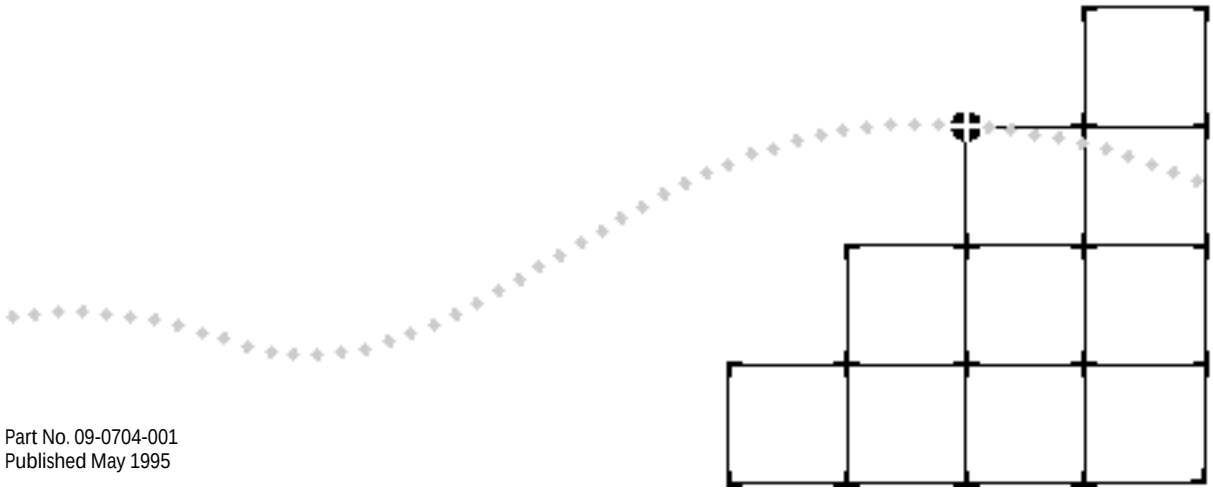
ACCESSBUILDER™ SECURITY PACKAGE -- NETWARE/WORKGROUP USER GUIDE

Software Version 1.2



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(Software Version 1.2)

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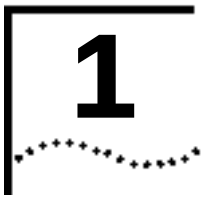


INTRODUCTION

General Information

The AccessBuilder Security Package is a model for flexible multi-vendor security interoperation that is consistent with preliminary IETF (Internet Engineering Task Force) work. The AccessBuilder Security Package software provides the network administrator with the means to control network access by remote users through an existing network security mechanism.

The AccessBuilder Security Package model allows integration of Novell NetWare security solutions while keeping the AccessBuilder open to future security options. The AccessBuilder Security Client is thus designed for maximum flexibility and investment protection for 3Com AccessBuilder customers.

This document provides an overview of the Novell NetWare Bindery/NDS Security, a description of the installation procedures, and a summary of limitations.

Also provided is documentation and installation procedures for AccessBuilder Name Server, a self-contained security database operating on a Sun workstation. The AccessBuilder Name Server has application in a wide variety of workgroup environments.

1.1. Three Security Client Types

The AccessBuilder Security Package - NetWare/Workgroup Version 1.2 software provides compatibility with two major types of Novell network-based user authentication environments and one self-contained security database package:

- AccessBuilder Security Client for Novell NetWare Bindery Services
- AccessBuilder Security Client for Novell NetWare Directory Services
- AccessBuilder Name Server for networks running SunOS 4.1.x

The AccessBuilder Security Package - NetWare/Workgroup software modules are designed to reside on their respective server or client workstations where they provide the appropriate agent software to interface between the AccessBuilder and the respective security server or database.

NetWare Applications

The AccessBuilder Security Client for Novell NetWare Bindery/NDS Security Clients work with the AccessBuilder server software Version 5.0 (or later) to enable remote user access authentication to be handled automatically from an existing Novell security database. The AccessBuilder login/password information is validated directly against the selected Novell security service. Each version is furnished on a single diskette.

The AccessBuilder Security Client for Novell NetWare bindery/NDS uses a designated user database maintained by Novell NetWare Bindery or NetWare Directory Services. It is designed to perform the authentication process using these services.

Workgroup Applications

The "AccessBuilder Name Server" module executes on a Sun Sparc station running SunOS 4.1.x to provide integrated LAN-based security through its own user database. The security database can then be used for automatic validation of remote users logging into one or more AccessBuilder. This software module is intended to reside on a network node where the AccessBuilder can query the security database through the AccessBuilder UDP/IP-based protocol. Also, a set of tools for managing the security database is provided to facilitate database administration.

1.2. Compatibility

The AccessBuilder Security Client for Novell NetWare works with AccessBuilder server software version 5.0 or later and Remote Client software version 5.0 or later.

