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Configuring LDAP on z/VM and Linux

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VM Assist

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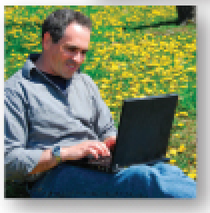
IBM DESTINATION z



Presentation Materials

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

Agenda

- 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
  - SugarCRM
  - z/VSE LDAP Client
  - Browsing/Editing Tools
  - Monitoring

Background

- This session is a companion to 9241 '*Securing Linux with RACF on z/VM*' by Alan Altmark
  - We will get into more details about the configuration of LDAP
  - But will not discuss/teach LDAP concepts
- Delivered with z/VM
  - Currently based on IBM Tivoli Directory Server (ITDS) for z/OS 1.10
  - ITDS 1.8 with z/VM 5.3

Background

- 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
  - Simplest setup
  - Can perform 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
  - Provides more comprehensive interface to the z/VM RACF Security Server
  - Allows password and password phrases verified by RACF
- GDBM Backend
  - Used for auditing changes to LDAP server

General Configuration

- TCP/IP Profile

```
PORT
    389   TCP   LDAPSRV               ; LDAP Server
    636   TCP   LDAPSRV  NOAUTOLOG    ; LDAP Server (Secure)

AUTOLOG
    LDAPSRV  0

OBEY
    LDAPSRV
ENDOBEY
```

- The sample profile that comes with z/VM already provides these statements

General Configuration

- LDAP parameters in DTCPARMS

```
:nick.LDAPSRV  :Type.server     :Class.ldap
:nick.ldap     :Type.class
               :ESM_Enable.
               :ESM_Racroute.
               :ESM_Validate.
               :Mixedcaseparms.
               :Mount.
               :Parms.
```

- If using the SDBM backend
(or the LDBM backend with RACF), specify YES for ESM_Enable
  - Other ESM options can then default

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

- The Message catalog files are stored in the ROOT file space
- The Schema databases are stored in the LDAP server users file space (default LDAPSRV)

General Configuration

- 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 administrator password

    ```
    adminPW secret
    ```

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

    ```
    database LDBM GLDBLD31
    ```

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

    ```
    suffix "ou=vm,dc=VMAssist,dc=com"
    ```

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 10:47:17 on 10 Dec 2008 (Wednesday)
DTCRUN1011I Running server command: LDAPSRV
DTCRUN1011I No parameters in use
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
081210 16:47:18.476413 GLD1003I LDAP server is starting.
081210 16:47:18.480935 GLD1001I LDAP server version 3.18, Service level
OA20193, Build date Jun 25 2007, Time 23:43:43.
081210 16:47:18.481765 GLD1002I LDAP runtime version 3.18, Service
level OA19849, Build date Mar 22 2007, Time 23:25:52.
081210 16:47:18.873245 GLD1023I Processing configuration
file //DD:CONFIG.
081210 16:47:19.936295 GLD1024I Configuration file //DD:CONFIG
processed.

Server Configuration
adminDN: cn=Admin
```

LDAP Startup

```
adminDN: cn=Admin
adminPW: *configured*
allowAnonymousBinds: on
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: off
persistentSearch: off
pwEncryption: none
pwCryptCompat: on
readOnly: off
secretEncryption: none
```

LDAP Startup

```
sizeLimit: 500
suffix 1: ou=vm,dc=vmassist,dc=com
timeLimit: 3600
useNativeAuth: off
081210 16:47:24.252327 GLD1191I LDAP server auditing is not available.
081210 16:47:24.965361 GLD1074W Maximum client connections changed from
65535 to 65523.
081210 16:47:25.032070 GLD1004I LDAP server is ready for requests.
081210 16:47:26.090196 GLD1059I Listening for requests on 192.168.1.50
port 389.

081210 16:47:26.163836 GLD1059I Listening for requests on 192.168.202.1
port 389.

081210 16:47:26.177932 GLD1059I Listening for requests on 127.0.0.1
port 389.
```

LDAP Checkout

- Netstat output

```
VM TCP/IP Netstat Level 530

Active IPv4 Transmission Blocks:

User Id  Conn     Local Socket            Foreign Socket          State
---- --  ----     ----- ------            ------- ------          -----
FTPSERVE 1003     *..FTP-C                *..*                    Listen
INTCLIEN 1000     *..TELNET               *..*                    Listen
INTCLIEN 1004     192.168.1.50..TELNET    192.168.1.102..53609    Established
INTCLIEN 1007     192.168.1.50..TELNET    192.168.1.102..44514    Established
INTCLIEN 1012     192.168.1.50..TELNET    192.168.1.102..50912    Established
PERFSVM  1005     *..81                   *..*                    Listen
PERFSVM  1002     192.168.1.50..81        192.168.1.102..44455    Established
PERFSVM  1006     192.168.1.50..81        192.168.1.102..44456    Established
SNMPD    UDP      192.168.1.50..161       *..*                     UDP
SNMPD    UDP      192.168.202.1..161      *..*                     UDP
SNMPD    1001     *..1024                 *..*                    Listen
LDAPSRV  1008     192.168.1.50..389       *..*                    Listen
LDAPSRV  1009     192.168.202.1..389      *..*                    Listen
LDAPSRV  1010     127.0.0.1..389          *..*                    Listen
```

LDAP Checkout

```
pwd
/var/ldap
#
ls -lR

.:
total 0
drwxr-----   1 ldapsrv  system          0 Dec 10 16:47 ldbm
drwxr-----   1 ldapsrv  system          0 Dec 10 18:45 schema

./ldbm:
total 16
-rw-r-----   1 ldapsrv  system         45 Dec 10 16:16 LDBM-1.db
-rw-r-----   1 ldapsrv  system         37 Dec 10 16:47 LDBM.ckpt

./schema:
total 424
-rw-r-----   1 ldapsrv  system     216015 Dec 10 18:45 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 "ou=vm,dc=VMAssist,dc=com"
"objectclass=*"
ldap_search: No such object
ldap_search: additional info: R004071 DN 'ou=vm,dc=vmassist,dc=com' does not
exist (ldbm_process_request)
```

- ...the database is empty

LDAP Checkout

- The same command from Linux

```
> ldapsearch -h 192.168.1.50 -x -w secret -s base -b
"ou=vm,dc=VMAssist,dc=com" "objectclass=*"
# extended LDIF
#
# LDAPv3
# base <ou=vm,dc=vmassist,dc=com> with scope subtree
# filter: objectclass=*
# requesting: ALL
#

# search result
search: 2
result: 32 No such object
text: R004071 DN 'ou=vm,dc=vmassist,dc=com' does not exist
(ldbm_process_request)

# numResponses: 1
```

- ... 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 secret -f //USRSCHEM.LDIF -u on

ldapmdfy -h 127.0.0.1 -D "cn=Admin" -w secret -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
  - SG24-7471
- Get the schema from
  - ftp://www.redbooks.ibm.com/redbooks/REDP0221/nisSchema.2.ldif
- Upload file to z/VM
- Modify line 5
  - From “dn:cn=schema, <suffix>” to “dn:cn=schema”
- Update schema on the LDAP Server

```
ldapmdfy -h 127.0.0.1 -D cn=Admin -w secret -f //NISSCHEM.LDIF -u on
modifying entry cn=schema
```

Setup admin access

- In this simple setup the administrator will be a user called 'Admin'
- 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

Setup admin access

- In a file called ADMIN LDIF

```
dn: ou=vm, dc=vmassist, dc=com
objectclass: top
objectclass: organizationalUnit
ou: vm

dn: cn=Admin, ou=vm, dc=vmassist, dc=com
objectclass: top
objectclass: person
objectclass: organizationalPerson
cn: LDAP Administrator
sn: Administrator
userPassword: secret
```

File actually contains two entries

- One to add the organizational unit (ou=vm, dc=vmassist,dc=com)
- The other to add the adminstrator (cn=Admin)

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 ou=vm, dc=vmassist, dc=com

adding new entry cn=Admin, ou=vm, dc=vmassist, dc=com

Ready; T=0.22/0.30 10:43:06
```

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

```
adminDN "cn=Admin, ou=vm, dc=VMAssist, dc=com"
#adminPW secret
```

- Turn off anonymous binds (optionally)
- Restart the LDAP Server
  - The new adminDN comes out in the configuration summary

Setup admin access

- Use ldapsrch to check on the LDAPSRV entry just made

```
ldapsrch -h 127.0.0.1 -D "cn=Admin,ou=vm,dc=vmassist,dc=com" -w
secret -b "ou=vm,dc=vmassist,dc=com" "(cn=Admin)"
cn=Admin, ou=vm, dc=vmassist, dc=com
objectclass=top
objectclass=person
objectclass=organizationalPerson
cn=LDAP Administrator
cn=Admin
sn=Administrator
userpassword=secret
```

