Dynamic Web-Based Applications Using SAS Software

Prepared by

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C O R P O R A T I O N

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Overview of SAS/INTRNET Software

Web based applications can be dynamic in their design. They can receive user input for requests of information as needed. This paper lists how to set up a simple web site. The demonstration will show the use of this web site for queries.

Three components are required for the SAS/INTRNET software to work.

- Web Server Software – such as Microsoft's Personal Web Server/Internet Information Services, or the Apache Web Server.

- Web Browser – Such as Microsoft's Internet Explorer or Netscape's Navigator.

- SAS/INTRNET Software – Called the Application Dispatcher. It is composed of 2 pieces.

  o SAS Application Server – A SAS program on a Server licensed with the SAS/INTRNET Module.

  o Application Broker – A Common Gateway Interface (CGI) program that resides on the web server and communicates between the Browser and the Application Server.

These components can all reside on the same system, or on different systems.
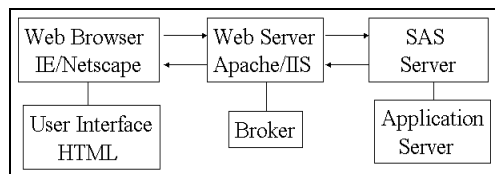
Types of Services

- Socket Service: Is constantly running, waiting for incoming transactions.

- Launch Service: A new service is started for each request.

- Pool Service: Provides a pool of servers that will be started when needed.

Installing and Running a Web Server

In order to execute the SAS/INTRNET software you need a "Web Server".

There are numerous Web Servers on the market today.

Microsoft IIS/Personal Web Server or Apache are amongst the most common.

For this paper we will be using the Apache Web Server.

Most organizations have an established Web Server and a System administrator who manages this software.

The following section explains how to install Apache on your own PC for development purposes.

Apache is a Web Server that runs on many different platforms.

It can be downloaded for free from the www.apache.org website. The download is found in binaries directory.
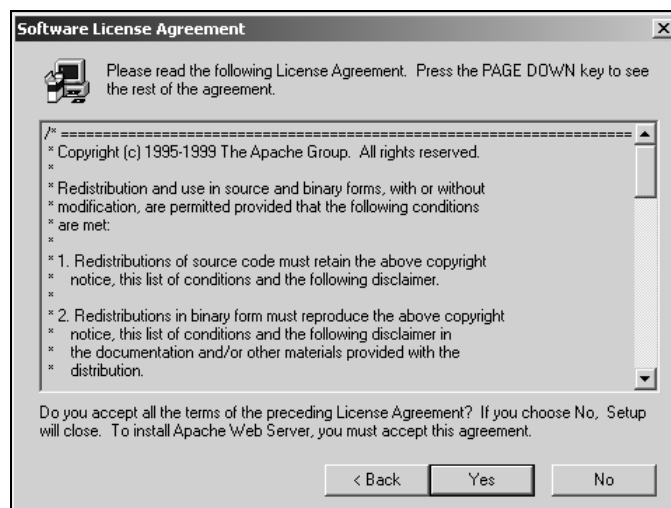
The Windows version will be a file named similar to the following:

apache_1_3_12_win32.exe

To begin the installation process, run (double click) on the file mentioned above.
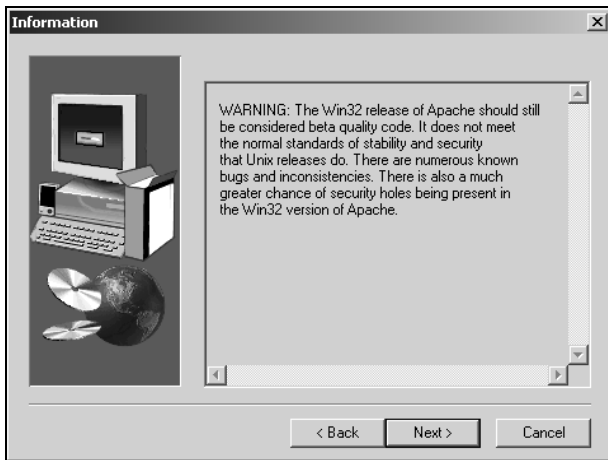
The Apache Installation will begin.

The Apache Window will appear. Select Next to continue. Do this twice.

Notice the warning mentioned here.

This course is showing you how to load Apache for developmental purposes only.

You are strongly encouraged to consult with a Professional Webmaster before implementing Web Software in a "Live" Internet environment.

