



FlipFactory®

INTRODUCTION TO FACTORYARRAY

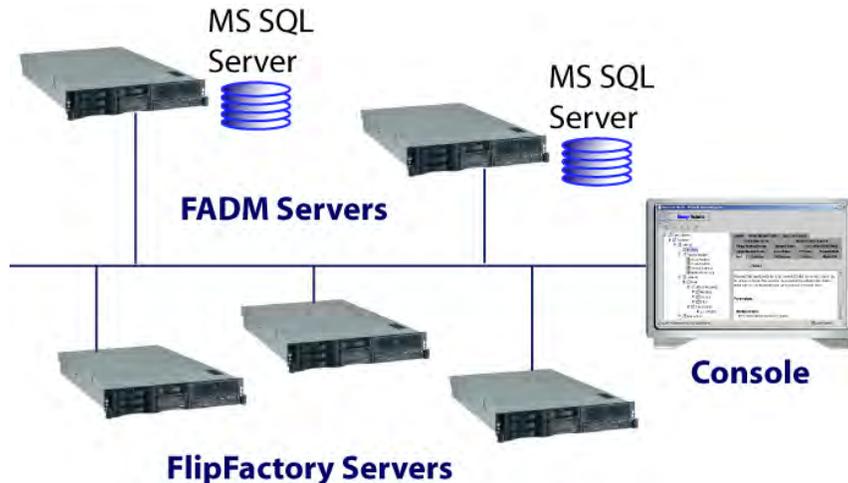
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This
App Note
applies to
versions
6.1 & later



FactoryArray Overview

A FactoryArray is a collection of two or more FlipFactory servers implemented in a load balance group, under operational control by two FactoryArray Database Mirroring (FADM) services, each controlling a Microsoft SQL Server database, synchronized to process jobs efficiently and reliably.



FactoryArray load balancing speeds workflows and increases job processing capacity, and if a FlipFactory fails, the other FlipFactories in the array continue to balance and process jobs. FactoryArray enables a FlipFactory operating at transcoding capacity to send jobs to an idle or under-utilized FlipFactory for processing.

FactoryArray also reduces the risk of job failure by coordinating multiple FlipFactory servers, which automatically pick up monitors and recover jobs in the event of a FlipFactory failure.

The FactoryArray Database Mirroring service utilizes a dynamically-assigned primary and secondary database, which helps safeguard your FlipFactory database against software, hardware, and system failures. Database mirroring replicates jobs in real time to provide automatic recovery for all jobs and FlipFactory servers with no single point of failure, increasing overall durability.

FADM automatically switches the secondary database to primary to use the mirrored version whenever the primary database is unavailable – without interruption of service to any FlipFactories in the array. As a result, your FlipFactory cluster always has seamless, fault-tolerant database support.

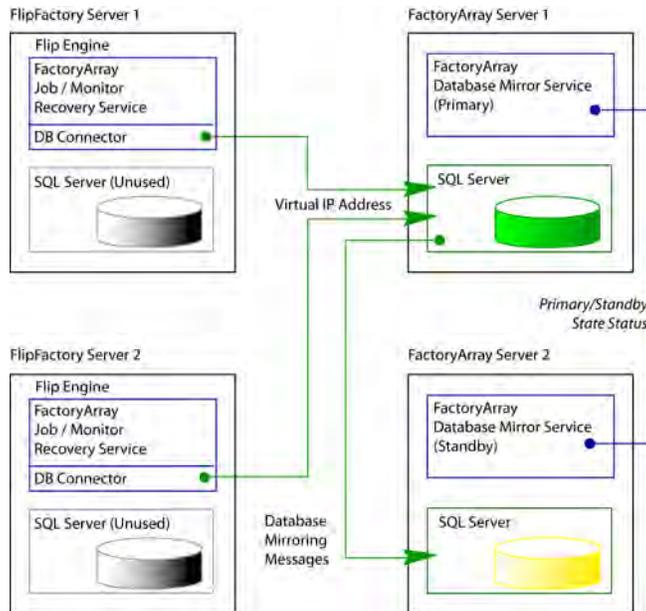
A FactoryArray with 20 or more FlipFactory servers is not uncommon, but this number of integrated FlipFactory servers is the exception rather than the rule. While there is no theoretical limit to the number of servers in an array, there is a practical limit.

