

# Ahsay Data Encryption



## Summary

A core feature of Ahsay Cloud Backup Suite v7 is the focus on data confidentiality and security by using the most secure encryption method and standards, by default the encryption is enabled with the highest encryption settings. Along with strong data protection capabilities, we provide our partners or MSP (Managed Service Providers) with tools for easy encryption key management (protecting encryption keys from loss, corruption, and unauthorized access) and the recovery of encryption keys.

## What Is Data Encryption?

Data Encryption is

“The process of completely re-writing a file using an algorithm so that the data itself is obscured from being read”  
unless a secret key or password is provided to decrypt the data back into its original form.

## How Does Ahsay Use Encryption To Protect Data?

When Ahsay is backing up your client data, commercial secrets, or financial records to an offsite location like AhsayCBS server or public cloud storage service such as Amazon S3, Google Cloud Storage, Microsoft Azure etc. Clients need to be confident their data is totally secure from unauthorized access.

The purpose of data encryption is to protect the confidentiality and security of the backup data:

- 1 When it's transmitted via the Internet or other networks during backup/restore or replication.



Backup / Restore

- 2 When it is stored in the backup destination(s), i.e. on the AhsayCBS server or public cloud storage.

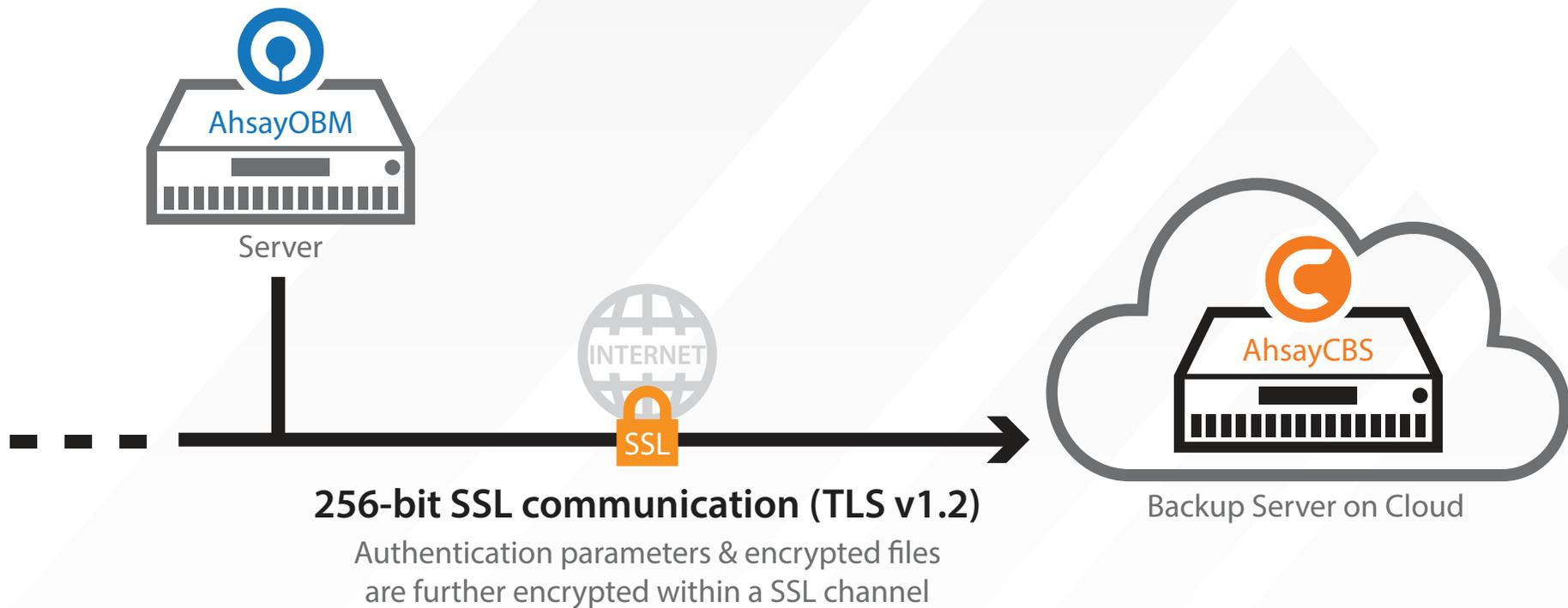


Backup Server on Cloud

All files are encrypted before they are transmitted to the AhsayCBS server or public cloud storage, so in unlikely event the data is intercepted it would be useless to the unauthorized recipient, the backup data is stored in encrypted format on the backup destination.



