Veeam Backups at Full Throttle!

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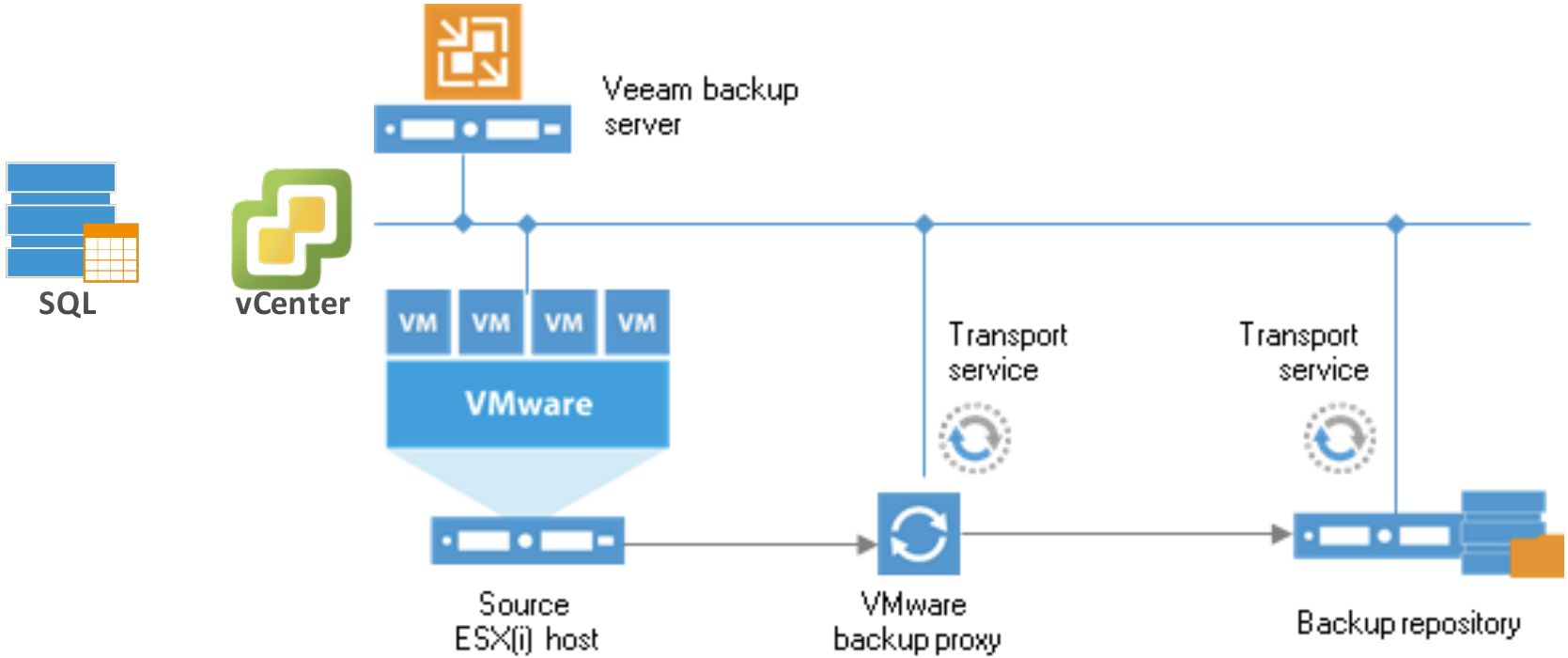
Veeam B&R is like a race car

- With default settings it's pretty fast
- To win the race, you better tune it!
- There are many parameters you can change, and each of them concur to the final performance
- You need to observe the environment first, just like you have specific setting for different race tracks

The Car

What you can tune?



The Race Track

Any virtualized environment has boundaries

vSphere environment

What to look after?

vCenter: VCSA or Windows installer?

