

# IPWorks Security Log Management Guide

## USER GUIDE

**Copyright**

© Ericsson AB 2017, 2018. All rights reserved. No part of this document may be reproduced in any form without the written permission of the copyright owner.

**Disclaimer**

The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing.

Ericsson shall have no liability for any error or damage of any kind resulting from the use of this document.

**Trademark List**

All trademarks mentioned herein are the property of their respective owners. These are shown in the document Trademark Information.



# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Related Information	1
<b>2</b>	<b>Prerequisite</b>	<b>2</b>
<b>3</b>	<b>Configuring Security Log</b>	<b>3</b>
3.1	Store Security Logs as Local File	4
3.2	Configuring Syslog Client	6
<b>4</b>	<b>Configuring Remote Syslog Server</b>	<b>8</b>
4.1	Configuring Syslog Server Using UDP Connections	8
4.2	Configuring Syslog Server Using TCP Connections	9
<b>5</b>	<b>Appendix</b>	<b>16</b>
5.1	Installing Rsyslog TLS	16
	<b>Reference List</b>	<b>17</b>





# 1 Introduction

This document describes how to configure the security log for IPWorks.

The security log provides records of security events related to the following processes:

- DNS
- ENUM
- Storage Server (SS)

Figure 1 shows the security log architecture.

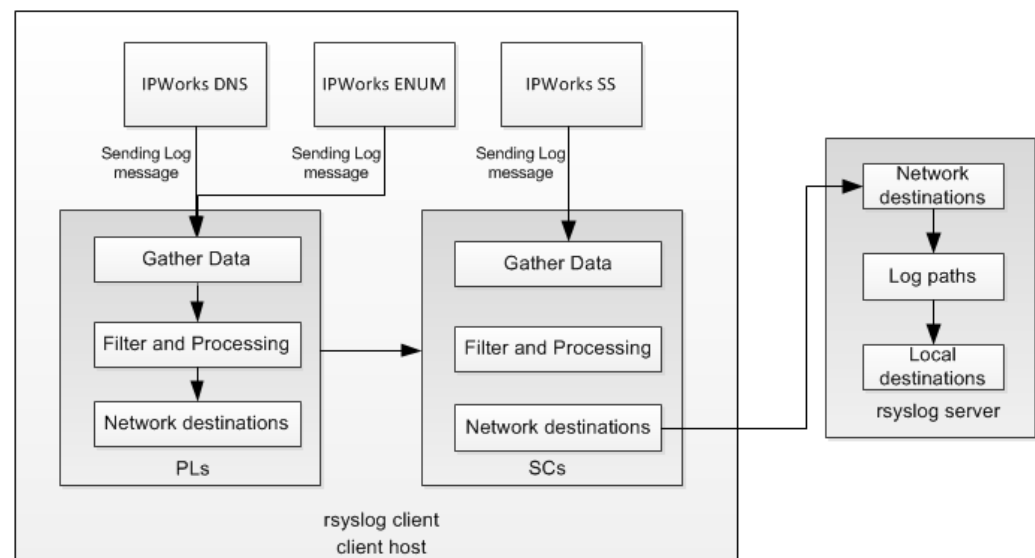


Figure 1 Security Log Architecture

## 1.1 Related Information

Trademark information, typographic conventions, and definition and explanation of abbreviations and terminology can be found in the following documents:

- Trademark Information
- Typographic Conventions
- Glossary of Terms and Acronyms



## 2 Prerequisite

- The syslog `rsyslog` has been installed on a platform that is used as the remote server.

For how to install the `rsyslog` on the remote server, refer to the online reference [Newbie guide to rsyslog](#).

- If IPv6 address is needed, first do the configuration according to the section [Configuring IPv6 OAM/Provision Network in IPWorks Initial Configuration](#), then use IPv6 address in the above configure process instead of IPv4 address.



### 3 Configuring Security Log

The security log configuration command `ipwsyslog` is located in the directory `/opt/ipworks/ipwsyslog/script`.

