Native messaging for strictly confined browsers

Olivier Tilloy – Ubuntu desktop team

CANONICAL ubuntu

Benefits of firefox packaged as a snap

- Strictly confined: added security layer
- Endorsed and published by Mozilla
- Timely updates
- Runs on old releases (16.04)

Shortcomings of firefox packaged as a snap

- Browsers interact in many different and creative ways with the system
- Native messaging was broken

What is native messaging anyway?

- ~~Integration with your favourite instant messaging application~~
- ~~Sending/receiving SMS~~
- IPC between browser extensions and native applications
- Opens up a whole lot of possibilities
- Not necessarily great from a security perspective
- Use cases:
  - GNOME Shell extensions management
  - Password managers (KeepassXC, 1Password, …)

Problem statement

- A strictly confined browser cannot enumerate and spawn arbitrary executables on the host system
- How do we address that?

XDG WebExtensions desktop portal

- WebExtensions portal proposed and implemented by James Henstridge
- D-Bus API for browsers to request launching a native host connector
- The portal
    - Accepts an app name and a unique extension ID as parameters
    - Looks up the corresponding manifest
    - Checks the extension is allowed to run the application
    - Prompts the user
    - Spawns the native connector
    - Passes open FDs to the browser

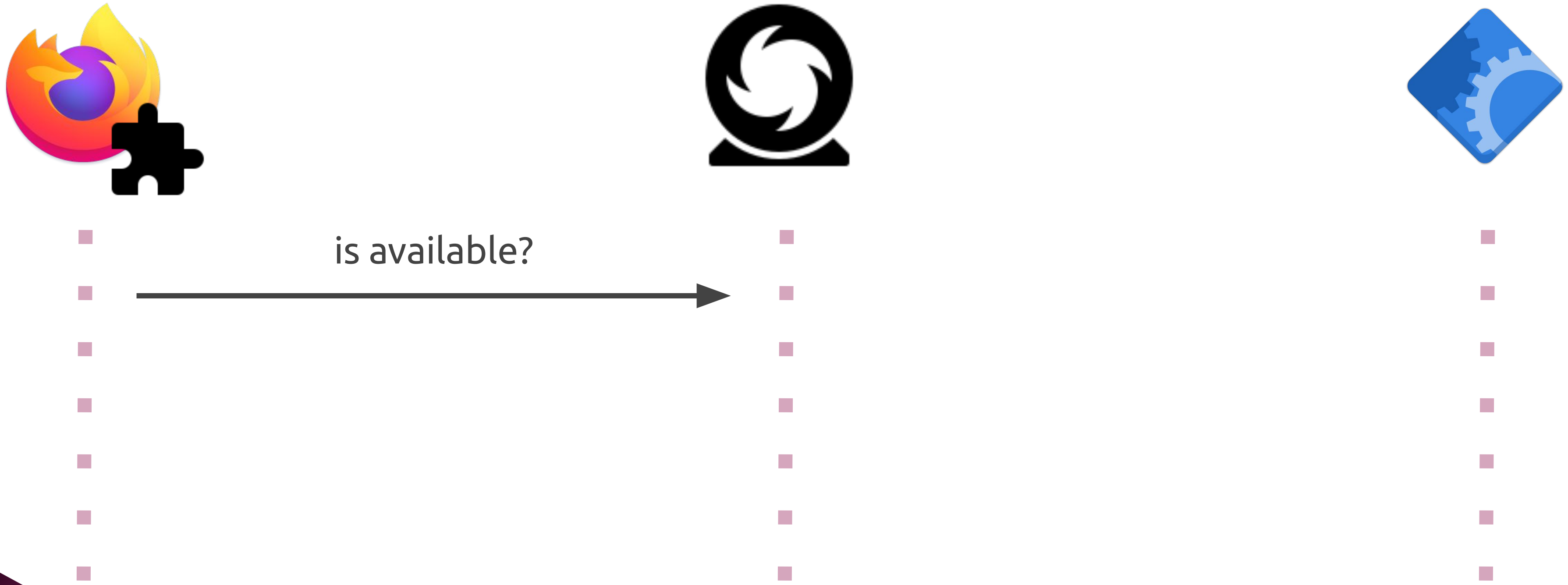
Advantages of the portal

- Not specific to one given browser
- Works across confinement technologies (snap, flatpak, …)
- Available in Ubuntu since 22.04

Making firefox use the portal

- Two code paths:
  - Legacy (unconfined)
  - Portal (confined, where the portal is available)
- Worked closely with Mozilla engineers
- Coding style and quality standards (tests)
- Pretty large patch (~1800 lines diff)
- Not merged upstream yet
- Cherry-picked in the stable snap last week

How does this work?



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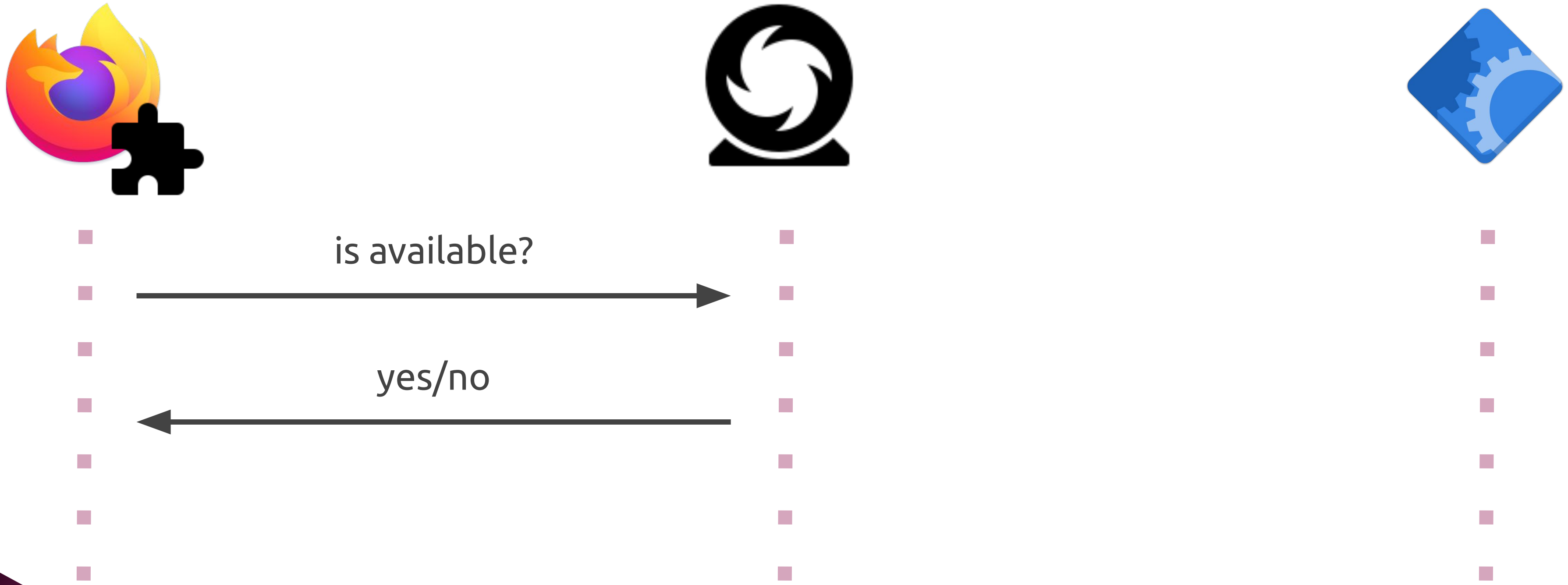

