Debugging

Useful commands

- Quick overview of everything on a cluster

  ```
  kubectl get all
  ```

  ```
  kubectl describe all
  ```

- Object state and events

  ```
  kubectl describe <object> <object-name>
  ```

Common pod errors

- `CrashLoopBackOff` : the pod runs a container that immediately exits.
- `ErrImagePull` : non-existing image.
    - In case of a rollout, you see it as "Pending" in the rollout status. If that "Pending" status is holding for long, look at the pods.

Common service errors

- Default service type is `ClusterIP` which will only expose the service inside of the cluster.
- Shell into a pod in the cluster via `kubectl exec --it <pod> sh` and curl into the affected pod.
    - `kubectl get pods -o wide` gives you IPs of all pods in the cluster.

Best practices

Be declarative

- There is support for imperative commands (`kubectl create`) but abusing them is an antipattern.
- Use instead YAML files, filling up some templates: `kubectl get <obj>/${MY-OBJ} -o yaml --dry-run > object.yaml`
- `kubectl apply -f` works with URLs too.
- You can combine multiple YAML files with `---` .
- Remember `kubectl edit OBJ` .

Be declarative (cont.)

- Use `--record` with `apply`
  - `kubectl apply -f auth.yaml --record`
  - `kubectl rollout history deploy auth`

Pods

- One pod = one container (except for sidecars).
- Run one process per container
  - if you have 20 processes, how does K8s know if the container failed?
- Don't use `latest` or no tag.

Availability

- Configure liveness and readiness probes.
- Provision at least 3 master nodes
  - `etcd` requires a majority to form a quorum and keep functioning.
- Distribute master and worker nodes across zones to prevent outages.
- Pods should be part of a deployment!
  - Naked pods are *not* rescheduled in case of node failure/shutdown.

Resource Management

- Set up resource requests and limits.
- Use namespaces (but wisely).
- Configure resource quotas in namespaces to ensure that all resources get request and limit values.

Use labels for all objects

Key	Description	Example
name	Application name	mysql
instance	Unique id	wordpress-abcd
version	Current version	5.7.2
component	Component within architecture	database
part-of	Parent application	wordpress
managed-by	Tool that manages its operation	helm

Mapping external services

- Create a service without pod selectors and an `Endpoint` object with the external IP.
- This avoids hard-coding the IP into the application and makes updates easier.

Wrap-up

- Kubernetes has lots of moving parts, and is moving quickly!
- It forces us to think in a different way about infrastructure.
- In exchange, lots of automation.

Thank you for your attention!