

Tape Your Data **NOW!**



Dmitrii Popov

Product Management, R&D
Veeam Software



Vinh Pham

Senior Systems Engineer,
System Engineering
Veeam Software



Agenda

- The history of tape
- What's new in V12
- Tape best practices
- Most common issues with tape
- Caveats and best practices
- Q&A





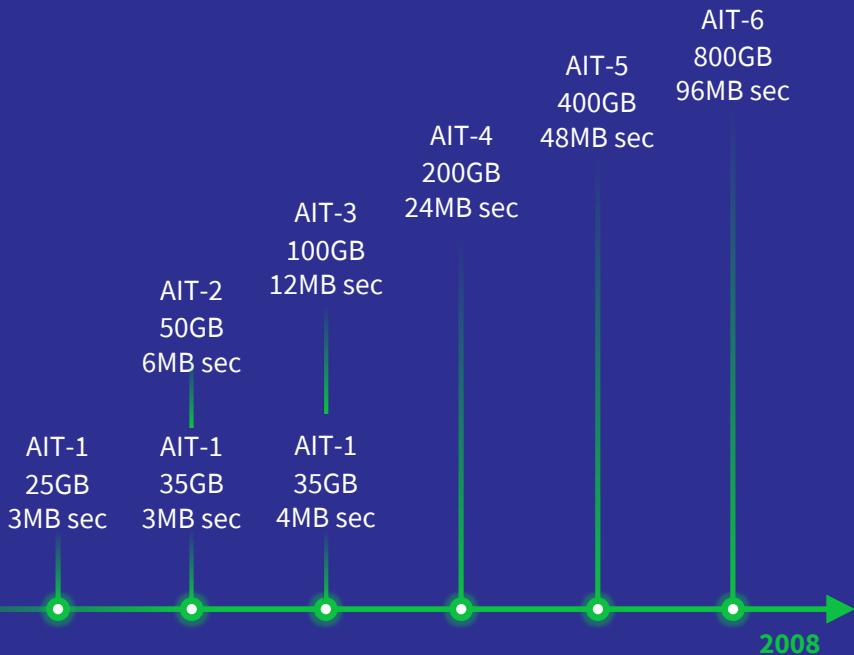
History of tape



univac *system*

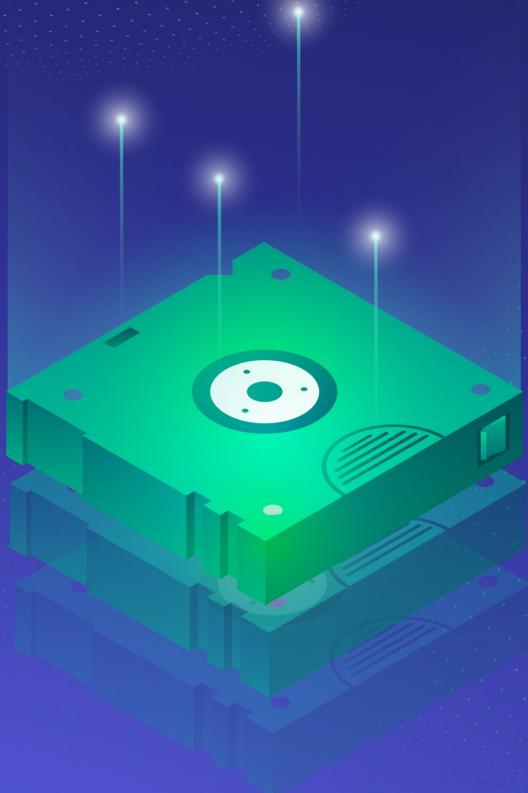
AIT

Sony became standard for 8 mm tapes



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Introducing LTO



Ultrium consortium

½" tapes became the new standard.

LTO consortium created early 1990's.

- LTO consortium defines new standards and road maps for tape technology.

