



VMware Tanzu Overview

NetApp Solutions

NetApp

February 16, 2023

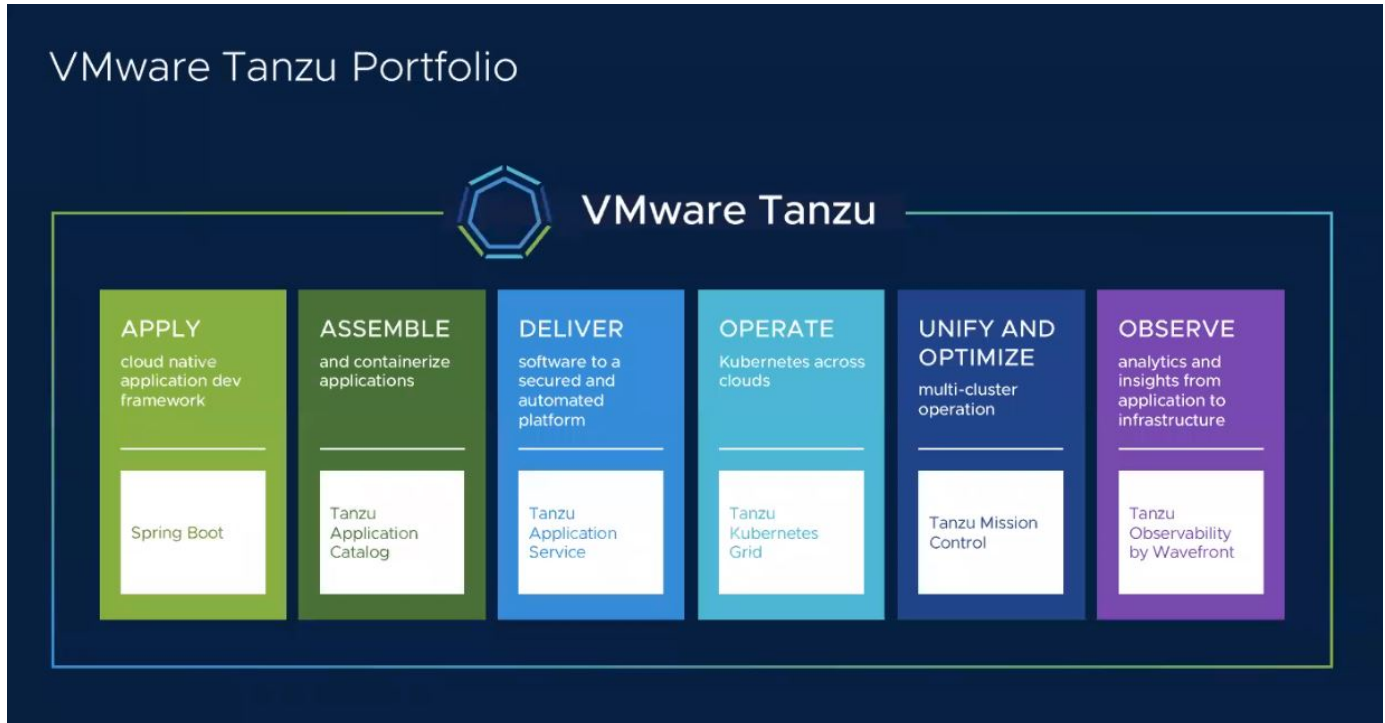
This PDF was generated from https://docs.netapp.com/us-en/netapp-solutions/containers/tanzu_with_netapp/vtnw_overview_tkg.html on February 16, 2023. Always check docs.netapp.com for the latest.

Table of Contents

- VMware Tanzu overview 1
 - VMware Tanzu Kubernetes Grid (TKG) overview 1
 - VMware Tanzu Kubernetes Grid Service (TKGS) overview 2
 - VMware Tanzu Kubernetes Grid Integrated Edition (TKGI) overview 4

VMware Tanzu overview

VMware Tanzu is a portfolio of products that enables enterprises to modernize their applications and the infrastructure they run on. VMware Tanzu's full stack of capabilities unites the development and IT operations teams on a single platform to embrace modernization in both their applications and their infrastructure consistently across on-premises and hybrid cloud environments to continuously deliver better software to production.



To understand more about the different offerings and their capabilities in the Tanzu portfolio, visit the documentation [here](#).

