INSTALLATION AND OPERATING MANUAL

EN

JNC and VIRTUAL-JNC for Windows Shutdown Agent SW

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CONTENTS

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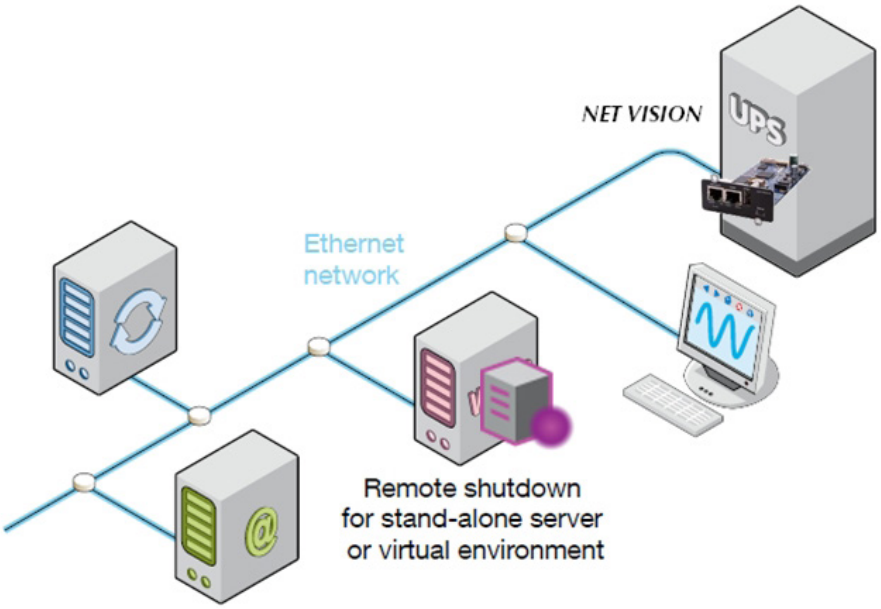
1.1 INTRODUCTION

This document describes the installation and the configuration of SOCOMEC Shutdown Agent. This SW is an “all in one package” for standalone PCs or servers with MS Windows (JNC), and also for VMware vCenter, Microsoft Hyper-V and Citrix XenServer environments (VIRTUAL-JNC).

The shutdown events are managed from NET VISION or RT VISION (Optional or Embedded Card) UPS network interface.



2. GENERAL DESCRIPTION

The Shutdown Agent is software for automatically managing the graceful shutdown of standalone workstations/servers, virtual machines and related hosts.

It includes an intuitive graphical interface and ensures an ordered shutdown process.

The Shutdown Agent, installed on Microsoft Windows physical/virtual machine, consists of two graphical applications, and a service:

- **Shutdown Agent Configuration**
  - UPS connection settings and network configuration
  - Server / Host parameters and virtual environment settings
  - Delay and shutdown parameters depending on server type.
- **Shutdown Agent Viewer**
  - UPS Status and shutdown event
  - Shutdown process notification
- **Shutdown Agent Service**
  - The shutdown agent is managed as a Windows service

2.1 NETWORK ADAPTER

The UPS which supplies the server / Host must be equipped with a SOCOMEC Network adapter (i.e. NetVision) and shutdown events and timings must be configured via the web pages.

NET VISION Shutdown events configuration page (Refer to NET VISION or RT VISION user manual for more details).

SHUTDOWN MANAGEMENT

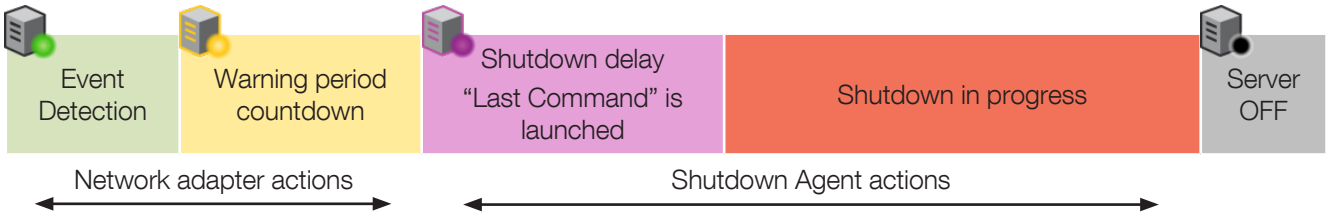
UPS Shutdown Delay (Sec)		Request to shut off the UPS after delay
UPS Shut Off	Disabled ▼ Enabled	
UPS On Delay (mn)		Request to restart the UPS
Level of battery capacity (%)	0 - 100	Set the battery level for event shutdown

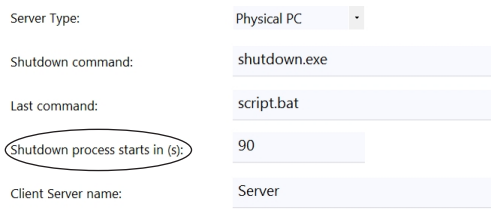
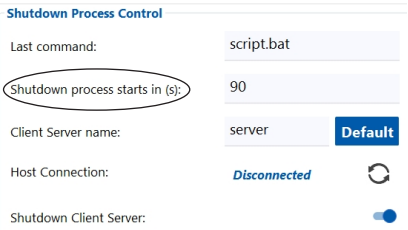
Shutdown Event	Shutdown Actions	Warning Period (Min)	1st Warning (Sec)	Warning Interval (Sec)
On Battery Bat. Low / Discharged Battery Level Imminent Stop UPS Overload UPS over Temperature On Bypass EMD events	Disabled ▼ Warning Shutdown	Delay in minutes before sending shutdown command to Shutdown Agent SW	Delay in seconds before sending the first warning message to sever	Delay between 2 warning messages sent to server

WARNING!
Make sure that the UPS shut-off time period is longer than the total time period for the shutdown procedure for the Server / Hosts supplied by the UPS

2.2 SHUTDOWN PROCESS

At the end of Warning period the network adapter sends a “SHUTDOWN REQUEST” to Shutdown Agent



Standalone Computer	Host / VM environment
	

2.3 SHUTDOWN PROCESS FOR VM ENVIRONMENT

For VM environment the shutdown procedure is split into 4 sequences:

Sequence	Shutdown process action
1	All VMs in “**Ordered Group**” are shut down one by one.
2	All VM in “**Any Order Group**” are shut down together. This sequence has a timeout of 1 minute set by default.
3	If the Shutdown Agent is installed on a specific server this server will shut down after a timeout of 90s.
4	Hosts are powered off at the end of the procedure, if this function has been enabled.

3. WINDOWS PLATFORM COMPATIBILITY

Shutdown Agent SW is compatible with following version, independently in the virtual environment.
This SW has to be installed on a windows platform with at least.Net Framework 4.8.

