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Introduction

This document describes a step by step procedure of adding Terminal Access Controller Access Control System (TACACS+) authentication service on the Cisco MGX 8850/8950/8830 running switch software revision greater than 5.0, with Cisco Access Control Server (ACS) version 4.2 and above.

Prerequisites

Requirements

Cisco recommends that you meet this requirements before you attempt this configuration:

- AAA Server is reachable from the MGX

Components Used

This document is restricted to Cisco MGX 8850/8950/8830 running switch software revision greater than 5.0 and with ACS version above 4.2.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Configure

Note: Use the [Command Lookup Tool](#) ([registered](#) customers only) in order to obtain more information on the commands used in this section.

Configuration on MGX

An example of the configuration required on MGX is shown here

Step 1. Verify the switch software version. You need version 5.0 or later to configure TACACS+

```
8950A.7.PXM.a > dspversion
  Image Type      Shelf Type      Card Type      Version      Built On
  -----
  Runtime         MGX             PXM45          5.1(20.200)  Jun 23 2005,
21:36:08
  Boot            MGX             PXM45          4.0(0.11)P2  -
```

Step 2. Verify you have the right IP address:

```
8950A.7.PXM.a > dspifip
  Interface      Flag  IP Address      Subnetmask      Broadcast
  -----
  Ethernet/lnPci0 UP    10.66.69.57     255.255.255.128
10.255.255.255
  SLIP/sl0       UP    127.0.0.2       255.0.0.0
(N/A)
  ATM/atm0       DOWN  0.0.0.0         0.0.0.0
(N/A)
```

Step 3. Verify you can ping the ACS server: (ACS server is at 10.106.60.182)

```
8950A.7.PXM.a > ping 10.106.60.182
PING 10.106.60.182: 56 data bytes
64 bytes from 10.106.60.182: icmp_seq=0. time=250. ms
64 bytes from 10.106.60.182: icmp_seq=1. time=240. ms
64 bytes from 10.106.60.182: icmp_seq=2. time=240. ms
----10.106.60.182 PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 240/243/250
```

If ping doesn't go through, we need to check IP reachability. Also verify **dspifip** and **bootchange** are configured with correct IP address.

```
8950A.7.PXM.a > bootchange
```

```
'.' = clear field; '-' = go to previous field; ^D = quit
```

```
boot device      : lnPci0
processor number  : 0
host name        :
file name        :
inet on ethernet (e) : 172.16.157.88 >>
inet on backplane (b):
```

```

host inet (h)      :
gateway inet (g)  : 172.16.157.1 >>
user (u)          :
ftp password (pw) (blank = use rsh):
flags (f)        : 0x0
target name (tn)  :
startup script (s):
other (o)        :

```

Note: Check the configuration of dspifip parameters and changed the Primary IP address of network management to Interface LAN IP and ATM address as secondary (using **cnfndparm**). Also you need to configure the bootchange parameters putting correct LAN IP address and gateway. The **routeshow** command output should indicate the default gateway for 0.0.0.0 as LAN IP address.

Step 4. Verify AAA configuration using **dspaaa** . By default no AAA is configured

```

8950A.7.PXM.a > dspaaa
AAA CONFIGURATION:
  Authentication Methods : local cisco
  Authorization Methods  : local cisco
  Authorization Type     : group
  Default Privilege Level : NOUSER_GP
  Prompt Display         : acs
  SSH/FTP Message Type   : Inbound ASCII Login
  IOS Exclusion List      :

```

```
TACACS+ SERVERS:      primary is shown first
```

IP Address	Port	Time Out	Dead Time	Single Conn	Shared Encryption Key
-----	----	---	----	-----	-----
-----	----	---	----	-----	-----

Step 5. Configure the AAA server IP address and key:

```

8950A.7.PXM.a > cnfaaa-server tacacs+ -ip 10.66.79.246
Do you want to change the encryption key (yes/no)?yes
Enter the encryption key: cisco
Re-enter the encryption key: cisco

```

```
TACACS+ SERVERS:      primary is shown first
```

IP Address	Port	Time Out	Dead Time	Single Conn	Shared Encryption Key
-----	----	---	----	-----	-----
-----	----	---	----	-----	-----
10.66.79.246	49	5	0	true	Cisco

Step 6. Configure Authentication:

```
8950A.7.PXM.a > cnfaaa-authen
```

Syntax: cnfaaa-authen <method> [<method>...]

```
method -- {local | default | tacacs+ | cisco}
  local   : Use the local database for authentication.
  default: Same as local.
  tacacs+ : Use the TACACS+ protocol for authentication.
  cisco   : Only the root user of 'cisco' is allowed to login.
```

Here we are doing TACACS+ then Local and then Cisco. (It is recommended to have cisco as a last resort in there...)

```
8950A.7.PXM.a > cnfaaa-authen tacacs+ local cisco
```

AAA CONFIGURATION:

```
Authentication Methods : tacacs+ local cisco
Authorization Methods  : local cisco
Authorization Type     : group
Default Privilege Level : NOUSER_GP
Prompt Display        : acs
SSH/FTP Message Type  : Inbound ASCII Login
IOS Exclusion List     :
```

WARNING: The newly configured authentication/authorization methods applies to the new sessions. This configuration has no impact on existing sessions.

