Google Cloud's Anthos on VxFlex family

Building a hybrid cloud with VxFlex family and Google Cloud's Anthos

Abstract

This white paper highlights a hybrid cloud solution utilizing Dell EMC VxFlex software-defined storage and Google Cloud's Anthos for deploying, managing, and optimizing applications—legacy as well as cloud-native across different environments.

April 2020
Revisions

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>April 2019</td>
<td>Initial release</td>
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<tr>
<td>May 2019</td>
<td>Branding updates</td>
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<td>July 2019</td>
<td>Updated for Anthos Ready validation</td>
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<td>Updated deploying procedures and load-balancer information</td>
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Executive summary

VxFlex is a software-defined storage platform designed to significantly reduce operational and infrastructure complexity, empowering organizations to move faster by delivering flexibility, elasticity, and simplicity with predictable performance and resiliency at scale. The VxFlex family provides a foundation that combines compute as well as high performance storage resources in a managed, unified fabric. VxFlex comes in flexible deployment options – integrated rack, appliance or Ready Nodes - that enable two-layer (compute and server SAN), single-layer (HCI), and/or storage only architectures. VxFlex is ideal for high performance applications and databases, building an agile private cloud, or consolidating resources in heterogeneous environments.

Containers offer an abstraction mechanism at the application layer. Containers help lower the barrier of entry to developing microservice-based applications and enable developers to spend less time worrying about runtimes, dependencies, and differences between test, development and production environments and more time innovating to meet the demands of today’s dynamic business environment. Container Orchestrators (COs), like Kubernetes, make running containers at production scale possible by handling the complexity of managing hundreds or thousands of containers at any one time.

Google Cloud’s Anthos is an integrated platform that lets you modernize how you develop, secure, and operate hybrid cloud and multi-cloud environments across the Google Cloud Platform (GCP) and on-premises infrastructure.

Working closely with Google Cloud, Dell EMC brings to market VxFlex system configuration that is optimized to power the full Anthos stack including GKE on-prem operating environment enabled by Anthos.

This paper has been jointly validated by Google Cloud and Dell EMC on VxFlex integrated rack. Customers can purchase Anthos knowing the VxFlex provides an operationally efficient, life cycle managed and scalable option for on premises deployments.
1 Introduction

1.1 Audience
The audience for this paper includes system engineers, field consultants, IT administrators, technical architects, and anyone else interested in configuring and deploying Anthos on Dell EMC VxFlex family with VxFlex OS as the underlying software defined storage layer.

Readers are expected to have an understanding and working knowledge of containers, Kubernetes, GCP, GKE, VMware vSphere, and VxFlex software-defined storage.

1.2 Terminology
The following table lists terminology and acronyms that are used throughout this document:

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>SDC</td>
<td>Storage Data Client for VxFlex</td>
</tr>
<tr>
<td>SDS</td>
<td>Storage Data Server for VxFlex</td>
</tr>
<tr>
<td>MDM</td>
<td>Meta Data Manager for VxFlex</td>
</tr>
<tr>
<td>DNS</td>
<td>Domain Name System</td>
</tr>
<tr>
<td>DHCP</td>
<td>Dynamic Host Configuration Protocol</td>
</tr>
<tr>
<td>RCM</td>
<td>Release Certification Matrix</td>
</tr>
<tr>
<td>GCP</td>
<td>Google Cloud Platform</td>
</tr>
<tr>
<td>GKE</td>
<td>Google Kubernetes Engine running on GCP</td>
</tr>
<tr>
<td>GKE on-prem</td>
<td>Google Kubernetes Engine running on premises</td>
</tr>
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<td>GCE</td>
<td>Google Compute Engine</td>
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</table>
2 Product overview

2.1 VxFlex family

VxFlex software-defined storage platform designed to deliver flexibility, elasticity, and simplicity with predictable performance and resiliency at scale by combining compute as well as high performance storage resources in a managed unified fabric. VxFlex is an ideal platform for modernizing infrastructure to improve IT agility.

