

# Monitors over a firewall

## LRE 2022 R2

**Installation Guide for Micro Focus SaaS Customers**



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## 2 Document Purpose and Target Audience

The "Monitors over a firewall - LRE 2022 R2 Installation Guide" assists customers in performing new Windows-based Monitor Over Firewall setups located in their networks.

Note that this guide does not attempt to include all potential setup situations. Instead, it focuses on the process and typical aspects of the MOFW installation.

The target audience of this document is technical personnel of Micro Focus SaaS customers who are involved with operating performance tests within LRE 2022 or higher and/or installing and maintaining matching MOFW agents in their own network that are connected to Micro Focus SaaS LRE environments. The audience typically includes load test specialists, QA lab managers, and QA managers.

## 3 How to use this guide

The recommended installation procedure consists of 3 phases to be followed in sequence. This guide provides a chapter for each phase.

**"5 Start Here"** lists typical steps of preparation that are required before the actual MOFW software can get installed. Performing these is crucial for a successful install later.

**"6 Installation"** walks through the actual installation of the MOFW software.

**"7 Configuration"** guides through the parameters to be configured after installation.

## 4 Terminology/Glossary

### **Monitor Over Firewall (MOFW)**

During an in-house performance test are the online monitors directly polling the monitored machines or applications, but that is not possible in a SaaS environment due to firewall(s) between the LRE instance and the application under test (AUT). To overcome that limitation, an MOFW Agent is installed inside the firewall to collect and forward the monitored data through the firewall to the LRE instance.

### **Agent Configuration**

An application installed on the MOFW host that is used to configure the specific MOFW. It is typically accessible through “Start/All Programs/Micro Focus/Load Runner Agent Configuration”.

### **Agent Service (Agent)**

A Windows service (called “LoadRunner Agent Service”) that runs on the MOFW host to connect it to Micro Focus SaaS LRE. In rare cases, the Agent is alternatively installed as a process instead that needs to be started by a logged in user.

### **Firewall**

In the context of this document, we refer to the firewall(s) in the customer’s network that typically separate(s) the injector hosts from the internet.

### **MI Listener (MIL)**

An MI Listener is a server located in the Micro Focus SaaS network that acts as a proxy to connect the customer’s injectors with LRE in the Micro Focus SaaS datacenters. Each MOFW must be configured in the Agent Configuration to point to that host (by entering the preferable the public DNS name, alternatively the public IP address, of the MIL into the “MI Listener” field).

### **System/Application Under Test (SUT/AUT)**

The target system or application of the performance test against which the Vusers are running.

## 5 Prerequisites

Before a successful installation and configuration of the MOFW Agent can take place, it is necessary to follow certain brief steps of preparation as outlined below.

### 5.1 Determining the location of your host(s)

First, decide on the specific location of the MOFW Agent that you want to use, network topology, and available hardware.

#### Network requirements between the MOFW Agent and the System Under Test

- Any machines or applications to be monitored needs to be accessible from the MOFW Agent, either directly in the same network or through firewall(s) inside your company network, or between physical data center locations through company VPN (recommended only for special cases).
- The closer the MOFW Agent is to the monitored machines and applications, the better, since firewalls, distance and especially VPN access can add latency in the update of the graphs during load tests. Hence, we recommend selecting MOFW hosts in the same network as the AUT if possible.

#### Network requirements between the MOFW Agent and Micro Focus SaaS

- The MOFW host must have *outbound* access to the public Micro Focus SaaS MI Listener DNS name, or alternatively, IP address.
- No *inbound* ports should be opened in the company firewall from the MI Listener to the MOFW host.
- While we recommend direct traffic whenever the firewall can be opened, alternatively a proxy server may be used if available in your network. Often such proxies are already configured for allowing browser traffic to the internet and may be reused for tunneling outbound traffic from the MOFW to the MI Listener as well.
- Which method of access is required for your MOFW depends on the configuration of your network and firewall, to some extent determined by the security policies laid down by your IT organization.
- The specific public DNS name (IP address) of the MI Listener will be obtained later in the process by request from Micro Focus SaaS.

### 5.2 MOFW hardware and software requirements

We generally recommend dedicating the MOFW host to that purpose only whenever possible, though MOFW and SiteScope installation on the same host are ok.

Do not install any web server such as IIS or other on the same host.

It is not possible to install a Load Generator on the same host, as it directly interferes with the function of the MOFW Agent software.

Please refer to the online help for the latest hardware and software system requirements:

[https://admhelp.microfocus.com/documents/lre/System\\_Requirements/2022-r2/LR\\_System\\_Requirements.pdf](https://admhelp.microfocus.com/documents/lre/System_Requirements/2022-r2/LR_System_Requirements.pdf)

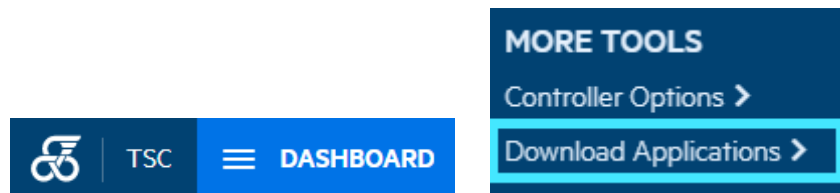
### 5.3 Downloading required components

At the time of writing of this document, the MOFW components required for an installation is only the basic Standalone Monitor Over Firewall LRE 2022 installer. The base installer is available in the download section of your LRE instance, as explained below. Alternatively, feel free to contact Micro Focus SaaS at the time of installation to determine the latest service packs and patches if required.

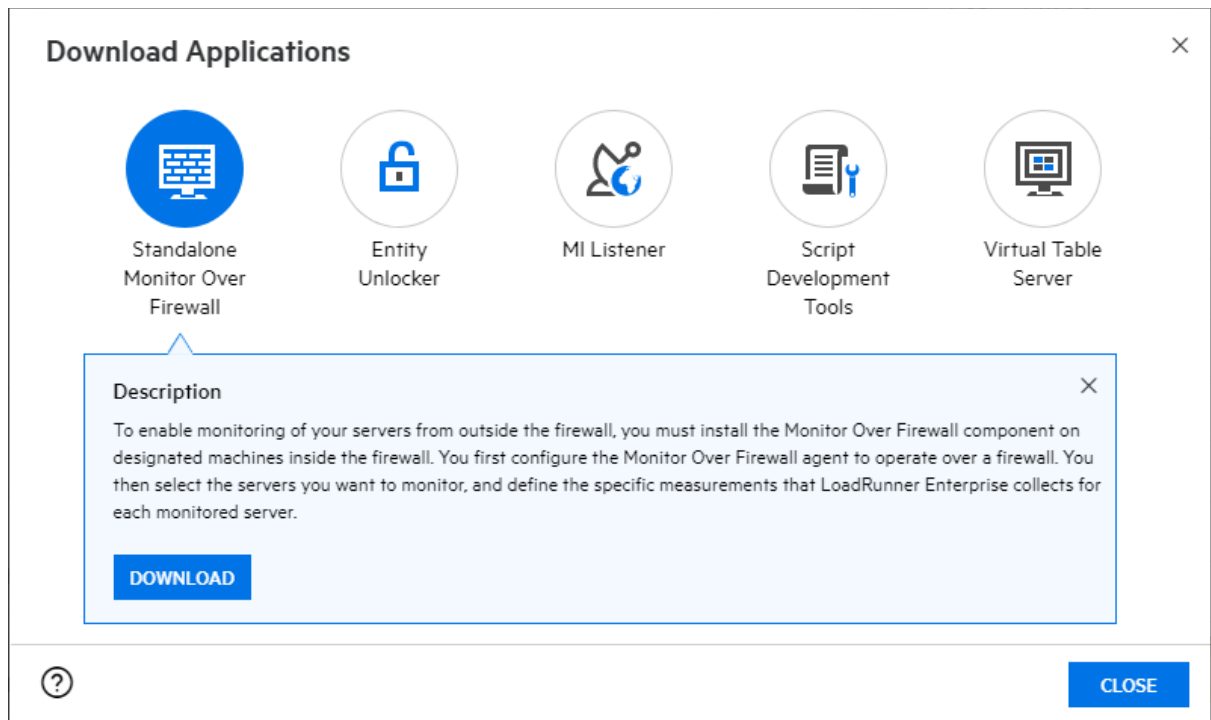
Important: Do not use installers obtained from other sources than your Micro Focus SaaS LRE instance or the Micro Focus SaaS team.

