

# ***Kubernetes Orchestration of Containerized Antelope Real- time Systems on AWS"***

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Ambli LLC

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*Trieste, Italy AUG*



# Introduction

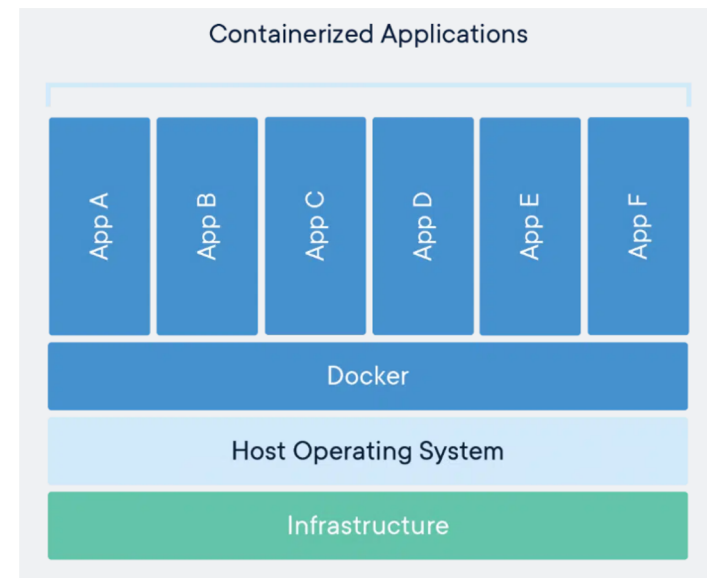
- Ambli, LLC. Contracting with BRTT
- Ported Antelope Python modules to Python 3 (part of Antelope 5.9 release)
- FDSN Webservices (Antelope 5.12)
- Containerized Antelope (Antelope 5.13)
- Antelope under Kubernetes management in hyper-scaler platforms

# Talk Structure

- Containers - quick refresher
- Kubernetes - What does it do for us?
- Evolution of Antelope packaging
- Current architecture for containerized Antelope

# Concept: Container

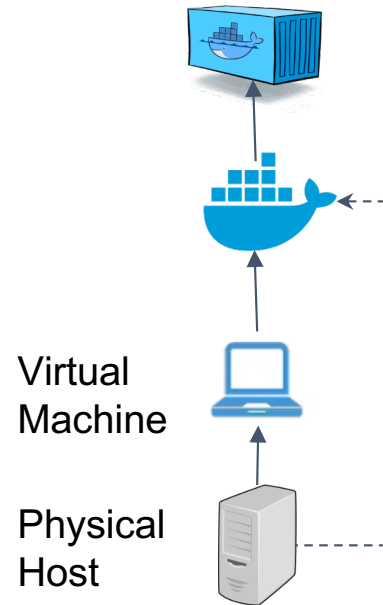
A standard unit of software that packages up code and all its dependencies so the application runs quickly and reliably from one computing environment to another.



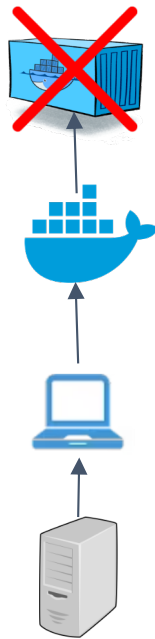
# Concept: Kubernetes

**Kubernetes automates operational tasks of container management** and includes built-in commands for deploying applications, rolling out changes to your applications, scaling your applications up and down to fit changing needs, monitoring your applications, and more—making it easier to manage applications.

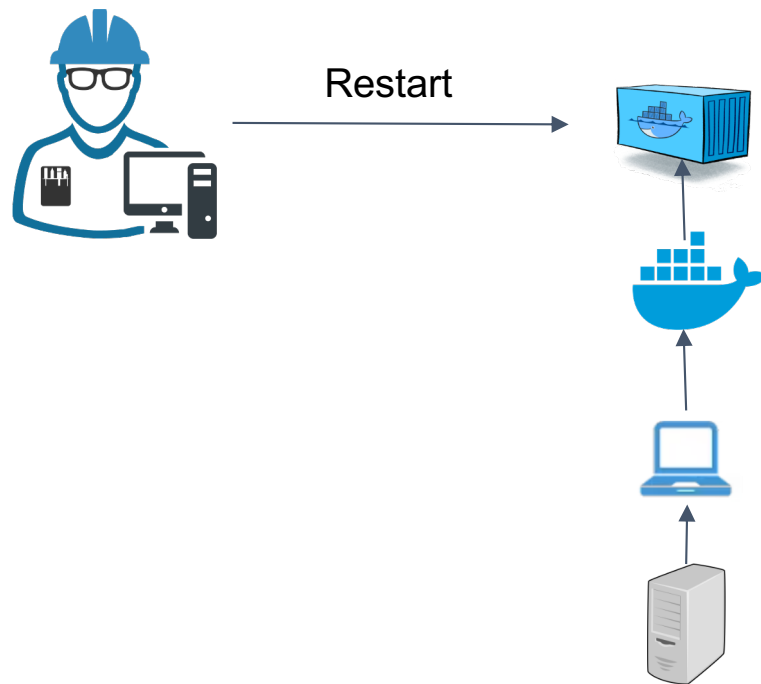
# Concept: Kubernetes



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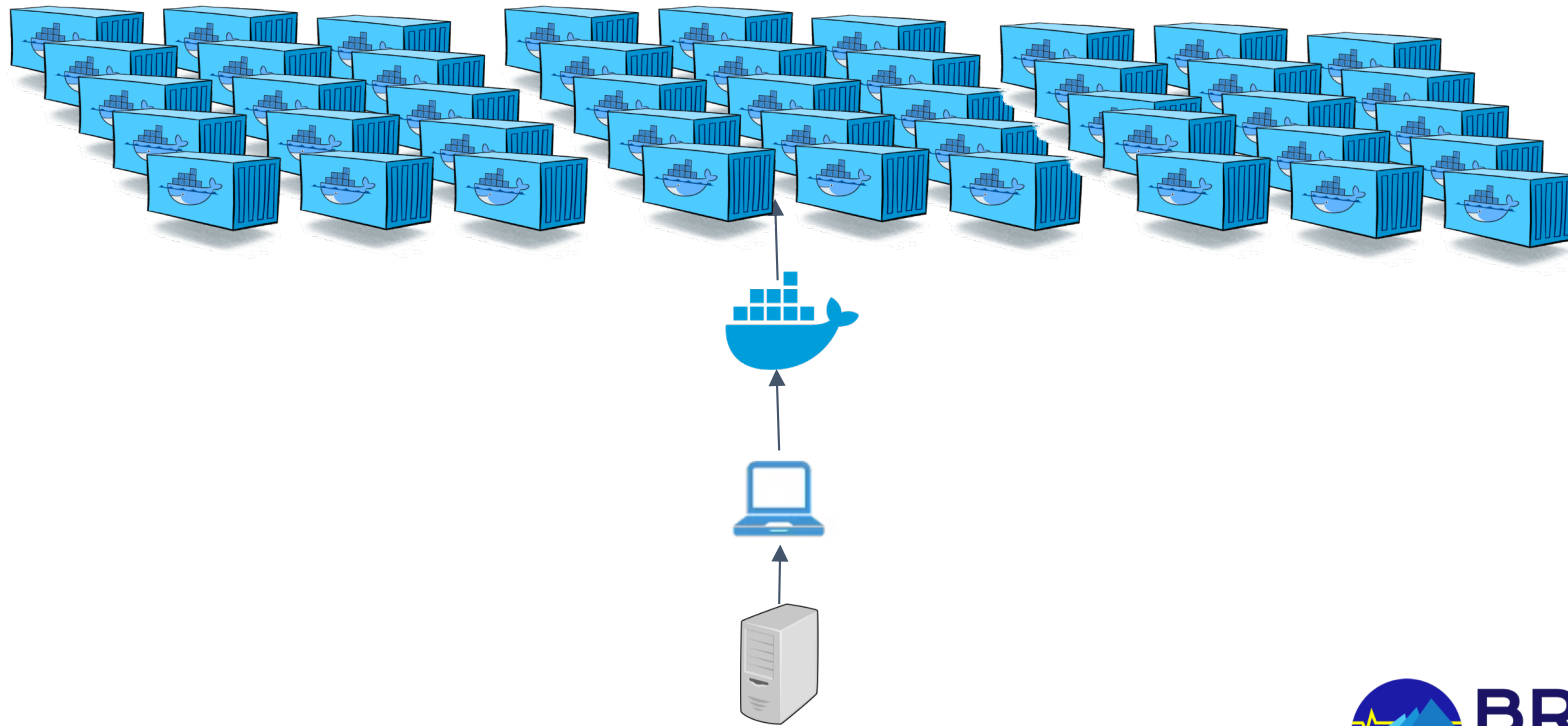


