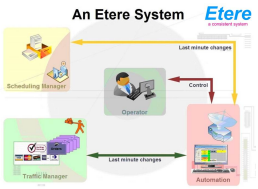
ETERE Automation Configuration

Etere Automation configuration includes an overview of Etere Architecture and Etere Hardware Guidelines.



An Etere System

Etere Architecture Manual
This document is intended to provide an overview of an Etere system, the installation requirements and characteristics, the recommended configurations, the supported interface devices and the improved redundancy of system. The document describes the key characteristics of the architecture of Etere as well as giving a brief comparison of Etere against traditional broadcast systems.

Etere Hardware Guidelines
Etere software system provides a number of modules that can be installed on multiple servers and computers. Every broadcast system is different, for this reason, we suggest you to submit your system configuration to your Etere Sales contact for a complete check. They will be able to give you suggestions how to improve the performance and cost efficiency across the entire enterprise.

Etere Requirements

Operating System

All Etere products are built specifically only for the Windows platform. Etere assures complete support for the following Microsoft Windows operating systems:

☐ Microsoft Windows Server 2016 (with desktop experience)
☐ Microsoft Windows Server 2012
☐ Microsoft Windows 8 (32-bit and 64-bit)
☐ Microsoft Windows Server 2008
☐ Microsoft Windows Server 2008 R2
☐ Microsoft Windows 7 (32-bit and 64-bit)
☐ Microsoft Windows Server 2003
☐ Microsoft Windows 10

It is important to note that, sometimes, operating systems does not automatically install some features that are usually related to multimedia; thus the operating system needs to be updated to the latest Microsoft Service Pack as well as to .Net framework 4.5 or higher (including the latest .net service pack).

Etere
a consistent system

Etere Devices

The Etere System is a complete software solution and does not require dedicated hardware of a specific type. broadcasters are free to choose their own preferred device brand to interface Etere. The only requirement is that the hardware must be compatible with MS Windows. Any device can be connected using Serial Hubs, Serial Boards and GPI.

Serial Hubs

Etere's distributed architecture provides networks with "distributed controls". By using off-the-shelf hardware, Etere Automation is able to virtualize old RS422 controls, thus allowing each Etere PC to control all the devices present in the network without installing an interface or a serial cabling.

Many PCs are able to control the same device (i.e. Master Control, VTR, etc.) without any direct connection, resulting in fewer serial cabling, fewer connection problems, maximum flexibility and the leverage all the benefits provided by standard fast Ethernet network. Serial devices servers provide embedded networking capabilities at high-speed for serial devices. The following Ethernet-to-RS422/RS232 hubs are recommended:

☐ Moxa NPort 54xx series
☐ Moxa NPort 56xx series
☐ Moxa NPort 6650 series including the NPort 6650-8 (RS422/232/485 - 8 ports serial device server) and the NPort 6650-16 (RS422/232/485 - 16 ports serial device server)

For more info, please check www.moxa.com

Serial Boards

Serial Boards are quite obsolete but still supported by ETERE. A serial board is about 5 times less expensive than a Serial Hub with the same number of ports. Serial Boards RS232 or 422 with 2-4-8-16-32 ports are still available on the market. Serial Boards statically Interface computers to devices. They are less flexible than serial hubs but they can be recommended for cost effective small networks.

GPI Devices

ETERE ensures GPI usage (i.e. General Purpose Interfaces). Actually, GPI are still used even if they are completely obsolete. General Purpose Interfaces are divided in output and input GPI, respectively Contact Closures and Input voltage. Etere suggest the following GPI Cards:

☐ Advantech USB-4761 (USB interface adapter)
☐ Quancom USB-OPTOREL16/32 (USB interface adapter)
☐ Advantech ADAM-6060 (6IN + 6OUT)
☐ Sealevel System 8206/8207/8208 (USB interface adapter)
☐ Advantech PCL-725/730
☐ Advantech PCI-1736/1750/1756/1760

NB: Please note that Advantech cards support 32BIT OS only. For more info, please check www.advantech.com

Tape Libraries and drivers

All tape libraries compatible with Microsoft Windows are supported including:

☐ ADIC All models
☐ HP All models

☐ IBM All Models
☐ Oracle Storagetek (All models)
☐ Overland storage
☐ Sony Petasite
☐ Spectralogic (All models)
Please consult the Microsoft HCL (MS Windows hardware compatibility list) for other models.
As for tape libraries, also all tape drives compatible with Microsoft Windows are supported, including:
☐ HP LTO 1-2-3-4-5-6-7
☐ IBM LTO 1-2-3-4-5-6-7
☐ Quantum DLT
☐ Seagate LTO 1-2-3-4-5-6-7
☐ Sony DTF-2
☐ Sony ODA
☐ Sony Sait-1
☐ Sony Sait-2
Please consult the Microsoft HCL (MS Windows hardware compatibility list) for other models.

