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Design of a Directory Information Tree

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Why do we need a good tree design?

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- Once deployed, a DIT is difficult to change.
- The Design has to be possibly simple to understand, just because we are going to talk about it with every customer (developers and application designers).
- Complex things are an impediment to further development

Requirements for the user's objects

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Schema is beyond the our scope, but we can state some simple facts:

- A very good start for the user object is the class "inetOrgPerson"
- For containers use "organizationalUnit" or "organization"
- The groups should be "groupOfNames" or "groupOfUniqueNames"
- You may have to define one or two auxiliary classes.

Requirements for the applications

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- **Applications with no integration to a Directory**
  - Very difficult to manage: use metadirectory techniques
- **Applications that can use a common user management and integrate authentication**
  - Very simple requirements if uid and password policy can be used
  - sometime you can talk to developers
- **Applications with full integration of user management, authentication and authorizazion, at least for roles**
  - This is usual for new application, when you can enforce your framework

Requirements for User's authentication

- Choose a simple password policy
- ensure that the passowrd and the password policy are encorfed IN THE DIRECTORY and not from someone else like a portal application

Requirements for the directory access

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- **Design you acces control before you need it:**
  - Classify your attributes in sensitivity classes
  - determine the access need from management applications and user's application
  - define the ACL's along your sensitivity classes, containers and access need
  - Define groups for the various access modes
  - Assign your users (service accounts) to the above groups

Requirements for the security

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- Avoid using the „root“ for access
- consider to split the root password between more people
- Define an administrator group with full rights
- Assign account to this group
- define an auditors group

Our simple Design

- **Think minimalist**
- **Think as you would define a file system and directories below that**
- **You can always define a new container**
- **move objects around may be later difficult**
  - you may have already defined groups (DN!)
  - you may already have users which grew up used to your structure

Design of a DIT: as flat as possible, as deep as needed

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- Here your architectural skills and creativity are needed: there is no absolute rule
- use a hierarchical structure everytime it makes sense
- but avoid unnecessary containers

Design of a DIT: as flat as possible, as deep as needed

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When you do need a different container?

- to keep together logically bound or homogeneous objects
- to simplify access control (ACI)
- to avoid name collisions (RDN)
- to keep the design clean & tidy
- comfortable browsing of the information
- to allow replication of different part of the DIT

Design of a DIT: as flat as possible, as deep as needed

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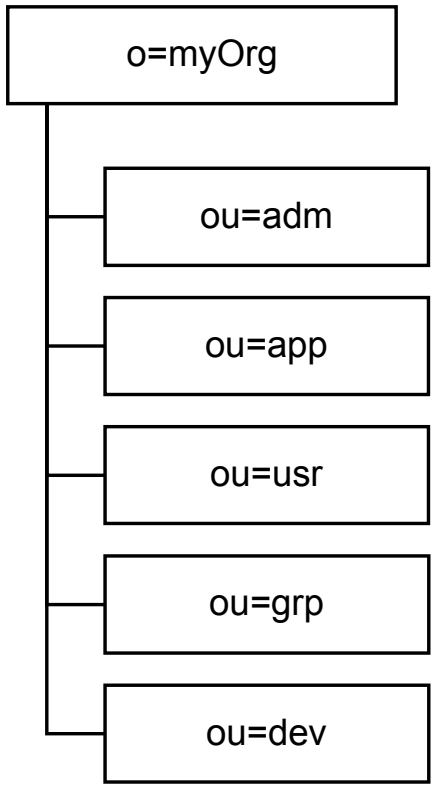
When you do *not* need a different container?

