| 2 Data | Packet format, integrity, and address |
| 1 Physical | Physical hardware specification |

Anything above layer 3 or 4 is just a glob or cloud that represents the endpoints in a networked conversation. System administrators, on the other hand, tend to extend the scope of internetworking to include the union of protocols and upper-layer services that result in some meaningful unit of interoperation between the cooperating systems. An example is the set protocols and services required to share files between platform "A" and platform "B". Given that a common set of supported protocols can be found, it is generally possible to build the corresponding set of software services to facilitate resource sharing even between quite dissimilar operating systems. Enter "Samba," which represents just such a suite of software services working in concert with standard protocols like *Server Message Block (SMB)*, *Common Internet File System (CIFS)*, *NetBIOS*, and *Transmission Control Protocol (TCP)* to internetwork UNIX and Windows-based resources (Figure 1.1). Thus the title for this text: *Samba: UNIX and Windows Internetworking*.
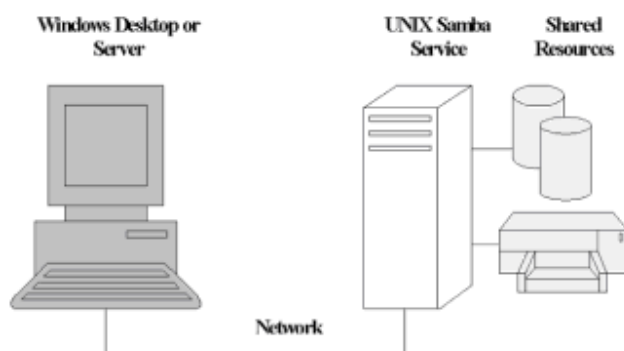

Figure 1.1: UNIX, Windows, and Samba

Why do we speak of UNIX and MS Windows internetworking? It is not uncommon these days to find a growing mixture of UNIX and Windows-based systems coexisting, for better or worse, in most organizations. This might seem a bit odd given that these operating systems are incarnations of somewhat different development histories and philosophies (Table 1.2 and Table 1.3). One is driven from an open systems and standards perspective and the other represents a more proprietary attitude, with a focus on business and personal use requirements. This is not to say that over time each of these operating systems has not had to address all of these issues to compete in the marketplace. Each has its own strengths and weaknesses. This is likely why we are seeing a marriage of these platforms within most enterprises today. One complements the other in addressing the demands of the complex heterogeneous computing environments found in businesses, schools, and even the home.

The importance of seamlessly internetworking these two worlds has gained the attention of traditional "UNIX-only" user groups like the USENIX Association. Over the last few years USENIX has held special symposia dedicated to UNIX and Windows NT