1** in the password field.



The web-based interface opens with the information page.

3.4.3 Configuring PROFINET

See Section [PROFINET](#)³⁶ in Chapter *Working with the user interface* for more details.

4 Security

The smartLink SW-PN is installed in level 0 of the Purdue reference model.

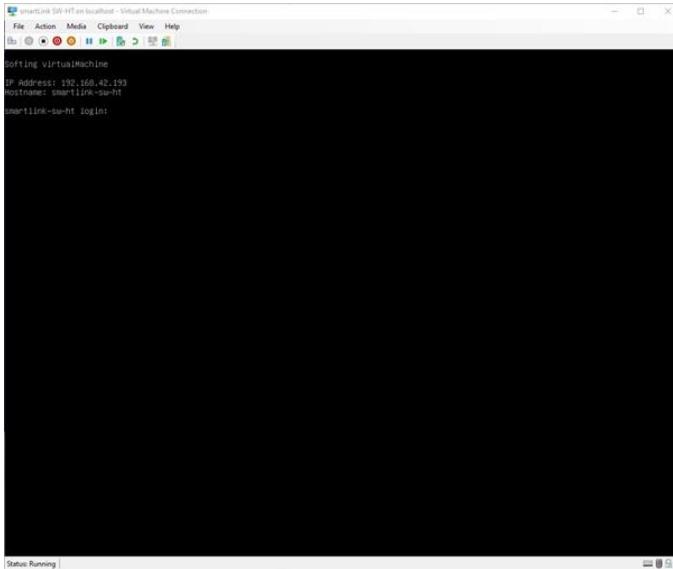
It must have IP access to the level 0 PROFINET network segments. The north-side is providing Software interfaces for asset management applications running in level 3.

smartLink SW-PN north-side Ethernet services

Service	Port	Description
OPC UA	4840 TCP	OPC UA Server Only this port of the device should be accessible from level 3
HTTP	80 TCP	HTTP Server of integrated web server
HTTPS	443 TCP	HTTPS Server of integrated web server

5 Configuration

smartLink SW-PN comes with an integrated web server which is used to configure the software.



5.1 User interface



Note

See Section [Log in to user interface](#)²⁰ for details on how to access the interface.

5.1.1 General functions

All interface windows display these functions:

Logout

Select this function to log out as an active user.

Auto logout

This default setting logs out the current user from the web server if it has been inactive for 10 minutes.

5.1.2 Information

The **Information** window shows product-related information. See the pages **System**, **License** and **About** for details.

smartLink		Information	Settings	Diagnosis	OPC UA	PROFINET
Views	Software / System					
	System	Software Version	1.02.00.27650			
	License	System ID	smartLink SW-PN			
	About	Host ID	#c0144d56-227d-bbf7-68c8-51a75a5b57ea#			

5.1.2.1 System

Select **Information** → **System** to view the hardware and software details of your device.

Parameter	Meaning
Software Version	Version number of the software
System ID	Device model
Host ID	This is the ID you will need to request a licence.

5.1.2.2 License

Select **Information** → **License** to view the licenses used by the gateway firmware under an [open source license](#).

5.1.2.3 About

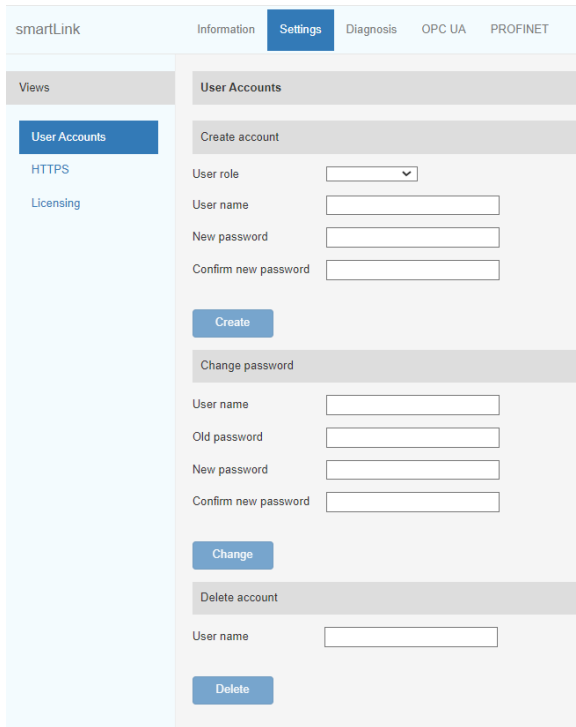
Select **Information** → **About** to show information about Softing and other useful information.