SONY

IBM

maxell

Quantum

 **Hewlett Packard
Enterprise**

FUJIFILM

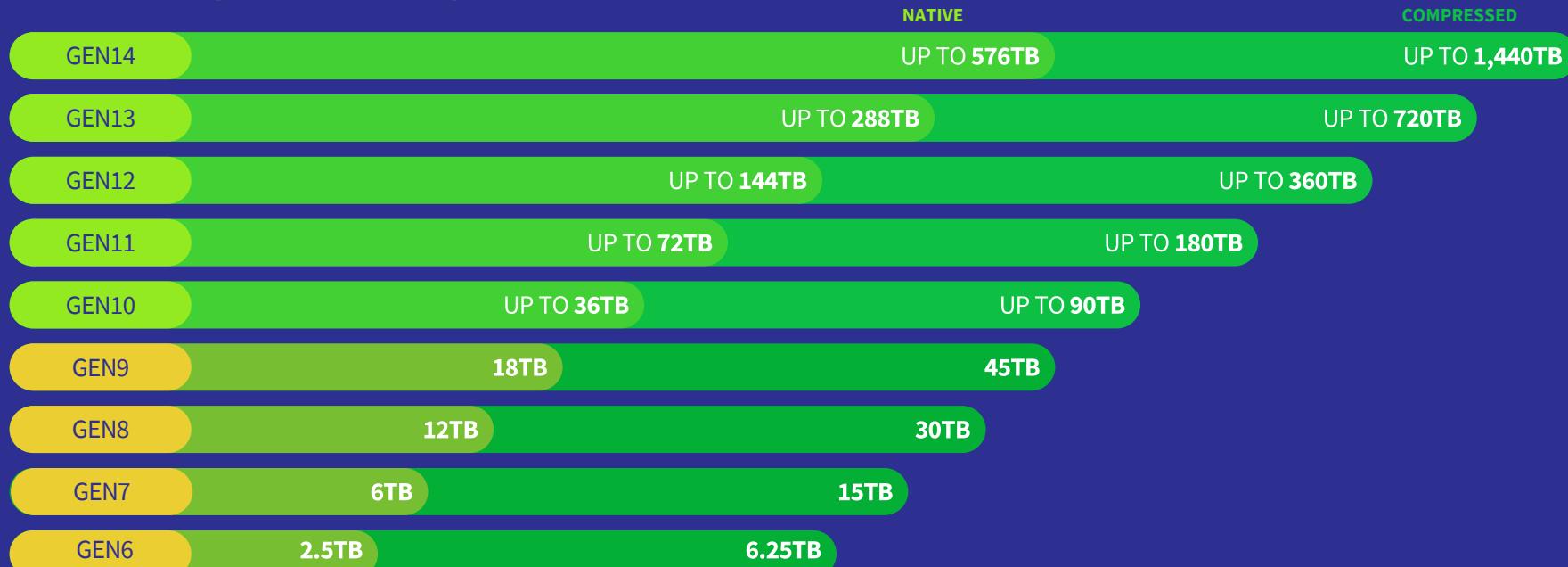
imation

**SPECTRA**



LTO ULTRIUM ROADMAP

Addressing your storage needs



PARTITIONING ENABLED LTFS | ENCRYPTION | WORM

NOTE: Compressed capacities assume 2.5:1 compression (achieved with larger compression history buffer).

SOURCE: The LTO Program, The LTO Ultrium roadmap is subject to change without notice and represents goals and objectives only. Linear Type-Open LTO, the LTO logo, Ultrium and the Ultrium logo are registered trademarks of Hewlett Packard Enterprise Company, International Business Machines Corporation and Quantum Corporation in the US and other countries. Please contact your supplier/ manufacturer for more information.

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IBM Quantum

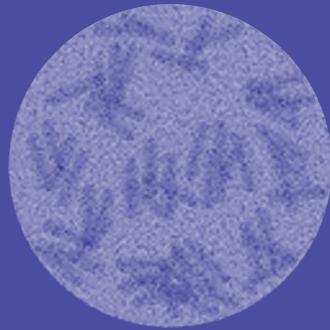
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Metal Particle vs. Barium Ferrite

Barium Ferrite released with LTO6. Becomes the new standard for .5-inch tape substrate.

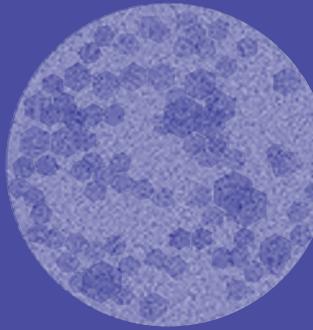
Oxidation is one of the main causes for particle deterioration and data loss. Barium Ferrite is pre-oxidated.

Metal Particle



40-100 nm

Barium-Ferrite



20 nm

GMR vs. TMR



- Tape drives uses same heads as disk drives.
- LTO8 began transition from GMR to TMR drive heads.
- Disk drives implemented TMR in 2006.

● =AMR ● =Transition from GMR to TMR
● =GMR ● =TMR

Bit error rate of tape

.5 inches x 1000 meters vs 3.5 inches by 8 platters.

Tape = 1 bit for every 10^{17} .

Enterprise disk = 1 bit for every 10^{12} .