To configure the security log by using the `ipwsyslog` command, do the following:

1. Run the command on both System Controller (SC) boards (SC-1 and SC-2).

```
SC-1:~ # ipwsyslog
```

2. Select one number from the script prompted information:

```
Backup the current conf...../etc/rsyslog.conf.backup
```

```
Where would like to store the ipworks logs? a local file or a
remote server?
```

- ```
1) local
2) remote
3) tls
```

3. Follow the instructions in Table 1 to continue based which option you selected in Step 2.

**Note:**

- After the configuration, `ipwsyslog` only works on the active SC, the other is in standby.
- The configuration from `ipwsyslog` covers the configuration in `/etc/rsyslog.conf`. For example, if you previously configure the log rotation in `/etc/rsyslog.conf`, and then you use `ipwsyslog` to do some configuration, you must re-configure the log rotation in `/etc/rsyslog.conf` again. The previous configuration in the file is stored in `/etc/rsyslog.conf.backup`.

Table 1 Log Storage and Configuration Instructions

| Log Storage   |                                                   | Configuration Instructions                                                                                                                                                                    | Instructions          |
|---------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| local file    |                                                   | Select 1 and specify the file path to store the log. The log must be stored in <code>/var/log/</code> , and you can specify the log file name. The default name is <code>ipworks.log</code> . | Section 3.1 on page 4 |
| syslog client | syslog client using UDP connections               | Select 2 and then 1. Specify the remote server's IP address and listening port to receive logs.                                                                                               | Section 3.2 on page 5 |
|               | syslog client using TCP connections (without TLS) | Select 2 and then 2. Specify the remote server's IP address and listening port to receive logs.                                                                                               |                       |



| Log Storage          |                                     |             | Configuration Instructions                                                                      | Instructions             |
|----------------------|-------------------------------------|-------------|-------------------------------------------------------------------------------------------------|--------------------------|
| remote syslog server | syslog server using UDP connections |             | Select 2 and then 1. Specify the remote server's IP address and listening port to receive logs. | Section 4.1 on page 8    |
|                      | syslog server using TCP connections | without TLS | Select 2 and then 2. Specify the remote server's IP address and listening port to receive logs. | Section 4.2 on page 9    |
|                      |                                     | with TLS    | Select 2 and then 2. Specify the remote server's IP address and listening port to receive logs. | Section 4.2.1 on page 10 |

## 3.1 Store Security Logs as Local File

If you choose to store security logs as a local file, set the log file by following the steps below:

1. Log on to the machine where IPWorks is installed.
2. Log on to the active SC and then execute the `ipwsyslog` command:

```
#ipwsyslog
```

```
Backup the current conf...../etc/rsyslog.conf.backup
Where would you like to store the ipworks logs?
a local file or a remote server?
1) local
2) remote
3) tls
#?
```

3. Select local by entering 1:

**Note:** You need to input the file name manually. The default file name is `/var/log/ipworks.log` if you don't input the file name.

For example:

```
#? 1
The IPWorks logs will be stored in local path (/var/log)
Which file you need to store the ipworks log?
Please enter file name (default file: ipworks.log)
/var/log/ipworks.log
```

4. Configure the maximum size of the log file:

**Note:** You need to input the size of log file (Range: 1-20M) manually. The default size is 2M if you don't input the size.

For example:





Please configure maximum size of log file [default size: 2048 (unit: K)]: **2048**

5. Configure the maximum number of retained log files:

**Note:** You need to input the number of retained log files (Range: 5-20) manually. The default number is 20 if you don't input the number.

For example:

Please configure maximum number of retained log files [default number: 20]: **20**

**Note:** You need to re-enter the size and number if the disk space required for the configuration is greater than eighty percent of the rest in the configuration directory.