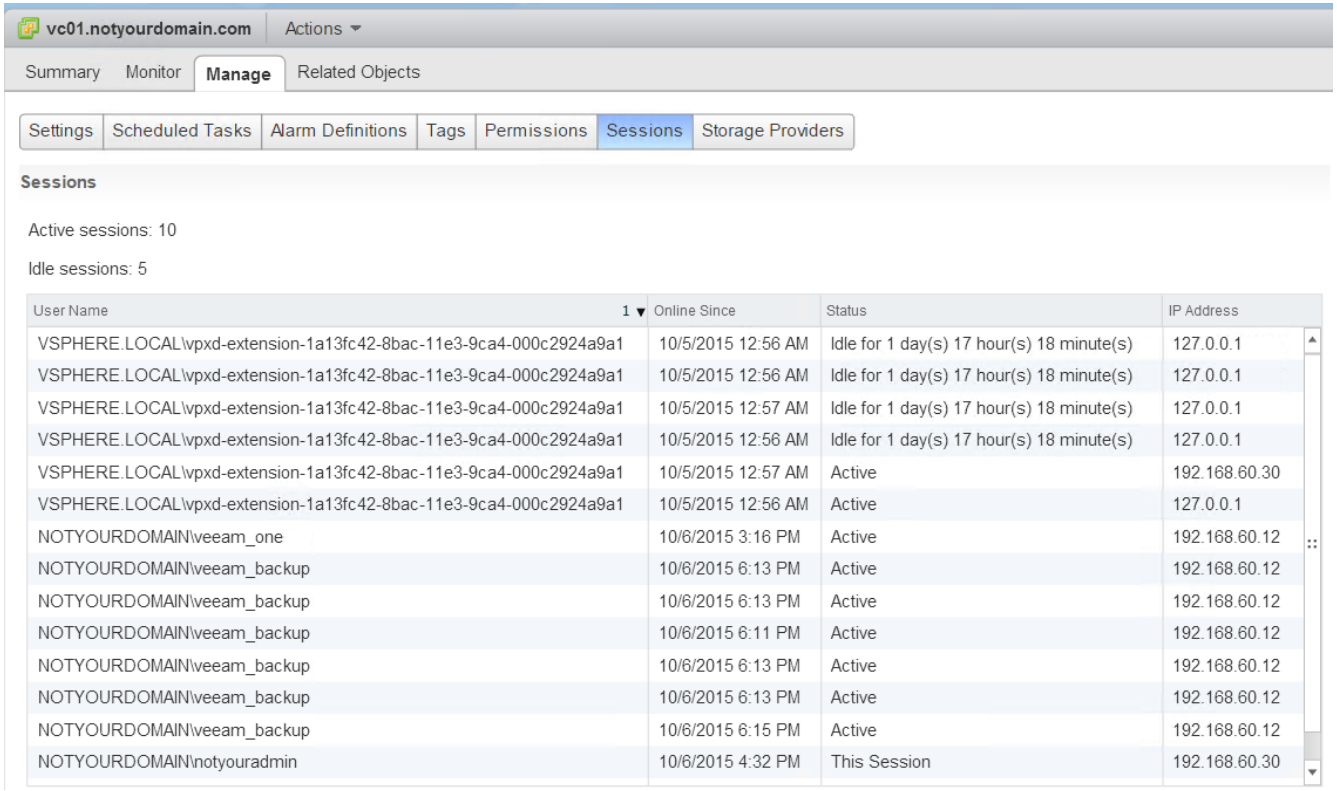
On VCSA, you only take care of the appliance size and performance

On Windows version, check SQL (express, local, remote…)

What to check?

Number of concurrent connections created by Veeam

vCenter connections limits



vCenter connections limits

SOAP session count limit reached

Per default, maximum is 500 connections

http://kb.vmware.com/kb/2004663 (but still applies to 5.5)

Edit vpxd.cfg file :

Add the following <soap> elements within the <vmacore> </vmacore> tags:

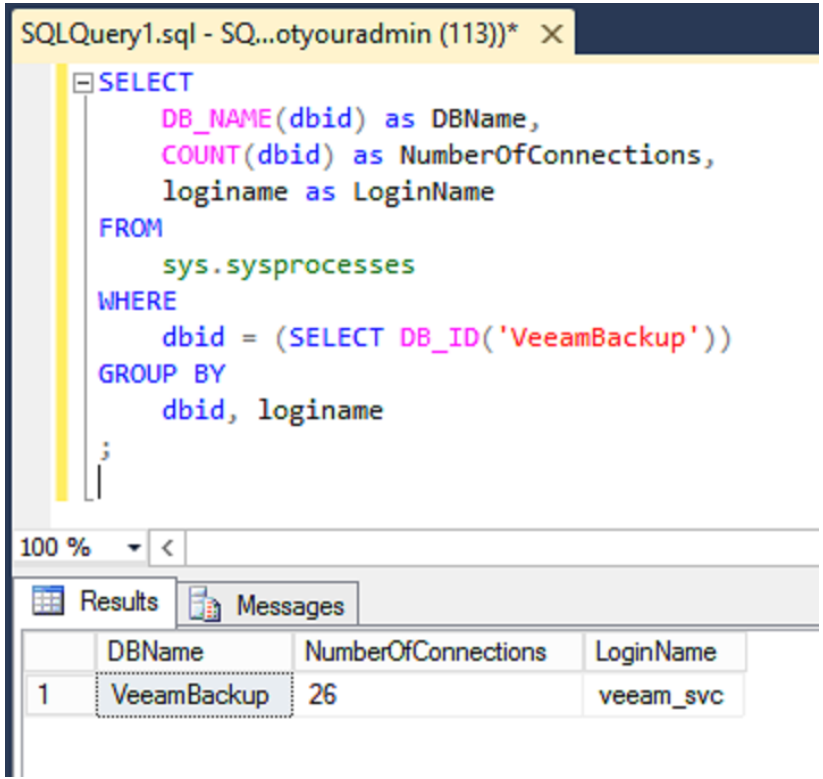
```
<soap>
<!-- Minutes before idle sessions time out -->
<sessionTimeout>30</sessionTimeout>
<!-- Maximum number of open sessions -->
<maxSessionCount>1000</maxSessionCount>
</soap>
```