This installer can be downloaded directly through the LRE application:

On the dashboard, top left, click the Dashboard icon and select “Download Applications”:



In the popup window, select “Standalone Monitor Over Firewall” and click “Download”:



LRE 2022 requires the matching LRE 2022 Standalone Monitor Over Firewall installation (no version difference), as present in the “Download Applications” dialog.

Install patches if and only if they can be found in that same “Standalone Monitor Over Firewall” section of your LRE instance you downloaded the main installer from.

At the time of writing, no patches are required for the LRE 2022 Standalone Monitor Over Firewall.



## 6 Installation

The MOFW installation on the host is straight-forward, using the base installer obtained in the preparation phase earlier and running an automatic patch update as described later.

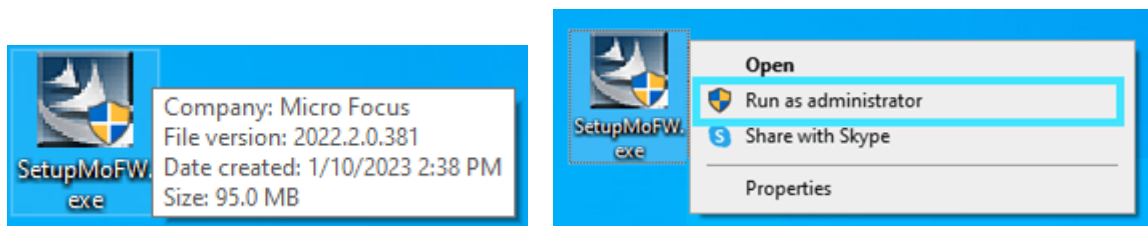
### 6.1 Checking for pre-installed components

Make sure that there are no previous versions of the MOFW software installed, and that no other LRE components such as VuGen, Analysis or Load Generator are installed. None of those components can exist on the machine where the Standalone Monitor Over Firewall is installed.

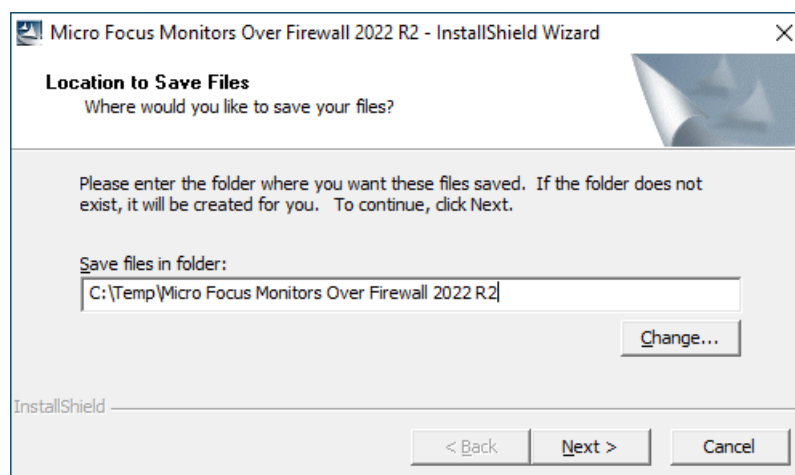
You can check for pre-installed components through the Windows Control Panel/Add or Remove Programs and uninstall them if present.

### 6.2 Base installation

After making sure that no previous load generator software is present, start the installation by starting your “SetupMoFW.exe” installer **using a local or domain administrator login, then Run as administrator**:



Accept the default location or select a temporary location for the installer to decompress the files:

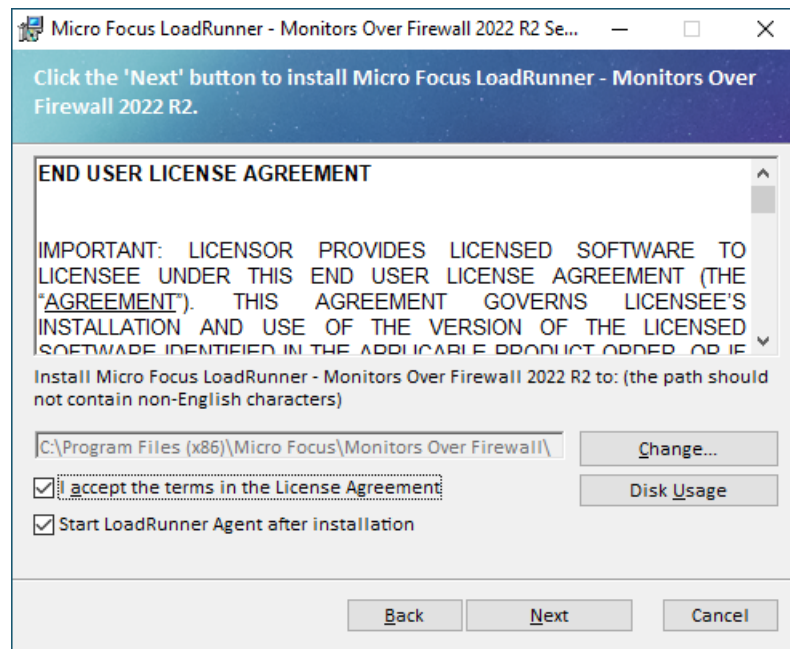


Accept any requests to install prerequisite programs that have been determined to be missing.

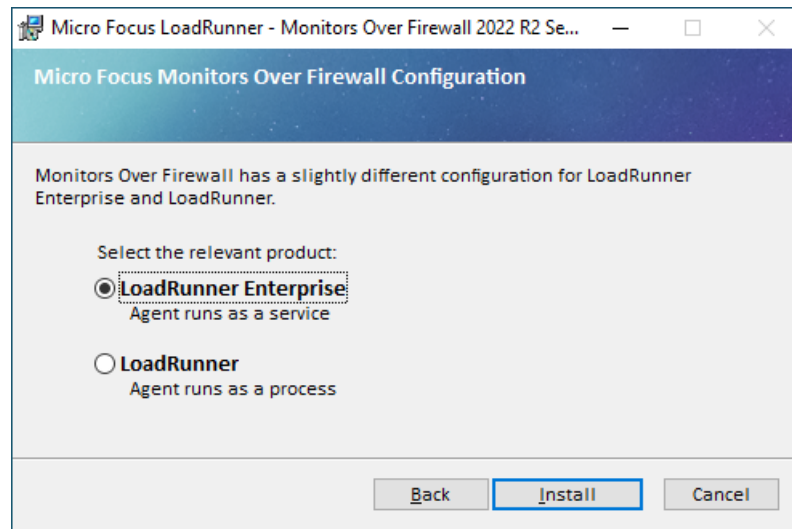
Once the prerequisite installation has completed, click “Next”.



Accept the License Agreement terms and to start the Agent after the installation.



Select the “LoadRunner Enterprise” product:

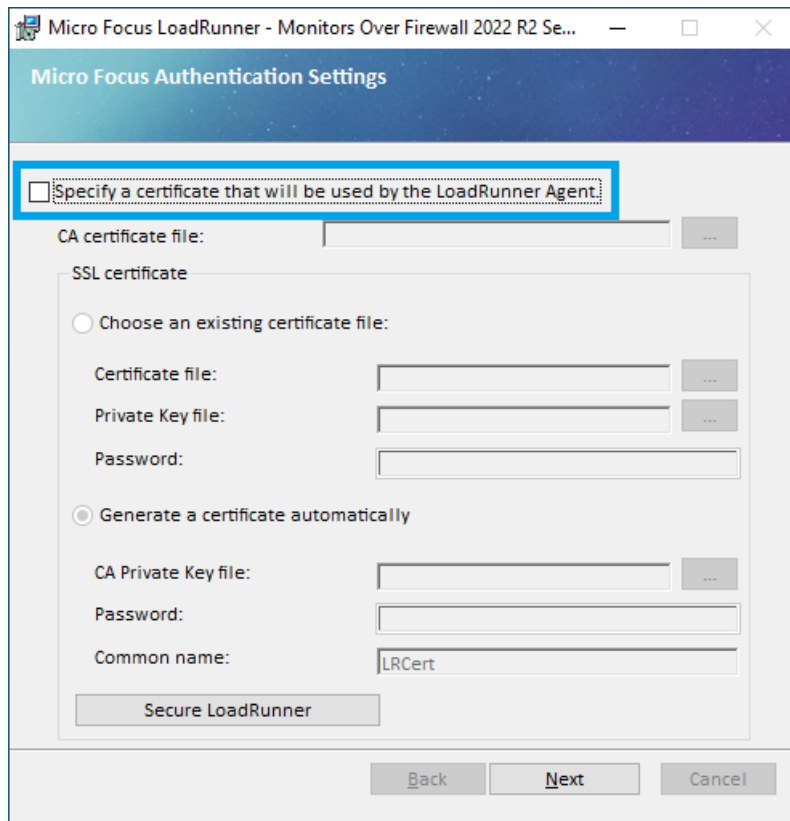


We recommend choosing “LoadRunner Enterprise” since this leads to installing the MOFW Agent as a service, providing permanent availability whenever the host is up and running.

