



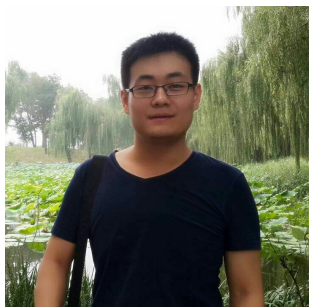
How Did OpenStack Improved for Public Cloud in Recent Releases and What Are Still Missing?

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About us:



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- **Sheng Liu**
Huawei Technologies Co., Ltd.
OpenStack Contributor, OpenLab Maintainer, Upstream Developer.

1. The Uniqueness of Public Cloud
2. What is the benefit From OpenStack ?
3. OpenStack Improvements in Recent Release For Public Cloud
4. What are Still Missing In OpenStack ?

1. The Uniqueness of Public Cloud

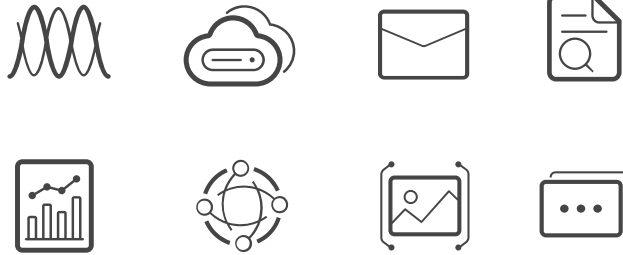
1. The Unique User

• Different Scale •



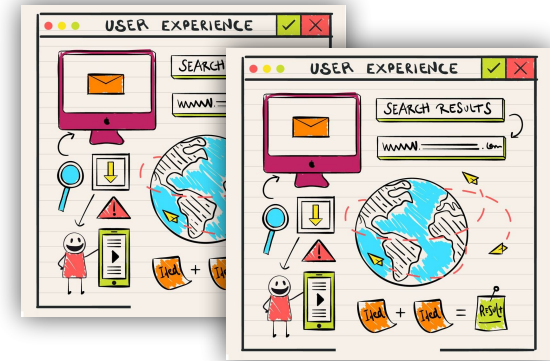
The scale of Public Cloud users could be very different, ranging from a personal user uses VM setting up his own VPN to enterprise that have thousands of employees.

• Various Demand •



According to their use cases, the users demands varies, there could be thousands of service combinations, and they will want them cheap, functional and easy to use.

• Extreme User Experience •



Different type of users will have different user experience preference, for example, rookie users may want it as simple as possible, but pros may want to have full control of their resources.

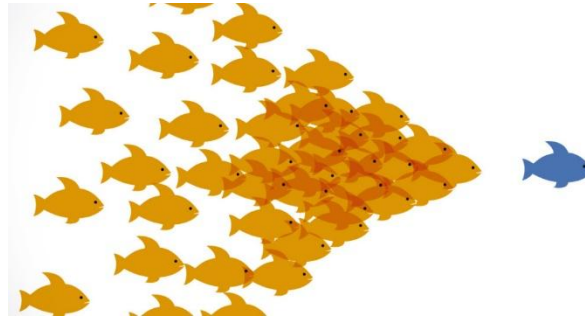
2. The Unique Operator

○ Huge Number of Users ○



The Public Cloud will serve huge number of users from all over the world, it is challenging to operate a platform at this scale and complexity, operators would have to consider cost, availability, performance, security, etc.

○ Follow the Trend ○



The Cloud have to always follow the trend, both technical and commercial. Operators should be able to response fast to the market and release new attractive services rapidly.

○ Flexible & Fine-grained Billing ○



Support flexible and fine-grained billing options for users, users will be able to choose the most suitable way according to their use cases, for example, user could pay either metering or monthly/yearly.

3. The Unique Vendor

Rapid Dev Iteration



In order to fulfill the various requests from Public Cloud users and the Operators request of rapid service release, the vendors have to be able to develop in small step and rapid iteration.