6. Enable the security logging on the IPWorks Server.

**Note:** Currently IPWorks supports the security logging for DNS, ENUM, and Storage Server. The following table lists the respective DN of security logging:

| Service        | DN                                                                                           |
|----------------|----------------------------------------------------------------------------------------------|
| DNS            | ManagedElement=<Node Name>,IpworksFunction=1,IpworksDnsRoot=1,DnsServer=1,BindService=1      |
| ENUM           | ManagedElement=<Node Name>,IpworksFunction=1,IpworksDnsRoot=1,IpworksEnumRoot=1,EnumServer=1 |
| Storage Server | ManagedElement=<Node Name>,IpworksFunction=1,IpworksCommonRoot=1,StorageServer=1             |

Following is an example of enabling the security logging for DNS Server:

```
#/opt/com/bin/cliss
```

```
> ManagedElement=<Node Name>,IpworksFunction=1,IpworksDnsRoot=1,DnsServer=1,BindService=1
```

```
(BindService=1)>configure
```

```
(config-BindService=1)>securityLog=true
```

```
(config-BindService=1)>commit
```

**Note:** The Step 3 and Step 4 are for log file rotation implement. When the maximum size of log file is reached, the log file is rotated. By default, the maximum log file size is 2M, the maximum number of retained log files are 20. Ring buffer is used, for example, when all the available log files are full, the oldest one is overwritten.



## 3.2 Configuring Syslog Client

This section describes procedures on how to configure the syslog client using UDP and TCP (without TLS) connections.

Here is an example of the configuration parameters that are applied to the syslog client:

| Protocol          | Assigned IP Address                                 |
|-------------------|-----------------------------------------------------|
| UDP               | syslog server IP: 192.168.0.1<br>syslog port: 514   |
| TCP (without TLS) | syslog server IP: 192.168.0.1<br>syslog port: 10514 |

1. Log on to the machine where IPWorks is installed.

2. Make sure that the port is available. For example:

```
# netstat -nap|grep "514"|grep "udp"
```

3. Log on to the active SC and then use the ipwsyslog command:

```
#ipwsyslog
```

```
Backup the current conf...../etc/rsyslog.conf.backup
```

```
Where would you like to store the ipworks logs?  a local file  
or a remote server?
```

```
1) local
```

```
2) remote
```

```
3) tls
```

```
#?
```

4. Select remote by entering 2:

```
#?2
```

```
which protocol are you going to use to transfer the ipworks  
logs?  tcp or udp?
```

```
1) udp
```

```
2) tcp
```

```
#?
```

5. Select udp by entering 1, and configure the IP and port of the remote server:



**Note:** For TCP (without TLS), enter **2**, the procedures for TCP (without TLS) and UDP are similar. The only difference is the port number.

For example:

```
#? 1
```

```
What is the remote server's ip address(multi addresses  
separated by comma):192.168.0.1
```

```
What is the remote server's listening port to receive  
logs(multi ports separated by comma):514
```

6. After the configuration is finished successfully, check the connection between the syslog client and server:

For example:

```
# netstat -anp |grep 192.168.0.1
```

```
udp 0 0 192.168.0.2:40930 192.168.0.1:514 8092/rsyslogd
```



## 4 Configuring Remote Syslog Server

This section provides examples of configuring the remote syslog server using UDP and TCP connections.

For more information on how to configure syslog server, refer to [Guides for rsyslog](#), Reference [6].

The syslog configuration file is located in `/etc/rsyslog.conf`.

### 4.1 Configuring Syslog Server Using UDP Connections

1. Log on to the syslog server.
2. Use `vi` or any editor to open the syslog configuration file `rsyslog.conf`.

Add below contents in `rsyslog.conf`:

```
module(load="imudp")
input(type="imudp" port="514")

if $fromhost-ip == '192.168.0.1' then {
    action(type="omfile" file="/var/log/remotefile02")
    stop
}
```

**Note:**

- Here, the IP address is the syslog client IP, and it must be the same as the IP that is configured in Section 3.2 on page 5.
- The port number must be unique and the same as the port that is configured in Section 3.2 on page 5.