Table 1-1 AccessBuilder Server and Security Client Version Compatibility Matrix

Server \ Security Clients	1.0	1.2
4.0		
4.1	●	
5.0	●	●

1.3. Limitations

Novell NetWare Security Client related limitations include:

- ARA and PPP clients using CHAP authentication are not supported

Limitations applying to both NetWare Security Client and Name Server include:

- No space characters are allowed in the user ID and password fields
- When the AccessBuilder (Version 5.0) Security Access feature is enabled, the user id and password fields are case sensitive. Also, when the remote client is using the AccessBuilder Remote Client software, version 5.0 or later must be used.

2 NOVELL NETWARE BINDERY/NDS SECURITY CLIENTS

2.1 Overview

If you are not using the Novell NetWare Bindery/NDS Security Client, you may skip this section.

The NDS (Netware Directory Services) Security Client is a Novell NLM that runs on Novell Netware Server 4.X.

The Bindery Security Client is a Novell NLM runs on Novell NetWare Server 3.11 or 4.X.

When a remote user dials into an AccessBuilder and provides the login information, the AccessBuilder server generates a validation request to the Bindery/NDS Security Client. The Bindery/NDS Security Client then initiates an authentication session with the Novell Netware server Bindery/NDS services. Based on the result of the authentication session, the Bindery/NDS security Client sends a validation response back to the AccessBuilder server and indicates to the user that the authentication has failed or passed.

2.2. Installation

To install the Bindery/NDS Security Client on a NetWare server, perform the following steps (on the object server):

1 Verify that TCPIP NLM is running (by verifying the autoexec.ncf file).

If not, verify that Ethernet_II frame type is used. Bind IP to Ethernet_II frame type. Following this, at the server prompt load TCPIP NLM.

The following are examples of an autoexec.ncf file which loads NetWare Bindery Services, and NetWare Directory Services security clients:

(NetWare Bindery example)

```
set Time Zone = PST8PDT
set Daylight Savings Time Offset = 1:00:00
set Start Of Daylight Savings Time = (APRIL SUNDAY FIRST  2:00:00 AM)
set End Of Daylight Savings Time = (OCTOBER SUNDAY LAST  2:00:00 AM)
set Default Time Server Type = SINGLE
set Bindery Context = O=b010
file server name SATURN
ipx internal net af0bfed9
load clib
load tcpip
load conlog
load 3C5X9 slot=5 frame=ETHERNET_802.2 NAME=3C5X9_1
bind IPX to 3C5X9_1 net=AA440000
load 3c5x9 slot=5 frame=ETHERNET_II name=3c5x9_2
bind ipx to 3c5x9_2 net=cc100001
load 3C5X9 slot=5 frame=ETHERNET_802.3 NAME=3C5X9_3
bind IPX to 3C5X9_3 net=AA330000
load 3c5x9 slot=5 frame=ETHERNET_SNAP name=3c5x9_4
bind ipx to 3c5x9_4 net=AA550000
bind IP to 3c5x9_2 addr=192.147.72.3 mask=255.255.255.0
set maximum concurrent directory cache writes = 50
set maximum directory cache buffers = 4000
load cpqhlth
load cdrom
cpqsnmp
mount all
unload conlog
load monitor
##############################################################################
# AccessBuilder NetWare Security Client Software
##############################################################################
load sbindery 3com
```

(NetWare Directory example)

```
set Time Zone = PST8PDT
set Daylight Savings Time Offset = 1:00:00
set Start Of Daylight Savings Time = (APRIL SUNDAY FIRST  2:00:00 AM)
set End Of Daylight Savings Time = (OCTOBER SUNDAY LAST  2:00:00 AM)
set Default Time Server Type = SINGLE
set Bindery Context = O=b010
file server name SATURN
ipx internal net af0bfed9
load clib
load tcpip
load conlog
load 3C5X9 slot=5 frame=ETHERNET_802.2 NAME=3C5X9_1
bind IPX to 3C5X9_1 net=AA440000
load 3c5x9 slot=5 frame=ETHERNET_II name=3c5x9_2
bind ipx to 3c5x9_2 net=cc100001
load 3C5X9 slot=5 frame=ETHERNET_802.3 NAME=3C5X9_3
bind IPX to 3C5X9_3 net=AA330000
load 3c5x9 slot=5 frame=ETHERNET_SNAP name=3c5x9_4
bind ipx to 3c5x9_4 net=AA550000
bind IP to 3c5x9_2 addr=192.147.72.3 mask=255.255.255.0
set maximum concurrent directory cache writes = 50
set maximum directory cache buffers = 4000
load cpqhlth
load cdrom
cpqsnmp
mount all
unload conlog
load monitor
load dsapi
#########################################################################
# AccessBuilder NetWare Security Client Software
#########################################################################
load snds 3com
```

2 For NetWare Directory Services, be sure the line load **dsapi.nlm** occurs before load snds.nlm (AccessBuilder Security Client).