SQL connections

Veeam is not the only one connecting to a shared SQL

Sometimes you see no apparent activity, go check SQL

SQL Express? 1 socket but multi-core



ESXi limits on NBD

Network mode uses NFC/hostd to transfer data

NFC is limited on resources, especially on 1G networks

NFC has a limit on write cache buffers

Brute force solution #1:use 10G network

Even on 10G, you can improve performances:

- Use at least ESXi 5.0 Update 2
- Increase number of buffers from 2048 to 4096:
  `esxcfg-advcfg -s 32768 /BufferCache/MaxCapacity`
- reduce the Buffer Cache Flush interval from 30 seconds to 20 seconds:
  `esxcfg-advcfg -s 20000 /BufferCache/FlushInterval`

What if you can bend the track?

It’s like The Matrix. Once you’ve got these blue pills …

Remove Veeam limits!

Default values are designed for safety reasons

In larger/powerful environments, tune them

Unleash the beast!

Snapshots per datastore

Limit maximum amount of active VM snapshots per datastore to prevent it from being overfilled with snapshot delta disks.

Ignored when Backup from Storage Snapshots is used.

Default value = 4

Change it with:
MaxSnapshotsPerDatastore (REG_DWORD)

Available since build 7.0.0.771 (V7.0 Patch 2)

WARNING: More concurrent snapshots mean more space consumption. Be careful about completely consuming it!

Snapshots per vCenter

Limit maximum amount of active VM snapshots per vCenter when using BfSS

Default value = 8 (in v7) or 20 (in v8)

Change it with:
SanMaxConcurrentCreatingVmSnapshotsPerVc (REG_DWORD)

Available since build 7.0.0.771 (V7.0 Patch 2)

Snapshots per ESXi

Limit maximum amount of active VM snapshots per ESXi.

Default value = 5 (v7) or 10 (v8)

Change it with:
SanMaxConcurrentCreatingVmSnapshotsPerEsx (REG_DWORD)

Available since build 7.0.0.771 (V7.0 Patch 2)

Snapshot commit

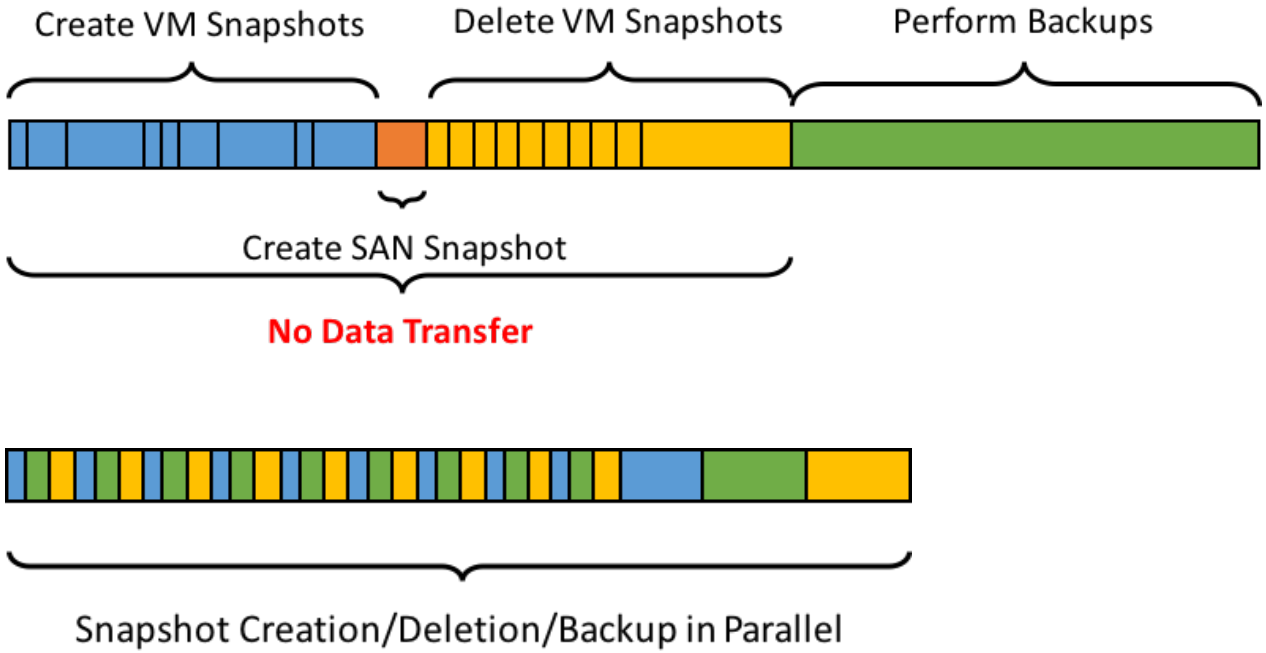
You always want to avoid as much as possible pesky stun problems, thus you do not want too many commits at once …

