

Title Page

vCalendar

by

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Acknowledgements Page Acknowledgements

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1-Jan The "Virtual Machine Administrator" role ships with vCenter. Think twice about using this role. At the very least, investigate the permissions this role has. The name of the role is misleading as it has a lot more permissions than virtual machine administration. For example, this role has the ability to destroy datastores!

2-Jan Convert an available ESX tty to an ESXTOP session with these steps:

1. Edit /etc/inittab file
2. Comment out the line 5:2345:respawn:/sbin/mingetty tty5 by placing a # at the beginning
3. Find: 6:2345:respawn:/sbin/mingetty -f /etc/issue.emergency -l /bin/login.emergency tty6
4. Insert after: esxtop:2345:respawn:/usr/bin/esxtop -d 2 -s > /dev/tty5 < /dev/tty5
5. Reboot the ESX host
6. CTRL+ALT+F5 for ESXTOP

3-Jan Configuration Maximums Comparison

Concurrent vSphere client connections:
vCenter Server 4.0 32-bit: 15 client connections
vCenter Server 4.0 64-bit: 30 client connections
vCenter Server 2.5: unpublished

4-Jan Configuration Maximums Comparison

Fibre Channel LUN size:
ESX(i) 4.0: 2TB minus 512B
ESX(i) 3.5 Update 4: 2TB

5-Jan Know Thy Open Snapshots

Snapshots are wonderful. With this technology comes the responsibility of using it properly and knowing its limitations. Keep constant track of the snapshots that exist in your environment. Leaving a snapshot open can cause slowness and lead to failure for the VMs residing on the snapshot volume.

<http://www.boche.net/blog/index.php/2008/12/02/know-thy-open-snapshots/>

6-Jan ESX has 2 execution modes: Direct Execution Mode & Virtualization Mode. Direct Execution Mode is much more efficient because it has direct access to the host hardware, thus it is the most preferred method of instruction execution. Virtualization Mode is used when Direct Execution Mode is not possible, primarily when an instruction needs access to CPU Ring 0. The VMkernel handles each of these requests, thus it's slower.

7-Jan Load averages in ESXTOP are 6-second sample calculations based on the total number of processors in the host in the last 1, 5, and 15 minutes. For example, in a 4 processor host, a value of 2.00, 2.00, 2.00 would mean 50% host utilization (2.00 divided by 4 processors) evenly in the last 15 minutes. A reading of 4.00, 2.00, 0.03 would indicate an idle host 15 minutes ago and a fully utilized host as of 1 minute ago.

8-Jan Lab Manager Organizations are container boundaries which determine which resources (resource pools, hosts, datastores, media stores, and physical networks) users and groups have access to or can be granted access to.

In a default installation, only (System) Administrators can add and delete Organizations.

9-Jan Secure your VI3 license pool with an Options file:

The FlexLM license tool in VI3 essentially lets any host on the network draw from its available license pool, exhausting licenses and features in the process.

Add security to your valuable license pool by implementing an Options file which dictates which network hosts can check out a license from the pool.

<http://kb.vmware.com/kb/1000955>

10-Jan Configuration Maximums Comparison

Hardware iSCSI initiator ports per host:

ESX(i) 4.0: 4 ports

ESX(i) 3.5 Update 4: 2 ports

11-Jan On this day in 2005, VMware releases ACE (Assured Computing Environment) 1.0. ACE is a revolutionary product that reinvents desktop management and security. ACE is a great fit for contractor, telecommuter, and mobile laptop users with a single mechanism that combines security, user autonomy, and centralized management.

12-Jan Configuration Maximums Comparison

Linked-mode for vCenter Server 4.0:

Linked vCenter Server system: 10 vCenter Servers

ESX(i) hosts in Linked-mode environment: 1,000 ESX(i) hosts

Powered-on VMs in Linked-mode environment: 10,000 VMs

Registered VMs in Linked-mode environment: 15,000 VMs

vCenter Server 2.5 Update 4 does not support Linked-mode

13-Jan What's New in VMware vSphere 4.0

Pluggable Storage Architecture — An open modular framework that enables third-party storage multipathing solutions for workload balancing and high availability. See the Fibre Channel SAN Configuration Guide or the iSCSI SAN Configuration Guide http://www.vmware.com/pdf/vsphere4/r40/vsp_40_san_cfg.pdf
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_iscsi_san_cfg.pdf

14-Jan Removing a datastore in Lab Manager deletes all its virtual machines, media stores, and media files from the Lab Manager database only. This operation does not actually delete files on the datastore.

Out of the box, only (System) Administrators can remove datastores and as you can probably imagine, for good reason. This permission should be delegated only to trustworthy administrators.

15-Jan On this day in 2008, VMware announces the acquisition of Thinstall. The Thinstall product is rebranded as ThinApp and VMware releases ThinApp 4.0 on 6/27/08. ThinApp creates portable applications that can be leveraged across a variety of operating systems (Windows NT, XP, Vista, 2000) and plug into a variety of deployment infrastructures (SMS, LANDesk, Citrix, BMC, and others)

16-Jan Recent ESX builds (English) and release dates

ESX 4.0, 5/21/09, Build 164009

ESX 3.5 Update 4, 3/30/09, Build 153875

ESX 3.5 Update 3, 11/6/08, Build 123630

ESX 3.5 Update 2, 8/13/08, Build 110268

ESX 3.5 Update 1, 4/10/08, Build 82663

ESX 3.5, 12/10/07 & re-released 2/20/08, Build 64607

See also <http://bit.ly/aK8zQ>

17-Jan VMware Update Manager Network Port Requirements

80

443

8084

9000-9100

<http://kb.vmware.com/kb/1004543>

18-Jan If you are an ESX shop contemplating a migration to ESXi and the benefits that it has to offer, keep in mind the two products do not share an identical list of compatible hardware. Generally speaking, the ESXi Hardware Compatibility List (HCL) is more limited in terms of hardware than ESX. There is a chance the hardware you have running ESX in the datacenter right now may not be supported by VMware for running ESXi.

19-Jan You may already know that while in esxtop, interactively pressing the c, m, d, and n keys changes the esxtop focus to each of the four food groups. But did you know there are more advanced views for drilling down to more detailed information?

Compare the following interactive keys with d: u, v

To view the complete documentation for esxtop (known as man pages in the *nix world), use the command man esxtop in the COS.

20-Jan Microsoft Cluster Server can be virtualized on VMware Virtual Infrastructure. Although MSCS can be deployed several ways on VMware, there exists a precise set of configurations and conditions that must be met in order to be supported by VMware. You can view them at the links below:

http://www.vmware.com/pdf/vi3_35/esx_3/r35u2/vi3_35_25_u2_mscs.pdf

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_mscs.pdf

21-Jan What's New in VMware vSphere 4.0

iSCSI Support Improvements — Improvements to both software and hardware iSCSI, resulting in a dramatic improvement of both performance and functionality of both software and hardware iSCSI and delivering significant reduction of CPU overhead for software iSCSI. See the Fibre Channel SAN Configuration Guide

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_san_cfg.pdf

22-Jan Networking Differences Between ESX3.5 & ESXi

Cisco Discovery Protocol = ESXi is listen only. ESX3.5 can be configured for both listening & advertising
Jumbo Frames = ESX3.5 VMkernel & guest support. ESXi3 guest support only
NetQueue = Supported on ESX3.5; not supported on ESXi3
NetFlow = Experimental support on ESX3.5; not available on ESXi3
Infiniband = HCAs from Mellanox Technologies not supported on ESXi3
KB1003345

23-Jan Disable access to VMware Tools in the Windows system tray (doesn't restrict access thru Control Panel)

- 1) Go to c:\program files\vmware\vmware tools\
2) Apply Deny permission for Read & Execute & Read for the users on file VMControlPanel.cpl
3) Right click on the VMware Tools system tray icon and choose disable
4) Run regedit & delete the VMware Tools key in HKLM\Software\Microsoft\Windows\CurrentVersion\Run
KB1006354

24-Jan Virtual NICs:

Vlance = Emulated AMD 79C970 PCnet32 LANCE NIC
VMXNET = Optimized NIC for ESX 2.x
Flexible = Reports as Vlance during VM boot & initialize as Vlance or VMXNET depending on which OS driver initializes it
E1000 = Emulated Intel 82545EM Gb Ethernet NIC for newer OS
VMXNET2 (Enhanced) = Supports Jumbo Frames & TSO
VMXNET3 = Next gen paravirtualized NIC, supports multiqueue, IPv6 offloads, MSI/MSI-X

25-Jan To configure VM guest VLAN tagging, configure the vSwitch portgroup for VLAN 4095. Any vNIC in a VM configured to use this portgroup will have VM guest VLAN tagging enabled. Of course, for it to properly work, the guest OS network configuration must be set correctly for VLAN tagging.

26-Jan At the ESX Service Console, use the fuser command to show which processes are using a specified file, file system, or socket.

i.e.

```
[root@esx3l /etc]# /sbin/fuser -u /sbin/fuser
/sbin/fuser: 3793e(root)
[root@esx3l /etc]# /sbin/fuser -u /var/log/vmkernel
/var/log/vmkernel: 1208(root) 2181(root)
```

27-Jan At the ESX Service Console, the w command will display a summary of every user logged in to the host, what that user is currently doing, and what load all the activity is imposing on the host.

i.e.

```
[root@esx3l /etc]# w
19:44:32 up 7 days, 20:00, 1 user, load average: 0.18, 0.06, 0.01
USER  TTY  FROM          LOGIN@  IDLE   JCPU   PCPU   WHAT
root  pts/0 workstation 2:53pm  0.00s  0.07s  0.01s  w
```

28-Jan Users cannot log into the Lab Manager system or access any resources until they are added to an Organization. Users can be added as new accounts in the Lab Manager database or imported from an LDAP source (such as Active Directory). Groups can only be imported from an LDAP source. When a group is imported, the members of that group don't appear on the Users tab until they have logged into Lab Manager at least once.

29-Jan VMware vSphere supports memory hot add for the following Windows OSs:

Win2k3 ENT x86/x64

Win2k8 STD x86*/x64*

Win2k8 ENT x86/x64

VMware vSphere supports CPU hot add for the following Windows OSs:

Win2k8 STD x64*

Win2k8 ENT x64*

Memory and CPU hot remove is not supported for Windows OSs.

* = Reboot of guest OS required to recognize added hardware

30-Jan In Lab Manager, the use of the "LiveLink" feature is a great way to report something you've found in a configuration (a bug perhaps). A LiveLink is the HTTP URL of a configuration in the Library. The URL can be emailed to another Lab Manager user (ie. Developer), who can click on the link to deploy a copy of the configuration exactly as it was when it was saved to the Library.

31-Jan APC PowerChute in the Service Console

It's a best practice to keep the number of COS software installations to a minimum. Here's a case that's justified for some environments to ensure graceful host shutdowns. Mike at motogobi has done some leg work & put together the procedure:

<http://www.motogobi.com/2008/11/13/setting-up-powerchute-network-shutdown-in-vmware-esx-35/>
See also <http://communities.vmware.com/docs/DOC-9531>

1-Feb What's New in VMware vSphere 4.0

vCenter Server 4.0 — vCenter Server 4.0 simplifies management for large environments with one-time setup and configuration, search-based navigation, and a single-pane-of-glass view for multiple vCenter Servers. In addition, vCenter Servers can be interconnected in Linked Mode. See vSphere Basic System Administration
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

2-Feb What's New in VMware vSphere 4.0

1TB Host Memory — ESX/ESXi 4.0 supports systems with up to 1TB of RAM. See the vSphere Compatibility Matrixes for a list of systems for which 1TB host memory is supported
http://www.vmware.com/pdf/vsphere4/r40/vsp_compatibility_matrix.pdf

3-Feb Add a static route for an additional Service Console interface with the following command:

```
/sbin/route add -net [subnet ID] netmask [subnet mask] gw [gateway for 2nd COS]
```

Example:

```
/sbin/route add -net 10.10.24.0 netmask 255.255.255.0 gw 192.168.0.2
```

Make the above change persistent by adding it to `/etc/rc.local`

<http://kb.vmware.com/kb/1005212>

4-Feb What's New in VMware vSphere 4.0

Storage Stack Performance & Scalability - Improved storage I/O performance, making even the most I/O-intensive applications prime candidates for virtualization. See the ESX Configuration Guide and the ESXi Configuration Guide

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

5-Feb Find out Size, Used, Available, and %Used of your ESX file system (including VM datastores) with the following command:

```
vdf -h
```

Leaving off the `-h` omits datastore information in the results, hence only local Service Console storage information is displayed.

6-Feb When a Lab Manager user that owns objects is deleted, the user is considered "stranded". When a user gets stranded, ownership of its objects must be reassigned before the user can be fully deleted.

7-Feb VMware doesn't allow Lab Manager users of any permission level to upload files to the Media library. Supposedly this is to protect valuable available storage. Ironically, Lab Manager users without quotas are allowed to freely chew through storage with any number of template and configuration deployments. This results in semi-frequent requests for the Lab Manager/VI admin to upload Media files for Lab Manager users.

8-Feb What's New in VMware vSphere 4.0

vSphere Management Assistant — The vSphere Management Assistant (vMA) is a virtual machine which includes vSphere Command-Line Interface and other prepackaged software that developers and administrators can use to run agents and scripts to manage ESX and ESXi systems. See the vMA home page for more information on vMA
<http://www.vmware.com/go/vma>

9-Feb What's New in VMware vSphere 4.0

Host Profiles — Host profiles simplify host configuration management through user-defined configuration policies. See the ESX Configuration Guide and the ESXi Configuration Guide
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

10-Feb Are your VMFS volumes block aligned? For optimal disk performance they should be. You can find out in the ESX Service Console with the following command:

```
fdisk -lu /vmfs/devices/disks/[vmhba_path]
```

A start value of 63 indicates no VMFS alignment (not the best)

A start value of 128 indicates VMFS alignment (great!)

11-Feb When deploying new ESX builds, save a lot of time by deploying from the newest build version of ESX available. Avoid using VMware Update Manager to remediate major updates because it takes an extraordinarily long time. For example, remediating Update 3 on an ESX 3.5.0 ESX host takes 1.5 hours on IBM x3850 hardware (including reboots).

12-Feb Deploying a Lab Manager Configuration registers its virtual machines in vCenter. This is when you'll see new VMs show up in vCenter.

Undeploying a Lab Manager Configuration unregisters its virtual machines from vCenter. At this time, you'll find that the VMs have disappeared from vCenter.