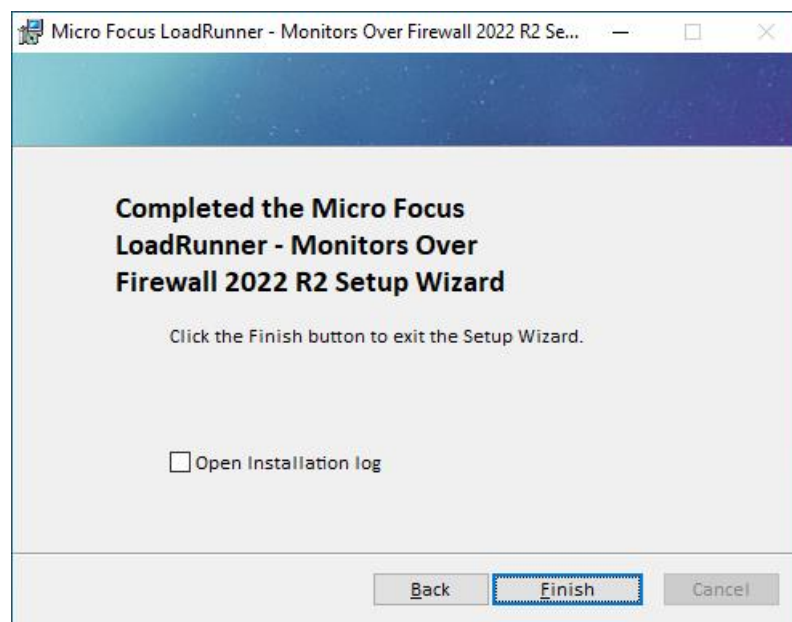
Continue with “Install” to finish the installation.

After the installation, make sure to **uncheck** “Specify a certificate that will be used by the LoadRunner Agent” unless you have exchanged certificates with Micro Focus, then follow the instructions from our operations team.

By unchecking this box, preinstalled default certificates are still used for the SSL communication.



Click “Next” and the installation is complete. Click “Finish” to end the installation process and proceed to the next phase.



### 6.3 Installation of the latest patches

Patches are to be installed if and only if present in the Downloads section of your LRE instance. At the time of writing this document, there are no patches are required.

## 7 Configuration

Once the MOFW has been successfully installed as per the previous chapters, the MOFW Agent must be configured to connect successfully to the MI Listener and then which server counters the MOFW Agent will collect and finally add the MOFW to our testing setup in LRE.

### 7.1 MOFW Agent Configuration

You will first need to configure the MOFW Agent on the MOFW host machine.

#### 7.1.1 Prerequisite #1: Agent Configuration parameters

You will need the following information.

- The **MI Listener Name**.
  - An example: almrwc1645p-mil1.saas.microfocus.com
  - This is the public DNS name of the specific MI Listener in the Micro Focus SaaS network that the MOFW will communicate with.
- The **Local Machine Key**.
  - The Local Machine Key is composed of  
  
                    <mofwname>  
  
  - Please note that the Local Machine Key for an MOFW has no location part like a Load Generator, so there are no underscores '\_' used in the name.

#### Policy for selecting a valid MOFW Local Machine Key

A valid MOFW Local Machine Key must meet the following criteria:

- Only alphabetical and numeric characters as well as dashes '-' are allowed.
- The name must start with a letter.
- We encourage the use of numbers, if prefixed with names.
- MOFW names must be unique (across the LRE instance). Hence, the name must be descriptive, contain customer-specific information and should not be generic.
- We recommend starting the name with an abbreviation of the company name, but also to include the term "mofw" to avoid confusion with the load generator names.

Here some typical examples of valid MOFW names for customer "Sample Industries, Inc.":

"sii-mofw01", "siwestmofw01", "siinyork-mofw"

#### 7.1.2 Prerequisite #2: Outbound Network Access from the MOFW to the MI Listener

As mentioned in the prerequisites chapter under "Network requirements between the MOFW Agent and Micro Focus SaaS", to function properly, the MOFW host must have network access to reach the MI Listener from your network. Network access can be provided through one of two means:

### Case A: Direct communication on port 443

The firewall between the MOFW and the internet must be open for **outbound communication on port 443 against the MI Listener DNS name** (or, less preferable, IP address).

If the firewall is not open, you need to open a firewall request to your security team.

Note that the firewall rule should not be bidirectional, since there are no incoming connections from the MI Listener. Only outbound connections on port 443 should be allowed.

*At this point, make sure to test if the firewall is open from your MOFW using the simple telnet test described in the Appendix.*

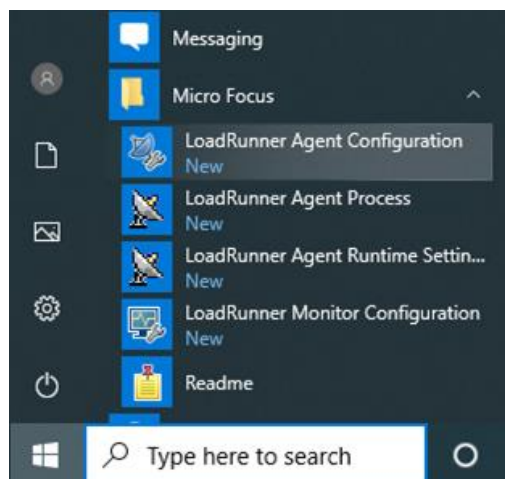
### Case B (alternate): Proxy Communication

If a proxy is required to reach the internet, please contact your IT or security team to provide the proxy configuration details, such as the proxy DNS name/IP address and its port. Proxy credentials and/or protocol information may be required as well.

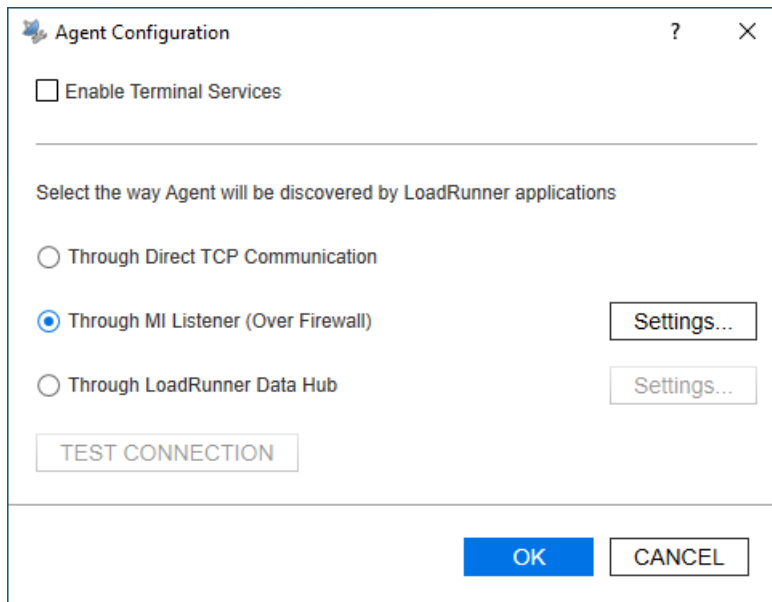
Alternatively, you may also log on to the MOFW host, open a browser and check its settings if a proxy is active and which parameters are used. If a proxy is present in the browser and browsing to the internet works, in most cases you should be able to use the same proxy settings for the MOFW configuration as well, but always check with your network team.

