



**System and Organization Controls 3 Report  
Report on Alibaba Cloud's  
Public Cloud Services System  
Relevant to Security, Availability, and Confidentiality  
For the Period October 1, 2021 – September 30, 2022**





## Report of Independent Service Auditors

### To the Management of Alibaba Cloud Computing Ltd.:

#### *Scope*

We have examined Alibaba Cloud Computing Ltd.'s and its affiliates' (including but not limited to Alibaba Cloud (Singapore) Private Limited, Alibaba.com (Europe) Limited, Alibaba Cloud US LLC, Alibaba Cloud (India) LLP, and Alibaba Cloud (Malaysia) Sdn. Bhd., in which the "Service Organization" or "Alibaba Cloud" is defined as Alibaba Cloud Computing Ltd. and its affiliates) accompanying assertion titled "Management of Alibaba Cloud's Assertion Regarding the Cloud Services System" ("assertion") that the controls within Alibaba Cloud's cloud services system (the "system") were effective throughout the period from October 1, 2021 to September 30, 2022, to provide reasonable assurance that Alibaba Cloud's service commitments and system requirements were achieved based on the trust services criteria relevant to security, availability, and confidentiality ("applicable trust services criteria") set forth in TSP section 100, *2017 Trust Services Criteria for Security, Availability, Processing Integrity, Confidentiality, and Privacy* (AICPA, *Trust Services Criteria*).

#### *Service Organization's Responsibilities*

Alibaba Cloud is responsible for its service commitments and system requirements and for designing, implementing, and operating effective controls within the system to provide reasonable assurance that Alibaba Cloud's service commitments and system requirements were achieved. Alibaba Cloud has also provided the accompanying assertion about the effectiveness of controls within the system. When preparing its assertion, Alibaba Cloud is responsible for selecting, and identifying in its assertion, the applicable trust service criteria and for having a reasonable basis for its assertion by performing an assessment of the effectiveness of the controls within the system.

#### *Service Auditor's Responsibilities*

Our responsibility is to express an opinion, based on our examination, on management's assertion that the controls within the system were effective throughout the period to provide reasonable assurance that the Service Organization's service commitments and system requirements were achieved based on the applicable trust services criteria. Our examination was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants. Those standards require that we plan and perform our examination to obtain reasonable assurance about whether management's assertion is fairly stated, in all material respects. We believe that the evidence we obtained is sufficient and appropriate to provide a reasonable basis for our opinion.

Our examination included:

- Obtaining an understanding of the system and the Service Organization's service commitments and system requirements;
- Assessing the risks that controls were not effective to achieve Alibaba Cloud's service commitments and system requirements based on the applicable trust services criteria;
- Performing procedures to obtain evidence about whether controls within the system were effective to achieve Alibaba Cloud's service commitments and system requirements based on the applicable trust services criteria.

Our examination also included performing such other procedures as we considered necessary in the circumstances.



We are required to be independent and to meet our other ethical responsibilities in accordance with relevant ethical requirements related to the engagement

*Inherent Limitations*

There are inherent limitations in the effectiveness of any system of internal control, including the possibility of human error and the circumvention of controls.

Because of their nature, controls may not always operate effectively to provide reasonable assurance that the Service Organization's service commitments and system requirements were achieved based on the applicable trust services criteria. Also, the projection to the future of any conclusions about the effectiveness of controls is subject to the risk that controls may become inadequate because of changes in conditions or that the degree of compliance with the policies or procedures may deteriorate.

*Opinion*

In our opinion, management's assertion that the controls within Alibaba Cloud's cloud services system were effective throughout the period from October 1, 2021 to September 30, 2022, to provide reasonable assurance that Alibaba Cloud's service commitments and system requirements were achieved based on the applicable trust services criteria is fairly stated, in all material respects.

A handwritten signature in black ink that reads 'PricewaterhouseCoopers' in a cursive script.

PricewaterhouseCoopers

Hong Kong, China

November 14, 2022



**Management of Alibaba Cloud’s Assertion Regarding the Cloud Services System  
Throughout the Period from October 1, 2021 to September 30, 2022**

We are responsible for designing, implementing, operating and maintaining effective controls within Alibaba Cloud Computing Ltd.’s and its affiliates’ (including but not limited to Alibaba Cloud (Singapore) Private Limited, Alibaba.com (Europe) Limited, Alibaba Cloud US LLC, Alibaba Cloud (India) LLP, and Alibaba Cloud (Malaysia) Sdn. Bhd., in which the “Service Organization” or “Alibaba Cloud” is defined as Alibaba Cloud Computing Ltd. and its affiliates) cloud services system (the “system”) throughout the period from October 1, 2021 to September 30, 2022 to provide reasonable assurance that Alibaba Cloud’s service commitments and system requirements relevant to security, availability and confidentiality were achieved. Our description of the boundaries of the system is presented in Attachment A and identifies the aspects of the system covered by our assertion.

We have performed an evaluation of the effectiveness of the controls within the system throughout the period from October 1, 2021 to September 30, 2022 to provide reasonable assurance that Alibaba Cloud’s service commitments and system requirements were achieved based on the trust services criteria relevant to security, availability, and confidentiality (“applicable trust services criteria”) set forth in TSP section 100, *2017 Trust Services Criteria for Security, Availability, Processing Integrity, Confidentiality, and Privacy* (AICPA, *Trust Services Criteria*). Alibaba Cloud’s objectives for the system in applying the applicable trust services criteria are embodied in its service commitments and system requirements relevant to the applicable trust services criteria. The principal service commitments and system requirements related to the applicable trust services criteria are presented in Attachment B.

There are inherent limitations in any system of internal control, including the possibility of human error and the circumvention of controls. Because of these inherent limitations, a service organization may achieve reasonable, but not absolute, assurance that its service commitments and system requirements are achieved.

