# MaxDeploy Hyper-Converged Reference Architecture Solution Brief

*MaxDeploy Reference Architecture solutions are configured and tested for support with Maxta software-defined storage and with industry standard server platforms from leading server vendors.  Maxta software-defined storage enables pooling of flash memory and locally attached disks across a virtualized cluster of any standard x86 server, delivering a simple, easy to deploy converged compute and storage infrastructure solution.*

## Convergence, Hyper-convergence

Software-defined storage platforms are disrupting traditional storage architectures (SAN & NAS) in the enterprise storage market. Enterprises, ranging from SMB, SME and large enterprises are beginning to take a page out of the book of the large public cloud providers like Amazon, Google and Facebook, where the IT infrastructure is a converged compute / storage scale out model. There are many different names used to describe this approach to storage such as Server SAN, Hyper-converged compute & storage infrastructure, software-defined storage, etc. The hardware building blocks are rack mounted industry standard servers with internal drives bays that can be populated with direct attached disk drives and SSDs. Intelligent software that runs alongside the applications in each server node abstracts and aggregates the pool of storage across the server cluster. Faster and cheaper CPUs, memory and flash technology has provided the leverage for intelligent software to deliver excellent performance, as well as all the data services required. Using this approach, NAS and SAN functionality can be delivered at a significantly lower cost. In many important application segments, this approach will offer superior performance, functionality and availability over traditional SAN & NAS.

This approach to storage is the de facto standard for the large public cloud providers. It is in the early stages of penetrating the enterprise storage market. Many industry analysts view that in the next 5 to 10 years, a majority of the enterprise storage market will shift to this approach. http://wikibon.org/wiki/v/The_Rise_of_Server_SAN

## Convergence with Virtualization

A smaller sub set of companies in this group have taken this approach to the next level. In addition to convergence, they provide integration into the server virtualization framework and deliver a VM centric storage framework, with full integration into the workflow and UI of the hypervisor. This approach allows for a single pane of glass management framework, where the VMs and associated storage can be managed seamlessly, significantly reducing the cost & complexity of managing storage. Maxta is a pioneer in this space, with its industry leading MxSP storage platform that exemplifies the best of the converged compute / storage model and a VM centric approach to managing storage.

## Components of the Solution

### Maxta Storage Platform

The Maxta Storage Platform (MxSP) is a hypervisor-agnostic, highly resilient storage platform for the virtual data center, and is helping transform the enterprise storage market. It fully integrates with server virtualization at all levels from user interface to data management, while supporting all possible deployments of virtual data centers, including private, public and hybrid clouds. Through its software-only solution, MxSP turns standard servers into a converged compute and storage solution, leveraging server-side flash and disk drives to optimize performance and capacity. MxSP's distributed architecture enables shared storage with enterprise-class data services such as snapshots, clones, thin provisioning, compression, de-duplication, replication as well as full scale-out without performance degradation. This results in dramatically simplifying IT and significant cost savings.

The innovative, peer to peer architecture aggregates storage resources from multiple servers, assimilating a global namespace, creating a shared storage pool. An instance of MxSP software is installed on each of the servers that are part of the virtualization cluster. The storage resources are a combination of magnetic disk drives and SSD. All the servers running MxSP software have access to the aggregated storage pool.

