

OpenStack + OpenHPC = 云超算开源平台

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议程

- 讲员简介
- OpenHPC
- OpenStack Bare Metal (Ironic)
- 两个开源项目的融合

讲员简介

- 宋毅良
- 新加坡国立大学电脑科学学士/硕士，
英国北爱尔兰女皇大学电脑科学博士
- 17年软件开发及架构师经验
- 矽谷创业公司，Motorola，Liberty Mutual 等等，
现任于英特尔开源机构，高级云科技软件架构师
- OpenStack 工作小组组长，3 eBooks 主导作者，
峰会演讲(summit)

OpenStack eBooks



<https://www.openstack.org/enterprise>

什么是OpenHPC?

- Linux Foundation
- 开源超算集成软件
- 致力于推广业界超算科技
- <http://openhpc.community>



OpenHPC 宗旨/目标

- 提供开源超算软体架构的集成及最佳方案，鼓励超算软件科技的部署、应用及研发
- OpenHPC由国际超算社区的用户，开发者，研究员，厂商支持，一同倡导超算科技的创新，以建立和谐的超算平台，



Argonne
National
Laboratory

ARM Atos



CRAY DELL EMC

FUJITSU



Indiana
University



University of
Cambridge

OpenHPC Repo Path

[OpenHPC]

Name=OpenHPC-1.3 – Base

Baseurl=http://build.openhpc.community/OpenHPC:/1.3/CentOS_7

Gpgcheck=1

Gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-OpenHPC-1

[OpenHPC-updates]

name=OpenHPC-1.3 - Updates

baseurl=http://build.openhpc.community/OpenHPC:/1.3/updates/CentOS_7

gpgcheck=1

gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-OpenHPC-1

OpenHPC 发展方向

Release	Target Release Date	Expectations
1.3.2	August 2017	New component additions and version upgrades.
1.3.3	November 2017	New component additions and version upgrades.

Previous Releases

A history of previous OpenHPC releases is highlighted below. Clicking on the version string will take you to the [Release Notes](#) for more detailed information on the changes in a particular release.

Release	Date
1.3.1	June 16, 2017
1.3	March 31, 2017
1.2.1	January 24, 2017
1.2	November 12, 2016
1.1.1	June 21, 2016
1.1	April 18, 2016
1.0.1	February 05, 2016
1.0	November 12, 2015

1.3.2

Due by August 31, 2017 25% complete

12 Open	4 Closed
add top-level utils/ directory in OHPC_macros	enhancement
#486 opened 4 days ago by koomie	
PLASMA (2.8.0)	built component new addition tparallel-libs
#469 opened on Jun 11 by koomie	
template scripts still have some hard-coded assumptions around nodenames	bug
#483 opened 12 days ago by koomie	
Cannot use task/cgroup in Slurm	
#476 opened 15 days ago by LaHaine	
enable hwloc support in slurm	
#385 opened on Mar 5 by LaHaine	
explore possibility of single OpenMPI build for psm/psm2	enhancement
#475 opened 19 days ago by koomie	
adding newer CMake as needed by LLVM	
#456 opened on May 24 by pawson-arm	
Provides option for stateful provisioning	enhancement
#253 opened on Jun 28, 2016 by nirmlasrin	

<https://github.com/openhpc/ohpc/wiki/Release-History-and-Roadmap>

OpenHPC 软体结构

Func. Areas	Components
Base OS	Centos 7.3, SLEC12 SP2
Architecture	x86_64, aarch64 (Tech Preview)
Admin Tools	Conman, Ganglia, Lmod, LosF, Nagios, Puppet, Genie
Provisioning	Warp
Res Mgmt	SLURM
Runtimes	OpenMPI
I/O services	Lustre, BeeGFS

Func. Areas	Components
Numerical / Scientific Lib	Boost, GSL, FFTW, Metis, PETSc, Trilinos, Hypre, SuperLU, Mumps, OpenBLAS, Scalapack
I/O Lib	HDF5 (pHDF5), NetCDF, Adios
	gfortran)
	OpenMPI, MPICH
	autoconf, automake, andR, SciPy, hwloc
	mpiP pdtoolkit TAU,
	Scalasca, ScoreP, SIONLib

