Security Acceleration Module

Getting Started Guide

15 December 2013
Important Information

Ordering Information
To order a Security Acceleration Module, contact Check Point (quote@checkpoint.com).
The SKU is CPAC-SAM108.

Latest Software
We recommend that you install the most recent software release to stay up-to-date with the latest functional improvements, stability fixes, security enhancements and protection against new and evolving attacks.

Latest Documentation
The latest version of this document is at: (http://supportcontent.checkpoint.com/documentation_download?ID=18043)
To learn more, visit the Check Point Support Center (http://supportcenter.checkpoint.com).
For more about the 21000 Appliance, see the 21000 Appliance home page (http://supportcontent.checkpoint.com/solutions?id=sk23641).

Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 December 2013</td>
<td>General formatting updates</td>
</tr>
<tr>
<td>5 November 2013</td>
<td>Updated show sam np connections (on page 19) and show sam np cpu-usage (on page 20)</td>
</tr>
<tr>
<td>14 May 2013</td>
<td>• Added Uninstalling the Security Acceleration Module (&quot;Uninstalling the Security Acceleration Module Tray&quot; on page 14)</td>
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<td></td>
<td>• Added show asset (on page 18)</td>
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<td></td>
<td>• Updated Monitoring the Security Acceleration Module Using the WebUI (on page 16)</td>
</tr>
<tr>
<td></td>
<td>• Updated show sam np # cpu-usage (&quot;show sam np cpu-usage&quot; on page 20)</td>
</tr>
<tr>
<td>21 August 2012</td>
<td>First release of this document</td>
</tr>
</tbody>
</table>

Feedback
Check Point is engaged in a continuous effort to improve its documentation.
Please help us by sending your comments (mailto:cp_techpub_feedback@checkpoint.com?subject=Feedback on Security Acceleration Module Getting Started Guide).
Introduction

Welcome

Thank you for choosing Check Point’s 21000 Appliance and the Security Acceleration Module. We hope that you will be satisfied with this system and our support services. Check Point products are the most up to date and secure solutions available today.

Check Point also delivers worldwide educational, professional and support services through a network of Authorized Training Centers, Certified Support Partners and Check Point technical support personnel. We make sure that you get the most out of your security investment.

For more about the Internet Security Product Suite and other security solutions, see the Check Point Web site (http://www.checkpoint.com), or call Check Point at 1(800) 429-4391. For more technical information about Check Point products, consult the Check Point Support Center (http://supportcenter.checkpoint.com).

Welcome to the Check Point family. We look forward to meeting all of your current and future network, application and management security needs.

Overview of the 21000 Appliance

The Check Point 21000 Appliance models are ideally suited for securing medium to large data center environments and high-end enterprise networks. The 21000 Appliance models are purpose-built Security Gateways in a compact 2U form factor. The acceleration options extend firewall throughput up to 100 Gbps with significantly lower packet latency.

The 21000 Appliance models remove complexity with central management of security protection services on one platform. With the Check Point security-leading Software Blades technology, these appliances can provide: VPN, IPS, Application Control, Mobile Access, Application and URL Filtering, DLP, Anti-Virus & Anti-Malware, Web Security and Anti-Spam & Email Security.

The 21000 Appliance models are highly modular, for greater scalability and flexibility. Up to 36 I/O ports are available with the optional 12x1GbE copper and fiber (SFP) Network Interface Cards. For 10GbE network connectivity, an optional 4x10GbE fiber (SFP+) module is also available. This makes the 21000 Appliance ideal for demanding network environments, and for securing many different networks.

The 21000 Appliance models deliver high serviceability and redundancy for these components that you can hot-swap: dual power-supplies, system fans, and dual hard-disk drive with RAID support. Accessories include NICs, memory upgrades and a LOM (Lights-Out Management) card module for out-of-band management.

This appliance supports the SecurePlatform and Gaia Operating Systems. Gaia is a single, unified network security Operating System that combines the best of Check Point's SecurePlatform and IPSO, the operating system from the Nokia security products. Gaia supports the full portfolio of Check Point Software Blades, Security Gateway and Security Management products.

For more about installing and using 21000 Appliance, see the appliance home page (http://supportcontent.checkpoint.com/solutions?id=sk68701).

Overview of the Security Acceleration Module

The Check Point Security Acceleration Module for the 21000 Appliance is designed to meet the needs of high-performance and low latency customer environments. Network security traffic can be offloaded from the general purpose CPU to the Security Acceleration Module, letting customers run many security functions in highly demanding network environments.

