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Open source OS的实例：
Arm架构服务器和应用

姬信伟
服务器生态系统团队

超大量的数据

5G

关键数据

边缘

边缘

边缘

云数据中心

本地决策

过滤和行动

分析和存储

" 多少的数据会在边缘处理？ "

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多样化终端
(数据源头)

本地服务
(网关)

网络服务

边缘云

云计算中心

arm CORTEX

arm NEOVERSE

不同的IP解决不同智能单元的需求

计算　　加速　　存储

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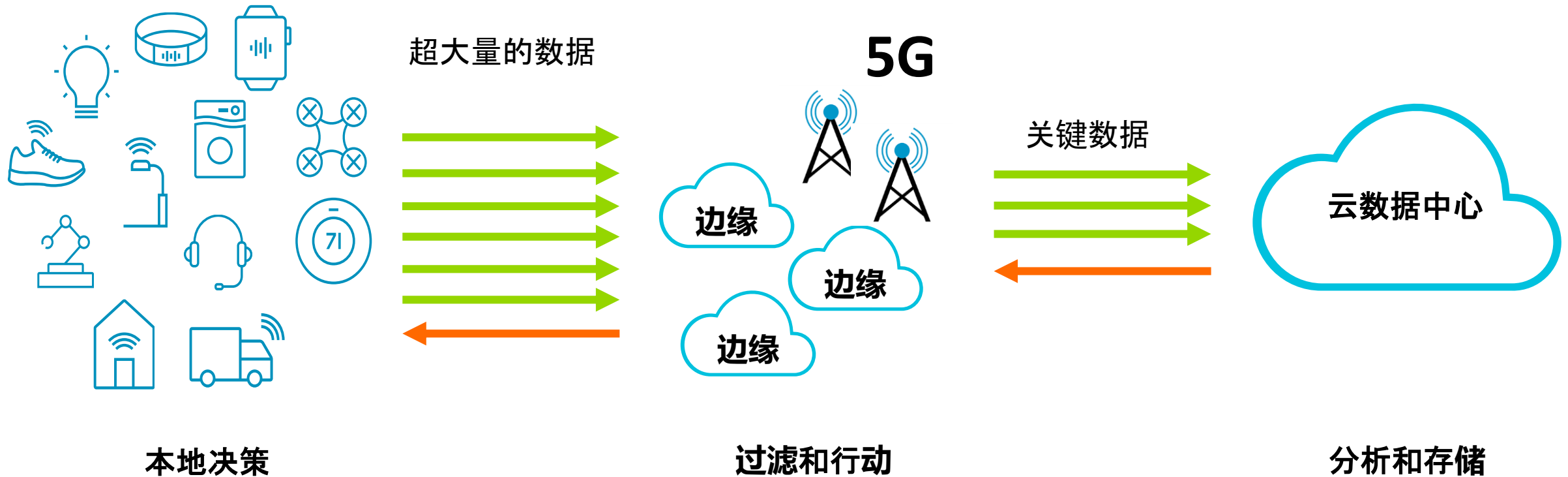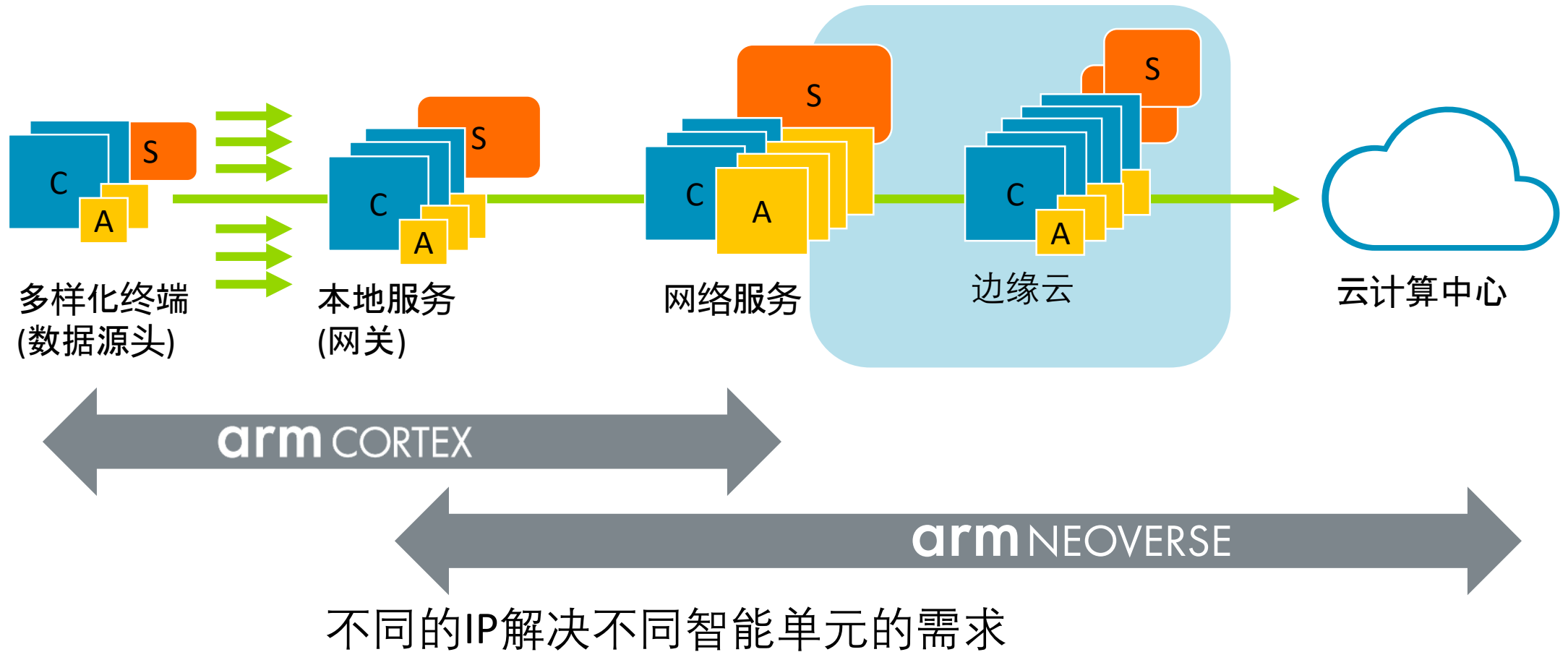
基于Arm IP设计服务器芯片：成熟架构的芯片可以开源吗？

