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

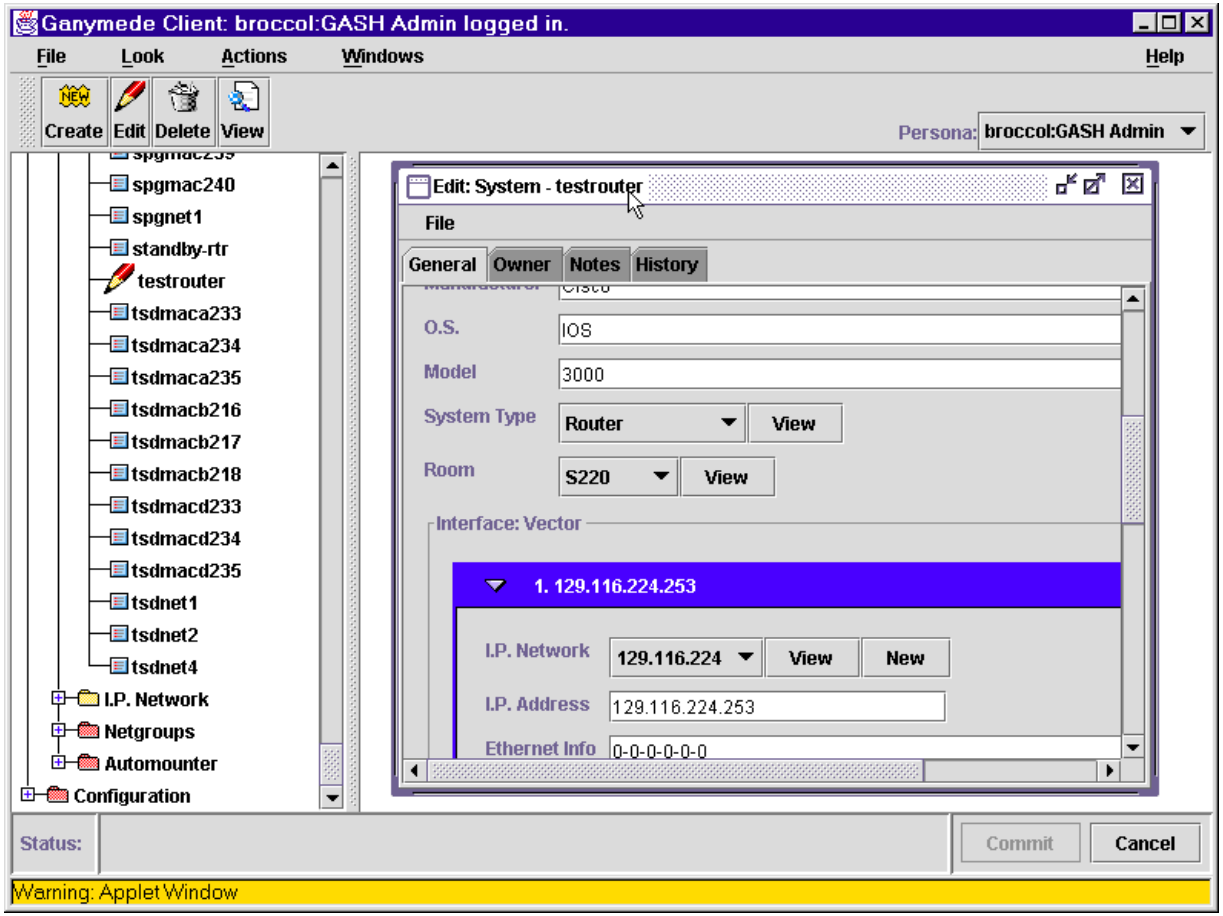
- Presented at LISA VIII, 1994
- Text-based shell
- Single user
- No automation
- Manipulates NIS files directly
- Supports single DNS domain, class C subnets

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.



