



# Breaking it Down – VVol and VM-aware Storage

The concept of VMware vSphere Virtual Volumes (VVOL) holds a lot of promise. And one of those promises is that VVol will make storage VM-aware. But awareness is a spectrum—so it’s important to know where your storage provider will land.

The reality is that VVol is an API, and so every storage provider will have a different implementation. When that implementation is built atop conventional LUN and volume-based storage, the virtual volume value is muted. Only when VVol is implemented by storage that operates at the VM-level can it be truly VM-aware.

To clarify what conventional storage can deliver with VVol vs. Tintri VM-aware storage, check out the table, and dig into the detail.

## Conventional storage

Is conventional storage VM-aware? Well, it’s certainly aware that VMs exist; only, those VMs are buried underneath LUNs and volumes and therefore not remotely visible to the storage or virtualization admin. As you can see from the table, you can’t take any meaningful action at the VM level with conventional storage.

## Conventional storage + VVol

OK, so layer on VVol and here’s how it works. Before, storage admins had to carve out LUNs and volumes; with VVol they now carve out storage containers. Storage admins assign policies (performance, cloning, snapshot frequency, etc.) to each container. Then, as virtualization admins provision new VMs, they simply select their desired policies. VVol plays matchmaker—aligning each VM to a storage container with appropriate policies.

This presents some clear benefits:

- 1. Less back and forth.** Storage admins set up the containers. Virtualization admins select their desired feature sets. VVol handles the “negotiation” that matches VMs to containers so the admins don’t have to.

	CONVENTIONAL STORAGE	CONVENTIONAL STORAGE + VVol	TINTRI +/- VVol
Set Storage Policies for LUNs	✓	✓	✗
Set Performance Policies for VMs	✗	✗	✓
Per VM Snapshot	✗	✓	✓
Per VM Clone	✗	✓	✓
Per VM Replication	✗	✗	✓
Per VM Minimum QoS Guarantee	✗	✗	✓
Per VM Latency Visualization	✗	✗	✓
VMware SRM Integration	✗	✗	✓
Number of VVol per Rack Unit	N/A	~5K	~250K
Available on vSphere 6	✗	✓	✓
Available on vSphere 4&5	✗	✗	✓

**2. Dynamic Resource Scheduling.** VVol helps you determine storage space and I/O load for better performance.

**3. Snapshots and Clones.** VVol lets you take snapshots and create clones at the VM level (instead of the LUN or volume level).

All of this is available as soon as (a) you deploy vSphere 6, and (b) your storage vendor implements all this VVol functionality. But again, the caveat is that VVol is an API, and conventional storage providers with LUN and volume-based architectures will struggle to realize the promise of VVol.

## Tintri +/- VVol

Tintri offers fully VM-aware storage. The first Tintri VMstore shipped in 2011, and 2,000+ units later, we have always operated exclusively in VMs. No LUNs and no volumes means no limitations for a VVol implementation.

VM-awareness fundamentally changes the way storage policy works. Storage admins don't need to carve out containers, and virtualization admins don't need to select desired policies. Instead, either can set exact performance characteristics for every single VM—including:

- **Replication.** Only Tintri allows VM-level replication—and in just three clicks.
- **Performance.** Conventional storage sequences I/O requests through a funnel, whereas Tintri provides every VM its own isolated lane. And while VVol helps you set Quality of Service (QoS) at the container level, Tintri lets you guarantee MIN and MAX IOPS for every single VM.
- **Latency Visualization.** Getting to the root cause of a latency issue is as simple as hovering over a VM in the Tintri user interface. That action pops a graphic that exposes latency across your infrastructure—host, network and storage—so you can pinpoint the source in seconds.
- **SRM Integration.** Tintri already offers SRM integration to streamline management of your virtual workloads.

Importantly, Tintri can also support the largest number of VVol on a single array—up to 1,000,000 (on a 4U Tintri VMstore T880). That matters because you're going to need more VVol than you think—a minimum of three-per-VM, multiplied by snapshots. Conventional storage is built to handle dozens or hundreds of LUNs or volumes, not thousands of VVol. We strongly recommend you crunch the numbers to find out how many VVol you'll need, and then ensure your storage provider offers sufficient support.

Best of all, Tintri VM-aware storage is available for vSphere 6, but also available right now across vSphere 4 and 5, plus Hyper-V, RHEV and OpenStack.

We're in full support of VVol—it validates the commitment we've already made to building VM-aware storage. Tintri was built to operate at the VM-level from inception, so we can state with total confidence that we will have the best implementation of VVol, and already have the best VM-aware storage.



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