



November 6, 2007

# The Case For Virtual Appliances

by James Staten  
for Strategy Professionals



November 6, 2007

## The Case For Virtual Appliances

How Hypervisors Can Simplify Software Distribution

by James Staten

with Eric G. Brown, Frank E. Gillett, and Walid Saleh

### EXECUTIVE SUMMARY

Time-to-deployment means time-to-revenue for most ISVs today, and reducing deployment complexity can be the difference between making your quarterly numbers or not. ISVs can now address time-to-deployment via new options, including hardware appliances and software-as-a-service (SaaS). This report makes the case for a new deployment option made possible by the proliferation of server virtualization — the virtual appliance. Virtual appliances enable dramatically simpler on-premise deployments without the burden of hardware management or the infrastructure implications of SaaS. Other benefits include assurance around performance and reliability, simpler administration, lower software life-cycle management, and streamlined upgrades. ISVs should begin evaluating this new option to determine if it can speed deployments and transform their business models for the better.

### TABLE OF CONTENTS

#### 2 **There Has To Be A Better Way To Deliver Software**

Software Firms Weigh New Delivery Alternatives

#### 3 **Virtual Appliances Cut Costs And Accelerate Sales**

IT Users Will Love This, Too

Commodity, Security, And SMB Software Fit Best

High-Performance And Highly Customized Apps Don't Fit

#### RECOMMENDATIONS

#### 8 **Start Experimenting With Virtual Appliances Now**

#### WHAT IT MEANS

#### 9 **Virtual Appliances Will Temper The SaaS Trend**

#### 9 **Supplemental Material**

### NOTES & RESOURCES

Forrester interviewed the following companies for this report: Amazon.com, BEA Systems, Business Objects, F5 Networks, La-Z-Boy, Network Engines, Openbravo, Purisma, rPath, SpamTitan, and VMware.

#### Related Research Documents

"Server Virtualization Adoption By Industry: Enterprise Worldwide 2006 — Industries Vary"  
May 7, 2007

"The State Of SMB Software And Services 2006: North America"  
November 10, 2006

"Software-As-A-Service: An Executive Primer"  
September 1, 2006

## THERE HAS TO BE A BETTER WAY TO DELIVER SOFTWARE

No one wins in today's enterprise software deployment model. While distribution via download or DVD might be simple, the complexities of development and configuration hurt profitability, time-to-revenue, and customer relationships. Enterprise customers, both big and small, hate it because it delays implementation. Commercial software vendors hate it even more because:

- **There are too many versions to maintain.** It's challenging enough to deliver differentiated and value-rich features, but ISVs have to do so across multiple versions of Windows, Linux, Solaris, and AIX, among others. Prioritizing the platforms and dealing with all of their inconsistencies and idiosyncrasies are a significant drain on resources.
- **The testing matrix is huge.** To ensure that most enterprise environments can run your software, you have to determine what works with what. This means building out a costly test matrix in QA, which can be challenging to maintain and drag testing times on for months beyond code freeze.
- **Setup and configuration are too complex.** With myriad infrastructure and middleware standards across enterprises, getting the right configuration in place is no easy task. What type of server, operating system (OS), storage, app server, or database could be implemented? What patch levels are required? Precious professional services resources spend weeks on-site, which stretches time-to-revenue far beyond the time of sale.
- **The support burden is too heavy.** When customers call, it can take up 90% of the time just determining what configuration they have and if the problem lies purely in that configuration, not in the software.
- **Follow-on revenue is too unpredictable.** As configuration is so challenging, customers often say, "Now that it's running, don't touch it" — and makes them gun-shy of upgrades. New features have to blow them away to get them to go through the pain of retesting, installing, and configuring.

## Software Firms Weigh New Delivery Alternatives

How can these complexities be dramatically reduced? Product strategists see two alternatives in the market today, as well as an emerging third model that provides some unique and compelling advantages worth ISV consideration:

- **Software-as-a-service (SaaS).** One approach is to deliver the software as a service, but this turns the ISV into a service provider that now has to manage the infrastructure supporting the service and compete on SLAs and an entirely different set of metrics.<sup>1</sup> This approach can also require substantial rearchitecting of the application.