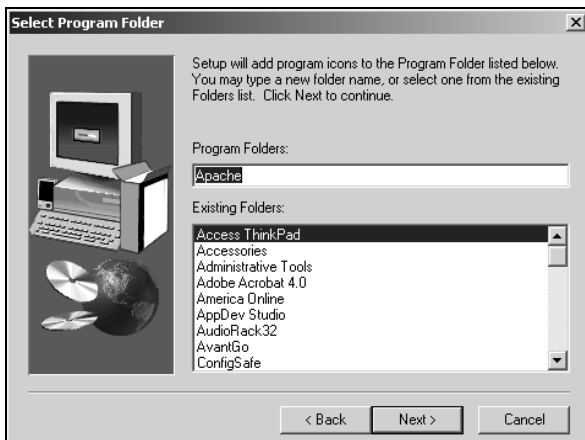You will be asked where you wish to install the Apache Software.

The default location is shown. Choose Next to continue.

The Setup Type window will prompt you for the type of setup preferred.

Select Typical and click next to continue. Do this twice.

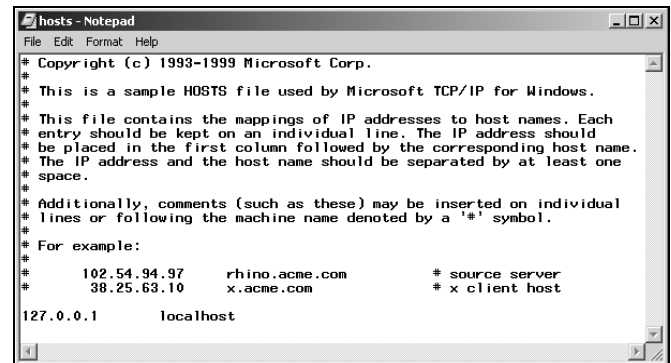The Select Program Folder window will appear.

The Setup Complete window will appear. Select Finish to complete the install.

To establish an "address" for you website you need to edit the HOSTS file.

In Windows 2000 and Windows NT it is located in c:\WINNT\system32\drivers\etc\

In Windows 95/98 it is located in c:\Windows\

The file may be opened in Notepad.

Apache is now installed and configured.

To start the Apache server you need to execute the following program.

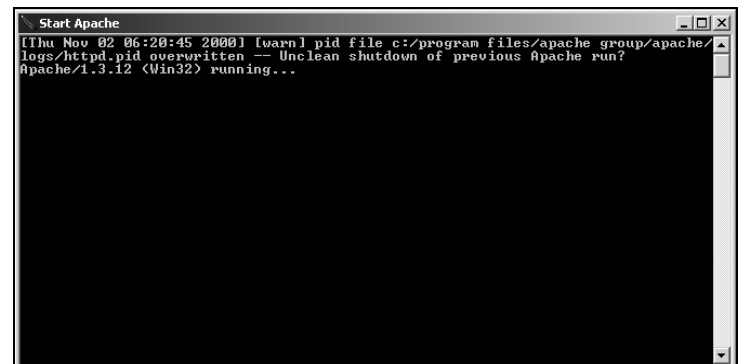   C:\Program Files\Apache Group\Apache\Apache.exe -c "ServerName LocalHost"

Apache can be run in several ways.

You can set Apache up to run as a "Service".

For this course we will simply create a shortcut on our desktop to start the Server.

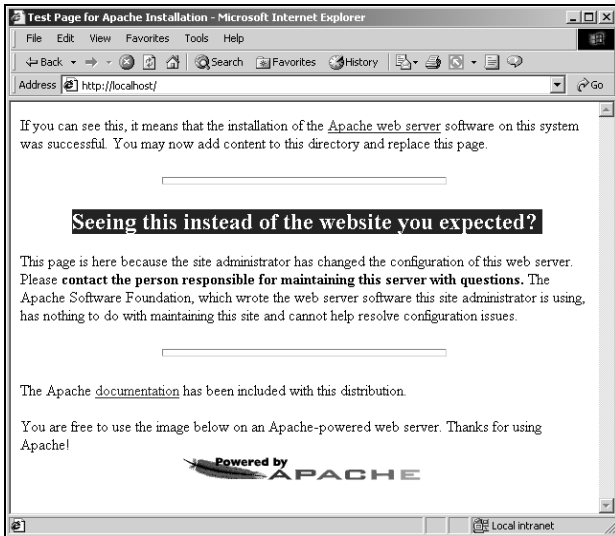When you initiate the program you will see the following window pop up.

