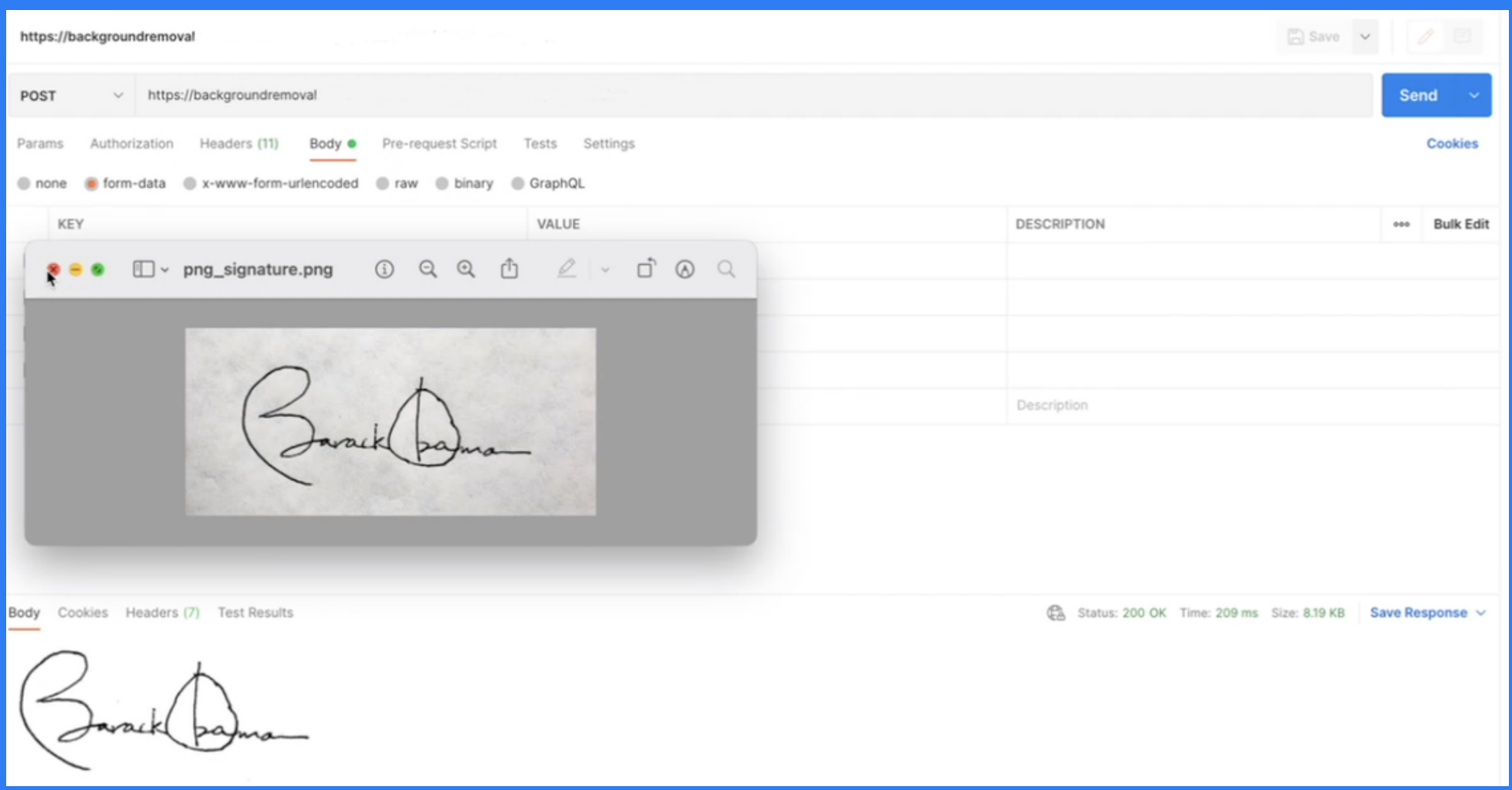
A Kubernetes and Wasm Case Study

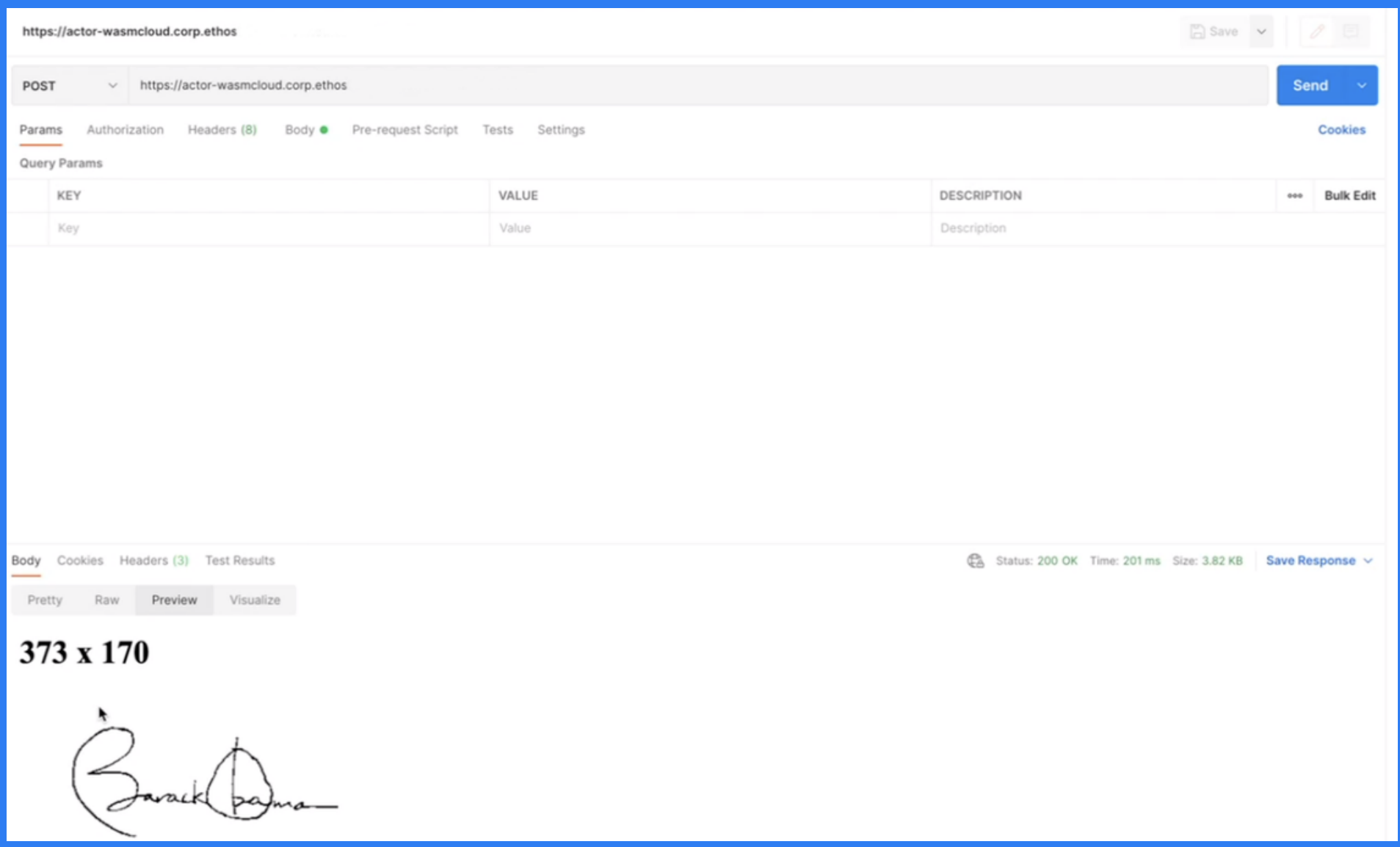
Use Case 1: Running Individual Functions in wasmCloud



CLOUD NATIVE COMPUTING FOUNDATION

Here, I take an existing function that removes the background from images, translating it into Rust, and porting it to wasmCloud.

In the previous slide, you can see **a) the original version**, and **b) compiled to Wasm and running as a wasmCloud Actor**.



Here, we can spin up an actor instantaneously to service the request, with an extremely low memory footprint versus running a service that needs a level of always-on, baseline resources.

Functions can easily be spun off to work on-device or in the cloud.

This enables extremely efficient use of cloud resources while promoting code and module reuse across a variety of compute architectures.

Use Case 2: Running wasmCloud as a Service in Kubernetes Clusters

Having seen some success in porting individual functions to run as actors wasmCloud, I wanted to see if I could take a full microservice, currently running in Kubernetes, and make it run in Wasm. **Here's the step-by-step:**

Ensure you have Helm installed, and valid credentials for a Kubernetes cluster. For me, that entails configuring kubectl to use an authenticated kubeconfig.yaml.

Normally, you can follow the single step in the documentation for installing wasmCloud via Helm.