We assert that the controls within the system were effective throughout the period from October 1, 2021 to September 30, 2022 to provide reasonable assurance that Alibaba Cloud’s service commitments and system requirements were achieved based on the applicable trust services criteria.

Alibaba Cloud Computing Ltd.

November 14, 2022

## **Attachment A –Description of Alibaba Cloud’s Cloud Services System**

### **System Overview**

#### ***Background***

Alibaba Cloud, a business unit of Alibaba Group (NYSE:BABA) (“Alibaba” or the “Group”), provides a comprehensive suite of global cloud computing services to our global customers and partners as well as Alibaba Cloud’s own e-commerce ecosystem. The cloud services provided by Alibaba Cloud are powered by self-developed cloud services platform and technologies. Alibaba Cloud aims to turn cloud computing into a state-of-the-art computing infrastructure by investing heavily in technical innovation to continually improve the computing capabilities and economies of scale of its services. The cloud services are widely used by a variety of industries, including finance, government, games, e-business, mobile services, medical services, multimedia, etc. Besides the cloud services, Alibaba Cloud also provides Internet of Things (IoT) platform for a wide range of fields including intelligent life, intelligent city, intelligent manufacturing, intelligent agriculture, etc. Alibaba Cloud is dedicated to being a builder of IoT infrastructure. It is critical to the users of Alibaba Cloud's IoT Platform that the data storage and processing of the IoT platform allows the integration with Application Programming Interface (API) and other Alibaba Cloud services to enjoy a comprehensive suite of services. It features a rule engine for rapid data collection, storage, and application development. Through the efforts to build an industry-wide and integrated development platform of cloud and device terminals, set up an entire industrial chain of the IoT, and establish global wide IoT standards, Alibaba Cloud continues building an IoT ecosystem, platform and infrastructure, to speed up the integration of the physical world and digital world, and to promote the development from IoT to Internet of Intelligences (IoI).

#### **Boundaries of the System**

#### ***Services Provided***

Alibaba Cloud is committed to building a public, open, and secure cloud computing service platform. The following public cloud services are in scope for this report:

1. ActionTrail
2. Alibaba Cloud Container Service for Kubernetes (ACK)
3. Alibaba Cloud DNS
4. Alibaba Cloud DNS PrivateZone
5. Alibaba Cloud Elasticsearch
6. Alibaba Cloud Service Mesh
7. AlibabaMQ for Apache RocketMQ
8. AlinPlat
9. AnalyticDB for MySQL
10. AnalyticDB for PostgreSQL
11. Anti-DDoS / Anti-DDoS Pro / Anti-DDoS Premium
12. API Gateway
13. Application Configuration Management
14. Application Real-Time Monitoring Service
15. Apsara Devops
16. ApsaraDB for MongoDB
17. ApsaraDB for OceanBase
18. ApsaraDB for Redis
19. ApsaraDB RDS for MySQL
20. ApsaraDB RDS for PostgreSQL
21. ApsaraDB RDS for PPAS

22. ApsaraDB RDS for SQL Server
23. ApsaraVideo Live
24. Auto Scaling
25. Bastionhost
26. Block Storage
27. CDN
28. Cloud Config
29. Cloud Enterprise Network
30. Cloud Firewall
31. Cloud Web Hosting
32. CloudMonitor
33. Container Registry
34. Content Moderation
35. Data Encryption Service
36. Data Management
37. Data Transmission Service
38. Database Backup
39. Dataphin
40. DataV
41. DataWorks
42. dbaudit
43. DCDN
44. Dedicated Host
45. Direct Mail
46. ECS Bare Metal Instance
47. Elastic Compute Service
48. Elastic Container Instance
49. Elastic Desktop Service
50. Elastic GPU Service
51. Elastic High-Performance Computing
52. Elastic IP Address
53. E-MapReduce
54. Enterprise Distributed Application Service
55. Express Connect
56. File Storage NAS
57. Fraud Detection
58. Function Compute
59. Global Accelerator
60. Global Traffic Manager
61. Hologres
62. Hybrid Backup Recovery
63. IDaaS
64. Intelligent Speech Interaction
65. IoT Platform
66. Key Management Service
67. Link ID<sup>2</sup> (IoT Device ID)
68. Link IoT Edge
69. Link Living
70. Link SOC
71. Link Visual

72. Link WAN
73. Log Service
74. Machine Learning Platform for AI
75. MaxCompute
76. Message Queue for Apache Kafka
77. Mobile Testing
78. NAT Gateway
79. Object Storage Service
80. OCR
81. Operation Orchestration Service
82. PolarDB
83. PolarDB-X
84. Quick BI
85. Realtime Compute for Apache Flink
86. Resource Access Management
87. Resource Management
88. Secure Content Delivery Solution
89. Security Center
90. Sensitive Data Discovery and Protection
91. Server Load Balancer
92. Short Message Service
93. Simple Application Server
94. Super Computing Cluster
95. Tablestore
96. Virtual Private Cloud
97. VPN Gateway
98. Web Application Firewall (WAF)

Alibaba Cloud public cloud services in scope for this report are grouped into categories and brief descriptions for each of the services are provided below. A complete list of Alibaba Cloud services available to customers is provided on the Alibaba Cloud official website. Customers shall consult extensive online documentation for additional information.

### **Analytics**

Alibaba Cloud Elasticsearch: Alibaba Cloud Elasticsearch is based on the open-source Elasticsearch engine and is designed for search and analytics scenarios. Alibaba Cloud Elasticsearch is a cloud-based service that offers built-in integrations such as Kibana, commercial features, and Alibaba Cloud VPC, Cloud Monitor, and Resource Access Management.

Dataphin: Dataphin is designed to help users create and manage intelligent and unified data assets and empower innovation. It provides a comprehensive one-stop solution including data integration, warehouse modelling, identity and profile distilling, asset management, and data services.