13-Feb When virtualizing Microsoft Network Load Balancing (NLB) in unicast mode, be sure the effective "Notify Switches" switch port policy for this VM (whether by portgroup or by vSwitch) is set to "No" or else the VM will have various networking issues with other network hosts. NLB in multicast mode is not impacted by this setting.

14-Feb One change from VMFS-2 to VMFS-3 was the outcome of a LUN failure when using extents. Because VMFS-3 employs LVM to manage volumes, data is not striped across the extents and therefore the loss of an extent doesn't necessarily constitute a loss of all VMs (although you will lose the VMs on the failed extent). VMs will continue to run on the other extents, unless the "head" extent is lost. Then all is gone.

15-Feb VMware does not support SAN multipathing on the VCB Proxy. If by chance your VCB Proxy is multipathed per the political powers that be, take a look at a workaround published by David Davis:

<http://www.petri.co.il/how-to-deal-with-vmware-esx-server-vcb-multipath-issues-consolidated-backup-windows.htm>

16-Feb What's New in VMware vSphere 4.0

64-bit VMkernel — The VMkernel, a core component of the ESX/ESXi 4.0 hypervisor, is now 64-bit. This feature provides greater host physical memory capacity, enhanced performance, and more seamless hardware support than earlier releases. See the vSphere Resource Management Guide
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_resource_mgmt.pdf

17-Feb Integrating Microsoft Active Directory authentication in the ESX Service Console used to be somewhat of a daunting task. Today, however, the steps have been greatly condensed and I find it a cinch:

1. Create a local user account on the ESX host for each AD user account you would like to authenticate
2. Use esxcfg-auth to configure the ESX host to be AD integrated

18-Feb If you are unable to add an ESX host to a cluster due to HA issues, take a look at VMware KB article 1001596 entitled Troubleshooting Adding an ESX Server Host to a VMware High Availability Cluster. This article contains several steps to troubleshoot HA issues.

<http://kb.vmware.com/kb/1001596>

19-Feb What's New in VMware vSphere 4.0

VMXNET Generation 3 — The third generation paravirtualized NIC from VMware. VMXNET3 includes many new features not found in Enhanced VMXNET

See the ESX Configuration Guide and the ESXi Configuration Guide

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

20-Feb When building the ESX host, create a dedicated partition for /opt.

Without a dedicated /opt partition, /opt is going to be a directory off /. Some instances of VMware HA logging as well as hardware agent logging is stored in /opt. Excessive logging on /opt can chew up all available partition space on /. Running out of disk space on / is less than ideal and that's putting it mildly. I prefer a 4GB partition size for /opt.

21-Feb Lab Manager 4 Agent/Service Tidbits

-The agent is installed on an ESX(i) host when it is "prepared" in Lab Manager

-The agent installs in the directory /opt/vmware/vslad

-Logging is in the directory /var/log/vmware/vslad

-The host service name is vslad and can be restarted for troubleshooting

-Debug logging can be enabled by modifying /etc/opt/vmware/vslad/vslad.xml (KB1012319) but not for an extended time

22-Feb The Fencing feature in Lab Manager isolates the virtual machine from other machines on the network and prevents IP and MAC address conflicts that could exist if multiple copies of the same machine are deployed at the same time.

The three modes of fencing are:

1) Allow In and Out

2) Allow Out

3) Block In and Out

23-Feb The Lab Manager Media library enables the storage of files (typically these will be .ISO or .FLP images) which can be accessed by the Lab Manager users. There's really no magic. A Media library is nothing more than a native ESX datastore with files on it. It's earmarked as a Media library within Lab Manager to provide user access directly to the folder where the files are located to provide some isolation.

24-Feb UDA (Ultimate Deployment Appliance) is a popular free PXE boot deployment tool by Carl Thijssen. Out of the box, it's configured with its own DHCP server. Configure UDA to use your network's native MS DHCP service in a 2 step process:

- 1) Disable DHCP in UDA
 - 2) Set option 066 on your MS DHCP server with the UDA IP address
 - 3) Set option 067 on your MS DHCP server with the string pxelinux.0
- <http://www.ultimatedeployment.org/>

25-Feb On this day in 2009, VMware announces the vExpert Awards. 300 recipients are awarded the first ever vExpert status. vExperts were chosen on the basis of contributions they made to the community of VMware and virtualization users in 2008. VMware will hand out the vExpert awards on an annual basis. In 2010, new vExperts will be announced.

<http://blogs.vmware.com/vmtn/2009/02/vmware-vexpert-awards.html>

26-Feb Find out what hardware devices were discovered during the ESX boot process with the Service Console command `dmesg`

27-Feb Enhanced VMotion Compatibility (EVC) processor support

Enhanced VMotion Compatibility (EVC) simplifies VMotion compatibility issues across CPU generations. EVC automatically configures server CPUs with Intel FlexMigration or AMD-V Extended Migration technologies to be compatible with older servers. Requires ESX Server 3.5 Update 2 or higher with Virtual Center 2.5 Update 2 or higher.

<http://kb.vmware.com/kb/1003212>

28-Feb An RDM has 2 compatibility modes:

Virtual = Fully virtualized mapped device and thus is able to take advantage of VMFS benefits such as advanced file locking and use of snapshots. Looks like a standard virtual disk to the VM.

Physical = Minimal SCSI virtualization of the mapped device. VMkernel passes most SCSI commands to the device. All physical attributes of the underlying device hardware are exposed to the VM.

Feb-29 ESX Heritage

Rule # 1: ESX is not Linux.

1-Mar What's New in VMware vSphere 4.0

64-bit Service Console — The Linux-based Service Console for ESX 4.0 is now 64-bit. The new Service Console version is derived from a recent release of a leading Enterprise Linux vendor. See the vSphere Resource Management Guide http://www.vmware.com/pdf/vsphere4/r40/vsp_40_resource_mgmt.pdf

2-Mar When creating a snapshot on ESX(i), consider not snapshotting the virtual machine's memory. By default the virtual machine memory will be included in the snapshot. Snapshotting a VM without the memory state will take a lot less time and disk storage. Understand, however, that you cannot revert to a live running VM without the saved memory state. The snapshot will be crash consistent.

3-Mar What's New in VMware vSphere 4.0

255GB RAM — Up to 255GB RAM can be assigned to ESX/ESXi 4.0 virtual machines. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

4-Mar Scott Herold owns and operates the VMGuru.com website. Together with co-authors Ron Oglesby and Mike Laverick, Scott is offering free downloads of their book "VMware Infrastructure 3 Advanced Technical Design Guide". This is one of the best VMware VI books on the market today. Find the downloadable book at the link below:

<http://www.vmguru.com/index.php/component/content/article/83>

5-Mar Oracle 9i R2 is a supported database back end for vCenter Server versions through 2.5 Update 4.

vCenter Server 4.0 requires Oracle 10g R2 or newer (including Oracle 11g).

6-Mar What's New in VMware vSphere 4.0

VMware vShield Zones — Enables customers to monitor and enforce network access to sensitive areas of the virtual datacenter, including the DMZ, or to servers with sensitive data that is subject to regulations such as PCI or SOX compliance. See the VMware vShield Zones documentation
http://www.vmware.com/support/pubs/vsz_pubs.html

7-Mar ESX Users and Groups

- Users are stored in the `/etc/passwd` file
- Groups are stored in the `/etc/group` file
- Encrypted passwords for the Users are stored in the `/etc/shadow` file

If you're a Red Hat Enterprise Linux administrator, this should sound strangely familiar to you.

8-Mar Purchasing a product and not being able to install or use it due to licensing issues can be frustrating. VMware provides at least two resource inlets to resolve licensing issues:

Email VI-hotline@vmware.com
or
Call 1.877.4.VMware (1-877-486-9273)

Manage your VMware account (and licenses) at: <https://www.vmware.com/account/index.do>

9-Mar To test HA isolation response, you don't necessarily need to physically pull the Service Console NIC cables from the host. You can disable the vswif interface remotely with the command `esxcfg-vswif -d [vswif_name]`. Be sure you have out of band remote access to the host hardware because you will lose network connectivity to the host. To restore the vswif, the command is `esxcfg-vswif -e [vswif_name]`.

10-Mar Windows Security Policy Requirements for Lab Manager 3

Microsoft network server: Digitally sign communications (always) - disabled
Microsoft network server: Digitally sign communications (if client agrees) - disabled
Network Security: LAN Manager authentication level - Send NTLM response only

11-Mar Lab Manager Roles:

(System) Administrator-Lab Manager Administrator; highest global authority
Organization Administrator-Highest authority in the Organization (save Administrator)
Template Creator-Can create VM Templates & Configurations
Application Owner-Can create Configurations
User-Can deploy Configurations & check out LiveLink Library Configurations
View Only-Can view Workspace Configurations only

12-Mar Your hardware platform standard for new deployments, especially with the availability of vSphere, should be virtual hardware as a first choice.

For workloads that are not virtualization candidates, traverse the normal route of selecting blades or full size rack servers.

13-Mar What's New in VMware vSphere 4.0

Resource Usage Statistics — vCenter Server now displays detailed CPU and memory usage statistics at both the virtual machine and resource pool aggregation levels in a cluster. Statistics include CPU usage and demand, and private, shared, ballooned, and swapped memory usage breakdown. See the vSphere Resource Management Guide http://www.vmware.com/pdf/vsphere4/r40/vsp_40_resource_mgmt.pdf

14-Mar For a small performance gain in certain operations on ESX3 and newer, disable the vmfs2 driver in the VMkernel. In smaller storage deployments, the gain probably won't be noticeable but for those who pride themselves in tweaks, this one's for you. The thread below describes a few different methods:

<http://communities.vmware.com/thread/67384>

15-Mar Windows administrators may become lost in the ESX file system. There are two methods I know of for locating files in the ESX Service Console.

whereis - It's the shorter of the two methods but only works with source/binary files. On the plus side, it also locates manual sections.

ie. whereis esxcfg-vswitch

find - This is the method I commonly use

ie. find / |grep .iso (or find / -iname *.iso) note the different results

16-Mar Misinterpreted vCenter memory statistics:

Usage = Percentage of memory used as a percent of all available machine memory

Granted = Memory granted to the VM by the host. Memory is not granted until it is touched one time

Active = Memory used by the VM in the past small window of time

Consumed = Absolute host memory consumed by the VM

Shared = Memory shared with other VMs as a result of Content Based Page Sharing

17-Mar New features in the ESX4.0 Service Console:

Support for both 32-bit and 64-bit apps; 64-bit driver support; Console root file system is a VMDK file; IPv6 support; Security Enhancement (ASLR); 64-bit Perl environment; Linux standard packages; Support for remote file systems; VMware configuration CLI support (esxcfg-*); Command-line utilities; DMTF SMASH 2.0 support; New vmware-cmd commands (listvms & getid)

18-Mar Use the Service Console command `esxcfg-vmhbadevs` to display the mappings between vmhba names and /dev names.

i.e.

`esxcfg-vmhbadevs`

or

`esxcfg-vmhbadevs -m`

19-Mar DRS Affinity/Anti-Affinity rules are nice features which I consider the precursor to vApps where VMs are tied together to run on the same host. VMware provides no export feature to document the rules and by virtue of their location, they are hidden and easily forgotten. Dominic Rivera provides a PowerShell script to export anti-affinity rules.

<http://vmprofessional.com/2009/06/drs-and-anti-affinity-rules.html>

20-Mar Virtualized Citrix Access Gateway Appliance

Citrix Access Gateway is a pay-for hardware appliance from Citrix allowing flexible and robust remote access to Citrix farms. It is the successor to Citrix Secure Gateway (which was free). The following URL contains information on virtualizing CAG with VMware. Unsupported by Citrix.

<http://cns-service.blogspot.com/2008/07/citrix-access-gateway-456-on-vmware.html>

21-Mar What's New in VMware vSphere 4.0

Events and Alarms Enhancements — Alarms are triggered only when they satisfy certain time conditions to minimize the number of false triggers. See vSphere Basic System Administration

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

22-Mar Scan your ESX logs for SCSI reservation conflicts with the following command at the Service Console:

```
grep -i reservation /var/log/vmkernel*
```

23-Mar The VMware Fusion team has put together a great "how to" guide for installing Microsoft Windows 7 (beta) on Fusion. The screenshots and detailed explanations should have you up and running Windows 7 in no time.

Some report that Windows 7 on a VM runs very well, better than Vista, with as little as 512MB RAM.

<http://blogs.vmware.com/teamfusion/2009/01/windows-7-on-mac-with-vmware-fusion-a-practical-guide.html>

24-Mar Cached Virtual Infrastructure Client host connection entries are stored in the Windows registry and are tied to each individual user profile (HKU). You'll find the comma delimited list of entries in the following registry key:

```
HKU\[User SID]\Software\VMware\VMware Infrastructure Client\Preferences\  
The value name is RecentConnections and the type is REG_SZ
```

25-Mar On the Lab Manager Server, the NETWORK SERVICE account minimally needs READ NTFS permissions in the Lab Manager installation directories or the Lab Manager services will fail to start with an "access denied" error message.

26-Mar Both VI3 and vSphere utilize VMFS-3 as a datastore format. Making the jump from VI3 to vSphere requires no VMFS upgrade.

While the native vSphere VMFS datastore version does increment from VMFS 3.31 to 3.33, there is currently no known advantage to upgrading to this VMFS version. In short, it would be counterproductive and a waste of valuable time.

27-Mar Enabling SSL certificates in vCenter often results in guest customization password decryption error messages after upgrading to a new version of vCenter. The error message will show up when trying to apply a guest customization to a VM. The resolution can be found in the following VMTN discussion (find the post by 'Tigernoy'):

<http://communities.vmware.com/thread/54721>

28-Mar What's New in VMware vSphere 4.0

Fibre Channel over Ethernet — Extends the number of I/O consolidation options available to VMware customers by adding Fibre Channel over Ethernet support on Converged Network Adapters (CNAs). For a list of supported Fibre Channel over Ethernet CNAs with vSphere 4.0, please see the IO Devices tab in the Hardware Compatibility Guide <http://www.vmware.com/resources/compatibility/search.php>

29-Mar By default, the first 5 nodes in an HA cluster are primary nodes. Remaining nodes are secondary. Primary nodes maintain all node states & this information is synchronized with other primary nodes. Secondary nodes send info to primary nodes.

To find out which hosts in the cluster & primary and which are secondary, run the following command in the Service Console:

```
cat /var/log/vmware/aam/aam_config_util_listprimaries.log
```

30-Mar Two of the Lab Manager 3 software installation requirements are Microsoft Internet Information Services 6.0 and Microsoft .NET Framework 2.0 SP1 or higher.

IIS 6.0 must be installed before .NET Framework.

