Tencent Cloud Fintech Solutions

Purpose-built finance sector solutions that focus on strengthening compliance and security and boosting financial business growth.
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Financial technology (fintech) has been emerging amongst a new wave of technological revolution and industrial transformation. The in-depth integration of information technologies such as the internet, artificial intelligence (AI), big data, cloud computing, Internet of Things (IoT), blockchain, and the evolution of finance from IT-based offerings to smart services are continuously fueling the digital transformation of the financial industry with innovations.

Fintech drives financial innovation through technology. Specifically, it leverages modern scientific and technological achievements to transform and optimize financial products, business models, business processes, etc.; it utilizes cutting-edge technologies (e.g., machine learning, data mining, and smart contract) to simplify the transaction linkage between suppliers and buyers, reduce the marginal costs of financing, and develop new ways to reach customers; and it promotes the sustained optimization of financial companies in terms of profit models, business forms, assets and liabilities, credit relationships, and channel expansion, which helps them continuously enhance their core competitiveness and empower them to digitally transform and upgrade.

Meanwhile, under the wave of industrial internet, the "Internet+" thinking offers new ideas on how industrial chain financial services can serve the real economy. The provision of financial services is no longer limited to traditional financial institutions. The integration of core companies with pan-financial companies brings about new business scenarios. Finance has transformed from the "point-to-point" service model between financial service providers and companies to the "multi-point" model between the financial system and the industrial chain as well as the "point-to-industry" model between industries and financial ecosystem participants. Relying on the development of fintech, industrial finance will reform the mode of industry-finance cooperation.

Tencent Cloud provides enterprise-grade integrated solutions of cloud computing, big data and AI, compliance and security, blockchain, mobile development, financial risk management, smart customer service, and smart marketing for financial companies in various fields such as digital transformation, corporate fintech application, consumer finance, and industrial finance, helping them build new digital infrastructure in the financial industry. By integrating Tencent’s technological advantages in social networking, payment, gaming, and other lifestyle scenarios, such solutions establish new and efficient digital connections between financial companies and end users, which effectively enable such companies to improve their business processing efficiency and resource utilization, reduce operating costs, optimize user experience, and promote rapid business growth.
Tencent Cloud provides integrated full-process fintech solutions designed for the digital transformation of customers in various finance-related industries such as: consumer finance, industry chain finance, auto finance, financial services, corporate finance, payment services, digital technologies, financial technologies covering marketing and customer acquisition, financial risk management, smart customer service, business scenario innovation, consumer credit, supply chain finance platforms, micro, small, and medium-sized enterprise (MSME) financing platforms, factoring business platforms, and cloud infrastructure services.

Tencent Cloud fintech solutions help customers:

1. Build distributed business systems based on cloud computing to utilize elastically scalable computing, storage, network, security, and other resources to sustain the rapid growth and iteration of businesses;

2. Build an enterprise-grade data platform based on big data technologies to support big data applications in marketing, risk management, operations, and other fields;

3. Build an innovative financial service system that covers smart customer service, contact bots, and face recognition for better business innovation;

4. Support various business scenarios such as marketing and customer acquisition, financial risk management, business operations, consumer credit, internet lending, supply chain finance, factoring, and MSME financing.

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### Figure 1

**“1+M+N” fintech solution portfolio**

<table>
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<th>(N) Financial business scenarios</th>
<th>Consumer finance solution</th>
<th>Industrial finance solution</th>
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<td>Tencent Cloud Enterprise (TCE) private cloud</td>
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<td>Physical security</td>
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*Figure 1 “1+M+N” fintech solution portfolio*
Tencent Cloud’s “1+M+N” fintech solution portfolio comprises various solutions at multiple levels, including (1) cloud infrastructure, (M) technology platforms, and (N) financial business scenarios, helping financial companies digitally transform and develop financial businesses.

- **Consumer finance solution**
  As the demand for consumer credit booms, Tencent Cloud provides financial companies with a one-stop full-process consumer finance solution, which enables them to integrate businesses, streamline processes, optimize structures, and create an efficient, professional, and smart distributed consumer credit management platform, and accelerate business innovations with regard to channels, products, and services for rapid business growth.

- **Industrial finance solution**
  As the industrial chain keeps upgrading digitally, new trends emerge in the industrial chain financial services. Tencent Cloud industrial finance solution integrates the development of industrial intelligence, data, and platforms to more comprehensively and continuously present entity conditions, industry chain situations, and big data to financial companies, while using blockchain and AI tools to better discover and transfer creditworthiness information and provide better business use cases and security assets.

- **Cloud infrastructure solution**
  Tencent Cloud provides financial companies with a one-stop solution for the construction of data centers and other infrastructure components, helping them build a cloud-based, secure, stable, highly available, flexible, and self-controllable infrastructure architecture.

- **Financial risk management solution**
  With the rapid development of the consumer internet and industrial internet and the fast popularization of fintech applications, how to build a full-process risk management system with new technologies to support risk management and control throughout the business life cycle has become a new challenge during the online, automated, and smart development of consumer and industrial finance businesses. Relying on the technological advantages of cloud computing, big data, and AI, Tencent Cloud provides financial companies with an all-around financial risk management solution, which reforms their traditional risk management processes and effectively helps them deal with emerging new risk challenges faced by their businesses.

- **Smart marketing solution**
  Backed by the huge user traffic pool in the Tencent social network ecosystem and drawing on its many years of experience in massive internet user marketing and operations, Tencent Cloud integrates AI, big data, risk management, and other technical capabilities to offer a smart marketing solution for financial companies, helping them establish new connections with end users, form a closed marketing loop, and improve the overall customer acquisition and operations capabilities.

- **Distributed database solution**
  Tencent Distributed MySQL (TDSQL) database solution features finance-grade strong consistency, high availability, distributed horizontal scalability, high performance, enterprise-grade security, and cross-region disaster recovery and comes with a complete set of supportive capabilities, e.g., smart DBA, automated operations, and monitoring and alarming, making it an ideal distributed database solution for financial companies.
• **Mobile financial channel solution**
  Mobile internet channels are important starting points for financial companies to connect customers and ecosystem participants, yet they are often faced with diversified customer demands for a better mobile service experience and a higher security level. Tencent Cloud mobile financial channel solution empowers them with the technical capabilities accumulated from Tencent’s excellent mobile internet channels to help them quickly launch diverse and smart mobile financial services with a smooth user experience, upgrade their tool sets, and establish new digital connections.