3.1 SD AGENT FOR STANDALONE STATION / SERVER

- Windows 7
- Windows 8
- Windows 10

SD-Agent version V4.00:
- Windows 2008 R2
- Windows Server 2012 R2
- Windows Server 2016

SD-Agent V4.30 compatibility:
- Windows Server 2019
- Windows Server 2022

3.2 SD AGENT FOR VIRTUAL ENVIRONMENT

MICROSOFT HYPER-V

SD-Agent version 4.00 compatibility:
- Hyper-V Server 2012 R2, 2016, 1709 (last 6 months release tested)
- Windows Server 2012 R2, 2016 with Hyper-V role
- SCVMM 2012 R2
- SCVMM 2016 R2
- SCVMM 1801 (last 6 months release tested)

SD-Agent V4.30 compatibility:
- Windows Server 2019 and 2022 with Hyper-V role enabled
- Hyper-V Server 2019
- SCVMM 2019
- SCVMM 2022

VMWARE VSPHERE (ESXi & vCenter)
- Free licence not supported
- Version 5.5 / 6.0 / 6.5 / 6.7
- Version 7.x
- Version 8

XEN SERVER
- 6.5 / 7.4

WARNING!
IT configurations are approximate and cannot be considered definitive because they are IT environment dependent and outside the scope of this user manual.

3.3 INSTALLATION CASES FOR VIRTUAL ENVIRONMENTS

The Shutdown agent SW has to be installed on a Windows OS according to following architecture:

3.3.1 VMWARE VSPHERE

<table>
<tr><td rowspan="2">Architecture</td><td colspan="3">Vmware vSphere</td></tr>
<tr><td>Without vCenter</td><td>With Windows vCenter</td><td>With Linux* vCenter</td></tr>
<tr><td rowspan="2">Shutdown Agent has to be installed on:</td><td colspan="2">Windows VM
  The ShutDown Agent will only turn off the VMs installed on same host.</td><td>vCenter Server (VM or physical)</td><td>Windows VM</td></tr>
<tr><td colspan="3">Thanks to vCenter for H.A. and vMotion technology it is not necessary to change the shutdown parameters.
Moving the VM where Shutdown Agent is running has no effect on its operation</td></tr>
</table>

(*) Shutdown Agent SW is not designed to be installed on Linux OS.

3.3.2 MICROSOFT HYPER-V OR SCVMM

Architecture	Microsoft Hyper-V		Microsoft SCVMM	
	Server with Hyper-V role	Hyper-V Server or Windows Server without "Desktop Experience" (GUI)	VM installation	Server installation
Shutdown Agent has to be installed on:	Same Server	Windows VM	Same VM	Same Server

3.3.3 XEN SERVER

Architecture	Citrix XEN Server	
	Single Host	Poll master
Shutdown Agent has to be installed on:	Windows VM	Windows VM installed on Poll master Host

4. SHUTDOWN AGENT SW INSTALLATION

The SD Agent SW installation package is available on SOCOMEC's website.

4.1 PREREQUISITES

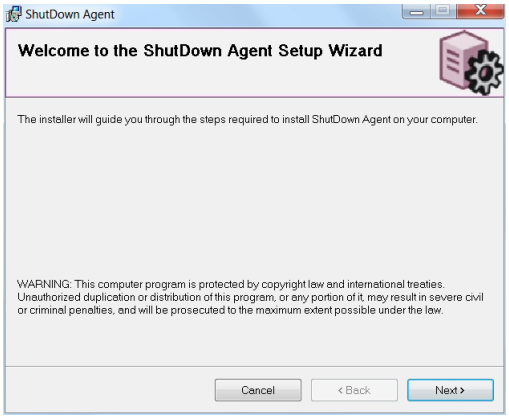
For all MS Windows versions, it is necessary to install SD Agent with admin credentials. For specific requirements, please check the section for your MS Windows version.

	Vmware vSphere	Microsoft Hyper-V	Microsoft SCVMM	Citrix XEN Server
TOOL	VMware tools must be installed on all virtual machines for a **graceful shutdown** instead of power off command.	Integration Services must be installed on all VMs for a **graceful shutdown** instead of a power off command (usually present by default at VM creation). Remote management must be enabled on Hyper-V and SCVMM Servers		
DNS		In SD Agent program, insert the server name instead of IP address (see also Configuration page, later in this manual). Hyper-V and SCVMM server names must be resolvable in a FQDN format, using a DNS server		XenServer names must be reachable using the DNS name or, alternatively, using the IP address.
SECURITY		Refer to Appendix 1: Security and Connection		The user (admin login) must have the "Pool Operator" role configured in the XenServer.

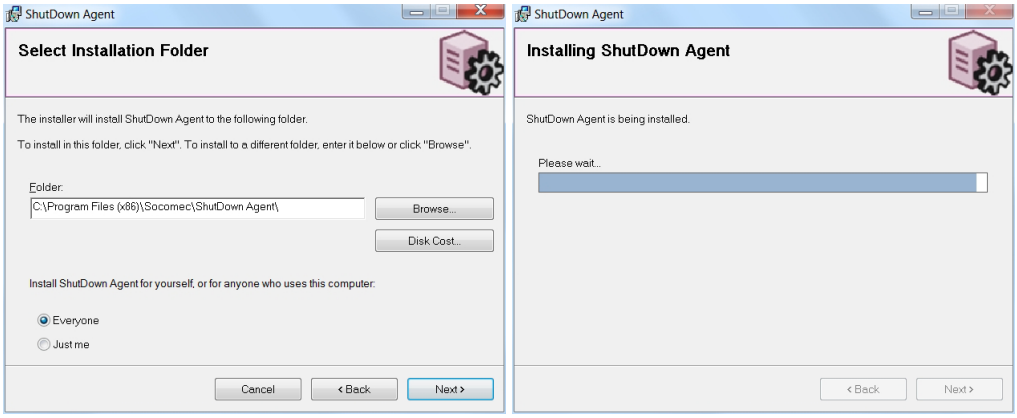
4.2 STANDARD INSTALLATION PROCEDURE

Run setup.exe programme on the targeted system.

The licence agreement must be read and accepted before installing the SW.

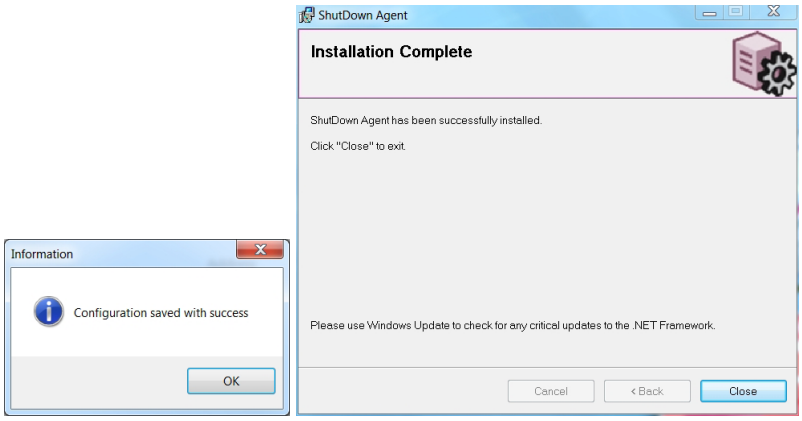


The SD Agent is installed on '\Program Files' folder by default

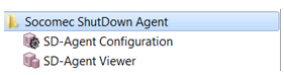


Once the installation is finished, the configuration program starts automatically.