Using z/VM LDAP with Linux

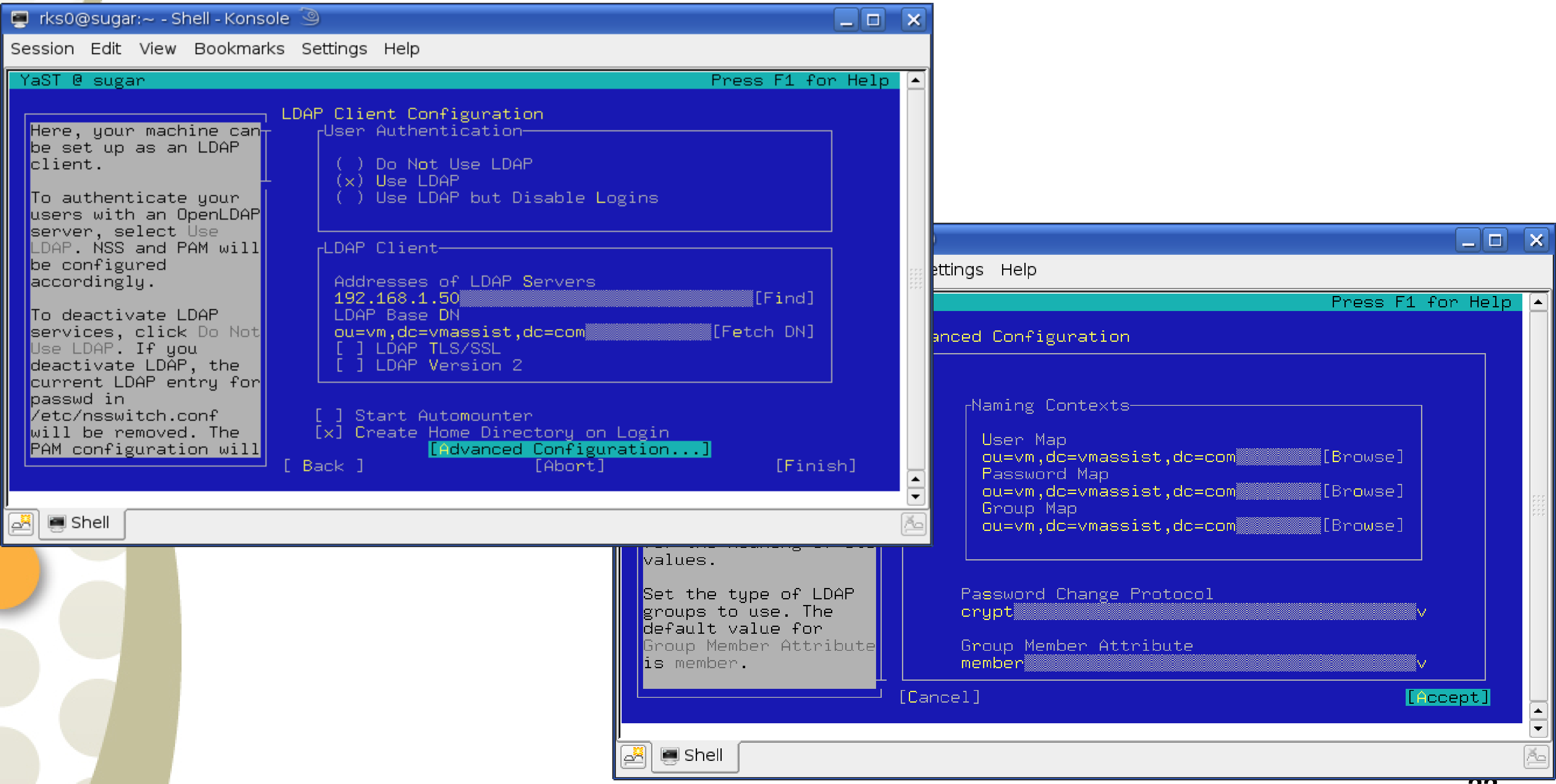
- LDAP provides a way to keep a repository of security information in a centralized place
  - Previously this could have been done with NIS
- The LDAP Server running on z/VM
  - Brings the power and capabilities of RACF to security management on Linux
  - LDAP clients (virtual machines or real machines)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

" Configure LDAP client with YaST



rks0@sugar:~ - Shell - Konsole
Session Edit View Bookmarks Settings Help
Shell

```
YaST @ sugar                                              Press F1 for Help

 Here, your machine can   LDAP Client Configuration
 be set up as an LDAP      User Authentication
 client.
                             ( ) Do Not Use LDAP
 To authenticate your        (x) Use LDAP
 users with an OpenLDAP      ( ) Use LDAP but Disable Logins
 server, select Use
 LDAP. NSS and PAM will    LDAP Client
 be configured
 accordingly.               Addresses of LDAP Servers
                            192.168.1.50                        [Find]
 To deactivate LDAP         LDAP Base DN
 services, click Do Not     ou=vm,dc=vmassist,dc=com            [Fetch DN]
 Use LDAP. If you           [ ] LDAP TLS/SSL
 deactivate LDAP, the       [ ] LDAP Version 2
 current LDAP entry for
 passwd in
 /etc/nsswitch.conf        [ ] Start Automounter
 will be removed. The      [x] Create Home Directory on Login
 PAM configuration will          [Advanced Configuration...]
                          [ Back ]          [Abort]              [Finish]
```

```
                                                          Press F1 for Help
 anced Configuration

        Naming Contexts

          User Map
          ou=vm,dc=vmassist,dc=com          [Browse]
          Password Map
          ou=vm,dc=vmassist,dc=com          [Browse]
          Group Map
          ou=vm,dc=vmassist,dc=com          [Browse]

 values.
                            Password Change Protocol
 Set the type of LDAP       crypt                                  v
 groups to use. The
 default value for
 Group Member Attribute     Group Member Attribute
 is member.                 member                                 v

                         [Cancel]                              [Accept]
```

Using z/VM LDAP with Linux

- Review /etc/ldap.conf

```
host    192.168.1.50
base    ou=vm,dc=vmassist,dc=com
ldap_version    3
bind_policy     soft
binddn  cn=LDAPSRV,o=VMAssist,c=US
bindpw  ********
pam_lookup_policy       yes
pam_password    crypt
ssl     no
nss_map_attribute       uniqueMember member
pam_filter      objectclass=posixAccount
tls_checkpeer   no
```

Using z/VM LDAP with Linux

- YaST should reconfigure several other files
  - /etc/nsswitch.conf, /etc/security/, /etc/pam.d/
  - YaST's modifications needed tweaking
- In /etc/nsswitch.conf
  - The following entries should be modified

```
passwd:   files ldap
group:    files ldap
```

  - Remove the lines

```
passwd_compat:   ldap
group_compat:    ldap
```

- In /etc/security/pam_unix2.conf
  - Remove the `ldap` values from

```
auth:
account:
password:
```

  - Leave the lines in place

Using z/VM LDAP with Linux

- In /etc/pam.d/common-auth
  - Insert

```
auth      sufficient      pam_ldap.so
```

  - Before

```
auth      required        pam_unix2.so
```

- In /etc/pam.d/common-account
  - Insert

```
account   sufficient      pam_ldap.so
```

  - Before

```
account   required        pam_unix2.so
```

Using z/VM LDAP with Linux

- In /etc/pam.d/common-password
  - Insert

```
password   sufficient     pam_ldap.so
```

  - Before

```
password   required       pam_unix2.so
```

- In /etc/pam.d/common-session
  - Insert

```
session    sufficient     pam_ldap.so
```

  - Before

```
session    required       pam_unix2.so
```

- These files are *included* by PAM service configuration files in the same directory (login, ssh, passwd)

Using z/VM LDAP with Linux

- Create LDIF file to add Linux user to LDBM database

```
dn: cn=RKS1,ou=vm,dc=VMAssist,dc=US
objectclass: person
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
userPassword: secret
```

- Add the entry

```
ldapadd -h 127.0.0.1 -w secret -D "cn=admin,ou=vm,dc=VMAssist,dc=US"
 -f //rks1.ldif
adding new entry cn=RKS1, ou=vm, dc=VMAssist, dc=US
```

Using z/VM LDAP with Linux

```
rks0@laptop:~> telnet 192.168.202.17
Trying 192.168.202.17...
Connected to 192.168.202.17.
Escape character is '^]'.
Welcome to SUSE Linux Enterprise Server 10 SP2 (s390x) - Kernel
2.6.16.60-0.21-default (1).

sugar login: rks1
Password:
Creating directory '/home/rks1'.
Creating directory '/home/rks1/.fonts'.
Creating directory '/home/rks1/.mozilla'.
Creating directory '/home/rks1/.xemacs'.
Creating directory '/home/rks1/bin'.
Creating directory '/home/rks1/Documents'.
Creating directory '/home/rks1/public_html'.
rks1@sugar:~> pwd
/home/rks1
rks1@sugar:~> id
uid=2000(rks1) gid=100(users) groups=100(users)
```