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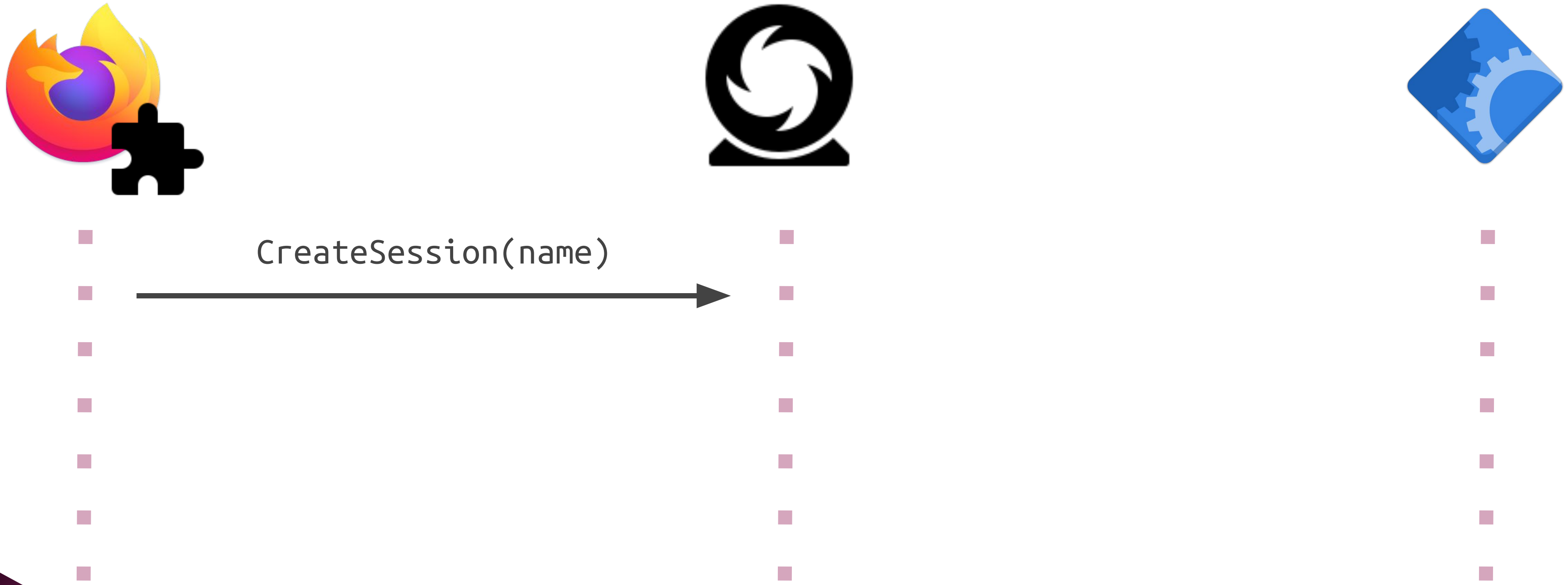

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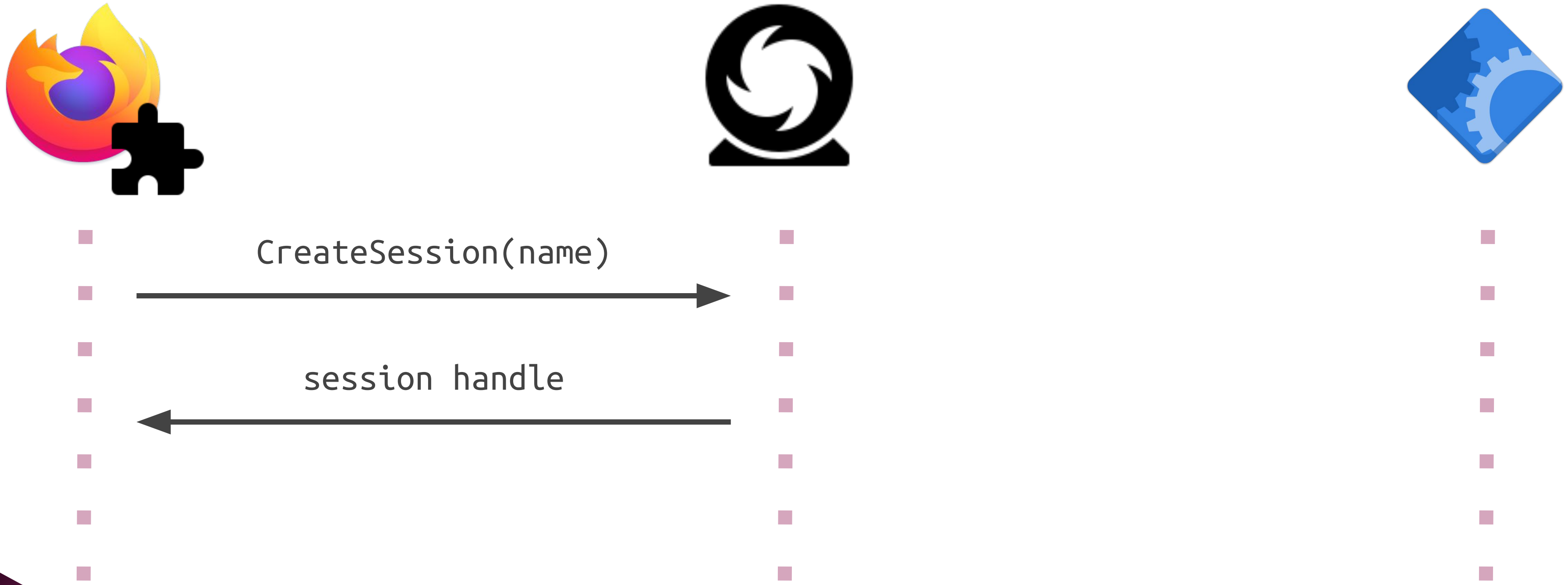

