
DEVOPS
DIA 9 DE 10

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KUBERNETES

KUBERNETES – SUMÁRIO

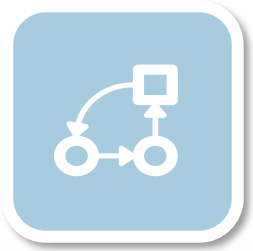
- Visão Geral
- Auto-Hospedagem
- Serviços Gerenciados e Ferramentas
- Soluções Turnkey
- Instaladores
- Principais Comandos
- Laboratórios

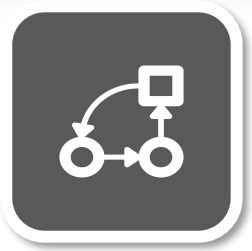
KUBERNETES

VISÃO GERAL

KUBERNETES - VISÃO GERAL

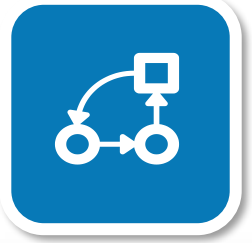
Sistema operacional nativo de nuvem.

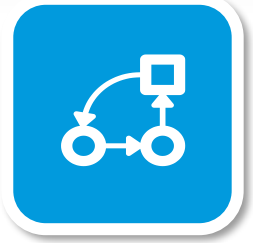




Plataforma confiável e escalável para executar cargas de trabalho em contêineres.

Arquitetura em cluster.

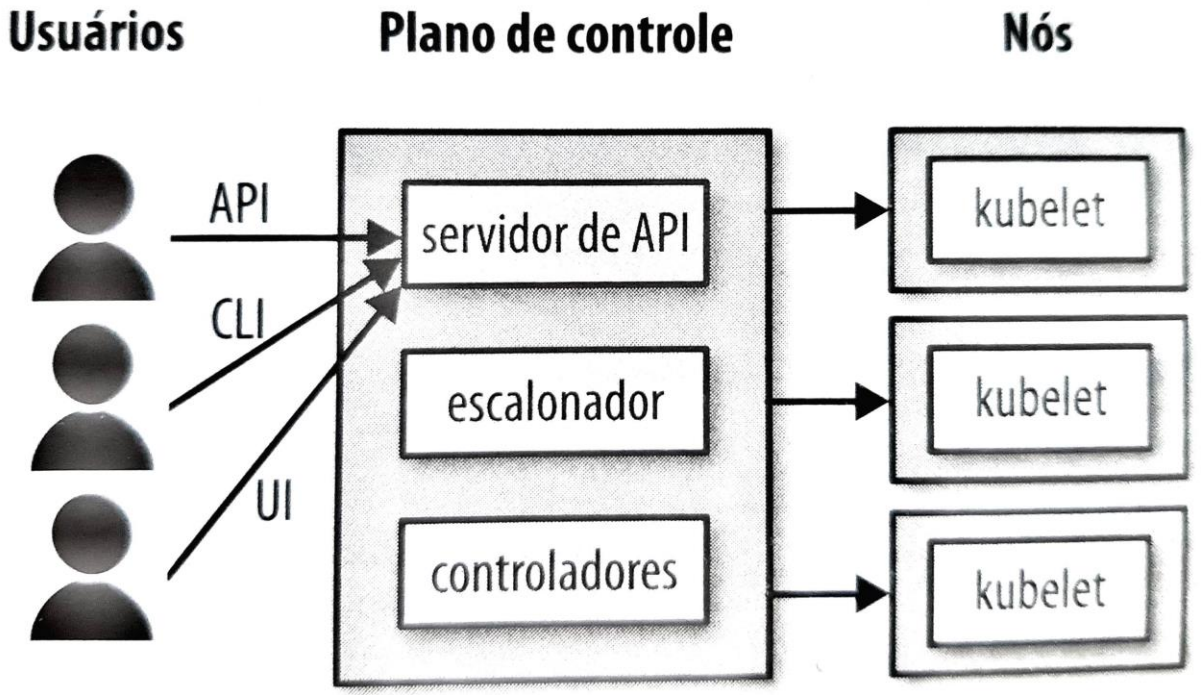




Auto-hospedagem ou serviço gerenciado.

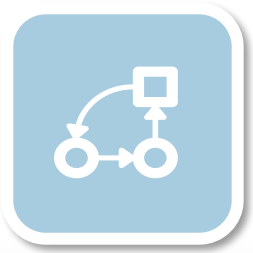
KUBERNETES – PLANO DE CONTROLE

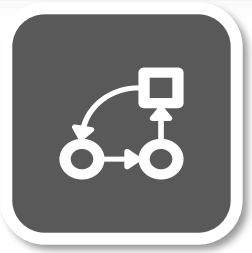
O plano de controle é a principal peça do Kubernetes. Ele executa todas as tarefas necessárias a realização dos trabalhos: escalona contêineres, administra serviços e atende requisições de API.



