Making symmetric block cipher meta permutating again

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February 17, 2026

Contents

Abstract

Hi, I'm Heinrich Elsigan I'm interested in CSharp, Java, MSSQL, .Net Core, Android and politics, society and the future; currently working as freelancer (one person company) and planning a secure endpoint 2 entpoint chat and looking to collaborate on reviews for other repositories and projects.

1. personal tech and political blog blog.area23.at
2. GitHub repositories github.com/heinrichelsigan/
3. StackOverflow stackoverflow.com/users/12213151/heinrich-elsigan
4. Curriculum vitae heinrichelsigan.area23.at/cv
5. live demo .Net area23.at/net

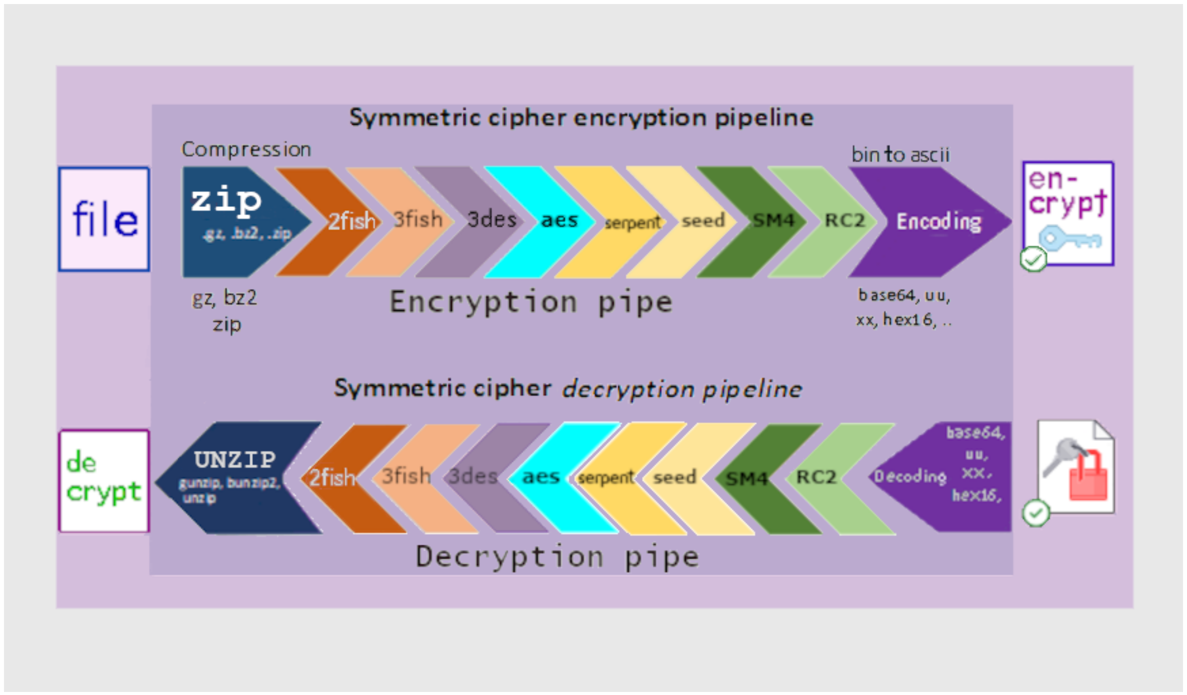


Figure 1: Cipher Pipeline

1 Thanks to

Normally, thanks to are always at the end of each paper, but the people or organizations I benefited from while trying to make AES strong again are more important than a simple proof of concept showing that it works, except on my raw experimental test form.

1. https://bouncycastle.org/
2. https://schneier.com/
3. https://github.com/dotnet/
4. https://github.com/microsoft
5. https://git.lysator.liu.se/nettle/nettle (real easy to read c/c++ code)

2 Software

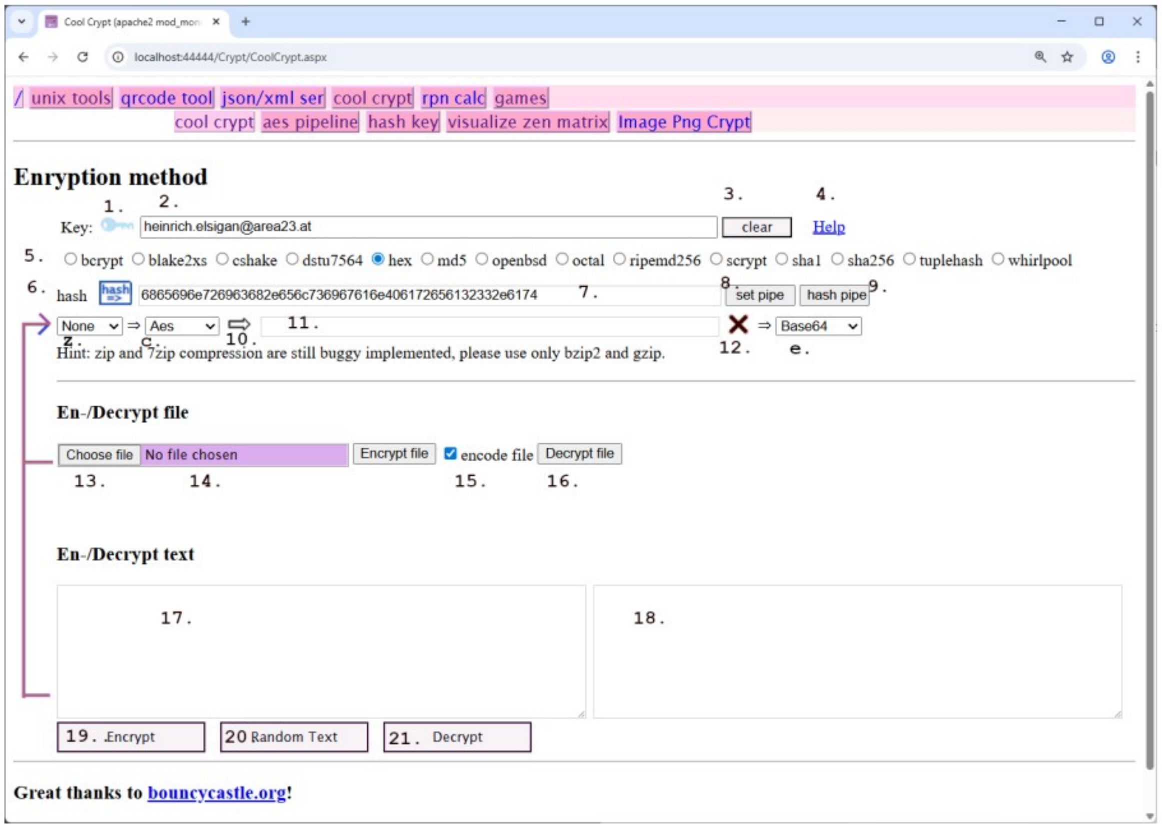
Source code of PermAgainCrypt is hosted at Github. Github releases contains compiled and linked .exe files for windows, but most users prefer download from a seperate download site https://cqrxs.eu/.

2.1 Git: PermAgainCrypt minimalistic repository

https://github.com/heinrichelsigan/PermAgainCrypt/

2.2 Download

Go to https://cqrxs.eu/ or https://io.cqrxs.eu/ and choose latest version. You can directly go to the download area https://cqrxs.eu/download/ or https://io.cqrxs.eu/download/. Attention, version before March 2025 have a 3-fish over Aes-Engine encryption bug, because 3-fish uses AES default block size and key length and Bouncy Castle Aes-Engine parameters. It works, but settings AES default engine for 3-fish, isn't so serious and please download version after March 30.


