Tyrone Container Platform

Multi-Cloud, Bare Metal, Upstream Kubernetes with Best-in-class Service & Support

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INTRODUCTION TO CONTAINERS

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Early on, organizations ran applications on physical servers. There was no way to define resource boundaries for applications in a physical server, and this caused resource allocation issues. As a solution, virtualization was introduced to allow you to run multiple Virtual Machines (VMs) on a single physical server's CPU. Virtualization allowed better utilization of resources in a physical server. Each VM is a full machine running all the components, including its own operating system, on top of the virtualized hardware.

Containers are similar to VMs, but they have relaxed isolation properties to share the Operating System (OS) among the applications. Therefore, containers are considered lightweight. Similar to a VM, a container has its own filesystem, CPU, memory, process space, and more. As they are decoupled from the underlying infrastructure, they are portable across clouds and OS distributions.

When your application is running fine in the traditional environment, it is natural to ask why containerize and move it to a cloud-native platform. Many people believe that containers and cloud-native platforms are suitable for microservices and other modern architectures. However, it makes complete sense to containerize even the traditional applications running on virtual machines or bare-metal servers.
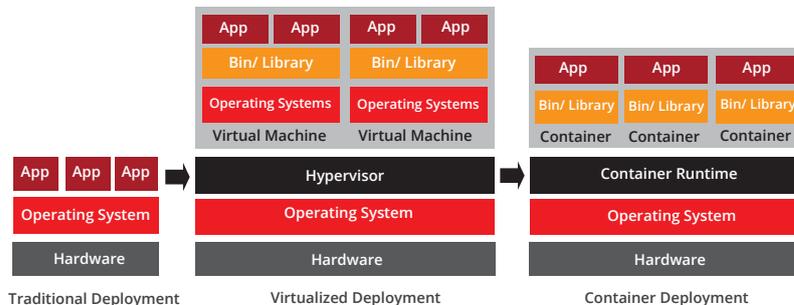
Why are Containers so popular ?

- **Increased ease and efficiency** of container image creation compared to VM image use.

- **Continuous development, integration, and deployment:** provides for reliable and frequent container image build and deployment with quick and easy rollbacks.

- **Dev and Ops separation** : create application container images at build/release time rather than deployment time, thereby decoupling applications from infrastructure.

- **Observability** not only surfaces OS-level information and metrics, but also application health and other signals.

- **Environmental consistency** across development, testing, and production: Runs the same on a laptop as it does in the cloud.

- **Cloud and OS distribution portability**: Runs on Ubuntu, RHEL, CoreOS, on-prem, Google Kubernetes Engine, and anywhere else.

- **Application-centric management:** Raises the level of abstraction from running an OS on virtual hardware to running an application on an OS using logical resources.

- **Loosely coupled, distributed, elastic**, liberated micro-services.

- **Resource isolation:** predictable application performance.

- **Resource utilization**: high efficiency and density.

App	App	App		App	App	App	App		App	App	App

Traditional Deployment | Virtualized Deployment | Container Deployment

WHAT IS KUBERNETES ?

Kubernetes is a portable, extensible, open-source platform for managing containerized applications and services that facilitates both declarative configuration and automation. Kubernetes provides a platform to configure, automate, and manage:

• Intelligent and balanced scheduling of containers
• Creation, deletion, and movement of containers
• Easy scaling of containers
• Monitoring and self-healing abilities

In the next few years

Over 75% of organizations will be running containerized applications in production

75%
CONTAINERIZED APPLICATIONS

Enterprises will fully embrace Kubernetes

70%
KUBERNETES ADOPTION

Development teams will build modern applications

35%
CLOUD NATIVE APPS

Why you need Kubernetes and what can it do ?

Containers are a good way to bundle and run your applications. In a production environment, you need to manage the containers that run the applications and ensure that there is no downtime. For example, if a container goes down, another container needs to start. Wouldn't it be easier if this behavior was handled by a system?

