

CSP

blocked URL

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CSP

(Cryptography Service Provider, CSP) — , . CSP :

- , () 34.10-2001 / 34.10-2012 (34.11-94 / 34.11-2012);
- , 28147-89;
- , TLS;
- ;
- .

<https://www.cryptopro.ru/products/csp>



- Astra Linux CSP.
- , .
- CSP.

CSP

CSP www.cryptopro.ru .

Astra Linux , " CSP x.x Linux (x64, deb)" " CSP x.x Astra Linux, (x64)" x.x - .

 CSP 3, .

:

- 1. «» : «linux-amd64_deb.tgz»;
- 2. " Fly" (Alt+T);
- 3. :

```
tar -zxf linux-amd64_deb.tgz
```

- 4. :

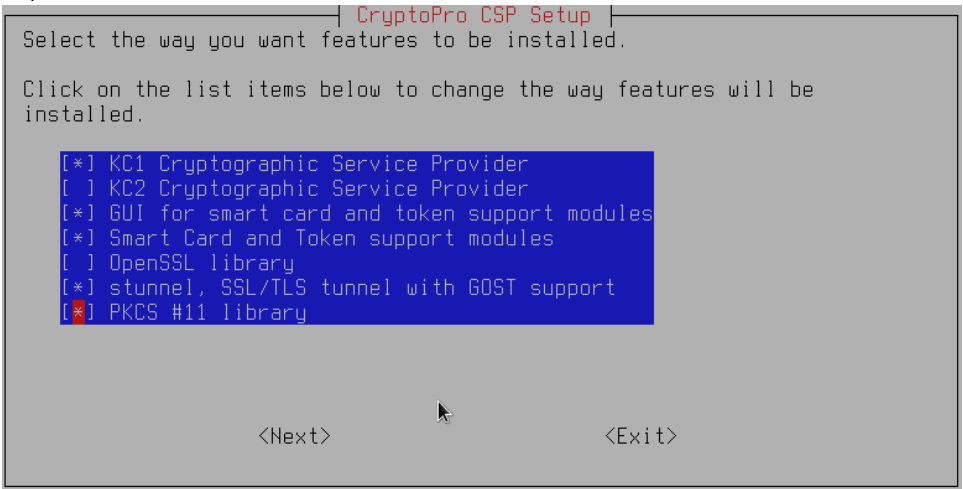
```
cd linux-amd64_deb
```

- 5. :

- a. install_gui.sh :

```
sudo ./install_gui.sh
```

:



- b. instal.sh :

```
sudo ./install.sh
```

:	
cprosp-curl	libcurl
lsb-cprosp-base	CSP

lsb-cprocsp-capilite	CAPILite
lsb-cprocsp-kc1	KC1
lsb-cprocsp-rdr	RNG
:	
cprocsp-rdr-gui-gtk	
cprocsp-rdr-rutoken	
cprocsp-rdr-jacarta	JaCarta
cprocsp-rdr-pcsc	PC/SC CSP
lsb-cprocsp-pkcs11	PKCS11

