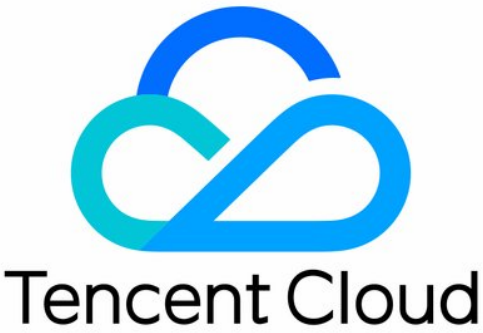
Tencent Kubernetes Engine

What's Tencent TKE

Product Introduction



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What's Tencent TKE Overview

Last updated：2018-09-03 16:24:32

Product Overview

Description

Tencent Cloud's Tencent Kubernetes Engines (TKE) is a container management service with high scalability and high performance. You can easily run applications on a hosted CVM pod cluster. With this service, you do not need to install, operate, maintain or expand your cluster management infrastructure. You can enable/disable Docker applications, query full status of the cluster, and use various cloud services by simply calling APIs. You can arrange containers in your cluster based on your resource needs and availability requirements, to meet the specific demands of your business or applications.

Based on native kubernetes, Tencent Cloud TKE is a container-based solution that solves environmental issues in the processes of development, testing, and OPS and helps users to reduce costs and improve efficiency. It is fully compatible with the native kubernetes API, and extends Tencent Cloud's kubernetes plug-ins such as CBS and CLB. Supported by Tencent Cloud's VPC, Tencent Cloud TKE also provides highly reliable and high-performance network solutions.

Glossary

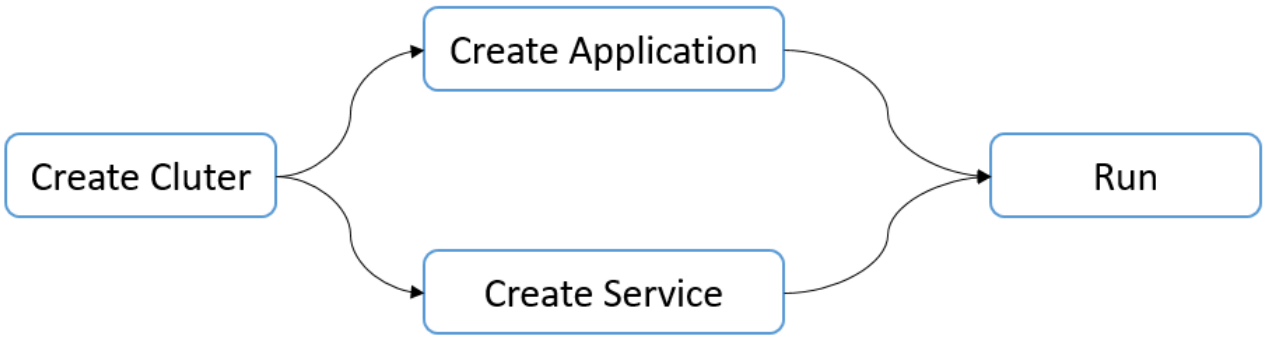
The following basic concepts can help you get familiar with Tencent Cloud TKE:

- **Cluster**: A collection of cloud resources required for the container to run, which contains CVMs, load balancers, and other Tencent Cloud resources.
- **Application**: A complete application composed of multiple services, which can be quickly deployed through templates.
- **Service**: A micro-service comprised of multiple instances with the same configuration and rules for accessing these instances.
- **Configuration Item**: A collection of multiple configurations, which helps you manage different businesses under different environments.
- **Ingress**: A collection of rules used to route external HTTP(S) traffic to service.
- **Image Repository**: Used to store Docker images for deployment of TKE.
- **Pod**: A pod consists of one or more relevant containers that share the same storage and network.

How to use

You can run an application by following three steps as shown below.

1. Create a cluster
2. Create a service/application
3. Run the service/application



Product pricing

No service fee is charged for TKE. The fee is only charged by the actual usage of cloud resources. For more information on billing methods and specific prices, please see TKE Pricing.

