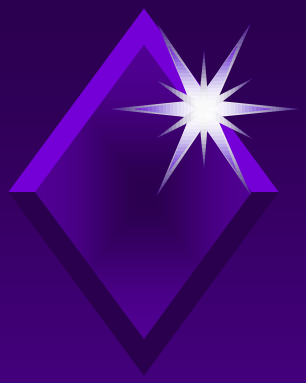
Chapter 3

File and Disk Maintenance

Overview

How to avert hard drive problems and how to avert conditions that can cause data errors will be discussed.



Overview

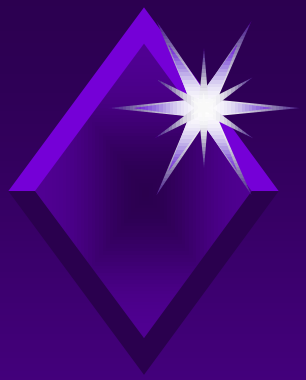
Will learn the purpose and function of and then use Check Disk, Disk Cleanup, Disk Defragmenter, and Task Scheduler.

Overview

The importance of and procedures for backing up and restoring files will be discussed.

Overview

Will create an Automated System Recovery Disk for start-up problems.



Overview

The purpose and function of the Registry will be discussed.

Overview

Will use the Computer Management tool to explore and manage your computer system.

Detecting/Repairing Disk Errors with Check Disk

- Physical hard drive problems:
  - Wear and tear on hard disk
    - Correct with Power Management and/or Hibernation
  - Head crash
- Software-related problems:
  - Viruses

Detecting/Repairing Disk Errors with Check Disk

Some error causing conditions to data that may be repairable:

- Power surges
- Power outages
- Locked system

Detecting/Repairing Disk Errors with Check Disk

Check Disk:

- Locates/repairs problems on hard disk
- Checks for logical errors in file system
  - Lost clusters
  - Cross-linked files

Detecting/Repairing Disk Errors with Check Disk

- FAT and directory table work in conjunction.
- Pointers, chain together all clusters that make up an individual file.

Detecting/Repairing Disk Errors with Check Disk

Lost Clusters:

- Have no directory entry in directory table
- Do not belong to any file
- Take up disk space -
- Unavailable for new data
  - Cannot be retrieved/deleted

Detecting/Repairing Disk Errors with Check Disk

Figure 13.1 Lost Clusters p. 722

Root Directory Table

File Name	File Extension	Date	Time	Other Info	Starting Cluster Number

File Allocation Table

Cluster Number	Status
1	in use
2	in use
3	4
4	6
5	in use
6	end

Clusters 3, 4, and 6 have data, are linked together, but have no file entry in the directory table.

Detecting/Repairing Disk Errors with Check Disk

Check Disk:

- Can fix lost clusters automatically

or

- Save them to disk as files

Detecting/Repairing Disk Errors with Check Disk

Cross-Linked Files

- Two or more files claim same cluster as part of their chain
- One file claims same cluster twice
- Data in cross-linked cluster:
  - Usually correct for only one file
  - May not be correct for any file

Detecting/Repairing Disk Errors with Check Disk

Figure 13.2 Cross-Linked Files p. 722

Root Directory Table

File Name	File Extension	Date	Time	Other Info	Starting Cluster Number
MY	FIL	4-15-94	11:23		1
HIS	FIL	4-15-94	11:23		3

File Allocation Table

Cluster Number	Status
1	MY.FIL
2	MY.FIL
3	HIS.FIL
4	MY.FIL HIS.FIL
5	HIS FIL
6	MY.FIL

Detecting/Repairing Disk Errors with Check Disk

Figure 13.3 Another Cross-Linked File p. 723

Cluster number	100	101	102	103	104
Pointer to the next cluster with data	101	102	103	103	EOF

Detecting/Repairing Disk Errors with Check Disk

Check Disk:

- CAN check/repair local hard drives, floppy disks, and removable drives
- CANNOT find/fix errors on CD-ROMs or network drives

Detecting/Repairing Disk Errors with Check Disk

Check Disk:

- Should be used on a regular basis
- Close all open programs when using this program

Detecting/Repairing Disk Errors with Check Disk

If disk is formatted at NTFS, Windows XP Professional will automatically (without running Check Disk):

- Log all file transactions
- Replace bad clusters
- Store copies of key information for all files on NTFS volume

Activity - Using Check Disk

KEY CONCEPTS:

- Invoking Check Disk program
- Two options available in Check Disk Options
  - Automatically fix file system errors
  - Scan for and attempt recovery of bad sectors
- Status bar

Cleaning Up Your Disk

Computer performance depends a great deal on the hard drive.