VxFlex is now an Anthos ready validated platform, enabling customers the choice to utilize Google Cloud's Anthos hybrid cloud management with VxFlex integrated rack, VxFlex appliance, and VxFlex Ready Nodes with either Two-layer (Server SAN), Storage-only, Hyperconverged (HCI), or Mixed deployment architectures.

<table>
<thead>
<tr>
<th>VxFlex Software-Defined Storage: Flexibility Unleashed</th>
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<tbody>
<tr>
<td><strong>VxFlex OS</strong></td>
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<tr>
<td>Block-storage service that enables customers to create a scale-out software-defined storage infrastructure</td>
</tr>
<tr>
<td><strong>VxFlex integrated rack</strong></td>
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<tr>
<td>Software defined foundation with compute &amp; high performance storage at rack scale</td>
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<tr>
<td><strong>VxFlex appliance</strong></td>
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<tr>
<td>Software defined foundation with compute &amp; high performance storage</td>
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<tr>
<td><strong>VxFlex Ready Node</strong></td>
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<tr>
<td>Software defined foundation of compute &amp; high performance storage with customer configurability</td>
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<tr>
<td><strong>VxFlex Manager</strong></td>
</tr>
<tr>
<td>Comprehensive IT Operations Management (ITOM) software</td>
</tr>
<tr>
<td><strong>Element Managers</strong></td>
</tr>
<tr>
<td>Manage and monitor node clusters</td>
</tr>
</tbody>
</table>

Power Positions
- Unmatched flexibility and scale
- Enterprise-class performance & resiliency
- Simple & efficient operations

Key Facts
- Complete infrastructure Lifecycle Management
- Mission-critical IO performance and resiliency
- Multi-hypervisor, bare-metal
- Scale compute and storage independently or together

Figure 1 VxFlex family

2.2 VxFlex OS

VxFlex OS is the software foundation of VxFlex software-defined storage. It is a scale-out block storage service designed to deliver flexibility, elasticity, and simplicity with predictable high performance and resiliency at scale.

VxFlex OS consists of the following components:

**Storage Data Client (SDC)**
- Provides front-end volume access to applications and file system
- Installed on servers consuming storage
- Maintains peer-to-peer connections to every SDS managing a pool of storage
Product overview

**Storage Data Server (SDS)**
- Abstracts local storage, maintains storage pools, and presents volumes to the SDCs
- Installed on servers contributing local storage to the VxFlex OS cluster

**Meta Data Manager (MDM)**
- Oversees storage cluster configurations, monitoring, rebalances, and rebuilds
- Highly available, independent cluster installed on three or five different nodes
- May reside alongside SDCs or SDSs, or on separate nodes
- Sits outside the data path

**Gateway**
- Performs installation and configuration checks
- Acts as an endpoint for API calls and passes them to MDM

### 2.3 VxFlex Manager

VxFlex Manager is the software component in VxFlex family that enables ITOM automation and lifecycle management capabilities for VxFlex systems. VxFlex manager helps automate common and tedious management and orchestration tasks, while providing a centralized dashboard to manage and monitor the entire infrastructure across storage, compute and networking, from firmware and BIOS to software, nodes and networking.

### 2.4 VxFlex Deployment Architectures

VxFlex software-define storage offers flexibility of deployment architecture to help best meet the specific deployment and architectural requirements. VxFlex can be deployed in a two-layer (Server SAN), single-layer (HCI), or in storage-only architectures. Customers can also mix these architectures as per their needs in a single deployment or cluster. This extreme flexibility simplifies architectural considerations.

**Two-layer (Server SAN) architecture**

In this architecture, nodes that provide storage capacity and host datasets are separated from nodes that host applications and workloads. VxFlex Manager provides LCM and IOTM for the entire infrastructure, including nodes that provide storage and nodes that host the applications. Compute and storage resources can be scaled by adding respective node to the cluster. This segregation of compute and storage resources can be helpful to minimize software licensing costs in certain situations. This architecture could be most suitable for hosting high-performance high-value databases and application workloads.

