Troubleshooting VMware ESX Server 3 and VMware VirtualCenter 2

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VMWORLD 2006

Agenda

- Common Issues
- Virtual Machine (VM)
- Virtual Infrastructure Client (VIC)
- ESX3
- VirtualCenter 2 Troubleshooting
- VMotion

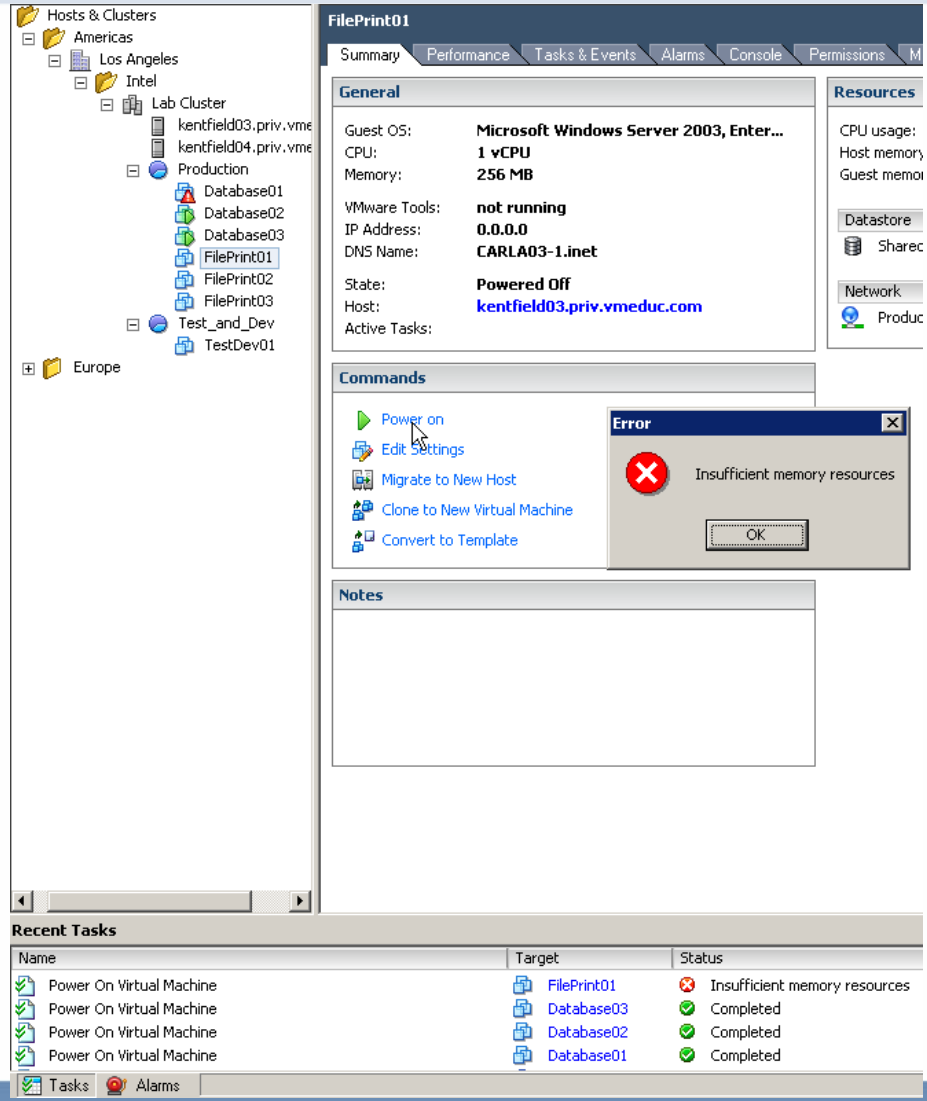
Common Issues

- Virtual machine problems can be caused by
  - Not enough resources
  - Guest OS or application failures
  - Misconfigurations
- Misconfigurations include
  - Undersizing virtual resources
  - Failure to satisfy VMotion requirements
  - Insufficient resources in resource pool
  - Insufficient resources in HA Cluster
  - Not using FQDNs for the ESX Servers

Use the VI Client to view error messages, resource usage values and configuration information

Cannot Power on VM

- Use the VI Client to identify what is failing
  - Error, “Insufficient memory resources”
- What does the failing feature depend on?
  - Permissions
  - Memory resources
    - Of the cluster?
    - Of the ESX Server?
    - Of the resource pool?
    - Of the VM?
  - Memory reservations
    - Set for the VM
    - Set for the resource pool



VI Client Problem: cannot login or add host to inventory

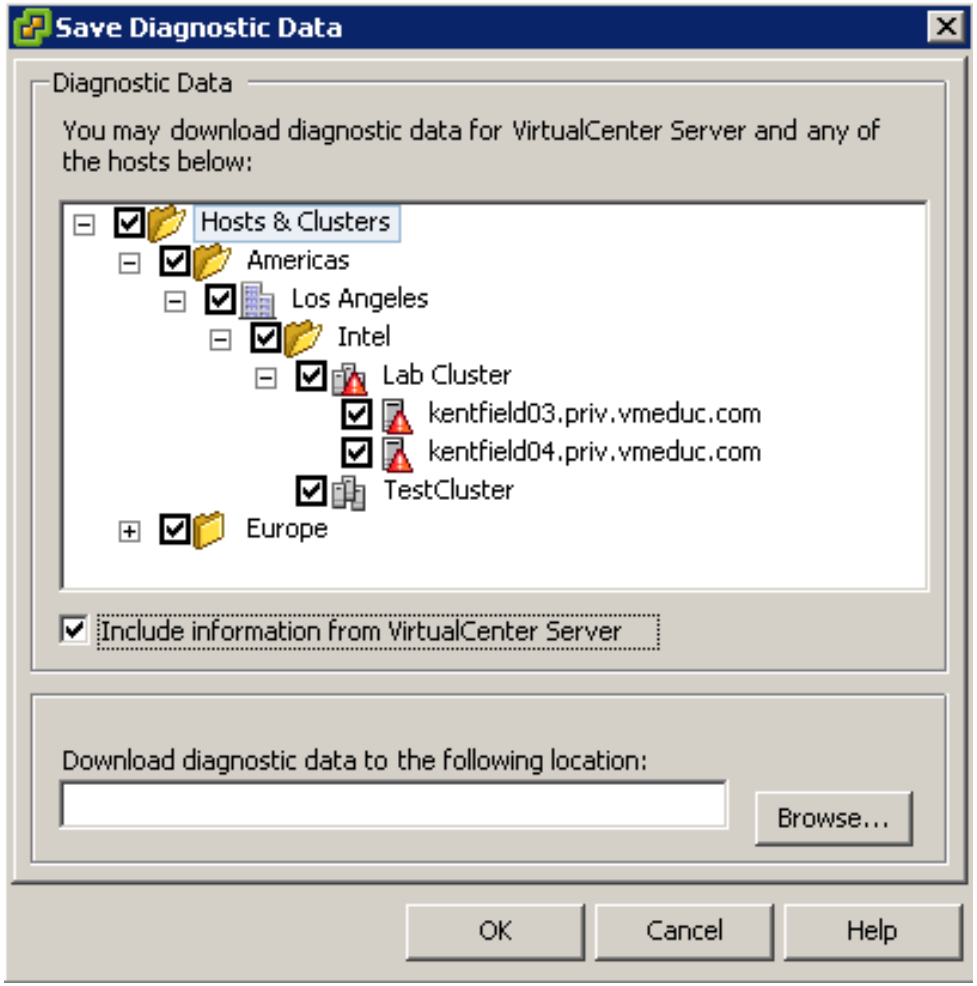
Possible underlying cause	How to test
Incorrect user account and/or password	Try to log directly into the VirtualCenter Server or ESX Server
VirtualCenter Server Service (`vpxd`) is not running	*(Only applies if logging into VC Server)* Check that the VirtualCenter Server service is running on the VC Server
ESX Server management agent (`hostd`) is not running	*(Only applies if logging directly into ESX Server)* Check that hostd is running: Run the command, `ps -ef | grep hostd`, at the service console command line
Local station has no IP connectivity	Depending on what you are logging into, ping the VirtualCenter Server or ESX Server

What to Do if the ESX Server Crashes

- If the machine had been running in a steady state, with running VMs
  - Check for environmental factors, especially room temperature
  - Check for detached external devices
- If the machine had been recently rebooted
  - Check for hardware configuration changes
- Copy down the screen display, screen-grab it, or take a photo
- Gather information and send to VMware Support
  - Run the vm-support program
  - Use the VI Client to export the diagnostics data

