

EDGeS

XWHEP tutorial



The EDGeS project receives Community research funding

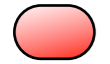










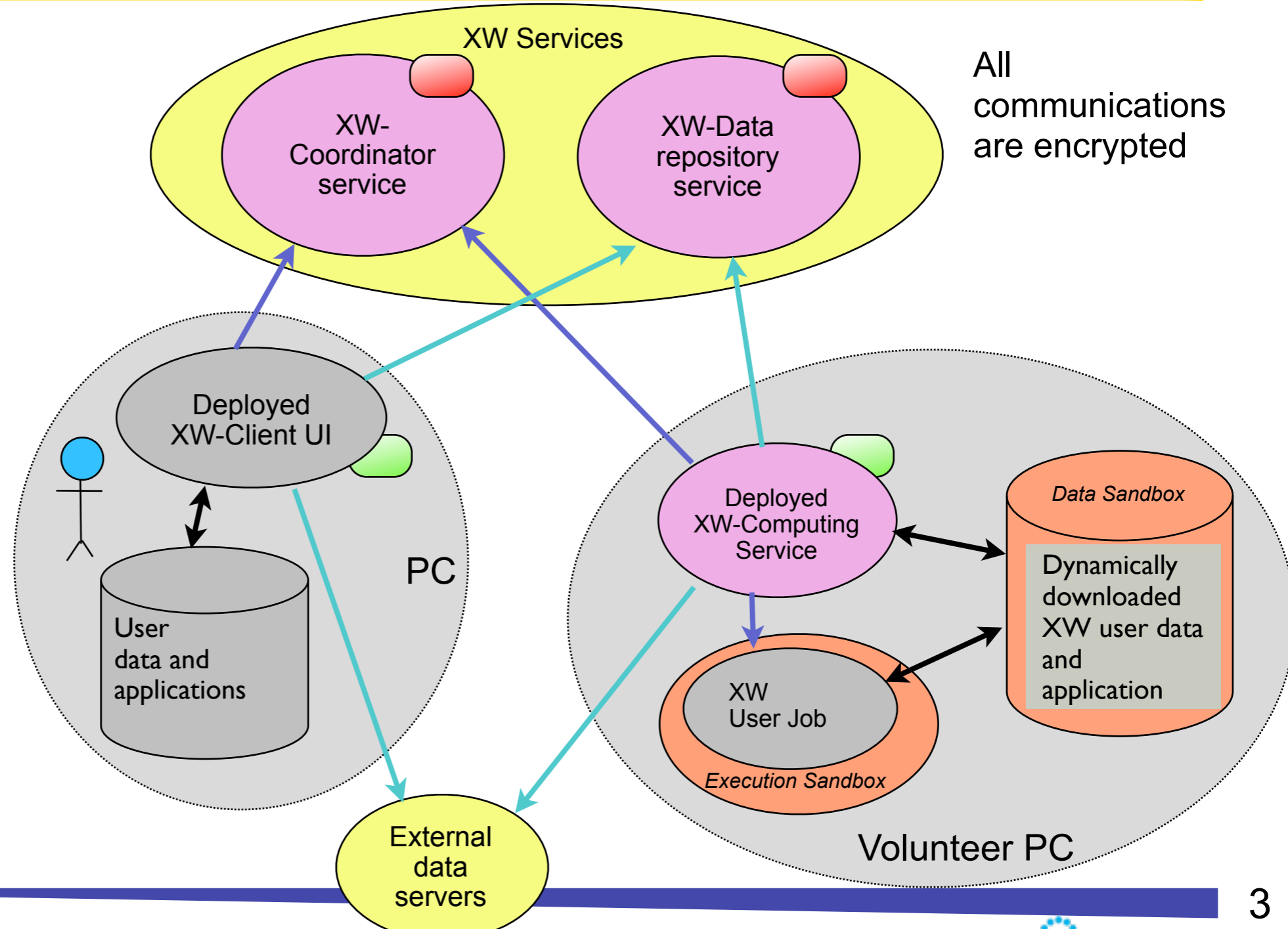
XWHEP tutorial

- Introduction
- Configuration
- Installing the server
- Installing the bridge
- Deploy the worker
- Using the client
 - Data management
 - Application management
 - Job management
 - User management

XWHEP at a glance : architecture

-  Private Key
-  Public key
-  Job Mgt
-  Data Mgt
-  Untrusted resource
-  Trusted resource
-  Service

All communications are encrypted



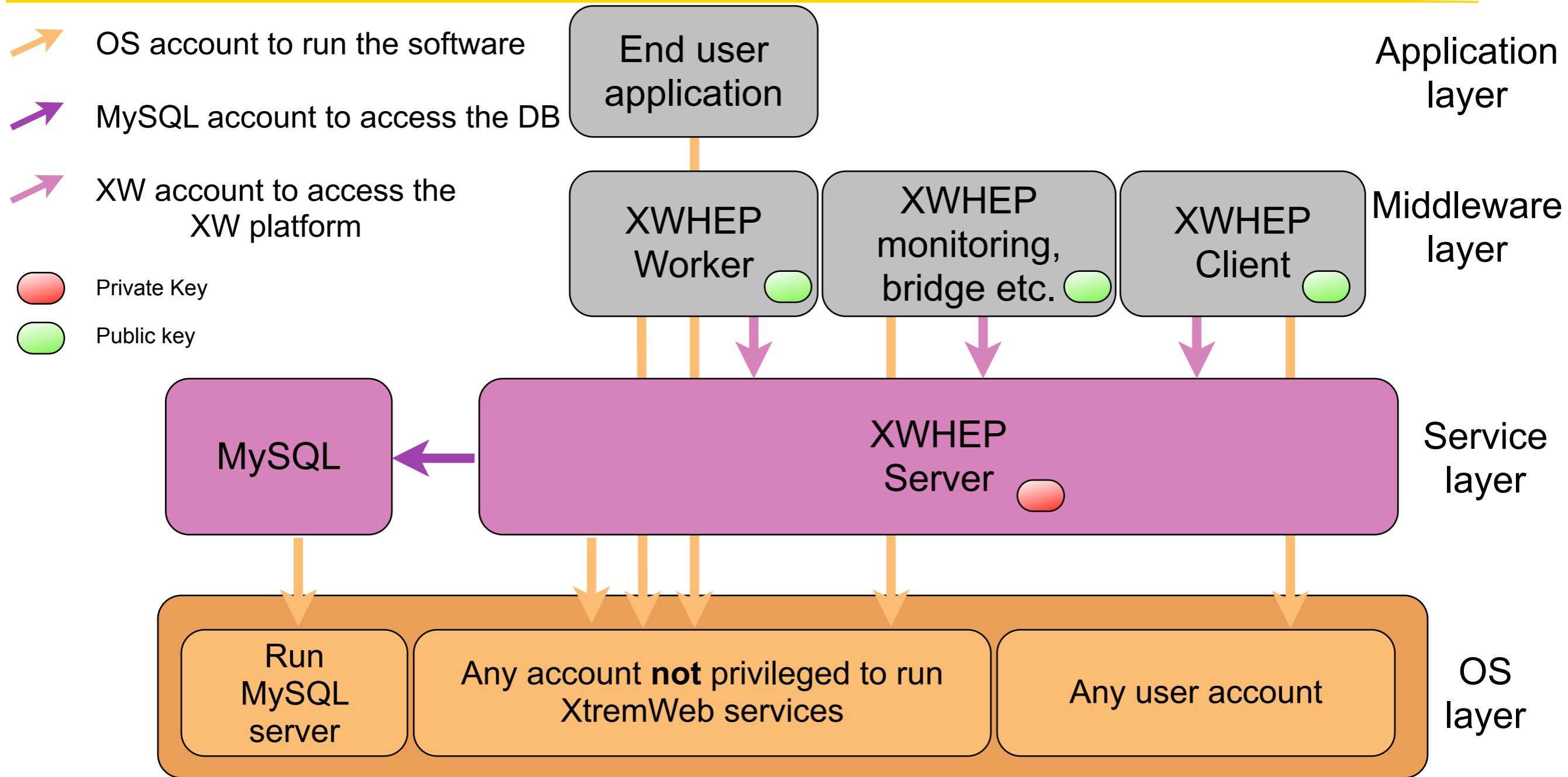
Resources are anonymously shared among individuals.