Cleaning Up Your Disk

Need disk space for:

- New files
- Temporary files
- Documents waiting to be printed
- **Cache files**
- Recycle

Cleaning Up Your Disk

Disk cleanup is a utility that helps maintain the hard disk.

Activity - Using Disk Cleanup

KEY CONCEPTS:

- Computer analysis
- Confirm files to be eliminated
- Options to free up disk space
- System Restore
- Restore Point

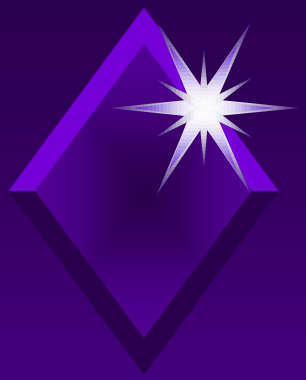
Contiguous and Noncontiguous Files

Windows XP Professional keeps track of data by placing it into a file.

Contiguous and Noncontiguous Files

To store and retrieve files:

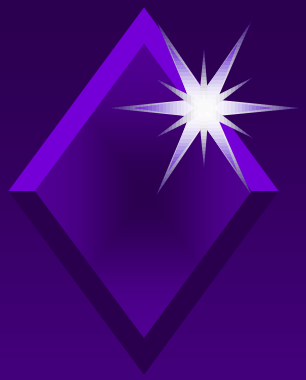
- Disk divided into numbered blocks called sectors
- Sectors grouped into clusters



Contiguous and Noncontiguous Files

When a file in FAT or FAT32 deleted:

- Only entries in FAT deleted
- Space file occupied becomes available



Contiguous and Noncontiguous Files

Files are:

- Contiguous
- Noncontiguous (fragmented)

Contiguous and Noncontiguous Files

Fragmented disk:

- ➔ Composed of noncontiguous files

Optimizing the Performance of Disks

The defragger/disk optimization program:

- Used to optimize disk performance

Optimizing the Performance of Disks

Prior to running Disk Defragmenter:

- Run Check Disk and Disk Cleanup
- Remove all lost/cross-linked clusters and unnecessary files
- Close All open programs
- Allow ample time
- Back up disk

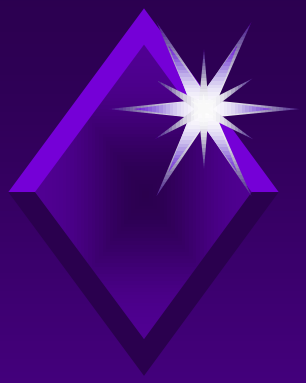
Activity - Using Disk Defragmenter

KEY CONCEPTS:

- Floppy disks cannot be defragmented
- Where the defragger can be started
- Function of line color
- Volume Information

Starting Programs Automatically

Task Scheduler can be used to schedule any program to run at any time.



Starting Programs Automatically

When scheduling tasks to run unsupervised, be sure task . . .

- does not need user input.
- can exit when task is completed.

Activity - Using Task Scheduler

KEY CONCEPTS:

- Scheduling maintenance with Task Scheduler
  - User scheduling must be identified
- Advanced features on menu bar
- Extension of Task Scheduler files

Backing Up Your Data

- **Backup** is a duplicate of file/s on a disk copied to another medium.
  - Use tape backup unit or removable drive with removable media
- Retrieve files by restoring them.

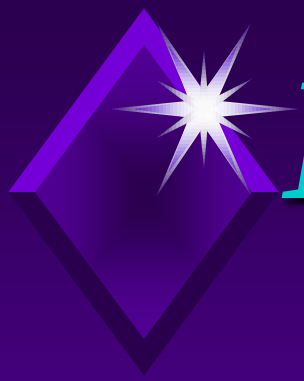
Backing Up Your Data

When you are working:

- Create settings, install/delete programs
- Add/make changes to system Registry
  - If Registry becomes corrupt will not be able to boot Windows XP Professional

Backing Up Your Data

It is important to backup your entire hard drive.



Backing Up Your Data

Every file has attributes.

- One attribute is archive bit.
  - This bit is either on or off.