DataV: DataV is a data visualization tool, featuring geographic information systems allowing for interpretation of data to understand relationships, patterns, and trends.

DataWorks: DataWorks is a Big Data platform product launched by Alibaba Cloud. It provides one-stop Big Data development, data permission management, offline job scheduling, and other features.

DataWorks works straight 'out-of-the-box' without the need to worry about complex underlying cluster establishment and Operations & Management.

E-MapReduce: Alibaba Cloud Elastic MapReduce (EMR) is a big data processing solution that runs on the Alibaba Cloud platform. EMR is built on Alibaba Cloud ECS instances and is based on open-source Apache Hadoop and Apache Spark. EMR allows users to use the Hadoop and Spark ecosystem components, such as Apache Hive, Apache Kafka, Flink, Druid, and TensorFlow, to analyze and process data. User can use EMR to process data stored on different Alibaba Cloud data storage service, such as Object Storage Service (OSS), Log Service (SLS), and Relational Database Service (RDS).

MaxCompute: MaxCompute (previously known as ODPS) is a general purpose, fully managed, multi-tenancy data processing platform used for large-scale data warehousing. MaxCompute supports various data importing solutions and distributed computing models, enabling users to effectively query massive datasets, reduce production costs, and ensure data security.

Quick BI: Quick BI allows the user to perform data analytics, exploration, and reporting on mass data with drag-and-drop features and a rich variety of visuals. Quick BI enables users to perform data analytics, exploration, and reporting, and empowers enterprise users to view and explore data and make informed, data-driven decisions.

Realtime Compute for Apache Flink: Realtime Compute for Apache Flink offers a one-stop, high-performance platform that enables real-time big data processing based on Apache Flink. It is widely used in diverse scenarios, such as streaming data processing, offline data processing, and data lake computing.

Hologres: Hologres is an all-in-one real-time data warehouse engine that is compatible with PostgreSQL. It supports online analytical processing (OLAP) and ad hoc analysis of PB-scale data. Hologres supports online data serving at high concurrency and low latency. It is deeply integrated with MaxCompute, Flink and DataWorks, provides a full-stack data warehouse solution that integrates online and offline processing.

## **Artificial Intelligence**

Intelligent Speech Interaction: Intelligent Speech Interaction is suitable for various scenarios, including intelligent Q&A, intelligent quality inspection, real-time subtitling for speeches, and transcription of audio recordings. Intelligent Speech Interaction allows users to use self-learning platform to improve speech recognition accuracy and provides a comprehensive management console and easy-to-use SDKs.

Machine Learning Platform for AI: Machine Learning Platform for AI provides end-to-end machine learning services, including data processing, feature engineering, model training, model prediction, and model evaluation.

OCR: Optical Character Recognition (OCR) converts text in pictures into editable text. OCR enables text conversion in over ten application scenarios, including general text, personal license, identity document, invoice, educational tests, vehicle logistics documents, office documents, corporate certificates, documents in minor language, customized templates, etc.

## **Container & Middleware**

Alibaba Cloud Service Mesh: Alibaba Cloud Service Mesh (ASM) is a fully managed platform that manages the traffic of microservice applications in a unified manner. ASM is compatible with Istio,

supports unified traffic management across multiple Kubernetes clusters, and provides consistent communication control for containerized applications and applications that run on virtual machines. ASM integrates with the Alibaba Cloud Container Service for Kubernetes (ACK) and Alibaba Cloud's network connection and security capabilities. ASM allows the user to create an optimal service mesh on the cloud and provides consistent traffic shaping and observability for each microservice.

AlibabaMQ for Apache RocketMQ: AlibabaMQ for Apache RocketMQ is a professional message middleware as a core product in the enterprise-level Internet architecture. It supports reliable message-based asynchronous communication among microservices, distributed systems, and serverless applications. This service can be used to easily create a scalable distributed system with loose coupling and high availability.

Application Configuration Management: Application Configuration Management (ACM) is used as a centralized management platform for application configurations. This makes for more convenient management of configurations and enhances service capabilities for such scenarios as microservices, DevOps, and big data.

Application Real-Time Monitoring Service: Application Real-Time Monitoring Service (ARMS) is an end-to-end Alibaba Cloud monitoring service for Application Performance Management (APM) used to quickly develop real-time business monitoring capabilities using the frontend monitoring, application monitoring, and custom monitoring features provided by ARMS.

Enterprise Distributed Application Service: Enterprise Distributed Application Service (EDAS) is the core product of Alibaba Cloud's enterprise Internet architecture solutions. It provides a multifunctional solution for the enterprise-level cloud computing market. EDAS provides a variety of features including full life-cycle management and application O&M.

Message Queue for Apache Kafka: Message Queue for Apache Kafka is a fully-managed Apache Kafka service which manages complex infrastructure-related operations for the user, such as the configuration, maintenance, upgrading, and monitoring of the user's workloads.

## **Database**

AnalyticDB for MySQL: AnalyticDB for MySQL is a high-performance data warehousing service that is secure, stable, and easy to use. It allows the user to easily create online statistical reports, multidimensional analysis solutions, and real-time data warehouses. AnalyticDB for MySQL uses a distributed computing architecture that enables it to use the elastic scaling capability of the cloud to compute tens of billions of data records in real time. AnalyticDB for MySQL stores data based on relational models and use SQL to flexibly compute and analyze data. AnalyticDB for MySQL allows users to easily manage databases, scale in or out nodes, and scale up or down instances. It provides various visualization and ETL tools to make enterprise data processing easier.

AnalyticDB for PostgreSQL: AnalyticDB for PostgreSQL is an online Massively Parallel Processing data warehousing service based on the open source Greenplum Database. AnalyticDB for PostgreSQL provides online expansion and performance monitoring service to free the user from complicated MPP cluster operations and management (O&M).

