5NINE SOFTWARE

#1 Management and Security for Windows Server and Hyper-V

Getting Started Guide

5nine Cloud Security for Hyper-V

Version 6.0

July 2015

Microsoft Partner Network

Windows Server 2012 Certified

Windows Server 2012 R2 Certified

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Summary

5nine Cloud Security is a fundamentally new virtual monitoring and complex protection tool for the new generation Hyper-V environment. It presents new effective methods to protect data center virtual infrastructure while at the same time maintaining its high performance and saving resources. There are four basic parts of the solution that protect the whole Hyper-V cloud – Virtual Firewall, Antivirus, Intrusion Detection System (IDS) and Network Traffic Scanner. 5nine Cloud Security supports new cutting-edge technologies such as NVGRE and IP Rewrite and secures point filtering of virtual machines traffic with its virtual firewall feature. The Antivirus component of 5nine Cloud Security solution provides unique, agentless protection of virtual machines that can be arranged either in groups or individually on each separate virtual machine. The active protection feature that protects virtual machine operating system in real time is also available. Intrusion Detection System (IDS) feature allows detection of active attacks, review of the event log and setting the blocking virtual firewall rule on the suspicious IP address. Network traffic scanner allows monitoring of inbound web – http traffic in real time to detect malware that might be downloaded to the virtual machine. Email notifications feature is available to inform administrator about IDS, Antivirus and network traffic scanner events. 5nine Cloud Security also supports multi-user and multi-tenancy that allow delegation of privileges on virtual machines security control so that each owner is able to control security policies in his virtual environment.

System requirements

Supported Operating Systems:

- Management server[1]:
  - Microsoft Windows 7 x64 (with .NET 4.5 additionally installed)
  - Microsoft Windows Server 2008 R2 SP1 (with .NET 4.5 additionally installed)
  - Microsoft Windows Server 2012
  - Microsoft Windows Server 2012 R2
- Host:
  - Microsoft Windows Server 2012
  - Microsoft Windows Server 2012 R2

[1] The host OS minimal requirements apply if management service is set onto managed Hyper-V host!

  - Microsoft Windows 8 Professional with enabled Hyper-V role
- Guest VM: any

Prerequisites:

- .NET Framework 4.5. or higher
- MS SQL Server
- MS PowerShell
- Hyper-V Module for PowerShell should be installed. It can be installed from GUI with Add Roles and Features Wizard (can be launched from Server Manager). Component path:

  Features -> Remote Server Administration Tools -> Role Administration Tools -> Hyper-V Management Tools -> Hyper-V Module for Windows PowerShell

  Also it can be installed with following PS command:

  Install-WindowsFeature -Name Hyper-V-PowerShell
- Snort application v. 2.9.7.3 with snort rules snapshot v. 2.9.7.3 deployed on managed host (https://www.snort.org/) for IDS function.

Attention! *Snort application uses MS-DOS SFN (Short File Names or 8.3) naming convention (read more at https://msdn.microsoft.com/en-us/library/aa365247.aspx#short_vs._long_names). This convention is enabled in the latest versions of MS Windows OS by default. If it is disabled, snort application and, accordingly, IDS feature will not work.*

Permissions

For both domain and workgroup configurations:

- TCP ports 8533, 8779 and 8788 should be opened on managed host.
- TCP ports 8534, 8741, 8789, and 8790 should be opened on management server.
- *5nine.VirtualFirewall.HostManagementService* should be installed on each Hyper-V host monitored and protected.
- For management service and host management service user accounts:
  - WMI access (http://technet.microsoft.com/en-us/library/cc787533(WS.10).aspx).
  - SQL database or file access (read/write) – for management service user account only if Windows authentication is used.

  - Allow to control Hyper-V (http://blogs.msdn.com/b/virtual_pc_guy/archive/2008/01/17/allowing-non-administrators-to-control-hyper-v.aspx).
  - "Logon as a service" privilege.
- Host Service user should be local administrator.
- If the host is managed remotely from the centralized management console, there should also be an account with similar permissions used in Server Settings. Best practice – to use the same account for service on managed host and in Server Settings in the management console.

For workgroup/mixed domains environment:

- The Account for workgroup environment should also have similar permissions for current managed host.
- Managed and management servers should be marked as trusted hosts if workgroup environment is used on several domains environment.

Installation

There are three separate components that compose the full set of 5nine Cloud Security that is being installed from a single setup launcher application:

- *Management Service*. This component should be installed on the host(s) and/or designated VM(s) that will be set as management servers for the entire Windows Server/Hyper-V environment. Refer to the 'Management Service installation' subsection below. There can be several management servers for the given Hyper-V environment, which provides disaster recovery function. Refer to the 'Disaster recovery' section below.
- *Host Management Service*. This component should be installed on each secured/monitored host. Refer to the 'Host Management Service installation' subsection below.
- *Management Console*. This component should be installed on each host/VM that will be used by administrators to operate and control the system security/compliance rules application. Refer to the 'Management Console installation' subsection below.

Additionally, the following components are available at single setup launcher application:

- *Extension for Azure Pack*. This component installs 5nine Cloud Security Azure Pack Extension to operate Cloud Security functions from Azure Pack admin and tenant portals. Please refer to the 5nine Cloud Security Azure Pack Extension QSG for details.
- *SCVMM compliance extension (5nine Cloud Security Network Manager Plugin)*. This component is required in certain cases when Microsoft System Center Virtual Machine Manager is used in the environment and the SCVMM-based logical switches are enabled. SCVMM compliance plugin helps to get SCVMM logical switches to compliant state. '5nine Cloud Security Network Manager Plugin installation' subsection below describes SCVMM compliance extension installation process.

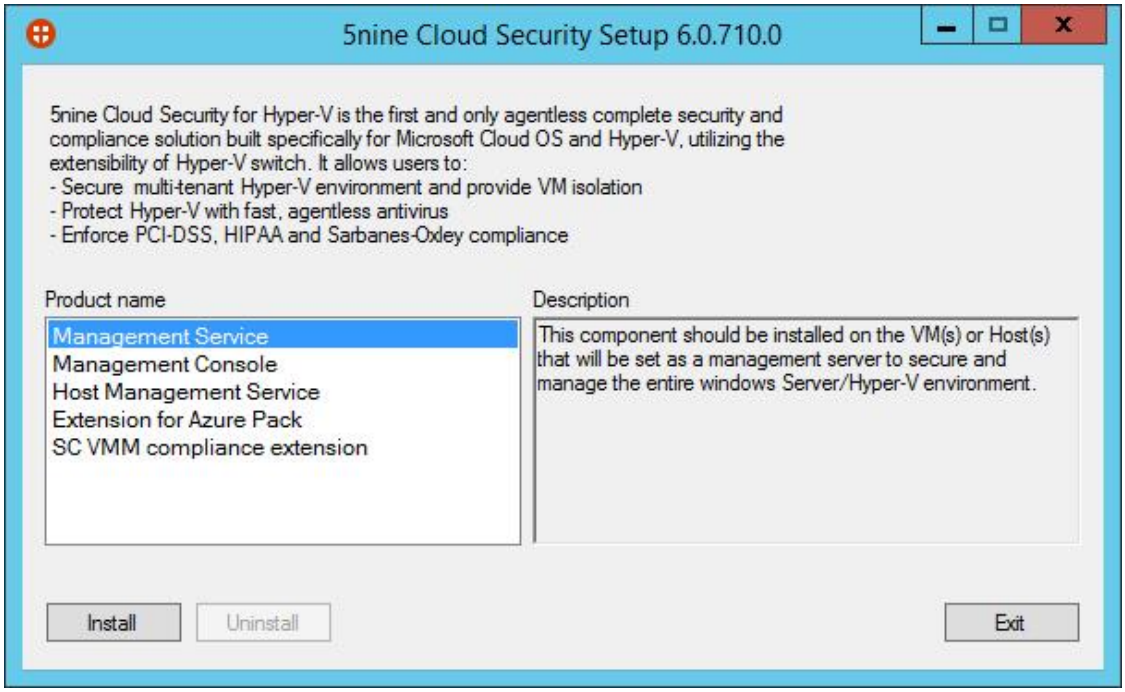
Management Service installation

Standalone installation

Management Service must be installed at least on one server (host or designated VM) prior to setting up all other 5nine Cloud Security components.

Attention! 5nine Cloud Security management service uses the same interface with the antivirus management service of the other 5nine product – 5nine Manager for Hyper-V PLUS. Even if they are used to manage different Hyper-V hosts, they still will run into a conflict and the antivirus feature will not work in the case they are running on the same server. Therefore placing of both management services on the same machine is not supported scenario.

To install Management Service, first run the single setup launcher application:



Select 'Management Service' and click **Install**. The Management Service Setup wizard will open:

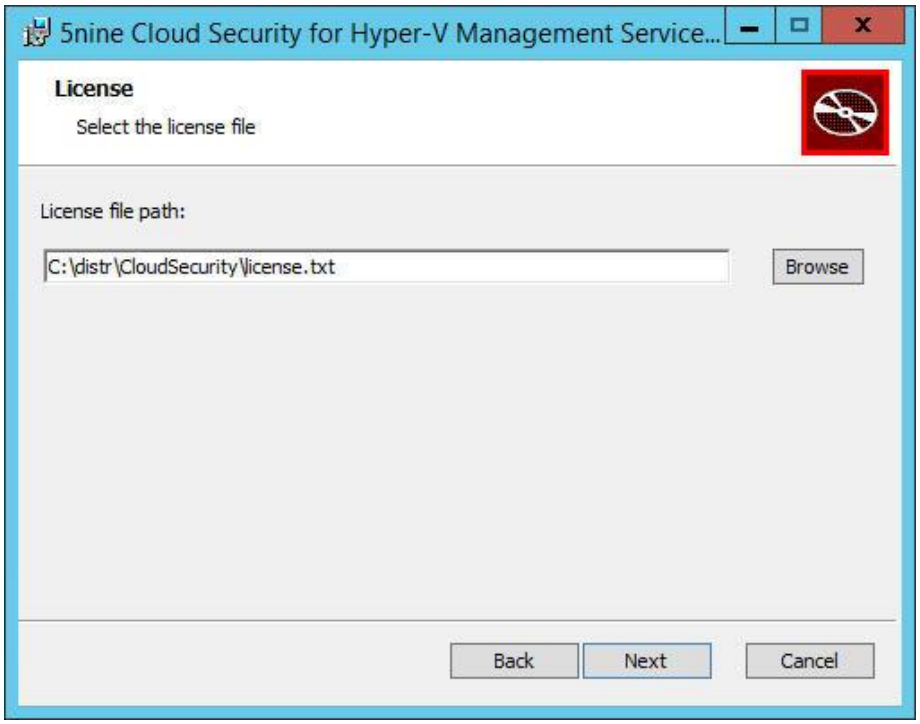
Click **Next** to start pre-configuration process.

Select the destination folder for the management service installation.

You can change the default destination folder.

Select or create the new folder and click **OK**. Then click **Next**.

Select the license (*.txt*) file:



Set the user that will run Management Service:

As a best practice, it is recommended to select the *User* option and enter either local or domain user credentials depending on the environment in which the management service is being installed. The hosts that are added to management console later, will use the user account, management console or host management service are running under, as default credentials. Please refer to "Adding and removing hosts" section for more information. If you select 'Local

system', all the hosts must be added with custom credentials, where the user account is entered. Click **Next**.

Select the database server and the authentication method:

- Select the database server from the list. If there is no database server detected by the installer, you will have to type it manually (e.g. this could happen in case of SQL server remote placement). The default port is 1433. If your SQL server uses different port, specify this port using the following format:

  SQLSERVER, port. Example: let's say SQL server hostname is "SQLSRV" and it uses port 1435 instead of standard 1433. Type the following string into the **Database Server** field:

  SQLSRV, 1435

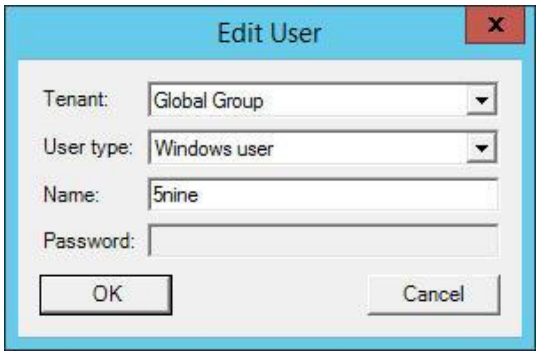
- Select the authentication method:

  - Windows authentication. Windows user's credentials entered at the previous step will be used for authentication;
  - SQL authentication. SQL Server specified account (sa) will be used for authentication.

  If 'Local system' had been selected at the previous step as an account to run management service, only SQL authentication is possible. Contact your database administrator (DBA) for assistance, if necessary.

If you are doing a fresh installation of 5nine Cloud Security for Hyper-V or there is no previously created security admins exist in your old database *vFirewall* in your selected data source, you will be offered to choose whether to create or not security global admin:

If you choose the option *Create global administrator*, you will be requested to specify the credentials for the new global admin:



Select the user type:

- *Custom user*. This option lets you create custom users independently from AD. This type is used only within 5nine Cloud Security to identify permissions. If you're working in a mixed environment you should always select this option. You can set any name and password for this user type.
- *Windows user*. This option applies to a single domain environment only. The user must be registered in the AD.

Global admin is a user who has full access over 5nine Cloud Security for Hyper-V. If you create global admin, you will be able to connect to cloud security management service only under this user (please refer to the 'Users management and tenants' section below for details). Remember the credentials you have entered to be able to connect to the management service after the installation.

If you choose the option *Do not create admin*, the installation will proceed without asking to specify user's credentials. In the case you have kept the old database vFirewall from the previous installation in your selected data source and there was at least one admin registered in it, the installer will detect this, and this step will be skipped automatically.

Click **Next**. Then click **Install** to start the Management Service installation process.

Wait until the following screen appears and then click **Finish** to complete the Management Service installation process.

Upon completing the installation of the Management Service, check that *5nine.VirtualFirewall.ManagementService* (display name: *5nine Cloud Security Management Service*) is installed and running on your server.

Configuration for high availability

If you are using failover clustering, it is possible to set up 5nine Cloud Security Management Service for high availability as it supports this standard setup scenario in cluster environments.

In this setup scenario, you will need to install a separate instance of Management Service onto each server in the failover pair, pointing to the same data source (SQL server). SQL server may also be set for high availability. Installation is done in the same way as described in the previous subsection. From this point you will have to use cluster failover role IP address/FQDN instead of a standalone IP address/FQDN as a management service address when you need to connect to the management service, i.e. when installing 5nine Cloud Security host management service, 5nine Cloud Security for Azure Pack backend service and connecting to the management service from the standalone management console or SCVMM plugin.

When configuring high availability in the failover clustering, you will have to select the "Generic Service" option for 5nine Cloud Security Management Service and proceed with setup in a standard way.

These are general steps to follow when configuring high availability for 5nine Cloud Security Management Service:

1. Make sure you have failover pair servers ready and meet requirements for 5nine Cloud Security Management Service installation. Please refer to the 'System requirements' section above.

2. Install 5nine Cloud Security Management Service separately onto each server in the failover pair, pointing to the same data source (SQL server). Please refer to the 'Management Service installation' – 'Standalone installation' section above. It is recommended to stop *5nine.VirtualFirewall.ManagementService* on the first server before proceeding with the installation on the second one.

3. Configure 5nine Cloud Security Management Service high availability in the standard way using the "Generic Service" option in the failover clustering. Please refer to the following sources for more information about setting up a service for high availability in failover cluster environment and using of the "Generic Service" option:

   https://technet.microsoft.com/en-us/library/dd197590(v=ws.10).aspx

   https://technet.microsoft.com/en-us/library/7fce4e54-3667-48b8-9ff3-266490acd980

   Note. *Remember that from this moment you will have to use your cluster role IP/FQDN instead of standalone IP/FQDN whenever you connect to 5nine Cloud Security Management Service.*

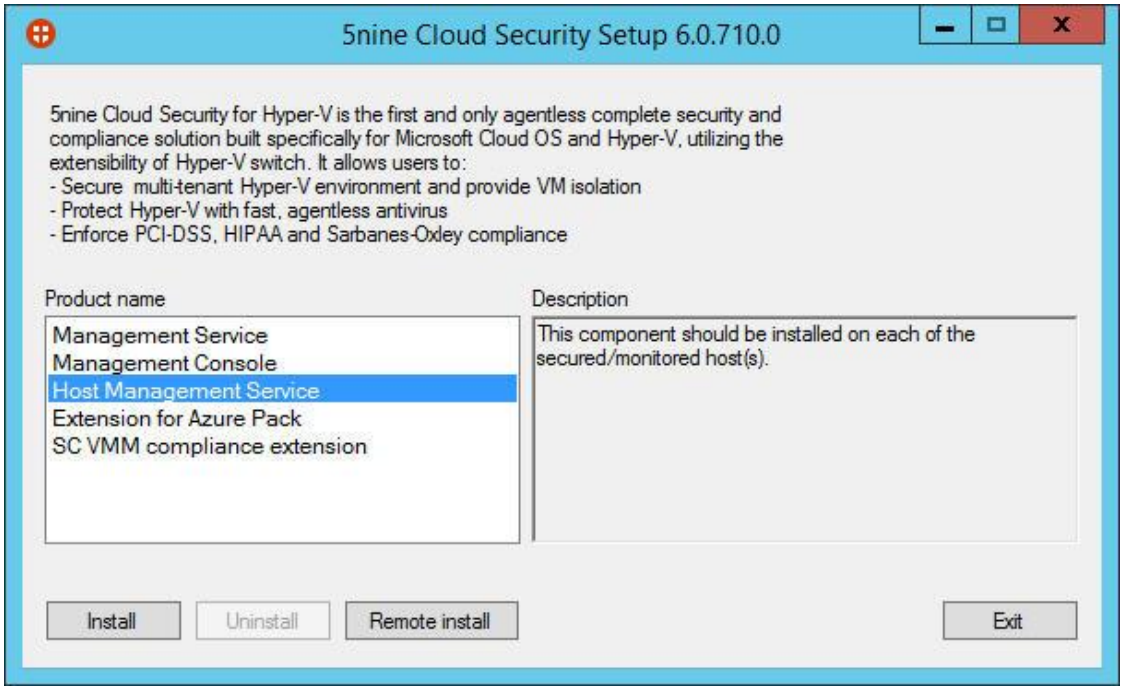
Host Management Service installation

Before starting Host Management Service setup:

- Confirm that Management Service is already installed on the host or VM that is selected as a management server in your network.
- Confirm that its service is running (*5nine.VirtualFirewall.ManagementService*; display name: *5nine Cloud Security Management Service*).

Attention! Host Management Service installs 5nine Antivirus Agent that is common to both 5nine Cloud Security for Hyper-V and the other 5nine product – 5nine Manager for Hyper-V PLUS. 5nine Antivirus Agent communicates either with 5nine Cloud Security for Hyper-V Management Service or with 5nine Management Service for Hyper-V PLUS. It cannot listen to both management services in the same time. Therefore using of both products on the same host is not supported scenario. When you install 5nine Cloud Security for Hyper-V in your environment it is recommended to use 5nine Manager for Hyper-V version without antivirus feature instead of 5nine Manager for Hyper-V PLUS version on the hosts that are managed by 5nine Cloud Security for Hyper-V. It will cover antivirus requirements while 5nine Manager for Hyper-V will perform management functions.

To install Host Management Service, first run the single setup launcher application:



Select 'Host Management Service'.

There are two options available for Host Management Service installation:

- Local installation. With this option Host Management Service will be installed onto the current local server. 'Local installation' subsection below describes local installation process.
- Remote installation. With this option Host Management Service will be installed onto any host accessible on the network. 'Remote installation' subsection below describes remote installation process.

Local installation

To start Host Management Service installation onto the local host click **Install** in the **5nine Cloud Security Setup** dialog of the single setup application. The Host Management Service Setup wizard will open:

Select the destination folder for the host management service installation. Click **Next** to start the pre-configuration process.

To change the default destination folder, select or create the new folder and click **OK**. Then click **Next**.

Set the user that will run under Host Management Service. Click **Next**.

Note. *These credentials are entered for the local host on which the host management service is being installed and may differ from those entered for the remote management server if the program is used in mixed environments.*

Specify the management server by entering its FQDN or IP address. If you set 5nine Cloud Security management service as a highly available clustered service, use cluster role FQDN/IP (please refer to the 'Management Service installation' – 'Configuration for high availability' section above). Click **Next**.

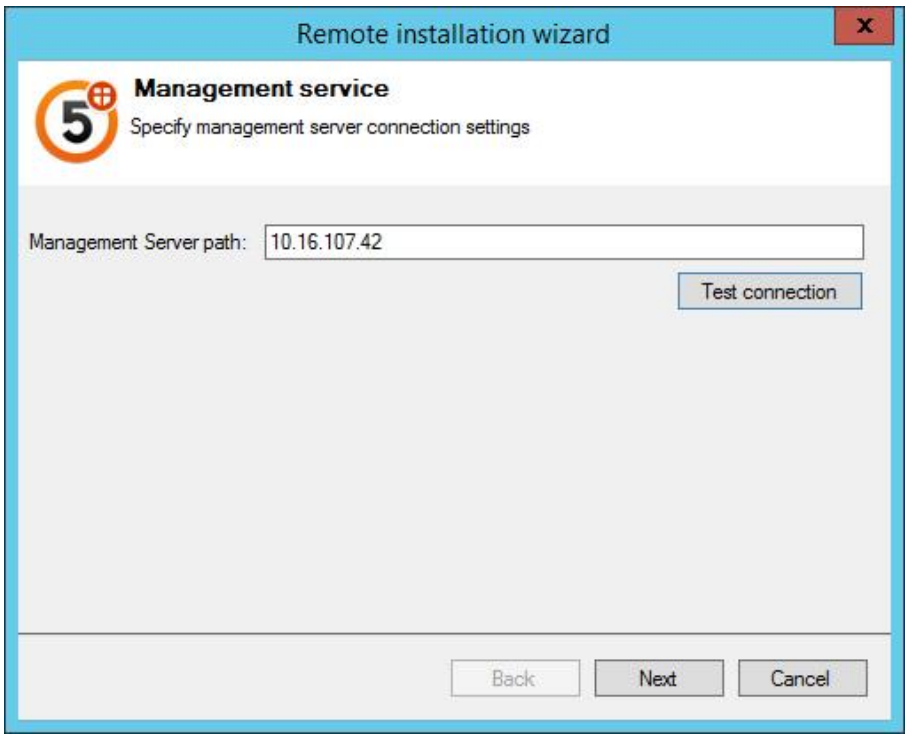
Click **Install** to start the Host Management Service installation process.

Wait until the following screen appears and then click **Finish** to complete the Host Management Service installation process.

Server reboot is required to complete the host management service setup. Confirm to the system prompt to perform the server reboot immediately or decline to do it at a later moment.

Remote installation

With this option you can install Host Management Service onto the multiple hosts simultaneously over the network. To start Host Management Service remote installation click **Remote install** in the **5nine Cloud Security Setup** dialog of the single setup application. The remote installation wizard will open:

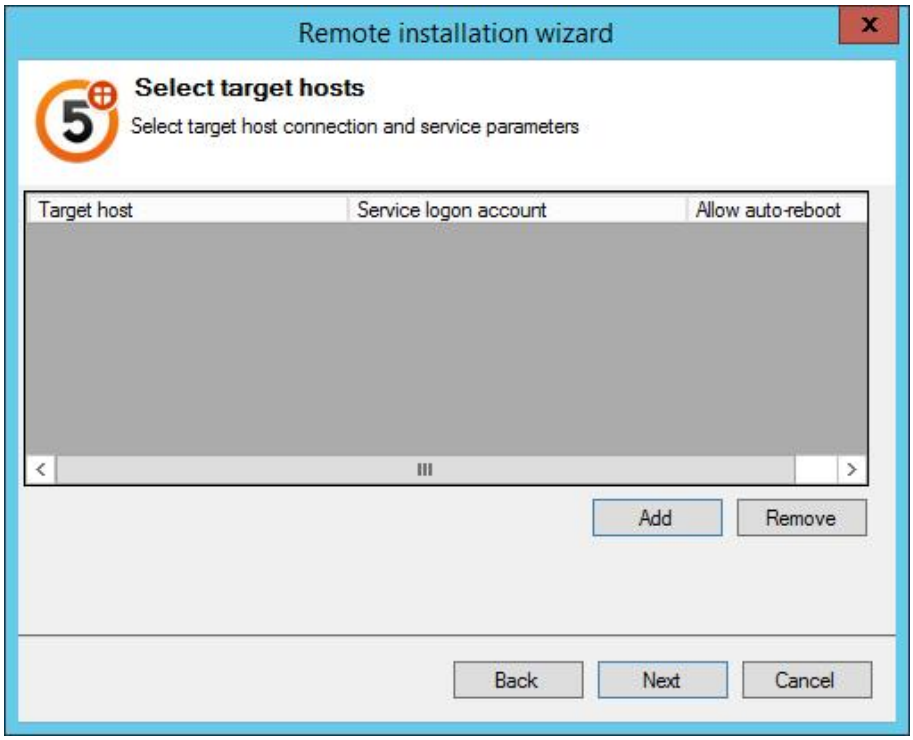


Specify the management server by entering its FQDN or IP address into **Management Server path** field. If you set 5nine Cloud Security management service as a highly available clustered service, use cluster role FQDN/IP (please refer to the 'Management Service installation' – 'Configuration for high availability' section above). Then select the authentication method:

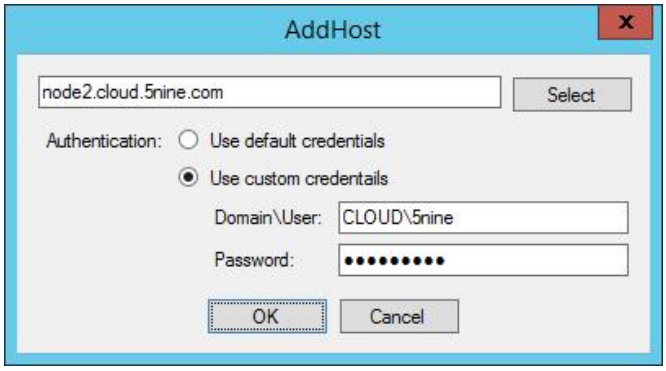
- *Use default credentials*. Select this option if you're working in the non-mixed environment where the single domain and single domain user are used to run the application services on all servers that will be included in the remote installation. This user must have sufficient privileges on the management server as well.
- *Use custom credentials*. Select this option in all other cases and enter the correct credentials that the management server accepts. Contact the owner of the management server or your system administrator for assistance if necessary.

Ensure the management server is accessible by clicking **Test connection**. The corresponding message should appear in the case of successful test. If the connection test is ok, click **Next**.

Add the remote hosts:



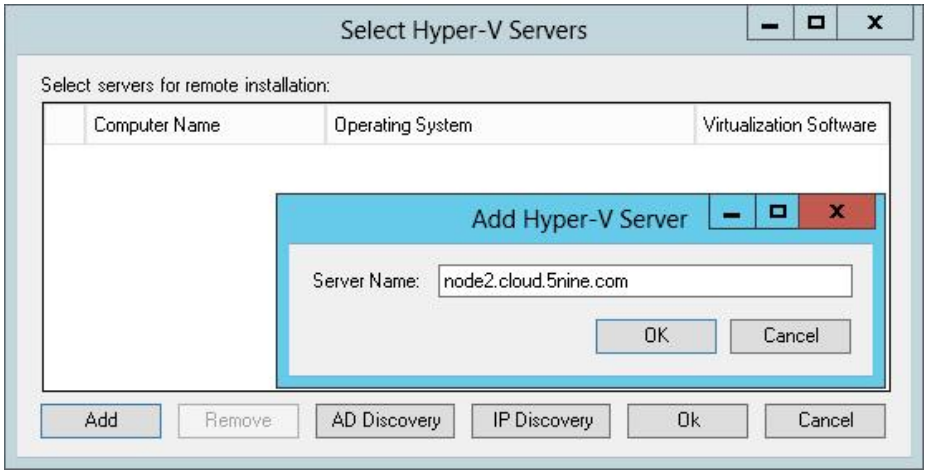
Click **Add** to select and the host(s) to the list for remote setup of Host Management Service:

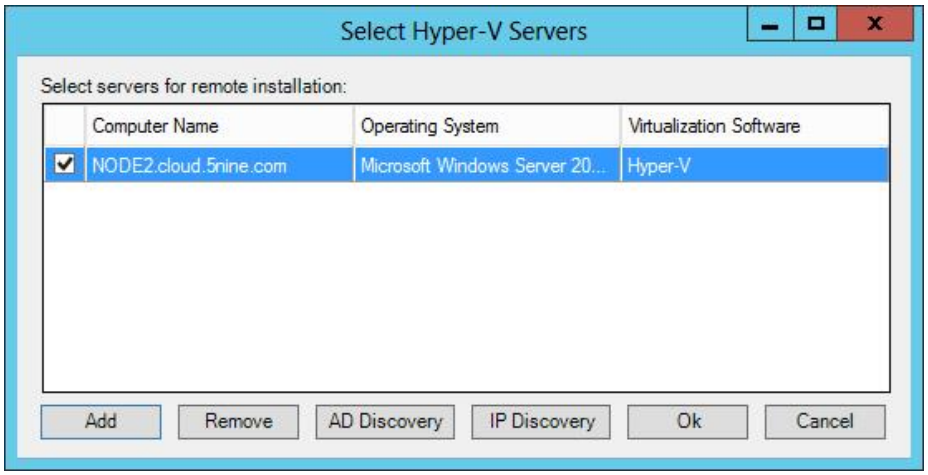


Enter the server(s) by typing their FQDN or IP addresses separated by commas. Then select the authentication method (contact your system administrator for the assistance if necessary):

- Use default credentials. The current user's credentials will be used. Use this option if the single domain is used in the environment and the current user granted all necessary rights on the remote server(s);
- Use custom credentials. Specify the credentials for remote host. Use this option if different credentials should be used on remote host. In the case multiple hosts are added, you will likely need to alter these credentials for each host as applicable in the case you're working in mixed environment and/or different credentials are used on the servers.

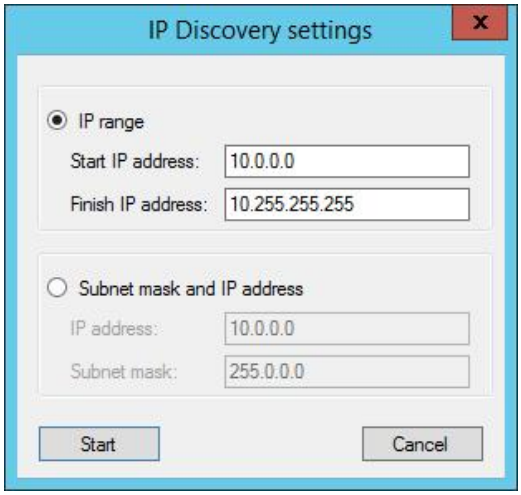
Click **Select** to search for the hosts on the network. The **Select Hyper-V Servers** dialog will be opened:



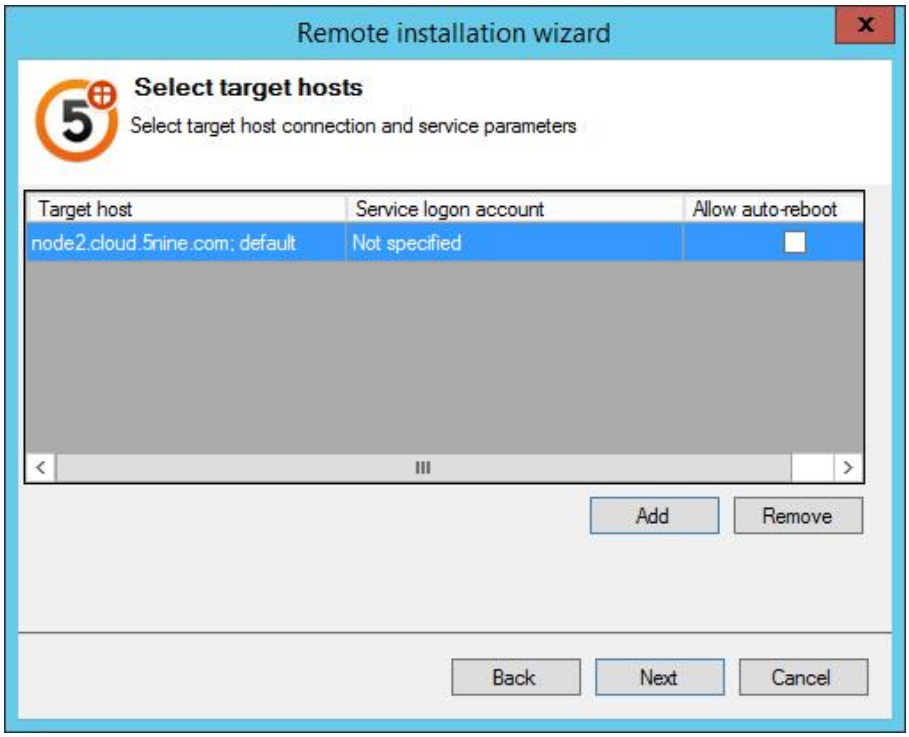


You may also add servers to the list one by one by pressing the **Add** button and enter server name manually in the dialog window above or let 5nine Cloud Security search and add them automatically by pressing the **AD Discovery** button,

or search them by IP range/subnet mask which can be set in the window below called out by pressing the **IP Discovery** button:



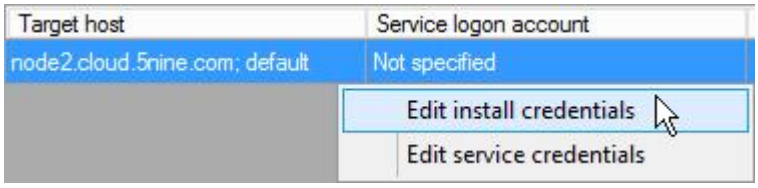
In the end click Ok. You will see selected hosts appeared on the list:



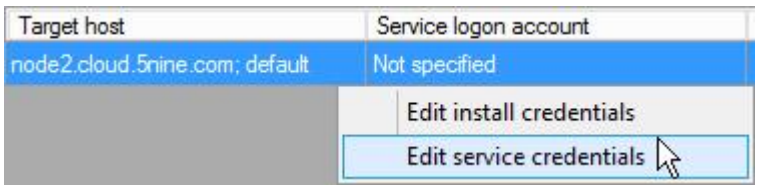
Make sure Service logon account is properly set. Otherwise 5nine Cloud Security will not allow you go further.

Right click each host to edit the installation and/or service logon accounts:

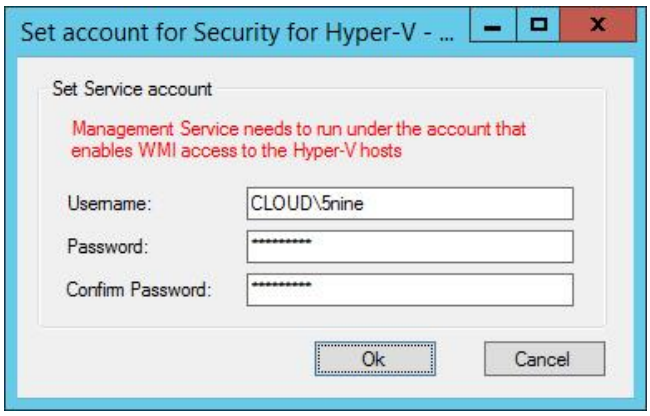
- Click **Edit install credentials** to specify/alter the credentials for the host management service installation onto the target host:



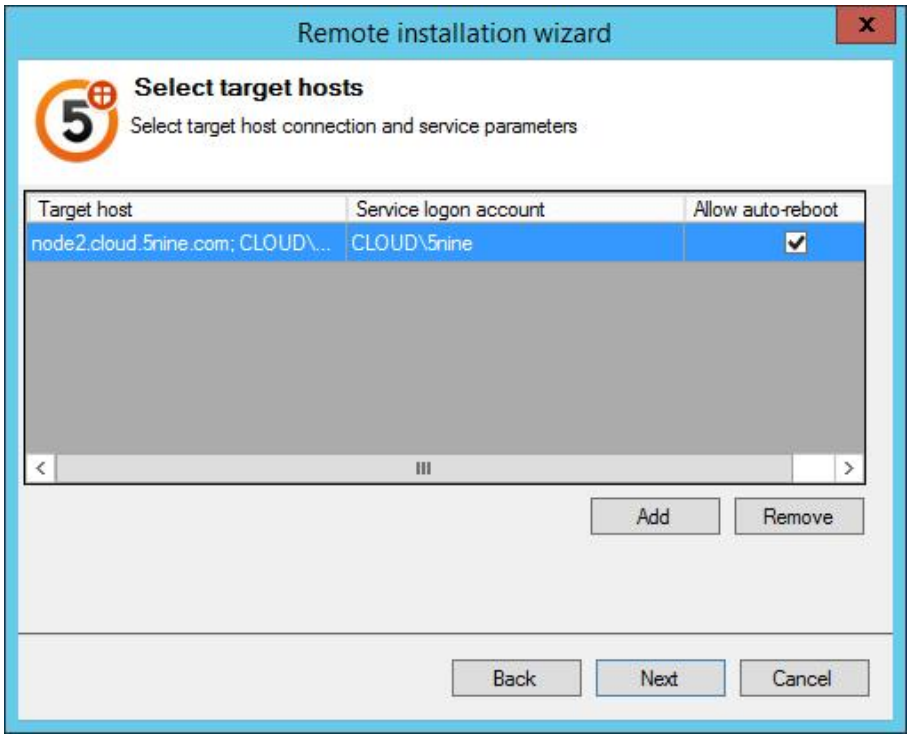
- Click **Edit service credentials** to specify/alter the credentials under which *5nine.VirtualFirewall.HostManagementService* (display name *5nine Cloud Security Host Service*) will be running on the target host:



Then specify/alter the credentials in the dialog that will open:

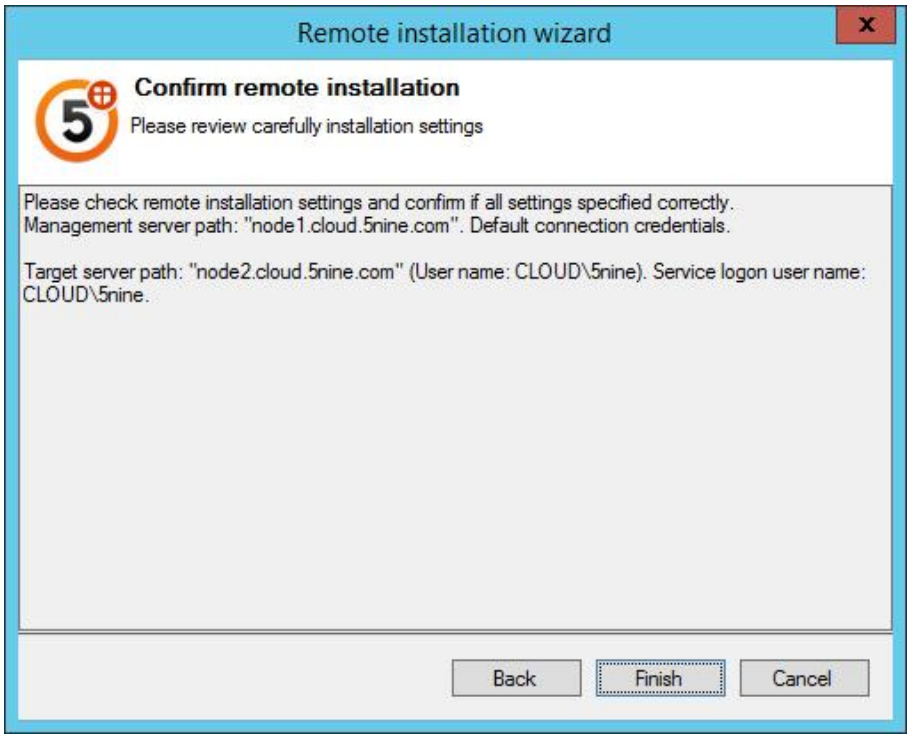


Check the credentials for all added hosts:

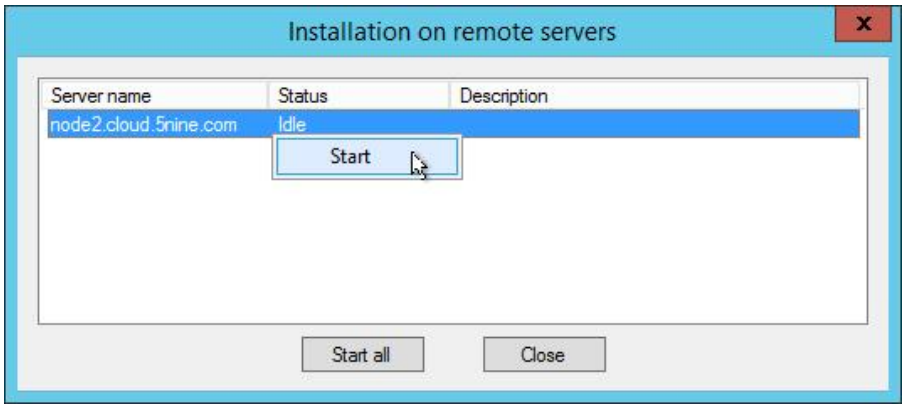


Check 'Allow auto-reboot' to let the target host be rebooted automatically after installation. Leave it unchecked to reboot the host manually at a later time. 5nine Cloud Security detects if the Virtual Firewall driver is already installed on the host and it is up to date (e.g. when the host service re-installation or upgrade is currently being done). If it is a fresh installation or the driver reset is needed, then either automatic or a manual reboot is necessary. If you are not absolutely sure, it is recommended to check 'Allow auto-reboot' to let 5nine Cloud Security do the right thing. Click Next.

