

Bank Load Balancing Scheme

Load balancing technology, widely adopted to ensure business system continuity and scalability, is a common high-availability solution. With the advancement of "self-reliance," "controllability," and localization initiatives, Infosec has emerged as the leading domestic load balancing vendor within the banking industry.

According to the report from the internationally renowned consulting firm IDC, titled IDC China Quarterly ADC Tracker, InfoSec has consistently maintained the highest market share in China's banking industry among domestic application delivery brands from 2015 to the present.

To date, Infosec has successfully served over 200 banks, providing load balancing products and solutions for systems including Enterprise Service Bus (ESB), image streaming systems, data warehouses, management information systems, multi-data centers, and e-commerce platforms, ensuring secure, reliable, and stable system operation.

Enterprise Service Bus (ESB) Solution

▪ Demand Analysis

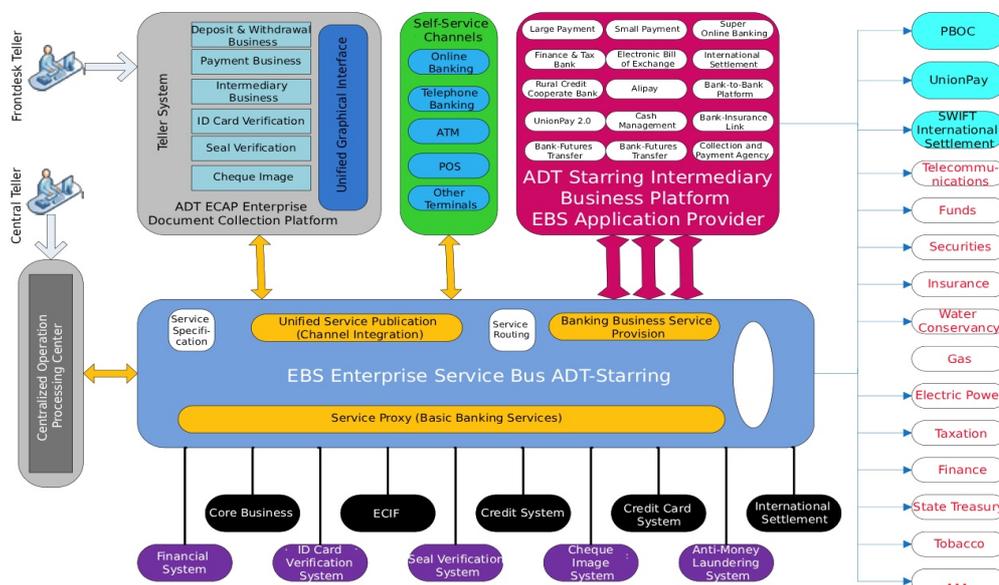
The current phase of banking system development constitutes the construction of an entirely new integrated system architecture, distinct from typical business product requirement projects. The new system must not only support business innovations such as customer expansion, channel extension, and processing model diversification, but also deliver robust performance in system operation, scalability, and new feature development. By applying advanced technological concepts, the overarching goal is to establish a specialized electronic banking system characterized by standardized omnichannel access, unified risk management, standardized transaction workflows, consistent customer experience standards, and centralized omnichannel backend support.

ESB, short for Enterprise Service Bus, is a product of integrating traditional middleware technology with XML and Web services. It serves as the fundamental connectivity hub within a network, forming an essential element in constructing an enterprise's neural system. The emergence of ESB has transformed traditional software architecture, offering a more cost-effective solution than conventional middleware products. Simultaneously, it bridges technical gaps between disparate applications, enabling coordinated operation among different application servers and facilitating communication and integration between diverse services.

The ESB system delivers integration technology to consolidate application resources, enabling information and resource sharing, optimizing business processes, and achieving cross-application information exchange and resource interoperability.

As the bank's unified application integration platform adhering to SOA principles, the ESB system facilitates the effective integration and utilization of applications, services, data, and existing resources. It supports rapid innovation for new business requirements and enables flexible future adjustments to existing transactions or additions of related systems.