Easy Upgrade



Rapid dev iteration will lead to rapid upgrade, vendors will have to provide a way of easy upgrades to help the operators release the latest services.

Stability and Performance



Running a Public Cloud normally means running it for 60*24*365, high availability for all time is the commitment from vendor and operator to customer, as well as high performance.

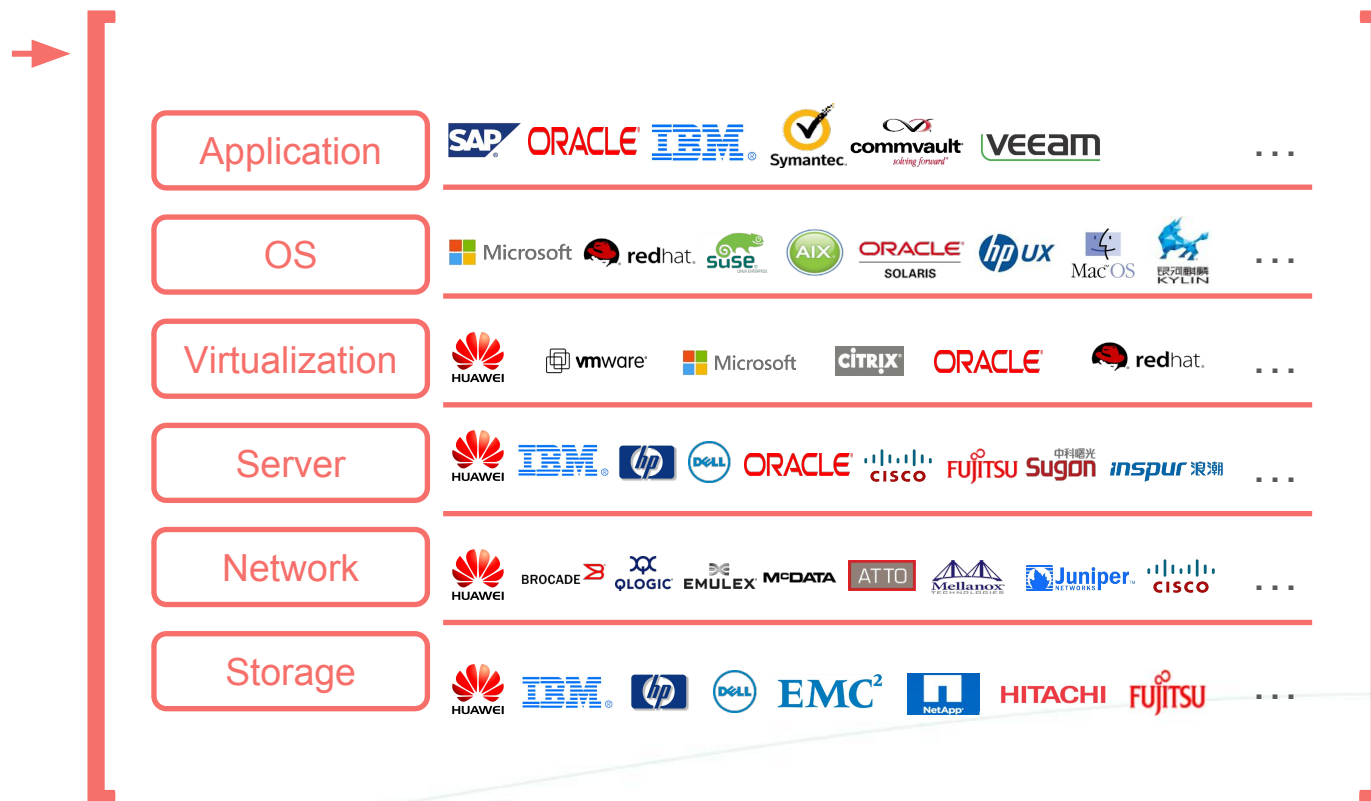
2. What is the Benefit from OpenStack ?

