BackBox® E4.07 User Guide

Edition: H06.06, J06.06 or L06.06 RVUs, or subsequent H-series, J-series or L-series RVUs

ETINET

Legal Notice

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PREFACE

This User Manual contains a product presentation and reference information for the configuration and operation of a BackBox subsystem connected to a NonStop server.

BackBox is part of the BackPak product family that also contains BackLib, a library management for NonStop attached tape libraries.

BackBox and BackLib share the software components running on the NonStop host and the user interface.

This present manual is dedicated to the BackBox version E4.07 .

The BackBox end user documentation consists of the following:

BackBox Upgrade Procedure – Updating NonStop and MS-Windows Platforms.

BackBox User Manual – BackBox Product. Configuring and operating BackBox subsystems.

BackBox Tape Encryption Option – Tape Volumes Encryption Guide

BackBox VTC Scripting Option – Guide for implementing Windows scripts archiving tape volumes to an Enterprise Backup Infrastructure.

BackPak UI Installation – Installation of the UI component of a BackPak domain.

BackPak Catalog Sync Option – Configuration and operation for replicating DSM/TC and BackPak catalogs.

BackPak Messages Manual and Troubleshooting – List of EMS error messages generated by the BackPak products.

BackPak Third Party Components – List of third-party software included in BackPak.

Product Description

ETI-NET BackBox is a virtual tape solution to connect the NonStop Guardian tape subsystem to external storage facilities.

BackBox related products:

- BackBox – provides NonStop virtual tape capability to store virtual volumes in various (enterprise) storage infrastructures.

Data Store is the storage system for virtual volumes.

BackBox currently supports two Data Store types:

1. Windows (compatible) disk file system:

- Any internal disk or SAN LUNs, configured under the Windows file system, or
- Any file server (SMB/CIFS) that is compatible with the Windows operating system. This includes specialized de-duplication appliances such as EMC Data Domain or HPE StoreOnce.

2. The IBM Spectrum Protect™ (TSM) Storage infrastructure implemented via the IBM Spectrum Protect™ TSM/API.

This manual describes how to configure and operate BackBox and how to link the NonStop tape subsystem to the chosen external storage.

BackBox Components
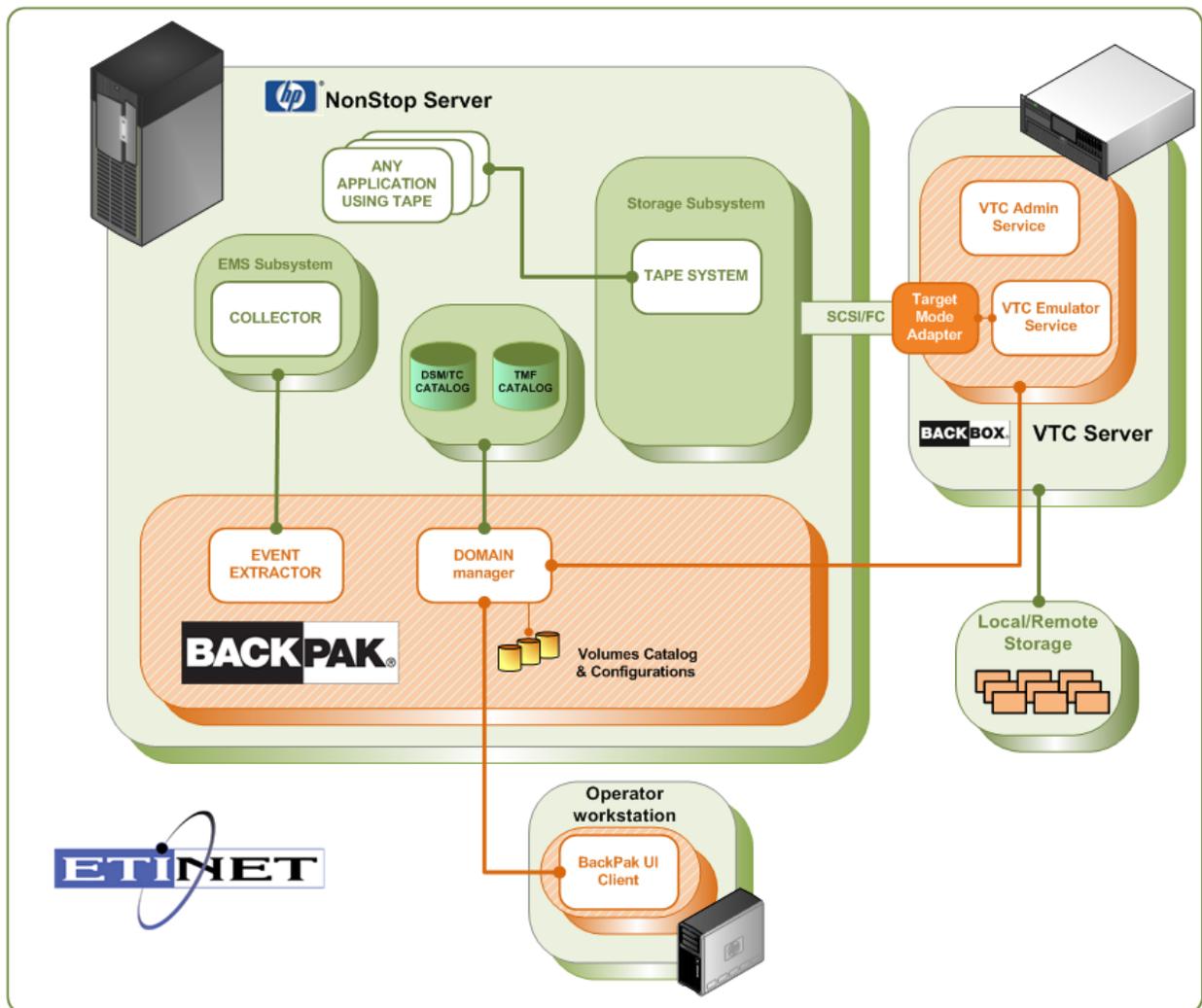
BackBox components:

- Virtual Tape Controller (VTC) unit
- BackPak User Interface Client
- Domain Manager
- Event Extractor

A graphical user interface (UI) to BackBox runs on the operator workstation.

The Domain Manager, Event Extractor and User Interface are BackPak components.

BackBox virtual tapes and BackLib library tapes can be managed in the same BackPak Domain. In a consolidated configuration, BackBox tape drives and BackLib tape drives appear on the same Client User Interface status page and they are operated by the same BackPak processes on the NonStop platform.

Virtual Tape Controller (VTC)

VTC Controllers are Windows-based servers connected to a NonStop server via Fiber Channels and ISCSI for Virtual NonStop. Several VTCs can be connected to the same NonStop system and several NonStop systems can be connected to the same VTC. VTC functions are controlled through TCP/IP.
The VTC is built on a dedicated Windows Server 2008 R2 or 2012 R2 server platform. It stores virtual tape images through the VTC Windows file system. Any Windows compatible disk subsystem can be used for storage. The number of possible physical connections per VTC depends on the model.

For more info see Product Requirements section below.

BackPak User Interface Client

The BackPak graphical user interface is a web-based client application that runs on the operator's workstation. The User Interface is used for configuration, virtual volume creation and manual exception operations.
Standard VTC operations are automated. The usual NonStop tape-related utilities and user interfaces are used for daily operations.
The BackPak User Interface Client can be installed in any Windows-based workstation. An instance must also be installed on each VTC. The User Interface Client installed on the VTC can be accessed through Windows Remote Desktop client.

Domain Manager

A BackPak domain is a group of VTCs and Guardian nodes whose virtual tapes are managed in a single environment. In a Domain, a unique label is given to each tape volume. If the virtual tapes of several NonStop nodes are managed by the same Domain Manager, the volume label must be unique across all nodes.
The user logs in to a Domain using the User Interface Client. The user can configure the virtual devices, the virtual volume characteristics and their storage, can create virtual volumes, query the operational status, and enter exception commands.
The main task of the Domain Manager running on the NonStop platform is to replay to the User Interface requests. It maintains a Domain configuration and a catalog of virtual volumes, including the real data location of each virtual volume. It also manages mount requests for virtual volumes.

Event Extractor

Each Guardian node set with virtual drives runs a BackPak Event Extractor. The Event Extractor essentially automates the mounting of the virtual volumes requested by $ZSVR, by forwarding them to the Domain Manager.
The Event Extractor also assumes secondary roles, such as maintaining the status of tape drives in the NSK OPER file for quicker display in the User Interface.

BACKBOX FUNCTIONALITIES

Basic BackBox functionalities are:

- Creation of virtual volumes.
- Completion of tape mounts.
- Emulation of a tape drive connected to a NonStop host.
- Safeguard of virtual volumes and their data.
- Import/export of virtual volumes through a physical tape drive attached to the VTC (virtualization / materialization).
- Encryption of virtual volumes (see *BackBox Tape Encryption Option* manual).
- Replication of catalog entries (BackPak catalog and DSM/TC catalog) to a secondary site (see *BackPak Catalog Sync* option manual).
- Primary storage pool Synchronization with the Copy Pool, available through the Windows Advance Pool Management (see Copy Pool Sync in "Windows Advanced Pool Management" section).

⚠️   Some BackBox optional functionalities are controlled by the license key. For example, the use of specific storage types, such as a de-duplication appliance, is controlled by the license key.

Virtual Volume Creation

Before using virtual volumes, they must be created through the BackPack user interface.

Volumes are created through the BackPak user interface:

- When a volume is created, it generates an entry in the Guardian tape catalog (DSM/TC or TMF), if the Volume Group is associated with such a catalog.
- The catalog stores the virtual media label to enable the Domain Manager to process the mount request (no separate labeling step is required under Guardian).
- BackBox does not allow the manual deletion of a virtual volume that contains non-expired data.
- For certain configurations, the volume has to be set up as a scratch volume in the chosen Data Store.

⚠️   Volumes associated with the NonStop tape catalog (such as DSM/TC) configured for auto-scratch are not created in the Data Store until they contain data.

Tape Drive Emulation

To the NonStop host, a BackBox virtual tape drive appears as a physical drive connected by SCSI or Fiber Channel. The drive appears as LTO3 (i.e. using LTO3 or LTO2 media type) by default, unless otherwise specified in the VT internal configuration files.

- 3480 media type can also be supported for Guardian nodes with older tape system (G06.31 or SPR T0021G05^ABW, H06.13 or SPR T0021H01^ABZ).
- LTO4 can be used for HP VLE Encryption with ESKM.
- LTO6 can be used on CLIM base NonStop host supporting LTO6 tape drive. LTO6 cannot be used for VLE Encryption with ESKM.
- BackBox supports all NonStop tape I/O commands that affect the data content on tape and the current position on the media.
- Data is stored and controlled by the BackBox configuration and the Data Store software/hardware, and it is transparent to the Guardian.

Virtual Volume Storage

Virtual volumes can be stored on a variety of storage, such as Windows Data Store or IBM Spectrum Protect™ (TSM) Data Store. See the description of different types of data stores in Windows Data Store and IBM Spectrum Protect (TSM) Data Store.

In all types of Data Stores, the size of the storage space allocated to a virtual volume is equal to the size of data actually written plus a marginal amount of metadata, regardless of the maximum size specified in the Volume Group.

The image of each virtual volume is kept indefinitely in the Data Store until:

- The virtual volume is rewritten by the Guardian tape application,

  or
- The BB017_FREE_EXPIRED batch TACL macro frees the storage of volumes declared expired by DSM/TC and TMF,

  or
- The virtual volume is deleted manually through the Web user interface.

Compression

Software compression is available for Windows file system Data Stores. Two types of compression are available:

- HIGH – better compression, more CPU usage for the VTC.
- LIGHT – Less compression, less CPU usage for the VTC.

When the size of the compressed data reaches the maximum volume size defined in the Volume Group, an EOT (End-Of-Tape) indication is sent to the Guardian tape process.

VTCs add metadata to the User data received from SCSI commands. This metadata is included in the computed storage size, displayed in the web application and used to compute the compression ratio. Consequently, the reported ratio is marginally lower than the ratio computed only on the user data.

Before choosing the final compression setting, it is recommended to determine which is the most appropriate compression for your data.

To determine if compression is advantageous for your environment, check the following:

- The effective compression for different backup types and different compression algorithms on the Web UI Volume list page.
- The global effective compression per Volume Group in the Volume Summary page.
- The CPU usage in the VTC server using the Windows performance monitoring tools. **Important:** VTC CPU saturation should be avoided.
- The impact on throughput as reported by the BackBox statistical report (OBB018 OBEY file).
- Virtual tape should be compressed only once, either by the VTC or by the enterprise backup software.

> ⚠️ The compression setting can be changed any time. The change will affect all subsequent volume mounts in that Volume Group.

Important: When sending the virtual volumes to a data de-duplication appliance (such as Data Domain), BackBox VTC compression should be disabled. Failure to do so results in poor de-duplication ratios.

Encryption of Virtual Volumes

Tape volumes can be encrypted by the BackBox VTC software or by the storage subsystem where the media is written by BackBox.

Encryption by BackBox Software

Software encryption is available for Windows File System Data Stores and for all NonStop systems H06.xx and J06.xx.
The data is encrypted using IEEE 1619.1 (tape) industry standard algorithms before it is sent to the Data Store. The encryption algorithm uses a 256-bit encryption key stored in an external Key Management Server.
Encryption by BackBox software can be used with an HP Enterprise Security Key Manager (ESKM) and can optionally be fully integrated with the NonStop Volume Level Encryption (VLE) product. The backups created from Blade systems with LTO4 and VLE can be restored by older systems with LTO3 or CART3480 emulations and vice-versa. When emulating LTO3 or CART3480, the BackBox VTC creates and retrieves the same encryption keys as would a CLIM with VLE.

⚠️ **Important:** For storage subsystems that implement data de-duplication, BackBox data encryption **MUST NOT BE USED**.

Encryption or compression prevents de-duplication algorithms from matching re-occurring data blocks, making de-duplication ineffective. For these subsystems, the encryption should be performed by the storage subsystems themselves.

Further detail about BackBox Encryption can be found in the [Compression / Encryption](#) section.

Encryption by the Storage Subsystem

Encryption provided by the storage or operating system itself is not described in this manual.
For example, EMC offers optional capabilities for "data at rest" and "data in motion" encryption on their Data Domain products.
IBM Spectrum Protect™ (TSM) API Data Stores and WINDISK Data Stores backed-up to a IBM Spectrum Protect™ (TSM) server offers various encryption functionalities, as do other similar enterprise backup products.

LARGEBLOCK SUPPORT

From L17.08 onwards, both BackBox and Virtualized BackBox support BLOCKSIZE of 224, 448, 672, and 896. To use this option, the LARGEBLOCKS attribute must be ON for the tape device in SCF (for more information, see *SCF Reference Manual for the Storage Subsystem* on the HPE support website.

By default, on the VTC, LARGEBLOCK mode is set to ON and it works whether the device on the NonStop is enabled for it or not. To turn this feature OFF see VTC Management Console section of this manual.

WINDOWS FILES DATA STORE

Under Windows Files Data Store, the virtual volume is implemented as a package of two Windows disk files:

- An .IND file - a small index file containing metadata (filename.IND).
- A .DAT file - a variable length data file, whose size is based on the current content of the volume (filename.DAT).

A Windows File Data Store is defined as a pool of disk paths following the UNC syntax (\\server-\path\directory\]. Although drive letters (d:\directory) are supported for single VTC, it is strongly recommended to use UNC for all Data Stores.

If the disk units are presented as a single logical disk, the emulator manages to provide:

- Space balancing across disks.
- Load balancing across disks.
- On the fly scratch volume creation (Data Store fault tolerance).

While writing and reading these Windows disk files:

- The VTC reserves the configured maximum volume size plus a margin of 10 MB when loading a volume in write mode. Unused space is freed at volume unload.

⚠️   Compression affects the file size but not the amount of NonStop data contained in the volume.

- Virtual volume may be moved from one disk to another in order to balance the space utilization or the work load when the Data Store is configured across a pool of disks.

A file can be moved when:

- A SCRATCH volume loaded for output with auto-scratch on, is deleted and recreated at the optimal location.
- A restore script is executed and the virtual tape is restored in the optimal location.

By using a parameter in the Data Store configuration, and independent of any other consideration, the user can change the load balancing algorithm to force use of the local disk.

Creation of Virtual Volumes

The virtual volumes in each set are spread evenly across the data paths on disks, creating sufficient free space for at least one volume on each data path. For a Volume Group configured as AUTOSCRATCH and associated with a NonStop tape catalog such as DSM/TC or TMF, no files are created by default.

However, when creating virtual volumes, both disk pool configuration and security settings are checked. Volumes are registered in BackPak and in DSM/TC or TMF.

Free Space on Remote Paths

When the size of the free space on a disk cannot be known, the VTC always considers that there is enough space for the current volume.

FILE ACCESS SECURITY

The files holding the virtual volumes are protected by Windows security. The Windows credentials entered in the Data Store configuration are used also for file creation and system access.

The account must successfully log in to all VTCs that are routes for the Data Store. The same account must have full access to all paths specified in Data Store configuration.

The account can be a workgroup account. In this case, the account must be defined with the same password in all file servers providing a share to the Data Store.

The account may also be defined in Windows Active Directory and can be a non-interactive account.

SCRIPTING/BACKGROUND MIGRATION ON TAPES

For convenience and performance purposes, BackBox is most often configured to write the tape image files to disk. Once the configuration is done, BackBox copies or moves (migrates) the image to a physical tape or to other storage for long-term retention.

To migrate virtual tapes, either install a general HSM client in Windows or use the BackBox scripting facility to trigger a backup by an enterprise backup client (such as Networker, NetBackup or IBM Spectrum Protect™ TSM).

- HSM solutions are transparent to BackBox.
- Script files are user written command files to call the enterprise backup client in order to save or restore a given virtual tape image.

The user can also:

> Schedule regular backups by the enterprise backup client.

> Configure BackBox to trigger scripts when:

- A virtual volume needs to be copied or moved as soon as it is unloaded from the tape drive. Unavailable when the Copy Pool Sync option is activated.
- A virtual volume must be loaded in read mode and must be restored by the enterprise backup client.

Scripting Facilities

Scripts are configured in the **Data Store Advanced** configuration page. Use's parameters can also be defined and their values set on the same page.

There are two script types: Implicit (IBM Spectrum Protect™ TSM and Manual Restore) and explicit (Generic). For implicit script, the user cannot specify a script name, as they are already predefined.

If IBM Spectrum Protect™ (TSM) or Generic type scripts are selected, the backup method must be specified (BackBox script or other methods – triggered by an enterprise backup software). IBM Spectrum Protect™ (TSM) and Generic type scripts can also be submitted via the Script Controller.

Without the Script Controller, scripts are executed for each virtual volume.

⚠️ With the Script Controller, the scripts named in the Data Store advanced configuration, forward the backup or restore request to the VTC Script Controller. The Script Controller manages queues of backups or restores requests and submits actual backup or restore scripts that can process several virtual volumes at the same time.

The Script Controller is a batch sub-system and is used for:

- *Retries:* When the user wants another layer of error recovery on top of the one implemented by the enterprise backup client. By default, the Script Controller will retry for 24 hours, with a delay of 5 minutes before ceach retry.

- *Serialization:* A VTC typically implements several virtual tape drives and might trigger several concurrent scripts. The number of concurrent script executions might be limited by the enterprise backup software, or just because the enterprise backup client writes directly to a physical tape library. The Script Controller queues the backup or restore requests, consolidates similar requests, and submits them in a number of queues and threads per queue, as set by the user.

For detailed information on scripting in the BackBox, refer to the *BackBox VTC Scripting Option* manual.

DISK SPACE MANAGEMENT TOOLS

The UI Storage Admin page shows a summary of the Windows Data Store disks for different groupings. The user can either:

- Resubmit the backup script for all Windows files that have not been backed up or,
- Manually start the synchronization of the storage and copy pool, if the Copy Pool Sync option is activated.

BackBox provides TACL macros that can be scheduled in NetBatch to:

- Delete files corresponding to volumes expired in TMF or DSM/TC catalogs. If a delete script is configured, it will be executed to also delete the backup of the expired file. (BB017_FREE_EXPIRED).
- Delete backed-up files after a certain number of days have elapsed since their backup. This allows the immediate retrieval of recent backups and the freeing of disk space associated with old backups (BB023_DEL_BACKEDUP).
- Delete restored files after a certain number of days have elapsed following their restore. This allows several executions of the NonStop RESTORE program after a single execution of the restore script (BB023_DEL_BACKEDUP).
- Check the available free space against a warning threshold set in the Data Store configuration and the maximum volume size configured in Volume Groups (BB022_CHECK_SPACE).

WINDOWS DISK PATH RESERVATION

For Windows Data Stores, in certain cases, different kinds of virtual volumes need to be set apart on different disks. For example, when only part of the available Windows disks is mirrored and should be assigned to the TMF AUDIT dumps or to the backups of a specific DSMTC pool.

The disk path reservation allows for specifying that certain disk paths will be used exclusively for a specific Volume class.

Volumes in a volume class with reserved paths will use only these paths.

The configuration of disk path reservation can be set through the Data Store configuration page in the UI.

WINDOWS ADVANCED POOL MANAGEMENT

With this option, a user can define a "Spare pool" and a "Copy pool" in addition to the "Storage pool".

The **Spare pool** is an emergency disk pool. This is the location the VTC will use only if all the Storage pools (all disk paths) are unavailable or full. In this case:

- The new backups will be written to the Spare pool. They are available only for Volume Groups defined as Auto Scratch.
- If an enterprise backup restore needs to be done through a script to satisfy a mount from the NonStop, the 'Spare pool' will be used as an alternative staging area.

The content of a Spare pool is not automatically moved back to the 'Storage pool' when it becomes available. However, it can be initiated manually through the UI in the **Storage Admin** page> **Move Files from Spare pool**.

The **Copy pool** is a path to a copy of the **Storage pool** when that is unavailable. In general, it uses a path to a replicated copy on a remote site. The VTC will search in the **Copy pool** only when a NonStop restore is executed and the virtual volume is not found in the regular **Storage pool**.

Copy Pool Sync

When the **Windows Advanced Pool Management** is available, it allows volume copying from the primary storage pool to the copy pool of the same Data Store by the CopySync program. Copying is done via the regular backup script and it is automatically submitted after a backup or on demand thru the UI (for a single volume or the entire Data Store). The script execution is reported in EMS as a regular backup script, although it is not configured as a script.

When activated, this option is incompatible with the backup script of an Enterprise Backup taking additional copies. However, an Enterprise Backup Server that pulls files from the storage pool is compatible.

The CopySync program chooses an available remote path (copies are only done on remote paths) in the Copy Pool. If the only available path is local, the copy will not be executed. Please take note that:

- Any pre-existing instance in the Copy Pool is deleted.
- The source volume is opened with write protect, but allows concurrent readings.
- The volume is not declared "IN USE" in the domain, but it is available to a load on the NonStop restores.
- After a successful copy, the target file modification time is set equal to the source file copying time.

If the **Windows Advanced Pool Management** option is not selected, the Copy Pool Sync option is not available. The storage pool replication does not depend on the product and it is provided with the customer installation.

⚠️ The copy pool sync scenarios work only without ENCRYPTION.

*

Use the following example for Copy Pool Sync set up:

Before setting up the Copy Pool Sync, choose the paths that you want to store the files into:

\\ASTERIX\DATASTOREQC\ on the Local VM for Storage Pool

\\OBELIX\COPY_QC\ on the remote VM for Copy Pool

1. To set up the **Storage Pool**:

a. Login as UI client, go to **Configuration** > **Data Store** > click on the **Data Store ID** where your storage pool has been created and **Switch to Edit Mode.**

b. Scroll down to **Windows Pool** section and select **Storage Pool**. In the **Path*** field put the name of the path that you defined for the local VM (e.g. \\ASTERIX\DATASTOREQC\).

Windows Pool

Storage Pool	Spare Pool	Copy Pool

Path* `\\ASTERIX\DATASTOREQC\`
Rank* `1`
[Add Path to Primary Storage Pool]

	Path	Rank	Reserved For
Edit Delete	\\ASTERIX\DATASTOREQC\	1	ANY

c. Scroll down to **Storage Route** section and add one storage route for the local machine (e.g. ASTERIX) and one storage route for the remote machine (e.g. OBELIX).

Storage Route [Add]

		Rank*	VT Controller ID*
Edit	Delete	1	ASTERIX
Edit	Delete	1	OBELIX

2. To set up the **Copy Pool**:

a. In the **Windows Pool** section, click on **Copy Pool** and in the **Path*** field put the name of the path that you defined for the remote VM (e.g. \\OBELIX\COPY_QC\).

Windows Pool

		Path
Storage Pool	Spare Pool	**Copy Pool**

Path* `\\OBELIX\COPY_QC\`

Add Path to Copy Pool

		Path
Edit	Delete	\\OBELIX\COPY_QC\

b. Scroll down to **Storage Route** section and add one storage route for the local machine (e.g. ASTERIX) and one storage route for the remote machine (e.g. OBELIX).

Storage Route	Add		Rank*	VT Controller ID*
Edit	Delete		1	ASTERIX
Edit	Delete		1	OBELIX

3. To set up the **Advanced** options:

a. Go to **Advanced** option of the data store and select **Copy Pool Sync Without Script Controller** option for the **Copy Pool Sync** feature, then click **Update**.

Data Store ID	Store Type	Status	Domain Access	Description		
DATASTORE-QC	WINDISK	Active	PRIMARY		Catalog Sync Export	Advanced

Advanced

Restore On Same VTC ☐

Disk Block Size (KBytes) 128 ▾
Copy Pool Sync Copy Pool Sync Without Script Controller ▾
Force Local Path ☑

Update

Enterprise Backup Software Scripting
Script Type No scripts ▾

Update Script Information

Script Parameters Add

		Name		Value
Edit	Delete	BBOX_COPY_IOPACING		0

b. **Save** the configuration

⚠ Make sure to set the shared file(s) permissions according to your data storage type.

IBM SPECTRUM PROTECT™ (TIVOLI STORAGE MANAGER) DATA STORE

In a IBM Spectrum Protect™ (Tivoli Storage Manager) server, a virtual volume is made of a series of IBM Spectrum Protect™ (TSM) objects of a certain size.

When the BackBox is set up as a storage appliance, its server can be a IBM Spectrum Protect™ (TSM) client and/or a host dedicated IBM Spectrum Protect™ (TSM) server.

IBM Spectrum Protect™ (Tivoli Storage Manager) Software

The IBM Spectrum Protect™ (TSM) Windows client API runtime module is required by all VTCs accessing IBM Spectrum Protect™ (TSM).

This software must be bought from an authorized distributor and installed according to user requirements.

IBM Spectrum Protect™ (TSM) Features

BackBox is a IBM Spectrum Protect™ (TSM) API client and all IBM Spectrum Protect™ (TSM) functionalities offered to API clients are available.

- Rule-based storage management, with automatic migration and duplication.
- Support of several server platforms.
- A choice of connectivity between the BackBox and the IBM Spectrum Protect™ (TSM) server, including LAN-free connections.
- A wide choice of storage media, drives and libraries.

Please refer to the IBM Spectrum Protect™ (Tivoli) documentation for more information about IBM Spectrum Protect™ (TSM).

IBM Spectrum Protect™ (TSM) Activity Log

Each time a new session is activated from the VTC to the IBM Spectrum Protect™ (TMS) Server a message will be issued to the TSM Activity Log. This message states the virtual tape labels for which the session was started.

```
4/27/2016 11:17:25 ANE4991I (Session: 1639, Node: QCMONT)

ANE4991 BackBox: Starting session for the virtual volume PBCT04 in WRITE
mode. (SESSION: 1639)
```

Integrity Check when a Volume is Written

When a recently re-written volume is unloaded, the IBM Spectrum Protect™ (TSM) data base is queried to verify the list of IBM Spectrum Protect™ (TSM) objects containing the virtual volume.

If an anomaly is detected, message **#6005** or **#6006** is issued to the EMS. The backup should be re-executed and ETI-NET support contacted.

- The backup or TMF dump finishes without any error.
- The number of IBM Spectrum Protect™ (TSM) objects can be seen in the Volume detail web page.

ADDITIONAL FUNCTIONALITIES

Auto-Scratch Mechanism

When auto-scratch is enabled in the Volume Group configuration, the VT Controller does not access the image of a virtual volume that is mounted for output, but it recreates the image of that volume.

This mechanism makes it possible to:

- Avoid restoring the archived image of the expired virtual volume
- Instantly move the Windows files from an unavailable path (disconnected or full) to an available path, or to the most efficient path.

⚠️ The volume content is deleted by this operation before any tape data is read by the NonStop. When Auto-scratch is not enabled, the last image of the tape volume is presented to the NonStop host.

Auto-scratch is incompatible with POOL set to APPEND ON.

The auto-scratch mechanism is active for automatic mounts and for manual loads initiated through the **Pending Mounts** section of the Web User Interface.

When processing these mount requests, the Domain Manager knows the characteristics of the Guardian DEFINE CLASS TAPECATALOG that initiated the mount request and can determine if the volume is scratch or not. For a DEFINE CLASS TAPE, the scratch status is determined by the tape header expiry date saved in the BackPak catalog.

The auto-scratch mechanism is never active for manual loads initiated through the UI **Volume Detail** page. Manual loads should be executed in the **Status Node** page.

The conditions to determine a volume scratch status depend on the type of label and catalog processing settings:

TMF tapes

> The media must be SCRATCH in the TMF catalog.
>
> The label processing must be enabled.
>
> The define attribute USE must be OUT.

DSM/TC cataloged tapes

> The tape define must be TAPECATALOG class.
>
> The tape volume must be SCRATCH in the DSM/TC catalog.
>
> The label processing must be enabled.

The define attribute USE must be OUT.

The tape volume must be recognized and known by DSM/TC.

The status of the tape volume must be PENDING or SCRATCH.

No tape file is cataloged on the required tape volume.

The DSM/TC pool associated with the tape mount must be set to APPEND OFF.

CA cataloged tapes

The tape define must be TAPECATALOG class.

The label processing must be enabled.

The define attribute USE must be OUT.

QTOS cataloged tapes

There must be a tape define of TAPE class

The label processing must be enabled.

The define attribute USE must be OUT.

Un-cataloged tapes

There must be a tape define of class TAPE

The label processing must be enabled.

The define attribute USE must be OUT.

The expiry date in the 1st file tape header (HDR1) recorded in the BackPak catalog must have been reached.

Delete Expired Volumes

To be able to free expired volume occupied storage, the Delete Expired Volumes in the Volume Group configuration must be checked.

The cleanup is triggered by the TACL macro BB017_FREE_EXPIRED in the daily batch OBB017.

The automatic cleanup is available only for DSM/TC, TMF and QTOS catalogs.

If a Delete script is configured for the Data Store, it is submitted to have the enterprise backup solution free its own storage.

Virtual Volumes Access Control

Access to virtual volumes can be secured at the volume level.

The VT Controller access control is similar to the basic security of the Guardian file-system. It works better when the Volume Group is set as auto-scratch, because the ownership of a volume is reset each time the volume is rewritten for a new backup.

Security attributes are stored in the BackPak catalog for each virtual volume:

> The Guardian owner (Guardian node and Guardian user ID)

> Three access authorizations: Read, Write and Control.

>> **Read:** to read the volume data

>> **Write:** to read, write and delete the volume data

>> **Control:** to change the volume security through the Web interface.

The security attributes are checked against the user at each volume operation; unless it is a load of a volume known as SCRATCH by DSM/TC or TMF and the auto-scratch is enabled.

Security attributes are reset each time the volume is loaded for output:

- The Guardian user becomes the owner.
- The access authorizations are initialized by the default values configured for the Volume Group, then overridden if the Guardian TAPE/TAPECATALOG DEFINE contains the special keyword BBOX-SECURE=rwc (Read, Write and Control authorizations).

User/Owner Identity

- To get the user identity, the Domain Manager queries the mount request detail from MEDIASRV.
- For operations initiated through the UI, the Guardian login information (Domain Manager node and user-id) is used.

Authorization Specification

Each of the three authorizations, Read, Write and Control, specifies how the user accessing the volume should be compared to the volume owner. Access can be:

> N Any node, any user-id

> C Any node, same group number

> U Any node, same user-id

> A Same node, any user-id

> G Same node, same group number

O Same node, same user-id

? Use authorizations that were set at backup time

. Disabled access

'**?**' is a special value that cannot be entered, but is displayed by the BackPak UI for volumes that were created in a RESTRICTED Data Store.

For such volumes, the domain does not hold the RW authorizations; the access control is done by the VTC against the authorization specifications that were set at backup time and copied as metadata in the Data Store.

'**.**' is another special value that cannot be entered or removed. This is the value displayed for WRITE access when a volume is in a RESTRICTED or SECONDARY Data Store. Such volumes can never be written for a new backup.

bbox -Secure Specification

"**bbox-secure=rwc**" can be added to the MOUNTMSG DEFINE attribute. The keyword and authorizations are not case sensitive.

Example of specification through a TAPE DEFINE:

```
RESET DEFINE *

DELETE DEFINE =TAPE1

SET DEFINE CLASS TAPECATALOG

SET DEFINE FILEID FULL-BACKUP

SET DEFINE POOL BBOX_BACKUP

SET DEFINE LABELS BACKUP

SET DEFINE MOUNTMSG "Full backup bbox-secure=GGO"

SET DEFINE USE OUT

ADD DEFINE =TAPE1
```

Un-Cataloged Volumes

Restricting the access to un-cataloged volumes is conditional.

There is no volume status in Guardian that allows recognizing a SCRATCH volume before accessing it. This way, the authorization check cannot be bypassed.

Updating the Security Attributes of a Volume

The Security attributes of a volume can be changed through the UI: **Volume** > **Volume Details** > **Edit**. To change the volume ownership or access authorizations, the user must have CONTROL access to the

volume or be SUPER.SUPER on the node running the Domain Manager. In addition, the volume must be created in a PRIMARY Data Store.

Device Reservation

Some tape devices can be reserved for specific usage: for example, if six devices are defined for a NonStop node, one of these drives can be reserved for TMF AUDIT DUMP activity.

Tape devices are reserved for volume class(es) that are defined in the Volume Group configuration.

To reserve devices, go to UI **Tape Device Configuration** page.

Reservations can also be modified by the TACL macro BB020_RESERVE that allows automatic reservation changes in scheduled batch.

The default is set for a device to mount volume(s) of any class.

Reserved drives are preferred, in general, for volume(s) of a specified class.

Pre-load

When a multi-volume backup set has been moved from a Windows disk Data Store to an enterprise backup server, a RESTORE operation may last for a long period because of the time needed for each volume switch to execute the restore script.

Pre-load applies only to the restore of multi-volume backup sets. It anticipates the next volume load by executing its restore script, while the previous volume is being read by the NonStop.

To use pre-load with multi-volume backup set:

- Be sure there are two virtual devices available for each NonStop restore tape process.
- Enable Pre-load in the Volume Group configuration.

BackBox detects and registers multi-volumes backup sets (BACKUP, BRCOM or TMF dumps).

When a load for input is executed and the volume is part of a multi-volume set:

1. The restore script for the first volume is run.

2. As soon as the first volume has been mounted and is in use by the tape application, the restore script for the second volume is started.

3. When the restore script ends, the volume is loaded and recognized by the NonStop tape system as an "Un-requested load".

4. When the tape application requests the next volume, it is already mounted.

⚠️   When the next volume has less than 1MB of data, the pre-load is not executed.

Restricted Data Stores

A Restricted Data Store is a view of a Data Store owned by another domain. Restricted Data Store provides read access to virtual volumes owned by another BackPak Domain, most often running on different NSK nodes.

Restricted Data Stores are also a way to manually repopulate the BackPak catalog when the catalog has been lost, and:

- No backup is available to restore VOLUME*
- No DSM/TC or TMF Catalog can be used as a source of re-registration in the BackPak domain (Import from tape catalogue)
- Actual volume images are still available in the Data Stores

The Data Store is created RESTRICTED to manually register the volumes in the domain. Once volumes are registered, the Domain access of the Data Store is changed to PRIMARY to allow backup and restore.
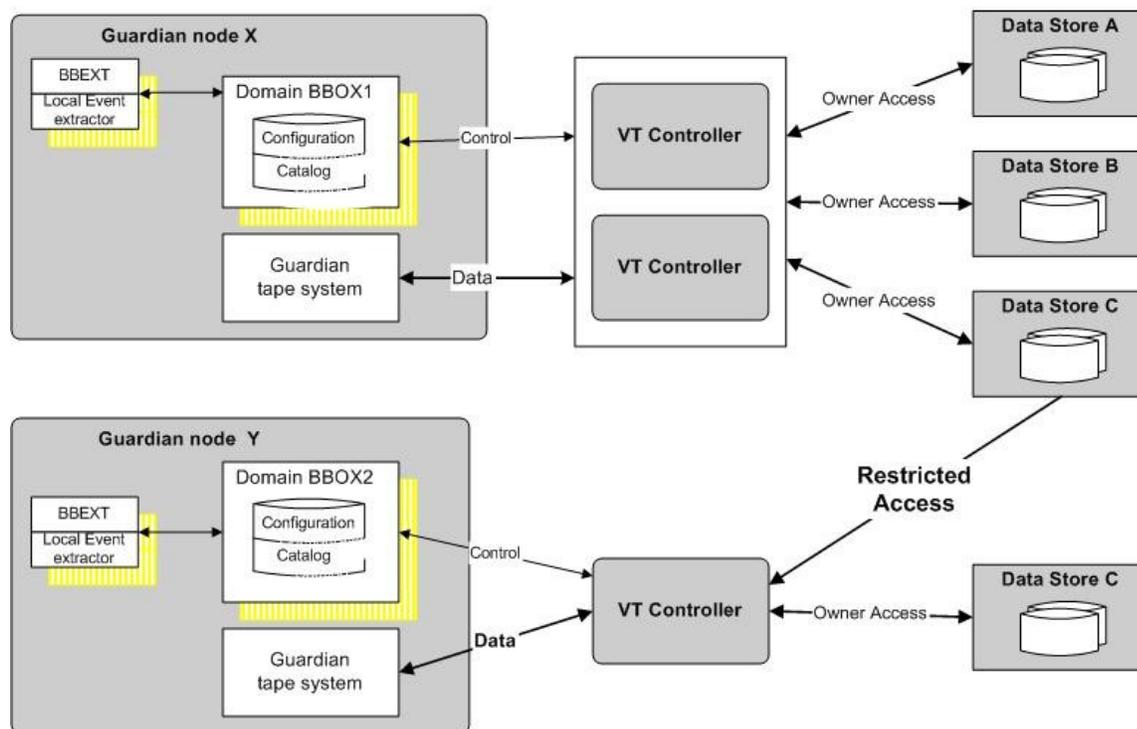
To Set-up a Restricted Data Store in a Domain:

In the Domain configuration, a Data Store is defined with RESTRICTED domain access. The Data Store ID and Volume Group IDs are ideally the same as in the original domain. If different, the original ids must be specified in Primary Data Store ID and Primary Volume Group ID. These primary

IDs become visible in the configuration pages only when the Data Store access is set to RESTRICTED.

The volume images in the Data Store must have been created with these same primary Data Store IDs and Volume Group IDs.

Once this is completed:

The Volumes Creation page is used to register the volumes in the domain catalog. The volumes creation in a RESTRICTED Data Store only registers the volume labels in the domain catalog. The image of volumes in Data Stores and TMF/DSMTC catalogs are not accessed.

The deletion of volumes removes only the volume entries from the domain catalog.

Tape application running on the nodes of the alternate domain can access the restricted volumes in Read only (SET DEFINE USE IN) mode.

For WINDISK Data Stores:

- Only Restore and Post restore scripts are available.
- The volume timestamp check is not available.

The access control to volume data is different from a PRIMARY Data Store:

In PRIMARY Data Stores, access to a volume is controlled by the security settings (volume owner and access authorizations) stored in the domain catalog.

In RESTRICTED Data Stores, Read is the only access option. The Read access is controlled by the security settings (owner and authorizations) that have been set in the original domain when the volume was written for a backup.

In the volume details displayed by the UI, access rights are shown as"?" or ".".

The "?" indicates the domain does not know the authorization and the owner for READ access.

The "." indicates the WRITE access is disabled.

Notes about access authorizations:

- If volume security settings are modified through the UI in the PRIMARY Data Store domain, these changes will not be forwarded to any other RESTRICTED Data Store domains.
- READ and WRITE authorizations can be updated only in PRIMARY Data Stores.

The user must manually coordinate the sharing of Data Stores between domains.

A data store can be configured for simultaneous access by:

- A single PRIMARY domain.
- One or several RESTRICTED domains.

With some type of high-end NAS, BackBox cannot open files in exclusive mode in order to avoid many program updating the same virtual volume at the same time and preserve data integrity. The user must prevent collisions, using tape label nomenclature ensuring uniqueness in the enterprise. If DSM/TC Catalog is correctly configured it is possible to avoid selection of the same tape volume by multiple host.

In IBM Spectrum Protect™ (TSM) API Data Stores, simultaneous access on the same volume by several domains is also technically possible and can be avoided in the same way.

The **Domain access to Data Store** can be modified at any time:

- In a site or recovery environment, a RESTRICTED Data Store promoted to PRIMARY replaces the original owner.
- When a RESTRICTED Data Store is promoted to PRIMARY domain access, the volumes of the Data Store will progressively migrate to the full Primary domain access state, as they are rewritten for backup by the new Owner domain.

⚠️ When a PRIMARY Data Store is changed to RESTRICTED, then changed back to PRIMARY less than 24 hours after, there is no progressive migration: all volumes are considered immediately migrated.

After a volume is migrated:

- The next load will be controlled by the volume timestamp (if the timestamp is enabled by the Data Store configuration).
- The next access will be authorized by the security setting registered in the domain catalog.

When volumes are not migrated, they are managed as Restricted.

There is no control of volume timestamp.

The authorizations displayed in the BackPak GUI look like: "**??N**".

The two '**?**' indicate that READ and WRITE access will be checked according to the settings saved at backup time as metadata in the tape volume image.

The user can override the security settings by specifying regular authorizations (such as N, O, G...) for READ and WRITE access and for reviewing the ownership (displayed in the same volume detail page).

Secondary Data Stores and Catalog Replication

To prepare for disaster recovery, virtual tape volumes must be saved, backed up or replicated. The tape catalogs on NonStop (BackPak catalog, DSM/TC catalog, etc.) must also be saved.

The virtual tape volumes are saved by specific storage means: HPE StoreOnce, IBM Spectrum Protect™ (TSM), Data Domain, and disk arrays. All these have their own methods of duplicating the objects representing a tape volume. BackPak is not involved in this data replication, except when the replication is obtained by triggering backup scripts (when virtual volumes are written).

With the D/R license option, BackPak replicates the entries in the BackPak and DSM/TC catalogs immediately after each backup.

QTOS, CA and TMF catalogs cannot be duplicated. For environments using these catalogs, only the BackPak catalog will be replicated from the primary to the secondary side.

The BackPak catalog replication brings several benefits:

- The timestamp of the last backup on the volume is written and will be verified against the volume in storage at restore time, securing the identification of the version of the volume data.
- When the virtual volumes are written on Windows disk and then saved to an enterprise backup server, the BackPak catalog contains the name of the original Windows file. At restore time, this name must be specified in the command to the enterprise backup software.
- The replicated volume may inherit owner and access restrictions.

To receive the replicated catalog entries on the secondary site, a Data Store must be configured with SECONDARY domain access in the BackPak Domain on the secondary site.

Refer to the *BackPak Catalog Sync Option* manual for more information.

Cloning Physical Tapes

Use OBEY file OBB055 to clone a set of physical tapes to a set of virtual media. The OBEY file receives two tape drive inputs: one physical and one virtual.
The new virtual tape has the same label as the physical one and it is automatically added in the BackBox catalog once created.

⚠️   This option is not available on the Virtualized BackBox.

CONFIGURATION

The chapter is organized as follows:

Entities Configured in a Domain - presents the main entities defined for a domain configuration.

Special Considerations at Installation – notes on installation procedure

WINDISK Data Stores and IBM Spectrum Protect™ (TSM) Data Stores - characteristics of WINDISK and IBM Spectrum Protect™ (TSM) data store types

The two latest sections provide info on the ESM extractor and on the recovery procedure:

EMS Extractor Configuration is a reference set for the BBEXT program that automates the tape load.

Procedures for Recovery describes the backup procedures.

Entities Configured in a Domain

The BackPak Domain configuration defines the VTC(s) and their virtual devices, where the volumes and virtual volume images are stored.

This configuration is kept in the **BBSVCFG** NonStop file located in the same disk sub-volume as the Domain Manager program BBSV.

This configuration is updated through the BackPak User Interface.

From the main Configuration tab of the UI, a sub-tab allows the user to configure each entity:

- The **Domain** contains global data such as the license key and the traces settings.
- The **NSK Nodes** includes operational details and parameters about the NonStop system.
- The **VT Controller** defines the virtual devices and the TCP/IP or SCSI/FC connections to the NonStop.
- The **Tape Library** communicates with the psychical tape library.
- The **Key Manager** manages the secondary encryption method.
- The **Data Store** describes where the virtual volume images are stored.
- The **Volume Groups** sets volume attributes, such as maximum volume size, volume type, and matching NonStop catalog and pool.

Domain

A domain is an operational environment for tape applications. It is a set of one or more NonStop systems connected to one or more VTCs. The domain is defined by a catalog of virtual tape volumes and a set of configurations for the VTCs, the storage, and the tape.

NSK Nodes and NSK Profiles

The NSK nodes make up the system where the VTC(s) present(s) the tape drives. The VTC(s) presents their tape drives to the NSK node systems.

The NSK profile configuration includes operational details, such as timeouts on the EMS Extractor running on each node.

The actual values are stored in NSK profiles. Usually, the NSK profile created by default does not need adjustment and can be shared by all NSK nodes of the domain.

VTCs and Virtual Devices

The VTC configuration defines the VTC servers and associates some or all of the available SCSI/FC connections to virtual tape drives on the NonStop systems.

Each available physical SCSI/FC connection to the VTC is presented as a port in the VTC configuration page.

Configuring several virtual devices on the same port:

- Allows more tape applications to run concurrently.
- Maximizes the usage of the available FC bus bandwidth.

With the virtual NonStop, the ISCSI port is a virtual device that estabnablishes connections between the VTC and the virtual NonStop. There is a total of 3 ISCSI ports allowed per network adapter connection.

Data Stores

A data store is a data repository for a set of volume groups.

To configure a data store in a domain you must define an area of storage and the routes to the storage. The routes establish through which VTCs a given storage area can be reached. The data storage area must be available to all routes of the data store. For a Window disk Data Store all paths configured in the disk pool must be reachable by all VTCs defined as routes.

Volume Groups

A volume group is a group of volumes that share the same set of attributes:

- Data store name.
- Tape maximum size.
- BackBox compression.
- Catalog type and name.

Once a volume group has been created, its name cannot be changed.

⚠️   Maximum volume size, class, compression and encryption will take effect only on volumes loaded for output.

SPECIAL CONSIDERATIONS AT INSTALLATION

Specifications for the Mount Request Message in EMS

The mount request message issued by $ZSVR in EMS must specify the volume label, in order for Back-Box to automatically mount the requested volume on a tape drive.

Tape catalogs like DSM/TC and TMF identify the volume to mount in the request.

Third party tape catalogs must be configured to generate mount requests that include the tape label.

OBEY files for uncataloged tape operation must not specify VOLUME SCRATCH in the TAPE DEFINE, but rather specify a volume label.

Recommendation for the TAPE DEFINE

The TAPE or TAPECATALOG DEFINE should not specify any tape drive. This will allow BackPak to choose a tape drive, providing:

- Fail-safe processing when some resources, such as a VTC server are down, but others are still up.
- Load balancing on the available resources.

BackPak will choose the appropriate drive if there is a mix of media types or if a VLE drive is required for tape Encryption.

Options for BACKUP, BRCOM and TMF

These options should be reviewed, given the differences between physical and virtual media. Some options apply to real media, but not necessarily to virtual media.

- Always use the maximum BLOCKSIZE supported.
- Use 52K in BACKUP and TMFCOM DUMP FILES commands.
- The block size of TMF Audit dump must be configured by TMFCOM
- With Backup/restore 2 BRCOM uses the maximum 56 K (by default). For Backup it is important to specify the BLOCKSIZE because the default value is only 4K.
- Avoid using NOUNLOAD.

Characteristics of Virtual Volumes

Size of Virtual Volumes

The maximum size of virtual volumes is configured by Volume Group. Note that the allocated size of a virtual volume is limited to the size effectively used for the data after compression (if applicable), in both Windows files and IBM Spectrum Protect™ (TSM) Data Stores.

This size should be consistent with the media capacity expected by the software (such as DSM/TC and TMF). For example, a very small size such as 5 MB should be generally avoided. For more info, see section Number of Virtual Volumes.

If virtual volumes are to be exported to physical media, the amount of uncompressed data must fit on a single physical media. Similarly, physical media content must fit in a single virtual volume when imported.

The maximum volume size must be supported by the Data Store.

In Windows files Data Stores, the maximum volume size plus 10% must fit on a single disk.

In IBM Spectrum Protect™ (TSM) Data Stores, the Volume Group configuration allows the split of a single virtual volume into several IBM Spectrum Protect™ (TSM) objects, allowing a very large virtual volume size. See details in the Volume Group section.

Note: Smaller volumes can reduce the time for a partial restore in a multi-volume backup, when BACKUP was executed with the CATALOGFILES option, or when the user keeps the backup output report and chooses the required volumes in this report for the partial restore. The benefit is especially important if the Data Store is Windows files with archive scripting, and if the Windows files must be restored on Windows disks before the virtual volume load can be completed.

Because each volume load introduces a delay, very small virtual volumes will significantly increase the time to complete a multi-volumes restore operation.

The maximum volume size is usually set from 10 to 50 GB.

