# Diamanti Spektra™

Break from legacy architecture

Diamanti is solving the challenge of container-based hybrid clouds with the best enterprise-grade platform for managing Kubernetes at any scale. Diamanti's Kubernetes management platform breaks from legacy architectures to deliver turnkey solutions that are simple and cost effective on-premises and in the cloud, allowing enterprises to focus on their applications and not on infrastructure complexity.

Diamanti addresses tomorrow's enterprise security, availability, resilience, and performance requirements. With Diamanti, enterprises can rapidly expand Kubernetes across public/private clouds while providing a purpose-built platform on-premises that delivers transformational application performance. Diamanti's patented acceleration technology and simplified multi-cluster operations deliver significant performance improvements and cost savings that fuel enterprise modernization efforts.

DIAMANTI SPEKTRA™ USE CASES

- Application modernization
- Microservices
- Hybrid cloud
- Multi-cluster Kubernetes
- Databases
- Logging and analytics
- Streaming data processing
- AI/ML
- DevOps
- Edge
- IoT

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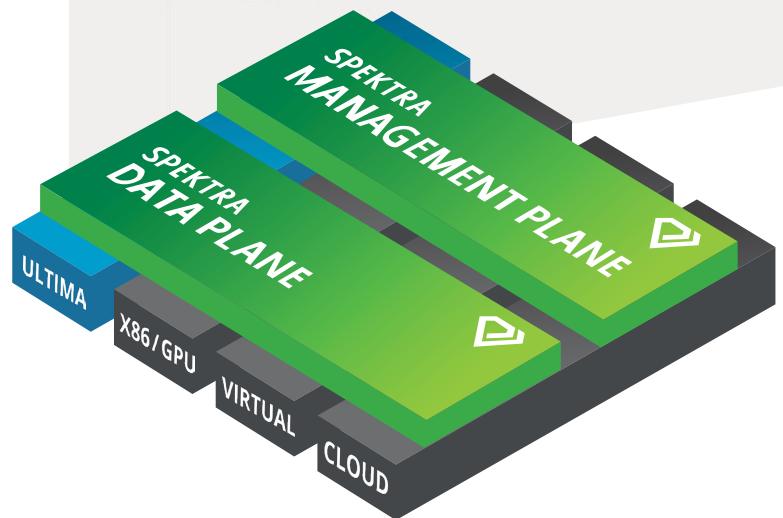
Key Benefits

Simple

- Ready to deploy cloud native applications in minutes with pre-installed CNCF-certified Kubernetes on validated infrastructure
- Fully integrated management and data planes eliminate the complexity of separate vendor solutions, separate control planes
- Easily adopt and expand Kubernetes both on-premises and in public clouds, centrally managing multiple Kubernetes clusters from a single console
- Pre-integrated with Diamanti's best-in-class Container Networking Interface (CNI) and Container Storage Interface (CSI) plugins

Future-Proof

- Optimized for enterprise security and high availability at scale
- Built-in volume snapshots, backup and disaster recovery
- Fault tolerant for node and availability zone failures
- Enterprise-ready role-based access controls (RBAC) integration with Active Directory (AD) and LDAP systems
- Policy-based secure multi-tenancy for enterprises and Managed Service Providers (MSPs)
- TLS encryption protects the cluster traffic
- Volume encryption
- When used with Diamanti Ultima and supported hardware:

  - Hardware-based self-encrypting drives (SED) protect against data theft and unintentional data loss

Efficient

- Bare-metal container deployments remove unnecessary layers of abstraction
- Guaranteed performance with hardware-enforced quality of service (QoS) for storage and networking
- Avoid overprovisioning of resources and eliminate "noisy neighbors"
- 70% reduction in overall data center footprint and TCO
- Diamanti Ultima offers:

  - Offloading of storage and network traffic allowing greater than 95% of compute resources for applications
  - 1 million IOPS per node with less than 100-micro-second latency

