

Microsoft NetworksSMB File Sharing Protocol Extensions Document Version 3.4TIME \@ "MMMM
d, yyyy"µFebruary 29, 1992§

TOC \o 1. Introduction	22. Negotiate Protocol	23. Session Setup and X	34. Tree
Connect and X SMB	45. Locking and X SMB	56. Unlock SMB correction	67. T2FindFirst SMB
68. Extension for Open Modes on the OpenX and T2Open SMBs	6		

§1. Introduction This document is meant as amendment to the existing SMB documents and as such does not discuss the SMB protocol in general. Refer to Version 3.3 for a thorough description of the protocol. This document only discusses those changes to the protocol required for compatibility with the Lanman 2.1 protocol dialect.

2. Negotiate Protocol 2.1 NegProt Resp SMB The dialects requested for the LM2.1 protocol are "LANMAN2.1" for the OS/2 clients and "DOS LANMAN2.1" for DOS clients. When one of the above protocols is negotiated, a new response is returned to the NegProt SMB. The new response is represented by the data structure below (* indicates change from earlier protocol).

byte	smb_wct	word	smb_index	word
smb_secmode	word	smb_maxxmt	word	smb_maxmux
smb_maxvcs	word	smb_blkmode	dword	smb_sesskey
word	smb_srv_time	word	smb_srv_date	word
smb_srv_tzone*	word	smb_cryptkeylen	*	word
smb_rsvd	word	smb_bcc	byte	smb_cryptkey*
byte	smb_domain[]			

In earlier versions of this protocol smb_rsvd was a dword, and the encryption key length was indicated by smb_bcc. There is a new field, smb_domain, that is a null terminated string that contains the name of the domain that this server is a member of. With the addition of this field, smb_bcc now represents the total bytes present due to both smb_cryptkey and smb_domain. To account for this smb_rsvd was split and the new field smb_cryptkeylen was created to represent the length of the smb_cryptkey field.

3. Session Setup and X3.1 SessSetupX Request The SessSetupX request SMB for the LM2.1 protocol has an additional 3 fields. These fields are used to indicate, the name of the domain on which the client was authenticated (smb_domain), the type of operating system the client machine is using (smb_nativeos) and what kind of LAN Manager software the client is using (smb_nativelm). All these fields are null terminated strings and their orientation in the SMB is indicated in the data structure below (* indicates new field).

```

byte  smb_wct      /* value = 10 */      byte  smb_com2
/* secondary (X) command, 0xFF = none */ byte  smb_reh2      /* reserved, MBZ */ word
smb_off2      /* offset (from SMB header) to next cmd (@smb_wct) */ word  smb_bufsize
/* the consumers max buffer size */ word  smb_mpxmax /* actual max multiplexed pending
requests */ word  smb_vc_num /* 0 = first only, non zero - additional VC number */ dword
smb_sesskey /* Session key (valid only if smb_vc_num != 0) */ word  smb_apasslen /* size
of account password (smb_apasswd) */ dword smb_rsvd      /* reserved */ word  smb_bcc
/* minimum value = 0 */ byte  smb_apasswrld[*] /* account password (* =
smb_apasslen value) */ byte  smb_aname[] /* account name string */ byte  smb_domain[]
/* name of domain that client was authenticated on */ byte  smb_nativeos[] /*
native operating system of client */ byte  smb_nativelm[] /* native LAN Manager type */
Some examples of the smb_nativeos field might be, "OS/2 1.0", "OS/2 1.21", "MS-DOS 5.0", "Unix
BSD 4.0", ... etc. Examples of smb_nativelm field might be, "LAN Manager 2.1", "LAN Manager
2.1", "LAN Server 2.0", ... etc.
3.1 SessSetupX Response The SessSetupX response SMB for
the LM 2.1 protocol contains 2 additional fields. These fields are the servers corresponding
smb_nativeos and smb_nativelm fields. These fields are null terminated strings. Their orientation in
the SMB are indicated in the data structure below (* indicates new field).
byte  smb_wct      /*
value = 3 */ byte  smb_com2 /* secondary (X) command, 0xFF = none */ byte  smb_res2
/* reserved (pad to word) */ word  smb_off2 /* offset (from SMB header) to next cmd
(@smb_wct) */ word  smb_action /* request mode: bit0 = logged on successfully - but as
guest */ word  smb_bcc /* min value = 0 */ byte  smb_nativeos[] /* server's
native operating system */ byte  smb_nativelm[] /* server's native LM type */