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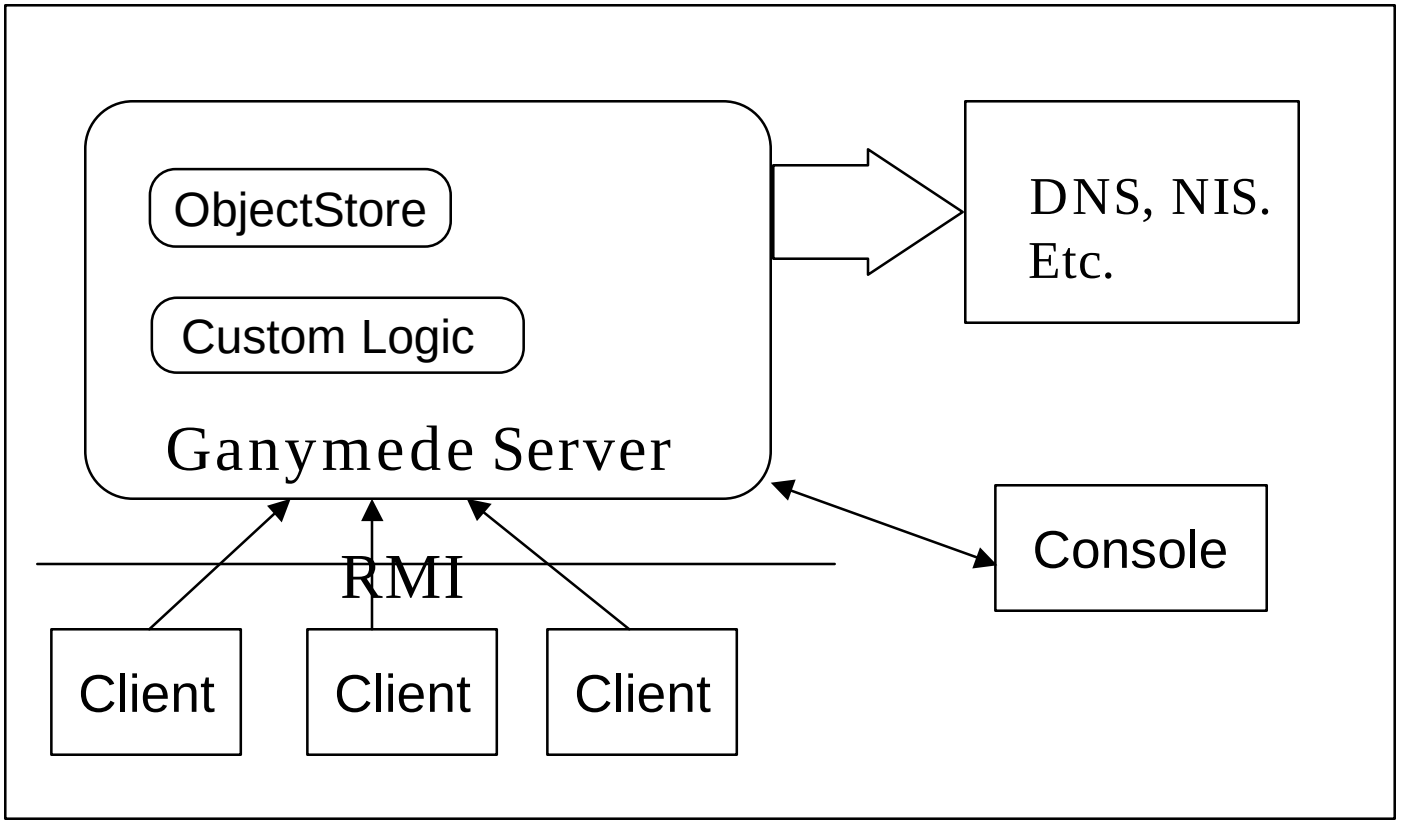
Ganymede Supports The Network

- DNS
- NIS
- LDAP
- Etc.

