



SNMP

SNMP in Docusnap – inventory and analysis

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AUTHOR	Docusnap Consulting
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1. INTRODUCTION

Active network components such as switches can be captured using the SNMP inventory with Docusnap. In this document the topic SNMP is described comprehensively, so that not only a complete inventory, but also an appropriate preparation of the collected information is possible.

The SNMP inventory supports SNMPv1, SNMPv2c and SNMPv3. Various predefined MIBs are queried, such as the Printer MIB or the RFC1213 MIB.

The collected data can then be displayed in the form of reports (text form) or plans (graphic formats such as topology and VLAN plans).

You can use the SNMP Inventory for the following purposes:

- Inventory and documentation of network components
- Carry out evaluations of which systems can be found on which switch, port and VLAN

2. INVENTORY

2.1 REQUIREMENTS

The following prerequisites must be fulfilled in order to carry out a successful SNMP inventory.

- SNMPv1, SNMPv2c or SNMPv3 must be supported and activated on the system to be inventoried.
 - o When using SNMPv1 or SNMPv2c at least one Read Community String must be used.
 - o When using SNMPv3, appropriate authentication data must be used.
- For a complete representation of the topology, one of the two protocols must be uniformly activated on the switches:
 - o Cisco Discovery Protocol (CDP)
 - o Link Layer Discovery Protocol (LLDP)
 - o Fallback - Spanning Tree (STP)
- All relevant IP ranges must be known
- The SNMP systems must be pingable.

If not all systems can be inventoried despite the prerequisites described above, the following must be checked:

- If the requests are blocked by monitoring or other security solutions - e.g. Flooding Protection
- Check IP-address-based access lists
- correctness of the community string

The names of the inventoried SNMP systems are derived from the system name of the devices, if this is maintained on the systems. Alternatively, it can be activated in the options that the DNS name is used instead of the system name.

If the system name is not maintained, the IP address is used as the name. For this reason, it is recommended to maintain the system names of the SNMP systems accordingly, since the display with the IP address or the standard SNMP name of the systems may not be very meaningful.

We recommend using the system name instead of the DNS name.

2.2 REQUIREMENTS CISCO SNMPV3

For Cisco devices, additional requirements are required if they are inventoried via SNMPv3. If these requirements are not met, the **learned MAC addresses** and **VLAN assignments** may not be read out. This in turn affects the correct display of the topology and VLAN plan.

You will find the corresponding information on the following pages:

- <https://community.cisco.com/t5/network-management/vlan-bridge-mib-and-snmpv3-contexts/td-p/1589698>
- <https://www.netnea.com/cms/2015/01/09/netdisco-with-snmp-v3-and-cisco/>
- <https://community.cisco.com/t5/network-management/bridge-mib-with-snmp-v3/td-p/1179194>

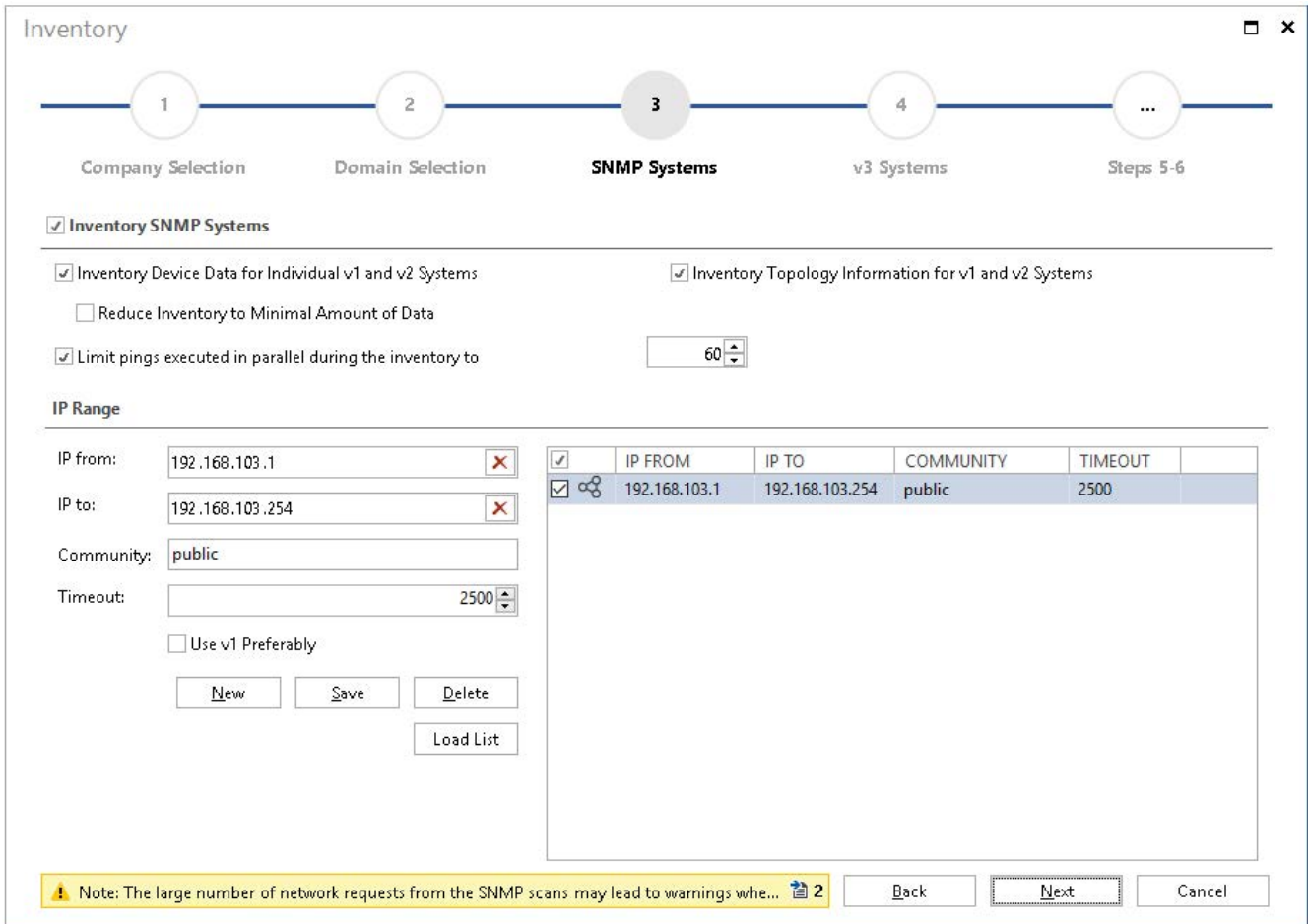
We do not assume any liability for the correctness of the contents of the previously linked websites.

2.3 SNMP INVENTORY WIZARD

The inventory wizard for the SNMP inventory is described below. It is divided into one step for SNMPv1 / SNMPv2c and SNMPv3.

2.3.1 SNMP V1 / V2

For the SNMPv1 / SNMPv2 inventory, the IP areas to be inventoried and a corresponding community string must be specified. If there are devices with different community strings in the IP range, this IP range must be added several times. Docusnap will try to ping the system and inventory it with the community string.



The screenshot shows the 'Inventory' wizard window, specifically step 3: 'SNMP Systems'. The progress bar at the top indicates the sequence: 1. Company Selection, 2. Domain Selection, 3. SNMP Systems (current step), 4. v3 Systems, and 5. Steps 5-6.

Inventory SNMP Systems

- ☒ Inventory Device Data for Individual v1 and v2 Systems
 - ☐ Reduce Inventory to Minimal Amount of Data
- ☒ Inventory Topology Information for v1 and v2 Systems
- ☒ Limit pings executed in parallel during the inventory to

IP Range

IP from:

IP to:

Community:

Timeout:

☐ Use v1 Preferably

<input checked="" type="checkbox"/>	IP FROM	IP TO	COMMUNITY	TIMEOUT
<input checked="" type="checkbox"/>	192.168.103.1	192.168.103.254	public	2500

Note: The large number of network requests from the SNMP scans may lead to warnings whe...

Fig. 1 - SNMP Inventory - SNMP v2c

For a large number of networks that need to be inventoried, it is recommended to create a CSV file and import it using **Load List**.

Extract of a usable CSV file:

The following CSV file describes the following values: IP from, IP to, Community and Timeout

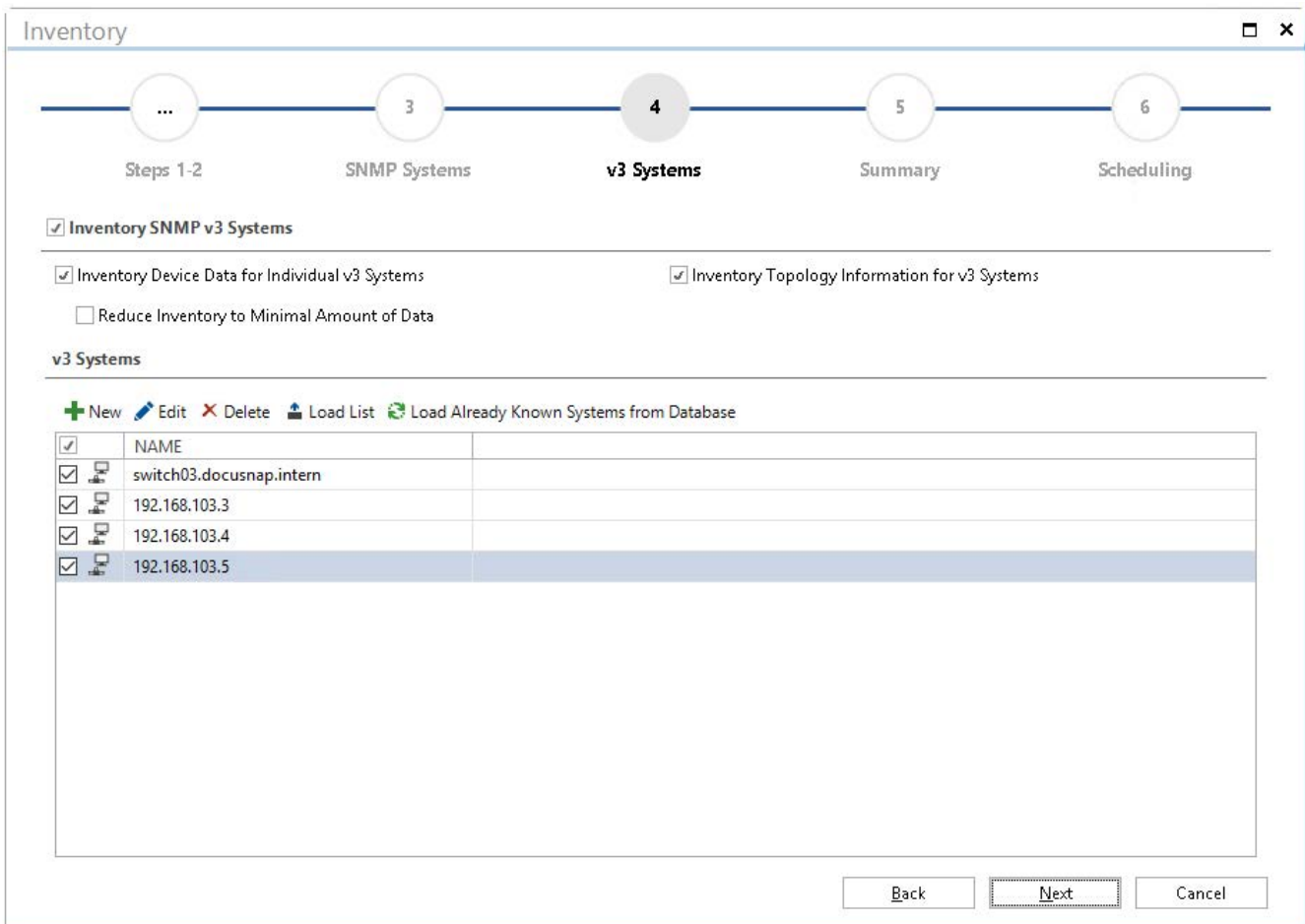
```
192.168.103.1;192.168.103.254;public;2500
```

To avoid problems with ICMP Flooding Protecting, the number of parallel pings can be reduced using the corresponding function.

Furthermore, the **timeout settings** should be observed if Cisco devices are in use. If you cannot reach all systems here, it is advisable to increase the timeout. This is necessary because some Cisco devices only react to a second or third ping.

2.3.2 SNMP V3

For the SNMPv3 inventory, the host name or the corresponding IP address must be entered. Additionally a corresponding authentication must be used. This authentication data can also be applied to all other SNMP systems.



Inventory

Steps 1-2 3 **4** 5 6

SNMP Systems **v3 Systems** Summary Scheduling

☒ Inventory SNMP v3 Systems

☒ Inventory Device Data for Individual v3 Systems ☒ Inventory Topology Information for v3 Systems

☐ Reduce Inventory to Minimal Amount of Data

v3 Systems

+ New Edit Delete Load List Load Already Known Systems from Database

<input checked="" type="checkbox"/>	NAME
<input checked="" type="checkbox"/>	switch03.docusnap.intern
<input checked="" type="checkbox"/>	192.168.103.3
<input checked="" type="checkbox"/>	192.168.103.4
<input checked="" type="checkbox"/>	192.168.103.5

Back Next Cancel

Fig. 2 - SNMP Inventory - SNMP v3

For a large number of SNMPv3 systems it is recommended to import them via the **Load List**. In this CSV file, not only the hostname or IP address can be transferred, but also the necessary login data.