- **Hardware appliances.** Several ISVs have solved these problems by packaging their software with hardware and selling the solution as an appliance — just plug it in, turn it on, and away you go. But this means entering the hardware business, which adds capital and inventory management issues and eats into the margins and simplicity of the software-only business model.
- **Virtual appliances.** Thanks to hardware virtualization, a new option is emerging that leverages the advantages of hardware appliances without the hardware. It lets ISVs package a fully configured and optimized software stack in a virtual server format that can be quickly deployed at the customer site on top of VMware ESX, Xen, or another hypervisor.

### VIRTUAL APPLIANCES CUT COSTS AND ACCELERATE SALES

All three approaches have their merits and shortcomings (see Figure 1 and see Figure 2). But virtual appliances deserve special attention, as they address many of the challenges that ISVs face today in a way that can be more palatable for enterprise infrastructure and operations professionals and application managers than either alternative — and certainly the status quo.

- **Development is much simpler.** Controlling the entire software stack selection lets your developers concentrate on adding value to your offering rather than addressing platform differences and retuning for each iteration that you support.
- **Performance and reliability are squarely in the ISV's control.** Perhaps the biggest customer-facing reason to move to the appliance model is to address the performance and reliability of your deployments. In the appliance approach, you set up the specific configuration that you know will work best for your application. ISVs can strip down, tune, and optimize the OS and middleware stack specifically to their requirements, add proprietary hooks and fixes, and hardwire the code as much as necessary to ensure optimum performance.<sup>2</sup> It is also easier to support because the ISV knows the exact stack, as customers are not allowed to edit the stack.
- **Hypervisors eliminate the hardware.** Moving from the hardware appliance model to the virtual appliance model eliminates the need to distribute your own hardware to get optimum performance and reliability, as the hypervisor abstracts the hardware dependencies away. IT infrastructure professionals like this because the software payload fits into their virtualized deployment scheme; application administrators like the simplified deployment model. Simply provide hardware resource requirements and recommendations that they can implement at the hypervisor layer.<sup>3</sup>
- **Virtual appliances ease the sales burden.** First, time-to-revenue is, as Oz Greenberg, senior product manager at Business Objects, puts it, “an order of magnitude faster,” as the virtual server simply needs to be loaded onto the hypervisor and you're up and running; this also eases demos by your sales force. Second, using the same tool kits mentioned above — or via your own mechanisms — you can manage upselling via remote license management schemes. The

customer wants to add a new module? No problem. Install it exactly as set in the specifications during the next update — even if it requires new components of the OS or middleware stack.

- **Appliance tool kits make management dramatically simpler.** Any ISV can configure an optimized stack for its application, but if you now own the stack, its management and maintenance now fall on your shoulders — as those who have gone down the hardware server appliance path have found. Your update mechanism now needs to maintain and update the entire software stack. Vendors like rPath, Network Engines, and soon VMware provide mechanisms to easily accomplish this; they also enable remote management of the stack as well as proxied updates that let IT align these changes to their security and maintenance windows.
- **QA, support, and maintenance costs are dramatically lower.** With the virtual appliance being the sole deployment configuration, the QA test matrix can be dramatically reduced; this means the time-to-resolution for support is faster and the application of security patches, bug fixes, and maintenance releases are more efficient and meaningful to the performance of the application. You are no longer at the mercy of the pace of server OS upgrades.
- **Adoption of the latest features accelerates.** Another beauty of the server appliance model is that because you control the entire software stack, you can more easily drive upgrades. While the customers will still need to approve and accept new features, their testing burden and migration are significantly simplified, as they only need to test your new software stack against the hypervisor and their internal processes.

**Figure 1** Software Delivery Choice Matrix

	Delivery option			
	Hardware appliance	Software virtual appliance	Traditional delivery	SaaS
Server resource requirements	<b>High:</b> Deploy exactly the hardware required	<b>Low:</b> Fits in a partition on a traditional server	<b>Any:</b> Must specify minimum and recommended configurations	<b>Any:</b> You control the deployment
I/O characteristics	<b>Highest:</b> Wire speed required	<b>Low:</b> Can share I/O with other apps without affecting performance	<b>Low to high:</b> Must specify	<b>Any:</b> You control the deployment
Deployment complexity	<b>Low to mid:</b> No configuration variance at factory; some at VAR or end customer	<b>Low to mid:</b> No configuration variance at factory; some at VAR or end customer	<b>Any:</b> The more complex, the longer the time to revenue and the higher the presales burden	<b>Any:</b> You control the deployment
Level of customization by end customer allowed	<b>Low:</b> Customization options diminish value of appliance, raise support costs	<b>Low to mid:</b> With tool kits, VARs can do some precustomization. Limited end user options, otherwise support costs rise	<b>Any:</b> The more customization allowed, the longer the time to revenue and the higher the presales burden	<b>Low:</b> Must be as repeatable and consistent from customer to customer to control operational costs

