FreeIPA - Control your identity

LinuxAlt 2012

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Nov 3rd, 2012

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Section 1

Introduction

The Identity Management problem

- Management of individual identities
  - users, hosts, ...
- Authentication, authorization
  - Policies, ACLs
- Privileges, permissions within or across systems

- Can be configured on one computer
  - `/etc/passwd`, `SUDO`, `PAM`, ...
- Different interfaces and languages
- May become a synchronization nightmare on network

centralize!

Ideal solution

- Central location (but with redundancy!)
- Secure but easy to use
- Based on industry standards
- Single sign-on
- Allow access control (and self-service) on data
- Privilege delegation and separation

Available solutions:

- NIS, NIS+ - deprecated
- LDAP - RFC 4511 (+Kerberos) - current industry standard
  - 389 Directory Server, OpenLDAP, AD

The building blocks

- LDAP - data storage
  - Tree-like data structure
  - Good access control granularity (ACI)
  - Optimized for read operations - stale data
  - Multi-master replication
- Kerberos - authentication
  - Single sign-on
  - Centralized, KDC knows all the secrets
  - Identity represented by a principal: `admin@EXAMPLE.COM`
  - Can *speak* AD language and create two-way trusts
- Additional services: CA, DNS, NTP, ...
- All this can be built manually...

... BUT

- Did you ever try configuring LDAP+Kerberos+other services manually?
- Difficult management for regular admin

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Section 2

FreeIPA

FreeIPA

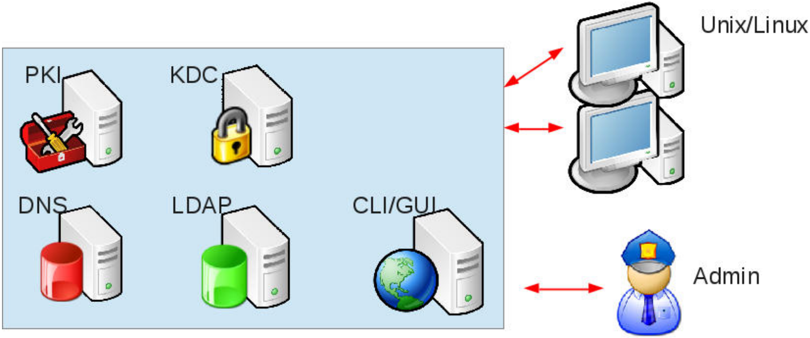
What does IPA stand for?

- Identity - who you are
- Policy - what are you allowed to do
- Audit - who and when accessed what

Advantages:

- Easy installation and setup
  - `ipa-{server,replica,client}-install`
- Interface to administer identities (users, groups), policies...
  - CLI, WebUI, custom RPC interface
- Linux clients are first-class citizens
  - Native support of Linux services - autofs, SUDO, SELinux, ...
- Redundancy - multi-master replication, read-only replicas, hubs

High-level architecture



Example: add a user

Add a user via LDIF

```
# ldapadd -D "cn=Directory Manager" -x -W
dn: uid=jdoe,ou=Users,dc=example,dc=com
objectclass: posixAccount
objectclass: person
uid: jdoe
uidNumber: 1001
gidNumber: 1001
sn: Doe
cn: John Doe
userPassword: PAsSw0rd
homeDirectory: /home/jdoe
```

Example: add a user (cont.)

Add a user with FreeIPA CLI [1/2]: kinit

```
# kinit admin
Password for admin@EXAMPLE.COM:
# klist
Ticket cache: FILE:/tmp/krb5cc_0
Default principal: admin@EXAMPLE.COM

Valid starting     Expires            Service principal
10/31/12 11:28:02  11/01/12 11:28:01  krbtgt/EXAMPLE.COM@...
```

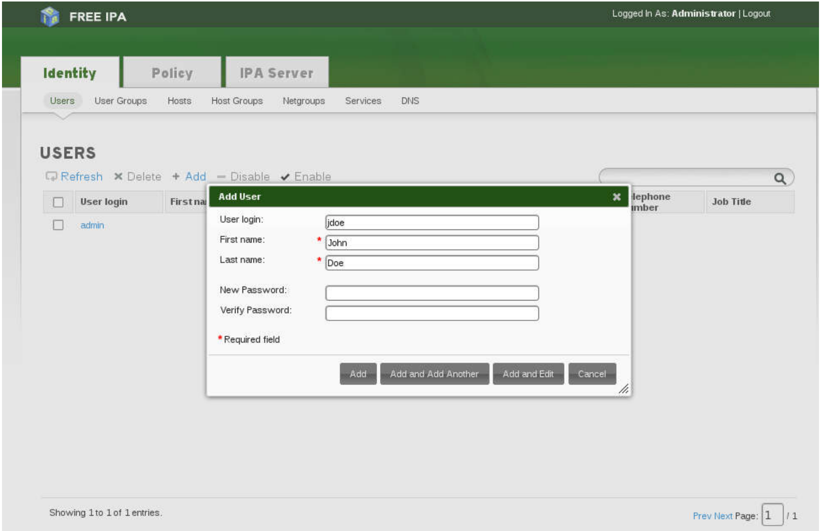
- Note: ticket lifetime can be configured with Kerberos ticket policy

Example: add a user (cont.)