Extract of a usable CSV file:

The following CSV file describes the following values:

- System name or IP,
- USM user,
- Auth algorithm,
- Auth password,
- Privacy algorithm,
- Privacy password,
- Context name
- and Timeout.

```
switch03.docusnap.intern;Docusnap;SHA;geheim;DES;geheim;kontext;2600  
192.168.103.3  
192.168.103.4  
192.168.103.5
```

In this CSV file only the login data of the first device was stored. This means that the credentials are automatically used for the other devices as long as no new credentials are entered.

3. ANALYSIS

3.1 INVENTORIED DATA

The inventoried data can be viewed via the data explorer / data tree following the inventory. Navigation is via

- Your Company - Infrastructure - Your Domain - SNMP Systems

The inventoried SNMP systems are now listed by device type.

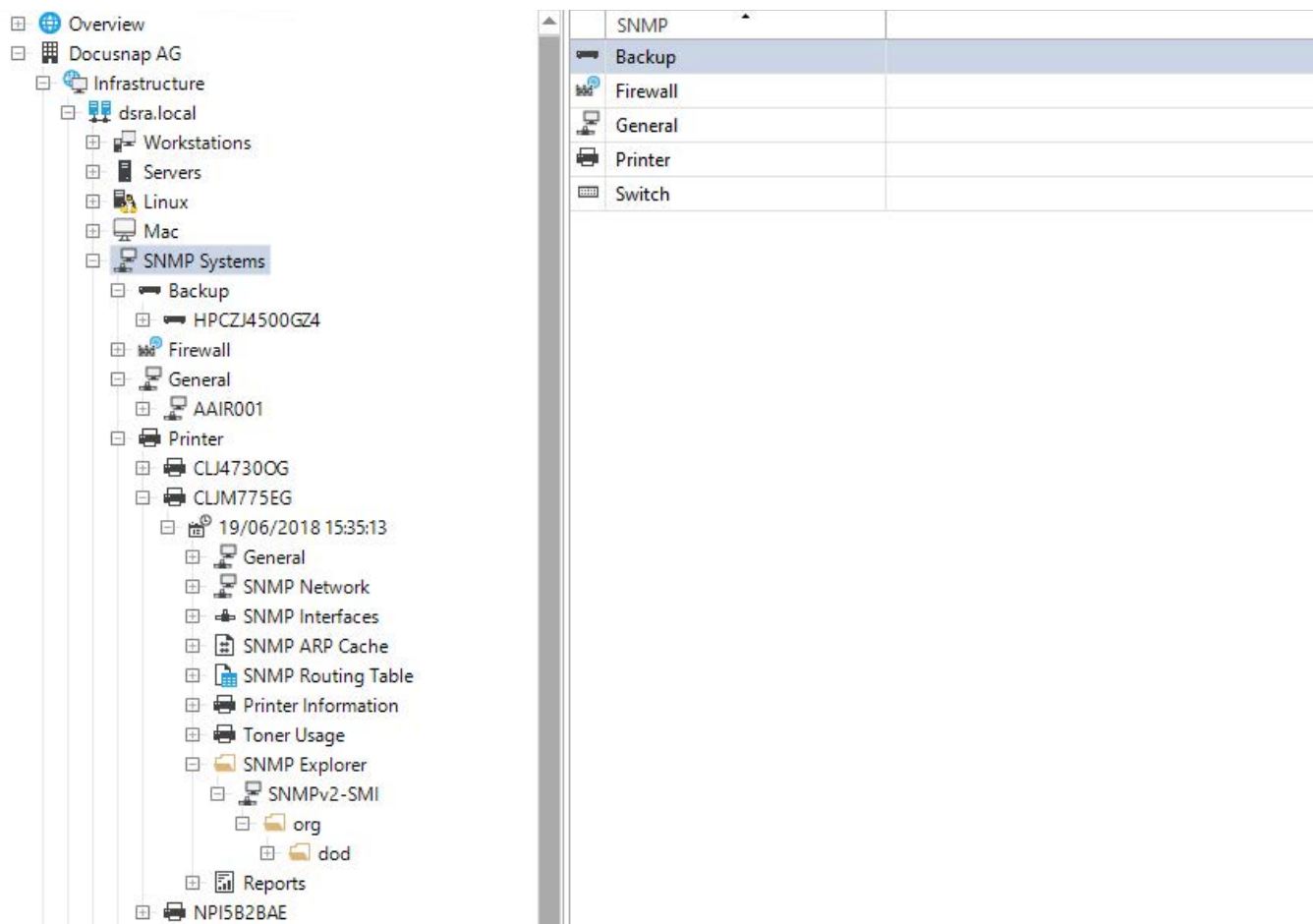
The device type of systems found under **General** could not be identified by Docusnap. You can manually assign a type to these systems. Through these assignments all devices will be automatically assigned to the type in the future - this is described in **4.1 SNMP TYPES**.

The inventory of the SNMP systems is carried out via standard MIBs. Since SNMP is based on a standard, parts of the inventoried information across all systems are the same. For example, **general information** such as system name, IP address, location, contact, and description.

In addition to these standard MIBs, device-specific MIBs are also used, e.g. for printers and switches, which retrieve standard information on these device types. For printers it is the printer and toner information.

You can also add manufacturer-specific MIBs to the SNMP information and thus inventory detailed information on SNMP devices - this is described in **5.1 MANUFACTURER SPECIFIC MIBS INCLUDING**.

Below each SNMP system is the report **Summary SNMP**. This report contains all the information collected during the standard inventory for a system.



The screenshot displays the Docusnap interface. On the left, a tree view shows the hierarchy: Overview > Docusnap AG > Infrastructure > dsra.local > SNMP Systems. The 'SNMP Systems' folder is expanded, showing a list of systems including Backup, Firewall, General, Printer, and Switch. The 'Printer' system is selected, and its details are shown in the main pane on the right. The details pane shows a table with the following data:

SNMP	
Backup	
Firewall	
General	
Printer	
Switch	

Fig. 3 - List of SNMP systems in the data tree

3.2 TOPOLOGY PLAN

Docusnap can inventory the topology of corresponding network devices (switches, routers, etc.). This means that the direct connections of network devices are read and displayed in the topology plan. In addition to the connections, the speed and the ports used are displayed. This information can be found in the overview plan.

In addition, a port allocation plan of switches is created using the ARP cache and displayed in the topology plan. You can find this information in the detailed plan of a switch.

It is important to note that the topology plan only uses the data from the last inventory. Furthermore, the ARP cache of the switches is volatile. This means that the ARP cache cannot be read from ports where the systems are not active. Therefore, the inventory of SNMP systems, especially switches, should be done at "peak times".

The following is a list of which systems etc. are listed in the topology plan

- SNMP Switch type devices
- SNMP devices with topology information (CDP, LLDP) - e.g. Access Points
- IP systems and MAC addresses recognized by switches via LLDP and CDP information
- Generally devices which are redundantly plugged into more than one switch
- Router

The topology plan can be created and exported ad hoc via the tree structure. In addition, the plan can also be exported automatically and time-controlled (PNG, HTML, VDX, SVG).

Using the tree structure, you can find the topology plan in the following places and in the following versions:

Your Company - Infrastructure - Standard Plans - Topology Plan

- Company-wide devices are used for the topology plan - across domains

Your Company - Infrastructure - Your Domain - Standard Plans - Topology Plan

- Only the devices of the domain are used

Your company - Locations - Location - Documentation - Topology Plan

- Only the devices of the selected and subordinate locations are used

The following figure shows the topology of the overview plan. This plan shows the direct connections between the switches:

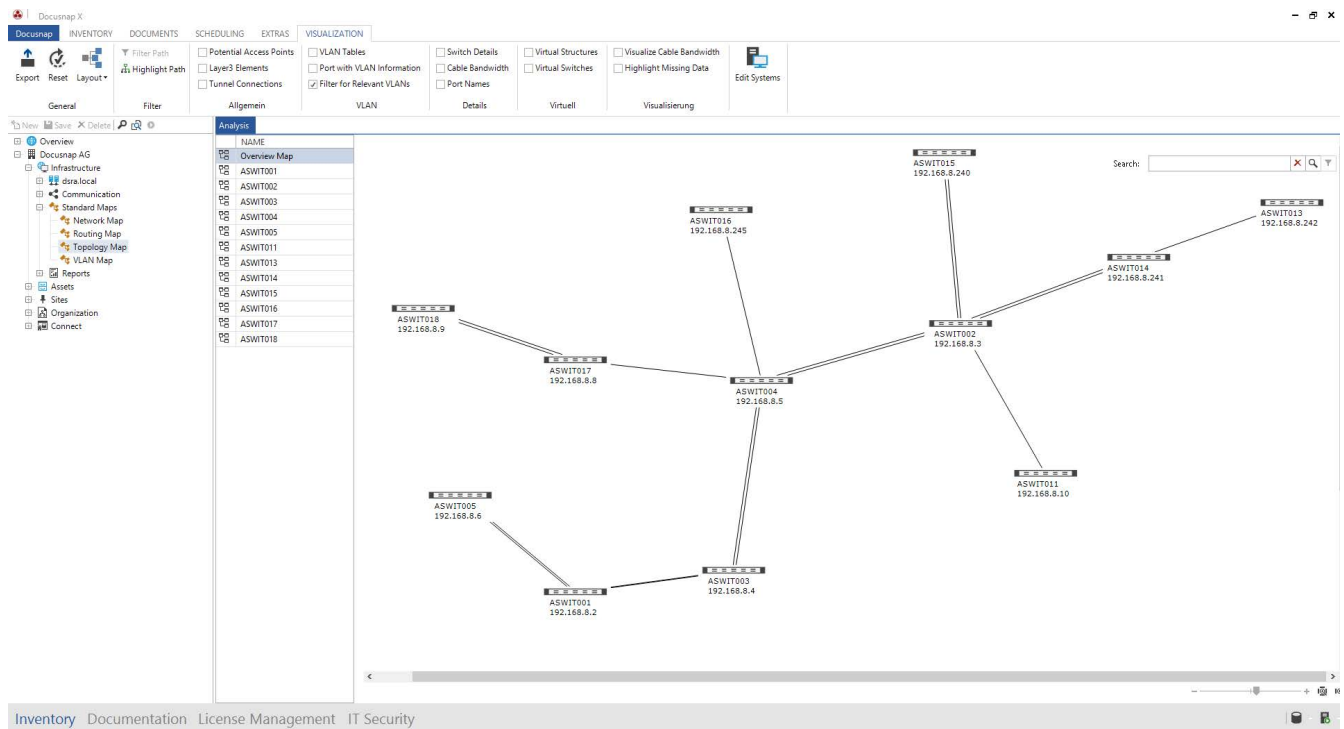


Fig. 4 – Topology Plan Overview Map

To the left of the map you can find more tabs. These tabs stand for the switches shown in the overview map. The selection of one of the listed switches opens the detailed plan:

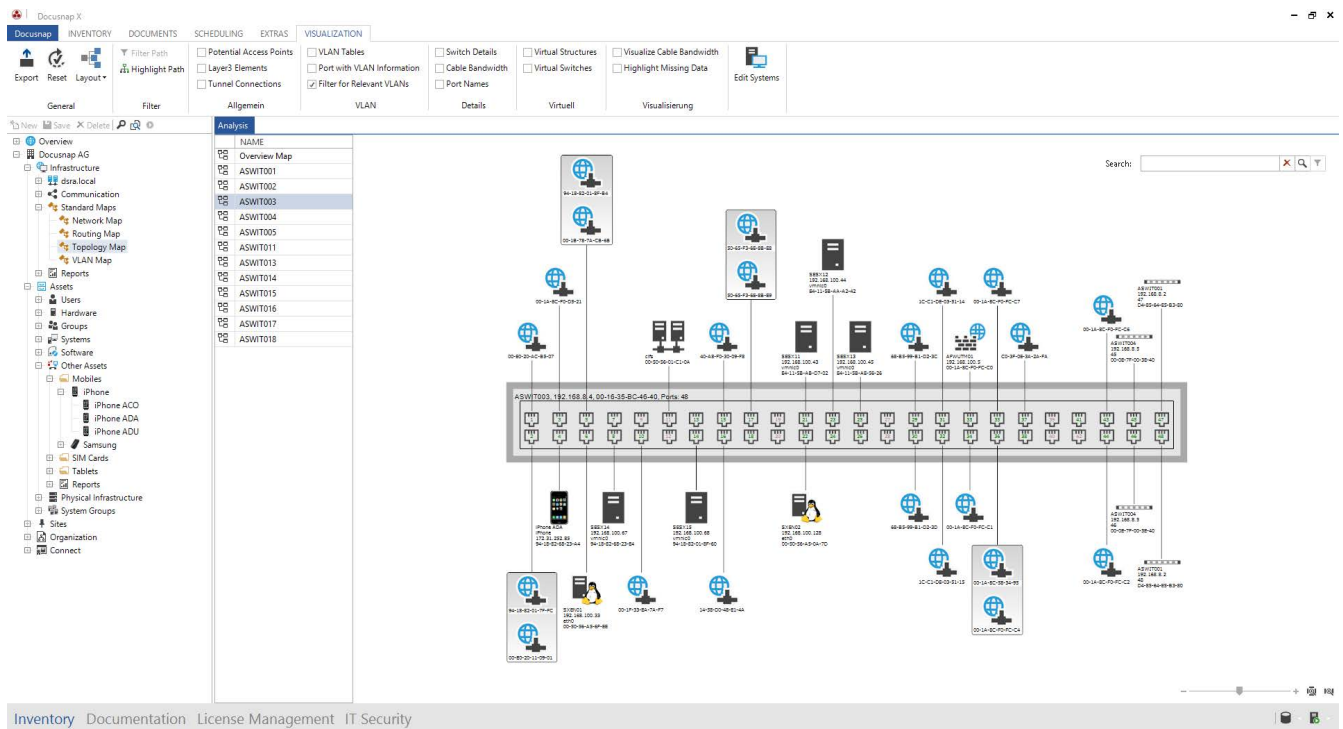


Fig. 5 – Topology Plan – Switch Overview

The detailed plan of a switch resolves the learned MAC addresses of the ARP cache, if the corresponding device has been inventoried and is thus known in Docusnap. If the device is not yet known, only a MAC address and the manufacturer are displayed on the port - this is done via the manufacturer part of the MAC address.

