



NAR Labs 國家實驗研究院

國家高速網路與計算中心

National Center for High-performance Computing



Compound User Scenarios on a Hybrid Cloud

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Author's Background

- ❏ National Center for High-performance Computing
 - ❏ Associate Researcher

- ❏ Currently serve as a Cloud Platform Administrator
 - ❏ responsible for the management and operations of Hybrid Cloud Platform

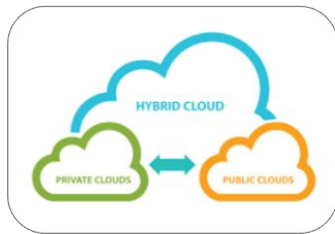
- ❏ Skills
 - ❏ Virtualization Technology
 - ❏ Cloud Technology
 - ❏ Cloud Management

Introduction

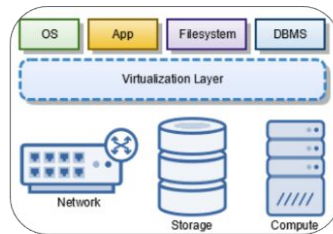
- NCHC Hybrid Cloud Platform
 - Realize hybrid cloud management of private and public clouds
 - HPC services are integrated to provide colossal computing power
 - Meet various cross-cloud scenarios and AI applications

With Cloud Technology

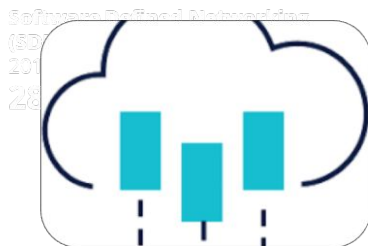
- Hyper-Converged Infrastructure, Multi-Cloud Management Tools and Software-Defined Data Centers



