OpenInfra Edge Overview
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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 1 million 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 sites

➔ 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 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
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/
Questions?

openinfra.dev