3. Check whether the UDP port 514 is occupied by a server or application:

```
#netstat -nap|grep "514"|grep "udp"

udp 0 0 192.168.0.1:514 0.0.0.0:* 7945/rsyslogd
```

4. Restart the syslog service to make the configuration take effect.

```
# service rsyslog restart
```

5. Enable security logging on the IPWorks Server.

Currently IPWorks supports security logging for DNS, ENUM, and Storage Server. You can enable the security logging by using ECLI. For details, see Section 3.1 on page 4.



6. Check whether the configuration works in the file `/var/log/ipworks.log` if you use the default value.

## 4.2 Configuring Syslog Server Using TCP Connections

1. Log on to the syslog server.
2. Use `vi` or any editor to open the syslog configuration file `rsyslog.conf`.

Add below contents in `rsyslog.conf`:

```
module(load="imtcp")
input(type="imtcp" port="10514")

if $fromhost-ip == '192.168.0.1' then {
    action(type="omfile" file="/var/log/remotefile02")
    stop
}
```

### Note:

- Here, the IP address is the syslog client IP, and it must be the identical to the IP configured in Section 3.2 on page 5.
  - The port number must be unique and the same as the port that is configured in Section 3.2 on page 5.
3. Check whether the TCP port 10514 is occupied by a server or application:
 

```
#netstat -nap|grep "10514"|grep "tcp"

tcp 0 0 0.0.0.0:10514 0.0.0.0:* LISTEN 10539/rsyslogd
```
  4. Restart the syslog service to make the configuration take effect.
 

```
#service rsyslog restart
```

If you need to secure logging using TLS, see Section 4.2.1 on page 10.
  5. Enable security logging on the IPWorks Server.
 

Currently IPWorks supports security logging for DNS, ENUM, and Storage Server. You can enable the security logging by using ECLI. For details, see Section 3.1 on page 4.
  6. Check whether the configuration works.

For example,

```
# tailf /var/log/ipworks.log
```



```
Feb 18 06:42:58 SC-1 rsyslogd: [origin software="rsyslogd"  
swVersion="8.4.0" x-pid="6514" x-info="http://www.rsyslog.com"]  
exiting on signal 15.
```

```
Feb 18 06:42:58 SC-1 rsyslogd: [origin software="rsyslogd"  
swVersion="8.4.0" x-pid="8935" x-info="http://www.rsyslog.com"]  
start
```

```
Feb 18 06:42:58 SC-1 systemd[1]: Starting System Logging  
Service...
```

```
Feb 18 06:42:58 SC-1 systemd[1]: Started System Logging  
Service.
```

### 4.2.1 Security Logging Using TLS

To configure the security logging using TLS, do the following:

For more information about security logging using TLS, refer to [Encrypting Syslog Traffic with TLS \(SSL\)](#).

To use TLS for the security logging, make sure that the required RPM packages are installed, for details, see Section 5.1 on page 16.

Perform Step 1 to Step 8 on the syslog server:

1. Create a configuration file `openssl.cnf` in a directory (for example `/etc/rsyslog/protected/`). An example of the configuration file is shown in Example 1.

**Note:** Make sure that the information in the `[ root_ca_distinguished_name ]` section is correct.

2. Clear up the commands if they have been executed previously.

```
# rm -rf crl newcerts private *.pem *.info serial index
```

3. Prepare the directories and files for the following commands.

```
# mkdir crl newcerts private
```

```
# chmod go-rwx private
```

```
# echo '01' > serial
```

```
# touch index
```

4. Create a CA with a key and generate a certificate request.

```
# openssl req -new -config openssl.cnf -keyout private/cakey.p  
em -out careq.pem
```

5. Create a certificate for the CA by using the above key and self-sign it.



```
# openssl ca -config openssl.cnf -create_serial -out cacert.pem
-batch -keyfile private/cakey.pem -selfsign -extensions v3_ca
-infiles careq.pem
```