Collecting Diagnostics Data

- VMware technical support might request several files to help resolve your product issues
- Use the VI Client to collect diagnostics data



Log into Service Console as Root

- When it is necessary to access the service console command line to troubleshoot problems:
  - Access ESX Server physical console
    - Use remote management adapter if one exists
  - Use a secure shell (ssh) client, such as puTTY
    - Allow root ssh login on port 22 (off by default)
    - To enable, modify /etc/ssh/sshd_config

      Change the entry

      `PermitRootLogin no`

      to

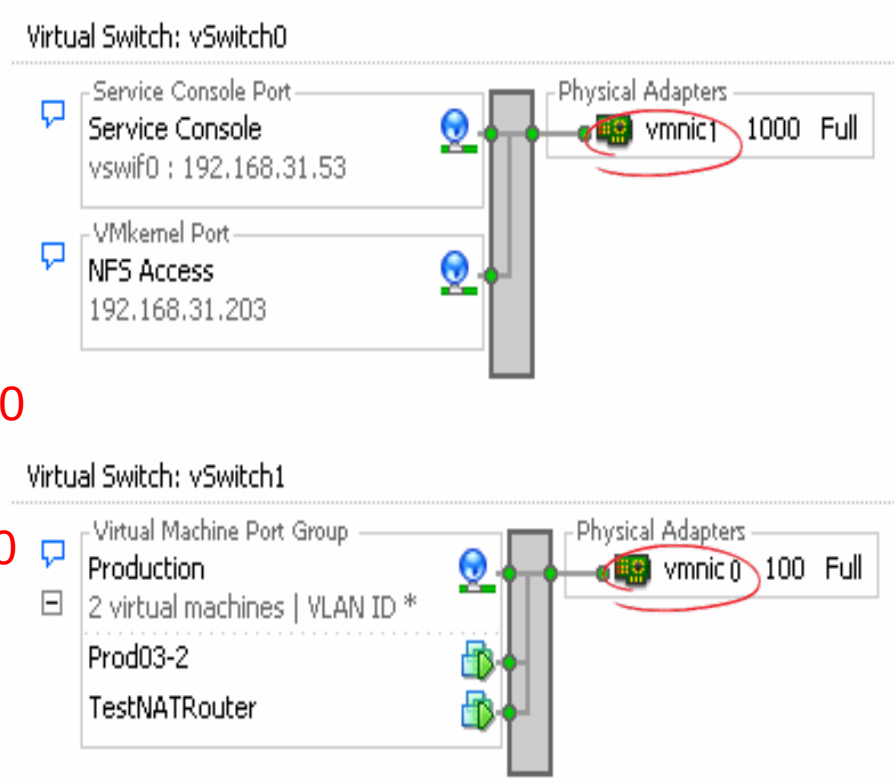
      `PermitRootLogin yes`
    - Restart the service:

      `service sshd restart`

Enabled in an upgrade - Disabled in a fresh install

Misconfigured ESX Service Console Networking

- If unable to connect to the ESX host with the VI Client
  - Use esxcfg-vswitch to verify current configuration of a virtual switch and to make changes
- Example:
  - esxcfg-vswitch –l to view virtual switch configuration
  - esxcfg-nics –l or cat /proc/vmware/pci | grep vmnic to view virtual nics
  - esxcfg-vswitch –U vmnic0 vSwitch0
    - Unlinks vmnic0 from vSwitch0
  - esxcfg-vswitch –L vmnic1 vSwitch0
    - Links vmnic1 to vSwitch0
  - service mgmt-vmware restart to restart hostd



Troubleshooting: hostd

- hostd is the replacement for serverd and ccagent
- New **`/usr/bin/vmware-watchdog`** process watches over hostd and restarts it if it crashed
- If watchdog and hostd crash, then you must restart hostd manually
- **`service mgmt-vmware restart`** will restart hostd if crashed

Time Synchronization

- Hardware clock or Network Time Protocol (NTP)
  - Sync to an Active Directory server or alternate time source
    - Example:

      `esxcfg-firewall –o 123,udp,out,ntp`

      `ntpdate <IP address of NTP master>`

      Then

      `service mgmt-vmware restart`
  - Set UTC time in the ESX host BIOS and use an offset
- Areas impacted
  - Performance charts
  - SSH keys could expire prematurely
  - NFS
  - Backups
  - Any operation that depends on time

Domain Name Service

- ESX needs to be configured with a FQDN
  - VMware HA expects DNS to be set up correctly
  - Putty connections
  - Commands like scp use host names
  - NFS mounts - server or client
  - Syslog
  - Anything that needs to resolve host names
- Specify the correct IP addresses for the DNS servers on each host
  - Both primary and secondary
  - Try to NOT rely on /etc/hosts – error prone!
- During the install, take the time to read the installation summary!

VirtualCenter 2

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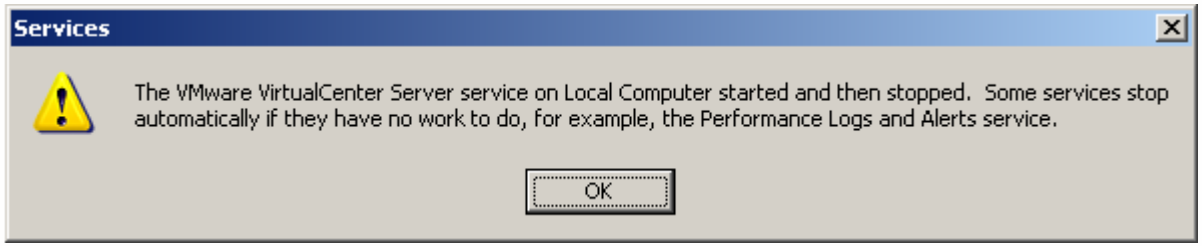
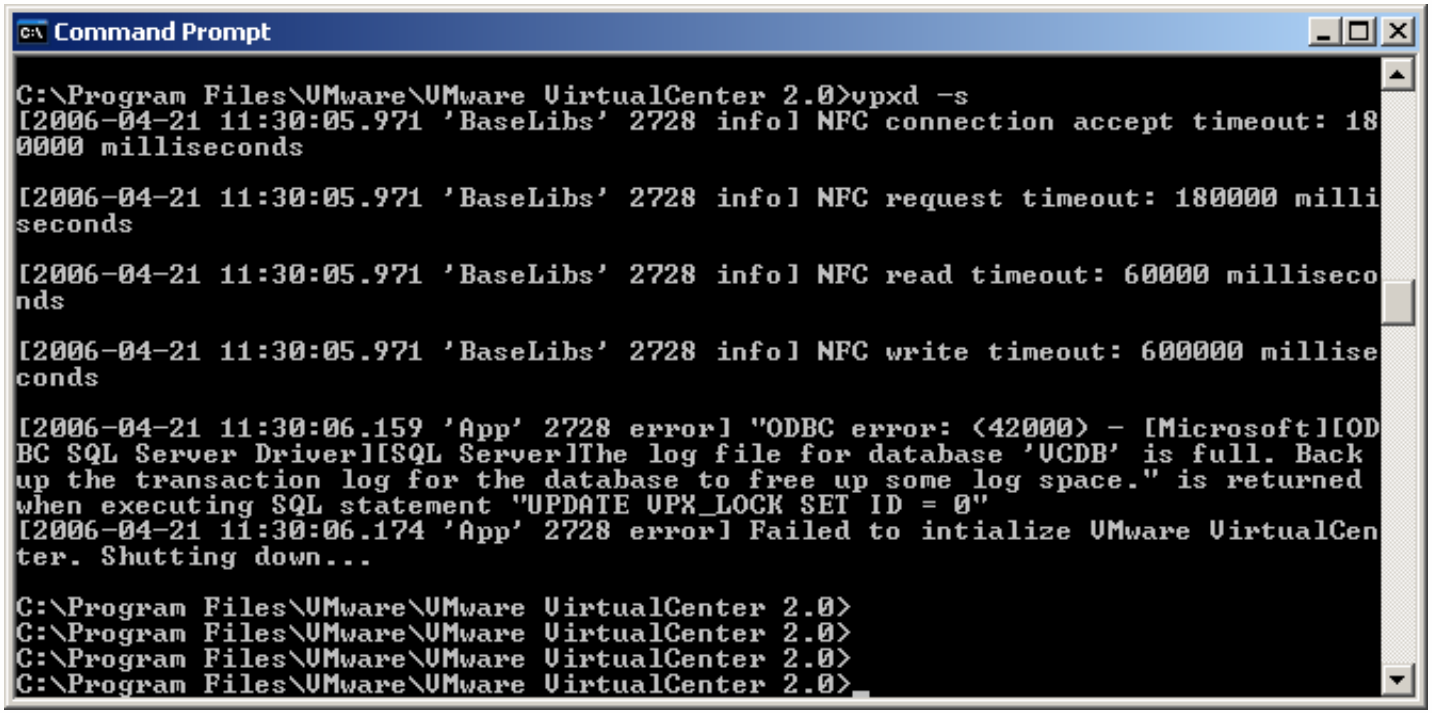
Windows Operating System Errors