Step 7. Configure the default privilege level if you want. We do not configure it in this example, i.e. we leave it as default:

```
8950A.7.PXM.a > cnfaaa-priv
```

```
Syntax: cnfaaa-priv <CISCO_GP | SERVICE_GP | SUPER_GP | GROUP1 | ANYUSER
|
```

```
NOUSER_GP | default>
```

(NOTE: 'default' is same as NOUSER_GP.)

```
8950A.7.PXM.a > cnfaaa-priv default
```

AAA CONFIGURATION:

```
Authentication Methods : tacacs+ local cisco
Authorization Methods  : tacacs+ local cisco
Authorization Type     : group
Default Privilege Level : NOUSER_GP
Prompt Display        : acs
SSH/FTP Message Type  : Inbound ASCII Login
IOS Exclusion List     :
```

Step 8. Verify Configuration:

```
8950A.7.PXM.a > dspaaa
```

AAA CONFIGURATION:

```
Authentication Methods : tacacs+ local cisco
Authorization Methods  : tacacs+ local cisco
Authorization Type     : group
Default Privilege Level : NOUSER_GP
Prompt Display        : acs
SSH/FTP Message Type  : Inbound ASCII Login
```

IOS Exclusion List :

TACACS+ SERVERS: primary is shown first

IP Address	Port	Time Out	Dead Time	Single Conn	Shared Encryption Key
10.66.79.246	49	5	0	true	cisco

8950A.7.PXM.a > dspaaa-servers

TACACS+ SERVERS: primary is shown first

IP Address	Port	Time Out	Dead Time	Single Conn	Shared Encryption Key
10.66.79.246	49	5	0	true	cisco

Configuration on ACS

An example of the configuration required on ACS is shown here:

Step 1. Add the MGX as client on the ACS: (the name used here is PXM_MGX, can be anything)

Click on **Network Configuration**

(the name used here is PXM_MGX, can be anything)

The screenshot shows the Cisco ACS Network Configuration interface. On the left is a navigation menu with options: User Setup, Group Setup, Shared Profile Components, Network Configuration (selected), and System Configuration. The main area displays a table of existing clients:

Client Name	IP Address	Protocol
Srilatha_switch	10.76.79.206	TACACS+ (Cisco IOS)
Switch_zubair	10.76.79.205	TACACS+ (Cisco IOS)
test	172.16.153.188	TACACS+ (Cisco IOS)
tesw	10.10.10.3	TACACS+ (Cisco IOS)

Below the table are two buttons: "Add Entry" (with a mouse cursor over it) and "Search".

Step 2. Click **Add Entry** and configure client hostname

The screenshot shows the "Add AAA Client" configuration form. The navigation menu on the left is the same as in the previous screenshot. The form fields are:

- AAA Client Hostname:
- AAA Client IP Address:
- Shared Secret:

Step 3. Configure the IP address of the AAA client (**MGX** in this case) and the 'key' which must match with the MGX config (the key used here is 'cisco').

Network Configuration

AAA Client IP Address: 172.161.57.88

Shared Secret: cisco

RADIUS Key Wrap

Key Encryption Key:

Message Authenticator Code Key:

Key Input Format: ASCII Hexadecimal

Authenticate Using: TACACS+ (Cisco IOS)

- Single Connect TACACS+ AAA Client (Record stop in accounting on failure)
- Log Update/Watchdog Packets from this AAA Client
- Log RADIUS Tunneling Packets from this AAA Client
- Replace RADIUS Port info with Username from this AAA Client
- Match Framed-IP-Address with user IP address for accounting packets from this AAA Client

Submit Submit + Apply Cancel

Click **Submit+Apply**

Step 4. Configure a USER. Click on **User Setup**. The user here is called 'mgx_test' . Click **Add/Edit**, after typing in a new username

User Setup

User: mgx_test

Find Add/Edit

List users beginning with letter/number:

A	B	C	D	E	F	G	H	I	J	K	L	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	1	2	3	4	5	6	7	8	9			

List all users

Remove Dynamic Users

Back to Help

Step 5. Configure a password for the user. We configure a password "cisco" in this example

The screenshot shows the Cisco User Setup interface. On the left is a navigation menu with options: User Setup, Group Setup, Shared Profile Components, Network Configuration, System Configuration, Interface Configuration, Administration Control, External User Databases, Posture Validation, Network Access Profiles, Reports and Activity, and Online Documentation. The main content area is titled "User Setup" and shows the configuration for a new user named "mgx_test".

