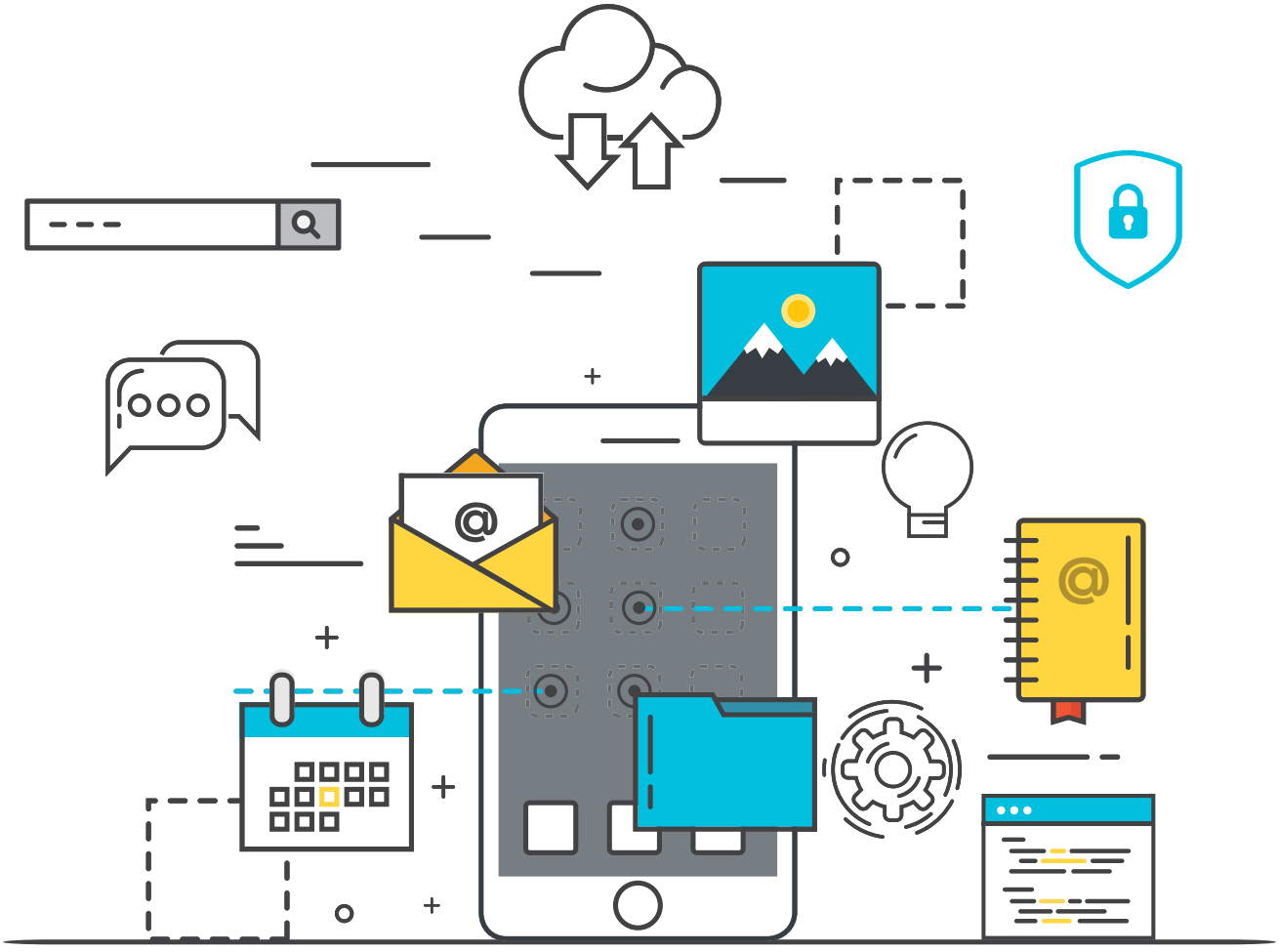
Alibaba Cloud

Catch the Next Wave of **Secure Mobility** with **Alibaba Cloud Mobile Solutions**



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01 Introduction

We have entered into an era where connectivity, collaboration and constant communication have become key necessities for any growing business. Mobility - the technology powering this wave of connectivity - is believed to be one of the most disruptive technologies of the past decade.

Gone are the days when mobile devices were used only for sharing data via SMS. Mobile devices are now paramount for enterprises to conduct business, and enable employees and customers to communicate and share data.

According to a survey by Gartner, "42 percent of organizations expect to increase spending on mobile app development by an average of 31 percent in 2016." Enterprise mobility surpasses mobile apps by ensuring a "Mobile First" business.

With an eye towards the future shape of the mobile landscape, this whitepaper focuses on:

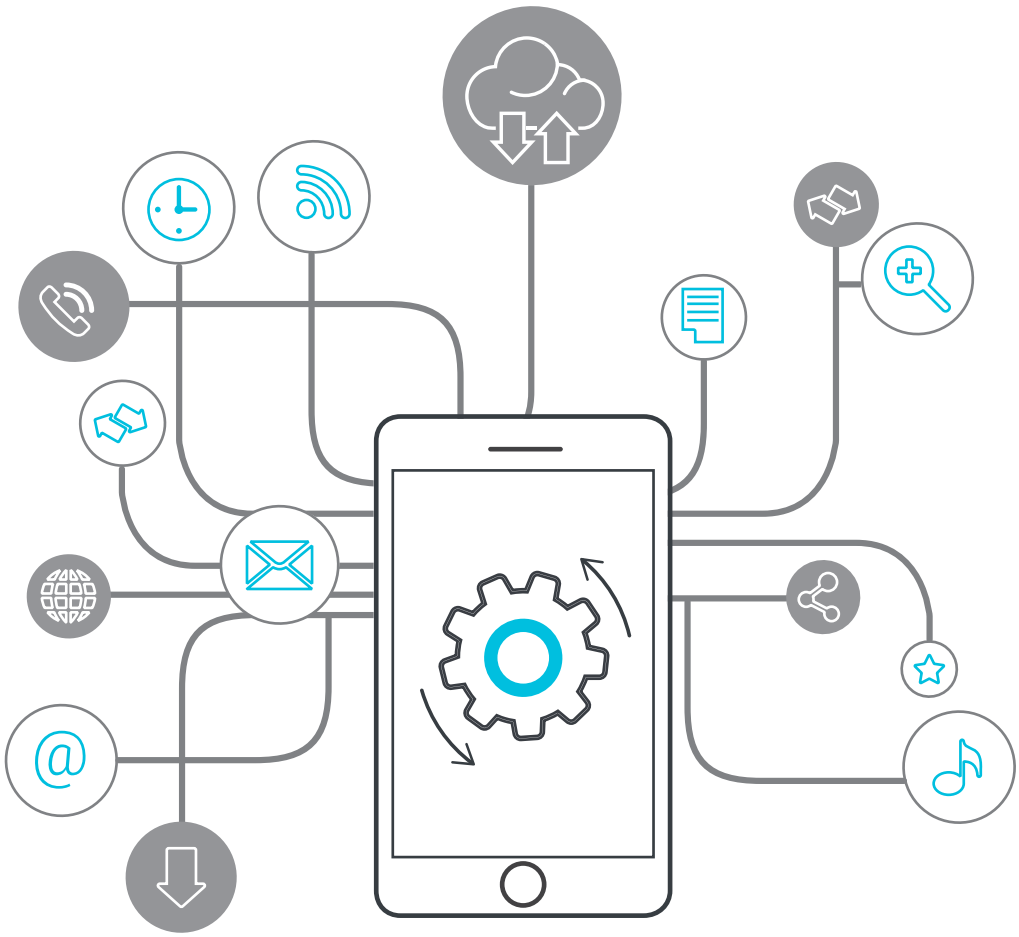
- Evolving trends within the mobile landscape and enterprise mobility
- Mobility challenges
- Alibaba Cloud Mobile Solutions
- Overcoming mobility challenges with Alibaba Cloud Mobile Solutions