• System Architecture



The next-generation online banking ESB platform project not only meets current requirements but is also designed to align with future development directions over the next five years, fulfilling future application and architectural demands. The system construction objectives are as follows:

- Based on the Enterprise Service Bus system, progressively establish a service-oriented architecture (SOA) IT application framework to ultimately achieve the IT strategic goal of comprehensively supporting and promoting business development;
- Adhere to design principles of flexibility, stability, security, and scalability. Employ parameterized and modularized technical approaches to enhance the flexibility and transparency of the bank's foundational IT architecture. This will reduce operational risks, simplify business operations, support product innovation and regionally tailored services, and strengthen IT's capacity to support business operations;
- Establish a standardized framework for banking financial services to support standardized and diversified services, rapidly meeting the personalized and multifaceted needs of all business operations. This will enhance the bank's market competitiveness and customer satisfaction.

• **Key features include:**

Built upon the unified, industry-leading, mature, and widely adopted Starring® technology platform, adhering to international SOA standards with extensive successful implementation experience. This ensures the efficient, stable, and scalable operation of the ESB system and all application systems, achieving the IT strategic goal of comprehensively supporting and driving business development;

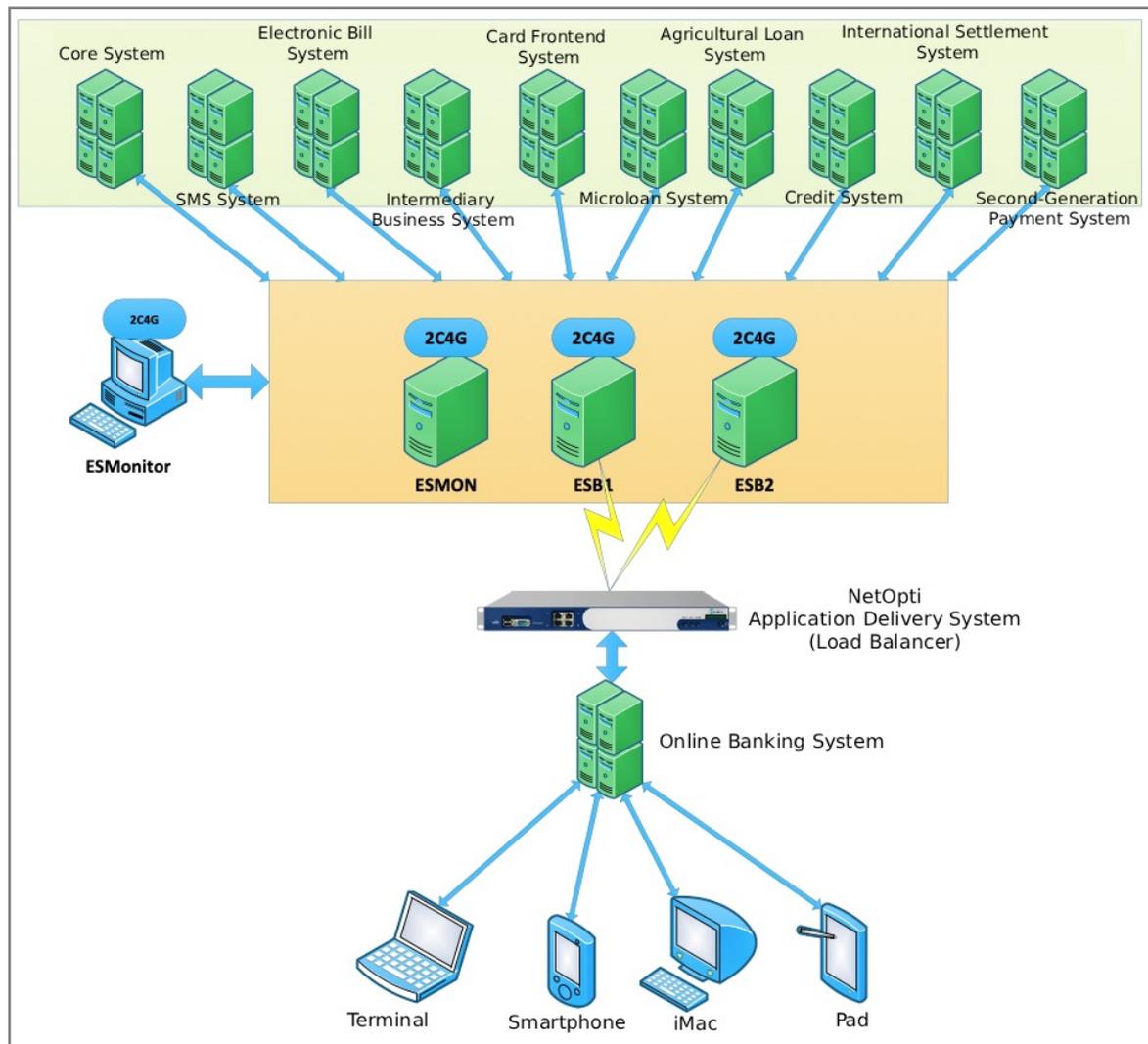
The product provides graphical, user-friendly secondary development tools and simulation testing tools. It implements the concepts of business productization and application layering, embedding core functional components into the base product. This enables rapid development of new business requirements while significantly reducing development workload and code volume through process-oriented and parameterized approaches. Pure code writing typically accounts for no more than 10% of the total workload.