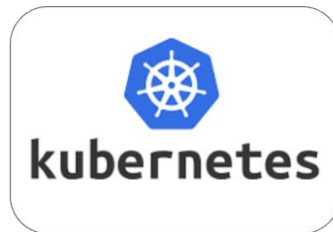
Multi-Cloud Management



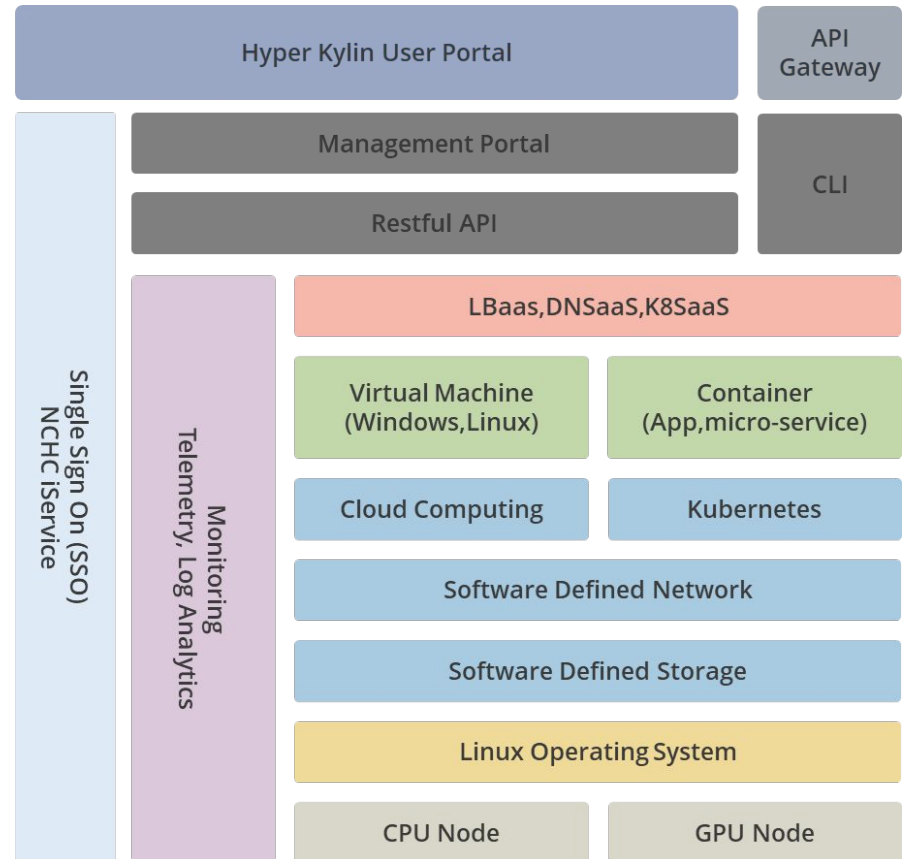
Software-Defined



Hyper-Converged

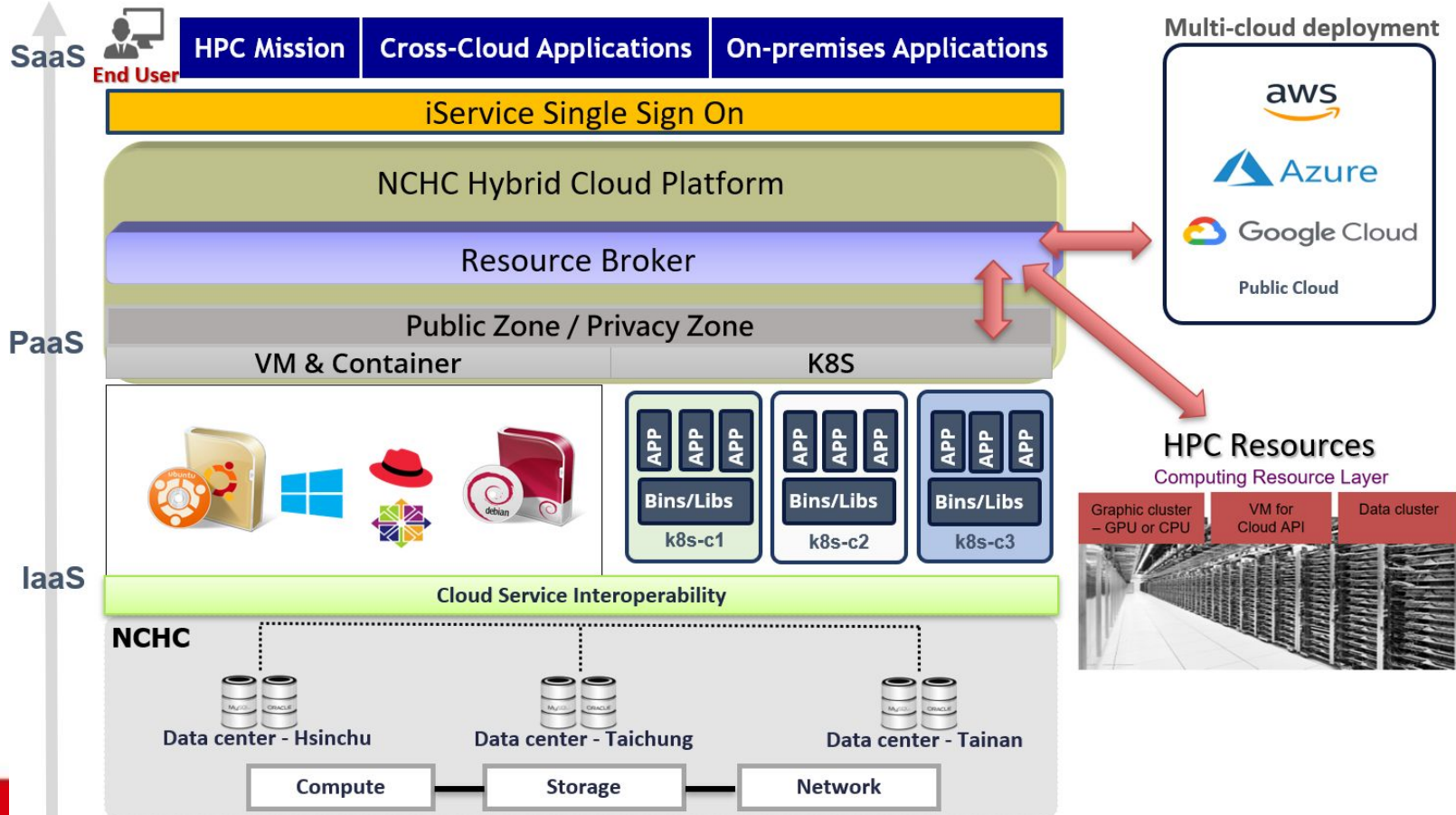


Container Service



System Architecture

- Cross-Cloud resource management
 - invoke the resources of the public cloud for expansion
- In order to cope with sensitive needs
 - mark out the privacy zone



User Portal Self-Service

- ❑ Integrate iService authentication
- ❑ Provide on-demand services
 - virtual machine
 - kubernetes cluster
 - storage
 - network
 - hybrid-cloud
 - ...