The installation tool will close when the configuration has been completed and saved.



A new program group is created with 2 applications: configuration tool and Viewer as SD Agent monitor application.

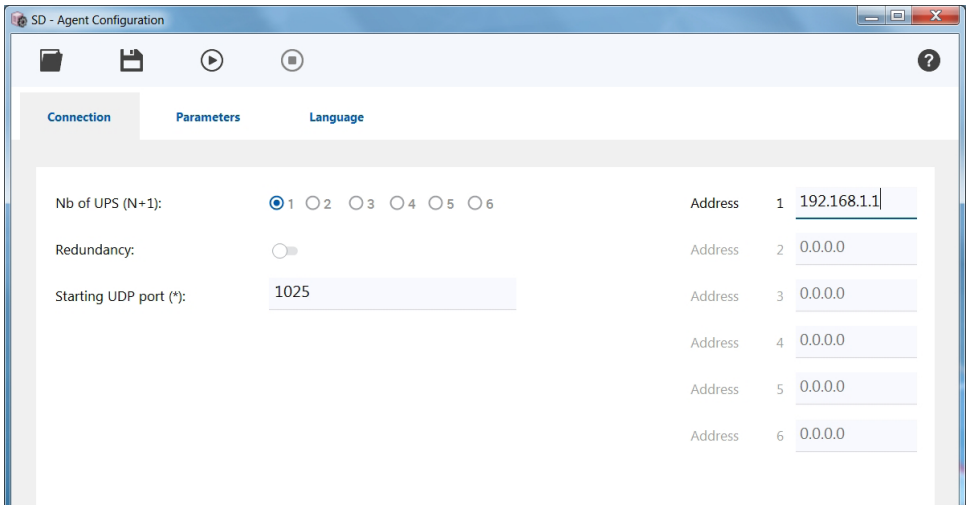


4.3 WINDOWS SERVICE

The shutdown procedure is controlled by the "Socomec Shutdown Agent" service. By default this service starts automatically during the Windows starting phase.

5. SD AGENT CONFIGURATION

5.1 CONFIGURATION TOOL DESCRIPTION

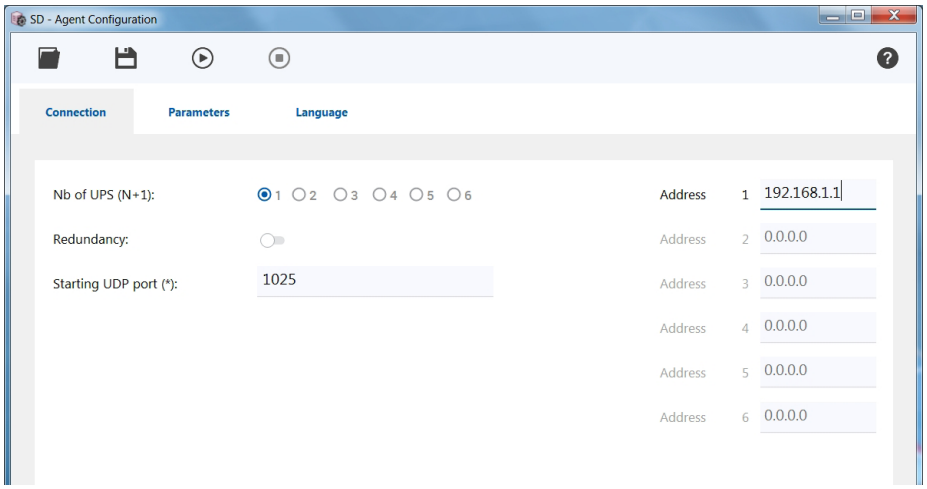


Functions	Description
	Load an existing configuration file
	Save current configuration and restart the service
	Service is stopped: Start the service manually
	Service has started: Stop the service manually
	Open “About” window.
	No connection with UPS
	UPS is connected to SD Agent
Connection	Access to UPS and network interface settings
Parameters	Access to Shutdown parameters
Virtual Machines	Access to VM shutdown order sequence (this tab is not present for standalone PCs or Servers)
Language	Access to available language list. Click on the flag to select the language and save the setting

5.2 UPS CONNECTION

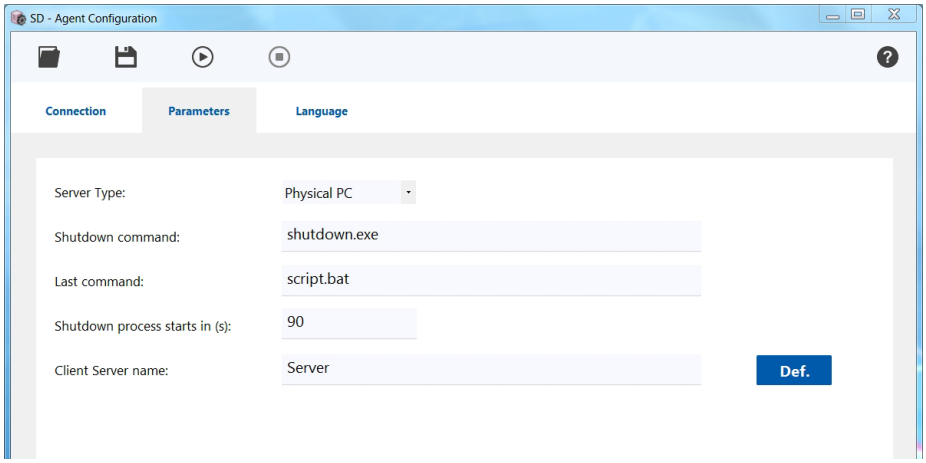
By default there is only 1 UPS system (standalone UPS or parallel UPS) to be linked to SD agent.

In the case of several UPS systems for a backup power supply the number of UPS systems has to be selected and the IP address of each Network interface has to be stated.



