

## SOLUTION BRIEF



Intel® Cloud Builders  
Yottabyte Cloud Blox\*  
Intel® Xeon® processors  
Intel® Solid State Drive Data Center Family  
Intel® Ethernet Converged Network Adapters

# Empower Your Experience with Easy Cloud Building

**Yottabyte Cloud Blox\* enables rapid deployment of private and hybrid clouds.**



Today's business environment has little room for error or delay when executing on key initiatives. And when every day counts, IT limitations can have a very real impact on business growth.

The primary limitation that IT departments face is from the infrastructure itself. Traditional architectures rely on complex and expensive specialized products from multiple vendors. Not only do these devices offer limited scalability options, but each vendor has its own unique certification and support process and requires different domain expertise. Ultimately, the tools chosen to support your most critical initiatives end up restricting your ability to respond to the needs of your business.

Yottabyte Cloud Blox\*, powered by Yottabyte Cloud Composer\* software, helps eliminate these limitations by providing a software-defined infrastructure (SDI) platform that allows you to build a highly scalable and distributed private, hybrid, or public cloud infrastructure. This complete solution includes everything you need—storage, computing, virtualization, networking, and security—all from one vendor and managed securely through one simple, browser-based interface.

Yottabyte takes advantage of advanced Intel® technologies—including Intel® Xeon® processors, the Non-Volatile Memory Express\* (NVMe\*) and Serial ATA (SATA) Intel® Solid-State Drive (SSD) Data Center Family, and Intel® Ethernet Converged Network Adapters—to offer modular and highly scalable building blocks, called Yottabyte Cloud Blox. Utilizing Intel® technology, Yottabyte has enabled the construction of a range of scale-out Yottabyte Cloud Blox appliances from hyper-converged to storage- or compute-only nodes. These appliances can be mixed and matched to enable the creation of a cloud infrastructure and the ability to grow that infrastructure as needed, without purchasing expensive overcapacity.

### Software-Defined Infrastructure (SDI)



**Software-Defined  
Computing**  
(SDC aka VMs)



**Software-Defined  
Networking**  
(SDN)



**Software-Defined  
Storage**  
(SDS)

## Virtual Data Center

The core of this next-generation data center infrastructure is Cloud Composer. This software abstracts and isolates physical appliance resources into secure containers. These physical elements are translated into secure pools of virtual storage, virtual compute, and virtual network resources. These virtual resource units are allocated to secure tenant containers, which are called virtual data center (VDC) environments. This enables multi-tenant, isolated data centers that run on the same physical infrastructure with zero impact from your neighbors. With Cloud Composer, disaster recovery is considered for the entire VDC, not just the virtual-machine (VM) level. Instant cloning and replication happen at the VDC level, even between sites. Everything is configured, managed, and provisioned entirely through software, with greater security, and from any device with a modern browser. This platform provides on-demand provisioning and unmatched flexibility, all while increasing efficiency and reducing complexity.

Yottabyte Cloud Composer SDI software translates the physical CPU, RAM, and storage components of Yottabyte Cloud Blox appliances into definable and configurable virtual resource groups that can be used to build multi-tenant, multi-site cloud infrastructures. Each VDC instance manages clusters of physical, hyper-converged compute, storage, and network-fabric Yottabyte Cloud Blox instances. They are organized and represented virtually through one or many domains, VDCs, and VM resource containers.

