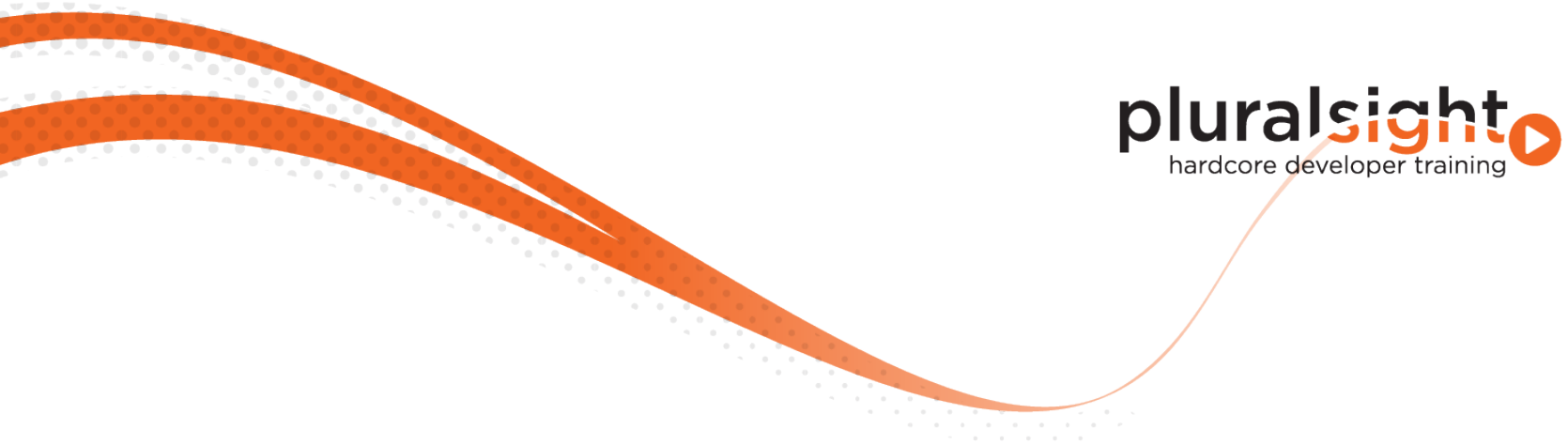
SQL Server 2012: Installation and Configuration

Module 2: Pre-installation Tasks for the Operating System

Glenn Berry
Glenn@SQLskills.com



Introduction

- **There are several OS-level tasks that you must complete first**
  - These affect security, performance, scalability, and maintainability
- **Getting domain accounts provisioned**
  - Needed for SQL Server Service accounts
- **Getting Windows Server 2012 installed and patched**
- **Updating the main BIOS and other firmware**
- **Updating device drivers**
- **Checking power management settings**
- **Granting Windows rights to the SQL Server service account**
- **Getting a static IP address for your database server**
- **Getting your database server added to the domain**

Getting Domain Accounts Provisioned

- **You should have a Windows Domain account for each service**
  - Some organizations also have one domain account for each SQL instance
- **This will depend on which components are installed**
  - SQL Server Service
  - SQL Server Agent Service
  - SQL Server Reporting Service
  - SQL Server Analysis Service
  - SQL Server Integration Service
- **These should be regular Domain User accounts**
  - The setup program will grant the necessary rights for each account
  - They do not need Local Administrator rights on the machine
- **You will need the name and password for these accounts**
  - This information is required during SQL Server installation

