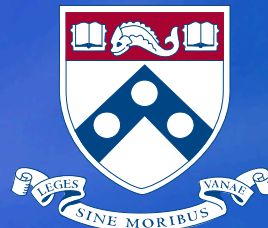# MacIT Conference M264
OS X Migration Case Study: We've Made It - Now What?
Strategies, Tactics, & Methodologies for Using Mac OS X in the Enterprise

Macworld Conference & Expo
San Francisco 2005

John Mulhern III

Senior IT Project Leader
Technology Support Services
Information Systems & Computing
University of Pennsylvania
mulhernj@isc.upenn.edu

LEGES SINE MORIBUS VANAE

Agenda

- Introduction, agenda, & questions for you
- Thumbnail description of enterprise computing at Penn
- Operating system migration strategies & philosophies
- Where are we now?
- Migration observations & lessons learned
- Issues that *still* keep me up at night
- Web sites, credits, & questions

Know Your Audience…

- How many of you are with for-profits?
- How many of you are with non-profits?
- Central IT, local IT, or ?
- How many of you are using Mac OS X as your primary operating system?
- How many of you are with an enterprise that has or had a Mac OS X migration strategy?
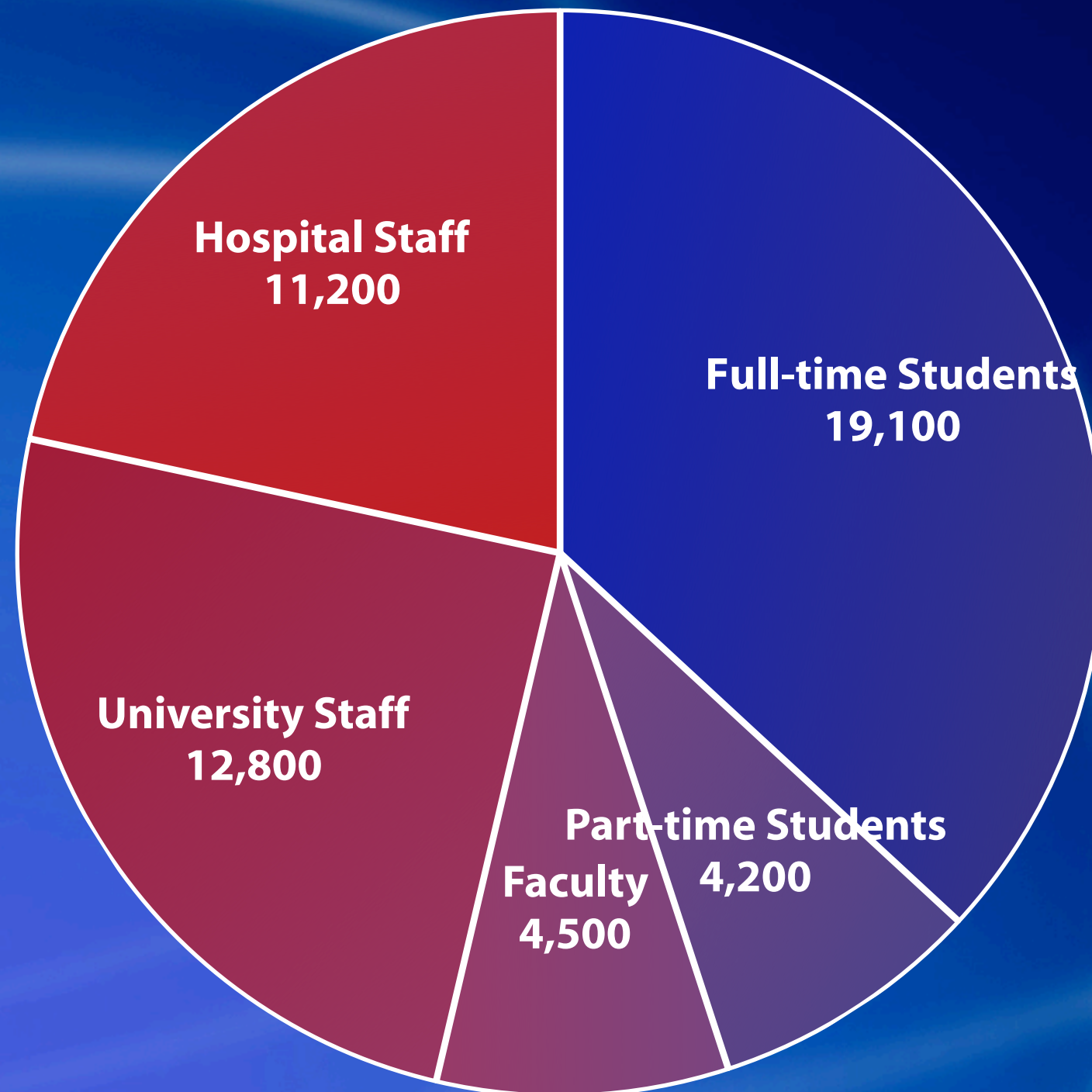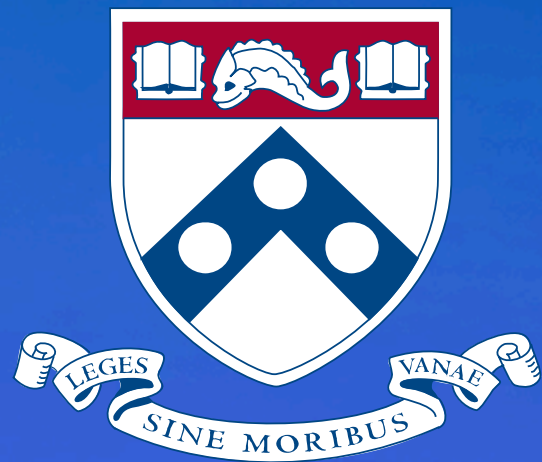
Defining The Enterprise