- If the VC service starts but stops immediately, a Windows error will be presented



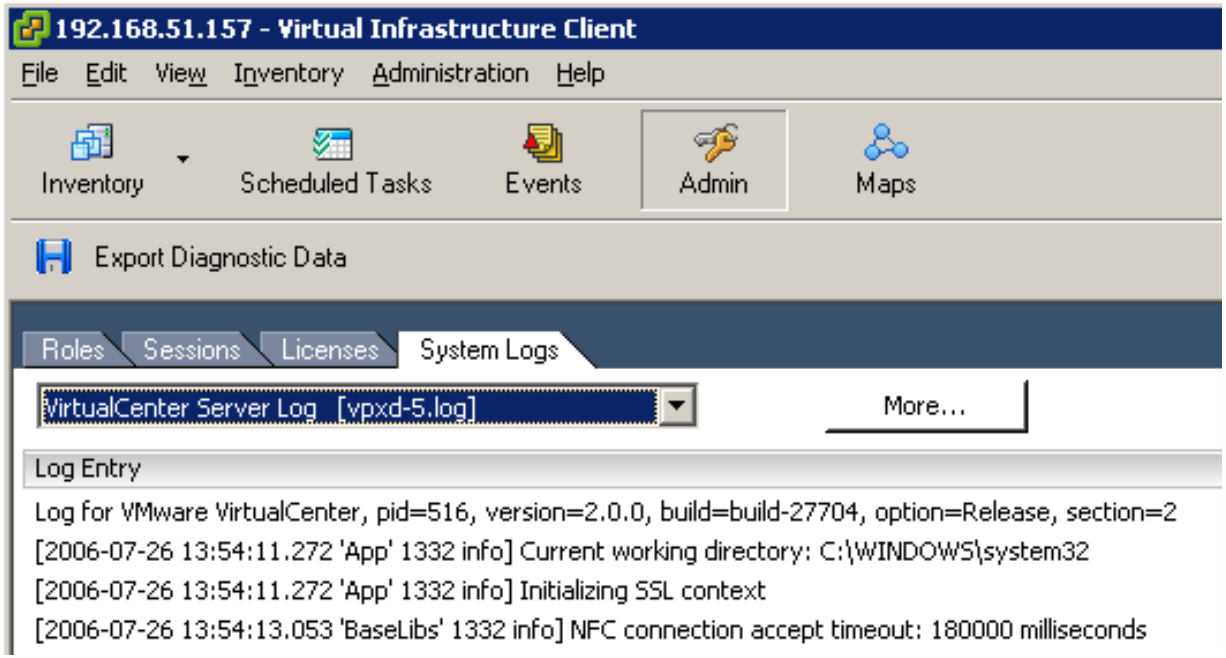
VC Service will Not Start

- Check vpxd logs and Windows event logs for clues
- Sometimes, VC terminates before adequate info is written to logs
- Invoke vpxd in stand-alone mode: **vpxd -s**



What happens if the VirtualCenter server service fails to start?

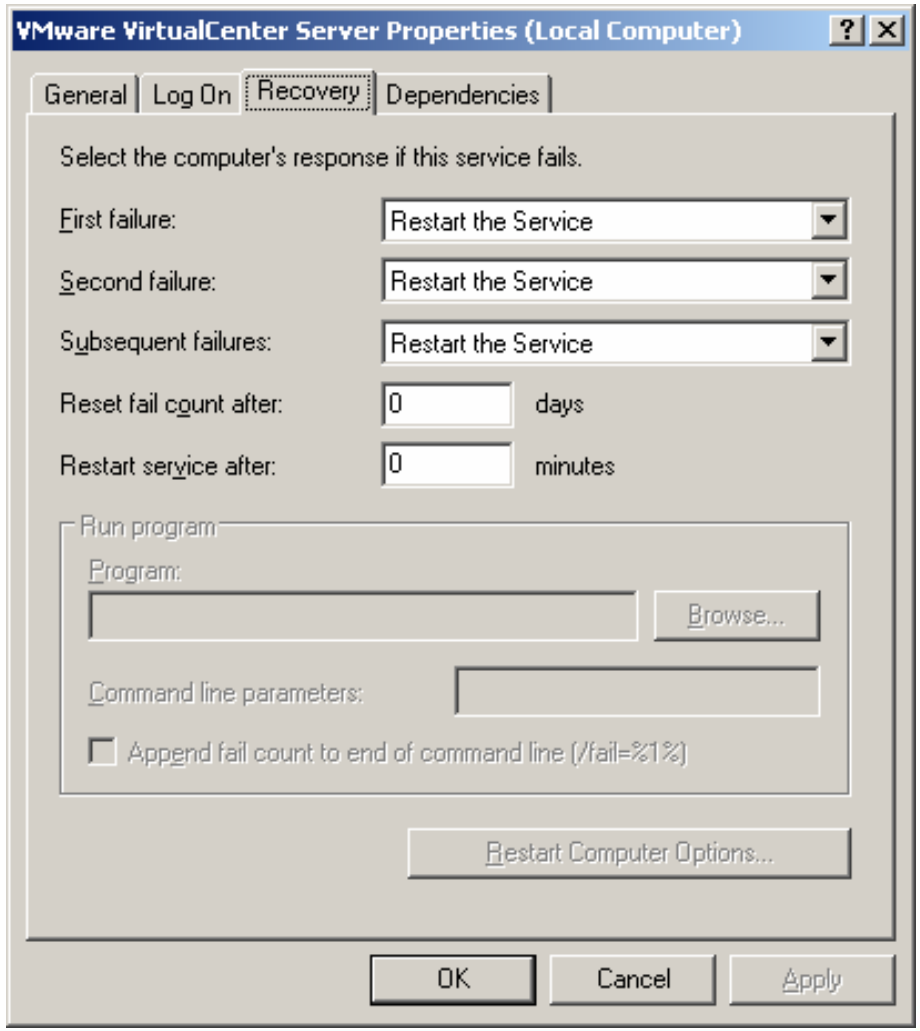
- Use the VI Client to check VirtualCenter Server service (vpxd) logs for clues
- Use the Windows Event Viewer to check event logs for clues