To accommodate future business growth, the solution employs application clustering for flexible deployment and isolation mechanisms to minimize cross-application impact. The foundational platform's high-concurrency, high-efficiency processing capabilities effectively support continuous expansion of business scale and scope;

The solution provides comprehensive service quality management and log auditing mechanisms, featuring robust fault tolerance and recovery capabilities to ensure 24/7 uninterrupted, secure, and stable system operation;

Business product services are uniformly published via ESB, utilizing standard WebService specifications for system-to-system interfaces. This loose coupling enables flexible upgrades and replacements, with services being searchable, manageable, monitorable, and tunable, supporting seamless transition for subsequent business systems.

• Solution Description



Infosec Application Delivery System (Load Balancer) provides server load balancing support for the bank's ESB system. By forwarding services based on recognized service ports, it ensures the secure and stable operation of the ESB system.

Access Flow :

1. Users access the online banking system via terminals (computers, mobile devices, etc.).
2. The online banking system forwards user requests to the NetOpti Application Delivery System (Load Balancer).
3. The NetOpti Application Delivery System (Load Balancer) distributes user requests evenly and accurately to ESB application servers based on request content.
4. ESB application servers forward requests to corresponding core system hosts based on request content.
5. After processing by the core system host, the data packet returns along the original path.

Function Description:

1. Provides load balancing for ESB applications. Delivers load balancing across multiple ESB hosts and ports.
2. Performs health checks on ESB hosts to ensure user requests reach operational hosts.
3. Two Infosec NetOpti Application Delivery Systems (Load Balancer) operate under an HA mechanism, ensuring seamless failover to the other system when one experiences operational abnormalities.

▪ **Solution Advantages**

1. The Infosec NetOpti Application Delivery System (Load Balancer) endows the ESB application platform with intelligent judgment and emergency handling capabilities. Even if certain devices fail, the entire ESB application continues to function normally, guaranteeing high reliability.
2. Infosec's web acceleration algorithm significantly improves user access speeds.
3. Infosec's ESB system load balancing solution allows application servers to be taken offline or brought online as needed. This enables comprehensive equipment maintenance without impacting application systems, reducing operational risks and simplifying maintenance.

