

ModemManager in your phone



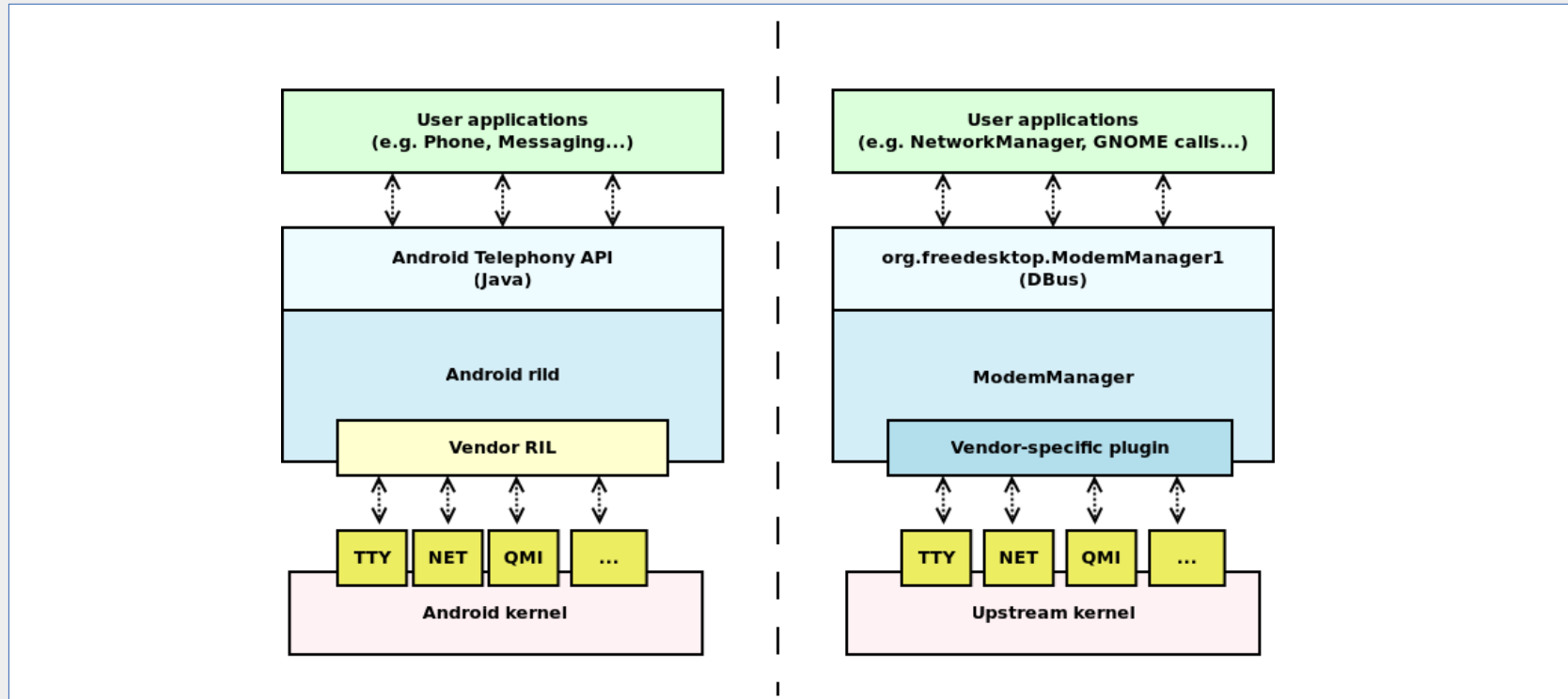
3GPP 5G QMI
qmi wwan
LTE MBIM MHI PCIe
libmbim
ModemManager
Mobile Broadband kernel
USB libqmi cdma AT
user-space

Who am I?

