Instruction for backup

Yi Shen

There are two procedures for the backup:
1. Synchronizing your files and directories from the server to your local computer;
2. Synchronizing your files and directories from your local computer to your external hard drive.

These two procedures are introduced in detail as follows.

I. Synchronizing your files and directories from the server to your local computer

During this procedure, *rsync* and *crontab* are needed. Here is a brief introduction of them.

- **Introduction of rsync**
  
  rsync is a software application and network protocol for Unix-like and Windows systems that synchronizes files and directories from one location to another while minimizing data transfer using delta encoding when appropriate.
  
  In the backup procedure, rsync is used to synchronize your files and directories from the server to your local computer.

- **Introduction of crontab**
  
  A cron is a utility that allows tasks to automatically run in the background of the system at regular intervals by use of the cron daemon. Crontab (CRON TABle) is a file, which contains the schedule of cron entries to be run, and at what times they are to be run.
  
  In the backup procedure, crontab is quite useful, which helps you do the backup once a day without manual operation.

After these brief introductions, I present a workflow for the first procedure as follows,

1. **Make a directory in your local computer for backup**
   
   e.g. `mkdir ~/backup`

2. **Copy the rsync script to your backup directory**
   
   You can download the script called `backupscript.py` from [http://sepwww.stanford.edu/data/media/public/sep/yishen/backup](http://sepwww.stanford.edu/data/media/public/sep/yishen/backup)

3. **Change the script**
   
   There are two major parts that needs to be changed in the script `backupscript.py`. These two parts are circled in the following figure.
The upper circle means the directory in your local mac that you want to back up to. The lower circle means the directory in the server that you want to back up. In this example, we back up yishen's home directory, personal device and her sep website. You can change them into your desired directory. Don't forget to remove/add the for loop in the script if you plan to back up less/more than three directories.
4. **Manually run the script**
   If you want to test whether this script works or not, type the following command in your back up directory.
   
   `/backupscript.py`
   
   (Ps: probably you will be asked to connect to the server at your first time.)

5. **Create a cron schedule**
   - Type “`crontab –e`” in the terminal window
   The text editor will open a blank window for the “crontab entries” to be entered. Each line presents a separate cron jobs.

   - Put the following line in the window
     ```
     * * * * /Users/yishen/backup/backupscript.py restart
     ```
     An asterisk (*) is used to indicate that every instance (i.e. every hour, every weekday, etc.) of the particular time period will be used.
     Here is how positions 1-5 are layed out:
     1 Minute 0-59
     2 Hour 0-23 (0 = midnight)
     3 Day 1-31
     4 Month 1-12
     5 Weekday 0-6 (0 = Sunday)

   - Change asterisks(*) accordingly.
   Find your name and the time for you to back up in the following table.
   The starting time means your rsync script will automatically run at this particular time.
   Then change ** **** according to the corresponding format.
   For example, Yi Shen’s command would look:
   ```
   40 1 *** /Users/yishen/backup/backupscript.py restart
   ```

<table>
<thead>
<tr>
<th>Name</th>
<th>Starting Time</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam Halpert</td>
<td>00:00 am</td>
<td>0 0 ***</td>
</tr>
<tr>
<td>Dave Nichols</td>
<td>00:20 am</td>
<td>20 0 ***</td>
</tr>
<tr>
<td>Qiang Fu</td>
<td>00:40 am</td>
<td>40 0 ***</td>
</tr>
<tr>
<td>Ohad Barak</td>
<td>01:00 am</td>
<td>0 1 ***</td>
</tr>
<tr>
<td>Ali Almomin</td>
<td>01:20 am</td>
<td>20 1 ***</td>
</tr>
<tr>
<td>Yi Shen</td>
<td>01:40 am</td>
<td>40 1 ***</td>
</tr>
<tr>
<td>Jon Claerbout</td>
<td>02:00 am</td>
<td>0 2 ***</td>
</tr>
<tr>
<td>Noha Farghal</td>
<td>02:20 am</td>
<td>20 2 ***</td>
</tr>
<tr>
<td>Yang Zhang</td>
<td>02:40 am</td>
<td>40 2 ***</td>
</tr>
<tr>
<td>Bob Clapp</td>
<td>03:00 am</td>
<td>0 3 ***</td>
</tr>
<tr>
<td>Jason Chang</td>
<td>03:20 am</td>
<td>20 3 ***</td>
</tr>
<tr>
<td>Musa Maharramov</td>
<td>03:40 am</td>
<td>40 3 ***</td>
</tr>
</tbody>
</table>
6. [Optional] Check the success of your crontab
   Type "ls -ltr /var/mail", and check the time shown in bold as follows
   rw------- 1 yishen  mail 5559 Mar 14:30 yishen

Notice: The first backup will take a while, which may exceed 20 minutes. Manually running the script for your first backup during the weekend or in the evening instead of using crontab is recommended.

II. Synchronizing your files and directories from your local computer to your external hard drive

   First, initialize your hard drive
   1. Click Initialize in the pop-up window as follows

   2. Another window will pop up which is shown as follows. Select a disk which is circled in red.
   3. Click Partition tab (circled in red);
   4. Click Volume Scheme to choose how many partitions you need (circled in red);
   5. Change the Name of your hard disk (circled in red);
   6. Click Apply (circled in red).
Second, use time machine to back up your local computer

- **Introduction of time machine**
  Time Machine is the built-in backup that works with your Mac and an external drive (sold separately) or Time Capsule. Connect the drive, assign it to Time Machine, and start enjoying some peace of mind. Time Machine automatically backs up your entire Mac, including system files, applications, accounts, preferences, music, photos, movies, and documents. But what makes Time Machine different from other backup applications is that it not only keeps a spare copy of every file, it remembers how your system looked on any given day—so you can revisit your Mac as it appeared in the past.

- **How to use time machine**
  2. Click Select Disk
3. Choose a drive where backups will be stored, then click **Use Backup Disk**

4. **[optional]** In Time Machine preferences you can click the **Options** button to select items to exclude from the backup

5. **[optional]** Change the backup interval
   - From the command line
     If you don't want to install any extra software then you can change Time Machine's backup interval from a shell prompt. Start up a Terminal window and then type:

     ```
     sudo defaults write
     /System/Library/LaunchDaemons/com.apple.backupd-auto
     StartInterval -int 18000
     ```

     The 18000 above is the required backup interval in seconds — five hours in this example. And note that the above command is all on one line.

   - Point-and-click
     There are several full Mac OS applications out there that allow you to manipulate Time Machine’s hidden preferences. The two most popular are Time Machine Scheduler and Time Machine Editor.

6. **Restore.**  
   Choose **Enter Time Machine** from the **Time Machine menu** and the restore interface appears. You can literally see your windows as they appeared "back in time."

Notice: The first backup may take a while. You may want to set up Time Machine in the evening so that the initial backup can be done overnight. You should not interrupt the initial backup. You can continue to use your Mac while Time Machine backs up.

Once the initial backup is completed, Time Machine performs subsequent hourly backups of only the files that have changed on your Mac since the last backup (as long as your Mac is awake and the backup drive is connected).

To know more information about time machine, please check the following website:


If you have any question, feel free to contact Yi Shen:

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