



LANDSCAPE ANALYSIS

EFSS (ENTERPRISE FILE SYNCHRONIZATION AND SHARING)

TOOLS

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DOCUMENT LOG

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TERMINOLOGY

For the purpose of this document, the following terms and definitions apply:

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119. For a complete list of term definitions see the EGI Glossary (<http://wiki.egi.eu/wiki/Glossary>).

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Executive Summary

The document reports a landscape analysis of Enterprise File Synchronization and sharing by looking at the general offering and drawing an overview of the available solutions. Making some comparison in relation to some of the major features available and some of the clients that are using it at the time of writing.

While the definition of the tools is limited at the synchronization and sharing, often those tools have been extended to include more advanced features to allow users to work simultaneously at the same documents in a collaborative way.

1 Introduction

Enterprise File Synchronization and sharing (EFSS) are tools that allow organisations to synchronise and share files and different types of documents inside the same organisation or with external collaborators. They normally allow the use of multiple devices to access said documents and files and to keep them synchronized on the local device with a dedicated client. An API and web access is normally provided as well. In general

In general the EFSS can have a con have most or all of the following features:

- Sync files stored in corporate storage to user desktops and devices
- Send links to large files with support for multiple file extensions and protocols
- Integration to existing business applications via APIs, plugins and mobile apps
- Built-in file creation, editing and previewing
- User access permissions to files and folders
- Protection of files stored and transferred by encryption, antivirus scanning, and DLP (data loss prevention)
- Publish links to files with the ability to set a login requirement to access data
- Authentication options for Active Directory, SAML, Azure Active Directory, etc.
- Schedule and automate file transfers from automated systems and repositories
- Audit and report file activities and system actions¹

2 Demand, use cases and fields of applicability

2.1 Demand

As it will be shown in the section “Analysis on the current adoption and usage of the technology” there is a strong demand for EFSS tools which can help with collaboration, sharing of files and documents, etc. This demand is reflected in commercial offers as well from several vendors which offer integrated solutions for sharing and manipulating the files and data made available in the EFSS.

2.2 Use Cases

In the next section will be presented the a set of tools both commercial and free and some of the most relevant users both in public institutions and private ones. Many of the tools are used by universities and some, like ownCloud deserve a special mention as it is currently used at CERN on their branded CERNBox² which is built on top of Owncloud (open source software) and uses EOS (the CERN disk storage system for physics data) as the storage backend. CERNBox provides 'cloud storage', meaning that your data is not only available locally, on your desktop, for example, but is also in the

¹ Wikipedia EFSS, https://en.wikipedia.org/wiki/Enterprise_file_synchronization_and_sharing

² <https://cernbox-manual.web.cern.ch/cernbox-manual/en/>

'cloud'. It also integrates with OnlyOffice, an online editing of documents, spreadsheets and presentations in CERNBox.

2.3 Field of applicability

Most of the institutions and partners of the different projects are already adopting EFSS solutions provided, for example by Google and Microsoft to share and work with partners on documents related to their projects. As the example of CERN shows, one tool that can be offered centrally by one of the partners, can give more control on the data and files that is being shared. It will ease possible concerns about privacy of the information shared as those will remain among the partners. In the case of open source projects this can allow more flexibility and the possibility to integrate them with existing or new technologies.

3 Available tools/services

In this chapter we will describe some of the most widely used tools and services that provide EFSS free, upon subscription or on a combination of the two.

3.1 ownCloud

3.1.1 Description

ownCloud offers a range of solutions, from the software itself which can be deployed on premises and leverage the available storage, to a fully supported, additional features, storage and helpdesk available from the company.

3.1.2 Server

The server is a PHP application which can be installed and configured on both Linux and Windows. There's a free version that can be installed and provides the basic functionality and paid subscriptions with additional features and support.

The server can be hosted on premises with some dedicated storage or the company can provide the service and storage with different fees depending on the storage used, number of users, etc

3.1.3 Client

A paid client is available on both iOS and Android while the desktop client for OSX, Windows and Linux is free.

