CRONUS CONSULTING (PTY) LTD.

Linux Guideline and Setup Information Document

(RHEL 8 and 9 64bit)

Contents

1. O/S Packages 2
2. Perl Packages 3
3. Development Packages (C & GCC) 4
4. Open SSH Packages 4
5. Open Security Packages - Fail2ban ..... **Error! Bookmark not defined.**
6. Kernel Changes 5
7. FTP config/setup ..... **Error! Bookmark not defined.**
8. JAVA JDK (Optional) 6
9. Linux File Systems: ..... **Error! Bookmark not defined.**
10. User-id's and Groups: ..... **Error! Bookmark not defined.**
11. Installation Directory ..... **Error! Bookmark not defined.**
12. File Permissions ..... **Error! Bookmark not defined.**
13. Environment Assignments: ..... **Error! Bookmark not defined.**

Paths and executables: ..... **Error! Bookmark not defined.**

14. Cronus and Software AG Products ..... **Error! Bookmark not defined.**
15. Natparm Definitions: ..... **Error! Bookmark not defined.**
16. Backup and transfer: ..... **Error! Bookmark not defined.**

Copyright © 2024 Cronus Consulting (Pty) Ltd.

Linux Setup

1. O/S Packages

- ✓ yum -y install glibc.i686
- ✓ yum –y install make, gcc-c++ make
- ✓ yum –y install unzip
- ✓ yum –y install ncompress
- ✓ yum -y install wget
- ✓ yum -y install rsync
- ✓ yum -y install sysstat
- ✓ yum -y install bind-utils,binutils
- ✓ yum -y install traceroute
- ✓ yum -y install mlocate
- ✓ yum -y install perl-IO-Socket-SSL.noarch
- ✓ yum -y install sshpass
- ✓ yum -y install ncurses-compat-libs
- ✓ yum -y install libnsl
- ✓ yum -y install libnsl.i686
- ✓ yum -y install libxcrypt.i686
- ✓ yum -y install elfutils-devel.i686
- ✓ yum -y install libcrypt.so.1
- ✓ yum -y install libncursesw.so.6

SELinux can sometimes prevent shared libraries from being executed!

If permission denied error occurs (Adabas) disable SELinux.

RHEL 9 additional packages

- ✓ yum install libcrypt.so.1

Optional and on request from client

- ✓ yum install telnet telnet-server –y
- ✓ yum –y install ksh
- ✓ yum –y install csh
- ✓ yum –y install ftp

Copyright © 2024 Cronus Consulting (Pty) Ltd.

For the S4Software (Security add-on) the following additional packages are required)

```
openmotif libXt libX11 libXext libXp libSM libICE ncurses-libs
ncurses openssl cyrus-sasl-lib openldap audit-libs bc
```

- ✓ `yum -y install libstdc++.i686 libXmu.i686 libacl.i686 ncurses-libs.i686 ncurses-compat-libs.i686 motif.i686 xterm libmount.i686 libgcc.i686 libnsl.i686 libXdmcp.i686 libXdmcp libnsl psmisc elfutils-libelf-devel make`
- ✓ *ncurses-compat-libs-6.1*

Additional Kernel Parameters on Linux

Optional / For information only

In addition to the general kernel parameters described above, on Linux systems it is necessary to configure the kernel parameters for the "inotify" file system monitoring mechanism. The following parameters should be set in the */etc/sysctl.conf* according to the number of Adabas client processes:

- **fs.inotify.max_user_instances**
  This specifies an upper limit on the number of inotify instances that can be created per real user ID (at least number of parallel used databases multiplied with the number of client processes).
- **fs.inotify.max_user_watches**
  This specifies an upper limit on the number of watches that can be created per real user ID (at least number of parallel used databases multiplied with the number of client processes).

See also */proc/sys/fs/inotify* for further details.

2. Perl Packages

- ✓ yum install perl (base)
- ✓ yum -y install perl-CPAN
- ✓ yum install -y perl-File-Slurp.noarch
- ✓ yum install perl-libwww-perl
- ✓ yum install perl-Time-HiRes

Copyright © 2024 Cronus Consulting (Pty) Ltd.

Install Perl Packages for Cronus

perl -MCPAN -e shell (as user-id **sag**)

```
cpan> o conf commit build_requires_install_policy yes
cpan> o conf commit prerequisites_policy follow
cpan> o conf commit
cpan> install Bundle::CPAN

*** Remember to restart your shell before running cpan again ***
```

perl -MCPAN -e shell (as user-id root [sudo su])

```
cpan> o conf commit build_requires_install_policy yes
cpan> o conf commit prerequisites_policy follow
cpan> o conf commit
```

perl -MCPAN -e 'install Net::SFTP' (sag *and as* root [sudo su])

*Which protocol(s) do you plan to use? [**3**]*

perl -MCPAN -e shell (as user-id sag)

```
cpan> fforce install Module::Metadata
cpan> install Module::Build
cpan> fforce install Net::SFTP::Foreign
cpan> fforce install LWP::UserAgent
cpan> install File::Slurp
cpan> install JSON
cpan> install JSON::PP
```

3. Development Packages (C & GCC)

- ✓ yum group install Development Tools
  or
- ✓ yum groupinstall "Development Tools"

4. Open SSH Packages

- ✓ yum -y install openssh-server openssh-clients

Start the service:

- ✓ chkconfig sshd on
- ✓ service sshd start

Make sure port 22 is opened:

Copyright © 2024 Cronus Consulting (Pty) Ltd.

