

White Paper

F-Secure Content Enabler

Version 4

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1 Executive summary

1.1 What is F-Secure Content Enabler?

F-Secure Content Enabler is a platform in which tailored online storage solutions can be built and where any type of content can be stored, shared and displayed across multiple devices (e.g., smart phones, computers or IPTVs). This platform is specifically designed for Operators to offer services to seamlessly access, manage and share irreplaceable content anywhere, anytime and from any screen.

Currently, there are more than 20 live Operator integrations that include services for content backup, content sharing, NAS backup, web mail, social networking integration, photo display from digital frames, and photo printing. In fact, over 2.8 million consumers are using these services offered by F-Secure Content Enabler platform today.

1.2 Why online storage?

Most consumer content is digital. The digital content (music, videos, office documents, e-mails, photographs, and address books) that is stored on computers or laptops is important and often irreplaceable.

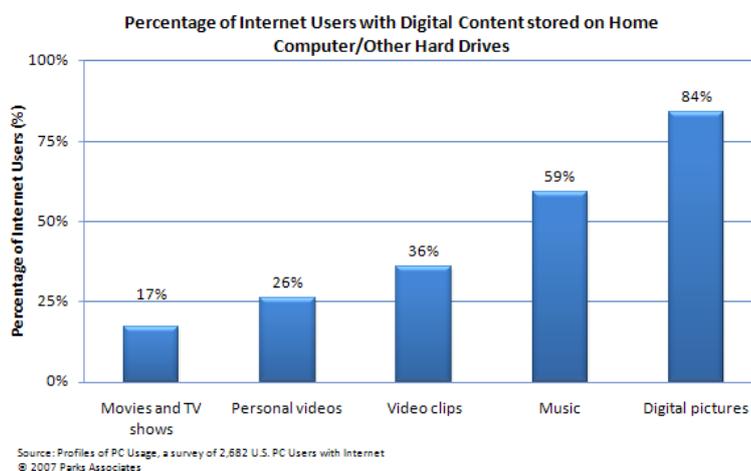


Figure 1: Percentage of Internet home users with digital content stored on home computers

Operator’s subscribers rate online storage as one of the top value-added services. Therefore, Operators who store content and make it available on different types of devices to gain or retain subscribers need a reliable, highly scalable and cost-effective online storage solution.



Figure 2: Value-added services scorecard

2 End-user benefits

2.1 Support for several types of content

F-Secure Content Enabler manages several types of content, such as pictures, videos, music, e-mails, office documents, mobile files such as MMS and SMS, and contact type files such as PIM files. It handles the content, and parses metadata, such as EXIF and tags.

Content Enabler adapts its service behavior according to the content type:

- Sends data only when handling SMSs
- Shows, shares or prints data only when handling pictures
- Streams or shares data when handling videos

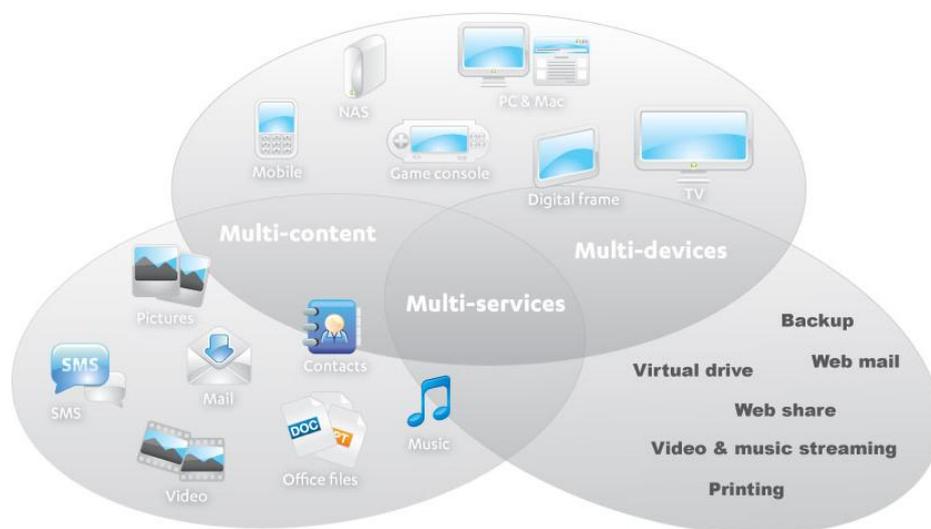


Figure 3: Support for several types of content

2.2 Support for multi-screen solution

You can access the content stored in F-Secure Content Enabler through multiple devices, including:

- PC

- Mac
- USB key
- Digital TV
- Wifi photo frame
- Smartphone

To provide the best end-user experience, Content Enabler adapts and transcodes the content within the constraints of the device (bandwidth, screen size, memory, operating system).

