INSTALLATION AND OPERATING MANUAL

Shutdown Agent for NUTANIX™

VIRTUAL-JNC for NUTANIX™

socomec

Innovative Power Solutions

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2. FOREWORD

This document describes the installation and the configuration of SOCOMEC Shutdown Agent software for NUTANIX™: SD Agent- NTX.

NET VISION, UPS network interface, needed to manage the shutdown events and procedure. NET VISION network interface is an option for UPS.
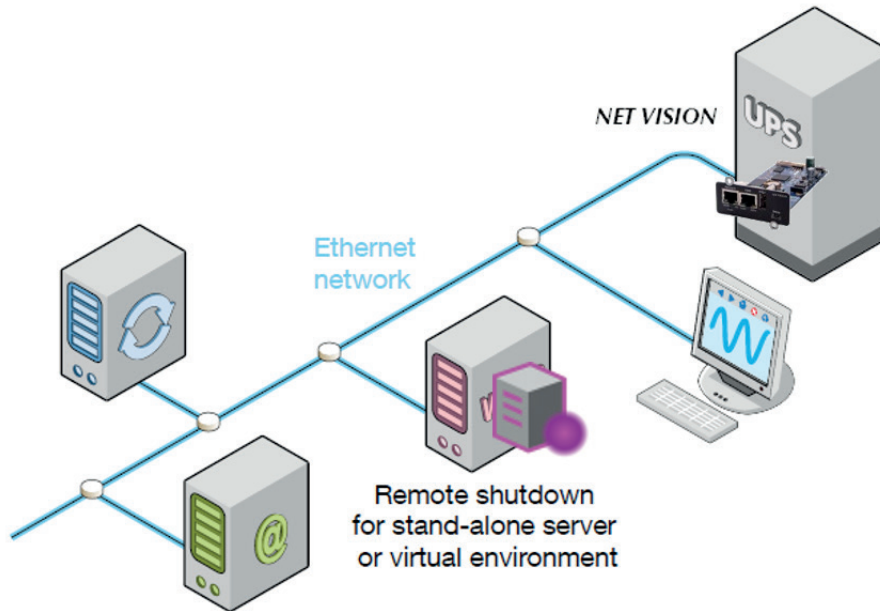
3. GENERAL DESCRIPTION

The Shutdown Agent (SD-Agent) is software for automatically managing the graceful shutdown of NUTANIX™ Hosts, Cluster and VM.

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

The SD-Agent software, installed on an external Linux computer, consists of a user interface using web interface and a daemon or service performing the complete shutdown procedure.

The user interface based on web pages includes:

- **Configurations pages with access protected by password**
    - Connection page: UPS connection settings and network configuration
    - Parameters page: to set credentials, delays and shutdown parameters of NUTANIX™ environment.

- **Viewer page: Client Monitor**
    - It displays the UPS status and shutdown event
    - It notifies the Shutdown process status

The web browser automatically switches to Viewer page in case of new notification coming from the UPS or from the SD-Agent.
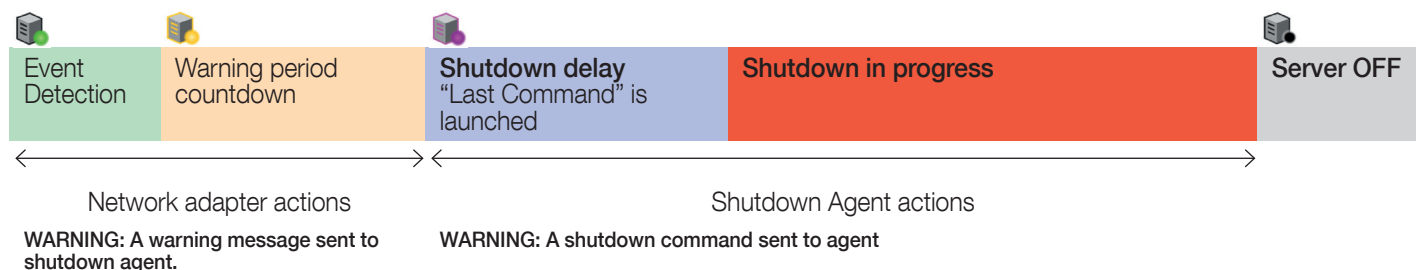
3.1. Shutdown Process

Warning reversible period:
- Managed by Network interface
- Regular warning notification

Shutdown procedure:
- Starts at the end of warning period
- Execute the script file, if defined
- Shuts down the complete system

| Event Detection | Warning period countdown | Shutdown delay "Last Command" is launched | Shutdown in progress | Server OFF |

| Network adapter actions | Shutdown Agent actions |

WARNING: A warning message sent to shutdown agent.   **WARNING: A shutdown command sent to agent**

3.2. Network adapter configuration

The UPS that supplies the computer or the server must be equipped with a SOCOMEC Network adapter, NET VISION, and shutdown events and timings shall configured via the web pages.