Table 1.LTO-9 Reliability

	HDD	LTO-9
Reliability (9s)	0.99999999999 (or twelve 9s)	0.9999999999999999999 (or seventeen 9s)

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

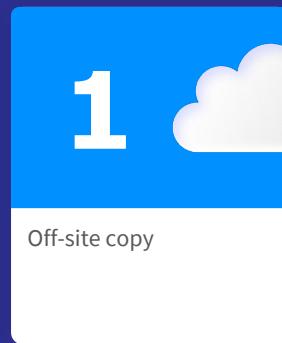
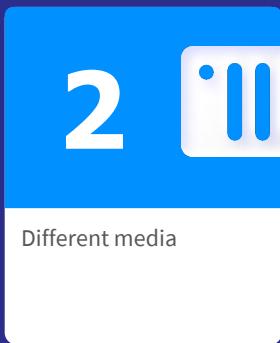
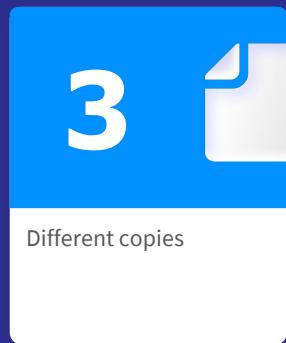
Economics of tape

<https://lto.org/tco-calculator/>

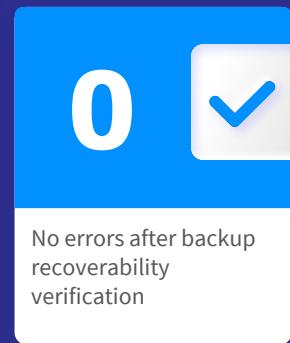
1 PB, 15% yearly growth, 10-year TCO.

	Tape	On-premises JBOD	Hyperscale	Oracle	Wasabi
Storage Expense	\$ 73,661.44	\$ 492,065.96	\$ 666,039.48	\$ 243,647.16	\$ 1,266,952.02
Capital Costs	\$ 4,088.16	\$ 652,273.48	\$ 0.00	\$ 0.00	\$ 0.00
Administration/ Maintenance Costs	\$ 50,000.00	\$ 182,733.46	\$ 550,000.00	\$ 550,000.00	\$ 550,000.00
Command Charges	\$ 0.00	\$ 0.00	\$ 438.51	\$ 41.76	\$ 0.00
Egress charges	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Energy	\$ 0.00	\$ 29,237.35	\$ 0.00	\$ 0.00	\$ 0.00
Floor Space	\$ 22,250.40	\$ 15,000.00	\$ 0.00	\$ 0.00	\$ 0.00

Backup strategy rule to live by



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Ultra resilient media types include....

Veeam® Ready Object
with Immutability



WORM (Write Once Read Many) –
tape media or tape media
removed/3mm ejected



WORM storage snapshots



Veeam Cloud Connect
with Insider Protection



Veeam Hardened Repository



Copies that require
4-Eyes Recovery



Offline, air-gapped media copies on disk
(removable/rotating)

Honorable mention:
FC replication

Caution: replication,
storage snaps

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What's new

What's new in V12



Object storage support



Trusted immutability



Cyber resiliency

What's new in tape support

- ✓ Tape server on Linux.
- ✓ LTO9 support enhanced.
- ✓ Reworked file to tape jobs.
- ✓ Expanded workload support.
- ✓ Back up to tape jobs with NAS backups as a source.

And many, many more!



Veeam Backup & Replication v12: **what's new**

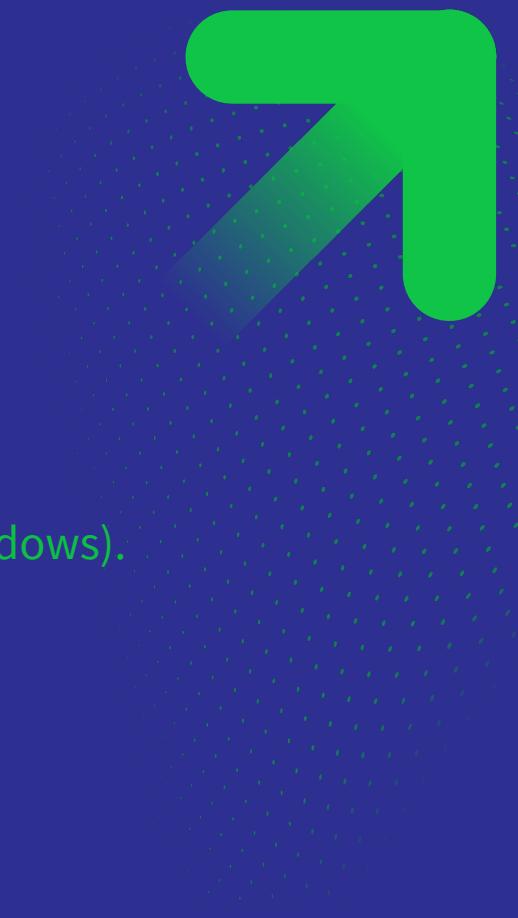
https://www.veeam.com/veeam_backup_whats_new_wn.pdf



