

Resources: Virtualizing Citrix / XenApp

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The purpose of this document is to collect together resources into one useful document on the topic of Virtualizing Citrix / XenApp.

There are many guides, discussions, white papers and blog articles on virtualizing Citrix - because lots of VMware customers ARE virtualizing their production Citrix systems.

This is not a proven practice document because it doesn't say who or how someone has done this - instead, it brings together a substantial selection of resources together into a format that should guide you through this challenge and leaves the actual steps up to you. A proven practice would be an excellent companion to this document to show the specific decisions and steps taken for a specific situation.

So what is this document? It's a mixture of guidance and supporting resources. I've tried to order this document as you would work through the challenge, from "thinking about it" through to "operations" and the "disaster recovery" stage. The end result is a document that hopefully flows in a reasonable way, and provides enough information within itself without being just an index of links. For each link, I try to provide a summary and outline of the resource and not just the URL.

I hope you find this Resource useful - if you DO - please RATE this document at the bottom (also do that if you hate it!) - please leave comments, and please feedback - even better, JOIN IN!

New Updates

Kenneth Boutroup added the attached Citrix doc in the discussion thread [Citrix On VMware](#)

Why Virtualize Citrix / XenApp?

All the normal reasons to [virtualize on VMware](#) apply

1. [VMware is more reliable than a mainframe!](#)
2. Reduce [space, power, heat, TCO](#)
3. Benefit from optimize workloads, especially if your Citrix environment is only busy between 9 and 5 - [DRS for workload balancing, Distributed Power Management](#)
4. As well as zero downtime for planned maintenance because of [vMotion](#), also benefit from [improved data recovery, high availability and disaster recovery](#)
5. Other people are doing it with great success:
 1. [VMware Success Story: Solvay Pharmaceuticals](#)
 2. [VMware Success Story: Mechanics Bank](#)
 3. [VMware Success Story: JanPak](#)
 4. [VMware Success Story: Monster](#)
 5. [See more Citrix success stories](#)

6. Because there's lots of advice on how to do it - which the rest of this doc explains...
 The first thing that you might think is "Why virtualize Citrix on VMware, if Citrix have their own virtualization product?". To answer that, check out if Citrix can do all of the above points, and then read these good reasons why Citrix runs better on VMware, despite what they might claim



1. [Brian Madden on Why Citrix needs to catch up with VMware.](#)
2. [VMware compared to Microsoft and Citrix management](#)

Features	VMware Infrastructure 3.5 with VirtualCenter	Microsoft Hyper-V with SCVMM	Citrix XenServer 4.1 with XenCenter
Integrated P2V tool	✓	✓	⊘
Integrated V2V tool	✓	Can import VMDK	⊘
Virtual machine Clones	✓	✓	⊘
Provisioning from virtual machine templates	✓	✓	✓
Automated guest customization	✓	Windows only	⊘
Virtual appliance marketplace	✓	⊘	⊘
Centralized server configuration	✓	✓	✓
Centralized license management	✓	⊘	⊘
SQL management database	✓	⊘	⊘
Web management client	✓	⊘	⊘
Advanced CPU and memory resource controls	✓	⊘	⊘
Network bandwidth resource controls	✓	⊘	⊘
Customizable alarms	✓	Requires SCOM	⊘
Customizable tasks	✓	Requires SCOM	⊘
Event logging	✓	✓	Only 15 minutes
Performance monitoring	✓	Requires SCOM	⊘
Resource topology	✓	⊘	⊘

maps			
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Features	VMware Infrastructure 3.5 with IT Services Delivery suite	Microsoft Hyper-V with SCVMM	Citrix XenServer 4.1 with XenCenter
Lab management automation tool	!http://www.vmware.com/files/images/icons/checkmark.gif! Lab Manager	Only basic self-provisioning with SCVMM Self-Service Portal	Third-party
Virtual machine life cycle automation tool	!http://www.vmware.com/files/images/icons/checkmark.gif! Lifecycle Manager	⊘	Third-party
Automated release management tool	!http://www.vmware.com/files/images/icons/checkmark.gif! Stage Manager	⊘	⊘

Virtualizing Citrix on VMware

The following list of resources have helped people virtualize Citrix on VMware - add to this list via the discussion thread, or the comments section at the end of this document, or edit this document yourself and Submit for Approval. Feedback is very welcome!