# Concept: Kubernetes

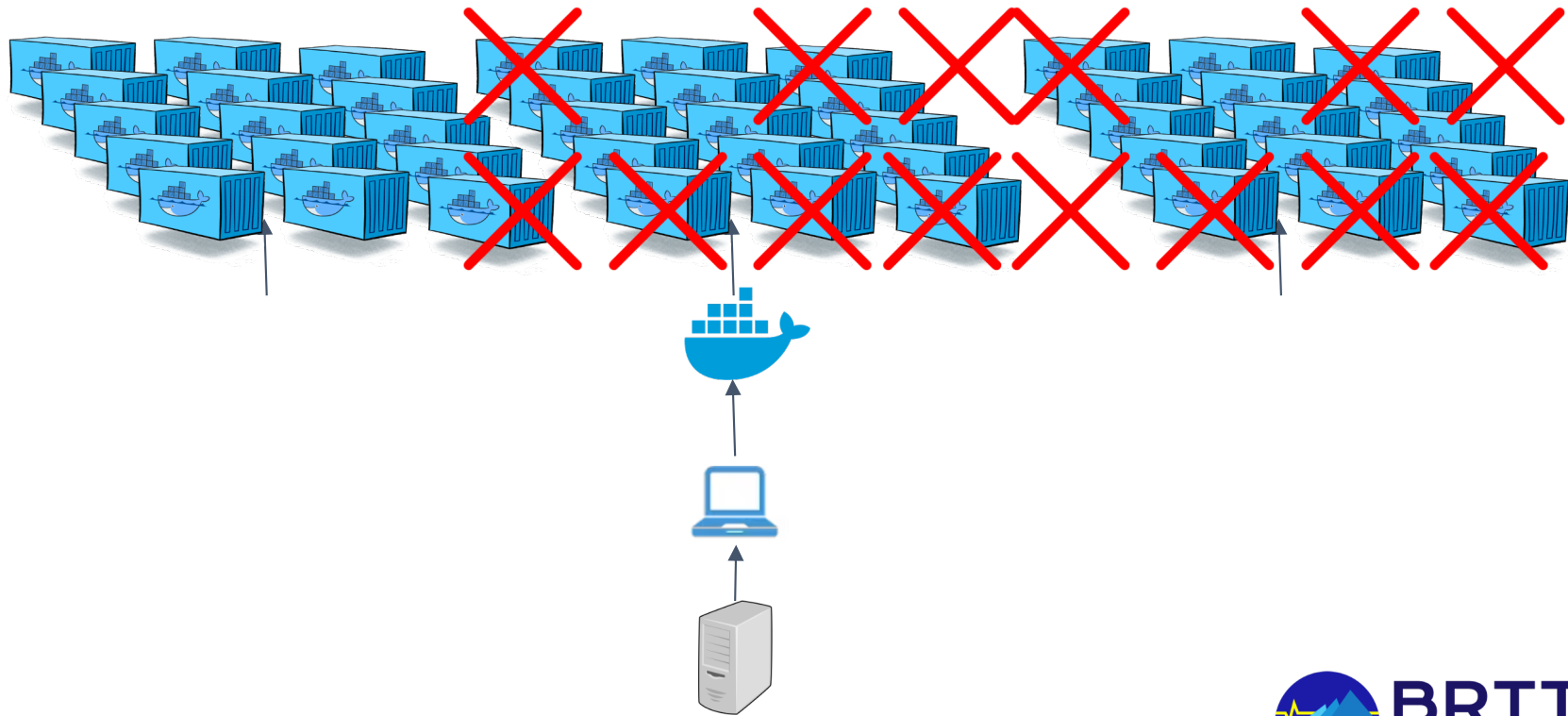




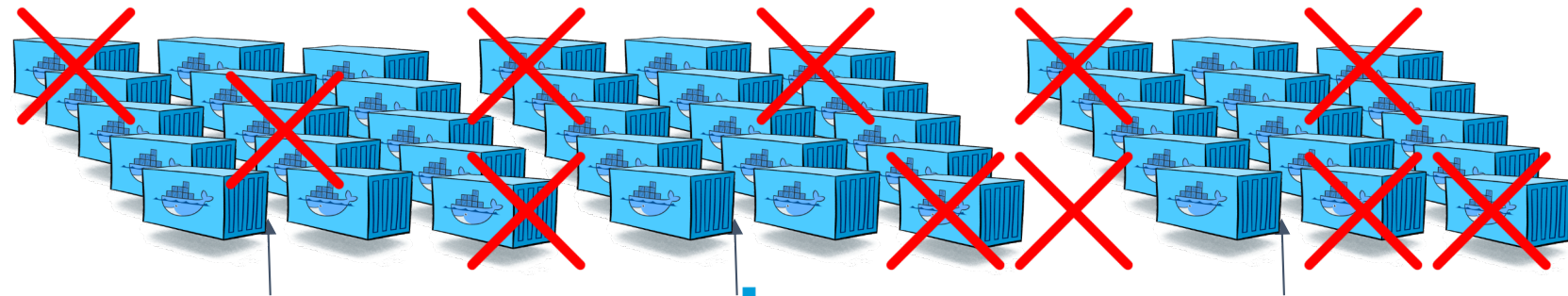
# Concept: Kubernetes



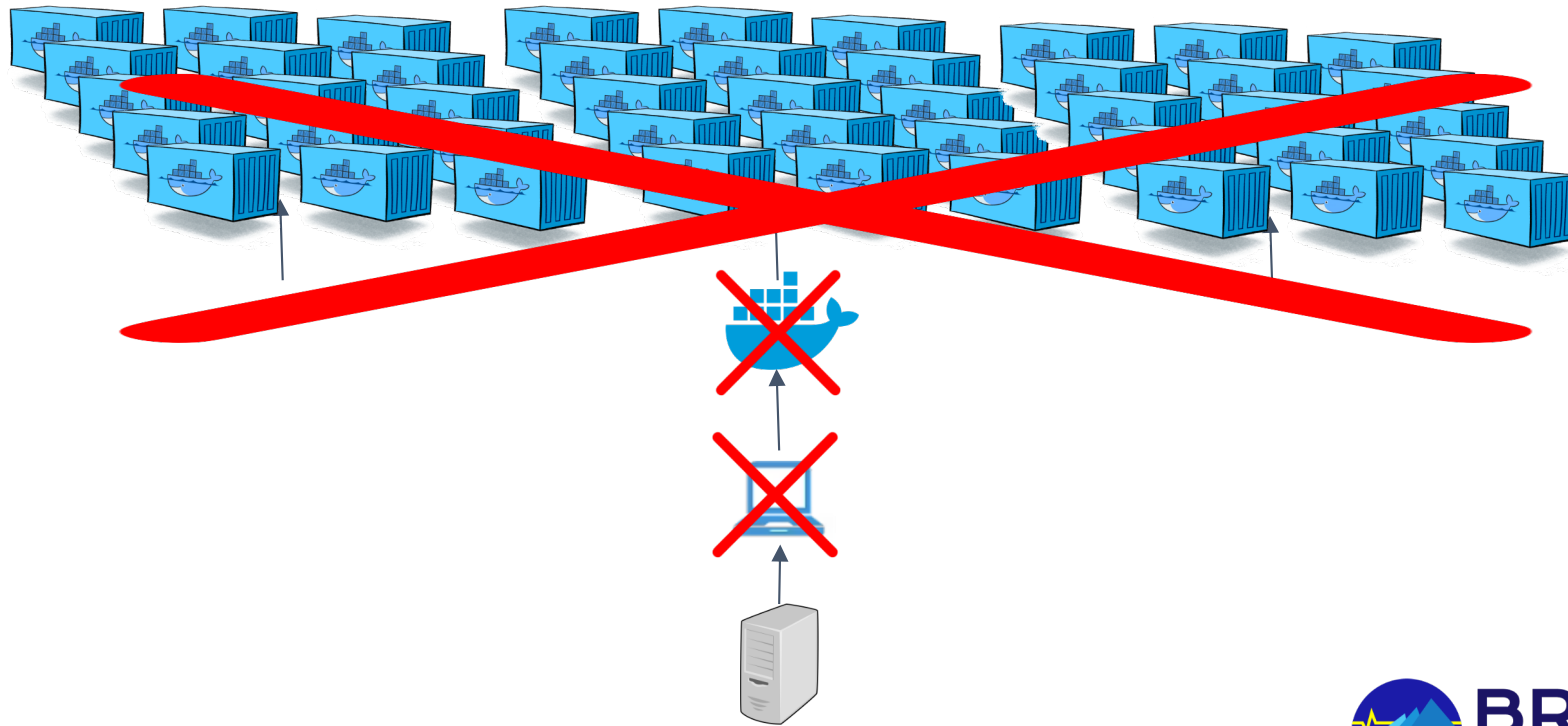
# Concept: Kubernetes



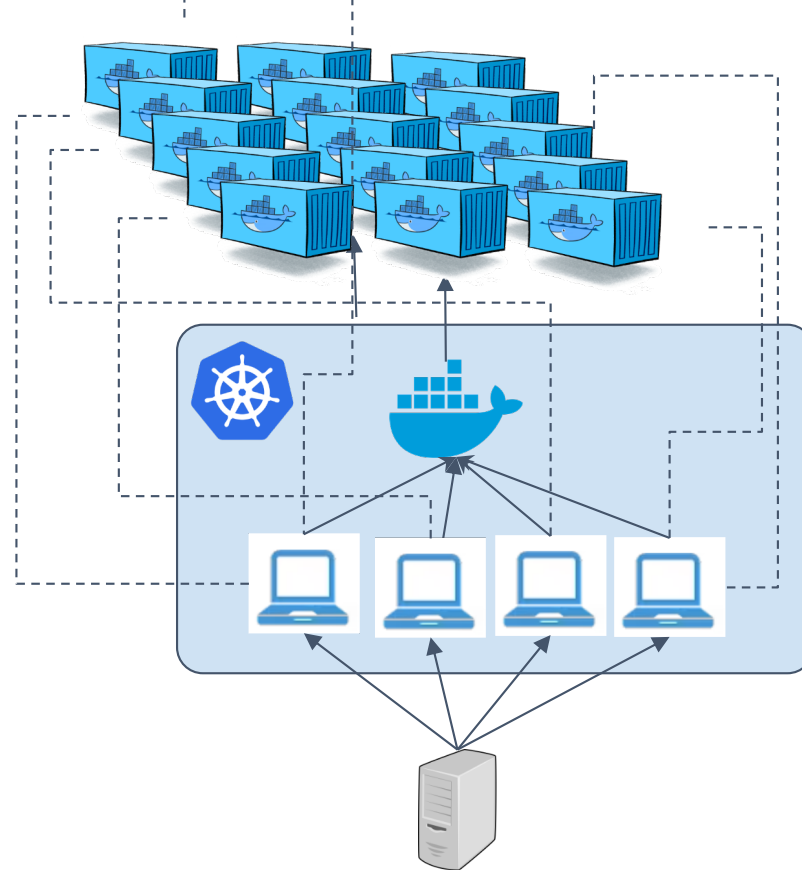
# Concept: Kubernetes



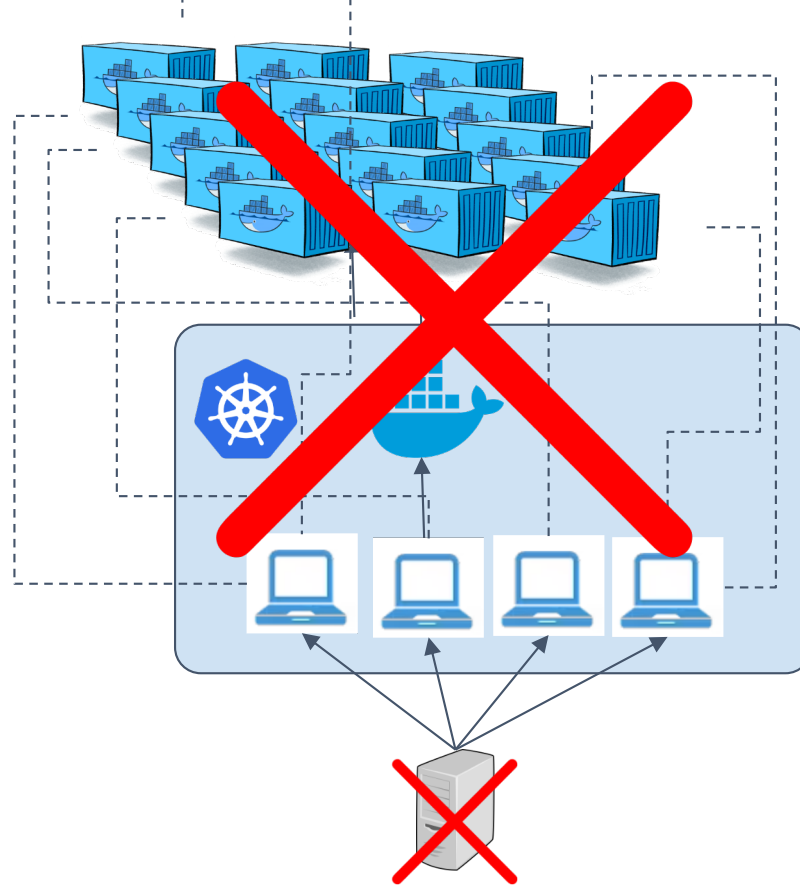
# Concept: Kubernetes



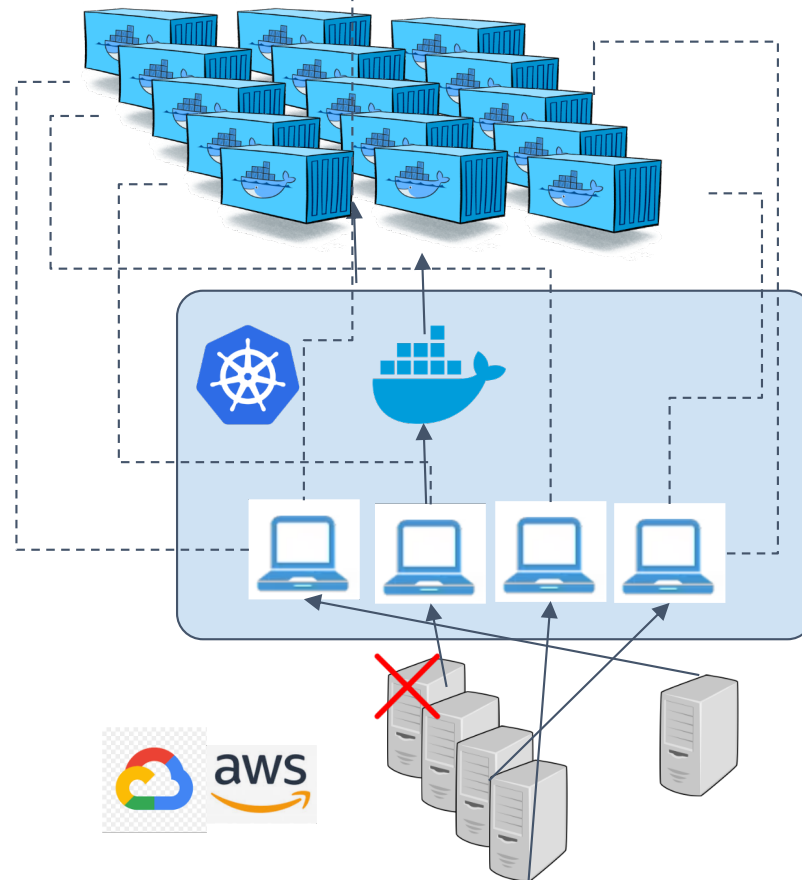
