Using LDAP & ICE to manage Novell eDirectory

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Overview

- What is LDAP?
- LDAP fundamentals
- LDAP tools
- LDIF
- ICE

What is LDAP?

- Lightweight Directory Access Protocol
  - Based on Directory Access Protocol
  - Provides access to X.500 type directory trees (such as eDirectory)
  - No OSI stack, solely TCP (so light and fast)
- Developed at University of Michigan in the 1990's
  - Now ratified by the Internet Engineering Task Force

LDAP fundamentals

- Names must be typeful, e.g. `cn=admin,o=oucs`
- Names must be distinguished
  - Fully distinguished. i.e., full containment to tree root
    - E.g. `cn=wylie,ou=staff,o=oucs`
    - Or relative `cn=wylie,ou=staff` in the context of the `o=oucs` base

More fundamentals

- Names are case insensitive
- Delimited with commas
- A fully distinguished name must be unique in the DIT

Novell’s LDAP

- Fully LDAP v3 compliant
- Based on Open standards
- Installed on NetWare by default
- Single NLM: NLDAP.nlm

LDAP tools

- Windows users
  - Command line tools available as part of the Novell LDAP SDK
  - Download from http://developer.novell.com/ndk/ldap-index.htm (requires a profile)
  - Select "LDAP Classes for C - Netware and Windows"
  - Download all
  - Open `cldap_all.exe` at download location