ApsaraDB for MongoDB: ApsaraDB for MongoDB is a secure, reliable, and elastically scalable cloud database service supporting ReplicaSet and Sharding architectures. ApsaraDB for MongoDB's highly available service includes automatic monitoring, backup, and disaster tolerance capabilities.

ApsaraDB for OceanBase: ApsaraDB for OceanBase is a relational database service developed by Alibaba Group for high-throughput, high-concurrency, and high-availability scenarios. ApsaraDB for OceanBase uses the Paxos protocol and maintains multiple data replicas. Users can build a financial-grade database by deploying PC servers in a distributed architecture.

ApsaraDB for Redis: ApsaraDB for Redis is an automated and scalable tool for developers to manage data storage shared across multiple processes, applications or servers. ApsaraDB for Redis supports primary-secondary, clustering and read-write separation architectures, low latency, high throughput and elastic scalability, and provides real-time diagnostic capabilities for large hot keys.

ApsaraDB RDS for MySQL: ApsaraDB for MySQL is one of the most popular open-source databases in the world. As a key component of the open-source software bundle LAMP (Linux, Apache, MySQL, and Perl/PHP/Python), MySQL has been widely applied to different scenarios.

ApsaraDB RDS for PostgreSQL: ApsaraDB RDS for PostgreSQL is an on-demand database hosting service for PostgreSQL with automated monitoring, backup and disaster recovery capabilities.

ApsaraDB RDS for PPAS: ApsaraDB for PPAS is a database service that has been jointly developed by Alibaba Cloud and EnterpriseDB, and is compatible with Oracle. The service enables easy data migration and supports Oracle PL/SQL, data types, advanced functions, and table partitioning.

ApsaraDB for SQL Server: ApsaraDB for SQL Server offers excellent performance when handling complex SQL queries, and fully supports applications built on .NET framework.

Data Management: Data management (DMS) supports unified management of multiple databases. It is a comprehensive data management service covering data management, structure management, user authorization, security auditing, trend analysis, and data tracing. DMS provides an easy-to-use portal for the centralized management of databases and servers to ensure more secure data, more efficient management and clearer data value.

Data Transmission Service: Data Transmission Service (DTS) helps the user migrate data between data storage types, such as relational database, NoSQL, and OLAP. The service supports homogenous migrations as well as heterogeneous migration between different data storage types. DTS can also be used for continuous data replication with high availability.

Database Backup: Database Backup (DBS) provides unlimited backup storage, second-level emergency recovery, and recovery drills. DBS activates cold data by using second-level sandbox instances and backup data queries.

PolarDB: PolarDB is a cloud-native database using compute-storage separation architecture and integrates software with hardware. PolarDB provide users with extremely flexible, high-performance, secure, and reliable database services that allow users to store large amounts of data.

PolarDB-X: PolarDB-X is a cloud-native distributed database developed by Alibaba Cloud. It is compatible with the MySQL syntax and provides scale-out capabilities, financial-grade high availability, and hybrid transaction/analytical processing (HTAP) functionality. It distributes business workloads to multiple compute and storage nodes and is designed to address database challenges such as ultra-high concurrency, massive data storage, and large table performance bottlenecks.

## **Developer Services**

Apsara Devops: Apsara Devops is a developer platform with Projects, Thoughts, Flow, Codeup, Packages, and Testhub together to support developers' work.

CloudMonitor: CloudMonitor is used to collect monitor metrics of Alibaba Cloud resources and custom metrics. The service can be used to detect the availability of the subscribed services and allows the users to set alarms on specific metrics. CloudMonitor enables the user to view and understand the usage of the cloud resources, and the status and health of the user's business so that the user can act promptly to ensure the availability of applications when an alarm is triggered.

Mobile Testing: Mobile Testing is a cloud platform that provides device testing services for enterprises and mobile developers. Mobile Testing provides a large number of popular models and offers a 24/7 service to help the user find all kinds of hidden risks in apps, including but not limited to app crashes, compatibility issues, functionality issues, and performance issues. It helps enhance market competitiveness and reduce user churn by improving app quality and user experience.

## **Elastic Computing**

Alibaba Cloud Container Service for Kubernetes (ACK): Alibaba Cloud Container Service for Kubernetes (ACK) integrates virtualization, storage, networking, and security capabilities. ACK allows the user to deploy applications in high-performance and scalable containers and provides full lifecycle management of enterprise-class containerized applications.

Auto Scaling: Auto Scaling is a service to automatically adjust computing resources based on the volume of user requests. When the demand for computing resources increases, Auto Scaling automatically adds ECS instances to serve additional user requests, or alternatively removes instances in the case of decreased user requests.

Cloud Web Hosting: Cloud Web Hosting is a virtual server used for storing and hosting website content, built on ECS.

Container Registry: Container Registry allows the user to manage images throughout the image lifecycle. It provides secure image management, stable image build creation across global regions, and easy image permission management. The service simplifies the creation and maintenance of the image registry and supports image management in multiple regions.

Dedicated Host: Dedicated Host (DDH) is a fully managed server hosting service that Alibaba Cloud provides for enterprise users. DDH offers dedicated physical resources, flexible deployment options, rich configurations, and high cost-effectiveness. Each tenant can use dedicated physical resources that are not shared with other tenants.

ECS Bare Metal Instance: ECS Bare Metal Instance features both the elasticity of a virtual server and the high-performance and comprehensive features of a physical server. The next-generation virtualization technology of these instances excels in supporting standard Elastic Compute Service (ECS) and nested virtualization technology.

Elastic Compute Service: Elastic Compute Service (ECS) provides fast memory and the latest Intel CPUs to help users power cloud applications and achieve faster results with low latency.

Elastic Container Instance: Elastic Container Instance (ECI) is an agile and secure serverless container instance service.

