TigerTechnology

metaSAN

FAQ

Frequently Asked Questions

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- Product Overview -

What are MetaSAN, MetaSAN iSCSI, MetaLAN Server, and MetaLAN?

All of above software enable file sharing Storage Area Network (SAN) management software that enables multiple users to share access to common data files in scalable workgroups where modest to heavy bandwidth requirements are the norm.

MetaSAN iSCSI has the same feature set to MetaSAN but as the name suggest works in an iSCSI environment.

With the addition of MetaLAN, a multi-point gateway software that connects your enterprise LAN with your high-speed SAN, your facility-wide LAN-based users can also benefit from many unique MetaSAN advantages. When compared to a regular Windows or Xserve server (which you can also use with MetaSAN), MetaLAN offers block level access, Avid support, bandwidth usage control, but most importantly the ability to virtualize the shared storage for virtually unlimited performance scalability.

MetaLAN Server also has the same great feature set to MetaSAN but does not mount volumes for local use. This means that the station running MetaLAN Server cannot be used for editing, it can only be used as a gateway server for MetaLAN clients. Multiple MetaLAN Servers can connect to a shared storage such as Fibre Channel, iSCSI, or Infiniband to deliver aggregate throughput to the LAN clients.

NOTE: Throughout this document, references to "MetaSAN" features also apply to MetaSAN iSCSI and MetaLAN Server.

Who are the typical MetaSAN clients?

MetaSAN appeals to film and video editors, digital artists, healthcare specialists, and corporate users having high to heavy bandwidth requirements and want to simultaneously access a common pool of data files such as video clips, databases, satellite imagery, medical archives, or CAD files - as easily and transparently as if the content was stored on their local drive.

MetaSAN clients are looking for performance not available over conventional LAN architectures.

Who are the typical MetaSAN iSCSI clients?

MetaSAN iSCSI will appeal to video editors, digital artists, healthcare specialists, and corporate users having low to medium bandwidth requirements and want to simultaneously access a common pool of data files such as video clips, databases, satellite imagery, medical archives, or CAD files - as easily and transparently as if the content was stored on their local drive.

MetaSAN iSCSI clients either already own an iSCSI appliance or have chosen to take the iSCSI route for IT reasons and want to share access to remote iSCSI target devices among multiple iSCSI initiator workstations without experiencing corrupted file systems. We feel others should consider MetaLAN when looking for a good LAN-based solution as it offers the same technical benefits without requiring additional target/initiator software.

Who are the typical MetaLAN Server clients?

MetaLAN Server and MetaLAN will appeal to video editors, digital artists, healthcare specialists, and corporate users having low to medium bandwidth requirements and want to simultaneously access a common pool of data files such as video clips, databases, satellite imagery, medical archives, or CAD files - as easily and transparently as if the content was stored on their local drive.

MetaLAN Server clients want to benefit from low cost LAN infrastructures but without being limited by the performance limitations of traditional servers or NAS appliances.

What is the current version of MetaSAN?

2.2.x

What are some of the main features in version 2.2.x?

- GUID Partition Table (GPT) supporting volumes of 18 exabytes
- support for Windows 64-bit
- GPT partition
- Support for Mac OS X Tiger – support for the latest Apple build
- File Sequence Optimizer – optimize single frame image sequences playback
- Dynamic Disk Optimizer – performance enhancement tools for dynamic disks
- Streamlined user interface – easier to configure and navigate
- Simplified licensing scheme - evaluation licenses can be turned into permanent ones without re-loading software
- UI-less MetaLAN – interface-less version for non-admin users
- Automatic software update check – warns users for newer version (does not install automatically)

What OS platform does MetaSAN currently support?

Microsoft Windows 2000 (Service Pack 2 or higher) or Microsoft Windows XP / Server 2003, Mac OS X Tiger, RedHat Linux kernel 2.4 and kernel 2.6. Mac OS X Panther is no longer supported. Please refer to the Minimum System Requirements document for specific OS builds.

How is cross-platform security working ?

Based on the exact configuration of the SAN, the following security schemes are supported with MetaSAN:

Domain security	Metadata Controller	Windows MetaSAN clients	Mac MetaSAN clients	LAN share
Windows	Windows	Active Directory	Fallback	Active Directory
Mac	Mac	Fallback	Open Directory	Open Directory
Windows	Mac	Fallback	Active Directory	Active Directory
Mac	Windows	Open Directory	Fallback	Open Directory

Note: MetaLAN clients behave exactly as MetaSAN ones. The LAN share refers to a regular share.

Do I need to use Microsoft Server to connect multiple LAN clients?

No. MetaLAN does not use any of the Microsoft Client Access Licenses (CAL) and therefore does not limit the number of MetaLAN clients that can connect to a Windows XP workstation.

What are the differences between file-level and volume-level SAN sharing?

Volume-level sharing is the most common type of arbitration found in the industry, yet it offers far less flexibility than the more advanced file-level sharing. Traditional volume-level sharing grants "write" access to a given volume to only one user at a time. As a result, many volumes must be maintained to accommodate all but the simplest workflows. Users end up constantly mounting and de-mounting volumes and projects get spread across multiple volumes. Storage provisioning is required on all volumes, resulting in a less efficient use of the available storage. MetaSAN file-level sharing allows multiple users to write to a common volume simultaneously. In addition, on Windows computers, users can benefit from the support for applications capable of reading a file while it is still being written - TDIR (Time Delay - Instant Replay).