Using z/VM LDAP with Linux

```
rks0@desktop:~> ssh rks1@192.168.202.17
Password:
rks1@sugar:~> id
uid=2000(rks1) gid=100(users) groups=100(users)
rks1@sugar:~> ll
total 12
drwxr-xr-x 2 rks1 users 4096 2009-01-05 11:43 bin
drwxr-xr-x 2 rks1 users 4096 2009-01-05 11:43 Documents
drwxr-xr-x 2 rks1 users 4096 2009-01-05 11:43 public_html
```

Using z/VM LDAP with Linux

- The vsftpd pam configuration file does not participate in the 'common' configuration that is made available by SUSE
- It will need to be modified manually in order to authenticate with LDAP
- In /etc/pam.d/vsftpd
  - Insert

```
auth      sufficient     pam_ldap.so
```

  - Before

```
auth      required       pam_unix2.so
```

  - Insert

```
account   sufficient     pam_ldap.so
```

  - Before

```
account   required       pam_unix2.so
```

Using z/VM LDAP with Linux

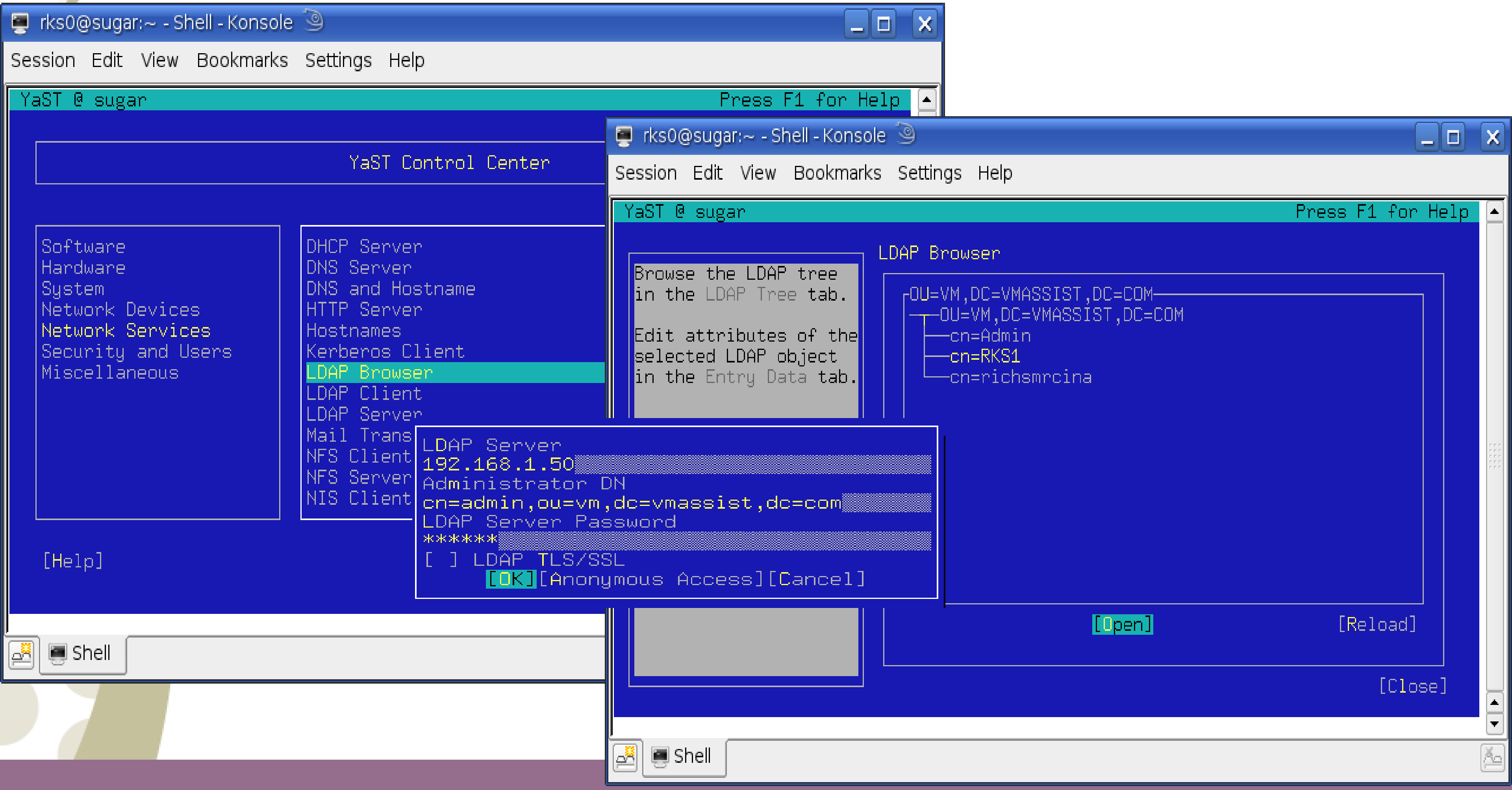
```
rks0@laptop:~> ftp 192.168.202.17
Connected to 192.168.202.17.
220 (vsFTPd 2.0.4)
Name (192.168.202.17:rks0): rks1
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> pwd
257 "/home/rks1"
```

Log file entry from FTP login

```
Jan  5 12:05:33 sugar vsftpd: Mon Jan  5 12:05:33 2009 [pid 18459]
[rks1] OK LOGIN: Client "192.168.1.101"
```

Browsing the LDAP Directory

- With YaST


rks0@sugar:~ - Shell - Konsole
Session Edit View Bookmarks Settings Help
YaST @ sugar
Press F1 for Help
Shell

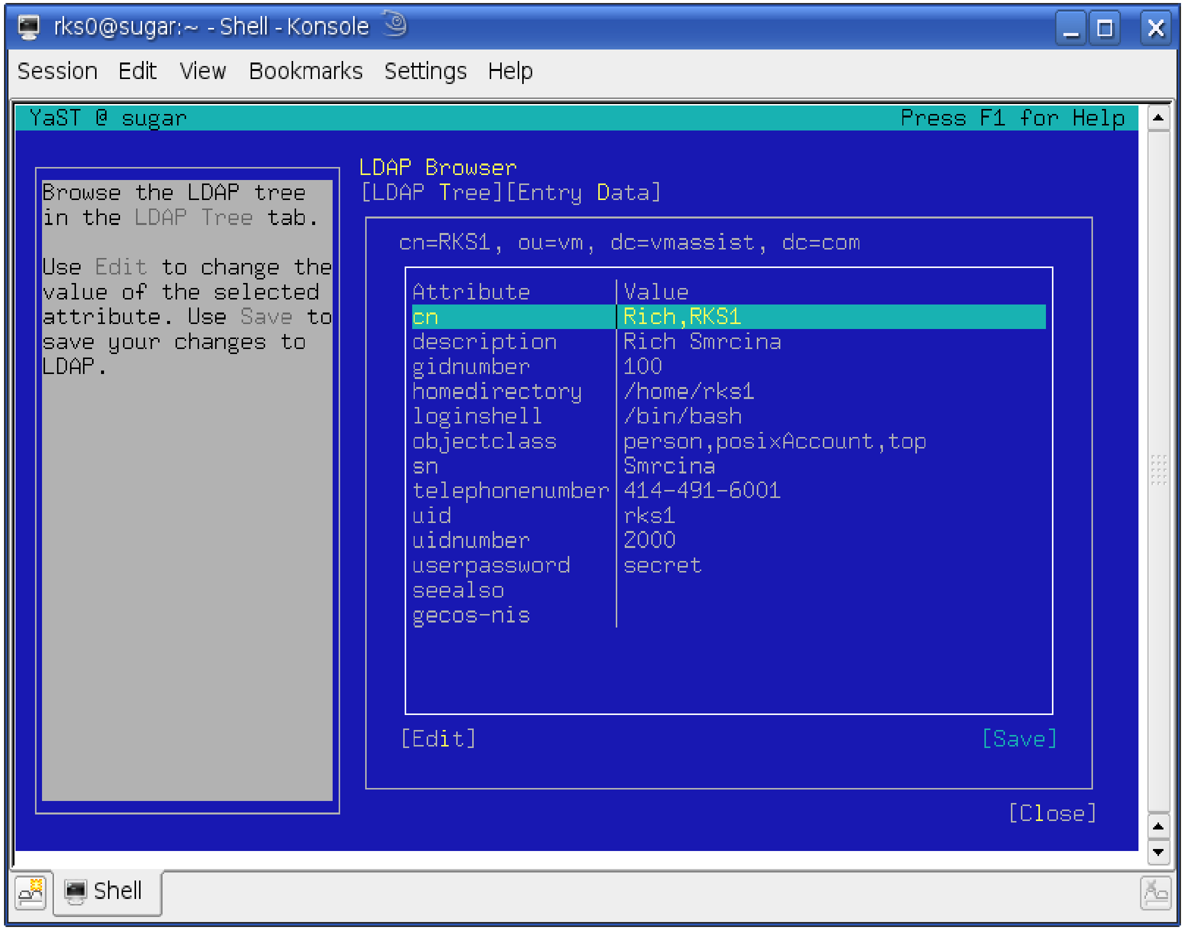
```
YaST Control Center

Software                DHCP Server
Hardware                DNS Server
System                  DNS and Hostname
Network Devices         HTTP Server
Network Services        Hostnames
Security and Users      Kerberos Client
Miscellaneous           LDAP Browser
                        LDAP Client
                        LDAP Server
                        Mail Trans
                        NFS Client
                        NFS Server
                        NIS Client

[Help]
```

```
LDAP Server
192.168.1.50
Administrator DN
cn=admin,ou=vm,dc=vmassist,dc=com
LDAP Server Password
******
[ ] LDAP TLS/SSL
    [OK][Anonymous Access][Cancel]
```

```
LDAP Browser

Browse the LDAP tree
in the LDAP Tree tab.

Edit attributes of the
selected LDAP object
in the Entry Data tab.

OU=VM,DC=VMASSIST,DC=COM
└─OU=VM,DC=VMASSIST,DC=COM
   ├─cn=Admin
   ├─cn=RKS1
   └─cn=richsmrcina

[Open]                        [Reload]

                               [Close]
```

