IDfusion
An Open-Architecture for Kerberos based Authorization

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Background

- 1997 - Identity based architecture.
  - *Hurderos Project*
- Host centric to service centric transition.
  - *Everything is a service*
- Integrated management and provisioning
  - *Uberware*

Why Authorization?

- What people want is authorization.
- No standardized protocol or scheme for implementing authorization.
- Lack of a standard hinders use of authorization.
- Open Standards = Open Architectures

Why emphasize standards?

"At the end of the day the only thing that matters in information delivery is who is consuming information and what information can they consume. He who controls that controls everything."

Wettstein's Theorem on the Transcendency of Identity Management

Goals

- Simple and flexible.
- Synergistic combination of the strengths of Kerberos and LDAP.
- Inherent security from the perspective of the directory.
- Consistent with services oriented architectures.

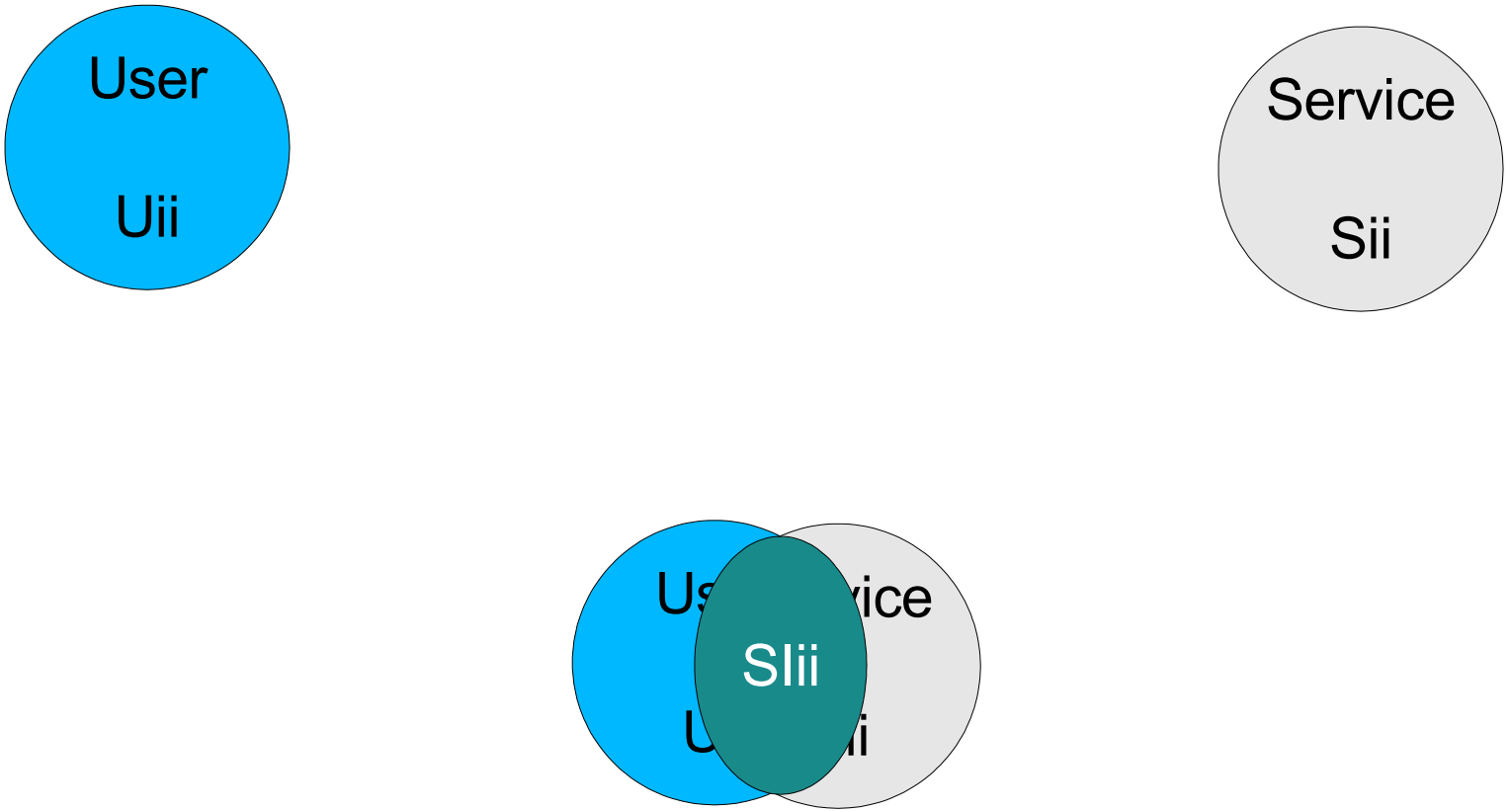
Rethinking Authorization

- Phases of authorization.
- Identity intersection model.

Authorization Phases

- Execution
  - Application specific process based on user attribute information.
- Implementation
  - Infrastructure to support execution of authorization decision.

Identity Intersection Model



Service Authorization Instance Identity

Model Implementation

- N-bit vectors used for intrinsic identities.