That's how Kubernetes comes to the rescue! Kubernetes provides you with a framework to run distributed systems resiliently. It takes care of scaling and failover for your application, provides deployment patterns, and more. For example, Kubernetes can easily manage a canary deployment for your system.
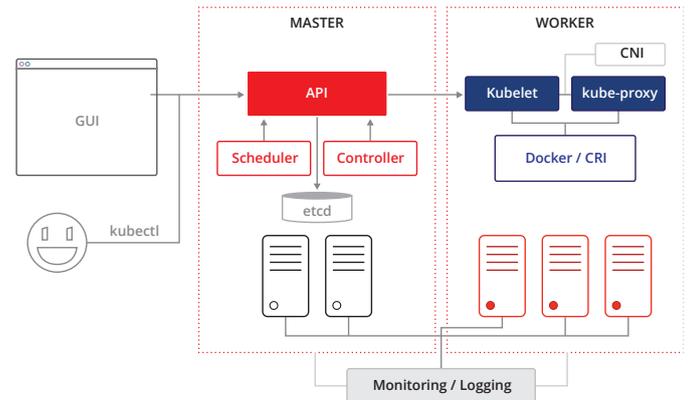
How does Kubernetes work?

At its core, Kubernetes is a database with some features layered on top of it. These features enable a set of Controllers that each implement specific capabilities and work together to produce the end result. Each Kubernetes component is written using the same APIs that are available to users. As a result, components can be ripped out and replaced to extend the system and adapt it to new requirements and environments

The diagram shows a typical Kubernetes system where the core of the system is the etcd database. The state of the cluster is stored there. In front of etcd is the API Server that talks to etcd directly. The Scheduler and the Controller Manager implement most of the orchestration logic of Kubernetes. Together, etcd, the API Server, Scheduler, and Controller Manager make up the Kubernetes control plane; they can run on a single node or across multiple nodes in an HA mode.

MASTER • WORKER • GUI • kubectl • API • Scheduler • Controller • etcd • CNI • Kubelet • kube-proxy • Docker / CRI • Monitoring / Logging

Tyrone Container Platform (TCP)

BENEFITS OF ADOPTING KUBERNETES

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PORTABILITY
Kubernetes and containers make application portability seamless. By tapping into Kubernetes, it is easy to migrate the applications from one cloud provider to another without getting locked into a single platform.

AGILITY
Containers are easy to build and deploy. This makes managing and scaling these applications much faster than in traditional environments. Containers make it easy to update these applications as it offers more flexibility in the process.

EFFICIENCY
Containers also provide many options to manage, track, and control resources usage for an application. This allows higher-level application management tools to make very efficient use of resources on each host, and across pools of resources.

HIGH AVAILABILITY
Kubernetes takes a self-healing approach to infrastructure that reduces the criticality of individual failures, making fire drills less common and your teams more productive.

SCALABILITY
Containers provide lightweight packaging and Kubernetes provides a seamless way to manage containers at scale. This allows efficient use of infrastructure and human resources, adding higher levels of efficiency to your organization.

DEEP SECURITY
Cloud native capabilities enable application developers to play an active role in creating securable applications that protect your company's intellectual property and the private information of customers and employees.

Storage Orchestration
Kubernetes allows you to automatically mount a storage system of your choice, such as local storages, public cloud providers, and more.

Service Discovery & Load Balancing
Kubernetes can expose a container using the DNS name or using their own IP address. If traffic to a container is high, Kubernetes is able to load balance and distribute the network traffic so that the deployment is stable.

Self-healing
Kubernetes restarts containers that fail, replaces containers, kills containers that don't respond to your user-defined health check, and doesn't advertise them to clients until they are ready to serve.

Secret and Configuration Management
Kubernetes lets you deploy and update secrets and application configuration without rebuilding your container images, and without exposing secrets in your stack configuration.

Automatic bin packing
You provide Kubernetes with a cluster of nodes that it can use to run containerized tasks. You tell Kubernetes how much CPU and memory (RAM) each container needs. Kubernetes can fit containers onto your nodes to make the best use of your resources.

HOW DOES IT HELP YOUR BUSINESS ?

The Kubernetes environment - with uniform deployment, management, scaling, and availability services for containerized applications—offers significant advantages for your IT and development efforts, contributing directly to the success of your business. Kubernetes clusters deployed in different private and public clouds provide a uniform (or very similar) management environment and identical principles of operation, reducing the learning curve associated with managing a multi-cloud environment and minimizing the risk of operator errors.

Kubernetes Advantages for CIOs

- Faster time to market : Kubernetes also allows your IT teams to manage large applications across many containers more efficiently by handling many of the nitty-gritty details of maintaining container-based apps.

- IT cost optimization: Kubernetes can help your business cut infrastructure costs drastically if you're operating at massive scale.

- Seamless migration to cloud: Whether you are rehosting, replatforming or refactoring , Kubernetes has you covered.

- Enable multi-cloud operations for greater agility and resilience: Kubernetes may be deployed across multiple cloud providers, or with on-premises infrastructure.