CSP :

```
dpkg -l | grep cprocsp
```

:

```
ii cprocsp-cptools-gtk-64                5.0.12000-6
amd64 GUI application for various CSP tasks. Build 12000.
ii cprocsp-curl-64                      5.0.12000-6
amd64 CryptoPro cURL shared library and application. Build 12000.
ii cprocsp-rdr-cloud-64                 5.0.12000-6
amd64 DSS keys support module
ii cprocsp-rdr-cpfsk-64                 5.0.12000-6
amd64 FKC support module
ii cprocsp-rdr-cryptoki-64              5.0.12000-6
amd64 Module for PKCS11 keys support. Build 12000.
ii cprocsp-rdr-edoc-64                  5.0.12000-6
amd64 Electronic documents support module
ii cprocsp-rdr-emv-64                   5.0.12000-6
amd64 EMV/Gemalto support module
ii cprocsp-rdr-gui-gtk-64               5.0.12000-6
amd64 CryptoPro CSP GTK GUI components. Build 12000.
ii cprocsp-rdr-infocrypt-64             5.0.12000-6
amd64 Infocrypt FKC support module
ii cprocsp-rdr-inpasport-64             5.0.12000-6
amd64 Inpasport support module
ii cprocsp-rdr-kst-64                   5.0.12000-6
amd64 MorphoKST support module
ii cprocsp-rdr-mskey-64                  5.0.12000-6
amd64 Mskey support module
ii cprocsp-rdr-novacard-64              5.0.12000-6
amd64 Novacard support module
ii cprocsp-rdr-pcsc-64                  5.0.12000-6
amd64 CryptoPro CSP. PC/SC devices support. Build 12000.
ii cprocsp-rdr-rosan-64                 5.0.12000-6
amd64 Rosan support module
ii cprocsp-rdr-rutoken-64               5.0.12000-6
amd64 Rutoken support module
ii lsb-cprocsp-base                     5.0.12000-6
all CryptoPro CSP directories and scripts. Build 12000.
ii lsb-cprocsp-ca-certs                  5.0.12000-6
all CryptoPro CA certificates. Build 12000.
ii lsb-cprocsp-capilite-64              5.0.12000-6
amd64 CryptoPro CSP. CryptoAPI Lite libraries and applications. Build 12000.
ii lsb-cprocsp-import-ca-certs           5.0.12000-6
all Import OS root certificates in CryptoPro CSP. Build 12000.
ii lsb-cprocsp-kc1-64                   5.0.12000-6
amd64 CryptoPro CSP KC1. Build 12000.
ii lsb-cprocsp-pkcs11-64                 5.0.12000-6
amd64 CryptoPro PKCS11. Build 12000.
ii lsb-cprocsp-rdr-64                    5.0.12000-6
amd64 CryptoPro CSP common libraries and utilities. Build 12000.
```

CSP, FLY :

```
export PATH="$(/bin/ls -d /opt/cprocsp/{s,}bin/*|tr '\n' ':')$PATH"
```

- :
 - libccid;
 - libgost-astra;
 - pcscd;
- , :
 - : <https://www.rutoken.ru/support/download/nix/>
 - : <https://www.aladdin-rd.ru/support/downloads/jacarta>

```
sudo apt install libccid pcscd libgost-astra
```

RD JaCarta AstraLinux Astra Linux.

CSP Astra Linux SE.

 () . Astra Linux:

Astra Linux SE : https://cryptopro.ru/sites/default/files/private/csp/cryptopro_pub_key.gpg.

- astra-digsig-oldkeys:

```
sudo apt install astra-digsig-oldkeys
```

- /etc/digsig/keys/legacy/cryptopro:

```
sudo mkdir -p /etc/digsig/keys/legacy/cryptopro
```

- :

```
sudo update-initramfs -uk all
```

- .

```
/opt/cprocsp/sbin/amd64/cpconfig -license -view
```

:

```
License validity:  
5050010037ELQF5H28KM8E6BA  
Expires: 88 day(s)  
License type: Demo.
```

:

```
sudo /opt/cprocsp/sbin/amd64/cpconfig -license -set <_>
```

:

```
/opt/cprocsp/sbin/amd64/cpconfig -hardware reader -view
```

:

```
Nick name: HDIMAGE  
Connect name:  
Reader name: HDD key storage  
  
Nick name: CLOUD  
Connect name:  
Reader name: Cloud Token  
  
Nick name: Aktiv Rutoken lite 00 00  
Connect name:  
Reader name: Aktiv Rutoken lite 00 00
```

:

```
/opt/cprocsp/bin/amd64/csptest -card -enum -v -v
```

,:

```
Aktiv Rutoken lite 00 00  
Card present, ATR=3B 8B 01 52 75 74 6F 6B 65 6E 6C 69 74 65 C2  
Unknown applet  
Total: SYS: 0,000 sec USR: 0,010 sec UTC: 0,310 sec  
[ErrorCode: 0x00000000]
```

:

```
/opt/cprocsp/bin/amd64/csptest -keyset -verifycontext -enum -unique
```

```

root@smakhmadiev:/home/shuhrat/ecp# csptest -keyset -verifycontext -enum -unique
CSP (Type:80) v5.0.10001 KC1 Release Ver:5.0.11233 OS:Linux CPU:AMD64 FastCode:READY:AVX.
AcquireContext: OK. HCRYPTPROV: 8495427
TestCont          ISCARD\rutoken_ecp_390a75ab\0A00\8AC7
Shuhrat           ISCARD\rutoken_ecp_390a75ab\0B00\5228
Shuhrat           IHDIMAGE\\Shuhrat.000\5228
TestCont123       IHDIMAGE\\TestCont.000\7760
OK.
Total: SYS: 0,010 sec USR: 0,080 sec UTC: 0,240 sec
[ErrorCode: 0x00000000]
FQCN (Fully Qualified Container Nam):

