Enterprise desktop: improving client side in the age of Samba AD and FreeIPA

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SambaXP'16

Enterprise desktop?

Centralized identity management system

There are now several free software identity management systems with the focus on managing operating systems' environments:

- Samba AD
- FreeIPA
- [many other LDAP+Kerberos based projects]

Enterprise desktop

- a client enrolled to a centralized identity management system
- a tool to solve business tasks
- a subject to centrally defined access controls

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- identity services: POSIX attributes for users and groups via NSSWITCH
- authentication services: logon details, mostly via PAM interface
- authorization services: mostly via PAM interface or application-specific ones

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- SSSD does authorization using GPO and/or account lock

That’s all behind the scenes, what would user see?

How *enterprisey* are we?

Let’s score by a password

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3. Obtain initial Kerberos credentials (enter a password)
4. Use corporate applications (enter a password?)

Can we do better than this?

how far are we from

- Sign into a corporate environment
- Use corporate applications

?

Let’s try to login!

Demo (first 40 seconds):
`http://talks.vda.li/2016/05/SambaXP/freeipa-logon-1FA-2FA.webm`

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Kerberos proxy

Available on the client side with Microsoft Active Directory and MIT Kerberos 1.13

- protocol is called MS-KKDCP
- transparent for Kerberos library users

Kerberos proxy is implemented by FreeIPA 4.2, OpenConnect Server 7.05, and as a standalone server

- Requires HTTPS connection, set up by default in FreeIPA 4.2, very easy to use (one line change on the client)
- Allows to obtain tickets from anywhere
- SSSD 1.12+
- Real-life example: GNOME project uses KDC proxy to allow GSSAPI authentication in SSH for GNOME developers

VPN and Kerberos

OpenConnect client supports GSSAPI negotiation

- Fedora 22+ works out of the box

OpenVPN does not support GSSAPI negotiation

- to do since 2005, ignored by upstream

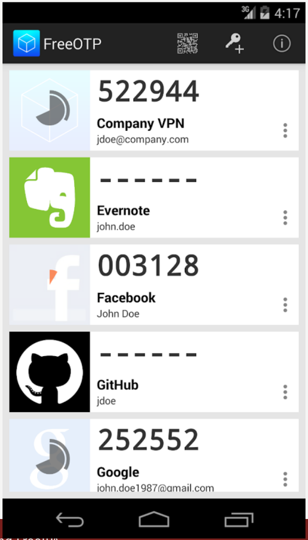
Support for GSSAPI in IPSEC is coming

Two-factor authentication

FreeIPA 4.x supports 2FA natively

- Yubikey, FreeOTP client for Android and iOS, any HOTP/TOTP compatible software and hardware
- Two-factor authentication is enforced on Kerberos level
- Performs pre-authentication before issuing a ticket
- Authentication Indicators are in Kerberos 1.14
- Pre-authentication modules can say *how* tickets were issued

FreeOTP: Android and iOS



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John Doe

GitHub
jdoe

252552
Google
john.doe1987@gmail.com

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- Choose which Kerberos principal is in use

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- One cannot use Google apps with GSSAPI in Gnome Online Accounts
- No single sign-on with GSSAPI from GNOME applications using WebkitGtk to authenticate

Can we do better than this?

Demo of single sign-on in Epiphany

Demo (until 1m42s): `http://talks.vda.li/2016/05/SambaXP/freeipa-ipsilon-googleapps-signon.webm`

What was that?

Tomáš Popela (Red Hat), David Woodhouse (Intel), and Guido Guenther (Debian) worked to fix `libsoup` and `WebkitGtk`

We logged into my FreeIPA server's Web UI

The code is in GNOME 3.20 (March 2016) and is in Fedora 24 beta (released on May 10th)

By default, all HTTPS sites advertising `WWW-Authenticate: Negotiate` authentication method will be probed with GSSAPI

Why all this is important?

- Multi-factor authentication moves to Web-based flows (Azure, Windows 10)
- Corporate portals are used to authenticate when accessing external resources
- Captive portals prevent Internet access before logon
- You need to be able to be on VPN before logon to your system or have Kerberos proxy working, or have multi-factor authentication working (full circle loop now)
- WebkitGTK+ is embedded in many applications

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Down the rabbit hole...

