# Secure Copying in Network Connection using Knoppix

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Abstract: -This paper describes the steps to be taken in obtaining data using a network in virtual environment. It describes the process of secure copying of file from Windows based system to Linux system like knoppix. This procedure helps user to copy data from one system to other without the interception of other parties in same network. Knoppix system transfers data using SSH server which uses authentication protocol to manage connection between end users.

**Keywords:** -Knoppix, Virtual environment, File sharing, SSH Server, Authentication

# I. PURPOSE

The purpose of this procedure is to copy data from one hard drive/folder/file to other computer when both the hard drives are connected in network. This paper provides a procedure for copy these data on hard drives without making changes to the data on the source drives using network. Here one scenario is taken. Both the system installed in VMware Workstation. Target system (in this case it is Windows system) has a folder in it's one of the drive and user has to obtain that folder's data using network.

#### II. LIST OF TOOLS

- i) VMware Workstation
- ii) Windows Xp
- iii) Knoppixsystem (ISO, CD, Bootable USB)

#### **III. PREPARATION**

Take a machine which runs Knoppix system.Knoppix is a bootable Live system on CD, DVD or USB flash drives, consisting of а representative collection of GNU/Linux software, automatic hardware detection.<sup>[1]</sup>Computers that support booting from USB devices can load Knoppix from a live USB flash drive or memory card.<sup>[2]</sup>Connect both systems (Knoppix and Target) with Ethernet Cable. Make sure that communication is ON between two systems. User can make sure that by pinging to source system. If there is no packet loss while Request\Response procedure then the target system is open for further processes.

## IV .FILE SHARING ON DIFFERENT WINDOWS SYSTEMS

User must check that file sharing option is ON in the target system. Here three windows system is shown. How the sharing option could be enable is also shown. For Windows 7 and Windows 8 password protection must be turned off for sharing.

i) Windows XP

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ten @c1				- 6
System Tasks 🛞 🅯 📔	Documents and Settings	Program Files	RECYCLER	System Vokane Information
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Constitute Adder's files Contex the Table				
Ither Places				
H-Cooperts				

Fig. 1 List of Files and Folders

Here Windows XP is source computer. User has to take files from XP to his own system. For this practical one folder is selected named 'Fourth'.



Fig.2 Sharing Folder from Windows System

To share the folder on network, go to Properties  $\rightarrow$  Sharing option. Check the 'Share this folder on the network' option. User can change the folder name.

He can also allow network users to change files. But User will not check that option, because it may alter the data. So we will leave that checkbox unmarked.



Fig.3 Sign change of Shared Folder So we can see the change in the icon of the folder. It shows that the folder is now shared and available on network.

😂 Fourth					
File Edit View Favorites Tools	Help				2
🔇 Back + 🜔 · 🏂 🔎 S	iearch 💫 Folders 🛄•				
Address 🛅 C/Fourth	_				e 🔁 🖌
File and Folder Tasks (*) File a new folder Publish this folder to the Web Share the folder	<b>)</b> n	F2	p to	Text Document 11/3	
Other Places (E)					

Fig.4 Content of Shared Folder

All the Files and folders of 'Fourth' folder is shown in the figure. These all are also shared as we shared the whole 'Fourth' folder. Note that if you share the parent folder than all the child folder(s)/sub folder(s) are also shared with their content.

i) Windows 7



Fig.5 Change Password Protection

Network File and Folder Sharing Shared Shared Network Path: WIIN-FLPMJTLDNHL\Shared Share Advanced Sharing Set custom permissions, create multiple shares, and set other advanced sharing options. Advanced Sharing Password Protection People without a user account and password for this compute can access folders shared with everyone.	eneral	Sharing	Security	Previous Versions	Customize
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Network Path: \\\\ININ-FLPMJTLDNHL\Shared Share Advanced Sharing Set custom permissions, create multiple shares, and set other advanced sharing options. Password Protection People without a user account and password for this compute can access folders shared with everyone.	T	Share Share	4 4		
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Password Protection People without a user account and password for this compute can access folders shared with everyone.		Advance	d Sharing		
People without a user account and password for this compute can access folders shared with everyone.	Passw	vord Protec	tion		
	Peopl can a	e without ccess fold	a user acci ers shared	ount and password fo with everyone.	or this computer
To change this setting, use the <u>Network and Sharing Center</u> .	To ch	ange this	setting, use	e the <u>Network and S</u>	haring Center.