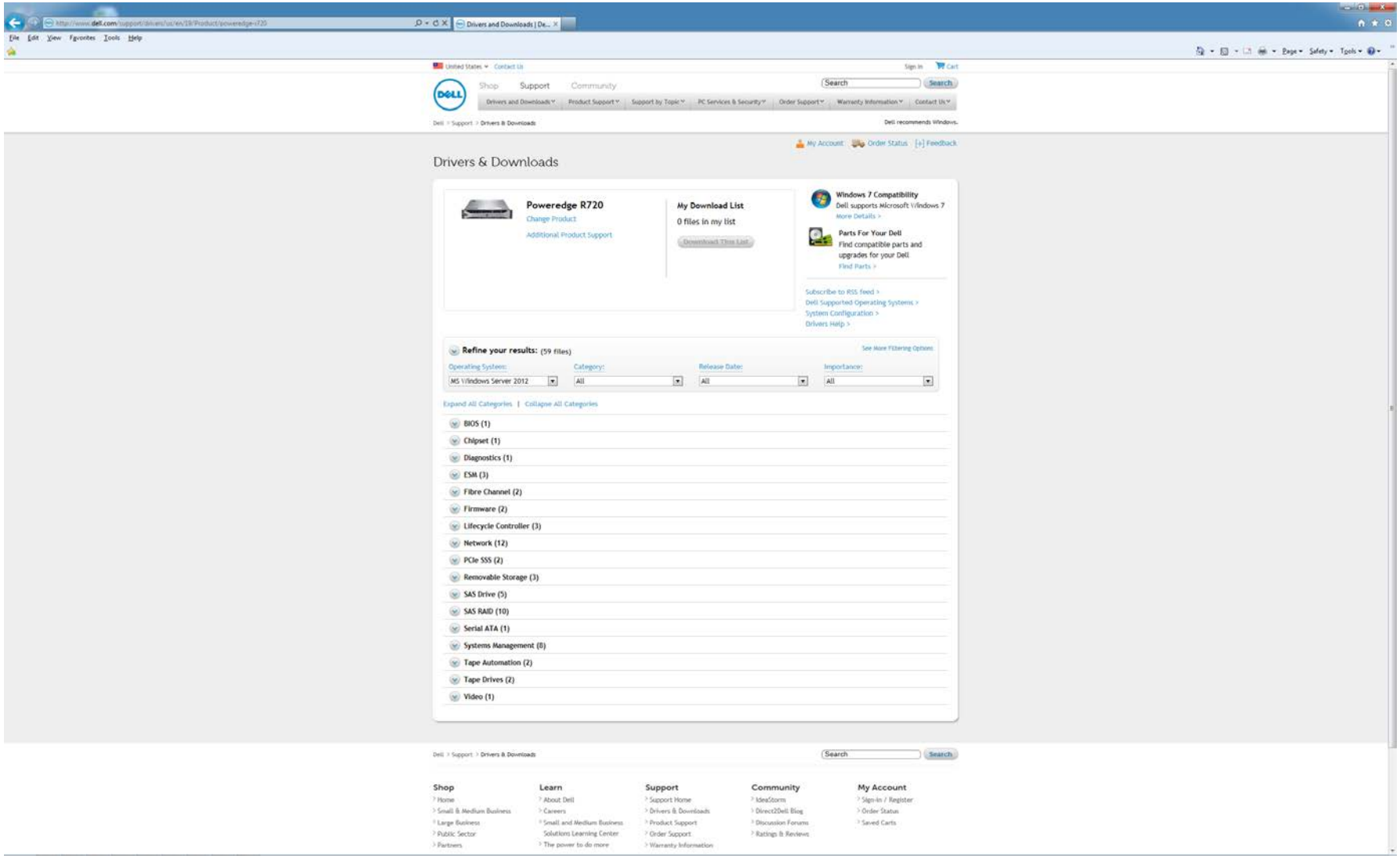
Install and Patch Windows Server 2012

- **Windows Server 2012 Standard Edition is a good choice**
  - It does not have the 32GB memory limit from previous versions
  - It allows you to install the Failover Clustering feature if needed
    - This is required for AlwaysOn Availability Groups
- **Install the operating system on a hardware RAID 1 array**
  - This gives you some basic protection from a single disk failure
- **Make sure to install Microsoft Update**
  - This is a superset of Windows Update
- **Configure Microsoft Update properly**
  - Make sure it only notifies you of new updates
  - You do not want it to automatically download and install updates
- **Check for available updates and install them**
  - You may have to do this several times to get every update

BIOS and Firmware Updates

- **Make sure you have the latest main system BIOS installed**
  - Brand new servers often have old BIOS versions
  - Check the system vendor's support site for the latest version
- **Make sure you have the latest firmware for all of your components**
  - This will depend on what components are in your server
    - RAID controllers
    - Host Bus Adapters (HBAs)
    - PCI-E storage cards
    - Network Interface Cards (NICs)
- **Vendor system management tools can detect out-of-date firmware**
  - Dell Open Management Systems Administrator
  - HP System Insight Manager
  - IBM Director