3 Add a UDP port for the Bindery/NDS Security Client into \etc\services with the service name "crsecacc", 888 is the default port number in the AccessBuilder server.

ex. add "crsecacc 888/udp" at the bottom of \etc\services as shown in the following example:

(\etc\services example)

```
# SYS:ETC\SERVICES
#
#              Network service mappings.  Maps service names to transport
#              protocol and transport protocol ports.
#
echo           7/tcp
discard        9/tcp               sink null
systat         11/tcp
daytime        13/tcp
netstat        15/tcp
ftp-data       20/tcp
ftp            21/tcp
telnet         23/tcp
smtp           25/tcp              mail
time           37/udp              timserver
name           42/udp              nameserver
whois          43/tcp              nicname        # usually to sri-nic
domain         53/tcp
hostnames      101/tcp             hostname       # usually to sri-nic
sunrpc         111/udp
#
# Host specific functions
#
tftp           69/udp
finger         79/tcp
link           87/tcp              ttylink
x400           103/tcp                            # ISO Mail
x400-snd       104/tcp
csnet-ns       105/tcp
pop-2          109/tcp                            # Post Office
uucp-path      117/tcp
nntp           119/tcp             usenet         # Network News Transfer
ntp            123/tcp                            # Network Time Protocol
NeWS           144/tcp             news           # Window System
#
# UNIX specific services
#
# these are NOT officially assigned
#
exec           512/tcp
login          513/tcp
shell          514/tcp      cmd     # no passwords used
printer        515/tcp      spooler # experimental
courier        530/tcp      rpc            # experimental
biff           512/udp      comsat
who            513/udp      whod
syslog         514/udp
talk           517/udp
route          520/udp      router routed
new-rwho       550/udp      new-who        # experimental
rmonitor       560/udp      rmonitord      # experimental
monitor        561/udp                     # experimental
ingreslock     1524/tcp
snmp           161/udp                     # Simple Network Mgmt Protocol
snmp-trap      162/udp      snmptrap       # SNMP trap (event) messages
crsecacc       888/udp
?
```

You may need to unload, then reload NetWare server to make the changes take effect.

4 Insert the distribution diskette into the floppy drive and load the AccessBuilder Security Client for Bindery (sbindery.nlm) or for NDS (snds.nlm) -- (depending upon your NetWare Server's version and which service is used).

:load sbindery 3com

where sbindery is NLM name for AccessBuilder Security Client for Novell NetWare Bindery. 3com is the default password for AccessBuilder Security Client.

:load snds 3com

where snds is NLM name for AccessBuilder Security Client for Novell NetWare Directory Services. 3com is the default password for the AccessBuilder Security Client.

SNDS Usage

Optionally, SNDS may also take context_name as a parameter for remote access authorization control. For example:

load snds *security_password(key)* /C:*context_name* [generic form]

load snds 3com /C:HQ.MyCompany [example]

SNDS will authenticate the remote user against the HQ.MyCompany context so only user names assigned to that context will be successfully authenticated. Other users will be denied.

If the context name is not specified in the loading command, SNDS will authenticate the remote user against the default bindery context.

2.3. De-installation

To remove the AccessBuilder Security Client function from the NetWare Server, enter:

:unload sbindery

or

:unload snds

2.4. AccessBuilder Configuration

Before running the Bindery/NDS Security Client, you will need to configure the following parameters in the AccessBuilder server:

1) SecurityServerType,

2) SecurityPasswd,

3) ScrtyClIpAddr,

4) ScrtyClUdpPort if necessary, and

5) Time Zone.

Be sure to enter the correct Security Client password which is shared by AccessBuilder server and AccessBuilder Security Client. The Security password for the AccessBuilder server should match the password used at the client security server (3Com is the default value).

The Bindery/NDS Security Client logs the user login records in the absecure.log file under the NetWare server root directory.

2.5. Usage

Client

At the AccessBuilder client site, the Novell NetWare login convention may be used. For example:

login: ServerName/UserName

password: ********

can be used to do authentication with Bindery Security Client for the specified Novell NetWare server with Bindery service. For NDS Security Client, users log into a network instead of a specified server. For authentication purposes, the UserName is adequate. For example:

login: UserName

password: ********

3 ACCESSBUILDER NAME SERVER

3.1. Overview

The AccessBuilder "Name Server" software module is intended to reside on a network node (Sun SPARCstation) and includes a security database management program and a security name server program that interface with AccessBuilders.

If you are not using the 3Com provided Name Server on a Sun SPARCstation, you may skip this section.

Figure 3-1 illustrates the data flow during the authentication process initiated by a remote client:

1. When a remote user dials into the AccessBuilder and provides the appropriate login information.
2. The AccessBuilder generates a Validation Request to the Database Name Server.
3. The AccessBuilder Name Server then initiates a database lookup request.
4. User database has retrieved the user record and delivered it to the AccessBuilder Name Server.
5. The AccessBuilder Name Server then sends a validation response and user data back to the AccessBuilder.
6. The AccessBuilder then receives the Validation Response and performs a final check before allowing the remote client to access the network.

Figure 3-1 Security Access Data Flow and Steps

3.2. Installation Steps

The AccessBuilder Name Server is distributed on two floppy diskettes; one for SUN OS 4.1x tar file format, and the other in standard DOS file format. Refer to the following installation section for your environment.

