GNOME Private Session

Do you confirm that you are eligible for this internship as stated in our eligibility rules at https://wiki.gnome.org/Internships#Eligibility?. Answer "yes" or "no".
Yes

Do you confirm that you have read and agree with the internship contract linked at https://wiki.gnome.org/Internships#Eligibility?. Answer "yes" or "no".
Yes.

== Personal Information ==

If you are accepted, fields in this section that are marked "(public)" will be displayed on a public acceptances page. If you prefer different information to be displayed publicly than you want to provide in this form, please provide both a private version visible only to the coordinators and mentors of the internship, and a public version to be displayed publicly.
Name (public): Tapasweni Pathak

Preferred pronoun (e.g. she, he, they): She

E-mail address: tapaswenipathak@gmail.com

Blog URL (public, required): tapaswenipathak.wordpress.com

IRC nick (public, optional): tapasweni

Twitter URL (public, optional): http://twitter.com/tapaswenipathak (inactive)

Website or Portfolio URL (optional): tapasweni-pathak.github.io

GitHub, GitLab, or any other code repository URL (optional):
http://github.com/tapasweni-pathak

LinkedIn URL (optional): https://www.linkedin.com/in/tapaswenipathak/

Any other online presence URL you wish to provide:
https://www.quora.com/profile/Tapasweni-Pathak

Location (city, state/province, and country) (public): India

Education completed or in progress (include university, major/concentration, degree level, and graduation year): Bachelors in Computer Science, Indira Gandhi Delhi Technical University for Women, Delhi, 2014

How did you hear about this internship? Someone added the information to the list https://github.com/tapasweni-pathak/SOC-Programs, I was looking for something to implement a project like https://wiki.gnome.org/Internships/2018/Projects/PrivateSession and working with mentors in an internship would be best.

== Project Information ==

What project are you interested in? Private Session

Who is a possible mentor for the project you are interested in? Benjamin Berg, Christian Kellner

Please describe your experience with the GNOME community and GNOME projects as a user and as a contributor. Some experience with GNOME stack and some contributions to GNOME are required for considering the application. Include information and links to the contributions you made: I have been using GNOME desktop and software since years. I started using linux based distro when I was in university in 2010. Since than my primary machine runs on linux have GNOME desktop. Some contributions can be found and will be updated here.

Please describe your experience with the project you are interested to participate as a user and as a contributor and relevant areas. Include information and links to the contributions you made:

Many parts of project needs thinking about steps and task list, so no mini projects or starter tasks could be prepared which can be patched during application period.

Background: Allow users to log into an ephemeral session

Tasks:
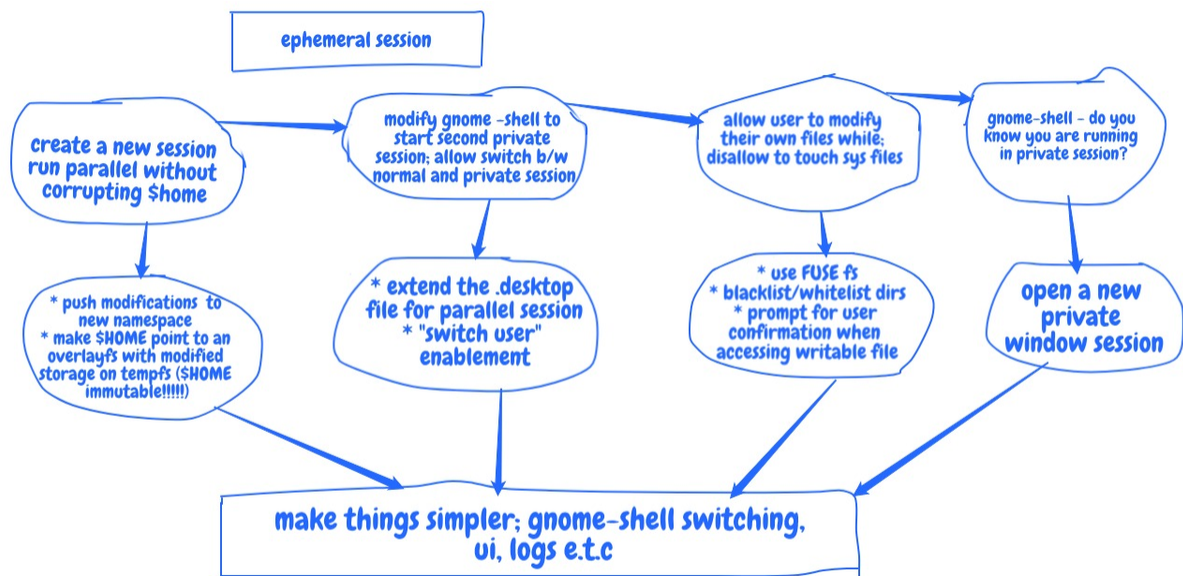
1. Create a new session type which can theoretically run in parallel with another session without corrupting anything in $HOME.
   - ☐ Create new namespace
   - ☐ Make $HOME point to overlayfs with modified storage living on tempfs
- Probable files to be edited
   - `~/.config/user-dirs.dirs`
   - https://github.com/GNOME/glib/blob/master/gio/glocalfile.c
   - https://github.com/systemd/systemd/blob/master/src/nspawn/nspawn-mount.h
   - https://gitlab.gnome.org/GNOME/gnome-session/blob/master/gnome-session/gsm-autostart-app.c
   - https://gitlab.gnome.org/GNOME/gnome-session/blob/master/gnome-session/gsm-session-save.c
   - https://gitlab.gnome.org/GNOME/gnome-session/blob/master/gnome-session/gsm-shell.c
- Probable Changes
   - create namespace[0]
   - create lower, upper, overlayfs in tempfs
   - allocate temp block device storage for lower and upper fs something like d if=/dev/zero of=lower-fs.img bs=some_value count=obvious_higher_value
   - allot ext4
   - mount fs create and chown(create files)