▪ **Success Cases**

Harbin Bank
Yingkou Bank

Multi-Data Center Application Delivery Solution

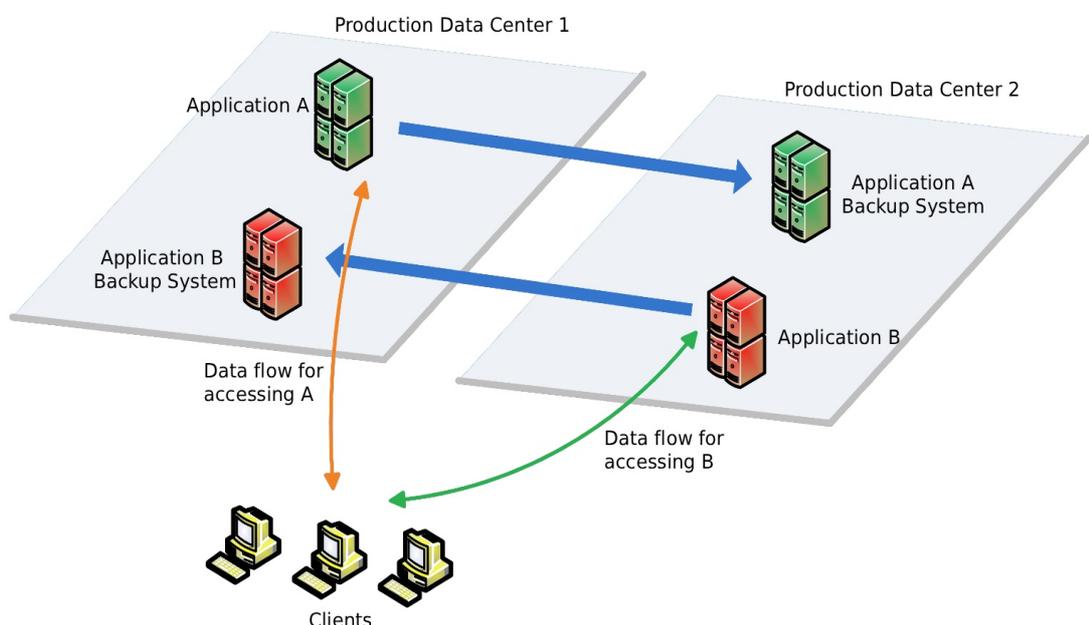
▪ Demand Analysis

With the rapid advancement of data centralization, banks have been establishing production data center facilities (commonly referred to as data centers) to centrally process transactions across various channels. These data centers bear the entire operational load, making their concurrent processing capacity and uninterrupted operation capabilities key indicators for evaluating a data center's maturity.

The 2010 “Guidelines for the Supervision of Commercial Bank Data Centers” issued by the China Banking Regulatory Commission (CBRC) introduced more explicit requirements for the construction levels of same-location and off-site disaster recovery centers for domestic commercial banks. Accordingly, nearly all nationwide joint-stock commercial banks (including the five major state-owned commercial banks, each with total assets exceeding one trillion yuan) must simultaneously operate both same-location and off-site disaster recovery centers.

A same-location dual-center model involves establishing two data centers within the same city or adjacent cities, each capable of independently supporting critical systems. These centers possess fundamentally equivalent business processing capabilities and synchronize data in real-time via high-speed links. Under normal conditions, they can simultaneously share the operation of business and management systems and perform operational switching. In the event of a disaster, they can execute emergency disaster recovery switching with minimal data loss, ensuring uninterrupted business continuity. Compared to off-site disaster recovery models, the same-city dual-center approach offers advantages including lower investment costs, faster deployment speed, relatively simpler operation and maintenance management, and higher reliability.

▪ Solution Architecture 1 - Application-Based Active/Standby Model



Solution 1 Description

- ✓ Both production centers must handle production workloads.
- ✓ Data replication technology synchronizes data between centers.
- ✓ User traffic is distributed across centers via business modules.
- ✓ During disasters, resources are dynamically allocated to the backup system based on required takeover methods.