SUN OS 4.1x Installation

1. Install the files on the AccessBuilder Name Server distribution diskette (this diskette contains three files, aceclnt, dbutil, and dbcnvt):
   a. On your Sun workstation, call up the target directory:

      cd (target directory)

   b. Insert the distribution diskette into the floppy drive and copy the files on the diskette to your target directory:

      tar xvf /dev/rfd0

2. Change the access right to the distribution files to 7555:

```
chmod 7555 files
```

3 Change the ownership of the distribution files to root:

```
chown root files
```

4 Assign a UDP port for AccessBuilder Name Server:

Edit the /etc/services file to add the following entry:

```
crsecacc        888/udp                 #AccessBuilder security access
```

If the UDP port 888 is used by other application, you may assign an unused UDP port number. Make sure the UdpPort parameter in AccessBuilder is set to the same number.

5 Run the dbutil program to build the user database. Refer to Section 3 for further information.

DOS Installation

To install from the DOS format diskette, perform the following:

1 Insert the DOS diskette into the floppy drive on your PC.

2 Run ftp to transfer the three distribution files from the diskette to the target directory on a Sun workstation.

3 Perform steps 4 and 5 as described above.

Launching the Name Server

1 Invoke the AccessBuilder Name Server program.

a Add the directory where the dbserver resides to the path.

Start the AccessBuilder Name Server program:

```
# dbserver
```

The AccessBuilder Name Server logs the user login records in the dbserver.log file which can be used to monitor the transaction status.

A list of error messages may be found in Appendix B.

3.3. Command Options

With Name Server Release 1.2, the 'dbserver' can run from '/etc/rc' file without user interactions. This makes it possible for the 'dbserver' to run automatically when UNIX boots up.

The command options for dbserver are:

dbserver [-d] [-p password] [-n/-y]

where:

-d -- The -d option enables the Name Server to print out trace information on the standard output and to save trace information into the log file 'dbserver.log'.

-p password -- is used as the encryption key by the Name Server to encrypt messages between Name Server and AccessBuilder. This password has to be the same as the 'Security Parameter' of the AccessBuilder. The default password is '3com'.

-y/-n -- The -y option allows the user to change the user password, while the -n option disables changing the user password. The default is '-y'.

3.4. Database Conversion

The following information applies only to users having an existing Name Server 1.0 database. If you do not have an existing version 1.0 database, skip this section.

Because Name Server release 1.2 produces the 'password.db' file in a different format from the previous release, it is necessary to convert your existing version 1.0 'password.db' file into the new file format. The command 'dbcnvt' is provided for this purpose.

Before running the dbcnvt command, make sure that the dbcnvt command resides in the same directory as the 'password.db' file, or the environment variable DBPATH is set to the name of the directory where the 'password.db' file is located. To run dbcnvt, enter the command name the UNIX SHELL prompt and follow the prompt to enter the database password.

3.5. AccessBuilder Configuration

In order for the AccessBuilder to work with the Name Server client, the following parameters in the AccessBuilder (under the admin directory) must be set to work properly:

1. SecurityServerType

   Set this parameter to AB (AccessBuilder Name Server).

2. SecurityPasswd

   This parameter has to be the same as the '-p password' command option to 'dbserver'. The default value is 3com.

3. ScrtyClntIpAddr

   This parameter is set to the IP address of the UNIX workstation which runs the Name Server.

4. ScrtyClntUdpPort

   This parameter has to be set to the same UDP port number as the 'crsecacc' entry of the /etc/services file. The default value is 888.

5. Date

   This parameter is set to the current date.

6. Time

   This parameter is set to the current time.

These steps may be performed using the Security Clients Parameters dialog box in Transcend AccessBuilder Manager.

NAME SERVER DATABASE UTILITIES

4.1. General Information

The AccessBuilder Name Server Database Utilities (dbutil) are a collection of tools that enable management of a user database on a Sun Workstation under SUN OS 4.1.x. Keeping the user database on SUN workstation has two advantages:

a The system administrator can better manage the user database because there is only one copy of database to deal with as opposed to one database per AccessBuilder Server.

b The database can store hundreds of thousands of user records in order to satisfy the needs of an enterprise network, where there are a large number of remote users.

4.2. User Record Contents

The User database contains a set of user records. Each user record contains information on a remote user who accesses AccessBuilder Server. A user record is composed of four elements of information:

1 The user's name,

2 login password,

3 privilege and

4 callback number.

The user's name is the key of a user record, and therefore must be unique. All information except the callback number are mandatory, which means this information must be supplied when adding a user record to the database.

There is a limited length of information that can input for each piece of information. The user name can contain up to 64 characters. The password can have up to 32 characters. The callback number can have up to 16 characters.

4.3. The Database Utilities User Interface

The Database Utilities provide a character based, menu driven user interface. Users interact with menu commands to perform database operations such as query, add, update, delete, backup and restore.