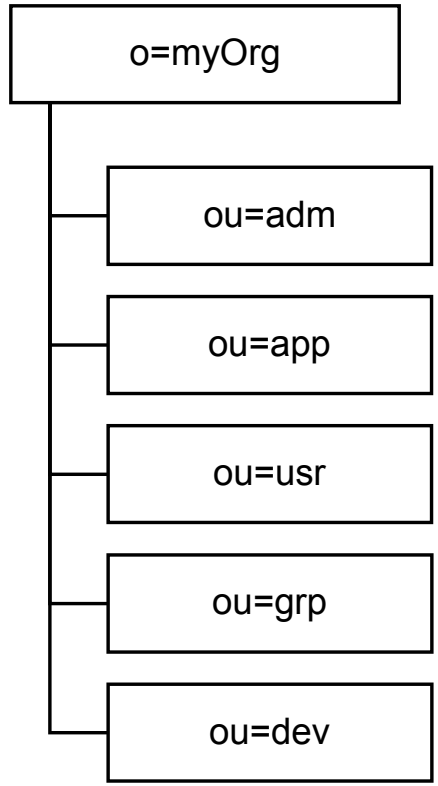
- If the number of objects is small (e.g. less than 10.000)
- if the functional scope is similar (e.g. people of the same organization, authorizations groups for applications, technical accounts)
- If the selection can be made through an attribute value (use filter, acl)

Our simple design



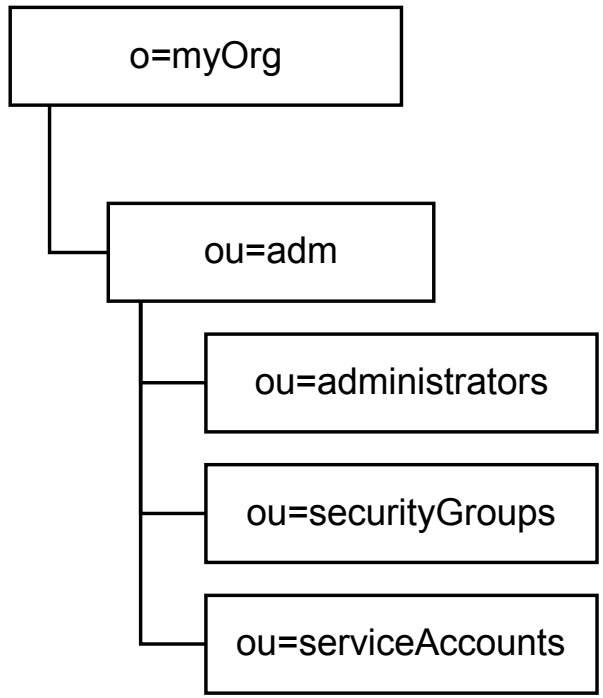
The Root Level

- Avoid long names for the root container. Remember: you have to carry them around everywhere
- My preferred choice is simply “o=<your organization’s name>”



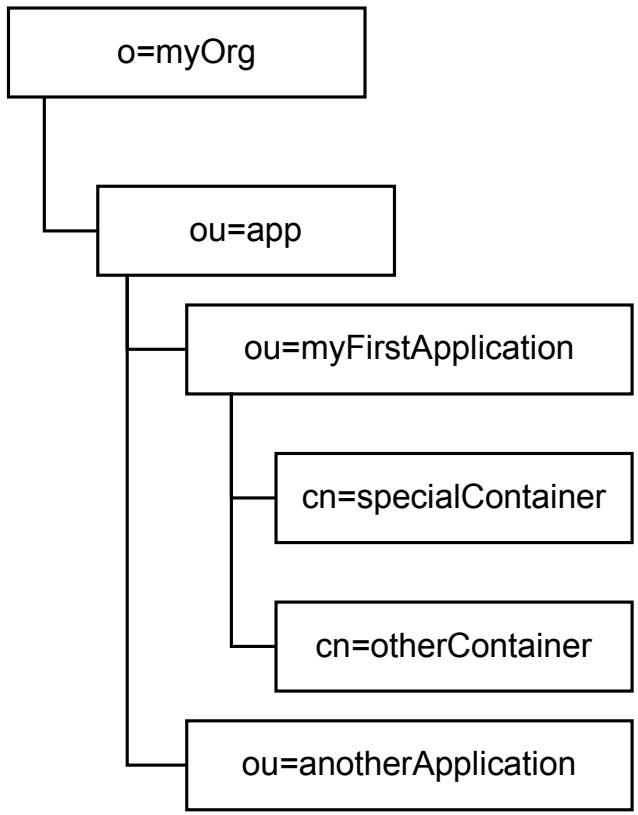
“ou=adm”: an administrative container

- hold the information directly involved in the administration of the directory itself
- The technical or service accounts should find place here
- Place here the few groups (groupsOfUniqueNames) needed to implement the access control