WHAT'S NEW

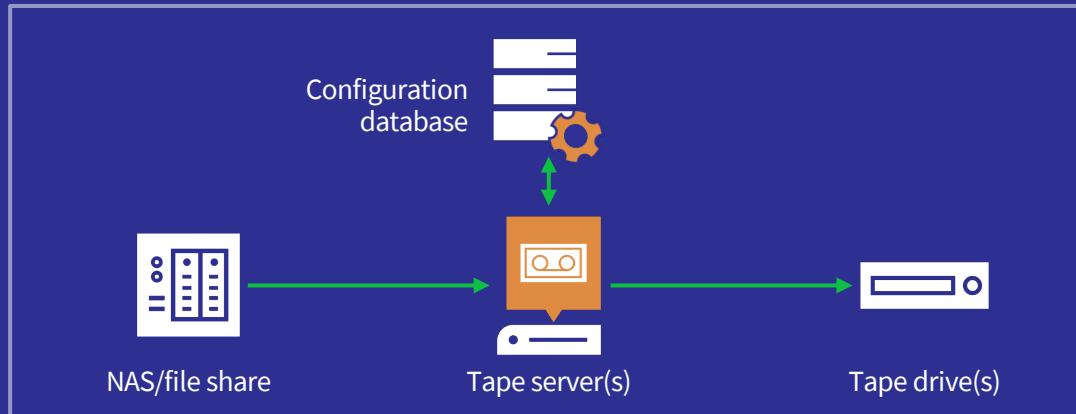
What's new in tape support

- ✓ Run directly on Linux Repository*.
- ✓ Save Windows license costs.
- ✓ SCSI drivers used.
- ✓ No vendor drivers for library or drives (easier than on Windows).



File to tape

- 1 Tape server(s) read files from NAS.
- 2 Configuration database stores index/catalog.
- 3 Files stored on tape (Microsoft tape format).
- 4 Retention applied “per tape” (regular active full required).



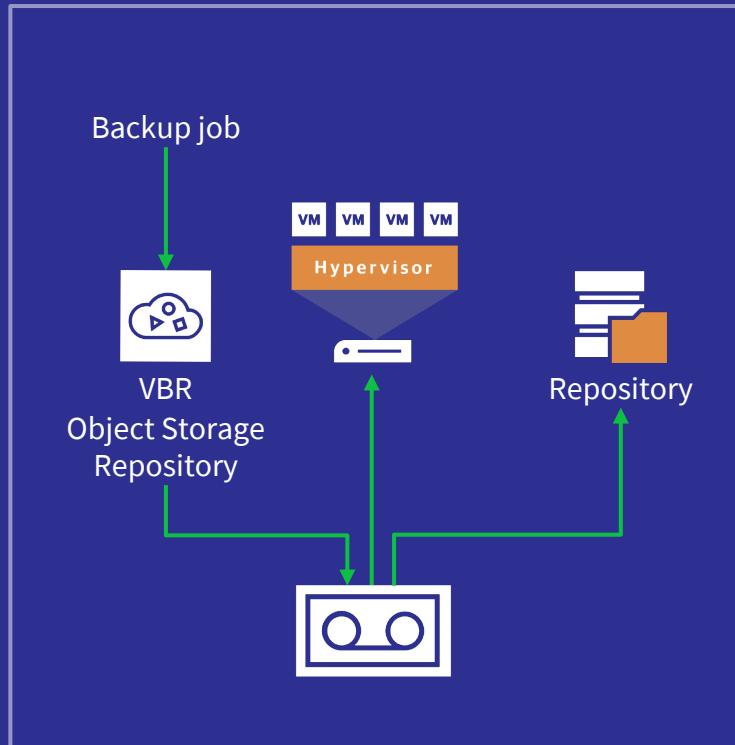
Object Storage Repository Support

Backup

- Same as from any other repositories.
- VBK/VIB image files on tape.

