

The logo for Facilis Technology features a stylized, dark blue graphic on the left that resembles a speech bubble or a dynamic arrow pointing towards the right. The word "FACILIS" is written in a large, bold, white, italicized sans-serif font, and the word "TECHNOLOGY" is written below it in a smaller, white, all-caps sans-serif font.

FACILIS TECHNOLOGY

Online Certification Training:
Version 7 / 7.1



Facilis Key Concepts

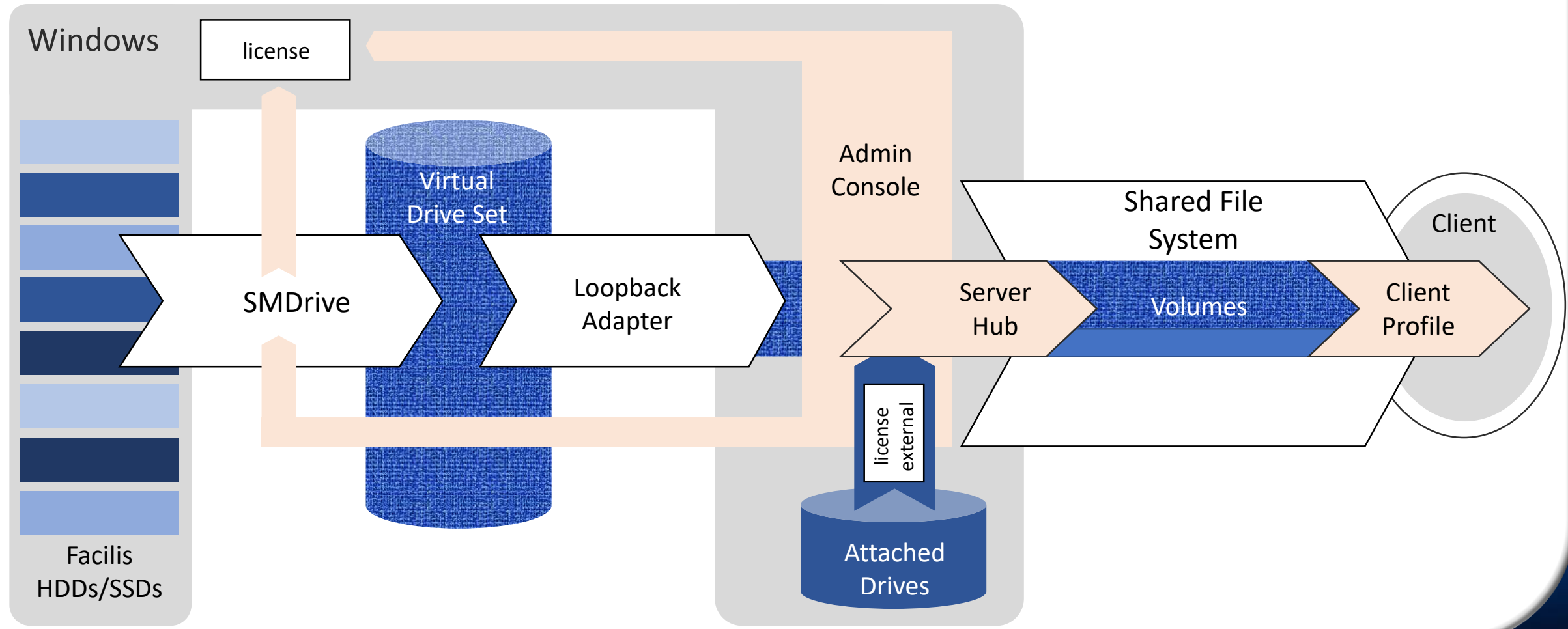
The Key Concepts of Facilis Shared Storage

In order to understand the features of the Facilis system, it's important to know the role of each part of the software and hardware, and how they work together.

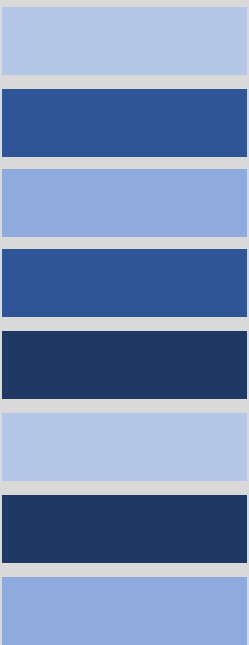
The following will take you through the processes responsible for delivering data to the client, and receiving data from the client to be written to the drive set.

It's important to know how to access each of these software components, and how to tell if each is running, in order to help troubleshoot problems.

Standalone Facilis Server Data Flow Overview



Windows



Facilis
HDDs/SSDs

The Drive Group

Drive groups can consist of 8, 12, or 16 drives.

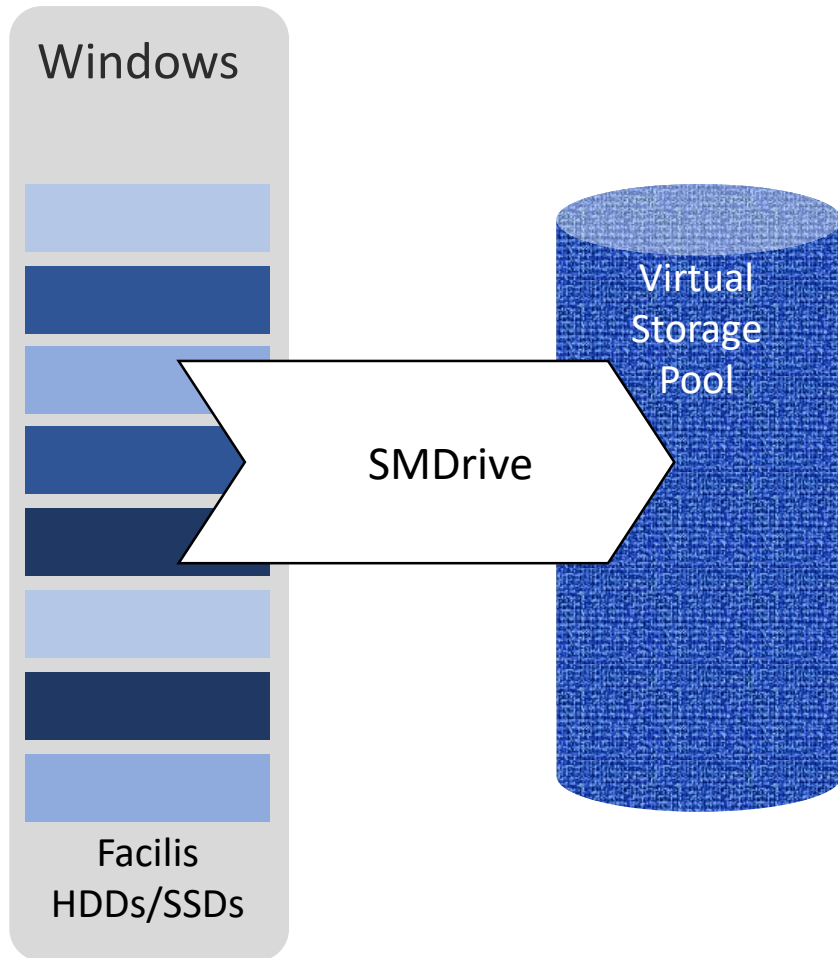
Up to two similar drive groups can be combined for internal spanning.

Up to eight similar or dissimilar drive groups can be combined for external spanning.

HDDs and SSDs cannot be spanned on a single volume.

The drive group (unallocated disks) is seen inside Windows disk management. The number of unallocated disks should match the drive group of the server model.

Facilis HDDs/SSDs are factory modified to work in Facilis systems - externally sourced drives will not be usable as part of a Facilis drive set.