Field	Description	Default value
Nb of UPS systems	Defines the number of network devices connected to the same server / Hosts. (also required for DIGYS and MASTERYS BC up to 40 kVA range parallel system).	1
Redundancy	Enable or disabled redundancy. If enabled the Shutdown Agent checks if there are shutdown events from **at least two UPSs** to start the procedure.	Disabled
UDP Port	UDP port used for communication with Network interface. The Service is linked on this port. If the port is busy, the service looks for the next free port.	1025

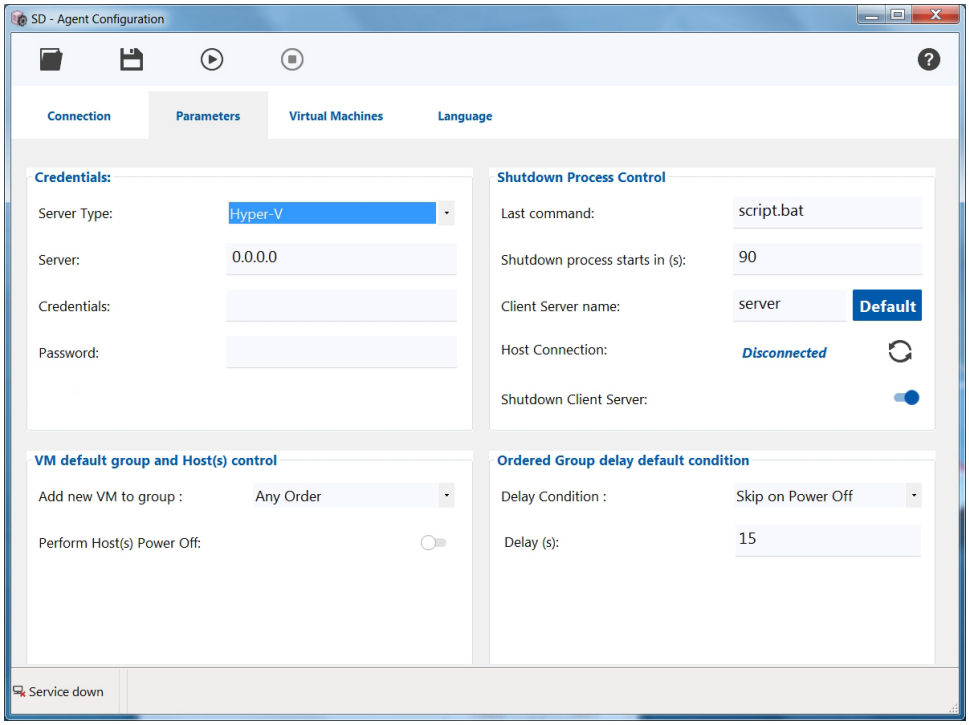
5.3 STANDALONE WINDOWS PC OR SERVER



Field	Description	Default value
Server type	Fixed to Physical PC for this configuration.	Physical PC
Shutdown command	Can be set with a batch file or direct shutdown command. Example: shutdown.exe /L /C /T:01	Empty
Last command	Set with the batch file name to execute when shutdown is requested, before complete OS shutdown. Gives possibility of stopping and closing application before OS shutdown.	Empty
Shutdown process starts in (s)	Defines the time between the shutdown request and the OS shutdown command. The delay set is greater than the time execution of the last command script.	90
Client Server name	Name of the server / PC. This name is shown on the NET VISION interface. Def. button reports the server / PC name automatically.	Empty

Click on to save the parameters and the service starts automatically.

5.4 MICROSOFT HYPER-V AND SCVMM SERVER



CREDENTIALS

Field	Description	Default value or format
Server type	Defines the type of virtual environment	Hyper-V SCVMM
Server	Insert FQDN instead of server name or IP address. If more than one server is present, separate them using semicolon (;), i.e. “server-name1.domain; servername2.domain”. server name ⚠ **Localhost is not allowed**	0.0.0.0

Credentials	User name for Hyper-V admin account. Please note that credentials must be common to all servers (hosts), if more than one present.
	⚠ **The user must be authorised to:**
	- Remotely manage the Hyper-V / SCVMM server.
	- Fully manage the Hyper-V / SCVMM environment.
	- Perform shutdown on the Hyper-V / SCVMM.
	- Perform shutdown on every Hyper-V server in the environment.
		Format:
		`DOMAIN\UserName`
		`or UserName`

Password	Hyper-V admin account password	Empty
Security and Connection	refer to Appendix 1 : Security and Connection	Enabled

SHUTDOWN PROCESS CONTROL

Field	Description	Default value
Last command	Sets the batch file name, or the command with parameters, to execute when the shutdown is requested, before OS shutdown command. Gives possibility of stopping and closing application before OS shutdown.	Empty
Shutdown process starts in (s)	Defines the time between the shutdown request and the OS shutdown command. The delay set is greater than the time execution of the last command script.	90
Client Server name	Name of the server / VM. This name is shown on the NET VISION interface. Def. button reports the server / VM name automatically.	Empty
Host connection	Displays the status connection: - Disconnected - Connecting - Connected	Disconnected
Connection tool-tip - role-over connection status	host - info - warning where info can be: - CONNECTED via HTTP - CONNECTED via HTTPS - DISCONNECTED where warning can be: - http Not Reachable - https Not Reachable - certificate not trusted	picture next page(*)
	To refresh the connection status	
Shutdown Client Server	To enable if the SD agent is not installed on the Hyper-V host. This function will turn off the VM where the SD agent is installed at the end of the shutdown process before the Hyper-V host shutdown. If the SD Agent is installed on Hyper-V host or on the same VM as SCVMM this function has no effect.	Disabled

VM DEFAULT GROUP

Field	Description	Default value
Add new VM to group	Defines the default group of VM shutdown to which a new VM is added and in the case where this new VM is installed after the SD Agent configuration. - Ordered (each VM has its own shutdown sequence position) - Any order (power off forced after ordered sequence) - No shutdown (power off with host if requested)	Any Order
Perform HOST(s) power off	This option allows Hyper-V host POWERED OFF when all VMs are down. In the case of clusters all Hyper-V hosts will be powered off at the same time. Note: if SVMM is installed on a VM of this host, this host will be powered off 10s after other hosts.	Enabled

ORDERED GROUP

Field	Description	Default value
Delay condition	Defined when the sequence moves from the current VM in shut-down, to the next - **Skip power off**: if current VM stops/powers off, or already is, the sequence passes immediately to the next VM. - **Wait full delay**: in this case the whole delay is waited, before the sequence moves from current VM to next.	Skip power off
Delay (s)	Defines the shut off delay of VM.	15

Click on to save the parameters and the service starts automatically.

