

CloudFabric 330 Open Source Release Documents

This document describes the scope of CloudFabric's v2.0 release, including the system components and features.

CloudFabric aims to address scalability and resource utilization challenges of super large cloud platforms and provides a unified orchestration and management for various types of compute resources, including VMs, containers and other virtualization technologies.

Release Theme:

In this release, CloudFabric umbrella includes the key components and features from 3 sub-projects:

- 1) Arktos: A compute platform evolved from Kubernetes with fundamental improvements on unified VM/Container support, multi-tenancy and scalability.
- 2) Mizar: A large-scale high-performance network data plane.
- 3) Alcor: A Hyperscale Cloud Native SDN Platform

Release Content:

- 1) Arktos Release v0.2
- 2) Mizar Release v0.7
- 3) Alcor Release v0.3

Arktos Release v0.2

- 1) Repos: <https://github.com/futurewei-cloud/arktos>
- 2) Release Summary: This release focuses on the stabilization of Arktos as well as new features design and implementation in multi-tenancy, scalability and unified management of VM/Container. Major implementations include:
 - a. Multi-tenancy: multi-tenancy access control and short path support
 - b. Scalability: API server data partitioning and active-active controller framework
 - c. Unified VM/Container: Partial runtime services readiness and storage volume support.
- 3) Features Added/Improvements
 - a. Multi-tenancy
 - i. Multi-tenancy design update ([link](#))
 - ii. Tenancy short-path support [#50](#)
 - iii. Add Tenant Controller [#124](#)
 - iv. Tenancy-aware token Authenticator [#129](#)
 - v. Tenancy-aware Cert Authenticator [#99](#)
 - vi. Tenancy-aware RBAC Authorizer [#20](#)
 - vii. Tenancy in kubeconfig context [#69](#)
 - viii. Stabilization on multi-tenancy API Model
 - ix. More test and workaround fixes Added [#92](#)
 - b. Scalability
 - i. API Server Data Partitioning [#105](#), [#65](#)

- ii. Active-active controller framework – new Kubernetes master component: Workload Controller Manager
 - iii. Set up test environments for data partitioned environment [#62](#)
 - iv. Add kube-up and start-kubemark for AWS [#127](#)
 - c. Unified VM/Container
 - i. Add support for primary runtime [#126](#)
 - ii. Add volume driver for OpenStack Cinder [#93](#)
 - iii. Fix issues on VM pod vCPU settings [#134](#) [#139](#)
 - d. Documentation
 - i. New documentation readthedocs page [\(Link\)](#)
- 4) Known Issues
 - a. Create new tenant make events related to the tenant populated to all api servers [#64](#)
 - b. Performance testing: Scheduling Throughput is one fourth of pre-Alkaid [#96](#)
 - c. AWS: Register kubemark master as a node [#171](#)
 - d. AWS: Start-kubemark failed to run without sudo password [#170](#)
 - e. Get coredns working with kubeadm [#169](#)
 - f. AWS: Add workload-controller-manager to aws-kube-up and start-kubemark [#168](#)
- 5) Future Releases
 - a. Performance Test result
 - b. ETCD Partitioning
 - c. Intelligent scheduling
 - d. in-place resource update
 - e. QoS enforcement

Mizar Release v0.7

- 1) Repos: <https://github.com/futurewei-cloud/mizar>
- 2) Summary: This release introduces a new management plane for Mizar, designed and developed from the ground up. The design relies on extensibility features in Kubernetes including Custom Resource Definitions and Operators. The Management Plane is built with several objectives in mind:
 - a. Replace Kubeproxy with the scaled endpoint
 - b. Improve Mizar usability and deployability
 - c. Improve Mizar control-plane and data-plane Interfacing and workflow
 - d. Facilitate end-to-end testing, validation, and performance benchmarks
 - e. Extensibility to support other data-plane technologies including ebpf, OVS, and host-networking.
- 3) Features Added:
 - a. Data Plane
 - i. Update kernel requirement to 5.6-rc2
 - ii. Minor Unit test fix [bdfc1f9](#)
 - iii. Direct path for cross network traffic [b5283a1](#)
 - b. Mizar Management plane
 - i. Mizar objects with [Custom Resource Definitions](#)

- ii. VPC, Net, Endpoint, Bouncer, Divider and Operators, Main Commits: [644d0fa](#), [21a43c3](#), [8934e26](#)
 - iii. Built-in Operators for K8s Pods and Services, Main Commits: [42abe77](#)
 - iv. Basic Bouncer and Divider Placement, Main Commits: [f12eb3b](#)
 - v. Simple manual scaling workflows for bouncers and dividers, Main Commits: [5b7c325](#), [354dda1](#)
 - vi. Replaces KubeProxy for Loadbalancer type with scaled-endpoint, Main Commits: [42abe77](#)
 - vii. Generic CNI RPC Interface for transit daemon, Main Commits: [ffa7e6a](#)
 - viii. Endpoint host management with Netlink, Main Commits: [5b46462](#)
- c. Documentation
 - i. New documentation readthedocs page [\(Link\)](#)
 - ii. Detailed data-plane design
 - iii. Detailed management-plane design
 - iv. Improvement in getting started guide to use the new management plane

Alcor Release v0.3

1. Repo: <https://github.com/futurewei-cloud/Alcor>
2. Release summary: This release focuses on the microservice design and implementation for Alcor control plane. It introduces implementation of three microservices including VPC manager, route manager and API gateway service. It also implements customer facing VPC operation APIs integrated with the new microservice framework.
3. Features Added:
 - a. Alcor Controller
 - i. API gateway (PR [#143](#))
 - ii. VPC Manager (PR [#134](#))
 - iii. Route Manager (PR [#144](#))
 - iv. VPC operation workflow design & implementation (PR [#134](#), [#143](#), [#144](#))
 - v. Database module with Apache Ignite in-memory cache support (PR [#129](#))
 - vi. Build and deployment enhancement (PR [#118](#), [#121](#))
 - vii. Controller logging improvement (PR [#107](#), [#116](#), [#120](#))
 - b. Alcor Control Agent
 - i. Design release v0.1 (PR [#94](#))
 - ii. Build enhancement with proxy support (PR [#95](#))
 - c. Document:
 - i. Overall microservice architecture design & API workflow for vpc/subnet/port [\(link\)](#)
 - ii. Network config data model (PR [#106](#))
 - iii. Control plane API document v0.1 (PR [#123](#))
4. Future Releases
 - a. New microservices to support existing and new business requirements including CURD of subnet, port, ip, and security group.
 - b. Grey release for control plane.