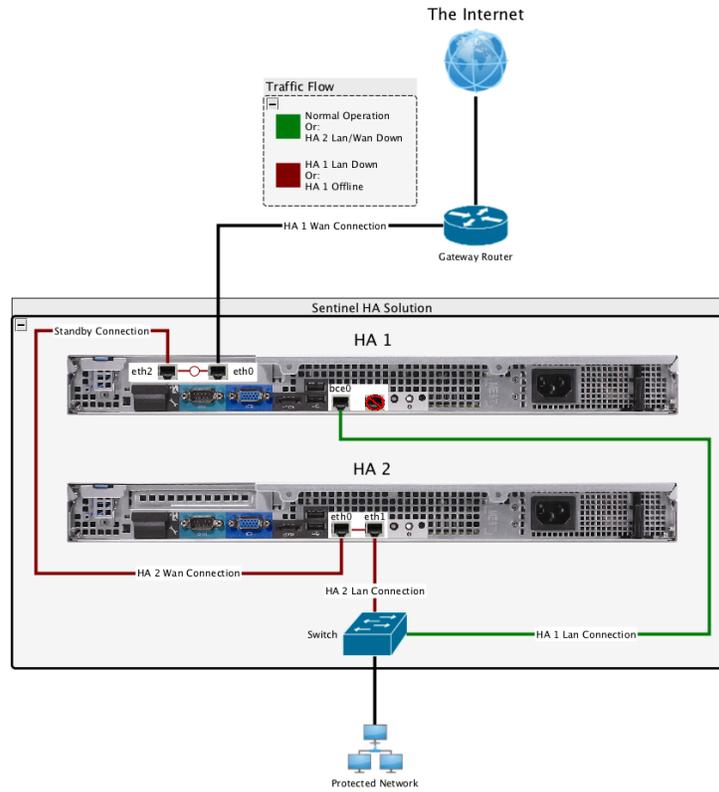


HIGH AVAILABILITY SETUP



SENTINEL IPS SUPPORT

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Sentinel 4 HA

Note: This guide assumes that you have an understanding of what Sentinel IPS does for your network. This document describes the most common installation of Sentinel 4 (HA or otherwise), where the Sentinels are placed between your network and your ISP router. Sentinels can also be placed behind load balancers, as internal EPS sensors, and in other positions on your network, but the general HA setup steps still apply.

High Availability Overview

The Sentinel 4 High Availability solution provides redundant Sentinel protection to a single network feed. Our HA implementation requires 3 devices:

1. **Primary Sentinel IPS Unit (HA1).** This is a specialized Sentinel 4 that runs as the *Primary* unit.
2. **Standby Sentinel IPS Unit (HA2).** The second unit (HA2) runs as a *Standby* unit.
3. **LAN-facing Switch.** Both Sentinel units' LAN ports must connect to a switch that passes traffic through to your protected network (the LAN, usually via your firewall). You may already have a switch at this point in your network, but if you don't, you'll need to add one.