Backing Up Your Data

Windows XP Professional supports five methods of backup:

- Normal (Full) Backup
- Incremental Backup
- Differential Backup
- Daily Backup
- Copy Backup

Backing Up Your Data

Full backup:

- Longer to backup
- Faster to restore

Incremental backup:

- Faster to backup
- Slower to restore

Backing Up Your Data

Usually use combination of :

- Full and incremental backups
  - Faster to backup
  - Slower to restore
- Full and differential backups
  - Longer to backup
  - Shorter to restore

Backing Up Your Data

- Need a regular backup schedule.
- Wise to have more than one copy of backup media.

Backing Up Your Data

Uses of Backup:

- Archive data
- Make room on hard disk
- Transfer files to other computers
- Make new computer look like old system

Activity - Using Backup

KEY CONCEPTS:

- Backup and Restore Wizard
- Four choices in Backup files & Settings
- Backup Wizard window Vs Explorer window
- Types of backups
- Backup labels

Restore

Backup/Restore Wizard:

- Backup option
  - Used to copy some/all files to original disk, another disk, or another directory
- To restore choose
  - Restore and type of restoration
  - Restore Wizard

Activity - Restoring Files

KEY CONCEPTS:

- Use of Backup or Restore Wizard
- Where files can be restored
- Determining how files will be restored
- Wizard does not have to be used to backup or restore files
- When Backup tasks can be scheduled

Automated System Recovery

Automated System Recovery (ASR):

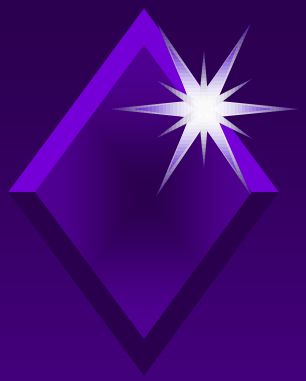
- Part of a built-in repair system for solving system problems
  - Relies on creation of Automated System Recovery
- Restores system as it was when ASR created or updated

Automated System Recovery

Automated System Recovery restores system as it was when ASR was created or updated.

Automated System Recovery

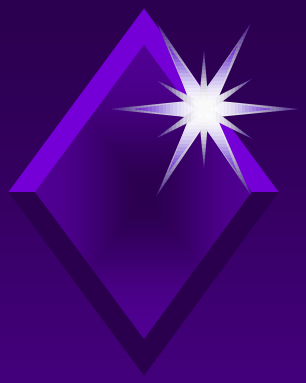
To repair system need ASR, availability of backed up system files and Windows XP Professional installation CD.



The Registry

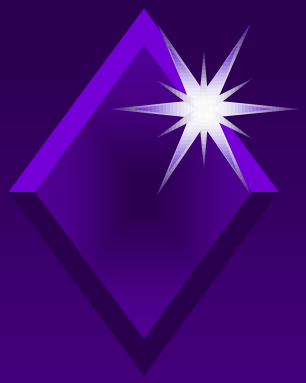
Configuration information:

- Contains data about the system
  - Hardware
  - Applications
  - User preferences



The Registry

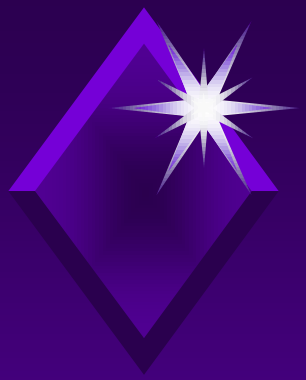
Previous Windows versions used .INI files for configuration information.



The Registry

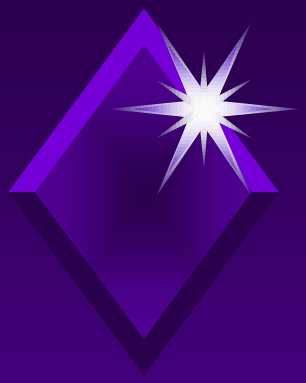
Two types of initialization files:

- System initialization files
- Private initialization files



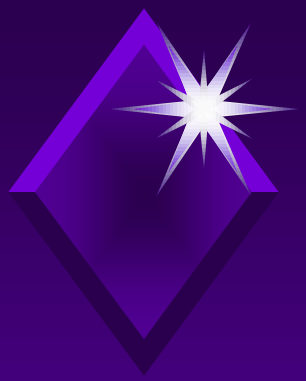
The Registry

- Previous window versions had two primary initialization files:
  - WIN.INI
  - SYSTEM.INI
- Also used REG.DAT



The Registry

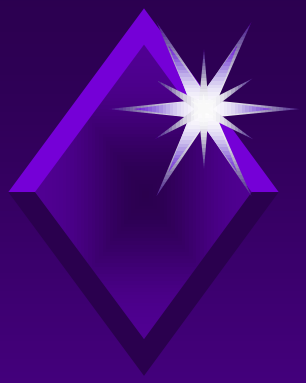
Today, Windows XP Professional uses single location, the Registry, for hardware, system software, and application configuration information.