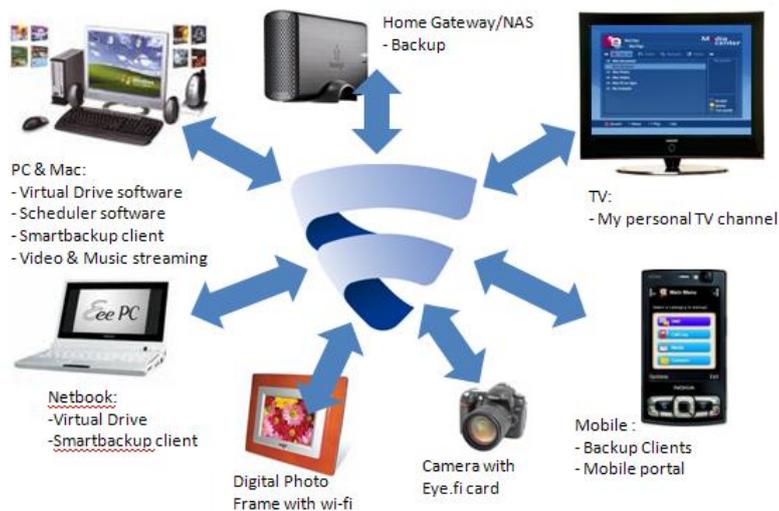


Figure 4: Support for multiple devices

2.3 Support for multiple services

Content Enabler provides two ready-to-use storage services:

- Online Backup
- Virtual Drive

Online Backup is an automatic backup service. It detects and automatically saves all the content that is generated from a computer. Online Backup is an easy-to-use, fully automated,

and secure, with a limited or unlimited backup space. It is an Internet-based online backup and restore solution that protects your data in case of a hardware failure or accidental deletion. With the patent-pending SmartBackup - technology, the backup process is easy and optimized. While backing up all your personal files, it preserves your valuable network resources.

Virtual Drive is an online storage solution for you to store and share your important content. It is a desktop drive that supports dragging and dropping files or folders from any location on your computer to the F-Secure Share PC drive. Documents, music, video or picture files can be uploaded to the web interface either by browsing or using the drag-and-drop feature.

Both services rely on an intuitive web interface that you can access with any device anywhere. The two services can also be combined for a fully-integrated online storage solution. The built-in security ensures that all files are always protected, while in transit and when stored on the F-Secure Content Enabler servers.

In addition to the two services mentioned above, Content Enabler allows tailored storage services based on existing frameworks:

- from web interface to the backup service
- from web mail integration to a third-party web
- PC or Mac desktop software (Virtual Drive, Scheduler, Uploader)
- media streaming service from music to video



Figure 5: Support for multiple services

2.4 Support for multiple formats

The Content Enabler supports almost all file formats, thus allowing the user to store any kind of files. The Content Enabler recognizes the file format, and can, for example, automatically open multimedia files in a flash player and e-mail messages in a web-based e-mail program.

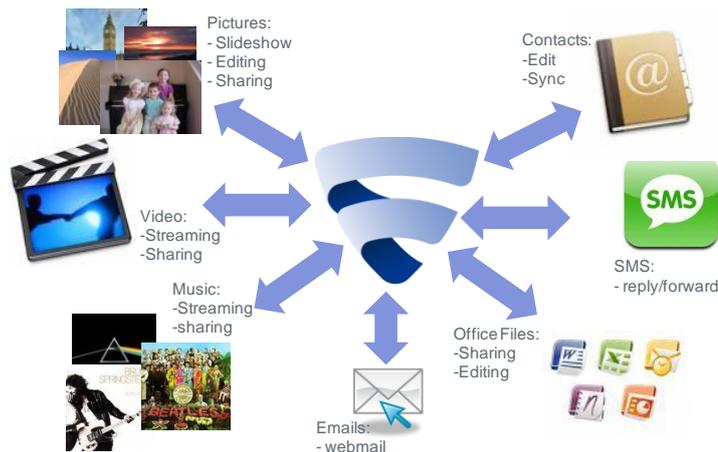


Figure 6: Support for multiple formats

3 Service provider benefits

3.1 Consumer-oriented online storage platform

F-Secure Content Enabler provides storage and sharing for all types of content for the consumer market. It includes optimized processing of media type files (images, video and music) and the capacity to display multi-media content in the context of the device that is being used:

- mobile phone / smartphone
- PC / Mac
- IPTV

F-Secure Content Enabler integrates the following Web 2.0 content management services:

- private or public use of data
- tagging, rating, and comments
- a first-class flash player

3.2 Content Enabler architecture

F-Secure Content Enabler is based on an architecture that provides:

- an application layer that handles all the file system type actions, such as file indexation, document converting capabilities, and server-side encryption or decryption.
- a data virtualization layer that optimizes bandwidth and caches requests to enhance the overall platform performance.
- a physical storage.