All communications between the AhsayOBM/AhsayACB backup agents and the AhsayCBS server or public cloud storage is via 256 bit SSL (Secure Socket Layer) channel using TLS (Transport Layer Security) v1.2 protocol to ensure that your data is transmitted securely.



# Encryption Algorithm

Ahsay provides **three encryption options**:

**AES, Twofish or DESede,**

with AES providing the highest level of protection and DESede the lowest. Different levels of encryption allows you to protect your backup sets at varying levels, as there is a tradeoff between backup/restore performance and data security. When encrypting data using an AES algorithm the backup speed may be affected verses DESede algorithm. Therefore, you may want to use AES for sensitive data such as client information, commercial secrets, and financial records. While for less sensitive data, you may consider using a lower encryption option such as Twofish or DESede.

In addition, **two encryption methods** are available:

**ECB (Electronic Cook Book) and CBC (Cypher Block Chaining),**

where CBC is the stronger method, along with support for 128 bit and 256 bit key lengths.

The default encryption algorithm used provides the highest level of protection is the industry standard AES (Advanced Encryption Standard) encryption algorithm, with a 256 bit key length and CBC mode. This is only publicly available encryption algorithm approved by the US government for securing top secret information.

## Can AES Algorithm Be Cracked?

Given enough time and processing power, any known encryption algorithm can be cracked using a brute force attack, i.e. systematically checking through all possible combinations.

To put things into perspective,

AES 256 bit encryption algorithm has  $1.1 \times 10^{77} (2^{256})$  possible combinations.

This would require approximately

$5.42 \times 10^{52}$  years to crack

with a brute force attack using a Tianhe-2 Supercomputer @ 33.86 petaflops. Therefore, the practical feasibility of a successful brute force attack is limited.



## Encryption Key

The encryption key is used by Ahsay to encrypt and protect your backup sets and data from unauthorized access, it is a password for your data. Once an encryption key is confirmed for a backup set, it cannot be removed or changed later.

If the encryption key on a backup sets needs to be removed or changed then:

- A new backup set will need to be created with the new encryption key.
- The data will have to be backed up again from scratch.

## Encryption Type

Ahsay offers three different options for generating the encryption key depending on the security level required by the customer; Default, User password, and Custom.

Type	Encryption Key Strength	Encryption Level
Default	The default option and is the most secure as the encryption key is a randomly generated 44 character key string with; upper case (A-Z) and lower case (a-z) characters, numbers (0-9), and other characters (/,\,=,+..).	AES, 256 bit, CBC
User password	Dependent on login password complexity	AES, 256 bit, CBC
Custom	Dependent on client preference	Client preference

Although different encryption options are available, Ahsay provides partners or MSPs with an easy way to customize which encryption options client can select to encourage good practices in data security via AhsayCBS group policy.

 **Note:** If the “User password” option is selected for generating the encryption key:

- AhsayOBM/AhsayACB will use the current login password as the encryption key.
- The encryption key will not change, even when the login password is updated later.

## Where Is the Encryption Key Saved and How Is It Protected?

The encryption key which protects the backup data is stored in a special file (settings.sys) encrypted using AES 256 bit algorithm, on the machine where the AhsayOBM/AhsayACB backup agent is installed.

Depending of the operating system of the machine the **settings.sys** file is located in the following folder:

Operating System	 AhsayOBM	 AhsayACB
Windows	%USERPROFILE%\\.obm\config	%USERPROFILE%\\.acb\config
Linux / UNIX	/root/.obm/config	--
Mac OS X	/Users/%username%/.obm/config	/Users/%username%/.acb/config
Synology NAS	/volume1/@appstore/AhsayOBM/.obm/config	--

## When Do I Need To Enter My Encryption Key?

The common situations where the AhsayOBM/AhsayACB backup agent will require you to enter the encryption key:



The original machine has suffered a fatal outage and you need Install AhsayOBM/AhsayACB on a new machine to restore the files.



When accessing a backup set originally created on another machine.



The .obm or .acb folder on the machine is deleted.



