



Datasheet

Trident

A dynamic persistent storage orchestrator for containers

Key Benefits

- Orchestrate persistent storage for data that will exist beyond the lifespan of the container
- Trident will automatically allocate persistent storage request to a NetApp target that meets the required class of service
- Drive data consistency even with unpredictable container lifecycles
- Easily deliver storage that is agile, secure and persistent



<http://netapp.io>

Application containers are becoming more critical to accelerating development and delivery of cloud-native applications and to modernizing existing applications. Individual containers might be ephemeral and stateless, but what about the data they use or generate during their lifespan? Often these applications have persistent data requirements that you must consider when you deploy a container framework.

Persistent storage with containers has a wide variety of use cases. From monolithic applications to 12-factor microservices, most DevOps workflows can benefit from development and deployment in containers. Workloads that require stateful data with containers include databases, artificial intelligence (AI) and machine learning (ML), continuous integration/continuous delivery (CI/CD), big data, and many more.

Challenges in Achieving Application Data Persistence

As we address the need to independently maintain data across each containerized unit of an application, it can be challenging to support application-persistent data with containers. Further investigation of the need for data persistence may lead to some new key questions:

- How do infrastructure teams configure the container system with storage volumes?
- How do infrastructure teams control which volumes are used by which applications?
- How are the storage volumes reclaimed when an application no longer needs them?
- How difficult is it to match a persistent volume request with an available volume that has the right capacity and performance characteristics?
- How many steps must a developer follow to make a persistent volume request?
- How long must developers wait for volume requests to be fulfilled?

Container orchestrators have taken some rudimentary steps to help automate provisioning of storage to support persistence. However, it is still a manual and time-consuming process for both developer and infrastructure teams. This process makes it challenging to support persistent data.

The introduction of Kubernetes storage classes has enabled NetApp to introduce new core capabilities that dramatically simplify the persistent volume provisioning process. Storage classes also reduce the complexity of supporting persistent storage for containers.

Trident: An Open-Source Storage Provisioner and Orchestrator

Enter Trident, an open-source project that NetApp maintains for application container persistent storage. Trident has been implemented as an external provisioner controller that runs as a pod itself, monitoring volumes and completely automating the provisioning process. Trident builds upon NetApp's 26 years of data management and storage experience and is fully supported by NetApp.

Some common use cases that can take advantage of persistent storage provisioning and orchestration are:

- DevOps teams who want to accelerate the CI/CD pipeline
- Modernize existing enterprise applications that are deployed on-premises (lift & shift), or migrate them to the cloud
- Cloud-native applications and microservices

Powerful Features to Improve DevOps Efficiency

In addition to basic persistent volume integration, Trident also enables inherent advanced data management capabilities built into NetApp storage platforms, all designed to provide storage deployment flexibility for your containerized applications. You get:

- Support for the full NetApp® portfolio, including NetApp HCI, NetApp Cloud Volumes, NetApp ONTAP®, NetApp SolidFire®, and NetApp E-Series technologies.
- Application data that is managed and protected by enterprise-class storage and data management services.
- The ability to use multiple storage backends simultaneously. Deployment of each backend with a different configuration allows Trident to provision and consume storage with different characteristics and costs. Trident can also present composable infrastructure to containerized workloads in a straightforward fashion, without complexity.

Enabling the Containers Ecosystem

The growing ecosystem for application containers can improve usability and augment deployments. The NetApp commitment to the open ecosystem is demonstrated through our continued

participation in the [Cloud Native Computing Foundation](#) and the [Container Storage Interface](#) initiative. By using Trident with your NetApp storage, you can natively support many popular application container platforms and orchestrators, such as:

- Kubernetes
- Red Hat OpenShift
- Docker Enterprise Edition
- Rancher

Unlocking Speed and Agility

NetApp believes that containers are the future of multicloud workloads. Containers abstract the application from the underlying operating system, which enables portability and flexibility in software development and increases efficiency for development and infrastructure teams. Trident can help bring your enterprise closer to fully embracing a cloud-native future. No matter what your use case or your workload is, Trident can enable a faster, more agile software lifecycle.

Trident is available from [NetApp's GitHub site](#). You can get details about deployment and configuration from the documentation and from our developer and open-source community, [thePub](#).

You can also send an email to trident@netapp.com to receive a list of comprehensive resources for Trident.

About NetApp

NetApp is the data authority for hybrid cloud. We provide a full range of hybrid cloud data services that simplify management of applications and data across cloud and on-premises environments to accelerate digital transformation. Together with our partners, we empower global organizations to unleash the full potential of their data to expand customer touchpoints, foster greater innovation, and optimize their operations. For more information, visit www.netapp.com. #DataDriven