- Cryptographic hash with message size m=N used to implement '*fusioning'.*

$$Slii = Hm(Uii,Sii)$$

Kerberos Model

- Define service authentication identity.
  - svc/SERVICE@REALM
- Use HMAC derivative of fusioning hash with authentication identity key Kn.
- Publish HMAC identity for SIii.

$$SIii = HmKn(Uii,Sii)$$

Example Publications

Service Identities:

dn: service=IDENTITY,dc=org,dc=NNN
kvno: 3
sii: [0-9a-f]{Lm}
state: enabled|disabled

dn: service=KERBEROS,dc=org,dc=NNN
kvno: 4
Sii: [0-9a-f]{Lm}
state: enabled|disabled

Service Instance Identities

dn: SIii=[0-9a-f]{Lm},dc=org,dc=NNN
cn: GoldenS St. Ignatius
sn: Wettstein
iid: Iggy.Wettstein
uid: k9
title: Corporate Retriever
Uii: [0-9a-f]{Lm}
state: enabled|disabled

dn: Siii=[0-9a-f]{Lm},dc=org,dc=NNN
krb5RealmName: ORG.NNN
krb5PrincipalName: bark1
state: enabled|disabled
preauth: IDfusion|OTP

Kerberos Protocol Extensions

- Authorization payload field holds intrinsic identities.
  - Ticket granting ticket: Uii
  - Service ticket: SIii
- Application uses payload field as a pointer into the directory.

AS_REQ Procedure

- Lookup and validate KERBEROS service object.
- Lookup and validate IDENTITY service object.
- Load binary representation of Uii in authorization payload field of TGT.

TGS_REQ

- Load Uii from credential (TGT).
- Lookup and validate Sii based on service name from svc/SVCNAME principal.
- Compute and validate SIii.
- Store binary representation of SIii in service ticket.

Reference Implementation - KDC

- Shared library plugin for MIT 1.4.3.
- Methods:

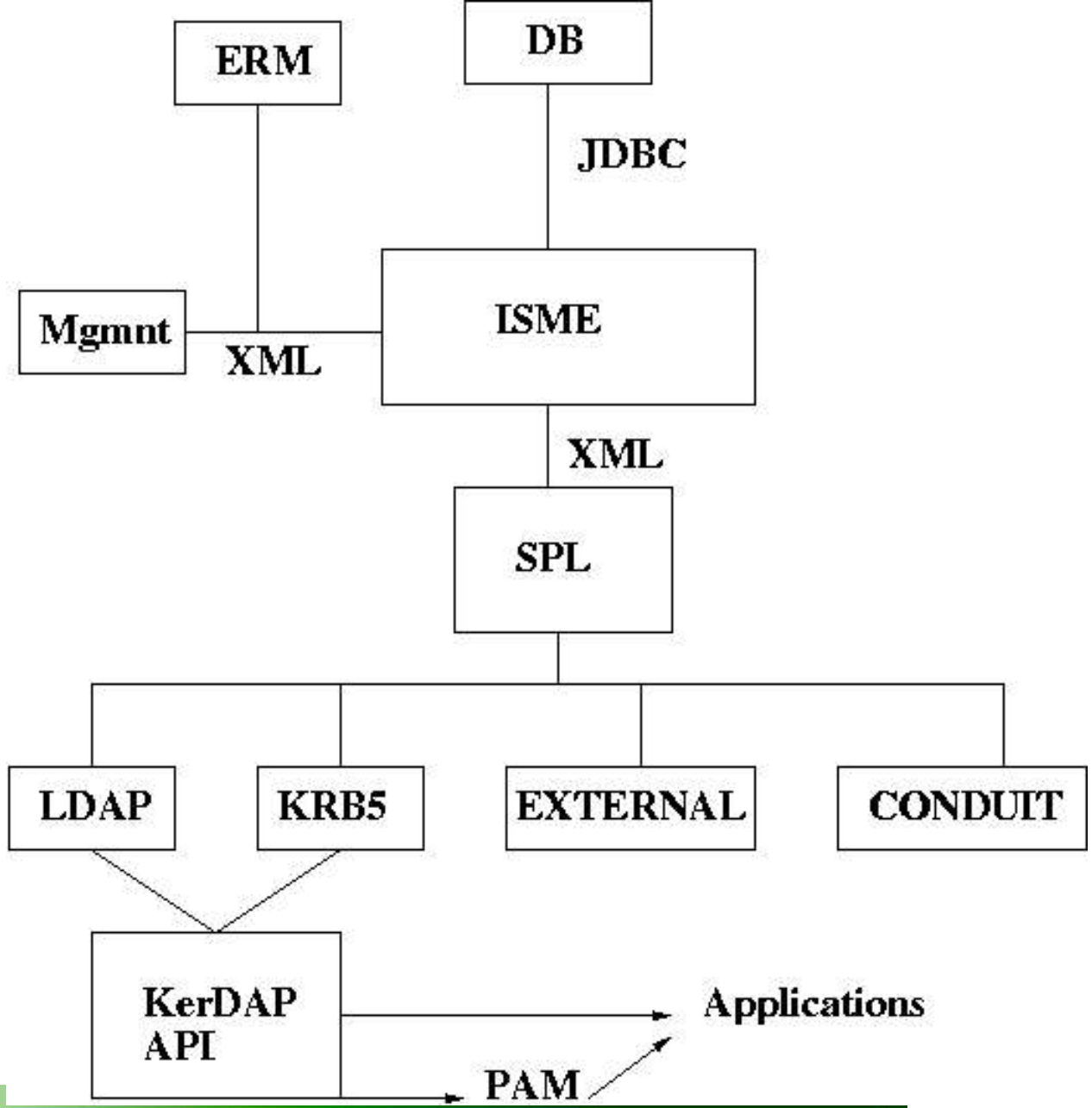
init	as_req
destroy	as_req_authz
	tgs_req
	tgs_req_authz

Administrative Support

- Plugin for kadmind.
- Methods:
  - pwd_update
  - acl_check
- Implementing support for KRBADM service.

