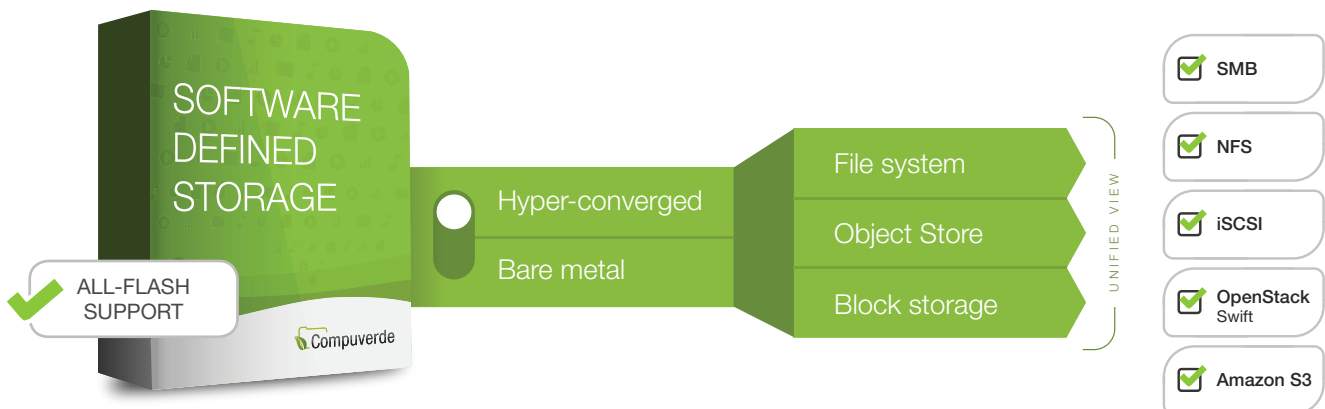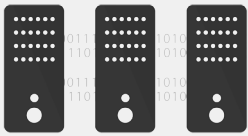# Compuverde Scale-out Storage

The software-defined, unified storage solution from Compuverde offers file system, block and object storage in one package - completely hardware-agnostic and massively scalable.
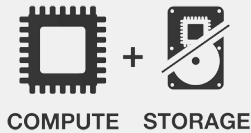
SOFTWARE DEFINED STORAGE

ALL-FLASH SUPPORT

Compuverde

Hyper-converged

Bare metal

File system

Object Store

Block storage

UNIFIED VIEW

- ☑ SMB
- ☑ NFS
- ☑ iSCSI
- ☑ OpenStack Swift
- ☑ Amazon S3

Scale-out NAS

Install on bare-metal servers. Start small, scale-out to hundreds of nodes.

Hyper-Converged

Computing and storage in one box. VMware, KVM, Hyper-V and Xen supported.

COMPUTE + STORAGE

Metro Storage Cluster

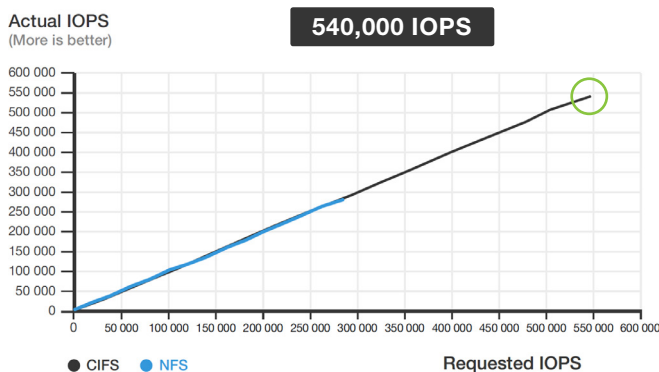Get improved redundancy by stretching your cluster to two locations in the same LAN.

Hybrid Cloud

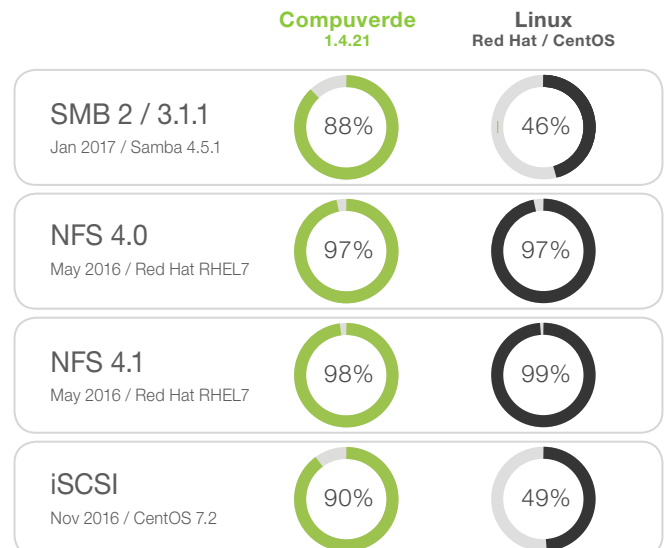Multiple clusters. The Internet in-between. A unified view of your data.