**Single-layer (HCI) architecture**

In this architecture, each node in the cluster contributes storage resources as well as hosts applications and workloads. This architecture allows you to scale your infrastructure uniformly and with a pre-defined building block that adds both storage and compute resources. VxFlex Manager provides ITOM and LCM capabilities for the entire infrastructure. This architecture is most suitable for datacenter and workload consolidation.
**Storage-only architecture**

In this architecture, VxFlex provides only storage resources. Using VxFlex storage-only nodes, a software-defined block storage environment is created that can be accessed and consumed by a number of applications and workloads that are hosted outside of VxFlex cluster. VxFlex Manager provides LCM and ITOM for the storage infrastructure. This is a suitable architecture where the customer has existing compute infrastructure but needs high-performance SDS. This can be a starting point with the customer, and may expand to a two-layer Server SAN deployment in the future as the external compute is migrated to VxFlex.

### 2.5 Google Cloud’s Anthos

Anthos provides you with a consistent platform for building and managing containerized applications across hybrid infrastructures and helps your developers become more productive across all environments. Anthos provides all the mechanisms that are required to bring your code into production reliably, securely, and consistently, while minimizing risk. Anthos is built on open-source technologies pioneered by Google Cloud, including Kubernetes, Istio, and Knative, enabling consistency between cloud and on-premises environments like VxFlex integrated rack. Anthos GKE (on GCP and on-prem), Anthos Service Mesh, and Anthos Config Management are the core building blocks of Anthos. Anthos also includes with GCP Marketplace and integrations with platform-level services such as Stackdriver, Cloud Build, and Binary Authorization.

Anthos puts all your IT resources into a consistent development, management, and control framework, automating low-value and insecure tasks across your VxFlex integrated rack and GCP infrastructure.

![Diagram of Anthos components](image)

**Figure 2**  Google Cloud's Anthos Components

Within the context of GCP, the term hybrid cloud describes a setup in which common or interconnected services are deployed across multiple computing environments that include public cloud and on-premises. A hybrid cloud strategy lets you extend the capacity and capabilities of your IT, without upfront capital expense investments by using the public cloud and preserving your existing investments by adding one or more cloud deployments to your existing infrastructure. For more information, see [Hybrid and Multi-Cloud Architecture Patterns](#).
3 Solution overview

Dell EMC brings to market a VxFlex system configuration optimized to power the managed GKE on-premises operating environment enabled by Anthos. In this White paper, we talk about VxFlex integrated rack and GKE on-prem version 1.2.x, which has been jointly validated by Google Cloud and Dell EMC. This section provides an overview of the components that are involved in this solution from a physical and logical perspective.

3.1 Prerequisites

The following requirements are mandatory to deploy Anthos on VxFlex integrated rack:

- Fully configured and working VxFlex integrated rack system of RCM 3.5 or greater
- Google Account (should be whitelisted for Anthos by Google team), GCP Service Account, and a billing enabled GCP project. For detailed information, see Configuring your Google Cloud project.
- vSphere 6.5 or 6.7 Update 3
- At least one VMFS datastore with 2 TB capacity
- Ability to create required DNS entries
- A Layer 4 Network load balancer like F5 BIG-IP LTM or Seesaw
- Plan IP addresses in three networks as required, before deployment
- Network access to Google Cloud APIs (*.googleapis.com)
- Official GKE on-prem installer downloaded as an OVA file

For the latest supported version, see Anthos GKE on-prem Compatibility Matrix.

3.2 Physical design

This solution encompasses a fully functional VxFlex integrated rack system which is engineered for complete fault redundancy and ability to scale out across compute and storage dimensions. At a minimum, three controller nodes for running management stack and four VxFlex hyperconverged nodes running VMWare ESXi 6.5 or greater are required to deploy GKE on-prem. For more information about the ESXi version, see Google Compatibility Matrix.

