

1 Network Configuration

Introduction

This module covers the network component of the M2000, specifically the configuration of network interfaces.

Objectives

By the end of this lesson, you will be able to:

- ▲ List the network interfaces available for the M2000
- ▲ Configure interfaces to be brought up at boot time
- ▲ Manually bring up interfaces
- ▲ Configure the system as a NIS client or slave

Networking Overview

The M2000 supports Fast Ethernet, FDDI, and Gigabit Ethernet

The host component has an on-board Fast Ethernet port, which is not to be used for serving NFS data

Network configuration can be performed by ASMT or on the command line

The M2000 can be configured to use NIS using standard Solaris procedures

The M2000 can also use DNS, again like a standard Solaris system

Networking Overview

Networking Overview

The M2000 currently supports Fast (100baseT full-duplex) Ethernet, Gigabit Ethernet, and FDDI (SAS and DAS fiber; MLT-3 (CDDI) is no longer supported). The Fast Ethernet card has four interfaces, which can run at 10baseT and half-duplex as well.

The host component of the M2000 also contains an on-board ethernet adapter, a Sun HME NIC capable of supporting 10baseT and 100baseT at half or full-duplex. This interface is designed to be used for diagnostic connectivity only; mounting NFS filesystems over this port will result in severe performance degradation.

Network configuration can be managed by ASMT or done manually by editing key configuration files in the /usr/AXbase/etc and /etc directories. This module will only discuss command line configuration.

The M2000 is configured for NIS with ypinit, equivalent to a standard Solaris 2.6 system.

The M2000 can also be configured as a DNS client or server.

Supported Network Interfaces

Auspex Fast Ethernet (afe)

Auspex Gigabit Ethernet (age)

Auspex FDDI (afddi)

Supported Network Interfaces

Supported Network Interfaces

Auspex Fast Ethernet (afe)

Auspex Gigabit Ethernet (age)

Auspex FDDI (afddi)

Network Configuration

Hosts Table: /etc/hosts

All IP addresses assigned to local interfaces should have an entry in /etc/hosts

Ensure that there are no duplicate entries

If the M2000 will be a NIS slave or client, include a NIS server in the hosts table

```
# Internet host table
#
127.0.0.1    localhost
172.16.65.72 piaget loghost
172.16.65.104 piaget-diag
172.16.65.105 piaget-afel
144.48.17.11 alpha1 alpha1-b
```

Netmask Table: /etc/netmasks

All locally attached networks should have an entry in /etc/netmasks specifying the netmask for that network

Variable length subnetting is not presently supported on the M2000

```
# The netmasks file associates Internet Protocol (IP) address
# masks with IP network numbers.
#
#   network-number netmask
#
172.16.0.0    255.255.255.224
```

Host and Netmask Tables

Network Configuration

In this section the network configuration procedure is detailed.

Editing Configuration Files

Hosts Table: /etc/hosts

All IP addresses assigned to local interfaces should be mapped to names in /etc/hosts. The /etc/hosts table looks like:

```
#
# Internet host table
#
127.0.0.1      localhost
172.16.65.72  piaget loghost
172.16.65.104 piaget-diag
172.16.65.105 piaget-afe1
144.48.17.11  alpha1 alpha1-b
```

Ensure that there are no duplicate entries in /etc/hosts, as this may cause problems.

If you intend to run as a NIS slave or client, /etc/hosts should contain the hostname and IP address of (a) NIS server(s) to which you can bind. This will be covered in more detail below.

Netmask Table: /etc/netmasks

The netmasks file should contain the network address and netmask for all locally attached subnets. The /etc/netmasks file has the following format:

```
# The netmasks file associates Internet Protocol (IP) address
# masks with IP network numbers.
#
#   network-number netmask
#
172.16.0.0    255.255.255.224
```

Note that while Solaris 2.6 supports variable length subnetting, Auspex does not support this functionality at this time. For further information on subnetting and netmasks, please see netmasks(4).

Network Configuration

Interface Table: /usr/AXbase/etc/iftab

The iftab file specifies which NP-attached interfaces should be enabled and how they are to be configured

ax_ifconf reads the iftab file to ifconfig interfaces up

The following options are only applicable for certain interfaces with the indicated restrictions:

Option	Description	afe	age	afddi
offmtu	Off-net MTU	N/A	N/A	Supported
reflect	REFLECT Mode	Supported (bug?)	Supported (future?)	Supported
S10/S100	Speed10/100	Supported		N/A
fd/hd	Full/Half Duplex	100baseT only		N/A

#Inter- #face #. #-----	Interface Name (name/ip) -----	Netmask (+/ip) -----	Broad- cast (+/ip) -----	Mtu (val) -----	Offmtu (val) -----	Auspex Options .
afe0	piaget	255.255.255.224	-	-	-	hd,S100
afe1	piaget-afe1	255.255.255.224	-	-	-	hd,S10

Interface Table

Auspex Interface Table: /usr/AXbase/etc/iftab

The iftab file indicates which Auspex interfaces should be enabled and how they should be configured. It is read by ax_ifconf, which is called at boot time, but can also be run manually. It has the following format:

```
<iface> <hostname> <netmask> <broadcast> <mtu> <offmtu> <options>
```

The contents of the option field depend upon the type of interface specified. A dash (-) may be used in place of a value, indicating that the default or automatically computed (as with the broadcast ip) should be used. The table on the opposite page lists which options are appropriate to each type of interface.

