RAISECOM
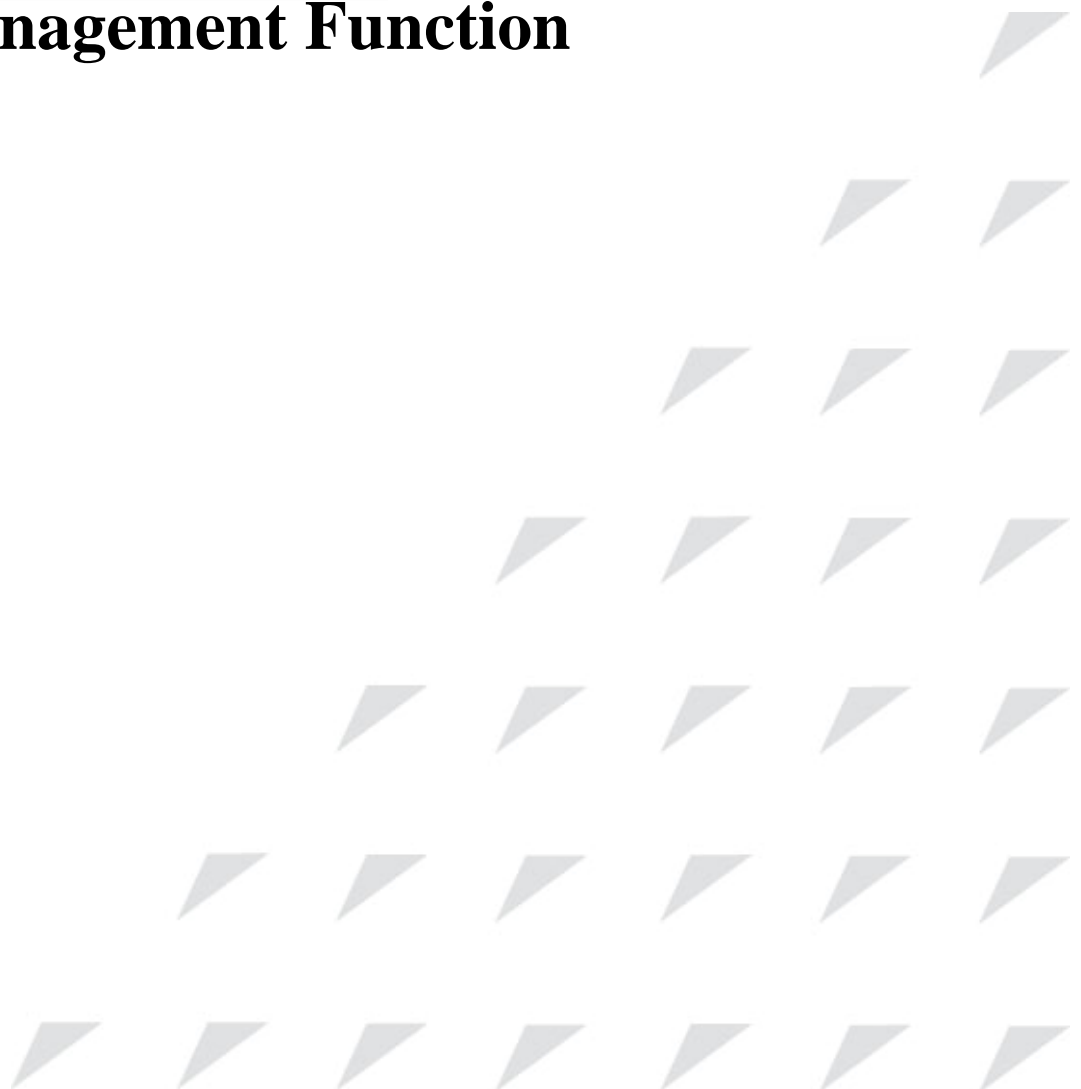
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Cluster Management Function

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If you have comments on the … specification, instead of the web page above, please send comments to:

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We hope to hear from you!

CONTENTS

Release Notes

Date of Release	Manual Version	Software Version	Revisions

Preface

About This Manual

This manual introduces primary functions of the configuration management software for RC series products.

Who Should Read This Manual

This manual is a valuable reference for sales and marketing staff, after service staff and telecommunication network designers. For those who want to have an overview of the features, applications, structure and specifications of … device, this is also a recommended document.

