APPLICATION INFRASTRUCTURE

Description of the Application

Application infrastructure, comprised of application servers, web servers, and often database servers, is a core component in most network architectures. This part of the network infrastructure delivers high performance application services to the LAN as well as to employees, partners and customers on the WAN.

Some of the key functionality of application infrastructure includes transaction management, clustering, reliable application-to-application messaging, system management, advanced application development tools, proprietary access, and interoperability with legacy technologies. These devices allow organizations to integrate, manipulate and deliver data from a variety of backend solutions including databases, web-based applications, and web-enabled legacy applications.

Application infrastructure provides a powerful platform to support and extend a broad range of application services from small, task-oriented and limited scale applications, to large, advanced e-commerce transaction systems supporting thousands of users.

Challenges to the Application Type

As web-based and web-enabled applications become more sophisticated and more frequently employed, application infrastructure will play an increasingly significant role within the enterprise. However, because the application infrastructure plays such a key role in IT strategies, it also poses some significant challenges:

- **Network Performance** - Network efficiency is hampered when server resources are used to provide other networking tasks such as SSL (Secure Sockets Layer) encryption, authorization and compression. Software-based scalability, security, and connection solutions each dramatically reduce the overall performance of the application infrastructure. Not only does this reduction in performance require additional servers and expensive software licenses, it also increases deployment complexity, integration hassle and administrative overhead.

- **Bandwidth Consumption** - As enterprise applications and their content become more sophisticated and accessible, the risk of bandwidth consumption also increases. Application infrastructure increasingly must support a variety of IP applications such as voice, video, and data services on the same network, while still delivering slower or legacy applications. Organizations need a solution that can maximize current resources and investments while improving application delivery and flexibility.

- **Connection Management** - Depending on the type of application served, the enterprise’s application infrastructure is not always able to manage complex connection requirements efficiently. For instance, maintaining session persistence, which can be required by in-memory applications, can reduce server performance by 20-30%. Further, organizations do not always have the ability to gracefully distribute connections among servers when removing application servers from a cluster.

- **Security and Accessibility** - Organizations need a solution that can secure the application infrastructure while maintaining network flexibility and accessibility. Some application servers offer software-based security solutions, but transaction processing can be limited dramatically when these servers perform SSL encryption and decryption. Some estimates suggest this reduction can be as great as a 90% reduction in standard non-HTTPS performance, ultimately requiring a significant investment in additional servers to support secure web-enabled applications.

- **Scalability** - Application infrastructure deployments often limit network scalability by utilizing only standard DNS or a Round-Robin load balancing algorithm. In this approach, application servers introduce single points of failure and limit the ability of application server clusters to scale to deliver true 99.999% uptime.

**F5 Solution**

With powerful local and global traffic management network devices, F5 Networks offers valuable benefits for enterprise application infrastructure deployment. Hardware-based traffic management technologies such as F5’s offer significant advantages over software-only solutions in this area.

Key benefits include a broader range of load balancing algorithms, HTTP compression, the ability to avoid unavailable servers, SSL acceleration, and more efficient traffic/application management. In addition to these advantages, F5 has established itself as a leader in enhancing the scalability of application

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**Key Benefits of F5**

- **Centralized Security** Reduces Management Costs by 20-25%
- **Application Acceleration** Improves Performance for End Users 126% or more
- **Hardware Expenditure Reduction** Of Up To 30% Results in Increased ROI
- **F5 can speed document downloads** 40x or more
Solution - Continued

F5 offers 40-60% performance improvements for application infrastructure over software-based security solutions.

To its foundation of intelligent application traffic management, version 9 of the BIG-IP system adds a suite of acceleration and optimization features. BIG-IP v9, with its unique Traffic Management Operating System (TMOS) architecture, is designed to increase network efficiency and control while improving end-user performance with fast, secure application delivery. These enhancements provide increased performance for users accessing applications over the WAN. The effectiveness of TM/OS was demonstrated using the Gomez Performance Network, which uses real clients from all corners of the globe. In recent Gomez Performance Network testing, these industry leading performance and optimization features resulted in greater than 125% application performance improvements. For the remote workforce, F5’s FirePass Controller SSL VPN extends this level of performance and access securely to remote users. The FirePass device provides access to the internal application infrastructure, including devices like BEA WebLogic Server and SAP Application Servers, as easily from inside the corporate LAN. It also delivers granular access control to intranet resources on a group basis. The controller's compression capabilities provide additional performance enhancement and server offload for application infrastructure deployments while securely delivering business-critical content. With this industry-leading combination of intelligent application traffic management, load balancing, and optimization features, the F5 solution delivers the following application infrastructure solutions:

**Application Acceleration and TCP Optimization** - Version 9 of the BIG-IP system provides industry-leading application acceleration and optimization, with a suite of new TCP Express features to facilitate this functionality. BIG-IP Traffic Management Operating System (TM/OS) architecture provides the foundation for TCP optimization with independent client and server side TCP stacks. Client and server side connections are independently optimized up and down the TCP stack, providing dramatic improvement for WAN efficiency. TCP Express functionality acts as a broker between noncompliant TCP stacks running across servers within the corporate data center, further increasing network efficiency. TCP Express optimizations reduce application response time and minimize errors associated with lost and re-ordered packets, thus significantly improving end-user experience for both dial-up and broadband connections. This communication streamlining process improves bandwidth link utilization and reduces overhead by increasing server capacity.