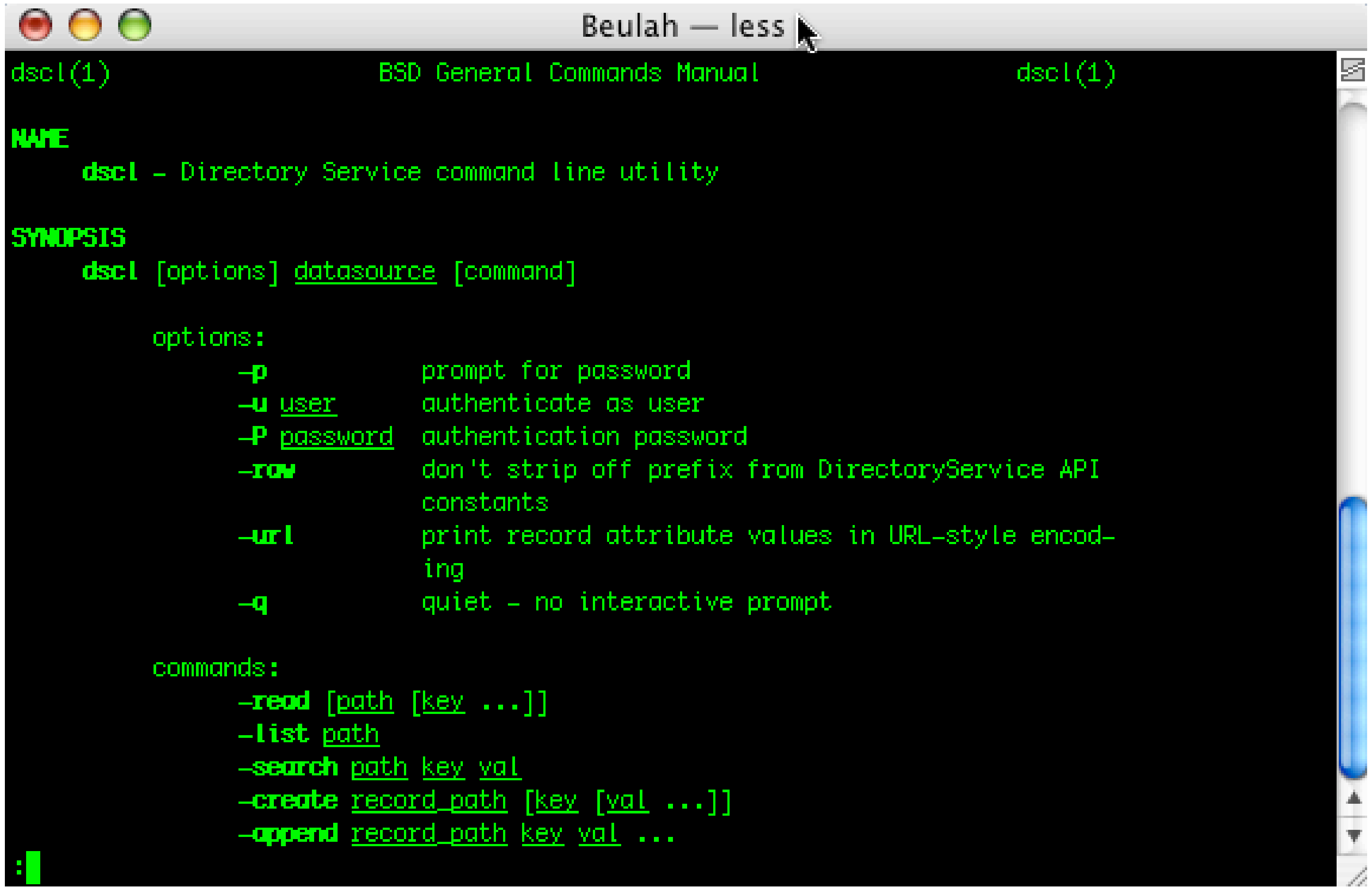
LDAP Browsers & Tools

- LDAP Browser: http://www.novell.com/coolsolutions/tools/1283.html
- Java LDAP browser available from http://www-unix.mcs.anl.gov/~gawor/ldap/
- Other useful LDAP tools on Novell Cool Solutions Site: http://www.novell.com/coolsolutions/tools/

Mac users

- Standard LDAP command line tools are incorporated in to OSX: `ldapsearch`, `ldapmodify`, etc.

- Also see the Directory Service command line utility; for details type `man  dscl` at an OSX terminal



```
dscl(1)                   BSD General Commands Manual                  dscl(1)

NAME
     dscl - Directory Service command line utility

SYNOPSIS
     dscl [options] datasource [command]

          options:
               -p          prompt for password
               -u user     authenticate as user
               -P password authentication password
               -raw        don't strip off prefix from DirectoryService API
                           constants
               -url        print record attribute values in URL-style encod-
                           ing
               -q          quiet - no interactive prompt

          commands:
               -read [path [key ...]]
               -list path
               -search path key val
               -create record_path [key [val ...]]
               -append record_path key val ...
:
```

Linux users

- Download tools from http://www.openldap.org/software/download
    - Select UK mirror `ftp://ftp.plig.org/pub/OpenLDAP/openldap-release/` and view Readme for latest stable release
    - Unpack archive then use gcc to make the tools located in the `/clients/tools` directory

What can we do with the tools?

- Authenticate
- Query
  - Bind and unbind (anonymous or authenticated)
  - Search
  - Compare

What else can we do with the tools?

- Change Entries:
  - Modify
  - Add
  - Delete
  - ModDN

LDAP Data Interchange Format

- Begin with line: `version: 1`
- comments are preceded by a #
- Records are delimited by empty lines
- All records must begin with : <object's DN>:
- The dn must be fully distinguished
- Line breaks

```
version: 1

#
#	Uploaded 01/08/2003 - Passed
#
#	Verion:	1.0 01/08/2003 3:00 MST
#

dn: cn=schema
changetype: modify
add: objectclasses
objectclasses: ( 1.2.840.113556.1.3.23 NAME 'container' SUP top STRUCTURAL MUST ( cn )
X-NDS_CONTAINMENT ( 'country' 'organizationalUnit' 'locality' 'organization' 'domain' ) )

#
# User attributes 1.3.6.1.4.1.63.1000.1.1.1.1
#

dn: cn=schema
changetype: modify
add: attributeTypes
attributeTypes: ( 1.3.6.1.4.1.63.1000.1.1.1.1.6 NAME 'apple-user-homeurl' DESC 'home
directory URL' EQUALITY caseExactIA5Match SUBSTR caseExactIA5SubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 SINGLE-VALUE )
```

LDIF

- Attributes are specified: `attribute_name: attribute_value`
- Lines may not exceed 76 characters in length (and must be folded if they are longer than 76 characters)
- Multi-valued attributes are listed as many times as needed to enumerate all values
- One attribute/value pair per line
- No blank lines are permitted in a record
- All lines must be fully left justified
- Non-ascii data must be base-64 encoded
- File:// urls may be used to reference binary content outside the LDIF file