4.4. The Main Menu

When the Database Utilities start up, the Main menu is displayed as shown:

```
 ***** Main Menu *****
1) Add User Record
2) Modify User Record
3) Delete User Record
4) Display User Records
5) Save User Records into ASCII File
6) Backup Database
7) Restore Database
8) Change Database Password
9) Exit

Please enter your choice:
```

Add a User Record

You can add a user record to the database by selecting '1' from the main menu. You will be prompted to enter information on the user's name, password, privilege and callback number. All information except the callback number are mandatory.

```
Please enter your choice: 1
User Name: demouser
User Password:
Privilege, (1) for User, (2) for Administrator: 1
Callback #:
```

Modify User Record

You can modify a user record in the database by selecting 2 from the Main menu. You are then prompted to enter the user's name. If the user's name is in the database, the Utilities display the current information and prompt you to make modifications. You may elect to skip changes by pressing the Enter key at the prompt.

```
Please enter your choice: 2
User Name: demouser
Please enter new password or press enter to skip changes:
The user privilege is: user,
please enter privilege or press enter to skip changes.
(1) for User, (2) for Administrator: 2
The user callback # is: 150,
please enter callback # or press enter to skip changes: 8941800
```

Delete User Record

You can delete a user record from the database by selecting 3 from the Main menu. You are then prompted to enter the user's name. If the user's name is in the database, the Utilities will prompt you to confirm the deletion of the user record.

```
Please enter your choice: 3
User Name: demouser

Do you really want to delete the user "demouser" from the database? (y/n) y
```

Display User Records

By selecting item 4 from the Main menu, you are offered four options:

1. Display user records display a particular user,
2. Display users having a 'user' privilege,
3. Display users having 'admin' privilege,
4. Display all users.

The following screen shows the Display User Records option and all user records with ‘user’ privilege.

```
***** Display User Record Menu *****

1) Display A User Record
2) Display User Records with User Privilege
3) Display User Records with Admin Privilege
4) Display All User Records
5) Return to Main Menu

Please enter your choice: 2

 User Name                                    Privilege Callback #
 ------------------------------------------------------------------------
 joe                                          (user)    8941801
 john                                         (user)    8941812

 Total 2 records found
```

Save User Records into ASCII Files

You can save the database information into ASCII files, which can then be viewed from a text editor or printed. By selecting item '5' from the Main menu, you have three options to save user records:

1. Save user records with the 'user' privilege,
2. Save user records with the 'admin' privilege,
3. Save all user records.

The following screen shows the Save User Records menu command and the contents of the ASCII file containing all the user records.

```
                    ***** Save User Record Menu *****

1) Save User Records with User Privilege
2) Save User Records with Admin Privilege
3) Save All User Records
4) Return to Main Menu

Please enter your choice: 3

     The contents of ASCII file:

 User Name                                        Privilege      Callback #
 ---------------------------------------------------------------------------
 joe                                               (user)         8941801
 john                                              (user)         8941812

Total 2 records found
```

Backup Database This menu command allows you to backup database into a specified database name. Since the database includes three related files, this command eliminates the need to back up three individual files.

```
 Please enter your choice: 6

 Please enter database name for backup: all

 Backup database...
```

Restore Database This menu command allows the you to restore the database from a backup database. Precaution should be taken with this command, because restore will overwrite the existing database with the backup database.

```
Please enter your choice: 7

Please enter database name for restore: all

Restoring database will overwrite existing database.
Do you wish to continue? y/n y

Restore database...
```

Change Database Password

This menu command enables you to change database password. Since every user's password in the database is encrypted with database password, precaution should be taken with this command, especially when the dbserver daemon is running.

After changing the database password, terminate and restart the dbserver daemon so that the user login request can be properly authenticated.

```
Please enter your choice: 8

Please note that if dbserver is currently running, after changing
database password, dbserver will not be able to authenticate user login
properly.

Please terminate and restart dbserver after database password has
changed.

Do you wish to continue? (y/n) y
Old database password:
New database password:
Confirm database password:

Updating database...
```

4.5.PATH

When dbutil starts, it checks for the setting of environment variable "DBPATH" to determine the directory to create or to open database files. If the variable is set, it assumes that the database is under the DBPATH directory. Otherwise, it assumes that the database files are under the directory where dbutil starts.

A list of dbutil error messages may be found in Appendix A.

DATABASE UTILITIES ERROR MESSAGES

The following table defines the error messages displayed by the Name Server Database Utilities(dbutil) when exception conditions arise. Each error message is accompanied with the possible causes of the error and solutions to the problem.

Message Number	dbutil Error Messages
1	DES initialization failed. *Cause:* Software internal error. *Solution:* Call tech support.
2	Database initialization failed. *Cause:* File access permission errors. *Solution:* Make sure that the user has permission to access all three files: 'helperdb.nx', 'helperdb.dt' and 'password.db' under $DBPATH directory or under current directory if DBPATH environment variable is not set.
3	The user record already exists. *Cause:* In adding a user record, entry of a user name which already exists in the database has been attempted. *Solution:* Make sure to enter a unique user name or to choose "Modify User Record" to modify existing information.
4	The user record doesn't exist. *Cause:* In updating or deleting a user record, entry of a user name which doesnot exist in the database has been attempted. *Solution:* Enter a user name which already in the database.
5	Failed to update user record. *Cause:* dbutil was not able to update a user record due to internal errors. *Solution:* Call tech support.