You can now minimize the window and begin work.

To stop the Apache server maximize the Apache Window and press <CTRL> C.

Test the Apache Installation by opening your browser(Internet Explorer or Netscape) and entering the URL http://localhost

The following page will appear.

This indicates that Apache has been successfully installed.

Installing SAS/INTRNET

Now that we have the Web Server running, we need to install the SAS/INTRNET software.
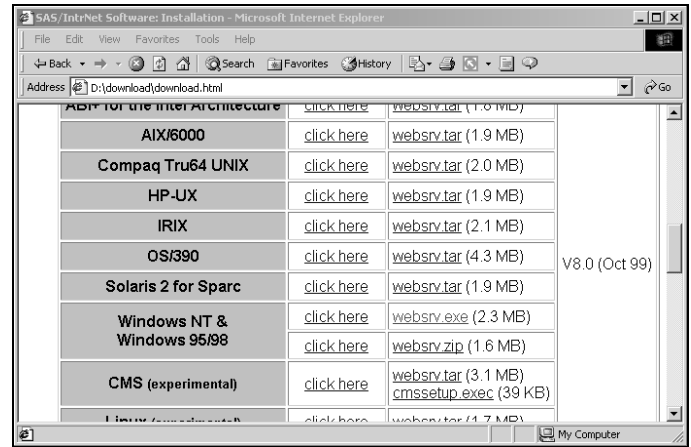
The install file will be on your SAS/INTRNET CD.

When the CD is placed in the drive the following page will appear.
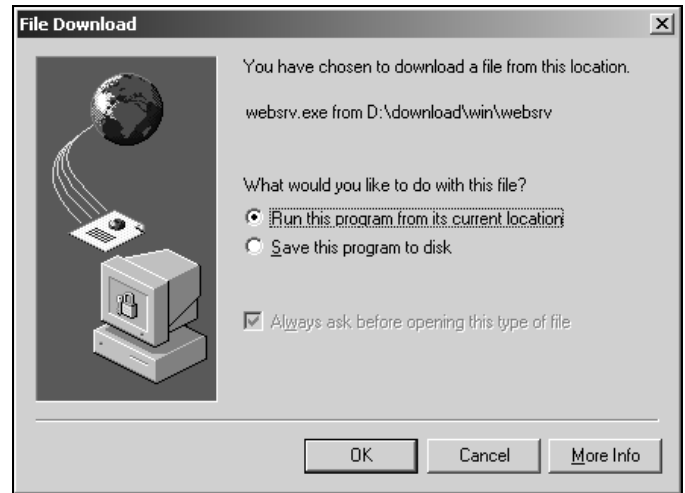
Select the install icon.

Now select the proper download for you operating system.

You can run this file from its current location or save it to your hard disk and run it by double clicking on it.

The Welcome window will appear. Click Next to continue. Do this twice.

The Copyright Information window will appear. Select Next to continue.
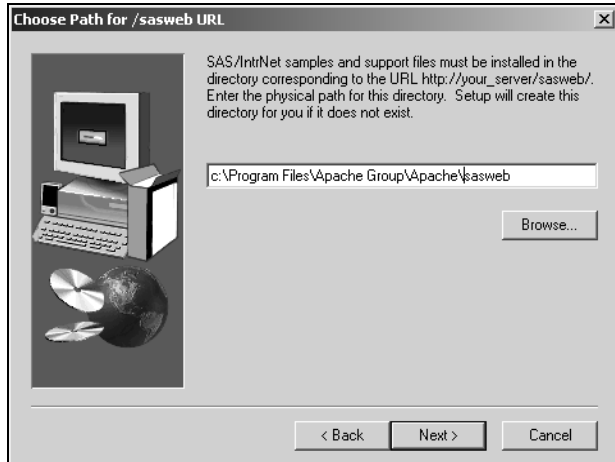
The Setup window will appear.