What benefits can MetaSAN/MetaLAN bring to a render farm?

MetaSAN/MetaLAN can significantly increase both the speed, and the reliability of render farms.

Many rendering programs take advantage of memory-mapping techniques to remember where textures and other source material reside on the disk (so they can access the block-level chunks they need as oppose to reloading the entire file every time). This memory-mapping technique cannot be used when using network file protocols. This is why rendering over a network is often much slower. On the other hand, MetaLAN mounts remote drives over the network as "local drives" and enable block-level access. This results in lower LAN traffic and faster access to textures and source files, which ultimately translates into significant speed increases.

In a large render farm - where a SAN is used and multiple servers are put to contribution - one set of render nodes connects to the shared storage via one server while another set of nodes connects through another server. At any given time, it is very likely that one of the servers be over-solicited, while the others are under-solicited. MetaSAN/MetaLAN will provide the automatic load balancing between the render nodes and any available servers to always optimize data transfers. In addition, MetaSAN/MetaLAN increases reliability: If one of the servers fails, render nodes don't lose connection to the shared storage; they simply increase the load on the remaining servers.

How does MetaSAN volume-level sharing differ from traditional volume-level sharing?

Volume-level sharing, as implemented in MetaSAN, mimics traditional volume-level sharing by maintaining a separate login procedure to authenticate users and limit their access to certain volume. This way, it is possible to make certain volumes writable by only one user by read-only from all. However, MetaSAN does not impose other traditional volume-level sharing limitations and even if your SAN operates with enabled volume security, multiple users will be able to write to one and the same volume.

Can MetaSAN be used in a homogeneous network environment?

Yes, you can use MetaSAN in a SAN comprising of only Windows or Mac OS computers. You cannot use MetaSAN in homogenous Linux environment as Linux computers can participate in your SAN as members only.

How many post and broadcast facilities are currently using MetaSAN?

Although MetaSAN is relatively new on the market, the technology behind it has been licensed to OEMs for years. The underlying engine is therefore very robust and field proven and has been used daily by hundreds of broadcast and post facilities worldwide, totalling thousands of seats.

What software applications are incompatible with MetaSAN?

MetaSAN is fully transparent and compatible with standard applications, including Adobe Digital Video Collection and Apple Final Cut Pro. In addition, the unique virtualization for Avid feature enables media file sharing and efficient collaboration among multiple users of Avid software.

The only applications known to be incompatible with MetaSAN are those that make low-level check for specific file system drivers, such as Digidesign Pro Tools. The AJA System Test 2.0 now works with MetaSAN. In the pref pane, you change the File I/O API: setting from MacOS to Unix. Now keep in mind that the tool does not always finish the test. This is a "known" issue.

What hardware does MetaSAN support?

Tiger Technology software is designed to be fully hardware agnostic. If you have a functional SAN, MetaSAN can easily be installed and configured so your workgroup can instantly benefit from its unique advantages. MetaSAN supports the leading vendors of storage technology such as ADTX, Atto, Brocade, Ciprico/Huge Systems, IBM, Emulex, LSI, Qlogic, Seagate, and Xyratex.

Can MetaSAN be used with technologies such as InfiniBand and AoE?

Yes. MetaSAN is technology agnostic. If multiple computers can mount a LUN, MetaSAN will provide SAN arbitration and cross-platform file system translation that will prevent file system corruption and enable efficient workgroup collaboration.

- Using Avid with MetaSAN -

Why do I need to enable the "Virtualization for Avid" feature when connecting multiple Avid to the SAN?

Without Avid Unity, it is normally not possible to share simultaneous access to media files among multiple Avid systems. This is because every Avid system stores its media AND its database inside a folder caller "OMFI MediaFiles". This folder cannot be renamed or moved. If two (or more) Avid systems share access to the same volume, they will inevitably collapse over each other's databases. Some volume-sharing SAN solutions promote Avid support, but fail to explain that you can't have two Avid systems sharing simultaneous access to the same media. Only one Avid can access a given volume at a time.

The special "Virtualization for Avid" feature of MetaSAN allows multiple Avid workstations to simultaneously share access to the same volume and the OMFI MediaFiles folder it contains; but with each workstation seeing its own private database, thereby preventing corruption.

Can everyone access and share media when using virtualization for Avid?

Yes, with minor limitations: If Avid workstation "A" and Avid workstation "B" both capture clips onto the SAN, all new clips will be stored in the common OMFI MediaFiles folder and will be immediately available to the workstations that captured them. But despite the fact that the media are stored in a common location, the two databases will remain different. As such, workstation "B" will not automatically see clips captured by workstation "A" (and vice versa). When attempting to open a project - or bin - referring to clips captured on another workstation, the media will appear as offline. The workaround is to manually trigger a refresh of the media directories in Avid. This force a re-scanning of the OMFI folder that will repopulate the local database with all clips found in the OMFI MediaFiles folder. This simple operation only needs to be done when new clips have been ingested (or rendered) and needs to be detected on a different machine.

How can I share Avid projects more efficiently?

When there are a great number of media files in the OMFI MediaFiles folder, the process of refreshing media directories can take a long time.

Using MetaSAN's command-line utility you can benefit from a timesaving workaround. The method allows the .pmr file in each virtual OMFI MediaFiles folder to be overwritten by a .pmr file from another virtual OMFI MediaFiles folder, thus allowing one workstation to work with another workstation's project, without going through the process of refreshing the media directories.

