



F5 White Paper

BIG-IP Version 10.1: An Integrated Application Delivery Architecture

Contextual application delivery is becoming a requirement for a dynamic data center—applications need to be managed based on access and network conditions. F5 BIG-IP v10.1 provides that context on a single, integrated platform.

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Introduction

In 2004, F5 broke away from traditional network load balancing and released the market's first integrated Application Delivery Controller (ADC)—BIG-IP® Local Traffic Manager™ (LTM) running on the TMOS® product platform. Prior to TMOS, load balancing—also known as L7 or application switching—was relegated to simply distributing TCP and UDP connections between servers, based on network information. If a server was up and responding to network connections, the load balancer would send application requests to that server. If there was no application available on that server, however, the connection would fail and the load balancer remained unaware of the application failure. Even though the products were referred to as application switches, standard load balancers had no application awareness or intelligence.

The F5 TMOS product platform changed the load balancing market by making it possible for an advanced ADC to factor in sophisticated application-level information for load balancing distribution decisions. This level of application knowledge wasn't simply bolted onto the existing load balancing platforms. Instead, F5 created a modular platform where discrete components were responsible for individual tasks throughout the application delivery lifecycle. TMOS managed those individual tasks and brought these independent load balancing tasks together to provide a complete application delivery solution. This unified, modular platform moved the ADC away from traditional load balancing to take on a much larger, more sophisticated role in the data center—that of total application delivery management.

The Swiss Army Knife Approach

The benefit of such a modular platform is non-repetition of services—the ability to handle any application delivery task without repeating a function. In a traditional, single-purpose load balancing appliance (or software) architecture, each task would be assigned to the appliance that sat positioned in-line before (or after) the next (or last) single-purpose appliance. As an application service request came through the data center it would be passed from device to device, pushed through the network assembly line. Often, each device would have to repeat functions to achieve a different goal. For example, if an HTTP connection needed to be secured and then optimized, two different devices would have to parse the HTTP stream in order to perform one of those specific tasks, doubling the amount of work necessary for each HTTP connection.

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In contrast, a modular, single-point application delivery appliance handles those typically redundant tasks only once, reusing the information and optimizing the processing chain. This is a very object-oriented approach, as opposed to the linear approach of single-point appliances. In the example above, one component of the system manages inbound connections; another component parses HTTP/1.1 application data; yet another component optimizes the HTTP connection; and finally another inspects the parsed stream looking for application-based attacks. F5's BIG-IP® Application Security Manager™ (ASM), which runs as a module on TMOS, manages and secures application traffic through this object-oriented approach.

The modular architecture assigns specific tools to specific tasks without duplicating work across the platform. BIG-IP LTM parses the application stream looking for URL-based information as the connection enters the ADC, the most efficient location in the system to parse data. BIG-IP ASM simply queries the parsing engine for a list of variable name:value pairs for immediate inspection, securing that particular connection.

BIG-IP v10.1—Integrated Application Delivery Solutions

Service integration becomes more important as both enterprise and service provider data centers are consolidated into more efficient IT processing centers. Single-purpose devices consume more power, require more management, introduce more points of failure, and cost IT more money in capital and operational expenses. An integrated service platform enables IT departments to consolidate functions and tasks, facilitating consolidation and providing a more immediate return on investment.

F5 BIG-IP v10.1 expands on the integrated ADC approach, providing unmatched control and savings for IT departments throughout the data center by combining key application delivery services—such as application service offloading, connection management, application data optimization, and security—into one multi-purpose device. Application delivery consolidation helps IT departments to recover capital expenses by buying fewer devices and licenses and reduce operational expenses in management and power usage.

Integration Inside: Resource Management

BIG-IP v10.1 is a truly integrated component of the F5 ADC. With BIG-IP v10.1, hardware resources and traffic management sub-systems function as one solution,



sharing resources and functions as needed to streamline the application delivery process. This internal integration provides the most impact to traffic management functions across hardware resources. Through Clustered Multi-Processing (CMP), hardware resources are virtualized within the F5 appliance for efficient resource utilization. As the need for more resources arises—such as BIG-IP ASM requesting CPU cycles for XML security—CMP ensures that those components get the hardware resources they need without impacting other traffic management processes. Because of this, a specific application delivery function can use the exact amount of resources needed without wasting vital hardware cycles.

Single-purpose solutions often waste hardware resources on tasks such as a management GUI: each appliance has its own GUI that will consume resources. Just dedicating one GUI for all application delivery functions drastically increases traffic management optimization.

Integration Outside: Enabling External Tools

In addition, BIG-IP v10.1 integrates with a wealth of other services in the data center to share management and application delivery information. iControl®—F5's open management API—enables IT departments to run BIG-IP v10.1 as part of a complete data center management solution. BIG-IP v10.1 integrates with data center management tools such as Microsoft's System Center Operations Manager and HP's Network Node Manager platforms, as well as many other third-party management solutions and home-grown systems, so those tools can manage the application delivery arm of their data centers.

External integration also extends the reach and breadth of BIG-IP v10.1 to include other infrastructure systems in the data center, such as VMware and Microsoft virtualized platforms. BIG-IP can integrate directly with VMware vCenter to provide application health and network delivery status information for more intelligent vMotion and DRS events. Likewise, vCenter can notify the BIG-IP device when provisioning and migration events are about to occur. This bi-directional, integrated communication brings application networking and virtual systems together in the data center for a more complete application delivery solution.

Integration and Context

Integrated application delivery services cut down on cost and complexity, but also create new opportunities for application control. Integration is the cornerstone to



contextual application delivery: making decisions on application traffic flow based on user and network information such as location, bandwidth, authentication status, and more. BIG-IP v10.1 introduced IP geolocation, a feature that can identify user location down to the zipcode. By applying this locational access information to application delivery, policies can be put in place to restrict access based on source location or to create an optimized profile for specific regions.

This type of contextual decision making can only be applied to application traffic through an integrated ADC such as BIG-IP v10.1. Another example is integrated access control and application security. The F5 BIG-IP® Edge Gateway™ provides secure access transport and policy management for remote users. BIG-IP Edge Gateway sits at the edge of the data center and can secure all application traffic in and out, and since it's based on the F5 TMOS product platform, it can also optimize and accelerate those connections. This is yet another example of contextual decision making. Typical SSL VPN services can secure user connections but they have no awareness of what the user is attempting to do or how the application and network are responding and performing. BIG-IP Edge Gateway provides endpoint user security as well as application security and optimization.

Conclusion

Simple load balancing and single-purpose appliances are no longer viable options for fluid and dynamic data centers. Applications require advanced contextual management as they move around the data center, from physical to virtual platforms, from one data center to another, which can only be delivered on an integrated platform. Attempting to cobble together a contextual application delivery system on disparate devices would require a massive undertaking in management, coordination, and third-party integration (not to mention the increase in network traffic associated with messaging between these “integrated” services).

As an advanced ADC, F5 BIG-IP v10.1 provides sophisticated, integrated, contextual application management on a single platform. This modular architecture enables IT departments to make the most of their application delivery infrastructure, saving capital and operational costs through the lifespan of the application. As data centers continue to grow in complexity and shrink in footprint, integration of services will become a critical component during planning and execution. F5 BIG-IP v10.1 provides the level of integration today's IT departments need to manage and control application delivery for users and services throughout the data center.

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[iControl: F5's Open Web-enabled Management API](#)

[Managing BIG-IP Devices with HP Microsoft Network Management Tools](#)

[VMWare DRS: Why You Still Need Assured Application Delivery Networking](#)

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