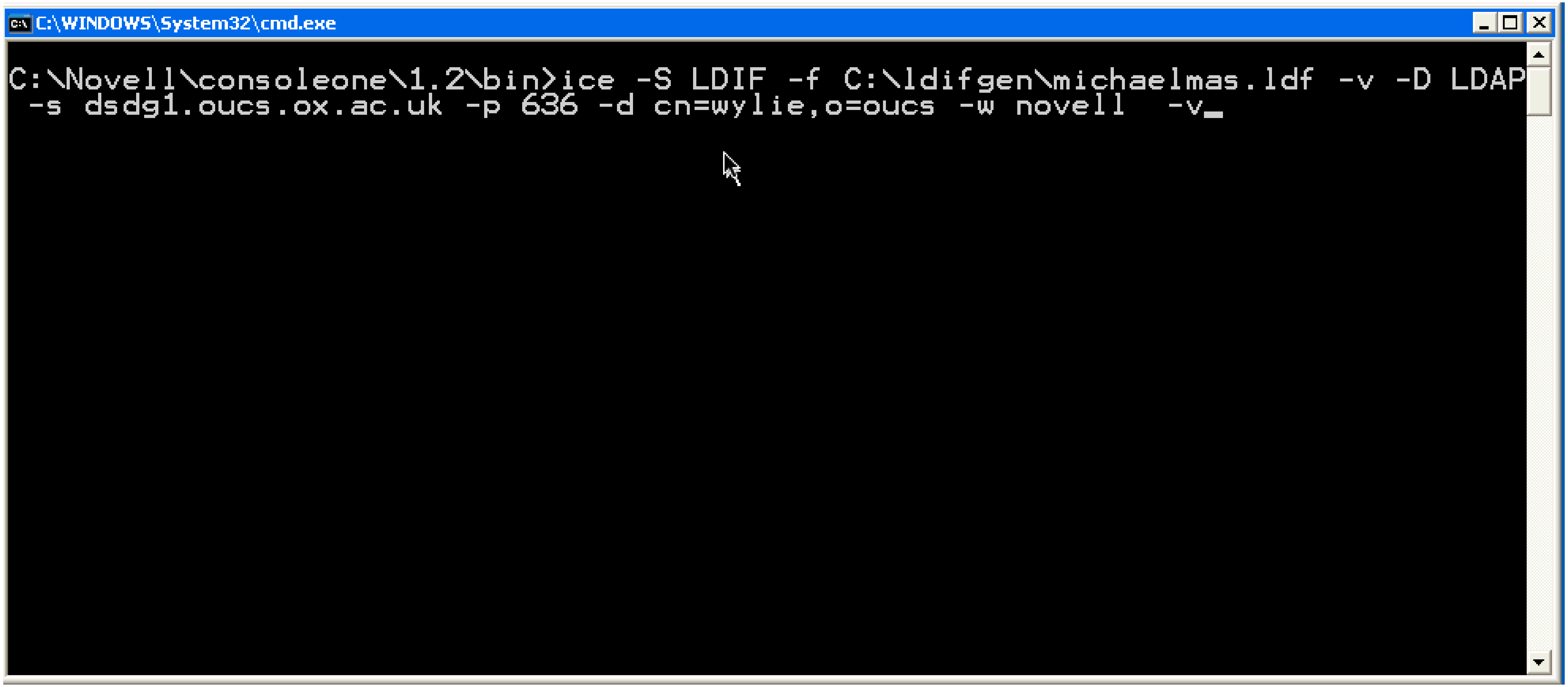
Import Convert Export

- Novell's Import Convert and Export tool

ICE command line demo

- Command line format is:

- ice <general options>
- -S <source handler> <source options>
- -D <destination handler> <destination options>



```
C:\Novell\consoleone\1.2\bin>ice -S LDIF -f C:\ldifgen\michaelmas.ldf -v -D LDAP
 -s dsdg1.oucs.ox.ac.uk -p 636 -d cn=wylie,o=oucs -w novell  -v
```

ICE tips

- Schema mapping problems
- Change entry placement
- Add default attribute values for mandatory attributes
- Omit or Exclude Attributes (using the -o switch)

Speeding up LDIF Imports

(Source:“Using the Novell Import Convert Export Utility, Mclain, N and Harrison, R. Novell Appnotes 2000

- Import to a server with a writeable replica
- Use LBURP (enabled by default in ICE)
- Configure database cache
- Use simple passwords
- Use indices appropriately

Potential problems

- SSL port 636
- Clear text port 389
- Forward references
- Search size and time limits
- Check syntax, try a limited sample first before running a large job
- Use the LDIF error file

References

- Novell's LDAP Developer's Guide, Novell Press 2000.
- eDirectory developer documents
  - http://developer.novell.com/ndk/doc_ndslib.htm
    - eDirectory Core Services
    - eDirectory Schema Reference
    - eDirectory Technical Overview
  - http://developer.novell.com/ndk/doc_cldap.htm
    - LDAP and NDS integration
    - Perl and LDAP
    - http://ldap.perl.org

References

- This talk and links to various relevant articles and tids
  - http://users.ox.ac.uk/~wylie/talks/ldap