VELOS

WHAT'S INSIDE

Performance and Reliability of Hardware–Agility and Scale of a Modern Architecture–Meet F5's Powerful Next-Generation Chassis System

Traffic continues to skyrocket as enterprises accelerate their digital transformation, resulting in more apps, users, and usage than ever. Meanwhile, the existing hardware platforms in place are rapidly aging. While some customers are "sweating their assets," many others are at the breaking point due to high operating costs, appliance sprawl owing to so many point products, burdensome manual processes, and increasing support and maintenance issues.

What's undisputed is that we are living in a cloud-first, software-first world. Yet, many apps still benefit from the predictability, high scalability, performance, and operational simplicity of an integrated and engineered hardware system. With existing hardware platforms, however, customers cannot leverage modern architectures for their new apps that unlock the benefits of being built with DevOps-friendly microservices—not without forcing operations teams to perform all the systems engineering and manage the resulting complexity.

The VELOS platform is the next generation of F5's industry-leading chassis-based systems, which deliver unprecedented performance and scalability in a single Application Delivery Controller (ADC). As with VIPRION, F5's existing chassis-based system that has been in the market for more than 10 years, customers can seamlessly scale capacity by adding modular blades in a chassis, without disrupting users or applications, rather than having to install and configure new appliances. Now, VELOS can also bridge traditional and modern application architectures by supporting a mix of traditional BIG-IP tenants as well as next-generation BIG-IP tenants in the future, which will unleash the true power of running on a microservices-based architecture.

KEY BENEFITS

Get More Done with Automation
Reduce your current deployment time from weeks to minutes and improve operational agility with an API-first architecture that powers automation.

Unmatched Performance for Improved ROI
Manage and protect demanding apps with industry-leading Layer 4 and Layer 7 performance and SSL processing power.

Infrastructure Reliability and Business Continuity
Achieve business continuity with fully isolated traffic using multiple layers of tenancy and ensure our apps are always available and secure with enterprise-grade platform redundancy.

Lower Operating Costs
Slash your total cost of ownership up to 3X with far greater price/performance, device consolidation, and multi-tenant scale.

MODERN PLATFORM SOFTWARE EASES YOUR TRANSITION

VELOS relies on a Kubernetes-based platform layer (F5OS) that is tightly integrated with F5's Traffic Management Operating System (TMOS) software, aligning with your modern architecture plans. Going to a microservice-based platform layer allows VELOS to provide new and exciting features that were not possible in previous generations of F5® BIG-IP® platforms.

Administrators won't have to worry about learning Kubernetes or microservices concepts. They only need to know that it's what powers the new platform and that it's abstracted, so an administrator can manage it via familiar CLI, GUI, and API interfaces. This means you can simultaneously run tenants with the current generation of BIG-IP software with more modern microservice-based BIG-IP software that will be introduced in the future. In addition, as you shift workloads among on-premises and cloud environments, you will not need to perform time-consuming migrations with heavily refactored apps.

VELOS is a flexible system that allows you to plug in both current and future versions of BIG-IP, making it easier to use multiple versions of BIG-IP. VELOS is more aligned to modern architectures, allowing you to future-proof your deployments and environments. With VELOS, we leverage native K8s management to manage BIG-IP tenant and app services for containerized apps.

PREDICTABLE PERFORMANCE AND MAXIMUM SCALE FOR DEMANDING APPLICATIONS

F5 has always provided the highest performance ADCs with chassis-based systems since the introduction of VIPRION more than a decade ago. As the next-generation chassis, VELOS continues this industry leadership for Layer 4–7 throughput, connection processing, and SSL TPS (RSA / ECC) performance, letting you more efficiently manage and secure your most demanding applications, offload web and app servers, and consolidate your infrastructure within the same VIPRION footprint. VELOS delivers the highest performance per rack unit as well as multi-Tbps L4–7 throughput with a fully non-blocking backplane.