As a rule of thumb, Telestream recommends implementing no more FlipFactory servers in an array than the number of cores you have in a typical FlipFactory server. For example, if you use Dual Quad-Core-based servers, you should implement no more than 8 FlipFactory servers in the array.

Note: *Be sure to name your FlipFactory servers using only approved characters, patterns and length of string, per Microsoft naming conventions for your operating system, which generally follow DNS naming conventions (RFC952). Failure to do so will result in networking problems, especially in a FactoryArray*

FactoryArray Architecture

The figure below depicts a typical FactoryArray implementation: two FlipFactory servers (left) and two FactoryArray Database Management servers (right).



Notice that FlipFactories on both FlipFactory Server 1 and 2 are depicted as operating under control of the *primary* SQL Server database on FactoryArray Server 1 (running FADM) and the SQL Server databases installed on the FlipFactory servers are *never used* in the array.

Telestream recommends against installing FADM Service on FlipFactory servers, to improve risk mitigation. FactoryArray servers must be on the same subnet as all of your FlipFactory servers or your IT department must have your network configured to operate correctly across multiple subnets.

Job and Monitor Recovery

Job recovery is the process of restarting jobs from a failed FlipFactory. If a FlipFactory fails, other FlipFactory servers in the array are assigned to re-process the job. The failed FlipFactory's monitors are also restarted on another FlipFactory and continue to operate normally.

Job and monitor recovery can significantly reduce risk of failure. Job and monitor recovery is a component of each FlipFactory. Job and monitor recovery is a peer-to-peer service which permits all FlipFactories in the array to restart jobs and monitors for continued normal operation.

Database Mirroring and Recovery

To enable database mirroring and recovery, FactoryArray Database Mirroring (FADM) service is installed on two independent database servers. Next, you attach each FlipFactory to the FactoryArray database via a virtual IP address controlled by FADM.

Note: A virtual IP address is an actual address assigned by your network administrator that is shared by both FactoryArray servers dynamically. By sharing the virtual IP address, FlipFactory database server responsibilities can be moved from one server to another if necessary (by adding the virtual IP address to the primary server's network interface under FADM control) without interrupting operations.

The two databases are identified dynamically as *primary* and *standby*. The server's network interface where the Primary database is running is dynamically assigned the virtual IP address.

If the primary FADM service (or server) fails, the standby FADM service assumes responsibility (becoming the primary FADM service) by re-assigning the virtual IP address to its network interface and continues without FlipFactory interruption. When the failed FADM server comes back online, it assumes standby responsibility.

Database mirroring and recovery eliminates the single point of failure, ensuring continuous operation if any single FlipFactory or FADM service fails. (Other events can occur in a network external to FlipFactory services that may render some or all of the factories inoperable).

Job Load Balancing

Load balancing in an array speeds workflow and increases capacity, and if a FlipFactory fails, the other FlipFactories in the group continue to balance and process jobs. Load balancing enables each FlipFactory to operate at transcoding capacity to send job tickets quickly to an idle or under-utilized FlipFactory for processing.

When jobs are submitted either by a monitor, manually, or via the FlipFactory API, preference is given to FlipFactories that are idle. That is, when a job is accepted into the array database, FlipFactories that are idle will accept a job from the database for processing before one that is already processing jobs. For example, if you have a 3 FlipFactory array and two of them are processing jobs (either localizing, flipping, delivering or notifying), a new job that is submitted will be accepted by the FlipFactory that is idle.

Implementation Requirements

In order to enable a group of FlipFactories to share jobs, assume monitor responsibility and operate from a centralized, dynamically-assigned database, certain implementation requirements are imposed.