Review the remote setup summary and click Finish to confirm the operation:

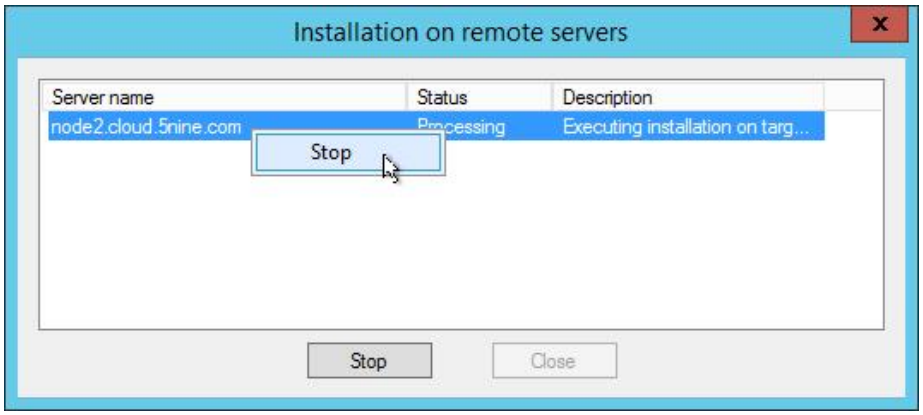


The Installation on remote servers dialog will open:



- Right click each server and then click **Start** to evoke the remote installation on each server separately;
- Click **Start all** to evoke the remote installation on all servers simultaneously.

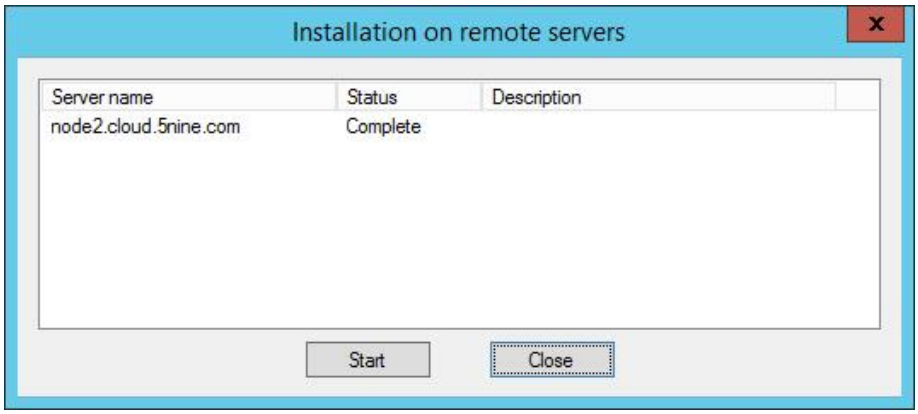
You can interrupt the installation process while it's going:



- Right-click each server and then click **Stop** to interrupt the remote installation on each server separately;
- Click **Stop** in the lower part of the dialog to interrupt the remote installation on all servers simultaneously.

Note. *It is not generally preferable to interrupt the installation process to avoid possible further application maintenance on the target host(s). Do not use these options without absolute necessity. Prepare and plan the installation well.*

At the end of the remote installation process the results will be displayed for each of the remote hosts:



- Complete. Remote installation completed successfully.
- Failed. Remote installation failed. Additional information for the error that occurred during remote setup will be shown in the **Description** column.

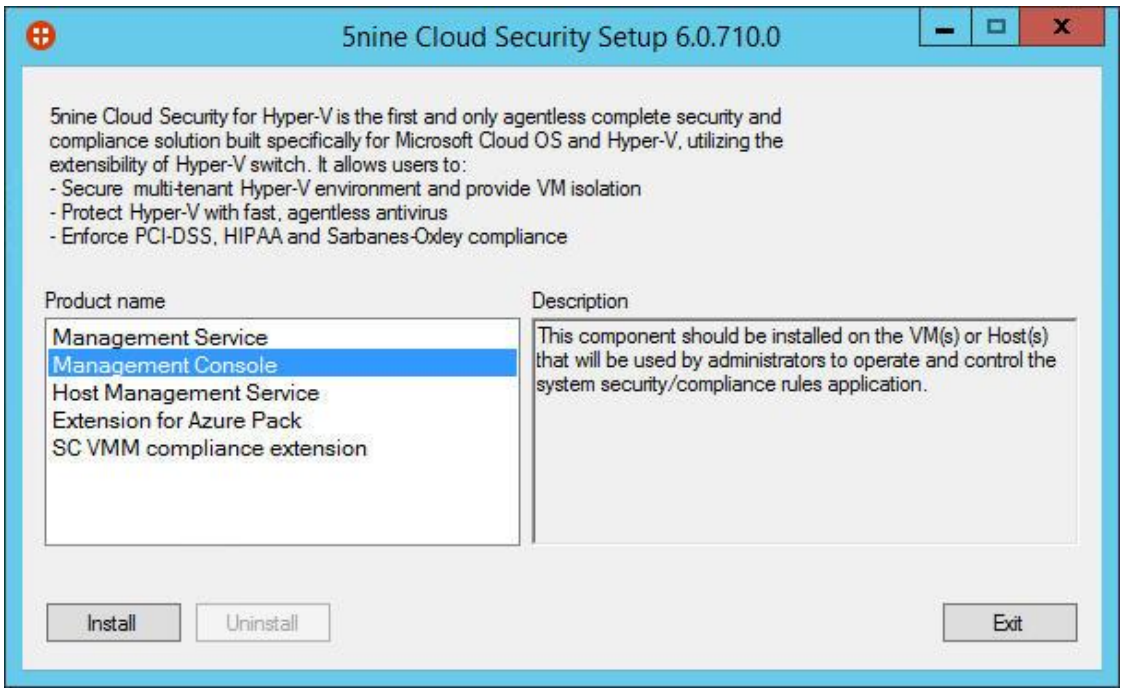
Click Close.

Upon completing the installation of Host Management Service, check that the following services are installed and running on the target host(s):

- *5nine.VirtualFirewall.HostManagementService* (display name: *5nine Cloud Security Host Service*);
- *5nine.Antivirus.Agent* (display name: *5nine.Antivirus.Agent*);
- *59CBTService* (display name: *59CBTService*).

Management Console installation

Before starting the Management Console setup, make sure Management Service is already installed on the host or VM that is selected as a management server in your network. It is also preferable to set up Host Management Service prior to Management Console installation. To install Management Console, first run the single setup launcher application:



Select 'Management Console' and click **Install**. The Management Console Setup wizard will open. Click **Next**:

Read and accept the EULA (license agreement). Click **Next**.

Select the destination folder and startup options, and then click **Next**.

To change the default destination folder, select or create the new folder and click **OK**.

Specify the management server by entering its FQDN or IP address and user credentials to connect to the management service. If you set 5nine Cloud Security management service as a highly available clustered service, use cluster role FQDN/IP (please refer to the 'Management Service installation' – 'Configuration for high availability' section above).

Select one of the following options:

- *Use default credentials* – the current user credentials will be taken to connect to management service each time the management console is started.
- *Use custom credentials* – the credentials entered here will always be taken to connect to management service no matter which user is running the management console.

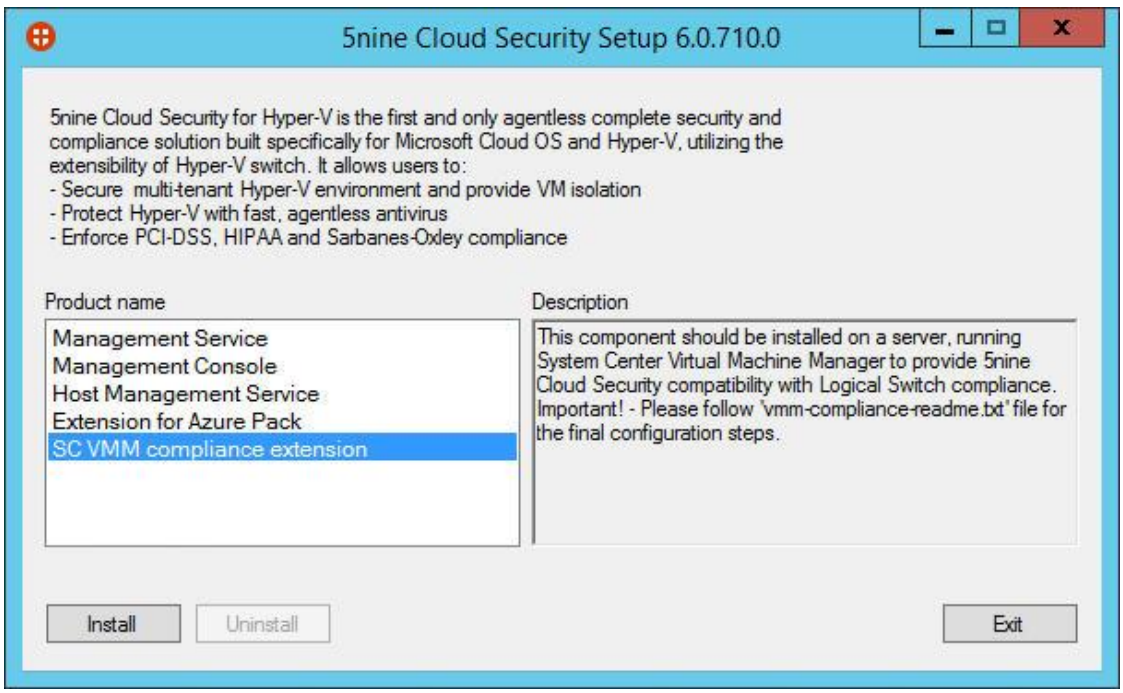
Note: *To install the management console on the server where multiple users with different privileges work, the best practice is to select the option 'Use default credentials' so that each time the management console is started the necessary privileges are granted on it. The same applies to tenants' setup, the user that is currently running the management console instance must match the user, set to connect to the management service in order to get the right privileges. Refer to the section of "Users management and tenants".*

Click **Next**. Then click **Install** to start the Management Console installation process.

Wait until the following screen appears, and then click **Finish** to complete the Management Console installation process:

5nine Cloud Security Network Manager Plugin installation

5nine Cloud Security Network Manager Plugin should be installed onto SCVMM server when all other 5nine Cloud Security components are set up in the environment managed by SCVMM. SCVMM compliance extension is installed from the single setup launcher application:



Select 'SC VMM compliance extension' and click **Install**. The 5nine Cloud Security for Hyper-V Network Manager Plugin Setup wizard will open. Click **Next**.

Select the destination folder or leave the default path and click **Next**.

Click **Install** to start the 5nine Cloud Security for Hyper-V Network Manager Plugin installation process.

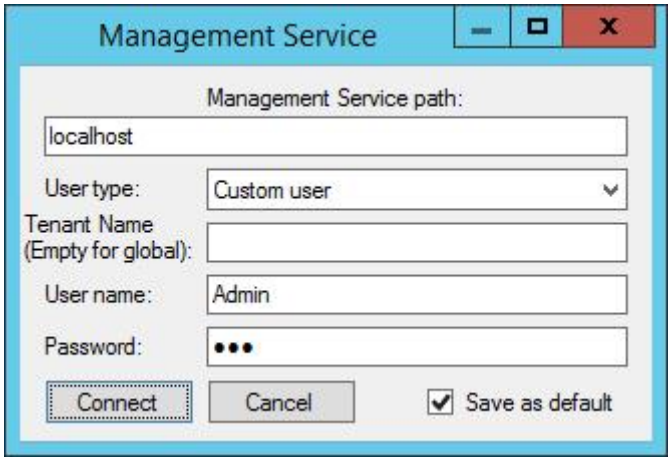
Wait until the following screen appears, and then click **Finish** to complete the 5nine Cloud Security for Hyper-V Network Manager Plugin installation process.

The installation process is complete, but the further steps are required to finalize 5nine Cloud Security for Hyper-V Network Manager Plugin configuration and setting up corresponding SCVMM items configuration. Refer to the '5nine Cloud Security Network Manager Plugin configuration' section below for details.

5nine Cloud Security operations

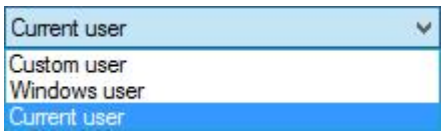
To configure 5nine Cloud Security, first open its Management Console using the shortcut to the following application: *C:\Program Files\5nine\5nine Security For Hyper-V Management Console\5nine.VirtualFirewall. ManagementConsole.exe*. This shortcut will be available on your desktop by default.

Management console works independently of the place it is installed. After starting it, you will be advised to specify the management server, which management console will connect to during the current session, tenant (or leave the field empty to connect to global group) and the user to work under:



- Enter the path to the management server by entering its FQDN or IP address. If you set 5nine Cloud Security management service as a highly available clustered service, use cluster role FQDN/IP (please refer to the 'Management Service installation' – 'Configuration for high availability' section above).

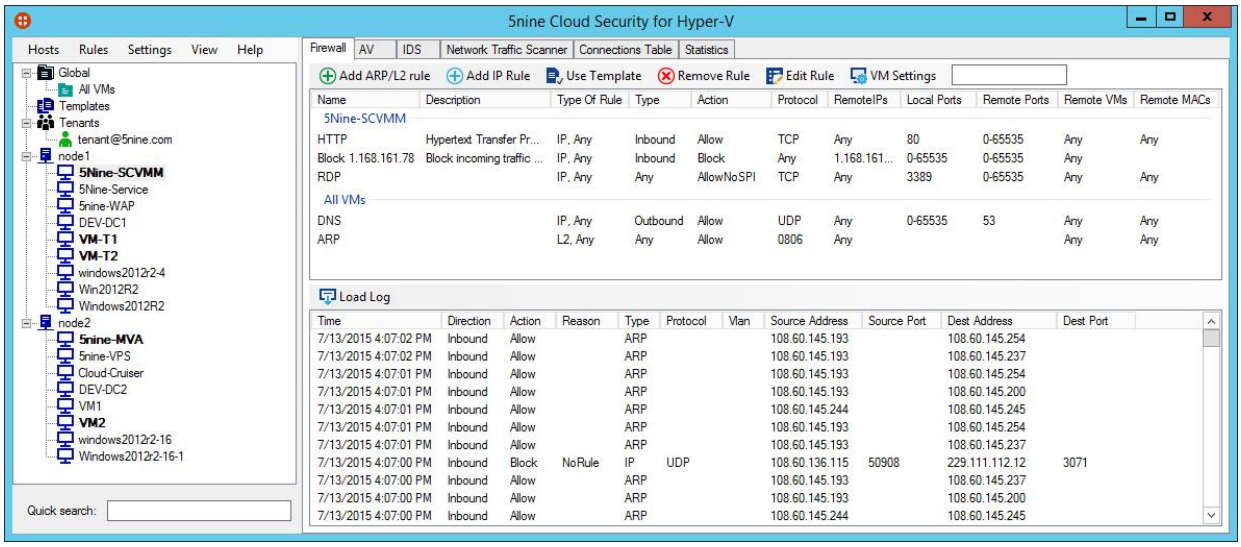
- Select the user type:



  - *Current user*. The account you are currently logged in under will be used to connect to the management server. Select this option when there are no users has been added yet or if you're working in a single domain environment and the current account has the necessary permissions as a global user.

- *Windows user*. The domain account registered in AD will be used to connect to the management server. This option can be selected in the case you are working in the non-mixed environment and available for the members of 'Global Group' only.
- *Custom user*. The previously created custom user will be used to connect to the management server. If you are working in the mixed environment you should always select this option once the users and permissions are set. Please refer to the 'Setting users' and 'Setting user permissions' paragraphs of the 'Users management and tenants' subsection below for the detailed information.

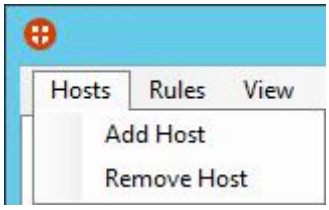
- Enter the tenant name to connect to a tenant or leave the field empty to connect to global group.
- For the *Custom user* and *Windows user* types enter the name and password in the appropriate fields.
- If you would like the current login information to be saved for the next sessions as a default option so that you don't have to enter it all over again each time you start management console, check the **Save as default** box.



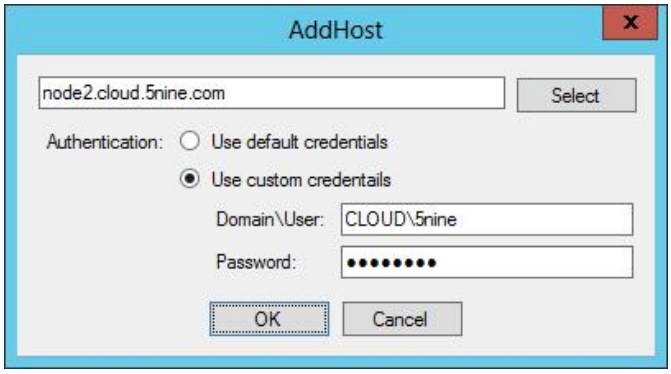
Quick search field in the left-lower part of the main window will help you to find the necessary VM fast. Just enter the key symbols in it and the VM list will be filtered accordingly.

Adding and removing hosts

To add host(s) for monitoring, select **Hosts – Add Host**.

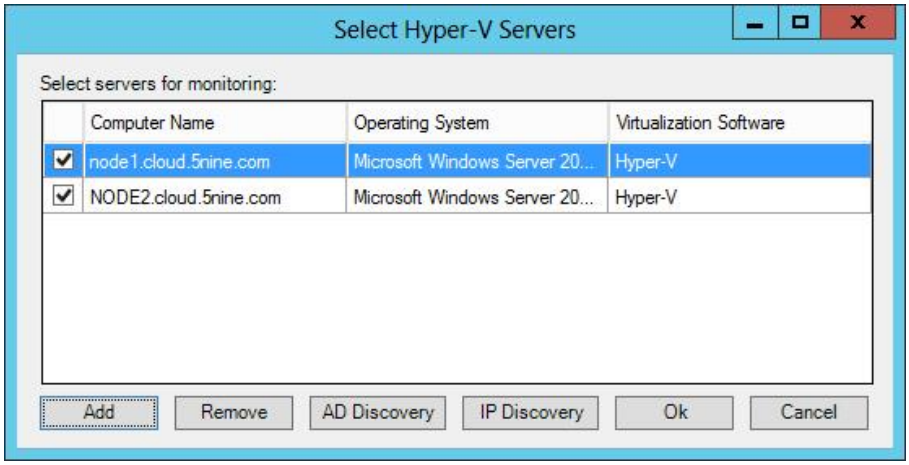


Type the host(s) name in the dialog box below or select them from the list (a separate window titled **Select Hyper-V Servers** will open). Then set the credentials in the dialog box. Contact your network administrator to get the credentials.



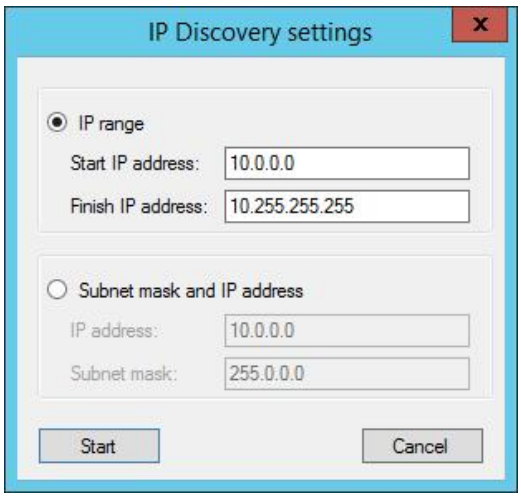
To change server credentials and the default monitoring state in the **Server Properties** dialog box, refer to “Host settings”.

Click **Select** to choose the host.



Add servers to the list by selecting **Add** and entering the server name manually in the dialog box below.

You can let 5nine Cloud Security search and add servers automatically by selecting **AD Discovery**. You can also search for them by IP range/subnet mask; select IP Discovery to open the window below.



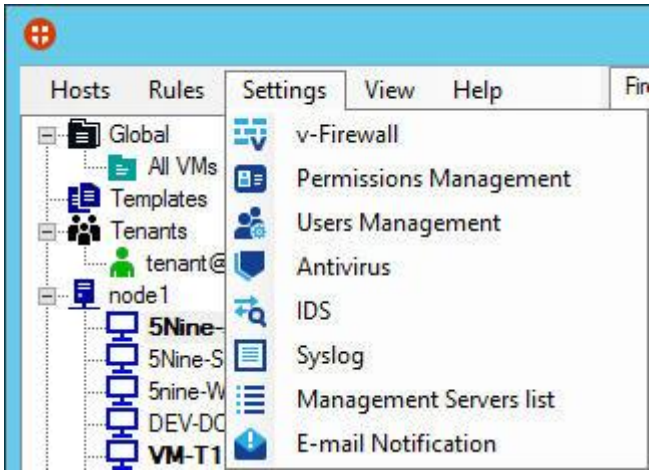
To remove the host from monitoring, select it in the tree and select **Hosts – Remove Host**.

Users management and tenants

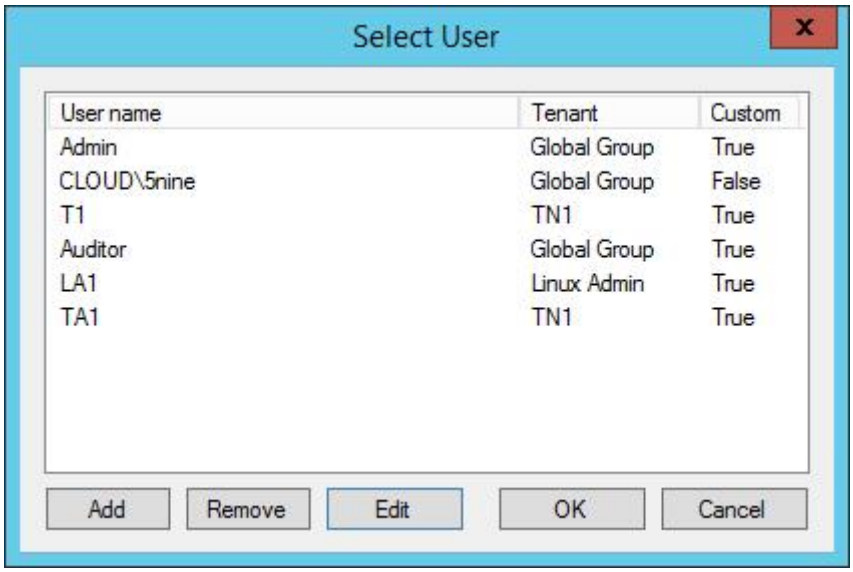
The User Management feature is designed to set permissions on 5nine Cloud Security objects (virtual machines) and operations performed through the management console. It is crucial to set them in the appropriate way. These permissions are unrelated to users' permissions that are set in OS MS Windows; they apply users' rights solely for 5nine Cloud Security objects and operations. The most important users that have to be created (added) in User Management are Global Users, particularly Global Administrator. This user will be able to see all the virtual machines that are managed by 5nine Cloud Security and to perform all the operations through the management console: set global rules, create/delete tenants described below, operate the antivirus feature and set permissions for other users. Before the Global Administrator is created, there are no permissions set and any user operating management console is considered as Global Administrator. Once it is set, no other user will be able to do anything until the Global Administrator grants necessary permissions. It is also possible to add several Global Administrators; their permissions will be equal. Tenants are the logical groupings of virtual machines, each with its own user management function. It allows setting permissions for non-global users to view and manage only designated groups of virtual machines within a single tenant whereas global users view the whole Hyper-V Cloud picture and all tenants.

Setting users

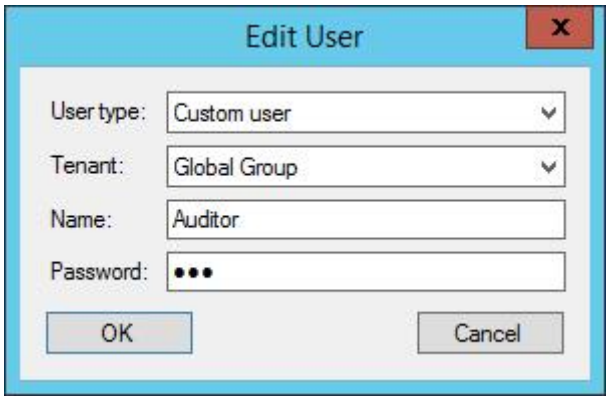
To set users select **Settings – Users Management**:



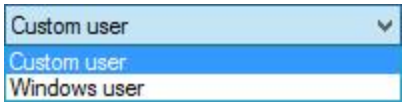
All users are managed in the **Select User** dialog box:



To add a user, click **Add**, and then enter the user parameters in the following dialog box:



- Select the user type:



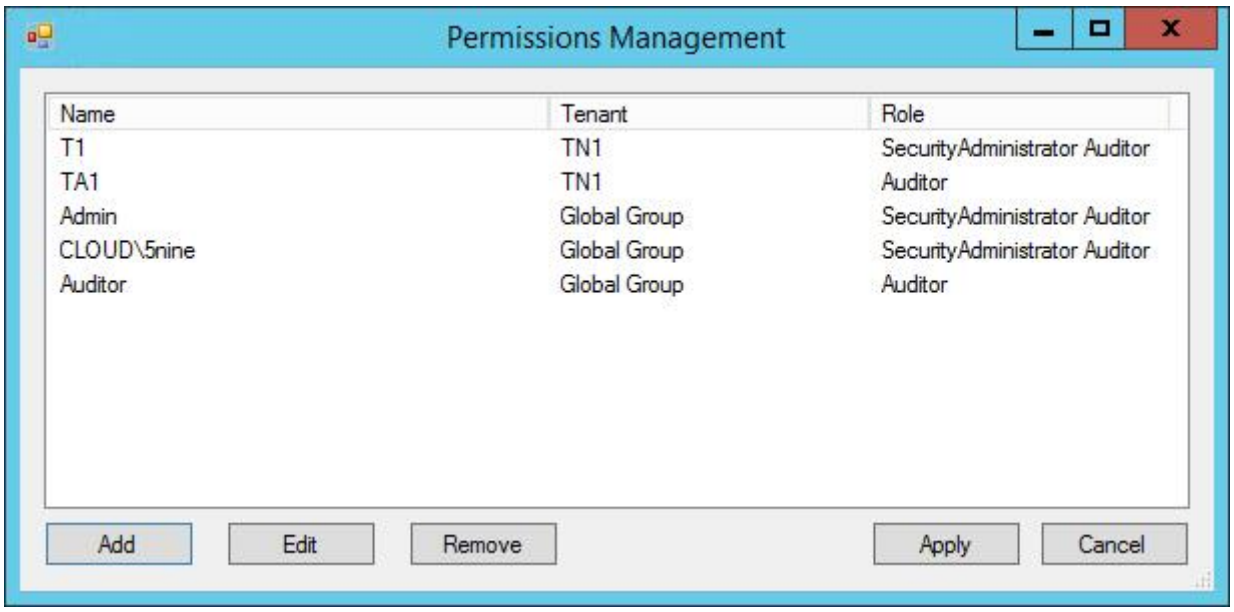
  - *Custom user*. This option lets you create custom users independently from AD. This type is used only within 5nine Cloud Security to identify permissions. If you're working in a mixed environment you should always select this option. You can set any name and password for this user type.
  - *Windows user*. This option applies to a single domain environment only and available only for Global Group membership. The user must be registered in the AD.

- Select tenant. The list content depends on how many tenants had been previously created. 'Global Group' represents global user group membership and it's always present in the list.
- Enter the user name in the **Name** field:
    - For *Custom user* type enter any name at your wish. E.g., 'Admin'. This name will in no way interfere with any of Windows (and/or AD) user names even in the case they are similar; it is solely up to you which one to enter here.
    - For *Windows user* type enter the real existing domain user name registered in the Active Directory. You can enter the user name in *DOMAIN\User* format or just name without specifying the domain – the proper domain will then be added automatically.
- Set the password for the *Custom user* type in the **Password** field.
- Click OK to complete the operation. The newly added user will display in the **Select User** dialog box.

To remove the user, select it in the **Select User** dialog box, and then click **Remove**. In the case the permissions have already been set for the user, remove them first as described in the next paragraph, and then proceed.

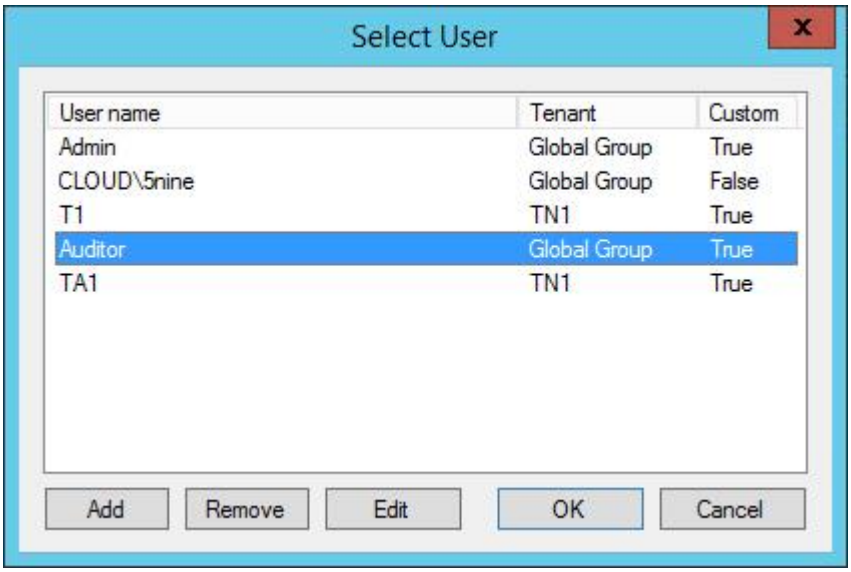
Setting user permissions

To set user permissions, use the **Settings – Permissions Management** main menu command (or right-click the tenant and use the *Edit users and permissions* context menu command to set the permissions for the particular tenant solely). The **Permissions Management** dialog box will appear:



- Click Add to assign the new role for the user. The **User Permissions** dialog box will open:

- Click the Select button to select the user:



  Select the user and click OK. You can add new users here in the way it's described above in the 'Setting users' paragraph.

- Enable the roles for the user:

  - *Security Administrator*. This role grants the full permissions on the Hyper-V Cloud for the user. The user assigned to this role will act as a global administrator or a tenant administrator, depending on which group it is assigned to.

  - *Auditor*. The user will be able to view the whole Hyper-V Cloud or a tenant depending on which user is selected. In this role, the user can review virtual firewall and IDS logs but cannot apply any changes.

Click OK. Then click Apply in the **Permissions Management** dialog to complete the operation.

To edit the user, select it in the **Permissions Management** dialog, then click the **Edit** button and repeat the actions described above.

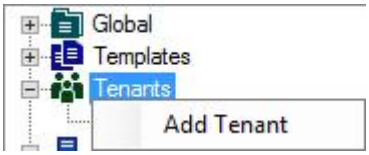
To remove the user, select it in the **Permissions Management** dialog, then click the **Remove** button. This operation must be done prior to removing the user itself.

Setting tenants

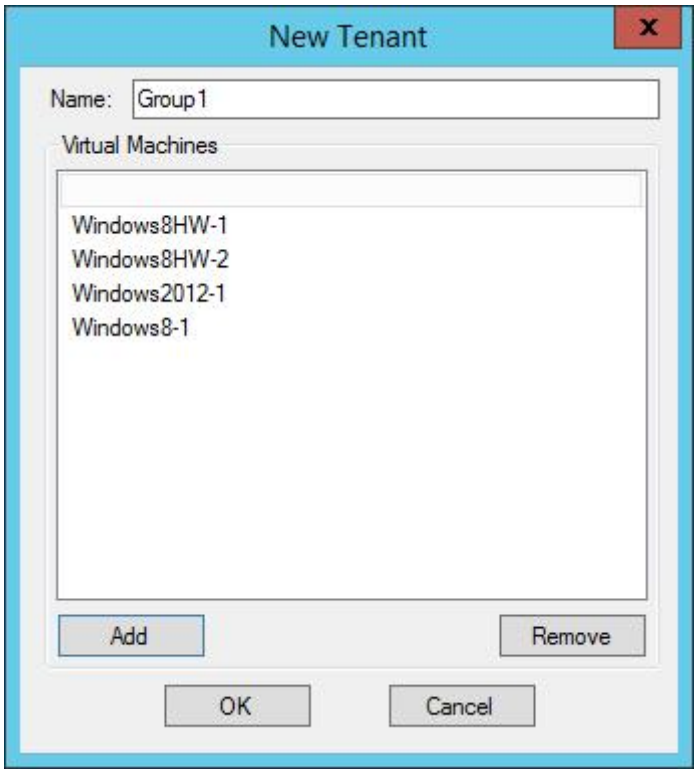
To set tenants, navigate to the *Tenants* entity in 5nine Cloud Security object tree and use the appropriate context menu commands.

Adding tenant

To add the new tenant, right-click **Tenants – Add Tenant**.

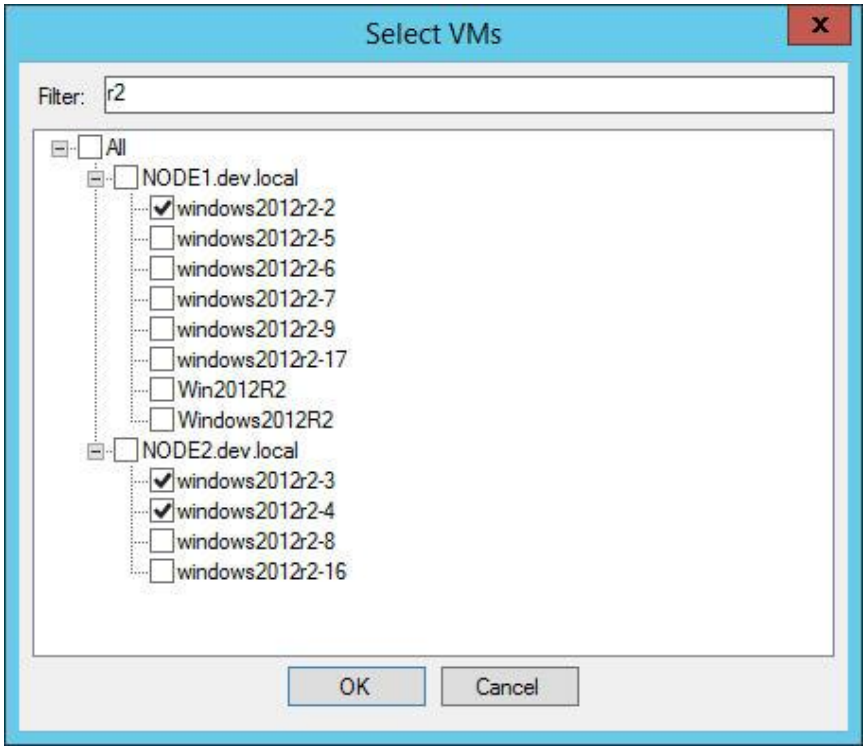


Enter parameters for the new tenant in the New Tenant dialog box.



- Enter the name for the new tenant in the **Name** field;

- Click **Add** and select the virtual machines that are assigned for the new tenant in the **Select VMs** dialog box, and then click **OK**:



  Type the symbols which a VM name must contain into the **Filter** field to filter the tree. Those VMs that have been pre-selected will not be filtered off the tree even if they do not match the filtering criteria. Click **OK**.

- To remove any virtual machine, either deselect it in the **Select VMs** dialog box or select it in the **New Tenant** dialog box and then click **Remove.** The effect will be the same.

- Click OK in the **New Tenant** dialog box to apply the changes.

At the end click OK in the **New Tenant** dialog to apply changes.

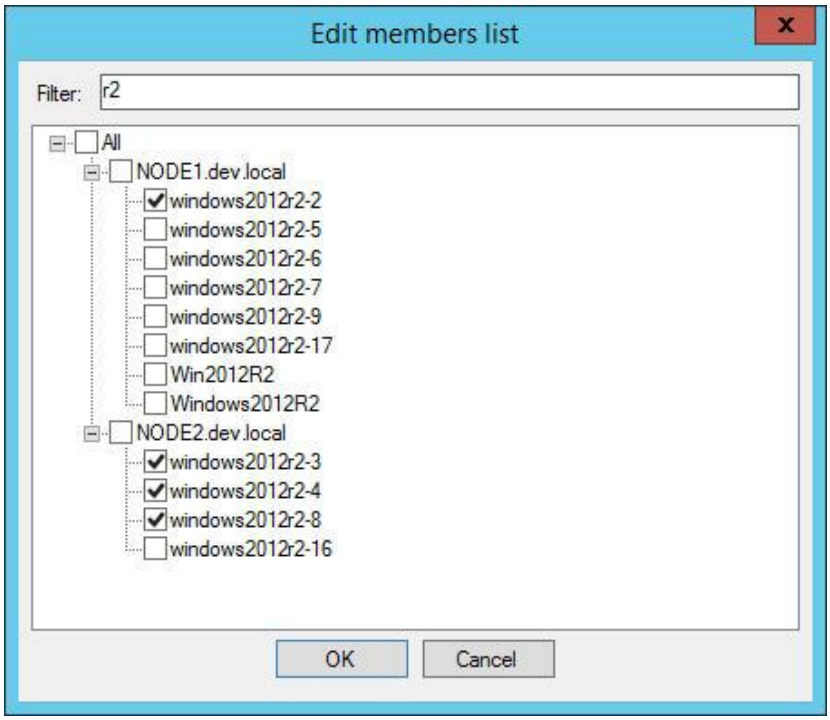
Editing tenant

To edit tenant, select the user name in the object tree, then right-click it and select the appropriate command:

- *Edit members*. Use this command to edit tenant membership. Perform the similar actions as described in the 'Adding tenant' paragraph above to add or remove virtual machines to/from the current tenant. You also can change the tenant's name.

Another way to edit tenant membership is to do it directly on the **Members** tab:

To edit tenant membership, select the target tenant in the object tree on the left, and then click the **Edit Members** button on the **Members** tab. In the **Edit members list** window select the necessary virtual machines to assign them to the tenant or deselect them to remove from it:



Type the symbols which a VM name must contain into the **Filter** field to filter the tree. Those VMs that have been pre-selected will not be filtered off the tree even if they do not match the filtering criteria. Click **OK**.

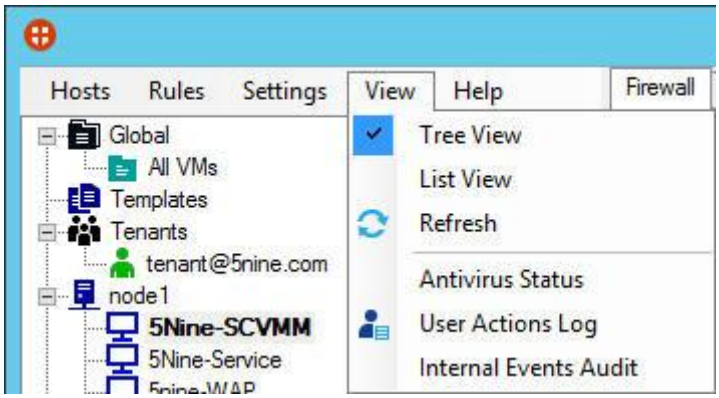
- *Edit users and permissions*. Use this command to edit users and permissions for the current tenant. The way of setting the users and permissions on the tenant level is similar to that performed on the global level and described in the 'Setting user permissions' paragraph above.

