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FUJITSU Software Infrastructure Manager V2.3
Infrastructure Manager for PRIMEFLEX V2.3
Settings for Monitoring Target OS and Cloud Management Software

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FUJITSU LIMITED

Note:

"Infrastructure Manager for PRIMEFLEX" is available only in Japan, APAC, and North America.

Modification History		
Edition	**Publication Date**	**Modification Overview**
01	August 2018	First Edition
02	October 2018	1. List of Settings Required per Monitoring Target OS/Could Management Software : Added SUSE 15 and Windows Server 2019 for Monitoring Target OS (ISM 2.3.0.b or later) : Added Note 2.1.3 Opening a Firewall Port : Added the case of Windows Server 2019 (ISM 2.3.0.b or later) 2.3 Setting Procedure for SUSE Linux Enterprise Server : Added the case of SUSE 15 (ISM 2.3.0.b or later)

To manage an OS by using Fujitsu Software Infrastructure Manager V2.3 and Fujitsu Software Infrastructure Manager for PRIMEFLEX V2.3, set up on the OS side is required. This document provides the required information for the settings.

Hereinafter, "Infrastructure Manager" is referred to as "ISM", and "Infrastructure Manager for PRIMEFLEX" is referred to as "ISM for PRIMEFLEX." When explanation is provided without distinguishing "Infrastructure Manager" from "Infrastructure Manager for PRIMEFLEX", it is referred to as "Infrastructure Manager" or "ISM" as a unified description.

For the details and abbreviations used in this document, refer to the manuals for ISM or ISM for PRIMEFLEX listed below.

- User's Manual
- Glossary

1. List of Settings Required per Monitoring Target OS/Could Management Software

   To utilize the display of the virtual machine information, device information (OS information and disk volume), Log Management (OS log collection) and firmware update (Online PCI card) from ISM 2.3, it is required to execute the setup for each OS/Cloud Management Software. Execute the setting change according to the tables shown below.

Y: Settings required ×: Settings not required -: Not applicable

		Service		Security			Domain	
		sshd	WinRM	Firewall	sslv3	Power Shell	SPN	ISM-VA Settings
Red Hat Enterprise Linux	6.x	Y	-	×	-	-	-	Y
	7.x	Y	-	×	-	-	-	Y
SUSE Linux Enterprise Server	11	Y	-	Y	-	-	-	Y
	12	Y	-	Y	-	-	-	Y
	15 (ISM 2.3.0.b or later)	Y	-	Y	-	-	-	Y
Windows Server	2008R2	-	Y	Y	-	Y	Y	Y
	2012	-	Y	Y	-	Y	Y	Y
	2012R2	-	Y	Y	-	Y	Y	Y
	2016	-	Y	Y	-	Y	Y	Y
	2019 (ISM 2.3.0.b or later)	-	Y	Y	-	Y	Y	Y
Windows Server VMware ESXi	5.x	-	-	-	Y	-	-	Y
	6.x	-	-	-	Y	-	-	Y

Table 1. List of Required Settings per Monitoring OSes

		Settings for each host	Domain		
		WinRM	SPN	ISM-VA Settings	Kerberos delegation configuration
vCenter Server	5.5 or later	-	-	Y	-
	6.x	-	-	Y	-
Microsoft Failover Cluster	Windows Server 2012 or later	Y	Y	Y	Y
Microsoft System Center	2012 or later	Y	Y	Y	Y
KVM Red Hat		-	-	Y	Y
KVM SUSE Linux Enterprise		-	-	Y	Y

Table 2. List of Required Settings per Monitoring Cloud Management Software

[Note]

- To monitor a target server, it is required to register OS information, with the user account having administrator privilege.
- To manage Emulex LAN/FC/CNA cards mounted on Windows/Linux, it is required that Emulex OneCommand Manager CLI is already installed on the OS of the target server.
- To manage the QLogic FC card mounted on Windows/Linux, it is required that QLogic QConvergeConsole CLI is already installed on the OS of a target server.
- To manage LAN/FC/CNA cards mounted on Linux, it is required that "lspci command" is executable on the Linux of the target server.
- Use the latest Emulex OneCommand Manager CLI or QLogic QConvergeConsole CLI. Apply the latest drivers for LAN/FC/CNA cards.
- To manage LAN/FC/CNA card mounted on Linux, it is required that the pciutils and ethtool package are already installed on the OS of the target server.
- To execute a monitoring of the disk speed and network speed of Linux, it is required that the sysstat package is already installed on the OS of a target server.
- -To collect Linux operating system logs or ServerView Suite logs, installation of a zip package on the OS of a target server is required in advance.
- -Also, to collect the operating system logs, installation of a syslog demon such as

rsyslog package to the OS of a target server is required in advance.

- -To manage OS with a general user account of Linux, installation of a sudo package on the OS of a target server is required in advance.
- After having changed the domain user password from Active Directory, change the password in ISM.

2. Setting Procedure for Monitoring Target (OS)

2.1. Setting Procedure for Windows

ISM 2.3 uses WS-Management protocol for the monitoring devices, with Windows Server installed. Https Protocol + Basic authentication is used as the communication method. The following are the required settings.

- Confirmation on starting of WinRM service
- Settings for WinRM service
- Opening the firewall port
- Execution policy change for Windows PowerShell script

2.1.1. Confirmation of staring WinRM Service

Open the command prompt as administrator and execute the following command to check that WinRM service has started.

```
>sc query winrm
```

Check the following result and check that the STATE is RUNNING.

```
        TYPE               : 20  WIN32_SHARE_PROCESS
        STATE              : 4  RUNNING
                                (STOPPABLE, NOT_PAUSABLE,
ACCEPTS_SHUTDOWN)
        WIN32_EXIT_CODE    : 0  (0x0)
        SERVICE_EXIT_CODE  : 0  (0x0)
        CHECKPOINT         : 0x0
        WAIT_HINT          : 0x0
```

Execute the following command to start WinRM service if the WinRM service has not started.

```
>sc start winrm
```

[Note]

In some cases, WinRM service does not start automatically depending on the conditions. It is required to change the settings so that WinRM service can be auto-started (auto) or

delayed-auto-started (delayed-auto).

The following is an example of the automatic start setting.

```
>sc config winrm start=auto
```

2.1.2. Settings for WinRM Service

(1) Settings for WinRM Service

Since Basic authentication is not allowed in the initial settings (refer to 1-1), the settings to allow Basic authentication is required.

Since https communication is used, communication with Basic authentication is encrypted.

Open the command prompt as administrator and execute the following command.

```
>winrm quickconfig
```

In cases where the following message is displayed, although WinRM service is running, remote access permission is not yet set. Therefore, proceed to the following steps. The settings are already complete if the message "WinRM service already runs on this computer" is displayed. In this case, proceed to "(2) Settings for Https Communication."

After entering "y", press the [Enter] key.

```
WinRM service is already running on this machine.
WinRM is not set up to allow remote access to this machine for management.
The following changes must be made:

Configure LocalAccountTokenFilterPolicy to grant administrative rights
remotely to local users.
Make these changes [y/n]? y
```

The following message is shown.

```
WinRM has been updated for remote management.

Configured LocalAccountTokenFilterPolicy to grant administrative rights
remotely to local users.
```

(1-1) Allowing Basic Authentication

Execute the following command.

```
>winrm set winrm/config/service/Auth@{Basic="true"}
```

(1-2) Additional Setting Item (Windows Server 2008R2)

Execute the following command to increase the numerical value of MaxConcurrentOperationsPerUser depending on the type and the number of cards, if the OS of a target server is Windows Server 2008 R2.

Execute the following command.

```
>winrm set winrm/config/Service @{MaxConcurrentOperationsPerUser="numerical value"}
```

Ex. In the case where the above value is set as 1500(1500 is recommended because 1500 is set by default in Windows Server 2012/2012R2.)

```
>winrm set winrm/config/Service @{MaxConcurrentOperationsPerUser="1500"}
```

(2) Settings for Https Communication

To establish https communication, certificate setup is required.

(2-1) Preparation of Required Tools

Two tools are required for creating a certificate. You can create the certificate without depending on the execution conditions.

・.NET Framework 4.5 (Download site)

https://www.microsoft.com/en-us/download/details.aspx?id=30653

・Windows Software Development Kit (Download site)

https://developer.microsoft.com/en-us/windows/downloads/windows-10-sdk

[Note]

The Windows Software Development Kit of the above URL is supported in Windows 7 SP1 or Windows 8.1 and Windows Server 2012 R2 or Windows Server 2016. When installing OS of other than mentioned, install the appropriate Windows Software Development Kit.

Windows Software Development Kit includes two tools required for creating the certificate.

Certificate creation tool (makecert.exe)

https://msdn.microsoft.com/en-us/library/bfsktky3(v=vs.80).aspx

Personal information exchange file creation tool (pvk2pfx.exe)

https://msdn.microsoft.com/en-us/library/windows/hardware/ff550672(v=vs.85).aspx

(2-2) Creating Certificate

Use the certificate creation tool and personal information exchange file creation tool to create the following three files.

・CER file (Certificate)

・PVK file (Private key file)

・PFX file (Service certificate)

For more detailed procedure of certificate creation, refer to the following URL.

https://msdn.microsoft.com/en-us/library/ff699202.aspx

(2-2-1) Creating a Certificate and Private Key Files

When create the certificate and private key files, it is required to execute commands suitable for the conditions of a target server.

The following is a command example where the server name of the target server is set as "192.168.10.10" and the effective period of the certificate is set to March 30th, 2017.

```
>makecert.exe -r -pe -n "CN=192.168.10.10" -e 03/30/2017 -eku 1.3.6.1.5.5.7.3.1 -ss My
-sr localMachine -sky exchange <certificate file name.cer> -sv <private key file name.pvk>
```

For detailed settings on the certificate configuration, refer to the following URL.
https://technet.microsoft.com/en-us/library/ms186362(v=sql.105).aspx

(2-2-2) Creating a Service Certificate

Execute the following command.

```
>pvk2pfx.exe -pvk <private key file name.pvk> -spc <certificate file name.cer> -pfx <service certificate file name.pfx>
```

(2-3) Registering Certificate and Service Certificate

Open the Certificate Snap-In and register the certificate created above in steps (2-2-1) and (2-2-2).

1. Execute mmc. exe on the target server.
2. From [File] >, select [Add and Remove Snap-In].
3. From [Available Snap-in], select "Certificate" to [Add].
4. Select "Computer Account" > [Next] > [Finish] in sequence.
5. Select [OK].

(2-4) Registering SSL certificate

1. Register <certificate file name.cer> with Trusted Root Certification Authority.
   From [Console Root] > [Certificates (Local Computer)] >, and right-click on [Trusted Root Certificate Authority]. From [ALL Tasks] > [Import], select <certificate file name.cer> file, and finish Certificate Import Wizard.
2. Confirm if <certificate file name.cer> is successfully registered with [Trusted Root

Certificate Authority].

Select [Console Root] > [Certificate (Local Computer)] > [Trusted Root Certificate Authority] > [Certificate] in sequence and confirm if “Issued to” and “Issued by” are the server names specified as CN, and “Authentication Purpose” is specified as “Server Authentication.”

3. Register <service certificate file name.pfx> in ‘personal’.

   From [Console Root] > [Certificate (Local Computer)] >, right-click on [Personal]. From [All Tasks] > [Import], select<service certificate file name.pfx>, and finish Certificate Import Wizard.

4. Confirm if <service certificate file name.pfx> is successfully registered with [Personal].

   From [Console Root] > [Certificate (Local Computer)] > select [Personal] in sequence and confirm if “Issued to” and “Issued by” are the server name specified as CN, and “Authentication Purpose“ is specified as “Server Authentication.”

(3) Register the Thumbprint Described on the Certificate to WinRM Service.

(3-1) Check Thumbprint

The following shows how to check if the certificate is saved in LocalMachine\my.

1. Start PowerShell from a command prompt.
2. Check the Thumbprint. Execute the following command.

```
>ls cert:LocalMachine¥my
```

This is shown as follows.

```
PS C:¥Windows¥system32> ls cert:LocalMachine¥my

Directory: Microsoft.PowerShell.Security¥Certificate::LocalMachine¥my
Thumbprint                                Subject
----------                                -------
1C3E462623BAF91A5459171BD187163D23F10DD9  CN=192.168.10.10
```

(3-2) Register the Thumbprint Described on the Certificate with WinRM Listener.

Finish Powershell and execute the following command. Space is required between “HTTPS” and “@”.

```
>winrm create winrm/config/listener?Address=*+Transport=HTTPS
 @{Hostname="<CN Name that was specified above in step (4)Creating a
 Certificate and Private Key Files>";CertificateThumbprint="<created
```

```
certificate thumbprint>"}
```

(3-3) Checking WinRM Listener is registered

Execute the following command.

```
>winrm get winrm/config/listener?Address=*+Transport=HTTPS
```

If the command result as shown below is returned, WinRM Listener is successfully registered.

```
Listener
    Address = *
    Transport = HTTPS
    Port = 5986
    Hostname = 192.168.10.10
    Enabled = true
    URLPrefix = wsman
    CertificateThumbprint = 1C3E462623BAF91A5459171BD187163D23F10DD9
    ListeningOn = 192.168.10.10, 127.0.0.1, ::1,
2001:258:8402:200:bd8a:1c1:c50d
:8704, fe80::5efe:192.168.10.10%13, fe80::bd8a:1c1:c50d:8704%12
```

2.1.3. Opening a Firewall Port

You need to open the port that you have set up in the above WinRM Listener, so that WinRM services can accept requests. The default port number of https communication is 5986.

(1) In the Case of Windows Server 2008 R2

Execute the command as shown below.

```
>netsh advfirewall firewall add rule name= <firewall rule name> enable=yes
localip=any remoteip=any protocol=tcp localport=<port number>
remoteport=any edge=no dir=in profile=domain,private,public action=allow
```

(Ex.) Set the name "WinRM" as the rule to open port number 5986.

```
>netsh advfirewall firewall add rule name=WinRM enable=yes localip=any
remoteip=any protocol=tcp localport=5986 remoteport=any edge=no dir=in
profile=domain,private,public action=allow
```

(2) In the Case of Windows Server 2012/2012R2/2016 or Windows Server 2019(ISM 2.3.0.b or later)

1. Open the PowerShell from the command prompt.
2. Execute the command as shown below.

```
>New-NetFirewallRule -DisplayName <firewall rule name> -Action Allow -
Direction Inbound -Enabled True -Protocol TCP -LocalPort <port number>
```

Ex.) Set the name "WinRM" as the rule to open the port number 5986.

```
>New-NetFirewallRule -DisplayName WinRM -Action Allow -Direction Inbound -
Enabled True  -Protocol TCP -LocalPort 5986
```

[Note]
The firewall settings differ depending on the environment of target node.