# Concept: Kubernetes



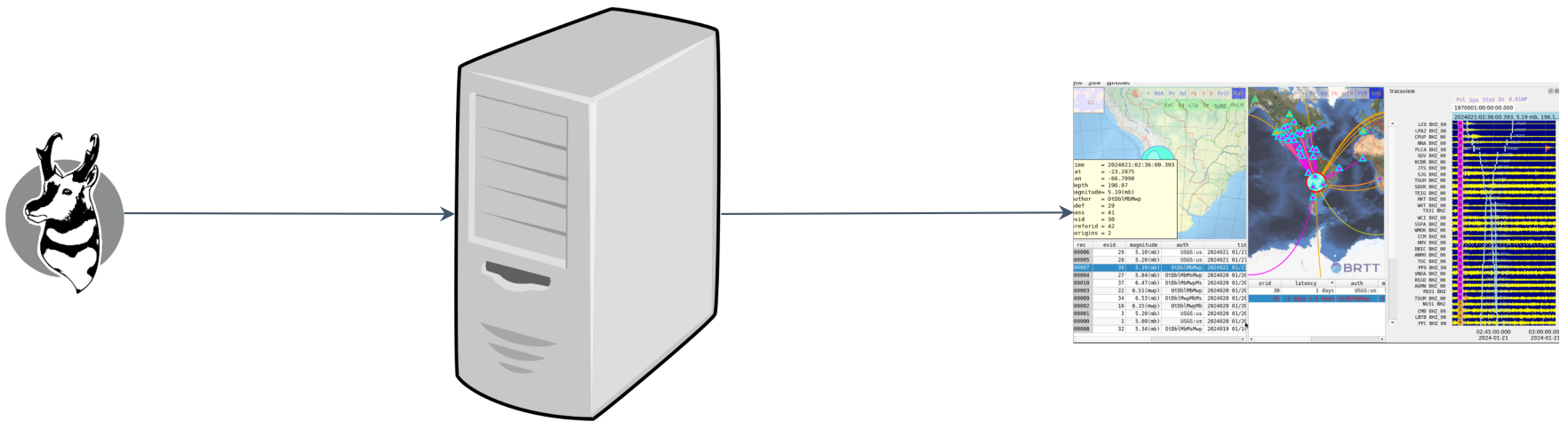
# Concept: Kubernetes



# Concept: Kubernetes in Cloud



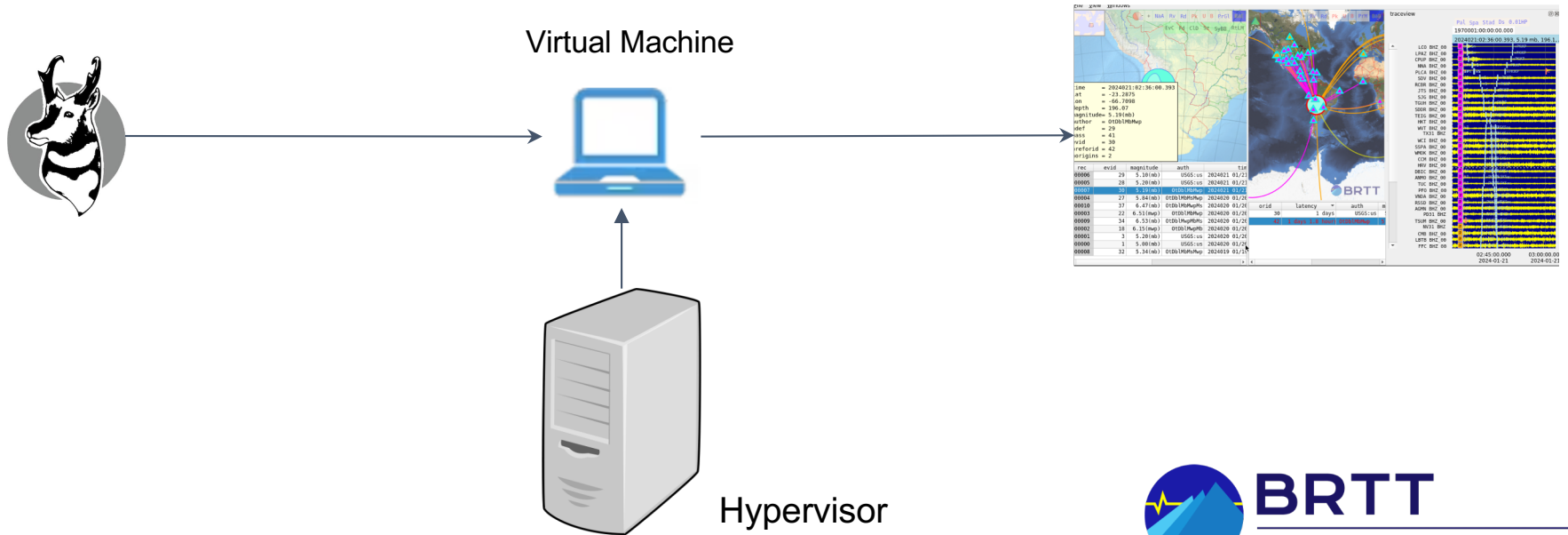
# Progression of Antelope Packaging



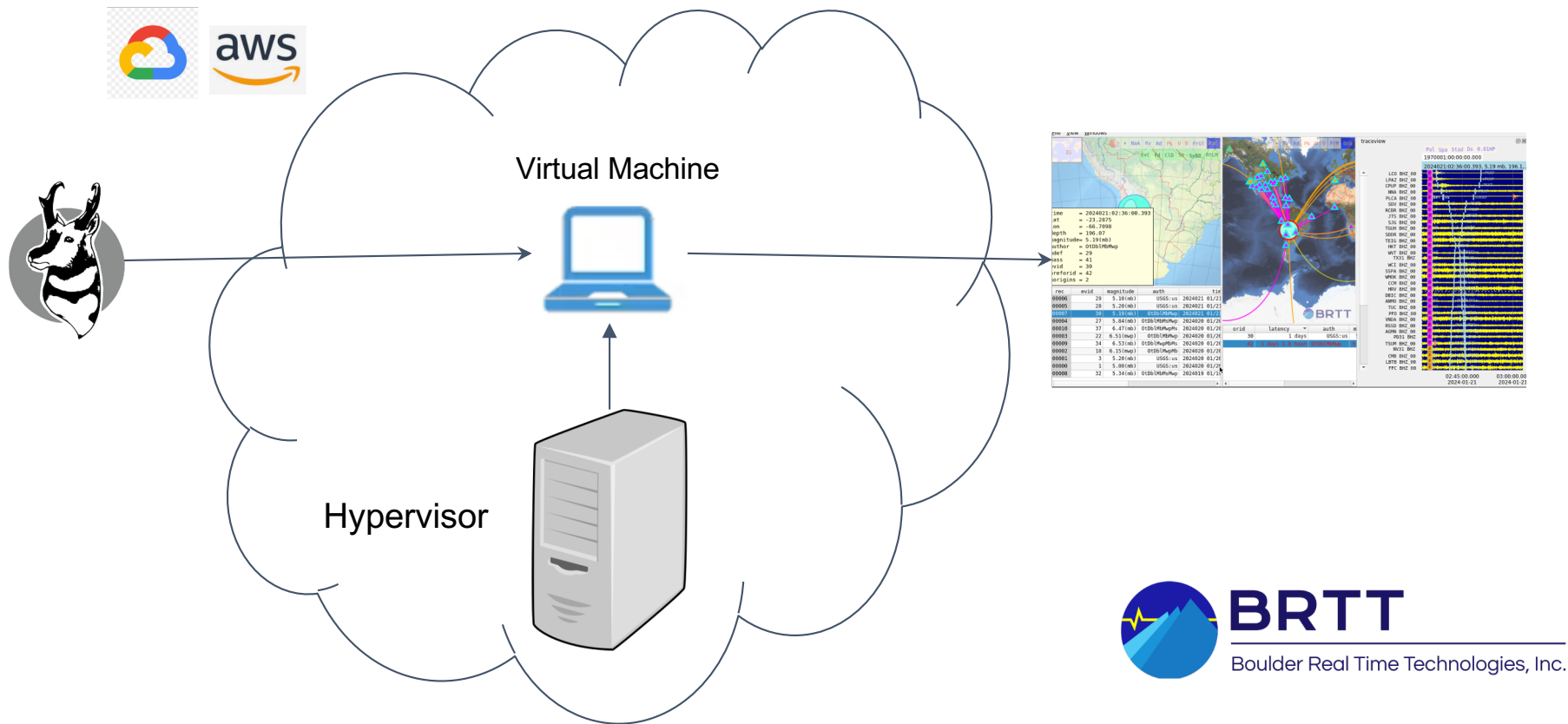
Physical host/machine



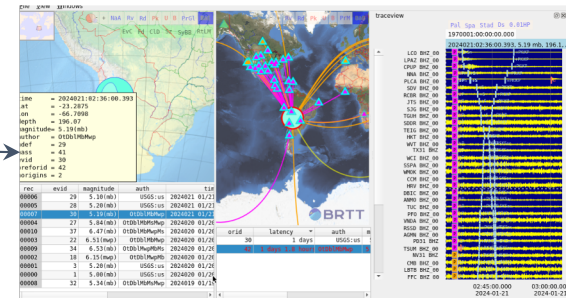
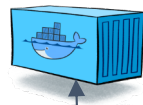
# Progression of Antelope Packaging