This workaround is ideal for environments in which one Avid workstation works with other Avid workstations' projects, but these projects are not used again by the workstations on which they have been created. For example - the capturing workstations create their projects and capture media into them, but then only the Rendering workstation works with their projects. If more than one workstation needs simultaneous access the same media, a local re-scan will be required.

Can I keep projects on separate volumes?

Instead of keeping all projects on one large SAN volume, some users prefer creating multiple volumes to avoid storing too many "unrelated" clips in the same OMFI Mediafile

folder. This is an excellent way to manage larger projects and does not limit the sharing capabilities of your SAN. It does however, force you to plan the size of your volumes.

How many clips can be stored in the OMFI MediaFiles folder?
According to experienced Avid editors, one should avoid storing more than 10,000 clips in a single OMFI MediaFiles folder. When more clips need to be manipulated, it is recommended to keep them on separate volumes. You can still share with others, but there are fewer MediaFiles to deal with at any given time.

What Avid software does MetaSAN support?
MetaSAN works with Avid Xpress, Media Composer, Adrenaline, Symphony, and even Nitris! MetaSAN supports all Avid editing products on the same SAN. MetaSAN achieves this by addressing two requirements: by enabling OMFI MediaFiles folders to be shared by each Avid Xpress, Media Composer, Adrenaline, or Symphony workstations that connects to a specific shared volume, but also by providing the native NTFS file system that Nitris requires to run.

Can I share access to media files acquired using different Avid software?
The naming convention for media files in Avid products depends on the product itself. For example, Nitris uses GUIDs to name its files while Avid Xpress uses the name of the capture tape + a unique number (not GUID exactly), and this regardless of the name you give the clip at capture time.

Avid Xpress has a feature to reveal the media file – select the clip and use the reveal command. As a result a Windows Explorer window opens and the media file is selected.

If you use a system for digitizing and the rest of the workstations for editing, in Xpress the files can be distinguished by the tape name you specify. Generally, one will use different tape names for different projects (even if the tape itself is the same). Note that when you import an existing OMF file in a new project, Avid creates a new copy of the media file (you end up with the same media several times).

The most efficient way to share media is therefore to create the project on the digitizing workstation, capture media, then close the project and start editing this project on the other workstations (you can continue capturing in a new project on the original system). This way you will avoid the unnecessary duplication of media files.

Is virtualization for Avid supported on Apple platforms?
No. This feature is currently only available on Windows platforms. However, you can create multiple volumes, and "assign" one volume for each of your Avid workstations. You will be able to open the same project from any Avid workstation, but you won't be able to share mediafiles dynamically like you can under Windows.

Can I share content between Avid and other Apple/Windows applications?
Yes and no. MetaSAN allows any Avid product to share access to common data files with other applications (be it Mac or Windows-based) such as Adobe Premiere Pro, Apple Final Cut Pro, DVD Studio Pro, Motion, or Shake! However, because Avid converts media into a proprietary format, you will still need to import the media into the Avid media file database.

- Sales & Support -

What kind of Support is included when purchasing a license?

Support is provided at no charge for the first year after purchase. Dot release upgrades for the version purchased are included at no charge. Additional years of support and Major Release upgrades are available through the Subscription Program (see details below)

How can I obtain support for Tiger Technology products?

Tiger Resellers provide frontline End User support. Tiger Technology assists its Resellers by telephone, email and can offer on-site support options. Please note that ***you will be requested to provide your Licensing Server's Order Name or MetaSAN Activation Serial Number in order to validate your support eligibility.***

How are Tiger Technology products distributed?

All three software are exclusively sold through a network of specialized Resellers. The executables must be downloaded electronically. Experienced SAN Resellers can provide professional assistance and guidance to you.

How can I get Evaluation licences?

Evaluation licences allow you to test and configure your SAN before purchasing the software. An Evaluation licence is fully functional and can operate for 30 days. Software download and activation is done through the Tiger Technology licensing server. If you already have a functional SAN hardware and want to evaluate MetaSAN, you can easily obtain Evaluation licences from your Tiger Reseller.

What are Minor versions? (Dot and maintenance releases)

Minor versions primarily include bug fixes but can also integrate some new features, and improved functionality. You can tell if a software release is a minor one by looking at the version number. If the version number on the right side of the decimal point has changed, it's a minor version. For example, if version 2.0.5 was the current shipping release; the release of version 2.1 would be an example of a minor version. Minor versions are available for download to all registered customers directly from the Tiger licensing server.

What are Major versions?

You can tell if a software release is a major one by looking at the version number. If the version number on the left side of the decimal point has changed, it's a major version. For example, version 2.0 is the current shipping release; the release of version 3.0 would be an example of a major version. Major versions are only available to those covered under the Tiger Technology Subscription Program (see below).

What is the Tiger Technology Subscription Program?

The Tiger Technology Subscription Program gives registered users access to a full year of support and access to major software versions. The Subscription Program can be purchased at any time and is valid for a one-year period from the date of purchase (any unused support time is not carried forward). The Subscription Program can be purchased from your Tiger Reseller at 50% off the product's current SRP pricing. All active MetaSAN/MetaLAN licences that are part of a workgroup must adhere to the Subscription Program in order for the entire SAN/LAN network to benefit from any software upgrades and support.

- How it works -

How does the concept of SAN Definition work in MetaSAN?

A SAN Definition lets you specify Members, their priority in becoming Metadata Masters, and the volume(s) they share. While a given volume can only participate in one SAN Definition, Members can participate in many. Soft zoning is achieved through the creation and the management of multiple SAN Definitions. Network administrators can easily secure accesses to a selected volume by creating a new SAN Definition that only includes authorized workstations. The concept of SAN Definition offers tremendous flexibility to network administrators for securing and managing access to content.