2.1.4. Execution Policy Change for Windows PowerShell

Open Windows PowerShell as administrator and execute the following command.

```
>set-executionpolicy remotesigned
```

If the following message appeas, enter [Y] and press the [Enter] key.

```
Execution Policy Change
The execution policy helps protect you from scripts that you do not trust. Changing
the execution policy might expose you to the security risks described in the
about_Execution_Policies help topic at
https://msdn.microsoft.com/powershell/reference/5.1/Microsoft.PowerShell.Core/about/about_
Execution_Policies. Do you want to change the execution policy?
```

2.1.5. Settings When Using Domain User Account

Monitoring by using a domain user account, you cannot monitor multiple different domain environments concurrently.

(1) Adding SPN to Active Directory

It is required to correctly register the Service Principal Name (SPN) of a monitoring server on Active Directory when monitoring a Windows Server using the domain user account. Execute the following procedure to register the Service Principal Name of the monitoring server.

```
>setspn -A HOST/[monitoring target IP address] [monitoring target host name]
```

Checking command

```
>setspn -L [monitoring target host name]
```

Removal command

```
>setspn -D HOST/[monitoring target IP address] [monitoring target host name]
```

(2) Adding domain information to ISM-VA

When execute a monitoring with the domain user account, follow the procedures in "3.4.2 Initial Setup of ISM-VA" (User's Manual).

(3) Adding DNS information to ISM-VA

When execute a monitoring with the domain user account, follow the procedures in "User's Manual (4.9 Network Settings)" to register the DNS server on ISM-VA.

2.2. Setting Procedure for Red Hat Enterprise Linux

ISM 2.3 communicates with the target servers with Red Hat Enterprise Linux installed, by using ssh (Secure Shell service). The following settings are required.

・Starting ssh service

2.2.1. Confirmation on starting of ssh Service

Configure so that sshd can be started. The command differs depending on the OS versions.

(1) In the Case of Red Hat Enterprise Linux 6

Execute the following command and confirm if sshd is started.

```
#chkconfig -list sshd
```

The start of sshd is disabled if the result shown below is displayed.

```
sshd            0:off  1:off  2:off  3:off  4:off  5:off  6:off
```

Execute the following command to cause ssdh to start automatically if the item of the number (corresponding to the run level of the management target server) is "off."

```
#chkconfig sshd on
```

(2) In case of Red Hat Enterprise Linux 7

Execute the following command and confirm if sshd is started.

```
#systemctl is-enabled sshd
```

The starting of sshd is disabled if the result as shown below is displayed.

```
disabled
```

Execute the following command if starting sshd is disabled.

```
#systemctl enable sshd
```

2.2.2. Settings When Using Domain User Account

Pay attention to the following points when monitoring by using the domain user account.

(1) Adding domain information to ISM-VA.

When execute a monitoring using the domain user account, execute the procedures in "3.4.2 Initial Setup of ISM-VA" (User's Manual).

(2) Adding DNS information to ISM-VA

When execute a monitoring using the domain user account, execute the procedures in "User's Manual (4.9 Network Settings)" to register the DNS server on ISM-VA.

(3) Restriction on domain user account name

Also pay attention to the restriction on the user names of Linux when you use the domain user name, registered on Active Directory, for Linux.

<Representative examples unavailable for Linux user names>

Uppercase letters, numeric characters at the beginning, and symbols, such as dot (.)

(4) Restriction when collecting Emulex card information

Use "hbacmd" to collect the card information for the devices on which the card provided by Avago/Emulex is mounted.

When collecting the card information with the domain user account, provide the administrator privilege to "hbacmdan".

For details, refer to "OneCommandManager Command Line Interface User Manual".

(5) Restriction when collecting QLogic card information

You cannot retrieve the information about the devices on which the card provided by QLogic is mounted, by using the domain user account. Register the root user from Edit OS Information screen to retrieve the information.

(6) Restriction when collecting ServerView logs

You cannot collect ServerView logs by using the domain user account. Register the root user from Edit OS Information screen to collect the information.

(7) Restriction when updating firmware

You cannot execute online firmware update by using the domain user account. Register the root user from Edit OS Information screen to execute firmware update.

2.2.3. Settings When Using General User Account

Pay attention to the following points when monitoring by using a general user

account aside from the root user account.

(1) Settings for Sudo Command

The applicable user account is required to change the settings for monitoring target servers to enable the sudo command with the login password of the general user account.

The following is a setting example of how to enable the sudo command with the login password of user1.

1. Edit /etc/sudoers file.

```
# visudo
:
#Defaults targetpw              ・・・Comment out
root    ALL=(ALL)       ALL
user1   ALL=(ALL)       ALL   ・・・Add user1
:
```

2. Log in to the monitoring target server with ssh using user1. If the password for user1 is asked when executing the sudo command, the setting is completed.

(2) Settings for Environment Variable

After logging in to the monitoring target server with ssh using the applicable account, confirm that the prompt strings meet the following conditions. If the following conditions are met, do not change the settings for prompt strings. Prompt strings can be changed by changing the value of environment variable P1, which enables the user to change the prompt strings.

- Directed to home directory upon login.
- '~' is included in the prompt strings upon login.

- '$' or '#' is included after ' ~' in the prompt strings upon login.

Example: [user1@localhost ~]$

Example of parameter of environment variable PS1)

```
[user1@localhost ~]$  echo $PS1
```

```
[¥u@¥h ¥W]¥$
```

2.2.4. Settings for the Account Used for Monitoring

(1) Settings for ".bashrc"

Open ".bashrc" file in the home directory of an applicable account. Create the file if there is no ".bashrc" file.

```
#vi ~/.bashrc
```

Add the paths of "/sbin", "/usr/sbin" and "/usr/loca/sbin" to ".bashrc" file.

```
PATH=$PATH:/sbin
PATH=$PATH:/usr/sbin
PATH=$PATH:/usr/local/sbin
```

(2) Settings for Environment Variable

To execute the Log Collection function of ServerView, it is required to set the environment variable PS1 of the applicable account. To set the environment variable PS1, refer to the section "2.2.3 Settings When Using General User Account, (2) Settings for Environment Variable."

2.3. Setting Procedure for SUSE Linux Enterprise Server

In ISM 2.3, SUSE Linux Enterprise Server communicates with the installed target servers with ssh (Secure Shell Service). The following are required settings.

・Confirm that ssh service is started

・Open a Firewall Port

2.3.1. Confirmation on starting of Ssh Service

The start of sshd is disabled by default in SUSE Linux Enterprise Server.

Make settings so that sshd can be started. The command differs depending on OS versions.

(1) SUSE Linux Enterprise Server 11

Execute the following command and confirm if sshd is started.

```
#chkconfig -list sshd
```

The start of sshd is disabled if the result is shown as follows.

```
sshd            0:off  1:off  2:off  3:off  4:off  5:off  6:off
```

Execute the following command so that sshd can be started automatically if the item of the number (corresponding to the run level of the target server) is "off."

```
#chkconfig sshd on
```

(2) SUSE Linux Enterprise Server 12

SUSE Linux Enterprise Server 15 (ISM 2.3.0.b or later)

Execute the following command and confirm if sshd is started.

```
#systemctl is-enabled sshd
```

The start of sshd is disabled if the result is as shown below.

```
disabled
```

Execute the following command if the start of sshd is disabled.

```
#systemctl enable sshd
```

2.3.2. Opening the Firewall Port

The firewall of SUSE Linux Enterprise Server closes its ssh port by default. It is required to allow ssh communication within the firewall settings.

The firewall settings differ depending on the conditions of the target servers.

(1) SUSE Linux Enterprise Server 11/12

The example as shown below is the firewall settings in which YaST is used.

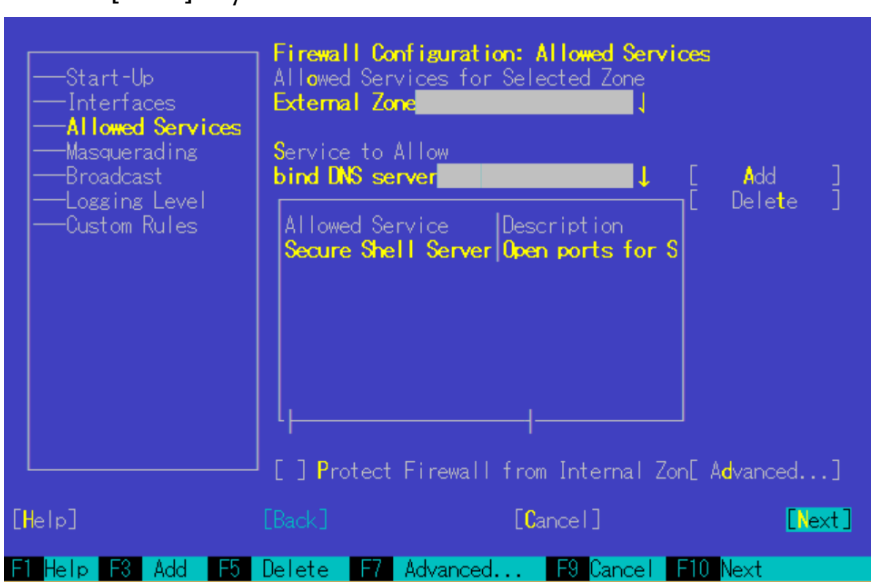
1. Execute the following command to show YaST Control Center.

```
#yast
```

2. From [Security and Users] >, select [Firewall] and press the [Enter] key.

3. From [Start-Up] screen, change the status of [Service Start] to "Enable Firewall Automatic Starting."

4. From [Allowed Services] > [Service to Allow], select “Secure Shell Server” and select [Add] to press the [Enter] key.
5. Confirm if “Secure Shell Server” is added to [Allowed Service], and select [Next] to press the [Enter] key.



6. After [Firewall Configuration: Summary] screen is displayed, select [Finish] and press the [Enter] key to finish the firewall settings.

(2) SUSE Linux Enterprise Server 15 (ISM 2.3.0.b or later)

For SUSE Linux Enterprise Server 15, Firewall setting with Yast is not supported.

Use "firewall-cmd" to set Firewall.

Execute the following command.

```
#firewall-cmd --permanent --add-service=ssh
#firewall-cmd --reload
```

[Note]

・Logging in as a root user is disabled by default in SUSE Linux Enterprise Server. To monitor target servers by using ISM 2.3, you need to allow login as a root user or you need to set up a user account comparable to the root user privilege. Change the settings as shown below for /etc/ssh/sshd_config to allow the root user to login with ssh.

```
PermitRootLogin  yes
```

2.3.3. Settings When Using Domain User Account

(1) Adding domain information to ISM-VA.

When executing a monitoring with the domain user account, execute the procedures in “3.4.2 Initial Setup of ISM-VA” (User’s Manual).

(2) Adding DNS information to ISM-VA

When executing a monitoring with the domain user account, execute the procedures in “User’s Manual (4.9 Network Settings)” to register the DNS server on ISM-VA.

(3) Restriction when collecting Emulex card information

Use “hbacmd” to collect the card information for the devices on which the card provided by Avago/Emulex is mounted.

When collecting the card information with the domain user account, provide the “hbacmdan” administrator privilege.

For details, refer to "One Command Manager Command Line Interface User Manual".

(4) Restriction when collecting QLogic card information

You cannot retrieve the information about the devices on which the card provided by QLogic is mounted, by using the domain user account. Register the root user from Edit OS Information screen to retrieve the information.

(5) Restriction when collecting ServerView logs

You cannot collect ServerView logs by using the domain user account. Register the root user from Edit OS Information screen to collect the information.

(6) Restriction when updating firmware

You cannot execute online firmware update by using the domain user account. Register the root user from Edit OS Information screen to execute firmware update.

2.3.4. Settings When Using General User Account

Pay attention to the following points when monitoring using a general user account aside from the root user account.

(1) Settings for Sudo Command

The applicable user account is required to change the settings for monitoring target servers to enable the sudo command with the login password of the general user account.

This is an example of a setting to enable the sudo command with the login password of user1.

1. Edit /etc/sudoers file.

```
# visudo
:
#Defaults targetpw              ・・・Comment out
root    ALL=(ALL)       ALL
user1   ALL=(ALL)       ALL   ・・・Add user1
:
```

2. Log in to the monitoring target server with ssh using user1. If the password for user1 is asked for when executing the sudo command, the setting is completed.

(2) Settings for Environment Variable

After logging in to the monitoring target server with ssh using the applicable account, confirm that the prompt strings meet the following conditions. If the following conditions are met, do not change the settings for prompt strings. Prompt strings can be changed by changing the value of environment variable P1, which enables the user to change the prompt strings.

- Directed to home directory upon login.
- ' ~' is included in the prompt strings upon login.
- '$' or '#' is included after ' ~' in the prompt strings upon login

Example: [user1@localhost ~]$

Example of parameter of environment variable PS1)

```
[user1@localhost ~]$ echo $PS1
[¥u@¥h ¥W]¥$
```

2.3.5. Setting the Account for Monitoring

(1) Settings for ".bashrc"

Open the ".bashrc" file in the home directory of the applicable account. Create a file if there is no ".bashrc" file.

```
#vi ~/.bashrc
```

Add the paths of "/sbin", "/usr/sbin" and "/usr/loca/sbin" to ".bashrc" file.

```
PATH=$PATH:/sbin
PATH=$PATH:/usr/sbin
PATH=$PATH:/usr/local/sbin
```

(2) Settings for Environment Variable

To execute the Log Collection function of ServerView, it is required to set the environment variable PS1 of applicable account. To set the environment variable PS1, refer to the section "2.3.4 Settings When Using General User Account, (2) Settings for Environment Variable.

2.4. Setting Procedure for VMware ESXi

ISM 2.3 communicates with target servers with VMware ESXi installed, by using vSphere API/CIM protocol. The following are the required settings.

・Enabling support for SSLv3 in VMware ESXi

2.4.1. Enabling Support for SSLv3 in Mware ESXi 5.5 and VMware ESXi 6.0

(1) Starting SSH Service

These settings are not required if ssh service is already running.

1. Log in to VMware ESXi on the target server with vSphere Client.
2. From [Configuration] tab, select [Security Profile] > [Properties] of Services.
3. Select "SSH" > [Options].
4. From "Service Commands", select [Start] to start ssh service > [OK].

[Note]

When enabling ssh for VMware ESXi, the following message to be displayed on vSphere Client.

```
Configuration Issues
SSH for the host has been enabled.
```

(2) Enabling SSLv3 for CIM server

The support for SSLv3 is disabled for CIM server (port 5989). Edit the sfcb.cfgfile to enable SSLv3.

1. Log in to the target server with VMware ESXi installed, as administrator, with ssh.
2. Use challenge-response authentication to log in.
3. Edit the /etc/sfcb/sfcb.cfg file to add this statement to enable SSLv3.

```
enableSSLv3: true
```

Restart sfcbd-watchdog. Execute the following command.

```
#/etc/init.d/sfcbd-watchdog restart
```

[Note]

If the security patch (ESXi550-201501101-SG) is not applied to the releases previous to vSphere ESXi 5.5 Update 2, POODLE security vulnerability may occur. Be sure to apply the security patch before you enable SSLv3.

