TELESTREAM

Admin Guide 5.3

High Availability

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The basic library functions are written in C and are freestanding. Also included in the distribution is a set of C++ wrapper functions.

The basic library functions

Written by:	Philip Hazel
Email local part:	`ph10`
Email domain:	`cam.ac.uk`

University of Cambridge Computing Service, Cambridge, England.

The C++ wrapper functions

Contributed by: Google Inc.

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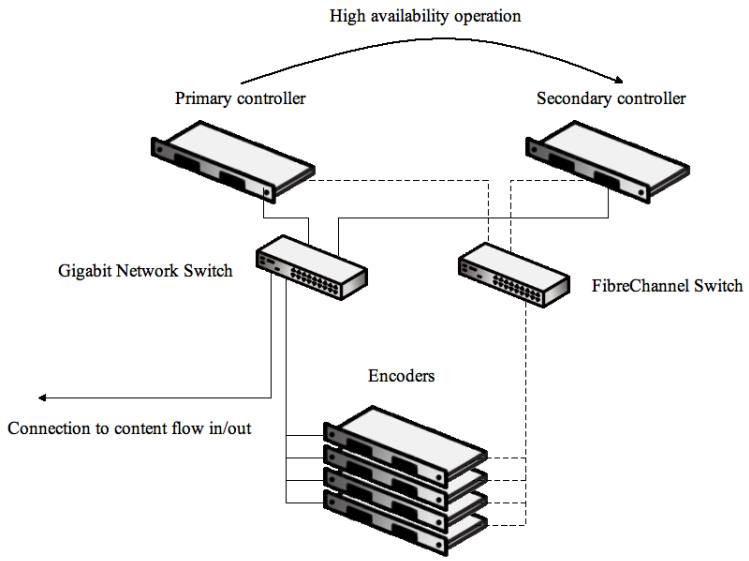
1 What does **Episode Engine High Availability Option** do?

Episode Engine High Availability Option is an extension of **Episode Engine Pro** for environments with high demands on uninterrupted operation. With **Episode Engine High Availability Option** you can set up two masters to run in parallel and monitor each other. If the primary master fails, the secondary master will take over, allowing encoding to continue without interruption while you take action to repair or replace the failed server. When the primary server is up again you can tell **Episode Engine High Availability Option** to reinstate the primary server as the running server.



1.1 About this Document

This document describes how to install, configure and run **Episode Engine High Availability Option**.

1.2 Audience for this Manual

This document has been written for use by an experienced OS X system administrator. Basic knowledge of media encoding is also strongly recommended.

1.3 Document conventions

NOTE

Paragraphs marked like this highlight items of particular importance for the proper function of the software.

TIP

Paragraphs marked like this highlight procedures that can save time or produce particularly good results.

Paragraphs marked like this warn about features which may cause loss of data or failed execution if used incorrectly.

Document references, both internal and external, are shown in italics. Example:
See chapter 2 *Before You Install.*

Literature references are given as numbers in brackets with the full reference in the Bibliography. Example:
See [2].

Directory names, file names, code examples, and prompts, are shown in plain typewriter type. Example:
The file `printer.ppd` can be found in `/etc/cups/ppd/`.

The names of interface components are given in **bold**. Example:
Adjust the time limit with the **Time limit** slider. Select **Quit** from the **Episode Engine Pro** drop-down menu.

Keys to be pressed on the keyboard are displayed in bold typewriter type. Example:
Press **`Return`** to select the GUI installation.

Examples of extended dialogue will include the shell `prompt>` .

Command syntax is described in Backus-Naur form.

Copy-pasting from the manual is not guaranteed to work, as the text contains formatting information which may not be accepted by the target application.

2 Prerequisites

2.1 Hardware requirements

2.1.1 Minimum hardware configuration

This is the minimum configuration you need to be able to perform encoding at all.

