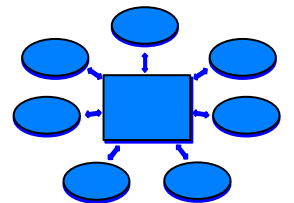


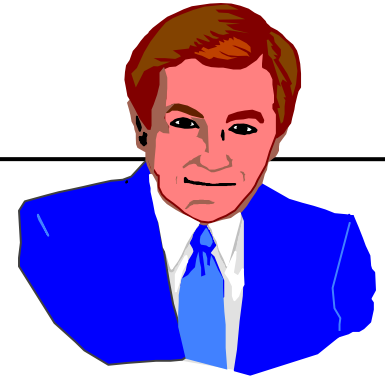
How to Revive an Old Computer

Howard Fosdick
(C) 2009 FCI



V 2 . 4

Who Am I ?



- * **Independent Consultant**
- * **Hands-on DBA** (*not a PC support specialist*)
- * **Management consulting with vendors**
- * **User group founder, author, analyst**

contactfci /an at sign here/ **sbcglobal** /dot/ **net**



Why This Talk ?

My hobby --

1. **Get PC donations**
2. **Hardware** (verify / rebuild / fix)
3. **Software** (verify / anonymize / install)
4. **Give away to someone who needs it**

On my own for 10 years => Free Geek Chicago



Outline

- I. Why old computers ?**
- II. Hardware**
- III. Steps to revitalize a PC**
- IV. Windows**
- V. Linux (other free OS's)**
- VI. Where to donate or get a free computer**
- VII. *“Free Computing”***
- VIII. Resources**

I.

Why Old Computers ?



Why Older Computers ?

Fun

Free

Useful

* *Planned Obsolescence* **versus** *Appropriate Technology*



Save the Planet

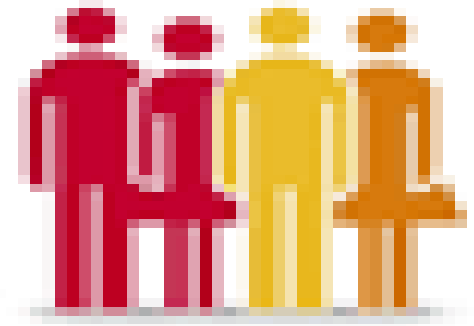
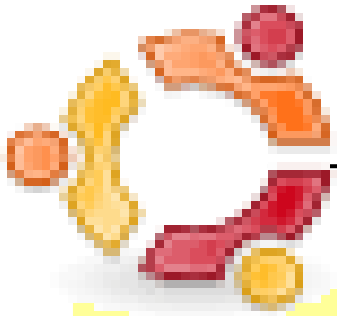
- * **PCs contain toxic materials (lead, mercury, BFRs, etc)**
- * **250 M sold worldwide yearly, 70 M in US yearly**
- * **500 M yet to be disposed of**
- * **Avg PC lifespan < 3 years**

One solution -- use them !

Buy → Re-use → Recycle

“Re-use, then recycle” -- James Burgett

Help Kids



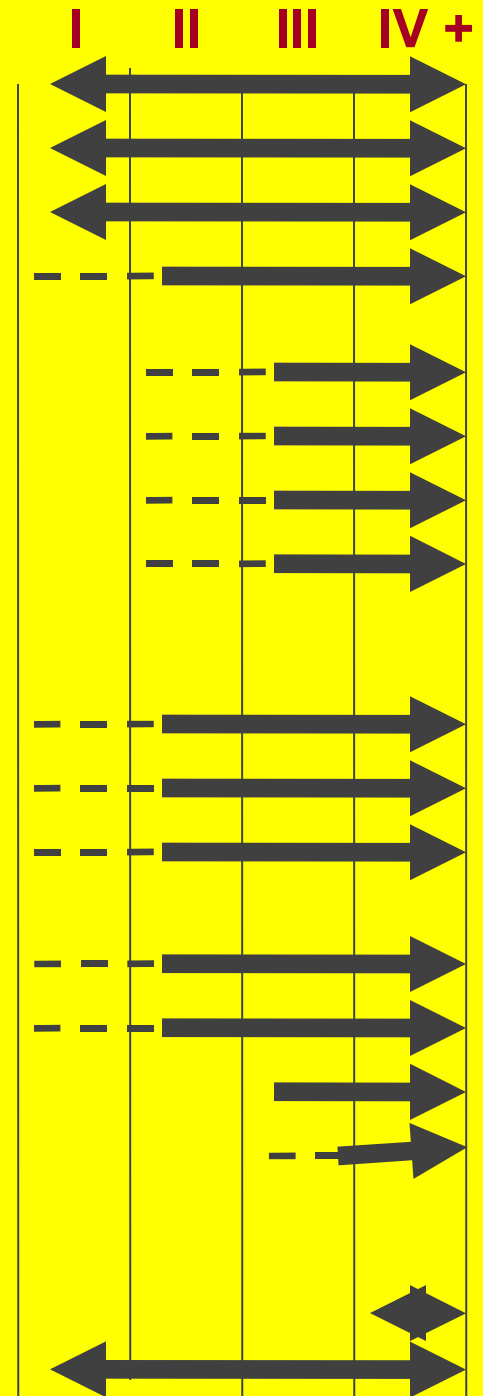
- * **Schools require computers**
- * **Not everybody has \$\$\$**
- * **Large families need that “extra” computer**



What Can You Do With an Old PC ?

Caveats:
(1) end user
(2) subjective

- **Office**
 - Word Processing
 - Spreadsheet
 - Presentation Graphics
 - Graphics, images
- **Fast Internet**
(Broadband)
 - Web surfing
 - Research
 - Wireless
 - Social websites
- **Slow Internet**
(Dial Up)
 - Email
 - Brief web searches
 - IM / Chat
- **Multimedia**
 - Photos
 - Music / Audio
 - Play Video
 - Create/edit Video
- **Games**
 - Current games
 - Older games





Summary

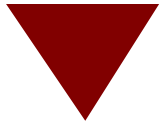
- New PCs are required for the *latest* --
 - Games
 - Graphics
 - Multimedia
 - Higher Concurrency
 - Microsoft software
- Pentium III does everything else
- Older useful but have limits --
 - P-II -- 450 mhz + 256 to 384 M tops
 - P-I -- 266 mhz + 128 M tops