Number of Virtual Volumes

Smaller catalogs are easier to manage. Therefore, it is recommended to avoid defining more volumes than needed. In some environments expired storage freeing is not possible, either because the tape catalog is not supported by BackPak or because it was not possible to write a delete script to remove the volume copy from the enterprise backup storage.

In such environments, the only way to limit the storage occupied by volumes is to speed up volume reuse by keeping the number of media as close as possible to the actual number needed.

Media Type of Virtual Volumes

Media types, such as LTO3 or LTO4, are not associated with each volume in the BackPak catalog. Each volume is considered being of the type currently defined in its volume group.

Consider the following when define virtual volumes:

- Each tape drive reports a media type to NonStop host queries.
- DSM/TC (but not TMF) associates a media type with each catalogued volume. When a DSM/TC volume is requested, it will load only on media compatible tape drives.
- Some features are available only on specific tape drive types. For example, when the volume encryption is implemented through HP VLE, only LTO4 tape drives are supported.

BackBox VTC can emulate these media types:

- CART3480
- LTO2 (on LTO3 tape drives)
- LTO3 (also on LTO4 tape drives)
- LTO4 (also on LTO6 tape drives)
- LTO6
- V0505 for virtualized BackBox on the Virtualized NonStop

DOMAIN NETWORK

BackBox Network Topology
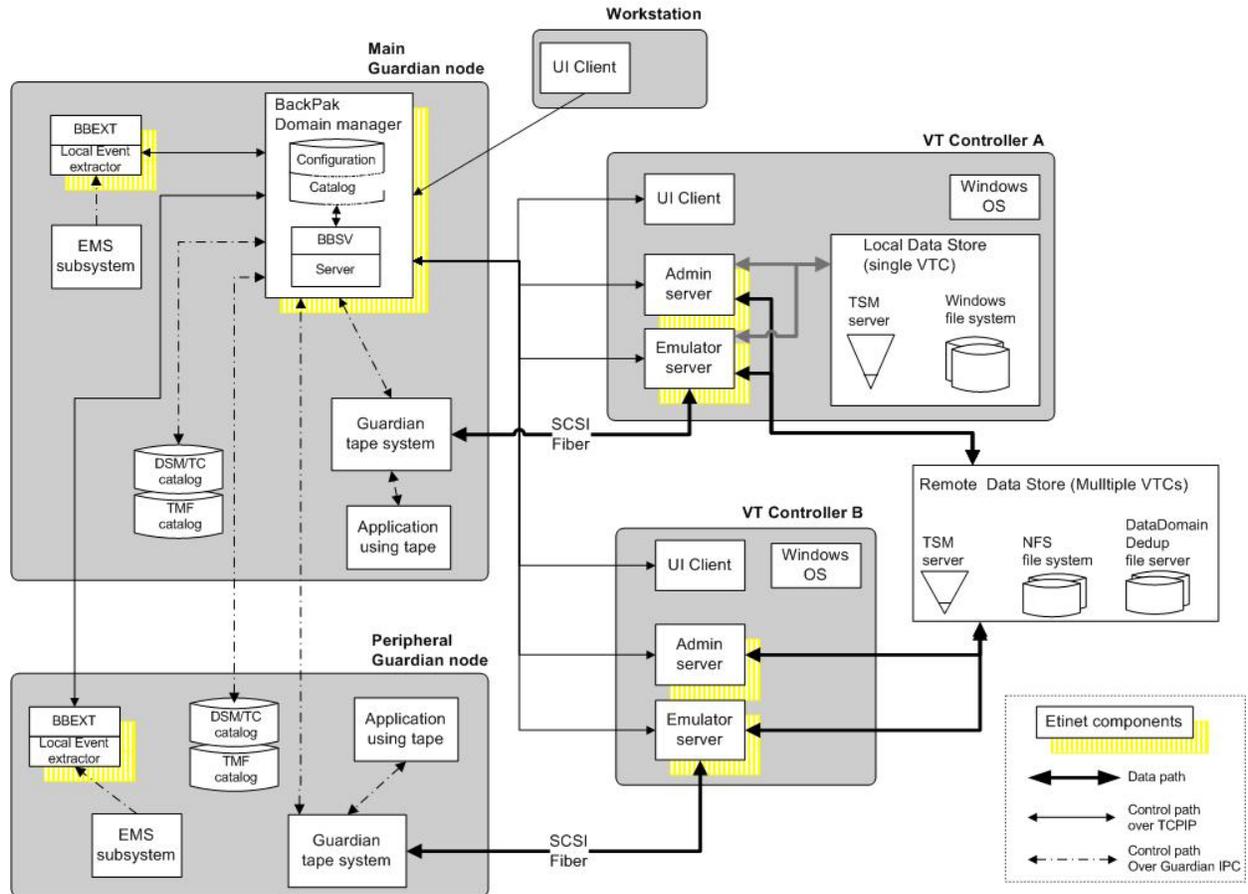
BackBox TCP/IP Ports

For BackBox TCP/IP ports, the firewall must be disabled in order to allow the connection to be established in the direction shown in the diagram. For other ports, used by various storage solutions, refer to suppliers' manuals.
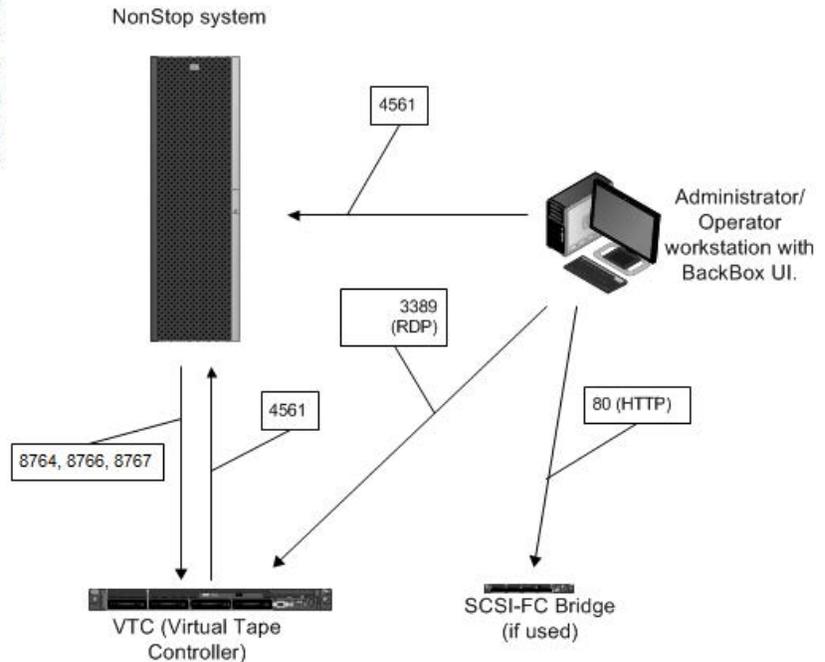
Domain Scope Considerations

Number of NonStop Nodes per BackPak Domain

A domain is defined by:

1. A main node that hosts the Domain Manager and a catalog of virtual volumes. This node runs the daily cleanup job OBB017.
2. Optional peripheral nodes that host only the EMS Extractor.

The UI requires a distinct login to each domain. UI instance shows only the configuration and operation of one domain at a time.

A multi-nodes domain consolidates the configuration and the operation of multiple systems, but it creates dependencies. The Domain Manager needs to be available to mount a tape on any of these systems.

There is no limit to the number of nodes in a domain, but the response time might become an issue with more than six nodes.

It is possible to concurrently operate several BackPak domains on the same NonStop node, but each domain must have its own separate:

- Domain Manager (distinct TCP/IP port).

- Domain installation sub-volume (programs, catalog and configuration).

- EMS Extractors (BBEXT processes).

- Data Stores (Disk for Windows data store, storage pool for IBM Spectrum Protect™ TSM Data Store).

Number of VTCs per Domain

For fault tolerance reasons we recommend that two or more VTCs be attached to each NonStop node (s). Several BackPak Domains can share a single VT Controller.

Although it is possible to share a device between domains, the load balancing across VTCs and virtual devices may not be optimum.

Network Configuration

All the control commands between the BackBox components (including Guardian BackBox components) are carried over TCP/IP sockets.

When there are several NSK nodes in the same BackPak domain, the Domain Manager accesses Guardian services on remote nodes through Guardian IPC over Expand. TMFSERVE and MEDIASRV processes are started in a remote node to access the tape catalogs.

Beside the requirement for Expand connectivity, the security settings must allow remote queries and catalog update commands to DSM/TC and TMF.

For further information on security, refer to NonStop Access Authorizations.

When the DSM/TC or TMF catalogs are not on the same node as the Domain Manager, the security parameters for remote access must be reviewed.

Assign to each VTC a permanent TCP/IP address.

Check all TCP/IP traffic for local network routing and firewalls.

For default port configurations, see *TCP/IP Traffic Port Configurations* in table below.

SSL can be implemented on the BackBox TCP/IP control paths through HPE NonStop SSL, thus providing an SSL tunnel through proxy processes on NonStop and Windows servers.

Client	Server	Standard Port
Workstation (UI Client)	NonStop (Domain Manager)	4561
Workstation (Windows Desktop Client)	VTC (Windows Remote Desktop Server)	3389

VTC (Emulator and Administrative Services)	VTC (IBM Spectrum Protect™ TSM Data Store Data Service)	1501
Workstation (Web Browser)	VTC (IBM Spectrum Protect™ TSM Data Store Administrative Service)	1580
Nonstop (Domain Manager)	VTC (FC Emulator Services)	8764
Nonstop (Domain Manager)	VTC (Administrative Services)	8766
Nonstop (Domain Manager)	VTC (iSCSI Emulator Services)	8767
If Windows Disk Data Store with IBM Spectrum Protect™ (TSM) scripts:		
VTC (Windows scripts fetching the IBM Spectrum Protect™ TSM client command line)	IBM Spectrum Protect™ TSM Server, Data Service	1501
VTC (Script Manager Service)	IBM Spectrum Protect™ TSM Server, Administrative Service	1580

TAPE CATALOGS IN THE NONSTOP SYSTEM

A tape catalog simplifies many operations and the user doesn't have to manage separately each volume.

BackBox works with any tape catalog. BackBox is fully integrated with DSM/TC and TMF and partially with QTOS. Special processing is also associated with CA catalogs. Other catalogs and not-catalogued volumes must be associated with the "No catalog" processing in the Volume Group.

Installation with DSM/TC, TMF and QTOS

When virtual volumes are cataloged in DSM/TC, TMF or QTOS, BackBox knows whether a volume is set as SCRATCH or not, and consequently optimizes storage occupancy and operation. A SCRATCH volume does not contain valuable data, and if the Volume Group is configured for Auto-scratch, SCRATCH Volumes are removed from storage. They are artificially regenerated as empty volumes, when requested again by a tape application.

Installation with QTOS

The virtual volumes are defined in both QTOS and BackBox. To register the volumes in the BackPak Domain:

- They are first created in the QTOS data base.
- To populate BackPak catalog from the QTOS data base, go to the BackPak UI, **Volume** > **Import from Tape Catalog**.

QTOS must be set for SILO.

QTOS vault must be set for Vault location "V" and Silo "S".

A BackBox Volume Group must be configured for each QTOS vault. They will contain the same set of media.

Auto-scratch should be enabled only on non-appended BACKUP.

It is assumed no backup will run in APPEND mode.

⚠️ Any volume requested for output will be deleted first, whatever the status of the volume in QTOS.

Installation with CA Universe

The virtual volumes must be defined in both CA and BackBox. For BackBox, go to BackPak UI > **Volume tab** > **Create Volume**.

Auto-scratch should be enabled only on non-appended BACKUP.

It is assumed no backup will run in APPEND mode.

⚠️ Any volume requested for output will be deleted first, whatever the status of the volume in QTOS.

If the BackBox Data Store contains Windows files and these files are archived (on IBM Tivoli Storage Manager, for example), and then deleted, the index file of each volume (.IND) along with .DAT file, should be deleted as well.

CA verifies the tape header HDR1 of each loaded volume to check that it matches the information recorded in its catalog. To allow auto-scratch, BackBox stores the HDR1 image in its catalog and uses it when auto-scratch must be executed.

For the auto-scratch feature with the CA catalog, BackBox VTC recreates an assigned but empty volume with the tape headers expected by CA.

NONSTOP ACCESS AUTHORIZATIONS

This section describes the default and recommended setup that controls the access to NonStop resources. Some adjustments might be implemented, as described in the section SUPER group not available to operators.

⚠️
- In a NonStop system, there is no interaction between tape applications (BACKUP, RESTORE, TMFDR, FUP) and the BackPak processes. The user ID running the tape applications has no impact on the BackPak processes and files.
- Operator actions on the NonStop tape system (TMFCOM, MEDIACOM or SCF) require a user ID in the SUPER group, to add, for example, a TAPEVOLUME in DSM/TC or to reject a MOUNT REQUEST. These actions are frequent in BackPak, therefore all BackPak processes must run in the SUPER group.

BackPak installation:

- An account in the SUPER group, but not SUPER.SUPER, is used to install the BackPak subvolume (see more in the *BackPak NonStop Installation* manual).
- This user ID will own all files and, therefore, the Domain Manager BBSV will be PROGID.
- The installation INSTALL macro allows the SUPER group to get access to all the files.

How BackPak Actions Are Initiated

Except for statistics and reports, all BackPak actions are executed by the Domain Manager, which is an instance of the BBSV program started by the NonStop TCP/IP LISTNER.

Because BBSV's PROGID file attribute is set, BBSV does not run under SUPER.SUPER, but under the user ID that has installed the package.

When the connection comes from the UI, before any command is processed, a full NonStop logon is executed with the credentials used to sign in on the UI page.

All UI users must log on with a user ID defined on the NonStop system where the Domain Manager runs. To use all the UI functions, the user must be in the SUPER group and must have access to the BackPak NSK files.

- Updates the domain configuration.
- Adds volumes in BackPak catalog and register them in DSM/TC or TMF.
- Queries the state of tape drives and mount requests.
- Loads volumes, modifies or rejects mount requests.
- Queries the state of the BackPak components and the storage state.

When the connection comes from a VTC server or from another NonStop process (such as the EMS Extractor or a TACL BackPak macro), the BBSV continues to run under the owner of the BBSV. In this case, only the actions pre-defined in the configuration are executed.

Examples of pre-defined actions:

- Volume load sent by the EMS Extractor.
- Cleanup of expired storage initiated by BB017_FREE_EXPIRED macro.
- Log message coming from a VTC server forwarded to EMS.

Access to the NSK Files in the BackPak Installation Sub-Volume

The basic Guardian security (set by the INSTALL configuration macro) allows remote access and updates the SUPER group.

File	Content	Access
BBSVCFG	Domain Configuration	All BBSV processes (UI and AUTOMATION) need to read it. The update might be reserved to specific users .
VOLUME and VOLUME0	Catalog of Virtual Volumes	All BBSV processes must be allowed to modify it. Local and remote EMS Extractors BBEXT must be allowed to read it.
STATE	Automatically Renewed IBM Spectrum Protect™ (TSM) Pass-words	All BBSV processes must be allowed to read and modify it.
OPER	Operational States	All BBSV processes must be allowed to modify it. Local and remote EMS Extractors BBEXT must be allowed to read and modify it.
All other files		All BBSV processes must be allowed to read and modify them. All users executing a TACL BackPak macro or OBEY file must be authorized to read and execute.
MEDIASRV, TMFSERVE, MEDIACOM	Guardian Utilities	All BBSV processes need to run these programs. They are started by BBSV in peripheral nodes included in the BackPak domain.
SCF, TACL, CLIMCMD	Guardian Utilities	BBSV processes for UI need to run these programs during the tape drives configuration of the VTCs in the domain.

Access to the NSK Utilities

BackPak starts SPI processes with MEDIASRV, TMFSERVE and MEDIACOM to access the Guardian tape system and catalogs during configuration and during normal operations. The MEDIASRV & TMFSERVE action commands are reserved for the SUPER group.

During the configuration through the BackPak UI, the programs TACL, CLIMCMD, SCF are also run.

In a domain that covers several NSK nodes, these programs are started on the peripheral nodes by BBSV running in the main node. The BBSV PROGID is important for non-interactive activities not-requireing a login.

SUPER Group Not Available to Operators

For some systems, the Guardian security pattern for the tape system is not directly applicable; especially when operators cannot be given a Guardian user ID in the SUPER group. In these cases, the PROGID attribute given to BBSV by the installation can be bypassed.

By default, the result of the PROGID attribute on interactive processes running for the UI will be overwritten by the logon initiated by the UI.

If the PROGID attribute must be applied to these interactive processes, a special item must be reset in the BackPak domain configuration in order to still verify the Guardian's user ID/password at UI login; it will not execute the full Guardian sign on procedure.

1. Log on to the BackPak UI with SUPER.SUPER or with the owner of the BBSV file.
2. Modify the configuration at the domain page: uncheck **Run interactive processes under the sign on user ID**

| Status | Domain | NSK Nodes | VT Controller | Tape Library | Key Manager | Data Store | Volume Group |

Configuration

Save

Cancel

Storage Admin

Volume

You are currently in Edit mode. You have to click the Save link to commit your changes to the Domain Manager and have the changes be mad

W3163 Domain license has expired 2016-12-31.

Domain ID*   BDDM1

Location   \ETINIUM.$DATA15.BDDM1

Version: H04.AAG

Release Date: 30JUN2016

EMS Collector* $0   Aler

EMS Verbose   ☑

Utilities Log $NULL

Trace Level   1

Trace Sub Volume $Data15.BDDM1T

VT Controller Timeout*   30

Stats File Name   \ETINIUM.$DATA15.BDDM1.STAT%YY%%MM%

Stats Retention   60   months

Mount Delay Threshold   60   minutes

☑ Run interactive processes under NonStop user ID

License Key*   DEMO LICENSE KEY number: 123457, created 2016/02/29   for BackPak H04.02
License Details   Evaluation context: ETI-NET
                      Site name   : Montreal-QC
License Update   Expiry Date   : 2016-12-31
                      Enabled products : BACKBOX: Yes   BACKLIB: Yes

Update

⚠️ • This procedure authorizes all users defined on the NonStop system to operate with BackPak.
   • Once **Run interactive processes under the sign on user ID** is set to false, the domain configuration can be modified only through the UI.

To limit this wide-ranging access, the page updating the domain configuration executes a real full logon before applying any modification. As a consequence, the user ID that modifies the configuration must be authorized in the NonStop operating system to update all data files: BBSVCFG, BBSVCFGO, VOLUME*, OPER, STATE.

Even though the modifications made outside the UI are not recommended, they are effective. The special setting **Run interactive processes under the sign on user ID** is disabled and full logon is executed for any new UI session.

The following message is also issued: **W3391 BBSV was running SUPER.SUPER**.

Full signon for user <login user-id> is executed even if **Run interactive processes under sign on user ID** is un-checked.

DATA STORES - WINDOWS FILES

A virtual volume is implemented in two disk files stored on a Windows compatible file system.

Supported storage technologies: any SAN, EMC Data Domain, HPE StoreOnce.

File Servers - NAS Considerations

Hardware Requirements

Write/read virtual tape images on a remote file server requires high performance network.

It is recommended to use gigabit Ethernet and dedicated network.

NAS Deduplication vs. BackBox Compression

For normal configuration with a deduplication appliance, such as StoreOnce or Data Domain, the Back-Box internal compression should be deactivated for the associated volume groups, except for the TMF AUDIT dumps (where local compression is suggested).

⚠️ The optional BackBox tape encryption avoids deduplication. As the encryption is enabled per BackBox volume group, the encryption can be enabled only for a dedicated volume group and associated DSM/TC pool.

Details on the Disk File-System Usage

The complete image of a tape volume is stored in two files:

- An index file containing META-DATA information. The file name has the form:

LB<volume–name>**.IND** for labeled virtual volumes

NL<volume-name>**.IND** for non-labeled virtual volumes

- A variable length data file containing the NonStop tape application output. The file name has the form:

LB<volume–name>**.DAT** for labeled virtual volumes

NL<volume-name>**.DAT** for non-labeled virtual volumes.

These files will be created in one of the paths defined in the data store's pool(s):

- *Storage Pool*
- *Spare Pool*

Copy Pool

A path is a fully qualified directory that can be specified in two formats: the UNC format based on share name (\\SERVER\SHARE\DIR\) or the legacy DOS format based on drive letter (d:\DIR\SUBDIR\). The path gives access to a local or a remote storage disk.

Paths on different disks can be added in a pool to increase storage space and to optimize parallel operations. If needed, multiple paths can point to the same disk in the same pool.

Attention: The DOS syntax based on a drive letter prohibits the sharing of virtual volumes by several VTC's. To allow several VTCs to ccess the same virtual volumes for fail-over and scalability purposes, all paths must be specified in the UNC format.

Even if it's in UNC format or not, a path is considered local for a VTC when the underlying disk is configured as a local disk in the host Windows system. The same path is considered remote by other VTCs sharing the same data store. Any path pointing to a storage managed by an external file server (or a NAS), is considered remote by all VTCs.

File Access Authorizations

For all file operations in the data store, the VTC does a non-interactive Windows login with the user account and password configured at the data store level.

This account can be a local user present in each VTC, but it should preferably be an account managed by a Windows Active Directory. The account should be a "non-interactive account" with the password set to never expire.

Full access authorization must be given to the configured Windows account for all paths of the data store.

Without a configured Windows account, the files are accessed through the Local System account.

Data Store pool(s) changes

The Data Store path(s) configuration can be dynamically modified.

When a path is removed from the pool:

- The VTC software will stop accessing this path and any valid files in this path must be moved to a path still present in the pool.
- The last known files location in this path is still preserved in the BackPak catalog. This location will be used in script to access a virtual media copy on an enterprise backup manager in order to restore the copy to a path still configured in the pool.

To manually move all files from an obsolete path to a newly defined path:

- Stop the Guardian tape activity.
- Move the files to a valid path in the disk pool.
- Make sure the moved files allow full access to the account specified in the data store configuration.

When a path is added to the pool:

- This path is immediately active and is considered as a candidate for the next file creation, as well for any move/restore operation.

Distribution of Files Among the Paths of a Pool

When a file is re-created to satisfy a mount for output (for example, when executing a NonStop backup), a selection algorithm is applied to choose one path from the data store's pool(s) as follows:

1. Paths from the storage pool are always selected over paths from the spare pool. A path in a spare pool can be selected only if no paths in the storage pool are available or can satisfy the volume space requirement.

2. Under the same pool, all paths are considered part of the same group and selection criteria are applied among them.

Exception: Spare pools under Storage Optimization for StoreOnce NAS consider all paths of the pool as an individual group and select the first path available in the order they have been configured.

3. Under the same group of paths, the following selection criteria are applied, in order:

a. Between two disks, a local disk is always preferred over a remote disk.

b. Between two disks, the disk with the less writing activity is always the preferred disk.

c. Between two disks, the disk with more free space is always the preferred disk.

d. Between two paths of the same disk, the path with the less writing activity is always the preferred path.

e. Between two paths of the same disk, the path with the lesser number of DAT files on it is always the preferred path (or the path with the lower DAT file size, when the Storage Optimization is for StoreOnce NAS.)

It is possible to change the behavior of some criteria by configuration:

- When the **Force local path** is checked in the data store advanced properties, only the path pointing to the local disk will be considered as a candidate. If the local path enforcement is activated, the load request may be rejected if there is not enough space on any local disk – even if there is enough space on a remote one.

DATA STORES - IBM SPECTRUM PROTECT™ (TIVOLI STORAGE MANAGER-TSM)

This chapter assumes that at least the following requirements are met:

- The IBM Spectrum Protect™ (TSM) client has been installed in each VTC.

- The API run-time is present.

- The command-line backup client is installed.

- The UI backup client is installed.

- The connectivity between the VTC and the IBM Spectrum Protect™ (TSM) environment has been tested using:

    1. A IBM Spectrum Protect™ (TSM) backup client

    2. The IBM Spectrum Protect™ (TSM) client node ID / password that will be used by the VTC.

- The IBM Spectrum Protect™ (TSM) management class to be used by the VTC meets the BackBox requirements.

IBM Spectrum Protect™ (Tivoli Storage Manager - TSM) Server Configuration

For a typical IBM Spectrum Protect™ (TSM) configuration, three objects should be defined on the IBM Spectrum Protect™ (TSM) server:

- Storage Pool
- Management Class
- Client Node

Storage Pool

Disk Storage Pools are strongly recommended for BackBox.
When tape media is required, it is recommended to back up to a disk pool and to let TSM migration move the data to tape.
It is also recommended to carefully plan restore operations, especially when the execution of several concurrent restore jobs may be expected. IBM Spectrum Protect™ (TSM) may consolidate several virtual NonStop volumes on the same physical media, limiting its ability to run several concurrent NonStop RESTORE operations.
The number of concurrent NonStop backup tasks is limited to the number of physical tape drives available to the BackBox client (mount points).
An emulated NonStop tape drive has response time limitations that are more sensitive to long delays and which are more likely to occur when a physical media must be loaded inside IBM Spectrum Protect™ (TSM).
Refer to the IBM Spectrum Protect™ (Tivoli) documentation to configure storage pools for the VTCs.

Management Class

The VT Controller stores only "Archive" objects. One or more management classes in the archive copy group must be defined specifically for BackBox.
A Management Class defines the backup data retention and the names of the Storage Pool.
The expiration of the tape volumes is managed by the Guardian tape catalogs. The storage corresponding to expired volumes is explicitly released by the BB017_FREE_EXPIRED macro.

⚠️ The IBM Spectrum Protect™ (TSM) server should keep the BackBox archives forever and the **Archive Copy Group** must be set accordingly.

When defining an **Archive Copy Group** for the VT Controller, set the following parameters:

DESTINATION = storage-pool

RETVER = NOLIMIT

RETINIT = CREATION (default value)

Other parameters usually do not apply to BackBox.

The IBM Spectrum Protect™ (TSM) Management Class for BackBox virtual volume can be specified in the BackBox **Configuration** > **Volume Group**.

IBM Spectrum Protect™ (TSM) provides a default Management Class for each TSM Client node.

IBM Spectrum Protect™ (TSM) Client Node

IBM Spectrum Protect™ (TSM) API client nodes must be explicitly registered in the IBM Spectrum Protect™ (TSM) server by using a IBM Spectrum Protect™ (TSM) administrative client. To access a given IBM Spectrum Protect™ (TSM) Data Store, all VTCs of the domain log on to the IBM Spectrum Protect™ (TSM) server using the same TSM node and password.

Alternatively, each VTC logs in with a different node name; the data is owned by a single target node. The access to the target node's data is authorized by the IBM Spectrum Protect™ (TSM) administrator. This setup is mandatory in a LAN-free configuration. For more info see Specifying NODENAME and PASSWORD in LAN-free configuration.

The VTC supports the IBM Spectrum Protect™ (TSM) automatic renewal of the node password. Different data stores directed to the same IBM Spectrum Protect™ (TSM) server will be set with different node names.

The Client Node must be authorized to delete archives.

The IBM Spectrum Protect™ (TSM) Client Node for a BackBox virtual volume can be specified in the BackBox configuration on the **Data Store** page or in the DSM.OPT file of each VTC. For more info see IBM Spectrum Protect™ (TSM) Client configuration.

Configuration of the IBM Spectrum Protect™ (TSM) client in each VTC

A DSM.OPT file must be prepared for each VTC.

DSM.OPT is a text file that must contain at least the IBM Spectrum Protect™ (TSM) server address. It can be located anywhere on the local disk.

To create a DSM.OPT file, either use the sample DSM.OPT with recommended options provided or copy the one used by the IBM Spectrum Protect™ (TSM) UI Backup client.

Creating the DSM.OPT with the IBM Spectrum Protect™ (TSM) Backup UI:

1. Start the IBM Spectrum Protect™ (TSM) UI backup-restore client application.
2. **Edit** > **Preference** > **General** > *Node Name*: specify the node name registered for the VTC.
3. **Edit** > **Preference** > **General** > **Authorization** > **Password Access**: choose **Password prompt**.
4. **Edit** > **Preference** > Communication: specify TCP/IP method and IBM Spectrum Protect™ (TSM) server address.
5. On the IBM Spectrum Protect™ (TSM) Backup UI, click on **File** > select **Connect** or **Logon** to logon to the server and then make an archive.

For each VTC:

- Create a folder with the same name as the VTC name and include the DSM.OPT file for the VTC.
- Copy the DSM.OPT created by the GUI or by the BackBox installer to the directory created for the VT Controller:

(C:\Program Files\tivoli\tsm\baclient) or

(C:\Program Files\ETINET\Virtual Tape Controller\Config\Samples\dsm.opt)

- Use any text editor to finalize DSM.OPT.

Verify the value of these keywords:

COMMMETHOD TCP/IP (TCP/IP is the default value)

TCPServeraddress ip address

Tcpport 1500 (1500 is the default value)

TCPBUFFSIZE 32 TCPWINDOWSIZE 63

TCPNODELAY YES

PASSWORDACCESS PROMPT

Remove the following keyword:

NODENAME

PASSWORD

Specifying NODENAME and PASSWORD in LAN-free configuration

⚠️ This alternative must be used when there are several VTCs accessing the same IBM Spectrum Protect™ (TSM) data storage in a LAN-free configuration.

- Each VTC must connect by using a distinct NODENAME/PASSWORD and must share access to the virtual volume data by specifying a distinct target node (ASNODENAME) that owns the IBM Spectrum Protect™ (TSM) data.
- Each VTC must specify a different NODENAME in its DSM.OPT file. The ASNODENAME must be the same in all VTC attached to the same domain.
- PASSWORD can be specified in the DSM.OPT file or set in the Windows registry by using PASSWORD ACCESS GENERATE (Refer to the IBM Spectrum Protect™ TSM documentation for details).
- Only PASSWORD ACCESS GENERATE allows the IBM Spectrum Protect™ (TSM) API to manage the automatic TSM password renewal when NODENAME/PASSWORD is specified in DSM.OPT file.
- In the configuration of the IBM Spectrum Protect™ (TSM) data store, the TSM user ID and password must be omitted when NODENAME/PASSWORD is specified in DSM.OPT.

Compression / Encryption

Compression and Encryption by the IBM Spectrum Protect™ (TSM) API are supported. However, the performance may be degraded if backup encounters a bad disk sector and must issue a back-space.
PARTIAL-RETRIEVE is a functionality that allows IBM Spectrum Protect™ (TSM) to position a media on the object being requested. It is however, not supported when using compression or Encryption.
If the performance is preferred, the (IBM Spectrum Protect™) TSM partial retrieve can be enabled in the VTC. Add the line below in the text file C:\Program Files\Etinet\Virtual Tape Controller\BBSL.OPT:
PARTIAL_OBJECT_RETRIEVE=1

⚠️ BackBox is distributed with PARTIAL_OBJECT_RETRIEVE=0
PARTIAL_OBJECT_RETRIEVE=0 is required to restore from a tape image created with PARTIAL_OBJECT_RETRIEVE=0

Recap of IBM Spectrum Protect™ - TSM Client Configuration Settings

IBM Spectrum Protect™ (TSM) Setting	IBM Spectrum Protect™ (TSM) Client Configuration
Location of DSM.OPT file in the	VTC Domain configuration, Data Store route. Field **TSM Client**

VTC	**Option File**.
Server Address and Port	DSM.OPT file. Keywords **COMMMethod** , **TCPServeraddress**, **TCPPort**
Other IBM Spectrum Protect™ (TSM) Client Options	DSM.OPT file. Keywords **PASSWORDAccess** , **TCPBuffsize**, **TCPWindowsize**
Client Node and Password	VTC Domain configuration, Data Store. Fields **Node**, **Password**. Or (LAN-free case): DSM.OPT file. Keywords **PASSWORDAccess** , **NODEName**, **ASNODEName**, **PASSWord**
Maximum Object Size	VTC Domain configuration, Volume Group. Fields **Max Object Size**.
Management Classes	VTC Domain configuration, Volume Group. Field **Management Class**.
File Space Names	VTC Domain configuration, Data Store. Fields **File Space** .

EMS EXTRACTORS

Each Guardian node where a BackBox virtual device is operating must run the EMS Extractor program BBEXT as a permanent process.

BBEXT reads tape mount messages from EMS events and forwards them to the Domain Manager. It also retries pending mount requests according to parameters specified in the domain configuration NSK Node profile.

A default profile is automatically created and associated with all nodes of the domain, with default values that fit most system installations.

BBEXT regularly checks the MEDIACOM list of pending mounts to detect any new mount that may have been missed if BBEXT was not running. This periodic check is executed every *failsafe-retry-interval*.

When BBEXT receives a device busy reply (or a similar error requiring quick retry), it retries the load every *busycheck-retry-interval* seconds. The load is also attempted when an unload EMS event is received.

When the *max-busycheck-retries* value is reached, the retries are executed only at the failsafe timer.

When BBEXT receives a severe error, it retries the load every *failsafe-retry-interval* seconds.

The retries are executed at the failsafe timer stop when *max-failsafe-retries* is reached. A new load attempt can only be executed manually through the BackPak user interface. When restarting BBEXT, reset the retry loop for all pending mounts.

BBEXT Start-up samples:

- BBEXT must run under a Guardian user-ID in the SUPER group.
- The file OEXT to start BBEXT is available in the BackBox installation sub-volume.

RUN BBEXT / NOWAIT, NAME $BBEXT/

Start BBEXT Automatically

BBEXT can be started automatically by the Guardian system at each system boot. A sample SCF input file SCFIN1 is available.

```
ADD PROCESS $ZZKRN.#BBOXEXT, &
PROGRAM $DATA05.BBOX.BBEXT, &
NAME $BBEXT, &
AUTORESTART 3, &
CPU FIRST, &
HOMETERM $ZHOME, &
STARTMODE APPLICATION, &
USERID SUPER.OPER
START PROCESS $ZZKRN.#BBOXEXT
```

PROCEDURES FOR RECOVERY

This section describes backup procedures for the BackBox environment. The recovery procedures are detailed in the Operations section.

When planning for recovery of the BackPak environment in the event of a site disaster or a simple file loss, three groups of BackBox data must be considered:

1. The metadata on NonStop server(s): the BackPak Domain Manager configuration, its catalog and one or more EMS Extractor configurations.
2. The configuration data kept in the BackBox VTC(s).
3. The images of virtual tape volumes kept in Data Store(s).

This related data must also be considered:

1. The tape catalog, such as DSM/TC.
2. The configuration of the storage for the Data Stores, such as NAS with de-duplication and replication.
3. The security settings for accessing the storage which could reside outside the storage appliance (in a Windows Active Directory, for example).

In a BackPak multi-domain environment, the data and metadata of each domain must be recovered separately. The BackPak Catalog Sync option handles the replication of the volumes metadata for the BackPak catalog (VOLUME* files) and the DSM/TC catalog. Please refer to the *BackPak Catalog Sync Option* manual.

With the **Catalog Sync Option**, the purpose of catalog recovery is to replicate that part of the catalog corresponding to a specific Data Store. The replication is an on-going replication of new/modified entries operated in a data store. The unit of recovery is not necessarily a BackPak domain.

Without the **Catalog Sync Option**, the BackPak VOLUME & VOLUME0 can only be backed up and restored globally using tools such as BACKUP/RESTORE or generic file replication tools.

⚠️ It is not possible to recover information for only a volume group or a data store. Therefore, Backup/Restore functions work as a recovery tool only with a full BackPak.

Data on the NonStop Servers
Summary of operational files

Operational file	Description
BBSVCFG	Domain Configuration
BBSETUP	TACL parameters

OPER	Cache for temporary status information (no need to protect)
STATE IBM Spectrum Protect™ (TSM)	API passwords (not used for WINDISK / StoreOnce)
VOLUME	Catalog of virtual volumes
VOLUME0	Index for the previous file

BackBox Configuration

The BackBox configuration is stored on the NonStop server in the BackBox Domain Manager installation sub-volume. The configuration file name is BBSVCFG.

A supplementary configuration file, BBSETUP, is also kept in the installation sub-volume.

Catalog of Virtual Volumes

The BackBox virtual tape catalog is stored in two ENSCRIBE files: VOLUME and its alternate index VOLUME0.

For the automatic replication of the catalog, refer to the manual *BackPak Catalog Sync Option*.

A BackPak virtual tape must be registered in the catalog in order to be identified and used by the Domain Manager.

After the last tape load for output, VOLUME and VOLUME0 must be recovered at their last consistent state.

The catalog is updated each time a virtual tape is created, deleted, or loaded.

Each time a volume is loaded for output, the following information is updated:

- The volume **timestamp**.
- The **Last load for output time**. It is used at load time to check the virtual volume image version found in the Data Store. It is also used to select a file among several occurrences that might be present if a disk path went down and virtual volumes continue to be written on other disk paths. If the failed path is later recovered, a duplicate virtual tape might be found.
- The **volume owner** and **access authorizations**.

⚠️   This data is also saved in the metadata part of the data store.

- For a Windows Data Store, the volume's **Last Update Index Path**.

This path is only used to retrieve Windows files from the enterprise backup software as the fully qualified original file name in the restore command.

The last time the volume was re-written by a NonStop tape application, but, at restore time, this location was not used to retrieve the virtual image in the online disk pool(s). Instead, volume's last update index path was used.

The host name of the VTC is provided as script parameter BBOX_BACKUP_HOST (V31.0 and up). This parameter can be used as client original identifier to recognize the backup that has to be to restored from an enterprise backup server in case the files are restored by a VTC other than the original one.

Each time a volume is loaded for input or output, different statistics are saved in the catalog files.

Basic Protection for the BackPak Files

The files STATE, VOLUME and VOLUME0 are distributed with the AUDIT attribute. It is suggested to protect them with TMF.

The other data files, including OPER, cannot be audited by TMF.

- Each time the BackPak Domain configuration is changed:

    - BACKUP the whole BackPak Domain NonStop sub-volume to a specific volume (labeled "non-cataloged"), to be able to restore it without the help of DSMTC and TMF.

    Alternatively, save this sub-volume to a PAK file.

    - Also save the configuration BBSVCFG text file separately.
    - Keep the copy of BBSVCFG and the PAK file (created above) in a safe place.
    - Plan for the license key that is included in the BBSVCFG file. The production license keys specify node names, system numbers and VTC IP address or host name.

- If the BackPak Catalog Sync Option is not available, each time the list of virtual volumes is changed:

    BACKUP the whole BackPak Domain NonStop sub-volume to a specific volume (labeled "non-cataloged"), to be able to restore it without the help of DSMTC and TMF.

    Alternatively, save this sub-volume in a PAK file.

- Enable TMF protection on the VOLUME* files. Execute a TMF DUMP once per day.

Basic Protection of NonStop DSM/TC Catalogs

- This applies when the BackPak Catalog Sync Option is not available.

Refer to the HPE documentation, such as:

Disaster/Recovery of DSMTC catalogs (Id: gcsc10456)

How to move a VOLCAT or FILECAT to another system (Id: 1.0.1593289.2189680)

How to recover/restore the DSM/TC database to the original node using TMF (Id: 100.0.40060491.3470204)

⚠️ Some of these HPE documents include the following restriction: "*This solution only applies to single node DSM/TC configuration without third party tape processing integration*".

This restriction does not apply to BackPak since it is not "integrated" with the HPE tape systems, but it rather communicates with this system through standard and public interfaces.

Protection with the BackPak Catalog Sync Option

- Configure and operate the BackPak catalog exports to save the new/updated BackPak and DSM/TC catalog entries each time a volume is created or re-written for a new backup. Refer to the *BackPak Catalog Sync* manual.
- Protecting the configuration files (documented in Basic protection for the BackPak files) is still required. TMF is still useful for VOLUME* files.

Configuration Data on Each VT Controller

VTC controller is built to be easily replaced in case of a failure or of an update. VTC configuration is minimal and it must be done using the VTCMC.

If the VTC needs to be replaced, enter the NonStop Domain address and the configuration before the replacement/ update will be applied to the new VTC or to the updated version. The configuration has to be redone only for the tape drive whose FC card has been changed.

Images of Virtual Volumes Kept in Data Store(s)

IBM Spectrum Protect™ (TSM) Data Stores

A IBM Spectrum Protect™ (TSM) server provides high-end data protection features.

Refer to the Tivoli Storage Manager documentation for securing the data.

Note: Backup Sets are not usable with the IBM Spectrum Protect™ (TSM) API client.

Windows File Data Stores

Protection tools for the Windows file system (such as the disk replication) are used independently of the BackBox software.

The BackBox VTC scripting integrates in the enterprise backup infrastructure.

OPERATIONS

Basic BackBox operational procedures are presented below:

VTC Startup

1. Stop the virtual tape devices emulated by the VTC with the Guardian SCF command:
   ```
   TACL> SCF STOP TAPE $vtname
   ```
2. Power on the VTC.

3. Wait for the following two EMS messages to be displayed on the Guardian node where the Domain Manager is installed:

   BBOX-I103 Service started (VTC Admin)BBOX-I103 Service started (VTC Virtual Tape Devices)
4. Start the virtual tape devices with the Guardian SCF command:
   ```
   TACL> SCF START TAPE $vtname
   ```

VTC Shut Down

1. Stop the virtual tape devices with the Guardian SCF command:

   ```
   TACL> SCF STOP TAPE $vtname
   ```
2. Shutdown the VTC.

Disabling the Volume Automatic Mount

When the EMS Extractor process is stopped, volumes will stop being mounted automatically. The mount requests will stay pending until a manual load is done or BBEXT is restarted.If the EMS Extractor is not registered in the Kernel subsystem, simply stop the process:`TACL> STOP $BBEXT`If the EMS Extractor is registered in the Kernel subsystem, stop it through SCF.If #BBOXEXT was the registered name:
```
TACL> SCF ABORT PROCESS $ZZKRN.#BBOXEXT
```

Enabling the Volume Automatic Mount

When the EMS Extractor is restarted, it will process firstly the pending mount requests before listening for new ones.If the EMS Extractor is not registered in the Kernel subsystem, use the provided OBEY file to start it: `TACL> OBEY OEXT`If the EMS Extractor is registered in the Kernel subsystem, restart through SCF. If #BBOXEXT was the registered name: `TACL> SCF START PROCESS $ZZKRN.#BBOXEXT`

Manual Load and Unload

⚠️ The processing of a manual load requiring the Domain Manager be running. Stand- alone loads do not require a Domain Manager and should be reserved to restore operations (for emergency cases). For further information, see [Stand Alone Load](#) section in this manual.

Unless operational needs require the pre-mount of a tape volume, the preferred method of operation consists of:

Loading a volume:

1. Start the tape application.
2. Log into the Domain Manager through the BackPak user interface using a Guardian user in the SUPER group.

For a labeled volume: wait until the EMS tape mount request appears in the Home page of the Web user interface.

For an unlabeled volume: select a volume from the Volume List page and go to step 5.

3. Locate the **Load** button associated with the pending mount request.
4. Click **Load**. The configured devices are presented for manual device selection.
5. A page showing the configured Guardian nodes and virtual devices is presented to the user to choose the mount point. The virtual device can be left unspecified to enable auto-assign processing.

Loading a volume:

1. Locate the drive on the **Home** page of the BackBox user interface.
2. Navigate to the **Unload** button associated with the drive.
3. Click **Unload** to unload the tape volume.

⚠ The unload will cancel any current operation on the tape device. If there is a NonStop tape application writing or reading to/from the tape device, this application will fail, giving an IO error.

Unlabeled Tapes

The BackBox environment supports unlabeled tapes. This allows the VT Controller to support existing tape software that expects unlabeled tapes.

⚠ It is not possible to automate the mount of unlabeled virtual volumes. All loads must be done manually.

In the BackPak environment, the user must identify each unlabeled volume by a pseudo-label. This pseudo-label is then used by the BackBox software to catalog and locate the image of the unlabeled volume.

Creating an Unlabeled Volume

1. Create the virtual volumes with the label type **Unlabeled**.

2. Assign a six-character label, along with a descriptive comment, to each unlabeled volume.

3. Click **Add**. The unlabeled volume is created.

The labels assigned to unlabeled volumes are usually different from those of labeled volumes in manual operations. Technically, it is possible to have an unlabeled volume and labeled volume share the same label; the label type allows the software to distinguish between the two volumes.

At volume load, the user can browse the catalog of unlabeled virtual volumes and correctly identify the required volume by the applied pseudo-label nomenclature.

Daily Cleanup (OBB017)

Cleanup tasks are collected in the OBB017 OBEY file.

`BB017_FREE_EXPIRED`: Free the storage allocated to newly expired TMF, DSM/TC or QTOS volumes.

`BB023_DEL_BACKEDUP`: Delete old Windows files tape images (Windows file Data Stores only) that have been backed up to a third party enterprise backup manager according to the Volume Group's settings.

`BB022_CHECK_SPACE`: Verify the available disk space for Windows Data Stores.

Scheduling

It is recommended to run OBB017 daily. Each individual task can also be submitted independently. Execution may be slow if scheduled during a time of high tape activity. When virtual volumes are cataloged in DSM/TC, `BB017_FREE_EXPIRED` should be run after the DSM/TC AUTOEXPIRE process to reflect the catalog status more accurately. The UI **Volume Detail** page is always up-to-date because DSM/TC, TMF and QTOS catalogs are always accessed before the display.

For a Daily Cleanup (OBB017) sample see OBB017 List in the Appendix.

As an additional safety mesure, volumes cannot be deleted when not expired in accordance with their original retention specification, as stored in the HDR1 tape header.

⚠️ If this safety validation needs to be bypassed, the OBB017 file has to be modified by changing the value of the parameter BB017IGNORECHECKHDR1 into "**1**". The default value of this parameter is "**0**". With this value set to "**1**", the HDR1 check will be bypassed.

BB017_FREE_EXPIRED

The BB017_FREE_EXPIRED command will free space for the volumes that have become SCRATCH since the last execution:

- By deleting the virtual volume image files in the Data Store.
- By running the Delete script in the enterprise backup server storage (if this script is configured in the Data Store)

The delete scripts are submitted to the VTC that contains the volume image files. If this VTC is no longer part of the configuration or does not reply to TCPIP commands, the VTC that has written the volume is preferred. As a last resort, any VTC that is configured as a route to the Data Store, will be used.

The command will free storage space for the virtual tape volumes that:

- have a Volume Group configured with Auto-scratch.
- are configured as SCRATCH according the DSM/TC, TMF or QTOS catalog specified in their Volume Group.
- are not in use.
- are in a PRIMARY Data Store.
- have a data size larger than the parameter MIN_SIZE, according to the "Write bytes count" kept in the domain catalog.

This macro will also 'unload' tape volumes that were abnormally left in LOAD state after the tape application using it ended. If the volume was actually already unloaded by the tape system, the LOAD state is simply reset in the BackBox catalog.

When the Copy Pool Sync is configured, the VTC will also delete all instances in the Copy pool.

Syntax:

```
BB017_FREE_EXPIRED [SCRIPT_TIMEOUT minutes]
[,PROCESS NEW | ALL],
[,MIN_SIZE size]
[,OUT filename]
```

Parameters:

`[SCRIPT_TIMEOUT minutes]` maximum number of minutes allowed to the Delete script. Default value is 5.

`[PROCESS NEW | ALL] NEW`: process only the new SCRATCH Volumes / ALL : process all SCRATCH Volumes or backup software. Default value is NEW.

`[MIN_SIZE size]` minimum number of KB of data in the tape volume, to allow the free up executed. Default value is 0.

`[OUT filename]` destination of the control report. Default value is the current home term.

For a sample report see [BB017 FREE EXPIRED](#) in the Appendix.

BB023_DEL_BACKEDUP

The BB023_DEL_BACKEDUP command will initiate a Windows process that will scan all configured paths in PRIMARY WINDISK Data Stores and, according to the Volume Group configuration associated with each volume, will delete the Windows files that have been saved to the enterprise backup server.

A file is considered archived if its archive bit is reset. The special processing for StoreOnce to test if a file is backed up by restoring it, depends on a distinct configuration flag "Archive bit supported" (**Data Store Configuration** in the UI).

To permit deletion, the Volume Group configuration must allow it. Additional criteria for the deletion may be specified in the Volume Group configuration.

- Number of days (number of full 24 hour periods) since the last modification of the .DAT file before deletion.
- Number of days (number of full 24 hour periods) since the last access of the .DAT file.
- A minimum file size.

⚠️ The .IND file of a volume is never deleted when the Volume Group is not associated with a NonStop tape catalog. The .IND file contains a copy of the tape headers. When there is no NonStop tape catalog, the tape headers in the .IND file are used to tell if the volume has expired. The presence of .IND files on Windows disks allows for the Auto-scratch procedure without having to read the data file.

When the Copy Pool Sync is configured, only files in the Storage and Spare Pools are tested. If a file is to be deleted, all other instances with the same or older timestamp are deleted in the Copy pool.

Syntax:

```
BB023_DEL_BACKEDUP STOREID {stored-id | ALL}
[, STOREID_ALIAS {0 | 1 | 2}]
[, START_TIME HH:MN],
[, END_TIME HH:MN]
[, MAX_DURATION minutes]
```

Parameters:

STOREID {stored-id | ALL} Specify a Store Id or ALL, for all Data Stores.

[STOREID_ALIAS {0 | 1 | 2}] Interpretation of the STOREID
value 1: replace '_' characters by space
value 2: replace '+' characters by space.
Default value is 0.

[START_TIME HH:MN] Specific to StoreOnce. See after the Sample regular report. Minimum start time in the day. If the macro is run before, nothing will be executed. From 00:00 to 23:59. Default value is 00:00.

START_TIME and END_TIME must be both specified or both omitted.