Note:

IT assets that you have documented with network information (especially the MAC address) are also displayed in the topology plan.

3.2.1 TOPOLOGY PLAN – OPTIONS

After you have opened the topology plan, the **Visualization** tab opens in the ribbon.

Within the tab you have the possibility to perform further actions regarding the topology plan. For example, you can export the plan, filter paths. You also have the following options available, which have a direct effect on the plan:

Show potential Access Points

- Displays potential access points in the overview plan. Potential access points are recognized by CDP or LLDP entries of the switches, which are not available in the Docusnap database.

Show Layer3 Elements

- Layer 3 systems, e.g. routers, are displayed in the overview plan.

Show Tunnel Connections

- If a tunnel connection is known via LLDP or CDP, the connection is indicated by this option.

Show VLAN Tables

- This option displays the respective VLANs as a table for switches.
- VLAN tables with the same content are colored the same way.

Displaying Ports with VLAN Information

- This option displays the **tagged** and **untagged** information for the ports in the detailed plans for the switches.

Filter for relevant VLANs

- Only relevant VLANs are displayed. VLANs that are active on switches but are not present on any port are ignored.

Show Details

- Switch details, cable bandwidth and port designation can be displayed.

Hide Virtual Structures

- Hides the virtual switches in the overview plan.

Virtual Switches

- Detailed plans of the virtual switches are not created.

Visualize Cable Bandwidth

- This option colors the lines of a connection differently depending on the speed.
- At higher speeds, a thicker line is used.
- If the speed exceeds 10GB, the line is displayed in blue.
- If the speed is less than 1GB, it is displayed in red.
- In the other cases the line is drawn in green.

Highlight Missing Data

- This option marks switches where no LLDP, CDP or Spanning Tree information is available.
- Furthermore, devices are marked if no learned MAC addresses are available or the interface stack data is missing.
- By right clicking on the highlighted object - **Display Data**, the error message is displayed in an additional dialog.

3.3 VLAN PLAN

In the first instance, you will notice that the VLAN Plan outputs the same information that you receive within the topology plan with the option Display VLAN Tables.

The overview plan shows the connections between the switches and the VLAN tables belonging to the switch.

You can also create a detailed VLAN plan. With this detailed plan you select a VLAN. You will then see all switches of the VLAN. The systems plugged into the switches and the selected VLAN are also displayed.

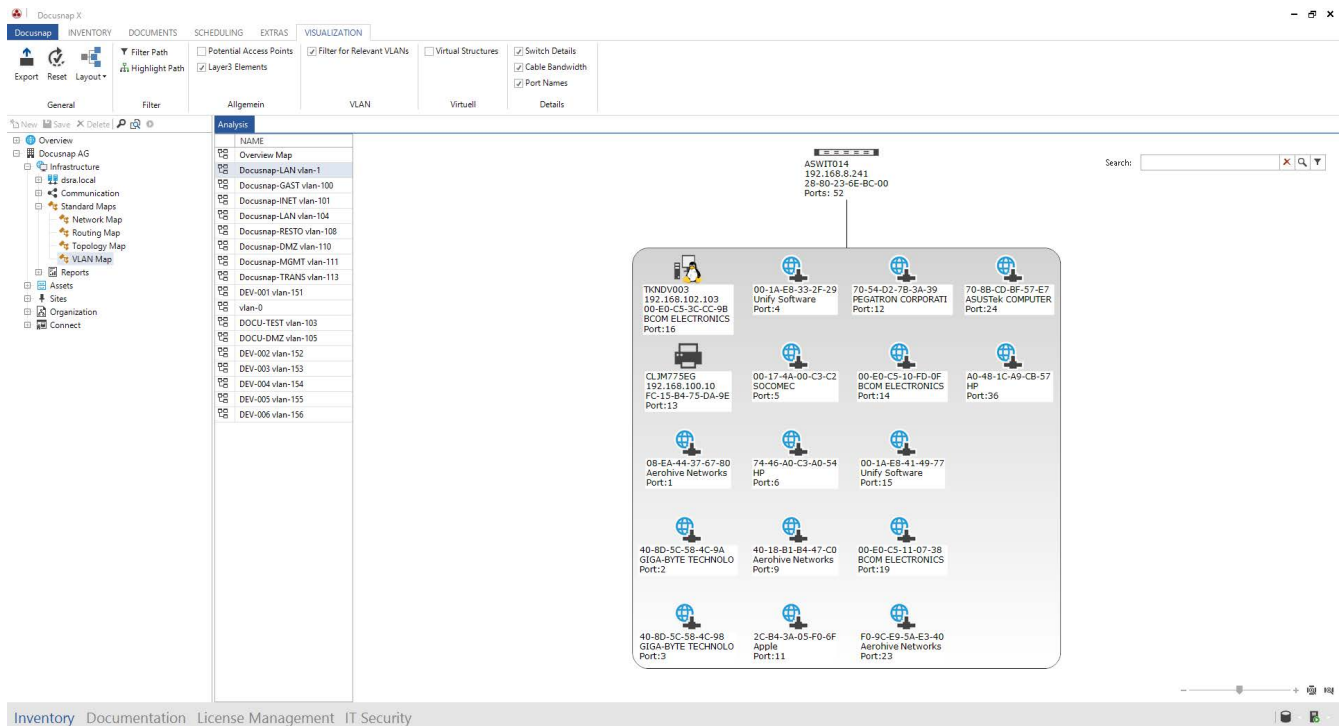


Fig. 6 - VLAN Detail Plan

3.4 REPORTS

In addition to the Topology and VLAN Plan, there are also reports that allow you to analyze information from SNMP systems. These reports can be found as follows:

Your Company - Infrastructure - Your Domain - Reports - Infrastructure - Systems - Network Components

Here you will find the following reports:

Active Network Components

- The report lists all SNMP systems with the information inventoried in the standard - among others
 - o General information
 - o Network information
 - o Interfaces

Network printer

- All printers with printer-specific information
 - o Printer information
 - o Toner

Topology Information

- This report provides you with detailed information about the switches, including
 - o VLAN information and its port assignment
 - o List of ports and systems plugged into them

VLAN Overview

- When creating the report, you must first select one or more VLANs
- You will then see a list of all associated systems, grouped by the selected VLANs
- For example:
 - o VLAN ID:1
 - Switch1
 - Switch2
 - ...
 - o VLAN ID:2
 - Switch3
 - Switch4
 -

VLAN Overview with Switches

- Here, too, you first select one or more VLANs
- The VLANs are then grouped again according to the selected VLANs
- In addition, the system is now also grouped by switches on which the associated systems are plugged - specifying the system type, MAC and IP address and port
- For example:
 - o VLAN ID:1
 - Switch: Switch1
 - ServerA – Server – 00-11-22-33-44-55 – 192.168.1.1 - Port 1
 - ServerB - Server – 00-11-22-33-44-66 – 192.168.1.2 - Port 2
 - ...
 - Switch: Switch2
 - Switch1 - SNMP – 11-11-22-33-44-66 – 192.168.100.1 - Port 1
 - o VLAN ID:2
 - Switch: Switch1
 - ServerC - Server – 11-11-11-33-44-66 – 192.168.1.3 - Port 3
 - ServerD - Server – 22-22-22-33-44-66 – 192.168.1.4 - Port 4

3.5 ADJUSTMENTS

3.5.1 EDIT SWITCH - CONFIGURE MANUAL CONNECTIONS

It has already been described in this How To that the data from the switch detail plan is inventoried by reading the ARP cache and that it is volatile again. For a complete documentation, you can also manually assign a MAC address to the switches and thus permanently document the port assignment of the switch. These manual adjustments remain even after a new inventory!

For example, you can see from the following figure that ports 20, 37 and 38 are highlighted in green. This means that a cable is plugged in here, but the ARP cache could not be read.

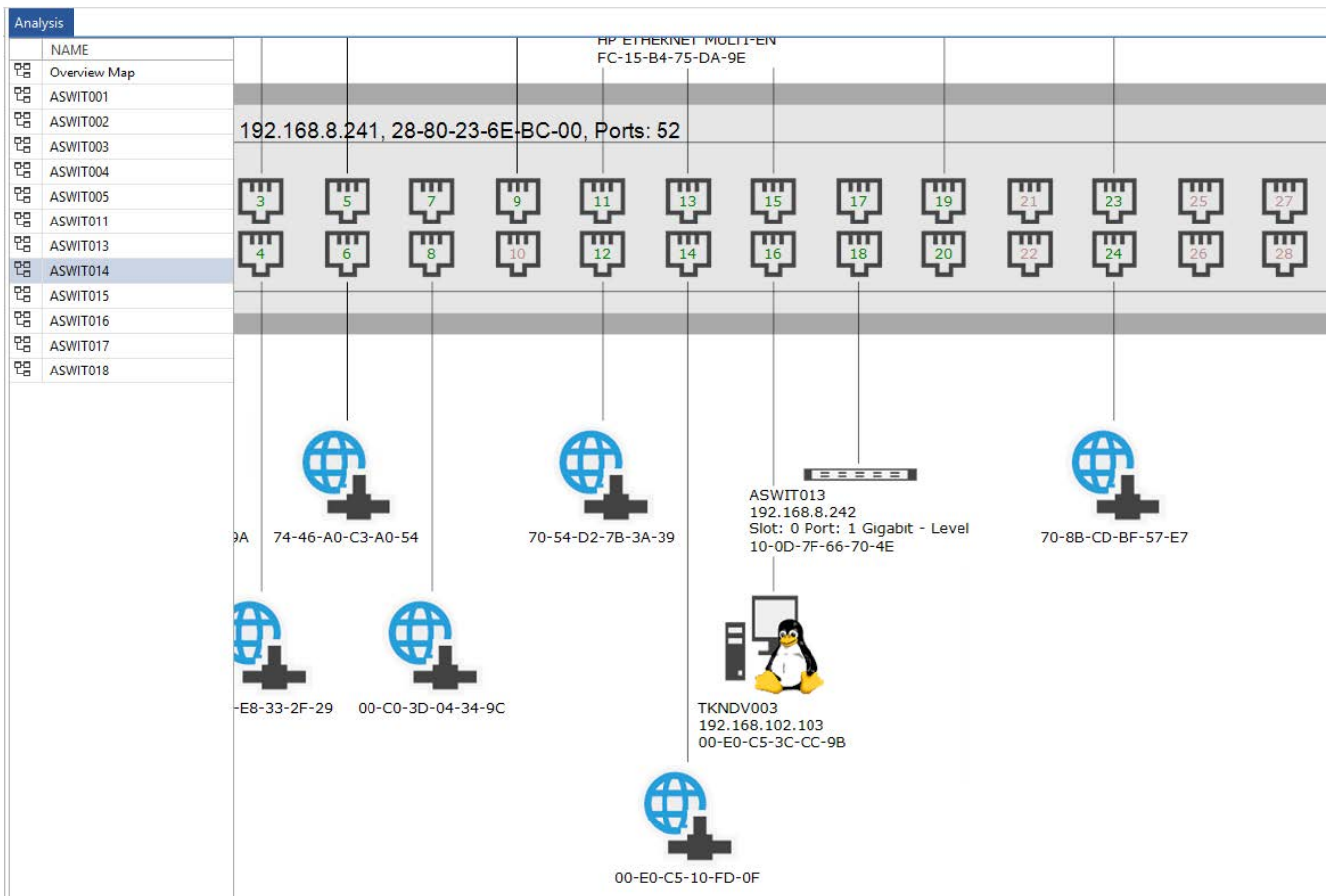


Fig. 7 - Active ports without ARP cache

You can now manually assign a system to these ports via the MAC address:

- Change to **Docusnap** administration
- Select the **Inventory** tab
- Within the ribbon you will find the category **SNMP** - select **Edit Switch**
- First select your company, then the domain and then the switch.
- Now select the port you want to customize and add the MAC address

Docusnap Management (Configuration, Management and Customization of Docusnap)

Close Management GENERAL **INVENTORY** CUSTOMIZING IT ASSETS DIAGRAMS IT CORRELATIONS LICENSE MANAGEMENT

Software Search Active Directory SNMP MIBs **Edit Switch** Wizard Configuration

Server Roles Assignment Criteria SNMP Types MAC Filter System Groups

Additional Tools

Windows SNMP Other

Edit Switch

Account: Docusnap AG Domain: dsra.local

SWITCH NAME	PORT	DESCRIPTION	PORT GROUP
ASWIT001	7	7	
ASWIT002	8	8	
ASWIT003	9	9	
ASWIT004	10	10	
ASWIT005	11	11	
ASWIT011	12	12	
ASWIT013	13	13	
ASWIT014	14	14	
ASWIT015	15	15	
ASWIT016	16	16	
ASWIT017	17	17	
ASWIT018	18	18	
	19	19	
	20	20	
	21	21	
	22	22	
	23	23	
	24	24	

+ Add Save Delete

MAC FILTER	TYPE
<input checked="" type="checkbox"/> E4-11-5B-AB-D7-02	Host

Fig. 8 - Assign MAC address to a switch port

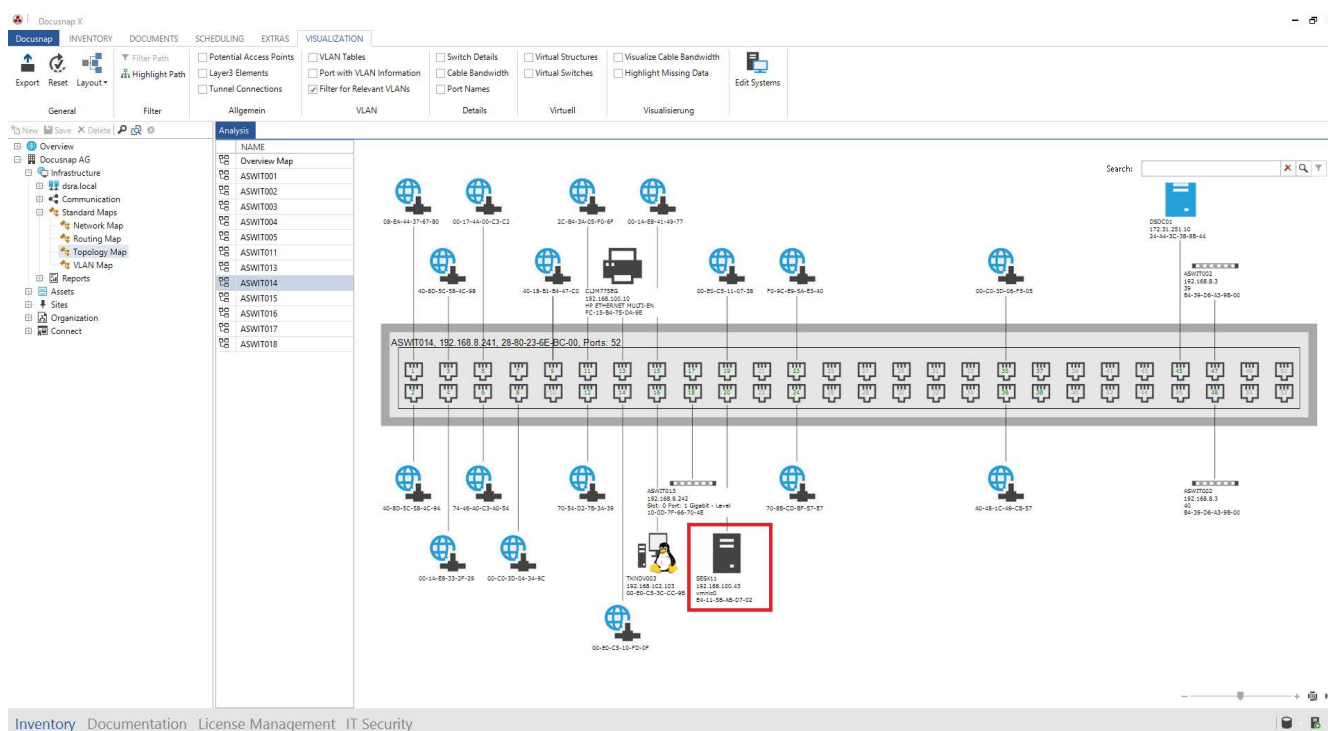


Fig. 9 - Topology Detail Plan with assigned systems

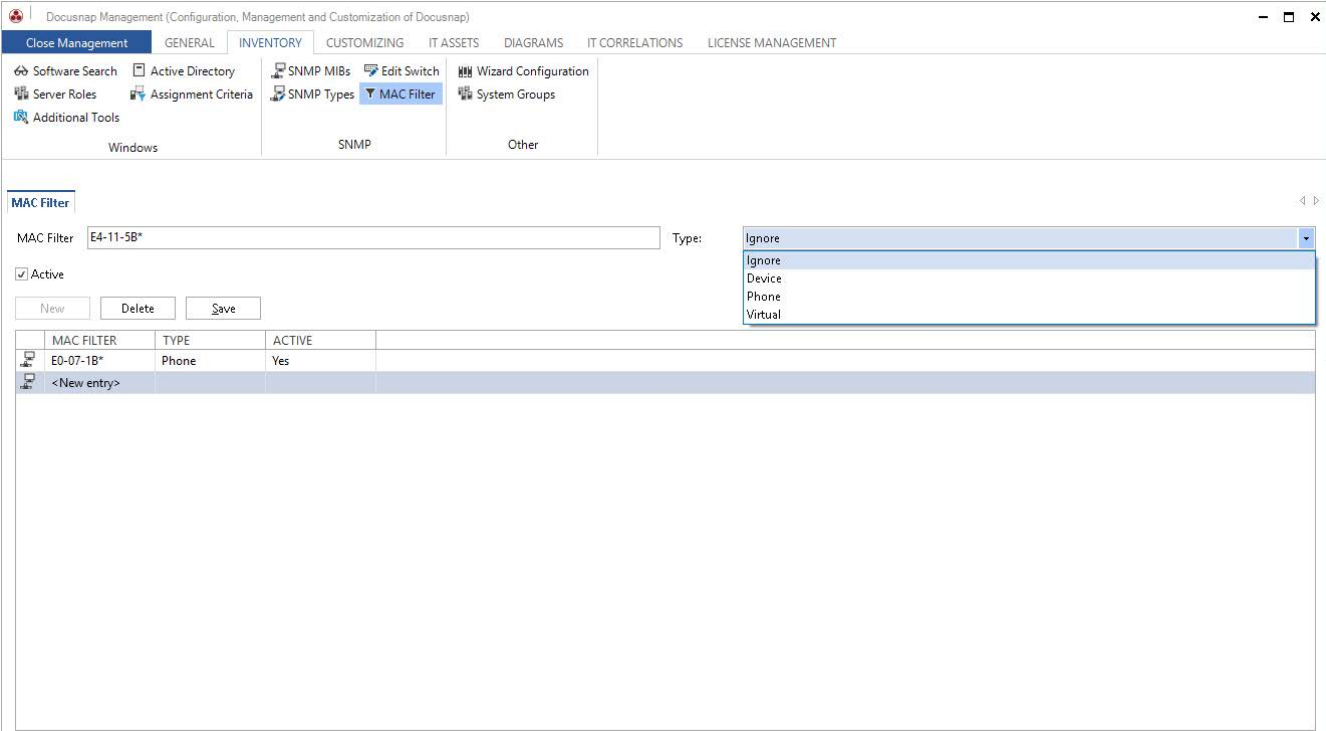
3.5.2 MAC FILTER

- Store MAC addresses that are to be displayed as device, telephone or not

It can happen that some systems cannot be inventoried correctly because they do not have a SNMP interface, for example. In the course of this, only the MAC addresses can be found in the topology detail plan. An example are IP phones.

In Docusnap you now have the possibility to make an assignment based on the MAC address. Search for the corresponding systems within the topology plan and check to what extent the MAC addresses match and write this match down. If you use IP phones of the same manufacturer, at least the manufacturer part will be the same.

- Switch to **Docusnap administration**
- Select the **Inventory** tab
- Within the ribbon you will find the category **SNMP** - select **MAC Filter**
- Enter an appropriate MAC filter - * can be used as placeholder



The screenshot shows the 'Docusnap Management' window with the 'INVENTORY' tab selected. The 'MAC Filter' ribbon is active. The 'MAC Filter' field contains 'E4-11-5B*' and the 'Type' dropdown is set to 'Ignore'. The 'Active' checkbox is checked. Below the form is a table with the following data:

MAC FILTER	TYPE	ACTIVE
E0-07-1B*	Phone	Yes
<New entry>		

Fig. 10 - Activation of the MAC filter

The following figure shows the effects on the topology plan.