```

```

/opt/cprocsp/bin/amd64/csptest -keyset -enum_cont -fqcn -verifc | iconv -f
cp1251

```

```

:
• \\.\HDIMAGE\<_>- - ;
• \\.\Aktiv Rutoken ECP 00 00\<_>- - .
. " "

```

```

/opt/cprocsp/bin/amd64/csptestf -keyset -container '' -info

```

```

:
/opt/cprocsp/bin/amd64/csptestf -keyset -container 'Shuhrat' -info
CSP (Type:80) v5.0.10001 KC1 Release Ver:5.0.11233 OS:Linux CPU:AMD64 FastCode:READY:AVX.

```

```

AcquireContext: OK. HCRYPTPROV: 8981043
GetProvParam(PP_NAME): Crypto-Pro GOST R 34.10-2012 KC1 CSP
Container name: "Shuhrat"
Signature key is available. HCRYPTKEY: 0x8f3b03
Exchange key is available. HCRYPTKEY: 0x8f9883
Symmetric key is not available.
UEC key is not available.

```

CSP algorithms info:

```

Type:Encrypt Name:'GOST 28147-89'(14) Long:'GOST 28147-89'(14)
DefaultLen:256 MinLen:256 MaxLen:256 Prot:0 AlgId:00026142

```

```

Type:Hash Name:'GR 34.11-2012 256'(18) Long:'GOST R 34.11-2012 256'(22)
DefaultLen:256 MinLen:256 MaxLen:256 Prot:0 AlgId:00032801

```

```

Type:Signature Name:'GR 34.10-2012 256'(18) Long:'GOST R 34.10-2012 256'(22)
DefaultLen:512 MinLen:512 MaxLen:512 Prot:0 AlgId:00011849

```

```

Type:Exchange Name:'DH 34.10-2012 256'(18) Long:'GOST R 34.10-2012 256 DH'(25)
DefaultLen:512 MinLen:512 MaxLen:512 Prot:0 AlgId:00043590

```

```

Type:Exchange Name:'DH 34.10-2012 256'(18) Long:'GOST R 34.10-2012 256 DH'(25)
DefaultLen:512 MinLen:512 MaxLen:512 Prot:0 AlgId:00043591

```

```

Type:Hash Name:'GOST 28147-89 MAC'(18) Long:'GOST 28147-89 MAC'(18)
DefaultLen:32 MinLen:8 MaxLen:32 Prot:0 AlgId:00032799

```

```

Type:Encrypt Name:'GR 34.12 64 M'(14) Long:'GOST R 34.12-2015 64 Magma'(27)
DefaultLen:256 MinLen:256 MaxLen:256 Prot:0 AlgId:00026160

```

```

Type:Encrypt Name:'GR 34.12 128 K'(15) Long:'GOST R 34.12-2015 128 Kuznyechik'(33)
DefaultLen:256 MinLen:256 MaxLen:256 Prot:0 AlgId:00026161

```

```

Type:Hash Name:'GR 34.13 64 M MAC'(18) Long:'GOST R 34.13-2015 64 Magma MAC'(31)
DefaultLen:64 MinLen:8 MaxLen:64 Prot:0 AlgId:00032828

```

```

Type:Hash Name:'GR 34.13 128 K MAC'(19) Long:'GOST R 34.13-2015 128 Kuznyechik MAC'(37)

```

DefaultLen:128 MinLen:8 MaxLen:128 Prot:0 AlgId:00032829

Type:Hash Name:'GR34.11-12 256 HMAC'(20) Long:'GOST R 34.11-2012 256 HMAC'(27)
DefaultLen:256 MinLen:256 MaxLen:256 Prot:0 AlgId:00032820

Status:

Provider handles used: 6
Provider handles max: 1048576
CPU Usage: 6 %
CPU Usage by CSP: 0 %
Measurement interval: 119 ms