[END_TIME HH:MN] **Specific to StoreOnce. See after the Sample regular report. The macro will not execute anything if run after this time. If the job is still processing at this time, the VTC will complete the current volume and stop processing. From 00:00 to 23:59. Default value is 23:59.**

START_TIME and END_TIME **must be both specified or both omitted.**

[MAX_DURATION HH:MN] **Specific to StoreOnce. See after the Sample regular report. Elapsed time after which the VTC will complete the current volume and stop processing. From 00:00 to 99:59. Default value has no limitation.**

Sample regular report:

When a Data Store is not configured for StoreOnce, the macro waits for the result and displays a control report showing the deleted volumes.

```
LSD3-BB023 Delete backed up Windows files 2016-08-21 10:38:36
Store id to clean up: ALL
Data Store: WIN1
Label Last Update Last Accsss Size (MB)
----- --------------- --------------- -----------
Path: \\208.180.1.87\LSAL_on_D\LSD3\WIN1
LMW104 2016-07-30 16:45:07 2016-07-30 16:44:59 31
Path: \\BB1\LS_E\LSD3\WIN1
LMW103 2016-08-21 10:32:49 2016-07-30 16:31:33 31
LMW111 2016-08-21 10:37:16 2016-08-21 10:37:03 31
Path: \\happy\lsal\lsd3\win1
LMW106 2016-08-01 14:03:56 2016-07-30 17:08:15 31
LMW107 2016-08-07 18:20:48 2016-08-07 18:20:39 31
LMW112 2016-08-21 10:33:51 2016-08-21 10:33:40 31
Data Store total
6 volumes for which Windows files have been deleted
12 Windows files deleted
185 MB deleted
LSD3-BB023 Delete backed up Windows files 2016-08-21 10:38:36
Data Store: WIN2
Label Last Update Last Accsss Size (MB)
----- --------------- --------------- -----------
Path: D:\LSAL\LSD3\WIN2
This path is not available
Data Store total
0 volumes for which Windows files have been deleted
0 Windows files deleted
0 MB deleted
Grand total
6 volumes for which Windows files have been deleted
12 Windows files deleted
185 MB deleted
LSD3-BB023 ends at 2016-08-21 10:38
```

```
I3224 BB023: 12 backed up Windows files have been deleted. Deleted
size: 194,559,102 bytes.
```

`START_TIME, END_TIME and MAX_DURATION` parameters for StoreOnce.

These parameters apply only to Data Stores configured for StoreOnce NAS.

The VTC cannot tell if a file located in a StoreOnce NAS is backed up or not according to its Archive Bit. Therefore, the VTC actually restores the files that would be candidates for deletion to temporary files. Then it checks the restored file against the original one before deleting both the original file and its restored copy. This process can be very long and can compete with regular NonStop backups for network and storage resources.

- The first precaution is to consider scheduling OBB017 outside of the backup windows, which may result in possibly splitting OBB017 into several jobs.
- The second possible precaution is to use these parameters to limit the duration of the processing and to limit the execution according to the time of the day.

Data Stores associated with StoreOnce NAS are processed in the background and the report produced by the macro indicates: **Submitted as a long-run background process for StoreOnce.** The report is empty and processed volumes will be logged in EMS.

All Data Stores associated with StoreOnce NAS in the domain are processed in parallel and one volume at a time per Data Store.

For a sample report for StoreOnce see [BB023 DEL BACKEDUP](#) in the Appendix.

BB022_CHECK_SPACE

The BB022_CHECK_SPACE produces two reports sorted by Data Store ID.

BB022-A Check disk space in Windows Data Stores.
BB022-B Volume Groups per BackBox Data Store.
- BB022-A shows the summary per disk path and checks the actual free disk space in Windows Data Stores for each disk path.
- BB022-B shows the summary per Volume Group for all Data Store types, including IBM Spectrum Protect™ (TSM) Data Stores.

Checks on space are done during execution. A warning message may be issued to EMS and may be included in the report.

- W3217 LSD3-W3217 nn% of Windows disk space used in store store. Store has reached warning level of nn%. nnnn MB are used. nnnn MB are free.

- W3219 Free space (nn MB) in store is not enough for writing a full volume (nnnn MB) in Volume Group group.W3218 Disk path \\server\share\folder:\LSAL\LSD3\WIN2 in Store store is not accessible.

- W3313 Only 30% of SCRATCH Volumes available in Volume Group DSMTC_???. Volume Group has reached the warning level of nn%. n volumes are SCRATCH out of nn volumes in the Volume Group.

- E2611 Socket error nn when connecting to address nnn.nnn.nnn.nnn port 8766. (Cannot reach a VTC).

- E3034 No available route to Data Store store.

Depending on the requirements of a particular installation, the macro BB022_CHECK_SPACE might be scheduled in NetBatch more than once a day and software monitoring EMS events can be configured to generate alarms when message W3217 or W3313 is issued.

Syntax:

```
BB022_CHECK_SPACE [OUT file-name]
```

Parameters:

[OUT filename] destination of the control report. Default value is the current home term.

For a sample report see <u>BB022 CHECK SPACE</u> in the Appendix.

Batch Submission of Backup Scripts by BB036_BACKUP_STORE

The backup script can be submitted for all non-backed up files of a WINDISK Data Store through the UI **Storage Admin** page, **Backup all non-backed-up files**. This can also be accomplished by the TACL macro BB036_BACKUP_STORE.

Macro syntax:

```
LOAD /KEEP 1/ BBOX.BBSETUP BBOX.MACROS
BB036_BACKUP_STORE STOREID data-store-id
     [, ROUTE vtc-id ]
```

STOREDID specifies the identifier of a WINDISK Data Store.

ROUTE specifies the identifier of a VTC that will execute all backup scripts. This overrides the default distribution of script submissions.

Batch Device Reservation by BB020_RESERVE

Device reservation can be modified dynamically by the macro BB020_RESERVE, where the device requirements change regularly. This allows scheduling changes in NetBatch.

Macro syntax:

```
LOAD /KEEP 1/ BBOX.BBSETUP BBOX.MACROS
```

```
BB020_RESERVE [DRIVE [\node.]$name-pattern,
      [, CLASS name | (name, name...) | NONE ]
      [, LIST ]
```
LIST shows all current reservations.

To modify reservations, the keywords DRIVE and CLASS must be entered.

⚠️   The modified reservations are always listed.

DRIVE specifies which drive whose reservation will be altered. Only a single specification is allowed, but wild-cards can be used in the device name. The current node is the default.

CLASS specifies the volume class reserved for the DRIVE. Specify NONE to remove reservation.

LIST generates the list of all reservations in the domain.

The macro ignores the drives of disabled VTCs.

Windows Data Store: Recovering a Disk Path

If one of the paths defined in a Data Store becomes unavailable, it can be recovered by modifying the path's settings in the **Domain Configuration**.

To recover a Disk Path, perform one of the following:

- Load virtual volumes stored in other available paths.
- Load a volume located in the lost path (not SCRATCH according to DSM/TC or TMF). The load will succeed if the volume timestamp check is enabled and a Restore script is configured and executed correctly, otherwise, the load will fail.
- Load a SCRATCH volume for output will be successful if at least one path remains available and the Volume Group is configured for auto-scratch.

Each time the path in error is accessed, an error message will be logged to EMS.

⚠️   To recover the files if there is no scripting, the user must restore the backups of these volumes in other paths of the Data Store.

It is recommended to modify the Data Store Disk Pool configuration to remove a path in error and add new paths as necessary. Virtual volume files must be manually moved to the new path as necessary.

Recover the BackPak Catalog

For the replication provided by BackPak, refer to the manual *BackPak Catalog Sync Option*.

⚠️   To recover the VOLUME* files, the Domain Manager should not be running. The EMS Extractor process BBEXT must be stopped.

To recover a version of VOLUME* from TMF dumps:

- Run TMF RECOVER. If the dumps have been saved on virtual tapes, use the Stand Alone Load panel in the user interface to mount the volume requested by TMF.

1. To restore a backup done with the PAK utility, simply UNPAK VOLUME and VOLUME0 and DSM/TC or TMF catalogs.

⚠ VOLUME0 is an alternate index and the option MAP NAMES should be used in the UNPAK command as follows: UNPAK pak- file, $SYSTEM.BBOX.VOLUME*, MAP NAMES $*.*.* TO $SYSTEM.BBOX2.VOLUME*, AUDITED, MYID, OPEN

2. To restore from a backup on virtual tape:

RESTORE =tapedef1, $SYSTEM.BBOX.VOLUME*, MAP NAMES $*.*.* TO $SYSTEM.BBOX2.VOLUME*, AUDITED, MYID, OPEN

⚠ Manually load the volume using the GUI page to initiate the load and check the restore completion of the restore in EMS. If an EMS message states that the unload cannot be registered, go to the **Volume** tab, display the detail of the volume, click the **Edit** button, reset the current operation and click **Update**.

If it is impossible to load the volume manually, use the **Stand Alone Load** panel in the BackBox user interface. A typical case would be to cold-load the system from an SIT tape on a virtual volume.

After the recovery of a catalog on another system, the restore jobs may fail because the access to the virtual volumes was controlled by the Domain Manager. The volumes security settings may not have been done correctly for disaster recovery; therefore, the read access may be denied.

Use the BackPak user interface to edit volume settings that were written since the BackPak catalog was backed-up and which may need to be restored/fixed due to volume load issues:

1. Modify the volume owner and security settings, if necessary.
2. Disable the **Check Volume Timestamp** at volume level or Data Store level.

⚠ When the timestamp check is disabled and the Windows INDEX file is present in several Disk Pool paths, the load will fail and the user will have to delete the obsolete versions.

To recover the catalog when there is no available catalog backup, but the actual data is available in the Data Store, the catalog has to be entered manually. To do so, perform the following steps:

1. Use configuration backups and notes to rebuild the configuration of a new domain.
2. In the **Domain Configuration**, modify the Data Store's domain access to RESTRICTED.
3. In **Windows file Data Stores**, restore all *.IND files, if they have been deleted after archive/backup to a back-end enterprise backup server.

4. Using the **Create Volume** page of the user interface, re-create all virtual volumes in the BackPak catalog. This does not access the actual Data Store.

5. If possible, modify the security settings at the volume level, as required.

6. Change the Data Store back to PRIMARY and, using your record, set the configuration back to its former state.

7. Until the volume is rewritten in the new environment, its access will be authorized according the access authorization set at backup time.

Recover the BackPak NonStop Environment

To recover the BackPak NonStop environment, four items must be re-installed:

1. The BackPak software.
2. The static BackPak Domain Configuration (**BBSVCFG**, **STATE** and **BBSETUP** files.)

⚠️   **BBSVCFG** includes a license key that is valid only for specific NonStop node(s).

3. The catalog of virtual volumes (**VOLUME** & **VOLUMEO** files).
4. The OBEY files, such as OBB017, that were customized by the user.

⚠️   A virtual volume must be recognized by the Domain Manager to be automatically loaded by BackPak. An up-to-date catalog is required to make all BackPak features available.

TMF and DSM/TC catalogs are not required to run restores from virtual volumes.
These NonStop catalogs must be restored according to the procedure recommended by HPE.

Recovery from Backups on a New NonStop System

If the backup was set for recovery when it was installed:

1. Unpack the PAK file containing the BackPak installation sub-volume including the VOLUME* files.
2. Check that the BackPak environment is operational and has access to Data Stores containing the images of TMF and BACKUP virtual volumes.
3. RESTORE the VOLUME* files from the most recent installation sub-volume backup.

The BackPak environment is now ready to process all mount requests. If the DSM/TC catalogs must be restored, it should be done at this time.

If the backup was set for recovery when it was installed:

- Install the BackPak software from an ETI-NET distribution package.
- Initialize the BackPak configuration by replacing the default **BBSVCFG** file with the one previously saved or in accordance with notes taken.
- Enter the list of virtual volumes in RESTRICTED Data Stores, as presented in the <u>Recover the Back-</u>

[Pak Catalog](#) section above.

- Recover the DSM\TC catalog.

Recovery on a Prepared DR System

Requirements for a recovery on a prepared DR system:

- The DR system already has a working BackPak environment.
- Backups or replications recommended in the Setup for recovery section of the Installation chapter are available.

To make the recovery:

1. Check that the whole BackPak environment is operational and has access to Data Stores containing the images of TMF and BACKUP virtual volumes.
2. If VOLUME* files were not replicated, RESTORE them from the latest backup of the BackPak installation sub-volume.
3. Recover the TMF and DSMTC catalogs using the procedures documented by HP. Eventually, use the BackPak Catalog Sync option for the DSM/TC catalog.

The BackPak environment is now ready to process all mount requests.

Recovery Hints:

If tape load requests are rejected because TMF is not yet operational, change the BackPak audited VOLUME* files to NO AUDIT until the NonStop system is fully operational.

If load requests are rejected because the timestamps in the BackPak catalog and those in the volume timestamps do not match, use the UI to:

- Disable the timestamp checking on the volumes that cannot be loaded.
- Disable the timestamp checking at the Data Store level, if you have more volumes.

If the BackPak catalog does not contain entries for volumes requested by RESTORE or RECOVER and no backup of the catalog is available, do the following:

- Configure a RESTRICTED Data Store and a corresponding Volume Group. Use the web application to create all the required virtual volumes in that Data Store.
- If only a few virtual tape volumes are involved, use the **Stand Alone Load** page of the UI. The tab for this page is available on the BackBox sign-in page.

TOOLS

Guardian Tools

The following TACL and OBEY file programs are provided as support tools for various reports, virtual drives performance testing, and trace tracking.

A reset procedure for the NonStop tape subsystem is documented in the *BackPak Messages Manual and Troubleshooting*.

BBREST – Restore Files Through MEDIACOM

BBREST is a TACL macro that helps users (not familiar with MEDIACOM) execute simple restores with pre-defined options.

BBREST prompts for parameters to generate the MEDIACOM commands INFO DISKFILE and RECOVER DISKFILE. Only backups executed with the CATALOGFILES option can be restored by BBREST.

The macro accepts a single file name or file name pattern, and asks for optional additional selection criteria to produce a list of tape files (i.e. backup executions) and a list of matching disk files.

This list of disk files can be browsed in Detail Report or in Summary Report. The Summary Report shows only the backup executions containing matching files.

Both the **Detailed Report** and Summary Report allow the selection of a backup execution for submitting a restore. The user can loop between the browsing of Summary and Detail Reports before submitting a restore.

When a restore is to be submitted, the macro asks for the target location of restore and initiates the RECOVER DISKFILE command.

When the RECOVER DISKFILE command is executed, MEDIACOM asks for confirmation and issues a mount request in EMS. The request will be answered by the BackPak EMS Extractor.

⚠️
- When a disk file pattern is entered, different subsets of disk files might be present in different tape files (different backups), but the RECOVER DISKFILE will execute only from a single tape file.
- Predefined standard restore options are set in the macro. It is possible to change them by editing BBREST. Search for:

```
#SET restore^opt LISTALL, OPEN, TAPEDATE, AUDITED and
#SET outfile $S.#DSMTC.RESTORE
```

Search information requested by BBREST:

Disk file(s) name / pattern :
Mandatory single disk file name or pattern.
Optional tape file name / template :
FILEID DEFINE at backup time.
Optional tape file generation (ALL/nn) :
If not specified, only the latest generation is presented.
Maximum backup time (2017-05-12 13:15:01) :

Default value is current time

Cannot be entered when a specific tape file generation is entered.

Information requested when a backup is selected for restore:

Recover destination sub-volume:

Recover report output ($S.#DSMTC.RESTORE):

Syntax:

```
LOAD /KEEP 1/ MACROS BBSETUP
RUN BBREST
```

For scenarios using the detailed report see the BBREST Scenarios in the Appendix.

TMFC2 – Extensions to TMFCOM Commands on Media

TMFC2 is a TACL macro (not specially attached to virtual tapes) that simply provides two extensions to the TMFCOM commands on media: INFO, ALTER and DELETE:

- A generic label pattern can be entered as a media name, ex: TMFC2 INFO MEDIA P*100?
- An optional keyword SELECTSTATUS is added to these commands to select the media object of the action according to their status in TMF, ex: TMFC2 ALTER MEDIA *, SELECTSTATUS RELEASE, STATUS SCRATCH

TMFC2:

- Receives the TMFCOM command as a TMFC2 command parameter.
- Browses the TMF catalog.
- Selects media according to the pattern and the SELECSTATUS parameter.
- Generates (in a temporary file) a command for each selected media.
- Runs TMFCOM giving the generated file as an input file.
- Deletes the temporary file.
- Requires running in the BackPak environment as it uses BackPak macro and programs.

Syntax:

```
LOAD /KEEP 1/ MACROS BBSETUP
TMFC2 [PEEK | NOPEEK,] [FILE file-name,] TMFCOM-command
```

Parameters:

[PEEK | NOPEEK,] allows preview of the commands to execute. Default value is NOPEEK.

NOPEEK: TMFCOM is executed with the generated input file

PEEK: the generated input file is displayed only.

[FILE file-name,] Name the TMFCOM input file to save it.

TMFCOM-command

TMFCOM command syntax on TAPEMEDIA. The clause [SELECTSTATUS status,] can be added,

with status being SCRATCH, ASSIGNED, RELEASED or BAD.
The media-name can be a media-name pattern.

For TMFCOM samples see TMFC2 Samples in the Appendix.

BB000_COLLECT – Gather Information for Support

BB000_COLLECT is a TACL macro that produces a file documenting a BackBox environment. It is used when issues arise and support needs the latest information.

The collected information, such as logs and configuration files, documents only the NonStop system where the macro is executed. The same macro must be executed in peripheral NonStop nodes and a Windows specific procedure must be executed in the VTCs.

BB000_COLLECT requires a working sub-volume (TARGET parameter) where intermediate files and two consolidated final files will be created. When completed, these two file names are displayed and available to product support.

Syntax

```
VOLUME <BackPak-installation-subvol>
LOAD /KEEP 1/ MACROS BBSETUP
BB000_COLLECT TARGET <target-subvol>
[, TIME <yyyy-mm-dd [hh:mn[:ss]]>]
[, COLLECTOR $process]
[, LISTALL yes|no]
```

Parameters:

TARGET subvol
Required the sub-volume where the files will be created. It is recommended to specify the Back-Pak trace for the sub-volume configured in the BackPak domain
[TIME <yyyy-mm-dd [hh:mn[:ss]]>]
Optional time of incident that will be used as base to extract EMS messages.
The extracted messages will be those produced from 24 hours before this time and up to one hour after.
The current time is used as the default value.
00:00:00 is the default when a date is specified without the time of day.
COLLECTOR process]
Optional EMS collector process name from which the messages will be extracted.
"$0" is used as the default value.
[LISTALL yes|no]
LISTALL YES produces the list of the PAK content (i.e. sends the LISTALL parameter to the BACKUP program). **No** is used as the default value.

For a BB000_collect sample see BB000_COLLECT sample in the Appendix.

BB010 - Extracts Virtual Volume Records

BB010 extracts virtual volumes records to the VOLEXT file for further reporting by BB011 or BB012.

Syntax:

```
RUN BB010 label-pattern [REPORT]
```
[REPORT] will generate a simple report of volumes that match label-pattern.
The VOLEXT file will be created if missing and its content will be overwritten if it already exists.
BB010 must be run in the sub-volume where the Domain Manager is installed.

Example:

$DATA15 BFERHG19 43> run bb010 AA* report

```
BB010- Extraction of the BackPak catalog to file VOLEXT 2016/10/28
16:50
Selection of volumes matching the label pattern: AA*

Label: AA0001 BACKUP
Max volume size : 5 MB
Automatic mount : Y
Creation time : 2016/10/06 17:42
Last load time : 2016/10/06 17:43
Owner : \LEOMIRA 255,100
Volume Group : FERNDSK
Store id : WIN1
Store type : WINDISK
Index path : D:\FERN\WIN1
Number records read : 24
Number records extracted : 1
```

BB044 –Series of Tape Label Reports

BB044 shows a summary of the tapes known in the NonStop system, listing them by a series of consecutive tape labels.

BB044 must run in a BackPak domain. It searches for tape labels registered in:

- The BackPak domain (i.e. the virtual tape volumes).
- All DSM/TC volume catalogs in the local NonStop system.
- The local TMF catalog
- The remote DSM/TC and TMF catalogs referred by Volume groups configured in the BackPak domain.
- The QTOS catalogs referred by Volume groups configured in the BackPak domain.

Syntax:

RUN BB044 [BPAK_REPORT {y|n}] [, CATALOG_REPORT {y|n}] [, MERGED_REPORT {y|n}]

Parameters:

`BPAK_REPORT {y|n}` If **Y** or **Yes**, the report BB044-1 will be produced. This report lists the virtual volumes of BackPak and their Volume Group name. Default value is **No**.

`CATALOG_REPORT {y|n}` If **Y** or **Yes**, the report BB044-2 will be produced. This report lists the volumes found in the tape catalogs and their location (DSM/TC VOLCAT and pool names). Default value is **No**.

`MERGED_REPORT {y|n}` If **Y** or **Yes**, the report BB044-3 will be produced. This report lists all volumes, matching the BackPak volumes and the volumes found in tape catalogs. Default value is **Yes**.

For BB044 sample see [BB044 Tape Label Report](#) in the Appendix.

OBB011 – List of Volumes in Windows Files Data Stores

OBB011: Lists the virtual volumes stored in Data Stores of Windows files, sorted by Windows disk path.

Syntax:

```
RUN OBB011 label-pattern
```
Label-pattern will select volumes whose label matches the pattern.
OBB011 must run in the sub-volume where the Domain Manager is installed.

For a sample of OBB011 - List of Volumes in Windows Files Data Stores see [OBB011 – List of Volumes in Windows Files Data Stores](#) in the Appendix.

OBB012 – List of Virtual Volumes

OBB012: Lists the virtual volumes registered in the BackPak catalog.

Syntax:

```
RUN OBB012 label-pattern
```
Label-pattern will select volumes whose label matches the pattern.
OBB012 must run in the sub-volume where the Domain Manager is installed.

For a sample of OBB012 see [OBB012 – List of Virtual Volumes](#) in the Appendix.

OBB018 – Statistics Report

OBB018 lists the VTC activity-related info: data size and throughput per volume loaded.

This report shows the activity of scripts started by the VTC emulator, but does not list the activity of scripts started by the Script Controller. See [OBB019 – Statistics Report – Script Controller](#) for the report on scripts initiated by the VTC Script Controller.

Rates printed in BB018 exclude the initial wait time. This report excludes all starting activity timestamps until the tape application begins to write or read data blocks.

Syntax:

```
OBEY OBB018
```

For a sample of the OBB018 content see <u>OBB018 Statistics Report</u> in the Appendix.

Report output:

```
$DATA05 BPAK 14> OBEY OBB018
BPAK-BB030 - Extraction of statistics files 2016-04-07 16:12
Stats file names : $DATA05.BPAK.STAT%YY%%MM%
Extract file : STATEXT
Selection from: 2016-04-06 17:00:00 to: 2016-04-07 17:00:00
Existing statistics files Records read Records extracted
----------------------- ------------ ------------------
\MONT.$DATA05.BPAK.STAT1102 5526 0
\MONT.$DATA05.BPAK.STAT1103 3712 0
\MONT.$DATA05.BPAK.STAT1104 766 4
Total records written: 4
BAPK -BB018 BackBox activity by Data Store page 1
From: 2011-04-06 17:00:00 to: 2016-04-07 17:00:00
Data Store: WIN1
Start End R Volume Data size Rate Set
time time Oper. W label MB MB/s ve VTC

-------- -------- -------- - ------ ---------- ------ -- -------------------

Start date: 2011-04-07
14:38:20 14:38:25 LOAD W OBCD09 2 1.0 I MTLBBLAB1
14:38:25 14:38:35 BACKUP W OBCD09 2 0.2 I MTLBBLAB1
14:55:03 14:55:22 LOAD R OBCD09 2 0.5 I MTLBBLAB1
14:55:04 14:55:16 RESTORE R OBCD09 2 0.2 I MTLBBLAB1
     BackBox activity summary for WIN1
        2 volumes accessed
        5 MB of transfered data
```

Report elements:

Start date/time: Time when the load request was accepted by the BackPak Domain Manager.

End time: Time when the volume was unloaded by the VTC.

Volume label: Virtual volume label.

Oper: BackPak operation.

LOAD - Virtual volume loaded in a NSK tape drive.

BACKUP – Backup Windows script.

RESTORE – Restore Windows script.

MOVE – Move the volume from a storage location to another.

EXPORT – Export to physical media.

IMPORT – Import from a physical media.

R/W: Read or Write (USE parameter of the tape define).

Data size: Data size written or read by the NSK tape application.

Rate: Transfer rate computed from the time the 1st data block is written/read (excluding tape headers processing) to the unload time.

Severity: I - information, normal emulation.

W – warning, error occurred during execution or the volume was manually unloaded.

E – severe error.

VTC: VT Controller identification.

OBB019 - Statistics Report – Script Controller

OBB019 lists script activities related to Script Controller: data size and throughput per script execution.

By using Script Controllers you can serialize backups, restore script operations, optimize access to resources, and minimize delays.

The statistics file name is specified through the BackPak user interface on the **Domain Configuration** page.

Syntax:

```
OBEY OBB019
```

For a sample of the OBB019 content see in the Appendix.

Sample of a OBB019 - Statistics Report – Script Controller:

```
$DATA15 LSBBOX 14> OBEY OBB019
BPAK-BB030 - Extraction of statistics files 2016-03-16 13:12
Stats file names : $DATA05.BPAK.STAT%YY%%MM%
Extract file : STATEXT
Selection from: 2016-03-15 14:00:00 to: 2016-03-16 14:00:00
Existing statistic files Records read Records extracted
------------------------ ------------ ------------------
\MONT.$DATA21.LSBBOX.STAT0912 5526 0
\MONT.$DATA21.LSBBOX.STAT1001 3712 0
\MONT.$DATA21.LSBBOX.STAT1003 766 313
Total records written: 313
BPAK -BB019 Scripts submitted by script controllers page 3
From: 2016-03-15 14:00:00 to: 2016-03-16 14:00:00
Start Start End Data size Rate Se
VTC date time time Oper. MB MBs ve
-------------- ---------- -------- -------- ---------- -------
---- ------- --
AUSTNSBUPC101 2016-03-15 16:56:13 16:56:19 BACK-BATCH 0 0.0 I
AUSTNSBUPC101 16:56:15 16:56:22 BACK-BATCH 1 0.1 I
AUSTNSBUPC101 16:56:29 16:56:35 BACK-BATCH 0 0.0 I
AUSTNSBUPC101 16:56:31 16:56:38 BACK-BATCH 1 0.1 I
AUSTNSBUPC101 16:56:50 16:56:55 BACK-BATCH 1 0.2 I
AUSTNSBUPC101 16:56:53 16:56:59 BACK-BATCH 0 0.0 I
AUSTNSBUPC101 16:57:11 16:57:17 BACK-BATCH 1 0.2 I
```

```
AUSTNSBUPC101 16:57:17 BACK-BATCH 0 0.0 I
AUSTNSBUPC101 16:57:29 16:57:36 BACK-BATCH 0 0.0 I
AUSTNSBUPC101 16:57:30 16:57:36 BACK-BATCH 1 0.2 I
AUSTNSBUPC101 16:57:47 16:57:52 BACK-BATCH 0 0.0 I
AUSTNSBUPC101 16:57:52 16:57:58 BACK-BATCH 1 0.2 I
AUSTNSBUPC101 16:58:09 16:58:15 BACK-BATCH 0 0.0 I
AUSTNSBUPC101 16:58:11 16:58:18 BACK-BATCH 1 0.1 I
AUSTNSBUPC101 16:59:09 16:59:15 BACK-BATCH 0 0.0 I
*** BB019 end of report
```

Report elements:

VTC: VT Controller identification.
Start date/time: Script start time according to the VTC clock.
End time: Script end time according to the VTC clock.
Data size: Data size written or read by tape application.
Rate: Transfer rate computed from the time the 1st data block is written/read (excluding tape headers) to unload time.

Severity:

I - information, regular execution.
W – warning, some error occurred for one or all the files processed by the script.
E – severe error occurred for one or all the files processed by the script.

OBB021 – Emulation Statistics Report

OBB021 lists the tape emulation activity only (data size and throughput per volume loaded).

Throughput calculations exclude the initial wait time.

Syntax:

```
OBEY OBB021
```

For a content sample of OBB021 see OBB021 - Emulation Report in the Appendix.

Report output sample:

```
$DATA05 BPAK 14> OBEY OBB021
BPAK-BB030 - Extraction of statistic files 2016-04-07 16:17
Stats file names : $DATA05.BPAK.STAT%YY%%MM%
Extract file : STATEXT
Selection from: 2016-04-06 17:00:00 to: 2016-04-07 17:00:00
Existing statistics files Records read Records extracted
------------------------ ------------ ------------------
\MONT.$DATA05.BPAK.STAT1102 5526 0
\MONT.$DATA05.BPAK.STAT1103 3712 0
\MONT.$DATA05.BPAK.STAT1104 766 4
Total records written: 4
LSBBE -BB021 BackBox emulation activity by Data Store page 1
```

```
From: 2016-04-06 16:00:00 to: 2016-04-07 16:00:00
Data Store: WIN1
Start End R Volume Data size Rate Compr En- Se
time time W label MB MB/s ratio cryp ve VTC
-------- -------- - ------ ---------- ------ ------ ---- -- ---------
---------
Start date: 2016-04-07
14:38:20 14:38:25 W OBCD09 2 1.0 2.36 I MTLBBLAB1
14:55:03 14:55:22 R OBCD09 2 0.5 2.36 I MTLBBLAB1
Virtual tape emulation summary for WIN1
2 volumes loaded
5 MB of transfered data
```

Report elements:

> **Start date/time:** Time when the load request was accepted by the BackPak Domain Manager.
> **End time:** Time when the volume was unloaded by the BackBox.
> **R/W:** Read or Write (USE parameter of the tape define).
> **Volume label:** Virtual volume label.
> **Data size:** Data size written or read by the NSK tape application.
> **Rate:** Transfer rate computed from the time the 1st data block is written/read (excluding tape headers processing), up to the unload time.
> **Compr. Ratio:** Compression ratio = user data size / storage size.
> **En-cryp:** Encryption indication = space or "Encr".

Severity:

> **I** - information, regular emulation.
> **W** – warning, error occurred in the emulation, or the volume was manually unloaded.
> **E** – severe error.
> **VTC:** VT Controller identification.

OBB038 – List of Encrypted Volumes

OBB038 lists the Encrypted volumes whose label matches an entered volume label pattern.

Syntax:

```
RUN OBB038 label-pattern
```

Where label-pattern is a specific label or a simple pattern ending by *.

Samples:

```
RUN OBB038 *
RUN OBB038 PR*
```

For a sample of OBB038 content see OBB038 List of Encrypted Volumes in the Appendix.

Report sample:

```
BB038 Encrypted volumes with label matching * 2016-10-24 11:24
Last DSMTC
Volume write or TMF
label date status Encryption Key ID
------ ---------- ------- ----------------------------------------
--------
Key manager id : KM-ESKM
Client type : 1-VTC ONLY
VE1001   2011/10/27   ASSIGNED   BBOX_ 21F5BD27VE1001D68095D44B400008_
111027202410
VE1015   2011/10/27   ASSIGNED   BBOX_ 767FE574VE1015D5C6642F4B230008_
111024144520
2 printed volumes for Key manager KM-ESKM
End of report BB038
```

Report elements:

> **Volume label:** Label of the virtual tape volume.
> **Last write date:** Last date the volume was written by a tape application.
> **DSM/TC – TMF:** Volume status in DSM/TC or TMF.
> **Status:** (when applicable).
> **Encryption Key ID:** Encryption Key name instance.

OBB039 – List of Virtualizations / Materializations

OBB039 lists the virtualizations, i.e. copies of physical volumes to BackBox virtual volumes and materializations, i.e. the copy of virtual volumes to physical volumes.

Syntax:

```
OBBEY OBB039
```

For a content sample of OBB039 see OBB039 - List of Virtualizations/Materializations in the Appendix.

Report output sample:

```
QC314EA -BB039 BackBox virtualizations / materializations page 1
From: 2016-08-01 18:00:00 to: 2016-08-02 18:00:00
Operation: MATERIALIZE
Volume Start Start Data size Rate Compr En- Se
label date time MB MB/s ratio cryp ve VTC
------ ---------- -------- ---------- ------ ------ ---- -- --------
EVTS01 2016-08-02 10:38:35 0 0.0 0.99 Decr W TANK
EVTS01 2016-08-02 10:40:26 0 0.0 0.99 W TANK
EVTS01 2016-08-02 11:02:44 135 7.9 0.99 I TANK
EVTS02 2016-08-02 13:40:33 4,832 4.4 0.99 I TANK
EVTSN1 2016-08-02 14:15:53 135 11.3 0.99 I TANK
EVTSN2 2016-08-02 14:42:46 4,832 4.4 0.99 I TANK
Summary for MATERIALIZE
6 volumes
9,936 MB of transferred data
```

Report elements:

> **Volume label:** Label of the tape volume.
> **Start date:** Starting date of the operation.
> **Start time:** Starting time of the operation.
> **Data size:** Data size written or read by the NSK tape application.
> **Rate:** Transfer rate computed from the time the 1st data block is written/read, up to the unload time.
> **Compr. Ratio:** Compression ratio = user data size / storage size in the BackBox Data Store.
> **En-cryp:** Encryption indication = space, "Decr" or "Encr".

Severity:

> **I** - information, regular emulation
> **W** – warning, error occurred in the emulation, or the volume was manually unloaded
> **E** – severe error
> **VTC:** VT Controller identification

Extracting Statistics for Workstation Reporting Tools

The statistics files used to produce ENFORM reports OBB018, OBB019 and OBB025 are comma-delimited files that can be imported into MS-Excel, MS-Access or other similar database tools. These statistics files contain detailed information and a record per operation. MS-Access or other data base tool must be used to produce summaries.

To get statistics in a workstation tool table to import comma-delimited files:

- A NonStop file is prepared by the macro BB030_EXTRACT_STATS.
- The prepared file is downloaded to the workstation.
- A PC tool is used to import the downloaded file as a comma-delimited file.

BB030_EXTRACT_STATS Usage

When extracting either from multiple statistics files or from a single file containing a chosen activity period, the same macro BB030_EXTRACT_STATS (used to prepare ENFORM reports) must be run.

In order to extract statistical data, the user must ensure that Backpak macros are loaded during the TACL session. Macros are located in the domain sub-volume.

Below is a sample of TACL commands that are subsequently devided in three line groups:

```
VOLUME domain-subvol
LOAD /KEEP 1/ BBSETUP MACROS
```

The period to extract must be set by TACL PARAMs:
```
PARAM CUTOFF-TIME hh:mn:ss
PARAM FROM-DATE yyyy-mm-dd
PARAM TO-DATE yyyy-mm-dd
```

This will select activity from FROM-DATE & CUTOFF-TIME (included) to TO-DATE & CUTOFF-TIME (excluded).

A shortcut to set these three PARAMs to the latest 24h period is to run the macro:

```
BB018_DEFAULTS
```

The extraction is triggered by a macro whose parameters set name and format of the extracted file:

```
BB030_ EXTRACT_ STATS  EXTRACT_ FILE  file- name  [,FIELD_ NAMES
YES|NO]
```

EXTRACT_FILE specifies the name of the NonStop file that will be re-created.

FIELD_NAMES YES will generate an extra first line with the name of the record fields (as the workstation import tools can use them).

A control report is generated by the macro sampled in the [BB030_EXTRACT_STATS Usage](#) in the Appendix.

The name of all statistics files matching the file name pattern configured in the domain is printed, with the total number of reads and writes executed.

Download the file to the workstation.

The written NonStop file is an Enscribe Entry Sequenced file that must be downloaded as a text file.

```
ftp nonstop1
quote site nocrlf on
get $data21.temp.mystat stats.csv
bye
```

Usage in the Workstation Tool

Specify the file as comma-delimited, declared containing field names in 1st line (if extracted with the FIELD_NAMES YES parameter).

In MS-Access, in addition to checking **First Row Contains Field Names**, change two values in the default Import specifications window, by clicking the **Advanced** button:

Date order must be set to YMD

Date Delimiter must be set to "-"

There is a statistics line per volume of operation; this detail depends on the *Operation_cat* and *Operation* fields.

- A regular tape usage (for example a BACKUP process writing a volume) is reported by a line with *Operation_cat* = EMUL and *Operation* = LOAD. Distinction between backup and restore is given by *Read/Write* field.

EXPORT and IMPORT Operations are related to the VTC attached physical tape drives.

- A line with *Operation_cat* SCRIPT reports the execution of a Windows script. The *Operation* field ports the type of script BACKUP, RESTORE, DELETE.

If the Script Controller is enabled in scripts, there will be additional SCRIPT records: one record with *Operation* = BACK-BATCH or REST BATCH per execution of a sub-script.

Notes applicable in case of Script Controller:

> The operation described by a BACKUP operation has no duration, as this execution is only a request for batch processing.
> The operation described by a RESTORE operation contains the waiting of an available batch queue and the execution of the whole restore batch sub-script.
> The throughput of actual backup or restore of the Windows files can be computed from records with *Operation* = BACK-BATCH or REST BATCH.
> These records are not associated with a specific tape volume, as sub-scripts are submitted for a set of volumes. Several columns remain blank.

• Operation_cat LIBR is for tape library specific Operations:

> MOVE-IN/-OUT is media moved from/to the I/O slots.
> INVENTORY-IN/-OUT are changes detected in the inventory regular BackLib operations.
> LABEL is for labelling new media.

All elapsed times are specified in seconds.

Fields with (note 1) have value only for labeled tape volumes used through a TACL TAPE DEFINE.

Report Fields

Field Name	Description	Sample Value for EMUL LOAD	Sample Value for SCRIPT BACKUP
Load_time	Load time	10-Jul-17 17:36:22	2017-07-09 14:33:06
Start_time	Operation starting time	10-Jul-17 17:36:22	2017-07-09 14:35:18
End_time	Operation ending time	10-Jul-17 17:36:37	2015-07-09 14:35:18
Operation_cat	EMUL or SCRIPT	EMUL	SCRIPT
Operation	**EMUL**: LOAD, EXPORT, IMPORT	LOAD	DELETE

Field Name	Description	Sample Value for EMUL LOAD	Sample Value for SCRIPT BACKUP
	SCRIPT: BACKUP, RESTORE, DELETE **STORAGE ADMIN**: MOVE SCRIPT (Script Controller): BACK-BATCH, REST-BATCH LIBR (libraries): LABEL, LOAD, MOVE-IN, MOVE-OUT, INVENTORY-IN, INVENTORY-OUT, EXPORT, IMPORT.		
Severity	**I** when there is no error. **W**, **E** and **F** are possible.	I	I
Domain	Domain name	BPAK	BPAK
Label_prefix	LB (labeled volume), or NL (unlabeled)	LB	LB
Label	Volume label	000264	000321
Label_type	BACKUP,TMF,ANSI,IBM or NL	BACKUP	BACKUP
Exec_time	Total elapsed time	0000015	000000132
Pre-load_time	Unused	0000000	000000000
Loading_time	Elapsed time in VTC to load the volume	0000001	000000000
Init_time	Elapsed time - from the time VTC is ready to report the tape drive ONLINE, - to the time VTC detects the 1st data block (i.e. after the processing of tape labels).	0000013	000000000
Data_time	Elapsed time of data blocks transferred. This is the base of throughput	0000001	000000132

Field Name	Description	Sample Value for EMUL LOAD	Sample Value for SCRIPT BACKUP
	computation in OBB018.		
Post_unload_time	Elapsed time in VTC after the unload	0000000	000000000
Read_byte_count	Number of bytes read by the NonStop host (including tape headers)	320	
Write_byte_count	Number of bytes written by the NonStop host (including tape headers)	52052	00000000000000150
Read_write	READ or WRITE on the virtual volume	WRITE	WRITE
Pre_load	Y if the volume was preloaded in the restore of a multi-volume backup		
Sequence	Sequence number of a multi-volume backup	1	000
Store	Data Store ID in the Domain Configuration	WIN3	WIN2
Store_type	Data Store type (WINDISK or IBM Spectrum Protect™ TSM)	WINDISK	WINDISK
Volume class	Volume class as defined in the Volume Group		BACKUPS
VTC	VTC ID in the Domain Configuration	VTC85	VTC31
NSK_node	NonStop node where the tape device is attached	\MONT	

Field Name	Description	Sample Value for EMUL LOAD	Sample Value for SCRIPT BACKUP
NSK_device	NonStop tape device	$VT8501	
NSK_access_node	NonStop node running the tape application	\MONT	
NSK_dui	NonStop User ID running the tape application	255.100	
Appl_process	NonStop CPU, pin and creation time of the tape application process	\ETINIUM.1.168 2017-07-15 17:29:43	
Volume_group	Volume Group ID in the Domain Configuration	ARCHIVES	MONT_BACKUPS
Data_size	NonStop data in bytes	52052	52052
Storage_size	Size of Windows file / or total size of IBM Spectrum Protect™ TSM objects	25124	25124
Compr_algo	Compression algorithm: 0 – none 1 – ZLIB 21 – IBM Spectrum Protect™ TSM API	3	
Encrypt_algo	Encryption method: 0 – none 1 – NSK CLIM VLE	0	
Media_type	DSM/TC media type: CART3480, LTO3, LTO4 etc..	LTO3	
Compr_algo	Compression algorithm: NONE ZLIB IBM Spectrum Protect™ TSM	NONE	

OBB055 – Low Level Tape to Tape Copy

TACL OBEY command creates a clone copy of a physical tape or of any non-BackBox virtual tape to a BackBox virtual tape. After completion, a clone of the physical tape is created in BackBox with the same label in such a way that no catalog update is needed.
This OBEY file runs the program BB055 that copies any data block and any file-mark from the input tape to the output tape, without any interpretation or validation.
Set the tape drives used in input and output to BLPCHECK OFF.

MEDIACOM ALTER TAPEDRIVE $tape, BLPCHECK OFF

If the previous technology, be it a physical drive or otherwise, has the capacity to automatically process a mount request, once a tape has been ingested in BackBox, a mount request may load the same label twice in two drives. It is possible to disable the automatic load in the specific BackBox Volume group that will receive migrated volumes by setting Migration to BackBox to Being prepared in the Volume group configuration.
Create a volume group for each DSM/TC pool from which volumes will be migrated.
Update the OBEY file before submitting.
Syntax:
```
TEDIT OBB055
OBEY OBB055
```

 For a content sample of OBB055 see OBB055 – Low Level Tape to Tape Copy in the Appendix.

Parameters:

> **B055TRIGGER** When the value is VOLUMELIST, an exhaustive list of volumes to clone needs to be provided in a file. The PARAM VOLUMELIST becomes mandatory and contains the file name where that list is. BB055 will sequentially generate mount requests for each tape on that list. When the value is OPERATORLOAD, the Operator needs to load each tape to clone, manually.
> **VOLUMELIST** Filename. The file "filename" contains a list of volume labels (one per line) to be copied. The format is: *label, type.* Where valid types are BACKUP,AINSI,IBM,OMITTED or NL.
> **GROUPID name** The name of the Volume Group where virtualized copies should be added.
> If the string *search* is used as groupid, for each tape loaded, BB055 will look in the DSM/TC catalog to find its tape pools and then it will find the BackBox Volume Group associated with that pool.
> For non-cataloged volumes, a valid Volume Group name is mandatory.
> **INDEVICE** Device name for reading; it can be remoted device.
> **OUTDEVICE** Device name for writing; it can be a remoted device.
> **IDLEWAIT n** In minutes value. Time waiting for volume mounts. Default is 15. Valid values are between 0 and 86400.
> **TIMEOUT n** In seconds value. Time waiting for i/o including rewind. Default is 60. Valid values are between 30 to 600.
> **MAXNOWAIT n** Number of blocks in memory. Default is 5. Valid values are between 5 and 30.

For an execution Sample, TACL Output see [BB055 - Execution Sample](#) in the Appendix.

For an execution Sample, EMS Log see [OBB055 - Execution Sample, EMS Log](#) in the Appendix.

> ⚠️ • The errors Sense Key Blank check and DSM/TC REPLY ERROR: 100 have no impact on the processing.
> • With operational errors, the target tape is deleted if already created, and the next tape is loaded. With severe errors, the process stops immediately.

OEMS2 - EMS Messages Display

TACL OBEY file displays BackBox and tape related EMS events. It is recommended when the number of EMS events is very high, especially during BackBox installation.

Syntax:

```
RUN OEMS2
```

For a content sample of OEMS2 see [OEMS2 - EMS Message Display](#) in the Appendix.

OEMS - EMS Message Extraction

TACL OBEY file extracts EMS events related to tapes and BackBox.
Update this OBEY file before submitting.

Syntax:

```
TEDIT OEMS
OBEY OEMS
```

For a content sample of OEMS see [OEMS - EMS Message Extraction](#) in the Appendix.

TAPEWR - Performance Test

TAPEWR generates and writes blocks of data to the specified TAPE DEFINE with FORMAT U and LABEL ANSI.
TAPEWR does not support multi-volumes output. The data size to write must be 1 MB less than the configured maximum volume size.
For meaningful results, the amount of data to write should be at least a few gigabytes.

Syntax:

```
[PARAM UNLOAD ON | OFF]
[PARAM MAXNOWAIT 5 | number]
[PARAM BUFFERMODE ON | OFF]
[PARAM BACKBOXVOL ON | OFF]
RUN   TAPEWR   =tapeDef   blocksize   SizeToWriteInMB   &   minRe-
cordLenInBytes maxRecordLenInBytes
```

Where

`=tapedef` Specifies the TAPE DEFINE to write to
`Blocklen` Specifies the length of data blocks to write. Same value as the BLOCKLEN parameter in the tape DEFINE.
`SizeToWriteInMB` Number of MB to write.
`minRecordLenInBytes` Minimum record length.
`maxRecordLenInBytes` Maximum record length.

Optional PARAMs below should not be used without consulting ETI-NET support.

> **PARAM UNLOAD ON|OFF** OFF: avoid the volume unload at the end
> **PARAM MAXNOWAIT number** Maximum number of pending IO's
> **PARAM BUFFERMODE ON|OFF** OFF: avoid the execution of SETMODE 99
> **PARAM BACKBOXVOL ON|OFF** ON: verify 'SizeToWriteInMB' against the BackPak configuration and possibly reduce it to limit the size to a single volume. OFF: skip 'SizeToWriteInMB< verification.

For a sample of the TAPEWR - Performance Test see TAPEWR - Performance Test in the Appendix.

TAPERD - Performance Test

TAPERD reads a tape volume created by TAPEWR.

Syntax:

```
RUN TAPERD =tapedef blocklen
```

=tapedef Specifies the TAPE DEFINE to read from.

Blocklen Specifies the length of data blocks to read.

For a sample of TAPERD - Performance Test see TAPERD - Performance Test in the Appendix.

Trace Macros

The domain traces can be enabled or disabled. The location of the trace files is specified by modifying the **Domain Configuration** page of the UI. Various files are created at each operation when the trace is on. It is important, therefore, to turn the option off when not needed.

Syntax:

```
    LOAD BBSETUP MACROS
    LISTT file-name-pattern (list the trace files)
    VIEWT file-name (visualize a trace file)
```

For a trace macro sample see Trace Macro in the Appendix.

MS Windows Tools

Specific VTC tools can be accessed from the **Start/Apps Menu** screen (2012 R2) or from the Windows **Start** button (2008 R2). Other Windows tools are provided for Windows scripts and documented in *BackBox VTC Scripting Option*.

Accessing Windows VTC Tools

Server 2012 R2

In remote sessions, access VTC Tools via the Windows Search bar, click on **Start** and type "BackPak". All software elements are prefixed by BackPak to ease retrieval. The Search dialog window will appear and allow you to choose the tools you want to use.
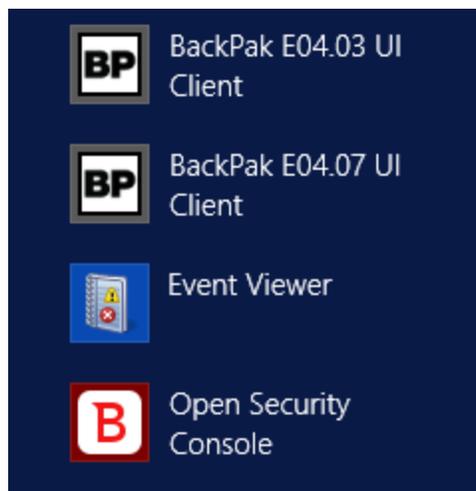
Server 2008 R2

In remote sessions, accessing VTC Tools via **All Programs** of the Windows **Start** button shows the group BackPak.

BackPak Collecting ticket information gathers the current VTC logs and configuration information in a zip file. See more in *BackPak Messages Manual and Troubleshooting*.

BackPak Default Folder points to the root of the VTC specific data folders, including the VTC internal configuration files that are set by the HPE field service engineer.

During a support call, a customer might be asked to browse some of these files.
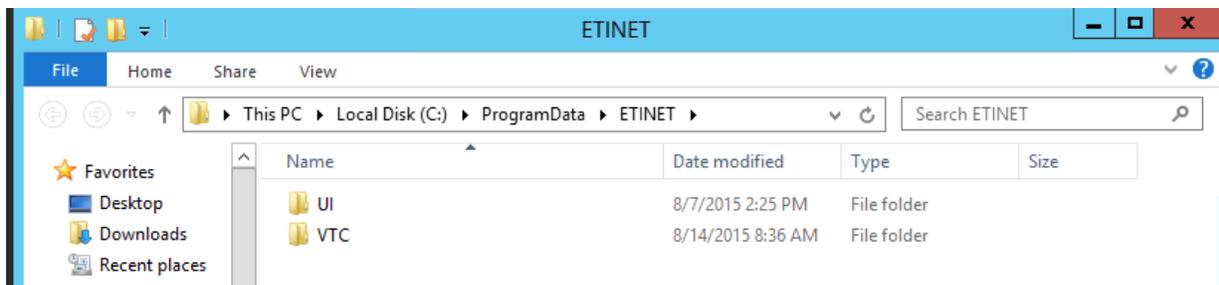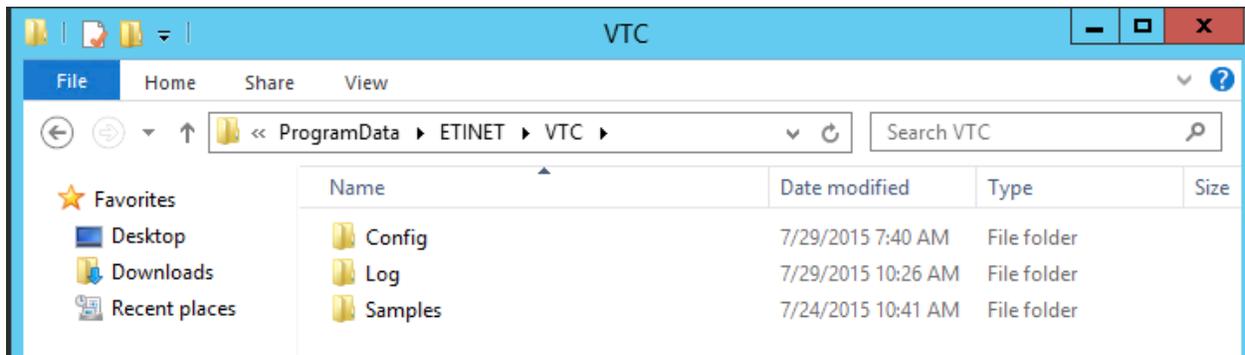
BackPak UI Client is a sub-menu containing the user interface shortcut (UI).