PERFORMANCE

Tests conducted with the benchmark software SPECsfs 2008 on 16 servers, each having the configuration below the graph.

540,000 IOPS

Actual IOPS
(More is better)

600 000
550 000
500 000
450 000
400 000
350 000
300 000
250 000
200 000
150 000
100 000
50 000
0

0 50 000 100 000 150 000 200 000 250 000 300 000 350 000 400 000 450 000 500 000 550 000 600 000

● CIFS   ● NFS

Requested IOPS

CPU	2 x Intel Xeon E5-2620 (2.0 GHz)	
Memory	256 GB	x16
Cache	2 x 400 GB Flash	
Data disks	24 x 900 GB SAS 10K (JBOD)	
Network	10 GbE (1500 MTU)	

PROTOCOL COMPATIBILITY

Tight integration between protocols and the virtual file system, as no third party software or open source is used in the solution.

	Compuverde 1.4.21	Linux Red Hat / CentOS
SMB 2 / 3.1.1 Jan 2017 / Samba 4.5.1	88%	46%
NFS 4.0 May 2016 / Red Hat RHEL7	97%	97%
NFS 4.1 May 2016 / Red Hat RHEL7	98%	99%
iSCSI Nov 2016 / CentOS 7.2	90%	49%

- SMB 2&3 Protocol Family Test Suite 2016 version 1.0.5142.0 developed by Microsoft
- pyNFS version October 20, 2015, developed by CITI
- LibiSCSI version 1.18.0 update November 16, 2016

Compuverde
Software-defined storage

Technical Specifications

KEY FEATURES

Storage modes	- Scale-out NAS (bare metal) - Hyper-converged - Hybrid Cloud - Metro Storage Cluster
Access Protocols	- SMB (1 / 2.0 / 2.1 / 3) - NFS (3 / 4.0 / 4.1) - iSCSI (with MPIO) - OpenStack Swift + Cinder - Amazon S3 - NNTP back end storage
All-Flash	Yes
Tiering	Yes
Multi-tenancy	Yes (multiple file systems)
Network	
Virtual IP	Yes
Multiple NICs	Yes
VLAN	Yes
Bonding / Link Aggregation	- Round Robin - Active/Backup - XOR - Broadcast - LACP - Adaptive Transmit Load Balancing - Adaptive Load Balancing
Rolling upgrade	Yes
Cache support	NVMe / SSD / RAM
Cache mode	- Read/Write - Write Only
Mirrored write cache	On / Off
RAM write cache	On / Off
Authentication	- Active Directory - LDAP - Kerberos KDC - NIS - Local database

MANAGEMENT FEATURES

Management tool	Yes (Windows based) - Performance - Configuration - Health - Alerts
Alarms	- SNMP - E-mail
Logging	- Yes, management tool - Remote syslog (rsyslog) - SNMP v2c
API	- REST API - Usage statistics
OpenStack Cinder	Yes

FILES AND FOLDERS

File Policy	Yes (at Folder level)					
Filters	- Pattern (ex: *.jpg) - Age (days/weeks/months/years)					
Actions	- Change file coding - Change tier - Retention (remove files after set time) - WORM (write once read many)					
Snapshot Policy	Yes (at folder level)					
Schedule	- Automated: Every hour/day/week - Manual					
Snapshots retained	Up to 253 (circular overwriting when threshold is reached)					
Quota Policy	Yes (at Folder level)					
Folder size limit	GB / TB / PB					
File coding	- Copies - Erasure coding					
Copies	3 or 5 copies					
Erasure coding	2+1	2+2	3+1	3+2	4+1	4+2
	5+1	5+2	6+1	6+2	8+1	8+2

CLUSTER FEATURES

Scalability	- Linear, by adding new nodes - 100+ billion files (exabytes of data)
Elasticity	Runtime change of cluster size
Self-healing	Yes (Automatic)
Automatic detection	- Node failure - Disk failure - Data inconsistency
Healing mode	Prioritized automatic repair
Availability	> 99.999 %
Data addressing	- File system - Block - Objects
Encryption	Data at rest: AES 256 bit XTS - one key for each file system

Compuverde
Software-defined storage