New Rock Technologies, Inc.

SX1000 Enterprise Session Border Controller (SBC)

Maintenance Guide

Website: http://www.newrocktech.com

Email: gs@newrocktech.com

Document No. : HS0-E002-P

Document version: 201211

Contents

Contents of Table

1 Routine Maintenance

1.1 Introduction

Routine maintenance, also known as preventive maintenance or periodic maintenance, is a proactive mode to periodically maintain devices in the normal status. Routine maintenance helps you understand the running status and changing trend of the device, allowing you to take effective measures to eliminate hidden faults. The recommended maintenance period for SX1000 is one week, which can be adjusted as required.

1.2 Maintenance Preparation

- Ensure that SX1000 can be accessed through Telnet. The default telnet username is **root**, with the password of **voipgateway**.
- Ensure that SX1000 can be accessed through graphical user interface (GUI). The default web password is **sx1000**.

1.3 Maintenance Items

1.3.1 Checking the Running Time

Step1 Telnet into SX1000.

Step2 Run the **uptime** command to check the running time of SX1000.

Note

The running time of SX1000 will be accumulated unless it is manually restarted.

1.3.2 Checking the RAM

Step1 Telnet into SX1000.

Step2 Run the **free** command to check the random-access memory (RAM) of SX1000.

```
~ # free
              total        used        free      shared     buffers
   Mem:      127936       29396       98540           0        2076
  Swap:           0           0           0
 Total:      127936       29396       98540
```

✎
Note

The lower threshold for the RAM of SX1000 is 5000 KB. If the value of column **free** is smaller than 5000, SX1000 will restart.

1.3.3 Checking the Process

Step1 Telnet into SX1000.

Step2 Run the **ps** command to check the current process message of SX1000.

```
~ # ps
  PID  Uid      VmSize Stat Command
    1 root        576 S    init
    2 root            SW   [keventd]
    3 root            SWN  [ksoftirqd_CPU0]
    4 root            SW   [kswapd]
    5 root            SW   [bdflush]
    6 root            SW   [kupdated]
    7 root            SW   [mtdblockd]
    9 root            SWN  [jffs2_gcd_mtd4]
   38 root        564 S    /sbin/syslogd
   41 root        564 S    /sbin/klogd
   78 root        456 S    /usr/sbin/telnetd
   98 root        752 S    /var/run/sntpd -v -P no -r -l /etc/rdated.conf -x 30 -4
  171 root       1912 S    /var/run/cpe
  172 root       9056 S    /var/run/app
  173 root       1240 S    /var/run/boa
  174 root        528 S    /sbin/getty 38400 /dev/tts/0
  214 root       9056 S    /var/run/app
  215 root       9056 S    /var/run/app
  216 root       9056 S    /var/run/app
  217 root       9056 S    /var/run/app
  218 root       9056 S    /var/run/app
  219 root       9056 S    /var/run/app
  220 root       9056 R    /var/run/app
  221 root       1700 S    /var/run/cpe
  222 root       1388 S    /var/run/cpe
  225 root        820 S    -sh
  281 root        668 R    ps
```

✎
Note

In normal conditions, the status of the app process is **S** or **R**. If no app process is displayed or the status is **Z**, restart SX1000.

1.3.4 Checking the Online Terminals

Step1 Log in to the GUI of SX1000.

Step2 Click **Statistics > Line number**.

Network	ITSP server	Service port	Advance	Statistics	Logs	Tools	Info

Online Devices | Call log | **Line number** | Basic statistics | *Logout*

```
Gateway Domain Name / Phone Number >>>>>

id) gw ip:rport     MGCP domain name  phone number
0) 192.168.1.55:41986   500
```

✎
Note

If SX1000 works normally, you can view IP address and number of the registered terminal on this page.

1.3.5 Checking the Link Status of the Ethernet Interface

Step1 Telnet into SX1000.

Step2 Run the **cat /proc/net/phystat** command to check the link status of the Ethernet interface.

![Note icon]

> PHY#0, PHY#1, and PHY#2 indicate Ethernet interface 1, Ethernet interface 2, and Ethernet
> interface 3 respectively. If the status of an Ethernet interface is "Link down", the Ethernet interface is
> disconnected.