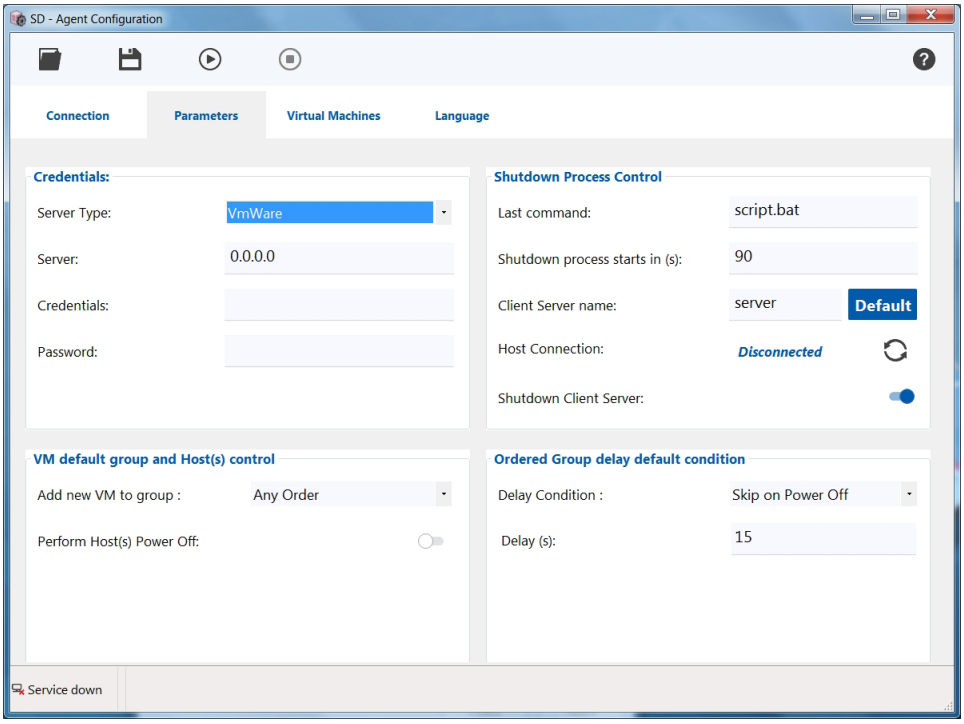
(*) Tool-tip for connection label

A tool-tip with connection info is present (mouse over Host Connection info label):

1 Host case example

2 Hosts case example

5.5 VMWARE VCENTER



CREDENTIALS

Field	Description	Default value or format
Server type	Defines the type of Virtual environment	VmWare
Server	IP address, only IPv4 format, or server name of ESX host, vCenter VM or vCenter server depending on where the SD Agent is installed. The names may or may not be in FQDN format, depending on the name resolution configuration. ⚠ Localhost is not allowed	0.0.0.0
Credentials	User name for admin account.	
Password	Admin account password.	Empty

SHUTDOWN PROCESS CONTROL

Field	Description	Default value
Last command	Sets the batch file name, or the command with parameters, to execute when the shutdown is requested, before OS shutdown command. Gives possibility of stopping and closing application before OS shutdown.	Empty
Shutdown process starts in (s)	Defines the time between the shutdown request and the OS shutdown command. The delay set is greater than the time execution of the last command script.	90
Client Server name	Name of the server / VM. This name is shown on the NET VISION interface. Def. button reports the server / VM name automatically.	Empty
Host connection	Displays the status connection : **Disconnected** **Connecting** **Connected**	Disconnected
	To refresh the status connection.	
Shutdown Client Server	To enable if the SD agent is installed on the vCenter server. This function will turn off the vCenter server 30s after the end of the shutdown process. If SD agent is installed on vCenter VM or on a dedicated VM this function has no effect. The VM will be turned off during the shutdown process.	Disabled

VM DEFAULT GROUP

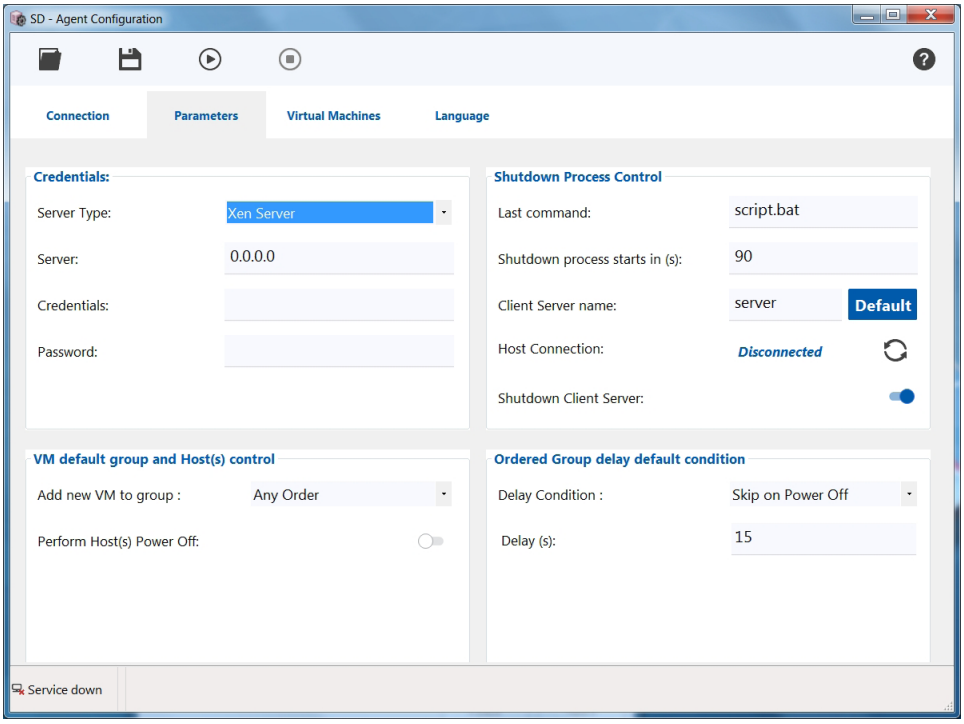
Field	Description	Default value
Add new VM to group	Defines the default group of VM shutdown to which a new VM is added and in the case where this new VM is installed after the SD Agent configuration. - **Ordered** (each VM has its own shutdown sequence position). - **Any order** (power off forced after ordered sequence). - **No shutdown** (power off with host if requested).	Any Order
Perform HOST(s) power off	If this option is selected the host will be POWERED OFF when all VMs are down. In the case of clusters all hosts will be powered off at the same time. Note: If the SD Agent is installed on a VM on this host, it will power off after 10 s with respect to the other hosts.	enabled

ORDERED GROUP

Field	Description	Default value
Delay condition	Defined when the sequence moves from the current VM in shutdown, to the next - **Skip power off**: if current VM stops/powers off, or already is, the sequence passes immediately to the next VM. - **Wait full delay**: in this case the whole delay is a waited, before the sequence moves from current VM to next.	Skip power off
Delay (s)	Define the shut off delay of VM.	15

Click on  to save the parameters and the service starts automatically.