Browsing the LDAP Directory

- With YaST

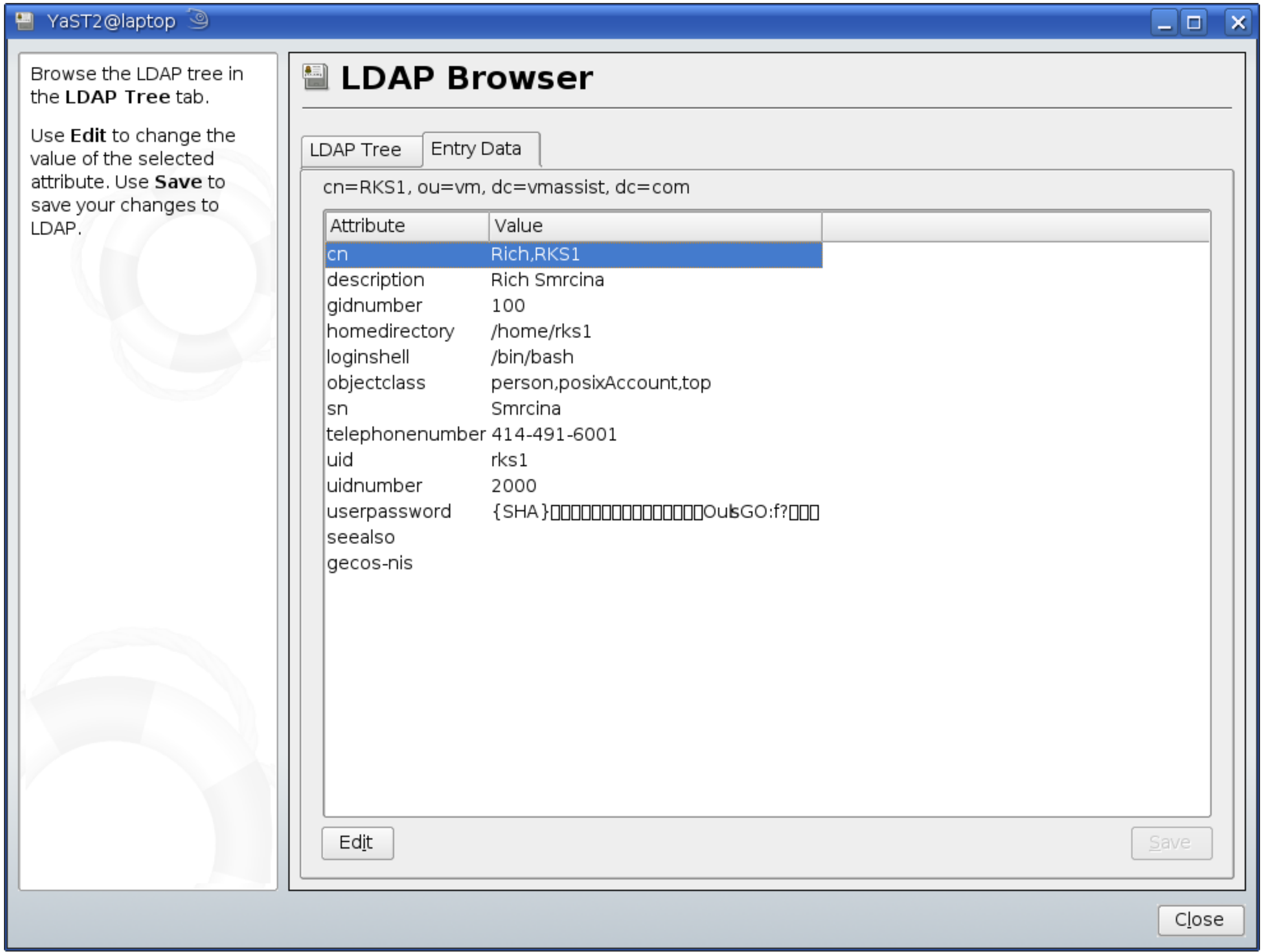


rks0@sugar:~ - Shell - Konsole
Session Edit View Bookmarks Settings Help
Shell

```
YaST @ sugar                                              Press F1 for Help

 Browse the LDAP tree      LDAP Browser
 in the LDAP Tree tab.     [LDAP Tree][Entry Data]

 Use Edit to change the      cn=RKS1, ou=vm, dc=vmassist, dc=com
 value of the selected
 attribute. Use Save to        Attribute       |Value
 save your changes to          cn              |Rich,RKS1
 LDAP.                         description     |Rich Smrcina
                               gidnumber       |100
                               homedirectory   |/home/rks1
                               loginshell      |/bin/bash
                               objectclass     |person,posixAccount,top
                               sn              |Smrcina
                               telephonenumber |414-491-6001
                               uid             |rks1
                               uidnumber       |2000
                               userpassword    |secret
                               seealso         |
                               gecos-nis       |

                             [Edit]                                   [Save]

                                                                     [Close]
```

Browsing the LDAP Directory

- With YaST2



Browse the LDAP tree in the **LDAP Tree** tab.

Use **Edit** to change the value of the selected attribute. Use **Save** to save your changes to LDAP.

