SMART SYSTEM SHUTDOWN.

How systemd inhibitors can be used to handle eCall and telephony scenarios?

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HOW CAN WE USE SYSTEMD IN THESE CASES?
LET'S HAVE A LOOK AT INHIBITORS.
RESOURCES.

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systemd: controlling stopping distance

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Who am I

- Linux enthusiast for many years
- Contributor to Mandriva and co-founder of community-run Mageia
- Was responsible for X and Sound in Mandriva
- Upstream PulseAudio maintainer
- Now responsible for boot+init in Mageia
- Integrated systemd
- Involved in upstream and attend several conferences and hackfests
What is systemd

- Modern, stateful init system (PID 1)
- But more!
- Base toolkit for building an OS
- Essential building blocks for bootstrapping any modern Linux system
PID 1

- Kernel hands over control
- Responsible for starting and stopping subsystems
- And, with various constraints and time limits, for shutting down the system cleanly
Inhibitors

- Ability to block certain system operations
  - Shutdown
  - Sleep
  - Hardware-led actions (Lids on Laptops, Suspend Keys etc)

- NOT part of PID 1

- Implemented on top of systemd as in logind
logind

- Proxy for many raw operations of systemd with logic and authorisation (polkit) taken into account
- Tracks user sessions – who is active and who has access to various h/w resources (via udev/uaccess)
- High level concepts not considered core part of PID1 e.g. inhibiting various operations
Inhibitors

- Important point: For the system to work with inhibitors, all operations must go via logind.
  - If something uses PID1 directly to shutdown, inhibitors will be ignored.

- Two types of inhibitors:
  - Delay
  - Block
Inhibitors: delay

● Only applicable to sleep and hibernate

● Allows callbacks to be triggered before state is entered
  – Instant Messaging clients can logout/set “away”
  – Lock screens can lock screen before suspending!

● Subject to a (global) InhibitDelayMaxUSec setting (logind.conf) which defaults to 5s
Inhibitors: block

- Prevent native handling of operation
  - i.e. stop logind proxying request to PID1
- In Desktop context, DE may want to handle lid-switch on laptops to implement its own high-level policy
  - e.g. do not suspend on lid closure if external monitor is attached
  - logind default is to “play it safe”
Handling calls

- Ensure all shutdown triggers go via logind – not directly asking PID1.

- When call in in progress request a “block” inhibit:
  - Recommended: via DBus
Handling calls

● To block or delay?

● Block calls will simply block while the lock file descriptor is open – no callback i.e. no way to know whether a shutdown request has come in during call, and thus no way to continue it after call has ended

● Delay of 5s is barely enough time to emit a blood curdling scream before the call ends!

● Delay probably still more appropriate
Loooonng delay?

- Possibly increase default delay to very long value (longest possible phone call)
- Is it too long for other uses of delay inhibitors (i.e. do you trust the other code not to block too long?)
- Perhaps (slight) API change needed to allow requesting a per-inhibition delay up to the Max value to protect other, less trustworthy code
Implementation

- **PrepareForShutdown() & PrepareForSleep()**
  - Callbacks triggered at appropriate times
- **Could only inhibit when call is initiated**
  - Would generally ignore callback
- **Could inhibit at all times (from boot)**
  - Callback could do some checks and close fd if no call in progress
  - Retake it later on resume (or GOTO 10 on boot)
Resources

- man (1) systemd-inhibit
- freedesktop.org/wiki/Software/systemd/inhibit
- systemd-devel@lists.freedesktop.org
Questions?

Any questions?