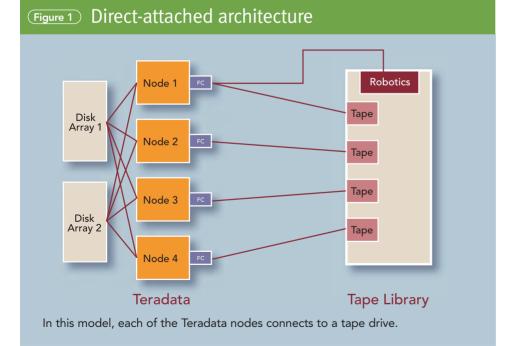# BAR your enterprise from data loss

Teradata's new Backup Archive and Restore solution makes data loss a thing of the past. *by Craig S. Mullins*

Today, the data in your data warehouse is every bit as important as the data in any of your other operational systems. Whether you support an active data warehouse or an enterprise data warehouse (EDW), your business relies on that information for mission-critical analytical decisions.

Of course, companies at different levels of data warehouse maturity have different requirements. As your data warehouse evolves through stages of maturity and business criticality, your availability,

recovery and data protection needs will also evolve. Teradata supports each stage of this process, and as your business continuity requirements expand, Teradata offers solutions that support the need for more extensive availability and recoverability. Teradata's Business Continuity Solutions (BCS) provide businesses with crucial services and software solutions to deliver the availability, recoverability and data protection required to do business in the real-time world with an active data warehouse.

BAR, which stands for Backup Archive and Restore, is one specific aspect of Teradata BCS offerings that focuses primarily on data availability and recoverability. Teradata's BAR solutions and services are essential to both the recoverability and data protection elements of business continuity. BAR allows data to be restored whether the loss is due to user error, technical failure or natural disaster. Further, going beyond data protection, BAR solutions help businesses meet regulatory requirements for long-term data archiving.

Benefits of Teradata's BAR solutions

Teradata has built its reputation as the leader in data warehousing on a scalable architecture that enables many operations to be performed in parallel. In order to facilitate the most successful and efficient business continuity plan, all Teradata BAR solutions are engineered to take advantage of the value provided by parallelism.

The BAR hardware is designed to handle data warehouses from small symmetric multiprocessing (SMP) systems to very large massively parallel processing (MPP) systems with multiple terabytes of data. Furthermore, Teradata offers skilled BAR services that can be specifically tailored to the requirements of each particular customer.

It's important to understand that there is no *single* Teradata BAR solution. Rather, there is a

Figure 1 Direct-attached architecture

In this model, each of the Teradata nodes connects to a tape drive.

portfolio of solutions, each consisting of an integrated combination of hardware and software designed to meet the particular requirements of different customer data warehouse environments.

Three basic configurations

There are three basic architectural designs for Teradata BAR: direct-attached, LAN-based and mainframe-attached.

The direct-attached architecture is the legacy approach for Teradata systems. In this architecture methodology (see figure 1, pg. 65), the tape drives and library are directly attached to the Teradata system, and storage management software runs on the Teradata nodes to initiate the backup/restore.

As depicted in figure 2 to the lower right, the LAN-based architecture is designed around a private LAN system that manages a Teradata BAR solution via dedicated BAR servers. Management of backup and restores are handled by the BAR servers for Teradata with a Gigabit Ethernet switch providing the inter-connectivity between the two. The LAN-based architecture is the preferred approach over the direct-attached architecture because it offloads the BAR work from the Teradata nodes, offers better scalability and provides the base for the use of new storage technologies such as disk backup.

The final architecture, mainframe-attached, uses the channel from the IBM mainframe to access tape drives on the mainframe for backup. Original Teradata systems used this architecture for backup, but today it's used only in special circumstances.

Hardware, software stress flexibility

Teradata BAR solutions work with a portfolio of storage technology offerings. The flexibility of BAR solutions enables each customer to utilize hardware that works best for each company's particular environment.

The hardware options span a variety of tape drives and libraries as well as hard disk storage
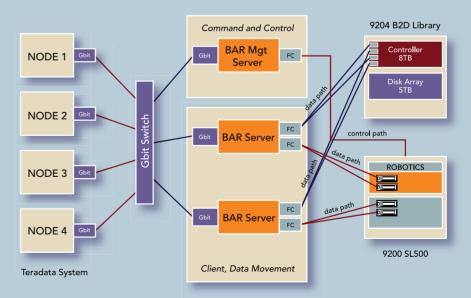
solutions. Backup to disk is an emerging capability, and it can serve as a complementary addition to tape backup. Disk is a key element in a two-tiered storage approach with immediate backup capabilities to disk, which can then be migrated to tape for extended and/or vaulted storage.

