E-commerce on the Cloud

Helping E-commerce Companies Focus on Sales

Contents

01 Introduction

E-commerce is booming around the globe following rapid advances in technology, online payments and changes in consumer behavior. As a result, entrepreneurs, suppliers, brands and investors are avid to make their mark and stake their claim in the online retail space. The growing number of entrants to the e-commerce industry is naturally leading to intense online competition. With the stakes as high as ever, it has become imperative for businesses to develop sophisticated strategies to attract and retain customers.

Startups, SMEs and large enterprises all face unique challenges in regards to IT infrastructure, and especially as business expands. E-commerce operators must strive to maintain a stable IT infrastructure while keeping costs down with cost-efficient, highly available and stable infrastructure.

This whitepaper caters to top enterprise leaders, CTOs, project managers and entrepreneurs embarking on their journey into the e-commerce space. This paper summarizes different e-commerce business scenarios and shares recommendations/best practices using cloud solutions.

02 The Rampant Growth of E-commerce

The past few years have brought remarkable changes to the e-commerce industry. The embrace of technology not just by e-commerce providers, but by consumers and suppliers has overseen a dramatic rise in growth and trust in e-commerce. Barriers to entry have also fallen following the introduction of turnkey solutions and micro e-commerce platform building tools, including Shopify and WooCommerce.

Established physical retailers are increasingly stepping into the online arena as well, and existing online platforms are expanding into new geographical regions. Businesses of all sizes are now able to reach a global audience and provide customers with a broader range of products and services.

Given that there is growing international competition, businesses are establishing competitive benchmarks through the expansion of distribution channels and the offering of exceptional deals and discounts on products. While keeping a pace with a hyper-competitive pricing environment, e-commerce businesses also need to focus on their business operations. Due to intense pressure to manage customer enquiries, collect payments and dispatch orders, businesses must adapt quickly and develop impeccable backend infrastructure to handle growing demands. Companies also need to plan their growth strategy in advance and focus on the customer experience, while ensuring the security and privacy of customer data, and protecting against illegitimate transactions.

 The subsequent section covers challenges faced by enterprises operating on traditional infrastructure and how a "cloud-shift" can make all the difference.

03 Traditional Solutions vs. Cloud Solutions for E-commerce

Given the nature of the Internet, online companies must adapt quickly to changing trends in order to stay afloat. Companies that still rely on traditional e-commerce architecture face additional challenges compared to companies already deployed on the cloud. These challenges include:

1. Cost of Infrastructure

Hosting on traditional infrastructure requires physical servers typically located at an on-premise location. Provisioning traditional infrastructure is also both expensive and difficult to scale as the business grows.

Hosting on the cloud eliminates both of these challenges. By hosting your e-commerce website or web application on cloud infrastructure provided by a public cloud provider, you can avoid the upfront cost of provisioning expensive equipment, and pay only for the resources you use.

2. Operation & Maintenance

For traditional e-commerce companies, the Operation & Maintenance of infrastructure, including load balancing and scaling, can also be expensive and complicated to manage. Fixed resources must be allocated to manage traditional infrastructure and react to fluctuating levels of web traffic and other web demands.

Hosting on the cloud on the other hand allows companies to schedule automated infrastructure updates and maintenance. This significantly cuts down the need for human resources in Operations & Maintenance. Striking an equilibrium between over-provisioning and under-provisioning of resources for Operations & Maintenance can result in an efficient allocation of company resources.

3. Traffic Predictions

The nature of the global Internet inherently leads to unpredictable fluctuations in web traffic. E-commerce operators typically find that they have insufficient IT resources during peak periods and excess resources during troughs. This diverts the focus from application development and optimization to managing website loads.

However, auto scaling on the cloud allows businesses to synchronize resources with actual demand. Businesses can scale dozens or hundreds of servers at a time to meet demand and scale down performance during low traffic periods.

4. Cyber Attack Vulnerabilities

As online payments and customer data are tightly intertwined, e-commerce websites tend to be more vulnerable to cyber attacks and have higher security needs.

