SFTP and SCP: Secure File Transfer Protocols

SFTP (SSH File Transfer Protocol) and SCP (Secure Copy Protocol) are both secure file transfer protocols that operate as subsystems of SSH-2 (Secure Shell version 2). These protocols provide encrypted and authenticated methods for transferring files between systems.

SFTP (SSH File Transfer Protocol)

SFTP is a robust and versatile protocol that offers secure file transfer capabilities:

- It operates over an encrypted SSH connection, typically on port 22.
- SFTP provides strong encryption and authentication to protect against various attacks.
- It supports a wide range of file operations, including uploading, downloading, and remote file manipulation.

Key Features:

- Encryption of data during transit.
- Simplified use with a single port connection.
- Support for advanced features that most other file-transfer protocols don't have.

SCP (Secure Copy Protocol)

SCP is another secure file transfer protocol that, like SFTP, operates as an SSH-2 subsystem:

- It is designed specifically for securely copying files between hosts on a network.
- SCP uses the same authentication and security mechanisms as SSH.

Comparison to SFTP:

- SCP is simple to use in scripts, but lacks many of SFTP's advanced features.
- SFTP offers more functionality, including the ability to resume interrupted transfers and perform remote file system operations.

> **Poison pill:** in order to fill the functionality gap between SFTP and SCP, some SCP clients attempt to use a parallel SSH-2 Shell to perform some of the operations the SCP protocol lacks, but in doing so they create a potential side-channel for attacks. If all you need are secure file-transfers, and SCP is requesting to perform Shell operations, the safest choice is

> to drop SCP altogether and switch to SFTP. Do not allow Shell just because SCP may ask for it, unless you know exactly how to keep it safe.

SSH-2 Subsystems

It's important to note that SFTP and SCP are not the only subsystems of SSH-2. The SSH-2 protocol is a versatile framework that supports various subsystems:

1. **File Transfer:** SFTP and SCP.
2. **Remote Command Execution:** Allows running individual commands on the remote system.
3. **Shell Access:** Provides a full interactive shell session on the remote machine.

This flexibility makes SSH-2 a powerful tool for secure remote system management and file transfer, but - as all powerful tools - it requires careful configuration from a knowledgeable administrator.

Security Considerations

Both SFTP and SCP offer significant security advantages over traditional, unencrypted file-transfer protocols:

- They use strong encryption to protect data in transit.
- They provide authentication mechanisms to verify the identity of both the client and server.
- They ensure data integrity, preventing unauthorized modifications during transfer.

Choosing Between SFTP and SCP

When deciding between SFTP and SCP, consider:

- **Functionality:** SFTP offers more advanced file management features.
- **Compatibility:** SCP might be the only choice in old/legacy environments where SFTP support is limited or absent.
- **Fitness:** In most modern scenarios, SFTP is the preferred choice due to its broader feature set and widespread support.

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