



Research Report

IBM's System Director VMControl: Advanced Multi-Platform Virtualization Management

Executive Summary

IBM's System Director VMControl (referred to herein as "VMControl") is an advanced, cross platform virtual server management environment. It is packaged as a software module that plugs into IBM's master management environment (Systems Director) where it can be launched and used for virtual workload, image and system pool management.

What makes this virtual machine management and environment *different* from other virtual machine management environments is that it has been designed to allow a single manager or administrator to assign and manage virtualized workloads across several different platforms simultaneously, including Linux, AIX (IBM's Unix), Windows, VMware, KVM, Hyper-V, PowerVM and z/VM (mainframe) environments.

What makes this virtual machine environment *special* is how advanced and well-integrated it is. Not only does VMControl allow information technology (IT) managers and administrators to manage workloads across several different platform, it also:

1. Allows for the automatic provisioning of new workloads;
2. Offers image management and an image repository;
3. Is highly integrated with network (allowing automated provisioning, application mobility, and fault isolation of servers and storage devices);
4. Offers virtual machine and infrastructure resilience;
5. Provides strong virtual systems security (including audit, isolation, and policy management);
6. Allows workloads to be optimized to specific service levels (pools of resources can be optimized for high-availability, or for security, or around energy efficiency, and so on...); and,
7. Enables software licenses to be managed efficiently and effectively.

In this *Research Report*, Clabby Analytics takes a closer look at IBM's VMControl environment. And what we find is an environment that is light years ahead of where was a few years ago in terms of automated provisioning, image management, systems/network/-storage integration, and resource pooling. We believe that VMControl is the strongest, most advanced cross-platform virtualization management environment on the market today — and we strongly suggest that IT executives who want to run the market's most efficient (non-siloed) virtualization/infrastructure/management environment take a close look at IBM's System Director VMControl.

Market Positioning

Before delving into the features and functions of the VMControl, it is important to understand how this product is positioned in the virtualization marketplace.

“Virtualization” is a process that allows for unused resources (including systems, network, and storage resources) to be logically pooled such that applications that need access to these resources can exploit them. The benefits derived from virtualization include significantly higher system/network/storage utilization (in some cases enterprises are able to double the amount of computing power that they have through virtualization); simplified management (because managers and administrators can manage more computing power on fewer systems); reduced cost for availability (because servers can be failed over to the virtualized pool rather than needing a redundant server for high availability); lower software costs (because software licenses are tied to the number of CPUs in the system — and with systems doing more work, fewer CPUs are needed); and lower testing/quality assurance costs (because pooled resources can be used — even on production machines — to test new software deployments).

The current situation in the virtualization marketplace is that there are dozens of virtualization vendors in the x86 space; only a few in the Unix midrange/high-end; and only one in the mainframe space. And what has tended to happen is that enterprises have created virtualization silos. And silos create borders and blockages that obstruct cross-platform resource sharing — and they create pockets of specialized expertise that apply only to one type of platform as compared with expertise that can manage across platforms.

In the x86 server world, the virtualization/the structure/management market is dominated by EMC with VMware, followed closely by Microsoft with Hyper-V. Then a bunch of smaller players with lesser market share fill in the rest of the picture. (It should be noted that a relative newcomer, open-source KVM, is rapidly gaining acceptance as a low-cost alternative to VMware and Hyper-V). The problem with most of these offerings is that they each have their own infrastructure and management stacks — and accordingly these environments tend to be managed and silos.

As you move up the food chain into Unix-based server environments, the same problem can exist. Hewlett-Packard builds its own hypervisor (a piece of code that manages the virtualization of underlying CPUs); as does IBM on its Power Systems; as does Oracle on its UltraSPARC-based servers. And again, this creates virtualization infrastructure and management silos for each environment.

As you reach the top of the food chain, the IBM System z mainframe, you'll find that IBM builds its own hypervisor (z/VM) and related infrastructure/management tools for the most advanced virtualization in the world: the mainframe.