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从边缘到核心的参考设计

得到验证的IP

支持主流EDA工具

优化的制造和伙伴

架构 & 参考设计

开源&商业软件生态

辅助 IP

开发环境

EDA 工具链

arm NEOVERSE
服务器IP

标准&认证

芯片代工&优化

编译器优化

主要的开源OS和商业软件生态的支持

从芯片、单板到服务器和云的开发支持

参与标准与认证

针对应用的优化

Server Base System Architecture 系统架构

SBSA

SBSG

Server Base Security Guide 安全指南

arm ServerReady

SBBR

Server Base Boot Requirements 启动需求

SBMR

Server Base Manageability Requirements 管理需求

服务器的基础标准，也适用于边缘计算和存储

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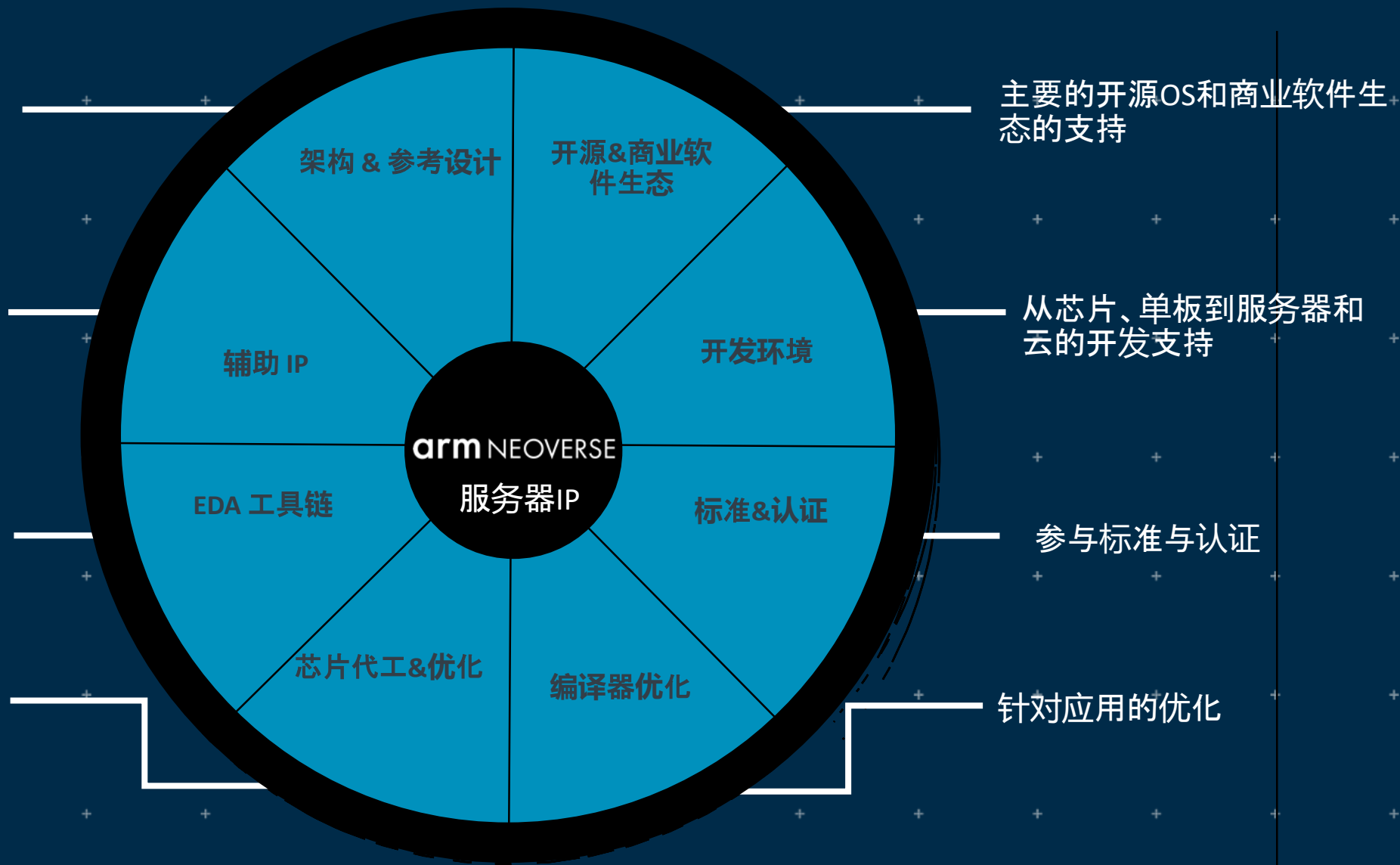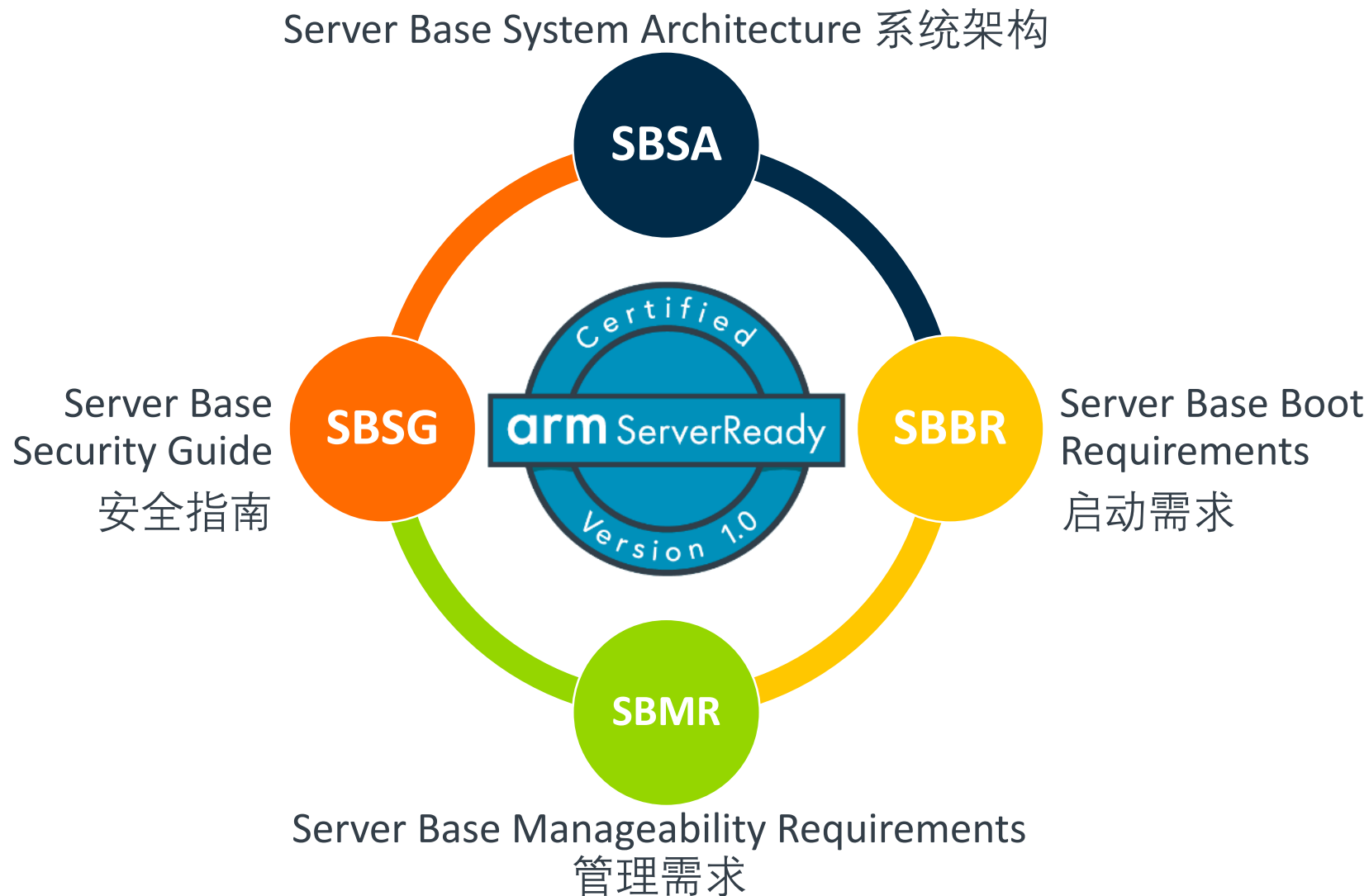
硬件的一致性、提升了开源OS的发展

