

AFS and PAM

Russ Allbery

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What is PAM?

- Pluggable Authentication Modules
- Abstracts the user authentication and session setup process
- Only does authentication and simple authorization
- Developed originally on Solaris
- Enhanced but mostly compatible version on Linux
- Now used by many UNIXes, but implementation varies

The PAM Groups

- PAM divides the login process into groups
 - auth: Prompts for and verifies password
 - account: Simple authorization decisions (only for login)
 - session: Prepares for an interactive session
 - password: Handles authentication token changes
- setcred, the odd step-child
- setcred vs. open_session: who knows? who cares?

PAM for Login

- auth group prompts for password, does basic authentication
 - Store the credentials in a separate temporary cache
 - Don't chown credential cache until setcred
- account group does basic authorization
- setcred stores credentials and adds supplemental groups
- session group creates a login session
- When the user logs out, session group closes the login session

PAM for Screen Savers

- auth group prompts for password, does basic authentication
- account group could do authorization, but frequently ignored
- setcred to refresh credentials (REINITIALIZE/REFRESH)
- session group not called
- Bad screen savers don't call setcred and thereby lose

AFS PAM Modules

- Authentication and AFS modules
 - pam_afs and pam_afs.krb (OpenAFS)
 - Heimdal pam_krb4 (requires Heimdal)
 - pam_krb5afs from Sourceforge (requires Heimdal)
- AFS session modules
 - pam_afs2 from Douglas Engert
 - Sam's pam_openafs_session
 - My pam_afs_session
- Using Heimdal vs. forking an external aklog

Problems with pam_afs

- Kerberos v4 and kserver only
- Does all of its work in the auth group
 - Doesn't work with SSH privilege separation
 - Doesn't support token renewal from screen savers
- Forks by default to avoid thread leaks
- Pulling AFS libraries into applications is very ugly
- Requires hacks to build shared on non-x86 Linux

Working with pam_krb5

- Merging the Kerberos auth module and AFS tokens is problematic
 - Vendor Kerberos v5 modules are common, often don't do AFS
 - AFS is conceptually separate
 - Easier to debug separate modules
- pam_krb5 responsible for getting tickets, AFS module for getting tokens afterwards
- AFS runs as a session module
- Ideally also want a setcred hook

SSH Challenges

- auth group run in a separate subprocess
- PAM data not passed out of authentication hook
- ChallengeResponseAuthentication required for prompting
- Threading issues
- Broken session/setcred behavior in older versions

Linux PAM Examples

```
auth      [success=ok default=1] pam_krb5.so
auth      [default=done]         pam_afs_session.so
auth      required               pam_unix.so try_first_pass
session   optional               pam_krb5.so
session   required               pam_afs_session.so

auth      sufficient             pam_unix.so
auth      [success=ok default=die] pam_krb5.so use_first_pass
auth      [default=done]         pam_afs_session.so
session   optional               pam_krb5.so
session   optional               pam_afs_session.so
```