- Service failure could also be caused by database problems

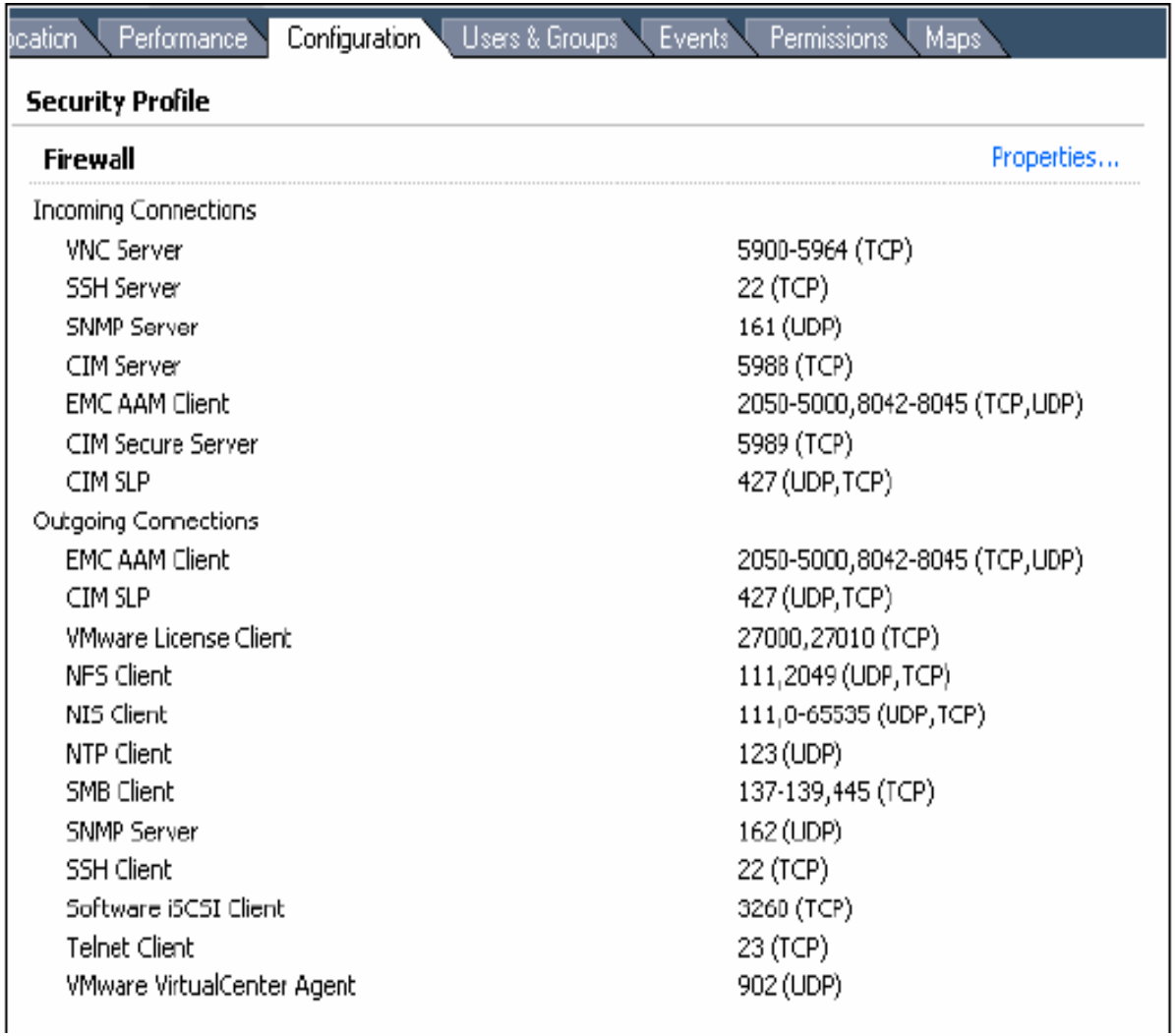
Windows Service Recovery

- If the VC service occasionally stops because of DB issues you may want to change the recovery options
- The root-cause should still be investigated



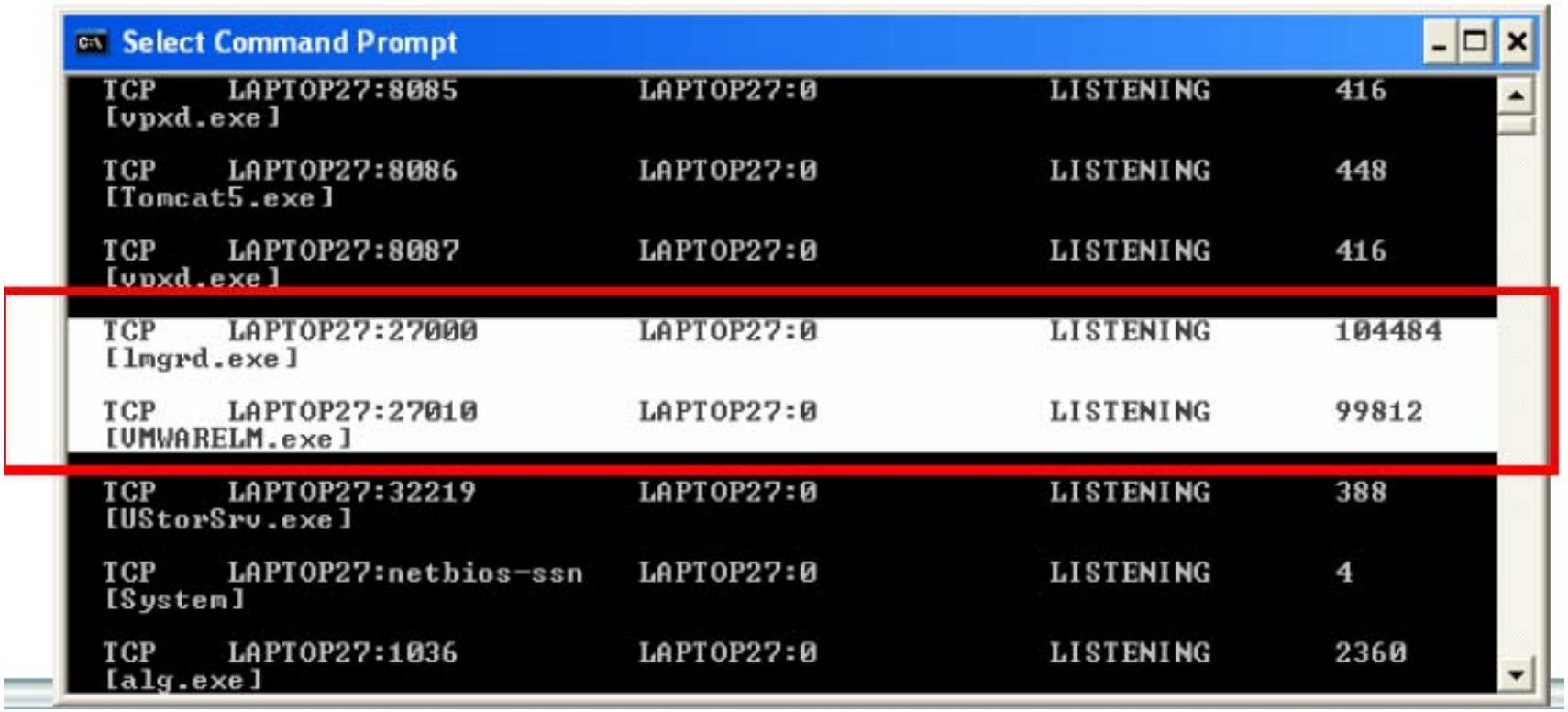
Communication between VC2 and ESX3

- Server Configuration Guide
  - Page 180 shows complete list of ports, the ports use, and whether traffic is incoming or outgoing
- Ports are defined as being used by the VMkernel or the SC



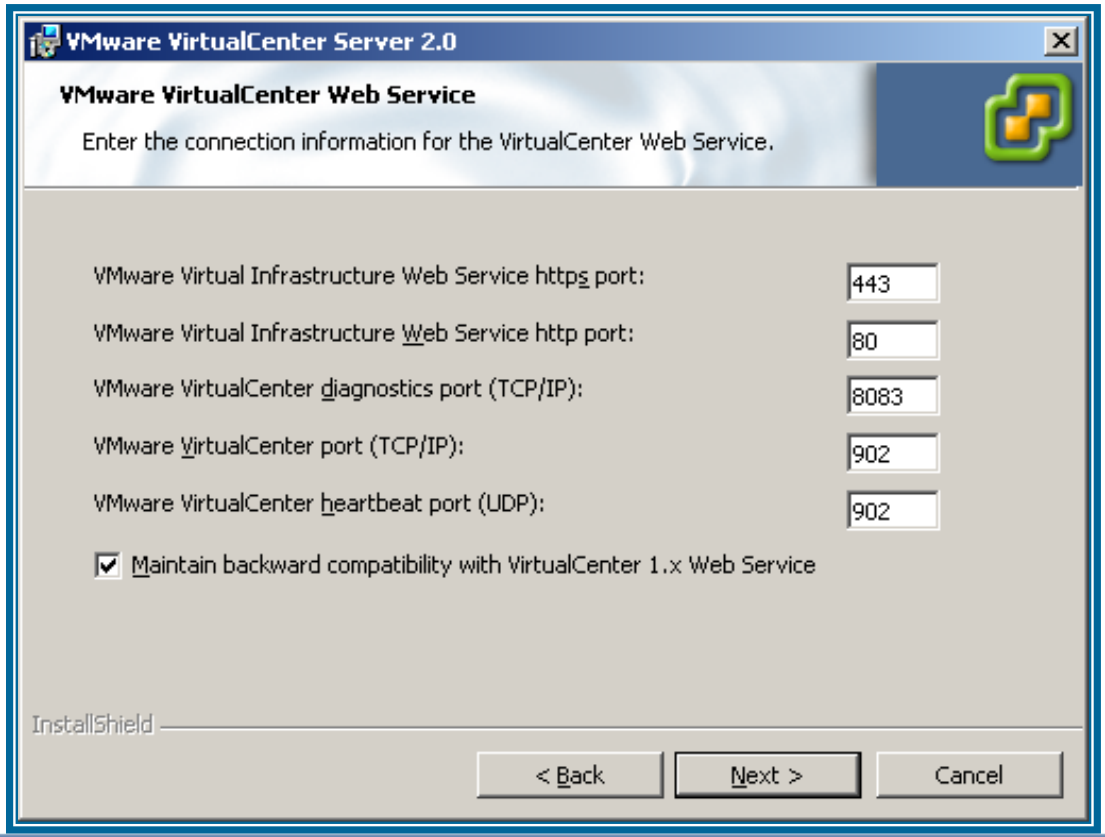
Find a Process Using the Port Number

- Get process information with **`netstat –a –b`**
- Remove service or change ports if possible



