ECSS-10 Software Installation on Ubuntu 18.04 Operating System

About

Hardware platform

- Installation on productive industrial servers
- Support for installation on virtualization platforms
- Operating systems: Ubuntu 18.04 LTS, AstraLinux

Management

- 2xWeb-interfaces for management and monitoring (HTTPS)
- MML console
- Subscriber portal

Signaling

- SIP 2.0 (RFC 3261)
- SIP-T/SIP-I/SIP-Q
- H.248 (MEGACO)
- T.38, SNMP, RADIUS AAA

Video codecs

- H.263-1998
- H.264

Accounting

- CDR
- RADUIS AAA

* TDM Signaling support (SS7, DSS-1 PRI (Q.931)) available with additional gateways

About

Audio codecs

- G729(A/B)
- G711(A/U)
- G726
- L16
- G.722
- iLBC
- Speex
- GSM FR
- OPUS

Redundancy

- ”Active-Active” redundancy mode
- GEO-Backup support
- Upper-registration support (with SMG gateways)

Additional features

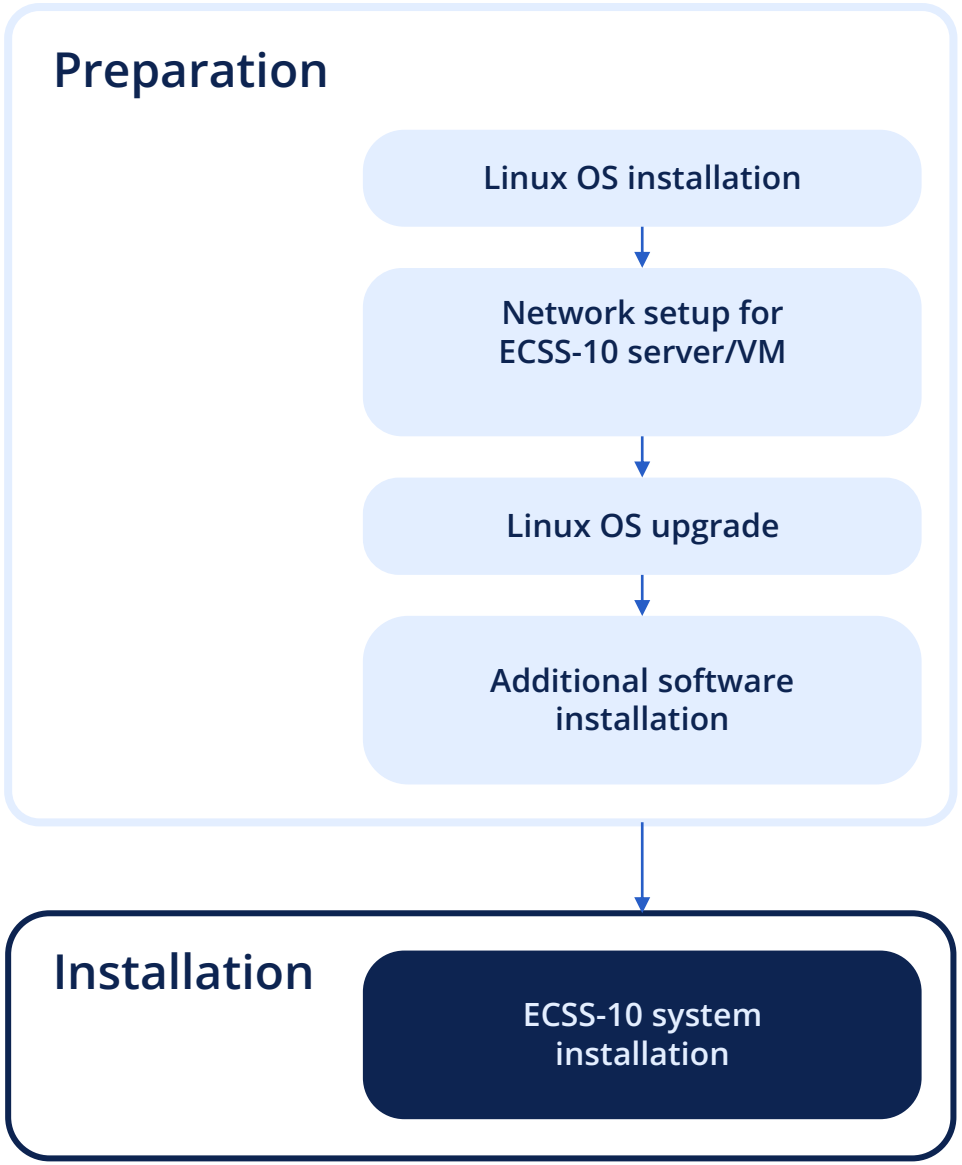
- SIP-registrar server
- Transcoding media streams
- Support for a wide range of VAS (Value Added Services)
- Hot software update
- Load balancing, trunk lines restrictions
- Black- and Whitelists on trunk line
- Support for geographically distributed media servers

Content

1. Server preparation steps
2. ECSS-10 software installation in «Active-Active» mode
3. ECSS-10 software installation in «W/o backup» mode
4. Additional software installation
5. Q/A

Server preparation steps

System installation



Server preparation steps

Preparation step 1. Ubuntu OS installation

- Install Ubuntu 18.04.0x server OS as required
- Set hostname for server#1 – ecss1, server#2 – ecss2
- Set any username and password exclude ssw (system username)
- Set up a network for remote work with the OS and Internet access
- Create the necessary disk partitions and LVM group
- Check documentation docs.eltex-co.ru – Softswitch ECSS-10

Server preparation steps

Preparation step 2. Ubuntu OS settings

Disable SWAP
And set up timezone

- sudo swapoff -a
- sudo rm /swap.img
- sudo timedatectl set-timezone Asia/Novosibirsk (example for city Novosibirsk (Russia))

Server preparation steps

Preparation step 2. Ubuntu OS settings

Set /etc/hosts for cluster mode

ecss1:

- 127.0.0.1 localhost
- 127.0.1.1 ecss1
- 192.168.1.22 ecss2

ecss2:

- 127.0.0.1 localhost
- 127.0.1.1 ecss2
- 192.168.1.21 ecss1

Example:

ecss1 has 192.168.1.21,
ecss2 — 192.168.1.22.

Server preparation steps

Preparation step 3. Ubuntu OS network setup

It necessary to setup network on both servers

- For hardware cluster recommended to setup bonding (LACP IEEE 802.3ad)
- Chose necessary network interfaces and VLAN`s
- Use Netplan (Ubuntu 18.04 LTS) for network configuration
- Check Internet access (only for installation period!)
- Check Netplan setting in details on docs.eltex-co.ru – Softswitch ECSS-10

Server preparation steps

Preparation step 4. Ubuntu OS packets setup

Connect Eltex repository with ECSS-10 Softswitch packets

```
sudo sh -c "echo 'deb [arch=amd64]
http://archive.eltex.org/ssw/bionic/3.14 stable main extras
external' > /etc/apt/sources.list.d/eltex-ecss10-stable.list"
```

And register repository keys

```
sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys
33CB2B750F8BB6A5
```

*For AstraLinux OS installation other repo addresses in use (check the documentation)

Server preparation steps

Preparation step 4. Ubuntu OS packets setup

Upgrade OS

sudo apt update
sudo apt upgrade

Install required service software

sudo apt install
ntp tcpdump vlan dnsmasq

Server preparation steps

Preparation step 4. Ubuntu OS packets setup

Install

List of additional software for debugging (optional)

sudo apt install aptitude atop ethtool htop iotop mc minicom mtr-tiny nmap pptpd pv screen ssh tftpd vim sngrep tshark cpanminus gnuplot libgraph-easy-perl debconf-utils

Software for «Active-Active» mode

sudo apt install

ifenslave-2.6 keepalived attr

Additional software for «Active-Active» mode

sudo apt install

bridge-utils ethtool

Server preparation steps

Preparation step 5. Check the OS installation and packet list

To check installed ecss packages use

dpkg --get-selections | grep ecss

*instead ecss you can use any key-word to find any packages

*no packets installed with empty output on display

Check that the first-time installation are occurred!

Some packages should be to remove before you will try install ecss again.

For e.g., delete MySQL working directories

sudo rm -R /var/lib/mysql/

ECSS-10 software installation in «Active-Active» mode

Installation scheme

Install ECSS-10 software “Step-by-step” in different distribution schemes

1. Active-Active mode (server 1)

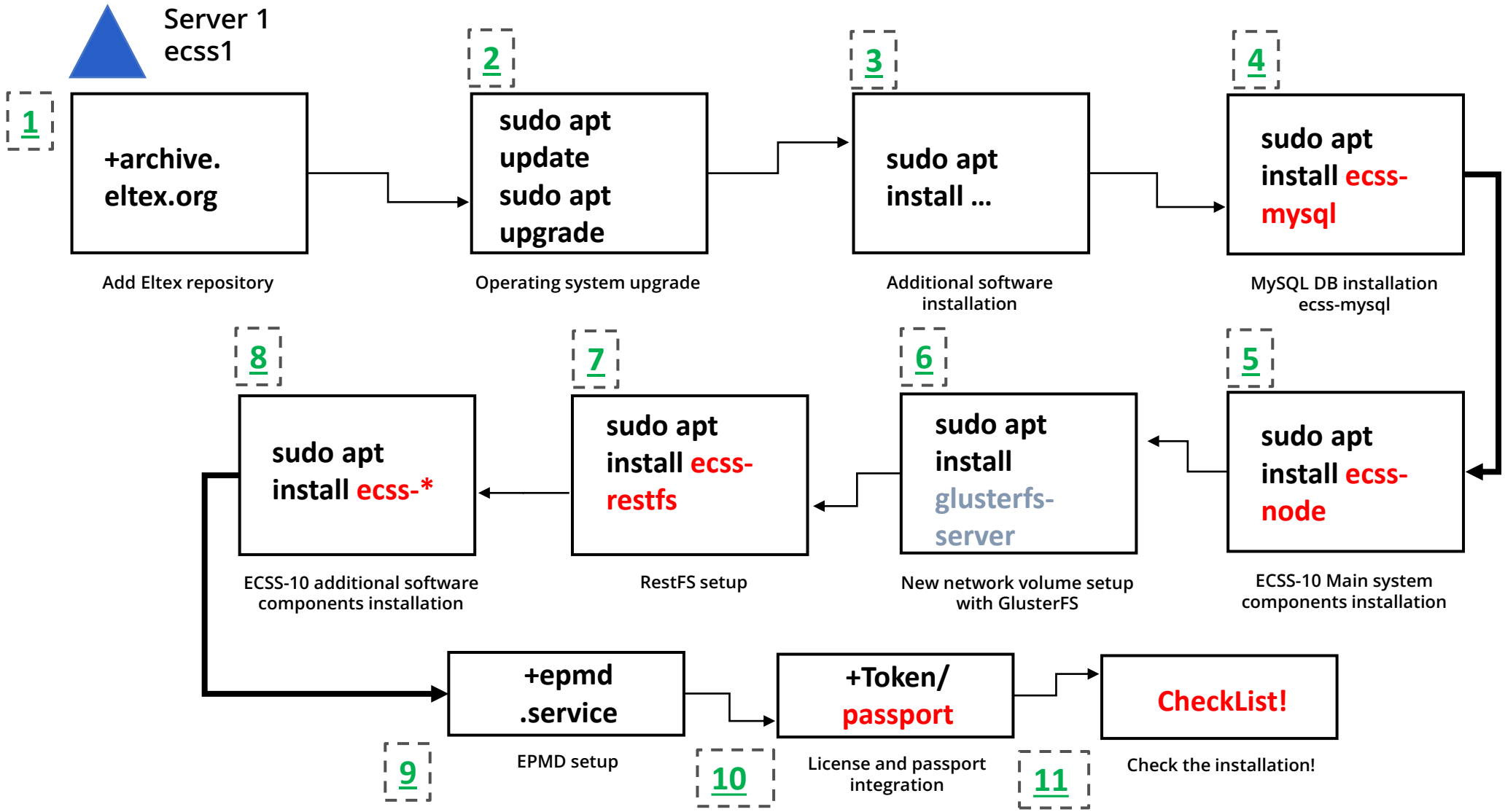
1.2 Active-Active mode (server 2)