Here is an example iftab file:

#Inter- #face #. #-----	Interface Name (name/ip) -----	Netmask (+/ip) -----	Broad- cast (+/ip) -----	Mtu (val) -----	Offmtu (val) -----	Auspex Options .
afe0	piaget	255.255.255.224	-	-	-	hd,S100
afe1	piaget-afe1	255.255.255.224	-	-	-	hd,S10

Host Ethernet (hme0)

As the host ethernet is intended only for diagnostic use, it is configured separately from the Auspex interfaces. As with Auspex interfaces, its entry must exist in /etc/hosts and its netmask should be specified in /etc/netmasks. Additionally, create hostname.hme0, which will contain the same hostname assigned in /etc/hosts. Further configuration options, such as autonegotiation, can be specified in /etc/system or with ndd commands in an rc script.

Host Ethernet (hme0) Configuration

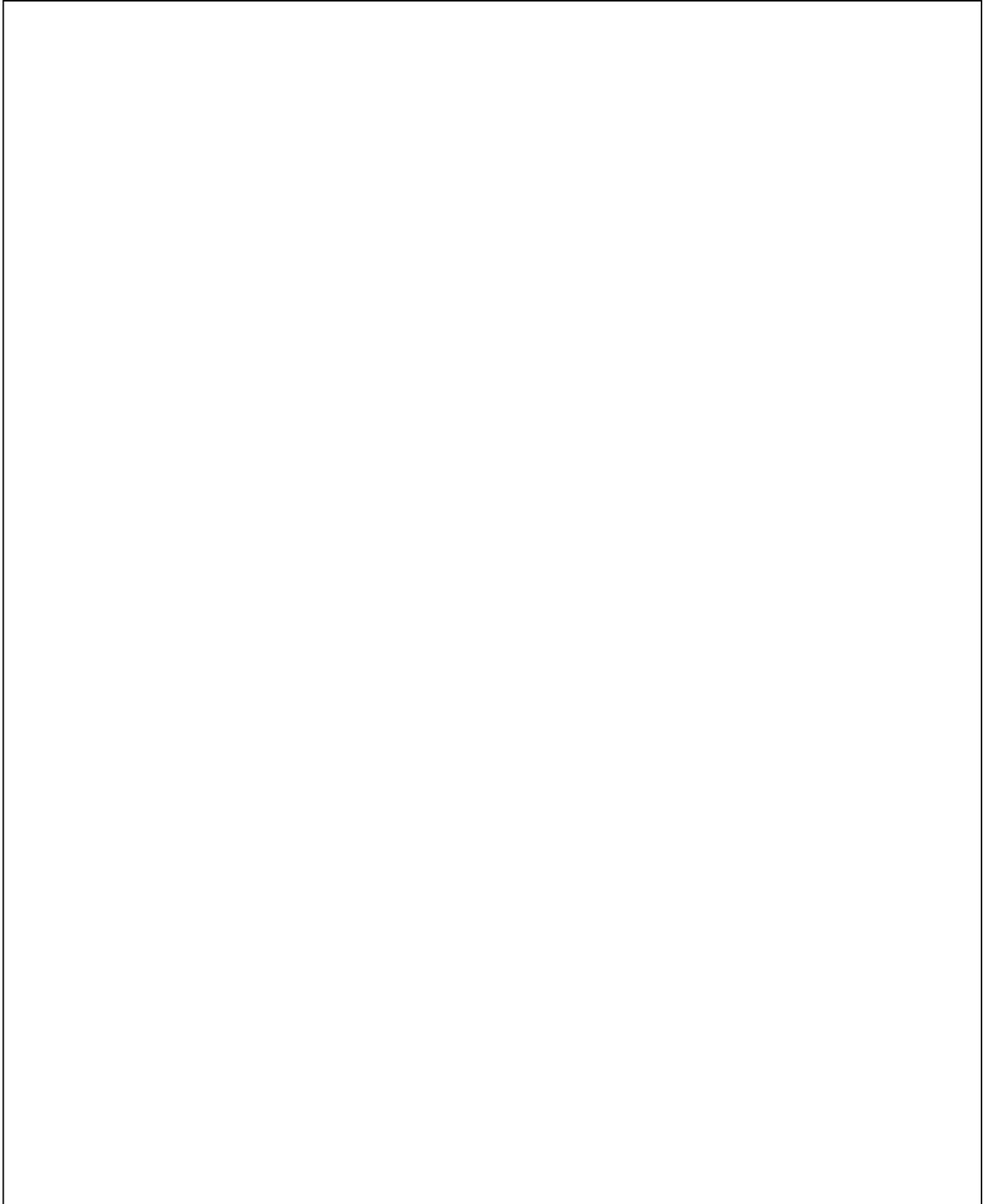
The host ethernet interface should only be used for diagnostic access, not for serving data

hme0 should have an entry in /etc/hosts and the network to which it is attached should have an entry in /etc/netmasks