Restore

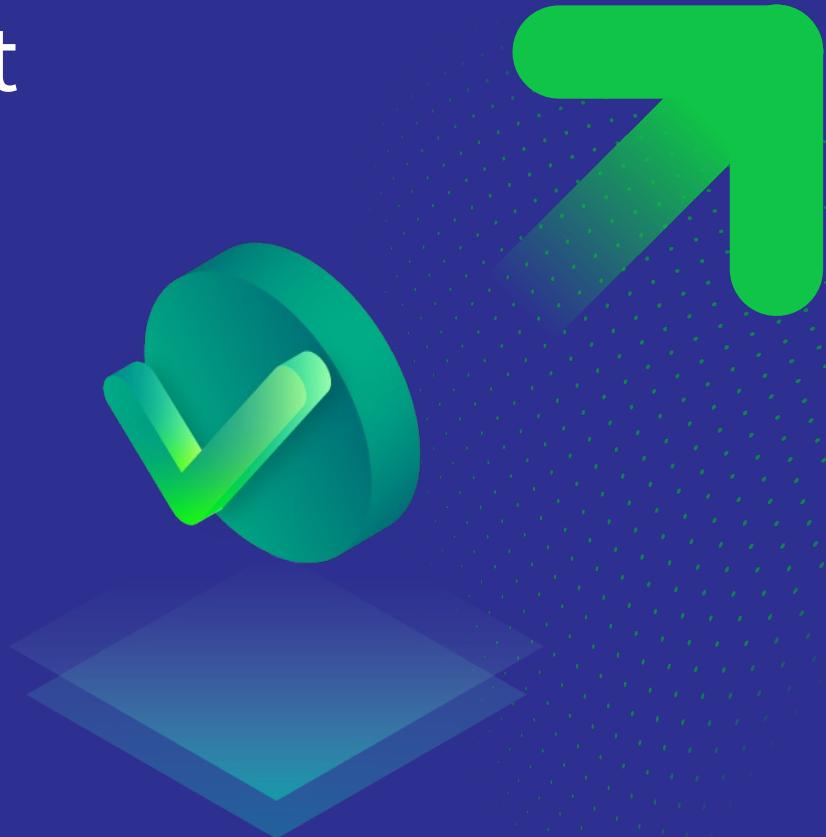
- Direct to infrastructure or to “classic” repository (block / NAS)



Improved LTO9 support

Hotfix for initialization available for 11a.

V12 works out of the box with LTO9.





Best practices

Sizing

Tape server sizing:

- Physical server with 8 cores 32GB RAM baseline
- 800MB RAM/1,000,000 files for file to tape jobs
- 800MB RAM/1,000,000 files for catalog jobs
- 300MB + 10GB for temp caching disk space

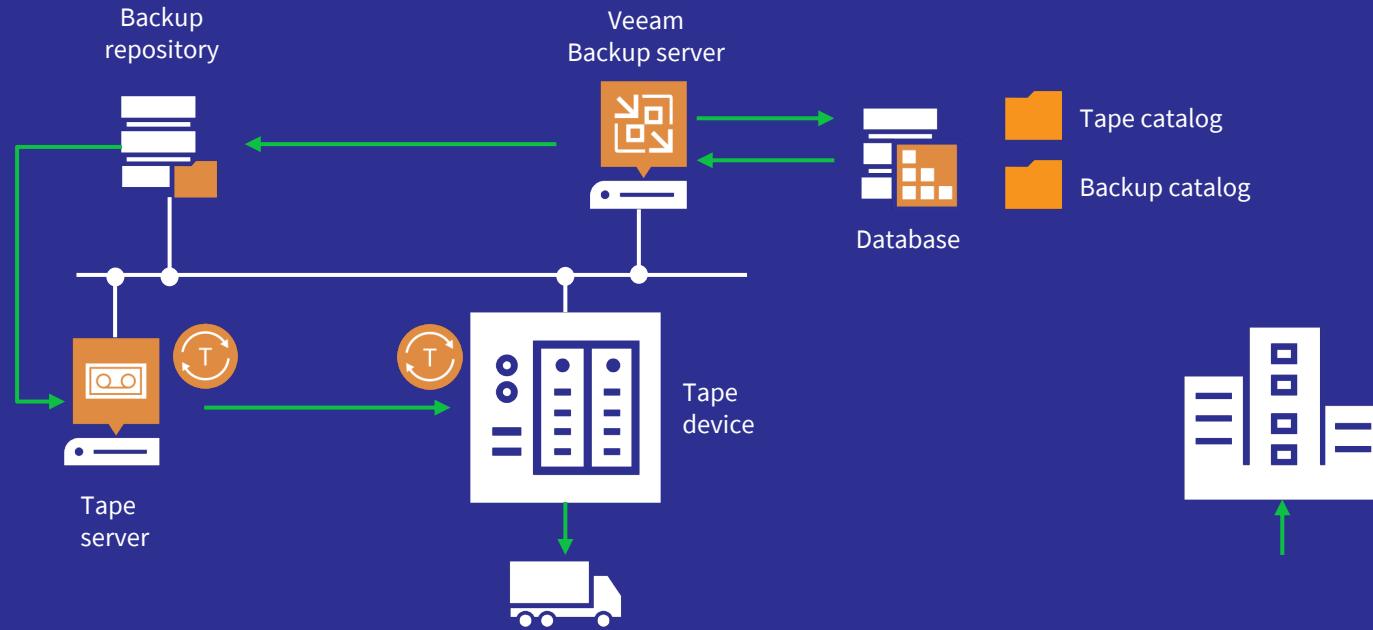
Backup Server: 1.5 GB RAM per 1,000,000 files