31-Mar vCenter Server 4.0 is compatible with and may be used to manage ESX 2.5.x, 3.0.x, 3.5 (all Updates), and 4.0.

http://www.vmware.com/pdf/vsphere4/r40/vsp_compatibility_matrix.pdf

1-Apr What's New in VMware vSphere 4.0

64 Logical CPUs and 320 Virtual Machines (with a total of up to 512 Virtual CPUs) Per Host — ESX/ESXi 4.0 provides headroom for more virtual machines per host and the ability to achieve even higher consolidation ratios on larger machines. See the Configuration Maximums for VMware vSphere 4.0

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_config_max.pdf

2-Apr Use cheaper/slower/less redundant storage alternatives for your templates, .iso files, and potentially snapshots or VMkernel swap. Save the higher performing and more expensive storage for your running VMs.

3-Apr The vSphere 4.0 client is compatible with and may be used to administer vCenter Server 2.0.x, 2.5 (all Updates), and 4.0.

4-Apr VMware license files by default are in UNIX format, without DOS/Windows return codes at the end of each line. DO NOT edit license files using Notepad or the license file may become corrupt and unreadable by the VMware License Server. Use WordPad or a third-party text editor that supports UNIX newlines.

<http://kb.vmware.com/kb/8996281>

5-Apr TCP Wrappers Authentication Flow Summary

When a remote connection is requested, the access control software consults two files. The search stops at the first match:

- Access will be granted when a (daemon,client) pair matches an entry in the /etc/hosts.allow file
- Otherwise, access will be denied when a (daemon,client) pair matches an entry in the /etc/hosts.deny file
- Otherwise, access will be granted

6-Apr When a user is removed from the entire Lab Manager installation, Lab Manager removes the user from all organizations, deletes all of the private objects (ie. Media, undeployed configurations, and VM templates) of the users, and reassigns the shared objects to the logged in administrator. When a user that owns objects is deleted, the user is considered "stranded". If an Organization is disabled, all its users are stranded.

7-Apr When configuring ESX(i) host hardware, if you're forced to make a decision on how to populate card slots when only a limited number of PCIe slots are available, you are best suited to place storage controllers (ie. HBAs) in the PCIe slots and NIC cards in the slower slots (ie. PCI-X). Storage needs the burst in I/O performance whereas the bus speed of a NIC will rarely be an issue.

8-Apr What's New in VMware vSphere 4.0

Service Management of vCenter Server Components and Plug-ins — vCenter Server features a service management console that displays the health of the components of vCenter and its associated extensions. Administrators can identify and correct failures in the management infrastructure. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

9-Apr Lab Manager Configurations with a saved state cannot be deployed to Lab Manager hosts with a different CPU family or type than where the configuration was originally saved without discarding the state. This would be similar to VMotioning between two different CPU types, or trying to unsuspend a VM on a different CPU type as compared to where it was originally suspended.

10-Apr To manually uninstall & re-install HA on a host, follow these steps in the Service Console:

- 1) Run the command `rpm -qa |grep aam`
- 2) Note the 2 case sensitive package names found
- 3) Uninstall HA with the command `rpm -e [package_name_1] [package_name_2]`
ie. `rpm -e VMware-aam-haa-2.2.0-1 VMware-aam-vcint-2.2.0-1`
- 4) Reinstall HA by choosing the "Reconfigure for VMware HA" in vCenter

11-Apr Configuration Maximums Comparison

Number of virtual machines per host:

ESX(i) 4.0: 320 virtual machines per standalone host

ESX(i) 4.0: 256 virtual machines per host in a DRS cluster

ESX(i) 4.0: 100 virtual machines per host in an HA cluster of 8 or less hosts

ESX(i) 4.0: 40 virtual machines per host in an HA cluster of 9 or more hosts

ESX(i) 3.5 Update 4: 170 virtual machines per host

12-Apr What's New in VMware vSphere 4.0

Virtual Machine Communication Interface (VMCI) - Facilitates high-speed communication between the VM & the hypervisor, as well as between virtual machines that reside on the same host. VMCI does not rely on guest networking. The VMCI Sockets library provides a convenient interface for using this device. See the VMCI landing page <http://www.vmware.com/support/developer/vmci-sdk/>

13-Apr In Lab Manager, only one snapshot of a configuration/virtual machine can exist at a time. Taking a new snapshot replaces the previous one. A configuration snapshot can only be performed when at least one of the configuration's VMs is in a deployed status.

14-Apr Whitepaper: Installing and Configuring Linux Guest Operating Systems

This whitepaper talks about installing, configuring, updating, and administering Linux guest operating systems in virtual machines running on VMware Infrastructure 3 version 3.5. In addition, it also provides a collection of useful tips and tricks in fine-tuning your Linux virtual machines:

http://www.vmware.com/files/pdf/linux_install_config.pdf

15-Apr The vSphere 4.0 client is compatible with and may be used to administer ESX 3.0.x, 3.5 (all Updates), and 4.0.

16-Apr When performing file level backups using VCB, there is a limit of 60 concurrent .vmdk files that may be mounted at one time on the VCB proxy server. While this isn't an issue when backing up one VM at a time which can have up to 60 virtual disks (max 4 SCSI controllers x max 15 devices per controller), it can become a scaling issue when backing up several VMs concurrently with VCB.

17-Apr Configuration Maximums Comparison

Virtual Machines manageable by a vCenter Server:

vCenter Server 4.0 32-bit: 2,000 powered on virtual machines

vCenter Server 4.0 32-bit: 3,000 registered virtual machines

vCenter Server 4.0 64-bit: 3,000 powered on virtual machines

vCenter Server 4.0 64-bit: 4,500 registered virtual machines

vCenter Server 2.5 Update 4: 2,000 virtual machines

18-Apr Beginning with VirtualCenter 2.0.1 Patch 2, VMware License Server (typically installed during VirtualCenter Server installation) no longer requires server-based licenses to be concatenated into a single file. Simply copy server-based licenses to the license directory. See KB 7252734, "License Server Directory Support for Simplified License Management" for more information.

<http://kb.vmware.com/kb/8996281>

19-Apr Configuration Maximums for VI is my favorite VMware document. It answers many of the "How many", "How much" type questions about VI capabilities. This is one of the documents that will most often be updated as new releases of VMware VI are released so it's a good one to keep tabs on.

http://www.vmware.com/pdf/vi3_35/esx_3/r35u2/vi3_35_25_u2_config_max.pdf
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_config_max.pdf

20-Apr What's New in VMware vSphere 4.0

Software iSCSI and NFS Support with Jumbo Frames — vSphere 4.0 adds support for Jumbo Frames with both NFS and iSCSI on 1Gb and 10Gb NICs. See the iSCSI SAN Configuration Guide
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_iscsi_san_cfg.pdf

21-Apr Nested Hypervisors

This is not a supported configuration, however, with the right tweaks you can install ESX4 on ESX4 or ESX4 on ESX3.5.

Take a look at <http://www.vcritical.com/2009/05/vmware-esx-4-can-even-virtualize-itself/>
Be sure to read through the comments as well as they contain some vital information.

Xtravirt.com has the procedure for Workstation: <http://xtravirt.com/node/177>

22-Apr What's New in VMware vSphere 4.0

Increased NFS Datastore Support — ESX now supports up to 64 NFS shares as datastores in a cluster.

23-Apr VMFS-3 Maximum File Sizes

The maximum file size allowable on a VMFS-3 volume is determined by the block size when the VMFS volume was created. Since the block size cannot be changed without destroying the VMFS volume and all the data on it, plan accordingly.

Block Size Max File Size

1MB-----256GB

2MB-----512GB

4MB-----1024GB

8MB-----2048GB

ESX4 supports the same file sizes minus 512Bytes

24-Apr What's New in VMware vSphere 4.0

Storage VMotion Enhancements — Storage VMotion can now be administered through vCenter Server and works across NFS, Fibre Channel, and iSCSI storage networking protocols. Virtual disk formats can be converted during a Storage VMotion session. See vSphere Basic System Administration
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

25-Apr Configuration Maximums Comparison

ESX(i) hosts manageable by a vCenter Server:

vCenter Server 4.0 32-bit: 200 ESX(i) hosts

vCenter Server 4.0 64-bit: 300 ESX(i) hosts

vCenter Server 2.5 Update 4: 200 ESX(i) hosts

26-Apr Older versions of vCenter used the term "Rolling Failover" to describe the recovery behavior of bonded PNICs. The settings were confusing:

Yes - The failed adapter is left inactive even after recovery until another active adapter fails

No - The adapter is returned to active duty immediately upon recovery

In the current version of vCenter, VMware has changed the term to "Failback" which is much more meaningful.

27-Apr VMware recommends allocating at least 1GB RAM to the vCenter Server. Lab Manager 3 generates more activity within the vCenter Server than the daily interaction between the vCenter Server and the Virtual Infrastructure Client

28-Apr What's New in VMware vSphere 4.0

Guided Consolidation Enhancements — The Guided Consolidation service is now a modular plug-in to vCenter Server. Guided Consolidation can concurrently analyze and make consolidation recommendations for up to 100 physical machines at a given time. See vSphere Basic System Administration
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

29-Apr VMotion CPU Compatibility - Migrations Prevented Due to CPU Mismatch - How to Override Masks

This KB article provides information about overriding VMotion CPU compatibility restrictions between ESX hosts managed by VirtualCenter 2.x or vCenter Server 4.x. Warning: Unless indicated, VMware neither supports nor recommends modifying the VMotion constraints for CPU features used by applications.

<http://kb.vmware.com/kb/1993>

30-Apr vmware-umds.exe is a VMware Update Manager command line utility that doesn't receive much attention. Nonetheless, it's installed on the VUM server and may come in handy for you some day. A few of its uses are invoking the download of updates as well as exporting updates to an archive folder.

Another command line utility is vmware-updateDownloadCli.exe which can be used to import updates from an archive folder.

1-May /usr/sbin/esxcfg-swiscsi is used to manage VMkernel software iSCSI (swiSCSI)
/usr/sbin/vmkiscsi-tool is used to manage a hardware iSCSI initiator device

2-May Virtu-Al (Alan Renouf) posted a great two-page cheat sheet for the VMware VI Toolkit version 1.5. <http://www.virtu-al.net/2009/02/23/vi-toolkit-quick-reference-guide/>

This gem of a document is similar to VI3 card created by Forbes Guthrie over at vReference.com.
<http://vreference.com/vi3-card/>

3-May Required VMware vCenter Converter ports
22 TCP, 139 TCP, 443 TCP, 445 TCP,
902 TCP, 903 TCP, 9089 TCP,
137 UDP, 138 UDP

<http://kb.vmware.com/kb/1010056>

4-May Configuration Maximums Comparison

Logical processors per host:
ESX(i) 4.0: 64 logical processors per host
ESX(i) 3.5 Update 4: 32 logical processors per host

5-May VMware is among the 9 hottest skills for 2009 according to Computerworld

"Few companies are recruiting specifically for data center skills. Instead, they're retraining existing staff in VMware and other virtualization technologies."

Read more here:

<http://www.computerworld.com/action/article.do?command=viewArticleBasic&taxonomyName=Management&articleId=330106&taxonomyId=14&pageNumber=1>

6-May One trick I picked up early on when navigating the Service Console was to use `ll -h` for directory listings. The key is the `-h` which tells the Linux command interpreter to provide a long list directory listing while displaying file sizes in human readable format with suffixes (ie. 1.2KB, 5.0MB, 3.7GB, etc.). Leaving off the `-h` yields a list of file sizes in Bytes with no comma separators. Drives me nuts!

7-May The maximum number of virtual machines supported in a vSphere High Availability cluster is 1,280 VMs.

However, to achieve this maximum requires a specific configuration of 32 ESX(i) HA hosts with exactly 40 virtual machines per host.

8-May What's New in VMware vSphere 4.0

vSphere Command-Line Interface — The vSphere CLI has a significant number of new commands, including `vicfg-dns`, `vicfg-ntp`, `vicfg-user`, `vmware-cmd`, and `vicfg-iscsi`. See the vSphere CLI product page for more information on the vSphere CLI http://communities.vmware.com/community/developer/vsphere_cli

9-May On this day in 2007, VMware releases Player 2.0. Features include Windows Vista support, USB 2.0, Shared folders, Appliance view, & experimental support for vSMP.
Also released: ACE (Assured Computing Environment) 2.0. Features include ACE Management Server, Instance View, Help Desk, Pocket ACE, Virtual Printer, Network Access, USB Device policy, integration with Linux hosts, and integration with VMware Workstation.

10-May Warning: Some 3rd party applications (such as chargeback applications) require the increasing of the vCenter statistics level. Increasing the vCenter statistics level wipes previous historical performance data from vCenter database without a warning from vCenter.

11-May For those who do not want to use fibre channel SAN, there are several alternatives for ESX shared storage to take advantage of advanced ESX features. For free solutions, many Linux distributions natively come with NFS and iSCSI Enterprise Target (IET) functionality including Fedora, Openfiler, and Freenas. Pay solutions include Starwind, NexentaStor (ZFS based), Lefthand VSA, and Windows Services for Unix.

12-May Lab Manager versions 3 & 4 install an instance of Microsoft SQL Server 2005 Express Edition for the back end Lab Manager database. The database is installed on the Lab Manager Server. As of this writing, there appears to be no support for a client/server relationship to separate the database from the Lab Manager Server. Consider this carefully in your Lab Manager recovery strategy as the database is a very key component.

13-May Snapshots do not grow to infinity. Snapshots are a delta bitmap of the parent .vmdk file. Snapshots grow in 16MB increments up to a maximum size equal to the size of the parent disk. An update to an existing sector in the snapshot will be overwritten; it's not a continuous append or transaction log which grows forever.

14-May I'll wager one of the most often forgotten steps in a vCenter installation is the installation of the Windows sysprep files. It's easy to forget because vCenter gives the false indication of functioning without them, until you try to perform a Windows guest customization.

Install the sysprep files to this location:

C:\Documents and Settings\All Users\Application Data\VMware\VMware VirtualCenter\sysprep

15-May At the ESX Service Console, quickly find out the uptime of the host with the uptime command.

i.e.

```
[root@esx31 /etc]# uptime
```

```
19:45:34 up 7 days, 20:01, 1 user, load average: 0.06, 0.05, 0.01
```

16-May Lab Manager "Valid NIC Requirement" prerequisite check fails

If you're installing Lab Manager 3.x and the Valid NIC Requirement prerequisite check fails, verify your Lab Manager server has a static IP address configuration and not a configuration that is assigned by DHCP.