Elastic Desktop Service: EDS enables quick and convenient creation and deployment as well as centralized management and O&M for desktop environments. The user can quickly create a secure, high-performance, and cost-efficient cloud desktop without making large hardware investments upfront.

Elastic GPU Service: Elastic GPU Service (EGS) is a GPU-based computing service ideal for scenarios such as deep learning, video processing, scientific computing, and visualization.

Elastic High-Performance Computing: Elastic High-Performance Computing (E-HPC) is an end-to-end public cloud service. E-HPC provides individual users, education and research institutions, and public institutions with a fast, elastic, and secure cloud compute platform that interconnects with Alibaba Cloud products.

Function Compute: Function Compute is a fully managed event-driven compute service that allows customers to focus on writing and uploading code without the need to manage infrastructure such as servers. Function Compute provides compute resources to run code flexibly and reliably.

Operation Orchestration Service: Alibaba Cloud Operation and Maintenance Orchestration Service (OOS) is an automated operations and maintenance (O&M) service. OOS allows the user to manage and execute various types of O&M tasks.

Simple Application Server: Simple Application Server is a new generation computing service for stand-alone application scenarios. It provides one-click application deployment and supports all-in-one services such as domain name resolution, website publishing, security, application O&M, and application management.

Super Computing Cluster: Super Computing Cluster (SCC) servers improve network performance and increase the acceleration ratio of large-scale clusters. SCC servers boast all the advantages of Elastic Bare Metal instances and feature high-quality network performance with high bandwidth and low latency. SCC servers cater to high-performance computing for artificial intelligence, science/engineering computing, and audio/video processing.

## **Enterprise Applications & Cloud Communication**

Alibaba Cloud DNS: Alibaba Cloud DNS is a secure, fast, stable, and reliable authoritative DNS service. It helps enterprises and developers convert human-readable domain names into machine-readable IP addresses and then routes user requests to required websites or application servers.

API Gateway: API Gateway provides API lifecycle management services including API publishing, management, maintenance, and monetization. It enables simple and fast microservice integration, front and back end separation, and system integration at low costs and low risks. API Gateway can be used to share functions and data with partners and third-party developers.

Direct Mail: Direct Mail is used to send email notifications and batch emails quickly and efficiently without the need to build the user's own email server.

Resource Management: Resource Management provides a collection of resource management services that support enterprise IT administration. The services include Resource Directory, Resource Group,

and Tag. Resource Directory allows the user to build an organizational structure for resources based on business requirements. Resource Group and Tag allow the user to hierarchically manage the resources.

Short Message Service: Short Message Service (SMS) has a batch sending feature and various API operations to send one-time password (OTP) messages, notification messages, and promotional messages to customers in more than 200 countries and regions worldwide.

## **Internet of Things**

AlinPlat: AlinPlat closely connects and coordinates factory equipment, production lines, products, supply chains, and customers to provide companies with a reliable basic platform and rich upper-level industrial applications, combined with comprehensive industrial support, to help companies complete digital transformation.

IoT Platform: Alibaba Cloud IoT Platform allows IoT companies stable communication between devices and the IoT Platform. Featuring nodes deployed globally, device around the world can communicate with the IoT platform rapidly and with low latency. Alibaba Cloud IoT Platform also provides various security measures that guarantee individual device security as well as secure communication between devices and the IoT platform. Alibaba Cloud IoT Platform is highly customizable, featuring a rule engine for rapid data analysis storage, and application development.

Link ID<sup>2</sup> (IoT Device ID): Alibaba Cloud LinkID<sup>2</sup> is an IoT device identity authentication system that provides device security authentication, secure connection, business data encryption, key management and other end-to-end trusted access ability for IoT systems through trusted computing and cryptography.

Link IoT Edge: Link IoT Edge fully integrates cloud and edge computing and has native support for Alibaba Cloud. The service comes with communication protocol development, remote operation and maintenance, and edge application frameworks. It is compatible with a large variety of IoT application layer data collection protocols. It shields the differences in underlying hardware communication links, standardizes data conversion, and provides standard object model data, enabling cloud applications to seamlessly use edge capabilities.

Link Living: The Living Internet of Things platform is Alibaba Cloud IoT's Internet of Things platform for consumer smart devices to solve the problems of device connection, App control, device message push, voice control, and voice control that are often encountered in the intelligent devices. A complete set of configuration solutions are provided to greatly reduce the development cost of "equipment-cloud-app"

Link SOC: Alibaba Cloud Link SOC (Security Operations Center) assists users in identifying and mitigating security threats to ensure secure operations of the IoT systems. Link SOC not only fixes security vulnerabilities identified in the devices, but also monitors operations on all devices. Abnormal operations will either be blocked by pre-configured rules or trigger alerts to the security administrators for follow-up actions. Link SOC provides continuous protection against security threats and minimize the impact of abnormal operations.

Link Visual: Alibaba Cloud Link Visual is a video cloud platform that provides video streaming, storage, forwarding, playing, and AI computing cloud services, which allows video device manufacturers, solution providers, and service providers to quickly deploy data from video devices onto cloud and build video scene applications. Link Visual also provides secure data transmission and storage services for videos requiring data privacy protection.

Link WAN: Alibaba Cloud Link WAN is a network management platform for enterprises using IoT services, with an aim to assist developers in constructing IoT networks with high capacity and high concurrency at the enterprise level. Developers can use Link WAN in conjunction with IoT Platform to benefit from the functions in each link and possess a self-managed IoT WiFi network.

## **Media Services**

ApsaraVideo Live: ApsaraVideo Live is a live streaming platform for both audio and video based on leading content hosting, delivery networks and large-scale distributed real-time transcoding technology. ApsaraVideo Live provides high-definition and uninterrupted live audio and video services that are convenient and accessible, with low latency and high concurrency.

## **Networking and CDN**

Alibaba Cloud DNS PrivateZone: Alibaba Cloud DNS PrivateZone is a Virtual Private Cloud-Based (VPC) domain name system (DNS) service for Alibaba Cloud users.

