

2. Slave 서버 설정

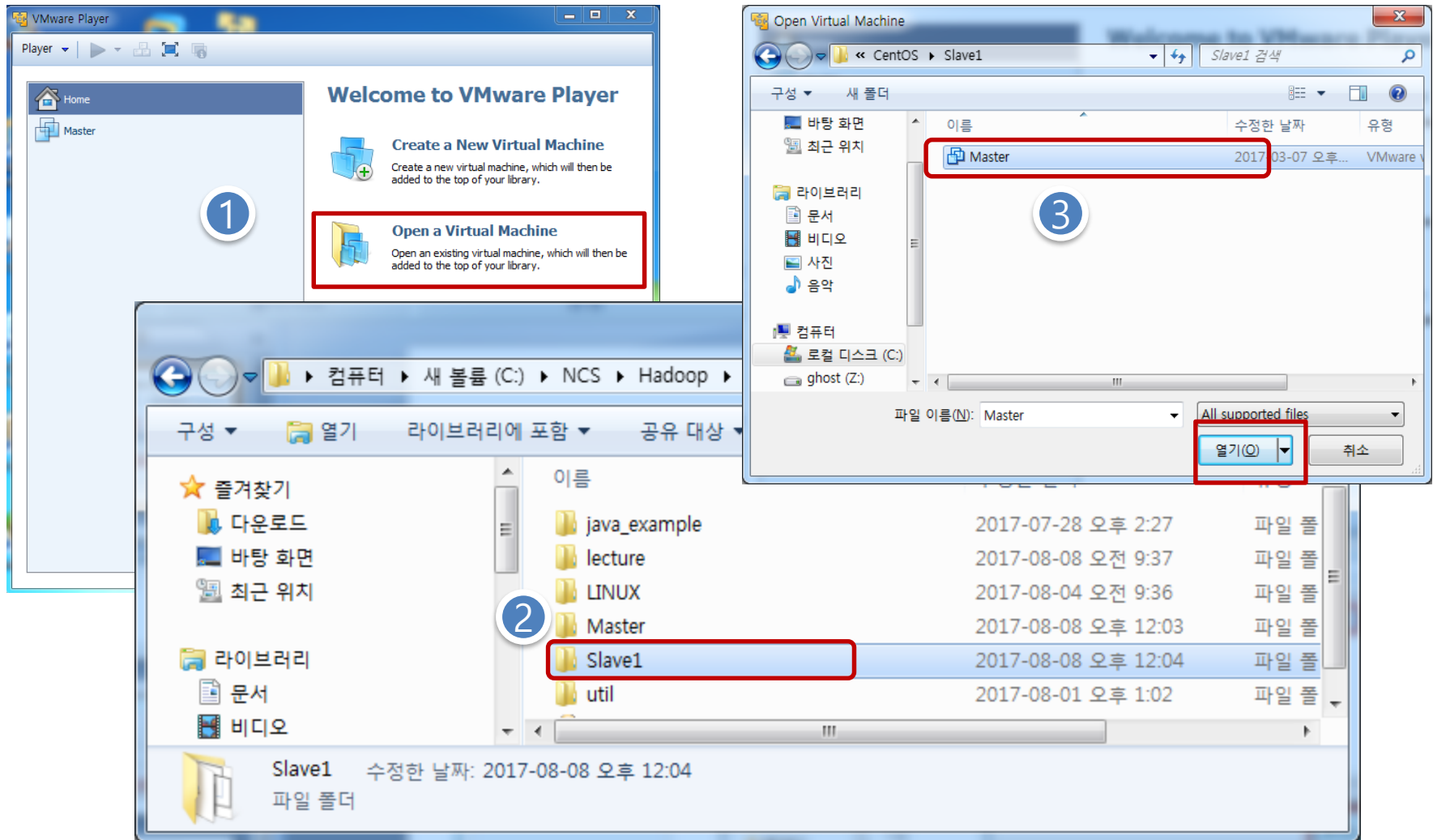
목 차

1. Slave1 서버 환경 설정
2. Slave2 가져오기
3. 인증키 생성 및 암호 해제

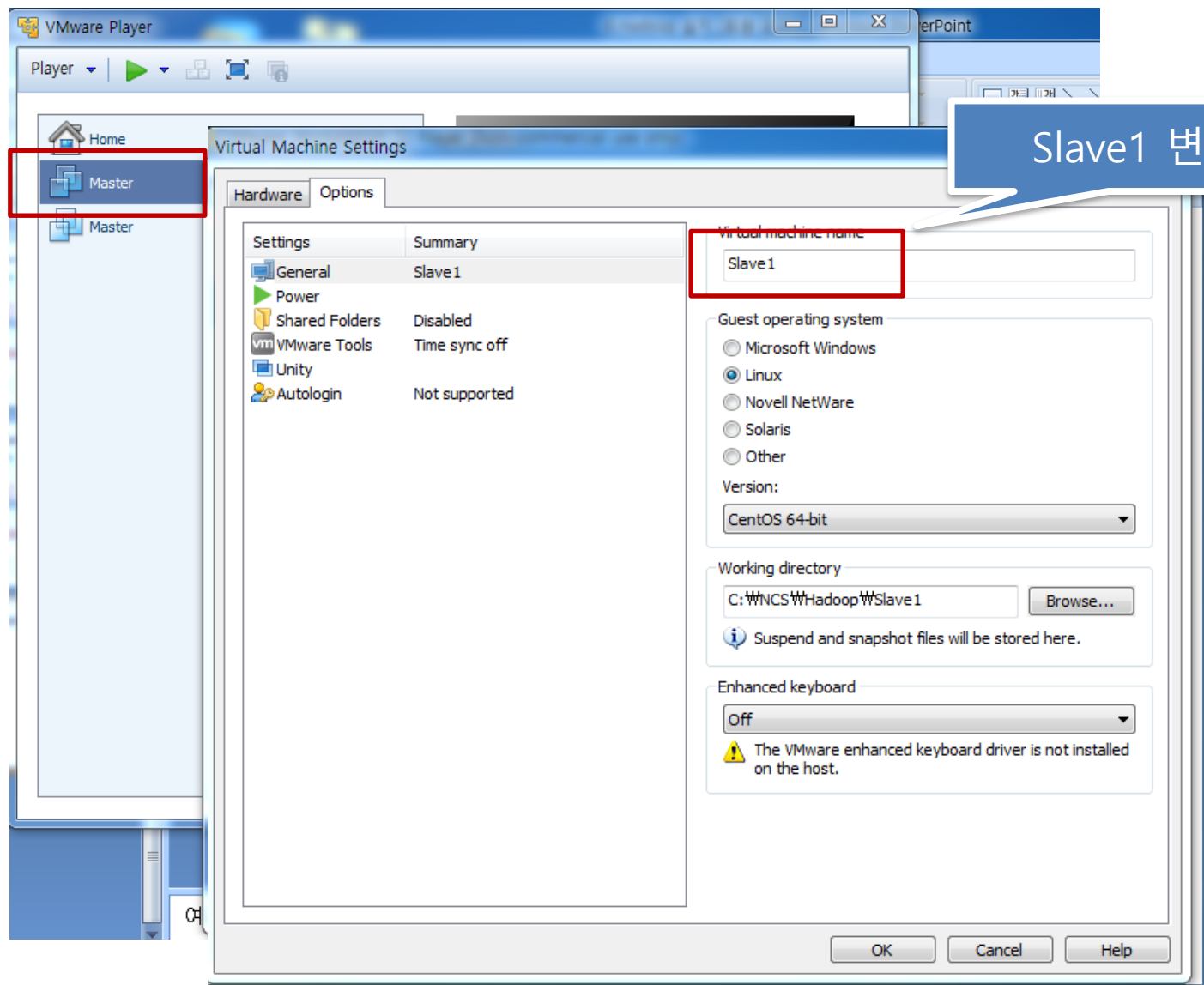
1. Slave1 서버 환경 설정

- 1) Slave 가져오기
- 2) Slave 이름 변경
- 3) MAC 주소 생성
- 4) 가상 머신 실행
- 5) Hostname 변경
- 6) Network 변경
- 7) Host 설정 확인
- 8) Master/Slave 상호 서버 접속