提交新的软体

<https://github.com/openhpc/submissions>

下季截止日期: 2017年8月4日

OpenHPC “食谱”(recipe)

- 创建你自己的“超算食谱”



CentOS 7.3 x86_64

- [Install guide with Warewulf + PBS Professional](#) (PDF)
- [Install guide with Warewulf + Slurm](#) (PDF)
- [Install guide with xCAT + Slurm](#) (PDF)

SLE 12 SP2 x86_64

- [Install guide with Warewulf + PBS Professional](#) (PDF)
- [Install guide with Warewulf + Slurm](#) (PDF)

CentOS 7.3 aarch64 [Install guide with Warewulf + Slurm](#) (PDF)

SLE 12 SP2 aarch64 [Install guide with Warewulf + Slurm](#) (PDF)

OpenHPC (v1.3.1)
Cluster Building Recipes

CentOS7.3 Base OS

Warewulf/SLURM Edition for Linux* (x86_64)

OpenHPC System Registry

- 用户可申请列入 System Registry
- 以了解OpenHPC对社区的贡献/回应



OpenHPC System Registry

This opt-in form can be used to register your system to let us (and the community) know that you are using elements of OpenHPC.

* Required

Name of Site/Organization *

Your answer

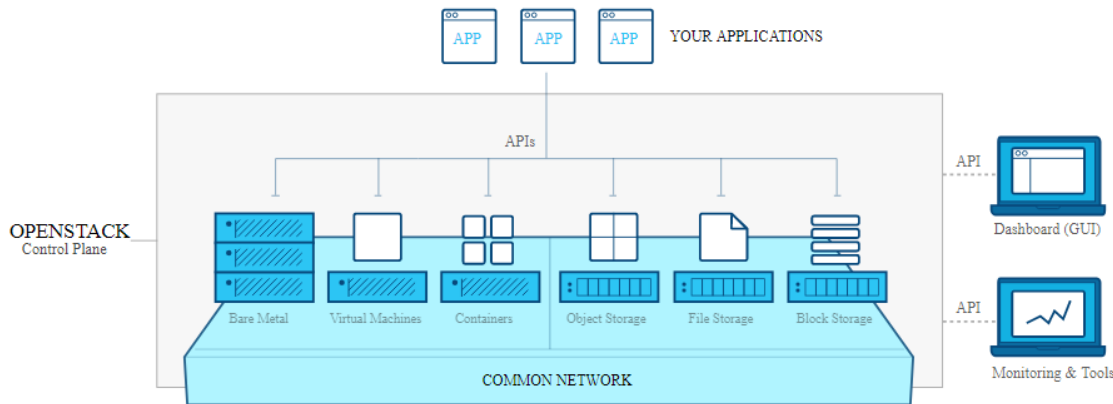
What OS distribution are you using? *

☐ CentOS/RHEL

☐ SLES

☐ Other: _____

什么是OpenStack?



