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Configuring LDAP on z/VM and Linux

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VM Assist

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IBM DESTINATION z

Presentation Materials

- SHARE Proceedings
- http://linuxvm.org
- http://sites.google.com/site/rsmrcina/presentations

This presentation is generally a follow-on to 'Securing Linux with RACF on z/VM' by Alan Altmark. Provides additional detail about configuring LDAP on z/VM

Agenda

- What is LDAP?
- Background
- General Configuration
- LDAP Startup
- LDAP Checkout
- Setting up Linux on System z to work/play in this environment
  - Load Schemas
  - Setup Admin Access
  - Using z/VM LDAP with Linux
  - Browsing the LDAP Directory
- Other software
  - Apache
  - Browsing/Editing Tools
  - Monitoring
- References

What is LDAP?

- Stands for **L**ightweight **D**irectory **A**ccess **P**rotocol
- A standard method for accessing and updating information in a directory
  - Defined in RFC 1777 and others[1]
- Widely used across all major operating systems and platforms
- The 'directory' can contain almost anything
  - Generally it is data that is read much more than updated
  - Name and address book
  - Organization chart
  - Hardware and/or Software information
- LDAP is optimized for lookup operations

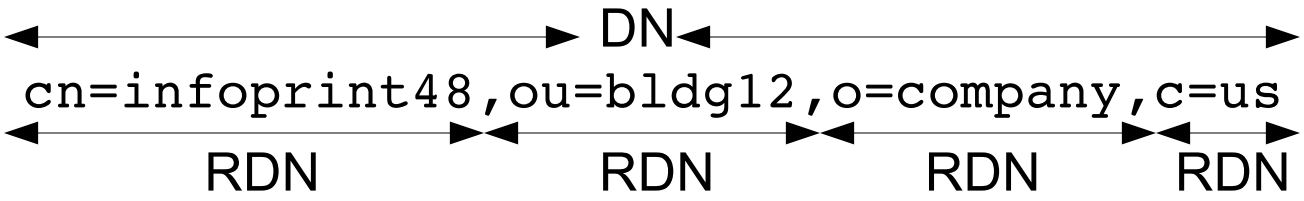
[1]RFCs 1777, 1778, 1779, 1959, 1960, 2251, 2252, 2253, 2254, 2255, 2256, 2829, 2830, 3377

What is LDAP?

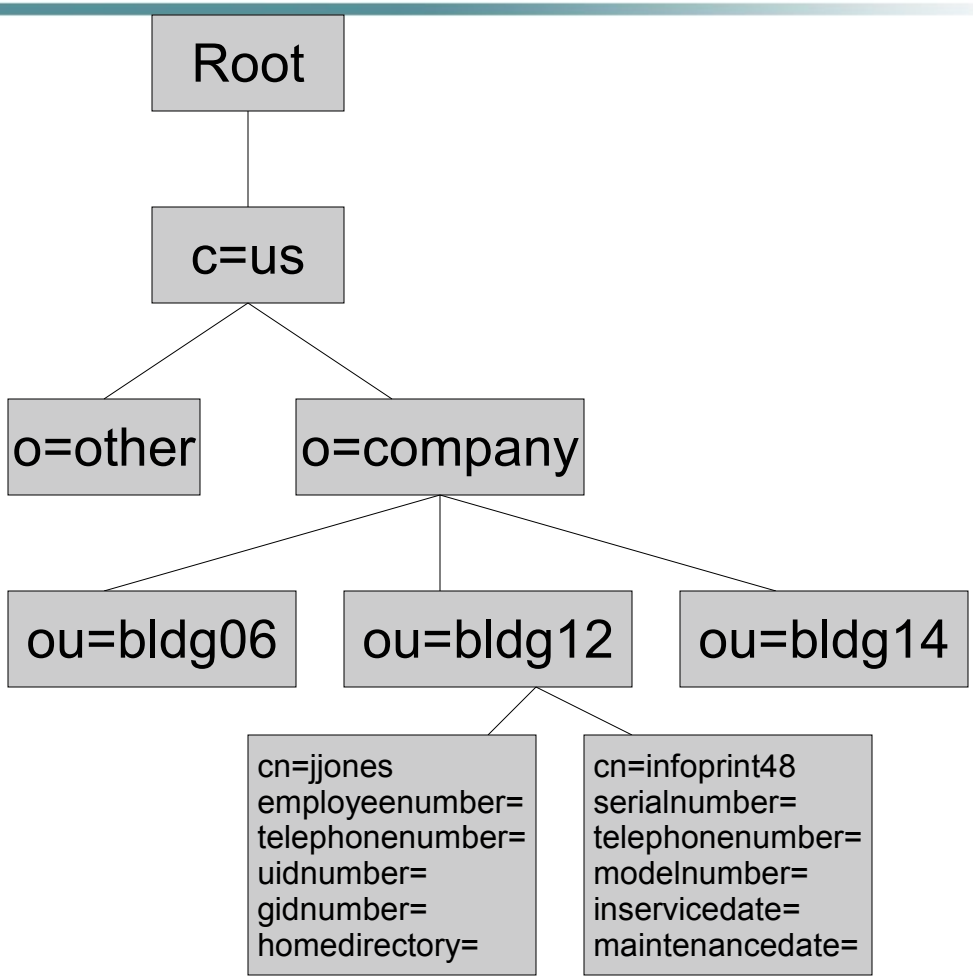
- Consider the phone book approach
- LDAP can search on any object in the directory
- Updating the directory can be limited to administrators
  - And/or controlled via ACLs so that certain people can update specific parts of the directory
- LDAP is the messaging protocol for communicating between clients and servers
  - Defines the API for accessing the directory
  - Does not define the mechanism to be used for backend storage

What is LDAP?

- The directory is made up of objects organized in a tree
  - Called the Directory Information Tree (DIT)
- Similar to DNS, the tree starts at a root and branches out
- Each entry is arranged on the tree via a unique identifier called the distinguished name or DN
- Each component of the DN is called the relative distinguished name or RDN



What is LDAP?


Root
c=us
o=other
o=company
ou=bldg06
ou=bldg12
ou=bldg14
cn=jjones
employeenumber=
telephonenumber=
uidnumber=
gidnumber=
homedirectory=
cn=infoprint48
serialnumber=
telephonenumber=
modelnumber=
inservicedate=
maintenancedate=

What is LDAP?

- More commonly LDAP is used to store and manage security related information
- Available across the network by any machine that needs it
  - Subject, of course, to it's own security controls
- Can be part of an enterprise-wide identity management infrastructure
  - A single point of control for user profile management

Background

- The LDAP Server on z/VM 5.4
  - Ported from IBM Tivoli Directory Server for z/OS V1.10
- Provides
  - Multiple database backends
  - Version 2 and 3 client capability
  - CRAM-MD5, DIGEST-MD5 authentication, Simple authentication
  - Referrals, aliases, directory information access controls
  - Change Logging
  - Client and Server authentication using SSL (V3) and TLS (V1)

Background

- LDBM Backend (Lightweight Database Manager)
  - Simplest setup
  - Performs authentication and password modification with the z/VM RACF Security Server
  - Stores directory information in the Byte File System
  - Keeps it in memory while the LDAP server is running
- SDBM Backend (Secure Database Manager)
  - Provides more comprehensive interface to the z/VM RACF Security Server
  - Allows password phrases up to 100 characters
- GDBM Backend (GNU Database Manager)
  - Used for auditing changes to LDAP server

General Configuration

- Uses TCP ports 389 and 636
  - As coded in the default profile that comes with the TCP/IP stack
- DTCPARMS values can default
  - If using the SDBM backend or the LDBM backend with RACF, set ESM_Enable to YES
- The sample file(s) provided with z/VM contain these statements

General Configuration

- The mount tag is used to set up the ROOT file space for the LDAP server in the BFS
- Use the Parms tag to pass any additional parameters to the LDAP server
  - A different configuration file (the default is DS CONF)
  - Debugging options
  - Listening URL
  - Maintenance mode

General Configuration

- Default values from 'IBM DTCPARMS'

```
:nick.ldap      :type.class
                :name.LDAP daemon
                :command.LDAPSRV
                :runtime.C
                :memory.128M
                :mixedcaseparms.YES
                :mount. /../VMBFS:VMSYS:ROOT/    /   ,
                        /../VMBFS:VMSYS:         /var/ldap
                :ESM_Enable.NO
                :ESM_Racroute.LDAPESM
```

General Configuration

- The LDAP server runs in the LDAPSRV virtual machine by default
- A different machine or additional machine(s) can be used
- A few caveats...
  - Directory Entry
  - BFS File Space creation and proper BFS permissions
  - Mount entry for additional server
  - Parms value to indicate a new listening port

General Configuration

- The LDAP Server uses the Byte File System to store
  - Message catalog files
  - Schema databases and other files for the LDBM and GDBM backends
  - Locations are tailorable

