

From “Go cloud” to “using cloud”

1. Executive Summary

As cloud computing technology continues to mature in global, traditional industries such as government affairs, finance, education, medical care, and industry are increasingly driven by policy and business innovation to move to the cloud. Enterprise cloud migration can help traditional enterprises reduce costs and increase efficiency, and promote the continuous innovation and development of traditional businesses. However, enterprises also face many challenges in cloud migration, such as difficulties in application cloud transformation, low utilization of cloud resources, and an imperfect cloud application ecosystem. Therefore, traditional enterprises are in urgent need of cloud operation support services to help them "use the cloud well."



Figure1: Cloud First to Cloud efficiency

This White Paper try to promote the concept of cloud operation support services to the industry, improve the efficiency of enterprise cloud migration by doing a good job in cloud operation, and thus transform traditional enterprises from "cloud first" to "cloud efficiency" in cloud migration. This report will deeply explore the background and pain points of enterprise cloud migration, explain the importance of cloud operation services for enterprise cloud migration, introduce the concepts of cloud operation and operation support services, and analyze the content of cloud operation support services. At the same time, by analyzing typical cases of domestic cloud operation support services, it will look forward to the future development trend of the cloud operation support service industry.

2. Introduction to LinkC Co., Limited

2.1. Company Overview

Founded in November 2021, LinkC Technology Limited, commonly referred to as "LinkC", is Hong Kong's premier digital technology enterprise, focusing on the Public Cloud service, Smart city and building service, Drone and Robot solution, the company's mission centers on harnessing the power of innovative digital tools and artificial intelligence to redefine modern structures.

2.2. Core Offerings



Figure2: Public Cloud Service

Mainly based on Huawei Cloud, supplemented by other data centers and cloud services, it provides customers with full-stack cloud resource services.



Figure3: Cloud consulting services

Provide customers with data center and enterprise application cloud planning and design services, including business analysis and architecture design.



Figure4: Cloud architecture application development

Provide customers with data and AI application development, deployment and operation and maintenance guarantee based on public cloud services.



Figure5: Integrated project management services

Artificial Intelligence Applications: In an age dominated by AI, LinkC's state-of-the-art applications utilize machine learning and deep learning algorithms to offer predictive analytics, energy optimization, and enhanced user experience.

2.3. Collaborative Associates

LinkC is proud of its strong collaborative ties with global tech giants and innovative startups alike, including Huawei Cloud, Xinghai IoT, Renjing Tech, and Beijing Institute of Technology Research Institute. These partnerships enrich LinkC's offerings, ensuring clients benefit from the very best the tech world has to offer.

2.4. Contact & Further Information

For further insights into LinkC's innovative solutions or collaboration inquiries, one can reach out through their official website www.hklinkc.cloud or visit their headquarters located in Hong Kong.

In the subsequent sections, we will delve deeper into LinkC's unique solutions, exploring case studies and success stories that underscore their expertise and commitment to excellence in the realm of smart building technology.

3. Overview of Enterprise Cloud Migration

3.1. Background of Enterprise Cloud Migration

Driven by both policy and business innovation, the demand for traditional industries to migrate to the cloud is becoming increasingly urgent. With the development of information technology, cloud computing has gradually become an

inevitable trend in the development of informatization. The continuous progress of science and technology and the rapid development of the economy have also made the market competition environment in which traditional enterprises are located increasingly fierce. Technological progress and diversified demand have continuously shortened the product life cycle. Enterprises are facing a series of pressures such as shortening delivery cycles, reducing costs, improving product quality, and improving services. The informatization construction of enterprises plays an important role in improving the comprehensive competitiveness of enterprises. At present, the traditional informatization model of enterprises faces the problem of being out of touch with the speed of business development, which has a great impact on the development of enterprises. In this context, major enterprises have promoted business transformation through informatization upgrades. Even for enterprises with relatively slow traditional business development, market competition is forcing these enterprises to transform their businesses in order to occupy a place in the market. In recent years, domestic policies on the development of cloud computing have been issued in a concentrated manner, proposing guiding opinions and promotion measures to promote the innovative development of cloud computing in my country. The macro-policy environment for important links such as the development of global cloud computing industry, industry promotion, and application foundation has basically been formed.