- Intelligent storage resource controls that deliver built-in data protection and business continuity
- Up to 30x performance improvements for I/O-intensive applications
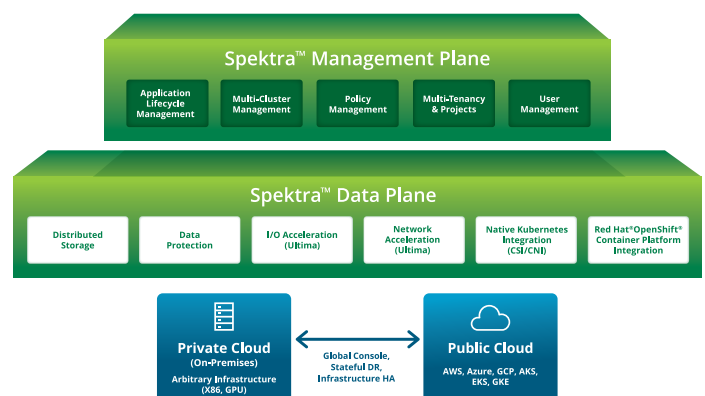
Diamanti Spektra™

Diamanti Spektra is a hybrid cloud Kubernetes platform that includes both a multi-cluster, multi-cloud management plane and an industry-leading cloud-native data plane solution.

Unified Management Plane

The management plane makes it easy to support multiple teams and projects spread across a hybrid cloud environment. With certified Kubernetes and Docker and a management console built-in, Diamanti Spektra enables administrators to easily manage large-scale, multi-cluster Kubernetes deployments. It offers enterprise-ready Role-Based Access Controls (RBAC) with integrations to Active Directory (AD) and LDAP systems and advanced resource and access controls to support secure multi-tenancy.

Advanced Data Services

The data plane provides a container-native distributed storage layer and integrated Container Networking Interface (CNI) and Container Storage Interface (CSI)

Diamanti Spektra™ at a Glance
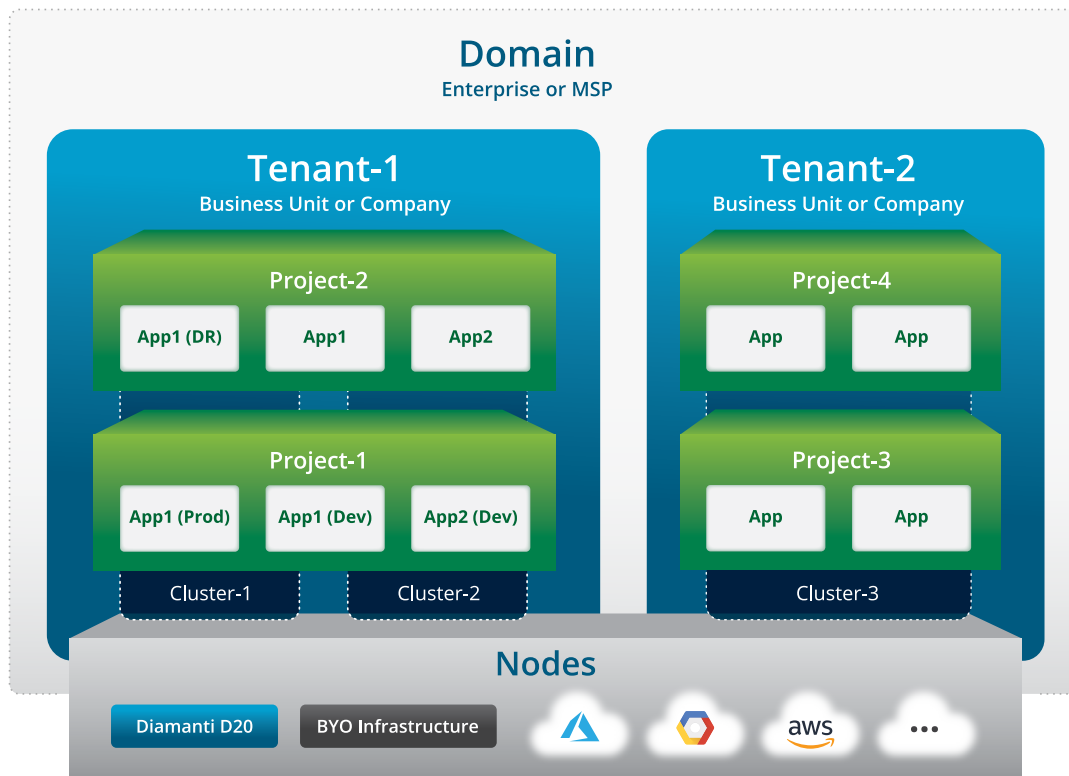
Multi-tenant Architecture

