Kerberos V, OpenLDAP, OpenAFS

Using Debian GNU/Linux

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Overview

- short site report
- our motivation for alternative cell
- core architecture =
  Kerberos V + OpenLDAP + OpenAFS
- benefits of this core
- implementation with Debian
- application scenarios
- gained experience
- next steps

Site Report

current cell vn.uniroma3.it for ≥ 10 years

alternative cell dia.uniroma3.it for ≈ 2 years

servers Dell PowerEdge SCSI HW RAID5

clients (AIX), Linux, MacOS X, (Windows XP)

volumes many backups, few replicas, some copies

backups to file on hard disk

users students, lecturer, staff

conventional use homes, mail, web

advanced use computer based exams, lab software

useful new commands found in OpenAFS

Context

department

part of Engineering from our university

hardware

32bit Intel off-the-shelf

software

mainly open source, Windows Campus licence

Linux distributions

Debian, Gentoo, Ubuntu

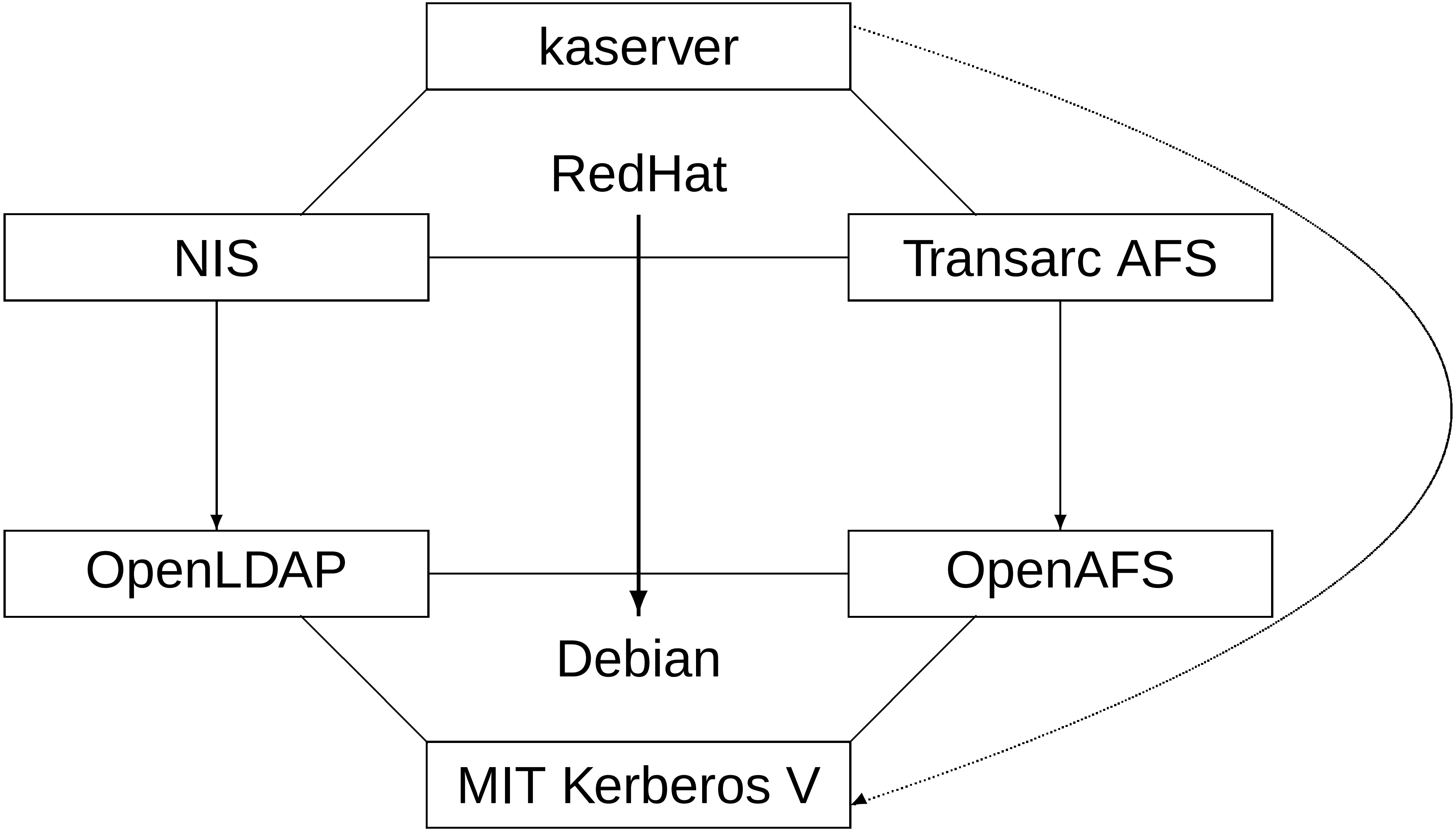
advancing technologies

parallel, distributed, grid computing;
new Windows 2000 server architecture

Motivation for alternative Cell

1. cell vn.uniroma3.it with external support
2. customized RedHat Linux
3. started with Transarc and now OpenAFS
4. on “AS IS” blackbox basis
5. born during the period of many UNIX dialects
6. no direct access to AFS administrative commands
7. kaserver (now fakeka) + NIS based
8. local mail spool but UW-imap folders in AFS
9. some ACLs with IPs but no keytabs

Core Architecture Shift



kaserver

RedHat

NIS

Transarc AFS

OpenLDAP

OpenAFS

Debian

MIT Kerberos V

Benefits of this Core

KRB5: centralized authentication

- master and slave
- PAM module

LDAP: centralized information

- replication
- SASL with GSSAPI

OpenAFS: distributed filesystem

- redundancy
- allows for mail and web integration
- low-cost NAS/SAN substitution over Ethernet