Ganymede System



Object Store

- Integrated object database
- Objects held in memory

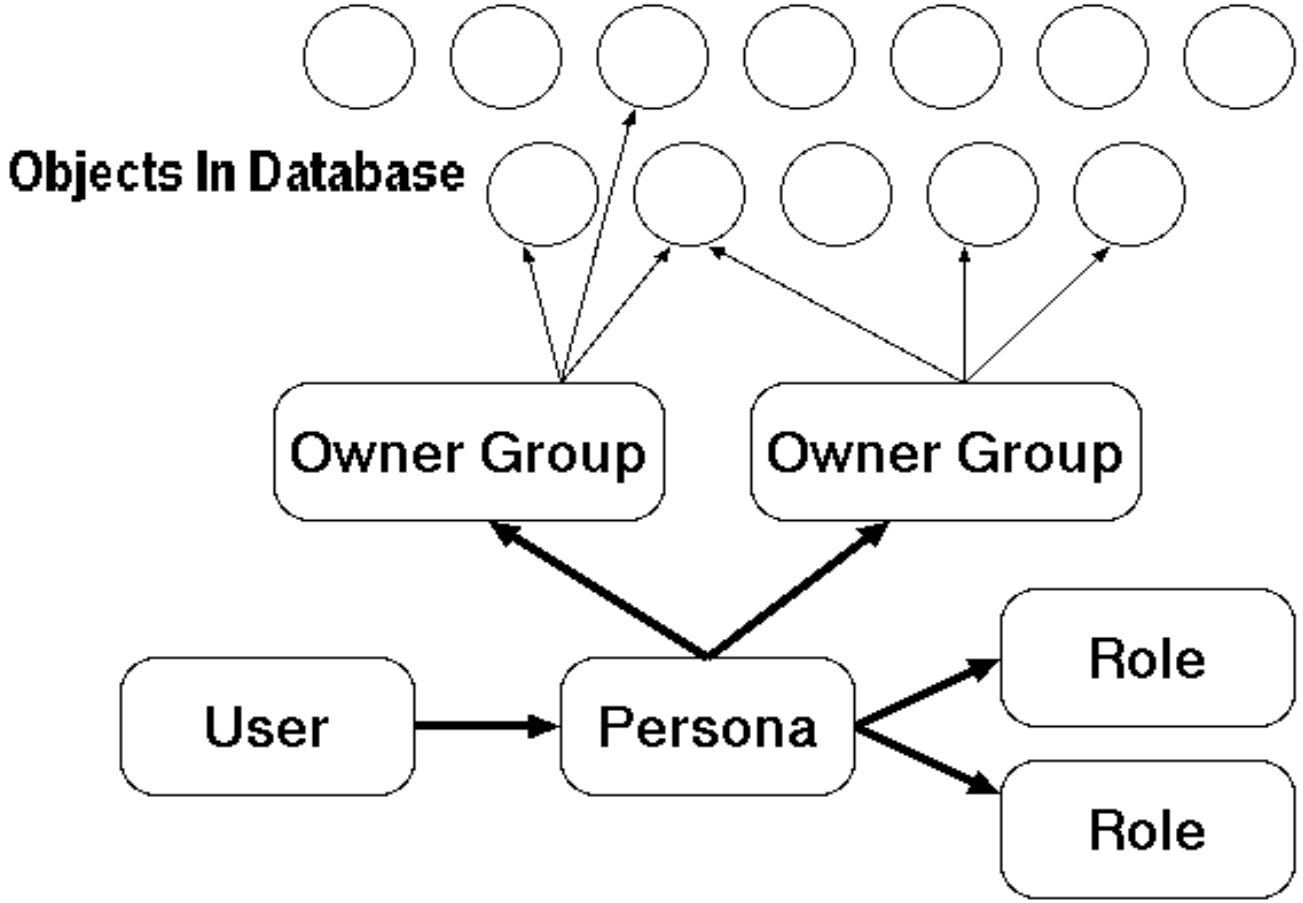
Object

- Name
- Type
- Invariant ID
- Ownership
- Fields

Field Types

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

Permissions and Ownership