! Tip: Make sure the SFS file servers come up before TCP/IP

- Two Configuration files
  - DS CONF – Primary Operational Parameters
  - DS ENVVARS – Environment Variables
- Copy samples from TCPMAINTs 591 disk to the 198 disk
  - LDAP-DS SCONFIG ----- > DS CONF
  - LDAP-DS SAMPENVR -----> DS ENVVARS

General Configuration

- Tailoring the configuration files
- DS CONF on TCPMAINTs 198
- A different name can be used
  - Indicate this with the -f flag on the LDAPSRV startup PARMS
- Contains four sections
  - Global section
  - LDBM section
  - SDBM section
  - GDBM section

General Configuration

- In the Global Section
  - Set `adminDN` to the Distinguished Name of the administrator

```
adminDN "cn=Admin"
```

  - Set the `adminPW`
- In the LDBM Section
  - Uncomment the `database` keyword

```
database LDBM GLDBLD31
```

  - Uncomment the `suffix` keyword and change the Distinguished Name

```
suffix "o=VMAssist,c=US"
```

General Configuration

- Tailoring the Environment Variables
- DS ENVVARS on TCPMAINTs 198 disk
- Read only at LDAP server startup time
- The following can be customized
  - Message logging options
    - Severity
    - End of an operation
    - Microseconds on timestamp
    - Summary records
  - Timezone
  - Debugging options
  - Trace output file
  - Error messages output
  - Environment variables filename

LDAP Startup

- Log on to LDAPSRV
- Starts up like any other TCP/IP service on z/VM

```
DTCRUN1011I Server started at 10:00:37 on 17 Jun 2008 (Tuesday)
DTCRUN1011I Running "LDAPSRV"
DTCLDP2106I Debug setting: 0
DTCLDP2107I Using server configuration file: DS CONF D1
DTCLDP2107I Using environment variable file: DS ENVVARS D1
DTCLDP2107I Using server module: GLDSRV31 MODULE E2
080617 15:00:41.662708 GLD1003I LDAP server is starting.
080617 15:00:41.667573 GLD1001I LDAP server version 3.18, Service level
OA19849, Build date Mar 22 2007, Time 22:58:27.
080617 15:00:41.671714 GLD1002I LDAP runtime version 3.18, Service
level OA19849, Build date Mar 22 2007, Time 23:25:52.
080617 15:00:42.123599 GLD1023I Processing configuration file
//DD:CONFIG.
080617 15:00:42.186911 GLD1024I Configuration file //DD:CONFIG
processed.
Server Configuration
adminDN: cn=Admin
adminPW: *configured*
allowAnonymousBinds: on
```

LDAP Startup

```
armName: GLDSRVR
audit 1: off
commThreads: 10
db2Terminate: recover
dnCacheSize: 1000
idleConnectionTimeout: 0
listen 1: ldap://:389
logfile: /etc/ldap/gldlog.output
maxConnections: 65535
pcIdleConnectionTimeout: 0
pcThreads: 10
schemaPath: /var/ldap/schema
schemaReplaceByValue: on
securityLabel: off
sendV3StringsOverV2As: UTF-8
serverEtherAddr: 402094000001
serverSysplexGroup: undefined
sizeLimit: 500
srvStartUpError: terminate
supportKrb5: off
```

```
tcpTerminate: recover
timeLimit: 3600
validateIncomingV2Strings: on
database LDBM GLDBLD31 LDBM-0001
changeLoggingParticipant: on
commitCheckpointEntries: 10000
commitCheckpointTOD: 00:00
databaseDirectory: /var/ldap/ldbm
extendedGroupSearching: off
fileTerminate: recover
filterCacheBypassLimit: 100
filterCacheSize: 5000
krbIdentityMap: off
multiServer: off
nativeAuthSubtree: all
nativeUpdateAllowed: on
persistentSearch: off
pwEncryption: none
pwCryptCompat: on
readOnly: off
secretEncryption: none
```

LDAP Startup


```
sizeLimit: 500
suffix 1: o=VMAssist, c=US
timeLimit: 3600
useNativeAuth: off
080617 15:00:58.233324 GLD1191I LDAP server auditing is not available.
080617 15:01:02.186225 GLD1074W Maximum client connections changed from
65535 to 65523.
080617 15:01:02.229484 GLD1004I LDAP server is ready for requests.
080617 15:01:03.491447 GLD1059I Listening for requests on 192.168.1.50
port 389.
080617 15:01:03.552522 GLD1059I Listening for requests on 192.168.240.1
port 389.
080617 15:01:03.564893 GLD1059I Listening for requests on 127.0.0.1
port 389.
```

LDAP Checkout

- Netstat output

```
VM TCP/IP Netstat Level 540       TCP/IP Server Name: TCPIP

Active IPv4 Transmission Blocks:

User Id  Conn    Local Socket            Foreign Socket          State
-------  ----    ------------            --------------          -----
FTPSERVE 1004    *..FTP-C                *..*                    Listen
INTCLIEN 1003    *..TELNET               *..*                    Listen
INTCLIEN 1011    192.168.1.50..TELNET    10.1.0.2..41112         Established
INTCLIEN 1012    192.168.1.50..TELNET    10.1.0.2..41113         Established
SSLSERV  1000    127.0.0.1..1024         *..*                    Listen
SSLSERV  1001    127.0.0.1..1024         127.0.0.1..1025         Established
SSLSERV  1002    *..1026                 *..*                    Listen
LDAPSRV  1007    192.168.1.50..389       *..*                    Listen
LDAPSRV  1006    192.168.240.1..389      *..*                    Listen
LDAPSRV  1008    127.0.0.1..389          *..*                    Listen
```

LDAP Checkout

```
pwd
/var/ldap
$
ls -l
total 0
drwxr-----   1 ldapsrv  system           0 Jun 17 15:04 ldbm
drwxr-----   1 ldapsrv  system           0 Jun 17 15:00 schema
$
ls -l ldbm
total 16
-rw-r-----   1 ldapsrv  system          32 Jun 17 15:00 LDBM-1.db
-rw-r-----   1 ldapsrv  system          24 Jun 17 15:04 LDBM.ckpt
$
ls -l schema
total 56
-rw-r-----   1 ldapsrv  system       25832 Jun 17 15:00 schema.db
$
```

LDAP Checkout

- Issuing LDAP Commands from CMS requires the use of characters that CP will remove from the command
  - eg: “”, @
- We need to tell CP to not perform line editing when we issue LDAP commands

```
CP SET LINEDIT OFF
```

...or...

```
CP TERMINAL ESCAPE OFF    (for the double quotes)
CP TERMINAL CHARDEL OFF   (for the at sign)
```

LDAP Checkout

- Test access to the server
- LDAP utilities are provided for use in CMS
  - ldapsearch (LDAPSRCH), ldapadd (LDAPADD), ldapmodify (LDAPMDFY), ldapcompare (LDAPCMPR), ldapdelete (LDAPDLET), ldapmodrdn (LDAPMRDN)
- We will use the LDAPSRCH command

```
ldapsrch -h 127.0.0.1 -w secret -s base -b "o=VMAssist,c=US" "objectclass=*"
ldap_search: No such object
ldap_search: additional info: R004071 DN 'o=VMAssist,c=US' does not exist
(ldbm_process_request)
```

- ...the database is empty

Load schema

- Schema is the definition of objects and their characteristics
  - eg: the rules that must be followed to form a telephone number
- Required for LDBM backend only
- Link and access TCPMAINTs 591 and 592 disks

```
ldapmdfy -h 127.0.0.1 -D "cn=Admin" -w ****** -f //USRSCHEM.LDIF -u on

ldapmdfy -h 127.0.0.1 -D "cn=Admin" -w ****** -f //IBMSCHEM.LDIF -u on
```

- A single line of output while the command is running

```
modifying entry cn=schema
```

- No error messages indicate a successful execution

Additional Schema

- Provides the LDAP posixAccount object class
  - Allows the use of uidnumber, gidnumber, homedirectory, etc
- Described in *Security on z/VM* redbook
- Download the schema from
  - ftp://www.redbooks.ibm.com/redbooks/REDP0221/nisSchema.2.ldif
- Upload file to z/VM (as NISSCHEM.LDIF)
- Modify line 5
  - From “dn:cn=schema, <suffix>” to “dn:cn=schema”
- Update schema on the LDAP Server

```
ldapmdfy -h 127.0.0.1 -w secret -D “cn=Admin” -f //nisschem.ldif -u on
modifying entry cn=schema
```

Native Authentication

- LDAP Server can authenticate to the Security Server through the LDBM backend
  - By providing Security Server password or pass phrase on a simple bind to the backend
- Information gathered by LDAP server based on DN that performed the bind
- LDAP server configuration options and specific attributes on LDAP user definition
  - useNativeAuth
  - nativeAuthSubtree
  - nativeUpdateAllowed
  - ibm-nativeID or uid

Setup Native Authentication and Admin access

- The LDAP Server virtual machine (LDAPSRV) will be set up as the administrator
  - The user exists on the z/VM system
- In DS CONF – LDBM section
  - Set the following options
  - `nativeUpdateAllowed on`
  - `useNativeAuth All`
  - `pwEncryption SHA`
- On user entries
  - `ibm-nativeID` or `uid`
- Create an **L**DAP **D**ata **I**nterchange **F**ormat file (**LDIF**)
  - A sample exists as SAMPSERV LDIF on TCPMAINTs 591 disk
  - The first two entries of the file were used as examples in the following scenario

Allow password or pass phrase updates in the Security Server via a modify command through the backend.

