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**RE: Softwareless Backup Solutions with Tandem DXR and FirstRAID G2.**
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***Summary:** The advent of Highly Reliable System's Tandem DXR and FirstRAID G2 backup systems poses some interesting backup possibilities including some which require no software whatsoever. This paper briefly discusses a few of those strategies.*

**The Tandem DXR and FirstRAID G2 by Highly Reliable Systems, Inc. of Nevada** have a unique talent which allows them to mimic a standalone SATA hard drive. In this mode, the Tandem DXR and FirstRAID G2 units look like a regular single SATA hard drive to the host. Thus, no special drivers or controllers are required to connect them to the host in these modes (providing the motherboard has SATA ports which most do these days).


In one case, we have connected a Tandem DXR to a white box PC via it's internal motherboard SATA ports. The white box is running Ubuntu 6.10 and is a WebServer. Every night, the machine runs a script which simply mounts the Tandem DXR as another drive, compresses the contents of the system and stores them on the Tandem DXR. In the morning, one of the Tandem's media is swapped out for off site backup.

While this case does use "software" for backup in the form of the script it runs, it would have been just as easy to configure the webserver to store and work on it's data and contents on the Tandem DXR in real time. The same process of swapping the drives out in the morning would still work just fine.

Because the Tandem DXR stays connected and online without notification or operational changes to the host when a drive is swapped, the host can treat the Tandem DXR just like an internal hard drive. If you design your system this way, the need for backup software becomes nil.

In another installation, a Tandem DXR was connected to a Windows 2003 server and simply shared as a drive on the network. All of the company's daily work is done on that drive. In the evening, drives are swapped and the system is fully synced by business time the following morning. Again, no backup software whatsoever is required in this type of installation.

It is possible that some data maybe truncated when the drives are swapped if they are removed during write activity. Typically, only a small portion of data is potentially at risk if the drive is removed while there is ongoing activity. Hence, it is best to swap the drives at a time there should not be any activity or after you close applications that would cause writing. Some systems which can be "suspended" before a drive swap will offer the best case. However, the "suspend" function is not a normally available function for servers.

Unlike typical mirror systems which offer your data protection in the event of a drive failure, the Tandem DXR is designed to operate as a broken mirror, only offering the protection of a mirror once the drives are synced up and before the next drive swap. While this is a perfectly acceptable

amount of risk for single desktops or small businesses (which are already operating at this level of protection), it maybe unacceptable in larger organizations. In this situation, the FirstRAID G2 can fill this gap.

The FirstRAID G2 offers the same "softwareless" backup feature as the Tandem DXR. But, it's primary storage is a RAID 5 array thus it is unlikely that a single drive failure during anytime would result in complete loss.

Depending on your concept of "continuous data protection – CDP", the Tandem DXR and FirstRAID G2 can offer this without the need of any software or configuration.

Recovering from a failure is as simple as replacing the master with a previous backup. In the case of installations where the data is running live, another High Rely device, such as the inexpensive High Rely SATA/USB one bay can be attached to a network machine and data from drives swapped previously can be acquired easily.

***Backup software certainly has its place and the Tandem DXR and FirstRAID G2 are certainly not going to make such obsolete. But, after analyzing your needs and use, you may determine that by using the Tandem DXR or FirstRAID G2, your backups can be done without any backup software, at your site.***