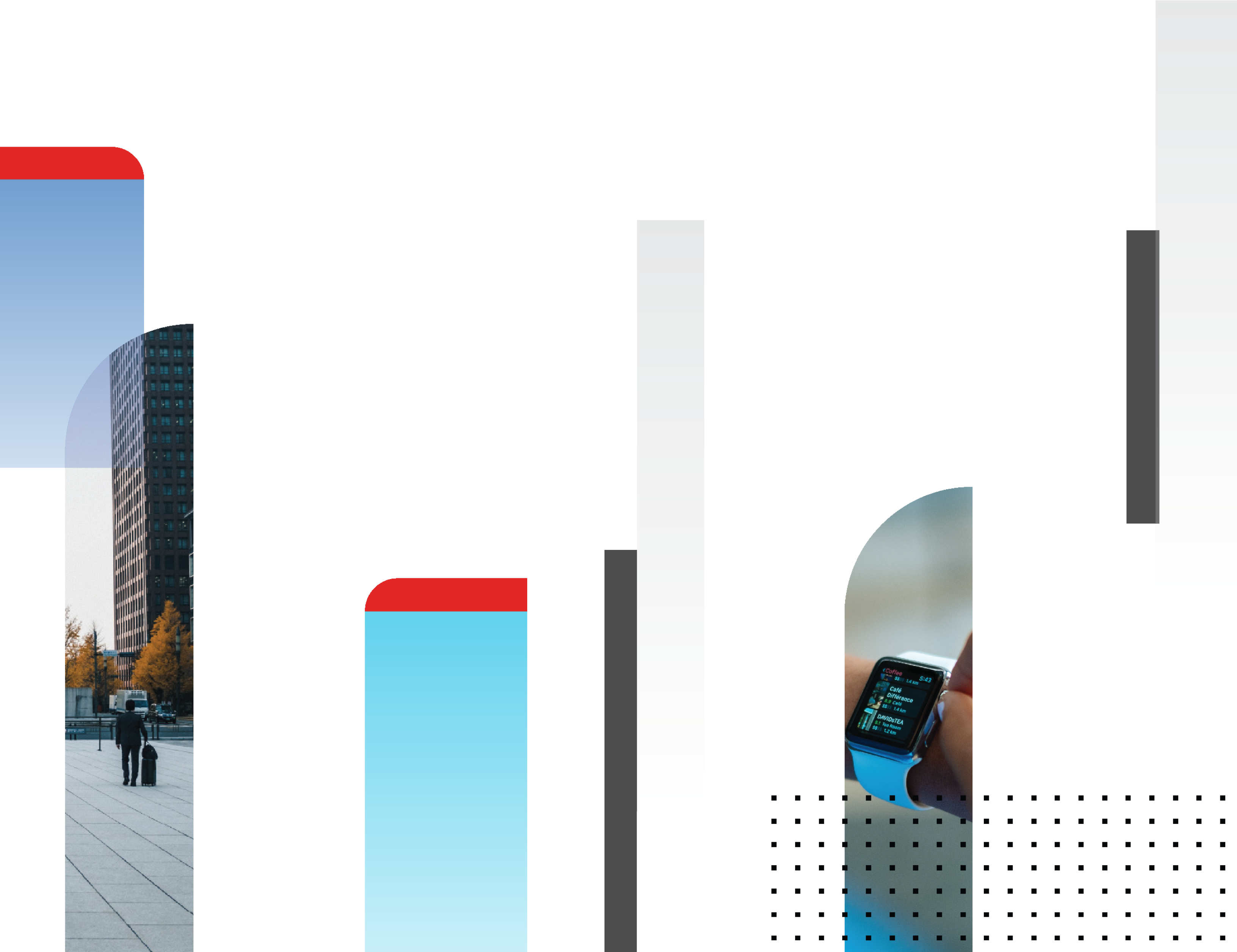
Disk Encryption of Data on FortiSIEM Supervisor

FortiSIEM 6.4.0



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FortiSIEM 6.4.0 Disk Encryption of Data on FortiSIEM Supervisor