I'm an OpenStack User

1. Interoperability and compatibility

2. All kinds of services and features

3. Various peripheral ecological tools

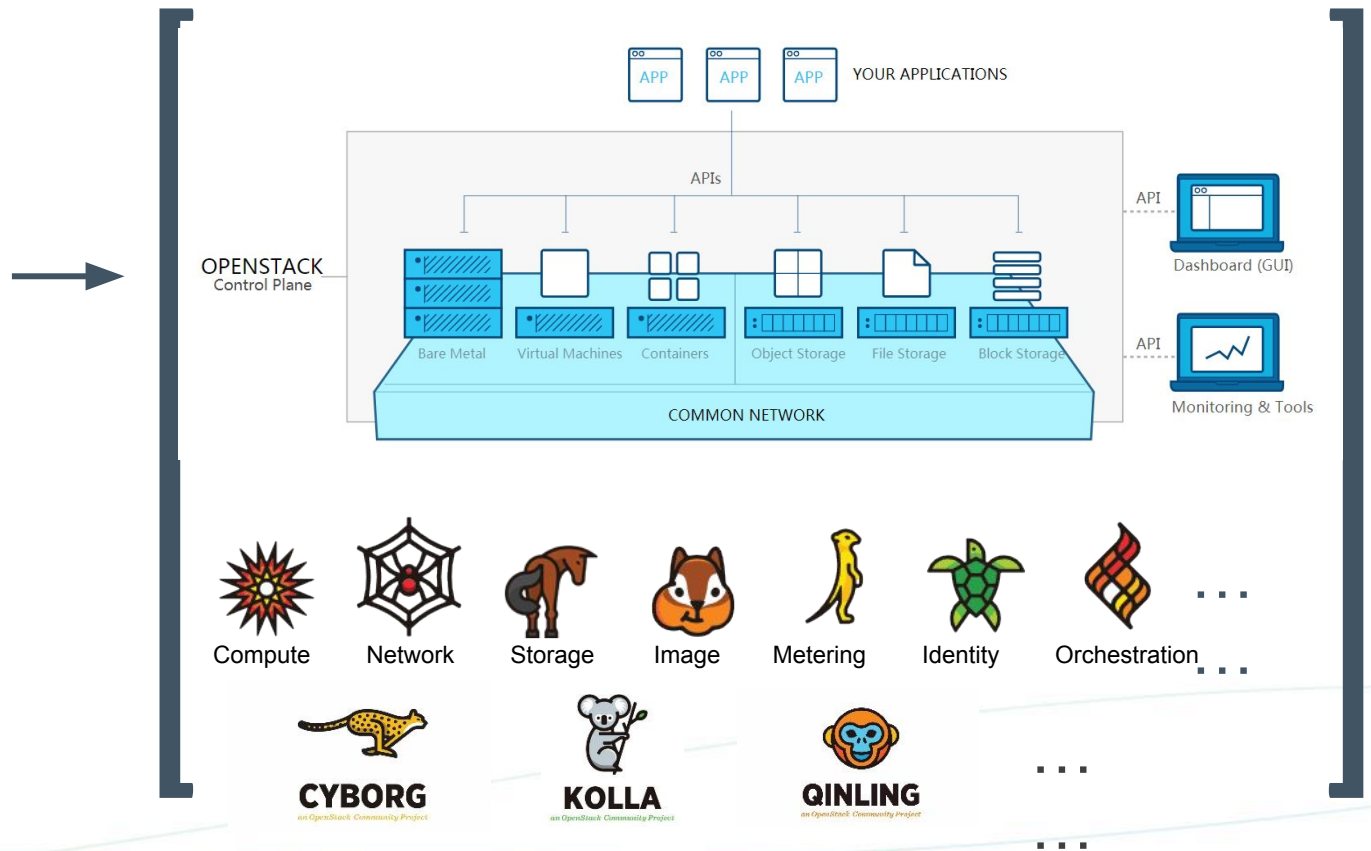


I'm an OpenStack User

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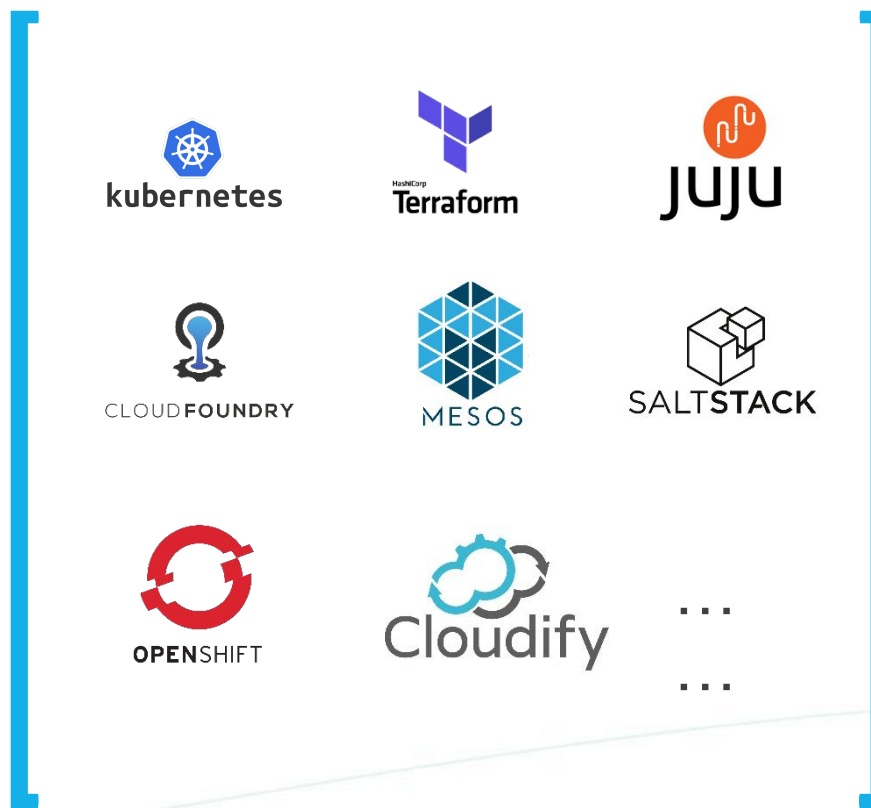


I'm an OpenStack User

1. Interoperability and compatibility