BackPak VTC Management Console starts the console that creates and configures the VTC. See VTC Management Console section.

VTC SOFTWARE COMPONENTS

VTC Server Services

On the VTC server, the following services are installed to provide BackBox functionalities:

VTC Admin

Is a service that performs administrative tasks that don't require the FC/SCSI tape emulation connectivity:

- Creates\Deletes Virtual Media.
- Virtualizes\Materializes Physical Media.
- Performs Data Store query status.
- Performs Data Store access for maintenance (Cleanup, Move from Spare Pool to Storage Pool, backup script re-submit).

VTC Emulator (FC)

VTC Emulator (FC) is a service that emulates virtual tape devices over a Fiber Channel connection:

- Emulates Manage tape connectivity.
- Emulates Response device status.
- Handles tape session with the NonStop.
- Handles tape migration with VTS.

VTC Emulator (ISCSI)

VTC Emulator (ISCSI) is a service that emulates virtual tape devices over an ISCSI connection:

- Works only with virtual NonStop
- Emulates Manage tape connectivity.
- Emulates Response device status.
- Handles tape session with the NonStop.

VTC Asynclog

VTC Asynclog provides asynchronous communication services with the BackPak Domain Server located on the HPE NonStop Server:

- Provides EMS message notification.
- Provides end operation on Virtual Media notification (load, virtualization, materialization, move).

VTC Script Controller

VTC Script Controller provides Windows scripts batching packages for the Enterprise Software Backup.

VTC Management Service

VTC Management Service provides management services to VTC Management Console UI.

VTC CONFIGURATION

This folder contains internal VTC configuration files. Other than with the port emulation configuration file (BBFcEmulPortCfg.xml), these files should not be changed before communicating with ETI-NET support.

The security configuration folder allows file reading by any user, but restricts changes to Local Administrator group users.

The following file descriptions are given for documentation purposes only and it does not need to be changed. The list of Edit tools are:

- **VTCMC** - the user interface VTC Management Console.
- **BPUI** - the user interface BackPak UI.
- **NPAD** - the NotePad editor.

File	Description	Edit Tool
CommonServicesCfg.xml	Parameters common for VTC Admin and VTC Emulator (FC) services. Changes are used only when the service is restarted.	**VTCMC**
BBAdminAppCfg.xml	Parameters for the service VTC Admin. Changes are used only when the service is restarted.	**VTCMC**
BBFcEmulAppCfg.xml	Application parameters for the service VTC Emulator (FC). Changes are used only when the service is restarted. The service must be restarted only when the NonStop tape devices are stopped.	**VTCMC**
BBFcEmulPortCfg.xml	Emulation parameters for the service VTC Emulator (FC), such as changing the emulated device type LTO3 to LTO. Changes are used only when the service is restarted. The service must be restarted only when the NonStop tape devices are stopped.	**VTCMC**
BBIscsiEmulAppCfg.xml	Application parameters for the service VTC Emulator (ISCSI). Changes are used only when the service is restarted. The service must be restarted only when the virtual NonStop tape devices are stopped.	
BBIscsiEmulPortCfg.xml	Emulation parameters for the service VTC Emulator	

	(ISCSI), such as changing the emulated device type. Changes are used only when the service is restarted. The service must be restarted only when the virtual NonStop tape devices are stopped. Supported tape format LTO6.	
BBSL.opt	Data Store parameters for the service VTC Virtual Tape Devices. Changes are used for the next tape load.	**NPAD**
Profile2.xml	Domain Address list and TLS/SSL parameters.	**VTCMC** or **BPUI**

BBSL.OPT File Content

Keyword	Description	Default
COMPRESSION_LEVEL	0 to 9 Parameter for STRONG compression 0 = disable compression 1 = best speed 9 = best compression	**6**
CONSOLE	0 or 1 Redirect trace files on the console.	**1**
MAX_OBJECT_COUNT	Number of IBM Spectrum Protect™ (TSM) objects. Used only for IBM Spectrum Protect™ (TSM) API Data Stores Maximum number of IBM Spectrum Protect™ (TSM) objects for a virtual volume.	**10 000**
MAX_KEEP_ALIVE_WAIT_ SEC	Number of seconds. Used only for IBM Spectrum Protect™ (TSM) API Data Stores. Time between two keep-alive procedures.	**45**
PARTIAL_OBJECT_ RETRIEVE	1 – enabled; 0 – disabled. Used only for IBM Spectrum Protect™ (TSM) API Data Stores Must be disabled to enable the IBM Spectrum Protect™ (TSM) compression or IBM Spectrum Protect™ TSM Encryption by the IBM Spectrum Protect™ (TSM) API lib-rary.	**Disabled**

SYNC_DEPTH	Number of buffers for asynchronous processing of input SCSI commands.	**50 (if SCSI)** **100 (if FC)**
TRACING	Value 0, 1, 4, 8, 12 or 16. When active, it will create a file for each Virtual Volume loaded. The volume name will be used as a file name. No trace will be activated in the FcLog.log file. All trace Levels are cumulative and are similar to verbose functionality. <table><tr><td>Level</td><td>Description</td></tr><tr><td>1</td><td>Trace management activity does not produce any trace at each block of data</td></tr><tr><td>4</td><td>Level 1 + minimal data per data block</td></tr><tr><td>8</td><td>Level 4 + data block description</td></tr><tr><td>12</td><td>Level 8 + function call and call context description</td></tr><tr><td>16</td><td>All of the above + debugging values</td></tr></table>	**0**
WARNONLY_TRUNCATE_ DATAFILE	Processing when a data file is detected truncated: 0 = the load request is rejected 1 = the load request is accepted and data file reading is attempted	**1**

VTC PERFORMANCE MONITOR

The VTC Server software integrates the standard Windows Performance Monitor.
Counters can be measured per Virtual Tape device, per Port, or per VTC.

VTC Performance Counters

Counter Name	Description
Host Bytes Read/sec	Number of data bytes read per second by a host.
Host Bytes Write/sec	Number of data bytes written per second by a host.
Host Read/sec	Number of reads per second by a host.
Host Write/sec	Number of writes per second by a host.
Host Avg. Bytes/Read	The average number of data bytes per read by a host.
Host Avg. Bytes/Write	The average number of data bytes per write by a host.
Host WriteMark/sec	Number of file marks written per second by a host.
Host Other CMD/sec	Number of SCSI commands per second that are not Read, Written or WriteMarked by a host.
Host Sync CMD/sec	Number of synchronization orders received to flush buffered data into the virtual media.
Device Buffered Queue Length	Number of Writes and WriteMarks currently in process.
Device Ready	Indicates if the device is ready (a virtual media is loaded).
Host Avg. Time IO/sec	The average time passed to answer host IO per second.
Device Avg. Time IO/sec	The average time processing host IO to be ready to perform Storage IO.
Storage Avg. Time IO/sec	Percentage of time waiting for a Storage IO to be completed.
Storage Bytes Transfer/sec	Number of data bytes transferred per second.

Storage IO/sec	Number of storage IO per second.
Storage Avg. Bytes Transfer/IO	The average number of data bytes transferred per IO.
Storage Queue Length	Number of IO pending to storage.
Device Avg. Bytes Compression	The average bytes compression ratio.

USER INTERFACE

Each page of the user interface contains the following elements:

Windows Title: contains the BackPak Domain ID.
Windows Menu: provides access to the main menu items.
Window Button Bar: provides access to a subset of the main menu items.
Tabs: provide access to sub-functions of the selected menu item.
Current Tab: the current page has a standard banner in the upper left corner and provides access to the current functionalities.
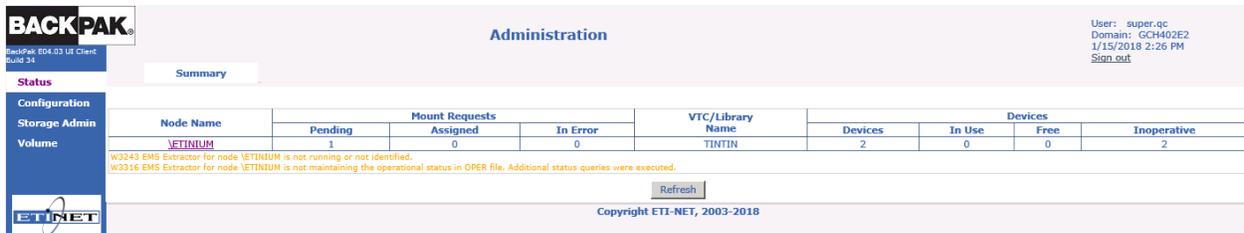
Windows title

An instance of the BackPak interface can connect to a single Domain at any time.
The domain ID (GCH402EA, in the screen cap above), user ID, and the connecting time are displayed in the page title.

Windows Menus
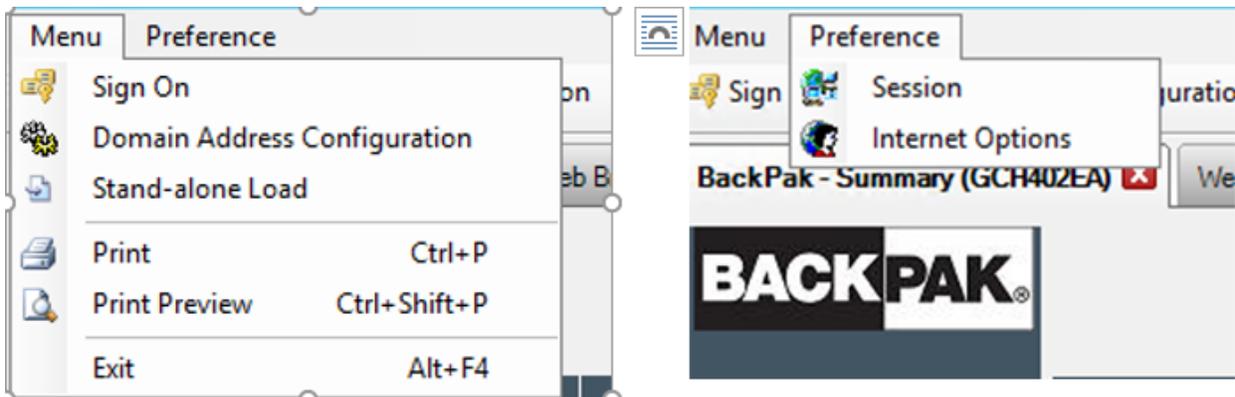
The menus above are used during the BackPak UI installation, but they can be accessed anytime to modify session preferences, Internet options, to sign on as another user, to modify the **Domain Address Configuration**, or to set up a **Stand Alone Load**.

Buttons Row

The three first buttons are BackPak specific; the remaining buttons are standard Windows buttons. The **Sign On**, **Domain Address Configuration** and **Stand-alone Load** pages are documented below.

Banner

The Banner is located at the top of each page and displays the BackPak logo and information about the current session.
Below the BackPak Logo: the UI release and build number.
On the right-hand side: user ID, Domain name, computer time, and Sign Out button for exiting the session.

Navigation Bar

The navigation bar is located on the left-hand side of the page. It allows access to the main functions of the user interface. The selected tab is highlighted.
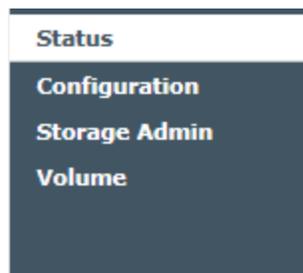
Tabbed Pages

When a page has more than one section, tabs across the top of the main page provide easy navigation between subsections. Each tab is highlighted when selected.

Data Grids

In configuration mode, information is displayed in data grids (exception, the Domain page).
The grids allow the user to view, edit, delete any row of data, or to access additional information pages (such as **Volume Group Information** or **Advanced information**).

VT Controller ID	Status	Physical Location	TCP/IP Address	Comment		
TOUTATIS	Disabled ∨		192.168.20.210		Advanced	Delete
ASTERIX	Enabled ∨		192.168.20.88		Advanced	Delete

To edit a value:

1. Click **Switch to Edit Mode** button.
2. Click on the node, controller, library, data store or volume group to open the values menu, type the new value or choose an option from the drop-down list.

NSK Node Name	Profile	
\ETINIUM	DEFAULT	Delete

NSK Node Name*: \ETINIUM ∨

Profile*: DEFAULT ∨ New Profile Delete Profile

Profile Name*: DEFAULT

Tape IOP CPU Affinity: Preferred ∨

BBEXT Configuration

IO Timeout: 600 seconds

EMS Filter: EMSFILT1

Trace: ☐

Retry Control for Volume Load Failures

Error category	Maximum number of retries (–1 = infinite retries)	Delay between retries (seconds)
No available tape device (busy condition)	-1	120
Other failures or Busy condition retries exhausted	-1	900

Update

3. Click **Save** to accept the changes or **Cancel** if you wish to cancel.

⚠️ The **Update** button does NOT save the change(s); it only displays the new value and triggers the error messages, if the case.

Changes are not saved if you click **Cancel**.

SIGN IN/OUT

Sign In

A successful sign in to the Domain Manager is required before accessing the BackPak functionalities. To sign in, the user must identify the BackPak Domain and must enter the credentials (user ID and password) for NonStop Guardian.
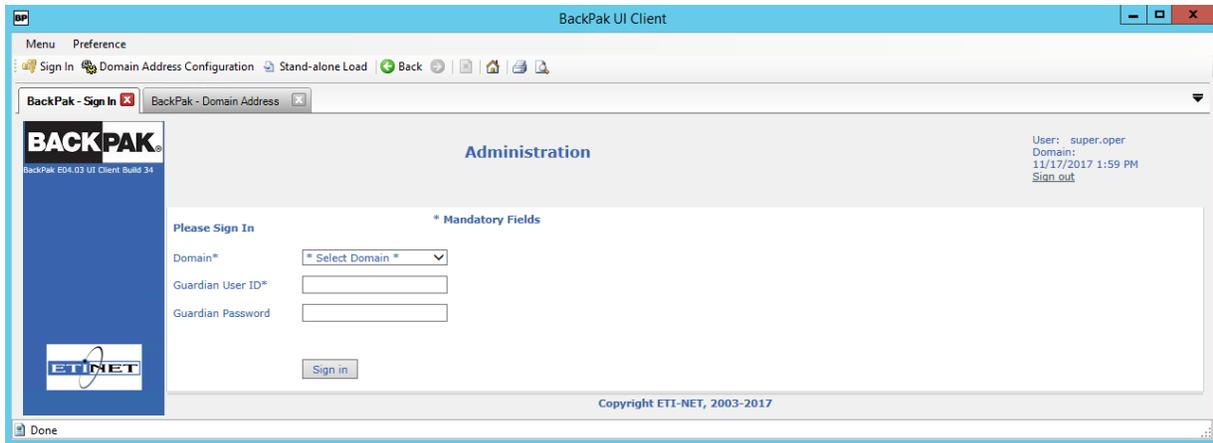
A successful NonStop log-on will display the main Status page.

Page Elements

Domain: The Domain Name selected for the session. Domain addresses are managed using the **Domain Address Configuration** page.

Guardian user ID: A Guardian user name (group.user) that has super.operator access rights.

Guardian Password: The Guardian password associated with the user ID.

Sign Out

Click the **Sign Out** link located on the upper right-hand corner of the user interface page.

Session Timeout

Sessions are automatically timed out after 20 minutes of inactivity. Attempts to access the user interface after a timeout requires a new log-in session. To set a different timeout period, use the **Menu Preferences** session.

Session SSL

SSL must be enabled/disabled through the UI (**Preference**>**Session**), along with the other BackPak components. For more info refer to the *BackPak SSL Setup* manual.

DOMAIN ADDRESS CONFIGURATION

A domain address identifies a BackPak Domain Manager.

Several domains (operational environments) can be identified and their corresponding addresses stored in a local file.

On a workstation, these addresses are bookmarked to ease the access to the domains.

In VTCs, all domains allowed to access the VTC must be registered in this list.
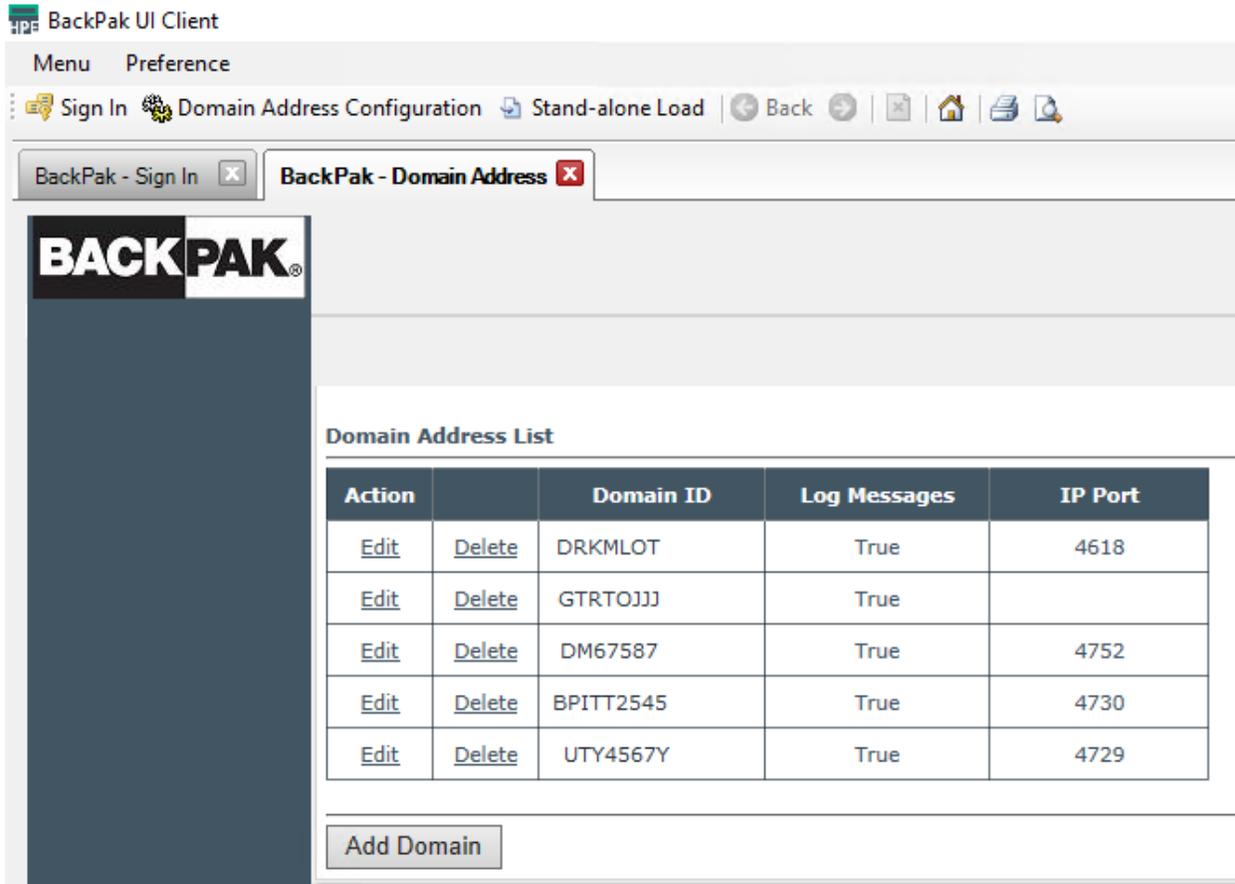
- When installed on a workstation, the **Domain Address Configuration** page allows the user to add, edit or delete a domain address. See *BackPak UI Installation* manual for further details.

- When installed directly on the VTC, the domain configuration is done through the VTC Management Console. See VTC Management Console section for details.

STAND ALONE LOAD

The **Stand Alone Load** allows virtual tape mounting without the Domain Manager when:

- A NonStop is cold-loaded from a virtual SIT tape.
- The Domain Manager is not operational because the catalog (Guardian files VOLUME*) is not available. A tape with a backup of VOLUME* must first be restored.

The following restrictions apply:

- This is a low-level tool that requires the user to enter all configuration information.
- The UI must be running in a VTC directly attached to the NonStop and the tape drive used must be on that VTC.
- The volume is loaded in Read-Only mode.
- Encrypted volumes cannot be used.

The page layout varies depending on the selected Data Store Type.

Stand Alone Load – Common Elements

Port Type: FC is the only possible value

Port Number: Identifies the port number in the VTC internal configuration.

Target ID: The method by which individual devices are identified on the storage. The Target ID is the ID associated with each disk or chassis location. For the FC port type, the Target ID value is "0" by default and it's hard-coded (grayed out).

Lun: SCSI LUN ID assigned to the Guardian tape device by SCF (FC connections). Lun is a Logical Unit Number that can be used to refer to an entire physical disk, or a subset of a larger physical disk or disk volume.

Volume Label: Volume Label to load.

Label Type: Volume label type (value are ANSI, Backup, TMF, IBM or No-label).

Data Store Type: IBM Spectrum Protect™ TSM (TSM-API) or Windows data store (SMB/CIFS).

Volume Lock: Check box that locks the volume and prohibits the volume data to be updated by a tape application. It is equivalent to the lock found on physical media.

Unload Tape from Device Prior to Load Operation: This avoids inopportune unload commands that may abort a tape operation that is in progress.

The check box should be left unchecked, unless the user gets an "already in use" message and is able to confirm that no other user or application is using the device.

Stand Alone Load - Windows Data Store

User Account: User account to access the Windows disk pool.

Password: Account password.

Fully Qualified Path of the Index File: Name of the path containing the virtual media index file (*.IND file).

Stand Alone Load - IBM Spectrum Protect™ (TSM) Data Store

The page elements are similar to those for the Windows Data Store with a few specific features fields:

Client Option File*: Name of the path containing the client user option file (`dsm.opt` on Windows systems and `dsm.sys` on UNIX systems)

IBM Spectrum Protect™ (TSM) Filespace: Name of the group of files stored as a logical unit in a IBM Spectrum Protect™ (TSM) server.

STATUS PAGES

The Home link opens with the **Status Summary** page. This page displays the list of NonStop nodes and a summary of current operations.

This **Status Summary** is an overview of all operations in all nodes included in the domain.

- More detailed info for each device and mount can be queried for a specific node on the Status for NonStop node page.
- The detailed reports can be generated for both NonStop MEDIASRV process and VT Controller(s).

Home – Status Summary

This page displays:

- the list of NonStop nodes with their virtual tape devices.
- information related to monitoring current operations.
- warnings if the EMS Extractor is not running.

⚠️ The **Status Summary** gathers information from the OPER file that is updated at each load processing. This has very little impact on response time when a VTC is down. However, if the EMS Extractor is not running, MEDIASRV will still be accessed and all VTCs will be contacted with potentially long response time, if there is a TCP/IP timeout caused by a non-responsive VTC.

Status for NonStop Node

This page shows the detailed operational status for a NonStop node, both from the NonStop and the VT controller point-of-view. This page opens up in a separate dedicated window.

Page Elements

Mount Requests

Mount requests appear only if there are pending mounts in $ZSVR or if there are any BackBox gen-erated pre-loads on pending.

All pending mount requests are displayed, including requests for tape volumes (such as physical tape media) that are unknown in BackPak.

NonStop View

The left part of a row shows the attributes of the mount request as seen by MEDIACOM.

>
> **Mount ID**: Tape mount ID as reported by MEDIACOM.
>
> **Device**: Guardian tape device specifically requested to load the volume.
>
> **Volume**: Volume label to be mounted or SCRATCH if the NonStop application requests a SCRATCH volume.
>
> **Label Type**: Requested volume label type. Values are ANSI, BACKUP, IBM, TMF and Unlabeled.
>
> Tape Use: Mount request tape use, IN or OUT.
>
> **Message**: Volume mount message.

BackPak View

The right part of the display shows the attributes of a mount request managed by the BackPak Domain Manager.

>
> **Volume in Domain**: Whether the volume is known by the domain or not.
>
> **Request Type**: $ZSVR for regular mount requests seen in MEDIACOM,
>
> PRELOAD for requests generated internally by BackBox.
>
> PRELOAD is a special BackBox feature for optimizing multi-volume restores. It is rarely used.
>
> For more info refer to Volume Group configuration
>
> Load attempts: Number of attempted loads.
>
> **Mount Status**: Request internal status:
>
> PENDING - Waiting for load completion
>
> NO RESOURCE - a resource (drive, disk space) is not available
>
> FAILED – last attempt failed for reason other than 'no resource'
>
> LOADED – load internally completed
>
> LOADING – load being processed, ex: a restore script is running
>
> NO MORE RETRY – maximum number of retries set for the NSK Node in the Domain con-figuration.
>
> **Assigned device**: Tape device assigned by BackPak for a loaded or loading request.
>
> **Details**: Open a mount request detail window.

VTC Tape Devices

This list contains all devices that are configured on the current domain.

NonStop View

The left part of a row shows the attributes of the device as reported by MEDIACOM.

>
> **Device**: NonStop device name.

Device type: Device type recognized by the NonStop tape system: CART3480, LTO2, LTO3, LTO4, and LTO6

Device status: Device status as reported by MEDIACOM, i.e. FREE, IN-USE, DOWN ...

Volume: Volume label recognized by $ZSVR.

Label type: Label type processing.

VT Controller View

The right part of a row shows the attributes of the device as managed by the VTC.

VTC Name: Name of the Virtual Tape Controller

Port: Port type and port number (ex: SCSI-2, FC-0).

TID/Lun: For SCSI or BRIDGE port: Target ID Device. For ISCSI Target ID: ISCSI-1. For FC port: Lun.

Volume: Virtual volume ID, equal to the volume label for labeled volumes.

Device State: Internal device state set by the VTC.

NOT CONFIGURED – not configured on the VTC.

ACTIVATED – initial communication received from the NonStop, but SCF START TAPE not received.

INACTIVE – not polled by the host for three minutes

FREE – operational and free

LOADED – internal load completed, reply READY to host polling

LOADING – the load is being processed (a restore script is running)

UNLOADING – volume unload is being processed

LICENSE LIMIT – the port exceeds the license key limitations

NO REPLY – the VTC did not reply to the status request

DOWN – the physical port is down

Load time: Load request timestamp.

Init Time (sec): Initialization time up to the first data block transfer in seconds. This interval includes:
- the time spent internally to load the volume
- the time spent by the NonStop tape system to detect the READY state and recognize the label
- the delay between the completed tape OPEN and the first tape IO on a user data block.

Throughput (MB/s): Data throughput since the first user data block. Init time is excluded from computation.

Write Bytes: Quantity of data written since the volume was loaded. Includes tape labels.

Read Bytes: Quantity of data read since the volume was loaded. Includes tape labels.

Encryption / Decryption: When the Encryption is in effect. This is shown only when Encryption is licensed.

Action: Unload will immediately unload any virtual volume loaded on the device.

If a tape application is using the device, this action is equivalent to a cancel.

Mount Request Details

Click on the **Details** link in the **Mount Requests** table (last column in the table). The pop-up page shows mount request details from both the NonStop and BackBox point of view.

Buttons:

Reject -A MEDIACOM REJECT command is issued. The tape application will fail.
Alter - A MEDIACOM ALTER command is issued. DSM/TC or TMF will search for another SCRATCH volume.
Load – The load of the volume will be immediately attempted in BackBox.
Close – The window is closed without any action.

NonStop View

The left part of a row shows the attributes of the mount request seen by MEDIACOM.

> **Mount ID**: Tape mount ID as reported by MEDIACOM.
> **Device**: Guardian tape device specifically requested to load the volume.
> **Volume Label**: Volume label to be mounted or SCRATCH if the NonStop application requests a SCRATCH volume.
> **Label Type**: Requested volume label type. Values are ANSI, BACKUP, IBM, TMF and Unlabeled.
> **Tape Use**: Tape usage in the Mount request, IN or OUT.
> **Mount Message**: Volume mount message.
> **Process Name**: Name of the tape application process.
> **User ID**: User ID running the tape application process.
> **DSM/TC VOLCAT**: VOLCAT assigned by the TAPECATALOG DEFINE.
> **DSM/TC POOL**: POOL assigned by the TAPECATALOG DEFINE.

BackPak View

The right part of a displayed row shows the attributes of a mount request managed by the BackPak Domain Manager.

> **Request Type**: $ZSVR for regular mount requests seen in MEDIACOM,
> PRELOAD for requests generated internally by BackBox (for multi-volumes restored with Pre-load option is enabled).
> PRELOAD is a special BackBox feature for optimizing multi-volume restores. It is rarely used.
> **Load Attempts**: Already executed load attempts.
> **BackPak Mount Status**: Internal status of the request.
> **Assigned Device**: Device assigned by load processing.
> **Request Time**: Time when the request is known by BackPak.
> **Restore script**: Future use.

In addition, the page displays the latest message issued by the latest load processing.

CONFIGURATION

The **Configuration** tabs allow navigation through the configuration pages. Any configuration change can be updated and then saved, if in edit mode.

Once **Switch to Edit Mode** is activated, a message displays: **You are currently in Edit mode.** You have to click **Save** to commit your changes to the Domain Manager and have the changes effective.

Domain: Configuration of the Domain entity (global parameters).
NSK Nodes: Use to add NSK Node and to assign a configuration profile.
VT Controller: Configuration of VTCs and virtual devices.
Data Store: Configuration of the storage of virtual volumes.
Tape Library: Use to select or delete Tape Library.
Volume Group: Configuration of how virtual volumes are created.

Domain

The **Domain** page allows making changes to the Domain Manager and tracing configuration.

Domain ID*: Unique name of the domain. It must match the Domain name entered in the VT Controller Manager through the Domain Address tab.

Location: Read-only field showing the NonStop installation sub-volume.

Version: Read-only field showing the BackPak NonStop component version.

Release Date: Read-only field showing the release date of the BackPak NonStop component.

EMS Collector*: Guardian process name for the destination of the EMS log messages.

If the process name is not qualified by an NSK node name:

- The Collector process must run on all NSK nodes that have a virtual device configured.
- When an event is related to a specific NSK node, the Domain Manager will send EMS messages only to the NSK node involved.
- General messages are sent to the NSK node running the Domain Manager.
- If the EMS collector is qualified by an NSK node name (i.e. \NODE1.$0); all messages will be sent to this node.

EMS Verbose: When checked, more EMS messages are issued. This should be checked when virtual tape drives are installed or configured. If the EMS verbose check box is checked, the page displays additional information on the processing of pre-load.

Utilities Log: Destination by the Domain Manager (mainly CLIMCMD), for output to the NonStop utilities. The default value is $NULL; the $NULL process is assumed to be started on each NonStop system. For troubleshooting, the output can be momentarily redirected to any valid collector. If not qualified, the process is used on the node where the query is performed.

Trace Level: The trace may be requested by ETI-NET support personnel to troubleshoot problems; to set the trace level, use "0" for no trace (off) or "1" to activate the trace on the Domain Manager.

⚠ This is reserved for ETI-NET use. The trace creates a significant number of NSK files, which may cause system performance degradation.

Trace Sub Volume: Valid Guardian Disk and Sub Volume where the trace files and some temporary files are created. (Be sure to dedicate a sub volume for traces and temporary files, see Trace Level above).

VT Controller Timeout: Maximum waiting time (in seconds). The Domain Manager waits for a response from a VTC before a timeout.

Stats File Name: Guardian name of the BackBox statistics file. If required, the file will be created. The following wild-cards can be used to change the file name according to the start of the data collection.

%DD% will be replaced by the day number

%MM% will be replaced by the month number

%YY% will be replaced by the year (two digits)

%YYYY% will be replaced by the year (four digits)

The statistics file can be formatted by the OBB018 OBB021 OBEY files.

The default file name at installation is STAT%YY%%MM% in the installation sub-volume.

Stats Retention: Number of months the statistics are kept. The old statistics files are automatically deleted according to their name, if all included activity is older than the configured retention.

Mount Delay Threshold: Delay in minutes, after which the warning message #3373 "*Volume … still not loaded after … minutes …*" is issued to EMS. This warning is issued by the BBEXT program, whatever the cause of delay. This warning is a good candidate to be set as an Alert. See Alerts Setup section.

Run Interactive Processes Under Signon User ID: Controls the user ID accessing the Guardian processes executing the GUI commands.
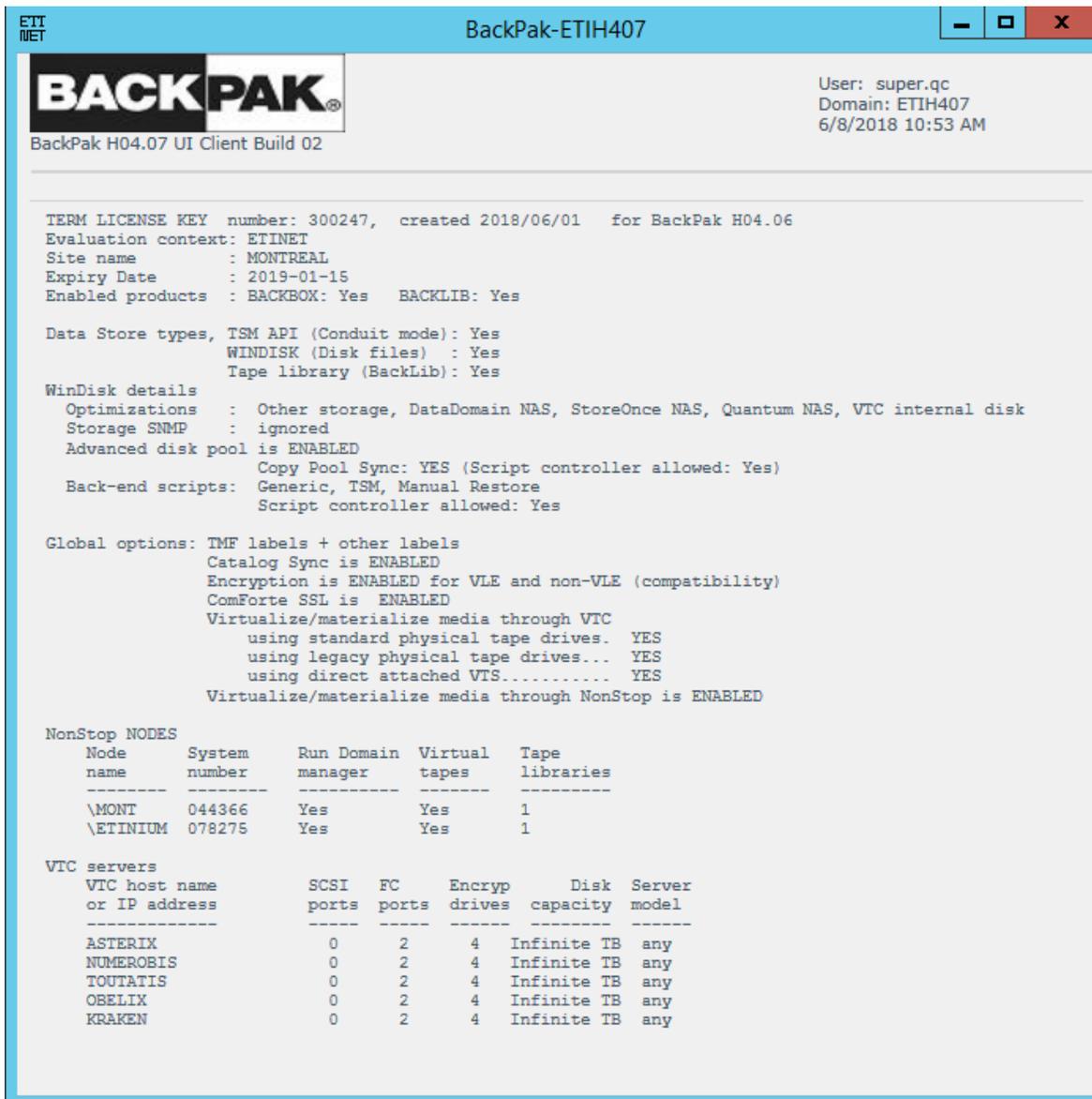
The default setting is *Enabled*: A full Guardian sign-on is executed with the credentials entered in the BackPak sign-on page.

This setting is *Disabled* to execute the UI commands under the user owning the BBSV program – which must be PROGID. Only SUPER.SUPER and the BBSV owner can change this setting.

See more in the NonStop Access Authorization section.

License Key*: Paste the license key from the license file sent by ETI-NET.

License Options: Link to show available licensed options of the BackPak Domain.

```
ETI                        BackPak-ETIH407                  [_] [□] [X]
NET

BACKPAK®                                    User:  super.qc
                                            Domain: ETIH407
BackPak H04.07 UI Client Build 02           6/8/2018 10:53 AM


TERM LICENSE KEY  number: 300247,  created 2018/06/01   for BackPak H04.06
Evaluation context: ETINET
Site name        : MONTREAL
Expiry Date      : 2019-01-15
Enabled products : BACKBOX: Yes   BACKLIB: Yes

Data Store types, TSM API (Conduit mode): Yes
                  WINDISK (Disk files)  : Yes
                  Tape library (BackLib): Yes
WinDisk details
  Optimizations   :  Other storage, DataDomain NAS, StoreOnce NAS, Quantum NAS, VTC internal disk
  Storage SNMP    :  ignored
  Advanced disk pool is ENABLED
                    Copy Pool Sync: YES (Script controller allowed: Yes)
  Back-end scripts:  Generic, TSM, Manual Restore
                    Script controller allowed: Yes

Global options: TMF labels + other labels
                Catalog Sync is ENABLED
                Encryption is ENABLED for VLE and non-VLE (compatibility)
                ComForte SSL is  ENABLED
                Virtualize/materialize media through VTC
                    using standard physical tape drives.  YES
                    using legacy physical tape drives...  YES
                    using direct attached VTS...........  YES
                Virtualize/materialize media through NonStop is ENABLED

NonStop NODES
    Node      System    Run Domain  Virtual   Tape
    name      number    manager     tapes     libraries
    --------  --------  ----------  -------   ---------
    \MONT     044366    Yes         Yes       1
    \ETINIUM  078275    Yes         Yes       1

VTC servers
    VTC host name        SCSI   FC    Encryp      Disk  Server
    or IP address        ports  ports drives  capacity  model
    -------------        -----  ----- ------  --------  ------
    ASTERIX                0      2      4    Infinite TB  any
    NUMEROBIS              0      2      4    Infinite TB  any
    TOUTATIS               0      2      4    Infinite TB  any
    OBELIX                 0      2      4    Infinite TB  any
    KRAKEN                 0      2      4    Infinite TB  any
```

To modify the Domain:

1. Click the **Domain** tab.
2. **Switch to Edit Mode** to change data to specific fields.
3. In **Domain ID** and in other fields, type the changes.
4. Click **Update** to display the new data. In case of invalid data, red error messages are dis-
   played next to the field.
5. Click **Save** to activate changes.

Alerts Setup

To make the monitoring of critical events easier, some EMS messages generated by BackPak can be high-lighted and duplicated by an Alert message tagged with a unique event number.

Alerts can be enabled for some pre-defined events or event sets. They can also be enabled for users entering EMS event numbers. For example, if time waiting for a tape mount is critical, the message W3373 (which is just a warning) can be defined to appear highlighted and followed by a Special Alert message: W3373 Mount-id \MONT.2243. Volume VRT15 is still not loaded after 60 minutes. This message will be highlighted in the Viewpoint console. The message will be followed by this Additional message: W3171 Alert triggered by message 'W3373 Mount-id \MONT.2243. Volume VRT15 is still not loaded after 60 minutes.

If a monitoring tool is being used, it is necessary to configure the special EMS message 3171. This single generic message has to be forwarded to all messages in order to be specified by Alert Setup.

By default, all alerts are checked. If you uncheck some of them, click **Confirm** to save the changes. If you click **Close**, the Alerts Setup page will not save the changes.

> **Mount Delay Threshold**: Generates an Alert if a MEDIACOM mount request is not satisfied within the delay configured in the Domain page above (event 3373).
> **Windisk Space Threshold**: Generates an Alert during the production of a report on disk space for a Data Store, if the Data Store is having less free disk space than the configured threshold (event 3217).

DSM/TC Catalog Checks Required: (event 3207).

Script Error: Generates an Alert if error is reported for Windows script execution (events 5025, 5026, 5027, 5028, 5030, 5073, 5105, 5129, 11004, 11014).

License Expiration: Generates an Alert if the BackPak license is going to expire in the next 7 days (event 3162).

Scratch Number Threshold: Generates an Alert if, during the production of a Volume Group summary report, a Volume Group has less SCRATCH Volumes than the configured threshold (event 3313).

VTC Critical: Critical messages from the VTC (events 116, 5104, 5106, 5114, 6008, 6009, 6015, 6016). **Message ID #1 to #4**: Generates an Alert if one of the above listed message event numbers is logged.

NSK NODES

The NSK Nodes page contains a list of all known NSK Nodes and their assigned configuration profiles. By default, only the node where the domain is installed is automatically added. It is therefore important to (manually) add all the required peripheral nodes.

Domain	NSK Nodes	VT Controller	Tape Library	Key Manager	Data Store	Volume Group

NSK Node Name	Profile
\ETINIUM	DEFAULT

Node profiles can be viewed and modified (when in edit mode) by clicking on the NSK Node Name. If you want to use a Tape process (tape IOP) on the same CPU where the tape application program is running, select the type of CPU affinity desired in the profile of the NSK node. This option is by default, set to active, but it can be disabled or set to mandatory (meaning that if no tape IOPs are available in the same CPU, the mount request will not be answered).

Status		Domain	NSK Nodes	VT Controller	Tape Library	Key Manager	Data Store	Volume Group

Configuration

Save
Cancel

Storage Admin
Volume

You are currently in Edit mode. You have to click the **Save** link to commit your changes to the Domain Manager and have the changes be made effective

Select, Delete or Create a Nsk Node

Add New NSK Node

NSK Node Name	Profile	
\ETINIUM	DEFAULT	Delete

NSK Node Name*: \ETINIUM ▾
Profile*: DEFAULT ▾ New Profile Delete Profile

Profile Name*: DEFAULT
Tape IOP CPU Affinity: Preferred ▾

BBEXT Configuration

IO Timeout: 600 seconds
EMS Filter: EMSFILT1
Trace: ☐

Retry Control for Volume Load Failures

Error category	Maximum number of retries (-1 = infinite retries)	Delay between retries (seconds)
No available tape device (busy condition)	-1	120
Other failures or Busy condition retries exhausted	-1	900

Update

The profile screen now replaces the BBEXT file previously used to configure the values needed by the extractor.

⚠️ If the Tape IOP (Input/Output Processor) CPU affinity is set on **preferred** or **mandatory**, a different profile can be specified. This is a new criteria added in the selection of a tape drive for replying to a mount request. BackPak prefers tape IOPs that run on the same CPU as the tape application (BACKUP, TMFDR). This option is by default set to **active**, but it can be disabled or set to mandatory. In this case, if no tape IOP is available on the same CPU, the mount request will not be answered.

NSK Node Name*: Name given by default. It cannot be changed (because it is hardcoded).

BBEXT Configurations that can be changed for a profile are:

IO Timeout: Maximum wait time in seconds for response from the Domain Manager.

EMS Filter: Filter associated with the node profile. Use the default value.

Trace: Check the box to trigger the saving of trace files and temporary files associated with the process running on BBEXT.

Retry Control for Volume Load Failures: This section shows the error types and the retry time and number of retries for the specified failures.

Maximum number of retries (-1 = infinite retries)

- Value "**0**" is entered to suppress any retry.
- Value "**-1**" is entered to allow an infinite number of retries.

Delay Between Retries (Seconds): Delay in seconds between two retries, to load a volume on a busy virtual device.

No Available Tape Device (Busy Condition): When there is no tape device configured or the configured one is busy.

Other Failures or Busy Condition Retries Exhausted: Maximum number of times a volume load is retried for any other failure or when the busy condition retries are exhausted.

- Value "**0**" is entered to suppress any retry.
- Value "**-1**" is entered to allow an infinite number of retries.

The default profile is created during the installation and it usually fits most configurations.

VT CONTROLLER

The **VT Controller** page allows to configure the VTC. The configuration of a VTC consists of setting up:

- Its TCP/IP address.
- The definition of operational tape drives. BackBox matches the VTC tape configuration with the one obtained from the CLIM and SCF. The VTC and the host definitions are prerequisites. The VTC must be functional and its virtual tapes must be connected in order to allow the configuration in the domain.

The **VT Controller** page shows the list of existing VTCs (if any). If in **Switch to Edit mode**, the button **Create VT Controller** becomes active and a new VT controller can be added.

For the existing VT Controllers, the **Status** (enabled/disabled) can be changed or the controller can be deleted.

Domain	NSK Nodes	VT Controller	Tape Library	Key Manager	Data Store	Volume Group

You are currently in Edit mode. You have to click the **Save** link to commit your changes to the Domain Manager and have the changes be made effective

Select, Delete or Create a VT Controller

Create VT Controller

VT Controller ID	Status	Physical Location	TCP/IP Address	Comment		
TOUTATIS	Disabled ▾		192.168.20.210		Advanced	Delete
ASTERIX	Enabled ▾		192.168.20.88		Advanced	Delete

To see the VTC properties of a specific VT Controller, click on the VTC listed under **VT Controller ID**.

Domain	NSK Nodes	VT Controller	Data Store	Volume Group

VT Controller ID	Status	Physical Location	TCP/IP Address	Comment	
BBLARGE	Enabled ∨		172.17.198.230		Advanced

Virtual Tape Controller Information

VT Controller ID*	BBLARGE	
Physical Location		
TCP/IP Address*	172.17.198.230	
Comments		

Licensed Concurrent Operations:
SCSI Ports: 8
FC Ports: 16
Encryption Devices: 0
ISCSI Devices: 16

Host Name: VTCMXQ50602ZH
Server Model: HP ProLiant DL380 Gen9
System: Server 2012 R2 Standard
Service Pack:
Architecture: 64
VTC Version: H04.05.11

VTC Ports   Refresh

Port	Port WWN/Target ID	Status	Speed	Card Module	Card Slot Id/Target IP	Card Channel Id	Host WWN
FC-11	2100001086037CEC	UP	8-Gb	FC-84EN	1	1	2100001086046C7C
FC-12	2100001086037CED	UP	8-Gb	FC-84EN	1	2	2100001086046C7D
FC-13	2100001086037CEE	UP	8-Gb	FC-84EN	1	3	5001438024295E7C
FC-14	2100001086037CEF	DOWN		FC-84EN	1	4	
ISCSI-1	02ZH400	UP	-	V0505 ETINET ISCSI V-Tape	172.17.198.230		-
ISCSI-2	02ZH401	UP	-	V0505 ETINET ISCSI V-Tape	172.17.198.230		-
ISCSI-3	02ZH402	UP	-	V0505 ETINET ISCSI V-Tape	172.17.198.230		-

Virtual Devices

Node	Guardian Device	Device Type	Serial Number	Port	Target	Lun	Explicit Only	Reserved For	Host WWN	Status	Guardian Port
\CGNAC2	$BBLG01	LTO6	BB037CEE00	FC-13	0	0	False	...	5001438024295E7C	FREE	$ZZSTO.#SCLIM001
\CGNAC2	$BBLG02	LTO6	BB037CEE01	FC-13	0	1	False	...	5001438024295E7C	FREE	$ZZSTO.#SCLIM001
\CGNAC2	$BBLG03	LTO6	BB037CEE02	FC-13	0	2	False	...	5001438024295E7C	FREE	$ZZSTO.#SCLIM001
\CGNAC2	$BBLG04	LTO6	BB037CEE03	FC-13	0	3	False	...	5001438024295E7C	FREE	$ZZSTO.#SCLIM001

Top Section: List of all VTCs configured on the current Domain.

Virtual Tape Controller Information: Displays the selected VTC attributes.

Click **Update** to display the change(s) made to this section.

VTC Ports: List all physical ports prepared for BackPak operations inside the VTC. This section is read-only.

Virtual Devices: List the virtual drives already configured in the domain, including their internal status. To add these devices by groups of devices simply select the physical connection of the devices (the VTC port and the NonStop host).

Devices can also be removed from the Domain Configuration individually (individually "deleted").

All devices currently configured in the VTC can be updated globally.

The update is not required after a change to this section.

⚠️ Certian data is retrieved from queries to the VTC:

General information such as Host name, OS and Version, and version of BackBox software.

VTC Ports: Lists all physical ports prepared for BackPak operations inside the VTC, as well as their internal status.

Virtual Devices: Lists the virtual drives already configured in the domain, as well as their internal status.

If there is no VTC connected (disabled VTC or the port associated with the configured devices has been removed from the internal VTC configuration), the information listed will be blank.

The **Refresh** button allows VTC query retries.

Some other information that comes from the NonStop host is kept in the BackPak configuration. The host is queried only when tape drives are added or updated through this page.

Host information:

- The host location, SAC name, or CLIM ID.
- The tape device name associated with the port and LUN/Target IDs, presented by the VTC.

Virtual Tape Controller Information

Virtual Tape Controller Information

VT Controller ID*	VBBOX-2	Licensed Concurrent Operations:	Host Name: VBACKBOX2-2C
Physical Location		SCSI Ports: 10	Server Model: OpenStack Foundation OpenStack Nova
TCP/IP Address*	172.17.233.36	FC Ports: 10	System: Server 2012 R2 Datacenter
		Encryption Devices: 0	Service Pack:
Comments		ISCSI Devices: 0	Architecture: 64
			VTC Version: H04.04.17

VT Controller ID: Identifies the VTC. It must be unique and cannot be changed once added.