Message Number	dbutil Error Messages
6	Failed to delete user record. *Cause:* dbutil was not able to delete a user record due to internal errors. *Solution:* Call tech support.
7	The database password file does not exist. *Cause:* dbutil was not able to locate the password file, however, user record files do exist. *Solution:* Make sure DBPATH is set properly or starts dbutil from where the password file is located.
8	Unable to create password file. *Cause:* dbutil was not able to create password file most likely due to a permission problem. *Solution:* Make sure that the user has permission to write to the file 'password.db'.
9	Incorrect password, exit dbutil. *Cause:* The user has entered password incorrectly three times. *Solution:* Enter the correct password.
10	Unable to create user record file. *Cause:* dbutil was not able to create user record file most likely due to permission problem. *Solution:* Make sure that the user has permission to write to the files 'helperdb.nx' and 'helperdb.dt'.
11	Unable to open user record file. *Cause:* dbutil was not able to open user record file most likely due to permission problem. *Solution:* Make sure that the user has permission to open the files 'helperdb.nx' and 'helperdb.dt'.
12	Unable to create xxx file. *Cause:* In saving database into ASCII file, dbutil was not able to create user specified file 'xxx' file most likely due to permission problem. *Solution:* Make sure that the user has permission to write to the files 'xxx'.

B NAME SERVER ERROR MESSAGES

Messages shown in the log file:

Message Number	Name Server Log File Error Message
1	Abnormal exit\n Recommended Action: Call 3COM Technical Support.
2	Out of memory when allocating request data. Recommended Action: Call 3COM Technical Support.
3	Protocol Error (<error code>). Recommended Action: Call 3COM Technical Support.
4	Version number Error (<error code>). Recommended Action: Call 3COM Technical Support.
5	Command Error (<error code>). Recommended Action: Call 3COM Technical Support.
6	Data length Error (<error code>). Recommended Action: Call 3COM Technical Support.
7	Auth Type length Error (<error code>). Recommended Action: Call 3COM Technical Support.
8	Auth Type data Error (<error code>). Recommended Action: Call 3COM Technical Support.
9	User Id length Error (<error code>). Recommended Action: Call 3COM Technical Support.
10	Challenge length Error (). Recommended Action: Call 3COM Technical Support.
11	Wrong option type (<error code>). Recommended Action: Call 3COM Technical Support.

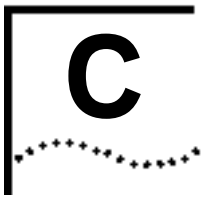
Message Number	Name Server Log File Error Message
12	Total length error (<error code>). Recommended Action: Call 3COM Technical Support.
13	Current Time length Error (<error code>). Recommended Action: Call 3COM Technical Support.
14	Incorrect option fields in the packet(<error code>). Recommended Action: Call 3COM Technical Support.
15	Incorrect option fields not in the packet(<error code>). Recommended Action: Call 3COM Technical Support.
16	DES decode input length error (<error code>). Recommended Action: Call 3COM Technical Support.
17	Recoverable software error. Recommended Action: Call 3COM Technical Support.
18	DES decode input length error (<error code>). Recommended Action: Call 3COM Technical Support.
19	Wrong Encrypted Key from user <user id>. Recommended Action: Verify the Name Server has the same password shared by the AccessBuilder.
20	Inconsistant time stamp (may be a replay request or misconfigured password). Recommended Action: Verify the Name Server has the same password shared by the AccessBuilder.
21	Wrong Encrypted New Key from user <user id>. Recommended Action: None. User has entered an invalid password.
22	Encrypt New Key appeared for Validation Request Packet. Recommended Action: None. User has requested changing his/her password.
23	Check password configuration. Recommended Action: Name Server is set to not allow the user to change his/her own password, and a user has attempted to change his/her password.
24	Time skew in the incoming packet is too large. Recommended Action: Verify the time setting on AccessBuilders and Name Server machine is set up correctly.

Message Number	Name Server Log File Error Message
25	UTC time not available. Recommended Action: Verify the time setting on the Name Server machine is set up correctly.
26	Duplicate time stamp used from user <user id> (could be a replay packet). Recommended Action: This may be a replay packet. Check if any user is injecting traffic to the network.
27	Duplicate sequence number used from user <user id> (could be a replay packet). Recommended Action: This may be a replay packet. Check if any user is injecting traffic to the network.
28	Authtication failed from user <user id>. Recommended Action: None. For information only.
29	Authtication passed from user <user id>. Recommended Action: None. For information only.
30	Authtication request from user <user id>. Recommended Action: None. For information only.
31	Authtication request failed from an invalid user <user id>. Recommended Action: None. For information only.
32	Change password failed from user <user id>. Recommended Action: None. For information only.
33	Change password passed from user <user id> Recommended Action: None. For information only.
34	Out of memory when allocating request data. Recommended Action: Make sure the system has at least 1MByte memory available.
35	No such service: crsecacc/udp. Check /etc/services file. Recommended Action: Make sure the /etc/services file has crsecacc entry. Also make sure no other Name Server is running on the same machine.
36	Cannot get UDP socket. Recommended Action: Make sure the /etc/services file has crsecacc entry. Also make sure no other Name Server is running on the same machine.
37	Cannot bind UDP socket. Recommended Action: Make sure the /etc/services file has crsecacc entry. Also make sure no other Name Server is running on the same machine.