Key features of the Security Acceleration Module:

- **Designed for Low Latency Environments** – Ideal for transaction-oriented environments, the Security Acceleration Module delivers sub five micro-seconds of network latency, enabling security in high-performance environments with minimal latency.
• **Purpose Built SecurityCore™ Technology** – With purpose-built hardware acceleration to improve the power of security processing, the Security Acceleration Module features 108 dedicated security cores for ultra-fast security performance.

• **Maximum Security and Performance** – Offers maximum security and performance of business-critical applications, with up to 110 Gbps of firewall throughput and an overall system power boost to 2,900 SecurityPower™ Units in the 21000 Appliance. The Security Acceleration Module delivers 300,000 connections per second and a 9X forwarding rate, with up to 60 million packets per second.

## Supported Line Cards

The 21000 Appliance front panel has three slots for Line Cards, also known as Network Interface Cards (NICs).

The 10GbE SFP+ 4 port Acceleration Ready Line Card supports the Security Acceleration Module. Line Cards that support the Security Acceleration Module are labeled **Acceleration Ready**.

These Line Cards are available for the 21000 Appliance:

<table>
<thead>
<tr>
<th>Item</th>
<th>Line Card</th>
<th>Description</th>
<th>Security Acceleration Module Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10GbE SFP+ Line Card, 4 Port</td>
<td>10 Gb Ethernet PCI-e line card for SFP+ transceivers</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>1GbE SFP Line Card, 12 Port</td>
<td>12 port 1Gb Ethernet PCI-e line card for SFP transceivers</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>1GbE Copper Line Card, 12 port</td>
<td>12 port 1000BaseT PCI-e line card</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>10GbE SFP+ Acceleration Ready Line Card, 4 Port</td>
<td>10 Gb Ethernet Acceleration Ready line card</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Preparing the 21000 Appliance

**Important** - We recommend that only experienced personnel install or remove hardware components. Installing or removing components incorrectly can permanently damage the appliance.

Before you start to install or remove the Security Acceleration Module, make sure that:

- The rear of the appliance is accessible, either installed into a rack or on a bench top, with sufficient clearance behind the appliance to allow insertion of the Security Acceleration Module.
- You can connect to the WebUI or CLI to shut down the appliance.
- You have Acceleration Ready Line cards installed in the appliance.
- You have the Check Point Security Acceleration Module Upgrade Kit.

**Important** - To protect the appliance and the Security Acceleration Module from electrostatic discharge damage, make sure that you are properly grounded before you touch any of the electronic components. Read the Health and Safety Information in the Check Point 21000 Appliance Getting Started Guide (http://supportcontent.checkpoint.com/solutions?id=sk23641) before you start to prepare the appliance.

We recommend that you use the grounding wrist strap that is included in the upgrade kit. The grounding plug on the rear of the appliance provides a chassis grounding point.

Security Acceleration Module Upgrade Kit Contents

- This guide - 21000 Appliance Security Acceleration Module Getting Started Guide
- Security Acceleration Module
- ESD grounding strap (anti-static)

To prepare the 21000 Appliance:

1. Make sure that you can access the rear of the appliance. It can be installed into a rack or on a bench top.
   - There must be sufficient clearance to insert the Security Acceleration Module tray into the rear of the appliance.
2. Connect to the appliance.
   - To connect using the WebUI, connect a standard network cable to the appliance management interface (marked MGMT) and to your management network. Browse to https://<management IP address>.
   - To connect using the CLI, use one of these ways:
     - Connect a console cable to connect the front panel CONSOLE port to a computer, and open up a console window.
     - Connect through SSH to the appliance management interface IP address using a terminal emulation program.
     - Use the CLI window in the WebUI toolbar.
3. Enter your user name and password.
4. Shut down the appliance.
   - Using the WebUI: In the Maintenance > Shut Down page, click Halt.
   - Using the CLI: Run halt
     - The appliance shuts down.
5. From the rear of the appliance, press and hold the power switch to turn off the appliance.
6. Remove the power cords from the appliance.
7. Put on an ESD strap and attach the other end to a grounding point.
8. Use a Philips screwdriver and loosen the two retaining screws for the top tray.
9. Pull the extraction handles for the top tray and remove the placeholder tray from the appliance.

![Diagram of the 21000 Appliance]

**Note** - The previous diagram shows the 21400 appliance.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Top tray with Security Acceleration Module</td>
</tr>
<tr>
<td>2</td>
<td>Bottom tray with the system board</td>
</tr>
<tr>
<td>3</td>
<td>Two retaining screws and extraction handles for the top tray</td>
</tr>
<tr>
<td>4</td>
<td>Grounding point for ESD strap</td>
</tr>
</tbody>
</table>
Installing Security Acceleration Module

This workflow shows how to install Security Acceleration Module in an appliance. For new appliances and clean installations, make sure that you configure the SAM interfaces after you complete the First Time Configuration Wizard.