Physical Location: Optional information field that describes where the BackBox unit is physically installed.

TCP/IP Address: TCP/IP address or TCP/IP host name used by the Domain Manager to communicate with the VT Controller.

If the license key has restrictions on the allowed VTCs, this field must match one of the VTC entries in the license key.

Comments: Optional information field.

⚠️ Click on either the **Update** button to display the changes or the **Exit Update Mode** button to keep the previous configuration. If you make changes and exit the page without updating them, they will not be saved.

VTC Details retrieved from the license key and from the VTC

Licensed Concurrent Operations:	Host Name: VBACKBOX2-2C
SCSI Ports: 10	Server Model: OpenStack Foundation OpenStack Nova
FC Ports: 10	System: Server 2012 R2 Datacenter
Encryption Devices: 0	Service Pack:
ISCSI Devices: 0	Architecture: 64
	VTC Version: H04.04.17

This sub-section lists the settings allowed by the license key.

SCSI Ports: Maximum number of SCSI ports that can be active at the same time. More ports can be configured and the associated tape devices started for failover purposes.

FC Ports: Maximum number of FC ports that can be active at the same time. More ports can be configured and associated tape devices started for failover purposes.

Encryption Devices: Maximum number of tape devices licensed to be concurrently in use for Encrypted volumes (VLE CLIM or VTC client to Key Manager).

ISCSI Devices: Maximum number (3) of ISCSI connections on the network adapter.

This sub-section lists the settings allowed by the VTC.

Host Name: This is the computer name.

Server Model: Model type server

System: Windows operating system release.

Service Pack: Microsoft Service Pack level.

Architecture: 32 or 64 bits.

VTC Version: VTC build level.

VTC Ports

Port	Port WWN/Target ID	Status	Speed	Card Module	Card Slot Id/Target IP	Card Channel Id	Host WWN
ISCSI-1	X22C100	UP	-	V0505 ETINET ISCSI V-Tape	172.17.233.36		-
ISCSI-2	X22C101	UP	-	V0505 ETINET ISCSI V-Tape	172.17.233.36		-
ISCSI-3	X22C102	UP	-	V0505 ETINET ISCSI V-Tape	172.17.233.36		-

This table shows all target-mode ports installed and configured. Virtual devices can be added in the Domain configuration on these ports only.

When the VTC cannot be reached, only the ports with tape devices already configured are displayed, but the VTC configuration cannot be updated.

Port: VTC internal port identification. Type (SCSI, FC, BRIDGE, RELAY, EXTERN, or ISCSI) and port number.

ISCSI provides block-level access to storage devices by carrying SCSI commands over a TCP/IP network. This type of protocol allows sending SCSI commands to storage devices (targets) on remote servers.

ISCSI does not require dedicated cabling, switches or cards; therefore, it can be run over an existing IP infrastructure.

Port WWN: FC port WWN or ISCSI Target ID

Status: Port status.

Speed: Nominal port speed.

Card Module: HBA model.

Card Slot Id: Server slot number.

Card Channel Id: Port number in multi-ports HBA.

Host WWN: Host HBA WWN.

Refresh button: Refresh the VTC status.

Virtual Devices

This table shows the virtual tape devices configured for the domain. To add devices, the VTC must be reachable and there must be a link between the VTC and the host HBAs.

The **Add Devices Automatically** tab allows adding devices by automatically mapping Guardian and VTC devices sharing the same physical connection (same host port and VTC port). For FC connection, the user will select a Guardian node name and a VTC port. The UI will identify the host port by the host WWN detected by the VTC.

VTC Ports [Refresh]

Port	Port WWN/Target ID	Status	Speed	Card Module	Card Slot Id/Target IP	Card Channel Id	Host WWN
FC-11	2100001086037CEC	UP	8-Gb	FC-84EN	1	1	2100001086046C7C
FC-12	2100001086037CED	UP	8-Gb	FC-84EN	1	2	2100001086046C7D
FC-13	2100001086037CEE	UP	8-Gb	FC-84EN	1	3	5001438024295E7C
FC-14	2100001086037CEF	DOWN		FC-84EN	1	4	
ISCSI-1	02ZH400	UP	-	V0505 ETINET ISCSI V-Tape	172.17.198.230		-
ISCSI-2	02ZH401	UP	-	V0505 ETINET ISCSI V-Tape	172.17.198.230		-
ISCSI-3	02ZH402	UP	-	V0505 ETINET ISCSI V-Tape	172.17.198.230		-

Virtual Devices

Add Devices Automatically	**Add Devices Manually**

Guardian Node* [\CGNAC2 ▾]
VTC Port* [ISCSI-1   02ZH400 ▾]
VTC Device* [All Used ▾]
Guardian Device* [＿＿＿＿＿＿]
Explicit Only [ ]

[Add Virtual Devices]

		Node	Guardian Device	Device Type	Serial Number	Port	Target	Lun	Explicit Only	Reserved For	Host WWN	Status	Guardian Port
Edit	Delete	\CGNAC2	$BBLG01	LTO6	BB037CEE00	FC-13	0	0	False	…	5001438024295E7C	FREE	$ZZSTO.#SCLIM001
Edit	Delete	\CGNAC2	$BBLG02	LTO6	BB037CEE01	FC-13	0	1	False	…	5001438024295E7C	FREE	$ZZSTO.#SCLIM001
Edit	Delete	\CGNAC2	$BBLG03	LTO6	BB037CEE02	FC-13	0	2	False	…	5001438024295E7C	FREE	$ZZSTO.#SCLIM001
Edit	Delete	\CGNAC2	$BBLG04	LTO6	BB037CEE03	FC-13	0	3	False	…	5001438024295E7C	FREE	$ZZSTO.#SCLIM001
Edit	Delete	\CGNAC2	$BBLG05	LTO6	BB037CEE04	FC-13	0	4	False	…	5001438024295E7C	FREE	$ZZSTO.#SCLIM001
Edit	Delete	\CGNAC2	$BBLG06	LTO6	BB037CEE05	FC-13	0	5	False	…	5001438024295E7C	FREE	$ZZSTO.#SCLIM001
Edit	Delete	\VNSK17	$PBB00	LTO6	BB2ZH400	ISCSI-1	0	0	False	…		FREE	
Edit	Delete	\VNSK17	$PBB01	LTO6	BB2ZH401	ISCSI-2	0	0	False	…		FREE	

For a SCSI or BRIDGE connection, the user will also have to select the Guardian Port to fully identify the host port.

The Node will be queried and all tape drives defined in SCF can be added, providing the Guardian Device is set to **All Available Devices**; otherwise, they can be added individually. The UI will automatically match the SCF and VTC definitions by the LUN and Target ID.

The **Add Devices Automatically** tab is used to re-add all tape devices previously configured in the host for this connection. They can also be individually updated.

⚠️   SCSI and BRIDGE automatic connection updates are not supported and will be ignored by this

process. To update such connections, all connected tape devices (same VTC port ID) must be deleted individually.

VTC Ports `Refresh`

Port	Port WWN/Target ID	Status	Speed	Card Module	Card Slot Id/Target IP	Card Channel Id	Host WWN
ISCSI-1	X22C100	UP	-	V0505 ETINET ISCSI V-Tape	172.17.233.36		-
ISCSI-2	X22C101	UP	-	V0505 ETINET ISCSI V-Tape	172.17.233.36		-
ISCSI-3	X22C102	UP	-	V0505 ETINET ISCSI V-Tape	172.17.233.36		-

Virtual Devices

| **Add Devices Automatically** | **Add Devices Manually** |

Guardian Node* : \VNSK6 ⌄
VTC Port* : ISCSI-1   X22C100 ⌄
VTC Device* : All Used ⌄
Guardian Device* : [   ]
Explicit Only : ☐

`Add Virtual Devices`

		Node	Guardian Device	Device Type	Serial Number	Port	Target	Lun	Explicit Only	Reserved For	Host WWN	Status	Guardian Port
Edit	Delete	\VNSK6	$B2C100	LTO6	BB22C100	ISCSI-1	0	0	False	...		FREE	
Edit	Delete	\VNSK6	$B2C101	LTO6	BB22C101	ISCSI-2	0	0	False	...		FREE	
Edit	Delete	\VNSK6	$B2C102	LTO6	BB22C102	ISCSI-3	0	0	False	...		FREE	

The **Add Devices Manually** tab allows adding devices by manually mapping Guardian and VTC devices that share the same physical connection (same host port and VTC port).

⚠️ Use this technique carefully. Invalid device mapping can result if the wrong information is entered. Adding devices manually should be used only if the host does not respond to queries.

For FC, SCSI or BRIDGE connection, the user will select a Guardian node name, the VTC port and VTC Device Target, and also LUN. The user has to provide the Guardian device name to complete devices mapping.

		Node	Guardian Device	Device Type	Serial Number	Port	Target	Lun	VLE	Explicit Only	Reserved For	Host WWN	Status	Guardian Port
Edit	Delete	\ETINIUM	$ASTERI0	LTO3	BB02FAE600	FC-23	0	0		False	...	50014380331312E8	INACTIVE	$ZZSTO.#S100231
Edit	Delete	\ETINIUM	$ASTERI1	LTO3	BB02FAE601	FC-23	0	1		False	...		INACTIVE	$ZZSTO.#S100231

Virtual tapes can be updated or deleted individually in the list of Virtual Drives.

Updatable Attributes:

Node
Guardian Device
Port
Target or LUN
VLE
Explicit Only
Reserved For

⚠️ ISCSI does not support automatic adding of a device. Use **Add Devices Manually** to add ISCSI devices.

Virtual Device Information

Node: Guardian system name.

Guardian Device: Guardian tape device name defined in SCF.

Device Type: Emulation provided by the VTC for this device, CART3480, LTO3, LTO4 or LTO6.

Serial Number: Tape device serial number.

Port: Port type (SCSI, FC, BRIDGE) and number.

BRIDGE corresponds to a SCSI physical port of the NonStop; in this case the port number is the FC port number shown in the Ports table, suffixed by CH1 or CH2 to distinguish the two corresponding SCSI Channels of the Bridge, ex: "BRIDGE-3-CH1"

Target: SCSI Target ID assigned to the Guardian tape device by SCF.

LUN: SCSI LUN ID assigned to the Guardian tape device by SCF.

VLE: "VLE" is displayed if this device was enabled for VLE Encryption by the SCF ALTER TAPE, KEYGENPOLICY command.

Explicit Only: Select "Yes" to exclude this device from the automatic device assignment provided. This device will be used only when specified explicitly in the command.

Reserved For: Link to the reservations list for this drive.

Host WWN: Host HBA WWN.

Status: Tape drive status in the VTC.

Guardian Port: Display the SAC name or CLIM ID

VT Controller Device Reservations

The **Volume Class List** page is opened when the **Reserved For** link of the VT Controller page is clicked. It lists the volume classes configured in Volume Groups and permits device reservation for one or several volume classes.

Device: Identifies the device.

Volume Class: Shows the volume class list. Check the classes for which the device must be reserved.

If no class is checked, the device is available to volumes belonging to any volume class.

VT Controller Advanced Properties

Top Section: Lists all VTCs configured in the current Domain, even when no VT Controller is selected.

Advanced Properties: Click **Update** to the display the changes made to the **Advanced** properties section.

Advanced Properties

SSL Proxy Ports

If the SSL Proxy Ports are not modified, the default values will be used.

SSL Proxy Ports: Check if the HP SSL Proxy is used to connect to the VTC.
The TCP/IP Ports for VTC services might have to be modified if the VTC is reached through the HP SSL Proxy. This is the case when several VTCs are in the domain: all VTCs are configured with

the same address of local proxy (127.0.0.1). To reach different VTCs, all port numbers con-
figured in the local proxy clients must be different.

Admin TCP Port: Port for the Admin service.

8766 is required if the VTC is not reached through the HP SSL Proxy.

VTC Emulator (SCSI) TCP Port: Port for the VTC SCSI Emulator service.

8765 is required if the VTC is not reached through the HP SSL Proxy.

VTC Emulator (FC) TCP Port: Port for the VTC FC Emulator service.

8764 is required if VTC is not reached through the HP SSL proxy.

VTC Emulator (ISCSI) TCP Port: Port for the VTC ISCSI Emulator service.

8767 Port for VTC Emulator (ISCSI).

Guardian Defines

This section allows redefining the TCP/IP Guardian environment provided by the TCP/IP LISTNER to the BackPak Domain Manager.
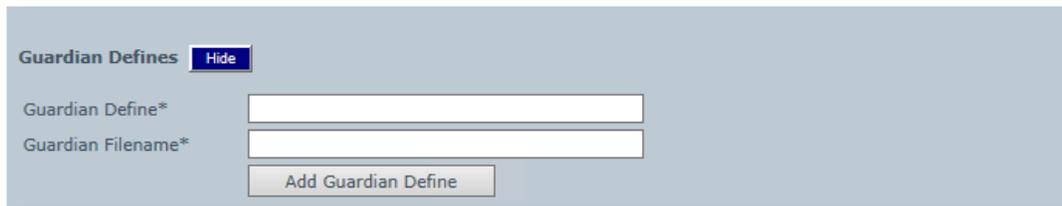
DEFINE is used when the Domain Manager communicates with the VTC. If a DEFINE is specified in this section, all TCP/IP Defines passed by the LISTNER are deleted in the process context, then the TCP/IP Defines configured here are created before accessing the NonStop socket interface.

For more information, please consult the Guardian TCP/IP Configuration Manual.

> **Guardian Define**: Valid Guardian environment variable name (define) supported by the TCP/IP stack, such as =TCPIP^PROCESS^NAME and =TCPIP^HOST^FILE.
> **File Name**: Value associated with the Guardian Defines.

Physical Tape Device Attached

This section allows declaration of physical tape devices attached to the VT Controller to use for vir-
tualization/materialization operations.

The user chooses the devices that will be used for Virtualize/Materialize operations from the list sup-
plied by Windows.

> **Alias**: Symbolic name to identify the tape drive. The name must be unique.
> **Vendor, Product, Version and Serial number**: Attributes returned by the device.
> **Bus, Target ID, Lun**: SCSI or FC address of the device reported by Windows.
> **Status**: Current status of the device.

Device Protocol: Reports if the tape drive is a Standard device handled through a Windows driver or if it is a *Legacy* drive handled in raw mode. Operation of legacy drives requires a license option.

DATA STORE

The Data Store page contains information about the storage configuration for the virtual tape volumes. The initial view shows the list of existing Data Stores. If in edit mode, **Create Data Store** button and **Delete** are available.

Click on the **Data Store ID** link to see additional information about that store.
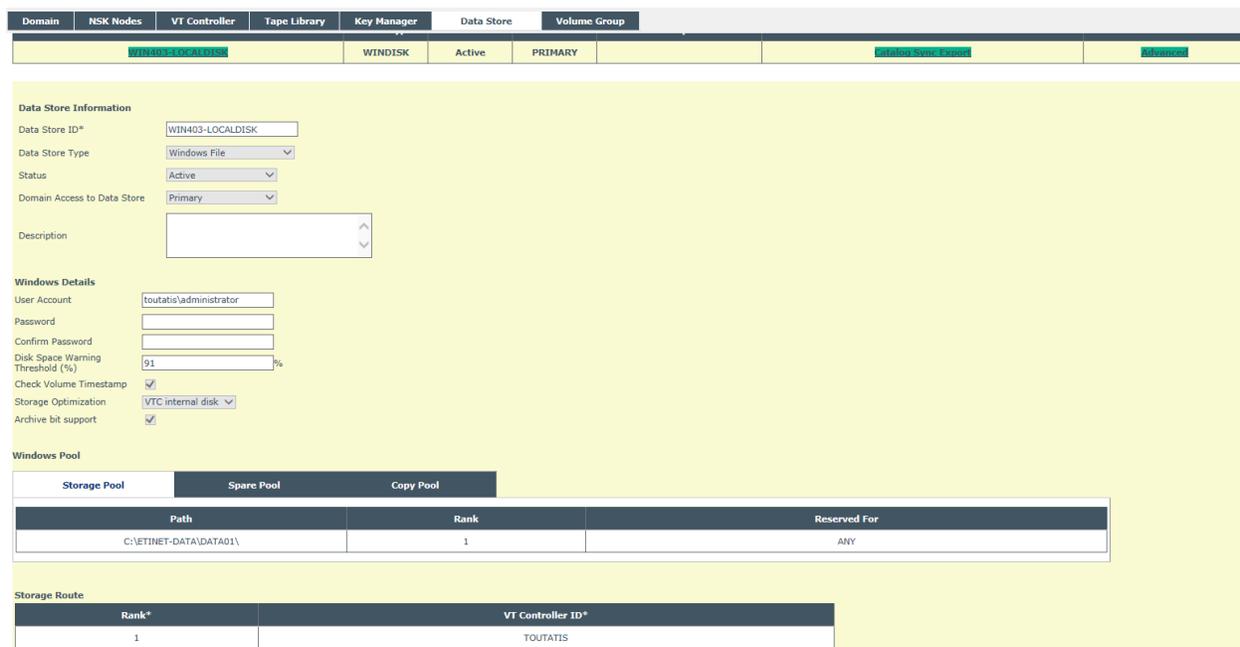
Data Store Information: Data store properties.
Windows Details, Windows Pool: Windows disk data store properties
Storage Route: For the selected Data Store, list of the VTCs that can access the storage.

Data Store Information

Store ID: Identifies the Data Store. Must be unique and cannot be modified after it is added.
Data Store Type: Cannot be modified after it is added. Refer to the related section in the Configuration chapter for details.
WINDOWS FILE: To store virtual volumes in the Windows file system
or in a compatible remote file server.

TIVOLI STORAGE MANAGER: To store virtual volumes on a IBM Spectrum Protect™ (TSM) server.

Status: Indicates whether the Data Store volumes can be used.

ACTIVE: Default, no restriction to volume operations.

INACTIVE: Tape volumes cannot be loaded to be read or written. Automatic operations such as the free-up of expired storage are disabled.

As an exception, catalog Export/Import functions (Catalog Sync) are still active.

Domain Access to Data Store: Qualifies the ownership of the Data Store virtual volumes.

PRIMARY: This is the usual value. The current domain owns and manages the Data Store, writes and reads virtual tapes.

⚠️ This value is equivalent to "OWNER" in previous BackBox versions.

SECONDARY: The Data Store is being prepared for Disaster/Recovery, receiving updates to the BackPak, and DSM/TC tape catalogs. The domain has a read-only view of the Data Store and cannot execute backups.

RESTRICTED: The Data Store is an alternate view of a Data Store owned by another domain.

The Data Store is read-only and the DSM/TC and TMF tape catalogs will not be modified; they should remain as configured. The user must manually register the volumes in the BackPak catalog.

Primary Data Store ID: Identifies the source PRIMARY Data Store ID.

Available only for a SECONDARY or RESTRICTED Data Store, pointing to virtual volumes copied from or shared with an original PRIMARY Data Store in another domain.

When configuring Data Stores pointing to the same data or to copies of the same data, it is convenient to give them the same ID. The Primary Data Store ID allows linking the two Data Stores, even if they don't have the same ID.

Description: Optional user description.

Administrative Link: Optional URL of an administrative client for the Data Store (available only for IBM Spectrum Protect™ - TSM Data Store Type).

Data Store - IBM Spectrum Protect™ (Tivoli Storage Manager - TSM)

Node: IBM Spectrum Protect™ (TSM) node name used by the VT Controller to log in to the IBM Spectrum Protect™ (TSM) Server. This node must be created by a IBM Spectrum Protect™ (TSM) administrator.

If omitted, the IBM Spectrum Protect™ (TSM) client configuration file (dsm.opt) must contain the node name and password.

Password: Password associated with the IBM Spectrum Protect™ (TSM) node. This password is used by the VT Controller to log in to the IBM Spectrum Protect™ (TSM) server.

File Space: Optional specification of a IBM Spectrum Protect™ (TSM) File Space that will contain all virtual volumes of this group. If left blank, a File Space name will be created for each virtual volume and named according to its volume label. When a File Space is created for each volume label, it is possible to delete or export/import the data of a single virtual volume.

A typical IBM Spectrum Protect™ (TSM) client creates a limited number of File Spaces. The IBM Spectrum Protect™ (TSM) administrator should be contacted before creating hundreds of File Spaces.

Storage Routes

This section defines the routes to data; it lists the VTCs that are connected to the storage.

Rank: Indicates the route priority. The highest priority is 1.

VT Controller ID: Identifies the VTC connected to the selected Data Store.

IBM Spectrum Protect™ (TSM) Client Option File: Name of the DSM.OPT file the VTC will use as local IBM Spectrum Protect™ (TSM) configuration for accessing a IBM Spectrum Protect™ (TSM) Data Store. Must be a local file (C:\...) to allow a VTC operations when another VTC is down. This local file must be in the same location in all VTCs, for a given Data Store.

Data Store Advanced Properties – IBM Spectrum Protect™ (Tivoli Storage Manager – TSM)

Restore on Same VTC: When checked, and when the TAPE DEFINE set for restore (USE IN) does not specify a tape device, the volume will be read from a device on the same VTC on which this volume has been initially written.

Data Store - Windows Files

Windows Details

User Account	toutatis\administrator
Password	●●●●●●
Confirm Password	
Disk Space Warning Threshold (%)	91 %
Check Volume Timestamp	☑
Storage Optimization	VTC internal disk ▾
Archive bit support	☑

[Update] [Exit Update Mode]

Windows Pool

Storage Pool	Spare Pool	Copy Pool

Path* [   ]
Rank* [1]

[Add Path to Primary Storage Pool]

		Path	Rank	Reserved For
Edit	Delete	C:\ETINET-DATA\DATA01\	1	ANY

User Account: The User Account is used to access the paths of the Windows disk pool. The account can be unqualified or qualified by a Windows domain name, and must allow for a non-interactive login in the VTCs named as routes to this Data Store.

When qualified by a domain, the syntax can be **<domain>\<account>** or **user-@domain.mycorporation.com**.

⚠ The maximum number of characters allowed for the user account name is 64.

If the account is unqualified (e.g. USER1), the VTC will execute a local Windows login. The account must exist in each VTC with the same name and password.

Password: The password for the account above.

Disk Space Warning Threshold (%): This parameter is used by the NonStop TACL macro BB022_CHECK_SPACE to check the total free space available in all Windows Data Stores. When the space occupied on disk is higher than this threshold, the EMS message 3217 is issued by the daily job OBB017.

Check Volume Timestamp: When enabled, the VTC checks that the Windows index and data files match the timestamp of the last load for output registered in the domain catalog.

These checks are normally enabled, increasing the control of restore operations.

⚠ If a volume must be loaded despite a timestamp discrepancy, it is recommended to disable the timestamp check for that specific volume rather than for the Data Store. If the Data Store check is enabled, the volume timestamp check will be automatically set again when the volume is re-written by a new backup.

Storage Optimization: This selects a de-duplication engine. If **Generic** is selected, the storage optimization is processed regularly, without de-duplication. The options depend on the license key.

Archive Bit Support: This is a flag that indicates if the WINDISK file system (optimization) supports the Archive Bit. The default value is active (Archive Bit Supported), even for customers migrating from a version previous to H4.02.

⚠️ If there was a Delete Archive File for StoreOnce, it will be ineffective until StoreOnce has a fixed version or until the user updates the configuration.

Windows Pool

This section permits adding or modifying a path for storing Windows files in three different pools:

Storage pool is the normal pool.

Spare pool is an emergency pool for writing new backups when the Storage pool is not available.

Copy pool is assumed to contain a copy of the files in the Storage pool and it's used only for a restore when the volume is not found in the Storage pool. Files are either copied via the Copy Sync Pool option (provided with the customer installation) or copied independently of the Back-Box.

⚠️ The Spare and Copy pool tabs can be accessed only if the licensed option **Windows advanced pool management** is enabled.

In a pool, the VTC will choose a path when a tape is created and may move it to a better location when re-writing the volume for a new backup.

Path: The path name where virtual volumes will be stored. Each path must be a fully qualified Network Share entered as a UNC path (e.g. \\SVR1\BBOX\STORE1). In exceptional cases, the path name can be also defined as a local directory (e.g. C:\BBOX\STORE1) For more information, refer to the Windows Files Data Store section.

Rank: The preference rank of the path in the pool. Path(s) with Rank 1 will be chosen first and filled before writing on other paths. Paths of the same Rank will be distributed according the workload and to the available free space.

Reserved For: Allows entering a Volume class for which the path will be dedicated.

Storage Routes

Storage Route	Hide		
Rank*	1 ⌄		
VT Controller ID*	ASTERIX ⌄		
	Add Storage Route		

		Rank*	**VT Controller ID***
Edit	Delete	1	TOUTATIS

This section lists all VTCs with access to the storage.

Rank: Indicates the route priority. The highest priority is 1.

VT Controller ID: Identifies the VTC connected to the selected Data Store.

Data Store Advanced Properties – Windows Files

Data Store ID	Store Type	Status	Domain Access
QC-DATASTORE	TSM	Active	PRIMARY
WIN403-LOCALDISK	**WINDISK**	**Active**	**PRIMARY**

Advanced

Restore On Same VTC ☐

Disk Block Size (KBytes) [128 ▾]
Copy Pool Sync [No ▾]
Force Local Path ☐

[Update]

Enterprise Backup Software Scripting
Script Type [No scripts ▾]

[Update Script Information]

Script Parameters [Add]

Restore on Same VTC: When checked, and when the TAPE DEFINE set for restore (USE IN) does not specify a tape device, the volume will be read from a device on the same VTC on which this volume has been initially written. When VTC local storage is used for a Data store (DAS or SAN), it is generally better, for performance reasons, to mount the tape on a drive from the same VTC (more chance the data still on that VTC local storage).

For example, in a Windows file Data Store where each VTC provides local disks for storage, checking the **Force Local Path** means that, at restore time, the VTC that has written the file on a local disk will be preferred to the one that has to access the Data Store through a shared drive.

Disk Block Size (KBytes): This parameter defines how large the Disk IO should be. When writing a Windows disk file, the VTC prepares large buffers to minimize the number of IOs sent to the file system. Increasing the default value might improve the throughput, especially when there are several tape volumes being written concurrently on the same disk.

Copy Pool Sync: Activates the synchronization between the Storage Pool and the Copy pool via the CopySync program. This program will be submitted via the regular backup script after a backup or on demand via the UI. It can be used with or without the Script Controller. Enabling this option will automatically disable the implicit backup script in the scripting section.

If any script type is chosen, a backup script running the CopySync program will replace it.

Copy Pool Sync Bandwidth utilization can be controlled via the parameter BBOX_COPY_IOPACING (default value "0"). The value assigned to the parameter is in milliseconds and indicates to the Copy Pool Sync program the amount of time to wait between two IO data blocks written to the copied files.

Force Local Path: Checking this box changes the regular algorithm used to choose a path when a virtual volume file is re-created for a volume mount request. Only local disks will be considered as candidate for destination path. A load request is rejected if there is not enough space on the local path – even if there is enough space on a remote path. **Force Local Path** is always on when the copy pool sync option is selected.

Enterprise Backup Software Scripting: Optionally specify Windows command files to be executed following specific tape events. For more info refer to [Scripting/Background Migration on Tape](#).

- For Manual Restore, the backup method is hardcoded and it is triggered by the Enterprise Backup Software.
- For Generic script type, the following fields are available:

Backup Method: available options are BackPak Backup Script (the script provided by BackPak) or Other methods (Triggered by Enterprise Backup Software).

Backup Script: command file to be executed after a volume unload. Not available when Copy Pool Sync is active.

Restore Script: command file to be executed at volume load, when a virtual media cannot be found on the Data Store.

Delete Script: command file to be executed after a volume has been deleted.

Post Restore Script: command file to be executed after a volume requiring the RESTORE script and mounted for input (USE IN) has been unloaded.

Script Parameters: They are optional and user-defined. Named parameters that will be passed on to the scripts. Up to ten parameters can be entered in the Domain configuration. These parameters will be passed as Windows environment variables to the shell executing the script, in addition to the parameters generated by the VTC to identify the files to be processed in the script.

Name: The name of the parameter. Do not specify the % sign after or before the name.

Value: The value of the parameter.

Refer to section [Scripting/Background Migration on Tapes](#) for more information.

VOLUME GROUP

The **Volume Group** page is used to define attributes common to a group of volumes.

These attributes are used and applied at volume creation and each time a volume is re-written with a new backup.

The **Volume Group** main page shows the list of existing Volume Groups. If in **Edit mode**, the following options are available: **Create Volume Group** and **Delete**.

Click on the name of the Volume Group to display additional parameters. The default values can be modified if in Edit Mode.

The page layout and the page elements vary according to the Data Store. The example above is for a group associated to a DSM/TC pool and a Primary Data Store.

The Advanced properties are common to all Volume Groups and documented at the end of this section.

For Windows files data stores, the page layout varies depending on the catalog type.

> Windows files – no tape catalog (or CA catalogs)
> Windows files – DSM/TC catalog
> Windows files – QTOS catalog
> Windows files – TMF catalog

For IBM Spectrum Protect™ (TSM) data stores, the same catalogs are possible – although only the DSM/TC layout is presented below.

Volume Group Windows Files – No Tape Catalog (or CA Catalogs)

Volume Group Information

Volume Group ID*	No-Catalog
Description	
Data Store ID	WIN403-LOCALDISK
Tape Catalog	None
Auto Scratch at Load Time	NO - data are never discarded
Delete Expired Volumes	No
Media Type	LTO3
Warning Threshold (Min % Of Scratch Volumes)	0 %
Migration to BackBox	None — Switch to the BackBox storage is completed. Virtualization is still available, but Auto-import is disabled.

Delete Backedup Files ? ☐

Days Past Last Update	0
Days Past Last Access	0
Min File Size For Deletion(MBytes)	0

Class Information

Compression Algorithm	None
Volume Class	
Max Volume Size(MB)*	25000
Encryption Algorithm	None
Key Manager ID	

[Update Volume Group] [Exit Update Mode]

Volume Group Windows Files – DSM/TC Catalog

Volume Group Information

Volume Group ID*	H403-CAT-WINDISK
Description	
Data Store ID	WIN403-LOCALDISK
Tape Catalog	DSM/TC
Auto Scratch at Load Time	YES - data discarded only for expired volumes
Delete Expired Volumes	Yes
Media Type	LTO3
Warning Threshold (Min % Of Scratch Volumes)	0 %
Migration to BackBox	None — Switch to the BackBox storage is completed. Virtualization is still available, but Auto-import is disabled.

Delete Backedup Files ? ☑

Days Past Last Update	0
Days Past Last Access	0
Min File Size For Deletion(MBytes)	0

Catalog Information - DSM/TC

Volcat*	\ETINIUM.VOLCAT
Pool*	H403_POOL_WINDISK

Class Information

Compression Algorithm	None
Volume Class	CLASS25
Max Volume Size(MB)*	25000
Encryption Algorithm	None
Key Manager ID	

[Update Volume Group] [Exit Update Mode]

Volume Group Windows Files – QTOS Catalog

Volume Group Information

Volume Group ID*	H403-CAT-WINDISK
Description	
Data Store ID	WIN403-LOCALDISK
Tape Catalog	QTOS
Auto Scratch at Load Time	YES - data discarded only for expired volumes
Delete Expired Volumes	Yes
Media Type	LTO3
Warning Threshold (Min % Of Scratch Volumes)	0 %
Migration to BackBox	None Switch to the BackBox storage is completed. Virtualization is still available, but Auto-import is disabled.

Delete Backedup Files ? ☑

Days Past Last Update	0
Days Past Last Access	0
Min File Size For Deletion(MBytes)	0

Catalog Information - QTOS

Catalog File	
Vault	

Class Information

Compression Algorithm	None
Volume Class	CLASS25
Max Volume Size(MB)*	25000
Encryption Algorithm	None
Key Manager ID	

[Update Volume Group] [Exit Update Mode]

Volume Group Windows Files – TMF Catalog

Volume Group Information

Volume Group ID*	H403-CAT-WINDISK
Description	
Data Store ID	WIN403-LOCALDISK
Tape Catalog	TMF
Auto Scratch at Load Time	YES - data discarded only for expired volumes
Delete Expired Volumes	Yes
Media Type	LTO3
Warning Threshold (Min % Of Scratch Volumes)	0 %
Migration to BackBox	None Switch to the BackBox storage is completed. Virtualization is still available, but Auto-import is disabled.

Delete Backedup Files ? ☑

Days Past Last Update	0
Days Past Last Access	0
Min File Size For Deletion(MBytes)	0

Catalog Information - TMF

Guardian Node*	

Audit Dump Class Information

Compression Algorithm	None
TMF Audit Dump Class	
Max Volume Size(MB)*:	25000
Encryption Algorithm	None
Key Manager ID	

Online Dump Class Information

Compression Algorithm	None
TMF Online Dump Class	
Max Volume Size(MB)*:	25000
Encryption Algorithm	None
Key Manager ID	

Update Volume Group   Exit Update Mode

Volume Group IBM Spectrum Protect™ (TSM) – DSM/TC Catalog

Volume Group Information
Catalog Information (DSM/TC Version)
Catalog Information (TMF version)
Catalog Information (QTOS Version)
Delete Backed Up Files
Volume Class Information (non TMF)
Audit Dump Class Information (TMF Audit Dumps)
Online Dump Class Information (TMF Online Dumps)
Volume Class Information for IBM Spectrum Protect™ TSM (non TMF)

Volume Group Information

Volume Group ID: Identifies a Volume Group. It must be unique and cannot be modified after it is added. If the Data Store type is RESTRICTED or SECONDARY, this Volume Group ID is usually identical to the corresponding Volume Group ID in the primary domain.

Description: Optional user description.

Data Store ID: Specifies in which Data Store the virtual volumes will be created. This value applies to new virtual volumes created in this group. It cannot be modified to change the location of volumes previously created.

Primary Volume Group ID: Specifies the corresponding Volume Group ID in the primary site, when it is different. This parameter is presented only when SECONDARY or RESTRICTED Data Store are selected.

Tape Catalog: Specifies the catalog type (None, DSM/TC, TMF, QTOS or CA).

Auto Scratch at Load Time: Indicates if the content of an expired virtual volume can be deleted at load time. The expiry test depends on the tape catalog type and its integration in BackPak.

⚠️ For QTOS and CA catalogs, there is no expiry test when auto-scratch is enable. Any tape volume requested for output is assumed to be expired. Refer to the Auto-Scratch Mechanism section.

Delete Expired Volumes: Indicates if a volume that has become SCRATCH in DSM/TC, TMF or QTOS must be deleted in storage. This controls the functionality of the macro BB017_FREE_EXPIRED (in OBEY OBB017).

Media Type: Specifies the media type that will be registered in the TAPEVOLUME entry of the DSM/TC when the volumes are created. This must match the device type returned by the command MEDIACOM INFO TAPEDRIVE $virtual-tape-drive. To solve a mount request, BackPak will search for a media compatible tape device. The default media type provided by the VTC tape emulation is LTO3.

For old Guardian tape systems not supporting LTO3, it is possible to change this default for 3480 in the internal VTC configuration; the Volume Groups must then be configured with CART3480 media type.

LTO4 media type is available to support the VLE tape Encryption. Non-Encrypted LTO4 media types can be mounted on LTO6 tape drive emulation.

LTO2 media type is also available to support old tape catalog versions (CA tape catalog). LTO2 media must be operated on LTO3 tape drives.

Warning Threshold (Min % of SCRATCH Volumes): Specifies a threshold that is tested in the daily OBB017 job. When the number of SCRATCH Volumes is less than the specified percentage, the message #3313 is issued to the EMS. For example, the message "Only nn% of SCRATCH Volumes are available in Volume Group <name>" would be issued when the number of SCRATCH tapes fall below the configured percentage. This setting applies only when the Tape Catalog is set to DSM/TC or TMF.

Migration to BackBox: Indicates the migration status from a legacy virtual tape solution. This parameter is available to Volume Groups attached to a PRIMARY Data store only.

Possible values:

- **None**: Migration is completed. Volume virtualization is still available, but without the migration specific Auto-import automation.

- **In Progress**: Migration of historical backups from a legacy storage system to BackBox has started, but is not completed. Tape applications may access some media not yet migrated using the legacy system.
- **Being Prepared**: Migration is in progress but all NonStop backups and restores are still executed using the legacy storage system.

Migration to BackBox enables or disables migration features for the following functionalities: **Volume Virtualization**, **Import of Volumes from Tape Catalog**, and **Auto-import of SCRATCH Volumes**.

For further information see [Concurrent Operation of Legacy System and BackBox](#).

Catalog Information (DSM/TC Version)

The following fields are available when Tape Catalog is set to DSM/TC.

This information is not used when the Data Store is RESTRICTED.

Volcat: Indicates the DSM/TC volume catalog where the tape volumes are cataloged. This must be prefixed with the Guardian Node Name (ex: \NODE.TAPECAT).

Pool: Indicates the DSM/TC pool where the tape volumes are cataloged. This pool must be defined in DSM/TC using MEDIACOM before creating new virtual volumes. Pools should be created by the MEDIACOM command ADD POOL with all default values. There must be a distinct pool per BackPak Volume Group and vice-versa.

Filecat: Indicates the DSM/TC file catalog where the tape files and disk files are written by the BackPak catalog replication (Catalog Sync option). This parameter is applicable only for SECONDARY Data Stores. The filecat must be prefixed with the Guardian Node Name (ex: \NODE.TAPECAT).

For more information see the related manual *Catalog Sync Option*.

Catalog Information (QTOS Version)

The following fields are available when Tape Catalog is set to QTOS.

This information is not used when the Data Store is RESTRICTED.

Catalog File: Fully qualified Name of the NonStop file where QTOS registers the volumes that it manages. The QTOS unqualified file name is TAPES.

Vault: Indicates the QTOS vault where the tape volumes are cataloged. There must be a distinct vault per BackPak Volume Group and vice-versa.

Catalog Information (TMF version)

The following fields are available when Tape Catalog is set to TMF.

This information is not used when the Data Store is RESTRICTED.

Guardian Node: Indicates the Guardian Node where TMF is running. (ex: \NODE1).

Delete Backed Up Files

Delete Backed Up Files must be used with caution, especially when set on IBM Spectrum Protect™ (TSM) with backup objects. For more information, see *BackBox VTC Scripting Option Manual*.

- Enables and controls the deletion of virtual volume Windows files that have been backed up by an Enterprise Backup software.

A file is recognized as backed up if its archive bit is reset.

The following criteria control the deletion of virtual media files. All conditions must be true in the same time for the deletion to occur:

> **Delete Backed Up Files**: Enables the deletion of backed up files.
> **Days Past Last Update**: Number of 24h periods the files are kept after the last file write.
> **Days Past Last Access**: Number of 24h periods the files are kept after the last file access.
> **Min File Size For Deletion (MB)**: Files under 1MB will not be deleted, even if other criteria may apply.

Volume Class Information (non TMF)

This information is available when Tape Catalog is not set to TMF and the Data Store type is Windows file.

> **Compression Algorithm**: For Windows files Data Stores only, enables the software compression. Values:
> > **Non**e – No compression.
> > **Light** - Low compression, less CPU usage.
> > **Strong** –High compression, high CPU usage.
> **Volume Class**: Class to associate with all volumes of this Volume Group.
> **Max Volume Size (MB)**: Indicates the maximum capacity (compressed data in megabytes) of the virtual volumes.

Audit Dump Class Information (TMF Audit Dumps)

These characteristics are applied when Tape Catalog is set to TMF, the Data Store type is Windows file, and the volume is loaded to write an AUDIT dump, according to the EMS mount message.

> **Compression Algorithm**: Enables the software compression. For Windows files Data Stores only. Possible values:
> > **None** – No compression.
> > **Light** - Low compression, less CPU usage.
> > **Strong** –High compression, high CPU usage.

When the file server is a Data Domain appliance, refer to the Data Domain section.

TMF Audit Dump Class: This class will be assigned to volumes of this group.

Max Volume Size (MB): Indicates the maximum capacity (compressed data in megabytes) of the virtual volumes.

Online Dump Class Information (TMF Online Dumps)

These characteristics are applied when Tape Catalog is set to TMF, the Data Store type is Windows file, and the volume is loaded to write an ONLINE dump, according to the EMS mount message.

Compression Algorithm: Enables the software compression. For Windows files Data Stores only. Possible values:

None – No compression.

Light - Low compression, less CPU usage.

Strong – High compression, high CPU usage.

When the file server is a Data Domain appliance, refer to the Data Domain considerations in the Configuration section.

TMF Online Dump Class: This class will be assigned to all volumes in this group.

Max Volume Size (MB): Indicates the maximum capacity (compressed data in megabytes) of the virtual volumes.

Volume Class Information for IBM Spectrum Protect™ TSM (non TMF)

The following fields available when Tape Catalog is not set to TMF and the Data Store type is IBM Spectrum Protect™ (TSM).

Volume Class: BackPak class to associate to all volumes of this Volume Group.

Max Volume Size (MB): Indicates the maximum capacity (compressed data in megabytes) of the virtual volumes.

IBM Spectrum Protect™ TSM Max Object Size (MB): BackBox creates multiple IBM Spectrum Protect™ (TSM) objects per tape. This parameter controls the size of these objects.

IBM Spectrum Protect™ (TSM) Management Class: Name of the IBM Spectrum Protect™ (TSM) Management Class to assign to the objects. This is the way to assign different storage services to different Volume Groups. Default assigns the default management class in IBM Spectrum Protect™ (TSM) for the IBM Spectrum Protect™ (TSM) node specified in the data store configuration.

Volume Group Advanced Properties

Volume Group	Data Store ID	Domain Access	Description		
H403-CAT-WINDISK	WIN403-LOCALDISK	PRIMARY		Advanced	Delete

Advanced

PreLoad	FALSE ▾
Auto Unload Timeout	60

Authorized Access

Read	N - Any userid, Any node ▾
Write	N - Any userid, Any node ▾
Control	N - Any userid, Any node ▾

[Update]

PreLoad: Enabling PreLoad can be useful for the NonStop restore/recover of multi-volume tape files, when a restore script must be executed before the volume can be read by the NonStop. When PreLoad is enabled, the load of the next volume is anticipated (and the restore script initiated) while the previous volume is being read by the NonStop tape application. For more info refer to the PreLoad section. The PreLoad processing requires two virtual tape drives per NonStop restore process.

Auto Unload Timeout: Minimum time (in seconds) that a volume will be kept loaded but unused. A tape loaded by a process that is no longer running should be unloaded when resources are required for a new mount request.

Authorized Access : This section defines the default authorizations that are assigned to the volumes each time they are loaded for output. Each element of the section defines a group of user IDs, relative to the owner of the volume:

N Any node, any user ID

C Any node, same group number

U Any node, same user ID

A Same node, any user ID

G Same node, same group number

O Same node, same user ID

? Use authorizations that were set at backup time

. Disabled access

? is a special value that cannot be entered, but is displayed by the BackPak GUI for volumes that were created in a RESTRICTED Data Store.

For such volumes, the domain does not hold the RW authorizations; the access control is done by the VTC against the authorization specifications that were set at backup time and copied as metadata in the Data Store.

. is another special value that cannot be entered or removed. This is the value displayed for WRITE access when a volume is in a RESTRICTED or SECONDARY Data Store. Such volumes can never be written for a new backup.

Read: User ID allowed read access.

Write: User ID allowed to read/write/delete data.

Control: User ID allowed to change the owner or the authorization of the BackPak catalog.

VOLUME

The virtual tape volumes are accessed through the **Volume** tab.

Volume List: Displays a virtual volumes list. May be used to delete several volumes in a single operation and can also be used to display the detail of a particular volume.

Volume Operations: Displays the Volume Detail page and the operations available to be performed on the specified volume. The available operations are: Load /Materialize /Edit /Delete.

Create Volume: Creates and labels new virtual volumes and adds them to the domain catalog.

Virtualize Volume: Copies the image of an external tape to a BackBox virtual volume, and adds it to the domain catalog.

Import From Tape Catalog: Registers in the domain catalog volumes that are already known in a NonStop tape catalog, such as DSM/TC. This function does not move any volume data.

⚠️ To register the volumes in the domain catalog and to migrate the volume data to BackBox storage, use the Virtualize Volume link described above.

Summary : Displays summarized information for all volume groups.

Volume List

Use the **Volume List** page to list the domain virtual volumes.

Output is limited to a "page size", defined as a maximum number of returned volumes. **Next** and **Previous** buttons allow scrolling the complete list of volumes. The list can be filtered according to selection criteria.

| Volume List | Volume Operations | Create Volume | Virtualize Volume | Import From Tape Catalog | Summary |

Filter

Volume Label		Data Store	ANY ⌄
Label Type	ANY LABELED ⌄	Volume Group	ANY ⌄
Current Operation	ANY ⌄	Page Size*	50

[Display] [Reset]

Volume List

[Delete Checked Volume(s)]

< Previous **Next >**

BackBox Volumes

☐ All	Volume Label	Type	Data Store	Volume Group	Catalog Status	Current Operation	Size(MB)	Compression Rate
☐	AAA162	BACKUP	KRAKEN_STORE01	BACKUP_DISK1_5MB	ASSIGNED		6.51	
☐	AAA163	BACKUP	KRAKEN_STORE01	BACKUP_DISK1_5MB	ASSIGNED		6.55	
☐	AAA164	BACKUP	KRAKEN_STORE01	BACKUP_DISK1_5MB	ASSIGNED		5.39	
☐	AAA165	BACKUP	KRAKEN_STORE01	BACKUP_DISK1_5MB	ASSIGNED		6.55	
☐	AAA166	BACKUP	KRAKEN_STORE01	BACKUP_DISK1_5MB	ASSIGNED		6.55	
☐	AAA167	BACKUP	KRAKEN_STORE01	BACKUP_DISK1_5MB	ASSIGNED		6.55	
☐	AAA168	BACKUP	KRAKEN_STORE01	BACKUP_DISK1_5MB	ASSIGNED		6.55	

Filters applied to select specific volumes. To activate the filters and to display the Volume List click Display. The volume list filter section is used to specify the volume selection criteria.

Volume List: The volume list with returned results after applied filters to volumes.

Clicking on the **Display** button without changing any criteria will display all volumes.

Volume Label: Specify the volume label. Blank indicates that no filtering is applied to the volume name. To get more than one result use wildcard characters (accepted characters "*" and "?"). For example, JN* will list all the volumes whose labels start with "JN".

Label Type: Filters volumes based on the label type.

Current Operation: Current operation on the volume.

Data Store: Filters volumes based on the data store they belong to.

Volume Group: Filters volumes based on the volume group.

Page Size: Maximum number of results to be displayed on the page. To browse through pages use **Previous** and **Next** buttons.

The Volume List section displays the virtual volumes that match the specified filter(s). Under the **Volume List** section:

Delete Checked Volume(s): Button thsat deletes all the checked volumes.

All Checkboxes: Check or uncheck all volumes displayed.

Volume Checkbox: Check or uncheck the volume.

Volume Label: Volume label or BackBox internal volume ID for NL volumes. The volume labels are linked to the volume detail page.

Type: Volume label type.

Data Store: Data Store to which the volume belongs.

Volume Group: Volume Group to which the volume belongs.

Catalog Status: If the volume group is associated with a catalog, shows the catalog status known from the last operation or the last execution of the daily batch OBB017.

To check the status of a specific volume, open the volume detail page.

To refresh the status of all volumes, the TACL job OBB017 must be re-executed.

Current Operation: Indicates the current operation (load, export).

Size: Number of megabytes exchanged over the SCSI or fiber link. Empty is displayed when the volume contains only the tape headers and trailers.

Compression Rate: If compression was enabled, Compression Rate displays the ratio (uncompressed data size) divided by the compressed data size.

Use **Previous** (<)**Next** (>) links at the bottom of the data grid to navigate through the list.

Volume Operations

The **Volume Operations** tabbed page allows the user to identify a virtual volume and directly access the volume detail page.

Label Prefix: Indicates whether the volume is labeled or not.

Volume Label: The label of the volume.

Get Details: Link to the **Volume Detail** page.

Volume Details

The **Volume Details** page displays the info available in the BackPak catalog for a specific virtual volume. The operations available for any volume are **Load**, **Materialize**, **Edit**, **Delete**, **Run Backup Script**.

Status						
Configuration	**Volume List**	**Volume Operations**	**Create Volume**	**Virtualize Volume**	**Import From Tape Catalog**	**Summary**
Storage Admin						
Volume						

Load	Materialize	Edit	Delete

Volume Details Refresh

Volume Label	HARRY
Label Type	BACKUP
Data Store	WIN403-LOCALDISK (WINDISK)
Domain Access to Volume	Primary
Volume Group	H403-CAT-WINDISK
Volume Lock	False
Automatic Mount	True
Current Operation	
Last Update	by SUPER.QC on 1/13/2017 1:05:34 PM
Comment	
VTC Host Name	
Status of Catalog Export	Done
Creation Time	1/13/2017 1:05:34 PM
Last Load for Output	
Last NonStop Operation	
	Preload: False
	Last Loaded Device:
	Effective Load Time:
Last Operation	
	Operation Type:
	Last Unload Time:
	Severity:
	Read Bytes Count: 0 bytes
	Write Bytes Count: 0 bytes
Data Size	0 Bytes
Storage Size	0 Bytes (No compression)
Encryption Algorithm	
Key Manager ID	
Encryption Key ID	
Volume Class	CLASS25
Guardian Owner	\ETINIUM 255,50
Authorized Access	NNN
Maximum Volume Size	25,000 MB
Guardian Catalog	Volcat: \ETINIUM.VOLCAT, Pool: H403_POOL_WINDISK
Volume Status In Catalog	SCRATCH
DSM/TC TAPEFILE	
Last Update Index Path	
Check Volume Timestamp	True
Last Storage Unit	
Number Objects	
Check Volume Timestamp	

Load: Links to the **Load** page.

Materialize: Links to the **Volume Materialization** page.