The Registry

Registry information comes from:

- Installation of WXP Professional
- Booting of WXP Professional
- Applications
- System and User interaction



The Registry

Registry:

- Critical to the operation of Windows XP Professional
- Files kept in %SystemRoot%\System32\Config
- Back up files kept in %SystemRoot%\Repair\RegBack

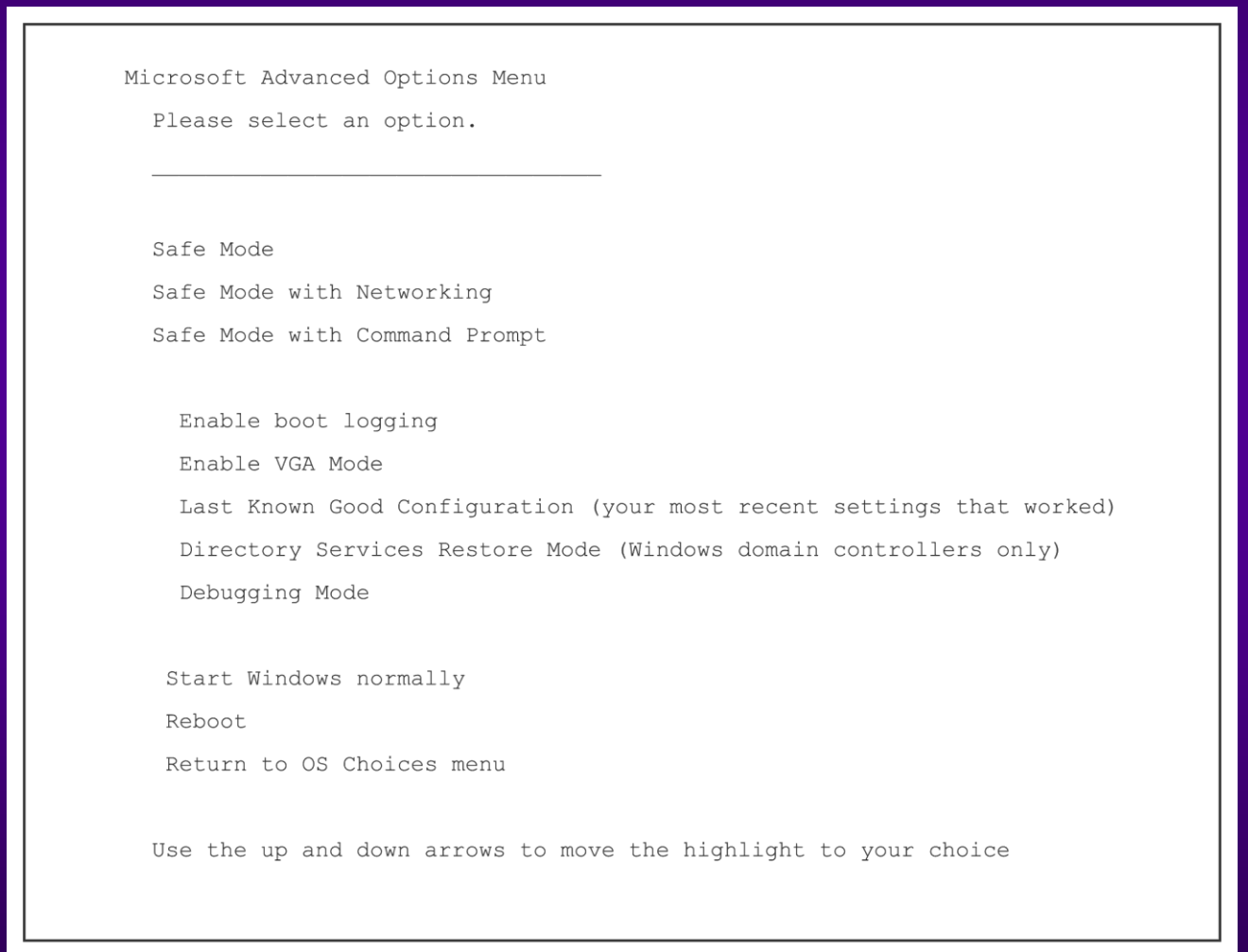
The Registry

The Registry can be restored by using:

- Recovery Console - if using ASR disk
- “Last Known Good Configuration” option
- Safe Mode
  - Loads minimum amount of drivers and functionality that allows Windows to run

The Registry

Figure 13.4 The Startup Menu p. 761



System Restore

System Restore can:

- Undo changes made to computer
- Roll back computer to more stable state
- Save email messages, browsing history, etc.
- Use calendar to select which date you want to restore to
- Provide several restore points

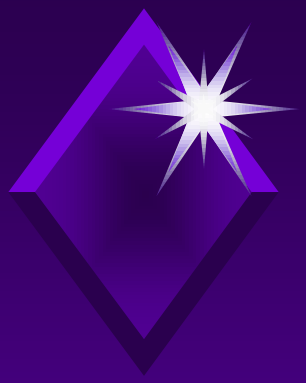
System Restore

- System restore does not save or restore documents.
- All system restores are reversible

Activity - Using System Restore

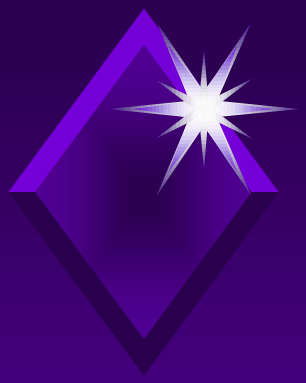
KEY CONCEPTS:

- Created restore point
  - Make name of restore point brief but meaningful
- Displayed restore points
  - Any bold date on calendar holds restore point



Plug and Play and Device Drivers

Plug and Play automates adding new hardware to computer.



Plug and Play and Device Drivers

Windows XP Professional has added support for new type of devices.

Plug and Play and Device Drivers

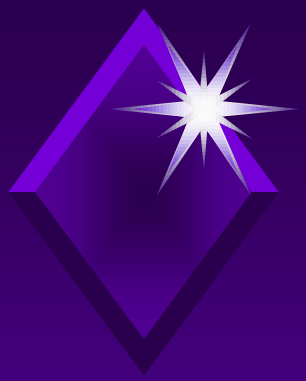
For Plug and Play to work:

- Computer needs Plug and Play compatible BIOS
- Device to be installed is Plug and Play compatible
- Compatible Plug and Play Operating System

Plug and Play and Device Drivers

Full support in Windows XP Professional requires:

- ACPI
- BIOS
- Windows XP Professional operating system
- Device to be installed
  - Drivers for device



Plug and Play and Device Drivers

Legacy hardware:

- Hardware that is not Plug and Play compatible.

Activity - Looking at Plug and Play

KEY CONCEPTS:

- Determining if computer and Plug and Play are compatible
- Driver tab (not all devices have one)
  - Driver details, Update driver
  - Roll back driver, Uninstall
- Device manager window used to determine if devices are working properly

The Paging File

Computer's system performance impacted by:

- Processor
- Amount of physical memory

The Paging File

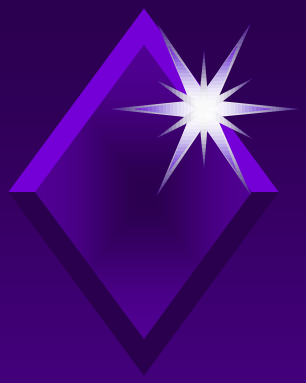
Paging file:

- Space on the hard drive used as **virtual memory** when the system runs out of physical memory

The Paging File

Paging file:

- Slows down performance
- Enlarges operating space



The Paging File

- User can set place/size of paging file.

BUT

- Microsoft recommends letting Windows manage paging file.