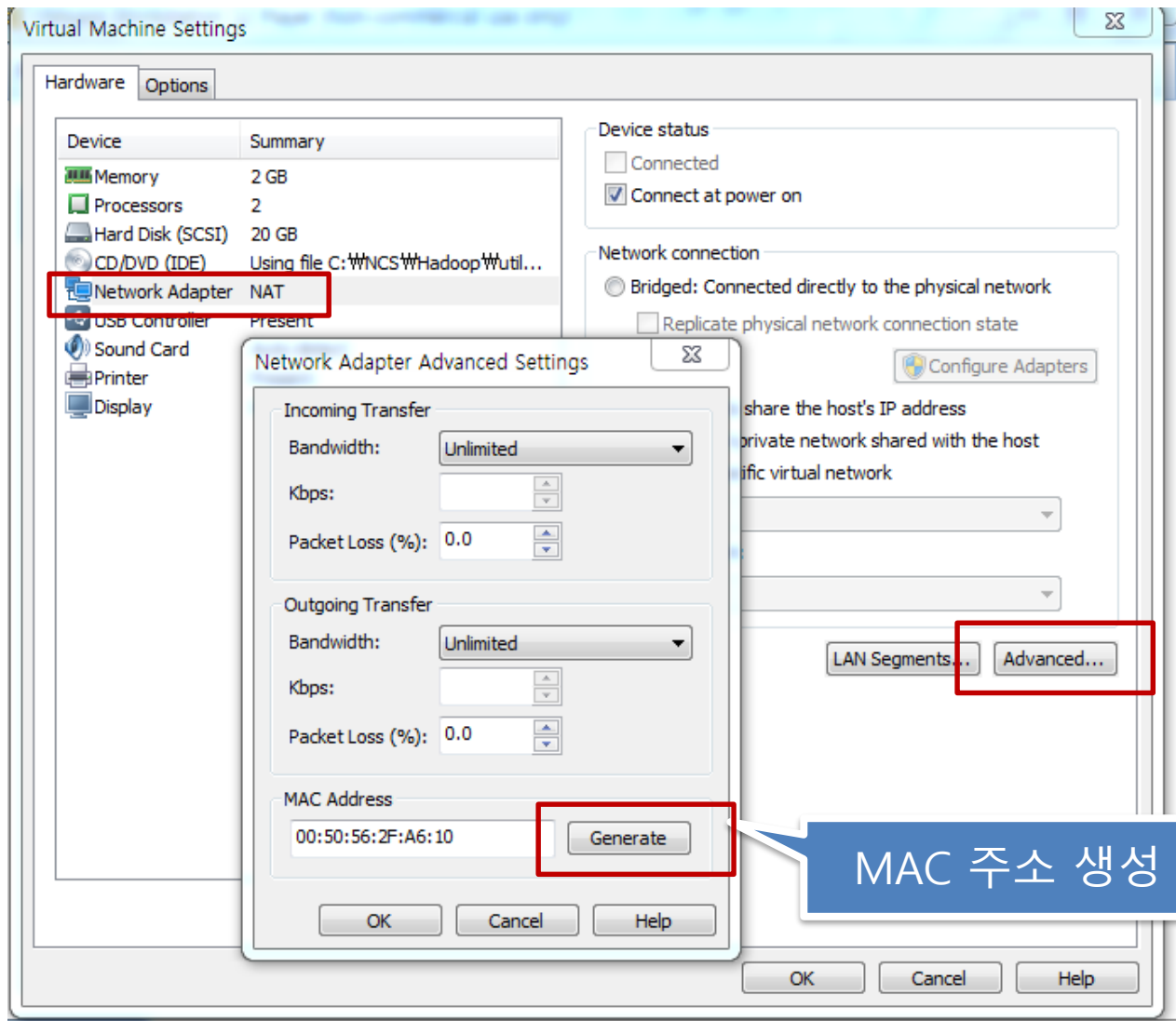
1) Slave 가져오기



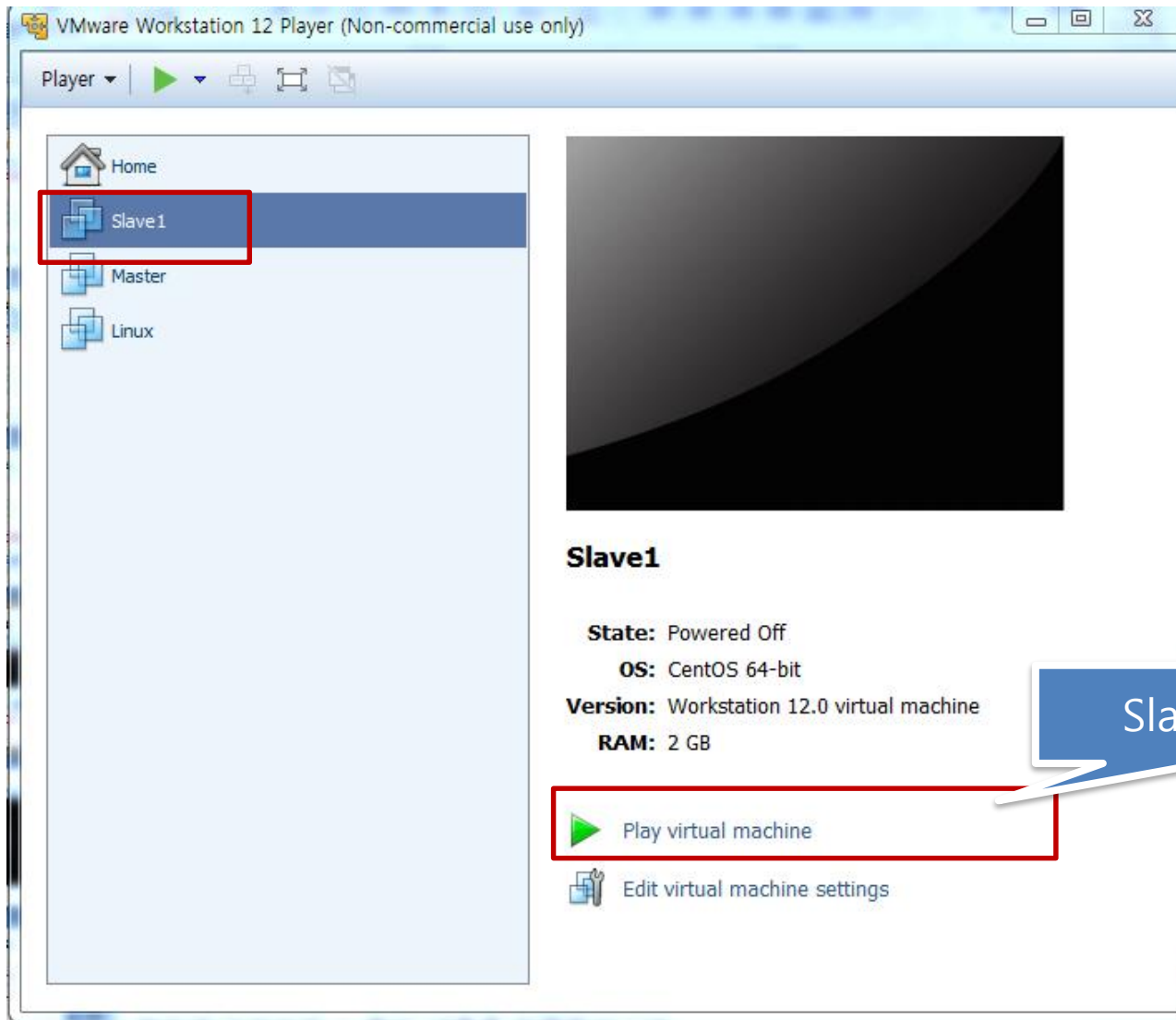
2) Slave 이름변경

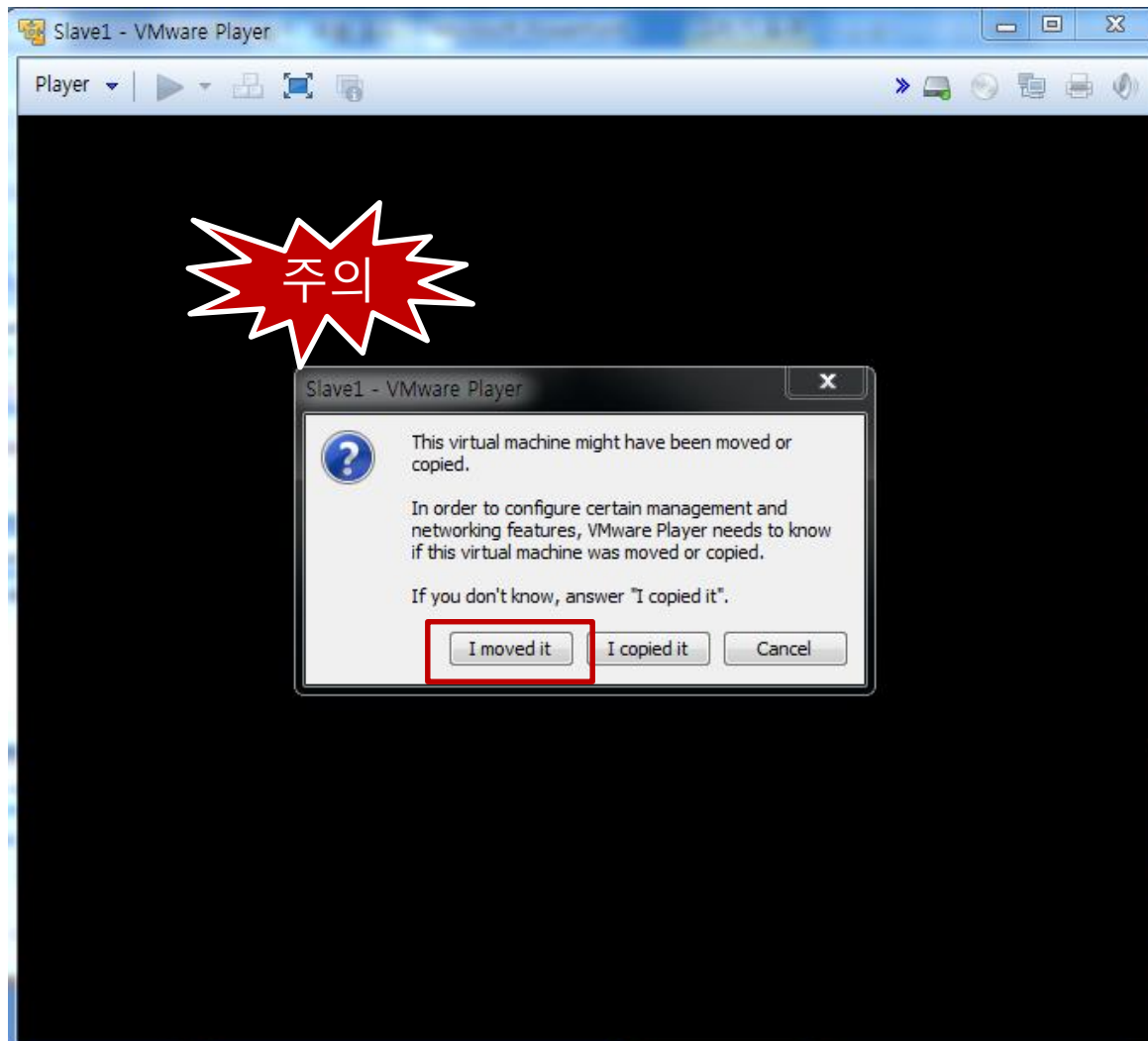


3) MAC 주소 생성

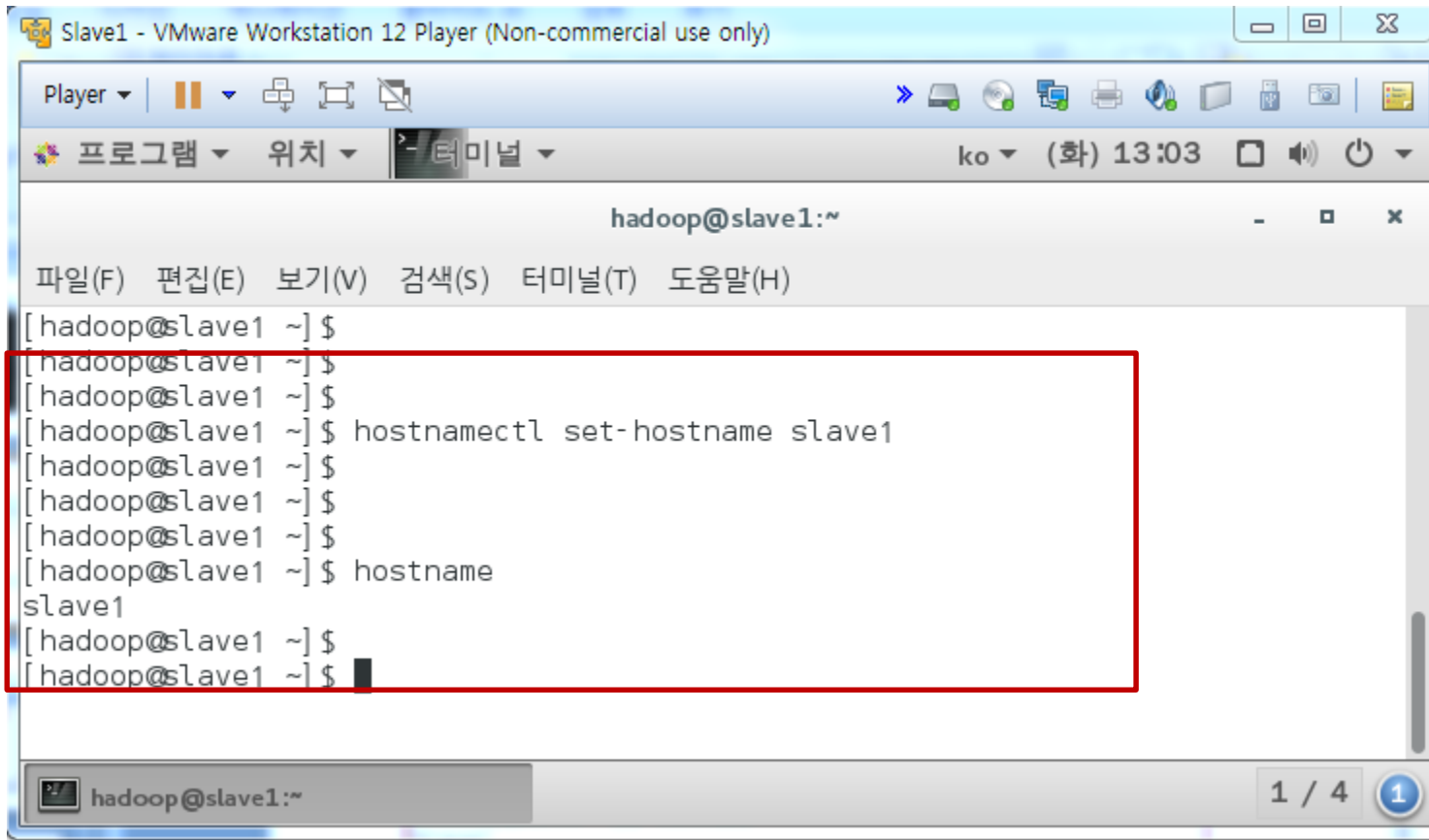


4) 가상 머신 실행





5) Hostname 변경



The screenshot shows a terminal window titled "Slave1 - VMware Workstation 12 Player (Non-commercial use only)". The terminal prompt is "hadoop@slave1:~". The user enters the command "hostnamectl set-hostname slave1", followed by "hostname", which outputs "slave1". The terminal window has a menu bar with "파일(F)", "편집(E)", "보기(V)", "검색(S)", "터미널(T)", and "도움말(H)". The status bar at the bottom shows "hadoop@slave1:~" and "1 / 4".

```
hadoop@slave1:~$  
hadoop@slave1:~$  
hadoop@slave1:~$  
hadoop@slave1:~$ hostnamectl set-hostname slave1  
hadoop@slave1:~$  
hadoop@slave1:~$  
hadoop@slave1:~$  
hadoop@slave1:~$ hostname  
slave1  
hadoop@slave1:~$  
hadoop@slave1:~$
```


6) Network 변경

취소(C) 유선 적용(A)

자세히 보기 신원 IPv4 IPv6 보안

이름(N)

MAC 주소 ▼

복제한 주소(C)

MTU 자동 - +

MAC 주소 선택

6) Network 변경

Slave1 - VMware Workstation 12 Player (Non-commercial use only)

Player | || | | | |

프로그램 위치 설정

취소(C) 유선

자세히 보기 신원 IPv4 IPv6 보안

IPv4 방식

☐ 자동(DHCP) ☐ 링크 로컬만 ☐ 사용 않기

☒ 수동

주소

주소	네트마스크	게이트웨이
172.16.119.10	255.255.255.0	172.16.119.2

네임서버(DNS)