5.6 XEN SERVER



CREDENTIALS

Field	Description	Default value Or format
Server type	Defines the type of Virtual environment	Xen Servere
Server	IP address, only IPv4 format, or server name of Xen Server host. The names may or may not be in FQDN format, depending on the name resolution configuration. ⚠ **Localhost is not allowed**	0.0.0.0
Credentials	User name for admin account. ⚠ **This user must have the Pool Operator role.**	
Password	Admin account password	Empty

SHUTDOWN PROCESS CONTROL

Field	Description	Default value
Last command	Sets the batch file name, or the command with parameters, to execute when the shutdown is requested, before OS shutdown command. Gives possibility of stopping and closing application before OS shutdown	Empty
Shutdown process starts in (s)	Defines the time between the shutdown request and the OS shutdown command. The delay set is greater than the time execution of the last command script.	90
Client Server name	Name of the server / VM. This name is shown on the NET VISION interface Def. button reports the server / VM name automatically	Empty
Host connection	Display the status connection : - **Disconnected** - **Connecting** - **Connected**	Disconnected
	To refresh the status connection	
Shutdown Client Server	The VM where the SD Agent is installed will be turned off at the end of the shutdown process.	Disabled

VM DEFAULT GROUP

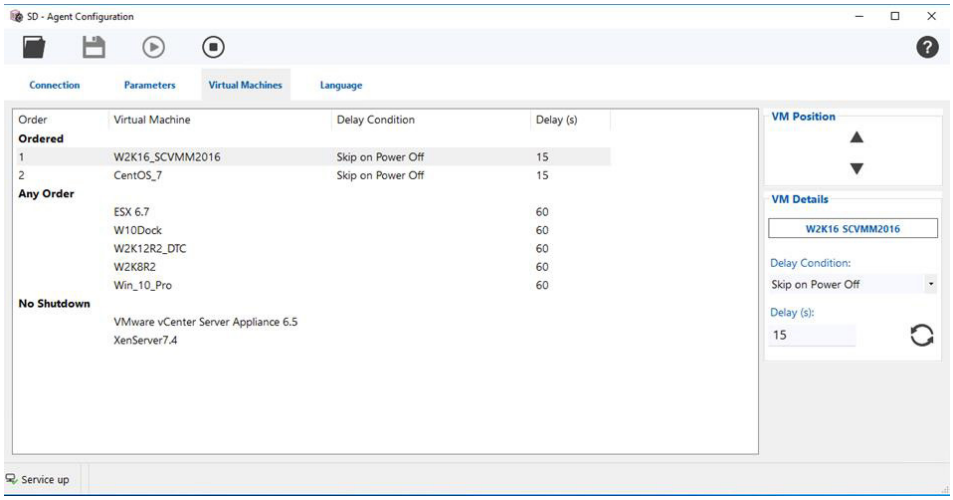
Field	Description	Default value
Add new VM to group	Defines the default group of VM shutdown to which a new VM is added and in the case where this new VM is installed after the SD Agent configuration. - **Ordered** (each VM has its own shutdown sequence position) - **Any order** (power off forced after ordered sequence) - **No shutdown** (power off with host if requested)	Any Order
Perform HOST(s) power off	If this option is selected the host will be POWERED OFF when all VMs are down. In the case of clusters all hosts will be powered off at the same time. Note: If the SD Agent is installed on a VM on this host, it will power off after 10 s with respect to the other hosts.	Enabled

ORDERED GROUP

Field	Description	Default value
Delay condition	Defined when the sequence moves from the current VM in shutdown, to the next - **Skip power off**: if current VM stops/powers off, or already is, the sequence passes immediately to the next VM. - **Wait full delay**: in this case the whole delay is a waited, before the sequence moves from current VM to next.	Skip power off
Delay (s)	Define the shut off delay of VM.	15

Click on  to save the parameters and the service starts automatically.

5.7 VIRTUAL MACHINE SHUTDOWN ORDER SETTINGS



ORDERED GROUP

VMs present in this group will be shut down following the list order. Shutdown of the next VM is dependent on the delay condition relative to the previous VM.

Shutdown sequence:

1. *The first VM shuts down when the shutdown process countdown is reached*
2. *Shutdown of the second VM is performed when the first one is off (Skip Power Off) or at the end of the delay interval (Wait Full Delay).*
3. *The next VM follows the same principle.*

ANY ORDER

SD Agent sends a shutdown command to all VMs in this list when the last VM of Ordered Group is down or powered off.

After 1 minute (timeout set by default) a power off command is sent to the VMs that are still running.

This delay can be set for all VMs by selecting any line in any order group.

NO SHUTDOWN

The VMs located in this group will be shut down only in the case of Host Power Off (where the VMs are running).

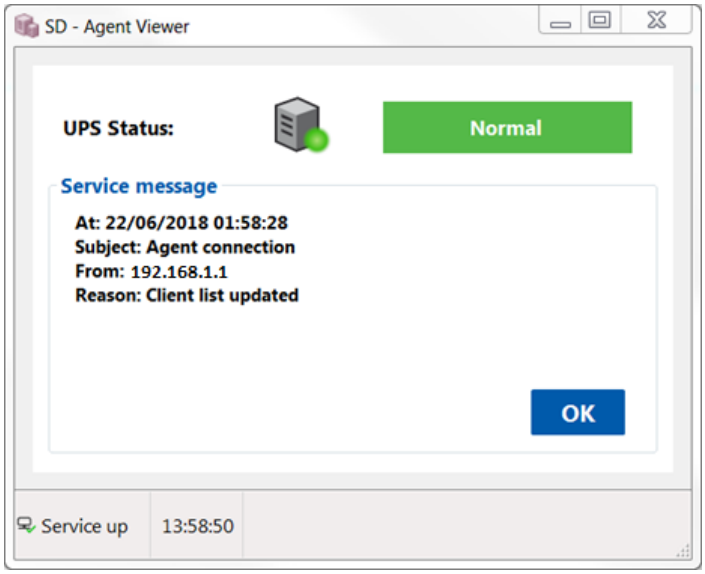
VM POSITION

Field	Description	Default value
▲	Move the selected VM up in the order list.	
▼	Move the selected VM down in the order list.	

VM DETAIL

Field	Description	Default value
NAME	Shows the name of the VM	
Delay condition	Defines whether or not the next VM will be powered off at the end of the delay or immediately without waiting for the delay. - **Skip Power off** - **Wait Full delay**	According to the default order Group settings
Delay	Starts when power off command is sent to the VM. Send power off command to next VM if "**Wait full Delay**" is selected.	15 seconds for Order Group 60 seconds for Any Order Group
↻	Button to refresh the VM list.	

6. SD AGENT VIEWER



This application indicates the status of the UPS and the SD Agent service. When it is running the status icon is displayed in the systray bar. Double clicking on the icon opens the Viewer window.

