

# Mobile Internet in GNOME



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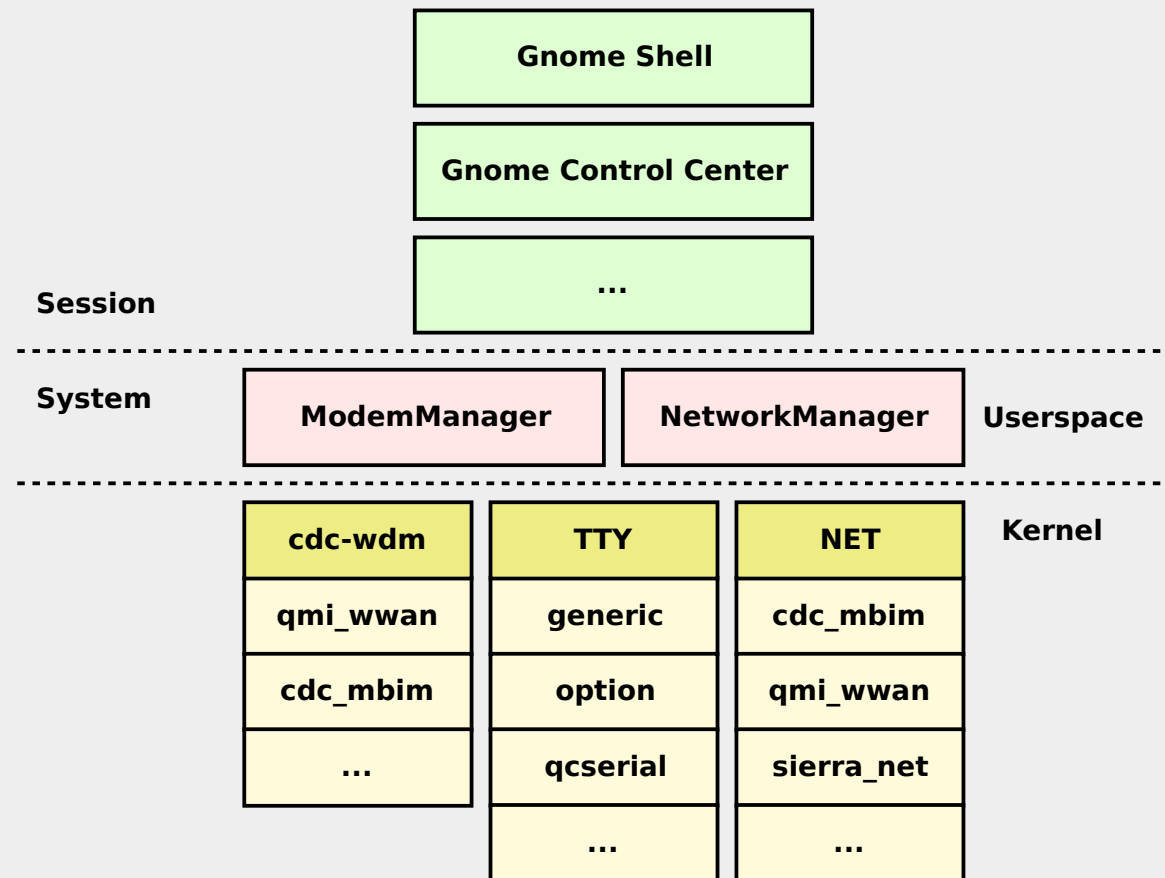


