



# CBRE

## CBRE VMware View Reference Architecture & Success Story

Stateless Virtual Desktops with VMware, Atlantis Computing, Trend Micro & Xsigo Systems

vmware®

atlantis  
COMPUTING



xsgo  
systems

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### Overview

This document provides a high-level summary of the CBRE Virtual Desktop Infrastructure (VDI) deployment success story. It is based on the VMware reference architecture for stateless virtual desktops with the addition of Atlantis ILIO VDI storage and performance optimization, Trend Micro Deep Security and Xsigo virtual I/O. The document includes specific information about how CBRE integrated these solutions to successfully deploy a VMware View stateless virtual desktop environment for 3,000 virtual desktops. The document also includes specific information necessary for VMware customers to replicate CBRE's success.

CBRE decided to go 100% virtual to provide a more flexible, centrally managed, secure, and lower-cost desktop environment that could adapt easily to changing business requirements such as employee mobility and frequent acquisitions of new companies.

When CBRE started with VDI, the company realized it was critical to satisfy the needs of both the business and the workforce by delivering a virtual desktop that cost less than a physical PC while providing a better user experience. Without satisfying both the financial and user requirements, CBRE would not have been as successful with its VDI deployment.

During the process of building the architecture and deploying VDI, CBRE realized there were three key challenges to successful deployment that were all related to VDI storage: cost, performance, and security. Delivering a high-performance virtual desktop with anti-virus meant lower server density and leveraging large amounts of storage disks to handle the heavy IO traffic generated by the Windows desktops. Additionally, those disks needed to be high-performance SAN and/or solid-state disk (SSD) drives that increased the cost of a virtual desktop above that of a physical PC. When CBRE looked at solving the problem with local SSDs, the cost was high, it was difficult to validate the performance of the SSDs under VDI write-heavy workloads, and it was operationally difficult to deploy and manage. Instead, CBRE used Atlantis ILIO VDI storage and performance-optimization software to **offload 80% to 90% of the storage IO traffic, reduce storage capacity consumed by 70% to 80%, and boost desktop performance** to outperform a physical PC.

By integrating VMware View with Atlantis Computing, and Trend Micro solutions, CBRE has realized millions of British Pounds in operational and capital expense savings, while at the same time delivering a desktop experience that is better than a physical PC.

### CBRE Quick Facts

#### About CBRE

Global real estate firm with 31,000 employees and \$128 billion in real estate transactions

#### VDI Business Drivers

- Workforce mobility
- Centralized desktop control
- Streamlining acquisitions
- Lower CAPEX and OPEX costs

#### VDI Challenges

- Storage costs
- Desktop performance
- Security without lowering density

#### Solution Components

- VMware View
- VMware ThinApp
- Atlantis ILIO VDI storage and performance optimization
- Trend Micro Deep Security
- Xsigo Virtual I/O

#### Deployment Results

- Increase scalability without adding storage
- Better-than-PC experience
- Lower CAPEX and OPEX costs
- 80% to 90% storage IO offload with Atlantis ILIO
- 70% to 80% storage capacity reduction

### Business Drivers

#### **About CBRE**

CBRE is the world's premier, full-service real estate services company. Operating globally, the firm holds a leadership position in virtually all of the world's key business centers. With 31,000 employees, CBRE is responsible for over \$128 billion in annual real estate transactions through its 438 globally distributed offices.

In the United Kingdom, CBRE has a mobile and diverse workforce, including brokers, surveyors, lawyers, and accountants.

#### **Why CBRE Chose VDI over Physical PCs**

CBRE deployed VDI to be more agile and deliver a better desktop experience to its mobile workforce, which moves frequently between offices and client sites to access desktop and corporate data. VDI with VMware View offered a way to provide the mobility needed by that workforce while securely and centrally managing the desktops in the datacenter.

#### **IT CAPEX and Operational Cost Savings**

Prior to VDI, CBRE had to refresh one-third of its PCs every year, which cost the company about £1 million in capital expenditures. By virtualizing the desktop, CBRE has extended the life of the existing hardware and instantly sees the bottom-line savings. In terms of operational costs, CBRE is realizing savings in two big areas: first, provisioning a desktop has gone from a long and expensive manual process with a physical PC to being nearly instantaneous with virtual desktops. Second, the time required to fix a problem has dropped dramatically because IT can simply re-provision a broken desktop to restore service.

#### **Using Desktop Virtualization for Acquired Companies**

CBRE frequently acquires companies and uses desktop virtualization to quickly deliver desktops to new employees, streamlining the integration process.