Processorf	1.33 GHz G5 or any Intel Mac
Memory	1 GB
Hard drive	20 GB, 5400 rpm

2.1.2 Recommended hardware configuration

For the best possible performance we suggest the following configuration for each node:

Processor	Dual 2.0 GHz G5 or Intel Mac
Memory	2 GB or more is recommended
Hard drive	120 GB, 7200 rpm or more recommended

Episode Engine Pro will create temporary files during processing. Make sure that the volume used for temporary files (`/tmp` by default) has at least twice as much free space as the expected size of the largest output file. If you do two-pass encoding of Flash 8 or Windows Media output the temp directory in addition needs to be able to store $1.5 \cdot \textit{output width} \cdot \textit{output height} \cdot \textit{framerate} \cdot \textit{duration}$ bytes.

You should connect cluster nodes using Gigabit Ethernet instead of the normal Ethernet 10/100 standard. To do so, you will need a Gigabit Ethernet switch, otherwise the speed of your cluster will be limited by the 10/100 standard Ethernet switch.

2.2 Software requirements

Episode Engine High Availability Option 5.3.2 requires Mac OS X Server, version 10.4 or later, and QuickTime™, version 7 or later.

You also need **Episode Engine Pro**.

3 Installing, configuring, and running **Episode Engine High Availability Option**

Episode Engine High Availability Option has an interactive installation script, but depending on your workflow and computing environment you may need to adjust firewalls, create users or perform other administrative actions. In this chapter we will indicate what actions have to be performed for a successful installation and configuration. We assume you have access to the **Episode Engine Pro** manual, we will refer back to it at relevant points.

3.1 Installation

Episode Engine High Availability Option is delivered on CD-ROM or over the Internet. The distribution includes a license file enabling the functionality.

3.1.1 **Episode Engine Pro** installation

If you are just now setting up your **Episode Engine Pro** cluster, you have to first install the base **Episode Engine Pro** software before installing **Episode Engine High Availability Option**.

If you are upgrading from a previous version of **Episode Engine High Availability Option**, we strongly recommend that you uninstall the old version first (see section 3.5, *Uninstallation*). Your old settings will be cached, so that you can reuse them when reinstalling.

Episode Engine High Availability Option requires external shared storage, which is not specified by the default installation of **Episode Engine Pro**, so if you currently have a configuration without shared storage, you must uninstall **Episode Engine Pro** and reinstall it configured for external shared storage.

Start by creating and exporting suitable directories on your external storage. We recommend Xsan for shared storage, so in the following examples we will assume that your Xsan installation exports the unit `/Xsan`.

Then run the **Episode Engine Pro** installation process, first on the primary server, then on the secondary server. You can use either the graphical installer or the command-line installer, but in the example below we will use the command-line installer.

```
Episode Engine INSTALLER
(c) Copyright 2009 Telestream Inc.
```

```
This is the Episode Engine installation.
You will be guided through the steps necessary to install this software.
Thank you for purchasing Episode Engine.

Press any key to review the license agreement, then press space,
or use the arrow keys, to scroll the text.

LICENSE AGREEMENT

Please take a moment to configure your Episode Engine installation.

NOTE: Default values, or the capitalized letter, within brackets are selected
by pressing ENTER at the prompts.

INSTALLATION PATH

  If the path does not exist, it will be created.
  Installation path [/usr/local/pwce]: /Xsan/EpisodeEngine/engine/bin
```

The installer will create any necessary subdirectories, so we can give installation paths below `/Xsan`.

```
USER & GROUP

  If the user and the group does not exist,
  they will be created later during the installation.
  Episode Engine user [jrn]: jrn
  Episode Engine group [staff]: staff


NODE TYPE

  1. Controller node
     The Controller node, previously called the Master node, is responsible for
     job scheduling. The Controller node may also, at your choice, be used as
     an Encoder node.

     NOTE: If you want to perform a stand alone installation,
     choose 1 for Controller. Also make sure to answer yes to the question
     later about using the Controller for encoding.

  2. Encoder
     The Encoder, previously called the Slave node, performs all encoding
     operations delegated by the Controller node.

Select a node type for this machine [1]: 1

Is the above correct [Y/n]? Yes

Running preinstall script.. ....

CONTROLLER
  Do you want to use the Controller node for encoding [Y/n]? Yes
```