Relevant Manuals

《Raisecom NView System User Manual》

《Raisecom Nview System Installation and Deployment Manual》

《… User Manual》

《… Commands Notebook》

Organization

This manual is an introduction of the main functions of … EMS. To have a quick grasp of the using of the EMS of … , please read this manual carefully. The manual is composed of the following chapters

Chapter 1 Overview

This chapter briefly introduces the basic function of …

Chapter 2 Configuration Management

This chapter mainly introduces the central site configuration management function of the ….

Chapter 3 Performance Management

This chapter focuses on performance management function of ….

Chapter 4 Device Maintenance Management

This chapter introduces the device maintenance management function of ….

Appendix A Alarm Type

The alarm types supported by ….

Compliance

The RC series products developed by Raisecom are strictly complied with the following standards as well as ITU-T, IEEE, IETF and related standards from other international telecommunication standard organizations:

YD/T900-1997 SDH Equipment Technical Requirements - Clock

YD/T973-1998 SDH 155Mb/s and 622Mb/s Technical conditions of optical transmitter module and receiver module

YD/T1017-1999 Network node interface for the Synchronous Digital Hierarchy (SDH)

YD/T1022-1999 Requirement of synchronous digital hierarchy (SDH) equipment function

YD/T1078-2000 SDH Transmission Network Technique Requirements-Interworking of Network Protection Architectures

YD/T1111.1-2001 Technical Requirements of SDH Optical Transmitter/Optical Receiver Modules——2.488320 Gb/s Optical Receiver Modules

YD/T1111.2- 2001 Technical Requirements of SHD Optical Transmitter/Optical Receiver Modules——2.488320 Gb/s Optical Transmitter Modules

YD/T1179- 2002 Technical Specification of Ethernet over SDH

G.703 Physical/electrical characteristics of hierarchical digital interfaces

G.704 Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels

G.707 Network node interface for the synchronous digital hierarchy (SDH)

G.774 Synchronous digital hierarchy (SDH) - Management information model for the network element view

G.781 Synchronization layer functions

G.783 Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks

G.784 Synchronous digital hierarchy (SDH) management

G.803 Architecture of transport networks based on the synchronous digital hierarchy (SDH)

G.813 Timing characteristics of SDH equipment slave clocks (SEC)

G.823 The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy

G.825 The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)

G.826 End-to-end error performance parameters and objectives for international, constant bit-rate digital paths and connections

G.828 Error performance parameters and objectives for international, constant bit-rate synchronous digital paths

G.829 Error performance events for SDH multiplex and regenerator sections

G.831 Management capabilities of transport networks based on the synchronous digital hierarchy (SDH)

G.841 Types and characteristics of SDH network protection architectures

G.842 Interworking of SDH network protection architectures

G.957 Optical interfaces for equipments and systems relating to the synchronous digital hierarchy

G.691 Optical interfaces for single channel STM-64 and other SDH systems with optical amplifiers

G.664 Optical safety procedures and requirements for optical transport systems

I.731 ATM Types and general characteristics of ATM equipment

I.732 ATM Functional characteristics of ATM equipment

IEEE 802.1Q Virtual Local Area Networks (LANs)

IEEE 802.1p Traffic Class Expediting and Dynamic Multicast Filtering

IEEE 802.3 CSMA/CD Access Method and Physical Layer Instruction

Chapter 1 Cluster Management Function

1.1 Cluster management introduction

1.1.1 Cluster definition

Using cluster management function, network administrator can manage several switches through the public IP address of a main switch. The main switch will be command equipment, while other switches under administration will be member equipments. The member equipment will not be configured IP address usually, use management equipment redirection to manage and maintain the member equipments.

1.1.2 Cluster role

The position and function of the switch are different in the cluster, so different switch has different role in the cluster. The switches can be commander, member and candidate.

● Commander equipment: the commander has public IP address, provides the management interface for all the switches in the cluster. Commander uses command redirection to manage the members: users send the management command to the commander through public network, and the commander will handle the command, if the commander finds that this command is for other members it will send the commands to members. Commanders have the functions: discover neighbor Raisecom switches, collect the network topology, cluster management, maintaining cluster status, and support different proxy.

● Member equipment: cluster members do not have IP address. User uses the command redirection function to manage the device. Member device has the functions including discovering neighbor, receiving the management info of commander, executing the proxy command, failure/log report function. Once the member is active, it can be managed by network commander.

