ZERO STACK

Zero Ops.
Complete Stack
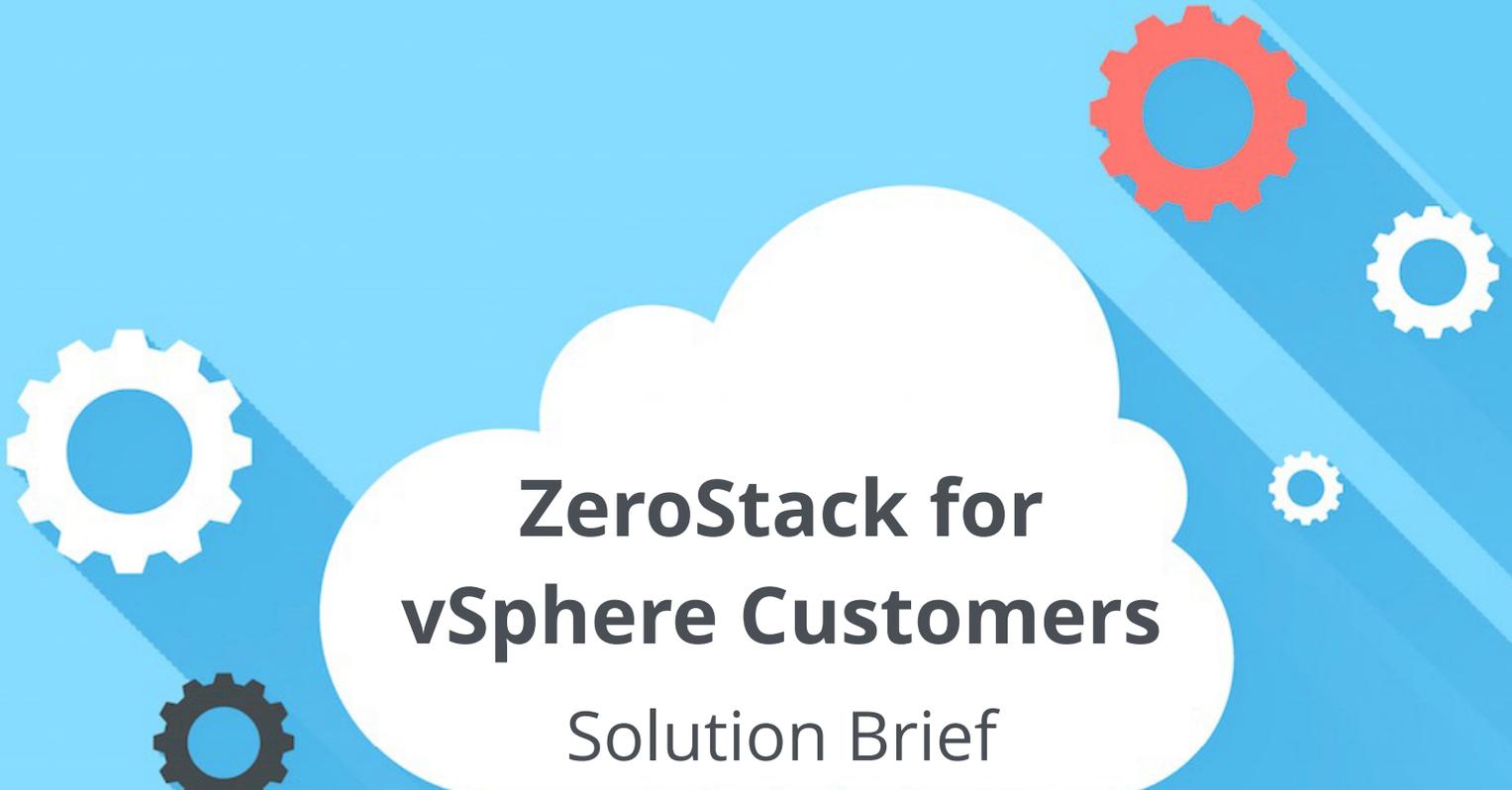Your Cloud.

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ZeroStack for vSphere Customers

Solution Brief

VMware vSphere has been a mainstay for datacenter virtualization for a long time. However, the vSphere platform is not designed for self-service private clouds, hybrid clouds, or API-driven cloud-native workloads that many enterprises and developers prefer. Enterprises are adopting a bi-modal IT strategy and complementing their VMware virtualization platform with a self-service, agile, hybrid cloud platform.

ZeroStack complements an existing vSphere setup and offers enterprises that new type of self-service cloud-native platform IT managers want to offer to their developers.