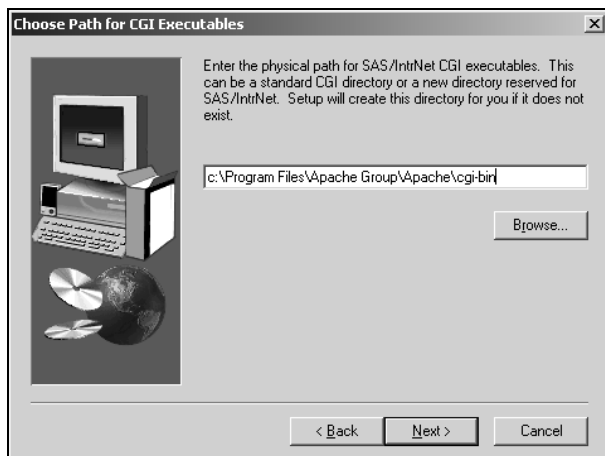Select Typical and then click on Next to continue.

Select the "ROOT" directory of your Web Server.

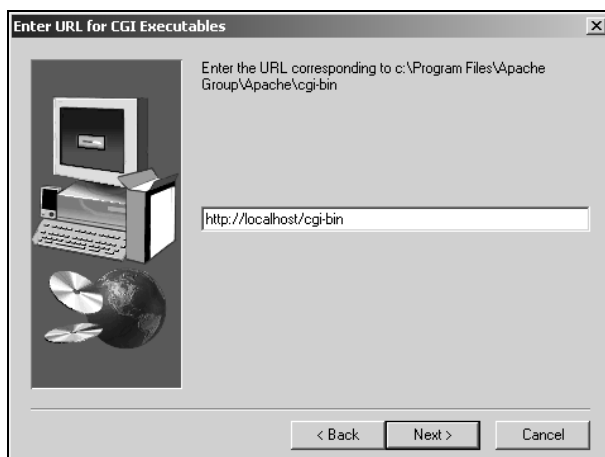Since we are using Apache, use the path shown.

Next, you will be asked to select the location to place the SAS CGI executables.

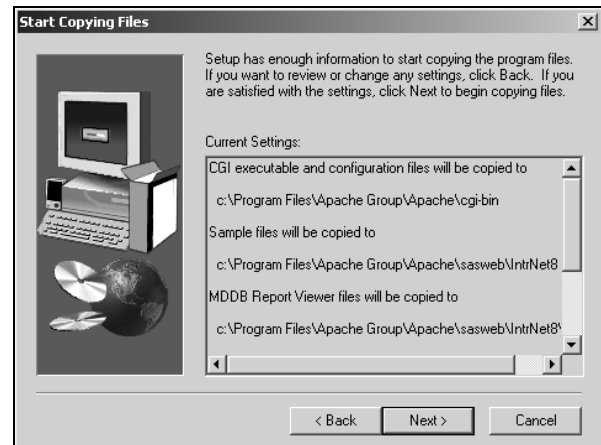Enter the path shown and select Next.

You will now be prompted for the Web Address of the Executable directory.

Enter the location below and select Next.

Select Next.

The Setup Complete window will appear. Select Finish.

SAS/INTRNET is now installed on your PC.

You still need to configure the Software for use.

You need to select the type of Service you wish to use and set it up for use.

The next 3 chapters show you how to set up the different types of services.

SETTING UP A SOCKET SERVICE

- Socket Service Description
- Setting Up the Application Server
- Edit the Broker's Configuration File

Socket Service Description

Socket services consist of one or more application servers that run continuously servicing client requests.

Socket services start when a machine is restarted (either manually or by an operating system mechanism for starting processes at boot or login time).

The service usually runs until the machine is shut down.

Socket services are relatively simple to configure and manage.

Socket services are adequate for most applications

Advantages

- Socket services are supported on all SAS/IntrNet platforms. Other service types are not supported everywhere.
- The server is already running by the time a client request appears. Clients do not have to wait for a server to start.
- The administrator has explicit control of resources allocated to the service. The administrator can control how many servers are run on each system and what resources are allocated to each server.
- Increasing load can be handled by adding more servers to the service.

Disadvantages
- Servers must be started and stopped manually or by the operating system. No automated start-up and shutdown is provided by SAS/IntrNet software.
- No dynamic scaling to meet increasing loads is provided. A fixed number of servers is available to handle all client requests. A few long-running requests can slow the entire service for all clients.

Setting up the Application Server

SAS Version 8 provides INETCFG utility to setup the Application Server.