Integrated Management

- ISME
  - identity generation and management engine.
  - service provisioning.
- GOOI
  - graphical representation and control of identity heirarchy.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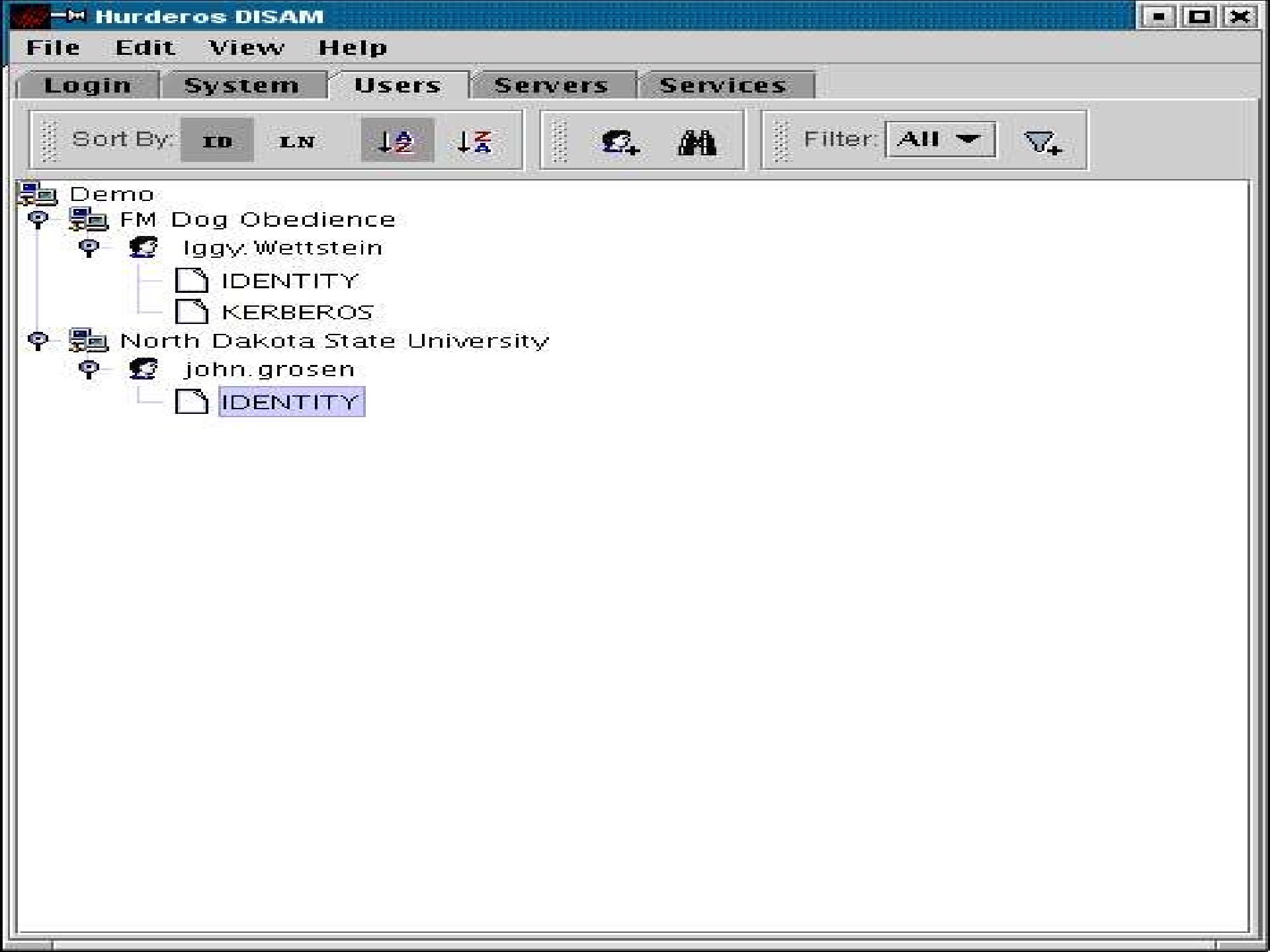
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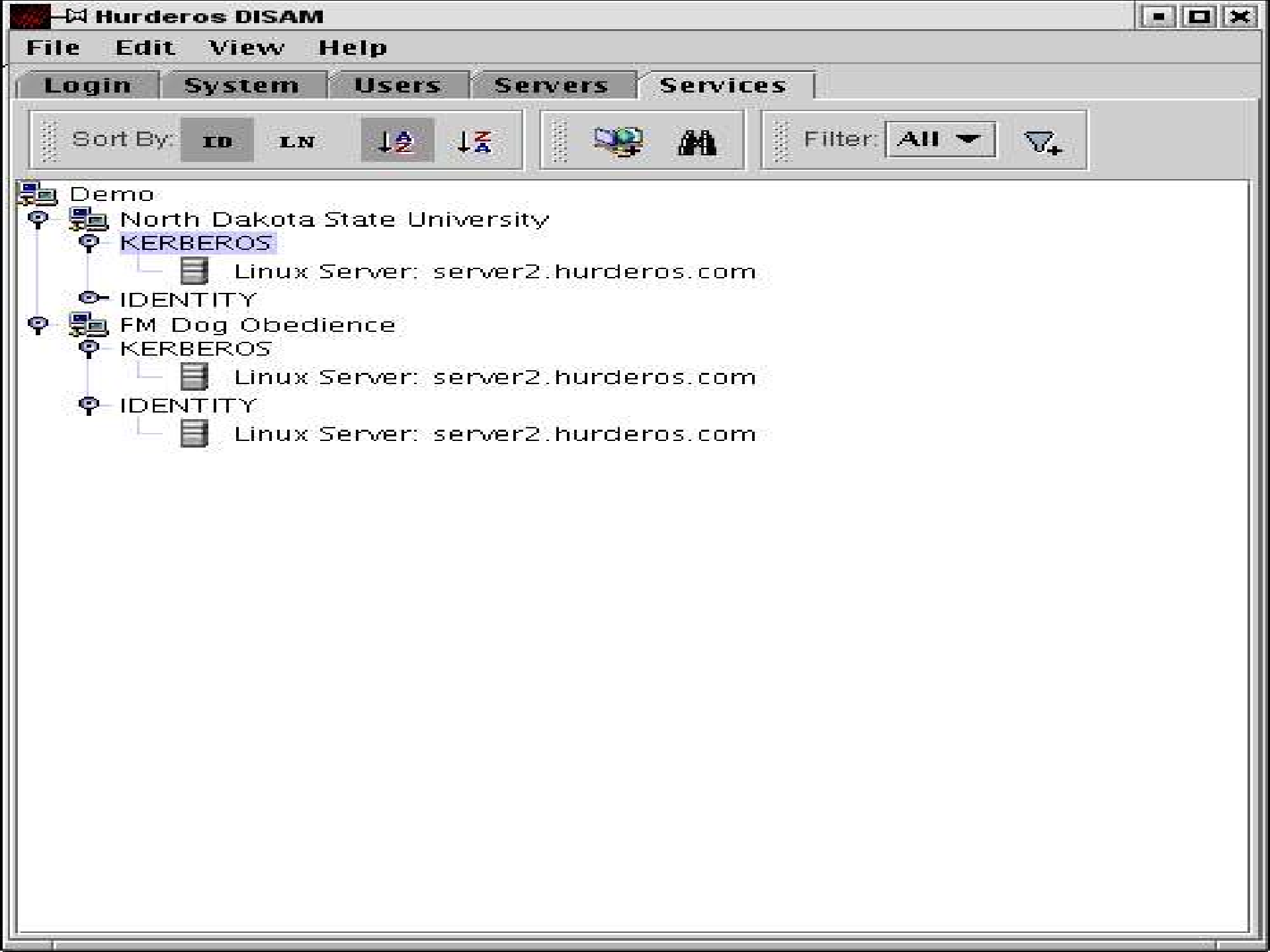
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In Our Spare Time

- Apache integration.
- IDfusion based two-factor authentication.
- Host ticket propagation of Slii's.
- API development.
- Delegated management.
- Client support.

Thank You

- John Grosen, Enrique Rodriguez
- NDSU and ITS