NET VISION Shutdown events configuration page: (Refer to the NET 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 for the shutdown procedure for the computer or the server supplied by the UPS.

3.3. Additional service to enabled

The Hosts restart function needs to communicate with UPS via MODBUS TCP.

If required, enable this protocol on Net Vision page as shown below:

Modbus Configuration

Modbus TCP Configuration	Enabled ▼
Modbus Port	502

⚠ WARNING!
This connection is no more available for remote monitoring if used for Hosts restart.
Net Vision does not allow multiple TCP connections on same time.

4. SHUTDOWN AGENT SW ENVIRONMENT

4.1. NUTANIX™ compatibility

AHV hypervisor	2019.0916.410 or above
AOS	5.20.21
Cluster maintenance utilities	2.0.3
FSM	2.11
Foundation	5.11 – platform 2.9
NCC	4.3.0

4.2. Prerequisites

LINUX Station.

An external Linux station (i.e. PC) needed to install the SD-Agent SW for Nutanix™.

Linux Distribution compatibility.

x64 Distribution only	Version
Ubuntu	21
Debian	10
CentOS	9
Other distributions compatible	

The SD-Agent software is not compatible with 32bits (x86) platform.

'ipmiutil' tooll

The "ipmiutil" utility tool is required to enable the Hosts restart.

Install this tool on the targeted external Linux Station for SD-Agent SW.

Batch command to install it:
- Ubuntu: `sudo apt-get install ipmiutil`
- Debian: `sudo apt-get -y install ipmiutil`

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

5. SHUTDOWN AGENT SW INSTALLATION ON EXTERNAL DEDICATED STATION

The SD-Agent software installation package is available on the SOCOMEC website.

5.1. Prerequisites

The administrator credentials are necessary to install the SD-Agent software for all Operating Systems.

5.2. LINUX installation procedure

The SDAgent-NTX.sh file is the script to use for installing the SD-Agent software.

It recommended to copy the file from your media to a common access directory such as /Documents

Step by step installation procedure:
1. Open a Terminal session in the directory where the installation script has been copied ('/Document').
2. Change the permission for execution: chmod +x SDAgent-NTX.sh
3. Execute the installation program: sudo ./ SDAgent-NTX.sh
4. Follow the instructions, and answer the questions to proceed.
5. The installation script allows to install (i) or to uninstall (u) the SD-Agent software or to cancel (x) the installation.
6. Select 'i' to continue the installation.
7. The SD-Agent software environment is installed in /opt/Socomec/SDAgent directory
8. Service activation

   The service or daemon installed in `/etc/systemd/system`

   Service name: `SDAgentConf-daemon.service`

   The installation script asks to install the service (y / n):

   If '**y**' install the service

   If '**n**' start manually the SD-Agent program with following command: `sudo ./SDAgentConfig`, or otherwise configured for automatic startup (refer to the documentation of the specific Linux distribution).

   The installation script asks if the service has to be set as 'ENABLED' to start on boot: (y / n)

   If '**y**': reboot the computer to start the service for the first time.

   If '**n**': the service has to be started by shell command (Refer to § below).

Once the service is running, open the web interface.
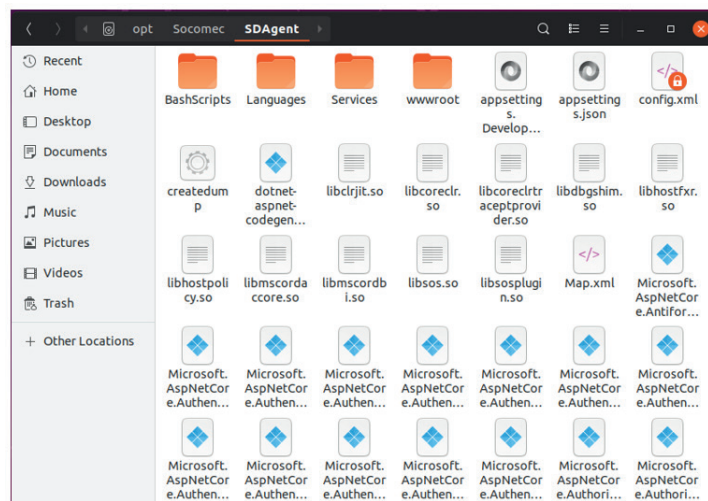
5.3. Manual control of the service

```
sudo systemctl start SDAgentConf-daemon.service

sudo systemctl stop SDAgentConf-daemon.service

sudo systemctl restart SDAgentConf-daemon.service

sudo systemctl status SDAgentConf-daemon.service
```

