

Virtual Machines for Dynamics AX Instruction and Investigation

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Abstract: Providing students and faculty with administrative rights to working, malleable, instances of Microsoft Dynamics AX (or other ERP) are one of the biggest hurdles for classroom adoption. In addition, for courses focused on implementation and configuration, managing the documentation and establishing clear checkpoints for rolling back inadvertent system choices is nearly impossible to handle in a course with 10, 20, perhaps even 100 different deployments (i.e., student projects) being pursued. As discussed in this overview and the detailed reference web site, virtualization – either on local computers or in the cloud – provides a workable solution to these issues.

I WANT MY VHD

Virtualization – whether by building or using local virtual machine (VM) images or utilizing cloud VM resources like Azure – can help with the infrastructure aspects of using Enterprise Resource Planning (ERP) software for teaching or research. By their nature, ERP's are large, multi-faceted, server-based products highly dependent upon system resources like networking, database management server, active directory, and resource sharing. This enterprise breadth and availability gives ERP's their value in supporting business process automation for large firms with complex requirements. These same capabilities fight against easily bringing the products into the classroom or research. By creating a virtual “computer within a computer” many of these challenges can be overcome, providing desktop or remote application hand on experiences with a fully configured ERP.

A virtual computer – or VM – consists of two core pieces: a VM image and a VM player. The image is essentially a copy of the hard drive of the computer to be run virtually; the player is the program on the user's host computer that executes the image. As a result, the user has an application which is really another computer. In Figure 1a a fairly lightly provisioned Apple Mac¹ Air is allowing Dynamics AX to be run with full administrative rights to the software and server; the image is a Microsoft Hypervisor Virtual Hard Drive (or VHD) residing on a portable hard-drive named DynAA and the player is VMware Fusion. The Dynamics AX session (well, it's actually a Windows Server session running AX) interacts with the host's file system making any transfer of files (e.g., from the VM to the host's desktop) as easy as normal file movement and the VM typically inherits any internet connection the host has. It is literally two computers in one.

¹Slightly snarkily, I am of the opinion that if I can “think different” enough to get a fickle Mac to accept what I am doing then I can get any platform to swallow it. A Mac is not a requirement, just an example.