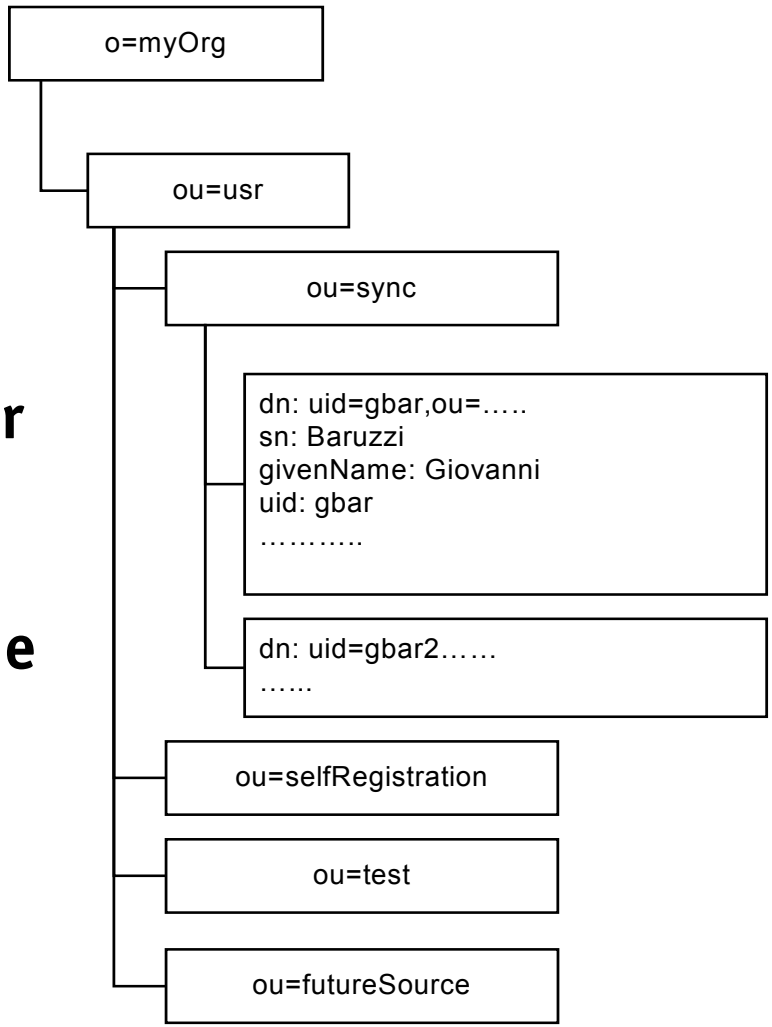
“ou=app”: an extra container for applications

- A dedicated container (“ou=app”) for applications’ private data
- Below this container you may define a dedicated container for every application.
- The single application would receive full access to its container.



The simple design: “o=usr”: the People container

- central to an LDAP Design
- the search base to locate the users
- No additional information is needed from the application than the name of this container and a filter expression
- conceal containers below this against applications (except the managing applications)
- define containers below it as needed (security, replications, logical needs)