1.3.6 Checking Softswitch in Usage

Step1 Log in to the GUI of SX1000.

Step2 Click **Statistics > Online Devices**.

![Note icon]

> The last but one field of the entry indicates the softswitch IP address in usage, which can be used to
> determine whether the current active softswitch is abnormal.

1.3.7 Backing up Configurations

Step1 Log in to the GUI of SX1000.

Step2 Click **Tools > Export data > Download**.

![Note icon]

> To avoid unexpected configuration loss, backing up configurations after the initial configuration or
> configuration change is recommended.

1.3.8 Changing Password Periodically

Changing the GUI Password

Step1 Log in to the GUI of SX1000.

Step2 Click **Tools > Change password** and enter the new password.

Changing the Telnet Password

Step1 Telnet into SX1000.

Step2 Run the passwd command to enter the new password according to the prompt and click **Confirm**.

Note

> To ensure the device security, changing the GUI and Telnet passwords periodically is recommended. You can click **Advance > Security management** in the GUI to disable Telnet services. After that, no Telnet-based access to SX1000 is permitted.

2 Troubleshooting

2.1 Troubleshooting Process

A troubleshooting process generally consists of the following stages:

● Collecting information

● Troubleshooting the fault

● Resolving the the fault

2.1.1 Collecting Information

Fault information can be collected from:

● Feedback from the customer

● Alarms generated by the network management system

● Routine maintenance or inspection

Collecting various raw information is of great importance during the initial troubleshooting stage. Raw information helps maintenance personnel narrow down the possible causes, ensuring a fast and accurate fault location. In case of faults, especially major faults, take caution that no action is performed until all necessary information is collected.

2.1.2 Troubleshooting the Fault

The cause of a fault is unique at each specific circumstance. Thorugh analysis and comparisons, the exact cause of the fault can be identified. A fast and accurate fault dianogsis improves the troubleshooting efficiency, preventing the fault from further deterioration due to aimless troubleshooting. Locating the cause of fault is an important step in the process of technical troubleshooting, which provides guide for determining the means or measures for resolving the fault.

2.1.3 Resoving the Fault

After identifying causes of a fault, you can troubleshoot the fault accordingly.

Fault troubleshooting is a process of taking proper measures or steps (such as changing configurations or restarting the device) to rectify a fault and restore the system.

2.2 Troubleshooting Cases

2.2.1 Subscribers Fail to Register to the Softswitch through SX1000

Fault Description

The IP terminal can directly register to the softswitch, but cannot register to the softswitch through SX1000.

Cause Analysis

● The network between the terminal and SX1000 or between SX1000 and softswitch fails.

● The registration server and ports of the terminal are improperly configured.

● The registration account and password are incorrectly set.

● The encryption modes on the terminal and SX1000 do not match.

● There are special restrictions.

Troubleshooting and Solution

● Telnet into SX1000 and run the **ping** command to check the network connection between SX1000 and terminal and between SX1000 and softswitch. If the network fails, debug the network and try again.

● Check whether the registration address on the terminal is the address of SX1000 and whether the serving port, account, and password are correct.

● Check whether the encryption modes on the terminal and SX1000 match. If not, change the encryption mode on SX1000.

● Check whether there are special restrictions on SIP signaling. For example, Huawei SoftCo will check whether or not there is a field of Huawei in **User-Agent** of the registation message.

In addition, you can capture packets on the network to fast locate the fault:

● If SX1000 does not receive registration messages, the cause may be that the terminal does not send these messages. Check terminal configurations and the network connection between the terminal and SX1000.

● If SX1000 receives messages and obtains no response after sending these messages to the softswitch, check software configurations on SX1000 and the network connection between SX1000 and softswitch.

● If SX1000 forwards registration messages to the softswitch and receives the code 403 in response, check whether the registration password is correct.

● If SX1000 forwards registration messages to the softswitch and receives the code 404 in response, check whether the registration number is correct.

2.2.2 One Side or Both Sides Fail to Hear the Voice of the Far End

Fault Description

During the communication, one side or both sides fail to hear the voice of the far end.

