Mike Nelson – SSV article

**Some Practical Free Ways to Backup Your Virtual Machines**

The practice of backing up data is a long lived traditional process in IT that has, at least for most of us, endured many trials and tribulations in our careers. Through many a trial and error experience, we have wrestled with the various different ways that are had been developed to safeguard our customers data, verify the integrity of the backed up data, and pray for a successful restore when it is needed. Since virtualization of our hosts that contain that data has taken over our lives in the last decade, there is a flurry of new ways and means to satisfy these backup dilemmas. Let's take a look at a few very practical (and free!) ways to backup that data for the VM Administrator. In a future article, I'll cover some useful recovery techniques and some ways to secure that backed up data.

In the conventional full OS backup, data residing within the logical confines of its medium (i.e. disk) is streamed to a certain type of media (either physical or virtual), where it is verified, indexed, and archived. In the virtual guest world, we can take that a step further and move outside the confines of the logical disk to the physical disk files themselves. By backing and recovering a complete set of disk files, and depending on your hosting hypervisor their associated configuration files, you can recover an exact machine copy of the entire guest by restoring them and dropping them back down on your hosting disk. Then, by re-associating the disks to the guest, you're back in business in no time.

For these types of full machine backups, there are several different ways to get that data safe and secure.

- VM Snapshots. I consider snapshots a somewhat good solution for backups in development environments, with varying success, but should be used with caution in production environments. Snapshots aren't without their issues, and depending on your hypervisor vendor, the terminology and use could mean something very different than their competitors. While VMware and Microsoft have steered Administrators away from only using Snapshots for backup, Citrix (and Xen) Some common problems are their constant growth with deltas and the possibility of corruption. Vendors will be the first to tell you that Snapshots are not meant to be a complete backup and recovery solution in any environment, and should not be thought of as such.
- Scripting. As a huge scripting fan, I love solutions that use the various script tools available to Administrators. By scripting (and scheduling) your guest disk backups, you can circumvent the cost of a commercial backup application and incorporate many other scripted tasks in your routines. One of the downsides of using this though is the downtime that is inherently required to ensure a stable backup. Some have gotten around this limitation by combining both Snapshots and scripting. By taking a hot Snapshot of the machine and scripting the backup of the snapshot disk files, no outage is necessary. A great example of this is the ghettoVCB project, which is free and

actively developed, and also a great tool for VMware guests. There are also PowerShell scripts that work similarly with Hyper-V.

- Integrated or Modular Backup Tools. Integrated with Windows Server 2008R2 for Hyper-V, the included Backup utility is now considered "Virtual Friendly" and will create backups of your Hyper-V guests. It uses the new Hyper-V VSS Writer component and I have heard some varying success stories on it so far. Here's a link to the Microsoft KB article on it. VMware had the long-lived VCB solution, which has been replaced with the Data Recovery virtual appliance, which still has limitations that, while good for small environments, isn't yet ready for the large enterprise. XenServer has integrated command line tools, which can be scripted, for backup of metadata, but relies heavily on 3rd party commercial products for a complete solution.
- Flat File Copy. Last but not least, and yes, I really do think this is a basic viable option for backups. Why? Because I know of many shops that use them religiously and some very successfully. This also could have gone under the scripting option above, but it's flexible in that it doesn't really have to be scripted with PowerCLI, PowerShell, bash, or vbScript. By using the internal scheduled task function of the OS, hypervisor, or file copy tool, you could power a machine off at a certain time and simply run a command line utility to copy the files to another medium. Depending on your hypervisor, this could be Robocopy, FastSCP, rsync, SyncToy, or even a Linux dd or tar. VMware and Hyper-V have built-in scheduled tasks to perform these scheduled tasks, but timing is everything, and since it is not completely a single task solution, Admin's should carefully investigate this option.

Now, some reading this article will notice I did not mention Storage-based Snapshots as a possible solution. That is mainly because this technology comes with a price tag and I cannot recall any storage vendor that offers this for "free". Most mass storage vendors offer integrated tools and/or add-on products that supply a backup solution at the shared storage level, rather than at the hypervisor or OS level. By using the technologies of storage-based Snapshots, de-duplication, and replication, a complete solution for the entire environment (virtual as well as physical) is implemented. But, again, it is not free, and may not even be practical in your environment.

For some, there really is little difference in moving their backup strategies from the physical world to the virtual. Some continue to use the OS-based backup to disk and tape that has stood the test of time. While others are looking at some new ways to not only backup the OS, but the entire machine itself. With how virtualized guests are constructed, this can be a pretty smooth transition and undertaking. But, with that said, your backup solution is heavily dependent on your infrastructure and environment, so some or none of these solutions may be useful to you in your current work. However, having some understanding of different methods is always another notch in the career belt that can take you places.