#### **Going 100% Virtual, Virtual First Policy**

CBRE is going 100% virtual with its desktops. Everyone who joins the company now gets a virtual desktop instead of a laptop or desktop PC. At CBRE, VDI is not just used by light task workers, but also by power users that require IO intensive applications such as AutoCAD and other line of business applications. There are still certain use cases with specific applications, such as Bloomberg, that haven't been virtualized yet. However, there are very few users that still need a physical desktop.

“We have a workforce that needs to travel, drop into remote offices or client sites, and access their desktops as if they were in their own building.”

*Rory Clements*

*Virtualization Architect*

*CB Richard Ellis*

### **Creating a Virtualization Center of Excellence**

While CBRE started in the U.K. with a 3,000-desktop VDI deployment, the U.K. virtualization deployments—including desktop virtualization, server virtualization, and cloud infrastructure—are becoming a center of excellence for virtualization that is expanding to the entire organization. Other EMEA countries, including Poland, Russia, and Germany, already use the U.K.-based VDI deployment from pockets of remote offices, and CBRE is looking at expanding its VDI deployment globally.

### **CBRE Business Challenges and Solutions**

#### ***Better-than-PC Performance***

Because CBRE was an early adopter of VDI, the user perception of VDI was that it was slower, awkward to use, and unreliable. One of the deployment objectives was to give users a desktop experience that was better than a physical PC. For the deployment to be successful, it was important to deliver a virtual desktop that was faster than anything a user might have in terms of a physical PC.

#### ***Storage Costs***

In order to justify the cost of switching from physical to virtual desktops, it was critical for CBRE to implement desktop virtualization at a total cost per desktop comparable to a physical PC. VMware View with tiered storage was implemented with Atlantis ILIO to enable CBRE to scale to six times more users with its existing storage and “wow” users with better-than-PC performance. Atlantis ILIO was able to offload 80% to 90% of the total IO traffic going from the VMware View desktops to the SAN. In addition to the total IO offload from storage, Atlantis ILIO enabled the storage system to handle bursts of up to 10 times the average IO during peak usage times. From a storage capacity or footprint perspective, Atlantis ILIO was able to reduce the storage footprint by 70% to 80% on top of the savings from using VMware View linked clones and thin provisioning.

#### ***Heavy User Workload and Application Virtualization***

Every user at CBRE is what would be classified as a “heavy” user workload. The user base employs all the Microsoft Office suites and 120 applications ranging from CAD to surveying applications to custom line-of-business applications that are virtualized using ThinApp and then streamed to the desktops. In addition to the total IO offload from storage, Atlantis ILIO enables the storage system to handle bursts of up to 10 times the average IO during peak usage periods such as when users boot their desktops, log on, or use IO-intensive applications.

“The other side to Atlantis ILIO is the “wow” factor that you get from a user when you put their desktop in an Atlantis ILIO optimized datastore. The best physical PC hardware you can get today will still be slower than a virtual desktop fronted by Atlantis ILIO. We can launch things like Outlook and Word in less than one second, which in the physical world is not the case.”

*Rory Clements  
Virtualization Architect  
CB Richard Ellis*

“The traditional thinking around a virtual desktop was that it was slower, awkward to use, and unreliable. One of the things we changed is that we wanted to give the users a better-than-physical-PC experience.”

*Rory Clements  
Virtualization Architect  
CB Richard Ellis*

### **Scalability**

After implementing the Atlantis ILIO with VMware View Tiered Storage, CBRE were able to rapidly accelerate their deployment from 500 to 3,000 users.

### **Security: Rethinking Anti-Virus for VDI**

As part of the VDI deployment, CBRE realized it needed to rethink the traditional approach to security and anti-virus for VDI. To minimize CPU and memory utilization, CBRE removed the anti-virus from the desktop image and replaced it with Trend Micro Deep Security, which operates outside the desktop images using VMware vShield Endpoint. In addition, Atlantis ILIO accelerates and optimizes the IO generated by the anti-virus scanning and operation. By eliminating the CPU, memory, and IO overhead of anti-virus, CBRE was able to deliver on its objective of “better than PC” performance without compromising on security or reducing the number of desktops per server.

### **Technical Challenges of the VDI Workload**

CBRE deployed VMware View only to realize that its VDI architecture could not scale without requiring additional investments in storage infrastructure. The root cause of VDI storage problems is that Windows XP and Windows 7 were designed to work with a dedicated local hard drive. When the Windows operating system is deployed with VDI, thousands of virtual desktops generate tremendous IO traffic that requires a significant increase in the number of storage disks and controllers. Traditional storage technologies struggle to keep pace with the IO demands of VDI workloads..

### **Write-Heavy IO Traffic**

Unlike server virtualization, VDI workloads are extremely write intensive, with the typical distribution of IO operations per second (IOPS) being 80% write and 20% read during normal desktop operation. Traditional storage caching and SSDs are ineffective with write IO and have little impact on improving virtual desktop performance.