Even if you are running a cluster, you can use your controller node for encoding if it fulfils the requirements in chapter 2, *Prerequisites*.

```
EPISODE ENGINE PATHS
  Installation path is set to /Xsan/EpisodeEngine/engine/bin.
```

```
  File-log path [/var/log/pwce]: /Xsan/EpisodeEngine/engine/log
  Temporary path [/tmp]: /Xsan/EpisodeEngine/engine/tmp
  Spool path [/var/spool/pwce]: /Xsan/EpisodeEngine/engine/spool

  Is the above correct [Y/n]? Yes

WATCH FOLDER SETUP
  Watch folder root path [/Xsan/EpisodeEngine]: /Xsan/EpisodeEngine/Media
  Input watch folder name [Input]: Input
  Output watch folder name [Output]: Output
  Archive folder name [Archive]: Archive
  Enable input material archive [y/N]? Yes

  Is the above correct [Y/n]? Yes

NFS-EXPORTING FROM THIS NODE
  NOTE: You must export the watch folders and the binaries from this machine if
  you are installing a Cluster and you have not prepared a shared storage as
  described in the manual.

  Do you want to NFS-export the watch folders from this node [y/N]? No
  Do you want to NFS-export the binaries from this node [y/N]? No

  Is the above correct [Y/n]? Yes

COMMUNICATION
  Controller IP address [10.50.5.1]: 10.50.5.1

  Is the above correct [Y/n]? Yes

PERMISSIONS AND SECURITY
  Engine Admin password [anonymous]: ennnsynen

  Is the above correct [Y/n]? Yes

Updating intermediate settings file..
Running postinstall script..
Please wait while installer is copying files.......

NOTE: Your old configuration files were backed up and can be found in /usr/local/pwce/

LICENSE
  No Episode Engine license is installed. Do you want to install a license now [Y/n]?
  Full path to license file type 'skip' to skip: /Users/jrn/Desktop/ha-license.xml
License successfully installed.

  Do you want to start Episode Engine now [Y/n]? Yes
Episode Engine started.

NOTE: To make additional configuration of your Episode Engine installation
please open the Episode Engine preference pane which has been installed in
System Preferences. Here you can also manage your Episode Engine licenses.

Episode Engine successfully installed.
```

Note that if you have a separate **Episode Engine High Availability Option** licence, you will get an error message if you attempt to start **Episode Engine Pro** before you have installed the **Episode Engine High Availability Option** licence. You should therefore instead open **System Preferences** and add the **Episode Engine High Availability Option** licence to the **License** pane.

When **Episode Engine Pro** is running, start **Engine Admin** and check that you can connect to the server. If everything goes well, stop **Episode Engine Pro** in **System Preferences**.

Do the same installation and test on the secondary server. Note that the secondary server shall also be configured as a controller node. You will get warnings that the directories already exist, this is not a problem. You will also not need to install a license, since that already has been done.

3.1.2 **Episode Engine High Availability Option** installation

Once you have made sure that the **Episode Engine Pro** installation works well on both the primary and secondary server, proceed to install **Episode Engine High Availability Option** on both nodes.

Before installing you need to decide on the following:

- Primary and secondary server Ethernet addresses. In the example below we use 10.50.5.1 and 10.50.5.2, respectively. These must be static so that they do not change upon reboot, reconnection to the network, etc. If your servers have multiple network interfaces you must make sure that you use the interfaces that are on the same subnet.
- A virtual IP address to point to the currently active controller. This is the address that encoder nodes and clients such as **Engine Admin** must connect to. In the example below we use 10.50.5.100.
- An administrator notification email address. In the example below we use `admin@yourcompany.com`.