For other Lab Manager requirements, be sure to check out the Installation and Upgrade Guide at http://www.vmware.com/pdf/lm30_installation_guide.pdf

17-May What's New in VMware vSphere 4.0

DPM Full Support with IPMI and iLO Remote Power On - DPM used with IPMI, iLO or Wake on LAN is now fully supported in DRS clusters that have been tested and configured in accordance with VMware guidelines. For more information on IPMI, iLO, and these guidelines, see the vSphere Resource Management Guide http://www.vmware.com/pdf/vsphere4/r40/vsp_40_resource_mgmt.pdf

18-May Jumbo Frames

Any packet larger than 1500 MTU is a Jumbo Frame. ESX 3.5 and beyond supports frames up to 9,000 Bytes. No Jumbo Frames support for NAS or iSCSI traffic.

Configure a vSwitch for Jumbo Frames with the following command:
`esxcfg-vswitch -m [MTU] [vSwitch_name]`

Configure a VMkernel interface for Jumbo Frames with the following command:
`esxcfg-vmknic -a -i [ip_address] -n [netmask] -m [MTU] [portgroup_name]`

19-May In the ESX Service Console, the "last" command parses recent entries in the `/var/log/wtmp` binary log which is a log of all logins and logouts to the system.

20-May Virtualization Wiki

Rynardt Spies, proprietor of the VirtualVCP blog (<http://www.virtualvcp.com/>), has launched VI-Pedia, the Virtualization Open Wiki. The purpose for this wiki is to gather information on all virtualization technologies in one place. This is a community driven project and anyone can therefore update the wiki.

<http://www.vi-pedia.com/>

21-May On this day in 2009, VMware vSphere, the next generation datacenter virtualization product and successor to Virtual Infrastructure 3 (VI3), was released boasting approximately 150 new features, new license tiers, and an amazing 350,000 I/O operations per second (IOPS). vSphere is a 64-bit only ESX host OS.

22-May For an index of the entire VMware Knowledge Base, visit the following URL:

<http://kb.vmware.com/selfservice/google/searchpage.jsp>

23-May From the ESX Service Console, you can run a short script to shut down all running VMs that are registered on the host. The following script will enumerate the running VMs, try to first shut them down gracefully, and power them off if a graceful shutdown is unsuccessful:

```
vmware-cmd -l | xargs -i{} vmware-cmd '{}' stop trysoft hard
```

24-May Force a vCenter Server update to reflect command line .vmx changes using 2 vimsh commands at the COS:

1. Run the command `vimsh -ne "vmsvc/getallvms" |grep [vmname]` to obtain the VMID of the VM.
2. Run the command `vimsh -ne "vmsvc/reload [VMID]"` using the VMID obtained in the previous step.
3. After a few seconds, the configuration change will be received by the vCenter Server and will be reflected in the VIC.

25-May Running ESXTOP in replay mode:

1. Capture statistics using vm-support in snapshot mode using the command:
vm-support -S -d duration -i interval
2. Unzip & untar the resulting tar file so that esxtop can use it in replay mode
3. To run esxtop in replay mode, enter the command:
esxtop -R [vm-support_directory_path]

26-May Resize a .vmdk virtual disk file at the ESX Service Console with the following command:

```
vmkfstools -X 50G mydisk.vmdk
```

The numerical value represent the new size of the disk, not the relative change in size. Size can be specified in G,M, or K (guess what these mean?). In ESX 2.x, disks could be increased and decreased in size, however, as of ESX3 and beyond, disks can only be increased in size.

See <http://bit.ly/X5Hoa>

27-May On this day in 2009, VMware releases View Manager 3.1. Key features include significantly reduced login times and server utilization, automated LDAP Data and View Composer database backup, client information, improved logging, USB improvements, Multimedia Redirection (MMR) for Windows Vista, Adobe Flash Bandwidth Reduction, and multi-protocol support including HP's Remote Graphics Software (RGS).

28-May SQL Server 2000 is a supported database back end for vCenter Server versions through 2.5 Update 4.

vCenter Server 4.0 requires SQL Server 2005. SQL Server 2008 Standard Edition 64-bit is also supported for vCenter Server 4.0 but not for Update Manager 4.0.

29-May One might think the most verbose log file setting for vCenter is "verbose". It's not. It's actually "trivia (extended verbose)" and can be changed in the vCenter Administration pulldown menu, Logging Options section.

This can also be changed by editing the vpxd.cfg file, however, a vCenter service restart would be required using this method.

30-May Do not install Lab Manager Server on a physical or virtual machine that runs vCenter Server. The two are not compatible together and will, at a minimum, result in port conflicts.

31-May Got a disconnected template? Several solutions exist to resolve the problem:

- Disconnect and reconnect the ESX host which owns the template
- Restart the mgmt-vmware service in the ESX service console
- Restart the vCenter service

1-Jun By default, when you add a virtual machine to a configuration in Lab Manager, the virtual machine is a linked clone that refers to the base disk of the virtual machine template and uses delta disks to describe the difference between the virtual machine template and the virtual machine. This amounts to a lot of disk savings but under certain conditions, linked clone performance can degrade over time.

2-Jun Recent vCenter Server builds (English) and release dates

vCenter 4.0, 5/21/09, Build 162902
vCenter 2.5 Update 5, 7/10/09, Build 174768
vCenter 2.5 Update 4, 2/23/09, Build 147633
vCenter 2.5 Update 3, 10/3/08, Build 119598
vCenter 2.5 Update 2, 7/25/08, Build 104263
vCenter 2.5 Update 1, 4/10/08, Build 84767
vCenter 2.5, 12/10/07, Build 64201
See also <http://bit.ly/aK8zQ>

3-Jun What's New in VMware vSphere 4.0

Virtual Disk Thin Provisioning — Enables virtual machines to utilize storage space on an as-needed basis, further increasing utilization of storage for virtual environments. See the ESX Configuration Guide and the ESXi Configuration Guide http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

4-Jun Check your ESX host NTP offset, as well as gaining other valuable NTP daemon diagnostic information, at the Service Console with the following command:

```
ntpq -p
```

If you receive the error "ntpq: read: Connection refused", it means the NTP daemon isn't running or configured properly.

5-Jun One of the advantages to using NFS datastores in ESX(i) is that newly created VMs on the NFS storage default to creating .vmdk files in a thin format. This a type of thin provisioning and storage virtualization.

6-Jun Permanently enable daemons/services in the ESX Service Console with the following command (the numbers specify runlevels at which to start the daemons/services):

```
chkconfig --level 345 [daemon/service] on
```

ie.

```
chkconfig --level 345 snmpd on
```

7-Jun What's New in VMware vSphere 4.0

Virtual Machine Performance Counters Integration into Perfmon — vSphere 4.0 introduces the integration of virtual machine performance counters such as CPU and memory into Perfmon for Microsoft Windows guest operating systems when VMware Tools is installed. VM owners can do accurate performance analysis within the guest operating system. See the vSphere Client Online Help.

8-Jun If you're running out of datastore disk space, consider configuring your VMs with 100% virtual memory reservation as a short term solution. Doing so will zero the VMkernel swap file on the datastore which is equal to the amount of RAM assigned to the VM.

The good news is that this change can be made while the VM is running

The bad news is that the VMkernel swap file isn't deflated until the VM is powered off

9-Jun What's New in VMware vSphere 4.0

VMware Paravirtualized SCSI (PVSCSI) — Paravirtualized SCSI adapters are high-performance storage adapters that offer greater throughput and lower CPU utilization for virtual machines. These adapters are best suited for environments in which guest applications are very I/O intensive. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

10-Jun It's important to note that the HA restart policy for VMs is designed to work only when the VMs are powered off. Technically this is due to file locking, but logically speaking, if the isolation policy for an HA host is configured to leave the VMs running, then for obvious reasons we don't want HA to come along and recycle the VMs.

11-Jun The Service Console on ESX is eventually going away. The writing is on the wall. I estimate the next major version of ESX won't offer a Service Console. While many of the tips in this calendar are geared towards administration via the Service Console, it would be beneficial for you start exploring alternative management and automation techniques (such as host profiles, vMA, and PowerShell) sooner rather than later.

12-Jun Server administrators were programmed to believe 90% CPU utilization was way over utilized. The truth of the matter is that any server not running at 100% CPU utilization is wasting time executing idle threads. This is one of the reasons we virtualize. To contrast that statement a bit, some CPU headroom should exist for HA failover and N+1 configurations. Find a good balance.

13-Jun Configuration Maximums Comparison

Virtual CPUs per VM:

ESX(i) 4.0: 8 vCPUs

ESX(i) 3.5 Update 4: 4 vCPUs

14-Jun How to enable SSH access to ESX3i (unsupported):

- 1) On the ESXi console press ALT+F1
- 2) Type the word unsupported
- 3) Type the root password
- 4) Use the vi editor: vi /etc/inetd.conf
- 5) Find the line with #ssh and remove the # symbol
- 6) Save the file with the keystrokes :wq!
- 7a) ESX3.5 or U1: Restart the management service with /sbin/services.sh restart
- 7b) ESX3.5U2 & newer: Restart the host or kill the inetd process

15-Jun On this day in 2006, VMware releases Virtual Infrastructure 3 which included ESX 3.0 and VirtualCenter 2.0. Key features included NAS and iSCSI shared storage support, clusters, DRS, HA, Resource Pools, VCB, and a FlexLM centralized license server.

16-Jun A "Multivendor Post" to help iSCSI customers using VMware

Shared storage is the key to unlocking many of the VMware Virtual Infrastructure components. EMC, VMware, NetApp, Dell/EqualLogic, and HP/Lefthand all conspired to create one of the most informative VMware on iSCSI documents available.

http://virtualgeek.typepad.com/virtual_geek/2009/01/a-multivendor-post-to-help-our-mutual-iscsi-customers-using-vmware.html

17-Jun Saving your ESXTOP workspace

If there is a particular group of metrics you commonly add/remove in ESXTOP, you'll notice you have to configure them each time you run ESXTOP. You can save your workspace permanently by running ESXTOP, choosing your preferred settings, and then hit the 'W' key to save the settings to a configuration file located at ~/.esxtop3rc. Future ESXTOP sessions will be run with your preferred settings.

18-Jun N+1 cluster architecture allows workload demands to be met while 1 host is dysfunctional. Capacity plan or scale your high availability virtual infrastructure for minimally N+1 based on peak load numbers, not average load numbers. At no time do you want to dip below N+1 availability. That is a very difficult position to be in.

19-Jun You can replace the default SSL certificate which ships with vCenter with a certificate signed by a Microsoft Certificate Authority, however it is a fairly lengthy process. The steps can found in the following thread (follow the 11 steps from user 'astrolab'):

<http://communities.vmware.com/thread/88053>

20-Jun Virtualized Terminal/Citrix servers may experience unwanted proliferation of user profile folders which are not removed after users log off. When VMware Tools is installed, it appends a value in the Windows registry to HKLM\SYSTEM\CurrentControlSet\Control\NetworkProvider\Order\ProviderOrder. The value of hgfs is appended. This causes an irremovable file in each user profile. Remove the hgfs value to resolve the issue.

21-Jun vSwitch Security Attributes & Defaults

Forged Transmits - Allows the guest VM OS to change its MAC address; impacts outbound frames - default: Allow
Promiscuous Mode - Allows the guest VM to listen to (capture) packets destined for other vSwitch ports - default: Reject
MAC Address Changes - Allows the guest VM OS to change its MAC address; impacts inbound frames - default: Allow

22-Jun Lab Manager Terminology

A "Deployed" (powered on) "Configuration" (which from the surface looks somewhat like a vApp group of VMs) consists of one or more virtual machines (up to 20 in Lab Manager 3) that are based on a virtual machine "Template". Configurations are created only in the "Workspace" and a "Storage Lease" is specified. Configurations to be shared with other team members are saved to the "Library".

23-Jun VMware recommends making Lab Manager LDAP connections at the root of Active Directory (ie. DC=domain,DC=com). The reason for this is that if specifying an explicit OU in the binding string may later end up blocking access to users or groups outside of that OU and a binding string change will be required which could be disruptive to the existing Lab Manager environment.

24-Jun The location of the VCB framework logs can be a bit of a mystery if you've searched in the usual locations such as Program Files or Documents and Settings. They are actually located in %windir%\temp

25-Jun By default, when files are added to the Lab Manager Media library, the media is shared with all Lab Manager users in all organizations. However, user access can be restricted to media files by Organizations (controlled by Lab Manager Administrators or Organization Administrators) or through Sharing rights which the media owner controls.

26-Jun VMware Tools for Linux comes in the form of two available packages: The RPM Installer (has an .RPM file extension) and the TAR Installer (has a .tar.gz extension). Some will argue that the RPM installer is easier to use, however, not all Linux distros can take advantage of the RPM installer.

http://pubs.vmware.com/server1/vm/wwhelp/wwhimpl/common/html/wwhelp.htm?context=vm&file=tools_server.4.12.html

27-Jun Whitepaper: SQL Server Workload Consolidation

While most database servers are lightly loaded, larger database workloads can be resource-intensive, exhibiting high I/O rates or consuming large amounts of memory. This whitepaper provides a good methodology for testing SQL server workloads to determine VM candidacy and placement:

http://www.vmware.com/pdf/SQL_Server_consolidation.pdf

28-Jun /etc/nsswitch.conf

The name service switch file determines which name services a system uses to search for information, and in which order the name services are searched. Out of the box, ESX builds an nsswitch.conf file which is auto generated by esxcfg-auth.

29-Jun If you are experiencing shared storage issues, whether it be SAN, iSCSI, or NFS, take a look at VMware KB article 1003659 entitled Identifying shared storage issues with ESX 3.x. This article contains several links to troubleshoot shared storage issues, as well as a handy flowchart.

<http://kb.vmware.com/kb/1003659>

30-Jun What's New in VMware vSphere 4.0

8-way Virtual SMP — ESX(i) 4.0 supports virtual machines with up to eight virtual CPUs allowing you to run larger CPU-intensive workloads on the VMware ESX platform. See the Guest Operating System Installation Guide for the guest operating systems that fully support SMP

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

1-Jul What's New in VMware vSphere 4.0

High Availability Clustering with Windows Server 2000, 2003, 2008 — Support for MSCS with Windows 2000 and Windows 2003, and Failover Clustering for Windows 2008. For information concerning supported storage arrays, see the vSphere Compatibility Matrixes http://www.vmware.com/pdf/vsphere4/r40/vsp_40_mscs.pdf

http://www.vmware.com/pdf/vsphere4/r40/vsp_compatibility_matrix.pdf

2-Jul VMware Technical Resource documents listing

The following URL provides a comprehensive list of VMware technical documents with links compiled by Rodney Hayward. It's like a table of contents for VMware white papers.