Activity - Looking at Setting Up Your Paging File

KEY CONCEPT:

- Can specify virtual memory settings
  - For best performance follow Windows suggestions
- Only administrator can make changes

Administrative Tools and System Information

System Information:

- Collects/displays system configuration information for local and remote computers

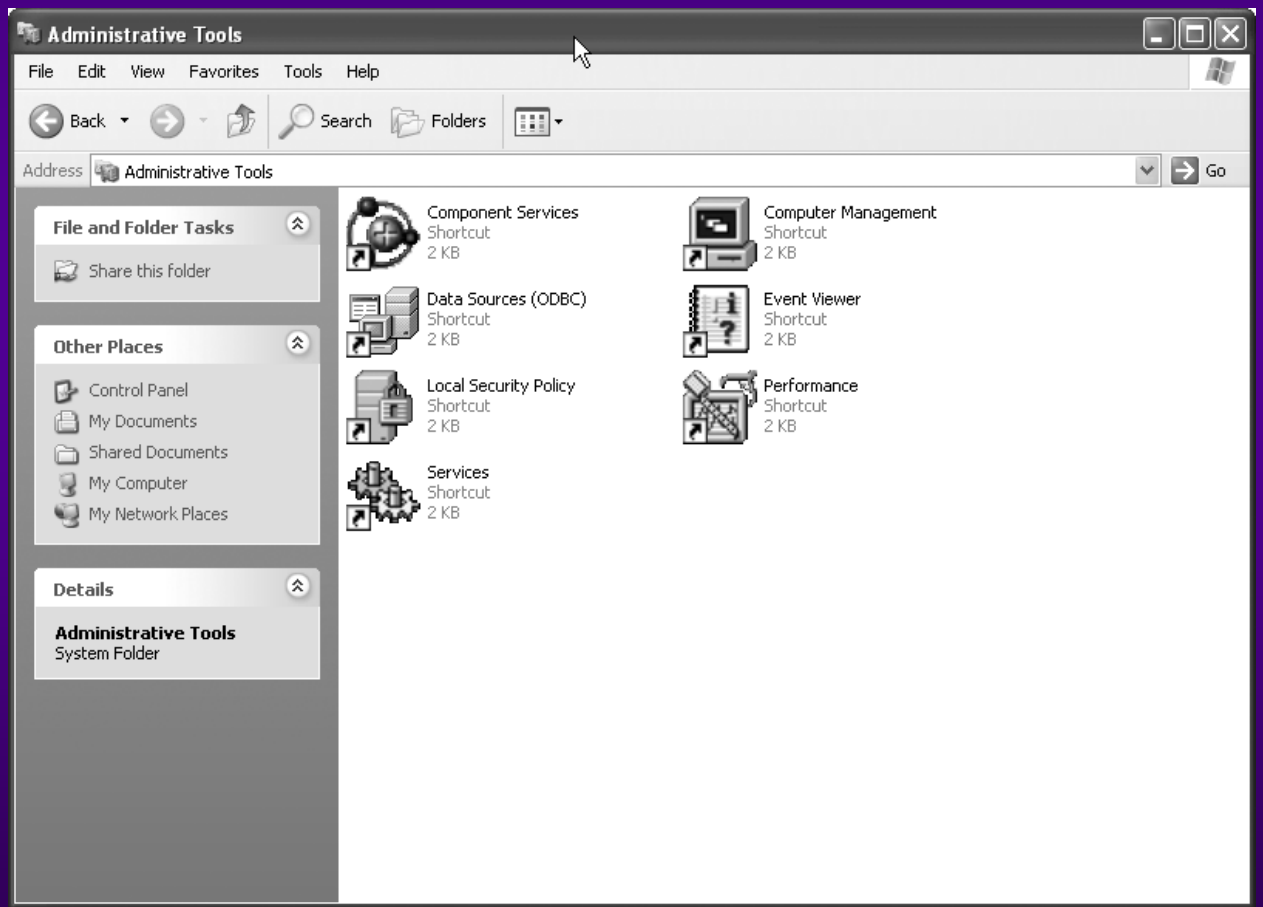
Administrative Tools and System Information

Microsoft Management Console (MMC):

- Tool used to create, save, and open collections of administrative tools

Administrative Tools and System Information

Figure 13.5 Administrative Tools p. 775



Activity - Using Information and Computer Management

KEY CONCEPTS:

- System Summary
- Tools that can be used
  - System Restore, Net Diagnostic, file Signature Verification Utility, Direct X, and Dr. Watson
- Disk Management tool
  - Graphical tool for managing disks
  - Do online administrative tasks without shutting down system/interrupting users
  - Provides shortcut menus for tasks on selected object
  - Must be administrator to use