



syslog-ng Premium Edition 7.0.28

## Windows Event Collector Administration Guide

**Copyright 2021 One Identity LLC.**

**ALL RIGHTS RESERVED.**

This guide contains proprietary information protected by copyright. The software described in this guide is furnished under a software license or nondisclosure agreement. This software may be used or copied only in accordance with the terms of the applicable agreement. No part of this guide may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording for any purpose other than the purchaser's personal use without the written permission of One Identity LLC .

The information in this document is provided in connection with One Identity products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of One Identity LLC products. EXCEPT AS SET FORTH IN THE TERMS AND CONDITIONS AS SPECIFIED IN THE LICENSE AGREEMENT FOR THIS PRODUCT, ONE IDENTITY ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ONE IDENTITY BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ONE IDENTITY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. One Identity makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. One Identity does not make any commitment to update the information contained in this document.

If you have any questions regarding your potential use of this material, contact:

One Identity LLC.  
Attn: LEGAL Dept  
4 Polaris Way  
Aliso Viejo, CA 92656

Refer to our Web site (<http://www.OneIdentity.com>) for regional and international office information.

**Patents**

One Identity is proud of our advanced technology. Patents and pending patents may apply to this product. For the most current information about applicable patents for this product, please visit our website at <http://www.OneIdentity.com/legal/patents.aspx>.

**Trademarks**

One Identity and the One Identity logo are trademarks and registered trademarks of One Identity LLC. in the U.S.A. and other countries. For a complete list of One Identity trademarks, please visit our website at [www.OneIdentity.com/legal](http://www.OneIdentity.com/legal). All other trademarks are the property of their respective owners.

**Legend**

 **WARNING:** A WARNING icon highlights a potential risk of bodily injury or property damage, for which industry-standard safety precautions are advised. This icon is often associated with electrical hazards related to hardware.

 **CAUTION:** A CAUTION icon indicates potential damage to hardware or loss of data if instructions are not followed.

# Contents

<b>Introduction</b> .....	<b>5</b>
<b>Authentication options</b> .....	<b>7</b>
<b>Configuring Windows event logs to be forwarded to the syslog-ng Premium Edition server using WEC</b> .....	<b>9</b>
Installing the Windows Event Collector .....	11
Generating SSL certificates for Windows Event Collector .....	12
Configuring certificate-based authentication on event source computers .....	17
Configuring Kerberos authentication on Windows Server (DC) hosts .....	21
Configuring Kerberos authentication on Windows domain client hosts .....	23
Configuring Kerberos authentication on Linux hosts .....	23
Configuring Windows Event Collector .....	25
Configuring syslog-ng PE .....	32
<b>Starting/stopping Windows Event Collector</b> .....	<b>34</b>
<b>Message format in Windows Event Collector for syslog-ng PE</b> .....	<b>35</b>
<b>Flow control</b> .....	<b>36</b>
<b>Performance</b> .....	<b>37</b>
<b>Limitations</b> .....	<b>38</b>
<b>Troubleshooting Windows Event Collector</b> .....	<b>39</b>
Troubleshooting Windows Event Collector if Kerberos authentication is used .....	40
<b>WEC configuration examples</b> .....	<b>43</b>
WEC configuration example for certificate-based authentication .....	44
WEC configuration example for Kerberos authentication .....	45
<b>WEC clustering in syslog-ng PE</b> .....	<b>47</b>
The working mechanism of Windows Event Collector (WEC) clustering .....	48
States in WEC clustering (file-based states and Redis states) .....	48
Converting file-based states to Redis states .....	50
An example use case for WEC clustering .....	51
Troubleshooting for WEC clustering .....	53

Log messages and why the WEC sends them .....	53
Checking data stored in Redis .....	54
Timers on the WEC side .....	55
<b>About us .....</b>	<b>56</b>
Contacting us .....	56
Technical support resources .....	56

## Introduction

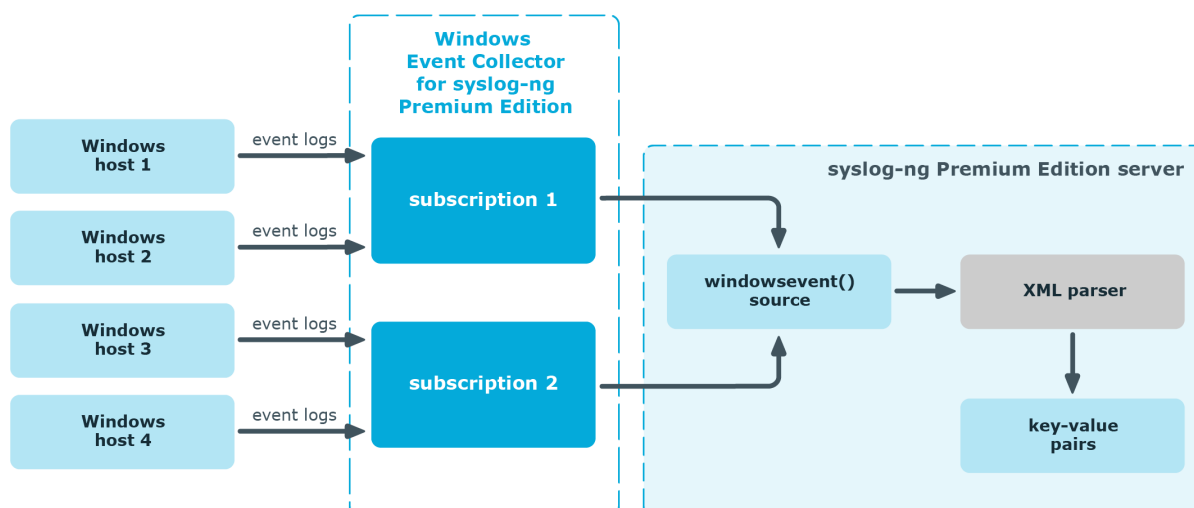
The Windows Event Collector (WEC) acts as a log collector and forwarder tool for the Microsoft Windows platform. It collects the log messages of Windows-based hosts over HTTP or HTTPS (using TLS encryption and mutual authentication), and forwards them to a syslog-ng Premium Edition (syslog-ng PE) server. In Windows terminology, this tool allows you to define source-initiated push subscriptions, and have them forwarded to a syslog-ng PE server. For details on the limitations of WEC, see [Limitations](#).

Unlike the [syslog-ng Agent for Windows](#), the Windows Event Collector is a standalone tool that does not require installing additional software on the Windows-based host itself. This can be an advantage when your organization's policies restrict or do not allow the installation of third-party tools.

Another difference between the Windows Event Collector tool and syslog-ng Agent for Windows is that WEC forwards only Windows EventLog, while syslog-ng Agent forwards both Windows event logs as well as files from Windows hosts to the syslog-ng PE server.

The Windows Event Collector sits between your Windows hosts and your syslog-ng Premium Edition server, accepting log messages from the remote Windows side with WinRM and feeding them to syslog-ng Premium Edition 7.0.

**Figure 1: How Windows Event Collector works in syslog-ng PE 7.0**



For more information on how you can configure Windows event logs to be forwarded to your syslog-ng Premium Edition server using the WEC tool, see [Configuring Windows event logs to be forwarded to the syslog-ng Premium Edition server using WEC](#).

# Authentication options

You can select which authentication option you want to use between Windows Event Forwarding (WEF) and Windows Event Collector (WEC) for event forwarding. The supported authentication options are the following:

- Certificate-based
- Kerberos

From syslog-ng PE version 7.0.26, for event forwarding between WEF and WEC, Kerberos authentication is also supported as a Preview Feature, besides certificate-based authentication.

**CAUTION:** This is a Preview Feature, which provides an insight to planned enhancements to functionality in the product. Consider this Preview Feature a work in progress, as it may not represent the final design and functionality.

This feature has completed QA release testing, but its full impact on production systems has not been determined yet, and potential future changes in functionality and the user interface may result in compatibility issues in your current settings.

One Identity recommends the following:

- Consider the potential risks when using this functionality in a production environment.
- Consider the [Support Policy on Product Preview Features](#) before using this functionality in a production environment.
- Closely and regularly keep track of official One Identity announcements about potential changes in functionality and the user interface. If these potential changes affect your configuration, check the changes you have to make in your configuration, otherwise your syslog-ng PE application may not start after upgrade.
- Always perform tests prior to upgrades in order to avoid the risks mentioned.

However, you are welcome to try this feature and if you have any feedback, [contact One Identity](#).

#### Support Policy on Product Preview Features

The One Identity Support Team will:

- Accept and review each service request opened regarding a Preview Feature.
- Consider all service requests relating to a Preview Features as severity level 3.
- Provide best effort support to resolve any issues relating to a Preview Feature.
- Work with customers to log any product defects or enhancements relating to Preview Features.
- Not accept requests for escalations regarding Preview Features.
- Not provide after-hours support for Preview Features.

**NOTE:** WEC cannot work in different authentication modes at once: you can either configure Kerberos authentication, or certificate-based authentication.

**NOTE:** Kerberos authentication does not work in a WEC cluster deployment.



# Configuring Windows event logs to be forwarded to the syslog-ng Premium Edition server using WEC

This section describes, at a high level, how you can configure Windows event logs to be forwarded to your syslog-ng Premium Edition server using the Windows Event Collector (WEC) tool.

The configuration procedure differs slightly according to which authentication option (certificate-based or Kerberos) you want to use between Windows Event Forwarding (WEF) and WEC.