### **IO Blender Effect—From Sequential to Random**

When the Windows operating system generates disk IO, it optimizes that IO on its local hard drive so that blocks are stored sequentially for optimal performance. With VDI, the hypervisor converts sequential IO into small blocks of random IO (the IO Blender Effect), which decreases storage and desktop performance. Atlantis ILIO automatically converts the small random blocks into larger blocks of sequential IO before sending them to storage, thereby increasing storage and desktop performance.

“We see ILIO offloading 80% to 90% of the IO driven through the View system.”

*Rory Clements*

*Virtualization Architect*

*CB Richard Ellis*

“VDI puts a lot of load on the SAN and requires that we overprovision storage with a lot of spindles to get the required performance. The Atlantis ILIO software allows me to plug in its virtual machine to deliver the required IOPS locally to the desktops, accelerate performance, and offload my existing storage.”

*Rory Clements*

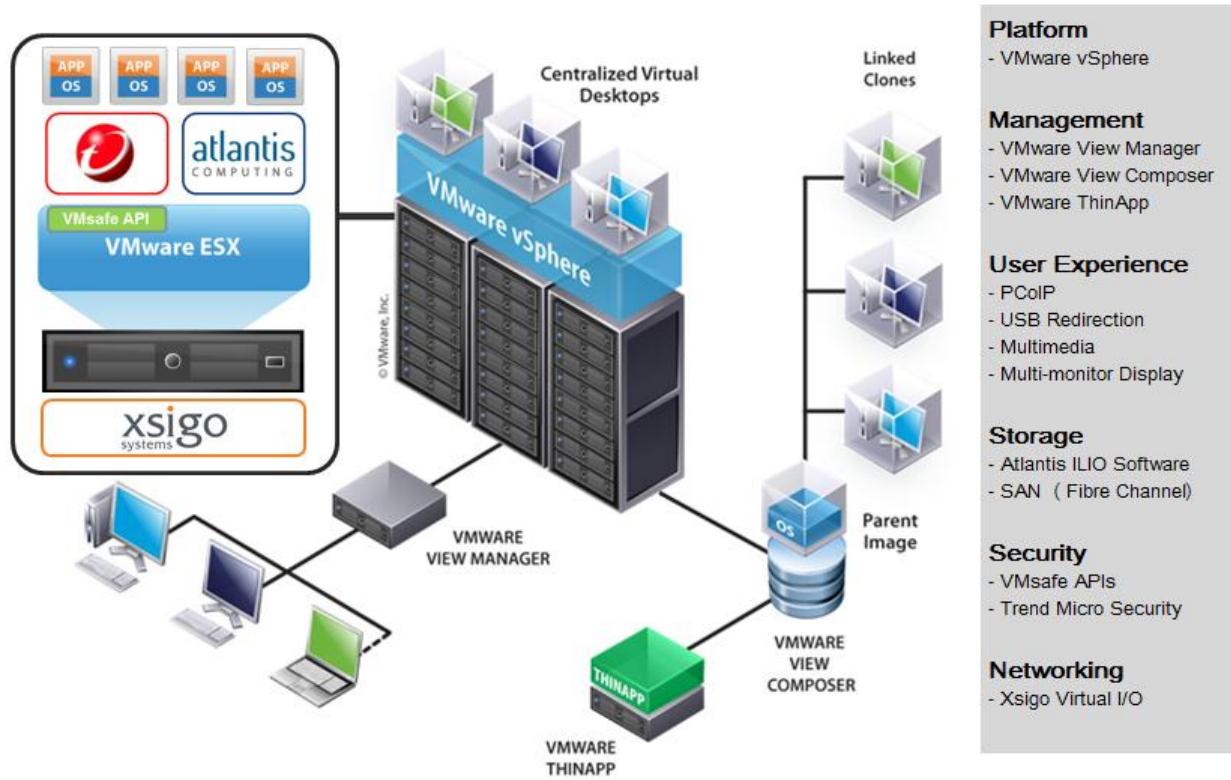
*Virtualization Architect*

*CB Richard Ellis*

### Peak Bursts of 10x Average IO

With VDI, end-user activities, such as simultaneous boot, logon, and application-related IO storms, and common IT activities, such as anti-virus scanning, patching, and cloning, generate peak IO that can be 10 times or more the average IO traffic. As a result, storage can either be sized for peaks and be extremely expensive or sized for the average IO traffic and result in serious performance impact during periods of peak activity. Atlantis ILIO delivers local IOPS to virtual desktops to ensure consistently high performance even during peak usage.