● Candidate equipment: the switch does not join any cluster but do have cluster capability, it can be member.

1.1.3 Cluster principle

There are three main cluster protocols: RNDP (Raisecom Neighbor Discover Protocol), RTDP (Raisecom Topology Discover Protocol) and RCMP (Raisecom Cluster Management Protocol). RNDP is in charge of neighbor discovery and information collection, RTDP is in charge of the collecting and processing topology information, RCMP is in charge of the functions like adding, active, and deleting cluster members. RTDP and RCMP protocol communicate with each other in VLAN 2. So if there is no such a device that supports Raisecom cluster management functions between two cluster management devices. It needs proper configuration for VLAN2 to make sure normal communication between RTDP and RCMP.

Each cluster has to designate a commander. When commander is designated, it can discover candidates by RNDP and RTDP.

When candidate is added to the cluster, it becomes a member; user has to active this switch by cluster management function, or by configuring automatically active function on the switch to active the cluster function.

1.2 Configure RNDP function

1.2.1 Default RNDP function configuration

By default, the command configuration is as follows:

Function	Default configuration
Enable/disable global RNDP function	Enable the switch RNDP and all the port's RNDP

1.2.2 Configure RNDP function

1.2.2.1 Enable global RNDP

In global configuration mode enable or disable global RNDP function, by default the system RNDP function is enabled, all the ports take part in RNDP judgment and discovery.

Step	Command	Description
1	config	Enter global configuration mode
2	rndp {enable	disable}	Enable/disable RNDP globally
3	exit	Return to privileged EXEC mode
4	show rndp	Show RNDP configuration

1.2.2.2 Enable RNDPP port

To enable/disable port RNDP function in port configuration mode, by default all the ports take part in RNDP judgment and discovery.

Step	Command	Description
1	**config**	Enter global configuration mode
2	**interface port <1-26>**	Enter port configuration mode
3	**rndp {enable	disable}**	Enable/disable port RNDP
4	**exit**	Return to global configuration mode

| 5 | **exit** | Return to privileged EXEC mode |
| 6 | **show rndp** | Show RNDP configuration |

1.2.3 Monitoring and maintenance

Use command **show** to monitor and maintain RNDP.

Command	Description
show rndp	Show RNDP configuration information
show rndp neighbor	Show RNDP neighbor information

1.2.4 Typical configuration example

Topology structure is as follows:

Fig 1 topology structure

As is shown in figure 1, connect SwitchA and SwitchB, enable all the ports RNDP for SwitchA, enable all the ports RNDP for SwitchB.

SwtichA configuration is show below:

Raisecom#**config**

Raisecom(config)#**interface range 1-26**

Raisecom(config-range)#**rndp enable**

Raisecom(config-range)#**exit**

Raisecom(config)#**exit**

Raisecom#**show rndp**

Raisecom#**show rndp neighbor**

Global RNDP feature: Enabled

Participant ports: 1-26

Switch A

MAC Address   LocalPort   RemotePort   SysID   Hostname

000E.5E03.5318   6   4   6001E   ISCOM2926

SwitchB configuration is as follows:

Raisecom#**config**

Raisecom(config)# **rndp enable**

Raisecom(config)#**interface range 1-26**

Raisecom(config-range)#**rndp enable**

Raisecom(config-range)#**exit**

Raisecom(config)#**exit**

Raisecom#**show rndp**

Raisecom #**show rndp neighbor**

Global RNDP feature: Enabled

Participant ports: n/a

MAC Address   LocalPort   RemotePort   SysID   Hostname

000E.5E00.C8D9   4   6   60002   ISCOM3026

1.3 RTDP function configuration

1.3.1 Default RTDP function configuration

By default, the command configuration is as follows:

Function	Default configuration
Enable/disable RTDP collection function	Disabled
RTDP collection range	The maximum RTDP collection range is 16 hop.

1.3.2 RTDP function configuration

1.3.2.1 Enable RTDP

Under global configuration mode, user can enable or disable RTDP function, RTDP is disabled by default. If RTDP is enabled, RTDP will collect all the information of Raisecom switch which RNDP function is enabled.

Step	Command	Description
1	**config**	Enter global configuration mode
2	**rtdp** {**enable** | **disable**}	Enable or disable RTDP collection.
3	**exit**	Exit to privilege EXEC mode.
4	**show rtdp**	Show RTDP collection.