The platform must ensure :

- ➡ Quality of Service
- ➡ Security



XWHEP at a glance : user layers





Materials

The last version is XWHEP 5.6.3

This is the only maintained version.

This version is developed by LAL IN2P3, based on XtremWeb-1.8.0 by INRIA released in Oct 2006.

Materials available at

<http://dghep.lal.in2p3.fr/spip.php?article55>



Materials

XWHEP current version : 5.6.3

In this document we refer XWHEP current version as
\$VERSION



XWHEP tutorial

- Introduction
- **Configuration**
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Requirements

XWHEP needs some softwares:

- Debian 4.0 or Mac OS 10.5.6, SLC 4.5
 - ➔ We support no other OS/OS version until further notification.
- MySQL 5.0
- JDK 1.5 (JDK 1.6 not fully tested yet)
- uuidgen (which is part of libuuid1 under Debian)
- zip



Third party softwares

Testing 3rd party softwares

- `$> mysql`
- `$> uuidgen`
- `$> java`
- `$> zip`

Installing 3rd party softwares

- `apt-get install mysql-server`
- `apt-get install libuuid1`
- `apt-get install zip`
- download Java from <http://java.sun.com>



Installation

Install last version binary

```
$> wget http://dghep.lal.in2p3.fr/lal/XWHEP-$VERSION-bin.tar.gz  
$> tar xvfz XWHEP-$VERSION-bin.tar.gz
```

This «binary» version is not «out of the box»

- you need to execute the xwconfigure script to generate installation packages
- you need to install XWHEP server, workers and clients using the generated installation packages



Configuration

Run the configuration script

```
$> cd opt/XWHEP-$VERSION/
```

```
$> ./bin/xwconfigure
```

The script prepares:

- configuration files
- database
- certificates
- installation packages

The script installs:

- the client with administrator privileges



Script header

XWHEP \$VERSION
XWConfigurator

This script helps to configure an XWHEP deployment

This script aims to :

- install a new MySQL database (<http://www.mysql.com/>)
- creates electronic keys :
 - * server private key
 - * client key store including server public key
 - * worker key store including server public key
- prepare worker installers
 - * Win32 InnoSetup project (<http://www.jrsoftware.org/isinfo.php>)
 - * Mac OS X Package Maker projects (<http://www.apple.com>)
 - * Linux RPM (<http://www.rpm.org>)

In order to complete configuration, several informations are needed :

- 1- MySQL administrator account (login and password)
 - => If you don't know it, please ask your system administrator
- 1.1- Database server
 - => The name or IP address of your MySQL server
- 1.2- Database name
 - => If you don't have a valid MySQL administrator account, you won't be able to perform this
 - => In such a case, please ask your system administrator to create one new empty database for us

- 1.3- Database user (login and password)
 - => This account must have insert / update / delete privileges to the previous database
 - => This account will be used by the XW server to access database
 - => If you don't have a valid MySQL administrator account, you won't be able to perform this
 - => In such a case, please ask your system administrator to create one for you
- 2- Electronic key passphrase
 - => This is free and up to you
- 3- Electronic key password for the server
 - => This is free and up to you
- 4- Electronic key password for the worker
 - => This is free and up to you
- 5- Electronic key password for the client
 - => This is free and up to you

To reset any variable, enter "xwreset" as value

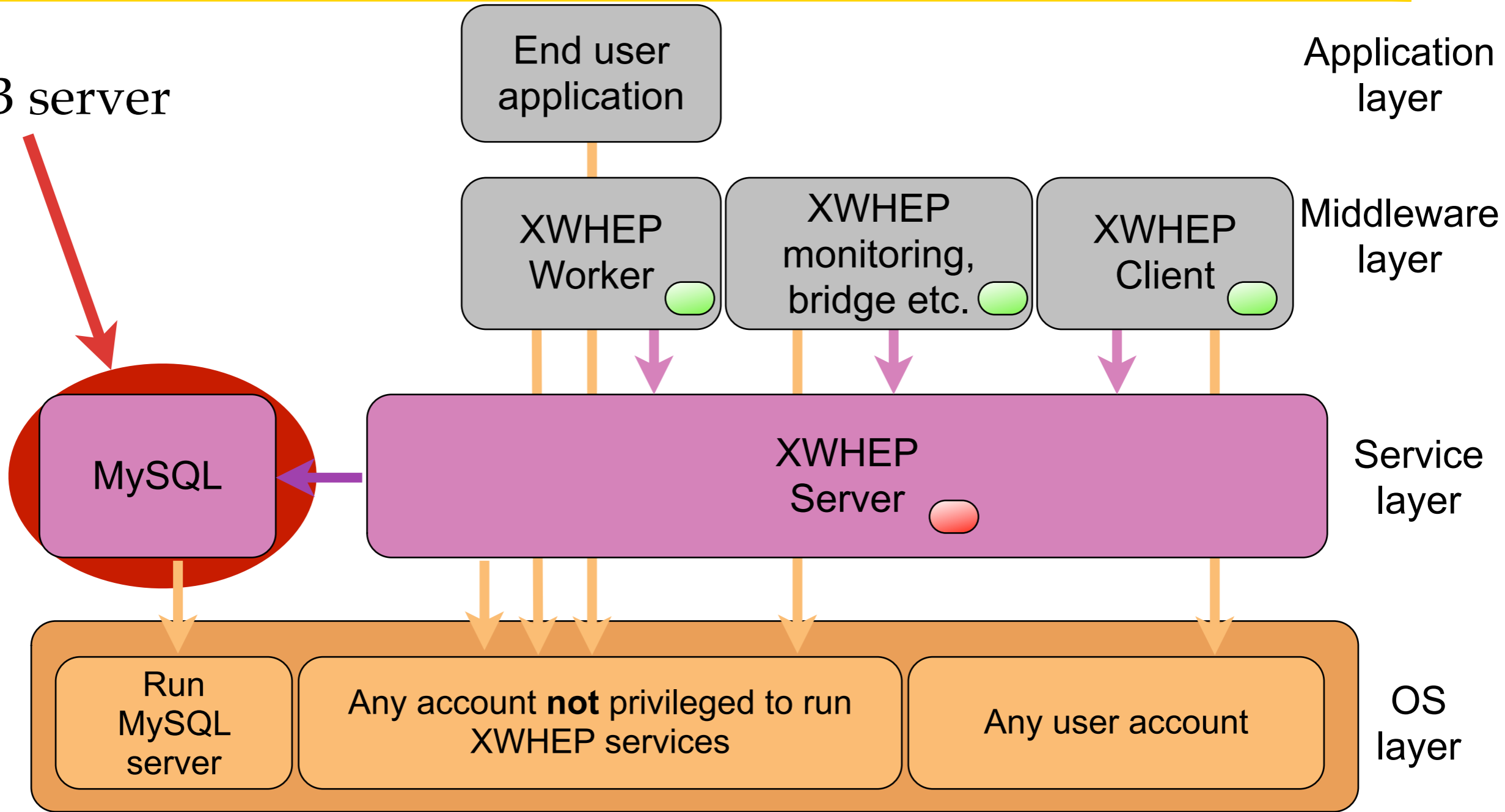
All informations are stored in /opt/XWHEP-\$VERSION/conf/xwconfigure.values

So that, you can stop this script when you want, and don't have to re-enter all informations

You should be aware that /opt/XWHEP-\$VERSION/conf/xwconfigure.values stores some critical informations!!!