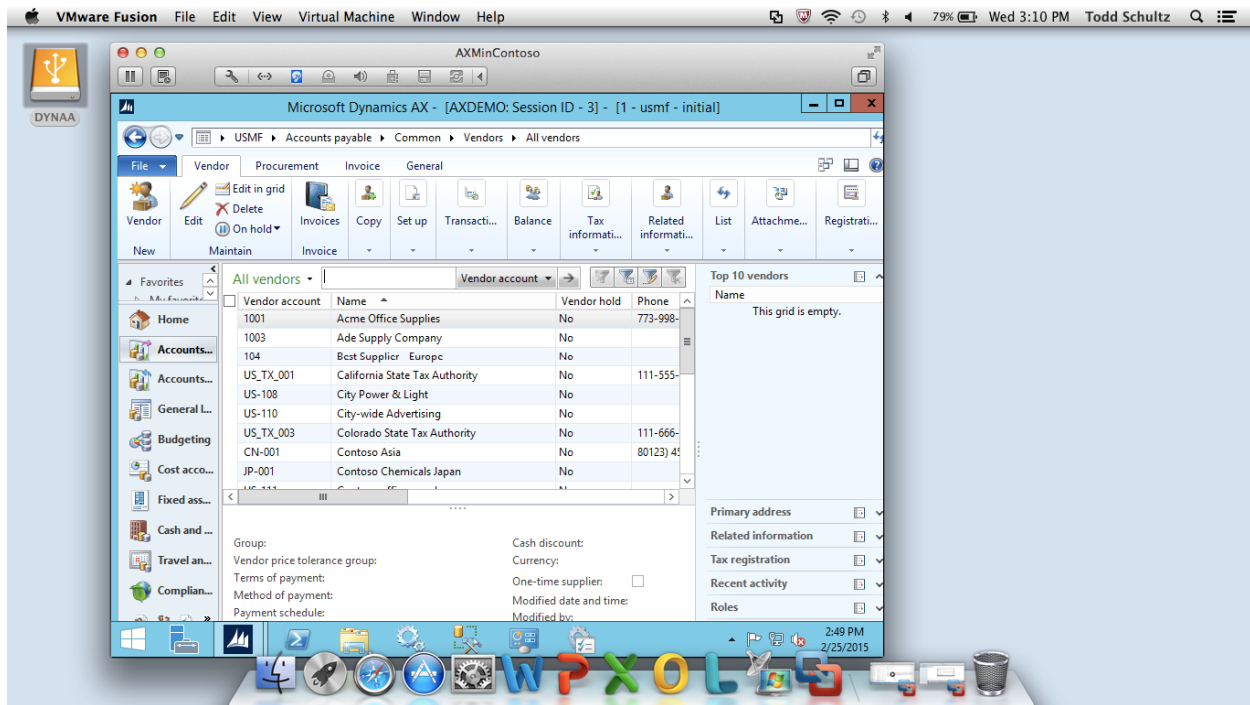


Figure 1: A Mac Hosts Dynamics AX

In general, the players for VM's are free or low cost – we discuss VMware Player (for Windows and Linux hosts), VMware Fusion (for Apple Macintosh hosts), and Microsoft Hypervisor (for Windows 8 or beyond or Windows Server 2008 and beyond); there are others. VM players are installed just like any software and the VM images can be built from scratch by installing and configuring all the relevant software within the VM – something suitable for a System Administration or Enterprise Architecture class – or by obtaining an already configured image – best for courses where using and applying the ERP are important (e.g., accounting, supply chain management, management information systems). Beyond a bit of sweat equity, this approach is very low cost or even free for members of Microsoft Dynamics Academic Alliance (DynAA) and DreamSpark. A number of variations are outlined in the web site referenced in the *Getting Started* section which concludes this overview.

I'M GOIN' UP TO THE SERVER IN THE SKY

The example in Figure 1 used a “local” VM meaning the virtual hard drive was available in the file system of the computer and when the VM was running, the memory for the virtual machine came from the PC. VM images to support ERP's can run from 30 GB for a minimal install of a product like Dynamics GP to 120+ GB for a Dynamics AX image with all the bells and whistles. To provide reasonable response, the VM requires anywhere from 2GB up to 12+ GB depending upon what is being executed. These demands can outstrip the hardware typically available to students and faculty. There is also the difficulty of distributing a prepared image to a class and challenges of changing from one computer to another (e.g., at school and at home) to do the work. There are ways to manage these issues with local VM's but they depend upon the installation environment and deployment goals. Again, a number of solutions are outlined in the web site referenced in the *Getting Started* section which concludes this overview.

A virtual image, however, does not need to reside on a local machine; it can reside “in the cloud” (i.e., on another computer connected to the internet) and if properly configured will allow remote access from anywhere on the planet with an internet connection using a computer with remote desktop capability (which includes all PC's, Mac's, Linux boxes, and at least a few tablets including Microsoft Surface). The picture ends up looking just like Figure 1 except the local machine is running a very lightweight remote client; the heavy lifting is offloaded to the “server in the sky”.

This is the approach used by the labs in the Dynamics Learning Portal, available as of this writing free to faculty (but not yet students) who are DynAA members. These labs have some duration and continuity issues – although they are full-fledged implementations allowing lab takers full freedom of motion (i.e., users are not tied to the lab script) they were designed for short duration, focused activities and not to provide a resource that is updated over days, weeks, or months of a University course.

Microsoft Azure can be leveraged to provide a more controlled version of this AX. In fact a DynAA member (again, faculty) can use Life Cycle Services – part of CustomeSource access to which comes with DynAA membership – and a free Azure account to have a no cost, 30 day trial sandbox of a fully configured Dynamics AX instance. It takes following a few instructions and perhaps a 30-45 minute wait while the VM is provisioned. This particular approach is outlined in “Configuring a Base Dynamics AX 2012 Test System” by Murray Fife, available for \$5 at <http://www.amazon.com/dp/B00KK5C800/> or visit the very compelling Dynamics AX Companions site at <http://www.dynamicsaxcompanions.com/>.

Microsoft Azure is very likely the core solution if “cloud hosting” of Dynamics is purchased or comes with a textbook so it can be helpful to get a bit of perspective on how this resource can be utilized. In short, a virtual hard drive can be uploaded to Azure (or built in Azure) and an image created that can be cloned to provide each user an AX test environment. Some recently deployed Azure technology raises the hope that any device capable of running an app (tablets and smartphones) could provide a remote interface to a Dynamics instance.

As with other approaches to deployment there are balances of effort, expense, and capabilities to be managed with Azure. Azure is essentially infrastructure or software as a service so there are bills based on usage that need to be paid even if the core software is free-to-use for academics. Once again we outline various approaches in the web site referenced in the *Getting Started* section which concludes this overview

GETTING STARTED

From students and instructors who simply need a system “that works” through courses involving server installations, configuration, and customized development, knowledge of VMs and their management is a critical skill for Dynamics Academic Alliance members and students. Implementation and how-to details are too voluminous to develop fully in writing and the hypertext and updatability of the web make a much better medium for dissemination. For fuller guidance and details please visit <http://dynaa.azurewebsites.net/VMs/>. This resource provides guidance and implementation detail for developing and deploying virtualized resources as well as access to such ready-to-use resources such as configured VM images and provisioned cloud VM’s (at this writing on a trial basis pending resolution of costing, licensing, and scale out issues. The site also addresses more “in the classroom” issues such as

- How to use a pre-configured VM containing Dynamics AX and the sample Contoso dataset (copies of this VM will be available for distribution at the preconference)
- Illustrate how VM players make using a VM convenient (e.g., quickly suspending or restarting VMs, managing files from and to VMs).
- Demonstrate some basic “tricks of the trade” for managing VM “checkpoints” allowing relatively easy restoration of early states of the VM (i.e., recovering from “uh oh’s”)
- Review guides we have prepared and tested which lead students through basic transaction sequences, configuration exercises, and server builds and deployments.