Cool Crypt (apache2 mod_mon
localhost:44444/Crypt/CoolCrypt.aspx
/ unix tools qrcode tool json/xml ser cool crypt rpn calc games
cool crypt aes pipeline hash key visualize zen matrix Image Png Crypt
1.
2.
3.
4.
clear
Help
5.
bcrypt blake2xs cshake dstu7564 hex md5 openbsd octal ripemd256 scrypt sha1 sha256 tuplehash whirlpool
6.
7.
8.
9.
set pipe
hash pipe
10.
11.
12.
z.
c.
e.
Choose file
No file chosen
Encrypt file
Decrypt file
13.
14.
15.
16.
17.
18.
19. Encrypt
20 Random Text
21. Decrypt

Enryption method

Key: heinrich.elsigan@area23.at

[✓ hex]

hash 6865696e726963682e656c736967616e406172656132332e6174

None ⇒ Aes ⇒ ⇒ Base64

Hint: zip and 7zip compression are still buggy implemented, please use only bzip2 and gzip.

En-/Decrypt file

[✓ encode file]

En-/Decrypt text

Great thanks to bouncycastle.org!

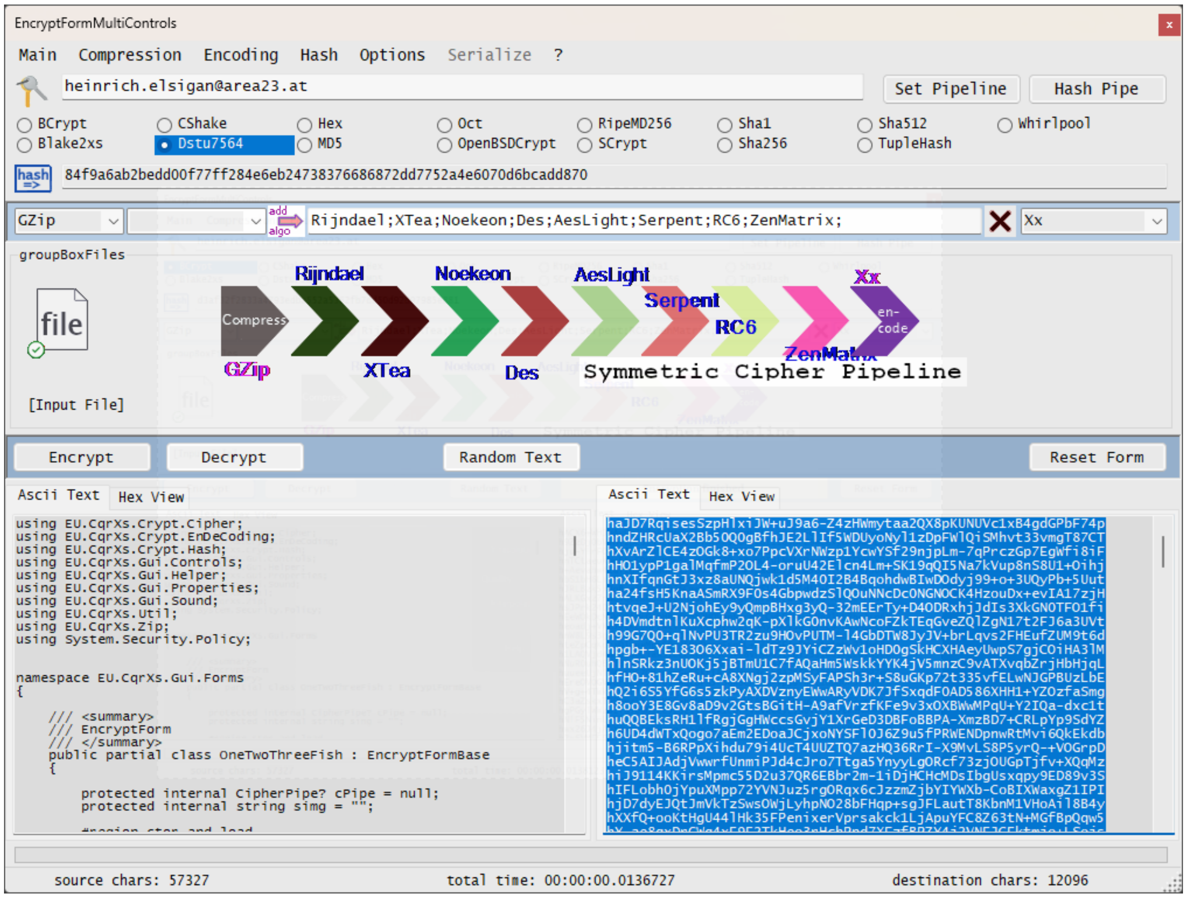
Figure 2: Symmetric Cipher WebForm

3 Different Forms

3.1 Documentation online en-/decrypt form

- cqrxs.eu/net/Crypt
- area23.at/net/Crypt

1. Key: When clicking key your entered key will be stored temporary in session.
2. Textbox secret key: Enter your Email address and secret key.
3. Buton Clear: Clear and reset the entire form.
4. Hyperlink Help: Show this help
5. RadioButtonList KeyHashes Choose the hash method to hash your secret key.
6. ImageButton Hash: Clicking will hash your key and display hashed key in textbox.
7. TextBox Hash (readonly): Displays your hashed key.
8. Button “Set Pipe”: sets symmetric cipher pipe, dependent only on your entered key
9. Button “Hash Pipe”: sets symmetric cipher pipe, dependent primary on calculated hash and secondary on your entered key.
10. DropDown ZipTypes Choose encryption type (Please only GZip or Zip or None)
11. DropDown CipherTypes Choose a symmetric cipher to add it to the symmetric cipher pipe.



heinrich.elsigan@area23.at

Dstu7564

84f9a6ab2bedd00f77ff284e6eb24738376686872dd7752a4e6070d6bcadd870

GZip

Rijndael;XTea;Noekeon;Des;AesLight;Serpent;RC6;ZenMatrix;

Xx

```
using EU.CqrXs.Crypt.Cipher;
using EU.CqrXs.Crypt.EnDeCoding;
using EU.CqrXs.Crypt.Hash;
using EU.CqrXs.Gui.Controls;
using EU.CqrXs.Gui.Helper;
using EU.CqrXs.Gui.Properties;
using EU.CqrXs.Gui.Sound;
using EU.CqrXs.Util;
using EU.CqrXs.Zip;
using System.Security.Policy;


namespace EU.CqrXs.Gui.Forms
{

    /// <summary>
    /// EncryptForm
    /// </summary>
    public partial class OneTwoThreeFish : EncryptFormBase
    {

        protected internal CipherPipe? cPipe = null;
        protected internal string simg = "";
```

```
haJD7RqisesSzpHlxiJW+uJ9a6-Z4zHWmytaa2QX8pKUNUVc1xB4gdGPbF74p
hndZHRcUaX2Bb5OQ0gBfhJE2LlIf5WDUyoNyl1zDpFWlQiSMhvt33vmgT87CT
hXvArZlCE4zOGk8+xo7PpcVXrNWzp1YcwYSf29njpLm-7qPrczGp7EgWfi8iF
hHO1ypP1galMqfmP2OL4-oruU42Elcn4Lm+SK19qQI5Na7kVup8nS8U1+Oihj
hnXIfqnGtJ3xz8aUNQjwk1d5M40I2B4BqohdwBIwDOdyj99+o+3UQyPb+5Uut
ha24fsH5KnaASmRX9FOs4GbpwdzSlQOuNNcDc0NGNOCK4HzouDx+evIA17zjH
htvqeJ+U2NjohEy9yQmpBHxg3yQ-32mEErTy+D4ODRxhjJdIs3XkGNOTFO1fi
h4DVmdtnlKuXcphw2qK-pXlkGOnvKAwNcoFZkTEqGveZQlZgN17t2FJ6a3UVt
h99G7QO+qlNvPU3TR2zu9HOvPUTM-l4GbDTW8JyJV+brLqvs2FHEufZUM9t6d
hpgb+-YE18306Xxai-ldTz9JYiCZzWv1oHDOgSkHCXHAeyUwpS7gjCOiHA3lM
hlnSRkz3nUOKj5jBTmU1C7fAQaHm5WskkYYK4jV5mnzC9vATXvqbZrjHbHjqL
hfHO+81hZeRu+cA8XNgj2zpMSyFAPSh3r+S8uGKp72t335vfELwNJGPBUzLbE
hQ2i6S5YfG6s5zkPyAXDVznyEWwARyVDK7JfSxqdFOAD586XHH1+YZOzfaSmg
h8ooY3E8Gv8aD9v2GtsBGitH-A9afVrzfKFe9v3xOXBWwMPqU+Y2IQa-dxc1t
huQQBEksRH1lfRgjGgHWccsGvjY1XrGeD3DBFoBBPA-XmzBD7+CRLpYp9SdYZ
h6UD4dWTxQogo7aEm2EDoaJCjxoNYSFlOJ6Z9u5fPRWENDpnwRtMvi6QkEkdb
hjitm5-B6RPpXihdu79i4UcT4UUZTQ7azHQ36RrI-X9MvLS8P5yrQ-+VOGrpD
heC5AIJAdjVwwrfUnmiPJd4cJro7Ttga5YnyyLgORcf73zjOUGpTjfv+XQqMz
hiJ9114KKirsMpmc55D2u37QR6EBbr2m-1iDjHCHcMDsIbgUsxqpy9ED89v3S
hIFLobhOjYpuXMpp72YVNJuz5rgORqx6cJzzmZjbYIYWXb-CoBIXWaxgZ1IPI
hjD7dyEJQtJmVkTzSwsOWjLyhpNO28bFHqp+sgJFLautT8KbnM1VHoAil8B4y
hXXfQ+ooKtHgU44lHk35FPenixerVprsakck1LjApuYFC8Z63tN+MGfBpQqw5
```