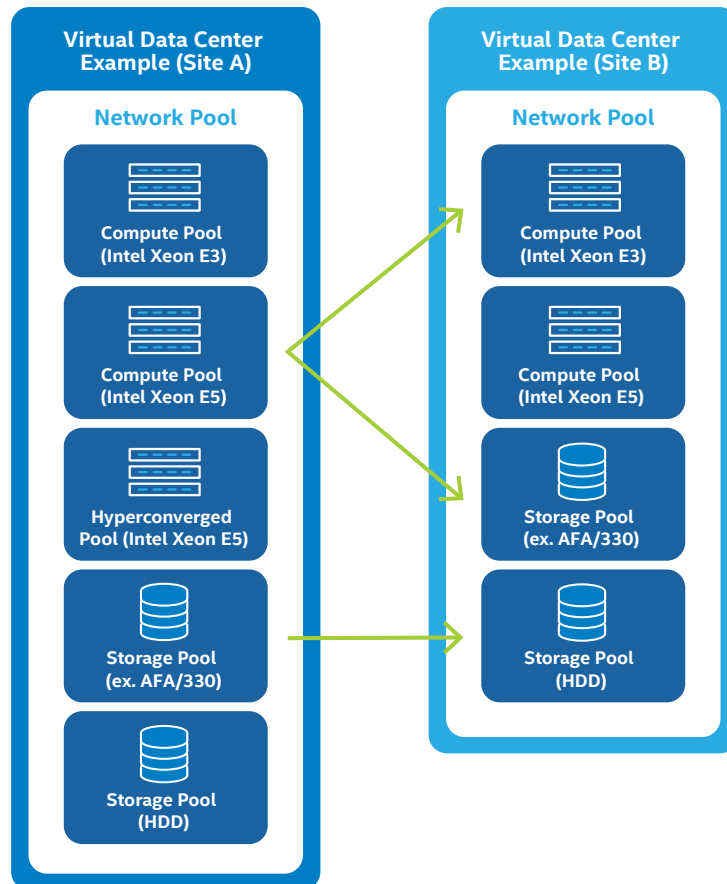
## Simplified Management

Because Yottabyte clouds are defined entirely by software, the infrastructure itself can be reconfigured on the fly. New storage volumes, virtual networks, virtual machines, and entire VDC environments can be spun up with just a few clicks at a moment's notice.

Cloud Composer takes the full scope of management, from building the infrastructure and provisioning storage to data protection and synchronization, and makes it available with greater security through a single-pane-of-glass interface using any browser.

## Scale-out Architecture

A Yottabyte SDI platform is built upon a scalable architecture of modular Yottabyte Cloud Blox appliances. With this architecture, you are free from the burdensome pre-planning and massive initial expense of traditional storage and compute systems. Your implementation can start small, with a minor investment, and can easily scale through evolution. The data center that you create for a proof of concept can easily scale for pilot testing and production use simply by adding additional Yottabyte Cloud Blox instances.



**True hybrid cloud** delivers scale-out infrastructure that effectively manages virtual machines, near real-time replication, and disaster recovery across multiple sites.

## Integrated Virtualization

Cloud Composer was designed from the ground up as an SDI platform for the express purpose of building clouds with the industry-proven Kernel-based Virtual Machine\* (KVM\*) hypervisor as an integral and transparent part of the software architecture. This convergence of infrastructure and hypervisor enables incredibly rapid deployment of server-virtualization projects, VDI infrastructures, and private and hybrid clouds—all by one administrator using a single console. Cloud Composer comes complete with everything needed to build out a modern, virtual data center, and with no additional licensing or third-party costs required.

## Software-Defined Networking

The Cloud Composer platform includes full-featured virtual networking capabilities that allow you to quickly configure and reconfigure internal and external networks to meet business demand. Each virtual network includes basic network functions, such as L2/L3, IP-address management, Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), network address translation (NAT), and a firewall.

Using overlay networking and encrypted tunnels between sites, Cloud Composer connects geographically disparate locations. This creates a “virtual wire” through the public network, helping to ensure security without requiring per-VM VPNs, and with minimal configuration.

The screenshot shows the Yottabyte management console for the 'YBRC Blue' environment. At the top, there are summary statistics: Machines (0/1), Tenants (0/0), Networks (5/9), Sites (1/1), Clusters (2/2), Nodes (30/30), vSAN Tiers (4/4), Users (9/9), and Groups (0/0). Below this, there are several sections:

- Compute Clusters:** A table showing cluster status, name, machines on, online nodes, cores usage, and RAM usage. Two clusters are listed: 'Storage' and 'Blue'.
- Storage Tiers:** A table showing storage tier names, used/capacity, and allocated/capacity. Four tiers are listed: Storage Tier 0, Storage Tier 1, Storage Tier 2, and Storage Tier 4.
- Networks:** A table listing network names, types, TX rates, and RX rates. Networks include BGP, Core, DMZ, IPM Switch, IPM-PXE, Reserved Switch, YBRCSW1 Switch, YBRCSW2 Switch, and test.
- Logs:** A table showing log levels, times, users, and messages. The logs include messages about firewall rules, snapshots, and cluster status changes.