Checking For Firmware and Driver Updates



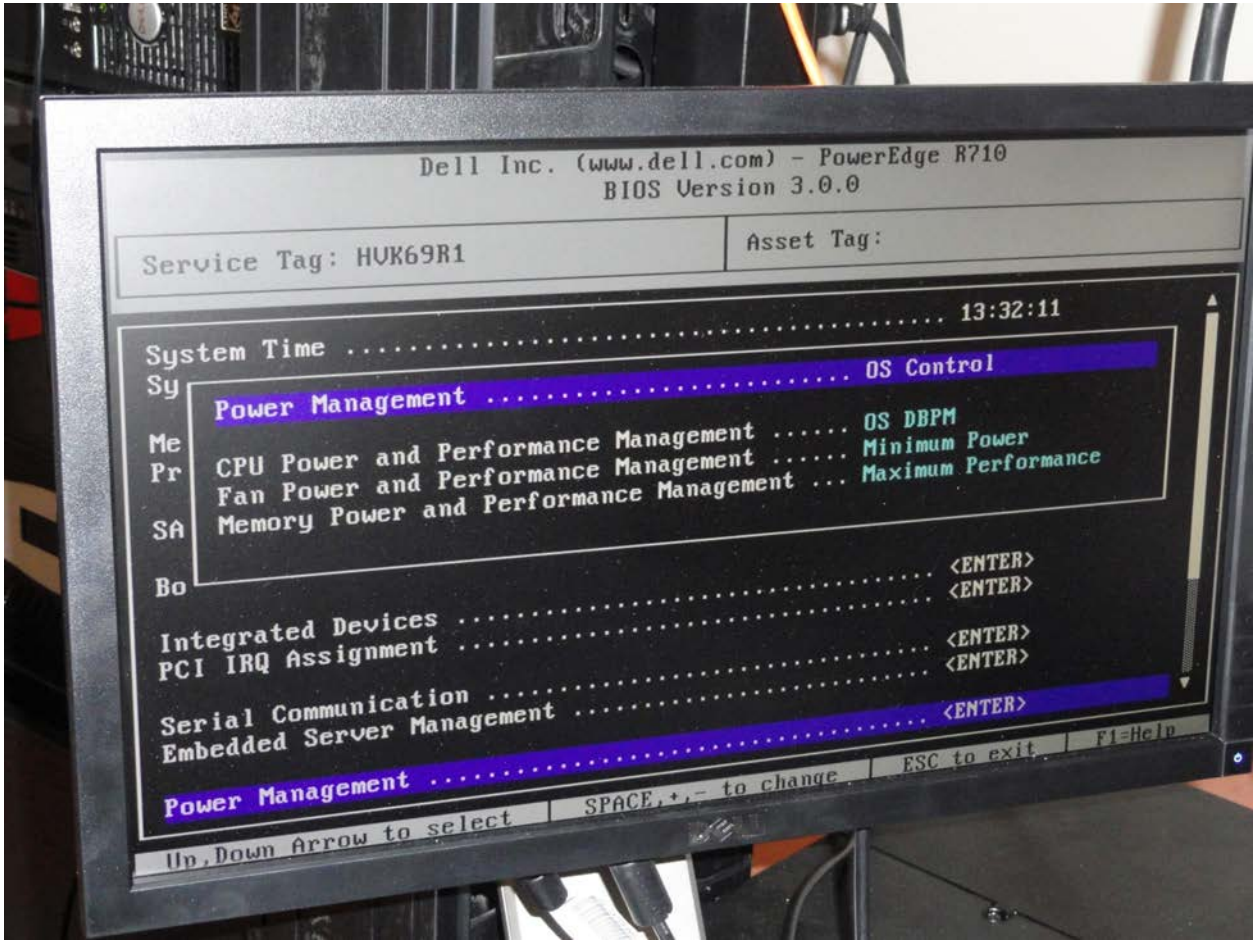
Install or Update Your Device Drivers

- **Prefer the vendor supplied, system-specific drivers instead of the generic Windows drivers**
- **What you need will depend on what components are in your server**
  - RAID controllers, Host Bus Adapters (HBAs)
  - PCI-E storage cards
  - Network Interface Cards (NICs)
  - Video drivers
- **Install the chipset drivers from the vendor first**
  - Install storage related and NIC drivers next
  - Install video drivers last

