Screencasting on Wayland

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Addressing the shortcomings

Moving from X11 to Wayland fundamentally changed how screen recording works under the hood and brought new challenges.

Who this talk is for:

- Compositor developers.
- Client application developers that use screencasting.
- Goal is to promote discussion!

Use cases of screencasting

- Sharing desktop
  - Content creation
  - Streaming
  - Video conferencing
  - Custom solutions
- Desktop environments
  - Application and screen previews
- Software development
  - Test verification
  - Debugging (Remote or local)
  - Bug reports

Screencasting Methods on Wayland

- PipeWire based
  - XDG Desktop Portal
    - Screen cast portal
    - D-BUS interface
    - Uses PipeWire nodes
    - The most common way
    - Not Wayland specific
  - PipeWire backends
    - Backend for compositors
    - No need for XDG Desktop Portal
    - Some examples are:
      - Gamescope
      - Weston 15

- Wayland Protocols
  - ext-image-copy-capture-v1
  - wlr-screencopy-unstable-v1 (Superseded)
  - Limited support from compositors

- KMS
  - Requires elevated permissions
  - Some examples are:
    - ffmpeg - kmsgrab
    - Sunshine
    - gpu-screen-recorder

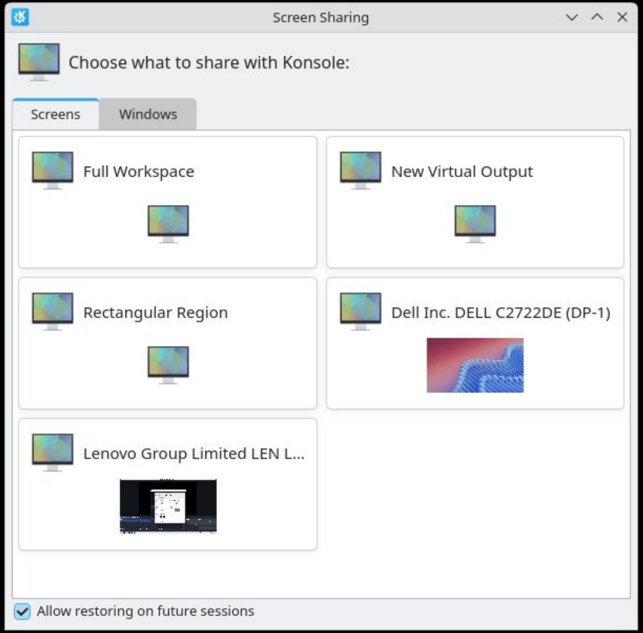
Explicit Synchronization in Screencasting

- Similar to Wayland explicit synchronization, accesses from clients and compositors to the shared buffers need to be synchronized.
    - XDC 2022 | Explicit Synchronization for Linux Display Servers | Erik Kurzinger
- For PipeWire based approaches:
    - PipeWire 1.2.0 - Added SPA_DATA_SyncObj
    - Mutter 47.0
    - KWin 6.3
    - OBS Studio 31.1 (and some fixes here)
    - NvFBC
- ext-image-copy-capture-v1 does not support explicit synchronization at the moment.
- Requires every client to implement it separately.
    - Unlike linux-drm-syncobj-v1, can't be hidden behind APIs like EGL, Vulkan WSI etc.

Permission Scheme

Problems with automation and remote recording

- Starting a screencasting session via XDG Desktop Portal requires GUI interaction.
  - Allow application to screencast.
  - Choose the output region for screencasting.
- Restricts automation and remote use cases.
  - Requires physical input from the user.
  - Client can’t request a specific screen for recording.
- Session can be restored without user input using tokens.
  - Creating the very first session still requires physical input.
  - Inconsistent behavior between compositors.
- Need for a common ahead-of-time permission scheme.



Screen Sharing

Choose what to share with Konsole:

✓ Allow restoring on future sessions

Call to action

- How can we solve these issues?
    - Explicit sync
        - Can we design an abstraction library?
    - The permission pop-up
        - Would the wider adoption of PipeWire backends for compositors help?
            - Implicit ahead-of-time permission.