Edit: Links to the **Edit Volume** page.

Delete: Deletes the virtual volume.

Run Backup Script: Not shown if the script option is not licensed, the script is not configured or if you have the Windows Advance Pool Management licensed. Click to run the backup script to backup this volume.

If you have the Windows Advance Pool Management licensed and if the Copy Pool Sync option is activated, it will be replaced by the Copy to Copy pool button. If the volume needs to be sync, the button will be activated and will force the copy of the selected volume. Otherwise, it will be deactivated. If the Copy Pool Sync option is not activated, the button will not be shown.

Refresh: Refreshes the data displayed.

Volume Label: Identifies the virtual volume.

Label Type: Label type, NL, ANSI, IBM, BACKUP or TMF.-

Data Store: Identifies the Data Store and its type. (WINDISK or IBM Spectrum Protect™ TSM).

Domain Access to Volume:

PRIMARY: This is the usual value. The current domain owns and manages the Data Store.

SECONDARY: The volume belongs to a Data Store using the CatSync option.

RESTRICTED: The domain has a read-only view of the Data Store. It will miss several metadata associated with the volumes in the domain containing the PRIMARY Data Store.

Volume Group: Identifies the virtual volumes group.

Volume Lock: Manual lock; it prohibits the update of the volume data by a tape application. Equivalent to the read-only lock found on physical media.

Automatic Mount: Manual setting to enable automatic mount when a request is issued by a tape application.

Current Operation: *ANY*, *Free*, *In Use*, *LOAD* (volume loaded and in use), *VIRTUALIZE* (virtual volume being written from external media), *MATERIALIZE* (volume being cloned to physical media), *LABEL* (labeled volume), *TRF_IN* (transfer in), *TRF_OUT* (transfer out), *POST_TRF* (post-transfer).

Last Update: User name and timestamp of the last update of the volume entry in the BackPak catalog. The user name may be an interactive user. The name is "AUTOMATE" for an update executed by the EMS Extractor when loading the volume on a drive.

Comment: User information.

VTC Host Name: Is a VTC that executed the last volume emulation for write or the last backup script.

Status of Catalog Export: *Pending*, *Done*, or *None*. *Pending* if the catalog information has been changed and must be exported, *Done* if the catalog has been exported, *None* if the Catalog Sync Option has not been configured.

Creation Time: This is the time when the virtual volume was created and initially registered in the catalog.

Last Load for Output section:

> **Timestamp** of the last load for output.

> **Tape application** process that requested the volume.

Last Operation section:

> **Timestamp** of the last load.

> **Tape Application Process** that requested the volume.

> **Operation Type**: LOAD, VIRTUALIZE, MOVE.

> **PreLoad**: Indicates if the volume was pre-loaded.

> **Effective Load Time**: This is different from the last load time, when the VTC replied to the load request with a LOADING, rather than LOADED status, because a long internal operation has prevented a quick reply.

A typical long operation is the execution of a restore script.

> **Last Unload Time** section:

> **Severity**: Severity (success, error, information) of the last operation.

> *Success* indicates that the virtual tape operations were successful. *Error* indicates that a load failed. *Warning* indicates that a volume was loaded, but some event occurred after the tape was loaded. Such events are Data Store I/O errors or manual unloads.

> **Last Loaded Device**: Last device where the volume was loaded.

> **Volume Sequence Number**: Rank in a multi-volume backup set.

> **Read Byte Count**: Bytes read by the NonStop host (last load).

> **Write Byte Count**: Bytes written by the NonStop host (last load).

> **Data Size**: Number of bytes written by the NonStop and stored in the virtual volume.

> **Storage Size**: Number of bytes kept for storing the virtual volume and if compression was used.

> **Encryption Algorithm**: When volume is Encrypted, specify the type of Encryption used (VLE or Non-VLE)

> **Key Manager ID**: Identifies which key manager has been used to generate and store the Encryption key.

> **Encryption Key ID**: Identifies the Encryption key ID.

> **Volume Class**: BackPak current volume class. This volume was assigned to the class specified in the Volume Group when it was loaded for output.

> **Guardian Owner**: Node and user ID running the last tape application that requested the volume for output. This user ID can be identified only if the mount was executed in the context of a load request, i.e. automatically or manually requested from a pending mount listed in the Home Page. For other manual loads, the owner will be the BackBox interface user. Before the first load, the owner is the user who created the volume in the domain catalog.

When the Data Store is RESTRICTED, the owner kept in the domain is used only for authorizing Control Access. The access to data is controlled by the ownership copied along with the volume data in the Data Store at backup time.

Authorized Access: Authorizations set when the volume was created or the last time the volume was loaded for output.

When the Data Store is RESTRICTED, the authorization kept in the domain is used only for authorizing Control Access. The access to the data is controlled by the Authorizations copied along with the volume data in the Data Store at backup time.

Maximum Volume Size: Maximum volume size, effective last time the volume was loaded for output.

Guardian Catalog: It is for a DSM/TC catalog, VOLCAT, for POOL names, and for a TMF, and Guardian node name.

Volume Status in Catalog: Status of the volume in the Guardian tape catalog (DSM/TC, TMF, QTOS, none).

DSM/TC TAPEFILE: The first non-expired TAPEFILE in DSM/TC, associated with this volume.

1st TAPEFILE HEADER: Information extracted from the first HDR1 tape header of the volume. It is displayed only if the catalog type is not DSM/TC or TMF. Displayed items: the file ID, the generation, and the expiration date.

⚠️ The expiration is to be interpreted carefully as there may be an override by a third party catalog on the NonStop system ID.

Last Update Index Path: Windows disk path containing the index file of the volume the last time the volume was written by the NonStop host. In the restore script, this path is used to qualify and identify the backup software for the Windows files to restore.

Last Update Data Path: Windows disk path containing the data file of the volume and the last time the volume was written by the NonStop host. In the restore script, this path is used to fully qualify and identify the backup software for the Windows files to restore.

The data path is almost always equal to the index path, and therefore not displayed when equal to the index path.

Check Volume Timestamp: When the Timestamp checking is enabled in the Data Store configuration, the VTC checks if the volume timestamp given by the Domain Manager (Last Load for Output) matches the time stamp stored in the Windows files.

Volume Load

The **Volume Load** page allows manually loading a media file on a NonStop tape drive outside of the context of a mount request.

⚠️ The manual load is normally initiated through the Home page or the Status for NonStop Node page where the pending mounts are listed. The load will then execute in the context of the associated mount request. In this case, the **Volume Load** page below is skipped because all parameters are provided by the mount request in $ZSVR.

When a volume is loaded using this page, the load is executed without the context of a mount request. Therefore, it might fail because of the configured automation. If the volume was created in an "Auto-scratch" Volume group associated to DSM/TC, an error - such as "file not found" - can occur; the volume will be created only by running a BACKUP with a TAPECATALOG DEFINE.

Volume: The volume label and label type to load.

Node: Guardian node of the tape device where to load the volume.

Device: Guardian tape device to load the volume on. If left to AUTO-ASSIGN, the Domain Manager will choose a device.

Comment: Free text kept in the BackPak catalog for the volume.

Volume Lock: Check to prohibit updates of the volume by a tape application.

Tape Use: IN or OUT, tape use of the mount request.

Load: Submits the load request to the Domain Manager.

Volume Materialization

The **Volume Materialization** page is used to clone a single virtual volume to a physical media loaded on a VT Controller attached drive.

This operation was named "Volume Export" in older BackBox versions.

The physical media capacity must be able to contain the whole virtual volume. Check Data Size on the volume detail page.

Status: Links to a Status page that will show all virtualizations and materializations on all VTCs that have configured physical/external tape drives.

Volume Label: Volume label to export.

The **Windows Tape Device** section describes the target device for this operation.

VT Controller ID: Identifies the VT Controller that is equipped with a tape device to write on and that is a route for the Data Store attached to the Volume Group.

Tape Device: Allows to select physical tape device that is attached to the specified VT Controller. The physical tape device needs to be declared in the VT Controller Advanced configuration page prior to being used in materialization.

Compression: If applicable, the **Compression** checkbox can be checked on to enable the compression feature of the device.

Idle Time Out: Maximum time the VTC will wait for the media to be loaded before ending the Materialization session.

Feed-back: UI will issue the following message: *I3386 Materialization initiated in VTC xxxx on device device.*

The EMS will report the starting, the ending of the Materialization session, and the status of the volume process (e.g. "ended successfully").

```
15:55 \ETINIUM BPAK-TINTIN-I5110 Starting MATERIALIZE session
on tape device SDLT
15:56 \ETINIUM BPAK- TINTIN -I5050 Materializing virtual volume
BBC001 started successfully
15:57 \ETINIUM BPAK- TINTIN -I5046 Materializing virtual volume
BBC001 ended successfully
15:57 \ETINIUM BPAK-TINTIN-I5111 Ending MATERIALIZE session on
tape device SDLT
```

Volume Details Edit

Status	Volume List	Volume Operations	Create Volume	Virtualize Volume	Import From Tape Catalog	Summary

Volume Label: Volume label to update.

Last Update: Date and time of the last update.

Domain Access to Volume: Domain access to this specific volume.

PRIMARY: Volume owned and regularly operated by the domain.

SECONDARY: Volume replicated from a PRIMARY side.

RESTRICTED: Volume owned by another domain.

This attribute can be updated only when the Data Store has been promoted from RESTRICTED to PRIMARY, as the volumes are progressively migrated to the PRIMARY state as they are rewritten.

Volume Lock: Prohibits the update of the volume data by a NonStop tape application. It is the equivalent of the lock found on some physical media.

Check Volume Timestamp: When the Timestamp checking is enabled in the Data Store configuration, the VTC compares the volume timestamp stored in the BackPak catalog to the timestamp stored either in the Windows files (WINDISK) or the IBM Spectrum Protect™ (TSM) objects (TSM API).

Automatic Mount: Enables the automatic mount.

Current Operation: Applicable if the volume is currently known as "in use". Reset the current operation of the volume to none. This is an option to be used when the end of an operation was not registered by the BackPak domain.

The current operation status (such as LOAD or MATERIALIZE) is set when an operation starts and is reset when the VT Controller returns results and statistics to the Domain Manager. If the end

of an operation is not received by the Domain Manager, the VT Controller will retry for up to seven days, then it stops.

The operation status is used as a lock to avoid concurrent operations on a volume. Check the Reset box, to allow a new operation.

Guardian Node Owner, Guardian User ID Owner: Owner of the volume used for access control. Updatable only if the user, logged to the UI, has Control Access to the volume or is SUPER.SUPER.

Comment: The comment box allows the user to add a comment.

Authorized Access: Updatable only if the user logged to the GUI has control access to the volume or is SUPER.SUPER.

> **Read Access**: User category authorized to read access.

> **Write Access**: User category authorized to read/write/delete access.

> **Control Access**: User category authorized to change security settings.

Last Update Index Path (WINDISK only): Gives the last known location of the .IND file. This is a Windows disk path, used as the original path name for a restore operation in the restore script. This field should be modified only if a restore script fails and if the user knows the correct original path name for the restore command.

Last Update DAT File Path (WINDISK only): Gives the last known location of the .DAT file. This is a Windows disk path, used as the original path name for a restore operation in the restore script. This field should be modified only if a restore script fails and the user knows the original path name for the restore command.

The 'Last Update DAT File Path' is almost always equal to the 'Last Update Index Path'. These two values are changed only when the NonStop writes a new backup on the virtual volume, and when the Admin service moves volumes from the Spare Pool to the regular Storage Pool.

Volume Deletion

Volume Deletion feature can be accessed through the **Volume List** page or the **Volume Detail** page.
- Once deleted, the selected volumes will be:
- Deleted in storage
- Deleted in its associated catalog (DSM/TC or TMF)
- Removed from the BackPak domain catalogue of virtual volumes.

Validations:

- A volume of a Volume group associated with an integrated catalog (DSM/TC, TMF) cannot be deleted in storage if it is not marked as SCRATCH or BAD in the catalog. This validation cannot be overridden unless the action is only to remove the volume from the BackPak domain catalog of the virtual volume.

- As an additional safety measure, volumes cannot be deleted when not expired in accordance with their original retention specification, as stored in the HDR1 tape header. This safety validation can be overridden on the **Volume Deletion** confirmation page.
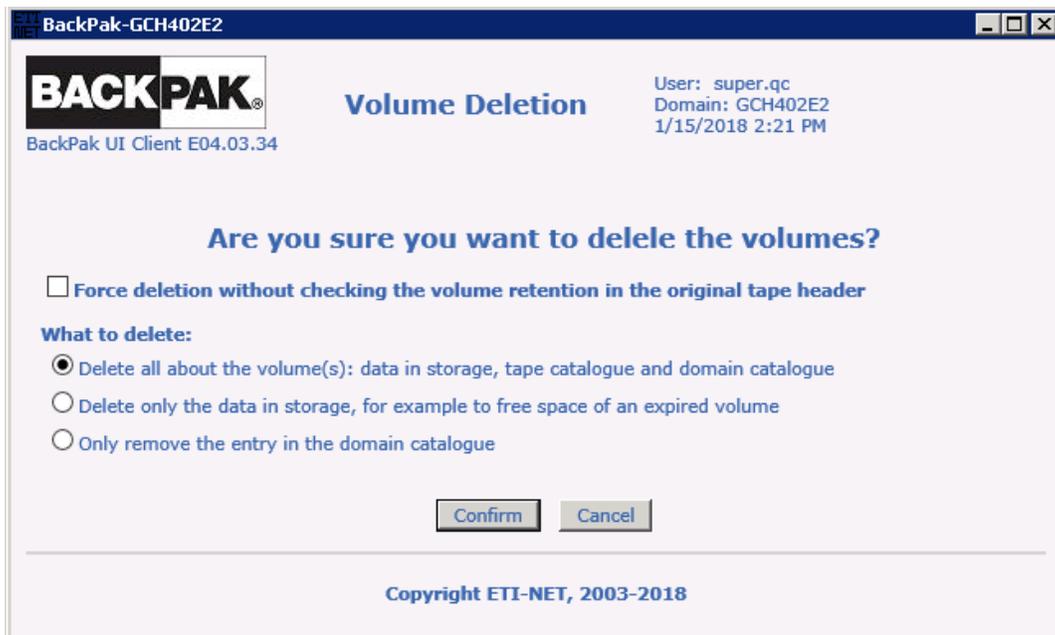
Force deletion without checking the volume retention in the original tape header

This is a safety feature to protect against unexpected manual handling and against wrong / in-progress configuration.
BackPak deletes expired volumes and validates the manual volume deletion after verifying the status of either SCRATCH (in DSM/TC) or TMF.
During migrations or setup modifications, it might happen that the link of a BackPak volume group to the DSM/TC is invalidated, or that the DSM/TC which must be migrated from another system is not yet populated.

⚠️ To prevent data deletion, BackPak verifies the expiry date written in the first HDR1 tape header at backup time. For the online storage, this date is verified in the tape image itself, and for the offline storage, the data is verified in the HDR1 image saved in the BackPak domain at backup time.

<p style="text-align:center">***</p>

There are legitimate deletion cases prevented by this. If an aborted backup is usually made "SCRATCH" by the DSM/TC the day after rather than exactly on the expiry date, the delete action takes place. Another case is if a user wants to delete an useless backup through "MEDIACOM DELETE TAPEFILE".
The free-up of storage for SCRATCH Volumes will be rejected in BB017_FREE_EXPIRED with an error message such as:

> E2617 Deletion of Volume xxx rejected. Volume is not expired according to the original expiry date 2017-07-22. To delete anyway, specify **force** in the UI Volume Delete confirmation window. To keep the volume in catalogs, choose **Delete only data** in UI.
> As indicated in the message, the storage free-up must be forced manually by the BackPak UI Delete volume page with the Force and Delete only data options.

The scope of the deletion can be adjusted while confirming the deletion.

What to delete:

- Delete all about the volume(s), data in storage, tape catalogue and domain catalogue. This is the default option, where the data, the volume entry in the DSM/TC and in the BackPak domain will be deleted.

- Delete only the data in storage, for example, to free space of an expired volume. The volume will still be available for the next backup and the volume entry in the DSM/TC and BackPak domain are retained.

⚠️   This is the option recommended to avoid the repetition of messages E2617 issued by BB017_ FREE_EXPIRED for volumes that have been prematurely scratched.

- Remove only the entry in the domain catalog. The volume which can still be available in another tape system may be a physical tape. There is no check mark against the DSM/TC or TMF volume status; the status can be ASSIGNED. This is an option to use after a virtualization executed with wrong parameters, and it must be re-executed.

Create Volume

The **Create Volume** page is used to create new volumes, label them, add them to the library, and catalog them in an external catalog (i.e. DSM/TC or TMF), if needed.

Volume Label: Specifies the label of the first volume to be created. To create more than a single volume, the end of the label must be consistent with the "Quantity" and "Increment Base" below.

E.g.: 3 digits are required to create 100 volumes in base 10.

Label Type: Indicates the volume label type. Values are: Unlabeled, ANSI, Backup, IBM and TMF.

Comment: User comments describing the purpose or the content of the volume. This comment is preserved with the volume in the catalog.

Volume Group: Selects the Volume Group in which to add the volume. The Volume Group determines in which Data Store the volume will be created, as well as which other attributes, such as the associated DSM/TC pool, are to be considered.

Quantity: Indicates the number of volumes to be created. You can create 999 volumes at a time.

Increment Base: Select the base used to compute the next label to create more than a single volume. By default, only 1 digit will be used (base 10). To create more volumes in a range of labels, use hexadecimal (base 16) or base 36 (0 to Z) digits.

Increment Base

```
10 Digits to build the next labels: 0~9
16 Digits to build the next labels: 0~9A~F
36 Digits to build the next labels: 0~9A~Z
```
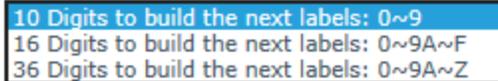
Allow Volume to be Automatically Mounted: Check the box to have the created volume(s) automatically loaded when a mount request is issued in EMS.

The Tape Creation - Progress page appears when the volume creation is in progress.

Tape Creation – Progress
Please Wait - Tape creation still in progress
Currently creating tape 1 of 20

[Cancel]
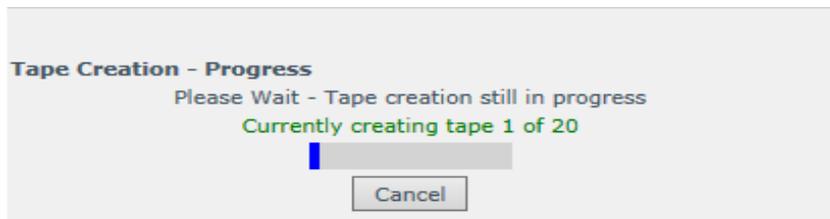
A message is displayed when the process is complete.

Tape Creation - Progress

Tape Creation is now completed

20 volume(s) created from label BBOB00 to BBOB19

Back to Volume Creation
Back to Volume List

Virtualize Volume

The **Virtualize Volume** page is used to clone physical or other legacy media to a BackBox virtual volume. Before or after initiating the operation, a physical media must be loaded on a VT Controller attached tape drive or a volume materialization must be initiated in a third party VTS connected to a VTC. At the end of the virtualization, the media is unloaded and any subsequent media presented by an auto-loader or an operator will be virtualized without manual intervention in BackBox.
The virtualization task stops if no media has been loaded during the entered Idle time out time.
Physical drives and drives used to directly connect another Virtual Tape System are presented and managed in the same way.

- For a Non-Labeled volume, the BackPak name for this volume must be entered to allow the virtualization to be submitted for a single volume.

- For Labeled volumes, the label will be read from the physical media and cannot be changed.

The maximum volume size configured in Volume Groups must be able to contain the entire physical media.
The NonStop tape catalogs associated with the Volume Groups (TMF, DSM/TC or QTOS) are not updated. The media that has to be virtualized must be already cataloged if the Volume Group is associated with a NonStop tape catalog.
A Status page shows the running virtualization-materialization tasks and allows task cancellation at any time.

Volume List	Volume Operations	Create Volume	Virtualize Volume	Import From Tape Catalog	Summary

Volume Virtualization _Status_

☐ Searching in DSM/TC, TMF and QTOS catalogs

○ Labeled Volume   ● Non-Labeled Volume
Windows Tape Device
VT Controller ID*   [KRAKEN ▾]
Tape Device*   [DIANATAPE (IBM-ULT3580-TD4) ▾]
Idle Time out   [10] min
New Virtual Volume Label*   [ECIY07]
Volume Group*   [BACKUP_ETI_NOCAT ▾]
     Description:
     Volume Capacity: 25000 MB
     Data Store: KRAKEN_STORE01(WINDISK)
     Catalog Type: No Catalog

Comment   [ ]

     ☐ Allow virtual volume to be automatically mounted.
     ☐ Volume lock

     [Virtualize]

Status: Link to a Status page that will show all virtualizations and materializations on all VTCs that have physical/external tape drives configured.

Searching in DSM/TC, TMF and QTOS Catalogs: Check when the volumes are already known in one of these NonStop tape catalogs: TMF, DSM/TC and QTOS.

When the volume is found in one of the catalogs associated with BackPak Volume Groups, the volume to virtualize is automatically associated with the corresponding Volume Group.
This allows submitting batch virtualization for any volume.
Only catalogs associated with Volume Groups belonging to PRIMARY Data Stores are considered.
The volumes that are not found in any catalog will be rejected, unless a Volume Group for Non-Cataloged Volumes is specified.

VT Controller ID: VTC where physical tape devices are attached for reading the tape volumes.

Tape Device: Select a device among physical tape devices configured in the VT Controller Advanced properties or select "All tape devices".

Idle time Out: Maximum time the VTC will wait for the first media and for a new media to be loaded (by manual load or by the auto-loader) before ending the Virtualization session.

Catalog Search in Node: Select one of the nodes that contains tape catalog(s) named in Volume Groups or select "ALL NODES" to search in all catalogs.
Send volumes of a single node in a virtualization batch and specify the node name in this field to avoid inter-node mix-ups.

Volume Group for Non-Cataloged Volumes: Selects the Volume Group where the volume is created. The Volume Group determines in which Data Store the volume is created, as well as other characteristics of the virtual volume (e.g. capacity, external catalog, etc.)

TMF DUMP Type: This element is required, if the chosen Volume Group catalog type is TMF. The possible values are AUDIT DUMP and ONLINE DUMP.

Comment: User comment. This comment is stored in each created volume entry in the BackPak catalog.

Allow Virtual Volume to be Automatically Mounted: Check to have the created volumes automatically loaded when a mount request is issued in EMS.

Volume Lock: This prohibits any update of the volume content by the NonStop tape applications. This is similar to an infinite retention. This attribute is also stored in the volume entries created in the BackPak catalog.

Labeled/Non-Labeled Volume: Type of media to virtualize. If Non-Labeled, the BackPak name for this volume will be requested.

The UI will show the following messages: `I3385 Virtualization initiated on 1 devices in VTC VTC85.`

EMS will report the virtualization starting and ending session and each volume processing status.

```
15:03 \ETINIUM.BPAK-MTLBBLAB1-I5108 Starting VIRTUALIZE session on
tape device OVERLAND
15:03 \ETINIUM BPAK-MTLBBLAB1-I5051 Virtualizing physical volume
OBCD53 started successfully
15:04 \ETINIUM BPAK-MTLBBLAB1-I5053 Virtualizing physical volume
OBCD53 ended successfully
15:05 \ETINIUM BPAK-MTLBBLAB1-I5051 Virtualizing physical volume
OBCD51 started successfully
15:06 \ETINIUM BPAK-MTLBBLAB1-I5053 Virtualizing physical volume
OBCD51 ended successfully
15:12 \ETINIUM BPAK-MTLBBLAB1-I5044 Cannot open tape device OVERLAND
: No media in drive.
```

```
15:12 \ETINIUM BPAK-MTLBBLAB1-I5109 Ending VIRTUALIZE session on tape
device OVERLAND
```

Virtualization / Materialization Status

This page can be accessed by a link in the **Materialization / Virtualization** page.
It shows all VTCs that have physical tape drives configured (or drives directly connected to a Virtual Tape System). For each listed VTC, the materialization/virtualization running tasks are listed.

VTC name (Show/Hide Details...)

The external devices are listed by VTC names. Click **Show Details** to see the tasks related to the attached physical devices.

> **Check Box**: Select the tasks to be cancelled.
> **Alias Name**: Name given to the device in the VT Controller Advanced Properties.
> **Serial Number**: Device serial number.
> **Domain**: The Domain that has initiated the task.
> **Operation**: VIRTUALIZE or MATERIALIZE.
> **Task State**:
>> IDLE (waiting for a media be loaded)
>> PROCESSING (media loaded being processed)
>> CANCELLING (a cancel task has been initiated).
> **Encrypted**: Encrypted volume
> **Volume Label**: Volume label being materialized/virtualized.
> **Load Time**: Time when the volume was loaded.
> **Elapsed Time**: Time since the volume was loaded.
> **Unit Ready Time**: Elapsed time after the volume is loaded, waiting for the 1st data block.
> **First Data Time**: Elapsed time until 1st data block is written.
> **Write Byte Count**: Size of data written to the BackBox virtual volume.
> **Read Byte Count**: Size of data read from the BackBox virtual volume.

Import From Tape Catalog

This page is used to register certain volumes (those already known in a tape catalog on the NonStop DSM/TC, TMF or QTOS) in the BackPak catalog.
This procedure is normally used at the beginning of a migration from a legacy storage system to Back-Box; in this case only SCRATCH Volumes will be registered.

For a migration, the registration of ASSIGN media must be done by the function Virtualize Volume that transfers data and registers the volume.

Experienced users can use this function to re-register all tape volumes of a Volume Group.

Import from Tape Catalog updates only three items:

- Create volume entries in the BackPak Domain.
- Create empty volumes in the storage for SCRATCH and RELEASE volumes associated with a Volume Group that is not set for Auto-scratch.
- If needed, update the media type in DSM/TC to match the media type configured in the BackPak Volume Group.

Volumes that already exist in the domain are skipped if they belong to the same Volume Group. If they belong to another Volume Group, they will migrate to this new group.

> **Volume Group**: Selects the Volume Group for which virtual volumes will be registered. BackPak will get the volume entries in the tape catalog associated with this Volume Group (for example, a DSM/TC pool in a given DSM/TC VOLCAT).
>
> All SCRATCH Volumes (or all volumes) of a DSM/TC pool, a QTOS vault, or a TMF node catalog in a node, will be registered in the domain.
>
> **Import only the SCRATCH Volumes for a migration to BackBox**: Check to select only the SCRATCH and RELEASED Volumes.

Feedback

The UI replies with the message below and processes the media in the background.

I3447 Process $Z50C initiated to import scratch & released volumes from the catalog DSM/TC volcat: \ETINIUM.TAPECAT, pool: BBOX_WIN1 (Volume group BBOX_WIN1).

EMS messages are issued to report the process start and process completion.

```
11:23 29AUG13 222,01,207 BPAK-I3447 Process $Z50C initiated to
import scratch & released volumes from the catalog DSM/TC
volcat: \ETINIUM.TAPECAT, pool: BBOX_WIN1 (Volume group BBOX_
WIN1).
11:23 29AUG13 222,01,207 BPAK-I3448 Process $Z50C import from
the catalog DSM/TC volcat: \ETINIUM.TAPECAT, pool: BBOX_WIN1 to
```

```
Volume group BBOX_WIN1ended. 11 volumes were created in Back-
Pak, 0 volumes were migrated from other Volume groups.
```

Summary

The summary displays the overall statistics information of virtual volumes per Volume Group. The information is based on data from the VOLUME file only.

Data Store ID	Store Type	Volume Group	Number of Volumes	User Data Size (MB)	Storage Size (MB)	Average Compression Ratio	Number of Scratch Volumes	Potential Size of Scratch Volumes (MB)
WIN1	WINDISK	NOCAT1	5	105	105	1.00	n/a	n/a

To display this page, the volume status in DSM/TC, TMF or QTOS is assumed to be the same as it was the last time the media was loaded.

To refresh the status of all volumes, re-execute OBB017.

The Summary section displays the following information:

Data Store ID: The Data Store name.

Store Type: The Data Store type (IBM Spectrum Protect™ TSM or WINDISK).

Volume Group: Volume Group name.

Number of Volumes: Number of volumes in this Volume Group.

User Data Size: The total size of all volumes data in this Volume Group. The computed size is based on the length of data buffers received from the NonStop host last time each volume has been written. This is the uncompressed size.

Storage Size: The total size of storage allocated to the volumes of the current Volume Group. This is the compressed size for both WINDISK and IBM Spectrum Protect™ (TSM) Data Stores.

Average Compression Ratio: [User Data Size] divided by [Storage Size].

Number of SCRATCH or Scratch Volumes: Applies only to Volume Groups associated with DSM/TC or TMF catalog. This is the number of SCRATCH Volumes in this group. Volumes are considered SCRATCH if they had the SCRATCH status in DSM/TC or TMF last time BB017_FREE_EXPIRED was executed or last time the volume detail was displayed.

Potential Size of SCRATCH or Scratch Volumes: Maximum space available for new backups, based on the number of Scratch Volumes. This number is computed by multiplying the number of Scratch Volumes by the maximum volume size set in the Volume Group. The Potential Size info does not give any indication on the actual storage available to the Data Stores in Windows disks or IBM Spectrum Protect™ (TSM) storage pools.

VTC MANAGEMENT CONSOLE
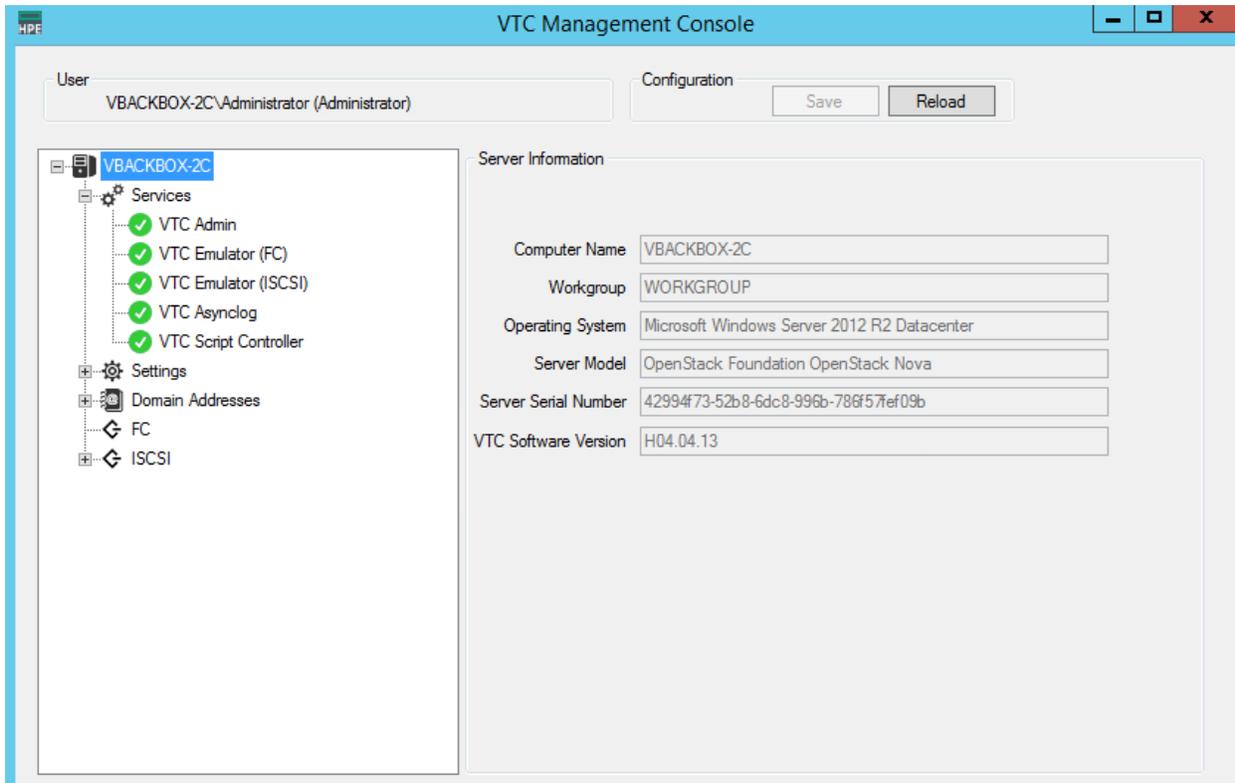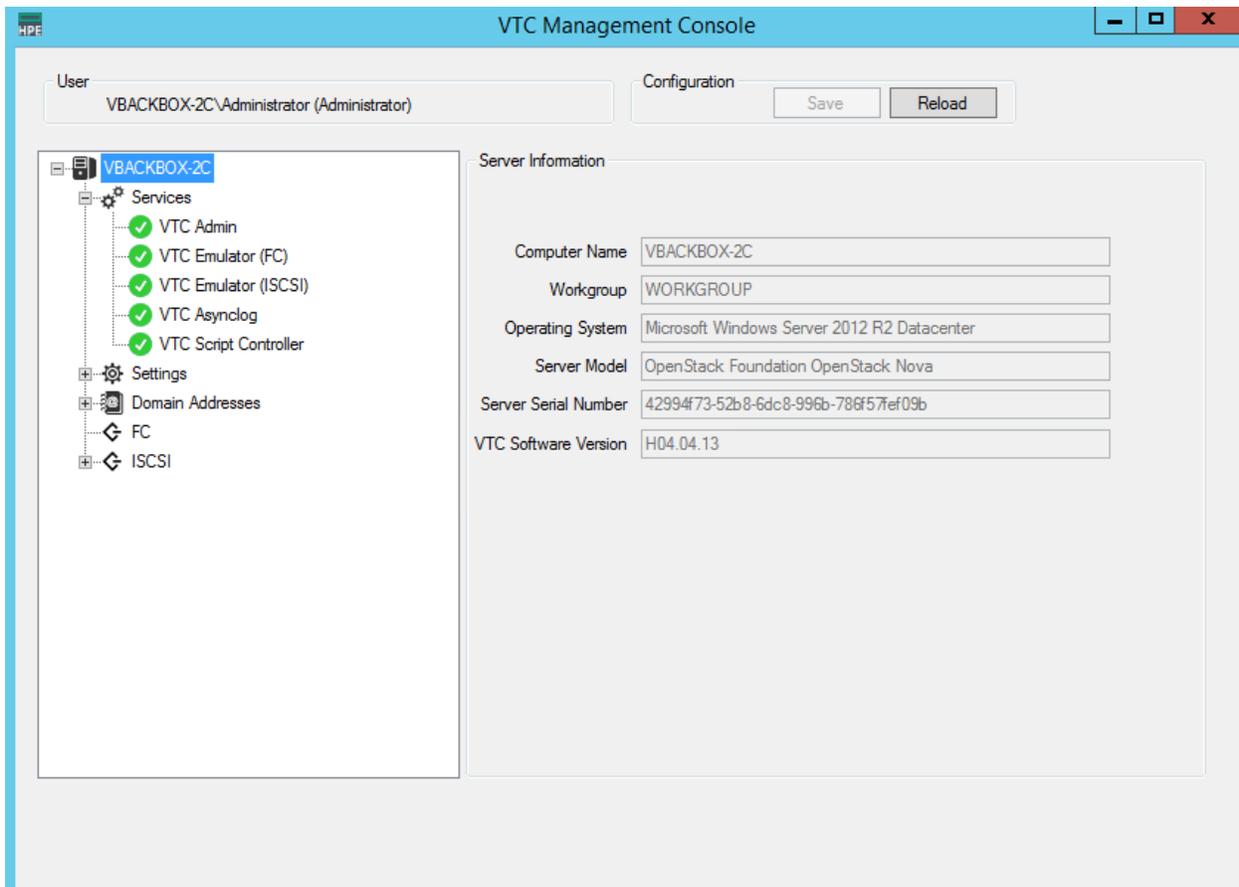
Security and Access Rules

To configure the security and access rules on the VTC server, the **VTC Management Console** has to be started using an interactive user with permissions to log on to the VTC Server.

The VTC Management Console attempts to connect to the local VTC Management Service.

The default connected user and their profile are displayed in the user identification box.
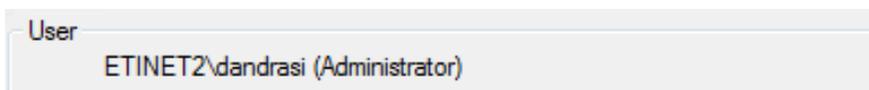
Once connected, the following administrating profiles are available for configuration:

VTC Administrator Profile

> *Administrator Profile* can browse and modify configurations and status, can perform service operations and restart the server.

⚠️ To be granted the VTC Administrator profile, the connected user must be a member of the VTC Server local Administrators group. The local Administrator is always a VTC Administrator.

VTC Operator Profile

Operator Profile can browse configurations and status, can perform service operations and restart the server.

⚠️ To be granted the VTC Operator profile, the connected user must be member of the VTC Server local Backup Operators group.

VTC User Profile

User Profile can browse configurations and status.

⚠️ To be granted the VTC User profile, the connected user must be member of the VTC Server local Users group.

Administrating Remote VTC Server

To connect to a VTC Server through a local VTC Management Console of another VTC Server, all VTC Servers must be reachable on the Network. Both Workgroup and Domain deployment can be used to get them connected.

To connect to a remote VTC Server right-click on the server node and select the **Connect** action. If different credentials need to be provided, "uncheck" the **Current User** box and enter the new credentials. To complete, click on the **Connect** button.
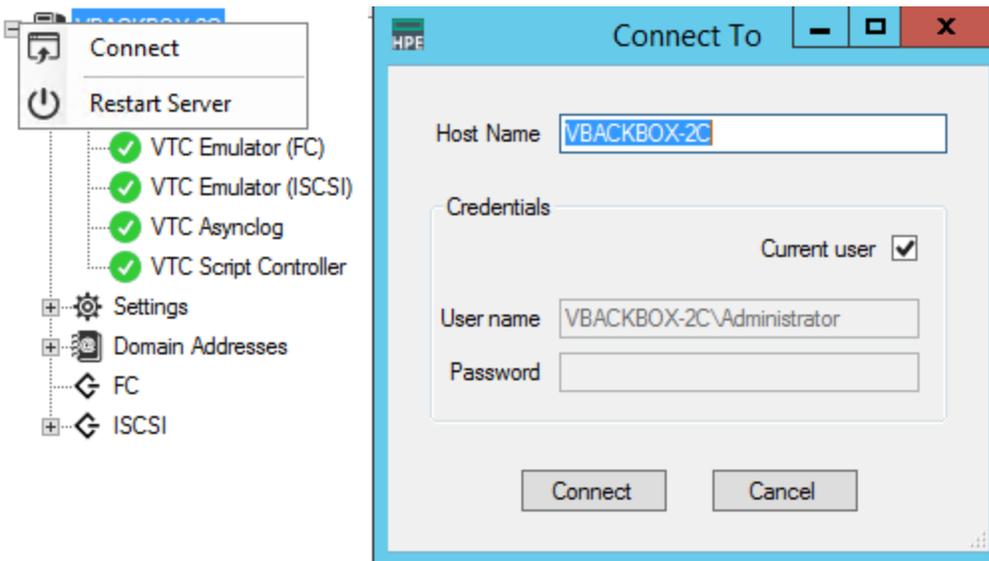
To connect from a workstation/laptop the VTC-Software has to be installed on Windows 7, Windows 8.1, or Windows 10. Only the VTC Management Console will be installed with this specific setup; the other BackBox components will not be affected.

⚠️ The workstation needs to reach the VTC through the network.

For WORKGROUP deployment, all users accounts for remote administration must be created on each server and must have the same user name and password. To avoid workgroup requirements, it is recommended to use only the domain user to create a local user on the workstation/laptop.

⚠️ When started from a workstation/laptop, the VTC Management Console opens with a connect dialog. Provide the remote name of the VTC server to which you want to connect.
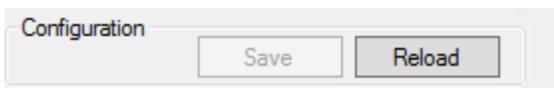
User Interface

The user interface has four sections:

1. User
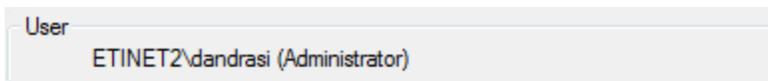
2. Configuration

When connected, the configuration section shows an active **Reload** button. If the configuration has been modified outside of the management console or by another user through another login session, the **Reload** button refreshes the configuration.

Following a configuration or a settings change, the **Save** & **Cancel** buttons become available.

3. Server Tree Nodes Panel (left-side panel)

This panel lists the server elements. Nodes can be expanded; they are grouped into different management categories. Right-click on the nodes or elements to see the available actions. If an action is not possible, it appears grayed out.
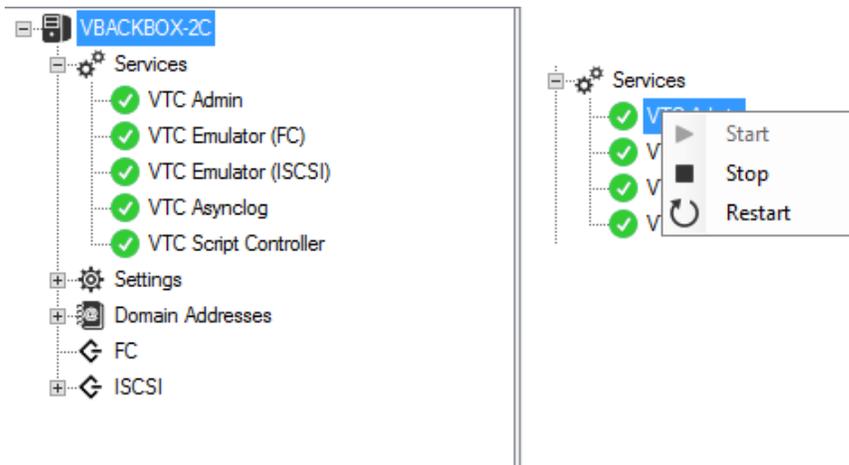
4. Server Information Panel

When a server is selected, the information displayed on the right side is related to that specific server. Not all server nodes have information to display when selected (e.g. Service nodes); in this case, the last accessed information is displayed in the panel.
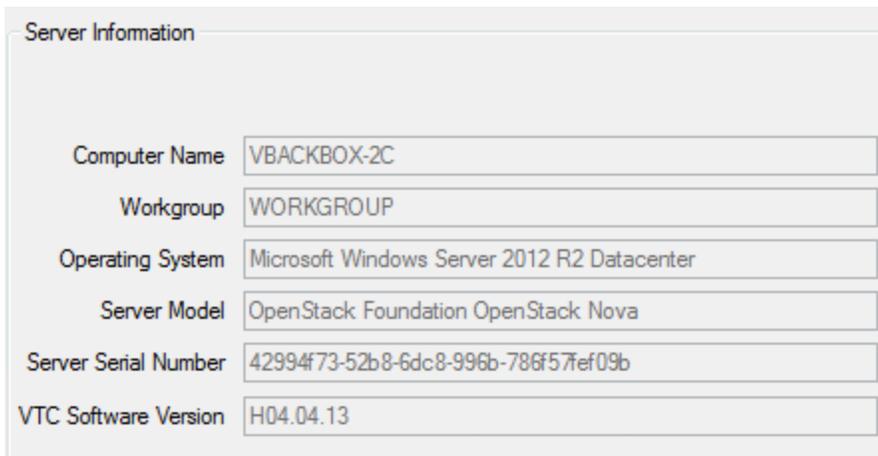

Server Nodes

When connected, the **Server Node** is always initialized with the server computer name. Under the **Server Node** there are the four main categories handled by the VTC Management Console: **Services**, **Settings**, **Domain Addresses**, and **FC/ISCSI** nodes.
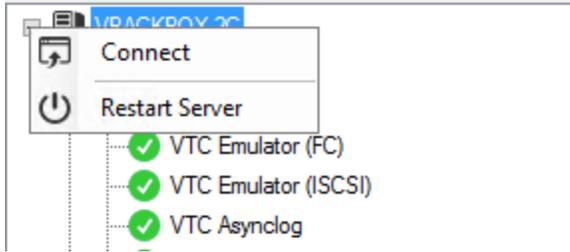
Lists all VTC services available on the server. Each service is represented by a service name: **VTC Admin**, **VTC Emulator (FC)**, **VTC Emulator (ISCSI)**, **VTC Asynclog**, **VTC Script Controller**.

When selecting any of the Service categories, there is no related information to be displayed in the right-hand side panel.
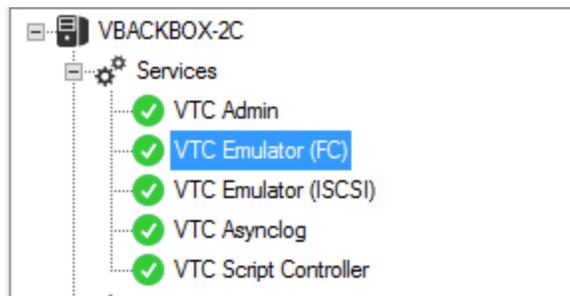
Service states	Description
✅	Started
❌	Stopped
⚡	Stopping / Starting

The available actions are activated when right-click on the service: **Start**, **Stop**, **Restart**.

If one service is selected, the available actions will be performed at service level, not at node level. The grayed-out actions are not available.
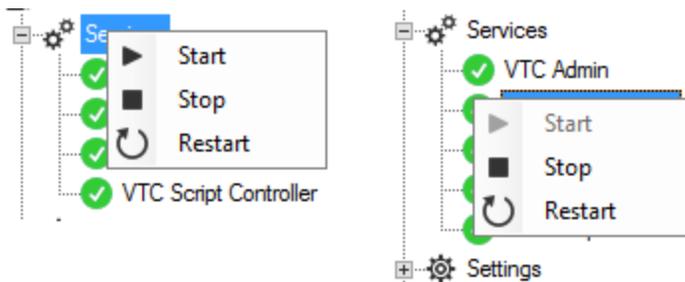
Settings

⚠️　These settings should not be changed without communicating with technical support.

The following settings are available:

Scripting

When selected, properties for script execution are displayed on the screen in the right-hand side panel. There are no actions when the mouse is right-clicked on the Scripting setting node. These properties apply only when scripts are running without the Script Controller.

A grey-scaled panel indicates the read-only properties associated with the specified setting. When selected, any of the listed properties is shortly explained at the bottom of the window.
Any change made to this setting requires restarting all the services listed under **Services**: right-click **Services** > **Restart**.

VTC Admin

⚠️

When VTC Admin is selected, the available properties for the service are displayed on the screen in the right hand side panel. There are no actions available when right-clicking on the VTC Admin setting node.

A grey-scaled window indicates read-only properties associated with the specified setting. When selected, any of the listed properties is shortly explained at the bottom of the window.

Any change made to the setting requires restarting the server services.

VTC Emulator (FC)

When VTC Emulator (FC) is selected, the available properties for the service are displayed on the screen in the right-hand side panel. There are no actions available when right-clicking on the VTC Emulator (FC) setting node.

A gray-scaledd window indicates read-only properties associated with the specified setting. When selected, any of the listed properties is shortly explained at the bottom of the window.

Any changes made to this page requires restarting **Services** for the change to take effect.

VTC Emulator (ISCSI)

⚠️ These settings should not be changed before communicating with technical support.

When VTC Emulator (ISCSI) is selected, the available properties for the service are displayed on the screen in the right-hand side panel. There are no actions available when right-clicking on the VTC Emulator (ISCSI) setting node.

A grey-scaled window indicates read-only properties associated with the specified setting. When selected, any of the listed properties is shortly explained at the bottom of the window.

Any changes made to this page, requires restarting the **Services** for the change to take effect.

Security

When selected, information related to the support of TLS/SSL from the VTC server is displayed in the right-hand side panel.

⚠️ No functions are available if right-clicking on the **Security** setting node.