To run it select the Windows Start menu, by selecting **Start**, then **Programs**, then **The SAS System**, then **INTRNET**, then **Create a New INTRNET Service.**

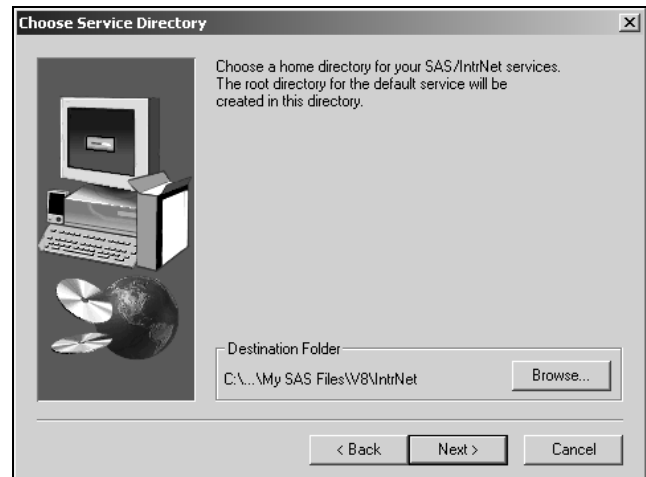The Welcome Screen is displayed. Click Next to continue.

In the Select Configuration Task window click on the radio button next to Create a Socket Service. Click Next.

In the Enter Service Name window you can choose any name for your service. We are going to choose default.
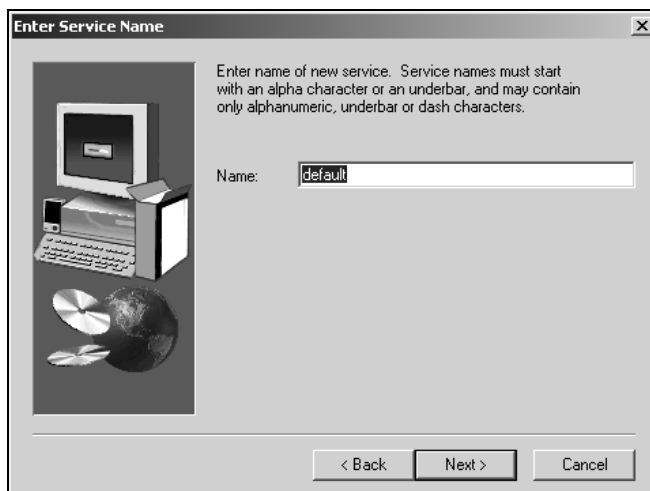
Select a Destination Folder for your service. Usually you will use the Default.

Select an available port as the PORT number for your service.

This will be the where your application Server "listens" for incoming requests from the broker.
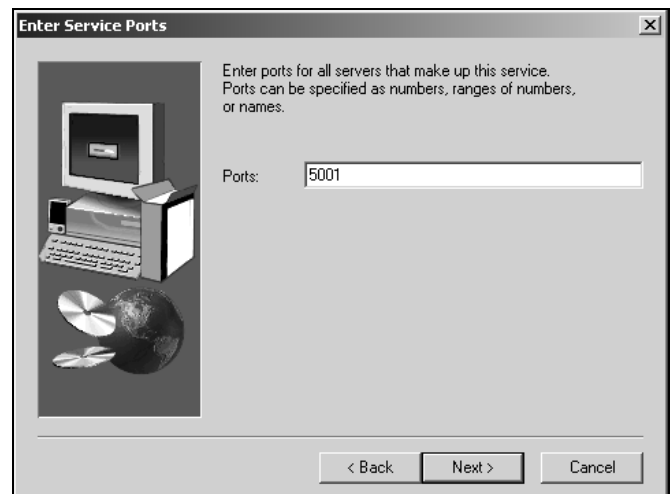
If you are in doubt as to which port to select, you can consult the services file.

You do not have to make an entry in this file to make the port work for the Application Server.

This file is located in the c:\winnt\system32\drivers\etc directory under Windows 2000 and Windows NT.
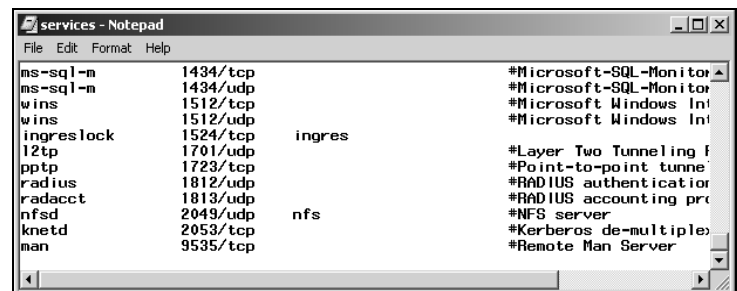
It lists all the ports that are currently in use.