Any shared drive that will be accessed directly by multiple computers must be included in a SAN Definition. Local disks (that are not visible from other computers) should normally not be part of a SAN definition. However, it is possible to give other machines access to these drives through a LAN share. This is a possible scenario but you should have a case for it.

Should machines and volumes in different SAN definitions be on separate Fibre Channel loops?

No. Unlike hard zoning, MetaSAN soft zoning does not restrict other workstations from seeing the disks. However, soft zoning will prevent users from mounting volumes on workstations that do not participate in the respective SAN definition. Thus, even though the physical backbone of the SAN is one and the same, storage resources and traffic to them are allocated in multiple SAN's definitions, depending on the needs of the workgroups that will use them.

What is a "floating Metadata Master"?

MetaSAN enables any SAN Member machine to become Metadata Master (i.e. metadata controller). This is a great way to reduce costs and simplify your SAN architecture. If one machine fails, another one will automatically pick up. The file system used to format the storage must be of the Metadata Master type. For instance, to format the drives using HFS+, you will need to have at least one (or more) Mac OS X machine attached to your SAN. Any Mac machine can then participate in the failover scheme (just like any Windows machine in an NTFS based SAN). You can assign various failover priorities, or exclude certain SAN Members from becoming a Metadata Master. When taking advantage of cross-platform OS, only the native machines can take part in the failover. For instance, a Windows Member cannot take part in the failover scheme of an HFS+ formatted storage. Linux Members can attach directly to HFS+ or NTFS file systems, but cannot become floating Metadata Master.

How does failover work?

The San Definition information is propagated across all computers that participate in a SAN Definition. The information is stored in a small text file that resides on the shared storage (on each SAN volume), and is also replicated on the system disk from which MetaSAN is started. At any given time each computer in a SAN Definition has the knowledge about the drives and computers that participate in that SAN Definition.

In a Floating Master configuration, the "master" role of a given computer is volatile. The "master" machine will play his role as long as it is up and running. In the case of a failure (or of a forced shut down), failover takes place and the mastership is transferred to another

machine. The transfer of mastership occurs after a timeout period during which the other machines in the SAN Definition realize that the Metadata Master is lost and that a new one needs to be elected. The duration of this timeout is set through the Failover Detection setting. While data integrity will be maintained during the failover, a slight delay will be introduced in any transaction that is taking place.

How can I find out which workstation is the current Metadata Master?

Open MetaSAN, go to Volumes tab, select a volume in the list and check the info pane. Alternatively, you can go to the SAN Management tab; click the Volumes button; then see the role of each machine in the SAN.

How does the file system appear to the various SAN Members?

MetaSAN supports native NTFS and HFS+ file systems. However, SAN Members do not access these file system through the built-in OS drivers (as the OS does not have SAN capabilities and will corrupt the file system). MetaSAN handles the calls locally or redirects them to the Metadata Master. Regardless of the file system it handles, MetaSAN/MetaLAN complies with all the requirement of the OS for a native file system and therefore can be used safely instead of a "native" volume. This allows HFS+ file systems to be seen as "native" on a Windows platform (and vice-versa), while providing both reading and writing capabilities. This approach makes MetaSAN conceptually different from all types of network sharing protocols that are clearly distinguished by the OS as such.

Using multiple SAN definition (and Metadata Masters), it is possible to have both HFS+ and NTFS volumes visible from PCs and Mac.

Are there any requirements for a machine to become Metadata Master?

With the exception of Linux computers that can only play the role of SAN Members, there are no special system requirements for a machine to become a Metadata Master. As long as a computer meets the system requirements for installation of MetaSAN software, this machine is capable of supervising the SAN volumes and processing metadata requests from the other Members. In heterogeneous environment the Metadata Master must be a machine that uses the same OS file system as the one to which SAN volumes are formatted.

Does the metadata traffic between Members and the Metadata Master burden the LAN?

MetaSAN keeps metadata overhead to an absolute minimum. The bulk of the metadata traffic occurs when performing lots of very small data transactions. While it is seldomly reported as a problem, Metadata traffic should always be kept on a separate Ethernet switch to ensure optimal performance. Still, MetaSAN allows you to slightly reduce the communication over the Ethernet by simply lowering (or eliminating) the failover detection frequency of your SAN. In this case SAN Members will check less often for the availability of a Metadata Master, thus minimally reducing traffic.

How does the failover detection affect the SAN?

Depending on the failover detection in your SAN, during the failover process requests for access to the SAN volume coming from Member computers are not rejected but just delayed till a new Metadata Master is appointed. Metadata Master failover allows redirecting open handles to the new Metadata Master of a volume absolutely transparently to all running applications and they can continue working with any open files after the failover takes place.

What is Fibre Channel to Ethernet Failover?

Besides Metadata Master Failover, MetaSAN implements an additional mechanism for providing SAN Members with uninterrupted access to data on the shared storage. In case there is a failure of the FC HBA or FC cable on a Member machine, the FC to Ethernet Failover mechanism of MetaSAN automatically redirects access to files on the shared storage from the Fibre Channel to the LAN and thus Members can continue working on the volumes although with decreased performance.

What performance should I expect when using MetaSAN?