6. Create server private key and generate a server certificate request.

```
# openssl req -nodes -new -keyout server-key.pem -out
server-cert-req.pem -config openssl.cnf
```

7. Create a certificate for the server by using the above server certificate request and sign it with the CA certificate.

```
# openssl ca -config openssl.cnf -out server-cert.pem -batch
-infiles server-cert-req.pem
```

8. Copy cacert.pem, server-cert.pem and server-key.pem to a directory (for example, /etc/rsyslog/protected/), edit the /etc/rsyslog.conf configuration file, remove "module(load="imuxsock")".

```
module(load="imuxsock") #remove this line

$ModLoad imuxsock # local messages
$ModLoad imtcp # TCP listener

# make gtls driver the default
$DefaultNetstreamDriver gtls

# certificate files
$DefaultNetstreamDriverCAFile /etc/rsyslog/protected/cacert.pem
$DefaultNetstreamDriverCertFile /etc/rsyslog/protected/server-cert.pem
$DefaultNetstreamDriverKeyFile /etc/rsyslog/protected/server-key.pem

$InputTCPServerStreamDriverMode 1 # run driver in TLS-only mode
$InputTCPServerStreamDriverAuthMode anon # client is NOT authenticated
$InputTCPServerRun 10514 # start up listener at port 10514
```

Perform Step 9 to Step 12 on the client machine:

9. Copy the cacert.pem to client directory (for example, /etc/rsyslog/protected/).

10. Create a configuration file named openssl.cnf as shown in Example 1.

**Note:** Make sure the information in the [ root\_ca\_distinguished\_name ] section is correct.

11. Create client private key and generate a client certificate request.

```
# openssl req -nodes -new -keyout client-key.pem -out
client-cert-req.pem -config openssl.cnf
```

12. Copy the client-cert-req.pem to the directory /etc/rsyslog/protected/ on the syslog server.

13. On the syslog server, create a certificate for the client by using the above client-cert-req.pem and sign it with the CA certificate.



```
# openssl ca -config openssl.cnf -out client-cert.pem -batch  
-infiles client-cert-req.pem
```

14. On the syslog server, copy `client-cert.pem` to the directory `/etc/rsyslog/protected/` on the client machine.

15. On the client machine, edit `/etc/rsyslog.conf` as below:

```
# make gtls driver the default  
$DefaultNetstreamDriver gtls  
  
# certificate files  
$DefaultNetstreamDriverCAFile /etc/rsyslog/protected/cacert.pem  
$DefaultNetstreamDriverCertFile /etc/rsyslog/protected/client-cert.pem  
$DefaultNetstreamDriverKeyFile /etc/rsyslog/protected/client-key.pem  
  
# Use default timestamp format  
$ActionSendStreamDriverMode 1 # run driver in TLS-only mode  
$ActionSendStreamDriverAuthMode anon # server is NOT authenticated
```

16. On the syslog server, restart the rsyslog service to make the configuration take effect.

```
# service rsyslog restart
```