#### 7.1.3 Agent Configuration

To configure the agent, go to: *Start / Micro Focus / LoadRunner Agent Configuration*



Select the “Through MI Listener (Over Firewall)” checkbox and click “Settings”:



Agent Configuration

☐ Enable Terminal Services

---

Select the way Agent will be discovered by LoadRunner applications

☐ Through Direct TCP Communication

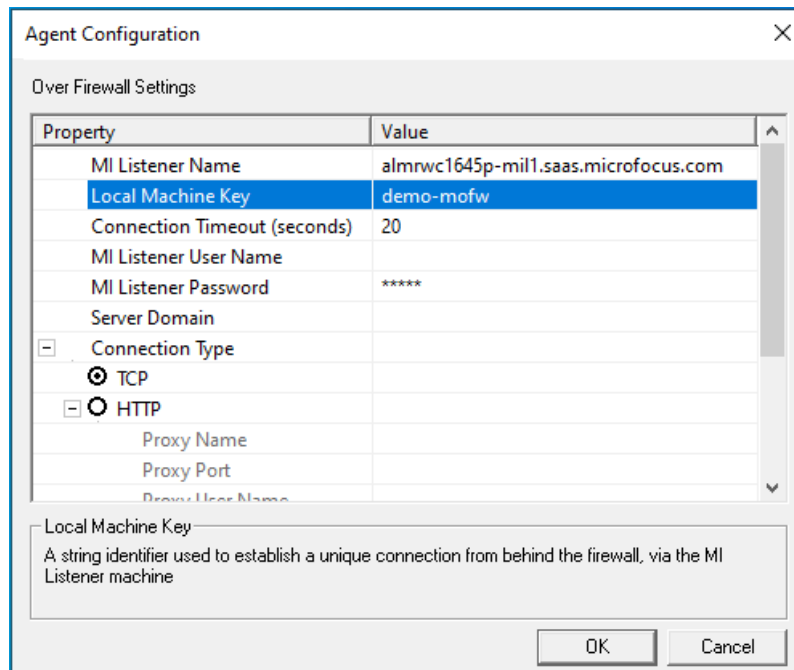
☒ Through MI Listener (Over Firewall) Settings...

☐ Through LoadRunner Data Hub Settings...

TEST CONNECTION

OK CANCEL

Enter the MI Listener Name, as provided to you by Micro Focus SaaS, and the Local Machine Key.



Agent Configuration

Over Firewall Settings

Property	Value
MI Listener Name	almrwc1645p-mil1.saas.microfocus.com
Local Machine Key	demo-mofw
Connection Timeout (seconds)	20
MI Listener User Name	
MI Listener Password	*****
Server Domain	
<input type="checkbox"/> Connection Type	
<input checked="" type="radio"/> TCP	
<input type="radio"/> HTTP	
Proxy Name	
Proxy Port	
Proxy User Name	

Local Machine Key  
A string identifier used to establish a unique connection from behind the firewall, via the MI Listener machine

OK Cancel

In this **example**, the public DNS name of the MI Listener Name is:

`almrwc1645p-mil1.saas.microfocus.com`

The Local Machine Key is the name only, without any location string. Example:

`demo-mofw`

Finally check the **Use Secure Connection (SSL)** box to enable SSL communication between the MOFW and the MI Listener and set **Check Server Certificates** to **None**. The latter is due to the certificate is offloaded on the load balancer and not on the MIL. It is also possible to not use SSL, so if you run into issues, please try without SSL as well.

**Agent Configuration**

Over Firewall Settings

Property	Value
<input type="checkbox"/> Connection Type	
<input checked="" type="radio"/> TCP	
<input type="radio"/> HTTP	
Proxy Name	
Proxy Port	
Proxy User Name	
Proxy Password	*****
Proxy Domain	
<input checked="" type="checkbox"/> Use Secure Connection (SSL)	
Check Server Certificates	None
Private key password	*****

Check Server Certificates:  
 Authenticate SSL certificates that are sent by the server. Medium - Verifies that the server certificate is signed by a trusted Certification Authority. High - verifies that the sender IP matches the certificate information.

OK Cancel

**For proxy configurations only (case B above):**

Enter the proxy parameters as provided by your IT or security team. This typically includes at least Proxy Name and Proxy Port, sometimes also credential information.

Check also the “Use Secure Connection (SSL)” box and set the “Check Server Certificates” to “None”.

**Agent Configuration**

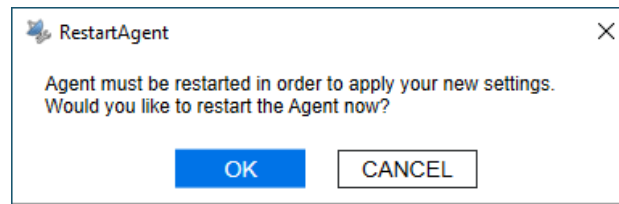
Over Firewall Settings

Property	Value
<input type="checkbox"/> Connection Type	
<input type="radio"/> TCP	
<input checked="" type="radio"/> HTTP	
Proxy Name	myproxy.example.com:8080
Proxy Port	
Proxy User Name	
Proxy Password	*****
Proxy Domain	
<input checked="" type="checkbox"/> Use Secure Connection (SSL)	
Check Server Certificates	None
Private key password	*****

OK Cancel

Click “OK” twice and you will be asked to restart the agent:

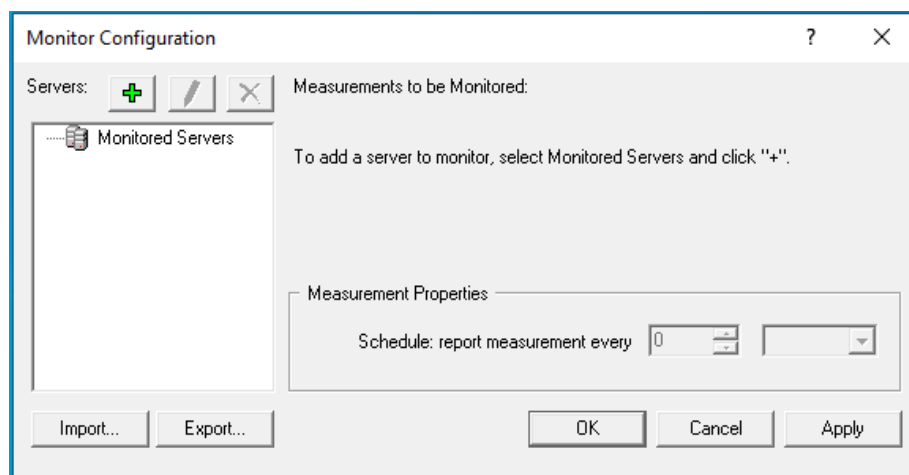
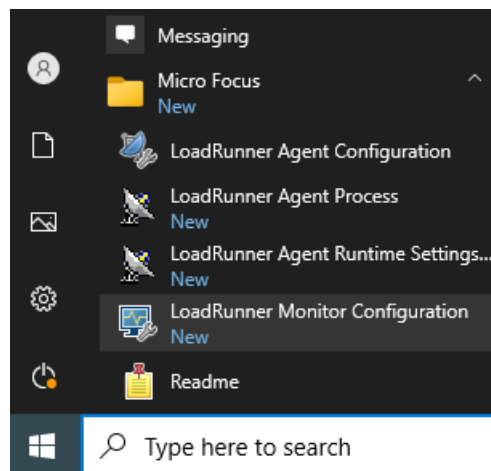




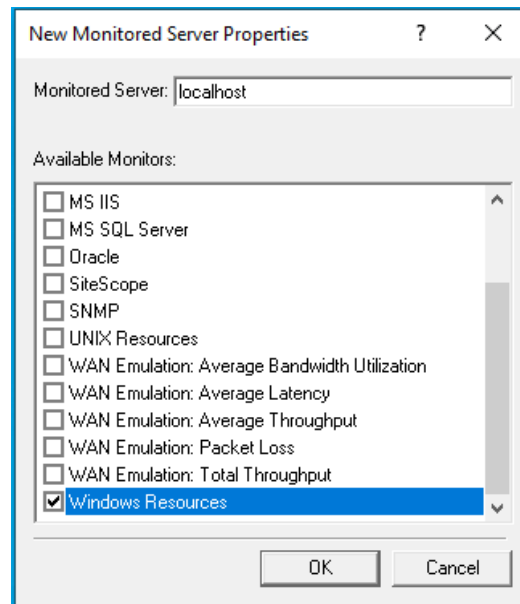
The Agent Configuration is now complete. Next, we need to configure the monitors.