KUBERNETES – PLANO DE CONTROLE

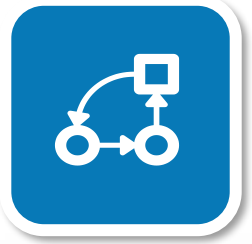
Kube-apiserver: servidor de frontend do plano de controle, trata requisições destinadas a API.

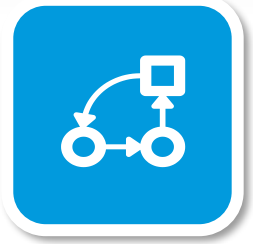




Etcd: banco de dados do Kubernetes. Armazena informações sobre os nós, recursos do cluster, etc.

Kube-scheduler: decide onde executar os Pods criados.



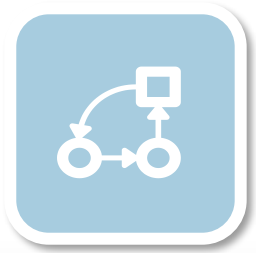


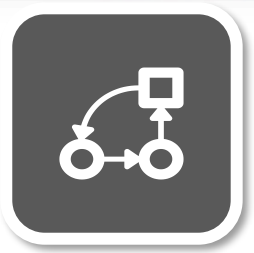
Kube-controller-manager: responsável por executar os controladores de recurso (ex.: deployments).

Cloud-controller-manager: Interage com o provedor de nuvem.

KUBERNETES – PLANO DE CONTROLE

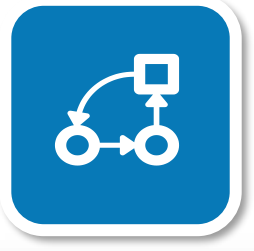
Deve possuir vários nós mestres, a fim de, garantir alta disponibilidades.

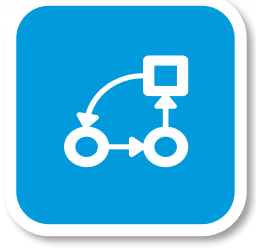




O banco de dados é replicado entre os vários nós, garantindo sobrevida em caso de falhas.

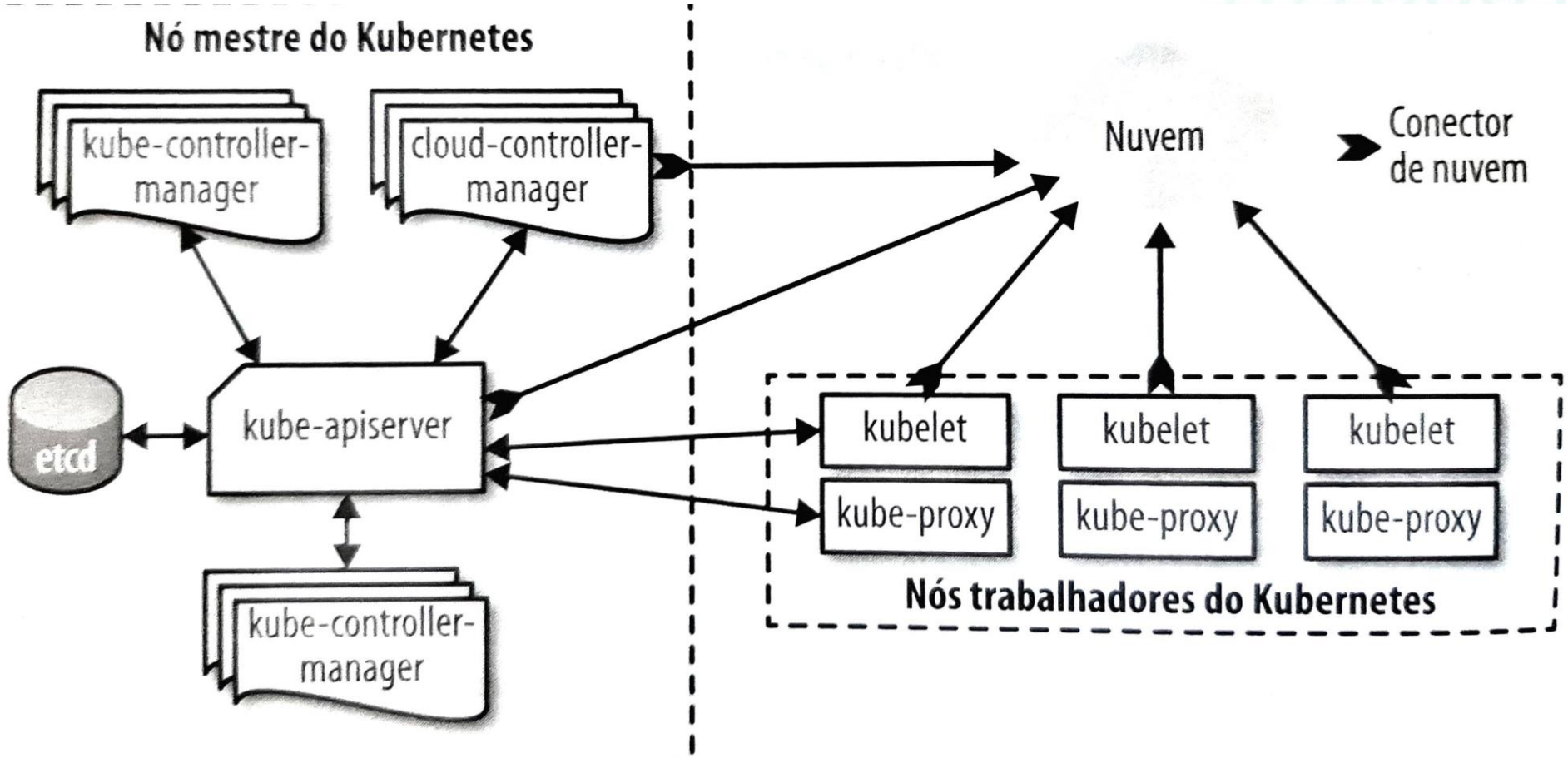
Uma falha geral nos nós mestres pode interromper a execução do cluster.





