Konveyor - Forklift Roadmap

June, 2021

Accelerate your journey to Kubernetes with the Konveyor Community

A community of people passionate about helping others modernize and migrate their applications to the hybrid cloud by **building tools and best practices on how to break down monoliths, adopt containers, and embrace Kubernetes.**

www.konveyor.io

Rehost virtual machines to KubeVirt

Rehost apps between Kubernetes clusters

Replatform applications to Kubernetes

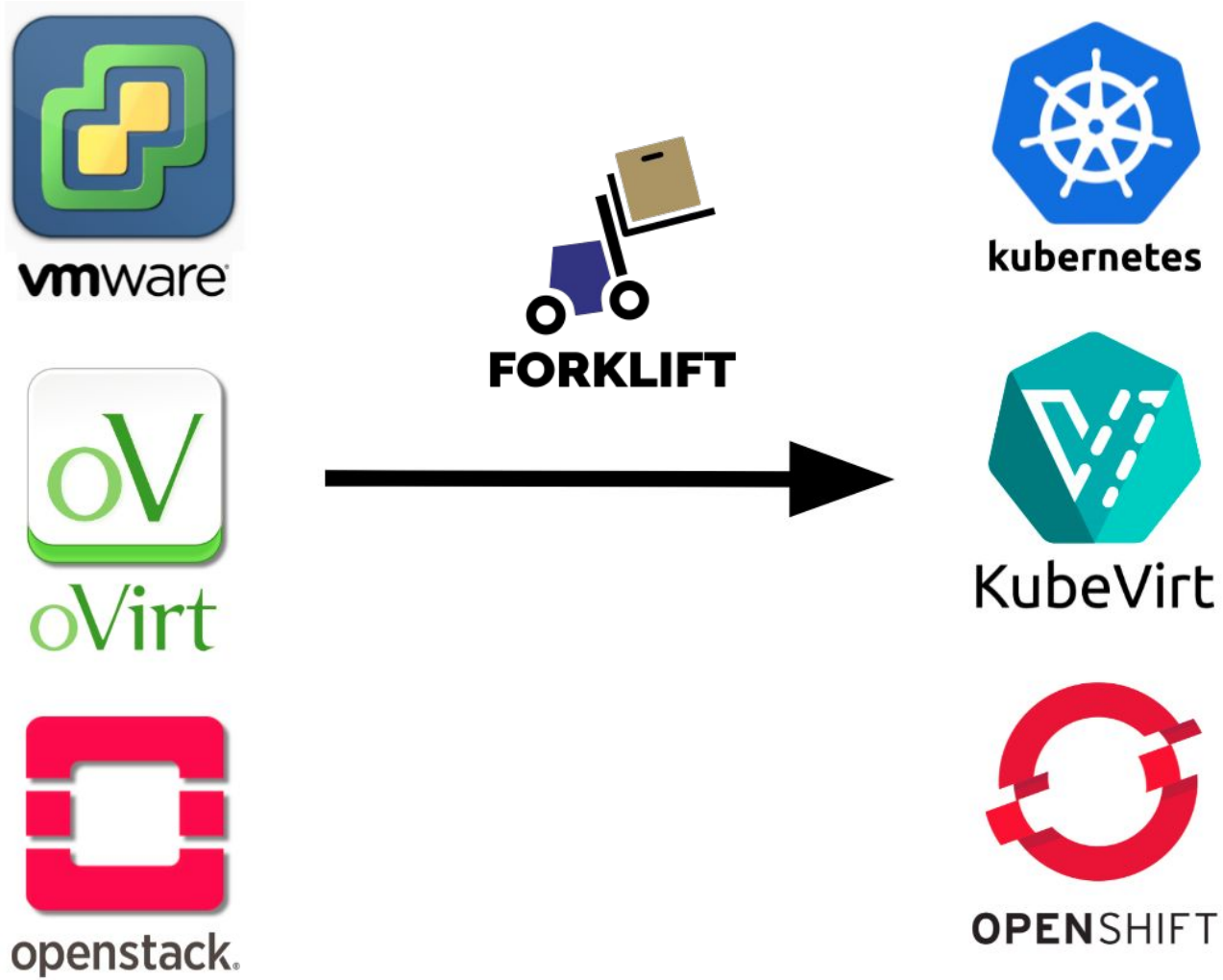
Refactor applications for Kubernetes

Measure software delivery performance

Forklift: Roadmap Overview

Forklift Roadmap

Mission



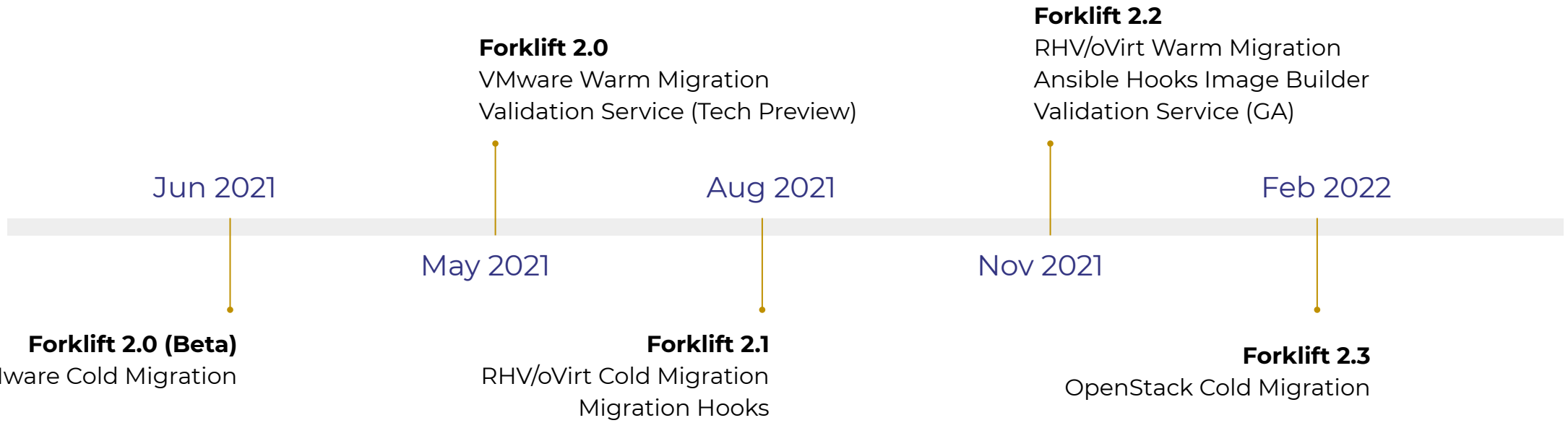
Forklift Roadmap

VM migration

- **Forklift 2.0** [Jun 2021]
  - VMware Warm migration
  - Validation Service (Tech Preview)
- **Forklift 2.1** [Aug 2021]
  - RHV/oVirt Cold Migration
  - Migration Hooks
- **Forklift 2.2** [Nov 2021]
  - RHV/oVirt Warm Migration
  - Ansible Hooks Image Builder
  - Validation Service (GA)
- **Forklift 2.3** [Feb 2022]
  - OpenStack Cold Migration

Forklift Roadmap

VM migration to KubeVirt + Kubernetes



Forklift Roadmap

Engineering Pillars

#1 - RELIABILITY + PERFORMANCE

The tool has to be predictable in order to perform the main task: moving VMs to K8S. Scaling migrations important, therefore performance is key. Covering most migration cases will require be close to real world experience.

#2 - CLEAR ERROR MESSAGES

Having clear and actionable error messages will help users resolve issues faster avoiding internal escalations. This will increase the chances for larger migrations and improve feedback loop.

#3 - REDUCE DOWNTIME

The time allocated for intervention windows will be the limiting factor on VM migrations. Being able to make the most of that time is important to increment migrated workloads.

#4 - MORE SOURCES

VMware is initial source for footprint. Including oVirt/RHV to provide a path to K8S. OpenStack customers can migrate, specially the developer related workloads.