- A Definition:
  - "A business, generally a large one. In the computer industry, the term is often used to describe any large organization that utilizes computers. For example, an intranet is an example of an enterprise computing system."
- This is a pretty wide definition (all definitions of enterprise seem to be), but we'll work with it

A Little Context —
The Enterprise I Come From

- Highly decentralized computing environment since 1996
  - Individual Schools & Centers make most of their own purchasing & support decisions under a theory developed by the Wharton School of Business called 'responsibility center management'
  - Penn as a whole is aggressively multi-platform
- Central IT works to enable individual Schools & Centers to achieve their specific information technology needs & goals
- Many of our vendors, including Apple, consider us to be a very 'corporate' higher education institution
- Fiscal year begins July 1

A Little More Context — Chart

Pie chart segments:
- Full-time Students 19,100
- Part-time Students 4,200
- Faculty 4,500
- University Staff 12,800
- Hospital Staff 11,200

LEGES SINE MORIBUS VANAE

Yet More Context — Statistics

- 65,300 affiliated personal computers (approximately 1.26 per user & rising)

- 15,000 affiliated Macintoshes (~23% of total & steady)

- 3 to 4 year product life cycle

- Over 720 information technology professionals, of which approximately 350 are providing local support, giving us an average direct support ratio of about 80:1 for faculty & staff

- On-campus undergraduate student support is provided by 8 information technology professionals, 25 student managers, & about 175 information technology advisors (ITAs)

Time Out For Some Quick Definitions…

- Operating system transition
  - Major change in technology — i.e. from Mac OS 8.x/9.x to Mac OS X.x
- Operating system update
  - Relatively minor update in technology — i.e. from Mac OS X version 10.2.x to Mac OS X version 10.3.x
- Operating system patch
  - Minor update/bug fix — i.e. from Mac OS X version 10.3.5 to Mac OS X version 10.3.6
- This is often tough for non-Mac OS folks in the enterprise to parse, because Microsoft does it very differently…

