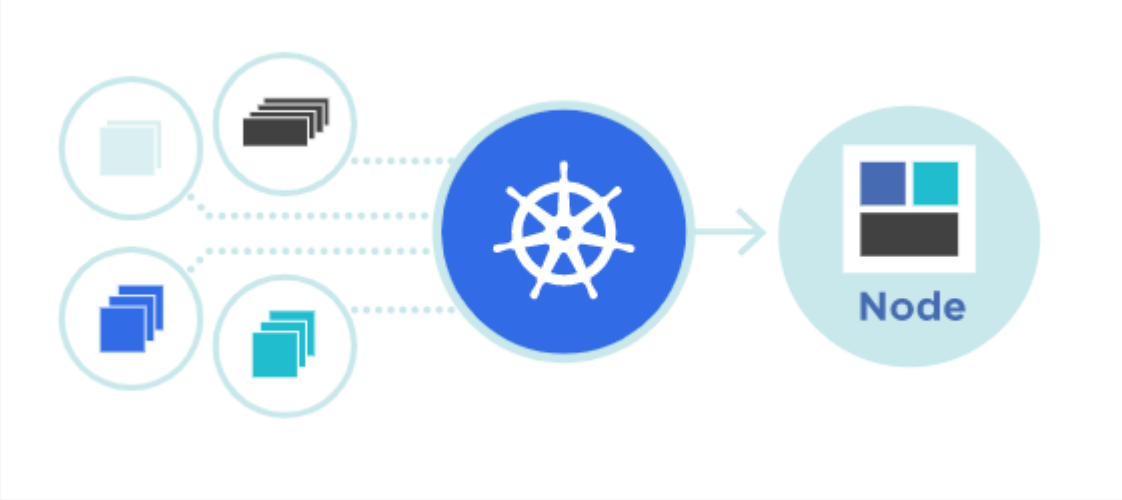
Integrating Docker and Kubernetes to run Web Applications

Containerization of Web App platforms for scalability and health checks

Need for Microservice in Modern Infrastructure

In todays Modern Infrastructure Platforms, Scalability should not just be a feature but should innately be a part of the design right from inception and for Web Applications it has become a necessity due to its variable user workload.

Kubernetes and Docker are Industry leaders in orchestrating this microservice solution and works effortlessly without any major configuration hassles