• **Information security solution**
  Tencent Cloud offers a systematic information security solution comprised of technical platforms and security expert services for financial companies, helping them effectively tackle security challenges, enhance security protection capabilities, and meet security compliance requirements.

• **Big data solution**
  Tencent Cloud provides a one-stop big data solution to financial companies, helping them build a unified enterprise-grade data platform, leverage various big data applications such as risk management, marketing, operations, and decision analysis, and make better use of data to support business growth.

• **AI solution**
  Tencent Cloud provides financial companies with an all-around AI solution that covers image recognition, optical character recognition (OCR), face recognition, speech recognition and synthesis, and much more, assisting them in identity verification, OCR, call center quality assurance, smart customer service, machine learning-based modeling, and other AI use cases.
As the new round of periodic changes are happening in domestic and foreign finance sectors, the overall growth the internet finance and consumer credit industries is slowing down, the traffic dividend is fading, and the market is getting gradually saturated. At the same time, the regulatory environment for the financial market is still complicated, the pressure on banks to increase registered capital is building up, the regulation of non-banking financial services and credit financing services is becoming stricter, and the concentration level for commercial factoring businesses is being restricted. As a result, tighter regulatory measures will minimize the risks under rapid industrial growth and drive the consumer credit industry to a window of opportunity for high-quality and orderly development in the long run.

In a more standardized market environment, operations compliance has become the lifeline for financial companies to carry out internet consumer credit businesses. Regarding compliant operations, they are still faced with various complicated dilemmas, such as how to offer more timely and personalized financial services to customers, how to stand out among innovative and fast-growing competitors in the market, and how to mitigate shortfalls in technical capabilities.

To help financial companies cope with various challenges in the consumer finance field, Tencent Cloud utilizes its own fintech capabilities and takes into full account the characteristics of credit businesses to provide an efficient, professional, and intelligent consumer finance solution, which overcomes the difficulties in all business aspects, seamlessly connects various links to form a sustainable closed business loop, and helps financial companies better offer consumer-oriented inclusive financial services.

Tencent Cloud’s consumer finance solution provides financial companies with an integrated consumer credit management platform, which consists of business modules of front-end asset channel, application receipt channel, pre-loan credit check, mid-loan review, grant, and monitoring, post-loan management, credit product factory, and accounting. Together with Tencent Cloud’s financial risk management solution, it constructs an integrated solution for the entire consumer finance business process plus risk management.

Through its consumer finance solution, Tencent Cloud helps financial companies adopt fintech capabilities to implement digital transformation, including:

1. Cloudified infrastructure, which relies on Tencent Cloud’s secure, flexible, and distributed IaaS/PaaS products and services to build a digital technology foundation;

2. Digitalized linkage, which makes all channels digital through mobile applications such as mini programs and technical means such as face recognition, OCR, eContract, and IoT;

3. Platform- and data-based business transformation, which establishes dual middleend engines of business and data, improves the application scalability and supports fast response through the microservice architecture design, and realizes data-driven business growth by building an integrated big data system;

4. Smart and automated decision making, which builds an intelligent decision-making system based on the components above and according to the actual requirements in enterprise finance scenarios.
Tencent Cloud’s consumer finance solution has many advantages in different aspects throughout the consumer finance business life cycle. In the customer application receipt scenario, it adopts various cutting-edge technologies such as mobile mini programs, OCR-based identity document recognition, and face verification in conjunction with pre-loan risk management policies such as fraud prevention and multi-factor authentication to implement digitization and control risks at the source.

In the financial product development scenario, it establishes a flexibly responsive financial product management system, accelerates financial product iteration, creates a diversified product system, and supports online design and product form adjustment that can take effect quickly through the configuration of related components, e.g., workflow engine and risk management decision engine. Moreover, it can be customized for various types of credit products such as traditional credit, internet credit, and credit card, which ultimately mitigates the homogeneity of financial products and improves user conversion and retention.

In the risk management scenario, relying on Tencent Cloud’s risk management solution, it establishes a complete credit risk assessment and management mechanism, which can conduct full-process management of loan risks before, during, and after loan grant. Specifically, it can perform pre-loan assessment, review, and fraud risk identification, mid-loan risk monitoring and alarming, and post-loan collection and tracking, helping financial companies comprehensively improve their risk management capabilities.

In the customer operations scenario, together with Tencent Cloud’s smart marketing solution, it enables financial companies to build a closed-loop marketing system for marketing planning, process automation, operations analysis, and customer remarketing. In addition, it supports connection with Tencent’s ecosystem benefits during event and campaign setup to achieve completely internet-based marketing production.

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**Figure 2**

*Consumer finance solution architecture*
In recent years, MSMEs have become an important part of the real economy in China. As of the end of 2019, they accounted for 99.7% of China’s total enterprises, their annual GDP contributions accounted for 60% of China’s total GDP, and their annual taxation accounted for 50% of China’s total taxation. However, they have various difficulties and high costs in financing, which should be solved urgently. The financing needs of nearly 40% of them go unmet, and their financing costs are generally over 10%. Given this status quo, China has formulated a series of policies to better support MSMEs. Moreover, as new infrastructure and industrial digitalization become national policies, various industries have started industrial digital transformation and application of more emerging technologies to actual businesses. Financial companies are also implementing reforms in many aspects such as management mechanisms, business models, and risk management methods to embrace the industry-finance ecosystem and promote the development of the real economy.

Industrial finance is an ecologically collaborative financial concept. It provides supply chain finance, inclusive finance, and other related services to companies in the industry chain through in-depth study of industry chain scenarios and has become an effective way to solve the financing problems of MSMEs. Under the background of industry chain upgrade, the integration of industry and finance has realized comprehensive reforms in terms of industrial interconnection, technological empowerment, and risk management upgrade, where market participants leverage finance based on industry to jointly build an industry-finance ecosystem and achieve win-win results.

Leveraging emerging technologies such as cloud computing, big data, blockchain, and AI, Tencent Cloud provides industrial fintech services to various market participants, e.g., government agencies and industry chain companies, through integrated solutions for supply chain finance, MSME finance, cloud-based factoring, industrial risk management, and much more.