But!

If you have a fast storage, maybe you can increase limits:

MaxConcurrentDeletingSnapshotsForCluster (DWORD)	Default:4
MaxConcurrentDeletingSnapshotsForHost (DWORD)	Default:2

BfSS: Handle with care



No limits on the # of VM snapshots in a volume in v8, configurable in v9

It takes time to snapshots all the VMs.

One single large NFS?
Hello, Direct NFS!

Time for Some Tuning

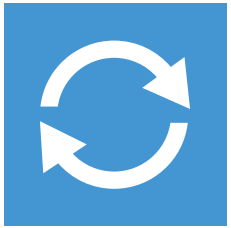
It just works, but it can work even better

General proxy/repository tuning

Optimize networking between proxy and repository

- Ideally on same Layer-2
- Jumbo Frames
- Use VMXNET3 for virtual proxies — but not PVSCSI
- Tune NICs for throughput
- Look out for hardware optimizations that introduce latency (interrupt mitigation for example)

Proxy sizing and tuning

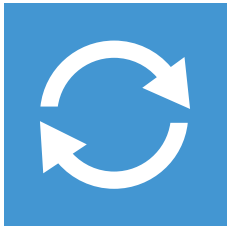


Size appropriately, tune lightly

- 2GB per core is ideal
- Estimated throughput is 50MB/s for each core
- If the single backup stream seems slow:

  VddkPreReadBufferSize – Default 4MB (4194304)
  Increasing can improve full performance. 8MB or 16MB are reasonable values to try — **but don't go crazy!**

Proxy recommendations



How many proxies?

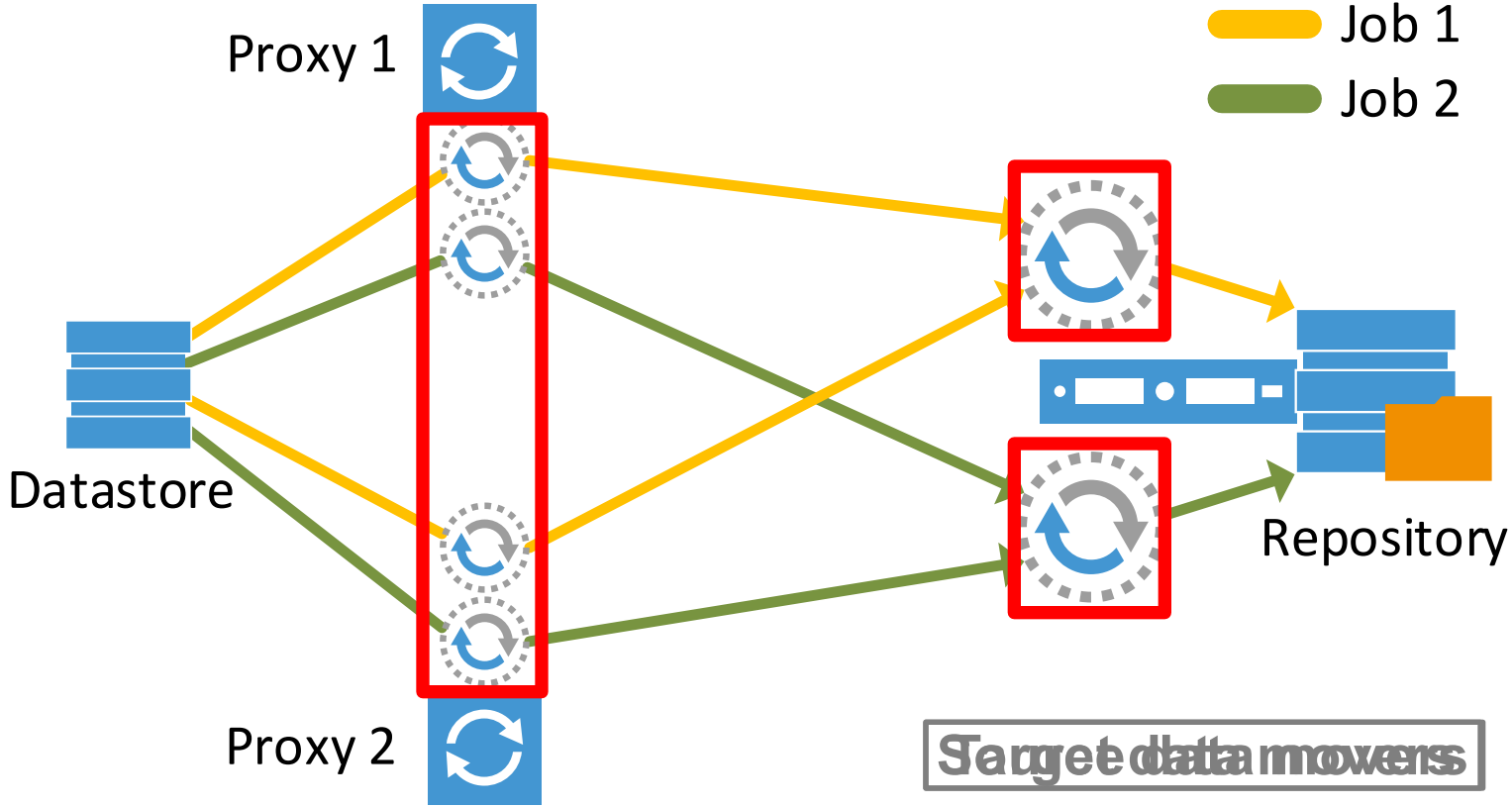
- Rule of thumb: 30 – 50 VMs per Core
- Having too many can decrease overall performance
- Increase only when proxies are obvious bottlenecks
  - Will probably not help if bottleneck shows **Network** or **Target**
- Hot add operations create lots of overhead on virtual proxies. Balance carefully. 4 vCPU/8GB is great!