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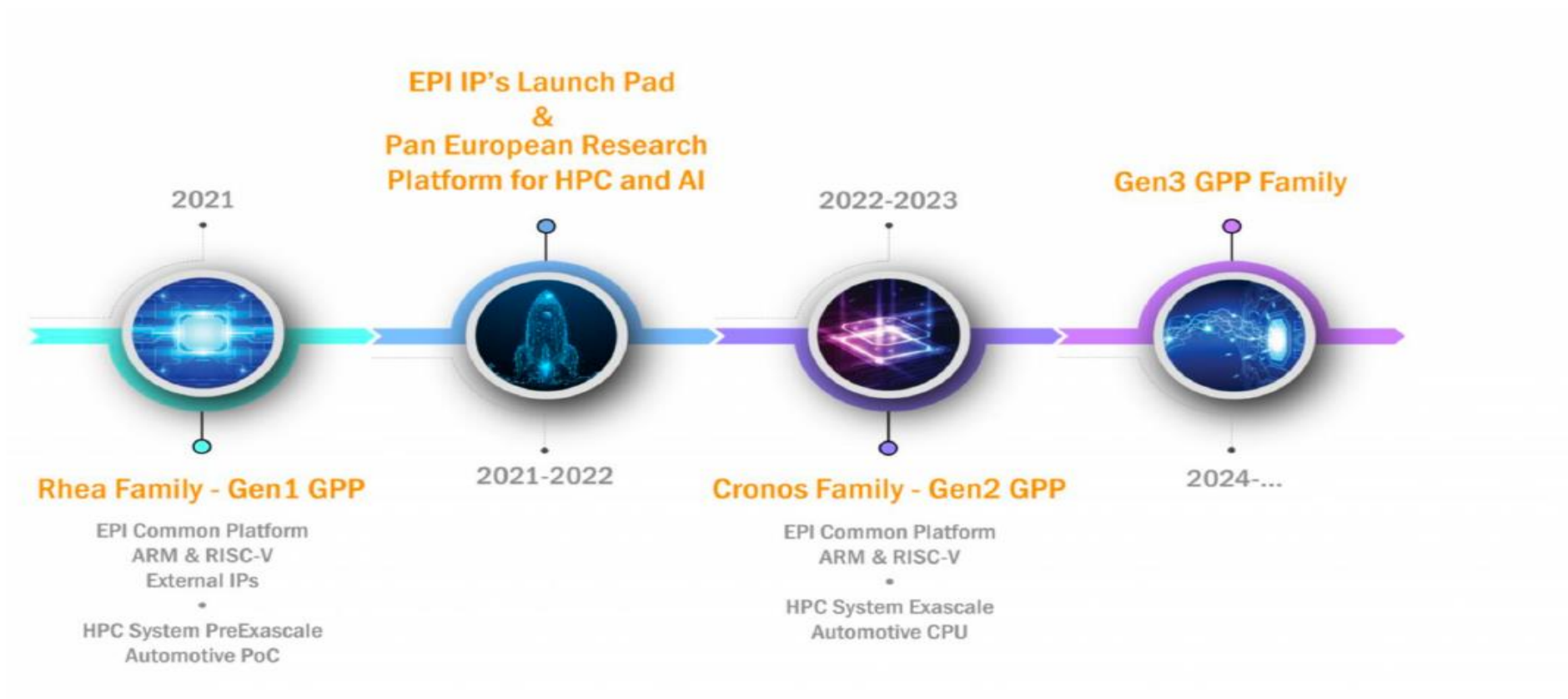
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Arm架构的分布式存储方案

应用场景

存储即服务　　　视频监控　　　媒体云　　　HPC　　　企业应用加速　　　备份
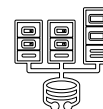
arm 分布式存储

分布式存储

块存储　　　　　　对象存储　　　　　　文件存储

arm 服务器

TaiShan 2280/TaiShan 2280 V2

ThunderX2
- max. 64 Kerne (256 Threads)
- bis zu 3,0 GHz
- 8 Speicherkanäle
- bis zu 4096 GB RAM
- DDR4 2666 REG ECC

