OBS

White Paper

Introducing OBS Cloud 1.0

Tokyo 2020

Summer Olympic Games

Contents

1 What is OBS Cloud?

Olympic Broadcasting Services (OBS) and Alibaba Cloud, the cloud computing arm of Alibaba Group, are building an innovative broadcasting platform that runs completely on the cloud, to accelerate the transformation of the media industry in this digital era. Starting at the Tokyo Olympics 2020, this ground-breaking platform will convert and digitise how broadcast organisations around the world will cover the Olympic Games.

The physical space of IBC together with the time and effort to setup the broadcasting facilities for the Games has been always under pressure. The OBS Cloud leverages Alibaba Cloud's best-in-class cloud computing infrastructure to create an optimal media broadcasting environment for all Rights Holding Broadcasters (RHBs) of the Olympics. The platform offers a suite of solutions including super computing capabilities, easily accessible cloud storage, real-time monitoring, and transcoding media processing resources.

This suite of solutions is further enhanced with high-speed connectivity with a dedicated solution available for RHBs in the IBC leveraging OBS state of the art networking layer and the several levels of physical diversity achieved by the OBS International Transport Network (ITN) offering within Tokyo.

Fig 1. OBS Cloud Datacentre Locations.

The **key features** of OBS Cloud include:

- Local Presence: Two data centers in Tokyo;
- Global Reach: 10+ other availability zones in USA, Europe, Asia and Oceania (Fig. 1);
- Cross-region connectivity: Data centers and zones are inter-connected for a seamless cloud experience;
- High Performance Cloud Servers: Bare Metal Servers and GPU Servers;
- High Performance and Elastic Cloud Storage: Object Storage and NAS Services;
- High Speed & High Availability networking infrastructure in Tokyo.

What OBS Cloud Can Do for You?

Rights Holding Broadcasters (RHBs) will be able to deploy a range of services and workstations in the cloud to leverage their production environments, including:

- Cloud Servers;
- Cloud Storage;
- Networking functionalities;
- Media Services;
- Security functionalities;

Additionally, OBS Cloud **Premium Services** will provide the technical support required for an optimal deployment and usage of the OBS Cloud Services.

2 Cloud Server

2.1 Elastic Compute Service (ECS)

Overview

Elastic Compute Service (ECS) provides fast memory and the latest Intel CPUs to help RHBs to power their cloud applications and achieve faster results with low latency. All ECS instances come with Anti-DDoS protection to safeguard data and applications from DDoS and Trojan attacks. ECS instances can be deployed with just a few clicks from the easy-to-use console and scale capacity up or down based on real-time demands. This means RHBs only pay for the resources used and avoid the need to provision expensive IT infrastructure and hire large network teams.

Stable and Reliable

- With OBS Cloud global network RHBs can enjoy extremely high disaster tolerance capabilities.
- The availability of instances reaches 99.95%, and the reliability of data in cloud disks is no less than 99.9999999%.
- Failover and automatic snapshot creation further ensure your service provisioning and data security.

Flexible Configurations

RHBs can modify the configurations and add or remove instances on demand, giving their system greater flexibility, efficiency while optimizing costs.

RHBs are provided with different types of ECS including general-purpose type family, compute-optimized type family, memory-optimized type family, network-enhanced type family, GPU type family and FPGA type family. This allows RHBs to select the perfect instance type based on your function, costs, and performance needs.

Features

Enterprise-oriented Computing Instances, Storage and Networking.

Instance specifications and storage types optimized for various scenarios in computing, storage and network, together with the private network, are provided to find the most cost-effective resource solution during the deployment of various applications.

Highly Stable Applications and Reliable Data Storage

Large-scale redundancy architectures guarantee the availability of running instances and the reliability of data stored in cloud disks. Instance availability up to 99.95% and cloud disk data reliability no less than 99.9999999%.

Various Security and Monitoring Resources:

Cloud Security is available at no additional cost to provide basic protection for network security and server security. CloudMonitor is also available at no additional cost to guarantee service security through a range of real time alert and notification services.

Multiple Management Methods and Full Management Permissions

The product console, remote terminals, and APIs provide multiple management methods and full management permissions to manage and control resources

Wide Range of Image Types for Accelerated Application Deployment

Multiple release versions are available for Windows and Linux operating systems. OBS Cloud provides authorized and certified public images, which cover nearly all the trending and popular platforms (see Table I).

Table I

Platform	Public Images
Windows	Windows Server 2008 R2 Enterprise Edition 64 bit Chinese Edition Windows Server 2008 R2 Enterprise Edition 64 bit English Edition Windows Server 2012 R2 Data Center Edition 64 bit Chinese Edition Windows Server 2012 R2 Data Center Edition 64 bit English Edition Windows Server 2016 R2 Data Center Edition 64 bit Chinese Edition Windows Server 2016 R2 Data Center Edition 64 bit English Edition Windows Server Version 1709 Data Center Edition 64 bit Chinese Edition Windows Server Version 1709 Data Center Edition 64 bit English Edition

CentOS	CentOS 6.8 64bit CentOS 6.8 32bit CentOS 6.9 64bit CentOS 7.2 64bit CentOS 7.3 64bit CentOS 7.4 64bit CentOS 7.5 64bit
Ubuntu	Ubuntu 14.04 64bit Ubuntu 14.04 32bit Ubuntu 16.04 64bit Ubuntu 16.04 32bit
Redhat	Red Hat Enterprise Linux 7.5 64bit Red Hat Enterprise Linux 7.4 64bit Red Hat Enterprise Linux 6.9 64bit
SUSE Linux	SUSE Linux Enterprise Server 11 SP4 64bit SUSE Linux Enterprise Server 12 SP4 64bit
Debian	Debian 8.9 64bit Debian 9.2 64bit Debian 9.5 64bit
Open SUSE	OpenSUSE 42.3 64bit
CoreOS	CoreOS 1465.8.0 64bit
FreeBSD	FreeBSD 11.1 64bit

2.2 Elastic Bare Metal (EBM)

Overview

Based on next-generation virtualization technology independently developed by Alibaba Cloud, Elastic Bare Metal Instance features both the elasticity of a virtual server and the high-performance and comprehensive features of a physical server. Compared with its predecessor, the next-generation virtualization technology of these instances excels in supporting standard Elastic Compute Service (ECS) and nested virtualization technology. This enables RHBs to retain the elasticity capability of common ECS while delivering the same user experience as physical servers.