Message Number	Name Server Log File Error Message
38	Send response failed. Recommended Action: Make sure the network connection is healthy.
39	Receive Error. Recommended Action: Make sure the network connection is healthy.

Messages displayed on the terminal:

Message Number	Name Server Terminal Error Message
1	**Cannot open log file.** Recommended Action: Make sure you have write access to the right directory.
2	**DES initialization Error!** Recommended Action: Make sure there is at least 1M bytes of memory available.
3	**UDP socket creation/binding Error!** Recommended Action: Make sure the /etc/services file has a crsecacc entry. Also make sure no other Name Server is running on the same machine.



TECHNICAL SUPPORT

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

On-line Technical Services

3Com offers worldwide product support seven days a week, 24 hours a day, through the following on-line systems:

- 3Com Bulletin Board Service (3ComBBS)
- World Wide Web site
- Ask3Com℠ on CompuServe®
- 3ComFacts℠ automated fax service

3Com Bulletin Board Service

3ComBBS contains patches, software, and drivers for all 3Com products, as well as technical articles. This service is available via modem seven days a week, 24 hours a day. To reach the service, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country	Baud Rate	Telephone Number
Australia	up to 14400 baud	(61) (2) 955 2073
France	up to 14400 baud	(33) (1) 69 86 69 54
Germany	up to 9600 baud up to 9600 baud	(49) (89) 627 32 188 (49) (89) 627 32 189
Hong Kong	up to 14400 baud	(852) 537 5601
Italy (fee required)	up to 9600 baud	(39) (2) 273 00680
Japan	up to 14400 baud	(81) (3) 3345 7266
Singapore	up to 14400 baud	(65) 534 5693
Taiwan	up to 14400 baud	(886) (2) 377 5838 (886) (2) 377 5840
U.K.	up to 14400 baud	(44) (144) 227 8278
U.S.	up to 14400 baud	(1) (408) 980 8204

World Wide Web Site

Access the latest networking information on 3Com's World Wide Web site by entering our URL into your Internet browser:

```
http://www.3Com.com/
```

This service features news and information about 3Com products, customer service and support, 3Com's latest news releases, selected articles from 3TECH™, 3Com's award-winning technical journal, and more.

Ask3Com on CompuServe

Ask3Com is a CompuServe-based service containing patches, software, drivers, and technical articles about all 3Com products, as well as an interactive forum for technical questions. To use Ask3Com, you need a CompuServe account.

To use Ask3Com:

1. Log on to CompuServe.
2. Enter `go threecom`
3. Press [Return] to see the Ask3Com main menu.

3ComFacts Automated Fax Service

3Com Corporation's interactive fax service, 3ComFacts, provides data sheets, technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, seven days a week. Within this service, you may choose to access CardFacts® for adapter information, or NetFacts® for network system product information.

- **CardFacts** provides adapter installation diagrams, configuration drawings, troubleshooting instruction, and technical articles.

  Document 9999 provides you with an index of adapter documents.

- **NetFacts** provides data sheets and technical articles on 3Com Corporation's hub, bridge, router, terminal server, and software products.

  Document 8888 provides you with an index of system product documents.

Call 3ComFacts using your touch-tone telephone. International access numbers are:

Country	Fax Number
Hong Kong	(852) 537 5610
U.K.	(44) (144) 227 8279
U.S.	(1) (408) 727 7021

Local access numbers are available within the following countries:

Country	Fax Number
Australia	800 123853
Denmark	800 17319
Finland	98 001 4444
France	05 90 81 58
Germany	0130 8180 63

Country	Fax Number
Italy	1678 99085
Netherlands	06 0228049
Norway	800 11062
Sweden	020 792954
U.K.	0800 626403

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- Diagnostic error messages
- A list of system hardware and software, including revision levels
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

Support from 3Com

If you are unable to receive support from your network supplier, technical support contracts are available from 3Com.

In the U.S. and Canada, call **(800) 876-3266** for customer service.

If you are outside the U.S. and Canada, contact your local 3Com sales office to find your authorized service provider:

Country	Telephone Number
Australia (Sydney)	(61) (2) 959 3020
(Melbourne)	(61) (3) 653 9515
Belgium	(32) (2) 7164880
Brazil	(55) (11) 241 1571
Canada	(905) 882 9964
France	(33) (1) 69 86 68 00
Germany	(49) (89) 6 27 32 0
Hong Kong	(852) 868 9111
Italy	(39) (2) 273 02041
Japan	(81) (3) 3345 7251

Country	Telephone Number
Mexico	(525) 531 0591
Netherlands	(31) (3) 402 55033
Singapore	(65) 538 9368
South Africa	(27) (11) 803 7404
Spain	(34) (1) 3831700
Sweden	(46) (8) 632 91 00
Taiwan	(886) (2) 577 4352
United Arab Emirates	(971) (4) 349049
U.K.	(44) (1628) 897000
U.S.	(1) (408) 492 1790