The settings.sys file is accidentally deleted or corrupted.



When using the “Decrypt Backup Data” feature on AhsayOBM/AhsayACB to restore files.



When using AhsayOBR to restore files.

**!** **Note:** If you do not have the correct encryption key you will not be able access the backup set and data or perform any backup/restore jobs.

## Encryption Key Best Practices

For backup sets protected with “User password” or “Custom” encryption setting it is very important to make sure the encryption key will not be easily cracked or guessed, please consider the following recommendations when creating an encryption key for your backup set.



Do not use an encryption key containing personal information, i.e. name, birthday, qwerty, login name, abc123, 123456 etc.

**Ab1@\$%**

The encryption key should contain both uppercase (A-Z) & lowercase (a-z) characters, numbers (0-9), and other characters (+/-\=@#\$%^&\*())

**≥ 8**

The encryption key should be at least 8 characters long.



Keep a copy of the encryption key.

The encryption key is the password that allows access to your data, without the correct encryption key your data will not be recoverable. It is highly recommended that you keep a separate copy of your encryption keys and store them in a secure place. Clients are prompted to do this during the creation of each new backup set on AhsayOBM/AhsayACB.

## How To Manage Encryption Keys?

To meet both the needs your clients and to satisfy any contractual, legal, or regulatory requirements related to data confidentiality and security. Ahsay allows partners flexibility on how they choose to manage their client's encryption key:

### Allow their clients manage their own encryption keys.

The client encryption key is not uploaded and stored on the AhsayCBS backup server, clients managing their own encryption key provides the highest level of protection. The downside is if a client ever loses or forgets their encryption key they will not be able to access their backup sets or recover data from their backup sets.

### Manage their client encryption keys.

A copy of the encryption key is uploaded and stored on the AhsayCBS backup server in a special file (**EncryptionKeys-YYYY-MM-DD.json.rgz**) for each backup set, which is encrypted using AES 256 bit algorithm to maintain the confidentiality and security of the client data. Even the partner and or the AhsayCBS server administrator cannot access to the encryption keys in this file.

The **EncryptionKeys-YYYY-MM-DD.json.rgz** file located in AhsayCBS user home path: `%CBS_USERHOME%\{%username%\%backupset_id%\settings` folder.

If a client ever loses their encryption key then a partner can request an encryption key recovery directly from AhsayCBS web management console using our "Self Service Encryption Key Recovery Service".

	Partner/MSP	Client
<b>Security Level</b>	The keys are stored in a file protected by AES 256 bit encryption on the AhsayCBS server. The partner/MSP does not have access to keys.	The client only knows the encryption key.
<b>Recovery</b>	Encryption key can be recovered in as little as 15 minutes directly from AhsayCBS web management console by partner/MSP.	 If the encryption key is lost or forgotten, the backup data is lost forever.

## Encryption Key Recovery

People unfortunately make mistakes as a result passwords or encryption keys are lost or forgotten over time. This causes serious problems as the data you have invested time and money into protecting is now no longer accessible.

To provide partners with peace of mind, Ahsay has introduced the Self Service Encryption Key Recovery, partners can now perform a recovery of client encryption key directly from AhsayCBS, the encryption key file will be automatically uploaded from AhsayCBS backup server to Ahsay shop. The recovered encryption key is emailed directly to the contact email on the backup user account around 15 minutes after confirmation of service fee payment.

During the whole process the recovered encryption is only disclosed to the authorized recipient.

 To use the Self Service Encryption Key Recovery Service partners must have:

- A valid maintenance contract.
- A valid Ahsay Shop login account.
- AhsayCBS version must be on v7.9.2.0 or above.
- AhsayOBM/AhsayACB must be on v7.5.0.0 or above.
- The "Upload encryption key after running backup for recovery" setting is enabled on the backup user account on the AhsayCBS backup server.
- The "Encryption Recovery" option must be enabled on AhsayOBM / AhsayACB backup client.
- AhsayOBM/AhsayACB v7 must have successfully uploaded the encryption key details to the AhsayCBS after a backup job.  
Which is saved in the **EncryptionKeys-YYYY-MM-DD.json.rgz** file located in AhsayCBS user home path: `%CBS_USERHOME%\{%username%\%backupset_id%\settings`
- The contact email address in the backup user account must be valid.