

Oracle 18c XE auf Oracle Linux 7

Preface

Oracle Linux (OL, formerly known as Oracle Enterprise Linux) is a Linux distribution packaged and freely distributed by Oracle. It is compiled from Red Hat Enterprise Linux (RHEL) source code, replacing Red Hat branding with Oracle's. Users can freely download Oracle Linux through Oracle's E-delivery service (Oracle Software Delivery Cloud) or from a variety of mirror sites, and can deploy and distribute it without cost.

Oracle Database 18c Express (XE) is a free to use for in-house applications. If you have a tight budget but the limits are acceptable you may consider XE on OL for your BPS schema.

The limits of XE are:

- Up to 12 GB of user data
- Up to 2 GB of database RAM
- Up to 2 CPU threads
- Up to 3 Pluggable Databases
- No support by Oracle, but [community support](#) available
- No patches from Oracle

In this tutorial linux and oracle are installed in a virtual machine under [VMware Workstation 15 Player](#). [Oracle VM VirtualBox](#) should also work, probably with small modifications.

Installation

Download Linux ISO

Download Oracle Linux from <https://edelivery.oracle.com>

- Sign In with your oracle credentials
- Search for „Oracle Linux“
- Add „DLP: Oracle Linux 7.7.0.0.0 (Oracle Linux)“ to cart
- Checkout and select „x86 64 bit“ as platform
- Accept license terms
- Download „V983339-01.iso Oracle Linux Release 7 Update 7 for x86 (64 bit), 4.4 GB“

Create Virtual Machine

Start VMware Workstation 15 Player

- Create a New Virtual Machine
- Installer Disc image file (iso): V983339-01.iso
- Virtual machine name: vmora18

- Location: E:\VM\vmora18
- Maximum disk size (GB): 120
- Store virtual disk as a single file
- Customize Hardware
 - Memory: 2 GB
 - Processors: 2
 - Network Adapter: Bridged
- Power on this virtual machine after creation

Install Linux

[Show all config steps](#)



ORACLE
LINUX

ORACLE LINUX 7.7 INSTALLATION

us

Help!

WELCOME TO ORACLE LINUX 7.7.

What language would you like to use during the installation process?

EnglishEnglish

AfrikaansAfrikaans

አማርኛAmharic

العربيةArabic

অসমীয়াAssamese

AsturianuAsturian

БеларускаяBelarusian

БългарскиBulgarian

বাংলাBengali

English (United States)

English (United Kingdom)

English (India)

English (Australia)

English (Canada)

English (Denmark)

English (Ireland)

English (New Zealand)

English (Nigeria)

English (Hong Kong SAR China)

Quit

Continue

**ORACLE**
LINUX

INSTALLATION SUMMARY

ORACLE LINUX 7.7 INSTALLATION

 **us**

[Help!](#)



LOCALIZATION

**DATE & TIME**
Americas/New York timezone

**KEYBOARD**
English (US)

**LANGUAGE SUPPORT**
English (United States)

SOFTWARE

**INSTALLATION SOURCE**
Local media

**SOFTWARE SELECTION**
Minimal Install

SYSTEM

**INSTALLATION DESTINATION**

**KDUMP**

[Quit](#)

[Begin Installation](#)


We won't touch your disks until you click 'Begin Installation'.

 Please complete items marked with this icon before continuing to the next step.