Add a user with FreeIPA CLI [2/2]: run IPA command

```
# ipa user-add --first=John --last=Doe jdoe --random
-----------------
Added user "jdoe"
-----------------
  User login: jdoe
  First name: John
  Last name: Doe
  Full name: John Doe
  Display name: John Doe
  Initials: JD
  Home directory: /home/jdoe
  GECOS field: John Doe
  Login shell: /bin/sh
  Kerberos principal: jdoe@EXAMPLE.COM
  Email address: jdoe@example.com
  Random password: +MK2XkIN=vVM
  UID: 1998400002
  GID: 1998400002
  Password: True
  Kerberos keys available: True
```

Example: add a user (cont.)



□	User login	First na	lephone mber	Job Title
□	admin			

Add User

User login: jdoe

First name: * John

Last name: * Doe

New Password:

Verify Password:

* Required field

Showing 1 to 1 of 1 entries.

Section 3

Features

Identity Management

- Users, groups:
  - Automatic and unique UIDs
  - Manage users' SSH public keys, SELinux context
  - Role-based access control, self-service
- Hosts, group of hosts, services:
  - Manage host or service certificates (e.g. secure web server)
- Automatic group membership for users and hosts

Add new identity object

```
# ipa user-add --first=John --last=Doe jdoe --random
# ipa group-add labusers --desc "Lab Users"
# ipa group-add-member labusers --users=jdoe

# getent passwd jdoe
jdoe:*:94800185:94800185:John Doe:/home/jdoe:/bin/sh
# getent group labusers
labusers:*:94800186:jdoe
```

Identity Management (cont.)

- Cooperation with Active Directory domains
  - Till 3.0: winsync+passsync - synchronize AD users to FreeIPA
  - From 3.0: Cross-realm Kerberos trust
- FreeIPA + AD domain with a Trust is recommended way to manage Windows and Linux hosts

Create Active Directory trust

```
# ipa trust-add --type=ad ad.domain \
                --admin Administrator --password
```

- Linux hosts now accessible with GSSAPI-aware Windows SSH client

DNS

- Add new A, AAAA, CNAME, ... records with IPA interface
- Controlled with `bind-dyndb-ldap` plugin
  - Provisions BIND with records from LDAP

Add new DNS records

```
# ipa dnszone-add lab.example.com \
    --name-server=ipa.example.com
# ipa dnsrecord-add lab.example.com pc01 \
    --a-rec=10.0.10.1 --a-create-reverse
```

- Updated automatically with client install or IP address change (by SSSD)

Policy - HBAC

- Control who can do what with Host Based Access Control
- Enforced by SSSD for authentication requests via PAM

HBAC - rule example

```
# ipa hbacrule-show labmachines_login
  Rule name: labmachines_login
  Source host category: all
  Enabled: TRUE
  User Groups: labusers
  Host Groups: labmachines
  Services: sshd, login
```

Policy - Other services

SUDO - rule example

```
# ipa sudorule-show labadmin_yum
  Rule name: labadmin_yum
  Enabled: TRUE
  RunAs User category: all
  RunAs Group category: all
  User Groups: labadmins
  Host Groups: labmachines
  Sudo Allow Commands: /usr/bin/yum
```

- Automount - automatic NFS mounts
- SELinux rule - similar pattern to HBAC, assign SELinux user context per-host

And now for the client part...

- It is nice to have a server, but client configuration matters too
- There is a lot to configure - users, auth, services...
- IPA client installer should make it easier:
  - Configures SSSD - our client project
  - Synchronizes time with IPA server via NTP (Kerberos!)
  - (Optional) Upload public SSH key of the host
  - (Optional) Creates DNS record for the client in IPA

Prepare client record (optional)

```
# ipa host-add client.example.com --random
------------------------------------------
Added host "client.example.com"
------------------------------------------
  Host name: client.example.com
  Random password: 7QGk+eHU.Y8U
  Password: True
  Keytab: False
  Managed by: ipa.example.com
```

And now for the client part... (cont.)

Configure an IPA client

```
# ipa-client-install --password 7QGk+eHU.Y8U \
                     --unattended
Discovery was successful!
Hostname: client.example.com
Realm: EXAMPLE.COM
DNS Domain: example.com
IPA Server: ipa.example.com
BaseDN: dc=example,dc=com

Synchronizing time with KDC...
Enrolled in IPA realm EXAMPLE.COM

...

DNS server record set to: client.example.com -> 10.0.0.10

...

Configured /etc/ssh/ssh_config
Configured /etc/ssh/sshd_config
Client configuration complete.
```

Section 4

Q&A

Resources, contact

- Web + wiki: www.freeipa.org
- Code: www.fedorahosted.org/freeipa/
- IRC: #freeipa on freenode
- Mailing lists:
    - freeipa-interest@redhat.com
    - freeipa-users@redhat.com
    - freeipa-devel@redhat.com

Questions?

The end.

Thanks for listening.