CDN: Alibaba Cloud Content Delivery Network (CDN) is used to deliver content to users from the nodes that are nearest to them, accelerating the response to user requests and increasing the response rate. CDN can also resolve the delivery latency problem that is usually caused by distribution, bandwidth, and server performance issues.

Cloud Enterprise Network: Cloud Enterprise Network provides a hybrid and distributed global network ideal for enterprise users with high demand on network coverage. With its stable transmission and next-generation network environment, the network provides high transmission speed and low latency for end-users. Cloud Enterprise Network can be used to facilitate communication between VPC to VPC and VPC to IDC. Routing information in CEN can be learned and distributed automatically, which allows CEN to achieve fast routing convergence and improved network quality and security.

DCDN: Dynamic Route for CDN (DCDN) is a content delivery acceleration service, based on Alibaba Cloud's CDN to accelerate content delivery for hybrid sites, dynamic sites, and applications. Dynamic Route for Content Delivery Network (DCDN) uses technologies, such as static and dynamic content separation, edge caching, intelligent routing, and data compression, to resolve issues, such as high latency, packet loss, and service instability.

Elastic IP Address: Elastic IP Addresses are independent public IP address resources, which allows users to decouple public IP addresses from ECS instances and facilitate management. An EIP is a NAT IP address that is located in the Internet gateway of Alibaba Cloud and mapped to the associated cloud resource through NAT. After a cloud resource is associated with an EIP, the cloud resource can communicate with the Internet through the EIP.

Express Connect: Express Connect allows users to establish high bandwidth, reliable, secure, and private connections between different networks. Dedicated physical connections link the user's on-premises data centers with Alibaba Cloud, which improves the flexibility of the user's network topology and the performance of cross-network connectivity. The service also supports peering connections between VPC networks across regions and Alibaba Cloud accounts.

Global Accelerator: Global Accelerator is a network acceleration service, benefiting from the high-quality bandwidth and global transmission networks that are provided by Alibaba Cloud. Global Accelerator enables nearby access to the Internet and cross-region deployment of applications, improving the user experience of Internet services. Global Accelerator features high network quality, high security, high

availability, and low latency. In addition, Global Accelerator can be activated within several minutes, making service deployment more agile.

Global Traffic Manager: Global Traffic Manager allows the user to access the nearest node wherever application or website is located and balance concurrent workloads between multiple nodes based on the DNS architecture. With built-in health checks, the user can easily monitor the health of applications and run DNS failover to meet any disaster recovery requirements.

NAT Gateway: NAT gateway enables multiple instances within a virtual private cloud (VPC) to communicate with the Internet. Custom SNAT and DNAT rules can be created to help the user use network resources flexibly and build a hybrid cloud network. The service provides value-added features, such as multiple IP addresses, shared Internet bandwidth, and extensive monitoring metrics.

Secure Content Delivery Solution: Secure Content Delivery Solution fortifies DCDN with a full range of edge security functions, such as DDoS mitigation, WAF, Bot Manager, and precise access control, making it a Secure Content Delivery solution that optimizes CDN for dynamic content delivery to render personalized web content as soon as users interact with it to offer a smooth user experience.

Server Load Balancer: Server Load Balancer (SLB) distributes network traffic across groups of backend servers to improve the service capability and application availability. It provides functions as a reverse proxy at Layer 7 (ALB) and load balancing services at Layer 4 (CLB).

Virtual Private Cloud: VPC helps customers build an isolated network environment based on Alibaba Cloud including customizing the IP address range, network segment, route table, and gateway. . In addition, the user can connect VPC and a traditional IDC through a leased line, VPN, or GRE to provide hybrid cloud services.

VPN Gateway: VPN Gateway is used to transmit encrypted traffic between Alibaba Cloud VPCs and enterprise data centers, enterprise office networks, or Internet platforms over the Internet. This service can be used to establish reliable and secure connections for data transmission.

## **Security**

ActionTrail: ActionTrail tracks the user's Alibaba Cloud account actions and records them as events to facilitate auditing. ActionTrail allows the user to deliver these events to the specified Log Service Logstores and Object Storage Service (OSS) buckets. The user can also query and download the recorded events. Then, the user can perform behaviour analysis, security analysis, and compliance auditing and track resource changes based on the events.

Anti-DDoS / Anti-DDoS Pro / Anti-DDoS Premium: Anti-DDoS service is based on Alibaba Cloud's global scrubbing centers, combined with intelligent DDoS detection and protection systems developed at Alibaba, automatically mitigates attacks and reinforce the security of users' applications, reduce the threat of malicious attacks.

Bastionhost: Bastionhost enables the user to manage asset O&M permissions in a centralized manner, monitor all O&M operations, and reproduce O&M scenarios in real time to facilitate identity authentication, access control, and operation audit. Bastionhost can be used to troubleshoot issues, such as difficulties in the management of various assets, unclear responsibilities and authorities, and difficulties in the backtracking of O&M events.

Cloud Config: Cloud Config monitors and tracks the changes to users' resource configurations, allowing users to monitor resource changes over time. Cloud Config allows users to set compliance rules for the configurations of users' Alibaba Cloud resources. Cloud Config applies the rules to check the configurations and sends alerts when non-compliant configurations are detected. Cloud Config allows users to configure manual or automatic remediation for non-compliant resources to implement compliance audits.

Cloud Firewall: Alibaba Cloud Firewall centrally manages the policies that control the traffic from the Internet to users' businesses, the traffic between VPC networks, the traffic on Express Connect instances, and the traffic generated by VPN-based remote access. Cloud Firewall is embedded with an Intrusion Prevention System and can detect outbound connections from users' assets. Alibaba Cloud Firewall can also visualize network traffic, access between businesses, and store network traffic logs generated within the last six months.