Dial-up
era



--- *Donation Sweet Spots* ---

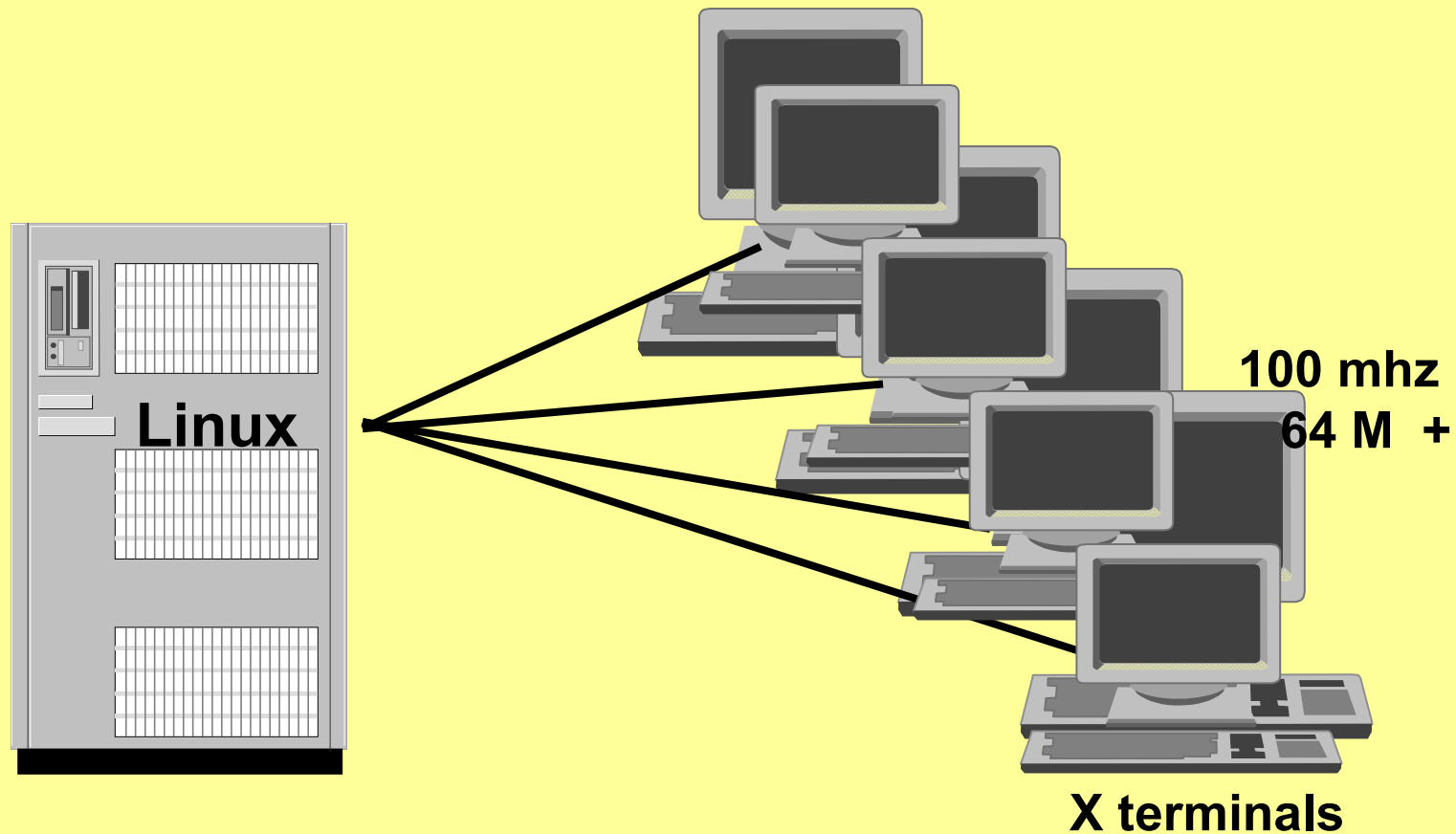
P-III, early P-IV
P-II you can top out



More Uses for Old Computers...

- **Specialized Single-Use Computers (App servers)**
 - **Firewalls**
 - **Print, File, or Network server**
 - **Email station**
 - **Word processor**
 - **other single use**
- **Run old programs** See http://www.freesoftwaremagazine.com/articles/free_computing
 - **Business**
 - **Consumer (eg: games)**
- **Act as terminals**

Linux Terminal Server Project (LTSP)

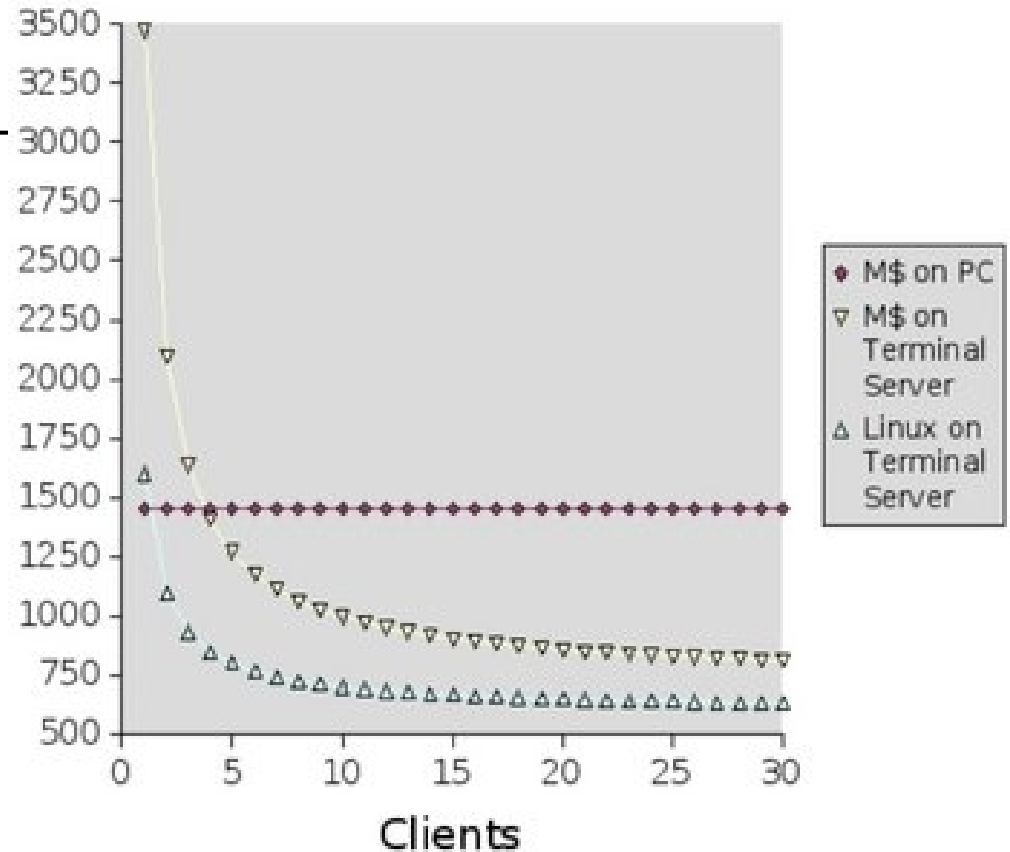


Killer App → **Big Money Saver !**

See: FreeSoftwareMagazine.com article by Robert Pogson
and: www.ltsp.org

LTSP

Cost per Client



From: Robert Pogson's article

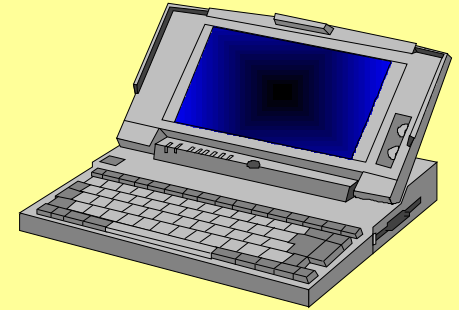
Server for up to 60 clients --

* AMD Opteron 170 dual core 2 MB cache	CAD\$519
* 4GB ECC DDR333 RAM	CAD\$500
* ASUS A8N-E motherboard	CAD\$125
* ATX case and power supply w/400-500W capacity	CAD\$200+
* 10/100 baseT NIC	CAD\$15
* dual 200GB hard drives SATA	CAD\$210
* Edubuntu	CAD\$0
* Total	CAD\$1570

II. Hardware

Main Focus is PC Desktops

Laptops



- Fewer made than desktops until 2007
- Fewer donated
- + This will change in a couple years

Apples

- Proprietary --> even across the Apple line !
- Parts --> expensive, hard to find

What Do People Donate?