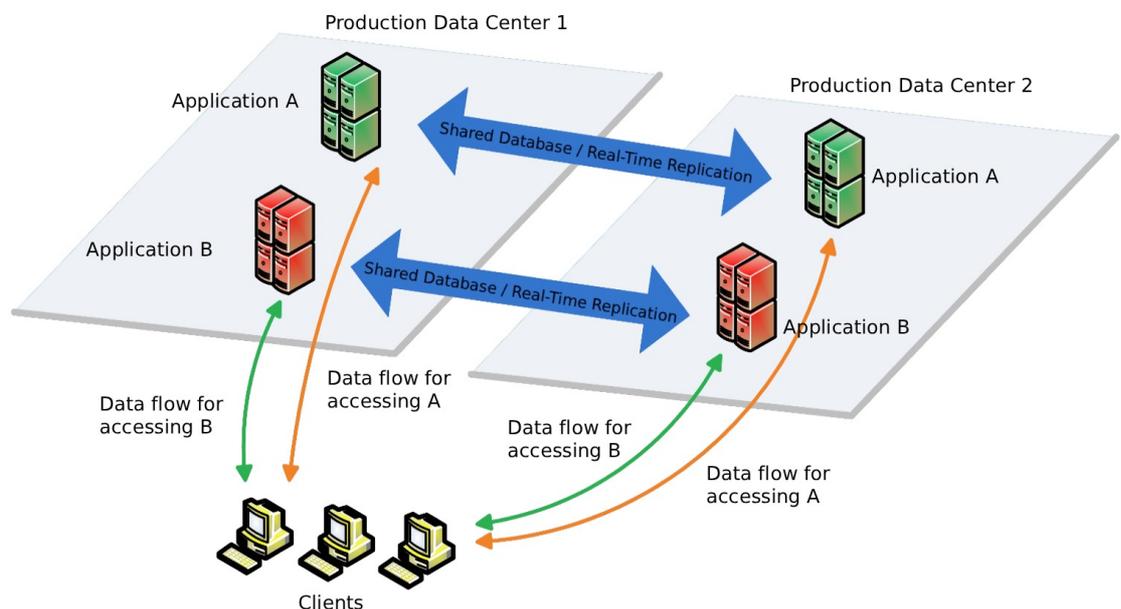
Solution 1 Advantages

- ✓ Primary and backup data centers are differentiated by role based on business type.
- ✓ Clear business traffic distribution.

Products Used in Solution 1

- ✓ NetOpti Application Delivery System (Load Balancer)

▪ Solution 2—Application-Based Active - Active Model



Solution 2 Description

- ✓ Businesses or users are distributed to each production data center.
- ✓ Each production center hosts its own application clusters for external services.
- ✓ Shared databases are established across both production centers.
- ✓ Data replication technology synchronizes data between centers.
- ✓ During disasters, the unaffected production center assumes all requests for designated applications as needed.
- ✓ All centers, hosts, and storage devices operate in production mode with load balancing.