On the primary server

The software disk image contains the script `Install High Availability.command`. Double-click it to run the installation script as shown below.

```
prompt> sudo ./INSTALLER install

LICENSE AGREEMENT

EPISODE ENGINE FAILOVER MODULE INSTALLATION SCRIPT
                        (c) Copyright 2009 Telestream Inc.

Which role is this server having [primary/secondary]? : primary
```

Note that you have to type **`primary`** and **`secondary`** in full.

```
FILES AND DIRECTORIES
  Failover module installation dir [/usr/local/pwha]: <ENTER>
  Is the above correct [Y/n]?
```

Note that the software is to be stored locally and not on the shared storage.

```
NETWORK CONFIGURATION
- Ethernet configuration
```

```
  Primary server ethernet IP address  : 10.50.5.1
    Available Ethernet interfaces on system:
        en0
        en1
  Primary server Ethernet interface   : en0
    Ethernet netmask is 255.255.255.0
    Default gateway set to 10.50.5.1
  Secondary server ethernet IP address: 10.50.5.2
  Virtual IP address                  : 10.50.5.100
  Is the above correct [Y/n]? <ENTER>

NOTIFICATIONS
- Email recipients
  Administrator e-mail address        : admin@yourcompany.com
  Is the above correct [Y/n]? <ENTER>

INSTALLATION PROCESS
  Installing primary failover server.........done.
  Making primary failover server master....done.

Primary failover server successfully installed and configured.
```

The script copies and modifies all the required files. It also starts all the needed services to put the primary server in the controller role when installation is complete. Verify the state of the primary server by opening the **System Preferences** panel for **Episode Engine Pro** and selecting the **Failover** tab.

NOTE

If you are re-installing the software, your earlier settings will have been cached and you will be given the option to reuse them when you start the installation script.

On the secondary server

The installation process is very similar to the one conducted at the primary server.

```
prompt> sudo ./INSTALLER install
EPISODE ENGINE FAILOVER MODULE INSTALLATION SCRIPT
                          (c) Copyright 2009 Telestream Inc.

Which role is this server having [primary/secondary]? : secondary

FILES AND DIRECTORIES
  Failover module installation dir [/usr/local/pwha]: <ENTER>
  Is the above correct [Y/n]?  <ENTER>

REMOTE CONFIGURATION SETUP
  Primary server ethernet IP address  : 10.50.5.1
  Is the above correct [Y/n]?  <ENTER>

Fetching configuration from primary server..done.

    Virtual IP Address is 10.50.5.100
    Primary server IP address is 10.50.5.1
    Secondary server IP address is 10.50.5.2
```

```
    Secondary server Ethernet interface is en0
    Ethernet netmask is 255.255.255.0
    Default gateway set to 10.50.5.1

INSTALLATION PROCESS
  Installing secondary failover server.............done.

Secondary failover server successfully installed and configured.
```

As seen above the script fetches configuration information from the primary server. The script copies and modifies all required files. It also starts all the needed services to put the secondary server in the standby role when installation is complete.

Once installation is complete on both servers, you need to restart the clients on all encoding nodes. Log in on each client and execute

```
prompt> sudo /usr/local/pwce/script/enginectl restart
```

Now open the **Episode Engine Pro System Preferences** pane on one of the servers. Select the **Failover** tab to check the functions.