Pentium

IV +

III

II

I

pre-Pentium



- Where and how you get free PCs shades the mix
- Mix changes yearly
- Capabilities of “old computers” constantly increase

Today --

P -IIIs , P -IIs , some P -IV s



My Best Donations are Easy-to-fix Problems

+ Slow ---

- + Windows tune-up
- + Add memory

+ Broken replaceable device

+ Random shutdowns

- + Overheating => check fans, redo heat sink, clean PC

+ Won't boot

- + OS issue => Boot LIVE CD
- + Check wires, card seating, loose screws, shorts

“Turnover Events” Cause Donations

Technology

or

Marketing

- **Technology Examples --**
 - **Monitors** => **Flat panels**
 - **ZIP disks** => **USB thumb drives**
 - **Modems** => **Broadband NIC's**
- **Marketing Examples --**
 - **Microsoft's Internet Explorer**
 - **Microsoft's Vista**

Typical Hardware

Processor:	CPU Speed (mhz):	Typical Memory (Megabytes):	Cost:
Pentium IV and dual core	1.3 – several ghz	256M – several Gig	Current
Pentium III	450 – 1.4 ghz	128 – 1 Gig	Low cost to free
Pentium II	233 – 450	64 – 256 or 384	Free
Pentium I MMX	150 – 266	32 – 128	Free
Pentium I	60 – 200	16 – 128	Free
486	16 – 133	4 – 32	Free
386	16 – 33	1 – 16	Free
286	8 – 16	1 – 4	Free
8088	4.77 – 8	< 1	“Collectable”

--- Memory varies widely ---

“Celeron” and “Xeon” mean nothing

- * **Desktops versus laptops**
- * **Max'ed out versus what shipped**

Typical Hardware

AMD Equivalents

Processor:	CPU Speed (mhz):
Opteron	1.4 – 2.4+ ghz
Athlon 64	2.2 – 2.6+ ghz
Athlon XP	1.3 – 2.1 ghz
Duron	600 – 1.8 ghz
Athlon	650 – 1.4 ghz
Thunderbird	
Athlon K7	500 – 1 ghz
K6 2/3	233 – 533
K6	166 200



-- When Sold --

P-I 1993-1998

P-II 1997-1999

P-III 1999-2003

P-IV 2000-2008

Memory

SDRAM

PC 66	66 mhz	← P-II
PC 100	100 mhz	← P-III
PC 133	133 mhz	← P-III

DDR (aka DDR1)

PC 2100	266 mhz
PC 2700	333 mhz
PC 3200	400 mhz

DDR2

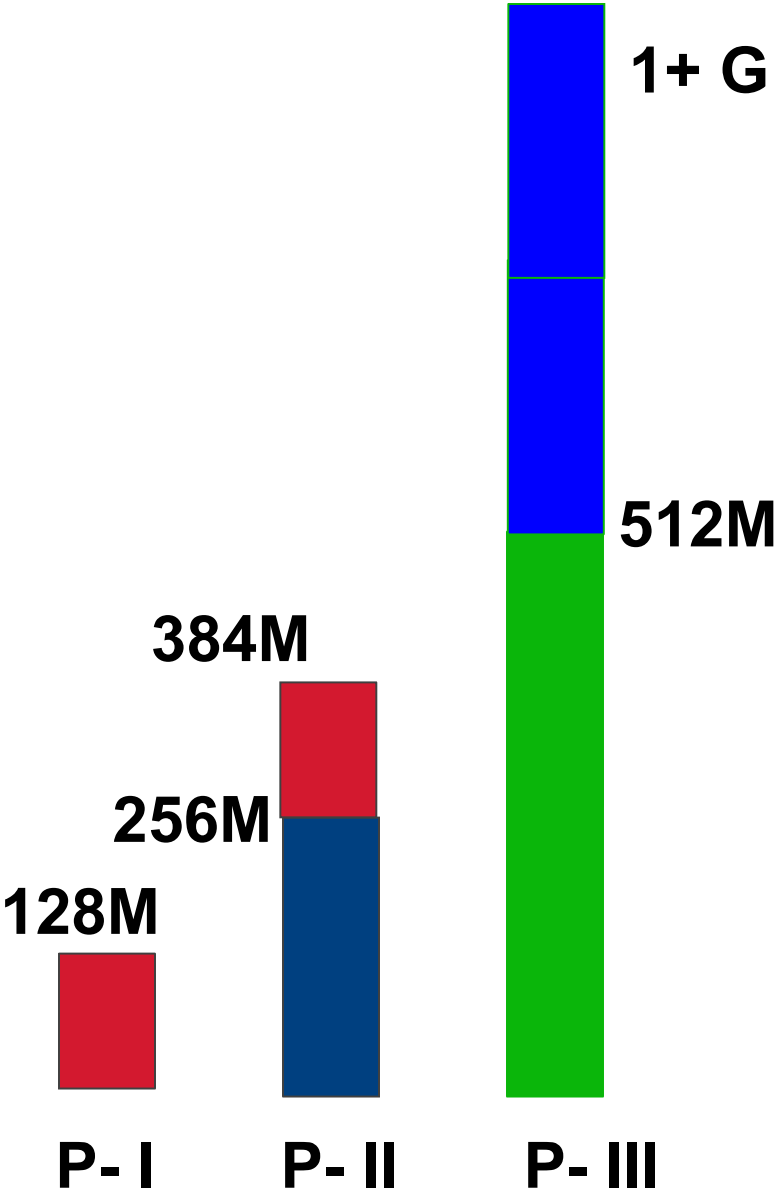
PC2 3200	400 mhz
PC2 4200	533 mhz
PC2 5300	667 mhz
PC2 6400	800 mhz

--- *Usually* ---

- * All in group cost the same
- * Can use one level slower as next level faster
- * Can use fastest in group for any in group

UpgradeMemory.com
KingstonMemory.com

Maximum RAM (typical)



Source: Tom's Hardware, other web sites

III. Steps to Revitalize an old PC



Steps to Revitalize an Old PC

1. Identify

- Hardware
- External (ports, form factor, stickers)
- Boot config panels
- Software
 - Password
 - **npasswd** in *Linux rescue CDs*
 - *Offline Password Editor* -- <http://home.eunet.no/pnordahl/npasswd/>

2. Verify

- Hardware
 - Run boot config panel diagnostics
 - Run Linux diagnostics
- Devices work (hardware & drivers)
 - Check disks, read/write CD/DVD & floppy, sound, video
 - Windows **Device Mgmt** panel
- Software
 - Malware free
 - Installed programs work
 - Registry scans ok

**Skip a step
and it will cost you!**

3. Define Objectives

4. Fix/configure for Objectives

“Rescue Disks”

(To Fix Windows or Linux)



**Ultimate Boot CD
for Windows**

ubcd4win.com



System Rescue CD

sysresccd.org



**Ultimate Boot CD
for Linux**

ultimatebootcd.com



Linux *“Rescue Disks”*

**Knoppix, Puppy,
others**



“OS Decision” Determines

- * **OS resource requirement (overhead)**
- * **Your Apps**
 - * **How easy to find**
 - * **Free**
- * **Drivers ?**