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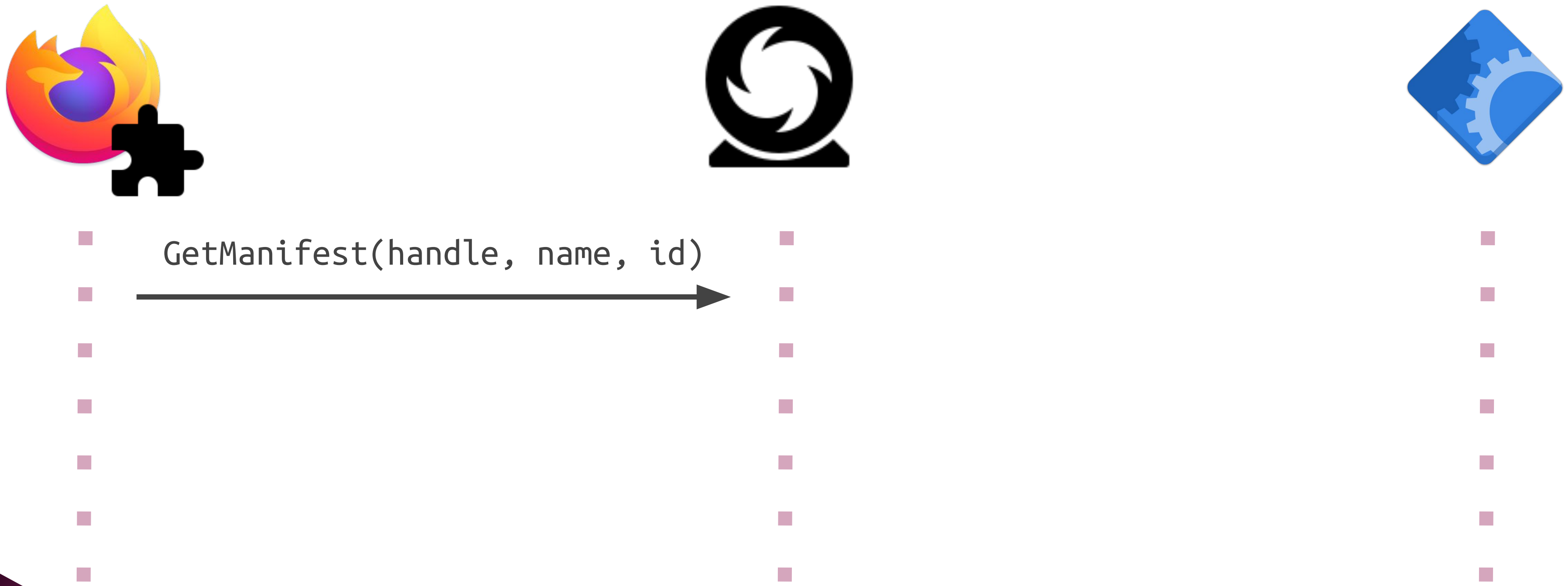

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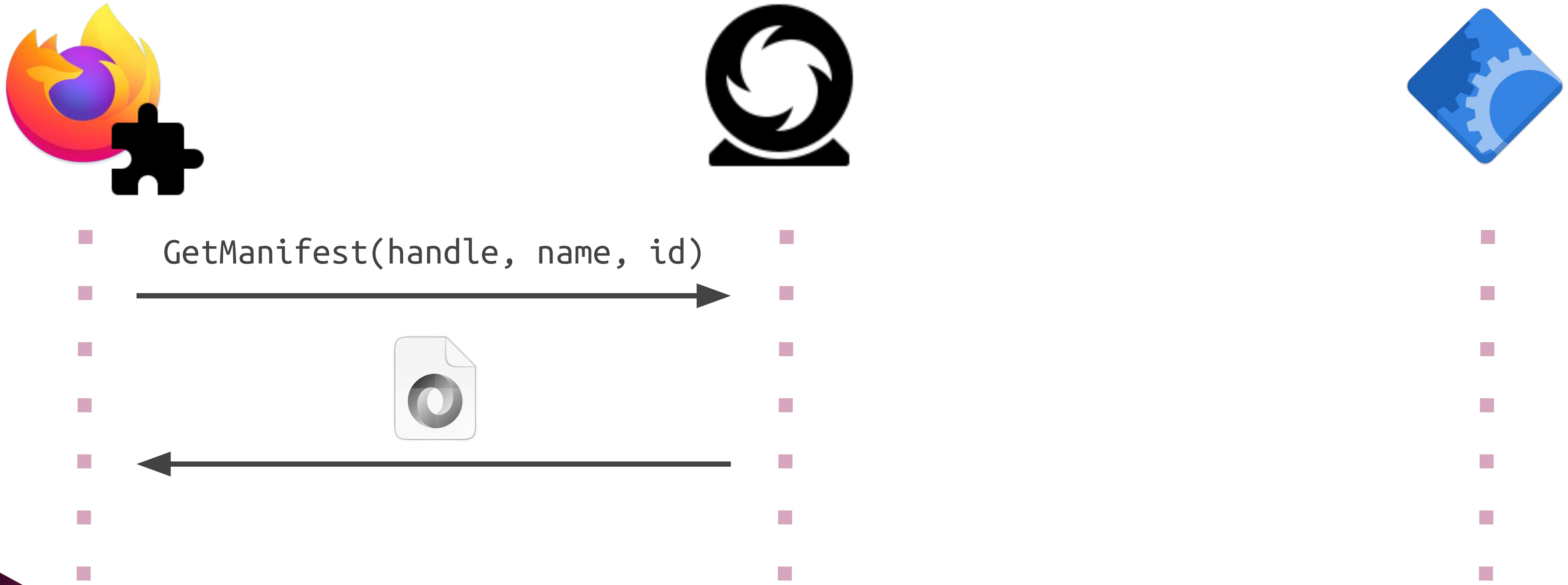