Kubernetes Advantages for Developers

- Containerized workloads can be run on any platform or in any location without any changes to the application's code.

- Instead of waiting for operations to provision machines, DevOps teams can quickly package an application into a container and deploy it consistently across different platforms

- Helps developers write distributed applications using immutable docker container images that run in any environment (name space) in any kubernetes hosted cloud.

INTRODUCING TYRONE CONTAINER PLATFORM (TCP)

Automation, Scalability, Security: WE MAKE IT EASY

Automating the time-consuming tasks involved in managing containers and microservices from deployment and management to scheduling and scaling Kubernetes saves you money and frees your application developers to spend more time doing what they do best: Innovating.

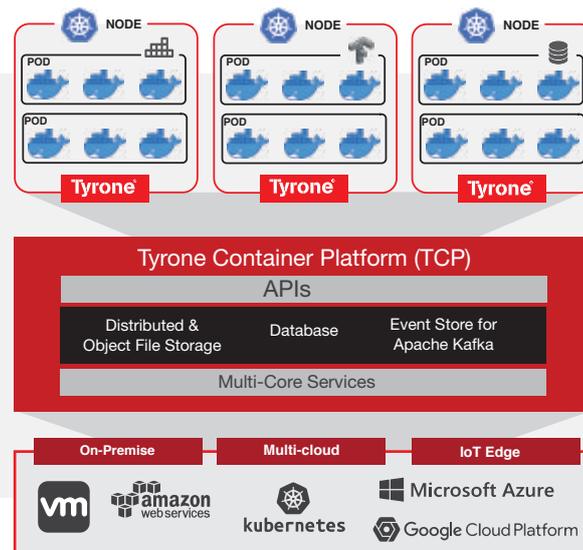Go with **Pure Upstream Kubernetes,** and you'll enjoy the added benefits of total customization;

- Portability between Cloud
- Bare-metal Performance
- Low-latency
- Ultimate Scalability
- Reduced Licensing Costs
- High-density

Open source and free to use, Kubernetes is the industry standard in container orchestration. But that doesn't mean it's simple to implement, manage, and support. Its rich feature set, remarkable adaptability to a variety of users and use cases, and ongoing development by a large and active community are just a few reasons that establishing and maintaining a highly available, secure Kubernetes cluster is such a complex undertaking.

Whether you want to train your own team to deploy and manage Kubernetes; need help co-designing and to deploy custom architecture across bare-metal, virtual, and cloud environments; or prefer fully managed Kubernetes that's operated remotely by highly qualified specialists, Tyrone offers the service and support you need for successful implementation.

Tyrone Container Platform (TCP) offers:

- Maximum compatibility with public container and docker offerings due to its upstream sources.
- Full automation for initial deployments, lifecycle management, and continuing operations - reducing costs, increasing adaptability without sacrificing security and empowering your team to manage multiple independent.
- Nimble architecture that enables fast and efficient upgrades in conjunction with Kubernetes's quarterly release cycle.
- Regular security updates & robust TLS encryption for all control plane components.
- Automatic acceleration of GPU-optimized workloads like transcoding and AI.
- Full confinement using kernel-level mandatory access controls.
- Kubernetes clusters from just about anywhere.

Tyrone Container Platform (TCP)

HOW TO PUT OUR CONTAINER PLATFORM TO WORK FOR YOU

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Implementing your Kubernetes cluster can be complicated - but it doesn't have to be. Here's how to get started in the simplest possible way:

Choose Your Enterprise Kubernetes Package

Determine which of Tyrone's Enterprise Kubernetes Package is right for your organization. Do you need fully customized, highly available, production-grade Kubernetes, deployed on bare metal? Or do you need something simpler - a predefined architecture, automated deployment, and standard training to help your in - house team get Kubernetes up and running? Whatever your requirements, Tyrone has a Kubernetes package for you.

Unleash the Potential of Your Kubernetes Cluster

Take full advantage of your Kubernetes architecture with containerized applications that allow you to meet your organization's specialized needs. Tyrone has broad experience in deploying and managing custom solutions that empower our customers to realize the full potential of their Kubernetes cluster. So whether you need real-time data streaming, dynamic management of solution components, continuous integration/continuous delivery pipelines, machine learning and AI, or something among of a variety of other applications or custom microservices, you can trust Tyrone to provide you with a cutting-edge solution to increase your efficiency and productivity.

Training and Implementation

Each of our Kubernetes packages include appropriate knowledge transfer as listed in the package descriptions. In addition, Tyrone offers services to deploy reference or custom Kubernetes architecture that's tailored to your needs, as well as to manage and operate it instantaneously.

