OpenInfra Edge Overview

Akraino Fall Summit
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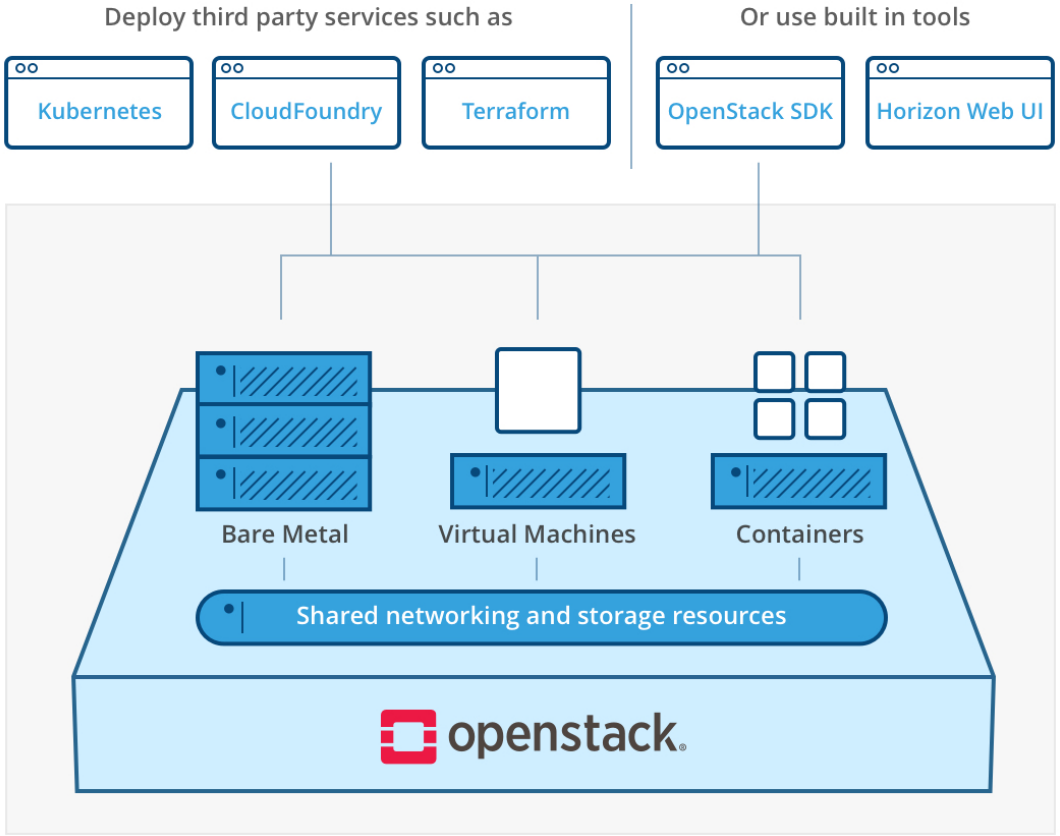
OpenStack

openstack®

OpenStack is a cloud operating system that controls large pools of compute, storage, and networking resources throughout a datacenter, all managed and provisioned through APIs with common authentication mechanisms.



40 million OpenStack Compute Cores

openstack.org/users

OpenStack Adoption Updates

- The recent OpenStack User Survey just closed
  - The survey examines the changes in deployments since August, 2021
  - There's significant growth in number and size of deployments
  - Public cloud footprint continues to grow
  - Security and new hardware trends are focus areas within the community and the ecosystem
- Deployment growth by 60%
  - 25 million —> 40 million cores managed in production

OpenStack Adoption Updates

- OpenStack public clouds
  - 180 around the globe
  - European based OVH currently has 1million cores in production managed by OpenStack
  - Main driving factors include data sovereignty and price constraints with the hyper scalers
- OpenStack public clouds
  - The full report will be published soon: https://www.openstack.org/analytics

Release Resources

- Current release cycle is Zed
  - Release planned for the week of October 03, 2022
  - https://releases.openstack.org/zed/index.html

- Latest stable release is Yoga
  - Release highlights: https://releases.openstack.org/yoga/highlights.html
  - Release artifacts: https://releases.openstack.org/yoga/index.html