2. Replication settings SIP and MySQL addresses based on Keepalived and VRRP

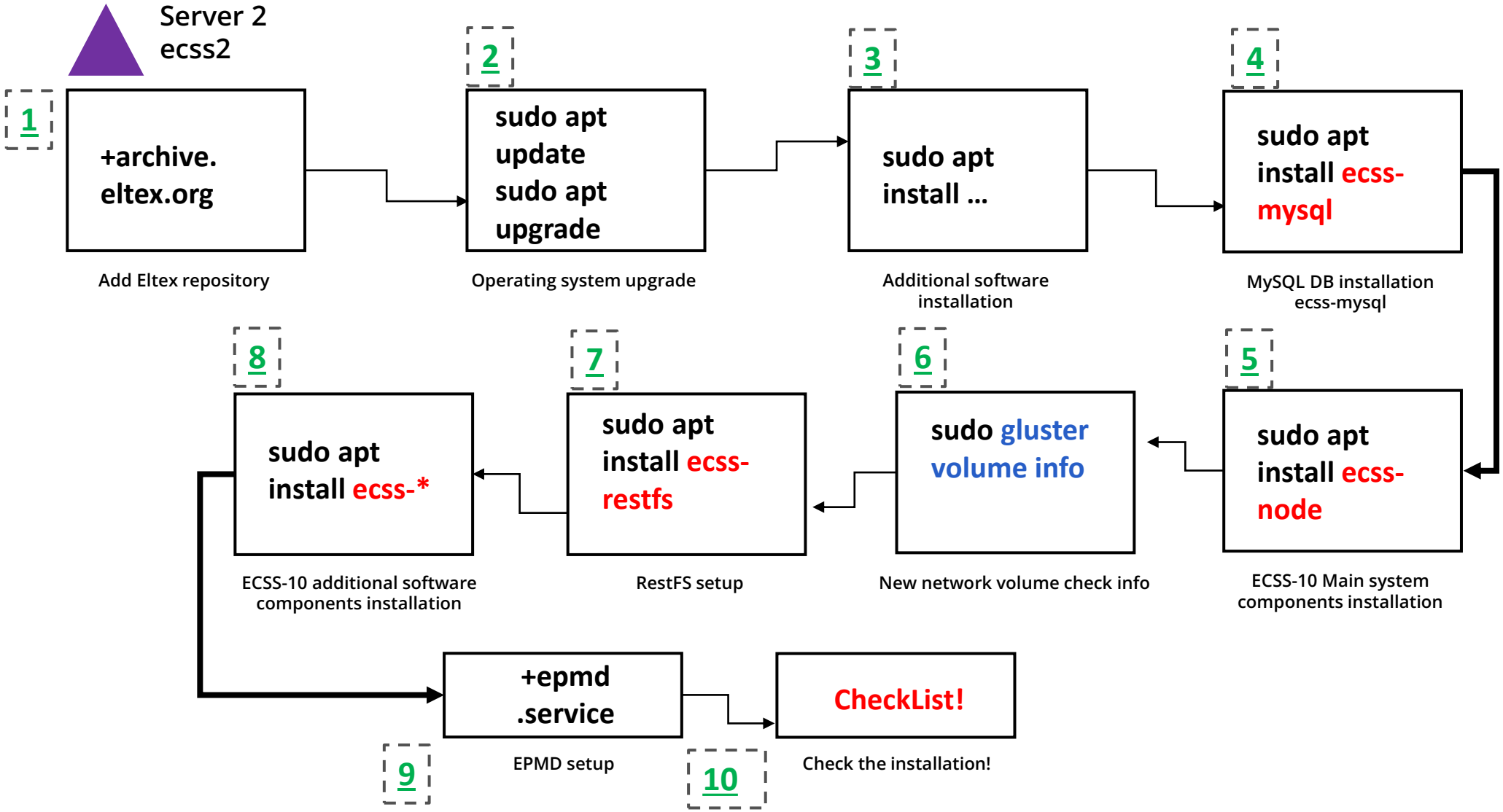
3. Example for virtual IP addresses for SIP

4. W/o backup mode settings

ECSS-10 software installation in «Active-Active» mode

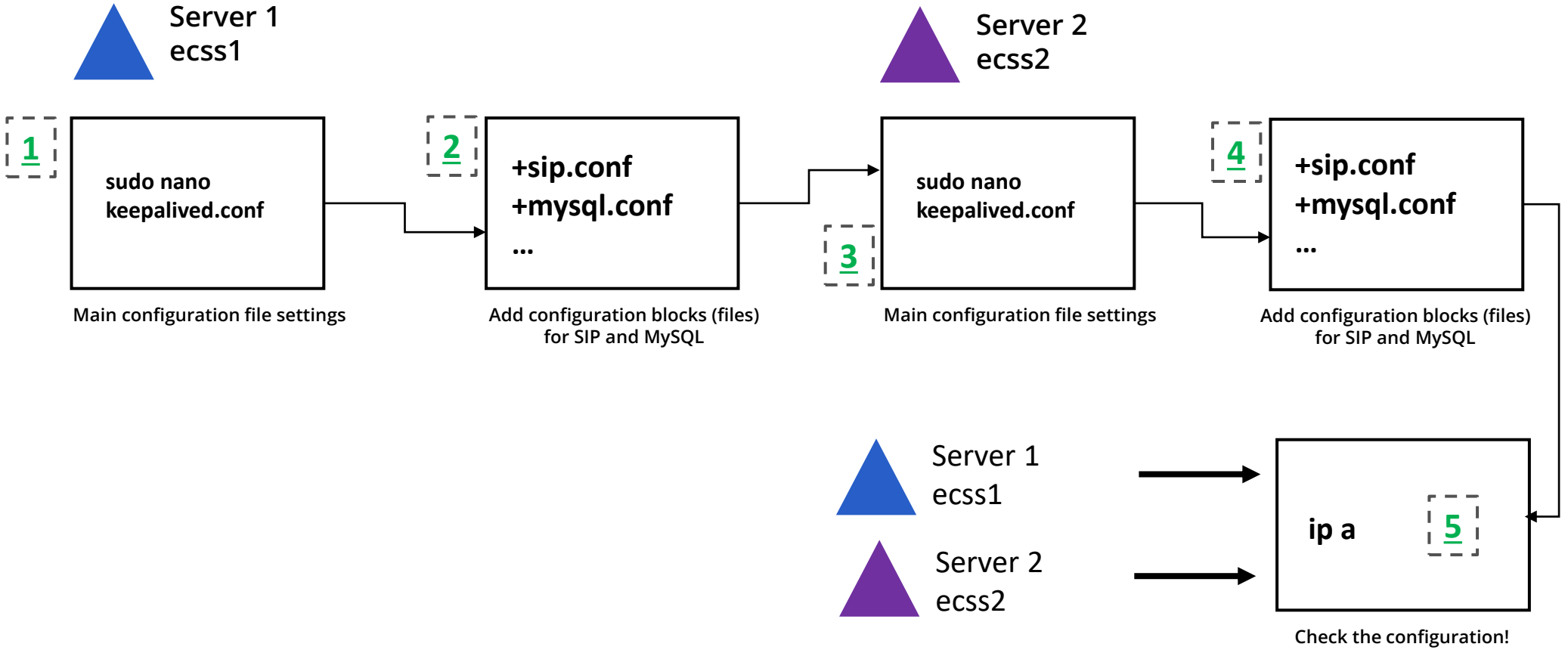


ECSS-10 software installation in «Active-Active» mode



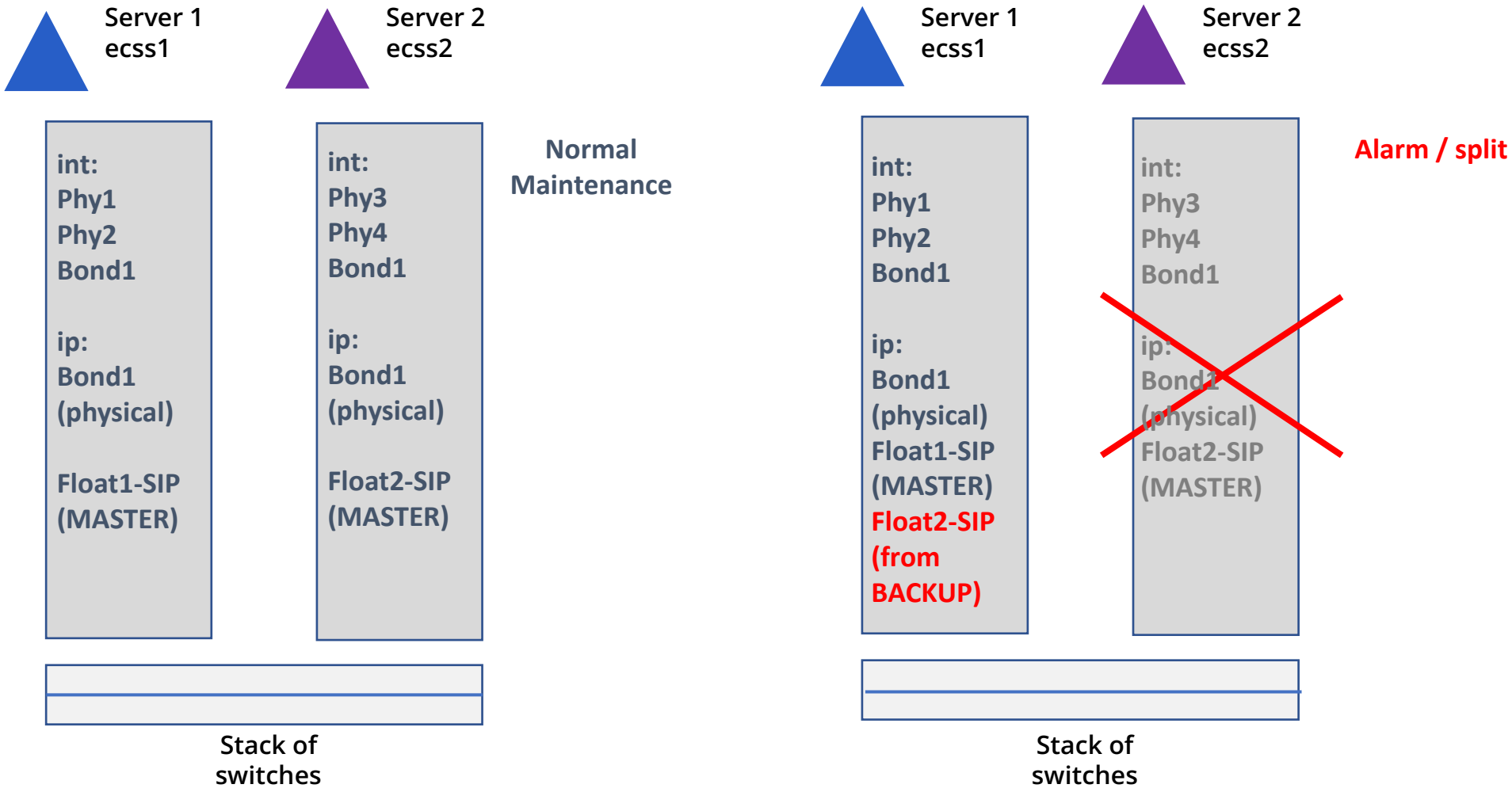
ECSS-10 software installation in «Active-Active» mode

Replication settings

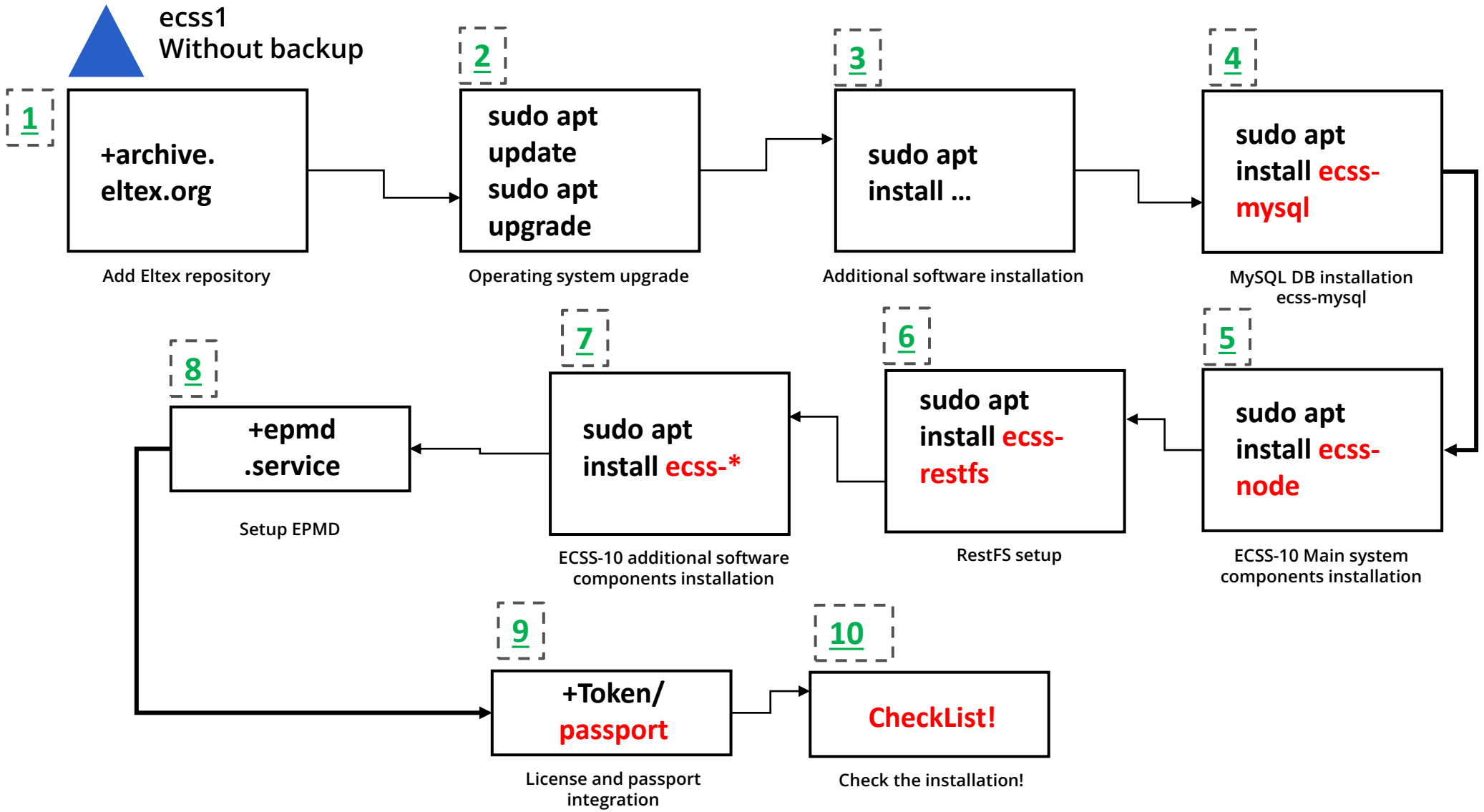


ECSS-10 software installation in «Active-Active» mode

Replication settings - example



ECSS-10 software installation in «W/o backup» mode



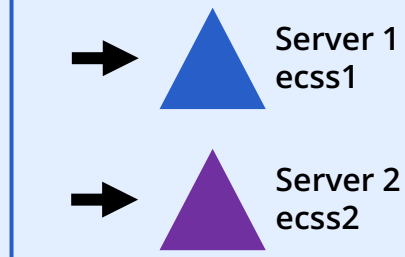
ECSS-10 software installation in «Active-Active» mode

Step 1

Installation starts with special data base package – ecss-mysql

sudo apt install ecss-mysql

Execute to:



ECSS-10 software installation in «Active-Active» mode

Step 1

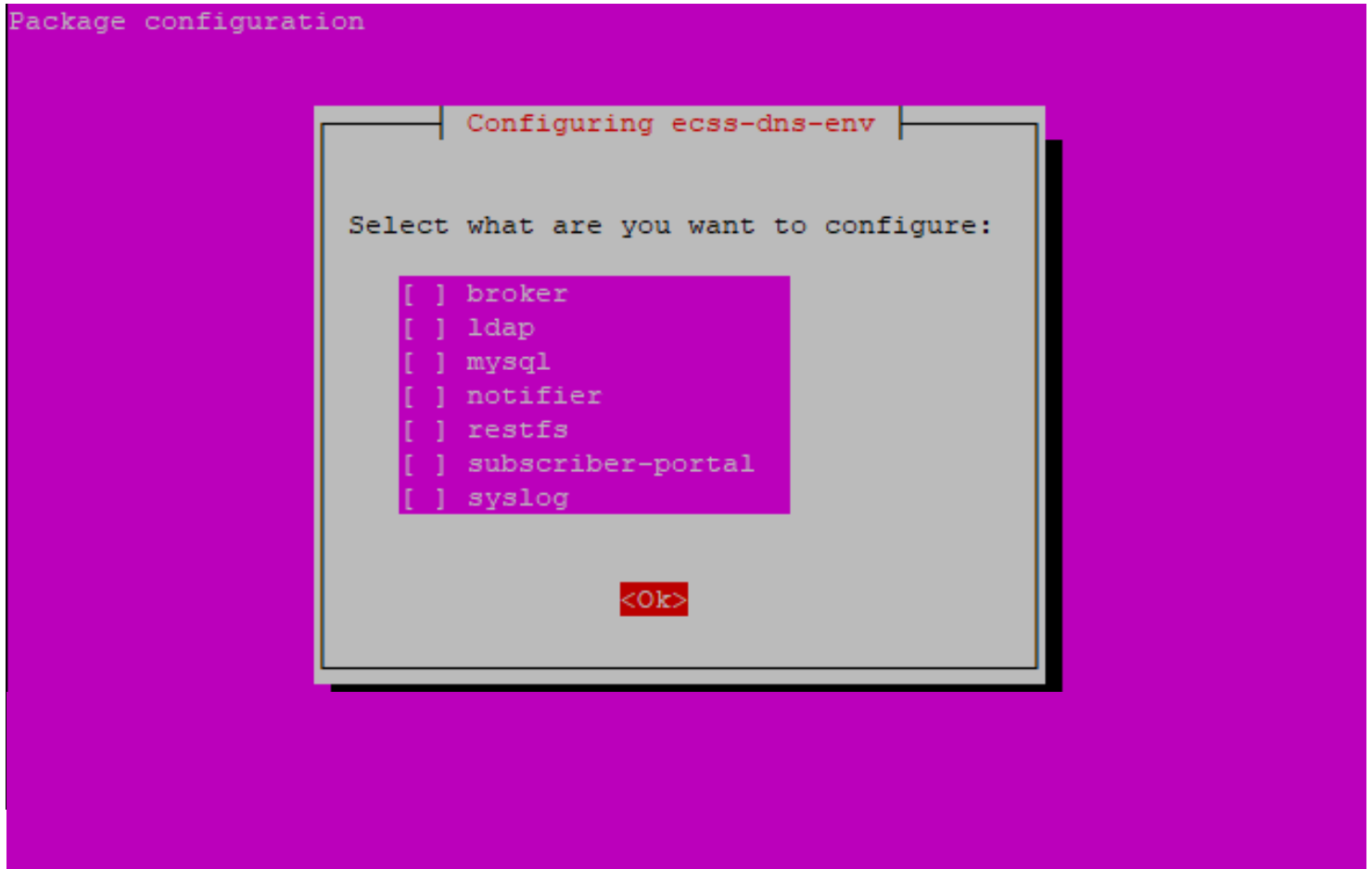
List of databases as the result of package installation

mysql> SHOW DATABASES;

```
+--------------------+
| Database           |
+--------------------+
| information_schema |
| ecss_address_book  |
| ecss_audit         |
| ecss_calls_db      |
| ecss_dialer_db     |
| ecss_meeting_db    |
| ecss_numbers_db    |
| ecss_statistics    |
| ecss_subscribers   |
| ecss_system        |
| history_db         |
| mysql              |
| performance_schema |
| sys                |
| web_conf           |
+--------------------+
```

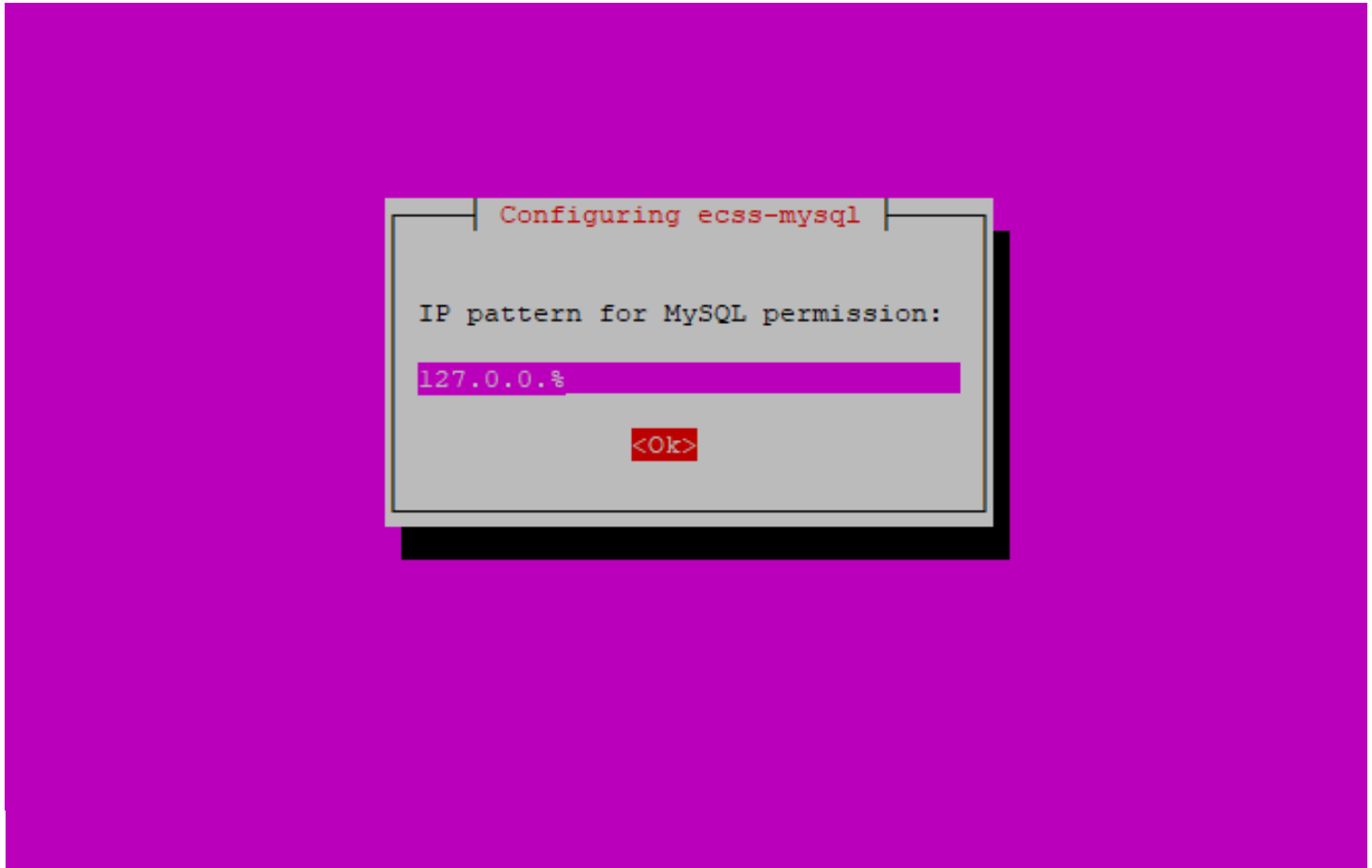
ECSS-10 software installation in «Active-Active» mode

Step 1



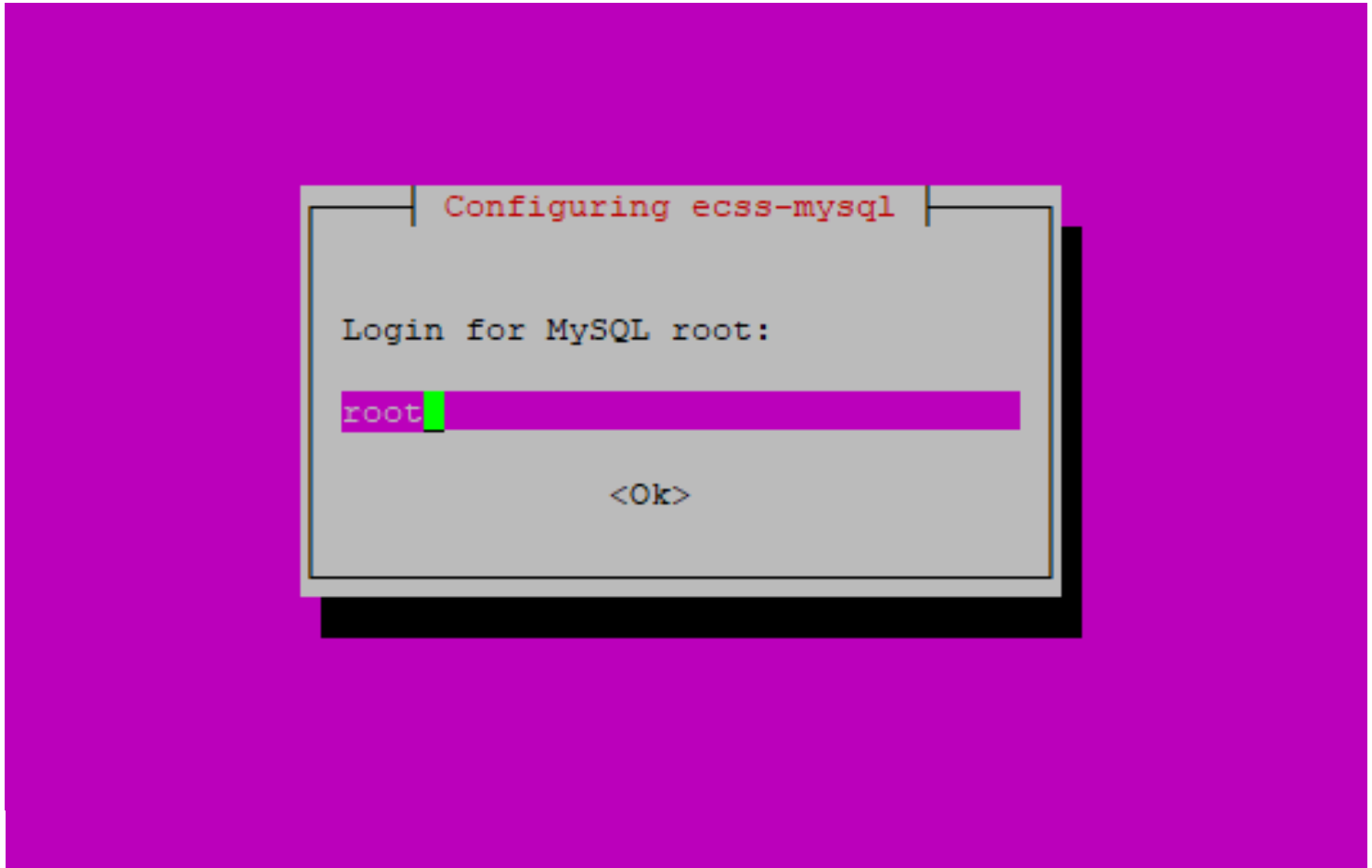
ECSS-10 software installation in «Active-Active» mode

Step 1



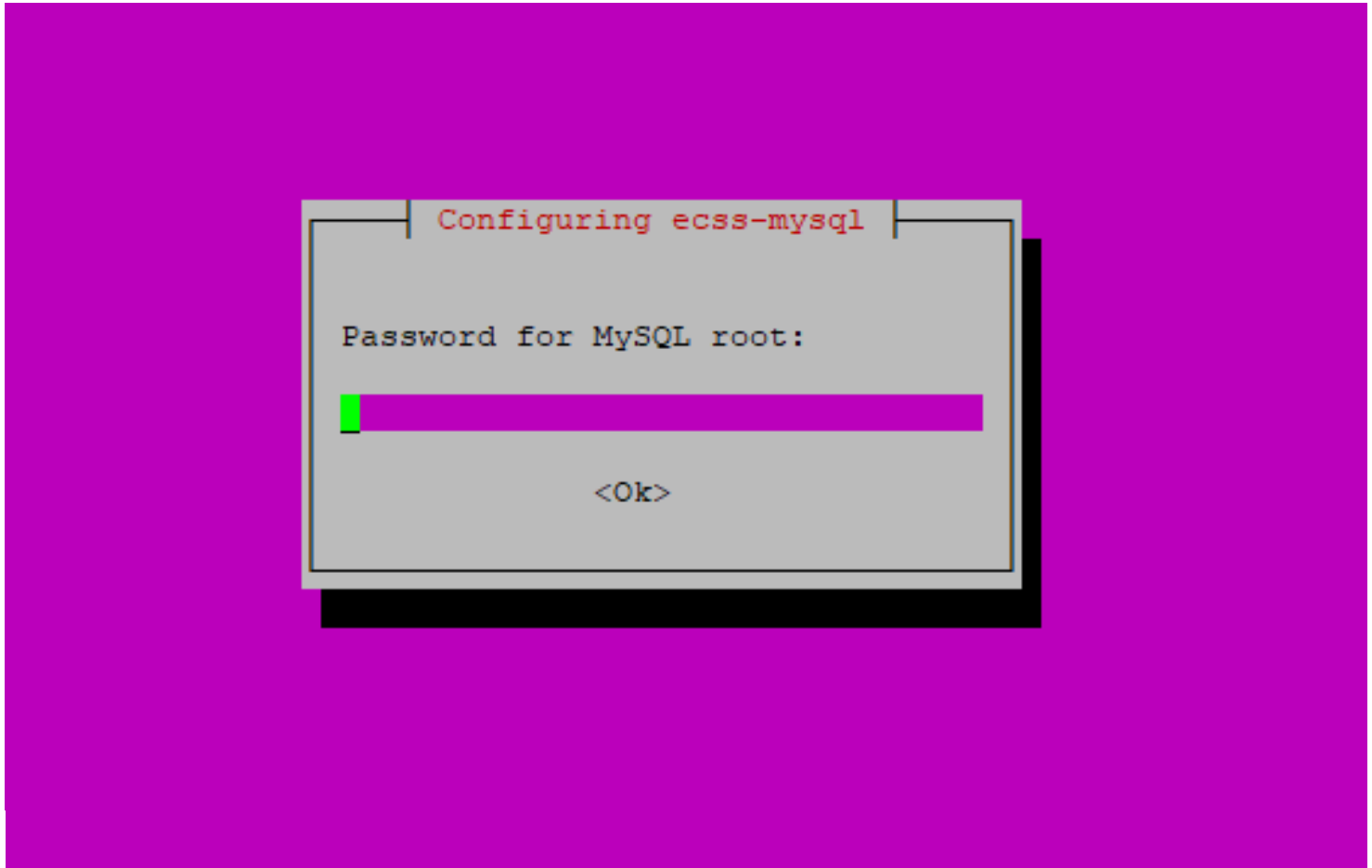
ECSS-10 software installation in «Active-Active» mode

