



IBM PureFlex and Atlantis ILIO Cost-Effective, High-Performance and Scalable Stateless VDI

Highlights

- **Management at scale**—Automated deployment and configuration that reduces mistakes. Simplified architectures that lowers the operational, cost and performance risks of deploying stateless VDI, while enabling high availability and disaster recovery.
 - **Lower project risks**—Proven and flexible solutions that scale to tens of thousands of desktop without the risk of SSD failures or storage and network bottlenecks.
 - **Control storage OPEX costs**—No storage or SSDs to deploy, maintain or repair.
 - **Better-Than-PC user experience**—Cost-effectively deliver better-than-PC performance including faster boot/login times, near-instant application launches and search speeds that will amaze users.
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Stateless VDI Challenges

Stateless virtual desktops (a.k.a non-persistent or pooled desktops) increase mobility, centralize control of corporate data, and streamline desktop management. They are often used by hospitals, call centers, schools or for users that don't require personalized desktops or need to install their own applications. When users login to their stateless virtual desktop, they are assigned a virtual machine from a pool of identical virtual desktops and their user documents, settings and profile are streamed into that desktop.

When deploying stateless virtual desktops, traditional storage and local Solid State Drives (SSDs) increase deployment risks and make stateless VDI difficult to manage at scale. IT administrators often choose stateless VDI based on the assumption that it requires less storage. However, while stateless virtual desktops do require less storage capacity, they have the same IOPS requirements. Therefore, using traditional SAN/NAS storage for stateless VDI has approximately the same \$400–\$1,000 CAPEX cost per desktop as persistent desktops.

With stateless VDI, organizations also have the option of using local SSDs for the virtual desktop images. However, SSDs increase operational risks, are difficult to manage at scale and are unreliable, particularly when deployed at larger scale with write-intensive workloads such as VDI. When using local SSDs, IT organizations must manage the SSDs in each server separately as an “island of disks”. If the SSD fails, then the entire server is taken offline until the SSDs are replaced. While SSDs are manageable on a small scale, they inevitably drive up OPEX costs and create operational risks at scale.

IBM PureFlex and Atlantis ILIO Stateless VDI

Together, **IBM PureFlex** and **Atlantis ILIO™** storage optimization software deliver a unique solution that addresses the challenges of stateless virtual desktop environments. The integrated solution complements Citrix XenDesktop or VMware Horizon View to simplify and de-risk stateless VDI deployments. The solution delivers consistently better-than-PC performance as projects scale, while eliminating the CAPEX and OPEX costs associated with storage or SSDs.

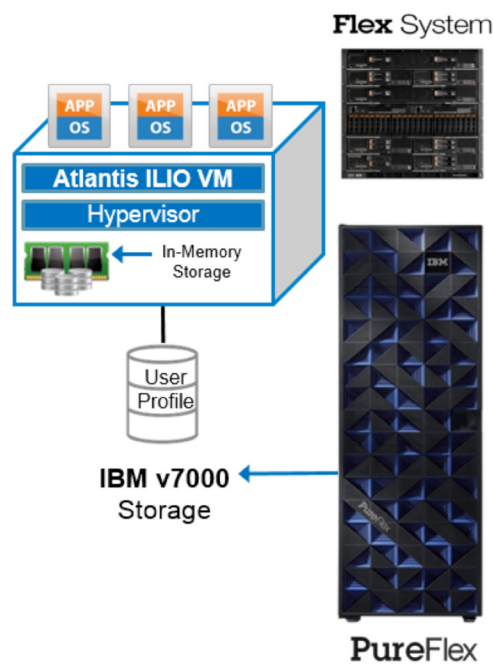
Built on fully validated reference architectures, this virtual desktop solution supports centralized management with flexible deployment options that scale to tens of thousands of users. By optimizing how stateless virtual desktops consume storage, Atlantis ILIO In-Memory Storage™ technology allows



virtual desktops to be run in IBM server RAM with user profile data stored on the IBM v7000 or IBM FlashSystems storage—at performance levels that consistently exceed what a physical PC can provide.

Management at Scale

IBM PureFlex and Atlantis ILIO simplify and automate the deployment of infrastructure to support thousands of stateless virtual desktops, while enabling high availability and disaster recovery. Deployment automation addresses the challenges of sizing storage and networking, making configuration mistakes and eliminates the time consuming process of integrating servers, storage, and networking.



Lower Project Risks

IBM PureFlex with Atlantis ILIO provides IT with a simple, powerful and scalable platform for deploying stateless VDI that eliminates the risks of storage and network bottlenecks that often derail VDI projects. As the project scales, the solution provides consistent and reliable desktop performance that is easier to manage and maintain than local SSDs.