Operating System Migration Philosophies & Strategies

- Make it an easy decision to migrate
- Cover all supported applications
- Give relevant & useful advice on whether to upgrade from the current operating system or start from scratch
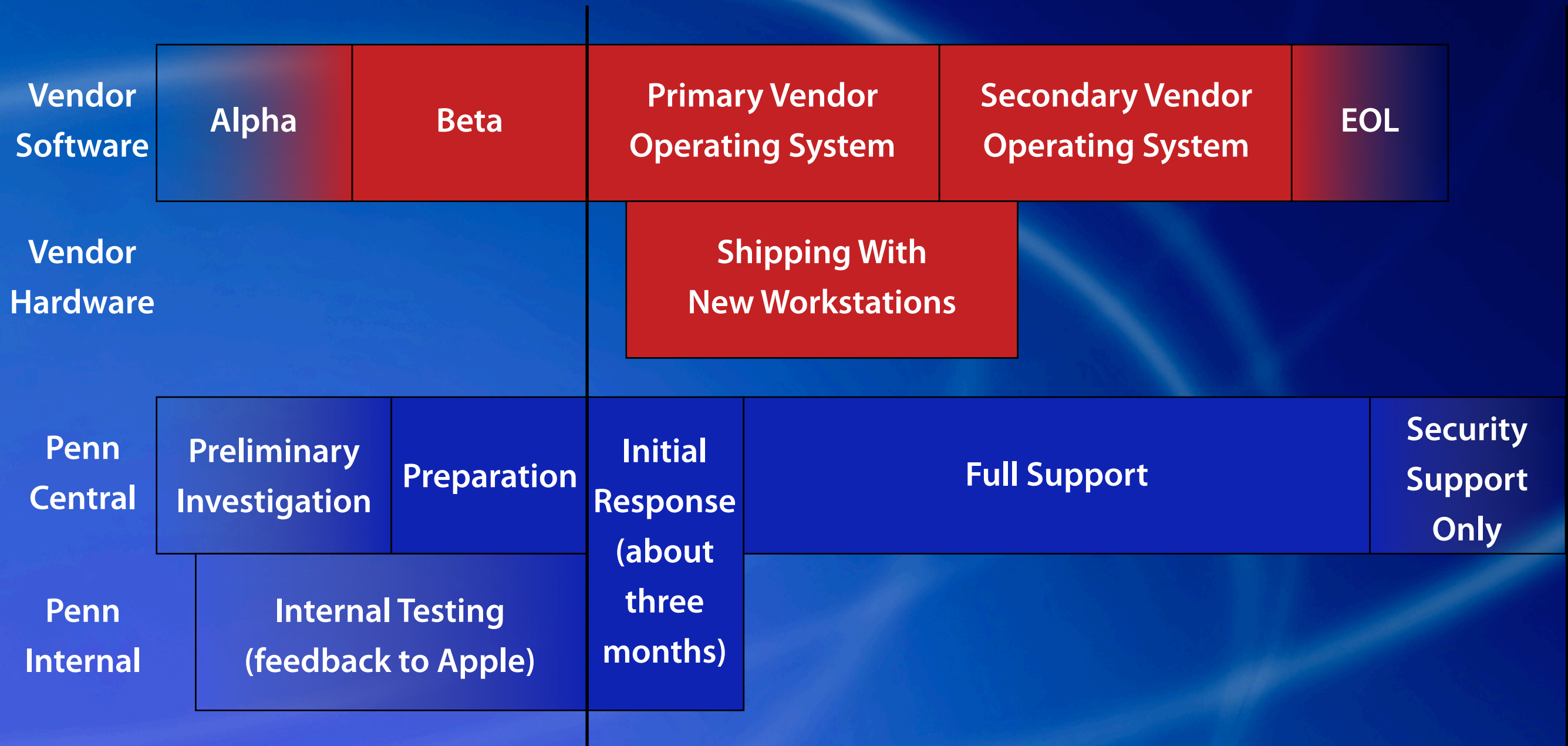
Operating System Migration Philosophies

- Operating systems are just operating systems
- Definition:
  - "Software that controls the operation of a computer and directs the processing of programs (as by assigning storage space in memory and controlling input and output functions)" - Webster's, 1961
- Doesn't sound that wild or new, does it?