Virtual memory used: 15281652 KB
Virtual memory used by CSP: 116572 KB
Free virtual memory: 26053680 KB
Total virtual memory: 41335332 KB

Physical memory used: 14602360 KB
Physical memory used by CSP: 12576 KB
Free physical memory: 5857712 KB
Total physical memory: 20460072 KB

Key pair info:

HCRYPTKEY: 0x8f3b03
AlgID: CALG_GR3410_12_256 = 0x00002e49 (00011849):
AlgClass: ALG_CLASS_SIGNATURE
AlgType: ALG_TYPE_GR3410
AlgSID: 73
KP_HASHOID:
1.2.643.7.1.1.2.2 (34.11-2012 256)
KP_DHOID:
1.2.643.2.2.35.1 (34.10 256 ,)
KP_SIGNATUREOID:
1.2.643.2.2.35.1 (34.10 256 ,)
Permissions:
CRYPT_READ
CRYPT_WRITE
CRYPT_IMPORT_KEY
0x800
0x2000
0x20000
0x100000
KP_CERTIFICATE:
Not set.

Key pair info:

HCRYPTKEY: 0x8f9883
AlgID: CALG_DH_GR3410_12_256_SF = 0x0000aa46 (00043590):
AlgClass: ALG_CLASS_KEY_EXCHANGE
AlgType: ALG_TYPE_DH
AlgSID: 70
KP_HASHOID:
1.2.643.7.1.1.2.2 (34.11-2012 256)
KP_DHOID:
1.2.643.2.2.36.0 (34.10 256 ,)
KP_SIGNATUREOID:
1.2.643.2.2.36.0 (34.10 256 ,)
Permissions:
CRYPT_READ
CRYPT_WRITE
CRYPT_IMPORT_KEY
0x800
0x10000
0x20000
0x100000
KP_CERTIFICATE:
Subject: INN=007814508921, E=user@astralinux.ru, C=RU, CN= , SN=
Valid : 18.10.2018 12:07:24 - 18.01.2019 12:17:24 (UTC)
Issuer : E=support@cryptopro.ru, C=RU, L=Moscow, O=CRYPTO-PRO LLC, CN=CRYPTO-PRO Test Center 2

Container version: 2

Carrier flags:

This reader is removable.
This reader supports unique carrier names.
This carrier does not have embedded cryptography.

Keys in container:

signature key
exchange key

Extensions (maxLength: 1435):

ParamLen: 46
OID: 1.2.643.2.2.37.3.9
Critical: FALSE
Size: 19
Decoded size: 24
PrivKey: Not specified - 18.01.2020 07:31:07 (UTC)

ParamLen: 47
OID: 1.2.643.2.2.37.3.10
Critical: FALSE
Size: 19
Decoded size: 24
PrivKey: Not specified - 18.01.2020 07:31:12 (UTC)
Total: SYS: 0,020 sec USR: 0,180 sec UTC: 2,180 sec
[ErrorCode: 0x00000000]



```
/opt/cprocsp/bin/amd64/csptest -keys -enum -verifyc -fqcn -un
```



PIN- :

- (,), PIN , , - . . : PIN;
- (, , HDIMAGE), PIN-. : PIN- HDIMAGE .

(,), :

```
/opt/cprocsp/bin/amd64/csptestf -keyset -container -check
```

:

```
/opt/cprocsp/bin/amd64/csptestf -keyset -container Shuhrat -check
```

CSP (Type:80) v5.0.10001 KC1 Release Ver:5.0.11233 OS:Linux CPU:AMD64 FastCode:READY:AVX.

AcquireContext: OK. HCRYPTPROV: 28224051

GetProvParam(PP_NAME): Crypto-Pro GOST R 34.10-2012 KC1 CSP

Container name: "Shuhrat"

Check header passed.

Signature key is available. HCRYPTKEY: 0x1b53883

Exchange key is available. HCRYPTKEY: 0x1b57e23

Symmetric key is not available.

UEC key is not available.

License: Cert without license

Check container passed.

Check sign passed.

Check verify signature on private key passed.

Check verify signature on public key passed.

Check import passed (import restricted).

Check sign passed.

Check verify signature on private key passed.

Check verify signature on public key passed.

Check import passed.

Certificate in container matches AT_KEYEXCHANGE key.