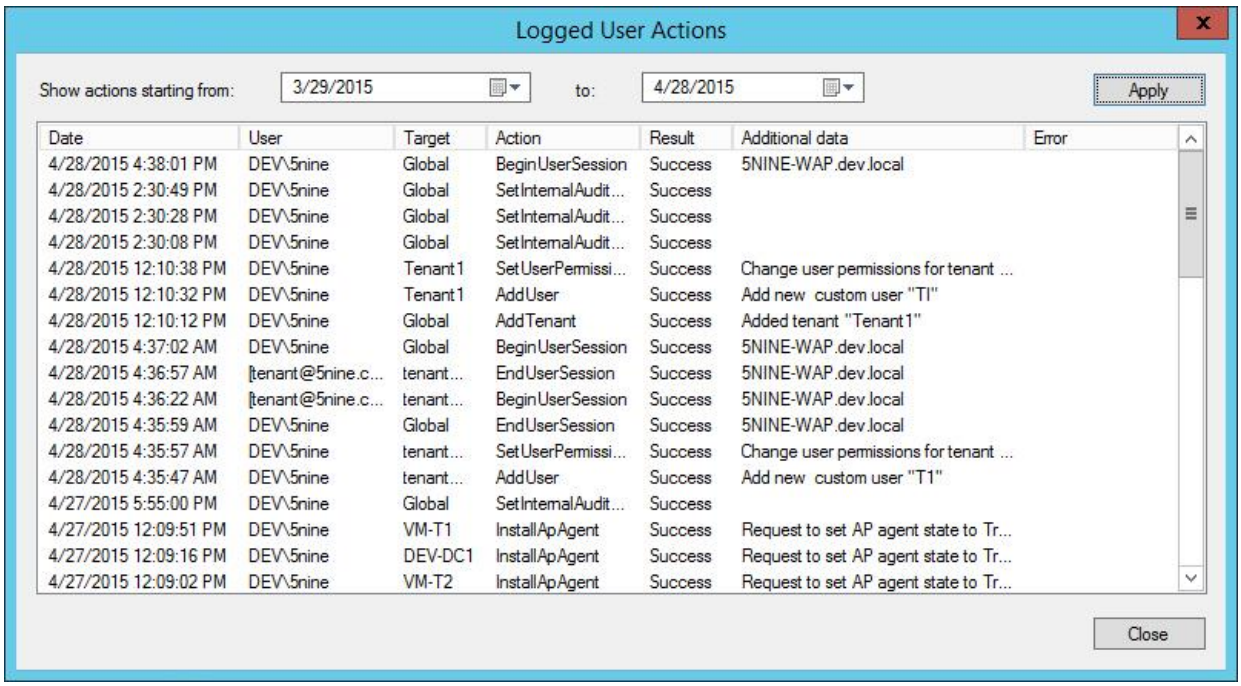
  Note. *The users assigned for the tenant will be able to see and operate virtual machines assigned to this tenant only. It is purposefully implemented in 5nine Cloud Security to allow delineation of users' permissions for virtual machines.*

- *Remove*. Use this command to remove the selected tenant. You will be asked to confirm the operation.

User actions audit

5nine Cloud Security performs user actions audit. It records all actions that users do when working with 5nine Cloud Security management console into the database. The recorded actions are displayed in the **Logged User Actions** window that is called out with **View – User Actions Log** menu command:



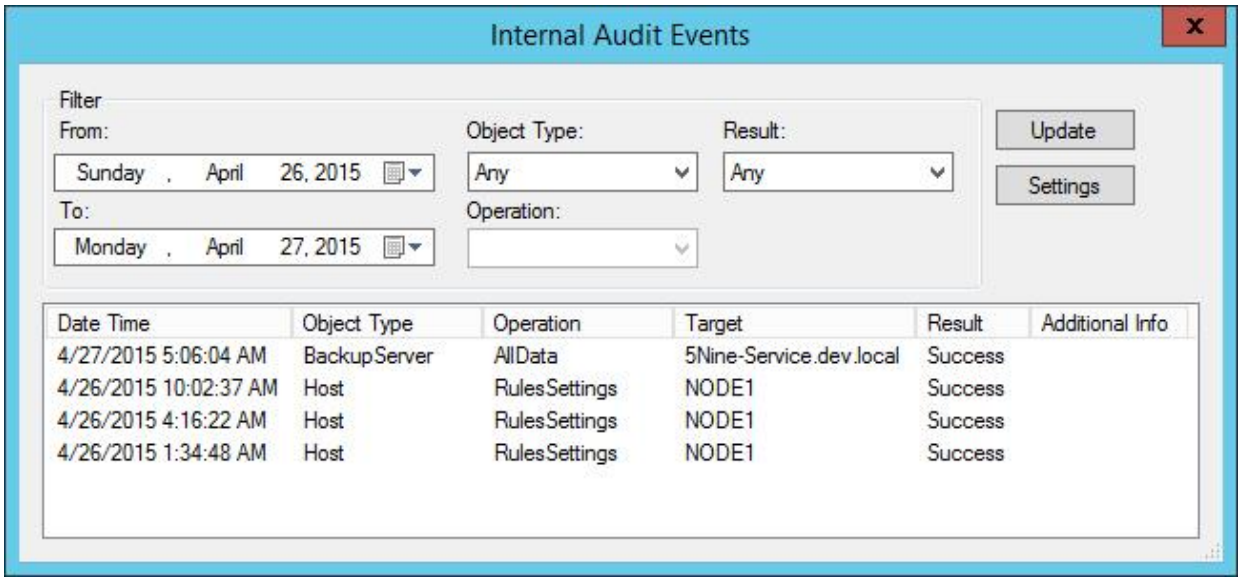


Date	User	Target	Action	Result	Additional data	Error
4/28/2015 4:38:01 PM	DEV\5nine	Global	BeginUserSession	Success	5NINE-WAP.dev.local	
4/28/2015 2:30:49 PM	DEV\5nine	Global	SetInternalAudit...	Success		
4/28/2015 2:30:28 PM	DEV\5nine	Global	SetInternalAudit...	Success		
4/28/2015 2:30:08 PM	DEV\5nine	Global	SetInternalAudit...	Success		
4/28/2015 12:10:38 PM	DEV\5nine	Tenant1	SetUserPermissi...	Success	Change user permissions for tenant ...	
4/28/2015 12:10:32 PM	DEV\5nine	Tenant1	AddUser	Success	Add new custom user "TI"	
4/28/2015 12:10:12 PM	DEV\5nine	Global	AddTenant	Success	Added tenant "Tenant1"	
4/28/2015 4:37:02 AM	DEV\5nine	Global	BeginUserSession	Success	5NINE-WAP.dev.local	
4/28/2015 4:36:57 AM	[tenant@5nine.c...	tenant...	EndUserSession	Success	5NINE-WAP.dev.local	
4/28/2015 4:36:22 AM	[tenant@5nine.c...	tenant...	BeginUserSession	Success	5NINE-WAP.dev.local	
4/28/2015 4:35:59 AM	DEV\5nine	Global	EndUserSession	Success	5NINE-WAP.dev.local	
4/28/2015 4:35:57 AM	DEV\5nine	tenant...	SetUserPermissi...	Success	Change user permissions for tenant ...	
4/28/2015 4:35:47 AM	DEV\5nine	tenant...	AddUser	Success	Add new custom user "T1"	
4/27/2015 5:55:00 PM	DEV\5nine	Global	SetInternalAudit...	Success		
4/27/2015 12:09:51 PM	DEV\5nine	VM-T1	InstallApAgent	Success	Request to set AP agent state to Tr...	
4/27/2015 12:09:16 PM	DEV\5nine	DEV-DC1	InstallApAgent	Success	Request to set AP agent state to Tr...	
4/27/2015 12:09:02 PM	DEV\5nine	VM-T2	InstallApAgent	Success	Request to set AP agent state to Tr...	

No user is able to alter these records in any way. The only action that is available here is filtering the list by the date on which the actions were recorded to get the desired view. To filter the user actions list by date, set the needed date (range from/to) and click the **Apply** button.

Internal events audit

Internal events audit is performed for any updates that are sent to a backup management server and managed Hyper-V hosts. On the backup management server it writes updates that are sent to the primary management server. To see internal events, use the **View – Internal Events Audit** main menu command:



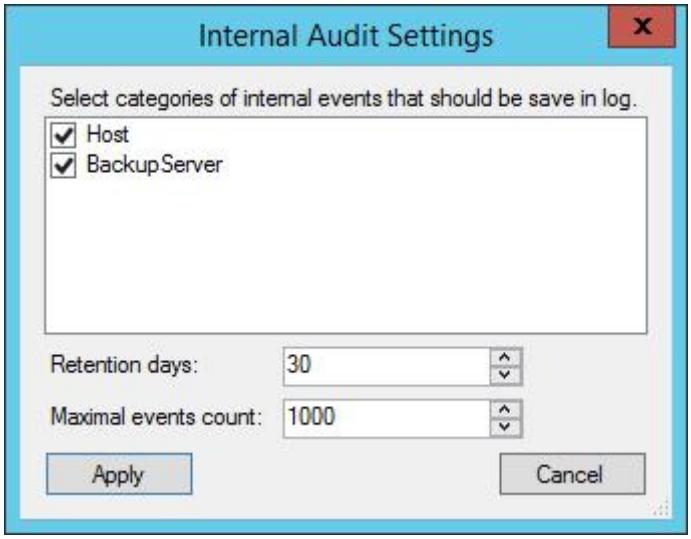
Date Time	Object Type	Operation	Target	Result	Additional Info
4/27/2015 5:06:04 AM	BackupServer	AllData	5Nine-Service.dev.local	Success	
4/26/2015 10:02:37 AM	Host	RulesSettings	NODE1	Success	
4/26/2015 4:16:22 AM	Host	RulesSettings	NODE1	Success	
4/26/2015 1:34:48 AM	Host	RulesSettings	NODE1	Success	

Click the **Update** button to retrieve the log records matching the filter criteria.

The following filter settings are available:

- Dates range for the report – From/To.
- Object Type – Any, Host, Backup Server.
- Result – Any, Success, Failed.
- Operation – Any, VM Settings, Rules, Rules Settings, AV Update Settings, Management Servers List, VM Groups.

Click the **Settings** button to set the events categories that should be saved into the log and log records retention parameters:



- Set the object type – Host, Backup Server.
- Set the retention days and maximal events count.

Click Apply to save settings.

Setting virtual firewall rules

There are three basic types of virtual firewall rules in 5nine Cloud Security:

- Global rules of default 'All VMs' group. These rules automatically apply to all virtual machines in the Hyper-V Cloud.
- Rules of user-defined security groups. These rules apply only to those virtual machines to which the group is assigned in the virtual machine settings. Each virtual machine can be a member of several security groups. Please refer to the "Changing VM settings" section for more information. The "User-defined security groups" section below describes how to set up user-defined security groups.

- Local rules. These rules apply only to a particular virtual machine in which list they were created.

  All rules take effect when the virtual firewall protection is enabled. Please refer to the "Setting virtual firewall" section.

All the rules are created in a similar manner using 5nine Cloud Security menu commands. The type of rule described above is determined depending on what object was selected in the 5nine Cloud Security object tree prior to creating the new rule. All this is described in the "Adding rules" subsection below.

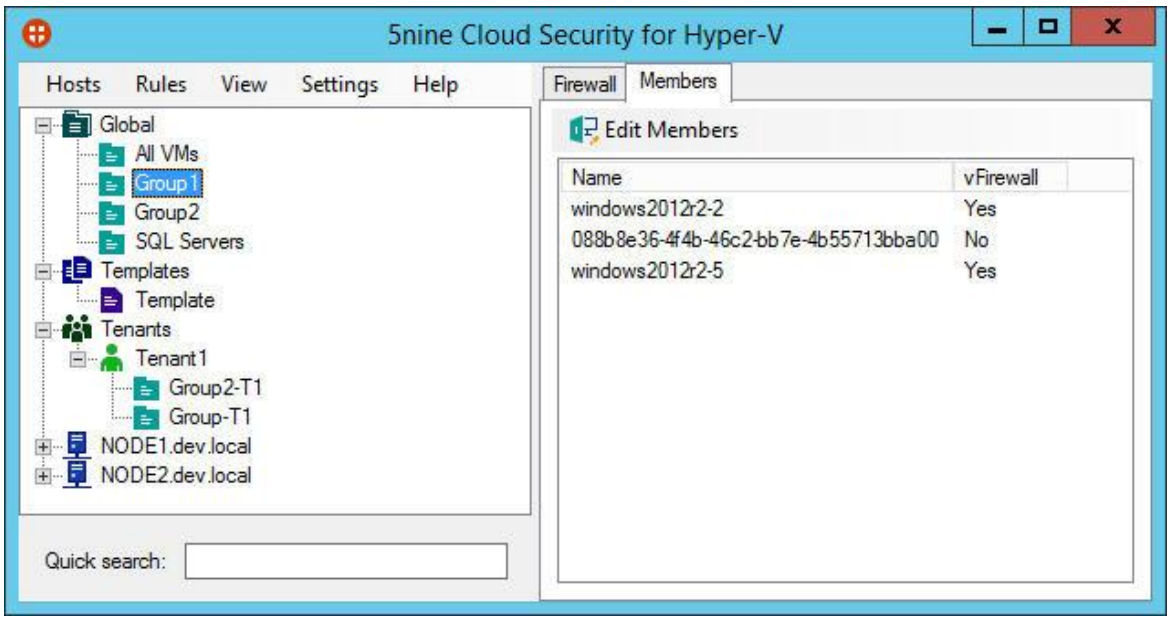
Virtual firewall rules priorities

Attention! *5nine Cloud Security for Hyper-V uses the following approach to applying virtual firewall rules that has been implemented in the 5.X product line:*

- *All traffic is blocked by default if no rule is added to the protected virtual machine.*
- *Any allowing rule opens the channel(s) it is set for and lets the corresponding traffic flow.*
- *Any blocking rule has priority over any allowing rule in the case they cross each other and the traffic that matches rule's criteria will be blocked.*

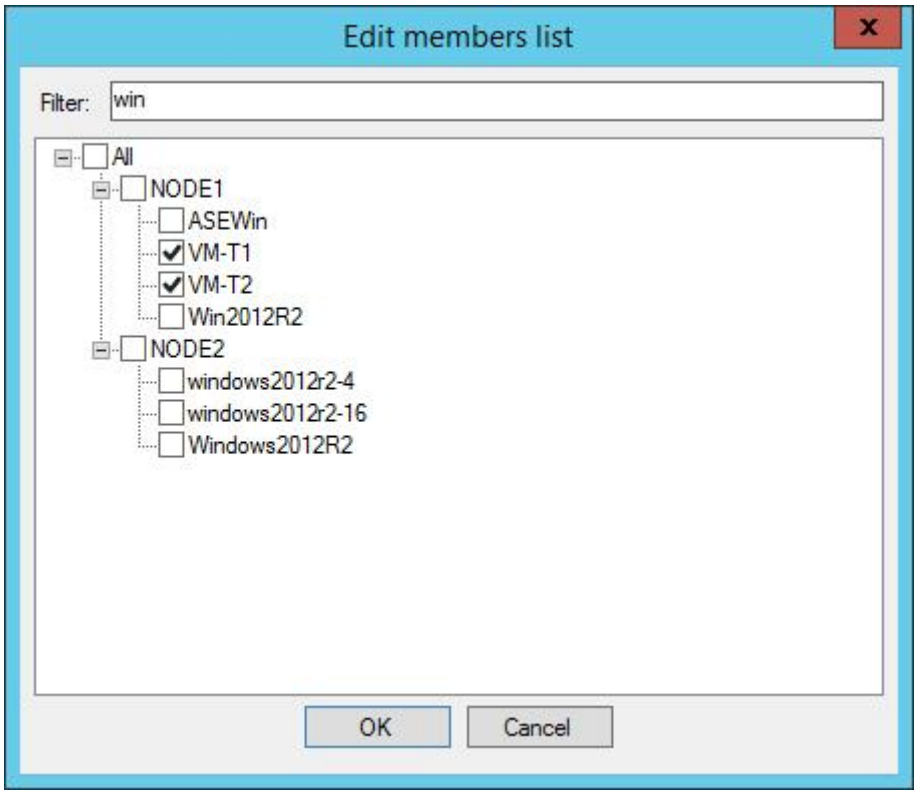
User-defined security groups

5nine Cloud Security allows creation of multiple security groups in addition to default built-in 'All VMs' group. The 'All VMs' default group rules apply to all virtual machines with enabled virtual firewall. Rules in other security groups apply to member virtual machines only. Each virtual machine can be a member of several security groups. Setting up security group membership can be done either in the virtual machine settings (Please refer to the "Changing VM settings" section for more information) or directly on the **Members** tab.



To edit security group membership, select the target security group in the object tree on the left, and then click the **Edit Members** button on the **Members** tab.

In the **Edit members list** window select the necessary virtual machines to include them into the security group or deselect them to remove from it:

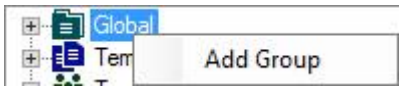


Type the symbols which a VM name must contain into the **Filter** field to filter the tree. Those VMs that have been pre-selected will not be filtered off the tree even if they do not match the filtering criteria. Click **OK**.

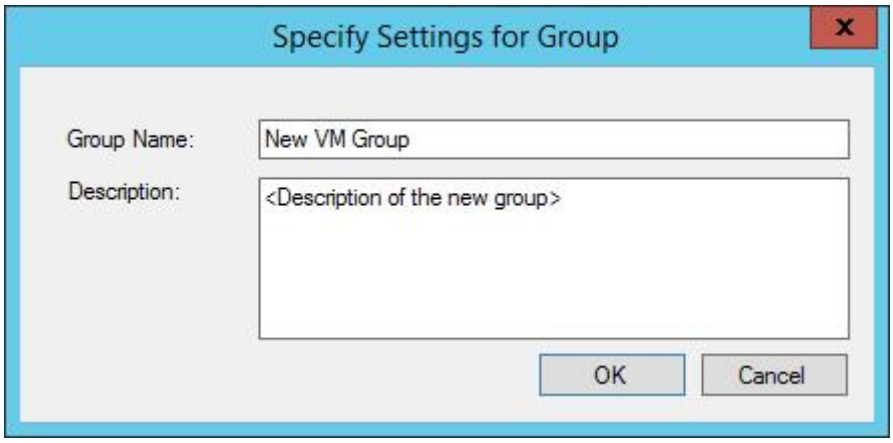
Note. *Use this method to edit security group membership for deleted VMs to remove them from the security group. They will be displayed under "Unknown" branch in the object tree like it's shown on the picture above.*

Security groups are also available for tenant users who can create their own groups that will apply within a tenant and are available to be altered for this tenant and global administrators only.

To create a new security group, select **Rules – Add Global Rules Group** main menu command or right click on the **Global** entity and then click **Add Group**.

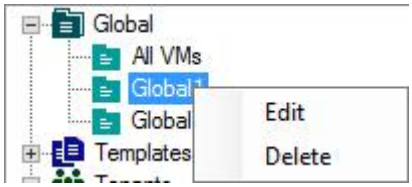


Then enter the name for the new group in the following dialog box ('New VM Group' is the default value) and the description (optional). Click **OK**.



The new group is created and appears in the object tree.

To edit the global rules group, select it in the object tree. Then select **Rules – Edit Global Rules Group** main menu command or **Edit Group** main panel button, or right click on the group and then click **Edit**:



Enter the new name and/or description in the same dialog box, and then click **OK**.

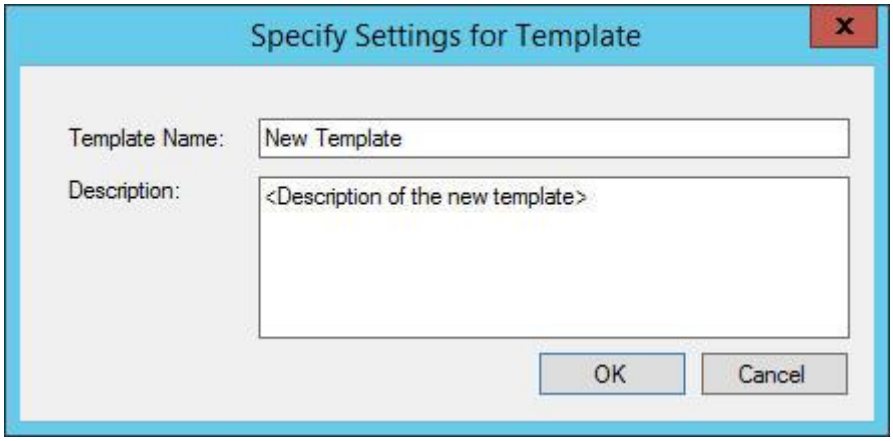
To delete global rules group, select **global rules group** in the object tree. Then select **Rules – Delete Global Rules Group** or right click on the group and then click **Delete**. Confirm the operation.

User-defined rules templates

You can create sets of rules as user-defined templates. These templates will then be available when adding rules to a group and/or VMs for convenience and to save time required for setting up (altering) the security plan. User-defined rules templates are tenant-specific – they work for each tenant and on the global level independently and are available only on the level (and in tenant) they were created. Templates are just some kind of storage for the rules, the rules added to a template will not take effect until this template is applied to a group or a VM. Altering template content – adding, changing and/or removing rules – will not affect those objects (groups and/or VMs) to which the template had been previously applied. Re-applying the template to the object will add the whole set of its rules over again, even if some of them (or all) are already present in the VM's/Group's rules list – that way the same rule may be doubled, which generally will not cause any difference in their functioning.

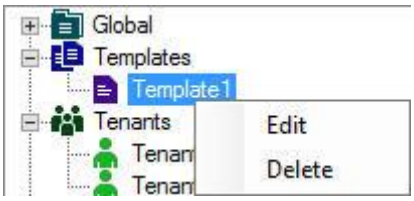
To create a new template, right click the **Templates** entity and then click **Add Template**:

Then enter the name for the new template in the following dialog box ('New Template' is the default value) and the description (optional). Click **OK**.



The new template is created and appears in the object tree.

To edit the rules template, right click on the template and then click **Edit**:



Enter the new name and/or description in the same dialog box, and then click **OK**.

To delete rules template, right click on the template and then click **Delete**. Confirm the operation.

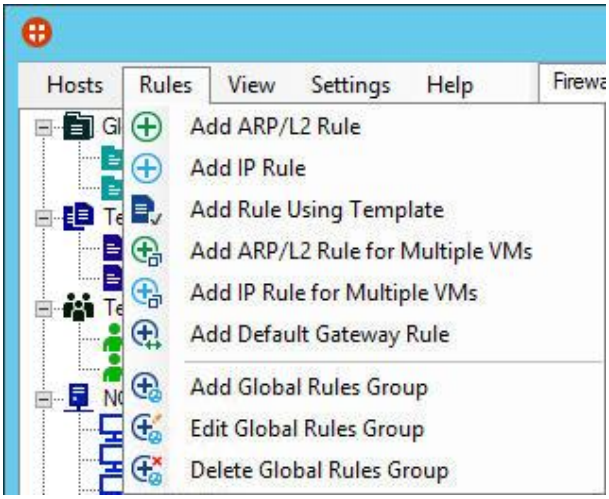
The next subsection will describe how to add rules into templates, groups and VMs' rules lists.

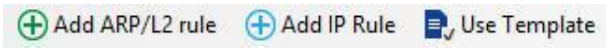
Adding rules

To add 5nine Cloud Security virtual firewall rules, select one of the following entities in the object tree:

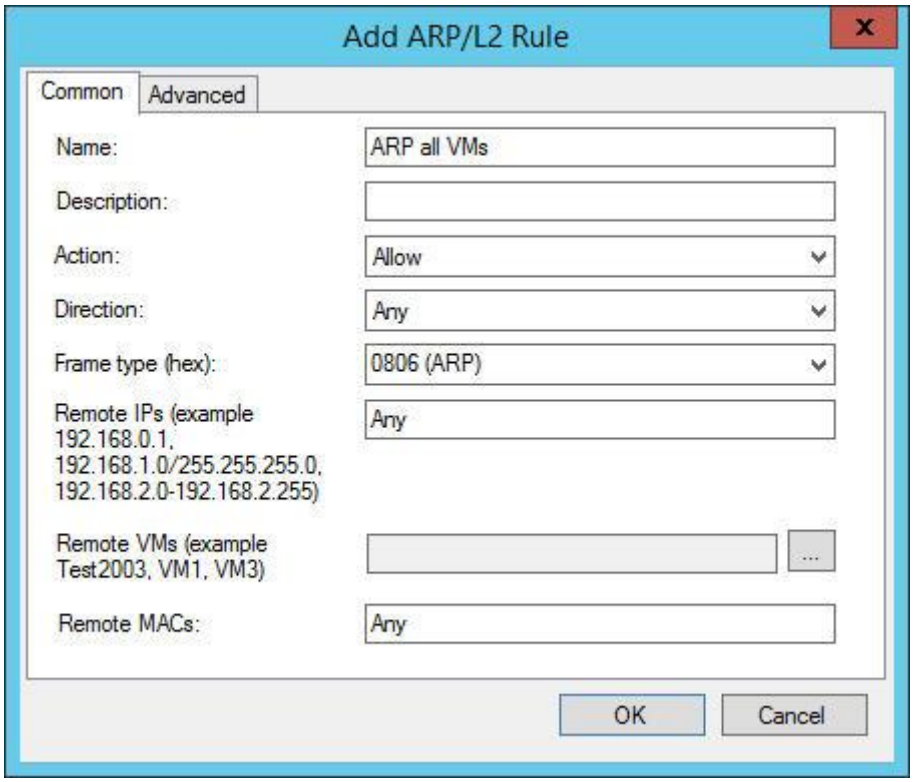
- All VMs default group to create a global virtual firewall rule that will apply to all virtual machines. The global administrator is the only user that is able to do this.
- Previously created user-defined security group. The rules will be created within this group.
- Previously created template under "Templates" entity to create the rule in the template. Please refer to the "User-defined rules templates" subsection.
- Virtual machine to create a local rule. This rule will apply to this virtual machine only.

Then use the **Rules** menu commands or the similar main panel buttons (not all of the panel buttons duplicate main menu commands).





Adding ARP/L2 rule:



Fill out all the parameters on the **Common** tab:

- **Name**. Enter the name that will help you identify the rule.
- **Description**. Enter the description for the rule (optional);
- **Action.** Select action for the rule to apply to corresponding network traffic – allow or block actions are only applicable for ARP/L2 rule.

  Note. *5nine Cloud Security blocks all traffic by default when the virtual machine is set on firewall protection. However, in certain cases you may need to use both type of rule's action with multiple rules to create a proper set.*

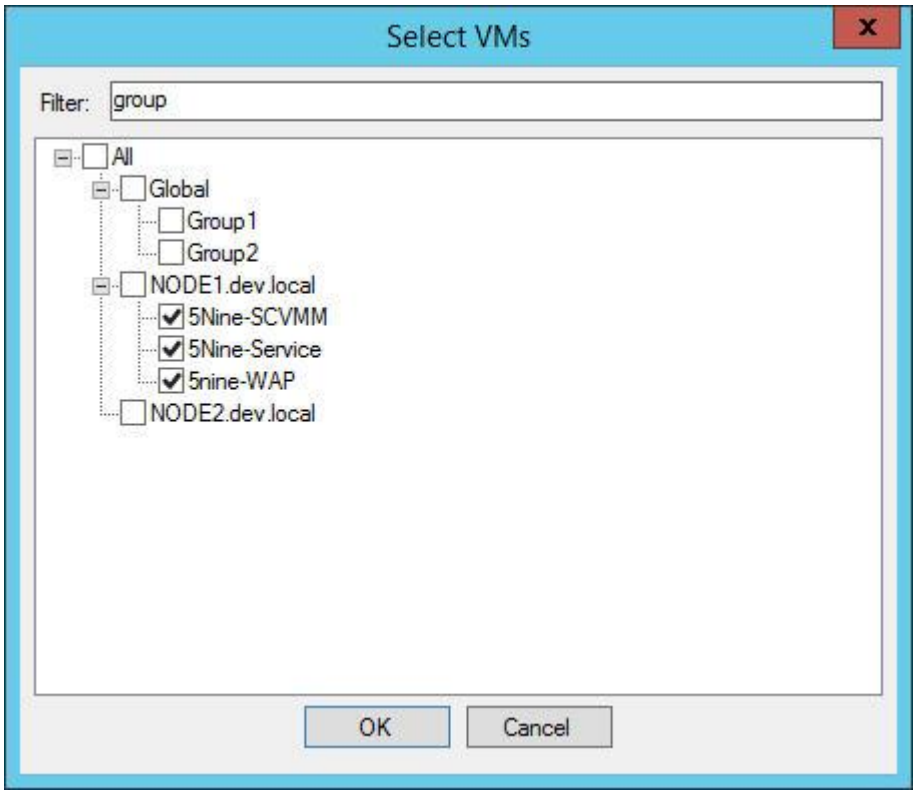
- **Direction**. Set the traffic direction in respect of the target VM(s):
  - any – to apply the rule in both directions;
  - inbound – to apply the rule for inbound traffic only;
  - outbound – to apply the rule for outbound traffic only.
- **Frame type (hex)**. Enter the frame type to identify L2 protocol. By default there are two values available from the list: ARP (0806) and RARP (0835). Type the necessary number for

the L2 protocol. ARP protocol will let you additionally specify remote IP addresses to limit rule action to.

- **Remote IPs**. Enter remote IP addresses to/from which the ARP traffic is sent/received, using spaces and comma as delimiters. Empty field assumes any address. This option basically applies to ARP traffic. For the majority of the other L2 protocols, e.g. for PPPoE protocol, this option is not applicable and will be disabled.

- **Remote VMs**. Select remote virtual machines to/from which the traffic is sent/received. Empty field assumes any remote VM. This option basically applies to ARP traffic. For the majority of L2 protocols, e.g. for PPPoE protocol, this option is not applicable and will be disabled.

  To select remote virtual machines from a list, check the box to the left of the field containing their names and check the machines you want to add:

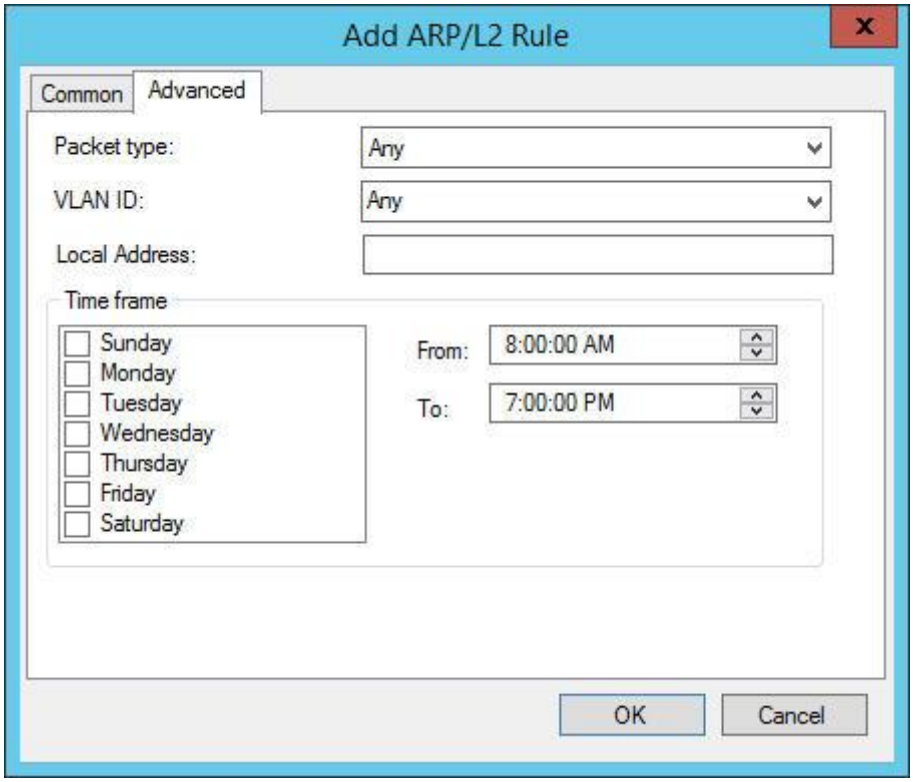


  Type the symbols which an object name must contain into the **Filter** field to filter the tree. Those objects that have been pre-selected will not be filtered off the tree even if they do not match the filtering criteria. Click **OK**.

- **Remote MACs**. Enter remote MAC addresses to/from which the ARP/L2 traffic is sent/received. Empty field assumes any MAC address.

Note. *Parameters Remote IPs, Remote VMs and Remote MACs work independently from each other and do not interfere with each other. I.e. if you select the remote virtual machine into the remote VMs list and enter IP address from another server into remote IPs field as well, the rule will apply to both remote systems.*

Fill out all the parameters on the **Advanced** tab:

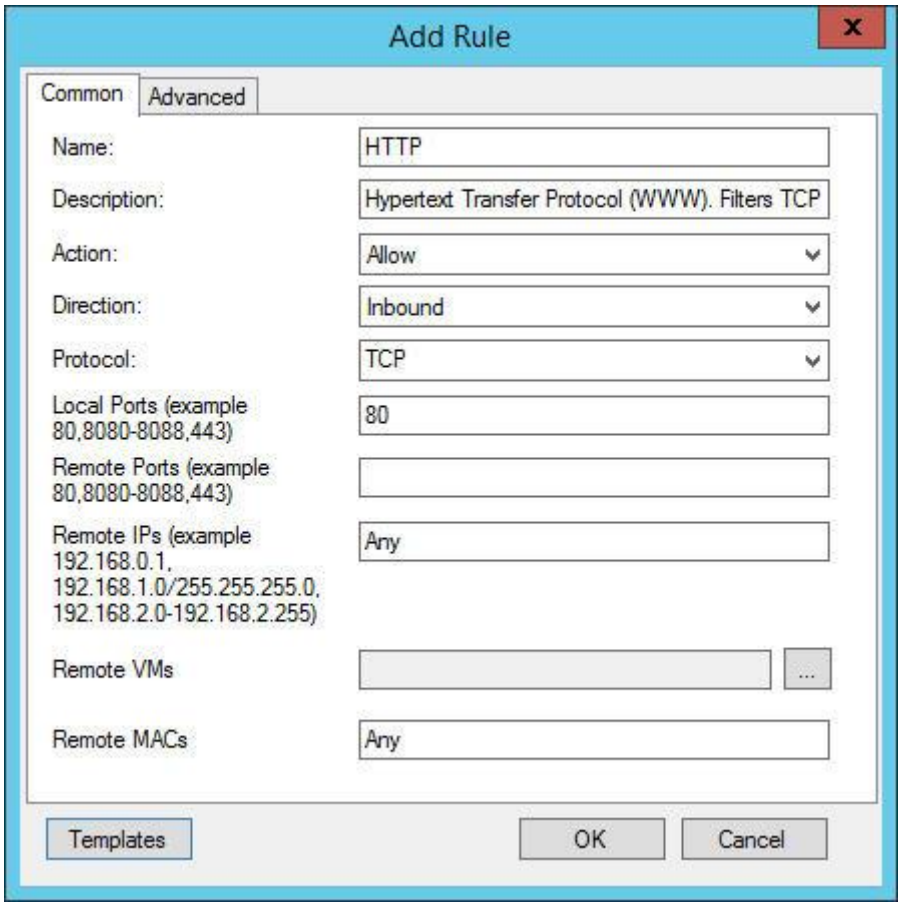


- **Packet type**. Select the address type:
  - Any. The rule will apply to any MAC address type.
  - Broadcast. The rule will apply to broadcast MACs only (FF:FF:FF:FF:FF:FF).
  - Unicast. The rule will apply to unicast MACs only.
  - Multicast. The rule will apply to multicast MACs only (0x:01:00:5E:00:00:xx).
- **VLAN ID**. Enter the VLAN number to add VLAN tagging option to the rule. The rule will apply to the frames with specified VLAN ID only. You have the following options to select from the list as well:
  - *Any* (default option) – the rule will apply to any frame regardless of VLAN tagging.
  - *No* – the rule will apply only to frames without VLAN tagging.

- **Local Address**. Enter the IP address or a subnet address using this notation: *x.x.x.x/y.y.y.y*, where *x.x.x.x* – network address in the decimal format; *y.y.y.y* – subnet mask in the decimal format, e.g., *192.168.0.0/255.255.255.0*. When this address is specified, local VM address that the rule is applied will be checked to match it. If local VM address does not match the entered value, the traffic will be blocked. Since ARP/L2 rule usually applies to multiple virtual machines or a group, it is important to have all these virtual machines in the same subnet to be able to use this parameter properly. In this case you may enter a subnet address instead of a single IP address – the rule will apply to VMs which local address is in this subnet. If VMs are in different networks/subnets, the rule will only apply to the VM(s), which local address matches the IP address or subnet specified in the rule. It is not currently possible to enter IP ranges or multiple IP addresses here. Therefore either omit using it for multiple virtual machines/groups from different networks, or use it in the rules that apply for each VM or a subnet (group) individually.
- Specify the time frame and the days in a week on which only the rule should be in action. Time period will only apply if at least one day of a week is marked. Leave all days unmarked to let the rule always be in action.

At the end click **OK**. The rule will be created and added to the selected VM or a group and will be displayed in the main window.

Adding IP Rule:



Fill out all the parameters on the **Common** tab:

- **Name**. Enter the name that will help you identify the rule. E.g., "LLMNR inbound" that refers to "Link-Local Multicast name resolution inbound";
- **Description.** Enter the description for the rule (optional);
- **Action**. Select action for the rule to apply to corresponding network traffic. The following options are available for IP rule:
  - *allow* – allow all packets including SPI.
  - *allow (no SPI)* – allow direct packets only, SPI packets will be filtered.
  - *block* – block all packets.
- **Direction**. set the traffic direction in respect of the target VM(s):
  - any – to apply the rule in both directions;

- inbound – to apply the rule for inbound traffic only (SPI packets will be excluded if *allow* action is set);
- outbound – to apply the rule for outbound traffic only (SPI packets will be excluded if *allow* action is set).

  SPI packets are normally allowed through 5nine Cloud Security virtual firewall when the certain traffic is set to be passed through it. E.g., the RDP inbound allowing rule on TCP port 3389 will let corresponding outbound SPI packets from TCP port 3389 to the remote private TCP port on the remote host that initiate RDP session in the case *allow* action is set. It will be considered as TCP established connection and will be displayed in connections table for the target VM. In certain situations such connections will be dropped by timeout, which results in losing the current session. Using *allow (no SPI)* action you can set two separate rules for inbound and outbound traffic to avoid such issues.

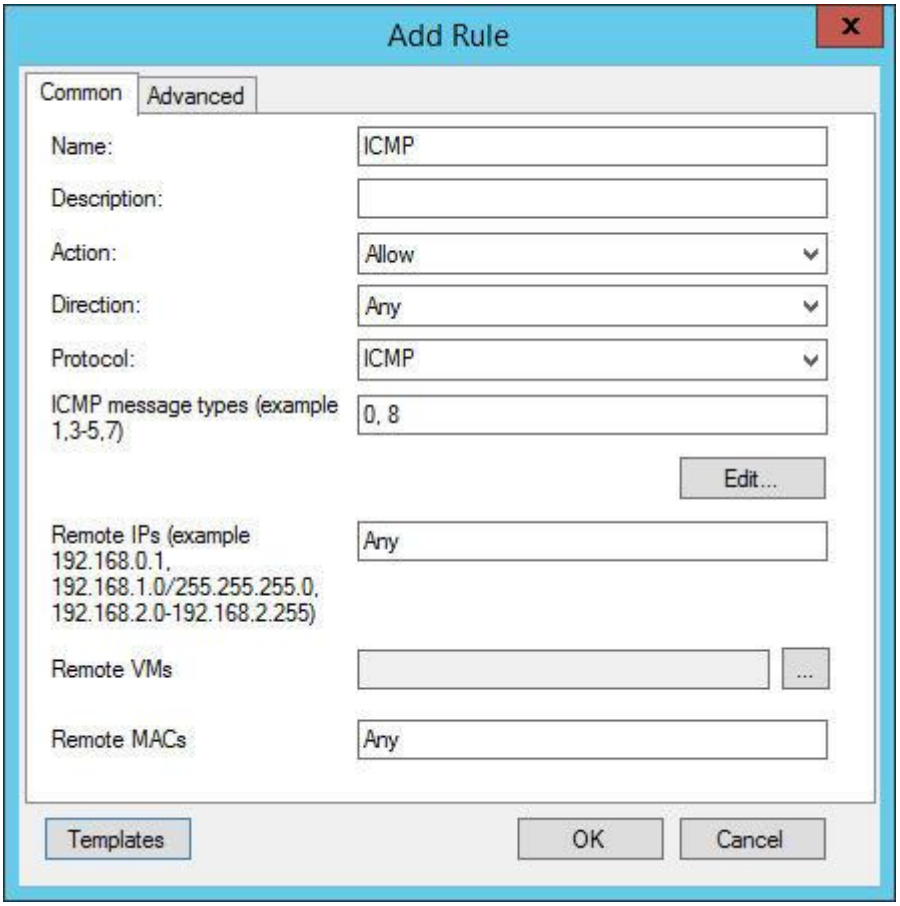
  In the given example it will look like:

  - *allow (no SPI)*, *inbound*, TCP local ports *3389*, remote ports empty (any);
  - *allow (no SPI)*, *outbound*, TCP local ports *3389*, remote ports empty (any);

  Such sessions are not recognized by 5nine Cloud Security virtual firewall as established TCP connections and will not be displayed in the connections table for the target virtual machine, while the sessions themselves will be allowed and will not be dropped by time out unlike SPI-based TCP connections.