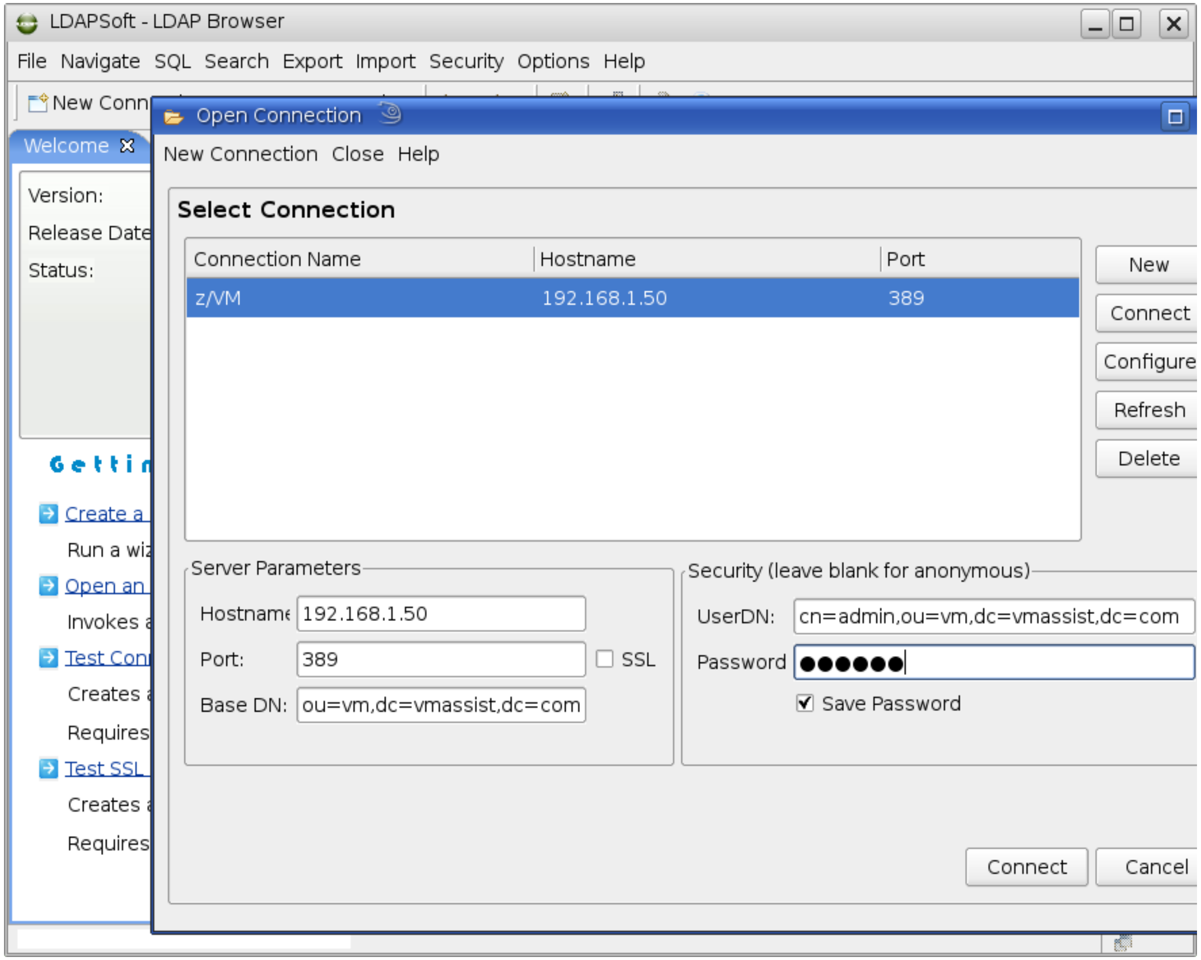
LDAP Browser

cn=RKS1, ou=vm, dc=vmassist, dc=com

Attribute	Value
cn	Rich,RKS1
description	Rich Smrcina
gidnumber	100
homedirectory	/home/rks1
loginshell	/bin/bash
objectclass	person,posixAccount,top
sn	Smrcina
telephonenumber	414-491-6001
uid	rks1
uidnumber	2000
userpassword	{SHA}□□□□□□□□□□□□□□□OulsGO:f?□□□
seealso	
gecos-nis	

Browsing the LDAP Directory

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



Select Connection

Connection Name	Hostname	Port
z/VM	192.168.1.50	389

Server Parameters

Hostname: 192.168.1.50
Port: 389 □ SSL
Base DN: ou=vm,dc=vmassist,dc=com

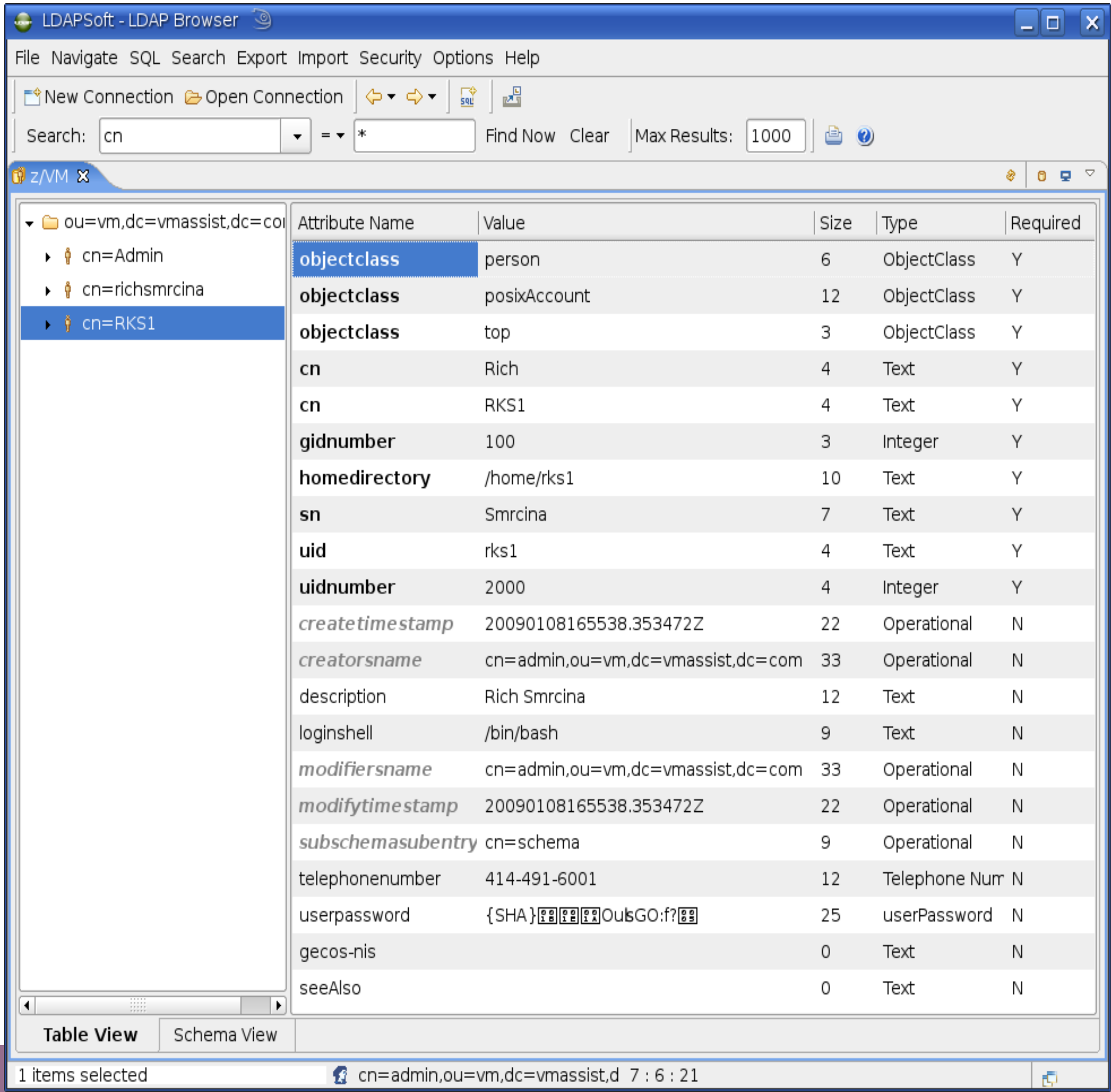
Security (leave blank for anonymous)

UserDN: cn=admin,ou=vm,dc=vmassist,dc=com
Password: ●●●●●●
☑ Save Password

Browsing the LDAP Directory

SHARE
Technology · Connections · Results

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

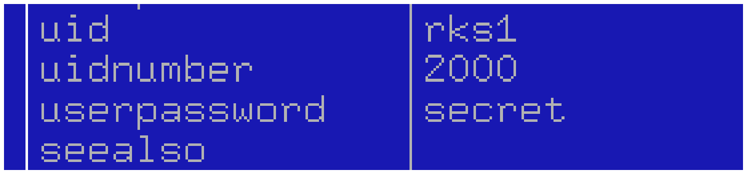

LDAPSoft - LDAP Browser
File Navigate SQL Search Export Import Security Options Help
New Connection Open Connection
Search: cn = * Find Now Clear Max Results: 1000
z/VM
ou=vm,dc=vmassist,dc=co
cn=Admin
cn=richsmrcina
cn=RKS1

Attribute Name	Value	Size	Type	Required
objectclass	person	6	ObjectClass	Y
objectclass	posixAccount	12	ObjectClass	Y
objectclass	top	3	ObjectClass	Y
cn	Rich	4	Text	Y
cn	RKS1	4	Text	Y
gidnumber	100	3	Integer	Y
homedirectory	/home/rks1	10	Text	Y
sn	Smrcina	7	Text	Y
uid	rks1	4	Text	Y
uidnumber	2000	4	Integer	Y
createtimestamp	20090108165538.353472Z	22	Operational	N
creatorsname	cn=admin,ou=vm,dc=vmassist,dc=com	33	Operational	N
description	Rich Smrcina	12	Text	N
loginshell	/bin/bash	9	Text	N
modifiersname	cn=admin,ou=vm,dc=vmassist,dc=com	33	Operational	N
modifytimestamp	20090108165538.353472Z	22	Operational	N
subschemasubentry	cn=schema	9	Operational	N
telephonenumber	414-491-6001	12	Telephone Num	N
userpassword	{SHA}□□□OulsGO:f?□	25	userPassword	N
gecos-nis		0	Text	N
seeAlso		0	Text	N