3.1.4 Relevant users

Among other users, of relevance we can find CERN's CERNBox³, Surfsara's Research Drive⁴

³CERNBox <https://owncloud.com/news/owncloud-cern-smashbox/> and the related project for end-to-end testing of the core functionalities Smashbox <https://github.com/cernbox/smashbox>

⁴Research Drive <https://userinfo.surfsara.nl/systems/researchdrive/usage>

3.2 nextCloud

3.2.1 Description

nextCloud starts as a fork of ownCloud and as such it has many similarities. While it doesn't offer hosted service and storage it offers different levels of support and subscription.

3.2.2 Server

The server is open source and it's provided free of charge

3.2.3 Client

All the available clients for iOS and Android and the desktop client for OSX, Windows and Linux are free and open source

3.2.4 Relevant users

A list of some institutional clients can be found in the official web pages⁵ and among them we can find the German Federal Administration⁶.

3.3 Box

3.3.1 Description

Box offers a cloud-native a dedicated solution which provides security and compliance capabilities like granular access controls, watermarking, and classification furthermore their Shield's machine learning technology and the ability to set policies that detect threats can improve the security of the data.

3.3.2 Server

The company doesn't offer a Server. The service can only be used through a subscription. The cost of the subscription depends on the plan selected and the number of users. More information can be found on the product webpages⁷

3.3.3 Client

All the available clients for iOS and Android and the desktop client for OSX and Windows are freely downloadable. At the time of writing there isn't currently a Linux official client.

⁵Nextcloud clients <https://nextcloud.com/industries/government/>

⁶German Federal Administration use case <https://nextcloud.com/blog/german-federal-administration-relies-on-nextcloud-as-a-secure-file-exchange-solution/>

⁷Box Plans & Pricing: <https://www.box.com/en-gb/pricing/business>

3.3.4 Relevant users

A list of private companies and foundations can be found on the official website⁸. Of interest there are pharmaceutical companies such as AstraZeneca and Lilly and foundations such as Oxfam and the United Nations Foundation

3.4 Dropbox

3.4.1 Description

Similarly to Box, Dropbox allows to manage tasks, track file updates, and stay in sync with the teams and clients, keeps files private with multiple layers of protection.

3.4.2 Server

The company doesn't offer a Server. The service can only be used through a subscription plan. The cost of the subscription depends on the plan selected and the number of users. More information can be found on the product webpages⁹

3.4.3 Client

All the available clients for iOS and Android and the desktop client for OSX, Windows and Linux are freely available. Dropbox offers a web interface as well.

3.4.4 Relevant users

There are many private companies¹⁰ and some non-profit and educational institutions such as UCL¹¹ who uses

3.5 Google Workspace

3.5.1 Description

Google Workspace is a collection of cloud computing, productivity and collaboration tools, software and products developed and marketed by Google. They can be used all through a web browser and all the applications in the Google Workplace can access the storage of the Google Drive. Files can be shared, edited, etc by teams.

⁸Box clients: <https://www.box.com/en-gb/customers>

⁹Dropbox plan: <https://www.dropbox.com/business/plans-comparison>

¹⁰Dropbox business: https://www.dropbox.com/en_GB/business/customers

¹¹UCL: <https://www.dropbox.com/business/customers/university-college-london>

3.5.2 Server

The company doesn't offer a Server. The service can only be used through a subscription plan. The cost of the subscription depends on the plan selected and the number of users. More information can be found on the product webpages¹²

3.5.3 Client

All the available clients for iOS and Android and the desktop client for OSX and Windows are freely downloadable. At the time of writing there isn't currently a Linux official client however several third party solutions are available. Google Drive is also available through the dedicated website.

3.5.4 Relevant users

Some of the largest institutional and private customers are listed on the official webpages¹³

3.6 Microsoft 365 (formerly Office 365) OneDrive

3.6.1 Description

OneDrive is available as a standalone or together with Microsoft 365 products. Depending on the plan selected different collaborations tools such as Exchange, Teams, the Office apps and different amount of storage is offered. The options available, dependent on the number of users are available on the official website¹⁴

3.6.2 Server

The company doesn't offer a Server. The service can only be used through a subscription plan. The cost of the subscription depends on the plan selected and the number of users. More information can be found on the product webpages¹⁵

3.6.3 Client

All the available clients for iOS and Android and the desktop client for OSX and Windows are freely downloadable. At the time of writing there isn't currently a Linux official client however several third party solutions are available.