- **Protocol**. Select the protocol that is used to send the certain traffic type. You have the following options:
  - *Any* – any IP protocol.
  - TCP – TCP protocol.
  - UDP – UDP protocol.
  - GRE – GRE protocol.

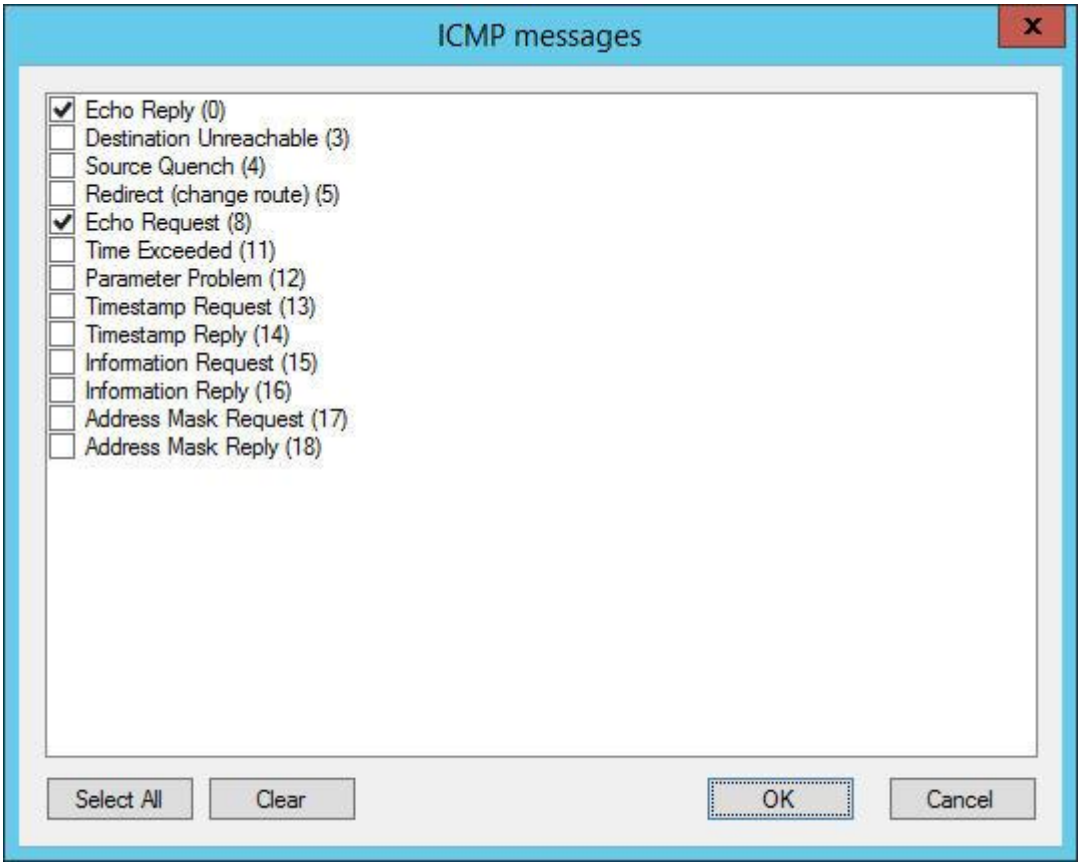
- *ICMP* or *ICMPv6* – ICMP (ICMPv6) protocol. The following additional options are available for this protocols:



MESSAGE TYPES: Echo Reply – *0*, Destination Unreachable – *3*, Source Quench – *4*, Redirect (change route) – *5*, Echo Request – *8*, Time Exceeded – *11*, Parameter Problem – *12*, Timestamp Reply – *14*, Information Request – *15*, Information Reply – *16*, Address Mask Request – *17*, Address Mask Reply – *18*.

Enter the required number(s) divided by commas (spaces will be added automatically). Leave the field empty to allow all types of ICMP messages.

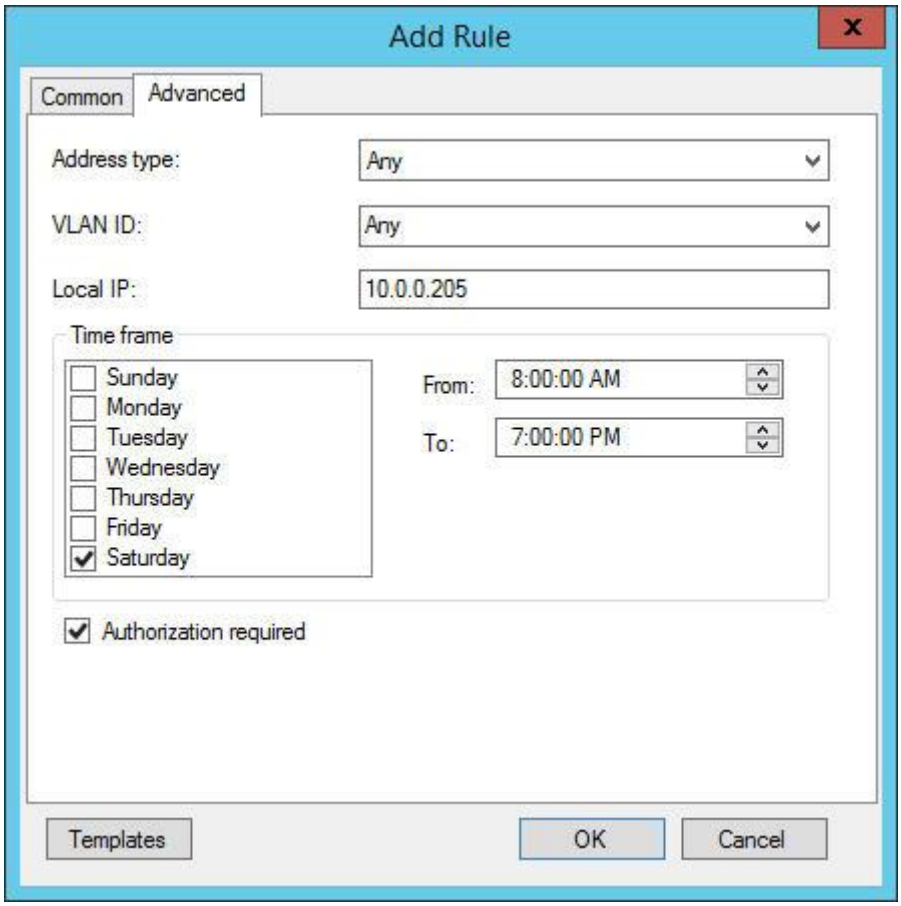
You can use the dialog box for you convenience to select the necessary ICMP message types by clicking the **Edit** button next to the **ICMP message types** field:



Check the boxes against the necessary types (the **Select All** and **Clear** buttons will select all types and clear the selection accordingly) and then click OK. The selected types will appear the **ICMP message types** field.

- **Local Ports** (if applicable). Enter the local ports through which the traffic flows. Empty field assumes any local port.
- **Remote Ports** (if applicable). Enter the remote ports through which the traffic flows. Empty field assumes any remote port.
- **Remote IPs**. Enter remote IP addresses to/from which the traffic is sent/received. Empty field assumes any address.
- **Remote VMs**. Select remote virtual machines to/from which the traffic is sent/received. Empty field assumes any remote VM.
- **Remote MACs**. Enter remote MAC addresses to/from which the traffic is sent/received. Empty field assumes any address.

Fill out all the parameters on the **Advanced** tab:



- **Address type.** Select the address type to which the traffic is sent:
  - *Any***.** All address types will be considered by the rule.
  - *Broadcast***.** Only broadcast traffic will be considered by the rule. E.g. the one that is sent to the IPv4 addresses like x.x.x.255 for the subnet mask like 255.255.255.0 (VLSM broadcast addresses are also considered, they depend on the subnet mask length each time).
  - *Unicast*. Only traffic that is sent to a single receiver will be considered. E.g. the one that is sent to the IPv4 single host address like 192.168.1.10 with the subnet mask of 255.255.255.0.
  - *Multicast*. Only multi-recipient traffic will be considered. E.g. in IPv4 the target addresses must be within the following range: 224.x.x.x – 239.x.x.x.

Note. *Certain types of traffic are unicast, multicast or broadcast by their nature. E.g. RDP connection on port 3389 is the unicast type. Link Local Multicast Name Resolution on port 5355 is the multicast type. You have to be aware of it when setting this parameter so that the rule applies correctly unless you choose to set it to "Any".*

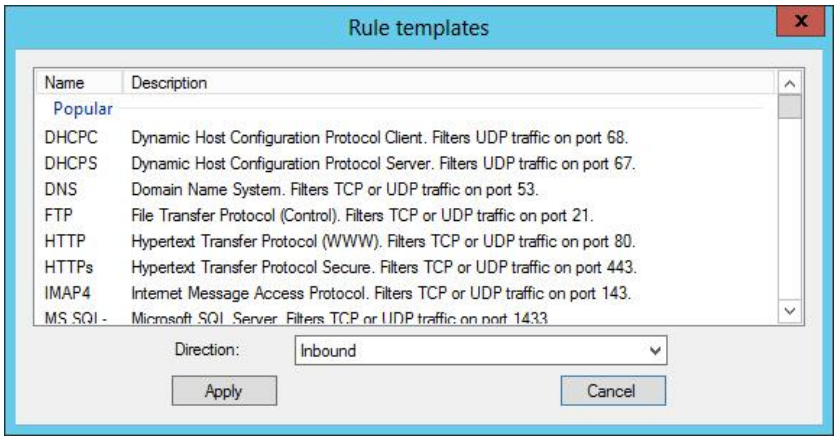
- **VLAN ID**. Enter the VLAN number to add VLAN tagging option to the rule. The rule will apply to the packets with specified VLAN ID only. You have the following options to select from the list as well:
  - *Any* (default option) – the rule will apply to any packet regardless of VLAN tagging.
  - *No* – the rule will apply only to packets without VLAN tagging.
- **Local Address**. Enter the IP address or a subnet address using this notation: *x.x.x.x/y.y.y.y*, where *x.x.x.x* – network address in the decimal format; *y.y.y.y* – subnet mask in the decimal format, e.g., *192.168.0.0/255.255.255.0*. When this address is specified, local VM address that the rule is applied will be checked to match it. If local VM address does not match the entered value, the traffic will be blocked. If the rule applies to multiple VMs that are in different networks/subnets, the rule will only apply to the VM(s), which local address matches the IP address or subnet specified in the rule. It is not currently possible to enter IP ranges or multiple IP addresses here. Therefore either omit using it for multiple virtual machines/groups from different networks, or use it in the rules that apply for each VM or a subnet (group) individually.
- Specify the time frame and the days in a week on which only the rule should be in action. Time period will only apply if at least one day of a week is marked. Leave all days unmarked to let the rule always be in action.
- Mark the **Authorization required** option to enable authorization in the rule. If this option is enabled, the rule will only apply to authorized addresses. Please refer to the 'Authorization' subsection below for details on how to set up authorization from remote computers when using the rules with this option.

At the end click **OK**. The rule will be created and added to the selected VM and will be displayed in the main window.

Pre-defined rule templates

There are pre-defined rule parameters sets (templates) implemented in 5nine Cloud Security that help you fill out the dialog box with necessary values to create rules for some common scenarios (e.g., HTTP access; remote access through RDP, Telnet or SSH). These templates already contain the necessary values to be entered in the dialog box, i.e., protocol, TCP/UDP port number etc. Select the desired template, and choose the right direction, action and remote VMs/IP addresses for which the rule will apply.

To use the rule template select **Templates** in the Add Rule dialog box. The dialog box below shows the template list with the most commonly used scenarios placed at the top of the list and marked as "Popular".



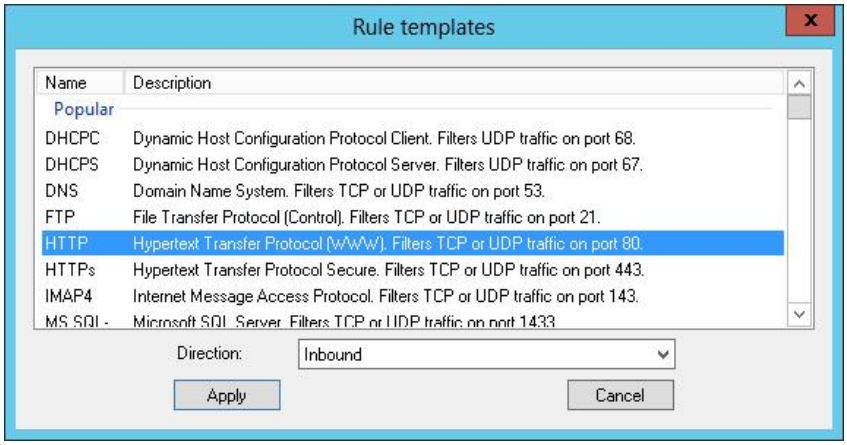
Select the desired scenario by using a left-click.

- Select the direction (inbound/outbound)
- Click **Apply**. The Add rule dialog box will show parameters applicable for the selected scenario.

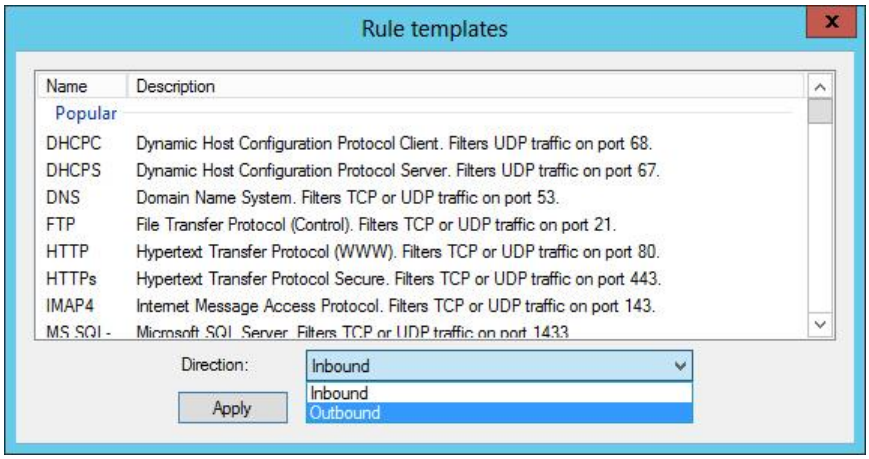
Note: *Be accurate when choosing the direction of the traffic you wish to allow or block. It is important to set this parameter correctly; the assigned TCP/UDP port (local or remote) depends on the set direction. Otherwise, the rule you created will not work properly. For example, if you wish to create the HTTP rule on the VM-web client, set the Outbound direction; if you wish to create the same rule on the VM that is a web server, set the Inbound direction. 5nine Cloud Security template will assign the HTTP port 80 to remote for VM-client and local for VM-server in order to set the TCP segment analysis properly. Contact your network expert if assistance is needed.*

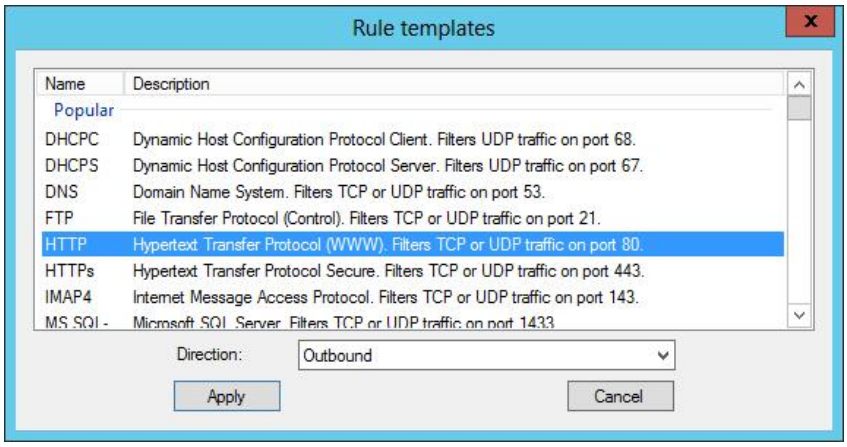
For example, let's see how it will work for the HTTP rule, allowing traffic on the VM – web client.

Select the template row with the name "HTTP":

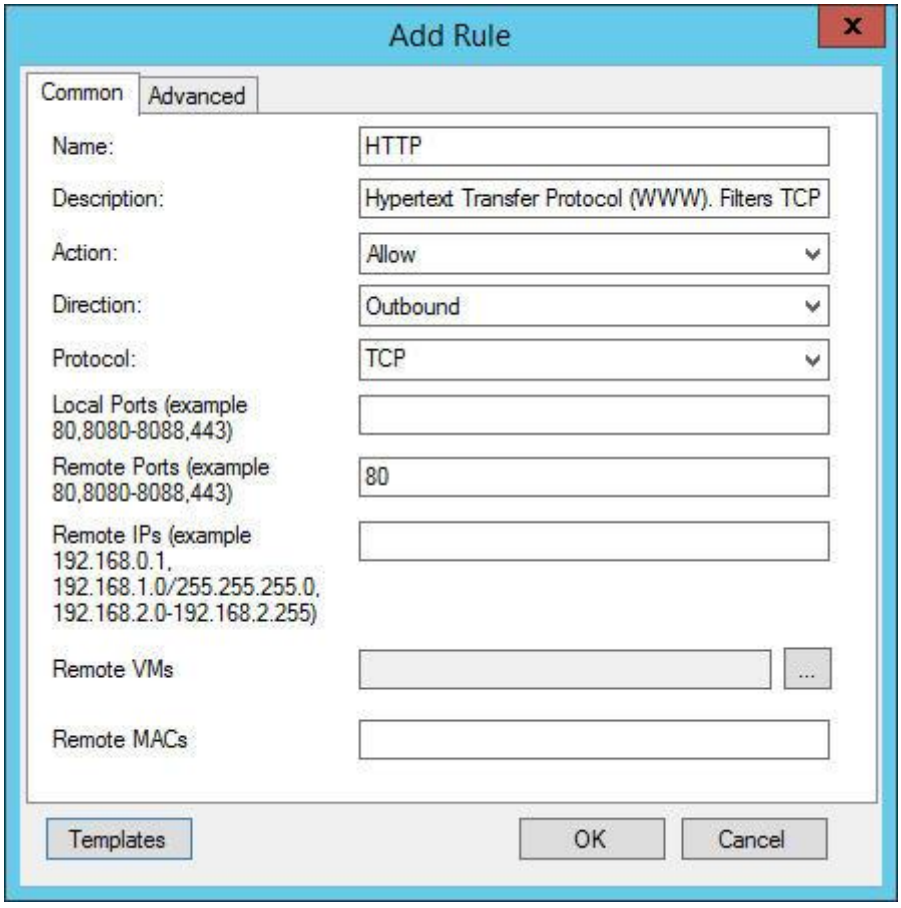


Make sure you have selected "Outbound" direction ("Inbound" is default).

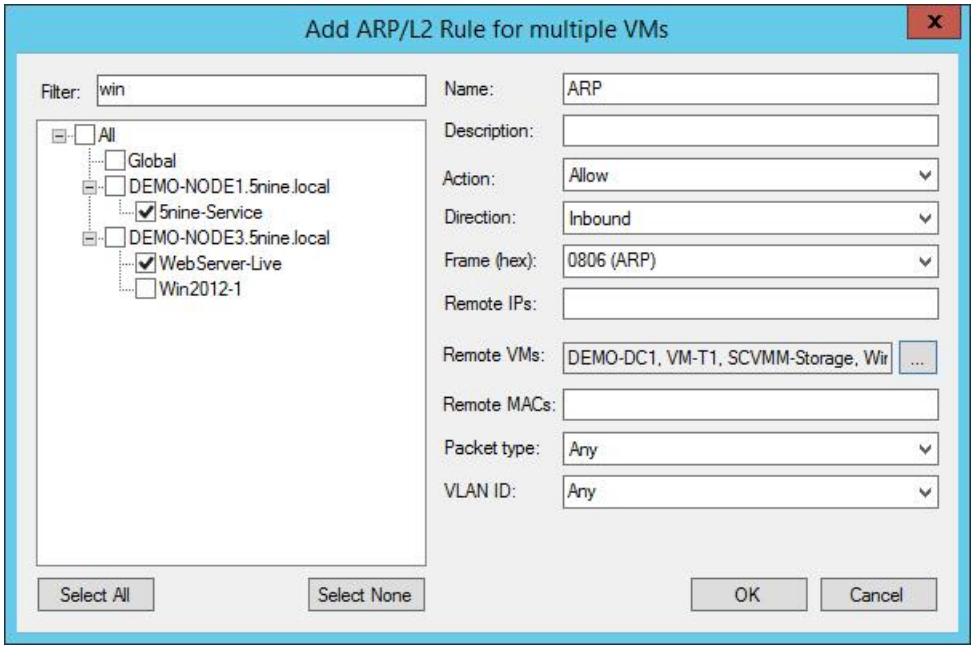


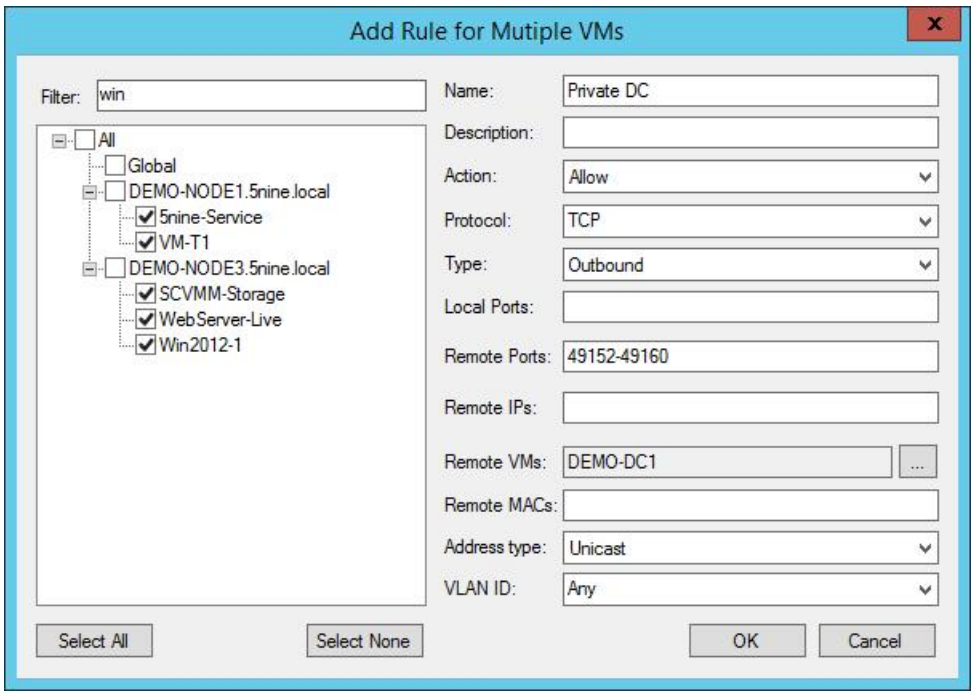


Click **Apply**. The Add Rule dialog box fields will be automatically filled in with the selected rule template:



Adding rules for multiple virtual machines:

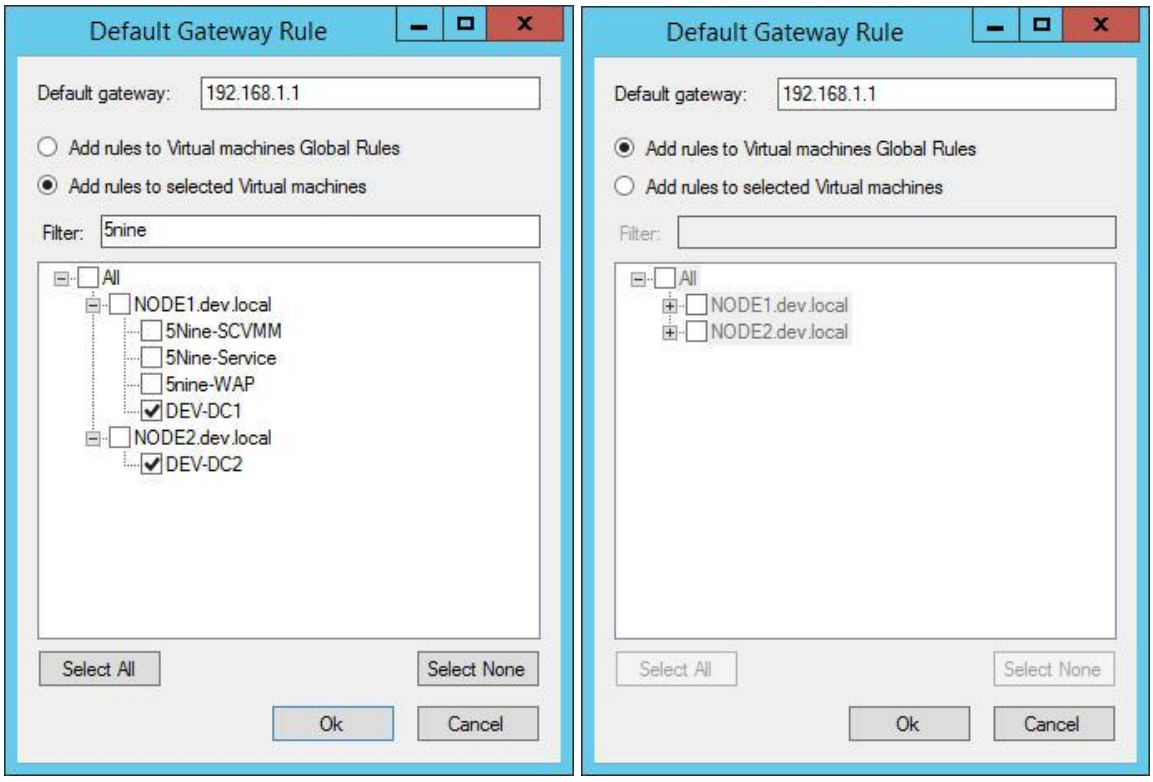




Type the symbols which an object name must contain into the **Filter** field to filter the tree. Those objects that have been pre-selected will not be filtered off the tree even if they do not match the filtering criteria.

Click **OK**. The corresponding message will appear after successfully adding multiple rules.

Adding default gateway rule:



You have two options:

- Add rules to Virtual machines Global Rules – the rule being created will be added to Global-VM Rules list and will apply to all VMs set on virtual firewall.
- Add rules to selected Virtual machines – the rule being created will be added to the rules lists only for those VMs that were chosen. Type the symbols which a VM name must contain into the **Filter** field to filter the tree. Those VMs that have been pre-selected will not be filtered off the tree even if they do not match the filtering criteria.

Click **OK**. The following rules with the characteristics shown below will be automatically created and then added to the necessary places as described above:

1. Default gateway IP Rule
    - **Name**: "Default gateway IP Rule"
    - **TypeOfRule**: "IP, Any"
    - **Type**: "Any"
    - **Action**: "Allow"
    - **Protocol**: "Any"
    - **Remote IPs**: "10.16.101.198" (as it's entered in the example given here)
2. Default gateway ARP Rule
    - **Name**: "Default gateway ARP Rule"
    - **TypeOfRule**: "ARP"
    - **Type**: "Any"
    - **Action**: "Allow"
    - **Protocol**: 0806
    - **Remote IPs**: any

Editing a rule

To edit a rule, select it in the list, then click **Edit Rule** on the top menu panel. Then change the rule settings in the appropriate dialog box just as when adding a rule.

Removing a rule

To remove a rule, select it in the list, then click **Remove Rule** on the top menu panel. The rule will disappear from the list.

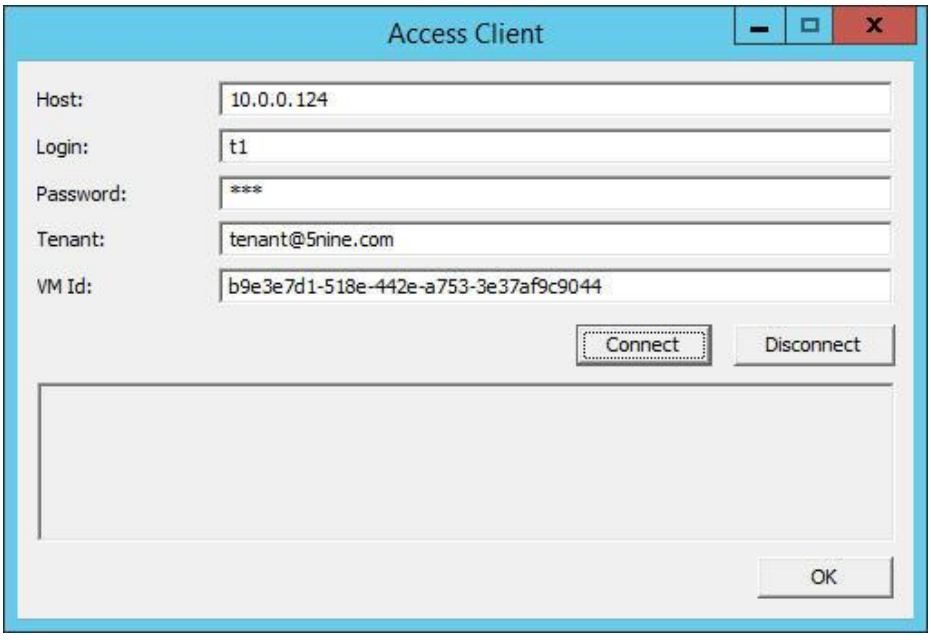
Authorization

When "Authorization required" option is enabled in the IP rule's parameters, this rule will only apply to authorized addresses. Any remote address that the rule is intended to be active for should be authorized using special application that arrives with 5nine Cloud Security for Hyper-V installation package. It is also necessary to have custom users created in 5nine Cloud Security for Hyper-V users list, which will be required during authorization.

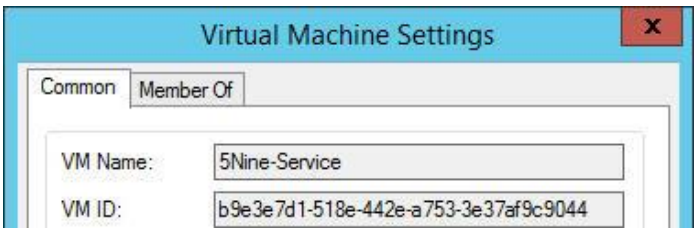
To setup authorization follow the steps below:

1. Ensure you have appropriate custom users created in 5nine Cloud Security for Hyper-V (please refer to the 'Users management and tenants' – 'Setting users' section for details). Currently it is not required to grant those users permissions, it is enough just to have them in the users list. If the target virtual machine is in the global group, then the custom user should be created in the global group. If the target virtual machine is assigned to a tenant, then the custom user should be created in that tenant. In the case your rule is created in the security group and/or applies for multiple VMs, which may be assigned to different tenants and some just be in the global group, then you should have custom users in each tenant and/or global group accordingly.

2. On the remote computer that the rule should be active towards, run the *5ninecli.exe* application that arrived with 5nine Cloud Security for Hyper-V installation package:

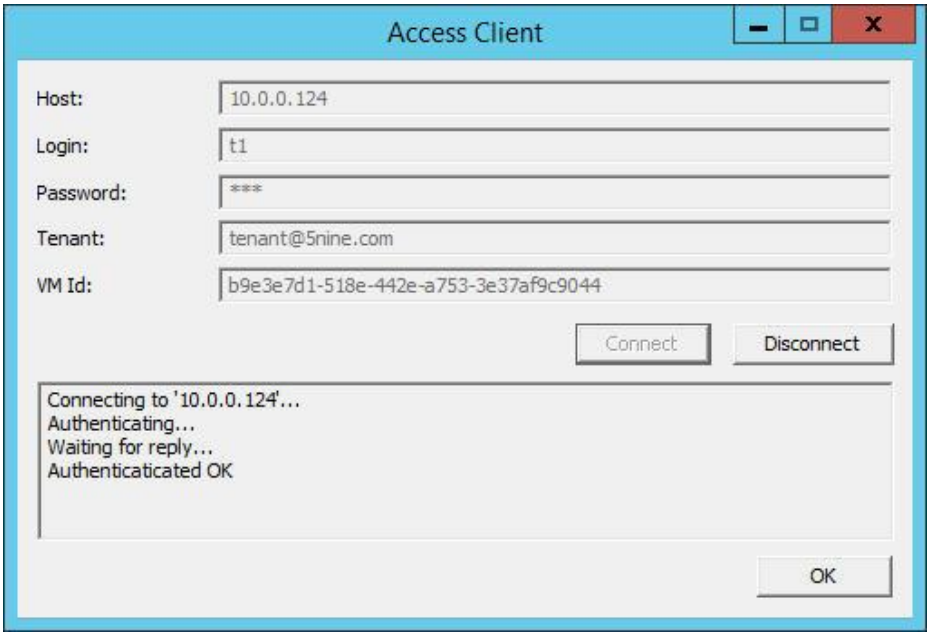


- Enter the management server IP address into the **Host** field.
- Enter the custom user's name into the **Login** field.
- Enter the custom user's password.
- Enter the tenant's name into the **Tenant** field. Leave it empty if you are connecting to global group.
- Enter virtual machine ID into the **VM Id** field. This value can be retrieved in the **Virtual Machine Settings** dialog window (please refer to the 'Changing VM settings' section for details):



Note. *In the case third party needs to get authorization, Cloud Security administrator will have to provide the above data to this person along with the 5ninecli.exe application.*

- Click the **Connect** button. If authorization is successful, you will see the following information:



At this point the IP address of the computer, which the authentication has been initiated from, is authorized and the rule will apply. Do not close the application unless you want to interrupt the authorization and your session. Clicking on the **Disconnect** button will also interrupt the session and the rule will be no longer in action.

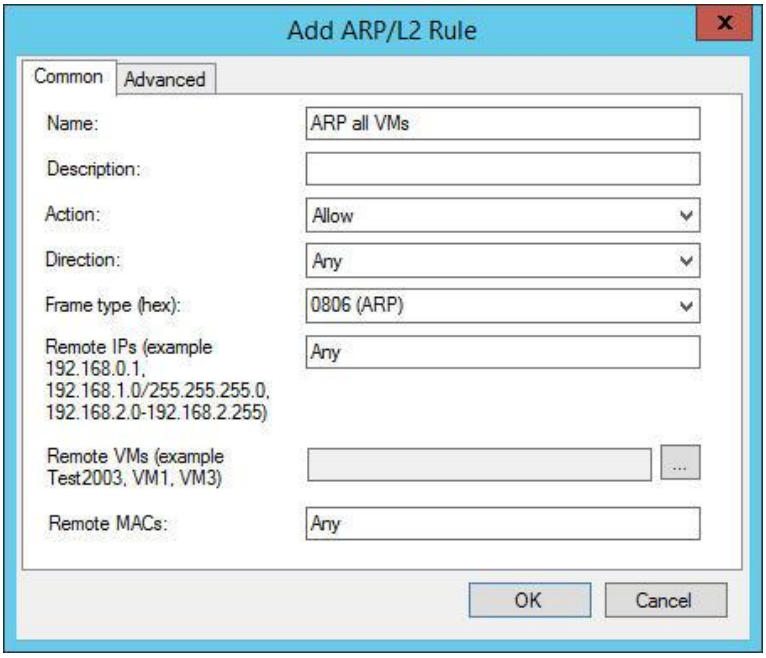
Common scenarios

To help you set the most commonly used virtual firewall rules, see the explanations listed below for which rules to use to allow or block the necessary type of traffic to or from the target virtual machine. We presume that the target VM is set on virtual firewall.

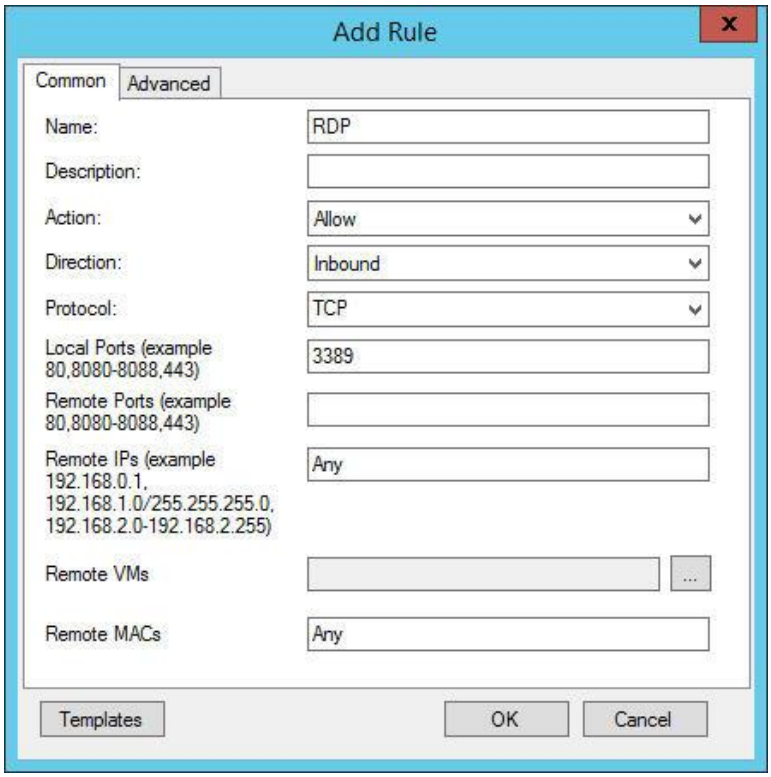
RDP

To allow remote desktop connection to the VM, the following rules must be added:

- ARP rule allowing any ARP traffic on the VM



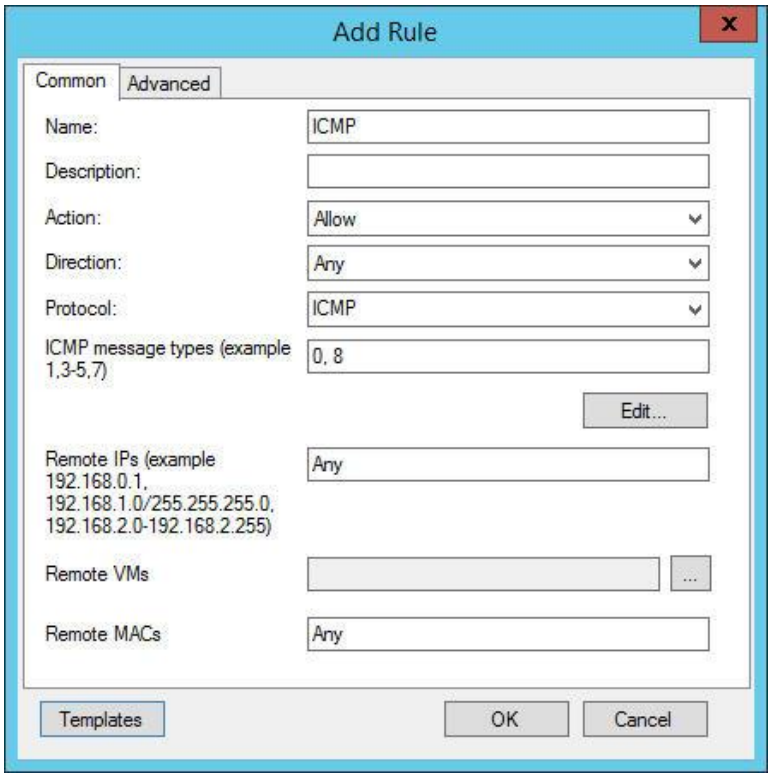
- IP rule allowing inbound TCP traffic on the local port 3389



Ping traffic

To allow ping commands to/from VM, the following rules must be added:

- ARP rule allowing any ARP traffic on the VM
- IP rule allowing ICMP traffic on the VM

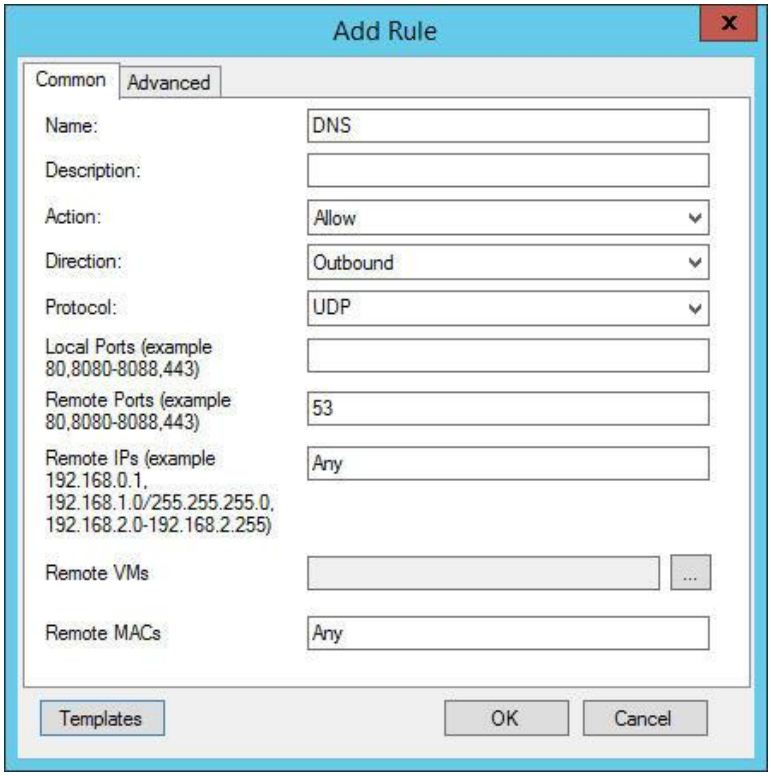


Leaving the **ICMP message types** field blank assumes any types of ICMP message, while 0 and 8 types covers echo request and reply messages to ping the host.