This whitepaper caters to CTOs, senior mobile app developers, technology leads, and VPs who want to be aware of the latest innovations and enterprise solutions in mobility technology. In addition, this paper will guide you through real-life scenarios of application development and suggest solutions using Alibaba Cloud's advanced big data and analytic services.

02 Evolving Mobile Landscape

Mobile usage has increased rapidly on the back of the "Post-PC Era". According to a Statista report, the number of mobile phone users in the world is expected to pass the five billion mark by 2019, or 67 percent of the world's population. Such mass adoption can be attributed to the increasing popularity and accessibility of smartphones. From young adults to sophisticated business users, mobile devices are deeply embedded into our daily lives. With such a frenetic adoption of mobile technology, it has transformed the way we connect and how companies conduct business.

Gone are the days when credit card swiping was the only form of online payment. Mobile payment gateways through smartphones have taken up the wave and make financial transactions easier than ever before. Mobile phones now play a pivotal role in accessing digital services.



03 Enterprise Mobility: The New Normal

Corporate IT departments used to stick to their workstations because of a lack of alternatives. But with the emergence of mobile computing, employees no longer need to restrict themselves to their cubicles. Users have the flexibility to switch between a desktop, tablet, and smartphone – anytime and anywhere. This flexible working style where employees use mobile cloud services to carry out their work is referred to as enterprise mobility.

Enterprise mobility is now a new normal in the industry, and according to a Workforce 2020 study, the capability to work at any time from any place is becoming a major factor in the business world, especially with more millennials joining and shaping the workforce.

This helps businesses extend their business applications to mobile devices and increase productivity. Corporate-Owned Personally Enabled (COPE) and Bring Your Own Device (BYOD) are the sub-products of enterprise mobility. Both bring tremendous benefits regarding employee productivity and offer flexibility for user-friendly devices.

There are however drawbacks, and managing enterprise mobility can at times seem like a minefield. Challenges include security issues and low network connectivity. The combination of personal and professional usage also gives rise to privacy and legal issues.

Undoubtedly, enterprise mobility is imperative for the growth and development of organizations. However, it comes with challenges that need to be addressed in order to achieve ROI and enable a company's workforce in this modern world.

04 Mobility Challenges

Mobility brings challenges and concerns that never existed during traditional times when there were only desktop computers.

1. Security

With increasing enterprise mobility trends, data security and privacy, including passwords and access to banking information, are at risk. Developers also tend to neglect the security aspect during development and testing phases due to shorter turnaround times.

2. Analytical Capabilities

Startups lack in-house mobile data analyzing capabilities and reliable tools that can enable their business and increase productivity.

3. Data Driven Acceleration Capabilities

Most mid-sized enterprises and SMEs have access to analytical tools. However, due to immature data analysis and mining ecosystems, they lack the ability to explore further, consume, and utilize data to make useful optimizations. This serves as a stumbling block for enterprise mobility.

4. Performance Optimization Systems

The vast majority of mobile developers lack systematic performance monitoring systems, which help in evaluating performance. Most apps lack an optimized environment configuration for content and storage resources.

To address the challenges mentioned above, Alibaba Cloud offers specialized mobile solutions. Alibaba Cloud Mobile Solutions enable SMEs to carry out lean operations based on big data technology, and utilize security products and other services tailored to mobile applications. This, in turn, improves overall application quality, security, and user-experience.

05 Alibaba Cloud Mobile Solutions - An Overview

Alibaba Cloud offers a range of products and services to help organizations develop mobile apps that are scalable and resilient to service up to millions of users. With Alibaba Cloud, you can develop high-quality mobile applications quickly and efficiently, and ensure robustness of the applications via testing tools.

Alibaba Cloud Mobile Solutions also provide vital security intelligence to help organizations holistically protect applications, inherent data, and corresponding infrastructure from probable attacks.

With its broad range of fully managed cloud services, you can utilize various services including storage, tracking and monitoring, security and protection, smooth content delivery, databases and machine learning in your application without any need to manage backend infrastructure.

You can also manage user identities and application sign-ins, push relevant notifications based on data analysis, perform independent log analysis, perform targeted marketing, and further optimization of the application.

06 Overcoming Mobility Challenges with Alibaba Cloud Mobile Solutions

6.1 Mobile Security

Mobile security threats are coming into their own, both concerning volume and capacity to inflict harm. Unprotected mobile devices are easy prey for cyber attacks. With the growth in BYOD and IoT device usage, enterprises need to take constructive security measures instead of centralized security models.

Based on the Global IT Security Risk Survey, it is reported that the average damage caused by a single serious attack costs a large company approximately USD $649,000 in damage. Companies, therefore, need to be aware of potential attacks and take protective measures to ensure multi-device application security.

6.1.1 Challenges

With low barriers to entry, more and more applications are designed on short timeframes. This can lead to developers neglecting the security aspect of the application during development stages. Since it is difficult for developers to create patches due to the vast range of hardware devices available in the market, developers' main focus remains on providing the main functionality rather than developing patching infrastructure for OS. Moreover, the flexibility of the Android platform fuels the probability of attacks in mobile apps. Various viruses, vulnerabilities, phishing attacks, counterfeiting, and other malicious activities disrupt the app market and affect user security.