/etc/hostname.hme0 should contain the hostname assigned in /etc/hosts

Autonegotiation and other options may be specified in /etc/system or with ndd commands in an rc script

Host Ethernet Configuration



Student Notes

Configuring NIS

The M2000 can run as a NIS client, slave, or master

The ypinit command is used to establish the NIS role and specify NIS servers (for client and slave roles)

If the system is to run as a client, running ypinit is not necessary if local NIS servers are present to bind via broadcast

/etc/nsswitch.conf must be set to actually utilize NIS for the desired services

Configuring NIS

Configuring NIS

The M2000 can be set up as a NIS client, slave, or master. We will only discuss setting up a NIS client or slave. The system can be set up as a master using standard Solaris procedures, but these are beyond the scope of this module.

The command to set up NIS is **ypinit**, which need only be run when the system is first being configured or when NIS servers are added or decommissioned. Note that if there is a NIS master or slave present on the local network, this will not be required; ypbind is run with the **-broadcast** option in `/etc/init.d/rpc`, and the M2000 will bind to a NIS server on the local network.

To set up the M2000 as a client, use the **-c** option of **ypinit**:

```
# ypinit -c
```

```
In order for NIS to operate successfully, we have to construct a list of the
NIS servers. Please continue to add the names for YP servers in order of
preference, one per line. When you are done with the list, type a <control D>
or a return on a line by itself.
```

```
next host to add: auspex
next host to add: alpha1
next host to add: ^D
```

```
The current list of yp servers looks like this:
```

```
auspex
alpha1
```

When specifying NIS servers to bind to, servers should be ordered from closest to furthest, and each NIS server must have an entry in `/etc/hosts`. **ypinit** stores this list of servers in `/var/yp/binding/<domain>/ypservers`, and is consulted when the **ypbind** is run without the **-broadcast** option.

To set up the M2000 as a slave, use the **-s** option of **ypinit** and specify a NIS server to retrieve maps from:

```
# ypinit -s auspex
[need correct output]
```

Regardless of whether you are binding to a NIS server or yourself, you will need to specify which NIS maps to use. The file `/etc/nsswitch.conf` is used by different facilities of the operating system to determine when to use NIS maps and when to use local files. For each map — such as `hosts`, `netmasks`, or `passwd` — you may specify “`nis`” or “`files`” to select which to use. Note that it is possible to specify both, in order of

```
#
# An example file that could be copied over to /etc/nsswitch.conf; it
# uses NIS (YP) in conjunction with files.
#
# "hosts:" and "services:" in this file are used only if the
# /etc/netconfig file has a "-" for nametoaddr_libs of "inet" transports.

# the following two lines obviate the "+" entry in /etc/passwd and /etc/group.
passwd:  files nis
group:   files nis

# consult /etc "files" only if nis is down.
hosts:   files xfn nis [NOTFOUND=return] files
networks: nis [NOTFOUND=return] files
protocols: nis [NOTFOUND=return] files
rpc:     nis [NOTFOUND=return] files
ethers:  nis [NOTFOUND=return] files
netmasks: files nis
bootparams: nis [NOTFOUND=return] files
publickey: nis [NOTFOUND=return] files

netgroup: nis

automount: files nis
aliases:  files nis

# for efficient getservbyname() avoid nis
services: files nis
sendmailvars: files]
```

Slidetitle

preference. DNS may also be specified for the hosts table. To make configuration simpler, there are two template files, `nsswitch.files` and `nsswitch.nis`, which can be copied to `nsswitch.conf` to set all maps to local files or NIS, respectively.

```
#
# An example file that could be copied over to /etc/nsswitch.conf; it
# uses NIS (YP) in conjunction with files.
#
# "hosts:" and "services:" in this file are used only if the
# /etc/netconfig file has a "-" for nametoaddr_libs of "inet" transports.

# the following two lines obviate the "+" entry in /etc/passwd and /etc/group.
passwd:  files nis
group:   files nis

# consult /etc "files" only if nis is down.
hosts:   files xfn nis [NOTFOUND=return] files
networks: nis [NOTFOUND=return] files
protocols: nis [NOTFOUND=return] files
rpc:     nis [NOTFOUND=return] files
ethers:  nis [NOTFOUND=return] files
netmasks: files nis
bootparams: nis [NOTFOUND=return] files
publickey: nis [NOTFOUND=return] files

netgroup: nis

automount: files nis
aliases:   files nis

# for efficient getservbyname() avoid nis
services: files nis
sendmailvars: files
```

A large empty rectangular box intended for student notes.

Student notes