Technical Note TN1111
Programmatic Mounting of AppleShare Volumes

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This Technote shows how to mount an AppleShare volume using the `PBVolumeMount` call.

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Introduction

The AppleShare Client implements the `PBVolumeMount` trap to allow developers to mount volumes programmatically. There are two ways to use the `PBVolumeMount` call to mount volumes. There is new functionality added to the `PBVolumeMount` call by AppleShare Client 3.7 that allows for mounting servers over TCP/IP as well as AppleTalk.

The first method is best used when you are remounting a volume that has been mounted by the user. Identify the volume that you wish to remount and call `GetVolMountInfoSize` to get the size of the `Vol Mount Block` that you will need to allocate. Allocate the memory for the `Vol Mount Block` and call `GetVolMountInfo` to get the block filled in. When you wish to remount the volume call `PBVolumeMount` with the `Vol Mount Block` created earlier. You will need to store the password separately as `GetVolMountInfo` will not return password information. The Alias manager uses this method to mount server volumes from aliases.

The second method entails creating your own `Vol Mount Block`, filling in the fields yourself and calling `PBVolumeMount`. This method gives great flexibility but is rather complex. I advise looking at the code in the MoreFiles Sample Code. (see the References section)

Snippet #1: Finding the version of the AppleShare Client

```
const   short   kASver_3_5      = 1;
const   short   kASver_3_6      = 2;
const   short   kASver_3_6_1    = 3;
const   short   kASver_3_6_2    = 4;
const   short   kASver_3_6_3    = 5;    // incld. 3.6.3, 3.6.4, 3.6.5
const   short   kASver_3_7      = 6;    // incld. 3.7.1
const   short   kASver_3_7_2    = 7;

short   ClientVersion(void)
{
    long    result;
    OSError theError = noErr;

    theError = Gestalt('afps',&result);
    if(!theError)
    {
        return(result & 0x0000ffff);
    }
    return 0;
}
```

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AppleShare Clients 3.0 - 3.6.5

AppleShare clients prior to version 3.7 mount volumes over AppleTalk only. The More Files sample code has a good example of using the `PBVolumeMount()` call to mount a volume given a server name and password. For maximum compatibility set the `UAMType` field of the `AFPVolMountInfo` struct to 1 for guest login or 3 for login using a password.

```
struct AFPVolMountInfo {
    short       length;               /* length of location data (including self) */
    VolumeType  media;                /* type of media                            */
    short       flags;                /* bits for no messages, no reconnect       */
    SInt8       nbpInterval;          /* NBP Interval parameter (IM2, p.322)      */
    SInt8       nbpCount;             /* NBP Interval parameter (IM2, p.322)      */
    short       uamType;              /* User Authentication Method               */
    short       zoneNameOffset;       /* short positive offset from start of
                                         struct to Zone Name */
    short       serverNameOffset;     /* offset to pascal Server Name string      */
    short       volNameOffset;        /* offset to pascal Volume Name string      */
    short       userNameOffset;       /* offset to pascal User Name string        */
    short       userPasswordOffset;   /* offset to pascal User Password string    */
    short       volPasswordOffset;    /* offset to pascal Volume Password string  */
    char        AFPData[176];         /* variable length data may follow      */
};
typedef struct AFPVolMountInfo AFPVolMountInfo;
```

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AppleShare Client 3.7

AppleShare Client 3.7 has several new features dealing with volume mounting:

- Mounting volumes over TCP/IP
- Option to use the AppleShare Client login and Volume Select dialogs
- Support for Custom User Authentication Modules (UAMs) in `PBVolumeMount`