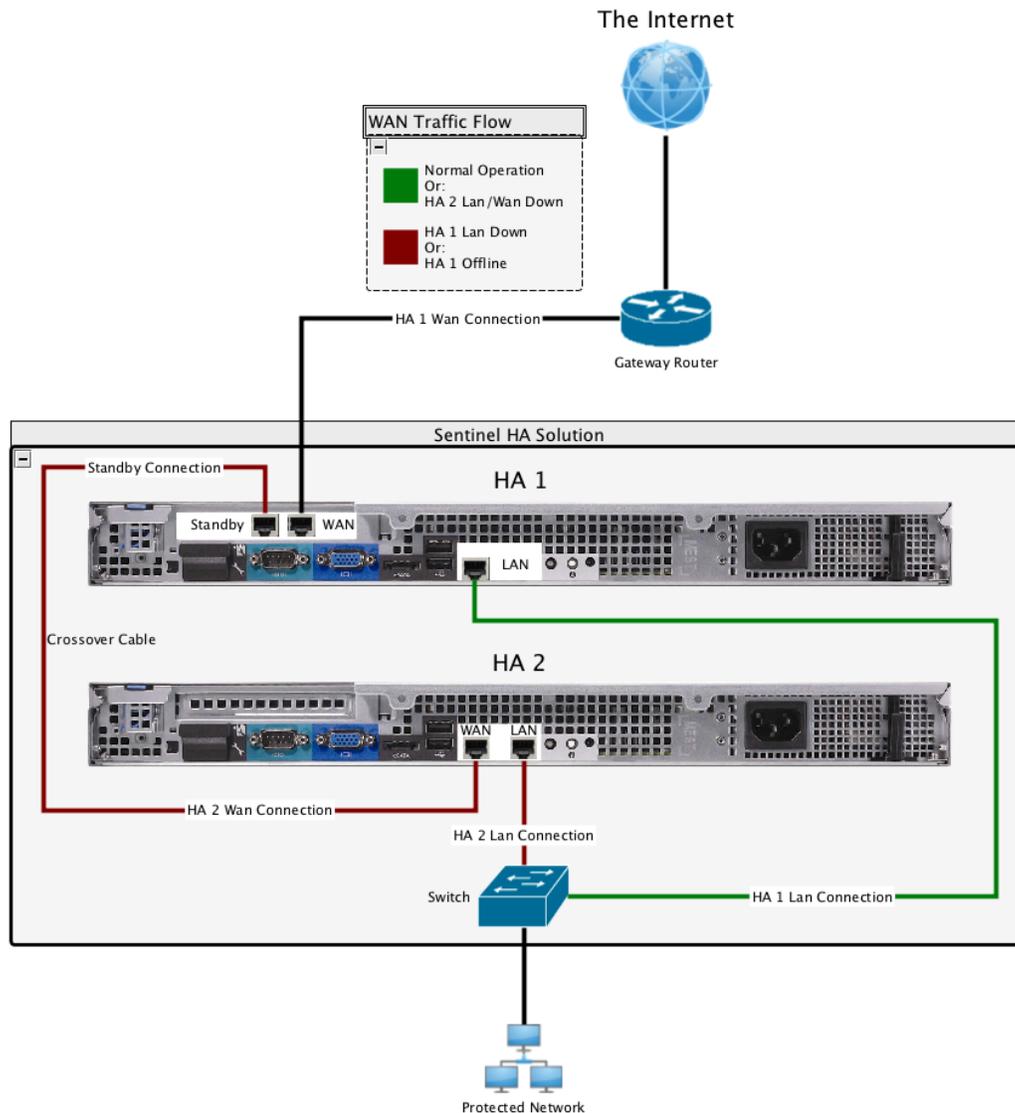
The diagram on the next page shows the proper setup, including the switch. Your ISP Router connects to the HA1 unit's WAN port. HA1's Standby port connects to HA2's WAN port, to provide WAN connectivity when HA1 cannot process/pass packets to your LAN. Both Sentinels connect to the switch via their LAN ports, and the switch passes traffic through to the protected network (LAN).

The term 'normal operation' refers to the state of a fully setup HA pair with Internet traffic passing through the HA1 unit between your LAN and the ISP router. During normal operation, HA2 is reachable via the LAN connection, although your network's Internet traffic does not flow through it.

The terms 'failover' or 'running in standby' refer to situations that prevent HA1 from processing/passing packets between your ISP router and your LAN, except for cases where the ISP router or the switch to the LAN are the cause. Situations leading to failover include: the shutdown, reboot, or physical bypass/removal of HA1; manual advanced NIC bypass; or disconnection of HA1's LAN port. For failover to occur, the WAN connection must still be in place, HA1's Standby port must still be connected to the HA2 WAN port, and (if HA 2 is an Advanced model unit) HA 2 is not manually bypassed. Another term, 'unsafe', indicates that disconnected cables or manual advanced NIC bypass would prevent proper failover.