To run the daemon automatically after boot:

```
sudo systemctl enable SDAgentConf-daemon.service
```

to disable the auto-execution

```
sudo systemctl disable SDAgentConf-daemon.service
```

Status return data:

```
root@ubuntu:/opt/Socomec/SDAgent# systemctl status SDAgentConf-daemon.service
SDAgentConf-daemon.service - SDAgent daemon
Loaded: loaded (/etc/systemd/system/SDAgentConf-daemon.service; enabled; vend
Active: activating (start) since Tue 2019-08-06 16:39:12 CEST; 6min ago Main PID: 923 (SDAgentConfig)
Tasks: 21 (limit: 2311)
Memory: 81.0M
CGroup: /system.slice/SDAgentConf-daemon.service
↳923 /opt/Socomec/SDAgent/SDAgentConfig
Aug 06 16:39:31 ubuntu SDAgentConfig[923]: Reason: Client list updated
Aug 06 16:39:31 ubuntu SDAgentConfig[923]: At: 06/08/2019 04:39:31
Aug 06 16:39:31 ubuntu SDAgentConfig[923]: Subject: Agent connection
Aug 06 16:39:31 ubuntu SDAgentConfig[923]: From: 192.168.1.1
Aug 06 16:39:31 ubuntu SDAgentConfig[923]: Reason: Client list updated
Aug 06 16:39:31 ubuntu SDAgentConfig[923]: Hosting environment: Production
```

5.4. User page – web interface

Call following url to open the User Interface: http://localhost:8082
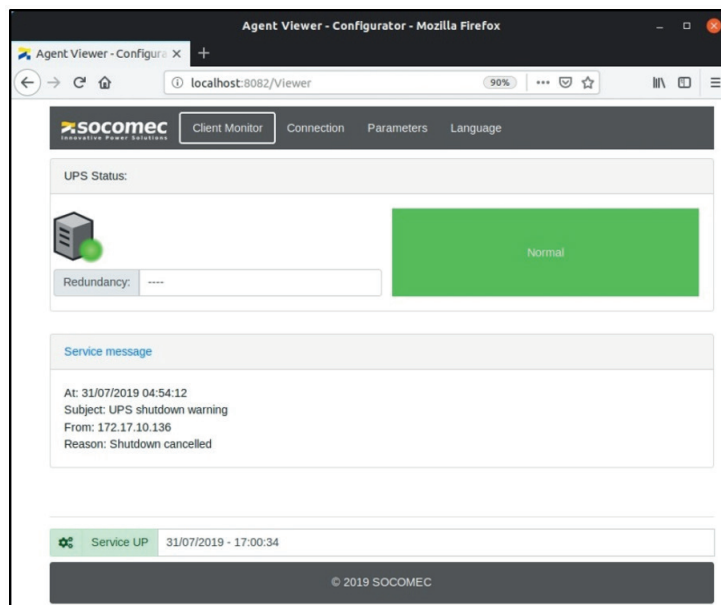
Web Browser compatibility:
- Firefox
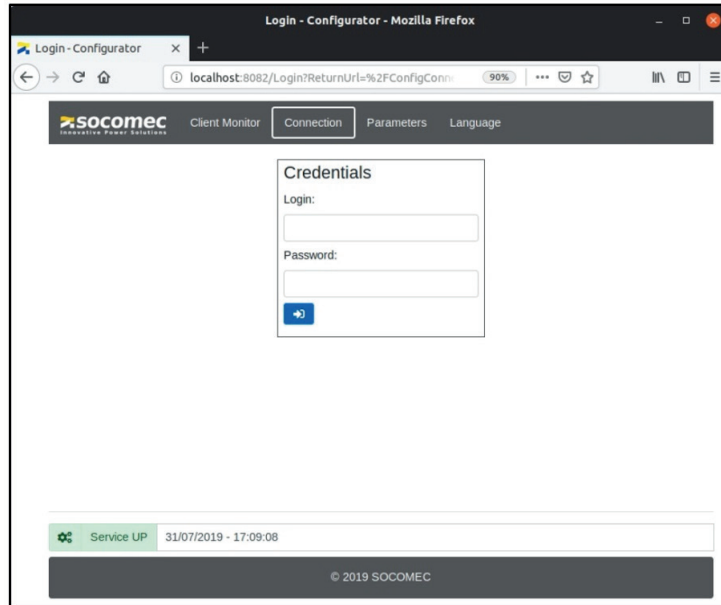- Chrome