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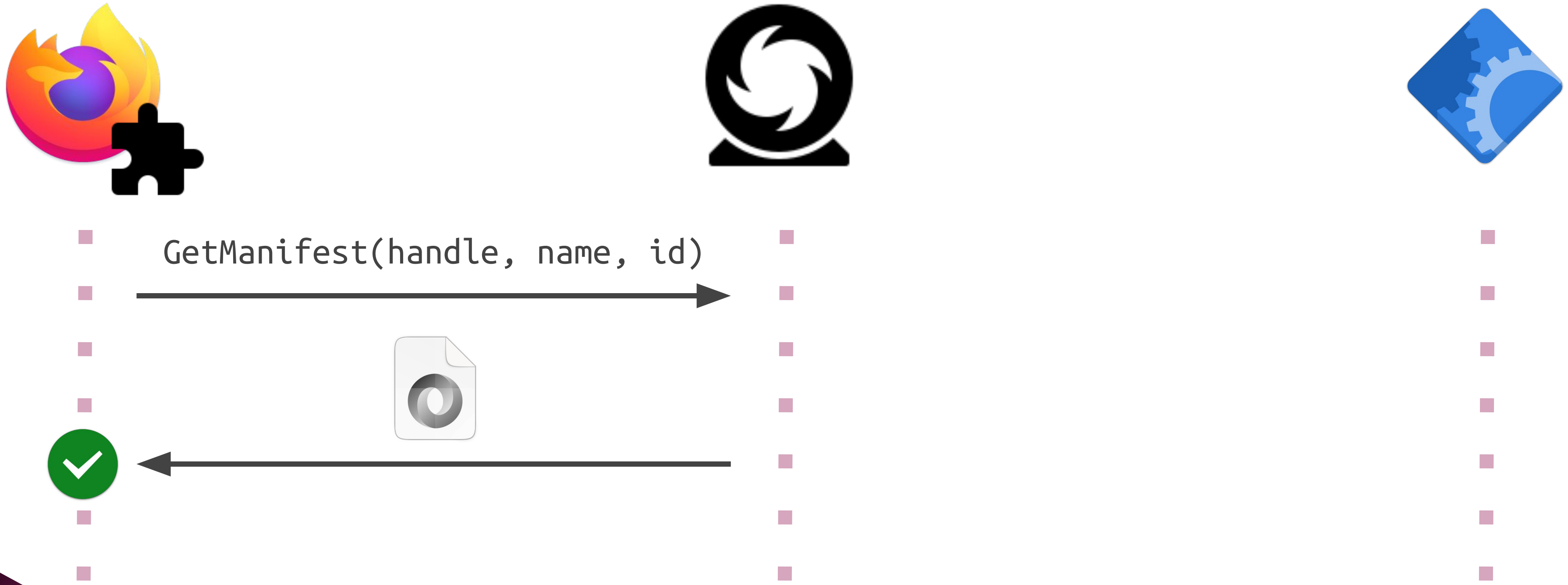

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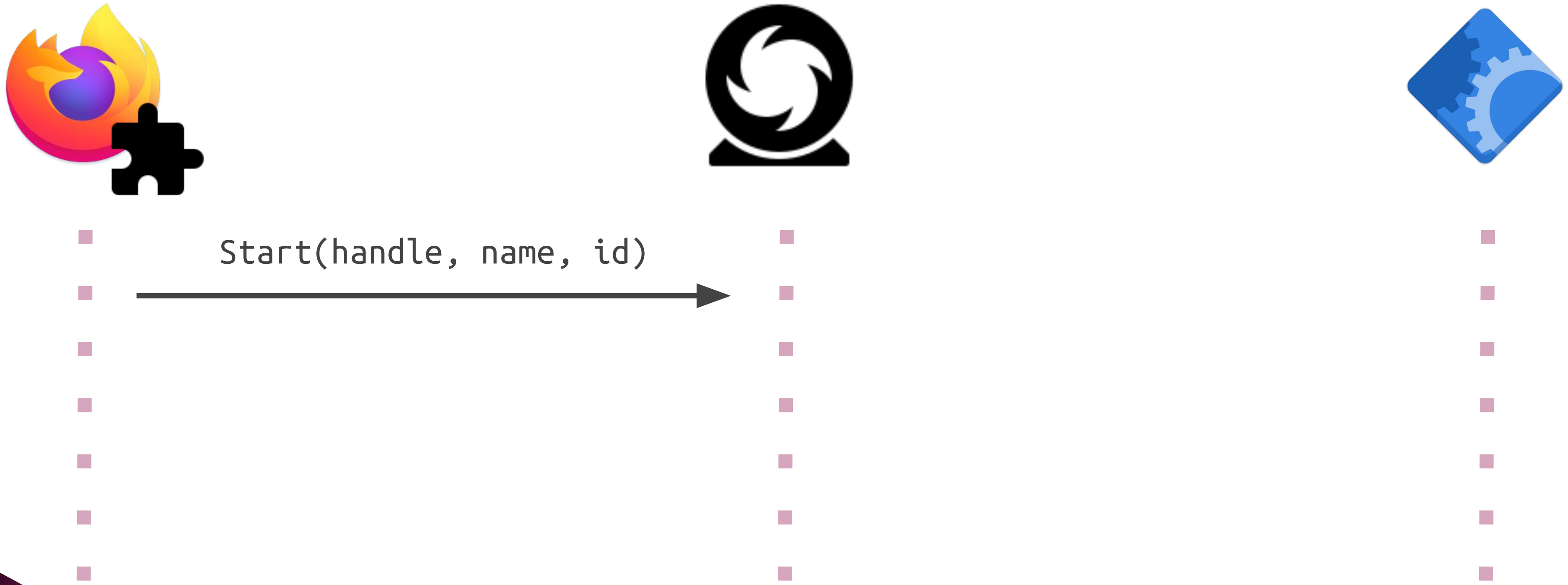

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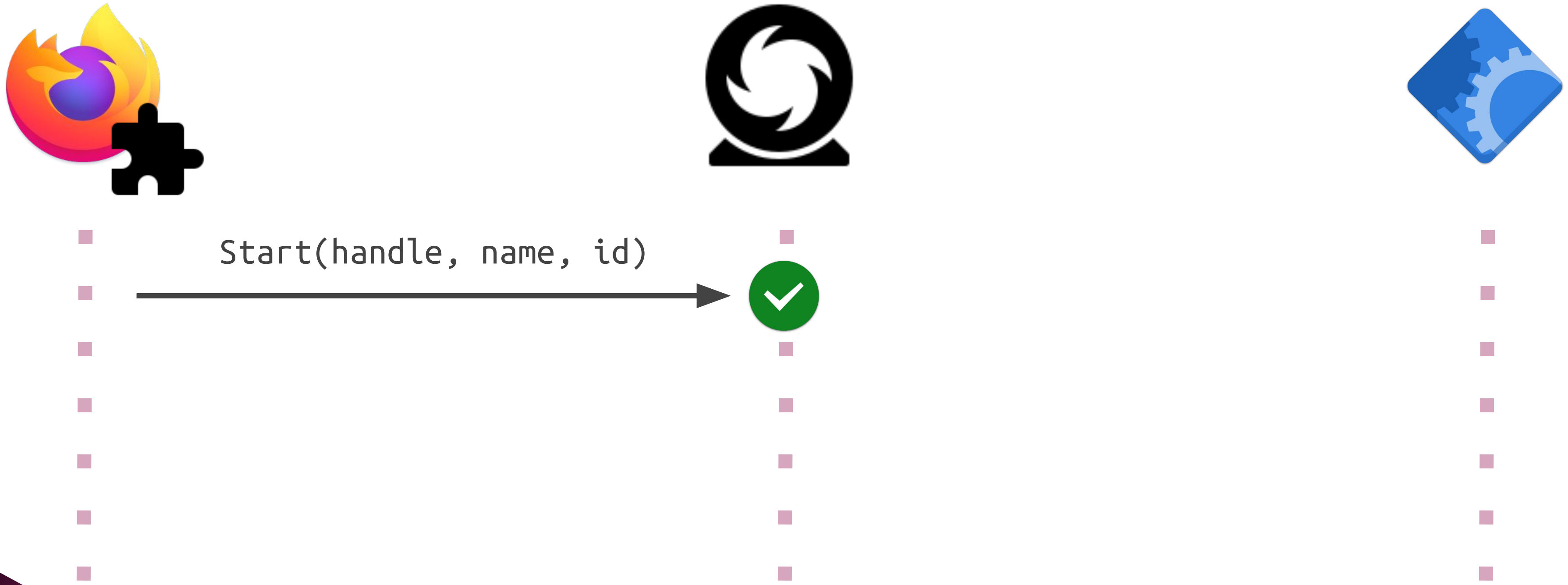