Configure DB

DB server



Configure DB

DB server

Please enter your DB server [""]:

- this is the default value : to accept it, just press *Return*
- it may be set if you already run the script
- enter "xwreset" if you want to cancel any previous value (set value to "")

This is true for all asked variable

This is the resolved host name of you database server.

You can leave this empty if you run the script on the machine that will run both XW server and DB server.

The host name is validated by the command :

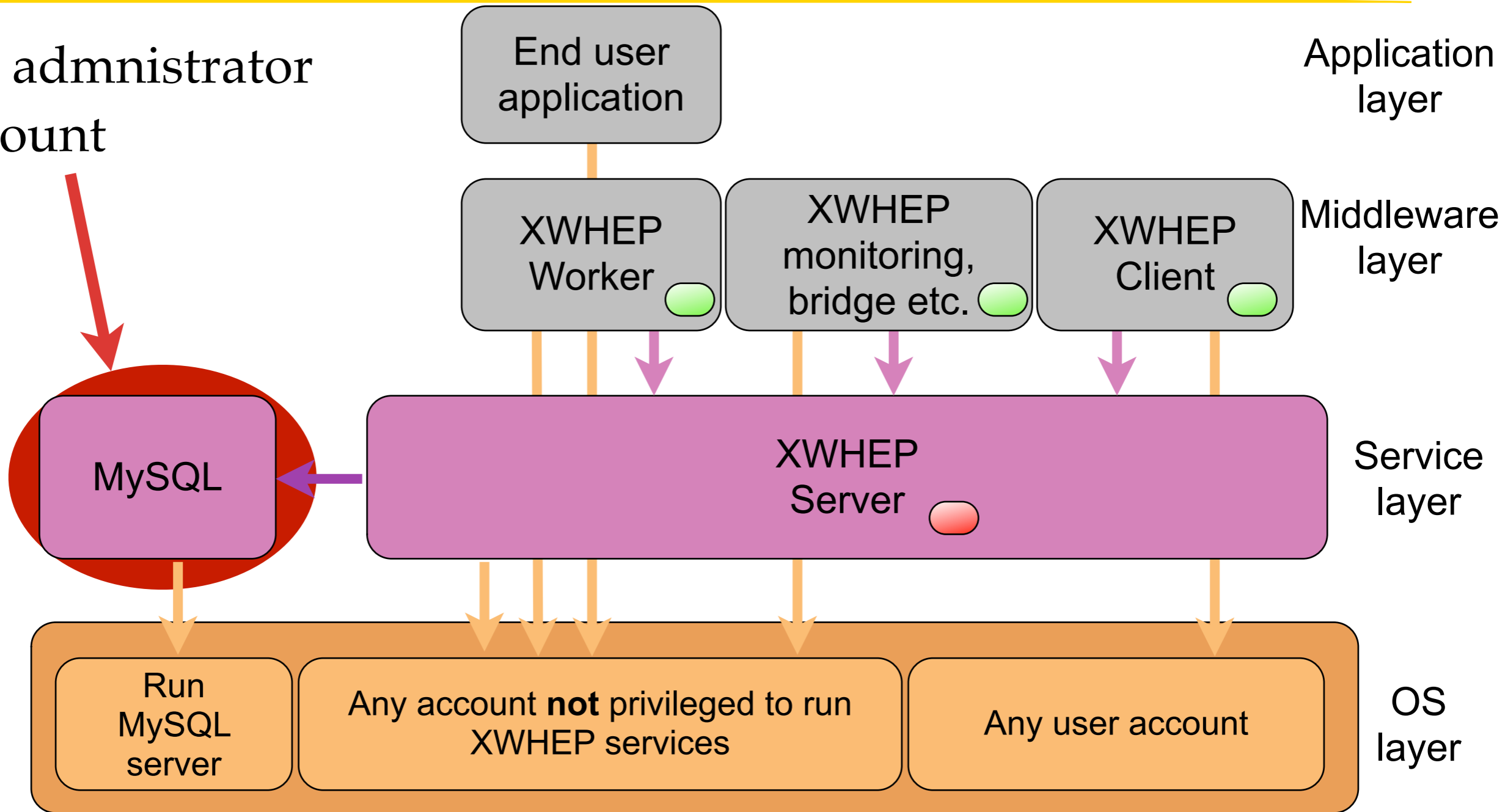
```
$> mysql -h <host name>
```

If host name is empty the validated command is

```
$> mysql
```

Configure DB

DB administrator account



Configure DB

DB administrator account

- Please enter your DB administrator login [“”]:

This is a valid DB login account for your database server.
Usually, MySQL installation has created a “root” account.

- this is the default value : to accept it, just press *Return*
- it may be set if you already run the script
- enter “xwreset” if you want to cancel any previous value (set value to “”)

- Please enter your DB administrator password [“”]:

This is the DB account password for your database server.
Usually, MySQL installation has created a “root” account without password.

These are validated by :

```
$> mysql -u <dblogin> --password=<dbpassword> [-h <host name>]
```

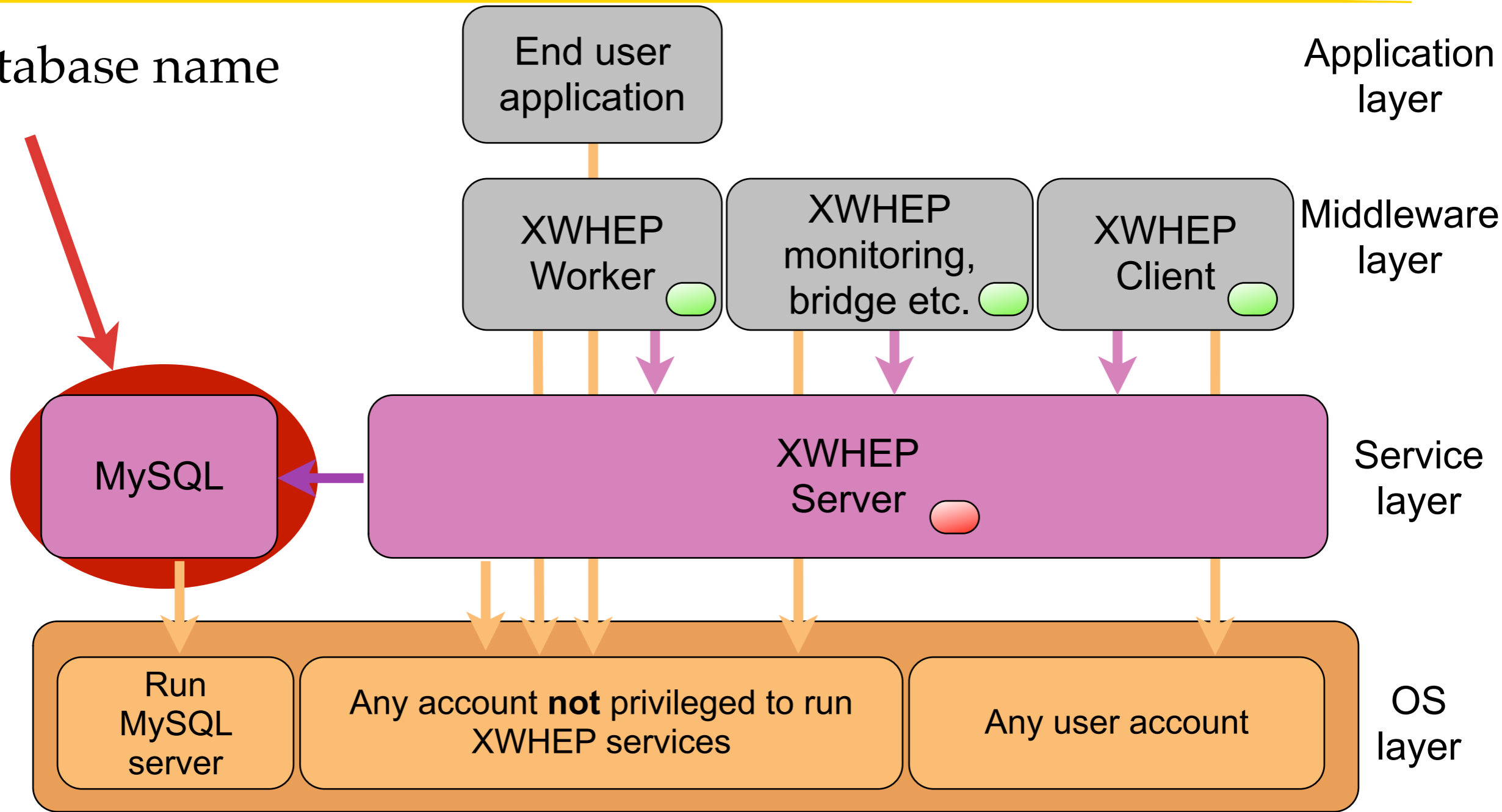
If password is empty the validated command is

```
$> mysql -u <dblogin> [-h <host name>]
```