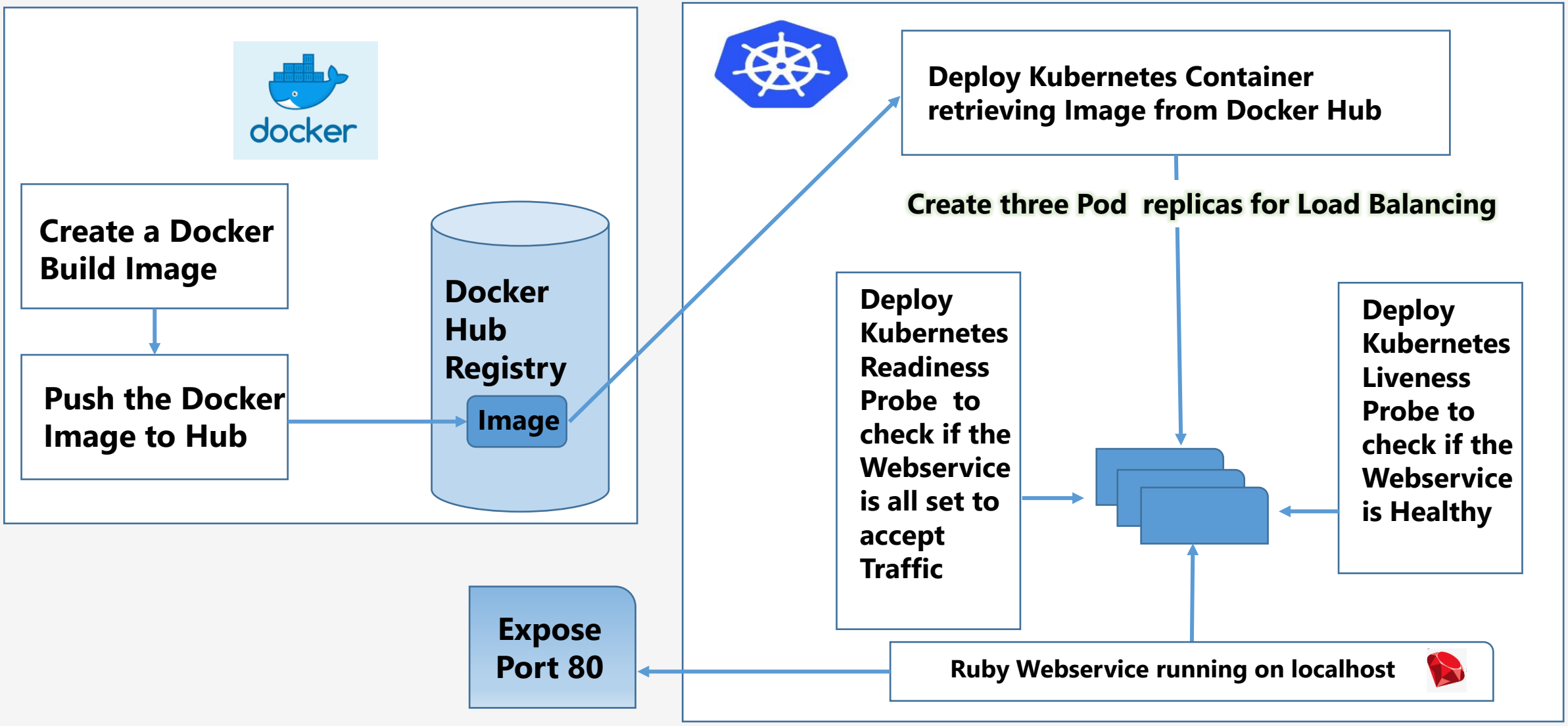


Essential Steps to Integrate Kubernetes and Docker for running your webapp

How it works:

1. Setup a Docker Image and Push it to the Docker Hub Registry
2. Setup Kubernetes or MiniKube(on workstations for testing purposes) on your Virtual Machines with minimal configurations
3. Deploy Kubernetes configuration files which retrieves the file from registry where docker has placed it
4. Deploy health check probes to check if the WebApp is alive or it is healthy to accept any requests

Design Diagram



Key Benefits of Microservice Architecture

1. **Scalability** – Kubernetes ensure scalability of the physical resources , the Kubernetes auto-scaling feature ensure your webservice stays up while it scales the underlying Pod where the Web-Service runs

2. **Simplified Packaging -** As Docker Images can be deployed across any Microservices platforms , the packaging becomes a standard ending the overhead of reengineering packaging techniques when your infrastructure moves from on-premises to Cloud or from one cloud services to other

3. **Optimized Cost** - Cost is optimized as the Pods are scaled down consuming least resources where the Workload is minimal

4. **Proactive Monitoring -** You can enable various Health probes for your Webservice ensuring that the service is at its best when serving requests

5. **Self-Healing -** In Kubernetes self-healing is built-in which restarts your containers when there is an anomaly identified

Future enhancements

1. **Expansion for Enterprise Usage** : We can enable Kubernetes Monitoring to check the health of each micro-service module like containers and generate reports to optimize the configurations for Enterprise Usage.

2. **Simplified Migration to Cloud** : This architecture works with Amazon Elastic Kubernetes Service , Azure Kubernetes or Google Kubernetes Engine ensuring minimal configuration when moved to a any Cloud Providers

3. **Easy Integration with other services** : Integrate other dependent components like Database , Storage , Analytics Platforms within the Microservice Architecture ensuring easy to setup robust ecosystem for your application