Repositories

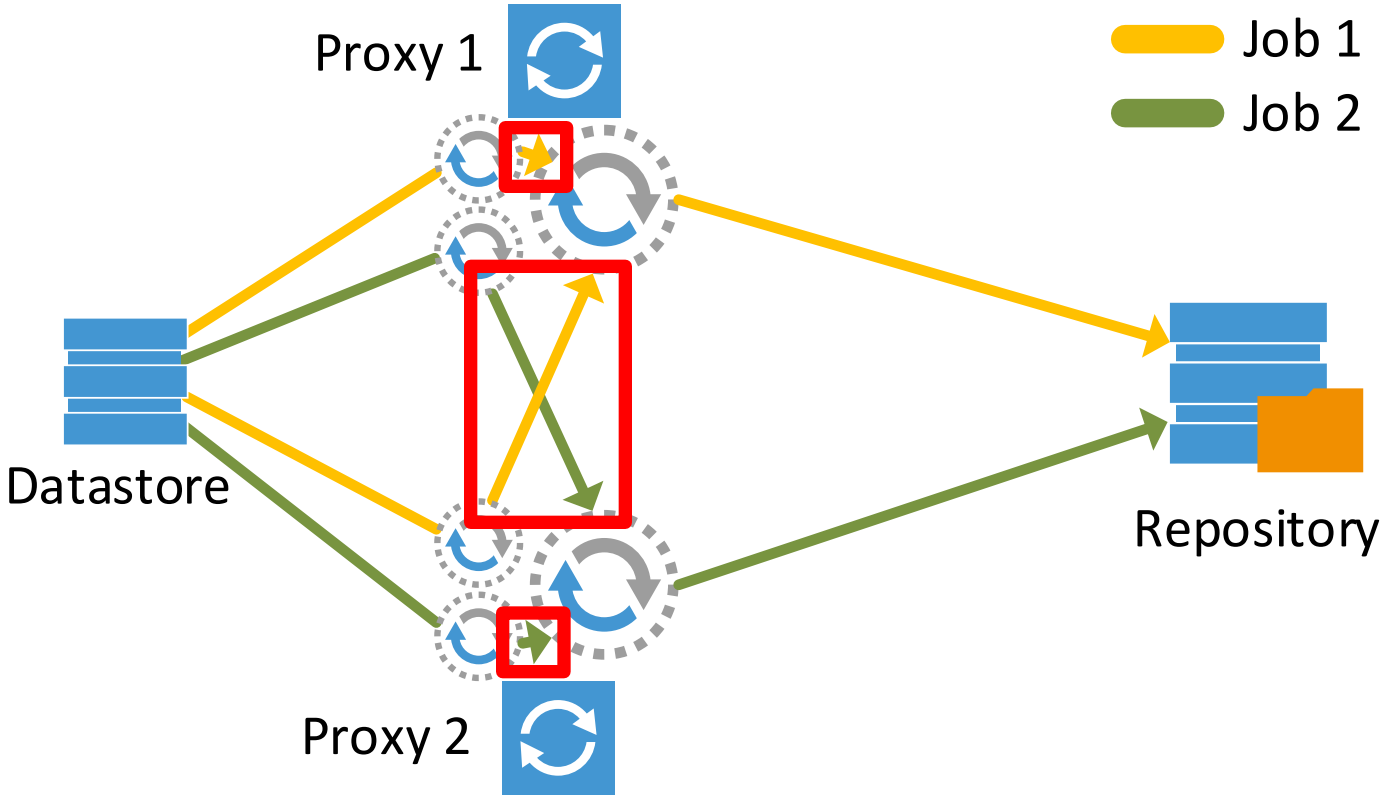
Proper configuration and sizing is critical