For more information on the configuration procedure:

- If you want to use certificate-based authentication, see [Configuration procedure if certificate-based authentication is used](#).
- If you want to use Kerberos authentication, see [Configuration procedure if Kerberos authentication is used](#).

**NOTE:** WEC cannot work in different authentication modes at once: you can either configure Kerberos authentication, or certificate-based authentication.

## Configuration procedure if certificate-based authentication is used

1. Set up WEC as the server that collects and forwards event logs.

The following procedure provides details on how to set up and configure the WEC tool:

1. Install WEC.

For more information, see [Installing the Windows Event Collector](#).

2. Generate SSL certificates for WEC.

For more information, see [Generating SSL certificates for Windows Event Collector](#).

3. Configure WEC.

For more information, see [Configuring Windows Event Collector](#).

2. Configure Windows event source computers.

For more information, see [Configuring certificate-based authentication on event source computers](#).

3. WEC accepts incoming event log subscription requests from the Windows hosts.

4. WEC handshakes the event forwarding settings with the Windows hosts, for example, which events to forward.

5. WEC accepts the forwarded event logs, and writes the raw logs to a Unix datagram socket.
6. The syslog-ng PE application reads the Unix datagram socket using a source called `windowsevent()`.  
For details on how to configure your syslog-ng PE server, see [Configuring syslog-ng PE](#).
7. The syslog-ng PE application parses the logs into key-value pairs using the XML parser.  
For details on the XML parser, see ["XML parser" in the Administration Guide](#).

## Configuration procedure if Kerberos authentication is used

1. Set up WEC as the server that collects and forwards event logs.  
The following procedure provides details on how to set up and configure the WEC tool:
  1. Install WEC.  
For more information, see [Installing the Windows Event Collector](#).
  2. Configure WEC.  
For more information, see [Configuring Windows Event Collector](#).
2. Configure the Windows event source computers.  
For more information, see:
  1. [Configuring Kerberos authentication on Windows Server \(DC\) hosts](#)
  2. [Configuring Kerberos authentication on Windows domain client hosts](#)
3. Configure the Linux host.  
For more information, see [Configuring Kerberos authentication on Linux hosts](#).
4. WEC accepts incoming event log subscription requests from the Windows hosts.
5. WEC handshakes the event forwarding settings with the Windows hosts, for example, which events to forward.
6. WEC accepts the forwarded event logs, and writes the raw logs to a Unix datagram socket.
7. The syslog-ng PE application reads the Unix datagram socket using a source called `windowsevent()`.  
For details on how to configure your syslog-ng PE server, see [Configuring syslog-ng PE](#).
8. The syslog-ng PE application parses the logs into key-value pairs using the XML parser.  
For details on the XML parser, see ["XML parser" in the Administration Guide](#).

---

## Installing the Windows Event Collector

The Windows Event Collector (WEC) is bundled into the syslog-ng PE installers from version 7.0.6 onward and is installed automatically. By installing syslog-ng PE, you also install WEC. A systemd service file is provided, however, syslog-ng-wec is not registered to start at boot.

### ***To install the Windows Event Collector***

To start syslog-ng-wec at boot, register the init script using the `systemctl enable syslog-ng-wec` command.

For details on how to start syslog-ng-wec manually, see [Starting/stopping Windows Event Collector](#).

## Generating SSL certificates for Windows Event Collector

**NOTE:** Perform the procedure described in this section only if you want to use certificate-based authentication between Windows Event Forwarding (WEF) and Windows Event Collector (WEC).

When the Windows-based host and WEC start communicating for the first time, they authenticate each other by exchanging and verifying each other's certificates. The process begins with the Windows host requesting and verifying the WEC tool's certificates. After successful verification, the Windows host sends its own certificates for verification to WEC.

**NOTE:** If the Windows host fails to authenticate the WEC tool's certificates for some reason, check the Windows event logs for details.

For details on which event logs to look at, see [Troubleshooting Windows Event Collector](#).

The example described in this section uses OpenSSL for certificate generation. Note, however, that you can generate certificates using the Windows Public Key Infrastructure (PKI).

**⚠ CAUTION:**

**The examples in this section illustrate the creation of certificates with a default value of 365 days for expiration. However, most deployments remain operational for several years, so refreshing your certificates every 365 days is unnecessary. To avoid refreshing your certificates every year, One Identity recommends that you setup your host certificates with an expiration time longer than the default value of 365 days (as seen in the examples).**

To generate the SSL certificates for WEC, complete the following steps:

**NOTE:** The following configuration example works only if you have a functioning DNS server in your network. If you want to test WEC without a properly working DNS server, instead of host names, work with IP addresses in certificates and configurations. For an example configuration, see [Creating certificates/Collecting Windows EventLog without installing extra software on Windows](#).

## To generate SSL certificates for Windows Event Collector

1. Create two certificate template files for both the server and the clients.

**NOTE:** The templates shown here are examples only. Not all elements of the example \*opts.cnf files are mandatory, for example, you do not need to define two DNS instances.

The contents of server-certopts.cnf:

```
[req]
default_bits = 4096
default_md = sha256
req_extensions = req_ext
keyUsage = keyEncipherment,dataEncipherment
basicConstraints = CA:FALSE
distinguished_name = dn

[ req_ext ]
subjectAltName = @alt_names
extendedKeyUsage = serverAuth,clientAuth

[ alt_names ]
DNS.1 = <1st DNS hostname of server (preferably FQDN)>
...
DNS.<N> = <Nth DNS hostname of server (preferably FQDN)>
IP.1 = <1st IP of server>
...
IP.<N> = <Nth IP of server>

[dn]
```

### Example: Contents of server-certopts.cnf

```
[req]
default_bits = 4096
default_md = sha256
req_extensions = req_ext
keyUsage = keyEncipherment,dataEncipherment
basicConstraints = CA:FALSE
distinguished_name = dn

[ req_ext ]
subjectAltName = @alt_names
```

```

extendedKeyUsage = serverAuth,clientAuth

[ alt_names ]
DNS.1 = windowseventcollector.widgits
DNS.2 = wec.widgits
IP.1 = 10.64.10.2

[dn]

```

The contents of `client-certopts.cnf`:

```

[req]
default_bits = 4096
default_md = sha256
req_extensions = req_ext
keyUsage = keyEncipherment,dataEncipherment
basicConstraints = CA:FALSE
distinguished_name = dn

[ req_ext ]
subjectAltName = @alt_names
extendedKeyUsage = serverAuth,clientAuth

[ alt_names ]
DNS.1 = <1st DNS hostname of client (preferably FQDN)>
...
DNS.<N> = <Nth DNS hostname of client (preferably FQDN)>
IP.1 = <1st IP of client>
...
IP.<N> = <Nth IP of client>

[dn]

```

### Example: Contents of client-certopts.cnf

```
[req]
default_bits = 4096
default_md = sha256
req_extensions = req_ext
keyUsage = keyEncipherment,dataEncipherment
basicConstraints = CA:FALSE
distinguished_name = dn

[ req_ext ]
subjectAltName = @alt_names
extendedKeyUsage = serverAuth,clientAuth

[ alt_names ]
DNS.1 = windowsclient01.widgits
DNS.2 = client01.widgits
IP.1 = 10.64.10.11

[dn]
```

## 2. Generate the certificate authority (CA):

```
$ openssl genrsa -out ca.key 4096

$ openssl req -x509 -new -nodes -key ca.key -days 3650 -out ca.crt -subj
'<subject name for CA cert (must be formatted as
/type0=value0/type1=value1/type2=..., characters may be escaped by \
(backslash), no spaces are skipped)>'
```

### Example: Generating certificate authority (CA)

```
$ openssl genrsa -out ca.key 4096

$ openssl req -x509 -new -nodes -key ca.key -days 3650 -out ca.crt -
subj '/C=AU/ST=Victoria/L=Melbourne/O=Internet Widgits Pty
Ltd/OU=Operations/CN=Operations Root CA'
```

Place a copy of the `ca.crt` file in a directory of your choice. Take a note of the directory because you need to reference it in the `caDir` option of the WEC configuration file. For more information, see [Configuring Windows Event Collector](#).

3. Save the thumbprint of the CA:

```
$ openssl x509 -in ca.crt -fingerprint -sha1 -noout | sed -e 's/\\: //g'
```

You will need the fingerprint to configure the event source computers that send log messages to Windows Event Collector. For details, see [Configuring certificate-based authentication on event source computers](#).