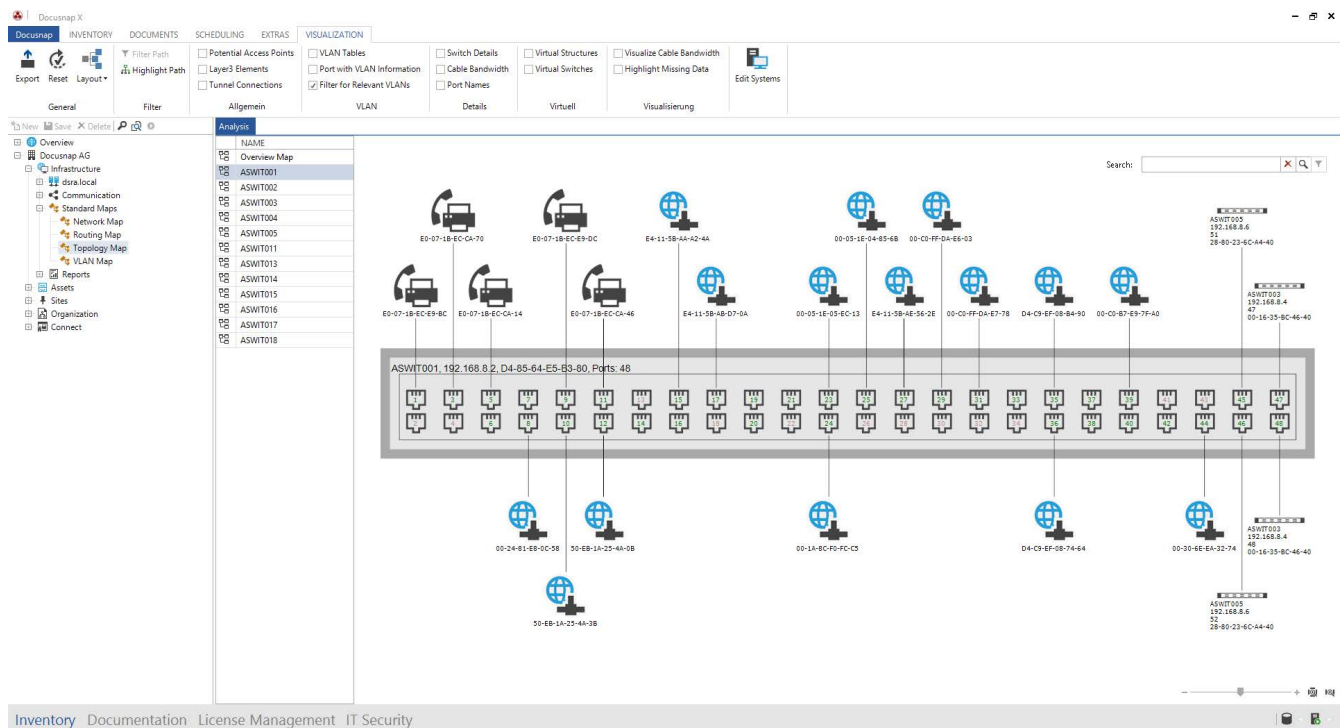


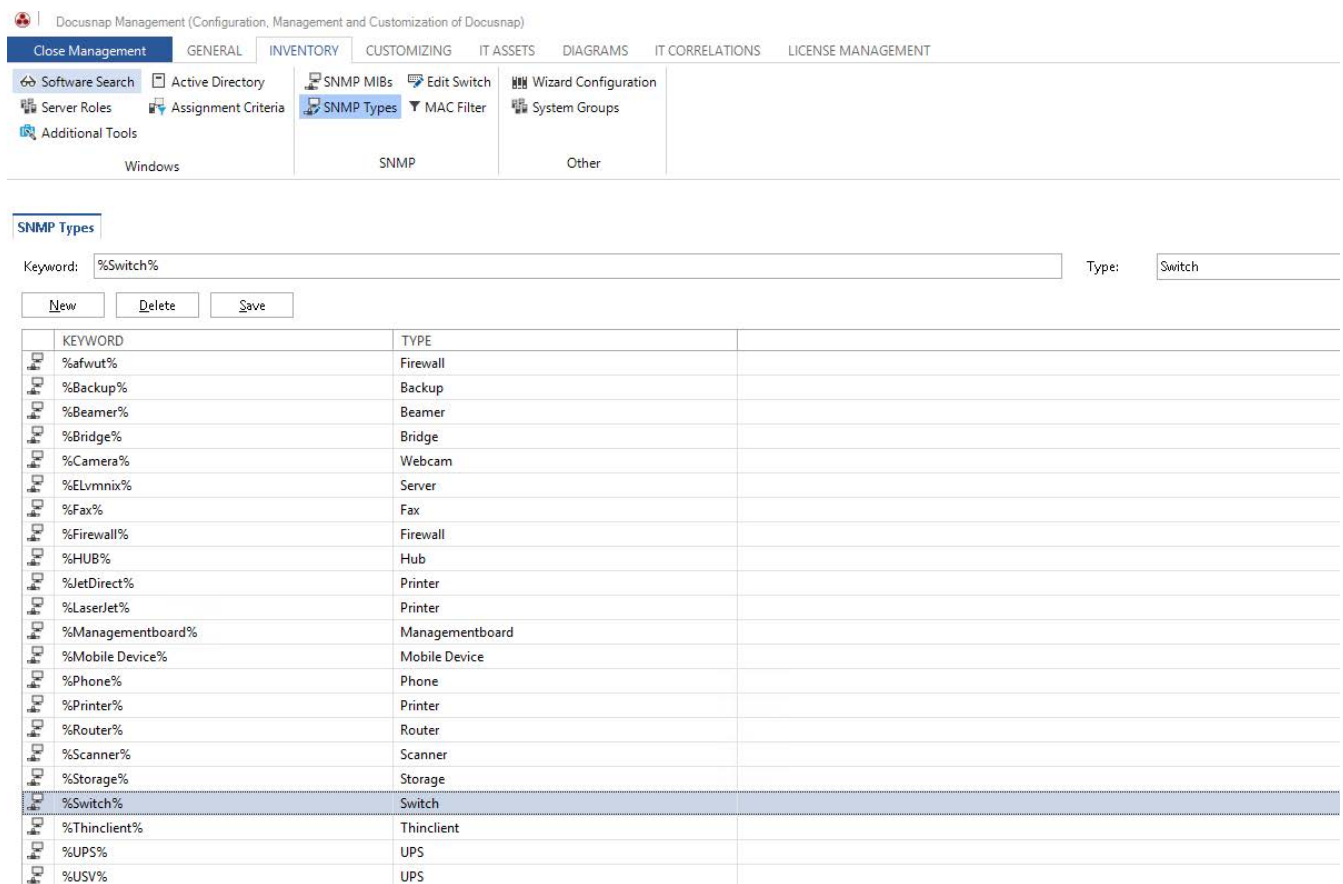
Fig. 11 - Topology Plan - Phones

4. DATA PREPARATION

The inventoried data can be prepared accordingly. For example, systems can be assigned to the correct type so that they appear as such in plans and reports. Thus the quality of these increases, since e.g. it becomes immediately apparent that it is a printer.

4.1 SNMP TYPES

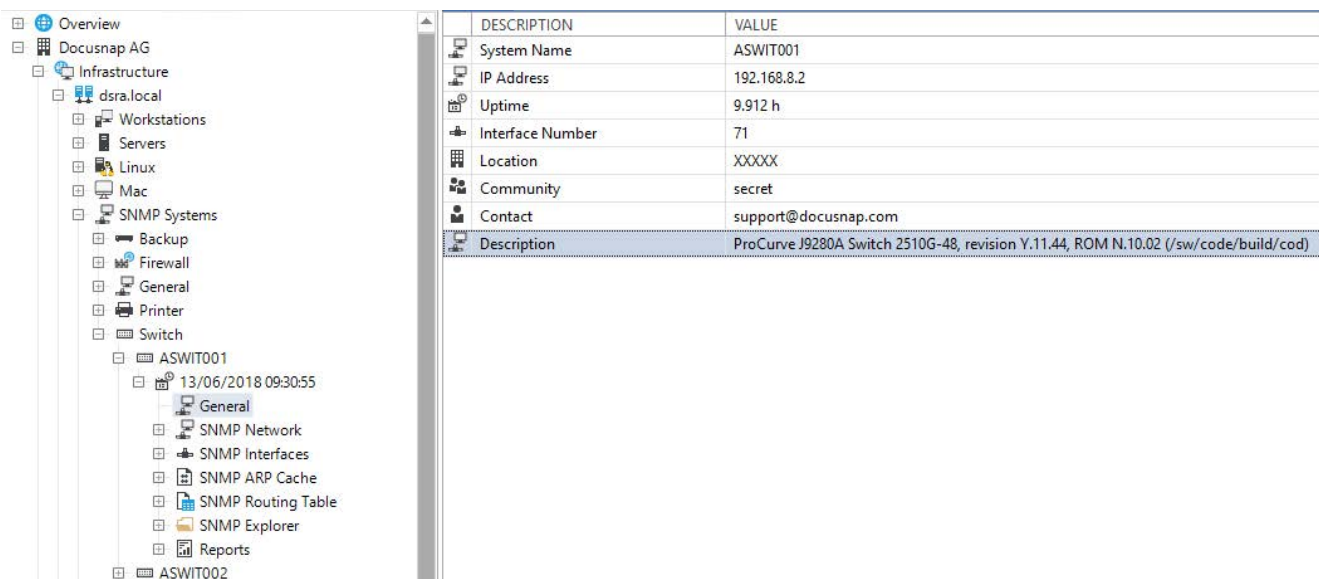
here are various SNMP types such as printers, switches and UPSs. These can be viewed and maintained in the **administration under Inventory - SNMP Types**. A corresponding search word must be stored there (see Figure 12).



KEYWORD	TYPE
%afwut%	Firewall
%Backup%	Backup
%Beamer%	Beamer
%Bridge%	Bridge
%Camera%	Webcam
%ELvmnix%	Server
%Fax%	Fax
%Firewall%	Firewall
%HUB%	Hub
%JetDirect%	Printer
%LaserJet%	Printer
%Managementboard%	Managementboard
%Mobile Device%	Mobile Device
%Phone%	Phone
%Printer%	Printer
%Router%	Router
%Scanner%	Scanner
%Storage%	Storage
%Switch%	Switch
%Thinclient%	Thinclient
%UPS%	UPS
%USV%	UPS

Fig. 12 - SNMP Types

In Figure 12, for example, the search word %Switch% is defined. If this is recognized in the description of an SNMP system, it is categorized as a switch. The description of an SNMP system can be found in the **General** section.



DESCRIPTION	VALUE
System Name	ASWIT001
IP Address	192.168.8.2
Uptime	9.912 h
Interface Number	71
Location	XXXXX
Community	secret
Contact	support@docusnap.com
Description	ProCurve J9280A Switch 2510G-48, revision Y.11.44, ROM N.10.02 (/sw/code/build/cod)

Fig. 13 - Hierarchical Structure - SNMP - General

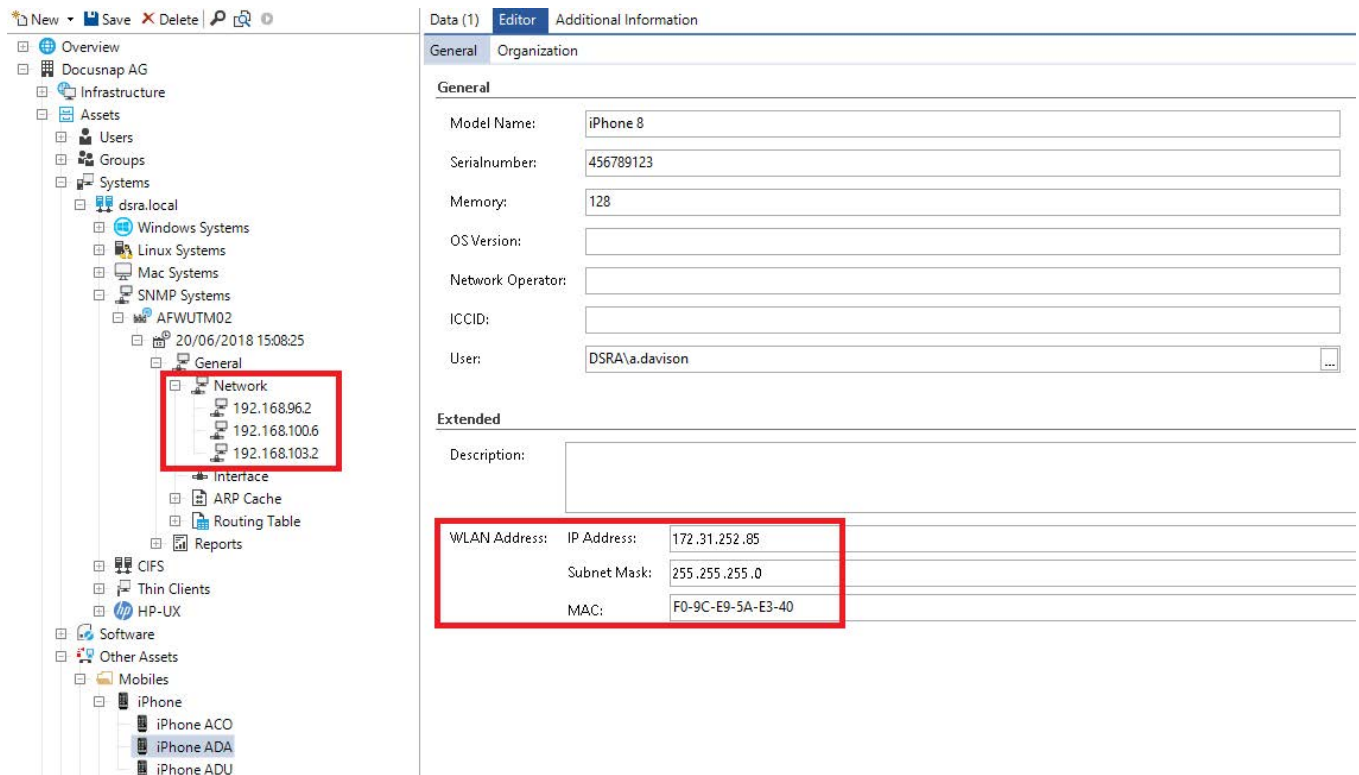
4.2 INTEGRATING MANUALLY CREATED DEVICES

Both manual systems (Windows, Linux, Mac, SNMP) and other assets can be included in plans (topology and network plans).

The following requirements must be met.

- Other assets - completed network information
- Manual systems - created network or interface

For the representation in the network plan the IP address and subnet mask are necessary and for the representation in the topology plan the MAC address.



The screenshot displays the Docusnap application interface. On the left, a tree view shows the hierarchy: Overview > Docusnap AG > Infrastructure > Assets > Systems > dsra.local > Windows Systems > Linux Systems > Mac Systems > SNMP Systems > AFWUTM02 > 20/06/2018 15:08:25 > General > Network. The 'Network' folder is highlighted with a red box. The right pane shows the 'General' tab for the selected device. The 'General' tab contains fields for Model Name (iPhone 8), Serialnumber (456789123), Memory (128), OS Version, Network Operator, ICCID, and User (DSRA\A.davison). The 'Extended' tab contains fields for Description, WLAN Address, IP Address (172.31.252.85), Subnet Mask (255.255.255.0), and MAC (F0-9C-E9-5A-E3-40). The 'WLAN Address', 'IP Address', 'Subnet Mask', and 'MAC' fields are highlighted with a red box.

Fig. 14 - Manual Systems - Other Assets

4.3 EFFECTS OF ADJUSTMENTS

The described adjustments result in a better representation of the systems in Docusnap. The adjustments can be seen in the following areas:

- Hierarchical Structure (Icons) - SNMP Types
- Network Map (Icons) - SNMP Types
- Topology / network plan - manually added systems (systems, other assets)

5. EXTENSION

The SNMP inventory can be extended by the integration of manufacturer MIBs. This allows additional OIDs to be read during inventory. It should be noted that this additional information must be prepared accordingly (view, report), since these are only visible in the SNMP Explorer.

5.1 INTEGRATE MANUFACTURER-SPECIFIC MIBS

The following example describes how manufacturer-specific MIBs can be integrated. The Entity.mib was used to read additional information of a switch (model, serial number). Further MIBs can be imported in the administration (Figure 15).