1.3.2.2 RTDP collection range

In global configuration mode, configure RTDP collection range, by default RTDP can collect the equipment information within 16 hop.

Step	Command	Description
1	**config**	Enter global configuration mode
2	**rtdp max-hop** <1-16>	Configure RTDP collection range
3	**exit**	Return to privileged EXEC mode
4	**show rtdp**	Show RTDP configuration

1.3.3 Monitoring and maintenance

Use command **use** to monitor and maintain RTDP.

Command	Description
show rtdp	Show RTDP configuration information
show rtdp device-list [*HHHH.HHHH.HHH* | *hostname*] [**detailed**]	Show RTDP discovery equipment list information

1.3.4 Typical configuration example

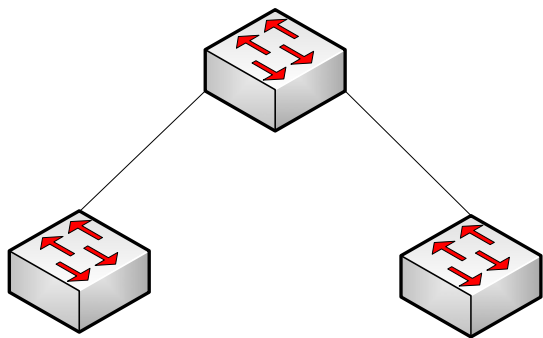The topology structure is shown below:

Fig 2 topology structure

As is shown in figure 2, connect the port of SwitchA with the port of SwitchB and SwitchC respectively, on SwitchA configure RTDP enabled and the collection range to 3, configure SwitchB to RTDP enabled, SwtichC to RTDP disabled.

SwitchA configuration is as follows:

Raisecom#**config**

Raisecom(config)#**rtdp enable**

Raisecom(config)#**rtdp max-hop 3**

Raisecom(config) #**exit**

Raisecom #**show rtdp**

Raisecom#**show rtdp device-list detailed**   Switch B

RTDP max-hop: 3

RTDP collecting feature: Enabled

RTDP reporting feature: Enabled

MAC Address   RcvdPort   Hop   SysID   Hostname

000E.5EBD.5951   8   1   60011   ISCOM2009

  -Device cluster information:

    Idendity: Candidate

    Autoactive: Disabled

  -Device adjacency information:

    Mac Address   LocalPort   RemotePort

    000E.5E00.C8D9   8   2

000E.5E03.5318   6   1   6001E   ISCOM2926

   -Device cluster information:

     Idendity: Candidate

     Autoactive: Disabled

   -Device adjacency information:

     Mac Address   LocalPort   RemotePort

     000E.5E00.C8D9   6   4

SwitchB configuration is as follows:

Raisecom#**config**

Raisecom(config)#**rtdp enable**

Raisecom(config) #**exit**

Raisecom #**show rtdp**

Raisecom#**show rtdp device-list detailed**

RTDP max-hop: 16

RTDP collecting feature: Enabled

RTDP reporting feature: Enabled

MAC Address   RcvdPort   Hop   SysID   Hostname

000E.5EBD.5951   4   2   60011   ISCOM2009

   -Device cluster information:

     Idendity: Candidate

     Autoactive: Disabled

   -Device adjacency information:

     Mac Address   LocalPort   RemotePort

     000E.5E00.C8D9   8   2

000E.5E00.C8D9   4   1   60002   ISCOM3026

-Device cluster information:

    Idendity: Candidate

    Autoactive: Disabled

-Device adjacency information:

    Mac Address   LocalPort RemotePort

    000E.5E03.5318   4   6

    000E.5EBD.5951   8   2

SwitchC configuration is as follows:

Raisecom#**config**

Raisecom(config)#**rtdp disable**

Raisecom(config) #**exit**

Raisecom #**show rtdp**

RTDP max-hop: 16

RTDP collecting feature: Disabled

RTDP reporting feature: Enabled

1.4 Cluster management function configuration

1.4.1 Default cluster management function configuration

Command	Default configuration
Disable or enable cluster management	Disable cluster management function
Disable or enable cluster management	Automatically active function disabled
Configure the MAC address of automatically active command switch	Default configuration is 0000.0000.0000。

1.4.2 Cluster management equipment function configuration

1.4.2.1 Enable/disable cluster management

By default system cluster management is disabled. With the steps below user can disable/enable cluster management, the command is used in the switch that has been command device.