Figure 3
New situation of industrial finance: Industry-finance ecosystem
### Tencent Cloud Integrated Industrial Finance Solution

<table>
<thead>
<tr>
<th>Industry chain</th>
<th>Commodities</th>
<th>Energy</th>
<th>Manufacturing</th>
<th>Logistics</th>
<th>Finance</th>
<th>Healthcare</th>
<th>Transportation</th>
<th>Retail</th>
</tr>
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<tbody>
<tr>
<td>Roles</td>
<td>Supplier</td>
<td>Distributor</td>
<td>Warehouse operator</td>
<td>Manufacturer</td>
<td>...</td>
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<tr>
<td>Scenarios</td>
<td>Trade settlement</td>
<td>Inventory monetization</td>
<td>Receivables management</td>
<td>Manufacturer risk management</td>
<td>...</td>
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#### Solutions
- Supply chain finance solution
- MSME finance solution
- Factoring solution
- Industrial risk management solution

#### Business models
- Supply chain finance
- MSME finance
- Enterprise receivables and payables

#### Product factory
- Supply chain finance
  - Receivables
  - Inventories
  - Advance payment
- MSME financing
  - Taxation
  - Transactions and invoices
  - Factoring SaaS
  - Enterprise receivable and payables

#### Middleend capabilities
- Business middleend
- Industrial risk management middleend
- Technology middleend
- Data middleend

#### Cloud infrastructure
- Finance zone
- Private cloud
- Hybrid cloud
03.1 Supply Chain Finance Solution

The traditional supply chain finance business development model is based on offline operations and has multiple problems, e.g., enterprise information asymmetry, difficult credit transfer, complex information verification, and long lending cycle. Tencent Cloud makes full use of new technologies such as blockchain, big data, and IoT to integrate "the four flows" and completely cover the generation and circulation links of credit assets.

Tencent Cloud utilizes Tencent Timely Rain (TTR) supply chain financial service platform as the carrier to help financial companies and core enterprises in the supply chain connect with each other and implement the following for them and their customers:

Full coverage of demand scenarios: it has a rich financial product library covering multiple scenarios such as receivables, inventories, and advance payments to meet customers’ diverse service needs;

Risk management measure upgrade: it assists financial companies in upgrading industrial financial risk management measures through financial technologies, e.g., big data, IoT, and blockchain;

Asset management support: it features complete transaction structure design, efficient massive data processing capabilities, many ecosystem partners, and strong risk management empowerment, helping implement asset management support, for example, securitization of high-quality assets.

Relying on Tencent’s rich use cases, vast business ecosystem, many years of data accumulation, and middleend construction capabilities, TTR supply chain financial service platform has formed unique advantages in products, data analysis, and financial technologies.

Figure 5
Tencent Cloud supply chain finance solution
Ecosystem collaboration of TTR supply chain financial service platform

TTR supply chain financial service platform

- Financial products:
  - Receivables financing
  - Advance payment financing
  - Inventory financing
- Middleend services:
  - Business middleend
  - Technology middleend
  - Risk management middleend
  - Data middleend
- Infrastructure:
  - Finance cloud
  - Big data
  - Blockchain
  - IoT
- Asset management

Advantages of Tencent Cloud supply chain finance solution

- Flexibly customized products:
  - Multi-Industry, multi-scenario customized design
  - Rich product parameters
- Industrial data analysis:
  - Multidimensional collection of industrial ecosystem data through multiple means
  - Vertical data analysis for different industries based on enterprise characteristics
- FinTech applications:
  - Full application of emerging technologies such as big data, blockchain, and IoT in various scenarios, e.g., credit risk management, collateral management, and enterprise credit check
03.2 MSME Inclusive Finance Solution

The financing services for MSMEs are faced with many challenges, and the service capabilities of financial companies need to be further improved. The TTR enterprise financial service platform provided by Tencent Cloud is an innovative technological product that promotes MSME inclusive financing services with fintech. Relying on Tencent’s information service capabilities in the internet field, it establishes efficient information connections between MSMEs and financial companies.

Through the construction of an enterprise knowledge graph with hundreds of millions of date entries, it provides financial companies with necessary capabilities such as enterprise identity verification, business intelligence, enterprise evaluation, and enterprise monitoring to help them tackle various pain points in the entire process of MSME financing service provision.

Figure 8

TTR enterprise financial service platform architecture
TTR enterprise financial service platform is positioned as an integrated solution for MSME financing information services plus risk management operations. Guided by the vision and mission of tech for good, it assists with the digital transformation of MSME financing:

1. Financial companies: it assists financial companies in microcredit customer acquisition, application acceptance, approval decision making, and monitoring and alarming, enabling them to serve more long-tail customers and conduct targeted marketing while using fintech to reduce labor costs and provide high-quality financing services;

2. Smart risk management: it builds an industrial risk management platform to offer pre-loan, mid-loan, and post-loan solutions for MSME financing scenarios, establish the capabilities to collect, cleanse, organize, and analyze data from local MSMEs, and form an intra-region enterprise credit check service system;

3. Industry connection: joining hands with local government agencies and regional platforms on industrial backgrounds, it creates a local financial portal that provides regional enterprise financing matchmaking services, breaks through the bottleneck of information release between borrowers and lenders, expands financing channels for MSMEs, and improves the connection efficiency of financing supply and demand.

Figure 9
Tencent Cloud uses technologies to help financial companies offer inclusive financial services
TTR enterprise financial service platform has the following features and advantages:

1. **Efficient information connection:**
   Relying on Tencent’s information service capabilities in the internet field, it establishes efficient information connections between MSMEs and financial companies and provides full-process information services, financial product aggregation services, and one-stop application services.

2. **Enterprise big data capabilities:**
   Based on Tencent Cloud’s existing mature products, it provides financial companies with various capabilities such as enterprise identity verification, development evaluation, risk assessment, and public opinion index to effectively solve their pain points in MSME financing services.