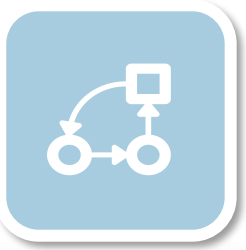
Falhas nos nós trabalhores serão tratadas pelo Kuberntes, escalonando os Pods em nós saudáveis.

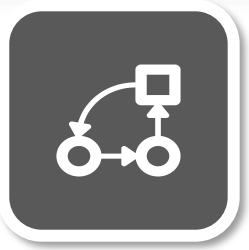
KUBERNETES – COMPONENTES DE UM NÓ



KUBERNETES – ESTRUTURA DOS NÓS

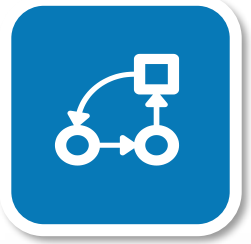
Kubelet: responsável por orientar o contêiner a iniciar cargas de trabalho escalonadas no nó e monitorar o status.

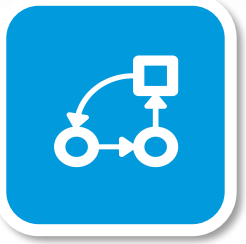




Runtime do contêiner: Inicia e finaliza os contêineres, além de tratar de suas comunicações.

Kube-proxy: Roteia as requisições entre os Pods e nós distintos, e também entre os Pods e internet.

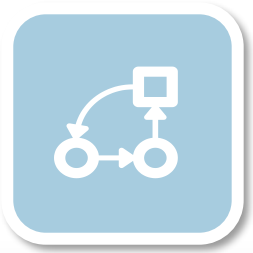


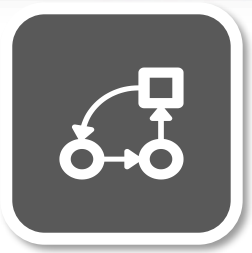


Nós mestres e nós trabalhadores.

KUBERNETES – DEPLOYMENTS

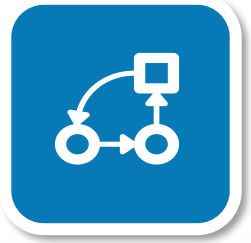
Programa supervisor que verifica, de forma recorrente, se o contêiner está executando.

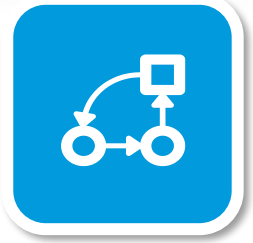




Em caso de paradas, ele reinicia imediatamente o contêiner.

Responsável por iniciar ou parar a execução de um contêiner.

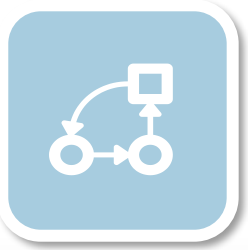


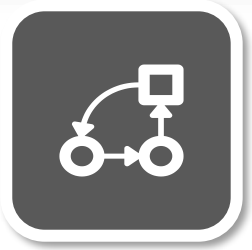


Responsável pela criação de controladores e gestores de replicas (ReplicaSets).

KUBERNETES – PODS

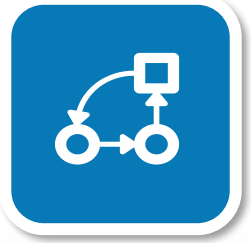
Objeto Kubernetes que representa um grupo de um ou mais contêineres.