Step	Command	Description
1	config	Enter global configuration mode
2	cluster	Enable cluster management function
3	exit	Return to global configuration mode
4	exit	Return to privileged EXEC mode
5	show cluster	Show cluster related information

1.4.2.2 Enable automatically active function

By using automatically active function and the configuring MAC address of the command switch that automatically active belongs to, when the equipment has connected to the network, it can be activated by the command switch it belongs to automatically. By default the system automatically active function is disabled. Follow the steps below to enable or disable automatically active function:

Step	Command	Description
1	config	Enter global configuration mode
2	[no] cluster-autoactive	Disable/enable automatically active function
3	[no] cluster-autoactive commander-mac *HHHH.HHHH.HHHH*	Configure the MAC address of the command switch that automatically function belongs to
4	exit	Return to privileged EXEC mode
5	show cluster	Show cluster related information

1.4.3 Cluster member equipment function configuration

Add and active all the candidate member

For the convenience of user add and active operation to cluster member, the command allows user to use the same username and password to add & active, or add and active all the candidate members that is configured automatically active function by the command switch, and add & active all the candidate member one by one driven by commands.

Step	Command	Description
1	**config**	Enter global configuration mode
2	**cluster**	Enter cluster management mode
3	**member auto-build** [{**active** *username password*}| {**active** *username password* **all**}]	Add all the candidate member; Active means activate all the candidate members; Username activated user's uername; Password activated user's password; All add and activate all the members
4	**exit**	Return to global configuration mode
5	**exit**	Return to privileged EXEC mode
6	**show cluster member**	Show cluster member related information.

⚠ Notice:

➢ Automatically add and activate all the candidate members that are configured activated by current command switch, the members can use command **member auto-build**. With the command, use **member auto-build active** *username password* to add and activate all the candidate members one by one. Use command **member auto-build active** *username password* **all.**

1.4.4 Add and activate cluster member

In cluster management mode, user can add the equipment that needs cluster management and

activate it. When the equipment is added into the cluster but not activated, it can not manage the equipment the equipment through cluster management function. User can follow the steps below to add member to the cluster and activate it.

Step	Command	Description
1	**config**	Enter global configuration mode
2	**cluster**	Enter cluster management mode
3	**member** *HHHH.HHHH.HHHH* **active** [*username password*]	Add a candidate member to the cluster; Active: activate the added equipment Username: activate the username that the equipment uses; Password: the password that is used to activated the quipment;
4	**exit**	Return to global configuration mode
5	**exit**	Return to privileged EXEC mode
6	**show cluster member** [*HHHH.HHHH.HHHH*]	Show cluster member related information

1.4.5 Delete and suspend cluster member

1.4.5.1 Delete cluster member

In cluster management mode, user can delete the equipment that needs not cluster management. Follow the steps below to delete cluster member:

Step	Command	Description
1	**config**	Enter global configuration mode
2	**cluster**	Enter cluster management mode.

3	no member {*HHHH.HHHH.HHHH* | **all**}	Delete one or all the members; HHHH.HHHH.HHHHis the member's MAC address that will be deleted. All: delete all the members;
4	**exit**	Exit to global configuration mode.
5	**exit**	Exit to privilege EXEC mode
6	**show cluster member**	Show cluster member information

1.4.5.2 Suspend cluster member

In cluster management mode, user can suspend the member which is in active mode, but it has not been deleted from the cluster. When the device is suspended, user cannot manage the device by cluster management any more. Follow the steps below to active cluster member:

Step	Command	Description
1	**config**	Enter global configuration mode.
2	**cluster**	Enter cluster management mode
3	**member** *HHHH.HHHH.HHHH* **suspend**	Suspend cluster member. HHHH.HHHH.HHHH stands for the MAC address of the device that will be suspended. Suspend is the key word to be suspended.
4	**exit**	Exit to global configuration mode.
5	**exit**	Exit to privilege EXEC mode.
6	**show cluster member**	Show cluster member information.

1.4.6 Cluster member remote access

In cluster management mode, user can remotely manage the members which have been active, refer following commands:

Step	Command	Description
1	**config**	Enter global configuration mode
2	**cluster**	Enter cluster management mode
3	**rcommand** { *hostname* | *HHHH.HHHH.HHHH* }	Login cluster member, the hostname is the member name, HHHH.HHHH.HHHH is the MAC address of the member.