Content Moderation: Content Moderation is an image and video moderation service that accurately detects inappropriate content. Content Moderation leverages Deep Learning technology and benefits from Big Data analysis to provide accurate monitoring of pictures, video, text and other multimedia content. Not only does Content Moderation help users to reduce adult, violence, terrorism, drugs and other illegal or inappropriate content, but can also minimize spam advertising and other user experience pain points.

Data Encryption Service: Alibaba Cloud Data Encryption Service allows the user to generate and use encryption keys on hardware that is FIPS 140-2 Level 3 validated. It also allows the user to access tamper-resistant HSM instances in Alibaba Cloud VPC in an exclusive and single-tenant manner to protect encryption keys.

dbaudit: dbaudit has Intelligent analysis of database communication flow, and fine-grained audit of database access behaviour. Through the audit traceability of the full amount of database behaviours, real-time measurement of dangerous attacks, and intelligent warning of risk statements, database audit will provide the most secure monitoring guarantee for users' most sensitive database assets.

Fraud Detection: Fraud Detection is a risk control platform, based on machine learning algorithms and stream computing technologies. Fraud Detection can be used to identify frauds in core services, such as user registrations, operations, transactions, and credit audits. Fraud Detection provides an end-to-end, anti-fraud system tool that is suitable for industry scenarios such as e-commerce, social networking, and finance.

IDaaS: Application Identity Service (IDaaS) is a centralized identity management service that provides a unified application portal, user directory, single sign-on, centralized authorization, and audit reporting.

Key Management Service: Alibaba Cloud Key Management Service (KMS) provides secure and compliant key management and cryptography services to help users encrypt and protect sensitive data assets. KMS is integrated with a wide range of Alibaba Cloud services to allow users to encrypt data across the cloud and to control its distributed environment. KMS provides key usage logs via ActionTrail, supports custom key rotation, and provides HSMs that have passed FIPS 140-2 Level 3 or other relevant validation, to help users meet regulatory and compliance needs.

Resource Access Management: Resource Access Management (RAM) is an identity and access control service which enables the users to centrally manage users (including employees, systems or applications) and securely control their access to resources through permission levels.

Security Center: Security Center is unified security management system that recognizes, analyzes, and alerts of security threats in real-time. Security Center provides protection from ransomware, various viruses, and web tampering. Security Center also provides compliance assessment to protect cloud and on-premises servers and meet regulatory compliance requirements.

Sensitive Data Discovery and Protection: Sensitive Data Discovery and Protection is an all-in-one data security solution that provides various features, such as sensitive data detection, classification, grading, and de-identification, to help users meet compliance requirements specified in General Data Protection Regulation (GDPR) and personal information protection.

Web Application Firewall (WAF): Web Application Firewall (WAF) is a Cloud firewall service that protects the user's websites and web servers based on the intelligent computing capabilities of Alibaba Cloud Security.

## **Storage**

Block Storage: Elastic Block Storage is a block-level data storage service attached to Elastic Compute Service (ECS) instances and features low latency, persistence, and high reliability. Block Storage enables automatic replication within the same zone to avoid data loss caused by hardware failures and guarantee the stability and continuity of users' workloads.

File Storage NAS: Apsara File Storage NAS is a file storage service for Alibaba Cloud ECS instances, Alibaba Cloud E-HPC and Container Service. It provides a distributed file system with unlimited capacity and performance scaling, with a single namespace, multi-party sharing, high reliability, and high availability.

Hybrid Backup Recovery: HBR is an easy-to-use and cost-effective online data management service. It provides secure and efficient backup, disaster recovery and archive services for Alibaba Cloud ECS instance, files, ECS databases, NAS and OSS, as well as on-premises data including VMware virtual machines, large scale NAS systems, files systems and databases.

Log Service: Log Service is a complete real-time data logging service that has been developed by Alibaba Group. Log service supports collection, consumption, shipping, search, and analysis of logs. It improves the capacity of processing and analysing large amounts of logs.

Object Storage Service: Alibaba Cloud Object Storage Service (OSS) is an encrypted, secure, cost-effective, and easy-to-use object storage service that enables to store, back up, and archive large amounts of data in the cloud, with a guaranteed durability of 99.999999999%(12 9's). RESTful APIs allow storage and access to OSS anywhere on the Internet.

Tablestore: Tablestore is a distributed NoSQL data storage service built on Alibaba Cloud's Apsara distributed computing system that enables seamless expansion of data size and access concurrency through data sharing and server load balancer technologies, providing storage of and real-time access to massive structured data.

## **Infrastructure**

Alibaba Cloud offers available, secure, and reliable cloud computing infrastructure by taking the following measures: setting up cloud data centers across multiple regions and zones globally, delivering good network access experience, providing cloud products with high availability infrastructure and

multi-replica data redundancy based on the Apsara distributed cloud OS, upgrading products, fixing vulnerabilities through hotfix dynamical patching technology, and ensuring operation and maintenance security. Alibaba Cloud data centers are deployed across multiple regions worldwide, with each region supporting multiple zones. Customer workloads can be deployed across regions and zones to implement a high availability architecture.

Alibaba Cloud is dedicated to providing stable and reliable computing and data processing capabilities and enabling an interconnected world. Alibaba Cloud has 84 availability zones in 27 regions across the globe from the west to east. Alibaba Cloud uses multiple telecom service providers for backbone connectivity and co-location service providers for data center facility management.

The scope of data centers covered in this report includes the data centers located in the following regions. The numbers in parenthesis indicate the number of availability zones under review for the respective region.