4. Create the server certificate:

**NOTE:** The Common Name must be the FQDN (or IP address) of the Windows Event Collector server.

```
$ openssl req -new -newkey rsa:4096 -nodes -out server.csr -keyout server.key -subj '<subject name for server cert (must be formatted as /type0=value0/type1=value1/type2=..., characters may be escaped by \ (backslash), no spaces are skipped)>'
```

```
$ openssl x509 -req -in server.csr -out server.crt -CA ca.crt -CAkey ca.key -CAcreateserial -extfile server-certopts.cnf -extensions req_ext -days 365
```

#### Example: Creating the server certificate

```
$ openssl req -new -newkey rsa:4096 -nodes -out server.csr -keyout server.key -subj '/C=AU/ST=Victoria/L=Melbourne/O=Internet Widgits Pty Ltd/OU=Operations/CN=windowseventcollector.widgits'
```

```
$ openssl x509 -req -in server.csr -out server.crt -CA ca.crt -CAkey ca.key -CAcreateserial -extfile server-certopts.cnf -extensions req_ext -days 365
```

5. Create the certificates for the clients:

**NOTE:** The Common Name must be the FQDN (or IP address) of the client.

```
$ openssl req -new -newkey rsa:4096 -nodes -out client.csr -keyout client.key -subj '<subject name for client cert (must be formatted as /type0=value0/type1=value1/type2=..., characters may be escaped by \ (backslash), no spaces are skipped)>'
```

```
$ openssl x509 -req -in client.csr -out client.crt -CA ca.crt -CAkey ca.key -CAcreateserial -extfile client-certopts.cnf -extensions req_ext -days 365
```



### Example: Creating the certificates for the clients

```
$ openssl req -new -newkey rsa:4096 -nodes -out client.csr -keyout
client.key -subj '/C=AU/ST=Victoria/L=Melbourne/O=Internet Widgits
Pty Ltd/OU=Operations/CN=windowsclient01.widgits'

$ openssl x509 -req -in client.csr -out client.crt -CA ca.crt -CAkey
ca.key -CAcreateserial -extfile client-certopts.cnf -extensions req_
ext -days 365
```

6. Export the certificates of the clients to the format recognized by the Windows Certificate Manager tool.

```
$ openssl pkcs12 -export -inkey client.key -in client.crt -certfile
ca.crt -out client.p12
```

## Configuring certificate-based authentication on event source computers

**NOTE:** Perform the procedure described in this section only if you want to use certificate-based authentication between Windows Event Forwarding (WEF) and Windows Event Collector (WEC).

### Prerequisites

Microsoft Windows 8 or newer, up to Windows Server 2019

When collecting event logs from Windows hosts, the Windows clients sending logs act as the event source computers. The WEC tool collects and forwards messages from the standard Windows eventlog containers.

There is no restriction on the number of Windows hosts that can connect to the Windows Event Collector.

To configure your event sources, complete the following steps.

### To configure event source computers

1. Open the **Microsoft Management Console** (`mmc.exe`), select **File > Add/Remove Snap-ins**, and add the **Certificates** snap-in.
2. Select **Computer Account**.

3. Right-click the **Personal** node, and select **All Tasks > Import**.
4. Find and select the client certificate (client\*.p12) and import this file.
5. The PKCS #12 archive contains the CA certificate as well. Move the CA certificate to the **Trusted Root Certification Authorities** node after the import.

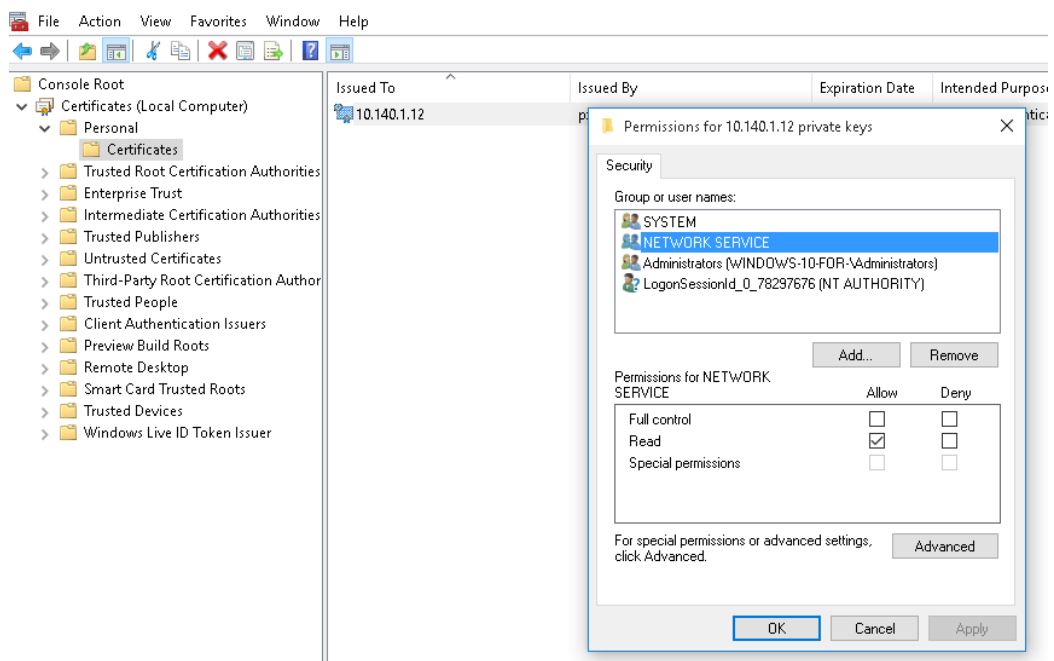
**NOTE:** Make sure that you only move the CA certificate and not the client certificate.

6. Give NETWORK SERVICE access to the private key file of the client authentication certificate:

**NOTE:** Make sure that you modify the access rights of only the private key file of the client certificate and not the CA certificate.

- a. In certmgr, right-click the client certificate, select **All Tasks > Manage Private Keys....**
- b. Add read permission to NETWORK SERVICE.

**Figure 2: Adding read permission to NETWORK SERVICE**



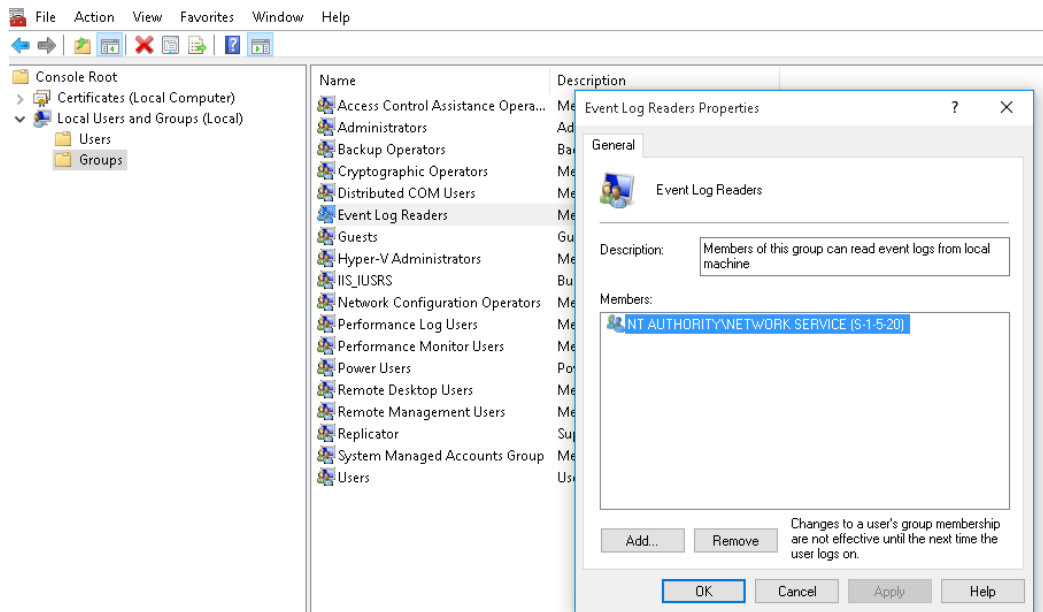
7. To forward security logs:

- a. In CompMgmt.msc, under **Local Users and Groups**, click **Groups > Event Log Readers** to open **Event Log Readers Properties**.

**NOTE:** If the Windows host is a domain controller, the **Local Users and Groups** option does not work. In this case, use **Active Directory Users and Computers**, select the name of your domain, and after that, select **Builtin**. In the right-side panel, you can modify the **Event Log Reader** group.

- b. Add the NETWORK SERVICE account to the **Event Log Readers** group.

**Figure 3: Adding the NETWORK SERVICE account to the Event Log Readers group.**



- c. Reboot the client computer.

8. Run the following commands from an elevated privilege command prompt:

```
winrm qc -q
winrm set winrm/config/client/auth @{Certificate="true"}
```

9. Open `gpedit.msc`.
10. Under the **Computer Configuration** node, expand the **Administrative Templates** node, then expand the **Windows Components** node, and then select the **Event Forwarding** node.
11. Select the **SubscriptionManagers** setting and enable it. Click the **Show** button to add a subscription ([Generating SSL certificates for Windows Event Collector](#)).