It this does not work the script immediatly stops

Configure DB

Database name



Database name

Please enter your database name ["xtremweb"]:

etc.

This is the name of the database the script will create, with all its tables.

If your DB account does not allow to create a database, please ask your system administrator to create one for you.

The script will check if DB already exists and will then only create tables.

This is validated by :

```
$> mysql -u <dblogin> [--password=<dbpassword>] [-h <host name>] <dbname>
```

If this does not work the script immediately stops

DB configuration error

Here is what the script dumps on DB access error

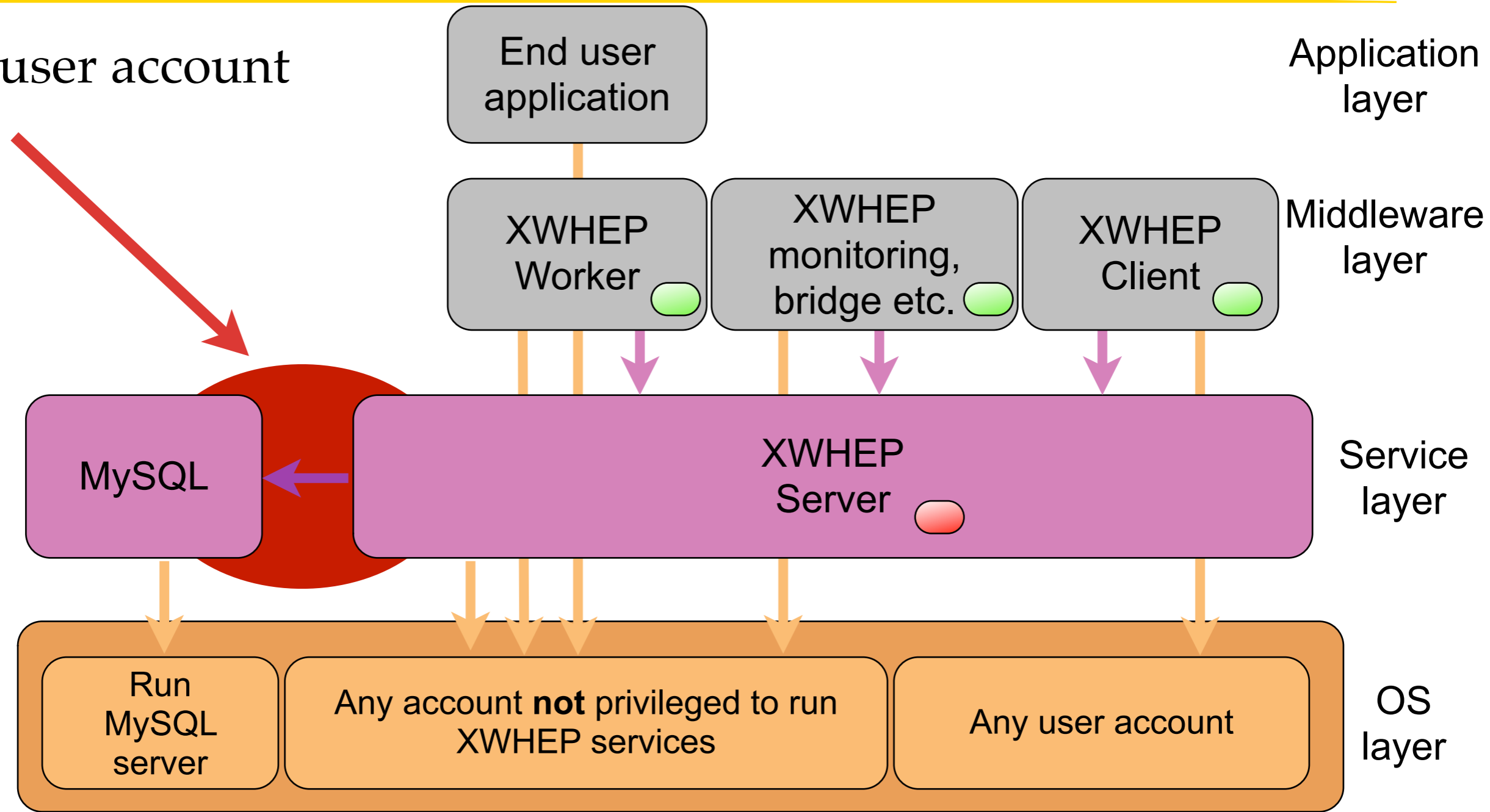
```
- * !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! * -
```

```
Error : MySQL access error; can't execute "mysql -u root -h dummy -e ""
```

```
- * !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! * -
```

Configure DB

DB user account





Configure DB

DB user account

- *Please enter a valid DB user name the XW server will use to connect to DB server :*

This is the DB account login the XWHEP server will use to connect to DB server.

If you can't create a new DB account, please ask your system administrator to create one for you with full access to database created on previous slides.

The script will try to create this new account.

- *Please enter a valid DB user password the XW server will use to connect to DB server :*

This is the DB account password the XWHEP server will use to connect to DB server.