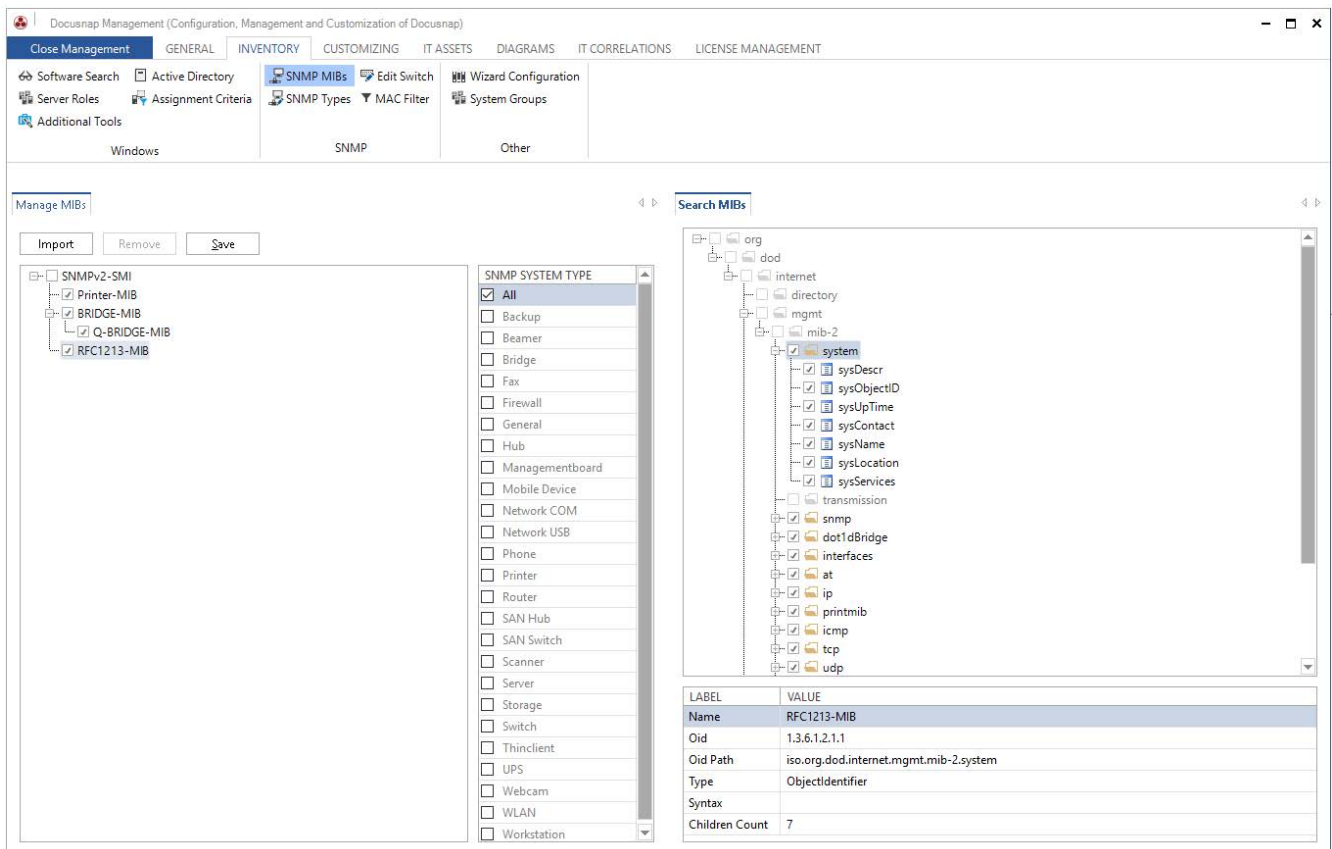


Fig. 15 - SNMP MIBs

MIBs can have various dependencies to other MIBs. If you import a MIB, an error message may appear if the dependency has not yet been resolved. Importing the **Entity.mib** causes the following error (Figure 16). How to resolve these dependencies is described later.

The following error message appears after importing the **Entity.mib**.

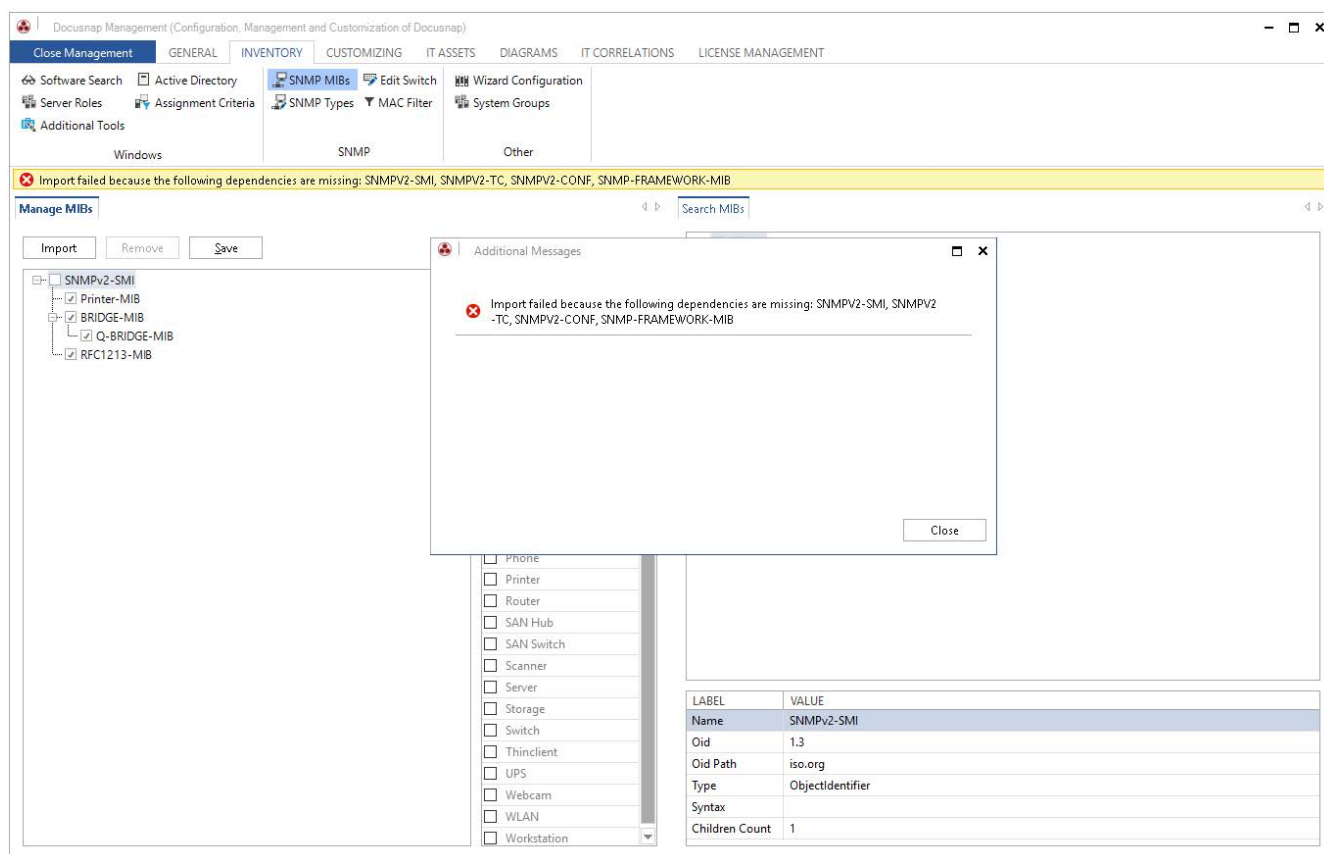
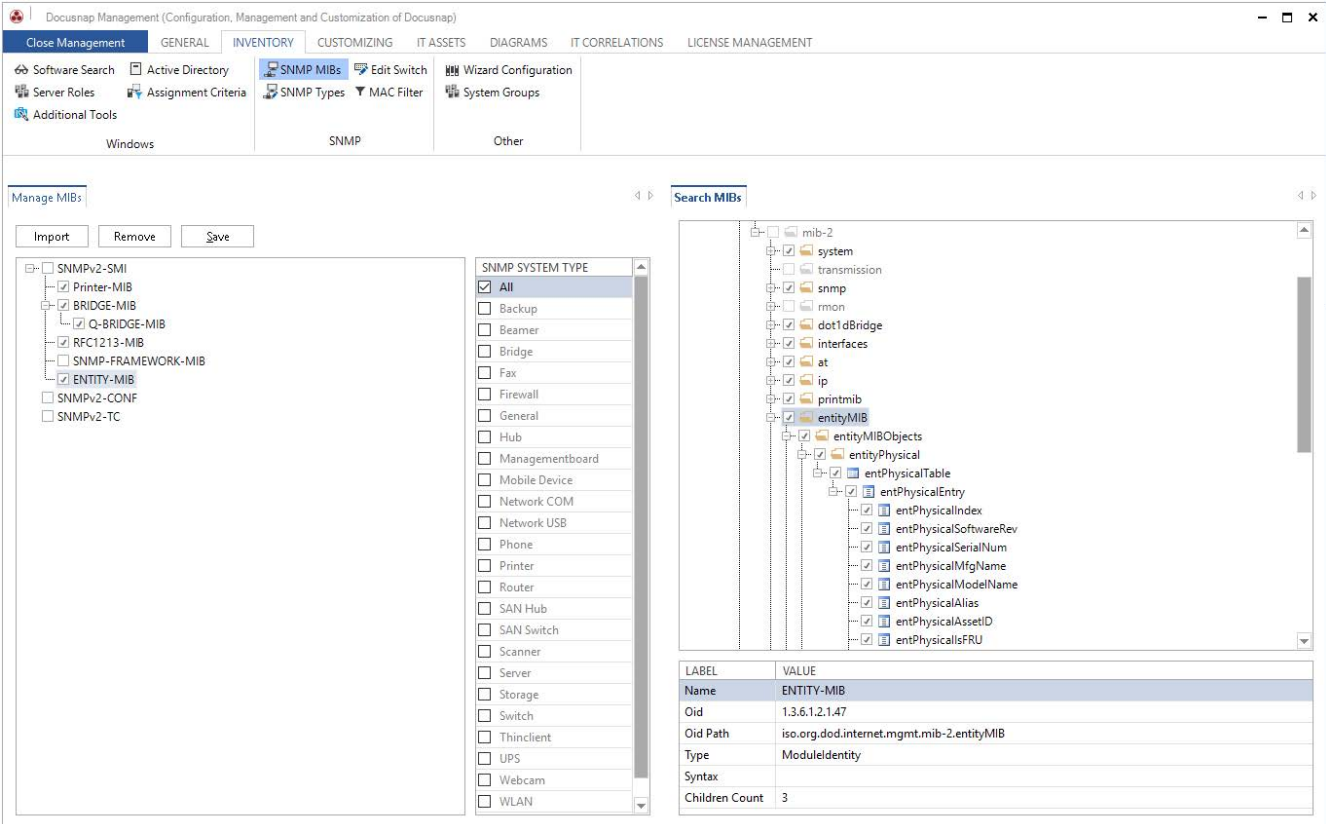


Fig. 16 - MIB Import Error

After the successful import (Figure 17), the MIB can be searched and the system type for which this MIB is read can be selected. Since the **Entity.mib** is a generally valid MIB, it should be read for all systems. It is therefore advisable to select the relevant types.



Manage MIBs

Import Remove Save

- SNMPv2-SMI
 - Printer-MIB
 - BRIDGE-MIB
 - Q-BRIDGE-MIB
 - RFC1213-MIB
 - SNMP-FRAMEWORK-MIB
 - ENTITY-MIB**
 - SNMPv2-CONF
 - SNMPv2-TC

SNMP SYSTEM TYPE

- ☒ All
- ☐ Backup
- ☐ Beamer
- ☐ Bridge
- ☐ Fax
- ☐ Firewall
- ☐ General
- ☐ Hub
- ☐ Managementboard
- ☐ Mobile Device
- ☐ Network COM
- ☐ Network USB
- ☐ Phone
- ☐ Printer
- ☐ Router
- ☐ SAN Hub
- ☐ SAN Switch
- ☐ Scanner
- ☐ Server
- ☐ Storage
- ☐ Switch
- ☐ Thinclient
- ☐ UPS
- ☐ Webcam
- ☐ WLAN

Search MIBs

- mib-2
 - system
 - transmission
 - snmp
 - rmon
 - dot1dBridge
 - interfaces
 - at
 - ip
 - printmib
 - entityMIB**
 - entityMIBObjects
 - entityPhysical
 - entPhysicalTable
 - entPhysicalEntry
 - entPhysicalIndex
 - entPhysicalSoftwareRev
 - entPhysicalSerialNum
 - entPhysicalMfgName
 - entPhysicalModelName
 - entPhysicalAlias
 - entPhysicalAssetID
 - entPhysicalsFRU

LABEL	VALUE
Name	ENTITY-MIB
Oid	1.3.6.1.2.1.47
Oid Path	iso.org.dod.internet.mgmt.mib-2.entityMIB
Type	ModuleIdentity
Syntax	
Children Count	3

Fig. 17 - SNMP MIB – Entity MIB

If an import error occurs when importing a MIB because dependencies are missing, they can be resolved as described below.

