Extending Deployment for Internet Financial Mission-Critical Scenarios

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A Brief Review

ReplicationController
- replication
- rolling update

Deployment and ReplicaSet
- replication
- rolling update
- version control
A Brief Review

- What is missed in deployment strategy?
A Brief Review

- What is missed pod scheduling strategy?
• IP Address Restriction

is incoming IP address in whitelist?

GatewayService

yes

Accept

no

Reject
A Brief Review

- **ReplicationController**
  - replication
  - rolling update

- **Deployment and ReplicaSet**
  - replication
  - rolling update
  - version control

- **CafeDeployment**
• In-Place upgrade
  • Stable Pod Ips

• High availability in financial scenarios
  • Active-Active replication
  • Graceful shutdown of Pods

• Safe and flexible deployment strategy
  • Canary deployment
  • Rolling upgrade in batches
InPlaceSet provides in-place upgrade values of following fields change:

- Image
- Command
- Env
- Liveness and Readiness Probe
- ...

kind: CafeDeployment
spec:
  podSetType: InPlaceSet
  replicas: 6
  matchLabels:
    app: demo
  ...
  template:
  ...
topology:
  unitType: DataCenter
  values:
    - DCA
    - DCB

kind: InPlaceSet
spec:
  minReadySeconds: 30
  replicas: 3
  selector:
    matchLabels:
      app: demo
deployUnit: DCA
  template:
  ...

CafeDeployment

InPlaceSet

Pod
Pod
Pod
kind: CafeDeployment
spec:
  podSetType: InPlaceSet
  replicas: 6
  matchLabels:
    instance: productpage
    name: bookinfo
  ...template:
    ...topology:
      unitType: DataCenter
      values:
      - DCA
      - DCB
Deployment Strategy

kind: CafeDeployment
spec:
  podSetType: InPlaceSet
  replicas: 10
  strategy:
    upgradeType: Beta
    batchSize: 4
    needWaitingForConfirm: true

InPlaceSetController

CafeDeploymentController

Replica/Partition Allocator

InPlaceSet A
- Pod A-1
- Pod A-2
- Pod A-3
- Pod A-4
- Pod A-5

InPlaceSet B
- Pod B-1
- Pod B-2
- Pod B-3
- Pod B-4
- Pod B-5

Beta Group

1st Group

2nd Group

Abort
Reschedule

- Enable auto-rescheduling Pod to another InPlaceSet when out of node resources in one deploy unit.

kind: CafeDeployment
spec:
  podSetType: InPlaceSet
  replicas: 10
  topology:
    unitReplicas:
      DCA: 4
      DCB: 60%
Multi Workload Adapted

CafeDeployment → CafeDeployment Controller → PodSetControl Interface

GetAllPodSets()
CreatePodSet()
UpdatePodSet()
UpdatePodSetPartition()
UpdatePodSetReplicas()

... → InPlaceSetControl → InPlaceSet → InPlaceSetController

... → ReplicaSetControl → ReplicaSet → ReplicaSetController

... → StatefulSetControl → StatefulSet → StatefulSetController
Multi Workload Adapted

kind: CafeDeployment
spec:
  podSetType: ReplicaSet
  replicas: 10
  strategy:
    upgradeType: Beta
    batchSize: 4
  needWaitingForConfirm: true

ReplicaSetController

CafeDeploymentController

Replica/Partition Allocator

RSA1
  Pod A1-1
  Pod A1-2
  Pod A1-3
  Pod A1-4
  Pod A1-5

RSA2
  Pod A2-1
  Pod A2-2
  Pod A2-3
  Pod A2-4

RS B1
  Pod B1-1
  Pod B1-2
  Pod B1-3
  Pod B1-4
  Pod B1-5

RS B2
  Pod B2-1
  Pod B2-2
  Pod B2-3
  Pod B2-4
  Pod B2-5

Beta Group

1st Group

2nd Group
Graceful Shutdown

- Strict readiness management during upgrade
- Third-party controller cooperation
Now it’s DEMO time!
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