- Beijing, China (12)
- Chengdu, China (2)
- Guangzhou, China (2)
- Hangzhou, China (8)
- Heyuan, China (2)
- Hohhot, China (2)
- Nanjing, China (1)
- Qingdao, China (2)
- Shanghai, China (11)
- Shenzhen, China (6)
- Ulanqab, China (3)
- Zhangjiakou, China (3)
- Hong Kong, China (3)
- Singapore (3)
- Sydney, Australia (2)
- Kuala Lumpur, Malaysia (2)
- Jakarta, Indonesia (3)
- Manila, Philippine (1)
- Bangkok, Thailand (1)
- Mumbai, India (2)
- Tokyo, Japan(2)
- Seoul, Korea (1)
- Virginia, United States (2)
- Silicon Valley, United States (2)
- Frankfurt, Germany (3)
- London, United Kingdom (2)
- Dubai, United Arab Emirates(1)

### ***Control Environment***

Alibaba Cloud organizationally aligns with the control environment of Alibaba and leverages some aspects of the control environment at the Group level. Alibaba Cloud defines and implements the internal controls by setting the core values and code of conducts aligning with Group. The roles and responsibilities of each division is clearly defined. The policies, procedures and standards are established, documented and communicated within the organization. Alibaba Cloud has established a risk management framework to identify, analyze and manage risks within the company and related to the services provided. The risk assessments and systematic management monitoring activities are conducted on a regular basis.

### ***People***

Alibaba Cloud organizational structure was established at all levels with clear reporting lines. Roles and responsibilities for each division are clearly defined. Alibaba Cloud is led by Alibaba Cloud Chief Executive Officer who reports directly to the Chief Executive Officer of the Group. Alibaba Cloud Security Division is responsible for building the cloud security defence eco-system, designing, developing and operating the cloud security products and managing cloud security and compliance. The head of Alibaba Cloud Security Division acts as Chief Information Security Officer of Alibaba Cloud, who is responsible for cloud security eco-system, cloud security management and compliance. The industry compliance and standard team of the Security Division is responsible for managing cloud computing-related external standard compliance, communicating with external regulators, building an information security management system and internal inspection procedures, establishing risk identification and assessment processes, and conducting regular risk assessments. The cloud security team of the Security Division is responsible for security management of cloud products and systems which defines the security standards and benchmark for cloud security operation.

## ***Information Security Governance***

Alibaba Cloud has implemented an Information Security Strategy for security management including processes and systems. The policies and standards for the information security have been defined and documented to guide the operations. The roles and responsibilities for information security have been clearly defined and communicated within the organization.

### ***Data***

Data is classified into different data types such as customer data, business data, and company data. Alibaba Cloud's Data Security Management ensures that data security is managed and controlled throughout the data lifecycle that covers data gathering, transmission, processing, exchange, storage, and destruction. Each stage of the data security lifecycle has its associated security management requirements and technologies.

Alibaba Cloud customers retain control and ownership of all Customer Data. Customers are responsible for the development, operation, maintenance, and use of the content of all Customer Data. Alibaba Cloud helps customers ensure the confidentiality, integrity, and availability of their data through the services and capacities it provides. Alibaba Cloud's infrastructure security measures and security mechanisms of virtualization technology help prevent customers' cloud resources from unauthorized access and ensures the segregation among multiple tenants in a cloud computing environment. Alibaba Cloud also provides services for customers to encrypt and back up their data. On terminating services to cloud service customers, Alibaba Cloud deletes data assets of customers in a timely manner using data erasure techniques that meet industry standards.

### ***Processes and Procedures***

Alibaba Cloud has established policies, processes and procedures to formulate control activities and support the achievement of security, availability and confidentiality commitments, relevant laws and regulations, and other system requirements. These processes and procedures cover the following areas:

- Data Security Management
- Infrastructure and Virtualization Security
- Identity and Access Management
- Asset Management
- Customer Authentication and Access Management
- Cryptography and Key Management
- Physical and Environmental Security
- Endpoint Security
- Threat and Vulnerability Management
- Security Incident Management
- Problem Management
- Change Management
- Business Continuity Management
- Vendor Management
- Audit and Compliance
- Interoperability and Portability

## **Attachment B - Principal Service Commitments and System Requirements**

Alibaba Cloud strives to provide customers with consistent, reliable, secure, and compliant cloud computing services, helping customers ensure the security, confidentiality and availability of their systems and data. Alibaba Cloud is responsible for designing, implementing, and operating effective controls over the systems and services to provide reasonable assurance that Alibaba Cloud's service commitments and system requirements are achieved. The services commitments to Alibaba Cloud's customers (user entity) are communicated in the form of Alibaba Cloud Security White Paper, Product Service Level Agreement ("Product SLA"), Membership Agreements, Privacy Policy, description of the service offering of Alibaba Cloud and contracts. The details of Product SLA, Membership Agreement and other legal documents can be found at [Alibaba Cloud Legal Document Centre](#).

Alibaba Cloud has also established various communication channels for customer support including but not limited to live chat, ticket, email, suggestion posting, etc. Any potential issues that could impact the customers are also communicated with customers by global customer support team through established mechanisms.

Moreover, Alibaba Cloud adheres to international standards and best practices. The details related to security and compliance are communicated with customers at [Alibaba Cloud Trust Center](#).

Alibaba Cloud employs a shared responsibility model where Alibaba Cloud and its customers are jointly responsible for security and compliance of the customers' cloud environments. Alibaba Cloud is responsible for the security of the underlying cloud service platform and providing security services and capabilities to customers, while customers are responsible for the design, implementation, and operation of their cloud environments, and for the security of applications and data hosted on Alibaba Cloud. Alibaba Cloud's customers should assess their objectives in choosing the services and designing the on-cloud architecture with consideration of both Alibaba Cloud's controls in place and the configurations and operational controls required as part of their security responsibilities. When designing and providing the services, to achieve the service commitments to its customers and comply with the relevant laws and regulatory requirements, Alibaba Cloud has established system and operational requirements in the form of policies, standards, manuals and procedures which are documented and communicated in organizational wide approaches.