Time code readers

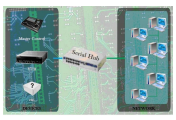
The following timecode read cards are suggested:
☐ Adrienne USB - LTC/RDR

Etere ET0558 and Redundancy

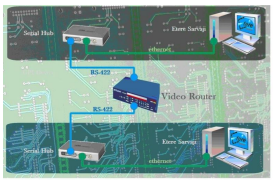
ET0558

Etere ET0558 is a device to carry out simultaneous switching of main/backup equipment, whether controlled via GPI or via RS232, RS422, and RS485. The ET0558 can be used to bring redundancy to your system if some of the devices that compose it are not redundant, that is, if your system has the following characteristics:

- ☐ 2 automations
- ☐ 2 playout servers
- ☐ 1 master control
- ☐ 1 logo generator
- ☐ 1 crawl generator



Please note that if your system does not meet the characteristics described above, the ET0558 device is not required.
The ET0558 device is able to switch the control of all the devices control from a Main to a Backup resource. The switch between Main and Backup can be performed by ET0558 either using a GPI or a Serial device. In the figure below it is illustrated how ET0558 can easily switch a Master Control on a decoder output via GPI, or a Logo Generator through a Serial connection.



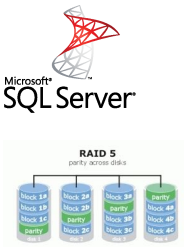
Router redundancy

In case you do not have a redundant router, Etere can be redundant on the router connection. Your router must have 2 serial ports, to have a redundant control, the 2 serial ports will be connected to 2 Sarvaji software which run on 2 Pc's and using 2 different Serial Hubs.

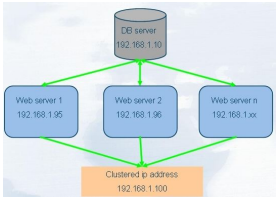
Etere will take care to run the same command from the 2 ports, so if one PC or Serial Hub fails, the router will continue to be controlled normally.

Database

Etere's software solution is based on the Microsoft SQL Server architecture that provides the whole system with a rich and powerful environment, and the best performance engine. Etere's software solutions has been designed to work with all versions of Microsoft SQL Server, including the free Express Edition (the best suited for smaller installations) and the professional editions (for larger installations).



The hardware suggested by Etere for hosting an SQL Server depends on various factors such as clients number, playlist number and the fault tolerant method, however, an standard configuration that guarantees a good performance should include the following hardware:
Recommended requirements for: Microsoft SQL Server 2008 R2



[Processor]
Xeon multi-core processor (2.0 GHz or faster)

[Framework]
.NET 4.5 (From Etere 28.1 and newer, .NET 4.5 is required)

[Operating System]
Windows 2012
Windows 2008 R2

[SQL Server]
SQL Server 2012
SQL Server 2008 R2
SQL Server 2008
Note: Please note that the list above is ordered from most to least suggested versions, SQL versions older than 8 years are excluded as they are not supported.

[Memory]
8GB RAM (or higher)

[Hard Disk]
System volume: n°2 HDD x 300GB (or bigger) configured as RAID1
SQL Volume: n°8 (or 12) HDD x 300GB (or bigger) configured as RAID10 (preferred) or RAID5 divided into 3 logical partitions (i.e. data, logs, tempdb)

[Drive]
DVD-ROM drive

[Display]
Super VGA (1024x768) or higher-resolution video adapter and monitor

[Devices]
Mouse or any compatible pointing device

[Other Requirements]
Microsoft Internet Explorer 7.0 or later
Latest MS Windows and MS SQL Server service packs
Dual network gigabit adapter configured in fault tolerant

Redundant power supply (strongly advised)

[NOTES]
Any computer brand (e.g. HP, IBM, Dell, Fujitsu Siemens)
Detailed specifications on SQL Server 2012 are available on the Microsoft's webpage

This chapter is a guideline for implementing an ideal SQL Server installation, from a performance and fault tolerance point of view. Since the Etere's database must have high availability for data access, it is suggested that the PC(s) that hosts an SQL Server goes beyond the minimum hardware recommendation, in order to assure the maximum possible SQL performance, the considerations listed below are suggested:

[Disk]
Redundancy and fault tolerance can be improved by using a hardware RAID (which provides more performance that an Operating System RAID). Suggested RAID configurations includes:
☐ In order to improve responsive times, use fast HDD systems (7200RPM or faster)
☐ As reported by the tests performed by Etere, there's no difference between using SATA / SAS / SCSI / FC disks
☐ The system performs better if you have a large number of small HDD instead a small number of large HDD,
☐ In case a large and mission-critical solution is required for an automatic SQL database switch in case of fault, Etere suggest configuring a SQL Server failover clustering solution based on the following recommendations:
* All disks to be used for external storage must be configured into a single RAID-10 disks array,
* The configured RAID-10 disks array must be divided into three (3) logical partitions for "DTC", "Quorum" and "Data" (i.e. physical database, logs and tempDB),
* Each RAID-10 cluster node's disk hosting the operating system must be mirrored,
* It's worthy mentioning that the disk configuration is held under customer's own criteria and responsibility, therefore, Etere will not take any responsibility in case of poor database performances due an omission of the customer in relation to the suggested configurations,
☐ In case the system is intended to host multiple databases, please refer to the related Microsoft SQL Server recommendations

[Processor]
The performance of a database server depends, as for any other computer system, on the CPU it was designed for processing information. In these terms, Etere strongly suggest customers to take into account the following recommendations:
☐ Depending on overall usage, you might consider dual processors, if it is intended to use your server as more than just a database server, dual processors would allow the O/S to balance the load between the database engine and the O/S and other applications
☐ It is recommended to scale up the server's processor (faster processors SQL Server will process queries faster), and in some cases also to scale out them (multiple processors may improve fault tolerance and maybe necessary for some very large databases)
☐ Input/Output performances are more important than CPU power since database applications can extremely Input/Output intensive,

remember it when selecting a disk system by choosing the faster ones

[Memory]
An insufficient amount of RAM can cause the SQL server to continually read data from disk instead of cached memory, this will significantly impact on query performance. In order to guarantee an optimal performance follow the next recommendations:
☐ Have an appropriate amount of memory to process queries more efficiently (by holding more data in the cache)
☐ Reserve physical memory for SQL process by specifying the 'working set size' of the dedicated SQL Server
☐ Use all the system CPU for SQL to allow the entire system to have a better performance

[Network]
☐ Almost half of all database-performance-related issues are related to the network on which it is shared, therefore, it is important to follow the recommendations below:
☐ Network Interface Cards, Routers, Hubs, and Cabling must be of a high quality
☐ The network components and cabling must be professionally installed
☐ Avoid WI-FI if your database is heavy-duty or even medium-duty, the connections just aren't fast enough and can be unreliable due to interference from many sources (e.g.: microwave ovens)

[Maintenance]
☐ A database which follows a periodical maintenance plan will provide better performances with respect to another which does not. The Etere database used by the system should meet the following recommendations:
☐ Perform a daily database maintenance including system backup as suggested by the ETERE user manual
☐ Use a simple recovery model to have a simple backup that can be used to replace the entire database in the event of a failure or if it is needed to restore the database to another server

[RAID Levels]
This chapter is intended to illustrate the standard RAID (redundant array of independent disks) levels typically implemented with SQL Server, including for each level a brief explanation of the major differences with respect to other levels:

RAID 0: (Stripping)
☐ In Raid 0 system, data gets split up in blocks that get written across all the drives in the array.
☐ RAID 0 has Superior I/O performance
☐ RAID 0 is not fault tolerant
☐ If one disk fails, all the data in RAID 0 arrays are lost
☐ RAID 0 should not be used in mission critical systems

RAID 1: (Disk Mirroring)
☐ RAID 1 provides a redundant copy of the selected disk
☐ RAID 1 improves read performance but degrade write performance

RAID 5: (Stripping and Parity)
☐ RAID 5 stripes the data across the discs and also adds parity

information to provide fault tolerance
☐ Parity information is distributed among all disks
☐ If any one of the disk fails, read performance decreases
☐ Requires at least 3 disks to implement
☐ Raid5 has poor write performances than Raid0 or Raid1

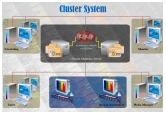
RAID 10: (1+0)
☐ RAID 10 includes both stripping without parity and mirroring,
☐ RAID 10 offers better availability and performance than RAID 5, especially for write-intensive applications,
☐ RAID 10 is best practice to have data files and log files placed in separate disks so that you can improve performance and reduce disk contention.

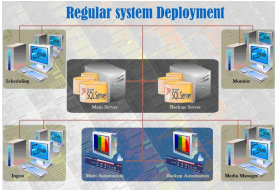
[Fault tolerance]
In case your system has a Main and Backup database, Etere Backup allows you to keep booth of them synchronized, this tool is given for free by Etere to its customers and also permits to perform automatic Backup and Restore procedures, Etere Backup is easy to configure and works with all the SQL version being thus a very simple, useful and versatile failover tool.