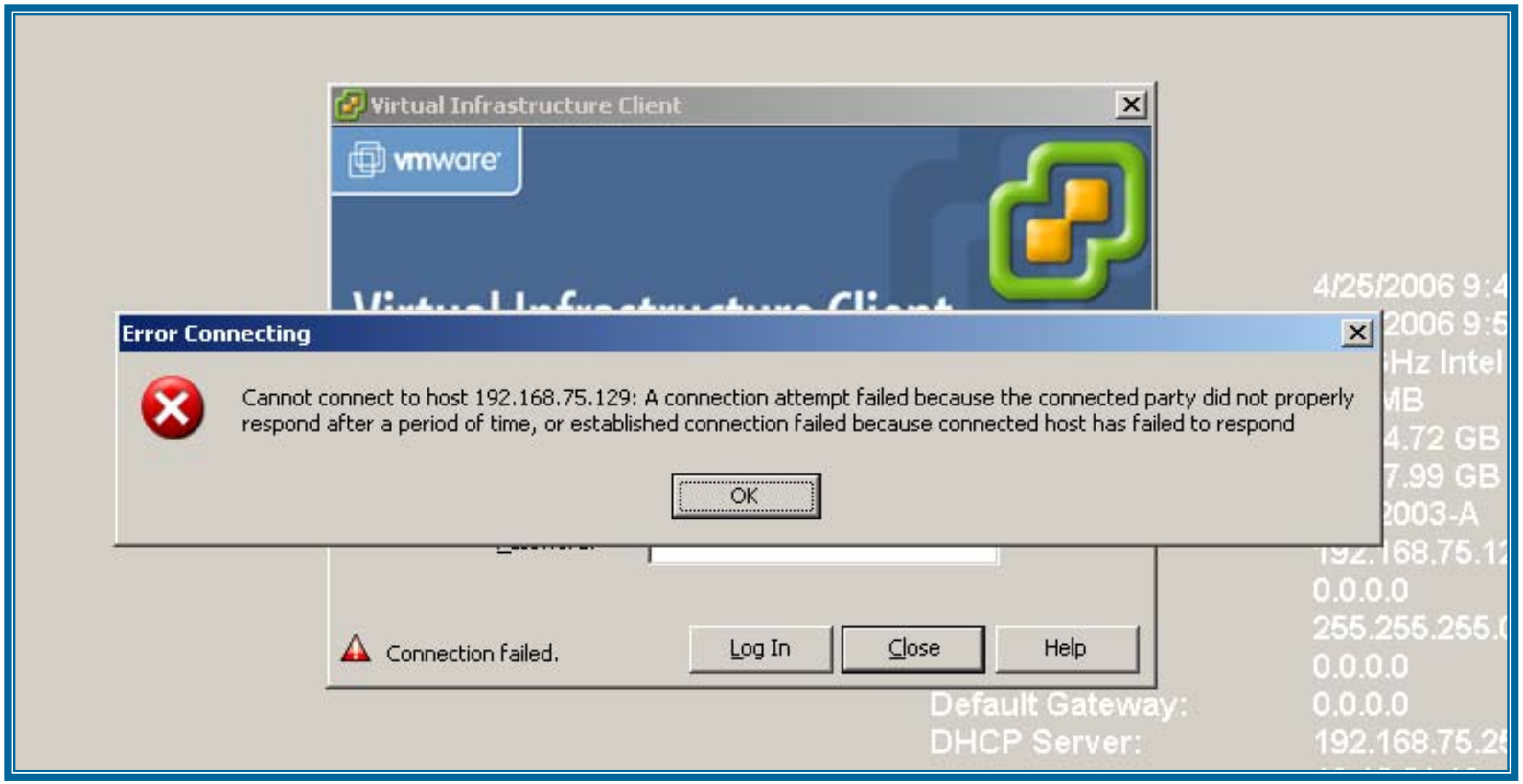
Modify VC Ports

- Change VC from default ports if needed, but be aware of additional complexity this introduces



Client Connections Blocked

- If VI Client on another machine can't connect to VC Server, it could be firewall-related



Troubleshooting Windows Firewall

- Turn on firewall logging if necessary to determine whether or not ports are blocked
- Control Panel > Windows Firewall > Advanced Tab
  - Click on "Settings"… (under Security Logging)
- Look at C:\WINDOWS\pfirewall.log

```
2006-04-26 14:15:21 DROP TCP 192.168.75.128 192.168.75.129
  1550 80 48 S 24007413
43 0 64240 - - - RECEIVE
2006-04-26 14:15:34 DROP TCP 192.168.75.128 192.168.75.129
  1551 902 48 S 2554083
295 0 64240 - - - RECEIVE
```

License Server

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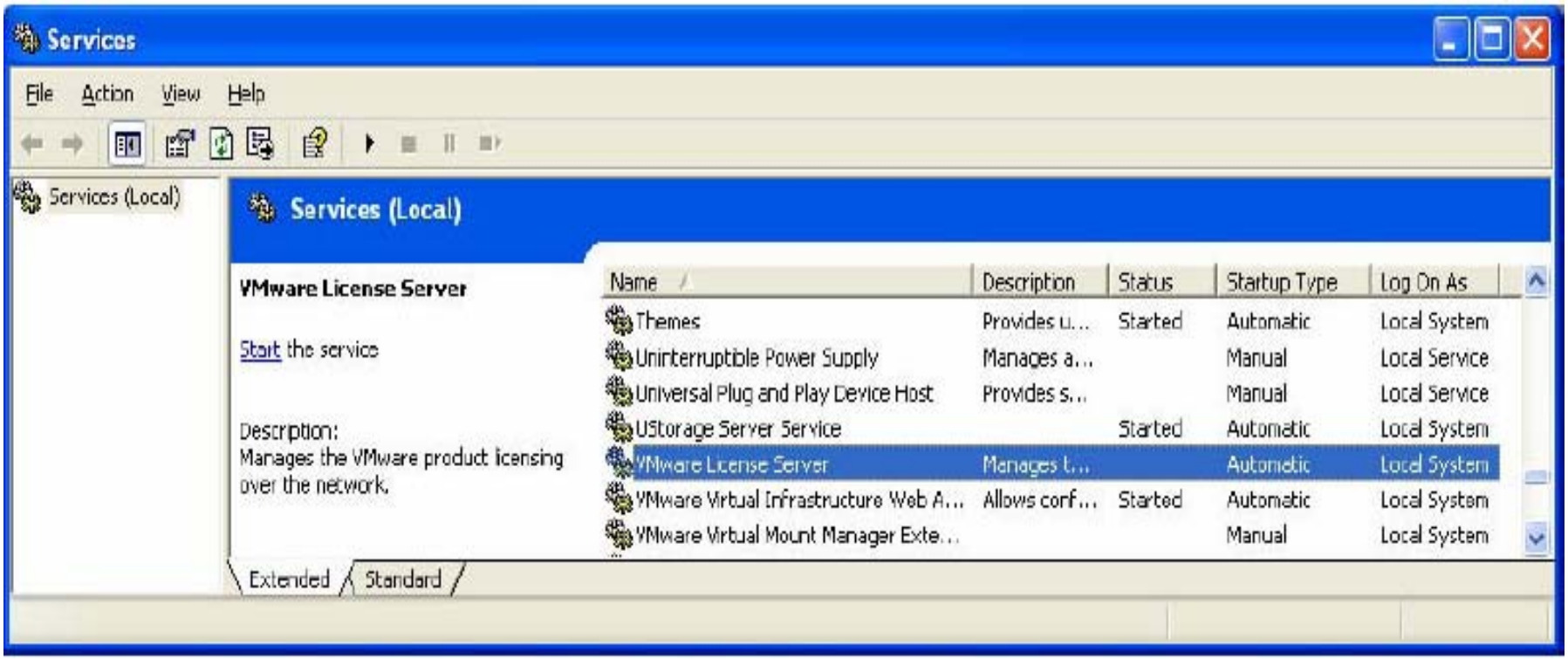
License Server Service

- Check whether the VMware License Server is running via Start->Control Panel -> Administrative Tools -> Services