Operating System Migration Philosophies

- Don't get caught up in either the glamorous features or the spectacular bugs
- In the end, it's the applications that matter
  - Nobody will care about Mac OS X version 10.3.x in several years, but they will care about Photoshop 9 & Word 12, & whether they work…

The Penn Operating System Life-Cycle

Vendor Software	Alpha	Beta	Primary Vendor Operating System	Secondary Vendor Operating System	EOL
Vendor Hardware			Shipping With New Workstations		
Penn Central	Preliminary Investigation	Preparation	Initial Response (about three months)	Full Support	Security Support Only
Penn Internal		Internal Testing (feedback to Apple)			

An Operating System Update Triad

- 1) Affected support providers should investigate the update on release
- 2) Updated enterprise-specific installers should be provided as soon as possible
  - Updated application & security installers for Panther were provided the week of release

An Operating System Update Triad

- 3) 'Normal' users should wait for an approximately three month 'cooling off' period
  - This was our statement for Panther:
    - "Information Systems & Computing (ISC) will support Mac OS X version 10.3 for its clients only on new Macintoshes that ship with Mac OS X version 10.3 pre-installed. ISC strongly recommends that all other users adopt a 'wait and see' approach, continuing to use previous versions of the Mac OS (including Mac OS X versions 10.1.5 and 10.2.x) until the initial bugs in Mac OS X version 10.3 are identified and fixed."

Enterprise Support Of Mac OS X Releases

	Mac OS X version 10.0.x	Mac OS X version 10.1.x	Mac OS X version 10.2.x Jaguar	Mac OS X version 10.3.x Panther	Mac OS X version 10.4.x Tiger
Apple Released	March 2001	September 2001	August 2002	October 2003	*1H/2005*
Penn Supported	July 2001	January 2002	November 2002	January 2004	*2H/2005*
Penn Recommended	**never**	July 2002	July 2003	July 2004	*2H/2005*
Penn Retired	July 2002	July 2004	*July 2006*	?	?

OS X Migration Case Study: We've Made It - Now What?
Macworld Conference & Expo San Francisco 2005

Ensuring Enterprise-Wide Compatibility

- Test, test, & test again

- To help with consistent, repeatable testing, we have what we call a Standards Lab with representative workstations & operating systems from the last four years

- The Standards Lab has five Power Macintoshes (G4s & G5s), each one loading multiple representative versions of the Mac OS ranging from 9.1 to 10.3.6

- Standards Lab resources can be requested by any IT professional at the University

Dealing With 'Laggard' Applications…

- When you roll new hardware, make sure that it works with your aging but essential application software
  - Virtual PC 6.x on the PowerMac G5 is an immediate & painful example that comes to mind
- When an application begins breaking, develop a plan of action to deal with it until it is either replaced or revised

Sometimes You May Have To Spend A Bit…Part I

- Qualcomm Eudora 5.x/6.x
  - Added Kerberos v.5 support
  - Slowly but steadily implemented effective parsing between SSL & Kerberos on servers that support both
- dataComet-Secure X
  - Added Kerberos v.5 support
- Assignments 2.1
  - Kerberized & 'Cocoa-ized' internally written IP assignment application
  - Most IP addresses at the University are still manually assigned — one of the costs of being an early adopter!

Sometimes You May Have To Spend A Bit…Part II

- NewsWatcher was a two-step process
  - We hired Vanteon to Kerberize the classic version of NewsWatcher 2.2.2 to 2.2.2up
  - When 2.2.2 was sucessfully Kerberized, we helped Simon Fraser Kerberize MT-NewsWatcher 3.4

Sometimes You May Have To Spend A Bit…Part III

- When in doubt, ask the developer!
  - Symantec didn't have a corporate installer for Norton AntiVirus 9.0.x
  - This caused the incredibly annoying 'you must subscribe' message after a year
  - Our users have use as long as they are affiliated with us
  - We made our feelings known — now there is a corporate installer, & it didn't cost us any extra

Controlling Costs:
Site-Licensed Software Upgrades

- Worked with Apple to implement a version of the Apple Maintenance Program for Penn for Mac OS X version 10.2.x/10.3.x

  - Departments purchasing licenses have the right to the Mac OS during the three year term of the agreement & will exit the program with the perpetual rights to whatever version of the Mac OS happens to be shipping at that time

  - Our minimum system requirements (not Apple's) for 10.2.x are G4 or G3 400 MHz & above, 256 MB RAM