Must leverage PostgreSQL or SQL standard for files jobs over 1,000,000 files

*Standard Linux repository – no hardened repository



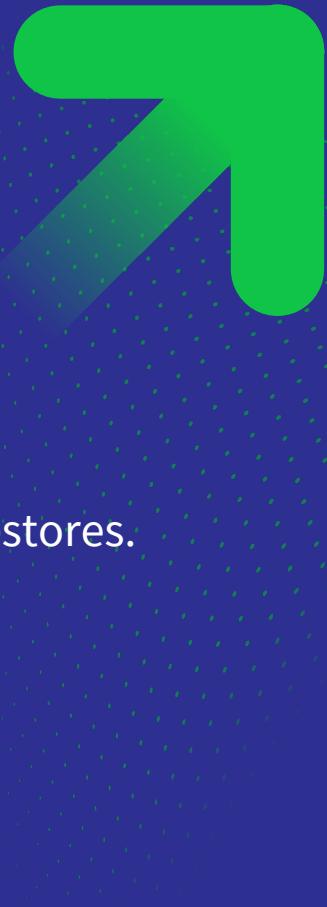
Back up to tape



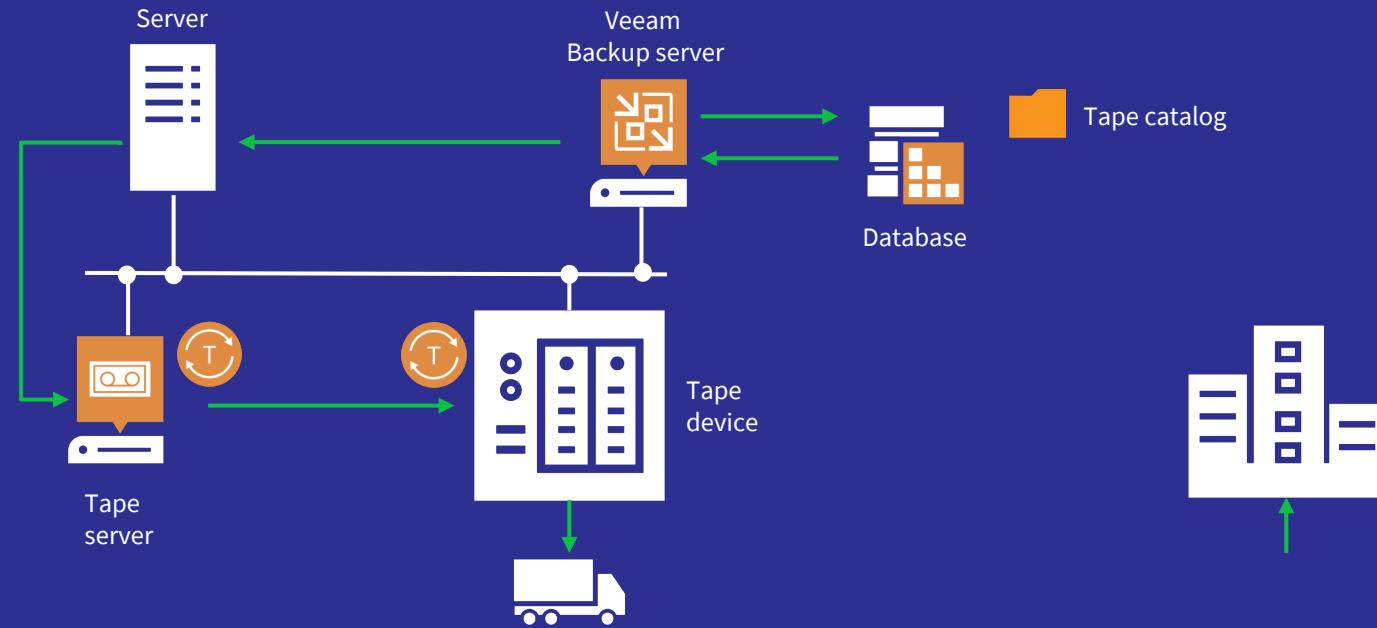
Back up to tape

- Must be at Enterprise Plus*.
- Consider reverse incremental if tape jobs are high priority.
- Server log files skipped during backup to tape jobs.
- Do not use hardware compression if leveraging Veeam compression.
- 100 Mb of disk space per 1TB of VM tape data on tape server during restores.
- Restoring from tapes to object storage repositories not supported.