자동

172.16.119.2

IP 주소 여러 개는 쉼표로 구분합니다

라우팅

자동

주소	네트마스크	게이트웨이	계측

설정


1 / 4

사용자 System에 맞게 지정

7) hosts 설정 확인

```
$ vi /etc/hosts
```

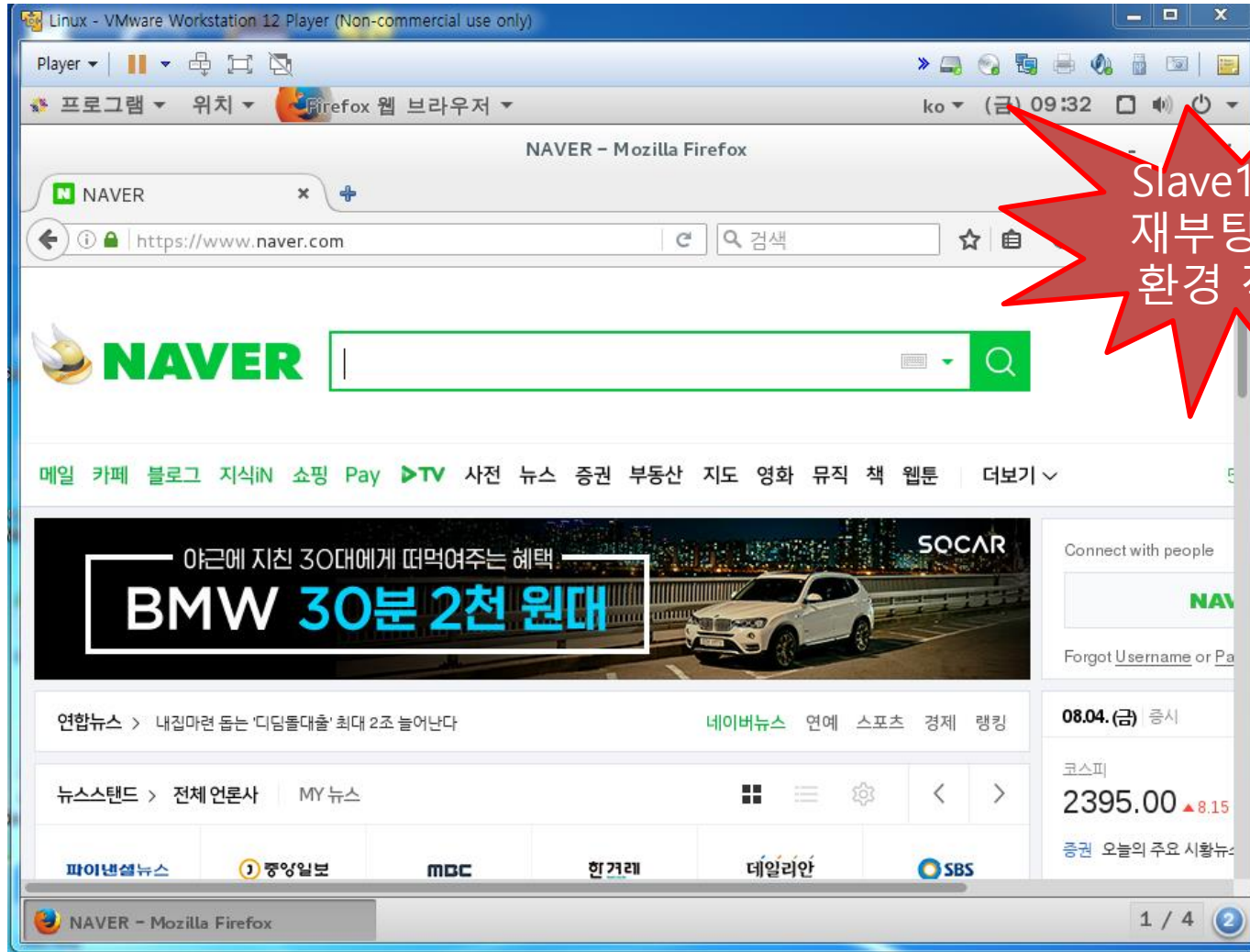
```
hadoop@master:~  
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)  
1 27.0.0.1    localhost localhost.localdomain localhost4 localhost4.localdomain4  
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6  
192.168.13.5 master  
192.168.13.10 slave1  
192.168.13.11 slave2  
~  
~
```



사용자
System에
맞게 지정

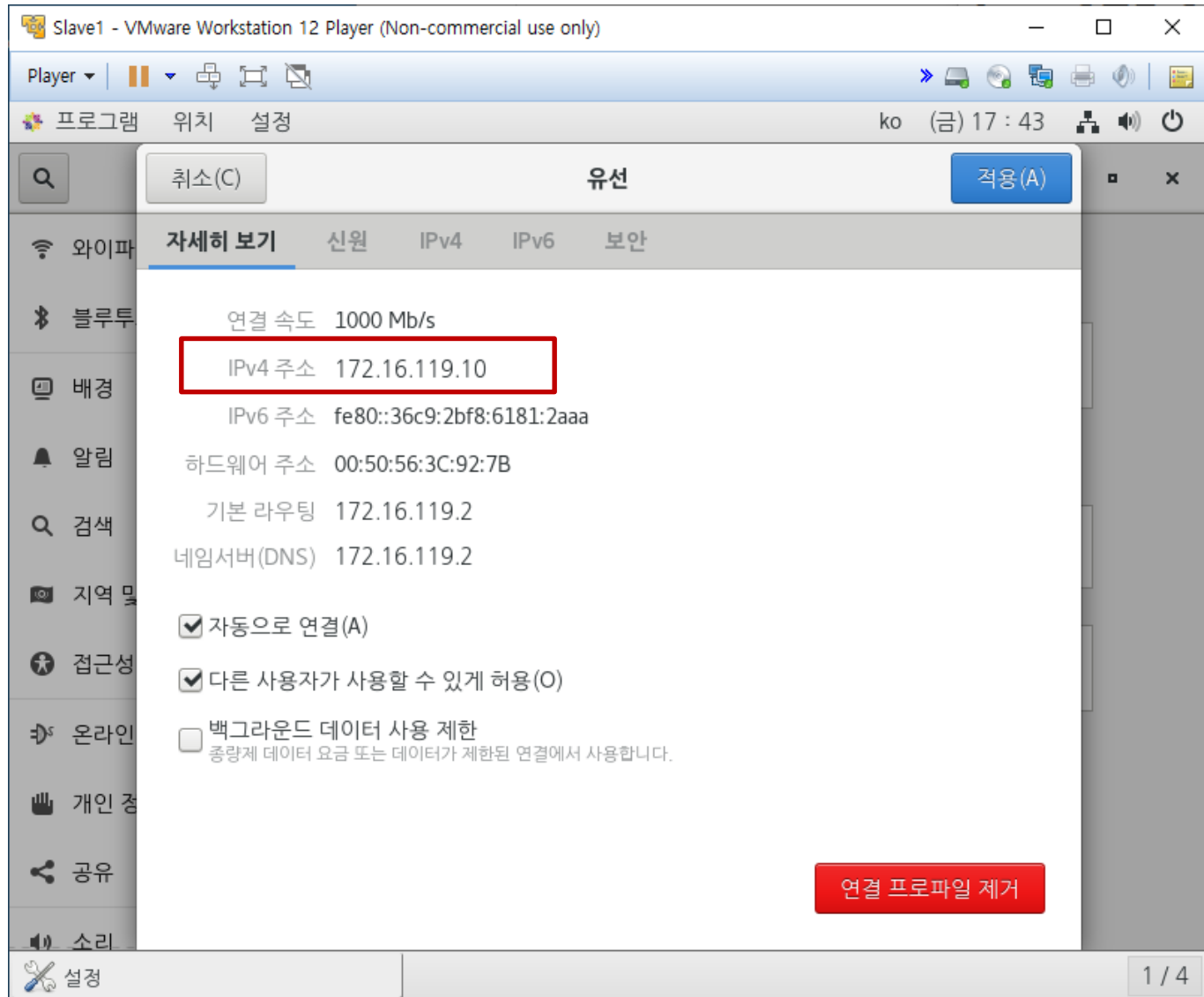
1, 1 모두

인터넷 연결 확인

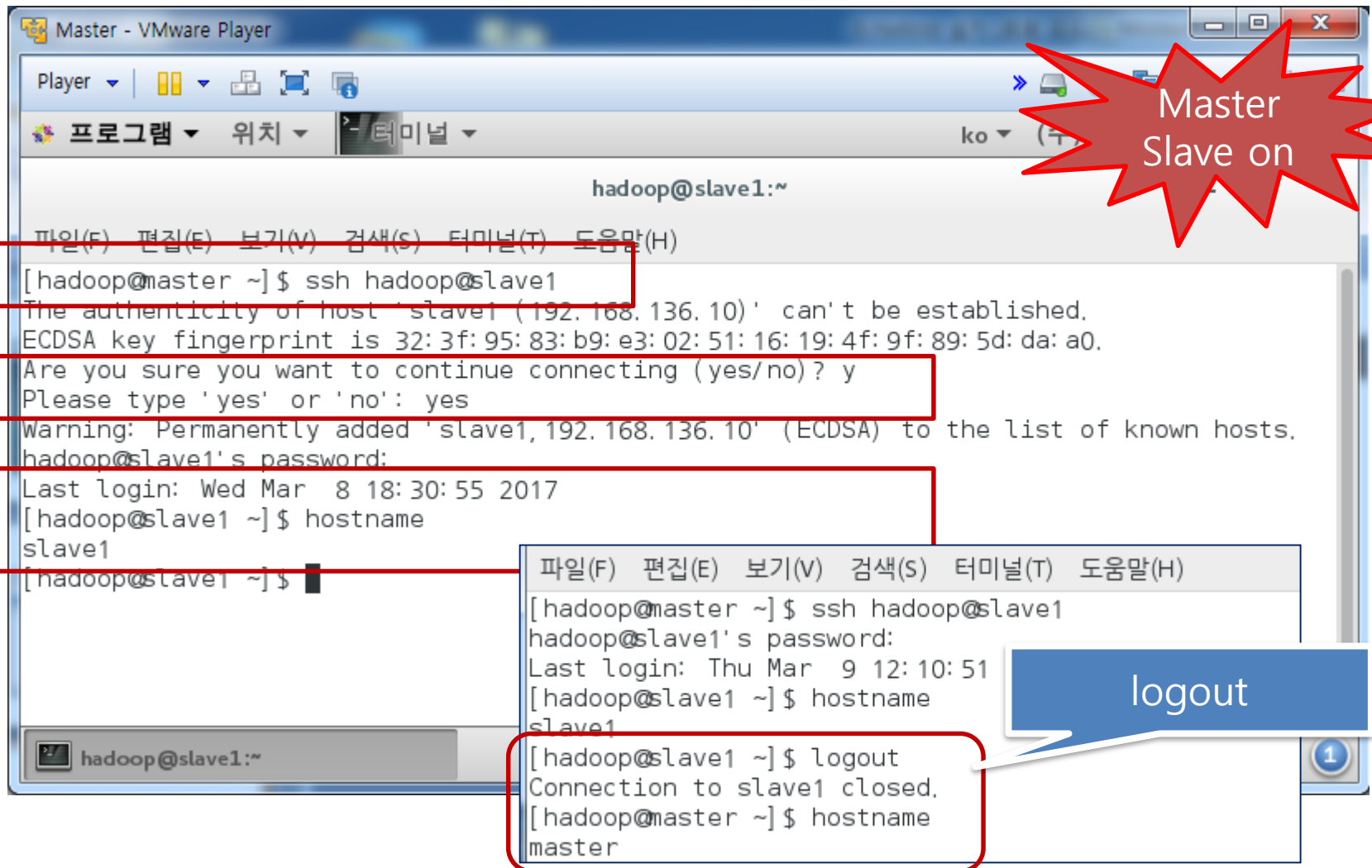


Slave1 서버
재부팅(NW
환경 적용)

서버 재부팅 후 네트워크 환경설정 확인



8) 상호 서버 접속(Master -> Slave)