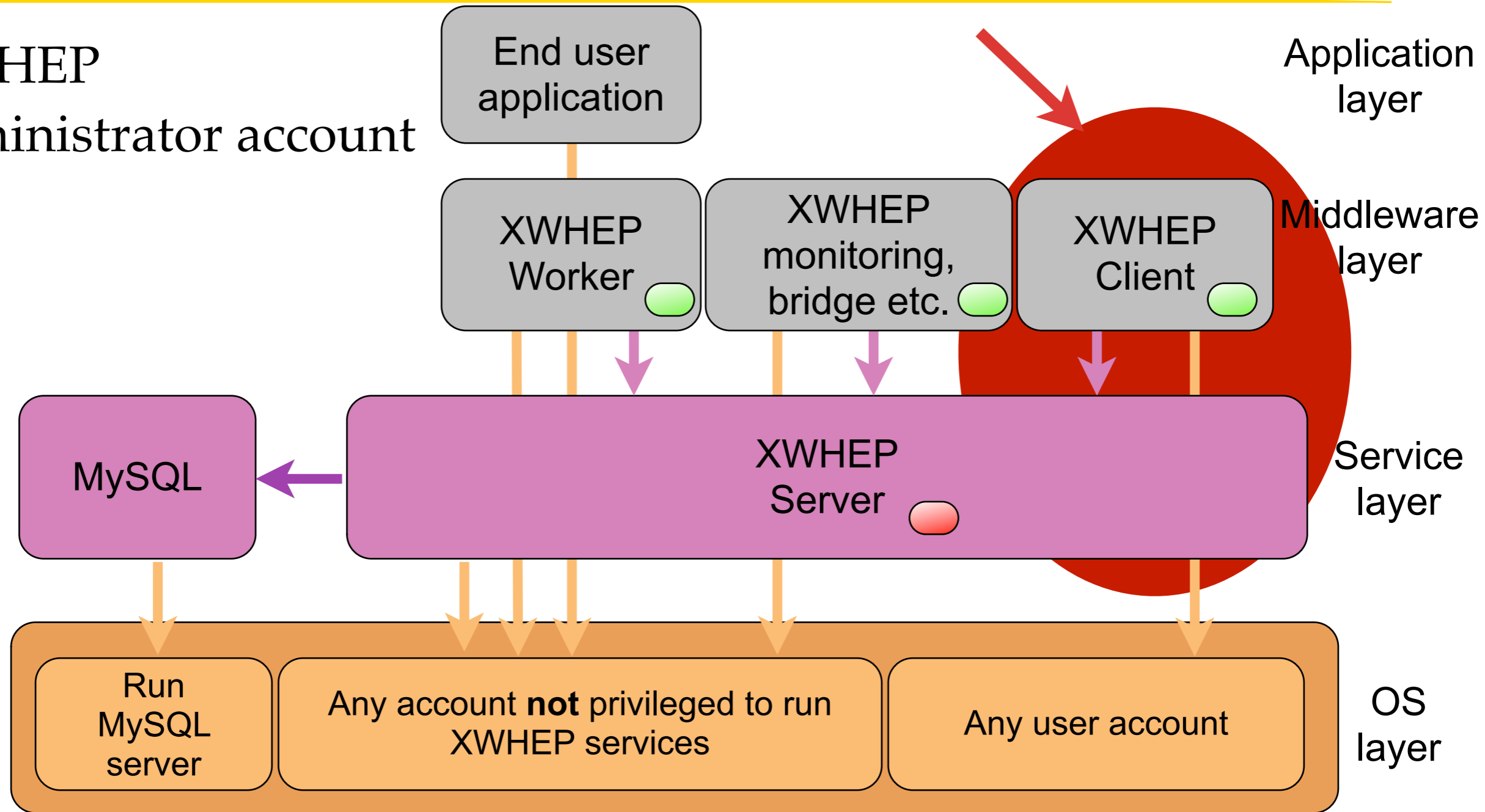
If you can't create a new DB account, please ask your system administrator to create one for you with full access to database created on previous slides.

The script will try to create this new password.

Configure XWHEP

XWHEP

administrator account





Configure XWHEP

XWHEP administrator account

- *Please enter an XW administrator login you will use to connect to XW server :*

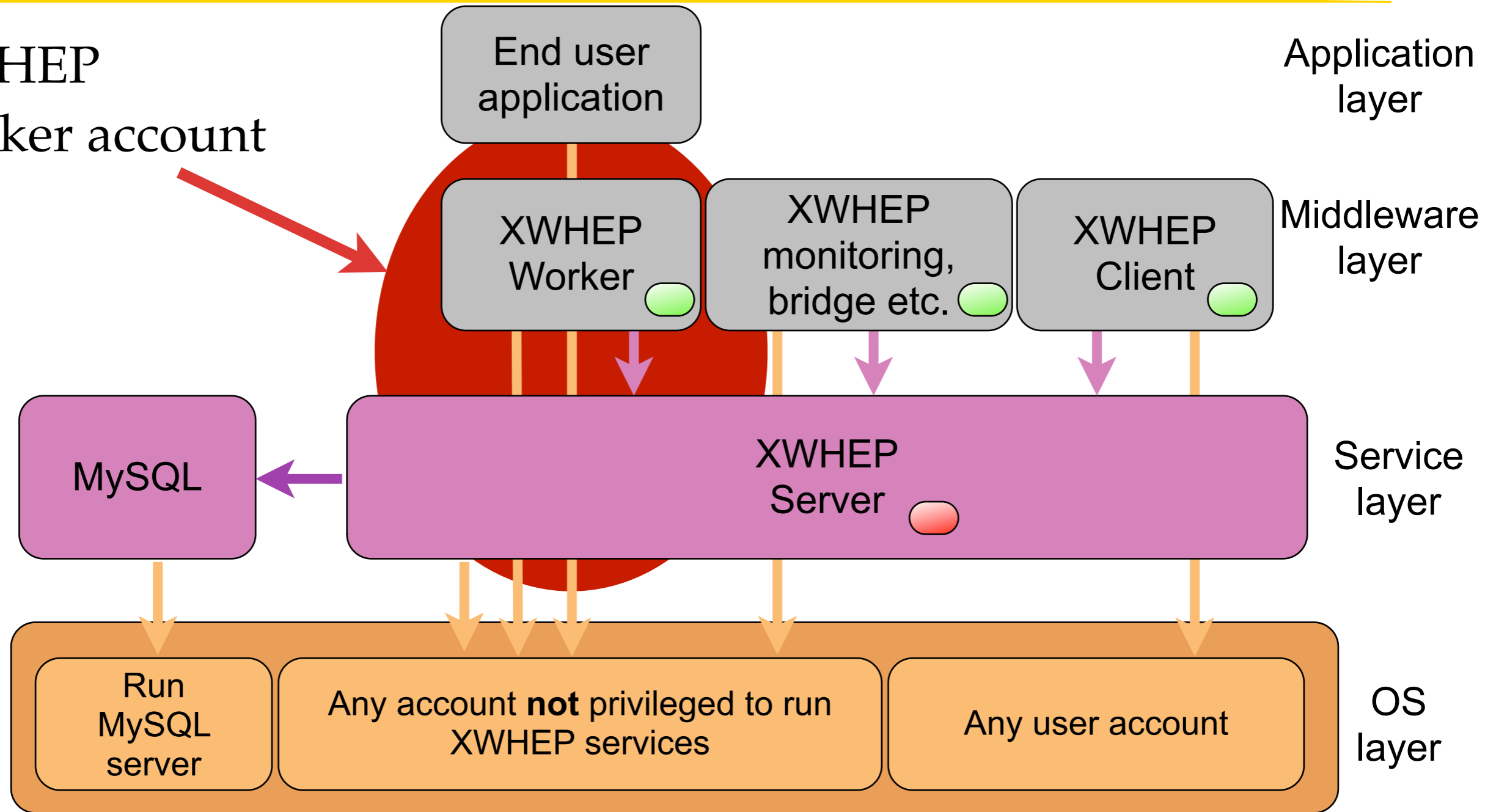
This is the XWHEP administrator account you will use to manage your XW platform.

- *Please enter an XW administrator password you will use to connect to XW server*

This is the XWHEP administrator password you will use to manage your XW platform.