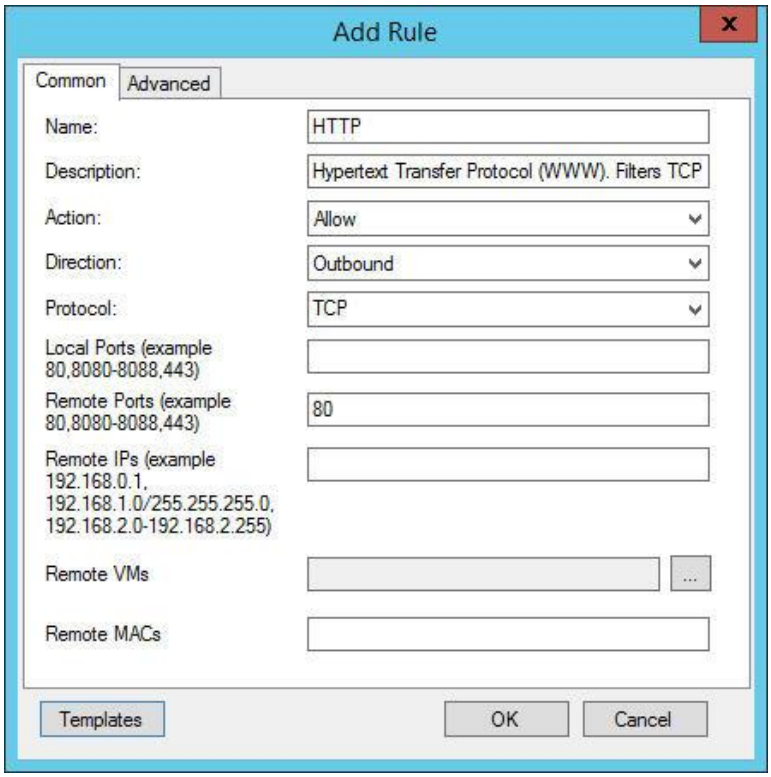
HTTP

To allow HTTP access on the VM, the following rules must be added:

- ARP rule allowing any ARP traffic on the VM
- Default gateway rule to the network default gateway IP address as it is set on your IP configuration. This will automatically add IP, ARP and Broadcast (UDP) rules to default gateway on the target VM.
- If the default gateway and the DNS Server have different IP addresses, an additional IP rule for DNS should be created allowing outbound UDP traffic on remote port 53.



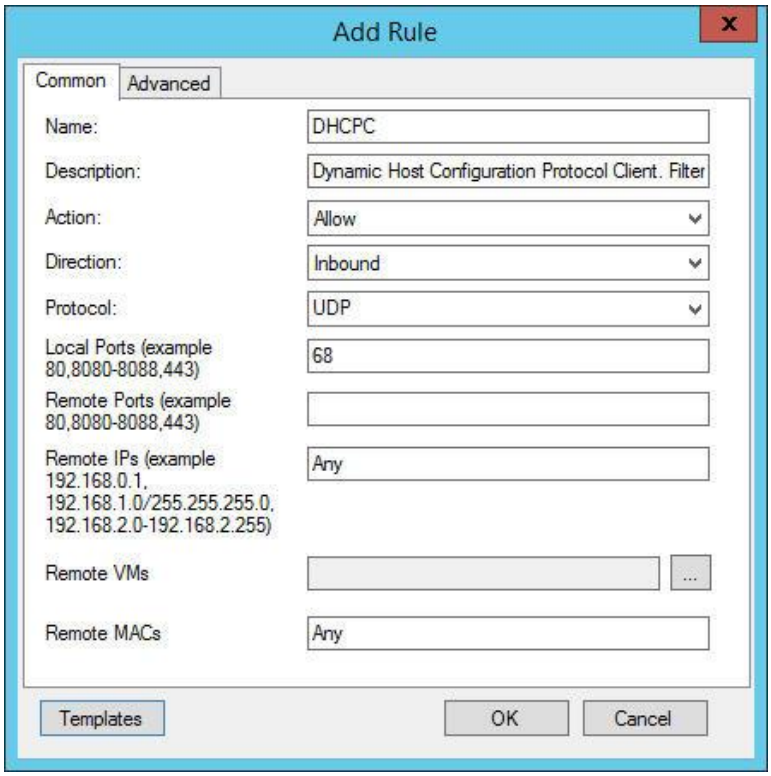
- IP rule allowing outbound TCP traffic on remote port 80 to allow HTTP access:



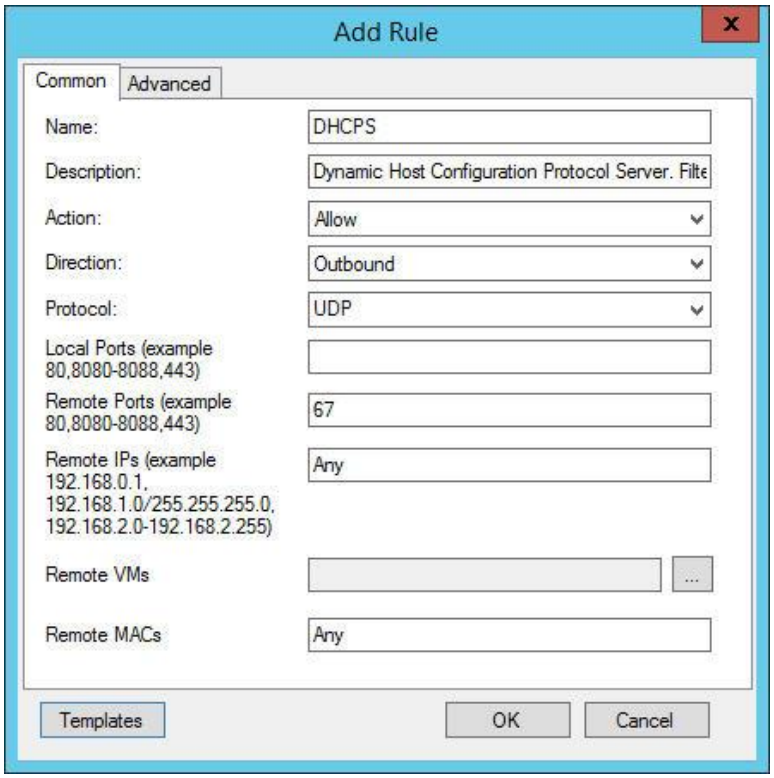
DHCP

To allow dynamic host configuration function on the VM, the following rules must be added:

- IP rule allowing inbound UDP traffic on local port 68 for DHCP client



- IP rule allowing outbound UDP traffic on remote port 67 for request to DHCP server



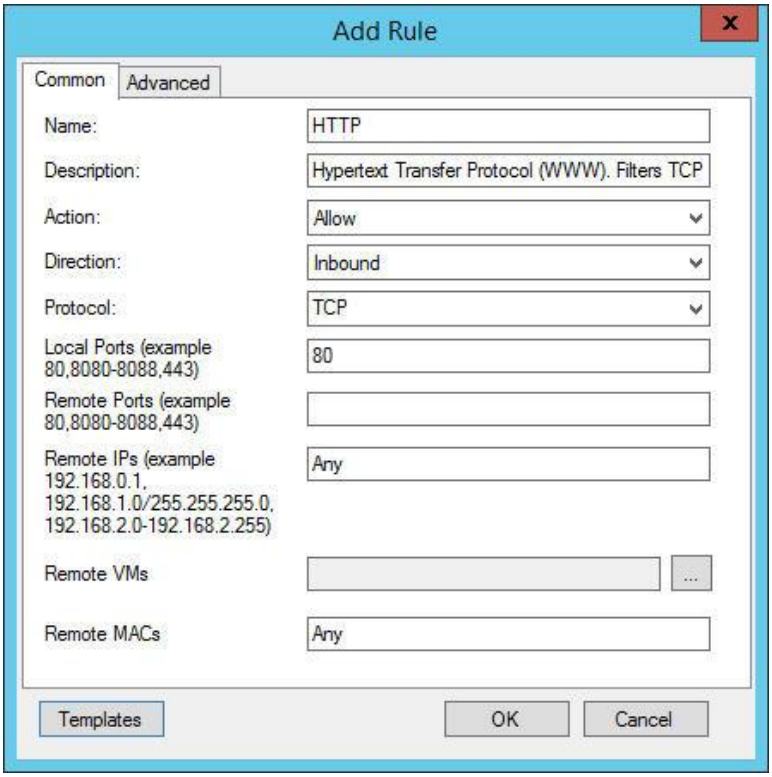
This is necessary when the VM gets its IP configuration dynamically through DHCP server, when resolving IP configuration issues if they take place on the target VM and when you have to renew the VM's IP configuration through DHCP.

IIS

To allow the necessary access on the VM that is a Web server, the following rules must be added:

- ARP rule allowing any ARP traffic on the VM;

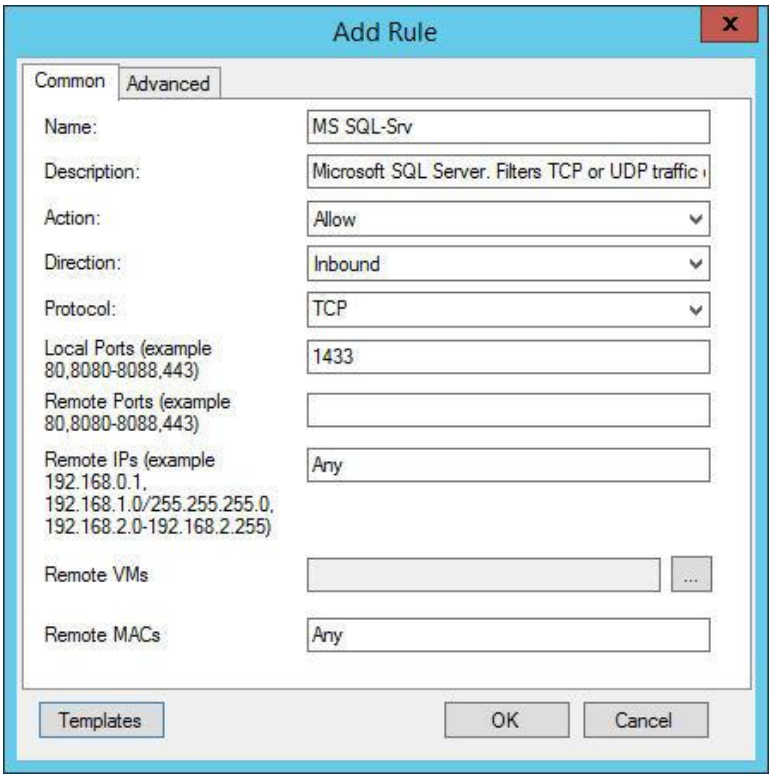
- IP rule allowing TCP traffic on local port 80 to allow HTTP access to the web server:



MS SQL Server

To allow the necessary access on the VM that is a Web server, the following rules must be added:

- ARP rule allowing any ARP traffic on the VM;
- IP rule allowing TCP traffic on local port 1433:



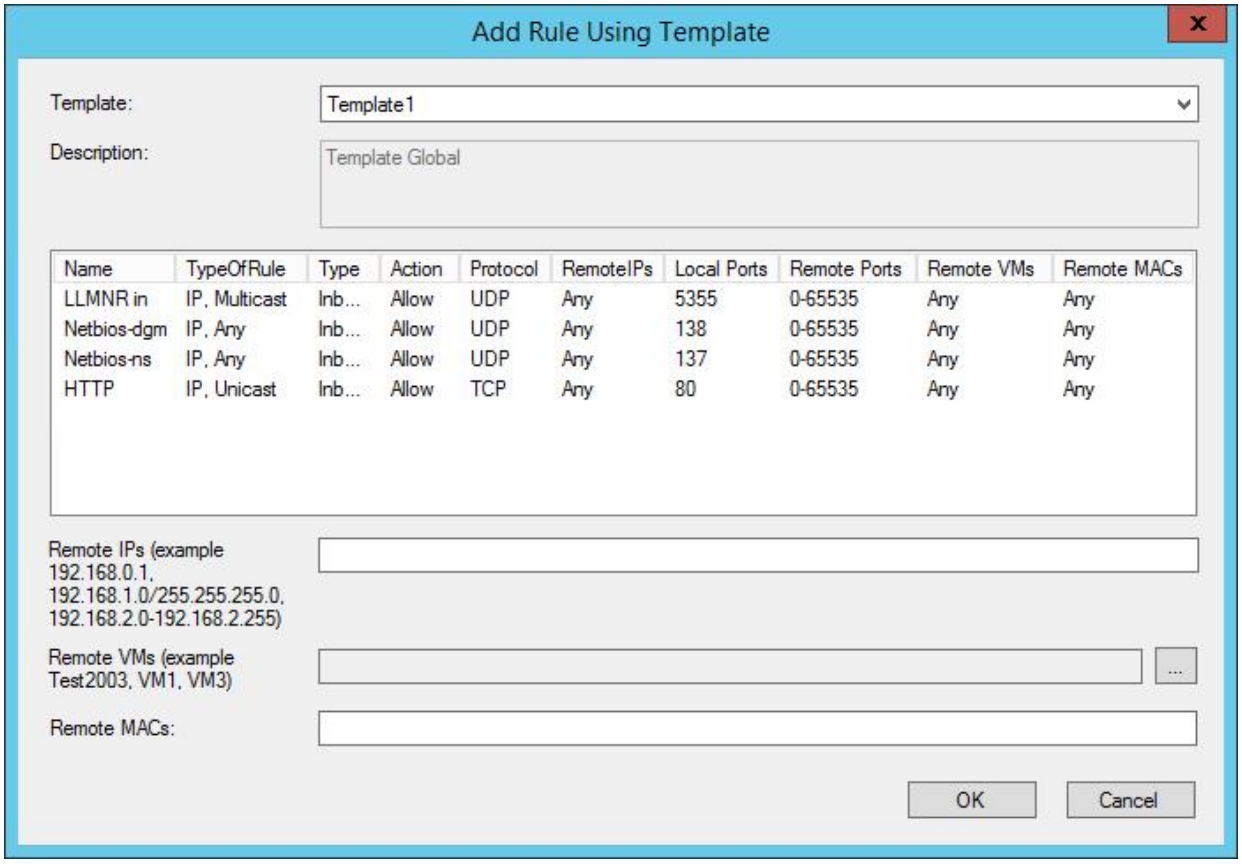
Note. *If a* VM *is MS SQL client, you should create a rule allowing TCP traffic on remote port 1433 so that the VM-client is able to communicate with VM – MS SQL server.*

Applying a user-defined rules template

To apply a user-defined rules template, select one of the following entities in the object tree:

- All VMs default group to apply a template to all virtual machines. The global administrator is the only user that is able to do this.
- Previously created user-defined security group to apply a template to the members of this group.
- Virtual machine to apply a template to a single VM.

Then click **Rules – Add Rule Using Template** main menu command or **Use Template** main panel button. The **Add Rule Using Template** window will appear:



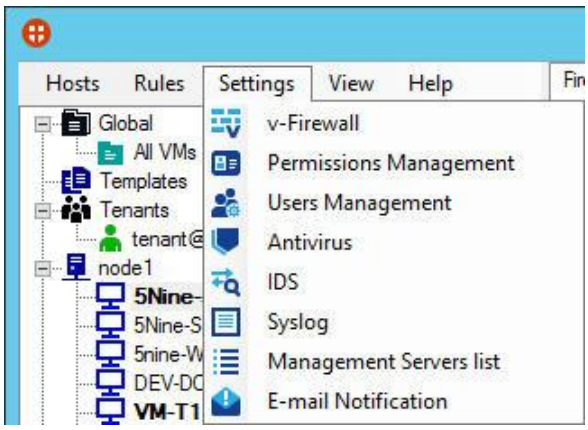
- Select the necessary template from the **Template** list. You will see the set of rules added into the template in the field next to the template description.
- If necessary, alter remote system parameters for the rules: remote IPs, Remote VMs and/or Remote MACs.

> **Note.** *The rules may already contain remote system parameters in themselves. If you set the new ones here before applying the template – they will overwrite those that had been set in the rules. This will happen at this time only, when the template is applied to the object. Template itself will keep its previous settings.*

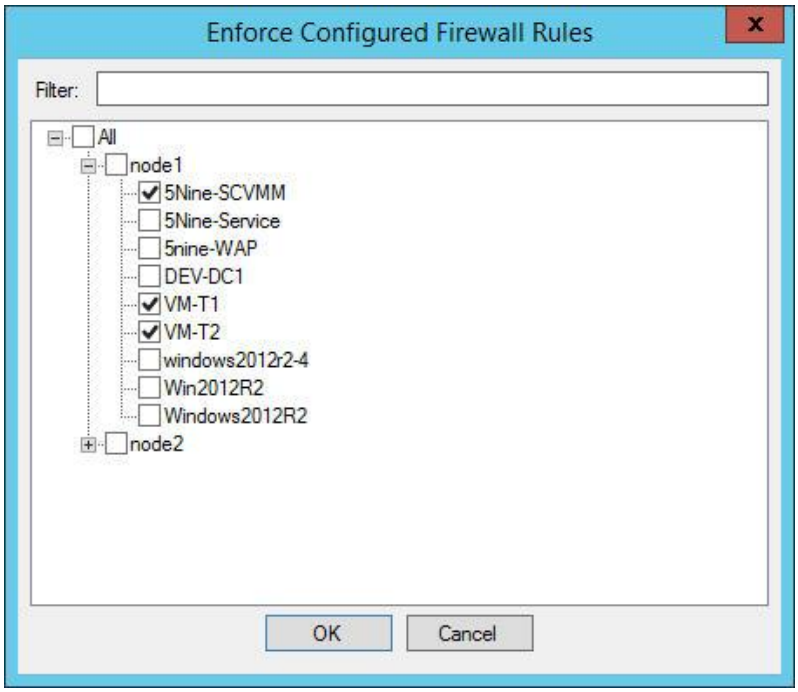
Click **OK** to apply the selected template. The rules will be added to the object's rules list.

Setting virtual firewall

To set virtual firewall select **Settings – v-Firewall**. menu command:



Specify which VMs will be set on virtual firewall protection in the **Enforce Configured Firewall Rules** dialog box:

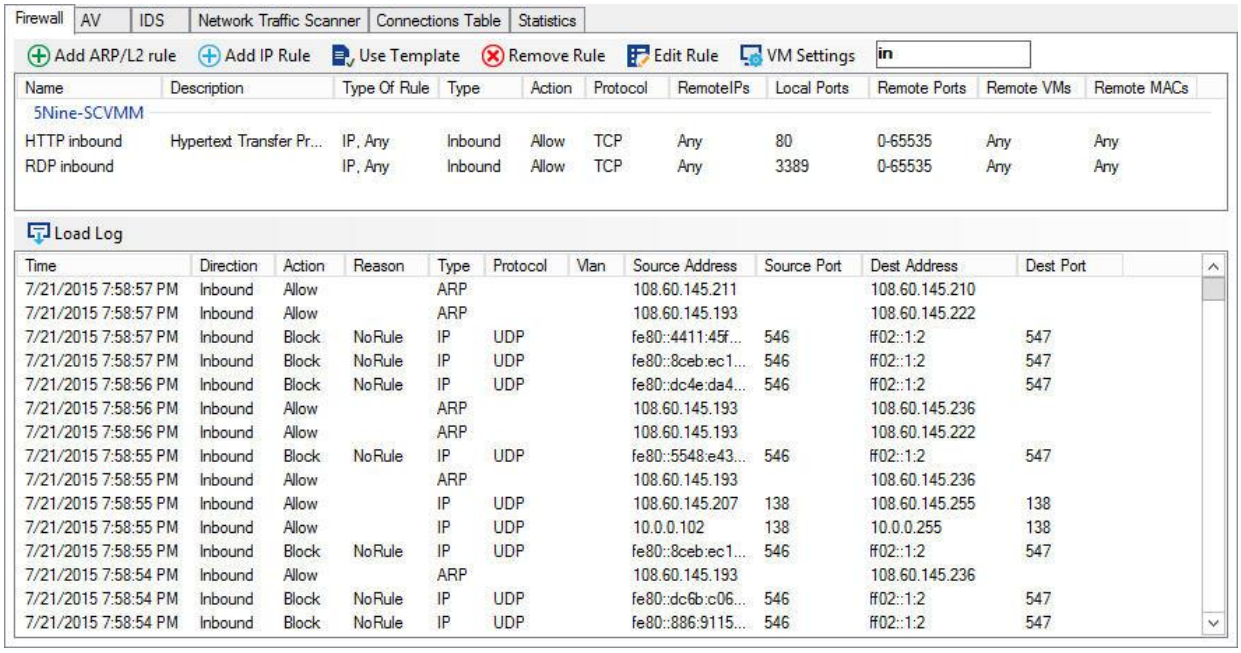


Check the boxes for the VMs that you want to remove from monitoring. Type the symbols which a VM name must contain into the **Filter** field to filter the tree. Those VMs that have been pre-selected will not be filtered off the tree even if they do not match the filtering criteria. Click **OK**. Then confirm to the system warning – only traffic allowed by the rules will go through from this moment on these VMs.

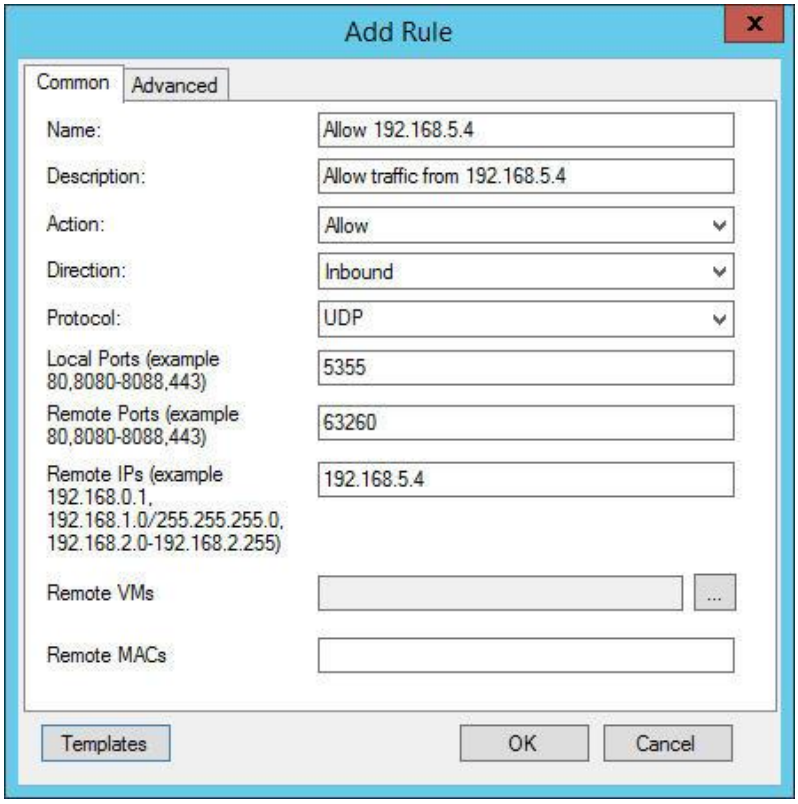
To set a particular VM on virtual firewall protection, select the necessary VM and click **vFirewall** context menu command and confirm to the system warning. Use the same command to remove the VM from virtual firewall protection.

View virtual firewall log records

To view current virtual firewall log records for the selected virtual machine, click **Load Log** on the **Firewall** tab of the program main window. The log records will display in the lower part of the main window:



You can create context rule directly from this log. To do so, select the necessary record and then use the **Add rule** context menu command. You will be offered to add the new firewall rule of the opposite action to the selected record, e.g. if it was blocked packet, you will be offered to add the corresponding allowing rule:



As it's shown on the picture, you are advised to allow inbound traffic from certain IP address on certain UDP port in accordance with the firewall log record the rule creation was initiated from. You are still able to alter the rule parameters in the standard way as it is described above in the 'Setting virtual firewall rules' section.

Antivirus

There are two basic ways in which 5nine Cloud Security antivirus works:

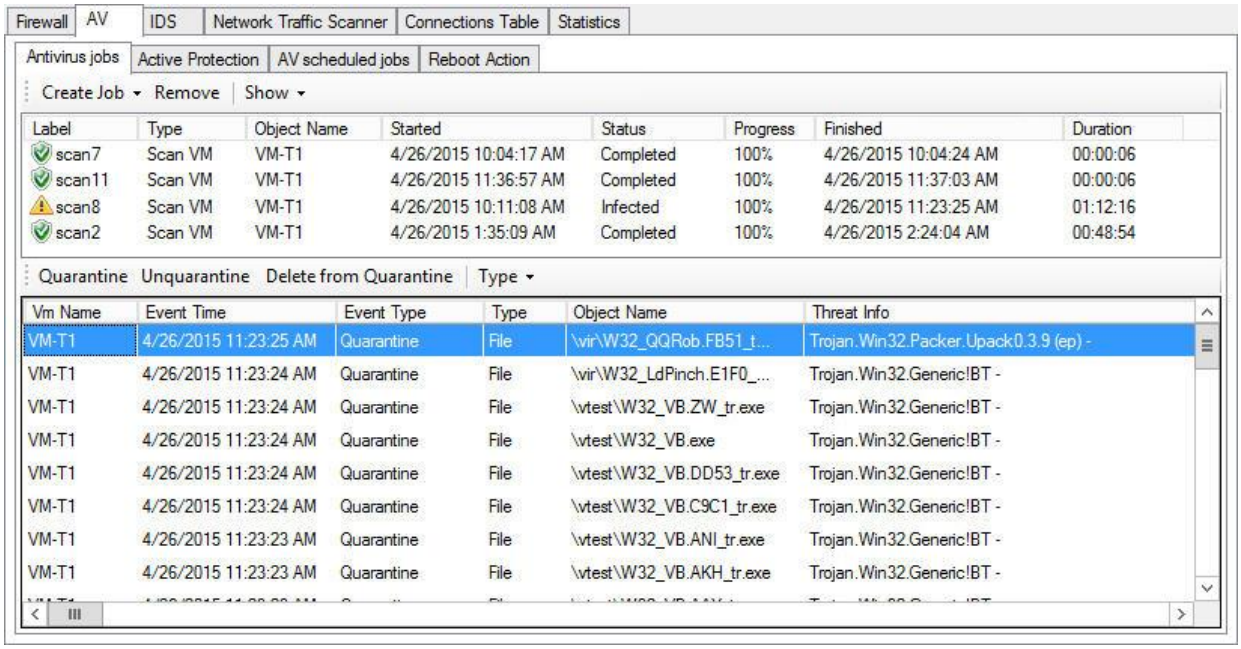
- Agentless antivirus:
  - Immediate anti-malware scans
  - Recurrent anti-malware scans by user-defined schedules
  - Delayed one-time anti-malware scans

  Agentless antivirus function is job-based – all these scan types are initiated via the same antivirus wizard.

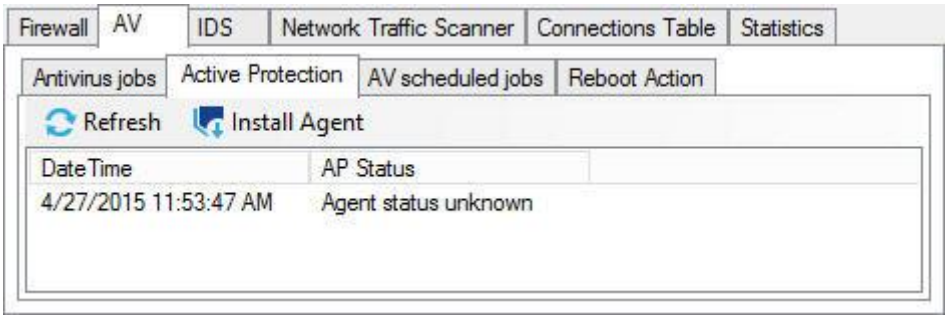
- Active protection. Agent-based real time virtual machine protection, including on-access file control.

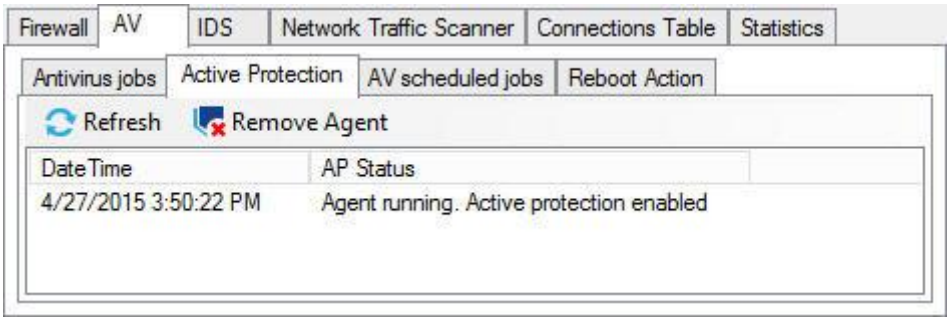
Network traffic scanner that in the current version of 5nine Cloud Security is represented as agentless protection for http traffic is also considered a part of antivirus function. It is described in "Network traffic scanner" section. Malicious files that were occasionally downloaded via http and have been detected by network traffic scanner then can be quarantined either by agentless anti-malware scan or active protection agent. In the last case it will be done immediately upon downloading such file.

All agentless antivirus activity is controlled on the **AV** tab of the main 5nine Cloud Security window:



Active protection agent activity is shown on the **Active Protection** tab:





See "Active protection" below for a description of the controls that are used to operate the active protection agent and get the results.

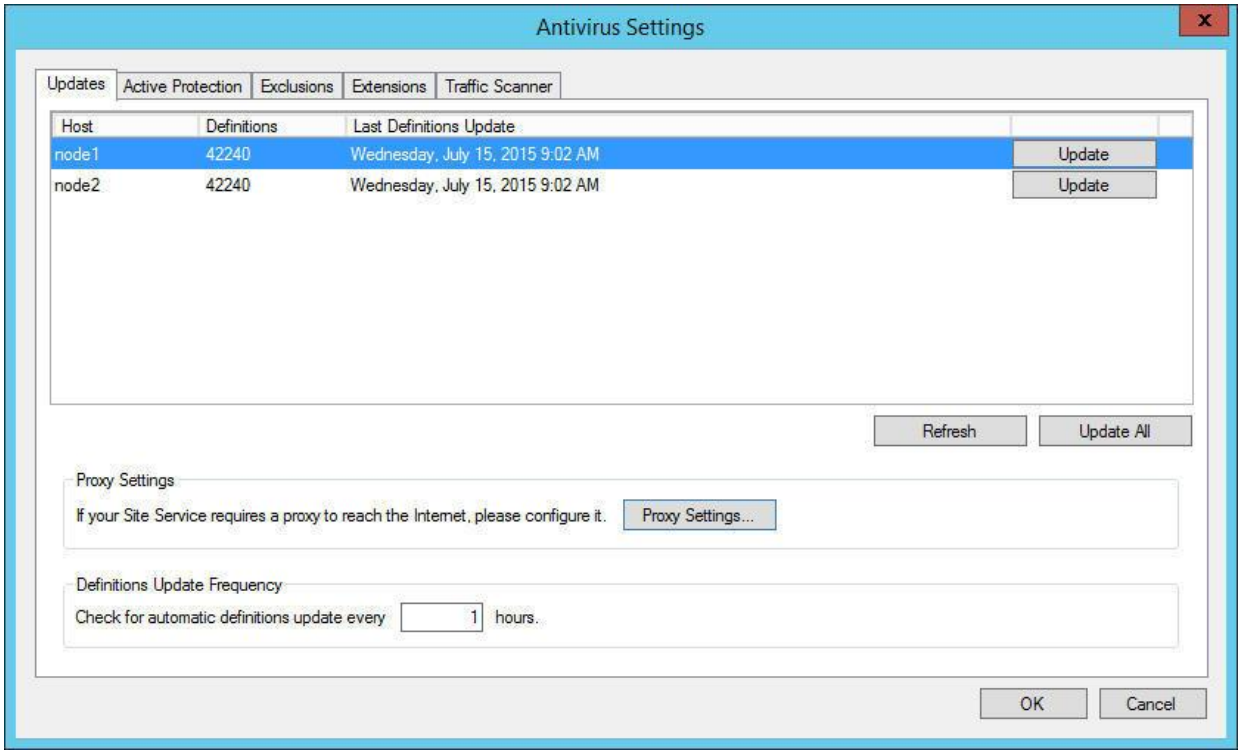
Antivirus and active protection settings

5nine Cloud Security antivirus function depends on pre-defined settings. You can change these settings if you are working under a user with sufficient privileges. That means the user must be set with *Security Administrator* role enabled. Please, refer to the "Users management and tenants" section above for more information.

To alter antivirus and active protection settings use the **Settings – Antivirus** main menu command. All settings are done in the **Antivirus Settings** window.

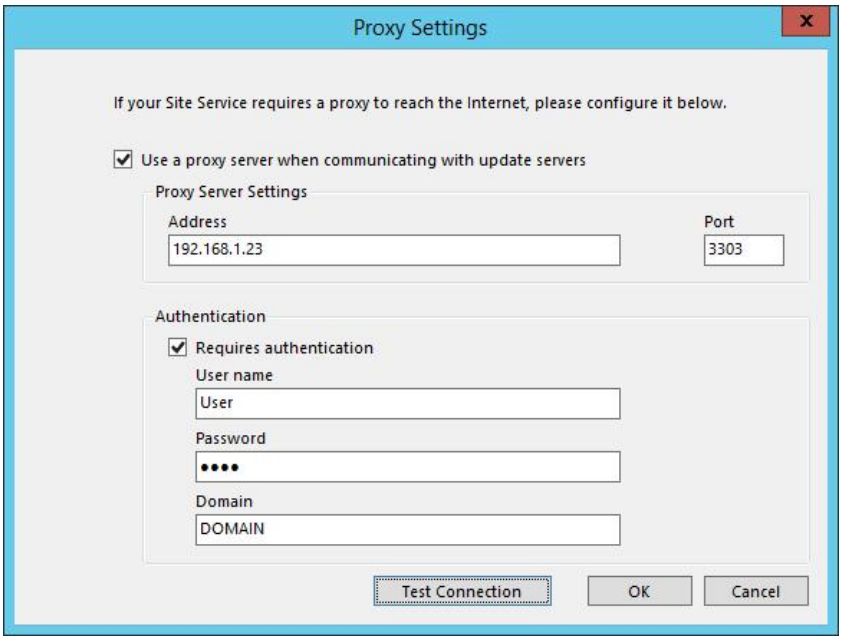
Antivirus updates

To set antivirus updates select the **Updates** tab:



Here you can do the following:

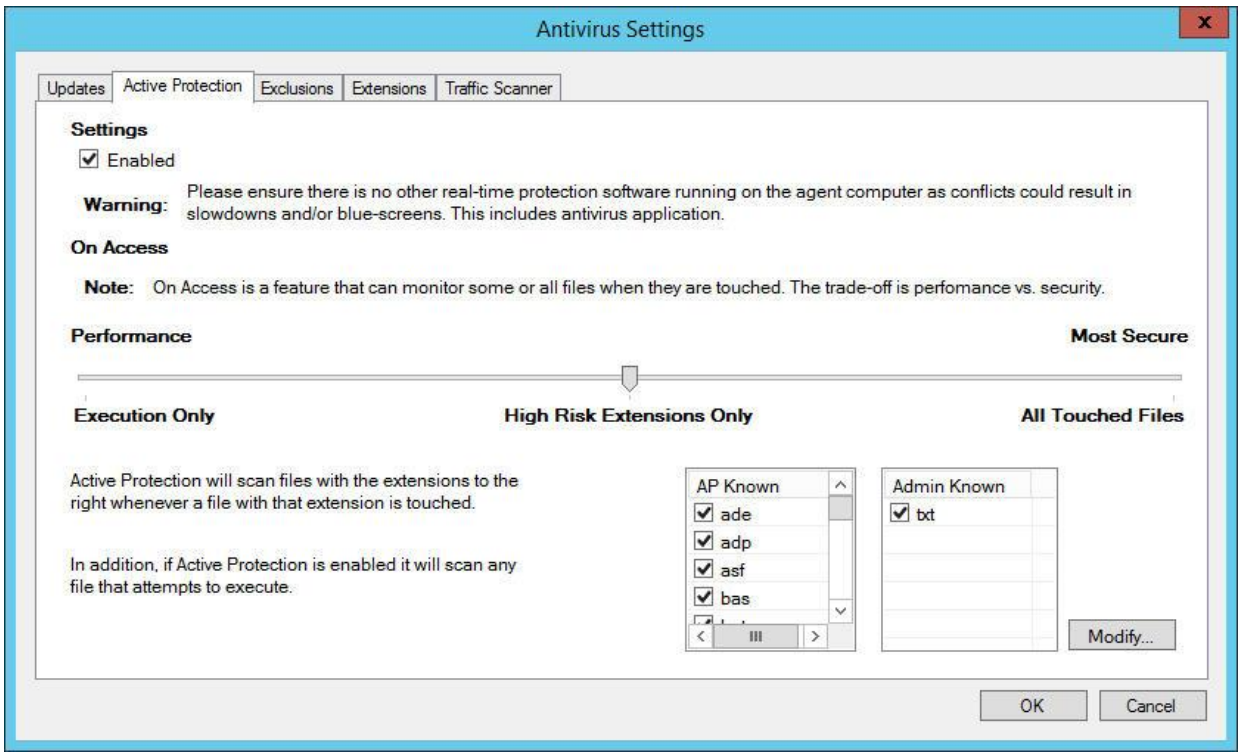
- Check the last definitions update info per each host;
- Manually evoke immediate definitions update by clicking the **Update** button for a particular host or the **Update All** button to perform update for all hosts;
- Configure the proxy server by clicking the **Proxy Settings...** button:



- Set the automatic definitions update frequency in minutes.

Active protection settings

To set parameters for the virtual machines real time anti-malware protection and active protection agent behavior options, select the **Active Protection** tab:



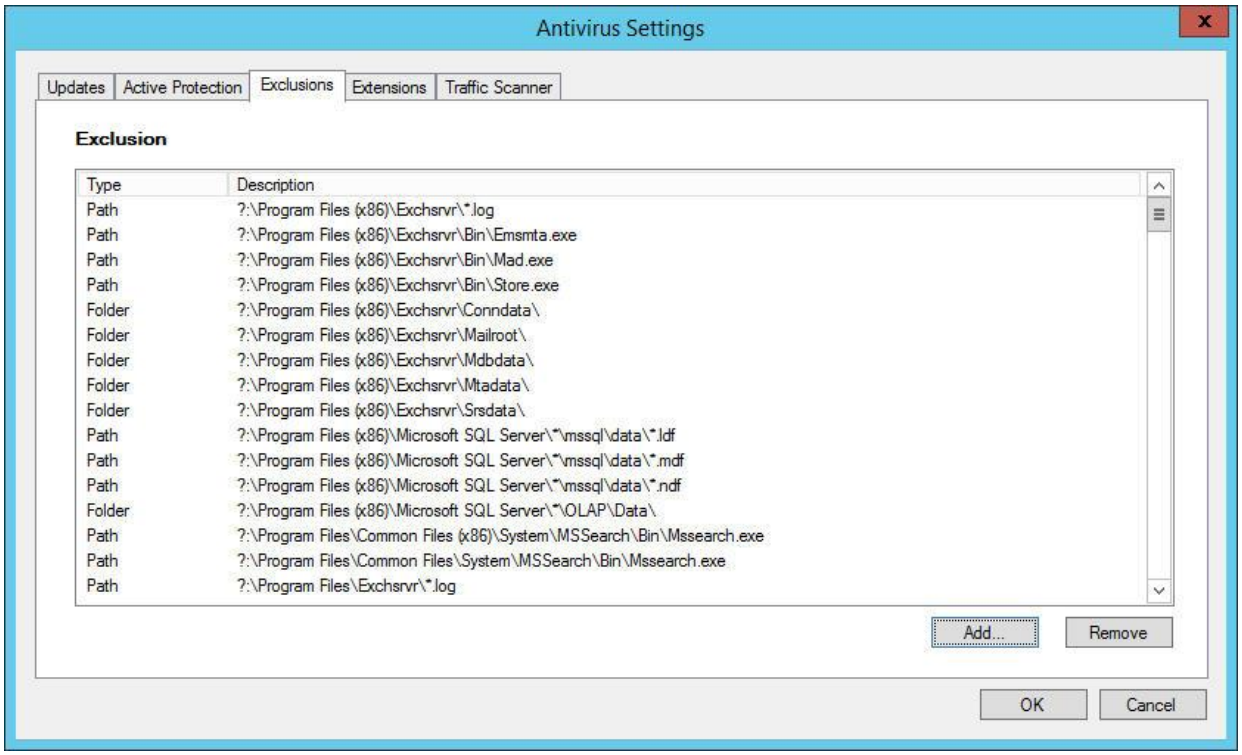
- Check **Enabled** under Settings to enable active protection on virtual machines; this is the default setting. Active protection will be immediately activated on those virtual machines where active protection agent is installed. Refer to the "Active protection" section for more information. If you need to disable active protection, deselect this box and active protection agent will immediately stop working.
- Move the On Access slider to one of the three positions:
  - *Execution Only*– the least resource consuming, but also the least secure. Active Protection agent will scan files when they attempt to execute. Malware could already be copied to the virtual machine and will not be caught by active protection until the malware attempts to execute if protection is enabled as described above.
  - *High Risk Extensions Only*– active protection will scan files with the known extensions (shown to the right) whenever these files are touched. Active protection will also scan any file that attempts to execute if protection is enabled as described above.