・VMware Security Patching Guidelines for ESXi and ESX (2020972)
https://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2020972

・VMware ESXi 5.5, Patch ESXi550-201501101-SG: Updates esx-base (2099273)

https://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2099273

(3) Stopping SSH Service

1. Log in to VMware ESXi on the target server with vSphere Client.
2. From [Configuration] tab, select [Security Profile] > [Properties] of Services.
3. Select [SSH] > [Options].
4. From "Service Commands", select [Stop] to stop ssh service > [OK].

2.4.2. Enabling Support for SSLv3 in VMware ESXi 6.5 or later

(1) Starting SSH Service

These settings are not required if ssh service is already running.

1. Log in to VMware ESXi on the target server with vSphere Client.
   Use a Web browser to access https://<IP address of ESXi>/ui/.
2. Select [Host] > [Management] to open ESxi management screen.
3. Select [Service] > [SSH] from the list.
4. Select [Start].

[Note]

When enabling ssh for VMware ESXi, the following message to be displayed on VMware Host Client.

```
Ssh is enabled on this host.  You should disable ssh unless it is necessary for administrative purposes.
```

(2) Enabling SSLv3 for CIM server

The support for SSLv3 is disabled for CIM server (port 5989). Edit the sfcb.cfg file to enable SSLv3.

1. Log in to the target server with administrator privilege which installed ssh of VMware ESXi.
2. Use challenge-response authentication to log in.
3. Edit the /etc/sfcb/sfcb.cfg file to add this statement to enable SSLv3.

```
enableSSLv3: true
```

Restart sfcbd-watchdog. Execute the following command.

```
#/etc/init.d/sfcbd-watchdog restart
```

(3) Stopping SSH Service

1. Log in to VMware ESXi on the target server with VMware Host Client.
   Use a Web browser to access https://<IP address of ESXi>/ui/.
2. Select [Host] > [Management] to open ESxi management screen.
3. Select [Service] tab > [SSH] from the list.
4. Select [Start].

2.4.3. Settings When Using Domain User Account

(1) Adding domain information to ISM-VA

When execute a monitoring with the domain user account, execute the procedures in "3.4.2 Initial Setup of ISM-VA" (User's Manual).

(2) Adding DNS information to ISM-VA

When execute a monitoring with the domain user account, execute the procedures in "User's Manual (4.9 Network Settings)" to register the DNS server on ISM-VA.

3. Setting Procedure for Monitoring Target (Cloud Management Software)

3.1. Setting Procedure for vCenter Server

3.1.1 Adding DNS information to ISM-VA

When execute a monitoring under the condition where an ESXi host with FQDN is registered on vCenter, execute the procedures in "User's Manual (4.9 Network Settings)" to register the DNS server on ISM-VA.

3.1.2 Settings When Using Domain User Account

(1) Settings for Respective Hosts Registered on vCenter Server

To retrieve the information from vCenter Server, it is required that the settings for respective hosts registered on vCenter Server are already completed. Refer to "2.4. Setting Procedure for VMware ESXi" to execute the settings for respective hosts.

(2) Adding domain information to ISM-VA

When execute a monitoring with the domain user account, execute the procedures in "3.4.2 Initial Setup of ISM-VA" (User's Manual).

(3) Adding DNS information to ISM-VA

When execute a monitoring with the domain user account, execute the procedures in "User's Manual (4.9 Network Settings)" to register the DNS server on ISM-VA.

3.2. Setting Procedure for Microsoft Failover Cluster

3.2.1. Settings When Using Domain User Account.

Settings for when using the domain user account

(1) Setting WinRM for Respective Hosts Configuring Cluster

To retrieve the information from Microsoft Failover Cluster, it is required that the settings for respective hosts that configure a cluster are already completed. Refer to "2.1. Setting Procedure for Windows" to execute the settings for respective hosts.

(2) Adding SPN to Active Directory

It is required to correctly register the Service Principal Name (SPN) of a monitoring target cluster on Active Directory when monitoring a Windows Server using the domain user account. Execute the following procedure to register the Service Principal Name of the monitoring target cluster.

```
>setspn -A HOST/[monitoring target cluster IP] [monitoring target cluster name]
```

Checking Command

```
>setspn -L [monitoring target cluster name]
```

If the command result as shown below is output, the registration is succeed.

```
HOST/[monitoring target cluster IP]
```

(3) Adding domain information to ISM-VA

When executing a monitoring using the domain user account, execute the procedures in "3.4.2 Initial Setup of ISM-VA" (User's Manual).

(4) Adding DNS information to ISM-VA

When execute a monitoring with the domain user account, execute the procedures in "User's Manual (4.9 Network Settings)" to register the DNS server on ISM-VA.

(5) Kerberos delegation configuration for Active Directory

1. Log on to the Active Directory server.
2. Open Server Manager.
3. From [Tool] button, select [Active Directory Users and Computers].
4. Expand the domain, then expand [Computers] folder.
5. Right-click the cluster node name or cluster name on the right-side window, then select [Properties].
6. From [General] tab, select [Trust computer for delegation to any service (Kerberos only)].
7. Select [OK] and repeatedly perform the above steps 5 and 6 for all the cluster nodes or cluster.

3.3. Setting Procedure for Microsoft System Center

Refer to "2.1 Setting Procedure for Windows" of this document to execute the settings for the respective hosts and virtual machines with Microsoft System Center installed.

3.4. Setting Procedures for KVM

3.4.1. Setting Procedure for KVM Red Hat Enterprise Linux (Using Domain User)

When retrieving the KVM information, set the SSSD service with the monitoring target.

The required packages are displayed below.

- krb5-workstation
- samba
- samba-client
- samba-common
- sssd

In the following, make the settings from the terminal as a root user.

(1) Editing "/etc/hosts"

Open the "/etc/hosts" file.

```
# vi /etc/hosts
```

- Add the following.
  - IP address and host name of the KVM server to be the monitoring target
  - IP address of ISM-VA

Example:

```
192.168.30.222 rhel73.win2016.local rhel73
192.168.30.228
```

[Note]

This setting is not reflected in the local host name (on the local host). However, if it is not made, executing the command to join Active Directory as described further below will result in an error.

(2) Editing "/etc/krb5.conf"

Open the "/etc/krb5.conf" file.

```
# vi /etc/krb5.conf
```

・ Make the settings of default_realm in the [libdefaults] section to the domain name in uppercase letters.

Example:

```
[libdefaults]
 dns_lookup_realm = true
 dns_lookup_kdc = true
 ticket_lifetime = 24h
 renew_lifetime = 7d
 forwardable = true
 default_realm = WIN2016.LOCAL
```

・ Make the settings in the [realms] section.

Example:

```
[realms]
 WIN2016.LOCAL = {
  kdc = 192.168.30.69
  admin_server = WIN2016-ADVM.WIN2016.LOCAL
 }
```

- For kdc, set the IP address of the server that issues Kerberos tickets.
- For admin_server, set the FQDN of the Kerberos management server.
- Generally, kdc and admin_server are the same servers as the DNS and Active Directory servers.

・ Make the settings in the [domain_realm] section.

Example:

```
[domain_realm]
 win2016.local = WIN2016.LOCAL
 .win2016.local = WIN2016.LOCAL
```

[Note]

Use uppercase and lowercase letters as in the above example to set the domain name you are actually using.

(3) Editing "/etc/samba/smb.conf"

Open the "/etc/samba/smb.conf" file.

```
# vi /etc/samba/smb.conf
```

・ Delete all sections other than the [global] section, and make the settings in the [global]

section as follows.

Example:

```
[global]
   workgroup = WIN2016
   client signing = yes
   client use spnego = yes
   kerberos method = secrets and keytab
   log file = /var/log/samba/%m.log
   realm = WIN2016.LOCAL
   security = ads
```

[Note]

For workgroup and realm, set the domain name you are actually using.

(4) Creation of "/etc/sssd/sssd.conf"

Open the "/etc/sssd/sssd.conf" file. Since it is not existing in the default setting, it is required to create it newly.

```
# vi /etc/sssd/sssd.conf
```

Example:

```
[sssd]
config_file_version = 2
services = pam,nss
domains = WIN2016.LOCAL

[pam]

[nss]
filter_groups = root
filter_users = root

[domain/WIN2016.LOCAL]
id_provider = ad
auth_provider = ad
enumerate = false
cache_credentials = false
case_sensitive = false
```

[Note]

For domains in the [sssd] section and for the [domain/WIN2016.LOCAL] section name, set the domain names you are actually using.

・ For automatically creating a home directory when a domain user logs in:

Add the following to the [domain/Domain name] section in "/etc/sssd/sssd.conf".

```
fallback_homedir = /home/%u
```

(5) Modification of permission in "/etc/sssd/sssd.conf"

Modify the permission in "/etc/sssd/sssd.conf" to "600".

```
# chmod 600 /etc/sssd/sssd.conf
```

[Note]

Any value other than "600" will cause an error at startup of the sssd service.

(6) Setting of local host name (on the local host)

Set the local host name (on the local host) with the following command:

```
# hostnamectl set-hostname FQDN of host
```

Example:

```
# hostnamectl set-hostname rhel73.win2016.local
```

[Note]

This is the host name setting on the local host. It is not reflected to the host name on the network. Make sure that the FQDN of the host matches the one you set in Step (1).

(7) IP address setting of DNS server

Use the following command to set the IP address of the DNS server and restart the interface:

```
# nmcli connection modify Interface name ipv4.dns "IP address of DNS server"
# systemctl restart NetworkManager
```

- Execute the following command to look up the interface name:

```
# ifconfig (Red Hat Enterprise Linux 6 or earlier)
# ip addr (Red Hat Enterprise Linux 7 or later)
```

- Execute the following command to check the settings:

```
# host Kerberos management server name
```

Example:

```
# host WIN2016-ADVM.WIN2016.LOCAL
```

If the output includes the IP address, the settings are correct.

(8) Getting permission to retrieve a Kerberos ticket

Execute the following command to get permission to etrieve a Kerberos ticket:

```
# kinit Administrator
```

When requested to enter the password, enter the password for the domain administrator user "Administrator".

・ Execute the following command to check the settings:

```
# klist
```

If the domain information is output, the settings are correct.

If there is any failure, check "/etc/krb5.conf".

(9) Joining Active Directory

Use the following command to join Active Directory:

```
# net ads join -U Administrator
```

When requested to enter the password, enter the password for the domain administrator user "Administrator".

Execute the following command to check the settings:

```
# net ads info
```

If the server (shown as "LDAP server") and domain information is output, the settings are correct.

If there is any failure, check the host name setting and the settings in "/etc/samba/smb.conf". Alternatively, refer to the "Login no longer available after changing host name" section further below.

(10) System authentication settings

Execute the following command to set the system authentication (authorization for target monitoring server).

This command automatically updates all related setup files.

・ To not automatically create a home directory for the domain user:

```
# authconfig --enablesssd --enablesssdauth --enablelocauthorize --update
```

・ For automatically creating a home directory for the domain user:

Make the settings under "For automatically creating a home directory when a domain user logs in" when you edit "/etc/sssd/sssd.conf" in above Step (4) in advance, and then execute the following command:

```
# authconfig --enablesssd --enablesssdauth --enablelocauthorize --enablemkhomedir --update
```

(11) Startup of SSSD (System Security Services Daemon) service

Execute the following commands to start up the SSSD service:

```
# systemctl enable sssd
# systemctl start sssd
```

Execute the following command to check that the service has started:

```
# systemctl status sssd
```

If it is running normally, the settings are correct.

If there is any failure, check the contents of "/etc/sssd/sssd.conf" and the file permissions.

(12) Check of login as domain user

・ Name formats for domain users

There are several different formats to write domain user names as follows:

- User name
- 'Domain prefix}\{User name'
- 'Domain prefix.Domain name suffix\User name'
- 'User name@Domain prefix'
- 'User name@Domain prefix.Domain name suffix'

Examples:

administrator

'win2016\administrator'

'win2016.local\administrator'

'administrator@win2016'

'administrator@win2016.local'

[Note]

Since "case sensitive" is set to "false" in the [domain/WIN2016.Domain name] section in "/etc/sssd/sssd.conf", there is no distinction between uppercase and lowercase letters.

・ Check of domain user existence

You can use any of the following commands to check whether a domain user exists.

For the user name, you can use any of the formats described above.

```
# id User name
```

```
# getent passwd User name
```

If the user information is displayed, the settings are correct.

- Check of login as domain user

  You can use any of the following commands to check logins with the SSH protocol. For the user name, you can use any of the formats described above.

```
# ssh User name@IP address of monitored server
# ssh -l User name IP address of monitored server
```

Examples:

```
# ssh administrator@192.168.30.222
# ssh 'administrator@win2016'@192.168.30.222
# ssh -l 'win2016.local¥administrator' 192.168.30.222
```

If you can log in normally with any of these commands, the settings are correct.

(13) Settings for the Domain User

Follow the procedures in "3.4.3 Settings when using General User Accounts" and make the settings for the domain user.

- Troubleshooting
  - When login is no longer available after changing host name

    If you changed a host name both on the local host and on the network, execute the following two commands:

```
# net ads join -U Administrator
# systemctl restart sssd
```

If the login still fails, the previous settings may be existing in "/etc/krb5.keytab", so it is required to delete "/etc/krb5.keytab" with the following command first, then execute the above commands:

```
# rm /etc/krb5.keytab
```

(14) Adding domain information to ISM-VA

Execute the settings of "User's Manual" – "3.4.2 Initial Setup of ISM-VA."

(15) Adding DNS information to ISM-VA

Register DNS servers in ISM-VA by executing the settings of "User's Manual" – "4.9

Network Settings."

3.4.2. Setting Procedure for KVM SUSE Linux Enterprise Server (Using Domain User)

When retrieving the KVM information, set the SSSD service with the monitoring node.

Make the following settings by either using the yast command on the terminal or by using YaST on the GUI menu. The following procedure uses the yast command.