Keys in container:

signature key

exchange key

Extensions:

OID: 1.2.643.2.2.37.3.9

PrivKey: Not specified - 18.01.2020 07:31:07 (UTC)

OID: 1.2.643.2.2.37.3.10

PrivKey: Not specified - 18.01.2020 07:31:12 (UTC)

Total: SYS: 0,030 sec USR: 0,140 sec UTC: 2,430 sec

[ErrorCode: 0x00000000]

:

```
/opt/cprocsp/bin/amd64/csptestf -passwd -cont '\\.\Aktiv Rutoken ECP 00  
00\TestCont' -deletk
```

:

```
csptestf -keycopy -contsrc '\\.\HDIMAGE\_ ' -contdest '\\.\Aktiv Rutoken ECP 00  
00\_ '
```

()

```
/opt/cprocsp/bin/amd64/csptestf -passwd -cont '\\.\Aktiv Rutoken ECP 00  
00\TestContainer' -change <_> -passwd <_>
```



, PIN, :

```
/opt/cprocsp/bin/amd64/csptestf -passwd -cont '\\.\Aktiv Rutoken ECP 00  
00\TestContainer' -change <_>
```

Linux

```
:
```

- (uMy, u = User, my -). , , (,). , , ;
- - , . (uroot, mroot, m = Machine, read only root-);
- - , (""->" "->" "). (uca, mca). (CRL). (CRL) , ucache. ;
- , . uMy (,), uAddressBook;

```
,
```

uMy :

```
/opt/cprocsp/bin/amd64/csptestf -absorb -certs -autoprov
```

uMy:

```
/opt/cprocsp/bin/amd64/certmgr -inst -cont '\\.\Aktiv Rutoken ECP 00 00\Ivanov'
```

mRoot(.):

```
wget https://zgt.mil.ru/upload/site228/document_file/GUC_2022.cer -O - | sudo  
/opt/cprocsp/bin/amd64/certmgr -inst -store mRoot -stdin
```

(CRL)(mca):

```
wget http://reestr-pki.ru/cdp/guc2022.crl -O - | sudo /opt/cprocsp/bin/amd64  
/certmgr -inst -store mca -stdin -crl
```



```
-pattern >>> 'rutoken' .
```

```
, CRL , , :
```

- ;
- ;
- -stdin -file .

```
:
```

```
1. :
```

```
wget https://zgt.mil.ru/upload/site228/document_file/GUC_2022.cer
wget http://reestr-pki.ru/cdp/guc2022.crl
```

```
2. ;
```

```
3. :
```

```
sudo /opt/cprocsp/bin/amd64/certmgr -inst -store mRoot -file
GUC_2022.cer
sudo /opt/cprocsp/bin/amd64/certmgr -inst -store mca -file guc2022.
crl -crl
```



