

Operating Systems and Systems Integration

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Is this a *boring* subject only about the theory of the internal operation of an operating system???

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Is this a theoretical subject?

- Hmm, operating systems: sounds like a theoretical subject
- At university, a lot of theory from a text book
- Are we going to spend lots of time copying from a text book? ...

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NO! This is *practical!*

- This subject aims to provide you with practical skills that you will find useful in your workplace.
- You learn here by *doing*.
- I even understand this subject too!

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Mostly based on Linux

- ... with some comparisons with Windows 2000.
- Aim to support career certification, e.g., Red Hat Certified Engineer, Linux Professional Institute

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So why does Nick love Linux?

- It is free software
- Free as in freedom
- ... also, free as in free beer
- It works really well
- It can “glue” many other things together
- Like Lego; can build anything I want

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More reasons why Nick Loves Linux

- Built on cooperation
- Great for Internet applications
- Only fully compliant TCP/IP
- We can see and modify the source code to any of it that we want to
- Based on standards
- Uses open protocols

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Open Standards and Protocols

- What do I mean by “*Open Standard?*”
 - Can freely download the standard, not pay a huge fee just to read it
 - Agreed to by open discussion: barrier to participation is lack of ability, not lack of money!
 - Examples of open standards:
 - TCP/IP, http, SSH, ftp, DNS, DHCP, Perl, LDAP, SMTP, TLS, many, many more

Embrace and Extend

- Many companies use “standards”
- But change them a little bit to give a competitive advantage
- Example: Kerberos
 - Developed at MIT as open source software,
 - Improved by programmers all round the world
 - Used by Microsoft for authentication in Active Directory
- Microsoft changed the interpretation of one small part of the protocol
- Effect: all Kerberos clients can use a Microsoft Kerberos server
- But Microsoft clients will refuse to work with anything except a Microsoft server.

Standards that are not so open

- Many standards are developed in a less open way
- Example: the WEP protocol, used to provide “privacy” for wireless LANs
- Developed behind closed doors, announced to the public
- Cracked almost immediately: a bad design
- Not open to inspection and peer review

Other “Industry Standards”

- Consider the Microsoft Office suite
- The layout is a secret
- OpenOffice.org has developed an office suite that can read and write Office documents
- Very hard work:
 - a moving target
 - Much effort by MS to make them very hard to read, and even harder to write

What is “Systems Integration”?

- It involves combining products from many companies into a system
- Other words: *interoperation, compatibility*
- Very important: it's not enough just to learn one product

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Monoculture (One supplier)

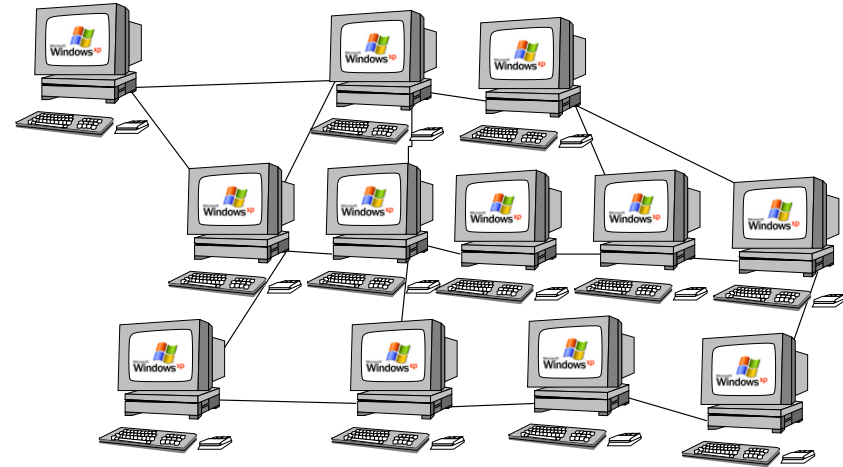
- Advantages:
 - Fewer system integration problems
 - Less skill required
 - All training from the one vendor
- Disadvantages:
 - Vulnerability in one is a vulnerability in all (e.g., So.Big, Blaster, SirCam, NIMBDA worms, Outlook viruses)
 - One supplier cannot make everything:
 - E.g., Cisco sell more routers and switches than Microsoft

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Why From Many Companies?

- Why not just from one supplier?



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How Best to Integrate? Standards

- Using *Open Standards* that are free of patents and other restrictions on use
- ... But every vendor says they support the standards!
- Some standards are more open than others!

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So what answers are there?

- Free software supports open standards
- So open, you can read the source code and see how it works!
- You can even change it to suit your needs, and if you find problems, you can fix them!
- Aim for interoperation, not for exclusion or market benefit

Samba — Systems Integration

- Samba allows a Linux or Unix or Macintosh machine to talk with Windows
- and the other way round
- Free Software
- A Linux machine can be an NT-4 compatible Primary Domain Controller
- Can also be an AD member
- Very stable, high quality
- Used by many companies to interoperate with Windows

Practical: 60 hours of laboratory workshops!

- We start this week!
- So what will we do?
- In the first class, we partition hard disks
- . . . then install Linux.
- See you there!