In keeping with the flexibility focus, Teradata supports a choice of software solutions in order to better address specific

needs and fit within each customer's enterprise infrastructure. Teradata's BAR solutions leverage the leading storage software, including BakBone's NetVault, Symantec's NetBackup and IBM's Tivoli Storage Manager. These software offerings work in conjunction with the Teradata Extension software.

Finally, Teradata offers services to facilitate an efficient implementation of BAR solutions. The BAR services portfolio is shown below in table 1.

Table 1: BAR services

BAR SERVICE	PURPOSE
Full Engagement	Analyze, design, install, configure, consult and train
Assessment	Provide an assessment of customer needs
Migration	Re-host a BAR solution from one hardware or software platform to another
Expansion	Add tape drives or disk libraries to an existing or expanding system

Figure 2 | LAN-based architecture

The LAN-based Teradata BAR solutions fit into standard enterprise architectures.

Using BAR solutions, customers can use the Teradata system as their single source for implementing and maintaining business continuity. All of the BAR storage hardware, software, services and training components are fully optimized, tested and certified with the Teradata Warehouse.

Tape versus disk

As you implement a BAR solution, it is prudent to consider the benefits and trade-offs of disk versus tape for your backup approach. In doing so, you first consider the reliability of the medium. Disk systems, which are configured to transparently recover from errors, are more reliable than tape systems. Disk systems simply have fewer hardware components that can break.

Predictability is another concern. Because disk systems never require manual intervention,

medium is also portable in a way that disk technology is not. If you want to have backup copies sent to different locations, then tape is the only BAR choice.

Given these considerations, Teradata advocates a two-tiered architecture. Such an implementation offers the true archival capability of tape, while at the same time leveraging the reliability of disk to provide a short-term backup and restore capability. (See "The Teradata BAR 'two-tier' approach," below.)
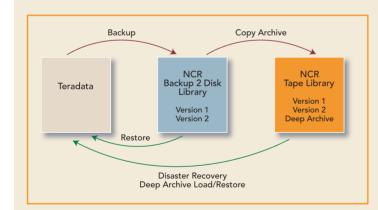
BAR in the real world

To highlight how Teradata BAR solutions can significantly reduce downtime, consider the example of a large financial institution. The customer had deployed a legacy mainframe BAR solution and was experiencing difficulty ensuring that all data was being

of six hours for backup and 12 hours for restore, the LAN-based architecture was the only viable option. Using 10 BAR servers, the company's backups took 5.3 hours to complete while data restores took 10.6 hours—both results well within the established SLAs.

In addition to drastically curtailing backup times, the company can now ensure that all data is protected. Plus, copying backup data from disk to tape doesn't disrupt operations, and short-term restores from disk can be accomplished very reliably.

Teradata's BAR solutions provide the peace of mind of knowing that whatever happens to the data warehouse environment, your data will survive. The comprehensive BAR solution is integrated to work seamlessly with your Teradata data warehouse environment. From initial install to production, Teradata will ensure

The Teradata BAR "two-tier" approach

The two-tier disk-to-tape backup infrastructure utilizes BAR servers that are connected to an NCR Backup 2 Disk Library and an NCR Tape Library, enabling the Teradata Database to back up to disk in this LAN-based architecture. The BAR servers manage archiving data from the NCR Backup 2 Disk Library to the NCR Tape Library without requiring Teradata Database resources.

Data from the Teradata Database is backed up to a disk backup library where on average, for example, two versions are stored. Subsequently, data is then copied to tape for longer-term archive and/or disaster recovery. Depending on the nature of the restore, information may come either from the NCR Backup 2 Disk Library or the NCR Tape Library.

backups with disk should always complete within your expected time windows. Tape devices and cartridges are mechanical devices and, by their nature, can fail during a backup. To restart from such an event, you'll need to restart the backup, which can result in a lengthened backup time window.

Although disk offers many benefits, tape isn't without its advantages. Tape is inexpensive and virtually unlimited in storage capacity as provided in a scalable tape library. The tape

backed up successfully. With 16TB of data across 20 nodes, the system couldn't achieve reasonable service level agreements (SLAs), and the company began to face major problems as backup times stretched to 25 hours and with restore times taking up to 53 hours. More than two days of downtime for a restore was simply unacceptable.

To alleviate the situation, the company migrated to a two-tier BAR architecture using both disk and tape storage. With targeted SLAs

ongoing availability of your data warehouse. Beyond BAR, Teradata provides the complete portfolio of business continuity products, services and features to address your availability, recoverability and data protection needs. **T**

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