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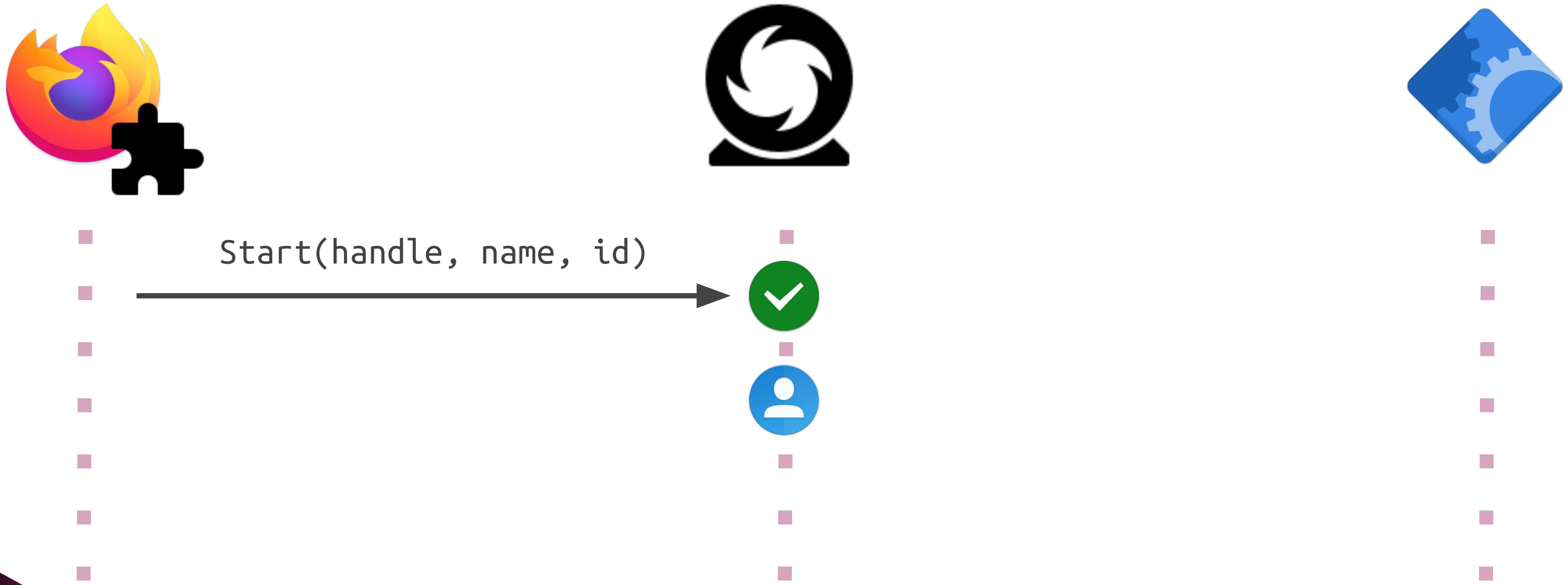

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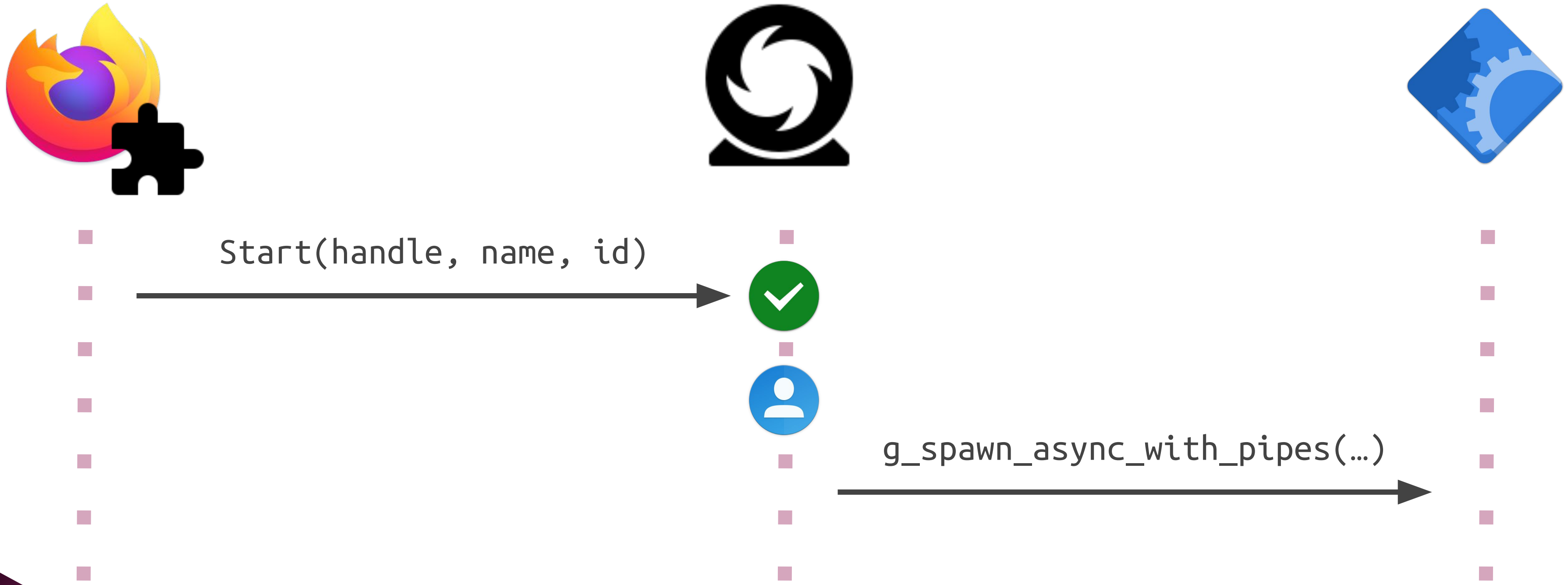