All or *Selected*, based on setting of nativeAuthSubtree option

Setup admin access

- In a file called ADMIN LDIF

```
dn: o=VMAssist,c=US
objectclass: top
objectclass: organization
o: VMAssist,c=US

dn: cn=LDAPSRV,o=VMAssist,c=US
objectclass: top
objectclass: person
objectclass: ibm-nativeAuthentication
description: Administrator
cn: LDAPSRV
sn: Administrator
ibm-nativeID: LDAPSRV
```

- File actually contains two entries
  - One to add the organization (o=VMAssist,c=US)
  - The other to add the 'user' (cn=LDAPSRV)

Setup admin access

- Use `ldapadd` to insert the entries into the LDBM database

```
ldapadd -h 127.0.0.1 -w secret -D "cn=Admin" -f //admin.ldif
adding new entry o=VMAssist,c=US

adding new entry cn=LDAPSRV,o=VMAssist,c=US
Ready; T=0.22/0.30 10:43:06
```

- Edit DS CONF to change the adminDN and remove the adminPW

```
adminDN "cn=LDAPSRV,o=VMAssist,c=US"
#adminPW ********
```

Setup admin access

- Make sure LDAPSRV can properly access RACF
- In DTCPARMS

```
:ESM_Enable.YES
```

- Issue the following RACF commands

```
rdefine facility ichconn uacc(none)
permit ichconn class(facility) id(ldapsrv) access(update)
setropts raclist(facility) refresh
```

- Restart the LDAP Server

```
RPICMS016I USER/RACF VM Racroute communication path is established.
```

Setup admin access

- Use ldapsrch to verify the entry just added

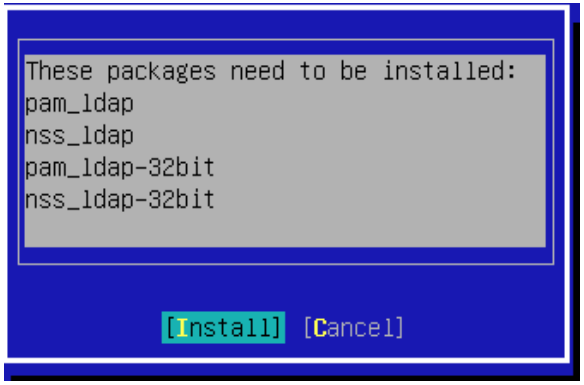
```
ldapsrch -h 127.0.0.1 -w vmpass -D "cn=LDAPSRV,o=VMAssist,c=US"
 -b "o=VMAssist,c=US" "(cn=LDAPSRV)"

cn=LDAPSRV,o=VMAssist,c=US
objectclass=top
objectclass=person
objectclass=ibm-nativeAuthentication
description=Administrator
cn=LDAPSRV
sn=Administrator
ibm-nativeid=LDAPSRV
```

Using z/VM LDAP with Linux

- LDAP provides a way to keep a repository of security information in a centralized place
  - Previously this could have been done with NIS
- The LDAP Server running on z/VM
  - Brings the power and capabilities of RACF to security management on Linux
  - LDAP clients (virtual machines or real machines) can authenticate with RACF
  - Passwords can be synchronized with z/VM

Using z/VM LDAP with Linux

- Prerequisite software
  - openldap2-client, pam-ldap, nss-ldap, +32-bit versions and yast2-ldap
- While configuring the LDAP client, if the prereq software is not installed, YaST will perform the install automatically



Using z/VM LDAP with Linux

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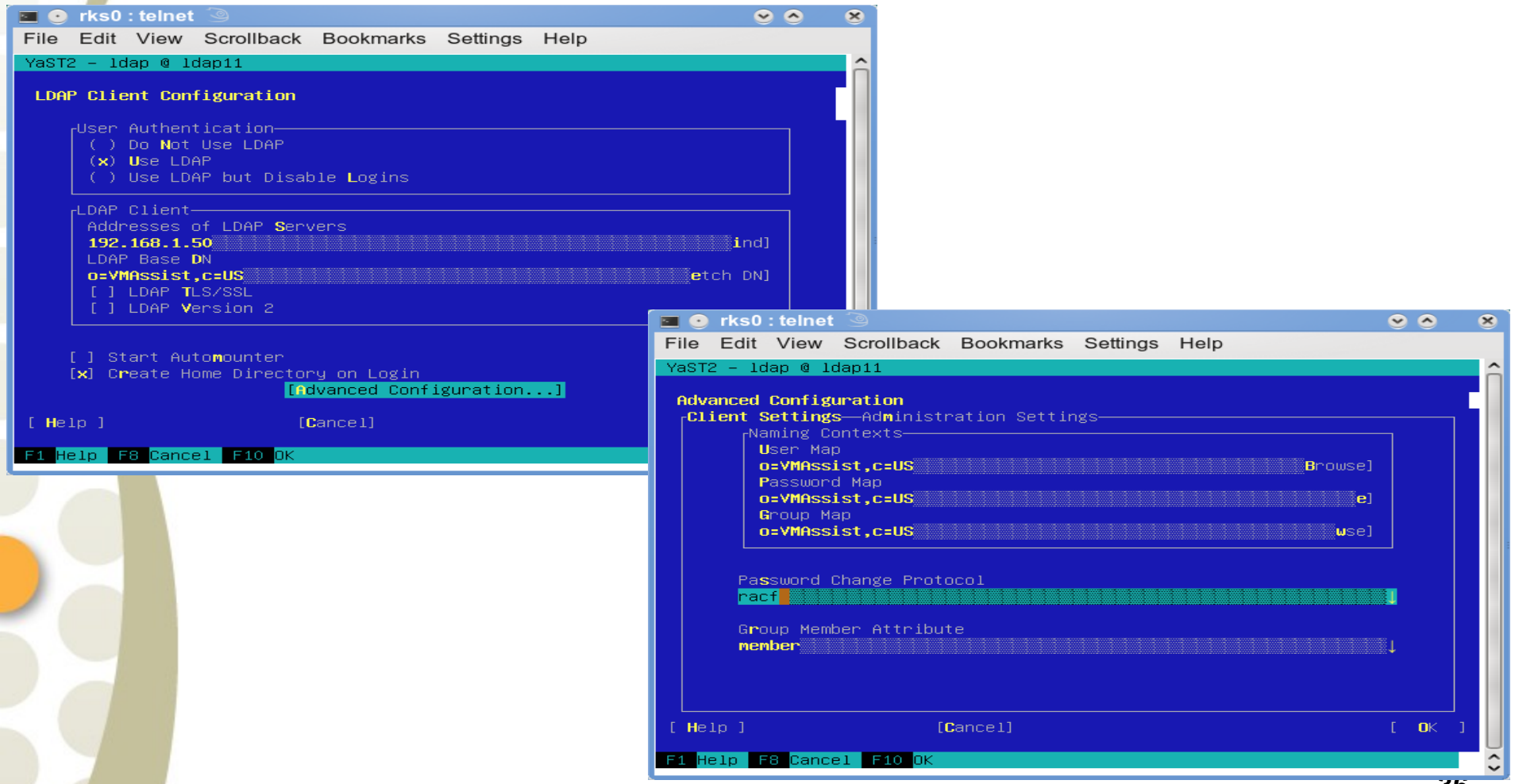
- Configure LDAP client with YaST



Using z/VM LDAP with Linux

- Review /etc/ldap.conf

```
Host                            192.168.1.50
base                            o=VMAssist,c=US
bind_policy                     soft
pam_lookup_policy               yes
pam_password                    racf
nss_initgroups_ignoreusers          root,ldap
nss_schema                      rfc2307bis
nss_map_attribute               uniqueMember member
ssl                             no
ldap_version                    3
pam_filter                      objectClass=posixAccount
tls_checkpeer                   no
```

Using z/VM LDAP with Linux

- YaST did not add the following to ldap.conf

```
binddn cn=LDAPSRV,o=VMAssist,c=US
bindpw vmpass
nss_base_passwd o=VMAssist,c=US
nss_base_shadow o=VMAssist,c=US
nss_base_group  o=VMAssist,c=US
```