We have no issue with any of these virtualization/infrastructure/management products when used to operate a homogenous environment. EMC's VMware is excellent for managing x86 Windows and Linux virtualized servers; as is Hyper-V for Microsoft environments; as is KVM for open source implementations;

as is PowerVM for Power Systems environments, as is z/VM for mainframe environments. But we do take issue with using siloed virtualization management when an enterprise runs a heterogeneous (multi-platform) computing environment. When this is the case, it is more efficient to run a common infrastructure using common management tools as opposed to running separately managed silos.

Based upon our research, we have found only two virtualization management environments that allow for heterogeneous virtualization management. The first is IBM's Systems Director VMControl; and the second is CA Technologies CA Unicenter Advanced Systems Management environment. We rarely see CA's product installed — so we consider IBM's VMControl to be the only viable cross-platform virtualization management product on the market today.

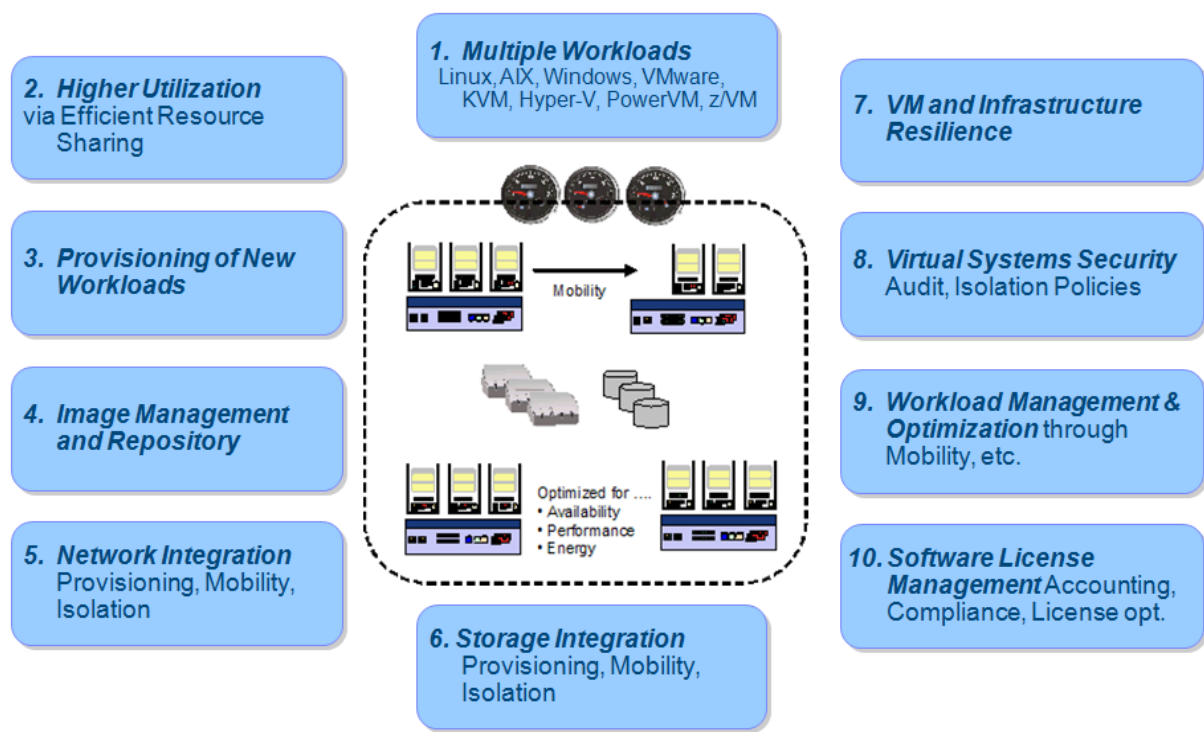
VMControl: An Overview

If a picture is worth a thousand words, then the illustrations and graphics in this section are worth at least two thousand words. Figure 1 provides an overview of VMControl functionality (a series of ten steps that lead to the deployment of a highly manageable, cross-platform virtualized environment); and Figure 2 provides a logical operator view of what VMControl enables an administrator to do.