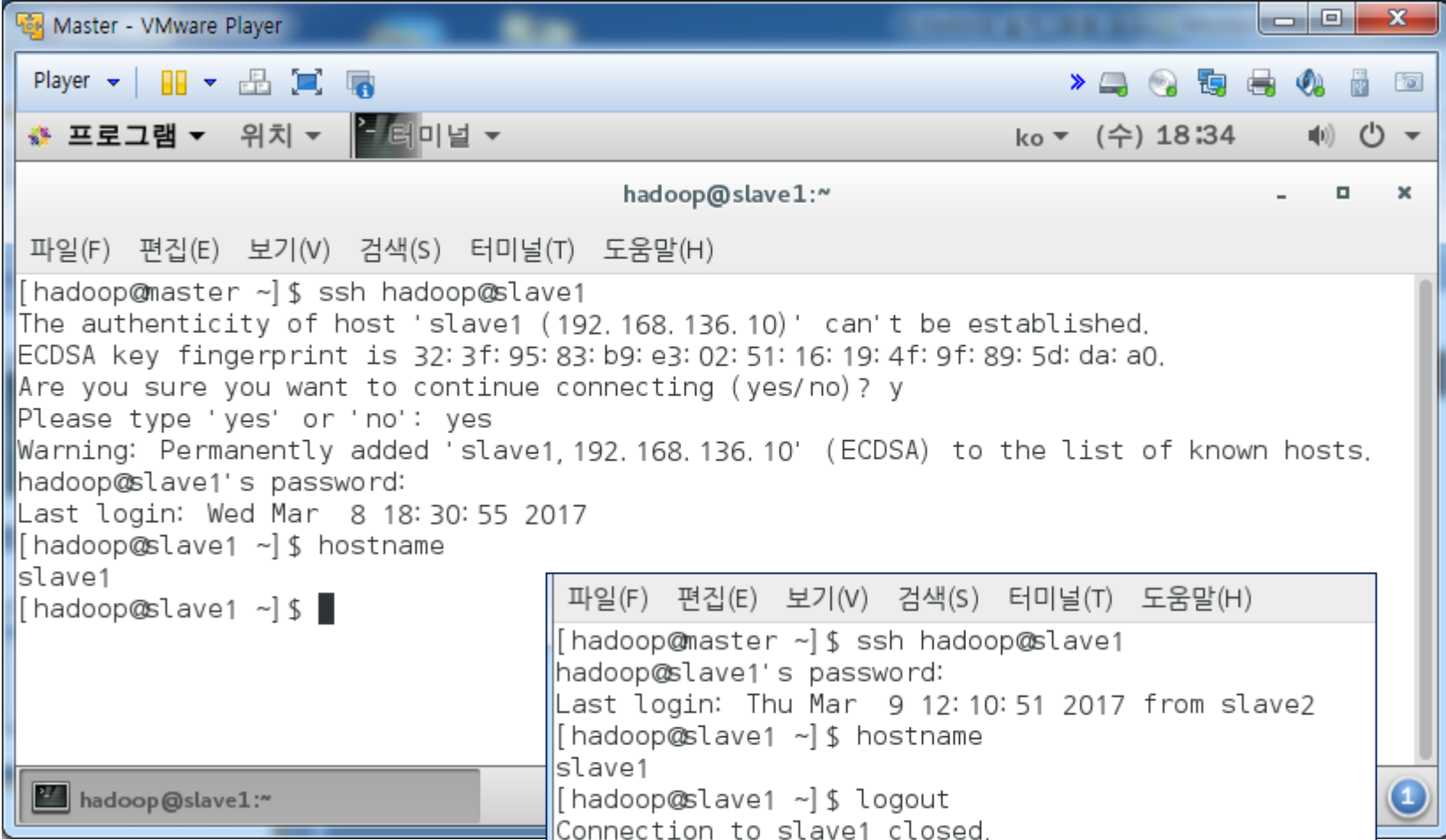


```
Master - VMware Player
Player
프로그램 위치 터미널 ko
hadoop@slave1:~
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)
[hadoop@master ~]$ ssh hadoop@slave1
The authenticity of host 'slave1 (192.168.136.10)' can't be established.
ECDSA key fingerprint is 32:3f:95:83:b9:e3:02:51:16:19:4f:9f:89:5d:da:a0.
Are you sure you want to continue connecting (yes/no)? y
Please type 'yes' or 'no': yes
Warning: Permanently added 'slave1,192.168.136.10' (ECDSA) to the list of known hosts.
hadoop@slave1's password:
Last login: Wed Mar  8 18:30:55 2017
[hadoop@slave1 ~]$ hostname
slave1
[hadoop@slave1 ~]$
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)
[hadoop@master ~]$ ssh hadoop@slave1
hadoop@slave1's password:
Last login: Thu Mar  9 12:10:51
[hadoop@slave1 ~]$ hostname
slave1
[hadoop@slave1 ~]$ logout
Connection to slave1 closed.
[hadoop@master ~]$ hostname
master
```

Master Slave on

logout

8) 상호 서버 접속(Master -> Slave)



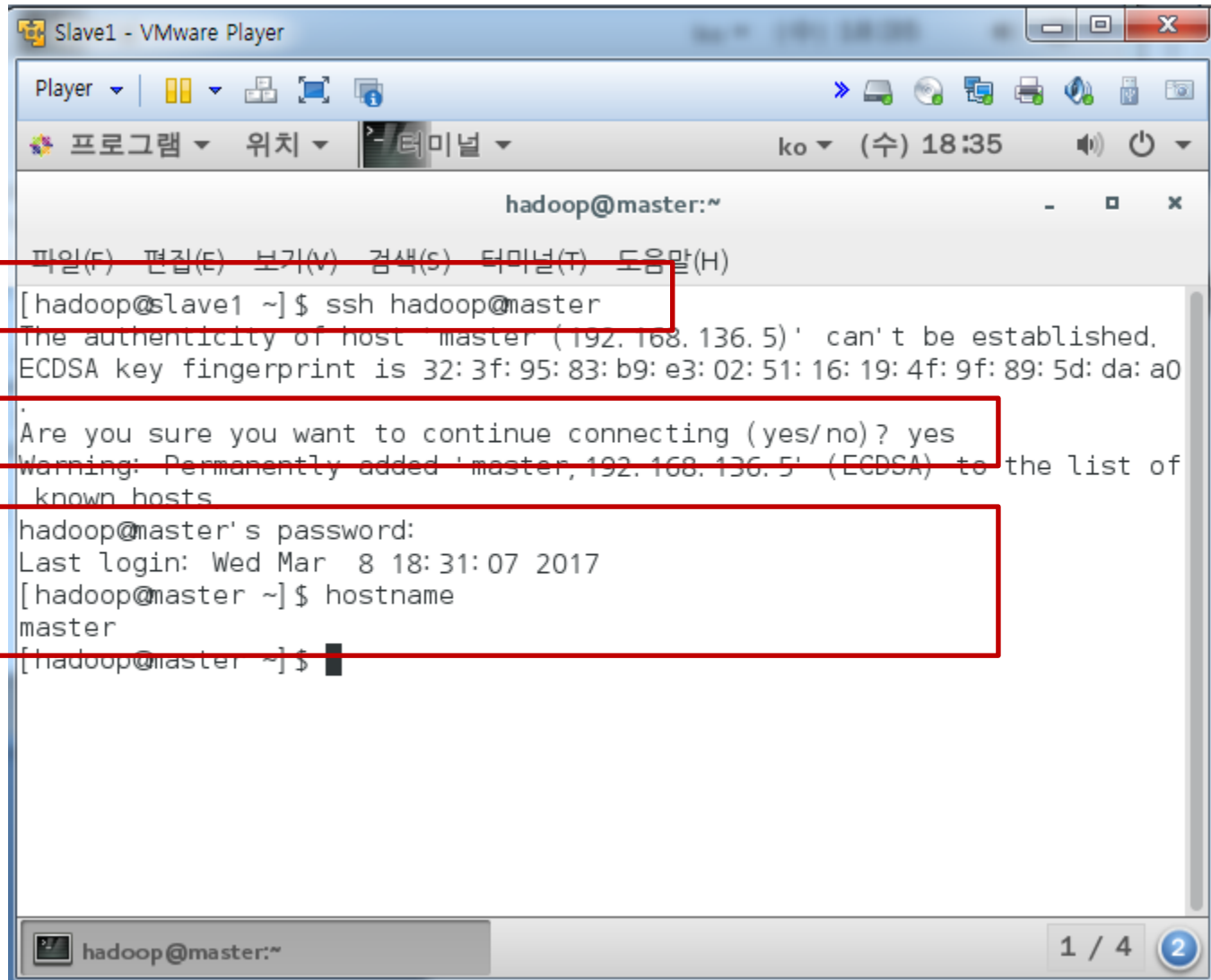
The screenshot shows a VMware Player window titled "Master - VMware Player". The interface includes a menu bar with "프로그램", "위치", and "터미널", and a status bar showing "ko (수) 18:34". The main terminal window is titled "hadoop@slave1:~" and contains the following text:

```
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)
[hadoop@master ~]$ ssh hadoop@slave1
The authenticity of host 'slave1 (192.168.136.10)' can't be established.
ECDSA key fingerprint is 32:3f:95:83:b9:e3:02:51:16:19:4f:9f:89:5d:da:a0.
Are you sure you want to continue connecting (yes/no)? y
Please type 'yes' or 'no': yes
Warning: Permanently added 'slave1,192.168.136.10' (ECDSA) to the list of known hosts.
hadoop@slave1's password:
Last login: Wed Mar  8 18:30:55 2017
[hadoop@slave1 ~]$ hostname
slave1
[hadoop@slave1 ~]$
```

An inset window shows the continuation of the terminal session:

```
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)
[hadoop@master ~]$ ssh hadoop@slave1
hadoop@slave1's password:
Last login: Thu Mar  9 12:10:51 2017 from slave2
[hadoop@slave1 ~]$ hostname
slave1
[hadoop@slave1 ~]$ logout
Connection to slave1 closed.
[hadoop@master ~]$ hostname
master
```

8) 상호 서버 접속 (Slave -> Master)



The screenshot shows a terminal window titled "Slave1 - VMware Player". The terminal is running a shell on a slave node. The user enters the command `ssh hadoop@master`. The terminal displays the following output:

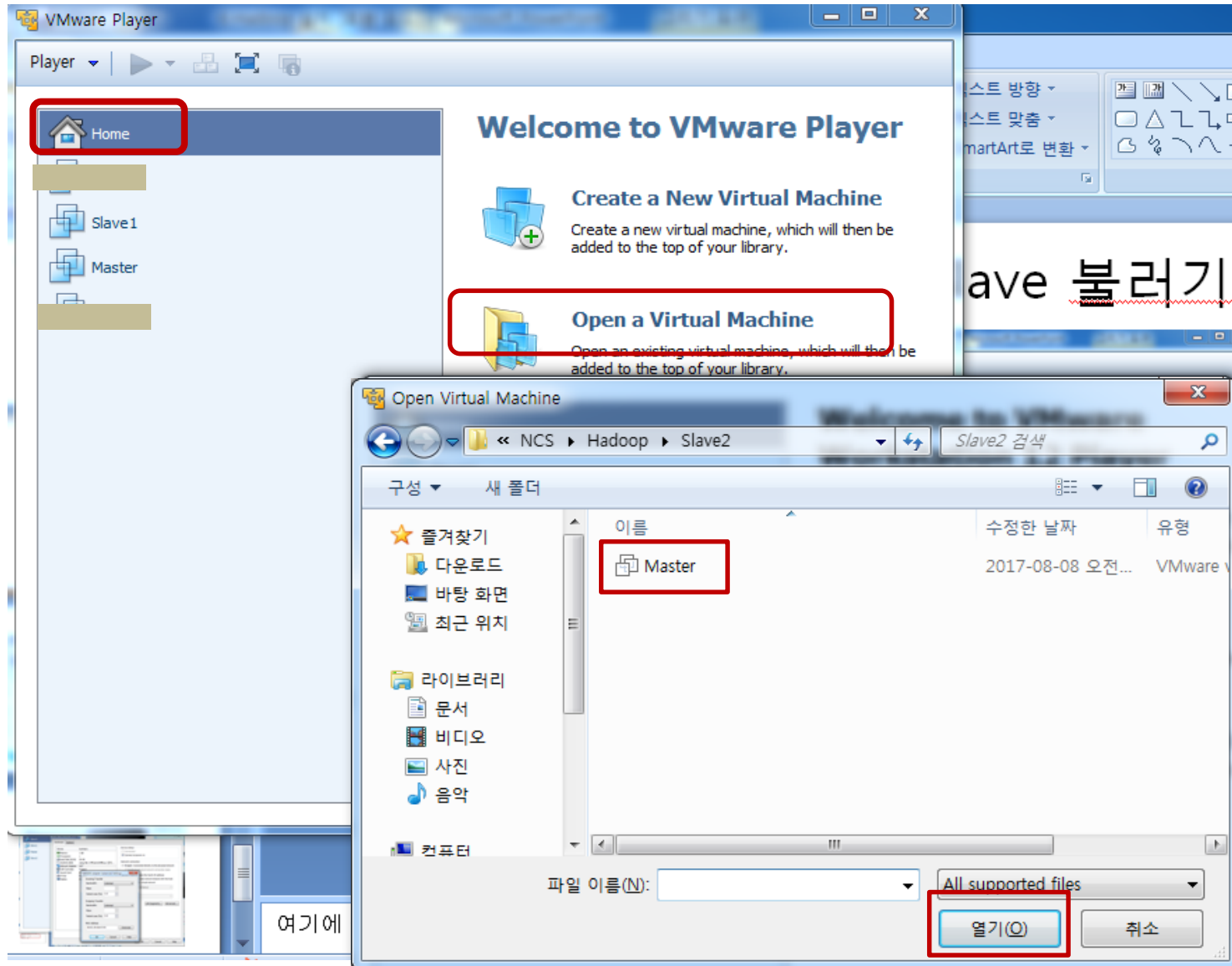
```
hadoop@master:~  
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)  
[hadoop@slave1 ~]$ ssh hadoop@master  
The authenticity of host 'master (192.168.136.5)' can't be established.  
ECDSA key fingerprint is 32:3f:95:83:b9:e3:02:51:16:19:4f:9f:89:5d:da:a0  
.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'master,192.168.136.5' (ECDSA) to the list of  
known hosts  
hadoop@master's password:  
Last login: Wed Mar  8 18:31:07 2017  
[hadoop@master ~]$ hostname  
master  
[hadoop@master ~]$
```

The terminal window has a menu bar with options: 프로그램 (Program), 위치 (Location), 터미널 (Terminal), and a status bar showing the time as 18:35 on Wednesday. The bottom status bar shows the current session as hadoop@master:~ and a page indicator 1 / 4.