Step 1



ECSS-10 software installation in «Active-Active» mode

Step 1



ECSS-10 software installation in «Active-Active» mode

Step 1

```
MySQL connection test success
Clear dead links to databases
Deploy MySQL tables
Creating database 'web_conf' ...
Database 'web_conf' is complete
Creating database 'ecss_audit' ...
Database 'ecss_audit' is complete
Creating database 'ecss_meeting_db' ...
Database 'ecss_meeting_db' is complete
Creating database 'ecss_numbers_db' ...
Database 'ecss_numbers_db' is complete
Creating database 'ecss_dialer_db' ...
Database 'ecss_dialer_db' is complete
Creating database 'ecss_subscribers' ...
Database 'ecss_subscribers' is complete
Creating database 'ecss_calls_db' ...
Database 'ecss_calls_db' is complete
Creating database 'ecss_address_book' ...
Database 'ecss_address_book' is complete
Creating database 'history_db' ...
Database 'history_db' is complete
Creating database 'ecss_system' ...
Database 'ecss_system' is complete
Creating database 'ecss_statistics' ...
Database 'ecss_statistics' is complete
Finished databases deploy
ecss-mysql-checker.timer is a disabled or a static unit, not starting it.
Setting up libcgi-fast-perl (1:2.13-1) ...
Setting up libhttp-message-perl (6.14-1) ...
Processing triggers for libc-bin (2.27-3ubuntu1.6) ...
Processing triggers for systemd (237-3ubuntu10.57) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...

Progress: [ 99%] [##################################################################################################.]
```

ECSS-10 software installation in «Active-Active» mode

Step 2

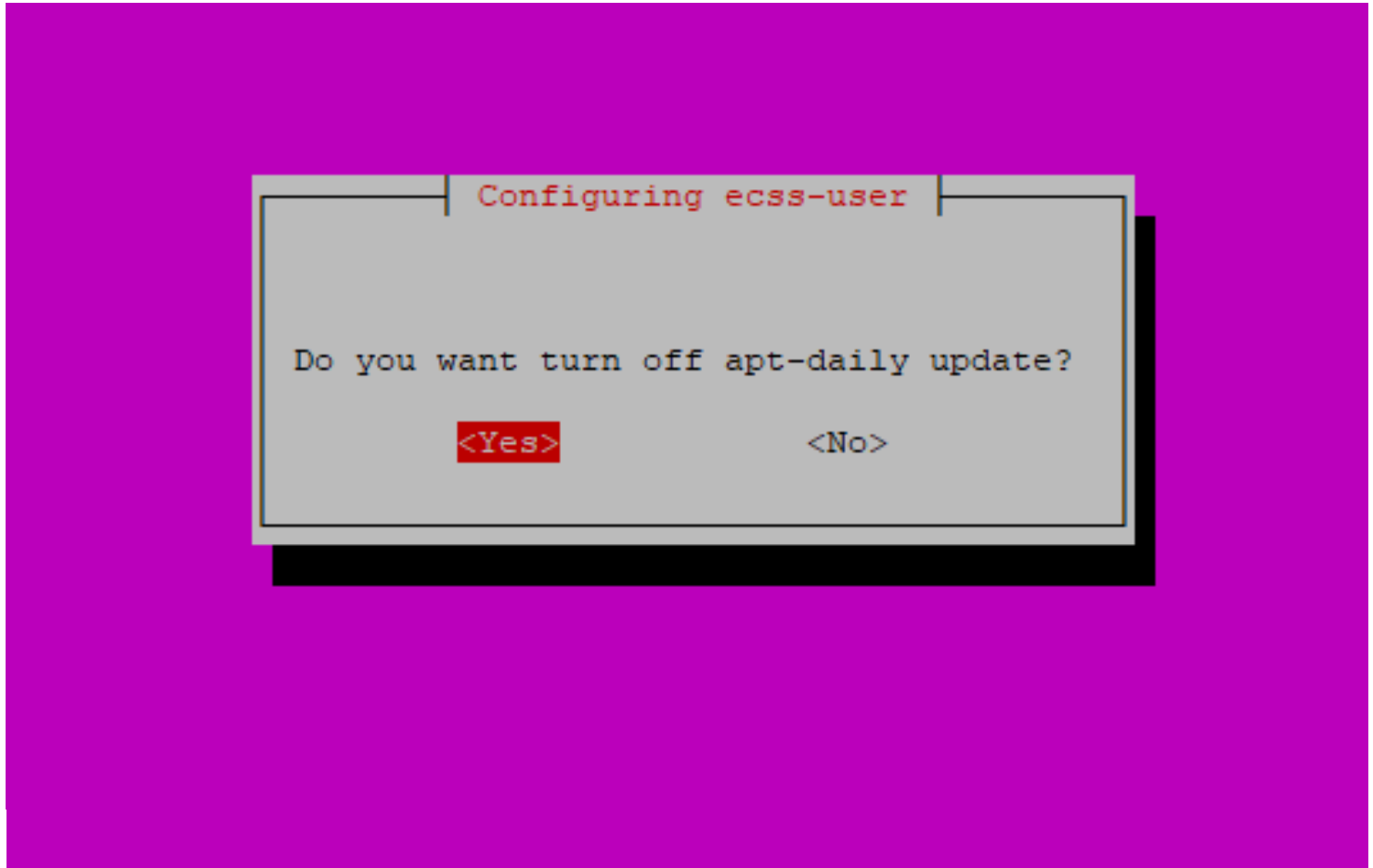
ECSS-10 Main system components installation

sudo apt install ecss-node

Execute to:

ECSS-10 software installation in «Active-Active» mode

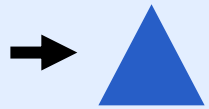
Step 2



ECSS-10 software installation in «Active-Active» mode

Step 2

Execute to:



Server 1
ecss1

Certificates installation

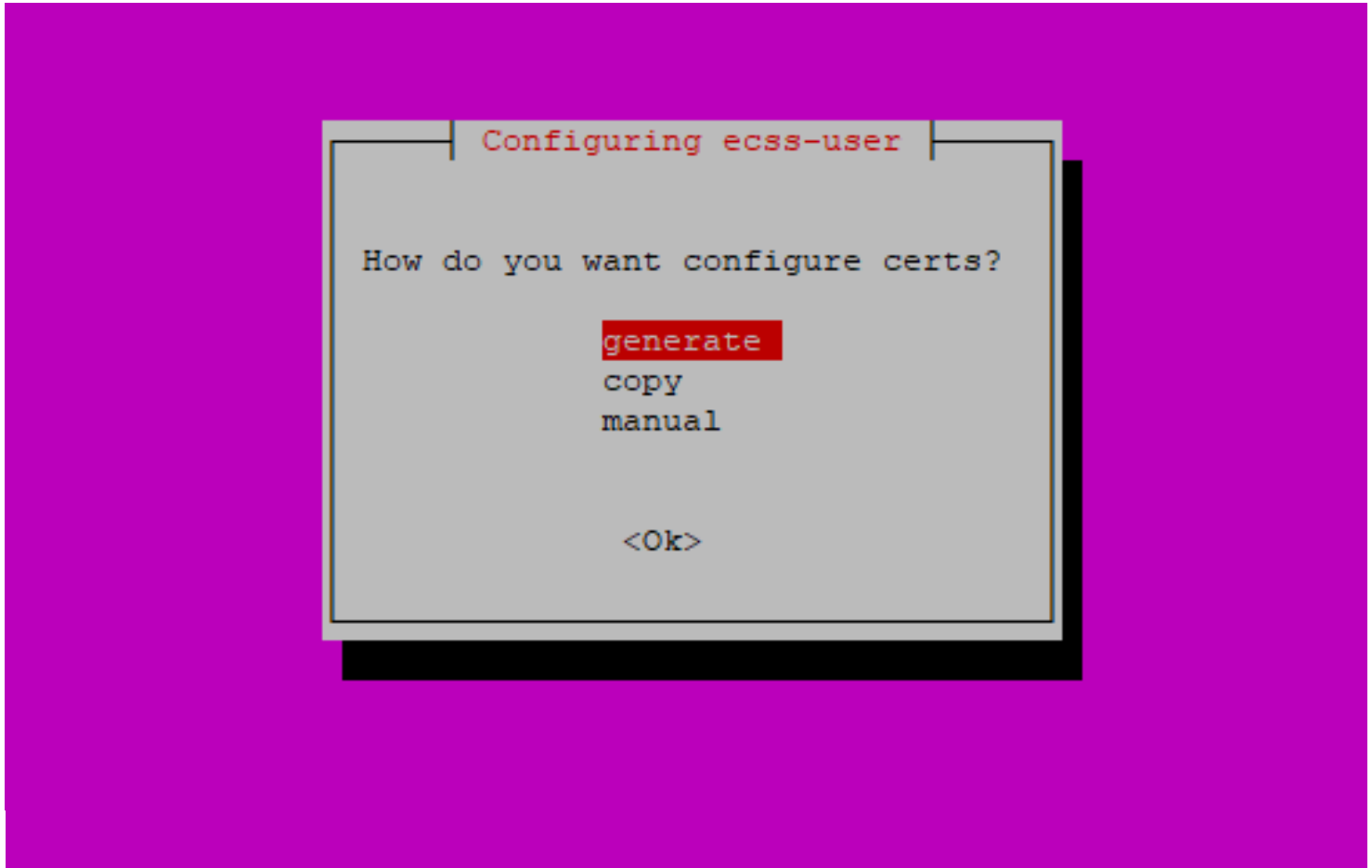
sudo apt install ecss-node

When executing the script, you will be prompted to generate new certificates

If you have no certs created before, choose generate

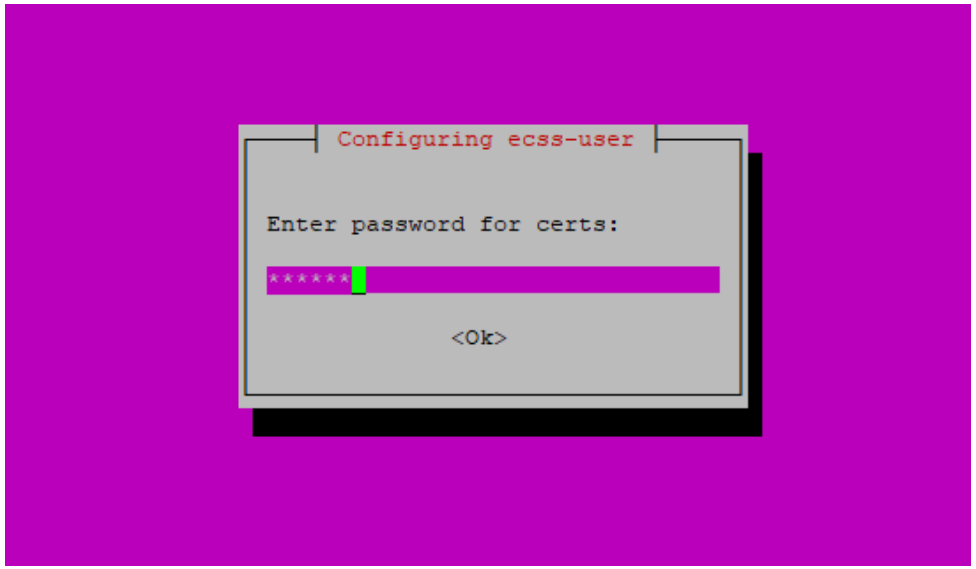
ECSS-10 software installation in «Active-Active» mode

Step 2



ECSS-10 software installation in «Active-Active» mode

Step 2



ECSS-10 software installation in «Active-Active» mode

Step 2

The following questions may be asked during certificate generation:

- Country (RU)
- State (Novosibirsk)
- City (Novosibirsk)
- Company (ELTEX)
- Department(IMS)
- Cert name(ecss10)
- Mail (ssw-team@eltex.loc)
- Number of days the certificate is valid
- Password for the root private key
- Encryption algorithm for the key
- Key difficulty
- Difficulty for Diffie-Hellman parameters
- Additional names covered by the certificate(eltex office example— ssw1.eltex.loc, ssw2.eltex.loc, ssw.eltex.loc), listed separated by a space (or wildcard)

ECSS-10 software installation in «Active-Active» mode

Step 2

Execute to:

Certificates installation on server 2

sudo apt install ecss-node

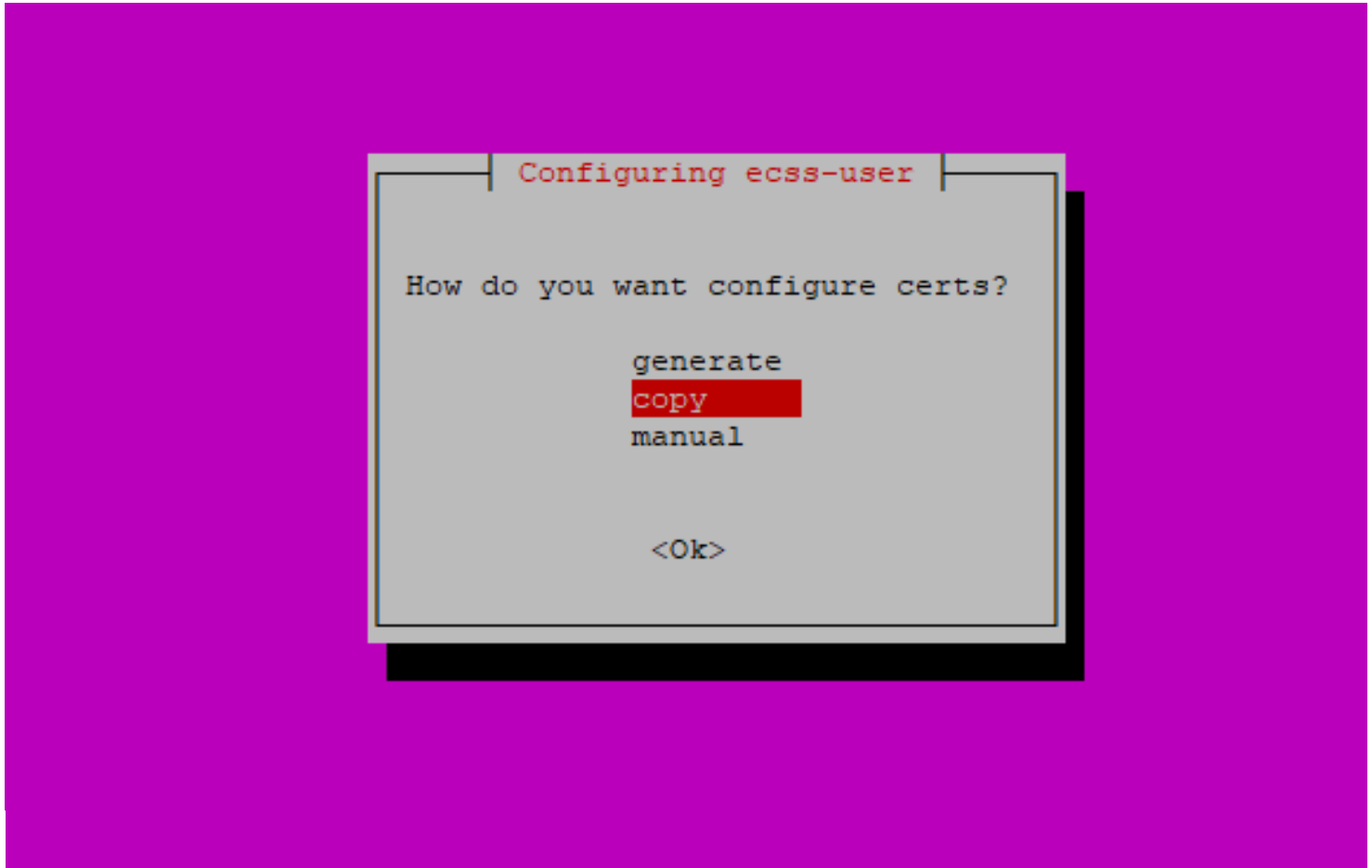
When executing the script, you will be prompted to copy the previously created certificates.

If the certificates were generated successfully, select the option:

copy

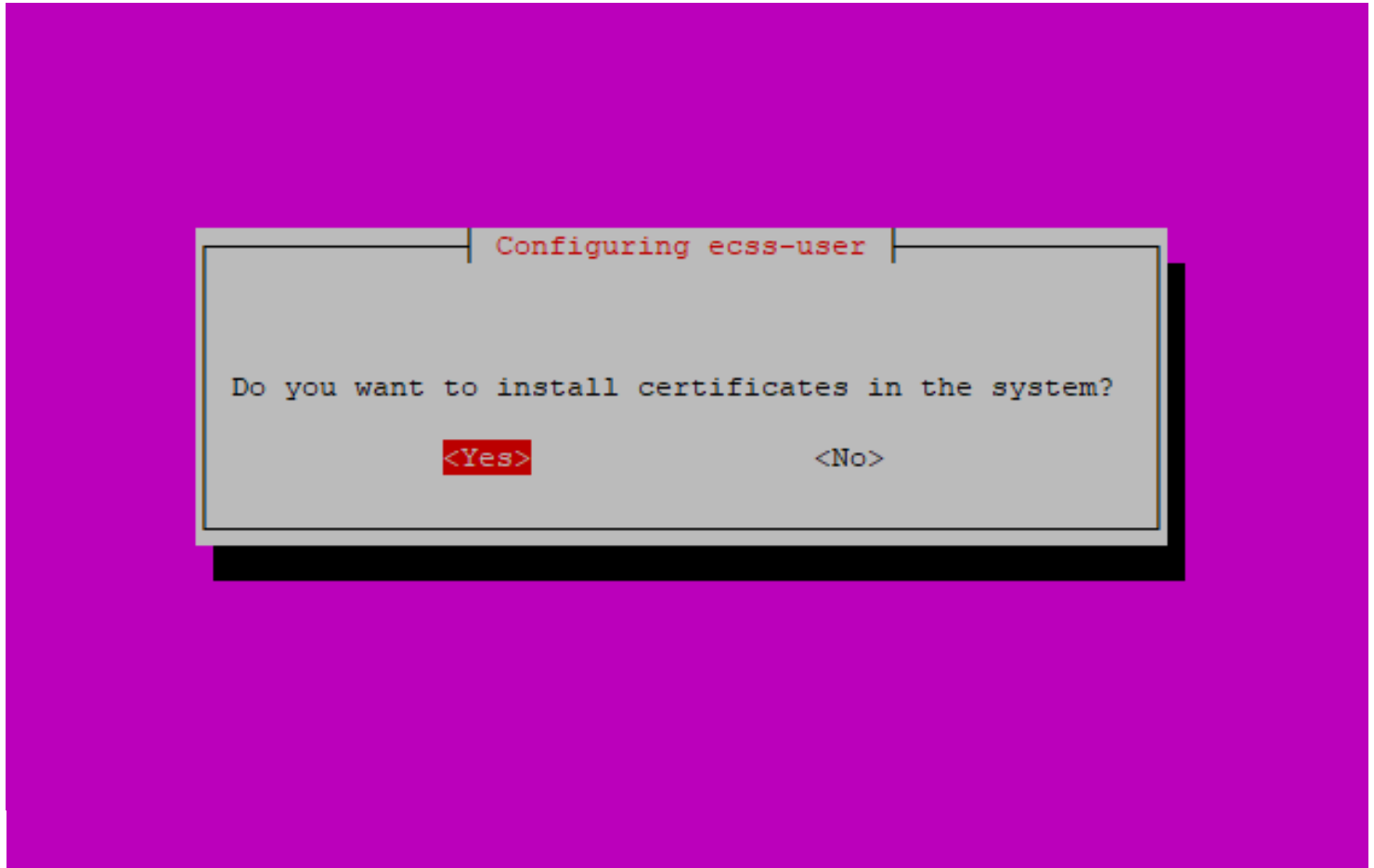
ECSS-10 software installation in «Active-Active» mode

Step 2



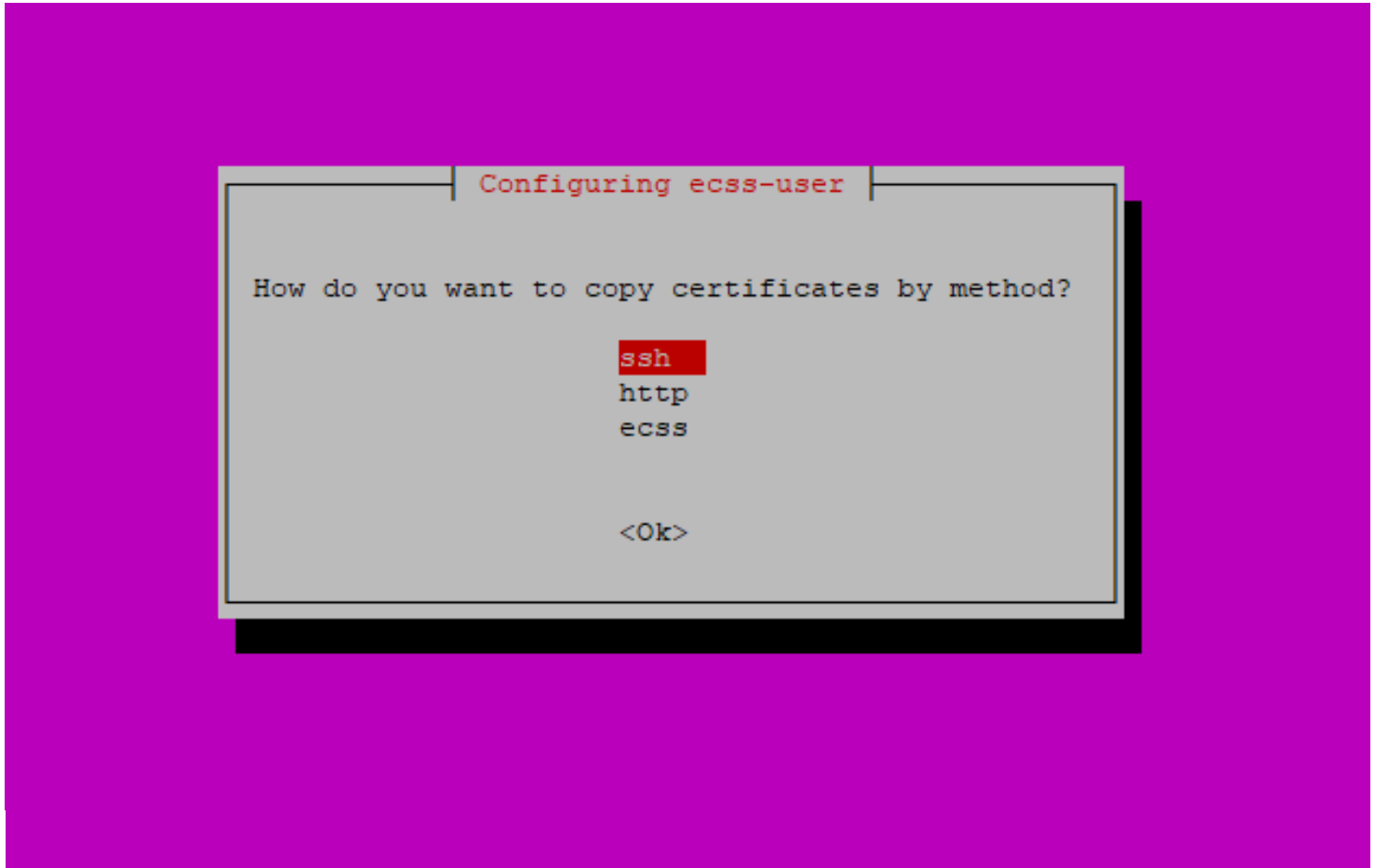
ECSS-10 software installation in «Active-Active» mode

Step 2



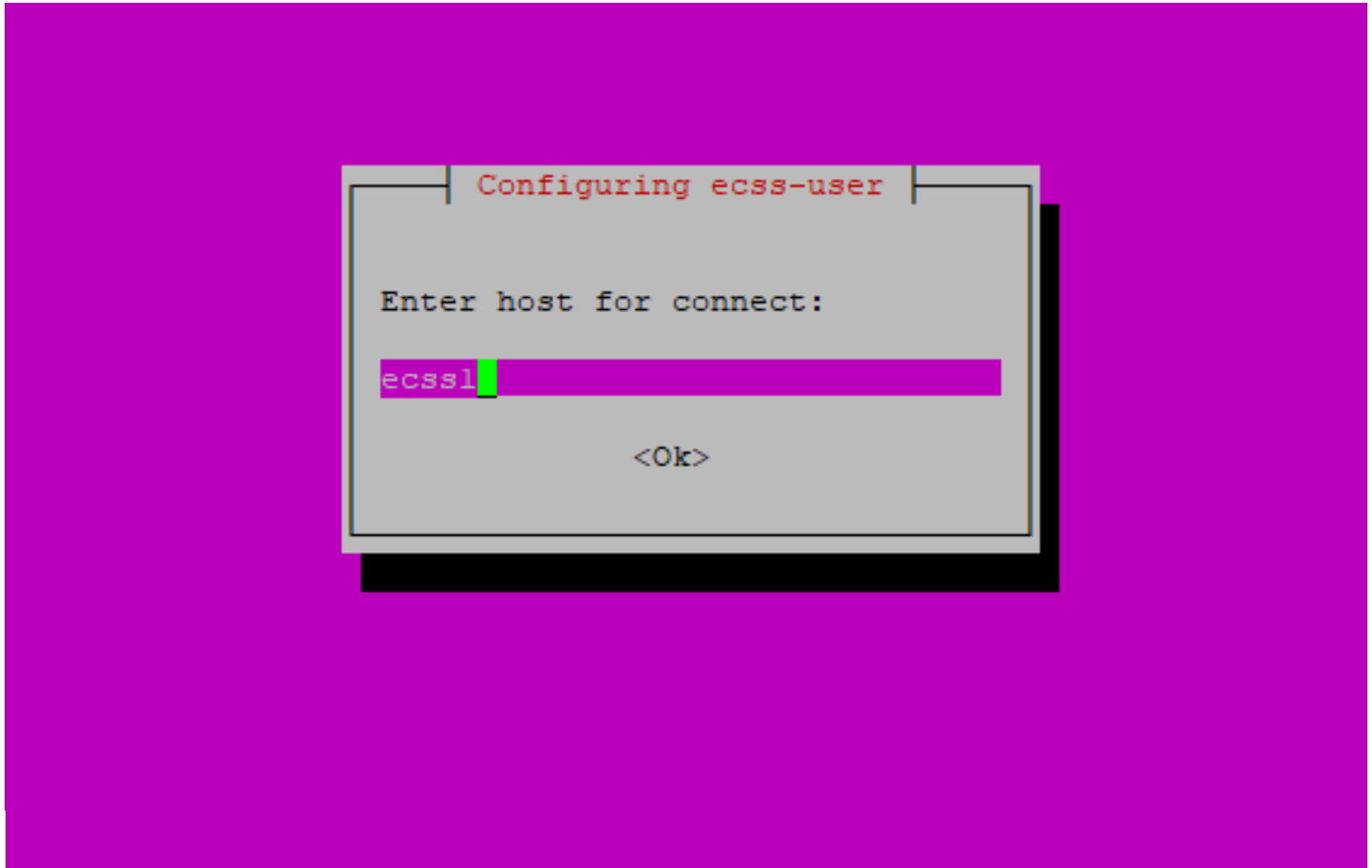
ECSS-10 software installation in «Active-Active» mode