Features

CPU configuration

Supports 8, 32 and 96 cores and ultra-high frequency instances.

Memory configuration

Supports instance memory expansion from 32 GB to 768 GB. For better computing performance, we recommend a CPU to memory ratio of 1:4 or 1:8.

Storage configuration

Supports starting from virtual server images or cloud disks to deliver instances in minutes. Supports mounting multiple cloud disks for better storage scalability.

Network configuration

Supports VPC networks, maintaining the interconnection with common ECS instances and other cloud products. Delivers the same comparable performance and stability as physical server networks.

Image configuration

Adopts the same images as common ECS virtual servers, thereby enabling flexible configuration changes to virtual servers without the need for any additional configurations. See Table I.

Nested Virtualisation

An EBM Instance combines the performance strengths and complete features of physical machines and the ease-of-use and cost-effectiveness of cloud servers. It can effectively meet demanding requirements for high-performance computing and help RHBs build new hybrid clouds.

Thanks to the flexibility, elasticity, and all the other strengths it inherits from both virtual and physical machines, it is enabled with the re-virtualization ability. As a result, offline private clouds can be seamlessly migrated to Alibaba Cloud with no concern about the performance overhead brought about by nested virtualization.

Security configuration

Maintains the same security policies and flexibility as existing ECS virtual servers.

Encrypted computing

ECS Bare Metal Instance supports Intel® SGX to guarantee that encrypted data is cleaned, processed and computed in a secure and trusted environment.

Offering

Table II

Instance	vCPU	CPU	RAM (GiB)	Bandwidth (Gbit/s)	Nic
ecs.ebmhfg5.2xlarge	8	2	32	6	6
ecs.ebmc4.8xlarge	32	16	64	10	12
ecs.ebmg5.24xlarge	96	48	384	10	32

2.3 GPU ECS

Overview

Elastic GPU Service (EGS) is a GPU-based computing service ideal for scenarios such as deep learning, video processing, scientific computing, and visualization. EGS solutions use the following GPUs: AMD FirePro S7150, NVIDIA Tesla M40, NVIDIA Tesla P100, NVIDIA Tesla P4, and NVIDIA Tesla V100 (see **Table II**).

Offering

Table III

Instance	GPU Card	GPU (GB)	Bandwidth (Gbit/s)
GA1	4 * AMD S7150	32	10
GN4	2 * Nvidia M40	2*12	10
GN5	8 * Nvidia P100	8*16	25
GN5i	2 * Nvidia P4	2*8	10
GN6	8 * Nvidia V100	8*16	25

GA1 instance

GA1 instance can provide a maximum of four AMD Fire Pro S7150 GPUs, 56 vCPUs, and 160 GB of memory. It has 32 GB of GPU memory and 8192 cores that work in parallel and delivers up to 15 TFLOPS of single-precision, and 1 TFLOPS double-precision, floating-point performance.

GN4 instance

GN4 instance can provide a maximum of two NVIDIA Tesla M40 GPUs, 56 vCPUs, and 96 GB of memory. It has 24 GB of GPU memory and 6000 cores that work in parallel and delivers up to 14 TFLOPS of single-precision floating-point performance.

GN5 instance

GN5 instance can provide a maximum of eight NVIDIA Tesla P100 GPUs, 56 vCPUs, 480 GB of memory, and 128 GB of GPU memory. It delivers up to 74.4 TFLOPS of single-precision floating-point performance. This helps achieve large-scale parallel floating-point computation performance required in deep learning and other general-purpose GPU computation scenarios. A GN5 instance also provides up to 37.6 TFLOPS of double-precision floating-point performance to deliver high computing performance required in scenarios such as scientific computing.

GN5i instance

GN5i instance can provide a maximum of two NVIDIA Tesla P4 GPUs, 56 vCPUs, and 224 GB of memory. It has 16 GB of GPU memory and delivers up to 11 TFLOPS of single-precision floating-point performance and 44 TOPS INT8 of computing capability.

GN6 instance

GN6 instance can provide a maximum of eight NVIDIA Tesla V100 GPUs, 88 vCPUs, and 256 GB of memory. It has 128 GB of GPU memory. Using Tensor Cores, a GN6 instance can provide up to 1000 TFLOPS of deep learning computing capability, and a single-precision floating-point performance of 125.6 TFLOPS. This helps achieve large-scale parallel floating-point computation performance required in general-purpose GPU computation scenarios. A GN6 instance also provides up to 62.4 TFLOPS of double-precision floating point performance to deliver high computing performance required in scenarios such as scientific computing.

3 Cloud Storage

3.1 Object Storage Service (OSS)

Overview

Object Storage Service (OSS) is a storage service that enables RHBs to store, back up, and archive any amount of data in the cloud. It is a cost-effective, highly secure, and highly reliable cloud storage solution.