Related services

- You can purchase a TKE cluster comprised of several CVMs in which containers are running. For more information, please see CVM product documentation.
- A cluster can be created under a VPC. CVMs in the cluster can be assigned to subnets under different availability zones. For more information, please see VPC product documentation.
- You can use a load balancer to automatically assign the request traffic of clients across CVM instances and then forward to the containers in the CVMs. For more information, please see Cloud Load Balance product documentation.
- Cloud Monitor can be used to monitor the operation data of TKE clusters and container pods. For more information, please see Cloud Monitor product documentation.

Our Advantages

Last updated：2018-07-05 15:36:44

Product Advantages

Orchestration advantages

Kubernetes-based services
Tencent Cloud TKE is developed on the basis of Kubernetes (k8s), a container cluster management system provided open source by Google. Using Docker technology, Kubernetes offers a complete set of features (including deployment and execution, resource scheduling, service discovery, and dynamic scaling) to containerized applications, making it much easier to manage large-scale container clusters.

Benefits of Kubernetes

- Using elegant software engineering design such as modularization and micro-service, Kubernetes provides a modular design that allows users to customize network, storage, scheduling, monitoring, and log modules as needed through flexible plugins.
- Kubernetes project community provides an open source platform for the implementation of container, network, and storage.
- Kubernetes Vs. other container orchestration tools (Swarm/Mesos)
  Vs. Swarm: Kubernetes has finer granularity and more features, including advanced features such as key management, configuration management, and auto-scaling.
  Vs. Mesos: Mesos focuses on resource scheduling while Kubernetes concentrates on distributed applications, micro-service and large-scale cluster management, which integrates the exclusive concept of "cluster management is not just resource scheduling and orchestration" proposed by Google.

Tencent Cloud's TKE Vs. Self-built TKE

Advantage	Tencent Cloud's Tencent Kubernetes Engines (TKE)	Self-built TKE

Advantage	Tencent Cloud's Tencent Kubernetes Engines (TKE)	Self-built TKE
Easy to use	**Simplified cluster management** • Tencent TKE provides large-scale container cluster management, resource scheduling, container arrangement, and code construction features. It blocks the differences of underlying infrastructures as well as simplifies management, operation and maintenance processes for distributed applications. You no longer need to use cluster management software or design fault-tolerating cluster structures, thus avoiding all relevant management or expansion works. • You simply need to enable the container cluster and specify the tasks you want to run. Tencent TKE will then help you complete all cluster management jobs, which allows you to concentrate on developing Dockerized applications.	When using self-built container management infrastructures, you usually need to go through complex management processes. For example: install, operate, expand your own cluster management software as well as configure management systems and monitor solutions.
Flexible to scale	**Flexible cluster hosting and integrated load balancer** • You can use TKE to schedule long-running applications and batch jobs flexibly. You can also use APIs to obtain the latest cluster status to integrate your customized scheduling applications with third-party scheduling applications. • Tencent Cloud's TKE is integrated with load balancers. You can assign traffic among multiple containers. You can simply specify container configuration and load balancers you want to use, and then the TKE management application automatically adds/deletes resources for you. In addition, Tencent Cloud's TKE is able to auto-recover containers with poor operation status to ensure the number of containers satisfies your demand, providing enough support for applications.	You need to determine how to manually deploy container services according to business traffic and health status, which has poor availability and scalability.

Advantage	Tencent Cloud's Tencent Kubernetes Engines (TKE)	Self-built TKE
Secure and stable	**High isolation of resources and high availability of services** • TKE launches inside your own cloud server instance without sharing computing resources with other customers. • Your clusters run inside VPCs, so you may use your own security groups and network ACL. These features provide high isolation level and can help you use CVMs to construct applications with high security and reliability. • TKE uses a distributed service structure to ensure auto failure recovery and fast migration for services, while combining distributed storage of the stateful service backend to provide security and high availability for services and data.	Due to kernel issues and incomplete Namespace of self-built container services, isolation for tenants, devices, and kernel modules are rather poor.
Efficient	**Quickly deploy images and keep businesses constantly integrated** • Tencent TKE runs inside your VPCs, where quality BGP network ensures fast upload/download speed for images and allows massive containers to launch within seconds, greatly reducing operation cost while helping you to focus more on business operation. • You can deploy businesses on Tencent TKE. When developers submit codes on Github or other code platforms, the TKE immediately creates, tests, packs, integrates and puts the integrated codes into the pre-release environment and existing network environment.	The efficiency for using images to create containers is not ensured, as the network quality of self-built container services cannot be guaranteed.
Low-cost	**TKE is provided free of charge** There is no extra fee for using Tencent TKE. You can call APIs to create your cluster management applications in containers for free. You only need to pay for cloud service resources you created for storage and running applications, such as CVMs and Cloud Block Storage.	You need to make investment to create, install, operate, maintain, and expand your own cluster management infrastructure, which costs a lot.