The screenshot shows the 'Create an Instance' page in the NAR Labs user portal. The interface includes a sidebar with navigation options like Projects, Cloud Providers (CUBE), Resources (Instances, Kubernetes, Volumes, Shares, Objects, Images, Networking), Management (Settings, Requests), and Features (Marketplace). The main content area is titled 'Create an Instance' and contains the following sections:

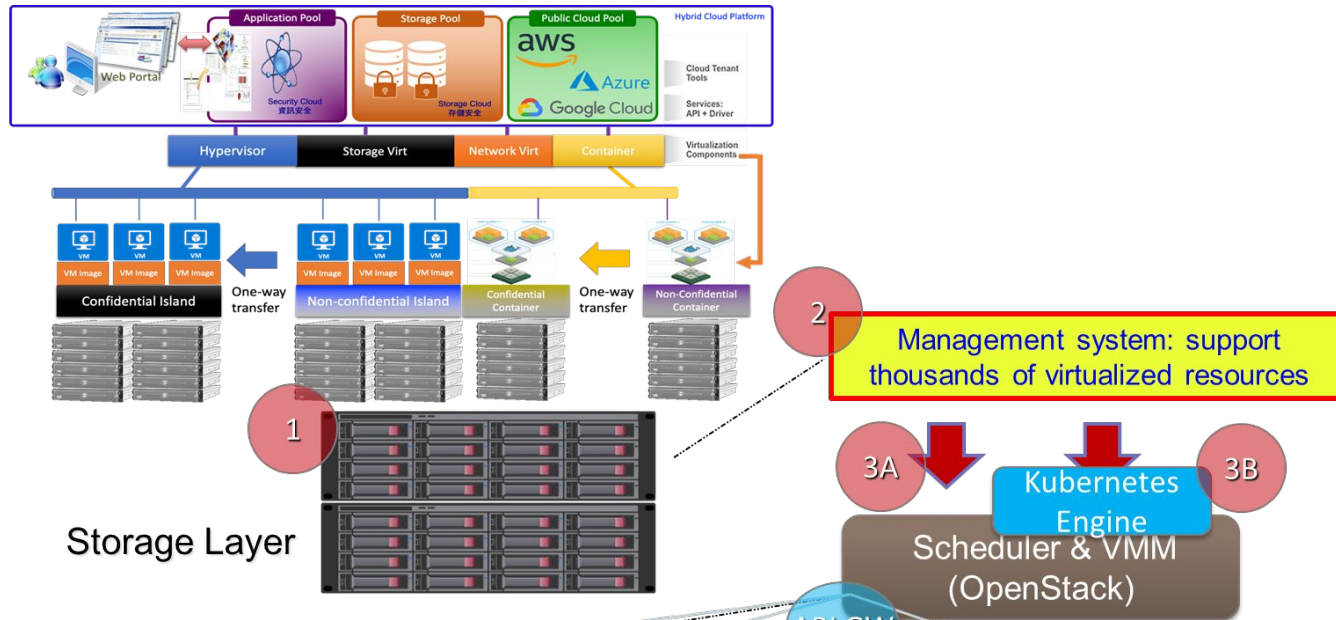
- CHOOSE REGION:** A dropdown menu currently set to 'local'.
- CHOOSE AN IMAGE:** A section with tabs for 'Distributions', 'Snapshots', 'Backups', and 'Custom Images'. Under 'Distributions', four options are shown: Ubuntu, CentOS, Rocky Linux, and Windows, each with a 'Select Version' dropdown.
- SELECT AN INSTANCE TYPE:** A row of buttons for different instance types: Basic, CPU-optimized, Memory-optimized, GPU-V100S-32G, GPU-A100-40G, and GPU-A100-40G(Dual). Below this is a table of instance specifications.

INSTANCE SIZE	VCPU	MEMORY (GB)	ROOT DISK (GB)
<input checked="" type="radio"/> Small	2	8	120
<input type="radio"/> Medium	4	16	120
<input type="radio"/> Large	8	32	120

A note at the bottom states: "The size of the root disk will be expanded automatically to meet the requirements of the selected base image."