Difficult decisions

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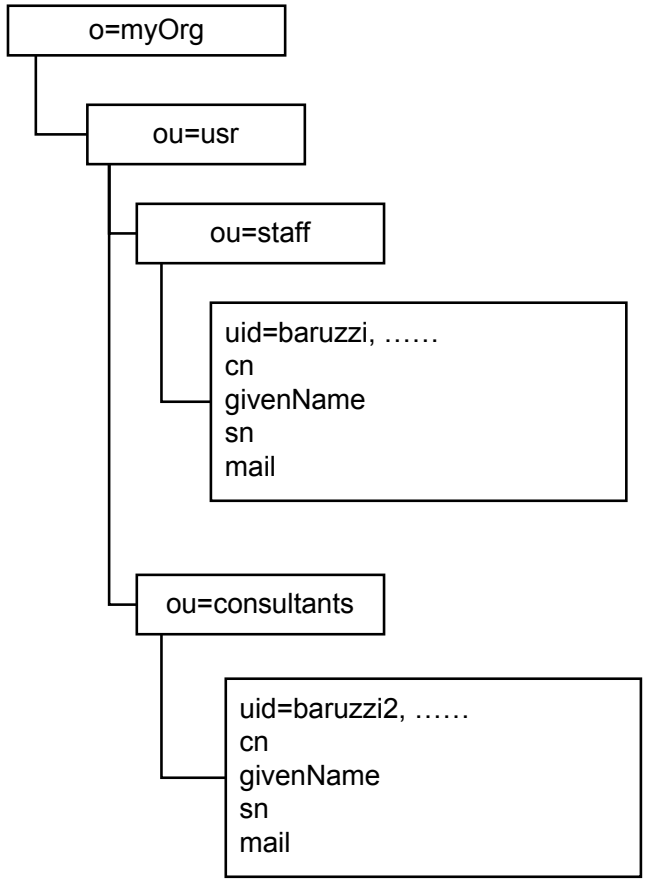
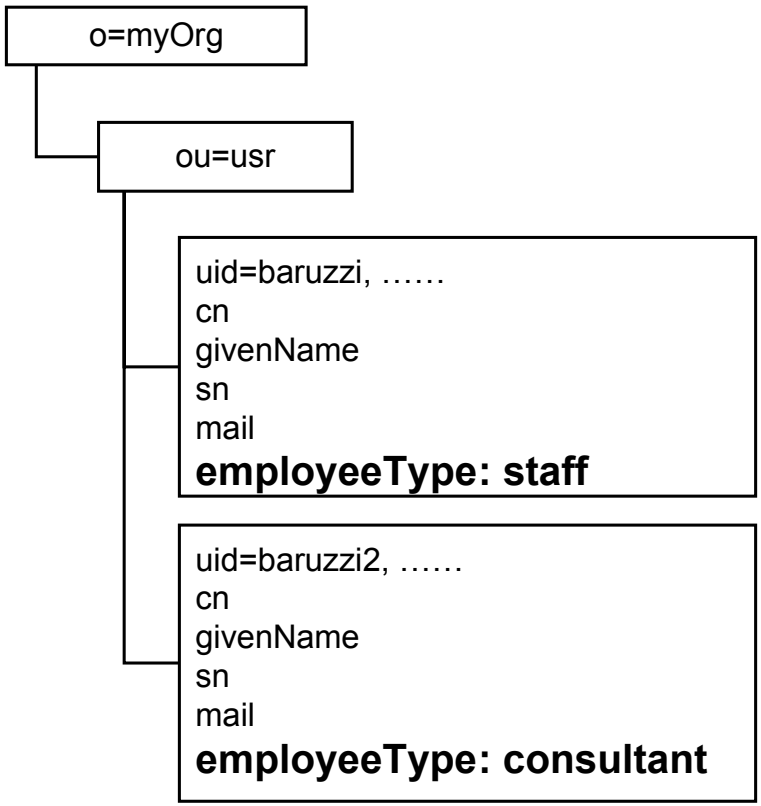
... arise when we work with very similar objects differentiated only by an attribute and only time to time we need to select between them.

Difficult decisions: different containers



Difficult decisions: additional attribute



“ou=grp”: Container for Roles and Groups

- Grouping of objects is an essential function for directories, used mainly to grant rights
- groupOfNames and groupOfUniqueNames are broadly used in applications
- we put groups
  - in the ou=adm container
  - below the private application container (ou=appName,ou=app...)
  - below the ou=grp container
- define subcontainers like “sync”, “provisioning” or “manual”

Use of “groupOfNames”