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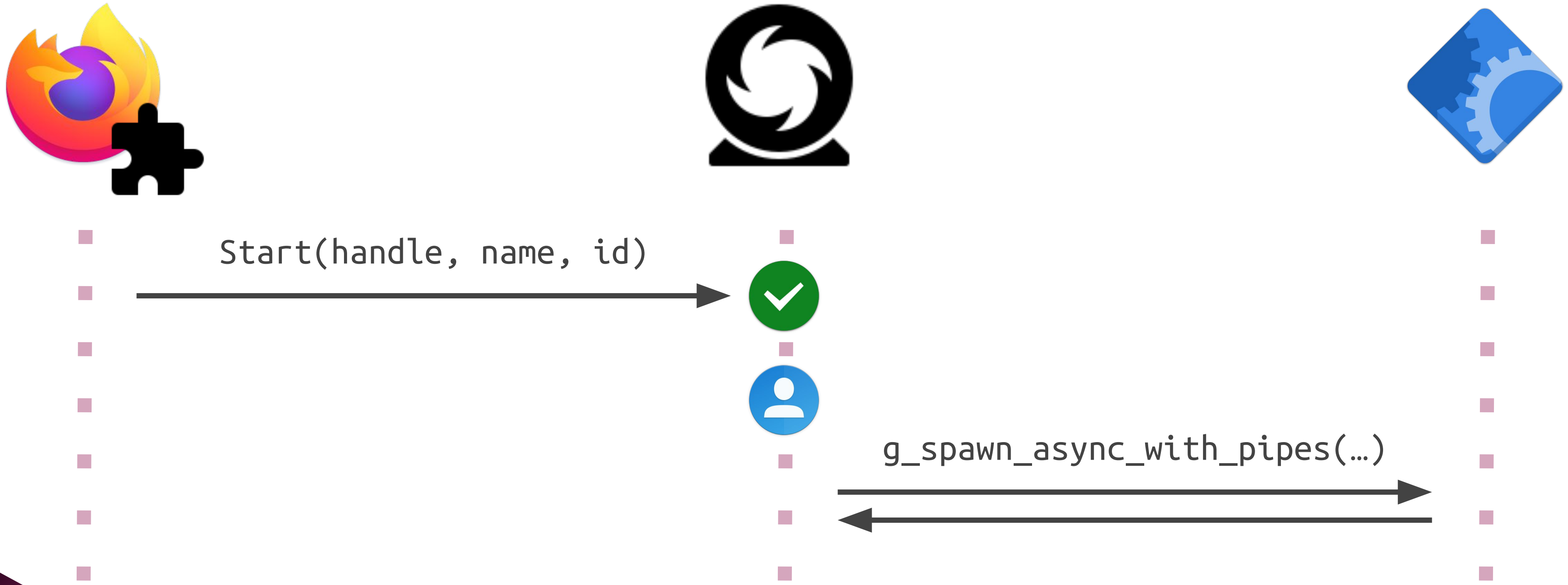

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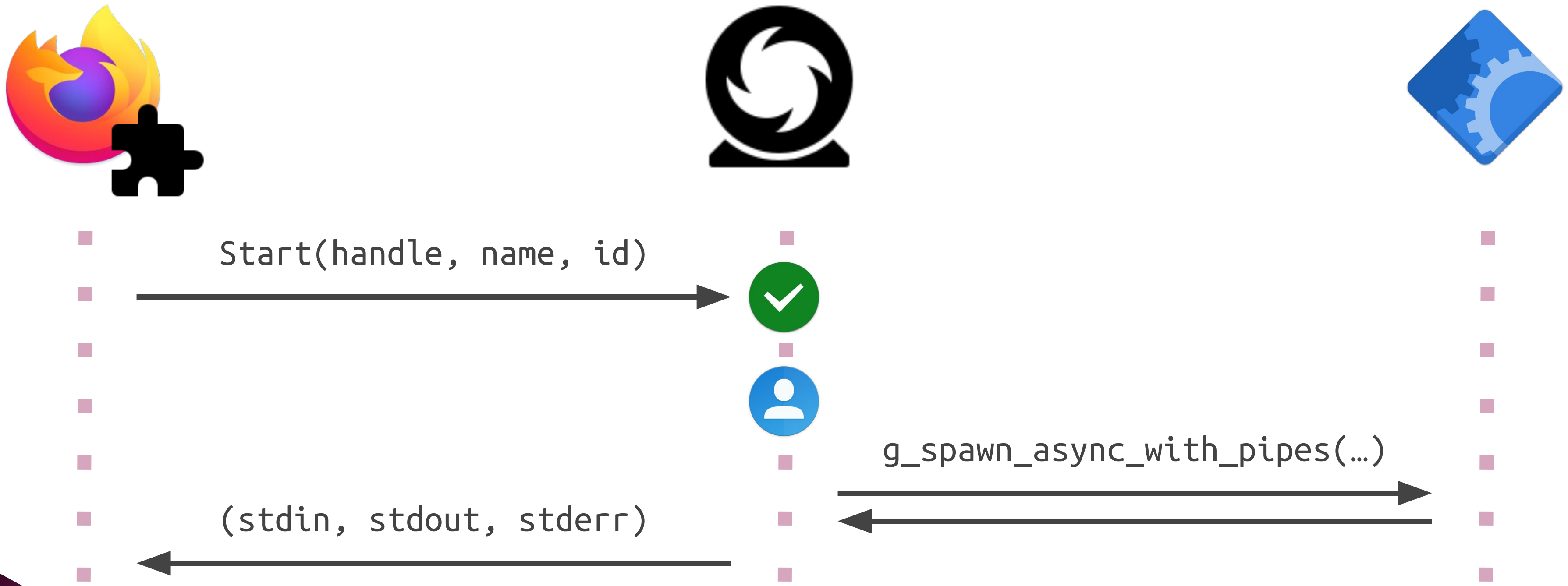