3 “Operating Environment” Choices

**Keep
Windows
only**

- + Easiest
- + Drivers
- + Age-appropriate software
- Cleanup required
- No MS fixes or support
- Security software resource consumption

**Replace
Windows
w/ Linux
(or other OS)**

- + No malware
- + Simple install
- + Linux Apps & Benefits
- + Erases donors' data
- Drivers?
- Loses value of installed software

**Add Linux
to
Windows**

- + Benefits of Windows *and* Linux
- + Linux co-exists with Windows
- Effort
- Requires 1/2 G disk

Free Geek

My Preference

IV. Windows on Old PCs



Windows Benefits

(versus Linux)



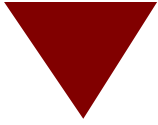
Compatible file formats

Easy to use

Efficient GUI on 486 to P-II

Device drivers

Comes on the computer



Obsolete Windows Versions run well on Obsolete PCs

Windows 3.1, 95 or 98

Office 4, 95 or 97

- + Faster than stock Linux GUIs (on 486 or P-I)**
- + More user-friendly !**

Example -- 486-DX2 @ 25 mhz / 8M ram / Windows 3.1 / WP 5 / Freelance

**But if you connect to the internet,
security software sinks them !**

Windows System Requirements

Version	CPU Minimal / Recommended	Memory Minimal / Recommended
Windows 3.1	>= 386	2 MB
Windows 95	386DX / 486	4 MB / 8 MB
Windows 98	486DX @66 + MHz	16 MB / 24 MB
Windows 98-SE2	486DX @66 + MHz	16 MB / 24 MB
Windows ME	Pentium @150+ MHz	32 MB
Windows NT 4.0 Workstation Edition	Pentium	16 MB / 32 MB
Windows 2000 Professional Edition	Pentium @ 133+ MHz	64 MB
Windows 2003 R2 Standard Edition	Pentium @ 133+ MHz / Pentium @ 550+ MHz	128 MB / 256 MB
Windows XP Home Edition	Pentium @ 233+ MHz / Pentium @ 300+ MHz	64 MB / 128 MB
Windows Vista	Pentium @ 800+ MHz	512 MB

From: Microsoft's web site 2006

**Double
above values
for good
performance !**

XP – P-III w/ 256 – 512 M
Vista – P-IV or dual core w/ 2 G

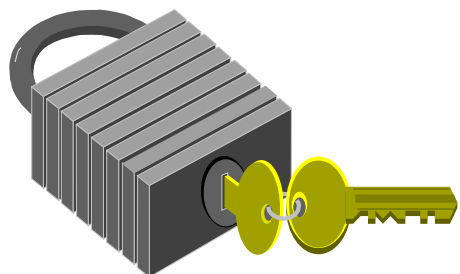
How to Tune / Clean-up Windows

How to Secure Windows and Your Privacy – H. Fosdick

-- download from --

www.RexxInfo.org/How_to_Secure_Windows_and_Your_Privacy.pdf

- + Explains everything
- + 40 pages
- + Several hundred thousand downloads



3 Related but Distinct Concepts

Security

Ability to isolate your computer and data from outside access or penetration

Privacy

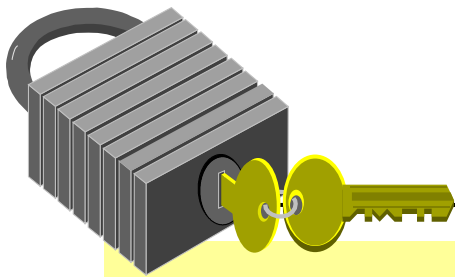
Ability to control who sees your personal data, when, and how they can use it

=> requires SECURITY

Anonymity

Remove traces of identity and personal info from computer

=> required on donations prior to placement



Secure / Clean-up Windows with FREE Software

- **Firewall**
 - ZoneAlarm, Comodo, Jetico, Sygate (NOT Microsoft)
- **Anti-Virus**
 - AVG, Avast!, ClamWin
- **Anti-Spyware / Malware**
 - Adaware, Spybot Search and Destroy, A-squared
- **Rootkit Detection**
 - Sophos
- **Intrusion Detection / Prevention**
 - WinPatrol, SpywareGuard, ThreatFire, ProcessGuard
- **Encryption**
 - TrueCrypt, BestCrypt, QuickCrypt
- **Secure Deletion**
 - Eraser, BCWipe
- **Document Properties Security**
 - DocScrubber, other JavaCool Software products
- **Browser Security**
 - HijackThis, BHODemon, others
- **Cleanup**
 - Ccleaner, PurgeIE, PurgeFox, MRUBlaster
- **MORE !**



Steps to Tune / Clean-up Windows

- **Install security scanners**
- **Full scans to remove virus/spyware/adware/malware**
- **Scan for Rootkits!**
- **Delete unneeded files (temp, internet temp files, install files)**
- **Delete their personal files (doc, ppt, mp3, image, etc)**
- **Delete unused installed programs**
- **Delete duplicate files, largest files on pc (media files, etc)**
- **Delete web surfing history (index.dat and Registry)**
- **Empty Waste Basket**
- **Ccleaner and PurgeIE handle the above**
- **Check disk (fast scan then full scan)**
- **Remove CHK files**
- **Defrag disk**
- **Scan / fix Registry (make backup first) with free reg scanner**
- **Fix start-up list (Run msconfig, XP => Services (from AUTO to MANUAL or DISABLED))**
- **Carefully consider which apps to pre-launch**
- **Remove craplets from SYSTRAY**
- **Cleanup desktop icons**
- **Cleanup Quick Launch**
- **Verify NOSHARE of disk**
- **Verify or install TWO-WAY Firewall**
- **Install Intrusion detection**
- **Check device drivers (working, suitable)**
- **MUCH MORE than listed here, see =>**

