# SMB – a protocol example

… of which one implementation is SaMBa

David Morgan

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# SMB

- "Server Message Block"
- an application layer protocol
- implements file ("resource") sharing
- built in to Windows

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## SMB historical lineage

- from early work by IBM, 3Com, Intel, Microsoft
- the native file-sharing protocol in Windows, since Win95
- fueled by market dominance of Windows
- latter-day version is CIFS (Common Internet File System)

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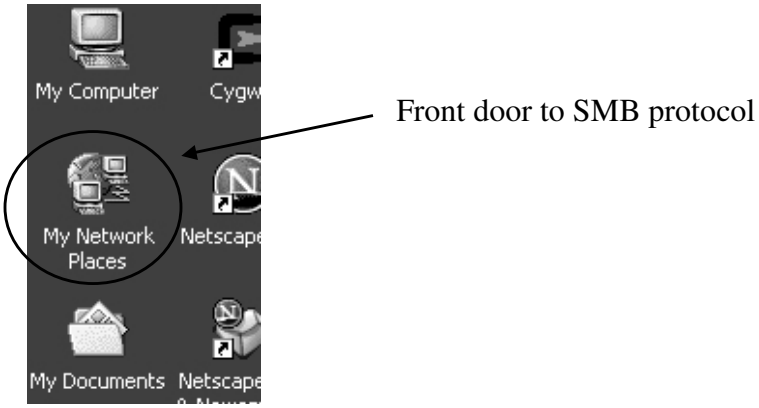
## Where can I find SMB?

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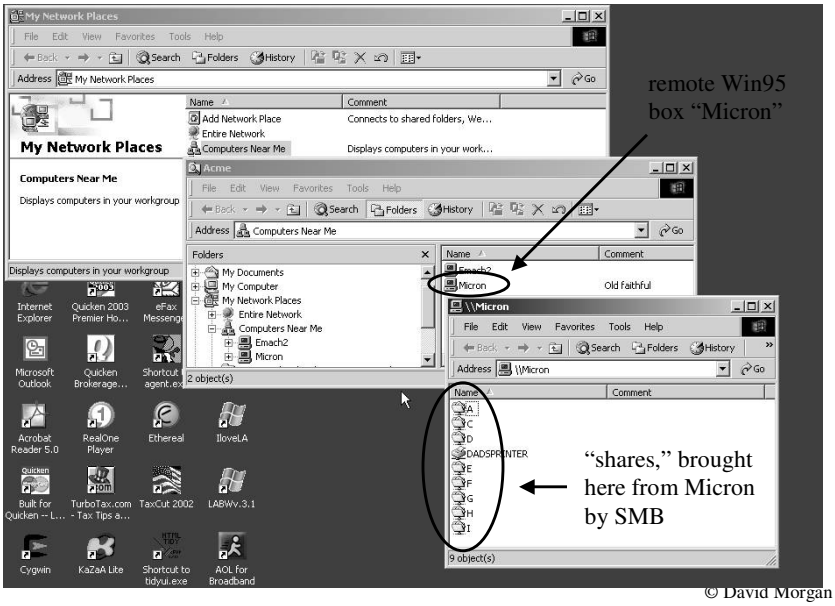
# SMB in action (on machine EMACH2)

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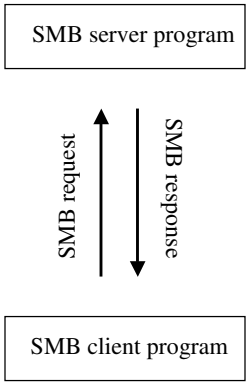
# An SMB conversation