## 7.2 Monitors Configuration

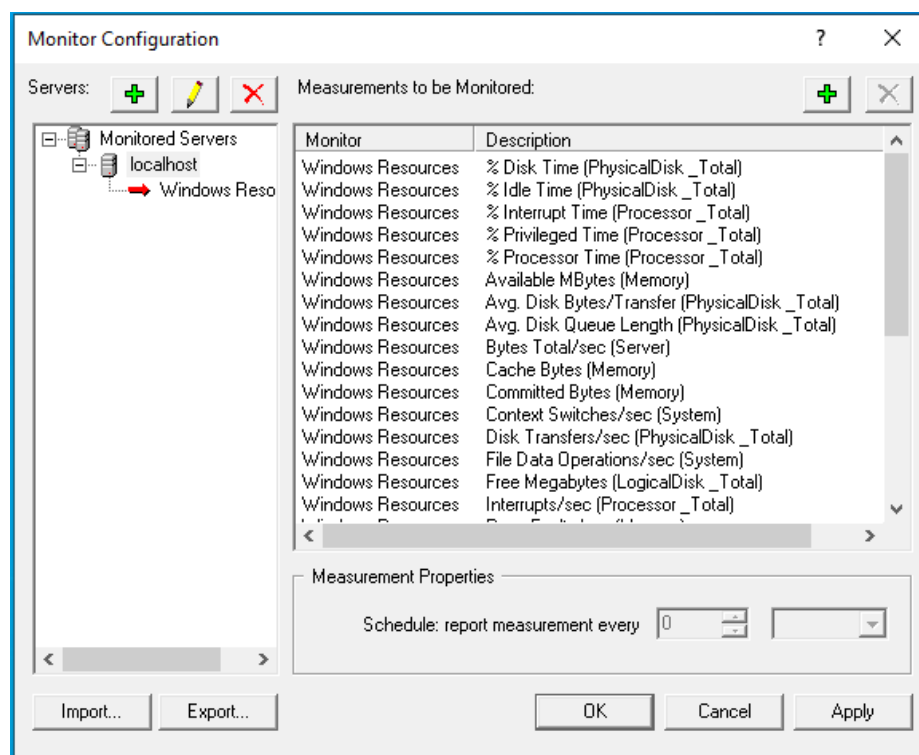
Open the LoadRunner Monitor Configuration from the start menu:



In the Monitor Configuration window, click on the upper left green '+' button to add the servers that will be monitored. Specify the server properties such as the server IP or hostname and the type of counters that will be captured.

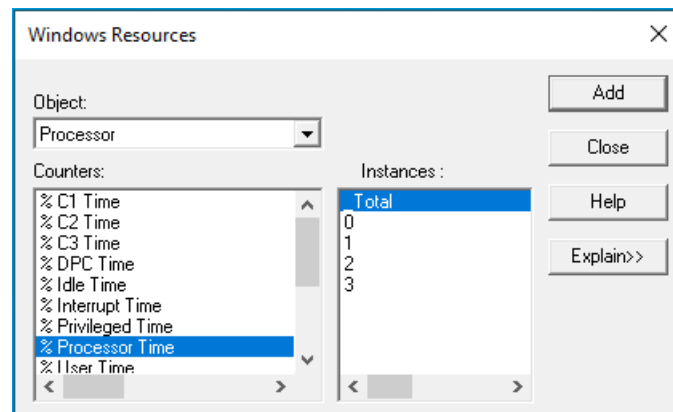


The Monitor Agent has a predefined list of server types and counters that could be captured by the product. It can also connect to Micro Focus SiteScope which is a more advanced monitoring tool. Once the server and a monitor type have been defined click OK and a default set of counters will be populated.

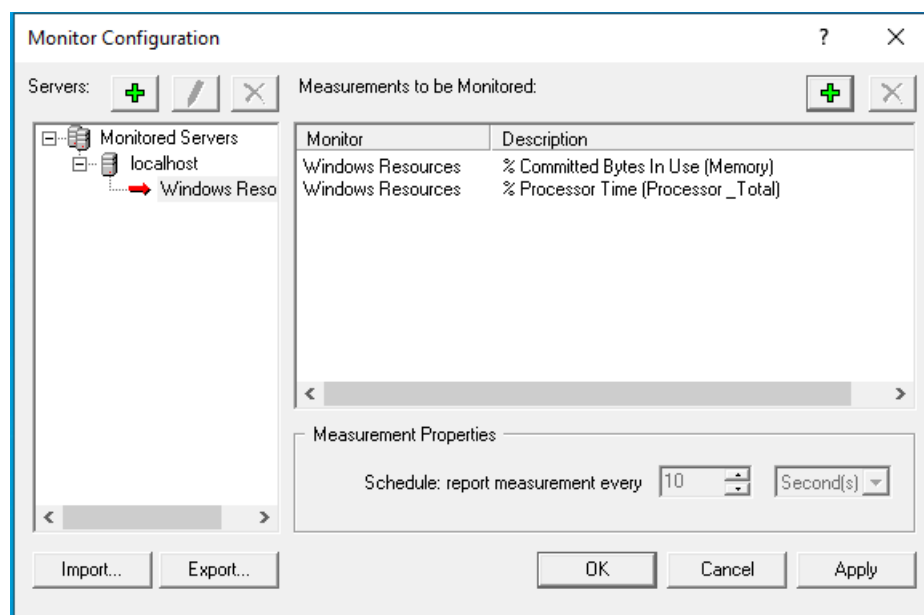


It is important to realize that the default set of counters might include counters that aren't available on the specific operating system that is being monitored, since different OS have slightly different counters. Due to that, best practice is to remove all the default counters and only add those of interest and that are confirmed to exist. To do that, highlight all the counters and click the delete button marked with a red 'x'.

To add the counters of interest, select the green + button on the right and select the name of the monitor type.



Select the object of interest and which counter to monitor, click the Add button for each and once done, click the Close button. This will bring you back to the Monitor Configuration window, and you will see your selected measurements once you've highlighted the monitor.

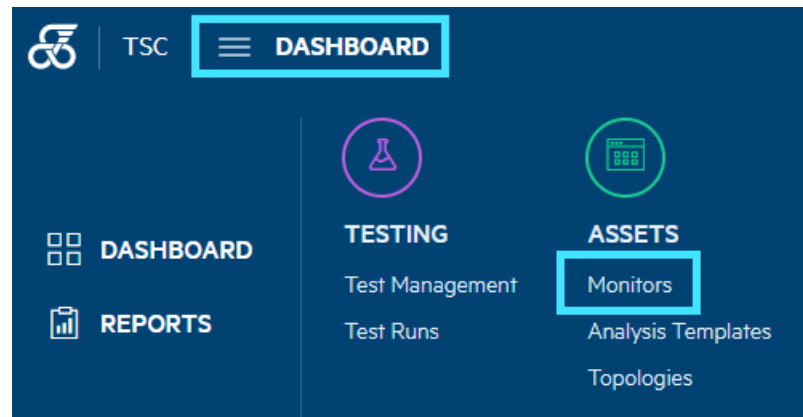


Click the OK button and the window will close, and the setup on the MOFW host is done.

### 7.3 LRE Configuration

To enable the MOFW Agent to report monitor measurements to a running performance test, we need to add the MOFW to our testing setup.

Log onto the LRE application and got to Assets -> Monitors:



Click the “New Monitor Over The Firewall Button” button.

Select Monitor Profile Type: Monitor Over Firewall.

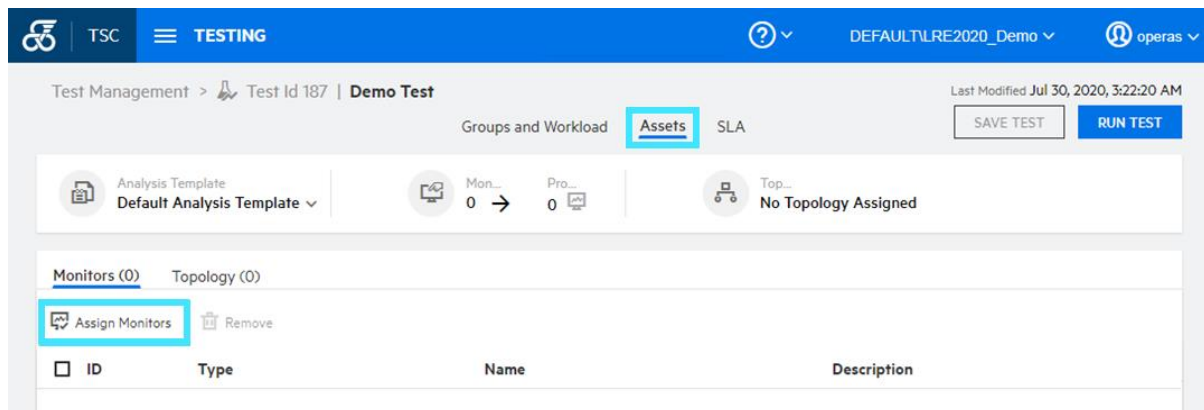
Enter a name (which isn’t related to the Local Machine Key).