1-2x

arm NEOVERSE 路标

16nm
Cosmos Platform

7nm
Ares Platform

~30% per Gen Performance Faster & New Features

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存储的测试和优化
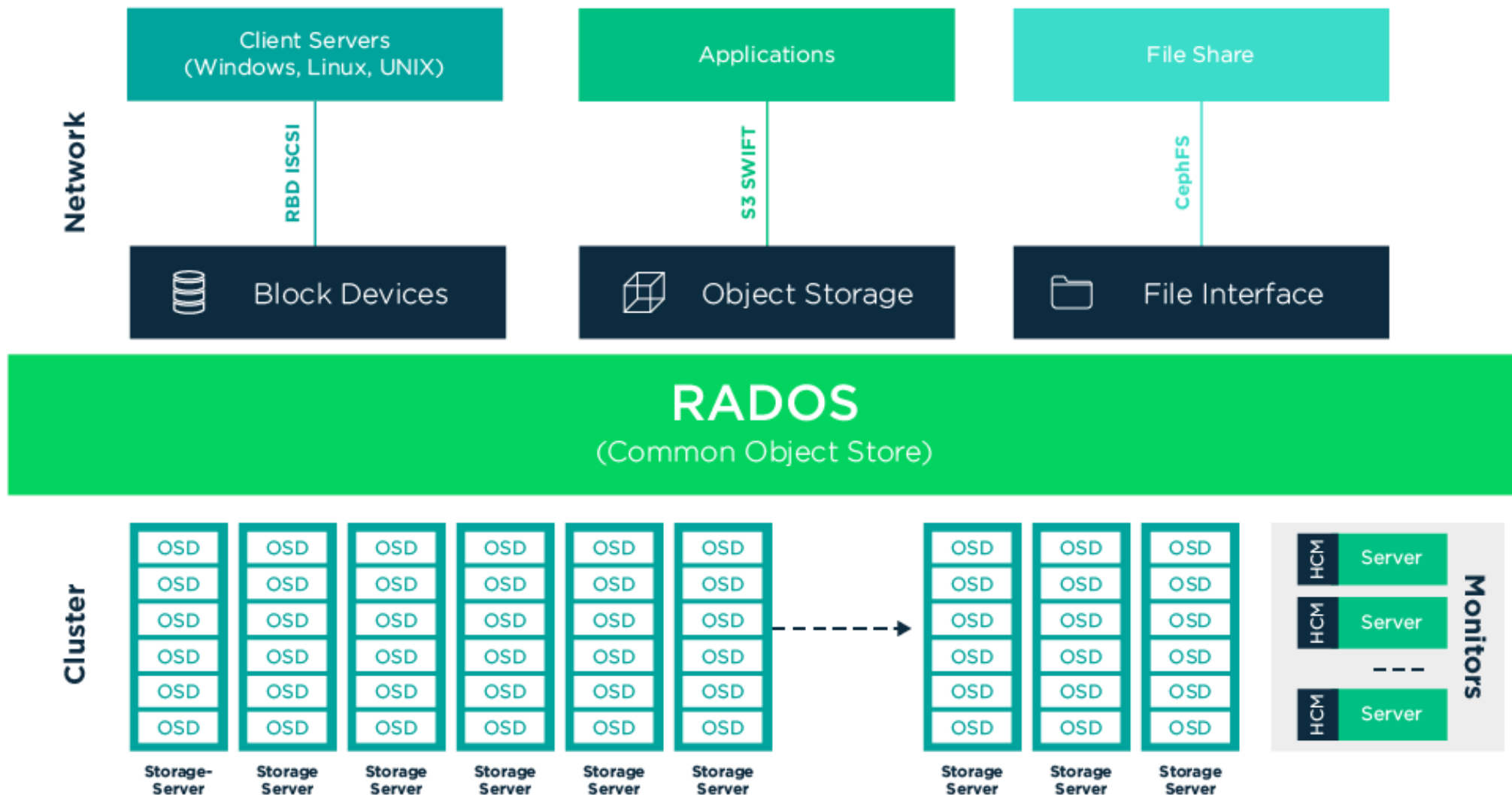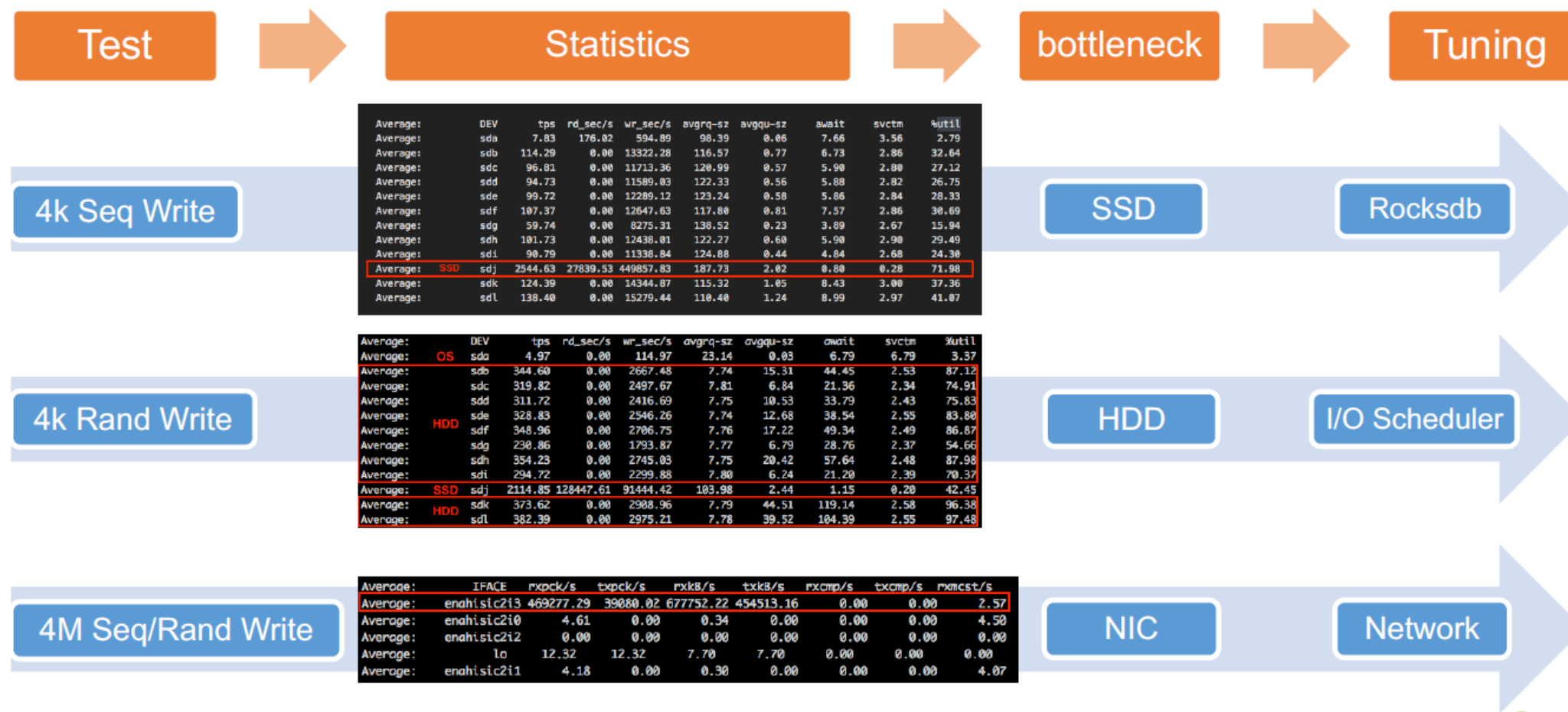
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Arm架构的手机云方案