3. **Fintech empowerment:**
   With the goal of fintech empowerment and leveraging Tencent Cloud’s advantages, it fully embeds big data and AI in the entire process to provide financial companies with smart and reliable digital tools and risk identification capabilities, e.g., identity document OCR and enterprise identity verification.
03.3 Factoring Solution

In the process of factoring business operations, financial companies lack online business processing, data-based risk management, and trade authenticity verification capabilities and have heavy workloads, which leads to high marginal costs. Yunxin factoring cloud platform provided by Tencent Cloud offers SaaS factoring cloud products and services for various types of financial companies (e.g., commercial factoring companies, financial leasing companies, and small and medium-sized commercial banks), helping them quickly build factoring business systems and construct simple, efficient, and standardized online receivables financing processes. It supports registration by multiple funders and relies on Tencent’s big data capabilities to implement convenient features and services such as online risk management check, smart verification, and risk management modeling, helping factors operate efficiently at low costs.

**Single-invoice factoring**
A supplier can transfer its single confirmed receivable to a factor

**Refactoring**
A factor can transfer its creditor’s rights in receivables to another factor

**Pool factoring**
A supplier can continuously transfer existing or future receivables to a factor to form a relatively stable receivables financing pool

**Multi-level flow**
Certificates of creditor’s rights in receivables can be generated based on the creditworthiness of enterprise entities for receivables split and flow

Figure 10
Factoring cloud platform architecture

Figure 11
Four major business models supported
Tencent Cloud Yunxin factoring cloud platform integrates factoring business management, customer portal, smart verification, risk view, public opinion report, risk management model, and other features and supports various business models such as traditional factoring, reverse factoring, pool factoring, multi-level flow, and refactoring, making it easy to meet the diverse needs of different financial companies.

In addition to offering the basic features required by factoring business operations, Yunlin factoring cloud platform also focuses on the process, convenience, and intelligence of factoring. Meanwhile, it relies on the Tencent ecosystem to realize resource matchmaking and connection. To sum up, it has the following features and advantages:

**Scenario-based cooperation**

**Scenario-based cooperation support within Tencent:**
It combines Tencent’s industrial internet scenarios and smart industry clusters to explore in-depth cooperation in Tencent scenarios with funders.

**High efficiency and convenience**

More efficient cloud-based platform deployment:
It provides secure and reliable elastic computing services. As it is deployed in the cloud, it can quickly and efficiently create factoring business systems and greatly reduce the costs of building and maintaining network infrastructure.

**Data-based risk management**

Tencent’s big data-based risk management capability:
Relying on the key landscape of Tencent’s industrial internet businesses, it integrates comprehensive enterprise information, analyzes and evaluates primary enterprise metrics through algorithms and models, and deeply taps into the value of enterprise information to help financial companies improve their risk management capabilities.

Fund connection

Collaboration with funding partners:
Together with Tencent’s financial partners, it provides factors with coordinated services such as refactoring and supply chain ABS.

Security & reliability

More secure financial cloud services:
Tencent Cloud integrates Tencent’s over a decade of technology accumulation in internet security protection, intrusion detection, vulnerability scan, and other security aspects and adopts cutting-edge data reinforcement schemes to create an integrated security protection system. In addition, it aligns the resources of basic services such as cloud computing, cloud storage, and cloud security to provide financial companies with better cloud products and services.
In the “post-pandemic era”, with the introduction of “new infrastructure” and the rapid development of mobile internet, all industries have started profound digital transformation. As financial companies serving various industries, they also urgently need to establish “new digital connections” with individual and corporate customers in a connected and digital manner and adopt a more internet-ready way to acquire customers. However, during the transformation from traditional customer acquisition based on offline marketing to online operations, they are often faced with the following challenges:

1. The construction of online contact points is not smooth, making it hard to form a cost-effective self-operated source of customer traffic.

2. Customer acquisition scenarios are independent of each other, leading to traffic fragmentation and inability to form a unified potential customer traffic pool.

3. The production costs of marketing campaigns are high, the responsiveness is low, and the supporting reward system cannot meet the operational requirements of internet-based marketing.

4. The data-based marketing capabilities are insufficient, and marketing effects are difficult to track, making it impossible to establish full customer life cycle management capabilities and personalized marketing capabilities.

Drawing on Tencent’s many years of experience in massive internet user marketing and operations in its own businesses, backed by the huge user traffic pool of the WeChat ecosystem, and taking into account the marketing needs of financial companies, Tencent Cloud integrates AI, big data, risk management, and other technical capabilities to provide a smart finance marketing solution. It helps financial companies create an all-around closed-loop marketing system covering self-operated traffic construction, potential customer identification and retention, marketing content production, campaign planning, point-based reward program connection, process automation, operations analysis, optimization, and customer reactivation, implement full customer life cycle management, and improve the overall customer acquisition and operating capabilities.

In terms of the construction of online user contact points, it offers various scenario-based capabilities such as social network communications, all-employee marketing, and small and micro merchant traffic sharing. Based on the WeChat Mini Program ecosystem, it effectively activates the business development capabilities of employees, customers, and partners to build new online user contact points. Together with the capabilities of back end platforms, it implements marketing tools of automatic event tracking, marketing lead capture, customer segmentation, targeted recommendation, community task system, and event engine to make possible personalized and targeted marketing.

In terms of potential customer retention, it helps financial companies reach potential customers, retain their data, and recognize and profile them to form a unified potential customer traffic pool across scenarios, thereby providing a cost-effective traffic source for subsequent potential customer operations and conversion.
In terms of marketing campaigns and point-based reward programs, it comes with a large library of more than 100,000 campaign templates and content materials to help financial companies achieve efficient production of personalized marketing campaigns and contents; it provides automated marketing capabilities, so that business personnel can use drag-and-drop configurations to create and automate internet-based marketing processes such as automatic markers, secondary reach and graded marketing rules, and graded reward rules, which reduce the costs of campaign production and improve the responsiveness; it interconnects the reward points of banks, partners, and third parties and gathers together over 100 Tencent special rewards and third-party rewards with regards to online use, spinoffs, and lifestyle services to meet diversified needs of different user groups and revitalize traditional reward point systems; and it offers a complete reward operations chain consisting of inventory, shipping, and write-off feature modules, which solves marketing problems such as homogeneous marketing rewards, lack of rewards from local merchants, and difficulty in reward write-off and makes possible personalized and targeted marketing through the interconnection of the financial marketing platform and the point-based reward platform.