Typically ports 5001 and above are available for this purpose.

The Enter Admin Password window will appear. Select an Administrator password for your service. Click Next.

SAS/INTRNET allows you to Administer your service through your browser.

You can restart or even shutdown your service.

Assigning a password forces you to use a password with these commands.
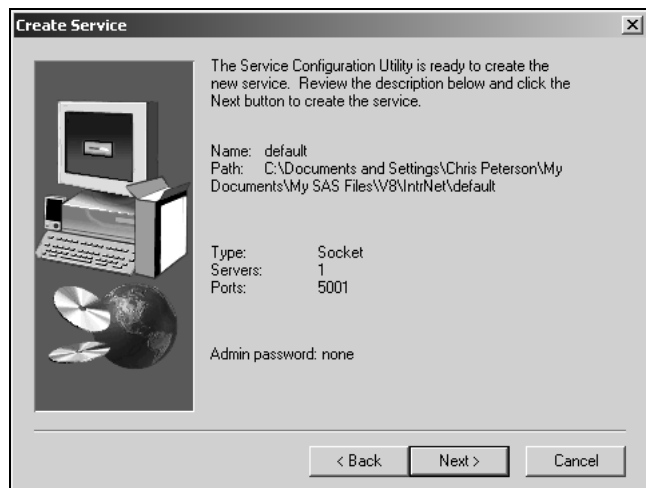
For local development a password is not necessary.

You will be shown a summary of your selections.

Click on Next.

You will be given some instructions, particularly to edit the Broker.CFG file.

The next window will state that the default service has been created. Select Finish to complete the installation.
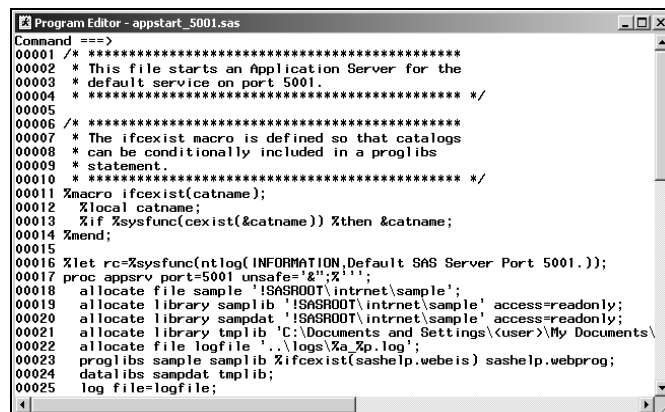
The system has setup the Default Service for us.

It has created the following SAS program.

This program runs proc appsrv and establishes data and program libraries for us to use.

This program will be located in the directory that you chose above.

Under Windows 2000 the default location is c:\Documents and Settings\<USER>\My Documents\My SAS Files\INTRNET\v8\<SERVICE NAME>\

Line	Function
Line 17:	Starts PROC APPSRV and listens at port 5001.
Line 18:	Allocates a file library to reference .SAS programs.
Line 19 – 21:	Allocates data and program libraries.
Line 23:	Sets program libraries.
Line 24:	Sets data libraries.
Line 25:	Sets the logfile.

You can and will need to allocate your own program and data libraries.

The program to add libraries would look like the following.
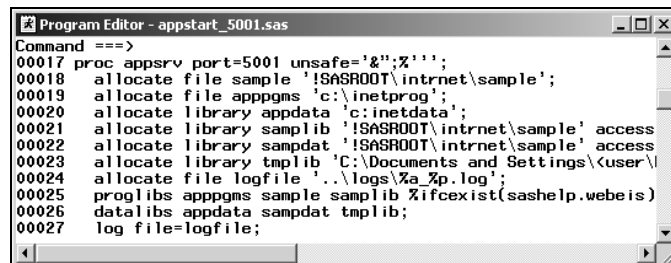
Line	Function
Line 19:	Allocates a library called apppgms. The use of allocate **file** indicates that this location will contain .SAS programs
Line 20:	Allocates a library called appdata.
Line 25	Designates these libraries as Program Libraries. Multiple proglibs lines are allowed.
Line 26:	Designates these libraries as data libraries. Multiple datalibs statements are allowd.
	Libraries defined here are available only in this Application Server.

Starting Your Service

There are several ways to run your SAS/INTRNET Server.