The screenshot shows the Yottabyte management console for the 'Troy' environment. At the top, there are summary statistics: Machines (0/1), Tenants (8/8), Networks (14/18), Sites (1/1), Clusters (2/2), Nodes (9/9), vSAN Tiers (4/4), Users (2/2), and Groups (0/0). Below this, there are several sections:

- Compute Clusters:** A table showing cluster status, name, machines on, online nodes, cores usage, and RAM usage. Two clusters are listed: 'Storage' and 'Primary'.
- Storage Tiers:** A table showing storage tier names, used/capacity, and allocated/capacity. Four tiers are listed: Storage Tier 0, Storage Tier 1, Storage Tier 3, and Storage Tier 4.
- Networks:** A table listing network names, types, TX rates, and RX rates. Networks include Core, Core 1 Switch, Core 2 Switch, DMZ, External, GRS/Link, IPM Switch, Multitenant, Reserved Switch, tenant\_astro.com, tenant\_aurora.com, tenant\_ott.com, tenant\_garmpbell, tenant\_inclonformatics.com, tenant\_ku.edu, tenant\_megacore.com, and tenant\_yottabyte.com.
- Logs:** A table showing log levels, times, users, and messages. The logs include messages about tenant creation and status changes.

## Software-Defined Storage

At the core of the Cloud Composer VDC is Yottabyte's software-defined storage platform or virtual storage area network (vSAN). Using the software-based architecture of Cloud Composer, the vSAN connects virtually any type and size of server or disk into a unified storage fabric, allowing you to build a storage platform that extends beyond the boundaries of traditional data center walls.

Cloud Composer supports multiple storage tiers and auto-tiering, allowing you to run your critical applications on the fastest storage. Cloud Composer can make use of RAM, NVMe and SATA SSDs, hard-disk drives (HDDs), and cloud storage.

Frequently accessed data can be cached to RAM or an SSD, whereas archives can be placed on spinning disks or in the cloud. As new storage types emerge, such as 3D XPoint™ technology, they can and will be easily integrated. Diverse storage devices can be used together to create highly extensible storage systems, with individual virtual disks expandable to 4 petabytes (PB). To add capacity, you simply add more disk drives to an existing server, or add another server—the allocation and balancing of resources is done automatically.

Resources are presented to cloud customers through resource pools defined by an administrator. These can be altered as needed to take advantage of changing storage needs. Cloud customers allocate to workloads what storage they see fit on whatever tiers they see fit based on the resource pools to which they have been granted access.

### SnapSync\*

SnapSync\* provides data replication across geographically disparate Cloud Composer clusters, enabling the construction of private and hybrid cloud infrastructures. Due to the global deduplication of Cloud Composer, SnapSync simply compares the hash of deduplicated blocks to those on target systems and only updates the changed blocks.

SnapSync allows for the snapshotting of entire domains, VDCs, or virtual machines. Thanks to the global deduplication of Cloud Composer, the replication footprint of snapshotting an entire tenant is minimal.

This functionality also provides robust data protection. You can schedule snapshots to occur every set number of hours for local copies and then set a daily snapshot to be replicated offsite as an example.

**Yottabyte Cloud Composer\* is a massively scalable, fully distributed, globally deduplicated SDI platform developed from the ground up for the express purpose of building clouds. Cloud Composer completely abstracts VDC environments from the underlying hardware. Completely automated orchestration enables secure provisioning of storage, compute, and networking in seconds.**

### General system features:

- Multi-tenant/cluster/site platform
- Ability to create multiple VDCs
- Web-browser-based graphical user interface (GUI)
- Single-pane-of-glass management dashboards
- Monitoring, management, and alerting
- Statistics and accounting
- REST-like API

### Storage features:

- Yottabyte vSAN (with auto-tiering)
- Scale-out, distributed architecture
- Live global deduplication
- Mirrored and striped data protection
- Live corruption detection and repair
- Encryption at rest and in flight
- Zero-impact maintenance mode

### Compute features:

- Built-in hypervisor (QEMU\*/KVM\*)
- VDC quality of service and isolation
- Automatic VDC and VM high-availability failover
- VDC and VM live migration
- VDC and VM site-to-site replication
- VDC and VM recipe creator (cloning)
- VDC and VM auto-snapshot with retention
- Windows\* guest-operating-system support
- x86-based Linux\* guest-operating-system support

### Network features:

- Built-in virtual switching
- Public/private IP address management
- L2/L3 support
- Built-in firewall
- NAT/PAT
- DNS and DHCP
- MAC address management

## Optimizing Yottabyte Cloud Blox with Intel® Technology

### Powered by Intel® Xeon® Processors

Although the Cloud Composer software provides a high degree of intelligence in terms of load balancing and workload migration, having high performing and reliable hardware is critical to achieving enterprise-class performance in a software-defined storage deployment.

Yottabyte Cloud Blox appliances using the Intel® Xeon® processor E3-1200 v5 product family, the Intel® Xeon® processor E5-2600 v4 product family, Intel® SSD Data Center Family, and Intel® Ethernet Converged Network Adapters enable the performance and input/output (I/O) needed for automated tiering and other advanced capabilities that can increase efficiency.