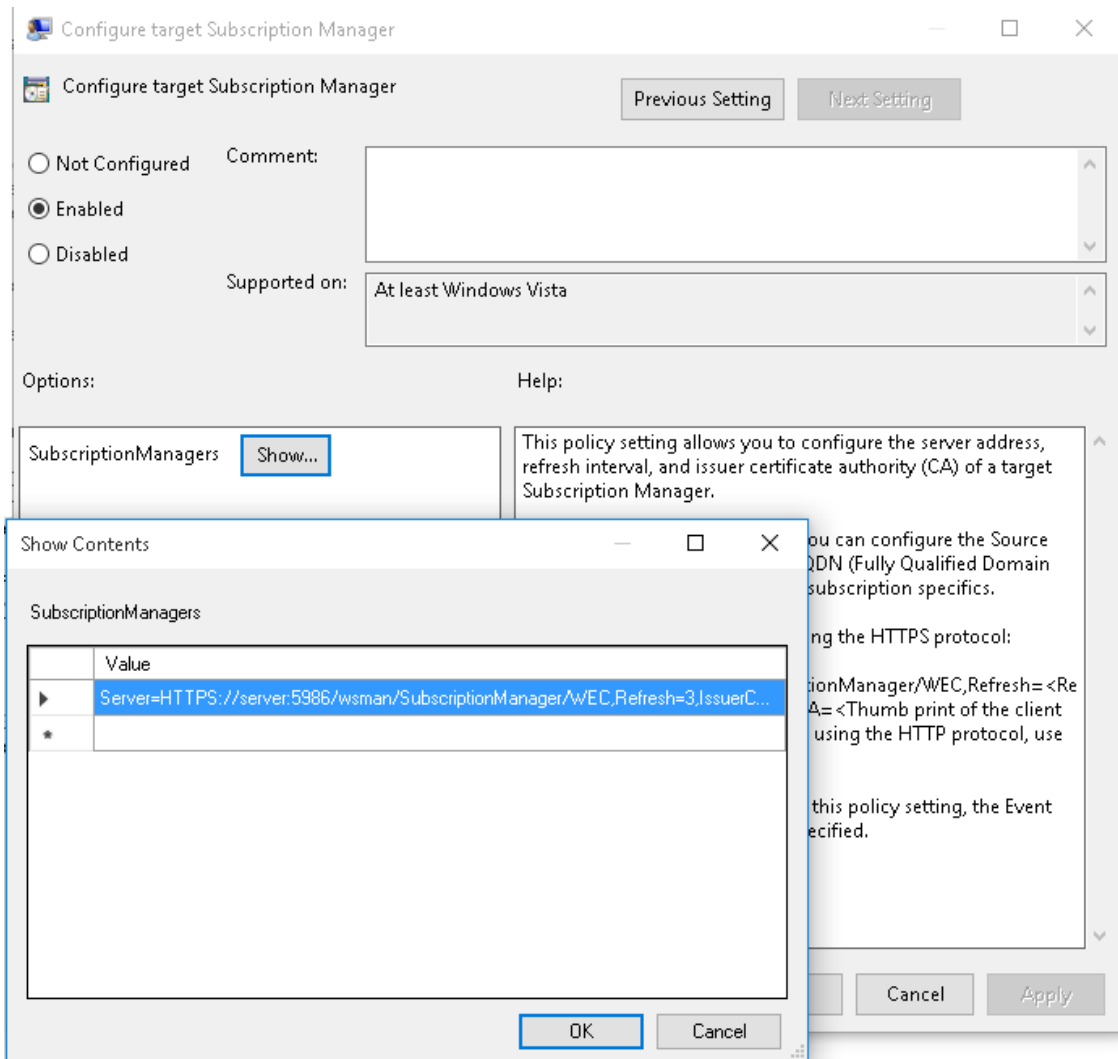
Use the FQDN of your WEC server in the URL, or, you can also use the IP address. Make sure that the name or the IP address that you use matches the common name in the certificate of the WEC server.

```
Server=https://<FQDN of the collector>:5986/wsman/SubscriptionManager/WEC,Refresh=<Refresh interval in seconds>,IssuerCA=<Thumbprint of the root CA>
```

### Example: Subscription using the FQDN of the WEC server

```
Server=HTTPS://wec.balabit:5986/wsman/SubscriptionManager/WEC,Refresh=60,IssuerCA=A814E609311FD3A89FFD0297974524E4F2D2BA9D
```

Figure 4: Adding the subscription in SubscriptionManagers



**NOTE:** If you want to configure multiple subscriptions because you want to forward Windows events to multiple event collectors (such as WEC), then you can do that here.

# Configuring Kerberos authentication on Windows Server (DC) hosts

This section describes the prerequisites and the configuration procedure for Windows Server (DC) hosts to use Kerberos-based authentication between Windows Event Forwarding (WEF) and WEC.

## To configure Windows Server (DC) hosts for Kerberos authentication

1. Install Active Directory Domain Services.  
For more information, see [Install Active Directory Domain Services \(Level 100\)/docs.microsoft.com](https://docs.microsoft.com/en-us/windows-server/identity/ad-ds/plan/install-active-directory-domain-services-level-100).
2. If Windows domain clients do not exist yet, join them to the domain.  
For more information, see [Join a Computer to a Domain/docs.microsoft.com](https://docs.microsoft.com/en-us/windows-server/identity/ad-ds/plan/join-a-computer-to-a-domain).
3. To make the Linux host reachable from all Windows hosts, register the configured FQDN for the Linux host in the Active Directory DNS Manager.
4. To communicate with Kerberos, in **Windows Domain Controller**, create a domain user whose password never expires.
5. In **User properties**, in **Account tab** > **Account options**, set Kerberos AES-128 bit and Kerberos AES-256 bit encryption support for the domain user that you created in the previous step.
6. From the console, run the following command to map the Service Principal Name (SPN) with a domain user and to generate a keytable file (also called keytab file) output to communicate with Kerberos. Run it as an administrator, or as a user with elevated rights, for example, as root.

### Example: Mapping SPN with a domain user and generating a keytab file

This command maps the SPN with the root domain user and generates a keytab at `C:\kerberos_shared\linux_service_account.keytab` to communicate with Kerberos.

**Command:**

```
ktpass.exe -out C:\kerberos_shared\linux_service_account.keytab -  
princ http/<linux_host_fqdn>@<kerberos_realm> -mapUser <DOMAIN_  
NETBIOS_NAME_in_UPPER_CASE>\<domain_user> -pType KRB5_NT_PRINCIPAL -  
crypto AES256-SHA1 -pass '<domain-user-password-as-string>'
```

**Example:**

```
ktpass.exe -out C:\kerberos_shared\linux_service_account.keytab -  
princ http/testlinuxhost.testdomain.com@TESTDOMAIN.COM -mapUser  
TESTDOMAIN\root -pType KRB5_NT_PRINCIPAL -crypto AES256-SHA1 -pass  
'Passw@rD123'
```

For more information on the ktpass command, see [ktpass/docs.microsoft.com](https://docs.microsoft.com/en-us/windows-server/security/kerberos/ktpass).

For more information on the setspn command, see [Setspn/docs.microsoft.com](https://docs.microsoft.com/en-us/windows-server/security/kerberos/setspn).

For more information on the keytab file, see [keytab/MIT Kerberos Documentation](https://web.mit.edu/kerberos/WWW/MIT/krb5.html).

7. Check whether the command ran successfully.
  - Verify if the output keytab file is generated.
  - Verify if the SPN is mapped with the domain user.

**Example: Checking whether the SPN is mapped with the domain user**

The following command lists the SPN that is mapped to the root user in testdomain.

**Command:**

```
setspn.exe -L <DOMAIN_NETBIOS_NAME_in_UPPER_CASE>\<domain_  
username>
```

**Example:**

```
setspn.exe -L TESTDOMAIN\root
```

8. Copy the generated keytab file from the Windows Domain Controller to the Linux host.

**⚠ CAUTION:**

**Risk of unauthorized access!**

**Protect the keytab file with proper file permissions, as anyone with read permissions can use the credentials in the network to access other services. Give administrators all permissions (6) to the keytab file, but do not give read or any other permissions (0) to users.**

## Configuring Kerberos authentication on Windows domain client hosts

To use Kerberos authentication between Windows Event Forwarding (WEF) and Windows Event Collector (WEC), configure the Windows domain client hosts.

Perform the following procedure on each Windows domain client host.

1. In the Windows domain client host, start `gpedit.msc`.
2. Navigate to **Computer Configuration > Administrative Templates > Windows Components > Event Forwarding**.
3. Select **SubscriptionManagers** and enable it.
4. To add a subscription, click **Show**.
5. Set **Server** to `HTTP://<linux_host_fqdn>:5985/wsman/SubscriptionManager/WEC,Refresh=10`

For example:

```
Server=HTTP://testlinuxhost.testdomain.com:5985/wsman/SubscriptionManager/WEC,Refresh=10
```

## Configuring Kerberos authentication on Linux hosts

Perform the following procedure on the Linux host to use Kerberos-based authentication between Windows Event Forwarding (WEF) and Windows Event Collector (WEC).

1. On the Linux host, configure the gateway and DNS settings so that the other hosts in the domain can reach the Linux host.

In Windows Active Directory DNS Manager, use the same name and IP address that you set for the Linux host.

2. Copy the generated keytab file from the Windows Domain Controller to the Linux host.

**⚠ CAUTION:**

**Risk of unauthorized access!**

**Protect the keytab file with proper file permissions, as anyone with read permissions can use the credentials in the network to access other services. Give administrators all permissions (6) to the keytab file, but do not give read or any other permissions (0) to users.**

3. (Optional) If there was a keytab file already installed on the Linux host, merge it with the keytab file that you generated previously in this procedure:
  1. Start the `ktutil` tool, and enter:

```
read_kt [path of the keytab file previously installed on Linux
host]

      read_kt [path of the currently generated keytab file]

      write_kt [path of the new, merged keytab file]
              q
```

2. After the `ktutil` tool has created the new, merged keytab file, configure it for WEC.



## Configuring Windows Event Collector

Once you have configured your event source computer(s), the next step is to configure your event collector, in this case, the Windows Event Collector (WEC) for syslog-ng PE.

**NOTE:** The configuration file of WEC is YAML based. Note that YAML uses spaces, not tabs, for indentation.

To configure WEC, use the following options.

For an example `wec.yaml` file, see [WEC configuration example for certificate-based authentication](#).

### server

Type:	string
Default:	N/A

*Description:* The hostname, IP address, or FQDN of the server where WEC is running.

**NOTE:** The value of the Server parameter must match the Common Name of the SSL certificate.

**NOTE:** If you use Kerberos authentication between WEF and WEC, set `server` to the FQDN of the Linux host.

### port

Type:	integer
Default:	5986

*Description:* The port where the server running WEC is listening.