<http://communities.vmware.com/docs/DOC-2590>

For a searchable catalog of white papers from VMware and its partners, head to:

<http://vmware.com/resources/techresources/cat/91>

See also <http://bit.ly/RJO9o>

3-Jul If you are upgrading from vCenter 2.5 to vCenter Server 4.0 and you had previously implemented SSL certificates, be sure to preserve the certificates files because they will be needed during the vCenter Server 4.0 upgrade. The files are located at:

C:\documents and settings\all users\Application Data\vmware\VMware VirtualCenter\SSL\

The three SSL files are:

ru1.crt

ru1.key

ru1.pfx

4-Jul In Lab Manager, consolidating a virtual machine can take an extended period of time, depending on the disk size and storage performance. Consolidation may improve VM disk performance, however, it reduces the free space on datastores because the virtual machine no longer benefits from delta disks. VMs in both Workspace and Library configurations can be consolidated. Only undeployed VMs can be consolidated.

5-Jul What's New in VMware vSphere 4.0

New Virtual Hardware — ESX/ESXi 4.0 introduces a new generation of virtual hardware (virtual machine hardware version 7), which adds significant new features. ESX/ESXi 4.0 will continue to run virtual machines created on hosts running ESX Server versions 2.x and 3.x. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

6-Jul Brand New Update Manager not downloading host updates?

Be sure you've added at least one ESX/ESXi host to the inventory. Per VMware KB 1008308, ESX/ESXi hosts must be present in vCenter Server before Update Manager will download the update metadata and the updates themselves.

<http://kb.vmware.com/kb/1008308>

7-Jul Network traffic between 2 VMs on the same vSwitch on the same ESX(i) host flows over the host hardware system bus and will not traverse the physical network. The processing of intra-vSwitch traffic is handled by CPU0 in the host. This is why it is possible for 2 VMs on the same vSwitch to communicate at greater than Gb speeds.

All of the above assumes there is no VLAN tagging involved.

See <http://bit.ly/yZaG3>

8-Jul On this day in 2008, VMware co-founder, President and CEO Diane Greene was unexpectedly fired by the VMware Board of Directors and replaced by Paul Maritz, a 14-year Microsoft veteran who was heading EMC's cloud computing business unit.

9-Jul vCenter Server 2.5 Update 4 is compatible with and may be used to manage ESX 2.5.x, 3.0.x, and 3.5 (all Updates).

http://www.vmware.com/pdf/vsphere4/r40/vsp_compatibility_matrix.pdf

10-Jul On this day in 2006, VMware releases Server 1.0 which essentially replaced GSX Server. Key features included background snapshot technology and experimental support for 2-way vSMP. The fact that this product was released for FREE was rejoiced by many but upset a handful of customers who had just prior purchased GSX Server for thousands of dollars.

11-Jul mountvm.exe is a VCB framework tool you can use to perform file level restores of VMs that were backed up using VCB. The tool is used to mount .vmdk virtual disk files on the VCB proxy host where the individual files can then be restored via file copy one at a time or many at a time.

mountvm.exe can be found on the VCB proxy host by default in C:\Program Files\VMware\VMware Consolidated Backup Framework

12-Jul What's New in VMware vSphere 4.0

VMDirectPath for Virtual Machines - Enhances CPU efficiency in handling workloads that require constant access to I/O devices by allowing VMs to directly access physical hardware. See the ESX Configuration Guide and the ESXi Configuration Guide http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

13-Jul On this date in 2009, VMware releases the next generation vCenter Lab Manager 4, and two new brand products vCenter AppSpeed and vCenter Chargeback. The releases hit the streets with list prices of \$1,495/cpu, \$1,250/cpu, and \$750/cpu respectively.

In addition, the Stage Manager product is retired as its own SKU and is rolled entirely into the Lab Manager 4 product. This is why the Lab Manager list price went up.

14-Jul Hyper-Threading (HT) has been supported in ESX since version 2.x. The ESX scheduler is aware of HT & treats logical & physical cores differently. vCPUs requesting resources are assigned first to physical cores until all physical cores are loaded. Future vCPU requests are assigned to logical (HT) cores. By this method, HT has no impact on performance until more vCPUs are concurrently executing than exist physical cores.

15-Jul The mostly widely used and accepted standard for disk I/O performance, benchmarking, and comparisons is a free tool named IOMETER (ESXTOP would also be used for ESX environments).

IOMETER is available at: <http://www.iometer.org/>

How does your storage stack up against others in the community? Check out this thread and compare:
<http://communities.vmware.com/message/584154>

16-Jul Configuration Maximums Comparison

Number of vCPUs per host:

ESX(i) 4.0: 512 vCPUs per host

ESX(i) 3.5 Update 4: 192 vCPUs per host

17-Jul FT Problem Decoder Chart

Receiving errors while trying to configure FT on a VM and stumped as to the reason why? Examine the vCenter server log in your vSphere Client and find the entry when the FT error occurred. Note the "reason = " line and cross reference it in the following URL:

<http://www.vmware.com/support/developer/vc-sdk/visdk400pubs/ReferenceGuide/vim.fault.VmFaultToleranceConfigIssue.ReasonForIssue.html>

18-Jul One of the items that the VMware Tools installation performs on a Windows VM is the increase of the disk timeout value to 60 seconds. This helps the OS tolerate a storage path failover which is not instant. The registry value is located at:

HKLM\System\CurrentControlSet\Services\Disk\TimeOutValue

The value is set to 60 Decimal/x03c Hex

MSCS installation will change this value to 20

Windows default is 10

19-Jul Why Choose VMware?

Make an informed decision on what virtualization solution is best for you and/or your business.

The "Why Choose VMware" web page:

<http://www.vmware.com/technology/whyvmware/>

6 reasons to choose VMware fact sheet - Good discussion points for use in your manager's office, on the bus or train, waiting at the airport, at a VMUG, or on a first date:

http://www.vmware.com/files/pdf/vmware_advantage.pdf

- 20-Jul To change the download location for Update Manager patches:
Open C:\Program Files\VMware\Infrastructure\Update Manager\vci-integrity.xml.
Search for [patchStore] XML tags. You'll see something similar to:
[patchStore]C:\Documents and Settings\All Users\Application Data\VMware\VMware Update
Manager\Data\[patchStore]
Replace the path with the preferred path.
Save, close the file, and reboot.
<http://kb.vmware.com/kb/1004152>
- 21-Jul Access a CD/DVD from the ESX COS
Find your CD/DVD ROM device by issuing the command: `ll /dev |grep cdrom`
Mount the CD/DVD ROM device by issuing the command (as an example): `mount /dev/scd0 /mnt/cdrom`
-or- `mount /dev/hda /mnt/cdrom`
You should now see your CD/DVD media mounted at /mnt/cdrom. View its contents by issuing the command `ll /mnt/cdrom`
Unmount the device with the command `umount /mnt/cdrom`
- 22-Jul Update Manager plugin failures
Users of vCenter 2.5.x and VUM may find this familiar. Your VUM plugin becomes disabled and as a result your ability to manage VUM from the Virtual Infrastructure Client ceases to exist. Make sure your VUM datastore is available as well as not scanning the VUM download repository with anti-virus software. vCenter 2.5.0 Update 4 seems to have cured the problem altogether. KB1007099
- 23-Jul Make vCenter 2.5 highly available by using Microsoft Cluster Services (MSCS) by following VMware's documentation here: <http://viops.vmware.com/home/docs/DOC-1111.pdf>
- There is a vCenter 2.0 version of the document as well here:
http://www.vmware.com/pdf/VC_MSCS.pdf
- To cluster vCenter 4.0, there are several additional steps to follow.
See <http://kb.vmware.com/kb/1010550>

24-Jul Identify the relationship between memory and processors in an ESX host. A good rule of thumb is 4-6 vCPUs per host processor. A good rule of thumb for 32-bit VMs is 4GB RAM per processor, however, I find this isn't nearly enough when virtualizing 64-bit operating systems. It also depends on your desired consolidation ratios.

25-Jul vSMP

For scheduling a VM with multiple vCPUs, ESX2 used the "Strict Co-Scheduling" technique where a skew value for each vCPU was tracked & increased when vCPUs were at different progress levels. With enough skew, the entire VM was descheduled.

The co-scheduling algorithm was improved to a "Relaxed Co-Scheduling" scheme in ESX3 resulting in a significant reduction of co-scheduling fragmentation.
See <http://bit.ly/yplYU>

26-Jul When a user creates a Configuration in Lab Manager, that user becomes its owner. The owner, or a user with the Administrator View and Control right, can give other users access to the configuration.

Configuration ownership can be assigned to another user in the same organization as the current owner by navigating to the Configuration property sheet and clicking the Change Owner button.

27-Jul Decoding PSOD (Purple Screen Of Death) Messages

If you work with ESX long enough, you may encounter a PSOD. It's the equivalent to the BSOD (Blue Screen Of Death) in Windows. Use the following VMware KB article, Decoding Purple Screens, to help make sense of the problem:

<http://kb.vmware.com/kb/1004250>

28-Jul The default vSphere VM boot order is:

1. Removable Devices
2. Hard Disk (virtual)
3. CD-ROM
4. Network

A VM with no OS will attempt to boot from Removable Devices, CD-ROM, or Network, in that order. During POST, you may change the boot order temporarily with [ESC] or [F12] and permanently with [F2]

You can also modify the VM settings (Options tab|Boot Options) to force the VM to boot into the BIOS or delay the boot.

29-Jul Decrease VM evacuation times by increasing the amount of concurrent VMotion migrations per host

(unsupported):

-On your vCenter server, edit c:\docs & settings\all users\application data\vmware\vmware virtualcenter\vpdx.cfg

-Insert the following lines between the [vpdx] XML tags:

```
[ResourceManager]
```

```
[maxCostPerHost]24[/maxCostPerHost]
```

```
[/ResourceManager]
```

Cold Migration has a cost of 1. Hot Migration has a cost of 4.

30-Jul When a Lab Manager deployment lease expires, Lab Manager automatically undeploys the Configuration or VM Template.

When a storage lease expires, Lab Manager either deletes the expired VM Template or Configuration, or marks the VM Template or Configuration for deletion. This decision depends on whether or not there are child dependencies involved which should not be deleted.

31-Jul vCenter Server 2.0 and later may be upgraded to vCenter Server 4.0. Earlier versions of vCenter Server must first be upgraded to 2.0 prior to making the jump to 4.0.

1-Aug Setting CPU Affinity on a per VM basis is not a great idea. Here are three reasons why:

- 1) Administrative burden to configure, track, and document
- 2) Not compatible with VMotion
- 3) Not compatible with DRS
- 4) It makes the scheduler's job more difficult when scheduling CPU time for VMs

2-Aug On this date in 2009, VMware releases the next generation vCenter Lab Manager 4, and two new brand products vCenter AppSpeed and vCenter Chargeback. The releases hit the streets with list prices of \$1,495/cpu, \$1,250/cpu, and \$750/cpu respectively.

3-Aug How to recover the root password on an ESX 3.x host in single user mode

Reboot the host.

At the ESX boot menu, highlight the Service Console Only mode and press the A key.

Type a space followed by the word 'single' and hit enter.

At the bash prompt, type the command 'passwd' to reset the root password.

<http://kb.vmware.com/kb/1317898>

4-Aug If you receive extensive path errors when trying to run the vmware-cmd command at the ESX Service Console, try running the command vmware-config.pl which rebuilds/reinstalls the VMware VmPerl Scripting API.

You may have guessed by now that vmware-cmd is actually a Perl script which lives in /usr/bin/.

5-Aug How to create a second root user account

1) Run the following command:

```
adduser -u 0 -o -g 0 -G 0,1,2,3,4,6,10 -M root2  
(omit the -M if you want a home directory created)
```

2) Create a password for the new account with the following command:
passwd root2

<http://kb.vmware.com/kb/1005278>

6-Aug On this date in 2007, VMware releases Fusion 1.0, a VMware Workstation like product for the Apple Mac. Fusion was the first VMware product to introduce Unity view - a technology which takes the guest VM start menu and application windows and presents them as a seamless window the Mac as if it was running PC applications.

7-Aug What's New in VMware vSphere 4.0

3rd Party Distributed Switch Support — The vNetwork Distributed Switch (vDS) includes support for 3rd party distributed virtual switches. For more information on 3rd party distributed virtual switches, please visit the documentation page for Cisco Systems, Inc. at <http://www.cisco.com/go/1000v>

8-Aug Virtualizing Existing Domain Controllers

Contrary to some beliefs, Domain Controllers make fine virtualization candidates with the right sizing and adherence to best practices. There are two approaches to DC virtualization: Creating new virtual DCs from scratch, and converting physical DCs to virtual. The following URL contains information for virtualizing existing domain controllers:

<http://kb.vmware.com/kb/1006996>

9-Aug DRS: Decisions.. Decisions..

Virtual Infrastructure revolves around 4 core resources: CPU, Memory, Disk, & Network. DRS is a service that balances the workload of an ESX cluster based on resource utilization. However, DRS only evaluates 2 of the 4 core resources: CPU & Memory which are the 2 biggest bottlenecks, with Disk being a close 3rd.

DRS examines the cluster workload balance every 5 minutes, or 12 times per hour.

10-Aug VMware ESX and ESXi Comparison

One of the most frequently asked questions and perhaps the most inconsistently or incompletely answered is "ESX and ESXi - what's the difference?". The following KB article explains on a feature by feature basis. The biggest differences are lack of a service console and generally thinner perception of ESXi, however, there exists many more subtle differences.

<http://kb.vmware.com/kb/1006543>

11-Aug In most cases, there are no performance benefits to using an RDM versus a traditional non-RDM virtual disk in a VM. There are 2 exceptions:

- 1) For sequential reads and writes, RDM provides slightly better I/O performance at smaller I/O block sizes.
- 2) As I/O block size increases, CPU cycles per I/O increases for VMFS compared to RDM.

12-Aug What's New in VMware vSphere 4.0

vCenter Server Linked Mode - vCenter Server systems can be interconnected in Linked Mode, which allows administrators to share roles and licenses across multiple connected vCenter Servers. Administrators get an overview of all inventory by launching a single vSphere Client session. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

13-Aug On this day in 2006, VMware, Inc. announced that the IPO of 33,000,000 shares of its Class A Common Stock has been priced at \$29 per share. Shares will begin trading August 14, 2007 on the NYSE under the ticker symbol "VMW".

14-Aug On this day in 2006, EMC Corporation releases 10% of the company's shares in VMware in an initial public offering on the New York Stock Exchange. The stock debuted at \$29 per share and closed the day at \$51 per share.