Additionally, at least one outbound connection to Google Cloud APIs (*.googleapis.com) is required to complete the GKE on-prem cluster registration and deployment processes.

The following figure describes how Anthos can manage multiple GKE on-prem clusters across geographically dispersed VxFlex systems through a single pane of glass with GCP console:
3.3 Logical design

From a logical perspective, traffic flows into and out of the on-premises system using a load-balancer. Let us consider the example with F5 BIG-IP LTM. The F5 BIG-IP LTM creates dynamic connections between the compute nodes and the external network interfaces. Current best practice for VxFlex integrated rack is to create three special-purpose networks used for management, internal, and external traffic:

- GKE on-prem Admin Network
- GKE on-prem Internal Network
- GKE on-prem External Network

Create a new compute cluster with at least one compute server and one resource pool in the production workload vCenter to host the workloads in the production vCenter. This cluster requires VMware Dynamic Resource Scheduling (DRS) and one resource pool.
The following figure describes the logical configuration between GKE on-prem clusters running in on-premises data centers on VxFlex integrated rack, GKE clusters, and Anthos hosted on GCP:

Figure 4  Logical design of Anthos with GKE on-prem deployed on VxFlex integrated rack.

In this architecture, applications running on GKE on-prem cluster can be exposed internally or externally to the web without traffic passing through GCP.

**Note**: The GKE on-prem Admin Network connection from the on premises data center to Anthos is outbound only.

The production vCenter server hosts multiple virtual machines in the new resource pool that consists of a virtual GKE on-prem compute cluster. The application workloads are processes that run inside one of the GKE on-prem compute cluster virtual machines. When an application gets deployed into the GKE on-prem compute cluster, no additional vSphere virtual machines are created. The application runs inside the GKE on-prem compute cluster virtual machines. If additional workload capacity is required, the GKE on-prem compute cluster is expanded using the `gkectl` command-line utility or the Kubernetes Cluster API.

The summary of the correlation between vSphere VMs and GKE on-prem cluster servers are as follows:

- GKE on-prem cluster is a collection of vSphere VMs running as a collective instance.
- GKE on-prem cluster’s performance profile (for example: RAM, CPU, storage, etc.) is the additive sum of all vSphere VMs running in the GKE on-prem cluster.
- Multiple GKE on-prem clusters can exist in a single vCenter deployment.
4

**Deploying Anthos on VxFlex integrated rack**

Deploying the Anthos software requires knowledge with vCenter, Linux command-line skills, and an understanding of the existing network topology. The time to deploy the code varies based on network speed and familiarity with the tools that are discussed in this section but can generally be completed within a few hours.

---

**Note:** The instructions captured in this section are relevant to GKE on-prem 1.2.x. For latest information, see [Anthos GKE on-prem documentation](#).

---

4.1 **Prerequisites**

Before starting Anthos deployment, ensure that all prerequisites mentioned in Section 3.1 are ready for deployment.

4.2 **Prepare vCenter**

Complete the following instructions to configure the vCenters of VxFlex integrated rack:

1. Log in to the VxFlex management controller vCSA and Customer vCSA using the Administrator credentials.
2. Create three special-purpose networks used for management, internal, and external traffic on both the vCenters as defined in the logical design.
3. Deploy and configure the load-balancer and deployment workstation on the VxFlex management controller vCSA.
4. Create a resource pool for VMs deployed by Anthos on the customer vCSA. Configure the resources in the resource pool as per the environment where the Anthos is being deployed.

4.3 **Deploy and configure Layer 4 network load balancer**

Anthos requires a Layer 4 network load balancer. By default, Anthos integrates with F5 BIG-IP load balancer. You can also choose to enable manual load balancing and use your own L4 load balancer.