Forklift Roadmap

Early Access Program

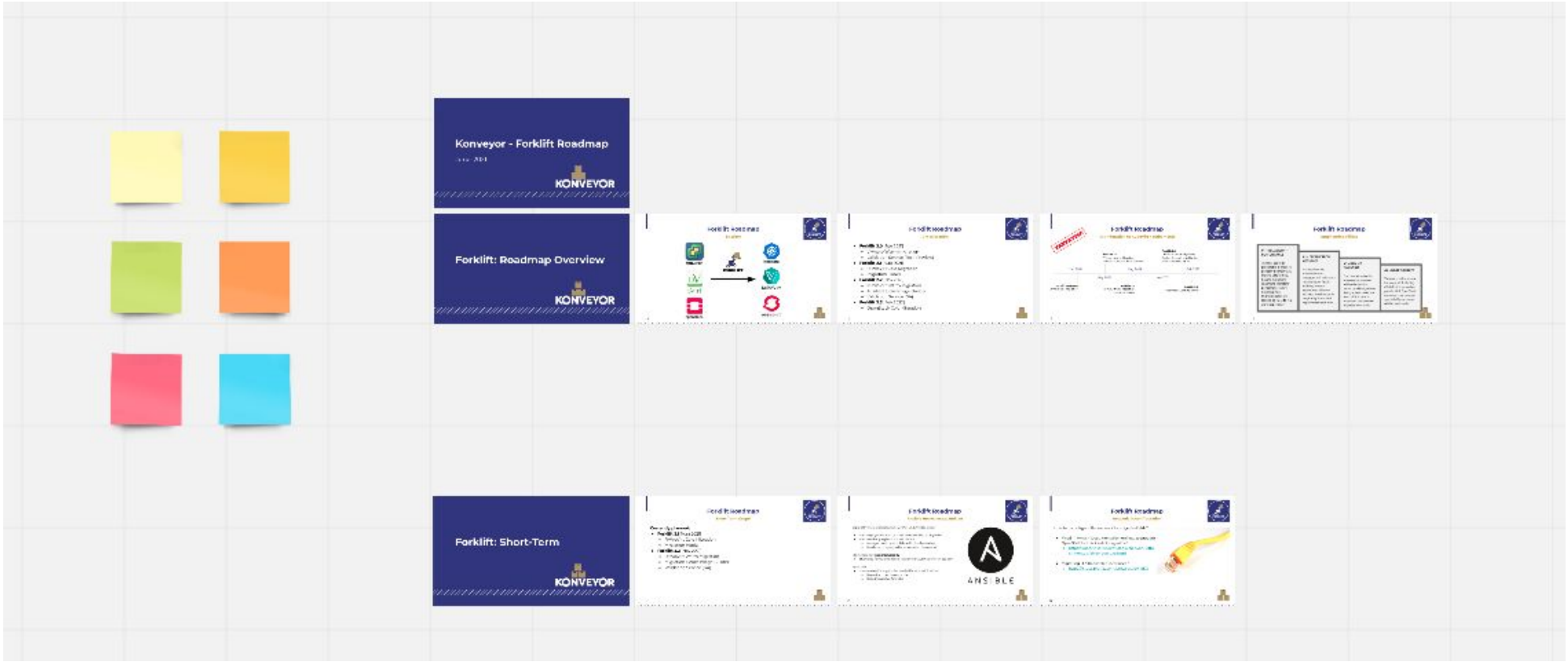
Red Hat Early Access Program for Downstream:
Migration Toolkit for Virtualization (MTV)

- Starting June 2021

Forklift Roadmap

Early Access Program

Please add comments in Miro:
https://miro.com/app/board/o9J_lBFAqHM=/



Forklift: Short-Term

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Forklift Roadmap

Short-Term Scope

Currently planned:

- **Forklift 2.1** [Aug 2021]
  - RHV/oVirt Cold Migration
  - Migration Hooks
- **Forklift 2.2** [Nov 2021]
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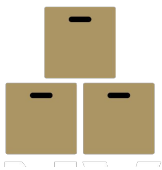


Forklift Roadmap

Ansible Hooks Image Builder

Expand the Ansible hooks user with Git and Ansible Galaxy

- Ansible playbooks can be more complex than a single file
- Ansible roles, plugins and modules are:
  - Managed in Git and published in Ansible Galaxy
  - Used as a company-wide automation framework

Main challenge is **reproducibility**

- The same hooks are applied to all the virtual machines in the plan

Approach:

- Create sealed images to be used without modifications.
  - Reuse for more than one plan
  - Keep images for forensics
- Builder will add a layer to the existing Ansible Hooks to
  - Be available for Crane or any other project
  - Reduce the maintenance effort

Forklift Roadmap

Network Reconfiguration

How to reconfigure the network for migrated VMs?

