



Operating Systems

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Using Operating Systems

- ❑ **Operating Systems Basics**
- ❑ **PC and Network Operating Systems**

Operating Systems Basics

Operating Systems Basics

- ❑ **Types of Operating System**
- ❑ **User interface**
- ❑ **Running Programs**
- ❑ **Managing Hardware**
- ❑ **Enhancing the Operating System**

Operating Systems

□ OS is a software program

“...tool that controls the system hardware and that interacts with the user and application software”

- System software
- Different from application software

Functions of OS

- ❑ **Provide a user interface**
- ❑ **Run programs**
- ❑ **Manage hardware devices**
- ❑ **Organized file storage**

Purpose of OS

- ❑ To provide an environment for a computer user to execute programs on computer hardware in a convenient and efficient manner.
- ❑ To allocate the separate resources of the computer as needed to solve the given problem given.
- ❑ As a control program it serves two major functions:
 1. supervision of the execution of user programs to prevent errors and improper use of the computer, and
 2. management of the operation and control of I/O devices.

Types of Operating System

- ❑ **Real-Time OS**
- ❑ **Single-User / Single-Tasking OS**
- ❑ **Single-User / Multi-Tasking OS**
- ❑ **Multi-User / Multi-Tasking OS**

Real-Time OS

- **Relatively small and very fast OS**
- **Built into a device, not loaded from disk drive**
- **Respond quickly to user input**
- **Real-time applications: MP3 players, Medical devices, scientific equipment**

Single-User / Single-Tasking OS

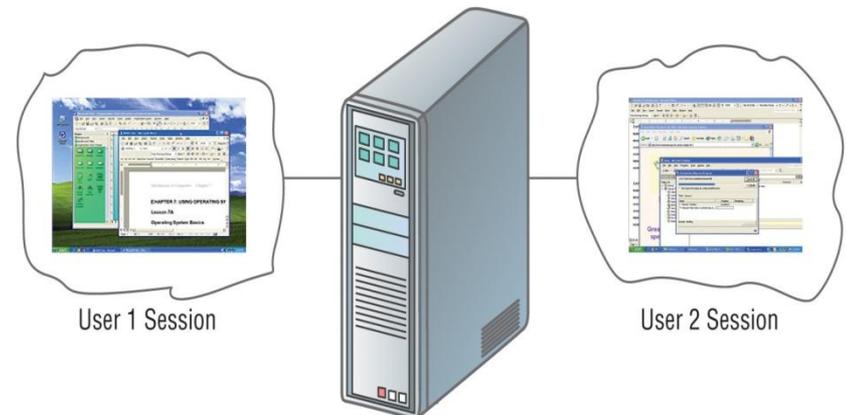
- **One user works on the system**
- **Performs one task at a time**
- **MS-DOS and Palm OS**
- **Take up little space on disk**
- **Run on inexpensive computers**

Single-User / Multi-Tasking OS

- **User performs many tasks at once**
- **Most common form of OS**
- **Windows XP and OS X**
- **Require expensive computers**
- **Tend to be complex**

Multi-User / Multi-Tasking OS

- ❑ Many users connect to one computer – Terminal server
- ❑ Each user has a unique session – Terminal client
- ❑ UNIX, Linux, and VMS
- ❑ Maintenance can be easy
- ❑ Requires a powerful computer