For enterprises, cloud computing is a new engine driving digital transformation. Due to the continuous progress of science and technology and the rapid development of the economy, the market competition environment in which enterprises are located is becoming increasingly fierce. Technological progress and diversified demand have shortened the product life cycle. Enterprises are facing a series of pressures such as shortening delivery cycles, reducing costs, improving product quality, and improving services. The informatization construction of enterprises plays an important role in improving the comprehensive competitiveness of enterprises. At present, the traditional informatization model of enterprises faces the problem of being out of touch with the speed of business development, which has a great impact on the development of enterprises. In this context, cloud computing is first of all conducive to better promoting the popularization and application of various information technologies in enterprises, and accelerating the pace of deep integration of the two in terms of software, platforms, networks, etc. Secondly, with the help of software applications and data services on the cloud, enterprises can improve production management efficiency, optimize business processes, and accelerate the cultivation of new products, new models, and new formats more quickly, conveniently, and efficiently. Thirdly, based on the cloud platform, through the information flow to drive

the technology flow, capital flow, talent flow, and material flow, it can effectively integrate and optimize design, production, and market resources, realize efficient docking and collaborative innovation of upstream and downstream of the industrial chain, and reshape production organization methods and innovation mechanisms. With the active innovation in the global cloud computing field and the development of cloud computing in China entering the stage of popularization of applications, more and more companies have begun to adopt cloud computing models to deploy information systems. Traditional companies have an urgent need to move to the cloud, and their awareness and ability to move to the cloud are constantly increasing.

3.2. Current Status of Enterprises Migrating to the Cloud

Large enterprises are gradually moving to the cloud, and the level is relatively high. In my country, large enterprises started to move to the cloud relatively early. Large enterprises' businesses cover multiple nodes across the country and even the world, with massive users and data. They have relatively high requirements for business real-time and data security. Cloud computing can effectively deal with business emergencies. Considering the need for data security, large enterprises usually tend to adopt the model of building private clouds to achieve cloud migration. With the continuous changes and development of business, it is difficult for a simple public cloud or private cloud to meet the needs of existing businesses. Therefore, on the one hand, enterprises have begun to use hybrid cloud architecture, which can not only deploy Internet applications and provide the best performance, but also ensure the security and reliability of private cloud local data centers. According to a survey by the China Academy of Information and Communications Technology, the proportion of hybrid cloud applications adopted by Chinese enterprises in 2017 was 12.1%, and it is expected that the proportion of hybrid cloud applications used by large enterprises in my country will increase significantly in the next few years. On the other hand, as cloud computing and industry are increasingly closely integrated, industry clouds based on industry attributes are increasingly attracting the attention of large enterprises. As the Internet enters the era of large traffic and wide interconnection, business needs and technological innovation drive the acceleration of profound changes in network architecture, and clouds and networks are highly coordinated and no longer independent of each other. The use of rich network products and services under cloud computing can effectively solve the interconnection and interoperability of different cloud models and business scenarios, ensuring the flexibility, intelligence and maintainability of the network.

For small and medium-sized enterprises, their "small, scattered and chaotic" characteristics, prominent industrial structural contradictions, weak technical capabilities and other problems have seriously restricted their development. The

increasingly fierce market competition environment has put forward higher requirements for the survival and development of small and medium-sized enterprises. At this time, cloud computing has become a major outlet for SMEs to break through transformation. Cloud computing will solve the risks of time, cost, security and technical support that SMEs encounter in the traditional IT model, especially cloud service providers provide professional technical support and security services. SMEs urgently need to use the flexible, agile, fast and timely characteristics of cloud computing to help them avoid risks and ensure the stable growth of their main business. In terms of cloud computing methods, SMEs are more inclined to the public cloud model considering the current status of capital and technical strength. In the future, SMEs will stimulate more demand for the use of public clouds.

SMEs have a strong demand for cloud computing and constitute the main force of cloud computing. With the support of the "mass entrepreneurship and innovation" policy, my country's SMEs have grown rapidly and have become an important growth engine for my country's economy. SMEs have the characteristics of "small, scattered and chaotic", and the prominent industrial structural contradictions and weak technical capabilities have seriously restricted their own development. The increasingly fierce market competition environment has put forward higher requirements for the survival and development of SMEs. Cloud computing has become a major outlet for SMEs to break through transformation. SMEs urgently need to use the flexible, agile, fast and timely characteristics of cloud computing to help them avoid risks and ensure the stable growth of their main business.