Configure XWHEP

XWHEP
worker account





Configure XWHEP

XWHEP worker account

- *Please enter an XW worker login your workers will use to connect to XW server :*

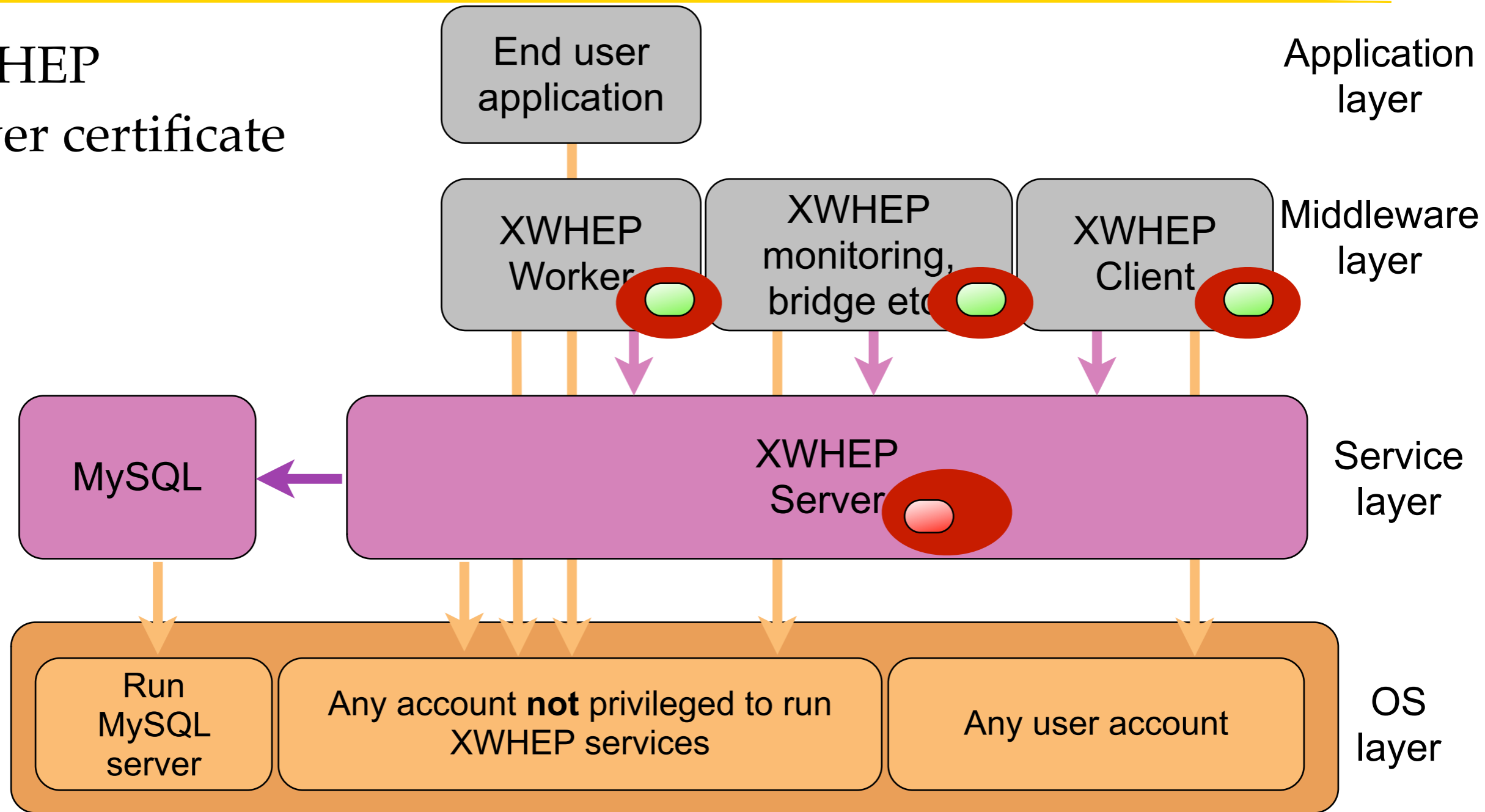
This is the XWHEP worker login your workers will use to connect to your XW server.

- *Please enter an XW worker password you will use to connect to XW server*

This is the XWHEP worker password your workers will use to connect to your XW server.

Configure XWHEP

XWHEP
server certificate





Configure XWHEP

XWHEP server certificate

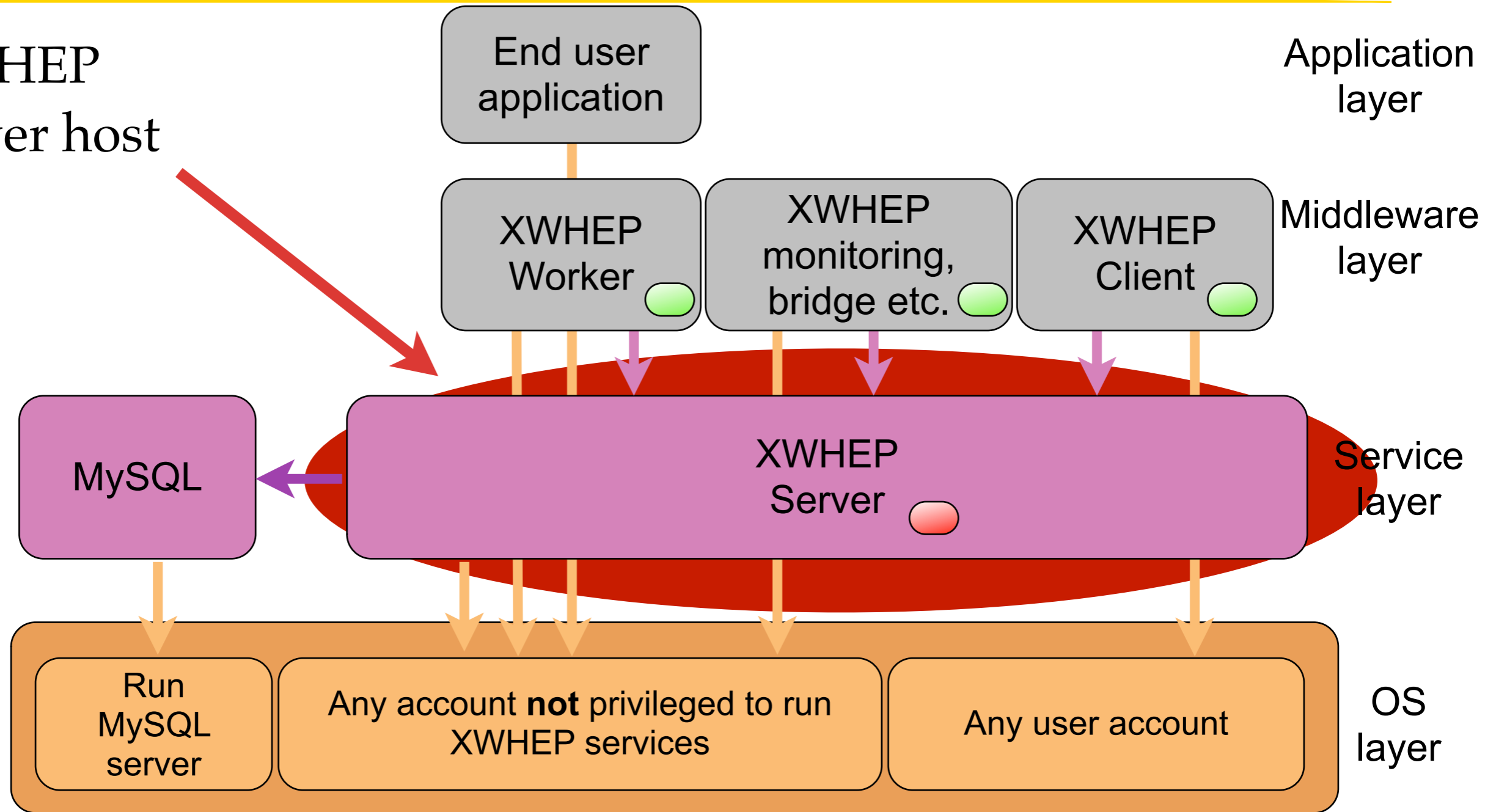
- *Please enter a common name for your certificate :*
This is the name of your platform (e.g. xwhep.edges-na3)
- *Please enter a organization unit for your certificate*
This is your organization unit (e.g. LAL)
- *Please enter an organization for your certificate*
This is your organization (e.g. CNRS)
- *Please enter a locality for your certificate*
This is your locality (e.g. Orsay)
- *Please enter a country for your certificate*
This is your country (e.g. fr)