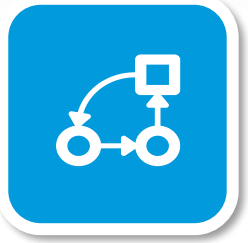




Garantia de que um grupo de contêineres será executado em um mesmo nó.

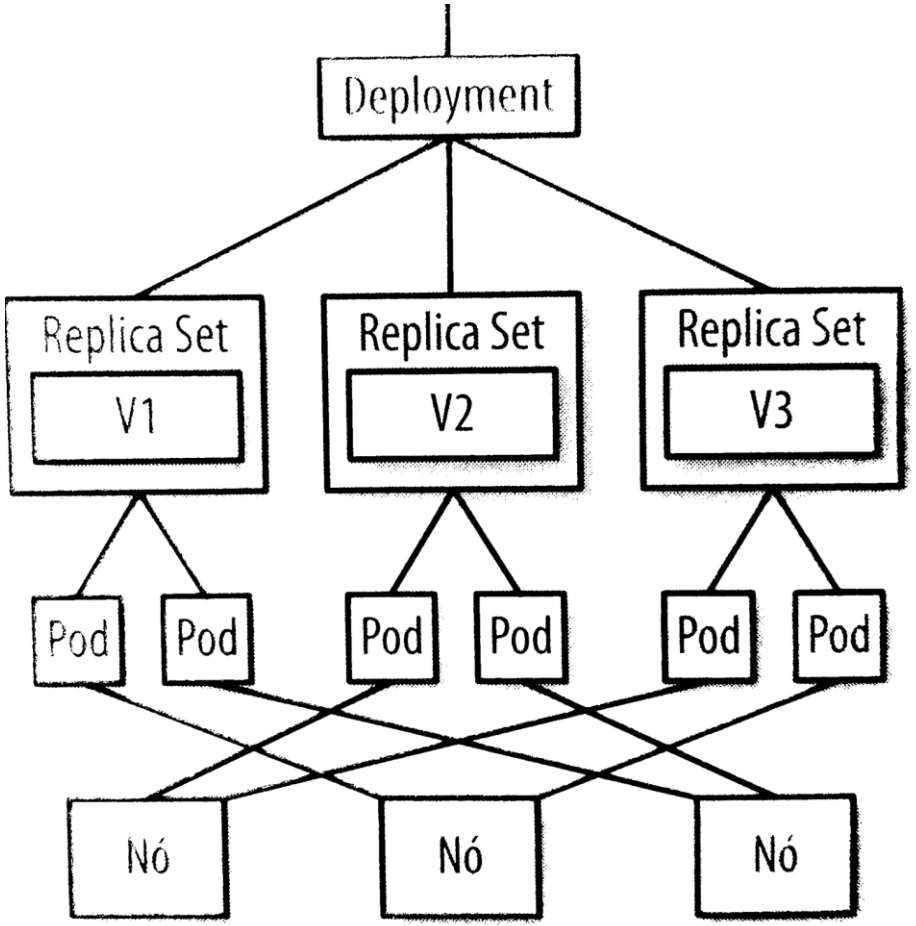
Facilita o escalonamento de grupos de contêineres.





Em diversos cenários o Pod conterá apenas um contêiner.

KUBERNETES – REPLICASET

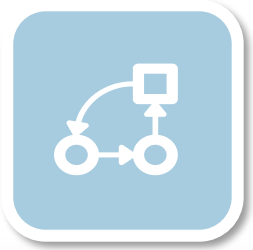


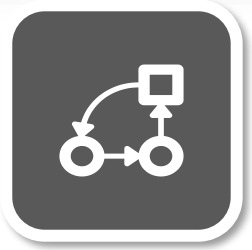
KUBERNETES

AUTO-HOSPEDAGEM

KUBERNETES – AUTO-HOSPEDAGEM

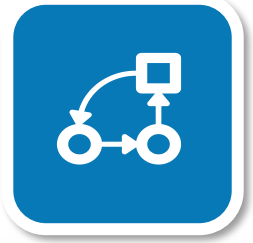
Máximo de flexibilidade e controle..





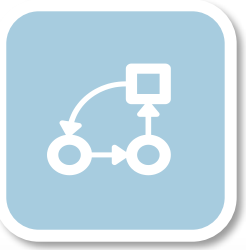
Equipe dedicada para instalação e manutenção da ferramenta.

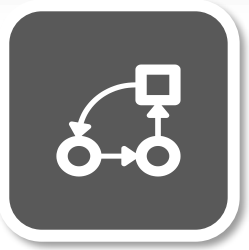
Controle total sobre atividades de upgrade.



KUBERNETES – AUTO-HOSPEDAGEM - DESAFIOS

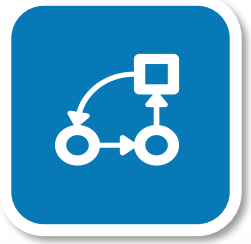
O plano de controle foi configurado para alta disponibilidade.