For VMware Infrastructure 3 (not the older ESX 2.x products)

[Citrix on VI3 Recommendations \(blog\)](#)

Sven Huisman's blog article on recommendations. This is a(nother) great article from Sven - he says what his experience has been with specific settings (e.g. balloon driver enabled, contrary to other recommendations) as well as providing some more links.

[More XenApp 4.5 on VMware recommendations \(blog\)](#)

Sven Huisman posted a link to his blog at virtualfuture.info. Thanks, Sven, this is a great article and draws out some key points from VD2591: Lessons Learned While Deploying Citrix

Presentation Server (XenApp) 4.5 in a Virtual Datacenter. I've attached a PDF of that presentation to this document, or you can visit vmworld.com to listen to the presentation recording - the presentation is from Orestes Melgarejo (Citrix) and Brandon Meyer (Citrix customer, Quebecor World Inc.)

Sven pulls out specific Host and VM settings, and also Citrix templates and cloning.

[A short guide to virtualizing Presentation and Terminal servers on VMware ESX 3](#)

This is a really nice article from Gabe Knuth, Aug 2007. His intro:

Server Based Computing has, for a long time now, been the most used method of centralization and consolidation of applications. Bringing applications to the user without the worries of physical location has been a key aspect in centralizing the infrastructure. Seeing as VMware is often a key player in the disaster recovery procedures, it is important to have at least some virtualized Terminal or Citrix Servers. The better the performance we can pull from these servers, the more users we can get back to work during a disaster.

I have spent a while trying to find the best practice for running virtualized Terminal or Citrix Servers, and I will try to go through the things I have found. The performance improvement of the servers is not really something that can be rated, as it all depends on the individual setup of applications and load. But the suggestions I will mention here can be used together, or individually, in whatever way works best for your environment.

There are two levels in which these changes can be made: Host settings, which apply to an entire ESX host, and Virtual Machine settings, which apply to the individual virtual machine only.

Then he covers

- Adding custom parameters to the Virtual Machine, specifically `sched.mem.pshare.enable`, `das.defaultfailoverhost`, `sched.cpu.htsharing`
- Using 1 vCPU, no HT, using LSIlogic, disabling unused devices, disabling visual effects and proper memory sizing
- For the host, Gabe talks about page sharing and `vmkernel` settings.

[VI3.5 And Citrix PS 4.5 \(VMTN discussion\)](#)

This is a good thread. I particularly like Jason Boche's entry that has some nice graphs of physical vs. virtual, showing the idle CPUs on a 4-core physical box.

Jason also posted a very detailed list of how to P2V a Citrix server, using both Converter and "P2V Assistant" - ah, I've just had a flashback to my old consulting days of P2VA (didn't you hear the involuntary loud, blood curdling scream?)

Jason's observations:

+We know as Citrix administrators there exists a user count threshold where performance and user experience tanks. We haven't hit that yet with 40 users on our Citrix VMs. I've asked for my manager's approval to take one of the Citrix servers out of the silo which will force user count per server to ~50 so we can start to discover where exactly that threshold is in a Citrix

VM with our application silo specific characteristics. The threshold will change from silo to silo. For this particular application silo, the threshold may be 50 users. For a silo that runs other applications, that threshold may be much lower, like 20 users. It all depends on the published application load in the silo.

Trust me, I'm keeping a keen eye on context switching. It's already reaching the boundaries of my comfortability level but if end user performance is not suffering, I can raise my context switching alarm level from 18,000/sec. to say 30,000/sec. Again, it's all about finding the sweet spot just before the tanking starts to happen.

My Citrix servers are running on average of 25 users each and get very good application response these are free floating along with all the other VMs, I'll post some stats next week; and the modifications I made maybe you have some more tricks I can add to my boxes.

I would definitely like to see what you are doing. From my side, I don't have any tricks up my sleeve as far as the VM configuration or the guest configuration. One of the benefits ESX 3.x brought to us was they eliminated the need to specify the "workload = terminalservices" parameter in the .vmx file which one needed to use on ESX 2.x for tuning. It's automagic in ESX 3.x. As far as customizations inside the guest OS after the P2V, that list isn't too lengthy because I don't want my Citrix platforms to be radically different between physical and virtual for support reasons.+

Jason also supplies a very detailed guide on P2Ving servers.