- Fixed IP VMs? → Documentation on how to prepare OpenShift for this kind of migration?
  - https://kubevirt.io/2020/Multiple-Network-Attachments-with-bridge-CNI.html

- Migrating DPDK enabled interfaces?
  - https://issues.redhat.com/browse/CNV-11337

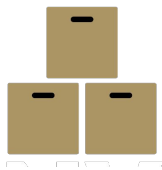
Forklift: Mid-Term

Forklift Roadmap

Mid-Term Scope

Currently planned:

- **Forklift 2.3** [Feb 2022]
  - OpenStack Cold Migration



Forklift Roadmap

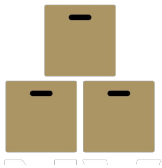
Provider Verifications

Improve user experience when adding providers:

- Can we simplify verification of provider fingerprints?
- Can we enable check before save?

Possible approaches:

- Validating Webhook
  - Meant for that kind of requirement. The provider is rejected if validation fails.
  - Implementation can be tricky: API latency, dead lock, etc...
- CR with a draft flag
  - This creates a real resource and validation is done by the controller
  - The resource can be reloaded and modified by the UI
  - There can be leftovers when the UI is closed



Forklift Roadmap

Analytics

Prototype in CY2021 - On Premise Analytics Layer (OPAL).

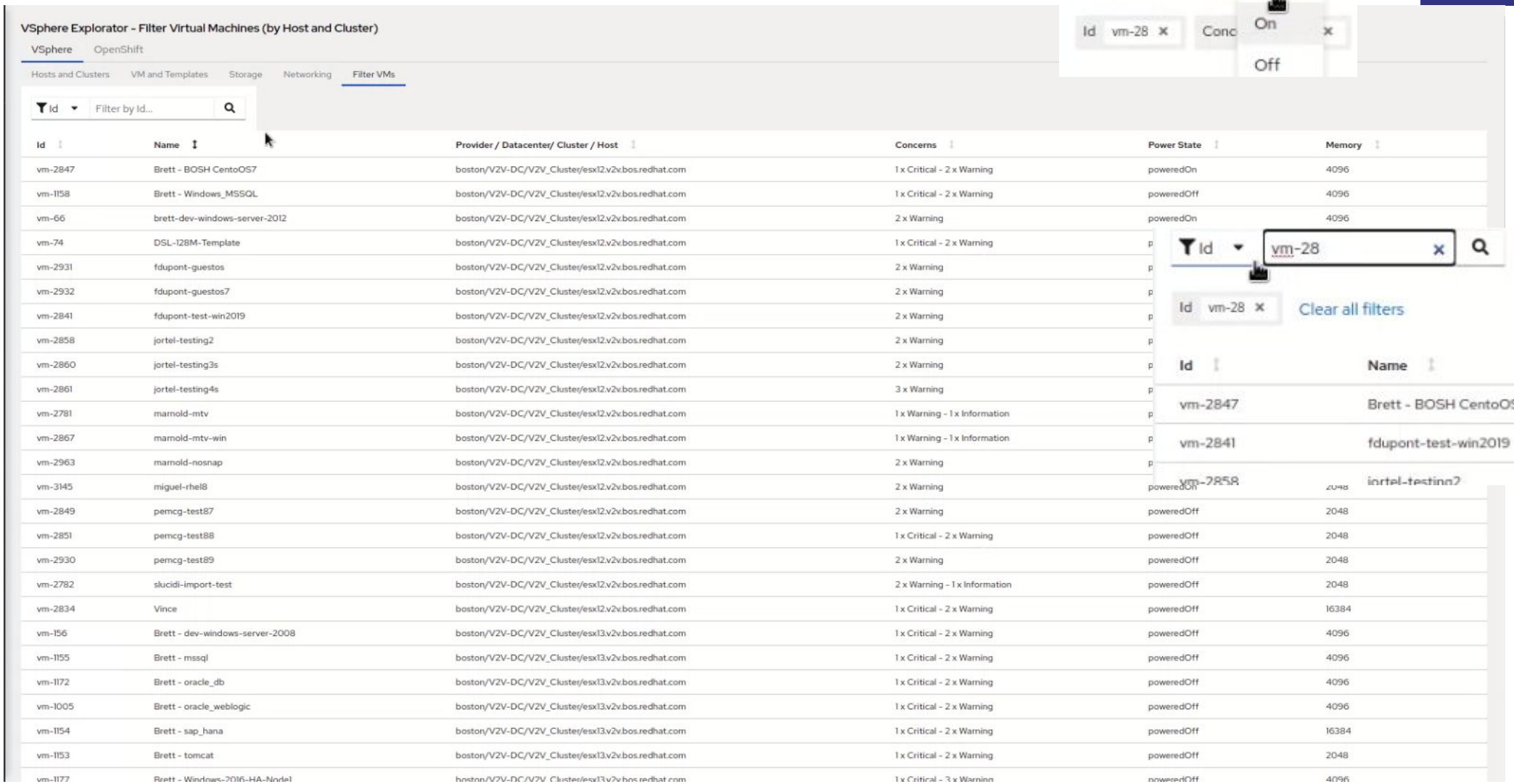
- Data graph exploration with traversal
- Search feature - Find VMs with similar concerns and *fix* the cause
- Search feature - Build migration plans from the search result
- Reporting - Generate CSV/JSON for injection in other tools