source chars: 57327   total time: 00:00:00.0136727   destination chars: 12096

Figure 3: WinForm CSharp

12. ImageButton „add algo“: Clicking on will add the in c. DropDown CipherTypes selected symmetric cipher algorithm to CipherPipe.

13. TextBox CipherPipe (readonly): Displays the current Cipher Pipe algorithms.

14. ImageButton "Clear Pipe": Clicking on will clear only the entire Cipher Pipe

15. DropDown EncodingTypes: Choose the final binary to ascii encoder, default is Base64. Beware of using uuencode in Web, because <> will be interpreted as possible html injection.

16. TextArea Source: paste or enter Text here.

17. TextArea Destination: (readonly) After clicking Encrypt or Decrypt processed text will appear in the text area.

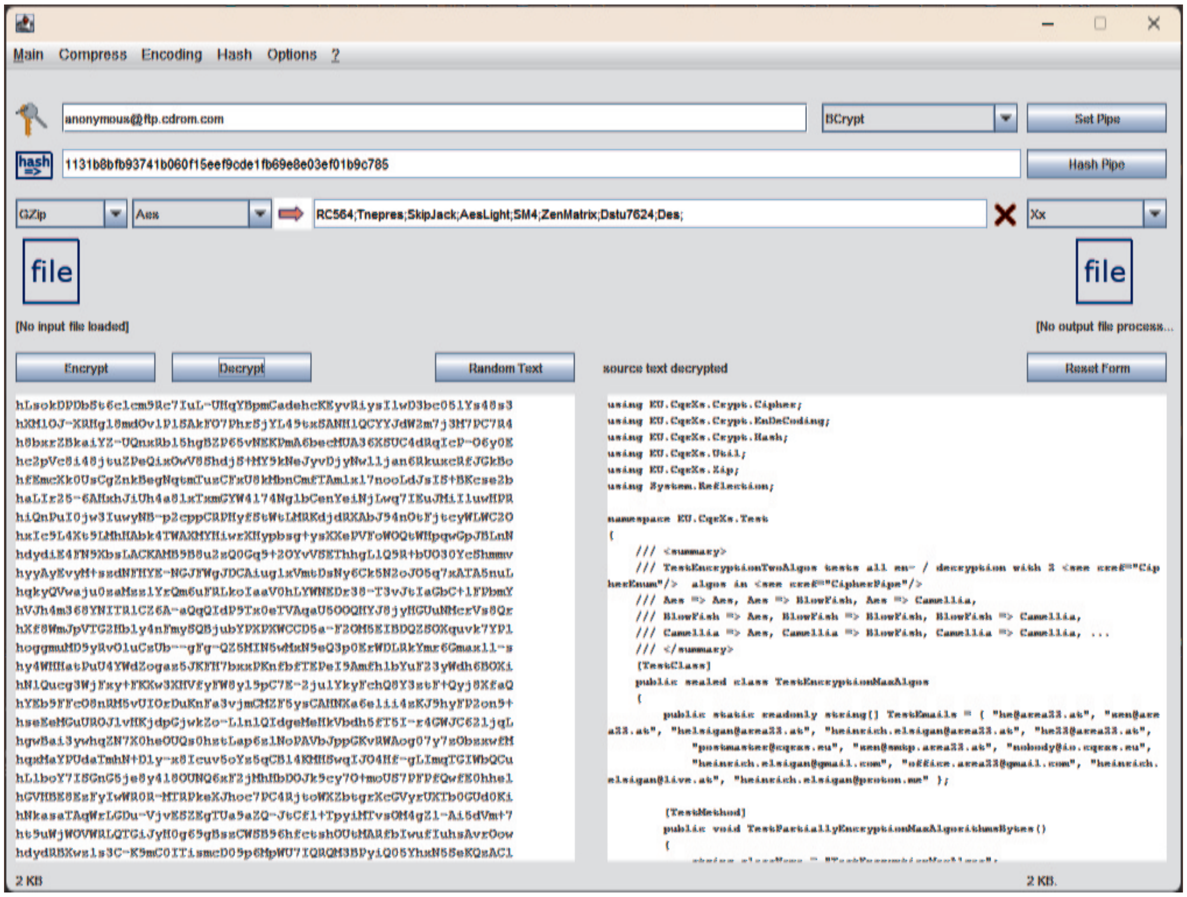
18. Button Encrypt: Encrypts the text from TextArea Source and displays encrypted text in TextArea Destination.

19. Button "Random Text": Adds a short fortune to TextArea Source.

20. Button Decrypt: Decrypts text in TextArea Source and display decrypted text in TextArea Destination.

3.2 Documentation of WinForm

You can also go directly to github.com/heinrichelsigan/PermAgainCrypt/releases to download newest Gui Form x86 and x64. . . .



anonymous@ftp.cdrom.com

BCrypt

1131b8bfb93741b060f15eef9cde1fb69e8e03ef01b9c785

GZip

Aes

RC564;Tnepres;SkipJack;AesLight;SM4;ZenMatrix;Dstu7624;Des;

Xx

[No input file loaded]

[No output file process...