User Interface

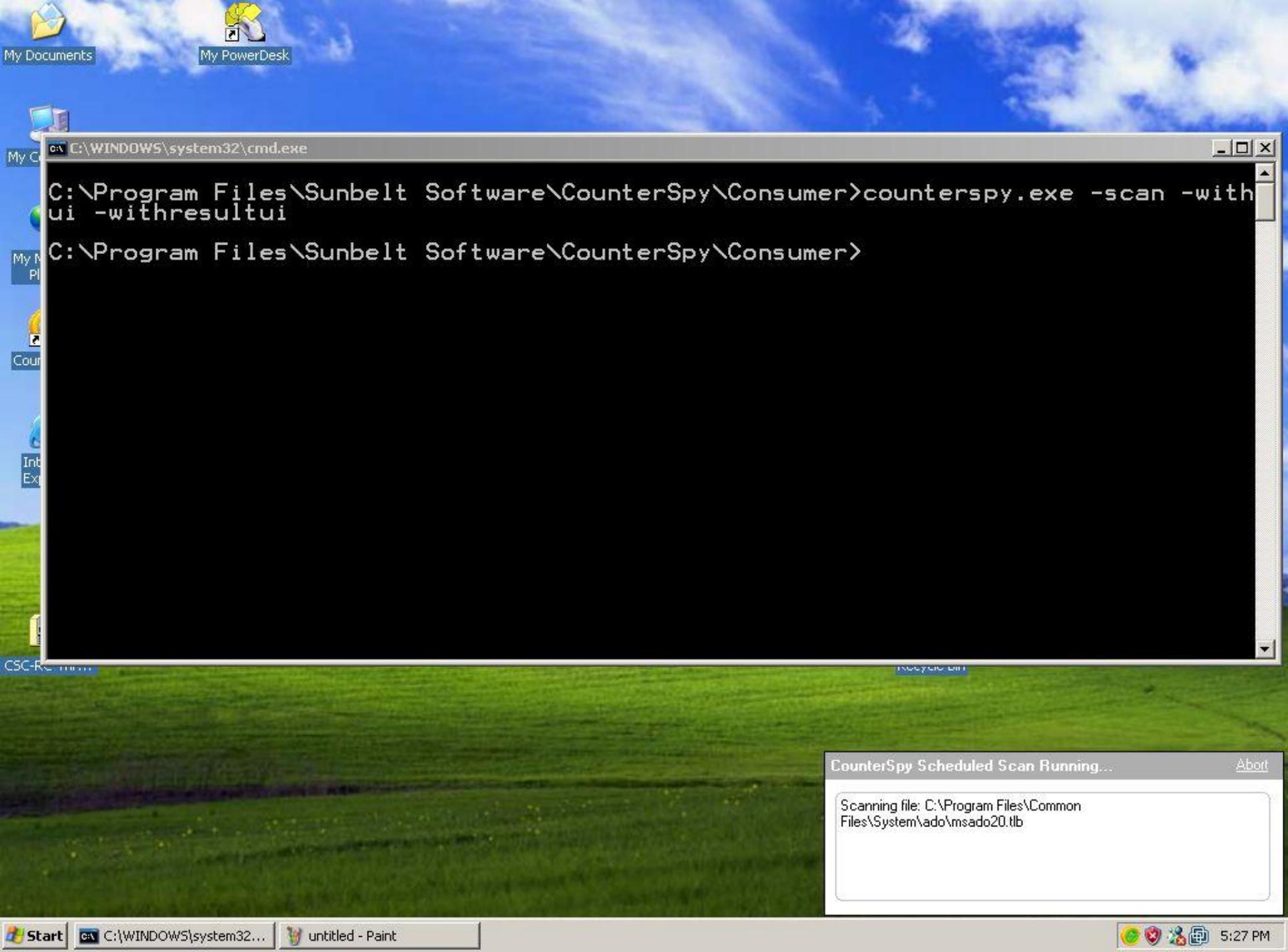
- ❑ **How a user interacts with a computer**
- ❑ **Require different skill sets**
 - ❑ **Graphical User Interface**
 - ❑ **Command-Line Interface**

Graphical User Interface

- ❑ **Most common interface**
 - **Windows, OS X, Gnome, KDE**
- ❑ **Uses a mouse to control objects**
- ❑ **Uses a desktop metaphor**
- ❑ **Shortcuts open programs or documents**
- ❑ **Open documents have additional objects**
- ❑ **Task switching**
- ❑ **Dialog boxes allow directed input**

Command-Line Interface

- ❑ Older interface
 - DOS, Linux, UNIX
- ❑ User types commands at a prompt
- ❑ User must remember all commands
- ❑ Included in all GUIs



My Documents



My PowerDesk



My C



My N
Pl



Coun



Int
Exp



CSC-R

```
C:\WINDOWS\system32\cmd.exe
C:\Program Files\Sunbelt Software\CounterSpy\Consumer>counterspy.exe -scan -with
ui -withresultui
C:\Program Files\Sunbelt Software\CounterSpy\Consumer>
```

CounterSpy Scheduled Scan Running... [Abort](#)