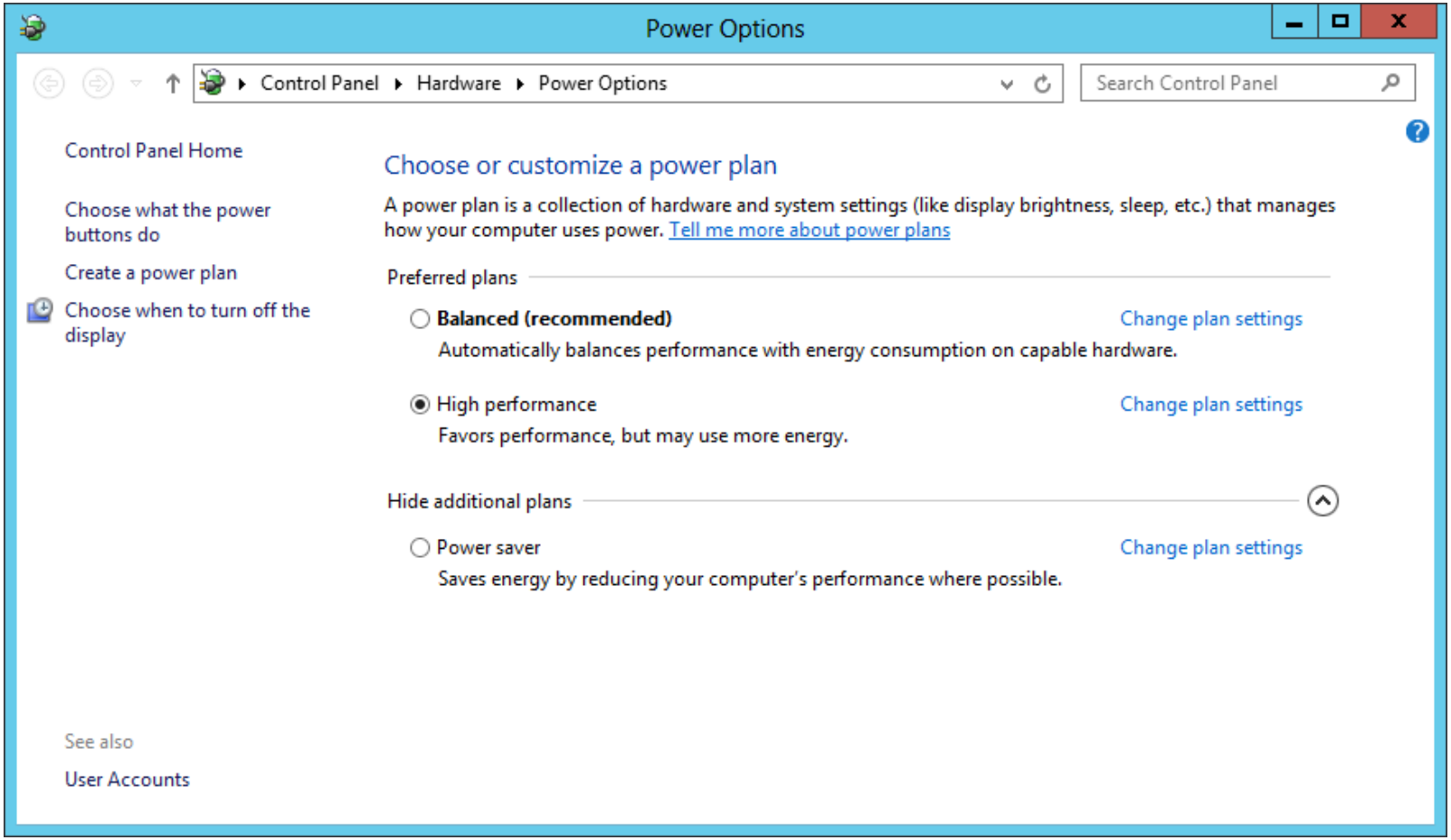
Checking Your Power Management Settings

- **BIOS power management in the BIOS setup application**
  - Should be set to OS control or disabled
- **Windows Power Plan should be set to "High Performance"**
  - Default setting is "Balanced"
  - This has a measurable negative effect on database server performance
- **Check your processor speed values to confirm the settings**
  - Windows Server 2012 Task Manager
  - CPU-Z utility from www.cpuid.com