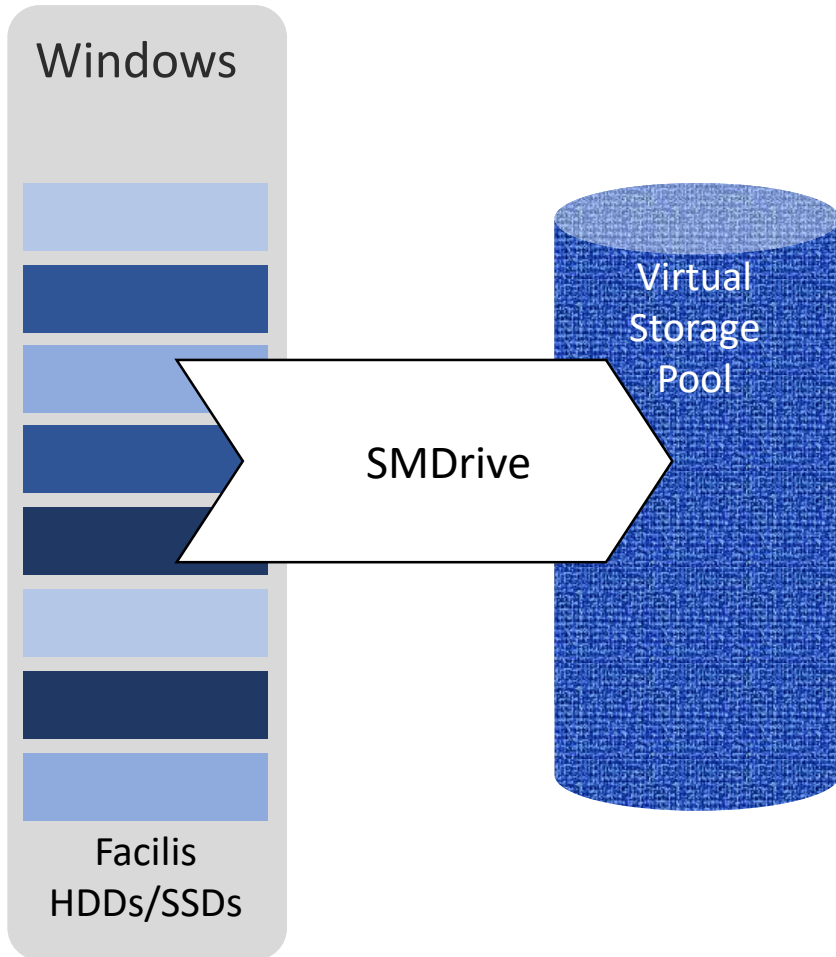


SMDrive

SMDrive reads proprietary data on the drive set in order to produce a virtualized pool of storage. The storage pool is not seen inside Windows, only within Admin Console.

SMDrive is the heart of the drive set virtualization and RAID engine for Facilis servers. SMDrive handles low-level aspects of drive replacement and recovery, volume creation and data I/O.

SMDrive is monitored with SMDrive Monitor (yellow arrows icon).



SMDrive Monitor

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SMDriveMonitor - Shortcut
Disk 4 Vendor Facilis Product SSD 850 PRO 1TB Serial S2BBNEAG110109P Blocks 2000409263 GB 1024
Disk 5 Vendor Facilis Product SSD 850 PRO 1TB Serial S2BBNWAG109259F Blocks 2000409263 GB 1024
Disk 6 Vendor Facilis Product SSD 850 PRO 1TB Serial S2BBNWAG109208M Blocks 2000409263 GB 1024
Could not find disk 6 in partition 1
Found 54 Logical Volumes
Found 19 Users
Have a failed disk 6
Listening on port 859 for socket connections
Facilis file system support initialized
Facilis storage service 7.1.0BD started Wed Jan 03 17:18:48 2018

Disk 25 Vendor Facilis Product SSD 850 PRO 1TB Serial S2BBNWAG109257A Blocks 2000409263 GB 1024
Reactivating missing disk 6 for recovery
Starting recovery on SSD8 ID 4 Thu Jan 04 08:56:12 2018

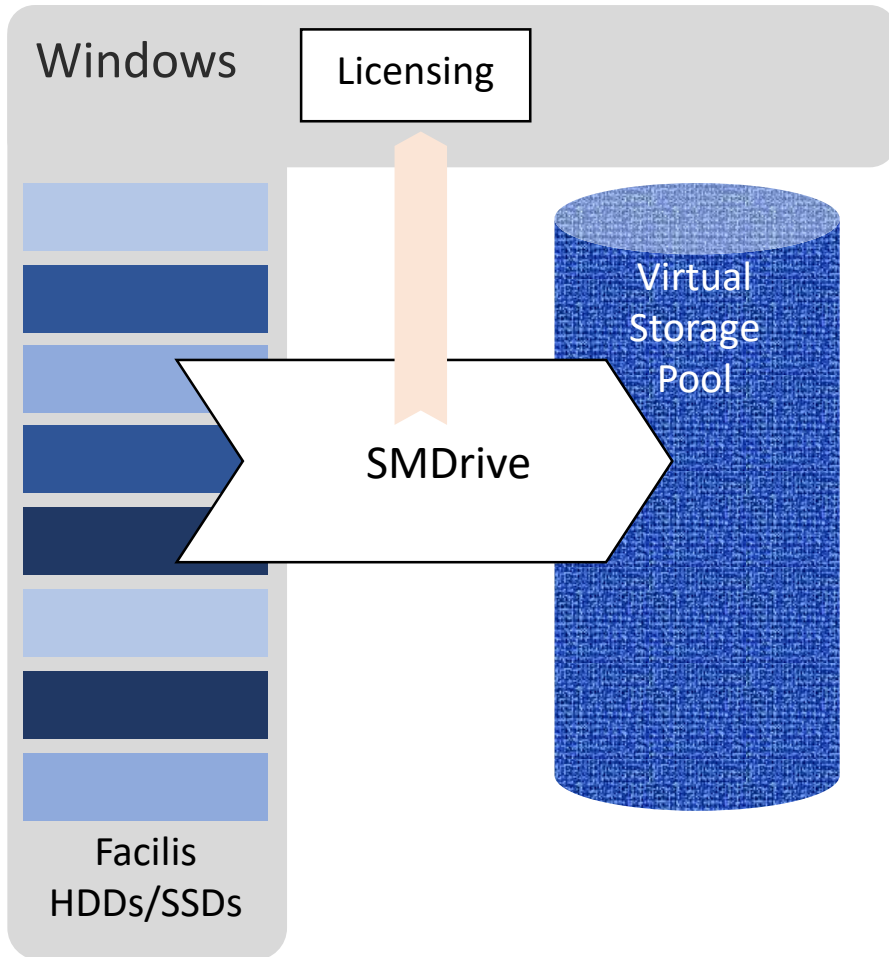
Finished recovery on SSD8 status SUCCESS Thu Jan 04 09:02:10 2018