Control Storage OPEX Costs

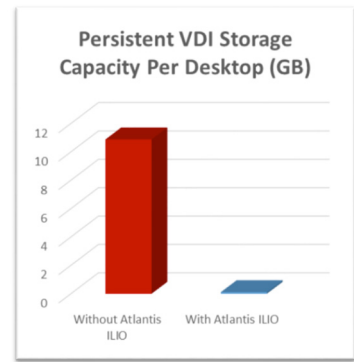
Deploying stateless VDI at scale introduces additional storage and network costs. With local SSDs, undersizing of the PVS write cache, or Linked-Clone, and high SSD failures rates can lead to hidden operational cost. IBM PureFlex with Atlantis ILIO storage optimization software enables customers to deploy stateless virtual desktops with no additional SAN/NAS storage or SSDs required for virtual desktop images, lowering the CAPEX and OPEX costs by up to 80%.

Better-than-PC User Experience

When IT organizations deploy virtual desktops, users expect that the performance of their virtual desktops in terms of boot/ logon time, application launch time, search and overall response time will be equal to or better than their physical PCs. IBM PureFlex optimized with Atlantis ILIO In-Memory Storage™ Technology enables organizations to deploy stateless VDI using IBM PureFlex server RAM as primary storage for virtual desktops with IBM v7000 or IBM FlashSystems storage for user profiles. This unique solution delivers a fantastic user experience that drives desktop virtualization adoption across your organization.

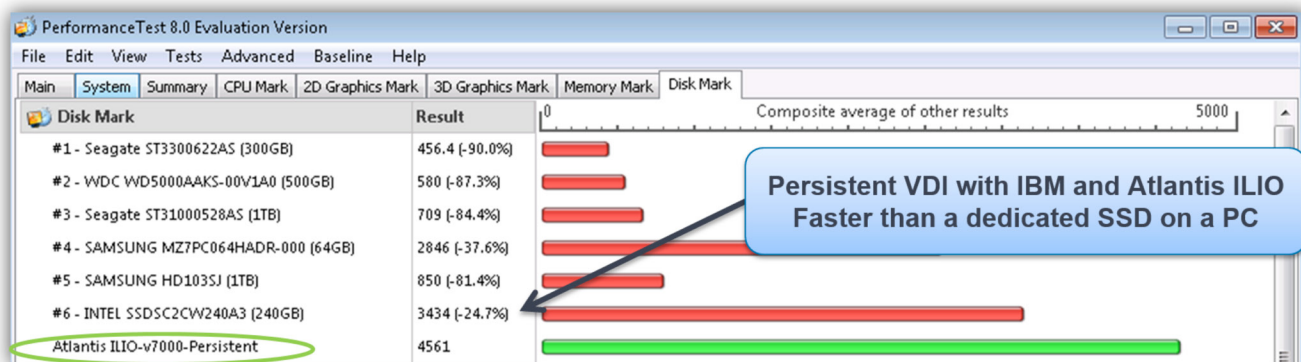
IBM Innovation Center Benchmark Testing

Benchmark Testing Summary	
Test	Atlantis ILIO Impact
Storage Capacity Per Desktop	98% reduction
Storage Density	No storage for desktop images
IOPS Per Desktop	361
Desktop Performance (PassMark 8.0)	3x faster than PC



Benchmark Testing Summary	
Desktop Performance (LoginVSI)	4x faster LoginVSI Max baseline (1010ms)

In order to validate the IBM PureFlex with Atlantis ILIO Stateless VDI solution, the IBM Innovation Center conducted extensive performance, scalability and reliability testing. The testing included measuring the storage density that could be achieved with Atlantis ILIO and desktop performance using industry standard benchmarking tools such as LoginVSI 3.7 (Medium workload), ioMeter and PassMark Performance Test 8.0. The results showed that Atlantis ILIO was able to increase storage density per disk by up to 55 times, while maintaining a server density of 125 virtual desktops per server (2x Intel Xeon E5-2670 with 256GB RAM). Performance testing using ioMeter,



LoginVSI and PassMark showed desktop performance that was 3-4x faster than a typical physical PC user experience with 32% faster disk performance than a PC with a dedicated Intel SSD.