# From the bottom to the top



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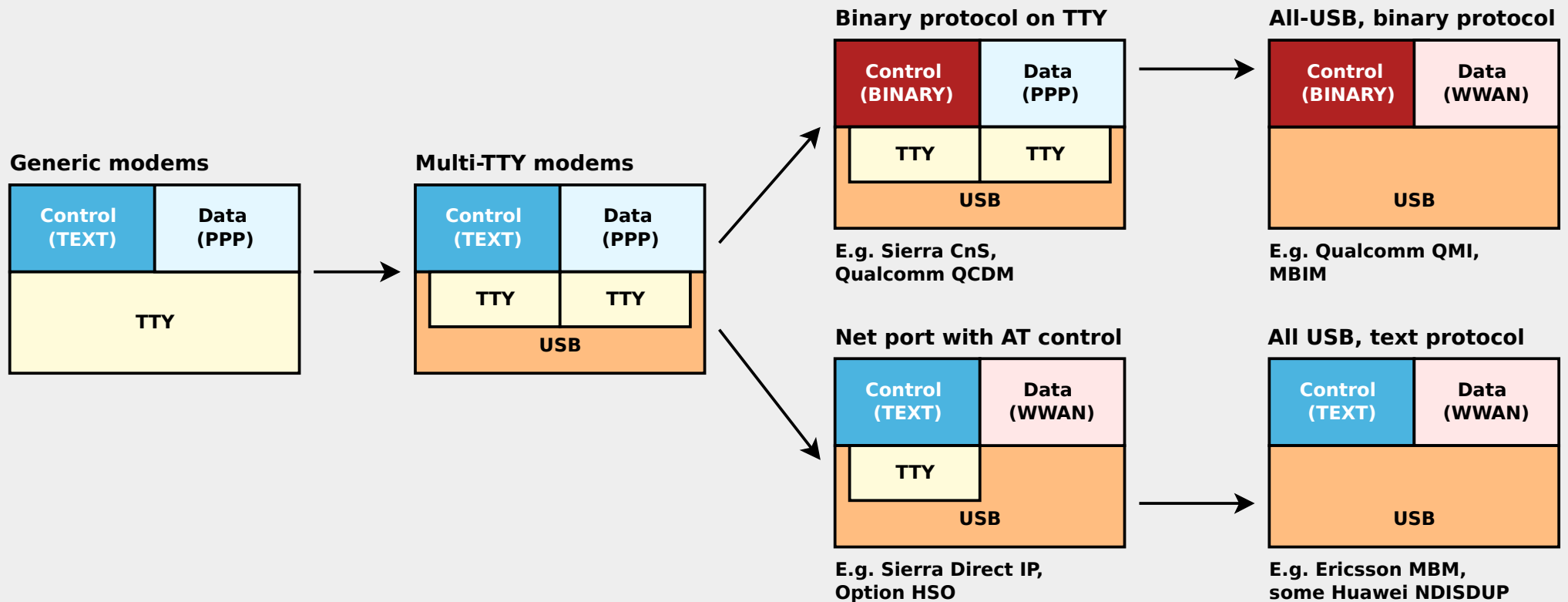
- **Userspace: user programs**
  - GNOME Shell
  - GNOME Control Center
- **Userspace: system daemons**
  - NetworkManager
    - pppd, dhclient...
  - **ModemManager**
    - libqmi, libmbim...
- **Kernel**
  - **Control port drivers**
  - Data port drivers



# Kernel



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- **TTY drivers for Control ports**
  - Generic
  - Vendor specific (e.g. option, qcserial, zte\_ev, sierra...)
- **NET drivers for Data ports**
  - Generic (e.g. cdc\_ncm)
  - Vendor specific (e.g. hso, sierra\_net)
- **Shared control/data port drivers: NET + cdc-wdm**
  - Generic (e.g. cdc\_mbim)
  - Vendor specific (e.g. qmi\_wwan)

# Kernel ↔ Userspace



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- **Control port**
  - TTY serial port
  - cdc-wdm port
- **Data port**
  - TTY serial port
  - WWAN net interface

# Userspace: system daemons



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- **ModemManager**

- Control port(s)

- SIM unlocking, Network registration, Signal quality, Location information, Connection setup (APN, auth\*)
    - Primary & secondary ports
    - External libraries for some binary protocols (e.g. libmbim, libqmi)

- **NetworkManager**

- TTY Data port

- PPP (launches pppd)