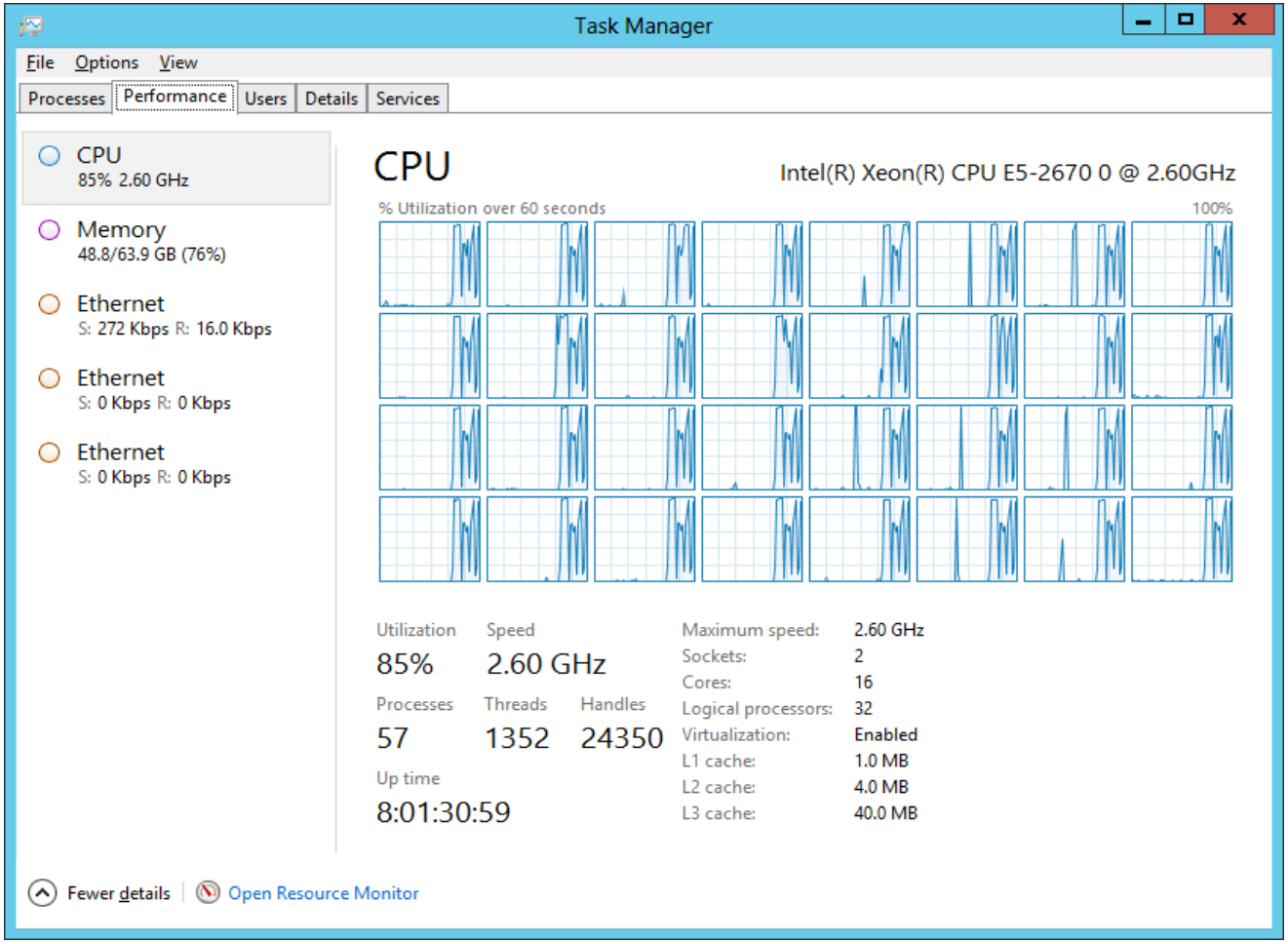
Main BIOS Power Management Settings



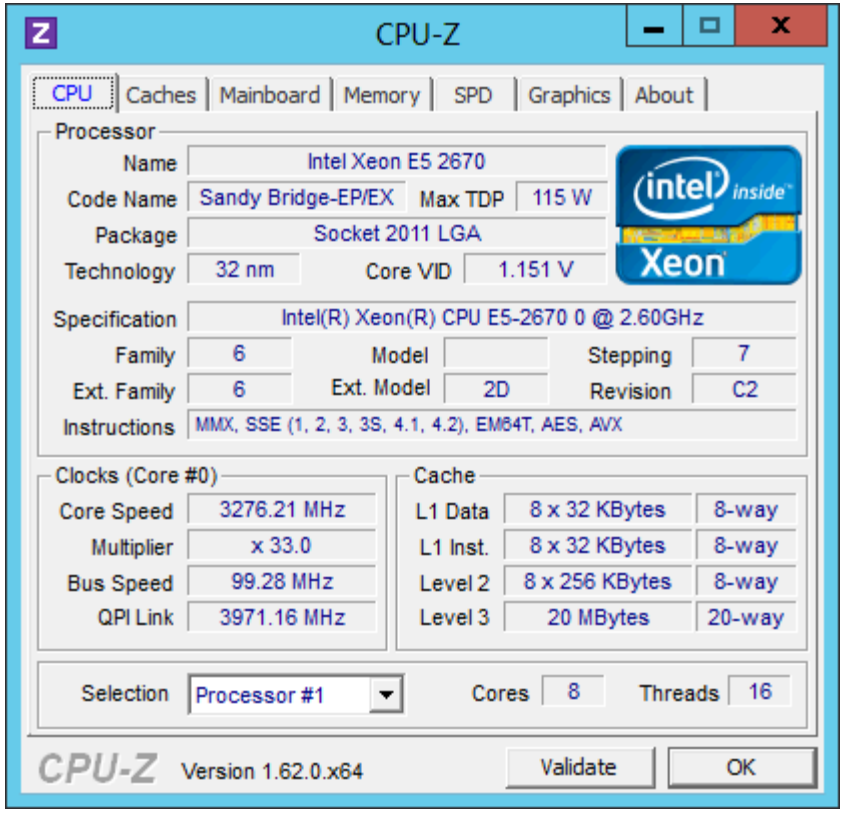
Windows Power Options



Using Task Manager to Check CPU Speed



Using CPU-Z to Check CPU Core Speed



Grant Windows Rights to the SQL Server Service

- **Two Windows rights should be granted on the machine to the SQL Server Service account**
  - Perform volume maintenance tasks
  - Lock pages in memory
- **The Windows domain account for the service must exist first**
  - You should do this before you install SQL Server 2012
  - Use the Local Group Policy Editor to do this
  - Type gpedit.msc at a command prompt