1. , certmgr. cryptcp : -mroot -uAddressBook.
2. uca, mca:
3. -pattern <'> uMy. :

```
/opt/cprocsp/bin/amd64/csptestf -absorb -cert -pattern ''
```

```
4. , -file :
```

```
certmgr -inst -file cert.cer -store uMy
```

```
5. /var/opt/cprocsp/users
```

```
:
```

```
/opt/cprocsp/bin/amd64/certmgr -list
```

```

shuhrat@smakhmadiev:/opt/cprocsp/bin/amd64$ certmgr -list -store uroot
Certmgr 1.1 (c) "CryptoPro", 2007-2018.
program for managing certificates, CRLs and stores

=====
1-----
Issuer       : E=support@cryptopro.ru, C=RU, L=Moscow, O=CRYPTO-PRO LLC, CN=CRYPTO-PRO Test Center 2
Subject      : E=support@cryptopro.ru, C=RU, L=Moscow, O=CRYPTO-PRO LLC, CN=CRYPTO-PRO Test Center 2
Serial       : 0x2B6E3351F06EB2AD40200203CB5BA141
SHA1 Hash    : 046255290b0ab1cdd1797d9ab8c81f699e3687f3
SubjKeyID    : 15317cb08d1ade66d7159c4952971724b9017a83
Signature Algorithm : GOCT P 34.11/34.10-2001
PublicKey Algorithm : GOCT P 34.10-2001 (512 bits)
Not valid before : 05/08/2014 13:44:24 UTC
Not valid after  : 05/08/2019 13:54:03 UTC
PrivateKey Link  : No
2-----
Issuer       : E=dit@minsvyaz.ru, C=RU, S=77 г. Москва, L=Москва, STREET="125375 г. Москва, ул. Тверская,
ной удостоверяющий центр
Subject      : E=uc@mail.ru, OGRN=1037700255284, INN=007704252261, C=RU, S=77 г. Москва, L=Москва, STREET=у
терство обороны Российской Федерации, CN=Министерство обороны Российской Федерации
Serial       : 0x00D100F4F5000000000309
SHA1 Hash    : 3bfd61fad00931dbbc53f79bbd051aa4cd3f03
SubjKeyID    : a21c01faf8e344ceb999ba0cd192f4eaa1a8fd5c9
Signature Algorithm : GOCT P 34.11/34.10-2001
PublicKey Algorithm : GOCT P 34.10-2001 (512 bits)
Not valid before : 20/09/2018 09:11:48 UTC
Not valid after  : 20/09/2026 09:11:48 UTC
PrivateKey Link  : No
CDP          : http://rostelecom.ru/cdp/guc.crl
CDP          : http://reestr-pki.ru/cdp/guc.crl
3-----
Issuer       : E=dit@minsvyaz.ru, C=RU, S=77 Москва, L=г. Москва, STREET="улица Тверская, дом 7", O=Минком
Subject      : E=uc@mail.ru, OGRN=1037700255284, INN=007704252261, C=RU, S=77 г. Москва, L=Москва, STREET=у
терство обороны Российской Федерации, CN=Министерство обороны Российской Федерации
Serial       : 0x7CA5D4F7000000000000
SHA1 Hash    : c7588c3365f0ed78be0dcff22aa33074f11d8b95
SubjKeyID    : 4ab7c589e2d91df0ec01225b7e6841dbee8bc33e

```

:

```
/opt/cprocsp/bin/amd64/certmgr -delete
```

.

:

```
/opt/cprocsp/bin/amd64/certmgr -del -all
```

```
/var/opt/cprocsp/keys.
```

:

:

```
/opt/cprocsp/bin/amd64/certmgr -export -dest cert.cer
```

, :

```
csptest -keyset -enum_cont -verifycontext -fqcn
```

:

```
certmgr -inst -file 1.cer -cont '\\.\HDIMAGE\container.name'
```

, :

Can not install certificate
Public keys in certificate and container are not identical

: , :

```
/opt/cprocsp/bin/amd64/cryptcp -copycert -dn 'CN=___' -df /temp/.cer
```



: CN, E, SN, OGRN, SNILS .

CryptCP 5.0 (c) "-", 2002-2018.

```
.
: : " "-
""", , 77 .
, RU, . 26, mail@rusbitech.ru
02.10.2018 14:31:02 02.10.2019 14:41:02

:

: " "-
""", , , "
""-
""", , , 77 .
, RU, . 26, 5087746137023, 007726604816,
13407634844, mail@rusbitech.ru

02.10.2018 14:31:02 02.10.2019 14:41:02

: ( 10000):
/dailybuilds/CSPbuild/CSP/samples/CPCrypt/Certs.cpp:396: 0x20000133
([Y], [N], [C])?
```

, . debug():

```
$ CP_PRINT_CHAIN_DETAIL=1 /opt/cprocsp/bin/amd64/cryptcp -copycert -dn 'CN=___' -df /temp/.cer
...
----- Error chain -----
Chain status:IS_UNTRUSTED_ROOT
Revocation reason:unspecified
1.
Subject:'E=uc@mil.ru, OGRN=1037700255284, INN=007704252261, C=RU, S=77 . , L=, STREET=. .19, OU=4 () 31659,
O= , CN= '
Issuer:'E=dit@minsvyaz.ru, C=RU, S=77 , L=. , STREET=" , 7", O= , OGRN=1047702026701, INN=007710474375, CN= '
Cert status:IS_UNTRUSTED_ROOT
...
```



CP_PRINT_CHAIN_DETAIL=1 -->

, CN= :

```
/opt/cprocsp/bin/amd64/certmgr -inst -store uRoot -file minoboron-root-2018.crt
```