The following error occurs when importing the **Entity.mib**:

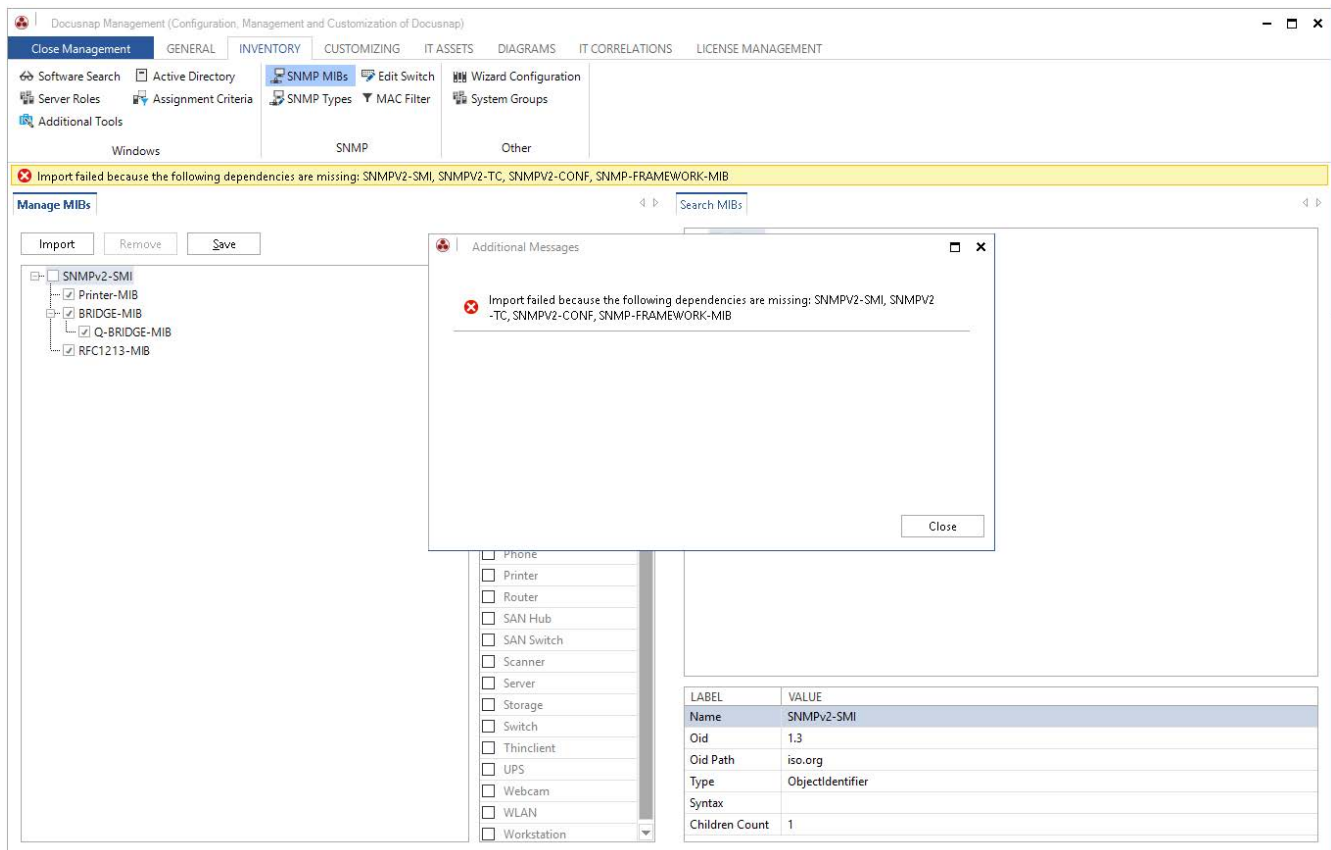


Fig. 18 - Error Message - Missing Dependencies

In order to resolve the dependencies, the required MIBs must be stored in the Docusnap settings path in the directory of the same name.

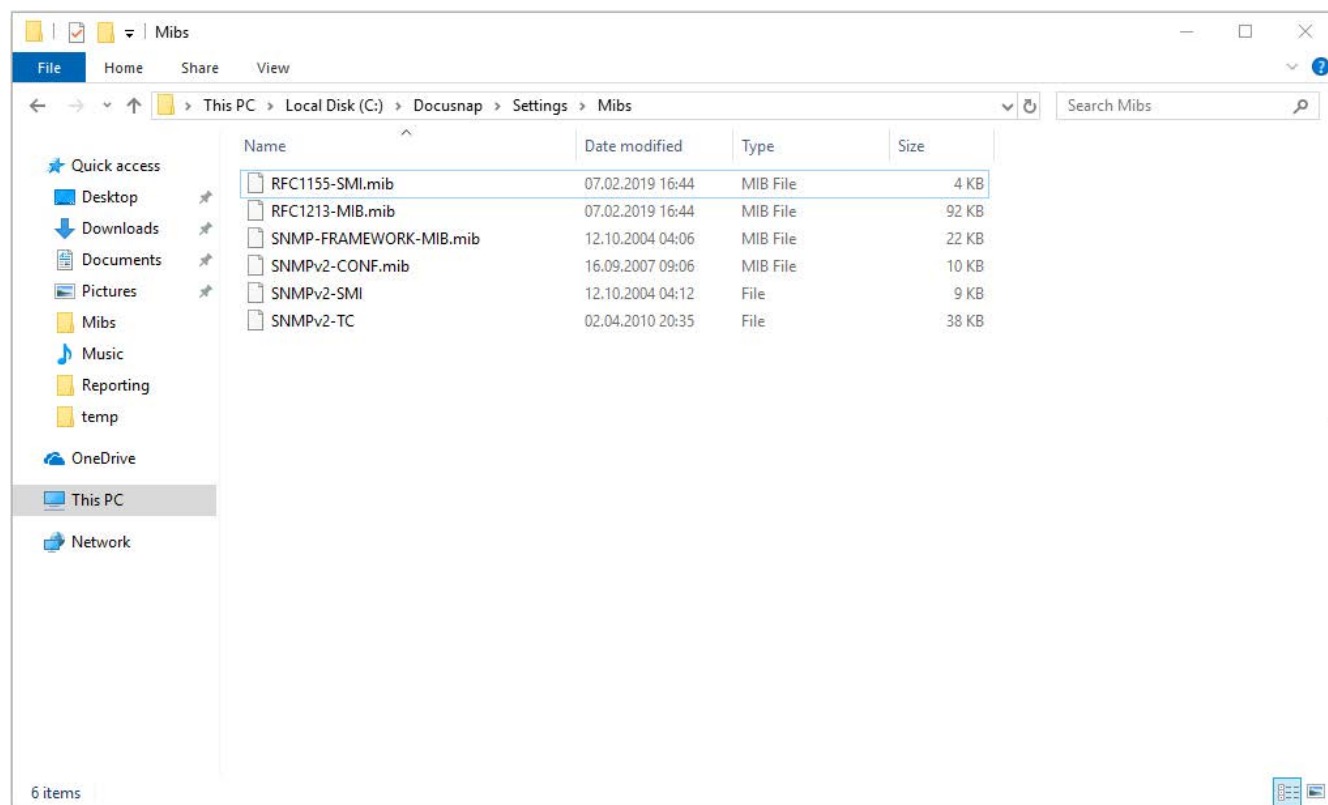


Fig. 19 - Setting Path - MIB Tray

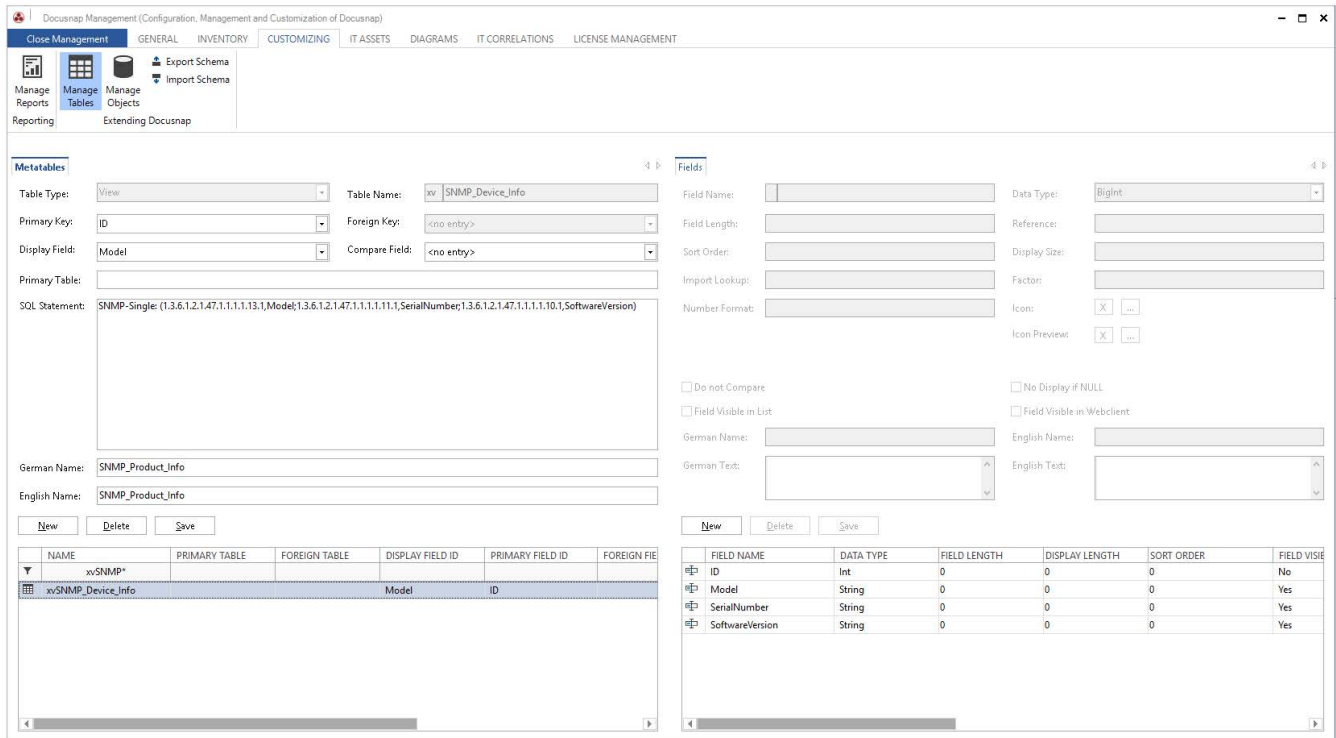
5.1.1 EVALUATE DATA

The additional information that is read by the MIB import can be found in the SNMP Explorer. This information can be formatted to appear in a report or in a new node in the hierarchical structure.

The following information is formatted in the following example:

- Product information such as model, serial number, software version, etc.

To display the information in the hierarchical structure, a new view was created - **xvSNMP_Product_Info**



The screenshot shows the 'Docusnap Management' window with the 'CUSTOMIZING' tab selected. The 'Metatables' section on the left shows the configuration for the 'xvSNMP_Product_Info' table. The 'Fields' section on the right shows the configuration for the fields in the table.

Metatables Configuration:

- Table Type: View
- Table Name: xvSNMP_Product_Info
- Primary Key: ID
- Foreign Key: <no entry>
- Display Field: Model
- Compare Field: <no entry>
- SQL Statement: SNMP-Single: (1.3.6.1.2.1.47.1.1.1.1.13.1,Model;1.3.6.1.2.1.47.1.1.1.1.11.1,SerialNumber;1.3.6.1.2.1.47.1.1.1.1.10.1,SoftwareVersion)
- German Name: SNMP_Product_Info
- English Name: SNMP_Product_Info

Fields Configuration:

- Field Name: ID, Data Type: BigInt, Field Length: 0, Display Length: 0, Sort Order: 0, Field Visible: No
- Field Name: Model, Data Type: String, Field Length: 0, Display Length: 0, Sort Order: 0, Field Visible: Yes
- Field Name: SerialNumber, Data Type: String, Field Length: 0, Display Length: 0, Sort Order: 0, Field Visible: Yes
- Field Name: SoftwareVersion, Data Type: String, Field Length: 0, Display Length: 0, Sort Order: 0, Field Visible: Yes

Table Structure:

NAME	PRIMARY TABLE	FOREIGN TABLE	DISPLAY FIELD ID	PRIMARY FIELD ID	FOREIGN FIE
xvSNMP*					
xvSNMP_Product_Info			Model	ID	

Fig. 20 - Create SNMP MIB View

The following statement was used:

```
SNMP-Single:
(1.3.6.1.2.1.47.1.1.1.1.13.1,Model;1.3.6.1.2.1.47.1.1.1.1.11.1,SerialNumber;1.3.6.1.2.1.47.1.1.1.1.10.1,SoftwareVersion)
```

To ensure that the view is also visible in the hierarchical structure, new headings and data objects have been added.