[Improving Scalability for Citrix Presentation Server \(VMware white paper\)](#)

This white paper presents data showing the number of Citrix sessions you can sustain when running Citrix Presentation Server 4.0 inside a virtual machine, and then measures scalability with 1, 2, 4 and 8 VMs. For ESX 3, engineering improved Citrix performance in a virtual machine and we want to showcase those gains, as well as present best practices for performance.

Citrix Presentation Server administrators have often opted for many small servers (with one or two CPUs) to run Citrix Presentation Server server farms. Due to the limitations in the underlying operating systems, it has been difficult to scale the number of Citrix Presentation Server clients that can be supported on a server as the number of CPUs in the server is increased.

With multiple-core processors becoming the norm, and servers with four to eight CPUs providing the best price point for servers, it is important for applications in the data center to be effective in scaling to servers with larger numbers of CPUs. Using VMware ESX Server it is possible to use larger servers as the infrastructure for a Citrix Presentation Server implementation. The purpose of this paper is to characterize the performance of Citrix Presentation Server running inside multiple VMware virtual machines on an ESX Server 3.0 host. It covers the following topics:

- Executive Summary on page 1
- Test Setup on page 2
- Test Suite on page 3
- Test Results on page 5
- Conclusions on page 7

[VMware: Best practices for deploying Citrix on ESX \(Blog article\)](#)

From Vincent Vlieghe, company called Xylos, on his blog at <http://virtrix.blogspot.com/>

First and foremost: this tuning list is my own experience and the experience of several users on the [VMware forum](#). Your mileage may vary.

The goods:

- Virtual Infrastructure 3
- Windows 2003 Std (or Enterprise) Edition R2 (x86, not x64)
- Citrix Presentation Server 4.0 (yes, I know, the old one 😊)

Vincent lists 24 tips, visit his blog article to read them.

[MED 0115 Optimizing Citrix Presentation Server with VMware ESX Server \(pdf presentation\)](#)

This is a 2006 VMworld presentation from Citrix (Paul Hahn) and VMware (Hemant Gaidhani). It covers VMware VI 3.0 and CPS 4.0. Topics covered:

- Single server scalability, particularly the things that restrict it
- Although there isn't a magic formula, it talks about some good rules of thumb, but testing is of paramount importance
- It shows the results of a test, including the reference implementation, test results, and guidance.

[TAC9728 Citrix and VMware How These Technologies Work Together \(pdf presentation\)](#)

Another VMworld 2006 presentation, this time from Thomas Huber and Daniel Euteneuer (both VMware). This presentation shows the results of a test, but part of the presentation was a live demo which is missing from the pdf of course.

For ESX 2.x (not the current VMware Infrastructure 3)

[White Paper on Citrix Metaframe in ESX Server Virtual Machines](#)

This KB article is from VMware's Knowledge Base (KB), which is the main outbound channel from VMware's Technical Support team. Anything on here is supported by VMware.

This KB article really just points to two other white papers, which are available from the [Technical Resources](#) page. Both of these papers are old (2005) and some of the advice no longer applies to VMware Infrastructure 3 (e.g. switching on the Terminal Services Workload feature - VI3 is already optimized for Terminal Services workloads).

[Reference and Capacity Planning for Citrix Presentation Server in a VMware ESX Server Environment \(pdf of a presentation\)](#)

This is an old (2005) presentation deck, and does the usual "Intro to Citrix products, Intro to Virtualization, Benefits of Virtualizing Citrix and then Best Practices". The best practices cover Planning, Sizing, Performance, Manageability and Availability - but only in bullet point format, so it has limited use as a guide. It's more of a high level list of things to address.

[Reference and Capacity Planning with Citrix Presentation Server \(pdf whitepaper\)](#)

This is also old. It is the detailed version of the presentation deck above.

[Ron Oglesby's Presentation \(video\)](#)

This is pre-VI3 but still useful... it has Ron, the seasoned Citrix expert, giving his view of the benefits etc. of Citrix on VMware.