In addition, as a fully integrated and tested system, VELOS enables you to gain predictable performance for your applications. As a result, you no longer have to engineer your own application stack with different combinations of server hardware and operating software, hypervisors, ADC software, and so on.

VELOS CX410

VELOS BX110

WITH ITS API-FIRST ARCHITECTURE, VELOS PROVIDES A FULLY AUTOMATABLE SYSTEM THAT CAN DELIVER THE AGILITY YOU NEED TODAY.

MAKE AUTOMATION STANDARD PRACTICE

With the demands of your business, you are under pressure to move faster to deploy and scale applications. Now, you don't need to implement software-only infrastructure to take advantage of CI/CD toolset integration, declarative APIs, and telemetry-based implementations. With its API-first architecture, VELOS provides a fully automatable system that can deliver the agility you need today.

With VELOS, you can take advantage of F5's Automation Toolchain. Automation Toolchain offers a way to simplify and streamline your F5 portfolio with simple, yet powerful declarative interfaces that minimize F5 knowledge requirements, reduce errors, increase deployment velocity, and make workflows more repeatable. Automation Toolchain is comprised of a unified set of REST API endpoints that are built using human-readable JSON that can be used to manage BIG-IP directly or through BIG-IQ. The Automation Toolchain makes it faster, easier, and more programmatic to configure and deploy F5 application delivery and security services.

GAIN BIG-IP MANAGEMENT AND VISIBILITY WITH BIG-IQ

F5 BIG-IQ® allows you to take an application-centric approach to core IT—networking, development, and deployment—with a unified tool for managing your F5 application delivery and security portfolio, including VELOS. BIG-IQ extends the operability and value of your F5 investment with the ability to create, configure, deploy, analyze, orchestrate, troubleshoot, upgrade, and patch the entire F5 security and application delivery services portfolio. BIG-IQ supports management of F5 BIG-IP physical and virtual devices, both locally and in the cloud, including third-party certificate management. From per-app virtual editions to traditional hardware appliances and now VELOS tenants, BIG-IQ makes it possible to gain deep visibility into F5 services and devices, build native and third-party integrated automation workflows, simplify configuration and deployment tasks, assign role-and-user-specific permissions, and ensure every team—and every app—has the resources required for optimal performance.

INCREASED PERFORMANCE AND GREATER AGILITY WITH PROGRAMMABLE SYSTEM RESOURCES

VELOS offers even more hardware-accelerated performance than previous generation blades, with double the field-programmable gate array (FPGA) chipsets, and with FPGA technology tightly integrated with the F5 TMOS® technology and software. This means that, for specific use cases, you can avoid CPU-exhaustion scenarios and gain performance that you cannot replicate on any other system with similar resources.

MULTI-TENANCY SECURITY WITH FULL ISOLATION

Virtualization and multi-tenant architectures are often implemented to address business and topological requirements, such as being able to consolidate services or acquire or merge existing networks. Organizations need to know that significant security mechanisms are built into these architectures. Enterprises seeking the CapEx gains that virtualization offers often run applications that have differing security requirements.

Essentially a dedicated hypervisor for F5 hardware platforms, F5's Virtual Clustered Multiprocessing (vCMP) technology gives organizations a virtualization strategy for application delivery and isolating multi-tenant environments. Chief information security officers, on the other hand, want to know how secure the vCMP technology is. Managed service providers need to be able to completely assure their downstream customers that their network traffic cannot be seen or manipulated by other customers hosted on the same physical device.

F5 developed the vCMP technology originally for VIPRION with these factors in mind, while preserving the high availability, speed, and performance that are the hallmarks of all F5 products. VELOS improves on the vCMP technology that is a benefit to many customers.

VELOS supports flexible multi-tenancy options across system resources improving on vCMP technology and enables even more multi-tenancy density than was previously achievable with VIPRION. This allows customers to achieve greater ROI on its new F5 hardware investments, because system resources can be allocated more effectively.