Cloud security services provide advanced and regularly updated defensive systems to protect against new DDoS and other malicious attacks.

The following section outlines e-commerce cloud solutions available in the market and introduces the e-commerce solutions offered by Alibaba Cloud.

04 Cloud E-commerce Solutions

E-commerce cloud solutions are a suite of cloud computing and big data services that help enterprises build and run their own e-commerce platform. Drawing on the power of the cloud, e-commerce companies can respond to fluctuating traffic, scale their operations and reduce their operational costs.

Although there are a number of cloud providers out there in the market, there's no questioning Alibaba Cloud's expertise and experience when it comes to e-commerce.

Alibaba Cloud powers a range of mega sized e-commerce platforms for Alibaba, and also oversees the infrastructure requirements for Alibaba's Single's Day. The annual Single's Day or Double 11 sales festival is the world's largest online shopping festival. In 2016, the online event recorded up to 175,000 transactions per second during peak periods. Alibaba Cloud was also able to provide uninterrupted service throughout the event and processed 1.98 million computation jobs using a cloud batch-data processing platform.

The advanced cloud technology protecting and powering Alibaba can be accessed via Alibaba Cloud's E-commerce Solutions. Users can quickly build their own e-commerce platform, reduce Operational & Management costs, cope with high business concurrency, and strengthen their layered security protection via an e-commerce solution. Through the integration of this service, along with Alibaba Cloud's big data capabilities, customers can quickly develop applications, process massive data sets and form insightful business decisions.

The subsequent section covers three scenarios based on small, medium and large e-commerce businesses, their changing needs, and discusses how Alibaba Cloud E-commerce Solutions can address such challenges.

Alibaba Cloud

# 05 Evolving Demands/Needs and Alibaba Cloud Recommended Solutions

5.1 Small Businesses and Startups

Each day there are many small companies and startups launching their e-commerce operations. Backed by venture capital or private savings, these businesses seek out to build innovative and user-friendly platforms. What they also require is a secure and scalable infrastructure, and at minimal cost.

