

# 8 ways to virtualize

F5 defines an architecture for the Virtual Data Center.

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Illustration by Keith Negley



**VIRTUALIZATION WAS WITHOUT** question one of the hottest IT topics of 2007, and it is showing no sign of cooling off in 2008. As is so often the case with new concepts, opinions differ as to what the term actually means, with most definitions centering on operating systems and desktops.

Most experts agree that virtualization involves disassociating an IT process from its physical operating environment. F5 implemented that concept with the 2004 introduction of our TMOS architecture, and has been building on it ever since. In all, we've defined eight distinct categories that collectively form a blueprint for creating and managing what we call the Virtual Data Center—an environment that enables you to provide any application to any user under any circumstance reliably, securely, and cost-effectively.

We support **Operating System Virtualization** through our open management API, iControl. iControl enables all F5 products to communicate directly with, and even manage, virtual data center infrastructure systems such as Microsoft's Hyper-V and VMware's ESX products.

Our TMOS architecture defines the industry standard for **Application Server Virtualization**, which makes many back-end servers appear to operate as one. F5 solutions address application server virtualization, from our BIG-IP Local Traffic Manager on the LAN to the BIG-IP Global Traffic Manager, which makes multiple data centers appear as one over the WAN.

**Application Virtualization** centers on delivering a full application to the user on-demand, over any network. We support the concept chiefly through the FirePass SSL VPN, which includes a built-in reverse proxy, terminal services virtualization, and support for Citrix Systems, Inc.'s MetaFrame and Presentation Server.

In the area of **Management Virtualization**, Auth Domains enable BIG-IP system customers to create isolated and secure partitions for each Applica-

tion Delivery Controller management function. This enables them to separate tasks related to network infrastructure from application security functions, for example.

F5 solutions support multiple levels of **Network Virtualization**, propagating the virtualization of data and state all the way through application routing decisions. This allows TMOS to make context-based decisions during application delivery.

**Hardware Virtualization** is probably the most critical virtualization category F5 has implemented to date. Our new VIPRION system enables a single hardware chassis to be carved up into multiple resources, each performing a different function, on an as-needed basis—an idea we call dynamic virtualization. As you add more blades and resources to a VIPRION chassis, those resources are consumed as needed across all blades. Dynamic provisioning allows data center and application delivery resources to grow as requirements dictate. This is a significant step forward from the alternative form of hardware virtualization, in which resources are sliced up and pre-allocated to specific functions.

**Storage Virtualization** can be done with the F5 Acopia ARX system and its FreedomFabric Network Operating System, which provides access to Windows and Unix files regardless of their location. ARX dynamically allocates file resources based on need, usage patterns, and application access restrictions, all enforced and governed by management virtualization policies.

F5's Application Ready Network (ARN) architecture embodies **Service Virtualization** by delivering applications on demand. Whether a user is accessing a Microsoft SharePoint service over a satellite link or a dial-up line, the ARN pieces together the various connections on the fly, taking into account their various limitations, to provide seamless access to the application services.

These eight virtualization concepts support the key aspects of data center virtualization. \*

**To learn more about technologies used in implementing the Virtual Data Center, go to [www.f5world.com](http://www.f5world.com).**

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