For specific online industries, including finance, healthcare and gaming, security of mobile applications is a major concern. For apps essential to our daily lives, a small security issue can cause inestimable economic and reputational damage to both enterprises and individuals. This problem is aggravated by the lack of national regulations or industry standards around developing or launching mobile apps, as well as the popularization of startup culture. At startups, stringent deadlines to launch applications can lead developers to overlook testing.

6.1.2 Alibaba Cloud Mobile Security Solutions

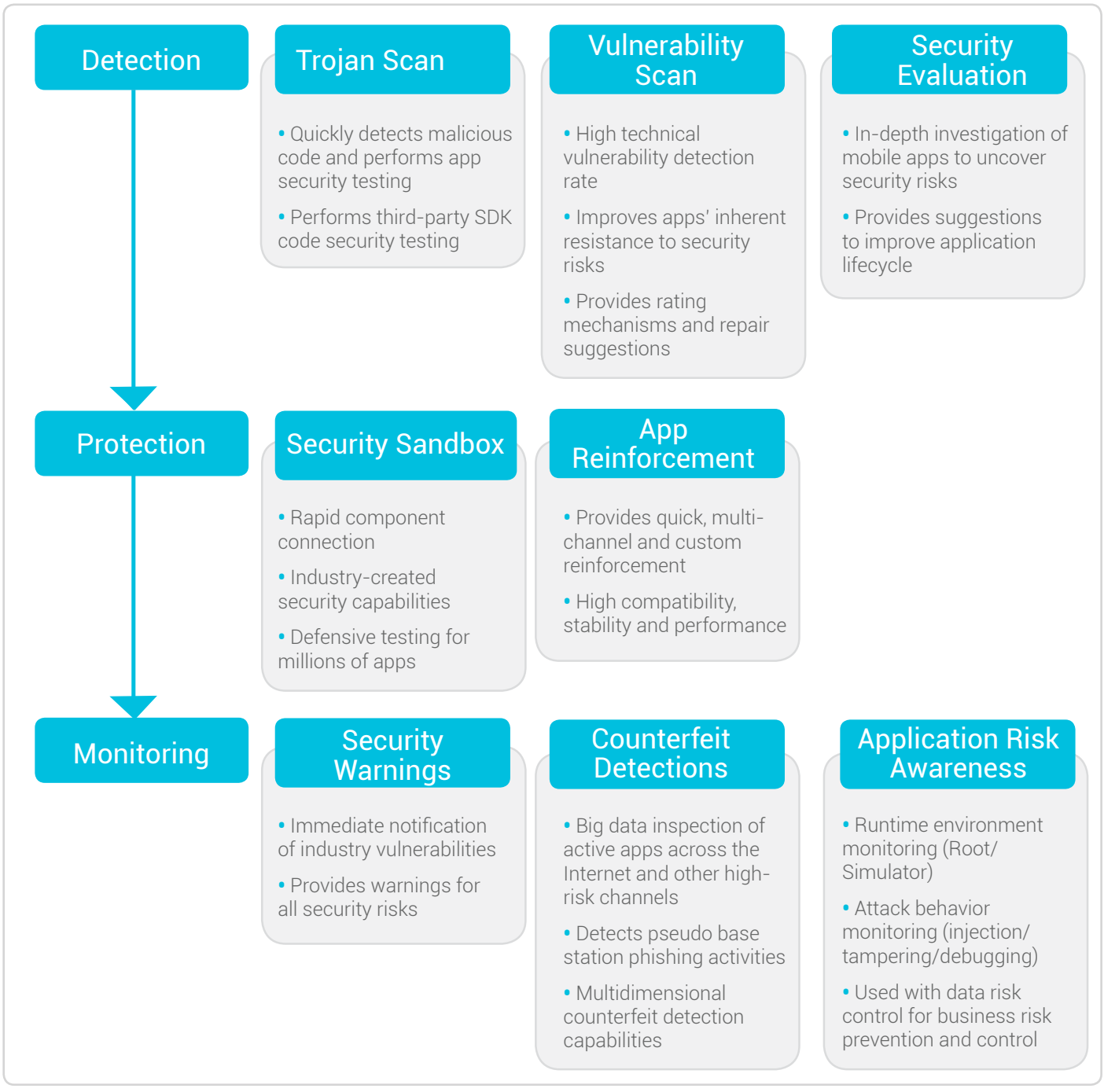
To provide lifecycle security services for apps, Alibaba Cloud Mobile Security Solutions offer an all-in-one solution for a variety of mobile security concerns. It can precisely detect security vulnerabilities and other potential risks, significantly improve apps' anti-reverse engineering and anti-hacking capabilities, and monitor pirated app channels across the Internet.

Based on the risk management process, mobile security products and services are divided into three areas spanning the entire app lifecycle from design, to development, testing and launch.

a. Risk Detection: Trojan scans, vulnerability scans, and security evaluation services determine current security risks of applications.

b. Security Protection: After detecting security risks, app reinforcement and connected security components are used to reduce or prevent such dangers.

c. Threat Intelligence/Security Monitoring: Through piracy detection and app risk awareness, security warnings identify risks and recommend solutions.



6.1.3 Mobile Security Solutions: Which One is Right For You?

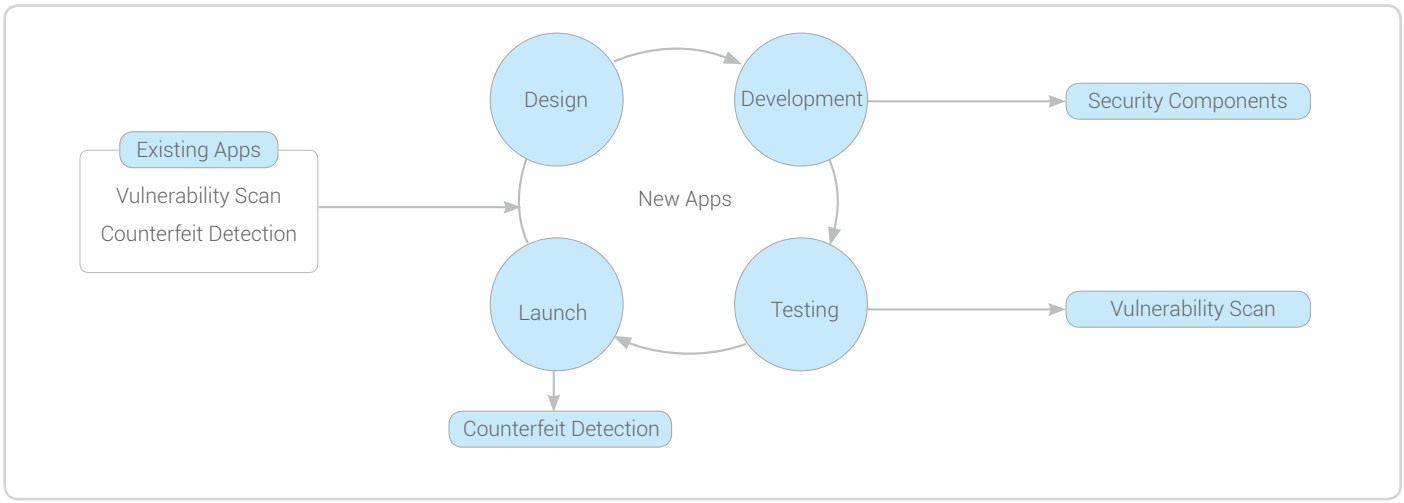
1. Enterprises With R&D Capabilities

Enterprises with R&D capabilities must take the following measures to ensure the security of their applications:

a. For existing applications, businesses with independent app R&D capabilities must immediately perform vulnerability scans and counterfeit detection, repair existing vulnerabilities and report and shut down counterfeit app sources.