Scanning file: C:\Program Files\Common
Files\System\ado\msado20.tlb

Running Programs

- ❑ **Many different applications supported**
- ❑ **System call**
 - **Provides consistent access to OS features**
- ❑ **Share information between programs**
 - **Copy and paste**
 - **Object Linking and Embedding**

Managing Hardware

- ❑ **Programs need to access hardware**
- ❑ **Processing Interrupts**
 - **CPU is stopped**
 - **Hardware device is accessed**
- ❑ **Device drivers control the hardware**

Organizing Files and Folders

- ❑ **Organized storage**
- ❑ **Long file names**
- ❑ **Folders can be created and nested**
- ❑ **All storage devices work consistently**

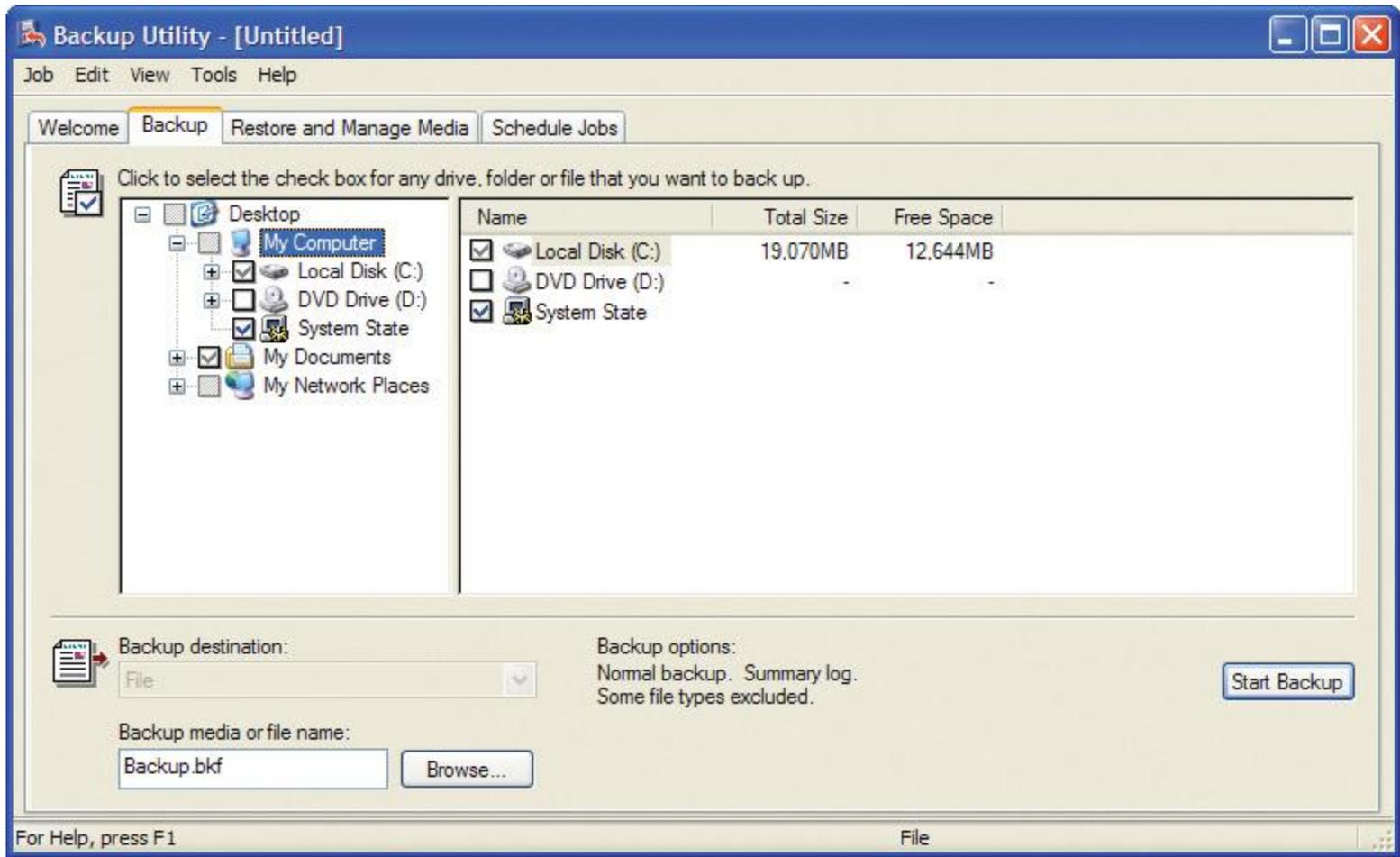
Enhancing an OS

Utilities – that enhance or extend the operating systems capabilities

- **Provide services not included with OS**
- **Firewall, anti-virus and compression**
- **Prices vary**
- **Utilities suites**