HPC Missions

- Integrate HPC services by Resource Broker
 - scheduling and management tool for physical and virtualized resources
 - leverage resources through an API Gateway, including HPC, hybrid cloud, and storage devices



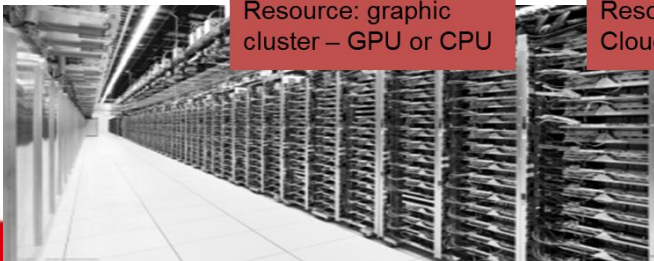
Computing Resource Layer

Technical components

Resource: graphic cluster – GPU or CPU

Resource: VM for Cloud API.

Resource: Data cluster



Data

Cross-Cloud Services

Connect with Public Cloud (AWS)

The image shows a workflow for connecting a public cloud (AWS) to a CUBE Portal. The top part is the CUBE Portal interface for project GOV111027, showing a list of instances. The bottom part is the AWS Management Console, where the instance 'instance-9c1hd6' is selected for connection.

CUBE Portal Resources:

NAME	KEYP...	INTERF...	FLOATI...	TAGS	O...	EXPIRES	CREATED	STATUS
instance-9t9avy	1 vCPU / 1 GB / Ubuntu 22.04(LTS) x64 / ap-northe	10.0.44.17	54.65.183.64 non-reserved	Add...	A	Never	5 minutes ago	Active
instance-9c1hd6	1 vCPU / 1 GB / Ubuntu 22.04(LTS) x64 / ap-northe	10.0.78.29	52.69.81.86 non-reserved	Add...	A	Never	20 hours ago	Active

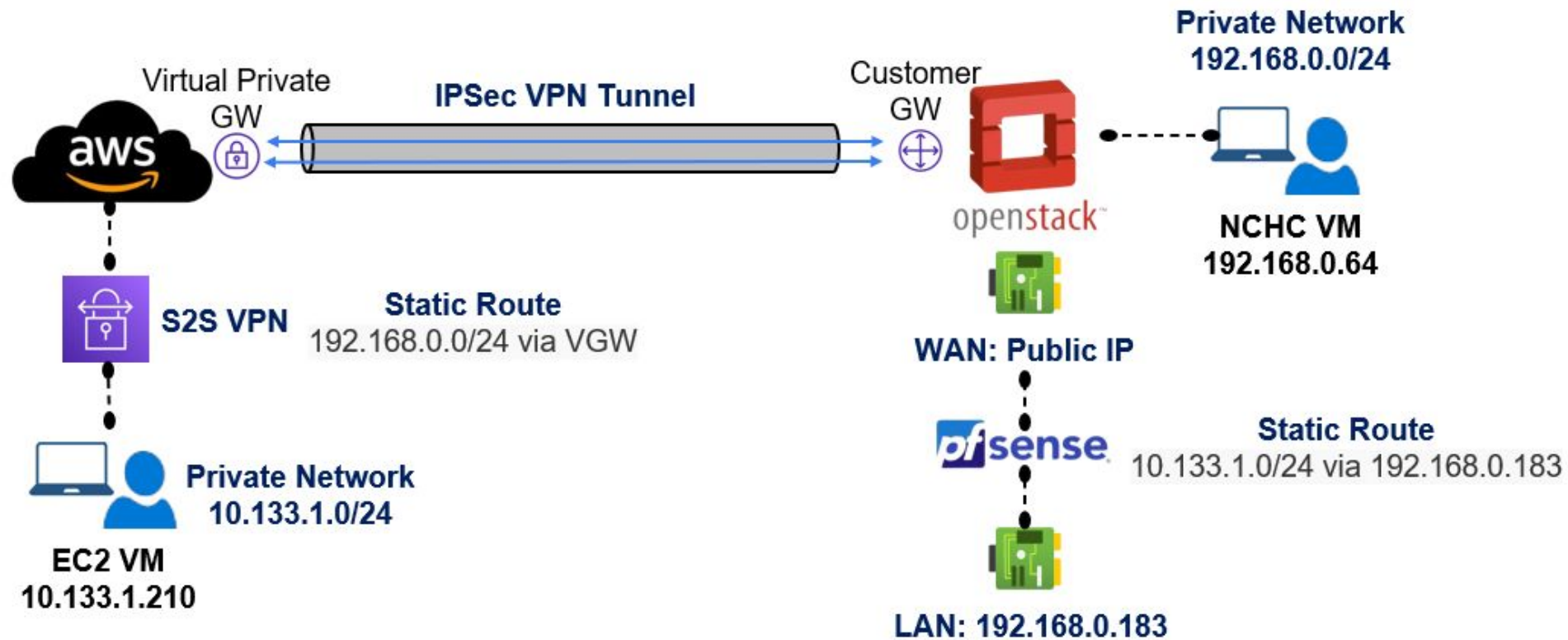
AWS Management Console Instances:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
instance-9c1hd6	i-Qc703d447c6e689c9	Running	t2.micro	2/2 checks passed	No alarms	ap-northeast-1a	-
u22	i-058a0e3a3666f85c3	Running	t2.micro	2/2 checks passed	No alarms	ap-northeast-1a	-
instance-9t9avy	i-0cf2f7cf84788aca6	Running	t2.micro	Initializing	No alarms	ap-northeast-1a	-