Next steps

- Production grade integration with the inventory data
- User experience design, either integrated in Forklift UI or standalone
- Extend the inventory data model to cover more use cases

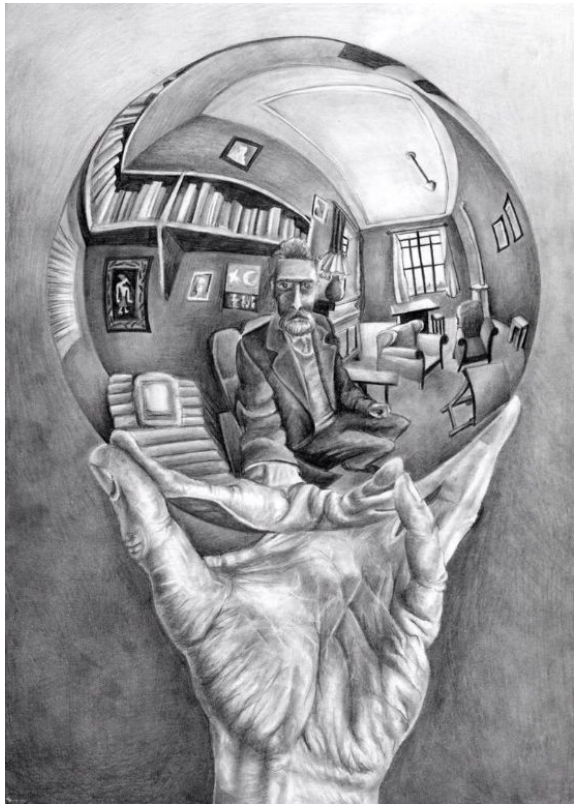
Forklift Roadmap

Analytics



Forklift Roadmap

VM Introspection



- Forklift inventory is limited to infrastructure
- VM Introspection gathers information about the workload
  - Enables better compatibility rules
  - Provides workload classification
- Knowing the workload helps to decide whether to rehost or refactor

Current state - Proof of concept - https://github.com/pemcg/vm-analyzer

Forklift Roadmap

Migrating GPU enabled VMs

Automatically migrate and configure GPU enabled VMs?

- GPU support in KubeVirt CNV-4776

Forklift: Long-Term

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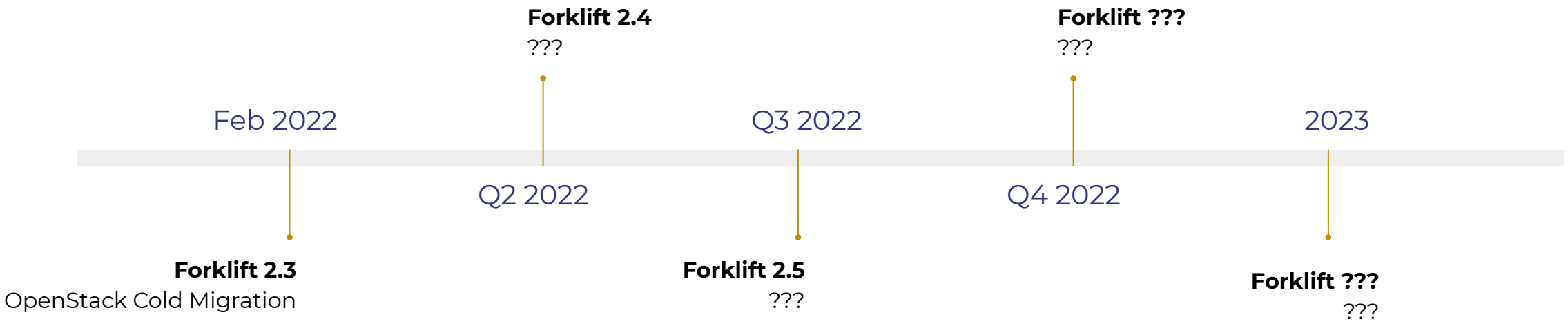
Forklift Roadmap