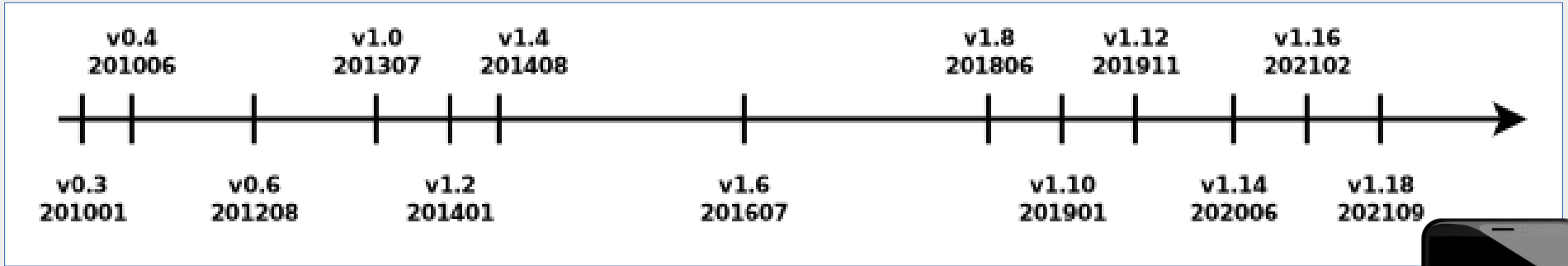


- Freelance
 - Telecommunications Engineer (UPV/EHU)
 - Senior Software Developer
- Father of 3
 - 5, 3 and 1 years old
- The little free time left...
 - ModemManager/libqmi/libmbim maintainer