**Figure 2** ISV Business Model Impact

	Delivery option			
	Hardware appliance	Software virtual appliance	Traditional delivery	SaaS
Cost to support	<b>Mid:</b> Remote management keeps support costs typically low, but hardware fix or replace costs can be high	<b>Low:</b> Remote management keeps costs typically low	<b>High:</b> Typically no remote management; support often costly, due to customizations, varied deployment, and large test matrix. Support costs rise as versions proliferate	<b>Low:</b> Nothing on-site; limited customization
Cost of business model (cost to operate, distribute)	<b>High:</b> Hardware inventory management	<b>Low:</b> Similar to traditional without the test matrix QA costs	<b>High:</b> QA test burden	<b>Highest:</b> Highly scalable DC operation replaces high QA test burden
Margin impact (increase in COGS/SG&A)	<b>High:</b> Hardware raises COGS substantially	<b>Low:</b> Low cost of goods; lowers cost of sales and marketing	<b>Mid:</b> Low cost of goods; cost of sales and marketing can be mid to very high	<b>High:</b> COGS impacted by high DC operations costs
Revenue flow	<b>Lumpy:</b> Subscription model can be employed, but eventually the hardware needs to be refreshed	<b>Predictable:</b> Subscription model easily employed, and license manager allows simple upgrade sales	<b>Lumpy:</b> Difficult to get users to upgrade	<b>Predictable:</b> Subscription model easily employed, and license manager allows simple upgrade sales
Ease of new feature delivery	<b>High:</b> Tools allow remote update for all appliances	<b>High:</b> Tools allow remote update for all appliances	<b>Low:</b> Customer controls timing and implementation in most cases	<b>Highest:</b> ISV fully controls software updating
Best-fit examples	VoIP, load balancing, high-volume security services	Business apps, SOA components, small to medium databases, low-volume security services, SMB software, others	Highly complex business apps; highly customized apps	Low-customization/high-configuration-complexity business apps

42968

Source: Forrester Research, Inc.

### IT Users Will Love This, Too

While conventional wisdom might suggest that infrastructure and operations professionals won't be in favor of specialized software payloads like this, the evidence in the market today suggests otherwise. Forrester has spoken with many enterprise IT infrastructure and application administration professionals and found that most are very comfortable with the appliance model — and, in most cases, prefer it. Virtual appliances fulfill IT objectives of standardization, commoditization, and simplification.

- **IT will trade less control for easier management.** The appliance is one less thing they have to manage.<sup>4</sup> The same is true of VARs, which often serve as IT for small businesses. The VARs appreciate that the ISV fulfills the management and maintenance of these services and removes complexity, which eats into their service margins and customer loyalty.
- **Lose the special hardware? Even better.** The chief complaint from enterprise IT about hardware-based server appliances is the nonconformity of these offerings. While they can monitor the appliances, they don't like having to make special arrangements for them or the fact that they don't fit into their major initiatives, such as consolidation, virtualization, and standardization. Virtual appliances address this issue, as they become just another payload that runs on the approved standard hardware.
- **Every payload's a special payload, but it's the vendor's problem.** Myriad OSes, patch levels, and configurations exist in the typical enterprise today; as a result, security concerns and management challenges demand more and more of IT's time. Virtual appliances don't make this worse; they make it better, as the ISV takes responsibility for managing their virtual machines. Plus, stripping down the OS and middleware yields a more secure stack, as many of the features that hackers exploit simply aren't there. This lifts OS and middleware management off of IT's shoulders, letting it concentrate on managing the hardware and hypervisor, which are far less complex and more easily standardized.

### Commodity, Security, And SMB Software Fit Best

All the above is fine and good if you can make virtual appliances fit your business model — there are presently more than 600 commercially available virtual appliances — but not all ISVs have offerings that do.<sup>5</sup> The more complex and varied your implementations, the less likely it is that this model may make sense for you. Even applications that need their own server fit this model, as the objective is easier deployment, not resource sharing. Modern hypervisors like VMware ESX 3 and Xen v4 don't add significant latency to applications that consume the whole box. Here are three categories that have a natural affinity:

- **Applications targeted at SMBs.** Software targeted at these customers and best suited to being deployed on-premise is a natural fit with this model. Smaller organizations tend to have fewer IT staff and less sophistication and prefer offerings that can be remotely administered and maintained.