NOVA
Compute



NEUTRON
Networking



KEYSTONE
Identity Service



GLANCE
Image Service



SWIFT
Object Storage



CINDER
Block Storage



ays

IT大咖说
知识分享平台



CHINA RUNS ON
OPENSTACK



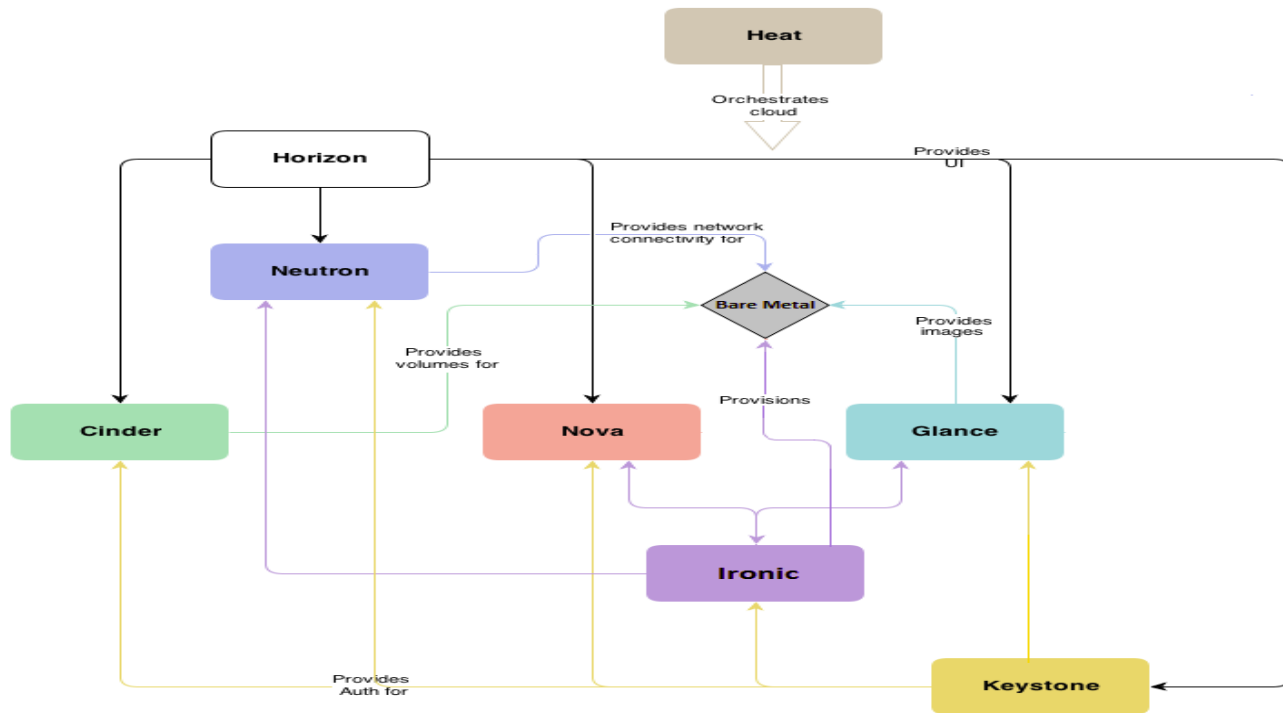
CHINA
OpenStack Days

裸机的部署

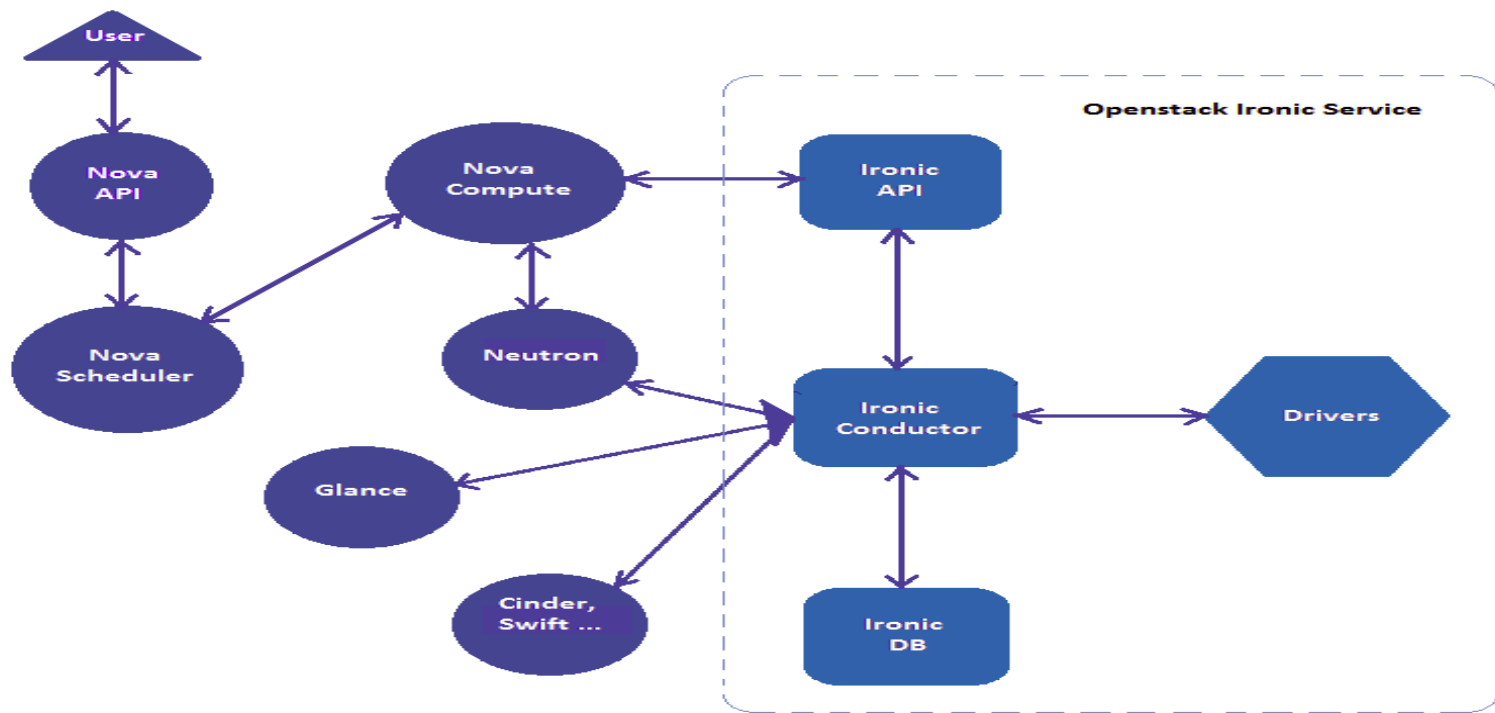
- OpenStack Bare Metal Provisioning
- Ironi 项目
 - 部署并建设裸机
 - 用途於超算，数据库，无法虚拟化的硬体计算等等。。。