6. SD-AGENT CONFIGURATION

6.1. Login

The access protected by a login and password.
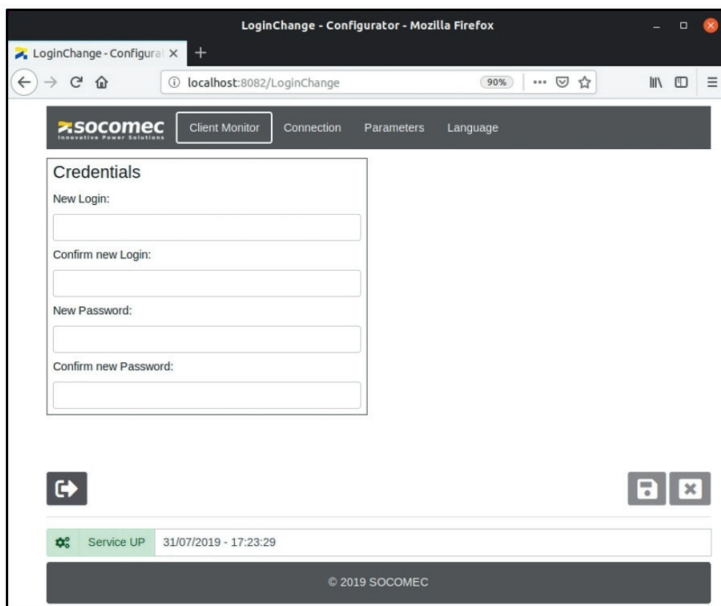
Default login: admin

Default password: public

⚠ WARNING!
In case of losing password, remove the config.xml file. A new session will create this file again.
The login and password are set to default values and set again all configurations.

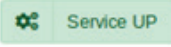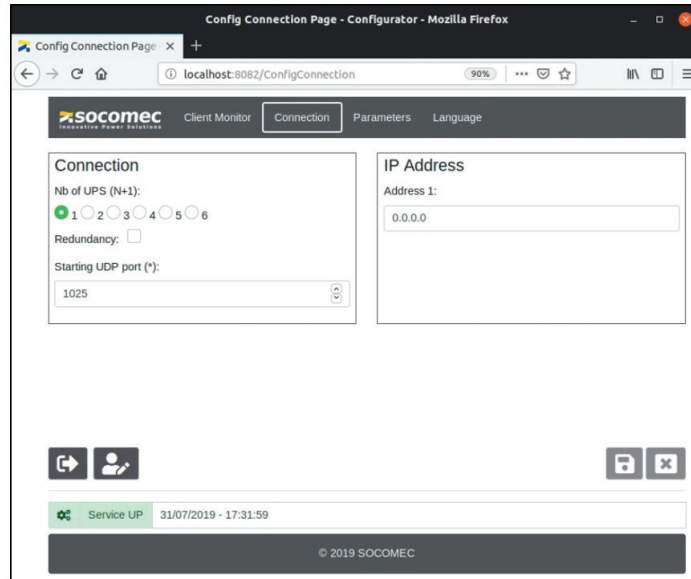Click on [icon] to change the login and/or password.

The yellow background means that the confirmed password doesn't match

6.2. Configuration pages description

Functions	Description
![logout icon]	To log out from configurations pages and switch to 'Client Monitor' page.
![change credential icon]	To change current credential
![save icon]	To save current configuration and restart the service
![cancel icon]	To cancel current settings without saving
Service UP	The daemon or service is running
Hypervisor	The SD-Agent is connected to Hypervisor
Connection	Access to UPS and network interface settings
Parameters	Access to Shutdown parameters
Language	Access to available language list. Click on the flag to select the language and save the setting

6.3. UPS Connection

By default, there is only one UPS system (standalone UPS or parallel UPS system) to link to SD-Agent.

In case of several UPS systems installation for redundancy power supply, select the number of UPS systems and report the IP address of each Network Interface.