### CBRE Solution Overview



- Platform**
  - VMware vSphere
- Management**
  - VMware View Manager
  - VMware View Composer
  - VMware ThinApp
- User Experience**
  - PCoIP
  - USB Redirection
  - Multimedia
  - Multi-monitor Display
- Storage**
  - Atlantis ILIO Software
  - SAN (Fibre Channel)
- Security**
  - VMsafe APIs
  - Trend Micro Security
- Networking**
  - Xsigo Virtual I/O

The CBRE VDI architecture was built based on the [VMware Reference Architecture for Stateless Virtual Desktops with VMware View 4.5](#), including the use of VMware vSphere for desktops, VMware View Manager, and vShield Endpoint. In addition, CBRE added VMware Technology Alliance partners Atlantis Computing, Trend Micro and Xsigo systems to provide critical components of the VDI deployment to address the density, scalability, performance, and storage cost challenges. Instead of using local SSD drives or buying additional SANs, CBRE was able to scale from 500 to 3,000 desktops without any additional storage using Atlantis ILIO software. Atlantis ILIO works with the existing Fibre Channel SAN to deliver a much faster desktop than a regular PC. Instead of using traditional anti-virus, CBRE deployed Trend Micro Deep Security to deliver security without consuming as many resources or impacting density per ESX host. With Xsigo Virtual I/O, CBRE was able to ensure low I/O latency and accelerate network traffic between the virtual desktops and the Atlantis ILIO datastore.

### **VMware View with Tiered Storage**

VMware View is the leading desktop virtualization solution, built for delivering desktops as a managed service—from the platform to the protocol. This solution unlocks the desktop components, operating system, applications, and persona (user data and settings), enabling IT to manage these components independently of one another for extreme business agility. VMware View dynamically assembles these components on demand, giving users a single, personalized, unified desktop with all applications and information immediately available.

VMware View simplifies desktop management, reduces operational costs, and increases control for IT with flexible access and a superior experience for users, over any network or while offline.

VMware View introduced the ability to tier storage by placing View Composer replicas on one class of storage and linked clones on another. First proposed by VMware’s View Architect, Daniel Beveridge, in his VMworld 2010 session, VMware View’s tiered storage and Atlantis ILIO are capable of delivering a highly efficient and low-cost storage model that delivers better-than-PC performance.

### **Atlantis ILIO**

Atlantis ILIO is a VDI storage and performance-optimization software solution that complements VMware View to optimize storage, boost desktop performance, and make VDI security economically feasible. Atlantis ILIO fundamentally changes the economics and performance characteristics of VDI by intelligently optimizing how the Windows operating system and ESX Hypervisor interacts with storage resources

### **Scaling and Optimizing Storage for VDI**

Atlantis ILIO processes up to 90% of the virtual desktop storage traffic locally, offloading the shared storage infrastructure and therefore reducing the amount of storage needed for each desktop. This enables customers to scale their VDI deployments to 4 -7 times more desktops (6 times in the case of CBRE) with their existing storage systems.

### **Boosting Desktop Performance**

Atlantis ILIO addresses the virtual desktop performance problem without requiring additional storage infrastructure. It eliminates the storage bottleneck by effectively delivering a massive amount of IOPS to boost all aspects of virtual desktop performance, including boot time, logons, profile loading, applications, productivity tasks, and applications that are virtualized using VMware ThinApp.

### **Making VDI Security Possible**

Anti-virus protection and endpoint security are requirements for enterprise VDI deployments. However, traditional anti-virus can cut density per server up to 50%, degrade performance, and ultimately increase the network, storage, and server infrastructure costs of VDI. Atlantis ILIO integrates with leading anti-virus solutions to dramatically accelerate anti-virus scanning and eliminate redundant anti-virus scanning operations. With

“My boss loves Atlantis ILIO because he doesn’t have to buy so many disks for VDI.”

*Rory Clements*  
Virtualization Architect  
CB Richard Ellis

“The Atlantis ILIO product is really simple to get going in your environment. It is a virtual machine that can front end any storage. So it is very easy to get into a lab and get a test going. There was a quantum leap in performance straight away.”

*Rory Clements*  
Virtualization Architect  
CB Richard Ellis

traditional anti-virus, Atlantis ILIO can eliminate the additional storage required to service the IO traffic generated by anti-virus, increasing density and accelerating anti-virus scanning.

### **How Atlantis ILIO Works**

Atlantis ILIO is a software virtual machine that is installed on the same hypervisor or rack as the virtual desktops to optimize how the Microsoft Windows XP and Windows 7 operating systems interact with storage. Atlantis ILIO technology, including Windows Protocol Layer Processing and Inline Deduplication are highly efficient and designed specifically for VDI workloads:

### **Windows IO Traffic Reduction with Protocol Layer Processing**

Atlantis ILIO software processes all VDI traffic locally at the Windows NTFS protocol level—within the ESX host—to dramatically reduce the amount of IO traffic going to storage and eliminate the huge burden normally placed on a storage array by hundreds or thousands of virtual desktops.