DATE & TIME

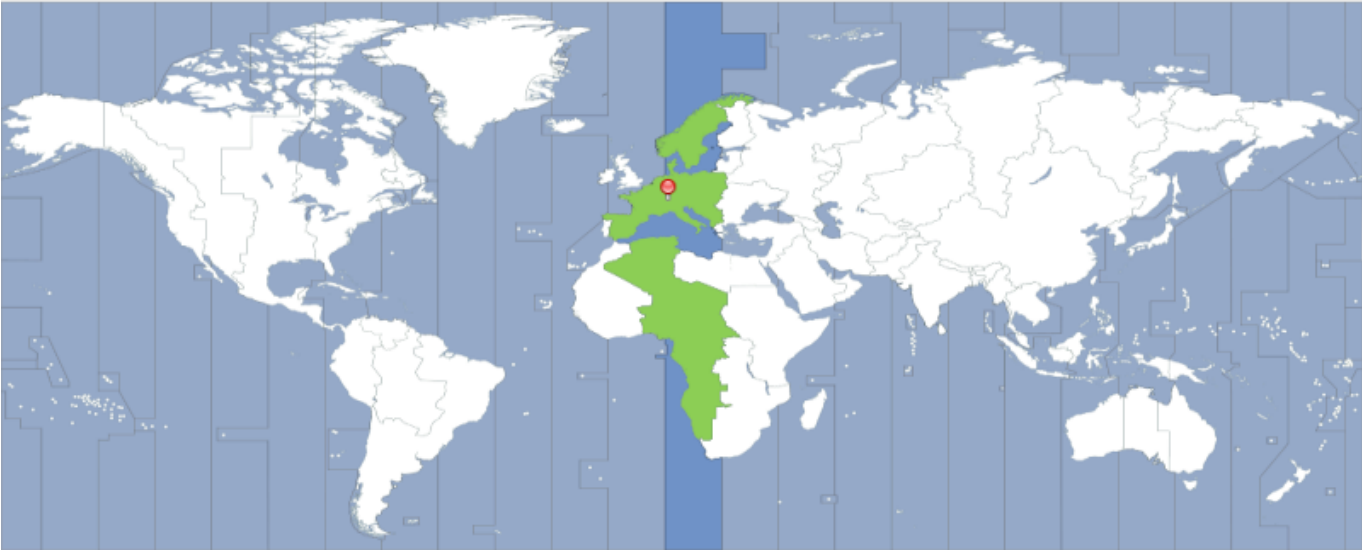
Done

ORACLE LINUX 7.7 INSTALLATION

 us

Help!

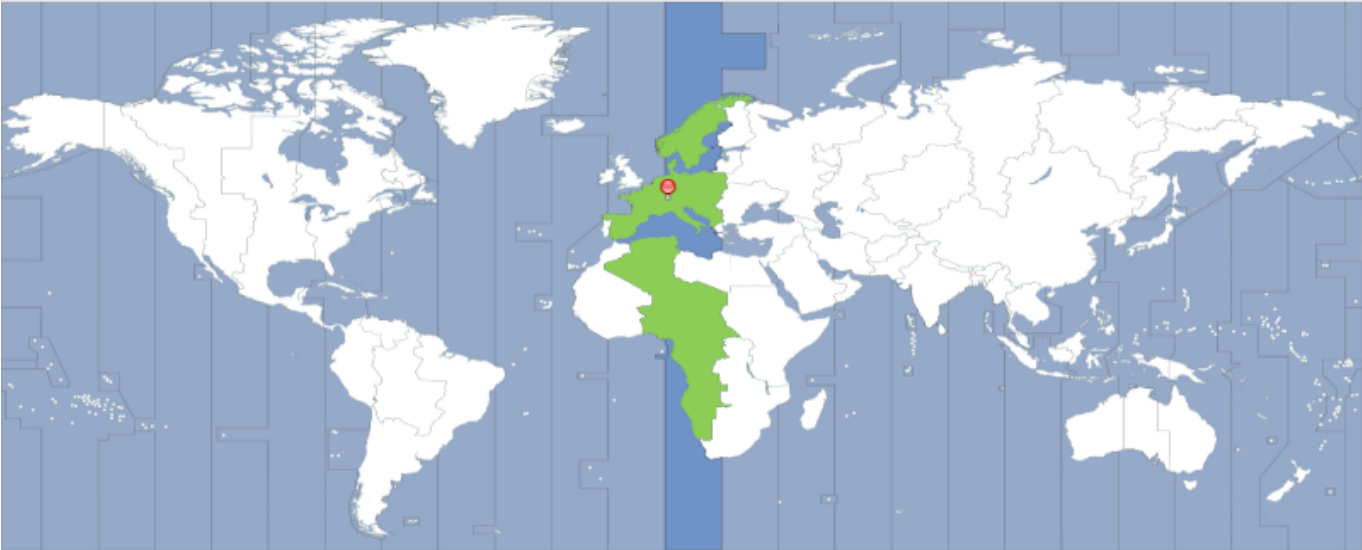
Region: Europe City: Zurich Network Time OFF



12:04 PM

☒ 24-hour
☐ AM/PM


09 / 27 / 2019

 You need to set up networking first if you want to use NTP

KEYBOARD LAYOUT

Done

ORACLE LINUX 7.7 INSTALLATION

 ch

Help!

Which keyboard layouts would you like to use on this system? You may move any layout to the top of the list to select it as the default.


Swiss German; Alemannic; Alsatian (German (Switzerland))

+

−

^

v



Test the layout configuration below:

öäü

Layout switching not configured.


Options

NETWORK & HOST NAME

Done


ORACLE LINUX 7.7 INSTAL

ch

 **Ethernet (ens33)**
Intel Corporation 82545EM Gigabit Ethernet Controller

+

-

 **Ethernet (ens33)**
Connected

Hardware Address 00:0C:29:C4:02:8B

Speed 1000 Mb/s

IPv4 Address 10.56.2.46

IPv6 Address 2a02:120b:2c24:98d0:e541:dff8:3c94:f824/64
2a02:120b:2c24:98d1:f299:24a9:301c:2661/64