- These entries are very critical to the operation of the LDAP client
- No other LDAP client config changes required
  - ...on SLES 11
  - SLES 10 SP2 required additional changes
    - SHARE 111 or 112 presentations
    - zJournal article “Configuring Linux to Authenticate to the z/VM LDAP Server” April/May, 2009

Using z/VM LDAP with Linux

- Add Linux user to RACF

```
RAC ADDUSER RKS1 PASSWORD(PWORD)
```

- Create LDIF file to add Linux user to LDBM database

```
dn: cn=RKS1,o=VMAssist,c=US
objectclass: person
objectclass: ibm-nativeAuthentication
objectclass: posixAccount
description: Rich Smrcina
telephoneNumber: 414-491-6001
uidnumber: 2000
gidnumber: 100
uid: rks1
homedirectory: /home/rks1
loginshell: /bin/bash
cn: Rich
sn: Smrcina
ibm-nativeId: RKS1
```

Using z/VM LDAP with Linux

- Add the entry

```
ldapadd -h 127.0.0.1 -w vmpass -D "cn=LDAPSRV,o=VMAssist,c=US"
 -f //rks1.ldif
adding new entry cn=RKS1,o=VMAssist,c=US
```

- Check it...

```
ldapsrch -h 127.0.0.1 -w vmpass -D "cn=LDAPSRV,o=VMAssist,c=US"
 -b "o=VMAssist,c=US" "(cn=RKS1)"
cn=RKS1,o=VMAssist,c=US
objectclass=person
objectclass=ibm-nativeAuthentication
objectclass=posixAccount
objectclass=top
description=Rich Smrcina
telephonenumber=414-491-6001
uidnumber=2000
gidnumber=100
uid=rks1
homedirectory=/home/rks1
loginshell=/bin/bash
...
```

Using z/VM LDAP with Linux


```
rks0@laptop:~> telnet 192.168.240.20
Trying 192.168.240.20...
Connected to 192.168.240.20.
Escape character is '^]'.
Welcome to SUSE Linux Enterprise Server 11 (s390x) - Kernel
2.6.27.19-5-default(2).

ldap11 login: rks1
Password:
Creating directory '/home/rks1'.
Creating directory '/home/rks1/bin'.
Creating directory '/home/rks1/.fonts'.
Creating directory '/home/rks1/.mozilla'.
Directory: /home/rks1
Wed Aug 19 11:07:14 CDT 2009
rks1@ldap11:~> id
uid=2000(rks1) gid=100(users) groups=100(users)
```

Using z/VM LDAP with Linux


```
rks0@laptop:~> ssh rks1@192.168.240.20
Password:
Last login: Wed Aug 19 11:07:03 2009 from 192.168.1.101
rks1@ldap11:~> id
uid=2000(rks1) gid=100(users) groups=100(users)
rks1@ldap11:~> ll
total 4
drwxr-xr-x 2 rks1 users 4096 2009-08-19 11:07 bin
```

Using z/VM LDAP with Linux

```
rks0@laptop:~> ftp 192.168.240.20
Connected to 192.168.240.20.
220 (vsFTPd 2.0.7)
Name (192.168.240.20:rks0): rks1
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> dir
229 Entering Extended Passive Mode (|||30082|)
150 Here comes the directory listing.
drwxr-xr-x    2 2000     100          4096 Aug 19 16:07 bin
226 Directory send OK.
```

- Log file entry from FTP login

```
Aug 19 11:28:20 ldap11 vsftpd: Wed Aug 19 11:28:20 2009 [pid 22971]
[rks1] OK LOGIN: Client "192.168.1.101"
```

Browsing the LDAP Directory

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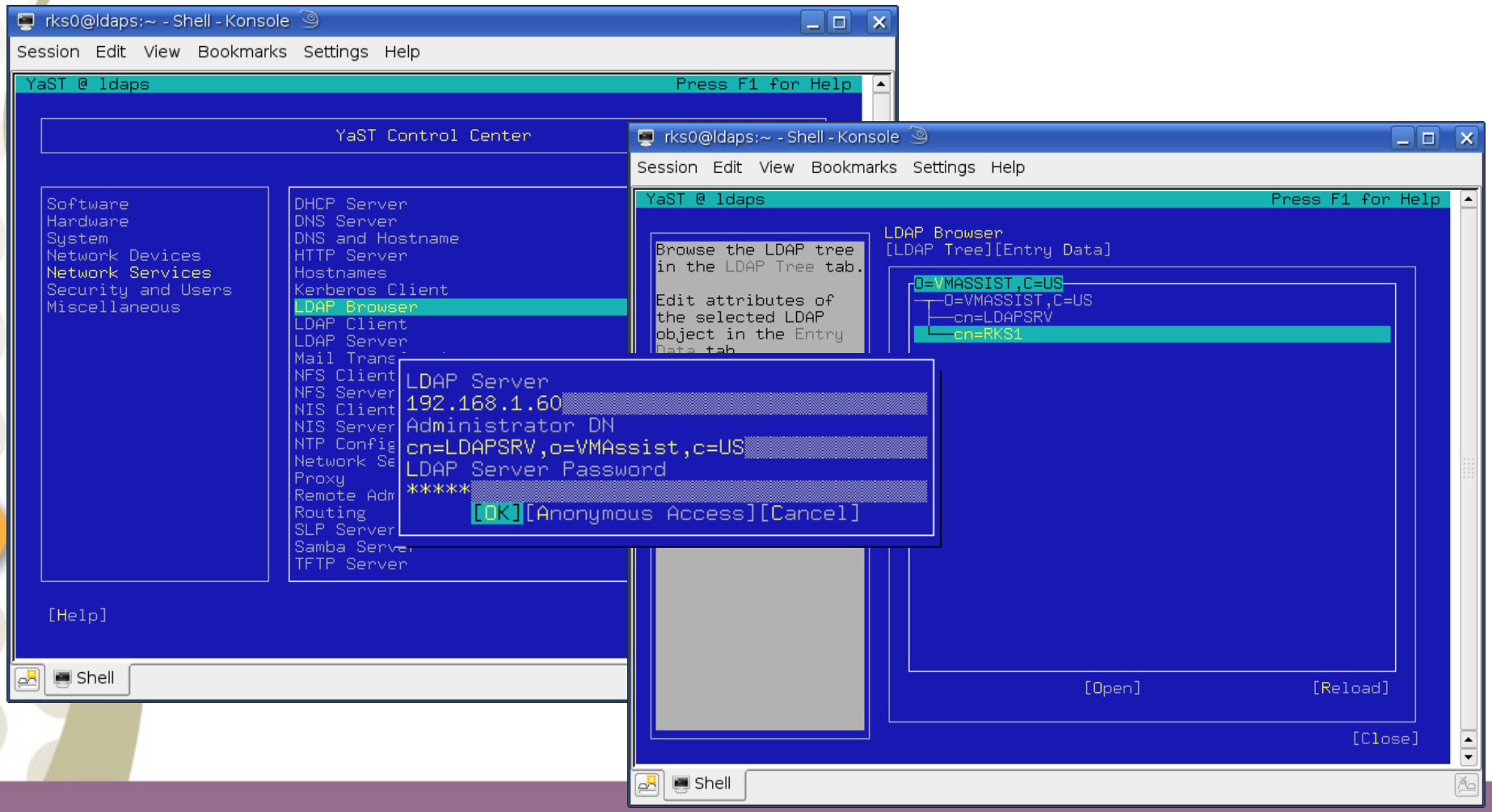
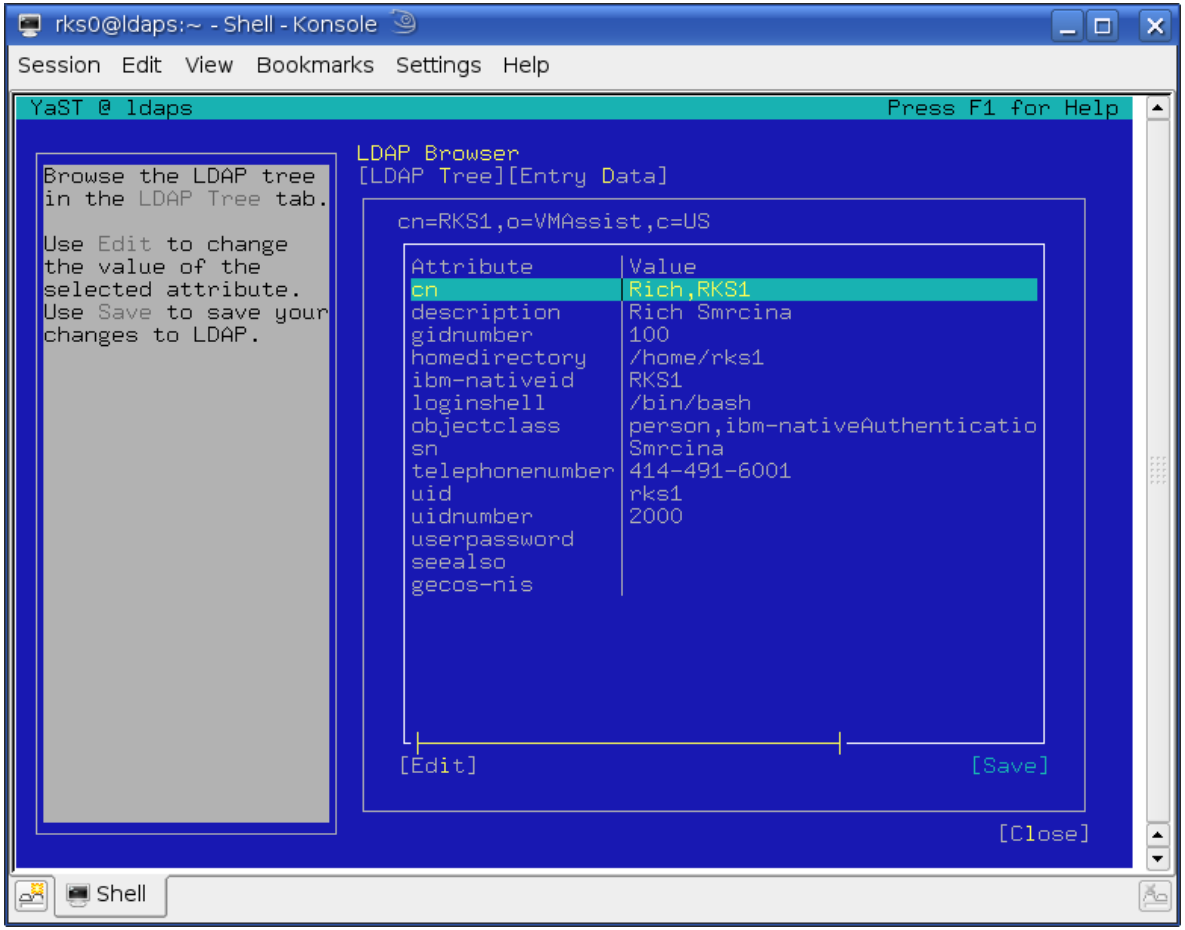
- With YaST