Changes in Release Process

- Skip-level upgrades
  - More flexible option
  - Allow for a direct upgrade between releases annually

- Numbered release designations
  - Release names will still be added to the releases
  - Release number format:
    - Year.x
    - ie 2023.1 and 2023.2 for the releases in 2023

Nova Highlights

- Yoga highlights
  - Keystone related enhancements
    - Support for unified limits - experimental feature to enforce quota on resources across OpenStack
    - Implementing the ‘scope’ concept with a combination of supported ‘roles’ and ‘scopes’ provided by Keystone
  - Offloading controlplane services to SmartNIC DPUs - increased security and reduced overhead
- Zed highlights
  - Using the Placement service to track PCI devices and optimize scheduling
  - Volume-backed server re-build - extending an existing functionality to instances that are booted from a volume and not an image
  - https://specs.openstack.org/openstack/nova-specs/specs/zed/index.html

Neutron Highlights

- Yoga highlights
  - Support for port binding to SmartNIC DPUs with VNIC type ‘remote-managed’
  - Support for minimum packet processing based scheduling
  - Support to enforce security group rules with any MAC address

- Zed highlights
  - Support for cascade deletion of Neutron networks and corresponding resources
  - Adding ‘distributed’ attribute to each Floating IP for more flexible configuration
  - https://specs.openstack.org/openstack/neutron-specs/specs/zed/index.html

Octavia and Designate Highlights

- Octavia - Load Balancer as a Service
  - Edge support with availability zones
    - Octavia Amphora load balancers are deployed at edge sites and defined as availability zones in Nova
    - Users can define profiles with compute availability zones in Nova
      - Management network
      - Valid list of VIP networks
    - In production use at edge sties
- Designate - DNS as a Service
  - Support for Unbound recursive resolver containers to be deployed at the edge with controller services
  - Enabling local DNS resolution and caching for edge sites

Ironic Highlights

- Bare Metal as a Service project
- Recent features and roadmap items
  - Default deployment boot mode changed from Legacy BIOS to UEFI
  - Multi-tenancy concepts and additional policy options are being added
    - Requires a Redfish proxy to provide access to node configuration and operations
  - Allow to power off nodes with a failed cleanup operation
- Bare metal program/SIG
  - https://etherpad.openstack.org/p/bare-metal-sig

Ironic Highlights

- Cross-community collaboration
  - Metal Kubed
    - Bare metal host provisioning for Kubernetes utilizing Ironic
    - CNCF Sandbox project
    - Ongoing cluster-api integration
    - Works as a Kubernetes application - runs on Kubernetes and is managed through Kubernetes interfaces
    - https://metal3.io
    - https://github.com/metal3-io/

Further Project Highlights

- Cinder - OpenStack Block Storage project
  - Users now can request to “re-image” an existing volume
  - New backend drivers: Lightbits LightOS for NVMe/TCP, a TOYOU NetStor Fibre Channel driver, and NEC V Series Storage drivers (FC and iSCSI)
- Cyborg - OpenStack Management Framework project for HW Accelerators
  - Improved Nova integration for better vGPU support
  - Improved documentation and refactoring of the API reference for better user experience
- Kuryr - Bridge between containers frameworks networking models to OpenStack networking abstraction
  - Improved debugging capabilities by adding Kubernetes events to resources managed by Kuryr
  - Better workload management with respect to the interaction with Neutron for more optimal resource utilization