如何更加OPEN？
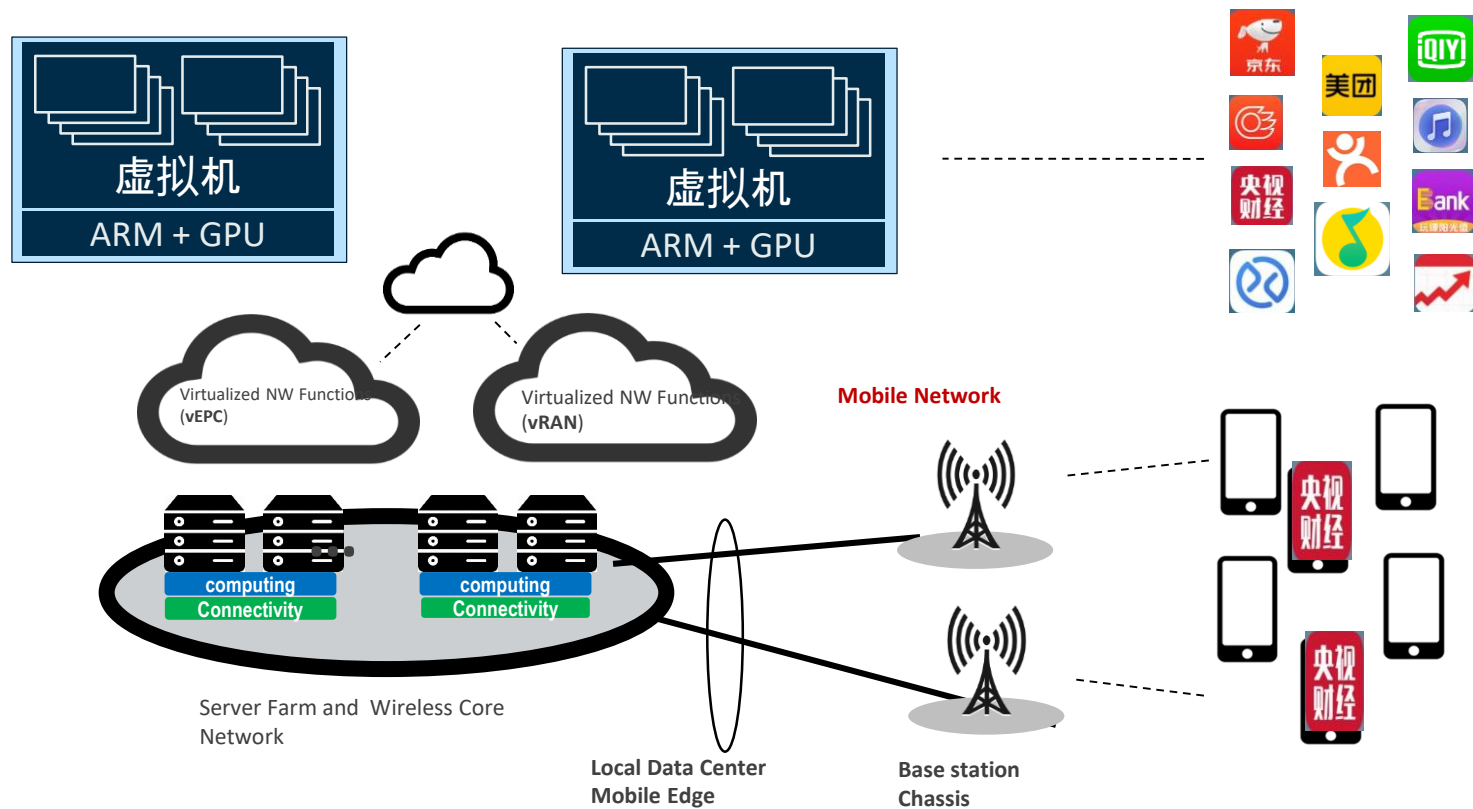
- 云端推动业务创新和盈利
  - 加快新业务部署：
    - 细分云服务平台
    - 从网络和数据到服务提供
  - 扩展收入
    - 更好服务移动产业链.
    - 快速切入到规模运营
  - 自主可控
    - 构建从服务器平台到云软件的自主开发
    - 提供更多政企应用
  - 回报周期
    - 需要研发投入新模式
    - 平台回报期要求缩短

Cloud	Edge Compute	Cell Phone	
Android流量90%以上	运营商	13亿部	从话音数据到应用服务
每用户月租	30RMB/month		2C云是海量市场

Android Cloud

GPU acceleration SW stack ④

Android Container | Android Container | ② | Android Container | Android Container

PaaS (Kubernetes & Docker) ③

Host OS (Ubuntu, CentOS, etc) ①

IaaS (OpenStack) ③

Arm Server — ARM64 | GPU ... Arm Server — ARM64 | GPU

⑤ H.264 stream

events &status

Client ⑥

1. Linux kernel with features for Android, virtualization, container, etc
2. Android support in container (bootup, networking, device emulation, ADB, etc)
3. Cloud infrastructure (public or private) including various tools and services
4. Full software stack for GPU acceleration
5. Communication protocols between Cloud and Client
6. Terminal applications on client devices