License Server will Not Start

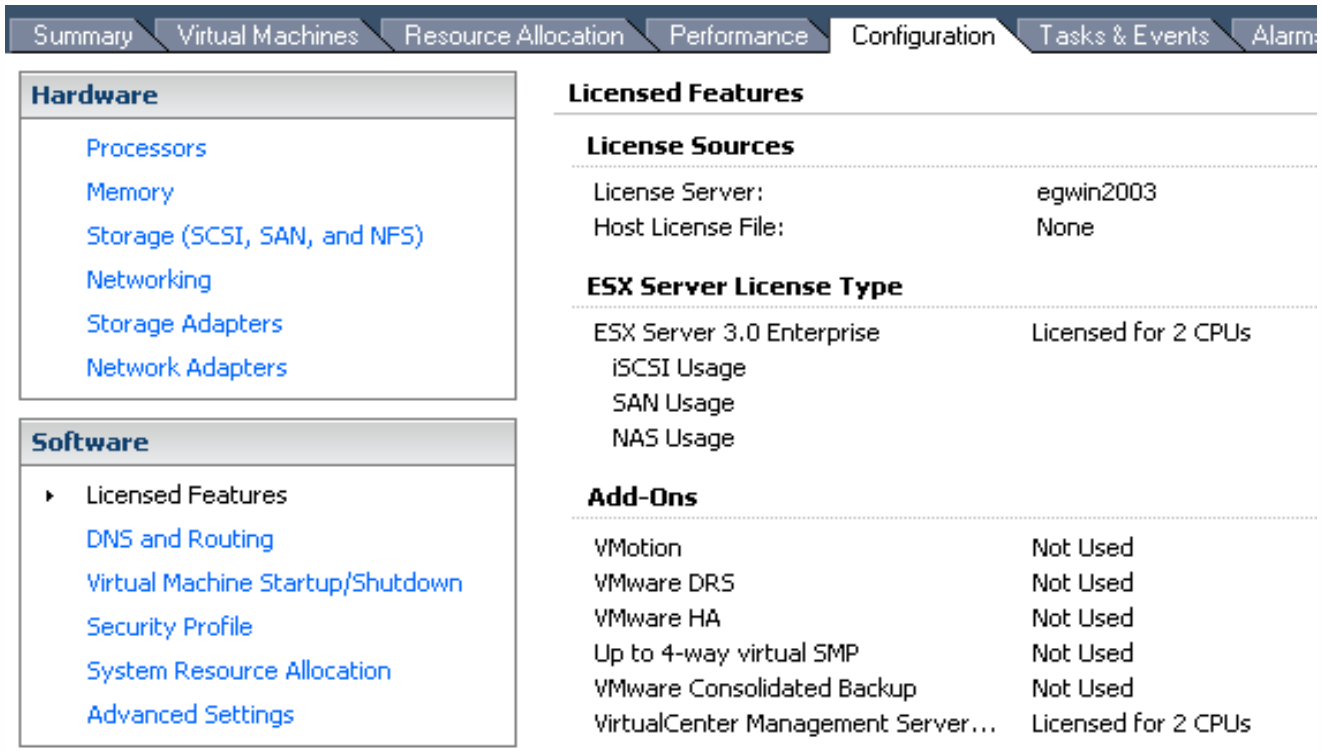
- Most likely cause is an incorrect or corrupted license file
  - KB1013698 provides syntax information about host/server based license files
- Use the LMTOOLS (license server tools) utility
  - Click the Server Status tab to check the status of the license server, and verify the path to the license file being used
    - Click "Perform Status Enquiry" and look at messages
    - Use Edit > Clear window between runs
  1. If the wrong file is being used, change it in the "Configure Services" tab; hit "Save Service" after making the change
  2. Attempt to start the service again

License Server Starts But Doesn't Behave Properly

- Check the log file in:
  %ALLUSERSPROFILE%\Application Data\VMware\VMware License Server\lmgrd.log
- Log viewer is also available in LMTOOLS under the “Config Services” tab
- Check the log under:
  %ALLUSERSPROFILE%\Application Data\Macrovision\FLEXlm
- Check the “Server Diags” tab in LMTOOLS. Click on "Perform Diagnostics" to see all licensed features and details
- Use the Generate VirtualCenter Server log bundle program
  - The result vcsupport-date-time.zip file is placed on the VC Server desktop

Are licenses available?

- Error: *“There are not enough licenses installed to perform the operation”*
- Check to see that the ESX Server License Type has been changed from the default of "Unlicensed"



Unable to Change License State

- If the License Server cannot be set or changed, the ESX host may not be able to resolve the name of the License Server machine
  1. Log into the console (ssh)
  2. Verify that the name resolves to the correct IP
  3. If not, use the IP address instead of name
- If hosts are not automatically updated with the correct License Server when adding to VC
  1. Modify the License Server address under Server Settings
  2. Select "Use the following license server"
  3. Enter the alias or IP of the server
     - If this step is not possible, restart the License Server right before clicking the OK button

VC2 Database

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Checking for Database Failure

- VC log may contain a line such as:

“An unrecoverable problem has occurred stopping the VMware VirtualCenter service

Check database connectivity before restarting”

- Check the state of the database before restarting the VC service

Checking for Failure to Connect to Database

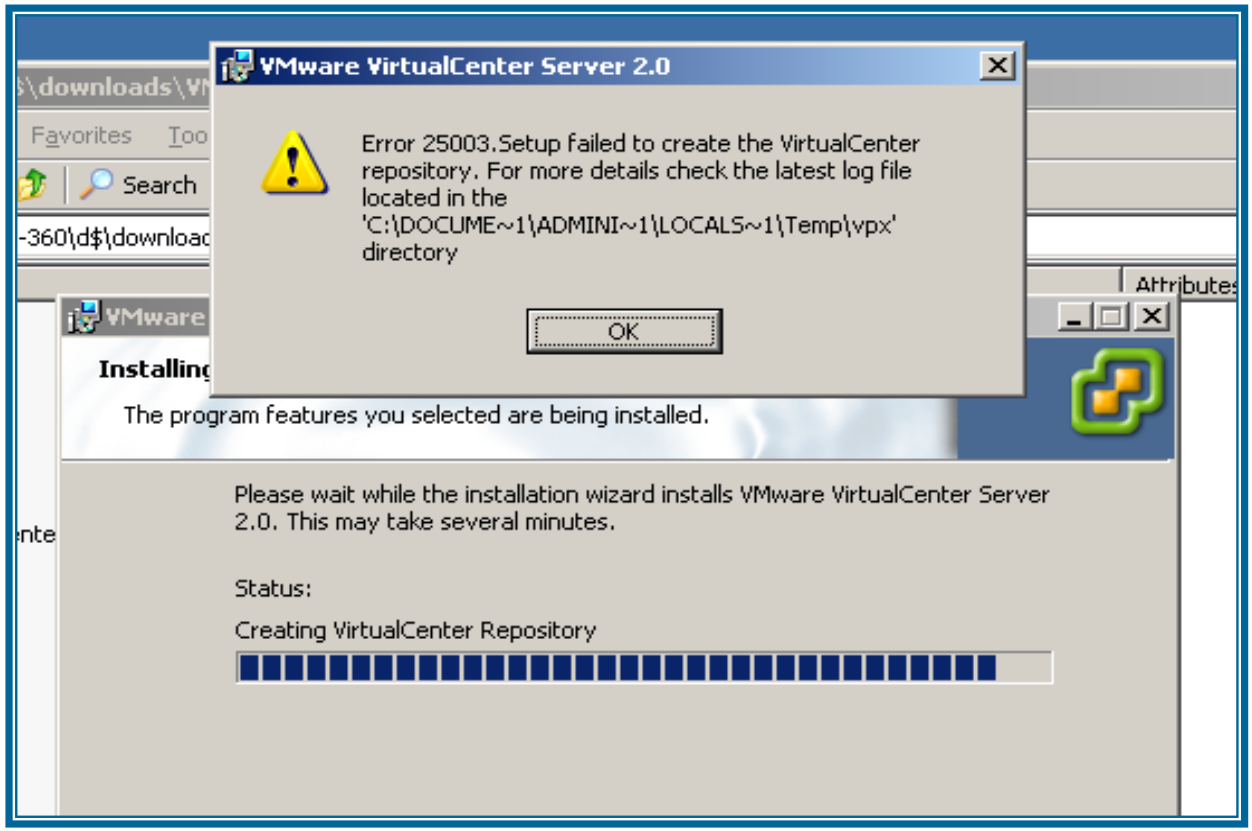
- VC log may contain a line such as:

  “SQL Server does not exist or access denied.”