Long-Term Scope

- **Q2 2022 and beyond → Forklift 2.4**



Forklift Roadmap

OpenStack Advanced Migration Features

Possible objects to be migrated from OpenStack:

- Virtual machine
- Virtual machine image
- Volume
- External network
- Load balancer
- Orchestration Stack
- Project

We can consider optimization such as storage swing

- Both OpenStack and OpenShift support Ceph

Forklift Roadmap

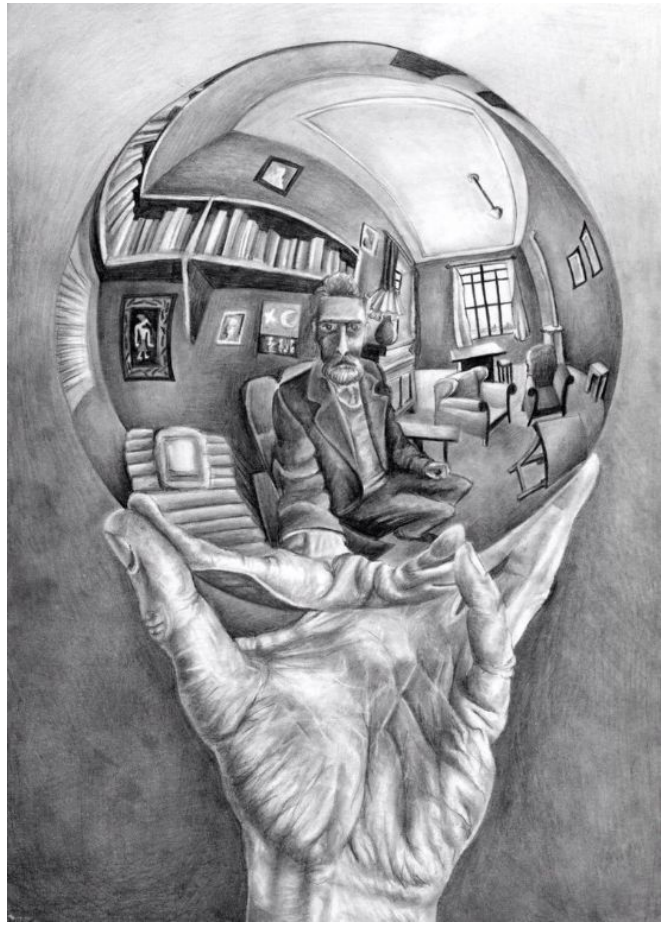
Ansible Migration Playbooks Catalog

Ansible collection published in Ansible Galaxy?

- Create and maintain sample playbooks?
- Playbooks for most common use cases?
  - F5 reconfig
  - Infoblox DNS changes
  - Removing commons agents

Forklift Roadmap

VM Introspection + OPAL



Introspection++

- Bridge OPAL + VM introspection?
- Possibility to engage with Tackle

Next steps:

- Design the workload data model
- Extend the inventory and OPAL graph
- Identify how to bridge Forklift with Tackle

Forklift Roadmap

Network Reconfiguration

Migrate the source provider network configuration

Minimal Viable Product

- Extend the inventory with network deep dive
- Write a translator to configure the layers in k8s:
  - NodeNetworkConfigurationPolicy (nmstate)
  - NetworkAttachmentDefinition (multus)

Additional features:

- Discovery of VLANs trunked to a node
- Support for VMware NSX
- Support for OpenStack Neutron

Joint effort with Kubevirt team.

Forklift Roadmap

Disk Optimization

Disk management optimization:

- Over-utilization in disk reported as an issue by IBM GBS. Being able to right size them provides an incentive to migration
- Golden Image import to be used for both VMs and containers.

Are we missing anything?

Please make your proposals!

Join the Konveyor Community

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Thank you!

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