15-Aug 5 methods to kill a hung or stuck VM:

1. vmware-cmd -l
vmware-cmd [.vmx config filename] stop trysoft
2. vm-support -x or cat /proc/vmware/vm/*/names
vm-support -X [vmid]
3. vmware-vim-cmd vmsvc/getallvms
vmware-vim-cmd vmsvc/poweroff [vm id]
4. ps -auxwww | grep [vm name]
kill [process id]
5. ps -auxwww | grep [vm name]
kill -9 [process id]
<http://kb.vmware.com/kb/1004340>

16-Aug Virtrix blogger Vincent Vlieghe pulled some information together on running ESX on Compaq/Proliant servers. He talks about a recommend BIOS setting for stable operation.

System Options - OS Selection: Select Windows 2000
Advanced Options - MPS Table Mode: Select Full Table APIC
For DL740 & 760 servers, set the OS to Linux

Take a look:

<http://virtrix.blogspot.com/2006/07/hp-proliant-and-compaq-mps-table-bios.html>

17-Aug What's New in VMware vSphere 4.0

IPv6 Support — Adds support for IPv6 for the ESX/ESXi VMkernel, service console, and vCenter Server. Manage ESX and ESXi hosts through vCenter Server in mixed IPv4/IPv6 environments. See the ESX Configuration Guide and the ESXi Configuration Guide http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

18-Aug VI3 License File Locations

Centralized server based license files are located on the vCenter License Server in the default directory of
C:\Program Files\VMware\VMware License Server\Licenses

Decentralized host based server license files are located on the ESX host at /etc/vmware/vmware.lic

19-Aug At the ESX Service Console, to create a compressed tarball of files and sub-folders, use the following command:

```
tar -czf tarballname.tar.gz /directory/
```

To list the files in a compressed .tgz file:

```
tar -tzf tarballname.tgz
```

To extract a tarball:

```
tar -xzf tarballname.tar.gz
```

20-Aug Each Lab Manager 3 installation should have a unique system name. The system name is used through various Lab Manager tasks. It is important to select an appropriate system name during installation because the system name cannot be changed later.

21-Aug Timekeeping best practices for Linux

The following recommendations include specifics on the kernel command line options to use for the Linux operating system. Descriptions are included for NTP time sync, configuration of VMware Tools time synchronization, and Virtual Hardware Clock configuration, to achieve best timekeeping results.

<http://kb.vmware.com/kb/1006427>

See also: <http://kb.vmware.com/kb/1011771>

22-Aug VMware VMotion & CPU Compatibility

This document discusses CPU compatibility & outlines the checks performed by VMware vCenter before allowing migration with VMotion. It details differences in features & extensions in current CPUs & describes procedures that could be used to relax some CPU compatibility constraints to facilitate VMotion.

http://www.vmware.com/files/pdf/vmotion_info_guide.pdf

See also <http://bit.ly/hgRRg>

23-Aug How to recover the root password on an ESX 2.x host in single user mode

Reboot the host.

At the LILO prompt select "linux" adding -s to the end of the line (it should read linux -s).

At the bash prompt, type the command 'passwd' to reset the root password.

<http://kb.vmware.com/kb/1317898>

24-Aug vCenter 4.0 license keys do not license VI3 legacy hosts. A VI3 license server or host based license keys must be plugged into vCenter 4.0 in order to properly license VI3 legacy hosts.

25-Aug VMware Network Communication Ports (ESX 3.5 & VC 2.5)
443, 902, 903, 2049, 2050-2250,
3260, 8000, 8042-8045, 27000, 27010

For a few different diagrams, see:

<http://www.boche.net/blog/index.php/2008/12/12/new-vmware-vi-network-port-diagram-request-for-comments/>

26-Aug What's New in VMware vSphere 4.0

VMware Data Recovery — VMware Data Recovery leverages virtual machine snapshots to make a precise copy in a short amount of time, and it includes data deduplication to save on disk storage that is consumed by backups. See the VMware Data Recovery Administrator's Guide http://www.vmware.com/pdf/vdr_10_admin.pdf

27-Aug Files that are uploaded to the Lab Manager Media Library are not automatically seen by the Lab Manager users. The Media Library must be synchronized first. Synchronization updates the Lab Manager database with the files that exist on the datastore. One of the purposes behind this is so that files become objects in the Lab Manager database and Lab Manager can control permissions to the objects.

28-Aug Applications that license per CPU will cost extra money in a vSMP VM. The following unsupported tweak may allow the application to see logical CPUs instead of physical CPUs:

1. Power off the VM & Edit the VM settings
2. Options tab
3. General (in the Advanced options section)
4. Configuration Parameters
5. Add Row
6. Enter "cpuid.coresPerSocket" in the Name column
7. Enter a value of 2 or 4 in the Value column

29-Aug What's New in VMware vSphere 4.0

Performance Charts Enhancements — Performance charts are now enhanced to provide a single view of all performance metrics, such as CPU, memory, disk, and network without navigating through multiple charts. See the Performance Charts Online Help and vSphere Basic System Administration
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

30-Aug Build a network boot disk for VMware guest VMs

Save time and effort by using Bart's Network Boot Disk. This especially holds true if you're not interested in modifying network boot disk files by hand which was one of the purposes behind Bart's solution. You must own a Microsoft Windows 98 operating system license.

<http://www.boche.net/blog/index.php/2008/11/25/build-a-network-boot-disk-for-vmware-guest-vm/>

31-Aug esxcfg-module and the older school vmkload_mod both provide about the same information when listing loaded VMkernel modules. However, a few of the differences that set the tools apart are:

Only esxcfg-module can enable/disable modules

Only vmkload_mod can interactively load/unload modules

1-Sep Any user or group who is a member of the local Administrators group of the Windows Server running vCenter, will by default have full administrative control of vCenter Server and thus full control of the virtual infrastructure.

After the installation of vCenter Server, this should be one of the first areas to address. Ideally it was already planned for in the design stage.

2-Sep Make vCenter highly available. Deploy vCenter in a Windows VM hosted on a VMware VI cluster. Here are a few reasons why:

- It's supported by VMware.
- You may already have a VI cluster in your environment you can leverage.
- Avoiding Microsoft Cluster Services removes a 3rd party infrastructure complexity, additional licensing costs, and dependency which requires an advanced skill set to support.

3-Sep What's New in VMware vSphere 4.0

vNetwork Distributed Switch — The vDS spans many ESX(i) hosts enabling customers to significantly reduce ongoing network maintenance activities and quickly scale up networking capacity.

See the ESX Configuration Guide and the ESXi Configuration Guide

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

4-Sep VMware ESX is NUMA (Non-Uniform Memory Access) aware and employs a handful of enhancements to take advantage of NUMA. While these settings can generally be left at their defaults in the hypervisor, you should make sure your ESX host hardware is configured optimally for ESX NUMA operation, which in short means you should disable node interleaving in the BIOS.

5-Sep If you have encountered a Storage VMotion failure, take a look at the following 2 resources for recovery procedures:

<http://www.van-lieshout.com/2009/03/how-to-recover-from-failed-svmotion/>

<http://kb.vmware.com/kb/1009113>

6-Sep Configurable Advanced HA Options:

das.AllowNetwork = Used to specify an additional portgroup to use for failure detection
das.isolationAddress = Used to specify additional addresses to check for isolation detection
das.failureDetectionTime = Time in milliseconds before isolation response action. Default=15000
das.failureDetectionInterval = HA heartbeat interval in milliseconds. Default=1000

7-Sep VMware switches are layer 2 switches. They do not perform routing or other traditional layer 3 switch tasks. In the case of Lab Manager network fencing, there is no exception. A VMware vSwitch is not routing packets in and out of the fence. A Lab Manager fence is actually a small Linux VM that performs the routing.

8-Sep Configuration Maximums Comparison

Size of RAM per host:
ESX(i) 4.0: 1TB RAM per host
ESX(i) 3.5 Update 4: 256GB RAM per host

9-Sep What's New in VMware vSphere 4.0

Virtual Machine Hot Add Support— The new virtual hardware introduced in ESX(i) 4.0 supports hot plug for virtual devices and supports addition of virtual CPUs and memory to a virtual machine without powering off the VM. See the Guest Operating System Installation Guide for the list of operating systems for which this functionality is supported http://www.vmware.com/pdf/GuestOS_guide.pdf

10-Sep VM displayName != Name on disk

In some situations, the display name of a VM may not match the folder where its files live. This can make life difficult when trying to identify a VM by its folder name. Dominic Rivera wrote a nice script that identifies these instances for which you should proactively correct. Follow the link below and check it out:

<http://vmprofessional.com/2009/06/displayname-name-on-disk.html>

11-Sep A collection of timekeeping articles from VMware:

<http://blogs.vmware.com/kb/2009/02/new-timekeeping-articles.html>

12-Sep On this day in 2008, VMware releases Fusion 2.0. Key features include Multiple snapshots and AutoProtect, URL handling, Application sharing, True multiple display support, Driverless printing, VMware importer, 3D graphics improvement, and much more.

13-Sep VM Disk Alignment

NetApp released a few scripts (mbralign & mbrscan) that will automate the disk alignment & verification processes at the guest VM OS level without destroying data.

Download the scripts:

<http://communities.netapp.com/docs/DOC-2563>

See also: NetApp - Storage Nuts & Bolts: mbrscan/mbralign

http://blogs.netapp.com/storage_nuts_n_bolts/2009/01/mbrscanmbralign.html

14-Sep Syslog Tidbits

The centralization of log files using Syslog requires UDP port 514 open between the ESX host and the Syslog server. Open a Syslog port in the ESX firewall with the following command:
`esxcfg-firewall -o 514,udp,out,"syslog"`

Syslog is configured on the ESX host in `/etc/syslog.conf`

Splunk is a very popular Syslog server solution.

15-Sep The native log file rotation behavior can be tweaked by logging into the ESX Service Console and modifying the file `/etc/logrotate.conf` (I very much prefer the nano editor to the VI editor).

There exists a man page detailing log rotation. Use the following command to view the man page:
`man logrotate`

16-Sep During a vCenter Server 4.0 installation, verify the vCenter SQL account has DBO rights to the MSDB, vCenter, & Update Manager databases.

During the vCenter 2.5 upgrade process, DBO is needed on the MSDB database only. Granting DBO on the vCenter database in VC 2.5 would typically result in a new parallel set of tables being created in the database & empty datacenter when all is said & done.

17-Sep When a Lab Manager configuration is deployed on a VMware HA cluster, Lab Manager uses the same calculation that vCenter has for assessing free slots available in the cluster. In addition, fenced configurations in Lab Manager 3 must all go on the same host. In Lab Manager 4, fenced configurations can be spread across hosts with the use of vNDS (Network Distributed Switch).

18-Sep To add an existing user to an existing group in the ESX Service Console, use the following command and syntax:

```
usermod -a -G [group_name] [user_name]
```

ie. usermod -a -G wheel joe -- adds user joe to the wheel group.

19-Sep SAN Zoning Best Practices

Take a look at Brocade's Secure SAN Zoning Best Practices document. Although it contains the Brocade name throughout, the principles can be applied to any vendor's fabric. Please keep these best practices in mind when designing and configuring SAN fabrics for your VMware virtual infrastructure.

Download it here:

http://www.boche.net/blog/wp-content/uploads/2009/Zoning_Best_Practices_WP-00.pdf

20-Sep Both vCenter 2.5 and 4.0 support up to 100 concurrent VM console connections (the default is 25). It is recommended to limit the number of vCenter and console connections to as few as possible. Remember 3rd party utils will use vCenter connections. With vSphere 32 and 64 bit client connections limited to 15 and 30 respectively, it's implied that a large number of console connections would come through the web interface.

21-Sep <http://viops.vmware.com/> is an incredibly technical community resource containing VMware Virtual Infrastructure proven practices and advanced solutions. Topics include strategy, applications, security, management, and availability.

22-Sep What's New in VMware vSphere 4.0

Storage Awareness Enhancements — VMware gives you increased visibility into vSphere 4.0 interaction with shared storage through customizable reports and topology maps. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

23-Sep ESX3.5 introduced a visual indicator to the VMware Tools system tray icon to notify when tools are old. This new behavior can be disabled manually in the VMware Tools applet, or it can be packaged with the following registry change:

HKLM\Software\VMware, Inc.\VMware Tools
Change the default value to a DWORD value of 0

To script:

```
REG ADD "HKLM\SOFTWARE\VMware, Inc.\VMware Tools" /V "" /T REG_DWORD /D "0x0" /F
```

24-Sep By default in ESX(i), a vSwitch Portgroup will automatically inherit configuration policies of the vSwitch it is created on, however, portgroup policies can be tuned to override the vSwitch policies.

25-Sep During the installation of ESX, it is extremely important to protect VM data stored on existing volumes. Early versions of ESX would actually destroy LUN data which it discovered during installation. Dominic Rivera outlines several options to protect data, a few of which are automated for unattended installs. Follow the link below and check it out:

<http://vmprofessional.com/2009/06/protecting-your-san-luns-during.html>

26-Sep Lab Manager Host Maintenance Mode

Performing maintenance on a Lab Manager host requires more than placing the host into maintenance mode in vCenter. All Lab Manager Configurations must be undeployed from the host (Resources|Hosts tab|Hover over host and choose Undeploy All VMs). The host should also be disabled in Lab Manager to prevent new deployments from landing on it. When finished, use the Redeploy All VMs option.

27-Sep *Temporarily disable the ESX firewall with service firewall stop or the following commands:

- esxcfg-firewall -allowIncoming

- esxcfg-firewall -allowOutgoing

- *Permanently disable the firewall with `chmod 644 /etc/init.d/firewall`
(re-enable with `chmod 744`)

- *Enable the ESX firewall with the following commands:

- service firewall start (if it was stopped)

- esxcfg-firewall -blockIncoming

- esxcfg-firewall -blockOutgoing

28-Sep What's New in VMware vSphere 4.0

Fault Tolerance - Fault Tolerance provides zero downtime & zero data loss availability for all virtual machines during server hardware failures. Enabling FT for a specific virtual machine allows a secondary copy of that virtual machine to run in lockstep synchronization on another ESX host. See the vSphere Availability Guide http://www.vmware.com/pdf/vsphere4/r40/vsp_40_availability.pdf

29-Sep DRS Affinity and Anti-Affinity rules are automated mechanisms to keep VMs on separate clustered hosts or to keep them together on the same host. This is a great unsung technology with one caveat: Only 2 VMs may be included per rule. In other words, if you need a rule for 3 VMs, create multiple rules which grow exponentially as VMs are added.

I'm not a big user of the word FAIL, but it applies here.