On Mac- and PC-based platforms, MetaSAN provides performance virtually equal to that of your storage and switch configuration. That's because MetaSAN is embedded within the native file system and consumes very little overhead as oppose to adding an extra layer on top of it. It is easy to measure the performance before and after installing MetaSAN. Whether your SAN hardware can achieve 350MB/sec or 800MB/sec, you will achieve the same results (within a few MB/sec) with MetaSAN running. The only time the performance of MetaSAN will be lower than what your hardware can achieve is while performing lots of small data transactions. In this case, metadata transfers over the LAN can become the bottleneck. But this has never been an issue with any post or broadcast facility mostly dealing with audio and video files. It usually shows when performing disk benchmarks using performance tools tweaked specifically to test these kinds of accesses.

Note that when using Linux 2.4 kernels, the disk accesses are limited to 64KB chunks, which limits MetaSAN's ability to achieve very high performances. This is addressed with support of kernel 2.6.

How can I transfer or upgrade my licenses?

- Upgrading from an Evaluation to a Commercial license
    - Prior to the release 2.1 of MetaSAN, the Commercial and Evaluation executables were different. You therefore had to upgrade your software, along with your license. With release 2.1 and up, you no longer need to re-install any software. You can simply re-activate MetaSAN with your Commercial license (overwriting the Evaluation license).

- Renewing an Evaluation license
    - Once your Evaluation license has expired, you will not be able to renew it using a "leftover" license that was part of your original order (all Evaluation licenses are tied to the same order). If you need to renew your Evaluation license, you will need to contact Tiger Technology.

- Transferring a Commercial license from one machine to another
    - Evaluation licenses cannot be transferred. Before you can activate a commercial license on a new machine, you must first de-activate it from the existing machine by obtaining a de-activation code. The de-activation code will confirm to Tiger Technology that the original license is no longer active and may be re-activated on another machine. You can even re-activate on a different OS as the MetaSAN licences are OS independent.

- Before installing -

How should I install/test MetaSAN?

Because MetaSAN is NOT a file system; you should always configure a working SAN **PRIOR TO** installing MetaSAN on any of the machines. Please refer to the User's Guide for details, but in a nutshell, you will need to proceed as follow:

- **Prepare your systems**
    1. Make sure ALL MetaSAN or MetaLAN client stations can ping each other's prior to installing MetaSAN or MetaLAN
        - Use static IP, disable firewall, disable wireless Ethernet to make thing easier. Refer to manual otherwise.

    2. Connect only one machine to your SAN storage, and then format it using either HFS+ or NTFS (if not already formatted).
        - Make sure there are no other "dynamic disks" on any of your Windows system if any of your SAN volumes are formatted as dynamic disks (see User Manual).
        - Now is also a good time to zone your FC switch.

    3. For all machines attached to the SAN that can read the native file format: Boot one machine at a time, ensure the SAN volume is visible and performance OK, then shutdown the machine.

- **Install your licenses**
    4. Install MetaSAN on the first machine (all other shutdown).
        - If you have multiple network interface card (NIC) installed, you will need to specify which one MetaSAN should use

    5. Follow the MetaSAN Wizard (create new SAN definition, select the SAN volume(s) to be managed).
        - Make sure to review the Release Notes when installing volumes >2TB under Mac OS X.

    6. After reboot, you will need to activate your eval license in order to be able to access the SAN volume (it is now protected). Open up MetaSAN from within the Control Panel and go to the "About MetaSAN" page to Activate your license.
        - MetaLAN licenses must be activated on the MetaSAN server.
        - The automatic activation procedure doesn't work over proxy.
        - Please refer to the User Guide for installation on Linux platforms. If you choose "Automatic activation" you simply need to enter the MetaSAN Order/Login name again.

    7. Shutdown previous machine(s), boot remaining machines one at a time, installing MetaSAN and/or MetaLAN and "joining" the existing SAN definition by pointing to the SAN volume.

Note that special additional steps must be respected to enable virtualization for Avid as well as support for Microsoft Server Cluster. Contact us for details.

What is the largest volume I can use with MetaSAN?

MetaSAN can easily manage multiple volumes. Keep in mind that huge volumes with tons of files are not very efficient. The maximum single volume size that can be managed by MetaSAN is the maximum size that can be managed by the OS. It depends on whether the volume is software striped (i.e. dynamic) or not. Using standard partition tables (basic disk), the maximum size under Windows is determined by the sector size reported by the controller. With standard block size of 512 bytes, the largest volume is 2TB (terabytes). But using blocks size of 4196 bytes you can create basic volumes up to 16 TB.

You must use dynamic disks if you need to create larger volumes. Windows XP Professional manages dynamic disks in a special database instead of in the partition table, so dynamic disks are not subject to the physical limit imposed by the partition table. In theory, dynamic NTFS volumes can be as large as 256TB.

NOTE: Before using dynamic disks with MetaSAN, please read the notes below.

For Mac OS X 10.3 Panther, the maximum volume size is 16 TB.

What are dynamic disks?

Dynamic disks use a private region of the disk to maintain a Logical Disk Manager (LDM) database, which contains volume types, offsets, memberships, and drive letters of each volume. The LDM database is also replicated, so each dynamic disk knows about every other dynamic disk configuration. This feature makes dynamic disks more reliable and recoverable than basic disks. However, even Microsoft suggests that before converting basic disks to dynamic disks, you should determine whether you require features that only dynamic disks provide. If you do not need spanned volumes, striped volumes, mirrored volumes, or RAID-5 sets, it is best to use basic disks. Once a basic disk has been converted to dynamic, it is very difficult to come back.
For more details, visit: http://support.microsoft.com/kb/329707/en-us

Can I use dynamic disks with MetaSAN?