Tyrone Support: All the Benefits of Kubernetes, None of the Headaches

Tyrone's Kubernetes experts provide ongoing support that's tailored to your organization's requirements, whether you need 24x7 Kubernetes-focused phone support or subscription-based Infrastructure support across the entire enterprise. Tyrone also offers award-winning full remote management simplifying your day-to-day Kubernetes operation while freeing your team to focus on other priorities.

Compliance Testing

We run extensive testing to ensure your Kubernetes cluster meets requirements and passes upstream conformance tests.

ENTERPRISE KUBERNETES PACKAGES

For companies that choose to deploy and/or operate their own Kubernetes cluster, the right know-how is essential, and Tyrone offers a range of enterprise Kubernetes packages so you can get the precise level of support you need.

All of our packages include knowledge transfer targeted to your organization's goals.

Our delivery team will define your Kubernetes environment, ensure your cluster meets its purpose, and give your team the skills they need to onboard your applications, scale your cluster, and operate it on a daily basis.

Kubernetes Basics	Kubernetes Standard	Kubernetes Advanced
Best for: • Organizations that plan to deploy Kubernetes on a public cloud and need support in case of issues	**Best for:** • Virtual Environments • VMware Environments • HPC Cloud Platform Environments • Public Clouds • Standard Kubernetes • Organizations that prefer to outsource deployment of a starter Kubernetes cluster.	**Best for:** • Bare-metal deployment • Organizations that need consulting to determine an optimal architecture based on workloads and available hardware (That architecture will be reusable if you want to scale up or duplicate the cluster later). • Organizations that wish to integrate their Kubernetes cluster with existing monitoring systems, storage, or networking.
Overview: • 10 hours of online guidance gives your team members the knowledge and skills they need to deploy and operate Kubernetes on public clouds. • You'll get a predefined architecture, automated deployment, and standard training to get Kubernetes up and running quickly.	**Overview:** • A three-day (24-hour) workshop covers Kubernetes and container basics, plus HPC Container Platform and tooling. You'll also get five days of deployment of a reference Kubernetes architecture on VMware or private or public clouds.	**Overview:** • Three weeks of consulting services include an on-site workshop, co-design of custom architecture, and full enterprise production deployment across bare-metal, virtual, and cloud environments. • The Advanced package addresses more sophisticated requirements, focusing on cluster deployment with production features related to storage, networking, private registry, CI/CD, management platforms, and more.

ENTERPRISE KUBERNETES PACKAGES

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Bare-metal deployment organizations that need consulting to determine the optimal architecture based on workloads and available hardware (That architecture will be reusable if you want to scale up or duplicate the cluster later).

Organizations that wish to integrate their Kubernetes cluster with existing monitoring systems, storage, or networking

Kubernetes Basics

Includes:

- Kubernetes & Container basics
- Reference Architecture
- Multi-Cloud Approach
- Security and Patching
- Lifecycle Management
- Backup and Recovery
- 10 Hours of Training
- Onboard Test Workloads

Kubernetes Standard

Includes:

- Highly available Kubernetes, deployed on HPC Cloud Platform, public cloud, private cloud, or VMware
- Logging, Monitoring, & Alerting
- Custom Kubernetes architecture optimized for your workloads
- Calico or Flannel Networking
- Three days (24 hours) of Training

Kubernetes Advanced

Includes:

- Highly available, production-grade Kubernetes, deployed on public cloud, VMware, HPC Cloud Platform, or bare metal
- Logging, Monitoring, and Alerting
- GPU Acceleration
- Storage for Persistent Volumes
- Custom Networking Options
- Management Platform
- Private Registry
- Load Balancers
- Application Catalog
- On - Site Knowledge Transfer

Optional Add-ons

- Fully Managed Kubernetes: Full, 24x7 remote management of your Kubernetes Cluster by Tyrone's Team of Experts.
- Infrastructure Support: Enterprise phone support for Kubernetes and Ubuntu.
- Kubeflow, Machine Learning Master Class: Week long training that explores the complete AI/ML stack and trains your team to build a full pipeline using Kubeflow on Kubernetes (available as an add-on to advanced, our bare-metal Kubernetes service package).
- Workload Deployment Services.

DETAILS AND PRICING

Kubernetes Basics
10-Hour Workshop on Kubernetes and Container Basics In this virtual knowledge transfer, our team will deliver an online introduction to setting up and running your own Kubernetes cluster. For between 2 and 5 people.