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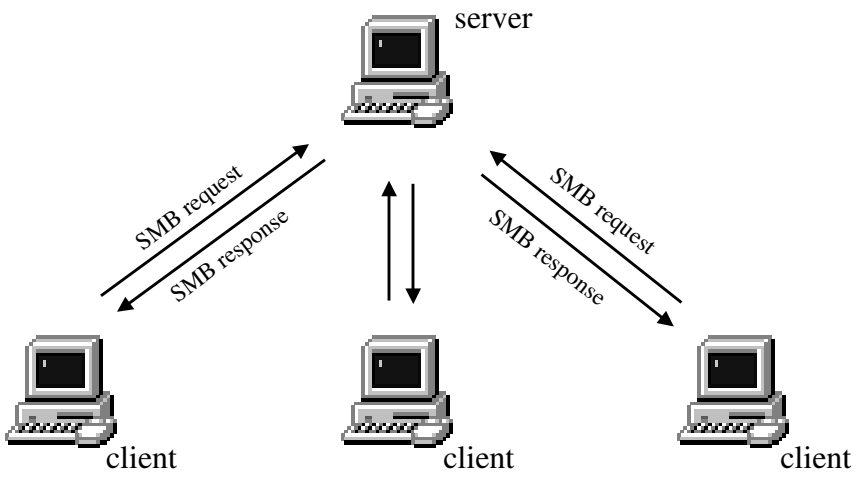
# Typical configuration…

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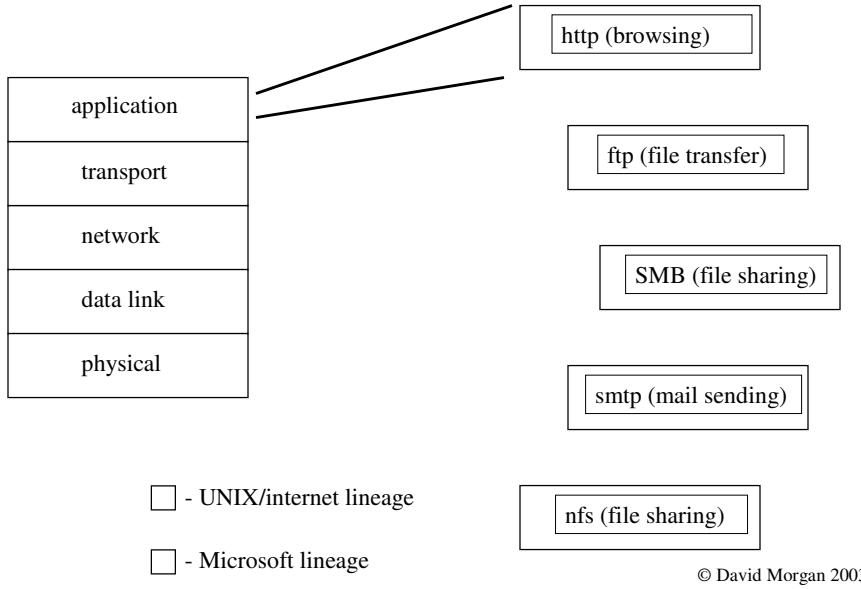
# Application layer protocols

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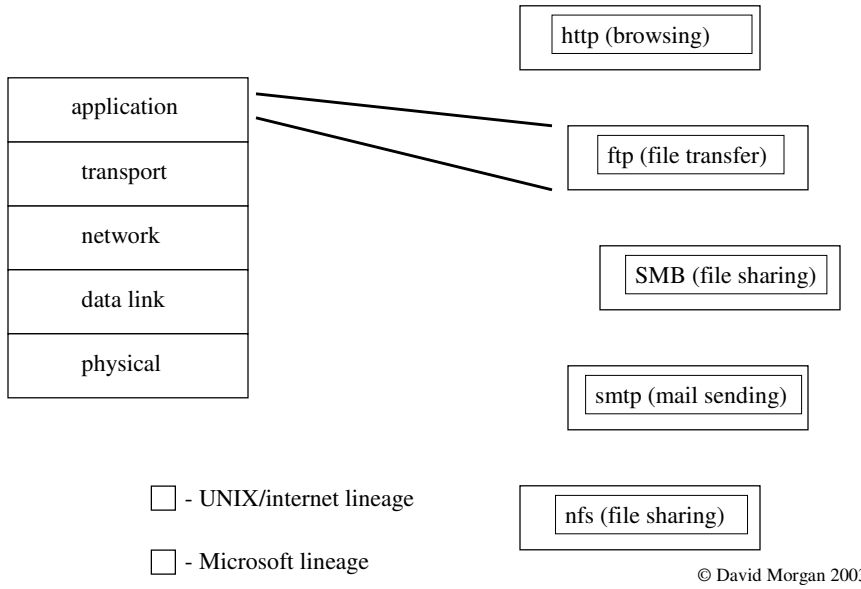
# Application layer protocols