### **In-Line Deduplication for VDI Workloads**

Atlantis ILIO deduplicates inline all VDI images before they reach storage, effectively eliminating the need to store up to 70-99% of Windows image components, further reducing the amount of storage required for a successful VDI deployment. With non-persistent desktops, CBRE was able to reduce their storage footprint by 70-80% on top of the storage saving provided by VMware View Linked-clone technology. With persistent desktops, the storage capacity savings can be up to 90%.

### **Benefits of Leveraging VMware View Tiered Storage with Atlantis ILIO**

Atlantis ILIO can provide a significant improvement in performance to a VMware View environment by allowing an administrator to create specific Atlantis ILIO virtual machines to serve the base image, replicas, and linked clones. These Atlantis ILIO virtual machines are better able to handle the specific IO patterns of the VMware View storage construct and boost the performance of a View environment by a significant multiplier.

### **Trend Micro Deep Security and VMware vShield**

Trend Micro Deep Security integrates with VMware vSphere to offer agentless security for VMware View environments. The Deep Security virtual appliance integrates the new vShield Endpoint APIs developed by VMware in collaboration with Trend Micro to offer the industry's first anti-malware solution designed specifically to protect the vSphere platform without requiring an agent in the virtual machine. In addition, the same virtual appliance also uses VMsafe APIs to provide firewall, IDS/IPS, and Web application protection for all virtual machines from outside the VM.

“Atlantis ILIO in-line deduplication means that I get the IO offload and decrease my storage footprint as well.”

*Rory Clements  
Virtualization Architect  
CB Richard Ellis*

“We use VMware View tiered storage with Atlantis ILIO. It fits in perfectly the VMware architecture and sees Atlantis ILIO as just another NFS datastore.”

*Rory Clements  
Virtualization Architect  
CB Richard Ellis*

### ***Xsigo Virtual I/O***

A great VDI user experience demands fast response time under all load conditions. Xsigo Virtual I/O consolidates all network and storage communications to a single high-speed fabric. This accelerates the user experience by minimizing latencies of server-to-server and server-to-storage communications. Xsigo also provides up to 80Gb bandwidth to each server to eliminate I/O bottlenecks, accelerate thin app servers, speed users through the login process, and enhance the user experience by guaranteeing bandwidth to specific virtual machines.

### **Architecture Overview**

CBRE builds on VMware's View stateless reference architecture, replacing raw SSDs with Atlantis ILIO optimization software combined with their existing SAN storage. . The CBRE deployment is currently deployed to 3,000 desktops on three clusters of ESX hosts running. Each physical server runs about 80 virtual desktops, with an Atlantis ILIO and Trend Micro Deep Security virtual machine on each host.

### ***Design Flexibility***

When building a highly scalable, flexible, and cost-effective architecture, it is important to view each area of a virtual desktop separately. User data, applications, and desktop operating systems must be thought of as dynamic, flexible entities. Each entity must be independent of another entity if the environment is to have the highest level of scalability and cost effectiveness. Separating user-data from the OS is the key enabler for stateless desktop designs. Such separation facilitates the CBRE design's joint objectives of cost reduction, risk reduction, and superb user experience..

### ***Storage Flexibility***

VMware View provides two critical storage capabilities for desktop virtualization:

1. VMware View Composer, which creates a master desktop image to deploy across the environment. The master image ensures consistency across the infrastructure and simplifies management with ease of patching, updates, and deployment.
2. The ability to direct various needs of the desktop image storage to different tiers of storage, including the ability to place the Replica base image on an Atlantis ILIO optimized datastore that can use either local disk (SATA/SAS/SSD) or shared SAN/NAS storage.

“When we did our initial scale-out test of the VMware reference architecture, to be aggressive on user density we would have to increase the number of disks at the back end to give us the performance users were expecting. Instead of adding more storage, we were able to slot in Atlantis ILIO to deliver the required IOPS and accelerate desktop performance with existing storage.”

*Rory Clements*  
*Virtualization Architect*  
*CB Richard Ellis*

“We are looking at using local SSDs with Atlantis ILIO because I know that the footprint with ILIO will always fit on a small number of low capacity SSDs.”