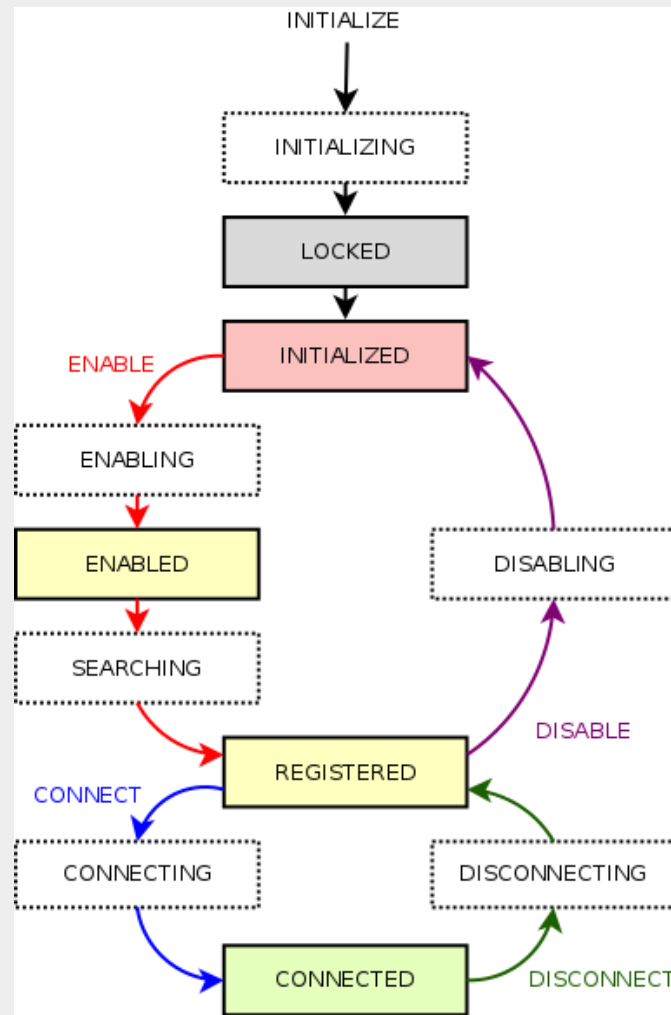
- NET Data port

- DHCP (launches dhclient or dhcpcd)
    - Static (netlink with kernel)

# ModemManager state machine



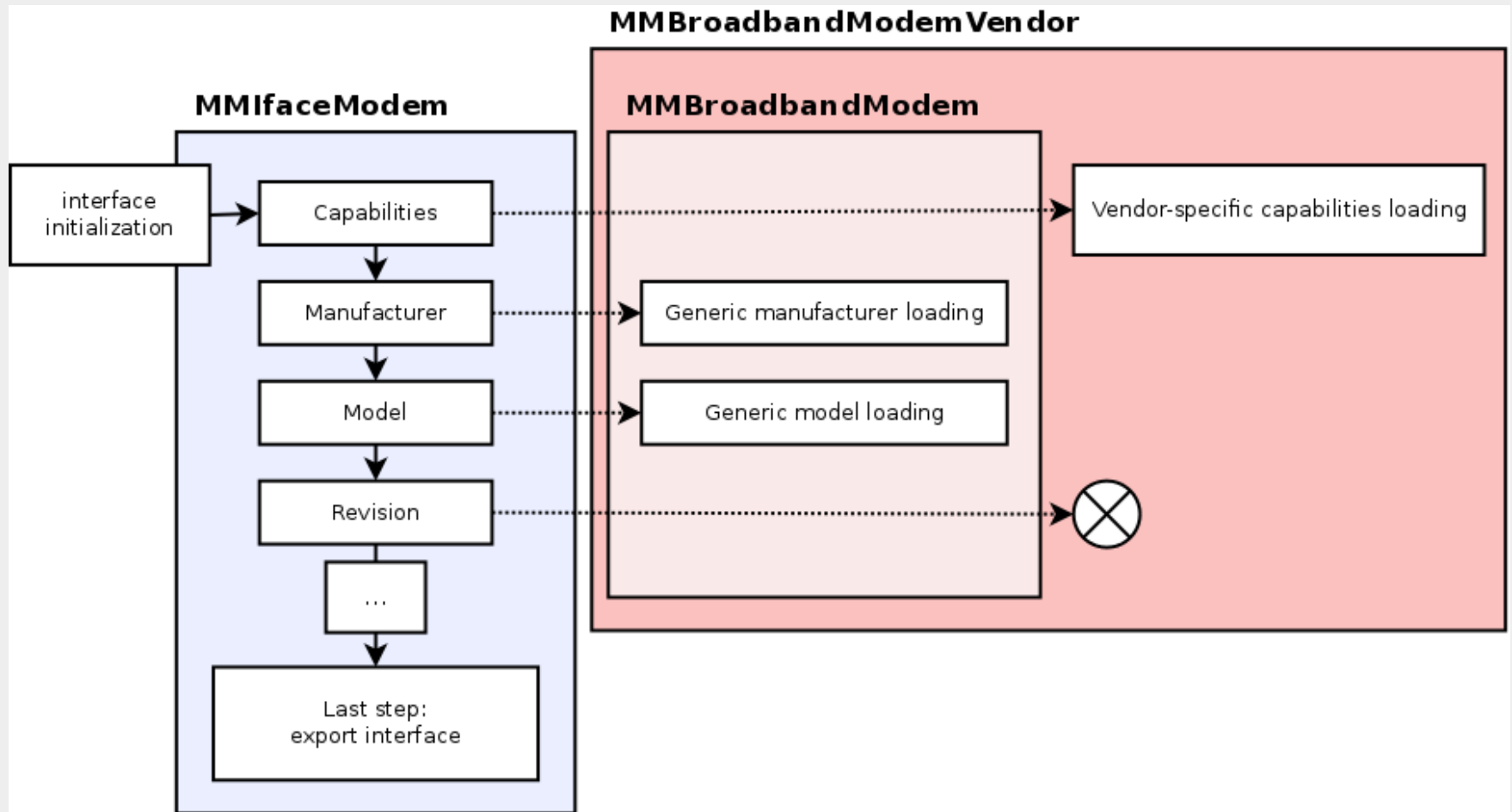
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# ModemManager plugins