Tencent Cloud's TKE Monitoring Vs. Self-built Container Monitoring

Tencent Cloud's TKE monitoring collects and display data for container clusters, services, and instances. With TKE monitoring, you can view the monitoring data from about 30 metrics (more will be added)

including cluster, service, instance and container, check whether the cluster runs properly, and create alarms accordingly.

Advantage	Tencent Cloud's Tencent Kubernetes Engines (TKE)	Self-built TKE
Complete metrics	About 30 metrics are used, including cluster, service, container, and pod.	Incomplete metrics, more yet to be developed.
Low creation cost	CSS monitoring is provided when a cluster is created.	Need to be created manually and cost a lot
Low OPS cost	Operated and maintained by the platform. Data accuracy is guaranteed.	Need to be maintained manually.
Low storage cost	Each metric's data in the last three months is saved for free.	Subject to the storage size
High scalability	TKE is optimizing and adding new metrics.	Technicians are needed to develop new metrics.
Alarm	Yes	No
Troubleshooting	You can check the container log in the console and use webshell to log in to the container upon one-click for troubleshooting.	The container needs to be logged in to manually and relevant machines are required for troubleshooting.

Architecture

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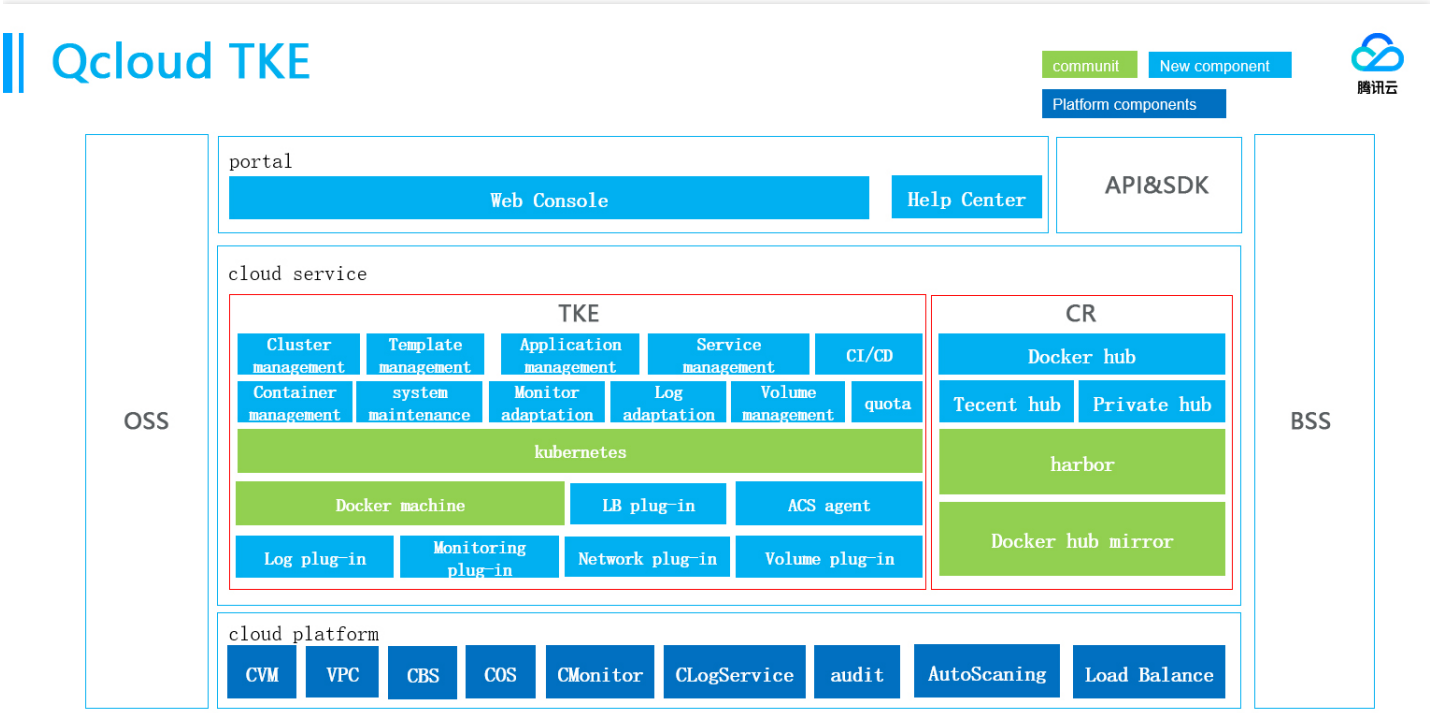
Product Architecture

