Network Services, VU 2.0

LDAP

Dipl.-Ing. Johann Oberleiter
Institute for Informationsystems, Distributed Systems Group

Directory

- Goal: help people find things
- Online: help also computer find things
  - Dynamic (Update)
  - Flexible Content & Organization
  - Can be made Secure
  - Can be personalized
    - Information inside the directory
    - Info delivered to users

Lightweight Directory Access Protocol

- Standardized Directory Access Protocol
- Supports
  - Centrally manage users, groups, devices, and other data
  - Single Sign-On
  - Reduces need to implement proprietary user and group management database
  - Reduces need for separate application-specific directories
  - Avoids tying exclusively to a single vendor and/or OS

LDAP Protocol

- Not simple string-based
  - Simplified version of Basic Encoding Rules (BER)
- Operations in 3 categories
  - Interrogation operations
  - Update operations
  - Authentication and control operations
- Lightweight
  - More efficient than "heavyweight" X.500 Directory Access Protocol (DAP)

LDAP Information Model

- Types of data and basic units that can be stored
- Basic unit is the entry
  - Collection of information about an object
  - Consists of a set of attributes
- Each attribute
  - Type
  - One or more values
  - May have constraints on type and length
- Information Model descries entries

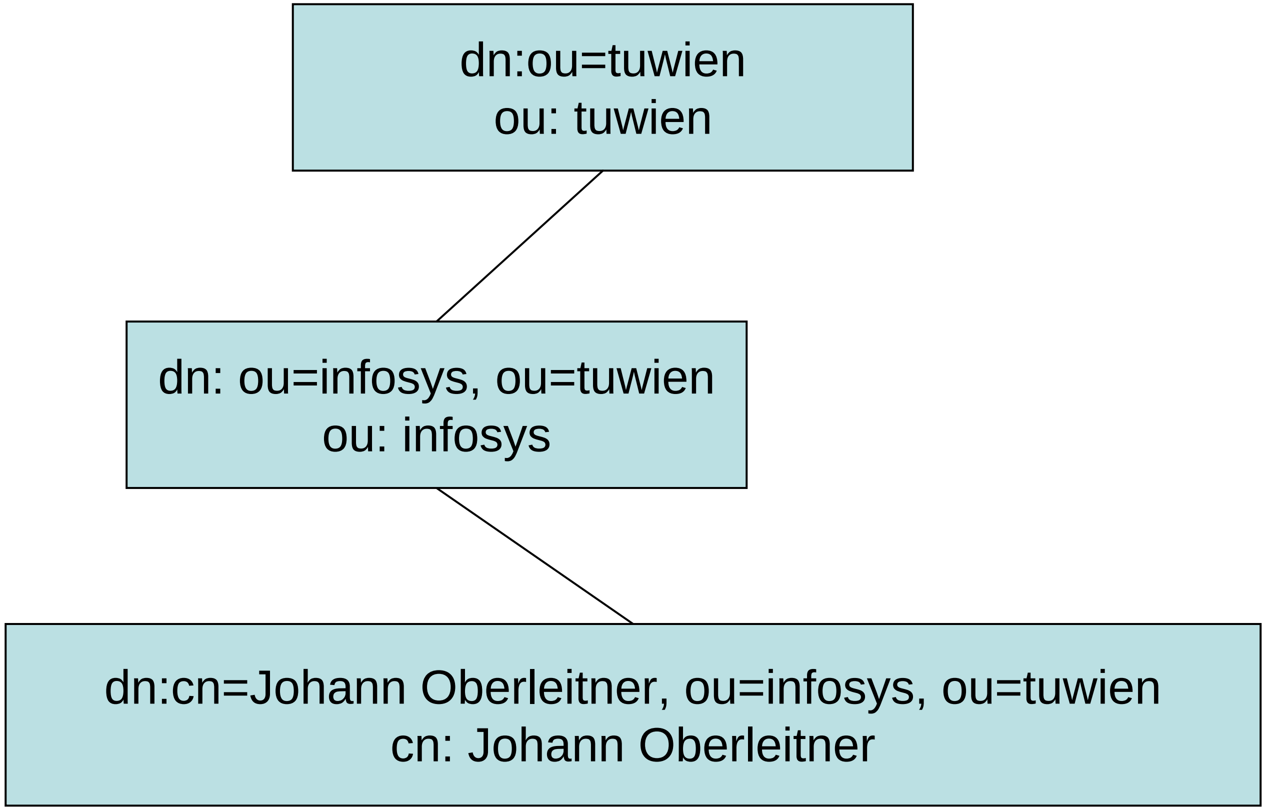
Information Model - Sample

cn: (common name)	Johann Oberleitner
sn: (sur name)	Oberleitner
telephonenumber:	+43 1 58801 58400
mail:	johann.oberleitner@infosys.tuwien.ac.at

LDAP Naming Model

- How data in directory is structured
  - How entries can be accessed
- Similar to file system
  - Every node contains data in LDAP directory
  - Any node can be a container
  - Backward relative to filenames
  - DN (distinguished name) refers to an entry
  - Within DN, leftmost component is RDN (relative DN)
- Aliases
  - One entry points to a completely different entry
  - Allows structures not strictly hierarchical

LDAP Naming Model



dn:ou=tuwien
ou: tuwien

dn: ou=infosys, ou=tuwien
ou: infosys

dn:cn=Johann Oberleitner, ou=infosys, ou=tuwien
cn: Johann Oberleitner

LDAP Functional Model

- Operations possible on the directory with LDAP
- Interrogation operations
  - Search
    - Parameters may restrict search scope, time limit, size limit, search filter
    - Search filter: (sn=K*), (sn>=O), logical operators
  - Compare
    - Whether a particular entry contains a particular attribute

LDAP Functional Model / 2

- Update operations
  - Add
    - Parent must exist, new entry must conform to schema in effect, no entry exists with same DN
  - Delete
    - Entry must exist
    - No children
  - Modify
    - Entry must exist
    - All attribute modifications must succeed
    - Result must obey schema in effect
  - Modify (DN) = rename
    - Entry renamed must exist
    - New name must not already exist

LDAP Functional Model / 3

- Authentication and Control operations
  - Bind
    - Client authenticates to directory
  - Unbind
    - Discards authentication information
  - Abandon
    - Takes message ID of LDAP operation
    - Client sends abandon if no longer interested in results

Active Directory

- Microsoft's Directory Service
- API
  - ADSI (Active Directory Services API)
  - Supports LDAP and other servers
  - One of Microsoft's most important tools in Server business
- Compatible with LDAPv3
  - Unfortunately interpretations are possible