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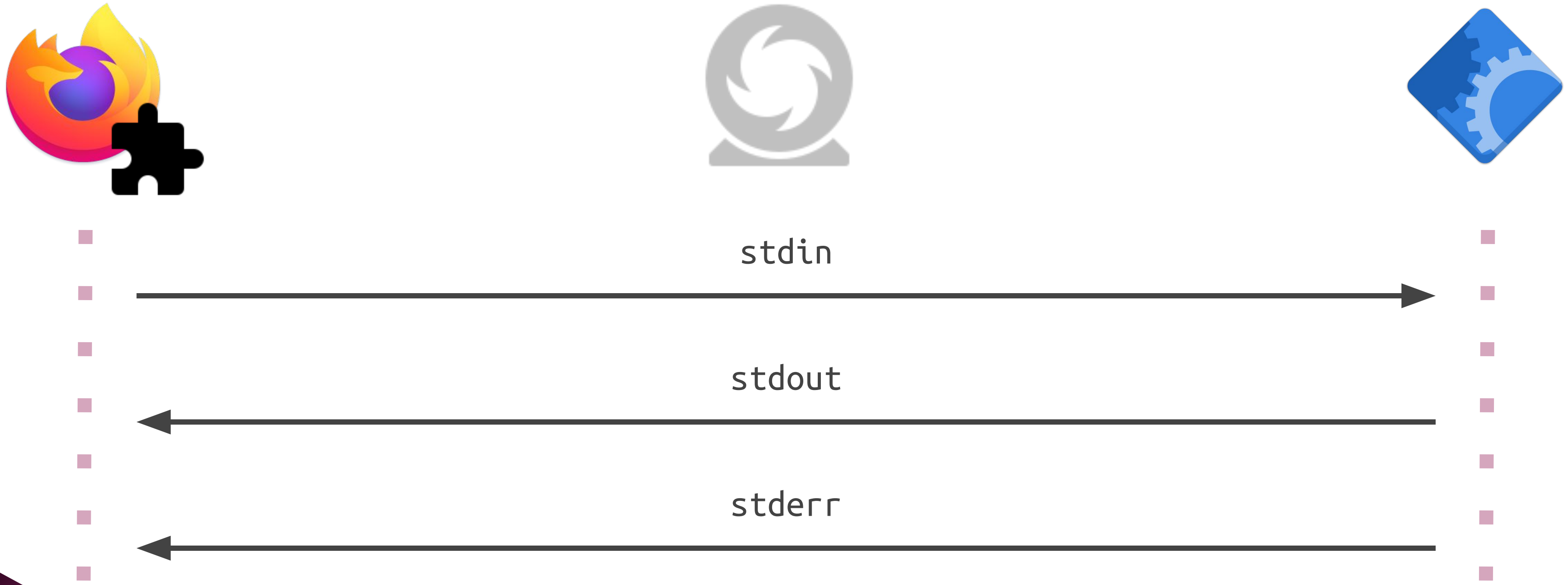

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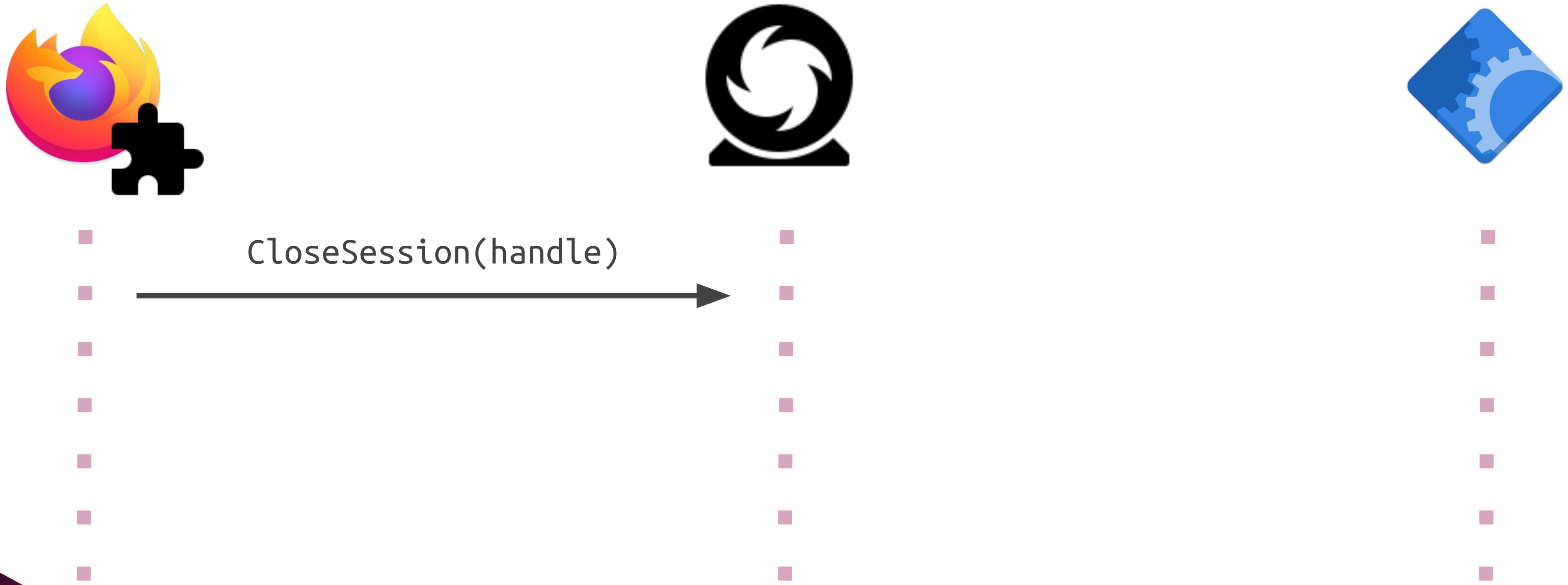

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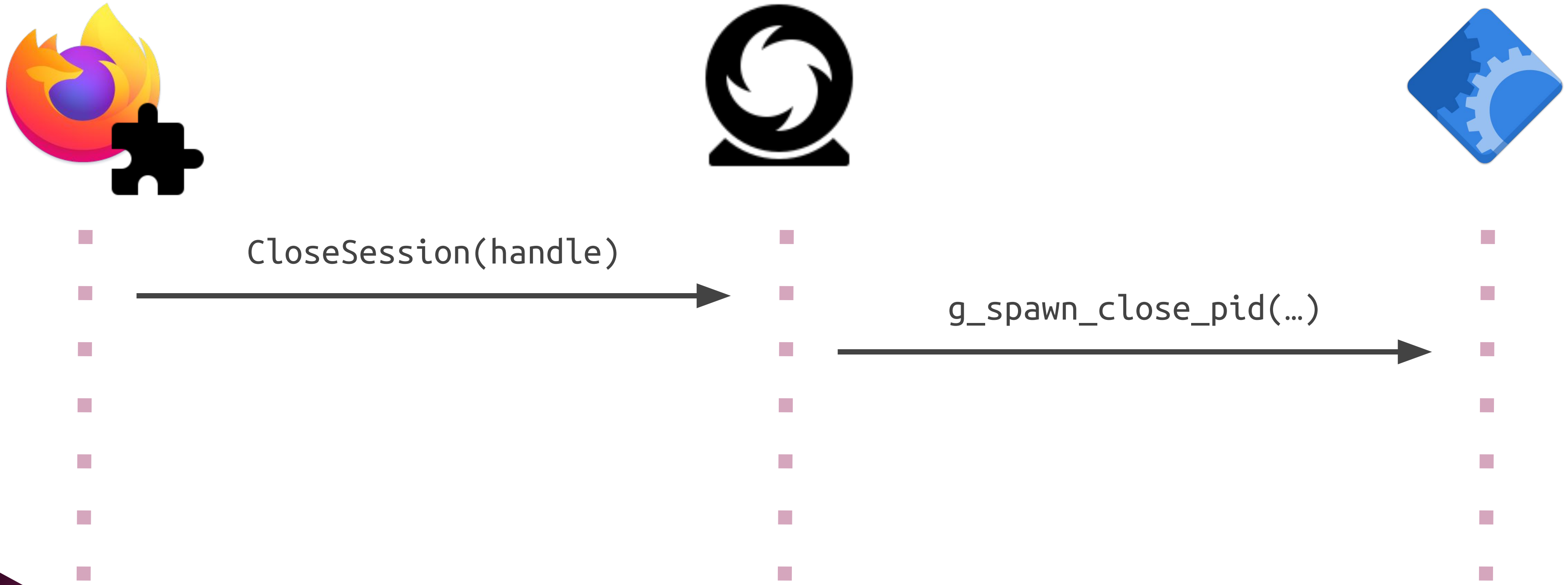