Overall Architecture

This section describes the design and implementation of TKE system, and its product architecture is as follows:



TKE consists of the following modules:

- **TKE console and APIs**: Users work with clusters and services through the console and cloud APIs.
- **User terminal**: Users perform operations such as upload/download and automatic building of images on their terminals or UI provided by Docker.
- **Image service modules:** Users can upload or download images locally using the image service modules provided by Tencent Cloud.
- **Container service modules**: The core TKE modules, including addition, deletion, modification and query of clusters and services.

Application Scenarios

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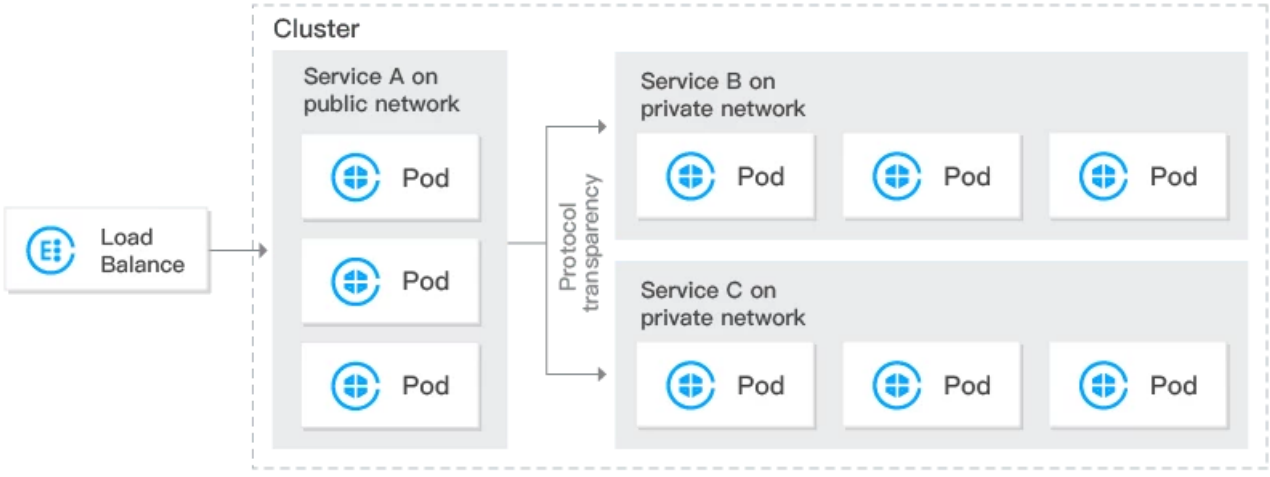
Micro-service Architecture

The micro-service architecture is suitable for creating complex applications. It splits your monolithic application into multiple micro-services at different dimensions, and the content of each micro-service can be managed by using a Docker image.