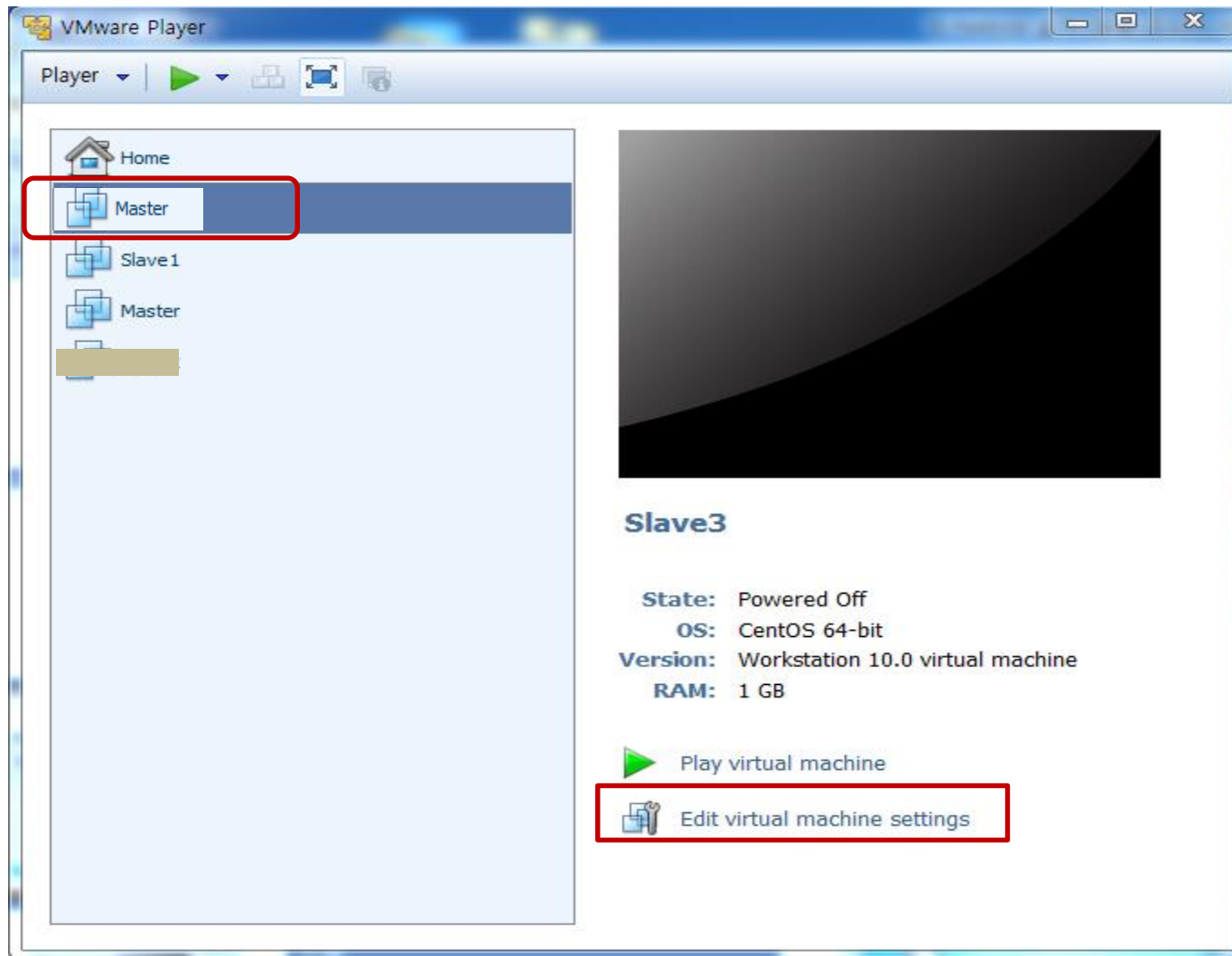
2. Slave2 가져오기

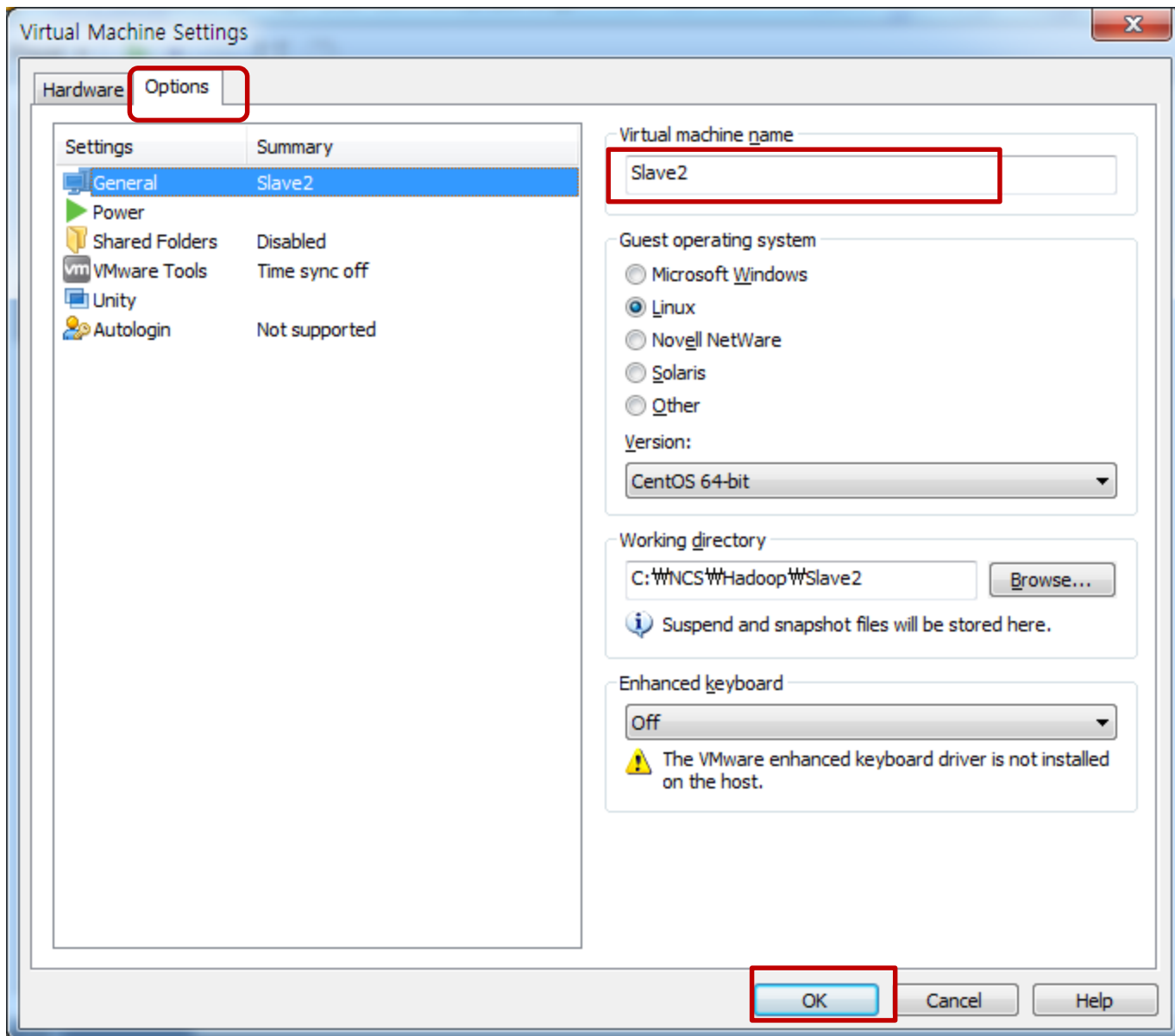
- 1) Slave2 가져오기
- 2) Slave2 이름 변경
- 3) MAC 주소 생성
- 4) 가상 머신 실행
- 5) Hostname 변경
- 6) Network 변경
- 7) 다른 서버 접속