User: mgx_test (New User)

Account Disabled

Supplementary User Info ?

Real Name

Description

User Setup ?

Password Authentication:
ACS Internal Database

CiscoSecure PAP (Also used for CHAP/MS-CHAP/ARAP, if the Separate field is not checked.)

Password

Confirm Password

Generate CHAP/MS-CHAP/ARAP

Step 6. Setup the Privilege level of the user under **Shell (exec)**. Here the user is given privilege level 12 or Service_GP.

Note: This is the main difference with IOS authentication. With PXM we are not assigning enable privilege, rather we are assigning shell (exec) privilege to the user.

The screenshot shows the "Shell (exec)" configuration section in the Cisco User Setup interface. The configuration options are:

- Shell (exec)
- Access control list
- Auto command
- Callback line
- Callback rotary
- Idle time
- No callback verify
- No escape
- No hangup
- Privilege level
- Timeout
- Custom attributes

On the right side of the configuration options, there are several checkboxes and input fields:

- Enabled
- Enabled
- Enabled
- Privilege level
- 12

Click **Submit** to commit the changes.

Verify

Telnet to MGX and ensure the user get the privilege level we configured on the ACS server (i.e. SERVICE_GP or privilege level 12):

```
aptcwm02% telnet 172.16.157.88
Trying 172.16.157.88...
Connected to 172.16.157.88.
Escape character is '^]'.
Username: mgx_test
Password: cisco
```

```
8950A.7.PXM.a > who
```

Port	Slot	Idle	UserId	Access	From

console	7	0:00:14	cisco	CISCO_GP	console port
20:55:29	JUL28				
telnet.01 *	7	0:00:00	mgx_test	SERVICE_GP	10.66.69.126
21:04:11	JUL28	<<<			

Check the AAA stats to see TACACS+ authentication happening:

```
8950A.7.PXM.a > dspaaa-stats
```

```
Last cleared on: 07/28/2005 17:55:42 (PST)
```

```
Last good login authen: mgx_test      telnet.01      10.66.69.126
                        tacacs+      10.66.79.246/49
                        07/28/2005 21:27:34 (PST)
Last good grp priv:    mgx_test      telnet.01      10.66.69.126
                        tacacs+      10.66.79.246/49
                        07/28/2005 21:27:34 (PST)
Last failed cmd:      NONE
```

Type <CR> to continue, Q<CR> to stop:

```
____SWITCH LEVEL COUNTS____
Method:                cisco                local
TACACS
# authen failures:     0                18                0
# grp author failures: 0                0                0
# cmd author failures: 0                -----          0
# authen falls back to: 0                32                0
# author falls back to: 0                1                0
```



```

# authen unreachable:  -----  -----  0
# author unreachable:  -----  -----  0
# challenges RX:       -----  -----  0
# socket throttles:   -----  -----  0
# Messages TX:        -----  -----  9
# Messages RX:        -----  -----  9
# Messages Flushed:   -----  -----  0
# Abort Messages Sent: -----  -----  0
# Supported AVPs RX:   -----  -----  2
# Unsupported AVPs RX: -----  -----  0
# Unknown AVPs RX:    -----  -----  0

```

Type <CR> to continue, Q<CR> to stop:

_____TACACS+ SERVER LEVEL COUNTS_____

```

Server IP Address:      10.66.79.246      0.0.0.0
0.0.0.0
Server Port:           49                0                0
# authen failures:     0                0                0
# cmd author failures: 0                0                0
# authen falls back to: 0                0                0
# author falls back to: 0                0                0
# authen unreachable:  0                0                0
# author unreachable:  0                0                0
# challenges RX:       0                0                0
# Messages TX:         9                0                0
# Messages RX:         9                0                0
# Messages Flushed:    0                0                0
# Abort Messages Sent: 0                0                0
# Supported AVPs RX:   2                0                0
# Unsupported AVPs RX: 0                0                0
# Unknown AVPs RX:    0                0                0
Avg Response Delay:    9                0                0
Max Response Delay:   15               0                0

```

The following commands are related to TACACS on MGX:

M7.8.PXM.a > ? aaa

Available commands

```

cnfaaa-authen
cnfaaa-author
cnfaaa-ftpssh
cnfaaa-ignore-ios
cnfaaa-priv
cnfaaa-prompt
cnfaaa-server
delaaa-server
dspaaa
dspaaa-servers
dspaaa-stats
dspaaa-tac-trace

```

setaaa-tac-trace

Related Information

- [Cisco MGX 8800/8900 Series Software Configuration Guide, Release 5.4](#)
- [Technical Support & Documentation - Cisco Systems](#)