**Fast Cache, Compression and SSL Acceleration** - From its central position in the network, the BIG-IP device can take on a variety of resource intensive tasks such as HTTP Compression and SSL termination. By offloading these processes, the BIG-IP system increases network speed while freeing application infrastructure to deliver content more efficiently. The BIG-IP solution also provides Fast Cache intelligent memory-based caching. By allowing caching at the BIG-IP on a per application basis, this function improves processing power, content delivery control, and server cluster performance. Thus the BIG-IP system increases the enterprise ROI by minimizing bandwidth consumption and offloading server processing.

**Advanced Health Checking and Intelligent Traffic Management** - Integrating the BIG-IP solution with the application infrastructure provides a specialized Layer 4-7 architecture with superior processing power, optimizing application speed and Quality of Service levels.

Unlike other networking products on the market, the BIG-IP product can read any value(s) of an IP-based packet header or payload and direct it to the appropriate resource. Based on precise business criteria and requirements, the Universal Inspection Engine (UIE) and iRules™ allow an organization easily to incorporate application specific logic into the BIG-IP product. Additionally, The BIG-IP system detects a variety of device failures to ensure that mission-critical resources are responding properly. The BIG-IP solution offers advanced content and application health checks such as Extended Content Verification (ECV) and Extended Application Verification (EAV) that simulate an end user request and monitor the true availability of content.

**Data Source Access and Integration** - With iT raining, the BIG-IP system’s open application program interface, applications and services can communicate with and influence the behavior of the underlying network. Made available as a free SDK, the iT raining architecture provides integration control of load balancing and traffic management, content delivery and fulfillment infrastructure. The resulting integrated web application, service, and network environment can be dynamically tuned based on application, server and customer needs.

**Secure Remote Access** - F5’s FirePass SSL VPN solution enables remote users to access applications as easily as from inside the corporate LAN. Once authenticated by FirePass, users pass through the corporate firewall and are able to access web services, applications and data from any device with a browser, from any location, without having to re-authenticate when accessing multiple resources. The FirePass controller's caching and compression capabilities provide additional performance enhancement and server offload while securely delivering business-critical content.
APPLICATION INFRASTRUCTURE

Benefits

Application Acceleration Improves Performance for End Users Up To 126%
By integrating the BIG-IP solution with their application infrastructure, organizations benefit from a specialized Layer 4-7 architecture with superior processing power, optimizing application speed and Quality of Service levels. The BIG-IP system’s Intelligent Compression module centralizes HTTP compression, removing this processing load from servers and maximizing application availability. The BIG-IP version 9 TCP Express features ensure that both client and server are transmitting data at the optimal rate and thus simultaneously reduce server download times, improve bandwidth link utilization for a site, and minimize errors associated with lost and reordered packets. These dramatic WAN optimization and client performance improvements can not be found in other networking devices or server operating systems.

Centralized Security Reduces Management Costs by 20-25%
The BIG-IP product comes standard with numerous security features that provide an extremely scalable, highly available and secure solution for both internal and external applications. It is also the first application traffic management solution with a FIPS (Federal Information Processing Standard) 140-2 Level 3 certified cryptographic/SSL accelerator. F5’s FIPS products meet higher levels of security standards required by Government agencies, financial services, and healthcare organizations by integrating a tamper-resistant, key protection module and sophisticated key management capabilities. The management cost savings of centralizing this function on the BIG-IP product, instead of on every server, is estimated to be 20 - 25%.

Hardware Expenditure Reduction of Up To 30% Results in Increased ROI
This solution maximizes application availability, allows for trouble-free maintenance, and reduces administration overhead. By offloading SSL and persistence functions (processor and server intensive operations) customers do not have to buy expensive hardware to support their applications. The result is substantial savings on hardware costs, with increased application performance. The BIG-IP system’s HTTP compression provides a significant reduction in bandwidth consumption for application infrastructure deployment, proficiently compressing a variety of content types including HTML, XML, JavaScript, and J2EE applications. Intelligent Compression provides a solution that serves high bandwidth content efficiently, further reducing the need to upgrade servers and bandwidth, while improving end-user experience.

Control Provides Simple Extensible Integration
iControl™ is the industry’s first open application program interface (API) for a comprehensive suite of application traffic management products. Made available as a free SDK, the iControl architectural approach overcomes the greatest challenges of integration - making it quick and easy to create intercommunication between 3rd party applications and the network via F5’s products.

Global Traffic Manager Enhances Global Business Continuity
The F5 Global Traffic Manager (formerly the 3-DNS Controller) seamlessly shifts global users to backup sites and databases. The Global Traffic Manager monitors site and resource availability, choosing the site to which distributed users should be sent for the best service.

Simple Scalability Maximizes Efficient Expansion of the Network - The BIG-IP product provides a highly scalable solution that allows the enterprise to meet growing organizational and traffic demands on web and application resources. If one service is nearing capacity, scaling it is as simple as adding another instance of the service to your network and then to the BIG-IP load balancing pool.

F5 Provides the High Availability that helps Networks Achieve 99.999% Uptime
Through the use of its advanced health checking capabilities, the BIG-IP product can recognize when a resource is unavailable or under-performing and direct traffic to another resource. With the BIG-IP product, all of your applications can achieve mission-critical availability while reducing operational complexity and costs.

FirePass Enables Secure Access from Any Location, On Any Device
F5’s FirePass controller enables enterprises to provide secure, reliable and intuitive remote access to corporate applications and data using standard web browser technology. This award-winning SSL VPN solution provides complete cross-platform support without resource-draining client software installation and configuration or changes to server-side applications. FirePass controller extends support for any IP application to Apple Macintosh, PocketPC and Linux clients, in addition to Microsoft Windows, and expands client and application security for web, email and file application access. It also offers the only open API and SDK that enables third party application vendors to build seamless, secure remote access into their client applications.