5.1.1 Common needs and challenges:

1. Basic web hosting service to host their platform

2. Scalable infrastructure to handle traffic: 1,000 to 10,000 page views/day

3. Efficient database systems to handle order volume: up to 1,000 orders/day

4. Minimal upfront costs

5. Convenient Operations & Maintenance services

5.1.2 Recommended Alibaba Cloud Architecture Diagram for Small Businesses and Startups:
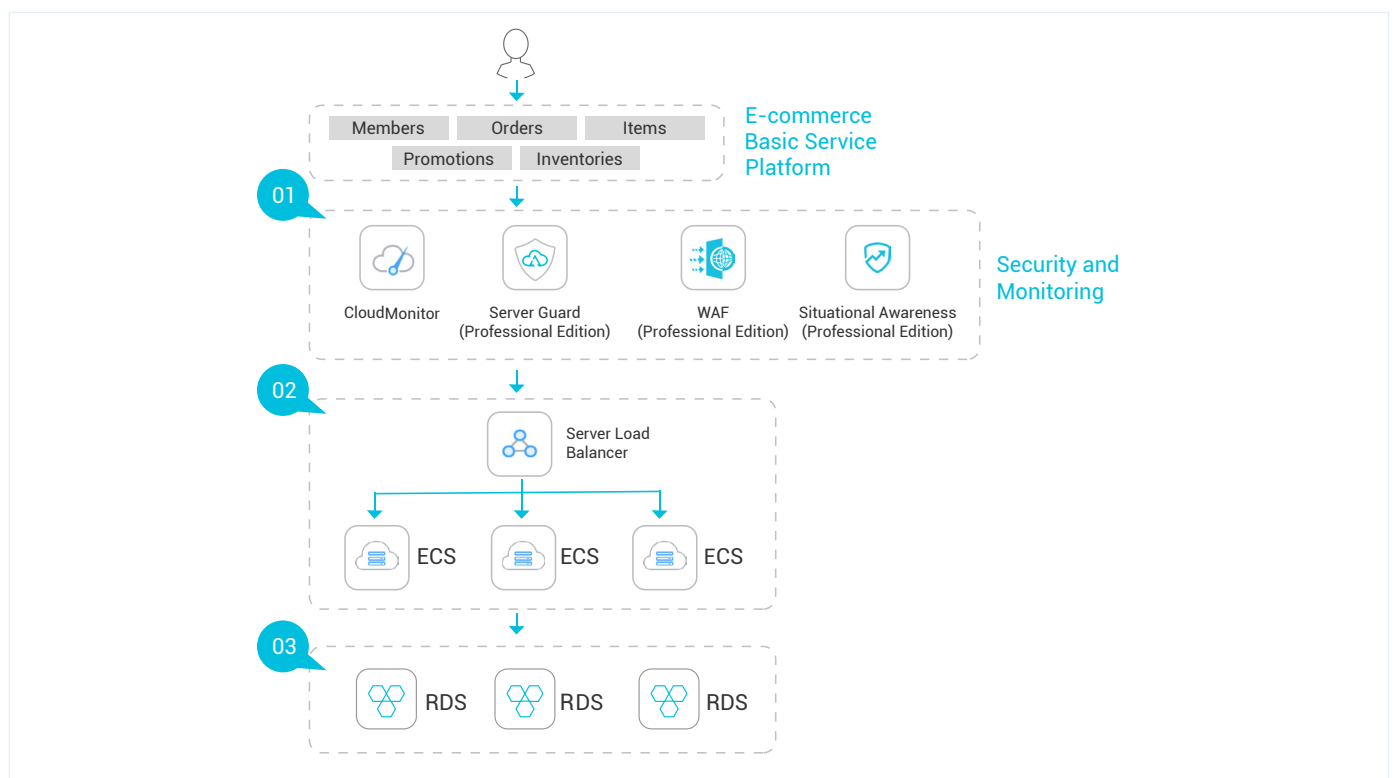
1. Alibaba Cloud Web Application Firewall (WAF) in combination with Server Guard and Situational Awareness ensure protection against common cyber-attacks including DDoS attacks. This includes providing intrusion prevention and security management for servers, and detecting potential intrusion and attack threats by using machine learning and data modelling. In addition, innovative server security solutions are included, so customers do not have to worry about security management.

CloudMonitor then monitors resources and Internet applications, detects service availability and sets alarms for metrics. CloudMonitor gives customers a comprehensive understanding of usage, performance and the operating status of their Alibaba Cloud resources.

2. Server Load Balancer eliminates any single-point-of-failure (SPOF) and ensures system stability during situations of high concurrency. This service dynamically scales ECS instances in response to changing business needs, to effectively deal with promotional activities and other traffic peaks.

3. Structured data is stored by Alibaba Cloud RDS (Relational Database Service). The active/standby RDS architecture prevents SPOFs in various task areas, including orders, inventories, promotions, and other core data items.

5.1.3 Recommended services:

QuickShield and Managed Server Security Service

5.1.4 Features of Alibaba Cloud Offerings for Small Businesses:

• Supports quick deployment of infrastructure through a user-friendly console, APIs, and SDKs

• Easy to use and integrate

• Ensured operational stability

• Minimal upfront costs and flexible payment models, including Pay-As-You-Go (highly suitable for startups)

• Convenient Operations & Maintenance, with 24/7 professional support from Alibaba Cloud

5.2 Mid-sized Enterprises

As small operators grow into mid-size e-commerce enterprises, they will need to ramp up their platform capacity and introduce additional features without compromising user functionality. Online business operations for a typical mid-sized enterprise may look something like this:

1. Average daily traffic: 10,000 to 100,000 page views

2. Order volume: 1,000-10,000 orders/day

5.2.1 Common needs and challenges:

1. Scalability Issues: Given the increase in visitors and transactions, this increased traffic volume needs to be handled via automated server provisioning. Also, as new features keep on being added, Auto Scaling is required.