However, I want to slightly customize this to enable the Kubernetes Applier to bootstrap application deployment. First, create a custom values.yaml:

```
wasmcloud:
  enableApplierSupport: true
  customLabels:
    wasmcloud.dev/route-to: "true"
```

Then you can deploy via helm (with your choice of RELEASE_NAME)

```
$ helm install <RELEASE_NAME> wasmcloud/wasmcloud-host -f values.yaml
```

Finally, to verify the install, you can grab the name of the deployment:

```
$ kubectl get deployments

NAME                          READY   UP-TO-DATE   AVAILABLE   AGE

wasmcloud-test-wasmcloud-host   1/1     1            1           4m32s
```

And then forward port 4000 to localhost:

```
$ kubectl port-forward deployment/wasmcloud-test-wasmcloud-host 4000

Forwarding from 127.0.0.1:4000 -> 4000

Forwarding from [::1]:4000 -> 4000

Handling connection for 4000
```

Then finally simply visit localhost:4000 in your favorite browser, and you can see the wasmCloud dashboard ready to run your first apps, all from an existing Kubernetes namespace.

In Summary:

A major advantage of WebAssembly on the backend is that it can securely enable high performance and efficiency, while still being compatible with Kubernetes.

So, in a case like this, where we have huge investments in Kubernetes operations, compliance, and automation, we can integrate WebAssembly directly into our existing infrastructure.