You can run `msm_play` from any machine on the same network with the specified SMC server.

Monitoring Output

Monitoring the output from ShowMeTV means simply viewing the video and listening to the audio for a given title. Good-quality video and audio with video and audio (and potentially other streams) synchronized indicates successful encoding, storage, and delivery of your bit streams.

If you do not have access to ShowMeTV, you have to rely on `msm_play` to test your server's stream-delivery function. If `msm_play` returns with no errors, you can use SunNet Manager or another SNMP manager to confirm the delivery of video streams from the SMC server. The steps to configure SunNet Manager for use with the SMC server are specified in Appendix A of the *SMC Server Software Manual*.

If you do not have an SNMP manager available, you can use the unsupported `MsmAdmin` utility to confirm the delivery of video streams from an SMC server. The `-s` option of `MsmAdmin` returns information on the players on a specified server. A player is a logical entity that plays a stream. For example:

```
% /opt/SUNWsms/msm/bin/MsmAdmin -s <SMC server name>
 0: host=<dest host>,udpport=2 Forward "<your title>"
```

The `0` in the first column of `MsmAdmin` output is the software-assigned number of the player. The word `Forward` indicates that the title is currently playing.

The `msm_play` and `MsmAdmin` utilities (as well as `mpegcheck`) are documented in the *SMC Server Installation and Service Manual*, which is a Sun-internal document.

As an alternative to SunNet Manager and `MsmAdmin`, you can use the standard Solaris `netstat` command—the `-ia` option is particularly useful—to detect activity over the server's FastEthernet or ATM port(s).

- Sun's ShowMeTV product, which is not shipped with the SMC server;
- the `msm_play` utility, an unsupported utility that is shipped with the SMC server.

Of these, only ShowMeTV offers display capabilities. `msm_play` lets you send video streams to a network-addressable destination.

ShowMeTV

The ShowMeTV product (release 1.1 and later) runs on Solaris/SPARC and has built-in support for the SMC server. Following installation, the application searches the local subnetwork for the presence of an SMC server. On discovering a server, ShowMeTV makes that machine available to the user. ShowMeTV requires that a system administrator edit a configuration file to list the titles stored on the SMC server(s) on a network. This configuration file is based on the output from the SMC server's `smc_ls` command.

ShowMeTV is shipped with a useful online help system that walks you through the configuration of that product for use with an SMC server.

`msm_play`

The SMC server is shipped with an unsupported utility, `msm_play`, that allows you to deliver streams from the server. You can then use an SNMP manager, such as SunNet Manager to detect the delivery of these streams. There is no application shipped with the SMC server for displaying the streams.

The syntax for `msm_play` is as follows:

```
% /opt/SUNWsms/msm/bin/msm_play -s <SMC server name> <title list>
```

The <*title list*> argument is a file containing a list of TOC files to be played. For our example, it would contain only the name of the single TOC file you loaded in the preceding section:

```
<your title>.TOC
```

If your content package resides on tape, with the tape inserted in a drive accessible to the SMC server, enter a command such as:

```
% smc_tar xf /dev/rmt/0
```

If your MPEG file resides on tape, independent of its TOC file, you must first store it as a file, then `tar` it together with the TOC file.

Content loading is time-consuming and varies according to the encoding bit rate. A title encoded at 1.5 Mb/sec. takes approximately one half the length of its normal play time to load. A title encoded at 6 Mb/sec. or higher takes about the full length of its normal play time.

When `smc_tar` is finished, enter an `smc_ls` command to confirm that content loaded correctly:

```
% smc_ls
Title              Status   NPT       Format      Available Speeds
<your content>.TOC FREE     00:10:05  MPEG2PS     1000
```

In the preceding example, note that the content indicated by <*your content*>`.TOC` is an MPEG-2 Program Stream title of 10 minutes, five seconds duration. It has one available speed (1000), which indicates normal-play speed.

The SMC server has an unsupported utility, `mpegcheck`, that accepts a TOC file as input. `mpegcheck` checks the accuracy of the PCR or SCR timestamps, in terms of the PCR/SCR jitter and drift, in all of the bit streams that make up the title described by the TOC file. An example of its use:

```
% /opt/SUNWsms/msm/bin/mpegcheck -t <your title>.TOC
```

To run `mpegcheck` successfully, you must have `/opt/SUNWsms/mfs/lib` as part of your `LD_LIBRARY_PATH`.

Playing Content

The alternatives for playing content are:

`mfs df` returns its output in terms of 64K (65535-byte) blocks. Multiply the number returned by `mfs df` by 65535 to obtain the number of bytes free. Compare this number to the size of the MPEG file produced by your encoder. The size of the MPEG file and the size of the MFS file, as stored on the server, are about the same.

Content Loading

Assuming you have sufficient free space on your SMC server, use `smc_tar` to load your content onto your SMC server.

We assume you are piping `tar` output to `smc_tar`, so as to avoid creating a large `tar` file, in addition to your (probably large) MPEG file. However, if you do have the content package in a `tar` file and your content package is accessible via NFS, from the server, enter a command such as:

```
% smc_tar xf <path to tar file>/<your title>.tar
```

Note – Because our example content package does not contain trick play streams, which require index files, `smc_tar` issues a warning about the absence of index files. You can ignore this warning.

The following is an example in which you pipe the `tar` command used to create your content package to the `smc_tar` command:

```
% tar cf - <your title>.TOC <your content>.mpg | smc_tar xf -
```

As noted earlier, you must specify the TOC file as the first file in the list of files that make up a content package.