TIP

You may wish to use the secondary failover server as an encoder as well. This requires the **vinculum** process to run on the secondary node. Given the same virtual IP address as above and default install path, execute on the secondary node

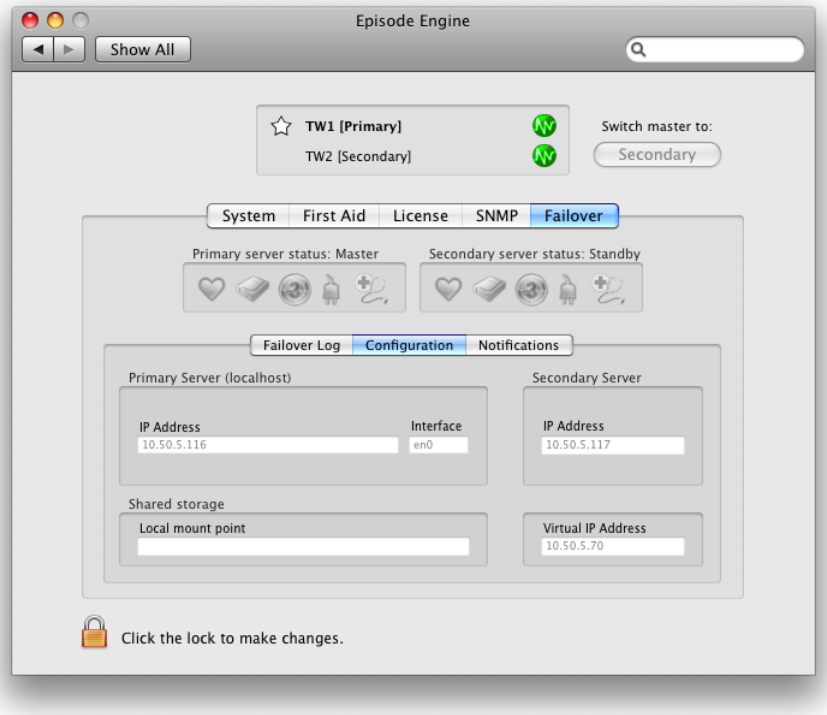
```
prompt> launchctl submit -l encoder -- /usr/local/pwce/bin/vinculum 10.50.5.100
```

This will also keep the **vinculum** process alive if you reboot the node.

3.2 System Preferences

You control the operation of the servers from the **System Preferences**. The **Episode Engine Pro** pane contains a **Failover** tab which at the top shows the state of the servers. A star (☆) indicates which of the servers currently is the controller. On the primary server you can use the **Switch master to** button to manually switch to the other server. Note that if the primary server has gone down and been restarted, you have to do a manual switch-over to return control to the primary server. You can also do this switch-over on the command line: run **`/usr/local/pwha/script/failover release`** on the primary server to relinquish control to the secondary; run **`/usr/local/pwha/script/failover acquire`** on the primary server to return control to it.

The pulse icon ( ) shows that the server is running. If the server goes down the icon will change to a red pulse ( ).



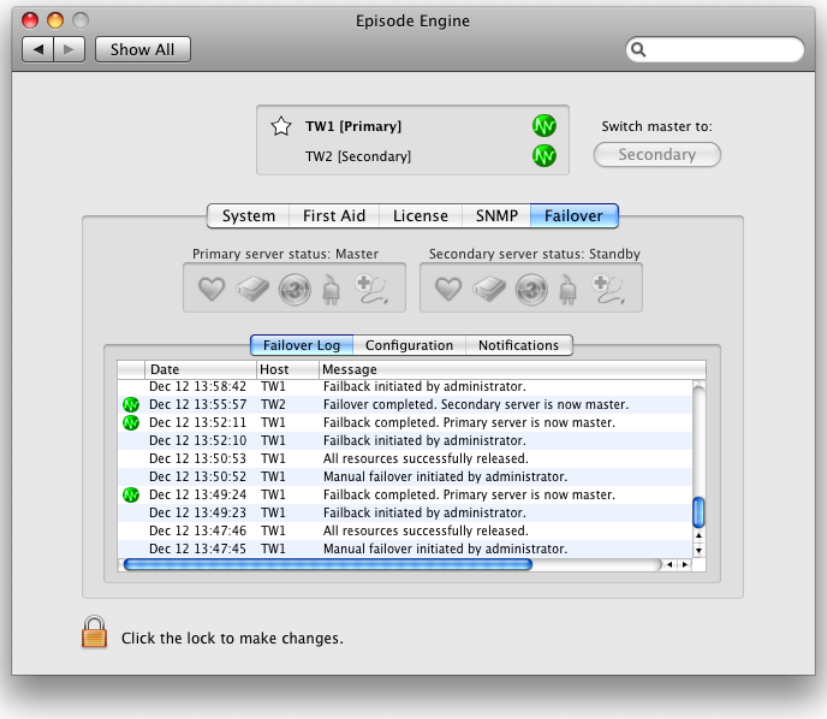
The icons in the fields **Primary server status** and **Secondary server status** are shown in grey to indicate that the following conditions hold:

- The heartbeat process on the primary server and the heartbeat receiver process on the secondary server, respectively, are running.
- The shared storage is readable.
- Only one server (normally the primary) is running the **Episode Engine Pro** processes.
- The preference pane has contact with its server.
- The **pwhad** process is running.

If a given condition does not hold, its corresponding icon will turn red.

Below the status area are three additional tabs for configuration information:

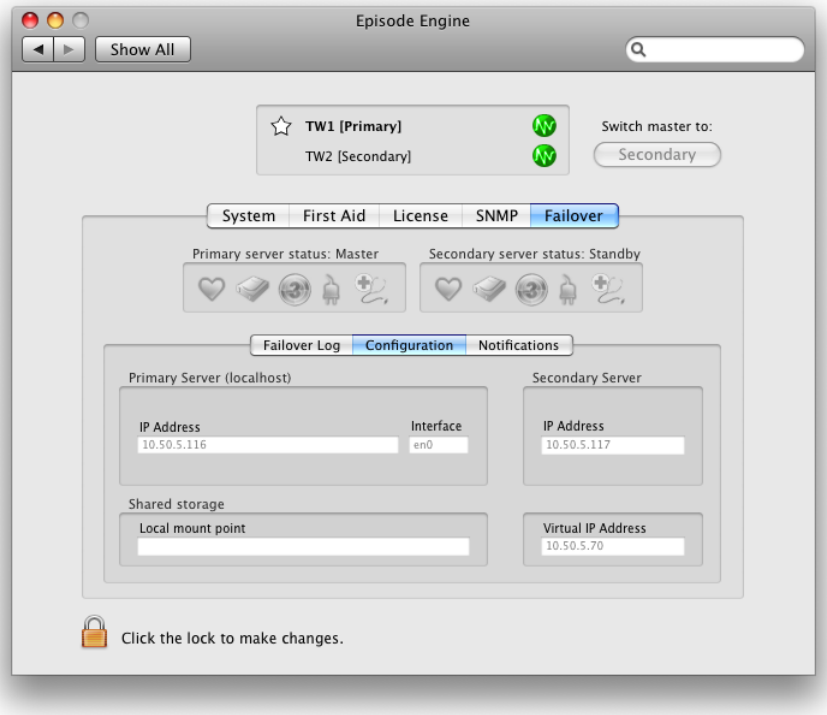
3.2.1 Failover log



The **Failover log** tab shows a running log of events in the servers. Events related to the status checks above will be marked with similar icons.