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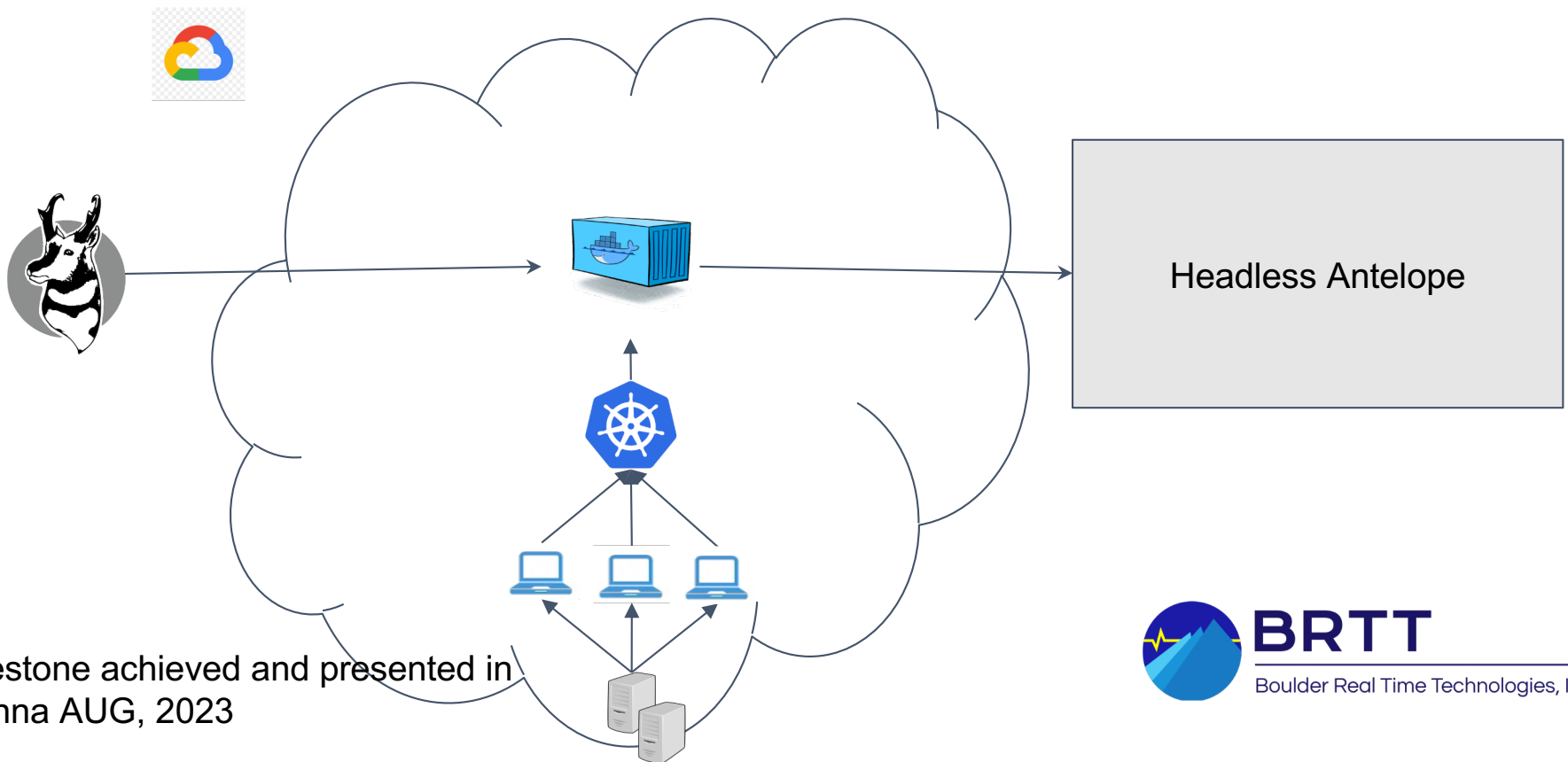
Milestone achieved and presented in Vienna AUG, 2023



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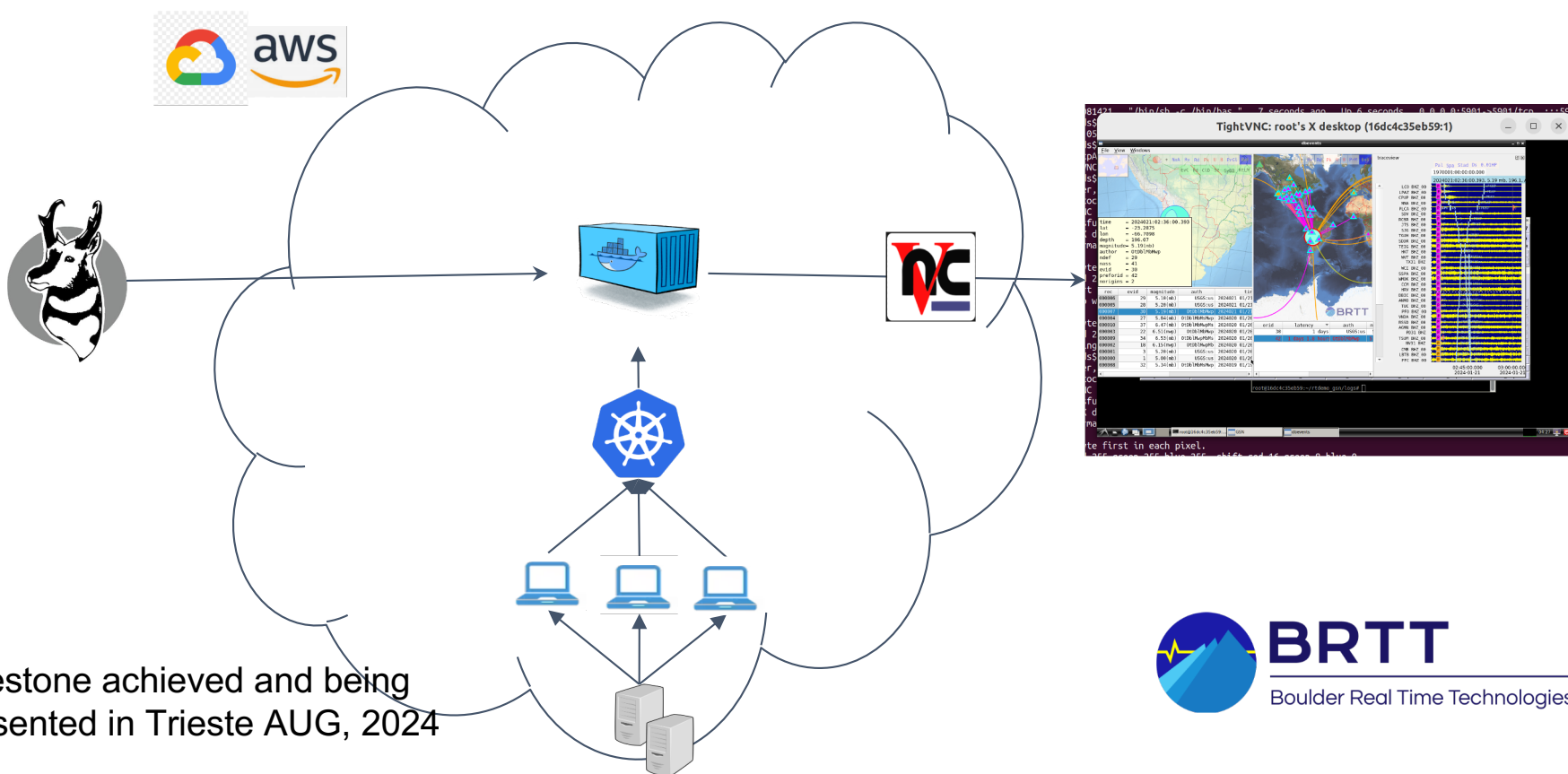
Boulder Real Time Technologies, Inc.

# Progression of Antelope Packaging



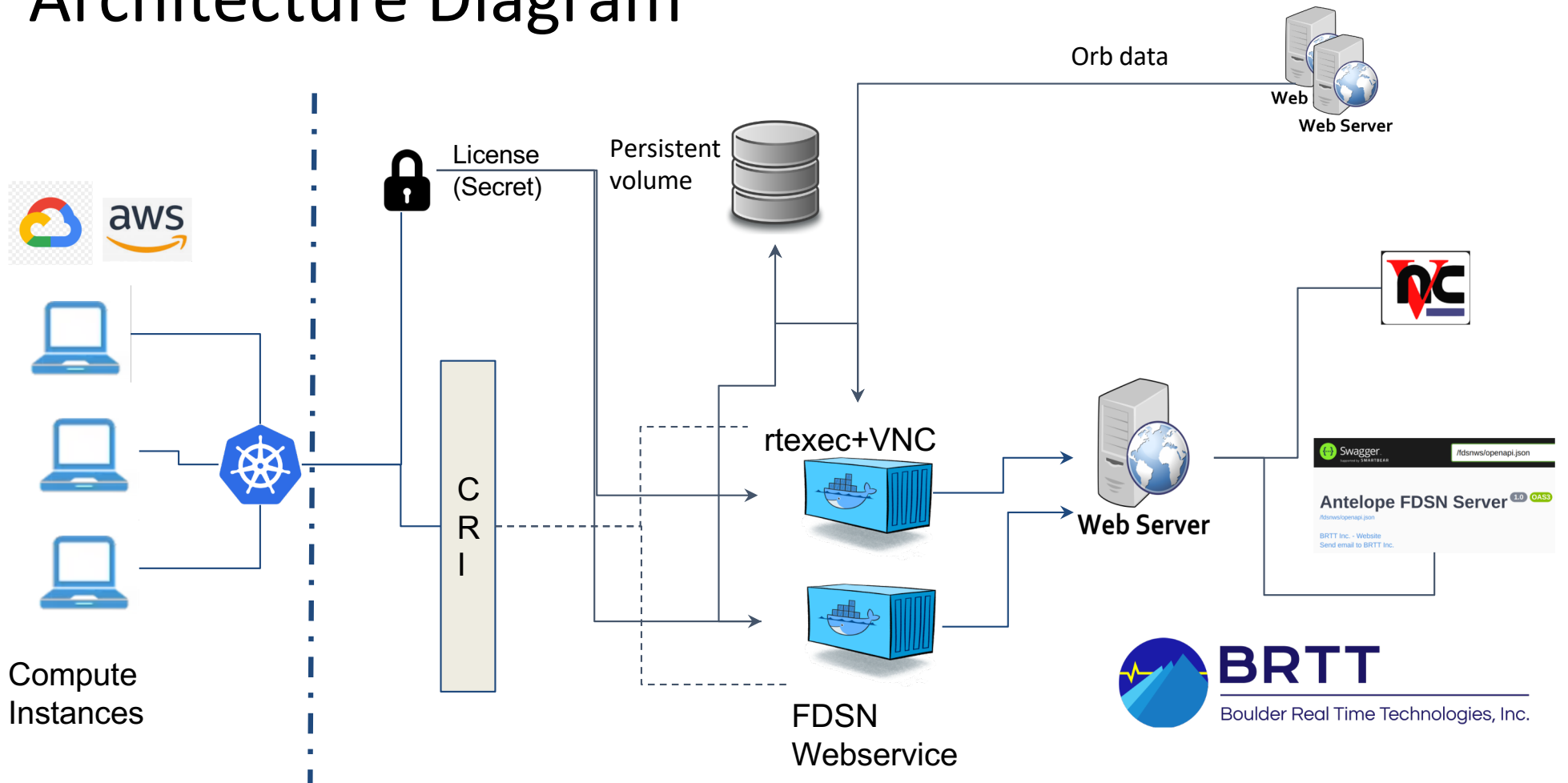
Milestone achieved and presented in  
Vienna AUG, 2023

# Progression of Antelope Packaging



Milestone achieved and being presented in Trieste AUG, 2024

# Architecture Diagram



# Deployment progression

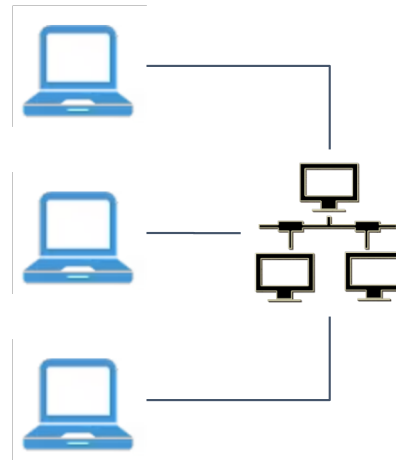
Create compute instances  
in the Cloud platform



Virtual Machine (Node)

