

Original Article

SFTP Integration Method – An Option to Consider in SAP ERP Integration Projects

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Abstract - Purpose: Systems Integration is most important in today's competitive world to ensure that all systems work together in harmony to boost productivity and enhance the quality of day-to-day operations. The goal of system integration is to streamline and simplify communication between not only the organization's internal systems but also the third parties the organization works with. System integration helps accelerate the outflow of information and cut back on operational costs. [1] [16]. This research paper aims to assist organizations in making informed decisions regarding the adoption of Secure Shell File Transfer Protocol (SFTP) as an integration method in SAP (Systems, Applications and Products in Data Processing) ERP application when it comes to the transfer of data between two applications through an untrusted network, as opposed to navigating through multiple integration layer. The exchange of data should always be done securely; once it leaves one application and until it reaches another application, it should be humanly unreadable, and this is where SFTP plays a significant role. The most common use case for the SFTP integration method in SAP ERP is when transferring bank information, accounts receivable data, accounts payable data, and customer or Vendor information. Data transfer through to the SFTP server is most common nowadays, in most cases, in integration, thus helping big organizations eliminate data breach risk. In this paper, an analysis of SFTP and its value when it comes to integration with SAP ERP or any other ERPs will prove to be a hidden gem for companies considering this method as a mode of integration. This paper will also give a different view on how companies can enable integration with SFTP servers by eliminating dependency on middleware or third-party FTP clients. It will also help companies be more sustainable by significantly reducing their carbon footprint. Fewer applications involved means fewer resources consumed. Data is the new oil, and when transferred securely, it can provide a company with a competitive advantage in making crucial decisions.[7]. **Design/Methodology/Approach:** This study is based on the author's own experience, having worked on 4 major ERP implementations and upgrades and worked on multiple integration projects, with each project having different flavors of integration approach depending on 3rd party application limitations or following best practices. Here, the primary focus is on SFTP, a secure file transfer protocol, which is one of the many ways in which SAP ERP can be integrated. The communication between client and server is encrypted, and authentication is based on passwords or public/private key authentication. **Findings:** Project management and its approach from the initial discussion play a crucial role in determining an approach to integration, especially when it comes to SFTP integration between client and server. The lack of an appropriate culture and organizational readiness, not adopting new methods or doing enough research on capabilities, and insufficient support from third-party applications are the primary reasons SFTP integrations end up going through multiple applications, such as middleware, before landing in end-client applications instead of having point to point connections. **Research Limitations/Implications:** The data analyzed is from secondary sources published in the press. Secondary reporting could increase objectivity; however, the weakness is that not all the factors might have been reported. **Originality/Value:** This paper identifies factors critical to the success of enabling SFTP integration between SAP and 3rd party clients without involving middleware or 3rd Party SFTP tools such as FileZilla or WINSCP.

Keywords - SAP ERP, Systems, Applications, and Products in data processing, SFTP, Secure file transfer protocol, SSH, IETF, SFTP client.

1. Introduction

Most industry segments, such as healthcare, finance or financial services, biotechnology, and telecommunication, are adapting new and automated processes to serve their customers, such as increasing throughput, customer holding,

cross-selling, finding new revenue models, and targeting advertising. Big organizations, which are part of industry segments, are inclined towards digitalization, and to support digitalization, data is one of the most essential elements. As mentioned earlier, data is valuable, but if raw data is not



useful, extra processing is needed to make it a valuable object that drives commercial and profitable endeavours. [12] Data is not stored in a specific location, and even if stored in a specific location, it must be distributed to various applications for effective communication. Getting this data to its respective application is becoming challenging, and this is where the topic of integration and choice of the best approach plays an extremely critical role in improving workflow efficiency within an organization.[10] Organizations, when discussing the integration approach, must go through the pros and cons of each approach before selecting one that will not disturb the current process, is secure, will bring change and improve output, and can be adapted by each generation within the organization. There are many methods of integration, such as API, RFC, EDI, IDOC, FTP, and SFTP. In this article, the discussion will focus on SFTP integration methods, which are one of the most secure methods. The article will explore various approaches to SFTP integration within SAP ERP and provide recommendations on best practices.

2. Capabilities

2.1. What is SFTP

SFTP stands for Secure File Transfer Protocol, where files are transferred between two applications through a secure tunnel irrespective of differences in software, hardware, or internal process. It is a part of the SSH protocol suite. Secure Shell (SSH) is a network communication rule that establishes communication between two computers to communicate, and SFTP is a protocol that uses SSH and provides a secure pathway to transfer data. One of the fundamental capabilities of a Secure Shell (SSH) is that the exchange of data between the two computers is encrypted. Thus, this method is also favorable when it comes to transferring information over insecure networks.[2][4][8] This is the most frequently used integration method due to its inherent capability of transferring data and the fact that it is encrypted. This method follows most regulatory rulings such as HIPAA GDPR; thus, hospitals, biotechnology, and finance organizations prefer SFTP over other integration methods. Tatu Ylonen first designed the Secure File Transfer Protocol (SFTP) in 1995, and then later, the second version was introduced by the Internet Engineering Task Force (IETF)