Starting recovery on Transfer ID 5 Thu Jan 04 09:02:10 2018

Finished recovery on Transfer status SUCCESS Thu Jan 04 10:18:15 2018

Starting recovery on Training ID 7 Thu Jan 04 10:18:15 2018

Training 84% complete
    
```

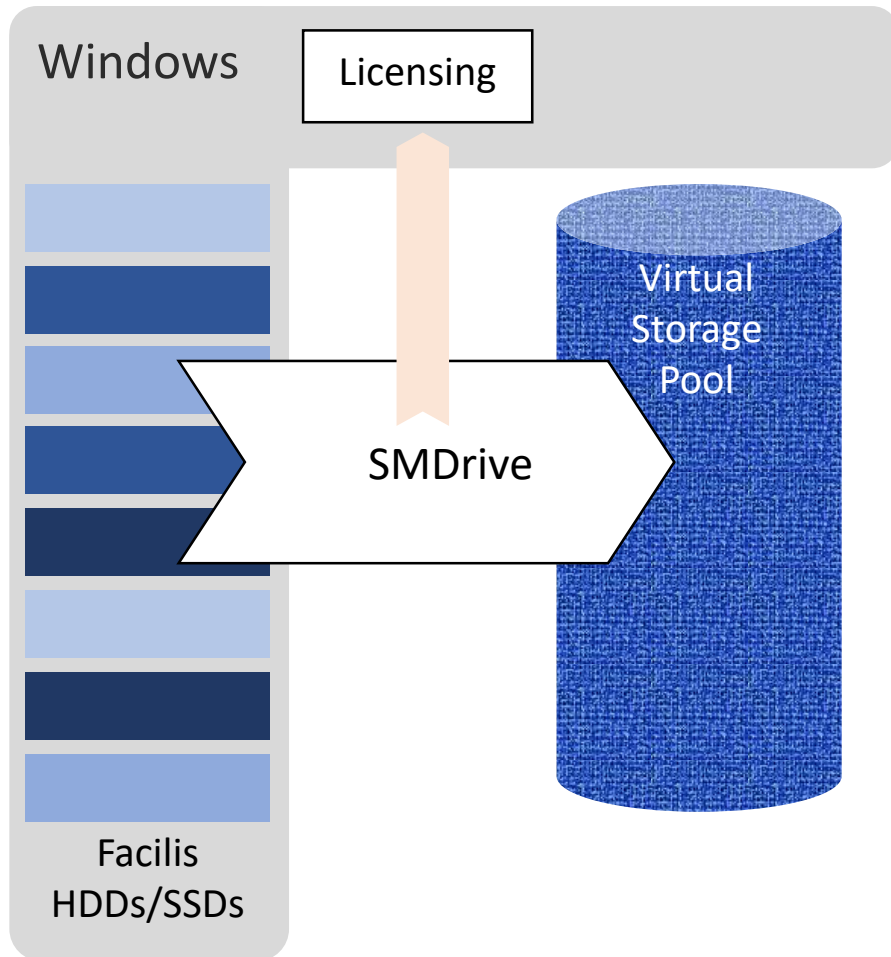


Licensing

A license is necessary for the operation of Smdrive. License file is checked when SMDrive starts, and after each successive action that involves SMDrive (volume creation, mount, client connect, etc.).

A missing license will prompt an error in SMDrive monitor. An existing but incorrect or expired license will not prompt an error, but SMDrive will fail to start after listing the disk drives.

The license file must exist in the C:/Program Files/Facilis/TerraBlock folder.

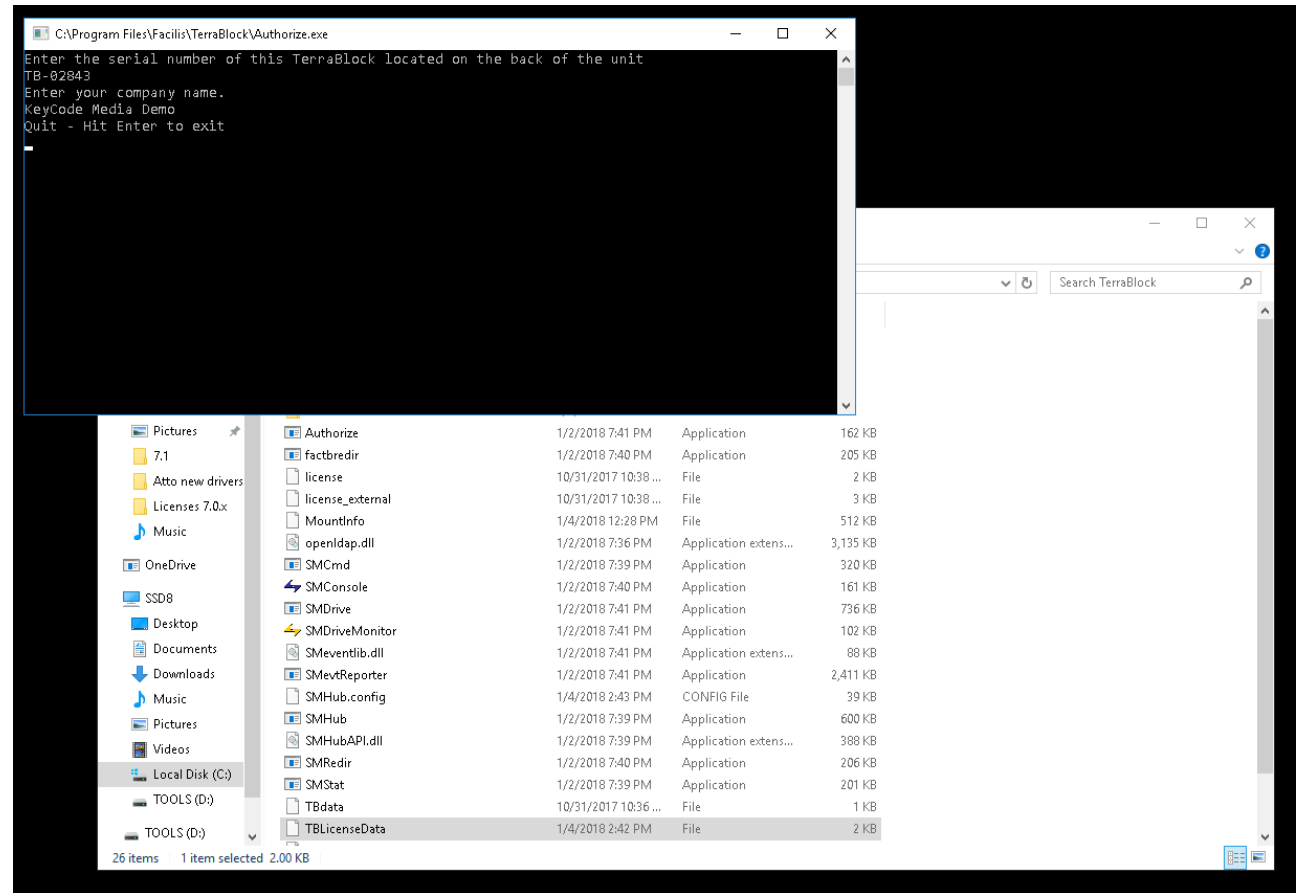
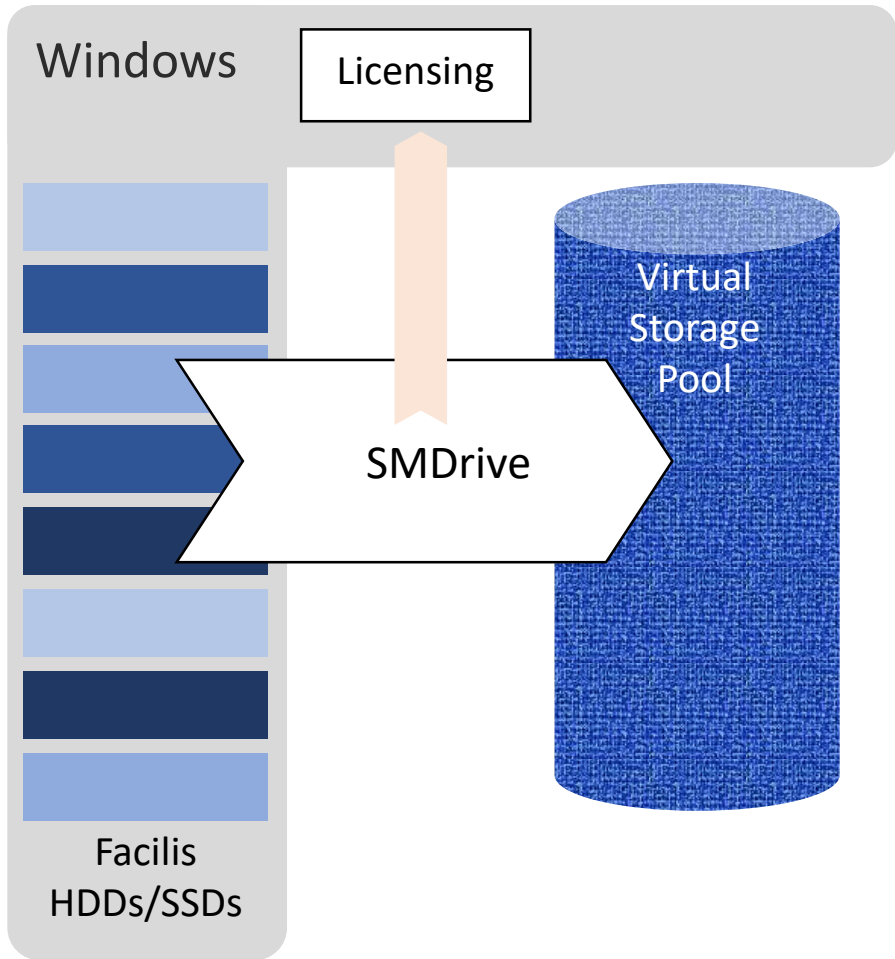


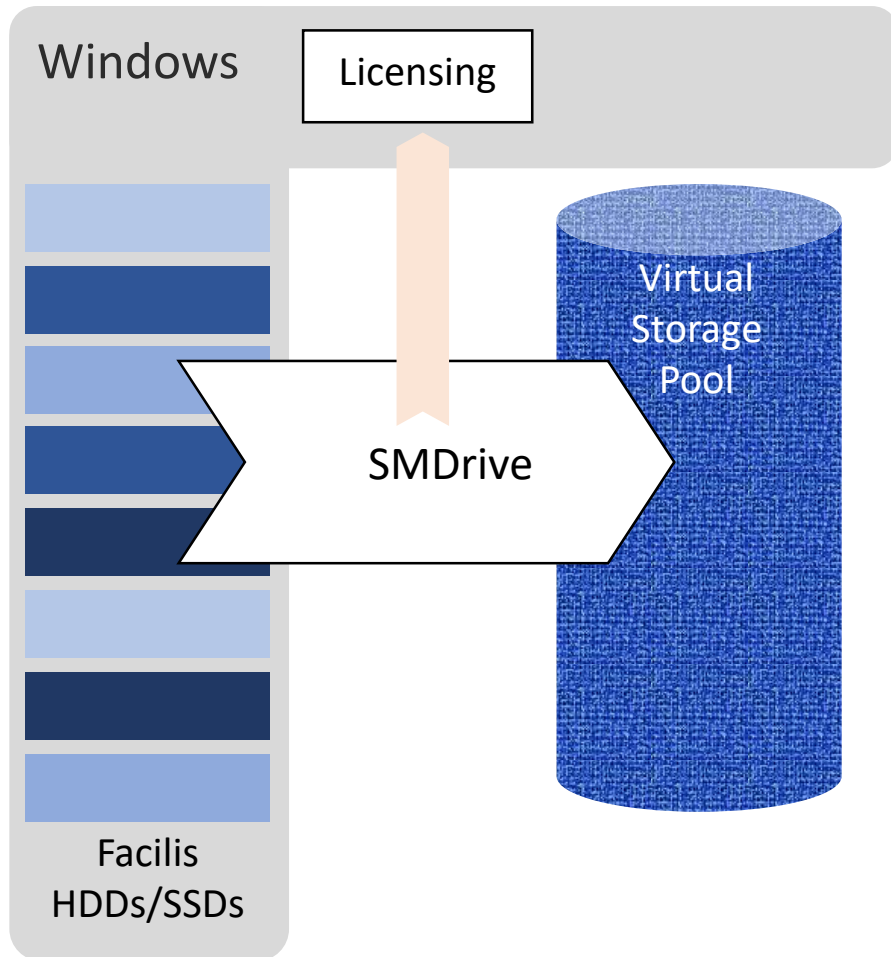
Licensing

Licensing of a Facilis server consists of four steps

- Automatic creation of the TBData file in the TerraBlock directory upon launch of SMdrive.
- Running the Authorize.exe program results in a TBLicenseData file in the TerraBlock directory.
- TBLicenseData file is sent to facilis support to create the license file.