2. All kinds of services and features

3. Various peripheral ecological tools



I'm an OpenStack Operator

1. Avoid vendor lock-in

2. Free technical support, continuous evolution, fast iteration.

3. Hot service



- ✓ Avoid Server Device lock-in
- ✓ Avoid Hardware Device lock-in
- ✓ Avoid OpenStack Vendor lock-in

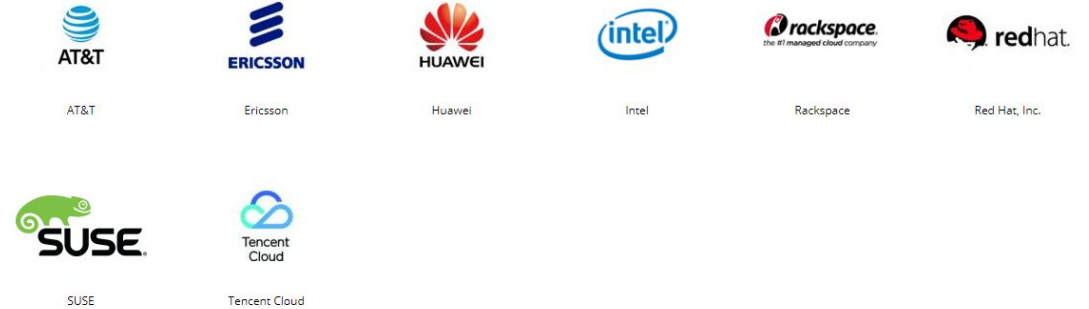
... ..