- To deploy F5 BIG-IP load balancer, see Appendix A.1.
- To deploy Seesaw load balancer, see Appendix A.2.
4.4 Deploy Anthos GKE on-prem admin VM on VxFlex integrated rack

Post physical environment setup, complete the following steps:

1. On the VxFlex management controller vCSA, create a deployment workstation from which the installation of Anthos is planned to be initiated.

2. Install the following software or packages on the deployment workstation:
   - **Google Cloud SDK** — Is a set of command-line tools that is used to interact with Google Cloud.
   - **govc** — This VMware vSphere CLI is used to interact with the Customer vCSA.
   - **HashiCorp Terraform** — This open-source infrastructure enables the automated deployment of VMs in VMware vSphere environment and to deploy the Anthos admin workstation.

3. Create service accounts: access, register, connect, and Stackdriver that is used during the GKE on-prem installation process.

   ```
gcloud iam service-accounts create [ACCESS_SERVICE_ACCOUNT_NAME] --project [PROJECT_ID]
gcloud iam service-accounts create [REGISTER_SERVICE_ACCOUNT_NAME] --project [PROJECT_ID]
gcloud iam service-accounts create [CONNECT_SERVICE_ACCOUNT_NAME] --project [PROJECT_ID]
gcloud iam service-accounts create [STACKDRIVER_LOGGING_SERVICE_ACCOUNT_NAME] --project [PROJECT_ID]
```

4. Enable the required APIs in the Google Cloud project.

   ```
gcloud services enable --project=[PROJECT_ID] container.googleapis.com gkeconnect.googleapis.com serviceusage.googleapis.com monitoring.googleapis.com
```

5. Create **IAM Policy** bindings for the service accounts.

   ```
gcloud projects add-iam-policy-binding [PROJECT_ID] --member="serviceAccount:[REGISTER_SERVICE_ACCOUNT_NAME]@[PROJECT_ID].iam.gserviceaccount.com" --role="roles/gkehub.admin"

gcloud projects add-iam-policy-binding [PROJECT_ID] --member="serviceAccount:[REGISTER_SERVICE_ACCOUNT_NAME]@[PROJECT_ID].iam.gserviceaccount.com" --role="roles/serviceusage.serviceUsageViewer"

gcloud projects add-iam-policy-binding [PROJECT_ID] --member="serviceAccount:[CONNECT_SERVICE_ACCOUNT_NAME]@[PROJECT_ID].iam.gserviceaccount.com" --role="roles/gkehub.connect"

gcloud projects add-iam-policy-binding [PROJECT_ID] --member "serviceAccount:[STACKDRIVER_LOGGING_SERVICE_ACCOUNT_NAME]@[PROJECT_ID].iam.gserviceaccount.com" --role "roles/stackdriver.resourceMetadata.writer"

gcloud projects add-iam-policy-binding [PROJECT_ID] --member "serviceAccount:[STACKDRIVER_LOGGING_SERVICE_ACCOUNT_NAME]@[PROJECT_ID].iam.gserviceaccount.com" --role "roles/logging.logWriter"
```
Deploying Anthos on VxFlex integrated rack

6. Create a Stackdriver workspace for your project. Stackdriver workspace is created by default when the GCP account is created and whitelisted.

7. Create a key for the Access Service Account.

8. Configure gcloud and gsutil to use access service account.

9. Download the GKE on-prem admin appliance OVA.

10. Import the OVA to vSphere using the govc utility and mark it as a template. Create a shell script (for ex: vcenter.sh) and copy the following commands into it.

11. Save the file and run it.

This command uploads the ova file into vSphere environment.
Deploying Anthos on VxFlex integrated rack

12. Generate a ssh key pair which will be used while logging to admin workstation.

   ```bash
   ssh-keygen -t rsa -f ~/.ssh/vsphere_workstation -N ""
   ```

13. Create and configure the terraform configuration file with VxFlex management controller vCSA environment variables where the admin workstation is deployed.