Advantages of Tencent Cloud's TKE deployed with micro-services:

1. Cluster management is simplified. Installation and management of cluster is not required.
2. It seamlessly connects to Tencent Cloud's computing, network, storage, monitoring, security capabilities, and directly uses Tencent Cloud's IAAS capability.
3. It is easy to use, and supports service choreography and application management at service granularity. Resources are highly isolated while services are highly available.



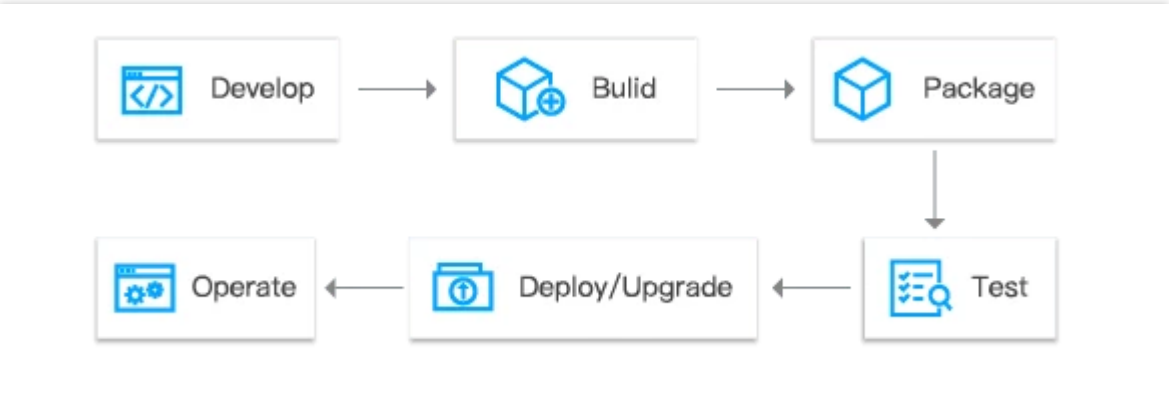
Continuous Integration and Continuous Delivery

Excellent DevOps environment is provided through Continuous Integration and Continuous Delivery to greatly increase the efficiency of software publishing.

Continuous Integration: It allows developers to complete building and (unit) testing processes immediately after they submit new code. According to the test results, we can determine whether the new

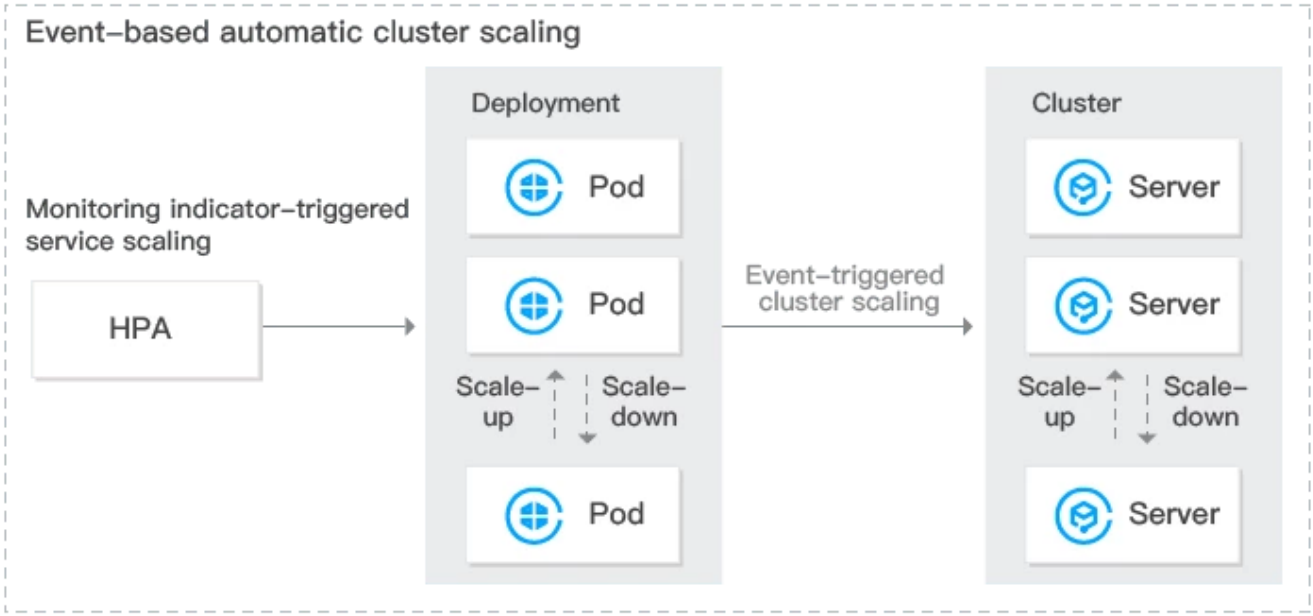
code and the original code can be properly integrated.
Continuous Delivery: It is used to deploy the integrated code to the operating environment based on Continuous Integration.