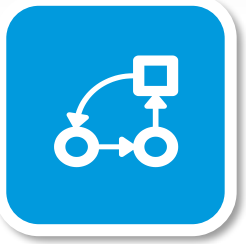




Os nós trabalhadores foram configurados para alta disponibilidade? Organizados geograficamente?

O cluster está seguro? A comunicação interna ocorre via canais seguros? Os contêineres possuem as permissões adequadas?

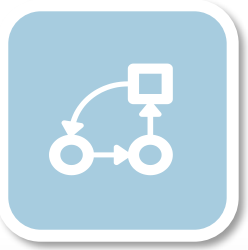


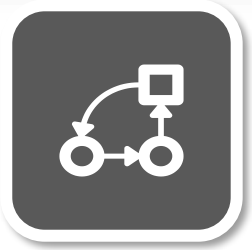


O acesso a base de dados (etcd) é autenticado e monitorado?

KUBERNETES – AUTO-HOSPEDAGEM - DESAFIOS

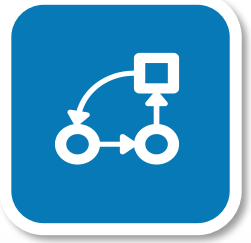
Todos os serviços do cluster estão seguros? Os acessos externos são autenticados e autorizados?

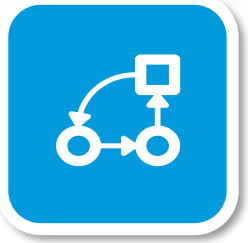




O acesso a API do Kubernetes foi devidamente limitado?

O cluster está em compliance? Atende a Cloud Native Computing Foudation?

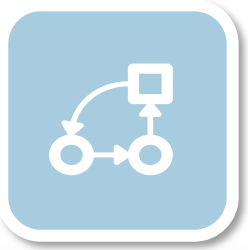


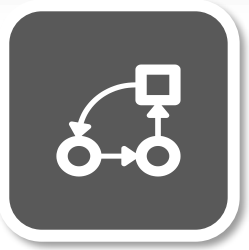


Manter o sistema operacional e o Kubernetes atualizados em cada um dos nós.

KUBERNETES – AUTO-HOSPEDAGEM - DESAFIOS

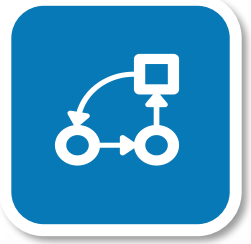
Os backups das bases de dados são feitos corretamente? Armazenados em local adequado? A restauração é testada com frequência?

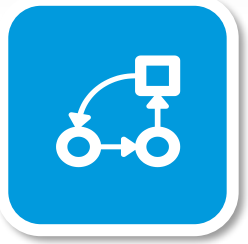




Como o cluster será mantido? Como novos nós serão incrementados?

Como o cluster será escalado diante de uma demanda crescente?





Como será feito o rollout de atualizações entre os nós?

KUBERNETES – AUTO-HOSPEDAGEM - DESAFIOS

Cindy Sridharan
@copyconstruct

At a previous job, we decided against doing K8s. A disgruntled engineer spent the entirety of their tenure being grumpy about this decision.

It takes well over a million dollars just in engineer salary to get K8s up and running from scratch. And you still might not get there.

Traduzir Tweet

> **K10g** @KarlKFI · 21 de jul de 2018
> Em resposta a @ibuildthecloud e @drnic
> Even with kubeadm and a team of 6 you can't get upstream K8s production ready in 6 months. We tried.
>
> Hard Problems:
> - High Availability
> - Single Sign On
> - Multitennancy
> - Resource Isolation
> - Permission Management
> - Upgrades
> - Backups
> - Package Management
> - CI/CD Integration

12:57 AM · 22 de jul de 2018 · Twitter for iPhone

KUBERNETES – AUTO-HOSPEDAGEM - DESAFIOS

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Find Cindy Sridharan at

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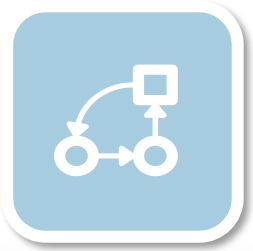
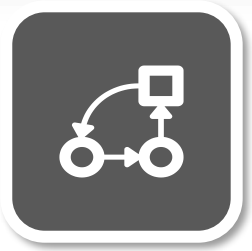
KUBERNETES

PRINCIPAIS FERRAMENTAS

KUBERNETES – GOOGLE KUBERNETES ENGINE (GKE)

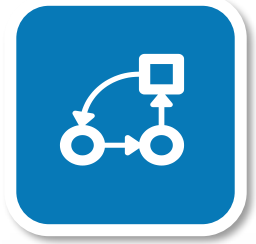
Possibilita a criação de clusters com poucos cliques.