*Standard Linux repository – no hardened repository



File to tape



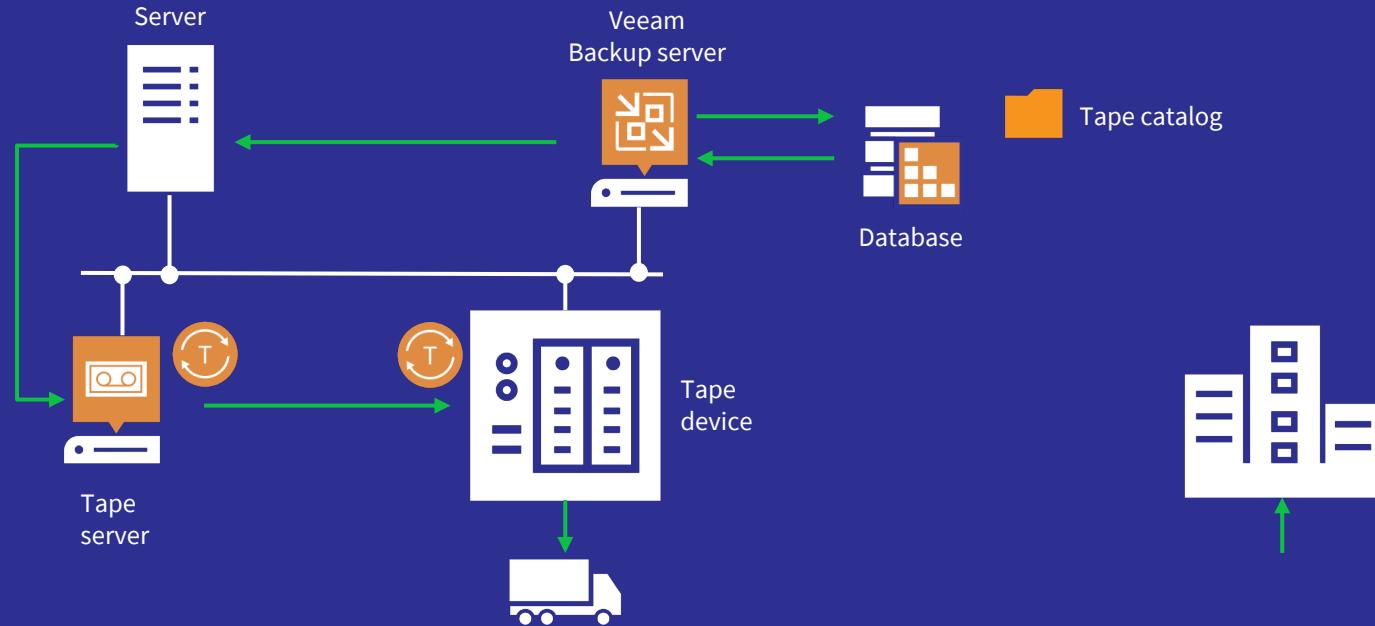
File to tape

- Leverage PostgreSQL or SQL standard as B&R DB.
- File to tape copy now consumes instance license.
- Ensure files and folders does not contain certain Unicode symbols:
 - U+D800 – U+DFFF, U+FFE, U+FFFF (55296 – 57343, 65534, 65535), U+007C (124)
- Backup of Symlinks not supported.
- 2.6 GB of RAM per 1,000,000 files for backup server during restores.
- Restore to original location not supported if NAS filers are the source.