¹²Google Workspace Pricing plans: <https://workspace.google.com/pricing.html?source=gafb-homepage-faq-en>

¹³Google Workspace Customers: https://workspace.google.com/intl/en_uk/customers/

¹⁴OneDrive cloud storage pricing and plans: <https://www.microsoft.com/en-gb/microsoft-365/onedrive/compare-onedrive-plans?activetab=tab:primaryr2>

¹⁵OneDrive cloud storage pricing and plans: <https://www.microsoft.com/en-gb/microsoft-365/onedrive/compare-onedrive-plans?activetab=tab:primaryr2>

3.6.4 Relevant users

Some of the biggest users and their use cases, ranging from hospital, to non profit and manufacturing to cite some, can be found on the official Microsoft website¹⁶

3.7 Sealife

3.7.1 Description

Seafile is an open source file sync share solution designed for high reliability, performance and productivity. It allows users to sync, share and collaborate across devices and teams. Among other features it allow online editing and co-authoring, file versioning and snapshot

3.7.2 Server

The server is distributed as a Community and Professional Edition. The community Edition is free of charge while the Professional is free for up to 3 users which is meant for evaluation purposes. For more users and depending on the type of support desired different subscriptions are available¹⁷. The latest available version of the server is version 8 and is available only for different versions of Linux, in particular Ubuntu, CentOS and Debian.

3.7.3 Client

All the available clients for iOS and Android and the desktop client for OSX, Windows and Linux are freely downloadable from the official website.

3.7.4 Relevant users

At the time of writing the official website lists two German universities, Humboldt University of Berlin, Johannes Gutenberg University of Mainz , as use cases¹⁸

3.8 CS3MESH4EOSC

3.8.1 Description

CS3MESH4EOSC or Cloud Services for Synchronization and Sharing for EOSC project's main asset is to provide an interoperable platform to easily sync & share, and deploy applications and software components within the full CS3 community.

Science Mesh allows users to retain control over their remote or domestic datasets, while at the same time becoming FAIR compatible and integrated with the European Open Science Cloud (EOSC). Users will also be able to directly access the service provided by ScienceMesh from easy-to-use interfaces and discover the different functionalities.

¹⁶Microsoft 365 Featured stories: <https://www.microsoft.com/en-gb/microsoft-365/customer-stories>

¹⁷https://www.seafile.com/en/product/private_server/

¹⁸Solutions and use cases: <https://www.seafile.com/en/solutions/>

3.8.2 CS3MESH4EOSC Components

3.8.2.1 *eduGAIN*

eduGAIN is an Interfederation sign-on service, led by GÉANT. It interconnects 55 federations world wide, allowing users to cross-authenticate across organizations and countries. While the technology stack underlying ScienceMesh will be service-agnostic and thus reusable across authentication backends and federations, eduGAIN's world wide reach and the fact that all the founding mesh nodes are already on it make it a perfect fit for gateway to Science Mesh.

3.8.2.2 *Reva - Cloud storage/application software, implementing CS3 APIs*

The Reva project aims to make cloud storage and application providers inter-operable through a common platform. It leverages the CS3 APIs in order to offer a straightforward way to connect existing services in a simple, portable and scalable way. Reva is also the reference implementation of the CS3 APIs, providing a vendor-neutral playground which allows service providers to benefit from the economy of scale.

3.8.2.3 *OPENCLOUDMESH - APIs and protocols for file sharing across services*

OCM aims to be a vendor-neutral open protocol which offers a common file access layer across an organization and/or across globally interconnected organizations, regardless of the location of the data and choice of clouds.

The OpenCloud Mesh concept document was produced by Christian Schmitz at ownCloud Inc. and first distributed on 23 July 2015. That same year it became a community-led project, co-managed by representatives of CERN, GÉANT, and ownCloud, under the umbrella of the GÉANT association.