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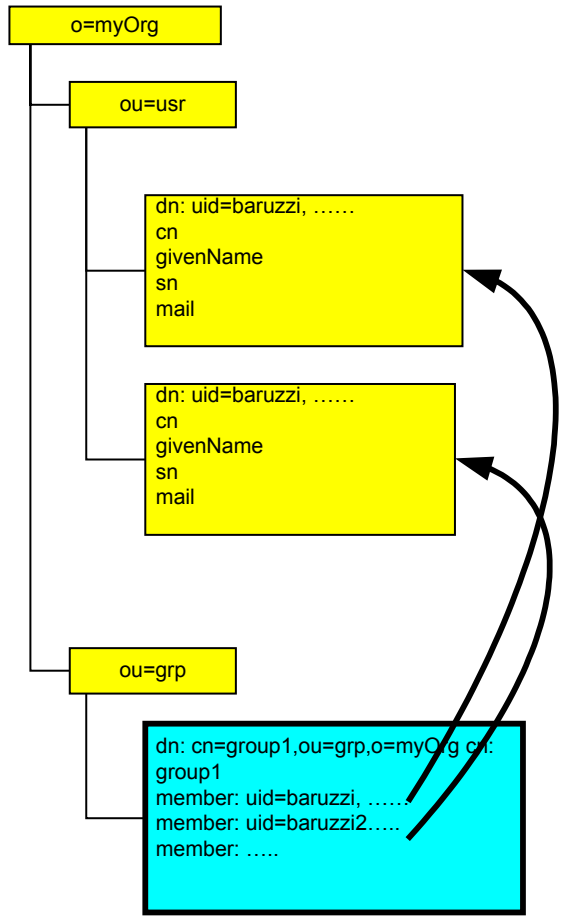
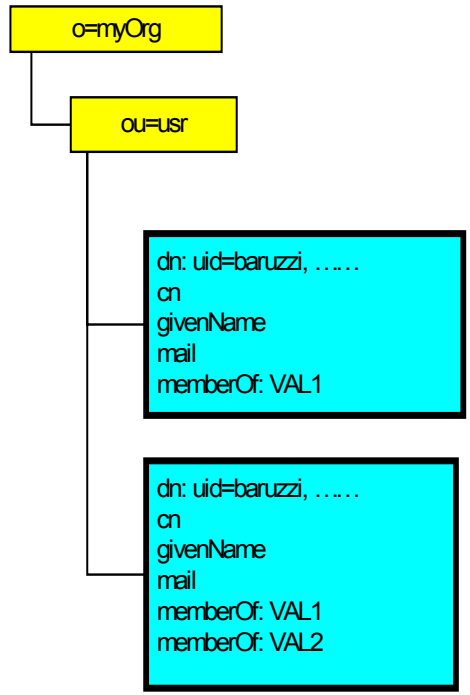
- Secure (simple ACL)
- does not scale well beyond 50.000 members
- broadly used