   ```bash
   mkdir [Terraform-directory-name]
   ```

14. Copy the .tf and .tfvars files from this link and save them as shown here:

   ```bash
   [TERRAFORM_DIR]/terraform.tf and [TERRAFORM_DIR]/terraform.tfvars
   ```

15. Update the terraform.tfvars file with VxFlex management controller vCSA specific variables.

16. Use terraform utility to deploy the admin workstation.

   ```bash
   terraform init && terraform apply -auto-approve -input=false
   ```

17. Once the admin workstation VM is deployed, retrieve its IP address using terraform utility and ssh into it using the key pair that was generated in Step 11.

   ```bash
   terraform output ip_address
   ssh -i ~/.ssh/vsphere_workstation ubuntu@[ADMIN_WORKSTATION_IP_ADDRESS]
   ```

For more details about instructions to deploy admin workstation, see Creating an admin workstation.

### 4.5 Create Anthos GKE on-prem admin and user cluster on VxFlex integrated rack

To create the admin and user cluster, complete the following steps:

1. SSH to the admin workstation from the deployment workstation.
2. Log in to Google Cloud using Google Cloud user account credentials.
3. Register gcloud as a Docker credential helper.
4. Create keys for the access, register, connect, and stackdriver service accounts.
5. Create a GKE on-prem configuration file.

   ```bash
   gkectl create-config --config <config_filename.yaml>
   ```

6. Modify the configuration file parameters to match your environment-specific variable. For detailed information, see Modifying the configuration file.

   ```bash
   gkectl check-config --config <config_filename.yaml>
   ```
8. Upload the Kubernetes node VM template to vCenter.
   gkectl prepare --config [CONFIG_FILE]

9. Create the GKE on-prem cluster.
   gkectl create cluster --config [CONFIG_FILE]

10. Verify the successful creation of admin cluster.
    kubectl get nodes --kubeconfig [ADMIN_CLUSTER_KUBECONFIG]

11. Verify the successful creation of user cluster.
    kubectl get nodes --kubeconfig [USER_CLUSTER_KUBECONFIG]

**Results:** The user cluster would be registered with Google Cloud once the cluster is created successfully.

12. Log in to Google cloud > Kubernetes Engine > Clusters to verify the results.

![Google Cloud Platform](image)

13. Select a cluster and click **Login**. You are prompted to choose a method you want to use for authentication of the cluster.
   - Token
   - Basic authentication
   - Authenticate with Identity Provider configured for the cluster

For detailed information, see [Logging in to a cluster from Cloud Console](#).
14. Select the method of your choice and login to view the cluster overview. For complete detail of the cluster, select **Kubernetes cluster details > Nodes**.

![Kubernetes cluster details](image)

**Note**: The Kubernetes cluster nodes for GKE on-prem clusters are running as vSphere VMs on VxFlex system.

15. *(Optional)* Check if the Kubernetes cluster nodes in the GCP console has the same name as the worker node VMs running on VxFlex integrated rack.

![VxFlex integrated rack](image)

For detailed information, see [Creating admin and user clusters](#).
Deploying Anthos applications on VxFlex integrated rack

After the GKE on-prem cluster has been deployed and registered, you can easily deploy workloads using the Google Cloud Console tool.

**Note:** Deploying applications to the GKE on-prem cluster running on VxFlex integrated rack system is no different than deploying applications to GKE running on GCP. Anthos GKE on-prem clusters can be selected as the workload destination cluster in the same way GCP data center would be selected. End users use a single, simplified interface to deploy applications without requiring in-depth knowledge of the underlying infrastructure.

5.1 Sample workload: NGINX web server deployment

In this example, we are deploying NGINX - a free, open-source HTTP server and reverse proxy that is well known for its high performance, stability, rich feature set, simple configuration, and low resource consumption. Since it is already in the Google marketplace, deploying NGINX requires just a few mouse clicks.

For complete information about NGINX, see [NGINX Wiki](https://nginx.org).