OCM is a fundamental technology for CS3MESH4EOSC and its flagship service the Science Mesh, as it provides the individual nodes with a fundamental mechanism they can use to exchange data. We expect that the various use cases and workflows which are part of the Project will result in further extensions to OCM, whose standardization we will encourage and work on.

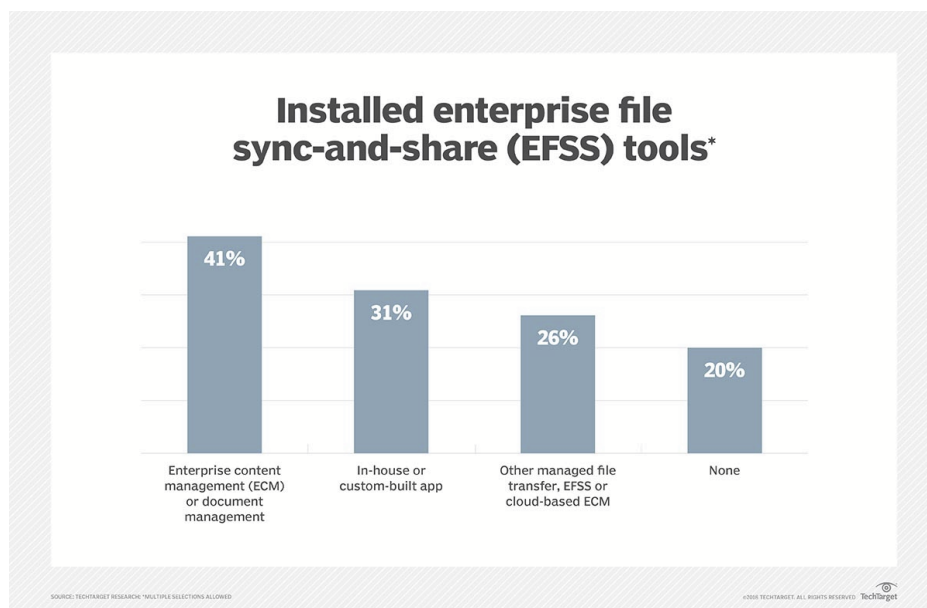
3.8.2.4 *CS3 - Cloud storage/application bridge APIs*

The CS3 APIs aim at connecting storage and application providers together, by abstracting out their inner workings and creating a common interface they can use to communicate. They effectively decrease the burden of porting applications developed for different EFSS platforms as well as the probability of vendor lock-in.

The CS3 APIs will be the "glue" which will bind together nodes and applications in ScienceMesh, by providing a common language which all parts will speak and allowing connectors to different services to be reused across applications.

4 Analysis on the current adoption and usage of the technology

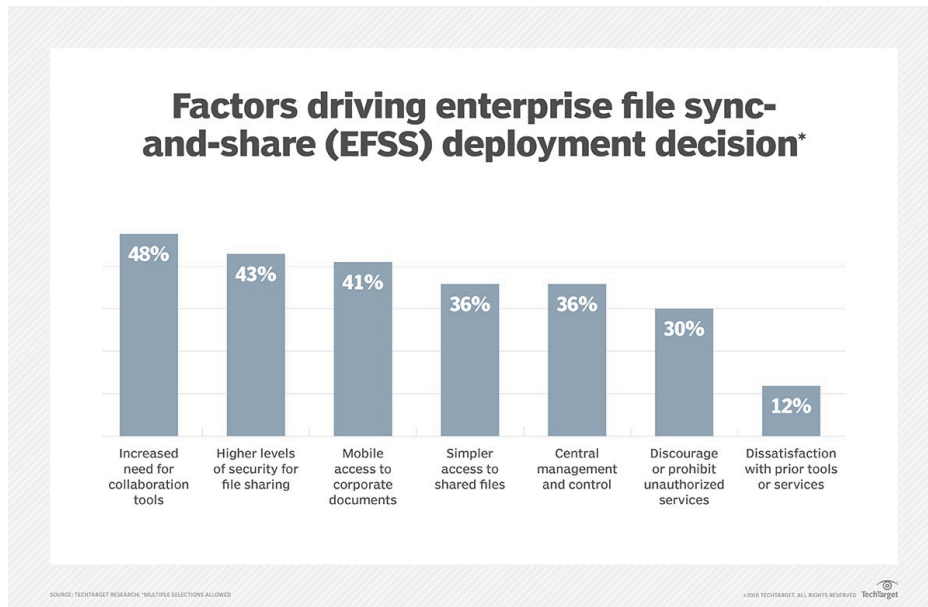
From “Enterprise file sync-and-share market evolves as adoption expands” research in 2018 done by Techtarget¹⁹ shows, there’s high interest in the adoption of a EFSS solution of some type. Overall only 20% of the enterprises did not have any EFSS solution while the remaining 80% had at least one or more (as the survey allowed multiple selections).