Streamlining deployment with a broad portfolio and flexible configurations

Every organization has unique business and technology needs. IBM PureFlex with Atlantis ILIO storage optimization software is designed to address a broad range of desktop virtualization requirements through smoother integration with a range of technologies:

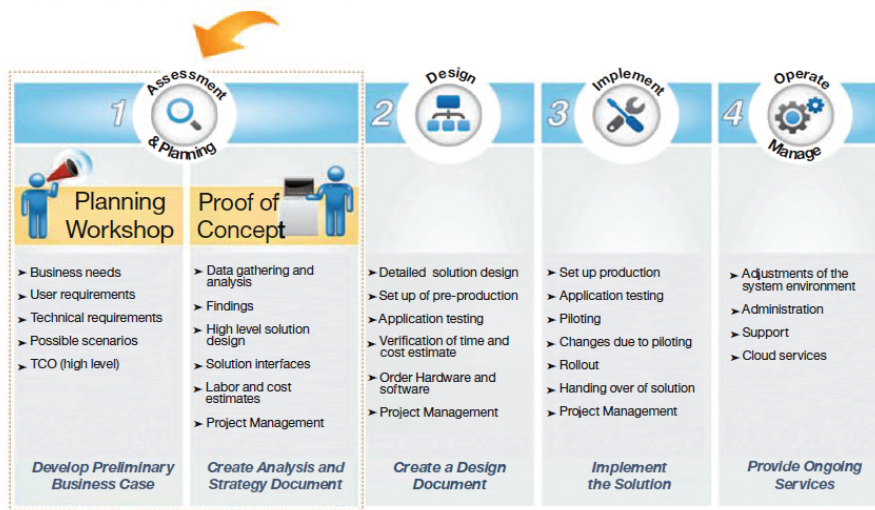
- IBM System x® servers, IBM PureFlex™ System and IBM Storwize® V7000. Recognized in the industry for quality, reliability and innovation, these technologies offer powerful building blocks for the SmartCloud Desktop Infrastructure. A broad portfolio of flexible configurations offer enhanced memory, high-speed I/O and industry-leading availability and

reliability features—a combination designed to reduce operating costs, simplify management and keep your virtualized desktop infrastructure up and running.

- Atlantis ILIO Diskless VDI™ software is the only solution that can eliminate storage from stateless VDI deployments by leveraging local IBM server RAM and ILIO In-Memory Storage™ technology. The solution delivers a user experience that is cheaper and faster than a PC—with near-instant app launches and searches, and fast boot times—at a cost below that of a PC, while fully automating deployments. With Atlantis ILIO, VDI can now be deployed to thousands of desktops in a matter of a few hours without the cost, complexity and risks of sizing, installing and managing storage.

In addition, robust services can help accelerate your transition to a less complex, virtualized desktop environment, leveraging a proven execution model. SmartCloud Desktop Services use time-tested methodologies, proprietary tools and extensive

IBM SmartCloud Desktop Infrastructure Best Practices and Services



expertise developed through real-world client implementations for virtual desktop environments. Robust services—including assessment and planning, design and implementation, as well as operation and management—and a phased delivery approach help speed your return on investment and reduce the risk of business disruption.

About IBM Partners

Atlantis Computing

Atlantis Computing™, winner of the prestigious Best of VMworld and Best of Citrix Synergy awards, addresses the challenges of storage-intensive applications in private and public clouds: performance, cost, disaster recovery, and the ability to scale-out on demand. Atlantis ILIO software complements virtualization solutions from Citrix, Microsoft and VMware to optimize the use of data center storage by virtualized desktops and servers, automate large-scale deployment and management, and lower implementation risks. Atlantis Computing is privately held and funded by Cisco Systems, El Dorado Ventures and Partech International, with headquarters in Mountain View, California and offices in Europe. For more information, visit: www.atlantiscomputing.com or follow us on Twitter @Atlantis-ILIO.

Why IBM and Atlantis Computing?

IBM has been a leader in large-scale virtualization for four decades, building strong intellectual capital and experience as a trusted adviser of end-user services to more than 4,000 companies. Along with IBM, Atlantis Computing has brought innovation to virtualization and shares a strong track record across virtually every industry. Together IBM and Atlantis Computing offer world-class solutions to help customers plan, implement and manage a more cost-effective, centralized and virtualized desktop environment. Atlantis Computing is recognized as industry experts in desktop virtualization and storage, basing their success in designing and implementing some of world's largest desktop virtualization deployments. The Atlantis ILIO In-Memory Storage technology is acclaimed by industry experts and analysts as one of the most innovative solutions in the desktop virtualization industry and is the only product to have swept the "Best of VMworld U.S", "Best of VMworld Europe" and "Best of Citrix Synergy" in the same year.



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