Within any SAN environments, dynamic disks can be difficult to manage because of their nature. Extra care should be taken when using dynamic disks. As such, Tiger recommends the use of basic disks whenever software striping is not required.

According to Microsoft, if you experience an unplanned outage (for example, fabric problems or a power outage) and lose access to the SAN storage that houses the dynamic disks, all dynamic disks will drop offline from the OS at the same time. If there are no dynamic disks attached locally, there are no LDM (Logical Disk Manager) database synchronization issues to contend with when the SAN disks eventually come back online. However, if you have even one dynamic disk on the locally attached storage, you run the risk of the LDM databases being mismatched, and you may have trouble getting one or more SAN-attached dynamic disks back online.

To combat that problem, avoid having dynamic disks locally if you need to have them on the SAN. If you must have dynamic disks in a mixed configuration of both locally attached storage and SAN-attached storage, it is a good idea to protect all fiber hubs, routers, switches, SAN cabinets, and the server from power outages by using uninterruptible power supplies (UPSs) on all connecting devices. Tiger Technology has develop tools to backup and restore (LDM) databases.

Can I create new volumes once I have installed MetaSAN?

As part of its protection scheme, MetaSAN will not authorize any machine to make changes to the file system, such as managing volumes or running chkdsk for repair. To enable system administrators to perform disk maintenance, MetaSAN provides a Maintenance mode where disk protection is temporarily disabled. Only one machine can be active during Maintenance mode.

What software RAID levels are supported?

MetaSAN supports all RAID levels implemented in hardware.

Some limitations apply to software RAID:
MetaSAN supports RAID 0 (and RAID 50) striping on Windows and Mac. MetaSAN fully supports simple and striped volumes. Spanned volumes are not supported in cross-platform environments. RAID 1 (mirror) volumes are not supported either.

Can I stripe multiple disks into a single volume?

Yes. MetaSAN allows you to create:

- a single volume on a single LUN
- multiple volumes on a single LUN (not supported in cross-platform setup)
- stripes across multiple LUNs

While MetaSAN works very well with a single volume, Tiger does not recommend trying to make a single large volume larger than 16TB under NTFS. It is rather suggested to create multiple volumes to avoid performance degradation as several millions of files on a single file system will affect its general performance. It is therefore preferable to have multiple volumes (perhaps mounted in subfolders of one thus looking like one volume) rather than one huge one.

NOTE: In a cross platform setup, a single volume should be created when striping multiple LUNs together. You should not partition the LUNs into multiple volumes). Also, spanned or mirror volumes are not supported. These limitations do not apply to homogeneous SAN, whether Windows or Mac.

Can I add additional storage to an existing volume?

Although it is possible to span volumes (which allows adding storage to the file system without reformatting), Tiger does not recommend this practice, as expanding a spanned volume is a risky business. The following article from the Microsoft's knowledge base illustrates why: http://support.microsoft.com/default.aspx?scid=kb;en-us;329826

Nevertheless, if you need to perform this operation, the following steps should be executed:

1. Shut down all the machines but one.
2. Enter Maintenance Mode
3. Backup the current LDM
4. Expand the volume using Disk Manager (must be of dynamic type).
5. Backup the new LDM
6. Reboot
7. Start all machines

Note that spanning is not supported in cross-platform SAN.

What is the impact of the Fibre Channel switch on the overall SAN performance?

Switches are designed to route data from one port to another. The speed at which they can do this depends on their internal architecture and how zones have been created. Many switches can offer poor performances under specific traffic conditions. The switch can therefore play an important role in any high-performance SAN, especially when lots of ports are solicited. Here again, storage performance can look really good when only a few ports are solicited (such as when only one machine is booted), but degrade rapidly as multiple ports gets solicited. For optimal performances, Tiger recommends to create dedicated zones that will limit data flow between individual host and their target. Your Tiger Reseller will assist you in choosing the right switch and configuring it for optimal performance.

Does MetaSAN support Microsoft Cluster Service (MSCS)?

Yes. However, in order to adopt computer clustering in MetaSAN environment, you should configure the cluster resource disks (such as the quorum disk, for example) to be excluded from MetaSAN i.e. not to be managed by MetaSAN. To do this on each cluster node you should create a MetaSAN registry key for each cluster resource disk you want to exclude from MetaSAN. Please contact support for details prior to configuring MSCS with MetaSAN.

Does MetaSAN supports GPT volumes?

Yes, with version 2.2 and up.

However, certain limitations apply:

1. Metadata master machines can only be Windows Server 2003 or Windows XP 64-bit. Regular Windows XP, Mac or Linux machines can only be used as clients.

2. If you want to maintain compatibility with Windows XP and Mac OS X, make sure individual LUNs do not exceed 2.2 TB, otherwise these volumes will mount as LAN drives on those machines (inability to establish connection with the LUNs).

- MetaLAN integration -

Can I create a regular share point on a MetaSAN data master?

Absolutely! You can share any volume on the network as you normally would by simply creating a share point. However, keep in mind that this share point will be controlled by your OS, and as such will not expose any of the MetaSAN benefits to the LAN users. For instance, the OS will not offer any failover in the case the data master goes down – LAN clients will simply lose their connection to the shared storage. The OS will also not provide any bandwidth control. MetaLAN is a companion product to MetaSAN that greatly improves the use of your LAN network.