1) Slave2 가져오기

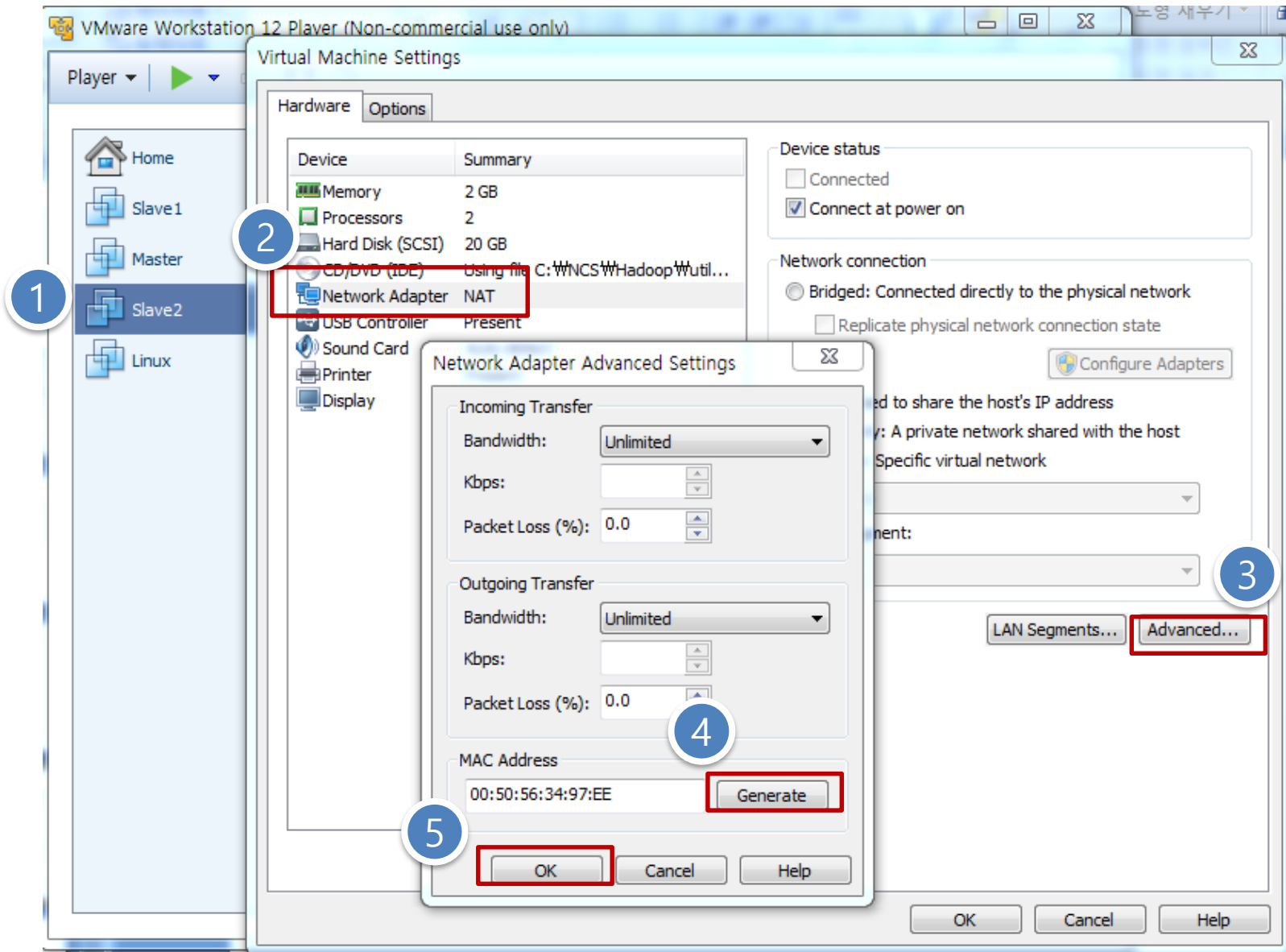


2) Slave2 이름 변경

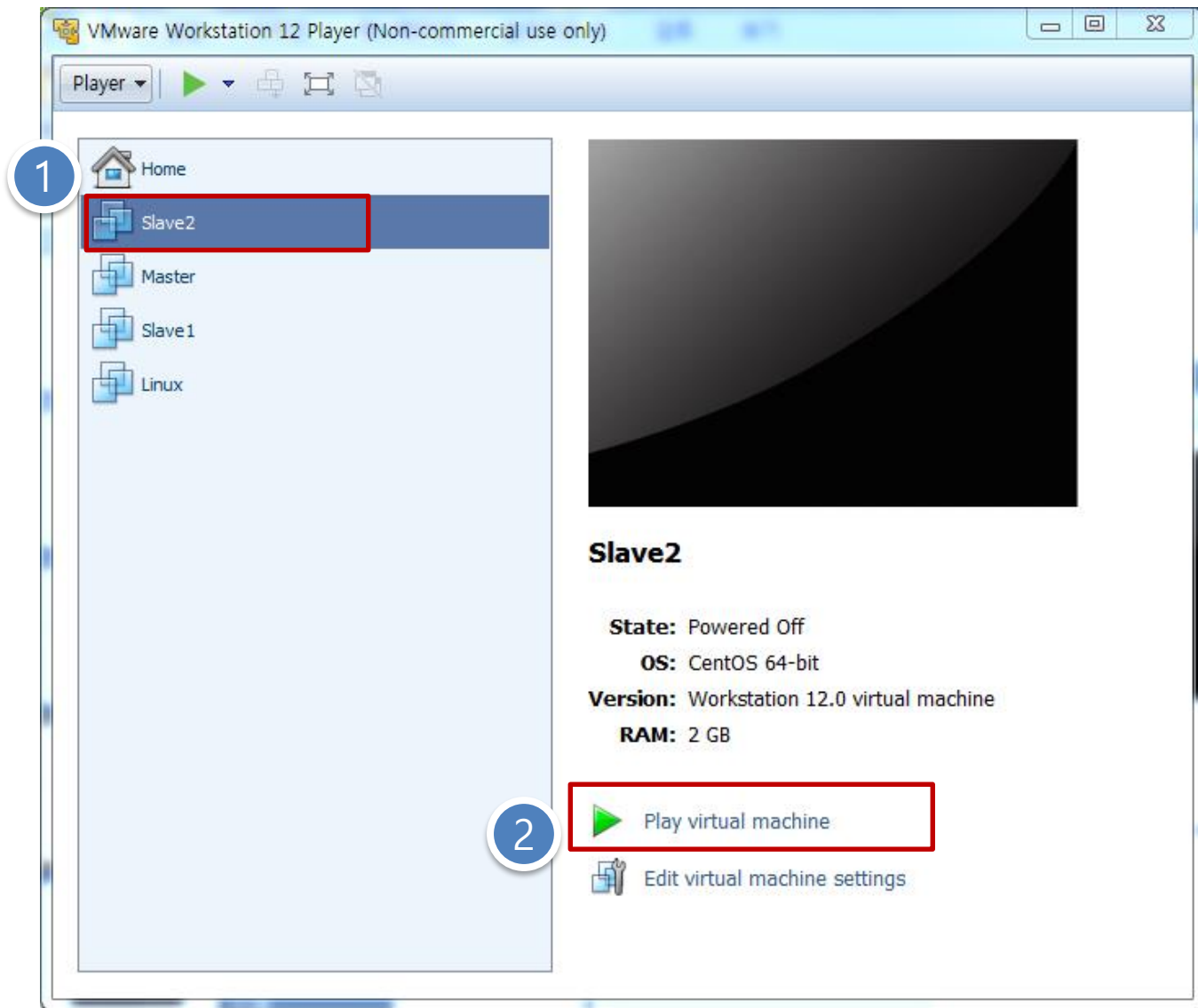


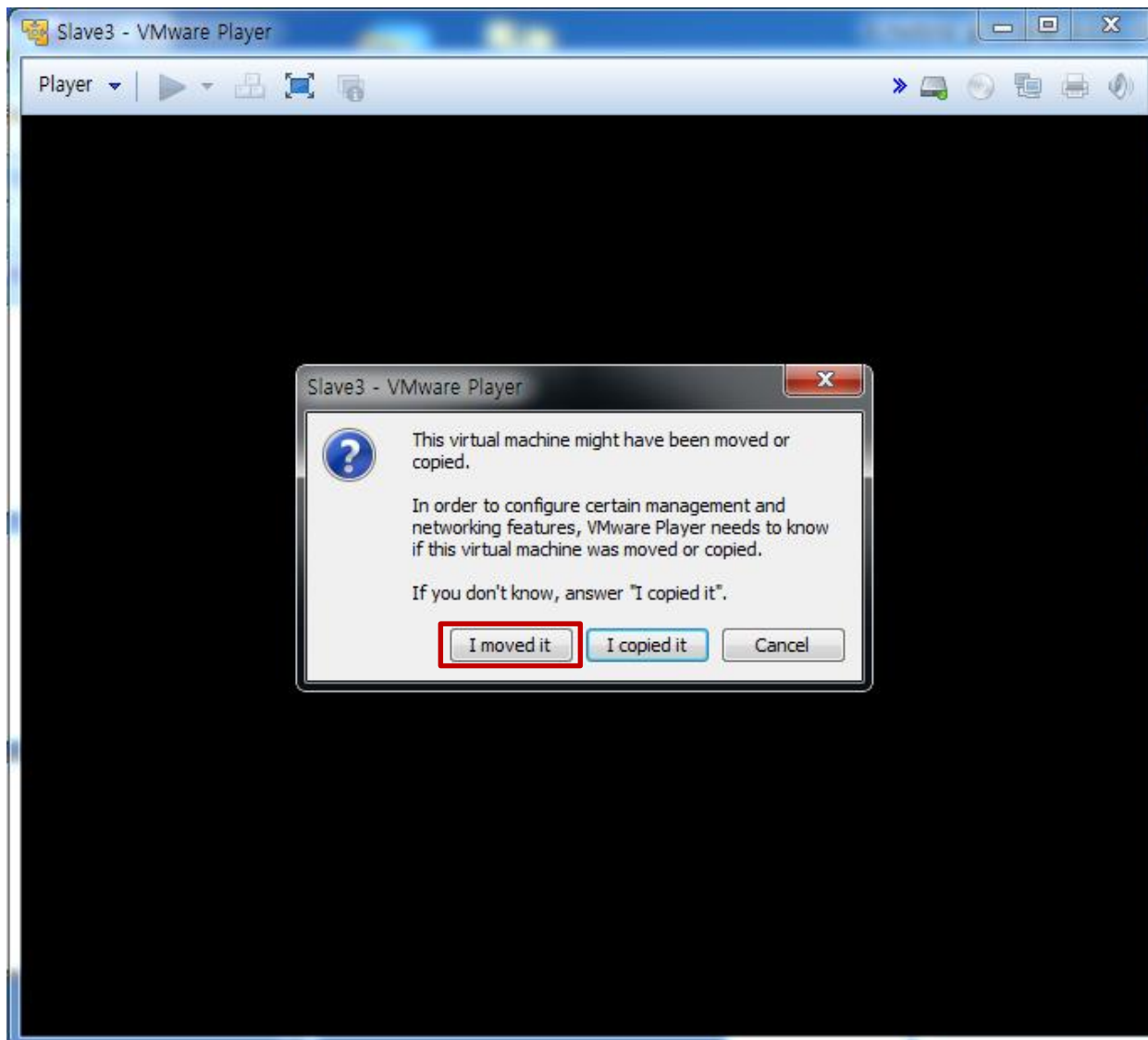


3) MAC 주소 생성

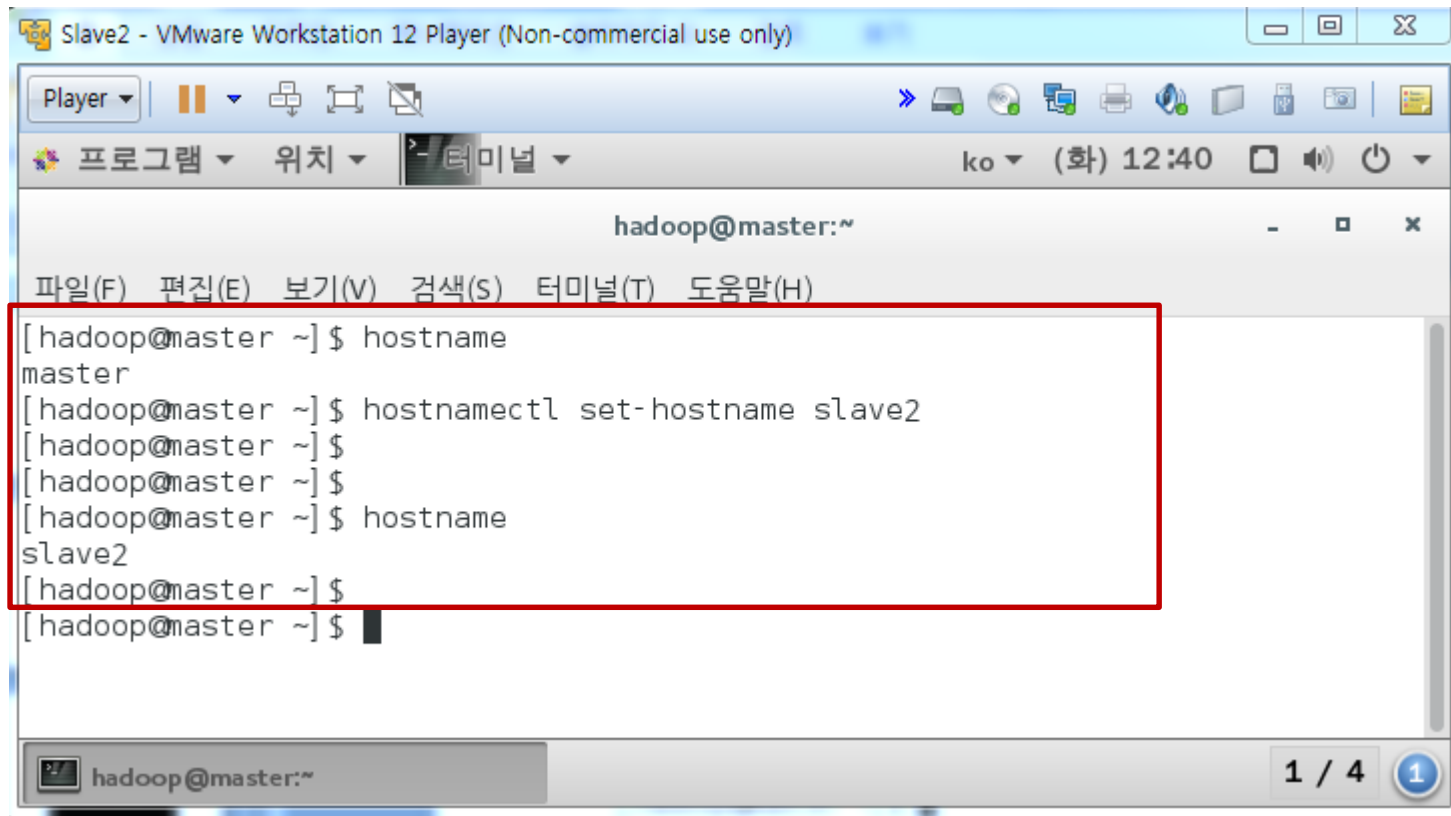


4) 가상 머신 실행





5) Hostname 변경




The screenshot shows a terminal window titled "Slave2 - VMware Workstation 12 Player (Non-commercial use only)". The terminal is running on a system named "hadoop@master:~". The user has executed the following commands:

```
[hadoop@master ~]$ hostname  
master  
[hadoop@master ~]$ hostnamectl set-hostname slave2  
[hadoop@master ~]$  
[hadoop@master ~]$  
[hadoop@master ~]$ hostname  
slave2  
[hadoop@master ~]$  
[hadoop@master ~]$
```

The output of the commands shows the hostname changing from "master" to "slave2". The terminal window also displays a menu bar with options like "파일(F)", "편집(E)", "보기(V)", "검색(S)", "터미널(T)", and "도움말(H)". The status bar at the bottom indicates "hadoop@master:~" and "1 / 4".