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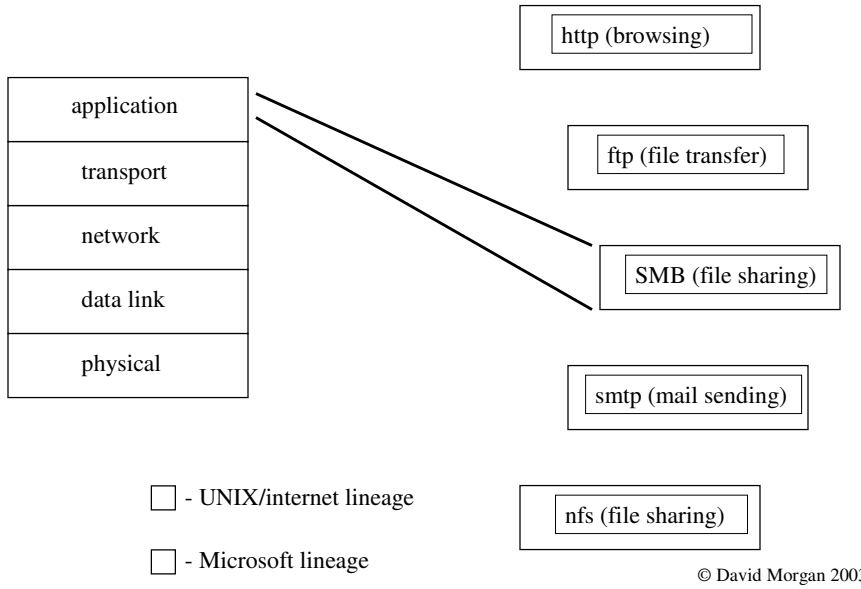
# Application layer protocols

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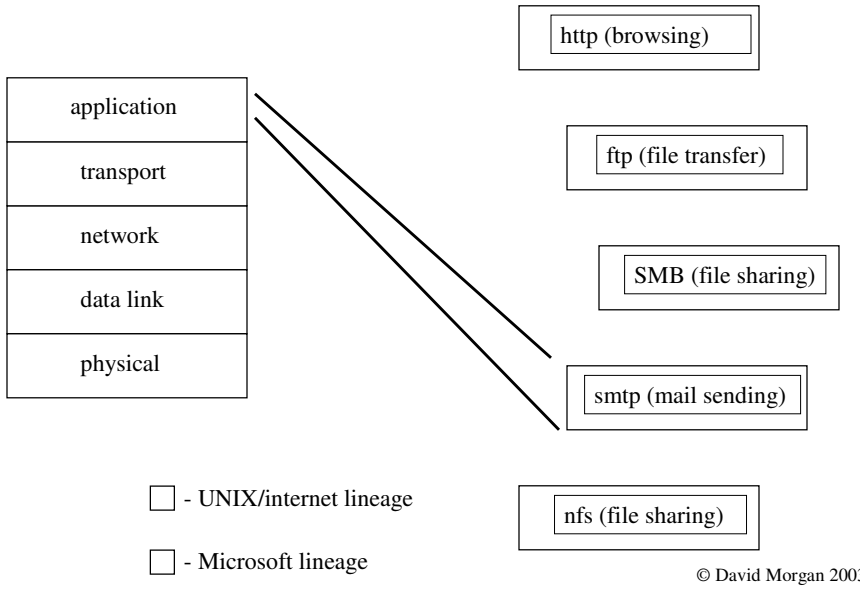
# Application layer protocols