I'm an OpenStack Operator

1. Interoperability and compatibility,
Avoid Device and Vendor lock-in

2. Free Technical Support, continuous
evolution, fast iteration.

3. Hot service



Hot discussion of real user requirement,
grow together with the Giants, open and fair discussion
from all company.

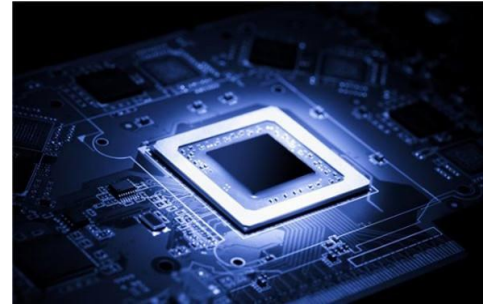
Take Keystone Unified Limit Feature as an example, it comes
from CERN's real nested relationship user model.

I'm an OpenStack Operator

1. Interoperability and compatibility,
Avoid Device and Vendor lock-in

2. Free Technical Support, continuous
evolution, fast iteration.

3. Hot Services following the trends



CYBORG
an OpenStack Community Project

In the active OpenStack community, there are a group of people who are rapidly implementing hot services



Take Acceleration Management Service “Cyborg” as an example, it only takes 6 months from idea to implementation.

I'm an OpenStack Vendor Developer

1. General framework and modular components



2. Upstream code and Product code Decoupling

3. Build our QA system using community CI

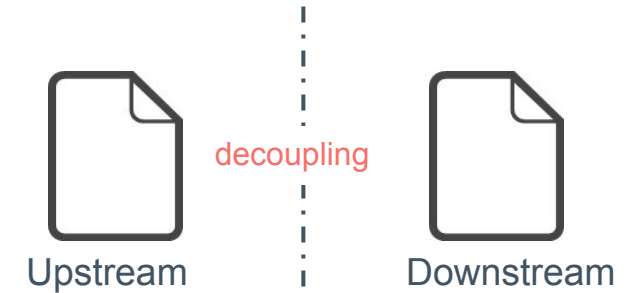
- Common libraries and middlewares
- Common architecture API+Object+DB
- Common schedule mechanism(Filter & Weight)
-

I'm an OpenStack Vendor Developer

1. General framework and modular components

2. Flexible customization and delivery

3. Infrastructure leverage



- Up/Downstream code decoupling
- Pluggable architecture
- Code reuse

I'm a OpenStack Vendor Developer

1. General framework and modular components

2. Flexible customization and delivery

3. Infrastructure leverage



- Zuul
- Jenkins
- Gerrit
- UT, Tempest...

3. OpenStack Improvements in Recent Release for Public Cloud Scenarios

OpenStack Improvements in Recent Release

User View	Operator View	Vendor View
<ul style="list-style-type: none">➤ Nova:<ul style="list-style-type: none">• Tag support• Expose extra-specs to flavor• Pagination Support• Improve filter instances by IP➤ Cinder<ul style="list-style-type: none">• Resource total count info in list APIs➤ Neutron<ul style="list-style-type: none">• Push Notifications for Agents(Performance)➤ Keystone<ul style="list-style-type: none">• Federation• Application credentials• Service token	<ul style="list-style-type: none">➤ Nova:<ul style="list-style-type: none">• Placement• API Database Separation• Support disabling a cell• Filter and sort whitelist➤ Cinder<ul style="list-style-type: none">• Volume multi-attach• Support AZ in volume type operation type backend filter• Explicit user messages➤ Neutron<ul style="list-style-type: none">• routed network• Vlan aware VMs➤ Keystone<ul style="list-style-type: none">• Application credentials• PCI DSS• MFA	<ul style="list-style-type: none">➤ Nova:<ul style="list-style-type: none">• Cell v2• Record host info in instance action➤ Cinder<ul style="list-style-type: none">• Dynamic Log Level control• Dynamic Reconfiguration➤ Neutron<ul style="list-style-type: none">• Logging API for security-group-rules• Port data plane status➤ Keystone:<ul style="list-style-type: none">• Unified limits

What Are Still Missing?