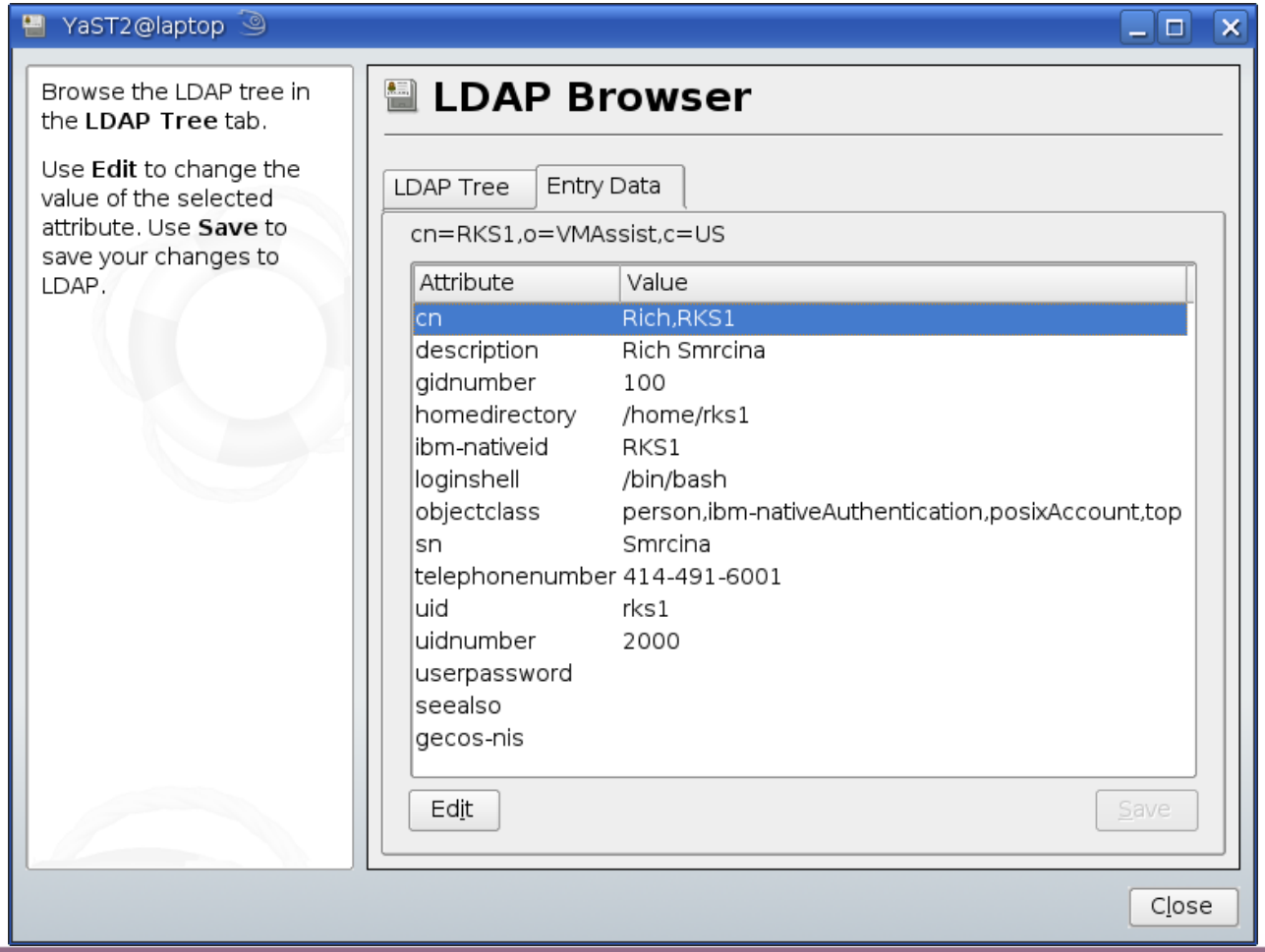
Browsing the LDAP Directory

- With YaST



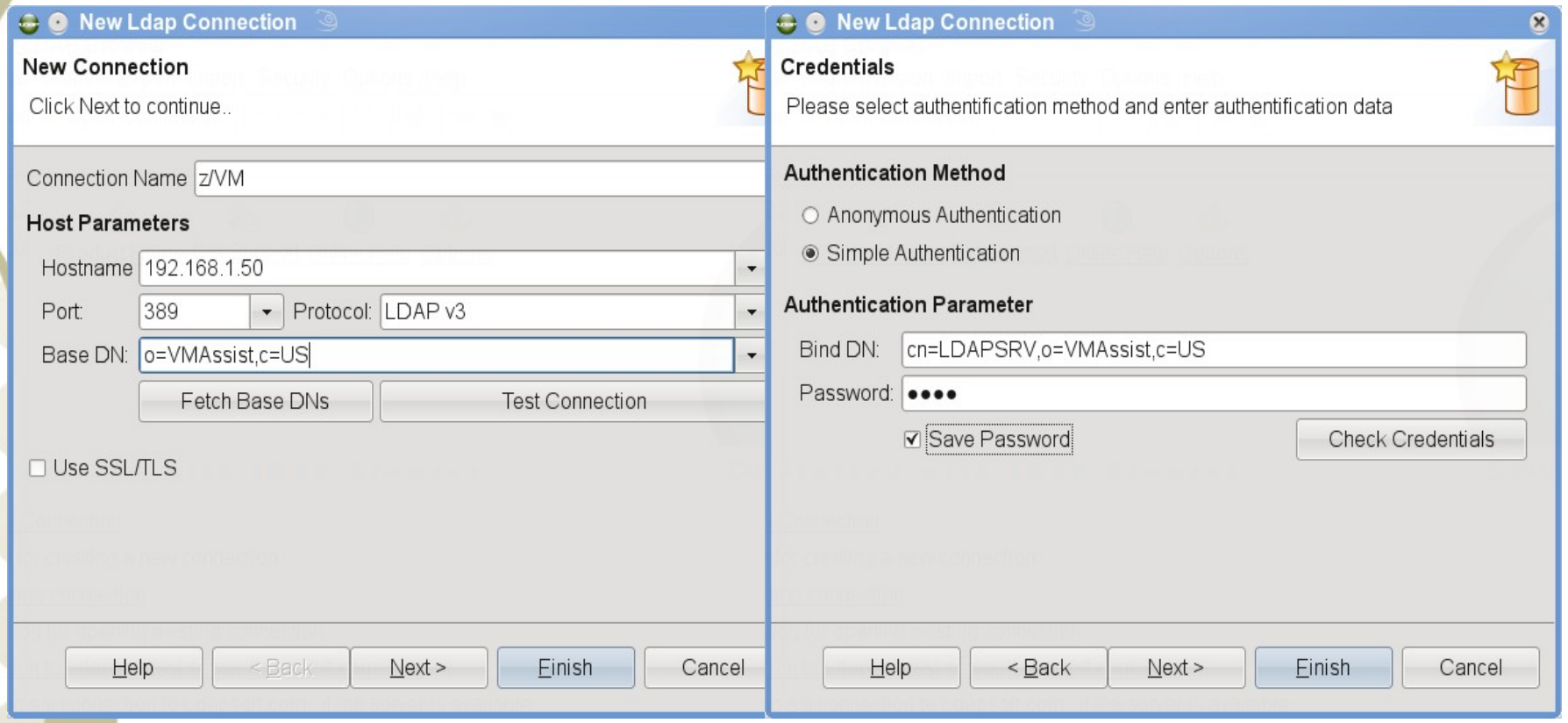
Browsing the LDAP Directory

- With YaST2



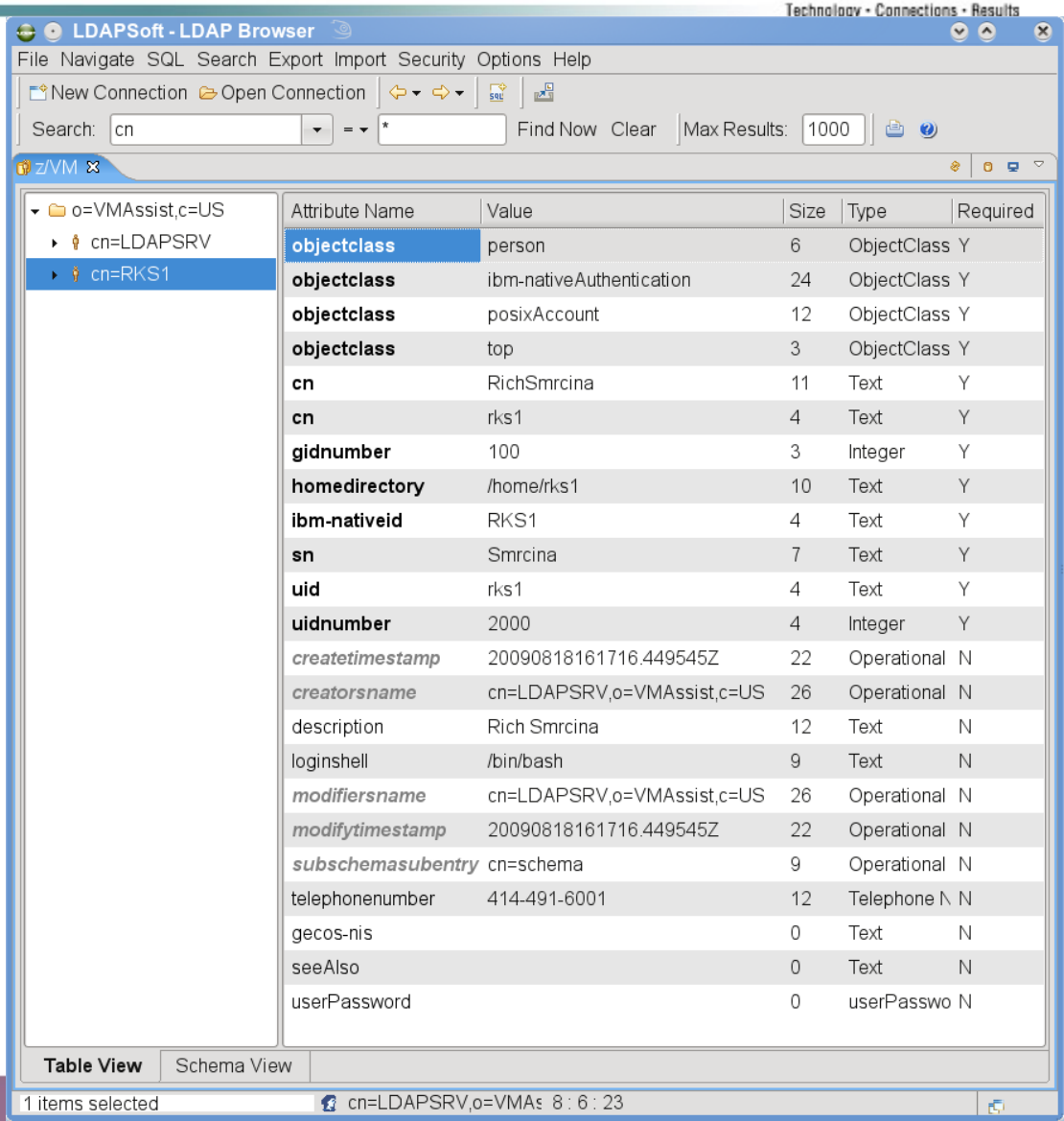
Browsing the LDAP Directory