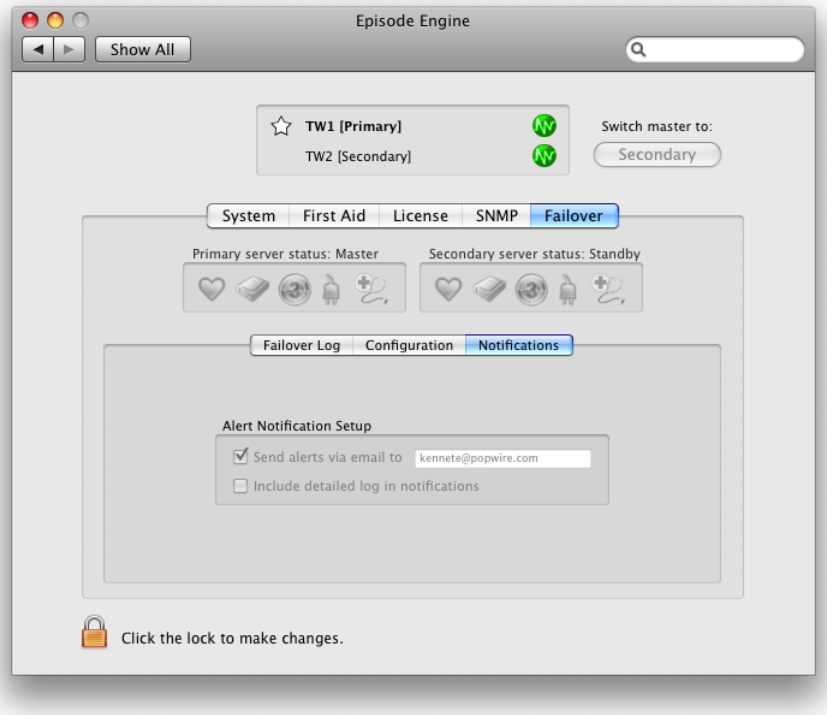
The log messages will also be written to the files `/usr/local/pwha/log/event.log` and `/usr/local/pwha/log/pwha.log` (default paths) on both servers.

3.2.2 Configuration



The **Configuration** tab lets you check and configure the network settings of the servers and the shared storage setup.

3.2.3 Notifications

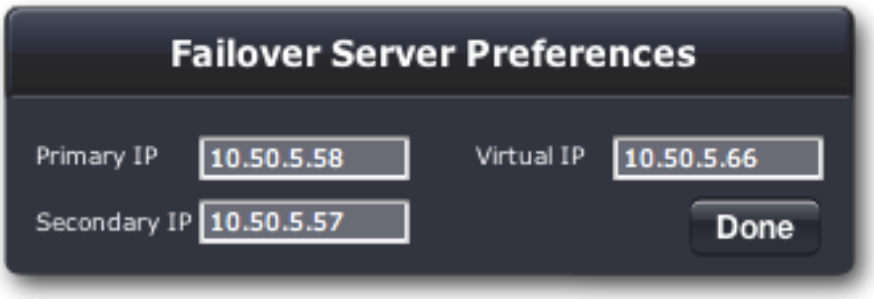


In the **Notifications** tab you can adjust the sending of alerts. You have three levels of notifications: none, simple alerts by email to a given email address, and email alerts with a copy of the Failover log in the message.

3.3 Status widget

In the distribution you will also find `FailoverStatus.wdgt`, which you can add to your **Dashboard** to show the status of the servers.

Clicking on the round button at lower right turns the widget over so that you can enter the addresses of the servers.



3.4 Processes

Episode Engine High Availability Option will add processes on both controller and encoder to those created by **Episode Engine Pro**: **heartbeatd** runs on the primary server and **failoverd** on the secondary server. If the secondary server no longer receives heartbeats it will take over as controller and optionally send a notification to the administrator as explained in section 3.2.3, *Notifications*. **pwhad** keeps the status information in the **System Preferences** updated.

3.5 Uninstallation

If you have to uninstall **Episode Engine Pro**, you should first uninstall **Episode Engine High Availability Option**. You do this by running the **`INSTALLER`** script, but with the argument **`remove`**:

```
prompt> sudo ./INSTALLER remove
EPISODE ENGINE FAILOVER MODULE REMOVAL SCRIPT
                          (c) Copyright 2009 Telestream Inc.

Primary failover server installation found in /usr/local/pwha.

Uninstalling..done.

Uninstallation successfully completed.
```

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