17. On the client machine, restart the rsyslog service to make the configuration take effect.

```
# service rsyslog restart
```

```
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100  
101  
102  
103  
104  
105  
106  
107  
108  
109  
110  
111  
112  
113  
114  
115  
116  
117  
118  
119  
120  
121  
122  
123  
124  
125  
126  
127  
128  
129  
130  
131  
132  
133  
134  
135  
136  
137  
138  
139  
140  
141  
142  
143  
144  
145  
146  
147  
148  
149  
150  
151  
152  
153  
154  
155  
156  
157  
158  
159  
160  
161  
162  
163  
164  
165  
166  
167  
168  
169  
170  
171  
172  
173  
174  
175  
176  
177  
178  
179  
180  
181  
182  
183  
184  
185  
186  
187  
188  
189  
190  
191  
192  
193  
194  
195  
196  
197  
198  
199  
200  
201  
202  
203  
204  
205  
206  
207  
208  
209  
210  
211  
212  
213  
214  
215  
216  
217  
218  
219  
220  
221  
222  
223  
224  
225  
226  
227  
228  
229  
230  
231  
232  
233  
234  
235  
236  
237  
238  
239  
240  
241  
242  
243  
244  
245  
246  
247  
248  
249  
250  
251  
252  
253  
254  
255  
256  
257  
258  
259  
260  
261  
262  
263  
264  
265  
266  
267  
268  
269  
270  
271  
272  
273  
274  
275  
276  
277  
278  
279  
280  
281  
282  
283  
284  
285  
286  
287  
288  
289  
290  
291  
292  
293  
294  
295  
296  
297  
298  
299  
300  
301  
302  
303  
304  
305  
306  
307  
308  
309  
310  
311  
312  
313  
314  
315  
316  
317  
318  
319  
320  
321  
322  
323  
324  
325  
326  
327  
328  
329  
330  
331  
332  
333  
334  
335  
336  
337  
338  
339  
340  
341  
342  
343  
344  
345  
346  
347  
348  
349  
350  
351  
352  
353  
354  
355  
356  
357  
358  
359  
360  
361  
362  
363  
364  
365  
366  
367  
368  
369  
370  
371  
372  
373  
374  
375  
376  
377  
378  
379  
380  
381  
382  
383  
384  
385  
386  
387  
388  
389  
390  
391  
392  
393  
394  
395  
396  
397  
398  
399  
400  
401  
402  
403  
404  
405  
406  
407  
408  
409  
410  
411  
412  
413  
414  
415  
416  
417  
418  
419  
420  
421  
422  
423  
424  
425  
426  
427  
428  
429  
430  
431  
432  
433  
434  
435  
436  
437  
438  
439  
440  
441  
442  
443  
444  
445  
446  
447  
448  
449  
450  
451  
452  
453  
454  
455  
456  
457  
458  
459  
460  
461  
462  
463  
464  
465  
466  
467  
468  
469  
470  
471  
472  
473  
474  
475  
476  
477  
478  
479  
480  
481  
482  
483  
484  
485  
486  
487  
488  
489  
490  
491  
492  
493  
494  
495  
496  
497  
498  
499  
500  
501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511  
512  
513  
514  
515  
516  
517  
518  
519  
520  
521  
522  
523  
524  
525  
526  
527  
528  
529  
530  
531  
532  
533  
534  
535  
536  
537  
538  
539  
540  
541  
542  
543  
544  
545  
546  
547  
548  
549  
550  
551  
552  
553  
554  
555  
556  
557  
558  
559  
560  
561  
562  
563  
564  
565  
566  
567  
568  
569  
570  
571  
572  
573  
574  
575  
576  
577  
578  
579  
580  
581  
582  
583  
584  
585  
586  
587  
588  
589  
590  
591  
592  
593  
594  
595  
596  
597  
598  
599  
600  
601  
602  
603  
604  
605  
606  
607  
608  
609  
610  
611  
612  
613  
614  
615  
616  
617  
618  
619  
620  
621  
622  
623  
624  
625  
626  
627  
628  
629  
630  
631  
632  
633  
634  
635  
636  
637  
638  
639  
640  
641  
642  
643  
644  
645  
646  
647  
648  
649  
650  
651  
652  
653  
654  
655  
656  
657  
658  
659  
660  
661  
662  
663  
664  
665  
666  
667  
668  
669  
670  
671  
672  
673  
674  
675  
676  
677  
678  
679  
680  
681  
682  
683  
684  
685  
686  
687  
688  
689  
690  
691  
692  
693  
694  
695  
696  
697  
698  
699  
700  
701  
702  
703  
704  
705  
706  
707  
708  
709  
710  
711  
712  
713  
714  
715  
716  
717  
718  
719  
720  
721  
722  
723  
724  
725  
726  
727  
728  
729  
730  
731  
732  
733  
734  
735  
736  
737  
738  
739  
740  
741  
742  
743  
744  
745  
746  
747  
748  
749  
750  
751  
752  
753  
754  
755  
756  
757  
758  
759  
760  
761  
762  
763  
764  
765  
766  
767  
768  
769  
770  
771  
772  
773  
774  
775  
776  
777  
778  
779  
780  
781  
782  
783  
784  
785  
786  
787  
788  
789  
790  
791  
792  
793  
794  
795  
796  
797  
798  
799  
800  
801  
802  
803  
804  
805  
806  
807  
808  
809  
810  
811  
812  
813  
814  
815  
816  
817  
818  
819  
820  
821  
822  
823  
824  
825  
826  
827  
828  
829  
830  
831  
832  
833  
834  
835  
836  
837  
838  
839  
840  
841  
842  
843  
844  
845  
846  
847  
848  
849  
850  
851  
852  
853  
854  
855  
856  
857  
858  
859  
860  
861  
862  
863  
864  
865  
866  
867  
868  
869  
870  
871  
872  
873  
874  
875  
876  
877  
878  
879  
880  
881  
882  
883  
884  
885  
886  
887  
888  
889  
890  
891  
892  
893  
894  
895  
896  
897  
898  
899  
900  
901  
902  
903  
904  
905  
906  
907  
908  
909  
910  
911  
912  
913  
914  
915  
916  
917  
918  
919  
920  
921  
922  
923  
924  
925  
926  
927  
928  
929  
930  
931  
932  
933  
934  
935  
936  
937  
938  
939  
940  
941  
942  
943  
944  
945  
946  
947  
948  
949  
950  
951  
952  
953  
954  
955  
956  
957  
958  
959  
960  
961  
962  
963  
964  
965  
966  
967  
968  
969  
970  
971  
972  
973  
974  
975  
976  
977  
978  
979  
980  
981  
982  
983  
984  
985  
986  
987  
988  
989  
990  
991  
992  
993  
994  
995  
996  
997  
998  
999  
1000
```