Subnet Mask 255.255.0.0

Default Route 10.56.1.1

DNS 10.56.1.1



ON

Configu

Host name: vmora18

Apply


Current host name: v





INSTALLATION SUMMARY

ORACLE LINUX 7.7 INSTAL


ch


**DATE & TIME**
Europe/Zurich timezone

**KEYBOARD**
Swiss German; Al...an (Switze


**LANGUAGE SUPPORT**
English (United States)


SOFTWARE


**INSTALLATION SOURCE**
Local media


**SOFTWARE SELECTION**
Minimal Install

SYSTEM

**INSTALLATION DESTINATION**
Automatic partitioning selected

**KDUMP**
Kdump is enabled


**NETWORK & HOST NAME**
Wired (ens33) connected

**SECURITY POLICY**
No profile selected

Quit

Begin Ins

We won't touch your disks until you click 'Begin




ORACLE
LINUX

CONFIGURATION


ORACLE LINUX 7.7 INSTAL

ch




ORACLE

USER SETTINGS




ROOT PASSWORD
Root password is not set




USER CREATION
No user will be created

Starting package installation process



DTrace: Providing comprehensive tracing capabilities
for complete software observability from a single too

 Please complete items marked with this icon before continuing to the next step.

ROOT PASSWORD

ORACLE LINUX 7.7 INSTA

[Done](#) ch

The root account is used for administering the system. Enter a password for the root user.

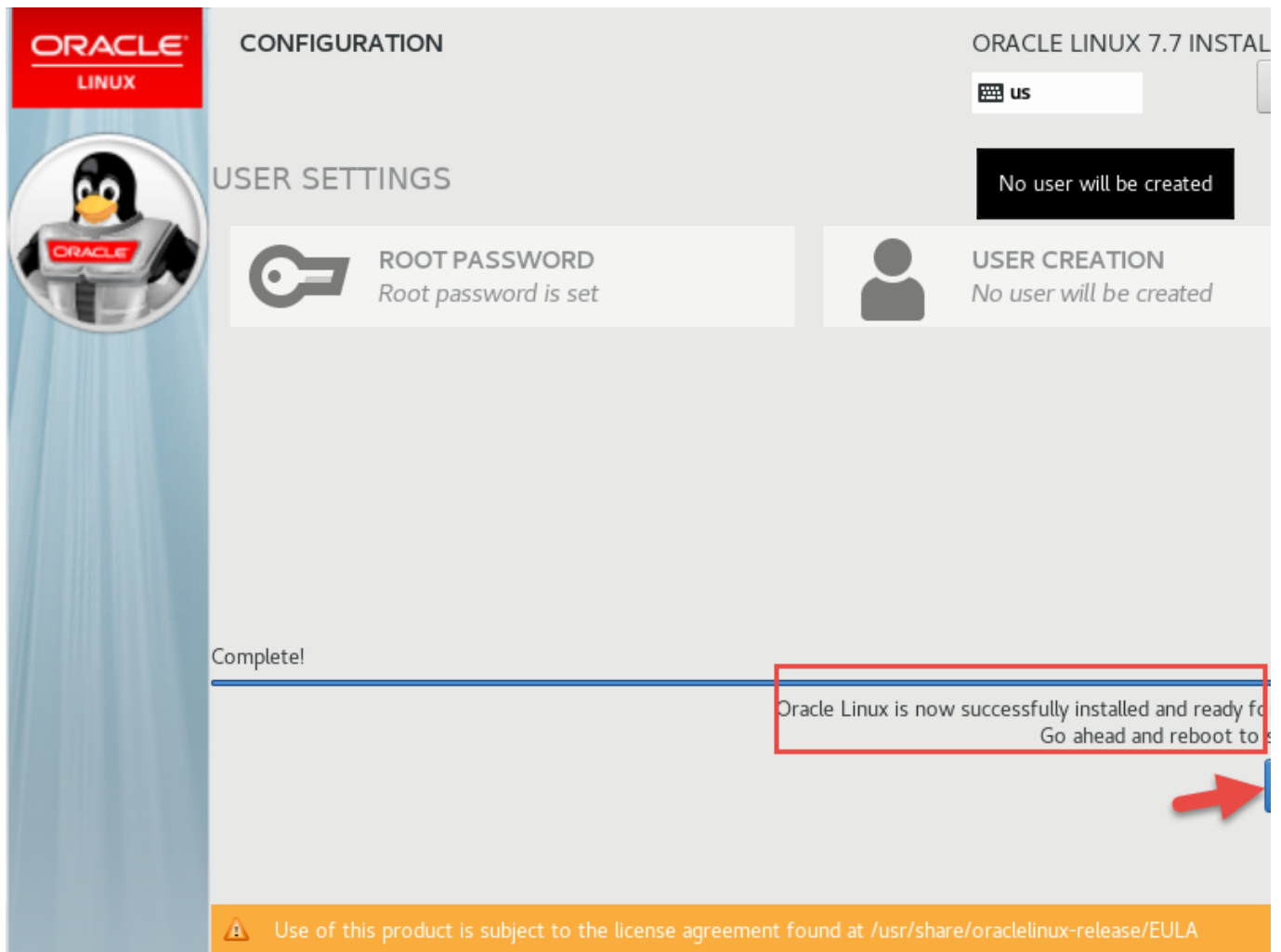
Root Password:

●●●●●●●●●●

 Strong

Confirm:

●●●●●●●●●●|



Update and DB Preinstall

Open a ssh terminal to „vmora18“ and login as root with the password defined before.