Refer to the diagram on the following page for port names and cabling requirements.

Connecting Your Sentinel 4 HA Pair



1. Preparation

Before moving your Internet connection to the Sentinel HA pair, you can configure both Sentinels, get the hardware into place in your rack or server room, and boot them. (The Sentinels may have arrived pre-configured; if not, you can configure them by connecting a keyboard and monitor to the units and following the prompts.) Also, if you need to add the switch that will connect both Sentinels to the LAN, get it installed and powered up now.

Now, with all three devices in place, configured, and fully booted, it is time to cable the devices.

Note: Have a monitor and keyboard handy for setting up the media settings on the Sentinels' NICs.

2. Hooking Up the Primary Unit - HA1

With HA1 (Primary) powered up and fully booted:

- Connect the HA1's LAN port to the switch
- Connect the Gateway Router cable to the HA1's WAN port
- If the switch is not already connected to your LAN, connect it now.

Note: As described below in step #4, the NIC media options should be checked and forced on the WAN connection. The Standby connection should also be forced to match the WAN.

When ARP resolves, you should have access to the Internet from your LAN, and you should be able to access the web interface on HA1. Some configuration by Sentinel Support is still required to set up the HA interface display on the dashboard, but this does not affect the function of either HA unit.

Finally:

- Connect a cross-over cable to the Sentinel's Standby port

3. Setting Up the Standby Unit - HA 2

With HA2 (Standby) powered up and fully booted:

- Connect HA2's LAN port to the switch
- Connect HA1's Standby cable to HA2's WAN port.

Note: As described below in step #4, the NIC media options should be forced on the HA2 WAN port to match that on the Standby port of HA1.

You should be able to access the web interface on HA2 now. Please note that Sentinel Support must complete some additional configuration settings for proper HA interface display on this standby unit.

4. Forcing NIC Media Options

It is particularly important that a crossover cable is used to connect the HA1 Standby port to the HA2 WAN port, and that their NIC media settings are forced to match the NIC media settings of the HA1 WAN port and the ISP router. The crossover cable is necessary because forcing settings removes auto-uplink detection. When you initially setup the HA pair, auto-negotiation is the default and a straight-through patch cable will work. However, a crossover cable becomes necessary when you force the settings of the HA1 Standby port and the HA2 WAN port.

During a failover event, traffic flowing into the HA1 WAN port is passed directly through the HA1 Standby port and on to the HA2 WAN port, as if it were a hard-wired connection. Since in this case HA2's WAN port is effectively connected directly to the ISP router, these ports must match the speed and media options. *This is why we recommend forcing the WAN ports on both HA units plus the Standby port on HA1 to the same settings that match the WAN feed's port.*

Before we cover how to change the NIC settings, you should know how to check the connections from the Sentinel's console. You can access the Sentinel console by connecting a keyboard and monitor to the unit. From the main menu, simply select 'Netstat'.

This screen is for an HA1 unit. It shows the ethernet device reference name, Active/No-Carrier state, speed and media options and (if the port is connected to another device) an indication of Forced or Auto Negotiated. The WAN connection should be eth0 and display in the upper left port section. The LAN port is eth1 and displays in the upper right port section. The lower section displays the HA Standby port.

The screenshot shows the 'Network Information' screen on a Sentinel console. The title is 'Network Information' and the time is '20:08:47'. The screen is divided into three main sections for different ports: eth0, eth1, and HA Standby (eth2). Each section displays the port's status, speed, media options, and traffic statistics (Inbound, Outbound, Total) in pps and bps. It also shows error counters (Errs, Coll, Drop) for each port. At the bottom, there are navigation options: '< Exit >' and '<Reset Counters>'. The status of all ports is 'Active'.