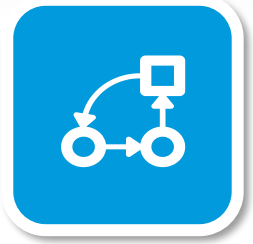




Plano de controle pronto. Garantia de alta disponibilidade.

Canais de lançamento, reparos automáticos e upgrade automático.

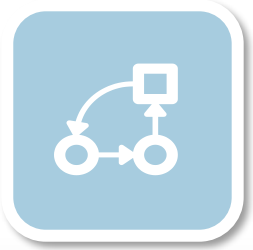


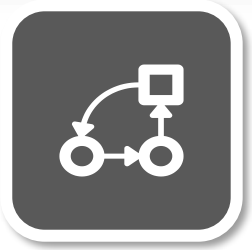


Seguro por padrão (verificação de vulnerabilidades e criptografia de dados). Monitoramento completo.

KUBERNETES – AMAZON FOR KUBERNETES (EKS)

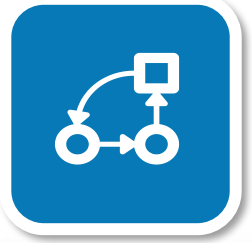
Experiência limitada em relação ao GKE.

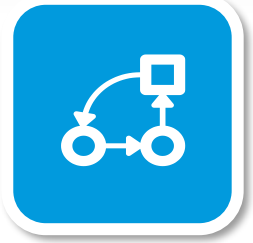




Esforços adicionais para configuração do serviço.

Cobrança pelos nós mestres e também pelo restante da infraestrutura.

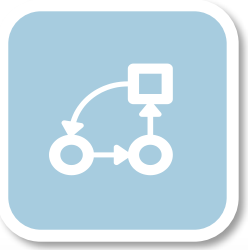


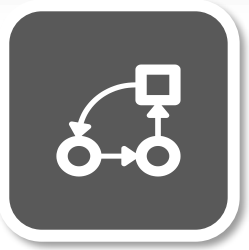


Geralmente mais caro que o serviço similar da Google e da Microsoft.

KUBERNETES – SERVIÇO DE KUBERNETES DO AZURE (AKS)

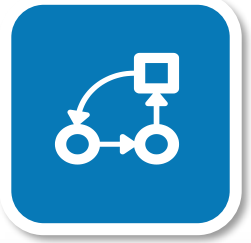
Provisionamento elástico, sem a necessidade de gerenciar a infraestrutura.

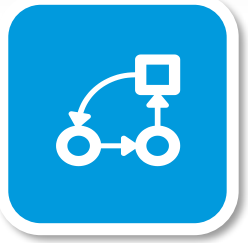




Monitramento visual e CLI.

Segurança aprimorada com o Azure Active Directory.

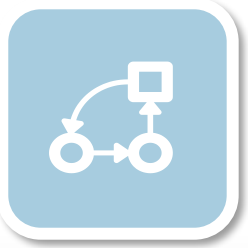


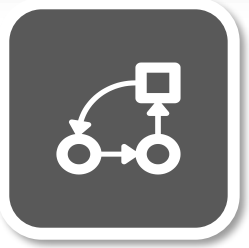


Ferramental para os desenvolvedores.

KUBERNETES – OPENSHIFT

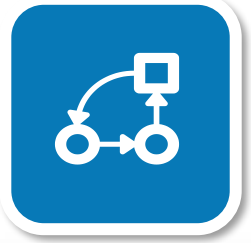
Serviços de gerenciamento Kubernetes, entregue na modalidade PaaS.

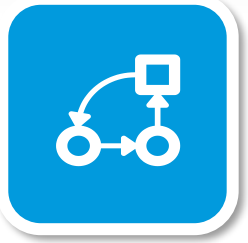




Features de ALM.

Suite de testes.

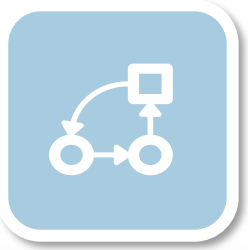


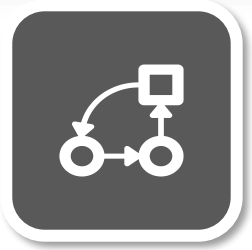


Funciona em ambientes heterogêneos : Nuvem pública, privada, máquinas virtuais, etc.

KUBERNETES – IBM CLOUD KUBERNETES SERVICE

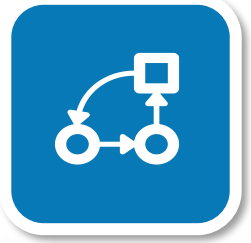
Simples e organizado. Ideal para construção de clusters mais simples.





Manutenção do cluster por CLI e interface gráfica.

Interessante apenas se a organização já estiver na cloud da IBM.