Update the software:

```
yum -y update
```

Run Oracle 18c preinstall:

```
yum -y install oracle-database-preinstall-18c
```

Install utilities:

```
yum -y install nano wget
```

Set a password for user „oracle“ so we can login:

```
passwd oracle
```

Optional: Assign a fixed IP in Swisscom Router

	vmora18	00:0C:29:C4:02:8B	10.56.1.216		
					

Reboot:

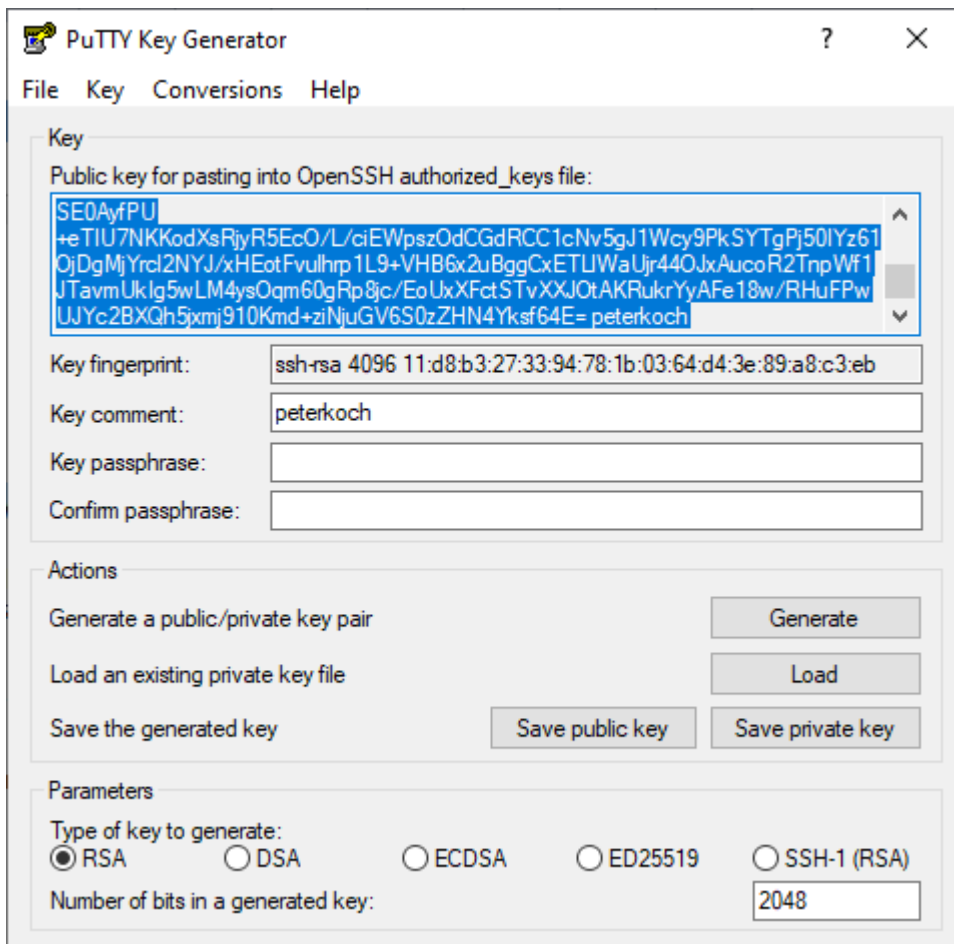
reboot

Setup SSH key auth for root

Create ~/.ssh and key

```
ssh-keygen -t rsa -b 4096  
<enter>  
<enter>  
<enter>
```

Load my personal key in PuTTYgen, and copy public key to the clipboard



PuTTY Key Generator

File Key Conversions Help

Key

Public key for pasting into OpenSSH authorized_keys file:

```
SE0AyfPU+e TIU7NKKodXsRjyR5EcO/L/ciEWpszOdCGdRCC1cNv5gJ1Wcy9PkSYTgPj50IYz61OjDgMjYrcI2NYJ/xHEotFvulhrp1L9+VHB6x2uBggCxETLjWaUjr44OJxAucoR2TnpWf1JTavmUklg5wLM4ysOqm60gRp8jc/EoUxXFctSTvXXJOtAKRukrYyAFel8w/RHuFPwUJYc2BXQh5xmj910Kmd+ziNjuGV6S0zZHN4Yksf64E= peterkoch
```

Key fingerprint: ssh-rsa 4096 11:d8:b3:27:33:94:78:1b:03:64:d4:3e:89:a8:c3:eb

Key comment: peterkoch

Key passphrase:

Confirm passphrase:

Actions

Generate a public/private key pair Generate

Load an existing private key file Load

Save the generated key Save public key Save private key

Parameters

Type of key to generate:
☒ RSA ☐ DSA ☐ ECDSA ☐ ED25519 ☐ SSH-1 (RSA)

Number of bits in a generated key: 2048

Add my personal key to authorized keys:

```
nano ~/.ssh/authorized_keys  
<paste>
```

Turn of password auth for ssh:

```
nano /etc/ssh/sshd_config  
...  
PasswordAuthentication no  
...
```

Restart ssh:

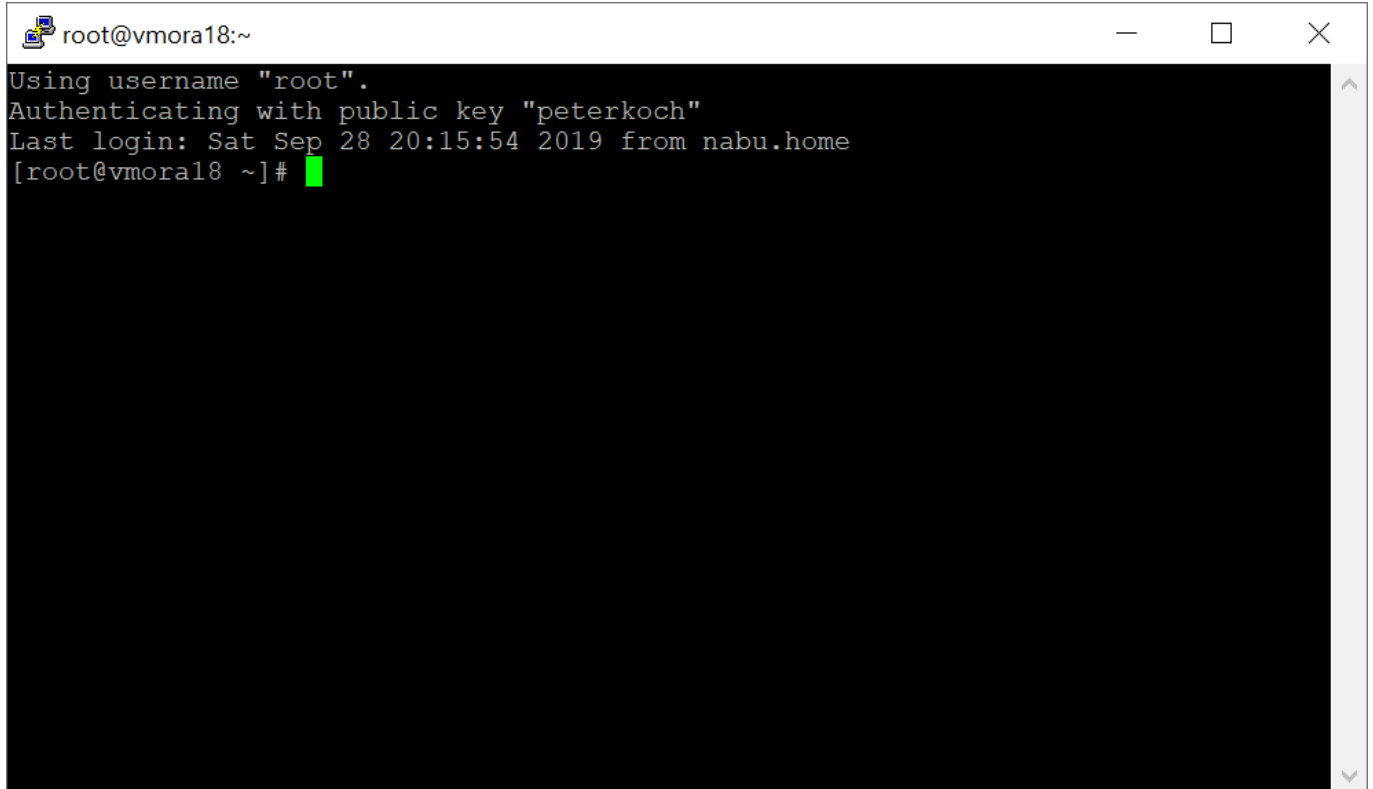
```
service sshd restart
```

Leave SSH terminal yet open in case.

Create and test PuTTY session for root:

- Session
 - Host Name: vmora18
 - Port: 22 / SSH
- Connection
 - Data
 - Auto-login username: root
 - SSH
 - Auth
 - Private key file: (location of my ppk)
- Session
 - Saved sessions: vmora18 - root
 - Save

[Test if autologin successful](#)

A terminal window titled 'root@vmora18:~' with standard window controls. The terminal output shows an SSH login process: 'Using username "root".', 'Authenticating with public key "peterkoch"', 'Last login: Sat Sep 28 20:15:54 2019 from nabu.home', and the prompt '[root@vmora18 ~]#' followed by a green cursor.

```
root@vmora18:~
Using username "root".
Authenticating with public key "peterkoch"
Last login: Sat Sep 28 20:15:54 2019 from nabu.home
[root@vmora18 ~]#
```

Motd Logo

Create logo at <http://www.network-science.de/ascii/>

- Text: vmora18
- Font: slant
- Reflection: no
- Adjustment: center
- Stretch: no
- Width: 80
- do it!