5.1.3 Settings

5.1.3.1 User accounts

In this section you will learn how to change accounts and passwords.

1. Select **Settings** → **User Accounts**.
As **administrator** you can create and delete user accounts and also change passwords.



2. Select a user role in the dropdown menu, assign a user name and enter a **New password** in the corresponding fields.
3. Retype the password in the **Confirm new password** field and click **[Create]** to save the user and password settings.

Password rules

A password must contain between eight and 128 characters, including at least 1 lower case letter, 1 upper case letter, 1 number and 1 special character: !"#\$%&'()*+,-./:;<=>@[\\]^_`{|}~

Changing the password

1. Enter the user name of the account for which you want to change the password.
2. Enter the **Old password**.
3. Enter the **New password**.
4. Retype the password in the **Confirm new password** field and click **[Change]** to save the new password settings.

Deleting an account

1. Enter the user name of the account which you want to delete.
2. Click **[Delete]** to erase the account settings and all remove the user.

The following table shows the user roles and corresponding permissions:

Permission	Administrator	Maintenance	Observer
Create and delete accounts	<input checked="" type="checkbox"/>		
Change all passwords	<input checked="" type="checkbox"/>		
Change own password	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Configuring gateway	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Reading configuration	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reading diagnostics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



Note

The user role *Diagnostic* is not required for daily operations. It is reserved for internal purposes such as troubleshooting. Softing Support may ask you to add a user with this role to obtain more details of your smartLink SW-PN.

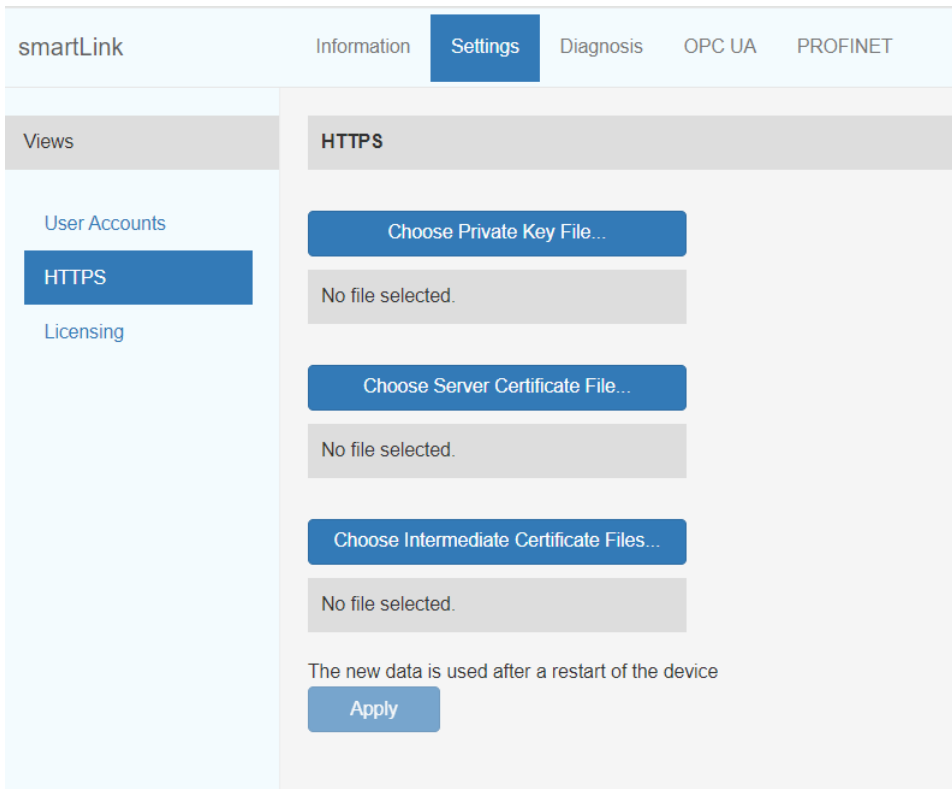
5.1.3.2 HTTPS

If you access the device on an HTTPS connection, make sure a trusted certificate is used. You can check easily if the IP address of your gateway is secured by a certificate. Most web browsers typically display a padlock icon in the address bar to indicate that a secured HTTP connection is used. Click on the icon to find out which type of security and certificate is used.