RHBs can use API and SDK interfaces or OSS migration tools to transfer massive amounts of data into or out of OSS. OSS supports RESTful API access and offers a wide array of SDK language support and tool services. Suitable for the storage of massive volumes of images, audio/video, logs, and other files, this service supports direct reading and writing from and to OSS for various devices, websites and mobile apps. It supports both stream and file writing. Its technological strength ensures a data writing reliability of up to 99.99999999%.

Features

Variable type of storage

- **Standard**: High-performance, highly reliable and highly available OSS instances;
- **Infrequent Access**: OSS instances characterized by relatively low storage costs and real time access;
- **Archive**: OSS instances that support long-term archive data storage at the lowest unit price.

Easy to use

- Provides RESTful APIs, a wide range of SDKs, client tools, and a web console. You can easily upload, download, retrieve, and manage massive amounts of data for websites and applications in the same way as for regular files in Windows;
- Sets no limit on the number and size of files. Unlike the traditional hardware storage, OSS enables you to easily scale up (expand) your storage space as needed;
- Supports streaming upload and download, which is suitable for business scenarios where you need to simultaneously read and write videos and other large files;
- Offers lifecycle management. You can delete expired data in batches or transition the data to low-cost archive services.

Powerful and flexible security

- Provides flexible authentication and authorization, including STS, URL, whitelist, anti-leeching, and RAM account features; Offers user-level resource isolation. You can also use the multi-cluster synchronization service.

3.2 Network Attached Storage (NAS)

Overview

Network Attached Storage (NAS) is a file storage service for ECS & EBM instances and Container Service. It provides standard file access protocols, so you do not have to modify existing applications. This enables you to have a distributed file system with unlimited capacity and performance scaling, with a single namespace, multi-party sharing, high reliability, and high availability.

Features

High performance

Based on RoCE and NVMe SSDs, NAS reduces network latency and provides high performance.

High reliability

Maintains multiple data replicas and a data reliability of 99.999999999%. NAS is more reliable than traditional RAID arrays.

High availability

Avoids single points of failure and maintains a data availability of 99.9%.

Unlimited, Elastic Storage

The maximum capacity of a file system can reach 10 PB. Each file system can store a maximum of 1 billion files, and the maximum file size is 32 TB.

Ease of Use

Supports standard POSIX interfaces. Both Windows and Linux applications can use this service without any modifications. You can mount the file system on ECS compute nodes. This allows you to perform file operations as if the files were locally stored.

Supports Various Standard Protocols

- **NFS**: Supports the NFSv3 and NFSv4 protocols and provides standard file system semantics for data access. Most mainstream applications and tasks can be seamlessly integrated with the service without any modifications.
- **SMB**: Supports the SMBv2.0, SMBv2.1, and SMBv3.0 protocols. Supports the applications that are deployed on Windows Vista, Windows Server 2008 and later versions.

Strong Security Control

Multiple security mechanisms are implemented to guarantee system data security, including network isolation (VPC) and user isolation (classic network), standard access control, permission groups, and account authorization.

Multiple Access Methods

Multiple compute nodes can simultaneously access the same file system, allowing applications deployed across multiple ECS instances or Docker clusters to access the same data source. You can also access the file system from remote data centres or the IBC both through the private Tokyo OBS connection, leased lines or VPN.

4 Networking

OBS Cloud offering is sustained on a networking infrastructure composed of several virtual and physical components which, put together, result in a high speed and high availability network, with global reach and a private connection from the IBC that is enhanced by OBS International Network and Tokyo presence.

RHBs can choose to deploy services in a Virtual Private Cloud, access them as part of their private on-premises network in the IBC, implement a public internet gateway through the usage of Elastic IP and interconnect its VPCs around the globe with OBS Cloud Express Connect functionality.

4.1 VPC

Within OBS Cloud, there is a concept of VPC (Virtual Private Cloud) which enables the connectivity to on-premises physical networks and between several OBS Cloud VPCs.

VPC is an isolated cloud network built for private use and it provides users with the utmost control over data, security and resources, including configuration of route tables, network gateways and selection of IP addresses range.

VPC helps RHBs to establish an isolated network environment. RHBs can have full control over their own VPC, including choosing the preferred IP address range, VLAN, RouteEntry and gateway.

VPC achieves network boundary security and complete isolation of network security domains through such functional components as VRouters, VSwitches, custom routes and security groups.

Features

Security Isolation

Builds an isolated network environment. Layer-2 logical isolation is achieved between different VPC instances.

Software Defined Network

Customized network configurations, full control of RHBs' VPC. Management operations with immediate effect.

Connectivity

OBS Cloud can also provide the connectivity options to the users as below:

- Connectivity between IBC and OBS Cloud Tokyo on a Private network based on high speed high redundancy physical and logical network infrastructure deployed by OBS in Tokyo.
- Connectivity among OBS Cloud VPCs. Provided by OBS Cloud express connect.
- Connectivity between RHB Headquarters on-premises network to regional OBS Cloud. Provided by telecom leased line capacity or by standard VPN over the public internet. RHBs shall source directly with their own telecommunications' providers.

4.2 Elastic IP (EIP)

An Elastic IP (EIP) address is a public IP address resource that will allow RHBs to provide public internet access from/to any VPC or service deployed in the OBS Cloud.

4.3 Server Load Balancer (SLB)

Overview

Server Load Balancer (SLB) is a traffic distribution control service that distributes the incoming traffic among multiple ECS instances according to the configured forwarding rules. SLB expands application service capabilities and enhances application availability.

By setting a virtual service address, SLB virtualizes the added ECS instances into an application service pool with high-performance and high availability, and distributes client requests to ECS instances in the server pool based on forwarding rules.