plugins, making it possible to deliver advanced data services. Diamanti Spektra includes built-in storage backup and restore, volume snapshots, synchronous replication for stretched clustering, and asynchronous replication for offsite disaster recovery (DR). Enterprises can seamlessly deploy, migrate and manage both stateless and stateful applications across multiple Kubernetes clusters, spread across hybrid cloud environments.

Open-Source Flexibility

Diamanti Spektra includes a CNCF-certified Kubernetes distribution and container runtime and an integrated CentOS or Red Hat Enterprise Linux operating system. The platform leverages other open source components like Prometheus as well, packaging all of these components together with quality and integration testing. By leveraging these open source components without modification, Diamanti Spektra provides an un-opinionated approach to CI/CD, container security and other software integrations.

Spektra Management Plane

Centralized Management Console

The Diamanti Spektra console is the portal for deploying and managing Kubernetes infrastructure. The console offers a rich set of container configuration capabilities, multi-tenancy, resource and user management features, detailed real-time dashboards, and enterprise-class data protection and security.

Cluster Management

Provision or attach Kubernetes clusters via the console for a centralized control plane. Add nodes, define storage classes, rotate certificates and perform other cluster management tasks as a Tenant Administrator.

Real-Time Monitoring Across Multiple Clusters

Monitor cluster, tenant, project, node, pod and container level metrics with intuitive dashboards that depict overall compute and memory consumption, network utilization, and storage performance and capacity. Diamanti Spektra provides long-term retention of metrics for querying and analysis.

Complete Application Lifecycle Management

Deploy and migrate applications to other managed clusters and configure replication policies for disaster recovery from a unified management console, providing a single-pane-of-glass for multi-cluster operations. Configure and manage applications using YAML and Helm charts. Secure applications with the integrated Vault secrets management tool.

Multi-Tenancy Management

Enterprises and managed service providers (MSPs) can operate in secure and isolated multi-tenant environments. Diamanti Spektra extends basic Kubernetes resource controls via the concept of 'Domains','Tenants' and 'Projects' to support some of the most complex organizations as they broaden their adoption of Kubernetes.

User Management And Access Controls

Diamanti Spektra supports role-based access control (RBAC) to ensure the right users have access to the right resources. Users can also be authenticated via LDAP and Active Directory (AD) and authorization is granted to different Kubernetes clusters based on roles - Service Provider, Tenant Administrator, Project Administrator, Project Member and Project Viewer.

Resource Management

Reserve capacity (CPU and memory) for different projects within a tenant as well as limit resources for containers to ensure efficient management of resources. Maximize resource utilization and ensure optimal performance for every user while monitoring usage for cost allocation.

Spektra Data Plane

Distributed Storage Layer

Diamanti's patented block storage architecture provides containerized applications with easily consumable persistent volumes. Diamanti's custom storage controller dynamically assigns PCIe VF interfaces to pods as they are scheduled, presenting each virtualized volume as a native NVMe block device.