6.1 VIEWER STATUS DEFINITION

Status	Icon	Colour	Description
SERVICE OFF		Grey	SD Agent service has not started.
CONNECTION REQUIRED		Red	SD Agent tries to connect to Network device (NET VISION).
CONNECTED		Green	SD Agent connected to Network device and UPS working in normal mode, on inverter or eco mode.
SHUTDOWN PENDING		Yellow	A shutdown event has been detected by network device. Warning period.
SHUTDOWN IN PROGRESS		Magenta	End of warning period: the shutdown procedure is in progress. Irreversible period.

6.2 SERVICE MESSAGE

Subject	Reason	Description
Empty	Empty	No event detected or Ack. by user clicking on “OK” button.
Agent connection	Client list updated	The SD agent has been registered by network interface.
UPS Shutdown warning	Power Fail*	UPS on battery.
	Battery Low*	Battery low or battery discharged.
	Over temperature	UPS temperature alarm.
	Over load	UPS in overload.
	Imminent Stop	UPS Imminent STOP.
	On bypass	Load supplied by automatic bypass.
	Level of battery capacity*	The level of battery capacity set on NET VISION has been reached.
	EMD** Temperature Alarm	The temperature detected is too high or low according to EMD settings.
	EMD** Humidity Alarm	The humidity detected is too high or low according to EMD settings if device present.
	EMD** Input 1 abnormal	Input 1 of EMD has been detected as abnormal.
	EMD** Input 2 abnormal	Input 2 of EMD has been detected as abnormal.
	Shutdown cancelled	The shutdown event has been removed from the UPS.
Shutdown action	Shutdown countdown started	The script is running (if present and set).
Shutdown pending		Last countdown: At the end the OS shutdown starts.

(*) if battery present on the UPS.

(**) if EMD device connected to NET VISION.

6.3 NOTIFICATION

A new incoming shutdown event opens the Viewer window automatically if the Viewer application is minimised on the systray bar.

7. TIMING AND DELAY MANAGEMENT

INPUT DATA TO KNOW:

- Remaining contractual backup time (R-BUT).
- Server(s) / host(s) shutdown time (SD-TIME).

COMMON DATA:

Theoretical maximum value for “Warning delay” set to Network interface = R-BUT – SD-TIME.

For security reasons it is advisable to consider half of the backup time.

Warning Delay = (R-BUT/2 – SD-TIME).

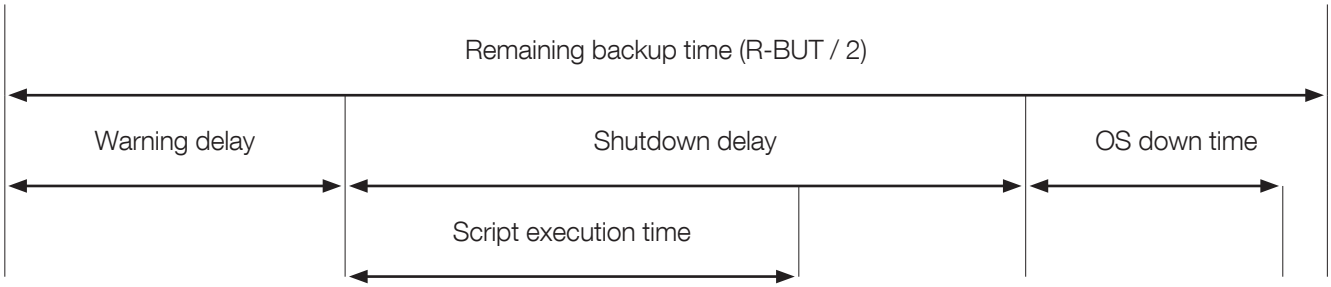
Example for 10 minutes BUT and a shutdown time of 2 minutes:

The warning delay can be set at (10/2) – 2 = 3 minutes.

7.1 FOR STANDALONE SERVER

SD-TIME has to consider:

- Script execution time
- Shutdown delay
- OS shutdown time



SD-TIME = shutdown delay + OS down time.

With Shutdown delay >> Script execution time

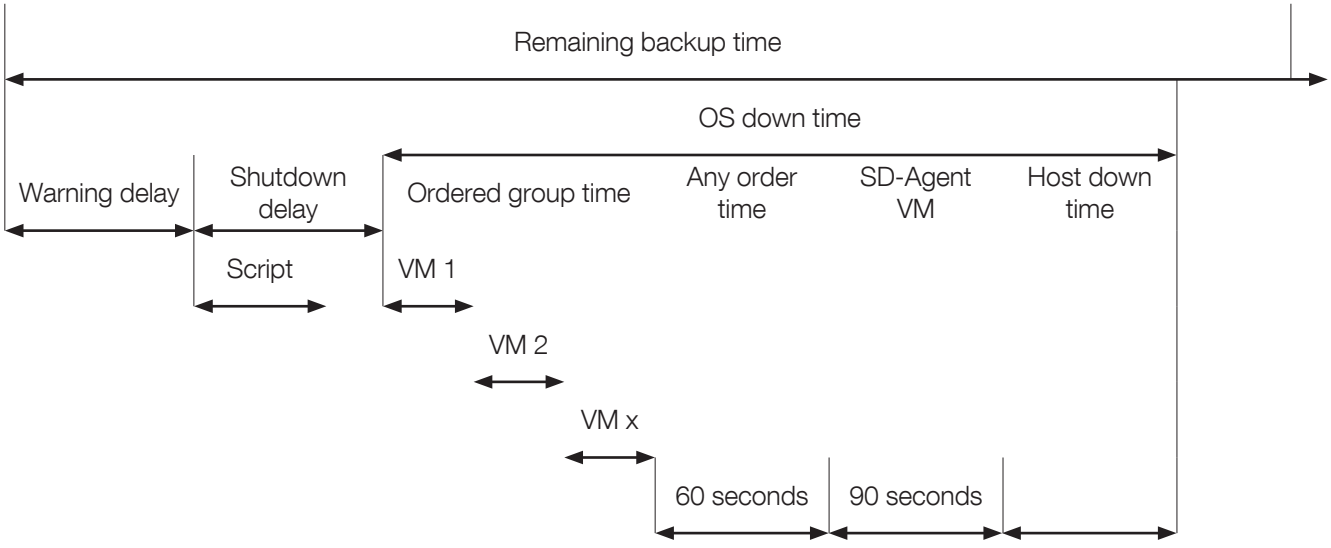
7.2 FOR VM ENVIRONMENT

SD-TIME has to consider:

- Script execution time
- Shutdown delay
- OS shutdown time = (nb of VM in ordered group * delay) + Any Order Delay + 90 + Host down time.