StarlingX

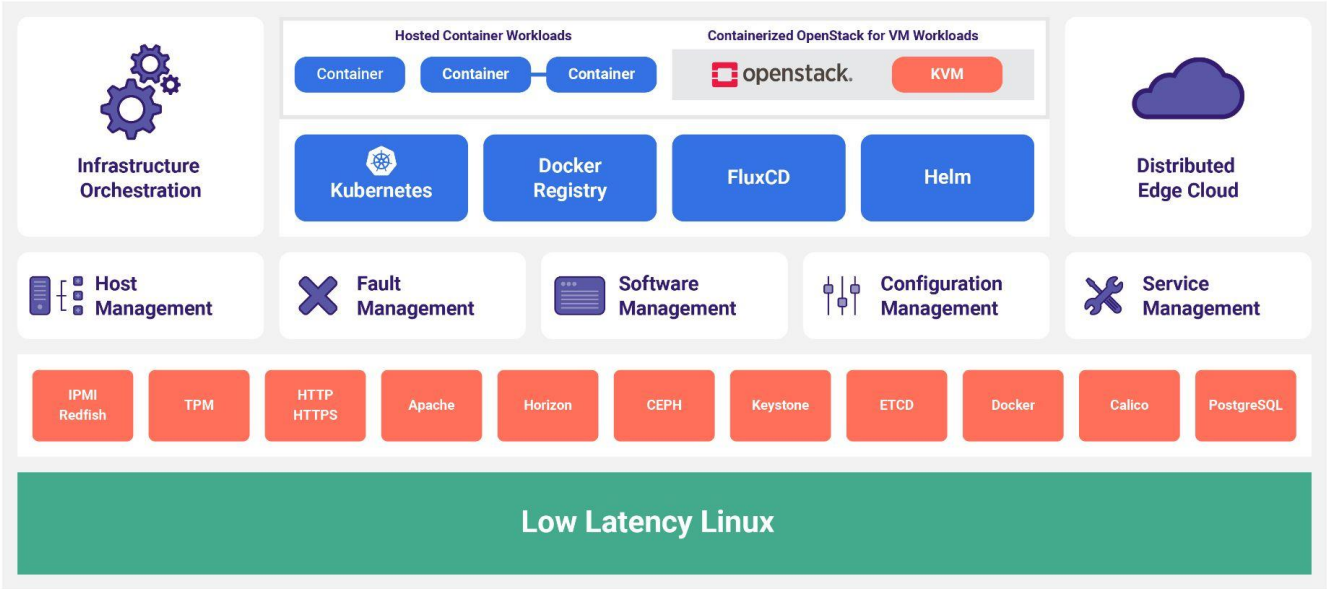
STARLINGX

StarlingX provides a **deployment-ready, scalable, highly reliable** edge infrastructure software platform

StarlingX platform services focus on

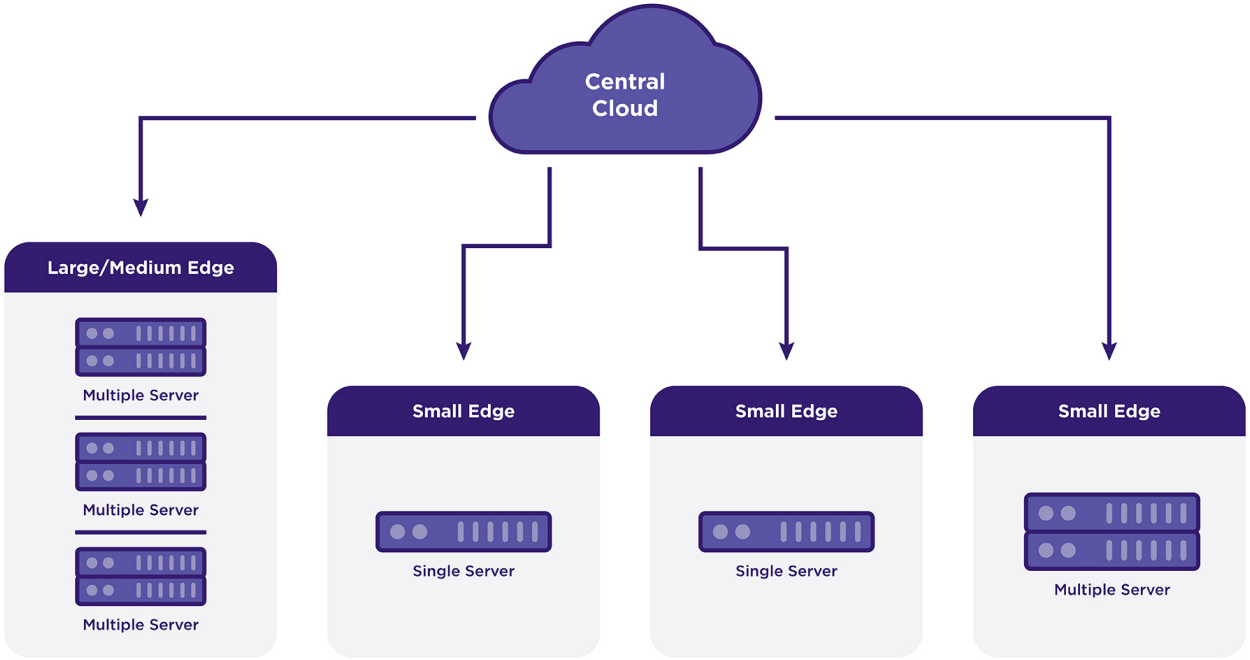
- **Easy deployment**
- **Low touch manageability**
- **Rapid response to events**
- **Fast recovery**
- **Distributed Cloud architecture**