- New license and license_external files are added to the TerraBlock directory.

Facilis Key Concepts



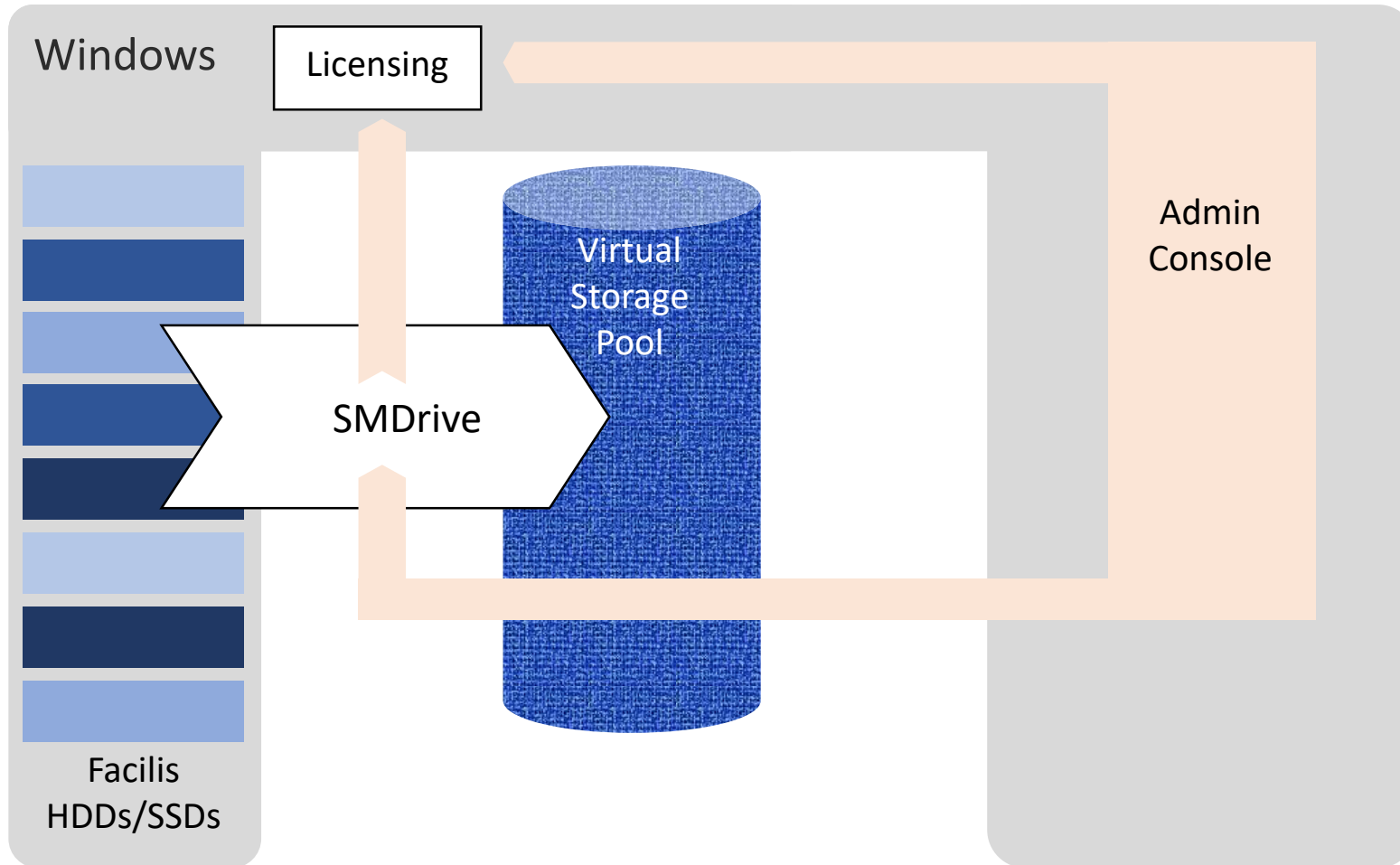


License allows the SMDrive service to start on the TerraBlock.

License_external allows attached storage to be managed through the Shared File System. This is required for NL16 Facilis arrays, and 3rd party arrays (fee required to license). To license attached storage:

- Run the Authorize.exe program with the storage attached to the TerraBlock (SAS or Fibre channel). The storage LUNS/partitions must be created and formatted.
- Send the new TBLicenseData to Facilis.
- Add the new license and license_external files to the TerraBlock directory.

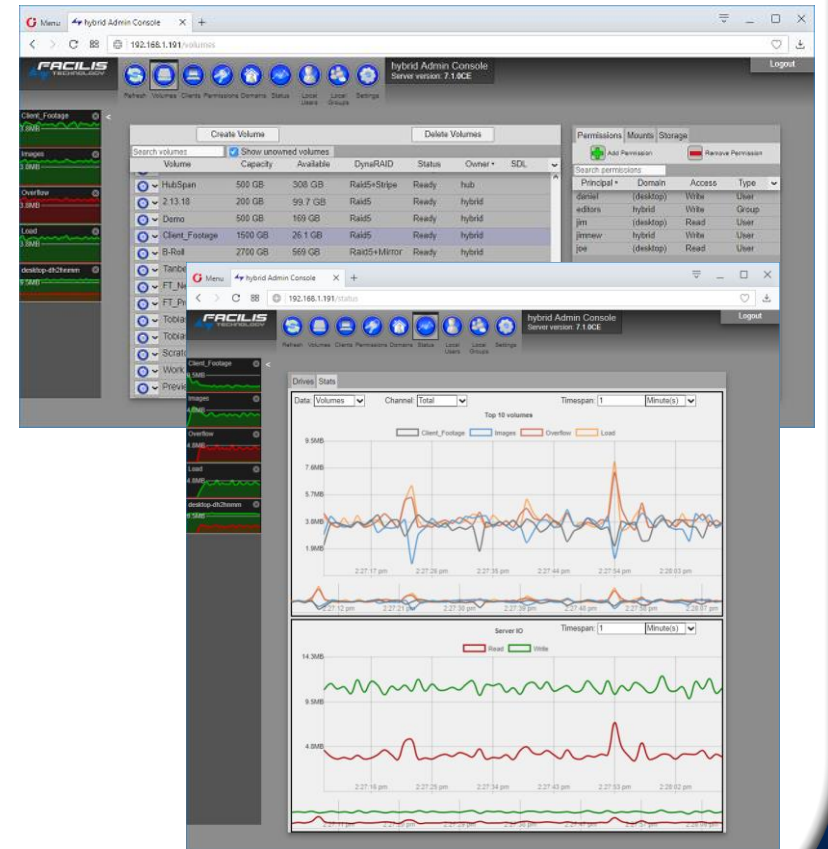
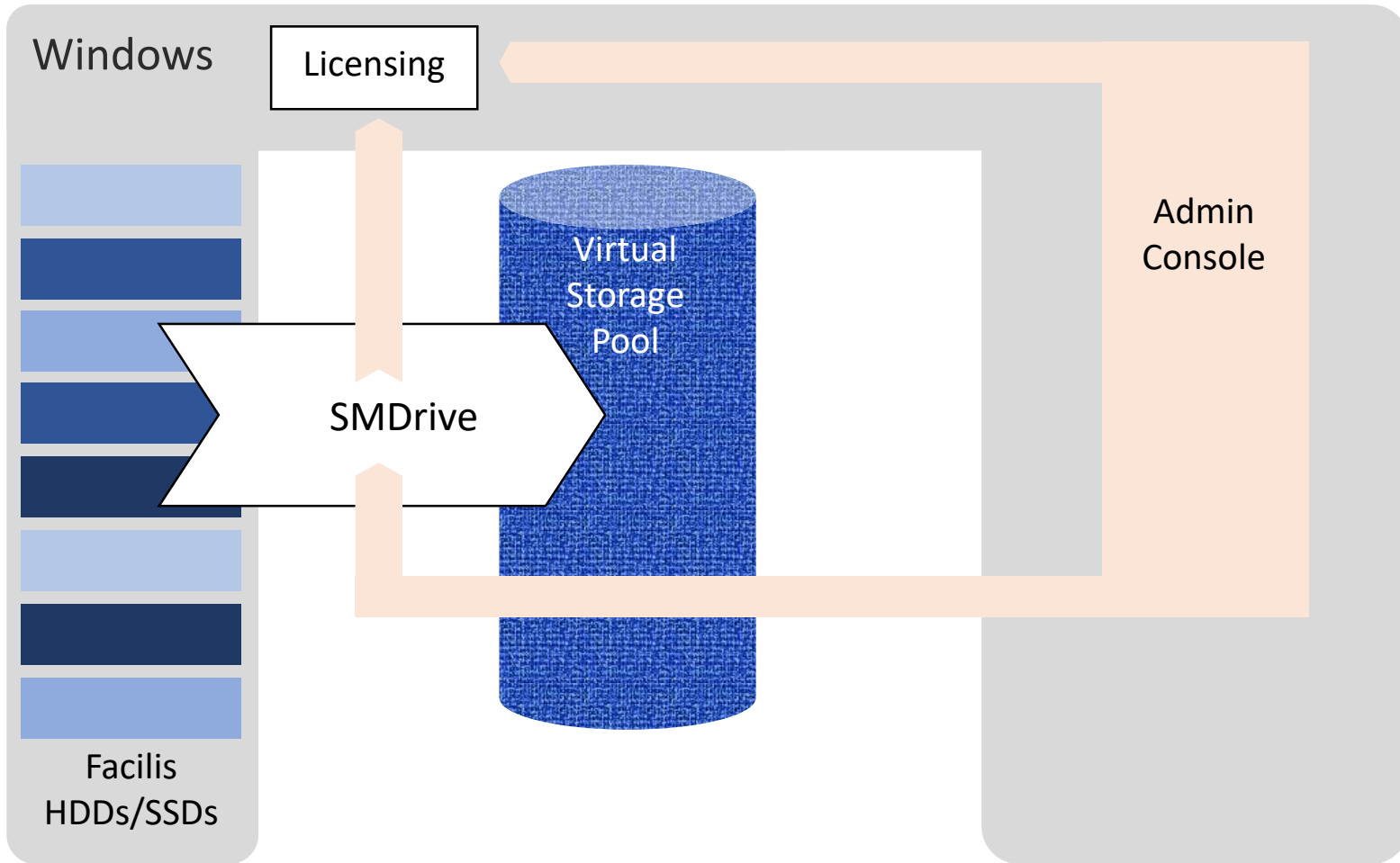
Facilis Key Concepts



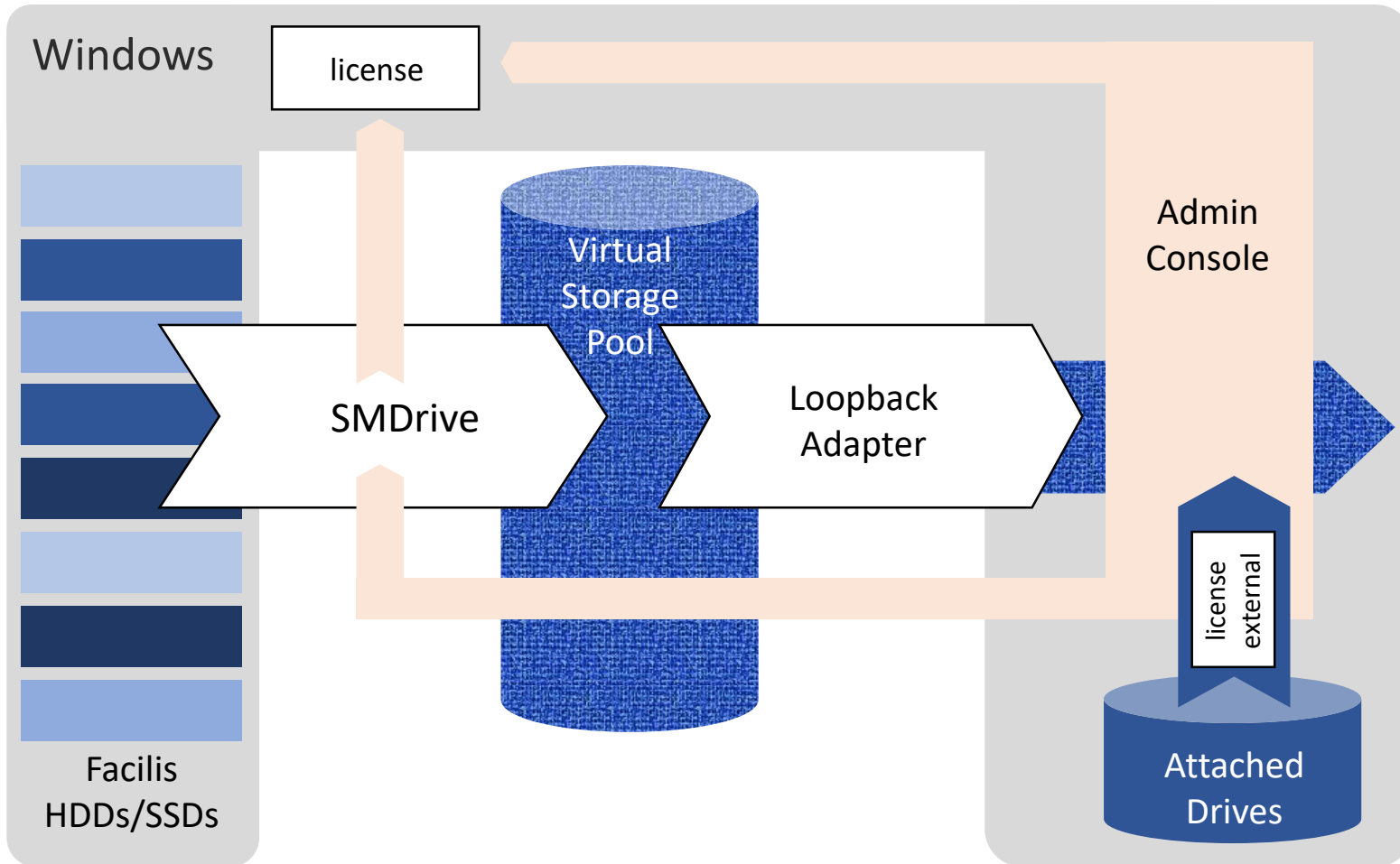
Admin Console is the user interface for SMDrive and the Shared File System. It also remotely controls the Client Profiles.

Admin Console manages volume creation, deletion, resize and spanning. It also manages user permissions, volume settings, and client mount status.

The license file is checked prior to making volumes accessible through the shared file system.