# Deployment progression

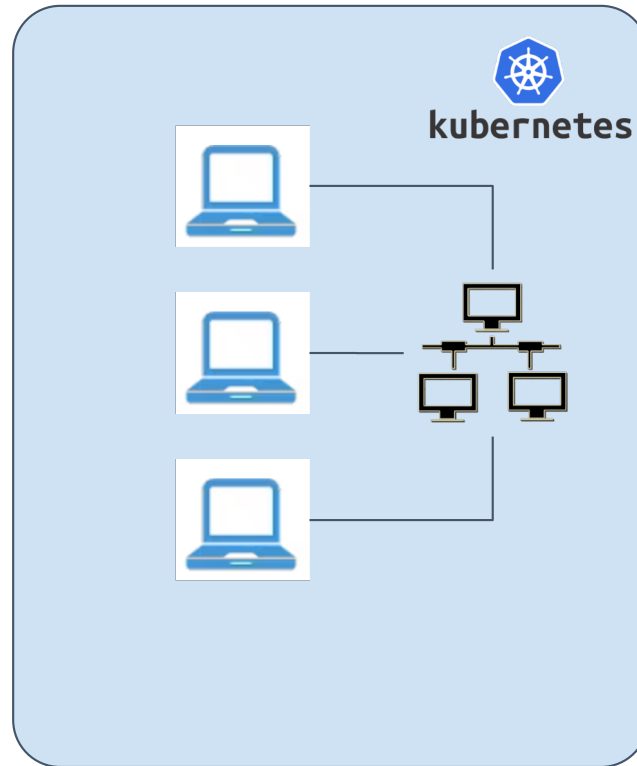
Create network and subnets





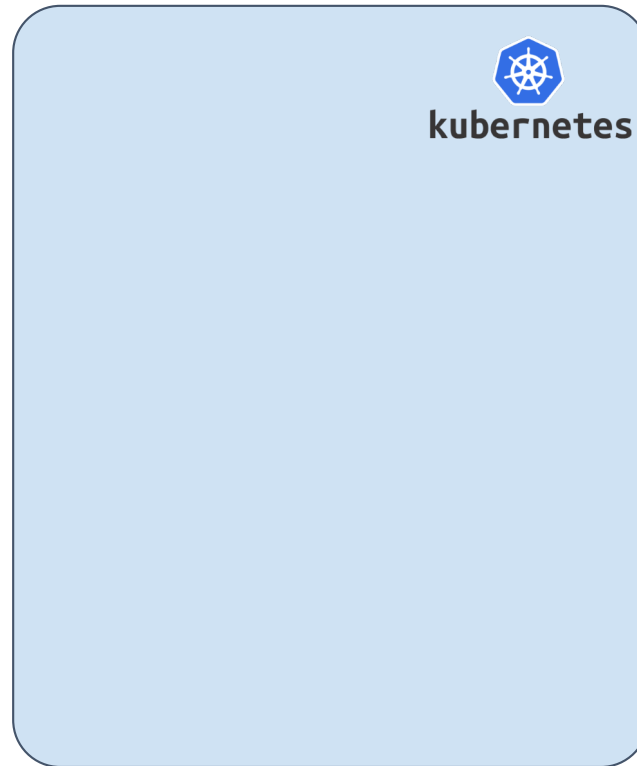
# Deployment progression

Create Kubernetes Cluster



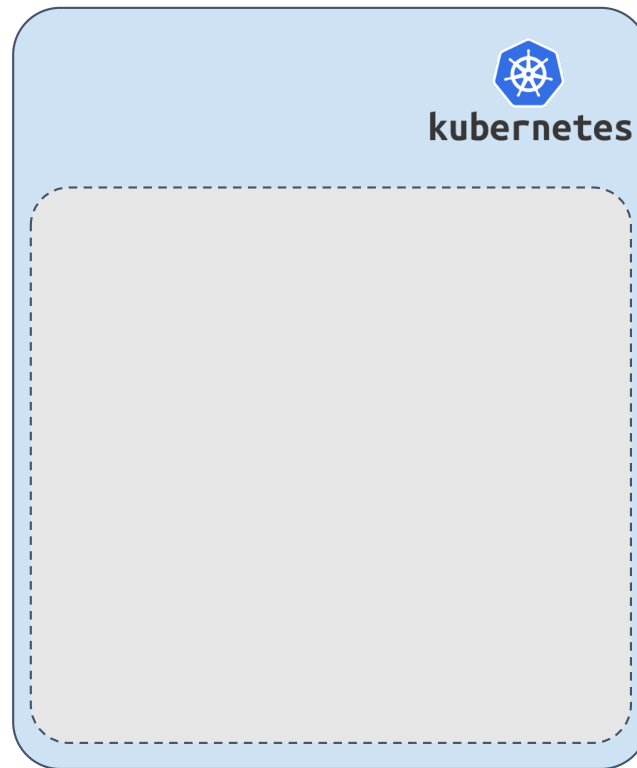
# Deployment progression

Initialize Antelope environment



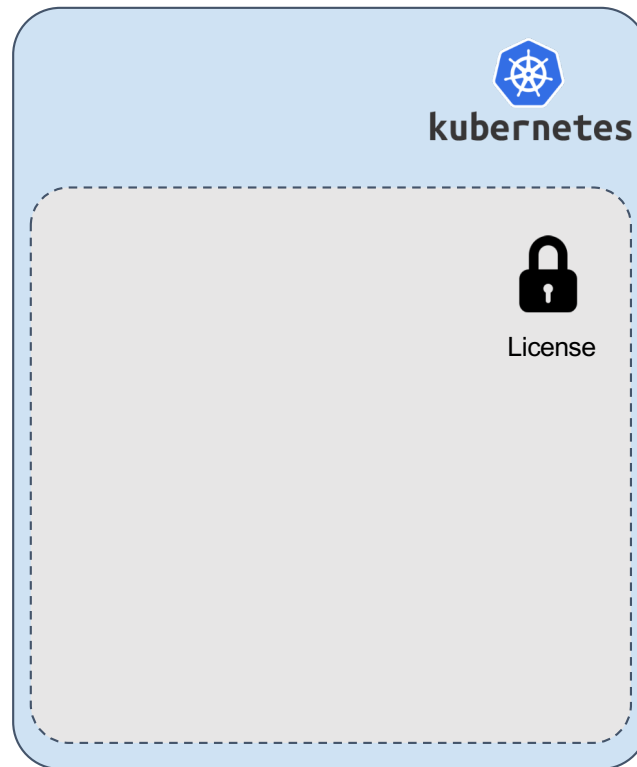
# Deployment progression

Create Antelope  
Namespace



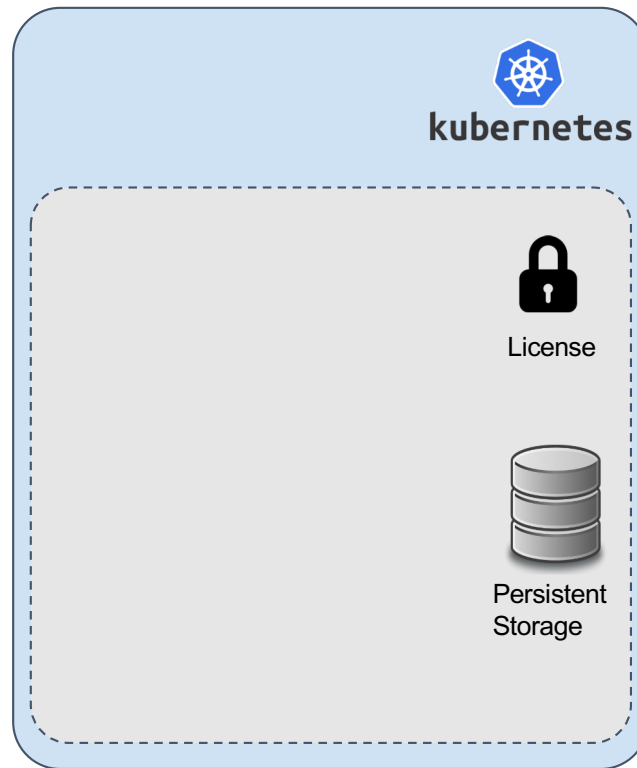
# Deployment progression

Create license.pf



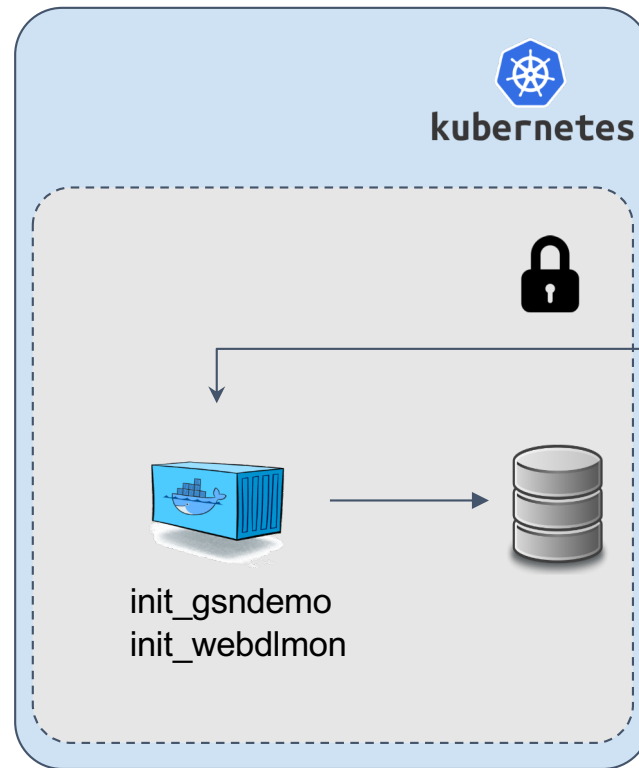
# Deployment progression

Create persistent storage



# Deployment progression

Initialize Antelope environment



External Image Registry

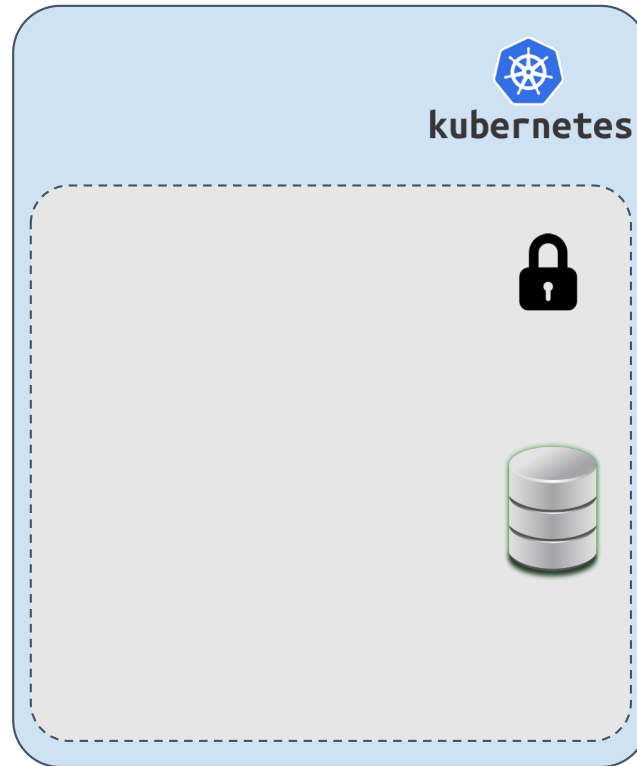


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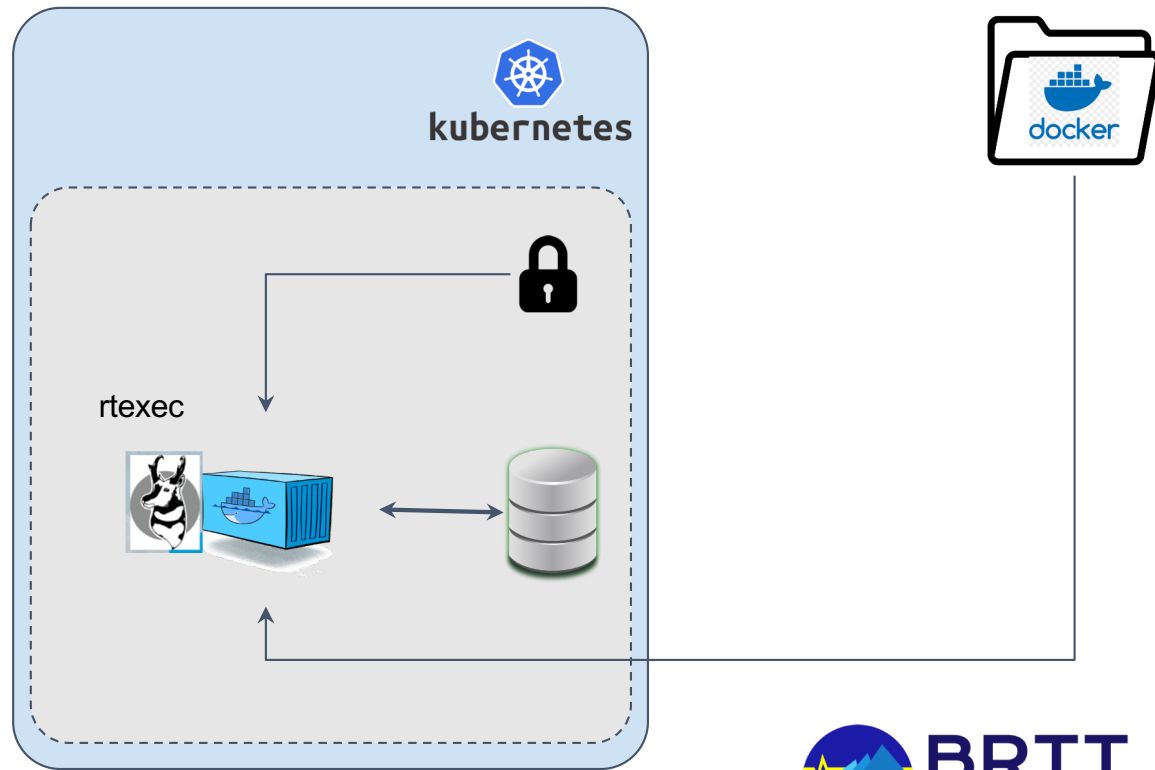
# Deployment progression

Environment initialized



# Deployment progression

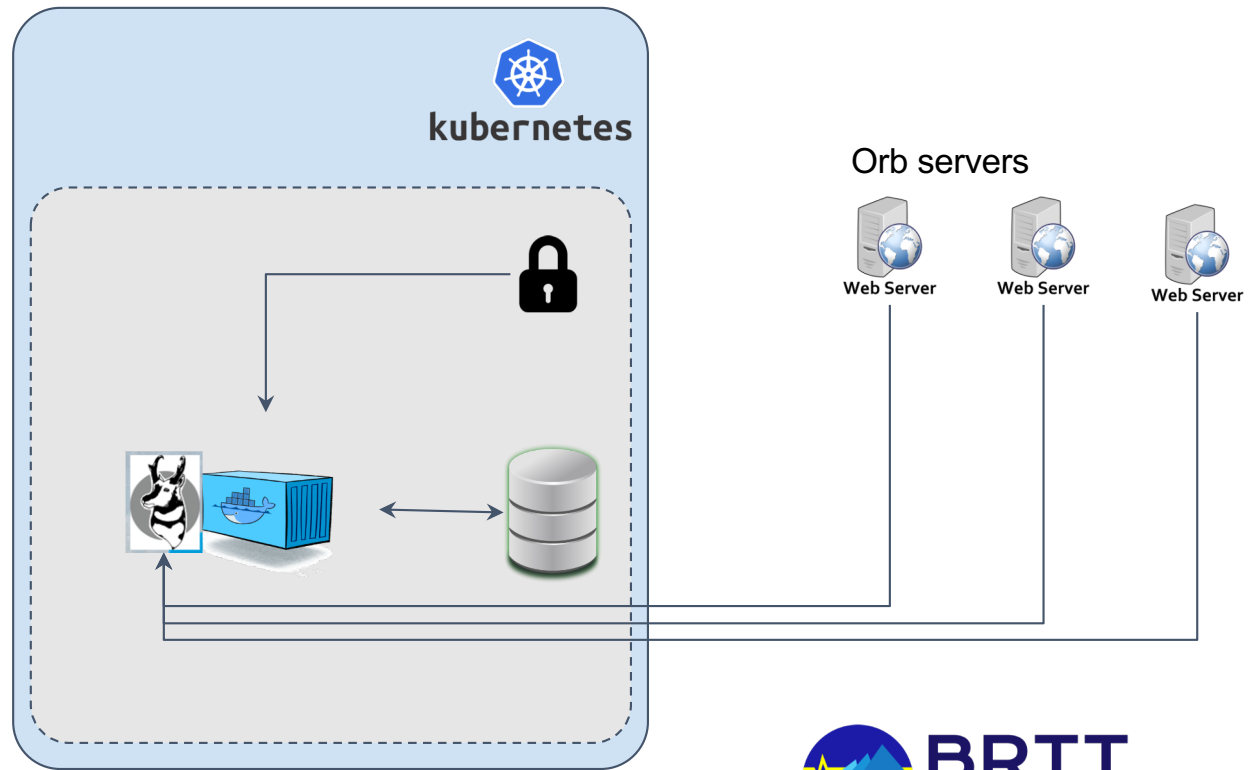
Start Antelope