Note

You need to be logged in as [administrator](#)²⁴ to change the HTTPS settings.



Parameter	Meaning
Choose private key file...	Install the private key file, containing the private key, generated simultaneously with the certificate signing request.
Choose server certificate file...	Install the server certificate file.
Choose Intermediate Certificate Files...	Optional for installing necessary intermediate certificate files.
Apply	Click button to activate your settings.



Note

If you change the settings you must restart the gateway.



Note

If you are experiencing problems with certificates, please update your web browser first with the most recent version before contacting Softing support.

**Note**

As your web browser might use cached data, please refresh the browser after rebooting the gateway.

Generating a self-signed certificate

To generate a self-signed certificate for the HTTPS server login to the console of the VM follow these steps:

1. **Enter** `./generate-HTTPS-cert.sh`
2. **Restart** the VM by entering: `systemctl reboot`
3. **Open** the Chrome browser and connect to the URL `https://<IP address of the VM>`. A security exception is shown in the browser.
4. **Save** the certificate as a file and install the certificate file in the Trusted Root Certification Authorities store of your Windows Explorer. Next time you restart the browser and open the URL you will be able to connect without an exception.


5.1.3.3 Licensing

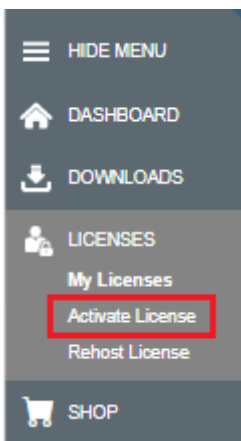
Licenses are needed for PROFINET Device Support by any Asset Management Tool to parameterize and monitor PROFINET devices and to retrieve process data and diagnosis data via OPC UA. Each license is tied to one PROFINET slave and can be used for Asset Management and for OPC UA at the same time.

You will most likely have purchased your smartLink SW-PN with one or more PROFINET licenses installed. You will need a license for each field device to which you wish to connect over the PROFINET network. A license is a unique key tied to the serial number of your gateway. It cannot be migrated or run on another smartLink SW-PN.

If your smartLink SW-PN has no license or you wish to connect to more PROFINET devices than previously licensed, please contact Softing Support.

How to activate a license

1. Go to the Softing Industrial website and click the  icon in the upper right corner to register yourself or select this [My Softing Portal](#) link. When you are registered and logged in you are directed to the **My Softing Dashboard**.
2. Select **Licenses** → **Activate License** in the side menu.



3. Enter the license key from your License Certificate in the license key input field. You will find the license key on the certificate you have received by email.

Activate License

Please enter your License Key and your Host ID. If you want to get notified in case of new releases, just check enable release info.

Host ID examples:

```
BIOS: VMware, Inc. - INTEL - 6040000 |BIOSVMware-564d0191cbe2387-8dc837c83d10ec97  
1cf54d56-ce98-3b8a-8a78-125e434699d9  
#bd984d56-dc7e-7e47-f262-bfa8d585af0e#  
#10-06-71-43-01-CB#123E#0B5ACDE9#
```

License Key

12345-ABCDE-67890-FGHIJ

Host ID

Enable Release Info

Activate License

Cancel

4. Select **Information** → **System** ²³.
5. Highlight and copy the Host ID from the Device/System table.
6. Paste the Host ID into the **Host ID** field of the Activate License form.
7. Click **[Activate License]**.
A license file is generated.
8. Click **[Download]** to save the license file to your PC.



Note

The license file is assigned to the device and can therefore only be used with this device.

How to install a license

To install a license file follow these steps:

1. Select **Settings** → **Licensing** in the side bar navigation.

Name	Version	Options	End date	Description	Status
PROFINET Device Support	2	"10"	unlimited		not installed

2. Click the **[Choose License File]** button.
Windows Explorer (file explorer) will open.
3. Go to the directory to which you have saved the file.
4. Select the license file and click **[Open]** in Windows Explorer.
The license file is now shown under the **[Choose License File]** button.
5. Click the **[Install]** button.
When the license has been installed, the following message appears at the bottom of the window.

Update License Info 1055: The license has been successfully updated.

In the Licensing window, the table entries for PROFINET Device Support will have changed.