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开源实例：arm架构

Akraino Radio Edge Cloud (REC) Blueprint

| | | | | | | RIC xApps - examples |
| Admission Control xApp | DualCo xApp | ANR xApp | Reporting xApp | | | |

| A1 Mediator | E2 Terminator | E2 Manager | Routing Manager | xApp Manager | RIC Basic functions |

| RIC PaaS | RIC PaaS |

| Host Rest API | CaaS API | NBI APIs |

Portal

Regional Controller
- Remote Installer
- Workflow Manager
- Switch Manager
- Server Manager
- Network Manager
- Blueprint LCM
- Artifact Manager
- Software Manager
- Performance/Fault Manager
- HW Management

ONAP
RIC Dashboard

Middleware:
| Elasticity |
High Availability	Symptoms	Audit Trail	Cert mgmt.	FM collect
B&R	Maintenance	Health Check	SWM	Inventory
User mgmt. (AAA)	Logs collect	PM collect

| Deployment | Ironic L3 | CLI FWK | Centos | CM FWK | Airship 1.0+ (Future) |
| Kubernetes | Docker | Helm | DANM | Ceph / NTP/DNS | |

Hardware

https://www.lfedge.org/projects/akraino/release-1/telco-appliance-radio-edge-cloud/

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Akraino Radio Edge Cloud (REC) Blueprint

- https://wiki.akraino.org/display/AK/Radio+Edge+Cloud+%28REC%29+Use+Case+Details

- Use case: Infrastructure orchestration
  - L3 Deployer: an OpenStack Ironic-based hardware manager framework

| Case Attributes	Description	Informational
Type	New	
Blueprint Family - Proposed Name	Telco Appliance	
Use Case	RIC	
	vRAN	
Blueprint proposed Name	Radio Edge Cloud	
Initial POD Cost (capex)		
Scale & Type	x86 OCP Open Edge servers x 6	
Applications	RIC	
Power Restrictions		
Infrastructure orchestration	Airship	
	Redfish	
	ONAP	
SDN	OVS-DPDK	
Workload Type	Containers	
Additional Details	Submitter to provide additional use case details	

OpenStack BareMetal : Ironic

- Ironic "drivers"
  - IPMI for basic management
  - Redfish
  - Other BMC proprietary (OEM specific)

- Redfish driver (Edge use cases):
  - Out-of-band inspection of nodes
  - Boot from virtual media (without DHCP) using Ironic L3 Deployer
  - BIOS configuration
  - Future: FW Updates


```
openstack baremetal node create \
  --driver redfish \
  --driver-info redfish_address=https://example.com \
  --driver-info redfish_system_id=/redfish/v1/Systems/CX34R87 \
  --driver-info redfish_username=admin \
  --driver-info redfish_password=password
```

OCP OpenEdge Chassis

- https://www.opencompute.org/wiki/Telcos/openEDGE
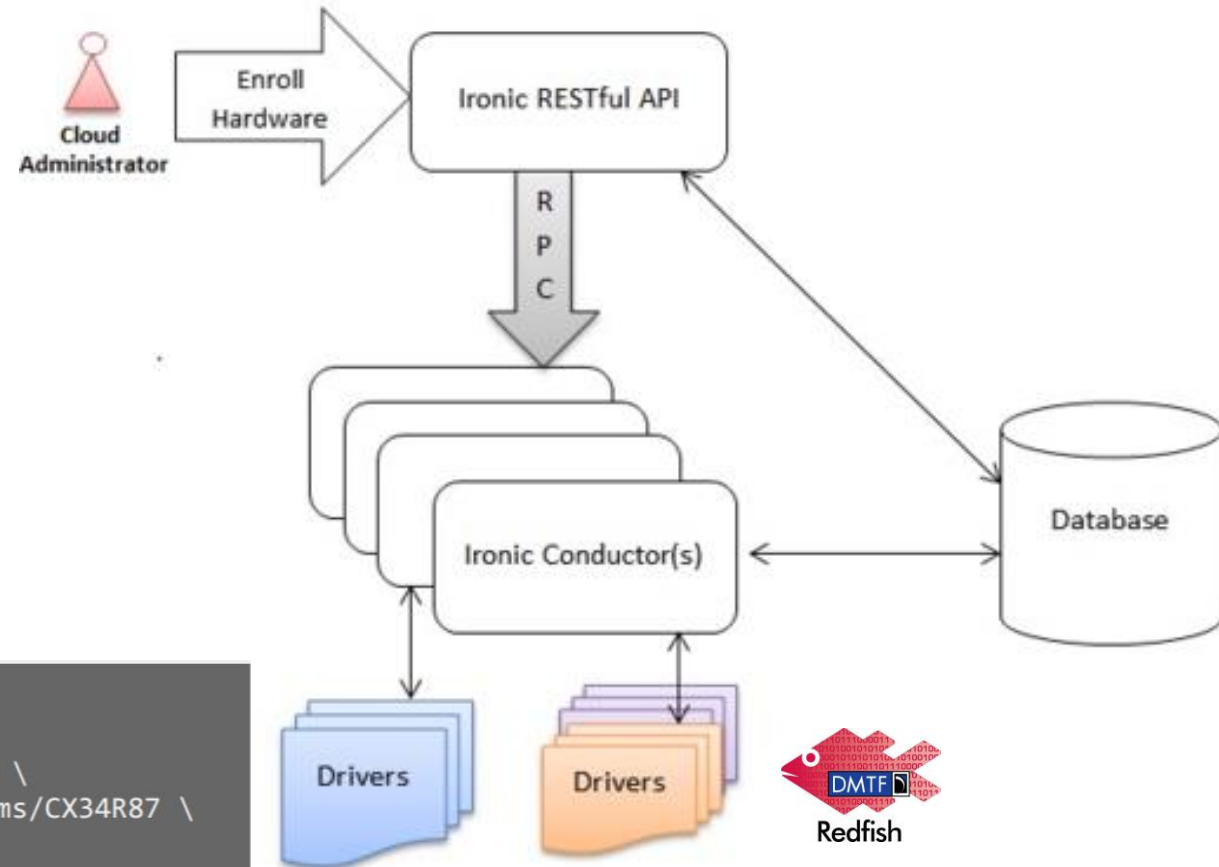
- BMC requirement

- Redfish and IPMI

- Depends on OpenRMC

4   Chassis Specifications

The key specifications of Open edge chassis and sleds are shown in Table 1.