Our History Of Mac OS X Installers

	Carbon Installers	Mac OS X.x-Specific Installers
FY 2002	Mindvision InstallerVISE **7.3** (NAI Carbon, Fetch, etc.)	
FY 2003	Mindvision InstallerVISE **8.0.2** (NAI Carbon, Fetch, etc.)	
Jaguar Release		Mindvision InstallerVISE **8.0.2** (NAI X)
FY 2004	Mindvision InstallerVISE **8.2** (Eudora, Fetch, Kerberos, etc.)	Mindvision InstallerVISE **8.2** (NAI X, NAV 9.x, etc.)
Panther Release	Mindvision InstallerVISE **8.3** (Fetch, Kerberos)	Mindvision InstallerVISE **8.3** (NAI X, Eudora)
FY 2005	Mindvision InstallerVISE **8.4** (Fetch, Kerberos)	Mindvision VISE X **1.2.1** (NAI X, Eudora, Mozilla, etc.)
FY 2006		*Mindvision VISE X **1.2.1** (NAI X, Eudora, Mozilla, etc.)*

Training Is Part Of A Migration, Part I

- Training's been tough to get a handle on…
- We've been sent about 30 local support providers to the various Apple courses for IT Professionals
- The most recent versions are:
  - Mac OS X Help Desk Essentials v10.3 (3 days)
  - Mac OS X Server Essentials v10.3 (4 days)
  - System Administration of Mac OS X Clients v10.3 (5 days)
- We find that these courses are not a great fit for our highly varied environment

Training Is Part Of A Migration, Part II

- For users, training (so far) has tended to be at the local level & somewhat informal
  - We've seen no push in our decentralized environment for centralized user training
- It's proven problematic to find application-specific Mac OS X training, even for very popular applications (i.e. Excel, Word)
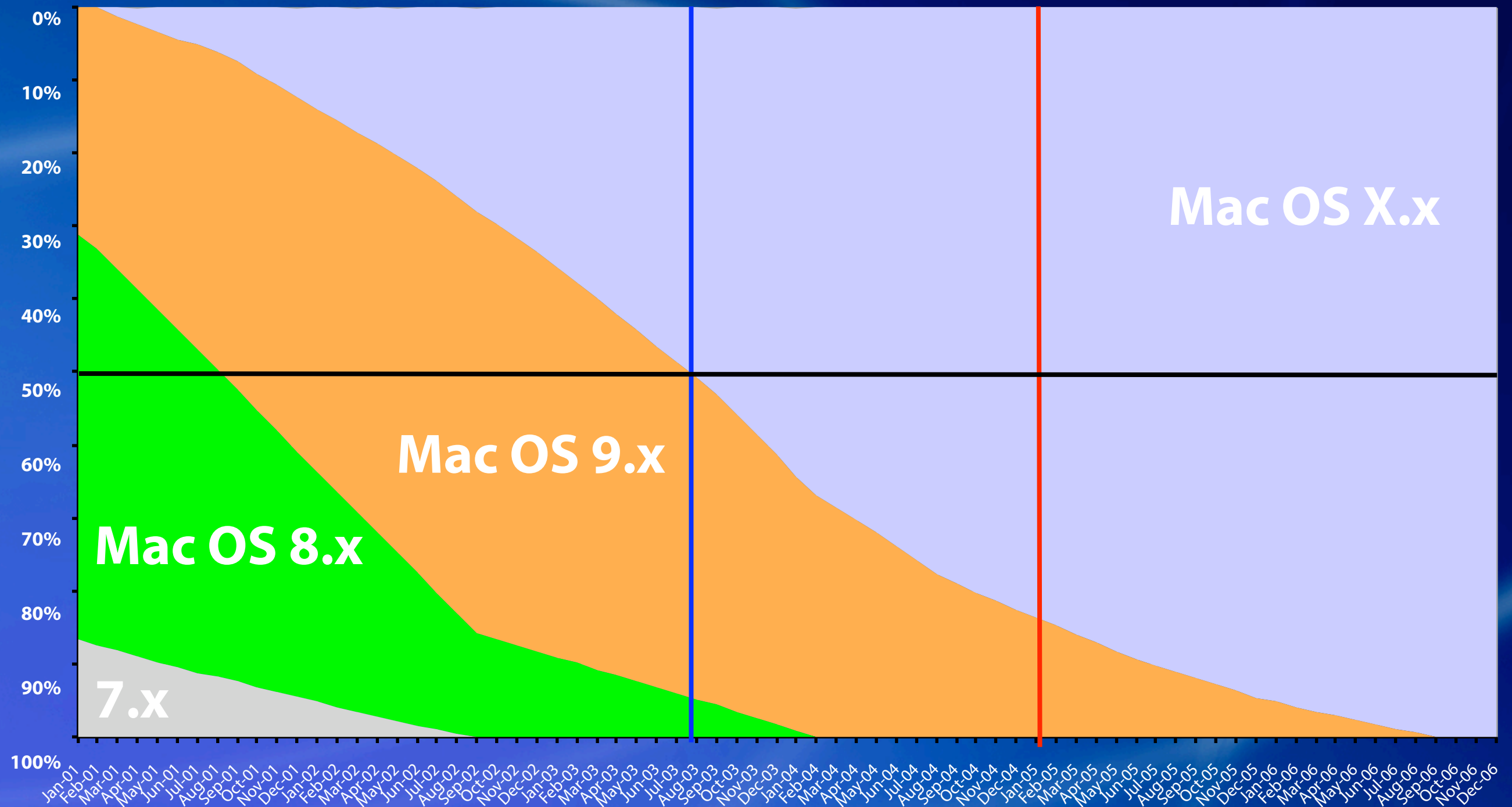
Security Actually Exists In Mac OS X…