# Deployment progression

Orb activity

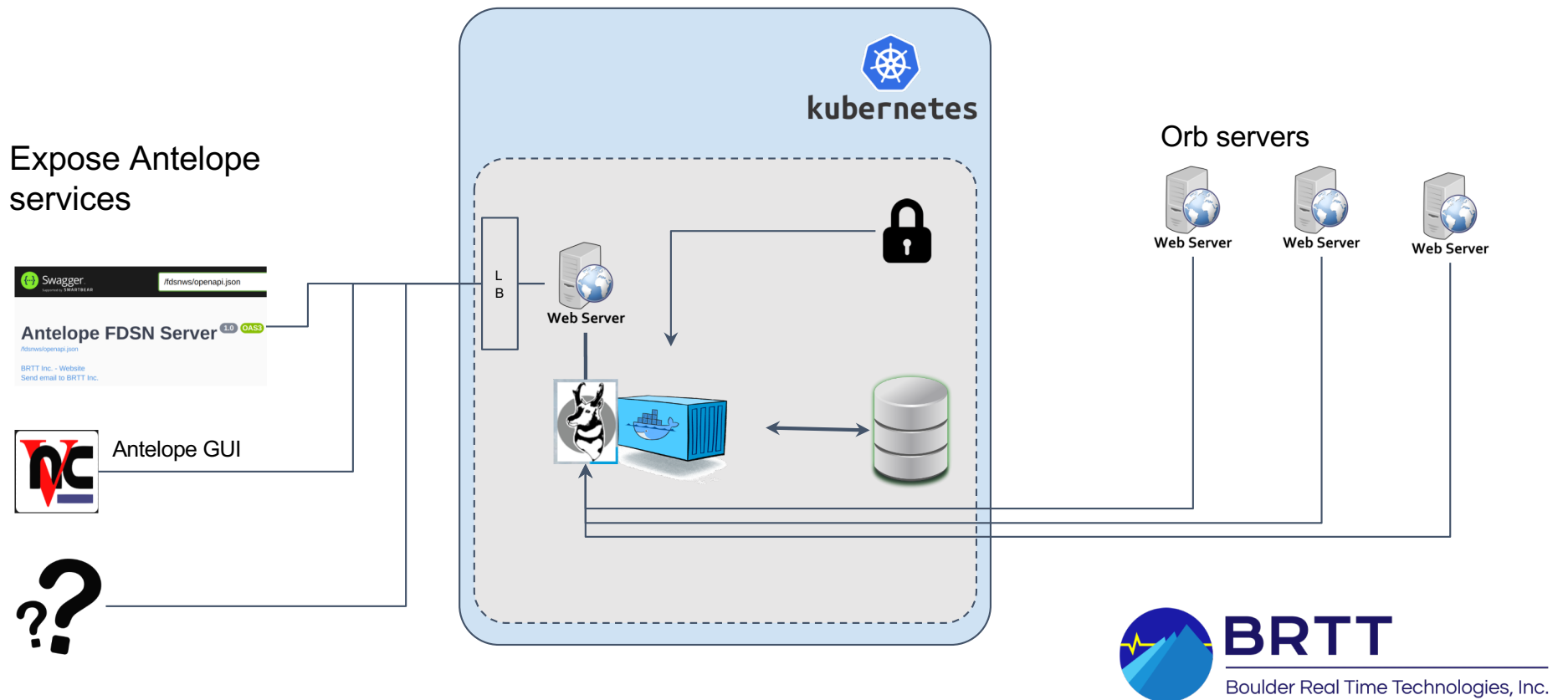




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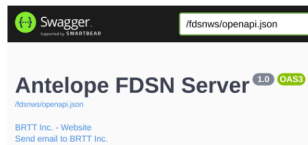
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# Deployment progression



# Deployment Progression

Expose Antelope services



  
kubernetes

Orb servers



# Demo

- VNC into Antelope instance

# Discussion/Questions

Thank you!

[support@brtt.com](mailto:support@brtt.com)



# Future direction

- Turn-key Antelope deployments in cloud provider



# Current state of Antelope in the cloud

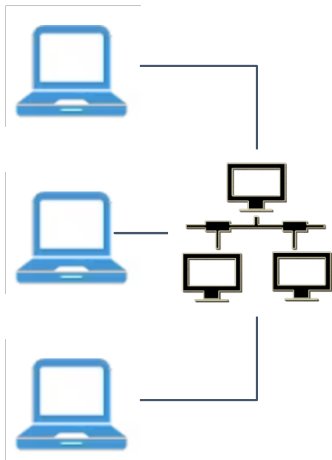
- Talk about GCP and AWS deployments
- Lay out the services running as part of the deployment
- Switch screen to show cloud deployment eye candy
- Show off webservice-fdsn end point is reachable
- Show off VNC support for Antelope GUI access
- Briefly mention webdlmon, to be covered in depth by Leslie