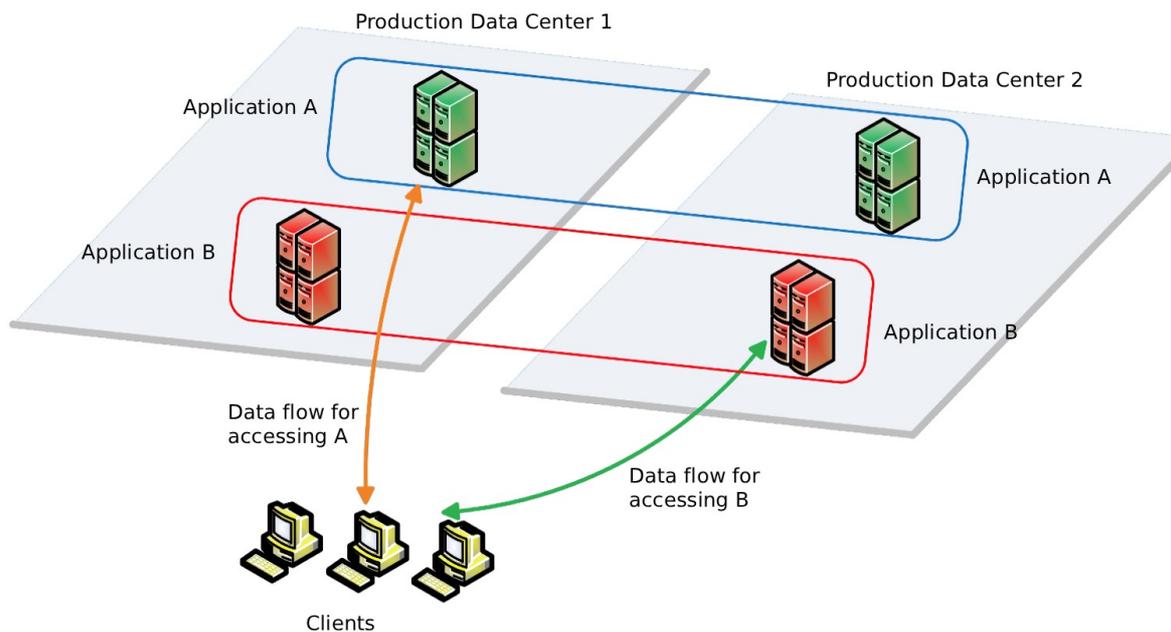
Advantages of Solution 2

- ✓ SDNS technology ensures controllable traffic flow between primary and backup data centers.
- ✓ Real-time synchronization of server load balancing between primary and backup data centers prevents session data loss.

Products Used in Solution 2

- ✓ NetOpti Application Delivery System (WAN Load Balancing)
- ✓ NetOpti Application Delivery System (Server Load Balancing)

▪ Solution Architecture 3—Dynamic Active-Active Model



7

Solution 3 Description

- ✓ Both production centers must handle production workloads.
- ✓ Workloads are distributed to different centers based on business modules or users.
- ✓ Primary processing capacity is allocated to production application systems during normal operations.
- ✓ During disasters, resources are dynamically scheduled for backup systems based on required takeover methods.

Advantages of Solution 3

- ✓ Server load balancing technology ensures controllable application server capacity across primary and backup data centers.
- ✓ Ensures backend application server operational status through health monitoring.
- ✓ Real-time monitoring of dual-center equipment status via native device diagnostics ensures synchronized session state.

Products Used in Solution 3

- ✓ NetOpti Application Delivery System (WAN Load Balancing)
- ✓ NetOpti Application Delivery System (Server Load Balancing)

▪ Success Cases

Huaxia Bank
Lanzhou Bank
Yingkou Bank

7

Load Balancing Solution for E-commerce Platforms

▪ Demand Analysis

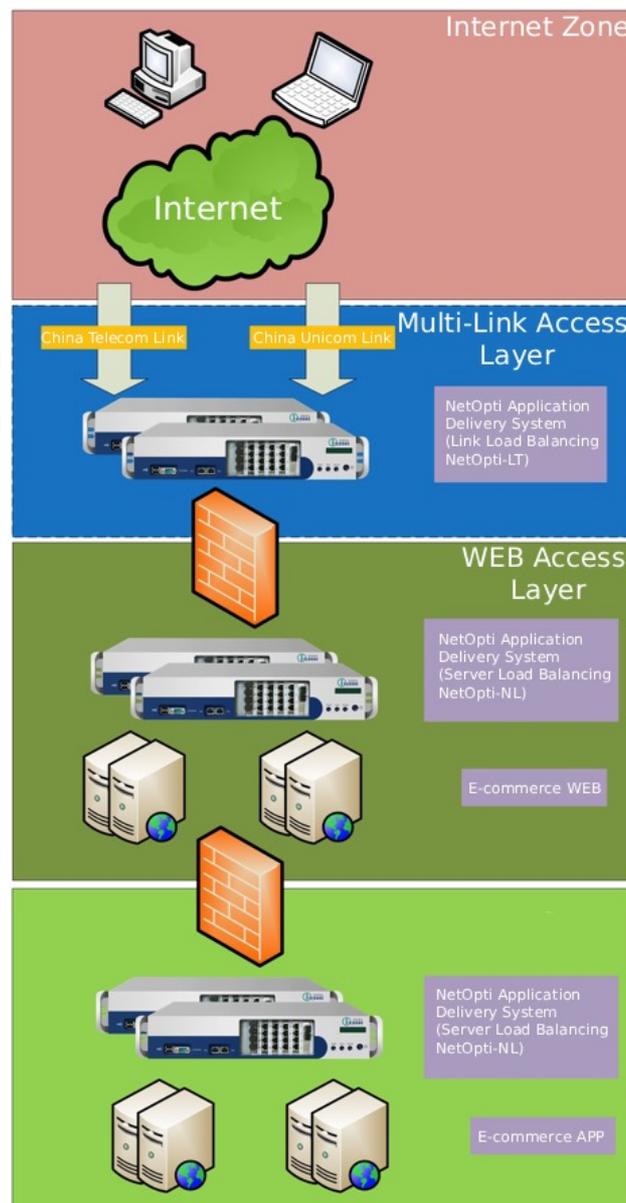
In recent years, with the continuous expansion of the internet and online product offerings, e-commerce platforms have entered a new phase of rapid development.