source text decrypted

```
hLsokDPDb5t6clcm9Rc7IuL-UHqYBpmCadehcKEyvRiysIlwD3bc051Ys48s3
hXM1OJ-XRHg18mdOv1P15AkFO7Phr5jYL49tx5ANH1QCYYJdW2m7j3M7PC7R4
h8bxrZBkaiYZ-UQnxRb15hgBZP65vNEKPmA6becMUA36X5UC4dRqIcP-O6y0E
hc2pVc8i48jtuZPeQixOwV85hdj5+MY9kNeJyvDjyNw11jan6RkuxcRfJGkBo
hfEmcXk0UsCgZnkBegNqtmTusCFxU8kMbnCmfTAmlx17nooLdJsI5+BKcse2b
haLIr25-6AHxhJiUh4a81xTxmGYW4174Ng1bCenYeiNjLwq7IEuJMiI1uwHPR
hiQnPuI0jw3IuwyNB-p2cppCRPHyf5tWtLMRKdjdRXAbJ94nOtFjtcyWLWC2O
hxIc9L4Xt9LMhHAbk4TWAXMYHiwrXHypbsg+ysXXePVFoWOQtWHpqwGpJBLnN
hdydiE4FN9XbsLACKAMB9B8u2sQ0Gq9+2OYvV5EThhgL1Q9R+bUO30Yc5hmmv
hyyAyEvyM+ssdNFHYE-NGJFWgJDCAiug1xVmtDsNy6Ck5N2oJO5q7xATA5nuL
hqkyQVwaju0saMsz1YrQm6uFRLkoIaaV0hLYWNEDr38-T3vJtIaGbC+1FPbmY
hVJh4m368YNITR1CZ6A-aQqQIdP9Tx0eTVAqaU5OOQHYJ8jyHGUuNMcrVs8Qr
hXf8WmJpVTG2Hb1y4nFmy5QBjubYPXPXWCCD5a-F2OM5EIBDQZ5OXquvk7YP1
hoggmuMD9yRvO1uCsUb--gFg-QZ5MIN5wMxN9eQ3p0ErWDLRkYmr6Gmax11-s
hy4WHHatPuU4YWdZogas5JKFH7bxxPKnfbfTEPeI9Amfh1bYuF23yWdh6BOXi
hN1Qucg3WjFxy+FKXw3XHVfyFW8y19pC7E-2ju1YkyFchQ8Y3stF+Qyj8XfaQ
hYEb9FFcO8nRM5vUIOrDuKnFa3vjmCMZF5ysCAHNXa6e1ii4sKJ9hyFP2on9+
hseEeMGuUROJ1vHKjdpGjwkZo-L1n1QIdgeMeHkVbdh5fT5I-r4GWJC621jqL
hgwBai3ywhqZN7X0heOUQs0hstLap6s1NoPAVbJppGKvRWAog07y7sObsxwfM
hqxMaYPUdaTmhN+D1y-x8Icuv5oYs5qCB14KMH5wqIJO4Hf-gLImqTGIWbQCu
hL1boY7I5GnG5je8y418OUNQ6xF2jMhHbDOJk9cy7O+moU57PFPfQwfE0hhe1
hGVHBE8EsFyIwWR0R-MTRPkeXJhoc7PC4RjtoWXZbtgrXcGVyrUXTb0GUd0Ki
hNkasaTAqWrLGDu-VjvE5ZEgTUa9aZQ-JtCf1+TpyiMTvsOM4gZ1-Ai5dVm+7
ht9uWjWOVWRLQTGiJyH0g69gBssCW5B96hfctshOUtMARfbIwufIuhsAvrOow
hdydRBXws1s3C-K9mC0ITismcD09p6MpWU7IQRQM3BPyiQ05YhxN55eKQsAC1
```

2 KB

```
using EU.CqrXs.Crypt.Cipher;
using EU.CqrXs.Crypt.EnDeCoding;
using EU.CqrXs.Crypt.Hash;
using EU.CqrXs.Util;
using EU.CqrXs.Zip;
using System.Reflection;

namespace EU.CqrXs.Test
{
    /// <summary>
    /// TestEncryptionTwoAlgos tests all en- / decryption with 2 <see cref="Cip
herEnum"/>  algos in <see cref="CipherPipe"/>
    /// Aes => Aes, Aes => BlowFish, Aes => Camellia,
    /// BlowFish => Aes, BlowFish => BlowFish, BlowFish => Camellia,
    /// Camellia => Aes, Camellia => BlowFish, Camellia => Camellia, ...
    /// </summary>
    [TestClass]
    public sealed class TestEncryptionMaxAlgos
    {
        public static readonly string[] TestEmails = { "he@area23.at", "zen@are
a23.at", "helsigan@area23.at", "heinrich.elsigan@area23.at", "he23@area23.at",
            "postmaster@cqrxs.eu", "zen@smtp.area23.at", "nobody@io.cqrxs.eu",
            "heinrich.elsigan@gmail.com", "office.area23@gmail.com", "heinrich.
elsigan@live.at", "heinrich.elsigan@proton.me" };

        [TestMethod]
        public void TestPartiallyEncryptionMaxAlgorithmsBytes()
        {
```

2 KB.

Figure 4: javax.swing.JFrame.java

3.3 Java JFrame based

- https://docs.oracle.com/javase/8/docs/api/javax/swing/JFrame.html
- https://github.com/openjdk-mirror/jdk7u-jdk/blob/master/src/share/classes/javax/swing/JFrame.java