2. Availability of Website: During major promotions, discount periods or festive seasons, e-commerce enterprises may experience a major increase in traffic. Even short downtime during such periods can significantly affect transactions and the user experience.

3. Management of Infrastructure: With business growth, backend infrastructure becomes more complex given the addition of individual modules (such as Customer Management Center and Order Management Center). The management and decoupling of multiple modules can be difficult to implement.

4. Increased Data Storage Needs: Companies need a reliable and scalable data storage service to address increasing storage requirements, especially during peak hours.

5. High Latency: During peak hours, users face lags or delays during transactions, which needs to be minimized.

6. Security Concerns: E-commerce websites are naturally prone to cyber-attacks, malicious logins, fraudulent or unauthorized transactions and pagejacking. This requires an effective security solution.

5.2.2 Recommended Alibaba Cloud Architecture Diagram for Mid-Size Enterprises:

1. Alibaba Cloud provides leading cyber security solutions and anti-fraud services to protect businesses against heavy traffic cyber-attacks, malicious order placement and scams. At the same time, Alibaba Cloud Anti-DDoS works with Alibaba Cloud CDN to ensure security and acceleration, thereby resolving core pain points for e-commerce companies.

2. Auto Scaling is a management service that automatically adjusts clients' elastic computing resources based on their business needs and policies. During promotional periods, e-commerce enterprises may experience major increases in traffic. This service dynamically scales ECS instances in response to changing business needs and effectively deals with promotional activities and other business peaks.

Server Load Balancer eliminates SPOFs and ensures system stability during high concurrency.

3. Distributed Message Service effectively deals with typical large-scale, high-reliability, high-concurrency e-commerce scenarios.

4. Structured data is stored by ApsaraDB for RDS. The active/standby RDS architecture also prevents SPOFs.

5. Object Storage Service (OSS) provides a high-volume cloud storage service that can be elastically scaled as required. It helps in processing massive volumes of images through image processing, audio and video transcoding, and other data processing capabilities. Additionally, it can be seamlessly integrated with CDN for accelerated content delivery.