An Overview of VMControl — Nine Functions

As described at the outset this *Research Report*, VMControl manages several distinct operating environments/hypervisors using one common interface. These functions are illustrated in Figure 1 (below).

Figure 1 — VMControl Overview



Source: IBM Corporation: October, 2011

Step 1 (above) shows the *hypervisors* supported by VMControl (a hypervisor is a piece of code that manages virtual machine interaction with underlying CPUs).

Step 2 reflects on what happens when virtualization software is deployed. The biggest benefit in the deployment of virtualization software is that *it increases overall systems/storage/network utilization* (enabling enterprises to get more work done from existing IT resources).

The next logical step (Step 3) after virtualizing a computing environment is to be able to “*provision*” the servers in that environment. Provisioning involves building up and/or tearing down of computer systems images (operating environments, related infrastructure, applications, etc.) such that a given computer could be running a Windows workload one minute and a Linux workload several minutes later. VMControl provides tools that enable it managers and administrators to provision new workloads. (It is also important to note that other IBM products including Tivoli Provisioning Manager can be used to automate the provisioning of workloads through the use of scripts, policies and procedures).

Provisioning also implies that a manager/administrator knows a bit about a system’s image (the operating environment, infrastructure software, application profile, etc.) that he or she is about to build up or tear down. To help managers/administrators capture /store/redeploy images (Step 4 above), IBM has created an *image management environment* as well as an *image repository*. By using this image management environment/repository, administrators and managers no longer need to create systems image from scratch every time they want to deploy a new application on re-provisioned server. Instead, prebuilt images can be copied from a repository and then be quickly deployed. For instance, IT managers and administrators can easily create and maintain a repository of secure virtual appliances that can be kept in an image repository — making it possible to create ‘golden master’ images that can be easily deployed. One of the new features in VMControl is that it can load appliance images as virtual servers under IBM’s “i” operating environment — enabling “i” appliances to be quickly deployed on their Power Systems that run i.

Steps 5 and 6 highlight the progress VMControl has made *in network and storage integration* — with big improvements in cross-platform application mobility, provisioning, and isolation. Most notable: in storage integration IBM has been able to accelerate storage-based provisioning, enabling virtualized workloads to be deployed in record time. By using storage-based rapid provisioning of virtualized workloads, managers and administrators can increase service levels and minimize wait times related to building up new workload images.

Step 7 highlights the big advances in VMControl in the areas of *virtual machine (VM) infrastructure and resilience*, virtual system security, and workload management and optimization. During the course of our briefing we learned that VMControl has been most successful when deployed as a cross-platform management environment for IBM Power Systems and x86 servers. In this environment, IBM has been able to provide a common infrastructure for both platforms — and by being able to find unused resources, IBM has been able to use those resources for high-availability/resilience purposes.

Step 8 describes VMControl progress in security. With VMControl, administrators and managers are able to establish a common security infrastructure as well as common audit/isolation policies that go a long way toward *treating security in a consistent fashion across disparate server environments*.

Step 9 gets to what we consider to be the heart of VMControl — *workload optimization*. One of the new workload optimization features that we liked best in this new revision of VMControl is in the area resource pooling where pools of resources can be assigned quality-of-service (QoS) characteristics — such as a group of servers could form a high-availability cluster, or a security cluster, or a cluster of dedicated appliances. (This function is described in greater detail in the next section under “*The System Pooling Function*”).

Step 10 highlights the fact that IBM offers *software license management tools* that can help administrators and managers account for license usage, ensures compliance, and perform license optimization.

