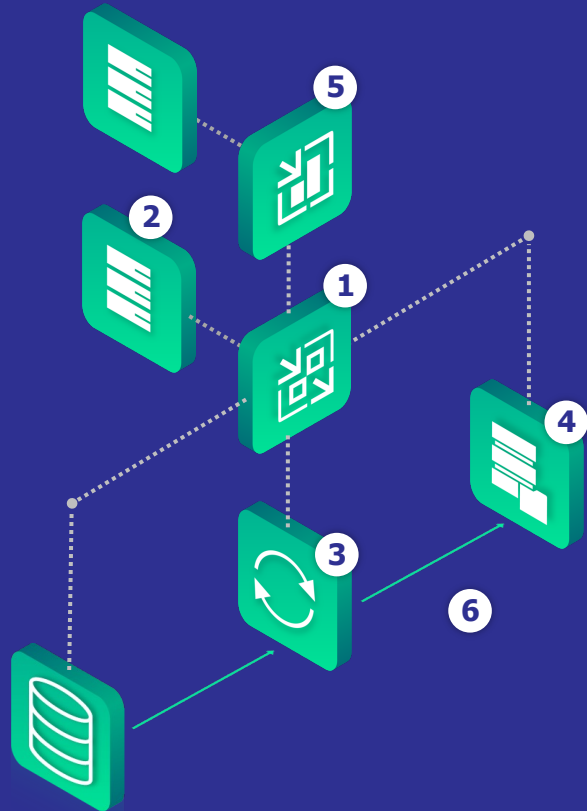# Agenda

- Backup repository
- Scale-out Backup Repository (SOBR)
- Object storage repository
- NAS backup & cache repository

Main components

Veeam Backup & Replication™

1. Veeam® backup server
2. Database server(s)
3. Proxy server
4. Repository server
5. Veeam Backup Enterprise Manager
6. Combo server (proxy and repository)

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Backup repository

Repository server

How to size: compute

Per task (VM or agent)

One CPU core for every task

(usually one-third of proxy cores)

Plus, one CPU core for every concurrent offload task

Per task (VM or agent)

4GB for every task (min 2GB)

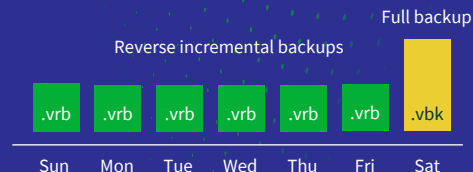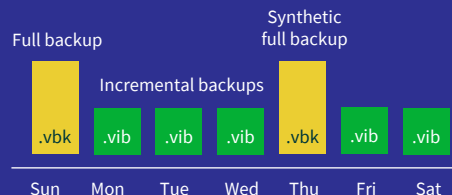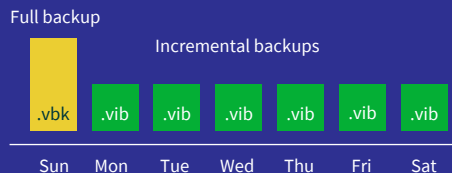+2GB for every concurrent offload task

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Repository server

How to size: capacity

Space usage

Calculated based off retention points and backup method used
See calculator.veeam.com/vbr for calculations

Full backup

Incremental backups

.vbk	.vib	.vib	.vib	.vib	.vib	.vib
Sun	Mon	Tue	Wed	Thu	Fri	Sat

Full backup

Incremental backups

Synthetic full backup

.vbk	.vib	.vib	.vib	.vbk	.vib	.vib
Sun	Mon	Tue	Wed	Thu	Fri	Sat

Reverse incremental backups

Full backup

.vrb	.vrb	.vrb	.vrb	.vrb	.vrb	.vbk
Sun	Mon	Tue	Wed	Thu	Fri	Sat

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Repository server

Input values:

300TB source data
Retention
- On-site: seven days (synth full Saturdays), ReFS.
- Off-site: four weeks/six months/four years.
Offload to object after seven days
Daily change rate 10%