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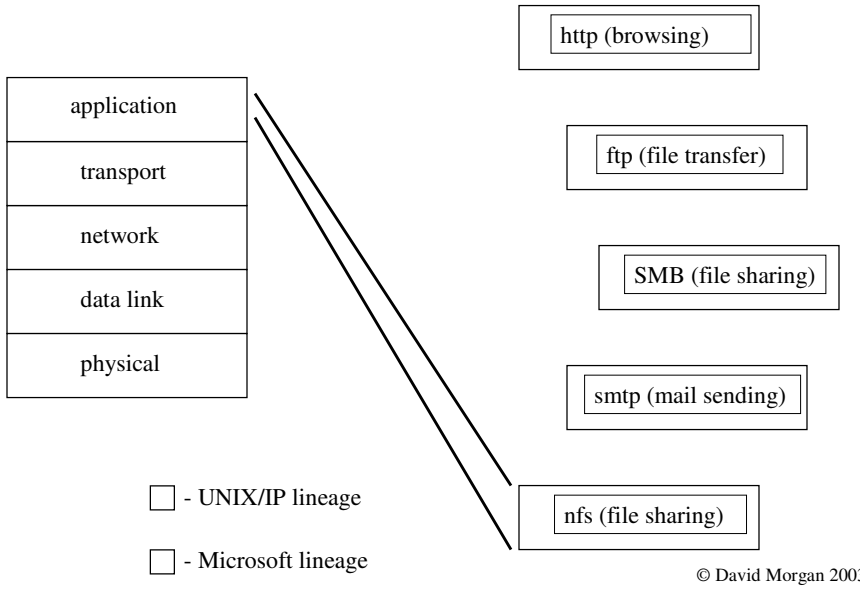
# Application layer protocols

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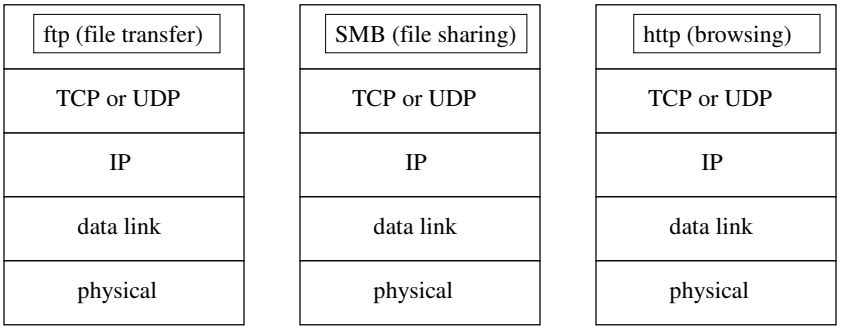
## TCP transport supporting different apps




☐ - UNIX/IP lineage

☐ - Microsoft lineage

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## SMB app supported by different transports

| OSI | | | | | TCP/IP |
|---|---|---|---|---|---|
| Application<br>Presentation | SMB | | | | Application |
| Session | NetBIOS | NetBEUI | NetBIOS | NetBIOS | |
| Transport | IPX[1] | | DECnet | TCP&UDP | TCP/UDP |
| Network | | | | IP | IP |
| Link | 802.2,<br>802.3,802.5 | 802.2<br>802.3,802.5 | Ethernet V2 | Ethernet V2 | Ethernet or others |
| Physical | | | | | |

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## SMB operation

- connection established by lower level protocol
  (pre-W2K involves netbios, post-W2K can be straight TCP)
- SMBs negotiate common version level
- client sends user/pass to "log in"
  - server returns a UID (id for user)
- client connects to a share
  - server returns a TID ("tree" id for share)
- client embeds UID & TID in future messages for transparent unimpeded access

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## SMB commands

- SMB has about 75 commands
- in SMB header's a 1-byte command field
- command categories
  - session control
  - file commands
    - create, open, read, write, close, etc
  - print commands
  - message commands

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# Samba and SMB

- Samba implements SMB
- indistinguishable from other implementations
- turns linux box into another windows box from viewpoint of windows boxes

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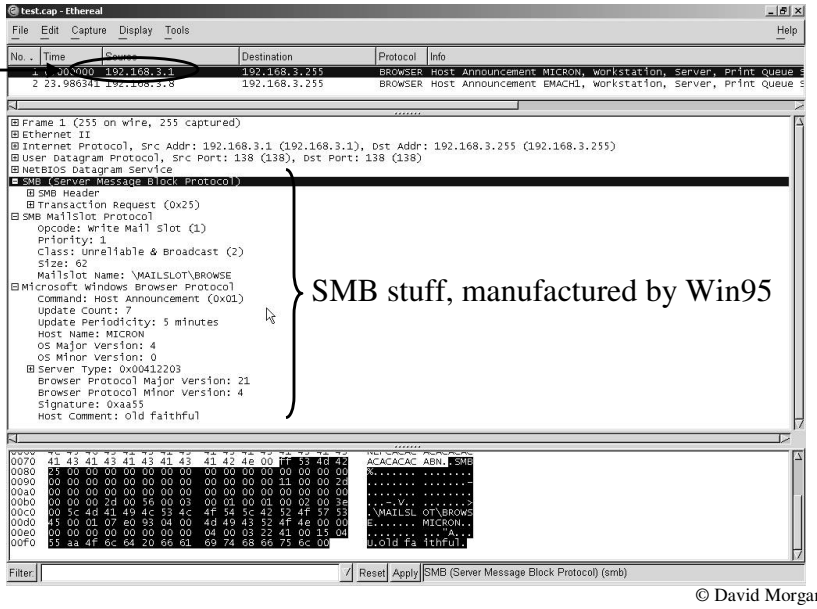
# “Host Announcement” by Win95