(1) Startup of yast command

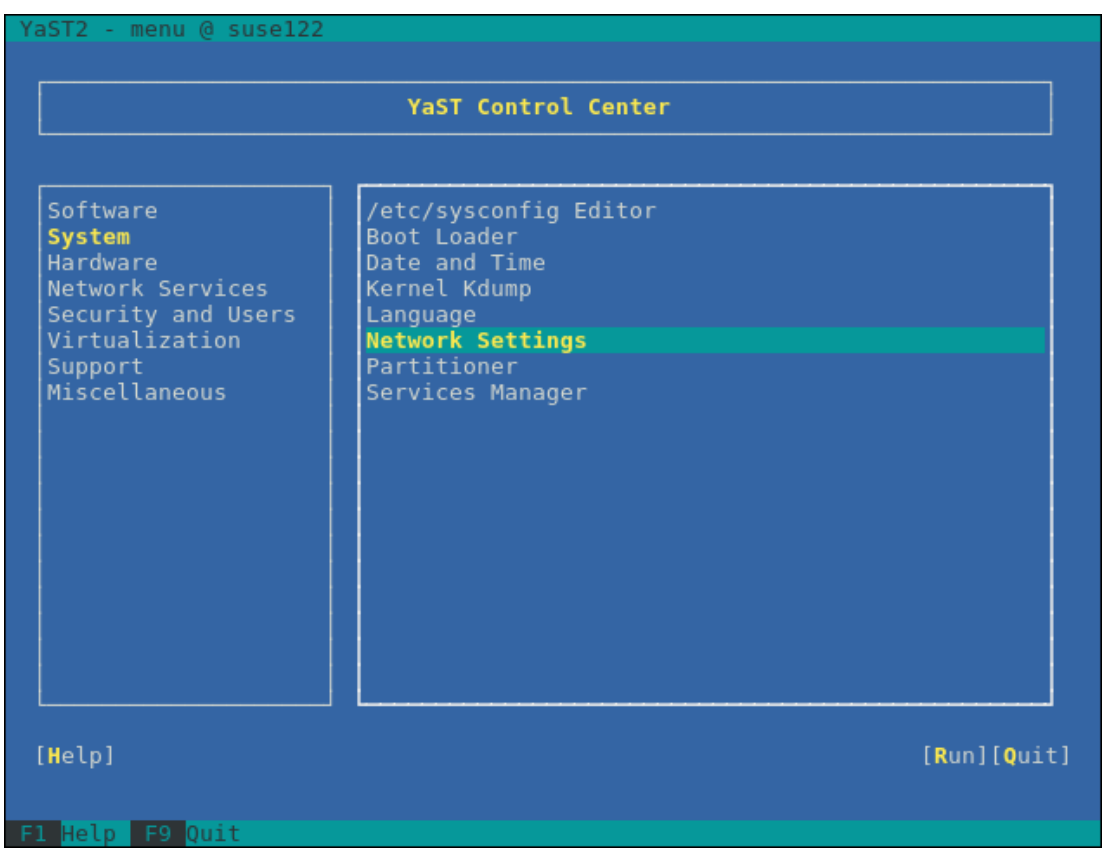
Execute the following command as a root user from your terminal:

```
# yast
```

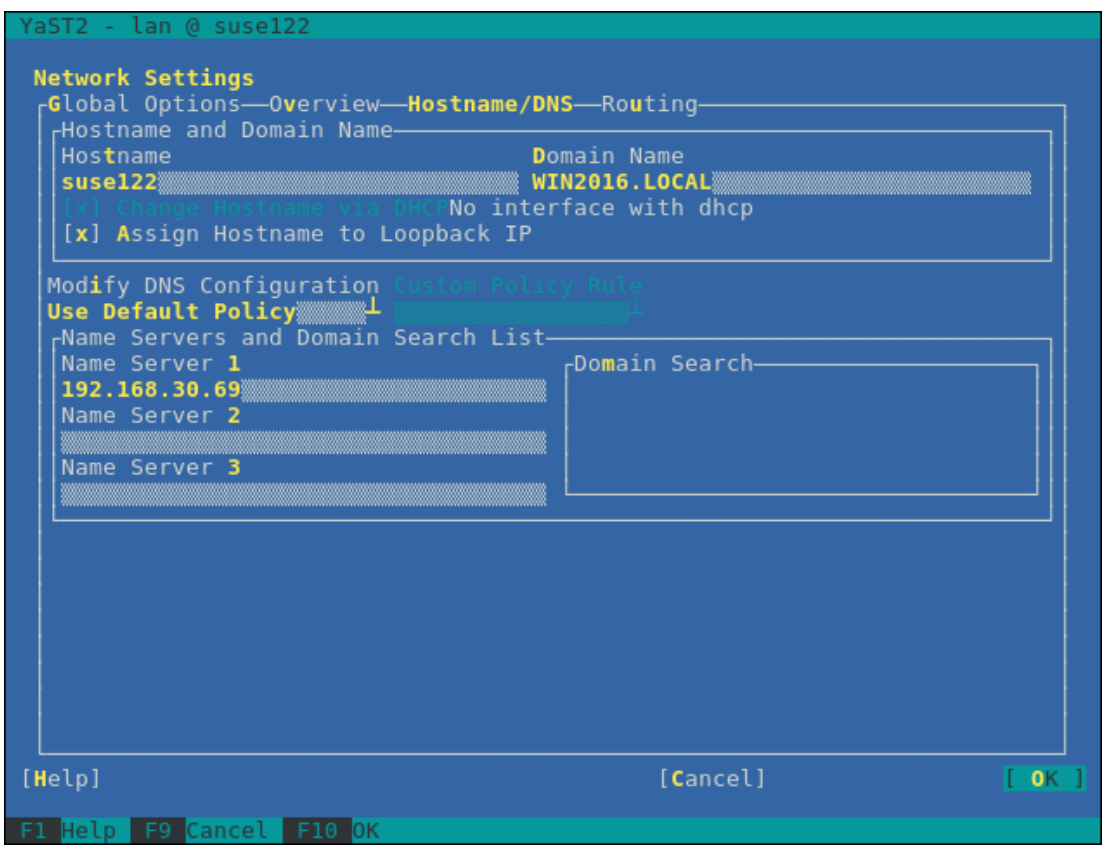
To select items in yast, use combinations of the arrow and tab keys.

(2) Host name and DNS settings

1. Select System -> Network Settings, and then press the [Enter] key.

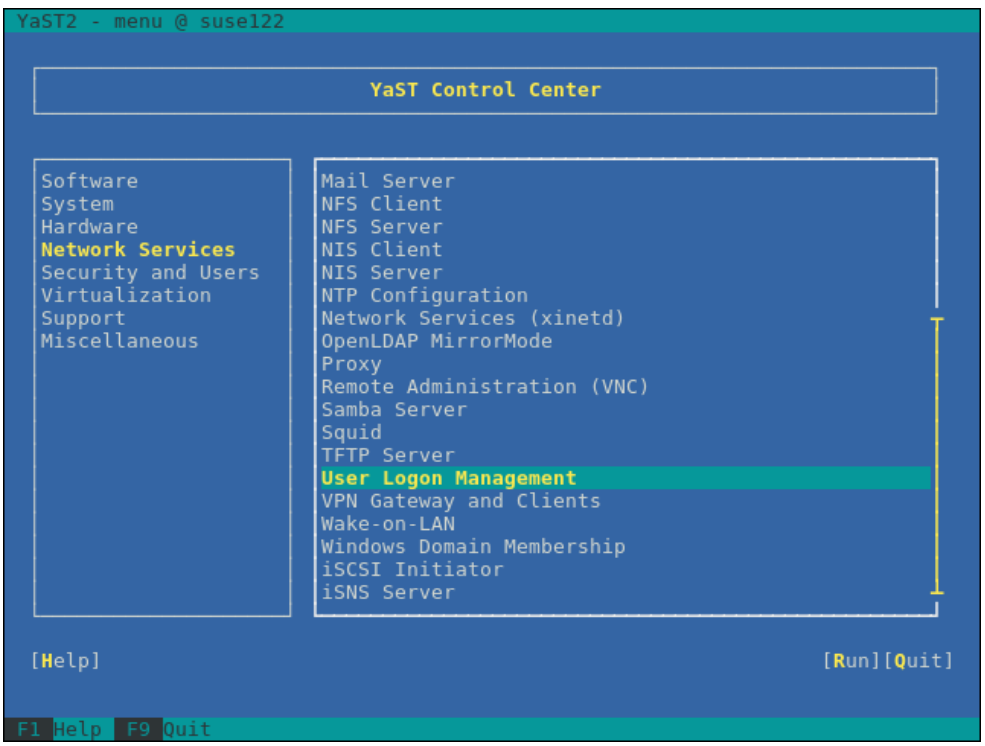


2. Select a host name or DNS, make the settings for the following items, then select [OK] and press the [Enter] key.
   - Hostname
   - Domain Name
   - Assign Hostname to Loopback IP
   - Name Server 1

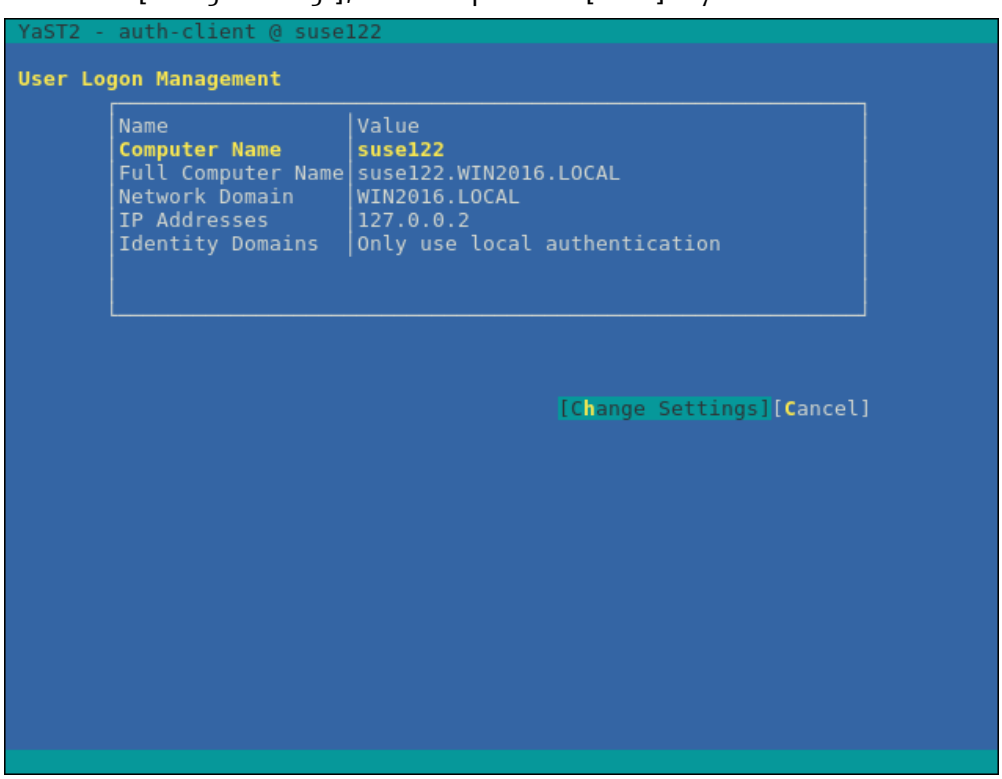


(3) SSSD service settings

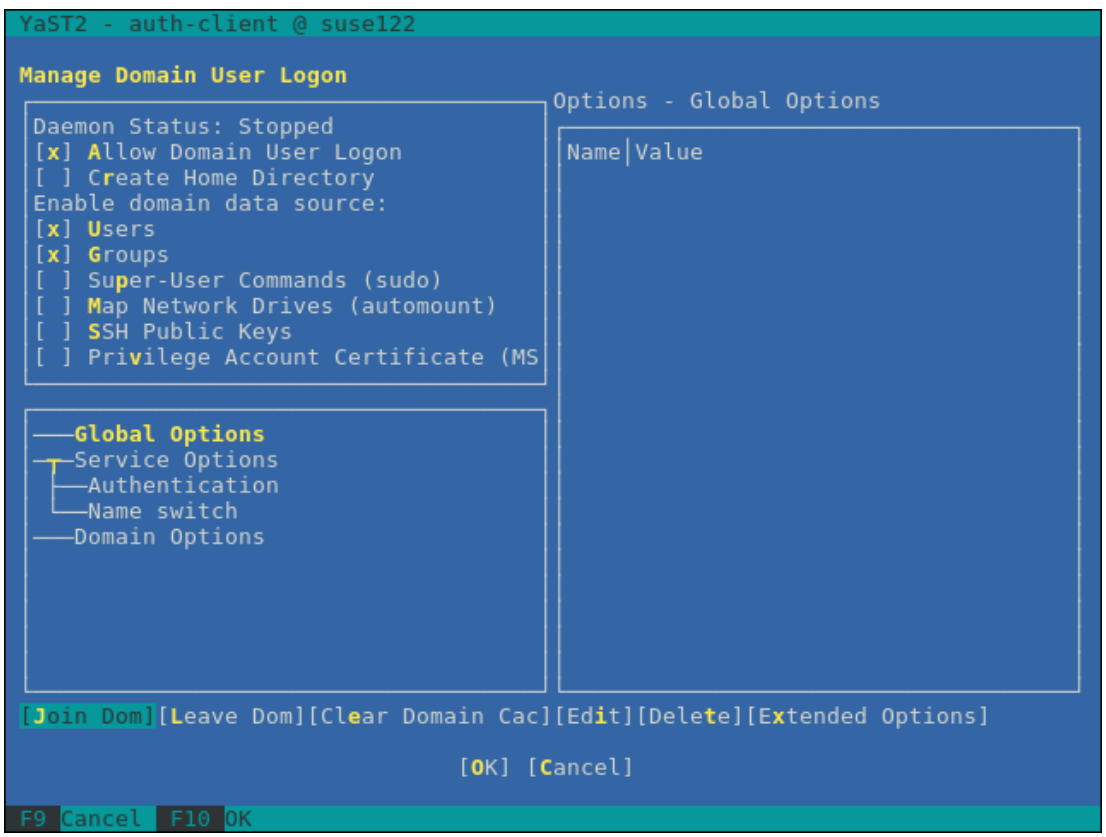
1. Select Network Services -> User Logon Management, and then press the [Enter] key.