Android rild vs MM



>10 years of ModemManager

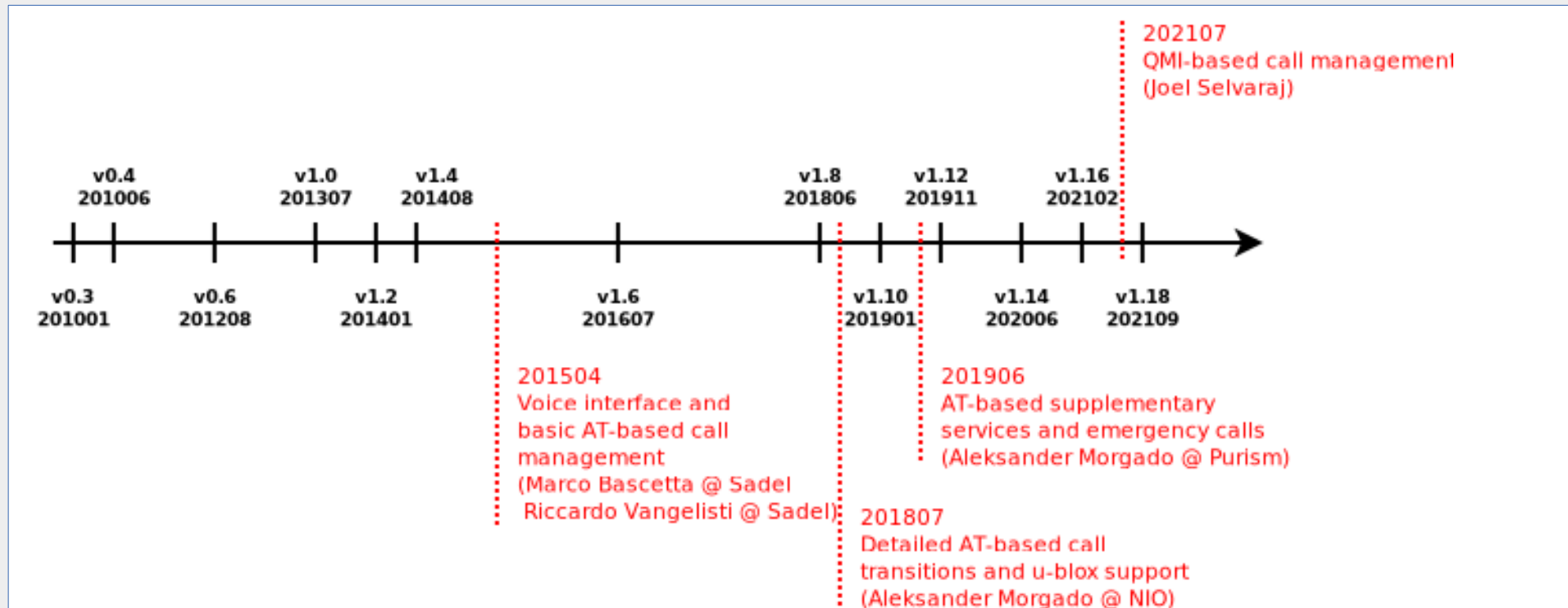


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<https://blogs.gnome.org/dcbw/2009/03/20/thats-when-i-reach-for-my-revolver/>

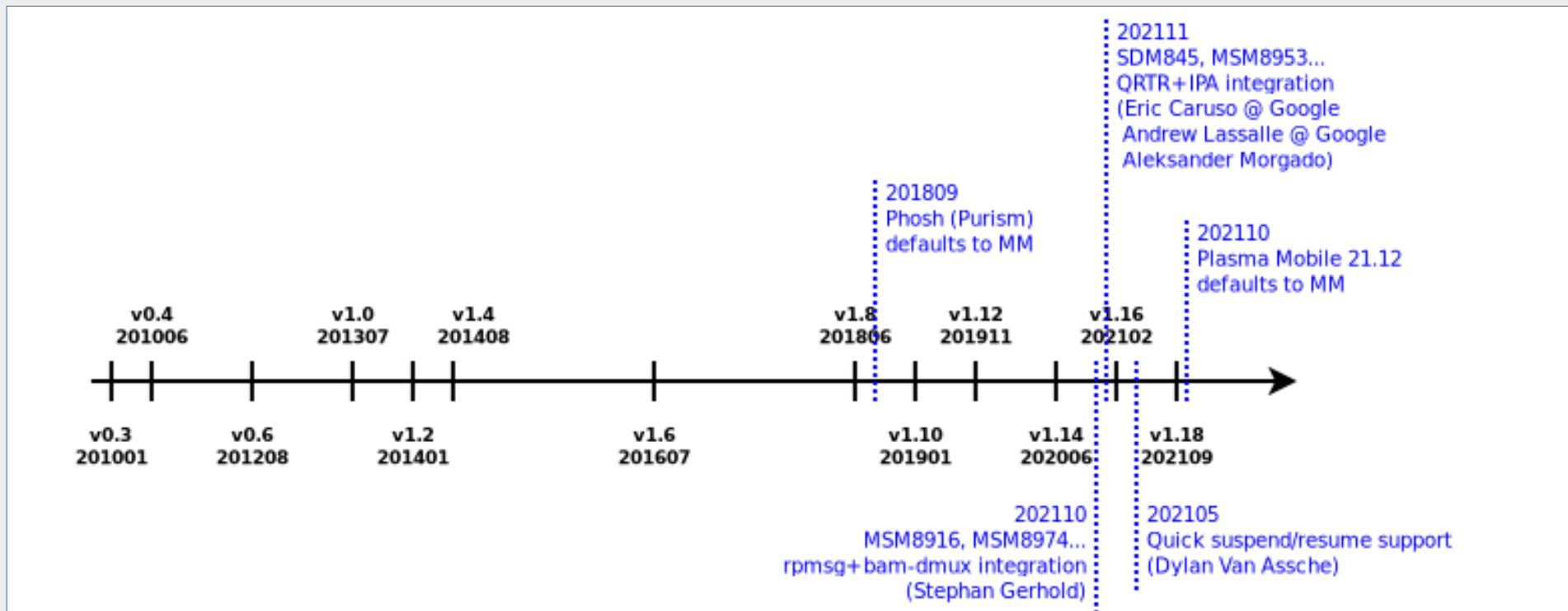
© Purism
<https://puri.sm/products/librem-5/>



Voice call support in MM



Phone integration in MM





Phone related features

- Basic call management
 - Dial, Accept, Hangup
 - Detailed call states (dialing, ringing...)
 - DTMF
- Supplementary services
 - Call transfer
 - Call on hold
 - Multiparty calls
 - USSD
- SMS
 - Single part, multipart
 - 3GPP and 3GPP2
- CS/PS domain management
 - UE mode of operation (+CEMODE, 3GPP TS 24.301)
 - CS fallback (CSFB)
- Multi-SIM Single Standby
- Emergency calls



Missing phone related features

- Multi-SIM multi-standby
- Multi-SIM multi-active
- SIM operations
 - SIM application toolkit
 - SIM auth
 - SIM contacts management
- Supplementary services: call barring
- ...