Fig.6 File sharing option

Same procedure is done on windows 7 operating system also. Here, User must sure that password protection is disabled for sharing. User can check by look into 'Advance Sharing Setting'.

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Choose people to share with	
Type a name and then click Add, or click the arro	w to find someone.
L	Add
Name	Permission Level
Sterveryone	Read 🔻
🙎 User	Owner

Fig.7 Authentication

Here, only READ permission is given so that there will no modification of data is happen on the device. ii) Windows 8

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saysay memberi, can			
ritefiles in the Public folders der can shill access these			
cona pictasas, music, and twolk,			
ns. Some devices don't			
(recommended)			
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	Name queste spinne her	the second region to     The second regree to     The second regree to     The second regre	u     image     image     image       image     image     image     image

Fig.8 Advance file sharing settings in Windows 8 File sharing in windows 8 is same as Windows 7.

# IV. PROCEDURE

User must have to ping between two systems to check communication between them.

C:\WINDOWS\system32\cmd.exe	- 🗆 ×
C:\Documents and Settings\Administrator>ping 192.168.133.136	·
Pinging 192.168.133.136 with 32 bytes of data:	
Reply from 192.168.133.136: bytcs=32 time(inc TLL-64 Reply from 192.168.133.136: bytcs=32 time(inc TLL-64 Reply from 192.168.133.136: bytcs=32 time(inc TLL-64 Reply from 192.168.133.136: bytcs=32 time(inc TTL-64	
Ping statistics for 192,160,133,136; Packets: Sont = 4, Ancoived = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = Oms, Maximum = Oms, Average = Oms	
C:\Documents and Settings\Administrator≻ipconfig	
Windows IP Configuration	
Ethernet adapter Local Area Connection:	
Connection-specific DNS Suffix .: localdomain IP Advess. Subnet Mask	
Ethernet adapter Bluetooth Network Connection:	
Media State Media disconnected	
C:\Documents and Settings\Administrator>	-

Fig.9 IP Address of Windows System

Here four packets are sent from Windows system, which all are received by Knoppix system (Reverse could also be checked). So both the systems are connected and exchange of information can be done. User must note down the IP address of source system because it will be used in upcoming steps. In windows system IP address is shown in command prompt by writing 'ipconfig' command.



Fig.10 Home Screen of Knoppix OS Live CD

You can also ping from Knoppix system to check the communication between two systems. Here the home screen of Knoppix system is shown.



Fig.11 IP address of Knoppix System

First of all we change Knoppix system to Super User to give the Admin privileges. Now the ip address of Knoppix system displays with the help of 'ifconfig' command.

DFE49 EB8A0 64FF5 FF805	AE81 5075 978 8FF	Chose/Restart KNOPPIX Deskto Export/Broadcast Desktop GPRS/UMTS connection	P
📸 Accessories	>	install components	Z FF//31FF//LCFF4
🚿 Graphics	>	Install KNOPPIX to flash disk	7//1207//32340
🕥 Internet	>	IP Traffic Analyzer	J97A9/392AE00;
M Knoppix	>	ISDN connection	F580F/EB80FFC3
M Office	>	KNOPPIX Firewall	100A38900A8AF0
🔯 Sound & Video	>	KNOPPIX HD Install	TEREPERCENCE
🍪 System Tools	>	Printer configuration	15 TO COOREED DOOL
🔞 Universal Access	>	🐨 (Re-) start 3D desktop compiz	IF/9C80FF9280/F8
989 Preferences	>	🍄 Root Shell	X080400A7B3//CE1
Run		Scan/Mount Network Shares	
🛃 Logout		Image: Set password for root	
M 🗃 🖬 🥶 🗋		🕸 Start SSH Server 🛛 St	art SSH Server (Remote access)

Fig.12 Starting SSH server

First step is to start SSH server from Knoppix.