*Standard Linux repository – no hardened repository



NDMP to tape



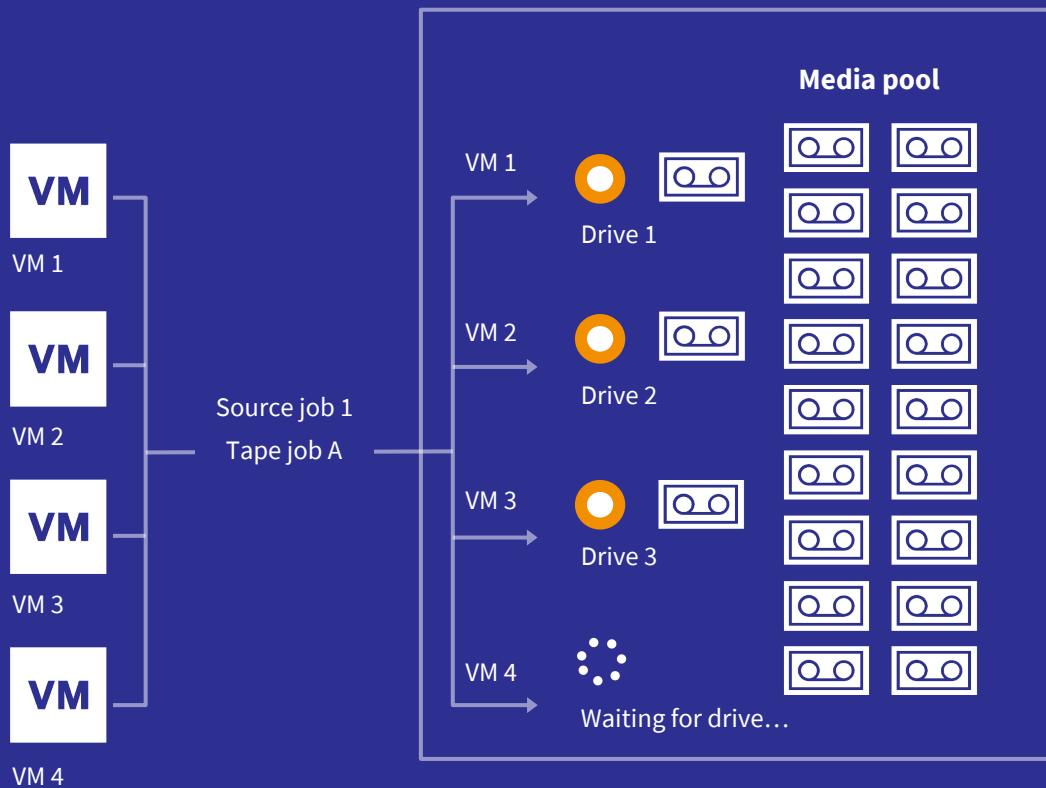
NDMP to tape

- Enterprise Plus* required.
- NDMP version 4 or higher.
- Maximum of 10 restore points supported.
- Does not consume a license.
- Cannot add NDMP volume to multiple backup jobs.
- Only restore of whole volume supported.
- Only restore to original location or to a similar NDMP server supported.

*Standard Linux repository – no hardened repository



Parallel processing

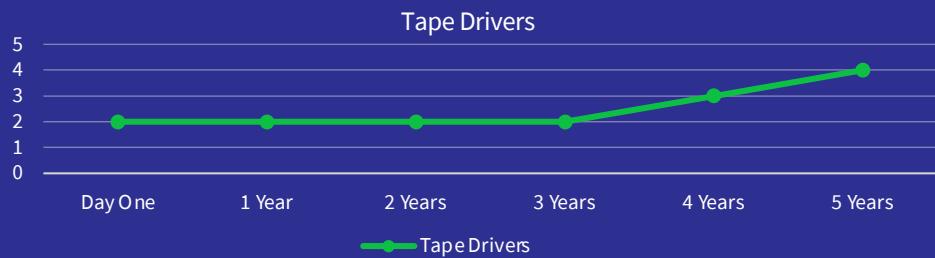


Sizing a tape library

	Values	Description
Tape Drive Type	LT08 FH	Drive type in Library
Compressability of data	Not	Not=1:1 Medium=1.875:1 High=2.5:1
Custom Compression Ration	1	Customer supplied compression ratio
Functional Tape Capacity (TB)	12.00	
Rated Tape Speed (MB/s)	360	Maximum performance
Tape Speed Efficiency	75%	Percent of max performance expected
Functional Tape Speed	270	

For a Media Set		
Full Size (TB)	35	
Full Frequency (#days pe week)	1	
Full Retention – in library (#weeks)	5	
Full retention -out of lib #copies	0	
Full Backup Window (Hours)	36	How many hours are available for fulls
Daily Size (TB)	5	How big is daily backup in TB
Daily Frequency (#per week)	4	
Daily Retention – in library (# of weeks)	5	How many copies are saved out of Library
Daily Retention – out of lib #copies	0	
Daily Backup Window (Hours)	8	
Data growth rate	25%	Annual growth of data
Spare Space for future backups (weeks)	2	Two is the minimum recommended
Export Slots	10	1 for T50e, increments of 10 for T200 up

	Day One	1 Years	2 Years	3 Years	4 Years	5 Years
Full Backup Size in TB	35	44	55	68	85	107
Daily Backup Size in TB	5	6	8	10	12	15
Tape Drives	2	2	2	2	3	4
Tapes needed in Library	38	48	58	68	88	112
Tapes, fulls, out of lib	0	0	0	0	0	0
Tapes, Daily, out of lib	0	0	0	0	0	0
Total tapes	38	48	58	68	88	112
Slots	48	58	68	78	98	112
Full Tapes per week	4	4	6	6	9	12
Daily Tapes per week	2	4	4	4	6	8
Tapes per week	6	8	10	10	15	20





Most common issues

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What's next?



Share your feedback!

- Veeam R&D Forums.
- Talk with us.
- Sales or support teams.





Thank you!

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