Step 2



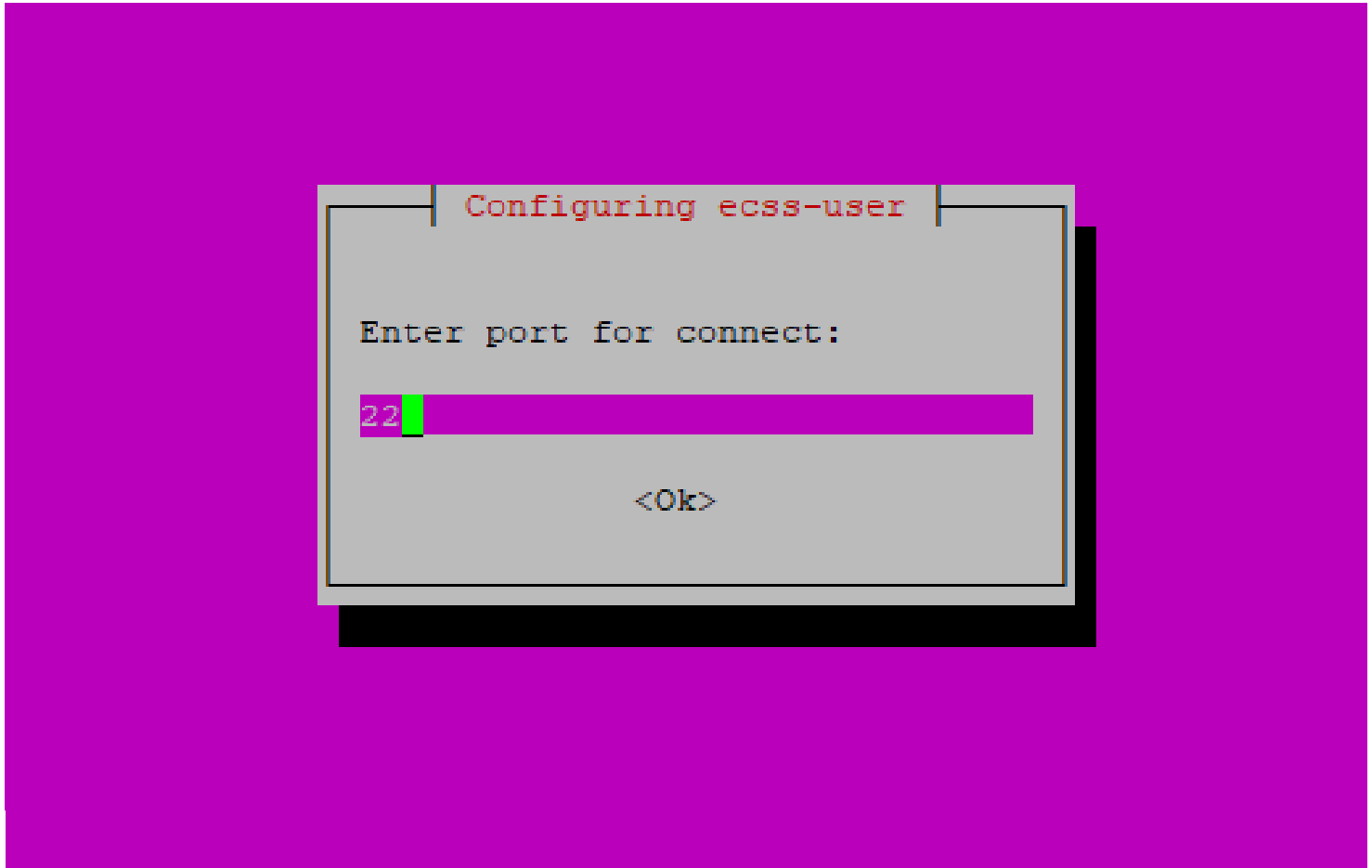
ECSS-10 software installation in «Active-Active» mode

Step 2



ECSS-10 software installation in «Active-Active» mode

Step 2



ECSS-10 software installation in «Active-Active» mode

Step 2

ECSS-10 software installation in «Active-Active» mode

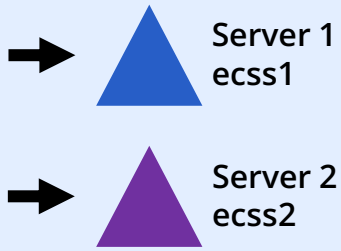
Step 2

```
tester@ecssl:~$ sudo id tester
uid=1000(tester) gid=1000(tester) groups=1000(tester),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),108(lxd)
tester@ecssl:~$ sudo id -Gn tester
tester adm cdrom sudo dip plugdev lxd
tester@ecssl:~$
tester@ecssl:~$
tester@ecssl:~$ sudo usermod -a -G ssw tester
tester@ecssl:~$
tester@ecssl:~$
tester@ecssl:~$ sudo id -Gn tester
tester adm cdrom sudo dip plugdev lxd ssw
tester@ecssl:~$
```

ECSS-10 software installation in «Active-Active» mode

Step 2

Execute to:



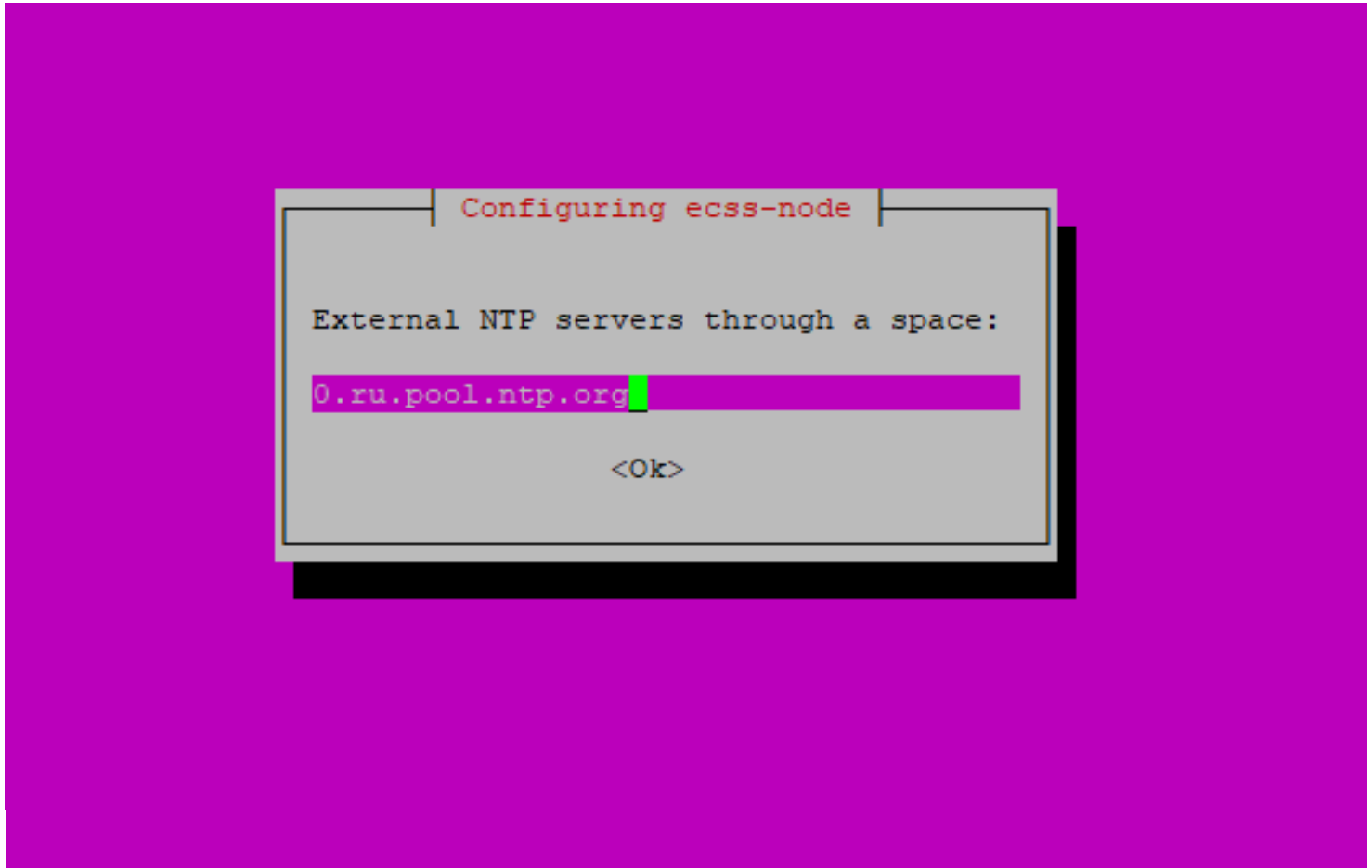
Main components installation

sudo apt install ecss-node

During the package installation, you will be prompted to setup NTP for time synchronization (for cluster mode)