6) hosts 설정 확인

```
hadoop@master:~  
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)  
127.0.0.1    localhost localhost.localhost localhost4 localhost4.localhost4  
::1         localhost localhost.localhost localhost6 localhost6.localhost6  
192.168.13.5 master  
192.168.13.10 slave1  
192.168.13.11 slave2  
~  
~
```



1, 1 모두

7) Network 변경

취소(C) 유선 적용(A)

자세히 보기 **신원** IPv4 IPv6 보안

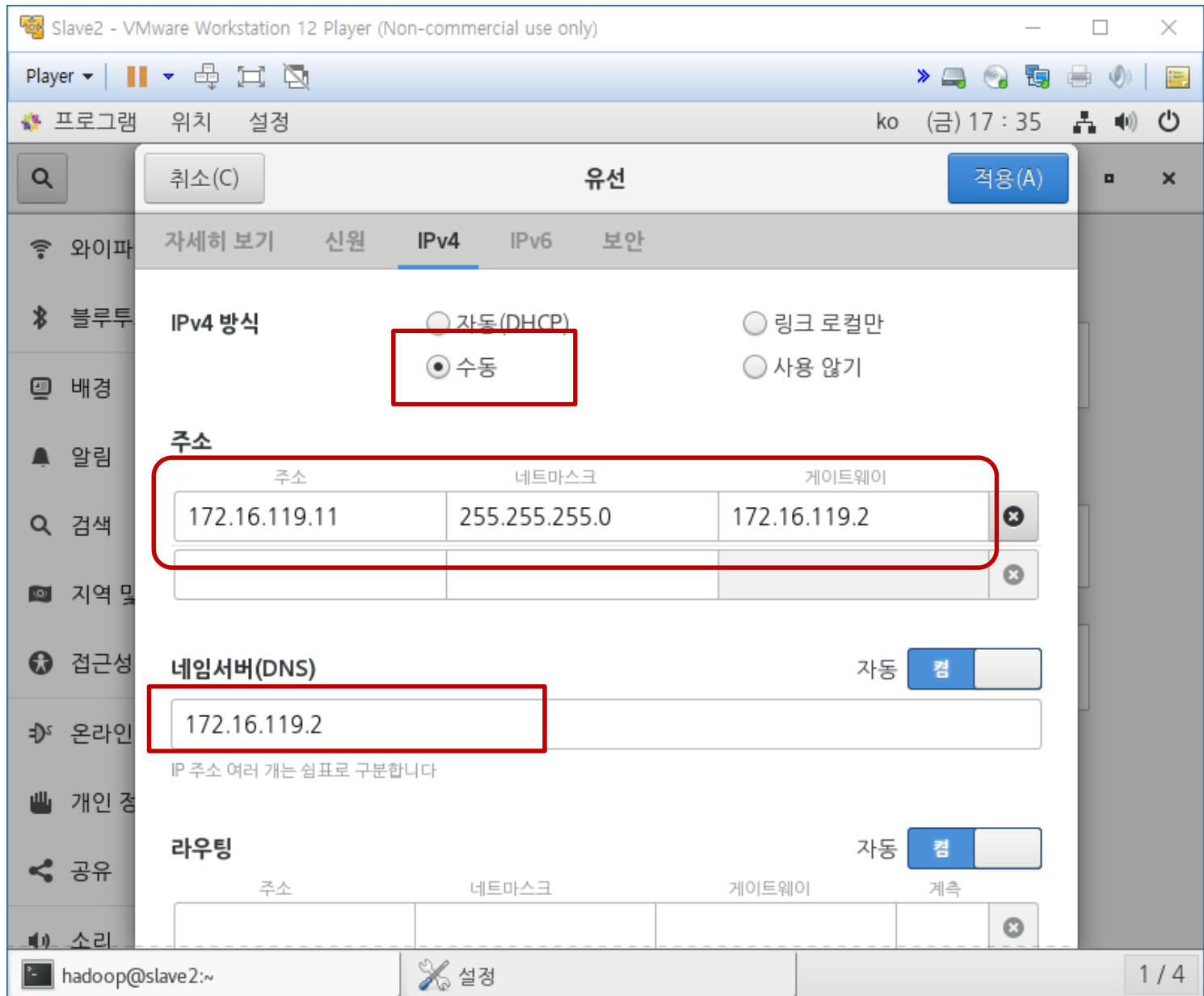
이름(N)

MAC 주소 ▼

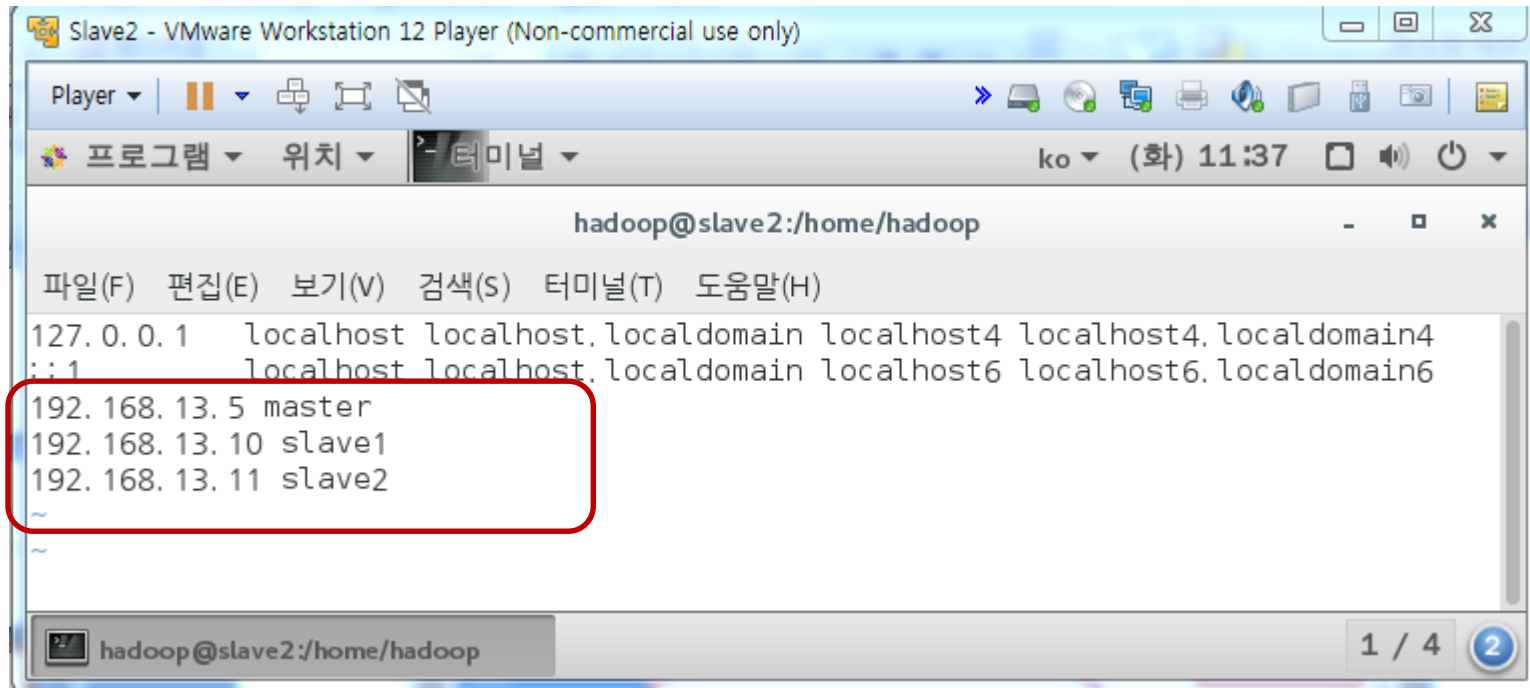
복제한 주소(C)

MTU - +

MAC 주소 선택



8) hosts 설정 확인



```
hadoop@slave2:/home/hadoop

파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)
127.0.0.1    localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.168.13.5 master
192.168.13.10 slave1
192.168.13.11 slave2
~
~
```

인터넷 연결 확인



9) 다른 서버 접속

다른 서버
접속 시 암호
요구

```
hadoop@master:~  
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)  
[root@master ~]# ssh hadoop@slave1  
The authenticity of host 'slave1 (192.168.136.10)' can't be established.  
ECDSA key fingerprint is 32:3f:95:83:b9:e3:02:51:16:19:4f:9f:89:5d:da:a0.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'slave1,192.168.136.10' (ECDSA) to the list of known  
hosts.  
hadoop@slave1's password:  
Last login: Thu Mar  9 12:15:06 2017 from master  
[hadoop@slave1 ~]$ hostname  
slave1  
[hadoop@slave1 ~]$ logout  
Connection to slave1 closed.  
[root@master ~]# ssh hadoop@slave2  
The authenticity of host 'slave2 (192.168.136.11)' can't be established.  
ECDSA key fingerprint is 32:3f:95:83:b9:e3:02:51:16:19:4f:9f:89:5d:da:a0.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'slave2,192.168.136.11' (ECDSA) to the list of known  
hosts.  
hadoop@slave2's password:  
Last login: Thu Mar  9 12:10:08 2017 from slave1  
[hadoop@slave2 ~]$ hostname  
slave2  
[hadoop@slave2 ~]$ logout  
Connection to slave2 closed.
```

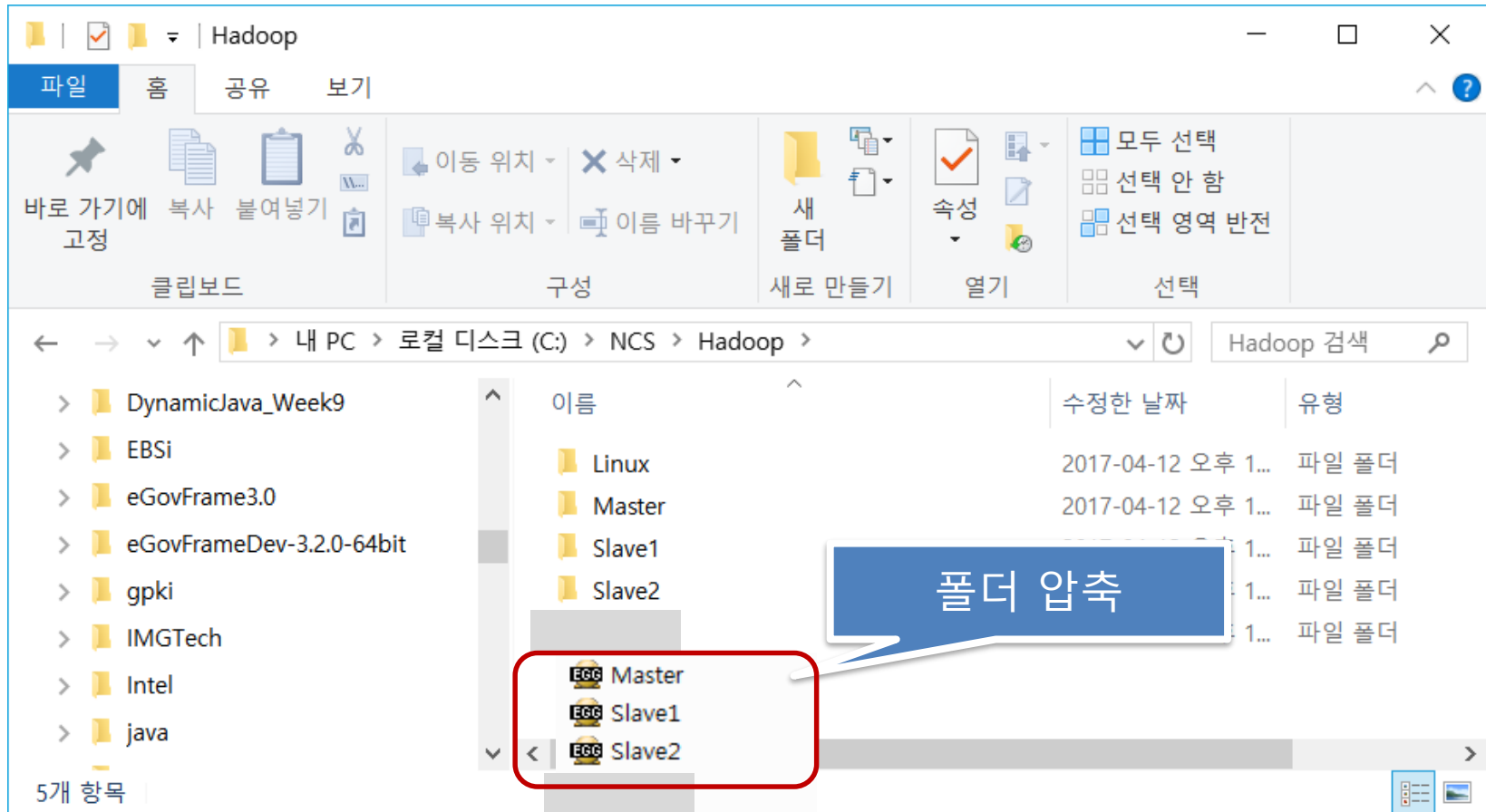
slave1 접속/해제

slave2 접속/해제

```
hadoop@master:~  
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)  
Last login: Thu Mar  9 12:10:08 2017 from slave1  
[hadoop@slave2 ~]$ hostname  
slave2  
[hadoop@slave2 ~]$ logout  
Connection to slave2 closed.  
[root@master ~]# ssh hadoop@master  
The authenticity of host 'master (192.168.136.5)' can't be established.  
ECDSA key fingerprint is 32:3f:95:83:b9:e3:02:51:16:19:4f:9f:89:5d:da:a0.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'master,192.168.136.5' (ECDSA) to the list of known  
hosts.  
hadoop@master's password:  
Last login: Thu Mar  9 12:11:24 2017 from slave2  
h[hadoop@master ~]$ hostname  
master  
[hadoop@master ~]$
```