- ✓ netstat -tulpn | grep :22

```
[root@localhost rhel_packages]# netstat -tulpn | grep :22
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      1766/sshd
tcp6       0      0 :::22                   :::*                    LISTEN
```

The first time that you login before creating user accounts, make the following edits:

5. Kernel Changes

- ✓ **ipcs -lm**

- ✓ vi /etc/sysctl.conf

Add this in /etc/sysctl.conf and reload the kernel. (minimum)

- ✓ kernel.shmmax = 2147483648 (this is 2GB as example but check max memory and adjust shmmax 50% of that is possible) in bytes.
- ✓ kernel.msgmnb = 65535
- ✓ kernel.msgmax = 65535
- ✓ kernel.msgmni = 1024
- ✓ kernel.sem = 2500 768000 100 128

Temporary load kernel parms to validate.
(Example below shows 2 GB shmmax – increase as needed)

- ✓ sysctl -w kernel.shmmax=2147483648
- ✓ sysctl -w kernel.msgmnb=65535
- ✓ sysctl -w kernel.msgmax=65535
- ✓ sysctl -w kernel.msgmni=1024
- ✓ sysctl -w kernel.sem='2500 768000 100 256'

- ✓ **sysctl –p** → to load the new kernel parameters immediately based on sysctl.conf file.

Adabas requires increased System V resources. Please refer to the Software AG installation documentation for detail on how to configure the Kernel parameters. You can check your current settings by using the command **showipc -s**. In the following, the resources required for Adabas are described.

Note that there are also other processes running on your system that require IPC resources. Therefore, you must add the IPC resources required by the other processes to parameters that describe a system-wide maximum number or size of resources.

For parameters that describe the maximum size of a resource, the value must, of course, be large enough for the other processes.

Copyright © 2024 Cronus Consulting (Pty) Ltd.

Example Kernel IPC configuration: (showipc -s)

```
SHMMAX:    8589934591 MSGMAP:      16384 SEMMAP:      32000
                      MSGMAX:      65535 SEMMNI:       2048
SHMMNI:          4096 MSGMNB:      65535 SEMMNS:     512000
                      MSGMNI:      65535 SEMMNU:      32000
                      MSGSSZ:         16 SEMMSL:       2400
                      MSGTQL:      16384 SEMOPM:        120
                      MSGSEG:      16384 SEMUME:         32
                                         SEMVMX:      32767
                                         SEMAEM:      32767
```

SHMMAX	The size of `SHMMAX` limits the size of the Adabas buffer pool and the number of attached buffers (`LBP` and `LAB` nucleus parameters). For all databases - select the maximum value of (750 KB + `LAB` + `LBP`)

Refer to the Software AG system requirements documentation for detail.

And

http://seriousbirder.com/blogs/centos-6-setting-shmmax-and-shmall-kernel-paramaters/

NB Be careful when distributing hardware threads across more than one socket and where sockets are distributed across more than one board; this could influence the synchronization times between the hardware threads. Memory is usually distributed across the sockets and access to the socket's own memory is relatively fast whereas memory belonging to a different socket is relatively slow. (NUMA architecture: Non-Uniform Memory Access

6. JAVA JDK (Optional)

To see a list of all available JDK on the system type the following command:

- ✓ `yum search java | grep -i --color JDK`

Where:

`java-1.7.0-openjdk` - OpenJDK **Runtime** Environment

`java-1.7.0-openjdk-devel` - OpenJDK **Development** Environment



Install Java SDK on a CentOS Linux if you <u>do not</u> already have it installed

- ✓ `yum install java-<version>-openjdk java-<version>-openjdk-devel`

RHEL and CentOS Linux install OpenJDK into /usr/lib/jvm/ directory

- ✓ `ls -l /usr/lib/jvm/`

Set the `JAVA_HOME` to the directory containing a bin/java executable using export command:

- ✓ `export JAVA_HOME=/usr/lib/jvm/jre-<version>-openjdk.x86_64`

Open the shell configuration file such as $HOME/.bashrc and at the bottom of the file, type the following line:

- ✓ export JAVA_HOME="/usr/lib/jvm/jre-<version>-openjdk.x86_64"

Copyright © 2024 Cronus Consulting (Pty) Ltd.