Example calculation

On-site:

$$(full) + (inc. * (days\ \text{-}1 + 6)) + workspace = capacity$$

$$\frac{300TB}{50\%\ data\ reduction} = \textbf{150TB (full)}$$

$$150TB\ (full) * 10\% = \textbf{15TB (incremental)}$$

$$(150) + (15 * (7\ \text{-}1 + 6)) + \textbf{53.1} = \textbf{383.1TB}$$

Off-site (object storage):

$$(150) + (15 * (4w + 6m)) + (4 * 150) = \textbf{930TB Min*}$$

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SOBR

Considerations

1. Try to keep extent count < 16

2. Pay attention to placement policy

3. Separate VM/Agent backups from NAS/plug-in backups

4. Metadata extents for NAS

5. Cloud offload

6. Block cloning does not span extents

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SOBR

NAS & metadata extents

1. When mixing dedupe storage with SSD storage: set SSD storage as metadata extents to improve transform performance

2. Assign via PowerShell

3. Metadata replica will exist on data extent also — not used

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Object storage repository

Direct to object

Considerations

1. Gateway(s)

2. Bucket security

3. Bandwidth

4. Object store limitations

5. Storage class (minimum stay)

6. Egress cost (Hotel California Syndrome)

7. Capacity, API cost, immutability

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Direct to object

Gateway(s) & bucket security

Connection Type

Choose a connection mode for this object storage repository. For the Direct mode, ensure backup proxies and backup agents have direct network access to object storage. For the Gateway mode, we recommend having at least two gateway servers for redundancy.

○ Direct
Backup proxies and agents will connect directly to object storage.

● Through a gateway server
Backup server will automatically determine the most suitable gateway server from the following list:
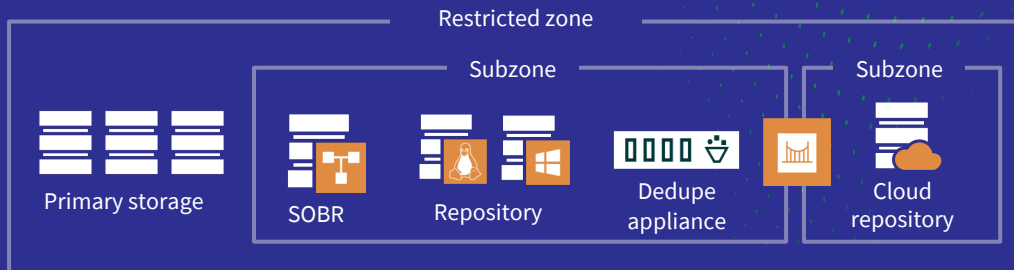
Name
- ☐ cacherepo01.protekt.local
- ☐ ec2-52-41-87-75.us-west-2.compute.amazonaws.com
- ☑ fp01.protekt.local
- ☐ fp02.protekt.local
- ☐ gtw01.protekt.local
- ☐ helper01.protekt.local
- ☐ hlr01.protekt.local
- ☐ hlr02.protekt.local
- ☐ linp01.protekt.local
- ☐ vbr12.protekt.local
- ☐ winp01.protekt.local

Select All
Clear All

Connection mode:
fp01.protekt.local

Specify whether object storage should be accessed directly or via selected gateway servers.

EDIT POLICY

```
8        "s3:PutObject",
9        "s3:GetObject",
10       "s3:DeleteObject",
11       "s3:GetBucketLocation",
12       "s3:GetBucketVersioning",
13       "s3:GetBucketObjectLockConfiguration"
14   ],
15   "Resource": [
16       "arn:aws:s3:::orossisecurebucket01/*",
17       "arn:aws:s3:::orossisecurebucket01"
18
```

Restricted zone

Subzone

Primary storage

SOBR

Repository

Dedupe appliance

Subzone

Cloud repository

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Direct to object

Bandwidth

B/W = Backup data/backup window

Object store limitations

Object metadata implementation
(DB, on-disk…)

New Scale-out Backup Repository

Performance Tier
Select backup repositories to use as the landing zone and for the short-term retention.

Name	Extents:
Performance Tier	Name
Capacity Tier	mbucket01
Summary	mbucket02

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Direct to object

Storage class

	S3 Standard	S3 Intelligent-Tiering*	S3 Standard-IA	S3 One Zone-IA†	S3 Glacier Instant Retrieval	S3 Glacier Flexible Retrieval	S3 Glacier Deep Archive
Designed for durability	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	(11 9's)	(11 9's)	(11 9's)	(11 9's)	(11 9's)	(11 9's)	(11 9's)
Designed for availability	99.99%	99.90%	99.90%	99.50%	99.90%	99.99%	99.99%
Availability SLA	99.90%	99%	99%	99%	99%	99.00%	99.90%
Availability Zones	≥3	≥3	≥3	1	≥3	≥3	≥3
Minimum capacity charge per object	N/A	N/A	128 KB	128 KB	128 KB	40 KB	40 KB
Minimum storage dura charge							**180 days**
Retrieval charge							per GB retrieved
First byte latency							hours
Storage type							Object
Lifecycle transitions							Yes

Cool and Archiv

In addition to the pe... period of 180 days. Additionally... ...er early deletion period of 30 days. This charge is prorated. For example, if a blob is moved to the Archive tier and then deleted or moved to the Hot tier after 45 days, the customer is charged an early deletion fee for 135 (180 minus 45) days of storage in the Archive tier.