```

4. Tree Connect and X SMB4.1 TreeConnX Response The response to the TreeConnX SMB returns 2 new fields for the LM2.1 dialect. With the addition of some new features in various operating systems it has become necessary to differentiate which of these features can be taken advantage of by the consumers on a connection basis. The exclusive search feature of OS/2 1.3 is an example of such features. The smb_optsupp field now returned by the server can be used to determine what if any of these features are available. In addition to this field the smb_nativefs field has been added to help the consumer determine the type of file system this connection is to. The smb_optsupp field is a word of bit masks and the smb_nativefs field is a null terminated string. There orientation is the smb is indicated below (* indicates new field).

```

byte  smb_wct      /* value = 3 */byte  smb_com2
/* secondary (X) command, 0xFF = none */byte  smb_res2      /* reserved (pad to 0) */
word  smb_off2     /* offset (from SMB header) to next cmd (@smb_wct) *//* word
smb_optsupp /* bit mask indicating advanced OS features available */
/* bit0 = 1, exclusive search bits supported */      word  smb_bcc      /* minimum value = 3
*/      byte  smb_nativefs[]      /* native file system for this connection */
Server's that can
support the new search bits defined below will identify themselves by setting bit0 of smb_oppsupp to
1. Note that this allows the server to optionally support these features on a per connection basis. For
servers that negotiate support of the exclusive search bits, the new search bits will be passed along in
the smb_attr field of the Find, FindUnique, Search, Trans2 and FindFirst SMBs. This change will not
be further documented individually later in this spec. All these SMBs will interpret the new bits of the
smb_attr field as follows. New bits are 8 - 13.
Bit      Meaning      13      If set, only
files marked as archive are included 12      If set, only directories are included 11      Meaningless
10      If set, only files marked as system are included 9      If set, only files marked as
hidden are include 8      If set, only files marked as read only are included

```

5. Locking and X SMB5.1 LockingX SMB Request The LockingX request SMB has modified the meaning of the previous `smb_locktype` field to take advantage of new locking features provided in various operating systems. The new LockingX request SMB is detailed below (* indicates changes from earlier protocols).

```

byte  smb_wct      /* value = 8 */byte  smb_com2  /* secondary
(X) command, 0xFF = none */      byte  smb_reh2  /* reserved (must be zero) */ word
smb_off2          /* offset (from SMB hdr start) to next cmd (@smb_wct) */word  smb_fid
/* file handle *//*      word  smb_lockflags/* locking mode: */          /* bit0 = 0, Lock out
all access; bit0 = 1, Read ok while locked */          /* bit1 = 1, Single user total file unlock
(OpLock Break) */          /* bit2 = 1, Requesting change lock type on supplied smb_lockrng[] */
/* bit3 = 1, Requesting cancel of lock specified in smb_unlkrng[] */      dword smb_timeout;
/* number of milliseconds to attempt each lock */ word  smb_unlocknum; /* number of
unlock range structures following */ word  smb_locknum; /* number of lock range structures
following */ word  smb_bcc; /* total bytes following */ struct smb_unlkrng[*]; /*
unlock range structures (* = smb_unlocknum) */ struct smb_lockrng[*]; /* lock range
structures (* = smb_locknum) */The consumer may take advantage of the feature supplied in OS/2 2.0
of being able to convert the type of lock held on a region without first unlocking the range by using
Bit2 of smb_lockflags in the following manner. The consumer should specify the new lock type by
setting Bit0 appropriately for the lock range specified in the smb_lockrng field. The range specified
should already be locked or the Server will return an error. As normal the consumer should expect to
wait smb_timeout milliseconds in the case of a lock conflict.By using Bit3 of smb_lockflags the
consumer may take advantage of the ability to cancel a lock request in OS/2 2.0. The consumer
specifies the range to apply the cancel to in the smb_unlkrng field and sets Bit3 to 1.

```

