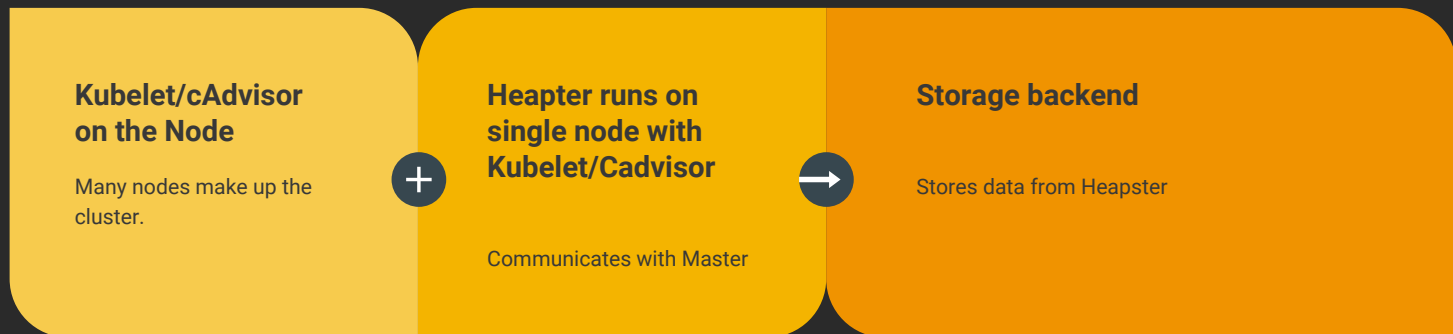# Monitoring

- Knowledge is power -- Monitoring is essential for a production system!

- Must monitor nodes, containers, pods, services, and the entire cluster.

- Provide end-users resource usage information.

Monitoring

Heapster -- Cluster-wide aggregator of monitoring and event data.

Kubelet/cAdvisor on the Node

Many nodes make up the cluster.

+

Heapter runs on single node with Kubelet/Cadvisor

Communicates with Master

→

Storage backend

Stores data from Heapster

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Monitoring

- **cAdvisor is an open source container resource usage and performance analysis agent.**

    - Auto-discovers all containers on a node and collects CPU, memory, file system, and network usage statistics.

    - Provides the overall machine usage by analyzing the 'root' container on the machine.

    - Exposes a simple UI for local containers on port 4194.

Monitoring

- The Kubelet acts as a bridge between the Kubernetes master and the nodes.

- Manages the pods and containers running on a node.

- Translates each pod into the containers making it up.

- Obtains usage statistics from cAdvisor.

- Exposes the aggregated pod resource usage statistics via a REST API.

Monitoring

- Grafana with InfluxDB.

- Heapster is setup to use this storage backend by default on most Kubernetes clusters.

- InfluxDB and Grafana run in Pods.

- The pod exposes itself as a Kubernetes service which is how Heapster then discovers it.

- The Grafana container serves Grafana's UI which provides a dashboard.

- The default dashboard for Kubernetes contains an example dashboard that monitors resource usage of the cluster and the pods inside of it. This dashboard can, of course, be fully customized and expanded.

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Monitoring

- Google Cloud Monitoring is a hosted monitoring service that allows you to visualize and alert important metrics in your application.

- Heapster can be set up to automatically push all collected metrics to Google Cloud Monitoring.

- These metrics are then available in the Cloud Monitoring Console.

- This storage backend is the easiest to setup and maintain.

- The monitoring console allows you to easily create and customize dashboards using the exported data.

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