Multi-tenancy enables many other benefits. For example, customers gain the ability to host many different BIG-IP tenants on the same chassis, depending on the needs of the particular applications or business requirements. Each tenant can be independently upgraded or patched without impacting other tenants. In addition to multi-tenancy, VELOS adds an additional layer of isolation called chassis partitions which allow administrators to group blades together into their own isolated environment. Each chassis partition has its own networking isolated from the rest of the chassis, as well as its own user interfaces and user authentication.

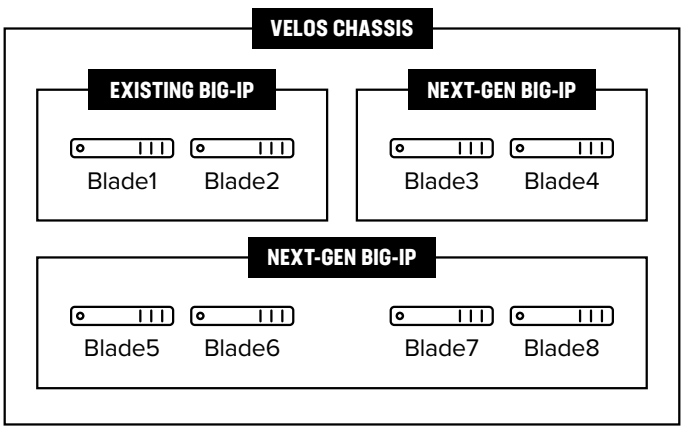

Figure 1: VELOS enables customers to host different BIG-IP software tenants on the same chassis.

MAXIMUM RELIABILITY

The reliability of your application infrastructure has never been as important as it is today. VELOS was designed from the ground up to provide maximum system reliability for your apps. VELOS uses two redundant system controllers, which perform the backplane switching functions and Kubernetes control plane functions. Switching functions operate in an Active/Active mode, while the Kubernetes control plane operates in an Active/Standby mode on the system controllers. If either system controller should fail the other will provide fault tolerance so that the chassis can withstand an outage and provide fast failover capabilities. All common system components, such as power supplies and fans, also were designed with redundancy in mind. If one triggers an event, the other one keeps going. Administrators can swap out a failed component without disrupting system. They can also dynamically add more capacity to the system by adding blades without disrupting users or apps.

F5 DUPLICATES SYSTEM RESOURCES TO AVOID THE TYPE OF CATASTROPHIC FAILURES THAT ARE POSSIBLE WITH OTHER CHASSIS-BASED DESIGNS.

F5 duplicates system resources to avoid the type of catastrophic failures that are possible with other chassis-based designs. Every blade has two interfaces that are connected to separate system controllers via the backplane interface. This forms an active-active type connectivity on the backplane while the control/management plane is still active-standby, providing the redundancy across the system controllers. When a customer starts configuring and accessing the chassis, the floating point management IP lands on the primary controller. Without the customer having to duplicate the configuration, the second controller automatically syncs the configurations, licenses, orchestration info, logging, and so on with the primary controller, allowing the customer to manage just one device, and not both.

CONSOLIDATED PLATFORM WITH BIG-IP APPLICATION AND SECURITY SERVICES

The VELOS platform offers the full BIG-IP portfolio of comprehensive and industry-leading application delivery and security services. These solutions can be consolidated onto a single chassis-based VELOS platform, reducing management complexity and overhead while offering superior performance and scalability.

F5's solutions for application delivery and security services are made up of the following modules:

- **BIG-IP Local Traffic Manager™ (LTM)**—Provides advanced traffic management, load balancing, and application delivery.
- **BIG-IP DNS**—Hyperscales and secures the DNS infrastructure during DDoS attacks and keeps global applications online.
- **BIG-IP Advanced Firewall Manager™ (AFM)**—This advanced network security solution forms the core of the F5 application protection solution. It provides network-layer and session-layer distributed denial of service (DDoS) mitigation.