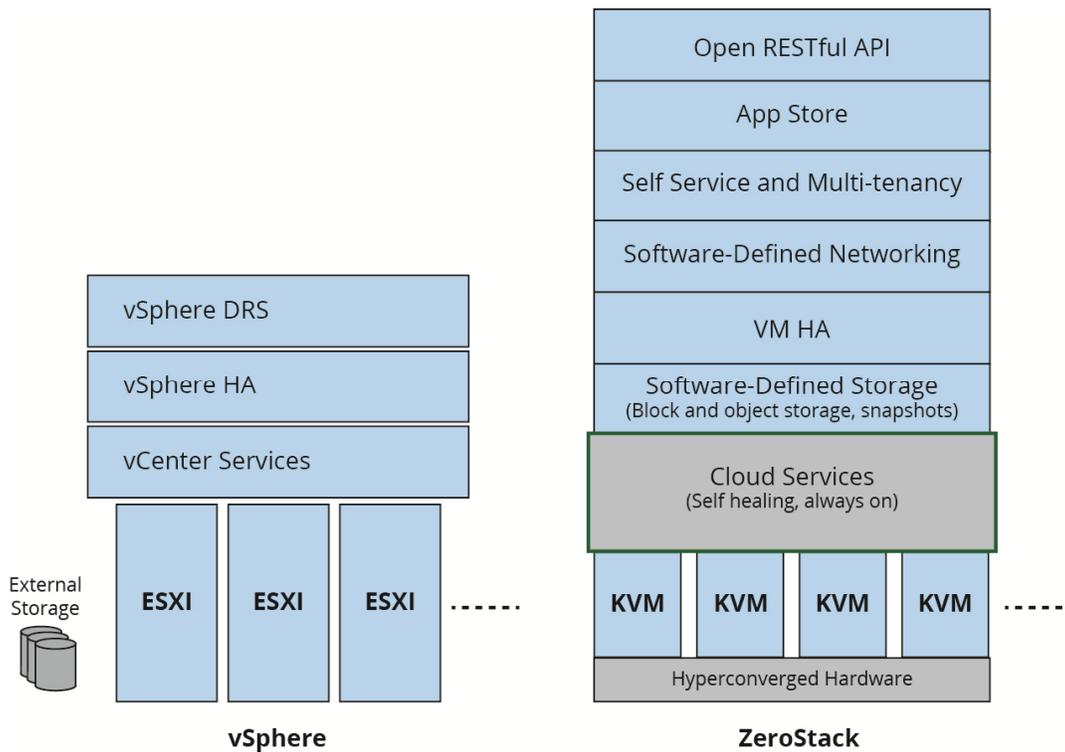## ZeroStack and vSphere Comparison

Figure 1. vSphere vs. ZeroStack platforms

The figure above compares the vSphere Enterprise offering to ZeroStack. The ZeroStack platform offers a complete software-defined datacenter (SDDC) including the hyperconverged hardware that combines compute, scale out storage, software-defined networking (SDN), and a self-healing control plane that eliminates the need to separately configure HA for the platform.

ZeroStack Cloud Platform Basics

Users can access the ZeroStack Cloud platform in three ways:

- **SaaS:** https://console.zerostack.com hosts the SaaS based user interface for ZeroStack. All admin and user operations can be performed from this portal.

- **API/SDK:** ZeroStack leverages OpenStack's cloud management software and ships with 100% pure OpenStack APIs. The API services offered by ZeroStack and their corresponding versions are described in the next section.

  Language-specific SDKs are available in Java, Python, C++, and other languages.

- **Command line interface (CLI):** ZeroStack cloud services can be used by leveraging the OpenStack CLI. The CLI installation guide is available at http://bit.ly/29WfvVg and the CLI command guide is at http://docs.openstack.org/cli-reference/openstack.html.

ZeroStack Cloud Platform Services

ZeroStack ships a 100% pure OpenStack implementation of cloud services. These services closely map to various vSphere services, as listed in the table below.

Service Type	vSphere Service	ZeroStack Service
Hypervisor	ESXi	KVM
Compute (VM as a service)	vCenter	OpenStack Nova
Block storage	VMFS/DataStore	Openstack Cinder
Object storage	N/A	Same S3 compatible API is supported
Image management	vSphere Templates	OpenStack Glance
Load balancer	None	OpenStack LBaas
Networking	DVS	OpenStack Neutron
Application templates	None	OpenStack Heat
Identity and access control	vCenter SSO	OpenStack Keystone

vSphere vs. ZeroStack Terminology

The table below maps some key concepts of vSphere terminology with the ZeroStack world.