The True Story from Huawei Cloud

Huawei Public Cloud



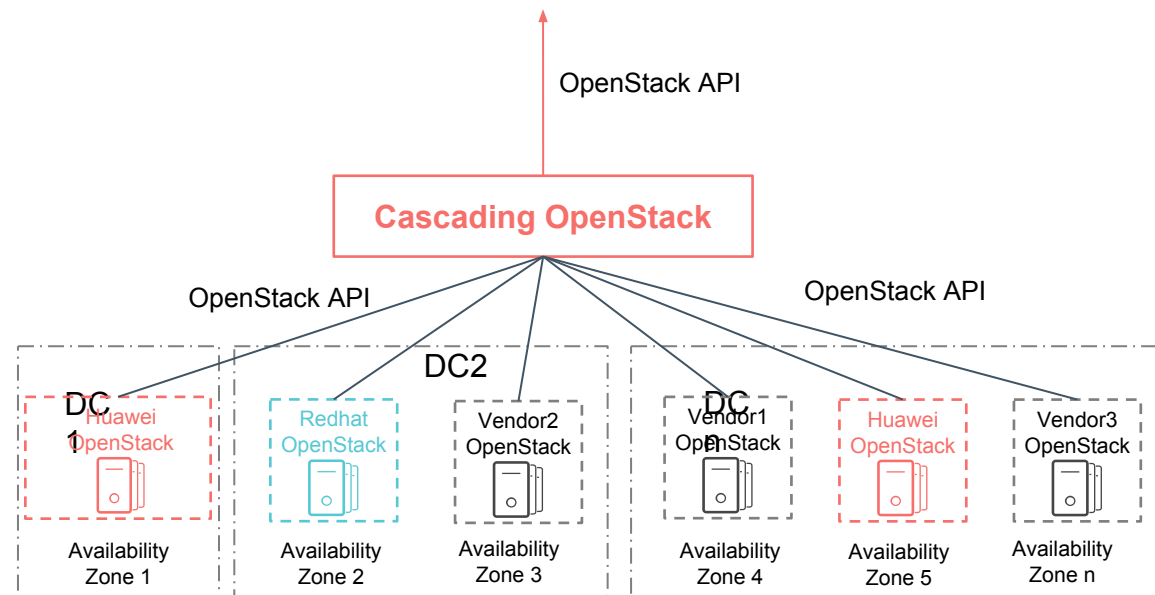
- OpenStack **Platinum** member
- **2000+** partner companies
- **60+** solutions
- **100+** cloud services

Large scale deployment: Cascading Architecture

Current Status

Only Nova Support the Cell V2 architecture.

Our Practice:

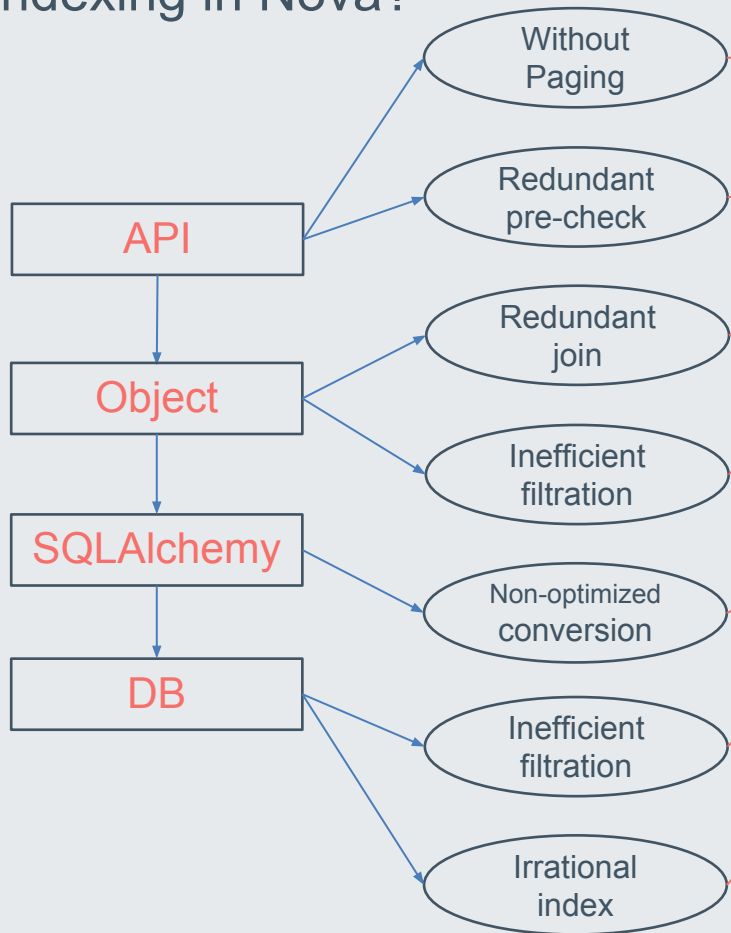


The cascading architecture help us expand our scale with Compatible API

Support 1 million VMs, 100 data centers, 100K hosts.

Extreme User Experience : Performance Optimization

What Happened when resource indexing in Nova?



Our Practice:

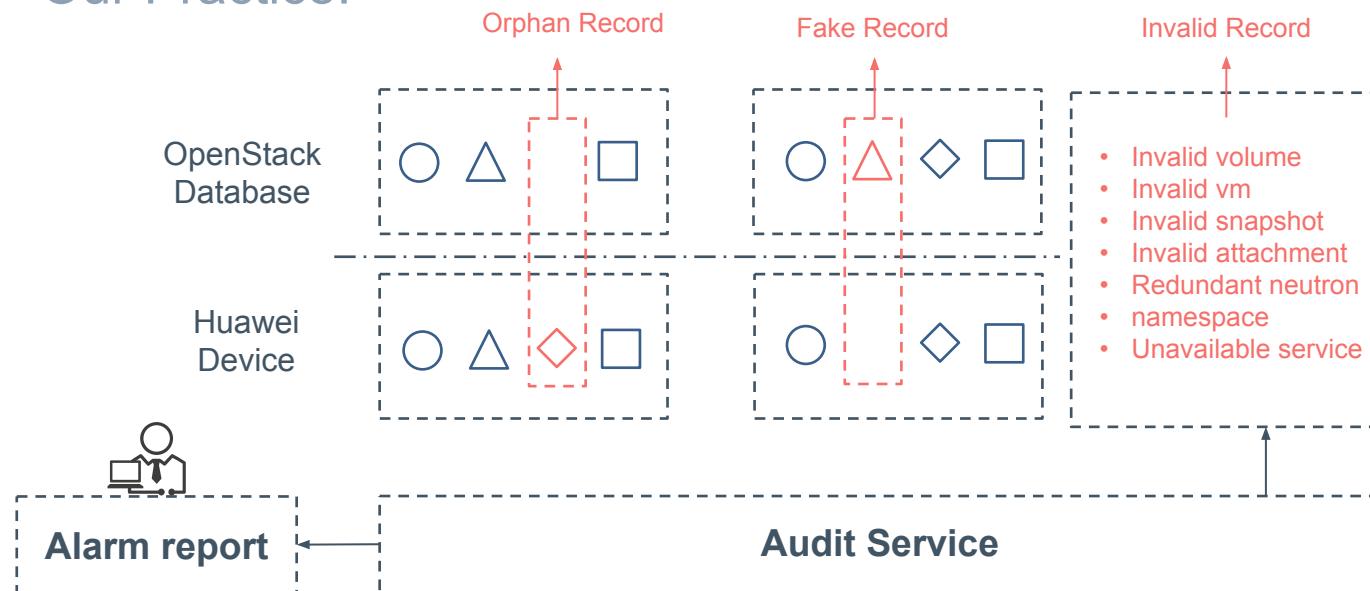
1. All key APIs with paging support
2. Removing unreasonable join and pre-check
3. Specific Query API optimization, such as IP fuzzy query optimization, +90% speed up
4. Lite API interface(Only API+DB)
5. Add more reasonable index, remove irrational index based on DB access frequency.