- 4GB RAM per core is ideal for enterprise with large jobs
- Fast storage connectivity (local attach or 10GbE)
- Single server can be configured for multiple Veeam repositories
- Remember to account for backup copy jobs when sizing!

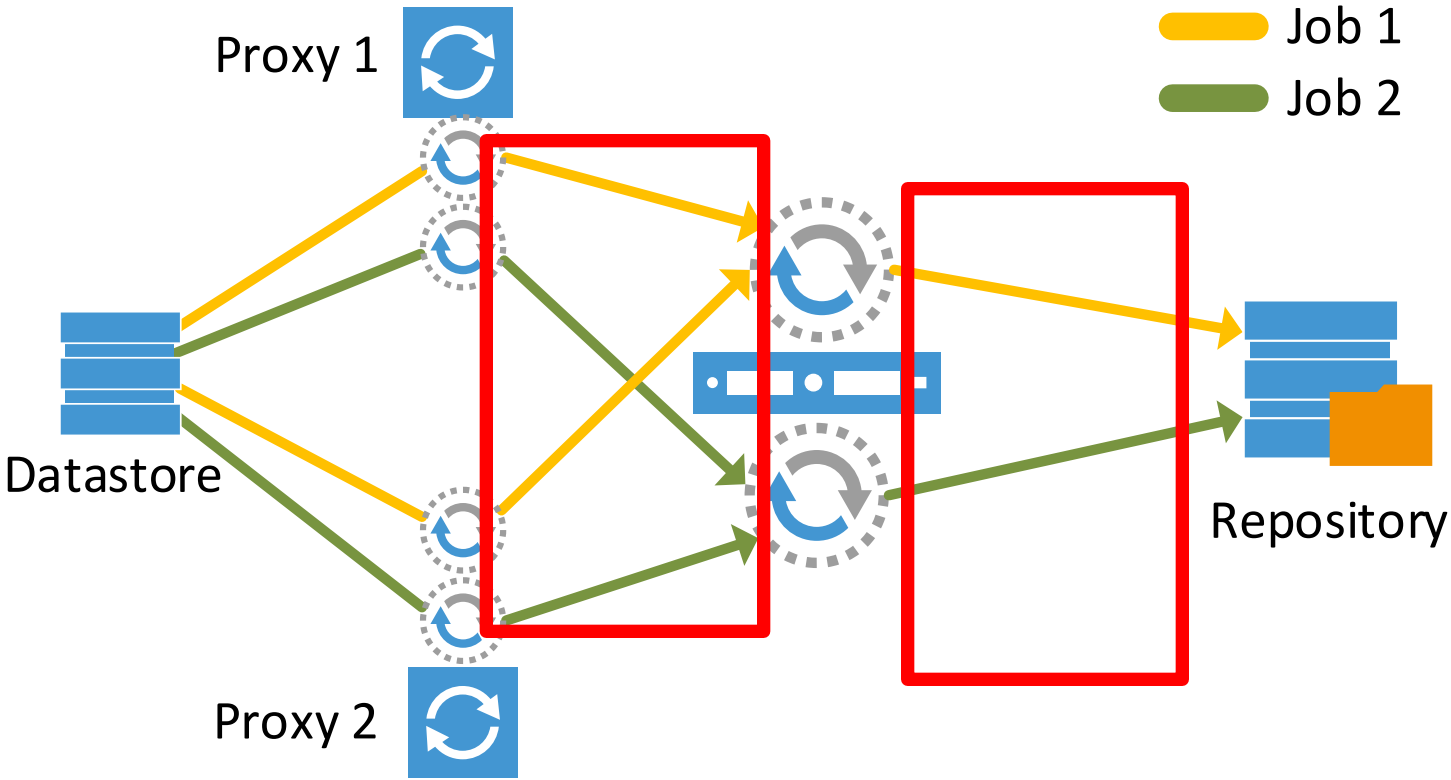
How a repository works: DAS



SMB/DDboost: Automatic gateway



SMB/DDboost: Manual gateway



Which type to choose?