Price on request

Kubernetes Standard & Advanced
These more advanced packages provide targeted training, plus deployment of reference or custom Kubernetes across a variety of environments.

	Kubernetes Standard	Kubernetes Advanced
	Price on request	*Price on request*
Environment	AWS, Azure, Google Cloud, Oracle Cloud, VMware, HPC Cloud Platform	AWS, Azure, Google Cloud, Oracle Cloud, VMware, HPC Cloud Platform, Bare Metal
Scale	16–200 nodes/VM	12–2,000 nodes/VM
Storage	VMware, Cloud Block, Ceph	Ceph, NetApp Trident* (ONTAP, SANtricity, SolidFire), Pure Storage FlexVolume,*Portworx,*StorageOS, *VMware native storage (VMDK), cloud-native block storage, local disks, NFS, iSCSI
Networking	Canal, Calico, NodePort, Fannel	Canal, Calico, NodePort, flannel, Juniper Contrail
GPGPU Acceleration	N/A	Physical CUDA GPUs on Bare Metal, public cloud GPU-enabled virtual machines
Authenticator	Kubernetes RBAC	Kubernetes RBAC, Kubernetes OIDC, LDAP, Active Directory, OAuth, SAML (through Keystone or OpenUnison)
Load Balancer	NGINX Ingress Controller, HAProxy Ingress Controller	NGINX Ingress Controller, HAProxy Ingress Controller, F5 BIG-IP,* Avi Networks*
Private Registry	N/A	JFrog Artifactory, *Sonatype Nexus, *VMware Harbor, *GitLab*

DETALS AND PRICING

Add-ons:
Remote Management Add-on: Fully Managed Kubernetes
EXTRA TRAINING, EXTRA SUPPORT

Kubernetes moves fast, and managing and supporting it means staying on the cutting edge of upstream developments through extensive training and research. Tyrone's Fully Managed Kubernetes service supported by our team of highly qualified experts - not only ensures that your company's Kubernetes cluster runs smoothly and employs the latest advancements, but also frees up your team's time and resources for other tasks. So leave the day-to-day management of your Kubernetes environment to us, on your choice of data center or cloud. We'll get you up and running fast, keep you operating seamlessly day in and day out and you can take control of your Kubernetes cluster at any time.

Infrastructure Support Add-on:
ENTERPRISE PHONE SUPPORT FOR KUBERNETES AND UBUNTU

For ongoing enterprise support, Tyrone's subscription-based Infrastructure Support provides kernel live patching to avoid reboots, Landscape systems management, and telephone support for the full stack, from kernel to Kubernetes.

To learn more about Infrastructure Support, please visit www.tyronesystems.com or write to us at info@tyronesystems.com

	Kubernetes Standard	Kubernetes Advanced
CI/CD	N/A	Jenkins
Knowledge Transfer	24 hours of hands-on knowledge transfer on deployed environment	24 hours of hands-on knowledge transfer on deployed environment
Security	Security patches for the entire stack from kernel to Kubernetes, including CVEs and additional security improvements	Audit logging, network policies, namespaces, pod security policies (PSP), AppArmor, PKI (Easy-RSA and HashiCorp Vault), Ceph encryption at rest
Upgrades	Latest distribution available within 7 days of upstream	Latest distribution available within 7 days of upstream
Docs	Design overview, Deployment guide	Design overview, Deployment guide
Connectivity	Internet Access Required	Offline Deployment Possible
Architecture	Reference	Customized
Monitoring & Logging	Internet Access Required	Offline Deployment Possible
Workload**	Per Workload**	Per Workload**

Note:
* Deployment only; Tyrone will provide support & managed services at a separate price.
** Included at extra cost.

ABOUT TYRONE SYSTEMS

In today's world, customer-centric solutions are of paramount importance. And we at Tyrone Systems work towards offering the latest technology-based solutions to increase your return on investments. With a clear focus, we deal in only specific products which enables us to specialize and provide the best solutions and services. Tyrone Systems is a unique company in its ability to offer solutions for the most challenging project of any size. Our ability to understand customer challenges and deliver value, is based on our collective technical and business expertise. And through our strong partnership with technology leaders, Tyrone aims to equip customers with the latest and the most optimal technology blocks to achieve their business goals.

Contact Us

Let us tell you more about how Tyrone Container Platform can save your organization time and money while keeping you agile, secure, and supported!

For more information,
E-mail info@tyronesystems.com | Call 1800-419-0688