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

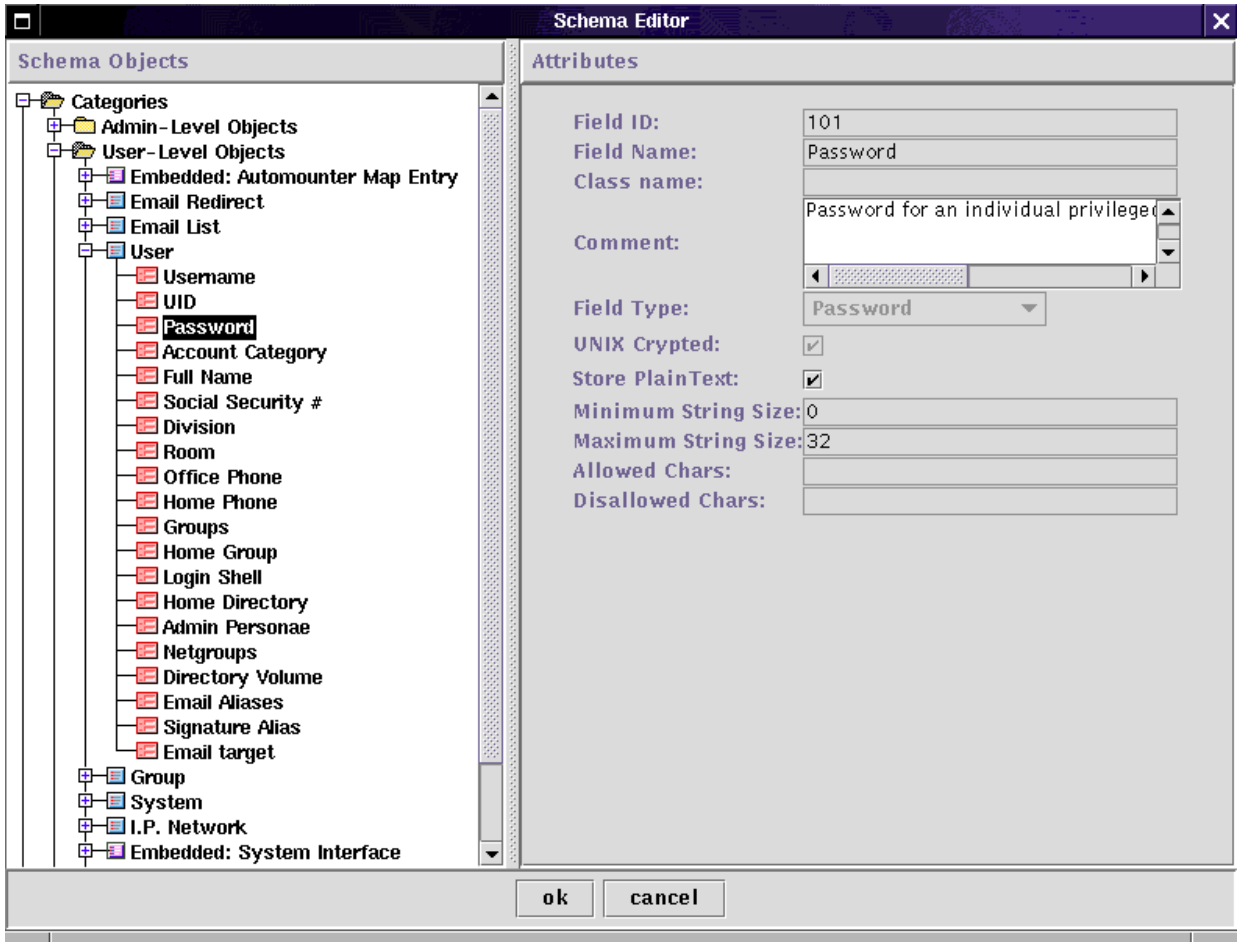
Email and Logging

- 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



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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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