- **F5 Advanced Web Application Firewall™ (Advanced WAF)**—Delivers application security, web scraping and bot prevention, and HTTP DDoS mitigation.
- **BIG-IP Access Policy Manager® (APM)**— This secure, flexible, high-performance access management proxy solution delivers unified global access control for your users, devices, applications, and APIs.
- **BIG-IP IPS**—Intrusion prevention protects infrastructure and protocols and compliance verification.
- **IP Intelligence and Geolocation**—These additional services provide IP reputation and geolocation information for added context-aware security.

MIGRATING TO VELOS

F5's new migration tool Journeys assists users in adopting newer platforms like VELOS by providing a frictionless migration experience. It allows users to migrate from recent source platforms (F5 chassis, appliance) running BIG-IP software version (on or above 11.x) to the VELOS platform. The tool assists in checking feature compatibility issues between different platforms and software versions, identifying and troubleshooting migration issues, and reducing overall complexity and time spent on migration. It is a single tool that helps with migrating entire customer configurations to a customer's existing operational procedures. This tool also provides post-migration validation metrics in terms of the memory footprint, cluster status, and configuration object count, for improved visibility into the migration status and for reducing the runtime issues.

- Flagging source configuration feature parity gaps and fixing them with provided built-in solutions
- Deployment of the updated configuration to a VELOS VM tenant
- Post-migration diagnostics
- Ability to create PDF Reports on the migration tasks

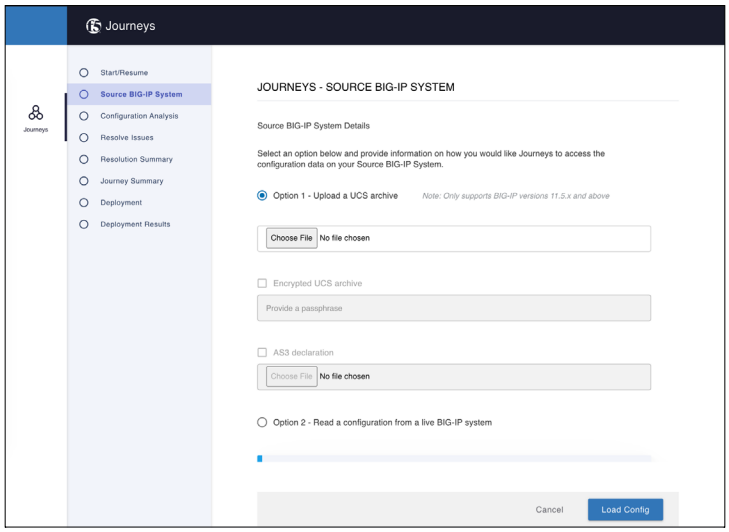

Figure 2: Reduce overall complexity and time spent on migration with F5 Journeys.

SPECIFICATIONS	VELOS CX410
Dimensions:	H: 6.9 inches (17.5 cm) x W: 17.4 inches (44.2 cm) x D: 32.0 inches (81.3 cm) rack-mount chassis
Weight:	Empty chassis, as shipped (0 blades, 8 blanks, 2 power supplies, 1 fan tray, 2 system controllers, 2PSU controllers): 132 pounds (60 kg) AC power supply: 6.4 pounds (2.9 kg) Power supply blank: 0.2 pounds (0.09 kg) Blade blank: 0.1 pounds (0.05 kg) Fan tray: 12.0 pounds (5.4 kg) System controller: 10.5 pounds (4.8 kg) VELOS PSU Controller (VPC): 0.5 pounds (0.2 kg)
Power Supply:	Two (default) to four 3000W, 200-240 VAC input, 16A per cord (max, 32A total)
Operating Temperature:	32° to 104°F (0° to 40°C)
Relative Humidity:	5% to 85% (40°C) non-condensing Up to 93% (40°C) non-condensing for a maximum of 96 hours
Safety Agency/Approval:	Harmonised standards: IEC 62368-1:2014 (second edition) EN 62368-1:2014+A11:2017 CSA C22.2 No. 62368-1-14, UL 62368-1, 2nd edition ETSI EN 300 386 V1.6.1 (2012) Class A EN 55032:2012/AC:2013 Class A EN 55024:2010 Class A IEC 63000:2018
Redundancy (Power):	Supports N+1 or N+N redundancy
System Controller SX410:	1x 10GBase-T 1x USB 3.0 1x serial console 960GB NVMe SSD 8-Core Intel SoC 32 GB DDR4 memory
Hardware Certification Model:	CX410-AC
Trusted Platform Module (TPM):	TPM 2.0