MxSP intelligently maps VMs to storage resources, optimizing data layout for virtual workloads and leverages SSDs for read/write caching. It dramatically improves performance and eliminates the need for IT administrators to make difficult tradeoffs between performance and cost.
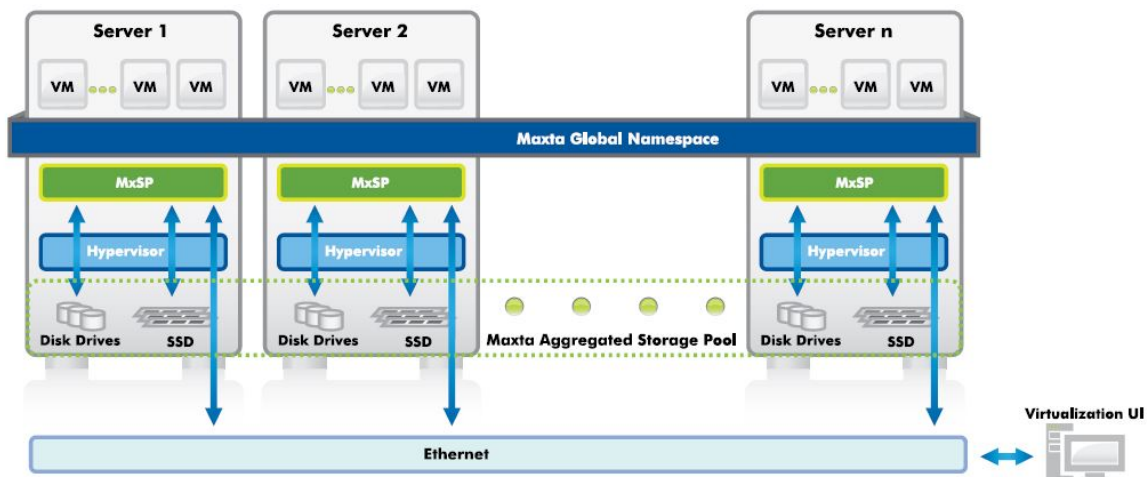
## Intel Architecture (IA) industry standard x86 Server Platforms

Maxta leverages x86 industry standard server platforms from all the leading server vendors to create a converged compute / storage platform that delivers new levels of flexibility, reliability, performance and cost effective scalability in a distributed scale out architecture. By delivering the solution on an industry standard architecture, customers reap unprecedented choice, flexibility and value.   Maxta's success as a hyper-converged solution provider is possible because of strong partnerships and technical integration. Maxta's MaxDeploy Reference Architecture delivers a new and flexible way of deploying hyper-converged solutions for the virtual data center by predefining and pre-validating solutions that combine Maxta's software along with partner solutions and platforms. This removes interoperability and performance guesswork and simplifies the ordering process.

Maxta MxSP software-defined storage solutions provide customers the complete flexibility to customize their solutions and run on existing x86 servers. Maxta provided server configuration tools and reference architecture briefs can help with configuration suggestions and compatibility verifications.

Maxta solutions have been tested for interoperability through MaxDeploy Ready test validations so that they can provide additional interoperability and solutions documentation for different workloads and use cases.

## Industry standard SSDs and HDDs

Maxta's storage platform has been optimized for a hybrid SSD / HDD storage deployment where customers can get the performance advantages of flash and the capacity and cost advantages of spinning disk. Customers have a wide choice of storage device types. Within SSDs, customers can deploy SSD devices ranging from eMLC SATA drives to PCIe drives and also leverage the latest advances in NVME technologies.  Maxta uses the SSD layer as a read, write back and metadata caching tool, with the persistent data being stored on spinning media. Within HDDs, customers can deploy disk drives ranging from large capacity slow spinning ( 7.2K RPM) to faster spinning ( 10K, 15K RPM) , higher performance drives.

Maxta's best practice for a hybrid deployment is for The SSD capacity to be in the range of 5% to 10% of the spinning disk capacity on each node, depending on the performance requirements.

## Hypervisor Agnostic

Maxta's software defined, hyper-converged storage platform provides choice to customers in terms of being able to run on a variety of hypervisors. Maxta supports VMware vSphere, the industry-leading closed virtualization platform for building cloud infrastructures. It enables IT to meet SLAs (service-level agreements) for the most demanding business critical applications, at the lowest TCO (total cost of ownership).

vSphere accelerates the shift to cloud computing for existing data centers and also underpins compatible public cloud offerings, forming the foundation for the industry's only hybrid cloud model. With the support of more than 3,000 applications from more than 2,000 ISV partners, vSphere is the trusted platform for any application.