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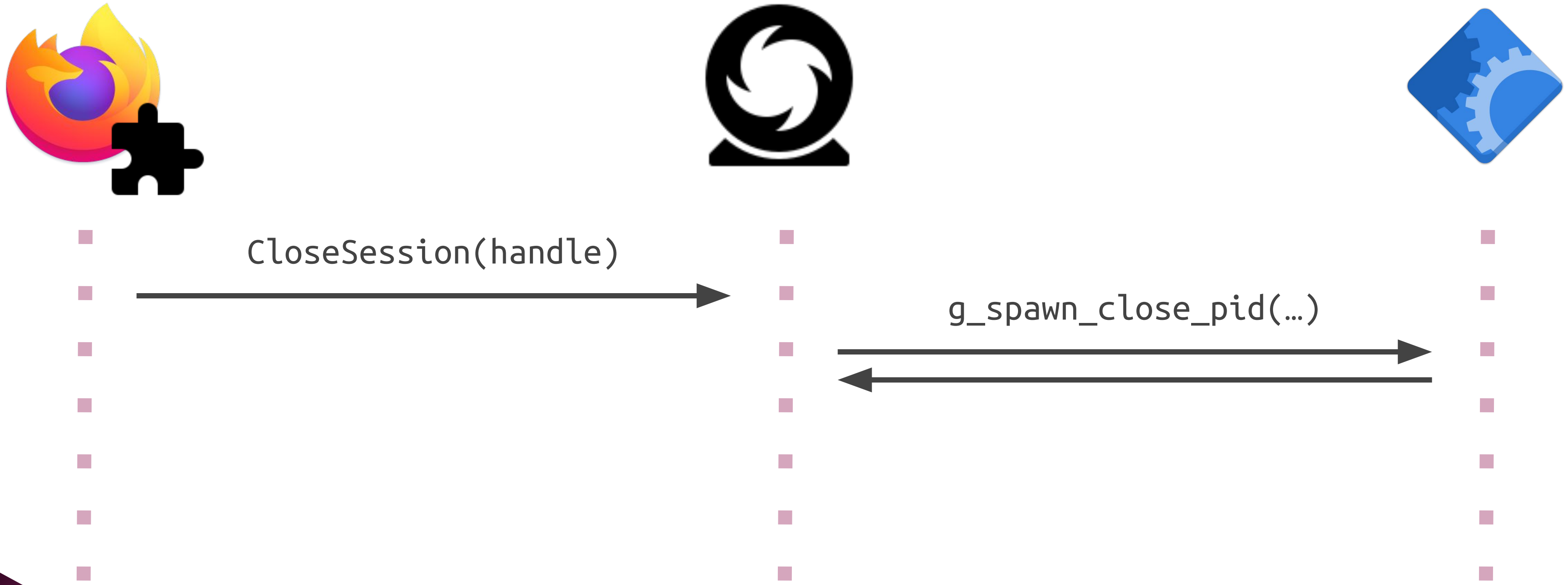

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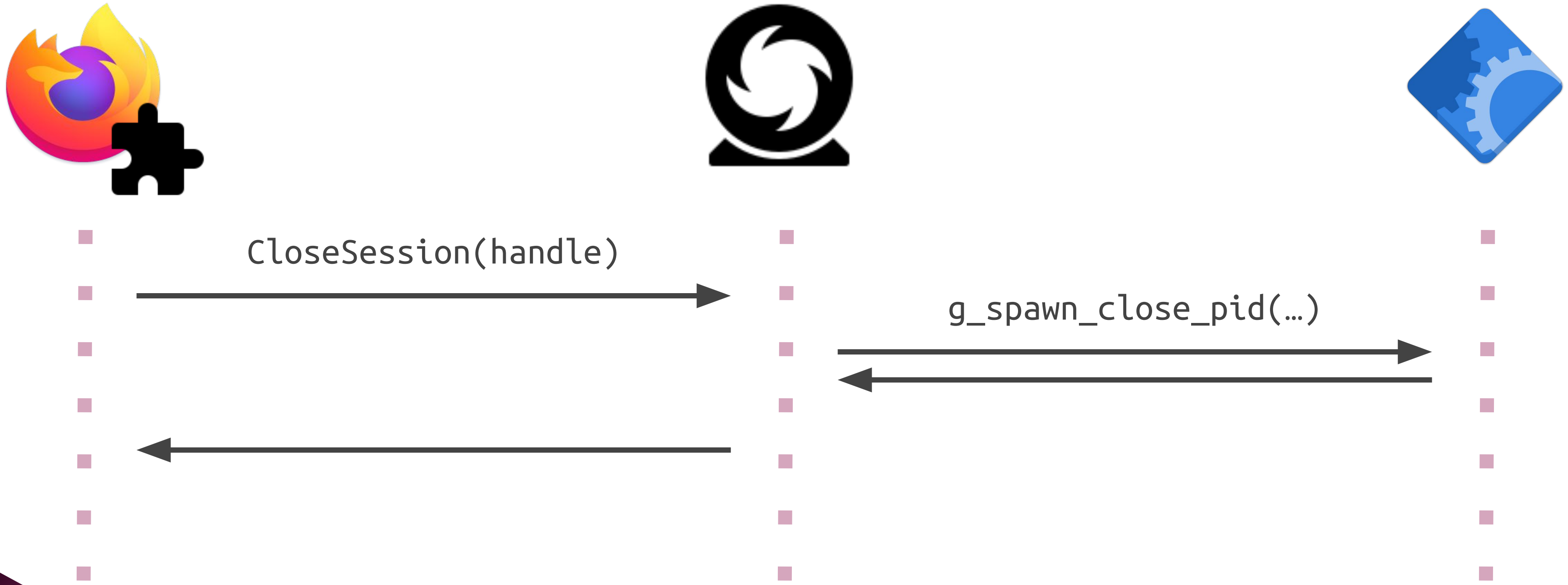

Demo

- chrome-gnome-shell (deb)
- KeepassXC (snap)

Future work

- Get consensus on the portal and get it merged upstream
- Land the firefox patch
- Extract CLI tool to manipulate the permissions db out of flatpak
- Create a UI in the settings app to allow changing those permissions
- Replicate this work for chromium and possibly other browsers
- Remove the KeepassXC warning about snaps

Thank you. Questions?