Win95 box

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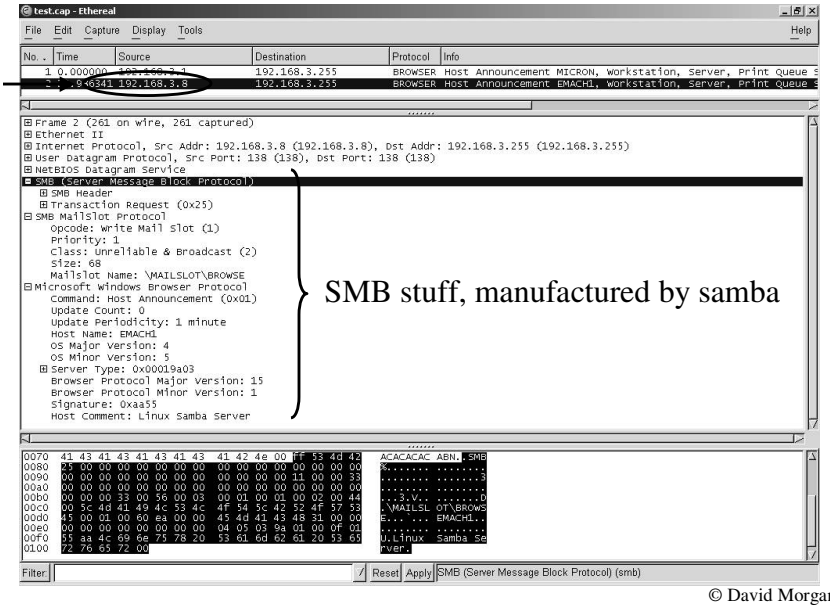
# “Host Announcement” by samba

linux box

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# SMB and nfs

- nfs – network file system
  - originated by Sun Microsystems
- SMB is to Windows as nfs is to UNIX
  - SMB is native file-sharing protocol in Windows
  - nfs is native file-sharing protocol in UNIX
- cross-operability via appropriate drivers
  - samba, for SMB under UNIX
  - Windows Services for UNIX, for nfs under Windows

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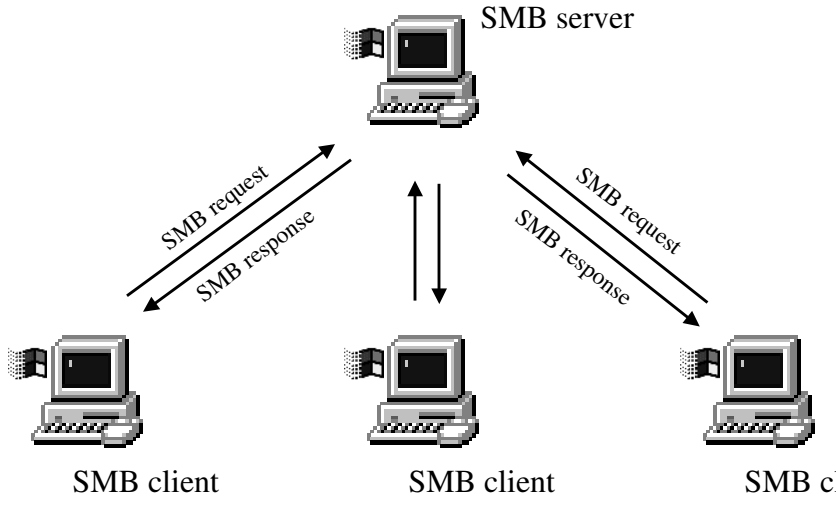
# Pure Windows “native” scenario