Ironic 概念架构



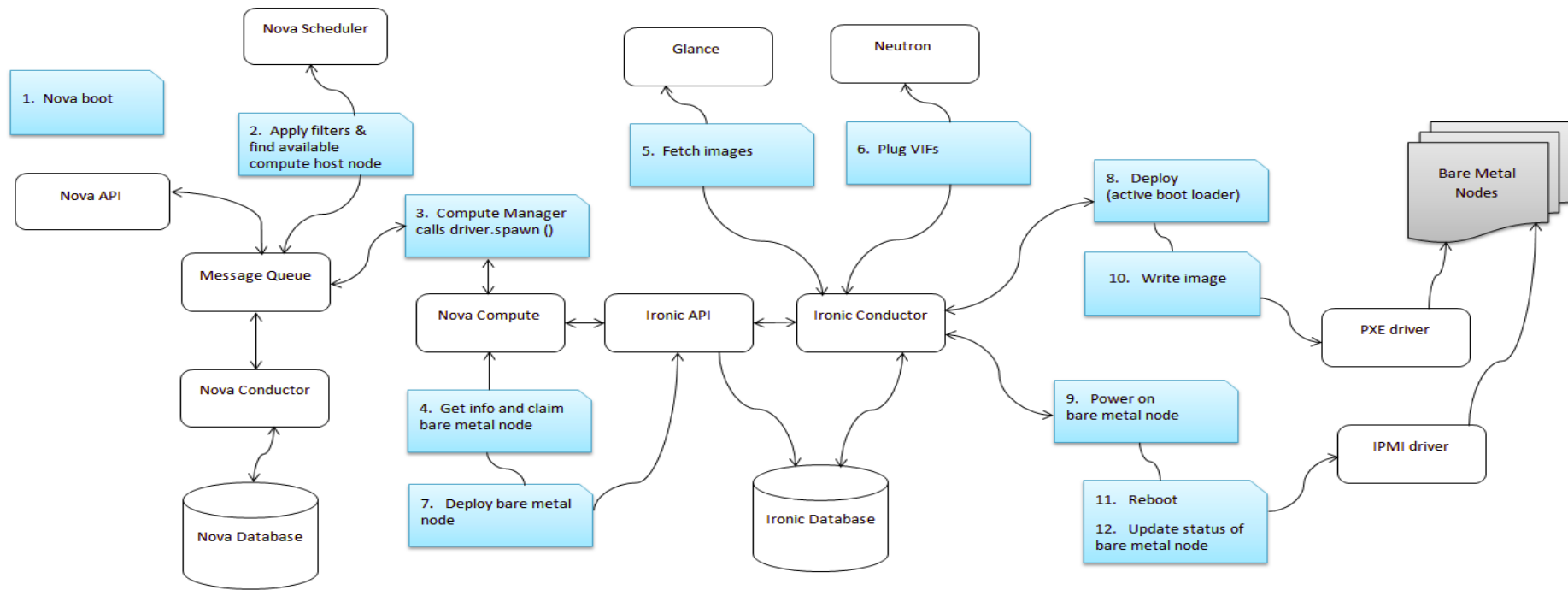
Ironiic 逻辑架构



IroniC 建造环节

- 网络配置 (provisioning, cleaning)
- Flavor (CPU, RAM, DISK)
- 部署镜像(deploy image)及用户镜像(user image)
 - disk-image-create ironic-agent fedora -o ironic-deploy
- 启动界面/管理 (PXE/iPXE, IPMI, ILO, Agent, etc)