- Basic security (real login passwords for "normal" users) is an issue for the first time in the Mac OS
  - If they flat out forget the password, it's often a real problem
  - The same issues we've had with Windows NT Workstation, Windows 2000 Professional, & Windows XP (Professional & Home) users for several years

So, Where Are We Now?

- Enterprise desktop operating system migrations are slow on any platform
- That said, we feel pretty good about where we are…
- …about 85% of our Mac OS installed base is currently running some version of Mac OS X
- 73% are running Jaguar or better
- Peak of change was in Q4/2003 & Q1/2004, when we were migrating about 325 users a month

Five Years Of Mac OS Percentages At Penn

Mac OS X.x

Mac OS 9.x

Mac OS 8.x

7.x

OS X Migration Case Study: We've Made It - Now What?
Macworld Conference & Expo San Francisco 2005

Question:
How Do We Know Our Numbers?

- Data comes from:
  - Apple
  - Surveys
  - Port scans/download counts (useful port scans are now less frequent due to security concerns)
  - University computer store (Computer Connection)
  - University purchasing department (Purchasing Services)
- This data is still not nearly as complete or as accurate as we'd like it to be (hopefully most of you have more complete data)
  - Still, hindsight tells us that we've rarely been off more than 2%

Migration Observations & Lessons Learned

- Privileges for 'normal' users
- Implementing Apple-centric technologies
- Enterprise-level Apple & third-party tools
- Hardware recommendations for FY 2005

What Kind Of Privileges For 'Normal' Users? Part I

- Two schools of thought…
- 1) Lock 'em down!
  - Keeps users from blowing away their workstations, most of the time
  - In many cases, doesn't let users install, configure, or update
- 2) The workstation is 'wide open'
  - Lets users do such wonderful things as throwing out various acutely relevant folders
  - Of course, they also have the freedom to install software as needed

What Kind of Privileges For 'Normal' Users? Part II

- Some local support providers deploy laptops with full administrative access, while locking down the desktops
- Again, past painful enterprise experience with Windows NT Workstation, Windows 2000 Professional, & Windows XP (Professional & Home) is often valuable here

Implementing Apple-Centric Technologies: ColorSync

- Tough to implement accurate color across the cross-platform enterprise except in the most basic way

- On the departmental level there are higher returns with significant cost savings when what people print actually resembles what they see on their displays

  - Quicker finished projects

  - Less (expensive) reprints

- A quick & dirty return: do your users have the appropriate factory display profile selected is System Preferences? It usually helps…

Implementing Apple-Centric Technologies: Rendezvous

- Newer printers like the Hewlett-Packard LaserJet 4200 & 4300 support Rendezvous…

- …which yields to problems like many printers showing up in the same Rendezvous list when you've got a large local zone
  - hp LaserJet 4300 (00:…:47)
  - hp LaserJet 4200 (00:…:33)
  - hp LaserJet 4300 (00:…:65)
  - hp LaserJet 4200 (00:…:21)

- You mean you don't know all your printer's MAC addresses by heart?