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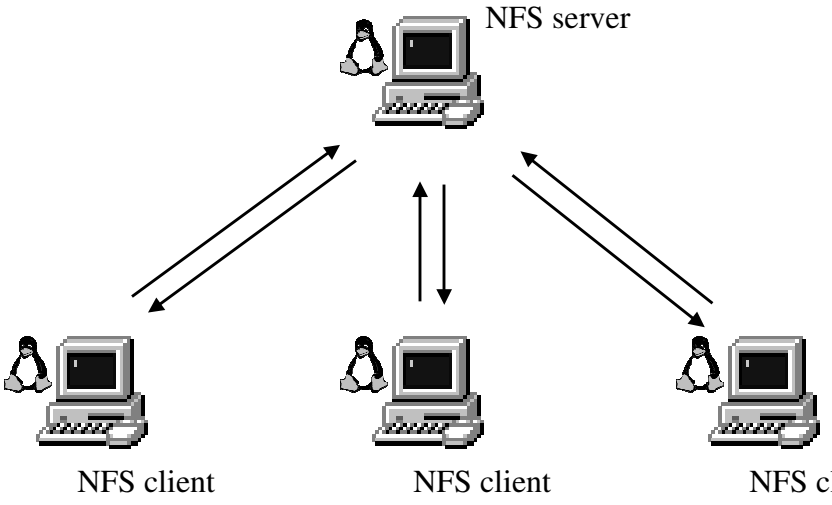
# Pure UNIX “native” scenario

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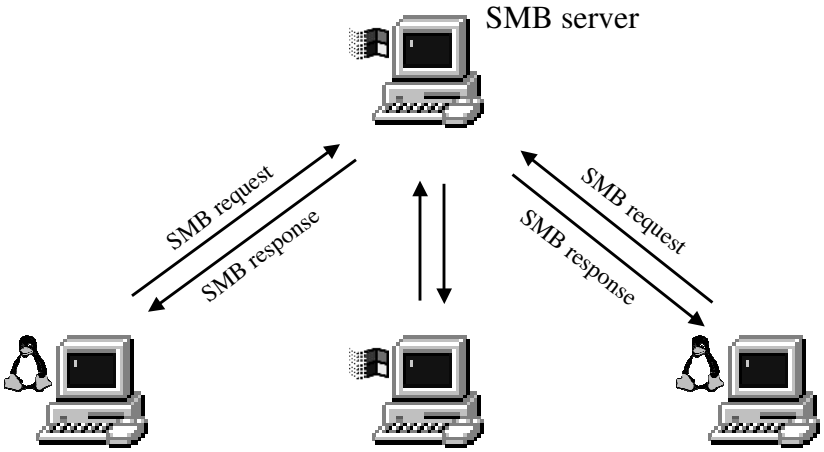
# One “mixed” scenario…

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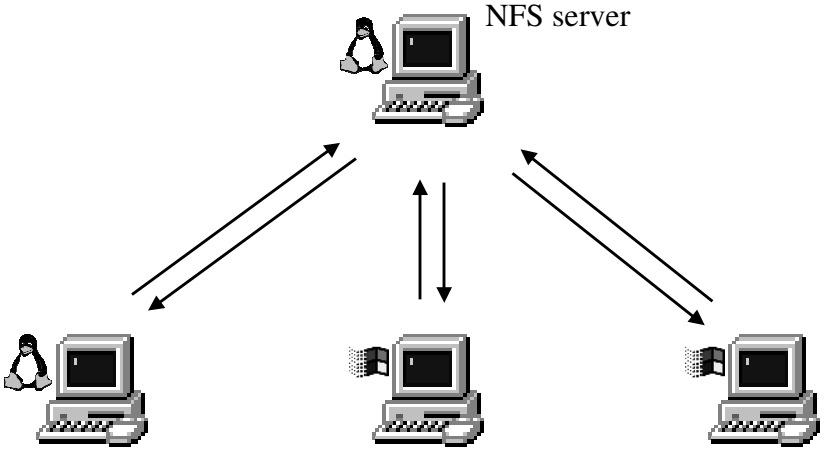
# Another “mixed” scenario…

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# Biblio

- http://us1.samba.org/samba/docs/
- Windows NT TCP/IP, Karanjit Siyan, New Riders, 1998

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