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# System <->Session



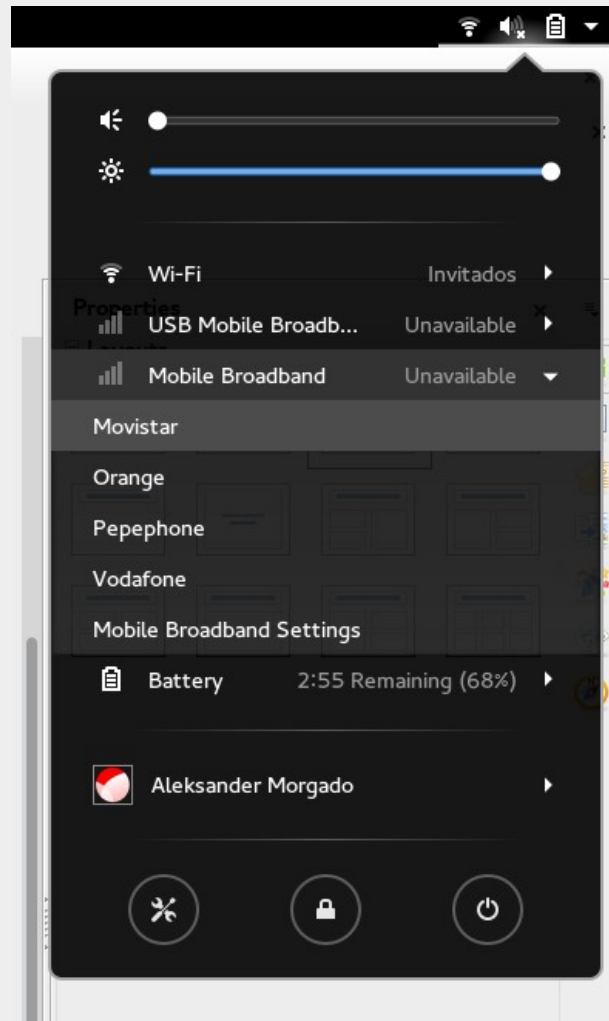
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- DBus
  - org.freedesktop.ModemManager1
    - /org/freedesktop/ModemManager1/Modem/0
    - /org/freedesktop/ModemManager1/Sim/0
    - /org/freedesktop/ModemManager1/Bearer/0
    - /org/freedesktop/ModemManager1/Sms/0
  - org.freedesktop.NetworkManager
    - /org/freedesktop/NetworkManager/Devices/0
      - Org.freedesktop.NetworkManager.Device
        - Udi == /org/freedesktop/ModemManager1/Modem/0