Ironiic 部署流程

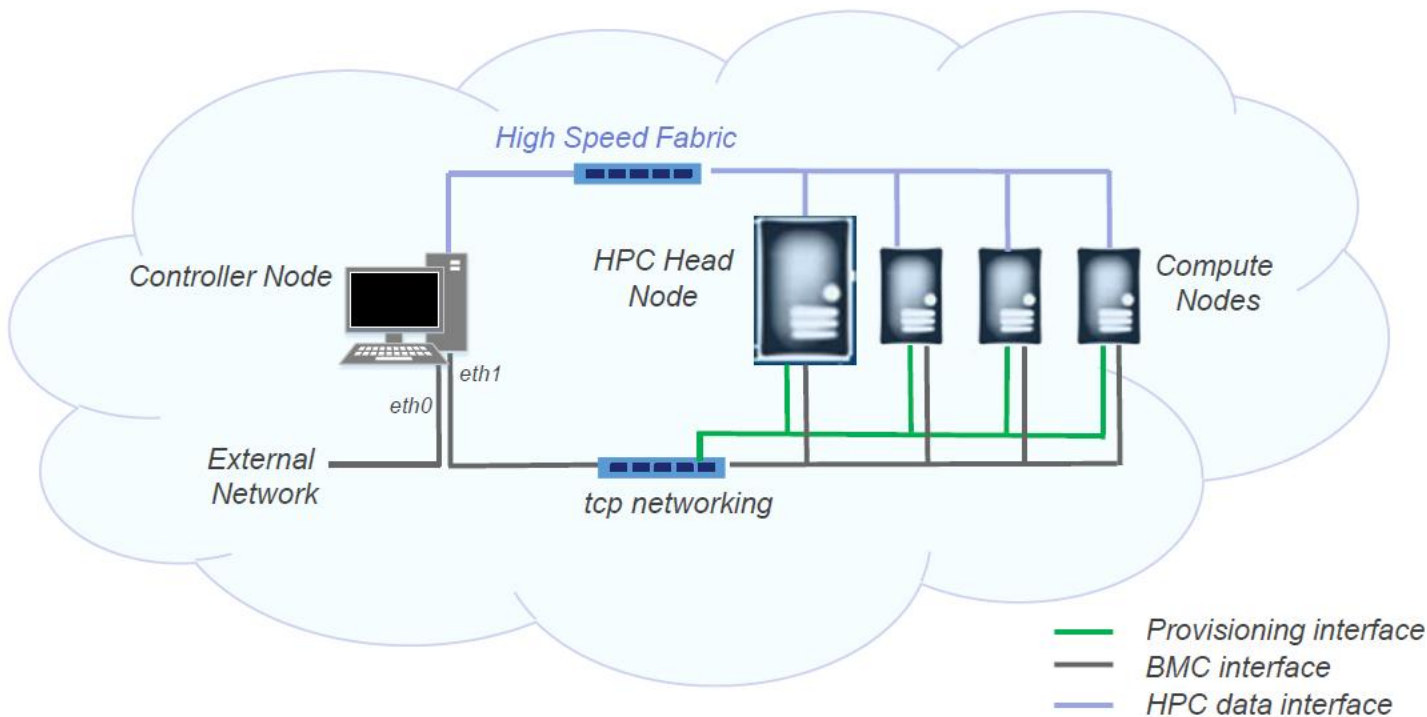


Ironiic 的发展方向

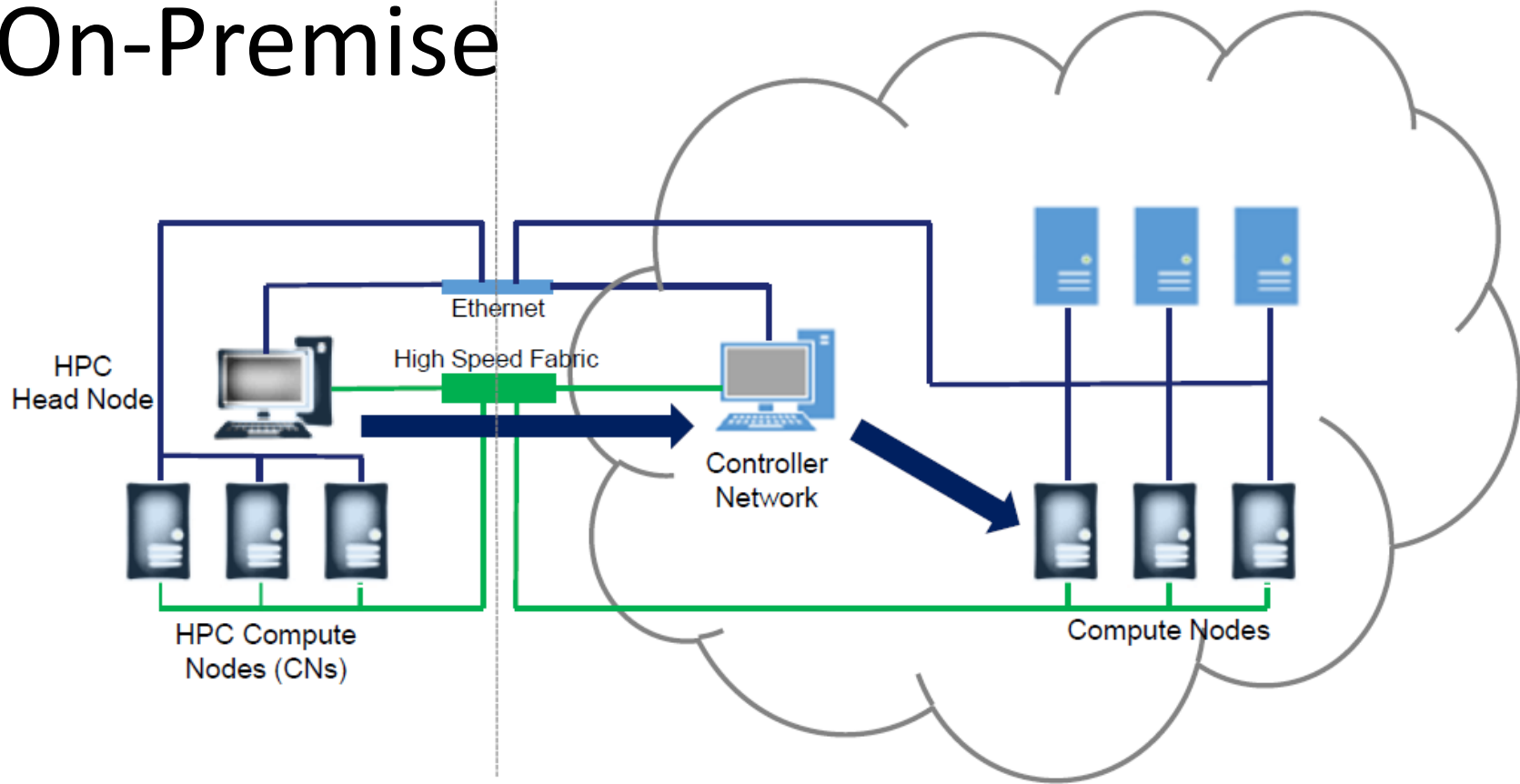
- 多网络配置(multiple network) – Ocata*
- 块储存启动(boot from volume)
- 升级(rolling upgrade)
- <http://specs.openstack.org/openstack/ironic-specs/priorities/pike-priorities.html>



