



Scale Performance for Your Data Center, Cloud, or Telecommunications Network

F5 Networks takes BIG-IP* performance to new heights with the Intel® Xeon® processor E5-2600 v3 product family and Intel® QuickAssist Technology

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-Clint Harames,
hardware architecture manager,
F5 Networks

Internet traffic is growing exponentially, with no end in sight. Data centers and telecommunications networks need to scale and adapt almost continuously to manage increasing application workloads, new security demands, and escalating user expectations. Yet budgets remain tight, requiring that operators evolve their infrastructures in the most cost-effective way possible.

F5 Networks application delivery controllers (ADCs) are helping today's most advanced and efficient data centers meet these demands. Based on Intel® Xeon® processors and Intel® QuickAssist Technology, these purpose-built appliances reside at the front of the data center, intelligently managing network traffic to help ensure applications are fast, secure, and available. An ADC provides a gateway for end-user requests, acting on data from client devices, such as smartphones, and reaching into the cloud through servers to provide the required compute, storage, and networking functions.

An ADC also strengthens cloud security, through firewalls and access controls and by implementing Secure Sockets Layer (SSL) for encrypted communications. SSL is critical to cloud security, yet requires massive computational resources, especially with the advent of 2,048-bit encryption keys. By offloading this and other compute-intensive network functions, ADCs reduce the load on data center application servers to improve performance and scalability for end-user services. This strategy has been so successful that F5 BIG-IP* solutions are currently used by 48 of the Fortune 50 companies, 27 of the top 30 U.S. commercial banks, and all of the top 10 global telecom operators.¹



Powerful Intelligence at Network Speeds

A BIG-IP appliance typically sits in front of hundreds, even thousands, of application servers and must be much faster than those servers to keep the data center operating efficiently, reliably, and securely.

A key challenge is to provide intelligent traffic management and security protection, without slowing network throughput. This requires packet inspection and analytics in tandem with fast, high-volume packet processing. F5 accomplishes this with a best in class solution stack that includes the F5 Traffic Management Operating System* (TMOS*) running on:

- **Intel® Xeon® processors** for high-speed application and packet processing
- **Intel® Solid-State Drives** to deliver the high-volume, low-latency storage access needed for high-performance application delivery networking
- **Intel QuickAssist Technology**, including the Intel® Communications Chipset Series 89XX, for offloading and accelerating data compression and SSL processing in ways that are largely transparent to the associated software applications.

TMOS is a real-time, event-driven operating system designed specifically for application delivery networking and built to meet the performance, security, availability, and management needs of enterprise and web-based applications. TMOS hosts a variety of platform-based modules that provide key network functions, such as load

balancing, Domain Name System (DNS) services, data center and web application firewalls, identity and access management, and application acceleration.

Individual modules are responsible both for processing packets and for making intelligent network and security decisions. To improve results, TMOS offloads high-volume functions to hardware acceleration engines. This leaves more execution resources available for smarter, faster decision making. As requirements grow, additional application modules can be integrated to increase functionality, and more BIG-IP blades or appliances can be added to scale performance and maintain fast network throughput.

Scaling BIG-IP Performance for Next-Generation Needs

Next-generation BIG-IP appliances, based on the Intel® Xeon® processor E5-2600 v3 product family, will set a new standard for ADC performance. These processors include up to 18 cores, 36 threads, and 45 MB of cache, which provide significant increases in performance and parallelism for ADC workloads. Servers based on these new processors also support Intel QuickAssist Technology, which delivers new options for integrating hardware acceleration into Intel Xeon processor-based servers.

Intel QuickAssist Technology provides a uniform means of communication between applications, hardware accelerators, and acceleration technologies. Intel offers a family of hardware accelerators that are

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designed to accelerate performance by 5 to 50 gigabits per second (Gbps) per accelerator. These accelerators are optimized for commonly used security and data compression algorithms and are available as server chipsets and as standard PCIe* add-in cards. Intel also provides software tools and libraries to simplify integration and to optimize performance for data plane applications on Intel® architecture.