As user scale grows linearly and activities like “flash sales” are constantly introduced, ensuring the stable and efficient operation of e-commerce platforms to provide users with a high-quality, 24/7 online shopping environment has become an urgent issue for these platforms.

▪ Solution Architecture

Addressing the “round-the-clock,” high-efficiency, and stable operational characteristics of e-commerce platforms, Infosec recommends deploying link load balancing and server load balancing devices at the multi-link access layer, WEB access layer, and APP access layer respectively to optimize the overall e-commerce platform system architecture.

The solution architecture is as follows:



▪ Key Solution Products:

NetOpti Application Delivery System (Link Load Balancing NetOpti-LT):

Infosec's NetOpti Application Delivery System (Link Load Balancing NetOpti-LT) delivers professional link load balancing capabilities. It provides automatic routing selection across multiple links for network applications, ensuring balanced customer network traffic, prompt response to link failures, and seamless switching to operational links. This guarantees reliable service across the entire system.

NetOpti Application Delivery System (Server Load Balancing NetOpti-NL) :

Infosec's NetOpti Application Delivery System (Server Load Balancing NetOpti-NL) delivers professional server load balancing capabilities. It evenly distributes business traffic across application servers and rapidly bypasses failed servers, ensuring 24/7 uninterrupted, highly reliable service for the entire application system.

▪ Solution Description

The NetOpti Application Delivery System's (Load Balancer) “Smart DNS” feature for link load balancing distributes inbound traffic. When an ISP link fails, it can be bypassed rapidly. The system performs health checks on ISP gateways and multiple secondary primary servers, associating and combining them for more stable and reliable link status monitoring.

The NetOpti Application Delivery System's (Load Balancer) server load balancing supports L2-L7 application load distribution, featuring pre-configured load algorithms and policies that seamlessly accommodate diverse e-commerce platform scenarios. Multiple redundancy architectures for HA and clustering further ensure the system's high availability.

▪ Solution Advantages

Intelligent Link Selection: Users consistently access e-commerce platforms via the fastest available link for optimal performance.

“Never-Down” Services: The NetOpti Application Delivery System (Load Balancer) rapidly “isolates” failed servers and redirects requests to operational servers, simplifying application management and enhancing reliability.

“Highly Resilient” Platform: Through architectural optimization, e-commerce platforms can effortlessly handle explosive user growth by simply scaling server or virtual machine capacity.

“High-Speed” Experience: The application front-end acceleration feature of the NetOpti Application Delivery System (Load Balancer) boosts user access speeds to e-commerce platforms by 80%, delivering a superior shopping experience.



INFO HK SECURITY LIMITED
409 Kinetic Industrial Centre
7 Wang Kwong Road, Kowloon Bay
Hong Kong
www.infohsec.com.hk
info@infohsec.com



www.infosec.com.cn



www.infohsec.com