What the Administrator Sees and Does

As described earlier, VMControl is a multiplatform virtualization management environment. From an administrative perspective, it provides three basic functions:

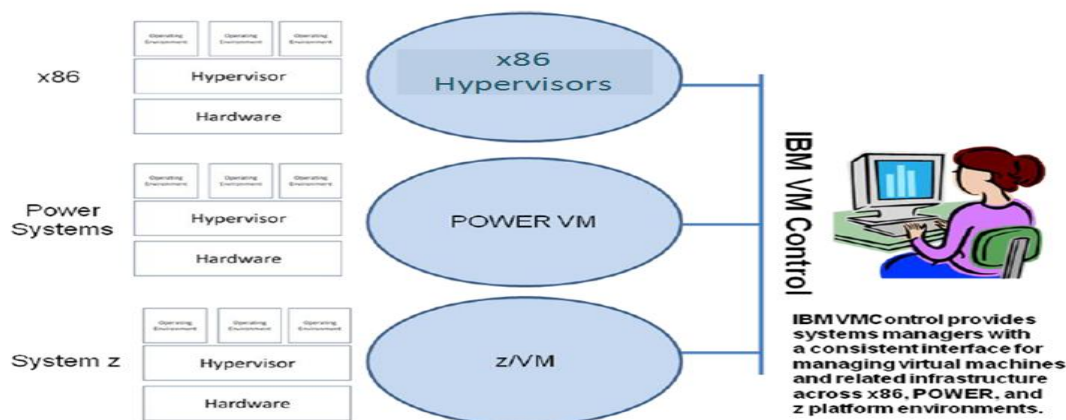
1. It helps IT managers and administrators *visualize* their virtual server/storage environment;
2. It allows IT managers/administrators to *control* their virtualized environment; and,
3. It enables IT managers and administrators to *create* “*systems pools*” designed to execute specific workloads.

Each of the functions deserves closer scrutiny.

The Visualization Functions

Using VMControl's visualization function, IT managers and administrators can see, create, modify, delete, stop, start, and relocate virtual machines across multiple systems platforms (see Figure 2).

Figure 2— IBM VMControl Provides a Common Interface Across Diverse Hypervisors



Source: Clabby Analytics, October, 2011

The Control Functions

The “control” features of VMControl enable virtual image libraries to be created and stored. By creating a library of images, IT managers can quickly deploy a virtual machine environment by launching a stored image of that environment (instead of having to manually recreate a particular environment). By saving virtual images, and by centralizing image management, IT managers and administrators can migrate and move virtual images to available systems — and then quickly deploy applications on those images.

The System Pooling Function

VMControl’s “system pooling” function allows IT managers and administrators to create collections of all of the resources needed to execute a particular job. In this case, a “system” refers to servers, storage, and network resources — all of which can be collected into a logical group.

These logical system pools are a very big deal — especially to enterprises who subscribe to cloud architecture. By creating optimized systems pools, IT managers/administrators can quickly build a pool of computing resources that have QoS characteristics that are required by a given application or group of applications. For instance, a high-security pool could be quickly deployed to run secure mission-critical applications. For high-availability pool could be quickly deployed to ensure that a particular application gets the availability services that it needs. And so on. It should also be noted that the amount of labor required to launch systems pools is miniscule compared to having to build a pool every time an application needs certain QoS services.

It should be noted that this latest revision of VMControl enables virtual images to be easily moved into and out of resource pools (this concept is known as “virtual image mobility”). Further, resources and the system pools can be easily optimized for high-performance, or for high-availability, or for optimal energy usage