Facilis Key Concepts

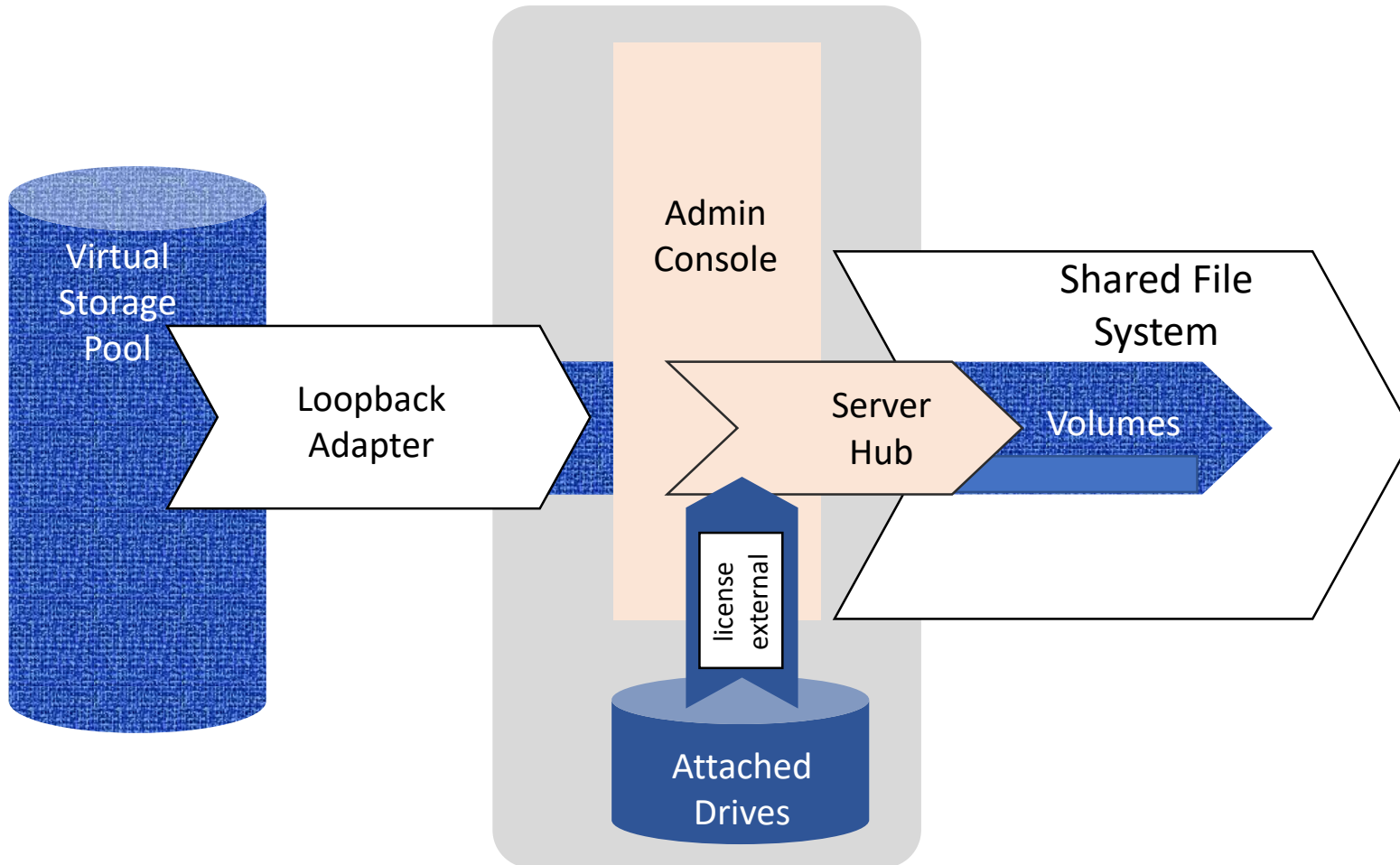


Loopback

As Admin Console creates volumes, they are populated into the OS through the Loopback adapter. Loopback adapter has no GUI.

Attached drives are already present in the OS, so they require no Loopback adapter.

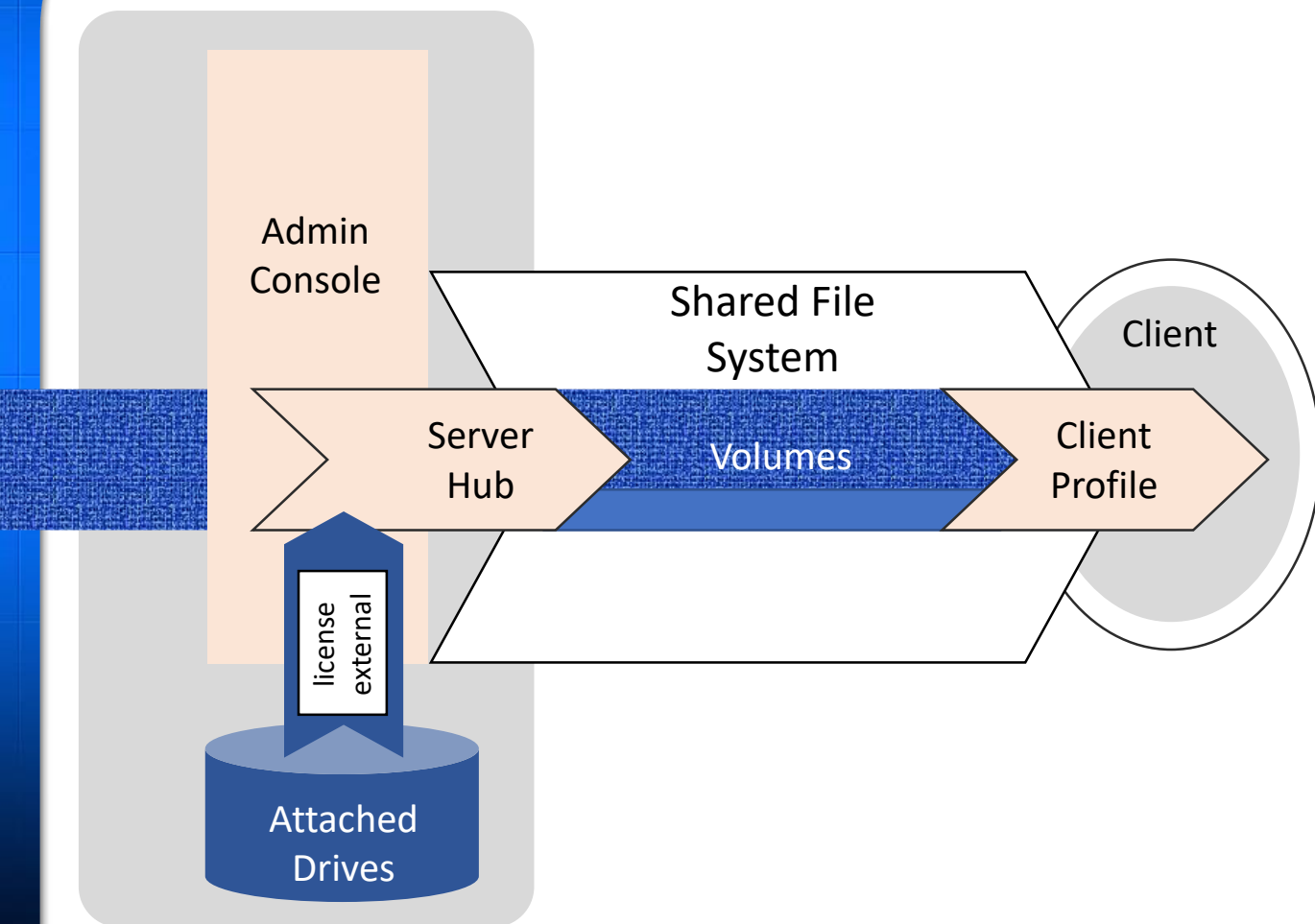
The license_external file is used to determine whether an attached drive can be added to the list of Multi-user Write volumes.



Shared File System

When a client attempts to access a volume, or the volume is pushed from the Admin Console, the volume is attached to the shared file system through the Server Hub.

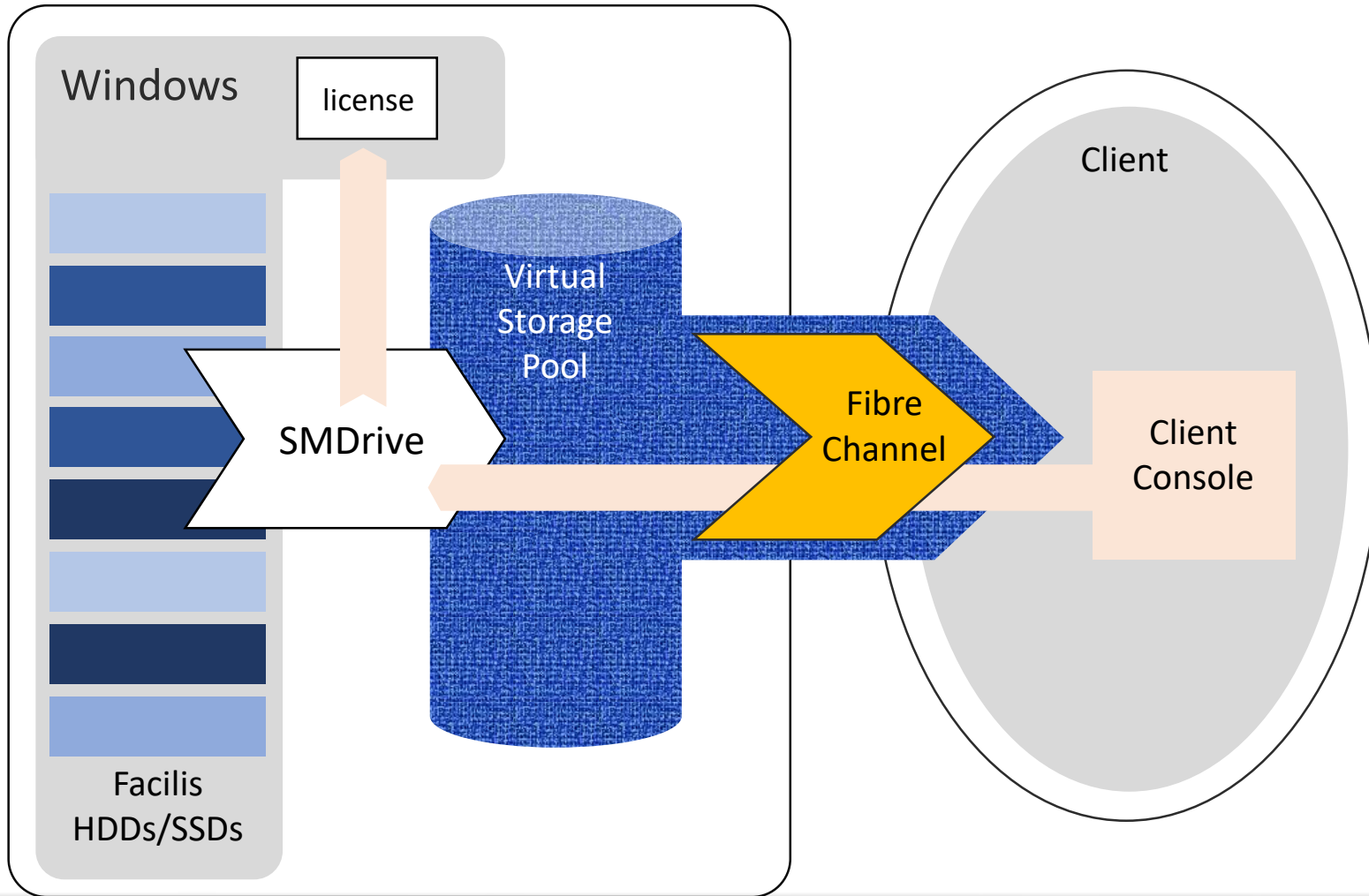
At this point, attached volumes and virtual volumes look the same, and follow the same data path. For every volume mounted to a client through the Shared File System, a process called SMRedir is spawned on the server to manage that mount point, and can be seen in Task Manager.



Client Profile Software

Installing the client software on a Mac. Windows or Linux system will install the Client Profile. Without this software the workstation cannot connect to Facilis volumes or run the client console.