6. To address latency issues, ApsaraDB for Redis provides online cache services, giving fast response to primary product data and other popular data.
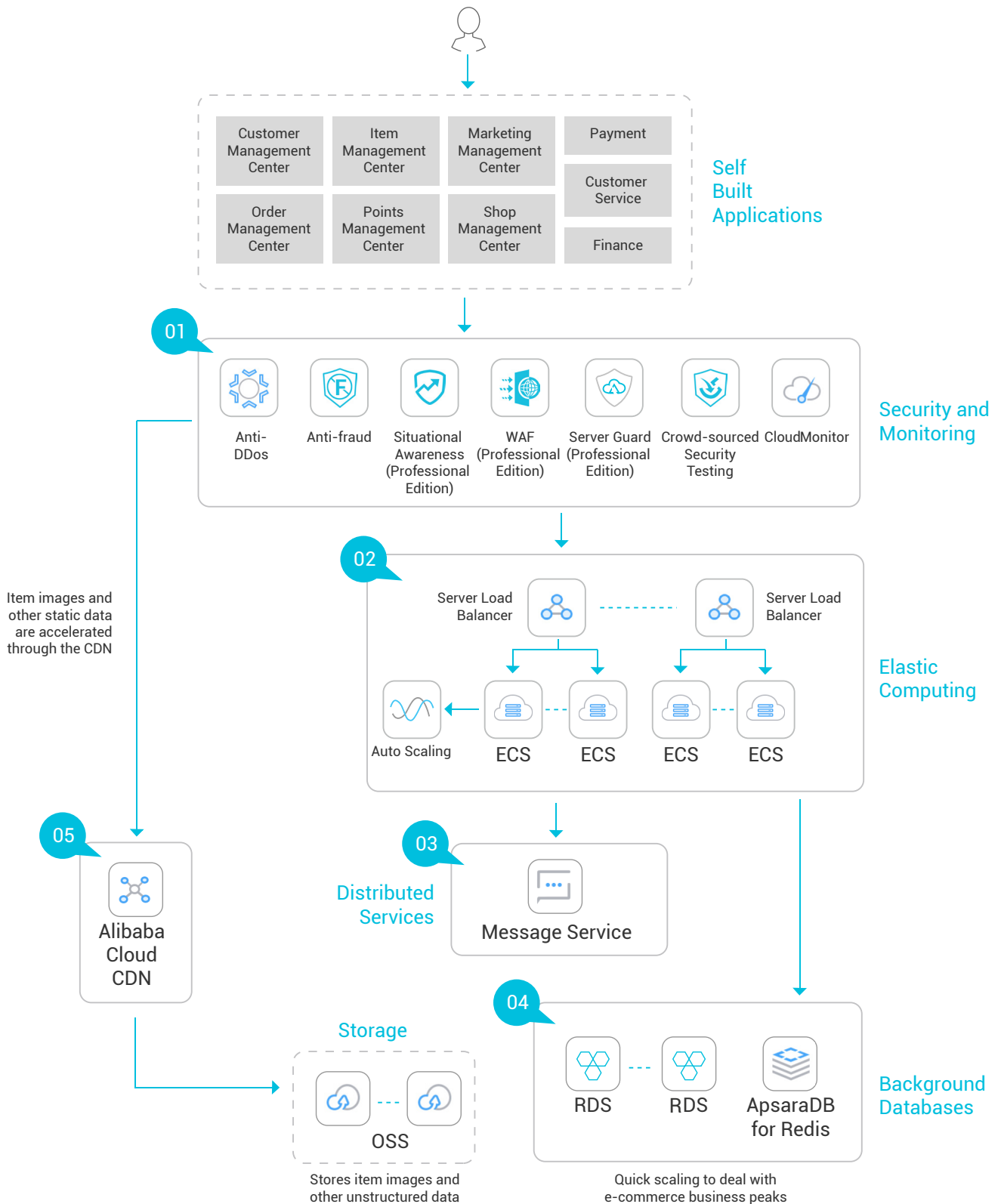
5.2.3 Features of Alibaba Cloud Offerings for Mid-size Enterprises:

• Automated scaling to handle peak traffic with Operation & Maintenance service

• SPOF elimination with multi-zone availability

• Easy management and decoupling of application modules

• Minimal latency through CDN

• Vertical scaling to address data expansion needs

• Highly secure infrastructure, and protection from cyber-attacks and fraudulent scams

5.3 Large Enterprises

Large enterprises require mature and stable architectures. This includes a special need for distributed services, container services, big data applications, and analytical tools to make data-driven business decisions. At the same time, a major concern with architects is how to enable and optimize technical architecture to support rapid business development.

5.3.1 Common needs and challenges:

1. **Zero Downtime:** Any downtime can hamper the user experience and affect the online transaction process and company's reputation.

2. **Advanced Analytical Capabilities:** Companies need to mine consumer insights to personalize the customer experience and strengthen business outcomes.

3. **Recommendations and Search Engine:** Advanced search and recommendation engines on websites are necessary to drive purchase and repurchase decisions.

4. **Security:** Established large e-commerce enterprises are prone to cyber-attacks and online fraud, including identity theft, pharming of websites, DDoS, and brute-force attacks.

5. **Scalability:** Need highly scalable infrastructure that can handle advertising, promotions and other business peaks.

6. **Disaster Recovery:** All services and applications should be recoverable and able to normally resume functionality in case of a failure.