Fig.13 Password Window to start SSH server

You have to enter same password twice to start the SSH services.  $\ensuremath{^{[3]}}$ 

#### Why SSH server?

- It provides remote login service. It is likely to replace the less-secure Telnet and rlogin programs used in the early days.
- SSH is most often used to provide strong client/server authentication/message integrity where the SSH client runs on the user's desktop machine and the SSH server runs on some remote machine that the user wants to log into—but it also supports confidentiality. Telnet and rlogin provide none of these capabilities.
- SSH provides a way to encrypt the data sent over these connections and to improve the strength of the authentication mechanism they use to log in. SSH Communicate via port 22.



Fig.14 Knoppix Menu

Now next step is to click on Knoppix  $\rightarrow$  'Scan/Mount Network Shares'. It will search for available devices/system connected in the network.



Fig.15 Searching

You can see that search for devices on network are going. Search process will take few seconds to find devices on Network.

E		SMB Network sh	ares	X)
	Selec	t Server		
		Server	IP	
	1	NISARG-55120E36	192.168.133.130	
	2	VAIO	192.168.133.1	
	n	Enter Server+Share manually (//server/share)		
			● <u>C</u> ancel 🖉 QK	

Fig.16 List of available devices on Network

Here two devices are found on network connection. If the target device not found then you can also enter Server and Share name manually. Our suspect is the first one in the list. You can see the list of device name and IP address of the systems.

C	SMB Ne	twork shares
Г	-Enter Login/Password for Server N	JISARG-55120E36
	Login (empty for guest access)	nisarg
	Password	•••••
	Workgroup (optional)	HOME
		● <u>C</u> ancel

Fig.17 Login Credentials

Here, Login and Password has to be given for create secure transmission of data as discussed above. User must note down Username and Password because same username and password will be used in further steps too.

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	Share	Description	
1	//NISARG-55120E36/First		
2	//NISARG-55120E36/SharedDoc	S	
3	//NISARG-55120E36/Second		
4	//NISARG-55120E36/Fourth		
5	//NISARG-55120E36/Third		
6	//NISARG-55120E36/ADMIN\$	Remote Admin	
7	//NISARG-55120E36/C\$	Default share	

Fig.18 Shared Folders

By clicking on OK it displays the list of shared files and folders of that system. Here we can see the list of all files and folders which are shared from Suspect's system. You can also share whole drive partition.

	Share	Description	
1	//NISARG-55120E36/First		
2	//NISARG-55120E36/SharedDo	cs	
3	//NISARG-55120E36/Second		
	//NISARG-55120E36/Fourth		
5	//NISARG-55120E36/Third		
6	//NISARG-55120E36/ADMIN\$	Remote Admin	
7	//NISARG-55120E36/C\$	Default share	

Fig.19 Selection of A folder

This will list out all the files and folders shared from source system. If there are multiple PCs connected in LAN than this box will display the entire PC name with shared folder. Here, we select the 'Fourth' named folder which was previously shared from windows system. After selecting 'Fourth' click OK.

8	SMB Network shares	×
9	//NISARG-55120E36/Fourth successfully mounted as /media/NISARG-55120E36_I	∙ourth
	2	<u>o</u> k

Fig.20 Mounted Successfully

Clicking on OK will take few seconds and one message will appear. It shows that folder is successfully mounted to Knoppix. So, shared folders could be seen from Knoppix system.<sup>[4]</sup>