Can MetaLAN be used without MetaSAN?

No. For MetaLAN to work there needs to be at least one workstation with direct access to the volumes over the Fibre Channel and MetaSAN installed and activated to provide LAN clients' accesses to the SAN.

Is virtualization for Avid supported on MetaLAN?

Yes, it is.

Can I use MetaLAN without Fibre Channel storage?

Yes. You can attach any type of storage (SCSI, SSA, etc.) to your MetaSAN data master, if no other computers need to connect directly to the same storage unit. MetaSAN is designed to run in solo mode and will be able to serve multiple MetaLAN clients. Keep in mind, however, that no failover or load balancing will take place on your LAN network since at least two MetaSAN computers are needed to provide this functionality.

What performance increase can I expect when using MetaLAN?

Much like iSCSI, MetaLAN uses block-level access as oppose to file transfer protocols to transfer data. It is highly recommended to purchase a Gigabit Ethernet NIC and switches that supports Jumbo frames and TOE. It is not uncommon to see significant LAN performance increase on regular 1Gb Ethernet when using MetaLAN. However, the most dramatic performance increase is realized when multiple MetaSAN (or MetaLAN Server) servers contribute to the available LAN bandwidth. Two servers will virtually double the available bandwidth. More servers can be added for increased performances. MetaLAN's automatic load balancing will ensure that the available bandwidth is distributed in the most efficient way.

Why should I use "Jumbo frames" support when using MetaLAN?

"Jumbo frames" extends Ethernet packets sizes from 1500 to 9000 bytes. This increases Gigabit Ethernet NIC and switches payload efficiency tenfold, but is done at the expense of increased latency. Gigabit Ethernet latency is $1/10^{th}$ that of 100Mbps Ethernet. Using "Jumbo frames", the new Gigabit Ethernet latency increases six fold (9000/1500) but is still 66% faster than that of old 100Mbps Ethernet). NIC and switches that integrate the Broadcom chipset support this feature. While Jumbo Frame support is not required, it is highly recommended for optimal performances.

Why should I use "TOE" support when using MetaLAN?

"TOE" stands for TCP Offload Engine and refers to an Ethernet NIC and switches that supports TCP/IP protocol processing for data movement, thus offloading the CPU. While TOE support is not required, it is highly recommended for optimal performances.

Does MetaLAN provide direct access to the SAN volumes?

No. All LAN client accesses to the SAN storage are processed through the machines that are set up as Data Masters (computers on which MetaSAN is installed and which are activated as SAN Members).

Can a whole volume be exported as a LAN share?

Yes, when creating LAN shares – if you don't specify a more specific directory of a volume to be exported as a share, the whole volume will be shared to LAN clients.

How does MetaLAN provide constant availability of the LAN shares?

To ensure persistent and reliable connection, a minimum of two high-speed workstations, directly attached to the SAN must serve as Data Masters. In case one Data Master breaks down, accesses are automatically and transparently redirected through an alternative Data Master, thus allowing LAN computers to reconnect to the shared storage volumes in run-time.

How does MetaLAN avoid bottlenecks at the Data Masters' side?

To avoid excessive burden on any given Data Master, MetaLAN ensures that all requests coming from LAN clients are fairly distributed among the available Data Masters.

Can a SAN definition be managed from a LAN client?

Yes, you can manage most of the settings of all SAN definitions in which your computer is included as LAN client. You just cannot add a volume to a SAN definition, because LAN clients don't see volumes, but just exported shares. Please note that the UI-less version of MetaLAN does not offer this functionality.

Should LAN clients be of the same platform as the SAN Members serving as Data Masters?

No, MetaLAN allow you to deploy a configuration of Data Masters (SAN Member machines) and LAN clients that use any of the three supported platforms – OS X, Windows and Linux, as long as there is a suitable machine (Mac OS X or Windows) to supervise the volumes.

Does MetaLAN provide security for exported shares?

Yes. When volume security is enabled in a SAN definition from which LAN shares are exported, these shares automatically inherit the permissions specified for all volumes.

Do LAN licenses have to be activated on each different machine in the network?

No. In order to connect LAN workstations to the SAN, you should activate LAN client licenses in the SAN definition from which you want to export LAN shares.

- Troubleshooting -

MetaSAN refuses to add a volume in the SAN Definition

On Windows:

- If running MetaSAN 2.1.x or older, check to make sure that your volume is not using GPT partition

On Mac:

- If your volume is larger than 2TB, you need to open MetaSAN and go in "Treatment of non-SAN volumes", click on "Advanced…" and uncheck the volume. Reboot.

I get an "Access denied" error message when accessing my SAN volume

To avoid data corruption from systems attached to the SAN but onto which MetaSAN has not yet been installed, we protect the drive by making it unavailable to the OS. To the user, the access is denied. There are a few circumstances under which this can occur:

- When MetaSAN has been installed, but has not yet been activated.
    - Go to the About page and follow the activation procedure

- When accessing the SAN storage from a machine that is not running MetaSAN (or after uninstalling MetaSAN)
    - If you want to permanently remove MetaSAN and free your storage from any protection, you should remove it from any SAN Definition BEFORE uninstalling MetaSAN
    - If you have already removed MetaSAN from your system, refer to the User Guide or contact our support team.

I get the "general error" message when trying to connect a volume to a workstation

This can happen when communication cannot be established with the remote client machine. Look into the Members list (SAN Management/Members…) and make sure that the machine shows as "online'". If not, see below.