, , . , = CERT_TRUST_NO_ERROR

```
....
Subject:'E=uc@mil.ru, OGRN=1037700255284, INN=007704252261, C=RU, S=77 . , L=, STREET=. .19, OU=4 ( ) 31659,
O= , CN= '
Issuer:'E=dit@minsvyaz.ru, C=RU, S=77 , L=. , STREET=" , 7", O= , OGRN=1047702026701, INN=007710474375, CN= '
Cert status:CERT_TRUST_NO_ERROR
...
.
.
[ErrorCode: 0x00000000]
```

:

- attached (), - CMS-, (). , , cryptcp / csptest / openssl / certutil (windows);
- detached (), - CMS- , (). "" . cat-



0

```
/opt/cprocsp/bin/amd64/cryptcp -sign -dn 'CN=___' -der zayavlenie.pdf
```

```
CryptCP 5.0 (c) "- ", 2002-2018.
```

```
.
```

```
:
```

```
: " " "
```

```
""", , 77 .
```

```
, RU, . 26, mail@rusbitech.ru
```

```
02.10.2018 14:31:02 02.10.2019 14:41:02
```

```
':/': raport.pdf...
```

```
...
```

```
[ErrorCode: 0x00000000]
```

0

```
/opt/cprocsp/bin/amd64/cryptcp -sign -detach -dn 'CN=___' -pin 12345678 raport.
pdf raport.pdf.sig
```

```
CryptCP 5.0 (c) "- ", 2002-2018.
```

```
.
```

```

: " "-
""", , 77 .
, RU, . 26, mail@rusbitech.ru

02.10.2018 14:31:02 02.10.2019 14:41:02

'./': raport.pdf... ...

[ErrorCode: 0x00000000]
```

```
/opt/cprocsp/bin/amd64/cryptcp -verify raport.pdf.sig
```

```

CryptCP 5.0 (c) "-", 2002-2018.

: 4

'./':
raport.pdf.sig ... ...

: " "-
""", , 77 .
, RU, . 26, mail@rusbitech.ru
02.10.2018 14:31:02 02.10.2019 14:41:02
02.10.2018 14:31:02 02.10.2019 14:41:02

[ErrorCode: 0x00000000]
```

-verall, , :

```
/opt/cprocsp/bin/amd64/cryptcp -verify -verall -detached /home/shuhrat/smolensk
/raport.pdf raport.pdf.sig
```

```

CryptCP 5.0 (c) "-", 2002-2018.

'/home/shuhrat/smolensk/': /home/shuhrat/smolensk/raport.pdf... ...

: " "-
""", , 77 .
, RU, . 26, mail@rusbitech.ru
02.10.2018 14:31:02 02.10.2019 14:41:02
02.10.2018 14:31:02 02.10.2019 14:41:02
```

```
./': raport.pdf... ..
```

```
[ErrorCode: 0x00000000]
```

'''

(-f):

```
/opt/cproesp/bin/amd64/cryptcp -verify -f raport.pdf.sig -detached raport.pdf  
raport.pdf.sig
```

```
CryptCP 5.0 (c) "- ", 2002-2018.
```

```
:" ""_  
""", , 77 .  
, RU, . 26, mail@rusbitech.ru  
02.10.2018 14:31:02 02.10.2019 14:41:02
```

```
./': raport.pdf...  
..
```