Port	Status	Speed	Media Options	Inbound (pps)	Inbound (bps)	Outbound (pps)	Outbound (bps)	Total (pps)	Total (bps)	Errs	Coll	Drop
eth0	Active	100baseTX	full-duplex Auto Negotiated	28	2766	26	4843	55	7609	0	0	0
eth1	Active	1000baseT	full-duplex Auto Negotiated	27	4728	30	3051	58	7779	0	0	0
HA Standby: eth2	Active	1000baseT	full-duplex Auto Negotiated	0	0	0	0	0	0	0	0	0

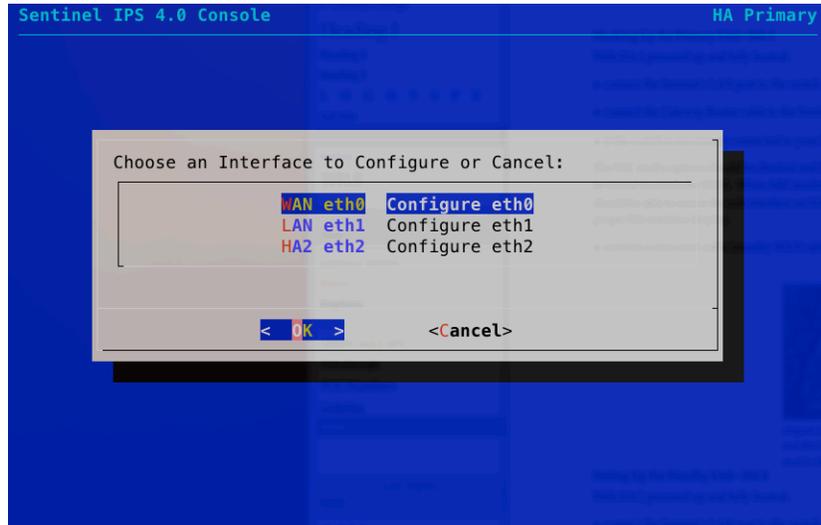
Sentinel HA Primary unit's Console Netstat

In each port section, an accumulating counter shows if there are any Errors (Errs), Collisions (Coll) or Drops (Drop) occurring on that port. If these counters are climbing, your connection will most likely experience degradation, slowness or failure until the cable connection's issue is resolved. The most common causes are incorrectly negotiated or forced port settings, a faulty cable, or bad NIC hardware. If reseating the cable on both ends does not stop the counters from climbing, resolving the NIC settings will typically solve it.

Tip: After making a change, the Reset Counters option sets the counters back to 0 to make it easy to see if the numbers have stopped climbing. The screen updates every 2 seconds. You will not see these counters increasing if there is no traffic flowing through the Sentinel.

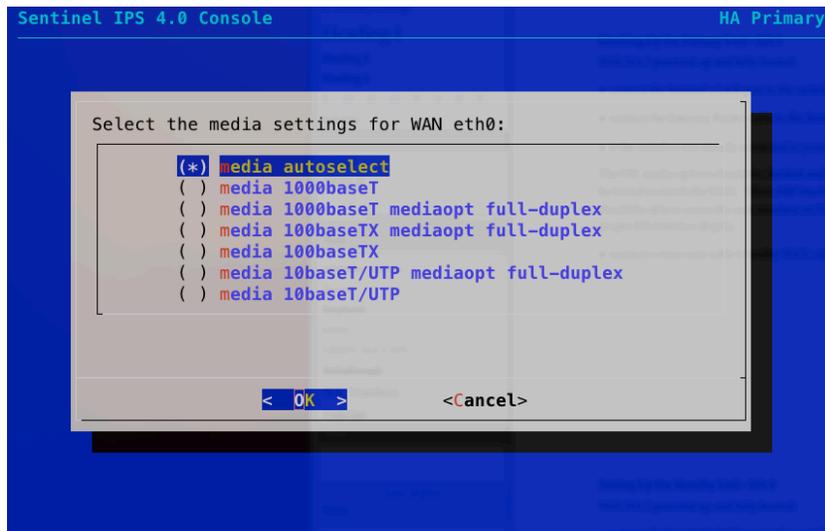
To set the media options, you must first login to the console, using your system username and password.