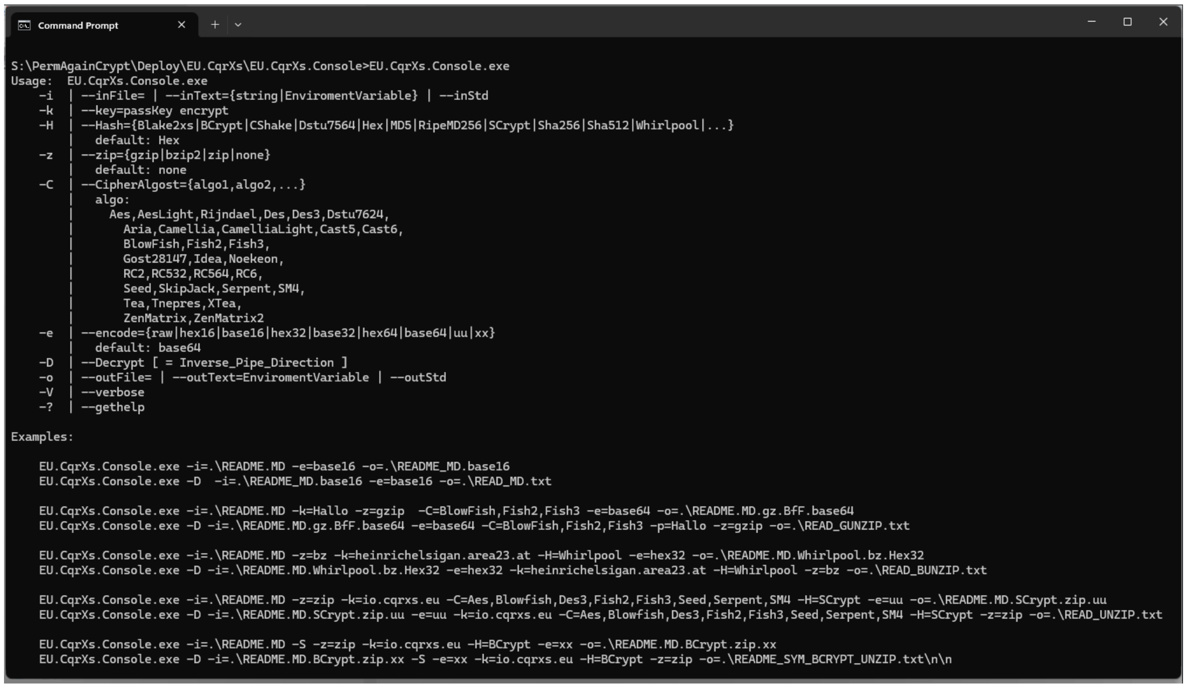
4 Console and cmd programs

4.1 Windows Console

Download the lastest Windows Console from io.cqrxs.eu/download/EU.CqrXs.Console/

4.1.1 Usage: EU.CqrXs.Console.exe

```
Usage:  EU.CqrXs.Console.exe
    -i  | --inFile= | --inText={string|EnviromentVariable} | --inStd
    -k  | --key=passKey encrypt
    -H  | --Hash={Blake2xs|BCrypt|CShake|Dstu7564|Hex|MD5|RipeMD256|SCrypt|Sha256|Sha512|Whirlpool|...}
        |   default: Hex
    -z  | --zip={gzip|bzip2|zip|none}
        |   default: none
    -C  | --CipherAlgost={algo1,algo2,...}
        |   algo:
        |     Aes,AesLight,Rijndael,Des,Des3,Dstu7624,
```



```
S:\PermAgainCrypt\Deploy\EU.CqrXs\EU.CqrXs.Console>EU.CqrXs.Console.exe
Usage:  EU.CqrXs.Console.exe
    -i  | --inFile= | --inText={string|EnviromentVariable} | --inStd
    -k  | --key=passKey encrypt
    -H  | --Hash={Blake2xs|BCrypt|CShake|Dstu7564|Hex|MD5|RipeMD256|SCrypt|Sha256|Sha512|Whirlpool|...}
        |   default: Hex
    -z  | --zip={gzip|bzip2|zip|none}
        |   default: none
    -C  | --CipherAlgost={algo1,algo2,...}
        |   algo:
        |     Aes,AesLight,Rijndael,Des,Des3,Dstu7624,
        |       Aria,Camellia,CamelliaLight,Cast5,Cast6,
        |       BlowFish,Fish2,Fish3,
        |       Gost28147,Idea,Noekeon,
        |       RC2,RC532,RC564,RC6,
        |       Seed,SkipJack,Serpent,SM4,
        |       Tea,Tnepres,XTea,
        |       ZenMatrix,ZenMatrix2
    -e  | --encode={raw|hex16|base16|hex32|base32|hex64|base64|uu|xx}
        |   default: base64
    -D  | --Decrypt [ = Inverse_Pipe_Direction ]
    -o  | --outFile= | --outText=EnviromentVariable | --outStd
    -V  | --verbose
    -?  | --gethelp

Examples:

    EU.CqrXs.Console.exe -i=.\README.MD -e=base16 -o=.\README_MD.base16
    EU.CqrXs.Console.exe -D  -i=.\README_MD.base16 -e=base16 -o=.\READ_MD.txt

    EU.CqrXs.Console.exe -i=.\README.MD -k=Hallo -z=gzip  -C=BlowFish,Fish2,Fish3 -e=base64 -o=.\README.MD.gz.BfF.base64
    EU.CqrXs.Console.exe -D -i=.\README.MD.gz.BfF.base64 -e=base64 -C=BlowFish,Fish2,Fish3 -p=Hallo -z=gzip -o=.\READ_GUNZIP.txt

    EU.CqrXs.Console.exe -i=.\README.MD -z=bz -k=heinrichelsigan.area23.at -H=Whirlpool -e=hex32 -o=.\README.MD.Whirlpool.bz.Hex32
    EU.CqrXs.Console.exe -D -i=.\README.MD.Whirlpool.bz.Hex32 -e=hex32 -k=heinrichelsigan.area23.at -H=Whirlpool -z=bz -o=.\READ_BUNZIP.txt

    EU.CqrXs.Console.exe -i=.\README.MD -z=zip -k=io.cqrxs.eu -C=Aes,Blowfish,Des3,Fish2,Fish3,Seed,Serpent,SM4 -H=SCrypt -e=uu -o=.\README.MD.SCrypt.zip.uu
    EU.CqrXs.Console.exe -D -i=.\README.MD.SCrypt.zip.uu -e=uu -k=io.cqrxs.eu -C=Aes,Blowfish,Des3,Fish2,Fish3,Seed,Serpent,SM4 -H=SCrypt -z=zip -o=.\READ_UNZIP.txt

    EU.CqrXs.Console.exe -i=.\README.MD -S -z=zip -k=io.cqrxs.eu -H=BCrypt -e=xx -o=.\README.MD.BCrypt.zip.xx
    EU.CqrXs.Console.exe -D -i=.\README.MD.BCrypt.zip.xx -S -e=xx -k=io.cqrxs.eu -H=BCrypt -z=zip -o=.\README_SYM_BCRYPT_UNZIP.txt\n\n
```

Figure 5: Windows EU.CqrXs.Console.exe

```
    |       Aria,Camellia,CamelliaLight,Cast5,Cast6,
    |       BlowFish,Fish2,Fish3,
    |       Gost28147,Idea,Noekeon,
    |       RC2,RC532,RC564,RC6,
    |       Seed,SkipJack,Serpent,SM4,
    |       Tea,Tnepres,XTea,
    |       ZenMatrix,ZenMatrix2
-e  | --encode={raw|hex16|base16|hex32|base32|hex64|base64|uu|xx}
    |   default: base64
-D  | --Decrypt [ = Inverse_Pipe_Direction ]
-o  | --outFile= | --outText=EnviromentVariable | --outStd
-V  | --verbose
-?  | --gethelp
```

4.1.2 Examples: EU.CqrXs.Console.exe

```
EU.CqrXs.Console.exe -i=.\README.MD -e=base16 -o=.\READMD.base16
EU.CqrXs.Console.exe -D  -i=.\READMD.base16 -e=base16 -o=.\READ_MD.txt

EU.CqrXs.Console.exe -i=.\README.MD -k=Hallo -z=gzip  -C=BlowFish,Fish2,Fish3
    -e=base64 -o=.\README.MD.gz.BfF.base64
EU.CqrXs.Console.exe -D -i=.\README.MD.gz.BfF.base64 -e=base64 -C=BlowFish,Fish2,Fish3
    -p=Hallo -z=gzip -o=.\READ_GUNZIP.txt

EU.CqrXs.Console.exe -i=.\README.MD -z=bz -k=heinrichelsigan.area23.at
    -H=Whirlpool -e=hex32 -o=.\README.MD.Whirlpool.bz.Hex32
EU.CqrXs.Console.exe -D -i=.\README.MD.Whirlpool.bz.Hex32 -e=hex32
    -k=heinrichelsigan.area23.at -H=Whirlpool -z=bz -o=.\READ_BUNZIP.txt

EU.CqrXs.Console.exe -i=.\README.MD -z=zip -k=io.cqrxs.eu
    -C=Aes,Blowfish,Des3,Fish2,Fish3,Seed,Serpent,SM4 -H=SCrypt
    -e=uu -o=.\README.MD.SCrypt.zip.uu
```

```
EU.CqrXs.Console.exe -D -i=.\README.MD.SCrypt.zip.uu -e=uu
    -k=io.cqrxs.eu -C=Aes,Blowfish,Des3,Fish2,Fish3,Seed,Serpent,SM4
    -H=SCrypt -z=zip -o=.\READ_UNZIP.txt

EU.CqrXs.Console.exe -i=.\README.MD -S -z=zip -k=io.cqrxs.eu -H=BCrypt
    -e=xx -o=.\README.MD.BCrypt.zip.xx
EU.CqrXs.Console.exe -D -i=.\README.MD.BCrypt.zip.xx -S -e=xx -k=io.cqrxs.eu
    -H=BCrypt -z=zip -o=.\README_SYM_BCRYPT_UNZIP.txt
```

5 Theory

5.1 8-staged symmetric block cipher pipeline

An eight staged symmetric block cipher crypto pipeline to improve advanced encryption standard based on meta DES, 3DES with P-Box S-Box.

The following image shows you an example of a symmetric cipher 8 staged encryption pipe and the corresponding decryption inverse pipe.

Before entering the encryption pipe, the file can be zipped to avoid huge amount of symmetric cipher blocks and after exiting the encryption pipe the file can be ascii encoded with base64 mime, uuencode, xxencode or hex16, because symmetric chiphered binary files might lose their block padding.

Implementation is based on my blog article: Making symmetric cipher encryption meta permutating again, including the follwing symmetric cipher algorithms:

- Aes, AesLight, Rijndael
- Bruce Schneier's BlowFish, 2-Fish, 3-Fish
- Camellia, CamelliaLight
- Cast5, Cast6
- National security agency's Des, 3-Des, SkipJack
- Dstu7624
- Ghost, Idea, Noekeon
- RC2, RC532, RC564, RC6
- SEED, SM4
- Serpent, Tnepres
- Tea, XTea
- and my own simplest symmetric block cipher alogrithms: ZenMatrix, ZenMatrix2

5.2 What are advantages and disadvantages of Symmetric Block Cipher

5.2.1 Advantages

Since symmetric block cipher ciphers each block in the same encrypting way

parallel processing can be implemented quiet easy with average performance bust on huge multi-processore machines.