**NOTE:** If you use Kerberos authentication between WEF and WEC, set `port` to 5985.

## kerberos | keytabfile

Type:	string
-------	--------

Default:	N/A
----------	-----

*Description:* The path to the keytable (also called keytab) file.

Specify the path to the keytab file in the keytabfile option, as it is a mandatory option for the kerberos parameter.

For more information, see [WEC configuration example for Kerberos authentication](#).

## keyfile

Type:	string
-------	--------

Default:	N/A
----------	-----

*Description:* The path to the file that contains the unencrypted private key of the server running WEC. The file is in PEM format.

## certfile

Type:	string
-------	--------

Default:	N/A
----------	-----

*Description:* The path to the file that contains the X.509 certificate of the server running WEC. The file is in PEM format.

## cadir

Type:	string
-------	--------

Default:	N/A
----------	-----

*Description:* The path to the directory that contains the trusted CA certificates in PEM format.

## log

Type:	map
-------	-----

Default:	N/A
----------	-----

*Description:* The options to specify how to handle the internal logs of WEC:

- [level](#)
- [file](#)

WEC sends internal log messages to stderr. You can also optionally specify a [file](#) to send logs to (in parallel with stderr). If you are using a systemd platform and start WEC using `systemctl`, then stderr is redirected to `systemd-journal`, and this is where you will find the internal logs of WEC.

#### *level*

Type:	debug info
Default:	info

*Description:* The application log level of WEC.

Possible values are:

- `debug`: Information with the most details, useful when debugging WEC and diagnosing issues.
- `info`: Basic information about the initialization of WEC. Following initialization, no information is displayed on screen, unless an issue occurs.

#### *file*

Type:	string
Default:	N/A

*Description:* The path to the file where WEC should write internal log messages. The log file is automatically created by `syslog-ng` PE.

You can send this file to `syslog-ng` using a `file()` source.

## **eventdestination**

Type:	map
Default:	N/A

*Description:* The options to specify how to store the event logs that are forwarded to WEC:

- [file](#)
- [unixdatagram](#)
- [queuesize](#)

#### *file*

Type:	string
-------	--------

Default: N/A

*Description:* The path to the file where WEC should write the events received from the Windows host(s). Use this option for debug purposes only, when you wish to check what WEC is sending to syslog-ng PE.

It is possible to log both to a file and a Unix datagram socket in parallel.

#### *unixdatagram*

Type: string

Default: N/A

*Description:* The path to the Unix datagram socket receiving the Windows events. WEC writes the received events to the Unix datagram socket specified here. The listening socket is automatically created by syslog-ng PE.

It is possible to log both to a file and a Unix datagram socket in parallel.

#### *queuesize*

Type: integer

Default: 10000

*Description:* The number of events that the destination memory queue can store. Note that the main purpose of `queuesize` is to speed up the writing of data into memory and smooth out peaks.

It is recommended to use the default value for this option.

For more information about flow control, see [Flow control](#).

## subscriptions

Type: map

Default: N/A

*Description:* The options related to the subscriptions you have set up on WEC:

- [name](#)
- [computers](#)
- [contentformat](#)
- [heartbeats](#)
- [connectionretry](#)
- [batchsizelimit](#)
- [batchtimeoutlimit](#)

- [queries](#)
- [readexistingevents](#)

**NOTE:** You can set up multiple subscriptions to events coming from the same Windows host. If an event matches more than one subscription, the event log comes in to WEC as many times as there is a match.

#### *name*

Type:	string
-------	--------

Default:	N/A
----------	-----

*Description:* The unique name of the subscription in WEC.

#### *computers*

Type:	list of strings
-------	-----------------

Default:	N/A
----------	-----

*Description:* A list of strings that specifies the DNS names of the non-domain computers that are allowed to initiate subscriptions. Specifies the Windows hosts from which you want WEC to receive event logs.

The names can be specified using the \* and ? wildcards, for example, "\*.mydomain.com" or "\*".

#### *contentformat*

Type:	Events RenderedText
-------	---------------------

Default:	N/A
----------	-----

*Description:* A value that specifies the format of the returned events.

Possible values are:

- **RenderedText:** Events are returned with the localized strings (such as event description strings) attached to the events
- **Events:** Events are returned without any of the localized strings

One Identity recommends setting this option to RenderedText.

#### *heartbeats*

Type:	integer
-------	---------

Default:	N/A
----------	-----

*Description:* A value that specifies the heartbeat interval for the subscription in seconds.

### *connectionretry*

Type: integer

Default: N/A

*Description:* WEC attempts to reconnect to the Windows host(s) at the specified interval of time in seconds.

### *batchsizelimit*

Type: integer

Default: 0 (meaning that there is no limit)

*Description:* Specifies the maximum number of items for batched delivery in the event subscription.

Set this value to 1 if you wish to perform tests or debugging.

**NOTE:** This option is not enforced on the Windows host side. Windows is handling this value only as a recommendation. The only exception is the value 1.

### *batchtimeoutlimit*

Type: integer

Default: N/A

*Description:* Specifies the maximum latency allowed in delivering a batch of events (in seconds).

**NOTE:** This option is not enforced on the Windows host side. Windows is handling this value only as a recommendation.

### *queries*

Type: string

Default: N/A

*Description:* Specifies the query string for the subscription.

You can:

- type this value manually, or
- copy this value from the **XML** tab of the **Create Custom View** pop-up window in Windows

For examples of queries, check the following Windows blog posts:

- Microsoft TechNet blog post [Advanced XMI filtering in the Windows Event Viewer](#)
- Microsoft Developer Network article [Wecutil.exe](#)

*readexistingevents*

---

Type: true|false

---

Default: false

---

*Description:* When the value is `true`, all existing events are read from the subscription event source if the subscription in question has not been read yet. When the value is `false`, only future (arriving) events are delivered. If the subscription has a state in the persist file, this option will have no effect.

# Configuring syslog-ng PE

## Prerequisites

syslog-ng Premium Edition (syslog-ng PE) version 7.0.6 or newer.

To enable syslog-ng PE to read and accept Windows events, you need to configure a source called `windowsevent()`.

### To configure syslog-ng PE

1. Configure the `windowsevent()` source.

```
source s_wec {
    windowsevent();
};
```

The `windowsevent()` source takes the following options:

- `unix-domain-socket()`: The path to the Unix domain socket to read messages from.

The default value is `/opt/syslog-ng/var/run/wec.sock`.

- `prefix()`: The prefix that you wish to append to the key-value pairs.

The default value is `".windowsevent."`.

If you want to send Windows event logs to SDATA, then set `prefix(".SDATA.")`. This can be useful, for example, when you forward Windows event logs to a syslog-ng Store Box.

For more information on the `windowsevent()` source, see ["windowsevent: Collecting Windows event logs" in the Administration Guide](#).

2. Define a complete log path in `syslog-ng.conf` to enable the `windowsevent()` source, `s_wec`. Otherwise, the WEC process will not run (connection refused).

For example:

```
source s_wec {
    windowsevent();
};

log {
```



```
source(s_wec);
destination {
    file("/var/log/example.log"
        template("${format-json --scope dot-nv-pairs}\n")
    );
};
};
```

## Starting/stopping Windows Event Collector

To start and stop the Windows Event Collector systemd service manually, use the following commands:

- Start WEC: `systemctl start syslog-ng-wec`
- Stop WEC: `systemctl stop syslog-ng-wec`

## Message format in Windows Event Collector for syslog-ng PE

The Windows Event Collector for syslog-ng Premium Edition (syslog-ng PE) is supported for Windows 8 or newer platforms. Starting with Windows 7, event logging is XML-based, meaning that event log messages reach WEC in XML format. When these are forwarded to the syslog-ng PE server, syslog-ng PE parses them into key-value pairs using the XML parser.

Once event log data is available in syslog-ng PE, you have the flexibility to modify and format data any way you want, using macros and rewrite rules.

Note that while event log data as processed by the WEC tool may differ from the data collected and made available by the syslog-ng Agent for Windows, the Windows Event Collector tool provides you with greater freedom and flexibility when it comes to manipulating your raw data.

## Flow control

The Windows Event Collector (WEC) tool applies flow control to minimize event log loss.

WEC regularly (in every second) polls the datagram socket that will receive the Windows events to check whether it exists already. Once the socket has been created (syslog-ng PE has started up), WEC connects to the socket and accepts the incoming connections from the Windows hosts. If the datagram socket does not exist, WEC refuses the incoming connections.

If the socket exists (syslog-ng PE is running) but syslog-ng PE does not read the Unix datagram socket, WEC fills up the kernel buffer of the datagram socket and stores `queuesize` amounts of log messages in the memory. When all buffers are full, WEC stops reading messages from the HTTP connections to prevent message loss.

The buffer size of a datagram socket is determined by certain Linux kernel parameters: the value of `rmem_*` (max/default) and the count of `net.unix.max_dgram_q1en`.

### Reliability

WEC flags a message as delivered once it has put the message in the socket buffer. If syslog-ng PE does not read the socket for some reason (for example, because it is still flow-controlled) and syslog-ng PE is stopped, the contents of this socket (that is, the messages that are in the kernel buffer, unread by syslog-ng PE) will be lost.

This is why in cases when a restart is necessary, it is recommended to stop the Windows Event Collector and syslog-ng PE in the following order:

1. Windows Event Collector
2. syslog-ng PE

While it is not guaranteed that syslog-ng PE has read all sockets by the time you stop it, at least you can maximize the chances that it has.

## Performance

Performance is dependent on the number of event log messages that the Windows hosts send to Windows Event Collector (WEC) and the capabilities of the XML parser.

