



## How-to for Apache Ignite Deployments in Kubernetes

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## **Apache Ignite In-Memory Computing Platform**



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# Apache Ignite as a Cache or as a Database







## **Apache Ignite Data Storage Modes**



Mode	Description	Major Advantage
In-Memory	100% data in the In-Memory Store (only)	Maximum performance possible (data is never written to disk)
In-Memory + 3 <sup>rd</sup> Party DB	Data in the In-Memory Data Store as a caching layer (aka. in-memory data grid) 3 <sup>rd</sup> Party DB (RDBMS, NoSQL, etc) used for persistence	Horizontal scalability Faster reads and writes
In-Memory + Persistent Store	The whole data set is stored both in memory and on disk	Survives cluster failures
100% on Disk + In-Memory Cache	100% of data is in GridGain Persistent Store and a subset is in memory	Unlimited data scale beyond RAM capacity



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#### **Stateless Deployments**

- Use **Deployment** controller
- <u>https://kubernetes.io/docs/concepts/workloads/controllers/deployment/</u>

```
apiVersion: apps/v1
kind: Deployment
Metadata:
   name: ignite-cluster
   namespace: ignite
spec:
```



. . .

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## **Stateful Deployments**



- Use StatefulSet controller
- <u>https://kubernetes.io/docs/concepts/workloads/controllers/statefulset/</u>

```
apiVersion: apps/v1
kind: StatefulSet
Metadata:
   name: ignite-cluster
   namespace: ignite
spec:
```



. . .

## **Cluster Automatic Discovery**

- Kubernetes Lookup Service
  - Tracks a list of all Ignite pods
  - Gateway for remote apps
- Kubernetes IP Finder
  - Consumes IPs from the service
  - Let's node to join the cluster





#### **Cluster Automatic Discovery**

- <bean class="org.apache.ignite.configuration.lgniteConfiguration">
- <property name="discoverySpi">
- <bean class="org.apache.ignite.spi.discovery.tcp.TcpDiscoverySpi">
- <property name="ipFinder">
- <bean class="
- org.apache.ignite.spi.discovery.tcp.ipfinder.kubernetes.TcpDiscoveryKubernetesIpFinder">
- <property name="namespace" value="ignite"/>
- <property name="serviceName" value="ignite-service"/>
- </bean>
- </property>
- </bean>
- </property>
- </bean>



# **Thick Clients and Thin Clients**

- Thick Client (a.k.a. Client Node)
  - Fully fledged member of the topology
  - Full API
  - Requires connectivity with every server node
- Thin Client
  - Uses lightweight binary protocol
  - Limited API
  - Requires connectivity with only one server node
  - Bonus: JDBC, ODBC



## **Applications and Server Nodes in Kubernetes**



## **Applications Only in Kubernetes**





## Server Nodes Only in Kubernetes



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## **Management and Monitoring**

- Kubernetes Dashboard
  - For Kubernetes environment
- Ignite Web Console
  - For Ignite cluster
  - Deploy Web Agent in K8





## **Demo: Deploying Apache Ignite Cluster in Kubernetes**



#### **Questions?**



#### • Documentation:

- https://www.gridgain.com/docs/latest/installation-guide/kubernetes/amazon-eks-deployment
- <u>https://www.gridgain.com/docs/latest/installation-guide/kubernetes/openshift-deployment</u>
- <u>https://www.gridgain.com/docs/latest/installation-guide/kubernetes/azure-deployment</u>
- <u>https://www.gridgain.com/docs/web-console/latest/deploying-amazon-eks</u>
- https://www.gridgain.com/docs/web-console/latest/deploying-web-console-openshift
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