ECSS-10 software installation in «Active-Active» mode

Step 2

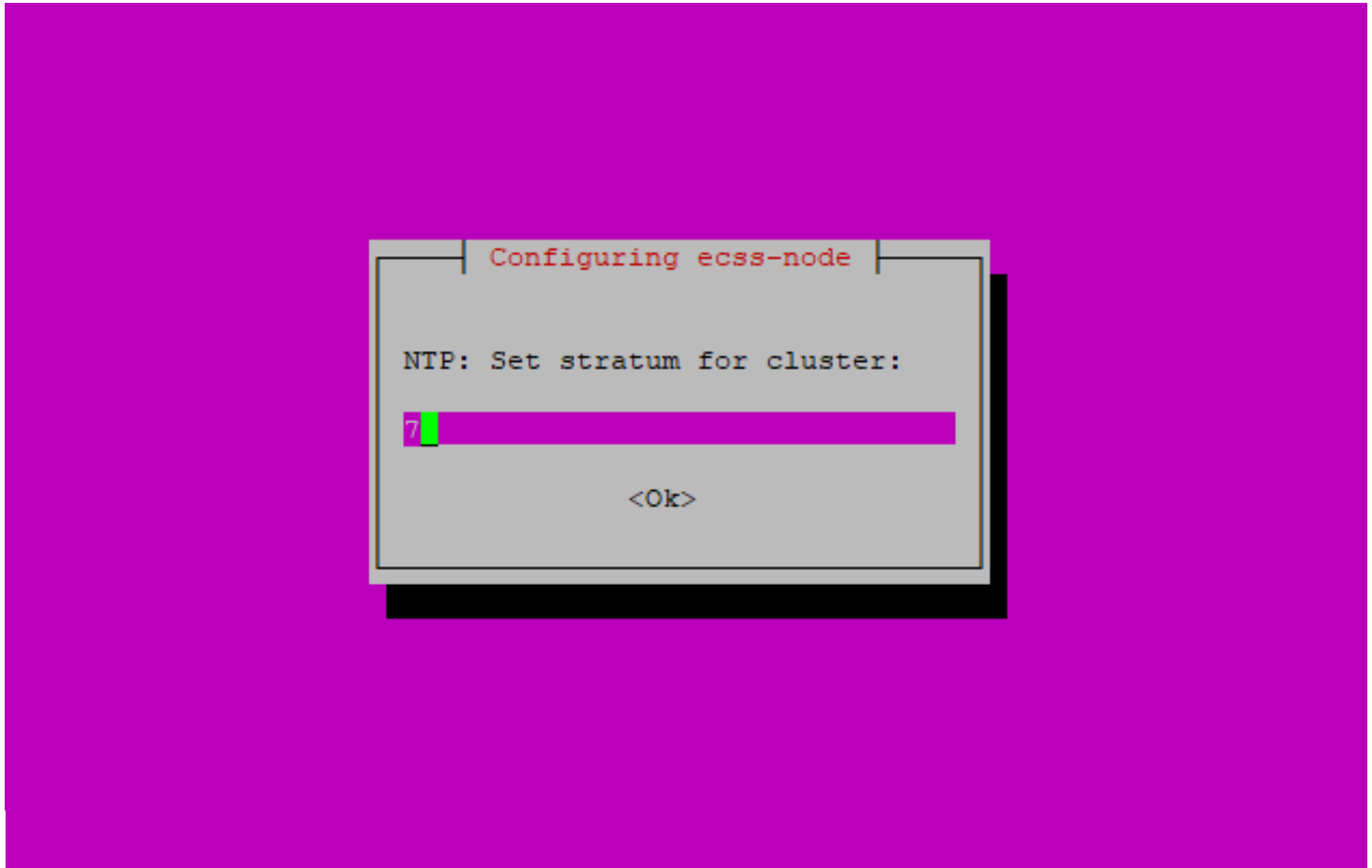


ECSS-10 software installation in «Active-Active» mode

Step 2

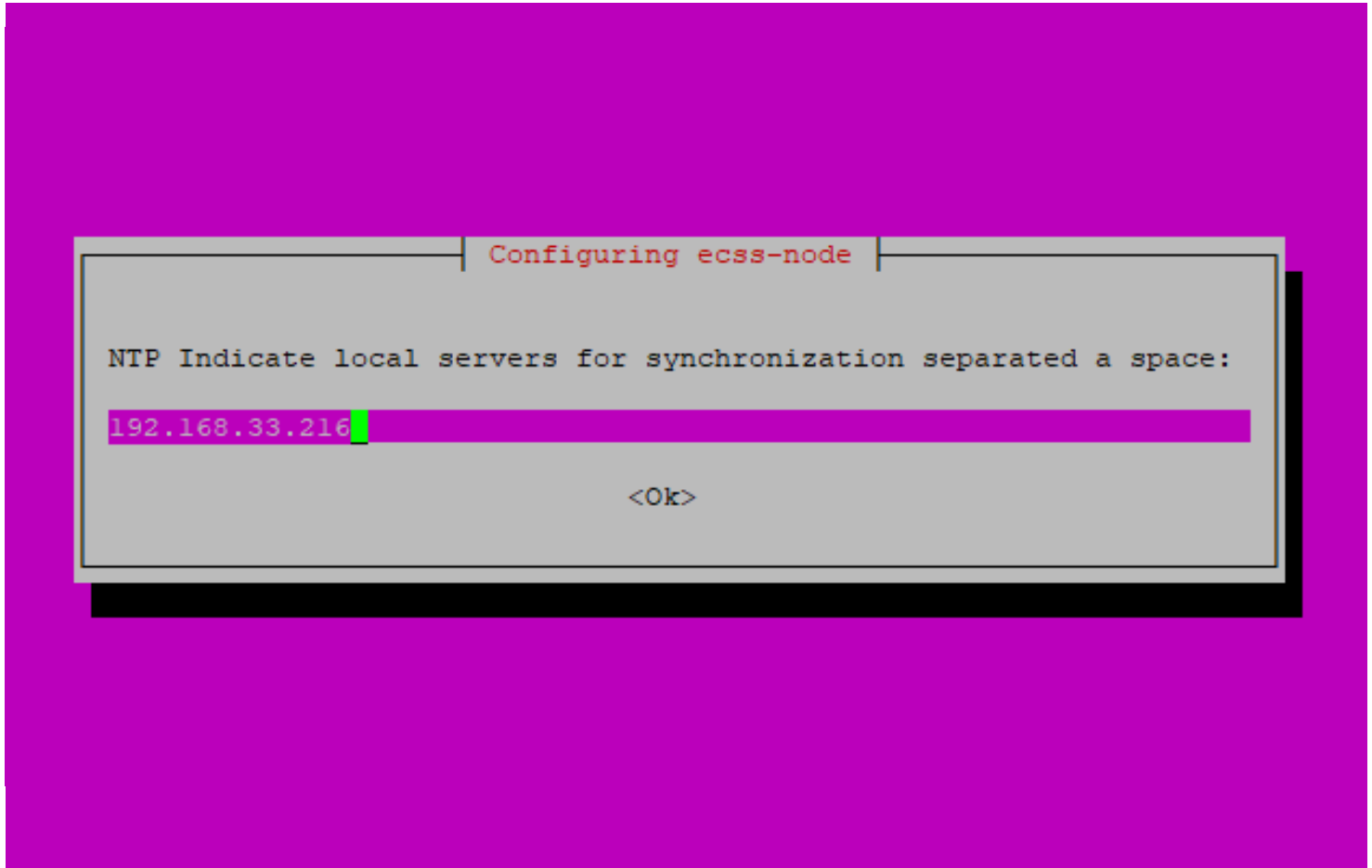
ECSS-10 software installation in «Active-Active» mode

Step 2



ECSS-10 software installation in «Active-Active» mode

Step 2

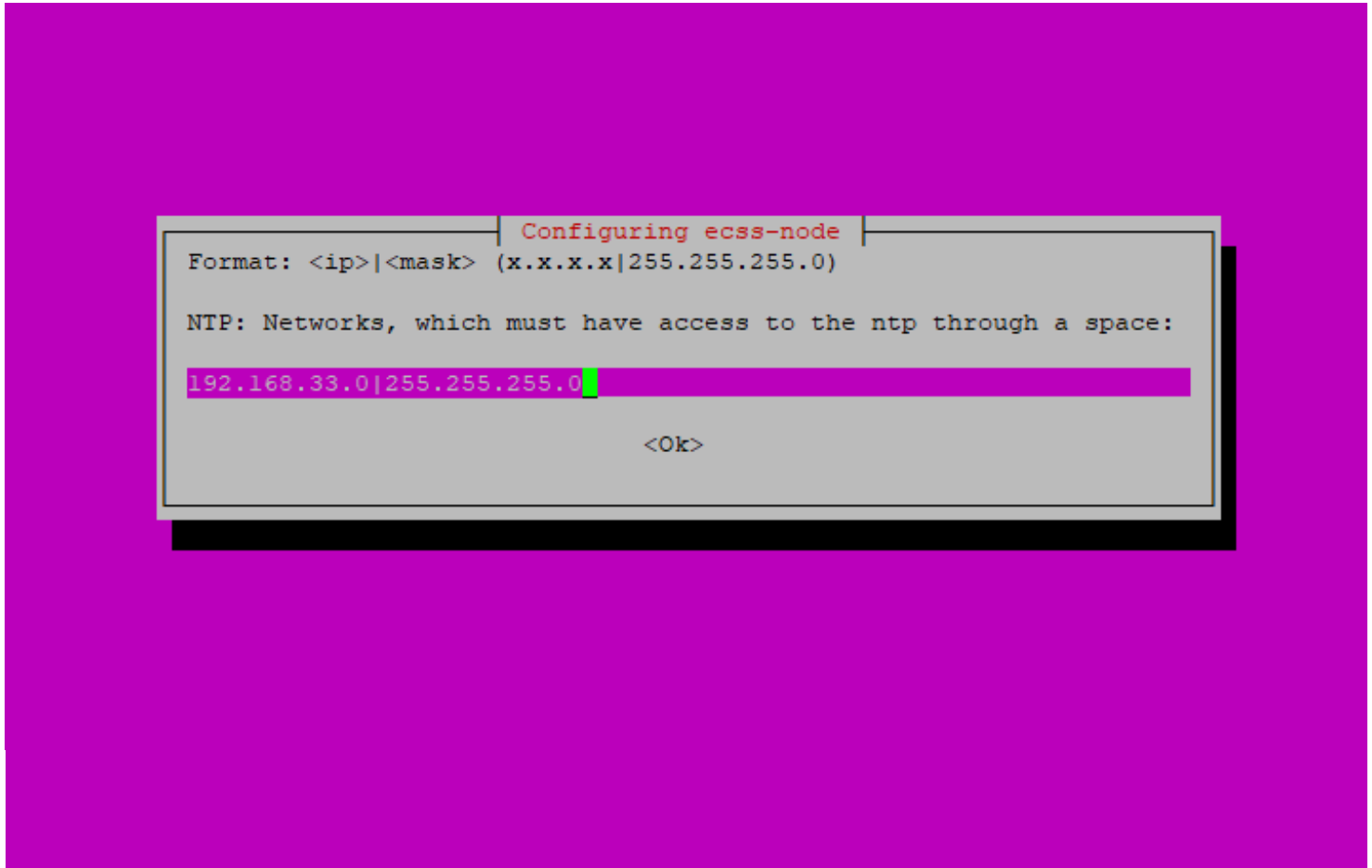


ECSS-10 software installation in «Active-Active» mode

Step 2

ECSS-10 software installation in «Active-Active» mode

Step 2

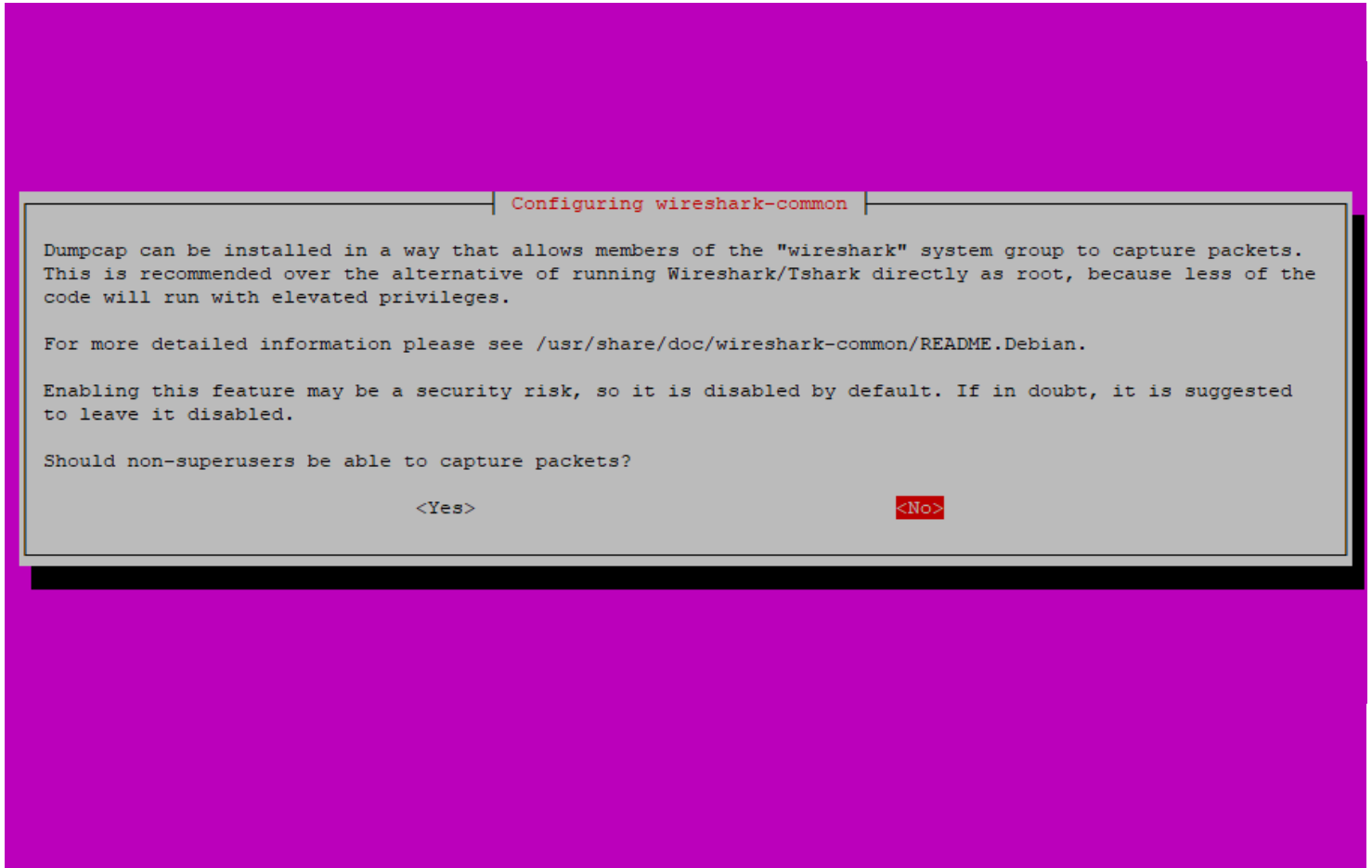


ECSS-10 software installation in «Active-Active» mode

Step 2

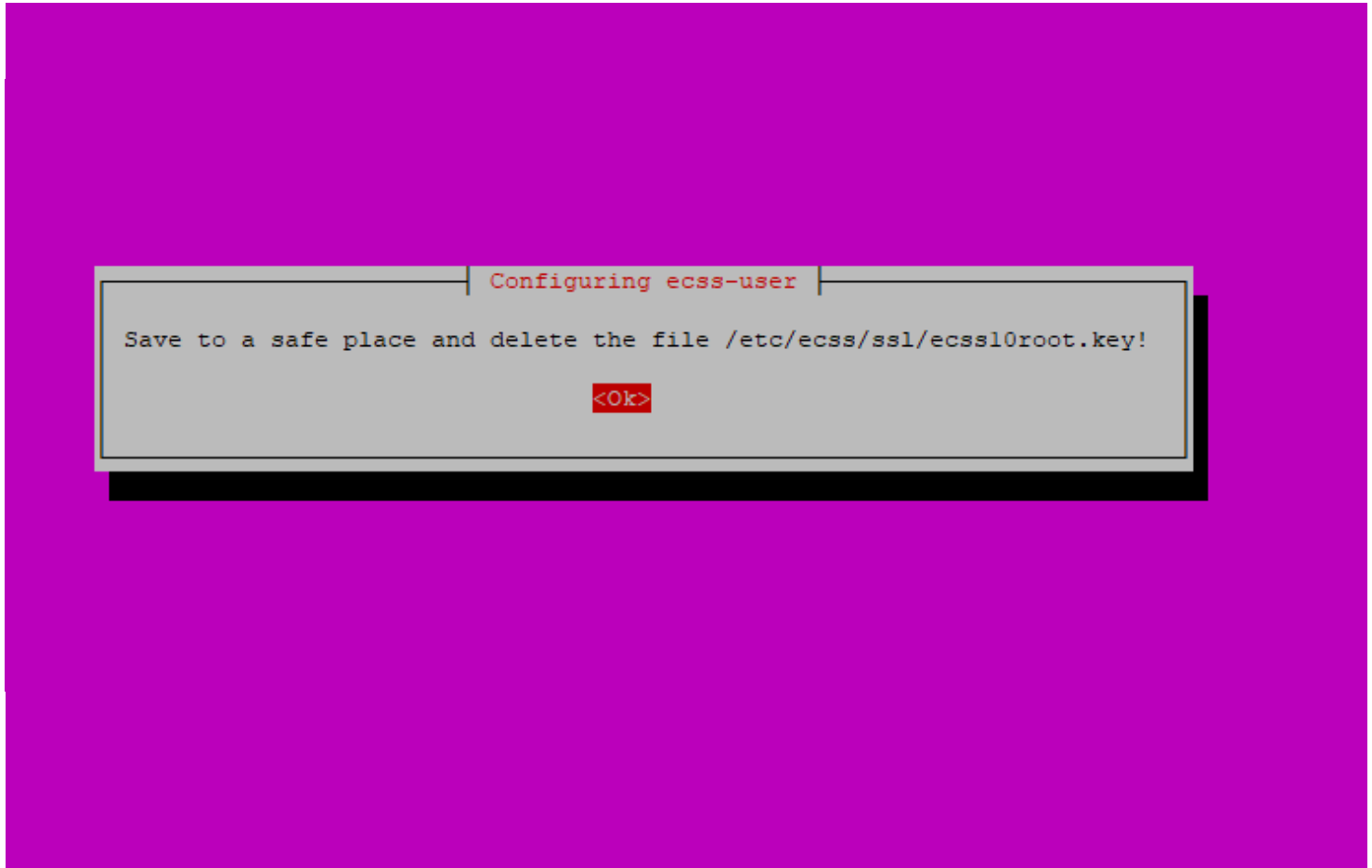
ECSS-10 software installation in «Active-Active» mode