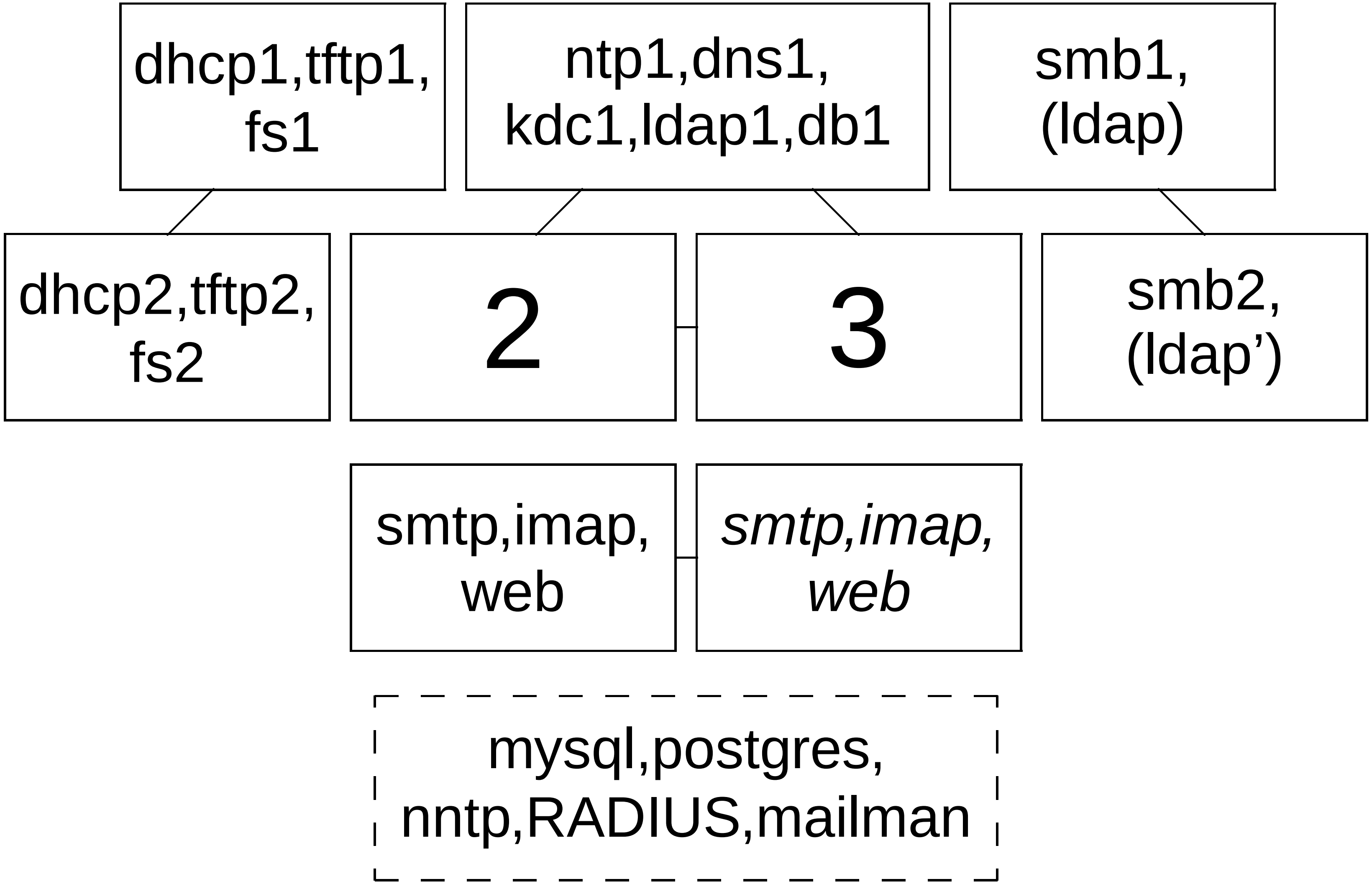
Implementation with Debian

MIT Kerberos V+OpenLDAP+OpenAFS: out of the box

	apache2	postfix-tls	courier-imap-ssl
KRB5	mod-auth-kerb keytab	saslauthd PAM	courierauthd PAM
LDAP	UserDir	aliases	HOME
oAFS	mod_dav DAV access	procmail MAILDIR	MAILDIR access

	ssh	inn2	postgresql
KRB5	GSSAPI + PAM	RADIUS + PAM	keytab
LDAP	NSS		
oAFS	HOME	(spool)	(backup)

Redundancy



dhcp1,tftp1, fs1

ntp1,dns1, kdc1,ldap1,db1

smb1, (ldap)

dhcp2,tftp2, fs2

2

3

smb2, (ldap’)

smtp,imap, web

smtp,imap, web

mysql,postgres, nntp,RADIUS,mailman

Computer Based Exams

1. rc.local in AFS space
   - kiosk mode
   - permits firewall activation
2. generic user on lab computer with IP based ACL
   - symbolic link into IP enabled work space
   - similar to possible NFS setting
3. home volume replacement
   - for specialized exams
   - prepare fresh empty volume
   - set real home volume offline during exam

Administration Tools with PROLOG

- scope: static analysis + basic operations (not full-blown ADM server)
- need consistency between data bases for Kerberos, LDAP, and pts
- simple db extraction to file in Prolog syntax
- this file gets just loaded into Prolog
- consistency easy to express with logic programming
- backtracking suitable for “undo” operation
- need to extend initial scripts
- small expert system feasible

Further Gained Experience

- secure services require SSL/TLS
- implementation of a small in-house PKI
- mainly for private host keys and certificates
- user certificates can be published in LDAP
- users can benefit from e.g. USB tokens (smartcards)
- possibilities:

  - certificate based mail relay
  - certificate based web access
  - mail signing and encryption

Next Steps

1. adding firewall rules (DDOS)
2. server hardening (SELinux)
3. Ubuntu on server

... AND ...
2007 book by Springer with Ing. Franco Milicchio
“Distributed Services with OpenAFS
for Enterprise and Education”

PLUS: help wanted for AIX
(5.2 on a donated pSeries for CATIA)