*Rory Clements*  
*Virtualization Architect*  
*CB Richard Ellis*

### ***Storage IO Flexibility***

Because of the separation and flexibility of VMware View tiered storage components, VMware View now has the capability to profoundly affect the physical storage IO usage that is associated with a typical virtual desktop. This is performed by directing specific types of desktop storage to different virtual disks that can be optimized by Atlantis ILIO and that reside in various physical storage locations, including local host drives. Because of this flexibility of the VMware View architecture, it can now utilize nontraditional means to reduce the IOPS requirements of a particular desktop. Specifically, when using Atlantis ILIO, it is possible to provide a desktop with tremendous amounts of IOPS processed locally in RAM within the ESX hypervisor without traversing any physical network or even having to write to disk. This architecture delivers the lowest possible storage cost per desktop. By allowing the parent OS image to be served from a centralized Atlantis ILIO virtual machine, more Atlantis ILIO memory is free to serve user activity on the distributed ILIO storage appliances.

### **Availability Considerations for Storing Replicas on a Separate Datastore or Shared Datastores**

An additional consideration to keep in mind is the availability of the pool. When you store replicas on the same datastores as linked clones, View Composer creates a separate replica on each datastore to enhance availability. If a datastore becomes unavailable, only the linked clones on that datastore are affected. Linked clones on other datastores continue running.

“Atlantis ILIO gives me 70% to 80% more IOPS than I could get on my existing physical infrastructure, and it give me additional burst IOPS capability as well, which I think is the main thing. Atlantis ILIO can be adaptive and step in during peak usage to deliver more IOPS.”

*Rory Clements*

*Virtualization Architect*

*CB Richard Ellis*

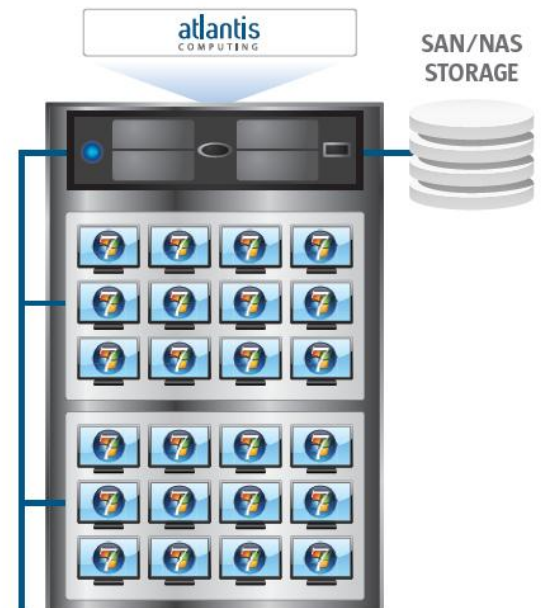
### Deployment Architecture for Atlantis ILIO with VMware View Tiered Storage

It is useful to discuss how Atlantis ILIO is usually deployed to better understand how to leverage VMware View storage tiering.

Typically Atlantis ILIO is deployed in one of two ways, depending on the use case:

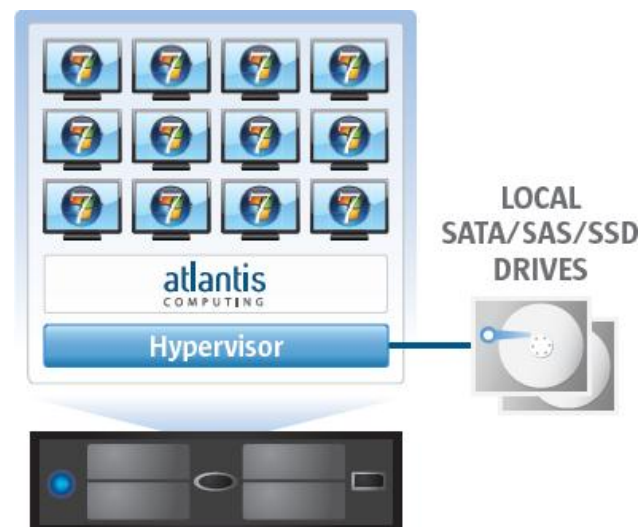
#### **Top-of-Rack Deployment**

The Atlantis ILIO software virtual machine is deployed on a dedicated server at the **top of each rack** of VDI servers. In this configuration, Atlantis ILIO uses a shared SAN/NAS system to store single instances of application and operating system files, without modification to virtual desktop images. The Atlantis ILIO virtual machine scales out easily to add more desktop capacity by adding VDI server racks without the need for more storage.