b. While developing any new app, they must use security components in the development stage. In the testing stage, they must perform vulnerability scans and repair any vulnerability. Then, prior to the release of the app, they must reinforce the app to enhance security.

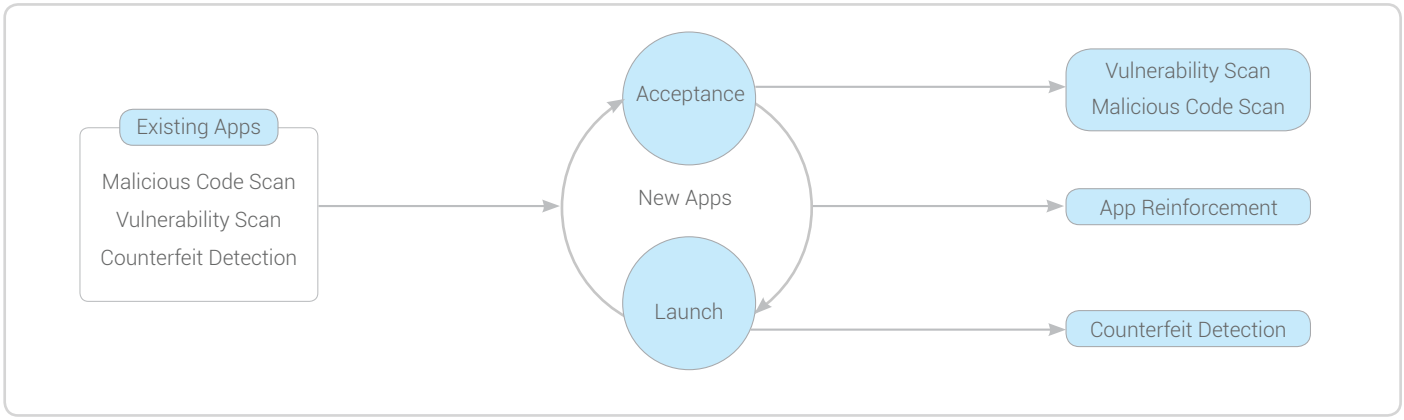
c. After the launch of an app or the release of a new version, enterprises must perform counterfeit detection periodically to identify counterfeit apps.



2. Enterprises Without Independent R&D Capabilities

Enterprises without independent R&D capabilities must entrust app development and testing to a third party. At multiple instances, enterprises may not be able to detect security issues during acceptance tests, such as the unintentional or intentional use of malicious code. Such problems may cause substantial losses to enterprises once the app is launched. Therefore, enterprises must perform vulnerability scans, counterfeit detection, and malicious code scans for existing apps, and then promptly troubleshoot existing problems.

Subsequently, while performing acceptance tests on new apps, they must use vulnerability scans and malicious code scans to discover security risks promptly.



6.1.4 Mobile Security Solution Advantages

1. Provides persistent visibility and security to all related devices on or off the network.
2. Security is handled through managed services with advanced anti-hacking mechanisms.
3. Identifies security vulnerabilities for multiple server groups via a single click.
4. No need for infrastructure provisioning to monitor mobile applications.

6.2 Mobile Analytics

Digital media usage continues to grow at a fast rate, driven by smartphone app usage, which is inching closer and closer to 50 percent of all digital media time spent as per a Comscore report released in 2016. With continually increasing mobile data usage, it becomes imperative to track the outcome and progress of your mobile apps and user behavior on the application. This helps to optimize mobile apps, making the engagement more personalized and also improves targeted marketing. Eventually, data analysis and optimization improve the overall ROI and monetization of the mobile experience.

6.2.1 Challenges

With such profusion of data in the mobile sector, the vast majority of mobile developers lack a sophisticated data collection and performance monitoring system for apps. The primary challenge is about what data should be collected and the best way to do it. As the number of users and amount of log data grow, developers must perform personalized log analysis on massive volumes of data. During app operations, developers need to monitor traffic in real-time and promptly discover performance issues.

For such massive log analysis, companies need an all-in-one mobile analytic service that independently collects data and provides real-time user behavior analysis and independent log analysis. The need is to perform targeted marketing

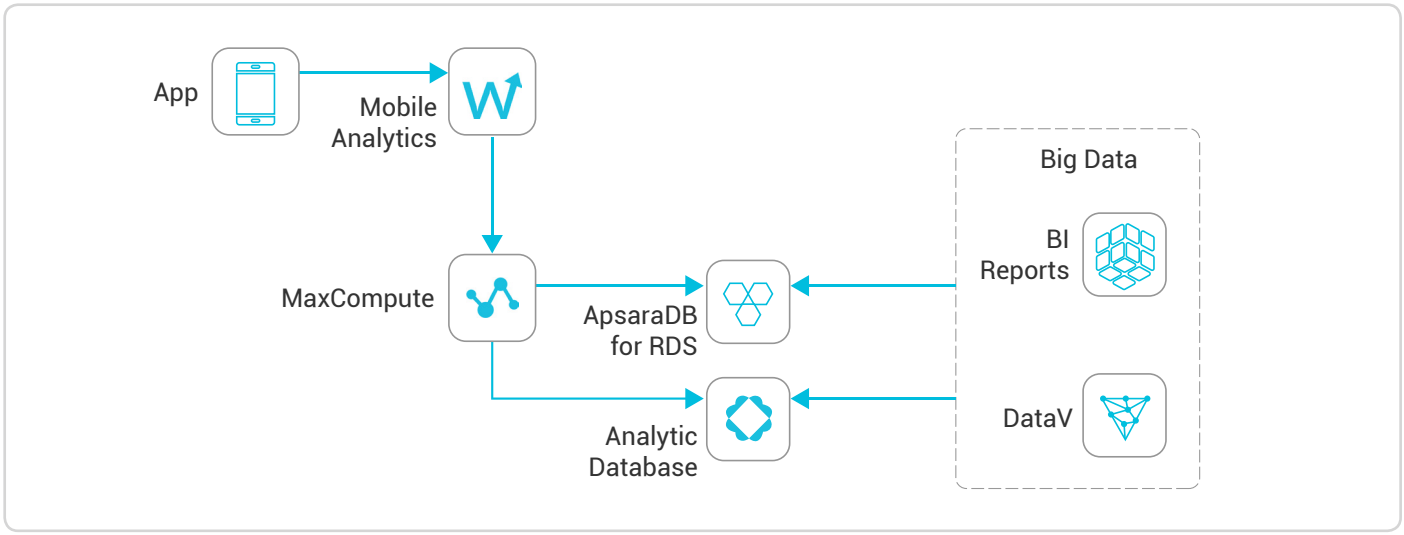
on users' behavior to improve product quality and increase user loyalty. Also, they don't have access to advanced warnings in case a fault occurs, which leads to a delay in taking measurable actions. The effectiveness of performance optimization cannot be quantified or evaluated for monitoring systems without performance data baselines and response thresholds.