Fast Abnormality Discovery : Monitoring and Auditing

Current status:

- The orphan, fake, invalid records only can be checked by admin manually.
- There is no reasonable mechanism to discover system abnormal services and heal them.
- The damage to key data can't be found in time

Our Practice:



Health Check Service: Fast discovery abnormality, Key data damage, and abnormal status service.

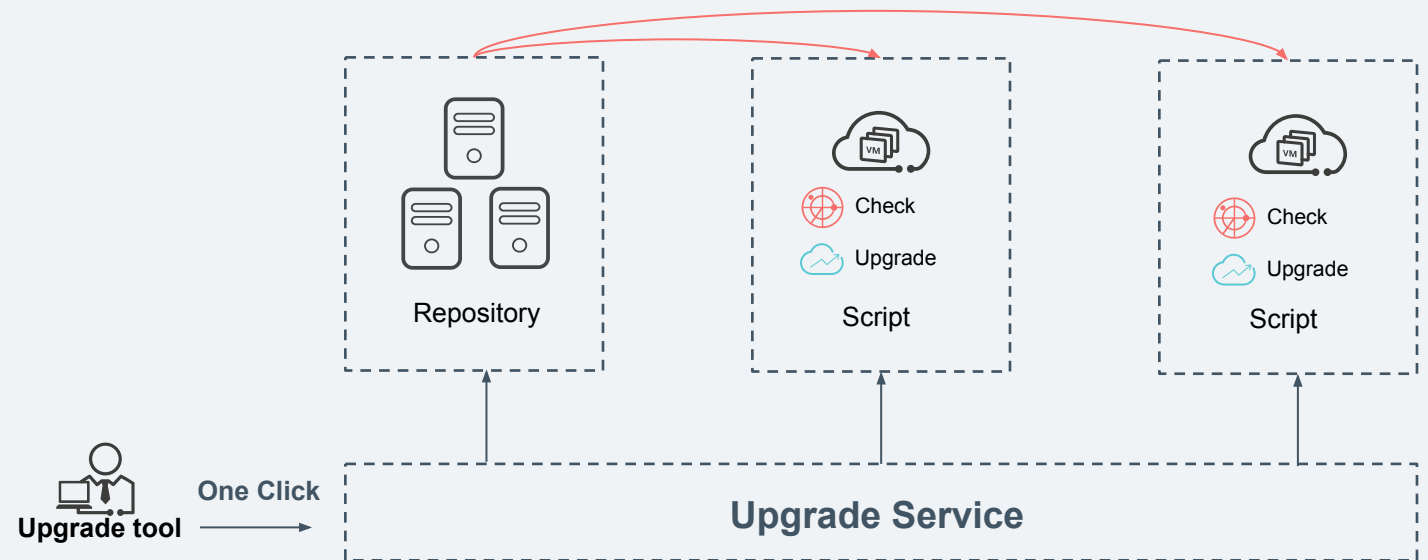
Data Audit Service: the invalid record can be audit periodically.

A Powerful Weapon: One-click Upgrading

Current status:

- Too complex
- Without pre-check before upgrade.
- No UI.

Our Practice:



- One-click upgrading: distribute package, pre-check, upgrade DB、Change Configuration、Data Cleanup...
- Support grayscale, business lossless upgrade, and rollback.

Still unsolved , help wanted

1. Not all components support grayscale, business lossless upgrade
2. Log analysis, log collection, call chain and some other maintenance abilities.
3. The configuration is too complex
4. Weak parallel API handling



Thank You.

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