# Session: Shell



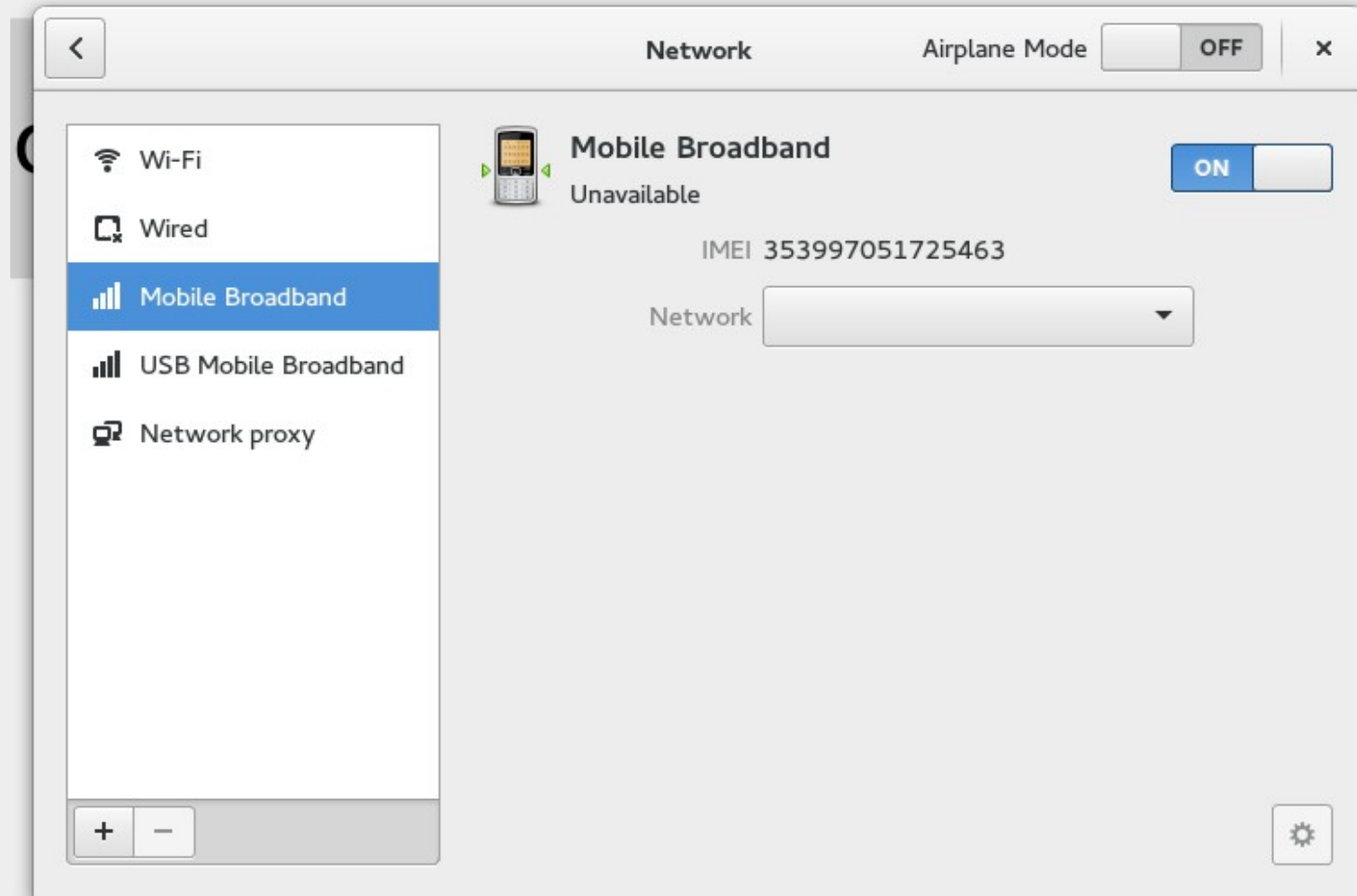
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# Session: Control Center



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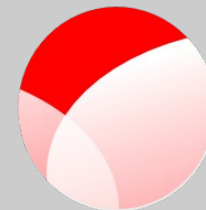
# Demo?



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...

# Thanks!



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