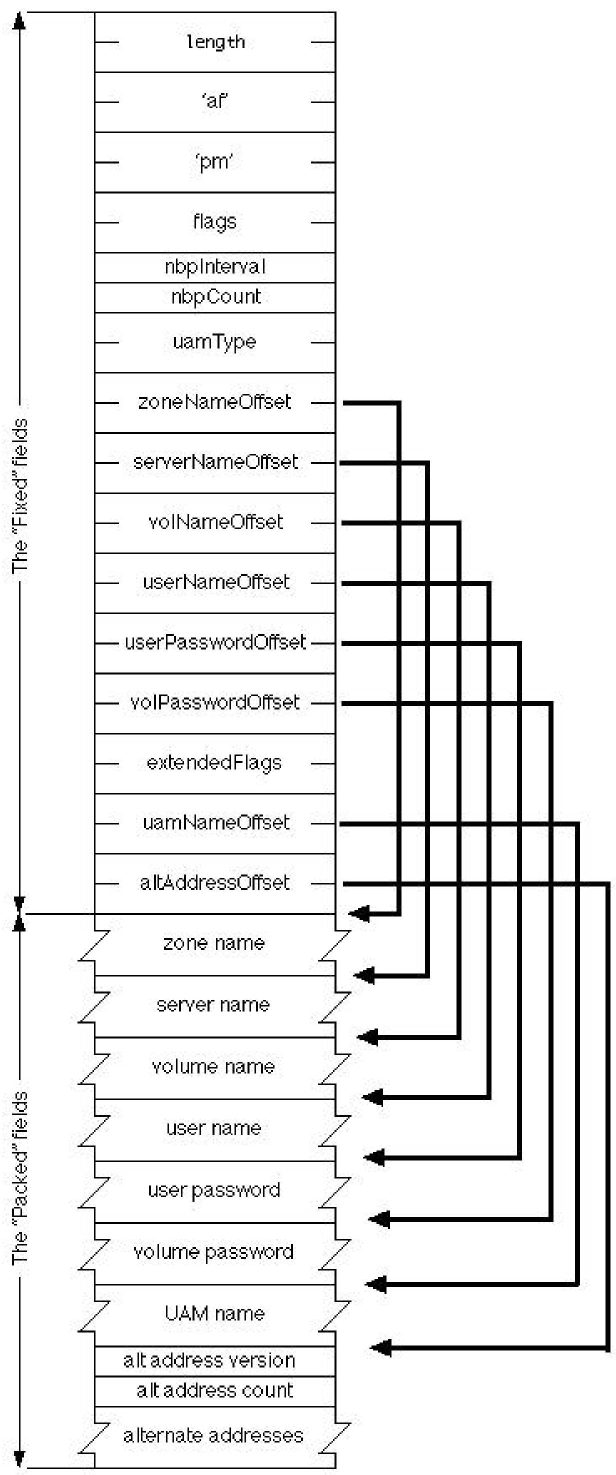
`PBVolumeMount` with `AFPXVolMountInfo`

As you can see, the `AFPXVolMountInfo` structure is an extension of the `AFPVolMountInfo` structure defined above. The three new fields and two new flag bits allow the developer to specify the information needed to support TCP/IP and UAMs. The 3.7 Client will also support the `old AFPVolMountInfo` struct.

From the latest `Files.h`:

```
/* AFPXVolMountInfo is the new AFP volume mount info record,
requires the 3.7 AppleShare Client */

struct AFPXVolMountInfo {
    short         length;                 /* length of location data (including self) */
    VolumeType    media;                  /* type of media */
    short         flags;                  /* bits for no messages, no reconnect */
    SInt8         nbpInterval;            /* NBP Interval parameter (IM2, p.322) */
    SInt8         nbpCount;               /* NBP Interval parameter (IM2, p.322) */
    short         uamType;                /* User Authentication Method type */
    short         zoneNameOffset;         /* short positive offset from start of struct
                                             to Zone Name */
    short         serverNameOffset;       /* offset to pascal Server Name string */
    short         volNameOffset;          /* offset to pascal Volume Name string */
    short         userNameOffset;         /* offset to pascal User Name string */
    short         userPasswordOffset;     /* offset to pascal User Password string */
    short         volPasswordOffset;      /* offset to pascal Volume Password string */
    short         extendedFlags;          /* extended flags word */
    short         uamNameOffset;          /* offset to a pascal UAM name string */
    short         alternateAddressOffset; /* offset to Alternate Addresses in tagged format */
    char          AFPData[176];           /* variable length data may follow */
};
typedef struct AFPXVolMountInfo AFPXVolMountInfo;

typedef AFPXVolMountInfo *              AFPXVolMountInfoPtr;

/* volume mount flags */

enum {
    volMountNoLoginMsgFlagBit   = 0,         /* Input to VolumeMount: If set, the file
                                                system */
    volMountNoLoginMsgFlagMask  = 0x0001,    /* should suppresss any log-in message/greeting
                                                dialog */
    volMountExtendedFlagsBit    = 7,         /* Input to VolumeMount: If set, the mount
                                                info is a */
    volMountExtendedFlagsMask   = 0x0080,    /* AFPXVolMountInfo record for 3.7 AppleShare
                                                Client */
    volMountInteractBit         = 15,        /* Input to VolumeMount: If set, it's OK for
                                                the file system */
    volMountInteractMask        = 0x8000,    /* to perform user interaction to mount the
                                                volume */
    volMountChangedBit          = 14,        /* Output from VoumeMount: If set, the volume
                                                was mounted, but */
    volMountChangedMask         = 0x4000,    /* the volume mounting information record
                                                needs to be updated. */
    volMountFSReservedMask      = 0x00FF,    /* bits 0-7 are defined by each file system
                                                for its own use */
    volMountSysReservedMask     = 0xFF00     /* bits 8-15 are reserved for Apple system use */
};

enum {
    kAFPExtendedFlagsAlternateAddressMask = 1  /* bit in AFPXVolMountInfo.extendedFlags
                                                  that means alternateAddressOffset is used*/
};
```

AFPXVolMountInfo



In order to use the new features of the `PBMountVolume` trap you must set the `extendedFlagsBit` in the `flags`word of the `AFPXVolMountInfo` structure, and use the new VMIB definition. Each of the offset fields specifies a 16 bit offset from the beginning of the struct to the data in question. To leave a string field empty you need to have the offset "point" to an empty string. You cannot just leave the offset = 0.