3.3. Problems faced by enterprises in cloud migration

3.3.1. Application cloud transformation is difficult and urgently needs user operation support

Driven by the rapid development of the Internet, the business of traditional industries is developing rapidly, and the frequency of business system updates and iterations is accelerating. The monolithic application architecture of traditional software is like a huge rock. A small change in the requirements of the business system will affect the entire system. It is impossible to use the advantages of cloud computing to complete the rapid iteration and agile delivery of the business, which seriously hinders the innovative development of enterprise business. Traditional enterprises hope to truly cloudify traditional industry applications and build "cloud-friendly applications" to achieve continuous integration and continuous delivery of application systems and software services. In the migration of enterprise business from traditional platforms to cloud platforms, it includes the transformation of the underlying infrastructure

and the cloudification of business systems. The architecture layout of most enterprises is not only large in number but also very complex, and the dependencies between systems are very complex. Therefore, migration to the cloud is bound to lead to major changes in the business architecture. If the migration time window is too long, the service provider's support is not strong enough, and the security guarantee is not in place, it will bring a series of problems such as business stability and security. The following challenges are faced in the process of application cloud transformation. First, from physical to cloud environment and heterogeneous hybrid environment, due to the difference in hardware between the source and target ends, the source end uses a variety of databases, middleware, operating systems and applications, and the coupling between architecture and application is intricate, resulting in difficulty in migration plan and implementation; second, the migration period is long, and the support of customer application manufacturers is not strong enough, which may also affect system performance and stability; third, it is difficult to ensure the secure encryption, integrity and synchronization of incremental data during the migration process to ensure the migration of continuously changing data with minimal downtime. For the problems encountered by enterprise application cloudification, it is urgent to provide corresponding cloud operation support in terms of cloud applications, cloud security, data, etc.

3.3.2. The utilization rate of cloud resources is low, and operation management is the key

After enterprises move their applications to the cloud, they face a huge amount of infrastructure resources and application services, and traditional operation and management methods are extremely difficult. Enterprises need an operation and management platform to manage the entire life cycle of infrastructure resources, orchestrate and schedule container resources, manage business system capacity, manage platform availability, and quickly and elastically scale capacity, etc., to improve resource utilization. Through the unified management of infrastructure resources and application services, the complexity of cloud operation and management can be reduced. In addition, the application solutions currently provided by cloud service providers are not rich enough to meet the diversified and personalized needs of enterprises. As the main service providers, cloud platform service providers and other relevant parties in the industry chain should work together to provide cloud-based

enterprises with complete consulting, planning, migration, operation and maintenance and other operational support services. At the same time, traditional software and information technology service companies are encouraged to accelerate their transformation into cloud service providers and speed up the enrichment of cloud computing product supply.

3.3.3. Software business models change, and ecosystem operations become the focus

The traditional software industry mainly sells software products through LICENSE, and enterprise customers deploy the software to their own data centers and perform operation and maintenance management. In the "cloud" era, software is provided to enterprise customers in the form of SAAS cloud services. The business model has undergone a disruptive change, and the operation model has become the key to the realization of business value for software developers. On the one hand, software has changed from being deployed and used by customers alone to being rented by multiple tenants. Software developers need to build a multi-tenant account management system. On the other hand, enterprise customers have changed from one-time purchases to paying according to the number of times and duration of service use, and access to services through the Internet. Enterprise customers need to ensure the accuracy of metering and billing bills. At the same time, software developers need to pay more attention to the quality of user experience and provide customers with more accurate, efficient and proactive services in order to achieve renewal of cloud customers and reduce customer acquisition costs. How to build a unified operation management platform, realize multi-tenant management, metering and billing, track and analyze the quality of user experience, and enable the continuous operation of software services after cloudification has become a key issue in the ecological and sustainable operation of cloud services.

