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OpenVMS Backup Products: ABS/MDMS and Data Protector Compared

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Overview

HP offers two backup applications for the OpenVMS operating system at this time: the Archive Backup System/Media and Device Management Services (ABS/MDMS) application and the Data Protector application. This article will point out the similarities and differences between the two, in order to help in the selection process between the products. There are also other backup applications from third-party vendors but this article will not cover them.

ABS/MDMS has been the go-forward application of choice for OpenVMS for a number of years. Development of ABS/MDMS has included new functionality as well as support for the latest devices and operating system releases. HP has also been developing the Data Protector product for many years as well. Formerly known as Omniback, this product is not OpenVMS-centric. It was developed for the large enterprise where multiple operating systems are deployed along with a Storage Area Network (SAN), direct accessible, or network tape devices.

Similarities

ABS/MDMS and Data Protector have the same basic purpose: to provide an automated method of managing backups, volumes, and devices in a user-friendly manner. Some of the areas where the two applications parallel each other are outlined below.

Automatic Backups:

Both products are software that automates backups in an unattended, lights-out environment saving staffing costs particularly in the non-primetime schedules. These products also allow for backups to take place 24 x 7 x 365 and with the flexibility to schedule around holidays and other special days where backups are not required. The products can also run on a predetermined schedule so that different interval backups are performed including weekly, monthly, and yearly.

Data Protection:

Both ABS/MDMS and Data Protector provide data protection by backing up critical data and system files on a regular and predetermined basis. The applications also provide a method of rebuilding a system from the ground up in case of catastrophic outage. Each product has built-in flexibility and methods for saving data. For example, ABS/MDMS can provide image and incremental frequency of backups to ensure the most complete protection with the least amount of recovery time required.

Data Management

Each application manages the data that it backs up via a system of catalogs so that data is easy to find. Once the requested data is located within a catalog, a restore can easily be initiated. These restores can be scheduled for unattended processing as well. ABS/MDMS and Data Protector both use a system of catalog databases that can be created as needed on each system. These files not only allow for easy lookup but also provide a method for retaining data for a predetermined length of time.

Media Management

Both Data Protector and ABS/MDMS manage the media that are used for backup operations. This assures that only the volumes that you require are used, stored, and recycled at their proper times. In the case of Data Protector, it also manages volumes used from different platforms.

Scalability

Both products are considered scalable in that backups can be accomplished from small servers to large clusters of systems. Also, disks connected via SCSI to large disk arrays and data farms can be protected. Disks out on the network, disks located on a SAN, or any other device that can be seen from OpenVMS DCL can be backed up using these products. Both products will manage when and how each of the available devices will be used.

High-performance Backups

As well as using different types of interconnects for access to drives and libraries, these products are able to implement backups to the latest high-performance drives. This allows for the smallest backup window possible. They can also execute backups to drives simultaneously so that peak performance can be achieved using all resources within a large library.

Tape Library Support

These applications provide support for high-performance tape devices as well as a large number of tape libraries, most of which are the latest shipping products available. Qualification is done on both products as soon as a new device is released to ensure that the product keeps running successfully when equipment is upgraded or replaced. Libraries also provide a method for developing a lights-out facility.

Central Administration

ABS/MDMS and Data Protector provide systems manager the ability to manage backup operations from a single point. At its server level, Data Protector provides a cell manager and a cell client. This strategy allows for the grouping of servers and portions of the environment for backups. At the enterprise level, Data Protector provides access via the OpenView Operation Console or through a distributed GUI. ABS/MDMS provides the DCL interface to manage its policies and objects along with a GUI that can be viewed from an OpenVMS system or a Windows-based workstation. ABS/MDMS groups its environment by domain allowing for security boundaries and backup granularity throughout the datacenter.

Disk Staging

For faster backups, both Data Protector and ABS/MDMS can stage their backups to disk. Once the data is on disk, normal production can resume and the staged data backup then sent to tape. Writing to disk is always faster then sending off to tape and this method of backup reduces the typical bottleneck caused by IOs to tape.

Disaster Recovery (DR) Support

Both products are designed to recover a data center in case of catastrophic outage regardless of cause. Documentation and suggestions for setting up a DR strategy are included and the ability to test a recovery is also possible. The key to any DR is the amount of time it takes to recover. Which product is faster is dependent on the current environment and the availability of backup equipment.