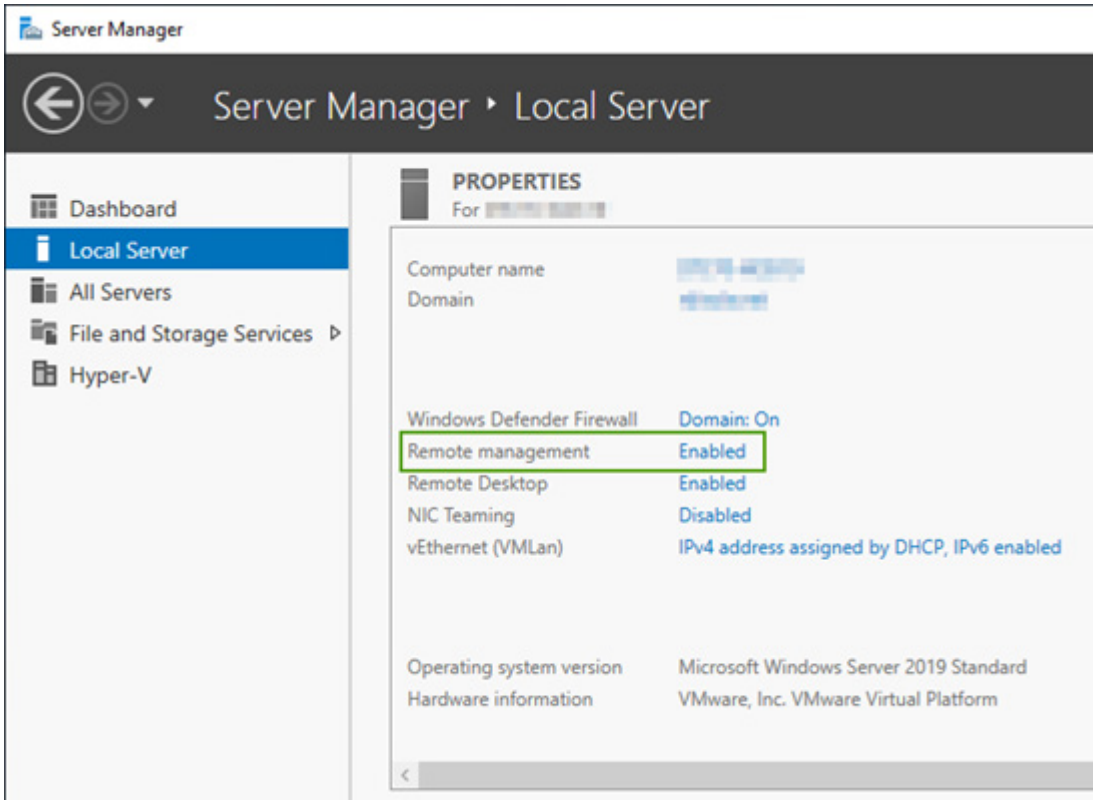
SD-TIME = shutdown delay + OS down time.

With Shutdown delay >> Script execution time



8. APPENDIX 1 - SECURITY AND CONNECTION

To allow SDAgent connecting to server please follow the steps below:
STEP 1: Enable “Remote management” on local server.
Example:



The SDAgent tries a secure HTTPs connection to server by default.
To ensure having this secure connection please follow the different steps.

STEP 2: Install a certificate on the server for a secure HTTPs connection to SDAgent service.

The certificate to installed for secure connection can be a self-signed (A) or a trusted certificate (B).

(A) Using self-signed certificate:

Example how to generate a self-signed certificate using PowerShell console:

```
$params = @{
        Subject = 'CN=servername'
        DnsName = 'servername.domain'
        CertStoreLocation = 'Cert:\LocalMachine\My'
        NotAfter = (Get-Date).AddMonths(36)
}
New-SelfSignedCertificate @params
```

This command returns a certificate thumbprint.

(B) Using trusted certificate:

Copy the certificate thumbprint.

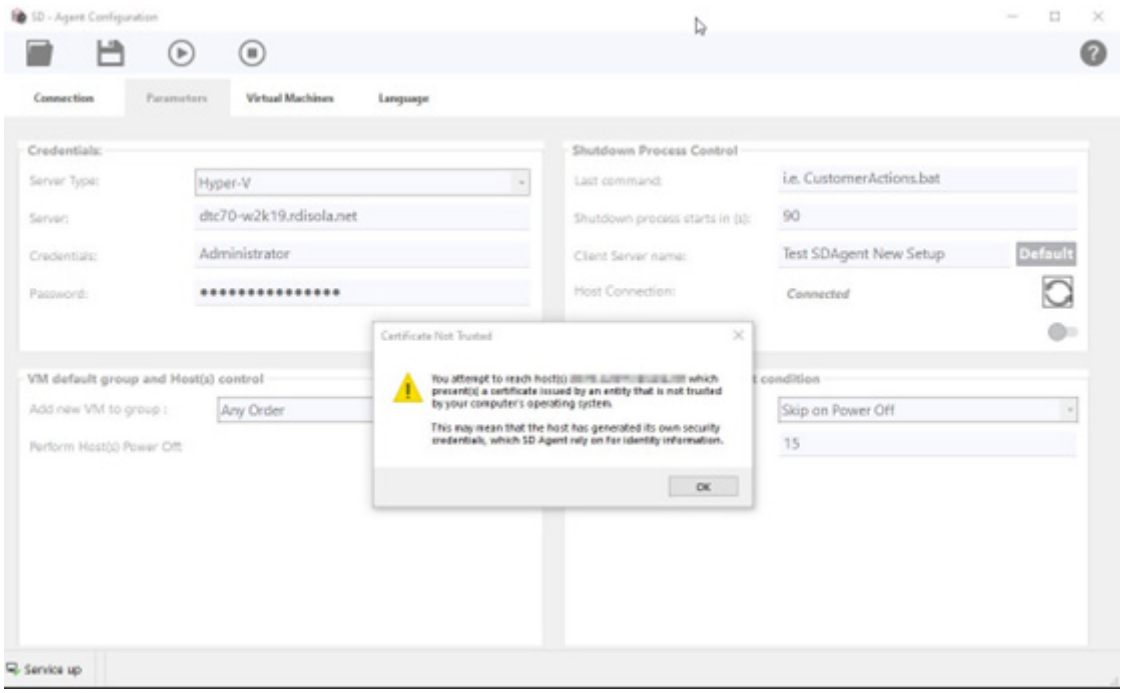
STEP 3: Create a WinRM listener, using above certificate thumbprint:

winrm create winrm/config/Listener?Address=*+Transport=HTTPS @{Hostname="servername"; CertificateThumbprint="CertificateThumbprint"}

STEP 4: Open firewall port 5986, using the following command:

New-NetFirewallRule -Displayname 'winrm (https-in) socomec sdagent' -Name 'winrm (https-in) socomec sdagent' -Profile Any -LocalPort 5986 -Protocol TCP

In case of connection to a server with a self-signed certificate, you'll be prompted with a popup by SD Agent:



Remark:

If a certificate (self-signed or trusted) is not present, SD Agent tries a HTTP connection, the port 5985 is used in that case.

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