Field	Description	Default value
Nb of UPS systems	It defines the number of network devices connected to the same computer / server. (needed also for DIGYS and MASTERYS BC up to 40 kVA range parallel system)	1
Redundancy	It enables or disables the redundancy function in case N+1 UPS architecture. If the redundancy is enabled the SD-Agent checks if there are shutdown events from at least two UPS to start the procedure.	Disabled
UDP Port	It defines the local UDP port used for communication with Network Interface. The Service bounded on this port. If the port is busy, the service looks for the first free port after.	1025
IP address	To set the IP address of the UPS WEB/SNMP interface.	

6.4. Shutdown Process Parameters

Credential Field	Description	Default value
Server type	It defines a type of Server: Computer or Server. (Currently fix. Reserved for future use)	NUTANIX™
Server:	IP address or FQDN (CVM VIP or first CVM in the cluster)	
Login (admin)	CVM credentials	
IPMI Login	IPMI Credentials – Common for all IPMI interface	
IPMI List	Add all IPMI IP addresses to restart their own host	

Group / Host control	Description	Default value
Default Group	Defined the default group (Ordered – Any Order) for all VM	Any Order
Perform Host(s) power off	Enable/disable Host(s) Power Off	disabled
Automatic restart	Enable the automatic restart of NUTANIX™ system after the specified delay when UPS is power on again.	60s delay
Host root password	Needed for hosts shutdown (must be common to all hosts)	
Cluster Restart	Button to restart manually all Hosts. Make sure that the 'ipmiutil' installed. (cf chapter "4.2. Prerequisites", page 8)	

Shutdown process	Description	Default value
Last command	It defines the command to execute when the shutdown command received from Network Interface. This function gives the possibility to stop and close applications before Operating System shutdown. The format command for last command script is the same as for shutdown command. Example: `./BatchScripts/myscript.sh`	Empty
Shutdown process starts in (s)	It defines the time between the shutdown request from Network Interface and the Operating System shutdown command. The delay set has to be greater than the time execution of the command or script set in 'Last command' parameter.	90
Client Server name	It defines the name of the Computer / Server. This name is reported to NET VISION interface. Click on to report the default Server / PC name in the Client Name field.	Empty

Ordered Group	Description	Default value
Delay condition		
Delay		

6.5. VM Shutdown settings

Example of NUTAMIX infrastructure:

6.5.1. Ordered Group

The Shutdown process follows the sequence defined

Change 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
Virtual Machine	Report the name of the VM	
Delay condition	Define if the next VM will be power off at the end of the delay or immediately when power off without waiting and of the delay. - **Skip on Power off** - **Wait Full delay**	According the default order Group settings
Delay	Starts when power off command sent to the VM. Send power off command to next VM if "**Wait full Delay**" selected.	15 seconds for Order Group 60 seconds for Any Order Group

6.5.2. Any Order

Those VM are shut down all together after Ordered sequence

7. SD-AGENT VIEWER WEB PAGE

This page indicates the status of the UPS and the SD-Agent service.

7.1. Viewer status definition

Status	Icon	Colour	Description
SERVICE OFF		Grey	The SD-Agent service is not started.
CONNECTION REQUIRED		Red	The SD-Agent tries to communicate with the Network interface (NET VISION).
CONNECTED		Green	The SD-Agent is communicating with the Network interface and the UPS working in normal mode, on inverter or eco mode.
SHUTDOWN PENDING		Yellow	A shutdown event detected by the Network interface. The warning period is starting.
SHUTDOWN IN PROGRESS		Magenta	The warning period is ending: the OS shutdown procedure is now in progress. The SD-Agent is now in an irreversible phase: it is not possible to stop the procedure.

7.2. Service message

Subject	Reason	Description
Empty	Empty	No event has been detected or has been acknowledged 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*	The UPS is on battery
	Battery Low*	The 'Battery low' or 'Battery discharged' alarm occurs
	Over temperature	The 'UPS temperature' alarm occurs
	Over load	The UPS is in overload
	Imminent Stop	The UPS is in 'Imminent STOP'. The UPS output is going to turn off in few minutes.
	On bypass	The load is 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 has been detected too high or too low according EMD settings.
	EMD** Humidity Alarm	The humidity has been detected too high or too low according EMD settings.
	EMD** Input 1 abnormal	The Input 1 of EMD has been detected as abnormal condition
	EMD** Input 2 abnormal	The Input 2 of EMD has been detected as abnormal condition
	Shutdown cancelled	The shutdown event has been cancelled from UPS
Shutdown action	Shutdown countdown started	The 'Last Command' script is running if it has been specified
Shutdown pending		The last countdown before the OS shutdown starts

(*) if battery present on the UPS
(**) if EMD device connected to NET VISION

7.3. Notification

A new incoming shutdown event swiches automatically the Viewer web page.