Summary Observations

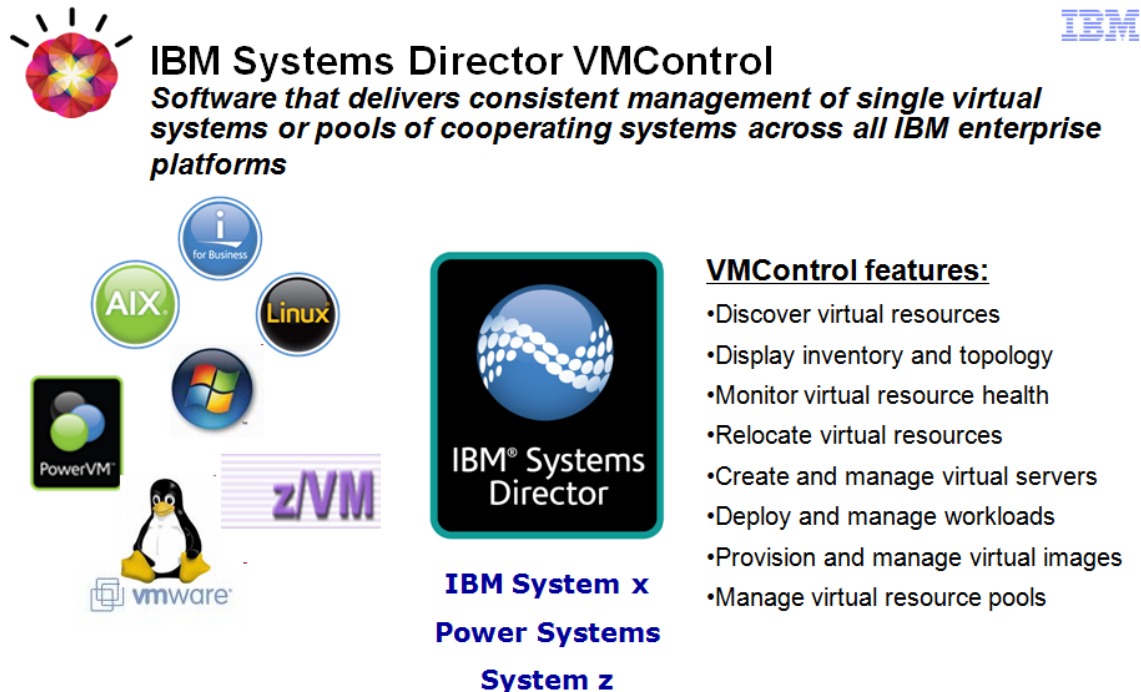
Virtualization can be viewed as the foundation for optimized systems. On top of this foundation administrators perform a variety of management functions such as provisioning, ensuring application mobility, ensuring that unused resources returned to systems/storage pools, and so on.

What VMControl does is that it enables IT managers and administrators to discover virtual resources; display inventory and topology; monitor virtual resource health; relocate (mobility) virtual resources; deploy and manage workloads; provision and manage virtual images; and manage virtual resource pools (see Figure 3). It offers a workload optimization environment; an image management system/repository; and a way to quickly deploy system pools (see Figure 3 — next page).

What makes VMControl different as compared with other virtual machine managers is that VMControl can manage x86 and non-x86 environments using a simple graphical user interface. We believe that IT executives who run x86-based Linux and Windows servers, as well as UNIX midrange/high-end servers, and potentially mainframes are best served by

a multiplatform virtual machine manager as compared with a siloed management environment.

Figure 3 — A Summary of IBM Systems Director VMControl Feature/Functions



VMControl encompasses virtual workload lifecycle management, image management and system pool management as an extension to IBM Systems Director.

Source: IBM Corporation, October, 2011

When comparing VMControl to other virtual machine management products, note that all of the market leaders focus on workload lifecycle management (virtualizing servers, provisioning those servers, running a given workload, and then de-provisioning those servers). VMControl takes this process a lot further with a sophisticated image management environment and repository — and with advanced system pooling functions that enable IT administrators and managers to quickly build virtual systems environments with the correct QoS characteristics needed to support particular workloads.

In the end, IT executives need to ask themselves whether it is cost-effective to operate siloed environments — or would they be better served running a cross-platform workload lifecycle management/image management/system pool management environment. We suggest that the right answer is the latter.