2.2. Why SFTP as an Integration Method in SAP?

SFTP is inherent from FTP and is utilized in conditions where the safety of data and its security is most critical. Data transferred via Cyberspace is susceptible to several risks. Hackers can steal usernames and passwords, take control of a server, and interfere with or manipulate data either in the server or transit. SFTP integration method overcomes this issue. Thus, it is the protocol of choice for file transfers. SFTP integration method also complies with security and privacy standards like HIPAA, CCPA or GDPR. SAP ERP system is implemented and used by 290,000 companies in over 190 countries, as per data reported by Salisbury University, which is in Maryland.[11]. This company is broadly but not limited

to Health care, Financial or Financial service segments. Companies integrate SAP ERP systems with other third party systems to meet business requirements, complete day-to-day operations, and uplift revenue. Master data or transactional data are the most common objects in integration. When it comes to sensitive information, SFTP is always considered one safe and secure method to transfer data to protect against data breaches.

3. Selecting the Methods to Integration from SAP to Client Server

When it comes to determining an approach to enable integration between SAP and 3rd Party applications, there are several options available, and the business/integration team must decide on a suitable option depending on how successful integration will look with the pros and cons of each option. In this section, a comparison between SFTP and FTP integration options will be made, considering the following factors.

- Compatibility with SAP systems and third-party applications.
- Operating systems such as Linux / Unix Operating systems
- Windows server 2019 and higher.
- The integration team’s expertise.

Table 1. SFTP vs FTP comparison [17],[18],[2]

Parameter	FTP	SFTP
Architecture	Service Side	Secure Shell
Secure channel transfer data	No	Yes
Protocol	TCP/IP	SSH protocol
No. of channels	2	1
Transmission methods	Direct transfer	Tunnelling
Vulnerability	Vulnerable to attacks	Not Vulnerable to attacks
Encryption	Usually not	Always encrypted
Outbound Port	21	22
Compliance	No	Yes

When comparing FTP vs SFTP for data transfer, the security of data is the most important parameter to be considered above all factors as data in today’s world, as said earlier, is the most important oil and has to be secured in a database or when transferring. SFTP integrations are ideal for sensitive information such as SSNs, addresses, login information, or financial information that is interfaced from the source to the target system. Considering the comparison between FTP and SFTP, SFTP is a clear winner in terms of data security and encryption. [18][2]

4. Best Practices for Implementing SFTP as a n Integration Option in SAP Projects

To maximize the benefits of integration between SAP and SFTP servers through SFTP methods of integration, organizations should follow some best practices, including:

4.1. Identify Requirement for SFTP Early

During the planning phase of an SAP ERP green field project, identify if any integration is required. If yes, then integration supports which business process and application integration is needed. Knowing this integration requirement early enough allows organizations to prioritize and consider the best option for integration.

When it comes to data integration, SFTP is considered secure and reliable. Thus, having a clear strategy for integration helps businesses avoid surprises during project implementation.

4.2 Develop Integration Strategy for SAP ERP System with 3rd Party Application

A linked IT application is the stepping stone for an organization to run its operation successfully. A strategic approach to connect SAP and third-party systems through the right technology is a must for an organization to achieve success. There are many methods of integration available in SAP, and depending on the need, the right technology should be used to meet business needs.

As discussed previously, when there is a need to transfer data from an SAP application to 3rd Party application or vice versa, and that is too secure, then SFTP is considered the best of all options as data is encrypted and unreadable until it reaches its destination. Most banking applications, cash applications, and treasury applications always use SFTP technology to transfer data. [5]

4.3. Different Options to Enable SFTP from SAP to 3rd Party SFTP Application

Whenever possible, always choose a technology that helps with the point-to-point transfer of SAP ERP to 3rd Party SFTP server, as it will save time and effort and have less chance of error. If there is any error, then two teams can work to overcome the issue quickly.

- 1) Transfer files to 3rd Party SFTP server manually through third party SFTP clients such as WinSCP and FileZilla.
- 2) Install third-party SFTP client on SAP server.
- 3) Transfer file to SFTP server through passwordless authentication without installing third party SFTP client Third party software.
- 4) SFTP adaptor connects an SAP Cloud integration tenant with an SFTP client [9]

4.4. Benefits of SFTP

There are many benefits of the SFTP integration method in SAP ERP.

4.4.1. Faster than Other File Transfer Protocols

SFTP is packet-based instead of text-based, so it is typically faster than other file transfer protocols since packets are easier to process, hence requiring fewer CPU resources.