Table 1 Key specifications of Open edge chassis

Technical specifications	
Form factor	3U, 19" rackmount
Server sled bays	Possible server configurations • 5 x 1U sled • 1 x 2U sled + 3 x 1U sled • 2 x 2U sled + 1 x 1U sled

Power supply	Dual, high efficiency, 1+1 redundant, hot-plug PSUs.
	Available PSU options
	
	• 230 VAC, 80+ platinum
	   o operating voltage range 180 VAC…264 VAC, output power 2000 W,
	   o operating voltage range 90 VAC…140 VAC, output power 1000 W
	   o Bel Power PET2000-12-074xA (x denotes airflow direction)
	• -48 VDC, 80+ platinum
	   o operating voltage range -40…-72 VDC, output power 2000 W
	   o Bel Power PET2000-12-074xD (x denotes airflow direction)

Sled power feed capacity	400 W max (1U sled), 700 W max (2U sled)
Cooling	Autonomous fan units on sleds and PSUs, reversible air flow

HW management (RMC)	Integrated HW management controller (AST2520) supporting
	
	• Ethernet interface for chassis management
	   o 2 x 10 Gbit/s (SFP+) and 1 x 1 Gbit/s (RJ45) front panel interfaces for uplinks or chaining multiple chassis
	   o 1 Gbit/s management Ethernet interface to RMC and all sleds via backplane
	• USB serial port for debug
	• Redfish, IPMI

Operating conditions	Chassis, PSUs, RMC:

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OCP OpenRMC

- https://www.opencompute.org/wiki/Hardware_Management/Open_RMC
- Initial development using IPMI + OCP specific OEM extensions
  - Abandoned (Legacy) in favor of Redfish North Bound API
- Redfish Profiles and inter-op testing tool for compliance:
  - OCP Baseline Hardware Management v1.0.0
  - OCP Server Management Interface v0.2.0
  - https://github.com/opencomputeproject/OCP-Profiles
  - Testing using https://github.com/DMTF/Redfish-Interop-Validator

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7. RACK MANAGEMENT CONTROLLER INTERFACES

The Rack Management Controller interfaces shall include support for Redfish Scalable Platform Management API. RMC designers may include support for other interfaces such as IPMI, CLI and Web Interface for support of legacy applications.
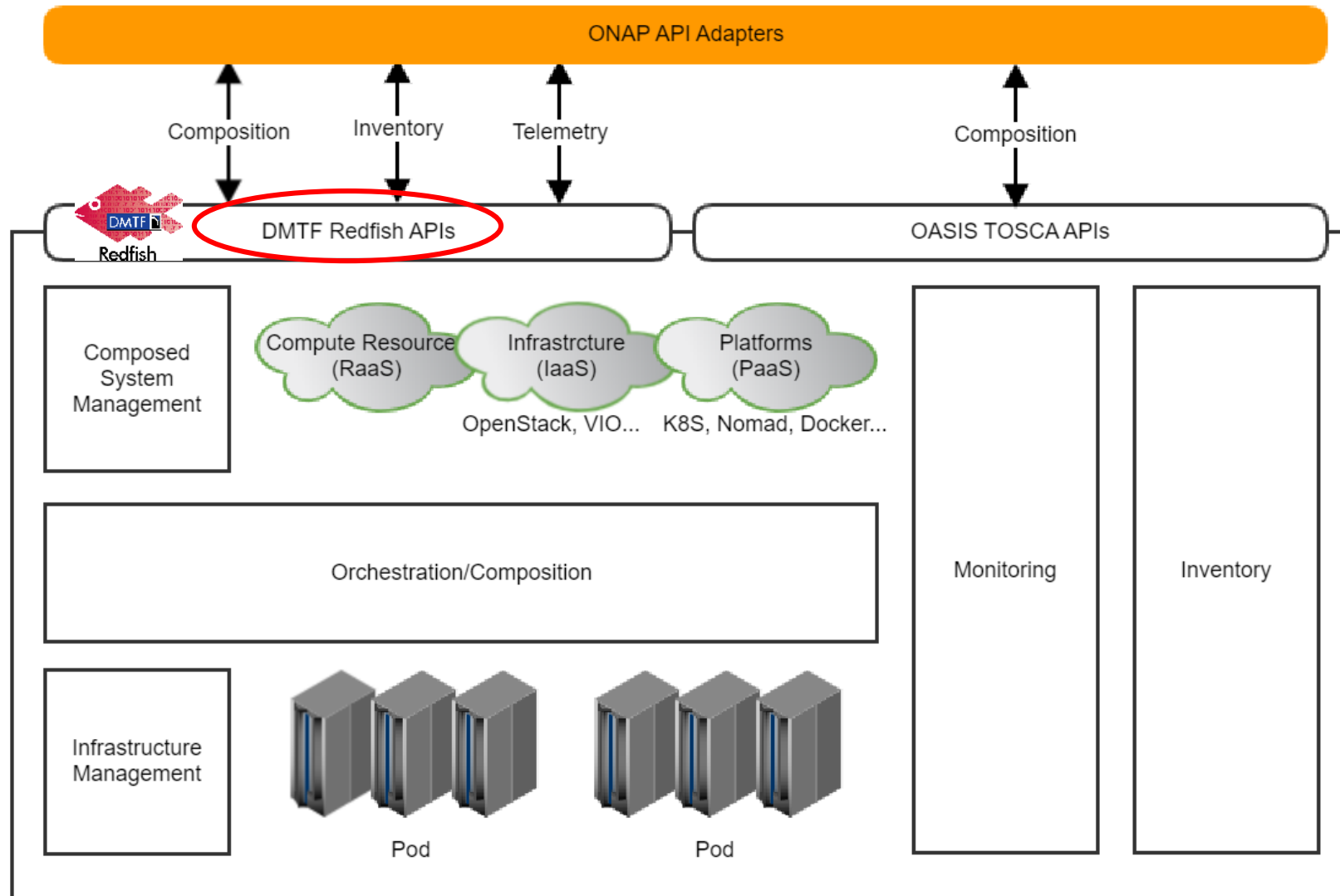
7.1.1. INTERFACE VERSIONS

The Rack Management Controller interfaces shall conform to the Redfish Scalable Platforms Management API Specification version 1.6.x.

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ONAP : Open Network Automation Platform

ONAP
OPEN NETWORK AUTOMATION PLATFORM

https://www.onap.org/

ONAP API Adapters

Composition   Inventory   Telemetry   Composition

Redfish   DMTF Redfish APIs   OASIS TOSCA APIs

Composed System Management

Compute Resource (RaaS)   Infrastrcture (IaaS)   Platforms (PaaS)

OpenStack, VIO...   K8S, Nomad, Docker...