5.3.2 Recommended Alibaba Cloud Architecture Diagram
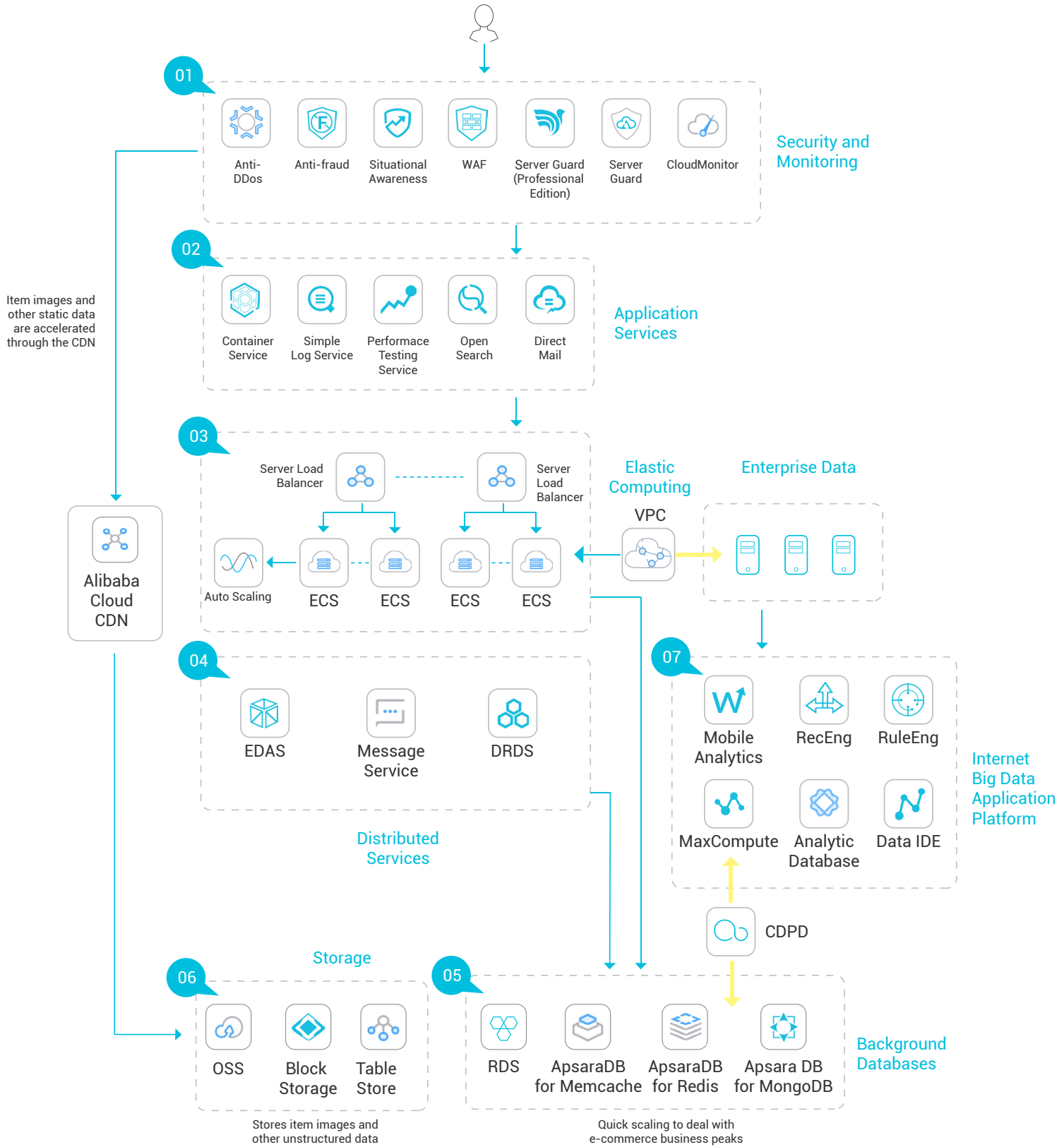
1. Complete protection from heavy traffic cyber-attacks, malicious order placement and scams are ensured through effective cyber security solutions and anti-fraud service.

2. Application services such as Container Service for hosting micro service architecture, Simple Log Service for centralized log management, Performance Testing for website load testing, and OpenSearch to develop search engines cater to different needs for e-commerce enterprises.