Licensing

Name	Version	Options	End date	Description	Status
Hart Device Support	2	"5"	unlimited	Hart Device Support	installed

Choose License File...

License File: No file selected.

Install

Parameter	Meaning
Version	A support number (for internal use only).
Options	Total number of supported PROFINET devices.
End date	The date on which the license expires. Generally all licenses are unlimited.
Description	Before a license is installed, this field displays the order number for a license for this specific gateway.
Status	Before a license is installed, this field displays "not installed". When a license has been installed it shows "installed" against a green background

5.1.4 Diagnosis

5.1.4.1 Settings

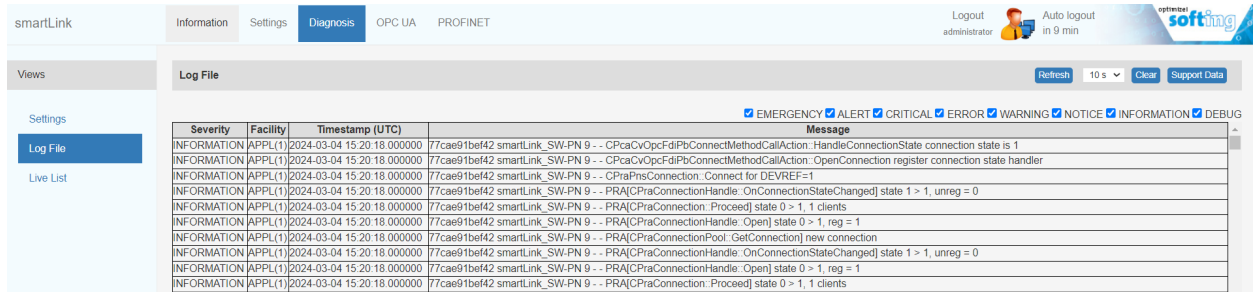
Select **Diagnosis** → **Settings** to view and adapt the settings of the smartLink SW-HT logging feature. The settings can be viewed in any role. To change the settings you must have administration rights.

When you have changed the settings click **[Apply]** to confirm.

Parameter	Meaning
Log File Priority	Available values: Emergency, Alert, Critical, Error, Warning, Notice, Information, Debug. All messages with the set priority or higher are logged. The log file is shown under Diagnosis → Log File .
Log File Facility	Tick the checkbox for the protocol layer you want to write to the log file.
Send Syslog Messages	Activates additional debug logging and sends the information to the IP address defined in the Syslog Server. Can be logged with wireshark, Visual Syslog Server or similar.
Syslog Server	IP address to where syslog messages are sent.
Apply	Click button to activate your settings.

5.1.4.2 Log File

Select **Diagnosis** → **Log File** to view the log file or to create support data in case you are facing problems. You can also filter the log file by ticking and unticking the checkboxes of the different priorities. This only affects the display of the log file and not the setting of the log file priority under **Diagnosis** → **Settings**.



Note

If you are facing problems with your smartLink SW-PN, use the button **[Support Data]** to create a support file. The information contained in this file helps Softing Support address and fix potential issues.

Parameter	Meaning
EMERGENCY; ALERT, CRITICAL, ERROR, WARNING, NOTICE, INFORMATION, DEBUG	Tick the check boxes to set a display filter.
Clear	Click this button to delete the log file entries.
Refresh	Click this button to update the message log entries.
Support Data	Click this button to upload a collection of all available logs for support requests.

Saving a license

1. Click **[Refresh]** at the top to update the table contents.
2. Click **[Support Data]**.
A zip file containing all data including the licenses of the device data is created.
3. Open the zip file to find the license key file for this gateway.

5.1.1.4.3 Live List

Select **Diagnosis** → **Live List** to see a table with all PROFINET, APL and PB devices connected to Softing APL switches or pnGate PA. The table is organized top-down in blocks from general status information to PROFINET and PROFIBUS devices details.