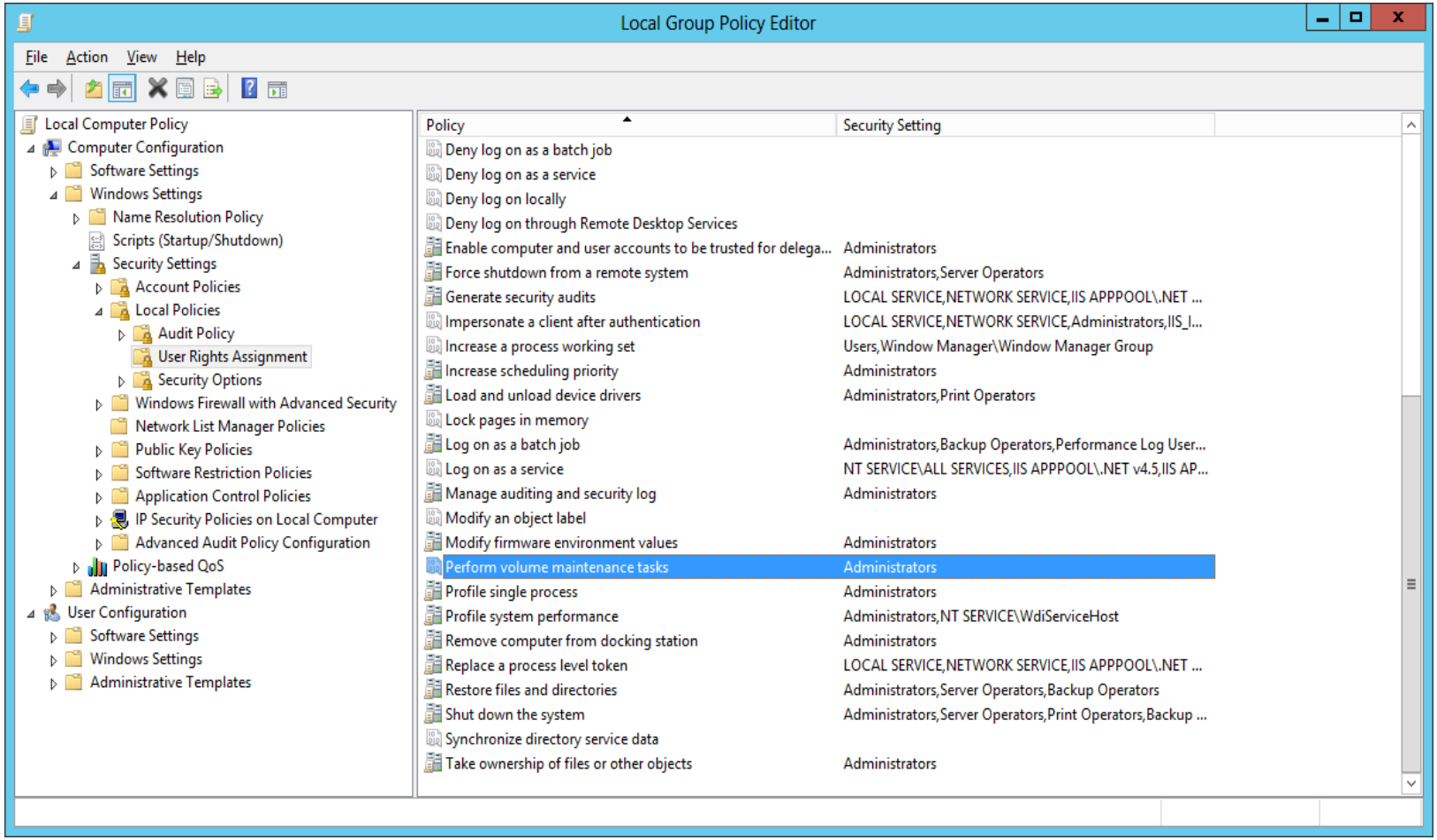
Perform Volume Maintenance Tasks

- **This right enables Windows instant file initialization (IFI)**
  - This lets SQL Server avoid having to "zero-out" data files after they are created or grown
  - This only affects SQL Server data files, not SQL Server log files
- **Huge reduction in data file creation and growth times**
  - Especially important for larger database data files
- **This dramatically reduces database restore time**
  - Makes it easier to initialize high-availability secondary copies of databases (such as database mirror, replication subscription database, or AlwaysOn Availability Group replica)
  - Dramatically reduces downtime during disaster-recovery restore
- **Very slight security risk with this setting**
  - A DBA could possibly access previously deleted files that they don't have normal rights to access
  - Not an issue if storage is dedicated to SQL Server

Lock Pages in Memory (LPIM)

- **Prevents OS from trimming the SQL Server working set**
  - Operating system forces SQL Server to release some memory
  - This can happen when the OS is under severe memory pressure
  - It is often caused by memory leaks in device drivers
  - Trimming the working set has an extreme negative effect on SQL Server
- **Used to only be available in SQL Server Enterprise Edition**
  - SQL Server 2012 Standard Edition now supports LPIM
  - No trace flag is required with SQL Server 2012 Standard Edition
- **Very important to set sp_configure 'max server memory'**
  - You want to limit how much memory SQL Server can use
  - You want to make sure the OS is never under memory pressure
  - Jonathan Keheyias post at http://bit.ly/Nn1RtQ