A new member can't join an existing SAN definition

This happens because of a communication problem.

You should NOT try to re-create or import the SAN Definition from another machine as this will create redundant information as oppose to solving the problem. MetaSAN will connect and the volumes will mount automatically as soon as a proper LAN connection can be established with the metadata controller.

Make sure you can ping all the workstations, and make sure there is no firewall preventing communication from taking place.

This can also happen when there are multiple NIC in a system (such as a wireless adapter on a Laptop). In this case, it is important to configure MetaSAN/MetaLAN to use the proper NIC adapter (refer to the User Manual).

Finally, another reason for this problem can be that there is no active Metadata controller (MDC) for the SAN definition. For example, all machines are shutdown and you are installing the last SAN client. The wizard will detect the SAN definition on the disks and will attempt to contact the master. But since the master is shutdown, this attempt to add to the SAN will fail.

I get the "service not available" message when launching MetaSAN/MetaLAN

This will happen when the Ethernet service is not started, or is taking too long to start. Make sure there is an active LAN connection to your computer, as Ethernet services won't start otherwise.

I can't see the volume on the desktop or in Finder (Mac only)

If the volume appears as a SAN volume in MetaSAN Volume Page, but is not mounting in the desktop, click "Refresh Finder" in the Utilities pages.

It takes a long time to open the "SAN Management" page of MetaSAN

The system is trying to connect with the other machines on the SAN. You can add the IP addresses of all members on the local hosts definition. Contact Tiger support for details on how to do this.

I made changes to my SAN Definition, but the old information keeps re-appearing

Make sure all members are up and connected to the SAN when making changes to a SAN Definition so that the information gets broadcasted to all. Otherwise, a workstation may still contain old information when it boots up that will be propagated to other members.

Storage performance is lower than specified by the storage manufacturer

Have you tested performance prior to installing MetaSAN as recommended? Performance measured on the metadata master machine as well as client should only be marginally slower. Performance on the master will be identical if you uninstall MetaSAN. Contact your storage vendor if you feel you are not getting the right performance.

Be aware that the performance of the storage varies when the storage is accessed form one host and multiple hosts. The total performance achieved from multiple hosts is not equal to performance achieved when accessing the storage from just one host. This is because of the randomization of the access. Unfortunately, you cannot measure the performance from multiple hosts without MetaSAN unless you are prepared to corrupt your file system. Some customers have measured good performance from a single host (prior to installing MetaSAN) and it was better than when hitting the storage from multiple hosts (after installing MetaSAN).

I notice a decrease in performance when attaching multiple machines to my SAN

One can falsely assume that MetaSAN delivers poor performance, when in fact it is the storage unit that doesn't deliver the same throughput when multiple files are being accessed simultaneously. That's because the disk's heads needs to swing from one end of the platter to another (as oppose to performing sequential reading or writing). Performance

test utilities such as IOMeter can easily demonstrate this and should therefore be run before installing MetaSAN and connecting multiple machines to the SAN. For high-performance SAN, specialized storage is often chosen that includes special mechanism designed to better handle simultaneous accesses. This explains why storage pricing can vary greatly for apparently similar performance and capacity. Your Tiger Reseller will assist you in choosing the right storage.

Storage performance is much slower on one machine than on others

MetaSAN is probably running in LAN failover mode. To confirm, open the Volume Page of MetaSAN and check if there is a "network" connection appearing underneath the SAN volume icon.

If so, look into disk manager to see if the disks are visible. Chances are that the LUNs cannot be seen. MetaSAN won't be able to connect if the OS cannot see the LUNs. Verify that your Fibre Channel adapter, and/or cable, and/or FC switch are functioning properly.

Why are recycling bins not supported on SAN volumes?

The recycle bin is disabled intentionally on SAN volumes. The reason is that a separate recycle bin is created for each user. User Administrator for machine A and machine B are different users (they have different user IDs) and separate recycle bins are created. If recycle bin is enabled, it may be impossible to identify where your free space on disk has gone. For example, when you log in with user A on machine A you can permanently delete all files from the disk. Your recycle bin is empty and you do not see any files in it. However, if other users used the recycle bin, you will not see these files. But you will notice that even if there are no files on the disk, you will not have the entire capacity of the disk. In this was the case, the user would think that the file system is corrupted and that MetaSAN has eaten the free space!

Files and/or folders are disappearing from the SAN

Your file system is most likely getting corrupted. Before you lose all content, make sure to run a Check Disk with repair. This resulted from application freezing or inappropriate machine shutdown. In a direct attach configuration, the operating system performs automatic check disk on reboot to clean up any files left open. However, check disk is disabled on a SAN (see below). It is always good practice to perform regular check disk to maintain a healthy file system and prevent losing data.

I can't run check disk or defrag software

You can't run Check Disk or Defrag software safely on a SAN volume as multiple machine can read & write to it while the file system is being updated. It is therefore necessary to first Disconnect all members from the SAN volume (SAN Management/Volumes…/Disconnect all), then mount the volume as Private (SAN Management/Volumes…/Private) on one machine. You can then run the software safely. Reconnect all members when done (SAN Management/Volumes…/Reconnect all).

Browsing folders take more time on the SAN

Browsing very large folders containing thousands of files will not be as fast as on a local drive. That's because a metadata request must be sent over the LAN for every file that

needs to be listed. A dedicated LAN network for metadata traffic and faster LAN connection will optimise performances.

Thank you for your support of Tiger Technology.
We trust that MetaSAN will become an indispensable tool for you.