

## Leveraging “The Power of Ethernet” for your Virtual Desktop Infrastructure

In recent years, the server market experienced a radical transformation -- commodity hardware and virtualization eliminated the need for expensive, esoteric big-box servers. Coraid® EtherDrive® is accelerating the same trend in the enterprise and cloud storage market.

Coraid is redefining storage economics with a new generation of Ethernet SAN technology. Coraid EtherDrive solutions provide enterprises of all sizes with a flexible tier of high performance scale-out storage built on commodity hardware. Coraid uniquely delivers the fundamental building blocks for scaling SAN projects such as virtualization, disaster recovery, high-performance computing, and cloud storage. Coraid solutions are trusted by more than 1,200 customers in sectors including manufacturing, life sciences, software, healthcare, education, financial services, military, and hosting.

Coraid delivers superior cost avoidance via three key attributes: maturity of AoE and CorOS™; use of industry standard networking and computer hardware; and dramatically lower operations and support costs.

**“We are enormously and unequivocally impressed with EtherDrive...the Coraid solution scales by simply installing additional disks and shelves, allowing organizations to start small and scale capacity to petabytes.”**

*ESG Lab. (Aug 2010)*

### Virtual Desktop Infrastructure

Virtual Desktop Infrastructure (VDI) is composed of a terminal end point (physical device or web browser), virtualization layer (includes platforms and possibly applications), network transport, and targetable shared storage. Key to user experience in this environment is good visualization, fast interface response, and the ready availability of both the basic desktop and user data. All three of these characteristics are directly impacted by the architecture, efficiency, and performance of the networking and storage sub-systems.

Well-designed 1 Gb and 10 Gb Ethernet infrastructures offer plenty of networking bandwidth. Where VDI typically bottlenecks is in the storage sub-system – Fibre Channel implementations on a large scale are generally too costly to realize the advertised ROI, and iSCSI implementations do not provide the performance or throughput required without costly hardware acceleration and the use of expensive Serial Attached SCSI (SAS) or solid state (SSD) hard disk drives.

VDI environments should be architected to deliver the lowest latency and highest throughput at the most effective price point. Use of Coraid EtherDrive technology in combination with enterprise class 10k rpm SATA hard disk drives provides an optimum mix of both technical performance and economic models.

### Hosted Virtual Desktops

The proliferation of Hosted Virtual Desktops (HVDs) is driving storage requirements at an industry-average three to five terabytes per one hundred users. This can result in staggering Virtual Desktop Infrastructure (VDI) costs when enterprises, institutions, and organizations are planning HVD implementations.

There are three basic types of users associated with HVD environments – Task Workers, Knowledge Workers, and Power Users.

Worker Type	Disk Subsystem IO Requirements
Task Worker	≤ 7 IOPS per HVD
Knowledge Worker	10 IOPS per HVD
Power User	≥ 13 IOPS per HVD

**“...many organizations that implement HVDs [hosted virtual desktops] for the majority of their workforce will likely increase their overall storage capacity (and budget) by two to five times more than they require/spend today in the data center as [PC] drives are replaced by centralized data center storage.”**

*Gartner, Inc. (Oct 2009)*

The needs of these three user types can typically be met using two basic HVD configurations: HVDs leveraging pooled images, and those using dedicated images. The use of pooled images offers the greatest reuse simplifying environmental configuration and management while reducing storage requirements – Task Workers and Knowledge Workers are strong candidates for the use of pooled HVD images. The use of a dedicated HVD image offers each end user a unique desktop instance. Power users with needs / privileges to modify their HVD environment require the flexibility of a dedicated image. The use of dedicated HVD images introduces the greatest variance in the target environment and consumes the greatest amount of storage.

## EtherDrive + VDI – Leveraging the Power of Ethernet

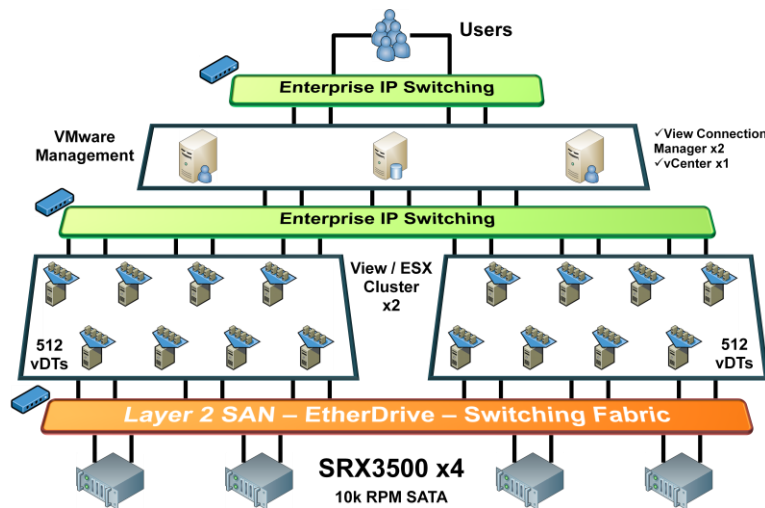
As HVD and VDI environments grow, significant effort is expended configuring and reconfiguring traditional FC and iSCSI SANs. Coraid’s design objective for EtherDrive was to eliminate unnecessary complexity. Instead of adding layers to mainframe-era storage networking protocols, Ethernet SANs running AoE reinvent storage networking by leveraging fast, ubiquitous Ethernet to deliver flexible SAN scalability and management simplicity. Coraid “...connects servers and storage directly across the physical Ethernet Layer.” (ESG, Aug 2010)

**“AoE is a simpler and more direct protocol than either iSCSI or Fibre Channel.”**  
*ESG Lab. (Aug 2010)*

Coraid’s Ethernet SAN architecture enables:

- Simpler configuration and higher performance
- Extremely flexible scale-out topology
- Linear scaling – just add more HBAs and disks

These characteristics deliver 5-8x price performance relative to legacy storage, providing an ideal platform for Hosted Virtual Desktops and a Virtual Desktop Infrastructure.



**Figure 1: VMware View 1000-User Block Architecture**

Figure 1 illustrates support for a standard VMware View 1000-user Block. In this example, running a mid-level Knowledge Worker workload requires 10,000 IOPS per 1000-user Block. Using EtherDrive, SATA disks, and RAID 5, two pairs of Coraid SRX3500s can deliver in excess of 11,500 IOPS and sub-3ms latency per spindle. Also in the example, all HVD hosts must be capable of seeing all storage in the Block in order to ensure high availability (recovery from failed host) and dynamic resource scheduling (offloading workload from pegged systems). The ability for all hosts to see all available storage is inherent to EtherDrive and does not require post-implementation configuration.

The final result is outstanding VDI capability using enterprise-class SATA disks across standard Layer 2 Ethernet via EtherDrive. This keep-it-simple approach enables execution of the fastest throughput with dramatically lower overhead and cost than traditional storage protocols.

The results:

- Task/Knowledge Worker solution: >11,500 IOPS and 2000 MB/s below \$125/HVD
- Power User solution: >14,000 IOPS and 2000 MB/s below \$175/HVD

**“...ESG Lab recommends that you consider Coraid EtherDrive SAN storage as the foundation for your virtualized data center.”**  
*ESG, Inc. (Aug 2010)*

## Contact Coraid for Your VDI Storage Needs

Coraid delivers high performance, rapidly scalable Ethernet SAN infrastructure in support of enterprise virtual desktop infrastructure requirements. Contact your Coraid representative to learn more about Coraid HVD infrastructure 1000-User solutions.