XWHEP server certificate

- *Please enter a passphrase needed to generate electronic key*
This is your secret passphrase
- *Please enter a password for the server electronic key store*
This is the password to secure your server keystore
- *Please enter a password for the worker electronic key store*
This is the password to secure your worker keystore
- *Please enter a password for the client electronic key store*
This is the password to secure your client keystore

Configure XWHEP

XWHEP
server host





Configure XWHEP

XWHEP server host

Please enter the resolved name or IP address where your XW server will run

This is the host name or IP address of your XWHEP server.



Configure XWHEP

Upgrade URL

Please enter the resolved name or IP address where your XW server will run

This is the URL where distributed parts (clients and workers) can find XW binary so that they can automatically upgrade if server is upgraded.

The URL can not point to localhost.

If the script can't find xtremweb.jar from URL, the following message is displayed:

!!

Can't download xtremweb.jar from "http://dummmmy"

You will have to ensure that xtremweb.jar can be found at "http://dummmmy"

!!





Configure XWHEP

You entered :

**** Database configuration :

```
DBHOST      = ""
DBNAME      = "xtremweb"
DBADMINLOGIN = "root"
DBADMINPASSWORD = ""
DBUSERLOGIN  = "xwdbuser"
DBUSERPASSWORD = "xwdbuserp"
XWADMINLOGIN  = "admin"
XWADMINPASSWORD = "adminp"
XWORKERLOGIN  = "worker"
XWORKERPASSWORD =
"workerp"
```

**** XWHEP server configuration :

```
XWSERVER    = "mbp-oleg.local"
XWUPGRADEURL = "http://
dummmy"
```

**** Certificate configuration :

```
SSLKEYPASSPHRASE = ""
SSLKEYCLIENTPASSWORD = "clientp"
SSLKEYSERVERPASSWORD = "serverp"
SSLKEYWORKERPASSWORD =
"workerp"
Common Name      = "xwhep.Edes"
Organisation Unit = "in2p3"
Organization Name = "cnrs"
Locality Name    = "orsay"
Country          = "fr"
```

Do you accept it [y/N] ?





Configure XWHEP

```
Preparing database xtremweb..... Done
Preparing server configuration file /opt/XWHEP-$VERSION/conf/xtremweb.server.conf..... Done
Preparing worker configuration file /opt/XWHEP-$VERSION/conf/xtremweb.worker.conf.... Done
Copying worker configuration file /opt/XWHEP-$VERSION/conf/xtremweb.worker.conf to /opt/XWHEP-$VERSION/installers/macosx/xtremweb.worker/installer
etc/xtremweb.worker/
Copying worker configuration file /opt/XWHEP-$VERSION/conf/xtremweb.worker.conf to /opt/XWHEP-$VERSION/installers/win32/xtremweb.worker/innosetup
conf/
Preparing client configuration file /opt/XWHEP-$VERSION/conf/xtremweb.client.conf.... Done
Creating server keystore file /opt/XWHEP-$VERSION/keystore/xwhepserver.keys
Génération de la paire de clés DSA ? 1024 bits et du certificat autosigné (SHA1WithDSA)
pour : CN="xwhep.Edes o=cnrs c=fr ou=in2p3 l=orsay"
[Stockage de /opt/XWHEP-$VERSION/keystore/xwhepserver.keys]
Exporting server public key to /opt/XWHEP-$VERSION/keystore/xwhepcert.keys
Certificat enregistré dans le fichier </opt/XWHEP-$VERSION/keystore/xwhepcert.keys>
Creating worker keystore file /opt/XWHEP-$VERSION/keystore/xwhepworker.keys
Génération de la paire de clés DSA ? 1024 bits et du certificat autosigné (SHA1WithDSA)
pour : CN="xwhep.Edes o=cnrs c=fr ou=in2p3 l=orsay"
[Stockage de /opt/XWHEP-$VERSION/keystore/xwhepworker.keys]
Certificat ajouté au Keystore
[Stockage de /opt/XWHEP-$VERSION/keystore/xwhepworker.keys]
Creating client keystore file /opt/XWHEP-$VERSION/keystore/xwhepclient.keys
Génération de la paire de clés DSA ? 1024 bits et du certificat autosigné (SHA1WithDSA)
pour : CN="xwhep.Edes o=cnrs c=fr ou=in2p3 l=orsay"
[Stockage de /opt/XWHEP-$VERSION/keystore/xwhepclient.keys]
Certificat ajouté au Keystore
```





Configure XWHEP

Preparing RPM worker package to `/opt/XWHEP-$VERSION/installers/linux/rpm/xtremweb.worker/BUILD/XWHEP-worker-$VERSION/opt`

Preparing worker Debian package

`dpkg-deb` : construction du paquet « `xtremweb-worker` » dans « `/opt/XWHEP-$VERSION/installers/linux/dpkg/xtremweb.worker.deb` ».

Worker Debian package ready

Preparing RPM server package to `/opt/XWHEP-$VERSION/installers/linux/rpm/xtremweb.server/BUILD/XWHEP-server-$VERSION/opt... D`

Preparing server Debian package

`dpkg-deb` : construction du paquet « `xtremweb-server` » dans « `/opt/XWHEP-$VERSION/installers/linux/dpkg/xtremweb.server.deb` ».

Server Debian package ready

Then everything is ready





What have been installed

Directory structure :

- bin/ scripts
- conf/ configuration files

- keystore/ certificates
- lib/ libraries

- installers/ installation packages
 - Linux Redhat RPM
 - Linux Debian DPKG
 - Mac OS X PKG
 - Win32 MSI



XWHEP tutorial

- Introduction
- Configuration
- **Installing the server**
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Installing the server

Linux rpm	installers/linux/rpm/ XWHEP.server	<u>Installation</u> rpm -i XWHEP.server <u>Uninstallation</u> rpm -e XWHEP.server
Linux debian	installers/linux/dpkg/ XWHEP.server	<u>Installation</u> dpkg -i XWHEP.server.deb <u>Uninstallation</u> dpkg -r XWHEP-server
Mac OS 10.5	installers/macosx/ XWHEP.server	xwhep-server.pmdoc



What have been installed

On Linux, everything is in `/opt/XWHEP-server-$VERSION`

Directory structure :

- `bin/` scripts
- `conf/` configuration files
- `keystore/` certificates
- `lib/` libraries



What have been installed

On Mac OS X

Directory structure :

- /usr/local/bin/
- /private/etc/xwhep.server
- /Applications/xwhep.server/doc
- scripts
- configuration files, java libraries, certificates
- documentations



Running the server

Server is started at boot time.