6.2.2 Alibaba Cloud Mobile Analytics

To address those challenges, Alibaba Cloud Mobile Analytics offers an all-in-one solution that monitors and analyzes real-time data generated by mobile applications and provides advanced BI reports. Once a mobile app is integrated with Alibaba Cloud Mobile Analytics, data monitored using mobile analytics is processed using MaxCompute. The result is stored in ApsaraDB for RDS. Big data analysis is performed on the result stored in RDS to generate BI reports. The following list details analysis provided by Alibaba Cloud:

a. User behavioral analysis
b. Hijacking analysis
c. Basic business statistics
d. Activity and retention
e. Performance analysis
f. Crash analysis

Alibaba Cloud Mobile Analytics is a solution that allows you to track, measure, and understand how mobile users are interacting with your mobile apps. It also allows you to build an efficient mobile marketing strategy based on user behavior reports.



6.2.3 Advantages

Alibaba Cloud Mobile Analytics provide a complete system of operational indicators that cover basic business analysis reports required for app operation: user behavior analysis, both active and retained user analysis, and region usage analysis. It continuously supports data collection through automatic native and H5 page collections. Analysis reports

also support multi-dimensional performance analysis, including request performance, network exception, and custom performance event analysis.

In addition to analyzing essential business data, app performance analysis allows developers to view multi-dimensional combinatorial analysis performance reports that show request connection times, network exceptions, and certain operations and interactions that are too slow. This detailed analysis allows developers to know which API modules need to be fixed.

6.3 Data-driven Mobile App Operation

According to a survey by AppDynamics, 86 percent of users delete or uninstall mobile applications because of performance problems. Users need an engaging and high-performing application. An application that can be enhanced with innovative recommendation engines that work on data analysis and enhance overall user experience. Companies either need to develop in-house capabilities for data mining and reporting, or look for a ready solution to increase productivity.

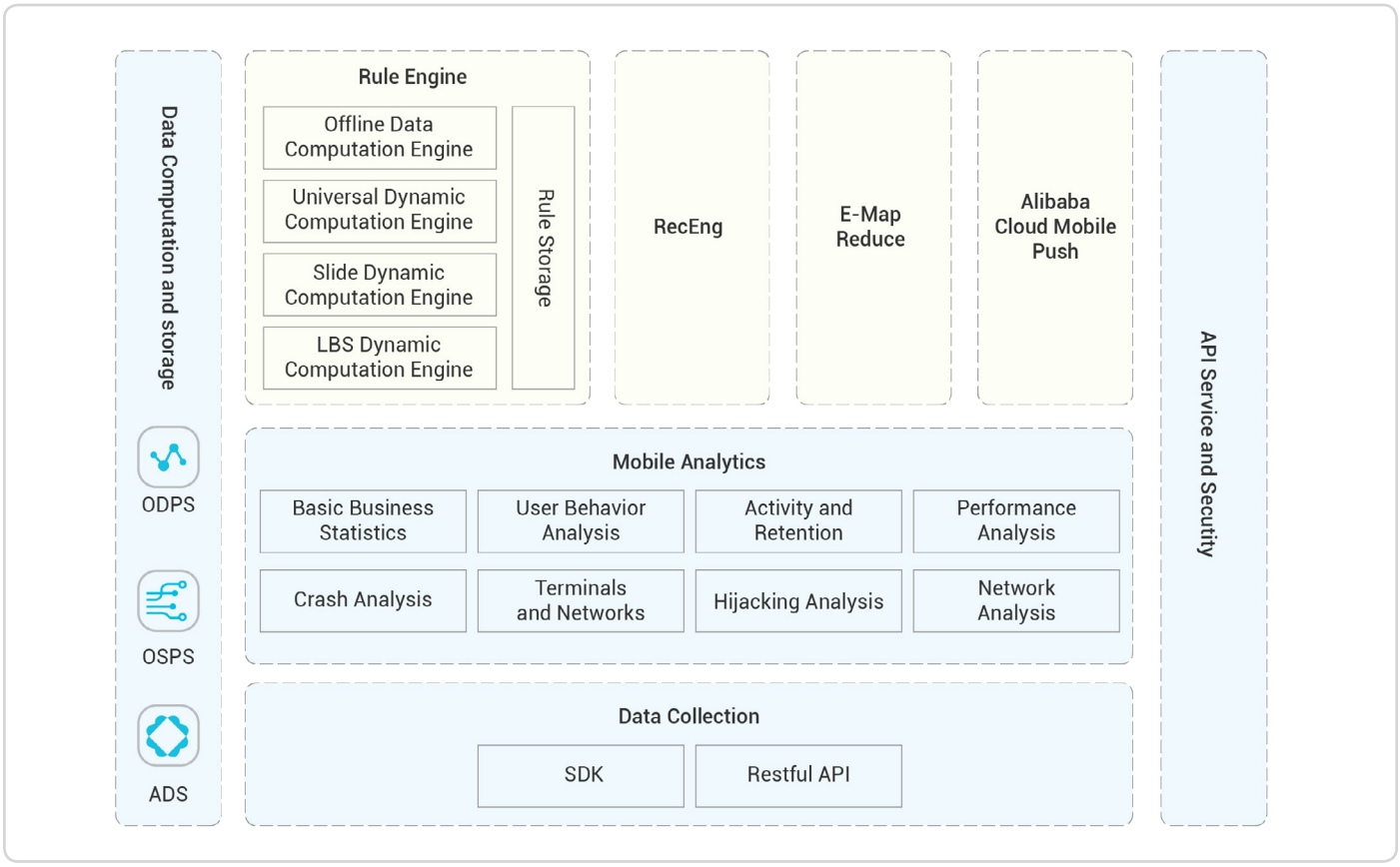
Startups typically lack such development and data-mining capabilities. They need to reduce the workload and technical barriers to provide basic data reporting capabilities. For this, they prefer to have ready operational services and tools to increase productivity.