Copy logo to clipboard, and paste to motd

```
nano /etc/motd
<paste>
```

Install rlwrap for cursor keys in sqlplus

```
wget https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rpm
rpm -ivh epel-release-latest-7.noarch.rpm
yum -y install rlwrap
```

Make SELinux permissive

```
nano /etc/selinux/config
```

```
...  
SELINUX=permissive
```

```
setenforce Permissive
```

Disable firewall

```
systemctl stop firewalld  
systemctl disable firewalld
```

Enable SSH Login for User oracle

Similar as for root

```
su oracle
```

```
ssh-keygen -t rsa -b 4096  
  <enter>  
  <enter>  
  <enter>
```

```
nano ~/.ssh/authorized_keys  
<paste my personal public key>
```

Create PuTTY Session

- Load session „vmora19 - root“
- Change auto-login username: oracle
- Save session as „vmora19 - oracle“

[Test if working](#)

[illegible]

Append to .bash_profile:

~/.bash profile

```
export ORACLE_SID=XE
export ORAENV_ASK=NO
. /opt/oracle/product/18c/dbhomeXE/bin/oraenv
alias sqlplus="rllwrap sqlplus"
```

```
exit
reboot
```

Get Oracle 18c Express Software

Download software:

- <https://www.oracle.com/database/technologies/xe-downloads.html>
- Click: Oracle Database 18c Express Edition for Linux x64
- Accept license agreement
- Click „Download“ button
- Login with your oracle credentials
- Save file on your desktop PC

Use Filezilla to connect as root with SFTP/SSH, then upload oracle-database-xe-18c-1.0-1.x86_64.rpm to /root

Install DB software and create database

Install the software:

```
yum -y localinstall oracle-database-xe-18c-1.0-1.x86_64.rpm
```

Create the database:

```
/etc/init.d/oracle-xe-18c configure
```

- Enter password for sys, system and pdbadmin 2x

```
root@vmora18:~  
[root@vmora18 ~]# /etc/init.d/oracle-xe-18c configure  
Specify a password to be used for database accounts. Oracle recommends that the  
password entered should be at least 8 characters in length, contain at least 1 u  
ppercase character, 1 lower case character and 1 digit [0-9]. Note that the same  
password will be used for SYS, SYSTEM and PDBADMIN accounts:  
Confirm the password:  
Configuring Oracle Listener.  
Listener configuration succeeded.  
Configuring Oracle Database XE.  
Enter SYS user password:  
*****  
Enter SYSTEM user password:  
*****  
Enter PDBADMIN User Password:  
*****  
Prepare for db operation  
7% complete  
Copying database files  
29% complete  
Creating and starting Oracle instance  
30% complete  
31% complete  
34% complete  
38% complete  
41% complete  
43% complete  
Completing Database Creation  
47% complete  
50% complete  
Creating Pluggable Databases  
54% complete  
71% complete  
Executing Post Configuration Actions  
93% complete  
Running Custom Scripts  
100% complete  
Database creation complete. For details check the logfiles at:  
/opt/oracle/cfgtoollogs/dbca/XE.  
Database Information:  
Global Database Name:XE  
System Identifier(SID):XE  
Look at the log file "/opt/oracle/cfgtoollogs/dbca/XE/XE.log" for further detail  
s.  
  
Connect to Oracle Database using one of the connect strings:  
    Pluggable database: vmora18/XEPDB1  
    Multitenant container database: vmora18  
Use https://localhost:5500/em to access Oracle Enterprise Manager for Oracle Dat  
abase XE  
[root@vmora18 ~]#
```

Post-installaton steps

As root

Edit /etc/oratab and set the restart flag 'Y' to have XE started by dbstart:

```
nano /etc/oratab
...
XE:/opt/oracle/product/18c/dbhomeXE:Y
...
```

As oracle

Make sure the PDB starts when the instance starts.

```
sqlplus / as sysdba
--
alter pluggable database xepdb1 open;
alter pluggable database xepdb1 save state;
```