- *LDAP Browser* from LDAPSoft (http://www.ldapsoft.com)



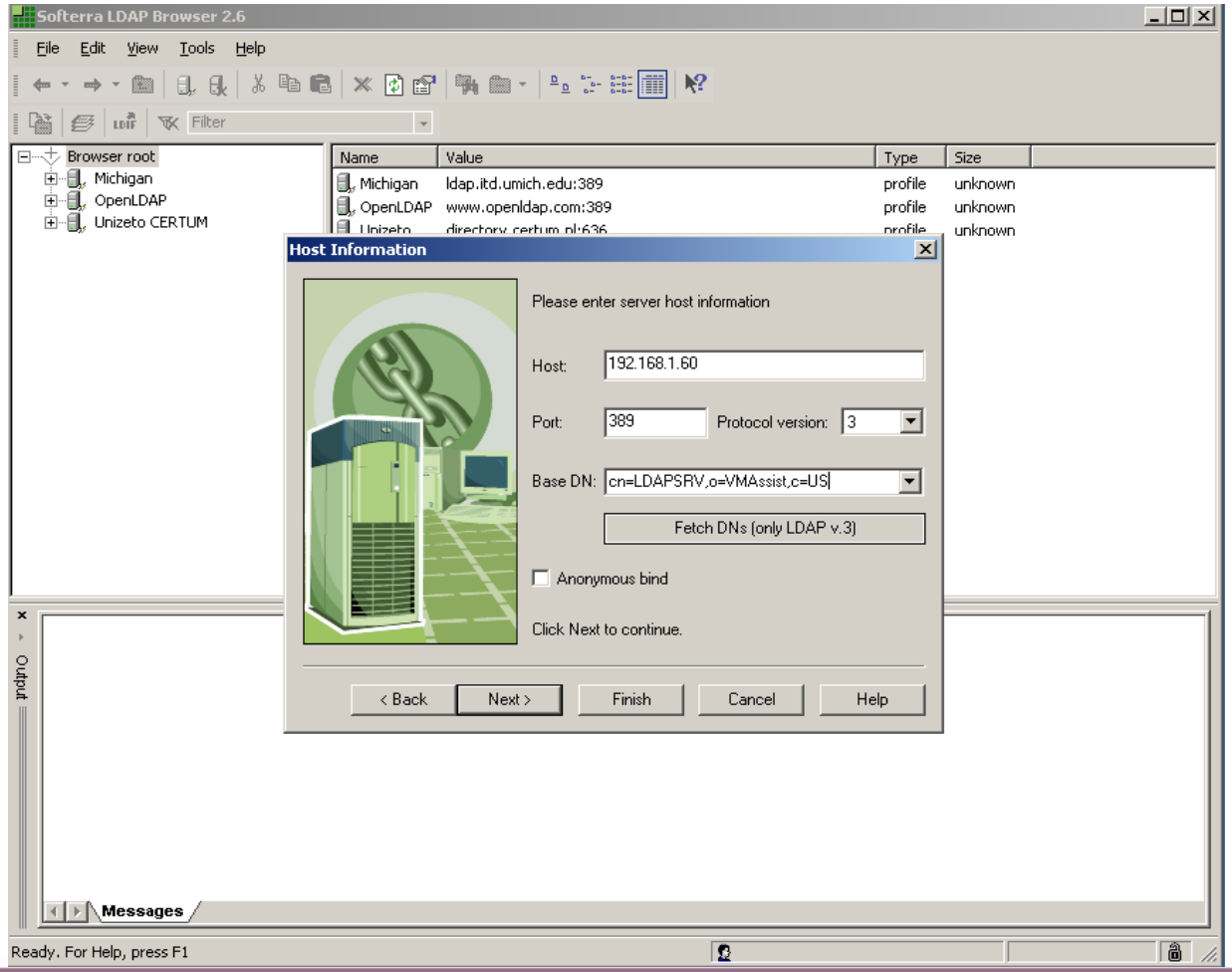
Browsing the LDAP Directory

- Comes in Windows and Linux flavors
- Provides an SQL interface and LDIF import and export
- A commercial product is available that provides editing