5.2.2 Disadvantages

Since we know often concrete structure of a file header, because of more static tableized structure inside file header and the sepecific binary format signature (MIT magic cookie)

REPLAY attacs could be used by trying encode only the 1st symmetric cipher block with some heuristic headers and possible keys.

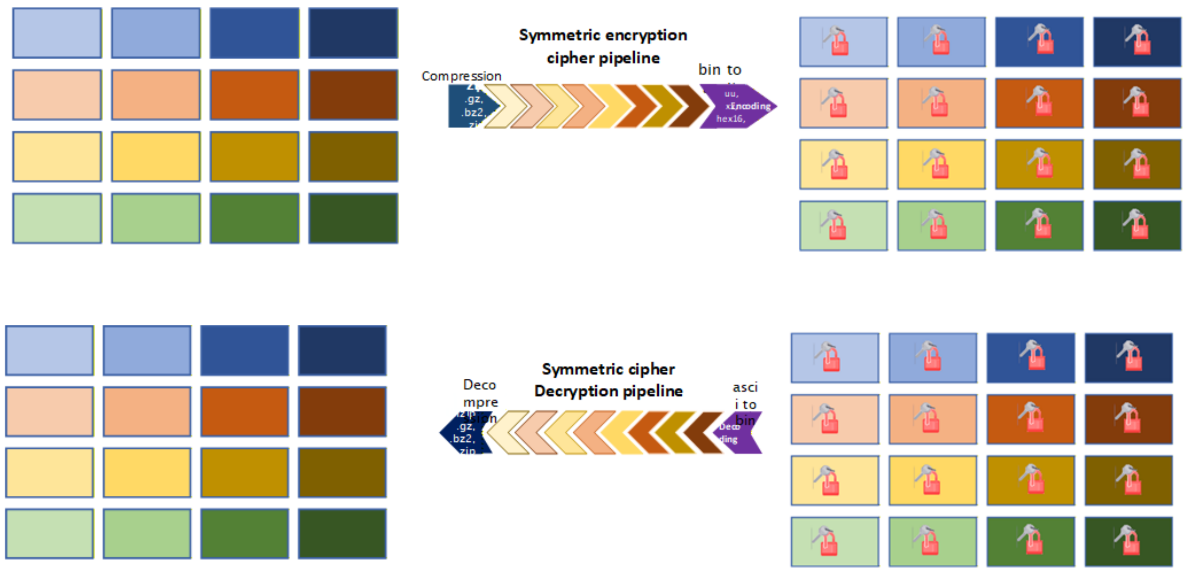
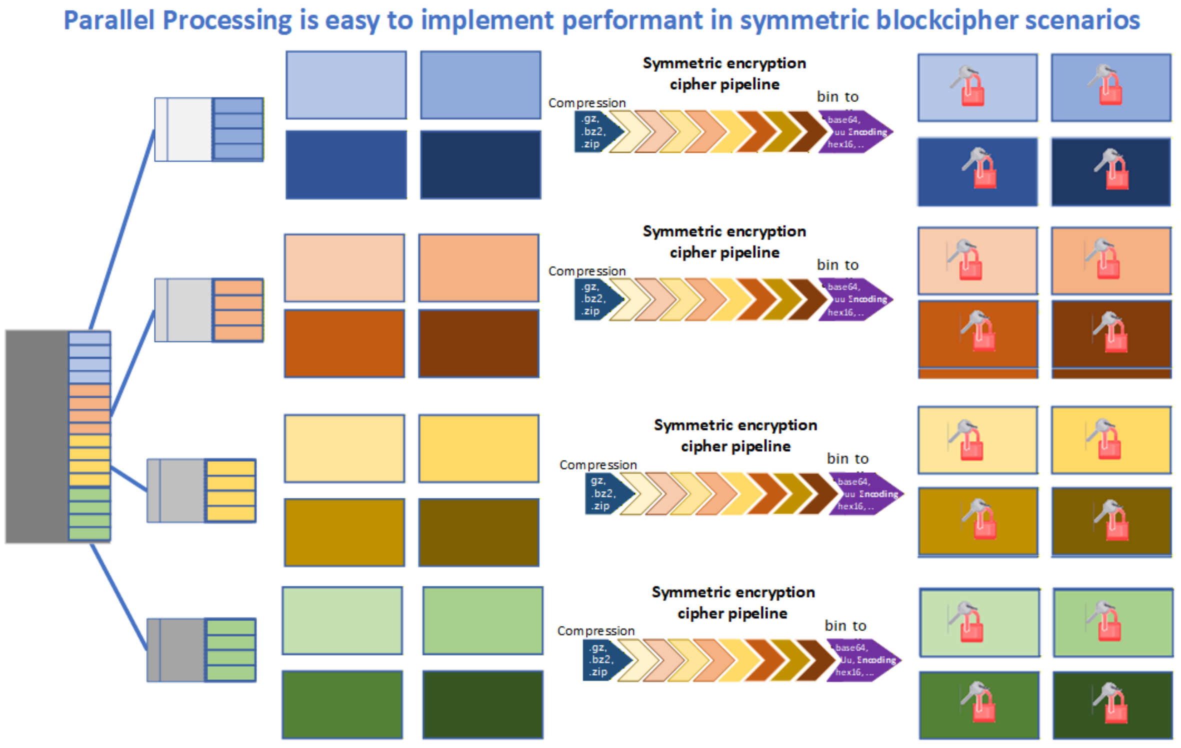
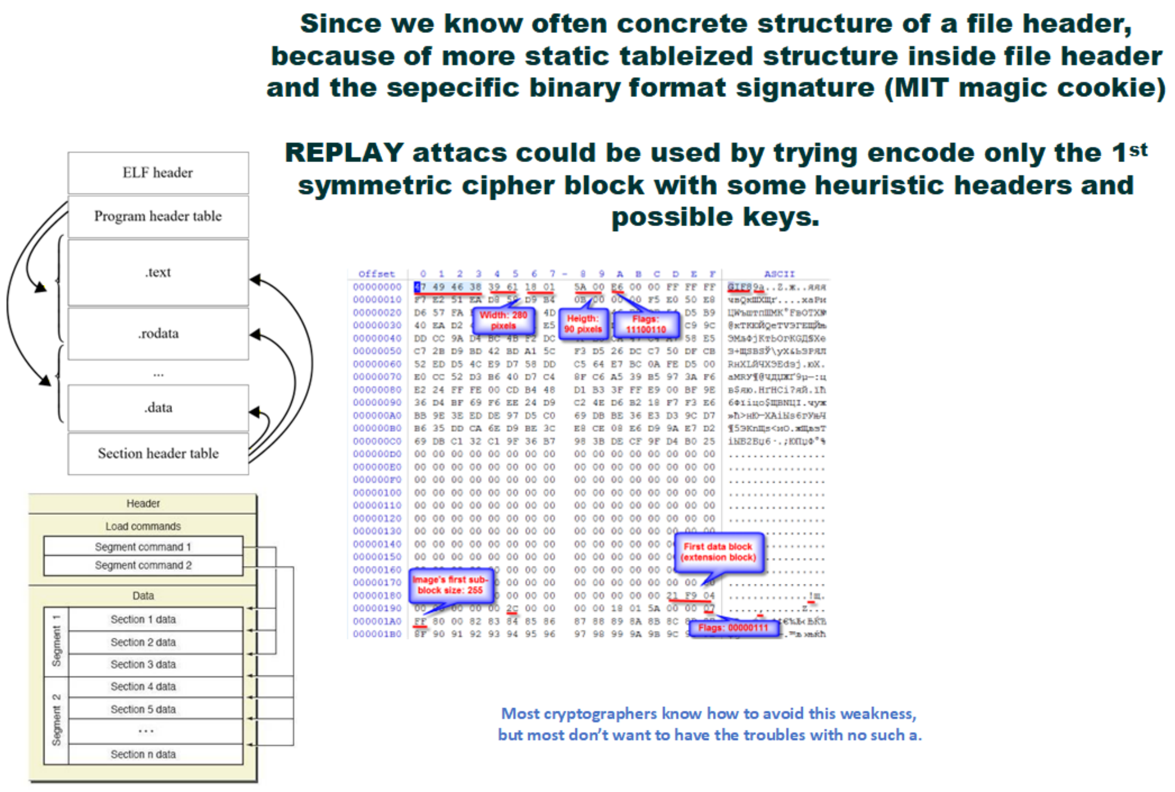


Figure 6: Symmetric BlockCipher Structure



Parallel Processing is easy to implement performant in symmetric blockcipher scenarios
Symmetric encryption cipher pipeline
Compression
.gz,
.bz2,
.zip
bin to
base64,
uu Encoding
hex16, ..