In terms of data-based marketing operations, it leverages Tencent’s big data technologies to collect various quantified marketing data such as pageviews, reposts, and form submissions, social network-based communications data such as communications levels, targeted audience, and reading sources, target audience demographic data such as genders, geographic locations, and nicknames, as well as user interaction data such as opens, button clicks, and page turns, which comprehensively supplement the customer data system. Based on Tencent’s data processing methodology, it processes the raw data into different business tags to accurately profile users and further applies profile tags to all aspects of marketing for better data-based marketing.
### 05 Financial Risk Management Solution

With the rapid development of the consumer internet and industrial internet and the fast popularization of fintech applications, the business context and forms of consumer finance and industrial finance have been undergoing profound changes. Financial businesses, especially credit businesses, are fully going online. As a result, customer identification, risk management, and approval are being automated, and various scenario-based tasks such as post-loan management are becoming smarter.

These trends bring greater challenges to traditional consumer finance and industrial financial risk management, including:

1. **How to leverage new technologies to build a full-process risk management system that sustains risk management and control throughout the customer business life cycle and supports mobile/offline multi-channel information collection, verification and authentication, and automated approval based on online risk management;**

2. **How to identify complex and ever-changing internet fraud risks, implement differentiated risk pricing through quantitative scoring models, and support dynamic monitoring and alarming throughout the entire process;**

3. **How to use AI, mobile communications, and other technical means to upgrade traditional operating modes and replace human jobs with bots to improve the quality and efficiency**

Taking advantage of cloud computing, big data, and AI technologies, Tencent Cloud provides financial companies with a complete set of financial risk management solutions, which enable them to apply new technologies to build a full-process risk management system, reform traditional risk management processes, and effectively cope with the new challenges in consumer finance and industrial finance.

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#### Pre-loan eligibility
- **Customer acquisition**
  - Registration
  - Application
  - Credit approval
- **Face recognition**
- **Multi-factor authentication service**
- **Marketing risk management**
  - Application fraud prevention
  - Custom scenario modeling
  - Industry risk list
  - Information confidence scoring

#### Mid-loan monitoring
- **Credit line usage**
- **Loan grant**
- **Multi-Source loan alarming**
  - Risk monitoring model
  - Address alarming
  - Address alarming
- **Financial contact bot**
- **Post-loan risk assessment**

#### Post-loan management
- **Repayment**
- **Overdue payment**
- **Multi-factor authentication service**
- **Marketing risk management**
- **Risk management platform**
  - Approval management
  - Blocklist management
  - Credit line center
  - Risk management decision engine
  - Monitoring and alarming
  - ...
Tencent Cloud financial risk management solution fully covers all links in the pre-, mid-, and post-loan business processes of consumer finance and industrial finance and comprehensively makes the risk management practices of financial companies smarter:

1. **The risk management platform** enables financial companies to build a unified risk management middle-end and connect the risk management operating modes and process policies in different scenarios so as to effectively improve the risk management capabilities and processing efficiency;
2. **Enterprise information verification**
   allows financial companies to effectively identify customers through various core capabilities such as basic enterprise information verification, enterprise activity rating, enterprise eligibility assessment, and enterprise information calibration;

3. **Fraud prevention, multi-source loan alarming, confidence scoring**, and other capabilities help financial companies identify customer fraud risks and support scenario-based model customization;

4. **Post-loan management services** help financial companies conduct post-loan risk assessment, repayment notification, and collection contact;

5. **Enterprise graph analysis** assists financial companies in discovering associated risks by identifying various relationships such as ownership, investment and shareholding, and upstream/downstream relationship through the knowledge graph with enterprises, individuals, and businesses as entities and association relationships as boundaries;

6. **Enterprise public opinion monitoring** empowers financial companies with public trend analysis. Based on the collection of data from the entire internet and combined with big data processing capabilities and NLP technology, it can discover and analyze trending topics, generate regular reports, and push alarm notifications for negative and sensitive events;

7. **Marketing risk management capabilities** fully support financial companies to identify risks such as malicious bargain hunting during customer acquisition and reactivation campaigns to improve their marketing effect.
Silos are common among traditional financial systems, and data is not fully reused, which leads to poor horizontal scalability and low response efficiency, reduces the value of enterprise data, and affects business production and decision making.

With the development of Internet+, businesses have gradually shifted from offline to online, which brings along new challenges such as user surges, changing business scenarios, and traffic uncertainty and drives higher requirements for fintech transformation of financial companies.

In the silo architecture formed by the project- and system-based construction model, information is isolated, making it impossible to fully tap into the value of enterprise data for effective use.

The IT construction model where hardware is configured based on the estimated business peaks requires a high one-time investment with low resource utilization. The isolation of different systems leads to a high number of technology stacks, high maintenance costs, and difficulties in OPS.

New technologies (e.g., big data, AI, and deep learning) have high thresholds and require high investments, so how to effectively integrate them with business scenarios has become a new problem for enterprise business innovation.

With the development of internet businesses, more and more security threats such as DDoS, phishing websites, and system vulnerabilities are emerging, yet the information security capabilities are weak, posing major challenges for business security.
Through the changes from environment support to service support and from passive response to active service, fintech gradually moves towards the front end. The construction of new financial infrastructure needs to support data security and compliance, rapid business iteration and deployment, and fast scalability during traffic peaks, break through information silos, integrate underlying data, and embrace cutting-edge technologies, e.g., AI, big data, IoT, and blockchain.

Backed by its rich experience and efficient services, Tencent Finance Cloud well supports the digital transformation of financial companies and offers multiple cloud infrastructure solutions, including full cloudification, hybrid cloud, and private cloud, that support the construction of infrastructure for different scenarios, sustain the internet-based operations of business applications, and meet regulatory requirements for security and compliance.

**Full cloudification**
Under the premise of meeting regulatory compliance requirements, all businesses of financial companies can be fully deployed in the finance cloud to take advantage of the elastic scaling and on-demand allocating capabilities of cloud computing, quickly build environments and agile fundamental IT capabilities, and comprehensively improve the security protection in terms of physical device, network, server, data, and application. This helps financial companies fully tap into the dividends of cloud computing, improve infrastructure capabilities, and effectively reduce costs and increase efficiency.

**Hybrid cloud**
An enterprise hybrid cloud can be constructed by using IDC infrastructure resources while fully tapping into the dividends of cloud computing. Under the premise of security and compliance, it meets the needs of financial companies to preferably cloudify certain businesses in a new model of financial infrastructure construction.