# Deployment progression



Create compute  
instances

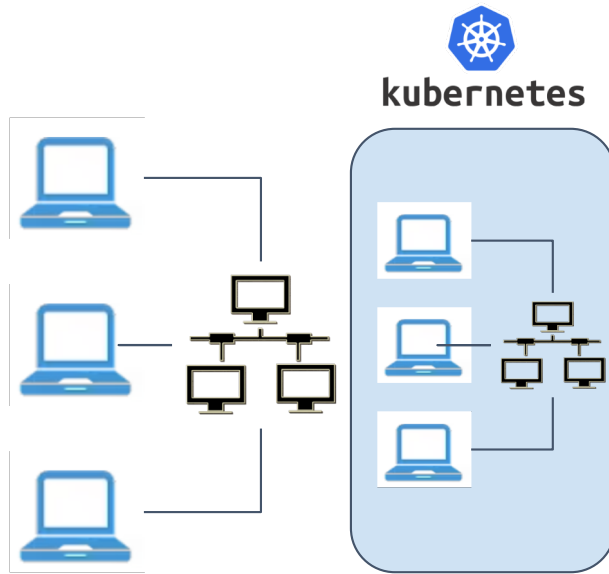
# Deployment progression



Create compute instances

Create network

# Deployment progression



Create compute instances

Create network

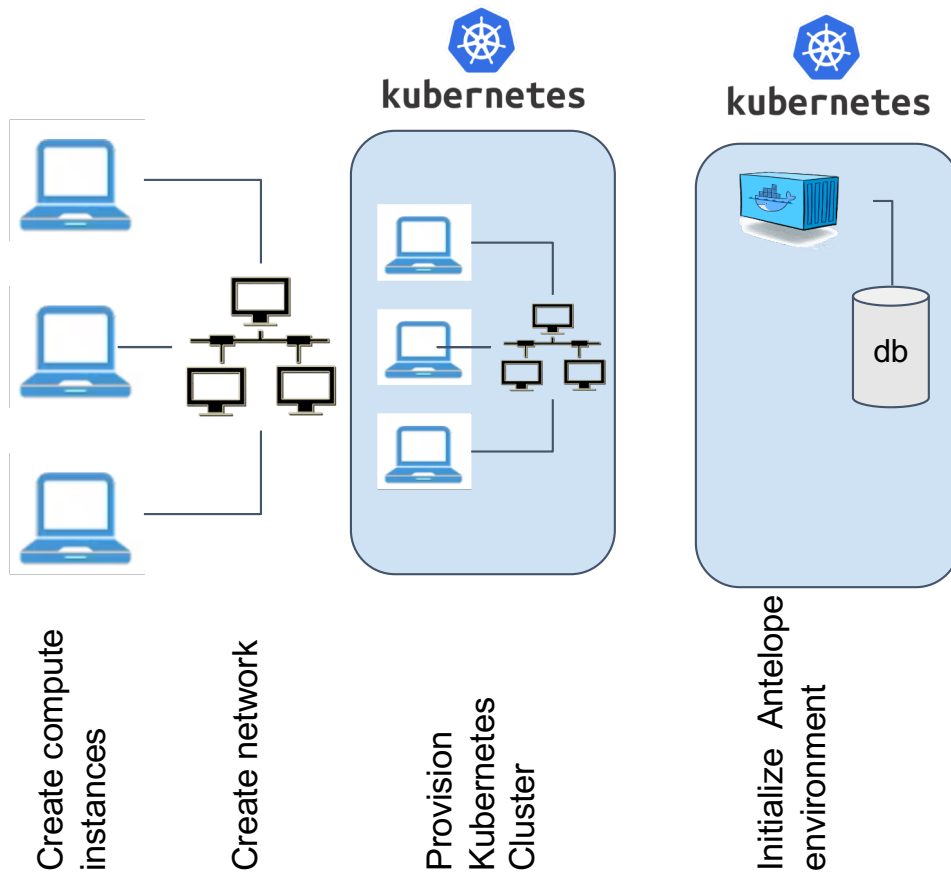
Provision  
Kubernetes  
Cluster



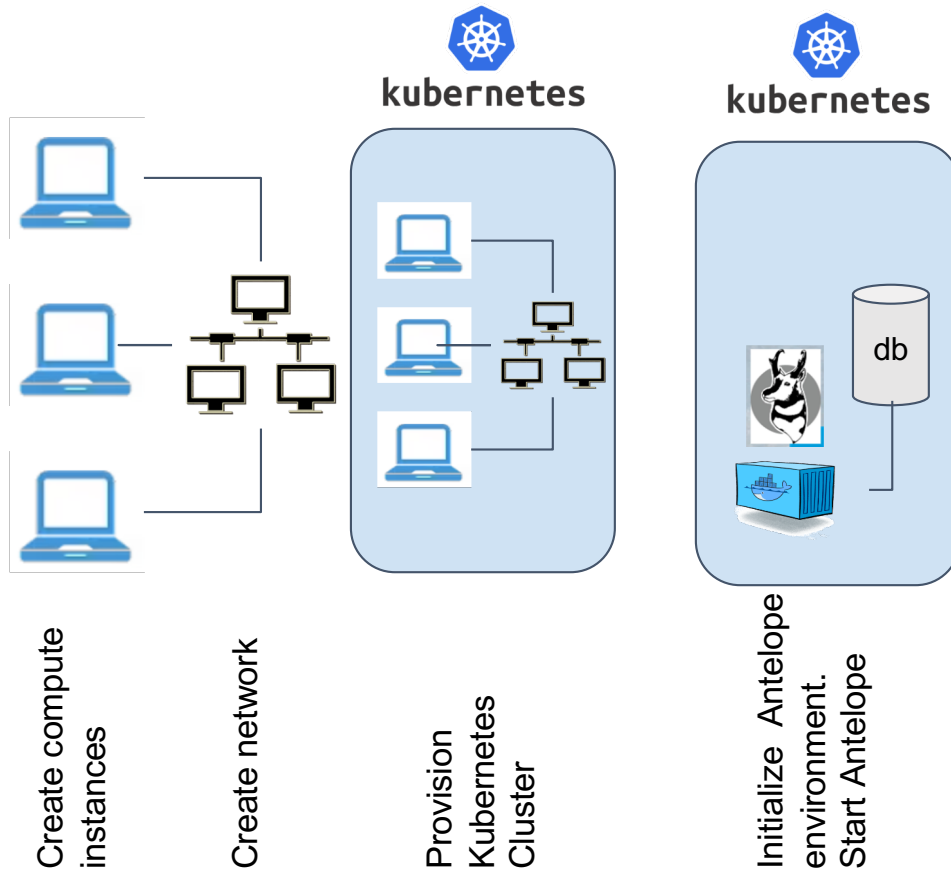
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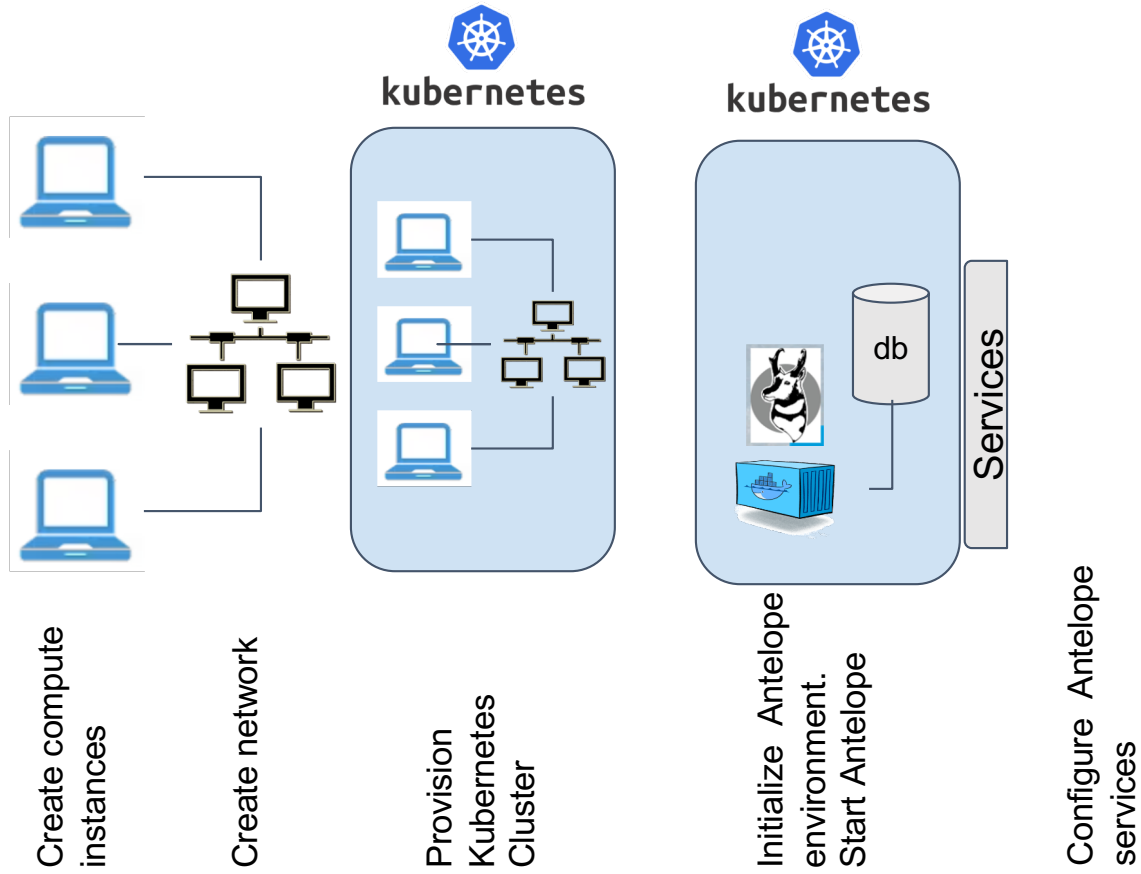
# Deployment progression