#### **On Each Server Deployment**

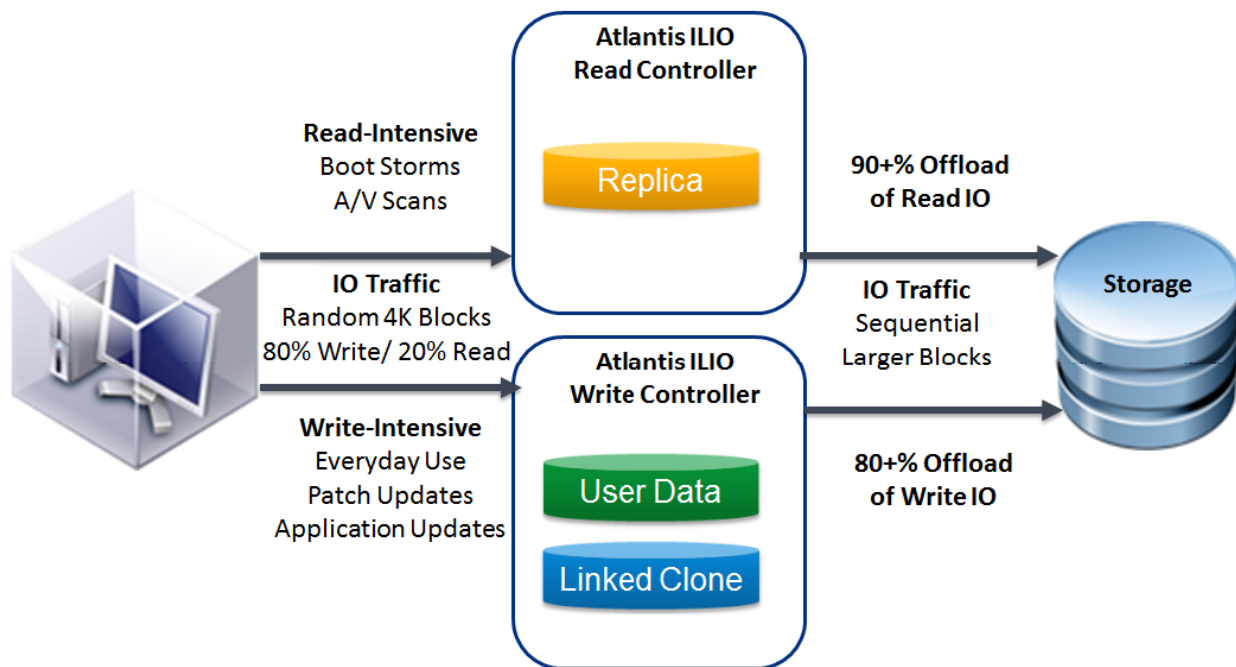
The Atlantis ILIO software virtual machine is deployed on each VDI server on the same hypervisor used by the virtual desktops. In this configuration, Atlantis ILIO uses either local SATA/SAS/SSD drives or a shared SAN/NAS system to store single instances of application and operating system files without modification to virtual desktop images. Atlantis ILIO **On Each Server** offers the best desktop performance and lowest possible CAPEX cost.



### The Atlantis ILIO with VMware View Tiered Storage Approach

In this type of deployment CBRE used two sets of controllers that leverage both the On Each Server and Top-of-Rack deployments for different storage tiers of the VMware View architecture. The CBRE architecture leverages VMware View tiered storage with Atlantis ILIO, optimizing and processing IO locally in software at the protocol layer within the hypervisor or rack. Because Atlantis ILIO also provides in-line deduplication for all IO traffic, the optimal deployment architecture is to segment IO traffic using VMware View tiered storage by type and place similar IO traffic on the same Atlantis ILIO controller to maximize the in-line deduplication rate and performance. Serving the View Composer parent image from a dedicated top of rack Atlantis ILIO virtual machine leaves more memory free on each server for Atlantis ILIO, maximizing inline deduplication efficiency and overall performance. The Atlantis ILIO read controller is deployed Top-of-Rack or shared by the entire VMware View environment depending on the networking configuration. This controller specializes in servicing the read requests made by the virtual desktop VMs. The read controller stores the parent image and replica images that will run guest VMs for a given View pool. A read controller can use a small amount of RAM or local SSD as its permanent storage and service all image and replica read requests from RAM or local SSD drives at very high speeds. Atlantis ILIO offloads up to 90% of the read IO traffic for the replica images.

1. Atlantis ILIO write controllers are deployed On Each Server and are specific to the virtual desktops on that host. This controller specializes in servicing the write and reread requests made by the virtual desktop VMs. They perform storage IO processing and inline deduplication for all write-intensive IO at very high speeds and low latency. The write controllers store the actual linked clone files and all transient data disks that can be created in a VMware View environment. Atlantis ILIO performs storage IO processing and inline deduplication on all write and reread IO traffic for the user data disks and linked clones to offload over 80% of the write IO from the storage system. The performance of the write controller exceeds that of solid-state drives and nonvolatile RAM because of its ability to optimize the heavy write IO generated by VDI environments without issues such as 'wear leveling' and other SSD related performance degradation



This reference architecture, however, is unique as the design takes full advantage of key features enabled by VMware View tiered storage capability while giving customers the option to use local SSDs or shared SAN/NAS. Instead of centralized caching, this architecture uses Atlantis ILIO to optimize the different tiers of IO traffic and use up to 90% less disk, whether that disk is local SSD or an existing shared SAN/NAS array. Atlantis ILIO offloads up to 90% of the desktop virtualization storage traffic and reduces the storage footprint/capacity required by 70% to 90%. This delivers more inexpensive local IOPS for a non-persistent desktop pool. With Atlantis ILIO, VMware View stateless desktops can accommodate the heaviest VDI workloads, including the use of applications such as code development or CAD design (used by CBRE).