2. Select [Change Settings], and then press the [Enter] key.



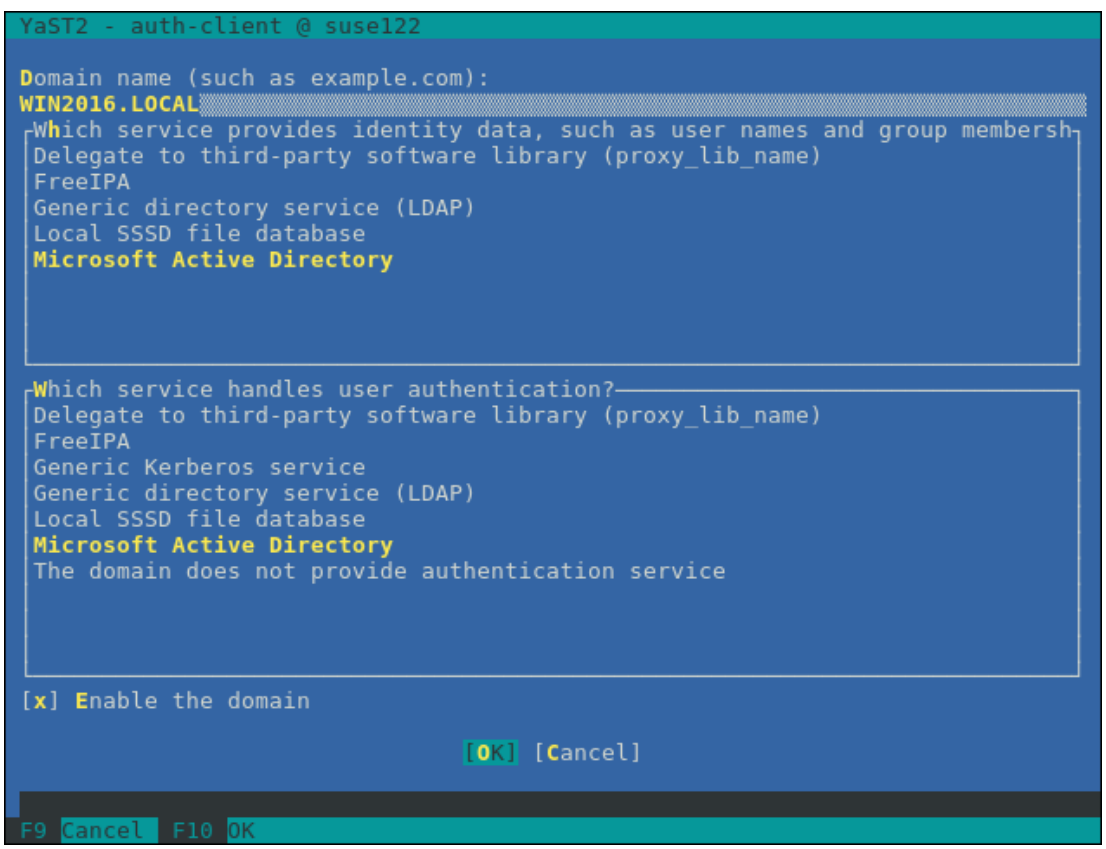
3. Select the checkboxes for the following items, select [Join Dom], and then press the [Enter] key.
   - Allow Domain User Logon
   - Users
   - Groups



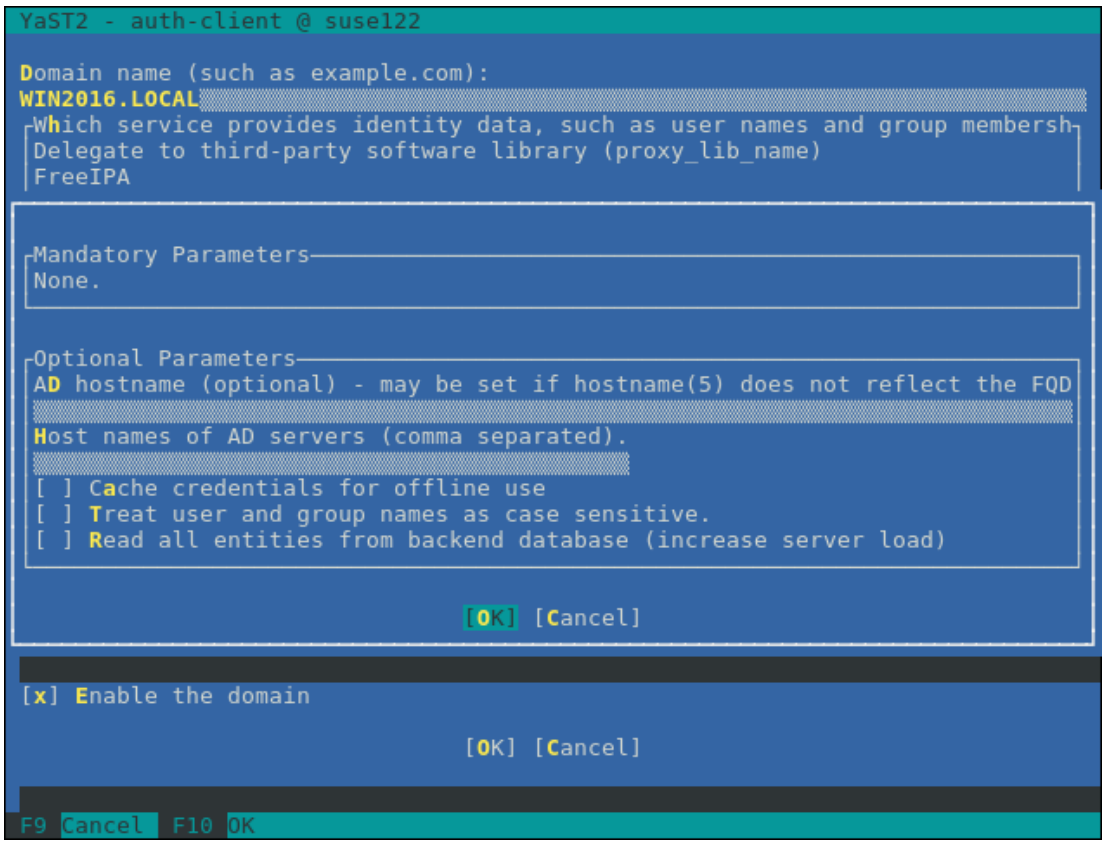
4. Make the settings for the following items, then select [OK] and press the [Enter] key.
   - Domain name
   - Which service provides identity data, such as user names and group members

     Microsoft Active Directory
   - Which service handles user authentication?

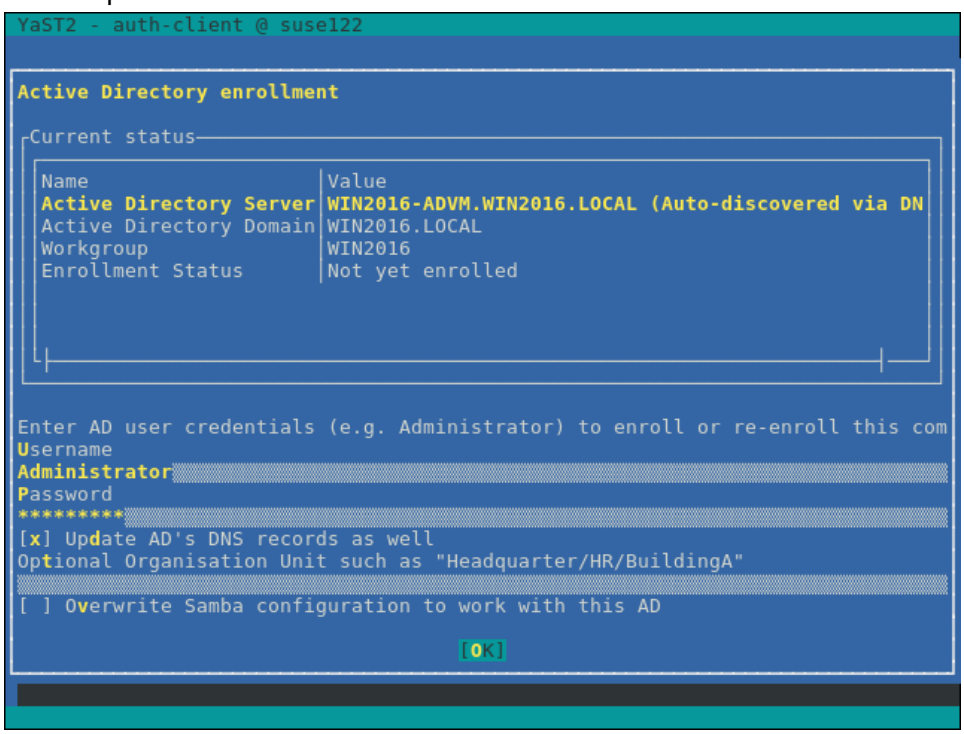
     Microsoft Active Directory
   - Enable the domain



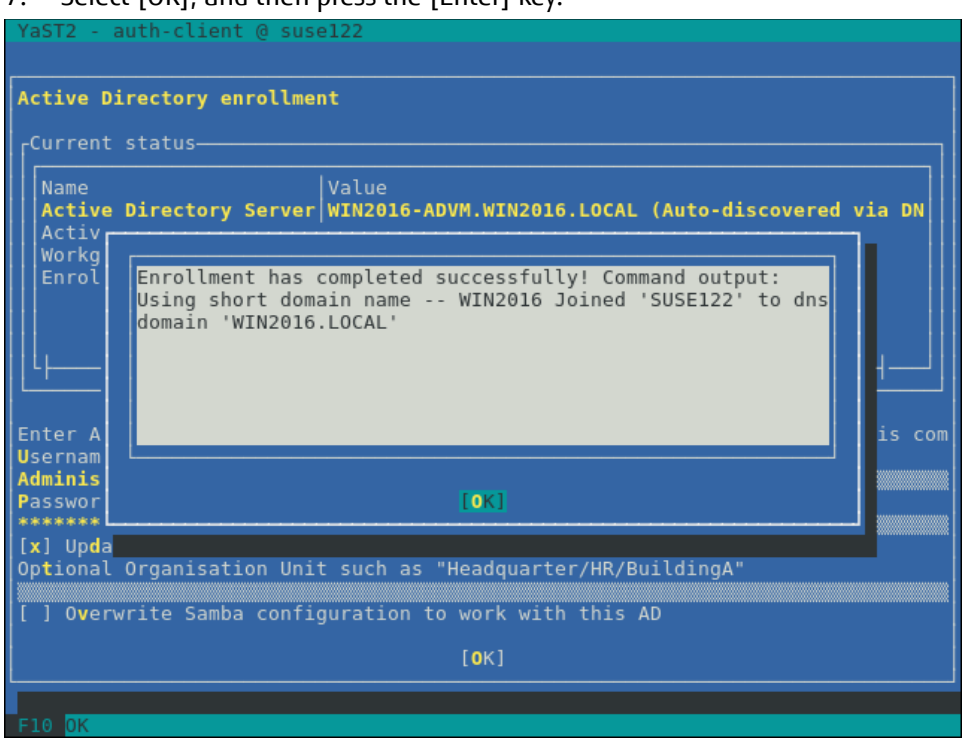
5. Leave all items blank and deselect the checkboxes, select [OK], and then press the [Enter] key.



6. Make the settings for the following items, then select [OK] and press the [Enter] key.
   - Username
   - Password
   - Update AD's DNS records as well



7. Select [OK], and then press the [Enter] key.

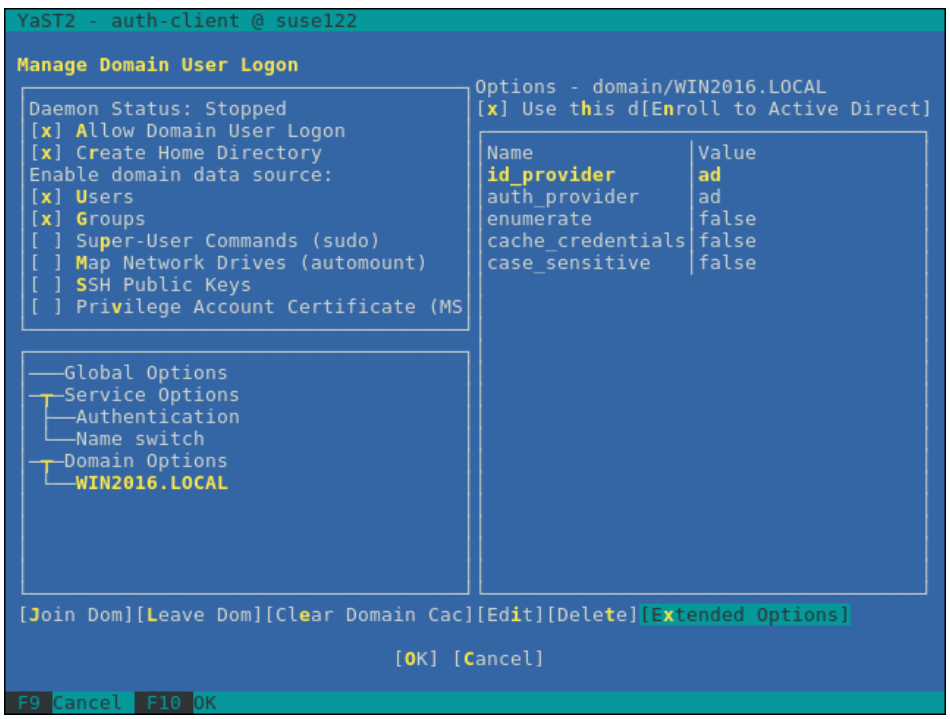


If you are going to create a home directory for the domain user, proceed to Step 8.

If you are not going to create a home directory for the domain user, proceed to Step 11.

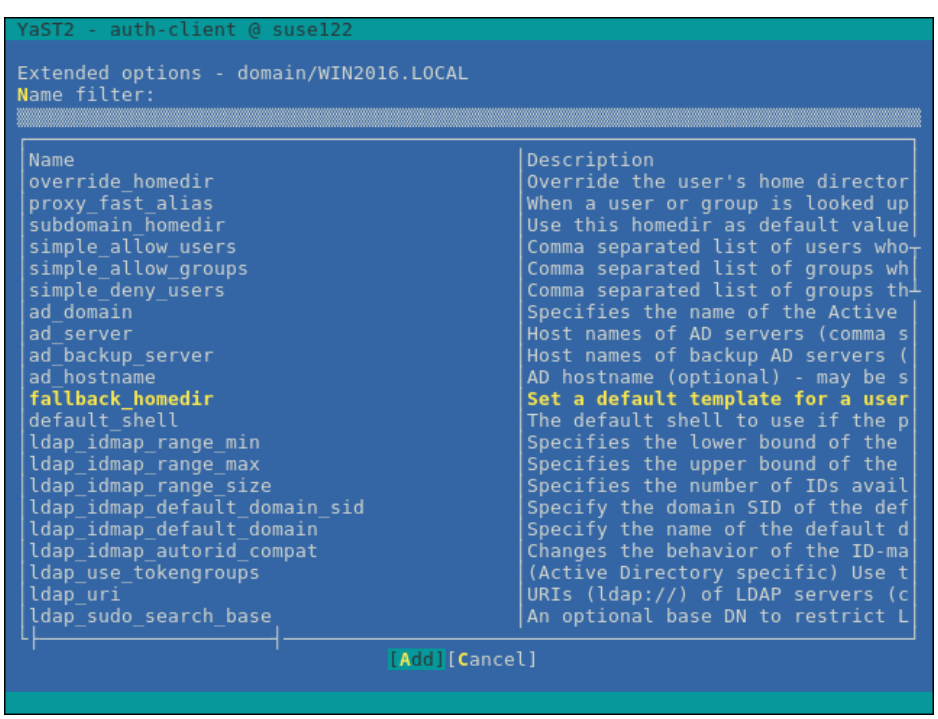
8. Make the following settings, then select [Extended Options] and press the [Enter] key.