Our performance measurements indicate that syslog-ng Premium Edition (syslog-ng PE)'s XML parser is capable of parsing 15,000-20,000 events/second. The exact capacity of the XML parser depends on the complexity of the Windows log messages, as well as the performance of the hardware that syslog-ng PE and WEC are running on. When the limit of 15,000-20,000 events/seconds is reached, a workaround is recommended.

As the value set in the `batchsizelimit` parameter is treated only as a recommendation by the Windows hosts, there is no direct way to control the amount of messages arriving from the event source computers. For more information, see `batchsizelimit` in the `subscriptions` option in [Configuring Windows Event Collector](#).

A possible workaround is to launch multiple WEC servers and create multiple `windowsevent` () sources in syslog-ng PE. That way, you can distribute your Windows hosts across multiple WEC and syslog-ng PE servers, decreasing the load on individual servers.

To run multiple WEC services per syslog-ng PE service, you need to create your own init script. This is because the init script that comes with WEC enables you to run only a single WEC service per syslog-ng PE service.

## Limitations

The Windows Event Collector (WEC) for syslog-ng Premium Edition (syslog-ng PE) currently has the following limitations:

- Only source-initiated push subscriptions are supported (Windows hosts connect to the WEC server).

An advantage of this, however, is that this requires less firewall rules.

- The compression of events is not supported.
- The `batchsizelimit` and `batchtimeoutlimit` options are not enforced on the Windows host side: Windows is handling these values only as a recommendation.

For more information, see `batchsizelimit` and `batchtimeoutlimit` in the subscriptions option in [Configuring Windows Event Collector](#).

- WEC cannot work in different authentication modes at once: either Kerberos authentication, or the certificate-based authentication is configured.
- Kerberos authentication does not work in a WEC cluster deployment.
- There is a known issue. After several reconnects (if WEC is restarted quickly), the remote sender can stop forwarding the logs for a certain period of time. In this case, restarting the Windows RM service can help.

This issue can also occur between two Windows machines. It has been reported to Microsoft and is awaiting resolution.

# Troubleshooting Windows Event Collector

**NOTE:** The troubleshooting instructions in this section apply to both the certificate-based, and the Kerberos authentication options.

For troubleshooting instructions that apply only if Kerberos authentication is used, see [Troubleshooting Windows Event Collector if Kerberos authentication is used](#).

When you experience issues while using Windows Event Collector (WEC), run WEC in debug mode to get detailed log messages.

1. Set the log level to debug:

```
log:  
  level: "debug"
```

2. Start WEC.

At every refresh interval, the following debug messages should be displayed:

```
DEBUG  subscriptionEndpoint  {"clientAddress": "..."}  
DEBUG  actionHandler  {"messageID": "...", "action":  
"http://schemas.xmlsoap.org/ws/2004/09/enumeration/Enumerate"}  
DEBUG  enumerate
```

This means that the client has connected and requested the subscription list.

3. If you cannot see these messages within the refresh interval, you should check the following channels in the client's event viewer:
  - Applications and Services Logs\Microsoft\Windows\Eventlog-ForwardingPlugin
  - Applications and Services Logs\Microsoft\Windows\Windows Remote Management

Some common error codes and their explanations:

- **5004**: A channel specified in the query XML does not exist or cannot be read on the Windows client. This can be caused by the "Network Service" not having permission to read the security log.

Add the "Network Service" account to the **Event Log Readers** group, and restart the computer for changes to take effect.

- **15008**: The query XML of the subscription is invalid.
- **995 (HTTP error 12186)**: The "Network Service" does not have permission to read the client certificate.
- **HTTP error 403**: If everything is set correctly, then it might be possible that a proxy is set and the forwarder tries to connect to the proxy instead of WEC.

**TIP:** Sometimes proxy settings are not displayed in any GUI window. Check them using `netsh winhttp show proxy`. To reset proxy settings, use `netsh winhttp reset proxy`.

# Troubleshooting Windows Event Collector if Kerberos authentication is used

## Communication is not established between WEC and Windows clients

If the communication between Windows Event Collector (WEC) and the Windows clients is not established, check the following:

- In the firewall settings between Windows clients and Linux systems, the required port must be opened and allowed.
- The date and time must be synchronized between the Windows clients and the Linux host.
- The correct SPN must be mapped with the generated domain user. Check it with:

```
setspn.exe -L <DOMAIN_NETBIOS_NAME_in_UPPER_CASE>\<domain_user>
```

For example:

```
setspn.exe -L TESTDOMAIN\root
```

- The copied keytab file on the WEC host must contain the correct SPN. To check it, run the following command from the command line. As a pre-requisite, the `klist` tool must be installed.

```
klist -kte <path_of_keytab_file>
```



For more information on the klist command, see [klist\(1\) - Linux man page](#).

- Enable the verbose level Kerberos event debugging on the Windows host, and check the system event logs.

For more information, see [How to enable Kerberos event logging/docs.microsoft.com](#).

- The Windows Remote Management service must be enabled on the Windows clients.
- Check the following Windows event logs for errors:
  - Applications and Service Logs\Microsoft\Windows\Eventlog ForwardingPlugin\Operational
  - Applications and Service Logs\Microsoft\Windows\Windows Remote Management\Operational
- Check the WEC debug log for errors.

## WEC does not receive logs from previously authenticated Windows clients

If WEC does not receive logs from previously authenticated Windows clients and the WEC debug log shows a similar error message, the current Key Version Number (KVNO) of the associated principal in Active Directory is higher than the KVNO in the keytab file. For security reasons, in such a case, the Kerberos authentication is not established between WEC and Windows.

```
ERROR    KRB-Event    gssapi/gssapi.go:90    Error in gss_api_wec_auth
...
ERROR    KRB-Event    gssapi/gssapi.go:69    Request ticket server [Principal
from keytab] not found in keytab (ticket kvno 22)    {"idx": 0}
...
ERROR    wecserver/wecserver.go:221    Kerberos authentication failed
{"client": "[Subscription Info for client]", "error": "Error doKerberosAuth
(clientID:[Subscription Info for client]): Error authenticating client: "}
```

Windows is responsible for the KVNO value. The KVNO can be changed by Active Directory, for example, when the password of the associated domain user is changed.

Check if the KVNOs are synchronized:

1. On Linux, get the KVNO from keytab. Run:

```
klist -kte <keytab_path>
```

2. On Windows, get the KVNO from keytab. Run:

```
ktpass -in <keytab_path>
```

3. On Windows, get the associated KVNO for the principal from Active Directory. Run:

```
get-aduser <domain_user> -property msDS-KeyVersionNumber
```

4. If the keytab files are not yet synchronized, re-generate the keytab file and copy it to the Linux host.

For more information, see [Configuring Kerberos authentication on Windows Server \(DC\) hosts](#).

5. (Optional) If the problem persists and Kerberos authentication fails in WEC, but the Key Version Numbers match in AD and in the keytab file, restart the Windows clients.

## Invalid keytab file

If the keytab file is invalid, a similar error message is listed in the WEC debug log after each post from the Windows clients:

```
ERROR      KRB-Subscription      gssapi/gssapi.go:33      Error in gss_api_
wec_init
...
ERROR      KRB-Subscription      gssapi/gssapi.go:69      Unsupported key
table format version number
...
```

1. Check the keytab file by running the following command in the command line. As a pre-requisite, the klist tool must be installed.

```
klist -kte <path_of_keytab_file>
```

For more information on the klist command, see [klist\(1\) - Linux man page](#).

2. Correct the keytab file configuration for WEC.

For more information, see [Configuring Kerberos authentication on Windows Server \(DC\) hosts](#) and [Configuring Kerberos authentication on Linux hosts](#).

# WEC configuration examples

The certificate-based authentication and the Kerberos authentication require a different configuration:

- For more information on the configuration example for the certificate-based authentication, see [WEC configuration example for certificate-based authentication](#).
- For more information on the configuration example for Kerberos authentication, see [WEC configuration example for Kerberos authentication](#).

## WEC configuration example for certificate-based authentication

This section provides a Windows Event Collector (WEC) configuration example for using certificate-based authentication between Windows Event Forwarding (WEF) and WEC.

### Example: Configuring WEC if certificate-based authentication is used

The configuration example lists the following:

- Server, port, key, and certificate-related settings
- Log detail level (`info`) and the path where the log file is created (`/opt/syslog-ng/var/wec.log`)
- Event destination-related settings that specify how the event logs are stored
- The subscription to the specified computers (`"windowsdc.mydomain.com"` and `"*.trusteddomain.com"`) in the `"ExampleDefaultSubscription"` domain
- Subscriptions-related parameters (such as `connectionretry: 60.0` and `batchtimeoutlimit seconds: 900.000`)

```
server: "wec.mydomain"  
port: 5986  
keyfile: "/opt/syslog-ng/etc/server.key"  
certfile: "/opt/syslog-ng/etc/server.crt"  
cadir: "/opt/syslog-ng/etc/cadir"  
  
log:  
  level: "info"  
  file: "/opt/syslog-ng/var/wec.log"  
  
eventdestination:  
  unixdatagram: "/opt/syslog-ng/var/run/wec.sock"
```

```

subscriptions:
  - name: "ExampleDefaultSubscription"
    computers:
      - "windosdc.mydomain.com"
      - "/*.trusteddomain.com"

    contentformat: "RenderedText"
    heartbeats: 900.000
    connectionretry: 60.0
    batchtimeoutlimit: 900.000
    queries: |
      <QueryList>
        <Query Id="0">
          <Select Path="Application">*</Select>
          <Select Path="Security">*</Select>
          <Select Path="System">*</Select>
        </Query>
      </QueryList>

```

For more information on the parameters and the configurable values, see [Configuring Windows Event Collector](#).