Figure 7: Symmetric BlockCipher Parallelism


Since we know often concrete structure of a file header,
because of more static tableized structure inside file header
and the sepecific binary format signature (MIT magic cookie)
REPLAY attacs could be used by trying encode only the 1st symmetric cipher block with some heuristic headers and possible keys.
ELF header
Program header table
.text
.rodata
...
.data
Section header table
Header
Load commands
Segment command 1
Segment command 2
Data
Segment 1
Section 1 data
Section 2 data
Section 3 data
Segment 2
Section 4 data
Section 5 data
...
Section n data
Width: 280 pixels
Heigth: 90 pixels
Flags: 11100110
First data block (extension block)
Image's first sub-block size: 255
Flags: 00000111
Most cryptographers know how to avoid this weakness,
but most don't want to have the troubles with no such a.

```
Offset     0  1  2  3  4  5  6  7 -  8  9  A  B  C  D  E  F     ASCII
00000000  47 49 46 38 39 61 18 01    5A 00 E6 00 00 FF FF FF   GIF89a..Z.ж..яяя
00000010  F7 E2 51 EA D8 59 D9 B4    0B 00 00 00 F5 E0 50 E8   чвQкШYЩґ....хаPи
00000020  D6 57 FA [illegible]       4D [illegible]       D5 B9   ЦWъштпШМК"FвОТХ№
00000030  40 EA D2 [illegible]       E5 [illegible]       C9 9C   @кТККЙQeTVЭГЕЩЙњ
00000040  DD CC 9A D4 BC 4B F2 DC    [illegible]          58 E5   ЭМљФjКтЬОгКGДSXе
00000050  C7 2B D9 BD 42 BD A1 5C    F3 D5 26 DC C7 50 DF CB   З+ЩЅBЅЎ\уХ&ЬЗPЯЛ
00000060  52 ED D5 4C E9 D7 58 DD    C5 64 E7 BC 0A FE D5 00   RнХLйЧXЭЕdзj.юХ.
00000070  E0 CC 52 D3 B6 40 D7 C4    8F C6 A5 39 B5 97 3A F6   аМRУ¶@ЧДЏЖҐ9µ—:ц
00000080  E2 24 FF FE 00 CD B4 48    D1 B3 3F FF E9 00 BF 9E   в$яю.НґHСі?яй.їћ
00000090  36 D4 BF 69 F6 EE 24 D9    C2 4E D6 B2 18 F7 F3 E6   6Фїiцо$ЩВNЦІ.чуж
000000A0  BB 9E 3E ED DE 97 D5 C0    69 DB BE 36 E3 D3 9C D7   »ћ>нЮ—ХАiЫѕ6гУњЧ
000000B0  B6 35 DD CA 6E D9 BE 3C    E8 CE 08 E6 D9 9A E7 D2   ¶5ЭКnЩѕ<иО.жЩљзТ
000000C0  69 DB C1 32 C1 9F 36 B7    98 3B DE CF 9F D4 B0 25   iЫБ2Бџ6·.;ЮПџФ°%
000000D0  00 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00   ................
000000E0  00 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00   ................
000000F0  00 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00   ................
00000100  00 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00   ................
00000110  00 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00   ................
00000120  00 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00   ................
00000130  00 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00   ................
00000140  00 00 00 00 00 00 00 00    00 00 00 00 00 00 [illegible]
00000150  00 00 00 00 00 00 00 00    00 00 00 00 00 00 [illegible]
00000160  [illegible]       00 00 00    00 00 00 00 00 00 [illegible]
00000170  [illegible]       00 00 00    00 00 00 00 00 00 00 [illegible] ................
00000180  [illegible]       00 00 00    00 00 00 00 00 21 F9 04   .............!щ.
00000190  00 [illegible] 00 00 00 2C 00 00    00 00 18 01 5A 00 00 07   ........,.....Z...
000001A0  FF 80 00 82 83 84 85 86    87 88 89 8A 8B 8C [illegible]   €‚ѓ„…†‡€‰Љ‹ЊЌЋ
000001B0  8F 90 91 92 93 94 95 96    97 98 99 9A 9B 9C [illegible]   .™љ›њќћ
```

Figure 8: Symmetric BlockCipher Header 1st Block

5.2.3 Most blockcipher algorithms break on a lot of 0 byte inside

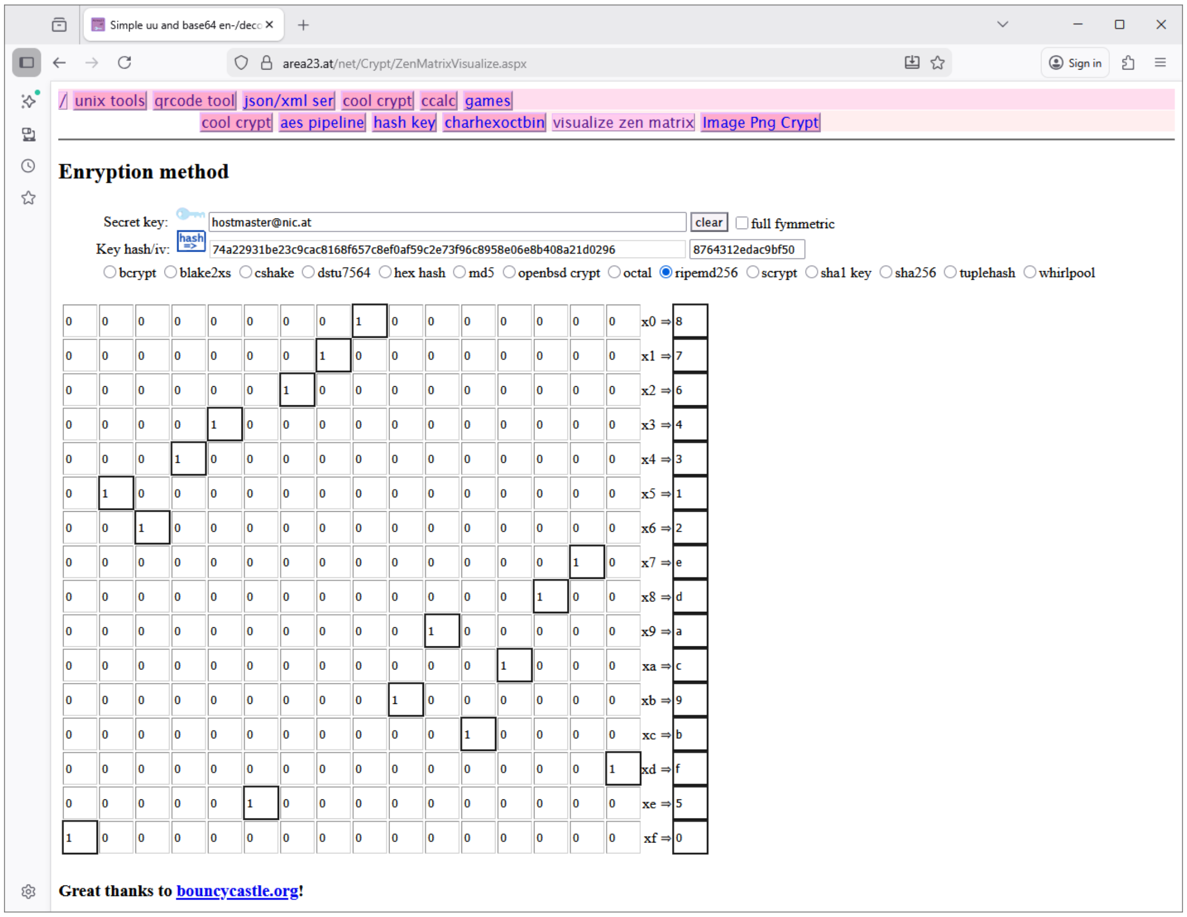
Most blockcipher algorithms break, when you fill a > 2x BLOCKSIZE (byte)0 inside a text or some other file. You can generate such a NULL block with linux dd:

```
sudo nice -n -17 dd if=/dev/zero of=/mnt/h/zeros.txt bs=4k  count=64
```

That's why we have added a gzip, bzip2, zip before to compress illegal character blocks inside the file to encrypt.