Maxta also supports KVM, the industry leading open virtualization hypervisor platform. Maxta also supports OpenStack a cloud operating system that controls large pools of compute, storage, and networking resources throughout a datacenter, all managed through a dashboard that gives administrators control while empowering their users to provision resources through a web interface.

Maxta has developed drivers to integrate with both compute (Nova) and storage (Cinder) components of Openstack to simplify management in a hyper-converged environment.

## Rich Enterprise class features and functionality

| Feature | Function | Benefit |
|---|---|---|
| Hypervisor agnostic | Support multiple hypervisors | VMware vSphere, KVM |
| Multiple management | Support for multiple management frameworks | VMware vCenter, Openstack |
| Single pane of glass (vCenter) for VM and data management | Eliminate storage management | Dramatically Simplify IT |
| VM centric data services (snapshots, zero-copy clones, policy management, thin provisioning, compression and de-duplication | Manage all data services at VM level granularity | No need for storage specific expertise |
| High Availability features (Maxta stretch storage cluster, local replication, local mirroring) | Failover VMs and storage in case of datacenter/rack, server and disk failures | Application uptime |
| Strong checksum | Data Integrity | Data availability, reliability |
| Optimized for flash performance and disk drive capacity | • Intelligently optimize mapping of VMs to storage resources<br>• Accelerate random writes with sequential data log layout<br>• Enable read/write caching | Eliminate difficult tradeoffs between performance and cost. |
| Co-exist with other storage solutions | Provide flexibility | Investment protection |

## Benefits of the Solution

**Dramatically Simplify IT – Manage VMs, NOT storage:**

The solution dramatically simplifies IT by eliminating the need for storage provisioning and managing volumes, LUNs, file systems, and RAID. The installation and configuration of takes only few minutes. Additionally, all data services such snapshots and zero-copy clones are configured and managed from the virtualization UI at the VM-level rather than from a storage specific UI at the storage-level. This enables the VM administrator to leverage storage without the need for deep storage and vendor specific expertise. This simplification along with converged compute and storage eliminates the day-to-day tasks of storage management and enables administrators to focus on managing applications and VMs.

**Maximize CAPEX and OPEX Savings – Leverage Convergence and Intel Server Boards and System Servers:**

The solution enables significant capital savings by converging compute and storage resources on Intel Server Boards and System servers, without compromising performance or scalability. This provides considerable up-front capital savings and even greater savings on upgrades compared to the capital expenses associated with purchasing and expanding storage arrays or storage appliances. In addition, leveraging commodity disk drives, Intel SSDs, snapshots, zero-copy clones, thin provisioning, in-line compression and in-line de-duplication increases storage efficiency and reduces storage expenses. By significantly simplifying IT, increasing IT efficiency, and enabling administrators to focus on managing applications and VMs, the solution enables dramatic reduction in operating expenses.

**Enhance Resiliency, High Availability, Data Protection, and Agility – Provide Enterprise-class Services:**

The revolutionary solution achieves best-in-class resiliency and high availability with end-to-end data integrity and no single point of failure. With the solution there is no compromise to the enterprise-class features such as efficient snapshots, zero-copy clones, capacity optimization features such as thin provisioning, compression and de-duplication. Additionally the solution seamlessly supports all the VMware vSphere features such as vMotion, Storage vMotion, HA and Dynamic Resource Scheduler (DRS).

## Conclusion

The MaxDeploy reference architecture delivers on the promise of a hyper-converged software defined solution for the virtual datacenter eliminating the need for SAN or NAS storage. This deployment provides a pre-defined and validated set of hardware and software for virtualized applications. The architecture will deliver the ability to combine the best-in-class technology for compute, storage and networking components. This delivers a simple and cost effective solution without compromising any features or performance to customers. For more information visit http://www.maxta.com/solutions or contact Maxta at sales@maxta.com

# Maximize the promise of hyper-convergence!