Enter the Local Machine Key that was used in the Agent Configuration.

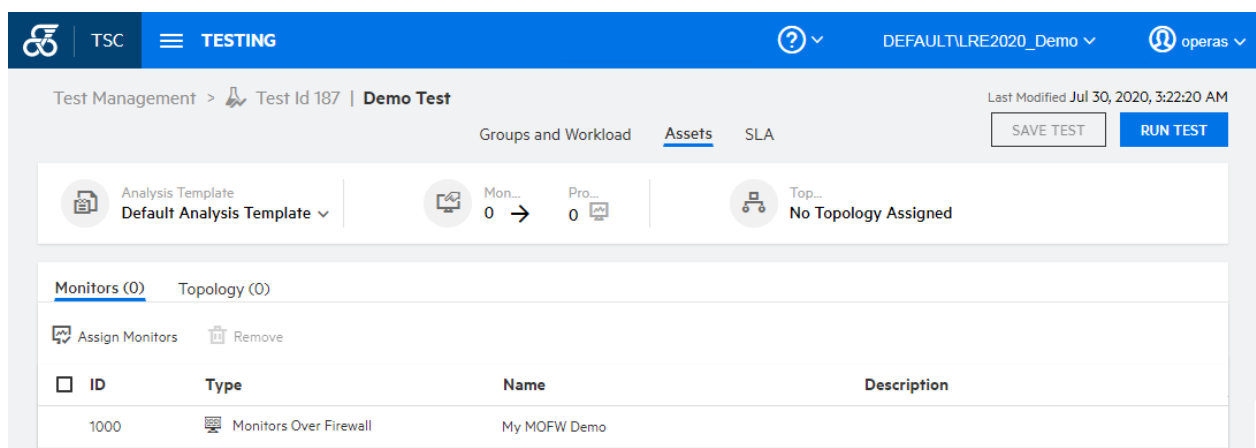
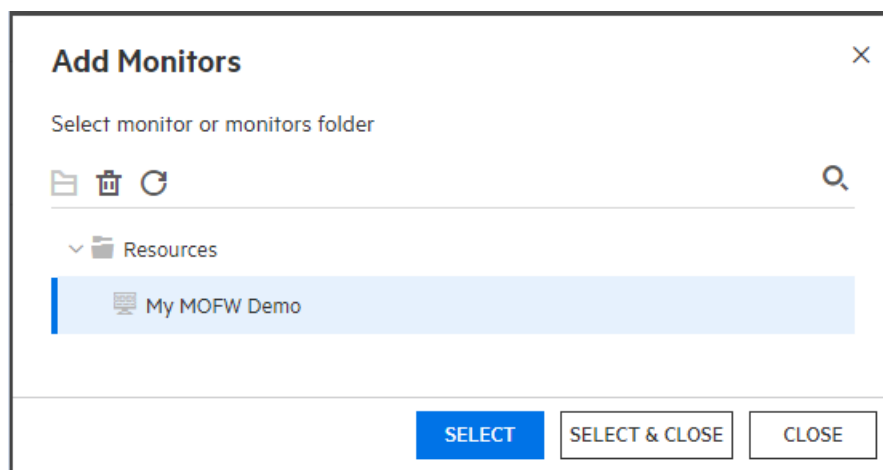
Select the MI Listener, which is displayed with the short name.

Click OK, and now that we have the MOFW registered in the system, we can add it to the tests that should utilize it.

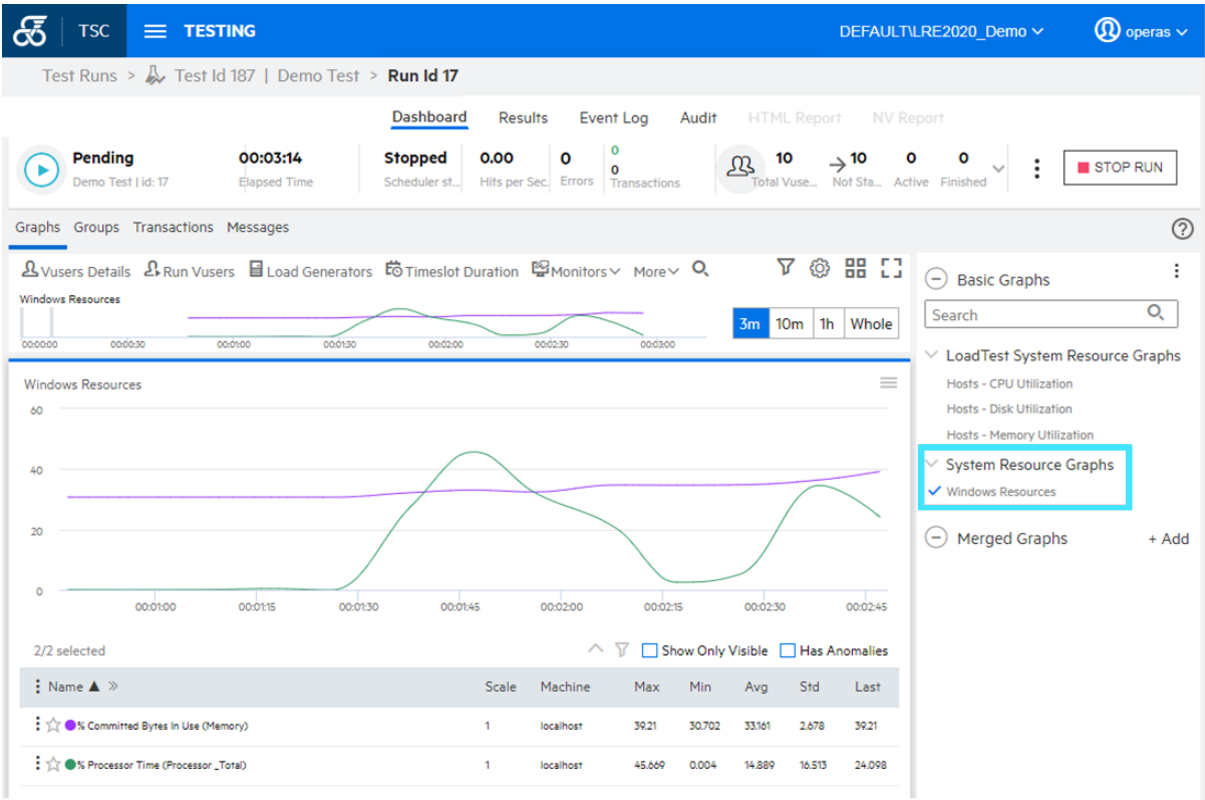
Select a test in the Test Management module and open it by clicking the Edit Test button. Select the Assets tab.



Click the Assign Monitors button and navigate to the MOFW in the tree and add it.



Once the test is running, although no Vusers need to be in a running state, the selected monitor measurements will start reporting after some time, but keep in mind that this might take up to a few minutes.



## 8 Troubleshooting

In case that the MOFW Agent is not working or running as expected, basic technical troubleshooting on your end will be required. Should the recommended steps in the *"Load generators over a firewall - LRE 2022 R2 Troubleshooting Guide"* not suffice to resolve any technical issues, please open a support case and our team will reach out to you to help you resolve the matter.

Please add at least the following information to the case to ensure fastest possible resolution:

- A short description of the issue, including any observations you find helpful that you may have made while troubleshooting the issue yourself.
- If applicable, which steps from the guides have already been attempted?

Note that during the troubleshooting process, the Micro Focus SaaS engineer may find it necessary to conduct a live remote diagnosis session on the MOFW host.

## 9 Using SiteScope with MOFW (Optional)

While the MOFW agent can connect to many servers and upload metrics to LRE, a more scalable solution is to use the MOFW agent together with SiteScope.

To use SiteScope with LRE you will still need the MOFW agent, so begin by configuring the MOFW agent as described above. Now you need to modify the MOFW agent to work with SiteScope.