**Private cloud**
Tencent Cloud’s mature public cloud technologies and many years of experience in cloud operations are delivered to financial companies in a privatized mode to help them build a new financial infrastructure platform. This mode supports the construction of distributed architecture systems and has various new internet-based features such as high concurrency, massive user base, and elastic scalability. The same platform can sustain IaaS + PaaS + SaaS services and prepare financial companies for infrastructure construction for the next decade.
# 06.1 Full Cloudification

Tencent Finance Cloud provides one-stop financial cloud infrastructure services to financial companies and supports fully cloud-based deployment of their businesses. Moreover, for the special compliance and security needs of the financial industry, it further offers specialized business components such as payment, risk management, and audit in addition to the physical isolation of infrastructure.

![Figure 17](image)

Tencent Finance Cloud has multiple finance zones in Shanghai, Shenzhen, and Beijing. Each finance zone contains multiple financial availability zones (AZs) with a distance of at least 15 kilometers, where the entire businesses of financial companies can be deployed in the cloud and “multi-AZ-multi-IDC” intra-region and cross-region disaster recovery can be achieved, so as to ensure the business continuity, data reliability, and security of financial services and applications.

1. **Regulatory compliance:**
   Tencent Finance Cloud meets the applicable compliance standards of the China Banking and Insurance Regulatory Commission (CBIRC) and has passed the Cybersecurity Classified Protection Certification Level 4 filing and evaluation by the Ministry of Public Security (MPS) of China, demonstrating its capabilities to provide secure and compliant financial cloud services to financial companies.

2. **Full-Stack products:**
   Tencent Finance Cloud provides the same full-stack products as Tencent Cloud (public cloud), covering various finance-grade IaaS, PaaS, and SaaS services to help financial companies cloudify their businesses in one stop.

3. **Dedicated resources:**
   Tencent Finance Cloud provides financial companies with isolated dedicated resources. It creates exclusive resource usage zones for financial users with cabinet as the basic unit and equipped with independent monitoring devices and physical access controls to meet their diversified requirements for resource exclusivity.
06.2 Hybrid Cloud

According to the characteristics of the financial industry, Tencent Finance Cloud helps financial companies flexibly build hybrid clouds on the premise of meeting financial regulatory compliance requirements. Enterprise IDCs are connected to Tencent Cloud through Cloud Connect Network (CCN) to achieve multi-point interconnection in and off the cloud, which assists with the digital transformation and business innovation of financial companies with the aid of Tencent Cloud’s elastic, scalable, secure, and compliant resources while guaranteeing the security of business data in the IDCs.

1. Financial companies deploy core data such as account data and transaction data in their own IDCs and deploy application receipt, marketing, and other front end internet-based services in a finance zone, so as to implement full-process business operations in the hybrid cloud architecture.

2. Financial companies set up a disaster recovery center in a finance zone, which, together with an existing production center, form a 2-region-3-IDC disaster recovery structure.

Enterprise IDCs are connected to the Tencent Cloud network over physical connections through Direct Connect access points and further interconnected with finance zone Virtual Private Cloud (VPC) and regular VPC through CCN.

Figure 18
Tencent Finance Cloud multi-region-multi-IDC fully redundant architecture
06.3 Private cloud

Tencent Cloud Enterprise (TCE) is an enterprise-grade cloud platform based on the mature product system of Tencent public cloud. It supports privatized deployment, features high availability, unified management and control, and industry-specific compliance, and provides comprehensive capabilities required by digital transformation, e.g., cloud computing, big data, and AI, making it an ideal integrated private cloud solution for industry leaders and large and medium-sized group companies.

TCE provides a one-stop solution covering IDC planning, basic resource cloudification, three-dimensional security protection system, big data and AI, distributed architecture, development and OPS management, and cloud implementation route planning to help financial companies build secure, compliant, self-controllable, and elastically scalable private clouds, industry clouds, or group clouds.

TCE offers high-availability and high-performance computing, network, storage, and database capabilities and a unified management system for resources, OPS, and monitoring to improve the infrastructure robustness and resource utilization. Moreover, it features an all-around security protection architecture empowered by its server security and data security capabilities.

TCE integrates rich IaaS-layer capabilities. Its high-performance virtual machines, bare metal servers, and other computing products meet financial companies’ differentiated requirements for computing resources in different scenarios. Its flexible and reliable seamless access capabilities such as VPC, IPv4/IPv6 dual-stack support, BGP networks, and physical connections form a solid foundation for the multi-region-multi-IDC distributed

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[Diagram: One-stop cloud platform, Security and controllability, Distributed architecture, Flexible delivery]
architecture required by financial companies. Plus, it uses TDSQL, CBS, COS, and other storage services to provide finance-grade, high-performance, and high-reliability data storage capabilities to safeguard the rapid growth of financial services.

TCE integrates rich PaaS-layer technical capabilities to provide middleware such as TKE, TSF, Cloud Kafka (CKafka), and TencentDB for Redis as well as distributed technology solutions such as DevOps, helping financial companies build PaaS technology platforms.

TCE provides an all-around security protection system that covers physical security, network security, server security, data security, application security, business security, security audit, and other security capabilities, forms a full-process security protection mechanism before, during, and after transactions, implements enterprise-grade security protection, and helps financial companies establish a complete, reliable, and compliant security architecture.
As fintech keeps evolving, the requirements for databases are getting more and more demanding; that is, databases must be able to sustain internet-based business surges in terms of data consistency, service availability, and flexible scalability. In addition, the requirements for information security and performance optimization are stricter than ever. The Fintech Development Plan (2019–2021) released by the People’s Bank of China (PBOC) clearly requires strengthening the research, development, and application of distributed databases. In the process of transformation to distributed architecture for financial companies, the application of distributed databases directly determines the success of transformation.

With the continuous expansion of Tencent’s own businesses, Tencent Cloud launched Tencent Distributed SQL (TDSQL) as a finance-grade database solution based on the distributed internet architecture. TDSQL features strong consistency, high availability and performance, global deployment architecture, distributed horizontal scaling, enterprise-grade security, and cross-region disaster recovery, while providing supportive services such as intelligent DBA, automated operations, and monitoring and alarming. Currently, it proudly offers database services in both public and private clouds to over 500 governmental and financial customers in various fields such as banking, insurance, securities, internet finance, billing, third-party payment, IoT, Internet+, and government affairs.