To have the AppleShare Client put up the login dialog, set the `volMountInteractBit` in the `flags` word. Make sure you have an A5 world and have initialized QuickDraw and the DialogManager before making this call with the bit set. You also must have this bit set if you are using a UAM other than the standard Apple ones. AppleShare Client 3.7.2 and later: If you leave the volume name blank in the `AFPXVolMountInfo` structure, the Client will put up the volume select window, allowing the user to choose which volumes to mount.

The `uamNameOffset` offset specifies an offset to a pascal string denoting the User Authentication MOdule (UAM) to use for this connection. You must also set the `uamType` field. The UAM name string is explained below

The Alternate Address offset specifies an offset to a block of tagged data, containing IP addresses. The Block begins with a version byte and a count byte, followed by up to 255 tagged addresses, see below for the format. The current version byte is 0x00.

Connecting to an IP address

To connect to a server over TCP/IP, you need to copy the IP address into an address tag and put the address tag into the Alternate Address field. A server name is still required, though it is not currently used. If you also specify a zone name the Client will fall back to AppleTalk if it cannot connect via TCP/IP, it will set the `volMountChangedBit` in the flags word if it falls back. An example Alternate Address field for address 128.0.10.1 would look like this:

```
0x00 0x01 0x08 0x02 0x80 0x00 0x0A 0x01 0x02 0x24
```

The client would use this address to connect to the default AFP over TCP/IP port 548 on the machine denoted by the address 128.0.10.1.

Tagged data for Addresses.

The new tagged data format accommodates changes in address formats, which will allow this client to support new addressing standards such as IPv6 (IPNG) without changing the interface. The first byte of the Alternate Address area is a version byte, currently set to 0. It is followed by an `AFPAlternateAddress` structure (defined below). The reason that the version byte is not included in the `AFPAlternateAddress` structure is that the `AFPAlternateAddress` structure is also used in the ServerInfo reply message in AFP 2.2.

Each Data Item consists of a length byte followed by a tagID byte followed by up to 254 bytes of data. ie | len | tag | up to 254 bytes of data |

The 3.7 Client understands the following tags:

Length	tagID	Description
0x06	0x01	Basic IP address; 4 bytes, no port number
0x08	0x02	IP address with Port; 4 bytes address, 2 bytes port

The length byte specifies the length of the whole tag, including the length byte. All fields are in network byte order. (MSB first)

From the latest `Files.h` (which is a part of the Universal Interfaces & Libraries v3.0.1):

```
enum {    /* constants for use in AFPTagData.fType field*/
    kAFPTagTypeIP        = 0x01,
    kAFPTagTypeIPPort    = 0x02,
    kAFPTagTypeDDP       = 0x03    /* Currently unused*/
};



enum {    /* constants for use in AFPTagData.fLength field*/
    kAFPTagLengthIP        = 0x06,
    kAFPTagLengthIPPort    = 0x08,
    kAFPTagLengthDDP       = 0x06
};

struct AFPTagData {
    UInt8    fLength;     /* length of this data tag including the fLength field */
    UInt8    fType;
    UInt8    fData[1];    /* variable length data */
};
typedef struct AFPTagData AFPTagData;

struct AFPAlternateAddress {
    UInt8    fAddressCount;
    UInt8    fAddressList[1];    /* actually variable length packed set of AFPTagData */
};
typedef struct AFPAlternateAddress AFPAlternateAddress;
```

Mounting a Volume using a Custom UAM

A UAM is a code resource with a single entrypoint that takes a selector. It lives in a file of type '`uams`'. It is used to extend the AppleShare Client, allowing it to connect to third party servers using different authentication schemes. UAMs usually put up password and volume select dialogs, and thus require that the `volMountInteractBit` be set in the flags word of the `VolMountInfo` block. UAMs are stored the "AppleShare Folder" at the top level of the System folder.

To use a Third-Party UAM for authentication, use the new VMIB definition (with the `extendedFlagsBit` set in the flags word), put the UAM type from the 'uamg' id 0 resource (from the UAM file) in the `uamType` field, and put the UAM Name into the VMIB at the `uamNameOffset`. Then call `PBVolumeMount()`.

You must make sure that you have an A5 world and have called `InitGraf` and `InitDialogs`, before making the `PBVolumeMount` call. Third-Party UAMs are currently (AppleShare Client 3.7.2 and earlier) limited to connecting over AppleTalk only.

UAMName

This is the AFP protocol name for the UAM, from the 'uamn' id 1 resource in the UAM file. It is a Pascal string.

> **Note:**
> All structures must be 68k aligned.

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Summary

The new `PBVolumeMount` interface gives the devloper a great deal of options in mounting AppleShare File Servers. `PBVolumeMount` can put up login and volume select dialogs. It can use custom UAMs in the same manner as the AppleShare Client when called through the Chooser. It can connect to the server using AppleTalk or TCP/IP.

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References

MoreFiles Sample Code

Technote 1106: Borrowed AFP Sessions

AFP 2.2 specification (41K PDF).

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