

Using TouchChip TFM/ESS FingerPrint BSP as an authentication module for PAM

Notice

This guide utilizes third party products (such as Linux OS, BioAPI framework and pam_bioapi module) which are not produced by UPEK, Inc. This is among others the reason why UPEK, Inc. cannot support them.

Requirements

- Linux system with PAM support installed on PC platform
- BioAPI 1.10 framework installed
- TouchChip TFM/ESS Fingerprint BSP installed
- pam_bioapi-0.2.1 archive downloaded from http://www.grivy.net/~michael/blua/pam_bioapi/

Note

This text assumes, that BioAPI 1.10 framework archive was extracted to local directory /install/bioapi-1.2.2/ and installed to the default directory (which is /usr/local/lib/). Replace these paths with your own if they differ.

Step by step installation and configuration

1. Login as root. Extract the pam_bioapi-0.2.1 archive into /install/pam_bioapi-0.2.1 directory. Switch to this directory.
1. Configure the package:

```
# ./configure --prefix=/ CPPFLAGS=-I/install/bioapi-1.2.2/imports/cdsa/v2_0/inc/\ -I/install/bioapi-1.2.2/include/ LDFLAGS=-L/usr/local/lib/
```
2. Compile the package

```
# make
```
3. Install the package

```
# make install
```
4. Create directory for templates /etc/bioapi1.0/pam/{5550454b-2054-464d-2f45-535320425350}
5. Create templates for users (use sample application from TouchChip TFM/ESS FingerPrint BSP) and put the .bir files to this directory
6. Setup your Xwindow manager to use pam_bioapi. Edit /etc/pam.d/kdm for KDE or

/etc/pam.d/gdm for Gnome:

- to add pam_bioapi.so as an authentication module add following line:

```
auth required pam_bioapi.so {5550454b-2054-464d-2f45-535320425350}  
/etc/bioapi1.0/pam/
```

- remove other authentication modules (remove other lines beginning by "auth ...")

```
kdm [B---] 0 L:[ 1+16 17/ 17] *(493 / 493b)= <EOF>  
##  
## /etc/pam.d/kdm - specify the PAM behaviour of kdm  
##  
## The standard Unix authentication modules, used with  
## NIS (man nsswitch) as well as normal /etc/passwd and  
## /etc/shadow entries.  
##@include common-auth  
##@include common-account  
##@include common-password  
##@include common-session  
##  
#auth      required      pam_nologin.so  
#auth      required      pam_env.so  
#session   required      pam_limits.so  
auth required pam_bioapi.so {5550454b-2054-464d-2f45-535320425350} /etc/bioapi1.  
-  
1Help 2Save 3Mark 4Replac 5Copy 6Move 7Search 8Delete 9PullDn 10Quit
```

7. Switch to runlevel 5 (or restart Xserver by Ctrl+Alt+Backspace if you are already in runlevel 5) and try to login. Enter only username. You should see similar image:



Swipe by enrolled finger and you should be logged in.

Troubleshooter

When you use KDE as your Xwindow manager you may find that biometric is not working (biometric GUI is not shown after entering username).

Another symptoms:

- if you swipe by correct finger, you will be logged in
- you can find messages from GUI callback routine such as "Verification start" or "Put finger" in /var/log/kdm.log

```
File: kdm.log          Col 0          24720 bytes          83%
OS Kernel: Linux version 2.6.12 (root@Knoppix) (gcc-Version 3.3.6 (Debian 1:3.3.
Markers: (--) probed, (**) from config file, (==) default setting,
        (++) from command line, (!!) notice, (II) informational,
        (WW) warning, (EE) error, (NI) not implemented, (??) unknown.
(==) Log file: "/var/log/XFree86.0.log", Time: Mon Oct 31 13:23:01 2005
(==) Using config file: "/etc/X11/XF86Config-4"
(WW) UMWARE(0): Failed to set up write-combining range (0xf6000000,0x1000000)
Could not init font path element /usr/X11R6/lib/X11/fonts/Speedo, removing from
QImage::convertDepth: Image is a null image
QImage::smoothScale: Image is a null image
Verification start
Put finger
Image processing
Scanned good image
Operation failed
Verification start
Put finger
Image processing
Scanned good image
Operation succeeded
XFree86 Version 4.3.0.1 (Debian 4.3.0.dfsg.1-14 20050601051219 fabbione@fabbione
Release Date: 15 August 2003
X Protocol Version 11, Revision 0, Release 6.6
1Help  2Wrap  3Quit  4Hex  5Line  6Rsrch 7Search 8Raw  9Unform 10Quit
```

Description:

Actually everything is working correctly only GUI is not displayed, because TouchChip BSP was unable to find Xserver. TouchChip BSP tries to use Xserver for showing GUI by call XOpenDisplay(NULL). If NULL is returned it is assumed, that Xserver is not running for current user (in active console) and simple text output is used. But when this routine is called in started Xwindows with KDE but without logged in user, it returns NULL even if the Xserver is already available.

Solution, workaround:

It is needed to help XOpenDisplay() to find display by specifying the DISPLAY environment variable in the PAM context. The DISPLAY's value will be read from the /etc/pam.d/kdm (for logging in to KDE) as an additional parameter and set by pam_bioapi.

- Find the routine pam_sm_authenticate() in /install/pam_bioapi-0.2.1/libpam_bioapi/pam_bioapi.c and add following code to the block parsing input arguments:

```

if (argc>2)
{
    setenv("DISPLAY",argv[2],1);
}

```

```

pam_bioapi.c [BM--] 0 L:[ 79+22 101/476] *(3011/14335b)= . 9 0x09
    if (argc > 0) {
        uuidString = argv[0];
        if (argc > 1) {
            birDbPath = argv[1];

            if (argc > 2 )
            {
                setenv("DISPLAY",argv[2],1);
            }

        } else {
            birDbPath = DEFBIRDBPATH;
        }
    } else {
        syslog(LOG_ALERT, "Mandatory BSP UUID not provided");
        closelog();
        return PAM_AUTHINFO_UNAVAIL;
    }

    bRet = BioAPI_Init(&version, 0, NULL, 0, NULL);
    if (bRet != BioAPI_OK) {
        syslog(LOG_ALERT, "Unable to initilize BioAPI framework, BioAPI");
        closelog();
    }

```

1Help 2Save 3Mark 4Replac 5Copy 6Move 7Search 8Delete 9PullDn 10Quit

- Edit file /etc/pam.d/kdm, add string ":0" (without quotes) to the line specifying the pam_bioai.so as an authentication module so the whole line should look like:

```

auth required pam_bioapi.so {5550454b-2054-464d-2f45-535320425350}
/etc/bioapi1.0/pam/ :0

```

```

kdm [B---] 89 L:[ 1+15 16/ 17] *(492 / 493b)= . 10 0x0A
.d/kdm - specify the PAM behaviour of kdm

dard Unix authentication modules, used with
nsswitch) as well as normal /etc/passwd and
dow entries.
common-auth
common-account
common-password
common-session

required    pam_nologin.so
required    pam_env.so
required    pam_limits.so
red pam_bioapi.so {5550454b-2054-464d-2f45-535320425350} /etc/bioapi1.0/pam/ :0

```

1Help 2Save 3Mark 4Replac 5Copy 6Move 7Search 8Delete 9PullDn 10Quit

- Recompile the library (do again steps 2,3 and then 7)

Dump of diff file for pam_bioapi.c

```
81a83,88
>
>
>          if(argc >2 )
>          {
>              setenv("DISPLAY",argv[2],1);
>          }
```