4. Overview of Cloud Operations and Operations Professional Services

4.1. Introduction to Cloud Operations

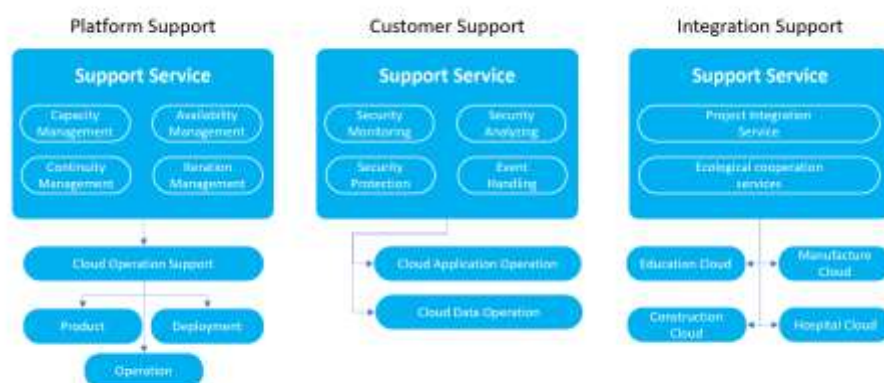
The key to enterprises' cloud migration is to shift from "cloud first" to "cloud efficiency". Operation is the planning, organization, implementation and control of the entire process of product production and service creation, and is an enterprise management behavior. Cloud operation is a comprehensive behavior based on the cloud platform to design, implement and manage the entire life cycle of cloud services and cloud applications.

Cloud operation can usually be divided into three dimensions of operation: management operation in the cloud platform dimension, service operation in the cloud service dimension, and application operation in the cloud application dimension. The complexity of the operation work in these three dimensions and the requirements for the ability of operators increase gradually. The management operation in the cloud platform dimension focuses on the operation management of basic resources, such as capacity management, resource management, availability management, continuity management, evolution management, etc., which is the foundation and guarantee of the entire operation system. After the basic platform operation capability is available or mature, the cloud platform can be enriched and improved through the operation of the service dimension and application dimension, so as to attract more users to use the cloud platform resources, promote the realization of the value of the cloud platform, and improve the efficiency and benefits of the use of the cloud platform. The operation of the cloud service and cloud application dimensions is the core and direct embodiment of the value of cloud operation. Considering the maturity of cloud business operations, the focus of cloud operations is to first carry out basic resource operations and support in the cloud platform dimension, and then gradually shift the focus to cloud service operations and cloud application operations to support future business development. At different stages of business development, the focus or emphasis of operations is different. The choice of operation level should match the business development stage to avoid affecting the business.

4.2. Introduction to Cloud Operation Support Services

In order to do a good job in cloud operations and help enterprises to move to the cloud, cloud operation support services came into being. Cloud operation support services help customers to move their businesses to the cloud. Service providers analyze the pain points and value of customers' business moving to the cloud through business cloud assessment, lead customers to establish matching teams, and improve IT resource utilization and accelerate business innovation through three operation methods of "platform evolution, business cloud, and big data services", so as to help customers' business continue to grow rapidly. Support the safe, efficient and low-cost migration of businesses to the cloud to achieve an increase in business loading rate; carry out digital innovation based on cloud/big data AI platforms to enable business success, make data generate value, and ensure that cloud transformation is carried out efficiently, safely and orderly. Make

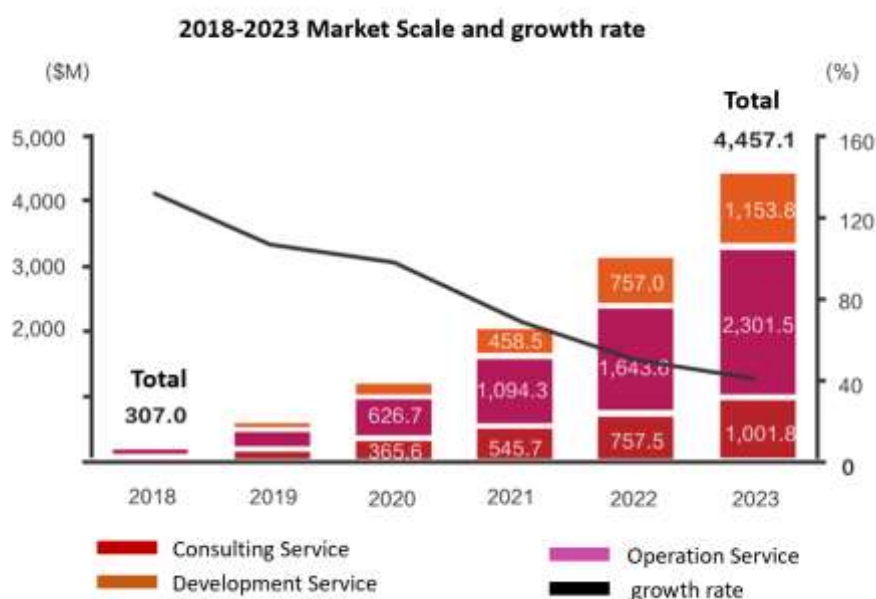
good use of the cloud to empower businesses and add value to data. For platform evolution, cloud service providers help customers evolve from virtualization platforms to full-stack cloud platforms to address the shortcomings of traditional virtualization in technology evolution, security and reliability, business innovation, and efficient operation and maintenance, and obtain obvious advantages such as full technology stack, elastic expansion, high reliability, network automation, unified operation and maintenance, and self-service, providing customers with a platform with full-stack capabilities from IAAS to PAAS and SAAS. The platform supports the migration of traditional and innovative applications to the cloud, and supports enterprises in reducing costs and increasing efficiency, as well as business innovation. For big data services, service providers are required to provide customers with big data platform operations, data warehouse operations, and data governance, to help customers generate value from their data and improve the end-user experience. The cloud operation support service architecture is as follows: Based on customer inventory virtualization and cloud/big data locations, the operation tool platform is used to promote customer virtualization, support customer business continuous migration to the cloud, and generate value from customer data. Focusing on full-stack cloud evolution, business migration to the cloud, and post-lifecycle operations, we help customers use and manage cloud and big data platforms, improve platform resource utilization, enable business success, realize data value realization, and serve as an operation consultant for customer cloud and big data platform management.