1. Prepare the appliance ("Preparing the 21000 Appliance" on page 7).
3. Turn on the appliance.
4. For a clean installation of the supported version of the Gaia operating system, run the First Time Configuration Wizard.
6. Reboot the appliance.

Installing the Security Acceleration Module Tray

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The tray is labeled <strong>Security Acceleration Module</strong>.</td>
</tr>
<tr>
<td>2</td>
<td>Cooling fans. The Security Acceleration Module fan units are redundant. If a fan fails, it can be replaced.</td>
</tr>
<tr>
<td>3</td>
<td>Memory sockets with DIMMs installed. The memory is replaceable.</td>
</tr>
</tbody>
</table>
To install the Security Acceleration Module:

1. From the rear of the appliance, push the Security Acceleration Module tray into the top slot.
2. Make sure that there is no space between the top and bottom tray.
3. Tighten the two top retaining screws to make sure that the top tray is securely installed.
To make sure the Security Acceleration Module is installed correctly:

1. Make sure there is no space between the extraction handles and the rear panel.

2. Connect the power cords to the appliance.
   The appliance turns on.

3. Use a serial cable to connect the front panel CONSOLE port to a computer.

4. Connect to the appliance with a terminal emulation program such as Microsoft HyperTerminal or PuTTY.

5. When the appliance is ready, log in.

6. Run the command `show sam status`
   The appliance shows this message:
   OK All NPs are in running state
   If the response is not OK, reboot the appliance one or more times. If there is still a problem, contact Technical Support.
Configuring the Acceleration Ready Ports

1. Connect to the appliance
   - To connect using the WebUI, connect a standard network cable to the appliance management interface (marked MGMT) and to your management network. Browse to https://<management IP address>.
   - To connect using the CLI, use one of these ways:
     - Connect a console cable to connect the front panel CONSOLE port to a computer, and open up a console window.
     - Connect through SSH to the appliance management interface IP address using a terminal emulation program.
     - Use the CLI window in the WebUI toolbar.

2. Enable acceleration for appliance network interfaces on an acceleration enabled Line Card. Use the WebUI or the CLI.

3. Reboot the appliance.

To enable acceleration on an interface with the WebUI:

1. In the WebUI, open the Network Management > Network Interfaces page.

```
<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The name of the appliance interface. Line Card slots are numbered from 1 on the top to 3 on the bottom. The interface ports are numbered from 1, left to right. For example, for a 12-port card the ports are numbered 1 on the left to 12 on the right. The interface <code>eth1-02</code> is the second port from the left in the top Line Card.</td>
</tr>
<tr>
<td>SAM</td>
<td>For Acceleration Enabled Line Cards: If the appliance interface is enabled for acceleration (Yes or No). For other Line Cards, the value is blank.</td>
</tr>
</tbody>
</table>
```

2. Select the interface and click Edit.
   
   The Edit `<interface name>` window opens.

3. Select the SAM tab.
4. Select **Enable SAM Mode**

5. Click **OK**.
6. Do steps 2-5 again for each interface that accelerates traffic.
7. Go to the **Maintenance > Shut Down** page.
8. Click **Reboot**.

**To enable acceleration on an interface with the CLI:**

From the CLI, run these commands:

```
set interface <if_name> sam-mode on
save config
reboot
```

**Description**  
Enable or disable an appliance interface for acceleration by the Security Acceleration Module

**Syntax**  
```
set interface <if_name> sam-mode {on|off}
```

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;if_name&gt;</td>
<td>The name of the appliance interface. Line Card slots are numbered from 1 on the top to 3 on the bottom. The interface ports are numbered from 1, left to right. For example, for a 12-port card the ports are numbered 1 on the left to 12 on the right. The interface eth1-02 is the second port from the left in the top Line Card.</td>
</tr>
<tr>
<td>sam-mode {on</td>
<td>off}</td>
</tr>
</tbody>
</table>

**Example**

```
set interface eth1-04 sam-mode on
```

**Comments**  
You must save the configuration and reboot the appliance after running this command.
Uninstalling the Security Acceleration Module Tray

The Security Acceleration Module is in the top slot of the appliance. If it is necessary to use the appliance without the Security Acceleration Module, then you must install the placeholder tray in the top slot.

This workflow shows how to remove Security Acceleration Module from an appliance and install the placeholder tray.

2. Remove the Security Acceleration Module tray from the appliance ("Removing the Security Acceleration Module Tray" on page 14).
3. Install the placeholder tray ("Installing the Placeholder Tray" on page 15).
4. Turn on the appliance.