Browsing the LDAP Directory

- Softerra LDAP Browser (http://www.ldapbrowser.com)



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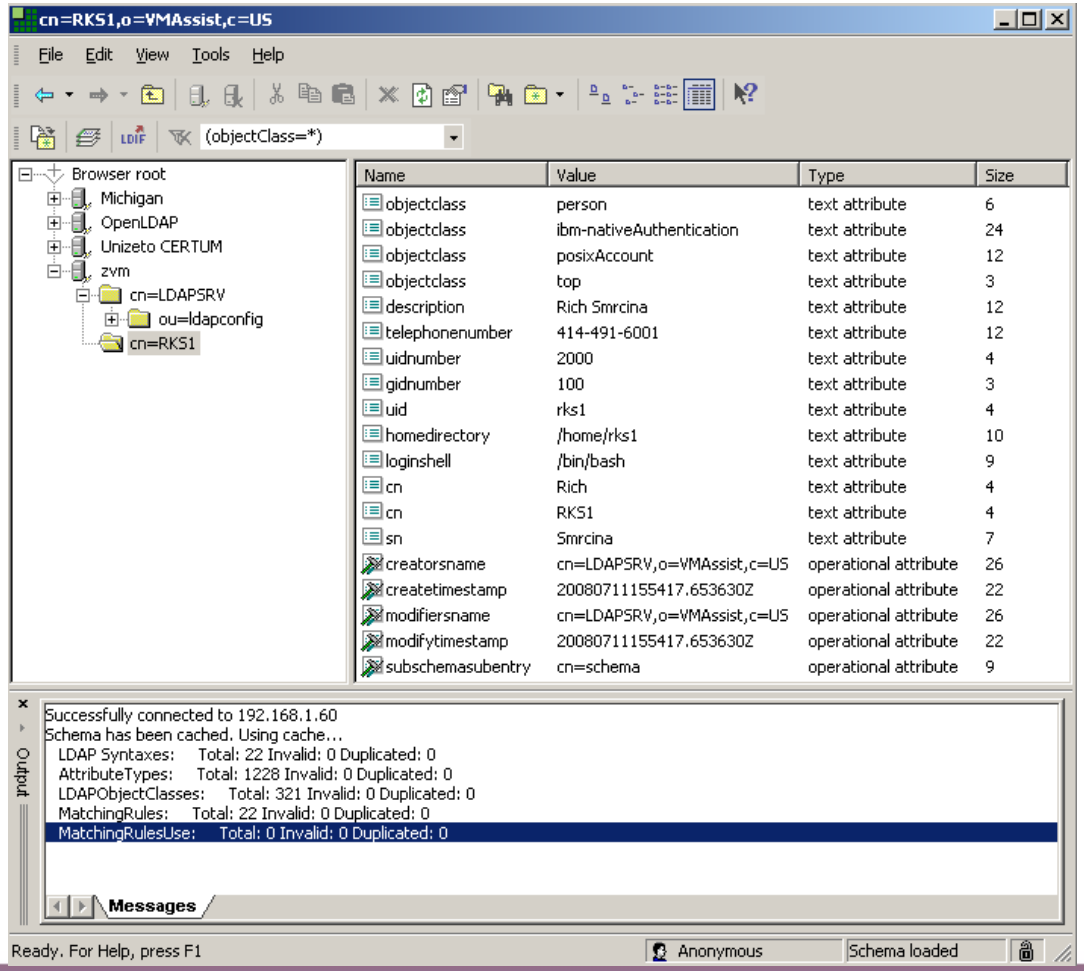


Setting up other software - Apache

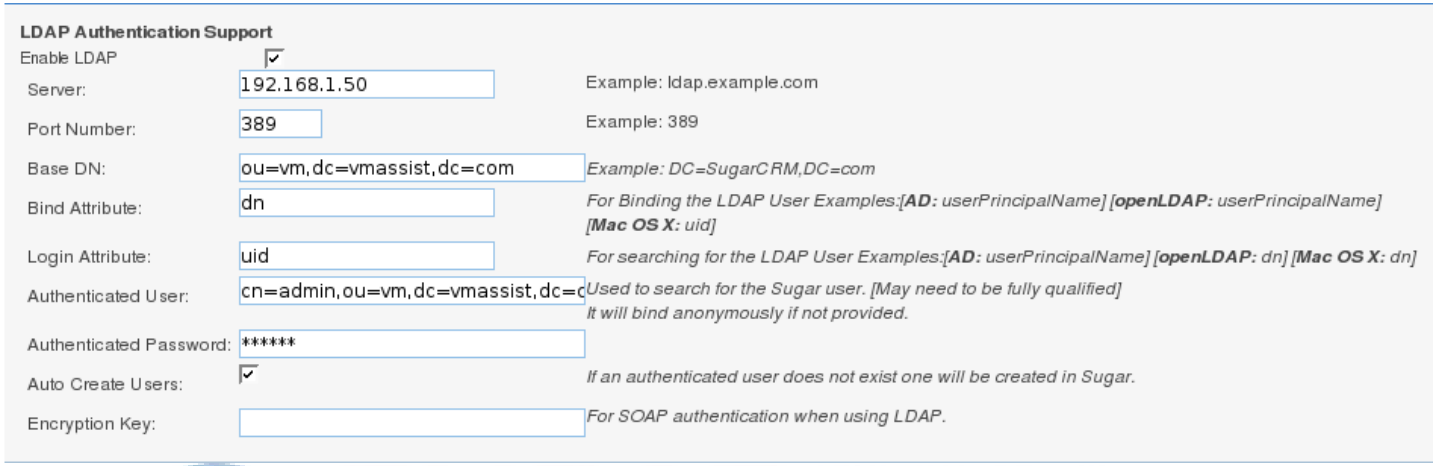
- In /etc/sysconfig/apache2 add to `APACHE_MODULES= ldap authnz_ldap`
- In the Apache configuration

```
ScriptAlias /hobbit-seccgi/ "/home/hobbit/cgi-secure/"
Directory "/home/hobbit/cgi-secure">
    AllowOverride None
    Options ExecCGI Includes
    Order allow,deny
    Allow from all

    AuthType Basic
    AuthName "Hobbit Administration"
    AuthBasicProvider ldap
    AuthzLDAPAuthoritative off
    AuthLDAPBindDN cn=LDAPSRV,o=VMAssist,c=US
    AuthLDAPBindPassword ********
    AuthLDAPURL ldap://192.168.1.60/o=VMAssist,c=US?uid?sub NONE

    Require valid-user
</Directory>
```

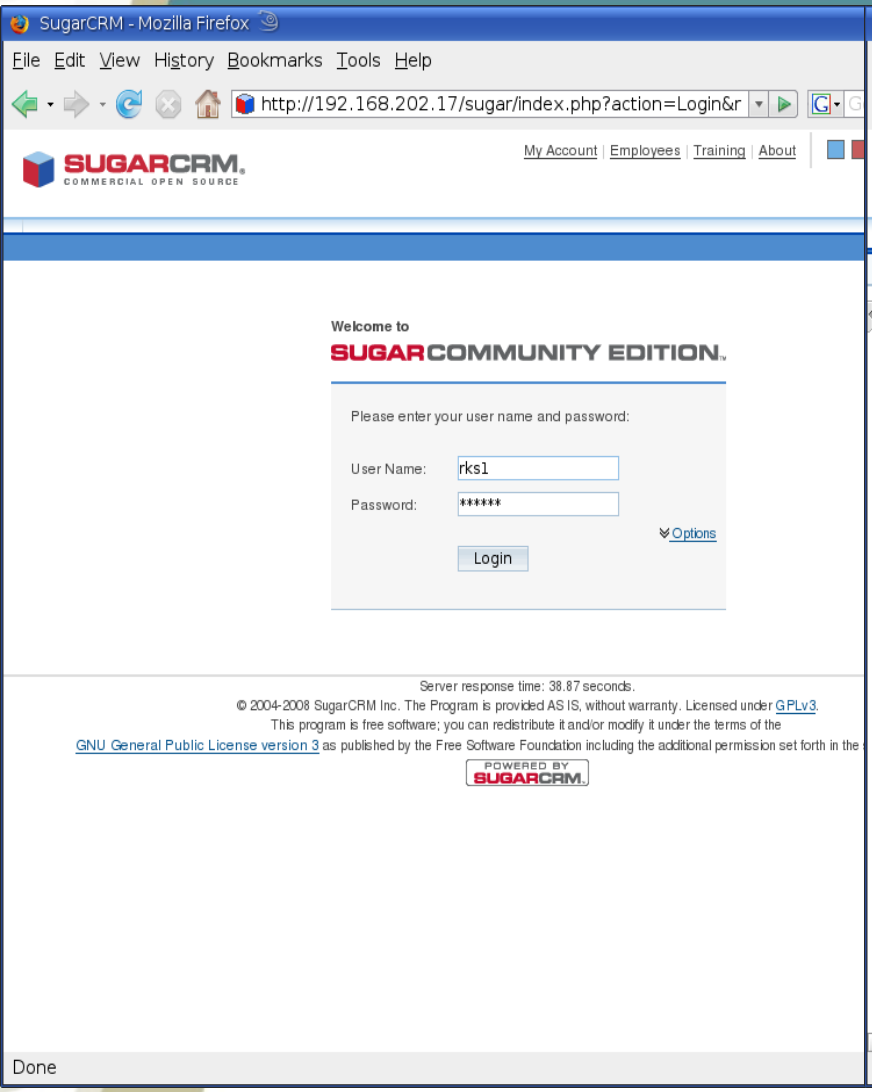
The Apache Software Foundation
http://www.apache.org/