   - Create Home Directory



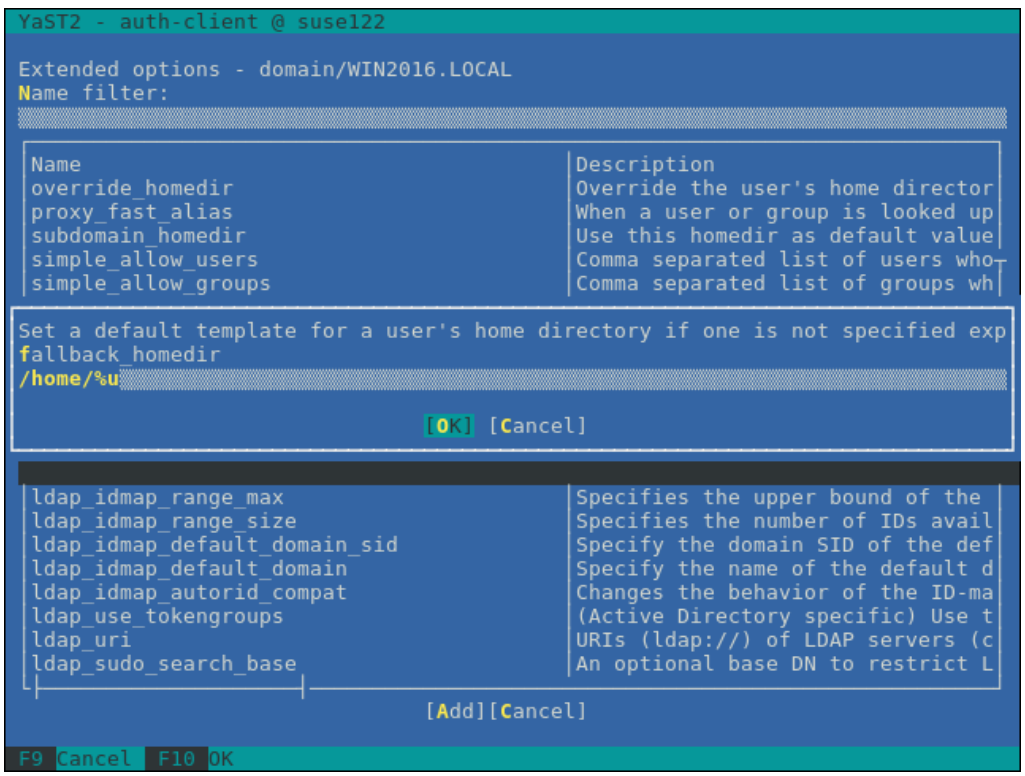
9. Select the following item, then select [Add] and press the [Enter] key.

   - fallback_homedir

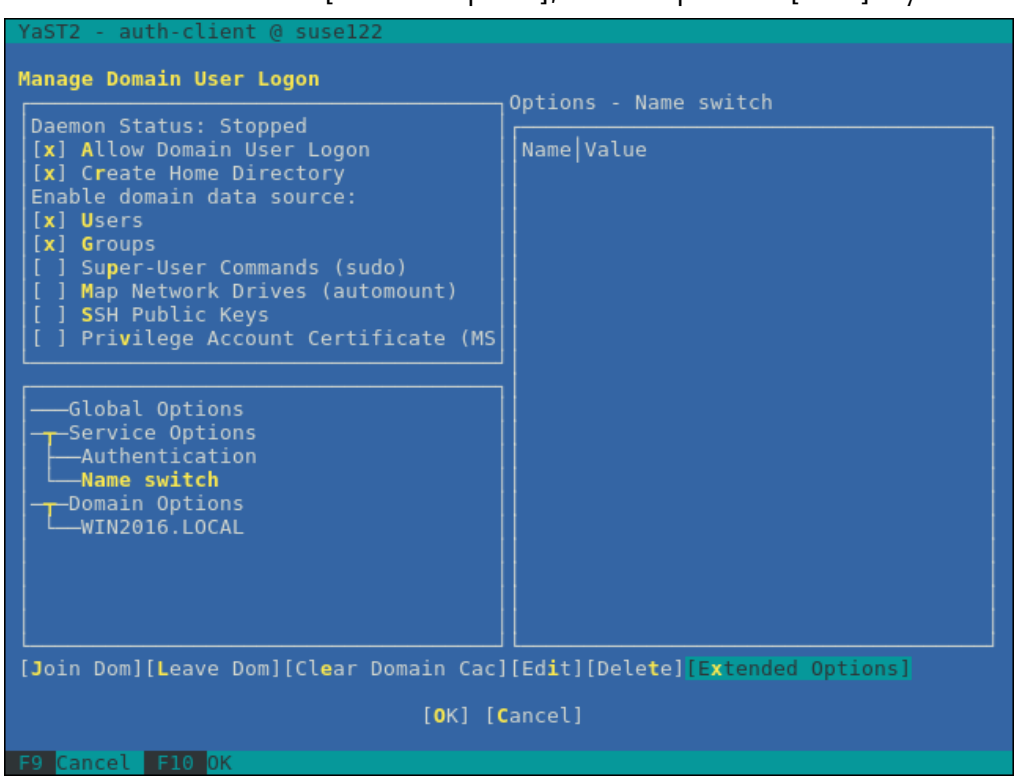


10. Enter the following text string, then select [OK] and press the [Enter] key.

- /home/%u

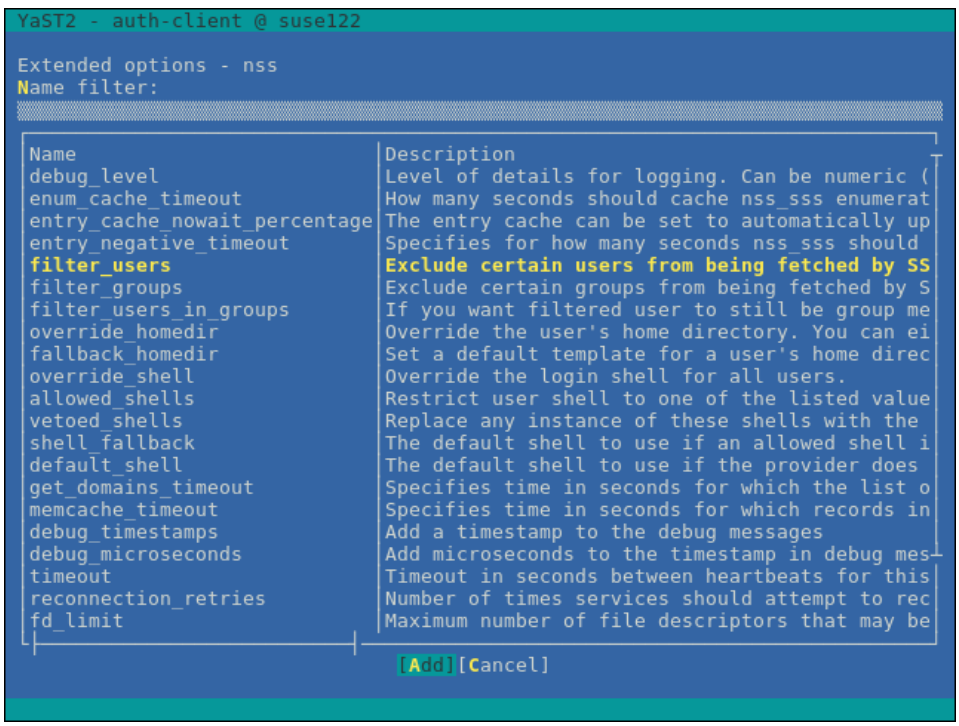


11. Select Name switch -> [Extended Options], and then press the [Enter] key.



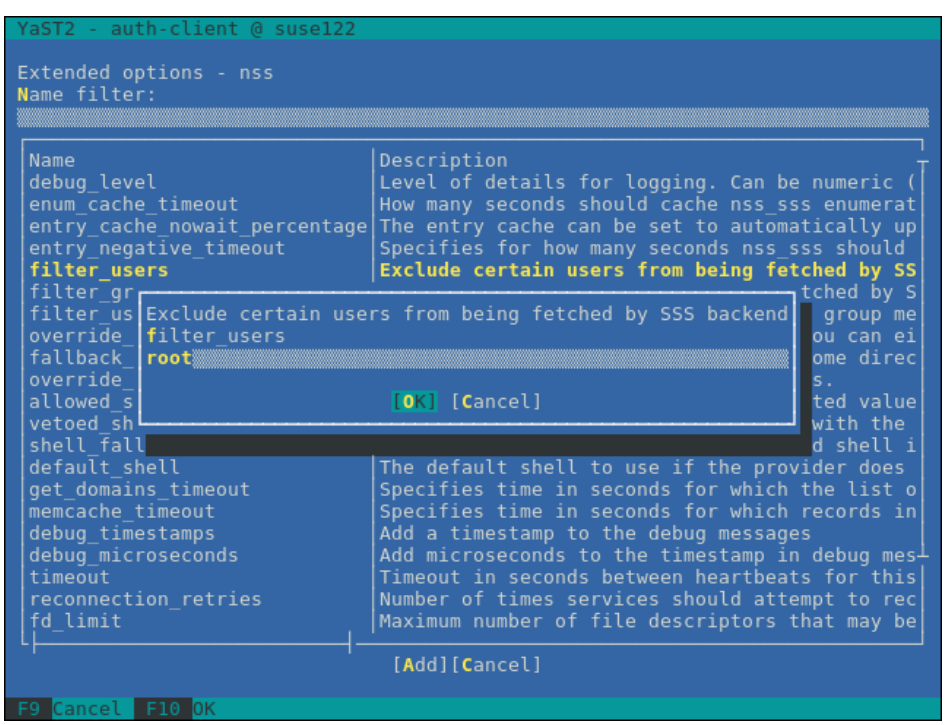
12. Select the following item, then select [Add] and press the [Enter] key.