4.3. Development characteristics of cloud operation support services

The domestic cloud management service market is expected to grow rapidly, with cloud operations management accounting for the majority of the

market. In 2018, the size of China's cloud management service market reached US\$307 million, a year-on-year increase of 131.4% from 2017. IDC predicts that the overall market compound growth rate will reach 70.8% from 2018 to 2023, and the market size will jump to US\$4.46 billion by 2023. It is a market with great development potential. The largest share of the sub-market is cloud operations management services, followed by cloud migration implementation services, accounting for 44.1% and 28.0% respectively. At the same time, cloud value-added development services are also an important direction for the development of the cloud management service market.



4.3.1. To Public Cloud

Public cloud operation support services provide comprehensive solutions for enterprises to migrate to the cloud. Enterprises will face many problems in the process of migrating to the cloud, such as platform selection, system migration, multi-cloud management, security protection, etc. Cloud operation support services can provide enterprises with a complete cloud migration process and solution, including consulting and planning, migration and deployment, and operation management services, to clear the obstacles encountered by enterprises in the process of migrating to the cloud. The importance of operation management is becoming increasingly prominent, and the scope of operation services is constantly expanding. The scope of operation services for public clouds extends from cloud platform basic resource operations to user-side operations and ecosystem aggregation operations. User-side operations help customers use and manage the cloud

well, rely on the big data platform, improve customer resource utilization, enable business innovation, and realize the value of customer data. Ecological operation introduces SaaS suppliers and partners to provide professional service solutions for small and medium-sized enterprises in the mode of standard SAAS services + customized cloud services for customers in the industrial Internet, intelligent manufacturing, Internet of Things, logistics, transportation, agriculture, tourism, environmental protection, education and other industries. Public cloud operation support services provide enterprises with professional services based on cloud environments, helping enterprises to efficiently utilize cloud capabilities on the road of digital transformation, so that enterprises can focus more on the development of core businesses.

4.3.2. To Private Cloud

Cloud operation support services can help enterprises build a unified private cloud operation management platform to manage the entire life cycle of infrastructure resources, orchestrate and schedule container resources, manage business system capacity, and quickly and elastically expand and shrink capacity, etc., to improve resource utilization. Enterprises can use a unified operation management platform to monitor and alarm infrastructure layer resources and application services, so that platform managers can troubleshoot the source of faults without frequently switching multiple management systems, so that they can find and solve faults in the first place. Operation support services require infrastructure layer cloud service providers to open their resource management and monitoring alarm interfaces to upper-layer application services, and use the operation management platform to uniformly monitor and alarm the utilization of basic resources and application service performance, which will greatly shorten the fault handling time. With the rapid increase in business volume, the operation and management of enterprise private clouds have become increasingly complex. Cloud operation support service providers provide customers with cloud operation system planning and design, cloud consulting and support services by deeply analyzing the current situation and specific demands of customers, combining industry best practices, and improving users' comprehensive cloud capabilities, thereby accelerating the speed of enterprise business cloudification and helping enterprises to move towards a deeper level of digital transformation; helping customers break information silos, strengthen business collaboration, and promote sharing and openness, providing strong support for promoting digital construction.