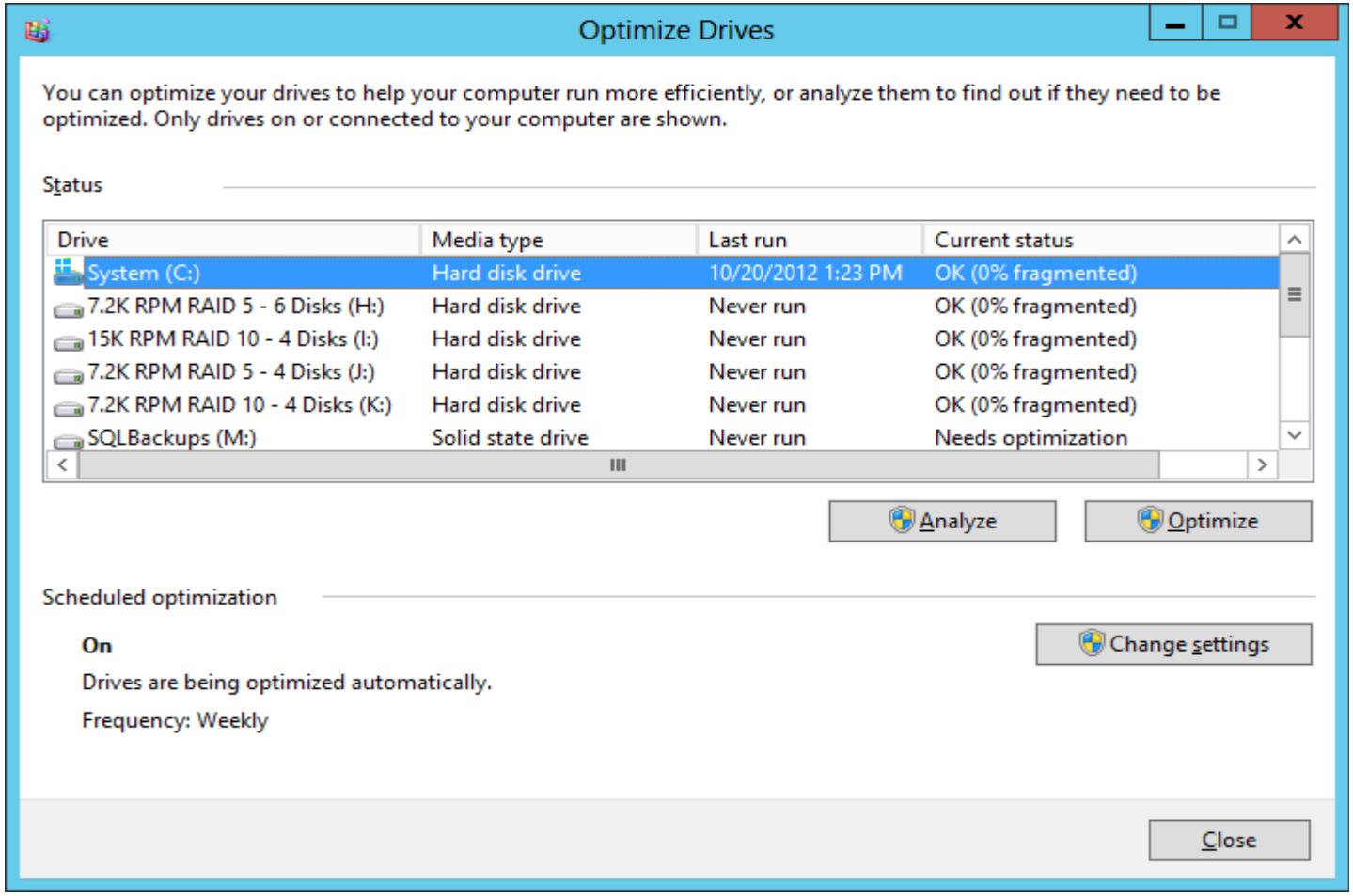
Local Group Policy Editor



Final OS Configuration Tasks

- **Change network settings to use a static IP address**
- **Make sure your server has been added to a Windows domain**
- **Enable Remote Desktop in Windows**
  - Allows you to logon remotely when needed
- **Configure anti-virus to skip .MDF, .NDF, and .LDF files**
- **Manually optimize your C: drive**
- **Make sure there are no pending reboots in Windows**
- **If you will be using the FILESTREAM feature:**
  - Disable 8.3 filename generation
    - fsutil behavior set disable8dot3 1
  - Disable updating of last file access time
    - fsutil behavior set disablelastaccess 1
  - Read Paul Randal's whitepaper for more details about FILESTREAM:
    - http://bit.ly/10QqTqt

Optimize Drives Dialog



Summary

- **Proper OS installation and configuration is very important**
  - Provides better performance, scalability and security
  - Makes the instance easier to maintain in the future
- **Hardware configuration is very important**
  - Power management and hyperthreading settings
  - BIOS and firmware updates
- **Make sure all of these tasks are completed before you install SQL Server 2012**

What is Next?

- **Module 3 will cover pre-installation tasks for SQL Server 2012**
  - Using a standardized naming scheme for disks and directories
  - Considering your workload for storage provisioning
  - RAID level and SQL Server workloads
  - Provisioning your logical drives
  - Testing your logical drive performance with CrystalDiskMark
  - Testing your logical drive performance with SQLIO