Concept	vSphere Terminology	ZeroStack Terminology	Details
Machines	ESXi instances	Nova instances	API: http://developer.openstack.org/api-ref/compute/
Block storage	DataStores, VMFS	Cinder volumes	API: http://developer.openstack.org/api-ref-blockstorage-v2.html
Object storage	None	Containers	S3 API supported
Image management	Image templates	Glance images	API: http://developer.openstack.org/api-ref-image-v2.html
Tenant and network-level isolation	None	Business units; projects	APIs: http://developer.openstack.org/api-ref-networking-v2.html http://developer.openstack.org/api-ref-networking-v2-ext.html
VM-level firewalls	None	Security groups	APIs: http://developer.openstack.org/api-ref-networking-v2-ext.html

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Concept	vSphere Terminology	ZeroStack Terminology	Details
Certificates for VM access	Access key, secret key	Access key, secret key	
Application templates	None	HOT template	API: http://developer.openstack.org/api-ref-orchestration-v1.html ZeroStack has an app store with popular application templates.
Physical organization	Resource pools, clusters	Availability zones; regions	AZs usually map to racks whereas regions can map to physical datacenters.
Logical organization	Datacenter; folders	Business units; projects	There is no multitenancy in vSphere.

vSphere/ZeroStack Interoperability

Viewing Workloads Already Running on vSphere

Users can add one or more vCenter accounts in their ZeroStack project. After connecting successfully, users can view all of their datacenter, folders, and VMs on ZeroStack.

Users can add the same vCenter accounts to multiple projects. This allows users to migrate from a single tenant vCenter model to multiple projects within ZeroStack, where they can take advantage of the tenancy model and enforce resource quota limits. Setting resource quotas helps limit the cost escalations in situations where VMs life cycles are not properly managed.
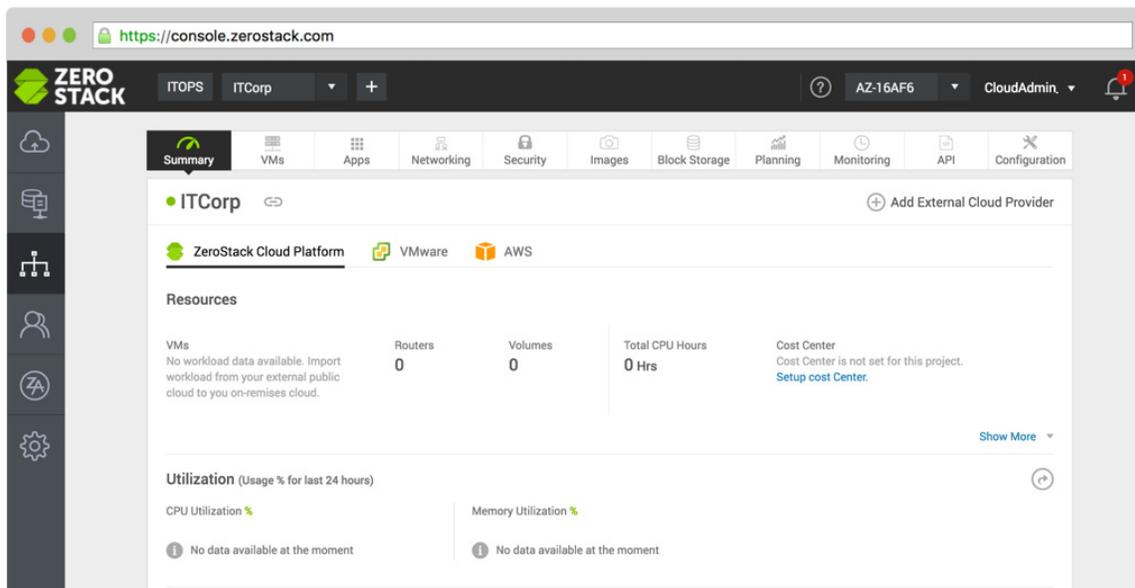

Figure 2.   ZeroStack Console window

Seamlessly Migrating Workloads from vSphere to ZeroStack

Users can choose a single or a group of VMs and bulk migrate them to ZeroStack with ease. The system automatically detects the characteristics of the vSphere VM instance, and determines the best configuration of that instance in ZeroStack. Most system-generated defaults can be used as is. Users may want to change the configuration of the VM as part of the migration, for example, by changing the storage pool type from HDD to SSD.

The migration process is asynchronous and users can track progress on the ZeroStack UI. The process allows seamless migration of Windows server, desktop, and RHEL instances.