- filter_users

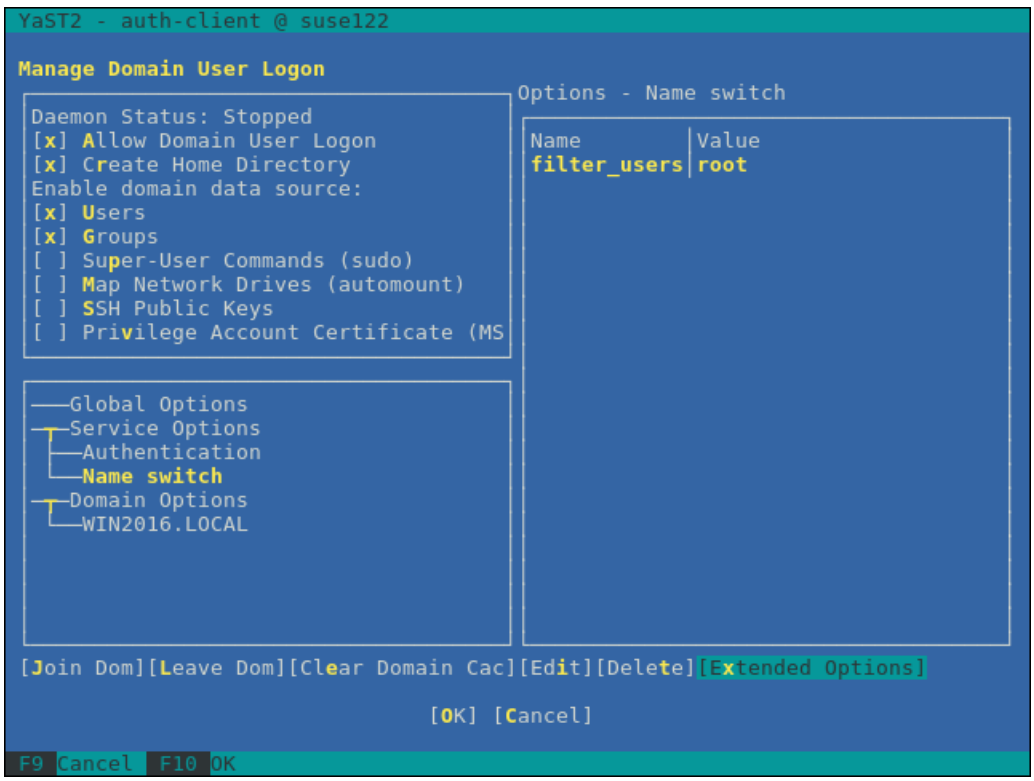


13. Enter the following text string, then select [OK] and press the [Enter] key.

- root

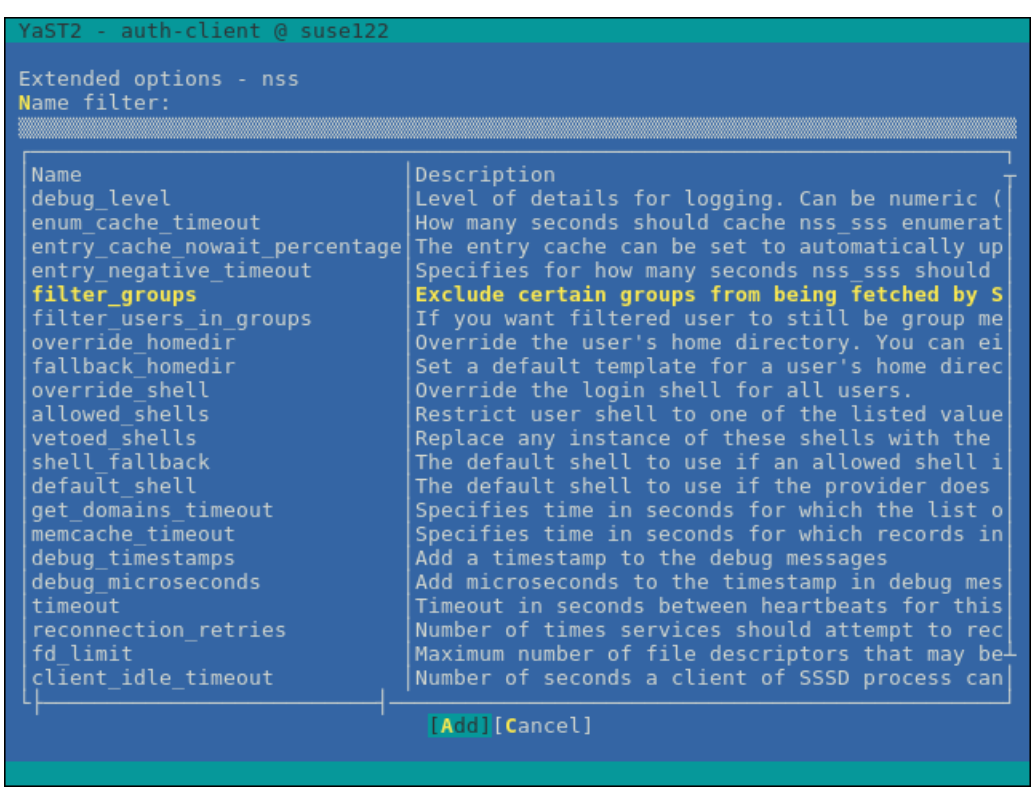


14. Select Name switch -> [Extended Options], and then press the [Enter] key.



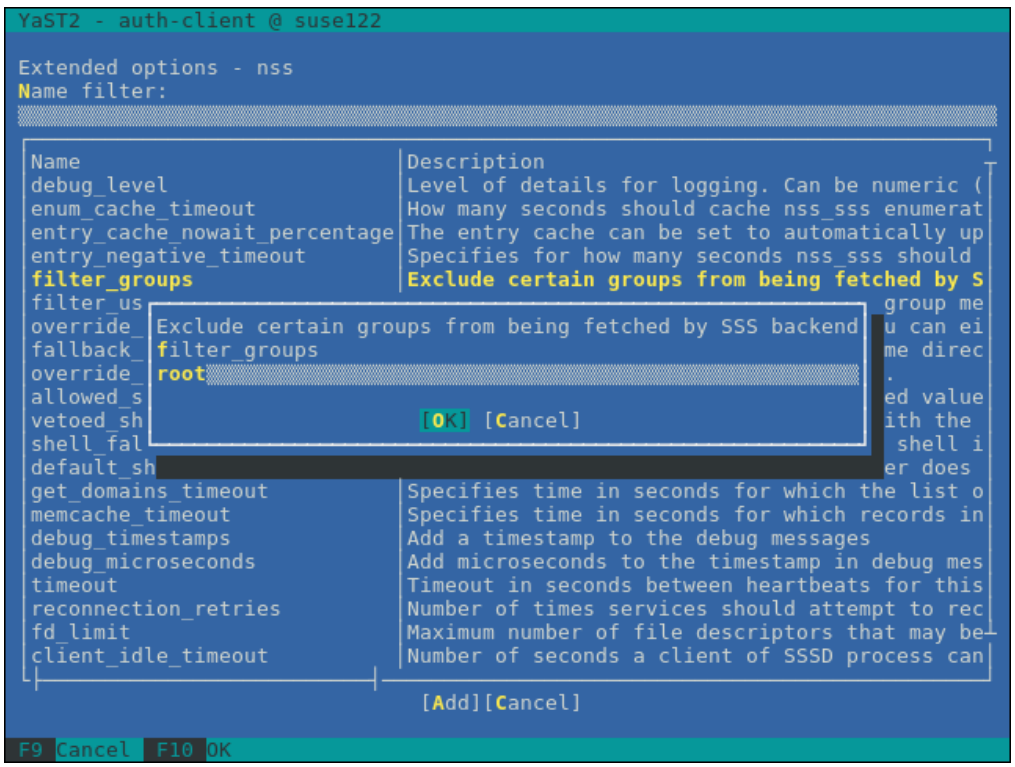
15. Select the following item, then select [Add] and press the [Enter] key.

- filter_groups

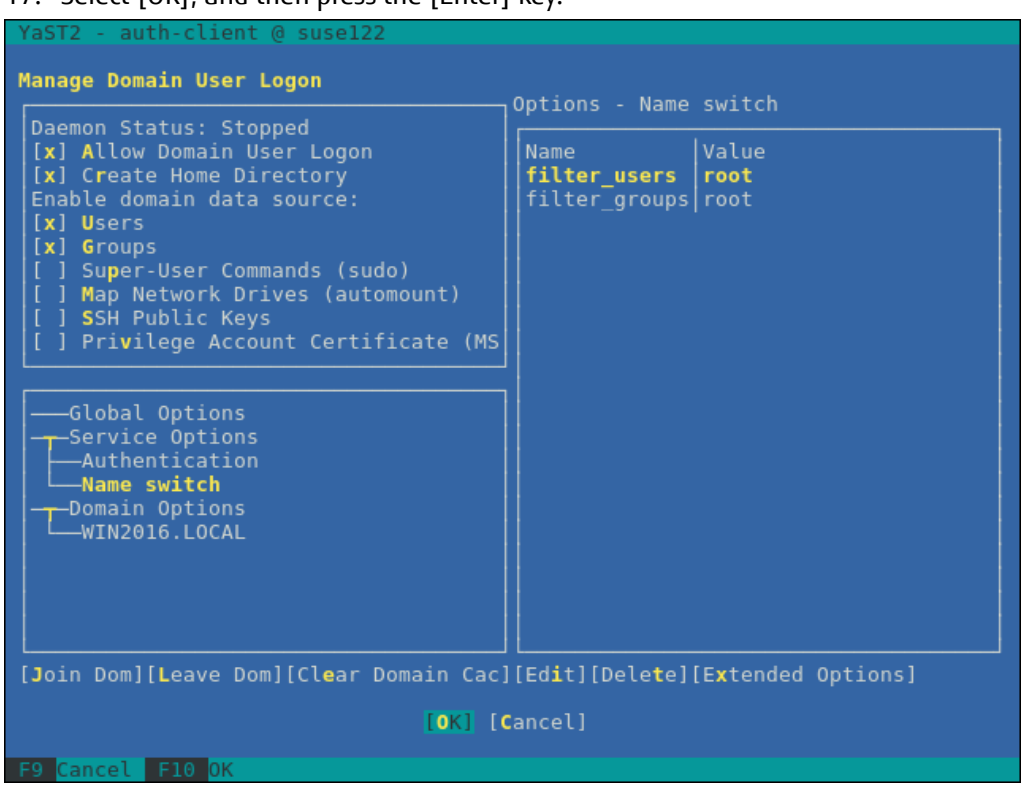


16. Enter the following text string, then select [OK] and press the [Enter] key.

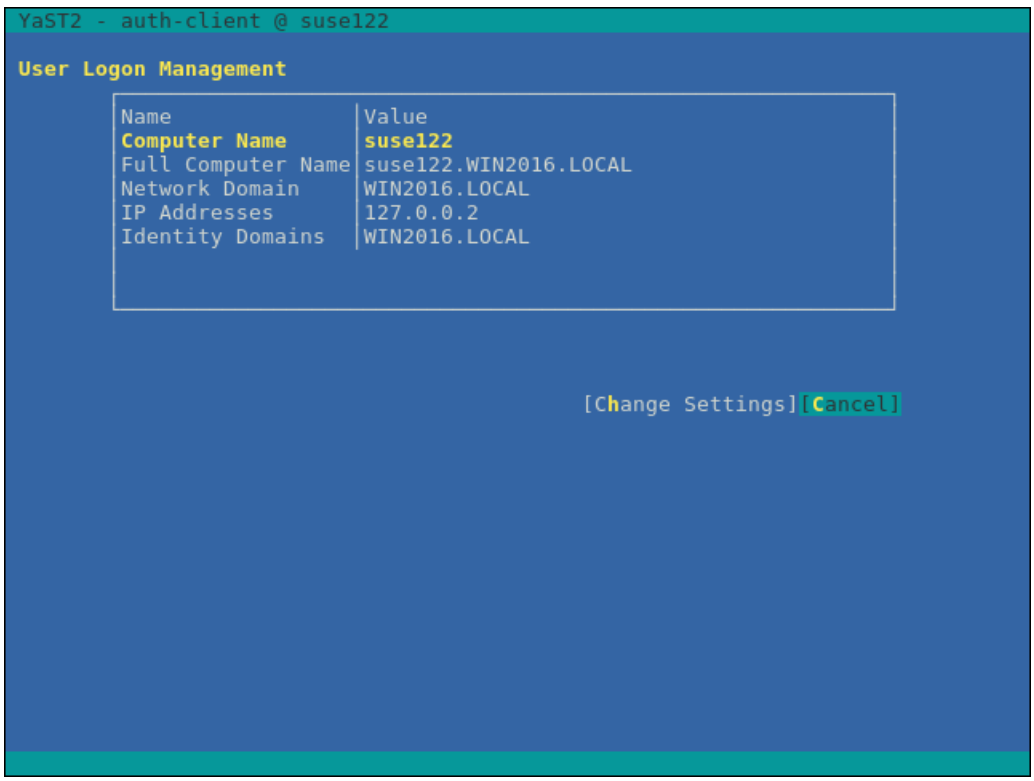
- root



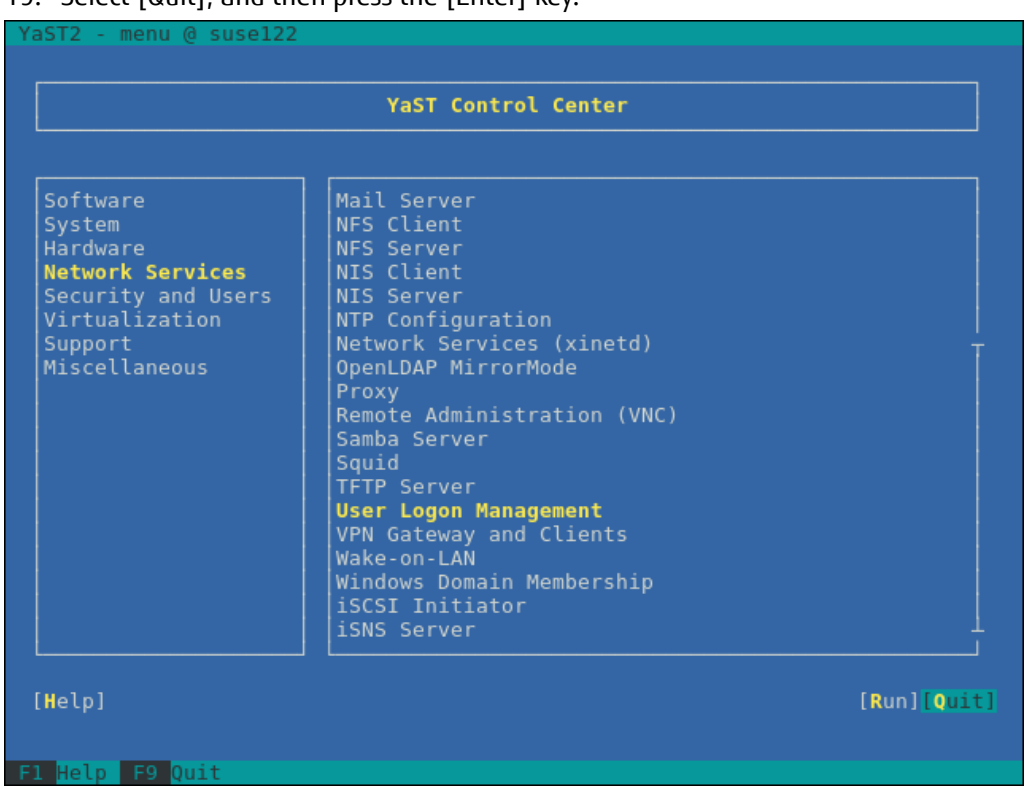
17. Select [OK], and then press the [Enter] key.



18. Select [Cancel], and then press the [Enter] key.



19. Select [Quit], and then press the [Enter] key.



By this, your settings for the SSSD service are complete.

(4) Check of login as domain user

- Name formats for domain users

  There are several different formats to write domain user names as follows:

  - User name
  - 'Domain prefix\User name'
  - 'Domain prefix.Domain name suffix\User name'
  - ‘User name@Domain prefix'
  - 'User name@Domain prefix.Domain name suffix'

  Examples:

administrator

'win2016\administrator'

'win2016.local\administrator'

'administrator@win2016'

'administrator@win2016.local'

[Note]

Since “case sensitive” is set to “false” in the optional domain settings, there is no distinction between uppercase and lowercase letters.

- Check of login as domain user

  You can use any of the following commands to check logins with the SSH protocol.

  For the user name, you can use any of the formats described above.

```
# ssh User name@IP address of monitored server
# ssh -l User name IP address of monitored server
```

  Examples:

```
# ssh administrator@192.168.30.222
# ssh 'administrator@win2016'@192.168.30.222
# ssh -l 'win2016.local¥administrator' 192.168.30.222
```

  If you can log in normally with any of these procedures, the settings are correct.

(5) Settings for the Domain User

Follow the procedures in "3.4.3 Settings when using General User Accounts" and make the settings for the domain user.

(6) Adding domain information to ISM-VA

Execute the settings of “User's Manual” – “3.4.2 Initial Setup of ISM-VA.”

(7) Adding DNS information to ISM-VA

Register DNS servers in ISM-VA by executing the settings of "User's Manual" – "4.9 Network Settings."

3.4.3. Settings when using General User Accounts

In principle, KVM information can only be retrieved by root users.

When let the users other than the root users (including domain users) retrieve KVM information, it is required to add those users to the "libvirt" group on the monitoring Linux server.

・ To add a user to the "libvirt" group, execute the following command as a root user:

```
# gpasswd -a [user name] libvirt
```

[Note] Set the user name using only lowercase letters.

・ To remove a user from the "libvirt" group, execute the following command as a root user:

```
# gpasswd -d [user name] libvirt
```

[Note]

You can also use the above commands to add and remove the domain user.

3.5. Setting Procedures for IPCOM

3.5.1. Setting Procedure to Assign Privilege to Execute the Command to Retrieve the Virtual Machine Information.

When retrieving the virtual information of IPCOM with an admin user, it is required to add the admin user to the "libvirt" group on the monitoring IPCOM server and assign the privilege to execute the command to retrieve the virtual machine information.

・ To add an admin user to the "libvirt" group, execute the following command as an admin user:

```
# sudo gpasswd -a admin libvirt
```

・ To remove an admin user from the "libvirt" group, execute the following command as an admin user:

```
# sudo gpasswd -d admin libvirt
```

3.6. Setting Procedures for OpenStack

3.6.1. Setting Procedure for a Controller Node

(1) Installing an SSL module

If an SSL module is already installed on the controller node, it is not required.

The following is an example of an installation using the "yum" command.

```
# yum install mod_ssl
```

(2) Preparing SSL certificates

You must prepare SSL certificates and SSL certificate key files for HTTPS communication.

SSL certificates can be prepared in the following three ways.

- Reusing the existing SSL certificates and SSL certificate key files that are already installed
- Issuing by the Certificate Authority
- Creating self-certificates

[Note]

Only Version 3 can be used.

You can check the version information with the following command.

```
# openssl x509 -text -noout -in certificate_file_path
*For "certificate_file_path", enter a full pathname of the certificate file.
```

A certificate file might be created automatically when installing OpenStack, but it may be created with a version other than Version 3. Be sure to use the certificates created in Version 3.

[Reference] Example of creating a self-certificate

```
# openssl genrsa -rand /proc/uptime 2048 > server.key
# openssl req -new -key server.key -x509 -sha256 -days 365 -set_serial
$RANDOM -extensions v3_req -out server.crt
*For "Common Name," enter an IP address, FQDN, or a host name.
```

Store the obtained SSL certificate in the controller node.

SSL certificate file: /etc/pki/CA/certs/

SSL certificate key file: /etc/pki/CA/private/

(3) Determining port assignment

Determine the port to assign to the Proxy server.