3. To process a massive amount of data generated by e-commerce businesses, Alibaba Cloud provides efficient big data analytical capabilities and processing tools based on Alibaba Group's own business practices. This architecture includes services such as AnalyticDB, MaxCompute, and MobileAnalytics for seamless functioning of big data workloads. All computations run in the sandbox to ensure high security and data reliability. These services eliminate the overhead of manual management of resources and reduce the costs of implementing data warehousing and business intelligence.

4. Server Load Balancer eliminates SPOFs and ensures system stability during high concurrency.

5. A Virtual Private Cloud (VPC) helps e-commerce enterprises construct isolated network environments based on Alibaba Cloud.

6. EDAS helps e-commerce enterprises build and host distributed application service systems. DRDS can achieve extensive database resizing.

7. Structured data is stored by RDS and protects against SPOFs through RDS' active/standby architecture. ApsaraDB for Redis provides online storage services, giving fast response to primary product data and other popular data.

5.3.3 Features of Alibaba Cloud Offerings:

1. Zero downtime with multi-availability zones

2. Advanced big data capabilities and processing tools with intelligent Operation & Maintenance services

3. In-built capabilities and tools such as RecEng to develop and customize recommendations and search engines required for e-commerce platforms

4. Suite of security and anti-fraud services suitable for large e-commerce websites

5. Automated scaling to handle massive and fluctuating traffic volume

6. Easy orchestration of micro services

7. Accelerated website, ensured minimum latency and support for global expansion

06 Common E-commerce Business Scenarios

6.1 Seckilling or "Second Killing"

E-commerce companies such as Taobao.com have come up with a new term called "Seckilling", where customers bid to buy newly advertised products within seconds in order to enjoy discounted prices. During Seckilling promotions, TPS/QPS generally reaches thousands of consumers. Companies strive to maintain high availability and smooth functioning of their systems to eliminate latency for incoming queries.

For a 30 second promotion during major events such as the New Year Gala, if the system goes down for even two seconds, this can dramatically affect sales. Any delay, short or long, can have an adverse effect on the user experience and lead to losses in foregone revenue. High concurrency scenarios often produce request response delays. Therefore, a robust and scalable backend architecture is needed to handle the extremely high access traffic volume.

Solution: Companies can switch to a reliable scaling service that can handle fluctuating traffic demands and scale up servers as traffic grows. If your site is hosted on a physical data center, there is also a need to keep servers in standby mode to manage oscillating traffic.

To speed up the communication process, use cloud **messaging or queuing** services or RabbitMQ to implement asynchronous decoupling between services and improve system response speed. To enhance the performance of a website, **CDN** can be used to deliver static pages and scripts. This pushes the content before the event starts, thereby increasing system response speed.

6.2 Oscillating Traffic/Scalability

Website traffic on e-commerce platforms can be unpredictable, as it can scale exponentially at the time of a sale or discount period, such as Cyber Monday, and fall during normal periods. For startups in their initial stages with a website receiving low volume traffic, this can be handled by basic web hosting. As and when the traffic increases, websites will need to respond to growing traffic demands.

Solution: To cope with traffic needs, you can keep a fleet of servers in standby mode. You can also write scripts to automatically provision server and scale the infrastructure horizontally. For significant traffic peaks and oscillating traffic, you can utilize scaling services from cloud providers like Alibaba Cloud **Auto Scaling**, which automatically provisions additional servers as and when the business load increases.

6.3 Need for Web Acceleration

If your website is receiving traffic from geographically distributed areas while hosting in a particular region, visitors face a number of latency issues that impact load speed, cause video buffering, and interrupt online payments. This, in turn, can cause users to leave your site and affect sales.

For scenarios where your website requires on-demand audio/video streaming or large file downloads (such as installation package downloads), content acceleration is a must.

Solutions: A CDN can be used to accelerate your website response time. If your website has a large number of static resources, you can separate the static content from dynamic content and use a CDN to store and deliver static content. This will effectively accelerate content loading, making it easy to deliver images, short videos, and similar website content to users in dispersed geographic regions.