5.3 ZenMatrix a simplest possible algortihm to basically understand symmetric blockcipher

Starting from a no permutating 1-matrix, where projection is same as base, ZenMatrix generates a permutating mapping with blocksize 16 a matrix with only one 1 per row and column (rest is 0) to change position inside block and value offset.
https://area23.at/net/Crypt/ZenMatrixVisualize.aspx


Simple uu and base64 en-/dec
area23.at/net/Crypt/ZenMatrixVisualize.aspx
Sign in

/ unix tools qrcode tool json/xml ser cool crypt ccalc games
cool crypt aes pipeline hash key charhexoctbin visualize zen matrix Image Png Crypt

Enryption method

Secret key: hostmaster@nic.at clear ☐ full fymmetric
Key hash/iv: hash 74a22931be23c9cac8168f657c8ef0af59c2e73f96c8958e06e8b408a21d0296 8764312edac9bf50

○ bcrypt ○ blake2xs ○ cshake ○ dstu7564 ○ hex hash ○ md5 ○ openbsd crypt ○ octal ● ripemd256 ○ scrypt ○ sha1 key ○ sha256 ○ tuplehash ○ whirlpool

0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	x0 ⇒	8
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	x1 ⇒	7
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	x2 ⇒	6
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	x3 ⇒	4
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	x4 ⇒	3
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	x5 ⇒	1
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	x6 ⇒	2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	x7 ⇒	e
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	x8 ⇒	d
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	x9 ⇒	a
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	xa ⇒	c
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	xb ⇒	9
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	xc ⇒	b
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	xd ⇒	f
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	xe ⇒	5
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	xf ⇒	0

Great thanks to bouncycastle.org!

Figure 9: ZenMatrix Visualize

x	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
x0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
x3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
x4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
x5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
x6	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
x7	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
x8	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
x9	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
xA	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
xB	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
xC	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
xD	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
xE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
xF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

When entering hostmaster@nic.at with hash ripemd256 and not fully symmetric checked, the matrix will look like this:

x	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF	Mx
x0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	8
x1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	7
x2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	6
x3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4
x4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
x5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
x6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
x7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	E
x8	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	D
x9	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	A
xA	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	C
xB	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	9
xC	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	B
xD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	F
xE	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5
xF	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

5.4 CSharp Code Example

```
/* CSharp constructing a CipherPipe */

// 1 with parameter key
string hash = KeyHash.Hex.Hash(key);
CipherPipe cPipe = new CipherPipe(key, hash,
    EncodingType.Base64, ZipType.None, KeyHash.Hex,
    CipherMode2.CFB);

// 2. with an array of ciphers, e.g. BlowFish;TwoFish;ThreeFish
string algos = "BlowFish;TwoFish;ThreeFish";
CipherEnum[] pipeAlgos = CipherEnumExtensions.ParsePipeText(algos);
cPipe = new CipherPipe(pipeAlgos, 8,
            EncodingType.Base64, ZipType.None, KeyHash.Hex,
            CipherMode2.CFB);

/* calling CipherPipe encrypt or decrypt */
string s = "Text to encrypt", key = "myKey", hashIv = KeyHash.Hex.Hash(key);
// encrypt text
string encryptext = cPipe.EncrpytTextGoRounds(s, key, hashIv,
                        EncodingType.Base64, ZipType.None, KeyHash.Hex,
                        CipherMode2.CFB);
// encrypt bytes
byte[] fbytes = System.Text.Encoding.Utf8.GetBytes(s);
byte[] cbytes = cPipe.EncryptEncodeBytes(fileBytes, key, hashIv,
                        EncodingType.Base64, ZipType.None, KeyHash.Hex,
                        CipherMode2.CFB);
// decrypt text
string dcrypt = cPipe.DecryptTextRoundsGo(encryptext, key, hashIv,
                        EncodingType.Base64, ZipType.None, KeyHash.Hex,
                        CipherMode2.CFB);
// decypt bytes
byte[] outBytes = cPipe.DecodeDecrpytBytes(cbytes, key, hashIv,
                        EncodingType.Base64, ZipType.None, KeyHash.Hex,
                        CipherMode2.CFB);
```

5.5 Java Example

```
boolean reverseDirection = false;       // variables we need later for cipher pipe
ZipType zipType = ZipType.None;
EncodeEnum encodingType = EncodeEnum.None;
KeyHash keyHash = KeyHash.Hex;
String inString = "Hallo, byte[] inside String will converted soonly!", outString = "";
String passKey = "MySecureKey", optCryptAlgos = "Aes,Des,Des3,Blowfish,Fish2,Fish3";
String[] algos = optCryptAlgos.split(",;:");
byte[] outBytes = null, inBytes = inString.getBytes(StandardCharsets.UTF_8);

CipherPipe pipe;                        // Create cipher pipe 4 en-/decrypting
if (passKey == null || passKey.isEmpty() || algos.length > 0) {
    pipe =  new CipherPipe(algos, Constants.MAX_PIPE_LEN,
            encodingType, zipType, keyHash, CipherMode2.CFB);  // CFB is default CipherMode
    verbout("Created pipe without passkey: " + pipe.getPipeString());
} else {
    pipe = new CipherPipe(passKey, keyHash.hash(passKey),
            encodingType, zipType, keyHash, CipherMode2.CFB); // CFB instead old ECB
    verbout("Created pipe with passkey=" + passKey + " pipe=" + pipe.getPipeString());
}
if (!reverseDirection) {                // encrypt
    PrintPipe(pipe, reverseDirection);
    try {                               // CipherPipe encrypt encode
        passKey = (passKey.length() == 0) ? " " : passKey;
        outBytes = pipe.encryptEncodeBytes(inBytes,
                    passKey, keyHash.hash(passKey),
                    encodingType, zipType, keyHash, CipherMode2.CFB);
    } catch (Exception exi) {
        exi.printStackTrace();
    }
    outString = new String(outBytes);
} else {                                // decrypt
    String inString = new String(inBytes);
    PrintPipe(pipe, reverseDirection);
    try {                               // CipherPipe decode decrypt
        passKey = (passKey == null || passKey.isEmpty()) ? "" : passKey;
        outBytes = pipe.decodeDecrpytBytes(inBytes,
                    passKey, (passKey.isEmpty() ? "" : keyHash.hash(passKey)),
                    encodingType, zipType, keyHash, CipherMode2.CFB);
    } catch (Exception exi) {
        exi.printStackTrace();
    }
}
```

5.6 How to write Mathematics

LaTeX is great at typesetting mathematics. Let $X_1, X_2, \ldots, X_n$ be a sequence of independent and identically distributed random variables with $\mathrm{E}[X_i] = \mu$ and $\mathrm{Var}[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \cdots + X_n}{n} = \frac{1}{n}\sum_{i}^{n} X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.

5.7 Good luck!

We hope you find PermAgainCrypt useful, and good luck. help library for more tutorials and user guides! Please also let us know if you have any feedback using the **Contact us** link at the bottom of the Overleaf menu — or use the contact form at `https://heinrichelsigan.area23.at`.

References