--- More ---

***“How to Secure
Windows and
Your Privacy”***

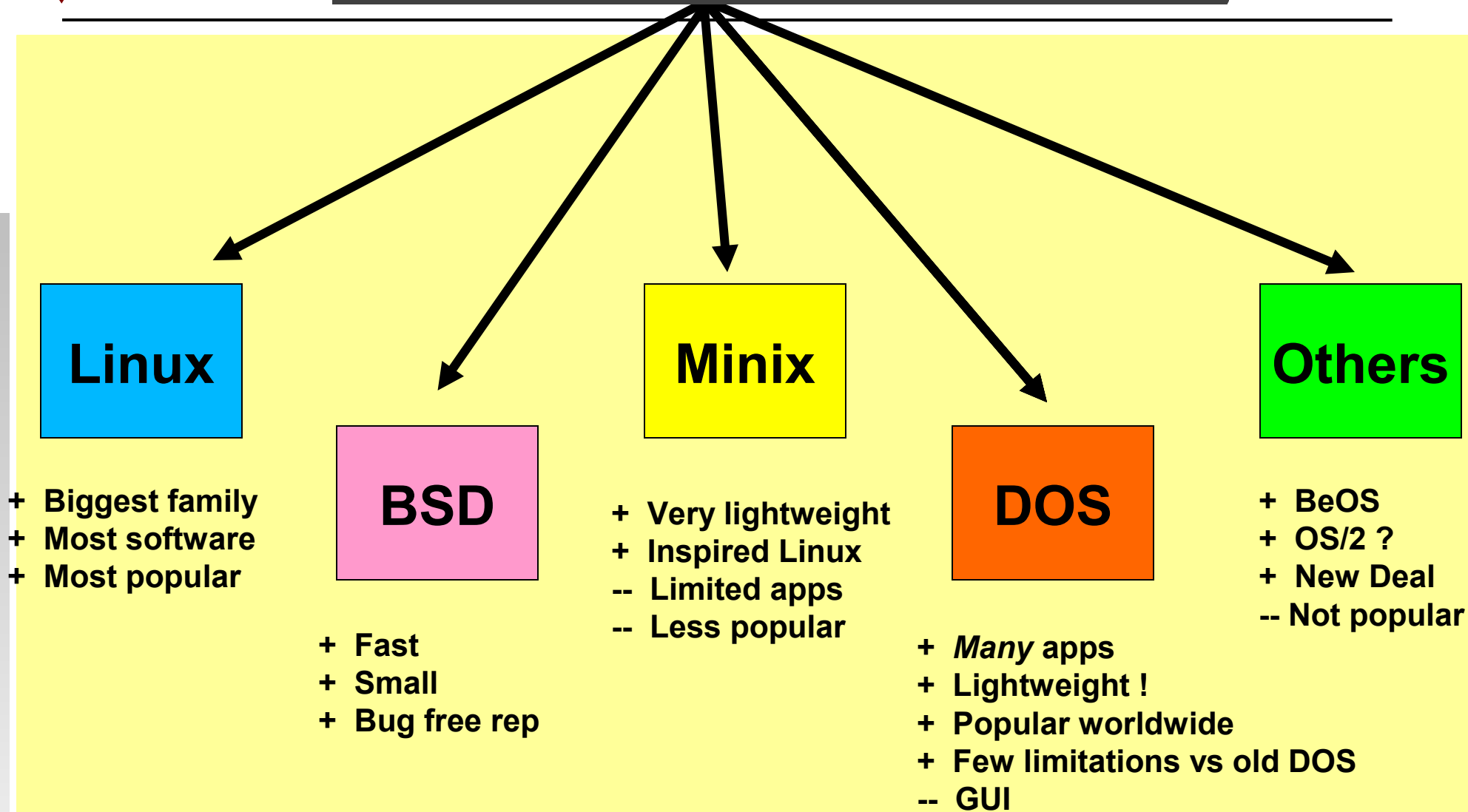


How to Anonymize Windows

- (1) Windows gives users into a false sense of privacy**
- (2) Anonymizing Windows is hard**

V. Linux (etc) on Old PCs

Free Operating Systems



Linux Benefits

(versus Windows)

No Vista DRM crap

No WGA, Product Activation,
or stealth updates

No Registry or
DLL problems

No viruses, spyware,
malware

No privacy issues

Co-exists with other
operating systems

No licensing issues

No artificial lockout
from current software

No forced upgrades

Free apps !

Small distros

Distro choices

– Rule of Thumb –

- Always add Linux
- Requires only 500 M disk
- Current, supported software
- No anti-malware overhead
- Free applications



“*Small Linux*” Strategies

1.

Small distro

2.

Older release of big distro

3.

Tailor distro during install

4.

Master your own Distro

Some Small Linuxes

DistroWatch.com

DistroMania.com

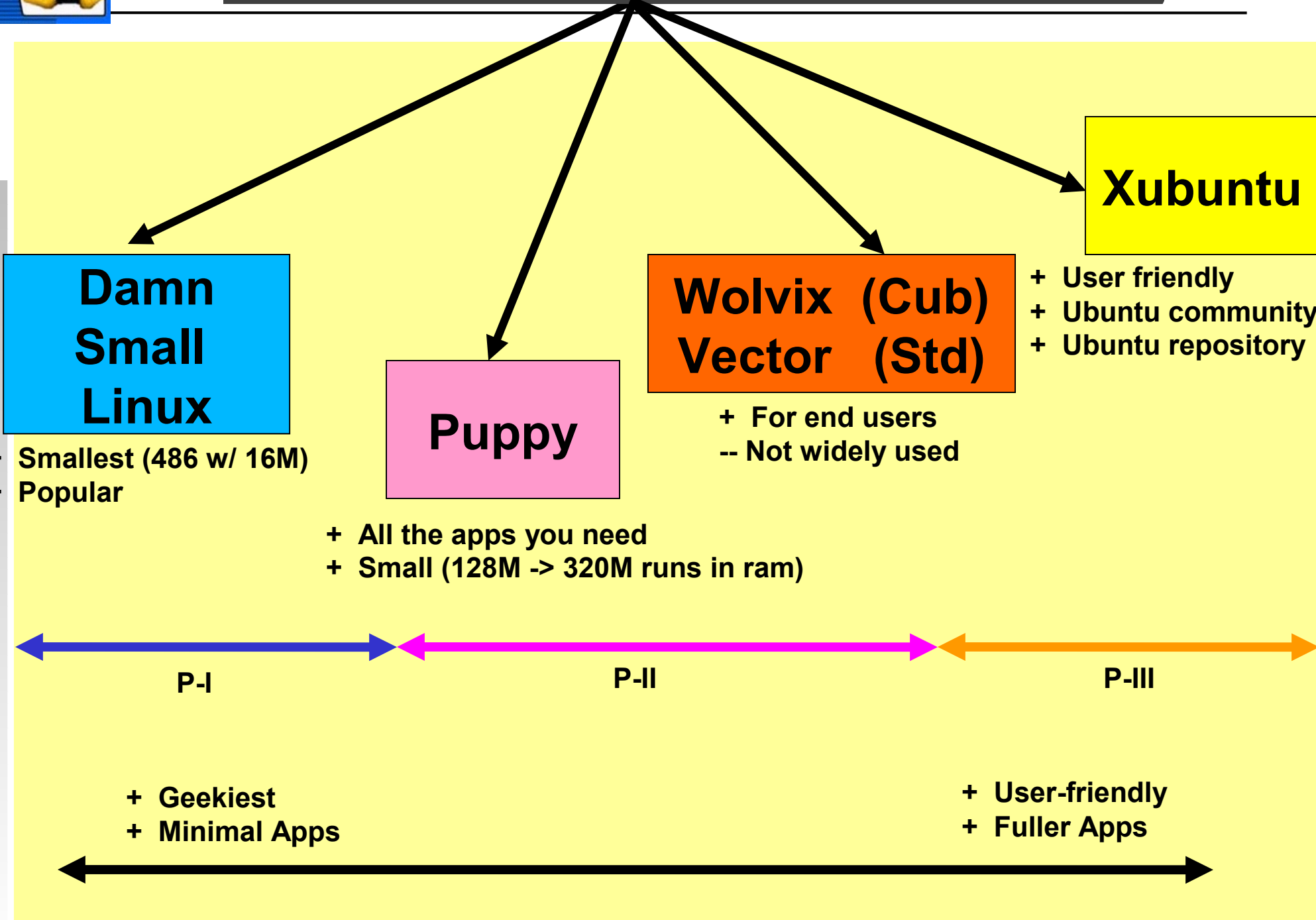
**Review
System
Requirements**

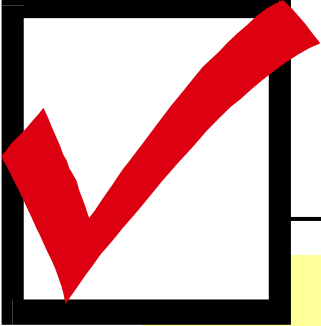
A fraction of what's available...