1. Start SAS. Open the proc appsrv program you have created, and run it.
2. Use the Shortcut SAS prepares for you.
3. Setup the SAS/INTRNET Server as a Windows NT/2000 Service.

We will use the Shortcut SAS creates for us.

Click on **Start** on the Taskbar, then **Programs**, then **The SAS System**, then **INTRNET**, then **Start Default Service**.

Editing the Broker Configuration File

The broker is an executable program that is placed in a directory under your Web Server.

In our example it is located in C:\Program Files\Apache Group\Apache\cgi-bin.

The broker.CFG file is the configuration file for this program.

 It is located in the same directory.

It contains several global variables and then a set of entries for each service.

When the file is installed from SAS it contains a lot of comments.

In the following pages the GLOBAL options are displayed. The comments have been removed.

```
broker.cfg - Notepad
File  Edit  Format  Help
#SelfURL "http://www.yourcomp.com/cgi-bin/broker"
Administrator "Your Name"
AdministratorMail "yourname@yoursite"
Allow get post
Debug 2
DebugMask 32767
FieldWidth 200
PrependFile  "c:\inetpub\scripts\header.html"
AppendFile  "c:\inetpub\scripts\footer.html"
DefaultService default
LoadManager loadmgr.yourcomp.com:5555
#LocalAddress 111.222.333.444
#Export <environment variable> <optional sas variable>
Set VARNAME "Value"
```

Option	Function
SelfURL	Sets the URL of the BROKER. Normally not set.
Administrator	Name of your System Administrator
Administrator Mail	Email Address of your System Administrator
Allow get post	Allows you to toggle the get and post CGI methods
Debug	Allows you to set a default value for Debug
DebugMask	Sets the maximum allowable value for Debug
FieldWidth	Sets the field width for variables being passed. Default is 80.
PrependFile	File inserted at the beginning of every HTML page generated.
AppendFile	File inserted at the end of every HTML page generated.
DefaultService	Default service used in the event no service value is available
LoadManager	Specifies the machine/port that the Load Manager is running
LocalAddress	Overrides the automatic determination of the local host IP Address.
Export	Allows you to export any environment variable.
Set	Allows you to specify any other variables you want.

The typical Socket Service entry appears below.

```
broker.cfg - Notepad
File  Edit  Format  Help
SocketService default "Reuse existing session"
  ServiceDescription "Default Service"
  ServiceAdmin "Your Name"
  ServiceAdminMail "yourname@yoursite"
  Server appsrv.yourcomp.com
  Port 5001
```

Option	Function
Service Description	Description of the Service
Service Admin	Name of the System Administrator
ServiceAdminMail	Email Address of your System Administrator
Server	The name of the Server running the Application Server.(Required). Multiple Servers are allowed.
Port	The port number the Application Server is listening too. (Required). Multiple ports are allowed.
	You can override the Global options here. If they are left blank then the defaults are used.

The socket service after editing is displayed below.

```
broker.cfg - Notepad
File  Edit  Format  Help
SocketService default "Default Socket Service"
  ServiceDescription "The Default Socket Service"
  ServiceAdmin "Name of Administrator"
  ServiceAdminMail "admin@destinycorp.com"
  Server localhost
  Port 5001
```
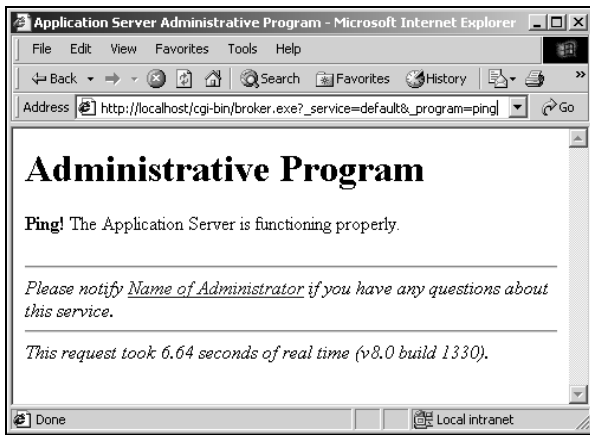
Testing Your Service

SAS provides the PING program to test your service.

To run it you need to open your browser and enter the following:

   http://localhost/cgi-bin/broker.exe?_service=default&_program=ping

Where
- Localhost/cgi-bin/broker.exe represents the URL of your BROKER executable.
- _service represents your service name.
- _program represents your program name.

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