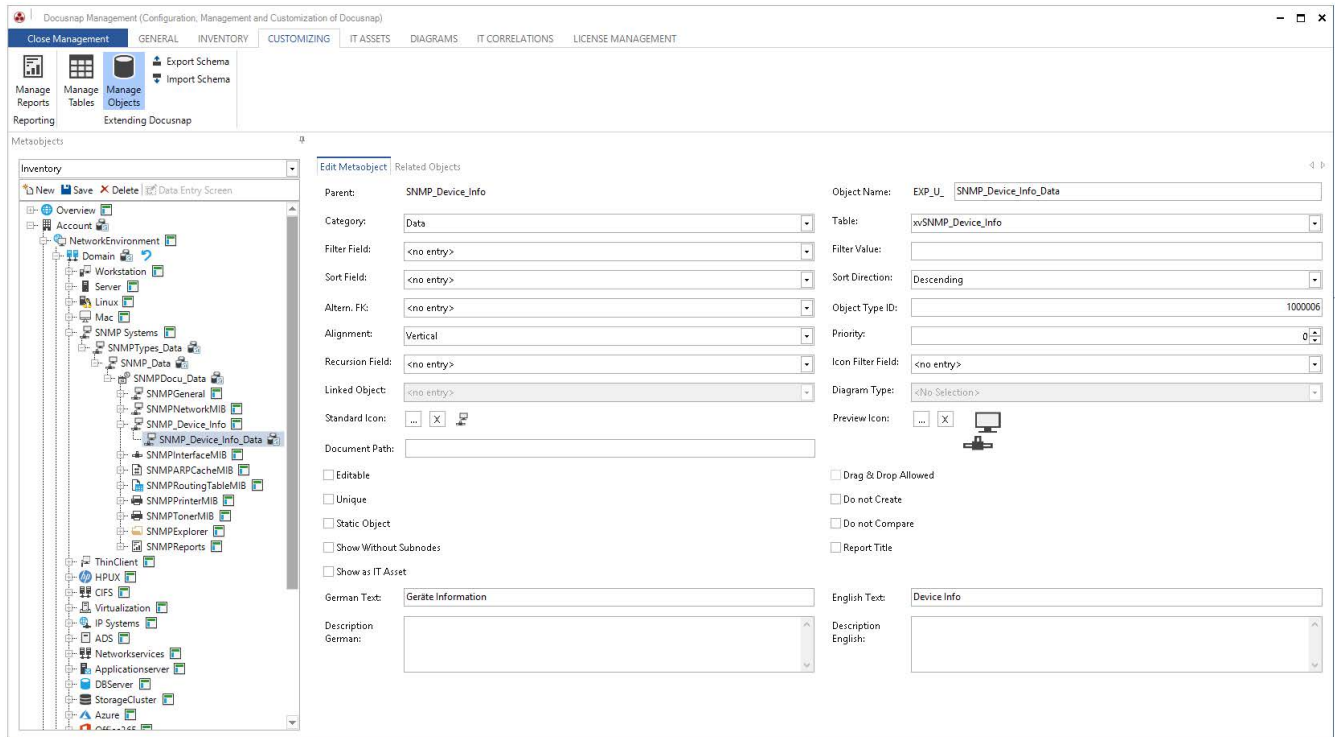
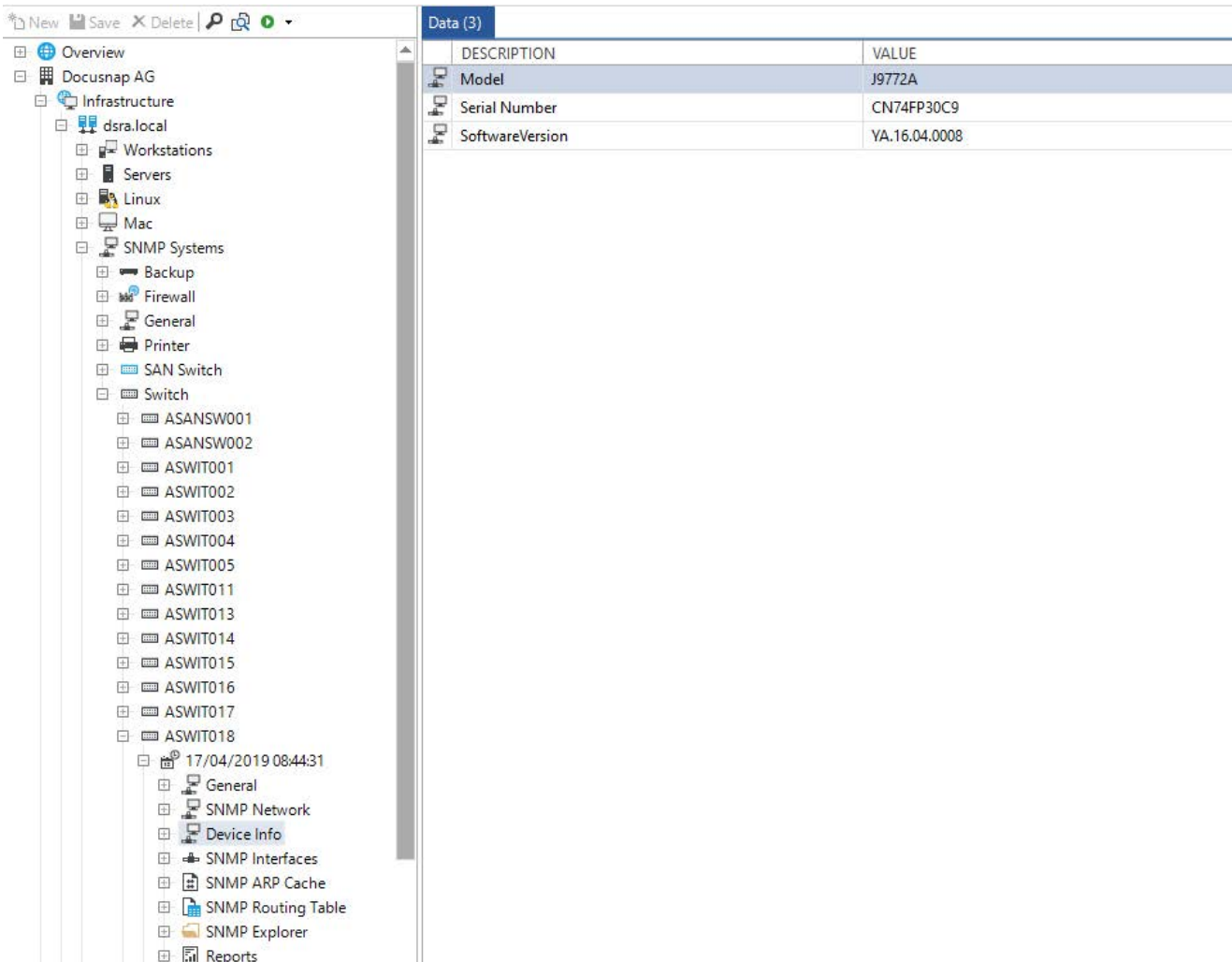


Fig. 21 - Extend Hierarchical Structure

When viewing the hierarchical structure, additional information is now displayed.



The screenshot displays the Docusnap application interface. On the left, a hierarchical tree structure is shown under 'Overview' > 'Docusnap AG' > 'Infrastructure' > 'dsra.local' > 'Switch'. The selected node is 'ASWIT018', which has a sub-entry '17/04/2019 08:44:31' containing 'General', 'SNMP Network', 'Device Info', 'SNMP Interfaces', 'SNMP ARP Cache', 'SNMP Routing Table', 'SNMP Explorer', and 'Reports'. The 'Device Info' entry is highlighted. On the right, a table titled 'Data (3)' displays the following information:

DESCRIPTION	VALUE
Model	J9772A
Serial Number	CN74FP30C9
SoftwareVersion	YA.16.04.0008

Fig. 22 - Extended Hierarchical Structure

5.2 STATEMENT TO DELETE OLDER SNMP SYSTEMS

The following statement can be used to identify SNMP systems that have not been inventoried for 3 months and then delete them from the database.

Please note that this statement deletes all SNMP systems that have not been inventoried for three months! Linked additional information is not deleted. This information is then no longer assigned to any system.

```
/**
Identify SNMP systems that have not been inventoried for 3 months
**/

SELECT Hostname, IpOnline, ScanDate FROM tHosts, tDocu
WHERE tHosts.HostID = tDocu.HostID
AND Archiv = 0
AND ScanDate <= DATEADD (MM,-3,SYSDATETIME()) --> (MM,-3,...) definition 3 month
AND HostTypeID IN (4) --> Restriction to SNMP systems
ORDER BY ScanDate

/**
Delete SNMP systems that have not been inventoried for 3 months
**/

DELETE tHosts
WHERE HostID in (
    SELECT HostID FROM tDocu
    WHERE ScanDate < DATEADD (MM,-3,SYSDATETIME())
    AND Archiv = 0
    AND HostTypeID in (4)
)
```

6. SNMP Troubleshooting - Checklists

Often the same errors occur with the SNMP inventory. In order to provide you with an opportunity for quick analysis and troubleshooting outside the classical support, two checklists are available for SNMP inventory. Docusnap Support first checks the same points for SNMP problems.

The first checklist deals with the solution of the SNMP inventory itself. The second checklist covers troubleshooting for missing topology information.

The checklists speak of SNMP agents and SNMP managers. These two terms essentially describe the function of the respective system.

SNMP Manager

Query system, e.g. Docusnap Server or Docusnap Client.

SNMP Agent

The queried system (to be inventoried). E.g. printer, switch, router or other SNMP capable network devices.

6.1 Checklist - SNMP inventory not possible

1. ☐ Supports SNMP target system
 - a. ☐ Yes: continue with next step
 - b. ☐ No: SNMP inventory is not possible. Device must be recorded manually
2. ☐ Is the SNMP protocol enabled on the agent?
 - a. ☐ Yes: continue with next step
 - b. ☐ No: Activate SNMP
3. ☐ Is communication via ping between SNMP agent and manager possible?
 - a. ☐ Yes: continue with next step
 - b. ☐ No: Check network connection
4. ☐ Does the communication between SNMP agent and manager take place via an additional network device, e.g. a firewall?
 - a. ☐ No: continue with next step
 - b. ☐ Yes: Check firewall log. If necessary, this blocks the connection.
5. ☐ Which SNMP version is supported?
 - a. ☐ SNMP v1/ v2
 - i. ☐ Is the correct community string used?
 1. ☐ Yes: continue with next step
 2. ☐ No: Customize Community String
 - b. ☐ SNMP v3
 - i. ☐ Authentication data correct?
 1. ☐ Yes: continue with next step
 2. ☐ No: Adapt authentication data
6. ☐ Check if there is a Backslash or an @ in the Community String / Username / Password
 - a. ☐ No: continue with next step
 - b. ☐ Yes: Change password. Many systems have a problem with special characters
7. ☐ Is the SNMP Manager (querying system, Docusnap client or server) authorized for SNMP queries?
 - a. ☐ No: Authorize SNMP Manager to SNMP Agent for SNMP Polling.
 - b. ☐ Yes
 - i. ☐ Is the right system required?
 1. ☐ Yes: continue with next step
 2. ☐ No: Select the correct system
8. ☐ Does the configured access have to be authorized to the OID tree?
 - a. ☐ Yes: continue with next step
 - b. ☐ No: Assign permissions to the community or group.
9. ☐ If the query is blocked by (monitoring) firewalls or security solutions (flooding protection, intrusion protection), if necessary
 - a. ☐ No: continue with next step
 - b. ☐ Yes: configure appropriate exceptions
10. ☐ Check if Docusnap can perform an inventory.
 - a. ☐ Yes: Checklist successfully completed
 - b. ☐ No: check if SNMP Agent is part of the configured IP segment
 - i. ☐ Yes: continue with next step
 - ii. ☐ No: Add IP segment
11. ☐ Check if 3rd Party Tool like Paessler can read the data (Description, Interfaces)
 - a. ☐ No: continue with next step
 - b. ☐ Yes: Contact Docusnap Support

12. ☐ Is the firmware of the SNMP agent up to date?
 - a. ☐ Yes: continue with next step
 - b. ☐ No: Check update for current version. (no warranty on the part of Docusnap Support)
13. ☐ Contact Docusnap Support

6.2 Checklist - Missing Topology Information

LLDP

Link Layer Discovery Protocol

CDP

Cisco Discovery Protocol

1. ☐ Supports SNMP system neighborhood protocols (CDP, LLDP)
 - a. ☐ Yes: continue with next step
 - b. ☐ No: Topology only possible via manual configuration
2. ☐ Is LLDP or CDP activated?
 - a. ☐ Yes: continue with next step
 - b. ☐ No: Activate LLDP or CDP
3. ☐ Is a uniform neighbourhood protocol used?
 - a. ☐ Yes: continue with next step
 - b. ☐ No: Configure uniform neighborhood protocol
4. ☐ Does the configured access still have to be authorized on the OID tree?
 - a. ☐ No: continue with next step
 - b. ☐ Yes: Assign permissions to the community or group.
5. ☐ Is the firmware up to date?
 - a. ☐ Yes: continue with next step
 - b. ☐ No: Check update for current version. (no warranty on the part of Docusnap Support)
6. ☐ Contact Docusnap Support

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VERSION HISTORY

Date	Description
April 16, 2019	Version 1.0 created
September 27, 2019	Description Topology Plan and VLAN Plan adapted and extended
December 19, 2019	Added checklist for SNMP troubleshooting and SNMP inventory with Docusnap