Flexibility

These products have some flexibility. But that flexibility is limited to prevent users from getting themselves into trouble by over-customizing their environments. The ability to shutdown and startup applications prior to backup is available as well as the ability to execute some DCL programming via pre- and post-processing command procedures. This functionality typically gives users the flexibility to accomplish backups according to their company policy.

File Attributes

When a file backup takes place on both Data Protector and ABS/MDMS, the following information is backed up:

- File and directory attributes

- Access Control Lists (ACL)

Both products can also back up from any mounted FILES-11, ODS-2, or ODS-5 disk volumes.

Locked Files

Data Protector has a –lock option that can allow the backup of files that have been opened and locked for write. This coincides with the OpenVMS backup qualifier /ignore=interlock, which allows as much of the open files to be backed up as possible.

Include and Exclude File Specifications

Data Protector uses the –skip and –only options to parallel the OpenVMS backup syntax of /include and /exclude. These qualifiers allow for selecting or omitting certain files from the dataset. Both products can use "*" and "$" for wildcarding within files specifications.

Intel® Itanium® Support

Both backup applications are fully supported on the Intel® Itanium® platform. Data Protector's latest OpenVMS client has been ported to Itanium® as well as the latest versions of ABS/MDMS. This is important to consider as some of the older backup application such as SLS are not being moved to Itanium®.

Oracle Database Backup

ABS/MDMS and Data Protector both have the ability to perform hot backups of Oracle 9i and 10i databases with 11i now being qualified. Backups can be written to tape or disk and information about the backup tracked in catalogs for easy restore.

Differences

When it comes to concepts of a backup and archiving application, ABS/MDMS and Data Protector have many similarities. However the functionality and process of how the backup is achieved is different. This section attempts to show many of these differences and how they may affect the backups of a particular environment.

Server versus Agent

The first difference seen between the two products is how each one is viewed on the OpenVMS system. Data Protector views OpenVMS systems within cells as an agent. Agent software needs to be loaded on any OpenVMS system to be backed up. From the Data Protector Cell manager these nodes show up as OpenVMS agents and backups can be initiated from this point. There is also a CLI available on the OpenVMS agent. Note that an additional software kit is required to be loaded for CLI access. Information about backups performed on the OpenVMS system is kept on the Data Protector Server. Data Protector runs its server software on HP-UX, Windows, or Linux operating systems. One of these servers will need to be available in a datacenter in order to use Data Protector to back up OpenVMS nodes.

The advantage for Data Protector is evident in environments where there are numerous operating systems that require backup. Data Protector can manage many different operating system agents from one location including HP-UX, Windows, and Linux. It can also back up numerous application agents including Informix, SQL, Exchange, and Oracle. Note that at this time the Oracle agent is not available for the OpenVMS operating system.

ABS/MDMS uses the OpenVMS system as a server and performs all its management from a selected OpenVMS node. All ABS/MDMS databases are stored on the server. The ABS/MDMS GUI runs on the OpenVMS machine or a Windows server and accesses these databases. Only one node is required to be a server at one time. However, ABS/MDMS has the ability to have standby nodes making failover possible and preventing downtime should the primary server become unavailable.

The advantage for ABS/MDMS comes in environments where OpenVMS is the predominate operating system. This is particularly helpful at sites where user skills are primarily OpenVMS. It also makes it easier to back up data domains where the only operating system is OpenVMS. No other platform is required to complete the backup.

Backup Formats

Data Protector uses its own proprietary backup format to save data to tape. This data stream includes catalog information about the tape for quick access and retrieval. By using this format, Data Protector can also provide functionality such as multi-streaming of data to single or multiple tapes simultaneously. This format also provides data redundancy on the tape volume for medium verification using CRC.

ABS/MDMS uses the native OpenVMS backup image to write to tapes. It can take advantage of all backup functions and qualifiers available to the image. ABS/MDMS directly uses the BACKUP.EXE image found with the SYS$SYSTEM directory. When ECOs are applied to the systems that affect this image, ABS/MDMS will immediately take advantage of their application. No updates to the application or reboots to the system need to be done. And because the data on tape is in saveset format, native OpenVMS backup can be used to restore without the ABS/MDMS application being available. This is particularly important in disaster recovery situations.