SLB also checks the health status of the added backend servers, and automatically isolates abnormal ECS instances to eliminate single point of failure (SPOF), improving the overall service capability of your application.

Server Load Balancer consists of the following components:

- **SLB instances**
  An SLB instance is a running load balancing service that distributes incoming traffic to backend servers. To use the load balancing service, you must create an SLB instance, and then configure the instance with at least one listener and two backend servers.
- **Listeners**
  A listener checks client requests and forwards the requests to the backend servers according to the configured rules. It also performs health check on backend servers.
- **Backend Servers**
  Backend servers are the ECS instances added to a SLB instance to process the distributed requests.

Features

SLB provides Layer-4 and Layer-7 load balancing services, and other functions such as health check, session persistence, domain name-based forwarding and so on to ensure high availability of your applications.

Table IV

Functions	Layer-4	Layer-7
Scheduling algorithm Server Load Balancer supports round robin, weighted round robin (WRR), weighted least connections (WLC), and consistent hash.	✔	✔
Health check Server Load Balancer checks the health status of backend servers. If a backend server is declared as unhealthy, Server Load Balancer will stop distributing traffic to it and distribute incoming traffic to other healthy backend servers.	✔	✔
Session persistence Server Load Balancer supports session persistence. In a session, Server Load Balancer can distribute requests from the same client to the same backend server.	✔	✔

Access control Server Load Balancer support adding whitelists and blacklists to control access to your applications.	✔	✔
High availability Server Load Balancer can forward incoming traffic to backend servers in different zones. Additionally, Server Load Balancer is deployed in the active/standby mode in most regions. Server Load Balancer will automatically switch to the standby zone to provide the load balancing service if the primary zone is unavailable.	✔	✔
Security Combined with Alibaba Cloud Security, Server Load Balancer can defend against up to 5 Gbps DDoS attacks.	✔	✔
Internet and intranet load balancing Server Load Balancer provides both Internet and intranet load balancing services. You can create an intranet SLB instance to balance traffic in your VPC network, or create an Internet SLB instance to balance traffic coming from the Internet.	✔	✔
Monitoring With the CloudMonitor service, you can view the number of connections, traffic and more of an SLB instance.	✔	✔
IPv6 support Server Load Balancer supports forwarding requests from IPv6 clients.	✔	✔
Access logs With Log Service, you can analyze access logs of an SLB instance to understand the behavior and geographical distribution of users, troubleshoot problems and more.	—	✔
Health check logs Server Load Balancer stores health check logs of backend servers generated within three days by default. You can store all health check logs in OSS for troubleshooting.	✔	✔
Domain name/URL based forwarding Layer-7 Server Load Balancer supports configuring domain name/URL based forwarding rules to forward requests from different domain names or URLs to different backend servers.	—	✔

Certificate management Server Load Balancer provides centralized certificate management service for applications using HTTPS protocols. You do not need to upload certificates to backend servers. Deciphering is performed on Server Load Balancer to reduce the CPU usage of backend servers.	—	✔
SNI support Server Load Balancer supports configuring multiple certificates in an HTTPS listener to distribute requests with different domain names to different backend servers.	—	✔
Redirection Server Load Balancer supports redirecting HTTP requests to HTTPS requests.	—	✔
WS/WSS support WebSockets is a new HTML protocol. It provides bi-directional communication channels between a client and a server, saving server resources and bandwidth and achieving real-time communication.	—	✔
HTTP/2 support HTTP/2 is the second version of Hypertext Transfer Protocol. It is backward compatible with HTTP1.X and significantly improves performance.	—	✔

4.4 OBS Private Connection Tokyo

OBS Cloud will be enhanced by a networking infrastructure beyond the standard connectivity options available for a typical cloud services user. A private networking infrastructure built around the concept of high speed and high availability will allow RHBs with IBC presence to access OBS Cloud Services with the highest network quality (see Fig 3).

Fig 2. Standard setup for RHB public cloud access:

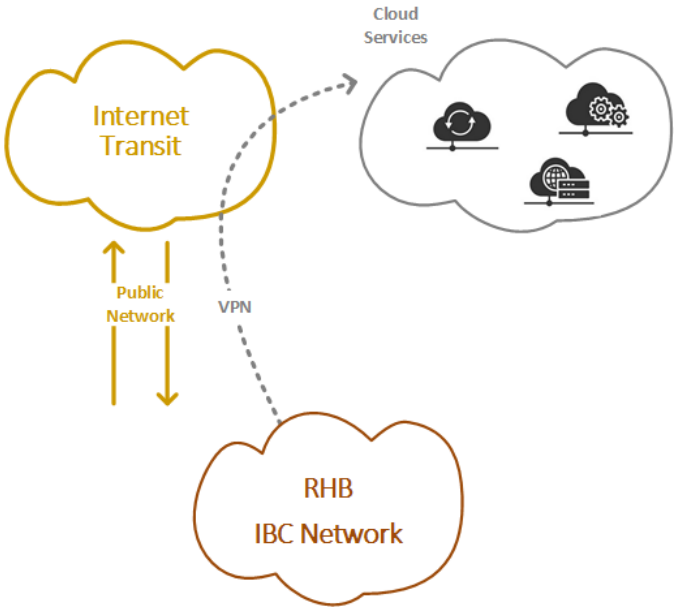


Fig 3. OBS Cloud Private Network

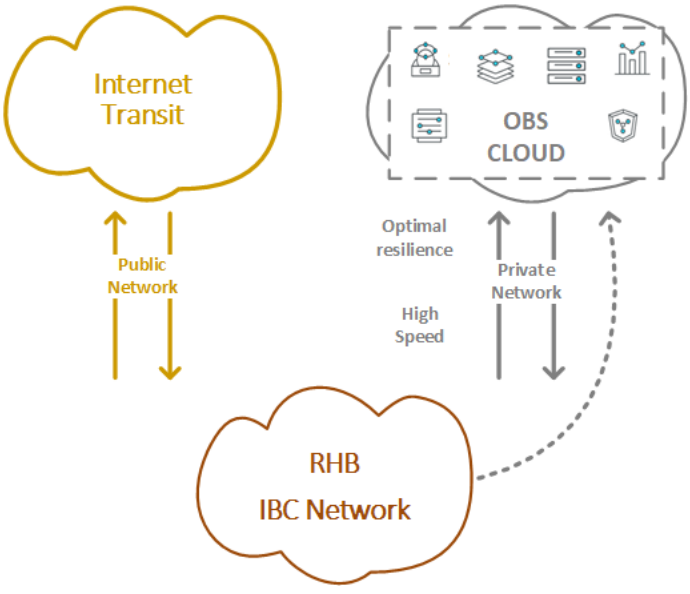
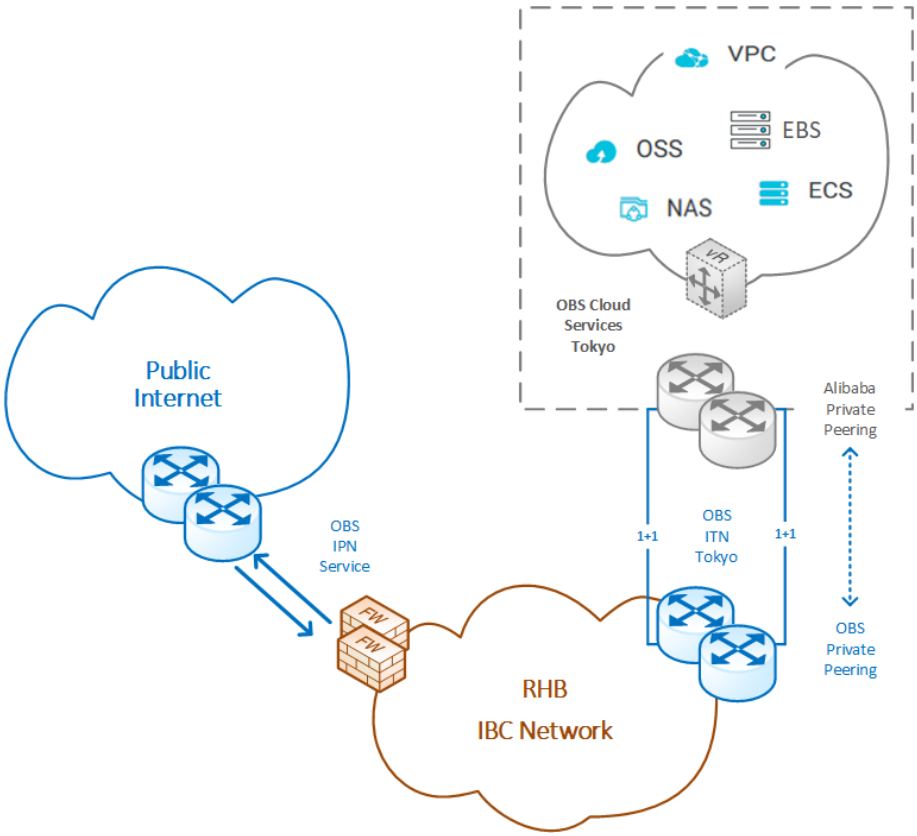


Fig 4. Physical Setup IBC



OBS Cloud will be available as an independent connection to the RHBs interested in deploying OBS Cloud services in the Tokyo region (see Fig 4).

This connection will be internally routed physically within the IBC to reach OBS border routers directly connected with Alibaba peering routers in Tokyo using protected access circuits within the International Transmission Network in the Tokyo metro segment.

Layer 1 Protection

These access circuit will be provisioned with dual fibre routes 100% diverse to each other and protected at the transmission level.

Layer 2 / 3 Protection

A second level of protection for the logical topology is provided by having dual routing devices at both ends and duplicated routing sessions between them for the connectivity to be always on.

This setup can, in effect, create a hybrid cloud infrastructure in which the RHB can reach the OBS Cloud services as if they were part of their internal network in the IBC.

4.5 OBS Cloud express connect

This infrastructure is completed with the availability of several key datacentres around the globe that can be used by RHBs to set up their VPCs and have them interconnected.

This will enable RHBs to build a secure, private, and enterprise-class interconnected network tailored for their combined needs in Tokyo and other points of presence.