6.3.1 Challenges

1. Low input-output ratio of business data collection
2. Low network performance and high data collection thresholds
3. Lack of data analysis report service
4. Need for in-depth DIY solution that allows them to focus on development and performance, increase value of their data, and deeply explore business operations
5. Incomplete data analysis and mining ecosystems
6. Lack of further data consumption capabilities

6.3.2 Alibaba Cloud Data-driven Mobile App Acceleration Solution

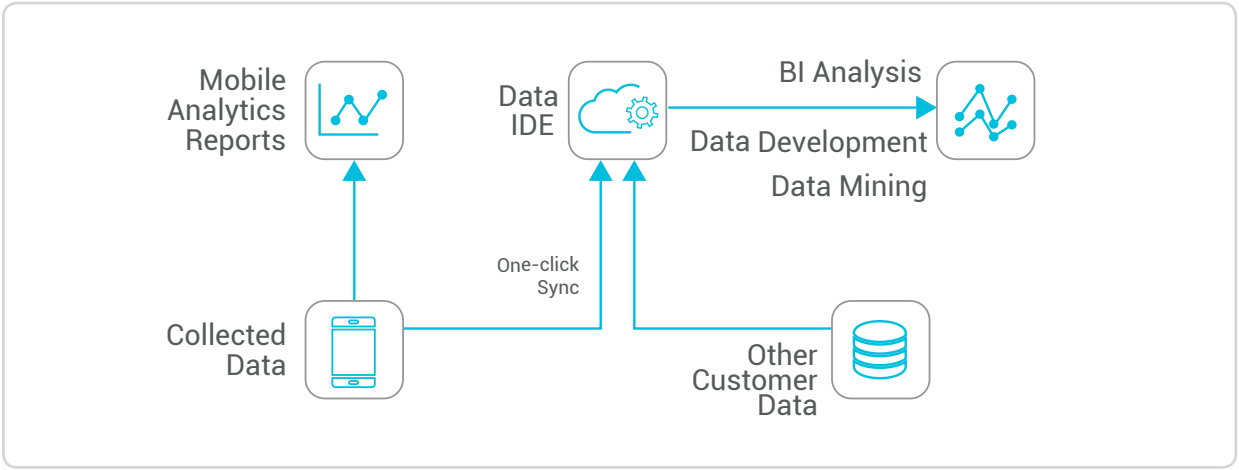
Alibaba Cloud's Data-driven Mobile App Solution delivers an all-in-one service, covering collection, analysis, personalized processing, and application for enterprises at all stages of development. This solution supports cloud-based data collection from multiple platforms and provides a broad range of pre-defined business analysis reports. It also returns data to developers for further processing. The solution provides user profile tag data that allows developers to select precise user groups for targeted marketing or smart pushing.



6.3.3 Typical Application Scenarios

1. Independent Log Analysis

For developers, it offers a quick collection of user behavior data that is then processed by the MaxCompute service to perform BI analysis and data mining independently. Developers can write a MaxCompute function to perform in-depth and customized analysis of log data.



Simple Procedure

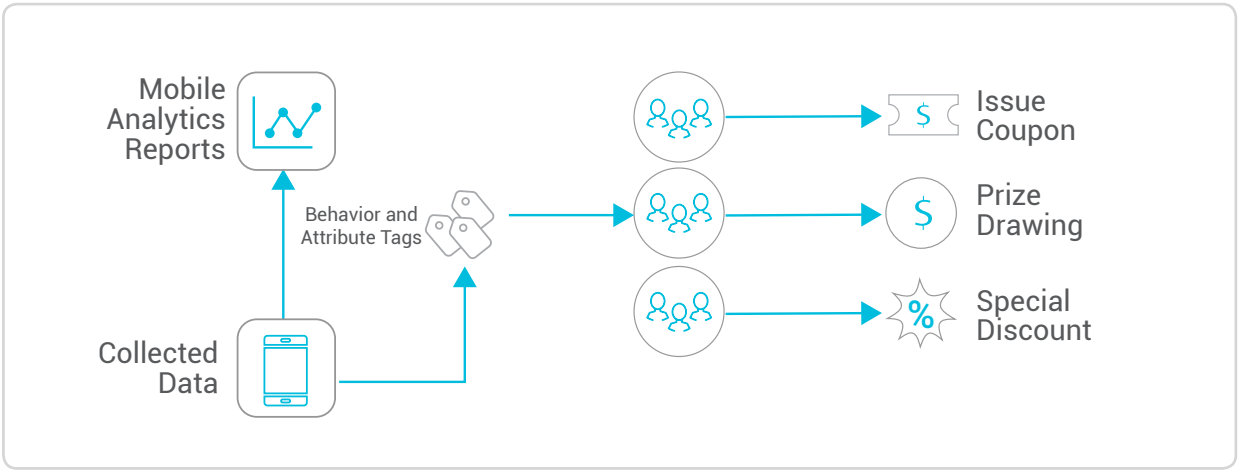
- Activate Mobile Analytics and integrate necessary SDKs after creating the app.
- On the Mobile Analytics console, click "Log Analysis" to sync data to Data IDE platform.
- On Data IDE platform, developers can integrate their own data for big data processing and analysis.

Products Used

Mobile Analytics, Data IDE, MaxCompute

2. Targeted Mobile Marketing

In targeted mobile marketing, you can pre-define user profiles and visualize user stratification based on previous analysis to allocate certain behavior or attribute tags to a similar group of users. Developers can quickly implement targeted marketing and perform precise traffic operations to increase user loyalty and put the data to use. For example, you can tag users who visit your website frequently but do not make any transactions above a certain limit and offer them exclusive discounts to encourage purchasing.