The screenshot shows the 'Live List' interface with the following components:

- 1**: General scan information: Last scan cycle finished at 6:50:17 and took 7 minutes, 11 seconds. 14 Device(s) - 14 Licensed - 36 License(s) remaining. Includes a 'Start Scan' button and a 100% progress bar.
- 2**: PROFINET header: 10 PROFINET device(s) - 10 Licensed. Status: A child component has an error. Includes a 'PROFINET' logo and a collapse/expand arrow.
- 3**: PROFINET table with columns: Name, Type, Tag Function, Tag Location, IP Address, MAC Address, Vendor, Device Type, HW Revision, SW Revision, Status.
- 4**: PROFIBUS header: 4 PROFIBUS device(s) - 4 licensed. Status: OK. Includes a 'PROFIBUS' logo and 'Collapse All' / 'Expand All' buttons.
- 5**: Proxy blocks for PROFIBUS segments, e.g., 'Proxy aplswitch-a: 1 Module(s) - 2 PROFIBUS device(s) - 2 licensed. Status: OK'.
- 6**: Detailed table for PROFIBUS devices with columns: Address, Tag Function, Tag Location, Vendor, Device Type, HW Revision, SW Revision, Status.
- 7**: Scan progress bar and 'Start Scan' button.

1 Results of the last scan. The general information includes the timestamp and the duration of the last completed scan, the total number of detected and licensed devices and the number of remaining licenses.

2 This header represents the number of detected and licensed PROFINET devices. PROFINET device details can be hidden and displayed by clicking the arrow icon (▼) to the left of the header text. If a child component (any connected PROFINET device) has an error, the following status icon ▲ is shown in the header.

3 The table lists the characteristic properties collected by I&M0 and I&M1 such as name, type, function, location, IP address or MAC address. The cause of the error is displayed in a status message. See further description under (6). The PROFIBUS icon () in the *Type* column indicates that the device has a PROFIBUS segment. By clicking the icon the corresponding proxy block and PROFIBUS device table is displayed.

4 This header sums up the number of detected and licensed PROFIBUS devices. If a child component (any connected underlying PROFIBUS device) has an error it is clearly indicated in the header as shown above.

5 This view shows all proxies with a PROFIBUS segment. The table beneath includes all successfully scanned PROFIBUS devices with additional properties such as channel number, tag function and location, vendor, device type, hardware and software revision numbers, status.

6 To the left of the device name you may see one of the following icons:
 ✓ = device is licensed and ▲ = connection attempt failed

7 **Scan progress bar (%)**
 Indicates the progress of a running scan process.

Start Scan

A scan is started cyclically once per minute. By pressing this button you can invoke a manual scan. The default scan cycle is set to once per minute. When a scan is in progress this button is disabled.

8 Collapse All

Hides all tables with details of connected PROFIBUS devices.

Expand All

Expands all tables with details of connected PROFIBUS devices.

PROFINET table column headers explained

Column Header	Meaning
Name	The device name of the PROFINET device
Type	Indicates if the PROFINET device has a proxy functionality. If so a corresponding icon is displayed and by clicking on the icon the browser will move to the corresponding proxy segment within the Live List page.
Tag Function	Displays the Tag Function contained in the device.
Tag Location	Displays the Tag Location contained in the device.
Address	The Internet Protocol Address is a set of four numbers separated by periods identifying a device in your network.
MAC Address	The Medium Access Control Address is the unique 12-digit hexadecimal device number assigned by device manufacturer.
Vendor	This column displays in brackets the manufacturer Identification code as a hexadecimal value. A vendor name is shown only if this value can be resolved.
Device Type	Displays the type of the PROFINET device as a hexadecimal value in brackets. A device type name is shown if this value can be resolved.
HW Revision	Displays the hardware revision of the PROFINET device.
SW Revision	Displays the software revision of the PROFINET device.
Status	It is either shown as "OK" (when a PROFINET device has been successfully scanned) or with a red error text describing the error detected during the scan process.