### ***How Does VMware View Tiered Storage Work with Atlantis ILIO?***

VMware View offers a tiered storage option that allows customers to place View Composer replicas on one class of storage and linked clones on another. By taking advantage of the new tiered storage option, intensive operations such as provisioning many linked clones at once can be sped up. As an example, you can store the replica virtual machines on a solid-state disk with Atlantis ILIO storage optimization. SSDs have low storage capacity and high read performance, typically supporting 10,000 IOPS. They are also expensive. However, View Composer creates only one replica for each View Composer base-image snapshot on each ESX cluster, so replicas do not require significant storage space as Atlantis ILIO will deduplicate these replicas by more than 90%. The Atlantis ILIO Controller improves the speed at which ESX reads a replicas' OS disk when a task is performed concurrently on many linked clones.

Linked clones can be stored on dedicated Atlantis ILIO virtual machines on each server. These Atlantis ILIO controllers provide high performance, typically supporting 20,000 IOPS or more per Atlantis ILIO virtual machine. They have extremely fast response times and reduce the storage capacity consumed by 70% to 90%, which makes them suited for storing many linked clones in a large pool. As VDI is a write-intensive workload (80% write, 20% read), the performance of virtual desktops improves as all the writes generated on a VDI host are processed locally within the Atlantis ILIO controller on that ESX host. This allows an administrator to provide a high-performance virtual desktop without needing to invest in very large and fast centralized storage systems.

### **Installing Atlantis ILIO with VMware View Tiered Storage**

The steps required to set up the Atlantis ILIO read and write controllers for VMware View deployments are simple and can be completed in as little as eight minutes. First, install a Top-of-Rack Atlantis ILIO virtual machine for each VMware View pool of virtual desktop to parent images and replicas. To maximize performance and minimize latency, the best practice is to create one VMware View Pool per rack of virtual desktops with an Atlantis ILIO virtual machine at the top of each rack to service IO to the master images and replicas. Next, install Atlantis ILIO write controllers on each server hosting desktops. In the VMware View Manager Datastore Selection Dialog, select the “Read Controller” as the datastore for the master images and replicas, and the “Write Controller” as the datastore for the user data disks and linked clones.

For more information on installing and configuring Atlantis ILIO, refer to the Atlantis ILIO Administrator’s Guide or Evaluation Guide. You can request an evaluation of Atlantis ILIO at [www.atlantiscomputing.com](http://www.atlantiscomputing.com).



To see the Atlantis ILIO installation process, watch the “[Atlantis ILIO 8 Minute Install Demonstration](#).”

### Conclusion

CBRE has implemented its VDI environments based on the concepts in [VMware Reference Architecture for Stateless Virtual Desktops with VMware View 4.5](#) with the addition of Atlantis ILIO storage optimization technology integrated with Trend Micro Deep Security and Xsigo Virtual I/O to overcome the storage, performance, scalability, and security challenges typically associated with VDI. By using Atlantis ILIO, CBRE was able to scale its VDI deployment from 500 to 3,000 desktops (6 times) using its existing SAN while boosting desktops performance to levels higher than physical PCs. By integrating Trend Micro Deep Security and leveraging Atlantis ILIO storage optimization, CBRE was also able to eliminate the typical density and storage penalties of running anti-virus with VDI. By deploying Xsigo Virtual I/O, CBRE was able to ensure low latency and high-bandwidth networking from every virtual desktop host to the Atlantis ILIO datastore. With its successful VDI deployment in the U.K. and EMEA, CBRE is now in a position to expand its VDI deployment globally to realize the benefits of VMware View and VDI for all its employees.

CBRE Results	VMware View, Atlantis ILIO, Trend Micro Deep Security Deployment Results
Scalability	From 500 to 3,000 desktops with existing storage
Performance	From slow desktop performance to “better than PC” user experience
Storage IO	80% to 90% reduction in IO traffic using Atlantis ILIO
Storage Capacity Reduction	70% to 80% reduction in storage capacity in addition to thin provisioned linked clones
Security Without Compromise	No reduction in server density by using VMware vShield Endpoint, Trend Micro Deep Security, and Atlantis ILIO