30-Sep When using SAN for shared storage in ESX(i) environments, be sure to set the following advanced options:

Disk.UseLunReset=1 (1 is the default)
Disk.UseDeviceReset=0 (1 is the default)

The reason for disabling DeviceReset is because it can perform a complete SCSI bus reset, clearing all SCSI reservations, which can disrupt the SAN fabric.

1-Oct The time zone in ESX is set through via a symbolic link to /etc/localtime, which is a file located in the /usr/share/zoneinfo directory. The symbolic link relates to the time zone that the ESX host is in. Check the current configuration with ll /etc/localtime and cat /etc/sysconfig/clock. To set the time zone, create the correct symbolic link:

ie. ln -sf /usr/share/zoneinfo/[country]/[location] /etc/localtime

2-Oct For optimal performance VM guest partitions should be block aligned. Methods for determining this inside the guest vary by guest OS type (Windows msinfo32.exe) but the value by which it is gauged is constant for all: the partition starting offset should be evenly divisible by 4,096. NetApp's mbrscan script (<http://communities.netapp.com/docs/DOC-2563>) will check at the .vmdk level. See also <http://bit.ly/15f4VI>

3-Oct Configuration Maximums Comparison

Virtual NICs per VM:
ESX(i) 4.0: 10 NICs
ESX(i) 3.5 Update 4: 4 NICs

4-Oct What's New in VMware vSphere 4.0

VMware HA Maintenance Mode — VMware HA now supports Maintenance mode that suspends failover actions during maintenance operations. See the vSphere Availability Guide
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_availability.pdf

5-Oct Whether you're studying for a VMware exam or looking for a good desk reference, you owe it to yourself to check out the vmreference card from Forbes Guthrie. This 2 page reference is jam packed with an incredible amount of Virtual Infrastructure information. Print it in duplex mode and laminate it.

<http://vmreference.com>

6-Oct On this day in 2008, VMware releases Player 2.5. Key features include Unity view, Accelerated 3-D graphics on Windows XP guests, Full screen mode, and experimental support for smart cards.

7-Oct Cisco Discovery Protocol (CDP) has 4 modes in ESX:

Down = CDP is fully disabled

Listen (default in ESX3.5) = Receives and displays information from other CDP enabled network devices. Does not Advertise

Advertise = Broadcasts the ESX host's network configuration. Does not listen

Both = CDP is fully enabled. Listen & Advertise are both enabled

Configure CDP on a per vSwitch basis with the command

`esxcfg-vswitch -B[mode]`

8-Oct Whitepaper: Microsoft SQL Server and VMware Virtual Infrastructure

This is a great whitepaper that will help you understand how to characterize your SQL Server databases for virtualization and outlines important best practices for designing VMware Infrastructure to support SQL Server.

http://www.vmware.com/files/pdf/solutions/sql_server_virtual_bp.pdf

9-Oct 3 Modes of VMFS Volume Resignaturing

- 1) EnableResignature=0,DisallowSnapshotLUN=1 - ESX 3.x default. Snapshots/replicas can't be brought online
- 2) EnableResignature=1,DisallowSnapshotLUN n/a - Safely bring snapshots/replicas online when host has access to the original
- 3) EnableResignature=0,DisallowSnapshotLUN=0 - ESX 2.x behavior. Ideal for DR to bring snapshot/replica online when host has no access to the original

10-Oct Make Portable Applications with VMware ThinApp

The following URL provides a tutorial in packaging applications with ThinApp. It's very easy. All you need is a pristine Windows machine (I highly recommend a VM with non-persistent disk so upon power off, the VM is pristine once again).

http://hacktolive.org/wiki/Make_portable_applications_with_VMware_ThinApp

11-Oct Find your ESX version and build number by running the following command in the service console:

```
vmware -v
```


12-Oct If you plan on integrating Active Directory authentication with ESX Service Console access using esxcfg-auth, you need to control any existing root account in Active Directory. A root account in Active Directory will natively grant root access to the ESX Service Console to whoever knows the AD root password regardless of what the root password is on the ESX host.

13-Oct Content Based Page Sharing is an incredible VMware invention that allows 2 or more VMs to share identical pages in host memory. This allows an over commit of VM guest memory and a cost savings of host memory. Take a technical deep dive by reading Carl Waldspurger's ESX Memory Resource Management white paper at:

<http://www.waldspurger.org/carl/papers/esx-mem-osdi02.pdf>

One day this paper should be in museum.

14-Oct Lab Manager Context view is a visual representation of how each VM looks on disk, which exposes the disk chains (which can get extremely complex and impressive). Unfortunately the Context view can be difficult to find in the Lab Manager menus. Here's where you find Context:

Resources | Datastores tab | View Datastore Usage button | Hover over the VM name and click Context

15-Oct What's New in VMware vSphere 4.0

vApps — vApps simplify the deployment and ongoing management of an n-tier application in multiple virtual machines by encapsulating the n-tier application into a single vApp entity. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

16-Oct During the installation of VMware vCenter Server 4.0, the NETWORK SERVICE account must have READ NTFS permissions at the root of the installation drive letter or else the installation of the local ADAM instance will fail and the entire installation process will roll back.

<http://kb.vmware.com/kb/1010938>

17-Oct /boot/grub/grub.conf is the boot loader configuration file in ESX3 and ESX4 which replaced /etc/lilo.conf in older ESX2 environments.

18-Oct vCenter Security Primer:

Similar to Windows security, a user granted permission to an object via 2 or more group memberships will in effect have the sum of all group membership privileges.

Dissimilar to Windows security, a user granted permission to an object explicitly (not through a group) will result in the explicit permission being effective. It's similar to the way the "deny" permission works in Windows.

19-Oct What's New in VMware vSphere 4.0

VMware HA Improved Admission Control — Admission Control is improved to provide more flexible configuration options to reserve failover capacity. See the vSphere Availability Guide
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_availability.pdf

20-Oct By default, Lab Manager synchronizes with configured LDAP servers every 15 minutes. Synchronizing updates Lab Manager user and group information based on changes to the LDAP directory.

Synchronization can be immediately forced by clicking the Synchronize LDAP button.

21-Oct Virtualization is among the most exciting and lucrative careers to have today. If you are looking for a virtualization job or perhaps trying to find the right candidate for an open position in your organization, try VMPeople.net, a leading source of virtualization networking for job seekers, contractors, consultants, hiring managers, and recruiters.

22-Oct VMs inherit privileges from two sources because their objects are shown in 2 different vCenter views (Virtual Machines & Templates and Hosts & Clusters). That said, certain actions or roles require a set of permissions on each side of the hierarchy. The 2 views and hierarchies become unified at the Datacenter level. If a permission is applied at the Datacenter level, it propagates down both sides of the hierarchy.

23-Oct Force a DHCP lease renewal in ESX and ESXi

If you are running your ESX or ESXi management console on DHCP and need to force a DHCP lease renewal, here is how it can be done in both ESX and ESXi.

ESX: Run the following two commands locally in the service console (COS):

```
ifdown vswif0  
ifup vswif0
```

ESXi: Use the local console menu to "Restart Management Network"

24-Oct The VMware VCB proxy server lacks bandwidth control. It is possible to saturate the VCB proxy with too much I/O such that it becomes crippled and causes jobs to fail.

Stagger backup job schedules accordingly.

25-Oct The minimum Service Console memory that can be assigned to an ESX4 host is 256MB. The default is 400MB. The maximum is 800MB.

The values for an ESX3 host are the same, except for the out of box default amount of memory which for ESX3 is 272MB. With the added features and bolt on products in vSphere, it's easy to see why VMware found it necessary to up the default amount.

26-Oct Use an RSS feed aggregator/reader to stay informed with up to the minute VMware virtualization news. Import the OPML file at the following location into your favorite reader.

http://www.boche.net/blog/wp-content/uploads/2008/rss_subscriptions.opml

Twitter has also become a popular communication channel. I use Twitter to engage in virtualization discussions. You can "follow" me on Twitter, my ID is @jasonboche

27-Oct What's New in VMware vSphere 4.0

Guest Operating System Customization Improvements — vCenter Server now supports the ability to customize the following new guest OS platforms:

-Windows Server 2008 (32-bit & 64-bit)

-Ubuntu 8.04

-Debian 4.0

Administrators can now customize time-zone information for Linux guests. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

28-Oct If a Lab Manager VM is removed via vCenter or an ESX host goes offline, the Lab Manager database will be out of sync resulting in an orphan or stuck object in the database and in Lab Manager. To resolve this matter and bring the database back into sync, undeploy the VM with force by choosing the "Force Undeploy" menu item (which by the way produces the same results as Undeploy-Discard State does in normal situations).

29-Oct On this day in 2008, VMware releases Server 2.0, the next major release after Server 1.0. Key features included a new Tomcat based and ESX-like VI Web Access, Remote Console, USB 2.0 device support, 8GB RAM per VM, and hot add/remove of SCSI disks.

30-Oct An "eagerzeroedthick" disk format in ESX guarantees the greatest file security and is also required in certain configurations such as Microsoft Cluster Services. Two drawbacks to using eagerzeroedthick disks are that they take the most amount of up front time during the creation process and they cannot be created with the Virtual Infrastructure Client. They are created using vmkfstools.
See <http://bit.ly/s31Cm>

31-Oct VMware ESX supports 3 VLAN strategies:

- 1) External Switch Tagging (EST) = Traditional VLANning performed at the physical switch. No trunking to the ESX host
 - 2) ESX Virtual Switch Tagging (VST) = Trunks run to the ESX host which can support many VLANs
 - 3) Virtual Machine Guest Tagging (VGT) = Trunks run to the ESX host. 802.1Q VLAN trunking driver installed in the guest VM where the packets are tagged
- <http://bit.ly/lrmqr>

1-Nov VMware vSphere Cheat Sheet

The document summarizes vSphere features, licensing, tiers, and more. The product comparison charts really help answer the questions "Why VMware?" "Why not MS or Citrix?" "Is VMware's price point worth it?" You bet it is. The data in the download speaks for itself.

<http://www.boche.net/blog/wp-content/uploads/2009/VsphereData.pdf>

2-Nov If you are experiencing host or VM networking issues, take a look at VMware KB article 1004109 entitled ESX Server host or virtual machines have intermittent or no network connectivity. This article contains several links to troubleshoot networking issues.

<http://kb.vmware.com/kb/1004109>

3-Nov In Lab Manager 4, configurations and VM Templates can be imported. Configurations are imported from an SMB share and can be exported to an SMB share or vCenter server inventory. VM Templates can be imported from an SMB share or from the vCenter inventory where you may select one of your "golden master images". Importing/exporting saves time over the creation of net new configurations or templates.

4-Nov A Tale Of Two Route Commands

The route command is used to manage the Service Console routing table.

The esxcfg-route command is used to manage the VMkernel routing table.

5-Nov Determining detailed build number information for VMware ESX hosts

In some cases, after patches have been installed on an ESX host, different build numbers are reported for different components of ESX Server. These KB articles provide details of the build information for ESX:

ESX 4.x: <http://kb.vmware.com/kb/1012514>

ESX 3.x: <http://kb.vmware.com/kb/1001179>

6-Nov On this day in 2006, VMware announces Lab Manager, which enables enterprise software development organizations to more efficiently utilize software development and test lab assets, accelerate software development cycles and increase the quality of delivered software products. Two years later on the same date, version 3.0.1 is released with support for ESX3.5 Updates 3 and 4

7-Nov What's New in VMware vSphere 4.0

CIM Storage Management API - Common Information Model (CIM) interface to monitor datacenter storage resources. The implementation is based on the Storage Management Initiative-Specification (SMI-S) defined by SNIA. See the VMware CIM APIs documentation page for more information <http://www.vmware.com/support/developer/cim-sdk/index.html>

8-Nov ESX snapshots by default are created in the virtual machine directory, even if the virtual machine directory and virtual disks are located on different datastores.

To change the location of the snapshot, add (or edit) the following line to the .vmx file of the VM:
`workingDir="[new_path_location]"`

Force a re-read of the virtual machine configuration by issuing the command:
`vimsh -ne "vmsvc/reload [Vmlid]"`

9-Nov Interpreting ESXTOP Statistics

ESXTOP is an essential troubleshooting and performance monitoring tool for ESX platforms. Master the meanings behind the numbers in ESXTOP by downloading this great document. Another great resource is Appendix B of the Resource Management Guide aptly titled "Using the ESXTOP Utility"

<http://communities.vmware.com/docs/DOC-9279>

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_resource_mgmt.pdf

10-Nov What's New in VMware vSphere 4.0

vSphere Host Update Utility — Upgrade ESX hosts (versions 3.0 and later) to ESX 4.0 remotely by using the vSphere Host Update Utility. The intuitive user interface provides real-time status of a remote upgrade and allows you to specify custom post-upgrade scripts. See the vSphere Upgrade Guide

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_upgrade_guide.pdf

11-Nov What's New in VMware vSphere 4.0

Virtual Machine Communication Interface Sockets API — VMCI Sockets is a convenience Application Programming Interface (API) for the Virtual Machine Communication Interface (VMCI) which provides fast communication between a virtual machine and the hypervisor as well as between virtual machines. See the VMCI landing page

<http://www.vmware.com/support/developer/vmci-sdk/>

12-Nov What's New in VMware vSphere 4.0

Granular Permissions for Network and Datastores — vCenter Server 4.0 supports permissions at the datastore and network level. Administrators can grant or deny access to a datastore or network for a specific set of users. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

13-Nov Find your individual ESX package build numbers by running the following command in the service console:

```
esxupdate -l query
```

or

```
rpm -qa
```

14-Nov Tail Wagging The Dog

One sensible recommendation I've read from respected authors on ESX(i) host hardware selection is to not dive in head first with server models. Instead, you need to think about the infrastructure storage and network design which will dictate the number of HBA and NICs you'll need. From that point you look at available card slots in the various hardware models to narrow down the selection.

15-Nov svmotion.pl is the tool that is used for Storage VMotion in VI3 and it can be found in the RCLI (Remote Command Line Interface) as well as the newer VIMA or vMA (vSphere Management Assistant) which includes the RCLI. svmotion.pl has 2 modes: scripted (with all the necessary switches) and interactive (invoked with the --interactive switch). However, anyone who is anyone uses Andrew Kutz's svmotion plugin in VI3.

16-Nov ESX can be configured to use CHAP for swiSCSI security. CHAP authenticates with a 3-way handshake at the time of the initial link, and may happen again any random time afterwards. The verification is based on a shared secret (essentially, the CHAP password). CHAP provides protection against playback attacks by incrementally changing the identifier and by using a variable challenge value.