5.1.1 Deploying NGINX

1. Log in to Google Cloud Platform.
2. Select **Kubernetes Engine > Workloads > Deploy**.

3. Enter appropriate container and configuration details in **Create a Deployment** window.
Providing examples to enter details:

- Container image — `nginx:latest`
- Application Name — `nginx-test`
- Namespace — `nginx-deployment`
- Destination Cluster — `gke-on-prem-US`
- Pods — Enter minimum pod number to start.

4. Click **Deploy** to start the deployment.

5. Verify if the deployment has been completed, select **Kubernetes Engine > Workloads**.

![Workloads Screenshot]

**Note:** Since the NGINX pods run inside the GKE on-prem cluster virtual machines, you will not see any additional virtual machines in vCenter.
5.1.2 Scaling NGINX deployment

Once deployed, scaling the number of pods in the deployment to meet the demands of your application is accomplished easily with a few clicks.

1. Log in to Google Cloud Console.
2. Select Kubernetes Engine > Workloads > SCALE.
3. Enter the required number of pod replicas, and click SCALE.

4. Refresh console window to view new pods.

Note: Refresh immediately else new pods passes the PodInitializing status and shows status as Running.
6 Conclusion

Engineered together with the Google Cloud team, this hybrid cloud solution provides you with best in class software-defined platform from Dell EMC and managed Kubernetes by Google Cloud, helping simplify hybrid cloud workload management while enabling organizations to respond to changing business needs rapidly.

VxFlex offers enterprises extreme flexibility, massive scalability, predictable performance and simple management for their on-premises private cloud infrastructure. With Google Cloud's Anthos, enterprises can complement their geographically dispersed on-premises VxFlex deployments and Google Cloud deployments with a simple hybrid cloud management framework for their next-generation cloud-native applications.
Appendix

A.1 Deploy and configure F5 Big-IP Virtual Edition appliance

Anthos requires a Layer 4 network load balancer and by default integrates with F5 BIG-IP load balancer.

**Prerequisite:**

Register, login, and download the Big-IP Virtual Edition OVA from [BIG-IQ Virtual Editions official site](#). Use this file to deploy OVF template.

**Procedure:**

1. Log in to the VxFlex Management Controller vCSA.
2. Right-click the cluster and select **Deploy OVF Template**. The Deploy OVF Template wizard appears.

![Deploy OVF Template wizard](image)

3. On the **Select template** page, select the Big-IP Virtual Edition OVA file and click **Next**.
4. Ensure to complete update all mandatory fields in the following pages:
   a. Select name and location
   b. Select a resource
   c. Review details
   d. Accept license agreements
   e. Select configuration
   f. Select storage: Select `vsan-datastore`.
   g. Select network: Select the appropriate Networks for the Internal, External, and Management networks as defined in the **Logical design** section.
   h. Ready to complete
5. Click **Finish** to start the deployment. For more details, see [Deploy an OVF or OVA Template](#).
6. Post-deployment of the virtual appliance, power the appliance up from the vCenter.
   - If the management network is configured with DHCP, then it should receive a DHCP address.
   - If the management is configured for static address then you must configure the Management Interface using VM console. See, [Deploying BIG-IP Virtual Edition in ESXi](#).

**Result:** You must successfully set up Management Interface.
7. Log in to the management interface of the load balancer using a browser.
8. Go to Try F5 official site to get F5 trial license.
9. Configure the self-IPs, one for external interface and the other for internal interface.
10. Create Administrative and User partition.

For more details, see Installing F5 BIG-IP ADC for Anthos GKE on-prem.

A.2 Deploy and Configure the Seesaw load balancer

Seesaw is an open source load balancer. It is a Linux Virtual Server (LVS) based load-balancing platform. You can use Seesaw instead of F5 LTM with GKE on-prem’s manual load balancer mode, but it requires you to use all static IPs. Because of this, you must plan your deployment ahead; unlike with F5 which can use DHCP IPs.

For complete information about deploying and configuring Seesaw load balancer, see Load balancing with Seesaw.