LARGEBLOCK mode is set to ON on installation for both FC and iSCSI. It is recommended to leave it ON as it has no impact on the system when not using this option. On the contrary, turning it OFF on the VTC and having it ON on the NonStop will result in error when performing any backup operation.
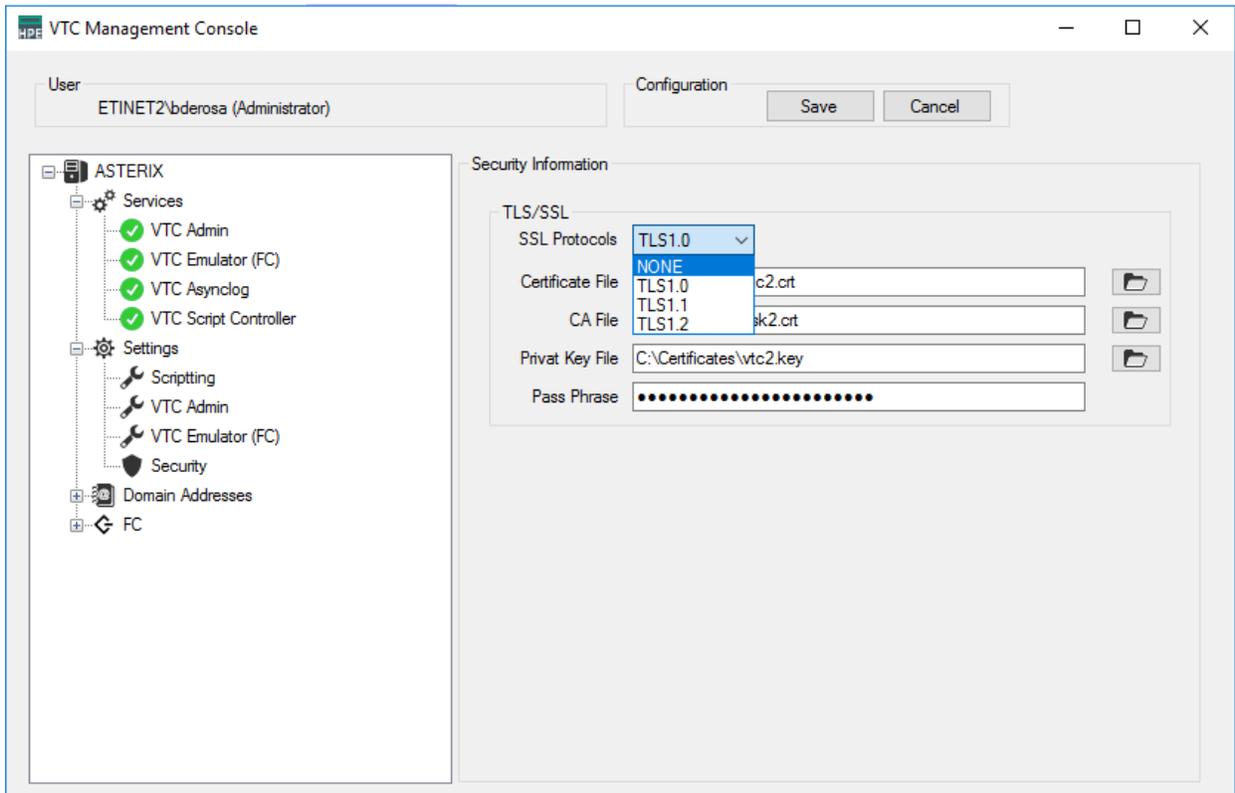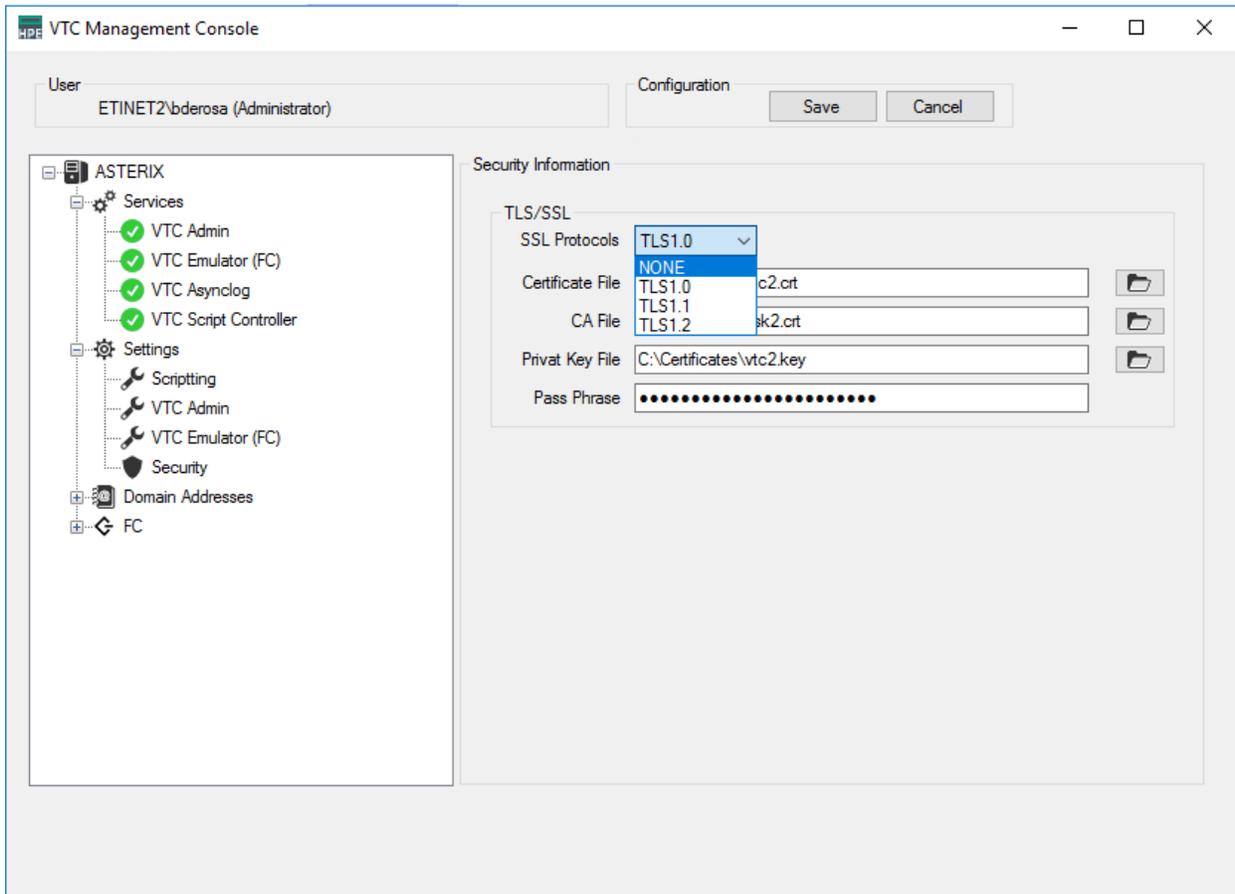
For additional information see the *BackPak SSL Setup* manual.

Domain Addresses

When expanded, the **Domain Addresses** node displays all domains currently configured on the VTC server.
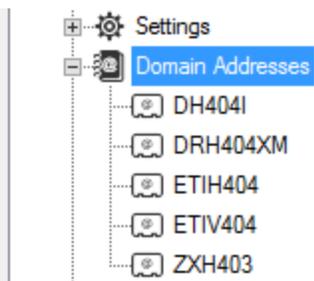
A new domain can be added to the list by right-clicking on the **Domain Addresses** category node and selecting **Add** or by pressing the Insert key while the Domain Addresses category node is selected. Type the name of the domain and press **Enter** to complete the node insertion.
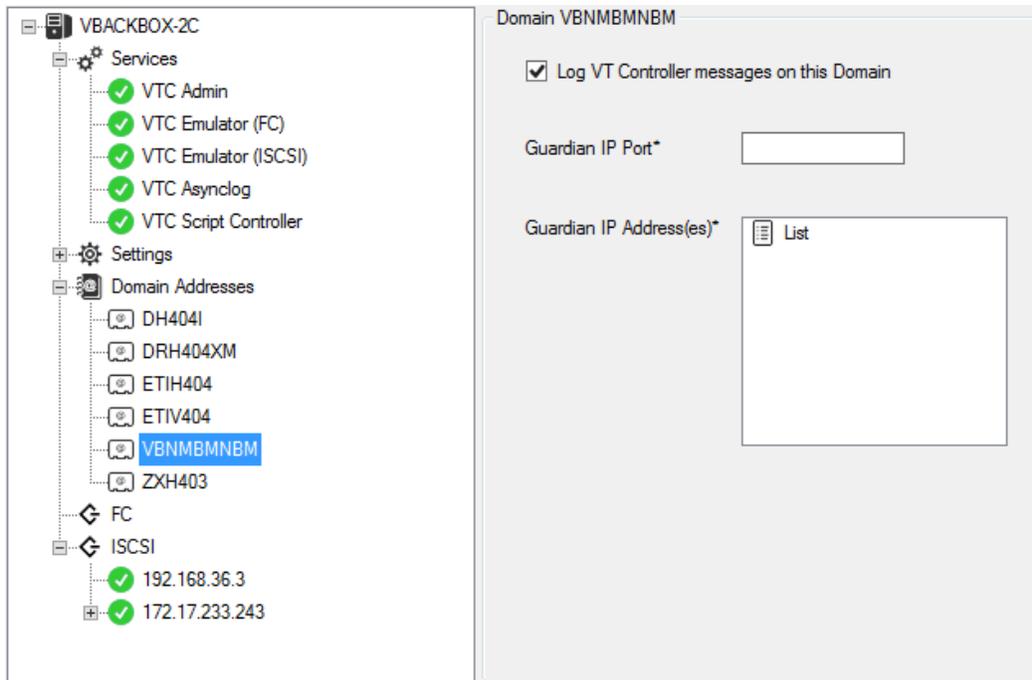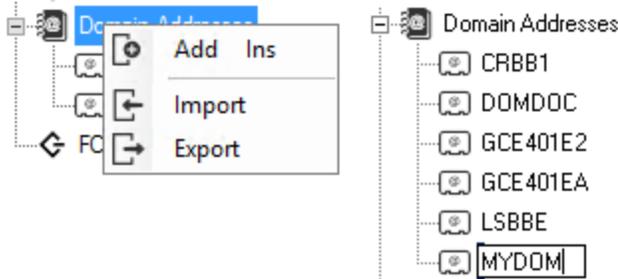
Complete the domain registration by entering the appropriate information in the fields on the right-hand side panel.

To add a Guardian IP Address, right-click on the **List** node and select **Add** or press the Insert key while the List node is selected. A new IP node will be added in the list. Enter the network address in either numeric or DNS form.
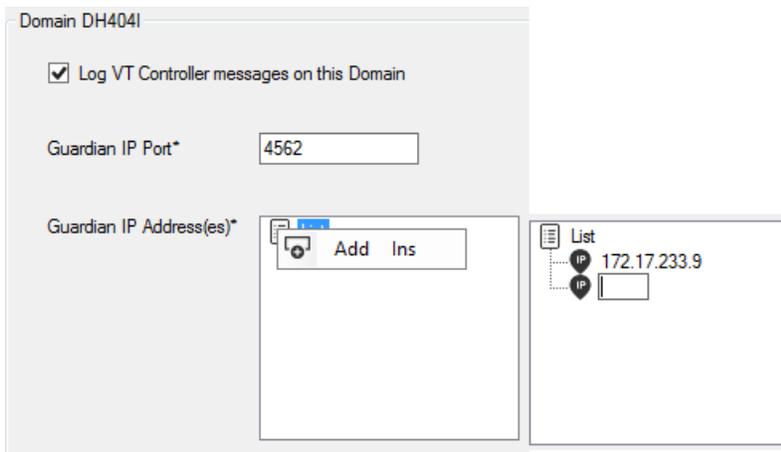
If missing or invalid information is entered, an error marker 🔴 will appear to the right side of the field.
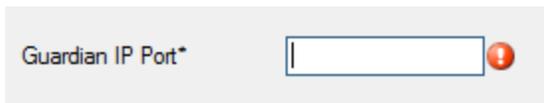
Place the pointer on the error marker to get the error description.

When the registration process has been completed, **Add** a new domain name or **Save** the modification (s).

To browse or edit a domain in the List expand the Domain Addresses list and select the targeted domain. Domain related information will be shown in the right-hand panel.
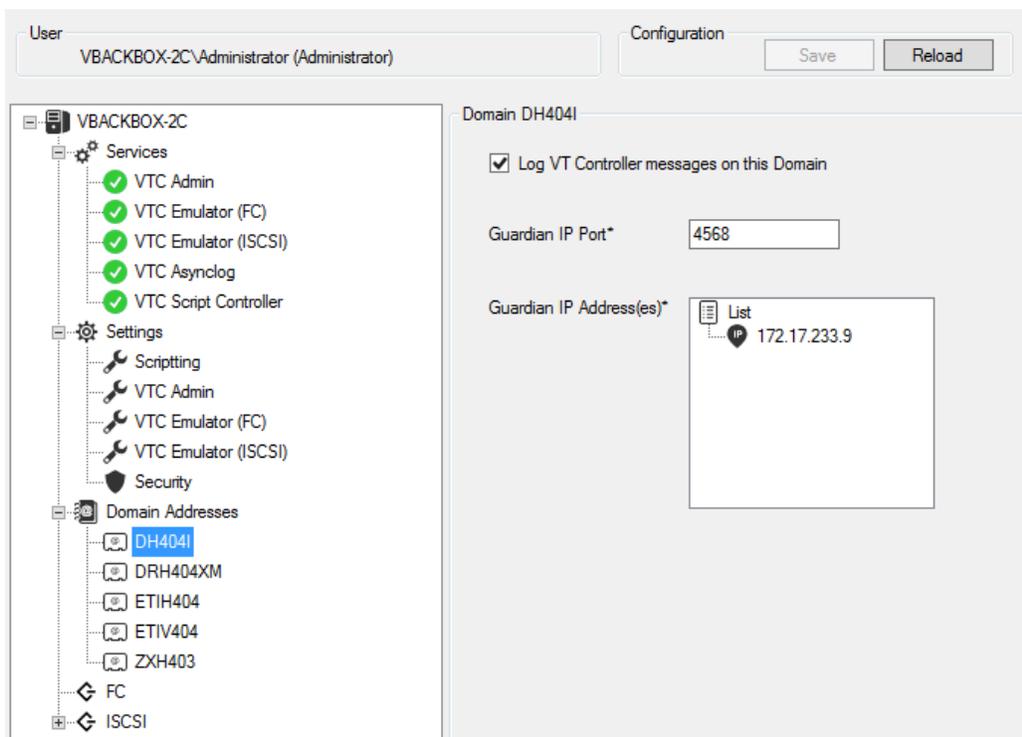
To **Delete** or **Rename** a domain, select it and ricght-click on it: **Delete** (or press the **Delete** key while the Domain is selected) or **Rename** (or press the F2 key while the Domain is selected).
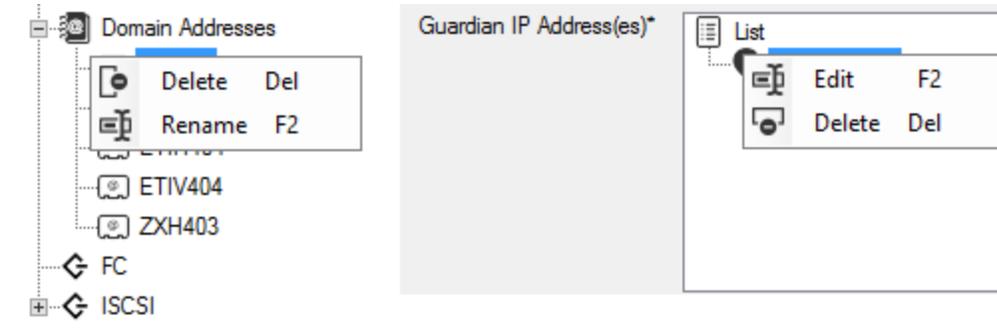
To **Export/Import** a Domain Addresses List right-click on the Domain Addresses node and select either Export or Import. The Export feature allows using the Domain Addresses list on another VTC server of the same domain by extracting the (Domain Adresses) list and placing it in a local file as backup.
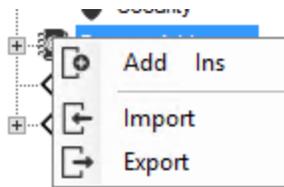
- **Export**: it opens a **Save** dialog box with the input server name as a predefined filename. You can change both the name and the destination or keep the default values. Press **Save** to save your values.

- **Import**: to copy the list to another server, connect to the target VTC server, right-click on the Domain Addresses node, and select **Import**. A dialog window opens up. Navigate to the exported file, press the **Open** button, then **Save** the configuration changes.

FC Node

All VTC Fiber Channel configurations are grouped under the FC category node. Changing of any of the elements described below requires restarting **Services** for the change to take effect.

When expanded, the FC category node lists all target mode cards installed on the VTC Server. When the FC category node is selected, no information is shown in the right-hand panel.

Right-click on the FC node to configure ATTO registry entries, to enable/disable Initiator, and to enable/disable Target mode Celerity HBA features. These features are based on family models and they apply to all ATTO Celerity HBA files installed on the server. ATTO Celerity family models supported are FC-4, FC-8, and FC-16. Family models are shown only if one or more Celerity HBA files are installed on the server.
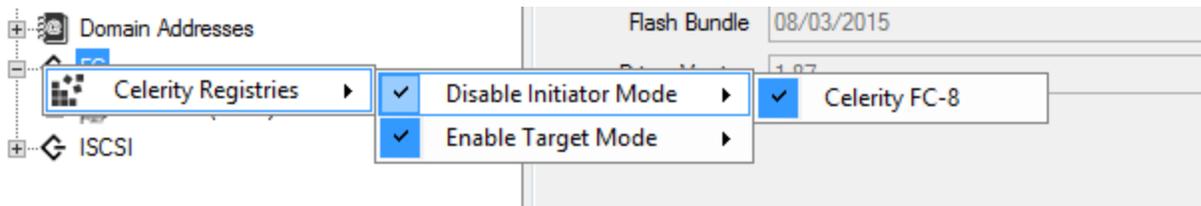
When enabled, the feature will be checked ✔ .

A diamond ◆ indicates that the feature is enabled only for part of the HBAs on the server . To enable or disable a feature, simply check or uncheck the feature on the model and **Save** the modification.
All ATTO Celerity features require a server reboot to be enabled.

Target Mode Cards List

When the FC category node is expanded a list of all target mode cards available on the server is displayed. When a target mode card node is selected, basic card information is displayed on the right hand panel. No functions are available if right-clicking on a target mode card.
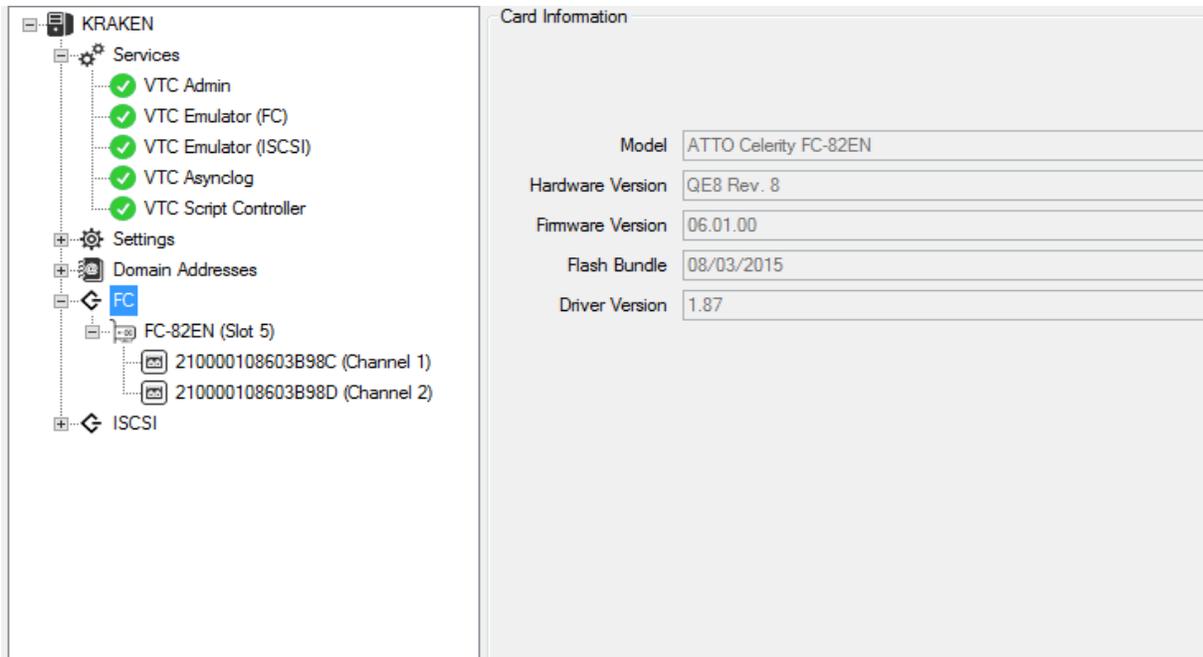
Card Ports List

When the target mode card node is expanded, a list of all the available ports on the card are shown. Each node represents a specific Fiber Channel port that can be identified by its port name (WWN) When the card port is selected, all port related configurations are displayed on the right hand side panel. There are no functions available when right-clicking on a card port.
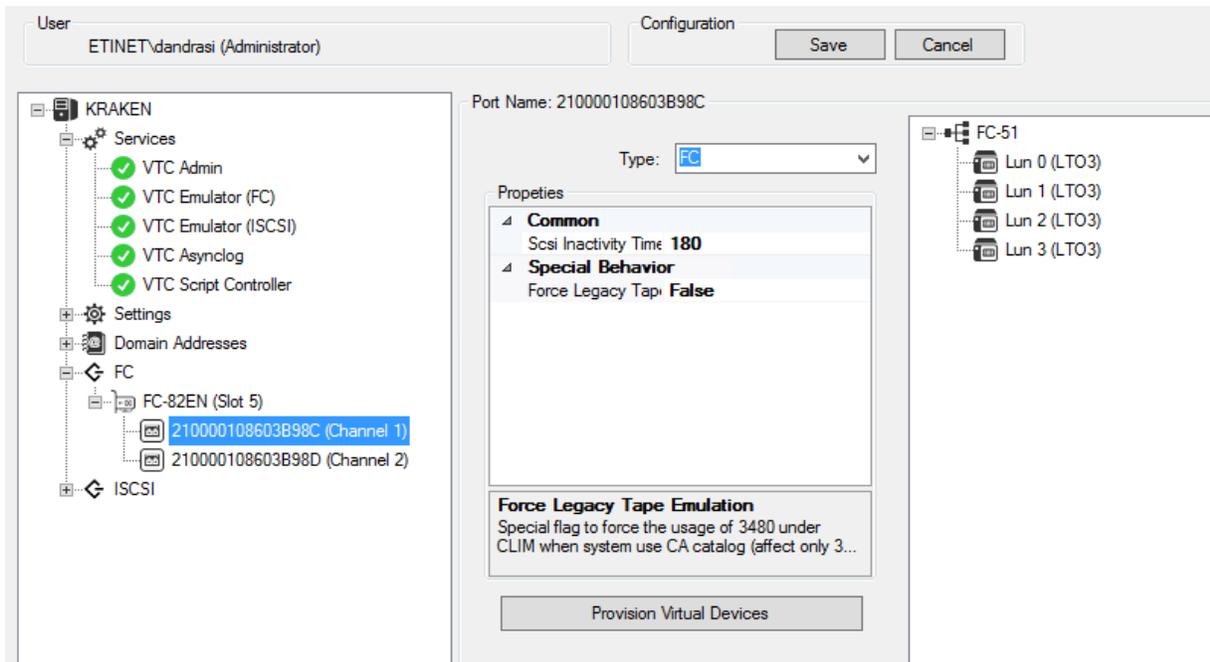
Port Configuration Elements

- Port Type

To change the port type, open the Type selection box and select one of the types.
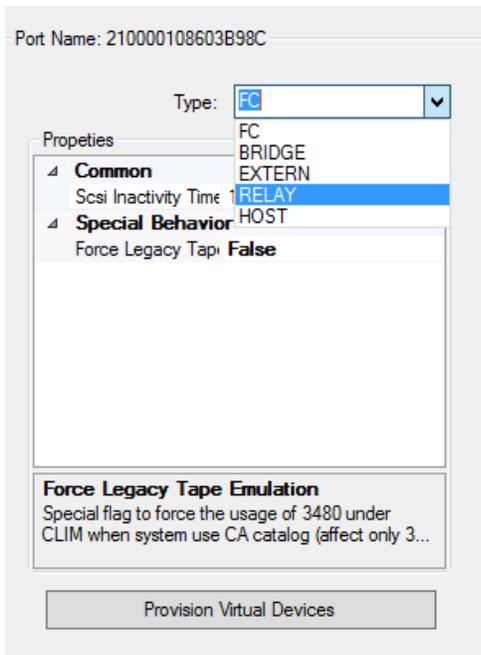
FC type is used when connected to a NonStop system.

BRIDGE type is used when connected to a NonStop S-Series system using SCSI via ETINET SCSI-to-FC bridge.

EXTERN type is used when connected to a Virtual Tape System for LTS media migration.

RELAY and **HOST** type are reserved for BackLib usage. See BackLib installation manual for more details.

Port Properties

Port properties are related to the port type. A "greyed-out" property indicates a read-only section. When a property is selected a message will be displayed at the bottom of the page.
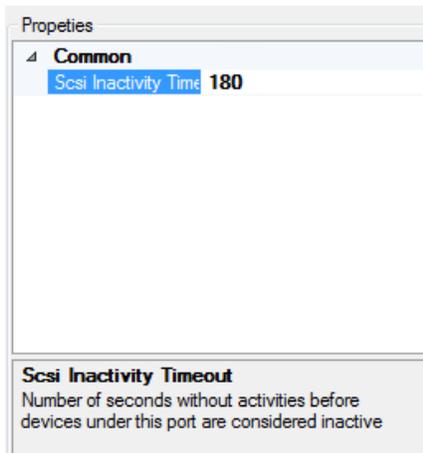
Provisioning Virtual Devices

To add or remove LUN in the port available device list use the **Provision Virtual Devices** button.
This button launches a dialog box that allows adding or removing LUN by checking or unchecking the LUN number.
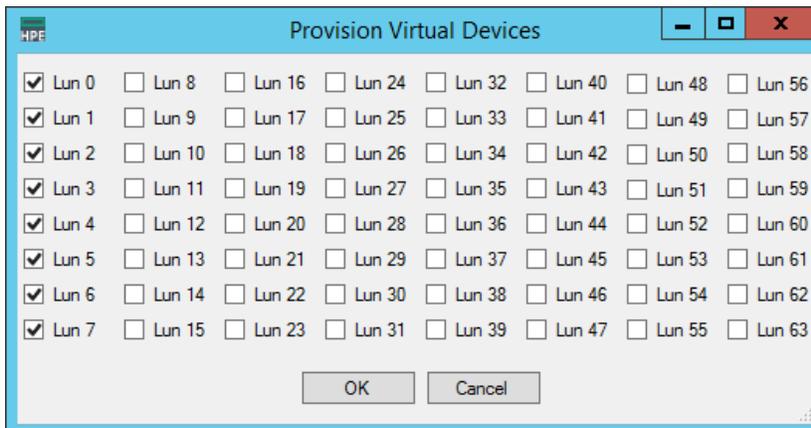
Port LUN List

The port Alias used in the BackPak Domain serves as a Root Element to regroup the configured LUN for a port. Each child node represents a specific Virtual tape device that will be presented to the NonStop host. Each LUN can have its own emulation type. To change the emulation type select the desired LUN by right-clicking on it. Select the new emulation type in the drop down box.
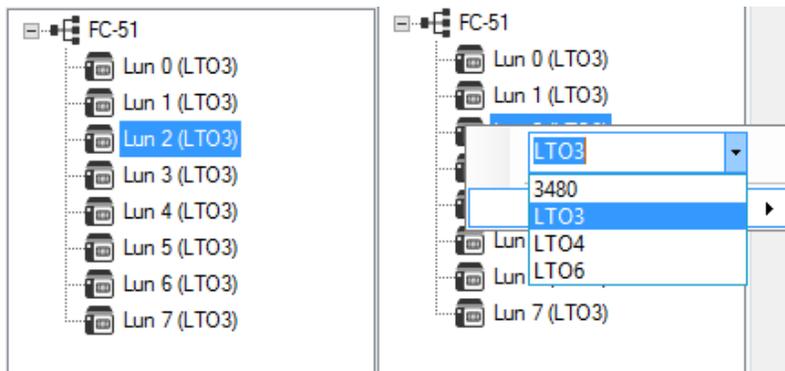
If an emulation type needs to be changed for a port, that can be done by right-clicking on the port node and selecting the new type in the emulation drop down box.

ISCSI Node

All VTC ISCSI configurations are grouped under the ISCSI category node. Changing of any of the elements described below requires restarting **Services** for the change to take effect.
When expanded, the FC category node lists all target IP addresses installed on the VTC Server. When the ISCSI category node is selected, no information is shown in the right-hand panel.
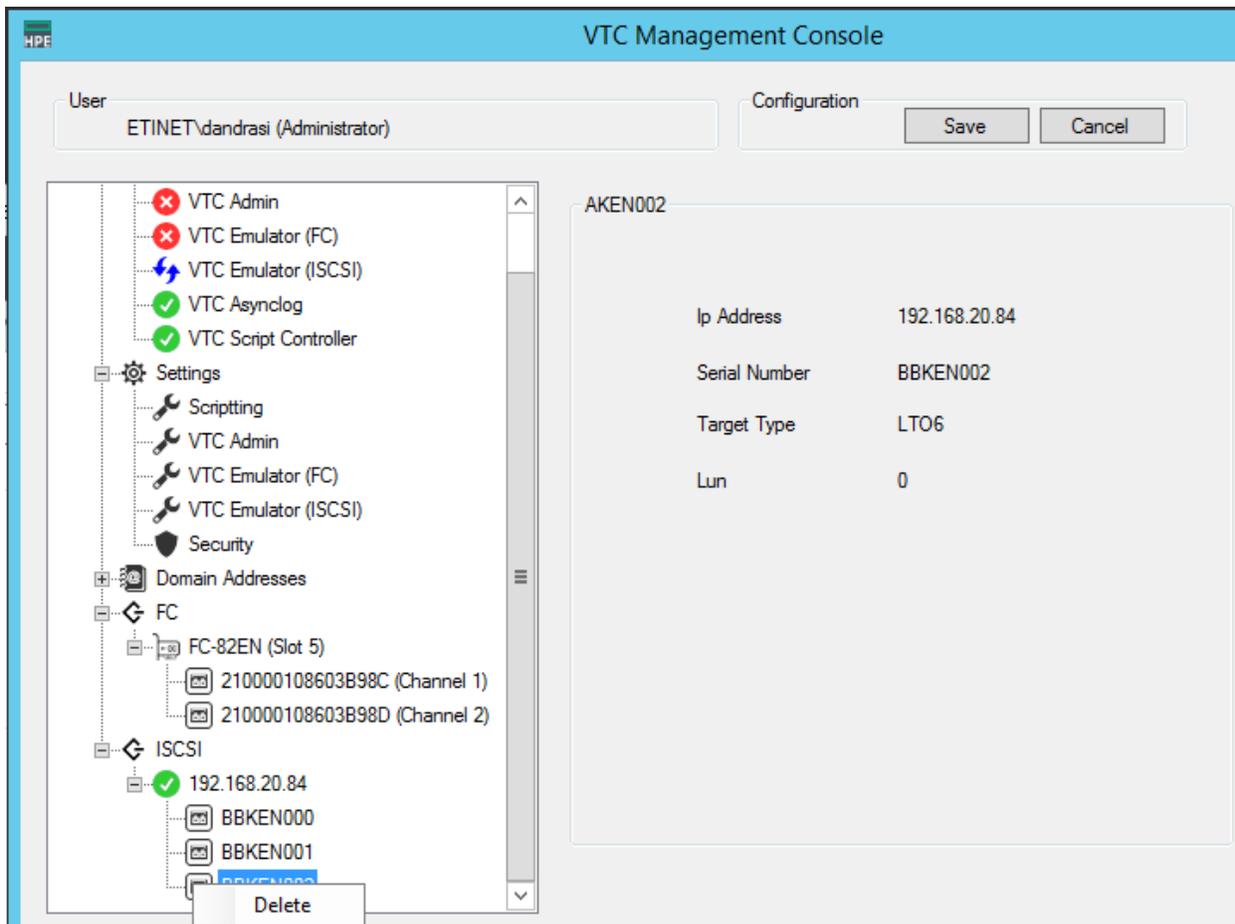
APPENDIX A - GUARDIAN TOOLS SAMPLES

BBREST – Restore Files Through MEDIACOM

Scenario using the detailed report:

User entries bold underlined:

```
LOAD /KEEP 1/ BBSETUP MACROS
RUN BBREST
Specify a single filename or filename template at the prompt.
Disk file(s) name / pattern: OBWIN1
Optional tape file name / template :
Default tape file generation is the latest generation.
Optional tape file generation (ALL/nn): ALL
**** excuting MEDIACOM query
Disk file(s) name / pattern: OBWIN1
Tape file name / pattern:
Tape file generation : ALL
Detail report, Summary or Quit (D/S/Q): D
(1) File Catalog \ETINIUM.TAPECAT
Tape File LSBBE-OBTSM1
Generation 6
Version 0
Time Archived 10May16 15:20
File Name Code EOF Last Modified Status
--------- ------- ---------------------- ------------- ------
\ETINIUM.$DATA15.LSBBE
OBWIN1 101 2368 14Mar16 9:57 VALID
(2) File Catalog \ETINIUM.TAPECAT
Tape File LSBBE-OBTSM1
Generation 5
Version 0
Time Archived 10May16 14:09
File Name Code EOF Last Modified Status
--------- ------- ---------------------- ------------- ------
\ETINIUM.$DATA15.LSBBE
OBWIN1 101 2368 14Mar16 9:57 VALID
2 disk files returned.
Enter (#) of tape file to recover from (or Q for quit):1
Recover destination subvol : $DATA06.LSREST7
Recover report output ($S.#DSMTC.RESTORE):
About to execute:
RECOVER DISKFILE OBWIN1, TAPEFILE LSBBE-OBTSM1, GEN 6 ,
MAP NAMES (OBWIN1 TO $DATA06.LSREST7.*), OUT $S.#DSMTC.RESTORE,
LISTALL, OPEN, TAPEDATE, AUDITED
Confirm execution (Y/N): Y
**** executing MEDIACOM recovery
MEDIACOM - T6028H01 (24JAN2011)
```

The tape file selected is shown as the following:

```
File Catalog \ETINIUM.TAPECAT
Volume Catalog \ETINIUM.TAPECAT
Pool Name BBLS_TSM1
Tape File LSBBE-OBTSM1
Generation 6
Version 00
Physical Copy 01
Logical Copy 1
Time Archived 10 MAY 2016, 15:20:57
Tape File Mode FILEMODE BACKUP
Catalog Files YES
Tape Name LSTS06
Total count of valid matching disk files: 0000000001
Do you want to see the matching disk files ? (y/n) Y
File Name Code Last Modified Status
---------------------------------- ------ ------------- -------
\ETINIUM.$DATA15.LSBBE.OBWIN1 00101 14MAR16 VALID
Do you want RESTORE to be started? (y/n) Y
Starting RESTORE...
Tape volumes used: LSTS06
Summary Information
Files restored = 1 Files not restored = 0
1 recover diskfile completed.
```

Scenario Using the Summary Report:

```
LOAD /KEEP 1/ BBSETUP MACROS
RUN BBREST
Specify a single filename or filename template at the prompt.
Disk file(s) name / pattern: OBWIN1
Optional tape file name / template :
Default tape file generation is the latest generation.
Optional tape file generation (ALL/nn): ALL
**** excuting MEDIACOM query
Disk file(s) name / pattern: OBWIN1
Tape file name / pattern:
Tape file generation : ALL
Detail report, Summary or Quit (D/S/Q): S
ETI-NET: TapeFiles listed in backup time
=======================================================================-
==
File Catalog
Tape File Gen Ver Time Archived
---------------------------------------- ------- ------ -------------
( 1) LSBBE-OBTSM1 6 0 10May16
( 2) LSBBE-OBTSM1 5 0 10May16
```

```
=======================================================================-
==
Enter (#) of tape file to recover from (or Q for quit):2
Recover destination subvol : $DATA06.LSREST8
Recover report output ($S.#DSMTC.RESTORE): $S.#BPAK.REST1
About to execute:
RECOVER DISKFILE OBWIN1, TAPEFILE LSBBE-OBTSM1, GEN 6 ,
MAP NAMES (OBWIN1 TO $DATA06.LSREST8.*), OUT $S.#BPAK.REST1,
LISTALL, OPEN, TAPEDATE, AUDITED
Confirm execution (Y/N): Y
**** executing MEDIACOM recovery
MEDIACOM - T6028H01 (24JAN2011)
(C) Copyright 1993-2002, 2004 Hewlett-Packard Development Company,
L.P.
The tape file selected is shown as the following:
File Catalog \ETINIUM.TAPECAT
Volume Catalog \ETINIUM.TAPECAT
Pool Name BBLS_TSM1
Tape File LSBBE-OBTSM1
Generation 6
Version 00
Physical Copy 01
Logical Copy 1
Time Archived 10 MAY 2016, 15:20:57
Tape File Mode FILEMODE BACKUP
Catalog Files YES
Tape Name LSTS06
Total count of valid matching disk files: 0000000001
Do you want to see the matching disk files ? (y/n) Y
File Name Code Last Modified Status
------------------------------------- ------ ------------- -------
\ETINIUM.$DATA15.LSBBE.OBWIN1 00101 14MAR16 VALID
Do you want RESTORE to be started? (y/n) Y
Starting RESTORE...
Tape volumes used: LSTS06
Summary Information
Files restored = 1 Files not restored = 0
1 recover diskfile completed.
```

TMFC2 – Extensions to TMFCOM Commands on Media

Sample 1

$DATA05 BPAK 570> tmfc2 info media nt*

```
        TMFCOM - T8652H01 - (24JAN2017- TMF)
        (C)2005 Hewlett-Packard Development Company, L.P.
        TMF 1> INFO MEDIA NTMF01
        Media Name Media Type Media Status
        ------------------------------------
        NTMF01 tape assigned
```

```
TMF 2> INFO MEDIA NTMF02
Media Name Media Type Media Status
--------------------------------------
NTMF02 tape assigned
TMF 3> INFO MEDIA NTMF03
Media Name Media Type Media Status
--------------------------------------
NTMF03 tape assigned
TMF 4> INFO MEDIA NTMF04
Media Name Media Type Media Status
--------------------------------------
NTMF04 tape assigned
TMF 5> INFO MEDIA NTMF05
Media Name Media Type Media Status
--------------------------------------
NTMF05 tape assigned
TMF 6> INFO MEDIA NTMF06
Media Name Media Type Media Status
--------------------------------------
NTMF06 tape assigned
TMF 7> INFO MEDIA NTMF07
Media Name Media Type Media Status
--------------------------------------
NTMF07 tape released
TMF 8> INFO MEDIA NTMF08
Media Name Media Type Media Status
--------------------------------------
NTMF08 tape released
TMF 9> INFO MEDIA NTMF09
Media Name Media Type Media Status
--------------------------------------
NTMF09 tape released
```

Sample 2

$DATA05 BPAK 571> tmfc2 PEEK, file tmfin, alter media nt*, select status released, status scratch

```
ALTER MEDIA NTMF07 ,status SCRATCH
ALTER MEDIA NTMF08 ,status SCRATCH
ALTER MEDIA NTMF09 ,status SCRATCH
3 RECORDS TRANSFERRED
```

$DATA05 BPAK 574>**fup copy tmfin**

```
ALTER MEDIA NTMF07 ,status SCRATCH
ALTER MEDIA NTMF08 ,status SCRATCH
ALTER MEDIA NTMF09 ,status SCRATCH
3 RECORDS TRANSFERRED
```

Sample 3

$DATA05 BPAK 572> tmfc2 alter media nt*, select status released, status scratch

```
          TMFCOM - T8652H01 - (24JAN2011- TMF)
         (C)2005 Hewlett-Packard Development Company, L.P.
         TMF 1> ALTER MEDIA NTMF07 ,status SCRATCH
         TMF 2> ALTER MEDIA NTMF08 ,status SCRATCH
         TMF 3> ALTER MEDIA NTMF09 ,status SCRATCH
```

BB000_COLLECT – Gather Information for Support

Sample:

```
$DATA05 BPAK 330> BB000_COLLECT TARGET BPAKTRC
... creating \ETINIUM.$DATA05.BPAKTRC.COL222* files for node
number 222
WARNING - $DATA05.BPAKTRC.COL222*: ERR 11
0 FILES PURGED
1 RECORDS TRANSFERRED
CREATED - $DATA05.BPAKTRC.ETINIUM
MEDIACOM - T6028H01 (24JAN2011)
(C) Copyright 1993-2002, 2004 Hewlett-Packard Development Com-
pany, L.P.
MEDIACOM - T6028H01 (24JAN2011)
(C) Copyright 1993-2002, 2004 Hewlett-Packard Development Com-
pany, L.P.
MEDIACOM - T6028H01 (24JAN2011)
(C) Copyright 1993-2002, 2004 Hewlett-Packard Development Com-
pany, L.P.
2 RECORDS TRANSFERRED
$DATA05.BPAKTRC.COL222X PURGED.
1 FILE PURGED
SCF - T9082H01 - (16JUL10) (30MAR10) - 08/07/2013 12:59:28 Sys-
tem \ETINIUM
(C) 1986 Tandem (C) 2006 Hewlett Packard Development Company,
L.P.
SCF W20052 Creating file \ETINIUM.$DATA05.BPAKTRC.COL222J
SCF W20052 Creating file \ETINIUM.$DATA05.BPAKTRC.COL222G
SCF - T9082H01 - (16JUL10) (30MAR10) - 08/07/2013 12:59:30 Sys-
tem \ETINIUM
(C) 1986 Tandem (C) 2006 Hewlett Packard Development Company,
L.P.
default times
... extracting events from 2013-08-07 10:59:24 to EOF
CREATED - $DATA05.BPAKTRC.COL222E
... creating PAK file \ETINIUM.$DATA05.BPAKTRC.COL222P
PAK - File compression program - T1255H01 - (2009-09-25)
File Mode BACKUP Program - T9074H01 (24JAN2011) (AFX)
(C)2000 Compaq (C)2007 Hewlett- Packard Development Company,
L.P.
Drives: (\ETINIUM.$X566)
System: \ETINIUM Operating System: H06 Tape Version: 3
```

```
Backup options: AUDITED, BLOCKSIZE 8, NO IGNORE, OPEN, PARTONLY
OFF,
INDEXES IMPLICIT
*WARNING-7147* Files created and stored via OSS and SQL/MX
objects are not
supported.
*WARNING-7033* This tape can only be restored with TNS/II
RESTORE (B41, C00 or
later).
Summary Information
Files dumped = 109 Files not dumped = 0
Total bytes: 1493064
Compressed bytes: 525322
----> Two files to pick up:
----> binary file \ETINIUM.$DATA05.BPAKTRC.COL222P
----> text file \ETINIUM.$DATA05.BPAKTRC.COL222A
STOPPED: 1,24
CPU time: 0:00:00.026
1: Process terminated with warning diagnostics
```

BB044 –Series of Tape Label Reports

Sample:

```
$DATA05 BPAK 133> run bb044 BPAK_REPORT y, CATALOG_REPORT y, MERGED_
REPORT y
BPAK-BB044 Series of tape labels 2016-04-03 15:55:28
Number of volumes in BackPak : 47
Number of volumes in DSM/TC of \ETINIUM: 285
Number of volumes in TMF of \ETINIUM : 4
Number of volumes in DSM/TC of \MONT : 29
Number of volumes in QTOS : 17
BB044-1 Labels in BackPak domain BPAK
Labels Number of Label Media Catalogue
from to volumes type type type Volume Group
---- -- ------- ------- ----- ---- ------------
0D7F15-0D7F15 1 BACKUP LTO3 BackPak BPAK_D2D_POOL
EDQ001-EDQ005 5 BACKUP LTO3 BackPak SPECIAL_CATALOGUE
LSDEP1-LSDEP9 9 BACKUP LTO3 BackPak DEPLOY
LSNC01-LSNC03 3 BACKUP LTO3 BackPak NOCAT
LSQ001-LSQ003 3 BACKUP LTO3 BackPak SPECIAL_CATALOGUE
VT0001-VT0024 24 BACKUP LTO3 BackPak CATALOGED_VOLUMES
LSNL01-LSNL02 2 NL LTO3 BackPak NOCAT
*** end of report BB044-1 ***
BB044-2 Labels in catalogs seen from system \ETINIUM and from domain
BPAK
Labels Number of Label Media Catalog
from to volumes type type type pool, volcat
---- -- ------- ------- ----- ---- ------------
```

```
000100-000150 51 BACKUP LTO3 DSMTC IBMVTLBK, TAPECAT
0D7F15-0D7F15 1 BACKUP LTO3 DSMTC BPAK_D2D_POOL, TAPECAT
123456-123456 1 IBM CART3480 DSMTC QC_B2, \MONT.TAPECAT
52284A-522853 10 BACKUP CART3480 DSMTC TESTLTO3, TAPECAT
AAAAAA-AAAAAA 1 ANSI LTO3 DSMTC BNT310_VGCAT_WD01, TAPECAT
ACB01 -ACB04 4 TMF TMF TMF \ETINIUM
EDQ001-EDQ005 5 BACKUP QTOS QCGAB,
\ETINIUM.$DSMSCM.QTOSDATA.TAPES
EFS301-EFS351 51 BACKUP LTO3 DSMTC BBQC_BACKUP_TSM_FILESPACE1,
TAPECAT
EFS401-EFS442 42 BACKUP LTO3 DSMTC BBQC_BACKUP_TSM_FILESPACE2,
TAPECAT
LSDEP1-LSDEP9 9 BACKUP LTO3 DSMTC DEPLOY, BBOXDEPL
LSE01 -LSE24 24 BACKUP LTO3 DSMTC BBLS_BIGFOOT, \MONT.LSVOLCAT
LSLSXX-LSLSXX 1 ANSI LTO3 DSMTC LS_WEEKBACKUP, TAPECAT
LSMM01-LSMM10 10 BACKUP LTO3 DSMTC BBLS_BACKDSK, \MONT.TAPECAT
LSQ001-LSQ012 12 BACKUP QTOS LS1,
\ETINIUM.$DSMSCM.QTOSDATA.TAPES
VT0001-VT0019 19 BACKUP LTO3 DSMTC BBOX_WIN1, TAPECAT
VT0001-VT0004 4 BACKUP LTO3 DSMTC BBOX_WIN1,
\MONT.VERYLONGVOLUMECATALOG
W8D00 -W8D99 100 BACKUP LTO3 DSMTC PRODBKP, ETINET_PROD
*** end of report BB044-2 ***
BB044-3 Labels in BackPak domain BPAK and in catalogs seen from
\ETINIUM
Labels Number of Label BackPak TMF node or
from to volumes type Volume group Catalog DSM/TC pool,volcat
---- -- ------- ------- ------------------- ---------------------
000100-000150 51 BACKUP (unknown in BackPak) IBMVTLBK, TAPECAT
0D7F15-0D7F15 1 BACKUP BPAK_D2D_POOL BPAK_D2D_POOL, TAPECAT
123456-123456 1 IBM (unknown in BackPak) QC_B2, \MONT.TAPECAT
52284A-522853 10 BACKUP (unknown in BackPak) TESTLTO3, TAPECAT
AAAAAA-AAAAAA 1 ANSI (unknown in BackPak) BNT310_VGCAT_WD01, TAPECAT
ACB01 -ACB04 4 TMF (unknown in BackPak) TMF \ETINIUM
EDQ001-EDQ005 5 BACKUP SPECIAL_CATALOGUE LS1,
\ETINIUM.$DSMSCM.QTOSDATA.TAPES
EFS301- EFS351 51 BACKUP (unknown in BackPak) BBQC_ BACKUP_ TSM_
FILESPACE1,
TAPECAT
EFS401- EFS442 42 BACKUP (unknown in BackPak) BBQC_ BACKUP_ TSM_
FILESPACE2,
TAPECAT
LSDEP1-LSDEP9 9 BACKUP DEPLOY DEPLOY, BBOXDEPL
LSE01 -LSE24 24 BACKUP (unknown in BackPak) BBLS_BIGFOOT,
\MONT.LSVOLCAT
LSLSXX-LSLSXX 1 ANSI (unknown in BackPak) LS_WEEKBACKUP, TAPECAT
LSMM01- LSMM10 10 BACKUP (unknown in BackPak) BBLS_ BACKDSK,
\MONT.TAPECAT
LSNC01-LSNC03 3 BACKUP NOCAT (no catalogue)
LSNL01-LSNL02 2 NL NOCAT (no catalogue)
```

```
LSQ001-LSQ003 3 BACKUP SPECIAL_CATALOGUE LS1,
\ETINIUM.$DSMSCM.QTOSDATA.TAPES
LSQ004-LSQ012 9 BACKUP (unknown in BackPak) LS1,
\ETINIUM.$DSMSCM.QTOSDATA.TAPES
VT0001-VT0004 4 BACKUP CATALOGED_VOLUMES BBOX_WIN1, TAPECAT
BBOX_WIN1,
\MONT.VERYLONGVOLUMECATALOG
VT0005-VT0019 15 BACKUP CATALOGED_VOLUMES BBOX_WIN1, TAPECAT
W8D00 -W8D99 100 BACKUP (unknown in BackPak) PRODBKP, ETINET_PROD
*** end of report BB044-3 ***
```

OBB011 – List of Volumes in Windows Files Data Stores

Sample:

$DATA15 BFERHG19 47> run obb011 AA*

```
BB010 - Extraction of the BackPak catalog to file VOLEXT 2016/10/28
16:54
Selection of volumes matching the label pattern: AA*
Number records read : 24
Number records extracted : 3
ENFORM - T9152D30 - (25SEP1999)DATE - TIME : 10/28/2016 - 16:54:45
COPYRIGHT TANDEM COMPUTERS INCORPORATED 1979, 1983, 1991, 1992, 1998
BB011 Volumes AA* sorted by index path 16/28/04
Volume Label Last load last load Owner Owner
label type date time node user
------ ------ ---------- --------- -------- ---------
Store id : WIN1
Index path: D:\FERN\WIN1
AA00 BACKUP 2016/10/06 17:43:19 \LEOMIRA 255,100
AA01 BACKUP 2016/10/06 17:43:38 \LEOMIRA 255,100
AA02 BACKUP 0000/00/00 00:00:00 \LEOMIRA 255,100
              3 volumes in path
              3 volumes in the report
```

OBB012 – List of Virtual Volumes

Sample:

$DATA15 BFERHG19 47> run obb012 LS*

```
BB012 List of virtual volumes 01/09/16
Volume Label Tapecat Tapecat Owner Owner Author. File-
Label Type Last Load Node status node user access Id
------ ------ ------------------ -------- -------- -------- ---- ---
--- -----
Store id: TSM2 Store type: IBM Spectrum Protect™ (TSM)
LSBT09 BACKUP 2016/01/06 12:55:46 \LEOMIRA ASSIGNED \LEOMIRA 130,251
GGO LS-OBACK1
```

```
LSBT10 BACKUP 2016/12/30 17:05:20 \LEOMIRA SCRATCH \LEOMIRA 130,251
NNN
LSBT11 BACKUP 2016/01/06 22:38:13 \LEOMIRA ASSIGNED \LEOMIRA 130,251
GGO LS-OBACK1
Store id: WIN1 Store type: WINDISK
LSBW01 BACKUP 2016/12/23 11:41:20 \LEOMIRA SCRATCH \LEOMIRA 130,251
GGG
LSBW02 BACKUP 2016/01/06 09:45:44 \LEOMIRA ASSIGNED \LEOMIRA 130,251
GGG LS-OBACKW1
5 volumes in the report
```