Media Management

Data Protector has the ability to manage devices and media within a heterogeneous network environment with servers of different operating systems that need to use the same library and sets of

tapes. Data Protector can manage this scenario by keeping track of what is written on each tape and by what operating system. The advantage is that an entire datacenter can be seen as one entity and there is no concern over the type of data being written to certain tapes. It makes best use of the Storage Area Network (SAN) tapes and libraries that are available.

ABS/MDMS provides for homogeneous backups within the OpenVMS environment. Its media manager can coordinate traffic coming to SAN libraries from OpenVMS nodes. It does not, however, interact with other operating systems that may be connected to the SAN. Libraries will need to be dedicated to OpenVMS use only so sites that primarily have data stored on storage connected to OpenVMS systems will be a good fit for this configuration. This is particularly true where the operating system expertise exists for OpenVMS only. ABS/MDMS can provide backups for Windows and Tru64 UNIX platforms via agent software. Functionality to back up these platforms is minimal and is most useful when a small amount of data needs to be backed up,

Disaster Recovery

The ability to recover from a disaster is most critical for any backup application. Also key is the amount of time that it takes to make the recovery. An event that requires a bare metal restore of a system can prevent production from taking place and cause high economic impact to a company.

ABS/MDMS has the ability to capture image backups of any disk. This is important for the system disk and will allow the restore to create a "bootable" disk. Image restores of a data disk provide the ability to defrag the disk and increase performance. ABS/MDMS has the advantage in that backups created through the application can easily be used and restored using the native backup image. In the case of a complete system disk rebuild, only the location of the tape needs to be found to be restored. ABS/MDMS does not have to be running to begin the restore.

Data Protector does not have the ability to run an image backup. Because of this limitation, a full system disk restore will not be bootable until a writeboot to place the boot block back out onto the disk is performed. However, the OpenVMS system will need to be booted from some location to run the writeboot image. This requires strategic planning to ensure this is possible.

Network and Direct Backups

ABS has the ability to back up remote nodes located on the network using the Remote Device Facility (RDF). RDF causes tape devices to look local to the remote node. In order to perform these backups, ABS/MDMS needs to be installed and licensed on the remote nodes and appear as a client to the ABS/MDMS server.

To Data Protector, all OpenVMS nodes appear as agents. All server software is located on an HP-UX, Windows, or Linux operating system. To back up a remote OpenVMS node, the client software needs to be installed and configured there. Once completed, the management GUI will be able to view that node.

Data Protector also has the ability to back up network-attached storage using network data management protocol (NDMP). It can also perform a "direct backup" using SNIA x-copy, where data is sent directly to the storage device and not through the server. ABS/MDMS does not have this functionality.

Oracle Backups

ABS/MDMS provides the ability to back up RDB style backups using the RMU facility. These backups are managed within the ABS/MDMS catalogs for easy restore.
Data Protector does not have this ability although an Oracle RDB agent for OpenVMS is currently in the plans for a future release.

File Specifications

ABS/MDMS uses the standard OpenVMS syntax when entering file specifications in either the command line or the GUI. For example, backing up a users login.com file from a disk might look like:

```
$1$DGA100:[USERS.DOE]login.com;1
```

ABS will expect to see the file specification in this format.
Data Protector uses a UNIX style file specification for OpenVMS backups. In the case of the above file specification, Data Protector requires the following format:

```
/$1$DGA100/Users/Doe/login.Com.1
```

Unlike the OpenVMS standard, Data Protector has no explicit version number. A version number always has to be defined or no file will be backed up.

Installation and Directory Structure

The Data Protector OpenVMS Agent software is installed using the PCSI facility. Its files are kept in a directory structure within the system software directory structure:

```
SYS$SYSDEVICE:[VMS$COMMON.OMNI]
```

ABS/MDMS is installed using the SYS$UPDATE:VMSINSTAL.COM procedure. By default its directory tree is created at:

```
SYS$SYSDEVICE:[SYS0.SYSCOMMON.MDMS.] and
SYS$SYSDEVICE:[SYS0.SYSCOMMON.ABS.]
```

ABS/MDMS does allow for the changing of this directory structure to a new device at installation time.