Orchestration/Composition

Monitoring   Inventory

Infrastructure Management

Pod   Pod

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ONAP : Open Network Automation Platform

- ONAP Composable Disaggregated Infrastructure (CDI) project

  https://www.onap.org/

- ONAP CDI Redfish use cases:
  - Composition
    – Automated resource composition and instantiation
    – Automated IaaS (OpenStack) composition and scaling
    – Automated PaaS (K8S) composition and scaling (future)
  - Inventory
    – HW Inventory and capacity information
  - Telemetry:
    – Data Collection, Analytics and Events (DCAE) integration

- https://wiki.onap.org/display/DW/Support+for+Composable+Disaggregated+Infrastructure+%28CDI%29+-+A+Multi-Cloud+Project

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OPNFV : Open Platform for NFV

- **Project Barometer** - Platform monitoring of the NFV Infrastructure
  - CPU, memory, load, cache, thermals, fan speeds, voltages and machine check exceptions, etc.
  - Telemetry and health

- Plugin architecture
  - IPMI
  - Redfish
  - Others

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OPNFV – Barometer – Redfish plugin

Collectd Redfish Plugin HLD

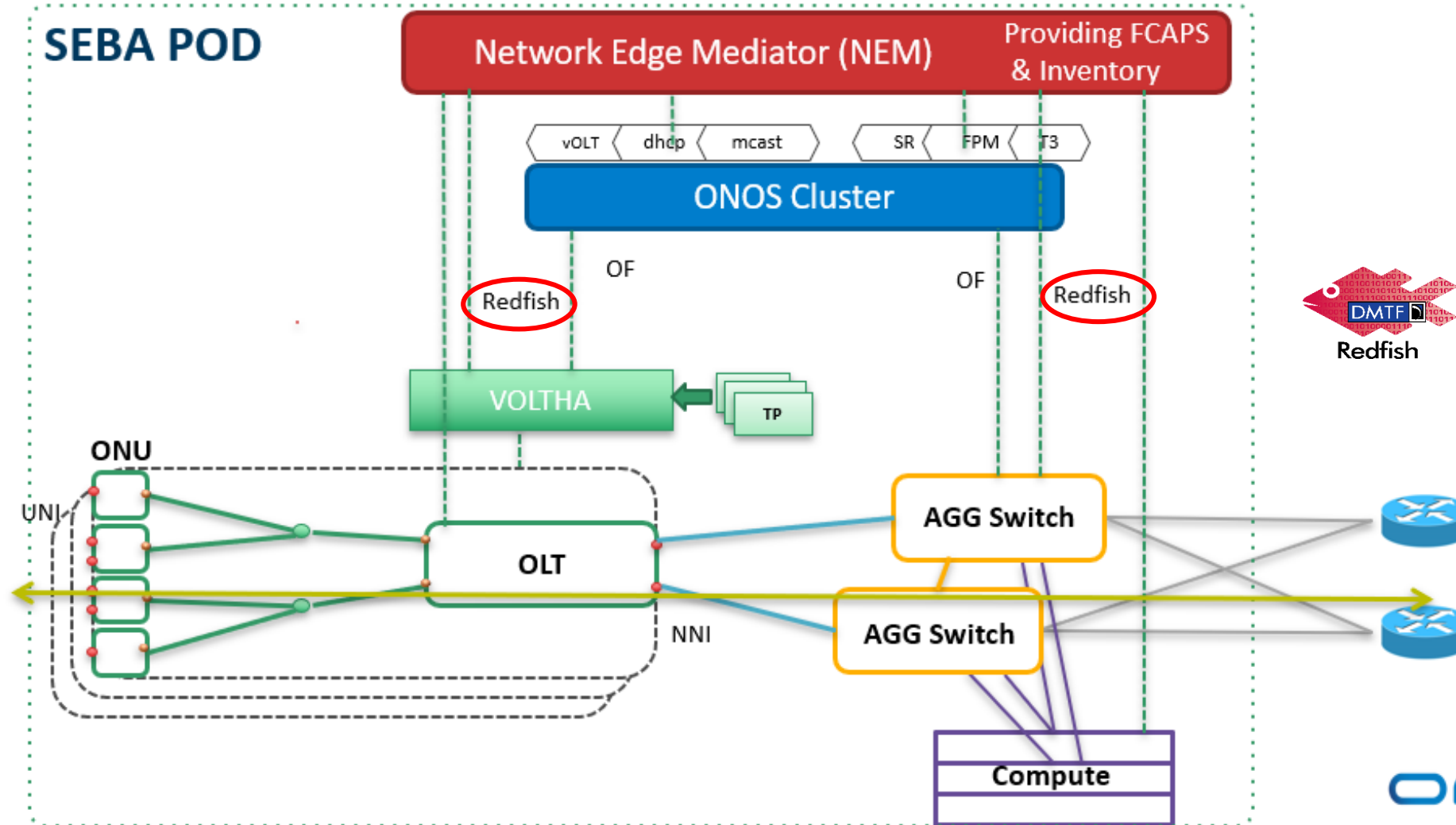Created by Man Singh, last modified by Krzysztof Kepka on Oct 05, 2018

Requirement

	Name	Description
1.0	Support Redfish v1.0	Make use of REST API and scheme defined in Redfish standard v1.0
2.0	Configurable list of endpoints	Plugin configuration shall contain list of queries and list of services.
		Each query entry shall contain endpoint and list of resources to be collected.
		Each service entry shall contain credentials to gain access and list of queries to perform,
3.0	Configurable mapping of redfish sensors to collectd metrics	There shall be mapping between redfish sensors to collectd sensors as for units and types.
4.0	OOB monitoring	Collecting telemetry shall be performed over the network.
5.0	Supported metrics of redfish v1.0	Metrics shall be supported: • Temperature • Power • Fan

https://wiki.opnfv.org/display/fastpath/Collectd+Redfish+Plugin+HLD

ONF SEBA: SDN Enabled Broadband Access

Summary

Edge Software Stacks	AKRAINO EDGE STACK · ONAP Open Network Automation Platform · OPNFV · SEBA · openstack
Standard OS / Hypervisor	redhat · ubuntu · vmware ESXi · CentOS · SUSE
Remote HW Management	BMC · OpenBMC · DMTF Redfish · IPMI
Server-based designs	
Arm Server Standards	SBSA · SBBR · SBMR · SBSG

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开放标准、共建生态、合作共赢