Select a port that is not used by other services on the controller node.

1-1023 cannot be used.

(4) Retrieving OpenStack endpoint information

Preparing a setting file for OpenStack environment variables

Download the information according to the following procedure. (The procedure may vary depending on the used version/platform.)

I. Log in to "OpenStack Dashboard" as an admin user.

II. Select the admin icon on the top right.

III. Select "OpenStack RC File v3" to download.

You can also use the file created when installing OpenStack.

・ Retrieving the endpoint

Execute the following command on the controller node to retrieve the following four types of URL information and two types of version information. For the version information, retrieve the last "vx" part of the URL. For the URL, retrieve up to "/vx" part.

- URL and version of the item where "Service Type" is "identity" and "Interface" is "public"
- URL of the item where "Service Type" is "network" and "Interface" is "public"
- URL of the item where "Service Type" is "image" and "Interface" is "public"
- URL and version of the item where "Service Type" is "compute" and "Interface" is "public"

```
source <OpenStack Environment variable settings file>; unset OS_SERVICE_TOKEN;
export OS_PASSWORD=< OpenStack_PASSWORD>; openstack endpoint list
```

Example:

```
source keystonerc_admin; unset OS_SERVICE_TOKEN;  export OS_PASSWORD=password;
openstack endpoint list
```

Output example:

```
+----------------------------------+----------+-------------+-------------
+---------+----------+-------------------------------------------------+
| ID                               | Region    | Service Name | Service Type |
Enabled | Interface | URL                                             |
+----------------------------------+----------+-------------+-------------
+---------+----------+-------------------------------------------------+
| 01d7dd66d19947d5870acec413876ba2 | RegionOne | keystone     | identity     |
True    | public    | http://192.168.30.86:5000/v3                    |
```

```
| 04005c8d71a544e596b9e40083fa7206 | RegionOne | placement    | placement    |
True    | internal  | http://192.168.30.86:8778/placement             |
| 0797675ff3c64da58a57a4988ec44a2b | RegionOne | cinderv2     | volumev2     |
True    | admin     | http://192.168.30.86:8776/v2/%(tenant_id)s      |
| 09ae73e20c004030ae04a7f5d8bf048a | RegionOne | placement    | placement    |
True    | admin     | http://192.168.30.86:8778/placement             |
| 12d9cbc0b1de4bf5a63d6819ec274685 | RegionOne | swift        | object-store |
True    | internal  | http://192.168.30.86:8080/v1/AUTH_%(tenant_id)s |
| 201c7c5ecef54c0691c043eafe6087ae | RegionOne | neutron      | network      |
True    | admin     | http://192.168.30.86:9696                       |
| 32920d76f674494d9a9dd98e06c9e229 | RegionOne | gnocchi      | metric       |
True    | internal  | http://192.168.30.86:8041                       |
| 3ff445febbee434aafc70c964dc3dbdc | RegionOne | ceilometer   | metering     |
True    | internal  | http://192.168.30.86:8777                       |
| 42f8a5c483ef43f18e736b622c2d5cf8 | RegionOne | cinderv2     | volumev2     |
True    | internal  | http://192.168.30.86:8776/v2/%(tenant_id)s      |
| 4aba919df7f947bbaf7a19918fadd01e | RegionOne | swift        | object-store |
True    | admin     | http://192.168.30.86:8080/v1/AUTH_%(tenant_id)s |
| 4b8c976fe4e742018b0fd4177dcae429 | RegionOne | cinderv3     | volumev3     |
True    | admin     | http://192.168.30.86:8776/v3/%(tenant_id)s      |
| 5b61335921c247689906b1bf390a45e7 | RegionOne | cinderv2     | volumev2     |
True    | public    | http://192.168.30.86:8776/v2/%(tenant_id)s      |
| 676ec9c2044947fea66b15f6168465de | RegionOne | gnocchi      | metric       |
True    | admin     | http://192.168.30.86:8041                       |
| 6855184db088496baabb85f5a70021f4 | RegionOne | aodh         | alarming     |
True    | internal  | http://192.168.30.86:8042                       |
| 8944c76fb0784089b1f7f56c94388530 | RegionOne | nova         | compute      |
True    | public    | http://192.168.30.86:8774/v2.1/%(tenant_id)s    |
| 930030ede13049439e2933665e91a3b4 | RegionOne | cinderv3     | volumev3     |
True    | public    | http://192.168.30.86:8776/v3/%(tenant_id)s      |
| 9503ad1f5e754993838fa53fd5d58690 | RegionOne | nova         | compute      |
True    | admin     | http://192.168.30.86:8774/v2.1/%(tenant_id)s    |
| 9541b01381404c4cb200dcbeea0168c4 | RegionOne | keystone     | identity     |
True    | admin     | http://192.168.30.86:35357/v3                   |
| 98f00b9d75564ba29e92ccd5fdccb376 | RegionOne | keystone     | identity     |
True    | internal  | http://192.168.30.86:5000/v3                    |
```

```
| 9ae897c5ae704d9aa142b7b61c728468 | RegionOne | aodh         | alarming     |
True    | admin     | http://192.168.30.86:8042                        |
| 9bdc57b0a32e40148e2a049ba9211e8b | RegionOne | placement    | placement    |
True    | public    | http://192.168.30.86:8778/placement              |
| b0ea3c01f909451bafb57ccc2e5a6e32 | RegionOne | glance       | image        |
True    | admin     | http://192.168.30.86:9292                        |
| b75f5ae0fc8644fc9859ef37d4a4afc5 | RegionOne | ceilometer   | metering     |
True    | public    | http://192.168.30.86:8777                        |
| b7de11ad749b4d0f9b593446794c355c | RegionOne | swift        | object-store |
True    | public    | http://192.168.30.86:8080/v1/AUTH_%(tenant_id)s |
| b82ce3bd754a46289838cdc4ec17fd0f | RegionOne | cinder       | volume       |
True    | public    | http://192.168.30.86:8776/v1/%(tenant_id)s       |
| be3d757e64a945f8b0cdf784f0167ff8 | RegionOne | neutron      | network      |
True    | internal  | http://192.168.30.86:9696                        |
| c70161c0b104474f8f1d15fee74b222f | RegionOne | gnocchi      | metric       |
True    | public    | http://192.168.30.86:8041                        |
| c89faf6e8b9d4b3f9823d1a7e490e45b | RegionOne | cinder       | volume       |
True    | internal  | http://192.168.30.86:8776/v1/%(tenant_id)s       |
| cbd56dff0a5d4fe4b1a705e820115fd6 | RegionOne | ceilometer   | metering     |
True    | admin     | http://192.168.30.86:8777                        |
| dab0b8fa23c943a787803e0fd5e00450 | RegionOne | nova         | compute      |
True    | internal  | http://192.168.30.86:8774/v2.1/%(tenant_id)s     |
| dbaf3b9d826d49ec8955623bf57cd7ec | RegionOne | neutron      | network      |
True    | public    | http://192.168.30.86:9696                        |
| e2fff591156f4176a13aad68c7e0e000 | RegionOne | glance       | image        |
True    | internal  | http://192.168.30.86:9292                        |
| ecda799534b144e7a48dbe8c4e99836a | RegionOne | cinderv3     | volumev3     |
True    | internal  | http://192.168.30.86:8776/v3/%(tenant_id)s       |
| f9052dd300904e8c80fca87fdb8bc2a1 | RegionOne | glance       | image        |
True    | public    | http://192.168.30.86:9292                        |
| fa9b861b2e14423baba72aa08bf2953d | RegionOne | aodh         | alarming     |
True    | public    | http://192.168.30.86:8042                        |
| fd768ee6e3844bd982e27b6cd3501c5b | RegionOne | cinder       | volume       |
True    | admin     | http://192.168.30.86:8776/v1/%(tenant_id)s       |
+----------------------------------+-----------+--------------+--------------
+---------+-----------+--------------------------------------------------+
```

Example of retrieval

Service Type	URL	Version
identity	http://192.168.30.86:5000/v3	v3
network	http://192.168.30.86:9696	-
image	http://192.168.30.86:9292	-
compute	http://192.168.30.86:8774/v2.1	v2.1

・ Retrieving the endpoint with version information

Retrieve the URL with the version information and the version of the URL for network and image with the curl command.

Retrieve the last "vx" part of the URL for the version information.

If there are multiple results, use the href key where "status" is "CURRENT."

For network

Execute the following command.

```
# curl -k <url of network>
```

Example:

```
# curl -k "http://192.168.30.86:9696"
```

Example of output:

```
{"versions": [{"status": "CURRENT", "id": "v2.0", "links": [{"href": "http://192.168.30.86:9696/v2.0/", "rel": "self"}]}]}
```

Example of retrieval:

Service Type	URL	Version
network	http://192.168.30.86:9696/v2.0	v2.0

For image

Execute the following command.

```
# curl -k <url of image>
```

Example:

```
# curl -k "http://192.168.30.86:9292"
```

Example of output:

```
{"versions": [{"status": "CURRENT", "id": "v2.5", "links": [{"href": "http://192.168.30.86:9292/v2/", "rel": "self"}]}, {"status": "SUPPORTED", "id": "v2.4", "links": [{"href": "http://192.168.30.86:9292/v2/", "rel":
```

"self"}]}, {"status": "SUPPORTED", "id": "v2.3", "links": [{"href": "http://192.168.30.86:9292/v2/", "rel": "self"}]}, {"status": "SUPPORTED", "id": "v2.2", "links": [{"href": "http://192.168.30.86:9292/v2/", "rel": "self"}]}, {"status": "SUPPORTED", "id": "v2.1", "links": [{"href": "http://192.168.30.86:9292/v2/", "rel": "self"}]}, {"status": "SUPPORTED", "id": "v2.0", "links": [{"href": "http://192.168.30.86:9292/v2/", "rel": "self"}]}, {"status": "DEPRECATED", "id": "v1.1", "links": [{"href": "http://192.168.30.86:9292/v1/", "rel": "self"}]}, {"status": "DEPRECATED", "id": "v1.0", "links": [{"href": "http://192.168.30.86:9292/v1/", "rel": "self"}]}]}

Example of retrieval:

Service Type	URL	Version
image	http://192.168.30.86: 9292/v2	v2

(5) Changing Apache SSL settings

1. Create a setting file with an arbitrary name by referring to the following example. The file extension must be ".conf."

```
Listen <Port number determined in Step3>
<VirtualHost *: <Port number determined in Step3>>
    ServerName <IP address of the controller node, FQDN or host name>
    SSLEngine on
    SSLProtocol all -SSLv2 -SSLv3 -TLSv1 -TLSv1.1
    SSLCipherSuite HIGH:MEDIUM:!aNULL:!MD5:!SEED:!IDEA:!3DES:!RC4:!DH
    SSLHonorCipherOrder on
    SSLCertificateFile    <Full pathname of SSL certificate>
    SSLCertificateKeyFile <Full pathname of SSL certificate key file>
    LogLevel notice
    ErrorLog /var/log/httpd/ssl_openstack_api_error.log
    ServerSignature Off
    CustomLog /var/log/httpd/ssl_openstack_api_access.log combined
    <Location /identity>
        ProxyPass  <URL of "identity" retrieved in Step 4>
        Header set x-openstack-api-version <version of "identity" retrieved in Step 4>
    </Location>
    <Location /network>
```

```
        ProxyPass  <URL of network retrieved in Step 4>
        Header set x-openstack-api-version <version of "network" retrieved in
Step 4>
    </Location>
    <Location /compute>
        ProxyPass  <URL of "compute" retrieved in Step 4>
        Header set x-openstack-api-version <version of "compute" retrieved in
Step 4>
    </Location>
    <Location /image>
        ProxyPass  <URL of "image" retrieved in Step 4>
        Header set x-openstack-api-version <version of "image" retrieved in Step
4>
    </Location>
</Virtualhost>
```

Example:

```
Listen 5001
<VirtualHost *:5001>
    ServerName 192.168.30.86
    SSLEngine on
    SSLProtocol all -SSLv2 -SSLv3 -TLSv1 -TLSv1.1
    SSLCipherSuite HIGH:MEDIUM:!aNULL:!MD5:!SEED:!IDEA:!3DES:!RC4:!DH
    SSLHonorCipherOrder on
    SSLCertificateFile    /etc/pki/CA/certs/server.crt
    SSLCertificateKeyFile /etc/pki/CA/private/server.key
    LogLevel notice
    ErrorLog /var/log/httpd/ssl_openstack_api_error.log
    ServerSignature Off
    CustomLog /var/log/httpd/ssl_openstack_api_access.log combined
    <Location /identity>
        ProxyPass  http://localhost:5000/v3
        Header set x-openstack-api-version v3
    </Location>
    <Location /network>
        ProxyPass  http://localhost:9696/v2.0
```

```
        Header set x-openstack-api-version v2.0
    </Location>
    <Location /compute>
        ProxyPass  http://localhost:8774/v2.1
        Header set x-openstack-api-version v2.1
    </Location>
    <Location /image>
        ProxyPass  http://localhost:9292/v2
        Header set x-openstack-api-version v2
    </Location>
</Virtualhost>
```

2. Store an Apache SSL settings file.

Store in the following path.

```
/etc/httpd/conf.d/
```

3. Reload the Apache settings.

Execute the following command from the terminal as a root user.

```
systemctl reload httpd
```

(6) Setting a Firewall

Use the following command to allow the specified port.

Command for confirmation of the port allowance status:

```
iptables -nL --line-numbers
```

Command for opening a port:

```
iptables -I INPUT 1 -p tcp --dport [port] -s [IP address of ISM] -j ACCEPT
```

Example of a command for opening a port:

```
iptables -I INPUT 1 -p tcp --dport 5001 -s 192.168.0.101 -j ACCEPT
```

Command for saving settings:

```
/sbin/service iptables save
```

Command for closing a port:

```
iptables -D INPUT [No]
```

Example of a command for closing a port:

```
iptables -D INPUT 1
```

3.6.2. Settings when using Virtualized Network Analysis

(1) Editing "/etc/nova/nova.conf"

Open the "/etc/nova/nova.conf" file.

```
# vi /etc/nova/nova. conf
```

Add the following two items in a separate line for each.

・Key: scheduler_available_filters, Value: arbitrary

・Key: scheduler_default_filters, Value: SameHostFilter

Example:

```
scheduler_available_filters = nova.scheduler.filters.all_filters
scheduler_default_filters =

SameHostFilter,RetryFilter,AvailabilityZoneFilter,RamFilter,DiskFilter,Compu
teFilter,ComputeCapabilitiesFilter,ImagePropertiesFilter,ServerGroupAntiAffi
nityFilter,ServerGroupAffinityFilter
```

(2) Restarting the nova service

Execute the following command on the controller node.

Enter the command in a line.

```
for service in api consoleauth conductor scheduler novncproxy; do  systemctl
restart openstack-nova-$service; done
```