Cause Analysis

● The codes of terminals are different.

● The SDP address in the SIP signaling is incorrect.

● The terminal does not send RTP packets.

● Type-of-Service (TOS) on SX1000 does not match TOS on the terminal.

● The RTP proxy function is disabled on SX1000.

Troubleshooting and Solution

Capture packets on the switch through mirroring or on SX1000 for analysis. For details, see **Q9 How to capture IP packets on the SX1000** in Chapter 3.

- Check whether the SDP address in the SIP signaling is correct. The **200OK** message sent from SX1000 to the terminal needs to carry the address of SX1000.

- Check whether the terminal sends RTP packets. If not, check the terminal configurations.

- Check whether codecs in RTP packets sent by the two terminals are the same. If not, check the terminal configurations.

- Check whether the TOS value is configured for SX1000. If so, check whether the TOS value for SX1000 is identical with TOS values on the terminal and softswitch.

- Log in to the GUI of SX1000, and click **Advance > System** to check the **RTP proxy** parameter. If the value of this parameter is set to **No**, both sides of the voice call fails. The fault can be rectified by setting the parameter value to **Yes**.

2.3 Vendor Assistance in Information Analysis

If the on-spot engineer is unable to troubleshoot the fault, New Rock can provide assistance in fault analysis. To ensure a quick and accurate troubleshooting, the on-spot engineer needs to provide the following information:

- Logs when the fault occurs (If the fault can be reproduced, logs with the level of 8 need to be captured. For method of capturing logs, see **Q6 How to download logs** in Chapter 3.)

- Packets captured on the network when the fault occurs (Packets can be captured on the mirroring switch using **wireshark** or on the background of SX1000 using **tcpdump**). For packet capturing on the background of SX1000, see **Q9 How to capture IP packets on the SX1000** in Chapter 3.

- Current configurations of SX1000. For configuration download, see **Q6 How to download logs** in Chapter 3.

- Fault information and on-site environment, including the detailed fault information, network topology, and IP address of the terminal/SX1000/softswitch.

The preceding information can be sent to New Rock through e-mail for instant help.

3 FAQs

Q1. What to do if I forget the IP address of SX1000 and how to change the IP address?

Log in to SX1000 through the console interface (with the username of **root** and password of **voipgateway**) and run the **ifconfig** command to check the IP address of each Ethernet interface. Set the IP address of the computer in the same network segment as the IP address of one of the Ethernet interfaces and then log in to the GUI of SX1000 to change the IP address.

> **Note**
>
> Communication parameters for the console interface on SX1000 include 115200 bit/s, eight data bits, one stop bit, no parity, and no flow control.

Q2. After logging in to the GUI as the administrator, I can neither change configurations nor find the submit button. What's wrong?

Multiple users can concurrently log in to the GUI of SX1000, but only the first login user has the authority as an administrator. Other users have only the read rights, not the read-and-write rights. The rights of the current user can be queried at the upper left corner of the GUI, as shown in the following diagram:

Network	ITSP server	Service port	Advance	Statistics	Logs	Tools	Info

Logout

Host name	SX1000	Contain letter, number and "-" but must start with letter
Logical IP address	192.168.3.201	
Gateway IP address		
ETH1		
IP address	192.168.3.201	
Netmask	255.255.0.0	
Gateway IP address	192.168.2.1	
MAC address	00:0E:A9:10:FD:0D	

Q3. How to forward messages if the IP address of the softswitch and addresses of ethernet interfaces on SX1000 are in different network segments?

After receiving registration messages, SX1000 checks the softswitch address and the IP address of each Ethernet interface. If the IP address of one of the Ethernet interfaces is in the same network segment as that of the softswitch, SX1000 uses this Ethernet interface for message forwarding.

If no IP address of all the three Ethernet interfaces on SX1000 is in the same network segment as that of the softswitch, SX1000 forwards registration messages through a logical IP address. The logical IP address can be queried in the **Network** tag of the GUI and cannot be changed. By default, the IP address of Ethernet interface 1 is used as the logical IP address. If Ethernet interface 1 is not configured, the IP address of Ethernet interface 3 will be used as the logical IP address. If only the IP address of Ethernet interface 2 is configured, the IP address of Ethernet interface 2 is used as the logical IP

address.