1.4.7 Monitoring and maintenance

Use command **show** to realize the monitoring and maintenance of cluster management function.

Step	Command	Description
1	**show cluster**	Show cluster information
2	**show cluster member** [*HHHH.HHHH.HHHH*]	Show cluster member information
3	**Show cluster candidate**	Show cluster candidate information

Use show cluster to check current cluster relevant information:

Raisecom# **show cluster**

Use **show cluster member** [HHHH.HHHH.HHHH] to check particular cluster member or all the member information:

Raisecom# **show cluster member**

Use **show cluster candidate** to check candidates' information:

Raisecom# **show cluster candidate**

1.4.8 Typical configuration example
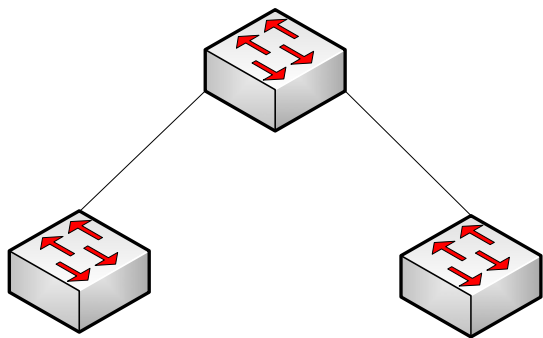
The topology structure is shown below:

Fig 3 topology structure

As is shown in figure 3, SwitchA is set to cluster manager, SwitchB and SwitchC are added to cluster member. User can land to SwtichB and SwtichC on Switch.

SwitchA configuration is as follows:

Raisecom#**config**

Raisecom(config)#**rndp enable**

Raisecom(config)#**interface range 1-26**

Raisecom(config-range)#**rndp enable**

Raisecom(config-range)#**exit**

Raisecom(config)#**rtdp enable**   Switch B

Raisecom(config)#**cluster-autoactive**

Raisecom (config)#**cluster**

Raisecom (config-cluster)# **member auto-build active all raisecom**

Raisecom (config-cluster)#**exit**

Raisecom(config)**#exit**

Raisecom #**show cluster**

Raisecom#**show cluster member**

Identity:Commander

Current member number:2

Max member number:128

MAC Address	Operation	State	Hostname
000E.5EBD.5951	Up	Active	ISCOM2009
000E.5E03.023C	Up	Active	IS2926-53

SwitchB configuration is as follows:

Raisecom#**config**

Raisecom(config)#**rndp enable**

Raisecom(config)#**interface range 1-26**

Raisecom(config-range)#**rndp enable**

Raisecom(config-range)#**exit**

Raisecom(config)#**rtdp enable**

Raisecom(config)#**cluster-autoactive**

Raisecom(config)# **cluster-autoactive commander-mac 000e.5e03.5318**

Raisecom(config)#**exit**

Raisecom #**show cluster**

Identity:Member

Autoactive:ON

Autoactive commander mac:000e.5e03.5318

Commander mac:000e.5e03.5318

SwitchC configuration is as follows:

Raisecom#**config**

Raisecom(config)#**rndp enable**

Raisecom(config)#**interface range 1-9**

Raisecom(config-range)#**rndp enable**

Raisecom(config-range)#**exit**

Raisecom(config)#**rtdp enable**

Raisecom(config)#**cluster-autoactive**

Raisecom(config)# **cluster-autoactive commander-mac 000e.5e03.5318**

Raisecom(config)#**exit**

Raisecom #**show cluster**

Identity:Member

Autoactive:ON

Autoactive commander mac:000e.5e03.5318

Commander mac:000e.5e03.5318

SwitchA 登录到 SwitchB:

Raisecom#**config**

Raisecom(config)#**cluster**

Raisecom(config-cluster)# **rcommand ISCOM2009**

Login:**raisecom**

Password:

Hello, Welcome to Raisecom Switch Operating System(ROS) software .

Copyright (c) 2004-2006 Raisecom Technology Co., Ltd .

ISCOM2009>**enable**

Password:

ISCOM2009#**show cluster**

Identity:Member

Autoactive:ON

Autoactive commander mac:000e.5e03.5318

Commander mac:000e.5e03.5318

ISCOM2009#**exit**

Connection to host lost.