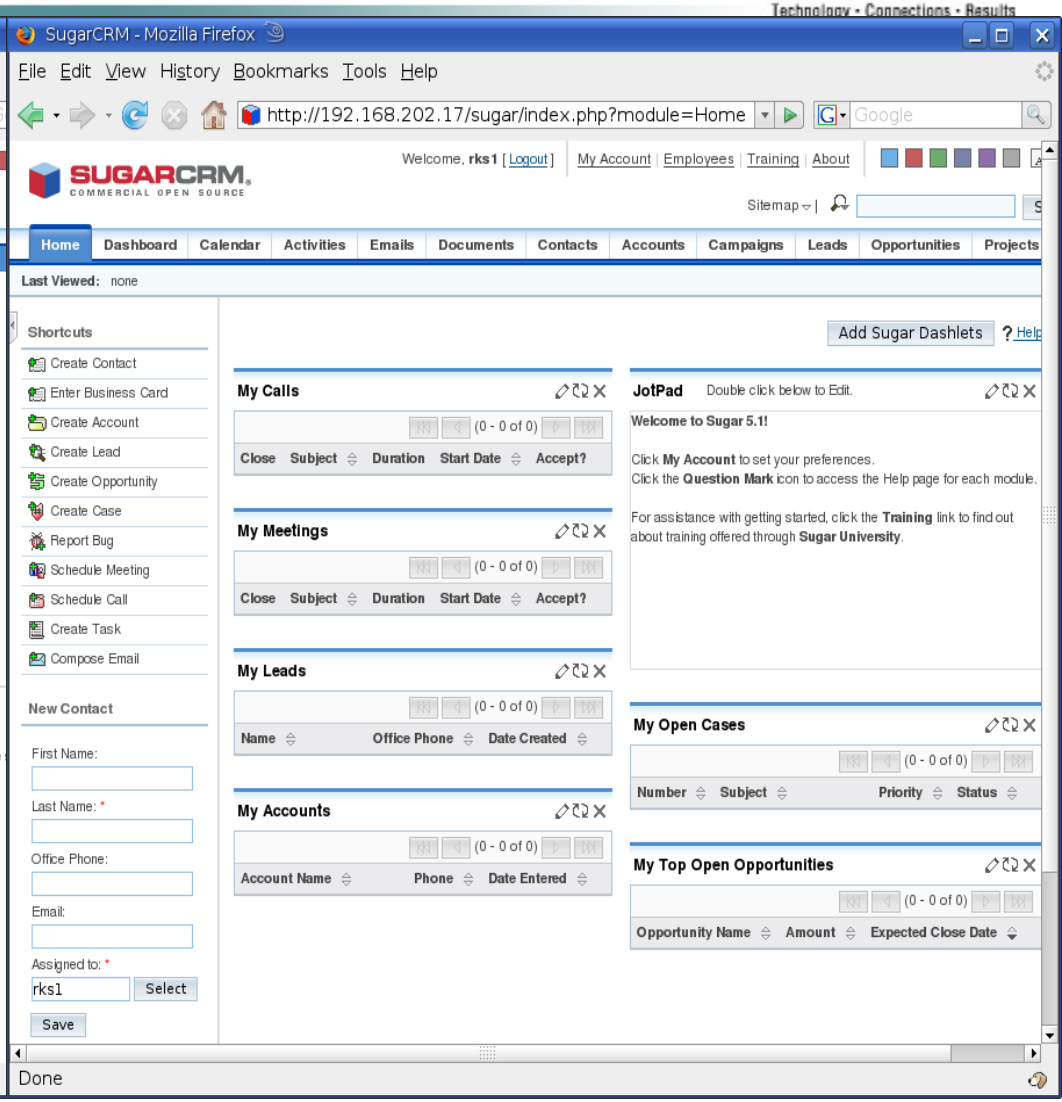
Setting up other software - SugarCRM

- SugarCRM is an open source customer resource management (CRM) package
- It uses the LAMP (**L**inux, **A**pache, **M**ySQL, **P**HP) software stack
- Sugar offers an LDAP authentication option
  - In System Settings



Setting up other software - SugarCRM





Monitoring

- LDAP Server keep statistics during it's operation
- An LDAP Search can be used to collect the statistics

```
ldapsrch -h 127.0.0.1 -s base -b cn=monitor "(objectclass=*)"
```

- Monitor stats can also be collected using SMSG

```
SMSG LDAPSRV DISPLAY MONITOR
```

- Stats can be reset via SMSG

```
SMSG LDAPSRV RESET MONITOR
```

- Statistics are not available over SNMP

Monitoring

- Format of the statistics

```
ldapsrch -h 127.0.0.1 -s base -b cn=monitor "(objectclass=*)"
cn=monitor
version=z/VM Version 5 Release 3 IBM LDAP Server
livethreads=10
maxconnections=65523
sysmaxconnections=65535
totalconnections=29
currentconnections=2
maxreachedconnections=5
opsinitiated=81
opscompleted=80
abandonsrequested=4
abandonscompleted=4
addsrequested=0
addscompleted=0
bindsrequested=25
bindscompleted=25
comparesrequested=0
comparescompleted=0
deletesrequested=0
deletescompleted=0
extopsrequested=0
modifiesrequested=0
modifiescompleted=0
modifydnsrequested=0
modifydnscompleted=0
searchesrequested=31
searchescompleted=30
unbindsrequested=21
unbindscompleted=21
unknownopsrequested=0
unknownopscompleted=0
entriessent=17
bytessent=5992
searchreferencessent=0
currenttime=Sat Jul 26 02:34:13.340516 2008
starttime=Sat Jul 26 01:15:05.412192 2008
resettime=Sat Jul 26 01:15:05.412192 2008
resets=0
```

Monitoring

- Format of the statistics

```
smsg ldapsrv display monitor
Ready; T=0.01/0.01 21:45:22
             Monitor Statistics
             ------------------

 Server Version:       z/VM Version 5 Release 3 IBM
                       LDAP Server
 Current Time:         Sat Jul 26 02:45:22.575461 2008
 Start Time:           Sat Jul 26 01:15:05.412192 2008
 Last Reset Time:      Sat Jul 26 01:15:05.412192 2008
 Number of Resets:     0

 Server Totals:
 --------------

 Description                    Count
 -------------------------------------
 Config Max Connections         65523
 System Max Connections         65535
 Total Connections                 31
 Current Connections                1
 MaxReached Connections             5
```

Operating the LDAP Server

- Startup
  - TCP/IP will start it
- Shutdown

```
SMSG LDAPSRV SHUTDOWN
090822 13:16:35.083425 GLD1007I LDAP server is stopping.
090822 13:16:35.234857 GLD6051I No database changes to commit
for LDBM backend named LDBM-0001.

Options Report for Enclave main 08/22/09 8:16:35 AM
Language Environment V01 R09.00
…

DTCRUN1014I Server ended normally at 08:16:35 on 22 Aug 2009
(Saturday)
RPICMS017I USER/RACF VM Racroute communication path has been
terminated.
```

- Does not listen to the shutdown signal

Operating the LDAP Server

- The SMSG interface also provides the following
  - Auditing Controls
  - Setting the backends to read only or read-write
  - Commit changes
  - Set debugging levels
  - Display LDAP Server information
  - Logging control (on/off)
  - Set normal or maintenance mode
  - Initialize SSL environment
  - Reset counters

References

- z/VM V5R4.0 TCP/IP Planning and Customization - SC24-6125
- z/VM V5R4.0 TCP/IP LDAP Administration Guide - SC24-6140
- z/VM V5R4.0 TCP/IP User's Guide - SC24-6127
- Essential System Administration, Æleen Frisch
  - 3rd Edition, August 2002, Published by O'Reilly
- LDAP System Administration, Gerald Carter
  - March 2003, Published by O'Reilly
- Redbook: Security on z/VM - SG24-7471
- Redbook: Understanding LDAP - SG24-4986

Questions?

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