Notes: Please refer to the Platform Guide for more information.

SPECIFICATIONS	VELOS BX110
Intelligent Traffic Processing (*1):	L4/L7 throughput 95/95 Gbps 3.0M L7 (inf-inf) requests per second 1.2M L4 connections per second Max hardware compression 65 Gbps SSL bulk throughput 50G Maximum SSL TPS 100,000 (RSA 2K Keys) 70,000 (ECDHE P-256-ECDSA) 55,000 (ECDHE P-256-RSA-2K)
Virtualization (vCPUs):	14-core 28 vCPU Multitenancy support: upto 22vCPU available to user. Possible configurations: 22x 1 vCPU, 11x 2 vCPU, 5x 4 vCPU, 3x 6 vCPU, 2x 8/10 vCPU, 1x 12/14/16/18/20/22 vCPU
Processors:	Single Intel 14-core Xeon processor (total 28 hyperthreaded logical processor cores)
Memory:	128GB (DDR4)
Hard Drive Capacity:	1x 960GB M.2 NVMe SSD (over provisioned 30%, 700 GB user capacity)
Network Interfaces:	2x QSFP28 ports (backward compatible with QSFP+) supporting: • 100G SR4 / LR4 / PSM4 / BiDi (future) • 40G SR4/ LR4 / PSM4 / BiDi • 4x25G SFP28 SR / LR • 4x10G SFP+ SR / LR
Power Consumption and Heat Output:	Please refer to Platform Guide: VELOS CX Series for the latest specific power ratings
Weight:	7.3 pounds (3.3 kg)
Width:	Quarter-width
Hardware Compression and SSL:	Integrated Intel Quick Assist
Front Panel and Backplane Data Path:	100% FPGA
Management Interfaces:	1x USB3.0
AOM:	F5 LOP (Lights-Out Processor)
Trusted Platform Module (TPM):	TPM 2.0
NEBS:	Future
Field Serviceable Components:	None

Notes: Please refer to the Platform Guide for more information.
(*1) Chassis with a single blade.

F5 Global Services

F5 Global Services offers world-class support, training, and consulting to help you get the most from your F5 investment. Whether it's providing fast answers to questions, training internal teams, or handling entire implementations from design to deployment, F5 Global Services can help ensure your applications are always secure, fast, and reliable. For more information about F5 Global Services, contact consulting@f5.com or visit f5.com/support.

Flexible Licensing Options

F5 VELOS is available in 2 different types of licensing models to suit your business and budget requirements, including:

- **Perpetual Licensing (Bring-your-own-license)**—One-time CapEx purchase, with an ability to extend for the lifetime of the product
- **Hybrid-Enterprise Licensing Agreement**—3-year subscription with maximum architectural flexibility across hybrid environments, annual budget protection and premium support included

The Good, Better, Best bundle offerings from F5 provide you with the best value through flexibility to provision additional advanced application traffic management and security modules as needed.

More Information

For more information about VELOS, visit f5.com to contact us. For the latest product specifications, see the applicable platform guide on askf5.com.

Data sheets

F5 VIPRION
BIG-IP Local Traffic Manager
BIG-IP DNS
BIG-IP Advanced Firewall Manager
BIG-IP Advanced Web Application Firewall
BIG-IP Access Policy Manager