- *All Touched Files*– active protection will scan any file each time it is touched. Active protection will also scan any file that attempts to execute if protection is enabled as described above. This mode is the most resource consuming, but also the most secure.

- Review the known extensions in *AP Known/Admin Known* lists. Check the boxes of each extension to enable or disable active protection. The same operations are made under the **Extensions** tab as described below. The **Modify** button will take you there.

Exclusions

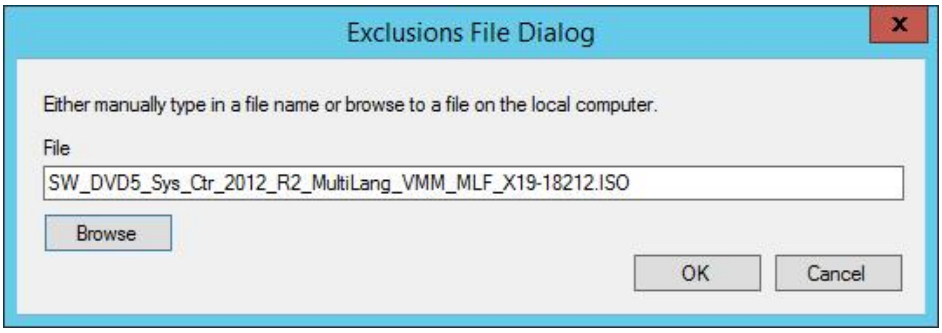
The **Exclusions** tab allows you to specify the files and folders (with destinations if needed) on the host that will be excluded from anti-malware protection and allowed on your system:



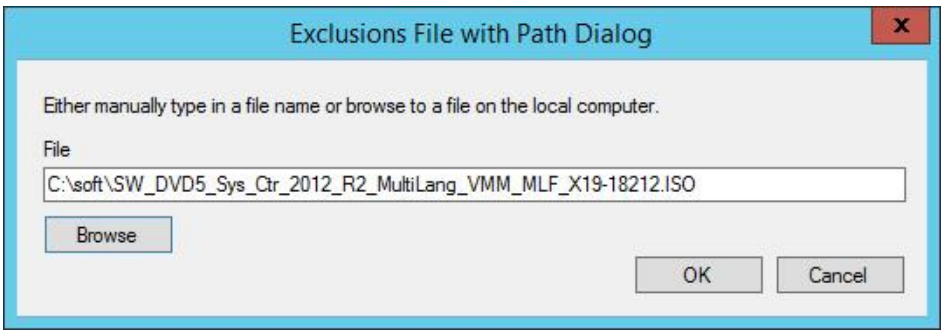
Note: *The files, destinations and folders can be added to the exclusions list either from the host file system or the VM internal file system, as it works for both VM and host. If you add entries from the VM internal file system, you can only type them directly into the dialog boxes as described below. If you add them from the host file system, you can either type them in directly or browse for them as described below.*

To add a file, destination or folder to the exclusions list, click **Add** and use the appropriate command:

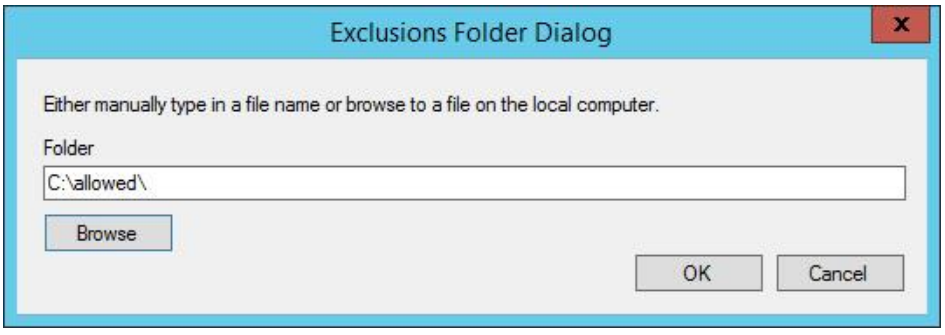
- *Add File* – select and add a single file to the exclusions list. Enter the file name directly or select **Browse** to search for the file.



- *Add File with Path* – select and add a single file with its destination to the exclusions list. Enter the full path to the file directly or select **Browse** to search for the file.



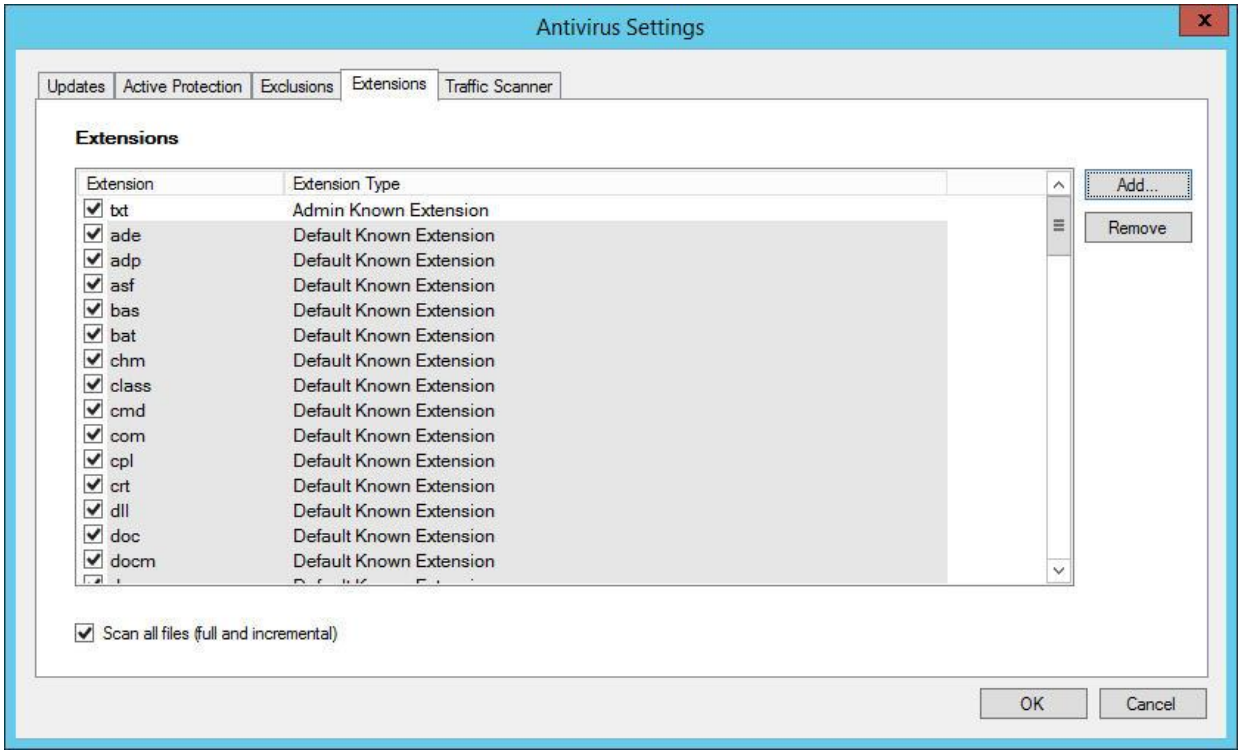
- *Add Folder* – select and add a folder to the exclusions list. Enter the path to the folder directly or select **Browse** to search for the file.



To remove a file, destination or a folder from the exclusions list, select it and then click **Remove**.

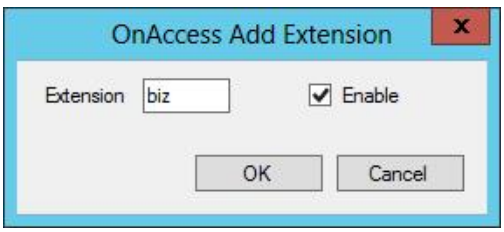
Extensions

The **Extensions** tab allows you to specify the file name extensions that will either be included or excluded from the anti-malware active protection. It will also determine whether or not the files of all the kinds should be included in the regular anti-malware scan.



There is a set of pre-defined known extensions on this tab. You can apply changes to it by:

- Clearing the check box to the left of each extension to exclude this file type from the anti-malware active protection and regular anti-malware scans;
- Checking the box to the left of each extension to include this file type in the anti-malware active protection and regular anti-malware scans;
- Adding the new 'admin known' extension for a certain file type. To add the extension, click **Add** and fill in the dialog box as shown below.



  - ➢ Enter the extension in the Extension field.
  - ➢ Check the **Enable** box to enable active protection for the files with this extension. Leave the box empty to disable active protection.

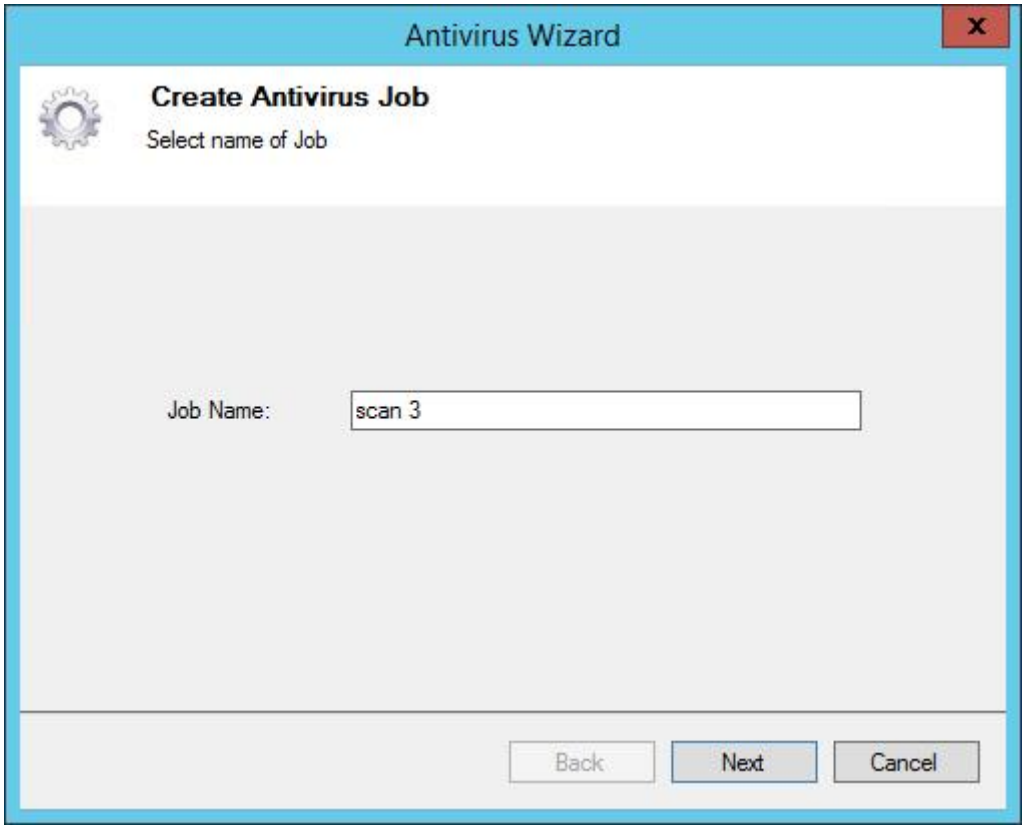
➢ Click **OK**.

- Select the extension and click **Remove** to remove it from the list of known extensions.

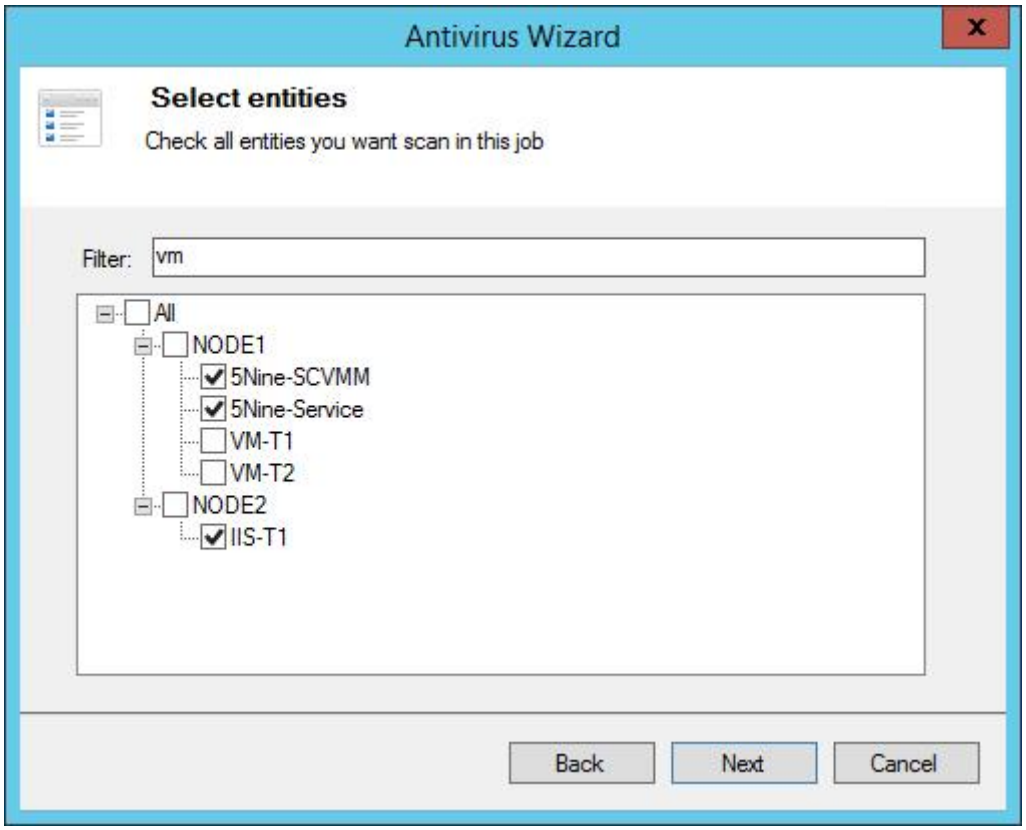
Check the **Scan all files (full and incremental)** box to include all file types in regular anti-malware scans. Leave it clear to let the internal antivirus mechanism decide which files to scan. Click **OK** in the Antivirus Settings dialog box when all the settings are complete.

Creating antivirus job

To create an antivirus job run Antivirus Wizard by pushing the **Create Job** button on the left side of the upper window command panel either staying on **Antivirus jobs** or **AV scheduled jobs** tabs and select which job to start **Scan Host** or **Scan VMs**.

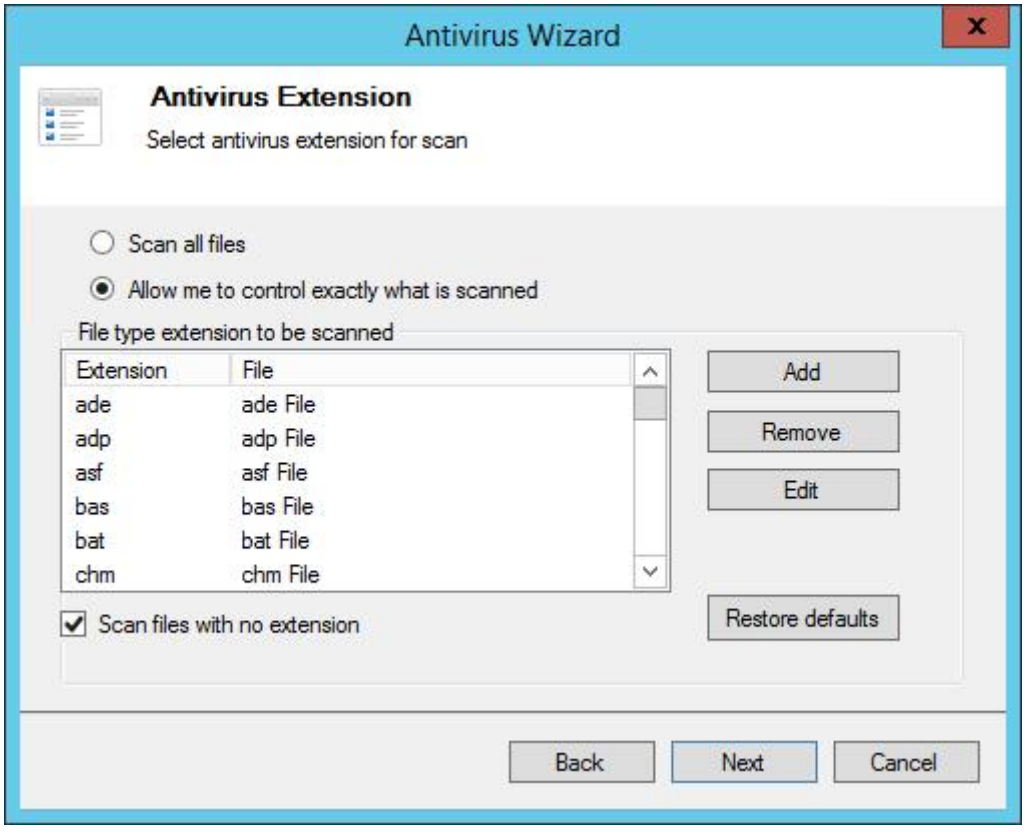


Name the job and click Next. Then select the entities to be scanned:



Mark objects to include in the job. Use filter for convenience. Click Next.

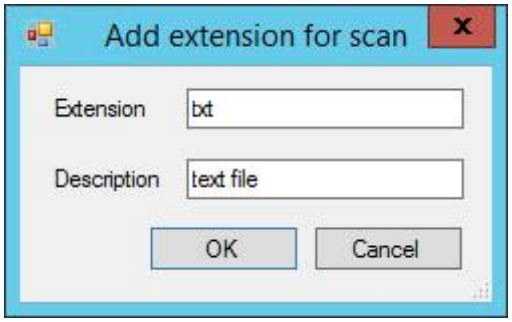
Select file types for the scan:



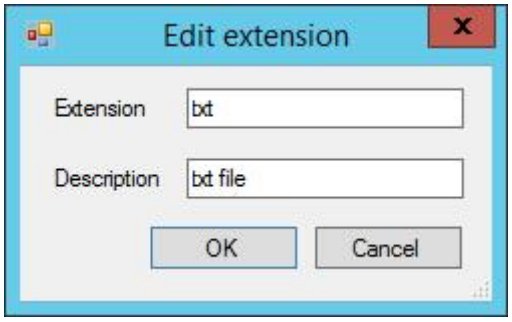
Here you have two options:

- *Scan all files* – all files on the virtual machine will be checked.
- *Allow me to control exactly what is scanned* (default option) – only certain types of files which extensions are added to the list will be checked. There is the default list of file types which is recommended to be used. However, you are able to edit it by adding or removing file extensions from this list. Push the **Add** or **Remove** buttons to add or remove the extensions.

Add the file extension and its description in the dialog below, and then click **Ok**:

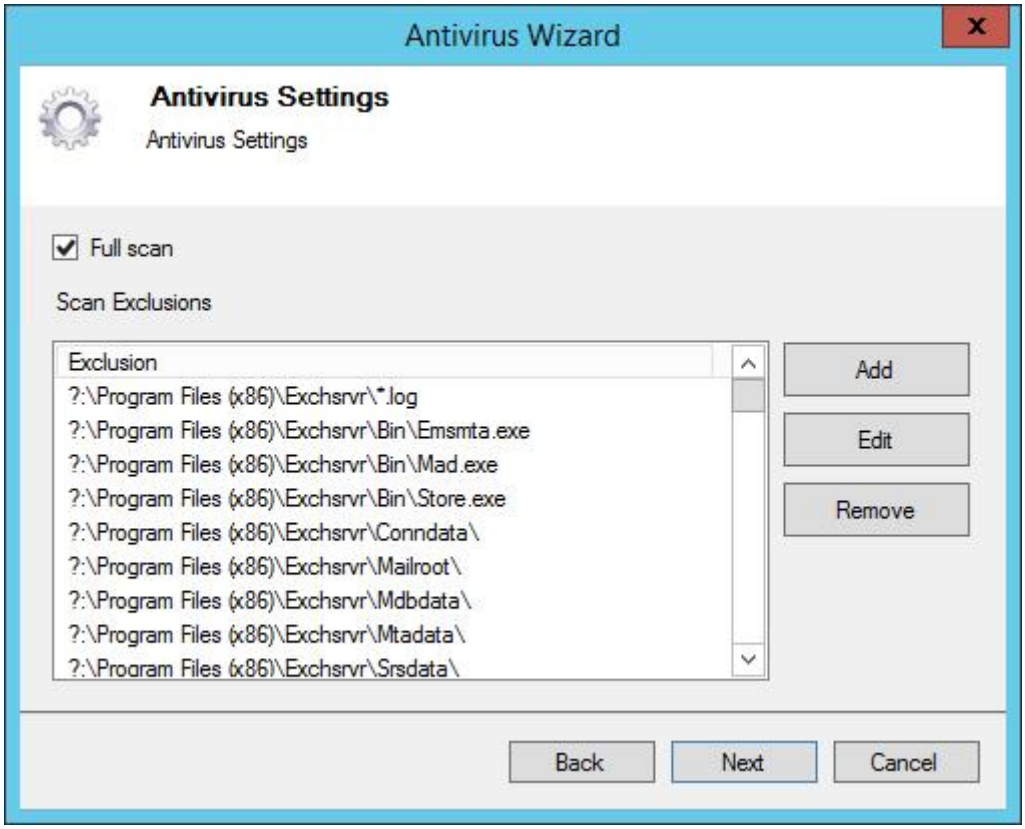


To edit the already added extension, find it in the list, then click the **Edit** button and do the same actions as above in the **Edit extension** dialog:



To include the files without extensions in the scanning process, enable the **Scan files with no extensions** option (disabled by default). To restore the default settings push **Restore defaults** button.

Set the location in the guest OS that will be excluded from the scan and specify if the full scan should be done forcefully:



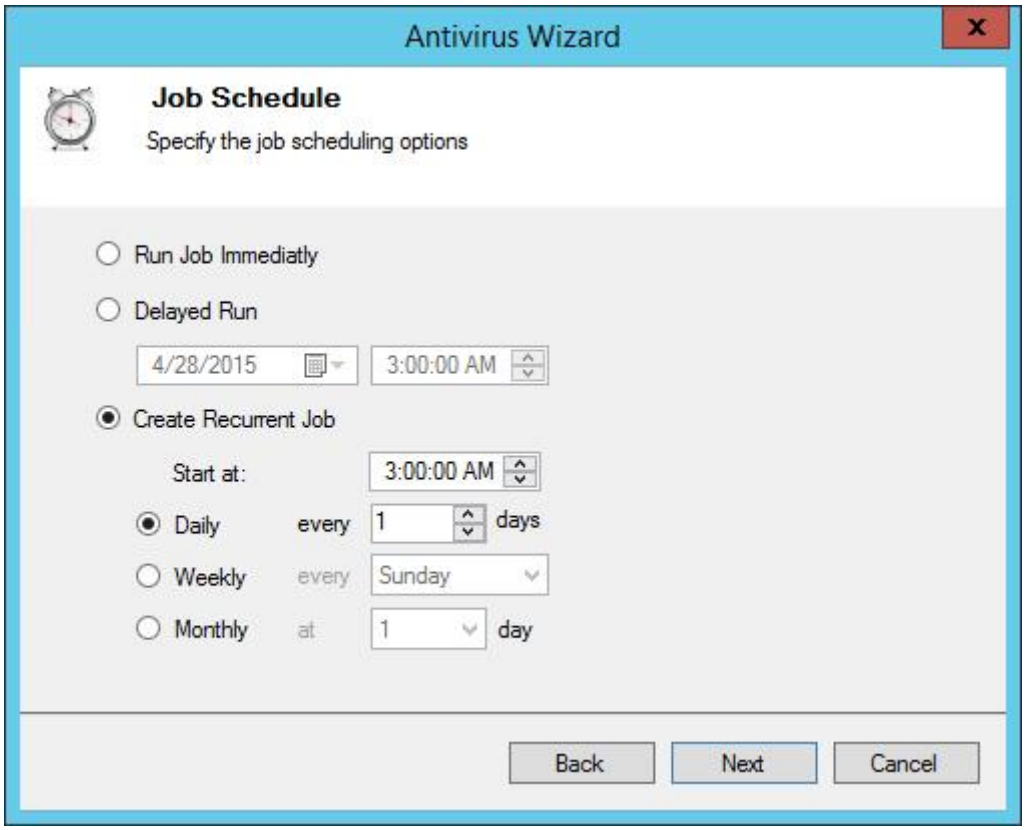
- Mark the **Full scan** box to force full scan regardless of CBT data. If it's left clear then CBT data will be taken into account and the scan type will be set in accordance with it for each VM – full scan for the first time scan and incremental for subsequent scans.
- Click the **Add** button to add the new location and enter the path manually in the following dialog:

  Click OK.

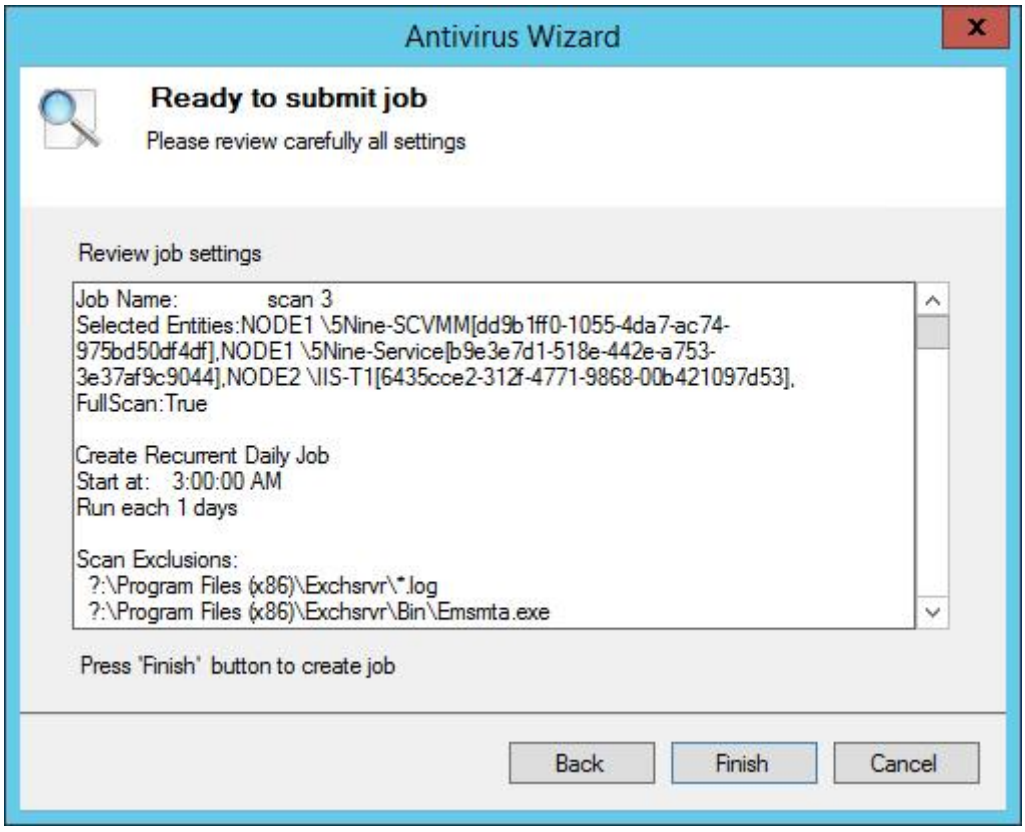
- Click the **Edit** button and do the same action as above for editing the existing location.
- Click the **Remove** button to remove the existing location from exclusions list.

Click Next.

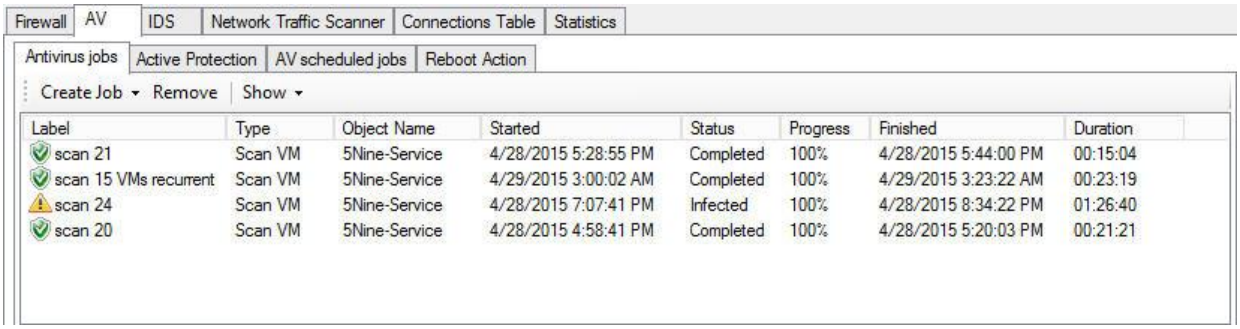
Set the job schedule:



Review all settings and submit the new job:



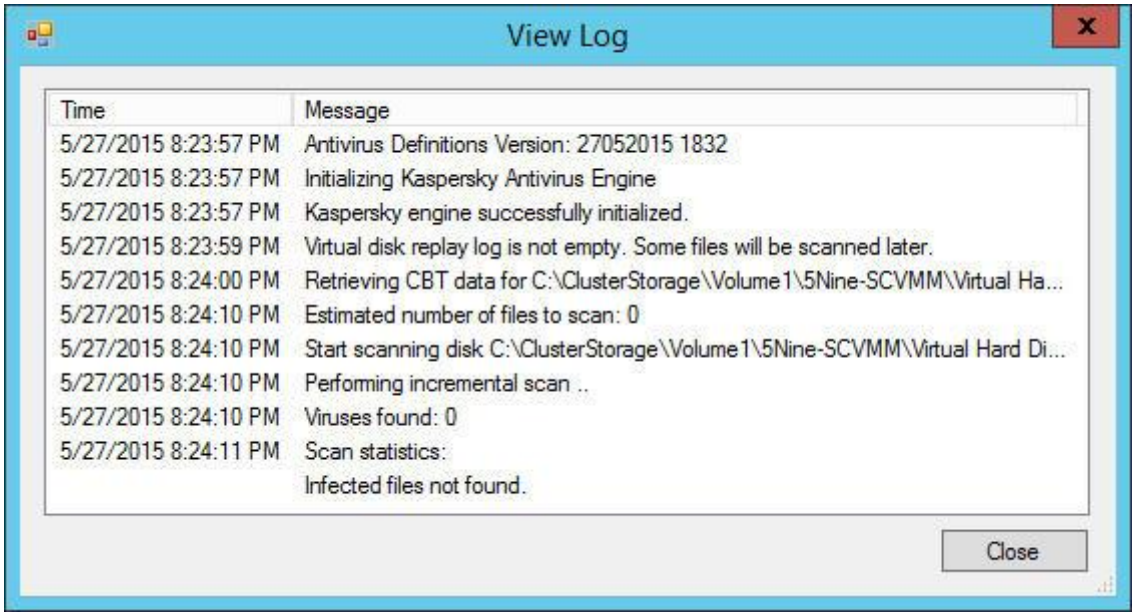
The job will appear in the **Antivirus jobs** tab if the job runs immediately and in the **AV scheduled jobs** tab if it is scheduled or deferred job.



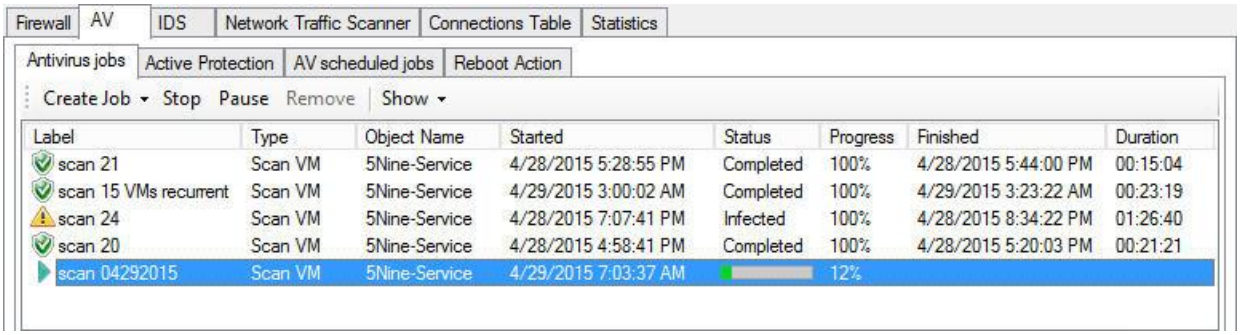
All currently active and already completed jobs are shown in the **Antivirus jobs** tab for the particular VM that is selected in the tree. If the host is selected in the tree, then all host scanning jobs and all jobs for VMs seating on the host and ever been scanned will be shown. To filter jobs by date select the **Show** filter options:

- *Last day* (default) – to show jobs occurred in the last day;
- *Last 7 days* – to show jobs occurred in the last 7 days;
- *Last 30 days* – to show jobs occurred in the last 30 days.

To view log of the particular antivirus job, double click it:

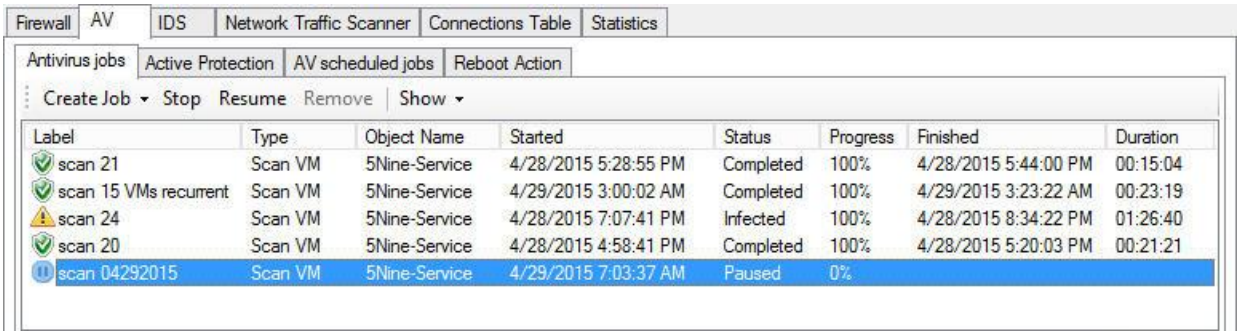


When the job is currently in progress, completeness percentage will be available with ability to pause, resume or stop (interrupt) the scan:



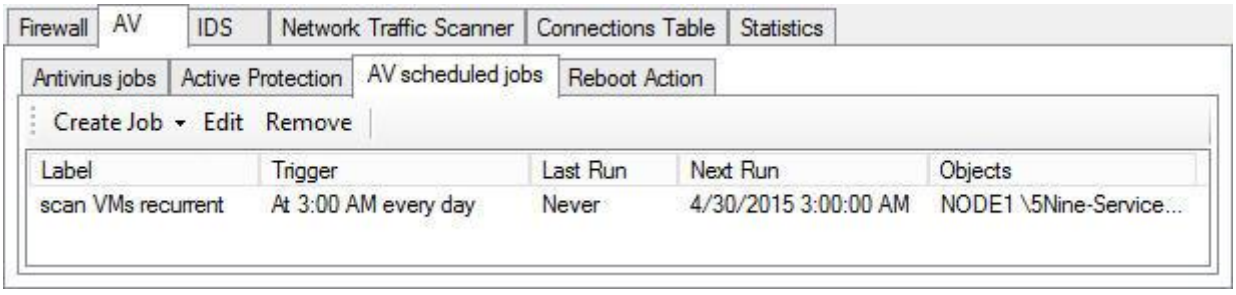
- To pause the scan, select the job that currently in progress and click the **Pause** button.

- To resume the paused scan, select the job on pause and click the **Resume** button.



- To interrupt the scan, select the job that currently in progress and click the **Stop** button.

All deferred and scheduled jobs are displayed in the **AV scheduled jobs** tab:



- To edit the existing job, select the job and click the **Edit** button – the same Antivirus Wizard will be opened as when creating the new job.

- To create the new job, click the **Create Job** button and select the necessary item – **Scan VMs** or **Scan host**. Then follow the procedure described above.

- To remove the job, select it and click the **Remove** button.

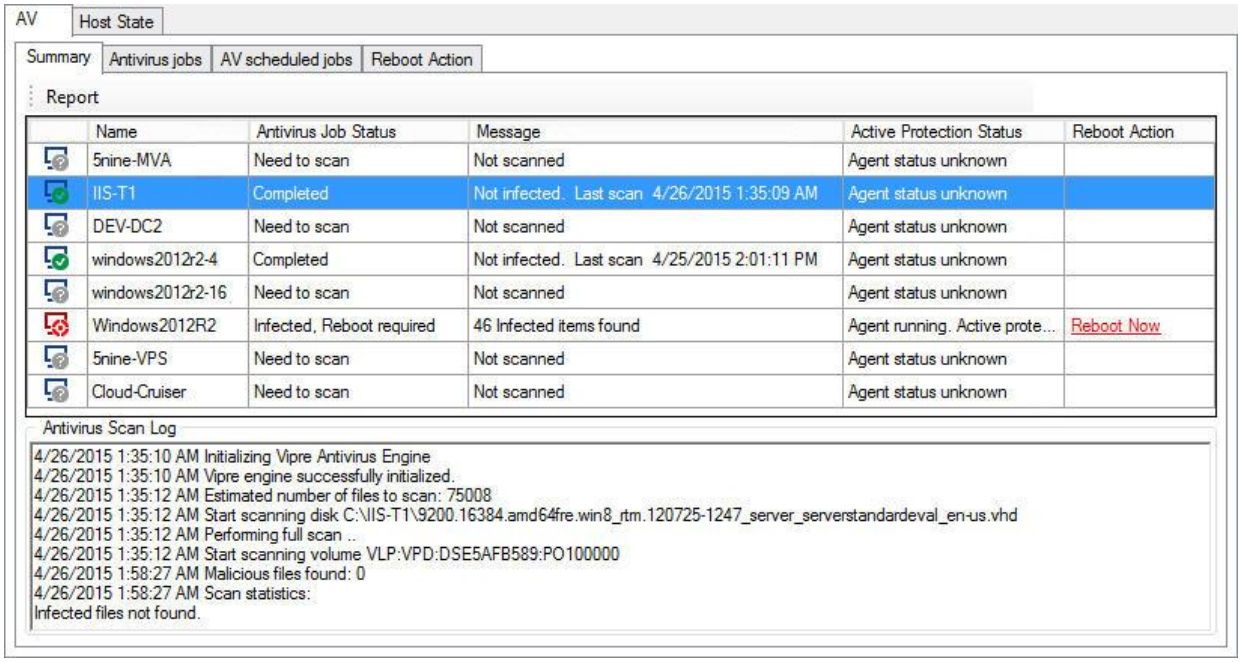
Note: *Each time malware is found on the virtual machine during any regular scan, the threats are moved to the designated quarantine folder inside guest OS. This requires rebooting of the target virtual machine. If malware is found on a particular virtual machine, the VM gets 'Reboot Required' status. It is then up to user when to reboot the target virtual machine. Please refer to the 'Quarantine' and 'Reboot action' subsections below for more information.*

Email notifications are available to inform admins about malware events detected during agentless antivirus scan. Please refer to the 'Notifications' subsection below for details.