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- But network profile (access point) needs to be selected first
- This means Network Manager has to run before logon
- This means Network Manager needs to access user-specific data before logon
- A complete re-arrangement of logon UX

Down the rabbit hole...

Ok, anything for users, not admins?

Single sign-on to Google Apps

Demo (starting from 1m42s): `http://talks.vda.li/2016/05/SambaXP/freeipa-ipsilon-googleapps-signon.webm`

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- Setup recipe:
  `https://ipsilon-project.org/doc/example/google-apps.html`

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- Automated token/assertion renewal for SAML/OpenID
- No need to store passwords locally (secure kiosks?)

Visualize

GNOME Online Accounts could show Kerberos ticket properties

- Ticket time validity, flags (forward, renewal)
- Authentication indicators
- Existing service tickets in the credentials cache and allow to remove them selectively
- Allow automatic ticket renewal if KDC permits it

Consume

Choose between different Kerberos principals

- MIT Kerberos supports kernel keyring (1.12+) and directory-based (1.11+) storage of credentials
- Multiple Kerberos principals can be stored and used at the same time
- Only a single principal can be defined as “primary” for each Kerberos realm in the collection of credentials

Kerberos ticket renewal

- SSSD supports automatic Kerberos ticket renewal for single factor cases
  - Renewing 2FA tickets requires UI interaction triggered by expiry time
  - Automatic ticket renewal requires permission from KDC, visible as a ticket flag
- GNOME Online Accounts could integrate with SSSD in prompting for credentials (multiple factors) as in 2FA case needed information could be provided via SSSD InfoPipe/AuthPipe

Better Kerberos in browsers

- Firefox Kerberos setup isn't nice
  - needs about:config manipulation
  - DNS domains associated with Kerberos realm could be discovered via DNS SRV records, prompted for confirmation once
- FreeIPA used to provide an extension to automate Firefox setup
  - Extension was generated locally for for each FreeIPA deployment to provide configuration details
  - not anymore: Firefox removed ability to provide non-publicly available extensions since version 43
- There are about dozen bugs related to GSSAPI support in Firefox, gradually being fixed by Red Hat Firefox team together with Firefox upstream

Better Kerberos in browsers

- Chromium/Chrome
  - Have bugs for processing of `WWW-Authenticate: Negotiate` when Kerberos credentials are not available
  - On Linux only allows to configure Kerberos use through command line or statically system-wide, poor user experience
- A fixed libsoup/WebkitGtk allows to always use GSSAPI if server advertises `WWW-Authenticate: Negotiate` over HTTPS
  - no need to configure anything in Epiphany
  - could be further confined with a user confirmation similar to how passwords are managed at the first logon
- Konqueror browser in KDE allows to always use GSSAPI if server advertises `WWW-Authenticate: Negotiate` over HTTPS

Better Kerberos in browsers

- GSSAPI flow is synchronous, needs better UI interaction to avoid hogging down other tabs
  - still major issue for many browsers
  - Bug #890908 is on the way to be fixed in Firefox
    `https://bugzilla.mozilla.org/show_bug.cgi?id=890908`
- But asynchronous GSSAPI flow would do wonders too!

Any *practical* use of it?

Single sign-on at home

Demo: `http://talks.vda.li/2016/05/SambaXP/freeipa-ipsilon-owncloud-signon.webm`

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Better support for SAML in GNOME Online Accounts

GNOME Online Accounts in GNOME 3.20 supports single sign-on with a catch

- WebDAV protocol doesn't really work well with `mod_auth_mellon` as SAML client
- Have to use separate Owncloud end-point for non-SAML logon

There is a plan to fix GNOME VFS to support SAML negotiation so that Nautilus would be able to re-negotiate when accessing WebDAV shares

How *enterprisey* our home could become?

Very very *enterprisey*

Demo: `http://talks.vda.li/2016/05/SambaXP/freeipa-ipsilon-trusted-domain-owncloud-signon.webm`

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3. Profit?

Questions?