Fig 5. Express connect

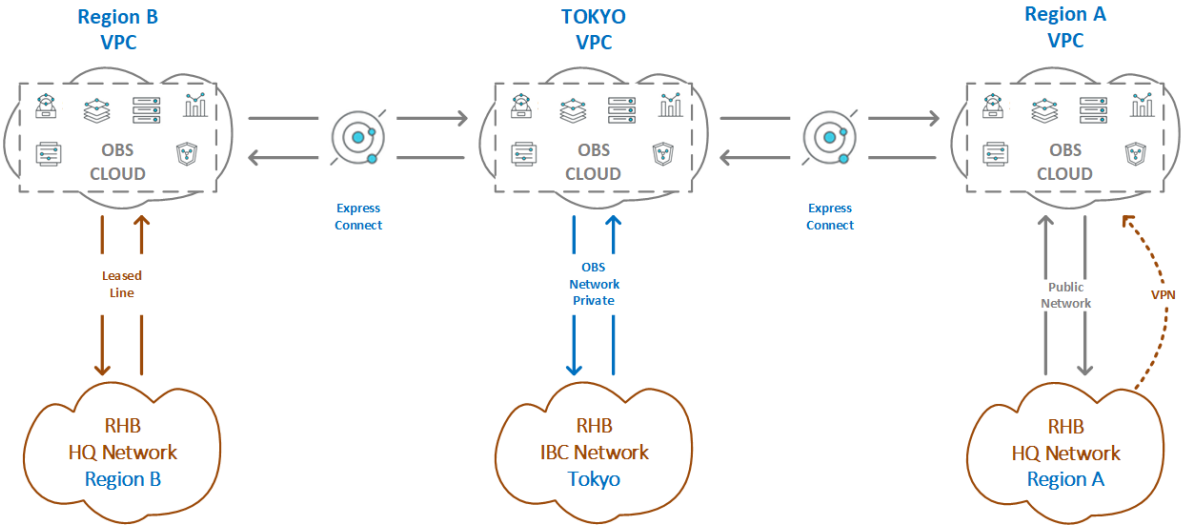


Table V

Features	Express connect cloud technology
Technology	Based on EoSDH. High-quality infrastructure delivers enhanced link quality and availability:
Quality and Availability	Delay jitter <= 20% Encapsulation success rate >= 99.8% Availability >= 99.95% Packet loss rate < 0.2%

To reach the cloud regions outside Tokyo in which the RHBs choose to deploy services, from HQ locations other than IBC (cloud regions here are available through the Private IBC connection), can do so with a combination of connectivity alternatives which include:

- Direct Lease line to the relevant OBS PoP in the region plus an extension to the final Datacentre.
- VPN over the public internet to the relevant PoP in the region.

In both cases and for all the datacentres outside of Tokyo, RHBs shall source with their own telecommunications' partner the chosen alternative for connection to OBS Cloud. Between IBC and the selected OBS PoP, the connectivity is provided by OBS.

5 Media Services

5.1 Transcoding Farm

OBS Cloud offers to RHBs access to OBS Transcoding Farm. The OBS Transcoding Farm, is a transcoding computing service specially designed for multimedia data. It provides an economic, elastic, and highly scalable method to convert audio and video into formats suitable for playing on PCs, TVs, and mobile terminals. The OBS Transcoding Farm offers unique features such as:

- Rich media transcoding techniques;
- Highly scalable media transcoding templates;
- High-speed and stable concurrent transcoding system;
- Unique video restoration technology.

RHBs can use the GUI to configure media workflows, map one input file to multiple output files (different resolutions and formats), and rapidly construct secure, elastic, and highly-customizable video platforms. The professional video encoding capabilities and rich video processing experience help to provide more stable and smoother videos.

5.2 Transcoding Farm Technical Features

Table VI

Encapsulation format

Parameter	Description
Input format	• Container formats: 3GP, AVI, FLV, MP4, M3U8, MPG, ASF, WMV, MKV, MOV, TS, WebM, and MXF. • Video encoding formats: H. 264/AVC, H. 263, H. 263+, MPEG-1, MPEG-2, MPEG-4, MJPEG, VP8, VP9, Quicktime, RealVideo, and Windows Media Video. • Audio encoding formats: AAC, AC-3, ADPCM, AMR, DSD, MP1, MP2, MP3, PCM, RealAudio, and Windows Media Audio.

Output format	• Container formats:
	  ○ Video: FLV, MP4, HLS（m3u8+ts）, MPEG-DASH（MPD+fMP4）
	  ○ Audio: MP3, MP4, OGG, FLAC, and m4a.
	  ○ Image: GIF and WEBP.
	• Video encoding formats: H. 264/AVC and H. 265/HEVC.
	• Audio encoding formats: MP3, AAC, VORBIS, and FLAC.

Encapsulation	Changes the encapsulation format of a video but not the encoding method. Audio files can be encapsulated into MP4, M3U8, and FLV formats.
Conversion from videos to animated images	Outputs highlight contents in a video into animated images in GIF or WEBP format for display.

Table VII

Video encoding parameters

Parameter	Description
Codec	Encoding/Decoding formats. • Supported formats: H. 264, H. 265, GIF, and WEBP. • default value: H. 264.
Bitrate	Bit rate. • Supported output bit rate range: [10， 50000]. • Unit: kbps.

Fps	Frame Rate. • The default value is the frame rate of the input file. If the frame rate of the input file is greater than 60, the value is still 60. • Value range: (0, 60]. • Unit: fps.

Width x Height	Resolution.
	• Width:
	  ○ The default value is the original video width.
	  ○ Value range: [128, 4096].
	  ○ Unit: pixel.
	• Height:
	  ○ Default: Video height.
	  ○ Value range: [128, 4096].
	  ○ Unit: px.

Scale	Automatic scaling. Allows proportional scaling of a file according to Width. Allows proportional scaling of a file according to Height.
GOP	Maximum time interval between two key frames or maximum number of frames. • Maximum time interval between two key frames: the unit of the value must be included for transmission. Unit: seconds. Default value: 10 seconds. • Maximum number of frames: no unit. Value range: [1, 100000].
Profile	Encoding level. H. H.264: Supported encoding levels include Baseline, Main, and High.
PixFmt	Video color format. • Values: yuv420p, yuvj420p, and other standard color formats. • Default value: yuv420p or original color format.
Rotate	Video rotation angle. The video rotation is clockwise. • Value range: [0,360). • Default value: 0.

Table VIII

Video processing parameters

Parameter	Description
ScanMode	Scan mode. Optional values: interlaced and progressive.
RateControlModes	Bit rate control method. The bit rate control methods that are supported: VBR, CBR, and CRF.
Crop	Video cropping. Allows automatically detecting and cropping black borders; allows user-defined cropping.
Pad	Pad a video with black borders is supported.