Backup Utilities

- ❑ **Archives files onto removable media**
- ❑ **Ensures data integrity**
- ❑ **Most OS include a backup package – Built-in**
- ❑ **Many third party packages exist**



Antivirus

- ❑ **Crucial utility**
- ❑ **Finds, blocks and removes viruses**
- ❑ **Must be updated regularly**
- ❑ **e.g., McAfee and Norton Anti-Virus**

Firewall

- ❑ utility
- ❑ Protects your computer from intruders
- ❑ Makes computer invisible to hackers
- ❑ Zone Labs is a home firewall
- ❑ Cisco sells hardware firewalls

Intrusion detection

- **Often part of a firewall package**
- **Announces attempts to breach security**
- **Snort is a Linux based package**

Screen Savers

- ❑ **Crucial utility for command line systems**
 - **Prevents burn in**
- ❑ **Merely fun for GUI systems**
- ❑ **Screen saver decorates idle screens**

PC and Network Operating System

PC Operating Systems

- **Microsoft Windows is the most popular**
 - **Installed more than other OS combined**
 - **Installed on about 95% of computers**
 - **Apple and Linux represent the other 5%**

DOS

- ❑ **Disk Operating System**
- ❑ **Single user single-tasking OS**
- ❑ **Command line interface**
- ❑ **16-bit OS**
- ❑ **Powerful**
- ❑ **Fast**
- ❑ **Supports legacy applications**

DOS Application

Employee Maintenance								Change View	Load new Location	Options	Help	Quit
View Screen												
Funburgers												
Employee Name			Mon	Tue	Wed	Thr	Fri	Sat	Sun			
Cashier			Off	11:00a	11:00a	11:00a	11:00a	Off	Off			
Jeff	Howister	=====	Off	07:00p	07:00p	07:00p	07:00p	Off	Off			
Beer Server			Off	Off	09:30a	Off	09:30a	Off	Off			
Jody	Loveless	=====	Off	Off	09:30p	Off	09:30p	Off	Off			
Grill Attendant			10:00a	10:00a	Off	10:00a	10:00a	Off	Off			
Eva	Perone	=====	09:00p	09:00p	Off	09:00p	09:00p	Off	Off			
Runner			09:00a	09:00a	09:00a	09:00a	Off	Off	09:00a			
Todd	Jones	=====	10:00p	10:00p	10:00p	10:00p	Off	Off	10:00p			
Sweeper			Off	09:00a	09:00a	09:00a	09:00a	Off	Off			
Andy	Kaufmann	=====	Off	10:00p	10:00p	10:00p	10:00p	Off	Off			
Cashier			11:00a	Off	Off	Off	Off	Off	11:00a			
Mandy	Williams	=====	07:00p	Off	Off	Off	Off	Off	07:00p			
Beer Server			09:30a	09:30a	Off	Off	Off	Off	Off			
Gloria	A Reimann	=====	09:30p	09:30p	Off	Off	Off	Off	Off			
Beer Server			Off	Off	Off	09:30a	Off	Off	Off			
Mandy	Williams	=====	Off	Off	Off	09:30p	Off	Off	Off			

Enter new employees or Edit/Delete employees. Alt-F1 for Help Index

Windows NT

- ❑ **Designed for a powerful system**
- ❑ **32-bit OS**
- ❑ **Very stable**
- ❑ **Windows NT Workstation**
 - **Single user multi tasking OS**
- ❑ **Windows NT Server**
 - **Multi user multi tasking OS**
 - **Network operating system**