Yottabyte Cloud Blox appliances powered by the Intel Xeon processor E3-1200 v5 product family achieve a blend of energy efficiency and performance optimal for lighter, scale-out workloads or standard storage tiers. Although designed for less-intensive workloads, the Intel Xeon processor E3-1200 v5 product family includes technologies such as Intel® Virtualization Technology (Intel® VT) and Intel® Data Direct I/O Technology (Intel® DDIO) that improve core performance and throughput for virtualized workloads.

For high-demand workloads or premium storage tiers, Yottabyte Cloud Blox appliances powered by the Intel Xeon processor E5-2600 v4 product family provide enterprise-

class performance and efficiency. With advanced multi-core, multi-threaded processing and industry-leading I/O performance, the Intel Xeon processor E5-2600 v4 product family helps improve energy efficiency while decreasing I/O latency for a variety of data-intensive workloads.

### Intel® SSD Data Center Family

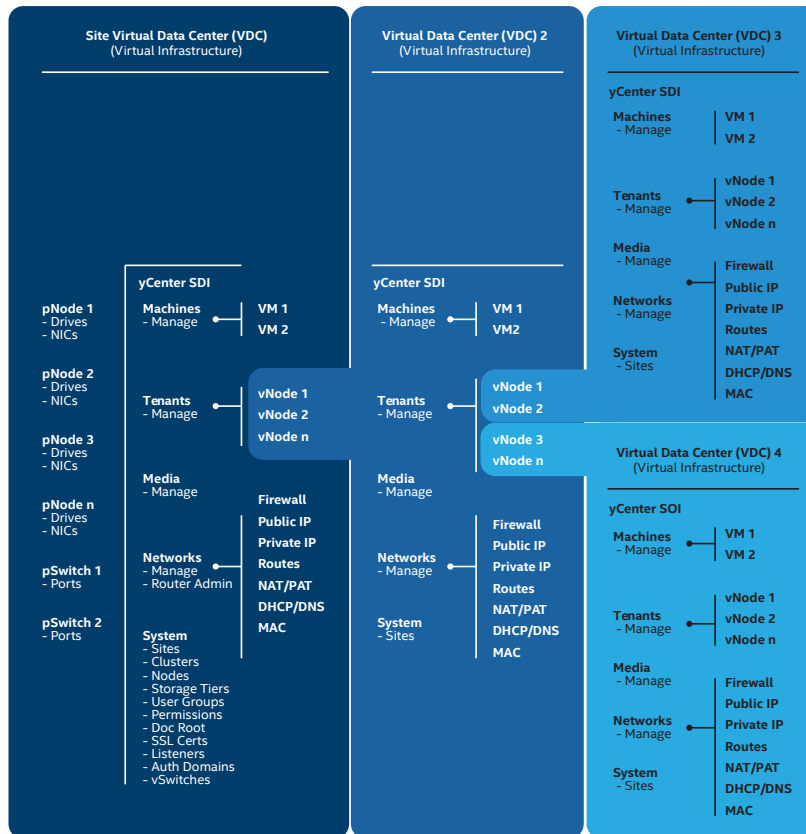
Creating a high-performance software-defined storage platform requires high performing and highly reliable storage devices. The Intel SSD Data Center Family modernizes storage with high-endurance and extreme-performance SSDs.

Yottabyte Cloud Blox appliances using the Intel SSD Data Center Family can eliminate the throughput and reliability limitations of standard storage built with spinning magnetic discs and mechanical actuators.

With incredibly high performance, end-to-end data-protection technologies, and enhanced power and thermal-management features, the Intel SSD Data Center Family provides the ideal performance and reliability for large-scale storage deployments.

### Intel® Ethernet Converged Network Adapters

Unlike standard hyper-converged offerings, Yottabyte Cloud Blox appliances integrate storage, compute, and networking resources into a single SDI. Using Intel Ethernet Converged Network Adapters provides Yottabyte Cloud Blox appliances with the ability to deliver full SAN and LAN connectivity via a single adapter.



Yottabyte Cloud Composer multi-tenant, nested virtual data center environment architecture. Physical storage, compute, and networking resources are translated into virtual resources for use by the highest level, primary virtual data center, or assigned to virtual nodes, which may be configured for use by sub-tenant environments. These sub-tenants are recursive and may be configured n-levels deep.

## Learn More

Request a demonstration or cloud-based evaluation at [yottabyte.com](http://yottabyte.com)

- Find more information on Intel® data center products at [intel.com](http://intel.com)



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