# Minikube Experiment Report

Course: Cloud Computing and Containerization  
Experiment Topic: Hello Minikube  
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Date: 9.27

## 1. Objective

1. Understand the basic architecture and core concepts of Kubernetes (Pod, Deployment, Service).  
2. Learn how to deploy and manage a Kubernetes cluster locally using Minikube.  
3. Use kubectl and Minikube CLI to deploy and expose applications.  
4. Demonstrate the full lifecycle of containerized applications from creation to access.

## 2. Environment Setup

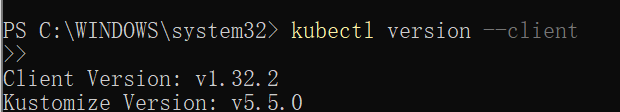
|  |  |
| --- | --- |
| Operating System | Windows 11 |
| Driver | Docker Desktop |
| Kubernetes Version | v1.34.0 |
| Minikube Version | v1.37.0 |
| Kubectl Version | v1.32.2 |
| Container Image | echoserver:1.10 (Aliyun Mirror) |

## 3. Experimental Procedure

### (1) Install and Verify Tools

Install Docker Desktop and ensure it's running (Docker Engine running). Download and move minikube.exe to System32 or set it in PATH. Verify installations:

* docker version
* kubectl version --client
* minikube version



### (2) Start Minikube Cluster

Run the following command to start the local Kubernetes cluster:

* minikube start --driver=docker

### (3) Verify Cluster Status

Check the node status:

* kubectl get nodes

### (4) Create Deployment

Deploy the application using Aliyun echoserver image:

* kubectl create deployment hello-minikube --image=registry.cn-hangzhou.aliyuncs.com/google\_containers/echoserver:1.10

### (5) Expose Service

Expose the deployment as a NodePort service:

* kubectl expose deployment hello-minikube --type=NodePort --port=8080

### (6) Check Pod Status

Verify if Pod is running:

* kubectl get pods

### (7) Access Service

Access the service via Minikube tunnel:

* minikube service hello-minikube

## 4. Results and Analysis

All components successfully deployed and verified as shown below:

|  |  |  |
| --- | --- | --- |
| Component | Status | Description |
| Docker | ✅ Working | Acts as Minikube driver |
| Minikube | ✅ Running | Kubernetes cluster initialized |
| Pod | ✅ Running | Echoserver container deployed |
| Service | ✅ Active | Accessible via NodePort |
| Browser Access | ✅ Success | Hello Minikube page displayed |

## 5. Conclusion

This experiment demonstrates the full process of deploying and accessing a containerized application on a local Kubernetes cluster using Minikube. The student successfully configured Docker and Minikube, created a deployment, exposed it via a service, and accessed it through a web browser. Common issues like ImagePullBackOff were solved by switching to a domestic mirror repository.