Version	System Requirements
Damn Small Linux	Minimum requirement is a 486DX with 16 MB memory. Runs fully in memory on machines with 128 MB. Also boots from USB thumb drive or from a live CD. 50 MB disk footprint. Details here.
Puppy	"Puppy has been tested on a few very old machines but for best results..." use a Pentium @166+ MHz with 64 MB for releases prior to 1.0.2, and 128 MB for releases since version 1.0.2. Be sure to create a swap partition on systems with less than 64 MB of memory, otherwise no hard disk required.
Feather	"Feather should be able to run on a 486 with 16 MB of RAM, but only in console (non-graphical) mode. To use X, 24 MB of RAM or more are required."
Wolvix	Requires 36 MB to boot slax, 96 MB to run X Windows with Fluxbox, 144 MB to run X Windows with KDE. 486 or better processor. A suggested system has a minimum Pentium @266+ MHz and 128 MB memory. No hard disk required.
Vector	The Standard Edition requires only a 386 or better processor with 16 MB of memory and 350 MB of disk space for a full install. The SOHO (Small Office / Home Office) edition requires Pentium III or better, 128 MB memory with 256 MB recommended, and 3 G for the OS on disk.
STX	"Oldest system tested so far: K5/75, 64 MB RAM, 130 MB Swap ... very slow but works"
Pocket Linux	"...you should at least have a Pentium II computer with 400 MHz and about 128 MB+ RAM in order to work efficiently."
Slackware	486 or greater processor, 16 MB memory with 32 MB suggested. Additional hardware required to run the GUI. 100-500 MB hard disk is minimally required with 3.5 G for a full install.
Debian	Pentium @100+ MHz minimum, plus 24 MB memory and 450 MB on disk for "No Desktop" systems, or 64 MB and 1 G disk for systems "with the Desktop."



My Favorite "Small Linuxes"





GUI is Key to Resource Usage

- * Always in use
- * Memory-consumptive

- * **Gnome & KDE**
 - + Standard
 - 128 M
- * **JWM, IceWM, Xfce, FVWM, Flubox, others**
 - + Less Memory (< 64M)
- * **Command line**
 - + For App Server
 - + Geeks
 - Not for end users

See xwinman.org for GUI details

Lite !

Pick Light Apps !

Good

Bad

Linux

Abiword
Gnumeric
Dillo, Opera
Terminal window
JWM, FVWM, Xfce

OpenOffice 1 (64M)
OpenOffice 2 (128M)
Firefox, SeaMonkey
GUI apps
Gnome, KDE

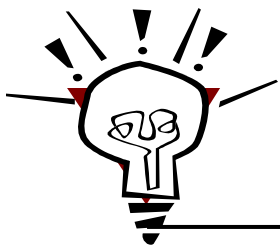
Older releases
(Acrobat, Winzip, etc)

Newer releases of
the same products

Windows

Office 97
Notepad
K-Meleon
ImgBurn, FinalBurner
TinyFirewall, Sygate
Avast!
Windows 98 GUI

Office 2000, 2003, 2007
Word
IE, Firefox
Easy CD Creator, Nero
ZoneAlarm
ClamWin, AVG 8
Vista GUI



How to Co-Install Linux with Windows

**Linux has free Partitioning, Boot Selection,
and Windows-recognition tools**

- 1. Verify Windows disk
(My Computer | Properties | Tools | Disk check)**
- 2. Defrag Windows**
- 3. Boot Live Linux**
- 4. Resize Windows partition (if you need space)**
- 5. Create Linux partition**
- 6. Create Linux Swap**
- 7. Install Linux**
- 8. Verify boot selection menu (/boot/grub/menu.lst)**



Ways to Install Linux

Almost all
Linuxes



1. **Live CD**

- Verify product, video, drivers, etc
- Evaluate & learn product

2. **Full Install**

- Co-exist with Windows
- Needs own partition
- Linuxes recognize Windows
- Linux creates boot selection list
- Little disk required
- Use Windows partition for your data

3. **Frugal Install**

- Stores Linux as file(s) in existing Windows partition

4. **Windows Program**

- Icon on Windows desktop

5. **USB memory Stick**

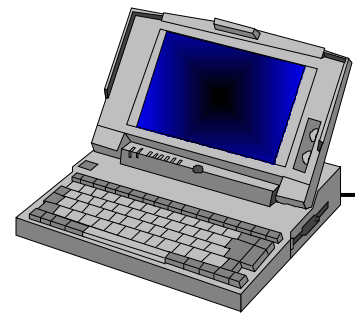
- Leaves Windows un-changed

6. **Updatable CD or DVD**

- Leaves Windows un-changed

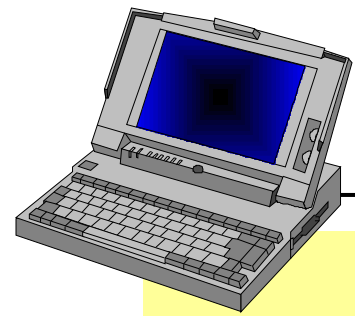
Some
Linuxes

VI. Examples



Example -- P-II Laptop

- IBM Thinkpad 770Z P-II @ 366 mhz / 128M ram / 14g disk
- CDROM, floppy, 56k modem, USB port, Windows 98
- 13.7" screen w/AGP graphics and 8M ram
- NO --> 10/100 port, wireless card, Writeable CD or DVD
- Hardware works
 - Config panel
 - Config diagnostics
 - Windows Devices panel
 - * Disk check
 - * Tested devices
- Software is clean
 - Malware clean
 - Registry clean
 - * Programs work
 - * MSCONFIG and daemons



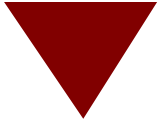
Example -- Objectives ...

- * Office work (in MS formats)
- * Presentations
- * Email
- * Web surfing
- * Run Windows and Linux apps

Conclusion ->

- Keep Windows
- Install Puppy Linux & run from RAM
- Add 128M (\$20) => 256M
- Add Network card (\$10) => Broadband access

UpgradeMemory.com
KingstonMemory.com

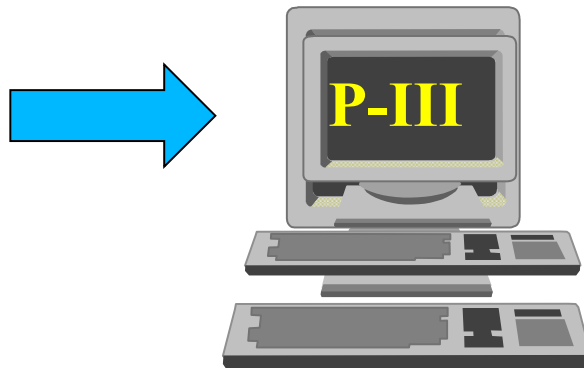


Example #2 -- P-III Desktop

- Dell 733r
- 256 M

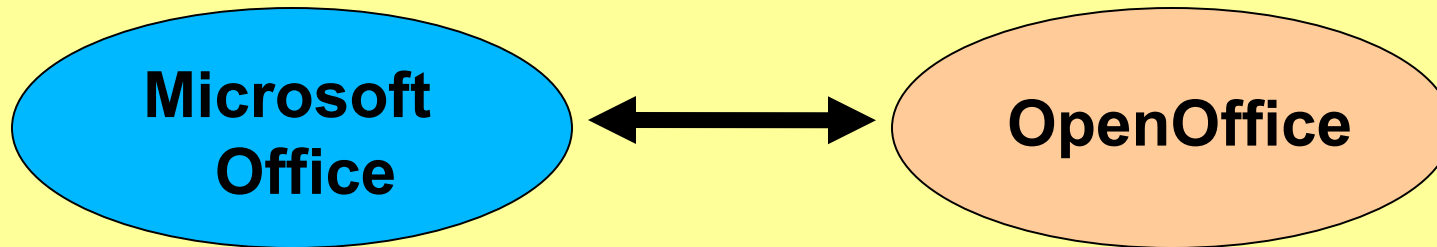
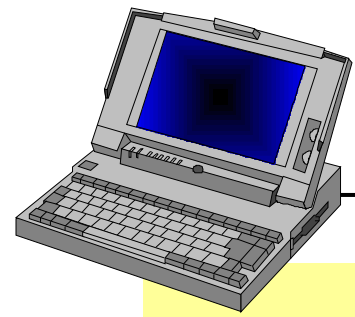
Objectives