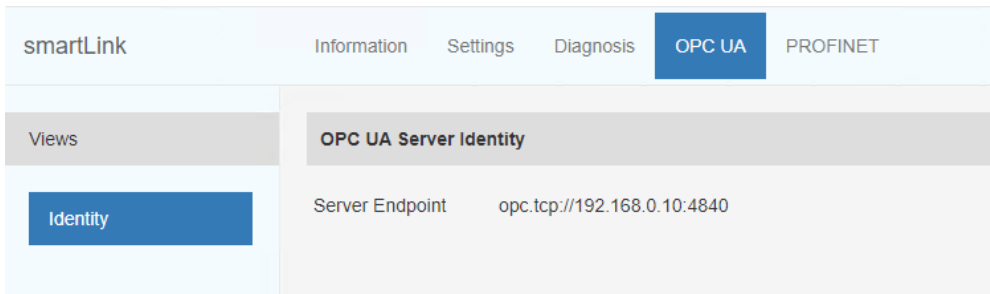
PROFIBUS table column headers explained

Column Header	Meaning
Address	Displays the address of the PROFIBUS device.
Tag Function	Displays the Tag Function contained in the device.
Tag Location	Displays the Tag Location contained in the device.
Vendor	This column displays in brackets the manufacturer Identification code as a hexadecimal value. A vendor name is shown only if this value can be resolved.
Device Type	Displays the type of the PROFIBUS device as a hexadecimal value in brackets. A device type name is shown if this value can be resolved.
HW Revision	Displays the hardware revision of the PROFIBUS device.
SW Revision	Displays the software revision of the PROFIBUS device.
Status	It is either shown as "OK" (when a PROFIBUS device has been successfully scanned) or with a red error text describing the error detected during the scan process.

5.1.5 OPC UA

All FDI-related instances have a *NodeId* with a string identifier. These are located in the OPC UA server application name space index 1.

Select **OPC UA → Identity** to see the server endpoint. In the current version of the smartLink SW-PN the server endpoint has the default port 4840, which cannot be changed in the user interface.



5.1.6 PROFINET

This chapter describes how you configure IP address ranges for PROFINET devices.



Note

To keep the scan process as short as possible it is recommended to define short domain ranges. Also, avoiding adding IP addresses to a scan range that are not assigned to a PROFINET device in your network.

1. Select **PROFINET** → **Domains**
2. Enter a **Domain Name** and the **IP Address** range (a start and an end address) for the PROFINET devices which are to be included in the cyclic Live List scan.

Parameter	Meaning
Scan cycle time	Interval in minutes when a new Live List scan is started.
Domain Name	Name identifying your domain.
IP Address Begin	Address of the first PROFINET device in the domain.
IP Address End	Address of the last PROFINET device in the domain.
Total number of IP addresses	The number of PROFINET addresses that will be scanned. Any address that has no PROFINET device assigned will slow down the scan cycle as the scan will wait for the address to time out before it will continue with the next address.

5.2 Virtual machine administration

5.2.1 UI administration

5.2.1.1 Login

1. Open your Internet browser and enter the following URL: `http://< IP address of the smartLink SW-HT>:5000`.



Note

If you are using VM images and you can't recall the IP address, open the VM console window to get the IP address.

2. Enter `root` in the user field and enter `Softing1!` in the password field. The credentials you have to enter here are the Linux login credentials of the VM.



Note

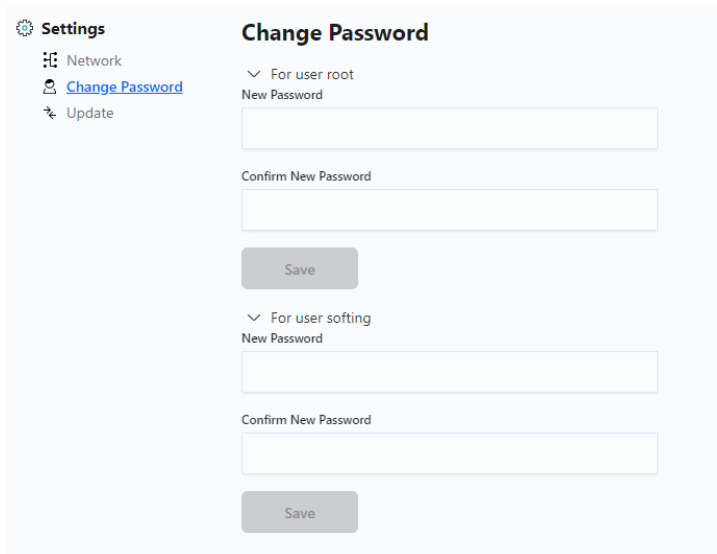
You will have to change the default passwords for root user and Softing user.

5.2.1.2 Network

1. Select **Settings** → **Network** to open the change the host name in the **Hostname** input field.
2. Click **[Save]** to confirm the new host name.
3. Select **DHCP** in the **Type** dropdown and enter the required details the input fields below.
4. Click **[Save]** to confirm your changes.

5.2.1.3 Change password

1. Select **Settings** → **Change Password** to change the root password.
2. Enter a **New Password** in the password field **For User Root** and repeat the password in the
3. Confirm **New Password** field.
4. Click **[Save]** to confirm your changes.
5. Enter a **New Password** in the password field **For User Softing** and repeat the password in the
6. Confirm **New Password** field.
7. Click **[Save]** to confirm your changes.