Physical servers + Fast Local Disk (Windows or Linux)

- Data mover runs directly on the hardware improving performance for synthetic operations and merges
- Provides the best performance and fastest recovery options by far
- Generally the most cost effective for up to 90 days of retention
- Fast caching RAID is the best, large stripe size (128K or greater) and SSD caching can really improve synthetic operation performance

Which type to choose?

NAS

- Some can scale easier than block
- Unified Namespace
- SMB protocol leads to some performance penalty especially for synthetic operations

Dedup

- Great for long term retention
- Support for DDboost can provide good backup performance and synthetic operations
- Support for Catalyst on HP StoreOnce will provide similar experience with v9
- ExaGrid landing zone and ability to run agent makes it perform similar to Linux server
- Restore performance will be lower

Memory consumption

Veeam backup file is like an embedded file system

There are metadata identifying blocks (for location and deduplication purposes)

1 VeeamAgent process (target data mover) will consume:

VBK size	VBK block size	Memory consumption(VBK metadata):	
1TB	256K	700MB	
1TB	512K	350MB	
1TB	1024K(1M)	175MB	← Default

This usage isn't constant, but best to design for worst case. Remember, 4GB per vCPU/core.

New per-VM backup chains?

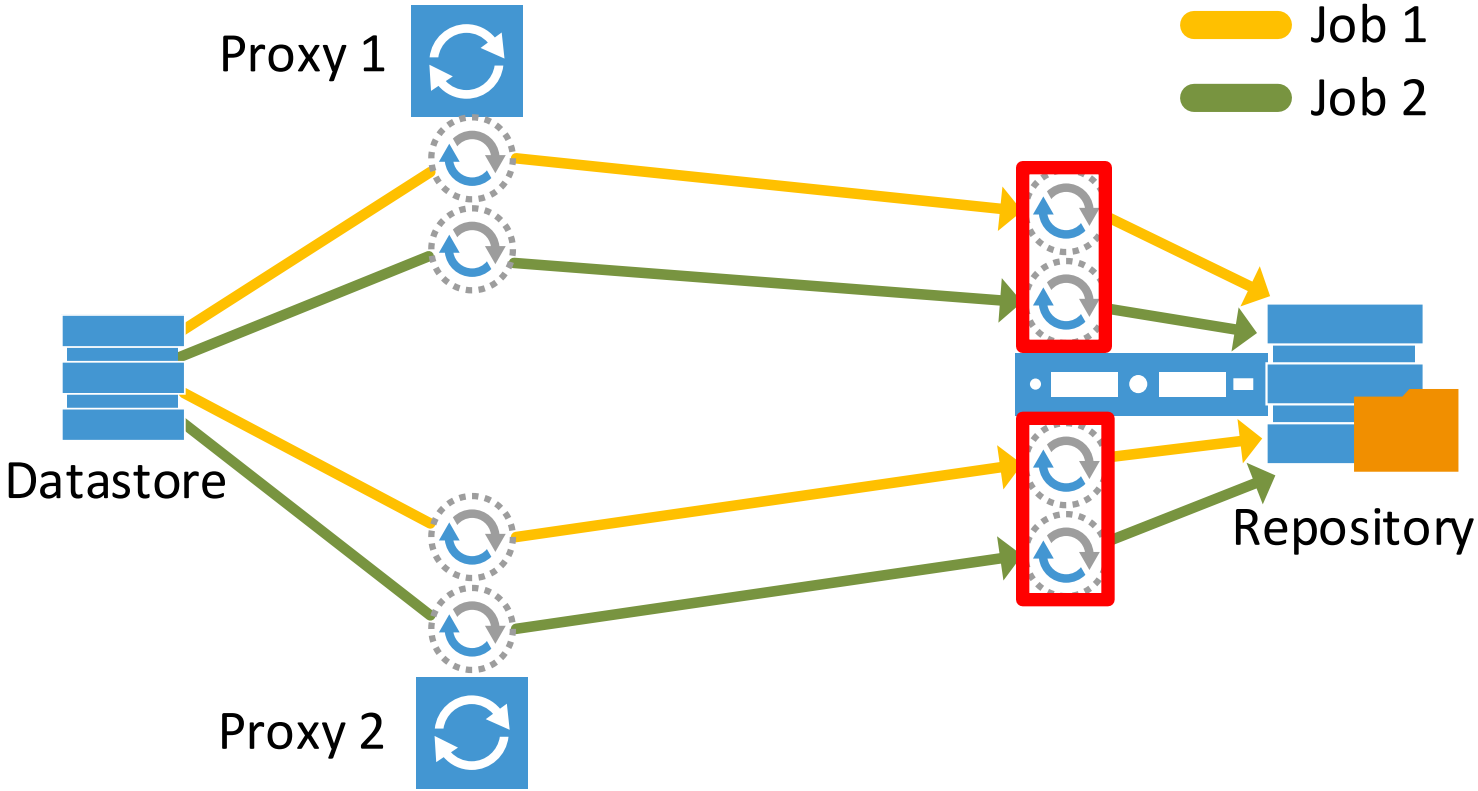
Same memory sizing considerations, the sum of all metadata will be the same