- Office / school work
- Email
- Web surfing
- Social networking
- Play Video, Audio



- Install Xubuntu
- All Linux apps
- Added Video Card
- Added \$10/month AT&T DSL

Example – Linux Compatibility with Windows



**Presentation
edited on --**

**You're viewing
it on --**

**Powerpoint 97 & 2003
and OpenOffice 2
on Windows 98 & XP**

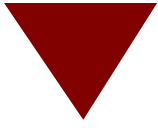


**OpenOffice 2
on Linux
(on P-III laptop)**

VII. Get a Free PC

-- or --

Donate one !



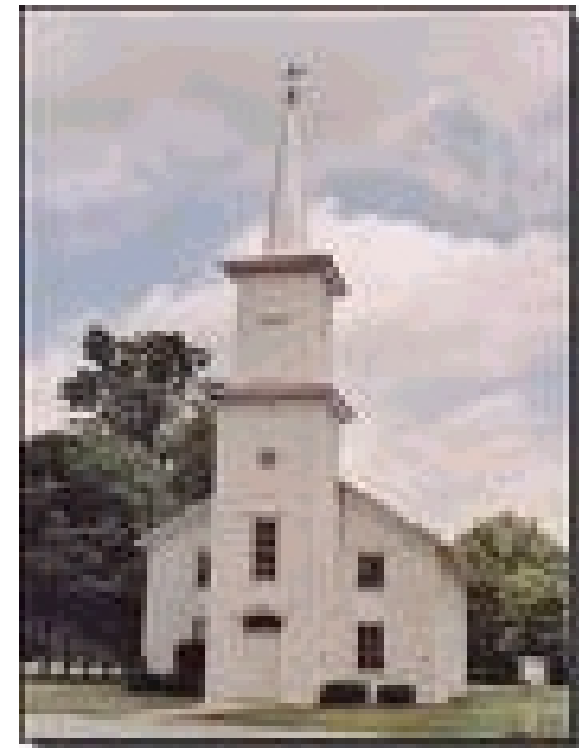
Where to Get a Free PC--

- * Trash
- * IT co-workers
- * Friends
- * Rummage sales
- * FreeSharing.org
- * FreeCycle.org
- * Craigslist.org
- * **FreeGeekChicago.org**
- * PeoplesRC.org



**FreeSharing
works !**

**Church
Rummage
Sales**





What Does “Free” Mean ?

You pay :

- Labor
- Buy a part (eg: memory)
- Internet subscription (\$ 10 – 40 / month)

**AT&T / Yahoo
DSL is
\$10 / month !**



Where to Donate a PC ?

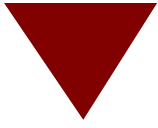
- www.FreeGeekChicago.org

3411 W. Diversey

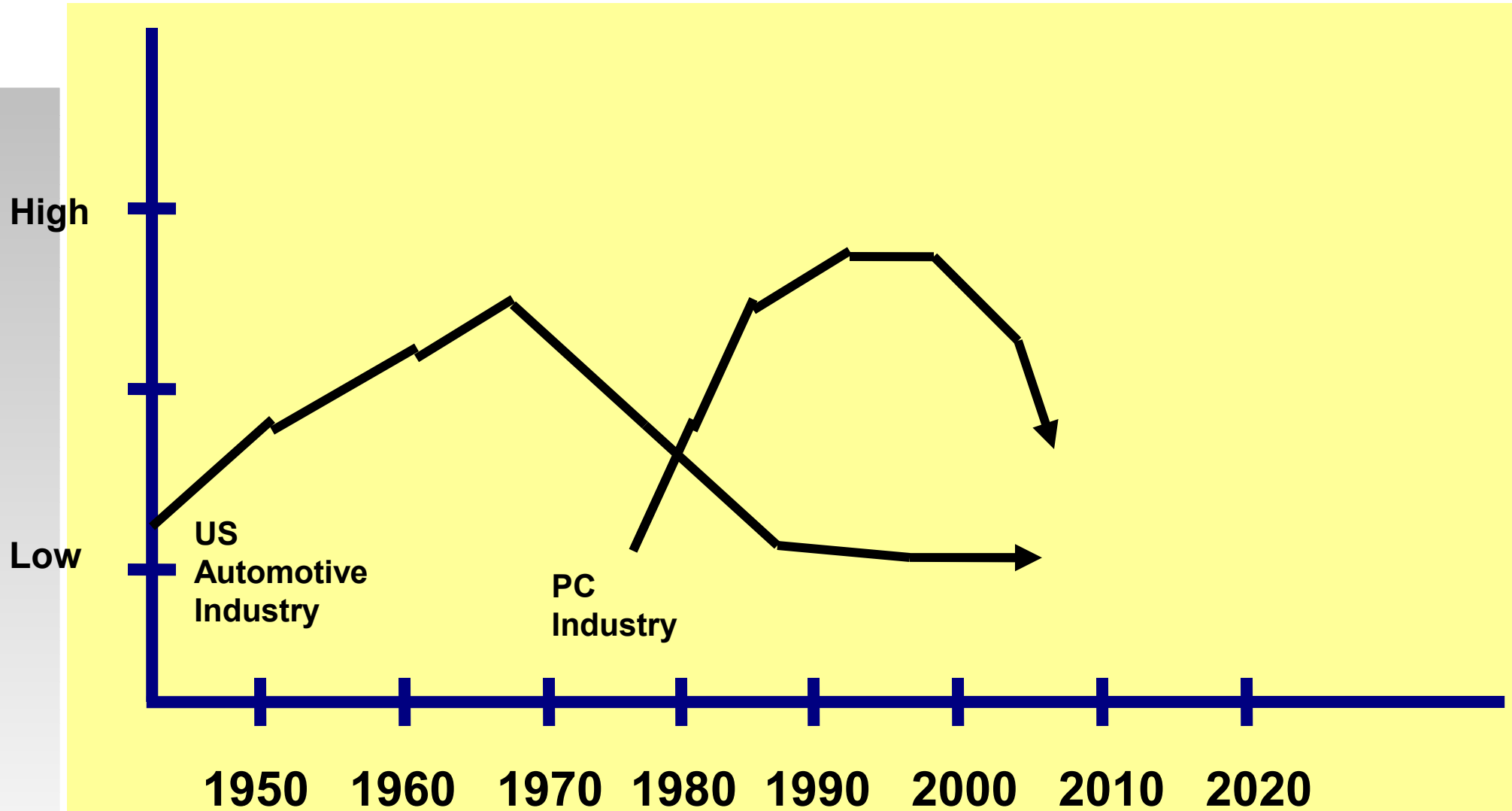
- **Too old for re-use . . .**

**Sims/United Recycling
166 Harvester Ave, W. Chicago
25 cents / lb.**

VIII. *Free Computing*



Ability to Enforce Planned Obsolescence





How the PC Industry Works

- Wintel monopolizes U.S. market
- > 50% of Microsoft's revenue is from Windows & Office
- They have to force you to upgrade
- New release soaks up new hardware for new functions
- Planned Obsolescence --
 - Word 97, 2000, 2003.... Who cares?
 - Older PCs are useful
 - Vista -- great example of a needless upgrade