TDSQL features high compatibility with the MySQL protocol, multi-thread asynchronous replication (MAR), read/write separation, database and table sharding, and automatic sharding. It uses Tencent’s proprietary MySQL-based MAR scheme to achieve strong data consistency and ensure that the data on primary and secondary nodes are completely the same. Plus, it supports automatic failover and recovery.
Security is the lifeblood of the financial industry. Financial companies are faced with increasingly diverse security attacks such as DDoS attacks, vulnerability intrusions, WAF attacks, brute force attacks, webshells, database attacks, phishing websites, and frauds, which pose more daunting challenges for their business security and data security.

Tencent Cloud’s three-dimensional security protection solution helps financial companies implement data security protection and control for more stable business operations. Based on a comprehensively planned holistic architecture, it achieves all-around security protection through diversified products and security attributes at different levels, such as physical security, virtualization security, network security, server security, data security, application security, business security, security audit, and security management, to form full-process protection capabilities throughout transactions. At the same time, Tencent Cloud is also constantly optimizing its own security attributes, e.g., authentication, data reliability, and monitoring.

Tencent Cloud offers a complete set of security solutions, including but not limited to Anti-DDoS for DDoS protection, Cloud Workload Protection (CWP) for server security, Web Application Firewall (WAF), Data Shield for data security, Network Traffic Analysis (NTA) for traffic analysis, security service, and security audit.

Tencent Cloud also offers security expert services for financial companies. Its professional security expert team provides various safeguarding services such as security consulting, website intrusion testing, emergency response, and classified protection compliance to help financial customers get appropriate security solutions before, during, and after cloudification, discover potential security threats, improve security protection capabilities, restore businesses, and identify hackers. The products and services provided by Tencent Cloud won an excellent score of zero errors in the network safeguard contest of a prestigious financial company in 2019 and received wide recognition and praise.
With the launch of “new digital infrastructure” and the rapid development of mobile internet, mobile digital channels, as a bridge connecting customer service scenarios with financial products and services, are important starting points for “new digital connections”, and more and more financial companies are using diversified mobile internet technologies to reach customers and open up the online ecosystem. As business development has increasingly high requirements for mobile financial channels, financial companies are often faced with various challenges, e.g., demanding customer requirements for operational performance and experience, adaption to multiple types of devices during R&D, fast product functionality iteration and update, higher security requirements of customers and regulators, and difficulties in systematically retain users’ channel-specific behavior data, and therefore urgently need to carry out integrated construction of mobile financial channels.

Tencent Cloud integrated mobile financial channel solution incorporates Tencent’s technical capabilities of excellent customer experience, integrated multi-terminal adaption, one-stop development, testing, and release, agile R&D, and data-driven operations into the process of mobile internet channel construction. It provides financial companies with a technology platform that can support the integrated transformation of mobile financial channels, and empowers them with Tencent’s technical capabilities to build super apps, so that they can quickly launch diverse and smart mobile financial services, upgrade tool sets, and expedite digital transformation.

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**Figure 23**

### Integrated mobile financial channel solution

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<tr>
<th>Business scenarios</th>
<th>Lifestyle service scenarios</th>
<th>Financial service scenarios</th>
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<tr>
<td>Excellent customer experience</td>
<td>Ecosystem channel linkage</td>
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</table>

#### Self-operated channels
- WeChat Official Account
- Mini program
- Personal mobile device
- Enterprise mobile device

#### Partner channels
- Cooperative financial company
- Third-party traffic scenario
- Industrial customer

#### Customer journey management
- One-stop product
- Smart channel service
- One-stop R&D

#### Mobile fintech base
- Unified mobile development
- Unified mobile testing
- Unified version release
- Unified operations monitoring
- Unified mobile security

#### Financial product service platform
- Self-operated products
- Partner products
- Distributed products

#### Data decision service platform
- Risk management decision making
- Marketing decision making

#### Hybrid cloud base
As a starting point for financial companies to establish “new digital connections” with customers and the ecosystem, it can help them implement:

- **Excellent customer experience**
  It provides customers with a WeChat-like smooth user experience that stays consistent across channels.

- **Ecosystem channel linkage**
  It offers one-stop support for various technologies such as HTML5, mini program, and app to help financial companies link ecosystem channels.

- **Cross-channel customer journey management**
  It enables customer journey management across channels. Especially, its support for mini programs in the WeChat ecosystem allows financial companies to easily build channel-specific customer acquisition capabilities through WeChat.

- **External one-stop product service**
  Through the one-stop connection with internal product services, it can quickly launch, remove, manage, and connect products in all channels.

- **Smart channel operations capability**
  It systematically retains customer behavior data in mobile channels and comes with built-in multidimensional data analysis modules and over 100 preset product analysis metrics in various dimensions such as user behavior tracks and page view levels, which ensure the complete collection of operating data and improve the effectiveness and efficiency of data analysis.

- **One-Stop R&D and integrated multi-terminal adaptation capabilities**
  It provides a unified R&D framework and integrated multi-terminal adaption technology to improve the R&D and production efficiency of features in mobile financial channels and reduce the R&D costs.

- **Industry-Leading security protection capabilities**
  It has a vast and comprehensive virus database, which, combined with Tencent’s over a decade of experience in protecting mobile device security, provides many cloud-based security protection measures to comprehensively protect client software security and data transfer security in multiple dimensions.
Data is the “petroleum” for financial companies in the Internet+ era, so they need to continuously tap into the value of data for constant service improvement. However, in this process, they are often faced with many challenges, e.g., low data consistency, chaotic data organization, low development efficiency, long development cycle, and lack of business- and application-oriented data services.

With many years of rich practical experience in the big data field, Tencent Cloud provides an integrated solution covering big data infrastructure and applications in different financial business scenarios around customer awareness, value enhancement, and full-life cycle continuous operations. It enables financial companies to quickly build an enterprise-grade big data platform and data application analysis system based on efficient data governance, better use data capabilities for business growth, improve the efficiency of their marketing, administrative, and decision-making personnel, and optimize auxiliary decision making.

Tencent Cloud big data solution builds full-linkage data service capabilities around data and helps financial companies gradually tap into the value of data through the combination of “basic big data platform + basic data services + data applications” and build new financial infrastructure.