Automating Database Startup and Shutdown

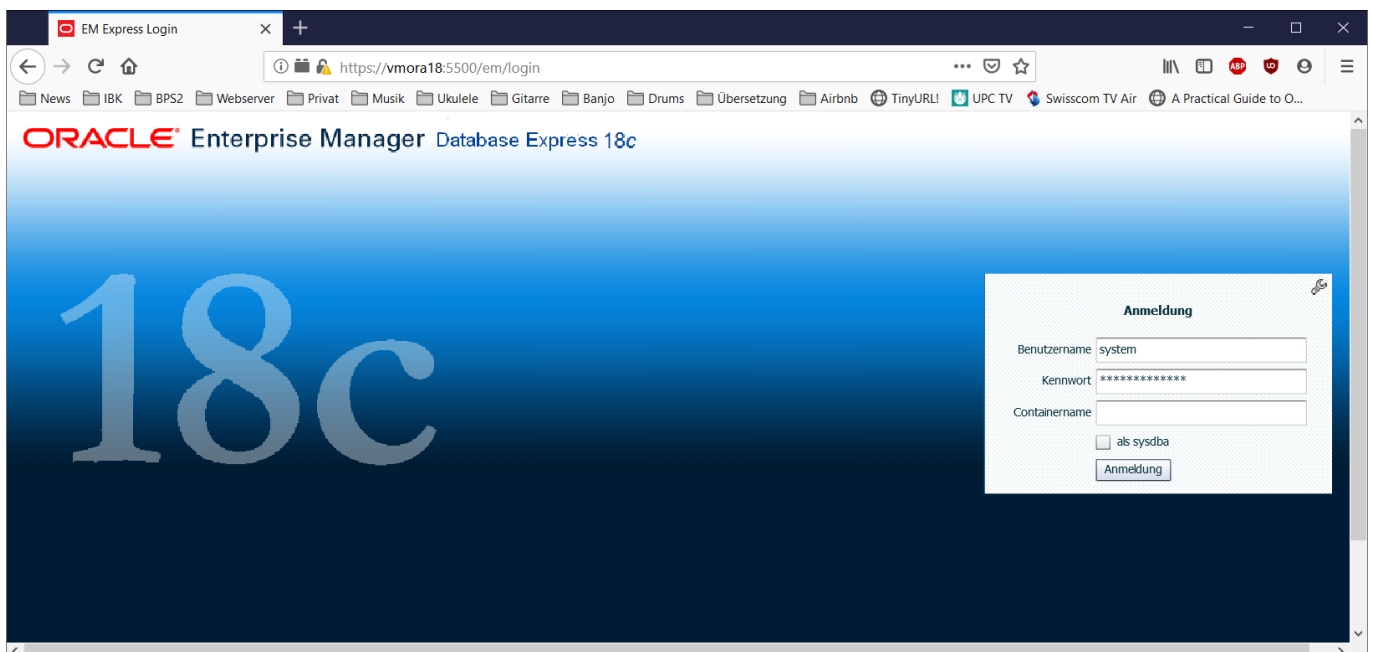
```
systemctl daemon-reload
systemctl enable oracle-xe-18c
```

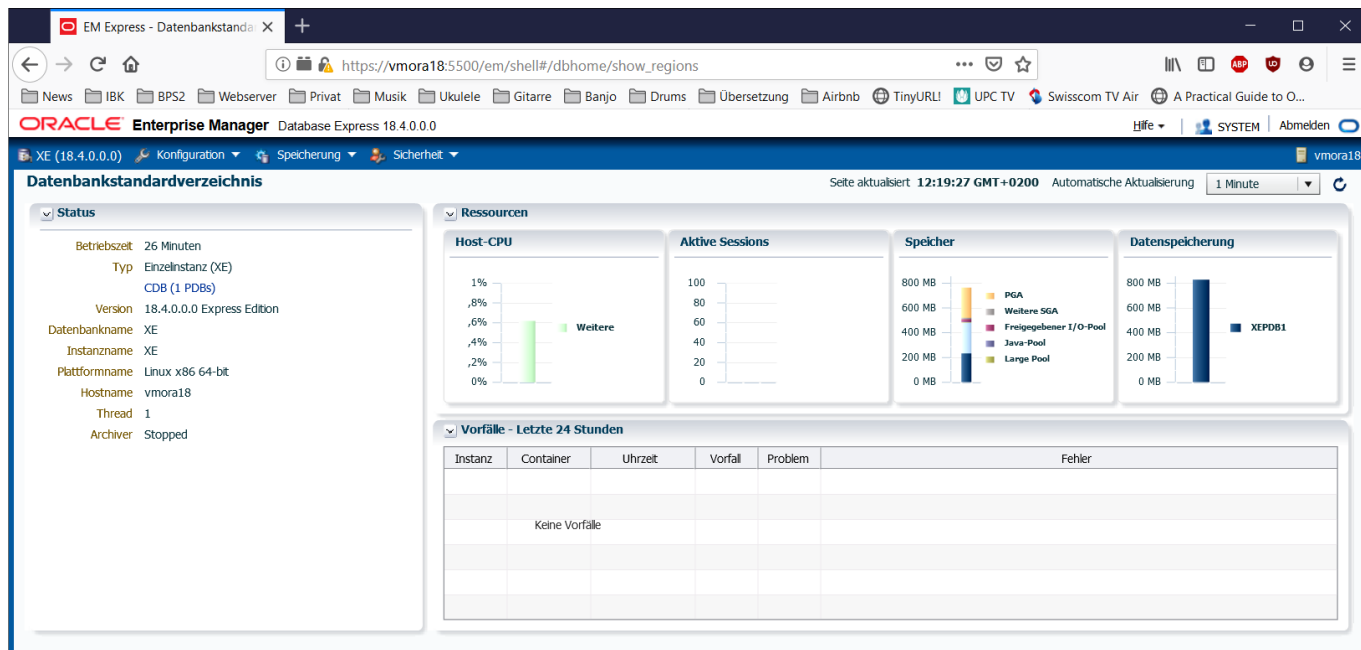
Enable Enterprise Manager Express

As oracle:

```
sqlplus / as sysdba
--
exec dbms_xdb_config.sethttpsport(5500);
```