5. Cloud operation support service

5.1. Consulting Service

Consulting and planning are the bridge between user business and cloud. At present, more and more users choose to migrate applications and data to the cloud. In this process, users will face many problems such as cloud deployment, cloud platform, cloud migration, multi-cloud management, security protection, etc. Cloud operation support service providers can provide users with comprehensive cloud consulting and planning services to help users understand cloud products, and provide cloud service software architecture in combination with user business characteristics, design feasibility plans, and improve the operation capabilities of cloud resources to meet users' elasticity, high availability, and high performance requirements. Consulting and planning are services provided by cloud operation support service providers through the accumulated knowledge and experience and comprehensive processing of user information and materials to provide users with consulting evaluation and cloud planning and design services for system migration to the cloud. Consulting and planning usually include analyzing user needs, evaluating the feasibility of migration to the cloud, formulating cloud strategies, etc. The specific contents are shown in the figure.

Analyze user needs and provide consulting and planning services to users from three aspects: real needs of users, business development goals and benefits of cloud migration. Before cloud migration, you must fully understand the real needs of users for cloud migration and business development needs in order to design a solution with cloud computing advantages. The benefits of cloud migration refer to the evaluation of whether the user's business is suitable for cloud migration from the perspective of economic benefits before and after the business is migrated to the cloud. Usually, the virtualization life cycle model is used to analyze the total cost of ownership and return on investment of the cloud construction plan in combination with the actual situation of the company, so that the preliminary cloud construction plan has quantitative TCO/ROI analysis results, and then evaluate whether the user is suitable for migrating the business to the cloud. The feasibility of cloud migration is usually evaluated from four dimensions: the user's current infrastructure, business operation, difficulty of migration, and risk of migration. Before migration, you must fully understand the user's cloud system, which usually includes the collection and organization of information such as server hardware configuration, network architecture, storage configuration, special hardware, etc., as well as the user's current business operation, system architecture, etc. Migration risk refers to the risk of data loss, data anomaly,

etc. during the user system migration process.

Cloud strategy formulation usually includes resource planning and design, network planning and design, application planning and design, and security planning and design on the cloud. Cloud resource planning and design refers to design services for cloud deployment models, resource configuration (computing resource pool, storage resource pool) and cloud service product selection; network planning and design includes cloud network topology design and network resources (subnet, routing, ACL, firewall, load balancing) and connection design services; application planning and design refers to design services for load balancing, elastic scaling, high availability and resource scheduling on the cloud; security design refers to designing user cloud environment security solutions with reference to level protection and ISO27000 and other specifications and standards, usually including platform security, network security, data security, application security, host security and other dimensions.

5.2. Migration Service

Migration and deployment refers to the service provider formulating a cloud migration plan for users, deploying users' applications in the cloud through standardized processes and professional tools, and migrating users' data to the cloud as needed. Migration and deployment services are based on consulting and planning, and are based on standard migration processes and efficient migration tools. They usually include migration plans, migration implementation, and migration verification services. The specific contents are shown in the figure.

Migration plan refers to the preparation and formulation of the migration plan before the implementation of migration, as well as the plan for various risks that may arise during the migration process. The first step in formulating a migration plan is to determine the scope of migration. Based on the assessment of the business operating environment and infrastructure, it should be determined which systems can be directly migrated, which systems need to be transformed before migration, which systems are suitable for direct reconstruction on the cloud, and which systems are not suitable for cloud migration. The corresponding system transformation methods and cloud reconstruction plans should be made. The migration plan should include the confirmation of the migration tools and migration methods, a detailed migration process plan, and the security strategy and risk response plan during the migration.

Migration implementation refers to the specific implementation of the

migration plan, including application system migration, database migration, storage migration and image migration. Through standardized migration processes and professional migration tools, the deployment of user applications, data, files, hosts, etc. in the cloud is finally realized. Finally, the traffic is switched to the cloud environment, and a complete migration verification is performed, which should include migration data verification, business function verification, performance verification and security verification.

5.3. Operation Service

Operation management is based on good operation and maintenance management, and is an IT management model that moves from "stable survival" to "active operation". After years of development with "survival" as the main form and "stability" as the main goal, more and more IT organizations have begun to move out of this stage of solving basic survival needs and move towards the operation management stage of how to "live well".

Operation management is divided into three dimensions, namely cloud platform side operation, user side operation and ecological operation. The operation of the cloud platform dimension focuses on the operation management of basic resources, such as tenant management, resource management, resource measurement, etc., which is the foundation and guarantee of the entire operation system. After the basic platform operation capability is available or mature, through application operation, the types and quality of application services provided by the cloud platform are improved, more users are attracted to use cloud platform resources, the realization of cloud platform value is promoted, and the efficiency and benefits of cloud platform use are improved.