Windows 9x

- ❑ **95, 98, and Millennium Edition (Me)**
- ❑ **32-bit OS**
 - Supported 16-bit programs well
- ❑ **Very pretty not stable OS**
- ❑ **Still found in large corporations**
- ❑ **95 introduced the Start button**
- ❑ **98 introduced active desktop**
- ❑ **Me improved multimedia software**

Windows 2000

- ❑ **Look of 9x with NT stability**
- ❑ **Optimized for office and developers**
- ❑ **Application software ran very well**
- ❑ **Entertainment software ran very poorly**

Windows XP

- ❑ Microsoft's desktop product
- ❑ Different look from 2000
- ❑ Many different versions
- ❑ Digital multimedia support was enhanced
- ❑ Communications was enhanced
- ❑ Mobile computing became a priority

Windows 7

- ❑ **Refined version of windows vista**
- ❑ **Additional features**
- ❑ **Both 32 and 64 bit OS**
- ❑ **Supportive to virtual hard disks**
- ❑ **Advanced touch, speech and handwriting recognition**
- ❑ **Improved boot features**
- ❑ **Performance with multi-core processor**

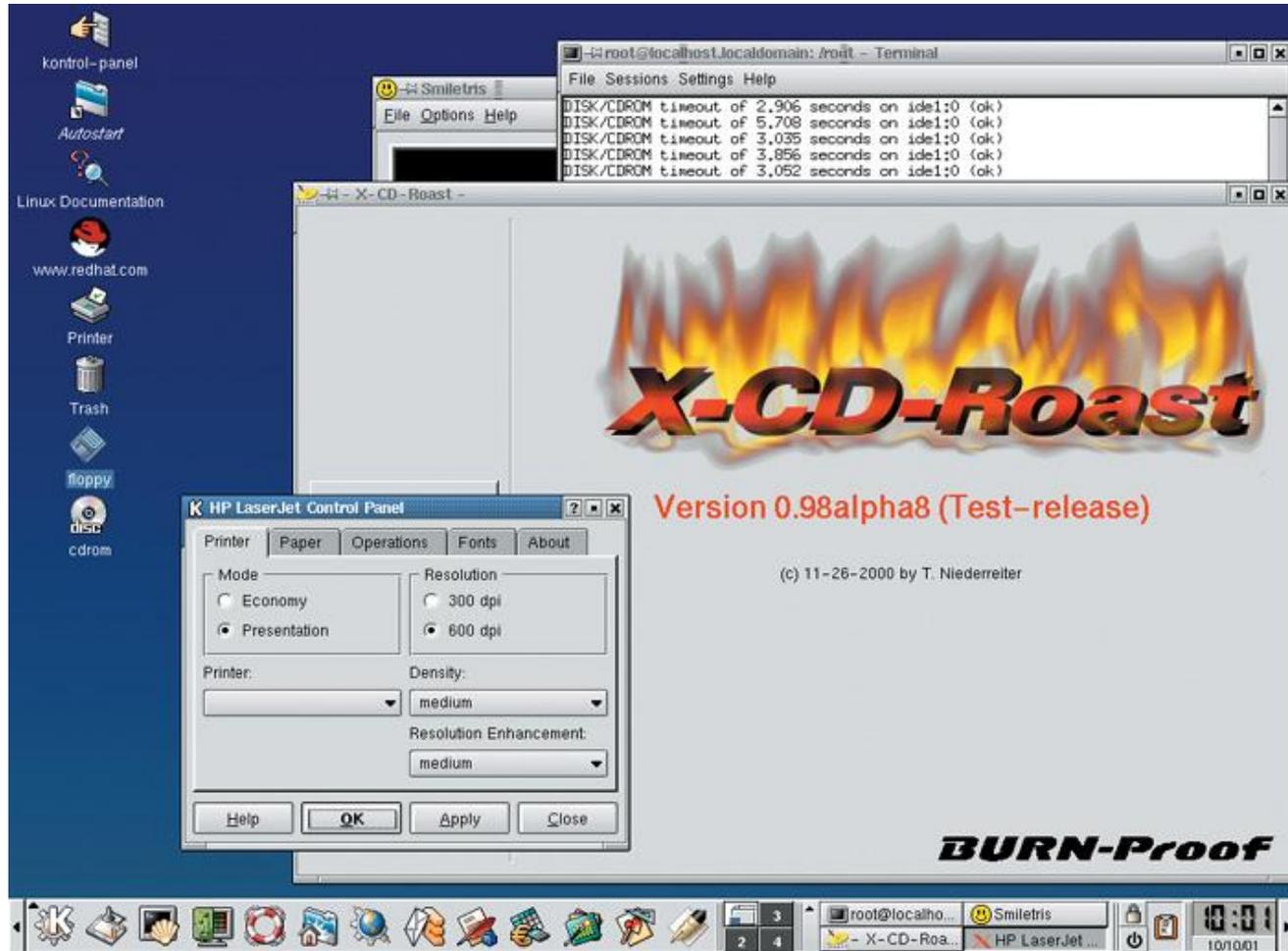
UNIX

- ❑ **Runs on all computer types**
- ❑ **32- or 64-bit**
- ❑ **Very stable and fast**
- ❑ **Command-line interface**
- ❑ **Can cost thousands of dollars**

Linux

- ❑ **Free or inexpensive version of UNIX**
- ❑ **32-bit OS**
- ❑ **Very stable and fast**
- ❑ **Most flavors are open source**
- ❑ **X Windows GUI**
 - **Command line interface is available**

Linux Desktop



Macintosh operating systems

- ❑ **OS X**
- ❑ **Based on FreeBSD Linux**
- ❑ **Very stable and easy to configure**
- ❑ **Only runs on Mac hardware**

OS X Desktop



NOS

- ❑ **Network operating system**
- ❑ **Fast and stable**
- ❑ **Runs on servers**
- ❑ **Multi-user and multitasking OS**
- ❑ **32- or 64-bit**

NOS Features

- ❑ **File and print sharing**
 - ❑ **Users access the same files**
 - ❑ **Hundreds of users use a printer**
 - ❑ **Different OS can interact**
- ❑ **Data integrity**
 - ❑ **Backups copies data onto tape**
 - ❑ **RAID copies data onto other drives**