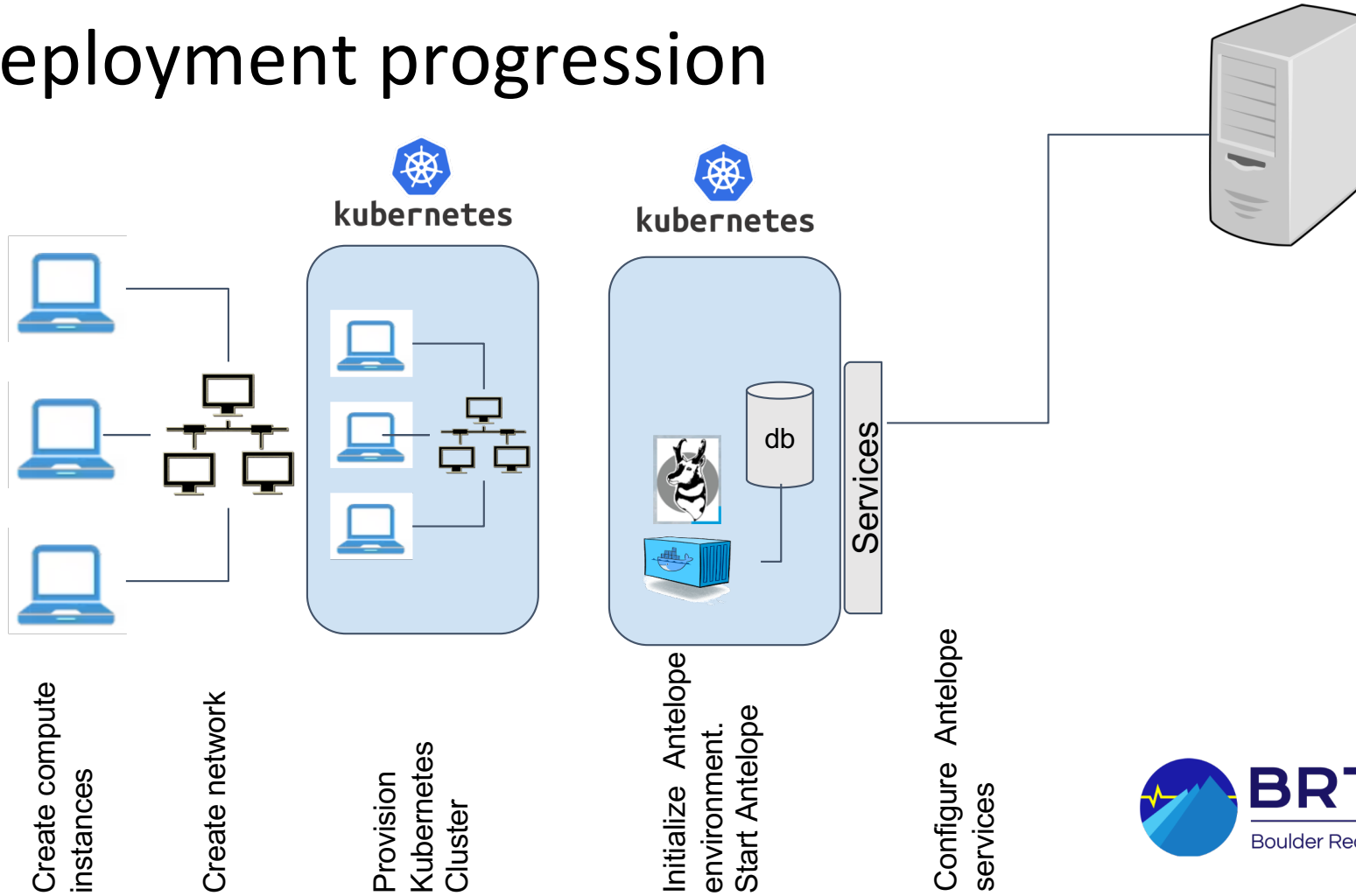
# Deployment progression



# Deployment progression

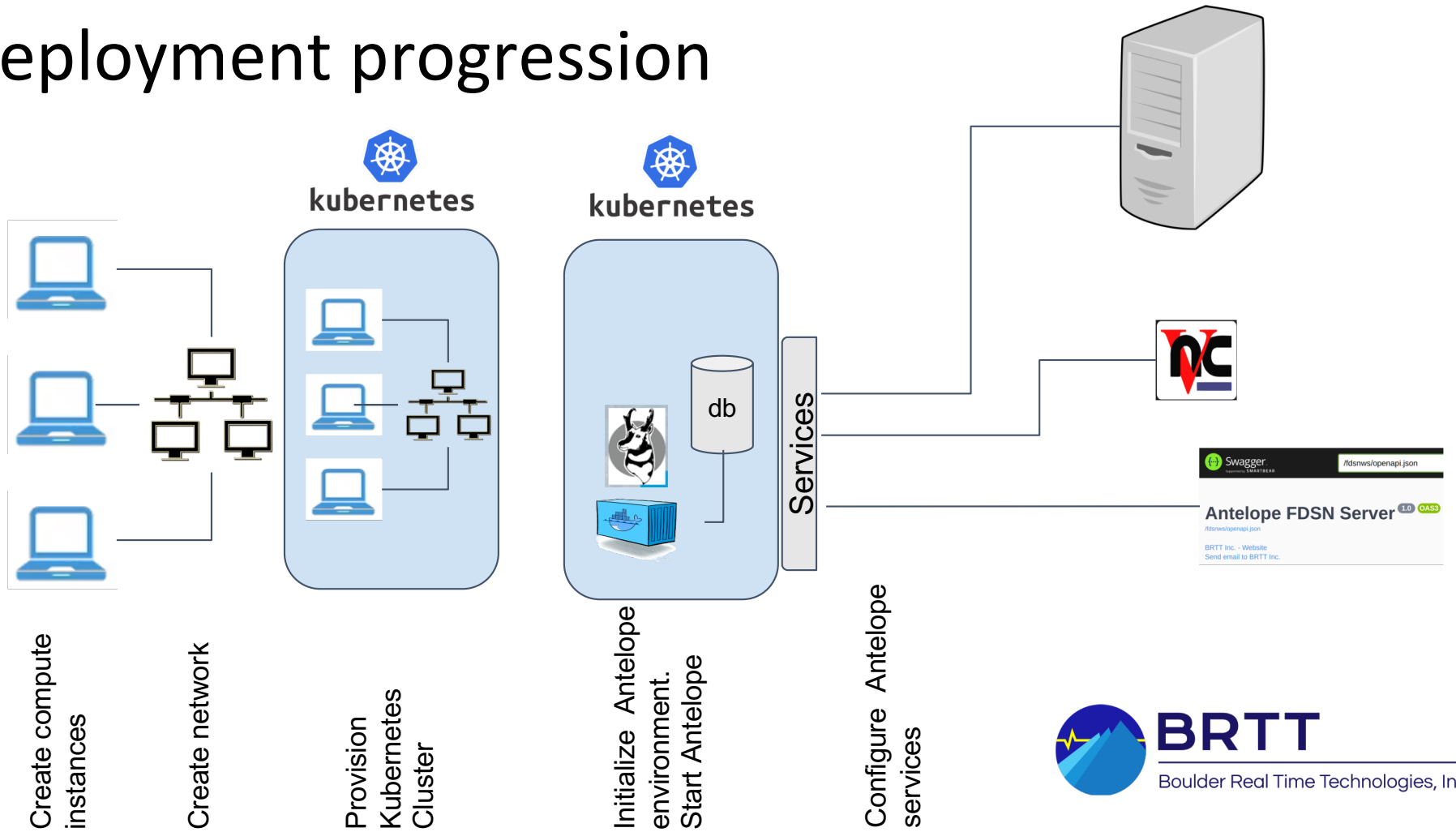


# Deployment progression

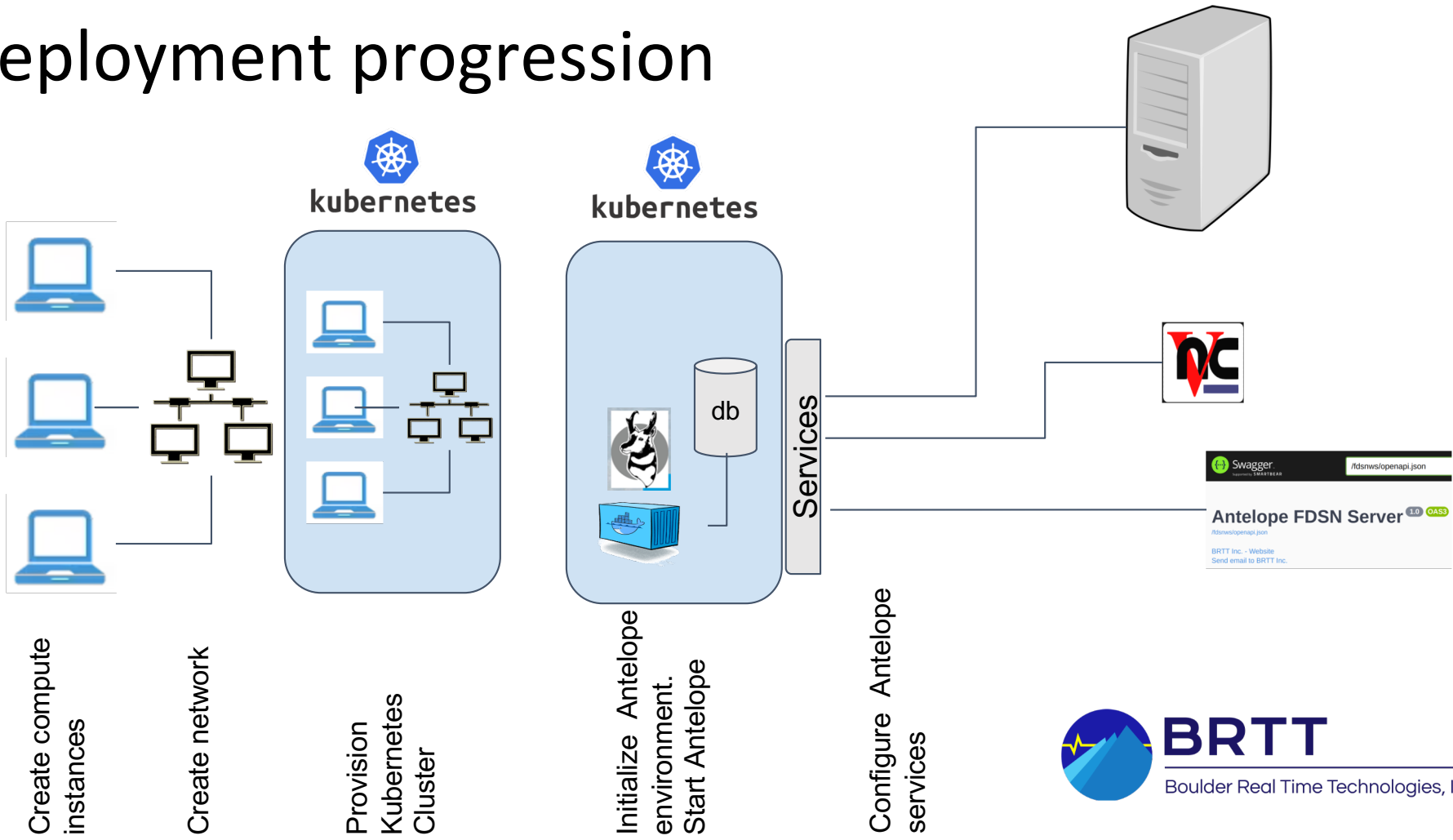




# Deployment progression



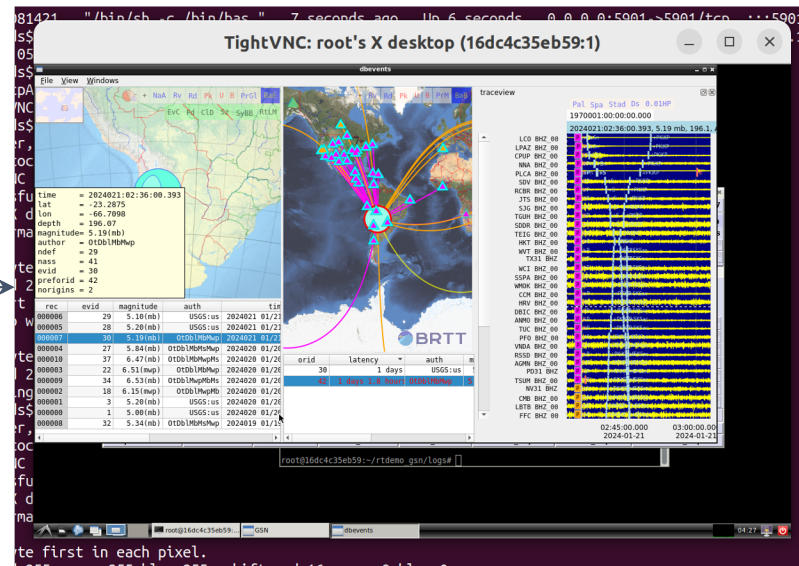
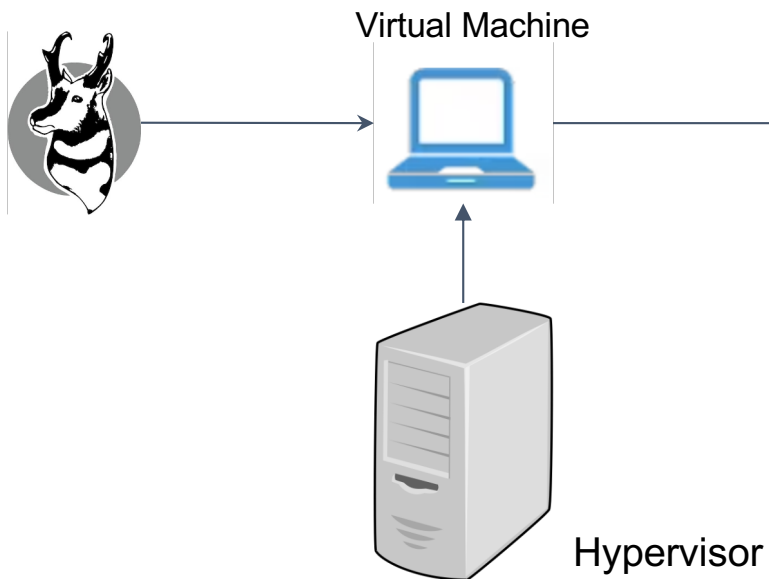
# Deployment progression



# Progression of Antelope Packaging

- Original Antelope packaging/deployment mechanism
- Antelope in Virtual Machines (VM)
- Antelope in Cloud VMs
- Containerized Antelope

# Progression of Antelope Packaging



# Containerization pros and cons

Portability – Write once, run anywhere (local or cloud)

- Self-contained dependencies
- Good workload isolation – Process and network namespaces
- Faster application startups
- Lightweight
- Missing nanny to monitor liveness of application
- Managing application lifecycle, upgrades etc
- Data persistence



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# Enter Kubernetes

- Explain concept
- How does this fit in? Why did we choose to use it?
- Benefits

# Kubernetes in the cloud

- Benefits of running in the cloud
- Frees up human hours from infra management, can focus on business needs rather than dev-ops and infra health
- Dynamic provisioning of VMs, workload migration
- High up-time
- Ease of exposing services externally
- more...