# Reinstall R packages from User's home-directories following an OS upgrade

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## Introduction

If customers are upgrading the OS on their Posit Workbench servers, there is an open question what to do with the R packages that users have installed into their user library (as set by `R_LIBS_USER` , typically `~/R/...`)

While there is some consensus that installing packages into a shared directory, especially then pointing to the "latest" CRAN repo is bad practice, those things still happen.

An impending OS upgrade will already interrupt users in some way (outage), but more productivity is lost by simply removing R packages installed in `R_LIBS_USER` and leave it as an exercise to the users to reinstall their R packages (cf. Posit's recommendations)

This document describes an efficient way on how to reinstall R packages in `R_LIBS_USERS`.

## Test approach

### Setup

1. Use 20 user accounts named `positXXXX` with XXXX being zero-padded 4-digits numbers ranging from 0001 to 0020

2. For each user, randomly select up to 20 of the top 3000 most downloaded packages from public package manager over the last year

3. Merge the package list into one and use this to install (as root) all the required OS dependencies.

4. For each user install the selected packages into `R_LIBS_USER` using R version 4.3.2, installed in `/opt/R/4.3.2`.

**Actual Upgrade**

1. (ideally done pre-upgrade) For each user get a list of all installed packages from `R_LIBS_USER`.

2. Merge the package lists into a global list and install all OS dependencies

3. For each user, delete their `R_LIBS_USER` and reinstall all packages from the list obtained in step 1

> **i** Note
>
> The above assumes that after the OS upgrade the same version of R is installed again and is readily configured with appropriate repositories (e.g. CRAN, Bioconductor or public/private Posit Package Manager).

**Test Setup Details**

1. Setup 20 user accounts named `positXXXX` with XXXX being zero-padded 4-digits numbers ranging from 0001 to 0020

2. Clone github repo into the home-directory of `posit0001`

3. Symlink the `upgrade` subfolder to `/home/posit0001/upgrade`.

4. Randomly select up to 20 of the top 3000 most downloaded packages from public package manager over the last year. This will create a file named `pkgs-selected-4.3.txt` in each user's home-directory.

   ```
   for i in `seq 1 20`
   do
     user="posit`printf %04i $i`"
     echo $user
     mkhomedir_helper $user
     sudo -u $user bash -l -c "cd && rm -rf ~/R ~/.cache/R/pkgcache && /opt/R/4.3.2/bin/
   done
   ```

5. Merge all individual selected package lists into one and install OS dependencies

   ```
   cat /home/posit00*/pkgs-selected-4.3.txt  | sort -u  > /home/posit0001/pkgs-selected-

   /opt/R/4.3.2/bin/Rscript /home/posit0001/upgrade/install-os-deps.R
   ```

6. Install selected R packages for each user including package dependencies

```
for i in `seq 1 20`
do
  user="posit`printf %04i $i`"
  echo $user
  sudo -u $user bash -l -c "cd && /opt/R/4.3.2/bin/Rscript /home/posit0001/upgrade/in
done

rm -f /home/posit00??/pkgs-selected-*.txt
```

> **❗ Important**
>
> All commands in this and the next section need to be run as root user with working
> directory set to `/home/posit0001`.

## OS upgrade procedure

### Before upgrade

Let's create a package list of installed packages for each of the users. The below script will
create a file called `pkgs-4.3.txt` in each user's home-directory.

```
for i in `seq 1 20`
do
  user="posit`printf %04i $i`"
  echo $user
  sudo -u $user bash -l -c "cd && /opt/R/4.3.2/bin/Rscript /home/posit0001/upgrade/get-pac
done
```

Then let's create a combined package list of all packages the users have installed and use this
to install all OS dependencies.

```
cat /home/posit00*/pkgs-4.3.txt  | sort -u  > /home/posit0001/pkgs-selected-combined.txt

/opt/R/4.3.2/bin/Rscript /home/posit0001/upgrade/install-os-deps.R
```

> **ℹ Note**
>
> At this step there is a risk that an error will occur due to OS dependency resolution
> issues. Usually those errors are fairly self-explanatory and should be helpful to find a fix.
> If not, please report any issue to https://github.com/r-lib/pak

**After the upgrade**

Let's remove the old `R_LIBS_USER` and install the packages from the list of packages created.

```
for i in `seq 1 20`
do
  user="posit`printf %04i $i`"
  echo $user
  sudo -u $user bash -l -c "cd && /opt/R/4.3.2/bin/Rscript /home/posit0001/upgrade/reinsta
done
```

> **i Note**
>
> The last step also could be done by each user individually at their own leisure.