Alternatively to the use of Etere Backup, it is always possible to use any other method to increase the database fault tolerance including the following ones (which are explained in detail in the SQL how to) document):

☐ DB Replica: need to be dismount every time is changed the DB structure
☐ DB Backup: automatic schedule procedure can be apply, manual restore
☐ DB Mirroring: it can impact heavily to the server performance
☐ DB Clustering: high availability solution, automatic failover

Some Configuration Samples





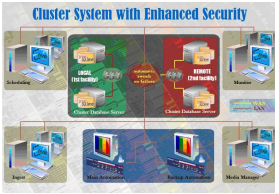
Demo Only
This is the simplest configuration and must be used only for demo purposes, because being this a single-Pc installation if there are too many heavy processes taking place on it, they won't allow the system to work according to the specified Frame Accuracy.

This ETERE installation requires the following steps:
☐ Install the Free SQL EXPRESS provided with The ETERE Setup, on the same PC
☐ Run the setup utility to start the installation.
Please note that SQL database is a basic requirement. SQL MSDE has to be installed if other SQL versions are not already running on the system. Only Etere Automation is recommended for demo purpose installations. PC performances will not be reduced too much and the expected software productivity can be experienced.
Small Networks
Small networks with maximum five PCs connection are usually common configurations with a very good balance between quality and price.

Small Networks with Fault Tolerance
Small networks fault tolerant are based, at least, on two OS XP computers synchronized as Main and Backup. An example of configuration is shown in figure A.3 in this case you install ETERE in both the main server and the backup at the same time. Compare figure A.2.
This Kind of configuration provides a good fault tolerance but with SQL EXPRESS limitations as well. The user manual reports detailed operations on how to:
☐ Install two SQL servers and two PCs in a Main and Backup mode
☐ Sync two databases using ETERE Backup in the backup server
If wider networks are required, windows Server 2012 and SQL Server 2012 are recommended. In this case, the system size limit depends only on the number of purchased licenses. In order to save money, a common MS XP OS running SQL EXPRESS can be employed; but if the Main Server crashes the system is still reduced to SQL EXPRESS limitations (see chapter A.1.2). Pay attention, the Automation PC doesn't charge the five Pc connection allowed by SQL EXPRESS because it accesses the database at the startup only.
Regular System Deployment
The Regular system deployment is used for large-scale networks, employing two SQL servers and two shared folders acting as Main Backup solution. Under this scenario, the switch between the Main and the Backup server can be performed manually by an operator, or automatically in case the Main server fails.
Cluster System
If real continuous operations are needed, the Microsoft cluster system is recommended. Actually, The Microsoft System switches automatically in case of hardware failure. The still alive backup system can be employed as a backup recovery.
Cluster System with Enhanced Security
Due to its distributed architecture and its deep SQL relation, Etere is able to provide high redundancy levels for partial system failure through an embedded Disaster Recovery capability to avoid broadcasting interruptions in case of entire site crash.
A Disaster Recovery implementation permits the system to rely its

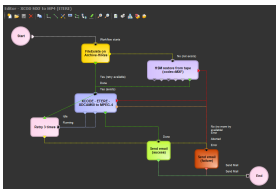
database server on two different sites (facilities) connected through a wan connection, and intelligently managed to enhance remarkably the level of security of the entire system with an unparalleled level of redundancy

Etere Datamover



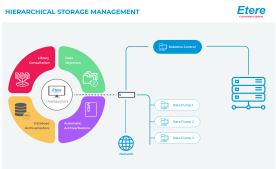
☐ A data mover moves a large amount of Data between storages. We suggest to use the fastest interface available
☐ Etere can use load balancing NIC as NAS or SAN storage
☐ You can use more servers to increase bandwith. Etere uses clustering to distribute the load among servers
☐ Etere's load balancing technology loads each server to the maximum capacity possible
☐ HP DL3xx, Dell PowerEdge R720 or similar servers are suggested

Etere Transcoder



☐ A transcoder changes the video format and code. Transcoding is a CPU intensive task, thus, transcoding servers need to have powerful CPU and more CPU as needed. Also RAM is important as well to speed up the operation
☐ Some transcoding formats as H264 can use the GPU, so it is important that a H264 GPU
card is available in the server. Etere uses the best GPU and CPU acceleration in the market
☐ Etere load balancing technology optimises resources and prevents overloading of any single resource
☐ HP DL3xx, Dell PowerEdge R720 or similar servers are suggested

Etere HSM



☐ For best performances we suggest to use 1 data pump server for every LTO, this is recommended but not mandatory
☐ A local cache is suggested to use the best of your LTO, we suggest a RAID0 system of 2 times the capacity of the LTO drive
☐ No fibre channel switch is needed as the drive can be connected directly with LTO
☐ Interface can be FC I-SCSI, SCSI or any others supported by Windows