Cross-Cloud Services

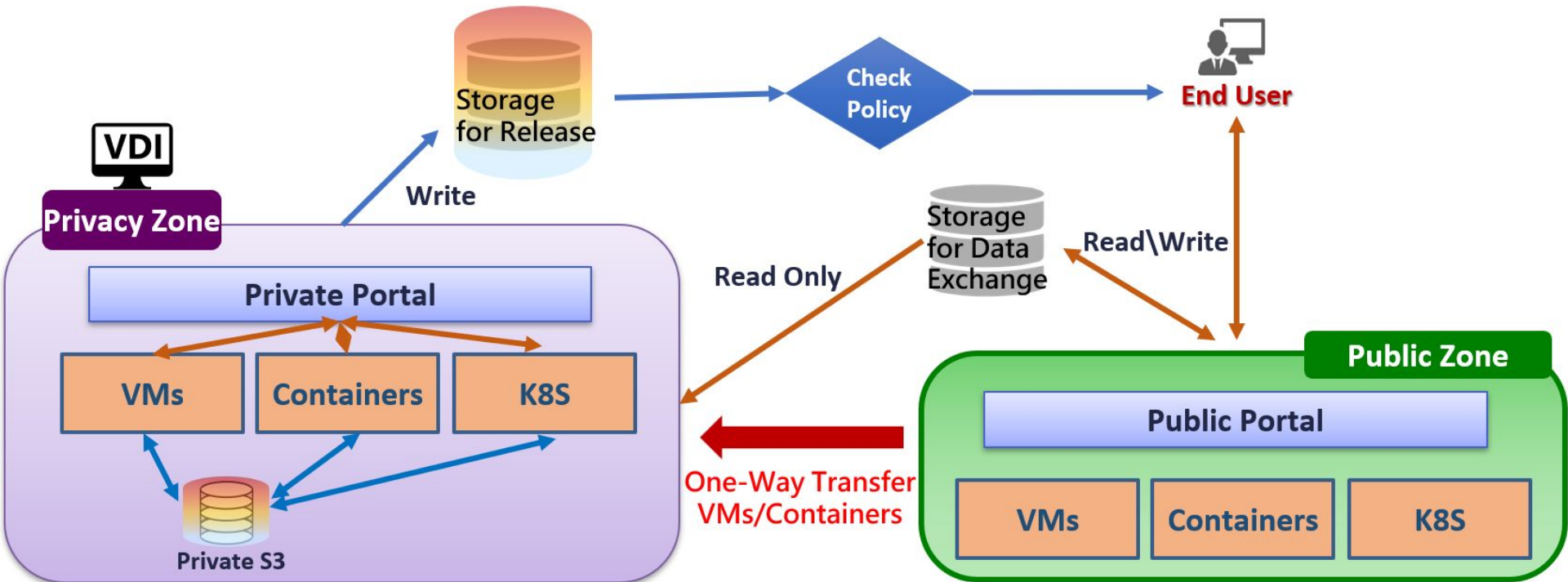
❑ AWS Site-to-Site VPN

- ❑ a secure and reliable private connection
- ❑ direct access to the public cloud and on-premises cloud resources



On-Premises Applications

- ▣ Privacy Zone
 - ▣ provide a private portal
 - ▣ access and manage resources through VDI
 - ▣ network isolation and protection of sensitive data



Conclusions

- ❑ Challenges
 - ❑ (1) Ensuring that sensitive data does not leave the privacy zone
 - ❑ (2) Secure access control when requisitioning HPC resources
 - ❑ (3) Encrypted data transmission

- ❑ ⇒ Crucial for the future development of our platform
 - ❑ effectively enhance the security of cross-platform environments and ensure data transmission

Thank You!