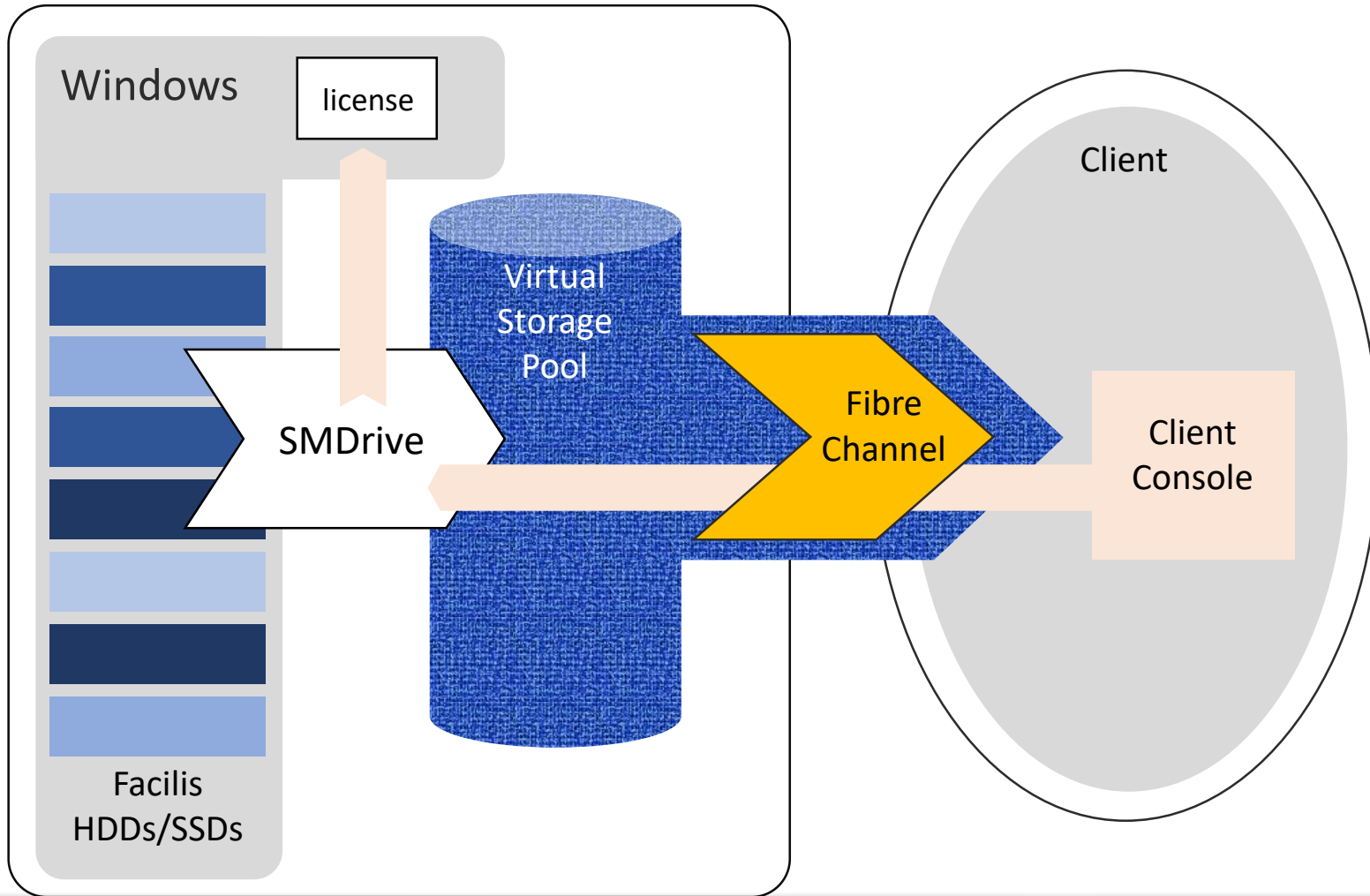
The Client Profile is the driver of the Client Console. If Client Profile isn't running, Client Console will not work. If the Client Profile can find no Facilis servers, the Client Console will not run. Look at the status of the Client Profile through CLI - "factbcmd info".



Single-user Volumes

When a volume is created, it is formatted as NTFS on the server. This NTFS volume is behind the Shared File System volume on the client. When a Fibre Channel client selects Single-user as the volume mount type, you are requesting that volume as NTFS, not Shared File System. Only a single workstation may mount the volume at any time for dedicated high-bandwidth workflows.

If formatting is removed from the volume on the server through Disk Management, the volume can also be mounted to a OSX or Linux client and formatted with native filesystems for those OS types. However, the volume can only be returned to Multi-user Write when formatted as NTFS.



Single-user Volume Selection

DPX_HYBRID Volume Settings

Mount Settings
 Read only Auto re-connect

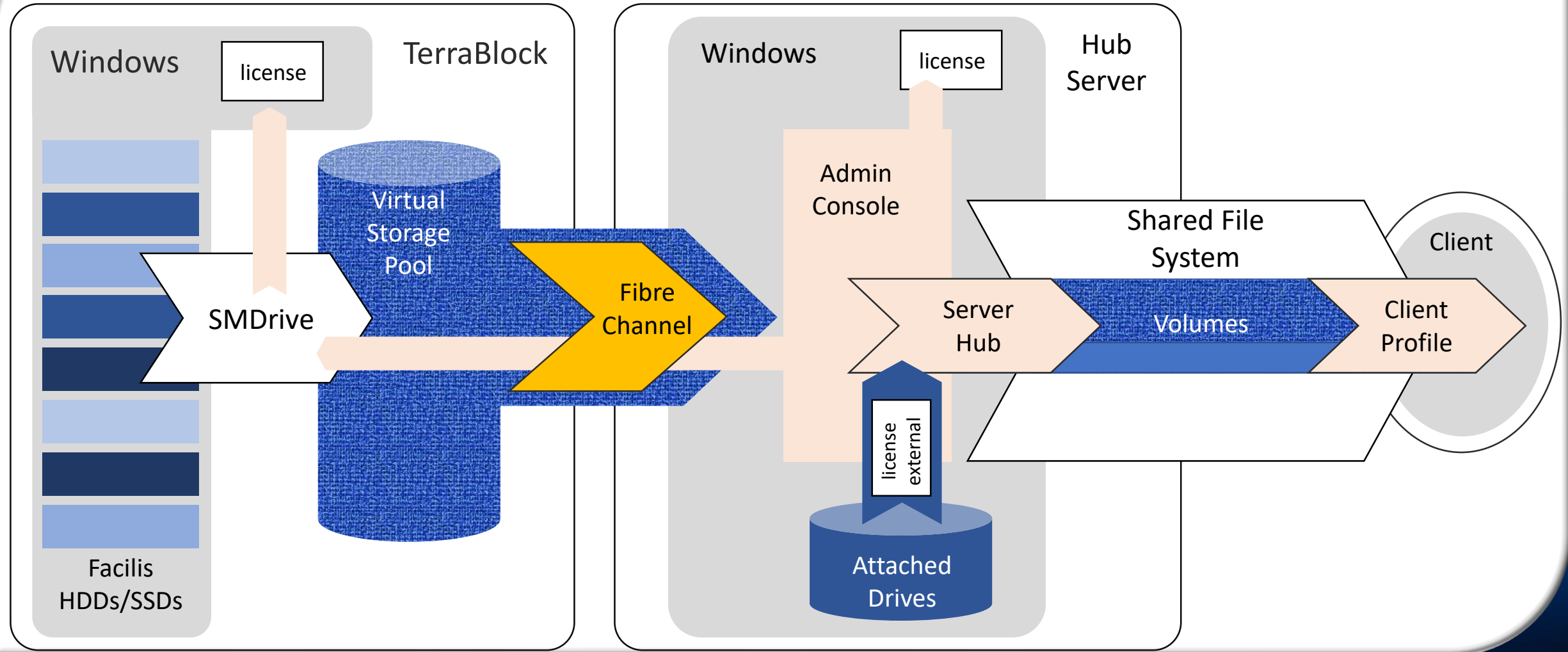
Mount as
Local Multi-user
Local Multi-user (Server default)