Returning Products for Repair

A product sent directly to 3Com for repair must first be assigned a Return Materials Authorization (RMA) number. A product sent to 3Com without an RMA number will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number, call or fax:

Country	Telephone Number	Fax Number
U.S. and Canada	(800) 876 3266, option 2	(408) 764 7120
Europe	(44) (1442) 278000	(44) (1442) 236824
Outside Europe, U.S. and Canada	(1) (408) 492 1790	(1) (408) 764 7290

LIMITED WARRANTY

HARDWARE: 3Com warrants its hardware products to be free from defects in workmanship and materials, under normal use and service, for the following lengths of time from the date of purchase from 3Com or its Authorized Reseller:

Internetworking products	One year
Network adapters	Lifetime
Ethernet stackable hubs and Unmanaged Ethernet fixed port repeaters	Lifetime* (One year if not registered)
*Power supply and fans in these stackable hubs and unmanaged repeaters	One year
Other hardware products	One year
Spare parts and spares kits	90 days

If a product does not operate as warranted during the applicable warranty period, 3Com shall, at its option and expense, repair the defective product or part, deliver to Customer an equivalent product or part to replace the defective item, or refund to Customer the purchase price paid for the defective product. All products that are replaced will become the property of 3Com. Replacement products may be new or reconditioned. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

3Com shall not be responsible for any software, firmware, information, or memory data of Customer contained in, stored on, or integrated with any products returned to 3Com pursuant to any warranty.

SOFTWARE: 3Com warrants that the software programs licensed from it will perform in substantial conformance to the program specifications therefor for a period of ninety (90) days from the date of purchase from 3Com or its Authorized Reseller. 3Com warrants the magnetic media containing software against failure during the warranty period. No updates are provided. 3Com's sole obligation hereunder shall be (at 3Com's discretion) to refund the purchase price paid by Customer for any defective software products, or to replace any defective media with software which substantially conforms to 3Com's applicable published specifications. Customer assumes responsibility for the selection of the appropriate applications program and associated reference materials. 3Com makes no warranty that its software products will work in combination with any hardware or applications software products provided by third parties, that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected. For any third party products listed in the 3Com software product documentation or specifications as being compatible, 3Com will make reasonable efforts to provide compatibility, except where the non-compatibility is caused by a “bug” or defect in the third party's product.

STANDARD WARRANTY SERVICE: Standard warranty service for hardware products may be obtained by delivering the defective product, accompanied by a copy of the dated proof of purchase, to 3Com's Corporate Service Center or to an Authorized 3Com Service Center during the applicable warranty period. Standard warranty service for software products may be obtained by telephoning 3Com's Corporate Service Center or an Authorized 3Com Service Center, within the warranty period. Products returned to 3Com's Corporate Service Center must be pre-authorized by 3Com with a Return Material Authorization (RMA) number marked on the outside of the package, and sent prepaid, insured, and packaged appropriately for safe shipment. The repaired or replaced item will be shipped to Customer, at 3Com's expense, not later than thirty (30) days after receipt by 3Com.

WARRANTIES EXCLUSIVE: IF A 3COM PRODUCT DOES NOT OPERATE AS WARRANTED ABOVE, CUSTOMER'S SOLE REMEDY SHALL BE REPAIR, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE PAID, AT 3COM'S OPTION. THE FOREGOING WARRANTIES AND REMEDIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. 3COM NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE OR USE OF ITS PRODUCTS.

3COM SHALL NOT BE LIABLE UNDER THIS WARRANTY IF ITS TESTING AND EXAMINATION DISCLOSE THAT THE ALLEGED DEFECT IN THE PRODUCT DOES NOT EXIST OR WAS CAUSED BY CUSTOMER'S OR ANY THIRD PERSON'S MISUSE, NEGLECT, IMPROPER INSTALLATION OR TESTING, UNAUTHORIZED ATTEMPTS TO REPAIR, OR ANY OTHER CAUSE BEYOND THE RANGE OF THE INTENDED USE, OR BY ACCIDENT, FIRE, LIGHTNING, OR OTHER HAZARD.

LIMITATION OF LIABILITY: IN NO EVENT, WHETHER BASED IN CONTRACT OR TORT (INCLUDING NEGLIGENCE) SHALL 3COM BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL, OR PUNITIVE DAMAGES OF ANY KIND, OR FOR LOSS OF REVENUE, LOSS OF BUSINESS, OR OTHER FINANCIAL LOSS ARISING OUT OF OR IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE, USE, PERFORMANCE, FAILURE, OR INTERRUPTION OF ITS PRODUCTS, EVEN IF 3COM OR ITS AUTHORIZED RESELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES

Some states do not allow the exclusion of implied warranties or the limitation of incidental or consequential damages for consumer products, so the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights which may vary from state to state.

GOVERNING LAW: This Limited Warranty shall be governed by the laws of the state of California.

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