Externalizing Media Storage

FactoryArray configuration involves specific storage implementation requirements that you must follow in order to ensure full access to media, monitor and destination shares, and job recovery – all aspects of ensuring the most durable configuration. During load balancing and when job and monitor recovery occurs, FactoryArray may assign a different FlipFactory to process the job.

To eliminate media access failures, you should not use local (FlipFactory server) drives or volumes – always use external storage – dedicated file servers, SANs or RAIDS; ideally connected via GigE/Fibre Channel for highest file transfer speed. Also, you must never reference drive letters in the monitors, destinations or notify components of factories. Always use shares, and always use

UNC paths to reference them except in a SAN, where the storage is represented as a physical mapped drive on each FlipFactory server.

Configuring Stores

A FlipFactory *store* is a virtual location where media files can be organized into categories. Stores can be based on content type (news, spots, etc.), by content source, or any other strategy appropriate for a specific application. Stores can be associated with one or more physical volumes.

Stores are used by monitors in FlipFactory to *localize* (duplicate the original media from its monitored location directly to the FlipFactory server) media to speed transcoding.

Note: *For a comprehensive discussion of stores, with instructions for implementing and configuring them using Registry keys, see Adding Custom Stores in the FlipFactory User's Guide in Chapter 6, Customizing FlipFactory.*

When you define stores for use by any factory in a FactoryArray, always make sure that each store points to a share or other network-accessible store (SAN or NAS), not a local drive. Additionally, the share should be on a dedicated file server, SAN, or NAS, and ideally connected via GigE Ethernet/Fibre Channel for high speed access.

Using shares ensures that each FlipFactory in the FactoryArray which is assigned to recover a monitor and process jobs from a failed FlipFactory can still access the media.

The default FlipFactory store is named *media*, and it is defined as a local folder: *C:\Program Files\Telestream\FipFactory\HTTPMedia*. The default media store (and any other store you define) in each FlipFactory must be modified, and published as a network-accessible share, and it should always be referenced using its UNC path.

Using Identical Registry Settings

All customization of FlipFactory, including store definitions, authentication, media and job expirations, cycle times, etc. are stored in the Windows Registry – *locally* – on each FlipFactory server.

FlipFactory resources (including registry settings and media) stored locally can be problematic when recovery is attempted because the registry settings that control the failed server are not available to the FlipFactory server that is responsible for the recovery task.

Therefore, to accomplish load balancing, job and monitor recovery, each FlipFactory must have identical registry settings, including:

- Monitor and destination authentication settings
- Media and Job database expiration periods
- All stores
- Cycle times
- Spot server start and end frame offsets
- Other custom FlipFactory registry settings

For details on setting up these setting correctly, see the FlipFactory User's Guide.

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FlipFactory is designed for professionals skilled in the art of digital media transformation and workflow automation to facilitate the automation of complex media operations and workflow that require a multitude of input and output media formats, delivery to various types of media devices and file systems, and notification of media systems including broadcast automation systems and media asset management systems.

The FlipFactory architecture and user interface is designed to provide maximum flexibility in the setup and configuration of these complex media transformations and workflows. In providing this high degree of flexibility, it is possible for media transformation and workflow processes to be configured that are impractical, likely to result in unexpected or unintended results, or beyond the limits of FlipFactory to perform satisfactorily. Additionally, FlipFactory may be executed on a platform that lacks the performance or capacity to perform the media transformations and workflows you've configured, which is your responsibility to specify. Telestream has implemented FlipFactory to provide the greatest flexibility without limiting its functionality to only those transformations and workflow that are known with certainty to be within its performance capabilities, including those limits imposed by the platform upon which you have installed FlipFactory.

Therefore, you acknowledge that you may create transformations and workflow that are impractical or beyond your FlipFactory installation's limits, and Telestream does not warrant that each transformation or workflow you specify or use will complete without error.

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