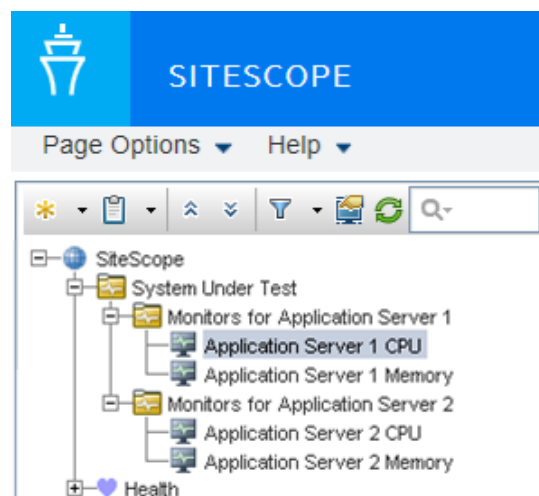
You can install SiteScope on the same host as the MOFW installation.

Please make sure that your SiteScope installation is compatible with LRE 2022 R2.

- Install SiteScope according to installation instructions.

### 9.1 SiteScope Configuration

After opening the URL <http://localhost:8080/SiteScope/> you should be presented with the SiteScope GUI, where you will first need to create a SiteScope group with a working SiteScope monitor attached. Please refer to the SiteScope specific documentation on how to do this in detail. In this example we've added two groups with two monitors in each group.



Do make sure that the Monitor has a green status indicating that data is being collected.

Name	Status	Type	Target	Summary
Selected node				
localhost CPU	🟢🔄	CPU	SiteScope Server	0% avg, cpu1 0%,
Counters (3 out of 3)				
utilization				0%
utilization cpu # 1	?			0%
utilization cpu # 2	?			0%

Status: Good  
Monitor Availability: Data Collected

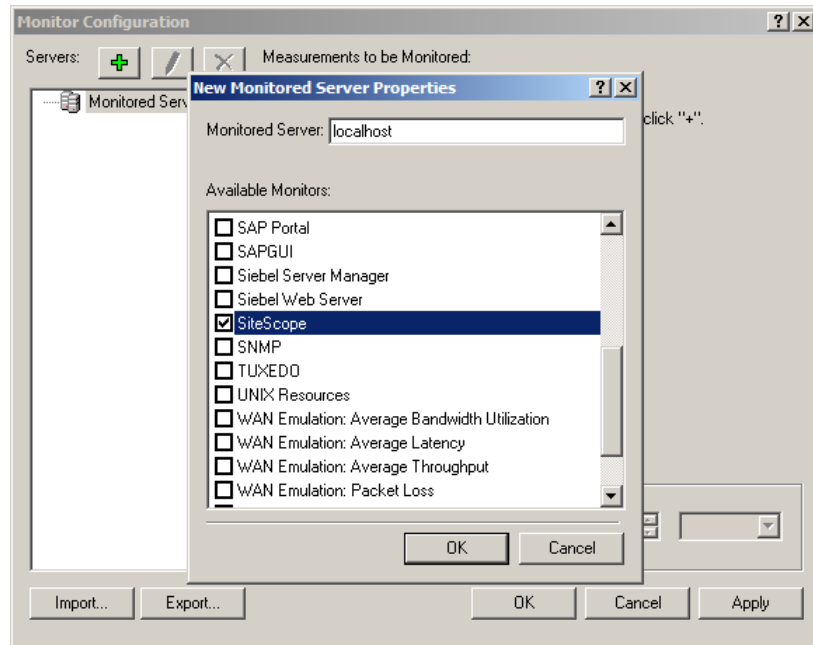
### 9.2 MOFW Configuration for SiteScope

Now we need to use the “Monitor Configuration” tool of the MOFW to tell LRE about the SiteScope setup we have created. This is done similarly to the steps in the “Monitor Configuration” chapter

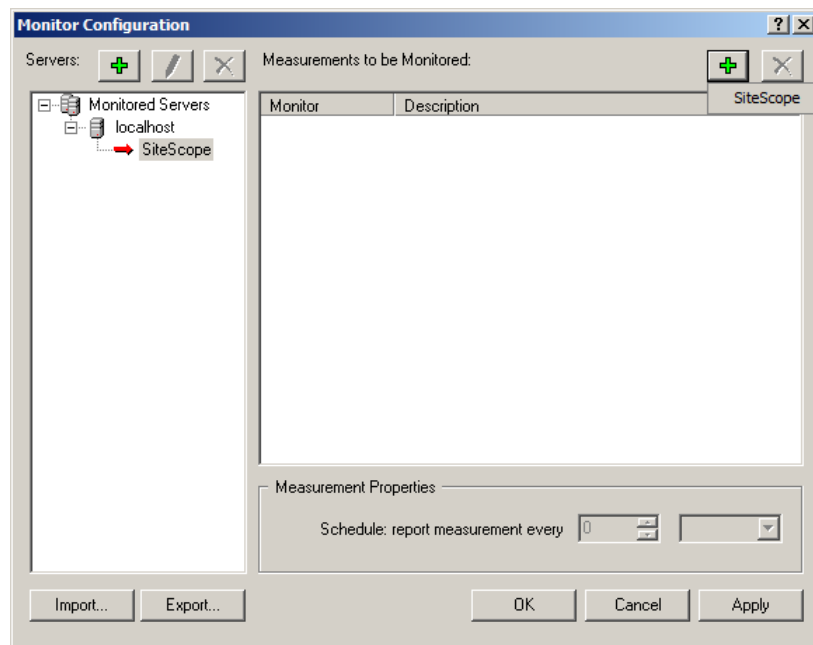


earlier in this document. Any differences are noted below.

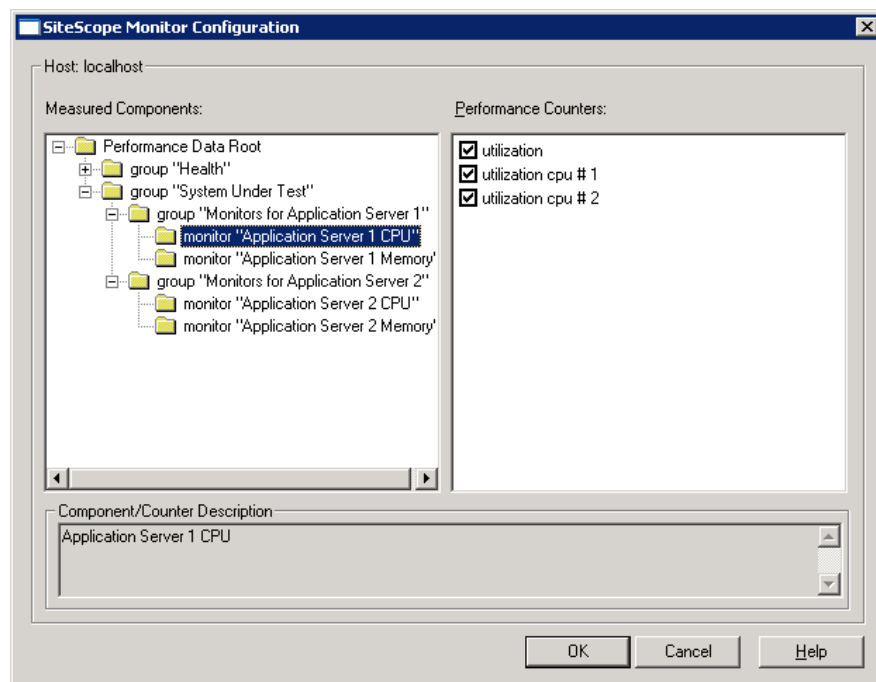
First we start the Monitor Configuration as before. Next, we bind SiteScope to the MOFW by registering a server “localhost” (or the network/host name of the host wherever the SiteScope application resides), and by adding a “SiteScope” monitor:



Now we add the monitors from SiteScope to MOFW. We first click on “+” to add monitors:



Next, we add all monitors (or a subset we chose) that we registered in SiteScope, by opening the tree for each desired monitor in each group and selecting each desired metric (performance counter) through checkboxes:



Now we click "OK" twice to close the Monitor Configuration tool. Assuming that all other steps earlier in this document were taken to register the MOFW inside of LRE and inside a load test, the monitoring setup is now complete.

## 10 Appendix

### 10.1 Configuring the MOFW Agent as either Service or Process

**The MOFW agent can be run either as service or as a process.**

The MOFW agent can be run either as service or as a process. Micro Focus SaaS recommends running the agent as a service, since the Agent then becomes available after the host is started.

*NOTE: It is crucial that the Agent only runs through one of these two means, not both, at the same time. Otherwise, operational errors will occur.*

As a service, the 'LoadRunner Agent Service' service runs automatically even if the user does not log in to the system. The user can login to the machine and go to Administrative Tools -> Services -> 'LoadRunner Agent Service' to verify or change which user account is running the service, since this might affect the user's rights to pass through proxies. The service should run under administrative privileges, or user "IUSR\_METRO".

