Ganymede: An Extensible and Customizable Directory Management Framework

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The Problem

- Networks need centralized management information
  - NIS
  - DNS
  - Automounter
  - Email

- Organizations need distributed control
Prior Work at ARL: GASH

- Presented at LISA VIII, 1994
- Text-based shell
- Single user
- No automation
- Manipulates NIS files directly
- Supports single DNS domain, class C subnets
Ganymede

- A client/server directory management system written in Java
  - Uses Java RMI
  - Multi-threaded, multi-user
  - GUI Client

- Can be completely customized
  - ‘GUI GASH Construction Set’
Ganymede Manages Objects

- Users
- Groups
- Subnets
- Systems
- Etc.
Ganymede Supports The Network

- DNS
- NIS
- LDAP
- Etc.
Ganymede System

Ganymede Server

ObjectStore
Custom Logic

DNS, NIS. Etc.
Console

Client

RMI
Object Store

- Integrated object database
- Objects held in memory
Object

- Name
- Type
- Invariant ID
- Ownership
- Fields
Field Types

- Strings
- Integers
- Passwords
- Dates
- Booleans
- IP addresses (IPv4 and/or IPv6)
- Object References
Permissions and Ownership

Objects in Database

Owner Group
Owner Group

User
Persona

Role
Role
Transactional Engine

- Full transactional support
  - Commit/Abort
  - Checkpoint/Rollback
- Custom logic verifies transactions
- Transactions logged to journal file
Server Task Scheduler

- Expiration task
- Warning task
- Database Consolidation task
- Build tasks
Email and Logging

- All events logged
- Server can scan its own log file
- Events can be mailed
Server Customization

- Schema editable
- Plug-in classes may be authored to provide intelligence for objects
- Custom build tasks write data files, invoke external build scripts
- Schema kits exist for Solaris NIS, Linux, BSD, and GASH
Schema Editor
Plug-in classes

- Adopters can author classes to provide custom intelligence for object types
- Two dozen methods for customization
- Wizards supported
- Create home directories, mailboxes, etc.
Custom build tasks/ scripts

- Adopters can author classes to generate NIS, DNS, LDAP, etc. source files
- Custom scripts propagate information into network
Ganymede Client

- Explorer-style GUI Interface
- Works on any 1.1.5+ JVM
- Win95, WinNT, Solaris, FreeBSD, etc.
Custom Clients

- Password-change applet
- Command line password utility
- Other special-purpose clients
- Must be written in Java
Ganymede Limitations

- RAM-limited object store
- No encryption between client and server
- Single server system
- No replication
Scalability Today

- ARL’s Data
  - DNS for 2087 systems
  - 753 users
  - 248 groups
  - 234 netgroups
  - 520 NFS volumes
  - 517 rooms

- Fits in laptop
Availability

- Currently available in late beta.
- GNU General Public License if approved
- Formal 1.0 within 6 weeks
Future Prospects

- Development of a variety of schema kits
- RMI over SSL
- Custom clients
GASH2 - Ganymede

http://www.arlut.utexas.edu/gash2

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