## WEC configuration example for Kerberos authentication

This section provides a Windows Event Collector (WEC) configuration example for using Kerberos authentication between Windows Event Forwarding (WEF) and WEC.

### Example: Configuring WEC if Kerberos authentication is used

The configuration example lists the following:

- The server and port parameters
- Path where keytabfile is generated (/root/linux\_service\_account.keytab)
- Log detail level (debug)
- Subscription set to all computers ("\*") in the Wec-Kerberos domain

- Subscriptions-related parameters (such as `connectionretry: 60.0` and `batchtimeoutlimit: 900.000` seconds)

```
server: "testlinuxhost.testdomain.com"
port: 5985
kerberos:
  keytabfile: /root/linux_service_account.keytab
log:
  level: "debug"
subscriptions:
  - name: "Wec-Kerberos"
    computers:
      - "*"
    contentformat: "RenderedText"
    heartbeats: 900.000
    connectionretry: 60.0
    batchtimeoutlimit: 900.000
    queries: |
      <QueryList>
        <Query Id="0">
          <Select Path="Application">*</Select>
        </Query>
      </QueryList>
```

For more information on the parameters and the configurable values, see [Configuring Windows Event Collector](#).

If WEC started successfully with Kerberos authentication, the following message is displayed in the WEC debug log:

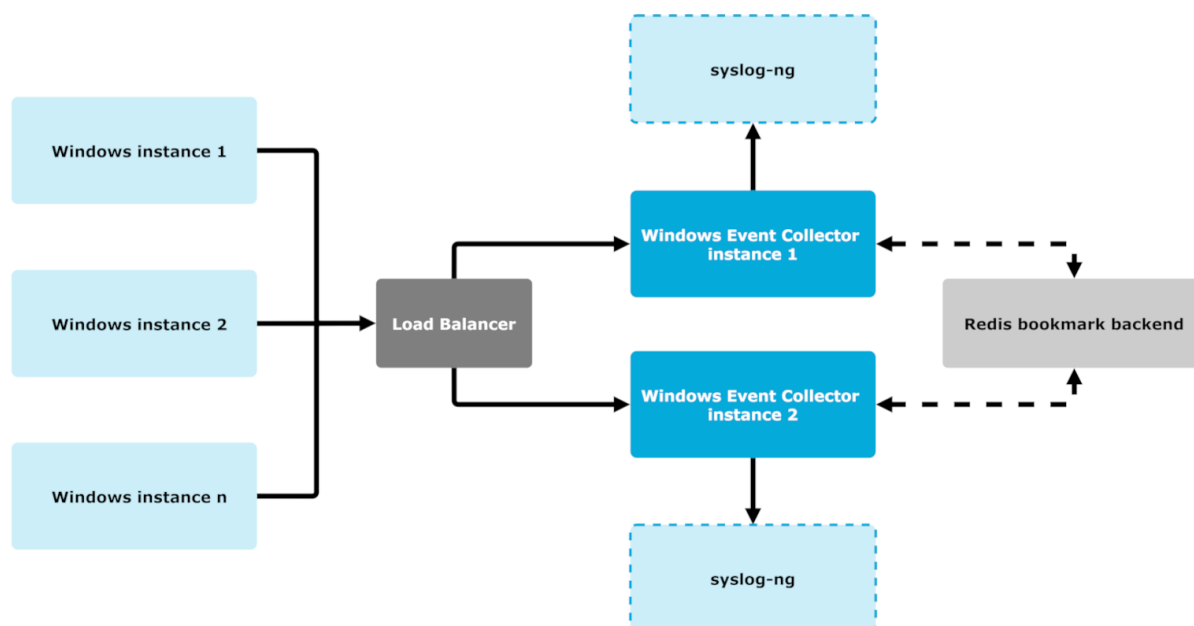
```
"Kerberos AUTH succeeded"
```

# WEC clustering in syslog-ng PE

From version 7.0.23, syslog-ng Premium Edition (syslog-ng PE) supports distributing and monitoring Windows Event Forwarder connections with a TCP-level load balancer across multiple Windows Event Collector (WEC) instances (in short, WEC clustering). While using WEC clustering in syslog-ng PE, the configuration also uses a [Redis](#) key-value database to share WEC instances' state.

**NOTE:** Kerberos authentication does not work in a WEC cluster deployment.

**Figure 5: A schematic figure of WEC clustering**



**NOTE:** There is no direct connection between WEC and Windows instances. Instead, the Windows machines are connected to load balancers, and the load balancers are connected to WEC instances. This also means that mutual authentication is performed between Windows hosts and load balancers, and then there is also a mutual authentication performed between load balancers and WEC instances.

## Limitations

### ⚠ CAUTION:

**Hazard of data loss!**

**In syslog-ng Premium Edition (syslog-ng PE) version 7.0.23, Redis Cluster is not supported. If you attempt to set up your configuration to enable the Redis Cluster feature, your WEC cluster will not function properly.**

**NOTE:** The timers described in the [Timers on the WEC side](#) section are not user configurable in version 7.0.23 of syslog-ng PE.

For more detailed information about WEC clustering, see the following sections:

# The working mechanism of Windows Event Collector (WEC) clustering

This section describes the principles of the working mechanism behind [Windows Event Collector \(WEC\) clustering](#).

If you are new to the concept of Windows Event Collectors, see the [Introduction](#) section of this guide, or the sections following the introduction for further details.

## How does WEC clustering work?

Windows Event Forwarders are connected to load balancers, and the load balancers are connected to Windows Event Collector (WEC) instances. When a WEC instance is disconnected from a load balancer, the load balancer detects the disconnected WEC instance, and forwards events to a different WEC instance. The new WEC instance can continue event requests from the last position saved by the disconnected WEC. To solve the redirection problem, you must have WEC instances that can be configured to share their states. Because it is possible for WEC instances to store their state in a [Redis](#) key-value database, syslog-ng Premium Edition (syslog-ng PE) utilizes this Redis feature and shares WEC instances' state across such a Redis key-value database when performing WEC clustering.

**NOTE:** The WEC clustering configuration operation is backward compatible and file-based states remain at their default as well. [Converting file-based states to Redis states](#) is also supported.

## States in WEC clustering (file-based states and Redis states)

In Windows Event Forwarders, the subscription's status at a given time is recorded in a file (or a Redis key-value database, depending on your use case) that is commonly called a state. Accordingly, while discussing [Windows Event Collector \(WEC\) clustering](#), these sections mention two types of states: file-based states and [Redis](#) states.

**NOTE:** File-based states are local states and are not synchronized between multiple WEC instances (as opposed to shared states) File-based states can only be used locally, by a single WEC instance at a time.

### The three data types within file-based states

States that are recorded in a file (that is, file-based states) consist of three data types:

- An [event source](#) (also called a host), where the events are received.
- A [subscription ID](#).
- A bookmark (also called a position).



In case of file-based states, this information is stored within files (in the stateDir directory). Each file stored in the stateDir directory contains subscription IDs and positions to the given host, one file each.

### Example: data structure within the stateDir directory

```
stateDir\win1: subscription_1 - position_1 subscription_2 - position_2 ...  
subscription_n - position_n
```

**NOTE:** Real state files store these data in a different format. This format is only true for the information structure within the stateDir directory.

### Mapping the file-based state structure to Redis states

If the user wants to use Redis states instead of file-based states while WEC clustering, the information has to be mapped to **HSET** data structures, a data structure native to Redis. Event sources are capable of identifying HSET data structures in file-based states' data structure contents, and the same state structure of subscription IDs and positions to the given host is mapped to Redis states as follows:

- In Redis, the Redis connections are mapped to the stateDir directory of the file-based state.
- In Redis, the HSETs are mapped to the file name of the event source (or host) of the file-based state.
- In Redis, the HKEYs within the HSETs are mapped to subscription IDs of the file-based state.
- In Redis, the HVALUES within the HSETs are mapped to bookmarks (positions) of the file-based state.

### What happens if the WEC instance is disconnected from a load balancer?

When a WEC instance is disconnected from a load balancer, the subscriptions connected to this instance are redirected to a different available WEC instance. When the new WEC instance receives the subscription, the WEC instance looks the subscription up in the Redis state, then populates the position from Redis. After this, the WEC instance continues processing requests from the last position loaded from the Redis backend. For each event (batch), the WEC instance writes bookmarks to Redis.

**NOTE:** Redis manages concurrent read or write operations.

### What happens if Redis becomes unavailable for a WEC?

If for some reason, Redis becomes unavailable for a WEC instance, the WEC instance performs the following, in this order:

1. The WEC instance stops the listener.
2. The WEC instance stops all TCP connections established between the load balancer and the WEC instance.
3. The WEC instance stops sending messages to syslog-ng Premium Edition (syslog-ng PE).
4. The WEC instance starts to ping Redis.

**NOTE:** The load balancer is connected to the listener, so when the WEC instance is disconnected, the load balancer redirects the Windows event source to a different WEC instance. When Redis becomes available again, the load balancer detects it, and starts forwarding the events to the original WEC instance.

## Converting file-based states to Redis states

This section describes the process of converting file-based states to Redis states, and the related potential limitations and issues.

For more information about file-based states and Redis states, see [States in WEC clustering \(file-based states and Redis states\)](#).