OBB018 - Statistics Report

Content of OBB018:

```
COMMENT ************************************************************
COMMENT * *
COMMENT * BB018: Lists the BackBox activity from the statistics files *
COMMENT * *
COMMENT ************************************************************
LOAD /KEEP 1/ $DATA05.BPAK.BBSETUP $DATA05.BPAK.MACROS
COMMENT ************************************************************
COMMENT * STEP 1: Sets the selection parameters *
COMMENT * for the two next steps, file extraction and report. *
COMMENT * *
COMMENT * By default, the last 24 hour period will be selected. *
COMMENT * *
COMMENT * Two parameters can be forced before calling BB018_DEFAULTS: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * tells when the 24 hour period ends *
COMMENT * default value is the next round hour *
COMMENT * RELATIVE-START-DAY number *
COMMENT * choose the starting 24 hour period relative to today*
COMMENT * default value is 0 (current period) *
COMMENT ************************************************************
     CLEAR ALL
COMMENT PARAM CUTOFF-TIME 00:00:00
COMMENT PARAM RELATIVE-START-DAY -1
     BB018_DEFAULTS
COMMENT ************************************************************
COMMENT * STEP 2: Extracts an extract file for the following step, *
COMMENT * from the statistics files matching the pattern *
COMMENT * configured in the BackPak Domain Configuration. *
COMMENT * Set an ASSIGN STATS-FILE-REC to the extract file. *
COMMENT * *
COMMENT * Input PARAM's: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * FROM-DATE yyyy-mm-dd *
```

```
COMMENT * TO-DATE yyyy-mm-dd *
COMMENT * *
COMMENT * Activity is selected from FROM-DATE & CUTOFF-TIME (included)*
COMMENT * to TO-DATE & CUTOFF-TIME (excluded) *
COMMENT *************************************************************
     BB030_EXTRACT_STATS EXTRACT_FILE STATEXT
COMMENT *************************************************************
COMMENT * STEP 3: Produce report *
COMMENT * from the file specified in ASSIGN STATS-FILE-REC *
COMMENT * *
COMMENT * Input PARAM's: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * FROM-DATE yyyy-mm-dd *
COMMENT * TO-DATE yyyy-mm-dd *
COMMENT * *
COMMENT * Activity is selected from FROM-DATE & CUTOFF-TIME (included)*
COMMENT * to TO-DATE & CUTOFF-TIME (excluded) *
COMMENT *************************************************************
ENFORM /IN BB018 /
```

OBB019 - Statistics Report – Script Controller

Content of OBB019:

```
COMMENT *************************************************************
COMMENT * *
COMMENT * BB019: List the script controller activity *
COMMENT * from the statistics files *
COMMENT * *
COMMENT *************************************************************
LOAD /KEEP 1/ $DATA05.BPAK.BBSETUP $DATA05.BPAK.MACROS
COMMENT *************************************************************
COMMENT * STEP 1: Sets the selection parameters *
COMMENT * for the two next steps, file extraction and report. *
COMMENT * *
COMMENT * By default, the last 24 hour period will be selected. *
COMMENT * *
COMMENT * Two parameters can be forced before calling BB018_DEFAULTS:
*
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * tells when the 24 hour period ends *
COMMENT * default value is the next round hour *
COMMENT * RELATIVE-START-DAY number *
COMMENT * choose the starting 24 hour period relatively to today*
COMMENT * default value is 0 (current period) *
COMMENT *************************************************************
CLEAR ALL
COMMENT PARAM CUTOFF-TIME 00:00:00
COMMENT PARAM RELATIVE-START-DAY -1
BB018_DEFAULTS
```

```
COMMENT
*****************************************************************
COMMENT * STEP 2: Extracts an extract file for the following step, *
COMMENT * from the statistics files matching the pattern *
COMMENT * configured in the BackPak Domain Configuration. *
COMMENT * Set an ASSIGN STATS-FILE-REC to the extract file. *
COMMENT * *
COMMENT * Input PARAM's: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * FROM-DATE yyyy-mm-dd *
COMMENT * TO-DATE yyyy-mm-dd *
COMMENT * *
COMMENT  *  Activity  is  selected  from  FROM- DATE  &  CUTOFF- TIME
(included)*
COMMENT * to TO-DATE & CUTOFF-TIME (excluded) *
COMMENT *****************************************************************
BB030_EXTRACT_STATS EXTRACT_FILE STATEXT
COMMENT *****************************************************************
COMMENT * STEP 3: Produce report *
COMMENT * from the file specified in ASSIGN STATS-FILE-REC *
COMMENT * *
COMMENT * Input PARAM's: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * FROM-DATE yyyy-mm-dd *
COMMENT * TO-DATE yyyy-mm-dd *
COMMENT * *
COMMENT  *  Activity  is  selected  from  FROM- DATE  &  CUTOFF- TIME
(included)*
COMMENT * to TO-DATE & CUTOFF-TIME (excluded) *
COMMENT ***********
*************************************************
ENFORM /IN BB019 /
```

OBB021 – Emulation Statistics Report

Content of OBB021:

```
COMMENT *****************************************************************
COMMENT * *
COMMENT * BB021: List tape emulation activity from statistics files *
COMMENT * *
COMMENT *****************************************************************
LOAD /KEEP 1/ $DATA05.BPAK.BBSETUP $DATA05.BPAK.MACROS
COMMENT *****************************************************************
COMMENT * STEP 1: Sets the selection parameters *
COMMENT * for the two next steps, file extraction and report. *
COMMENT * *
COMMENT * By default, the last 24 hour period will be selected. *
COMMENT * *
COMMENT * Two parameters can be forced before calling BB018_DEFAULTS: *
```

```
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * tells when the 24 hour period ends *
COMMENT * default value is the next round hour *
COMMENT * RELATIVE-START-DAY number *
COMMENT * choose the starting 24 hour period relatively to today*
COMMENT * default value is 0 (current period) *
COMMENT ************************************************************
CLEAR ALL
COMMENT PARAM CUTOFF-TIME 00:00:00
COMMENT PARAM RELATIVE-START-DAY -1
BB018_DEFAULTS
COMMENT ************************************************************
COMMENT * STEP 2: Extracts an extract file for the following step, *
COMMENT * from the statistics files matching the pattern *
COMMENT * configured in the BackPak Domain Configuration. *
COMMENT * Set an ASSIGN STATS-FILE-REC to the extract file. *
COMMENT * *
COMMENT * Input PARAM's: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * FROM-DATE yyyy-mm-dd *
COMMENT * TO-DATE yyyy-mm-dd *
COMMENT * *
COMMENT * Activity is selected from FROM-DATE & CUTOFF-TIME (included)*
COMMENT * to TO-DATE & CUTOFF-TIME (excluded) *
COMMENT ************************************************************
BB030_EXTRACT_STATS EXTRACT_FILE STATEXT
COMMENT ************************************************************
COMMENT * STEP 3: Produce report *
COMMENT * from the file specified in ASSIGN STATS-FILE-REC *
COMMENT * *
COMMENT * Input PARAM's: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * FROM-DATE yyyy-mm-dd *
COMMENT * TO-DATE yyyy-mm-dd *
COMMENT * *
COMMENT  *  Activity  is  selected  from  FROM- DATE  &  CUTOFF- TIME
(included)*
COMMENT * to TO-DATE & CUTOFF-TIME (excluded) *
COMMENT ************************************************************
ENFORM /IN BB021 /
```

OBB038 – List of Encrypted Volumes

Content of OBB038:

```
?tacl macro
COMMENT ********************************************************
COMMENT * Extract VOLEXT from the BackPak catalog *
COMMENT * and list Encrypted volumes *
COMMENT * One positional parameter: pattern of labels to select*
COMMENT ********************************************************
```

```
RUN BB010 %1%
COMMENT ***********************************************************
COMMENT BB038: List the BackBox Encrypted volumes *
COMMENT *
COMMENT Note: The Tandem ENFORM reporting tool is required *
COMMENT ***********************************************************
ASSIGN VOLEXT-REC, VOLEXT
PARAM LABELS %1%
ENFORM /IN BB038/
```

OBB039 – List of Virtualizations / Materializations

Content of OBB039:

```
COMMENT ****************************************************************
COMMENT * *
COMMENT * BB039: List volumes virtualizations / materializations *
COMMENT * *
COMMENT ****************************************************************
LOAD /KEEP 1/ $DATA05.BPAK.BBSETUP $DATA05.BPAK.MACROS
COMMENT ****************************************************************
COMMENT * STEP 1: Sets the selection parameters *
COMMENT * for the two next steps, file extraction and report. *
COMMENT * *
COMMENT * By default, the last 24 hour period will be selected. *
COMMENT * *
COMMENT * Two parameters can be forced before calling BB018_DEFAULTS: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * tells when the 24 hour period ends *
COMMENT * default value is the next round hour *
COMMENT * RELATIVE-START-DAY number *
COMMENT * choose the starting 24 hour period relatively to today*
COMMENT * default value is 0 (current period) *
COMMENT ****************************************************************
CLEAR ALL
COMMENT PARAM CUTOFF-TIME 00:00:00
COMMENT PARAM RELATIVE-START-DAY -1
BB018_DEFAULTS
COMMENT ****************************************************************
COMMENT * STEP 2: Extracts an extract file for the following step, *
COMMENT * from the statistics files matching the pattern *
COMMENT * configured in the BackPak Domain Configuration. *
COMMENT * Set an ASSIGN STATS-FILE-REC to the extract file. *
COMMENT * *
COMMENT * Input PARAM's: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * FROM-DATE yyyy-mm-dd *
COMMENT * TO-DATE yyyy-mm-dd *
COMMENT * *
COMMENT * Activity is selected from FROM-DATE & CUTOFF-TIME (included)*
COMMENT * to TO-DATE & CUTOFF-TIME (excluded) *
```

```
COMMENT ***********************************************************
BB030_EXTRACT_STATS EXTRACT_FILE STATEXT
COMMENT ***********************************************************
COMMENT * STEP 3: Produce report *
COMMENT * from the file specified in ASSIGN STATS-FILE-REC *
COMMENT * *
COMMENT * Input PARAM's: *
COMMENT * CUTOFF-TIME hh:mn:ss *
COMMENT * FROM-DATE yyyy-mm-dd *
COMMENT * TO-DATE yyyy-mm-dd *
COMMENT * *
COMMENT *  Activity  is  selected  from  FROM- DATE  &  CUTOFF- TIME
(included)*
COMMENT * to TO-DATE & CUTOFF-TIME (excluded) *
COMMENT ***********************************************************
ENFORM /IN BB039/
```

BB030_EXTRACT_STATS Usage

```
BPAK-BB030 - Extraction of statistics files 2016-08-18 14:39
Stats file names : $DATA05.BPAK.STAT%YY%%MM%
Extract file : $data21.temp.stats1
Selection from : 2016-08-17 15:00:00 to: 2016-08-18 15:00:00
Existing statistic files Records read Records extracted
----------------------- ----------- -----------------
\ETINIUM.$DATA05.BPAK.STAT1005 0 0
\ETINIUM.$DATA05.BPAK.STAT1006 0 0
\ETINIUM.$DATA05.BPAK.STAT1007 0 0
\ETINIUM.$DATA05.BPAK.STAT1008 1954 45
Total records written: 45
```

OBB055 – Low Level Tape to Tape Copy

```
COMMENT ***********************************************************
COMMENT Virtualize / materialize volumes
COMMENT using the low-level tape copy program BB055
COMMENT ***********************************************************
RESET DEFINE *
DELETE DEFINE =BACKPAK_BBSETUP
ADD  DEFINE  =BACKPAK_ BBSETUP,  CLASS  MAP,  FILE  \volume.$sub-
vol.LSBBE.BBSETUP
DELETE DEFINE =TCPIP^PROCESS^NAME
ADD DEFINE =TCPIP^PROCESS^NAME, CLASS MAP, FILE $ztc?
PARAM BB055TRIGGER [VOLUMELIST|OPERATORLOAD]
PARAM GROUPID *search*
comment PARAM searchnode \remote-node
PARAM VOLUMELIST vollist
PARAM INDEVICE $<input-tape-device>
PARAM OUTDEVICE $<output-tape-device>
COMMENT PARAM IDLEWAIT 15
```

```
COMMENT PARAM TIMEOUT 60
COMMENT PARAM MAXNOWAIT 5
RUN BB055 /NAME/
```

Execution Sample, TACL Output:

In this sample virtualizing two tapes, the configured maximum volume size in the Volume Group is very low (40 MB).

```
LSD2-BB055 virtualization is starting 2015-08-05 23:26:05
PARAM BB055TRIGGER VOLUMELIST
PARAM INDEVICE $TNLT303
PARAM OUTDEVICE $HALT300
PARAM VOLUMELIST VOLLIST
PARAM GROUPID NOCAT
PARAM IDLEWAIT 15 minutes
PARAM TIMEOUT 60 seconds
PARAM MAXNOWAIT 5
LSD2- I3486  NSK  tape  virtualization  ready  to  copy  volumes  from
$TNLT303 to
$HALT300. Volume Group is NOCAT.
LSD2- I3485  NSK  tape  virtualization:  input  volume  EBCD04  (labels
BACKUP) is
loaded.
Waiting 60 seconds for $HALT300 to be loaded ...
LSD2-W3491 NSK tape virtualization skipping input volume EBCD04 (Tape
full
condition returned after writing 46,198,426 bytes)
Waiting 60 seconds for $TNLT303 to be un-loaded ...
LSD2- I3485  NSK  tape  virtualization:  input  volume  EBCD05  (labels
BACKUP) is
loaded.
Waiting 60 seconds for $HALT300 to be loaded ...
Waiting 60 seconds for $TNLT303 to be un-loaded ...
LSD2-I3487 NSK tape virtualization of volume EBCD05 (labels BACKUP)
successfull. 24 MB data and 8 file-marks copied
LSD2-I3495 NSK tape virtualization ends. 1 volume successfully copied
for 24
MB. 1 volume skipped
LSD2-BB055 virtualization ending 2015-08-05 23:31:17
```

Execution Sample, EMS Log:

```
23:26 05AUG15 222,00,025 $ZSVR: STATUS 1504 - TAPE OPENED ON $HALT300
23:26 05AUG15 222,00,025 $ZSVR: STATUS 1516 - TAPE ON DRIVE $HALT300
USED BY 0,221
23:26 05AUG15 222,00,025 $ZSVR: STATUS 1504 - TAPE OPENED ON $TNLT303
23:26 05AUG15 222,00,221 LSD2-I3486 NSK tape virtualization ready to
copy
volumes from $TNLT303 to $HALT300. Volume Group is NOCAT.
```

```
23:26 05AUG15 222,00,025 $ZSVR: STATUS 1516 - TAPE ON DRIVE $TNLT303
USED BY 0,221
23:26 05AUG15 222,00,025 $ZSVR: 0422 MOUNT EBCD04 ON $TNLT303 NO RING
23:27 05AUG15 222,00,025 $ZSVR: MOUNT OF EBCD04 ACCEPTED
23:27 05AUG15 222,00,025 $ZSVR: ERROR 1007 - DSM/TC REPLY ERROR: 100
23:27 05AUG15 222,00,221 LSD2-I3485 NSK tape virtualization: input
volume
EBCD04 (labels BACKUP) is loaded.
23:27 05AUG15 222,00,025 $ZSVR: STATUS 1504 - EBCD04 TAPE OPENED ON
$TNLT303
23:27 05AUG15 222,00,025 $ZSVR: STATUS 1516 - EBCD04 TAPE ON DRIVE
$TNLT303
USED BY 0,221
23:28 05AUG15 222,00,221 LSD2-W3491 NSK tape virtualization skipping
input
volume EBCD04 (Tape full condition returned after writing 46,198,426
bytes)
23:29 05AUG15 222,00,025 $ZSVR: STATUS 1512 - EBCD04 TAPE DISMOUNTED
FROM DRIVE
$TNLT303
23:29 05AUG15 222,00,025 $ZSVR: 0423 MOUNT EBCD05 ON $TNLT303 NO RING
23:30 05AUG15 222,00,025 $ZSVR: MOUNT OF EBCD05 ACCEPTED
23:30 05AUG15 222,00,221 LSD2-I3485 NSK tape virtualization: input
volume
EBCD05 (labels BACKUP) is loaded.
23:30 05AUG15 222,00,025 $ZSVR: STATUS 1504 - EBCD05 TAPE OPENED ON
$TNLT303
23:30 05AUG15 222,00,025 $ZSVR: STATUS 1516 - EBCD05 TAPE ON DRIVE
$TNLT303
USED BY 0,221
23:30 05AUG15 222,00,025 $ZSVR: ERROR 1007 - DSM/TC REPLY ERROR: 100
23:30 05AUG15 222,01,958 $TNLT303 Sense Key: Blank Check, LDEV $387
23:30 05AUG15 222,01,958 $TNLT303 Sense Key: Blank Check, LDEV $387
23:30 05AUG15 222,01,958 $TNLT303 Sense Key: Blank Check, LDEV $387
23:30 05AUG15 222,01,958 $TNLT303 Sense Key: Blank Check, LDEV $387
23:30 05AUG15 222,01,958 $TNLT303 Sense Key: Blank Check, LDEV $387
23:31 05AUG15 222,00,221 LSD2-I3487 NSK tape virtualization of volume
EBCD05
(labels BACKUP) successfull. 24 MB data and 8 file-marks copied
23:31 05AUG15 222,00,221 LSD2-I3495 NSK tape virtualization ends. 1
volume
successfully copied for 24 MB. 1 volumes skipped
23:31 05AUG15 222,00,025 $ZSVR: STATUS 1512 - EBCD05 TAPE DISMOUNTED
FROM DRIVE
$TNLT303
23:31 05AUG15 222,00,025 $ZSVR: STATUS 1512 - TAPE DISMOUNTED FROM
DRIVE
$HALT300
```

OEMS2 - EMS Messages Display

Content of OEMS2:

```
?TACL routine
[#CASE [#EXCEPTION]
|_CALL| ==
|_ERROR| #PUSH errtxt
#ERRORTEXT /CAPTURE errtxt/
#OUTPUTV errtxt
#POP errtxt
#RETURN
|_BREAK|
#OUTPUT Break key pressed, stopping [#PROCESS]
stop
#RETURN
|ABORT|
#RETURN
] == END CASE
#FRAME
#PUSH #INFORMAT
#FILTER _BREAK
#SET #INFORMAT TACL
emsdist /name / type printing, filter $DATA05.BPAK.EMSFILT2, &
collector $0, textout [#myterm]
#UNFRAME
```

OEMS - EMS Message Extraction

Content of OEMS:

```
fup purge emsout
fup /in EMSFUPIN /
stop $EMSP1
emsdist /name $EMSP1 / type printing, filter EMSFILT2, &
collector $0, textout EMSOUT, &
time 24 feb 2006 08:00, &
stop 24 feb 2006 09:50
```

TAPEWR - Performance Test

Sample:

```
CLEAR ALL
DELETE DEFINE =TAPE1
RESET DEFINE *
ADD DEFINE =TAPE1, CLASS TAPE, FILEID testfile, VOLUME LSMM11, &
LABELS ANSI, RETENTION 0
RUN bpak.TAPEWR =TAPE1 56000 500 100 200
TAPEWR
--------
PPARAM's in use...
```

```
UNLOAD : ON
maxNoWait : 5
BUFFERMODE : ON
BACKBOXVOL : ON
Volume label : LSMM11
Volume Group : NO_CATALOG
Command line parameters ....
File size to write: 500 MB
Number of Blocks : 9,362
Length of Blocks : 56,000
Varout, minReclen : 100,
maxReclen : 200
Start time : Fri Nov 16 12:22:05 2012
End time : Fri Nov 16 12:22:14 2012
Elapsed time : 9 seconds
Rate : 55.56 MB/sec
```

TAPERD - Performance Test

Sample:

```
ADD DEFINE =TAPE1, CLASS TAPE, VOLUME TST001, &
LABELS ANSI, BLOCKLEN 56000, FILEID testfile, USE IN
RUN TAPERD =TAPE1 56000
```

Trace Macros

Sample:

```
LOAD BBSETUP MACROS
LISTT *
TRCZ3Z2 22 12:11:47.40 ConnectDM I3073 MountId: \LEOMIRA.129. Volume
QTN410 lo
TRCZ3Z4 22 12:11:50.48 LogMessage BB1-I5043 Running [FetchData] oper-
ation for (
TRCZ3Z5 22 12:12:03.52 EndVolumeOperation QTN410
TRCZ3Z7 22 12:12:08.94 ConnectDM I3023 MountId: \LEOMIRA.130. Volume
QDN347 lo
TRCZ3Z9 22 12:12:13.06 ConnectDM QTN410
TRCZ3ZA 22 12:12:26.65 EndVolumeOperation QDN347
TRCZ3ZC   22   12:12:28.65   LogMessage   BB1- I5029   The   script
[E:\QC\SCRIPTS\BACKUP.CM
TRCZ3ZD   22   12:12:30.37   LogMessage   BB1- I5030   The   script
[E:\QC\SCRIPTS\BACKUP.CM
TRCZ3ZF 22 12:12:34.18 ConnectDM I3073 MountId: \LEOMIRA.131. Volume
QTN411 lo
TRCZ3ZH 22 12:12:42.18 LogMessage BB1-I5043 Running [FetchData] oper-
ation for (
TRCZ3ZJ 22 12:12:53.07 EndVolumeOperation QTN411
```

```
TRCZ3ZL 22 12:13:01.81 ConnectDM I3023 MountId: \LEOMIRA.132. Volume
QDN348 lo
VIEWT TRCZ3ZF
```

Operations samples

OBB017

```
COMMENT
********************************************************************
COMMENT * BackBox Data Store cleanup *
COMMENT * *
COMMENT * 1- BB017_FREE_EXPIRED in all Data Stores, free storage
allocated *
COMMENT * to volumes expired in DSMTC and TMF catalogs *
COMMENT * *
COMMENT * 2- BB023_DEL_BACKEDUP in "Windows files" data stores,
delete backed*
cOMMENT * up files according to the Volume Group config*
COMMENT * *
COMMENT * 3- BB022_CHECK_SPACE in "Windows files" data stores, *
COMMENT * check the available disk space *
COMMENT *
COMMENT * PARAM BB017IGNORECHECKHDR1 1 (TO BYPASS hdr1 check on NSK)
COMMENT * DEFAULT 0
COMMENT ************************************************************
LOAD/KEEP    1/$DATA05.BPAK.BBSETUP    $DATA05.BPAK.MACROS    PARAM
BB017IGNORECHECKHDR1 0
BB017_FREE_EXPIRED OUT $S.#BBOX.BB017
BB023_DEL_BACKEDUP STOREID ALL, OUT $S.#BBOX.BB023
BB022_CHECK_SPACE OUT $S.#BBOX.BB022 COMMENT
```

BB017_FREE_EXPIRED

```
BBOX-BB017 Free BackBox expired storage 2015/02/05 23:14
SCRATCH Volumes to process : NEW
Minimum size of volumes to purge: 0 KB
Timeout per Delete script run : 1 minutes
List of expired tape volumes that have been freed up:
Label Type Last Load Last Write Count Volume Group
----- ---- ---------- --------------- ------------
VSW001 BACKUP 2015-02-03 8 MB BACKDSK
VSW002 BACKUP 2015-02-04 8 MB BACKDSK
VSW009 BACKUP 2015-02-03 13 MB BACKDSK
51 Volumes in BackBox catalog
1 Volumes not in DSM/TC or TMF
50 Volumes in DSM/TC or TMF
15 Scratch
35 Assigned
0 Released
```

```
0 Other/unknown status
I3173 BackBox storage space purge of expired tape volumes. 51 volumes
in catalog, 3 volumes purged.
BBOX-BB017 ends at 2015-02-05 23:16
```

BB023_DEL_BACKEDUP

Sample Report for a StoreOnce:

```
QCBLADE-BB023 Delete backed up Windows files 2016-09-10 13:44:18
Execution window from: to: , max duration: 00:03
Store id to clean up: WINETI1
Processing will be interrupted on: 2016-09-10 13:47:00
Data Store: WINETI1 DATASTORE WINDOWS
Label Last update Last access Size (MB)
----- --------------- --------------- -----------
Clean job was submitted for data store WINETI1. It is submitted as a
long-run background process for StoreOnce storage
Data store total
0 volumes for which Windows files have been deleted
0 Windows files deleted
0 MB deleted
Grand total
0 volumes for which Windows files have been deleted
0 Windows files deleted
0 MB deleted
QCBLADE-BB023 ends at 2016-09-10 13:44LSD3-BB023 Delete backed up Win-
dows files 2016-08-21 10:38:36
```

BB022_CHECK_SPACE

Sample report:

```
BPAK-BB022-A Check disk space in Windows Data Stores 2016-03-17
11:49:31
Data Store Disk Space used (MB) Free space (MB)
---------- ---- -------------- ---------------
WIN1
\\BB1\WIN1_D1 65 9,053
\\BB1\WIN1_D2 57 136,037
\\BB1\WIN1_D3 61 5,555
Total Data Store 183 150,645
WIN2
W3218 Disk path D:\LSAL\LSD3\WIN2 in Store WIN2 is not accessible
Total Data Store 0 0
BPAK-BB022-B Volume Groups per BackBox Data Store 2016-03-17 11:49:47
Data Store : WIN1 (Type WINDISK)
Volume Nbr of Uncompressed Compr. Nbr of SCRATCH Potential size of
group volumes data size(MB) ratio SCRATCH ratio SCRATCH vols (MB)
```

```
------ ------- ------------- ----- ------- ----- ----------------
ABC
10 135 1.46 8 80% 2,920
BPAK-W3313 Only 30% of SCRATCH Volumes available in Volume Group
DSMTC_ETINIUM. Volume Group has reached the warning level of 80%. 3
volumes are SCRATCH out o
f 10 volumes in the Volume Group.
DSMTC_ETINIUM
10 344 3.80 3 30% 119
QTOS
5 0.01 1.12 n/a n/a n/a
Data Store : WIN2 (Type WINDISK)
Volume Nbr of Uncompressed Compr. Nbr of SCRATCH Potential size of
group volumes data size(MB) ratio SCRATCH ratio SCRATCH vols (MB)
------ ------- ------------- ----- ------- ----- ----------------
BACKDSK
2 0 0 0% 0
TSTS_NOCAT
1 0 n/a n/a n/a
BPAK-BB022 ends at 2016-03-17 11:49
```

APPENDIX B – EXTERNAL TAPE DEVICE INSTALLATION

⚠️ This section does NOT apply to the Virtualized BackBox.

For materialization and virtualization, physical tape devices must be installed in a VTC and configured in Windows as regular tape devices.

For virtualization, direct connection can be established between a BackBox VTC and an HPE VTS.

See below how to install the external tapes. Once installed, they are configured and operated the same way in the UI.

⚠️ If a restore script is configured, it is assumed that the files will be backed up again by the enterprise backup software when the files are discovered in the new disk location. The Back-Box does not submit the backup script after a **Move from Spare**. If the Data Store is configured for backups through the script, the user has to manually initiate the backup of the moved file.

In a multi VTCs installation, it is possible to dedicate a VTC to the materialization and virtualization, running no tape emulation for NonStop.

Old tape drives attach to the Windows server by SCSI copper cables require Windows Server 2003. This may force the installation of a dedicated VTC. With a dedicated VTC, the old legacy equipment will not impact the performance and stability of the tape drive emulation for the NonStop hosts.

Physical Tape Device Attachment

**Virtualization from physical tape drive**
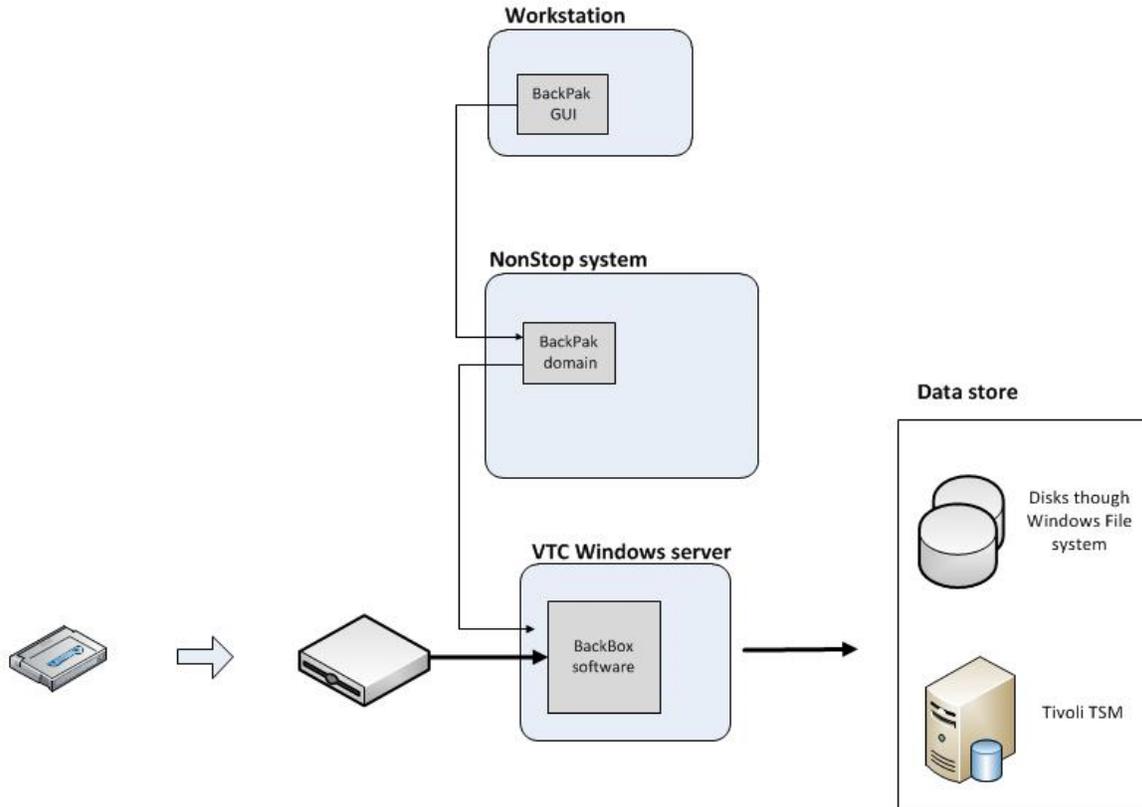
The tape drive must be physically connected to the VTC and the appropriate Windows tape driver must be installed. If there is no Windows driver for the tape drive, the VTC is able to access the legacy drives in raw mode. A BackPak license option is required to access legacy drives.

Auto-loaders are supported.

The Windows Media Manager in Windows 2003 Server must be uninstalled.

Attachment to Another Virtual Tape System
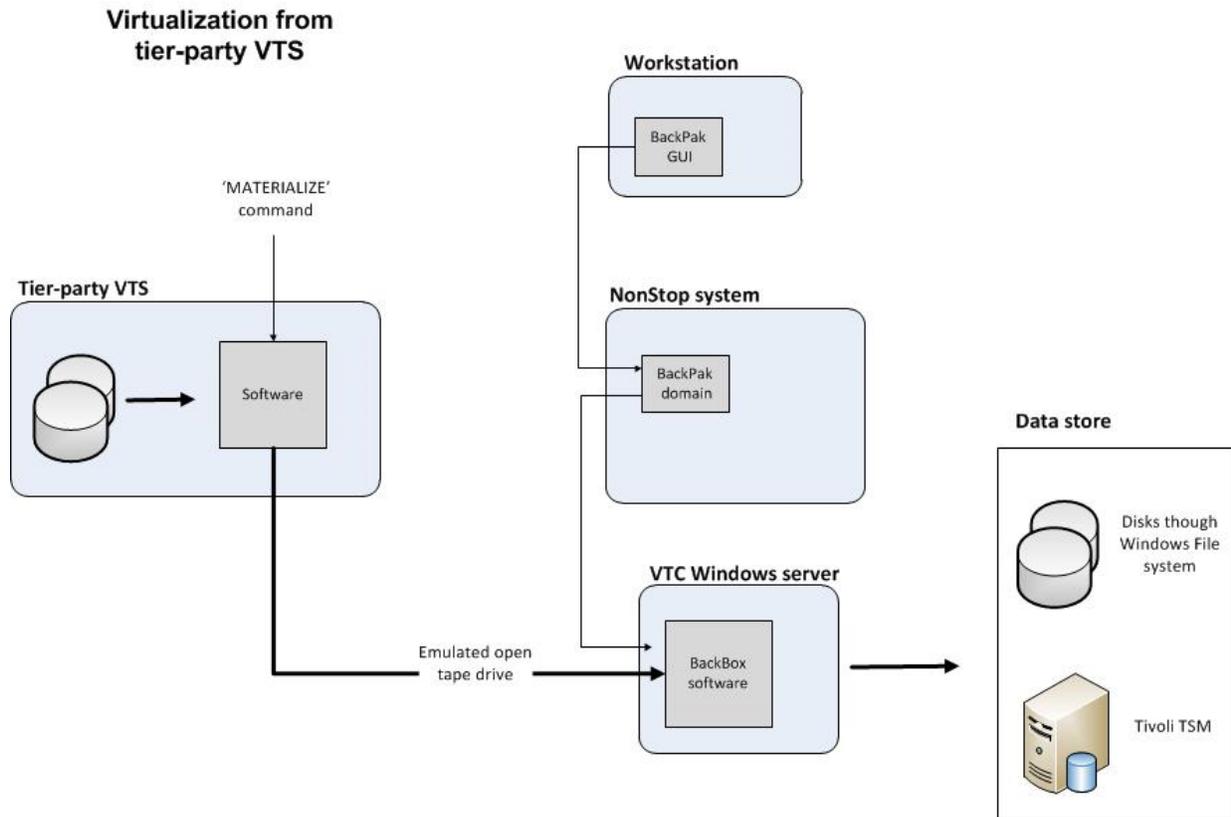
Images of virtual tape volumes can be exchanged directly with a tier party Virtual tape unit. The transfer is possible only from the third party to the BackBox system, i.e. for virtualizations. Like the BackBox, other Virtual tape systems are able to materialize/virtualize. In addition, the BackBox VTC is able to provide to the other system a device that appears as a physical tape drive. This link allows a third party virtual tape unit to export its media to be virtualized on the VTC.

To install:

- In the VTC, one FC port is dedicated to the Unix or Windows emulation and one or several tape drives must be configured on this port.
- A cable connects the VTC (target-mode tape controller) to the third party virtual tape unit (host tape controller).
- The tape devices are configured in the third party OS.

VTC Configuration

⚠️ NonStop devices attached to the VTC should be stopped before the service is restarted.

Update Fiber Ports Configuration

On the VTC Server, start the VTC Management Console and expand the FC category node. Navigate up to the Fiber Port that will be used to connect to the external VTS.
Change the Port type to EXTERN. 8 Devices will automatically be defined.
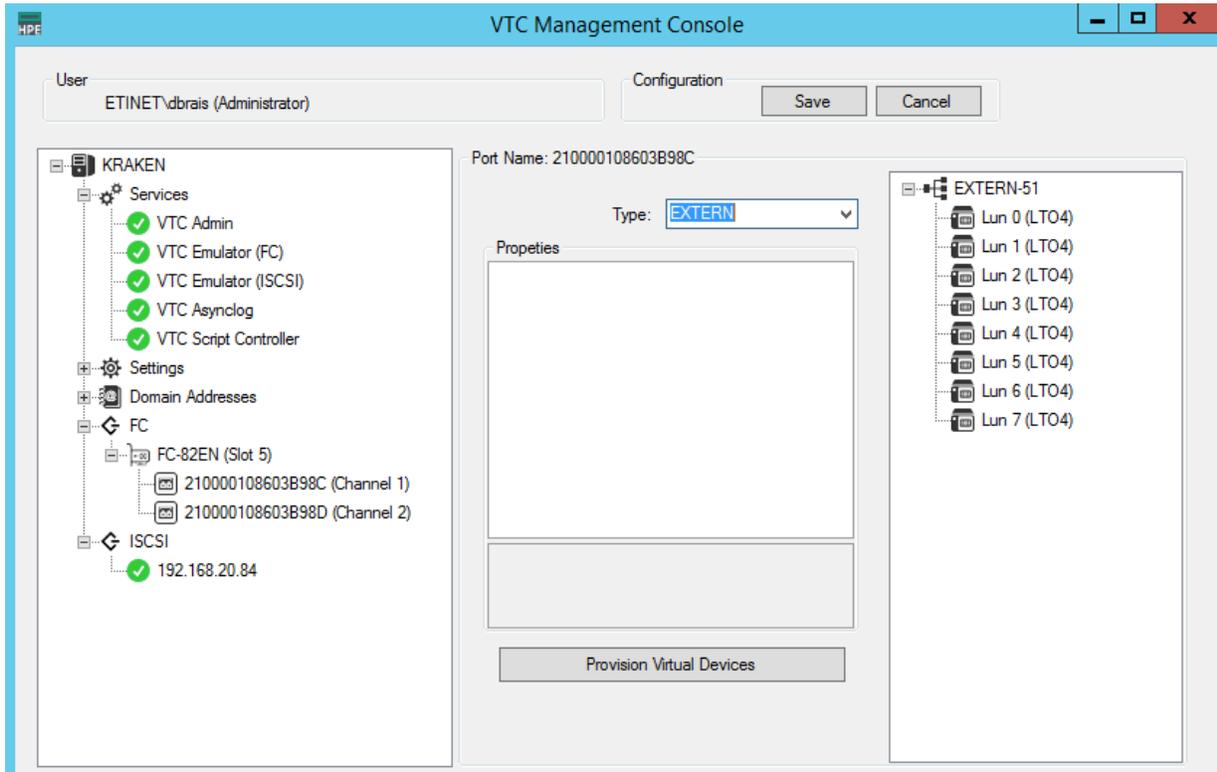
Device emulation can be changed by right-clicking on a specific LUN device or globally by right-clicking on the EXTERN root port. The Emulation type selection box can then be used.
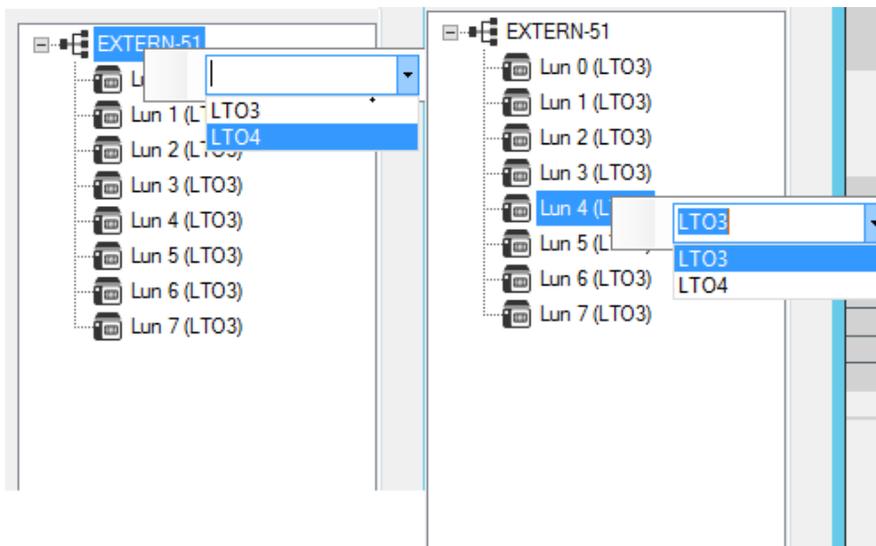
If more or less LUN are needed, use the Provision Virtual Devices dialog box and check or uncheck the LUN number to add or remove from the list. The LUN 0 must always be defined. There are actually no properties that can be set using the EXTERN port type.

When finished, click on the **Save** button and restart the **Services**.

Configuration in the BackPak Domain

For both physical devices and devices emulated by the VTC for another Virtual Tape System, two items must be configured in the Domain configuration through the BackPak UI:

- In VT Controller Advanced Properties, the physical/external tape device(s) must be detected by the VTC and be given a name, i.e. an Alias.
- In Data Store, the VTC that has attached physical/external tape devices, must be a route of the Data Store where virtual volumes will be read or written.

Storage Access in the VTC

The VTC server needs to be prepared to access the Data Store. For example, the IBM Spectrum Protect™ (TSM) API software might have to be installed or the access to remote disk share must be verified.
The access to WINDISK Data Stores can be tested in the BackPak UI on the Storage Admin page, by selecting the VTC with attached external tape as a route to the Data Store.

APPENDIX C – MIGRATION TO BACKBOX

This appendix presents general guidelines for migrating legacy tape storage to BackBox with a focus on the tape media, their content, and their cataloging:

On each site, the migration period requires detailed planning for data in storage, tape catalogs in the NonStop systems and tape drive operations.

NonStop Tape Catalogs

For tape catalogs on NonStop, the BackBox migration functionality is the same for all three catalog types BackBox can access: DSM/TC, TMF and QTOS.

The migration functions (Virtualize Volume, Import from Tape Catalog and the Volume group auto-import feature) work the same way for these three catalog types.

Media Type

BackBox provides emulation for the following media types: CART3480, LTO2 (to mount on LTO3 drives), LTO3, and LTO4, providing a native media type support to all NonStop systems from G06.xx to J06.xx.

If the BackBox media is virtual, the media type is not related to the volume format (except LTO4 which has to be accessed with HPE VLE Encryption) and is not assigned to each volume individually. However, the media type registered in the catalogs DSM/TC and CA must match the emulation type of the tape drive for $ZSVR read/write of a loaded media.

BackBox can manage different media types and device types in a single system and single VTC. It selects the tape drive appropriate to the media type configured in the Volume Group.

During a migration, it might happen that:

- The legacy system uses a media type that is not supported by BackBox (for example, DLTIII).
- An S-Series system that supports CART3480 is replaced by a Blade that does not support CART3480.

In these two cases, the media type of the volume cataloged in DSM/TC or CA must be modified when the volume is moved to the new environment. This change of media type is automatically done by BackPak, in DSM/TC only (not in CA), as part of the three migration functions (**Virtualization**, **Import from Tape Catalog** and the Volume group **auto-import** feature).

This change is reported in EMS by the message #3427: `Media type of volume %s changed from %s to %s in %s %s, to match the configuration of the Volume group %s.`

Short Term Expiration

Short term expiration usually reduces the migration work load. A large part of tape volumes is often written for a short term retention of either 7 or 30 days. It is much more economical to wait for the volumes with short time legacy to expire than to configure them with long time retention settings.

New Tape Labels

Creating BackBox volumes with new labels involves:

- Modifying the backup OBEY files. For DSM/TC, the POOL of the TAPECATALOG define must be modified. (The restore jobs are not affected).
- Running BACKCOPY to move the non-expired data to the BackBox system. The data will be re-cataloged while being copied.

Re-using old tape labels involves:

- Controlling the two storage systems.

	New Tape Labels	Re-use Old Tape Labels
Backup OBEY files	Must be updated (for DSM/TC change the POOL in TAPECATALOG defines) when new tape label is created	No change required
Restore OBEY files	No change required	No change required
Copy of non-expired data to BackBox storage	BACKCOPY Backups and backup content are cataloged twice until the original backup is deleted. Heavy data flow on the NonStop	BackBox virtualization No change in catalogues. Data is moved directly between the storage systems.
Automatic load in the legacy system	Can be kept running for the restores.	Must be stopped. Mount requests to be executed manually in the legacy system.

Available Functionality to Migrate Volumes to BackBox

Migration of ASSIGNED Volumes

The data of these volumes must be converted to the BackBox format to be restored through BackBox. To migrate the tape content:

- Duplicate the content by a NonStop utility to different tape labels in BackBox. Use BACKCOPY for backups, FUP for ANSI tapes.
- Use OBB055 to do a low level cloning with no re-cataloging.

The legacy tape system provides and reads the source tapes as BackBox has written the target tapes. Multi-volume backups might be re-organized in fewer and more BackBox tape volumes, depending on the capacity and compression configured in BackBox.
The new volumes in BackBox must be cataloged again in DSM/TC. For a backup with the CATALOGFILES option, this might considerably increase the size of the DSM/TC database until the old backup is un-cataloged in DSM/TC.
- Virtualize the media to BackBox volumes with the same set of tape labels.

Multi-volume backups are reproduced to the exact same set of tape labels.
This operation is transparent to any tape catalog and what was cataloged is still registered for the same tape labels.
BackBox will register the tape volume in its catalog when the tape data is actually written in the BackBox storage.

Migration of SCRATCH Volumes

SCRATCH Volumes can be migrated only when the same tape labels are to be re-used in BackBox, so that the migration is transparent to existing tape catalogs and to NonStop OBEY files.

Specific functionality allows moving SCRATCH Volumes under the control of BackBox without converting expired data. In the Volume tab, the page Import from Tape Catalog allows to select volumes that are SCRATCH and also populate the BackPak's own catalog. The imported volumes are ready for new backups. As the migration may last several months, some volumes may expire earlier, and they should be ready for reuse before they are virtualized. Auto-import will pick up these specific volumes.

This feature is enabled when the BackBox Volume Group is configured for IN-PROGRESS migration.

When $ZSVR issues a mount request for a SCRATCH volume, BackPak tries to process it even if the volume is unknown in BackPak.
If the requested volume belongs to one of the tape catalogs associated with BackPak Volume Groups configured for "Migration to BackBox" IN-PROGRESS:
- The volume will be automatically registered in BackPak.
- The volume will be loaded for backup and stored as a BackBox virtual media.

Concurrent Operation of Legacy System and BackBox

Two scenarios of concurrent operations are supported; the choice of scenario is configured in the Volume Groups, through the Migration to BackBox parameter.

Migration Feature	Migration None	Migration In Progress	Migration Being Prepared
Auto-import SCRATCH Volumes	No	Yes	No
Automatic load	Yes	Yes	No. Does not prevent a manual load.
Automatic update of the tape DSM/TC TAPEVOLUME entry to match the media type emulated by BackBox	Yes	Yes	No

When there is a migration, the *Migration to BackBox* is usually set to **In Progress**:

1. Switch to using BackBox for all new backups.
2. Assigned volumes data is acquired by BackBox.

During the migration, BackBox executes new backups and restores from recent backups written by Back-Box. For restoring from volumes not yet migrated, the legacy system must still be able to load volumes.

⚠️ If a new series of tape labels were created for the BackBox, the data migration is made by BACKCOPY on different labels.

Each backup is cataloged twice in DSM/TC. The possible load automation in the legacy system can be kept running and there would be no likelihood for potential confusion.

⚠️ If the same set of volume labels must be re-used by the BackBox system, the data migration is made by BackBox virtualization that does not involve the NonStop tape system.

Each backup is kept cataloged once in DSM/TC. The legacy system must not automatically load volumes that could also be automatically loaded by BackBox.

3. Remove the legacy tape system.

When Migration to BackBox is set to *Being prepared*, the legacy system is still used in the same manner for all NonStop tape applications:

1. Start-up: Nothing changed for backup and restore. Still operated by the legacy system.
2. Data of assigned volumes is acquired by BackBox virtualization.

Each backup is kept cataloged once in DSM/TC. Because of the *Being prepared* status, BackBox will not modify the media type and will not automatically load the volume if $ZSVR issues a mount request.

3. Switch to BackBox for backup and restore, and removal of the legacy tape.

Sample Plan for Migration with Re-Using Existing Cataloged Labels

This can be applied to DSM/TC, TMF and QTOS, with these following special notes for TMF:

⚠️ Re-using existing labels is not possible when TMF has a single pool of virtual volumes. Round-robin should be enabled to help visually distinguish in which tape system the volumes were written (TMFCOM ALTER CATALOG, ROUNDROBIN ON).

Initial Status

The BackPak configuration is assumed to be completed.
The VTCs, the Data store, and the Volume group paired to the DSM/TC, QTOS or TMF catalog are configured.
Be sure the Volume Group is set for **Auto-import**, such as the volumes that expired during the migration period and requested for a new backup would automatically be registered in BackPak and processed by BackPak.
A VTC is equipped with physical tape drives or direct connection to third party VTS to allow virtualization and the cloning of legacy media to BackBox virtual volumes.
No volume is yet registered in the BackPak domain for this Volume Group.
In this example, it is assumed that the legacy tape media is physical media, the VTC is equipped with an auto-loader and the tape catalog is set to TMF type.

> **Step-1**: Switch Write Operation to BackBox

- Prevent any new mount requests for backups (TMFCOM ALTER AUDITTRAIL ..., AUDITDUMP OFF).

- Make sure that the legacy tape system will not mount any tape.

- Register in the BackPak domain all volumes that are currently SCRATCH.

  On the BackPak UI > **Volume** > **Import from Tape Catalog**, select the Volume group and ask for registering only SCRATCH Volumes.

- Allow new mount requests for backups (TMFCOM ALTER AUDITTRAIL ..., AUDITDUMP ON).

- Be sure the EMS Extractor is running for the BackPak domain.

  > **Step-2**: Migrate the Non-Expired Tape Volumes.

- Load a set of legacy tapes in the auto-loader.

- Submit the virtualization of the media loaded.

  On the BackPak UI >**Volume** > **Virtualize** > enable **Searching in DSM/TC, TMF and QTOS catalogs** > select the VTC that has the auto-loader > select **All tape drives** > select the NonStop node where the catalog is located.

- The Virtualization task reports the processing of each volume in EMS.

- The Virtualization status can be requested from the Virtualize page.

    In Step 2, a legacy volume might expire. If a new backup request is issued, BackBox should automatically register it and load it. This special case is reported by the EMS message #3445:

```
Automatically importing the SCRATCH volume %s requested by a backup
and found in the NonStop catalog %s, (volume group: %s).
```

    Step-3: Stop Using the Legacy Tape System

- Register the latest legacy volumes that have expired in the BackPak domain.

    On BackPak UI > **Volume** > choose **Import from Tape Catalog** > select the Volume group and ask for registering only SCRATCH Volumes

- Verify all the legacy volumes are now in the BackBox system.

Volume summary page can be compared to the number reported by DSM/TC: MEDIACOM INFO TAPEVOLUME *, POOL xyz

- Update the BackPak configuration to disable the Auto-import in all Volume groups.