Q4. If all the three ethernet interfaces of SX1000 are in usage, the IP address of which interface is used as the default gateway?

If the gateway address is configured for all the three Ethernet interfaces, the IP address of Ethernet interface 2 is the default gateway.

If Ethernet interface 2 is not used or configured with the gateway, the IP address of Ethernet interface 3 is the default gateway. If only Ethernet interface 1 is used, the IP address of Ethernet interface 1 is the default gateway.

Q5. How to set QoS?

Quality of Service (QoS) can be set by setting TOS values. TOS values are set in the **Advance** tag of the GUI. TOS values are in hexadecimal, which can be converted from DSCP binary value by adding two bits 00 at the left side. For example, if the DSCP value is 46(101110), the converted TOS value is 0xB8.

The following information is used as reference:

IP precedence (IP TOS)

There are eight IP precedence values, ranging from 0 to 7. The larger the value, the higher the precedence. By default, values 6 and 7 are reserved for internetwork and network controll. You are not recommended to use these two values.

DSCP precedence

There are 64 IP precedence values, ranging from 0 to 63. The larger the value, the higher the precedence. Under the current definition, the default DSCP value is 0. For class selectors that are defined as being backward-compatible with IP precedence, the DSCP value can be 8, 16, 24, 32, 40, 48, or 56. For Expedited Forwarding (EF) that is commonly used for low-latency services, the recommended DSCP value is 46 (101110). For Assured Forwarding (AF), four service levels are defined and each service level is assigned with three DSCP values, namely (10, 12, 14), (18, 20, 22), (26, 28, 30), and (34, 36, 38).

Q6. How to download logs?

Click **Logs > Managing Log** to download logs of SX1000.

Logs are downloaded for fault analysis on SX1000. If the fault occurred on SX1000 can be reproduced, you are recommended to change the value of **Log level** to **Registration information(8)** so that more detailed information can be obtained.

During normal operation of SX1000, set the value of **Log level** to **4** or a value smaller than 4.

Q7. Does SX1000 support the TR069 protocol?

Yes. You can configure TR069-related parameters such as the server URL, username, and password in the **Advance** tag of the GUI. In addition, SX1000 has passed the interoperability testing with Huawei

network management system.

Q8. What are the UDP and RTP ports in the advance tag of the GUI and what are value ranges of these two ports?

The User Datagram Protocol (UDP) port is the source port used by SX1000 to forward Session Initiation Protocol (SIP) messages to the softswitch. For example, the IP terminal sends registration messages to the service port 5060 of SX1000. Then, SX1000 forwards the registration messages to the softswitch from the port 20010. The port 20010 is the UDP port.The UDP port number ranges from the 10000 to 30000. It is recommended to set the UDP port value to be greater than 20000.

The RTP port is used by SX1000 for sending and receiving media flows, with port number ranging from the 30000 to 31599).

The minimum UDP and RTP port numbers can be set as required.

Q9. How to capture IP packets on SX1000?

SX1000 is equipped with a built-in **TcpDump**, a data collection and analysis tool in the Linux system. With **TcpDump**, headers of data packets transmitted on the network can be intercepted for analysis.

Procedures of using **TcpDump** at the background are as follows:

Step1 Telnet into SX1000, with the username of **root** and default password of **voipgateway**.

Step2 Run the **cp /var/bin/tcpdump /tmp** command to copy the **tcpdump** file in the directory **/var/bin to the directory /tmp**.

Step3 Run the **cd /tmp** command to enter the **directory /tmp**.

Step4 Run the **chmod 777 tcpdump** command to grant users rights to manage the **tcpdump** file.

Step5 Run the **./tcpdump -i any -s 0 -w sbc.pcap** command to capture packets.

```
/tmp #
/tmp # ./tcpdump -i any -s 0 -w sbc.pcap
tcpdump: WARNING: Promiscuous mode not supported on the "any" device
tcpdump: listening on any, link-type LINUX_SLL (Linux cooked), capture size 65535 bytes
```

Step6 Reproduce the fault. After that, the **sbc.pcap** file will be generated in the directory **/tmp** after pressing **Ctrl+C**.