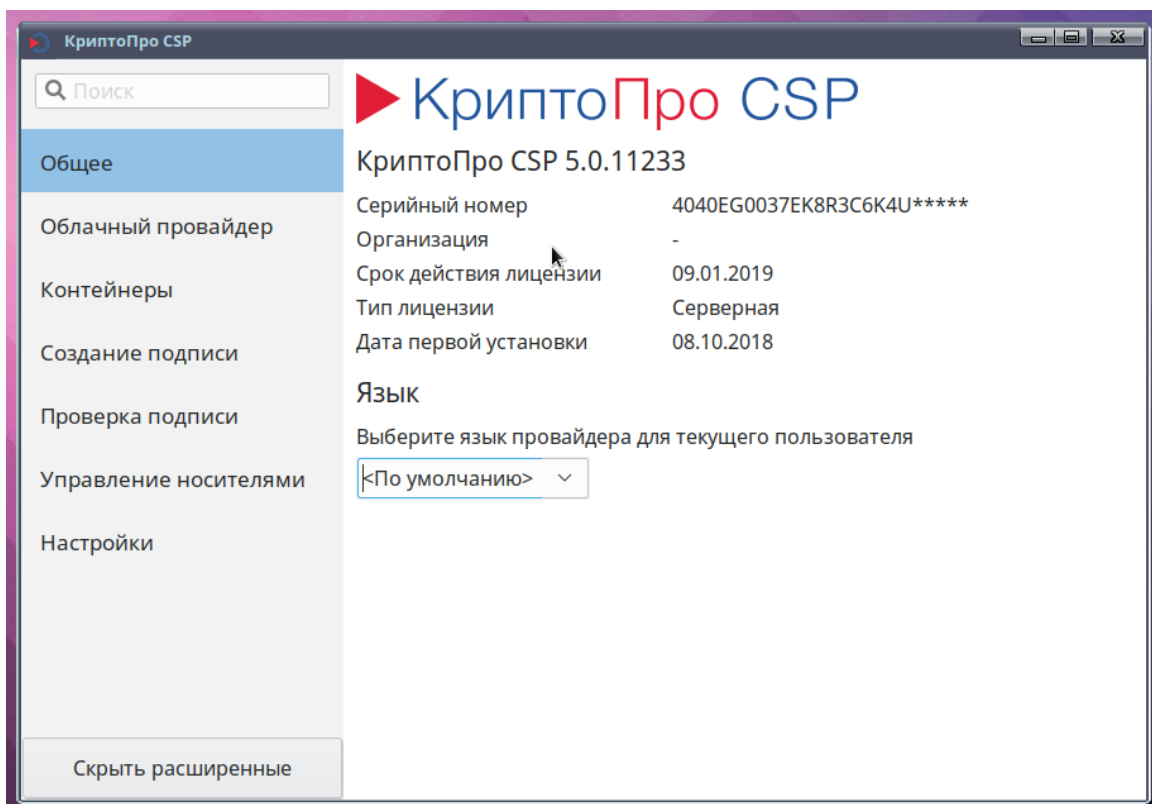
```
:" ""_  
""", , 77 .  
, RU, . 26, mail@rusbitech.ru  
02.10.2018 14:31:02 02.10.2019 14:41:02
```

```
[ErrorCode: 0x00000000]
```

, :

```
cryptcp -verify raport.pdf.sig raport.pdf
```

CSP v. 5.0 (cptools)



5 - cptools. :

cptools

:

/opt/cproscsp/bin/amd64/cptools

CSP

, CSP, FLY 3 :

```
sudo rm -rf /opt/cproscsp
sudo rm -rf /var/opt/cproscsp/
sudo rm -rf /etc/opt/cproscsp/
```

34.10-2012

2014 34.10-2012 1 2019 34.10-2001 () CSP 3.9, 4.0 JCP 2.0 1 2019 / (), / 34.10-2001. 34.10-2001, .

CSP, /etc/opt/cproscsp/config64.ini Parameters:

[Parameters]

#

warning_time_gen_2001=11:9223372036854775807

warning_time_sign_2001=11:9223372036854775807



34.10-2001 2019 . CSP HSM 2.0 34.10-2001 1 2019 , .

: IFCP plugin ()

: IFCP plugin ()

CADES Browser plug-in

CADES Browser plug-in

- CSP

, CSP:

<https://www.cryptopro.ru/products/csp/compare>

<https://support.cryptopro.ru/index.php?/Knowledgebase/List>

CSP astralinux

<https://forum.astralinux.ru/threads/419/>

Chromium+

<https://www.cryptopro.ru/news/2018/12/zashchishchennyi-brauzer-dlya-gosudarstvennykh-elektronnykh-ploshchadok-teper-i-na-linu>

<https://astralinux.ru/news/category-news/2018/brauzeryi-%C2%ABastra-linux-special-edition%C2%BB-adaptirovani-dlya-raboty/>

ca-des-bes plugin

▪

, :

```
sudo /opt/cproccsp/bin/amd64/curl http://cryptopro.ru/sites/default/files/products/csp/cprodiag 2>/dev/null|sudo perl
```

cprodiag____.tar.gz, [Astra Linux](#) .