4.4.2. Increases Speed and Efficiency of File Sharing

Complimenting packet-based transfer SFTP connection allows for the efficient transfer of large file types, as well as bulk file transfers when compared to other file sharing methods like email or cloud-based solutions, which are not secure and cannot handle large files due to limitations. Overall, this efficiency will keep all customers, suppliers, and trading partners happy with easy of doing business.[3]

4.4.3. Lowers Risk of Corruption During Data Transfers

An The SFTP connection utilizes the SSH protocol to ensure the secure transfer of business files between remote systems. Consequently, opting for an SFTP connection is optimal for maintaining the confidentiality and integrity of business data. Unlike traditional FTP protocols, which expose data to significant risks such as man-in-the-middle attacks, SFTP provides encryption that safeguards the data during transmission.[6]

4.4.4. Increases Overall Security:

One of the topmost benefits of an SFTP connection is the total security that it provides. Some of the security mechanisms accompanying an SFTP connection is:

- a) Encryption
- b) Public key authentication
- c) Data integrity
- d) Authenticity checks
- e) Host authentication.

4.4.5. Error Handling

Robust error handling and email notification for the below list scenario, but it is limited to the same.

- a) Error in opening the connection
- b) File not found.
- c) Incorrect file name

These security methods make SFTP connections an excellent alternative for businesses to transfer their files securely and efficiently. Not complying with security requirements can also prove expensive to companies. Therefore, it is always in a business's best interest to share files in the most secure manner possible.

4.5. Continuously Monitor, Optimize

Regularly monitor the performance of SFTP integration to identify bottlenecks, inefficiencies, or other issues that may impact the business operations. By continuously optimizing SFTP, organizations can ensure that they meet the evolving needs of the business and deliver the expected results.

4.6. Archiving and Error Handling

Files, once transferred to the SFTP server, should be moved to the processed folder/archive folder for future reference and then should be purged per company policy. Also, error handling should be enabled so that if the SFTP server is unavailable or files cannot be transferred through some unknown error, then business users or IT should get a notification to address the issue proactively.

5. Limitation of SFTP Integration Method

Despite its many benefits, SFTP integration methods in SAP can also present some challenges. Some common issues organizations may face include:[18]

5.1. Human Errors

SFTP introduces the possibility of human error and can potentially allow crucial issues to perpetuate within the systems.

5.2. Not Real Time

SFTP does not function in real-time. Once the file is submitted, it could be outdated when compared to data in the system of truth. You can only work with the data that is in the file, and when new data is needed, the file will need to be submitted.

5.3. File Validation

The file is transferred through SFTP if validation is required each time it is submitted; then, it is manually and

time-consuming. It is part of an asynchronous method of communication.

6. Future of SFTP and its Seamless Integration Between SAP and SFTP Without SFTP Client

Configure SFTP integration between SAP ERP and 3rd party SFTP client through passwordless authentication.

A. Configuration requires the following components.

- 1) SFTP
- 2) FTP user
- 3) SSH-keygen

B. Software & Hardware Requirements

- 1) Windows Server 2019 & 2022 64-bit on x64 (AMD) and Intel EM64T

- 2) Linux/Unix Operating systems

C. SFTP command on the SAP server

OS script to enable transfer of files from SAP ERP to 3rd Party SFTP client

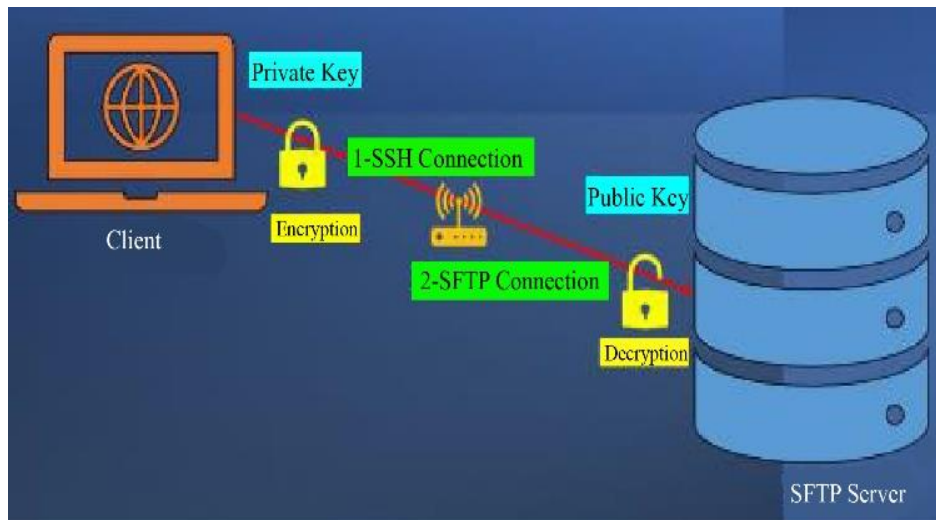


Fig. 1 SAP to SFTP integration through Private-Public key (password less authentication) [13]

7. Conclusion

One of the most exciting journeys that have been adopted by enterprises today is 'Digital Transformation,' and the technological innovations that happened to make this a reality are also top-notch. SFTP's are one of the players in helping

businesses to concur digital transformation. To go digital and enable AI, data must be needed, and this data must be transferred securely through the SFTP protocol. Thus, SFTP plays an important role in meeting the business demand and scaling up your digital business.

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