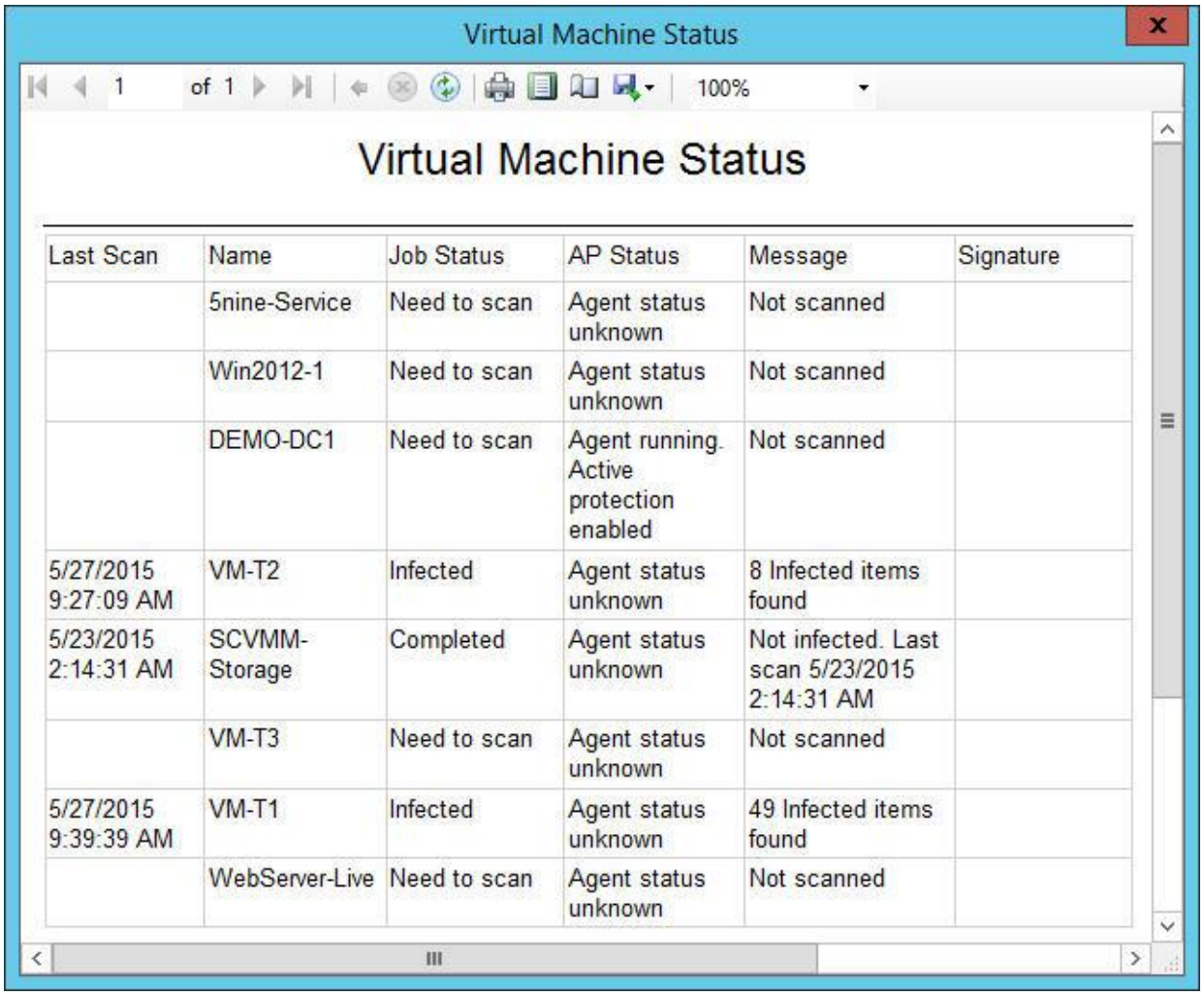
Antivirus status

The full antivirus status view is available for all VMs:

- On the host **AV – Summary** tab when the host is selected in the object tree (will display all VMs that are currently seating on the selected host):



- In the **Virtual Machine Status** window. Use the **View – Antivirus Status** main menu command to open this window (will display all VMs that are currently seating on the selected host):



Last Scan	Name	Job Status	AP Status	Message	Signature
	5nine-Service	Need to scan	Agent status unknown	Not scanned	
	Win2012-1	Need to scan	Agent status unknown	Not scanned	
	DEMO-DC1	Need to scan	Agent running. Active protection enabled	Not scanned	
5/27/2015 9:27:09 AM	VM-T2	Infected	Agent status unknown	8 Infected items found	
5/23/2015 2:14:31 AM	SCVMM-Storage	Completed	Agent status unknown	Not infected. Last scan 5/23/2015 2:14:31 AM	
	VM-T3	Need to scan	Agent status unknown	Not scanned	
5/27/2015 9:39:39 AM	VM-T1	Infected	Agent status unknown	49 Infected items found	
	WebServer-Live	Need to scan	Agent status unknown	Not scanned	

Here you can get the following information:

- Last scan date and time.
- VM name.
- Antivirus job status.
- Active protection status.
- Message – last scan brief result (if it has ever occurred).
- Signature.

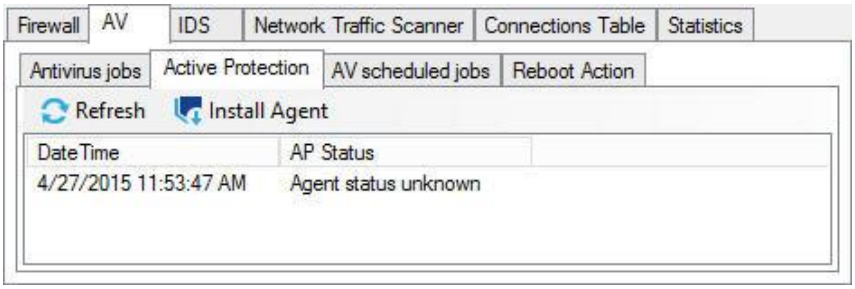
From this window, using standard controls in the top menu, you can change page layout settings, print the report, or export data to MS Word, MS Excel or PDF file formats.

Active protection

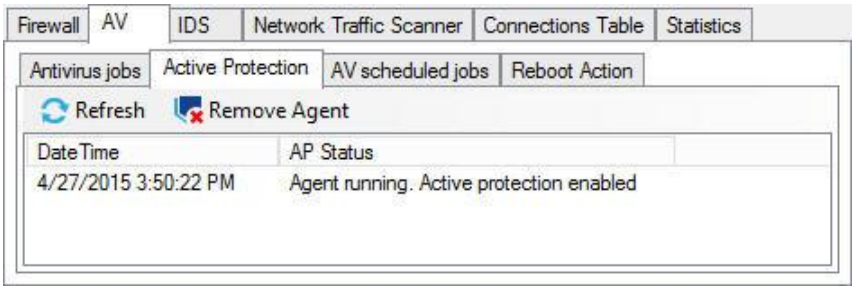
Active protection controls your system in real time by using the active protection agent. This agent should first be installed separately on each virtual machine that needs protection. Go to the **AV** – **Active Protection** tab of 5nine Cloud Security's main window.

5nine Cloud Security automatically detects the presence of the active protection agent on a particular virtual machine. As shown in the pictures above.

If there is no active protection agent installed on the virtual machine, the **Install Agent** button will be available on the **Active Protection** tab:



If the agent is already installed on the virtual machine, the **Remove Agent** button will appear on the **Active Protection** tab instead:



Note: *Make sure there are no other active protection agents or antivirus software active on virtual machines as problems and conflicts may occur.*

- To install the active protection agent on the virtual machine, click **Install Agent** on the **Active Protection** tab. 5nine Cloud Security will evoke AP agent installation onto the current virtual machine.
- To remove the active protection agent from the virtual machine, click **Remove Agent** on the **Active Protection** tab. 5nine Cloud Security will evoke AP agent uninstallation from the current virtual machine.

Note. *Each time you click **Install Agent** or **Remove Agent** buttons, the current virtual machine gets 'Reboot Required' status. The reboot is required to install and remove active protection agent software to/from the guest OS. It is then up to user when to reboot the target virtual machine. Please refer to the 'Reboot action' subsection for more information.*

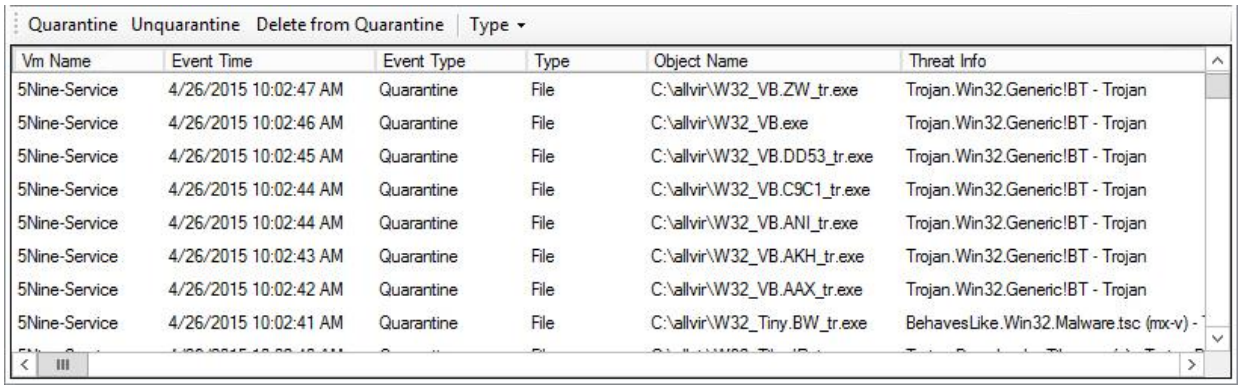
Click **Refresh** to immediately get the current active protection agent status.

Quarantine

All threats that are found and caught by the active protection agent or during agentless anti-malware scan are moved to the designated quarantine folder, located on each virtual machine at the following destination:

- For agentless antivirus: *C:\5nine.QAR*;
- For AP agent: *C:\ProgramData\5nine, Inc\AntiMalware\Quarantine*[2].

All quarantine events are displayed in the **Antivirus jobs** tab in the lower part of the main window:



Vm Name	Event Time	Event Type	Type	Object Name	Threat Info
5Nine-Service	4/26/2015 10:02:47 AM	Quarantine	File	C:\allvir\W32_VB.ZW_tr.exe	Trojan.Win32.Generic!BT - Trojan
5Nine-Service	4/26/2015 10:02:46 AM	Quarantine	File	C:\allvir\W32_VB.exe	Trojan.Win32.Generic!BT - Trojan
5Nine-Service	4/26/2015 10:02:45 AM	Quarantine	File	C:\allvir\W32_VB.DD53_tr.exe	Trojan.Win32.Generic!BT - Trojan
5Nine-Service	4/26/2015 10:02:44 AM	Quarantine	File	C:\allvir\W32_VB.C9C1_tr.exe	Trojan.Win32.Generic!BT - Trojan
5Nine-Service	4/26/2015 10:02:44 AM	Quarantine	File	C:\allvir\W32_VB.ANI_tr.exe	Trojan.Win32.Generic!BT - Trojan
5Nine-Service	4/26/2015 10:02:43 AM	Quarantine	File	C:\allvir\W32_VB.AKH_tr.exe	Trojan.Win32.Generic!BT - Trojan
5Nine-Service	4/26/2015 10:02:42 AM	Quarantine	File	C:\allvir\W32_VB.AAX_tr.exe	Trojan.Win32.Generic!BT - Trojan
5Nine-Service	4/26/2015 10:02:41 AM	Quarantine	File	C:\allvir\W32_Tiny.BW_tr.exe	BehavesLike.Win32.Malware.tsc (mx-v) -

To filter events use the **Type** menu items:

- *All* – to display all events;
- *Antivirus* – display agentless antivirus events;
- *ActiveProtection* – to display active protection agent events.

You can control the threats that are moved to the quarantine folder. You can take the following actions:

- *Unquarantine* threats. This command places the quarantined malware elements back to their original location. To unquarantine a threat, select it, and then click the **Unquarantine** button on the upper panel.
- *Remove from quarantine*. This command permanently deletes the threat from the Quarantine folder. To remove a threat from quarantine, select it, and then click the **Delete from quarantine** button on the upper panel.

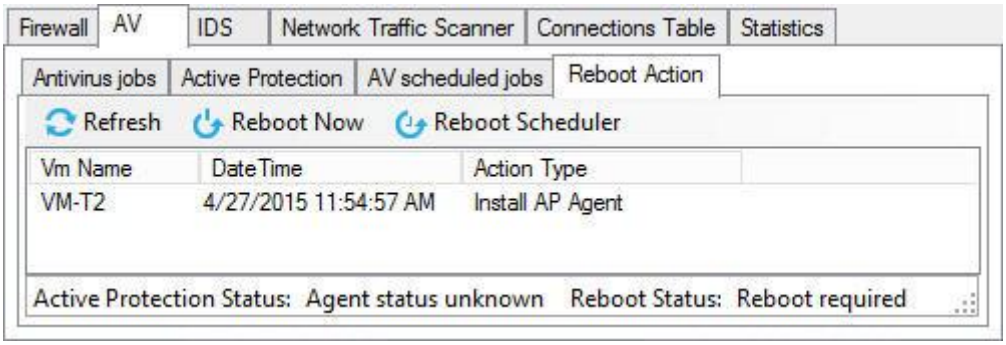
[2] In the case 5nine Cloud Security for Hyper-V version with ThreatTrack antivirus engine is used. The path is shown for the guest OS Windows 7 or later versions.

Reboot action

Reboot action is required on virtual machine in the following cases:

- to move threats that were detected by the agentless anti-malware scan to quarantine folder;
- to remove threats from quarantine or unquarantine threats;
- to install or remove active protection agent onto/from guest OS.

5nine Cloud Security will prompt you each time the reboot action is required and it is up to you when to do it. You will see the current reboot status for each VM in the lower status bar that is displayed in **Reboot Action** tab of the 5nine Cloud Security main window, and be able to control it:

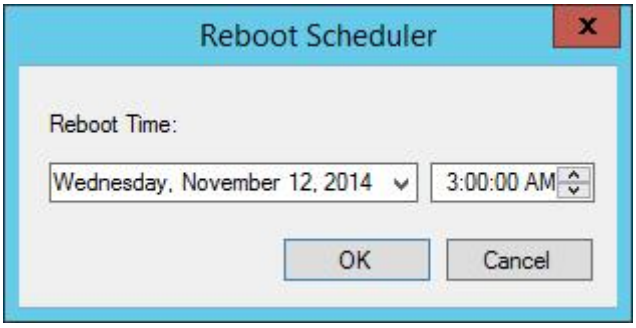


Click **Refresh** to immediately update current information of what actions are required VM reboot. This information is also updated automatically.

If there are such actions, then the following reboot options will be possible and the corresponding buttons will appear:

- Immediate reboot of the target VM. To evoke it, click **Reboot Now**. Selected virtual machine will be rebooted immediately.
- Delayed (scheduled) reboot of the target VM. To set the delayed reboot, click **Reboot Scheduler**.

Then set the date and time when you would like the target VM to be rebooted and click OK in the **Reboot Scheduler** dialog:



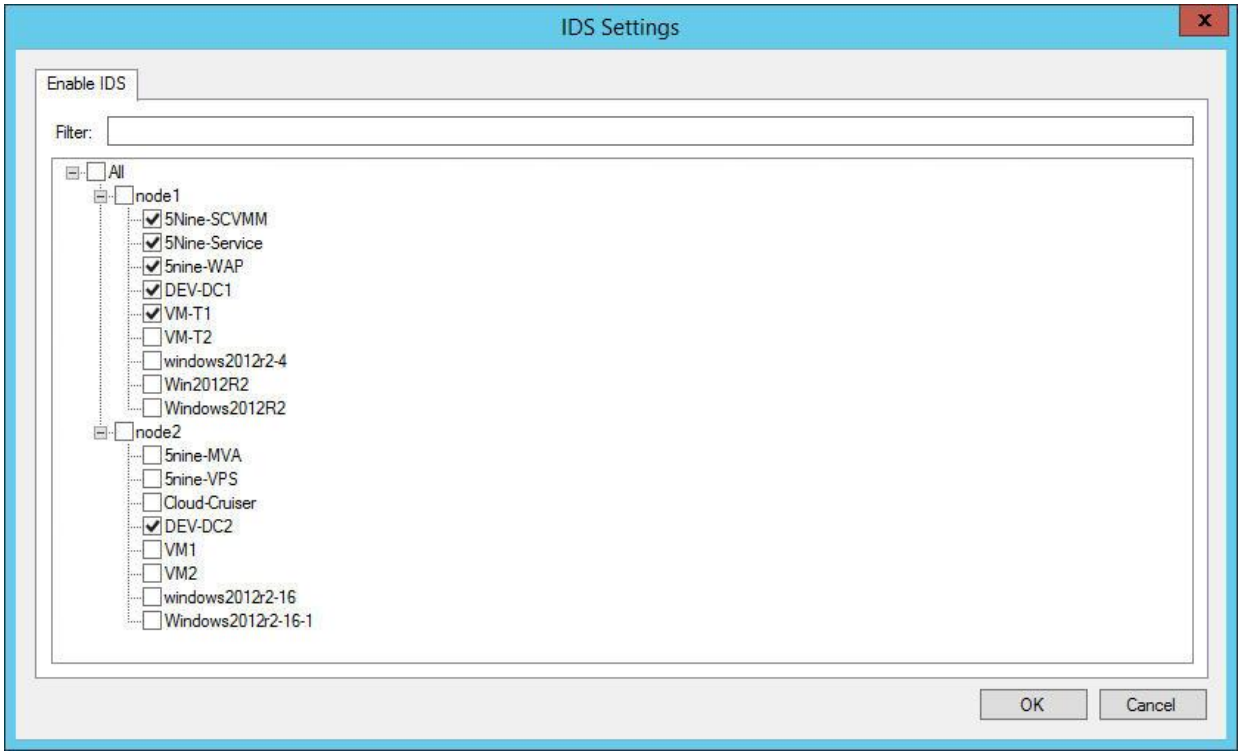
The selected virtual machine will be rebooted automatically at this time.

IDS

The Intrusion Detection System (IDS) allows detection[3] of intrusion attacks, review of the event log and setting the blocking virtual firewall rule on the suspicious IP address.

Enable IDS

IDS feature is disabled on all virtual machines by default. To enable IDS on the virtual machines, open the **IDS Settings** dialog window using the **Settings – IDS** main menu command:



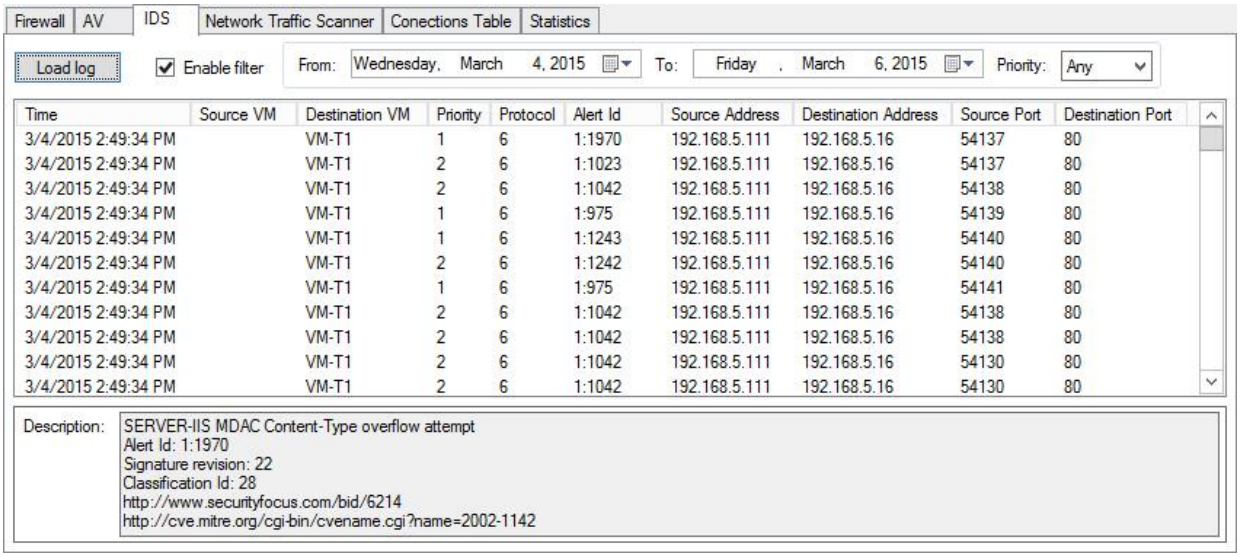
On the **Enable IDS** tab check the boxes against the VMs on which IDS should be enabled. Type the symbols which a VM name must contain into the **Filter** field to filter the tree. Those VMs

[3] Detection of intrusion attacks is done through free IDS – Snort ® – third-party freely distributed application that is able to determine whether certain inbound traffic is considered as an intrusion.

that have been pre-selected will not be filtered off the tree even if they do not match the filtering criteria. Click **OK**.

View IDS log records

The IDS log is displayed on the **IDS** tab:



Check the **Enable filter** box to turn on the filter on so that only IDS events matching filter parameters will be displayed.

Set the start date for IDS events in the **From** field and the end date in the **To** field. Use the calendar feature for convenience.

Set event priority in the **Priority** field. Select the priority1, 2, 3 or 'Any' (for all priorities) from the list.

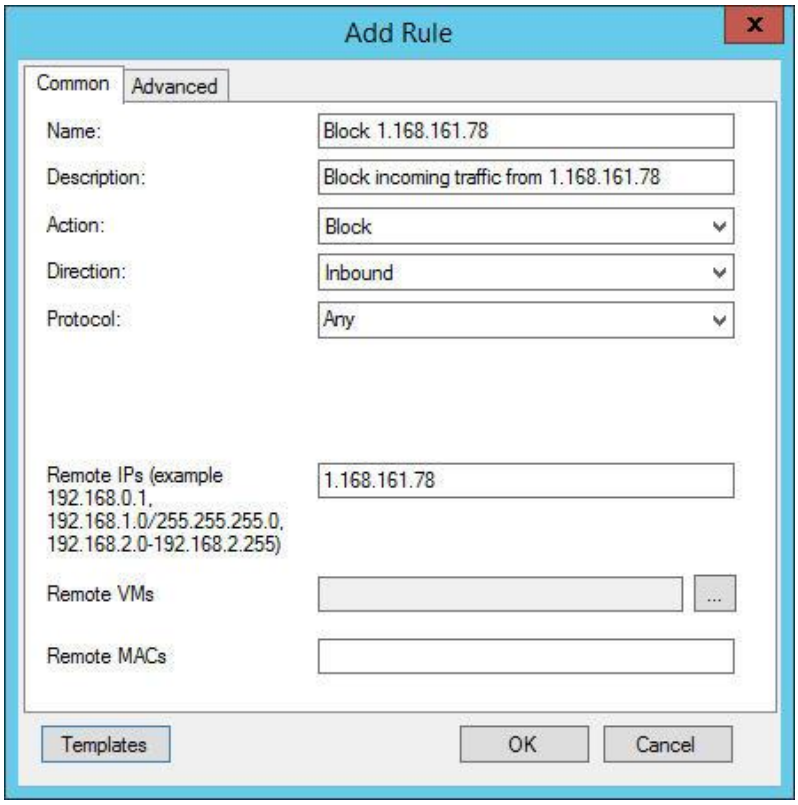
To view IDS events, click **Load Log** in the left-upper corner.

Note: *The IDS feature works only with the third-party, free distributed IDS – Snort application, which is able to detect inbound traffic to determine intrusion attacks. It must be running on the target host. See readme.txt file provided with 5nine Cloud Security installation archive for details on how to set up and use Snort application.*

Email notifications are available to inform admins about possible intrusions – IDS events. Please refer to the 'Notifications' subsection below for details.

Block the intrusive IP address

To block the traffic flow from the suspicious address, right-click the event and select *Add blocking rule*. You will be offered to create the blocking virtual firewall rule with pre-defined parameters:



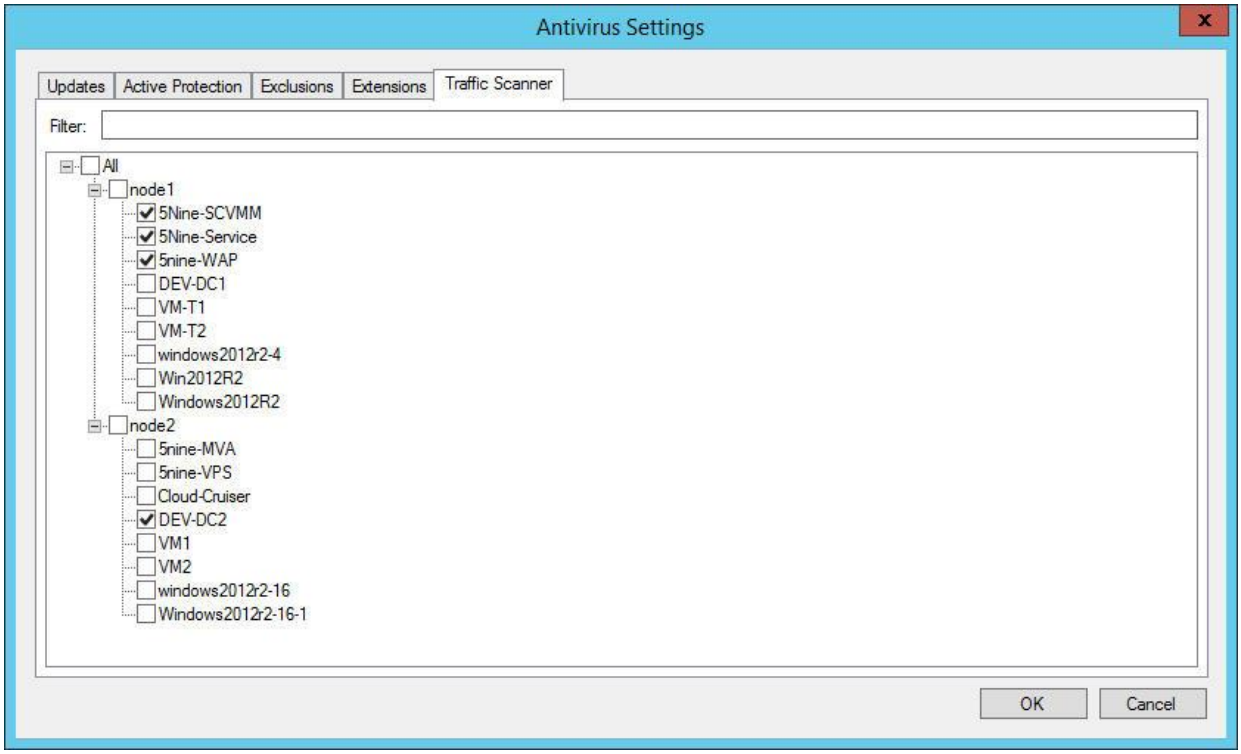
As it's shown on the picture, you are advised to block all IP traffic from the address-aggressor and it is strongly recommended to leave these default settings. However, you are still able to alter the rule parameters in the standard way as it is described above in the 'Setting virtual firewall rules' section.

Network traffic scanner

Network traffic scanner allows detection of malware that might be downloaded to the virtual machine with http inbound traffic and review the event log.

Enable network traffic scanner

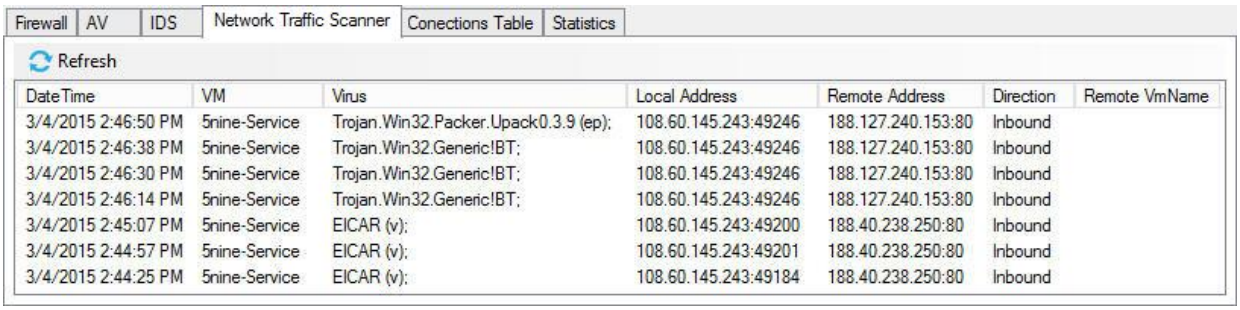
Network Traffic Scanner feature is disabled on all virtual machines by default. To enable Network Traffic Scanner on the virtual machines, open the **Antivirus Settings** dialog window using the **Settings – Antivirus** main menu command:



On the **Traffic Scanner** tab check the boxes against the VMs on which IDS should be enabled. Type the symbols which a VM name must contain into the **Filter** field to filter the tree. Those VMs that have been pre-selected will not be filtered off the tree even if they do not match the filtering criteria. Click **OK**.

View network traffic scanner log records

The Network Traffic Scanner log is displayed on the Network Traffic Scanner tab:



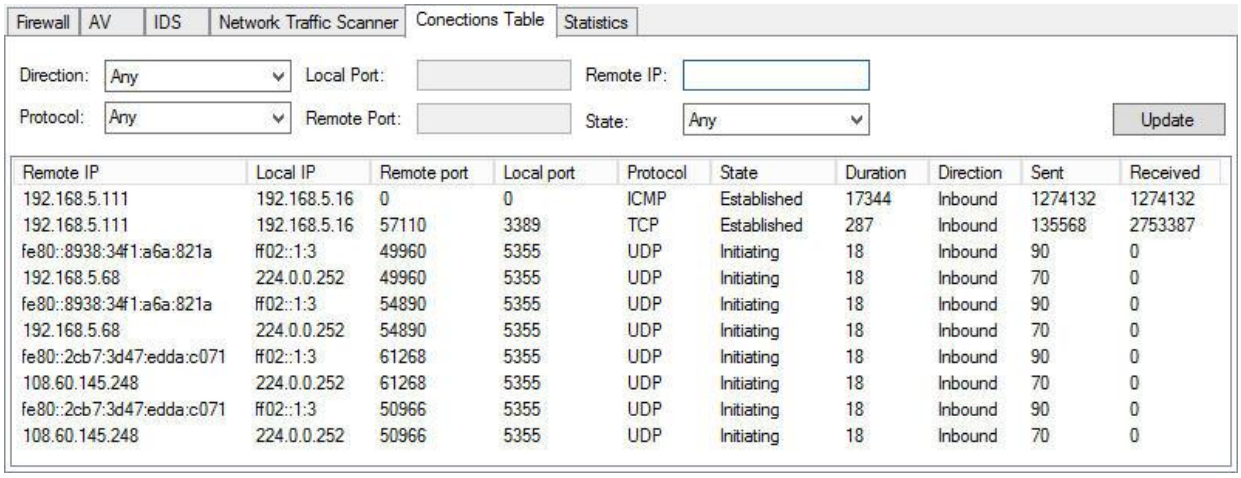
DateTime	VM	Virus	Local Address	Remote Address	Direction	Remote VmName
3/4/2015 2:46:50 PM	5nine-Service	Trojan.Win32.Packer.Upack0.3.9 (ep);	108.60.145.243:49246	188.127.240.153:80	Inbound	
3/4/2015 2:46:38 PM	5nine-Service	Trojan.Win32.Generic!BT;	108.60.145.243:49246	188.127.240.153:80	Inbound	
3/4/2015 2:46:30 PM	5nine-Service	Trojan.Win32.Generic!BT;	108.60.145.243:49246	188.127.240.153:80	Inbound	
3/4/2015 2:46:14 PM	5nine-Service	Trojan.Win32.Generic!BT;	108.60.145.243:49246	188.127.240.153:80	Inbound	
3/4/2015 2:45:07 PM	5nine-Service	EICAR (v);	108.60.145.243:49200	188.40.238.250:80	Inbound	
3/4/2015 2:44:57 PM	5nine-Service	EICAR (v);	108.60.145.243:49201	188.40.238.250:80	Inbound	
3/4/2015 2:44:25 PM	5nine-Service	EICAR (v);	108.60.145.243:49184	188.40.238.250:80	Inbound	

Events normally appear in the log automatically. Click the **Refresh** button to facilitate retrieving of the fresh events.

Email notifications are available to inform admins about http malware events. Please refer to the 'Notifications' subsection below for details.

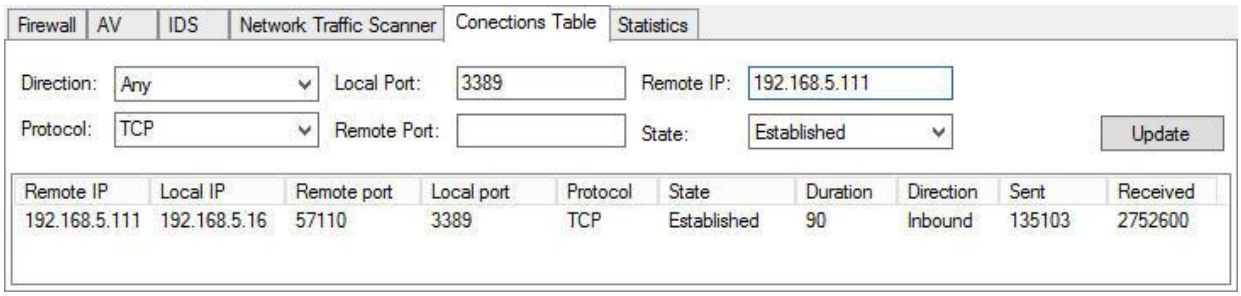
Connections table

The list of current connections is displayed for each virtual machine (the virtual firewall must be turned on):



Click the **Update** button to get the current connections list for the selected virtual machine.

You can set certain connection parameters to filter the list in the way you want it to be displayed, e.g. to find the exact TCP session in the connections table. Set the connection parameters you need to see and click the **Update** button:

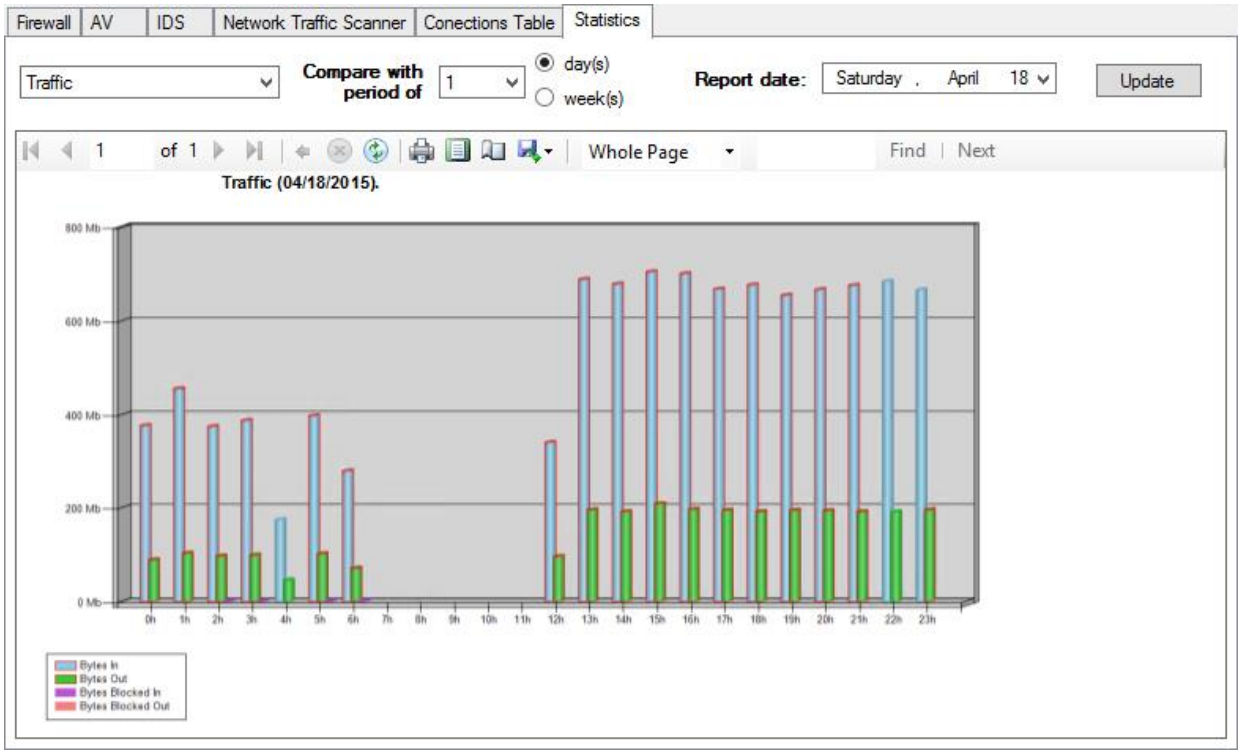


The connections table will be filtered.

Note. *In the current version of 5nine Cloud Security for Hyper-V the connections table feature can be used in observation mode only.*

Network statistics

Network statistics is displayed on the VM level for each VM separately, on the **Statistics** tab:



Display options available:

- Traffic – displays traffic in Mb;
- Packets – displays packets amount;
- Packet size – displays packets size in bytes.

Traffic types are distinguished by a color (bytes in – blue, bytes out – green, bytes blocked in – purple, bytes blocked out – pink).

Export format options available: Excel, PDF, MS Word. Or the report can be printed out right from the console with possibility to adjust page parameters – use print/page setup buttons  to set up page parameters to print.

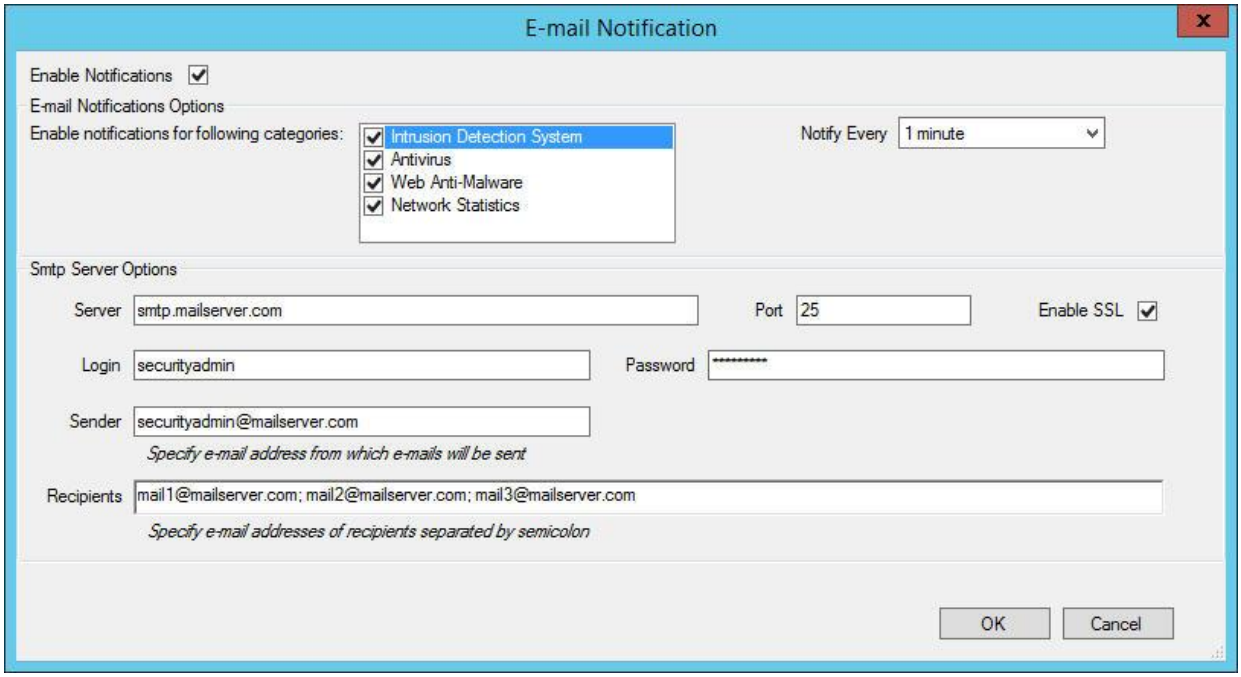
Use the calendar in the **Report date** field to set the date for network statistic report.

Notifications

5nine Cloud Security has the feature that allows sending email notifications for the following security events:

- IDS.
- Agentless antivirus.
- Web anti-malware events.
- Network traffic statistics anomalies.

To set up notifications, call out the **E-mail Notification** window with **Settings – E-mail Notification** menu command:



Set the notifications parameters:

- Check the **Enable Notifications** box to enable email notifications.
- Select which security events must be sent via email notifications:
  - Check the **IDS Events Notifications** box to include IDS events into email notifications.
  - Check the **Antivirus Events Notifications** box to include antivirus events into email notifications;

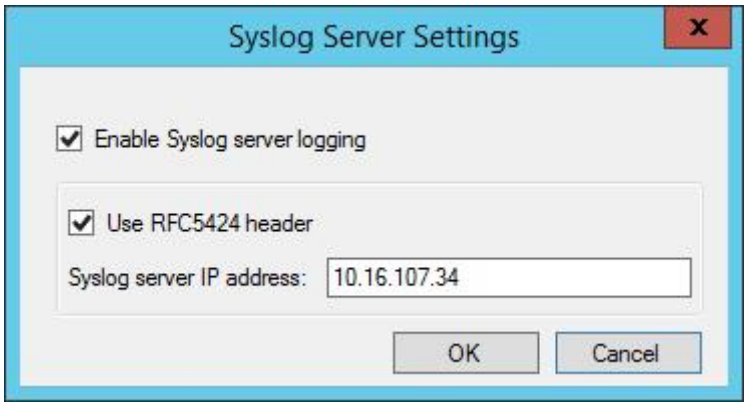
- Check the **Web Anti-Malware Events** box to include inbound http traffic events into email notifications;
- Check the **Network Statistics** box to include network statistics anomalies into email notifications. 5nine Cloud Security automatically analyzes network statistics on monitored VMs for the period of last week, then splits the data for the last day by hours and sends notifications if the traffic skew factor is equal to or greater than 1.4. The following parameters are measured: the amount of traffic, packet size, the number of packets. Notification shows virtual machine with detected traffic anomaly and the hour of the day during which this anomaly had been detected.