- **Security software.** These applications tend to be challenging to configure and deploy and require frequent updating. Taking this burden off of IT has led to significant sales of security hardware appliances to date; as most of these applications don't require dedicated hardware, a transition to the virtual appliance model would be a no-brainer for these vendors.
- **Complex-to-configure — but not highly customized — business applications.** Any type of business application that has multiple components, dependencies on middleware or databases, or requires (or can benefit from) specialized OS configurations can benefit immensely from the virtual appliance approach. Even if the end configuration involves multiple virtual appliances that need to be deployed together, this approach can shave weeks to months off time-to-production.

### High-Performance And Highly Customized Apps Don't Fit

The types of applications that this deployment model will likely not fit easily include applications that require specialized hardware, have tight quality of service (QoS) metrics, or require wide levels of customization and configuration variance. Examples include:

- **Telecommunications applications with specialized hardware.** Any application dedicated to providing voice services, be they VoIP or a related capability, tend to be highly sensitive to latency and are still best deployed on hardware server appliances optimized for this function. These appliances tend to employ specialized hardware to assist with call quality, compression, encryption, or WAN optimization.
- **Apps that must run at wire speed.** High-volume spam filtering, virus detection, XML preprocessing, and streaming media applications are also best deployed on hardware appliances where the software and hardware are tuned to these functions. However, with lower volume or QoS requirements, these same offerings can be a fit with virtual appliances.
- **Highly customized applications.** If every deployment is different, you may be better off sticking with the traditional model. However, a virtual appliance might add value if there is a foundation of core services deployed every time.

## RECOMMENDATIONS

## START EXPERIMENTING WITH VIRTUAL APPLIANCES NOW

It behooves every ISV to consider the viability of this deployment model for their business. The improvements in deployment time and reduction in QA and support burden alone justify the investment. It will take years to migrate customers from the traditional model and fully deliver the benefits promised, but the sooner you start, the faster you can lower these costs.

- **Temper your initial expectations — evangelism is required to drive demand.** Don't expect rapid adoption of this deployment model, as most enterprises are just getting started with virtualization.<sup>6</sup> While you can serve as a catalyst for this change, most organizations haven't fully thought through the administration, availability, and recoverability processes of a virtual environment, let alone what a virtual appliance is and what it means to their environment.
- **Treat it as a new business.** Forrester recommends financially tracking this effort separately; examine its costs and benefits in isolation to determine if this model will yield more long-term benefits to your business than the traditional model. Separate tracking will also help you justify the effort to upper management and secure its on-going funding.
- **Start with SMBs.** These customers tend to be the most costly to support and want an on-premise solution; while VARs typically do the fulfillment, time-to-deployment can be just as long as with enterprise customers.<sup>7</sup> Hardware server appliances have done well in these environments, but SMB customers welcome the reduction in the number of discrete hardware elements that have to be managed.
- **Include the channel in your appliance strategy.** While a more simplified deployment model might mean you can direct-ship or direct-download your software more easily, VARs will still play a critical role in the rest of the relationship if they are part of your business model today. Some ISVs' business models thrive on their own complexity, something their VARs count on as well. If this is your play, think through how VARs can participate. If deployment involves some customization of the configuration, consider passing the "appliance" tool kit to your VARs and allowing them to do this work in the field or allowing them to package the offering on hardware that they supply to the customer.
- **Which hypervisor? Follow the market, then adopt the standard.** Which hypervisor should you base your appliances on? For now, VMware has the bulk of the installations, but an emerging standard has been proposed at the Distributed Management Task Force (DMTF). The Open Virtual Machine Format Specification (OVF) will eventually allow virtual appliances to run on any hypervisor supporting the format.<sup>8</sup> At present, VMware, Citrix, and Microsoft have all announced their participation in the development of the specification and plan support. Citrix and Microsoft have further announced native interoperability between their virtual machine formats.

## WHAT IT MEANS

### VIRTUAL APPLIANCES WILL TEMPER THE SAAS TREND

As most ISVs can't recognize revenues until the customer puts the application into production, innovations like virtual appliances should drive down costs and deliver competitive advantage for ISVs that favor the on-premise approach. And as appliances can be remotely managed, updated, and upsold, the use of virtual appliances should help on-premise ISVs stem the tide of SaaS alternatives. The approach should also fuel more rapid application advancement, as new features can get through QA and into production more quickly. There should also be ample opportunity to deliver greater value through combining multiple virtual appliances via SOA communications mechanisms, Web services, and the mashups of on-premise and over-the-Internet services.