Regarding Tanzu's Kubernetes Operations catalog, VMware has a variety of implementations for Tanzu Kubernetes Grid, all of which provision and manage the lifecycle of Tanzu Kubernetes clusters on a variety of platforms. A Tanzu Kubernetes cluster is a full-fledged Kubernetes distribution that is built and supported by VMware.

NetApp has tested and validated the deployment and interoperability of the following products from the VMware Tanzu portfolio in its labs:

- [VMware Tanzu Kubernetes Grid \(TKG\)](#)
- [VMware Tanzu Kubernetes Grid Service \(TKGS\)](#)
- [VMware Tanzu Kubernetes Grid Integrated \(TKGI\)](#)
- [VMware vSphere with Tanzu \(vSphere Pods\)](#)

Next: [NetApp storage systems overview](#).

VMware Tanzu Kubernetes Grid (TKG) overview

VMware Tanzu Kubernetes Grid, also known as TKG, lets you deploy Tanzu Kubernetes clusters across hybrid cloud or public cloud environments. TKG is installed as a management cluster, which is a Kubernetes cluster

itself, that deploys and operates the Tanzu Kubernetes clusters. These Tanzu Kubernetes clusters are the workload Kubernetes clusters on which the actual workload is deployed.

Tanzu Kubernetes Grid builds on a few of the promising upstream community projects and delivers a Kubernetes platform that is developed, marketed, and supported by VMware. In addition to Kubernetes distribution, Tanzu Kubernetes Grid provides additional add-ons that are essential production-grade services such as registry, load balancing, authentication, and so on. VMware TKG with management cluster is widely used in vSphere 6.7 environments, and, even though it is supported, it is not a recommended deployment for vSphere 7 environments because TKGS has native integration capabilities with vSphere 7.



For more information on Tanzu Kubernetes Grid, refer to the documentation [here](#).

Depending on whether the Tanzu Kubernetes Grid is being installed on-premises on vSphere cluster or in cloud environments, prepare and deploy Tanzu Kubernetes Grid by following the installation guide [here](#).

After you have installed the management cluster for Tanzu Kubernetes Grid, deploy the user clusters or workload clusters as needed by following the documentation [here](#). VMware TKG management cluster requires that an SSH key be provided for installation and operation of Tanzu Kubernetes clusters. This key can be used to log into the cluster nodes using the `capv` user.

Next: [NetApp storage systems overview](#).

VMware Tanzu Kubernetes Grid Service (TKGS) overview

VMware Tanzu Kubernetes Grid Service (also known as vSphere with Tanzu) lets you create and operate Tanzu Kubernetes clusters natively in vSphere and also allows you to run some smaller workloads directly on the ESXi hosts. It allows you to transform vSphere into a platform for running containerized workloads natively on the hypervisor layer. Tanzu Kubernetes Grid Service deploys a supervisor cluster on vSphere when enabled that deploys and operates the clusters required for the workloads. It is natively integrated with vSphere 7 and leverages many reliable vSphere features like vCenter SSO, Content Library, vSphere networking, vSphere storage, vSphere HA and DRS, and vSphere security for a more seamless Kubernetes experience.

vSphere with Tanzu offers a single platform for hybrid application environments where you can run your application components either in containers or in VMs, thus providing better visibility and ease of operations for developers, DevOps engineers, and vSphere administrators. VMware TKGS is only supported with vSphere 7 environments and is the only offering in Tanzu Kubernetes operations portfolio that allows you to run pods directly on ESXi hosts.



For more information on Tanzu Kubernetes Grid Service, follow the documentation [here](#).

There are a lot of architectural considerations regarding feature sets, networking, and so on. Depending on the architecture chosen, the prerequisites and the deployment process of Tanzu Kubernetes Grid Service differ. To deploy and configure Tanzu Kubernetes Grid Service in your environment, follow the guide [here](#). Furthermore, to log into the Tanzu Kubernetes cluster nodes deployed via TKGS, follow the procedure laid out in this [link](#).

NetApp recommends that all the production environments be deployed in multiple master deployments for fault tolerance with the choice of worker nodes' configuration to meet the requirements of the intended workloads. Thus, a recommended VM class for a highly intensive workload would have at least four vCPUs and 12GB of RAM.