1 items selected cn=admin,ou=vm,dc=vmassist,d 7 : 6 : 21

Password exposure

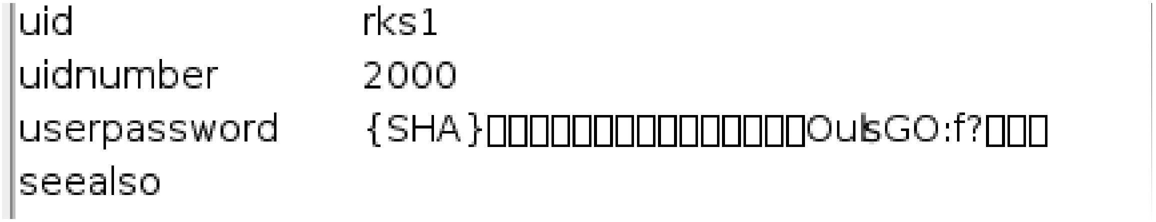
- Default configuration is to not encrypt the password



```
uid            rks1
uidnumber      2000
userpassword   secret
seealso
```

- To prevent the viewing of passwords while browsing the LDAP directory the server provides various ways to encrypt stored passwords
    - crypt, MD5, SHA, DES and AES
- In the LDBM section, the pwEncryption option determines the method used to encrypt the password

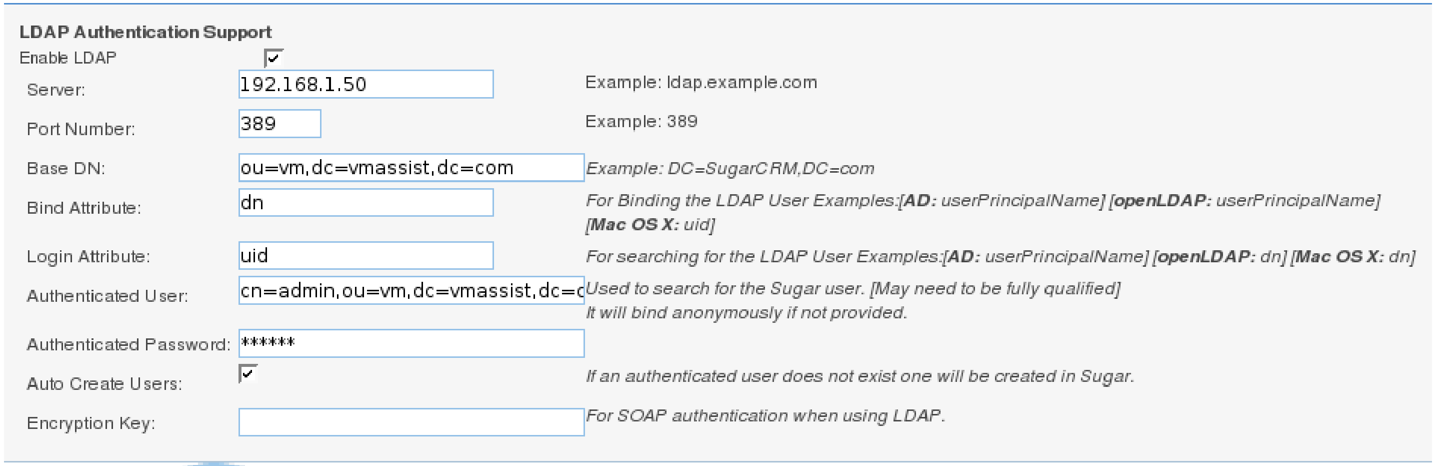
```
pwEncryption SHA
```



```
uid            rks1
uidnumber      2000
userpassword   {SHA}□□□□□□□□□□□□□□□OulsGO:f?□□□
seealso
```

Setting up other software - SugarCRM

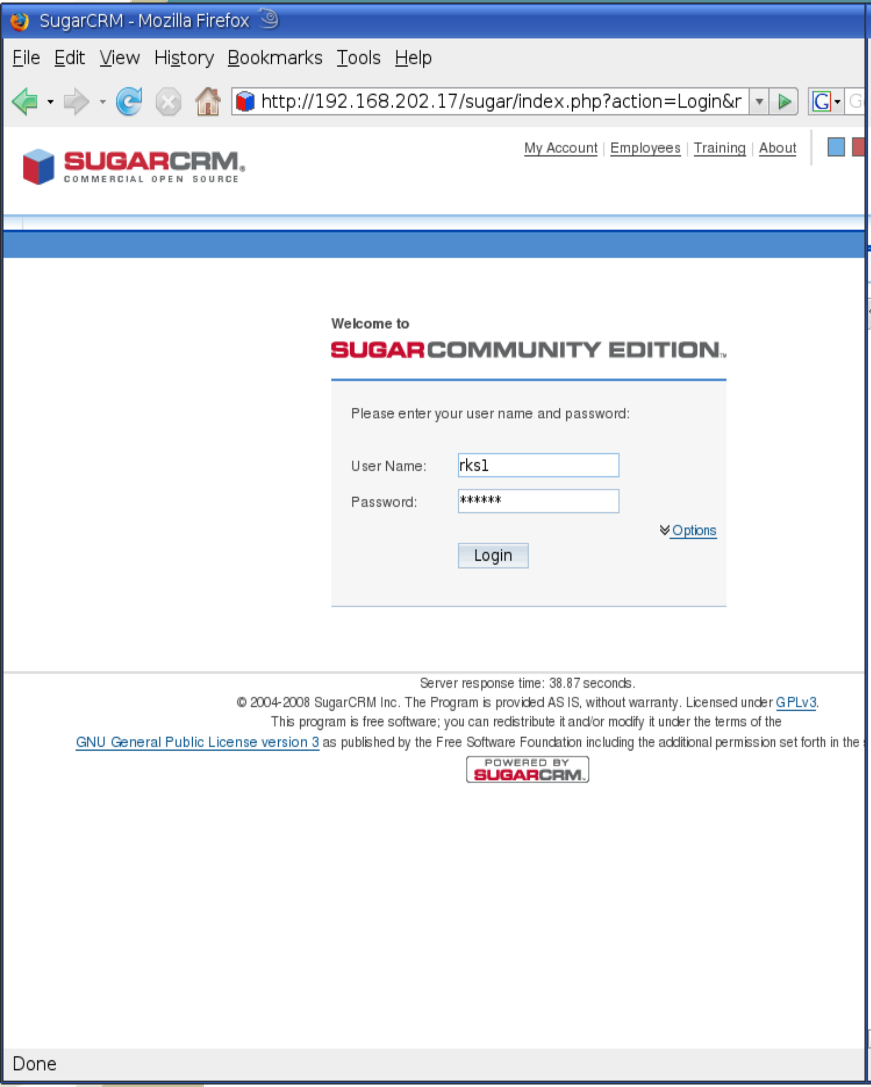
- SugarCRM is an open source customer resource management (CRM) package
- It uses the LAMP (**L**inux, **A**pache, **M**ySQL, **P**HP) software stack
- Sugar offers an LDAP authentication option
  - In System Settings



LDAP Authentication Support

Enable LDAP	☑	
Server:	192.168.1.50	Example: ldap.example.com
Port Number:	389	Example: 389
Base DN:	ou=vm,dc=vmassist,dc=com	*Example: DC=SugarCRM,DC=com*
Bind Attribute:	dn	*For Binding the LDAP User Examples:[**AD:** userPrincipalName] [**openLDAP:** userPrincipalName] [**Mac OS X:** uid]*
Login Attribute:	uid	*For searching for the LDAP User Examples:[**AD:** userPrincipalName] [**openLDAP:** dn] [**Mac OS X:** dn]*
Authenticated User:	cn=admin,ou=vm,dc=vmassist,dc=c	*Used to search for the Sugar user. [May need to be fully qualified]* *It will bind anonymously if not provided.*
Authenticated Password:	******	
Auto Create Users:	☑	*If an authenticated user does not exist one will be created in Sugar.*
Encryption Key:		*For SOAP authentication when using LDAP.*

Setting up other software - SugarCRM


SugarCRM - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.202.17/sugar/index.php?action=Login&r
SUGARCRM.
COMMERCIAL OPEN SOURCE
My Account | Employees | Training | About
Done

Welcome to
SUGARCOMMUNITY EDITION.