Different performance!

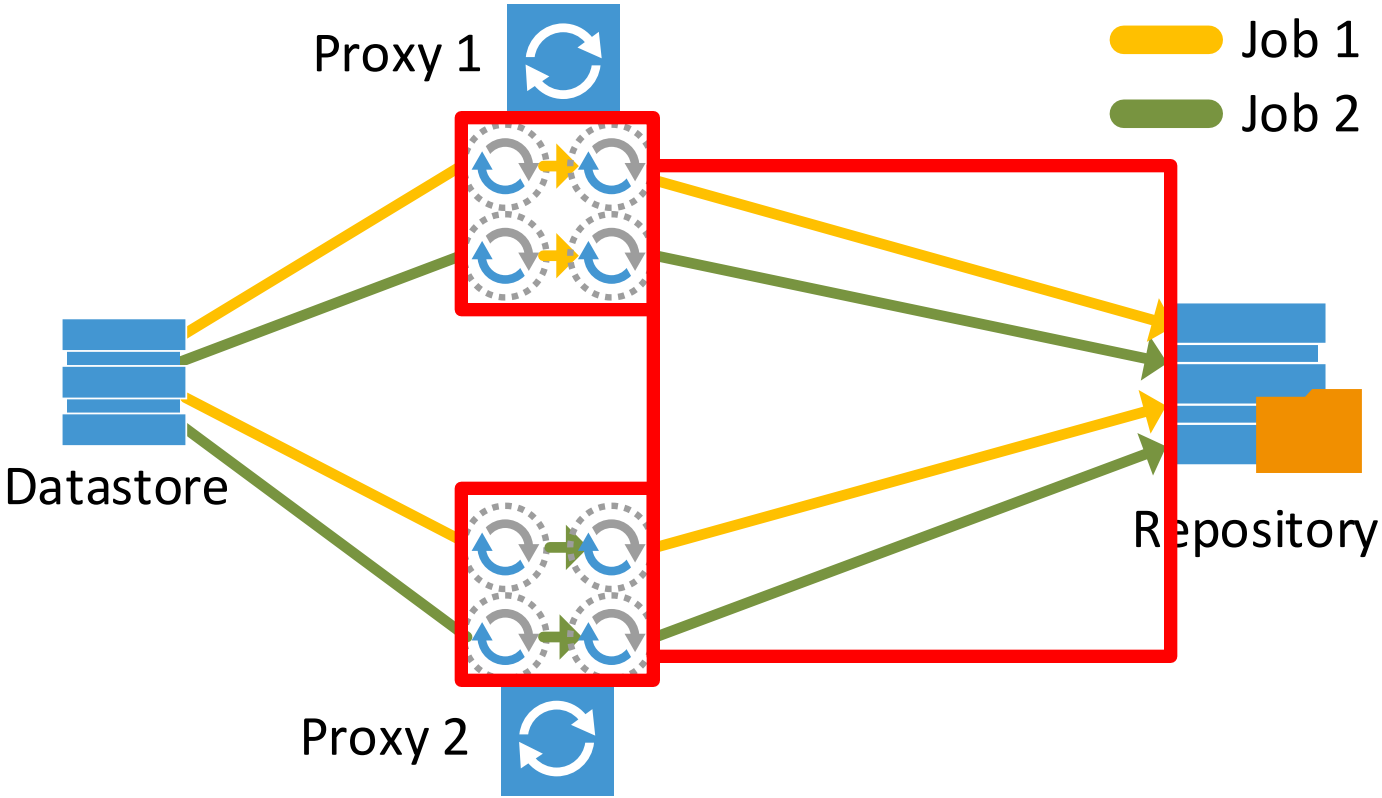
Modern storage systems love multi-thread!

What about deduplication?

DAS repository with per-VM option



SMB/DDboost with per-VM option



Thank you!

VEEAM
IT JUST WORKS!™