How to backup your NMR data?

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Introduction

- Are you afraid of losing your NMR data from the spectrometer computer.
- Here is a simple and effective way to automatically backup your data to a remote computer.
- What I will show in this tutorial:

1) Backup data from a Linux Computer to a Linux Computer.

2) Backup data from a Windows 7 (or higher) to a Linux Computer.

- Tutorial comes with warnings
- I have implemented this procedure in Centos and Windows 7 computers to a remote Linux computer.

Let's Start

- Before we start, we need to prepare the local computer (Spectrometer computer). And you need administrative privilege.
- In Linux, you need to install: rsync and crontab.
- In Windows, you need to install: Cygwin (I installed version-2.909 in windows 7).
- While installing Cygwin, you need to select rsync and openssh.

Definitions

- Local Computer: The spectrometer computer, where you have your data.
- Remote Computer: The computer you use for backup. Which is always a Linux in my case.
- Name and IP of local computer: nmrsu@yyy.yyy.yyy.yyy
- Name and IP of remote computer: nmrbackup@xxx.xxx.xxx.xxx
- Location of data in local computer: /opt/topspinX.X.X/data/ OR C:\topspinX.X.X\data
- Location of directory to backup in remote computer: /path_to_diretory/backup_NMRdata/

Programs used

- Rsync: Copy your data from local computer to remote computer.
- Why rsync and not scp (or sftp)? Because rsync copy only new or modified files (and folders).
- Crontab: For automatic execution of backup on a desired time
- Windows Task Scheduler: Do the same job of crontab in Windows computers.

Password less SSH from local to remote computer

- Open your terminal in Linux (use 'su' privilege) or Cygwin terminal in Windows (use admirative privilege) of local computer.
- Type: ssh-keygen -t rsa
- It will create two files at directory: /root/.ssh (linux) or ~/.ssh (windows)

  id_rsa (private key) and id_rsa.pub (public key)
- Type: scp ~/.ssh/id_rsa.pub nmrbackup@xxx.xxx.xxx.xxx:~/.ssh/

  This commnad copy id_rsa to remote computer

Password less SSH from local to remote computer

- Go to the remote Computer and do the following:
- Open terminal and type: cat ~/.ssh/id_rsa.pub >> ~/.ssh/authorized_keys
- And type: chmod 700 ~/.ssh
- Type: chmod 600 ~/.ssh/authorized_keys
- Type: ssh nmrbackup@xxx.xxx.xxx.xxx
- You will see you don’t want a password any more
- WARNING: since you don’t need a password, you make the security of remote computer weak. So please make sure user-nmrbackup in remote computer cannot access file, folders or external drives of others users in remote computer.

Creation of ".sh" (Linux) or ".bat" (Windows) file for executing the backup

- In Linux (local computer), create backup_NMRdata.sh and add following lines at directory "/root/"

```
!#/bin/bash

/usr/bin/rsync -av -e ssh /opt/topspinX.X.X/data/
RemoteComputer@xxx.xxx.xxx.xxx:/path_to_diretory/backup_NMR
data/
```

Creation of ".sh" (Linux) or ".bat" (Windows) file for executing the backup

- In Windows (local computer), create backup_NMRdata.bat (where ever you want) and add following lines

```
@echo off
setlocal
REM Define variables
set SRC_FOLDER=/cygdrive/c/topspinX.X.X/data
set DEST_USER=nmrbackup
set DEST_HOST=xxx.xxx.xxx.xxx
set DEST_FOLDER=/path_to_diretory/backup_NMRdata/
set SSH_PATH=C:\cygwin64\bin\ssh.exe
set RSYNC_PATH=C:\cygwin64\bin\rsync.exe
%RSYNC_PATH% -av -e %SSH_PATH% %SRC_FOLDER%/* %DEST_USER%@%DEST_HOST%:%DEST_FOLDER%
Endlocal
```

- Note: source directory must be /cygdrive/c/topspinX.X.X/data and not C:\topspinX.X.X\data

Set Crontab in Linux local Computer

- Open Terminal and type: export VISUAL=nano; crontab –e
- Add following lines: 0 0 * * * /root/backup_NMRdata.sh
- The above line, run "/root/backup_NMRdata.sh" every day at midnight. Read manual of crontab for more details.

Set Task Scheduler in Windows local computer

- Open Task Scheduler
- Create Task: Click "Create Basic Task"
- Give a name to the task
- Set Trigger: Daily or Weekly or ...
- Set Action: Start a program
- Add link to backup_NMRdata.bat file by browsing
- Click Finish

All SET, Ready to GO