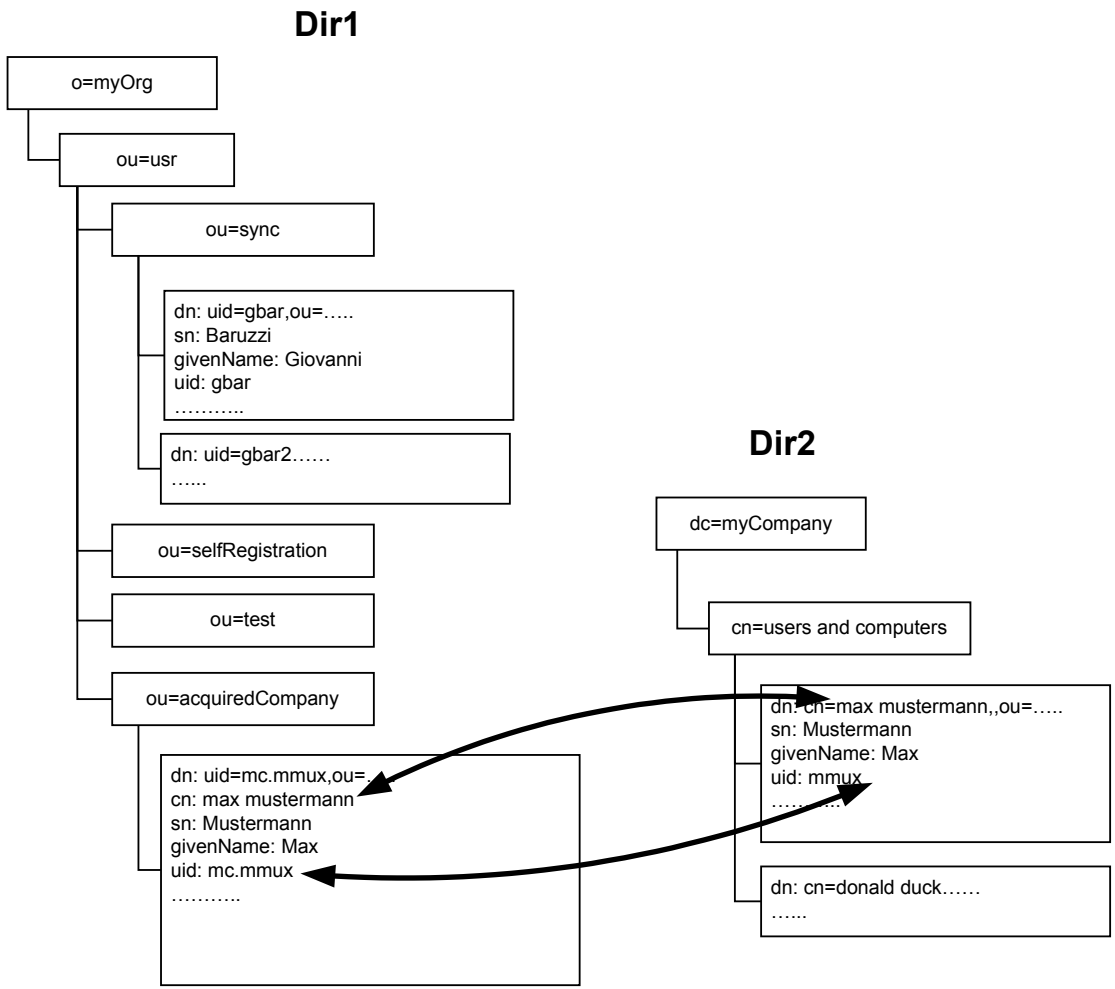


Use of „memberOf“

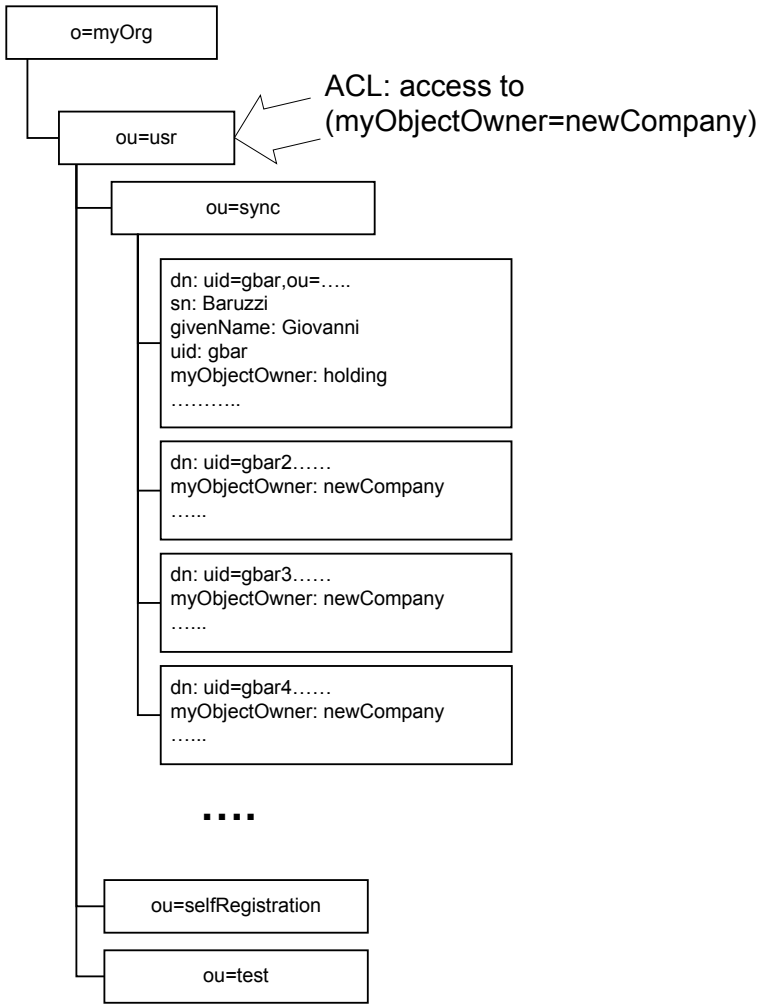
- Scales very well
- One access gets all group memberships
- If an administrator has the right to manage memberOf, she can grant membership to every group defined in this way



Growth of the design with the time: merge two directories



Growth of the design with the time: a directory split



Conclusion

for LDAP, complex structure are often an impediment to further development.
Our simple DIT model, as we have seen, can even survive a merger....

Thank you!