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Change Log

Date	Change Description
05/13/2019	Initial version of Disk Encryption of Data on FortiSIEM Supervisor
11/20/2019	Release of Disk Encryption of Data on FortiSIEM Supervisor for 5.2.6.
03/30/2020	Release of Disk Encryption of Data on FortiSIEM Supervisor for 5.3.0.
03/23/2021	Release of Disk Encryption of Data on FortiSIEM Supervisor for 6.2.0.
05/06/2021	Release of Disk Encryption of Data on FortiSIEM Supervisor for 6.2.1.
06/03/2021	Additional notes added for Disk Encryption of Data on FortiSIEM Supervisor for 6.2.x.
07/06/2021	Release of Disk Encryption of Data on FortiSIEM Supervisor for 6.3.0.
08/26/2021	Release of Disk Encryption of Data on FortiSIEM Supervisor for 6.3.1.
10/15/2021	Release of Disk Encryption of Data on FortiSIEM Supervisor for 6.3.2.
12/22/2021	Release of Disk Encryption of Data on FortiSIEM Supervisor for 6.3.3.
01/18/2022	Release of Disk Encryption of Data on FortiSIEM Supervisor for 6.4.0.

Disk Encryption of Data on FortiSIEM Supervisor

The steps below show how to encrypt `/cmdb`, `/svn`, and `/data` disks on a FortiSIEM supervisor VM node with local disk for EventDB (`/data`). If you are using NFS or Elastic storage, you must perform additional steps for the actual data directories on these servers in addition to supervisor (`/cmdb`, `/svn`).

Note 1: We do not recommend encrypting the root disk which presents an operational challenge during boot up to provide a passphrase. The root disk contains binaries and some internal system and application logs, not data.

Note 2: Disk encryption key management is an operational challenge. If you want strong security, then you must protect encryption keys with a passphrase and that requires a human to type them and mount the “opened” disks. The less secure alternative is to use keys that are not protected by a passphrase and stored in a file on the root partition.

Note 3: The `cryptsetup` command is not included in FortiSIEM. To verify if the package is installed, run the following command:

```
dnf search cryptsetup
```

To install, run the following command:

```
dnf install cryptsetup -y
```

It is best to perform these steps on a fresh installation prior to initializing the product. This avoids the need for additional disks. If you have to perform these on an existing installation of FortiSIEM, then you must have additional disks of the same capacity to encrypt and copy the data to it. Here is a quick overview of the steps:

1. Import the latest FortiSIEM VA image on one of the supported platforms.
2. For each disk, (`/cmdb`, `/svn`, `/data`) complete the following steps:
   a. Unmount the filesystem.
   b. Wipe the filesystem of exiting filesystem and partition table.
   c. Setup a LUKS formatted disk which prompts you for a passphrase that protect the encryption keys in Slot 0 – Your disk is now encrypted.
   d. Add another LUKS key into Slot 1 and save this into a file on `/etc`. (There are a total of 8 key slots).
   e. Open the encrypted disk after providing a passphrase for further operations which provides a `/dev/mapper/XYZ` device.
   f. Create an entry in `/etc/crypttab` which will open the encrypted disk using the Slot 1 key file you saved above at boot time.
   g. Create an `ext4` filesystem on the opened disk in `/dev/mapper/XYZ`.
   h. Create an `/etc/fstab` entry to mount the opened disk above to a named path (`/cmdb`, `/svn`, or `/data` as the case may be).

Detailed Steps to Encrypt Disk Data

Step 1: Import VA VM image and start the VM

Import VA VM image on one of the supported platforms as per user guide. Add a 4th `/data` disk if you plan on using local storage. Then, start the VM. Once you login by using ssh, run the `df -h` command to list the mounted filesystems.

You will see both `/cmdb` and `/svn`, for example:

```
[root@localhost ~]# df -h
 Filesystem      Size  Used Avail Use% Mounted on
 /dev/sda3        55G  6.7G   46G  13% /
 tmpfs           7.8G     0  7.8G   0% /dev/shm
 /dev/sda1       124M   43M   76M  36% /boot
 /dev/sdb1        60G  180M   56G   1% /cmdb
 /dev/sdc1        60G  180M   56G   1% /svn
 [root@localhost ~]#
```

If you had added a 4th disk for `/data`, you should be able to list this as well by using the `fdisk` command. These device names will vary on other platforms such as AWS, KVM, etc.

```
[root@localhost ~]# fdisk -l /dev/sdd
Disk /dev/sdd: 53.7 GB, 53687091200 bytes
255 heads, 63 sectors/track, 6527 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000
```

Step 2: Unmount /cmdb filesystem

Use the `umount` command to unmount the CMDB filesystem, for example:

```
umount /cmdb
```

Step 3: Wipe the `/cmdb` disk of previous filesystem and partition info

Use the `wipefs` command to clear the existing filesystem and partition information from the CMDB disk, for example:

```
[root@localhost ~]# wipefs --all /dev/sdb1
 2 bytes [53 ef] erased at offset 0x438 (ext3)
 [root@localhost ~]# wipefs --all /dev/sdb
 wipefs: WARNING: /dev/sdb: appears to contain 'dos' partition table
```