Table IX

Audio encoding parameters

Parameter	Description
Codec	Encoding/Decoding formats. • Audio codec format: AAC, MP3, VORBIS, and FLAC. • Default value: AAC.
Samplerate	Sampling rate. • Default value: 44100. • Optional values: 22050, 32000, 44100, 48000, and 96000. • Unit: Hz. • When the video container format is FLV and the audio codec format is MP3, Samplerate cannot be set to 32000, 48000, or 96000. • When the audio codec format is MP3, Samplerate cannot be set to 96000.
Bitrate	Audio bit rate. • Default value: 128. • Rate range: [8,1000]. • Unit: Kbps.
Channels	Number of sound channels. • Default value: 2. • It can be set to either 1 or 2 when Codec is set to MP3. • It can be set to 1, 2, 4, 5, 6, or 8 when Codec is set to AAC.

Table X

Transcoding control

Category	Description
HLS MasterPlayList	Generates a Master Playlist file by combining multiple subtitles, sound tracks, and video streams of multiple bit rates.
Workflow	Cloud-based automated processing workflows. The workflows are used to automatically process audio and video files after the files are uploaded.

5.3 Transcoding Media Orchestration Layer

As part of the OBS Transcoding Farm, RHBs can make usage of an orchestration layer aimed at simplifying operational tasks and to ease access to content, including:

- The management of folders of OSS to store the transcoded material;
- To define the input folder, output folder, transcoding template and priority in the workflow;
- To trigger the workflow after a video file has been uploaded to the input folder, and to save the transcoded the transcoded video to the output folder;
- To prioritize tasks, RHBs can create two workflows with two different input folders, say normal video folder and high priority video folder

The Orchestration Layer is available through API.

6 Security

6.1 Web Application Firewall (WAF)

Overview

Web Application Firewall (WAF) is a dedicated firewall that monitors, filters, and blocks HTTP traffic to and from web applications. It inspects the traffic and protects the network from the attacks of web application vulnerabilities.

As a key component of Alibaba Cloud Security, Alibaba Cloud WAF applies to most common web attacks, such as SQL injections, XSS, web shell, Trojan, and so on. WAF improves the website performance through HTTP or HTTPS floods mitigation, and provides bad bot protection. It also provides customized security policies for various scenarios.

Features

Protects your website against common web application attacks

- **Defense against common OWASP threats**, such as SQL injection, XSS attacks, Webshell uploading, command injection, illegal HTTP protocol requests, common Web server vulnerability attacks, unauthorized access to core files, and path traversing. Also provides backdoor isolation and scanning protection services.
- **Websites stealth**: Keeps the website address invisible to attackers to avoid direct attacks that bypass WAF.
- **Regular and timely patches against 0day vulnerabilities**: The protection rules used by Alibaba WAF are tried and tested and cover the latest vulnerability patches, which are updated in a timely manner and synchronized globally immediately after release.
- **User-friendly observation mode**: Provides observation mode for newly launched businesses on the website. In this mode, a suspected attack only triggers a warning, instead of a blocking action, in a bid to facilitate the statistics of business false alarms.

Protection against HTTP flood attacks

- Manages the access frequency from a single source IP address by using re-direction verification and human/machine identification.
- Prevents massive and slow request attacks based on precise access control policies and recognition of exceptional response code, URL request distribution, Referer, and User-Agent requests.
- Establishes threat intelligence and trustful access analysis models to quickly identify malicious requests by making full use of Alibaba Group's big data security advantages.

HTTP ACL Policy

- Provides a user-friendly configuration console that supports condition combinations of common HTTP fields such as IP, URL, Referer, and User-Agent to form precise access control policies. Also supports anti-leech protection, website back end protection, and so on.
- Combined with common web attack protection and HTTP flood protection, access control helps to create multiple layers of protection to suit a variety of needs to identify legitimate and malicious requests.

Virtual patches

Adjusts web protection policies to enable swift protection before patches are released for rectification of web application vulnerabilities.

6.2 Anti-DDos Premium

Overview

By enabling Anti-DDoS Premium, all attack traffic against your server is pulled to your Anti-DDoS Premium’s dedicated IP. Then, the Anti-DDoS Premium service filters attack traffic that diverted to global distributed scrubbing centers by using Anycast technology, and forward clean traffic back to the origin server. This mostly improves the stability of your business.

Features

Protection functionalities

- **Malformed packets filtering:** Defends against Frag flood, Smurf attack, stream flood and Land attacks, and filters malformed IP packet, TCP packet and UDP packet.
- **Transport layer DDoS protection**: Defends against SYN flood, ACK flood, UDP flood, ICMP flood, and RST flood attacks.
- **Web application layer DDoS protection**: Defends against HTTP Get flood, HTTP Post flood, and connection flood attacks by using filtering rules based on HTTP characteristics, URI and Host.

Core features

- **Global DDoS Mitigation**

  Anti-DDoS Premium integrates capacities of all Alibaba Cloud scrubbing centers over the world as protection resources by using Anycast technology. With distributed technology, Anti-DDoS Premium automatically diverts DDoS attack traffic to the nearest scrubbing center to the attacking source for mitigation.

- **Unlimited Protection**

  Anti-DDoS Premium provides unlimited protection with full capacity to each user by comprehensively utilizing global near-source mitigation abilities.

  In 2018, the total protection capacity of Alibaba Cloud International Anti-DDoS scrubbing centers increases to over 2 Tbps. Anti-DDoS Premium aims to defend against every single DDoS attack for you.