- Check to make sure the DSN is set up properly and access is granted to the connecting account

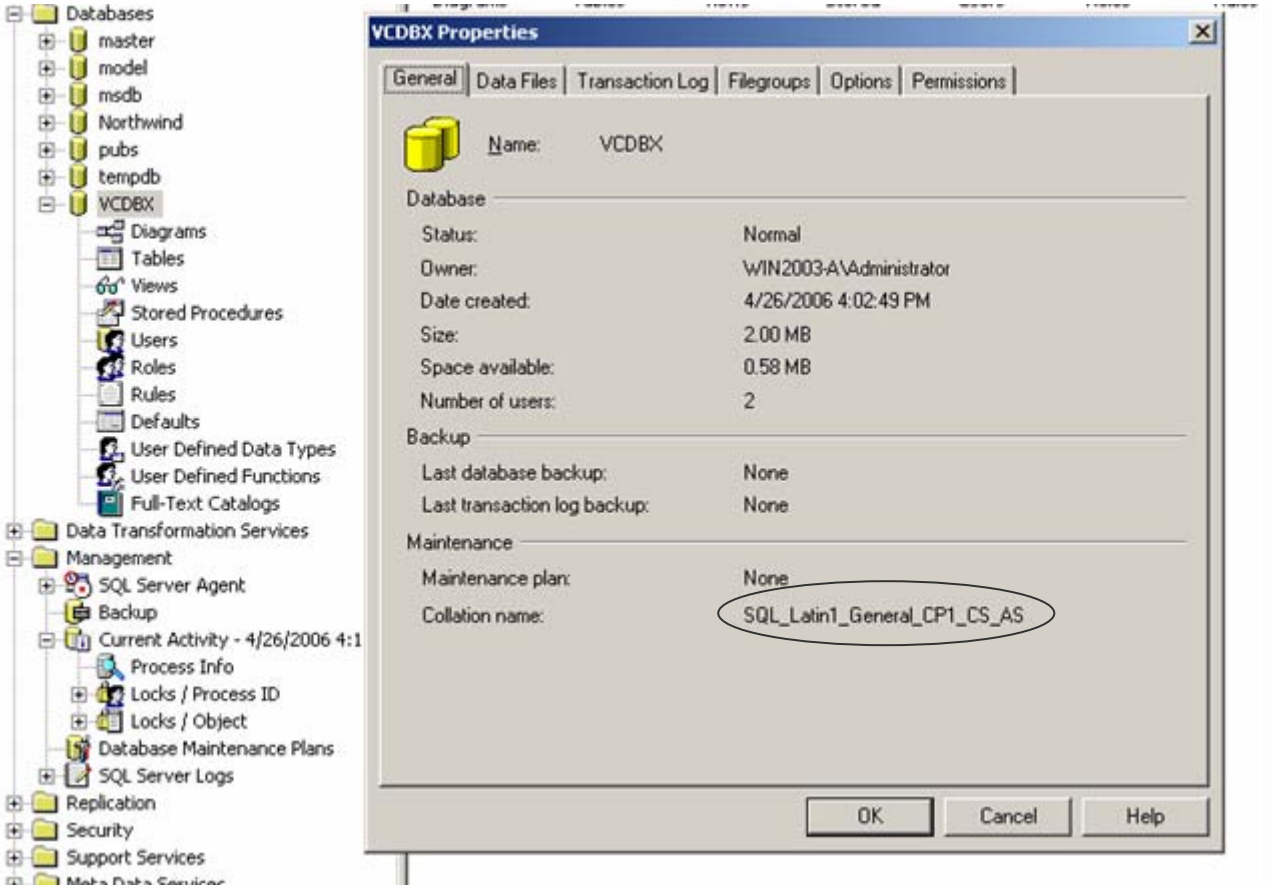
Case-sensitive SQL Server

- VC is a case-insensitive DB application
  - Installation will fail with a case-sensitive collation



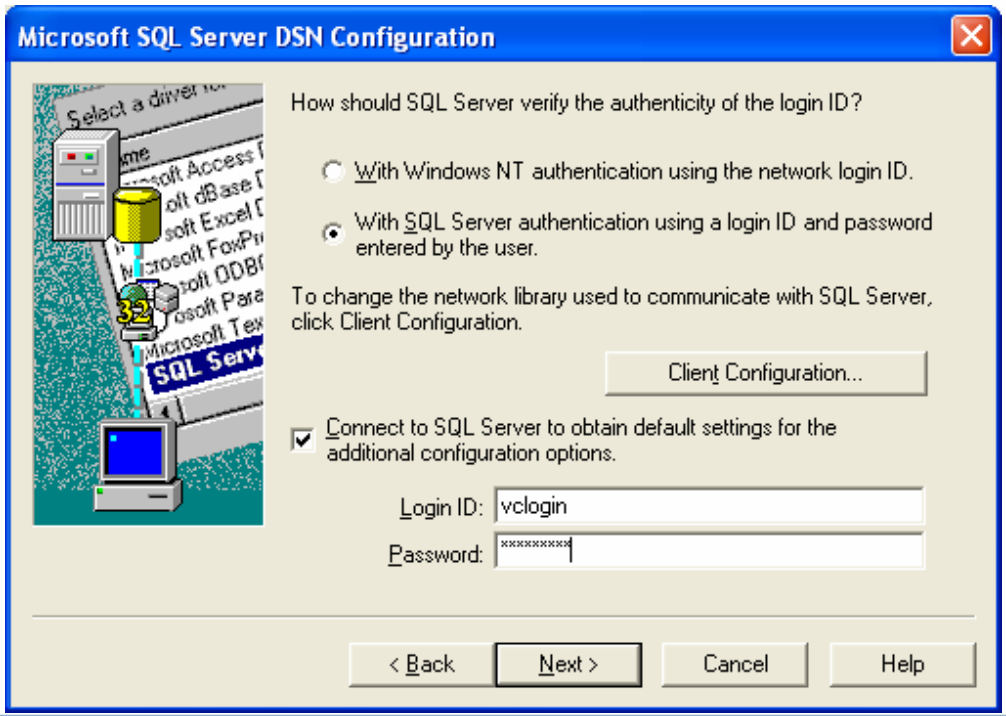
Checking SQL Server Collation

- Check the DB Properties



ODBC Authentication Issues

- SQL Server authentication will work predictably on local and remote database servers
- NT authentication requires VC to run with a service account that has access to the DB; "Local System" account does not have access to remote servers



Transaction Logs Filling Up

To prevent this:

1. Set to simple recovery mode if possible
2. Take regular backups of database if not in simple recovery mode
3. Ensure adequate disk space and configure transaction logs to grow automatically (logs will eventually fill entire disk unless regular backups are performed)
4. If customers are using SQL 2000 they may see an issue with transaction logs filling up, the vpxd log may contain:

“The log file for database 'VCDB' is full. Back up the transaction log for the database to free up some log space”

Reinitializing the VC DB

- Wipes out and resets all data stored in the VC DB
- Use only as a last resort
- If vpxd is running under a user account, log in as that user
- From a command prompt:
  - C:\>"\Program Files\VMware\VMware VirtualCenter 2.0\vpxd.exe –b"

VMotion

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Virtual Machine Requirements for VMotion

- Migrating a VM with the following conditions produces an **error**:
  - VM has an active connection to an internal virtual switch
  - VM has an active connection to a CD-ROM or floppy device with a local image mounted
  - VM has its CPU affinity set to run on one or more specific, physical CPUs
  - VM is in a cluster relationship (e.g. using MSCS) with another VM
- Migrating a VM with the following conditions produces a **warning**:
  - VM is configured with an internal virtual switch but is not connected to it
  - VM is configured to access a local CD-ROM or floppy image but is not connected to it

Host Requirements for VMotion

- Source and destination ESX servers must have
  - Visibility to all SAN LUNs (either FC or iSCSI) and NAS devices used by VM
  - A Gigabit Ethernet backplane
  - Access to the same physical networks
  - Consistently labeled virtual switch port groups
  - Compatible CPUs
    - New CPU features exposed, which introduce new VMotion compatibility constraints and trade-offs