Please enter your user name and password:

User Name: rks1

Password: ******

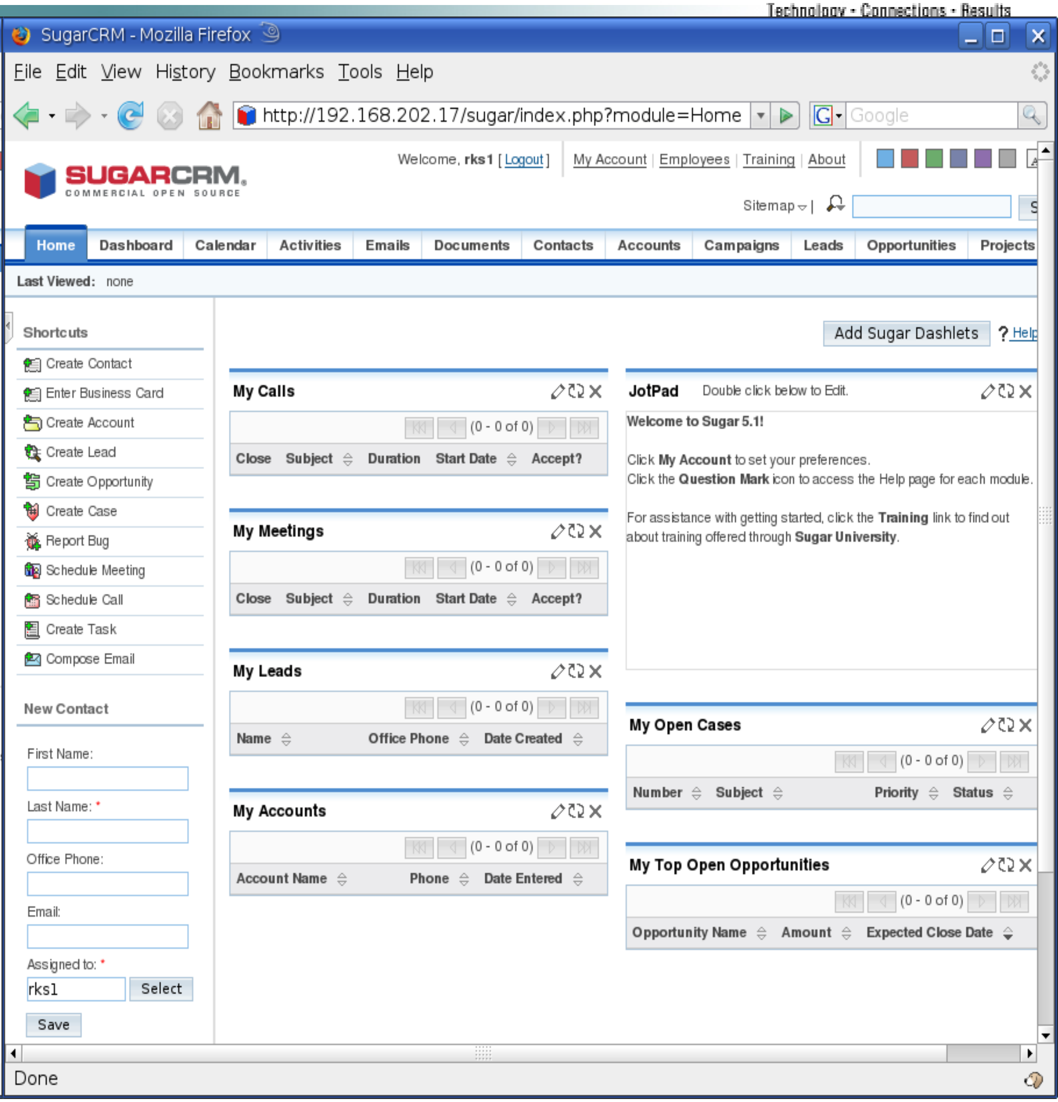
Options

Login

Server response time: 38.87 seconds.

© 2004-2008 SugarCRM Inc. The Program is provided AS IS, without warranty. Licensed under GPLv3.
This program is free software; you can redistribute it and/or modify it under the terms of the
GNU General Public License version 3 as published by the Free Software Foundation including the additional permission set forth in the

POWERED BY SUGARCRM.


SugarCRM - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.202.17/sugar/index.php?module=Home
Google
SUGARCRM.
COMMERCIAL OPEN SOURCE
Welcome, rks1 [Logout] | My Account | Employees | Training | About
Sitemap
Home Dashboard Calendar Activities Emails Documents Contacts Accounts Campaigns Leads Opportunities Projects
Add Sugar Dashlets
Help
Done

Last Viewed: none

Shortcuts

- Create Contact
- Enter Business Card
- Create Account
- Create Lead
- Create Opportunity
- Create Case
- Report Bug
- Schedule Meeting
- Schedule Call
- Create Task
- Compose Email

New Contact

First Name:

Last Name: *

Office Phone:

Email:

Assigned to: * rks1 Select

Save

My Calls

(0 - 0 of 0)

Close	Subject	Duration	Start Date	Accept?

My Meetings

(0 - 0 of 0)

Close	Subject	Duration	Start Date	Accept?

My Leads

(0 - 0 of 0)

Name	Office Phone	Date Created

My Accounts

(0 - 0 of 0)

Account Name	Phone	Date Entered

JotPad Double click below to Edit.

Welcome to Sugar 5.1!

Click **My Account** to set your preferences.
Click the **Question Mark** icon to access the Help page for each module.

For assistance with getting started, click the **Training** link to find out about training offered through **Sugar University**.

My Open Cases

(0 - 0 of 0)

Number	Subject	Priority	Status

My Top Open Opportunities

(0 - 0 of 0)

Opportunity Name	Amount	Expected Close Date

Setting up other software - z/VSE LDAP Client

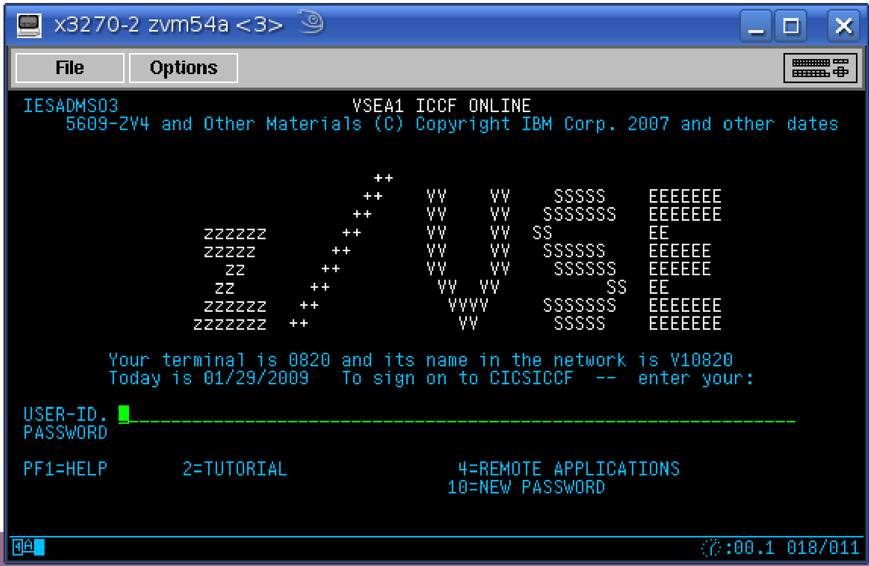
- An LDAP Client is delivered starting with z/VSE 4.2
- Provides an alternate signon program
  - Allows userids and passwords up to 64 characters
  - Lets the LDAP Server control identity management and security policies for z/VSE
- Sample provided as SKLDCFG

```
LDAP_SERVERS       DC     CL256'192.168.202.1:389'
BIND_DN            DC     CL64'cn=admin,ou=vm,dc=vmassist,dc=com'
BIND_PWD           DC     CL64'secret'
USER_ATTRIBUTE     DC     CL64'cn'
BASE_DN            DC     CL64'ou=vm,dc=vmassist,dc=com'
```

Setting up other software - z/VSE LDAP Client

- A mapping file is used to map long userids to short userids
- A utility is provided to populate the mapping file

```
// EXEC IESLDUMA
ID USER='RKS0' PWD='PASS'
ADD LDAPUSER='rsmrcina' TYPE=LDAP DESC='Richard Smrcina' -
    VSEUSER='RKS0' VSEPWD='PASS'
ADD LDAPUSER='richsmrcina' TYPE=LDAP DESC='Richard Smrcina' -
    VSEUSER='RKS1' VSEPWD='PASS'
/*
```



```
IESADMS03                      VSEA1 ICCF ONLINE
    5609-ZV4 and Other Materials (C) Copyright IBM Corp. 2007 and other dates


                                 ++
                                ++    VV    VV    SSSSS    EEEEEEE
                               ++     VV    VV   SSSSSSS   EEEEEEE
                 zzzzzz       ++      VV    VV  SS         EE
                 zzzzz       ++       VV    VV   SSSSSS    EEEEEE
                   zz       ++        VV    VV    SSSSSS   EEEEEE
                  zz       ++          VV  VV          SS  EE
                 zzzzzz   ++            VVVV     SSSSSSS   EEEEEEE
                zzzzzzz  ++              VV       SSSSS    EEEEEEE

        Your terminal is 0820 and its name in the network is V10820
        Today is 01/29/2009   To sign on to CICSICCF  --  enter your:

USER-ID. ______________________________________________________________
PASSWORD

PF1=HELP       2=TUTORIAL               4=REMOTE APPLICATIONS
                                       10=NEW PASSWORD

 4A                                                         :00.1 018/011
```