The same research shows multiple factors contributing to the decision of the enterprise to adopt an EFSS solution.

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<https://searchdatabackup.techtarget.com/feature/Enterprise-file-sync-and-share-market-evolves-as-adoption-expands>

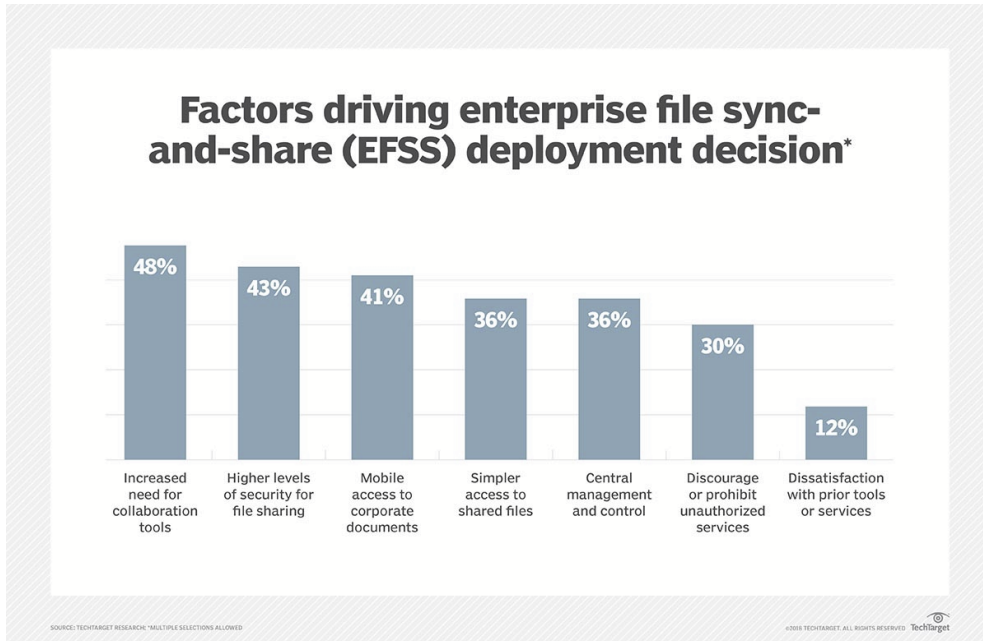


Furthermore the report from Gartner quadrant²⁰ from 2016 show several of the technologies analysed in this document showing their ability to execute and the completeness of vision which demonstrate a good maturity. Up to that point, big vendors such as Microsoft, Google, Dropbox, etc are appearing as leaders. Others such as ownCloud and by proxy nextCloud do not show the same level of maturity. This quadrant however shows the status in that specific moment in time and the adoption of both technologies as shown in the previous analysis is quite broad and big institutions such as CERN opted, for example, for ownCloud as this allowed the integration in their architecture and the development of tools specific for their needs.

²⁰ <https://www.getfilecloud.com/gartner-magic-quadrant-efss/>



As reported in the same research, most of the many factors are driving the adoption of EFSS tools. In particular the most cited is the increased need for collaboration tools, high level of security for file sharing, mobile access to corporate documents, simpler access to shared files, central management and control, etc.



EGI is involved in many European projects that require collaboration and sharing of files and documents across multiple partners. In this environment a solution that could provide an answer to those needs will be beneficial.