Storage Settings

☑ Store archived backups as standalone fulls
To reduce storage costs, we store each backup as a delta from the previous one. For the long-term archive reliability considerations, you may instead choose to store each backup as a standalone full, without any dependencies on previous backups.

☑ Archive backups only if the remaining retention time is above minimal storage period
Avoid processing costs and penalties associated with early data deletion by not archiving backups which will have to be deleted before the minimum storage period expires.
Minimum storage duration for the selected repository: 90 days

[OK] [Cancel]

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Direct to object

Egress cost

Data Transfer OUT From Amazon S3 To Internet

AWS customers receive 100GB of data transfer out to the internet free each month, aggregated across all AWS Services and Regions (except China and GovCloud). The 100 GB free tier for data transfer out to the internet is global and does not apply separately or individually to AWS Regions.

First 10 TB / Month	$0.09 per GB
Next 40 TB / Month	$0.085 per GB
Next 100 TB / Month	$0.07 per GB
Greater than 150 TB / Month	$0.05 per GB

Internet Egress (routed via Microsoft Premium Global Network)

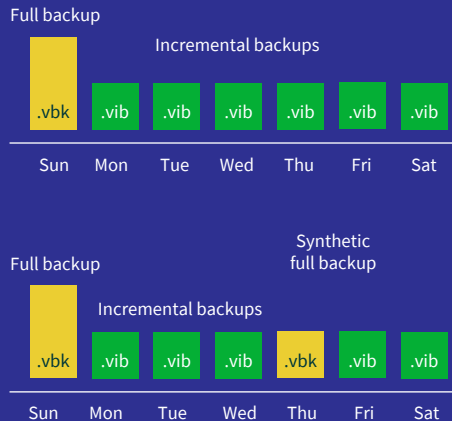| Source Continent	First 100GB / Month	Next 10TB / Month	Next 40TB / Month	Next 100TB / Month	Next 350TB / Month
From North America, Europe to any destination	Free	$0.087 per GB	$0.083 per GB	$0.07 per GB	$0.05 per GB	$0.05 per GB
From Asia (China excluded), Australia, MEA to any destination	Free	$0.12 per GB	$0.085 per GB	$0.082 per GB	$0.08 per GB	$0.08 per GB
From South America to any destination	Free	$0.181 per GB	$0.175 per GB	$0.17 per GB	$0.16 per GB	$0.16 per GB

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Direct to object

How to size: compute

- Same math as backup repository
- Apply to gateway(s) server(s)

How to size: capacity

Full backup

Incremental backups

.vbk	.vib	.vib	.vib	.vib	.vib	.vib
Sun	Mon	Tue	Wed	Thu	Fri	Sat

Full backup

Synthetic full backup

Incremental backups

.vbk	.vib	.vib	.vib	.vib	.vib	.vib
Sun	Mon	Tue	Wed	Thu	Fri	Sat

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Direct to object

Input values:

300TB source data

Retention: seven days, four weeks

Daily change rate 10%

Example calculation

$(150) + (3 * 15 * 2) + (15) + (15 * (7-1 + 6)) \sim$ **435TB**

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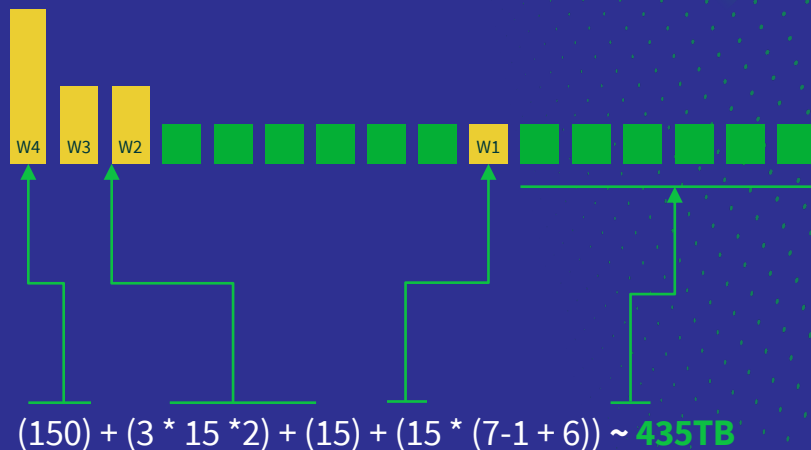
SOBR with Capacity & Archive Tier
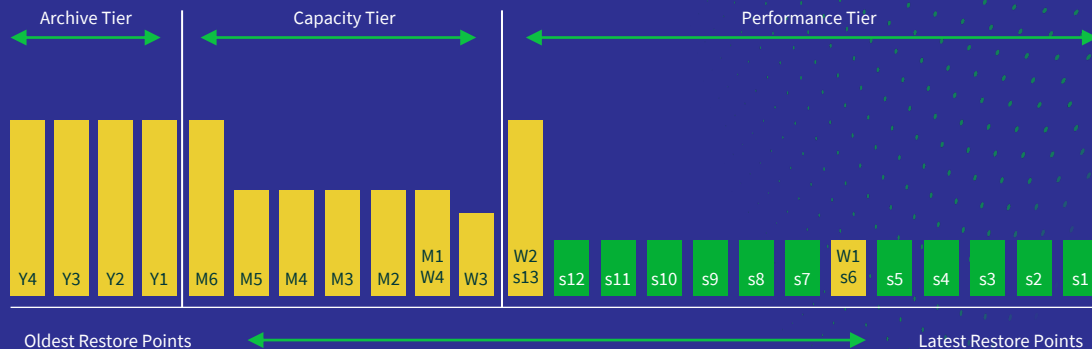
Example scenario:

Retention: seven days, four weeks, six months, four years

Capacity offload: after seven days

Archive offload: after 180 days (standalone fulls)

Performance Tier: leverages block clone

Backup method: forward incremental (i.e., synthetic fulls)

Archive Tier | Capacity Tier | Performance Tier

Y4 Y3 Y2 Y1 | M6 M5 M4 M3 M2 M1 W4 W3 | W2 s13 s12 s11 s10 s9 s8 s7 W1 s6 s5 s4 s3 s2 s1

Oldest Restore Points — Latest Restore Points

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API calls

Direct to object

of PUTs = source data / 1MB
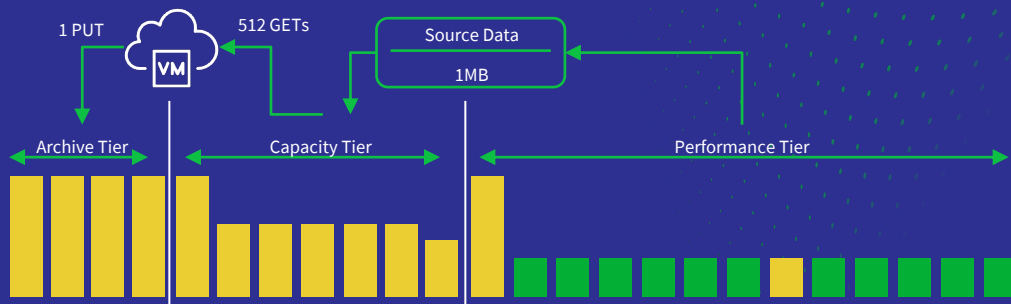
Express per month

First month: full PUTs + 30 inc. PUTs

Last month: 31 inc. PUTs

Immutability

Immutability $\text{PUTs}_{(10\ days)}$ = FULL/1MB

SOBR capacity and archive tiers

1 PUT

512 GETs

Source Data

1MB

Archive Tier

Capacity Tier

Performance Tier

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NAS repository

Cache repository

CPU
Two-thirds of file proxy cores

RAM
4GB per CPU core

Disk
~1GB or 5% of source data (if direct to object)

Repository/gateway server

CPU
1/2 of file proxy cores

RAM
4GB per CPU core

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NAS repository

Repository capacity

Typical data reduction: [100-70%]

Typical change rate: [1-3%]

Metadata + workspace for disk repo: 20% * (full + inc.)

Metadata for object repo: 5% * source data

Repository capacity = full + incremental + meta

API calls

of PUTs$_{(data)}$ = Full(or inc.)/64MB

# of PUTs$_{(metadata)}$ = 20% of PUTs$_{(data)}$

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Thank you!

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