User-side operation refers to cloud operation support service providers helping customers build matching teams, improve user IT resource utilization, shorten business TTM, accelerate business innovation, and help customers' business continue to grow rapidly. After the user system is migrated to the cloud, a digital innovation platform based on big data and AI can be established through user-side operation to make data valuable and make good use of the cloud.

Ecological operation refers to cloud operation service providers exploring new vertical businesses such as smart education, smart manufacturing, smart medical care and smart services with a large number of content and application providers through the "platform + service + project" model. Ecological operation helps enterprises reduce costs and increase

efficiency by building content and ecological aggregation capabilities, helps local governments achieve industrial upgrading, and promotes local economic development.

5.4. Application Operation Service

Enterprise cloud transformation is not achieved overnight, but a gradual evolutionary process. At present, from the perspective of the evolutionary stage, although some enterprises have begun to explore innovative applications and EI-enabled businesses, the vast majority of enterprises are in the stage of traditional applications on the cloud, or in the process of exploring innovative applications. In traditional enterprise applications, the core system is usually the database management system to meet the needs of real-time transactions and analysis. From the traditional stand-alone database, in order to achieve high performance and larger data storage capacity requirements, the cluster-designed OLTP (ONLINE TRANSACTION PROCESSING) system has gradually become the mainstream. The typical IOE architecture has poor scalability and is bound by manufacturers, while the cost remains high.

Over the past few years, enterprise IT departments have built their own infrastructure around virtualization, which helps with resource consolidation and infrastructure optimization. However, the increasing complexity of infrastructure has led to more and more complex operations, which still need to be configured and maintained by professionals, becoming a new bottleneck in IT supply. Cloud computing has solved this problem well through service-oriented . Cloud computing has a significant role in reducing enterprise IT costs, maximizing IT resource utilization, enhancing business flexibility, and improving system maintainability. Therefore, the necessity for enterprises to migrate IT to the cloud is obvious. At the same time, Enterprises moving to the cloud also conform to the trend of enterprise digital transformation and development.

Application operation support services focus on the full life cycle of application cloudification, covering application cloud consulting, cloud design, cloud development support, post-cloud operation management, etc., focusing on existing applications.

Smoothly migrate to the cloud platform, build standard specifications for cloud-based applications and cloud-native application development processes, realize continuous cloud migration of subsequent applications, make full use of the advantages of the cloud platform, improve business response time, and reduce operation and maintenance costs.

From the perspective of the full life cycle process of migrating applications to the cloud, the main tasks include:

- Application cloudification assessment: research on existing customer network applications, analyze the feasibility of cloud-based applications, output cloud-based application roadmaps and outline plans, and formulate cloud-based application standards and specifications;
- Application cloud solution design: Analyze customer specific applications, and output detailed solutions for application cloud migration based on application cloud migration standards and specifications;
- Application enablement platform operation: Analyze customer applications, introduce commonly used middleware and business public services to build customer application enablement platforms, and continuously enrich and improve application enablement platforms based on customer needs, and standardize customer application development based on application enablement platforms;
- Application migration to the cloud: For scenarios where applications do not need to be transformed, formulate implementation plans and plans for application migration to the cloud, and migrate applications to the cloud platform;
- Application transformation to the cloud development support: For scenarios where applications need to be transformed, support customer application development teams to carry out containerization, microservice transformation and cloud native application development based on Huawei PAAS platform;
- Application development integration management: Based on Huawei's software development management experience and DEVOPS platform, help customers manage ISV software development processes and ensure software development quality;
- Application performance management: Mainly refers to monitoring and optimizing key business applications of enterprises, improving the reliability and quality of enterprise applications, and ensuring that users receive good services.

5.5. Security Operation

Security operation activities are based on the IPDRR security assurance system.

Combined with various defense dimensions of cloud security, the cloud platform basic security and cloud business security architecture are built to ensure the security of the cloud platform itself and the security of cloud business, and to achieve cloud security capabilities of in-depth defense, active defense, and resilient defense.

Centered on customer needs, the overall security operation system framework is constructed from the aspects of security operation organization, security operation management, security operation activities, and platform tools.