Disabling Security Acceleration Module

Disable Acceleration Mode on the appliance before you remove the Security Acceleration Module tray.

To disable Security Acceleration Module with the WebUI:

1. Use an Internet browser to connect to the appliance.
2. Log in to the appliance.
3. For each SAM interface do these steps:
   a) In the WebUI, click **Network Management > Network Interfaces**.
   b) Select the SAM interface and click **Edit**.
   c) Select the **SAM** tab.
   d) Clear **Enable SAM Mode**.
   e) Click **OK**.

   A window opens and tells you to reboot the appliance after you configure all the SAM interfaces.
4. Shut down the appliance, in the **Maintenance > Shut Down** page, click **Halt**.
5. From the rear of the appliance, press and hold the power switch to turn off the appliance.

To disable Security Acceleration Module with the CLI:

1. From the CLI, run these commands:

   ```
   set interface <if_name> sam-mode off
   save config
   halt
   ```

   The appliance shuts down.

2. From the rear of the appliance, press and hold the power switch to turn off the appliance.

Removing the Security Acceleration Module Tray

Make sure that the appliance is turned off and that the rear of the appliance is accessible.

⚠️ **Important** - Only use the appliance when the Security Acceleration Module or the placeholder tray is in the upper slot to make sure the appliance is cooled correctly.

To remove the Security Acceleration Module tray:

1. Remove the power cords from the appliance.
2. Use a Philips screwdriver and loosen the two retaining screws for the top tray.
3. Pull the extraction handles for the top tray and remove the Security Acceleration Module tray from the appliance.
Installing the Placeholder Tray

To install the placeholder tray:
1. From the rear of the appliance, slide the placeholder tray into the top slot.
2. Make sure that there is no space between the upper tray and bottom tray.
3. Tighten the two retaining screws to make sure that the top tray is securely installed.
4. Make sure there is no gap between the extraction handles and the rear panel.
5. Make sure that the placeholder tray is installed correctly.
   a) Connect the power cords to the appliance.
      The appliance turns on.
   b) Make sure that the LCD screen shows the appliance model.

Verifying that Traffic is Accelerated

Verify that the traffic through the Acceleration Ready Line Card ports is accelerated by monitoring the acceleration LED.

Line Card LEDs

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Activity</td>
</tr>
<tr>
<td></td>
<td>OFF - No Activity</td>
</tr>
<tr>
<td></td>
<td>Slow Blink (Amber) - Activity</td>
</tr>
</tbody>
</table>
## Monitoring the Security Acceleration Module Using the WebUI

You can monitor the core usage and number of connections per core in the Security Acceleration Module. Traffic from the network interfaces is distributed to the NP (Network Processors).

**To monitor the Security Acceleration Module using the WebUI:**

1. Connect to the WebUI.
2. Open the **Network Management > SAM Monitor** page.
   
   The three bar graphs at the top of the page show the number of cores with High, Medium and Low core load for each NP.
3. Click on an NP bar graph.
   
   The bar graphs at the bottom of the page, in the **Detailed Core Information** section, show the details for that NP.
4. In the **Detailed Core Information** section, Click the **Usage** tab.
   
   The graph shows the percentage usage of the cores. Cores with Low, Medium and High loads are shown by color. Each of the cores in the NP is identified by number.
5. Click the **Connections** tab.
   
   The graph shows the connections handled by the cores, compared to the average over all the cores. Cores with Low, Medium and High numbers of connection are shown by color. Each of the cores in the NP is identified by number.
6. Click the **Table** tab.
   
   The table shows usage and connection data per core. To download the data to a text file, click **Download SAM Data** and then click **Generate Text file**.

**To configure range divisions for graphs:**

- **Usage Range Divisions** - Select the range boundary values to define Low, Medium and High core load.
- **Connections Range Divisions** Select the range boundary values to define Low, Medium and High core connections, relative to the average.

### Item | Description
---|---
2 | **Link**
- OFF - No Link
- ON (Green) - Link
3 | **Accelerated Port**
- OFF – Port served by the appliance motherboard without acceleration
- ON (Blue) – Port served by Security Acceleration Module
Example SAM Monitor Page

Monitoring Security Acceleration Module Hardware Health

You can monitor the:

- Temperature of the Security Acceleration Module.
- Temperatures of the Network Processors.
- Fan speed.
- Major voltages.

To monitor the Security Acceleration Module hardware health using the WebUI:
1. Connect to the WebUI.
2. Open the Maintenance > Hardware Health page.
## Monitoring the Security Acceleration Module Using the CLI

You can monitor the core usage and number of connections per core in the Security Acceleration Module. Traffic from the network interfaces is distributed to the NP (Network Processors).