Deploying Workloads on ZeroStack

Most vSphere customers spin up workloads in VM folders. Users can construct a ZeroStack project to mimic a vSphere folder, but ZeroStack projects have many more features.

Resource Quotas

A project has resource quotas and is a great way for cloud administrators to offer self service to users without giving away keys to the kingdom. The cloud admin can create projects with a certain quota and automate project creation via an approval workflow.

Networking and Security

The software-defined networking (SDN) layer allows users to create virtual networks within projects. Users can launch VMs in a virtual network that they define. Users have complete control over their virtual networking environment, including the selection of IP address ranges, creation of subnets, and configuration of route tables and network gateways.

Users can easily customize the network configuration. For example, a user can create an intranet or public-facing subnet for their webservers that has access to the Internet, and place their backend systems such as databases or application servers in private subnets with no Internet access.

Users can leverage multiple layers of security, including security groups and network access-control lists, to help control access to instances in each subnet. Users can also upload or generate key pairs for securely connecting to VMs.

Load Balancer

ZeroStack offers Load Balancer as a Service (LBaaS). Users can create web or other scale-out applications and connect them to load balancer instances. Users can be assigned fixed-private, intranet-facing, or external-facing IP addresses to the load balancers depending on the nature of the application.

VM HA

ZeroStack is adding support for high availability in an upcoming release. Users can mark important VMs as being "highly available" and the system then ensures the high availability of that VM. Users can mark entire projects as highly available.

Data Protection

Users can periodically backup an entire project or mission-critical VMs within a project to external NFS-mounted storage.

Workload Placement

ZeroStack's placement policies allow for the placement of workloads on certain hardware or with certain storage profiles. For instance, users could create a "gold" placement policy that places VMs in a subset of hosts and with all SSD volume types.

Role-Based Access Control in ZeroStack

Customers who want to deploy workloads on ZeroStack can connect their on-premises active directory or LDAP, allowing users to log in using their corporate credentials. They can also create users and groups within ZeroStack's Identity Service. Access to resources can be controlled by assigning granular privileges to users/groups at a project level.

Use Cases

VMware customers can use ZeroStack for a number of use cases. A sample of these is listed below.

Self Service

IT admins can offer developers and lines of businesses a self-service IT platform without the hassles of an IT ticketing system. The system has a built-in approval workflow that simplifies the process of requesting and approving resources. ZeroStack allows the cloud to be divided into business units that map to organizations within any size enterprise. These business units can be tied to AD/LDAP organization units and domains. This allows existing corporate authentication and authorization mechanisms to work seamlessly with ZeroStack.

ZeroStack also offers a fully featured app store where admins can offer a controlled set of image and application templates that developers can deploy with ease. Developers can also upload their own templates to be used for testing, staging, and production.

CI/CD Workflows

The ZeroStack app store comes with templates for deploying Git Server and Jenkins Server, and for creating developer boxes with ease. Enterprises with an existing CI/CD workflow can easily spin up workloads on ZeroStack by referencing the OpenStack APIs for workload creation. All popular CI/CD tools (both containers and VMs) have OpenStack plugins, so the OpenStack APIs are very helpful.

Hosting In-House or Public-Facing Website

Users can host a basic web application, such as a blog or simple website in a ZeroStack project, and gain the additional layers of privacy and security afforded by the platform. They can secure the website by creating security group rules that allow the webserver to respond to inbound HTTP and SSL requests from the Internet while simultaneously prohibiting the webserver from initiating outbound connections to the Internet.

Hosting Multi-Tier Web Applications

Users can host multi-tier web applications and strictly enforce access and security restrictions between webservers, application servers, and databases. Users launch webservers in a publicly accessible subnet and application servers and databases in non-publically accessible subnets. These application servers and databases can't be directly accessed from the Internet, but they are still available via something like a NAT gateway to download patches. Users control access between the servers and subnets using inbound and outbound packet filtering provided by network access-control lists and security groups.

Deploying Big Data Applications

Applications such Apache Spark and Hadoop tend to be resource intensive and need VM flavors with high CPU and memory count. ZeroStack is an ideal platform for importing these workloads on-premises.

Extending the Corporate Network to the Private Cloud

ZeroStack's software-defined networking (SDN) layer allows users to create new private networks and move corporate applications to the ZeroStack Cloud, launch additional webservers, or add more compute capacity. Users can extend the corporate network to the private cloud by connecting it to the ZeroStack network. Because projects are hosted behind the corporate firewall, users can seamlessly move IT resources into the ZeroStack cloud without changing how these applications are accessed.

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