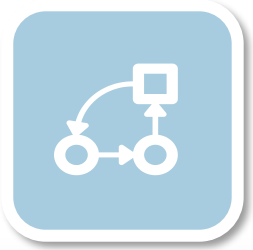


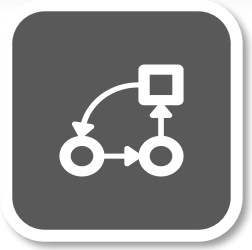
KUBERNETES

SOLUÇÕES TURNKEY

KUBERNETES – STACKPOINT

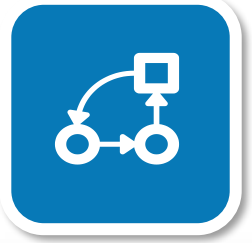
Poucos cliques para implantar um cluster Kubernetes em uma nuvem pública.

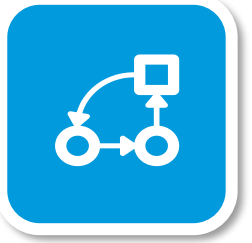




Suporte a grandes marcas: AWS, Google, Microsoft, etc.

Portal web de gerenciamento.

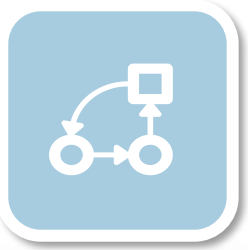


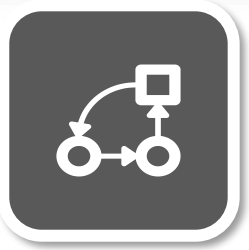


Planos a partir de 50 dólares por mês.

KUBERNETES – CONTAINERSHIP KUBERNETES ENGINE (CKE)

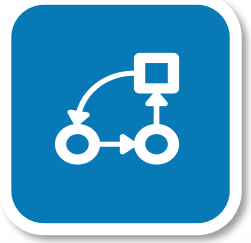
Suporte a nuvens públicas e privadas e ambientes on-premisse.

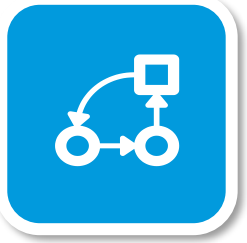




Configurações padrões e recomendadas para o plano de controle.

Flexível, pois, suporta a customização do cluster.





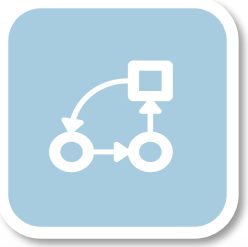
Provisionamento de um novo cluster através de poucos cliques.

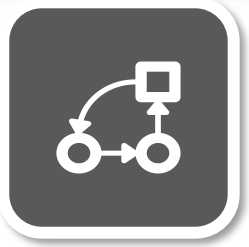
KUBERNETES

INSTALADORES

KUBERNETES – INSTALADORES - KOPS

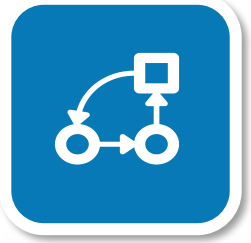
Ferramenta para provisionamento automático de clusters Kubernetes.

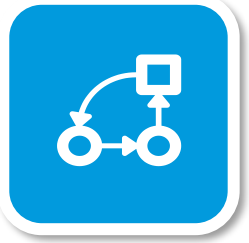




Suporte para AWS e GC.

Suporte a construção de clusters para alta disponibilidade.

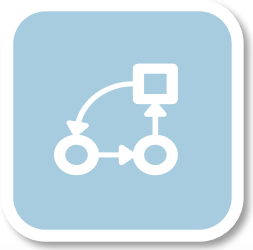


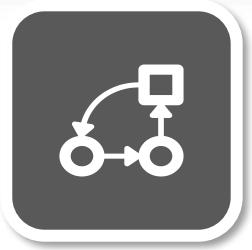


Ferramenta madura e sofisticada. Faz parte do projeto Kubernetes.

KUBERNETES – INSTALADRES - KUBESPRAY

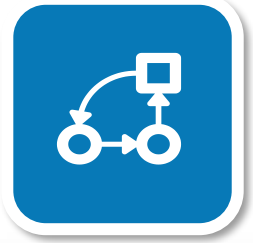
O projeto faz parte da família Kubernetes.

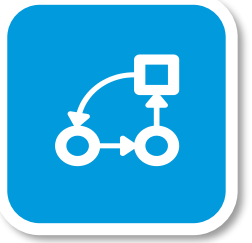




Suporte a servidores on-premisse.

Suporte e serviços de nuvem.

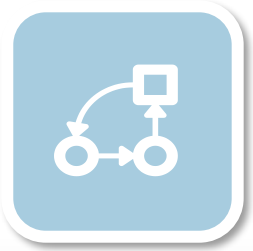


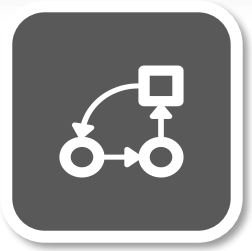


Configura clusters de alta disponibilidade.