Simple Procedure

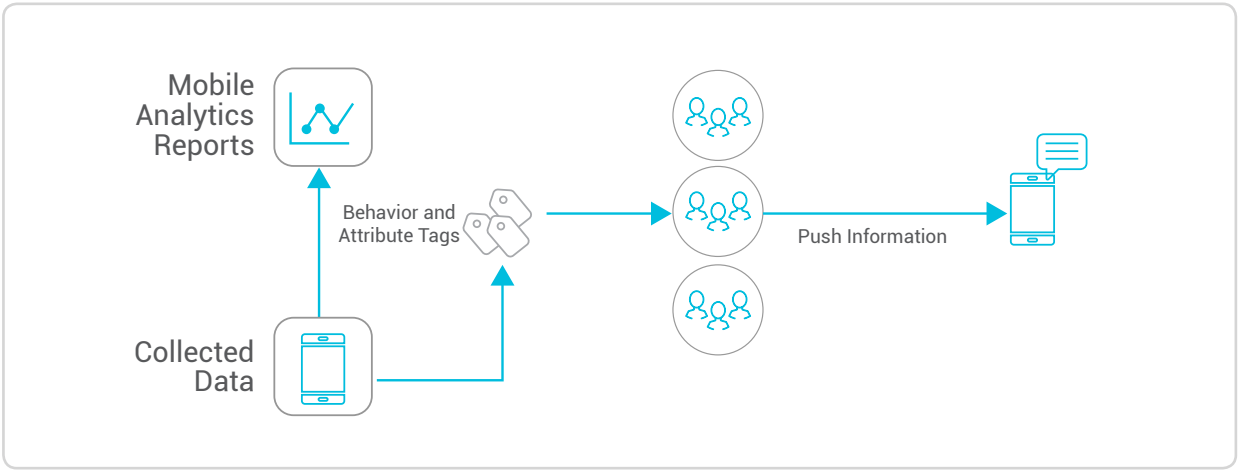
- Activate Mobile Analytics and integrate necessary SDKs after creating an app.
- On the Mobile Analytics console, click "Data Application" to go to "Targeted Marketing."
- In the Targeted Marketing and User Group selection, developers can release content based on their own operation background.

Products Used

Mobile Analytics, Rule Engine

3. Smart Push

Developers can use pre-defined terminal and user tags to precisely select fine-grained groups to send the right content to the right people at the right time, thereby boosting user activity.



Simple Procedure

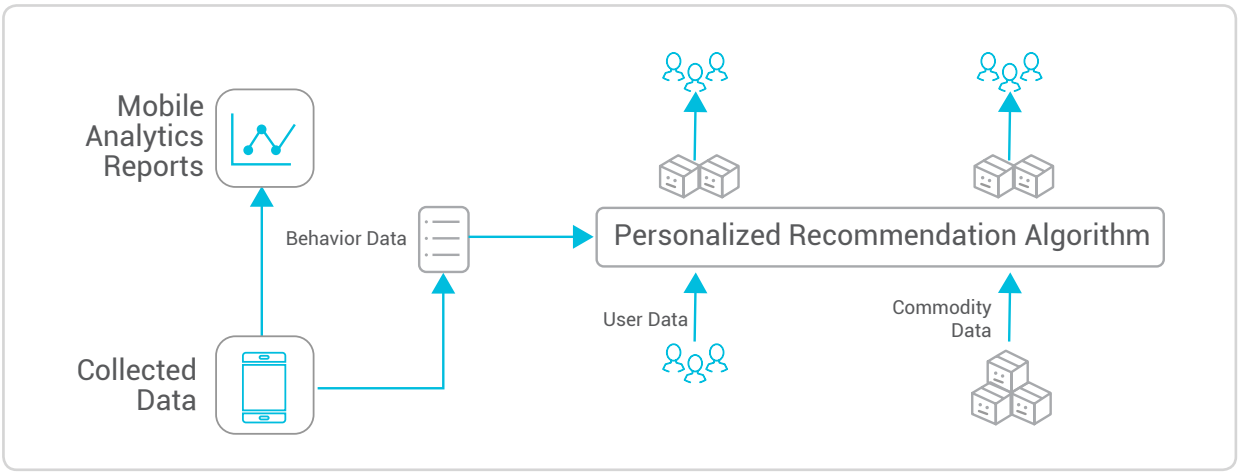
- Activate Mobile Analytics and Alibaba Cloud Mobile Push at the same time; integrate necessary SDKs after creating app.
- In Alibaba Cloud Mobile Push, use tags to select relevant groups and send push content.

Products Used

Mobile Analytics, Alibaba Cloud Mobile Push

4. Personalized Recommendations

This application integrates user behavior, item, and user-data to predict real-time recommendations. This allows you to implement an item display logic that shows personalized ads to users to rapidly optimize the product experience and increase user activity and conversion rates.



Simple Procedure

- Activate Mobile Analytics: Integrate necessary SDKs after creating app.
- On the Mobile Analytics Console, click "Log Analysis" to sync user behavior data to Data IDE platform.
- Activate RecEng service and prepare behavior, user, and item data on Data IDE platform to create your own recommendation service.

Products Used

Mobile Analytics, RecEng

Introduction About Related Products

- MaxCompute (formerly known as ODPS) is a fast and fully hosted TB/PB-level data warehousing solution. MaxCompute provides comprehensive data import solutions and a variety of typical distributed computing models that enable you to speed up massive data computing, effectively reduce costs, and ensure data security.
- Rule Engine is an online service used to solve the problem of frequent changes in business rules. This service helps you to separate business rules from application program codes by flexibly compiling business rules using simple combinations of predefined conditional factors and making business decisions based on business rules. The Rule Engine provides a set of efficient and easy-to-use APIs, coupled with a simple and easy-to-use rule configuration interface, allowing rapid integration with business systems. The engine can be used for targeted marketing, IoT smart homes, smart buildings, scheduling, control, dispatching, and other scenarios.
- Alibaba Cloud Mobile Push is a big data-based mobile cloud service. The service enables apps to integrate Alibaba Cloud Mobile Push functions quickly. While allowing apps to implement efficient, precise, and real-time mobile pushing, it also significantly reduces development costs. This allows developers to connect with users in the most effective way, increasing user activity and app retention rates.

- The RecEng provides a wide variety of standard recommendation algorithms with targeted solutions for users in different data situations, helping them to implement data collection and process recommended algorithms and output APIs. Without any customization operations, you can simply make selections on the product interface and configure an algorithm flow. You can allocate traffic between different recommendation algorithms to compare their respective recommendation conversion rates. You can accurately predict the recommended products for users in real-time by selecting the best algorithms.

6.4 Mobile Cloud Acceleration

Companies need to improve upon their mobile applications and deliver content with an improved end-to-end quality of service. Most mobile developers have no systematic performance monitoring system. Therefore, they have no way of knowing when a mobile service encounters a local fault and cannot quickly locate and respond to the fault.

6.4.1 Challenges

For businesses of all sizes, it is essential to maintain an excellent mobile app performance to meet user expectations. With new devices constantly being released into the market, apps need to be developed to ensure unrivalled user experience. There are many mobile network end-user scenarios due to different device models, resolutions, and network standards. It becomes difficult to maintain a quality user experience due to fluctuating bandwidth on mobile devices. This leads to certain latency issues and delays in mobile websites and applications. Also, the majority of apps lack optimized environment configuration as well as content and storage resources. This causes inefficiency and a waste of bandwidth.

