



syslog-ng Premium Edition 7.0.16

Collecting log messages from UDP
sources

Copyright 2019 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. 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.

syslog-ng PE Collecting log messages from UDP sources
Updated - September 2019
Version - 7.0.16

Contents

Problems	4
Resolving UDP message loss problems	5
About us	8
Contacting us	8
Technical support resources	8

Problems

Central logging is based on TCP connections in most cases (or even encrypted TCP connections) as it provides several reliability features that are simply not available using UDP. Still, there are certain situations, when you have to use UDP. One use case is when the company standard syslog configuration for servers contains only a single, common UDP destination, and it cannot be altered because of company IT policies. The other, more common use case is, that network devices, for example, routers, switches or firewalls send their logs using UDP. Most of the time the TCP implementation of syslog is completely missing from these devices. In some cases it is there, but badly broken and therefore avoided by the users.

When compared to TCP, UDP is more lightweight, and it consumes less computing resources. However, this is probably the only positive feature of UDP when discussing log message transfer. On the sender side UDP sends packets with a “fire and forget” method, meaning that it does not ensure that the packet was received, there is no error handling, acknowledgment, retransmission or timeout and therefore it is prone to losing messages.

There are several points during the transmission where messages can be lost when using UDP:

- When there are multiple hops, a burst of log messages can be lost.
- Kernel network card driver level: virtualization might cause problems, also certain drivers and cards are unable to keep up with high-traffic and therefore log messages can be lost.
- Kernel buffer size: when syslog-ng cannot read fast enough from the kernel, buffers are filled and log messages can be lost.
- In syslog-ng when the destination side is not fast enough and buffers are filled. For example, when the disk I/O is held by some other application, therefore the messages cannot get written by syslog-ng. Even on a dedicated server, just browsing the stored logs can be a reason for that.

The effects of these problems can be reduced, but keep in mind, that UDP is not a reliable protocol.

Resolving UDP message loss problems

Even if UDP is not a reliable protocol, and message loss can not be completely avoided, there are many ways to improve the situation. If you only have a few incoming UDP messages, you might not need any or all of these safe guards. However, as soon as you expect higher UDP traffic or burst of UDP packages, it is definitely worth implementing them.

Collect messages close to the source

UDP packages easily get lost if they have to travel through switches and routers. This kind of loss is difficult to detect, unless you can count the number of messages both on the sending and receiving side. To avoid message loss, install a syslog-ng relay collecting UDP messages as close as possible to the log source, ideally on the same switch or at least on the same subnetwork. Forward the logs to your central log server using a more reliable protocols, such as TCP or ALTP.

Use the right network card and network driver

Some network cards handle high load better than others. In high-traffic environments it is worth using server class network cards that can off-load many of the tasks. The same hardware can sometimes be used with different drivers, so select the driver that suits your needs best.

To generate syslog traffic for stress testing your environment, use `loggen` (a tool bundled with syslog-ng). To check for dropped packages at hardware level, use `ifconfig` or `ethtool`.

Use physical machines instead of virtual ones

Full hardware virtualization, for example, VMware can degrade performance, especially during hardware access like high speed networking. In some situations, using the right network driver inside the virtual machine can resolve this problem. On a loaded host machine even the right network driver will not solve these issues, therefore it is better to move log collection to a physical machine.

Use large buffers in kernel

If syslog-ng cannot read the messages fast enough from the UDP socket, the kernel receive buffers will start to fill and after the configured limit has been reached, the kernel will start discarding messages. In this case, it is necessary to adjust the buffer size accordingly. To raise the size of the kernel receive buffers, use the `sysctl` command to tune the `net.core.rmem_max` parameter. Next, raise the size of the `so-rcvbuf` option of the syslog-ng source definition as well, so that syslog-ng is capable of utilizing the larger kernel receive buffers. In a high-traffic environment as high as 256MB might be necessary:

```
sysctl -w net.core.rmem_max=268435456
```

Enter the value in bytes. In the example above, $256*1024*1024=268435456$ bytes. As a rule of thumb, this buffer size should be enough to accommodate incoming peak message rate for at least one second.

CAUTION:

Any issue causing the loss of buffer content can result in higher message loss because of the higher buffer size. To minimize risk, it is important to determine the required buffer size instead of using a buffer that is higher than what is absolutely necessary.

To monitor packet loss, use the following command:

```
netstat -su | grep "receive errors"
```

Tuning syslog-ng for UDP

There are several configuration possibilities in syslog-ng that are related to using UDP protocol. To be able to handle message bursts, increase the value of the `log_fifo_size()` option. To match the value configured for `net.core.rmem_max` in the previous step, increase the value of the `so-rcvbuf()` accordingly.

Flow control in syslog-ng slows down message reception if the destination slowed down for some reason. This works fine when messages are coming from TCP sources, as the sender side will notice slower reception and send messages at a lower rate. UDP, as a stateless protocol cannot handle this situation, the sender side will never notice that the receiving end slowed down and this will result in immediate message loss. Therefore in case of UDP sources, do not enable flow control for the destination.

When you use a syslog-ng Store Box as the central logserver, flow-control is always applied to the log paths where messages are written into logspaces in order to avoid message loss. Therefore, log processing may slow down if logs are massively searched by dozens of users (this is similar to the example described in the "Problems" section above). Contrary to the highly configurable syslog-ng PE, you do not have the ability to fine-tune the low level OS level buffers underneath the syslog-ng Store Box log management application. Therefore, you may turn the UDP-based log collection into TCP-based already on a lower message rate.

The UDP source driver in syslog-ng is not multi-threaded. A single UDP source runs only in a single thread on a single CPU core. If you have a high message rate and multiple CPU cores, define multiple UDP sources in your syslog-ng configuration. This way load is distributed among multiple CPU cores, ensuring that CPU does not become a bottleneck.

Still in this case, if the messages received from several UDP sources are written into the very same file, the destination side can become a bottleneck.

The consequence is that UDP-based collection always comes with a risk of message loss. The possibility of losing messages is different in each environment, therefore the situation might be examined in all cases in order to select the right safe guards that are sufficient to eliminate the risk of losing messages.

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 or other inquiries, visit <https://www.oneidentity.com/company/contact-us.aspx> or call +1-800-306-9329.

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
- Engage in community discussions
- Chat with support engineers online
- View services to assist you with your product