Enterprise-Level Apple Tools & Paid Support

- Apple Remote Desktop 2.x
  - Slowly but surely getting there…a *significant* upgrade from 1.x
- Apple OS X Server Admin Tools 10.3
  - Note that these tools work fine on Jaguar Server
- AppleCare Help Desk Support
  - Can be a gateway to better support, but is not necessarily an end-all, be-all
  - Far superior to what it was several years ago

Enterprise-Level Third-Party Tools

- They do exist!
- LANDesk Management Suite 8.1
  - Being separated from Intel has done wonders for their Mac OS support…
- Netopia Timbuktu Pro 7.0.3 for Mac OS
  - Still the most flexible of the remote control applications
  - Often used to support remotely located senior administrators
- Thursby ADmitMac 2.0
  - Allows realistic (as opposed to theoretical) Active Directory integration

Hardware Recommendations For FY 2005

- At Penn, I write yearly hardware & OS recommendations for both Mac OS & Windows, with quarterly addendums
- These recommendations are for new desktop workstations to meet our 4 year life cycle
  - 1.8 GHz PowerPC G5
  - 1.0 GB of RAM
    - Realistically, we'd be happy with 768 MB, but past experience suggests that any RAM specification that isn't a multiple of 2 won't work
  - CD-RW/DVD-ROM 'combo' drive
    - In general, we're not sold on the SuperDrive for general enterprise deployment

Migration Issues That
Still Keep Me Up At Night

- Apple & the enterprise are still an uncomfortable fit
- Mix of 'Classic' Mac OS & UNIX is still an issue
- Change comes to the web browser
- Oracle financials are still not native
- Current state of disk utilities & desktop publishing
- Rapid aging of early Mac OS X releases

Apple & The Enterprise
Are Still An Uncomfortable Fit, Part I

- Disclaimer: I'm not interested in turning this into a gripe session

- Moreover, all of these conditions can be fixed!

Apple & The Enterprise
Are Still An Uncomfortable Fit, Part II

- Dealing with other enterprise vendors does not always place Apple in a beneficial light
  - No road maps to retirement of support for an operating system
  - Training is sparse & rarely free even when making it easily available would benefit Apple
  - 3-year AppleCare should be standard on all professional workstations
  - In general, Apple is not willing to expend the resources that other R&D heavy vendors (i.e IBM) are willing to

Apple & The Enterprise
Are Still An Uncomfortable Fit, Part III

- Any kind of enterprise security strategy for Mac OS X is completely reliant on having a recent version (right now, 10.2.8 or above).

- Here's the offending paragraph, from Apple's web site:

    - "Be sure that you are running the latest version of system software. Apple will release security updates from time to time, and having the latest available system software version should improve the security of your system. Check the Security Updates page for more information."

- In comparison, the oft reviled operating system software vendor from Redmond, WA is still releasing the occasional update for Windows NT

OS X Migration Case Study: We've Made It - Now What?
Macworld Conference & Expo San Francisco 2005

Apple & The Enterprise
Are Still An Uncomfortable Fit, Part IV

- Sometimes, Apple's of what enterprise means seems to be restricted to server software & hardware

- This is not a full enterprise story!

- The number six result when you search for 'enterprise' on the Apple site relates to Star Trek icons…

Mix Of 'Classic' Mac OS & UNIX Is Still An Issue

- Value of folks who 'speak' both languages well is high, but they're hard to retain
  - We do have a couple of these folks…
- It's scary, but application developers themselves often seem to be as confused as we are about some of the specifics

Change Comes To The Web Browser

- As of July 1st, 2004, Safari 1.x became our supported & recommended web browser for Mac OS X.