[Test in browser](#)





Administration

Create tablespaces in xepdb1

```
sqlplus / as sysdba
```

Create and list tablespaces

```
ALTER SESSION SET CONTAINER = xepdb1;
CREATE TABLESPACE lu_agrar_dat DATAFILE
'/opt/oracle/oradata/XE/XEPDB1/lu_agrar_dat.dbf' SIZE 10M AUTOEXTEND ON
NEXT 10M;
CREATE TABLESPACE lu_agrar_inx DATAFILE
'/opt/oracle/oradata/XE/XEPDB1/lu_agrar_inx.dbf' SIZE 10M AUTOEXTEND ON
NEXT 10M;
SELECT TABLESPACE_NAME, STATUS, CONTENTS FROM DBA_TABLESPACES;
```

TABLESPACE_NAME	STATUS	CONTENTS
SYSTEM	ONLINE	PERMANENT
SYSAUX	ONLINE	PERMANENT
UNDOTBS1	ONLINE	UNDO
TEMP	ONLINE	TEMPORARY
USERS	ONLINE	PERMANENT
LU_AGRAR_DAT	ONLINE	PERMANENT
LU_AGRAR_INX	ONLINE	PERMANENT

7 rows selected.

Check new tablespaces are available in xepdb1 only

```
ALTER SESSION SET CONTAINER = CDB$ROOT;
SELECT TABLESPACE_NAME, STATUS, CONTENTS FROM DBA_TABLESPACES;
```

TABLESPACE_NAME	STATUS	CONTENTS
-----	-----	-----
SYSTEM	ONLINE	PERMANENT
SYSAUX	ONLINE	PERMANENT
UNDOTBS1	ONLINE	UNDO
TEMP	ONLINE	TEMPORARY
USERS	ONLINE	PERMANENT

Drop tablespaces in xepdb1

```
sqlplus / as sysdba
```

List and drop tablespaces

```
ALTER SESSION SET CONTAINER = xepdb1;
SELECT TABLESPACE_NAME, STATUS, CONTENTS FROM DBA_TABLESPACES;
DROP TABLESPACE lu_agrar INCLUDING CONTENTS AND DATAFILES;
```

TNSNAMES entry for clients

```
VMORA18 =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = vmora18)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = xepdb1)
    )
  )
```

Monitor Used Space



Monitoring the used space is important on XE, since you don't want to run into the maximum 12 GB limit!

What counts to the XE space limit of 12 GB is somewhat unclear for me. Oracle says **USER DATA**. So the default sys-, undo- and temporary tablespaces are probably unconsidered. Since I am not completely sure about this, I count all data visible in `cdb_data_files`.

Connect

```
sqlplus / as sysdba
```

Check used space per tablespace:

```
select tablespace_name, round(bytes/1024/1024) MB,  
round(bytes/1024/1024/1024,3) GB from cdb_data_files;
```

Sample output:

TABSPACE_NAME	MB	GB
-----	-----	-----
USERS	5	.005
UNDOTBS1	65	.063
SYSTEM	840	.82
SYS_AUX	580	.566
SYSTEM	290	.283
SYS_AUX	430	.42
UNDOTBS1	220	.215
USERS	5	.005
LU_AGRAR_DAT	50	.049
LU_AGRAR_INX	50	.049

If you just want the summary of user data:

```
select round(sum(bytes)/1024/1024) MB, round(sum(bytes)/1024/1024/1024,3) GB  
from cdb_data_files  
where tablespace_name not like 'SYS%' and tablespace_name not like 'UNDO%';
```

Sample output:

MB	GB
-----	-----
2535	2.476

Disable Password Expire

You may want to disable password expire at least for system and the BPS superuser.

As system, check used profiles:

```
select profile from DBA_USERS where username = 'SYSTEM';  
select profile from DBA_USERS where username = 'LU_AGRAR';
```

Check settings of the profiles, for example the DEFAULT profile:

```
select resource_name,limit from dba_profiles where profile='DEFAULT';
```

Set to unlimited:

```
alter profile DEFAULT limit password_life_time UNLIMITED;
```

From:

<https://bps.ibk-software.com/> - **BPS WIKI**

Permanent link:

<https://bps.ibk-software.com/dok:ora18oIn7>

Last update: **02.04.2021 20:59**