Cloud-Native Storage

Diamanti Spektra includes a CSI plugin that supports persistent data and provides the performance required of modern applications. Diamanti Spektra supports advanced features for enterprise-grade data protection and disaster recovery (DP/DR).

Plug-And-Play Networking

Containers have their own unique system of port mappings, overlays, and bandwidth requirements that create a host of interoperability challenges. Diamanti eliminates these configuration roadblocks with its unique plug-and-play CNI that integrates directly with existing network infrastructure.

Multi-Zone Clustering

Synchronous mirroring allows enterprises to deploy Spektra across stretched clusters, enhancing fault tolerance and application availability by deploying workloads across geographically distributed availability zones.

Enterprise-Class Data Management

Diamanti Spektra console provides options for enabling data management features such as snapshots, mirroring, multi-cluster asynchronous replication, backup and restore, volume encryption and SEDs.

High Availability And Instant Failover

Diamanti Spektra abstracts all the Kubernetes complexities and offers a turnkey solution that makes it easy to deploy and manage any type of application across multiple Kubernetes clusters, spread across hybrid cloud environments. Diamanti Spektra offers flexibility for deploying highly available Kubernetes applications. In case of a failure, the Diamanti control plane can fail over instantaneously from one location to another with zero disruption. Kubernetes applications can seamlessly access storage volumes across geographically distributed availability zones, thus enabling high availability of application data.

Data-At-Rest Encryption

Diamanti Spektra offers protection for data-at-rest with AES 256-bit volume encryption and Self-Encrypting Drives (SED) on supported hardware. With these capabilities,

enterprise customers can prevent data theft and protect against security breaches while not incurring significant performance penalties.

AI/Ml Integration

Diamanti Spektra enables easy integration of GPU resources and intelligent storage thus enabling scalable AI infrastructure and helps simplify AI/ML workloads deployment. Using the power of Kubernetes on bare-metal, data scientists can tap into performance, ease of use, and flexibility of deploying AI/ML workloads in containers.

Diamanti Ultima™

Transformational Application Performance With I/O Acceleration

Diamanti Spektra can be paired with Diamanti Ultima to offload storage and networking I/O traffic from the CPU, freeing compute and memory resources, enabling greater than 95% host utilization, for your workloads. Using a pair of PCIe cards, Ultima accelerates storage and networking I/O while delivering traffic isolation and guaranteed Quality of Service (QoS).

Diamanti Ultima Storage Card

- Second generation PCIe based I/O acceleration card
- Utilizes SR-IOV to provision volumes as virtual functions
- Implements container granular QoS policies for guaranteed IOPS
- Performs volume management
- Offers enterprise-class storage services such as snapshots, mirroring, asynchronous replication and backup and restore
- Allocate-on-write snapshot architecture ensures zero performance impact on applications when snapshots are created

Diamanti Ultima Network Card

- Second generation PCIe based I/O acceleration card
- 4x10 GbE via QSFP+ module
- Utilizes SR-IOV to provision network interfaces as virtual functions
- Implements container granular QoS policies for guaranteed throughput
- Provisions virtual network interfaces on-demand

Choice of Hardware

Modern Hyperconverged Platforms

Diamanti Spektra works with your choice of x86 hardware, including options directly from Diamanti or from leading server providers including Dell Technologies and Lenovo. Diamanti Spektra supports a wide range of hardware configurations. The Diamanti D20 family of modern hyperconverged platforms consists of D20, D20X, G20T and G20P and each includes ultra-fast NVMe storage.

The Diamanti D20X is equipped with the latest Intel® Xeon® Scalable Processors delivering unmatched performance for modern applications delivering a significant reduction in footprint and total cost of ownership (TCO).

Diamanti G20T and G20P are purpose-built to support artificial intelligence (AI) and machine learning (ML) use cases with maximum utilization and return on investment (ROI). G20T is ideal for AI/ML model training and supports Nvidia NVLink technology. G20P is intended for AI/ML inference to cater to the varying AI/ML use cases in production.