Step 2



ECSS-10 software installation in «Active-Active» mode

Step 2



ECSS-10 software installation in «Active-Active» mode

Step 2

```
 * ecss-node: enabling ecss-ds.service
Created symlink /etc/systemd/system/multi-user.target.wants/ecss-ds.service → /lib/systemd/system/ecss-ds.service.
 * ecss-node: enabling ecss-core.service
Created symlink /etc/systemd/system/multi-user.target.wants/ecss-core.service → /lib/systemd/system/ecss-core.serv
ice.
 * ecss-node: enabling ecss-mediator.service
Created symlink /etc/systemd/system/multi-user.target.wants/ecss-mediator.service → /lib/systemd/system/ecss-media
tor.service.
 * ecss-node: enabling ecss-pa-sip.service
Created symlink /etc/systemd/system/multi-user.target.wants/ecss-pa-sip.service → /lib/systemd/system/ecss-pa-sip.
service.
 * ecss-node: starting ecss-mycelium.service
 * ecss-node: starting ecss-ds.service
 * ecss-node: starting ecss-core.service
 * ecss-node: starting ecss-mediator.service
 * ecss-node: starting ecss-pa-sip.service
 * ecss-node: disabling ecss-pa-megaco.service
 * ecss-node: mask ecss-pa-megaco.service
Setting up libspandsp2:amd64 (0.0.6+dfsg-0.1) ...
Setting up libwscodecs2:amd64 (2.6.10-1~ubuntu18.04.0) ...
Setting up libwiresharkll:amd64 (2.6.10-1~ubuntu18.04.0) ...
Setting up wireshark-common (2.6.10-1~ubuntu18.04.0) ...
Setting up tshark (2.6.10-1~ubuntu18.04.0) ...
Setting up termshark (1.0.0-2) ...
Processing triggers for mime-support (3.60ubuntu1) ...
Processing triggers for ureadahead (0.100.0-21) ...
Processing triggers for libc-bin (2.27-3ubuntu1.6) ...
Processing triggers for systemd (237-3ubuntu10.57) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for shared-mime-info (1.9-2) ...
Processing triggers for ufw (0.36-0ubuntu0.18.04.2) ...
tester@ecss1:~$
```

ECSS-10 software installation in «Active-Active» mode

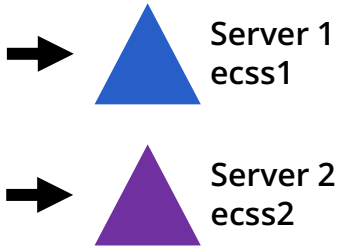
Step 2

Main components installation

After completing the installation of the package, in cluster mode you need to configure the cluster name

- sudo nano /etc/ecss/ecss-mycelium/mycelium1.config
- {cluster_name, my_cluster},
  where my_cluster – new cluster name, not «undefined»

Execute to:



ECSS-10 software installation in «Active-Active» mode

Step 2

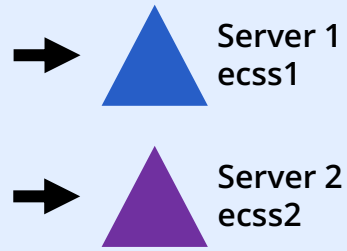
Main components installation

Also, we have to configure broker file:

- sudo nano /etc/dnsmasq.d/ecss-broker
- address=/primary.broker.ecss/192.168.1.1
- address=/secondary.broker.ecss/192.168.1.2

Where 192.168.1.1 – IP address for server 1, 192.168.1.2 – IP address for server 2. The same settings on server 2.

Execute to:



ECSS-10 software installation in «Active-Active» mode

Step 3

Glusterfs installation in cluster mode

Install glusterfs-server

- sudo apt install glusterfs-server attr
- sudo systemctl enable glusterd.service
- sudo systemctl start glusterd.service

Execute to:

ECSS-10 software installation in «Active-Active» mode

Step 3

Check the connection(probe) Glusterfs in cluster mode

Execute on ecss1

sudo gluster peer probe 192.168.1.2

192.168.1.2 – second server address (ecss2)

Execute to:

ECSS-10 software installation in «Active-Active» mode

Step 3

Check the connection(probe) Glusterfs in cluster mode

Execute on ecss2

sudo gluster peer status

Collect information about connection:

ecss1

Execute to:

ECSS-10 software installation in «Active-Active» mode

Step 3

Setup new volume in Glusterfs in cluster mode

Execute on ecss1:

sudo gluster volume create ecss_volume replica 2 transport tcp 192.168.1.1:/var/lib/ecss/glusterfs 192.168.1.2:/var/lib/ecss/glusterfs force

192.168.1.1 – primary server address(ecss1), 192.168.1.2 – secondary server address(ecss2).

Start GlusterFS cluster:

sudo gluster volume start ecss_volume

Execute to:

ECSS-10 software installation in «Active-Active» mode

Step 3

Glusterfs volume settings in cluster

Execute to:

Check the status

sudo gluster volume info

Volume Name: ecss_volume
Type: Replicate
Volume ID: 60774e49-d2f1-4b06-bb4a-3f39ccf1ea73
Status: Started
Number of Bricks: 1 x 2 = 2
Transport-type: tcp
Bricks:
Brick1: 192.168.1.1:/restfs
Brick2: 192.168.1.2:/restfs

ECSS-10 software installation in «Active-Active» mode

Step 3

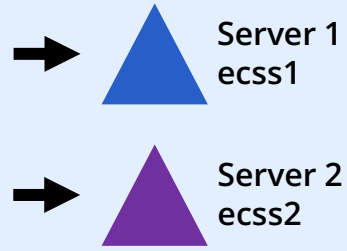
Mount new volume in OS

Edit this file:

sudo nano /etc/systemd/system/ecss-glusterfs-mount.service

```
[Unit]
Description=mount glusterfs
After=network.target
Requires=network.target
[Service]
RemainAfterExit=no
Type=forking
RestartSec=10s
Restart=always
ExecStart=/sbin/mount.glusterfs localhost:/ecss_volume /var/lib/ecss/restfs -o fetch-attempts=10
ExecStop=/bin/umount /var/lib/ecss/restfs
[Install]
WantedBy=multi-user.target
```

Execute to:



ECSS-10 software installation in «Active-Active» mode

Step 3

Mount new volume in OS

Add new “Unit” in startup

sudo nano /etc/systemd/system/ecss-glusterfs-mount.service

Then reboot your server/VM

sudo reboot

And check new volume with command:

df -h

Execute to:

ECSS-10 software installation in «Active-Active» mode

Step 4

Check the installation and start RestFS

Check this package installation

sudo apt install ecss-restfs

And start it on both nodes

sudo systemctl start ecss-restfs.service

Execute to:

ECSS-10 software installation in «Active-Active» mode

Step 5

Install additional system components (optional!)

Install packets

- ecss-web-conf
- ecss-media-server
- ecss-media-resources
- And other ...

Set of services will be change depend on each project installation and requirements.

Execute to:

ECSS-10 software installation in «Active-Active» mode

Step 6

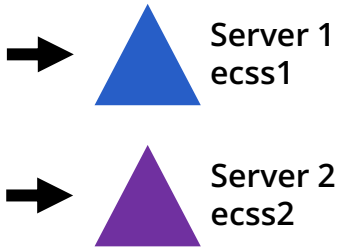
Setup Epmd service!

Edit epmd settings:

- sudo systemctl edit epmd.service
- [Service]
- Environment="ERL_EPMD_ADDRESS=127.0.1.1,192.168.1.1"

- 192.168.1.1 – primary server address (ecss1), 192.168.1.2 – secondary server address (ecss2)

Execute to:



ECSS-10 software installation in «Active-Active» mode

Step 7

Setup your licensing scheme!

Start services:

- sudo systemctl start ecss-ds.service
- sudo systemctl start ecss-mycelium.service

Install passport and then add license!

- /cluster/storage/<CLUSTER>/licence/set-passport <PASSPORT>
- /cluster/storage/<CLUSTER>/licence/add [--force|--no-diff] <LICENCE>

Execute to:

ECSS-10 software installation in «Active-Active» mode

Step 8

Check the intallation

Execute node checking command(CoCon):

- ssh admin@<IP_ECSS> -p8023
- →password
- node/check-services

Execute to:

```
admin@mycelium1@ecss1:/$ node/check-services
Nodes:
   core1@ecss1     core1@ecss2
    ds1@ecss1       ds1@ecss2
    md1@ecss1       md1@ecss2
mycelium1@ecss1 mycelium1@ecss2
    sip1@ecss1      sip1@ecss2
```

All services are started

ECSS-10 software installation in «Active-Active» mode

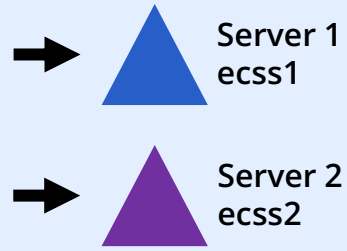
Step 8

Check the installation

Perform a functional test:

- Web-configurator
- CoCon console
- Domains, aliases, trunks, bridges
- Protocol adapters
- Media-servers (MSR)
- Restfs volumes
- Configuration replication and backup
- Cluster state, alarms

Execute to:



ECSS-10 software installation in «Active-Active» mode

Replication settings based on Keepalived and VRRP

Setup keepalived service

During the process of installation, you will need:

- Access to the keepalived configuration files
- Free virtual IP addresses for replication:
  - SIP1 vIP – 192.168.1.3
  - SIP2 vIP – 192.168.1.4
  - MySQL vIP – 192.168.1.5
- VRRP virtual_router_id for SIP1 – 50
- VRRP virtual_router_id for SIP2 – 51
- VRRP virtual_router_id for MySQL – 49

Execute to:

ECSS-10 software installation in «Active-Active» mode

Replication settings based on Keepalived and VRRP

ecss1 configuration example

```
vrrp_script check_sip {
script "/usr/bin/ecss_pa_sip_port 65535"
interval 2
timeout 2 }

vrrp_instance SIP_1 {
state MASTER
interface ens160
garp_master_delay 10
smtp_alert
virtual_router_id 50
priority 100
advert_int 1
authentication { auth_type PASS       auth_pass 1111 }
virtual_ipaddress { 192.168.1.3 label ens160:sip1 }
 track_script { check_sip  }
}
```

Execute to:

ECSS-10 software installation in «Active-Active» mode

Replication settings based on Keepalived and VRRP

ecss1 configuration example

```
vrrp_instance SIP_2 {
state BACKUP
interface ens160
virtual_router_id 51
priority 50
advert_int 1
authentication { auth_type PASS       auth_pass 1111 }
virtual_ipaddress { 192.168.1.4 label ens160:sip2 }
track_script { check_sip }
}

include mysql.conf
```

Execute to:

ECSS-10 software installation in «Active-Active» mode

Replication settings based on Keepalived and VRRP

ecss1 configuration example

```
vrrp_script check_mysql {
script "/usr/bin/mysql --defaults-file=/etc/mysql/debian.cnf -e 'SELECT 1;'"
user root
interval 2
fall 1
timeout 2
}
vrrp_instance MySQL {
state MASTER                    # Initial state at start
interface ens160                # The name of the network interface on which the VRRP protocol will run
virtual_router_id 49            # Unique router identifier (0..255)
priority 100                    # Priority (0..255) the higher – more priority
advert_int 1                    # Notification interval (s)
preempt_delay 60                # Waiting interval for the master when starting the daemon (s) in the initial state BACKUP
BACKUP    virtual_ipaddress { 192.168.1.5 label ens160:mysql }
track_script { check_mysql }
}
```

Execute to:

ECSS-10 software installation in «Active-Active» mode

Replication settings based on Keepalived and VRRP

ecss2 configuration example

```
vrrp_script check_sip {
script "/usr/bin/ecss_pa_sip_port 65535"
interval 2
timeout 2 }

vrrp_instance SIP_1 {
state BACKUP
interface ens160
garp_master_delay 10
smtp_alert
virtual_router_id 50
priority 50
advert_int 1
authentication { auth_type PASS       auth_pass 1111 }
virtual_ipaddress { 192.168.1.3 label ens160:sip2 }
 track_script { check_sip }
}
```

Execute to:

ECSS-10 software installation in «Active-Active» mode

Replication settings based on Keepalived and VRRP

ecss2 configuration example

Execute to:

```
vrrp_instance SIP_2 {
state MASTER
interface ens160
virtual_router_id 51
priority 100
advert_int 1
authentication { auth_type PASS   auth_pass 1111}
virtual_ipaddress { 192.168.1.4 label ens160:sip1 }
track_script { check_sip }
}

include mysql.conf
```

ECSS-10 software installation in «Active-Active» mode

Replication settings based on Keepalived and VRRP

ecss2 configuration example

Execute to:

```
vrrp_script check_mysql {
script "/usr/bin/mysql --defaults-file=/etc/mysql/debian.cnf -e 'SELECT 1;'"
user root
interval 2
fall 1
timeout 2
}
vrrp_instance MySQL {
state BACKUP                    # Initial state at start
interface ens160                # The name of the network interface on which the VRRP protocol will run
virtual_router_id 49            # Unique router identifier (0..255)
priority 50                     # Priority (0..255) the higher – more priority
advert_int 1                    # Notification interval (s)
preempt_delay 60                # Waiting interval for the master when starting the daemon (s) in the initial state BACKUP
virtual_ipaddress { 192.168.1.5 label ens160:mysql }
track_script { check_mysql }
}
```

Спасибо за внимание!

Мы всегда готовы к диалогу, разработке и доработке решений под ваше техническое задание

630020, г. Новосибирск, ул. Окружная 29В
09:00 — 18:00 (GMT+7)
Понедельник - пятница

+7 (383) 274-10-01, 274-48-48
eltex@eltex-co.ru; eltex-co.ru