- mount $home as readonly
- create workdirs in upperfs or lowerfs(may be try with making lower or upper fs as readonly)
- create overlayfs mount something like

```
sudo mount -t overlay -o \
lowerdir=/tmp/lower,\
upperdir=/tmp/upper/upper,\
workdir=/tmp/upper/workdir \
none /tmp/overlay
```

- try nesting or combining overlays(possible in 4.0 kernel versions)

2. Modifying gnome-shell (both lock screen and GDM part)
   - ☐ .desktop file Changes
     - https://github.com/GNOME/gnome-shell/blob/master/js/ui/appFavorites.js
   - ☐ Switch user enablement
     - https://github.com/GNOME/gnome-shell/tree/master/js/ui

3. Allow user to modify their files and disallow sys file
   - ☐ Explore FUSE fs
     - ☐ blacklist/whitelist directories
     - ☐ prompt user with checks and errors
4. gnome-shell
   - ☐ UI updates, logging
     - starting in private session
5. Making it simpler for user
   - ☐ simpler UI
     - design
   - ☐ propper error logging
   - ☐ propper updates send to user
   - ☐ prompts for user

Please describe any relevant projects that you have worked on previously and what knowledge you gained from working on them (include links):
- System level programming ↔ C and C++
  - Base Number Convertor System
  - Visualization of CPU Scheduling Algorithms
  - IITD Research Internship Report

- Qualcomm Internship Report
- Linux Kernel Patches; Arnd's tree's patches
- Linux Kernel Analysis; USENIX ;login: paper
- Notes and implementations of few OS and AOS papers; All OS Algos
- Linux kernel analysis [initial phase]
- Some open source docs AWS work
- Other programming projects and Open Source Contributions

I have been interested contributing to low level or close to system level projects since few years. During my bachelors I worked on implemented different operating system algorithms as a starting point in C and graphics.h. I contributed to Linux kernel in the application period and worked on research and submitted patches as a summer of code intern and wrote an article about it. I worked with Julia Lawall and Nicolas Palix. I worked to fix y2038, iio, coccinelle and infer fixes. Recently I have been working on fixing facebook/infer issues in Linux kernel and researching over 4.x versions.

I have nearly 5 years of programming experience. I did engineering internship with Qualcomm where I contributed to low level C and perl programming. I have worked with SAP Labs as Software Engineer(Level 13), Software Engineer with Mapbox and Senior Software Engineer with Reliance Jio Financial Innovation Group. I have also been OWASP summer of code intern which is more close to web security areas. In all these I have worked with low level systems programming.

Please describe your experience with any other FOSS projects as a user and as a contributor:

As described above, I have been involved with open source project since my bachelors. I learn a lot while contributing to open source projects. I open source few of my projects on GitHub and reports of closed source ones are present on LinkedIn. I have been contributing and involved with Linux kernel, OWASP, AirMozilla dev, Systers projects.

Please describe the details and the timeline of the work you plan to accomplish on the project you are most interested in (discuss these first with the mentor of the project):

Project timeline

Dec1 - Dec7	• Bonding period ○ Get in touch with community, mainly my mentors

	○ Get familiar with codebase, standards followed. ○ Checklist and complete setup, decide on system configuration, any specifics. ○ A lot of the above points require discussion, try to get their views from developer perspective
Dec7 - Dec21	• Namespace creation • Testing • Overlayfs
Dec21- Jan6	• .desktop file
Jan6- Jan19	• UI work
Jan19- Jan31	• Prototype FUSE fs
Feb1- Feb9	• Implementation of errors and prompts
Feb10- Feb23	• All time to gnome-shell to make it ready for user • default setup
Feb24- Mar1	• Buffer time for unexpected delays, or necessary work unidentified in the beginning.

Enhancement Tasks :

Right now I could see many mostly to make this production ready

- UI
- Error logging storage
- Proper user prompts
- Deleting of any extra directories created

Readings

- https://wiki.gnome.org/Initiatives/SystemdUser
- More info here.