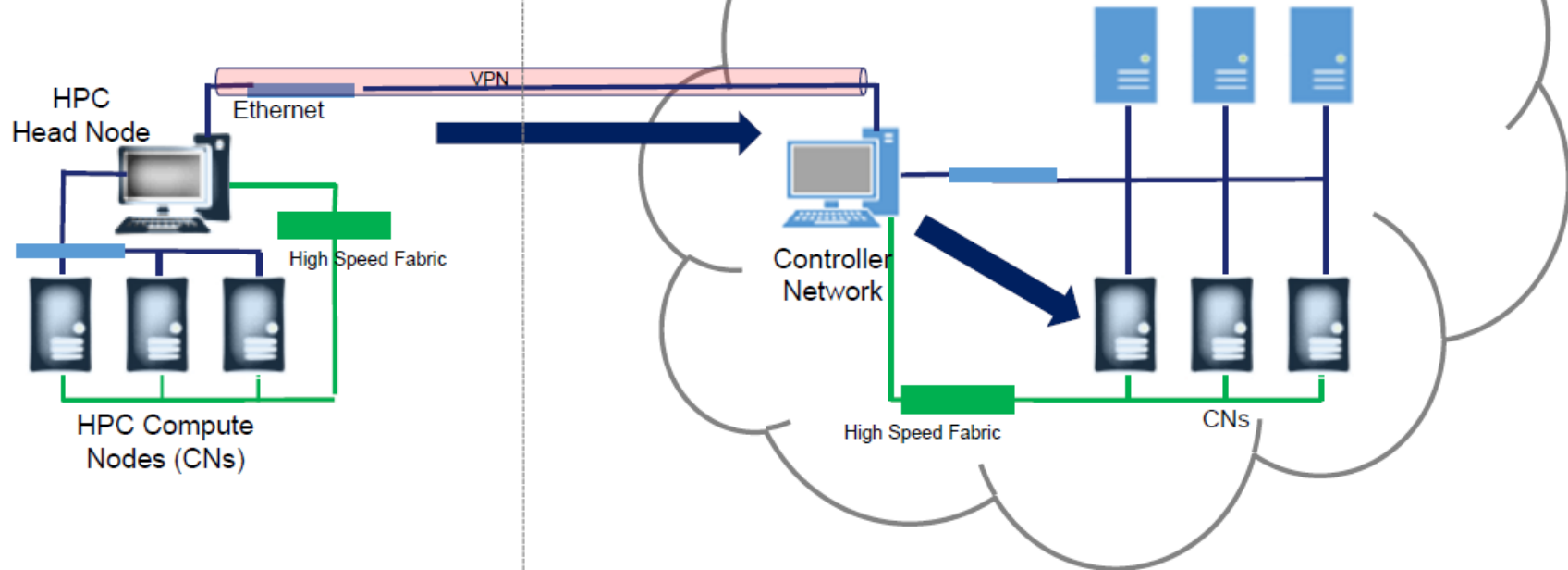
云超算开源平台



On-Premise



Off-Premise



集成方式重点

- 使用 disk-image-builder 建立 HPC 控制及计算节点 (head & compute)的影像模式 (image)
- 应用cloud-init设置 HPC 节点，善用 Heat 协助部署
- 建立OpenHPC 的OpenStack食谱

未来的研发计划

- 容器化 Containerizing
- Kubernetes 的结合
- 测试 Infiniband 及 IroniC的部署配置
- 等等。。。

Q&A



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IT大咖说
知识分享平台

THANK YOU