Access the **Nics** menu and choose **NIC Settings** option.



The NIC Settings port selection list screen on an HA 1 unit

Select the port you want to set. (Arrow keys move up and down the list, or select with the red-highlighted letter, then hit enter.)



The media options list of the WAN port on an HA 1 unit

Select the row with the correct speed and media settings that you need. (After moving to the correct row with the up and down arrow keys, hit **space** to select that row.) The new selection is marked with * after hitting space to set your selection

To apply the selected settings, make sure the < OK > option on the bottom row is highlighted and hit enter. This will save the media settings for that port and attempt to connect to the cabled device. Check the Netstat screen to confirm that the port is Active and free of errors, collisions and drops. If you want to leave the specific NIC Settings screen without changing settings, hit TAB to move the OK/Cancel option over to the <Cancel> option and hit enter. This will leave the port as it was before you entered the menu screen.

Repeat this process for each port. Assuming Netstat is reporting all NICs as active and free from errors, collisions, and drops, your HA setup should be complete.

The Web-based User Interface

An HA Sentinel's Dashboard page will display HA-specific information in a section below the default activity graph titled 'High Availability'. This section displays:

- The Sentinel's **role** (Primary or Standby)
- The Sentinel's **peer IP** (The IP of the other HA Sentinel)
- The current **status** of the HA configuration. This status may be:
 - *Active*. Traffic is passing through this unit. In the case of the Primary unit, this is normal. If the Standby unit is showing a status of 'Active', then there is a problem with the Primary unit.
 - *Ready*. This status only applies to the Standby unit. 'Ready' is the status of a Standby unit when everything is operating normally. That is, when the Primary unit is passing traffic and the Standby unit is ready to take over if necessary.
 - *Unsafe*. Traffic is passing through the primary unit normally, but the HA setup is not configured properly. In this state, if the Primary unit fails, the Standby unit is unable to take over. This is usually caused by incorrect cabling, or there is an issue with the HA2 unit.
 - *Failed*. The Primary unit has failed and the Standby unit has taken over.
- **NIC Status**. This will display the status of each NIC on the unit.

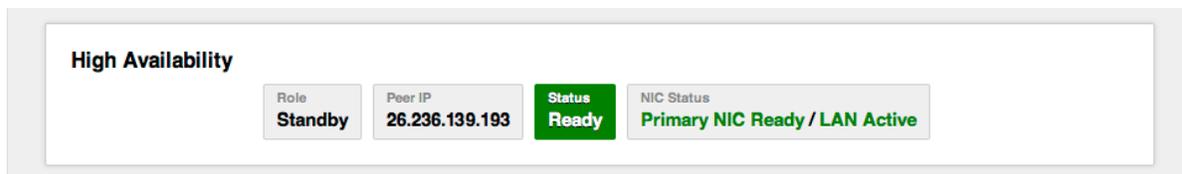
Here are examples of the web interface's display for a Primary and Standby unit operating normally:



The screenshot shows a 'High Availability' status panel. It contains four data points: 'Role' is 'Primary', 'Peer IP' is '10.0.0.100', 'Status' is 'Active' (highlighted in green), and 'NIC Status' is 'WAN Active / LAN Active / Standby Ready'.

Role	Peer IP	Status	NIC Status
Primary	10.0.0.100	Active	WAN Active / LAN Active / Standby Ready

*A **Primary** unit in normal operation. Note the status is 'Active', and the Standby NIC is 'Ready'.*



The screenshot shows a 'High Availability' status panel. It contains four data points: 'Role' is 'Standby', 'Peer IP' is '26.236.139.193', 'Status' is 'Ready' (highlighted in green), and 'NIC Status' is 'Primary NIC Ready / LAN Active'.

Role	Peer IP	Status	NIC Status
Standby	26.236.139.193	Ready	Primary NIC Ready / LAN Active

*A **Standby** unit in normal operation. Note the status is 'Ready', and the Primary NIC is also 'Ready'.*