- Set the notification period (select value between 1min – 24 hours from the list). The default value is 1 minute.
- Specify the SMTP server address and port.
- Check the Enable SSL box in the case SSL authentication is required to access the SMTP server. Then set the login and password for the user (SMTP administrator).
- Specify the sender's email address.
- Specify the recipients' email addresses separated by semicolon.

Click OK to save the settings and close the **E-Mail Notification** window.

Syslog server integration

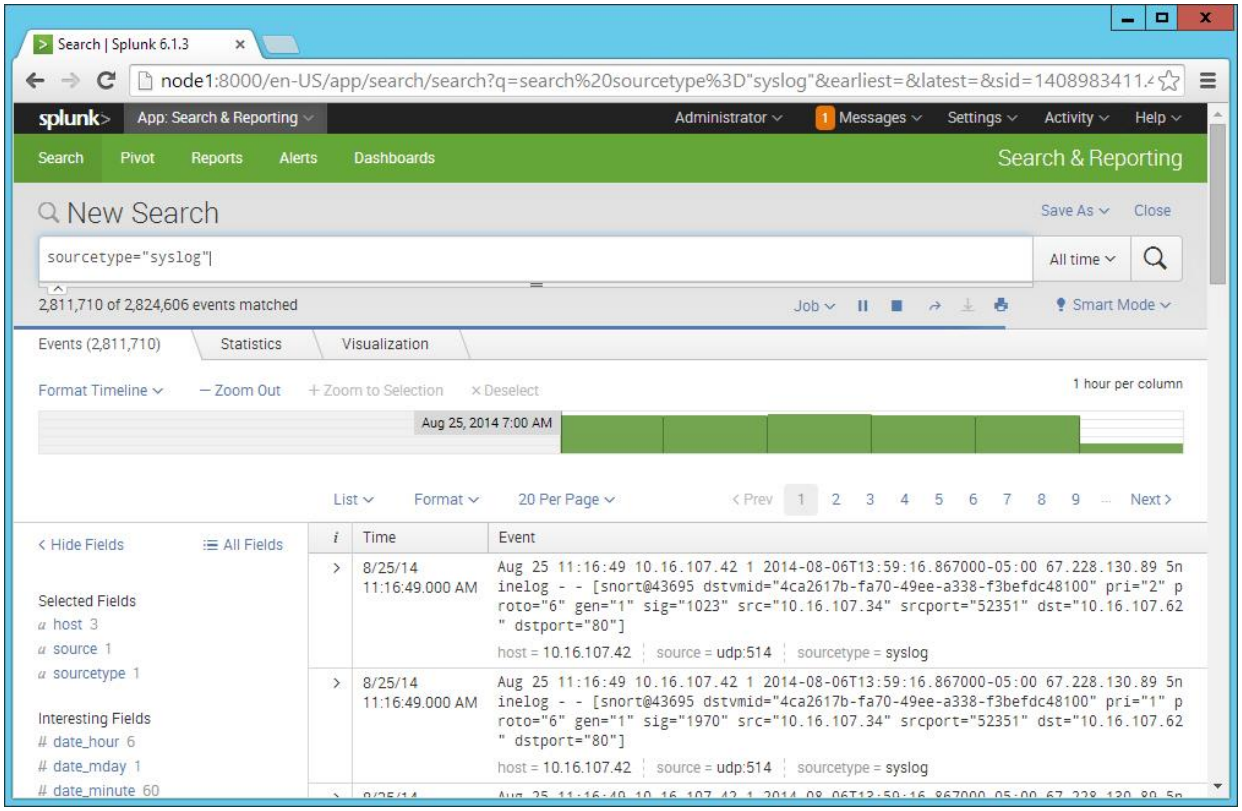
5nine Cloud Security supports integration with external Syslog server. To let virtual firewall, IDS, agentless antivirus and active protection events be sent to an external Syslog server, call out the **Syslog Server Settings** dialog box with **Settings – Syslog** menu command, enable syslog server logging and set the IP address where it's running:



- Enable syslog server logging to turn this option on.
- Enable RFC5424 header if necessary[4].
- Type the syslog server IP address.

[4] Some external syslog servers require RFC5424 standard header support (e.g., Splunk ® syslog server), whereas the others do not (e.g., SolarWinds ® syslog server) and won't function if this option is enabled. Contact your system administrator to determine if your external syslog server requires RFC5424 header support!

Example of external syslog server function with 5nine Cloud Security (Splunk ® syslog server is shown):



On the shown picture the IDS events appear in the Splunk event log loaded from 5nine Security IDS event log.

Disaster recovery

Having multiple management servers installed on different servers (host(s) and/or VMs) in Windows Server/Hyper-V environment instead of using just a single one on a single server, provides disaster recovery. Management server that is currently taking control over the environment is a *primary* management server. The other one(s) are *backup* management server(s). When the primary management server becomes unavailable, the next backup management server takes over the control. It is also possible to switch the management servers manually. After the installation of 5nine Cloud Security components, there is only one management server is active – the one that had been installed and specified during Host Management Service and Management Console installation (refer to the 'Installation' section above). With just a single management server the product will function in ordinary mode without disaster recovery. The following subsections below describe disaster recovery functioning and setting it up.

Disaster recovery functioning

Multiple management servers running management service instances are connected to own separate data source each, having separate database *vFirewall*.

Management servers exchange and replicate the following data:

- Managed Hyper-V hosts list and settings.
- Virtual firewall rules and VMs' monitoring statuses.
- Antivirus and active protection settings and VMs' antivirus statuses (for scheduled scans).
- Global security groups and tenants.
- Syslog server integration settings.
- Notifications settings.
- VM connections table (the feature is not replicated but works independently from management server and VM connections are displayed similarly no matter which management server is currently taking control).
- Management servers list itself.

These data are replicated in the real time from any of the management servers, to which management console is connected when applying the changes, no matter whether it is a primary or a backup one.

Management servers do not exchange the following data:

- Virtual Firewall and IDS log records.
- Antivirus and Active protection (including quarantine) log records.
- User's actions.

These data remain at the management server at which they had been recorded. The next one simply takes the log recording over from the moment it becomes the primary management server and stops recording when the other one takes the control next.

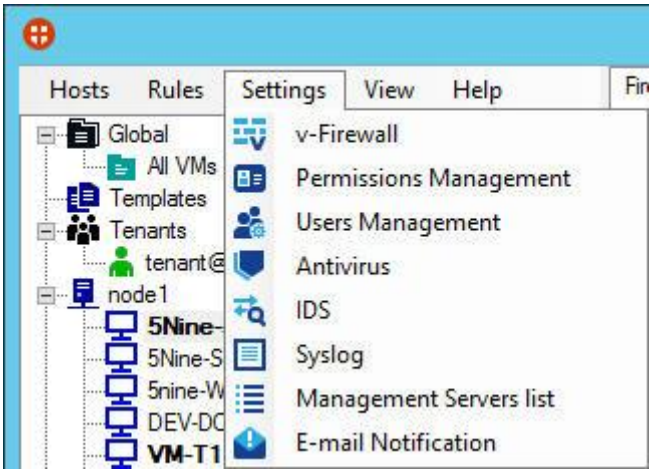
Attention! *In the current version of 5nine Cloud Security, Antivirus and Active protection functions are not replicated between management servers! This means that any action – install/remove AP agent into guest OS, run agentless anti-malware scan and subsequent reboot actions must be completed with the management server they had been evoked without switching to the other one. In the case management servers were switched before completing the reboot action, you will have to set the first management server back to complete them.*

Setting up disaster recovery

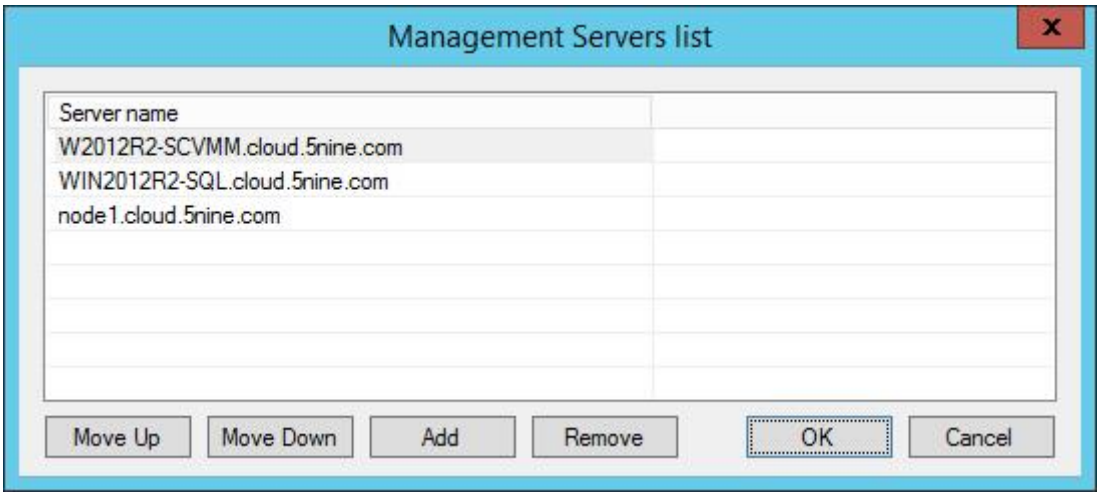
To set up disaster recovery, do the following:

- Install the additional management service instances onto other host(s) and/or designated virtual machines as you chose to be backup management servers. This is done in the similar way as when installing the first instance of management service (refer to the 'Installation' – 'Management Service installation' section). The recommended number of management servers is 2-3 servers in general case. It depends on available resources at the data center. Note that each one should connect to its own separate data source (SQL instance)!

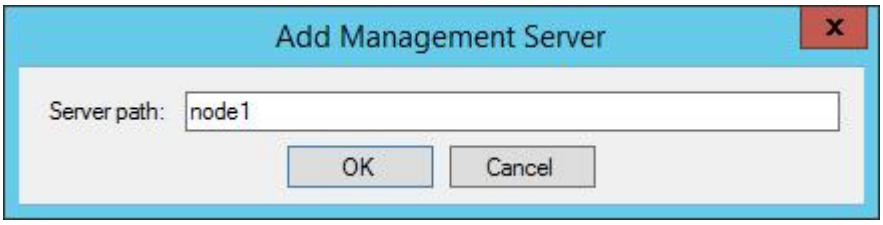
- Go to the management console connected to the first management service and push the **Settings – Management Servers list** main menu command:



- In the **Management Servers list** dialog box edit the management servers list:



  - Click the Add button to add another management server to the list:



    Type the hostname, FQDN or IP address of the management server and click OK.

  - Select the management server and click the **Move Up** button to bring the target server to the one position up. The top one will become the primary management server and will immediately take over the control. The second one will take over the control if the top one becomes unavailable, etc.

  - Select the management server and click the **Move Down** button to bring the target server to the one position down.

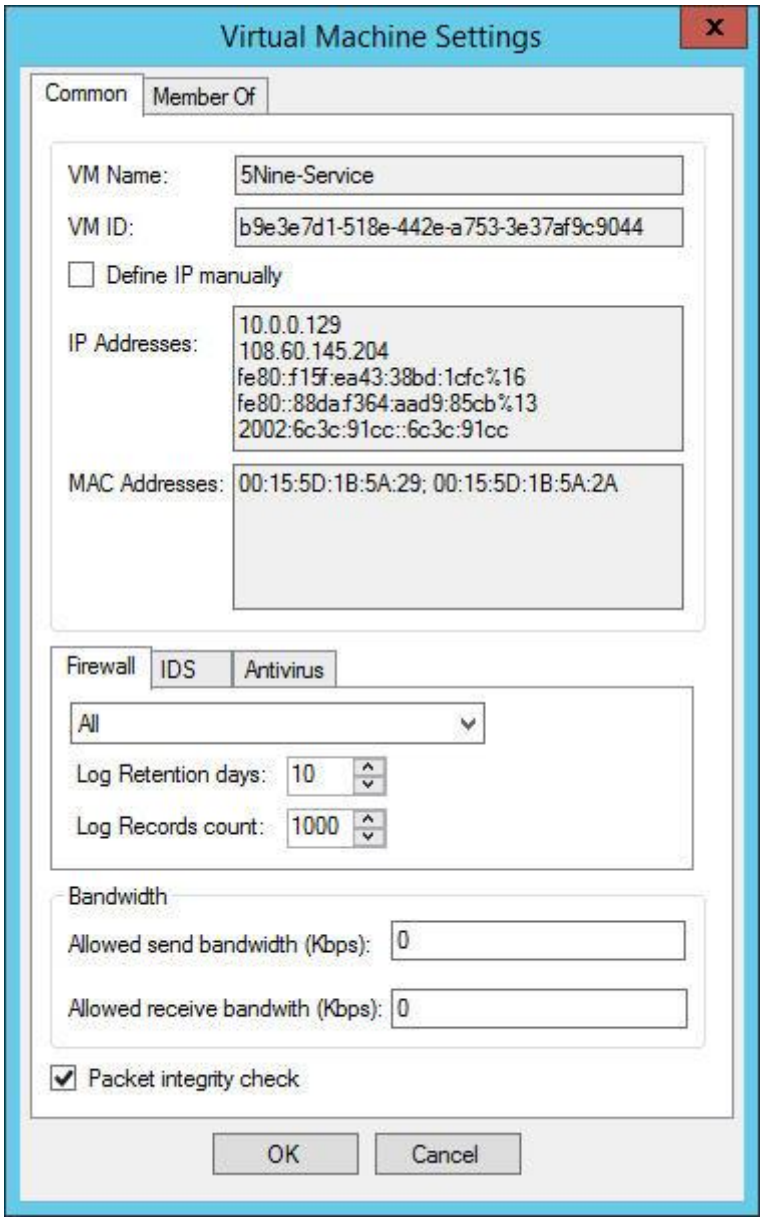
  - Select the management server and click the **Remove** button to remove it from the list

Click OK in the **Management Servers list** dialog box to complete the disaster recovery setup operation.

Changing VM settings

To change virtual machine settings, select the necessary virtual machine in the tree on the left. Then click **VM Settings** on the top menu panel or use the **VM Settings** context menu command.

The following dialog will display:



On the **Common** tab you can manually define the VM IP address, set logging parameters such as retention length in days, log records count and bandwidth – allowed send/receive limits for the virtual machine service.

The **VM Name** field displays the virtual machine name. The **VM ID** field displays the virtual machine ID – this parameter will be needed for authorization in the case virtual firewall rules with authorization are used (please refer to the '5nine Cloud Security operations' – 'Setting virtual firewall rules' – 'Authorization' section for detailed information).

Check **Define IP manual** box to detect the VM IP address for 5nine Cloud Security manually. In most cases you don't have to do this, because normally the IP address is detected automatically by 5nine Cloud Security. However, there are certain situations when this option is needed, such as with non-Windows OS based VMs, when 5nine Cloud Security is unable to automatically detect VM IP configuration. In the cases like this it is necessary to manually determine IP address so that Virtual Firewall rules work for this kind of virtual machines.

Enter a single IP v4 or IP v6 IP address (as applicable), which are assigned to the VM, in the **IP Addresses** field – only single value is accepted. If 5nine Cloud Security gets the IP addresses from the VM IP network settings automatically, you will see them in this field when this dialog box opens – there is no need to define them manually in this case.

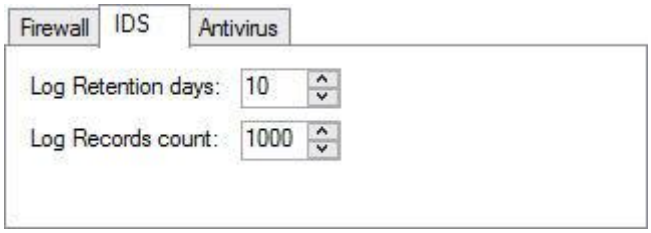
Note: *The IP address that is set here manually does not affect actual IP settings on a virtual machine. It is only used by 5nine Cloud Security to analyze the virtual machine traffic and properly apply virtual firewall rules in the case it is unable to automatically detect it.*

Set virtual firewall logging parameters on the **Firewall** tab:

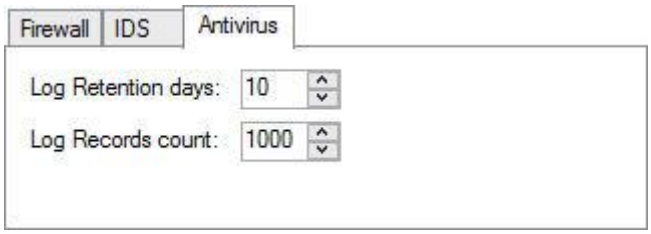
- Select the logging level from the list.
  - *Filtered* – only filtered VM events will be recorded to the log.
  - *Allowed* – only allowed VM events will be recorded to the log.
  - *All* (default) – all VM events except SPI packets will be recorded to the log.
  - *No Logging* – neither of the VM events will be recorded to the log.
  - *Allowed and SPI* – allowed VM events and allowed SPI packets will be recorded to the log.
  - *All and SPI* – all VM events including SPI packets will be recorded to the log. It is the maximal logging level.
- Enter the number of days to keep the log records in the **Log Retention days** field.

- Enter the maximum number of records that will be added to the log in the **Log Records count** field.

Set the log size and retention for the IDS logs on the **IDS** tab in the same way.



Set the log size and retention for the antivirus logs on the **Antivirus** tab:

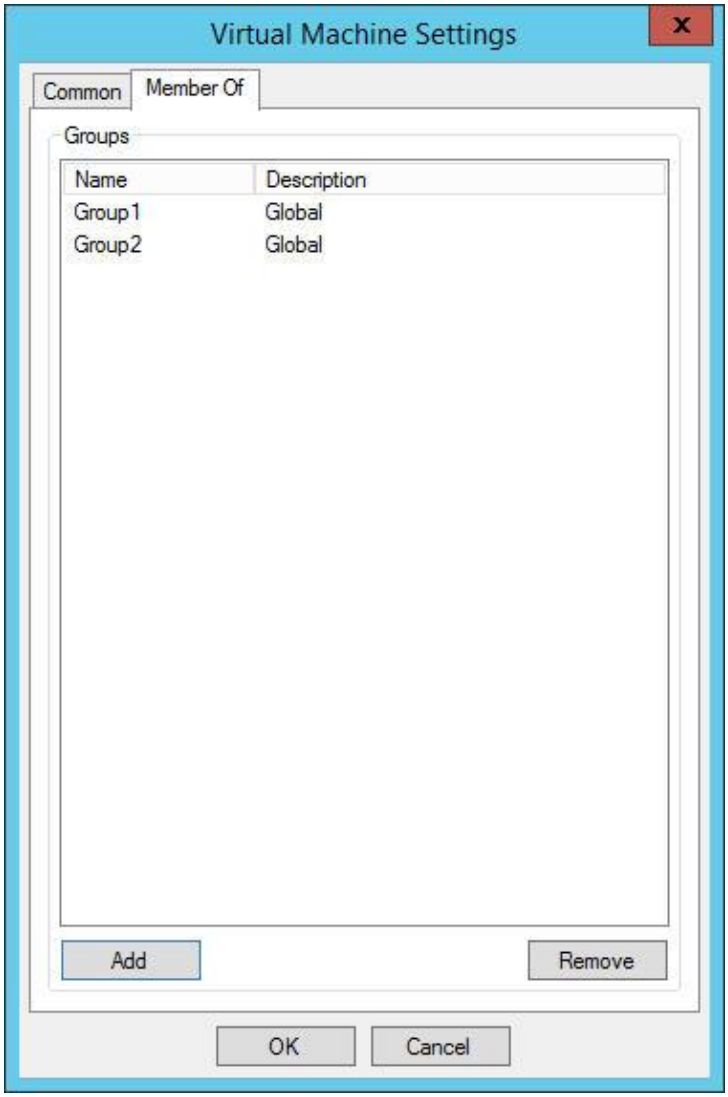


Set bandwidths allowed send/receive limits:

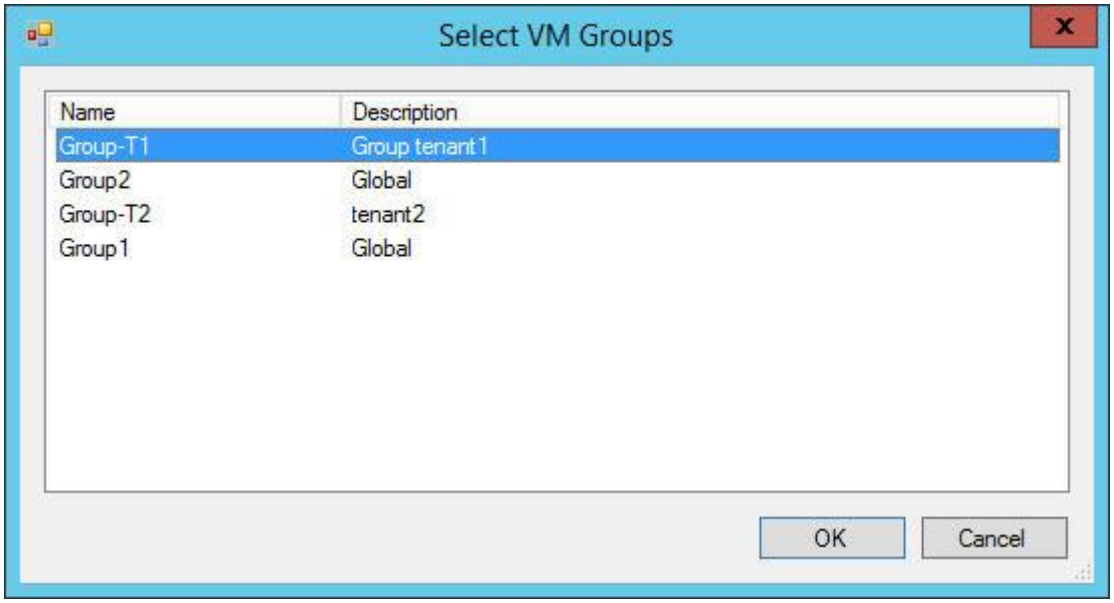
- Enter the maximum (in Kbps) allowed send bandwidth limit in the **Allowed send bandwidth (Kbps)** field.
- Enter the maximum (in Kbps) allowed receive bandwidth limit in the **Allowed receive bandwidth (Kbps)** field.

Tick the **Packet integrity check** box to enable CRC check in the packets towards the VM. If this option is enabled, any traffic allowed by any rule for this virtual machine will be put to CRC check. If the sum is incorrect or corrupted the packet will be dropped. Some network devices might not be compatible with this option and therefore normal traffic will be blocked if CRC check is enabled. In such cases it is recommended to leave this option disabled.

On the **Member Of** tab you can determine to which user-defined security groups a VM will be assigned:



To add a new security group, click **Add**. In the **Select VM Groups** dialog box select the necessary groups and click OK to add the selected groups to the VM:



You may select several groups by holding the Shift or Control buttons pressed on your keyboard while doing the selection:

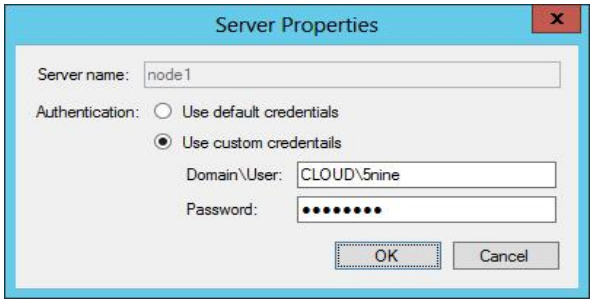
All the groups created by any user will be seen here if you work under the global administrator. If you work under a tenant user, only those groups created by this tenant's users will be displayed and available to be assigned to the VM.

The rules of the assigned security groups will then be applied to the VM. Please refer to "Setting virtual firewall rules" above for details of how the user defined security groups and virtual firewall rules are set.

Host settings and state

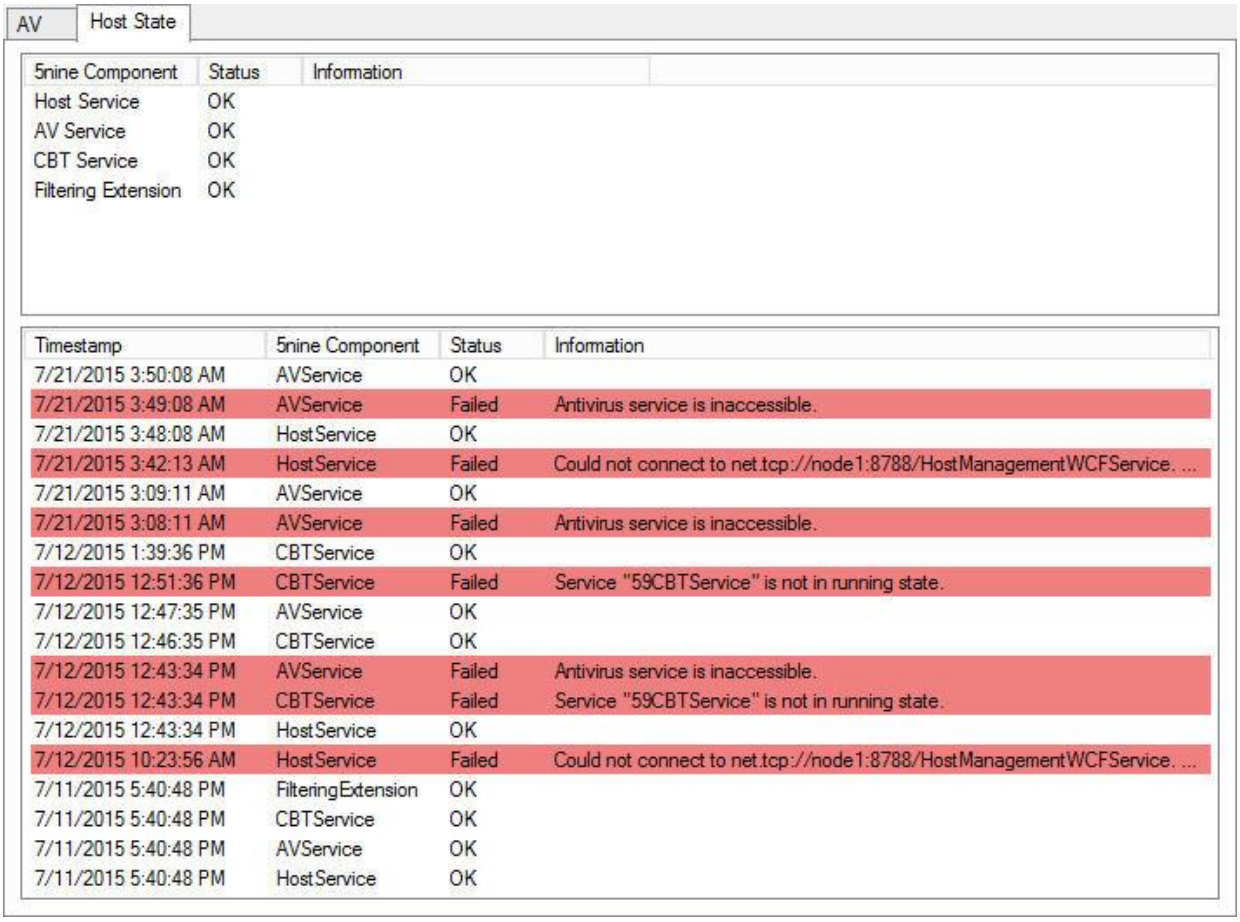
To change host settings, first select the necessary host in the tree, then use the **Settings** context menu command.

The Server Properties dialog box will display:



Set the authentication parameters as described in “Adding and removing hosts”.

5nine Cloud Security for Hyper-V displays current state and recent history for each managed Hyper-V host. This information is shown on the **Host State** tab when the host is selected in the object tree:

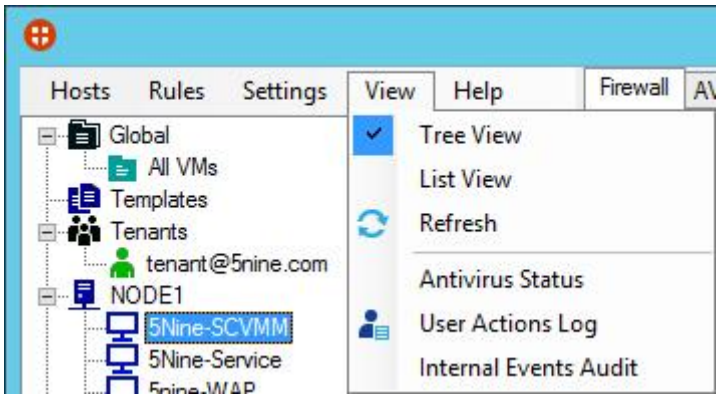


The upper field shows current host state. The following components on the host are monitored: services *5nine.Antivirus.Agent*, *5nine.VirtualFirewall.HostManagementService*, *59CBTService*; and the Hyper-V virtual switch filtering extension *5nine vFW extension* (filtering driver).

The lower field shows the recent history for each component if there were problems and the moment they had gone.

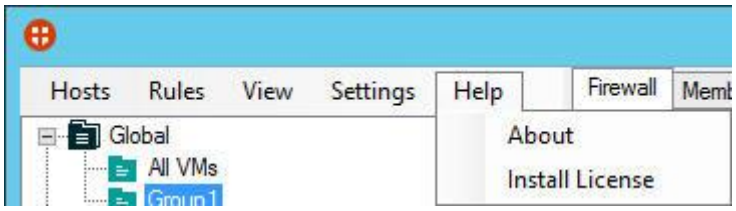
Refreshing the object tree

To refresh or change the view (list or tree), go to the **View** menu:

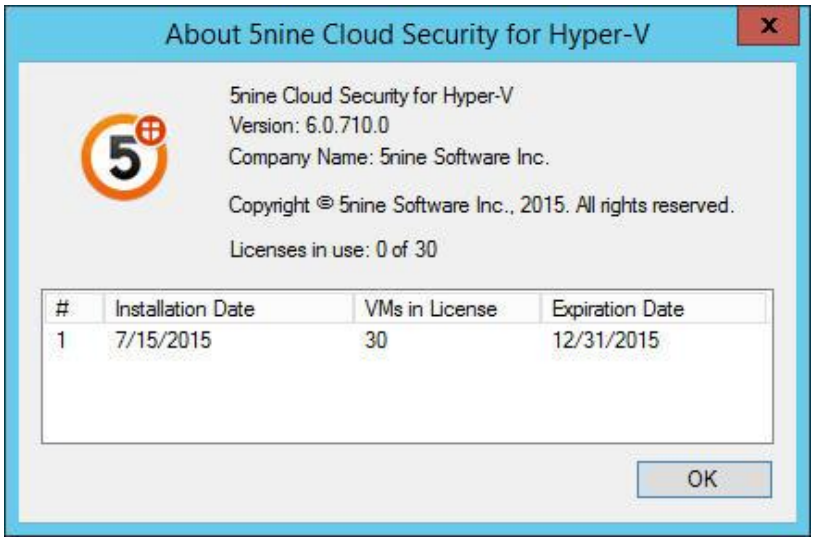


5nine Cloud Security information

To get the 5nine Cloud Security version/user license information, use the **Help – About** menu command:



The **About 5nine Cloud Security for Hyper-V – Data Center** window will show the 5nine Cloud Security version info and the licensing information (also refer to 'Licensing' section below):



Licensing

5nine Cloud Security has its licensing policy, which allows you to use it for the certain number of virtual machines. If you need the greater number of virtual machines to be monitored and protected by 5nine Cloud Security, you are always able to purchase additional licenses for the required additional number of virtual machines. 5nine Cloud Security allows exceeding the limited number of VMs by 20% (but not less than one VM) and prompts you when you exceed the current license.

The license also has its expiration period. When it's expired, Virtual Firewall will be turned off automatically and scheduled antivirus will be disabled on those VMs that have been set on Virtual Firewall and/or scheduled antivirus.

You can get information about currently and previously installed licenses' installation and expiration dates, total VMs amount allowed by the license and number of VMs currently in use in the **About 5nine Cloud Security for Hyper-V – Data Center** window as described in '5nine Cloud Security information' section above.

Call out the **Licensing** dialog with **Help – Install License** menu command to install the new license:

Then, browse to the license *.txt* file or copy-paste/manually type the path to it and click OK.

Note. *When updating the license in the environment with disaster recovery set, you will have to install the new license onto each of management servers separately.*

Compatibility with the other 5nine products

5nine Cloud Security for Hyper-V is compatible with 5nine Manager for Hyper-V (version without antivirus feature) and incompatible with 5nine Manager for Hyper-V PLUS (version with antivirus feature). 5nine Cloud Security for Hyper-V uses the same services for antivirus feature on managed hosts as 5nine Manager for Hyper-V PLUS – *5nine.Antivirus.Agent* and *59CBTService*. Services run into a conflict if they are managed by both products on the same host. 5nine Cloud Security for Hyper-V Management Service and 5nine Manager for Hyper-V PLUS Antivirus Management Service use the same program interface and also cannot be placed on the same machine as they will run into a conflict resulting in a failure of the antivirus feature. Therefore it is recommended to use 5nine Manager for Hyper-V without antivirus in the environments that are protected by 5nine Cloud Security for Hyper-V, which will cover anti-malware demands instead of 5nine Manager for Hyper-V PLUS. In the case there are separate hosts in the data center that are not supposed to be managed by 5nine Cloud Security for Hyper-V, it is possible to use 5nine Manager for Hyper-V PLUS on such hosts, but in this case its antivirus management service shall not be placed on the same machine with 5nine Cloud Security for Hyper-V management service.

5nine Cloud Security log files

5nine Cloud Security writes the following log files that are used to troubleshoot the product and contains information of its activity:

Log file name	Location	Description
	Management server file system	
YYYY-MM-DD ManagementServiceLog.txt	*C:\ProgramData\5nine\5nine Cloud Security for Hyper-V\Logs\Management Service*	Contains information related to central management service activity
Starter.log	*C:\Program Files\5nine\5nine Cloud Security for Hyper-V Management Service\Logs*	Contains information related to recurrent agentless anti-malware scans
	Host/VM(s) file system where Management Console is installed	
YYYY-MM-DD ManagementConsoleLog.txt	*C:\ProgramData\5nine\5nine Cloud Security for Hyper-V\Logs\Management Console*	Contains information related to activity on management console

Log file name	Location	Description
	Managed host file system	
snortlog.txt	*C:\ProgramData\5nine\5nine Cloud Security for Hyper-V\Logs*	Contains information related to snort application initialization with 5nine Cloud Security for Hyper-V
YYYY-MM-DD HostServiceLog.txt	*C:\ProgramData\5nine\5nine Cloud Security for Hyper-V\Logs\Host Service*	Contains information related to host management service activity
vFWFilteringPlatform.log (hidden)	*C:\ProgramData\5nine\5nine Cloud Security for Hyper-V*	Contains information related to virtual firewall rules applicability
5nine.Antivirus.AgentService.log	*C:\ProgramData\5nine\5nine Antivirus Agent\Logs*	Contain information about agentless antivirus (including anti-malware scans tracking) and active protection agent activity on the current host and its virtual machines.
GfiThreatEngineNet.log	*C:\ProgramData\5nine\5nine Antivirus Agent\Logs\GFI*	Contains information related to GFI threat engine activity.
	Guest file system	
APAgentSvcLog.csv	*C:\ProgramData\5nine, Inc\5nine Hyper-V Agent\Logs*	Contains information related to *5nine.AP.Agent* service activity.
SBAMSvcLog.csv	*C:\ProgramData\5nine, Inc\AntiMalware\Logs*	Contains information related to *SBAMSvc* service activity.
SBAMThreatEngineLog.csv	*C:\ProgramData\5nine, Inc\AntiMalware\Logs*	Contains information related to threat engine activity.

5nine Cloud Security Network Manager Plugin configuration

This section is only applicable to those environments that are running under Microsoft System Center Virtual Machine Manager with enabled SCVMM-based logical switches where it is necessary to get those switches to compliant state with 5nine Cloud Security for Hyper-V filtering extension.

Upon installation of 5nine Cloud Security Network Manager Plugin, do the following actions on your SCVMM server to complete 5nine Cloud Security for Hyper-V Network Manager Plugin configuration:

1. Restart SCVMM service. Re-open SCVMM management console, make sure you do it with administrative privileges (“Run as Administrator”).
2. Go to Settings – Configuration Providers. Check that "5nine Cloud Security Network Management Provider" is present in configuration providers list.
3. Create Network Service in SCVMM:
    - Go to Fabric – Networking – Network Service – (right click) Add Network Service;
    - Name the network service (e.g. “Cloud Security Filtering Service”);
    - Select “5nine Software, Inc – CloudSecurity Manager”;
    - Enter credentials. The best way is to add current domain user account that has all necessary permissions;
    - Connection string: localhost;
    - Host group: check “All Hosts”
4. Go to Fabric – Networking – Logical Switches:
    - Right-click on the logical switch – Properties;
    - Select Extensions;
    - Check the box against the new “5nine Cloud Security Filtering extension”.
    - Click OK.

5. Check that logical switch extensions order in SCVMM console and Hyper-V manager match for each Hyper-V host. Alter the order if necessary by using the Move UP/Move Down buttons.

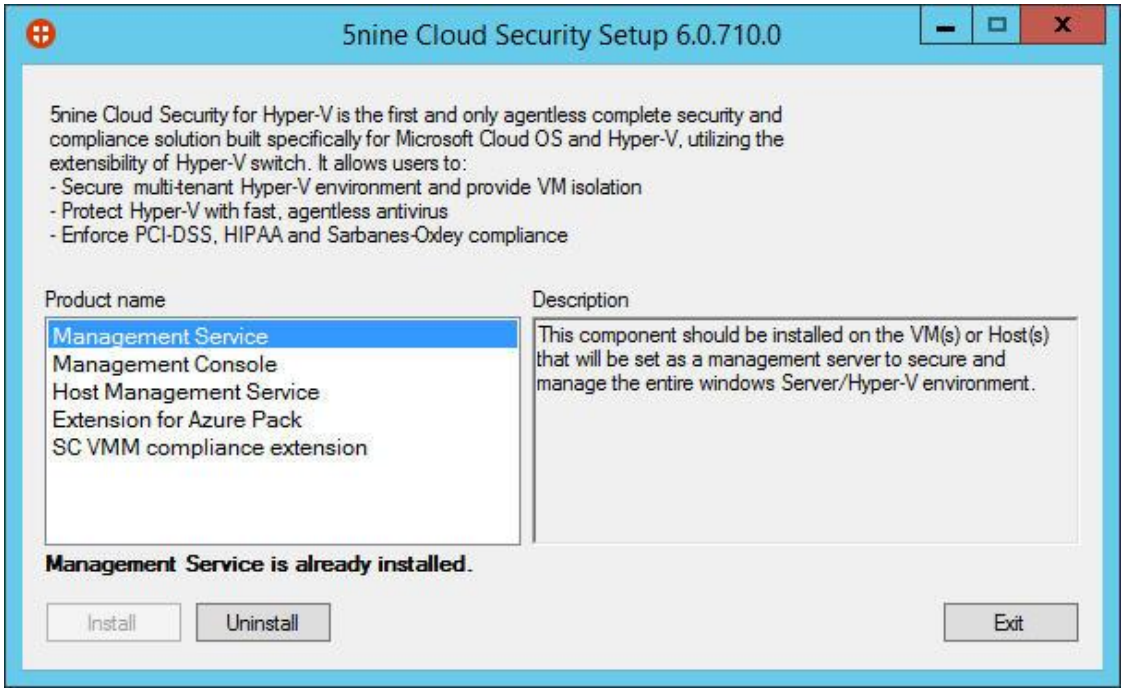
6. Go to Fabric – Networking – Logical Switches:

    - Select "Hosts" on the main pane;
    - Select logical switches that are in “Not Compliant” state.
    - Remediate the logical switches that are in “Not Compliant” state.
    - Wait until the state of logical switch becomes “Compliant”.

Note: You might have to refresh the hosts that do not run 5nine Cloud Security Host Management Service (in the case you have those in your environment) upon remediate action is complete to get the logical switches to Compliant state on such hosts!

Uninstallation

To uninstall 5nine Cloud Security components from your servers, use the same single setup launcher application as when installing the product:



Select the necessary component, click **Uninstall** and confirm the operation.