An open Linux session needed to allow the notification page.

7.4. Local and remote User Interface connection

The SD-Agent software allows a remote connection for the user web interface.

The `appsettings.json` file can be modified for the remote (and also for Local) connection via HTTP or HTTPs Protocol.

This file is located in `/opt/Socomec/SDAgent`

The default web User Interface accesses are set following:
- Locally using HTTP with 'localhost' address
- Remotely using HTTPs IP:8443 port

Default json file contents:

```
{
 "Kestrel":
      {
       "Endpoints":
           {
            "Http":
                {
                 "Url" : "http//localhost:8082"
                },
            "Https":
                {
                 "Url": https://*:8443
                 "Cerficate":
                      {
                       "Path":"./sdagent.pfx",
                       "Password":"Socomec",
                       "AllowInvalid":"true"
                      }
                }
           }
      }
}
```

HTTP configuration:

Replacing 'localhost' by '*' enables a remote HTTP connection from any computer connected to same network.

The HTTP port, set to ':8082' by default, editable as well.

HTTPs configuration:

- To change the default certificate: to remove the default .pfx file to your selected certify cate with the correct path.

- The HTTPs port, set to ':8443' by default, editable as well.

⚠ WARNING!
Using the default certificate can provoke an error on the browser: NET::ERR_CERT_AUTHORITY_INVALI.
This error occurs, as external servers cannot trusted this certificate as it is self-signed.
Continuing the navigation the connection is secure and safe using SSL/TLS layers.
In any case, it is possible to replace it with your own certificate having the same format (mind also to modify the Password field accordingly).

8. TIMING AND DELAY MANAGEMENT

Input data to know:

- Contractual remaining 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 reason it is suggested to take account the half of backup time.
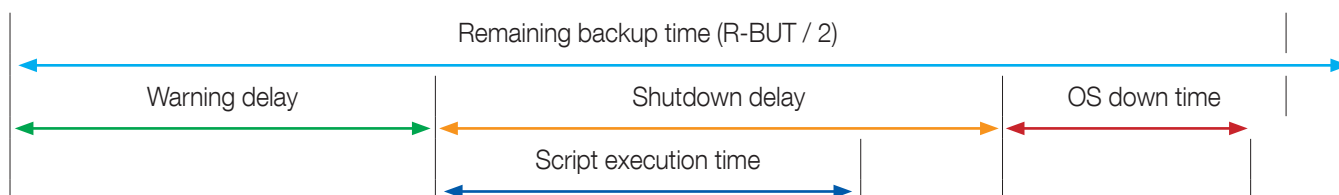
Warning Delay = (R-BUT/2 – SD-TIME)

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

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

8.1. For standalone Server

SD-TIME has to take account of:

- Script execution time
- Shutdown delay
- OS shutdown time

SD-TIME = shutdown delay + OS down time.

With Shutdown delay >> Script execution time

9. TROUBLESHOOTING

Error during installation

If errors occur during installation (.sh) please check if the session has been opened as 'admin' and all permissions set to read/write for all folders needed for the installation.

The installation package permission has to be change for execution rights.

The http page cannot open

The http page cannot open

CASE1: the http port changed
- Check the parameter set in `appsettings.json`

CASE2: the service is not running
- Check the status of the service, and restart it if necessary (refer to chapter "5.3. Manual control of the service", page 10).

9.1. USING SD-Agent SW

SD-Agent cannot connect to UPS: CONNECTION REQUIRED displayed in the view page
- Check that the port UDP 200 is enabled.
- Check IP address of the UPS Network Interface.
- Check if the UPS Network Interface is power on and connected to same network.
- Check if the UPS Network Interface is reachable from the Computer/Server where the SD-Agent SW installed.
- Change the local UDP Starting Port if busy (1025 by default).

The Shutdown not executed
- Check the command set in "shutdown command" field.

  `./BashScripts/Shutdown.sh`   if using the script file.

  `shutdown -h now`   if using the command.
- In case of script file, check if the script file is present in the right folder.

Password lost
- Remove the config.xml file and restart the service. The config.xml file will be create with default password.
- All settings are to be set again.

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