While installing, make sure to have administrative privileges (domain or local).

As a process, the Agent runs through 'magentproc.exe' from the <MOFW>\launch\_service\bin folder. This requires a user to login to the machine to start this Agent and stay logged in during the use of the MOFW. The Agent will run with the same user rights as the logged in user.

After installing the MOFW Agent, the user can switch the Agent to run as either service or process by performing the following steps.

**To run the MOFW Agent as a service (recommended by Micro Focus SaaS for permanent setups):**

1. Remove the "LoadRunner Agent Process" shortcut from the Start -> Program Files -> Startup group if present, to avoid the process from starting when the computer is rebooted.
2. Launch the command prompt using **Run as Administrator** and go to <MOFW>\launch\_service\bin. (If started erroneously as a non-administrative user, the installed service will not work properly later).
3. Type in: `magentservice.exe -install`  
  - Note: If you want to set a different account:  
Type in:  
`magentservice.exe -install <user_domain>\<user_name> <password>`
4. Go to the Window's Services view and change its properties to start it as "Automatic".
5. If you wish to modify the login details after installation of Agent Service, do the following:
  - Go to Start -> Control Panel -> Administrative Tools -> Services and look for the LoadRunner Agent Service.
  - Right-click and select Properties->Log On and change the information from there.

**To run the MOFW Agent as a process (if needed):**

1. Launch the command prompt using **Run as Administrator** and go to <MOFW>\launch\_service\bin

2. Uninstall LoadRunner Agent Service by typing in:  
`magentservice.exe -remove<enter>`
3. Verify that the service 'LoadRunner Agent Service' is no longer running.
4. Start the MOFW Agent process by running `magentproc.exe` from  
`<MOFW>\launch_service\bin`
5. If desired to start the process automatically after login, add a shortcut to the  
`magentproc.exe` into the Start -> Program Files -> Startup group.

#### **To run the MOFW Agent service under a different account:**

If an installed MOFW Agent service runs under incorrect credentials that do not have proper administrative permissions, you can correct this by uninstalling and reinstalling the service:

1. Launch the command prompt using **Run as Administrator** and go to  
`<MOFW>\launch_service\bin`
2. Uninstall LoadRunner Agent Service by typing in:  
`magentservice.exe -remove<enter>`
3. Type in `"magentservice.exe -install <user_domain>\<user_name> <password>"`
4. Go to the Window's Services view and change its properties to start it as "Automatic".

## **10.2 Reinstalling the Standalone Monitor Over Firewall Software**

In some cases, it may be required to reinstall the Standalone Monitor Over Firewall software completely, e.g. if the installation got corrupted. Please see steps for reinstallation below.

#### **Note for multi-component installation**

With some older versions of the MOFW software, it has been possible to install multiple standalone components on the same host. That is no longer supported meaning that **ONLY** the MOFW software can be installed on the host.

#### **Uninstalling and reinstalling the MOFW:**

- Make a note of the Agent Configuration parameters.
- Obtain the Standalone Monitor Over Firewall software by downloading it from the LRE application ("Standalone Monitor Over Firewall"), using the "Download applications" button.
- Make sure your Windows account on the MOFW has administrative privileges.
- Now uninstall the existing Standalone Monitor Over Firewall software.
- Reinstall the latest Standalone Monitor Over Firewall software using *administrative* privileges (e.g. by right-clicking on the installer and selecting "run as administrator"), and during the setup choose the "LoadRunner Enterprise" and "as a service" (in contrast to as a process) options.
- In the Agent Configuration application, enter the configuration parameters as previously, and restart the agent as requested. This typically includes at least the MI Listener Name and the Local Machine Key.
- Verify through the Windows "services" view that the service is now present in Windows.
- Allow the host to restart.

- Make sure that the service is running.

### 10.3 Applying the Latest Patch Upgrades

- **Any patches for your Standalone Monitor Over Firewall installations that are required to match your LRE instance will be available to download from your LRE instance, certified for use by Micro Focus SaaS.**
- At the time of writing, for LRE 2022 R2, no SaaS-certified patches for Standalone Monitor Over Firewall are required. Patches are required if and only if shown in your download section.

### 10.4 Test if the firewall is open for MOFW to SaaS Communication

MOFWs can connect to the MI Listener in Micro Focus SaaS LRE in one of two ways: Either directly through your company's firewall through outbound port 443 (recommended), or through a proxy in your network.

In many cases, outbound communication on port 443 is already permitted, for example for browsing the internet from the host, though in cases of higher security, even outbound communication may be blocked by default.

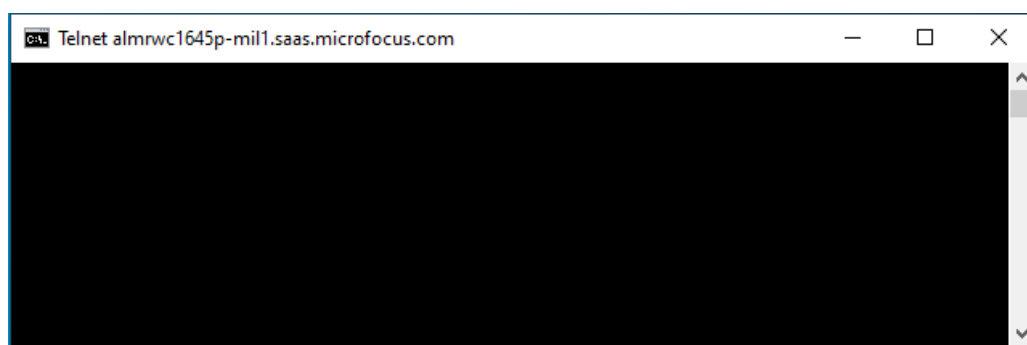
Log in to the selected MOFW, e.g. through Remote Desktop Client (RDP).

Open a Windows command shell (e.g. by Start/Run, typing "cmd").

Enter `telnet <MI Listener DNS name> 443` and check the response.

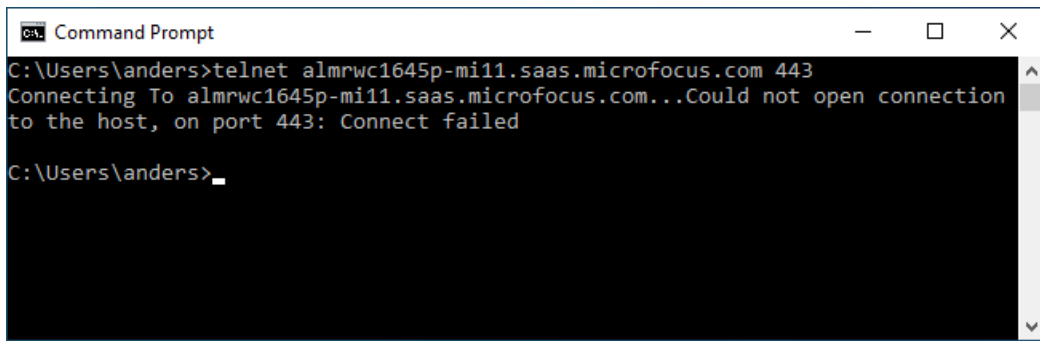
Example: `telnet almrwc1645p-mil1.saas.microfocus.com 443`

**Case 1:** If the response looks like this (blinking cursor on empty window):



Then the firewall is open from the MOFW host to the MI Listener on port 443, as it needs to be for direct communication. You can click the "X" close icon to close the window and log off.

**Case 2:** If the response looks like this ("could not open connection ..."):



```
Command Prompt
C:\Users\anders>telnet almrwc1645p-mi11.saas.microfocus.com 443
Connecting To almrwc1645p-mi11.saas.microfocus.com...Could not open connection
to the host, on port 443: Connect failed

C:\Users\anders>
```

Then the firewall is not open and is in need to be opened by your IT Security team unless you should use a proxy configuration instead. Please contact your IT Security Team to open the firewall from the list of IP addresses of MOFW hosts you use to the MI Listener DNS name/IP address outbound on port 443. Note that the firewall rule should not be bidirectional, since there is no incoming communication from the MI Listener. Only outbound connections on port 443 need to be allowed.

**Case 3** – If the telnet test cannot be performed:

We recommend asking your IT Security team to check if the firewall is open outgoing from the MOFW IP address(es) to the MI Listener DNS name (or if given alternatively, the MI Listener IP address) on port 443.