5.2.1.4 Update

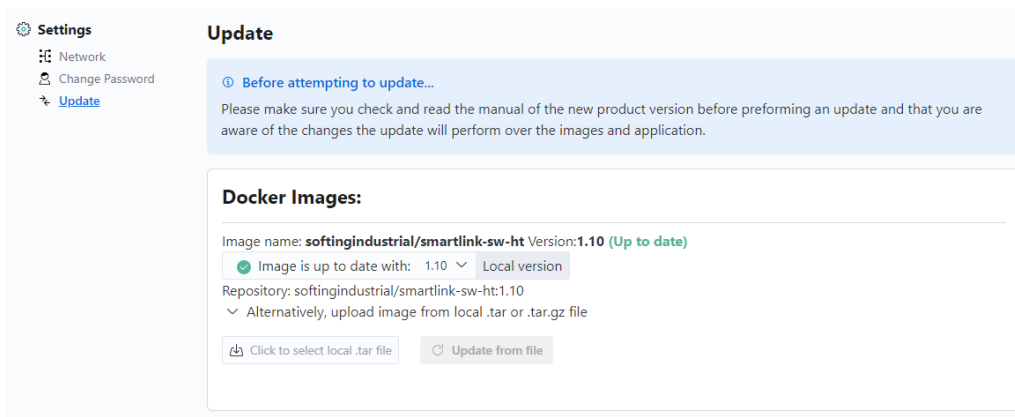
1. Select **Settings** → **Update** to open the Update window.

Update from Docker Hub

2. Select the version you wish to update from the Update tags available list.
3. Click **[Update]** to execute the update.

Update from local file

4. Click **[Click to select local .tar file]**.
5. Select the docker image file.
6. Click **[Update from file]** to execute the update.



Note

If you don't have an Internet connection to Docker Hub the Update tags available list shows the string "No connection to docker hub". In that case you can only update from file.

5.3 Console administration

Disable/Enable HTTP VM administration GUI

**Note**

The HTTP VM administration GUI is enabled by default.

1. Call the following command to disable the HTTP VM administration GUI login as root to the VM console:
`/home/softing/disable-admin-gui.sh`
2. Call the following command to enable it:
`/home/softing/enable-admin-gui.sh`

**Note**

If you are not using a NAT network in the VM we recommend to disable the HTTP VM administration GUI. The HTTP VM administration GUI gives you administrative access to the VM.

Disable/Enable HTTP port of the configuration GUI

**Note**

The HTTP port is enabled by default.

1. Call the following command to disable the HTTP port login as root to the VM console:
`/home/softing/disable-HTTP.sh`
2. Call the following command to enable it:
`/home/softing/enable-HTTP.sh`

**Note**

If you are not using a NAT network in the VM we recommend to disable the HTTP port. The HTTP communication is not encrypted and therefore allows sniffing the communication.

Disable/Enable SSH server

1. To disable the SSH server login as root to the VM console call the following command:
`systemctl disable ssh`
`systemctl stop ssh`
2. To enable it you have to call the command:
`systemctl enable ssh`
`systemctl start ssh`

By default, the SSH server is disabled

**Note**

If you are not using a NAT network in the VM we recommend to disable the SSH server. The SSH server gives you remote access to the VM.

Change keyboard layout

The VMs are configured for an English keyboard by default and can be changed in these steps:

1. Edit the file `/etc/default/keyboard` and change the locale in the `XKBLAYOUT` line.
2. Login to the VM console as root and enter: `nano /etc/default/keyboard`
3. Enter `setupcon` to change the locale to `XKBLAYOUT="de"` for a German keyboard layout.



6 Glossary

Abbreviations	Definition
DHCP	Dynamic Host Configuration Protocol
ETH	Ethernet
Ex	Explosion protection
FDI	Field Device Integration
GUI	Graphical User Interface
HTTPS	Hypertext Transfer Protocol Secure
I/O	Input/Output
IP	Internet Protocol
NTP	Network Protocol Time
OPC UA	Open Platform Communications Unified Architecture
PA	Process Automation
PLC	Programmable Logic Controller
PN	PROFINET
pnGate	Softing PROFINET Gateway
RIO	Remote Input / Output
UI	User Interface

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