- We also support Mozilla 1.7.3

- Microsoft has announced that they will no longer do functional revisions of Internet Explorer for the Mac OS

  - Little noticed among Mac users who are convinced that Microsoft is *always* out to get them is that Microsoft has also announced that there will also be no new version independent version of Internet Explorer for Windows

  - In other words, there will be no executable installer that will work for multiple versions of Windows

Oracle Financials Are Still Not Native

- Making the Oracle Financials work on Mac OS X with SSL requires an instance of the 11i Financials deployed with the Forms Listener Servlet

- Unfortunately, the Forms Listener Servlet can not be used as the Developer version we are using for our forms/reports is patch set 6 while the level that is required for the Servlet to work is patch set 7

- We anticipate moving to patch level 7 (or further) at some point, but do not have any concrete plans for when this will happen

Some Other Considerations

- Functionality with Oracle-based central administrative systems (financials, etc.)
  - Tested & validated Virtual PC 6.x for G4s as an interim solution
  - Working on MRJ for Mac OS X (high hopes for a native client)
  - Explored & rejected Citrix middleware solution
  - We'll talk more about this later…

Oracle Financials On Mac OS X

Internet Explorer 5.2.3 **Mozilla 1.7.3** **Safari 1.x**

JDK 1.4.2

Forms Listener Servlet

Forms Designer

Oracle11i Financials

Oracle9i Database

Disk Utilities, Part I

- After almost 1 year, Symantec finally released a Mac OS X compatible version of Norton SystemWorks

- After almost 2 years, Symantec finally released a fully Mac OS X compatible version of Norton SystemWorks

- After over 2 years, Alsoft finally shipped a fully Mac OS X compatible version of Disk Warrior

- After almost 3 years, Micromat finally shipped a fully Mac OS X compatible version of TechTool Pro

Disk Utilities, Part II

- This is not cause for great confidence…
- …if something goes horribly wrong in Mac OS X, local support providers are far more likely to do a complete rebuild, which is more of the normal Microsoft OS process
- This may be a sign of operating system maturity, but I don't have to like it

Desktop Publishing is Not All There

- Most Adobe-centric (Photoshop, InDesign, Illustrator, etc.) & Macromedia-centric (Dreamweaver, Flash, FreeHand, etc.) folks have already migrated
  - Some of these applications (InDesign, Photoshop, etc.) are in their second or third major Mac OS X revision
- Quark XPress 6.x is not exactly setting the relevant portions of the enterprise (or the rest of the world) on fire
  - Many Quark-centric portions of enterprises didn't migrate until late 2004 at the earliest
- Advanced printer drivers, especially for unusual or high-end printers, are still not completely functional & capable

Rapid Aging Of Early Mac OS X Releases

- About 12% of our users are still running 10.1.x, mostly because of the upgrade cost
    - We expect this percentage to fall to 4% by the end of this fiscal year
- 10.1.x has proved problematic to support
    - As of July 1, 2004, we discontinued centralized support of 10.1.x for everything except antivirus (Norton AntiVirus Corporate Edition) & secure sign-on (Kerberos)
    - In September, 2004, we discontinued support for Kerberos when MIT announced two security exploits that they were not going to fix

Some Apple Web Sites

www.apple.com/macosx/

www.apple.com/server/

www.apple.com/server/resources/

www.apple.com/support/products/helpdesk.html

train.apple.com/

Some Other Web Sites

displaysbysony.com/display/artisan/home.htm

web.mit.edu/ist/topics/macos/index.html

www.macosxlabs.org

www.macwindows.com

www.microsoft.com/mac/

www.versiontracker.com/macosx/

Some Penn Web Sites

www.upenn.edu/computing/arch/standards/

www.upenn.edu/computing/arch/standards/desktop-
   current.html

www.upenn.edu/computing/help/doc/os/macosx/

www.upenn.edu/computing/penngetsit/

www.upenn.edu/computing/product/

www.upenn.edu/computing/provider/

Sources, Credits, & Questions

Mark Aseltine, Penn

Peter Bernard, Apple

Christopher Bradie, Penn

Darlene Dziomba, Penn

Rachael Jones, IDG

Paul Kent, IDG

Sources, Credits, & Questions

Larry Macy, Penn

Heather Meninno, IDG

Ivelis Mulhern

Kevin O'Connor, MakeColorBehave

Michael Wolk, Apple

MacIT Conference M264
OS X Migration Case Study: We've Made It - Now What?
Strategies, Tactics, & Methodologies for Using Mac OS X in the Enterprise

Macworld Conference & Expo
San Francisco 2005

John Mulhern III

Senior IT Project Leader
Technology Support Services
Information Systems & Computing
University of Pennsylvania
mulhernj@isc.upenn.edu

LEGES SINE MORIBUS VANAE