A useful technique for situations in which your MPEG file resides on CD-ROM is to create a symbolic link from the directory where your TOC file resides to the file on CD-ROM. You then use `tar` with the `h` option, which causes `tar` to follow symbolic links. The following are example commands:

```
% ln -s /cdrom/cdrom0/<your content>.mpg <your content>.mpg
% tar cfh - <your title>.TOC <your content>.mpg | smc_tar xf -
```

`description`
A string of your choosing. For your own use in describing the entire title. This field is a good place to record all of the PIDs used in your title.

second `description` field
Again, a string of your choosing. This string describes the individual bit stream. You might enter “Normal-play speed”.

`speed`
`1000` indicates normal-play speed.

`bitrate`
Exact encoding bit rate or multiplexed bit rate where there are audio and video streams.

`filepath`
Path where `smc_tar` will find tar file containing content package.

`filesize`
Size of the `tar` file that is input to `smc_tar`.

Checking the Server for Free Space

If you have a new server with no content on it, you have the following amounts of space available for content:

- 6.3 GB, for an SMC 5
- 12.6 GB, for an SMC 20
- 50 GB, for an SMC 1000E

If you have content already stored on the SMC server, you might want to check on free space on the server. To do so, `rlogin` to the server and enter the following command:

```
% /opt/SUNWsms/bin/mfs df
```

As an alternative to `rlogin`, you can use `tip` to make a serial connection to the server from an ASCII terminal. This procedure is described in the *SMC Server Hardware Manual*.

TOC File Format

The following is an example TOC for a title with a single bit stream:

```
content
{
   title "Your title here",
   version "SUNW.00.01",
   format "<MPEG format>",
   description "Enter string here",
   bitstreams
   {
      description "Enter string here",
      speed 1000,
      bitrate <encoding bit rate, in bps>,
      datafile
      {
        segment 1,
        filepath "<path to tar file>",
        filesize <size of tar file>
      }
   }
}
```

In the TOC file, the critical fields are `format`, `bitrate`, and `filepath`. `format` and `bitrate` are critical for the eventual playing of your stream. The `filepath` field, is critical for the correct operation of `smc_tar`, which loads your content onto the server.

The fields in the TOC file are described as follows:

`title`
A name of your choosing. After you have stored the title on the server, `smc_ls` returns the contents of this field.

`version`
For versions 1.0 and 1.1 of the SMC server software, this is always `SUNW.00.01`.

`format`
For MPEG-1 content, this is `MPEG1SYS`. For MPEG-2 content, enter `MPEG2PS` (MPEG-2 Program Stream) or `MPEG2TS` (MPEG-2 Transport Stream), depending on how you encoded your content.

- a Table of Contents (TOC) file, an ASCII file described in the following section.

After you have an encoded MPEG file, you create a TOC file, following the format described below, naming your TOC file with a `.TOC` file extension. Following content loading, your title will be identified by the name of your TOC file, so you should give the file a descriptive name.

A more complex content package than the one in our example would contain additional MPEG files, for trick play, with an index file for each trick play stream. See the *SMC Server Software Manual* for a discussion of trick play.

You can use `tar` to combine your MPEG and TOC files into a content package file. However, because of the large size of most MPEG files, we suggest piping `tar` output directly to `smc_tar`, the command you use to load content onto the SMC server. Example commands are given in "Content Loading" on page 6.

If you need to create a content package file, independent of loading the package onto the SMC server, enter a command such as the following:

```
% tar cf <your title>.tar <your title>.TOC <your content>.mpg
```

Note that, as in the example above, you must specify the TOC file as the first file in the list of files that make up a content package.

If your encoder outputs to a non-Unix file system and you cannot specify the order between the TOC and MPEG files for your `tar` command, you must name the files to ensure that the TOC file comes first in the `tar` file. An easy way to do this is to start the name of the TOC file with a capital letter and make the name of the MPEG file all lowercase.

5. **Play content.**

6. **Monitor server output.**

For the purposes of this document, we use a title that consists of a single, normal-play bit stream.

Content Encoding

Content encoding is not part of the SMC server product. Here at Sun, we use hardware encoders from Minerva, Optivision, and Vela Research. We have had success with all three encoders. The output we choose for these encoders is a file that can be stored in a Unix File System. A Unix file containing MPEG (-1 or -2) data is the real starting point of this procedure.

When you encode content, it is critical that you make a note of the exact bit rate, in bits per second, used for encoding of all bit streams that make up your title. For example, for a title that has audio, video, and annotation data, this is the multiplexed bit rate (combined video, audio, and data). Also make note of the PIDs used to identify each of your bit streams.

If you use MPEG-2 encoding, make note of whether you use MPEG-2 Transport Stream (TS) or MPEG-2 Program Stream (PS), both of which are supported on the SMC server. With MPEG-2 encoding and given a single video bit stream, as in our example, you could either MPEG-2 TS or PS format. Your choice might be dictated by your encoder. That is, your encoder might support only one format or the other or might produce output that is more visually pleasing with one format or the other.

After your encoder completes encoding your content, copy the output file to a Unix file system, ideally one accessible via NFS to the SMC server.

Preparing a Content Package

The reference here is Chapter 3 of the *SMC Server Software Manual*.

A content package for a title with a single video stream consists of a `tar` file containing:

- the MPEG file that is output from your encoder, which contains the multiplexed video and audio and, perhaps, annotation streams;

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This document defines a procedure for getting started with your use of the Sun MediaCenter (SMC) server. The material here is summarized from the SMC server documentation set.

Use this document after you have connected your SMC server to a FastEthernet or ATM switch and have booted the machine. The procedure for first-time booting is described in Chapter 2 of the *SMC Server Software Manual*.

Unless noted otherwise, the path for the SMC utilities described here is `/opt/SUNWsms/bin`.

Overview

At a high level, the steps to use an SMC server are:

1. **Encode content.**
2. **Prepare content package.**
3. **Check for free space in Media File System.**
4. **Load content onto server.**