Identifying CPU characteristics

- In most cases, use server & CPU family/model specifications
- Use VMware's CPU bootable utility

```
TEST: 56983: CPUID CHANGE: 312580
Reporting CPUID for 1 logical CPU...

     Family: 06 Model: 0d Stepping: 6

     ID1ECX      ID1EDX      ID81ECX     ID81EDX
     0x00000180 0xafe9f9bf 0000000000 0000000000

Vendor                    : Intel
Processor Cores           : 1
SSE Support               : SSE2
Supports NX / ED          : No
Hyperthreading            : No
Supports 64-bit Longmode  : No
Supports 64-bit VMware    : No

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```

http://www.vmware.com/download/vi/drivers_tools.html or Get it from the ESX3 CD

Links

- HCL for supported server hardware and operating systems
  - http://www.vmware.com/pdf/vi3_systems_guide.pdf
- HCL for support I/O adapters
  - http://www.vmware.com/pdf/vi3_io_guide.pdf
- HCL for support SAN storage
  - http://www.vmware.com/pdf/vi3_san_guide.pdf
- Installation and upgrade guide
  - http://www.vmware.com/pdf/vi3_installation_guide.pdf
- Command line reference in Appendix A of Server Configuration Guide
  - http://www.vmware.com/pdf/vi3_server_config.pdf
    - esxcfg-nics, esxcfg-vswif, esxcfg-vswitch, esxcfg-firewall, etc.
- License server configuration
  - http://www.vmware.com/pdf/vi3_license_redemption.pdf

The End

Questions?

Presentation Download

Please remember to complete your
session evaluation form
and return it to the room monitors
as you exit the session

The presentation for this session can be downloaded at
http://www.vmware.com/vmtn/vmworld/sessions/

Enter the following to download (case-sensitive):

Username: cbv_rep
Password: cbvfor9v9r

Some or all of the features in this document may be representative of feature areas under development. Feature commitments must not be included in contracts, purchase orders, or sales agreements of any kind. Technical feasibility and market demand will affect final delivery.

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Appendix

Service Console NIC

- vswif
  - eth0 is gone. Have to specify interface name while using standard Linux networking commands e.g. **`/sbin/arping –I vswif0`**
  - MAC address is retained across reboots (ifcfg-vswif0)
  - MAC address could be changed using ifconfig
  - Multiple vswif's could be easily added – possible multi-homed configuration issues (routing table entries)
  - vswif0 settings are replicated to eth0 when booting into Troubleshooting mode
    - **`esxcfg-linuxnet –setup`**: creates ifcfg-eth0
    - **`esxcfg-linuxnet –remove`**: removes ifcfg-eth0
  - Resetting SC NIC settings
    - Use esxnet-support script – included with **`VMware-esx-supptools.rpm`**

Virtual Center Installation Logs

- Install logs are located in the %TEMP% directory of the user that installed software

vmlic.log	test results for served license file during install
redist.log	MDAC/MCAD QFE rollup install results
vmmsde.log	MSDE installation log
vmls.log	License server installation log
vmosql.log	Creation of database/trans logs for VCDB
vminst.log	Log of VC server installation and subtasks
VCDatabaseUpgrade.log	Details of upgrading from VC 1.x DB
vmmsi.log	VI client installation log
vpx\vpxd-0.log	small stub from first time starting service

VC Log File Locations - VPXD logs

- Location: %TEMP%\vpx (relative to the user account running vpxd)
- Naming: vpxd-#.log (# is one digit, 0-9)
- vpxd-index contains the # of the currently active log file
- Logs rotate each time vpxd is started, and also when it reaches 5 MB in size

VC Log File Locations - VPXA logs

- VC agent on ESX host
- Location: **`/var/log/vmware/vpx`** on the ESX host
- Naming: vpxa-#.log (# is one digit, 0-9)
- vpxa.cfg can be used to modify logging behavior like vpxd.cfg

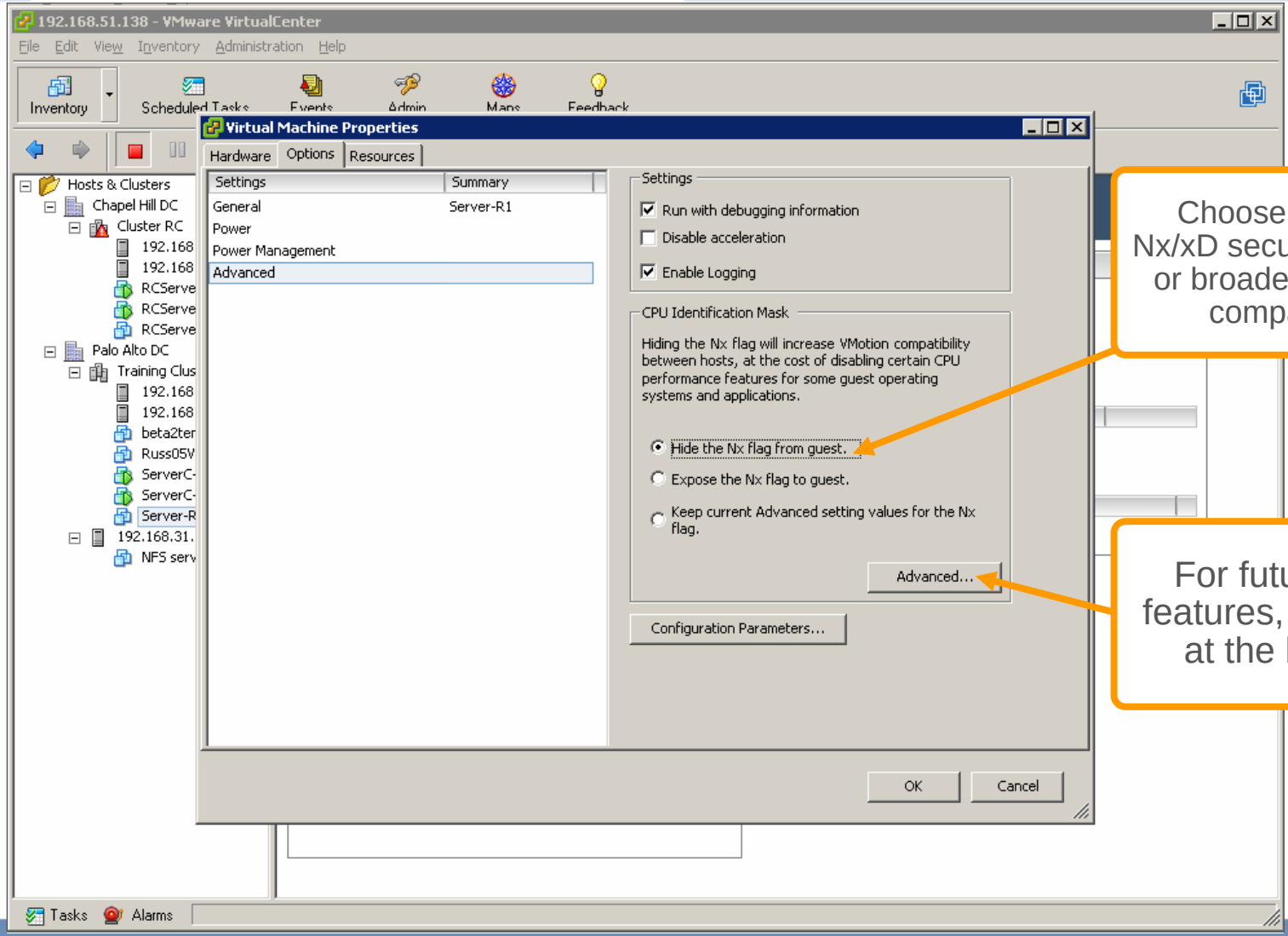
VIC Log File Locations - VI client logs

- Intended for client-specific diagnostics
- Location: %TEMP%\vpx (relative to the user running the client)
- Naming: viclient-#.log (# is one digit, 0-9)
- No index file
- Logs rotate each time VI Client is started

VC Log File Locations - Miscellaneous logs

- Core dump location
  - %USERPROFILE%\Application Data\VMware
- License Server debug log
  - %ALLUSERSPROFILE%\Application Data\VMware\VMware License Server\lmgrd.log (reset each time the service starts; no rotation)
  - %ALLUSERSPROFILE%\Application Data\Macrovision\FLEXlm\
- Web Access (Tomcat) Logs
  - C:\Program Files\VMware\VMware VirtualCenter 2.0\tomcat\logs

Enable or disable Nx/xD



Choose between Nx/xD security features or broadest VMotion compatibility

For future CPU features, edit mask at the bit level

VMware HA

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Troubleshooting VMware HA

- Ensure IP connectivity
- DNS resolution (<29 char DNS name). May want to add nodes to /etc/hosts on ESX Server AND hosts file on VC Server
  - A better plan would be to use primary and secondary DNS servers
- Service Console has default gateway defined.
- Insure that storage and networks are visible throughout the cluster
- Ensure that no one has managed hosts directly, bypassing VC
- Check logs:
  - `/opt/LGTOaam512/logs/*`
  - `/opt/LGTOaam512/vmsupport/*`

Configuration error

- After enabling HA, you may see a generic error like this:

- Double check the failover capacity to make sure it is greater than zero