## SUPPLEMENTAL MATERIAL

### Research Methodology

For this report, Forrester spoke with leaders in the hardware and software server appliance market, including tool kit makers, finished product distributors, and even enterprises that are "appliantizing" their internal applications. We also spoke with companies leading the software-as-a-service model.

### Companies Interviewed For This Document

Amazon.com	Openbravo
BEA Systems	Purisma
Business Objects	rPath
F5 Networks	SpamTitan
La-Z-Boy	VMware
Network Engines	

## ENDNOTES

- <sup>1</sup> As software-as-a-service (SaaS) offerings proliferate, clients are increasingly wondering what they are, why firms are adopting them, and how they differ from alternate deployment models like application service provider (ASP) and application outsourcing. To help clients sort through the confusion, Forrester examined various characteristics that differentiate the various models. See the September 1, 2006, "[Software-As-A-Service: An Executive Primer](#)" report.
- <sup>2</sup> Virtual appliance tool kit maker rPath provides its own locked-down Linux distribution offering that you can use with appliances as a starting point.
- <sup>3</sup> VMware, rPath, and other virtual appliance proponents are developing SLA checkers — tools that will ensure that the resources allocated through the hypervisor will comply with your requirements, so you can be sure that the proper infrastructure is in place to meet your SLAs.
- <sup>4</sup> ISVs should be prepared, though, for enterprise customers to request an audit of their security, patch management, and maintenance procedures to ensure compliance with their corporate standards. Consider conducting a SAS-70 audit on your security procedures and mapping your patch and maintenance procedures to the ITIL framework.
- <sup>5</sup> VMware maintains a directory of commercial, freeware, and open source virtual appliances on its virtual appliance marketplace Web site: Visit <http://vmware.com/appliances/> for more information. Visit <http://www.rpath.com/corp/partners/rpath-isv-partners.html> for a list of ISVs using the rPath tool kit.
- <sup>6</sup> More than 50% of enterprises are either using or piloting server virtualization today; breadth of deployment varies widely. See the February 7, 2007, "[Server Virtualization Accelerates In North America](#)" report.
- <sup>7</sup> Despite claims from the SaaS market that SMBs want to subscribe to services, Openbravo, SpamTitan, and Purisma all said that customers prefer an on-premise solution rather than SaaS. This is supported by Forrester research that shows that the majority of small businesses are not interested in SaaS. See the November 10, 2006, "[The State Of SMB Software And Services 2006: North America](#)" report.
- <sup>8</sup> However, in its current iteration, OVF is simply a descriptive wrapper. If you want to support multiple hypervisors, you will have to package multiple virtual appliances in the same OVF wrapper. Visit <http://xml.coverpages.org/ni2007-09-11-a.html> to read more about the OVF proposed specification.

# FORRESTER®

Making Leaders Successful Every Day

## Headquarters

Forrester Research, Inc.  
400 Technology Square  
Cambridge, MA 02139 USA  
Tel: +1 617.613.6000  
Fax: +1 617.613.5000  
Email: [forrester@forrester.com](mailto:forrester@forrester.com)  
Nasdaq symbol: FORR  
[www.forrester.com](http://www.forrester.com)

## Research and Sales Offices

Australia	Israel
Brazil	Japan
Canada	Korea
Denmark	The Netherlands
France	Switzerland
Germany	United Kingdom
Hong Kong	United States
India	

*For a complete list of worldwide locations,  
visit [www.forrester.com/about](http://www.forrester.com/about).*

For information on hard-copy or electronic reprints, please contact the Client Resource Center at +1 866.367.7378, +1 617.617.5730, or [resourcecenter@forrester.com](mailto:resourcecenter@forrester.com). We offer quantity discounts and special pricing for academic and nonprofit institutions.

Forrester Research, Inc. (Nasdaq: FORR) is an independent technology and market research company that provides pragmatic and forward-thinking advice to global leaders in business and technology. For more than 24 years, Forrester has been making leaders successful every day through its proprietary research, consulting, events, and peer-to-peer executive programs. For more information, visit [www.forrester.com](http://www.forrester.com).