Ele Edt Jabs Help Knoppixt@Microknoppix:-\$ sudo su root@Microknoppix:/home/knoppix# cd /media root@Microknoppix/media# is -l total 0 drwxr-xr-x 2 knoppix knoppix 0 Jan 28 10:58 fd0 drwxr-xr-x 2 knoppix knoppix 0 Jan 27 23:40 MISARG-55120E36_Fourth drwxr-xr-x 2 knoppix knoppix 0 Jan 28 10:58 sda drwxr-xr-x 2 knoppix knoppix 0 Jan 28 10:58 sr0 root@Microknoppix:/media#	-		
knoppix@Microknoppix:-\$ sudo su root@Microknoppix:/home/knoppix# cd /media root@Microknoppix:/homei# is -l total 0 drwxr-xr-x 2 knoppix knoppix 0 Jan 28 10:58 fd0 drwxr-xr-x 2 knoppix knoppix 0 Jan 27 23:40 NISARG-55120E36_Fourth drwxr-xr-x 2 knoppix knoppix 0 Jan 28 10:58 sda drwxr-xr-x 2 knoppix knoppix 0 Jan 28 10:58 sr0 root@Microknoppix:/media#	<u>File Edit T</u> abs	Help	
	knoppix@Mic root@Microk total 0 drwxr-xr-x drwxr-xr-x drwxr-xr-x drwxr-xr-x	roknoppix:-\$ sudo su noppix:/home/knoppix# cd /media noppix:/media# ls -l 2 knoppix knoppix 0 Jan 28 10:58 fd0 2 knoppix knoppix 0 Jan 27 23:40 NISARG-55120E36_Fourth 2 knoppix knoppix 0 Jan 28 10:58 sda 2 knoppix knoppix 0 Jan 28 10:58 sr0 noppix:/media#	

Fig.21 From Knoppix System

The location of the shared folder is in media directory of Knoppix system.So mounted folder can be seen from command prompt by listing the media folder.<sup>[5]</sup>

Eile	Edit Tab	s <u>H</u> elp						
knor	opix@Mi	croknoppix	:~\$ sudo	su				<u> </u>
root	teMicro	knoppix:/h	ome/knopp	ix# c	d /	nedia		
root	teMicro	knoppix:/m	edia# ls	-l				
tota	al 0							
drw	xr-xr-x	2 knoppix	knoppix	0 Jan	28	11:46	fd0	=
drw)	xr-xr-x	2 knoppix	knoppix	0 Jan	28	11:46	sda	
drw	xr-xr-x	2 Knoppix	Knoppix	0 Jan	28	11:46	sre	
100	Cemicro	knoppix:/m	edia# mkc	ir ba	скu	p 1		
100	Centero	knoppix:/m	edia# Chi	1 1	/ D	аскир		
tot		Knoppix:/m	eura# ts	- L				
drw		2 root	root	0 lan	28	11.48	hackup	
drw	xr-xr-x	2 knoppix	knoppix	0 Jan	28	11:46	fd0	
drw	kr-xr-x	2 knoppix	knoppix	0 Jan	28	11:46	sda	
drw	xr-xr-x	2 knoppix	knoppix	0 Jan	28	11:46	srθ	
root	teMicro	knoppix:/m	edia# ls	-l				
tota	al O							
drw	xrwxrwx	2 root	root	0 Jan	28	11:48	backup	
drw	xr-xr-x	2 knoppix	knoppix	0 Jan	28	11:46	fd0	
drw)	xr-xr-x	2 knoppix	knoppix	0 Jan	27	23:40	NISARG-55120E36_Fourth	
drw	xr-xr-x	2 knoppix	knoppix	0 Jan	28	11:46	sda	
drw)	xr-xr-x	2 Knoppix	Knoppix	0 Jan	28	11:46	sre	
100	Cemicro	knoppix:/m	edia# cle	ar				
100	centiono	кпорртх:/ш	cula# LS	- L				~

Fig.22 Creation of New Directory to Store data

Another new directory should make by user for storing files from network. Here one directory called 'backup' is created at same location in Knoppix running system. All the privileges are given to that directory. Here in below screenshot backup directory is highlighted. One folder named 'backup' is created in '/media' directory.<sup>[5]</sup>



Fig.23 Copying data from Windows System Securely

Now the mount command is used to attach the data from the mapped drive/folder. Here, –o command is stands for options. User has to give username and password which was given at connection time. Ip address of the device should be mentioned and name of the folder is mentioned. At the end storage location of the data is given. Here 'Fourth' folder from ip address of windows Xp system is copied to 'backup' folder of Knoppix system.