When Tanzu Kubernetes clusters are created in a namespace, users with `owner` or `edit` permission can create pods directly in any namespace by using the user account. This is because users with the `owner` or `edit` permission are allotted the cluster administrator role. However, when creating deployments, daemon sets, stateful sets, or others in any namespace, you must assign a role with the required permissions to the corresponding service accounts. This is required because the deployments or daemon sets utilize service accounts to deploy the pods.

See the following example of ClusterRoleBinding to assign the cluster administrator role to all service accounts in the cluster:

```
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRoleBinding
metadata:
  name: all_sa_ca
subjects:
- kind: Group
  name: system:serviceaccounts
  namespace: default
roleRef:
  kind: ClusterRole
  name: psp:vmware-system-privileged
  apiGroup: rbac.authorization.k8s.io
```

[Next: NetApp storage systems overview.](#)

VMware Tanzu Kubernetes Grid Integrated Edition (TKGI) overview

VMware Tanzu Kubernetes Grid Integrated (TKGI) Edition, formerly known as VMware Enterprise PKS, is a standalone container orchestration platform based on Kubernetes with capabilities such as life cycle management, cluster health monitoring, advanced networking, a container registry, and so on. TKGI provisions and manages Kubernetes clusters with the TKGI control plane, which consists of BOSH and Ops Manager.

TKGI can be installed and operated either on vSphere or OpenStack environments on-premises or in any of the major public clouds on their respective IaaS offerings. Furthermore, the integration of TKGI with NSX-T and Harbour enables wider use cases for enterprise workloads. To know more about TKGI and its capabilities, visit the documentation [here](#).



TKGI is installed in a variety of configurations on a variety of platforms based on different use-cases and designs. Follow the guide [here](#) to install and configure TKGI and its prerequisites. TKGI uses Bosh VMs as nodes for Tanzu Kubernetes clusters which run immutable configuration images and any manual changes on

Bosh VMs do not remain persistent across reboots.

Important notes:

- NetApp Trident requires privileged container access. So, during TKGI installation, make sure to select the Enable Privileged Containers checkbox in the step to configure Tanzu Kubernetes cluster node plans.

The screenshot displays the configuration interface for a Tanzu Kubernetes cluster node plan. It is organized into several sections:

- Worker Node Instances:** A dropdown menu showing the value '3'.
- Worker Persistent Disk Size:** A dropdown menu showing the value '50 GB'.
- Worker Availability Zones:** A toggle switch labeled 'az' is turned on.
- Worker VM Type:** A dropdown menu showing 'medium.disk (cpu: 2, ram: 4 GB, disk: 32 GB)'.
- Max Worker Node Instances:** A text input field showing the value '50'.
- Errand VM Type:** A dropdown menu showing 'medium.disk (cpu: 2, ram: 4 GB, disk: 32 GB)'.
- Enable Privileged Containers:** A checkbox labeled 'Enable Privileged Containers (Use with caution)' is checked.
- Admission Plugins:** Two toggle switches are shown: 'PodSecurityPolicy' and 'SecurityContextDeny', both of which are currently turned off.
- Cluster Services:** Four toggle switches are shown, all of which are turned on:
 - 'Force node to drain even if it has running pods not managed by a ReplicationController, ReplicaSet, Job, DaemonSet or Stateful Set'
 - 'Force node to drain even if it has running DaemonSet managed pods'
 - 'Force node to drain even if it has running pods using emptyDir'
 - 'Force node to drain even if pods are still running after timeout'
- Node Drain Timeout:** A text input field labeled '(minutes, min: 0, max: 1440)' showing the value '0'.
- Pod Shutdown Grace Period:** A text input field labeled '(seconds, min: -1, max: 86400)' showing the value '10'.

At the bottom left, there are two buttons: 'SAVE PLAN' (in blue) and 'DELETE' (in light blue).

- NetApp recommends that all production environments be deployed in multiple master deployments for fault tolerance with the choice of worker nodes' configuration to meet the requirements of the intended workloads. Thus, a recommended TKGI cluster plan would consist of at least three masters and three workers with at least four vCPUs and 12GB of RAM for a highly intensive workload.

[Next: NetApp storage systems overview.](#)

Copyright information

Copyright © 2023 NetApp, Inc. All Rights Reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.