Advantages:
By deploying services on Tencent Cloud TKE, developers can perform such operations as creation, testing, package and integration immediately after they submit new code. Then, they deploy the integrated code into the pre-release environment and existing network environment based on Continuous Integration.



Elastic Scaling

TKE features elastic scalability at both the cluster and service levels. It can automatically scale up or down by monitoring container indicators such as CPU, memory and bandwidth based on the operation status of the business. Meanwhile, it can automatically scale the cluster according to the deployment conditions of the container when resources are insufficient or excessive.



Features

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Product Features

Cluster management

Tencent TKE allows you to manage your container clusters easily and efficiently while ensuring security and reliability, to seamlessly connect to Tencent Cloud's computing, storage, and network capabilities.

Module	Feature
Cluster composition	• All CVM models are supported, and you can add or use existing CVMs. • CVMs within a cluster can be deployed across availability zones. • Both prepaid and postpaid plans are supported. • Clusters in a VPC are isolated for security concern and users can use them exclusively. • You can define your cluster network and configure the container network as needed.
Cluster management	• Supports dynamic cluster scaling and pod upgrading/degrading • A wide range of monitoring metrics is provided. You can define your alarm policies.
kubernetes management	• Supports multiple kubernetes versions and version upgrade • You can manage certificates using kubernetes and operate clusters directly using kubectl. • Namespace can be managed easily on the console.

Application management

The application management feature provided in Tencent Cloud's TKE can help you quickly create multiple services and deploy applications for different environments with one click.

Module	Feature
Application Composition	• Supports multiple TKE types • Supports multiple resources such as Kuberntes Deployment and DamentSet

Module	Feature
Application Management	• Supports quick application creation via My Template or Template Market • Supports real-time viewing of updated applications • Supports quick deployment/termination of services within an application
Template Management	• Supports My Template and Template Market • Supports quick template copy

Service management

Service management provides an efficient container management solution, and supports the following features: quick creation of service, quick scaling, load balancer, service discovery, service monitoring, health check, etc. You can manage your container conveniently by using this service.

Module	Feature
Service Deployment	• Supports deploying multiple containers in one pod • Multiple service access methods are available • Supports deploying pods within a service across availability zones • Supports affinity and anti-affinity scheduling
Service Management	• Supports rolling update and fast update of services • Supports dynamic scaling of services • Supports remote login to the container in a service
Service OPS	• Supports viewing detailed monitoring metrics • Supports viewing stdout and stderr logs for containers in a service • Supports setting service alarm policies • Supports liveness check and readiness check • Supports automatic recovery from container exceptions

Configuration item management

Configuration items are used to specify the read-in settings of some programs when they start. You can apply different configuration items to different objects.

Module	Feature
Configuration Item Management	• Supports multiple versions of configuration items • Supports visual editing and YAML editing

Module	Feature
Use of Configuration Items	• Configuration items are mounted to the container directory as data volumes • Configuration items are used to import environment variables • Configuration items are used to replace variables in application templates

Image management

Tencent Cloud Image Registry contains official Dockerhub images and private user images. Image management allows you to quickly create images and deploy services.

Module	Feature
Image Management	• Supports creation of private image repositories • Supports viewing and using DockerHub image repository • Supports viewing and using TencentHub image repository • Supports management of multiple image namespaces
Use of Images	• Provides high-speed private network channels for image creation services • Supports image upload and download via public network
CI/CD	• Supports automatic creation of private images • Supports setting triggers for images