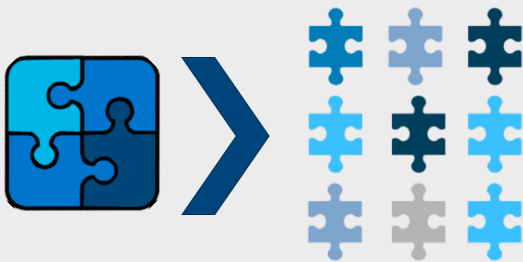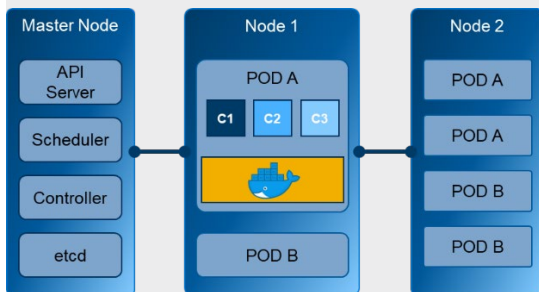# Dell EMC Container Storage Interface (CSI) Drivers

Dell EMC CSI Drivers enable IT organizations to extend their existing infrastructure to rapidly deploy modern microservice based applications.

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Shift in Software architectures from a monolith to a microservices based architecture.

Container deployment in a Kubernetes environment

## Shift in Software Architectures and Development Processes

Software architectures are rapidly shifting from a monolith of tightly coupled modules to microservices based ones, where small, self-contained and independent pieces of functionality can be built and deployed with much greater agility, at scale and with higher availability. Microservices are deployed as one or more Containers. A Container is a light weight package of the micro service together with all the dependencies so that a complete Operating System image is not required to run these services.

Docker, Kubernetes and the Container Storage Interface (CSI) Plugin Specification

Docker is the Container Engine that is used to extract container images of applications and run the container image and Kubernetes is the most popular container deployment and orchestration platform. The Container Storage Interface (CSI) standard is rapidly evolving as the de-facto standard to provision and manage shared storage for containerized workloads. Dell EMC's industry leading PowerMax, XtremIO and VxFlex OS storage platforms all come with CSI plugins to support containerized workloads running on Kubernetes.

Dell EMC Container Storage Integration (CSI) Plugins

The CSI plugin is the interface between the logical volumes in the Kubernetes environment called Persistent volumes and the storage volumes or LUNs. Storage Classes specify a set of parameters for the different characteristics unique to the underlying storage arrays. In a static provisioning workflow, a storage admin can create Persistent Volumes (PVs) using specific storage classes available for a Kubernetes cluster. In dynamic provisioning the pod manifest can specify a persistent volume claim (PVC) of a particular storage class be provisioned dynamically.

Database POD

Persistent Volumes
(Logical volumes in Kubernetes)

CSI Driver

LUNs / NAS Shares
on Storage Array
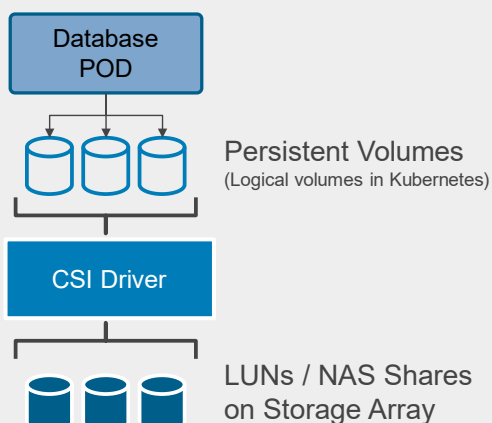
How does it work

Let us take an example to understand how this works. Consider a simple eCommerce application. Database services are required to store and retrieve information from records like product catalog, pricing database, customer information etc. Depending on the design this may require multiple database workloads, both relational databases as well as NoSQL databases. These database services are deployed as PODs in a Kubernetes environment. To provision storage to these services, logical volumes called **Persistent Volumes** are used. The CSI Plugin for Dell EMC storage array presents the backend LUNs of the required size and performance characteristics (defined in a **Storage Class**) and maps them to the Persistent Volumes.

Looking forward

In October 2021, Dell Technologies announced Dell EMC Container Storage Modules (CSM). CSM builds on top of the CSI drivers to extend enterprise storage system capabilities such as provisioning, snapshotting, replication, observability, authorization and resiliency to containerized workloads. CSM along with all of the CSI drivers are available through a single installer.

To learn more about Container Storage Modules please see the solution brief.

Get Started Today

You can download the Dell EMC CSI drivers from GitHub via the Single Installer for Container Storage Modules or via:

PowerMax CSI Driver

PowerScale/Isilon CSI Driver

PowerStore CSI Driver

PowerFlex CSI Driver

Dell EMC Unity XT CSI Driver

XtremIO CSI Driver

For more information on ways to consume Dell EMC Storage functionality through third party tools and REST APIs visit: https://www.dellemc.com/storagesource/