-----

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]

[ 10 ]



## 5 Appendix

### 5.1 Installing Rsyslog TLS

---

---

#### Attention!

This section provides the Rsyslog TLS (version 1.2) installation in SLES 12.

---

---

1. Download the following RPM packages by searching the keyword **rsyslog-module-gtls** from the website <https://www.suse.com>.
  - libp11-kit0-0.20.3-1.6.x86\_64.rpm
  - libnettle4-2.7.1-5.20.x86\_64.rpm
  - libhogweed2-2.7.1-5.20.x86\_64.rpm
  - libtasn1-3.7-2.13.x86\_64.rpm
  - libtasn1-6-3.7-2.13.x86\_64.rpm
  - libgnutls28-3.2.15-1.8.x86\_64.rpm
  - rsyslog-module-gtls-8.4.0-2.2.x86\_64.rpm
2. Log on to the Linux Server with the Rsyslog installed.
3. Create an installation directory, for example, /home/install, and copy the downloaded packages into the directory.
4. Execute the following commands to install the RPM packages:

```
rpm -ivh libp11-kit0-0.20.3-1.6.x86_64.rpm libnettle4-2.7.1-5.20.x86_64.rpm libhogweed2-2.7.1-5.20.x86_64.rpm  
  
rpm -ivh libtasn1-3.7-2.13.x86_64.rpm libtasn1-6-3.7-2.13.x86_64.rpm libgnutls28-3.2.15-1.8.x86_64.rpm rsyslog-module-gtls-8.4.0-2.2.x86_64.rpm
```



# Reference List

## IPWorks Documents

- [1] Trademark Information
- [2] Typographic Conventions
- [3] Glossary of Terms and Acronyms
- [4] IPWorks Initial Configuration, 5/1553-AVA 901 33/3

## Other Reference

- [5] [Novell AppArmor](#)
- [6] [Newbie guide to rsyslog](#)
- [7] [Guides for rsyslog](#)
- [8] [Encrypting Syslog Traffic with TLS \(SSL\)](#)