### Conversion steps and limitations

During the conversion process, you move your existing file-based states into Redis states. The WEC binary supports moving the file-based states with a dedicated command line option (-i):

```
root@ubuntu1:/opt/syslog-ng/var/wecstate# /opt/syslog-ng/libexec/wec -h Usage of
/opt/syslog-ng/libexec/wec:
-c string
Configuration file name (default "/opt/syslog-ng/etc/wec.yaml")
-i Initializing shared state from stateDir
-s string
Persistent state directory (default "/opt/syslog-ng/var/wecstate")
-v WEC version
```

### To convert file-based states to Redis states

1. Load your existing file-based states from your stateDir directory.
2. Connect to Redis server.

**NOTE:** If your Redis server is not available, the WEC will not start at all, and the conversion process stops.

3. Save your previously loaded file-based states into a Redis HSET.
4. Move the files containing your WEC states to your stateDir/.converted folder.

**⚠ CAUTION:** If moving the WEC states to your `stateDir/.converted` folder is unsuccessful, your file-based state will contain out-of-date data. If the final conversion step is unsuccessful, and you have your `-i` option enabled, the out-of-date data in your file-based states overwrite the data in your Redis states after your next WEC restart (which results in message duplication). To avoid this, remove the `-i` command line option before you restart your WEC following your state conversion.

**NOTE:** If for some reason, your WEC cluster configuration does not work as expected, your previous file-base states will not be available if you delete them. Instead, One Identity recommends moving the files to the folder, where they will be available for recovery if needed.

**NOTE:** State conversion has two possible results:

- successful
- unsuccessful

If any of the state conversion steps is unsuccessful, the WEC instance stops with an error. As a result, even if the file-based state is successfully saved to Redis, but moving the files is unsuccessful, the WEC instance stops and prints an error message:

```
Failed to move state files, remove it manually
```

This is an expected behavior, developed to avoid unwanted, huge message duplication and related issues. Instead of message duplication, if the file-based state is converted, but moving the state files is unsuccessful for some reason, you can re-initialize Redis with the state files that contain old bookmarks.

## An example use case for WEC clustering

This section describes an example use case for [Windows Event Collector \(WEC\) clustering](#). For more detailed information about the working mechanism of WEC clustering, see [The working mechanism of Windows Event Collector \(WEC\) clustering](#).

### Limitations

**⚠ CAUTION:**

**Hazard of data loss!**

**In syslog-ng Premium Edition (syslog-ng PE) version 7.0.23, Redis Cluster is not supported. If you attempt to set up your configuration to enable the Redis Cluster feature, your WEC cluster will not function properly.**

### Configuration

In the example use case for WEC clustering, the following configuration is used:

```
bookmarks:  
backend: redis  
uri: 192.168.0.14:6379  
password: pwd #optional
```

**NOTE:** In the example use case, multiple WEC instances are running behind the load balancer. Load balancing in this configuration will only work with multiple WEC instances if you have the same Redis backend configured on all WEC instances, with the same subscription used by all of the WEC instances. Otherwise, you will encounter message duplication.

## Required components for a functional WEC cluster configuration

For a functional WEC cluster configuration, the required components are the following:

- WEC instances, with the following considerations:
    - The WEC instances must have a shared state (on the Redis backend).
    - The WEC instances must be configured to use the same subscription.
- The subscriptions part of the configuration should be the same in every WEC instance, for example:

```
subscriptions:  
- batchsizelimit: 1  
batchtimeoutlimit: 1.0  
computers:  
- '*'  
connectionretry: 1.0  
contentformat: RenderedText  
heartbeats: 3.0  
name: wec-1-subscription  
queries: "<QueryList>\n <Query Id=\"0\">\n <Select  
Path=\"Application\">*</Select>\n\  
\ </Query>\n</QueryList>\n"readexistingevents: false  
* wec is connected to LoadBalancer (server and port is set to  
Load Balancer)
```

- Windows instances that forward requests to load balancers.
- An appropriately installed, set up, maintained, and monitored TCP level load balancer.

The customer has the following responsibilities:

- Installing the TCP level load balancer.
- Setting up the TCP level load balancer.
- Maintaining the TCP level load balancer.
- Monitoring the TCP level load balancer.

- Configuring the SSL certificates appropriately.

**NOTE:** When configuring your SSL certificates while WEC clustering, consider that the load balancer functions as a proxy in your configuration.

For more information about configuring SSL certificates for Windows Event Collectors, see [Generating SSL certificates for Windows Event Collector](#).

- An appropriately set up, configured, maintained, and monitored Redis server.

The customer has the following responsibilities:

- Setting up the Redis server.
- Configuring the Redis server.
- Maintaining the Redis server.
- Monitoring the Redis server.

## Troubleshooting for WEC clustering

This section provides troubleshooting information and solutions in connection with [Windows Event Collector \(WEC\) clustering](#).

### Log messages and why the WEC sends them

This section describes the possible log messages you may get while using [Windows Event Collector \(WEC\) clustering](#) with syslog-ng Premium Edition (syslog-ng PE), and why the WEC sends them.

- If Redis is not available during startup, the WEC instance cannot start. In this case, you will get a similar log message:

```
2020-11-16T21:24:03.843Z      FATAL   state/redisstate.go:17  RedisConn:
Error connecting to Redis   {"error": "RedisConn: connection failure:
dial tcp 192.168.0.14:6379: connect: connection refused"}
```

- If Redis is disconnected, you will get a similar log message:

```
2020-11-16T21:11:12.818Z      ERROR   state/redisconn.go:55
RedisConn: dial failed     {"error": "dial tcp 192.168.0.14:6379: connect:
connection refused"}
```

- If you are trying to ping Redis periodically (in this case, the ping period is 1 second), you will get a similar log message:

```
2020-11-16T21:11:12.818Z      DEBUG    state/redisconn.go:115  RedisConn
is still disconnected
2020-11-16T21:11:13.819Z      ERROR    state/redisconn.go:55
RedisConn: dial failed {"error": "dial tcp 192.168.0.14:6379: connect:
connection refused"}
```

- I Redis eventually becomes available, you will get a similar log message:

```
2020-11-16T21:13:59.829Z      DEBUG    state/redisconn.go:136  RedisConn
is connected
2020-11-16T21:13:59.829Z      INFO     wec/main.go:120 Redis connection
restored, starting server...
2020-11-16T21:13:59.830Z      INFO     eventstorage/datagrameventstorage.go:34 Trying to connect to unix datagram
socket {"unix-datagram": "/home/vagrant/wec_unix_dgram"}
2020-11-16T21:13:59.830Z      INFO     eventstorage/datagrameventstorage.go:44 Connected to unix datagram socket
{"unix-datagram": "/home/vagrant/wec_unix_dgram"}
```

## Checking data stored in Redis

You can use the following commands to check your data stored in Redis.

**| NOTE:** The following commands must be run from the CLI tool within Redis.

- Listing subscription IDs for an event source (or host):

```
127.0.0.1:6379> HKEYS win1
1) "FE14EC9A-A667-5375-B0B5-C4C4A9A6F745"
```

The command lists the available subscriptions (in this case, FE14EC9A-A667-5375-B0B5-C4C4A9A6F745 is the only one available) for the event source or host (in this case, win1).

- Getting bookmarks for a subscription ID:

```
127.0.0.1:6379> HGET win1 FE14EC9A-A667-5375-B0B5-C4C4A9A6F745
"<BookmarkList><Bookmark Channel=\"Application\" RecordId=\"11098\"
IsCurrent=\"true\"/></BookmarkList>"
```

The command lists the bookmark value (RecordId="11098") from the FE14EC9A-A667-5375-B0B5-C4C4A9A6F745 subscription ID within the win1 event source.

## Timers on the WEC side

This section describes the predefined timers on the Windows Event Collector (WEC) side, and how they affect the interactions of syslog-ng PE and Redis during WEC clustering.

**NOTE:** The timers described in this section are not user-configurable in version 7.0.23 of syslog-ng PE.

In version 7.0.23 of syslog-ng PE, the following predefined timers are used during WEC clustering:

Timer	Description
healthCheckInterval (periodical PING): 1 second	When Redis is disconnected, the WEC instance is trying to PING Redis periodically. The period length is 1 second.
connectTimeout: 10 seconds	Connect operation fails when a connection to Redis cannot be established within 10 seconds.
readTimeout: 5 seconds	Redis is disconnected when a read operation cannot be finished within 5 seconds.
writeTimeout: 5 seconds	Redis is disconnected when a write operation cannot be finished within 5 seconds.

One Identity solutions eliminate the complexities and time-consuming processes often required to govern identities, manage privileged accounts and control access. Our solutions enhance business agility while addressing your IAM challenges with on-premises, cloud and hybrid environments.

## Contacting us

For sales and other inquiries, such as licensing, support, and renewals, visit <https://www.oneidentity.com/company/contact-us.aspx>.

## Technical support resources

Technical support is available to One Identity customers with a valid maintenance contract and customers who have trial versions. You can access the Support Portal at <https://support.oneidentity.com/>.

The Support Portal provides self-help tools you can use to solve problems quickly and independently, 24 hours a day, 365 days a year. The Support Portal enables you to:

- Submit and manage a Service Request
- View Knowledge Base articles
- Sign up for product notifications
- Download software and technical documentation
- View how-to videos at [www.YouTube.com/OneIdentity](http://www.YouTube.com/OneIdentity)
- Engage in community discussions
- Chat with support engineers online
- View services to assist you with your product