Important Note: *OBS & Alibaba Cloud keeps rights of action when attacks against any RHB impact the infrastructure of Alibaba Cloud International Anti-DDoS scrubbing centers. Once the actions are triggered on an RHB Anti-DDoS Premium instance, the protected network may be affected. The action includes but is not limited to "black holing" of the IP addresses being attacked, or alteration to the routing of the traffic destined to the IP addresses being attacked. However, the Olympics event will be planned accordingly to ensure enough infrastructure capacity, minimizing the chance of this kind of intervention to occur.*

- **Dedicated IP Resource**

  Anti-DDoS Premium provides a dedicated Anycast IP for each user. Each IP is isolated to avoid any impact by DDoS attacks against other users. This provides you a safer DDoS mitigation service.

- **High Quality Reporting**

  Anti-DDoS Premium provides detail traffic report and attack protection report in real time for you to have a clear view on the security of your business.

7 Premium Services

The **Premium Services** provide RHBs with dedicated **Cloud Architect** and **Service Manager** to use OBS Cloud products more effectively. The Premium Service package includes:

- Dedicated Cloud Architect participates in and help RHBs design the architecture on the cloud and provides best practices for cloud products;
- Dedicated Service Manager as the single contact of point for all questions and services regarding your needs;
- IM enterprise group service, providing 7x24 hours support;
- Corporate telephone line with 7x24 phone support;
- Enhanced Professional Services during Games Time period including 24x7 performance and security monitoring;
- Training on all OBS Cloud Products and Services can be made available.

8 Contacts

A dedicated team of Cloud Architects and Service Managers will be at the RHBs' disposal for any queries. The team can be contacted through obscloud@obs.tv email address.

9 FAQ

Security Cloud Web Application Firewall

1. WAF provides security against specific attacks aimed at web servers/applications. Is a WAF included as part of this solution or available as an standalone solution in the case RHBs require to deploy web applications?

   WAF is a standalone solution described in the Security Section 6.

Elastic Cloud Server

2. Are there any APIs available for CloudMonitor? Can I use my own tool to consolidate the information provided by CloudMonitor?

   Yes. CloudMonitor applies to various scenarios including System Monitoring, Cloud Service Monitoring, Site Monitoring and Custom Monitoring. All the monitoring data can be fetched by using API.

3. What OS versions/releases will there be supported by 2020?

   OBS Cloud will keep supporting the new OS for Windows and Linux. Providing also support OS Update Services for administrators to update the OS.

4. How is Windows activation managed? Will OBS Cloud provide activated instances?

   OBS Cloud will provide the KMS server, and end users can activate OS using command "slmgr –ato" to activate by themselves.

Elastic Bare Metal Server

5. Will I be able to run my own applications or instances on top of EBM hosts? Can I run dockers on top of EBM hosts?

   Yes, docker is supported on EBM.

Cloud Storage

6. Is there any sort of multi-region support for users accessing content worldwide?

   CDN is not included

7. What is the support for file transfer acceleration?

   RHBs can use cross region replication to copy it to a near location.

Networking

8. Can a VPC span across different regions? Can RHBs deploy virtual machines on different regions while sharing network configuration?

   No, VPC cannot cross region.

9. How is Internet connectivity offered for instances within a VPC?

   RHBs can use the Elastic IP or Load Balancer functionalities described in the Networking Section.

10. How is the DNS service configured for an Instance within a VPC?

    VPC DNS is not included in OBS Cloud.

11. What sort of VPNs are supported? How can I check compatibility between my local and the cloud endpoints?

    Users can install IPsec-VPN or SSL-VPN on ECS. Users can use any software or device that supports IKEv1 and IKEv2. Software like OpenVPN, Openswan are supported. Devices like Cisco, ASA, Juniper, SonicWall, Nokia, IBM, and Ixia are supported.

12. How is in this scenario the ingress/egress traffic managed in OSS buckets? If RHBs want big media files transferred through the OBS Cloud express connect link rather than through the regular Internet.

    OSS can be accessed inside VPC instead of through internet. When have express connect setup, users can access VPC through the EC and then access OSS with some networking configurations.

Transcoding Farm

13. Is this service only available for file-based workflows?

    No, it also supports live streaming.

14. What is the transcoding performance compared to real time?

    For transcoding service, the performance is different according to the output. Assume we have a clip of 1 minute, the output (60fps) and related transcoding time as below:

    Under 480p: 0.1~0.2 min

    Under 720p: 0.2~0.4 min

    Under 1080p: 0.4~0.7 min

    Under 2K: 1.0~2.0 min

    Under 4k: 2.0~4.0 min.

15. What is the support for Subtitles/Closed Captions?

    Captions support WebVTT and SMIL.

16. Per title/scene encoding support for ABR formats?

    MPS support CRF.

17. Encryption (Common Encryption for DASH)?

    Support Common Encryption, HLS Sample-AES, AES-128.

18. Where does the Farm get/put mezzanine and target files? Is it from/to OSS buckets?

    Yes, it is from/to OSS buckets.

19. As part of the workflows, can RHBs automate upload/push to a third party service (FTP, SFTP, etc)

    To upload to OSS, OBS Cloud will provide command line tools and graphic tools. But not integrated with FTP, SFTP software yet.

20. Otherwise, is there any way in which RHBs can take the content out from OSS and store it somewhere else (RHBs own premises, take it to any other platform, etc)

    May need to download it from OSS. OSS provides public internet access or through express connect.

21. For how long will the content be available on the OSS bucket?

    OBS Cloud let you configure the duration for the clip RHBs want to generate, from 15 mins to 360 mins. It will take a few seconds for the clip to show in the OSS bucket.