Eile Edit Tabs Help	
drwxrwxrwx 2 root root 0 Jan 28 11:48 backup	^
drwxr-xr-x 2 knoppix knoppix 0 Jan 28 11:46 fd0	
drwxr-xr-x 2 knoppix knoppix 0 Jan 27 23:40 NISARG-55120E36 Fourth	
drwxr-xr-x 2 knoppix knoppix 0 Jan 28 11:46 sda	
drwxr-xr-x 2 knoppix knoppix 0 Jan 28 11:46 sr0	
<pre>root@Microknoppix:/media# mount -o username=nisarg,password=nisarg //</pre>	/192.168.133
.130/Fourth backup	
root@Microknoppix:/media# ls -l	
total 0	
drwxr-xr-x 2 root root 0 Jan 27 23:40 backup	
drwxr-xr-x 2 knoppix knoppix 0 Jan 28 11:46 fd0	
drwxr-xr-x 2 knoppix knoppix 0 Jan 27 23:40 NISARG-55120E36 Fourth	
drwxr-xr-x 2 knoppix knoppix 0 Jan 28 11:46 <mark>sda</mark>	
drwxr-xr-x 2 knoppix knoppix 0 Jan 28 11:46 sr0	
root@Microknoppix:/media# cd backup	
root@Microknoppix:/media/backup# ls -a -l	
total 1	
drwxr-xr-x 2 root root 0 Jan 27 23:40 .	
drwxr-xr-x 7 root root 0 Jan 28 11:49	
drwxr-xr-x 0 root root 0 Jan 27 23:40 Fl	=
drwxr-xr-x 0 root root 0 Jan 27 23:41 F2	
drwxr-xr-x 0 root root 0 Jan 27 23:40 F3	
-rwxr-xr-x 0 root root 19 Jan 27 23:41 File1.txt	
root@Microknoppix:/media/backup#	2

Fig.24 Folders from Windows System

Using ls -l command we can list all the files stored in the directory. <sup>[5]</sup> Path of backup folder is given. Below figure shows the list of folders and files located in backup folder. User can see the exact names of files and folders which are generated and stored on windows system in 'Fourth' folder.



Fig.25 Mounted folder from Windows System

Here the backup folder is shown in the figure. It shows the same files and folders which are shared from Windows system. After that we can image that folder and create the dd file for investigation. It is noted that only those files are copied that are seen to user. No deleted files, slack space or unallocated files are recovered.

<u>N</u> ame:	Copied.txt	
Location:	/media/backup	
File Type:	plain text document	
Open <u>w</u> ith:	🥖 Leafpad	0
Total Size of Files:	14 bytes (14 bytes)	
Size on Disk:	512 bytes (512 bytes)	)
Last Modification:	02/20/2015 02:05	
Last Access:	02/20/2015 02:04	

Fig.26 File Property

File property can be seen by selecting property option from pop-up menu. Here File Type, Size, Timestamp is shown.



Fig.27 Deletion Failed

User could not delete the files which are copied from windows system to backup folder. So no alteration in data could be done.

## V. ADVANTAGES

Data can be copied from multiple locations.

Data will start copying after entering correct username and password.

Data will pass from SSH tunnel it means copy of data is secure.

Data cannot be altered when transportation took place.

Breaching of data could not be done.

Data cannot be modified in destination folder it means that integrity of data is maintained.

User can copy the data from multiple sources in same network.

At forensic investigation time investigator can boot the system using Knoppix with LinEn (Linux EnCase) to copy suspect's system data.<sup>[6]</sup>

#### VI. LIMITATIONS

Both the systems should be in same network.

Both the systems should alive for communication.

User should have knowledge about Knoppix system and Knoppix commands.

In windows system like Windows 7 and above password protection should be turned off.

#### VII. CONCLUSION

This process is mainly used to copy data securely. It prevents the interruption of any third party in data transmission. This process helps user to copy data from multiple system which are in same network and in a system like where hard drive is impossible to remove.

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