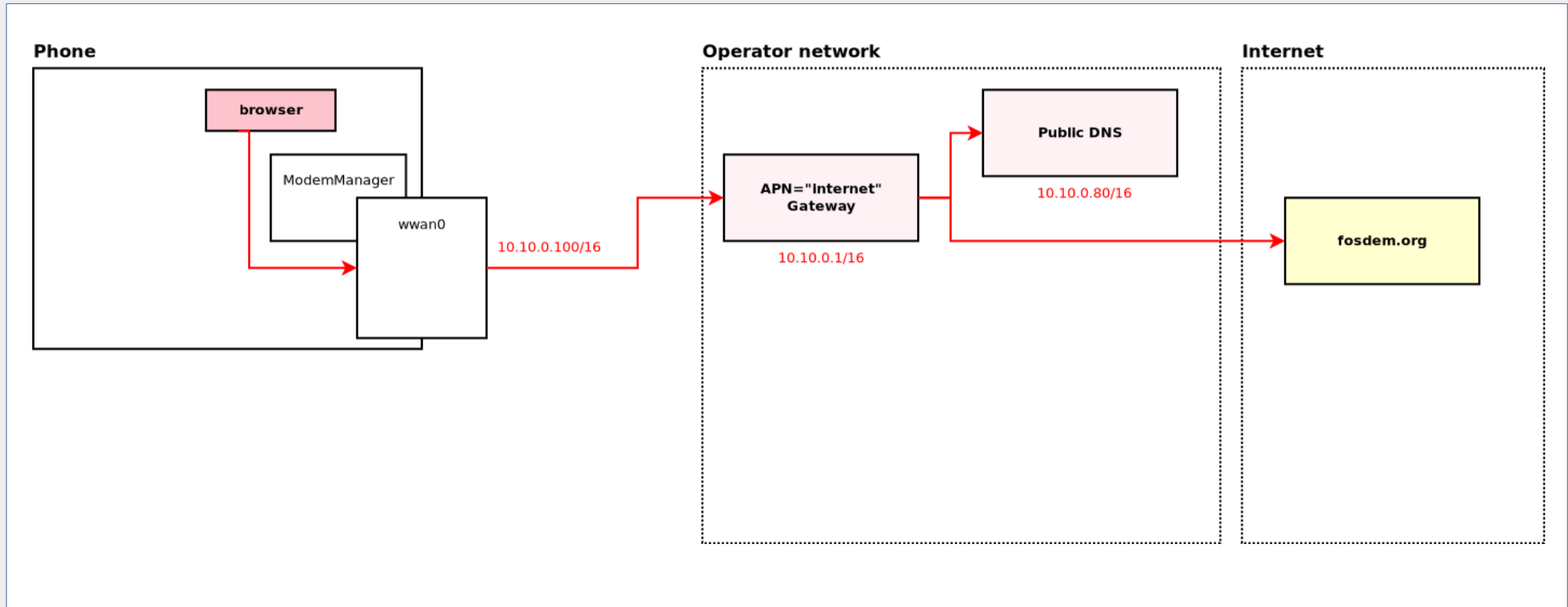


Multi-PDN

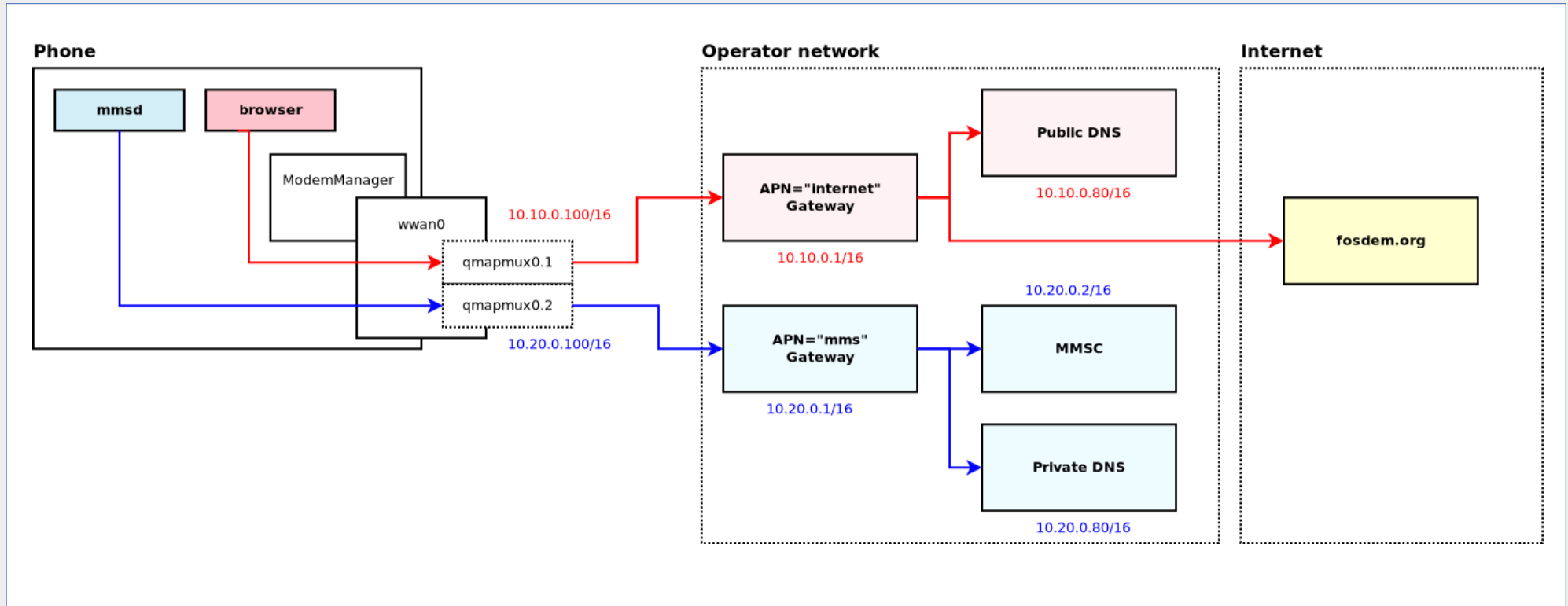
(or Multi-APN)

But what's an APN?

Single-PDN usecase



Multi-PDN usecase



Switch to Multi-PDN



- By default in MM as a whole:
 - `--test-multiplex-requested`
- Per-connection:
 - “multiplex=yes” in `Simple.Connect()` or `Modem.CreateBearer()`.



Voice calls over LTE

CSFB vs VoLTE



VoLTE management

- From the point of view of ModemManager:
 - Voice call management operations are **100% the same** when using a CSFB or when using VoLTE
 - Same for SMS or supplementary services like USSD, call barring configuration...
- Missing:
 - **IMS** bearer/context configuration and enabling
 - VoLTE support check/enable/disable in the modem



Profile management

(Bearer/context
settings management)

Profile



- **Modem3GPP.ProfileManager** interface
 - List/Set/Delete operations
 - 3GPP profile settings
 - Profile ID
 - APN & authentication settings
 - IP type (IPv4 only, IPv6 only, Ipv4v6)
 - APN type → Informative only!
 - Enables use of “profile-id=X” in Simple.Connect() or Modem.CreateBearer()
 - **Missing:** enable profile but don't setup data connection in host

Thanks!



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