Network Multi-user
Local Multi-user
Single-user

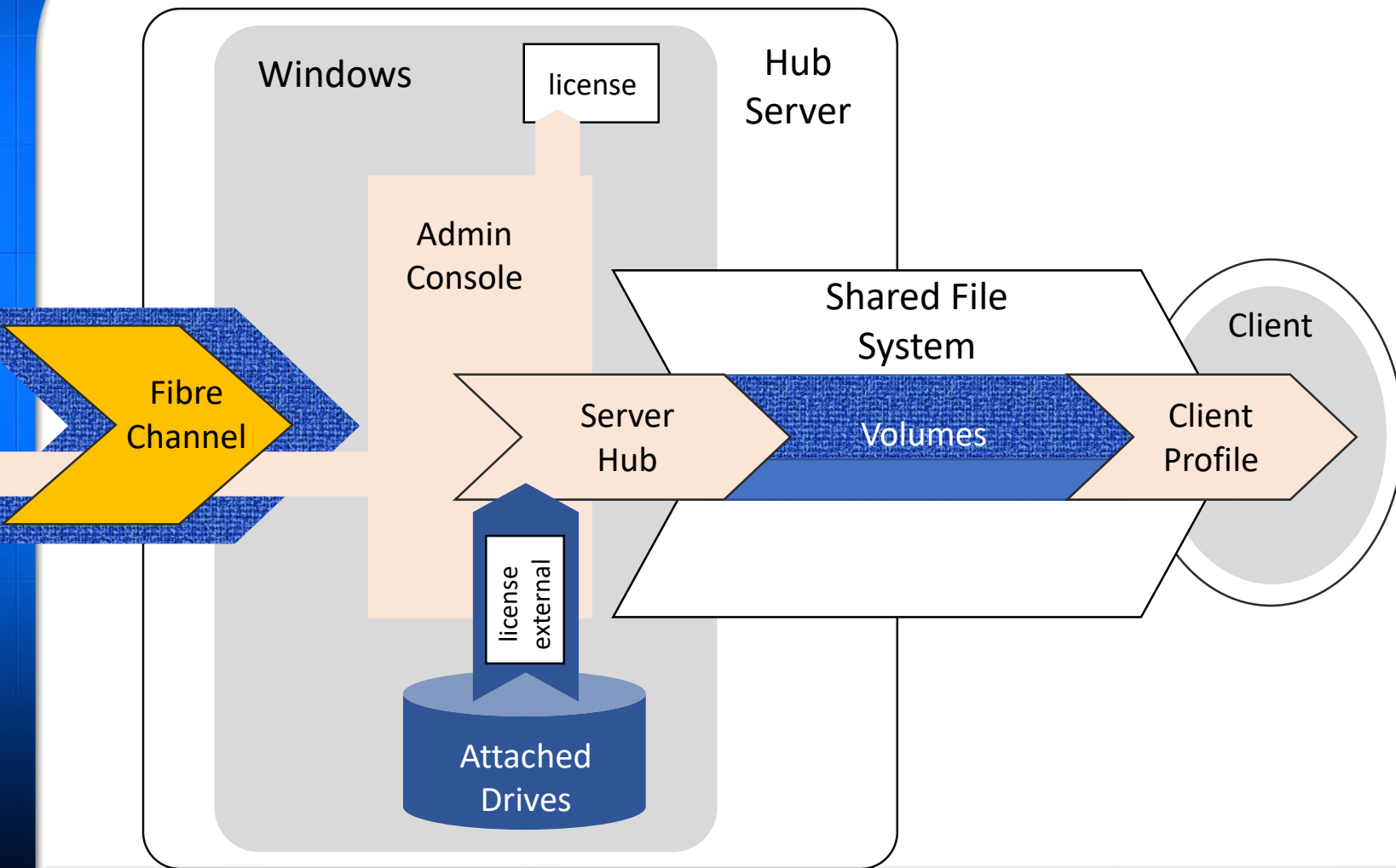
Preferred connection address
10.0.0.100

Reset to defaults

Save Cancel

Facilis Hub Server Data Flow Overview





Hub Server

The Hub server uses every type of connectivity and volume type when providing access to aggregated volumes from multiple TerraBlock servers. Volumes from TerraBlock storage servers are mounted as Single-user Write to Hub, and then shared through the Shared File System. In this design, the 32Gb FC connection takes the place of the Loopback adapter.

Hub server can also share attached storage, and uses the same Server Hub and licensing as a standalone TerraBlock server. Volumes mounted from Hub server are identical to standalone Shared File System volumes, even if spanned in RAID50 or RAID51.

Important Terms

Server Hub	Software that connects the volumes to the shared file system on the TerraBlock or Hub Server
Admin Console	Browser-based administration of volumes, users and permissions; system monitoring
Hub Server	Hardware platform that aggregates and offloads the Shared File System from attached TerraBlock servers
Server Hub	Software on Facilis servers that provides access to volumes through the Shared File System via Web Console
SMDrive	Software on TerraBlock servers that manages the protection, disk virtualization and volume allocation on disk
Client Console	Browser-based software that controls access to volumes and user authentication on client workstations
Client Profile	Underlying software running on every installed Facilis client that manages the connection with Server Hub
Multi-user	Shared FS volume available over Fibre Channel and Ethernet through Server Hub and Client Profile
Single-user	Natively formatted volume available over Fibre Channel that bypasses the Shared File System
Loopback	Adapter that makes block-level virtual volumes accessible to the Windows OS for Shared FS management
Storage Pool	An internal and/or external virtualized disk set on which virtual volumes are created and resized
Spanned Volume	A volume created with more than one drive group or storage pool - RAID50 or RAID51
Attached Drives	3 rd party drives that are added to the list of Multi-user volumes through Open Storage Attachment licensing
TBLicenseData	The file generated by Authorize.exe that is used by Facilis to license software versions and attached storage