Tencent Cloud big data solution comes with a unified enterprise-grade big data platform that sustains enterprise data asset management and metadata management, implements the entire process of data collection, cleansing, processing, storage, and governance, and supports processing terabytes to petabytes of data in different scenarios such as data warehouse construction, real-time and offline data processing, and data analysis and mining. Based on the platform, financial companies can build basic data services (e.g., data map and customer tagging) to support front end data applications and business applications. In addition, the solution assists financial companies in building smart risk management, targeted marketing, decision making support, operations management, and other data-based core applications.

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**Figure 24**

| (N) Core applications | Smart risk management | Dynamic customer view | Targeted marketing | Smart customer service | Decision making support | Robo-Advisor | Other |
|-----------------------|----------------------|----------------------|--------------------|-----------------------|------------------------|--------------|
| (M) Basic services    | Data map service     | Customer tag service | Smart image        | Natural language processing | Smart language | Public index service | Other |

**Tencent Cloud big data and AI platform**

- **Messaging middleware**
- **Large-scale task scheduling**
- **Multidimensional analysis engine**
- **Graph database and graph computing**
- **Graph deep learning (with Caffe and TensorFlow supported)**
- **Automated model deployment**
- **Dynamic load balancing**
- **Automated failover**
- **Auto scaling**
- **Integrated development, scheduling, and operating platform**
- **Automated model operating, scheduling, and management platform**
- **Automated failover**
- **Auto scaling**

**Underlying storage (structured, unstructured, and semi-structured data storage)**

**Resource scheduling management (CPU, GPU, multi-tenancy, and resource isolation)**
As AI applications boom faster, they have evolved from computational intelligence based on big data analysis to more advanced perceptual intelligence and cognitive intelligence scenarios such as image recognition, speech recognition, and natural language processing. The integration of AI and financial applications creates more use cases, but also poses new challenges in many aspects, e.g., high application thresholds, large structural differences, complex scenarios, difficulties in data preprocessing by self-built AI platforms, complicated model training, lengthy model deployment process, and insufficient experience in parameter adjustment.

Tencent Cloud incorporates many years of technical accumulation in AI and leverages its core technological advantages to provide an AI solution that covers two major aspects: basic AI services and AI application services.

In terms of AI application services, Tencent Cloud enables financial companies to automatically recognize identity documents, bank cards, driver’s licenses, road-worthiness certificates, business licenses, business contracts, etc., effectively optimize existing processes, and improve the business processing and operating efficiency. It provides various services such as smart customer service bots, call center quality assurance, and financial contact bots to assist with the business development of financial companies. Plus, it offers “business-savvy” smart voice bot service for credit check, callback, repayment reminding, overdue repayment collection, and other scenarios in the loan business.

In terms of basic AI platform, Tencent Cloud provides a one-stop TI-ONE machine learning platform solution to assist financial companies in building a basic AI modeling platform as well as creating and training models for risk management, investment research, investment advisory, and marketing. It supports fully automated modeling and drag-and-drop task flow design, integrates multiple machine learning algorithms (e.g., classification, clustering, and regression) and deep learning algorithms (e.g., graph algorithm and CNN), and enables quick model deployment for seamless connection between user-trained models and real businesses. In addition, it features grayscale release and traffic distribution, which can help financial companies flexibly perform upgrade and rollback operations in actual business scenarios and reduce the risks of version switching.
Tencent Cloud compliance

Compliance is the foundation of Tencent Cloud’s business development. Tencent Cloud complies with applicable requirements of different industries, fields, countries, and regions and strives to create cloud services that customers can trust. Meanwhile, it actively participates in the formulation and promotion of industry-specific security standards and insists on compliant service provision to establish a secure and reliable cloud ecosystem environment. It plans and builds cloud services in accordance with internationally recognized information security and IT management and control standards to provide customers with cloud services that have been reviewed and approved by authoritative third-party certification bodies. It complies with various country-specific regulatory requirements and passes the evaluations by third-party authorized assessment bodies to ensure that its cloud services meets regulatory standards. Moreover, according to industry-specific best practice requirements, it has passed various audits by third-party evaluation bodies and self-evaluations to better demonstrate its compliance practices to customers. It is also committed to protecting the personal and private information of each and every customer, building a complete personal information management system, and adopting various technical means to protect customer privacy.

ISO 27701 International Standard for Personally Identifiable Information Management System

Tencent Cloud is the world’s first cloud service provider certified by ISO/IEC 27701. It has established and implemented a privacy management system and has the ability to continuously improve it.

CAC Cloud Service Security Assessment

Tencent Cloud is one of the first cloud computing service providers in China to pass the Cloud Computing Services Security Assessment by the Cyberspace Administration of China (CAC).

OSPAR Audit

Tencent Cloud has passed the Outsourced Service Provider Audit Report (OSPAR) audit by the Association of Banks (ABS) of Singapore, proving that its security capabilities meet the applicable control requirements for Singaporean financial service providers and comply with the applicable regulatory requirements of the Monetary Authority of Singapore (MAS).

KISMS Certification

Tencent Cloud is the first cloud computing service provider in China to earn the Korean Information Security Protection Management System (K-ISMS) certification, proving that its information security management systems and capabilities are in compliance with applicable Korean laws and standards.

HIPAA

Tencent Cloud has released its self-assessment reports for Health Insurance Portability and Accountability Act (HIPAA) compliance, which demonstrates its ability to protect users’ personal health information in the cloud.

PCI DSS

The Payment Card Industry Data Security Standard (PCI DSS) is jointly established by Visa, Mastercard, and a number of international card associations. Tencent Cloud has passed the level 1 service provider certification assessment.

MPAA

Tencent Cloud ensures that its management of customer content is in compliance with the Motion Picture Association of America (MPAA) Content Security Model through self-assessment.

MTCS T3 Certification

Tencent Cloud has been awarded Singapore’s Multi-Tier Cloud Security (MTCS) Standard certification at Level 3, proving that its information security management systems and capabilities are in compliance with applicable Singaporean laws and standards.

CISPE

The Cloud Infrastructure Services Providers in Europe (CISPE) is a leading cloud computing alliance that serves millions of customers in Europe. Tencent Cloud is the first cloud computing service provider in China to earn the CISPE Data Protection Code of Conduct certification.
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For more information about our Fintech Solutions, please contact us at globalcloud@tencent.com.