 - ❑ **Redundant Array of Inexpensive Disks**
 - ❑ **Relies on two or more hard drives**
 - ❑ **May speed access to data**

NOS Features

- ❑ **Data security**
 - ❑ **Access to data can be restricted**
 - ❑ **Access to server resources is controlled**
 - ❑ **Audits can be kept**

NT Server

- ❑ Same core as NT Workstation
- ❑ Security added
- ❑ Multi user capability added
- ❑ RAID support included

Windows 2000 Server

- ❑ Same technology as 2000 workstation
- ❑ Active Directory (AD)
 - Central database of server resources
 - Simplifies network management
- ❑ Distributed programs supported
- ❑ Server Standard Edition
- ❑ Advanced Server Edition
- ❑ Data Center Edition

Windows 2003 Server

- ❑ **Designed to compete with UNIX**
- ❑ **XP like interface**
- ❑ **Better support for XP computers**
- ❑ **MS .NET framework supported**
- ❑ **Distributed programs are supported**
- ❑ **Server Standard Edition**
- ❑ **Data Center Edition**

UNIX for servers

- ❑ **Oldest NOS in widespread use**
- ❑ **Stable secure and fast**
- ❑ **Main OS for Internet and Web**
- ❑ **Large organizations depend on UNIX**

Linux for servers

- ❑ Popular in small businesses
- ❑ Stable, fast and inexpensive
- ❑ Linux's popularity is growing

Embedded Operating Systems

- ❑ **Devices have EOS built in**
- ❑ **Cell phones, PDAs, medical equipment**
- ❑ **Stable and fast**

Windows XP embedded

- ❑ **Based on Windows XP**
- ❑ **Customized for each device**

Windows CE

- ❑ **Not based on a desktop OS**
- ❑ **Customized for each device**
- ❑ **PDA and cell phones**
- ❑ **Microsoft Automotive will run in cars**

Palm OS

- ❑ **Standard on Palm PDA**
- ❑ **First PDA OS for consumers**
- ❑ **Can be found on cell phones**

Pocket PC

- ❑ **Developed to compete with Palm**
- ❑ **Not customizable**
- ❑ **Interacts securely with business networks**
- ❑ **Can control PCs through PC**

Symbian

- ❑ Found in smart cell phones
- ❑ Games, Instant Messaging, Internet
- ❑ Full color display