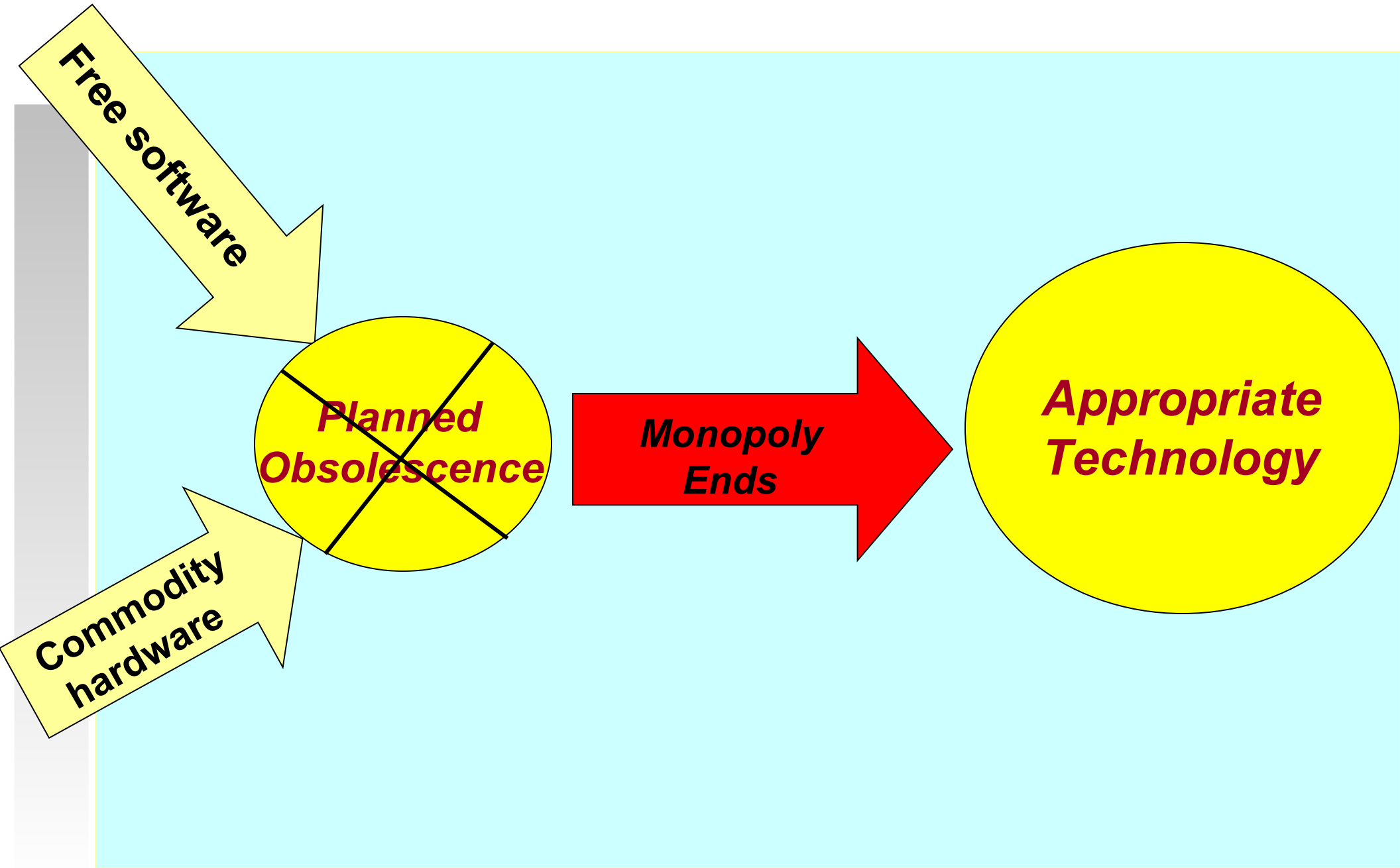
How Microsoft Forces You to Upgrade



- **MS software is designed not to run on older computers**
- **Software prerequisites are marketing-based (not technology-driven)**
(eg: you must have IE to get Windows Updates or run XP or etc.
Or, you must have a certain level of product to use an unrelated product)
- **Older MS software doesn't run on newer machines**
(eg: Win 98 needs bug fixes for > 512 M and > 2 ghz)
- **MS terminates security fixes, support for older software (key due to Windows security flaws)**
- **WGA & PA kill old copies of software**
- **Registry prevents porting a Windows disk across computers or even an upgraded computer**
- **Registry locks & controls installed software**
- **Intentional incompatibilities between different versions of the same product**
(eg: older version of Word can not read *.doc file from newer version)
- **Restrictive EULAs**
- **Software Assurance program -- contractual lock-in**
- **Very difficult to anonymize Windows without wiping the disk**
- **New Windows versions are bundled with all new PCs**
(no consumer choice due to coerced vendor lock-in)

Trends!

The Monopoly Ends



Low-end Machines Proliferate !

Laptop Projects

OLPC --

- 433 mhz, 256M ram, 1G flash
- Self-powered
- Linux
- \$175 -> \$100

Intel Classmate --

- 900 mhz, 256M ram, 1-2G flash
- 4-hr battery
- Windows XP Pro or Linux
- \$225 -> \$200

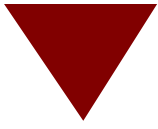
Consumer PC's

Household appliance

Schools

Walmart

IV. Resources



Recommended Resources

Free software websites--

Windows-- TheFreeCountry.org
MajorGeeks.com
Download.com

Linux-- SourceForge.net
Freshmeat.net

Hardware Info websites--

1. TomsHardware.com
2. PCGuide.com
3. Computer.HowStuffWorks.com
4. PCMech.pair.com
5. PCSupport.About.com

Hardware books--

Upgrading & Repairing PCs by Mueller

Complete PC Upgrade & Maintenance Guide by Minasi

Where to get Drivers--

Windows -- DriverGuide.com
Linux -- Linux-Drivers.org



Example Re-Use Programs

People's Resource Center (www.PeoplesRC.org) Wheaton

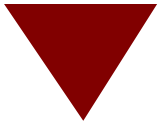
- > 500 mhz +
- > Have given away > 5,000 computers in Dupage Cty
- > 100 / month
- > Microsoft Authorized Refurbisher (MAR)

Free Geek (www.FreeGeekChicago.org) Chicago

- > P-III with 256M ram
- > Linux (Xubuntu)

ACCRC (www.accrc.org) Berkeley CA

- > Linux (Suse or Ubuntu)
- > Give away 5,000 to 10,000 / year



questions...