**To monitor the Security Acceleration Module Using the CLI:**

1. Connect to the CLI.
2. To see available monitoring commands, run `show sam <TAB>` and press Enter.
   These commands are available:

   ```
   show sam connections
   show sam cpu-usage
   show sam np # connections
   show sam np # cpu-usage
   show sam status
   show sam summary
   ```

### show asset

**Description**  
Shows a summary of the hardware components that are installed on the appliance. Each memory slot has two DIMMs.

The following example shows a Security Acceleration Module that is upgraded to 24 GB of memory.

**Syntax**

>` show asset all

**Example**

```
SAM> show asset all
Platform: G-50
Model: Check Point 21400
Serial Number: To Be Filled By O.E.M.
CPU Frequency: 2400.183
Number of disks: 2
Disk 1 Model: ABC 1234
Disk 1 Capacity: 500 GB
Disk 2 Model: ABC 5678
Disk 2 Capacity: 500 GB
Sam Present: Yes
Sam CPLD Version: 4
Sam Serial Number: 
Sam Total Memory: 23.7 GB
Slot 1 Memory: 7.92 GB
Slot 2 Memory: 7.92 GB
Slot 3 Memory: 7.92 GB
```
### show sam connections summary

**Description**  
Shows a summary of the connections through the Security Acceleration Module, for each of the three network processors.

**Syntax**  
> show sam connections summary

**Example**

```
SAM> show sam connections summary
NP   Total Connections on NP
NP   #1  384
NP   #2  384
NP   #3  384
```

### show sam cpu-usage summary

**Description**  
Shows a summary of core CPU usage on the network processors of the Security Acceleration Module

**Syntax**  
> show sam cpu

- usage summary

**Example**

```
SAM> show sam cpu
CPU Usage Summary on Network Processors
Mean 34.2% (on 105 cores)
Usage   Cores   Percentage
0-30%    2      6%
30-70%   96     91%
70-100%  3      3%
```

### show sam np connections

**Description**  
Shows the number of connections on one of the three network processors (NP) in one of these views: Grid, Summary, Top, and Top 10.

**Syntax**  
show sam np <num> connections {grid|summary|top <top num>|top-10}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;num&gt;</td>
<td>Number of network processor</td>
</tr>
<tr>
<td>&lt;top num&gt;</td>
<td>Top number of connections on one of the three network processors</td>
</tr>
</tbody>
</table>

**Examples**

```
SAM> show sam np 1 connections grid
Cores   Current Connections
0-5     0 0 8 8 8 8 8
6-11    8 8 8 8 8 8 8
12-17   8 8 8 8 8 8 8
18-23   8 8 8 8 8 8 8
24-29   8 8 8 8 8 8 8
30-35   8 8 8 8 8 8 8
Global Connections 0 (not associated with any core)
```
show sam np cpu-usage

Each of the three CPUs contains 36 cores. Security Acceleration Module uses 35 cores on each CPU for data processing.

**Description**  Shows the CPU usage on one of the three network processors (NP) in one of these views: Grid, Summary, Top, and Top 10.

**Syntax**  show sam np <num> cpu-usage {grid|summary|top <top num>|top-10}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;num&gt;</td>
<td>Number of network processor</td>
</tr>
<tr>
<td>&lt;top num&gt;</td>
<td>Top number of connections on one of the three network processors</td>
</tr>
</tbody>
</table>

**Examples**

```
SAM> show sam np 1 cpu-usage grid
Cores CPU Usage Percent
0-5 0 0 71 35 36 36
6-11 35 35 35 35 36 36
12-17 36 35 35 35 36 36
18-23 38 35 35 35 36 35
24-29 35 35 34 36 35 35
30-35 35 35 35 35 36 -
```
**show sam status**

**Description**
Shows a summary of the connections through the Security Acceleration Module, for each of the three network processors.

**Syntax**
show sam status

**Example**
SAM> show sam status
OK All NPs are in running state

**Comments**
If the response is not OK, reboot the appliance one or more times. If there is still a problem, contact Technical Support.

**show sam summary**

**Description**
Shows a summary of:
- CPU usage on network processors
- The number of connections on each network processor

**Syntax**
> show sam summary

**Example**
SAM> show sam summary
CPU Usage Summary on Network Processors
Mean 34.2% (on 105 cores)
Usage  Cores  Percentage
0-30%    6     6%
30-70%   96    91%
70%-100% 3     3%

NP Total Connections on NP
NP #1 384
NP #2 384
NP #3 384