Step7 Install the FTP server on the computer and do as follows on the background of SX1000 to upload files to the computer:

- Run the **ftp 192.168.1.55** command. 192.168.1.55 is the IP address of the local computer.
- Enter the FTP username.
- Enter the FTP password.
- Run the **put sbc.pcap** command to upload the **sbc.pcap** file to the local computer. The **sbc.pcap** file contains packets captured by SX1000 on the network.
- Run the **bye** command to quit FTP.

Step8 Run the rm **sbc.pcap** command to delete the **sbc.pcap** file and release the occupied memory.

Note

Capturing of packets on the background is used only when the packet capturing cannot be performed in the on-site environment. The recommended packet capturing duration is two minutes. If the packet capturing process lasts for a long period of time, excessive memory will be occupied, leading to the restart of SX1000. During packet capturing, you can open another Telnet window and run the free command to check the remaining memory. Ensure that the memory of SX1000 is greater than 5M bytes.

Q10. How to add static routes to SX1000?

After logging in to the background of SX1000 through Telnet, you can add static routes to SX1000. If the static routes are not added from the background, they will be deleted after device restart. To prevent the added static routes from being deleted after device restart, do as follows to add routes to the last part of the rcS script.

Step1 Telnet into SX1000, with the username of root and default password of voipgateway.

Step2 Run the vi /etc/rc.d/rcS command and then use the shortcut key Shift+g to jump to the last line of the file

Step3 Enter static routes to be added in the last line of the file and save the configuration.

As shown in the following diagram, a static route is added, with the destination network being 172.16.1.0, outgoing gateway being 192.168.1.2, and outgoing physical port being eth0 (Ethernet interface 1).

Step4 Restart SX1000 and run the route command to check whether static routes are added successfully.

Q11. If I forget the Telnet password, how can I restore it?

The missing Telnet password can be restored by logging in to SX1000 through the console interface.

The detailed procedures are as follows:

Step1 Log in to SX1000 through the console interface (with the forwarding speed of 115200 bit/s). Restart SX1000 and press Enter when the prompt "Hit any key to stop autoboot" is displayed.

Step2 Run the **setenv bootargs root=1f03 init=/sbin/init** command.

Step3 Run the **bootm 0xff710000** command.

Step4 Run the **mount -t jffs2 /dev/mtdblock/4 /mnt/rwfs** command.

Step5 Run the **cd/mnt/rwfs/etc** command.

Step6 Run the **vi shadow** command.

Step7 Press **a** to modify the first line, and delete characters between the colon after root and the colon before 10933.

Note: Press shift when deleting characters. After the deletion, press esc and then enter :wq. Press Enter, save the configuration, and then quit.

```
root:$1$$GmbL31XOMZR57QUGDLV.L1:10933:0:99999:7:::
bin:*:10933:0:99999:7:::
daemon:*:10933:0:99999:7:::
adm:*:10933:0:99999:7:::
lp:*:10933:0:99999:7:::
sync:*:10933:0:99999:7:::
shutdown:*:10933:0:99999:7:::
halt:*:10933:0:99999:7:::
uucp:*:10933:0:99999:7:::
operator:*:10933:0:99999:7:::
nobody:*:10933:0:99999:7:::
~
```

Step8 Run the reboot command to restart SX1000. After that, log in to SX1000 through Telnet and you will find that the old password is cleared. Run the passwd command to set the new password.

4 Acronyms and Abbreviations

Table 4-1 Acronyms and Abbreviations

Terms	Full Spelling
SBC	Session Border Controller
RTP	Real-timeTransport Protocol
SIP	Session Initiation Protocol
TR069	CPE WAN Management Protocol
TOS	Type-Of-Service
DSCP	Differentiated Services Code Point
QoS	Quality of Service
UDP	User Datagram Protocol
URL	Uniform Resource Locator
EF	Expedited Forwarding
AF	Assured Forwarding