F5 was an early adopter of Intel QuickAssist technology and the first supplier to deliver products based on this industry-standard approach to hardware acceleration. According to Clint Harames, the hardware architecture manager for F5 Networks, “We had already standardized on Intel Xeon processors, so moving to Intel QuickAssist Technology made a lot of sense for us. It provides outstanding performance per dollar and helps us build ADC solutions that deliver higher value to our customers.”

Next-generation F5 solutions will use the new Intel® Communications Chipset 8955, which provides up to 50 Gbps of acceleration and up to 24 Gbps of compression per chipset.² According to Intel Product Manager Stephen Palermo, “The Intel Communication Chipset 89xx Series is ideal for addressing data center security needs through fast, low-overhead SSL processing based on Intel QuickAssist Technology. Intel serves as a one-stop-shop for CPUs and accelerators, making it straightforward for vendors to address the security needs of telecommunications networks and cloud data centers.”

Higher Value through Collaborative Development

F5 and Intel have worked closely together to optimize F5 software and platforms to deliver high-speed packet processing using Intel Xeon processor-based servers. With Intel Xeon processors and Intel QuickAssist Technology, F5 can use the same optimized software code across multiple platforms. If hardware accelerators are installed in the server, they are automatically detected and used. If not, the software still runs as expected. If hardware accelerators are added or upgraded at a later date, the software automatically takes advantage of the additional resources.

This strategy has helped F5 deliver better performing and more scalable solutions at lower cost across a range of customer needs. It also allows F5 to deliver optimized software—known as BIG-IP Virtual Editions—that customers can run on their own server platforms, with or without hardware accelerators.

The collaboration with F5 has also been helpful for Intel, providing valuable insights that Intel engineers have used to extend and refine hardware and software support for data plane applications and hardware acceleration, such as that provided by Intel QuickAssist Technology. In addition to processors, SSDs, and hardware accelerators, Intel now provides comprehensive software support.

- **The Intel® Data Plane Development Kit** provides an array of packet-processing libraries that are optimized to deliver high performance on Intel architecture with lower power consumption and superior cost models compared with traditional networking systems.
- **Intel QuickAssist Technology** includes APIs and highly-optimized software libraries that help to simplify integration and improve performance for Intel hardware accelerators. Intel also provides patches for Linux* and other open source applications.

These resources provide the foundation for developing complete network solutions on Intel architecture and for implementing control plane and data plane applications on the same platform. They also make it easier for suppliers to deliver software-defined networking solutions that customers can deploy on Intel Xeon processor-based servers, and then scale to address almost any performance requirements.

Increasing Benefits to Come

The demands on data center ADCs will continue to increase, driven by exponential growth in Internet traffic volumes and increasing security requirements. F5 sees Intel as a strategic partner in addressing these growing needs. According to Harames, “Intel QuickAssist Technology has become a foundational technology for F5. Delivering high-performing networking solutions using industry-standard hardware accelerators gives us a real edge in providing ADCs that are increasingly powerful and cost effective.”

For Intel, the collaboration with F5 offers valuable insight into the practical design challenges faced by leading vendors as they develop intelligent, high-speed networking solutions. Those insights will help guide Intel's own development efforts, to ensure that future generations of processors, SSDs, hardware accelerators, and software tools deliver the application and packet processing performance needed to address the extreme future demands of our Internet-driven world.



¹ Source: F5 Networks website, as of August 14, 2014. www.f5.com/about-us/leadership

² For more information, see the Intel Platform Brief: "Intel® Xeon® Processor E5-2600 v2-Based Platforms for Large-Scale Communications Infrastructure Systems." www.intel.com/content/www/us/en/intelligent-systems/highland-forest/xeon-e5-2600-v2-large-scale-communications-brief.html?wapkw=%22e5-2600+v2-based+platforms+for+large-scale+communications%22

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