17-Nov Lab Manager User/Group Legend

- A gray icon indicates the user is disabled
- A blue and yellow icon indicates the user is enabled
- A blue and yellow icon with a key indicates an administrator user
- A blue and yellow icon with a group indicates the user was added as part of an LDAP group import
- A green check mark indicates a group is in sync with LDAP
- A red X indicates a group is disabled, deleted, or not in sync with LDAP

18-Nov Modern versions of the VMFS file system (VMFS-3 and newer) include journaling. Journaling logs changes to a journal (typically a circular log in a dedicated area) before committing them to the main file system. Journaling file systems are less likely to become corrupted in the event of a power failure or system crash.

19-Nov Lab Manager 3 Datastore Requirements

The datastore must have ample available space as chains cannot span datastores.
A VMFS (or NFS) datastore must first be configured in ESX outside of Lab Manager.
To use a datastore for media, you must configure it as a media store in Lab Manager. You can use the same datastore for media and virtual machine storage, as long as you use different directories.

20-Nov Run ESXTOP in batch mode using the -b switch along with a .csv file name. ie. `esxtop -b > my_file.csv`. The esxtop utility does not enforce a .csv file extension, however, post-processing tools require it. Tools such as MS Perfmon and Excel can be used to view the .csv file after the capture.
Somewhat related, you can also run esxtop in replay mode on vm-support collection data with the command:
`esxtop -R [vm-support_path]`

21-Nov Freeing space when the /var/ partition is full

To free some space on the /var/ partition, you can safely remove the cached RPM package saved on /var/cache/yum/update.

To remove the RPM package:

Log into the ESX host as root using an SSH client.

Run the command:

```
yum clean all
```

Rerun the command:

```
df -h
```

The output indicates that the amount of free space on the /var partition has increased.

<http://kb.vmware.com/kb/1005768>

22-Nov Check the status of all daemons/services in the ESX Service Console with the following command:

```
service --status-all
```

23-Nov Choosing the right network adapter for your virtual machine

The network adapter choices that are available depend on the virtual machine version number and the guest operating system running on the virtual machine.

The Choose Networks window makes available only those network adapters that make sense for the virtual machine you are creating. Continue reading at the following KB article:

<http://kb.vmware.com/kb/1001805>

24-Nov There are three text editors I know of in the ESX Service Console

nano - By far the easiest editor to use. Windows admins will gravitate to it's notepad like feel.

vi - The old school editor used in *nix platforms. Complex.

visudo - A dedicated vi editor designed for the sudoers file. Has the ability to check for errors.

25-Nov A Service Console vSwitch with only 1 PNIC will result in a constant yellow warning banner in vCenter indicating the lack of network redundancy for the Service Console. This warning can be disabled by changing the advanced HA setting `das.ignoreRedundantNetWarning` from false to true. However, do understand the negative implications of no Service Console redundancy.

26-Nov Convert a standard virtual disk to an RDM with the following commands:

For virtual compatibility mode: `vmkfstools -l [srcfile] -d rdm: /vmfs/devices/disks/vmhbaW:X:Y:Z /vmfs/volumes/[datastore]/[vmdir]/[vmname].vmdk`

For physical compatibility mode: `vmkfstools -l [srcfile] -d rdmp: /vmfs/devices/disks/vmhbaW:X:Y:Z /vmfs/volumes/[datastore]/[vmdir]/[vmname].vmdk`

<http://kb.vmware.com/kb/3443266>

27-Nov Use the `logger` command to write log entries to the `/var/log/messages` log file. This can be useful for scripted installations to confirm sections of the script completed successfully.

i.e.

`logger Hello there!`

Results in the following entry in `/var/log/messages`

`Jul 26 16:07:23 esx3l root: Hello there!`

28-Nov For those new to ESX, you may be curious as to why many of the advanced HA configuration settings contain the acronym "DAS". What is DAS? DAS was the acronym for HA during the VI3 beta, before it was changed to HA. DAS stood for Dynamic Available Service. VMware killed the DAS acronym just before the VI3 launch, but apparently it was too difficult to change in the code tree, so DAS lives today (behind the scenes).

29-Nov How VMware Virtualized Exchange 2007

I often hear questions or concerns about virtualizing Exchange. E-Oasis Network Specialists found a new VMware white paper and provides a nice lead in explaining how VMware corporate took their physical servers and migrated to virtual, reducing aggregate hardware usage.

<http://e-oasis.com/vmware/exchangeonvmware/>

See also <http://bit.ly/NBYFZ> for more Exchange virtualization resources

30-Nov Configuration Maximums Comparison

NFS datastores:

ESX(i) 4.0: 64 NFS datastores (requires change in advanced settings)

ESX(i) 3.5 Update 4: 32 NFS datastores (requires change in advanced settings)

1-Dec Be the first to see new and updated VMware KB articles by following @VMwareKB on Twitter and subscribing to the following RSS feed:

<http://feeds2.feedburner.com/VMwareKnowledgebaseWeeklyDigest>

Or visit the VMware Weekly KB Digest with your browser at:

<http://blogs.vmware.com/kbdigest/>

2-Dec What's New in VMware vSphere 4.0

Native SATA — Support for internal SATA disks that are connected through the SATA interface. This choice allows administrators to reduce storage costs by supporting the lowest cost type of disk storage available. See the ESX Configuration Guide and the ESXi Configuration Guide

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

3-Dec What's New in VMware vSphere 4.0

Enhanced ESX Error Reporting — Per-host network, storage and VMFS issues reported to the vSphere Client in the Events tab. Each error event also provides a link to a specific Knowledge Base article that explains the event and provides detailed remediation steps to resolve the error. See vSphere Basic System Administration http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf

4-Dec The following OUIs (MAC address prefixes) are registered to VMware through the IEEE. These are the possible MAC address prefixes you will see assigned in the first three octets of VMware virtual network adapters:

00:05:69
00:0c:29
00:1c:14
00:50:56

5-Dec Starting with ESX3, virtualized Citrix Presentation Server (XenApp) workloads with a reasonable amount of users became a reality. I've virtualized many Citrix servers in production with great success. The content based page sharing mechanism really shines here. Following is a great 'Citrix on VMware' best practices article from Sven Huisman:

<http://virtualfuture.info/2008/10/more-xenapp-45-on-vmware-recommendations/>

6-Dec Features no longer supported in the ESX4.0 Service Console:

Service Console net-snmp no longer supported; Deprecated /proc/vmware nodes; Migration from /proc to /sys file system; Custom IPMI drivers no longer supported; Booting into Linux or debug mode no longer supported; ESX4.0 Service Console is not a development environment (no longer ships with development packages and libraries)

7-Dec Use a "one-two punch" approach to backing up your virtual infrastructure by implementing both file level and image level (.vmdk) backups. File level backups will facilitate the day to day restore requests. Image level backups offer rapid recovery options in disaster recovery scenario. The best backup products available will offer both types of protection.

8-Dec vCenter Statistics Rollups

Real Time = 1 hour of real time stats refreshed every 20 seconds. Not stored in the vCenter database

Past Day = Real Time stats rolled up w/ 1 data point for every 5 minutes

Past Week = Past Day stats rolled up w/ 1 data point for every 30 minutes

Past Month = Past Week stats rolled up w/ 1 data point for ever 2 hours

Past Year = Past Month stats rolled up w/ 1 data point per day

9-Dec At the ESX Service Console, the who command will display a list of users who are currently logged on to the host, as well as the network host they are connecting from in the case of a remote session.

i.e.

```
[root@esx31 /etc]# who
```

```
root pts/0 Jul 26 14:53 (workstation.boche.mcse)
```

10-Dec On this day in 2007, VMware releases ESX 3.5 and VC 2.5 and introduces ESXi, the industry's first ultra-thin hypervisor. More than two months later it was discovered that a corrupted ESX 3.5 ISO image (as indicated by a false MD5SUM hash) had been released into the wild causing issues in some customer datacenters. VMware released a new ISO correcting the problem on 2/20/08.
<http://kb.vmware.com/kb/1003801>

11-Dec Lab Manager virtual machines are more or less pinned to the datastores they were originally created on which brings the importance datastore capacity management and planning to the forefront. However, the Lab Manager utility SSMove.exe (located in C:\Program Files\VMware\VMware vCenter Lab Manager\Tools\SSMove) can be used to move an entire datastore, or a specific tree of virtual machines to another datastore.

12-Dec On this day in 2005, VMware releases Player 1.0, a FREE desktop hypervisor for Windows and Linux platforms. It's purpose was the running of existing VMs, however it lacked the ability to create VMs and as such it was often likened to Adobe Acrobat Reader. Shortly after its release, users engineered clever ways to create VMs to be used in Player without paying VMware for a licensed VM creation product.

13-Dec Lab Manager Garbage Collection is the automatic detection and freeing of images that are no longer in use in a disk chain or otherwise. Lab Manager does not immediately delete files associated with a deleted VM. Each pass of the garbage collector involves an attempt to delete nodes without dependencies. Several passes over time may be required. The default Garbage Collection frequency is 120 seconds.

14-Dec VMware offers an online Cost Per Application Calculator. The tool was designed to accurately estimate and compare acquisition cost of a virtualization solution. VMware has labeled this metric Cost Per Application.

Take the tool for a spin and see how much you can save with VMware:
<http://www.vmware.com/technology/whyvmware/calculator/>

15-Dec ESX script to display the full path in the Service Console

Example:

In your ESX console, instead of seeing this:

```
[root@host vmware]#
```

You'll see this:

```
[root@host /etc/vmware]#
```

Paste the following into PuTTY on your ESX host:

```
mv /etc/bashrc /etc/bashrc.old
```

```
sed -e "s/\h \\W/\h \\w/g" /etc/bashrc.old > /etc/bashrc
```

Close your PuTTY session and re-open to see the change take effect.

16-Dec On this day in 2003, Hopkinton, Mass. based EMC Corporation announced its plans to purchase VMware, Inc. for \$635 million. The purchase was completed January 9th 2004 for \$625 million in cash.

17-Dec Configuration Maximums Comparison

RAM per VM:

ESX(i) 4.0: 255GB

ESX(i) 3.5 Update 4: 65,532MB (64GB - 4BM)

18-Dec What's New in VMware vSphere 4.0

VMkernel Protection — Mechanisms were introduced to assure the integrity of the VMkernel and loaded modules as they reside on disk and in memory. See the ESX Configuration Guide and the ESXi Configuration Guide

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

19-Dec What's New in VMware vSphere 4.0

vStorage VMFS Volume Grow — Allows dynamic expansion of a VMFS volume extent to add capacity to an existing datastore without disrupting running VMs. See the ESX Configuration Guide and the ESXi Configuration Guide
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf
http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esxi_server_config.pdf

20-Dec Native partitions can not be manually created or sized during ESXi 3 installation. The short ESXi 3 installation routine consumes approximately 4.7GB of disk spanning six partitions which are automatically created based on VMware best practices. The remaining disk space is allocated as block unaligned VMFS for use with virtual machines and VMkernel swap.

21-Dec Before attempting to install the VMware Tools on a Linux VM, be sure to have the GCC Compiler and Kernel Source installed. More often than not, these components are required during the VMware Tools `vmware-config-tools.pl` configuration script.

22-Dec Join A VMware User Group (VMUG)

VMUGs are run by the users, for the users. This isn't corporate propaganda jammed down our throats. These are peer level meetings with a wide range of expertise and experience. It's straight talk about VMware virtualization benefits, strategies and related 3rd party products, and we don't sugar coat, overlook, or ignore VMware issues.
<http://www.vmware.com/communities/content/vmug/>

23-Dec Why ESXi?

- Smaller hypervisor means faster deployment times
- Smaller hypervisor means less code vulnerability, risk to the environment, and time spent patching the hypervisor
- Smaller hypervisors can be embedded in server hardware
- ESXi free edition lends itself well to rapid and wide spread implementation
- Automation efforts are moving away from the COS (PowerShell, Host Profiles, Distributed Virtual Switch, etc.)

24-Dec Installing the Performance Overview Plug-In in vCenter 2.5 Update 4

VirtualCenter 2.5 Update 4 introduced new Performance Overview charts which resemble the old vmkusage/vmktree of the ESX2 days. However, the plugin is not installed automatically. Follow the KB below for the many required steps. Fortunately, the new charts are installed automatically in vSphere with no manual steps.

<http://kb.vmware.com/kb/1008296>

25-Dec To add an existing user to an existing group in the ESX Service Console, use the following command and syntax:

```
usermod -a -G [group_name] [user_name]
```

ie. usermod -a -G wheel joe -- adds user joe to the wheel group.

26-Dec Lab Manager: When To Fence A Configuration?

- You have a configuration with one or more servers and you anticipate cloning the configuration numerous times
- You have a configuration involving a difficult and complex setup, and cloning the configuration is an easier solution than repeating the setup process

27-Dec Clearing The Air On Shares

Share values are a method of allocating CPU and memory resources to VMs with preference in an over commit situation. Shares can be assigned individually in the VM configuration, or more globally at the resource pool level. What's often forgotten is that shares only come into play when a shortage of CPU or memory actually occurs. Outside of a resource shortage, shares don't do a darned thing.

28-Dec What's New in VMware vSphere 4.0

Power Management — ESX/ESXi 4.0 supports Enhanced Intel SpeedStep® and Enhanced AMD PowerNow! CPU power management technologies. With dynamic voltage and frequency scaling (DVFS), ESX/ESXi can save power consumed by ESX hosts when they are not operating at maximum capacity. See the vSphere Resource Management Guide http://www.vmware.com/pdf/vsphere4/r40/vsp_40_resource_mgmt.pdf

29-Dec At the ESX Service Console, use the su command to change users. su is short for substitute user or switch user and is typically used for the elevation of privileges. I liken it much to Windows Fast User Switching. The bottom line is that su provides a method for admins to log on with their own accounts and to use su - for root privileges when needed, while providing an audit trail. It's a good security measure.

30-Dec VMbook: Practical Guide to Business Continuity and Disaster Recovery with VMware Infrastructure featuring Hardware and Software Solutions from:
AMD, Cisco, Dell, Emulex, Intel, NetApp, Sun Microsystems

Once you have VI installed, this is a fantastic 230 page manual for jumpstarting your VI BCP/DR planning and execution.

http://www.vmware.com/files/pdf/practical_guide_bcdr_vmb.pdf

31-Dec Looking for VMware Tools? Look no further than your ESX host under /vmimages/tools-isoimages. There you'll find the .iso files that mount as images into the virtual CD-ROM tray when the "Install/Upgrade VMware Tools" command is passed to the ESX host for a VM. Under the floppies folder you'll find vm SCSI-1.2.0.2.flp which is the optimized BusLogic SCSI driver for legacy Windows guests.