Currently **running in production** at large telecom operators such as **T-Systems**, **Verizon**, **Vodafone**, **KDDI**, and more.



StarlingX Edge Deployments

- Geographically distributed multi-region deployment
- Central datacenter providing orchestration and synchronization services
- Geographically distributed Edge sites of various sizes



StarlingX 7.0

- Released in September, 2022
- Apache 2 license
- Release artifacts
  - https://opendev.org/starlingx
  - http://mirror.starlingx.cengn.ca/mirror/starlingx/release/
- More information in the release notes and project documentation

Key Features

- Debian OS Migration
  - First steps of moving from CentOS to Debian as base operating system
- Distributed Cloud Horizon orchestration updates
  - Use the web interface to manage and upgrade firmware images and other components of the system
- Updates Kubernetes to the 1.23.1 version and uses that as default

Key Features

- **Improved scalability**
  - Increases the number of sub-clouds that the Distributed Cloud architecture can manage. For example, the 7.0 version of the platform can handle up to 1000 All-in-One Simplex (AOI-SX) sub-clouds
  - Integrates Istio service mesh to enhance Kubernetes in areas such as observability, traffic management, security and policy management

Key Features

- **Enhanced security and stability**
  - Includes support for security audit logging to capture commands that were executed using the REST API of the platform services, including using SNMP
  - Takes the first steps to replace Pod Security Policies (PSP) with Pod Security Admission Controller for Kubernetes

Key Features

- **Greater flexibility to manage a diverse set of decentralized workloads**
  - Upgraded PTP Dual NIC Support Boundary Clock Configuration
  - Enhanced PTP features to support 5G Time SyncE Solution
  - Enhancements to Sub-cloud Local Installation feature

Roadmap

- FULL Debian OS Support
  - CentOS no longer supported
- Kubernetes enhancements
  - Upversion
  - Custom configuration at runtime
- HW Acceleration
  - Enhanced FEC Device Configurability for N3000 FPGA and ACC100 Accelerators
  - Marvel Octeon NIC Accelerator Integration

Roadmap

- 5G
  - PTP O-RAN Compliant API Notification
  - Silicom TimeSync Server Adaptor Integration
- Security
  - SSH integration with remote Windows Active Directory
  - Support for ‘reader’ role for StarlingX APIs/CLIs
- Distributed Cloud
  - Centralized sub-cloud backup and restore
  - Enhanced sub-cloud re-homing w/o reboot and install/upgrade error reporting

Community Resources

- #starlingx@OFTC, IRC channel for online discussions
- Mailing Lists: lists.starlingx.io
- Email: info@starlingx.io
- Weekly meetings:
  - Zoom calls
  - https://wiki.openstack.org/wiki/Starlingx/Meetings
- Twitter handle: @StarlingX

Events

OpenInfra Live on Thursday

- An interactive, live show
- Featuring panel discussions with industry experts, OpenInfra Community updates and more!
- Submit episode ideas at ideas.openinfra.live!
- Popular topics include:
  - Global connectivity
  - Cloud economics
  - Sustainable computing
  - Automation
  - Large scale deployments

Find out more at openinfra.live

OpenInfra Project Teams Gathering

Online event

- Project Teams Gathering (PTG) is back in person!
- Contributor-focused event to plan roadmap and discuss release priorities and further technical topics
- Team signup starts soon!

Event information at **https://openinfra.dev/ptg/**

Open Infrastructure
FOUNDATION

Questions?

openinfra.dev