6.4 Cyber Attack Protection

[According to a PwC report,](#) "90% of large organisations and 74% of small businesses reported that they had suffered a security breach in the last year." While DDoS attacks can paralyze websites, brute force attacks can decrypt your authentication credentials. SQL injection attacks are another type of attack that abuse the application's interaction with the backend database server and extract information. These attacks modify existing database queries by leveraging non-validated inputs and achieve unintended results.

Solutions: To tackle security issues and prevent cyber-attacks, companies need to take preventive measures to protect their sensitive data from potential security threats. They can either look for a third-party security provider or leverage security products from their cloud provider, such as [Anti-DDoS](#) and [Mobile Security](#). Such products protect against brute force attacks, methods like two-factor authentication and certificate-based authentication should be used.

For brute-force cracking and similar behaviors, companies can summarize and analyze all plug-in data in real-time via a cloud processing center such as Server Guard offered by Alibaba Cloud. It detects any possible chances of brute-force cracking and immediately blocks the malicious IP to ensure that server passwords cannot be cracked by hackers.

6.5 Data Backup

Data is the key to any business. For e-commerce operators, data is an important asset as it impacts their overall reputation and the customer lifecycle. E-commerce operators need to store and backup enormous amounts of data

while tracking intricate activities ranging from customer details to customer purchasing history and buying preferences. Maintaining a manual backup of your traditional servers becomes difficult and time-consuming, and can lead to data loss. Data loss can be devastating to a company's reputation, as it leads to unfulfilled orders and dissatisfied customers.

Solution: Companies need to have robust backup and restore plans in place to secure their business-critical data. Below are two ways to backup your website.

1. **Static Data Backups**: To store static files while cutting costs, companies can remotely store data, such as log files, backup files, and packaged files using storage services, including Alibaba Cloud OSS.

2. **Database Backups**: Companies can leverage automatic backup policies provided by cloud database services such as Alibaba Cloud RDS. To achieve these backups, one can write automation scripts to be run at particular time intervals and keep the backups in a remote location.

6.6 Recommendation and Search Engines

We are leaving the age of information and entering the age of recommendation.

Every e-commerce business needs an efficient product search and recommendation engine. Search engines connect users to the right items from an extensive and dynamic product catalog, and recommendation engines show relevant suggestions to site visitors. Every search and recommendation system involves complex algorithms and relationship discovery techniques.

In-house development of such systems requires hefty investment in terms of both time and labor. To implement such capabilities into your e-commerce website, hosting and management of the embedded recommendation system and search server will need to be addressed. As product catalogs change frequently, companies need a dynamic, yet scalable solution to handle significant amounts of data while maintaining relevancy during the search process.

Solutions: There are several search and recommendation solutions available on the market. Retailers can quickly get started with product recommendations and save an enormous amount of time and internal resources. In addition, enterprises can customize personalized search and recommendation algorithms to help achieve their specific business goals.

Alibaba Cloud offers **OpenSearch** to build search engines, and **RecEng** can be used in combination with other big data services to build a customized recommendation engine.

07 Conclusion

With the e-commerce industry evolving faster than the speed of light, e-commerce leaders need to keep a pace with blazing changes, survive, and ultimately stay ahead. This calls for scalable IT infrastructure to strengthen business and drive precision like focus on sales and the customer experience.

Alibaba Cloud has an acute understanding of the e-commerce industry and offers mature cloud computing solutions to create, power, and safeguard your own e-commerce ecosystem.

Be it the high-security needs of all e-commerce enterprises or advanced features such as intelligent recommendation engines, Alibaba Cloud provides a comprehensive and in-depth solution to address all requirements to power your e-commerce platform. Moreover, big-data capabilities and quick tools such as RecEng or OpenSearch evolve with your specific business requirements and help you in analyzing, optimizing and personalizing the user experience through advanced search and recommendation algorithms. Now has never been a better time for e-commerce companies to adopt cloud technologies, to power their e-commerce operations and scale their business globally.

Learn more and get started with **Alibaba Cloud E-commerce Solutions**.