Startup and Shutdown Files

To handle startup and shutdown of Data Protector the following files are provided:

- `SYS$STARTUP:OMNI$STARTUP.COM` – This command procedure starts the Data Protector service.

- `SYS$STARTUP:OMNI$SYSTARTUP.COM` – This command procedure defines the OMNI$ROOT logical name. Any other logical names required by this client may be added to this command procedure.

- `SYS$STARTUP:OMNI$SHUTDOWN.COM` – This command procedure shuts down the Data Protector service.

- `OMNI$ROOT:[BIN]OMNI$STARTUP_INET.COM` – This command procedure is used to startup a new TCP/IP INET process, which then executes the commands sent by the Cell Manager.

- `OMNI$ROOT:[BIN]OMNI$CLI_SETUP.COM` – This command procedure defines the symbols needed to invoke the Data Protector command line commands. Execute this from the login.com procedures for all users who will be using the CLI interface. This file will only exist on the system if you chose the CLI interface option. Several logical names are defined in this procedure, a procedure that is necessary to execute the CLI commands correctly.

ABS/MDMS has the following files available for startup and shutdown:

- `SYS$STARTUP:ABS$STARTUP.COM` – This command procedure is used to startup the ABS backup engine software. Note that this will startup MDMS as well.

- `SYS$MANAGER:ABS$SYSTARTUP.COM` – This command procedure is used to put site-specific information for ABS. This command procedure is called during the run of ABS$STARTUP.COM.

- `SYS$STARTUP:MDMS$STARTUP.COM` – This command procedure can be used to start MDMS alone.

- `SYS$MANAGER:MDMS$SYSTARTUP.COM` – This command procedure is used to set site-specific information about the MDMS application.

Application UAF Accounts

Data Protector creates a UAF account called OMNIADMIN to handle its OpenVMS administration work during the run of backups. OMNI services (processes) on the OpenVMS system also run under this account. It has a login directory of OMNI$ROOT:[LOG]. Log files for the startup of INET are placed in this directory along with any debug files.

ABS/MDMS creates two accounts from which it runs its processes and backups; ABS and MDMS$SERVER. Their login directories are ABS$ROOT:[000000] and MDMS$ROOT:[SYSTEM].

Device Support

The MDMS portion of ABS/MDMS manages tape devices and volumes. It is included as part of the install of the application and no additional software is needed to ensure that connectivity is available to OpenVMS tape devices. ABS/MDMS documentation explains how to set up the drives to be used for backups.

Data Protector is based on a non-OpenVMS operating system. In order to use devices locally attached to the OpenVMS system, an additional software package, the Data Protector Media Agent, must be installed. Data Protector README.TXT files have more information on installing this software.

Both products follow the OpenVMS device support matrix to ensure that any recently purchased libraries or tape drives are usable. Check the OpenVMS software product description (SPD), Release Notes, or online support pages for the latest supported devices.

Summary

Which software to use in a particular environment will be dependent on a number of factors:

- What operating system is predominant in the environment? Environments that have mostly OpenVMS servers may find ABS/MDMS more feasible for them.

- Are your libraries and devices used by more than one operating system? Data Protector will be the application that can manage multiple systems to a library or device. ABS/MDMS will require that a library be dedicated to an OpenVMS system.

- On which operating system does most of the data reside? If it is mostly on OpenVMS, ABS/MDMS may prove most efficient. However, if there are large SQL, Exchange, or other applications or databases on other operating systems, Data Protector can back those up along with your OpenVMS system.

- What type of operating skills does your staff have? If your staff is OpenVMS centric, then ABS/MDMS may prove to be the best choice. You should do an analysis of how much it will cost to hire new skills such as those required for HP-UX.

- How fast must a disaster recovery take place? If OpenVMS is the primary operating system in the datacenter and quick, flexible restores are required, ABS/MDMS may be the best choice. If there are other operating systems, however, their restore time and criticality need to be considered.

- Is there particular OpenVMS backup functionality that is needed or required? Data Protector will be somewhat of a cultural change for users and the list of qualifiers that backup owns is not available. You should carefully consider what types of backups and their associated functionality are required before deciding on an application.

Another deciding factor is the cost of the application. Your choice of one product or the other depends on your environment, current applications running, and future growth considerations.

For more information

You may contact the author at