6.4.2 Mobile Cloud Acceleration Solution by Alibaba Cloud

As a specialized cloud service of Alibaba Cloud tailored for mobile developers, the Mobile Cloud Acceleration Solution is designed to help developers establish comprehensive performance monitoring systems and performance data baselines. The ultimate goal is to optimize basic network performance and improve app communication quality and efficiency over mobile networks to deliver a premium experience for end users.

Powered by Alibaba Cloud's access edge nodes, massive network bandwidth, and other superior infrastructure resources, the solution provides developers with fast and stable network access capabilities and significantly enhances app availability. Alibaba Cloud CDN accelerates transmitted content before it reaches mobile terminals. This reduces overall latency and enhances user experience.

This solution offers four layers of optimization: protocol, link, content, and carrier.

1. Protocol Optimization

Alibaba Cloud uses in-depth protocol optimization techniques to ensure low latency during data transmissions and accelerates user response time. Since data is transmitted through the TCP channel, the Nagle algorithm is used to concatenate small messages and send them as one to prevent increasing packet size of individual small messages.

SPDY protocol is used to divide a message into multiple chunks and send it across multiple connections to minimize latency. SPDY also allows request header compression to define request priorities for more important messages to be transmitted first. Wireless Head of Line (HOL) scheduling algorithms are implemented to optimize the throughput because it does not have any dependency on the arrival traffic. The HOL algorithms are easier and more practical to implement and are superior to other scheduling algorithms.

2. Link Optimization

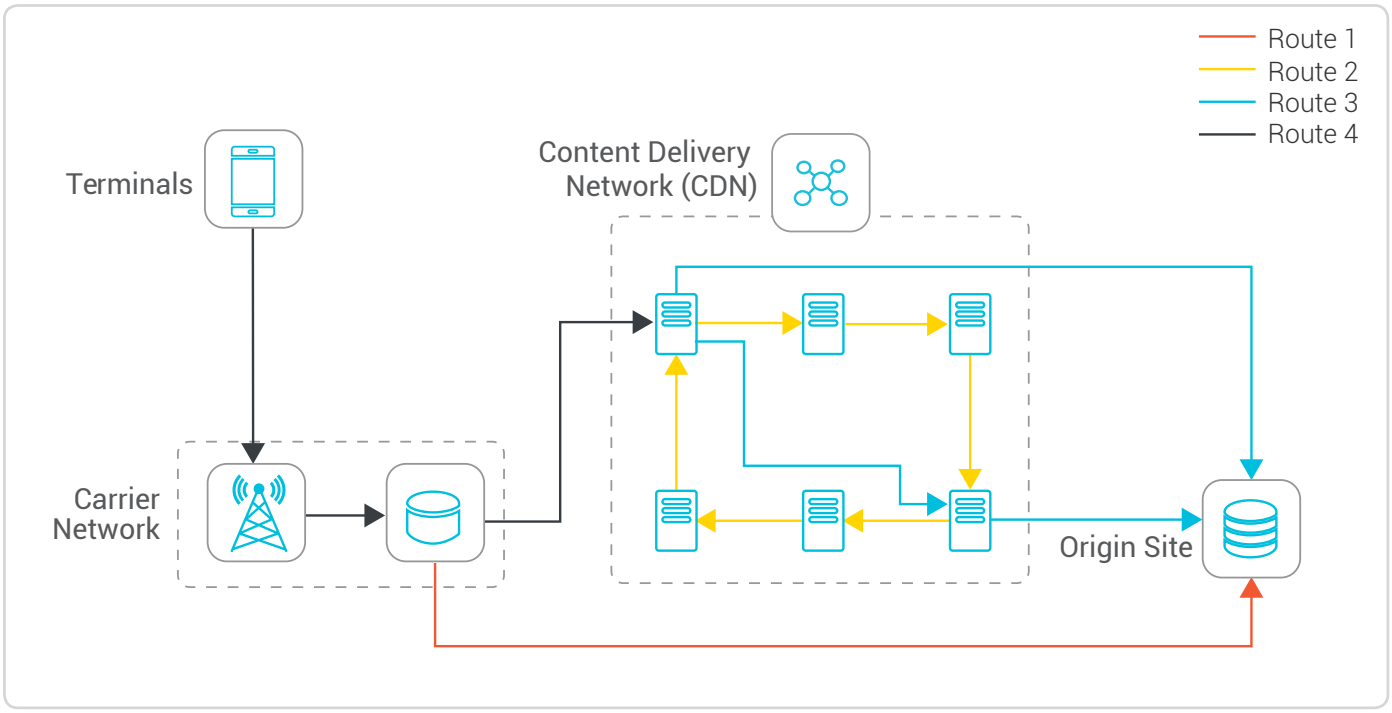
A web request originates from a user and travels to the acceleration nodes of the CDN via various edge centers and sends a response back to the user. The CDN nodes refresh content available on each node by obtaining data from the origin site based on defined caching policies. The network link between the mobile device and CDN is governed by bandwidth limitations of the mobile network provider. However, the CDN communicates to the origin site via a high-speed network for the latest content to be fetched in minimal time.

1. Integrates Alibaba Cloud's smart mobile resolution product called, HTTPDNS, for smart routing
2. Provides accelerated access
3. Utilizes CDN resources for hotspot content caching, dynamic routing, and dynamic link acceleration between access nodes/ECS

3. Content Optimization

For transmission of large images over 2G environments, users face numerous issues. Even after compression, the quality of the images can deteriorate.

1. Utilizes CDN to streamline web content
2. Reduces network transmission volumes
3. Performs CSS and JS optimization
4. Optimizes image requests and adapts to multiple terminals
5. Improves user experience on different terminals
6. Provides smart gzip, and optimizes mobile content



4. Carrier Optimization

In cooperation with domestic carriers, Alibaba Cloud can perform link optimization based on network topologies of different carriers in order to quickly separate content.

Advantages

1. Accelerates content and app's availability
2. Offered at extremely low access costs
3. SDK APIs replicate system's native interfaces
4. Easy to use
5. Developers only need to change a few lines of code to access acceleration service

07 Conclusion

Mobility is seen and conceived as a business enabler designed to exceed expectations from customers and employees and improve business productivity. However, businesses need to understand both the challenges and advantages, such as mobile security and analytics, to maximize opportunities now and in the future.

Using Alibaba Cloud Mobile Solutions you can keep your business at the forefront of the mobility revolution and focus more on your business rather than managing the backend infrastructure and security of your application.

Learn more about Alibaba Cloud Mobile Solutions**.**

Alibaba Cloud