KUBERNETES – INSTALADORES – TK8

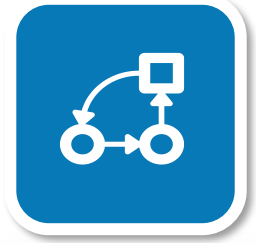
Ferramenta de linha de comando. Faz uso do Terraform e Kubespray.





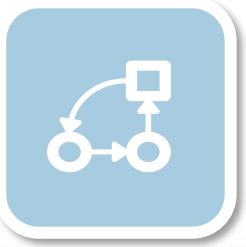
Suporte para AWS, Azure e GC.

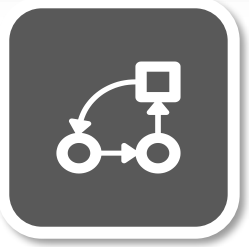
Instala plugins opcionais para manutenção do ALM.



KUBERNETES – INSTALADORES - KUBEADM

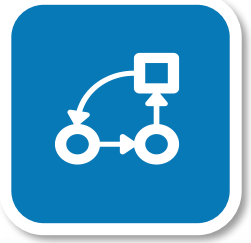
Ferramenta integrada a distribuição do Kubernetes.

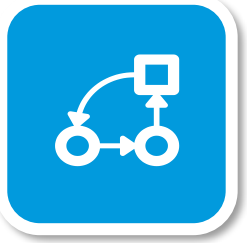




Suporte a instalação, a fim de, garantir que as melhores práticas sejam adotadas.

Não faz o provisionamento da infraestrutura do cluster.





Conformidade com o Kubernetes Conformance Test.

KUBERNETES

PRINCIPAIS COMANDOS

KUBERNETES – PRINCIPAIS COMANDOS – CREATE DEPLOYMENT

```
c:> kubectl create deployment [nome] --image [imagem docker]
```

--image nome da imagem a ser executada

Cria um deployment e consequentemente instância o pod relacionado.

KUBERNETES – PRINCIPAIS COMANDOS – LOGS

```
c:> kubectl logs [nome do pod]
```

Exibe o log de uma instanciação.

KUBERNETES – PRINCIPAIS COMANDOS – PORT FORWARD

```
c:> kubectl port-forward type/name 0000:9999
```

type deploy, pod, service, etc.
0000 porta do host
9999 porta exposta no container

Realiza o encaminhamento de portas, entre o host e o container.

KUBERNETES – PRINCIPAIS COMANDOS – GET NODES

```
c:> kubectl get nodes
```

Exibe a lista de nós vinculados ao cluster Kubernetes.

KUBERNETES – PRINCIPAIS COMANDOS – GET DEPLOYMENTS

```
c:> kubectl get deployments
c:> kubectl get deployment [nome do deployment] --output yaml
```

Lista os deployments ativos no namespace corrente.

KUBERNETES – PRINCIPAIS COMANDOS – DESCRIBE

```
c:> kubectl describe [tipo do recurso]/[nome do recurso]
```

Exibe os detalhes de um recurso específico do Kubernetes.

KUBERNETES – PRINCIPAIS COMANDOS – GET PODS

```
c:> kubectl get pods
c:> kubectl get pods --selector app=[nome do deployment]
```

Obtém os pods instânciados para determinado deployment.

KUBERNETES – PRINCIPAIS COMANDOS – DELETE PODS

```
c:> kubectl delete pods --selector app=[nome do deployment]
c:> kubectl delete all --selector app=[nome do deployment]
```

all remove o deployment e as réplicas.

Desativa os pods do deployment.

KUBERNETES – PRINCIPAIS COMANDOS – DELETE DEPLOYMENT

```
c:> kubectl delete deployment [nome do deployment]
```

Remove o deployment parametrizado.

KUBERNETES – PRINCIPAIS COMANDOS – SET IMAGE

```
c:> kubectl set image [tipo do serviço]/[nome do serviço] [nome do contêiner]=[nome da imagem]
```

Atualiza a imagem de contêiner de um deployment.

KUBERNETES – PRINCIPAIS COMANDOS – APPLY

```
c:> kubectl apply -f [arquivo yaml]
```

Aplica a configuração de um recurso a partir de um arquivo *.yaml.

KUBERNETES – PRINCIPAIS COMANDOS – PATCH

```
c:> kubectl patch deployment [nome do deploy] --patch $(Get-Content [yaml file name] -Raw)
c:> kubectl patch deployment [nome do deploy] --patch "$(cat [yaml file name])"
```

Atualização parcial de um objeto Kubernetes.

KUBERNETES

LABORATÓRIO 12

KUBERNETES

LABORATÓRIO 13