Finding Information in an LDAP Directory

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What's the phone number?

A scenario:

You just left a meeting and forgot to get some important information. Now, you need to call someone whose name you wrote down but don’t know their office phone number or email address.

What's the phone number?

- Where to look?
- What do I ask for?
- How do I ask for it?
- What will I get back?
Where do I look?

- White pages (phone book)
- UH INFO - http://www.hawaii.edu/dir/
- An application using LDAP

LDAP Directory

- DIT - directory information tree
- hierarchical - like a file system
- subtrees - groups
- search area

What do I ask for?

- Thing(s) to match
  - All fields
  - Selected fields
  - No fields (presence, existence)
How do I ask for it?

- Host:port of LDAP server
- Search base
- Scope
- Search filter
- Attributes to return
- Attributes only

What will I get back?

- Zero or more entries
- Attributes
- Value(s) for each attribute present

Demo

Someone with last name sounds like roads

/ou=people,o=hawaii.edu?sub?(sn=road)

/ou=people,o=hawaii.edu?sub?(sn=r*oad*)
LDAP Terminology

- **Namespace**
  - What do you call things
  - How things are organized
  - Hierarchical DIT
    - Contains entries
    - Entries contain entries

- **Schema**
  - What data can be stored
  - Object classes
  - Attributes in the classes
    - Name
    - Type
    - Value
**LDAP Terminology**

- **Object class**
  - Grouping of attributes
    - required
    - optional
  - Inheritance
    - extend existing classes

**LDAP Terminology**

- **person**
  - surname
  - common name
  - user password (opt)
  - phone number (opt)
  - see also (opt)
  - description (opt)

**LDAP Terminology**

- **organizationalPerson**
  - surname
  - common name
  - user password, phone, descr, etc. (opt)
  - title, orgUnit, etc. (opt)
**LDAP Terminology**

- **inetOrgPerson**
  - surname
  - common name
  - user password, phone, descr, etc. (opt)
  - title, orgUnit, etc. (opt)
  - givenName, uid, mail, etc. (opt)

**LDAP Terminology**

- **Attribute**
  - **Type (syntax)**
    - kind of information to be stored
      - character
    - how searched for
      - ignore case
  - **Value**
    - single or multiple values

**LDAP Terminology**

- **Entry**
  - Attributes
  - Types
  - Values
LDAP Terminology

- **Entry**
  - Attributes
  - Types
  - Values

```
uid   cn   telNum
CN
string   John Q Doe
```

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LDAP Terminology

- **Distinguished Name (DN)**
  - name of an entry
  - uniquely identifies entry
  - composed of attributes

```
ou=People, o=hawaii.edu
```

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LDAP Terminology

- **Distinguished Name (DN)**

```
o=hawaii.edu
```

- **ou=People, o=hawaii.edu**
- **ou=Groups, o=hawaii.edu**
- **ou=UH, o=hawaii.edu**
LDAP Terminology

- **Distinguished Name (DN)**
  
  `dc=hawaii, dc=edu`
  
  - `ou=People, dc=hawaii, dc=edu`
  - `ou=Groups, dc=hawaii, dc=edu`
  - `ou=UH, dc=hawaii, dc=edu`

More LDAP Terminology

- **Search base**
  - What part of the DIT to look in
- **Scope**
  - Base, One, Sub
- **Search filter**
  - What to use as a comparison
More LDAP Terminology

- **Search base**
  - What part of the DIT to look in

```
o=hiawii.edu
  - ou=People, o=hiawii.edu
  - ou=Groups, o=hiawii.edu
  - ou=UH, o=hiawii.edu
```

- **Scope**
  - Base - main entry
  - One - main entry and immediate children
  - Sub - main entry and all descendants

- **Search filter**
  - What to use as a comparison
  - One or more attributes
    - firstname=John,
    - lastname=Doe,
    - department=Leeward CC
How to find it

- **LDAP URL (RFC 2255)**
  - host:port
  - Search base
  - Scope
  - Search filter

How to find it

- **LDAP URL (RFC 2255)**

How to find it

- **LDAP URL (RFC 2255)**
  - /ou=people,o=hawaii.edu??sub?(sn=Doe)
Search Filters

• Search Attribute(s)
  – Exact match
  – Approximate match
    • partial key
    • regular expression
  – Substring

Search Filters

• Search Attribute(s)
  – Exact match

(sn= Doe)

(& (sn= Doe) (givenName= John ) )

Search Filters

• Search Attribute(s)
  – Approximate match

(sn~= road)

(& (sn~= Doe) (givenName= John ) )
Search Filters

- **Search Attribute(s)**
  - Substring

  \[(sn=do*)\]

  \[(& (sn=r*oa*) (givenName=sam*))\]

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Search Filters

- **More examples**

  \[(& (sn=do*) (! (givenName=jo*)) )\]

  \[(& (givenName=Jo*n) ((sn=Do*)(sn=Sm*)))\]

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Attributes Returned

- **All**
- **Only those of interest**

  \[telephone,mail,cn\]

  \[o=hawaii.edu?telephone,mail,cn?sub?(sn=Doe)\]
What’s in LDAP?

- uid (ITS username)
- cn (last, first middle)
- givenName (first name)
- sn (last name)
- employeeType (faculty, staff, student)
- ou (home campus)

What’s coming next?

- Refine schema
- Refine data sources
- Enable more applications
- Engage more people