The implementation of security mechanisms has a relatively fixed pattern, that is, "organizations (or people) operate continuously under security strategies with the help of certain security technical means", among which organization and security strategy are security management. Therefore, a complete information security system should be a combination of security management, security technology, and security operations, and none of the three can be missing.

The cloud security operation system of the service provider is led by security operation management, with security platforms and tools as the cornerstone, and security operation organizations and security operation activities as the pillars to build an overall framework.

Security operation management defines security strategies and security procedures, and security assessment management. The content includes security policy creation and maintenance, defining the overall security strategy of cloud platform network security; formulating security operation processes and systems based on security strategies; defining security KPIs, creating regular security operation reports and reporting them to the information security leadership team. The security operation organization defines the organization and personnel of the security operation team. The organizational setting defines the organizational structure of the security operation and operation team, the roles and responsibilities of security operation personnel, the communication mechanism of the security operation team, and the management and monitoring of outsourced third-party services and personnel.

The security operation support service controls the security of equipment, business operation and monitoring, manages and handles security incidents, and ensures the implementation of business continuity planning. It includes network security strategy formulation, risk assessment, security training, security consulting, security testing, vulnerability

management, security incident monitoring, security incident analysis, security incident handling, emergency response, asset management, security auditing, cloud application security testing, cloud application security configuration and other services.

Platforms and tools refer to the platforms and tools that support security operations, including vulnerability scanning, penetration testing, baseline verification, operational auditing, security operations platform, security analysis platform, etc.

5.6. Ecosystem Operation

The deep integration of technology and business will be the core of digital transformation in the next three years. The huge ICT market needs to aggregate ecological partners to jointly develop.

At present, players in various industries are aggregating and penetrating each other to create new industrial fields. IT players rely on equipment and services to provide industry applications, help vertical industries build ecosystems, continuously interact with consumers, and assist industry business operations. Typical companies include IBM, HP, CISCO, ACCENTURE, etc.

OTT players focus on platforms and services, start from channel digital, expand industries, and aggregate customer assets. Through service expansion, activate customer assets and achieve secondary benefits. Typical companies include AMAZON, GOOGLE, ALIBABA, etc.

Traditional network operators are also based on network resources and capabilities, through capability opening, gradually penetrating the Internet/media/vertical industries, transforming from network asset management to customer asset management, and exploring diverse business models. Typical companies include China Mobile and TELEFONICA.

Cloud ecosystem operations build content and ecosystem aggregation capabilities, break through ecosystem breakpoints, and many content and application providers and platform operators jointly explore the success of new digital businesses. Positioning "gathering ecosystems and winning the future", gathering ISV partners, establishing localized enterprise service centers, helping enterprises reduce costs and increase efficiency, helping local governments achieve industrial upgrading, and promoting local economic development.

Compared with underlying resources, customers are more concerned about upper-level businesses. Now, cloud service providers do not have the industry experience and industry accumulation required to provide industry

solutions, and enterprise services are not standard online SAAS applications, requiring offline localized service teams to guide customers to success. Through the construction of the ecosystem, introducing SAAS suppliers, working hand in hand with partners, facing small and medium-sized enterprises, and providing professional service solutions for customers in industries such as industrial Internet, intelligent manufacturing, Internet of Things, logistics, transportation, agriculture, tourism, environmental protection, and education in an O2O manner (online standard SAAS + offline customized services).

Through ecological aggregation operation, SAAS layer applications are introduced to provide added value, achieving a win-win situation for cloud service providers, data center operators, local governments, local enterprises, and ISVs: solving the problem of low customer stickiness of IAAS and PAAS layer resources at the bottom of cloud data centers; benefiting cloud service providers; data center operators cultivate local industry talents, absorb industry science and technology, expand the company's scale, bring sales revenue, and enhance the company's core competitiveness; realize the collection and retention of industrial data, conduct industrial data decision analysis and data realization, optimize the industrial structure, eliminate backward production capacity, promote local industrial transformation and upgrading, and cultivate the objective needs of the new economy; attract enterprises to register locally, improve the level of local investment promotion and taxation, and enhance the government's credibility and influence.

In addition, enterprises can enjoy government policy support, improve their business management capabilities and efficiency, reduce operating costs, improve their information ability, intelligence level and core competitiveness, and enable enterprises to reduce costs and increase efficiency on the cloud, and realize the objective needs of digital transformation.

Finally, ISVs pass the professional certification of service providers and use the service provider brand to obtain new sales channels, bring in scale sales revenue, focus on solution capabilities, and save marketing resources and sales costs.