This modular architecture makes these products highly customizable.

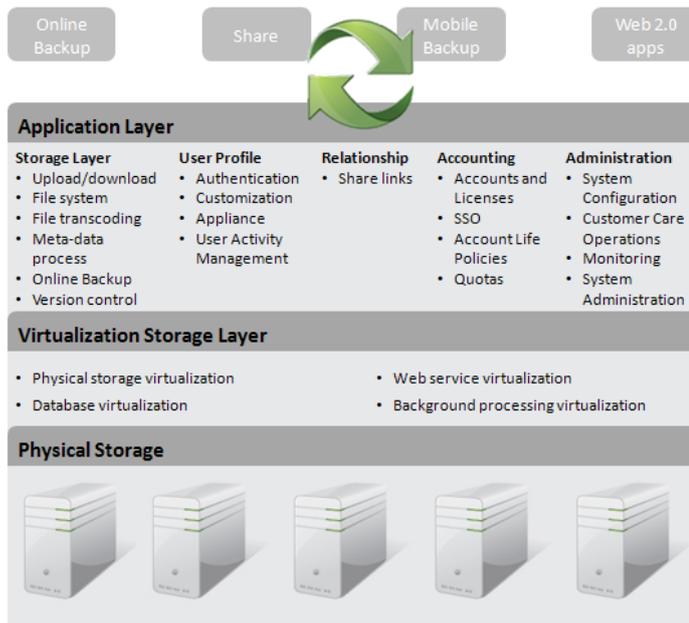


Figure 7: Modular architecture

3.2.1 Application layer

As a storage system, F-Secure Content Enabler manages files providing the following features:

- feature-based access rights
- extended public and private notion (virtual projects, sharing, etc.)
- user-profile management (administrator, regular user, guest, etc.)
- playlist management
- album, set, and collection management

F-Secure Content Enabler saves all the necessary data that is associated with the files:

- enhanced metadata

- contextual information that is linked to specific files, for example, e-mails (e-mail header and context), pictures (EXIF), music (ID3), and address books (PIM)
- automatic thumbnail generation or music cover attachments

As a powerful encoding machine, F-Secure Content Enabler adapts any content to the user display constraints, encoding and streaming such as web or IPTV (MPEG2 and MPEG4):

- queued or on-the-fly encoding
- compression
- adaptive compression

It also protects the content by supporting the following functions:

- encryption
- virus cleaning

F-Secure Content Enabler provides a large set of functions for integrating the provided services within the Operator IT infrastructure:

- accounting: flexible or standalone accounting
- link to external provisioning or key mode
- large set of web service modes
- link to external authentication system with an extensive SSO integration record
- link to external address book system

F-Secure Content Enabler also provides a Storage API for integrating it with an external device or service

- accounting
- files, contacts, and user session management

- playlist sharing and search sessions

3.2.2 Virtualization layer

The virtualization layer includes functions that ensure scalability, robustness and high performance of the overall storage platform. The functions include:

- integrity check
- version control
- caching control

Integrity check is the main function of the virtualization layer. It has a deep impact on the performance of the following main components of F-Secure Content Enabler:

- physical storage - separate physical storages, for example, two separate data centers with full mirroring
- database storage - a split database to ensure better load response time during peak hours
- web service - a more robust web access
- background processing - better performance for all background processing actions (file encoding or thumbnail generation).

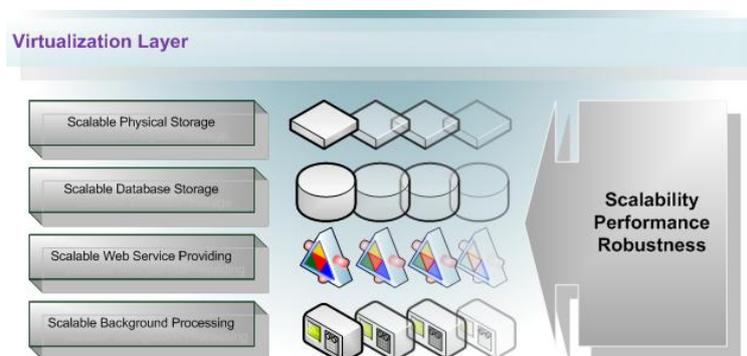


Figure 8: Virtualization layer

Caching control is the main cache that is used to reduce the access time to the most used files and services.

3.2.3 Physical layer

Focusing on the hardware and storage capability on the physical layer, F-Secure Content Enabler ensures the best price and performance compared to major storage infrastructure providers. A full flexibility is ensured to cover the required level of security.

The design of the physical layer depends also on the service that is used and on the SLA that is associated with the service. For example, a free storage space service does not have the same physical layer architecture as a premium paying service.

The physical layer can be also external to the system and rely on an existing storage platform.

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