You can also manually call scripts to start/stop/restart the server

- Linux
 - ➔ `/etc/init.d/xtremweb.server [start | stop | restart | console]`
(*console* starts the server in foreground mode)
- Mac OS X
 - ➔ `/Library/StartupItems/xwhep.server/xtremweb.server [start | stop | restart | console]`
(*console* starts the server in foreground mode)

The server log is :

`/tmp/xwhep.server-yourhost.log`



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Installing the bridge

Linux rpm

installers/linux/rpm/
XWHEP.bridge

Installation

```
rpm -i XWHEP.bridge
```

Uninstallation

```
rpm -e XWHEP.bridge
```

Linux debian

installers/linux/dpkg/
XWHEP.bridge

Installation

```
dpkg -i XWHEP.bridge.deb
```

Uninstallation

```
dpkg -r XWHEP-bridge
```





What have been installed

On Linux, everything is in `/opt/XWHEP-bridge-$VERSION`

Directory structure :

- `bin/` scripts
- `conf/` configuration files
- `keystore/` certificates
- `lib/` libraries



Running the bridge

Bridge is started at boot time.

You can also manually call scripts to start/stop/restart the bridge

- Linux

➔ `/etc/init.d/xwhep.bridge [start | stop | restart]`

The bridge log is :

`/tmp/xwhep.bridge-yourhost.log`



XWHEP tutorial

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- **Deploy the worker**
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 - Data management
 - Application management
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Deploy the worker

Linux rpm	installers/linux/rpm/ XWHEP.worker	<u>Installation</u> rpm -i XWHEP.worker <u>Uninstallation</u> rpm -e XWHEP.worker
Linux debian	installers/linux/dpkg/ XWHEP.worker	<u>Installation</u> dpkg -i XWHEP.worker.deb <u>Uninstallation</u> dpkg -r XWHEP-worker
Mac OS 10.5	installers/macosx/ XWHEP.worker	xwhep-worker.pmdoc
Win 32	installers/win32	installers/win32/XWHEP.worker/InnoSetup/worker.iss

<http://www.innosetup.com/>



What have been installed

On Linux, everything is in `/opt/XWHEP-worker-$VERSION`

Directory structure :

- `bin/` scripts
- `conf/` configuration files
- `keystore/` certificates
- `lib/` libraries



What have been installed

On Mac OS X

Directory structure :

- /usr/local/bin/
- /private/etc/xwhep.worker
- /Applications/xwhep.worker/doc
- scripts
- configuration files, java libraries, certificates
- documentations



Deploy the worker

Workers are started at boot time.

You can also manually call scripts to start/stop/restart the worker

- Linux
 - ➔ `/etc/init.d/xtremweb.worker [start | stop | restart | console]`
(*console* starts the worker in foreground mode)
- Mac OS X
 - ➔ `/Library/StartupItems/xwhep.worker/xtremweb.worker [start | stop | restart | console]`
(*console* starts the worker in foreground mode)

The worker log is :

`/tmp/xwhep.worker-yourhost.log`



XWHEP tutorial

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- Configuration
- Installing the server
- Installing the bridge
- Deploy the worker
- **Using the client**
 - Data management
 - Application management
 - Job management
 - User management



Using the client

Control the client : linux like

Send objects

- xwsendwork
- xwsubmit

- xwsendapp
- xwsenddata
- xwsendgroup
- xwendsession
- xwsenduser
- xwsendusergroup

Get objects

- xwapps [UID|URI ...]
- xwdatas [UID|URI ...]
- xwgroups [UID|URI ...]
- xwsessions [UID|URI ...]
- xwtasks [UID|URI ...]
- xwusers [UID|URI ...]
- xwusergroups [UID|URI ...]
- xwworks [UID|URI ...]
- xwworkers [UID|URI ...]

Manage Objects

- xwchmod
- xwrm

Misc

- xwclean
- xwgui



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- **Data management**
- **Application management**
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Data usage inside XWHEP:

- Data encompass binaries, inputs and results
- XWHEP server may serve data
- but data can be stored in any public server
- data must be defined by URI

- XWHEP handles following URI schemas
 - http
 - xw (introduced by XWHEP for data managed by XWHEP server)



XWHEP Data management

All users can insert data.

Data usage basic commands:

- **xwsenddata**: insert/update data in XWHEP server
 - ➔ you get an URI `xw://mySrv/UID`
 - ➔ keep this URI to be able to reference your data
- **xwdata `xw://mySrv/UID`**: read data from XWHEP server
- **xwrm `xw://mySrv/UID`**: removes your data from XWHEP server
 - ➔ data is removed only if user has the right to do so (if it owns data)



XWHEP tutorial

- Introduction
- Configuration
- Installing the server
- Installing the bridge
- Deploy the worker
- Using the client
- Data management
- **Application management**
- Job management
- User management



XWHEP application management

Application usage in the platform:

- contains binaries for several architectures
 - Mac OS X
 - Linux
 - Win32
 - Java
- binaries are just data
 - binaries may be stored in XWHEP server
 - but binaries may be stored anywhere as soon as they are described by an URI



XWHEP application management

Applications are stored on XWHEP server.

All users can insert applications. But admin privileges are needed to insert applications that can be used by any user (these app are **public**)

Application basic commands:

- **xwsendapp**: insert / update application in XWHEP server
 - ➔ you get an URI `xw://mySrv/UID`
 - ➔ keep this URI to be able to reference your app
- **xwapp `xw://mySrv/UID`**: read app from XWHEP server
- **xwrm `xw://mySrv/UID`**: removes your app from XWHEP server



XWHEP application example

The package includes “apptest”.

Next example illustrates how to insert one application with two binaries :

```
$> xwsendapp apptest ix86 linux apptest/apptest-linux-ix86
```

```
$> xwsendapp apptest ix86 macosx apptest/apptest-macosx-ix86
```

```
$> xwapps
```

```
<xml version="1.0" ...>
```

```
<get>
```

```
<app name="apptest" linux_ix86uri="xw://..." macosx_ix86uri="xw://..." />
```

```
</get>
```



XWHEP application example

Update apptest

```
./bin/xwsendapp --xwconfig conf/xtremweb.client.conf-admin --xwxml  
apptest.xml
```



XWHEP tutorial

- Introduction
- Configuration
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- Deploy the worker
- Using the client
- Data management
- Application management
- **Job management**
- User management

Job usage in the platform:

- job refer applications stored in XWHEP server
- can have input data, results data
- inputs can be stored in XWHEP server
- but input may be stored anywhere as soon as they are described by an URI
- results are stored in XWHEP server

Jobs are stored on XWHEP server.

All users can insert jobs. Jobs refer to applications in XWHEP server.

Job usage basic commands:

- **xwsubmit**: insert a job in XWHEP server
 - ➔ you get an URI `xw://mySrv/UID`
 - ➔ keep this URI to be able to reference your job
- **xwworks** `xw://mySrv/UID`: retrieves job from XWHEP server
- **xwresult** `xw://mySrv/UID`: retrieves job results
- **xwrm** `xw://mySrv/UID`: removes your job from XWHEP server
 - ➔ job is removed only if user has the right to do so (if it owns job)



XWHEP job example

```
$> xwsubmit apptest -n 10
```

```
$> xwworks
```

```
$> xwresults
```



XWHEP tutorial

- Introduction
- Configuration
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- Data management
- Application management
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- **User management**



XWHEP user management

XWHEP user are registered to use the platform

- xwsenduser:

➔ `$> xwsenduser <login> <password> <email> <rights> [<a user group UID | URI>]`

Rights:

```
$> java -cp xtremweb.jar xtremweb.common.UserRights
```

...

```
STANDARD_USER
```

...

```
SUPER_USER
```