master 접속/해제

10) Master/Slave 백업



3. 인증키 생성 및 복사

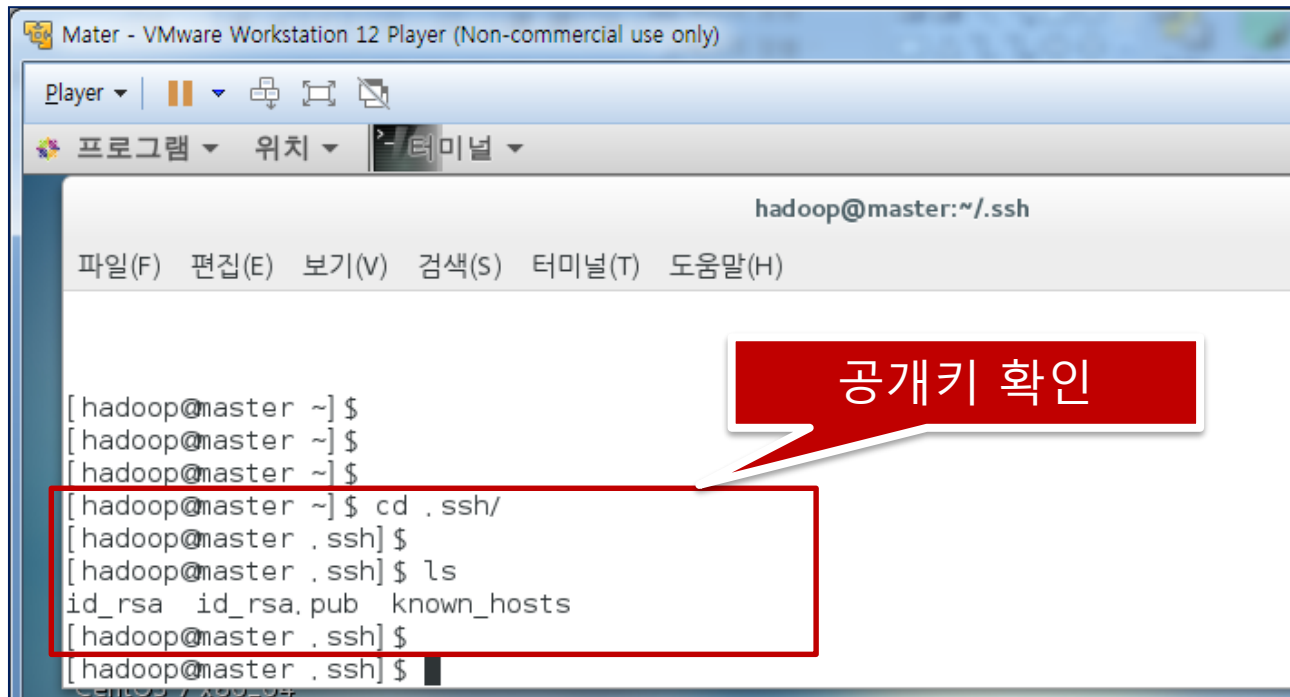
- 1) 인증키 생성 및 암호 해제
- 2) 다른 서버에 인증키 복사
- 3) 각 서버 접속 테스트

1. 인증키 생성/암호 해제[master 작업]

```
hadoop@master:~  
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)  
[hadoop@master ~]$ ssh-keygen -t rsa  
Generating public/private rsa key pair.  
Enter file in which to save the key (/home/hadoop/.ssh/id_rsa):  
Created directory '/home/hadoop/.ssh'.  
Enter passphrase (empty for no passphrase):  
Enter same passphrase again:  
Your identification has been saved in /home/hadoop/.ssh/id_rsa.  
Your public key has been saved in /home/hadoop/.ssh/id_rsa.pub.  
The key fingerprint is:  
8a:b9:66:34:2e:2b:14:c3:a6:e9:bc:63:68:3f:d7:db hadoop@master  
The key's randomart image is:  
+--[ RSA 2048 ]-----+  
|  
|  
|.   
| =   
| o.o      S   
| o.  oo .   
| =  oo.o   
| o*..+o ..   
| oo=*+  ..E   
+-----+  
[hadoop@master ~]$
```

공개키 생성 후 Enter키 3회

공개키는 홈 디렉터리 하위에 .ssh 폴더로 생성된다.



The screenshot shows a terminal window titled "Mater - VMware Workstation 12 Player (Non-commercial use only)". The terminal prompt is "hadoop@master:~/ssh". The terminal output shows the following commands and results:

```
[hadoop@master ~]$  
[hadoop@master ~]$  
[hadoop@master ~]$  
[hadoop@master ~]$ cd .ssh/  
[hadoop@master .ssh]$  
[hadoop@master .ssh]$ ls  
id_rsa id_rsa.pub known_hosts  
[hadoop@master .ssh]$  
[hadoop@master .ssh]$
```

A red box highlights the commands "cd .ssh/" and "ls", and a red speech bubble points to the "ls" command with the text "공개키 확인" (Check public key).

2. 다른 서버에 인증키 복사

```
hadoop@master:~/ssh
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)
[hadoop@master .ssh] $ ls
id_rsa id_rsa.pub
[hadoop@master .ssh] $ scp id_rsa.pub authorized_keys
[hadoop@master .ssh] $ ls
authorized_keys id_rsa id_rsa.pub
[hadoop@master .ssh] $ scp id_rsa.pub hadoop@slave1: /home/hadoop/.ssh/authorized_keys
The authenticity of host 'slave1 (192.168.220.10)' can't be established.
ECDSA key fingerprint is 75:ce:82:0d:bd:b0:48:07:cd:e4:72:09:cf:35:50:73.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'slave1, 192.168.220.10' (ECDSA) to the list of known hosts.
hadoop@slave1's password:
id_rsa.pub                                100% 395      0.4KB/s   00:00
[hadoop@master .ssh] $
[hadoop@master .ssh] $ scp id_rsa.pub hadoop@slave2: /home/hadoop/.ssh/authorized_keys
The authenticity of host 'slave2 (192.168.220.11)' can't be established.
ECDSA key fingerprint is 75:ce:82:0d:bd:b0:48:07:cd:e4:72:09:cf:35:50:73.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'slave2, 192.168.220.11' (ECDSA) to the list of known hosts.
hadoop@slave2's password:
id_rsa.pub                                100% 395      0.4KB/s   00:00
[hadoop@master .ssh] $
```

Master 공개키 복사

Slave1 복사

Slave2 복사

- ❖ Slave1, Slave2 홈 디렉터리 하위에 .ssh 폴더가 생성되고, 공개키가 복제된다.
- ❖ 서버 복사 과정에서 오류 발생하면 Slave1과 Slave2에서 각각 Master와 ssh 명령어로 서버 연결 후 복사한다.

3. 다른 서버 접속 테스트

System **reboot** 후 Master에서 Slave 연결

The screenshot shows a VMware Player window titled "Master - VMware Player". Inside, a terminal window titled "hadoop@master: ~/.ssh" is open. The terminal displays the following commands and output:

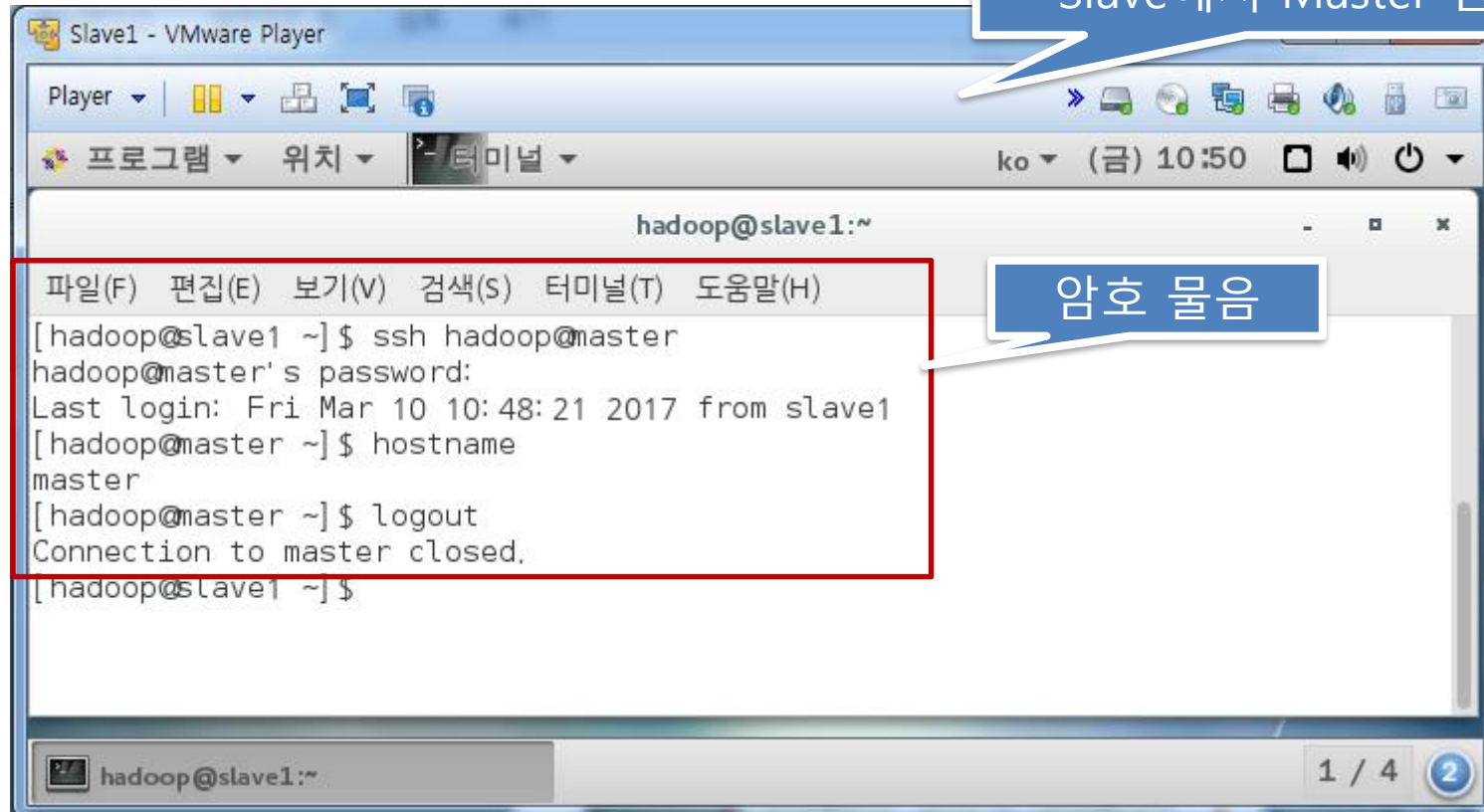
```
[hadoop@master .ssh]$ ssh hadoop@slave1
Last login: Fri Mar 10 09:42:32 2017
[hadoop@slave1 ~]$ hostname
slave1
[hadoop@slave1 ~]$ logout
Connection to slave1 closed.
[hadoop@master .ssh]$ ssh hadoop@slave2
Last login: Fri Mar 10 09:42:43 2017
[hadoop@slave2 ~]$ hostname
slave2
[hadoop@slave2 ~]$ logout
Connection to slave2 closed.
```

Annotations on the image include:

- A blue callout box pointing to the terminal window with the text "System **reboot** 후 Master에서 Slave 연결".
- A blue callout box pointing to the first SSH command with the text "Slave1 연결".
- A blue callout box pointing to the second SSH command with the text "Slave2 연결".
- A red starburst shape with the text "암호 NO" (Password NO) indicating a password prompt.

다른 서버 접속 테스트

Slave에서 Master 연결



```
Slave1 - VMware Player
Player | [Icons] | ko (금) 10:50
프로그램 | 위치 | 터미널
hadoop@slave1:~
파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)
[hadoop@slave1 ~]$ ssh hadoop@master
hadoop@master's password:
Last login: Fri Mar 10 10:48:21 2017 from slave1
[hadoop@master ~]$ hostname
master
[hadoop@master ~]$ logout
Connection to master closed.
[hadoop@slave1 ~]$
```

암호 물음

hadoop@slave1:~ 1 / 4 2