Step 4: Setup LUKS format disk encryption for /cmdb disk

When you run the `cryptsetup luksFormat` command, you must provide a passphrase that protects the encryption key for the disk. This key is stored in Slot 0 of the keys.

```
[root@localhost ~]# cryptsetup luksFormat /dev/sdb

WARNING!

========

This will overwrite data on /dev/sdb irrevocably.
Are you sure? (Type uppercase yes): YES
```

```
Enter LUKS passphrase:
Verify passphrase:
```

There are a total of 8 slots for additional keys which can be used to provide multiple admins the ability to unlock the disks or can be used for periodic rotation of keys. The following command can be used to dump information about different slots.

```
[root@localhost ~]# cryptsetup luksDump /dev/sdb|grep Slot
Key Slot 0: ENABLED
Key Slot 1: DISABLED
Key Slot 2: DISABLED
Key Slot 3: DISABLED
Key Slot 4: DISABLED
Key Slot 5: DISABLED
Key Slot 6: DISABLED
Key Slot 7: DISABLED
```

Step 5: Add a new key to LUKS disk for /cmdb

Use the `cryptsetup` command with the `luksAddKey` option to add the LUKS key for the CMDB disk, for example:

```
cryptsetup luksAddKey /dev/sdb /etc/enccmdbkey
```

Note: `/etc/enccmdbkey` is not a file that is included. If `cryptsetup` throws an error stating that the file is missing, run the following:

```
touch /etc/enccmdbkey
```

Enter any passphrase.

If you enter the `cryptsetup` command with the `luksAddKey` option again, you will see that two slots have enabled keys. Slot 0 contains the key that was generated when you first created the encrypted disk. Slot 1 contains the new key you just added above which was copied to a file. Additional commands for LUKS keys are in this document.

```
[root@localhost ~]# cryptsetup luksDump /dev/sdb|grep Slot
Key Slot 0: ENABLED
Key Slot 1: ENABLED
Key Slot 2: DISABLED
Key Slot 3: DISABLED
Key Slot 4: DISABLED
Key Slot 5: DISABLED
Key Slot 6: DISABLED
Key Slot 7: DISABLED
```

Step 6: Open the encrypted CMDB disk

Use the `cryptsetup` command with the `luksOpen` option to open the encrypted CMDB disk, for example:

```
cryptsetup luksOpen /dev/sdb encryptedCmdb --key-file /etc/enccmdbkey
```

Step 7: Configure automatic encrypted disk “open” at boot up

Create an entry in `/etc/crypttab` which will open the encrypted disk using the Slot 1 key file you saved above at boot time.

```
echo "encryptedCmdb /dev/sdb /etc/enccmdbkey luks" > /etc/crypttab
```

Step 8: Create an `ext4` filesystem on the “opened” encrypted disk

Use the `mkfs.ext4` command to create an `ext4` file system on the disk, for example:

```
[root@localhost ~]# mkfs.ext4 /dev/mapper/encryptedCmdb
mke2fs 1.41.12 (17-May-2010)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
3932160 inodes, 15728128 blocks
786406 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=4294967296
480 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
4096000, 7962624, 11239424
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

This filesystem will be automatically checked every 37 mounts or 180 days, whichever comes first. You can override this by using the `tune2fs -c` or `-i` command.

Step 9: Replace /etc/fstab entry to mount the encrypted disk instead of the original

Enter these commands to mount the encrypted disk instead of the non-encrypted disk.

```
[root@localhost ~]# grep cmdb /etc/fstab
/dev/mapper/encryptedCmdb /cmdb ext4 defaults,nodev 0 1
```

Step 10: Remount new /cmdb

Use the `mount` and `df` commands to remount the new CMDB disk, for example:

```
[root@localhost ~]# mount /cmdb
[root@localhost ~]# df -h /cmdb
```

```
Filesystem     Size  Used Avail Use% Mounted on
/dev/mapper/encryptedCmdb
59G   52M   56G   1% /cmdb
```

Steps to Encrypt Disk Data for /svn

Encrypting disk data for `/svn` is very similar. Replace the device names, encryption key file name, and device mapper device names appropriately.

Steps to Encrypt Disk Data for /data (local)

Encrypting disk data for local `/data` is very similar. Once you have created the encrypted disk, do not create the filesystem. That will be done when you setup storage. You must provide a `/dev/mapper/encryptedData` device name in the storage setup.

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