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         modifiesrequested=0
sysmaxconnections=65535      modifiescompleted=0
totalconnections=29          modifydnsrequested=0
currentconnections=2         modifydnscompleted=0
maxreachedconnections=5      searchesrequested=31
opsinitiated=81              searchescompleted=30
opscompleted=80              unbindsrequested=21
abandonsrequested=4          unbindscompleted=21
abandonscompleted=4          unknownopsrequested=0
addsrequested=0              unknownopscompleted=0
addscompleted=0              entriessent=17
bindsrequested=25            bytessent=5992
bindscompleted=25            searchreferencessent=0
comparesrequested=0          currenttime=Sat Jul 26 02:34:13.340516 2008
comparescompleted=0          starttime=Sat Jul 26 01:15:05.412192 2008
deletesrequested=0           resettime=Sat Jul 26 01:15:05.412192 2008
deletescompleted=0           resets=0
extopsrequested=0
```

Monitoring

- Format of the statistics

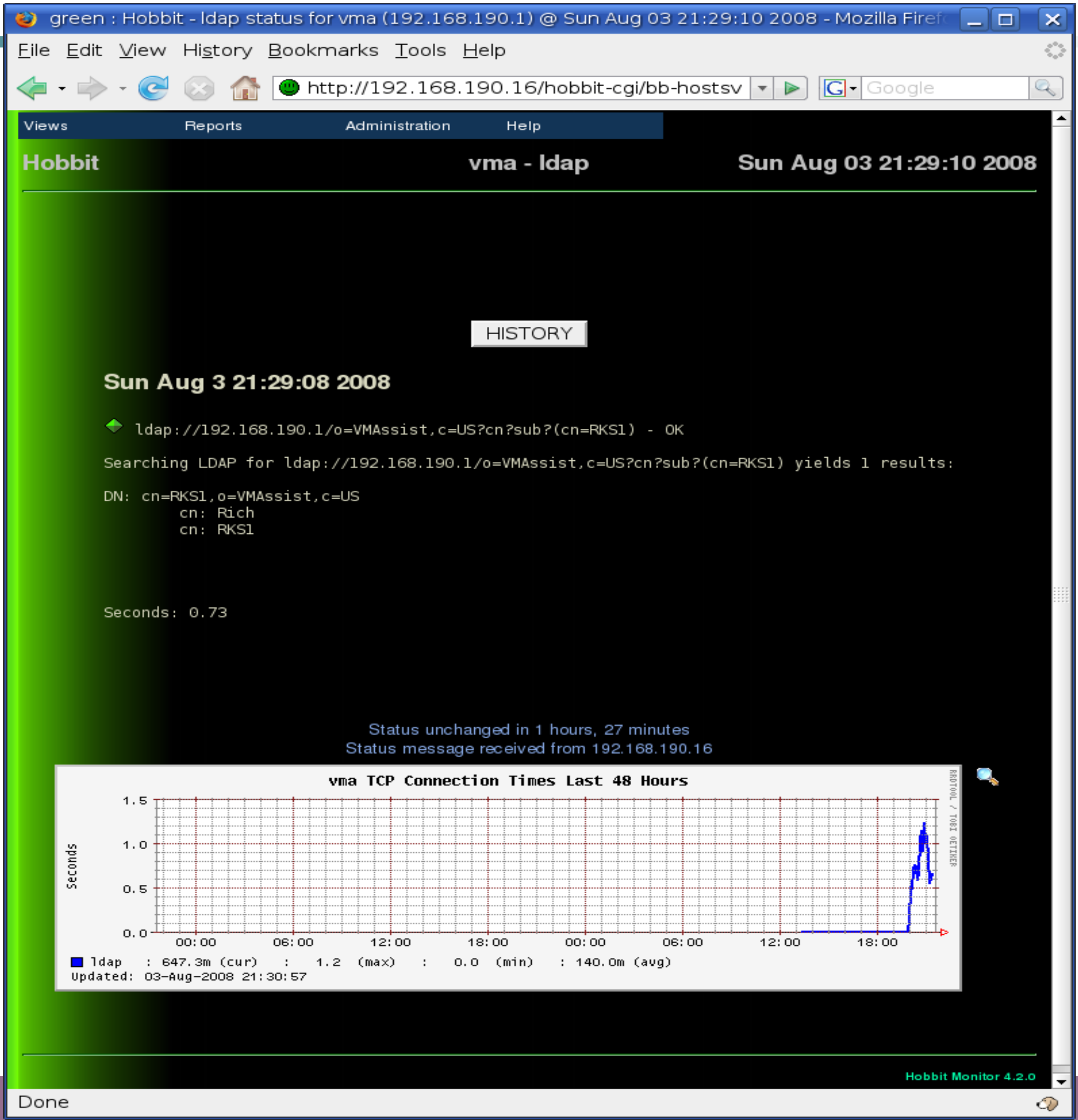
```
smsg ldapsrv display monitor
Ready; T=0.01/0.01 21:45:22
             Monitor Statistics
             ------------------

 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
```

Monitoring

- The Hobbit network services monitor can watch LDAP connections
- Must either
  - Build with the LDAP capabilities
  - Use the RPM
- In the hosts definition file

```
192.168.190.1  vma   # ldap://192.168.190.1/o=VMAssist,c=US?cn?sub?(cn=RKS1)
```

Monitoring


green : Hobbit - ldap status for vma (192.168.190.1) @ Sun Aug 03 21:29:10 2008 - Mozilla Firef
File Edit View History Bookmarks Tools Help
http://192.168.190.16/hobbit-cgi/bb-hostsv
Google
Views Reports Administration Help
Hobbit
vma - ldap
Sun Aug 03 21:29:10 2008
HISTORY

Sun Aug 3 21:29:08 2008

```
ldap://192.168.190.1/o=VMAssist,c=US?cn?sub?(cn=RKS1) - OK

Searching LDAP for ldap://192.168.190.1/o=VMAssist,c=US?cn?sub?(cn=RKS1) yields 1 results:

DN: cn=RKS1,o=VMAssist,c=US
        cn: Rich
        cn: RKS1


Seconds: 0.73
```

Status unchanged in 1 hours, 27 minutes
Status message received from 192.168.190.16

vma TCP Connection Times Last 48 Hours
Seconds
1.5
1.0
0.5
0.0
00:00
06:00
12:00
18:00
00:00
06:00
12:00
18:00
RRDTOOL / TOBI OETIKER

```
■ ldap   : 647.3m (cur)   :   1.2  (max)   :   0.0  (min)   : 140.0m (avg)
Updated: 03-Aug-2008 21:30:57
```

Hobbit Monitor 4.2.0
Done

Operating the LDAP Server

- Startup
  - TCP/IP will start it
- Shutdown

```
SMSG LDAPSRV SHUTDOWN
090109 04:13:33.833359 GLD1007I LDAP server is stopping.
090109 04:13:33.983744 GLD6051I No database changes to commit
for LDBM backend named LDBM-0001.

Options Report for Enclave main 01/08/09 10:13:34 PM
Language Environment V01 R04.00

... (LE runtime messages) ...

DTCRUN1014I Server ended normally at 22:13:40 on 8 Jan 2009
(Thursday)
```

- 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

RACF Integration

- LDBM backend also works with RACF
  - Integrate z/VM defined users into the LDAP concept
  - Password checking based in RACF
- Presented at SHARE 111 in same session
  - http://www.linuxvm.org/Present/SHARE111/S9156rs.pdf

References

- z/VM TCP/IP Planning and Customization
  - SC24-6125-03 (z/VM 5.3) SC24-6125-04 (z/VM 5.4)
- z/VM TCP/IP LDAP Administration Guide
  - SC24-6140-00 (z/VM 5.3) SC24-6140-01 (z/VM 5.4)
- z/VM TCP/IP User's Guide
  - SC24-6127-03 (z/VM 5.3) SC24-6127-04 (z/VM 5.4)
- 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
  - SG24-7471-00

Questions?

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Specializing in support of z/VM,
z/VSE and Linux on System z systems