EDAF35

freezer.c

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Purpose of freezing tasks

- Controll user space process during hibernation or suspend
- Controlling (some) kernel threads
- Preventing damage of filesystems after hibernation
- Prevent unnecessary memory allocation
- Preventing interference with suspending and resuming of devices
- Keeping user space processes in the dark

How does it work?

- PR_NOFREEZE, PR_FROZEN, PR_FREEZER_SKIP
- freeze_task();

```
bool freeze_task(struct task_struct *p)
{
    unsigned long flags;

    if (freezer_should_skip(p))
        return false;

    spin_lock_irqsave(&freezer_lock, flags);
    if (!freezing(p) || frozen(p)) {
        spin_unlock_irqrestore(&freezer_lock, flags);
        return false;
    }

    if (!(p->flags & PF_KTHREAD))
        fake_signal_wake_up(p);
    else
        wake_up_state(p, TASK_INTERRUPTIBLE);

    spin_unlock_irqrestore(&freezer_lock, flags);
    return true;
}
```

How does it work?

- thaw_task();

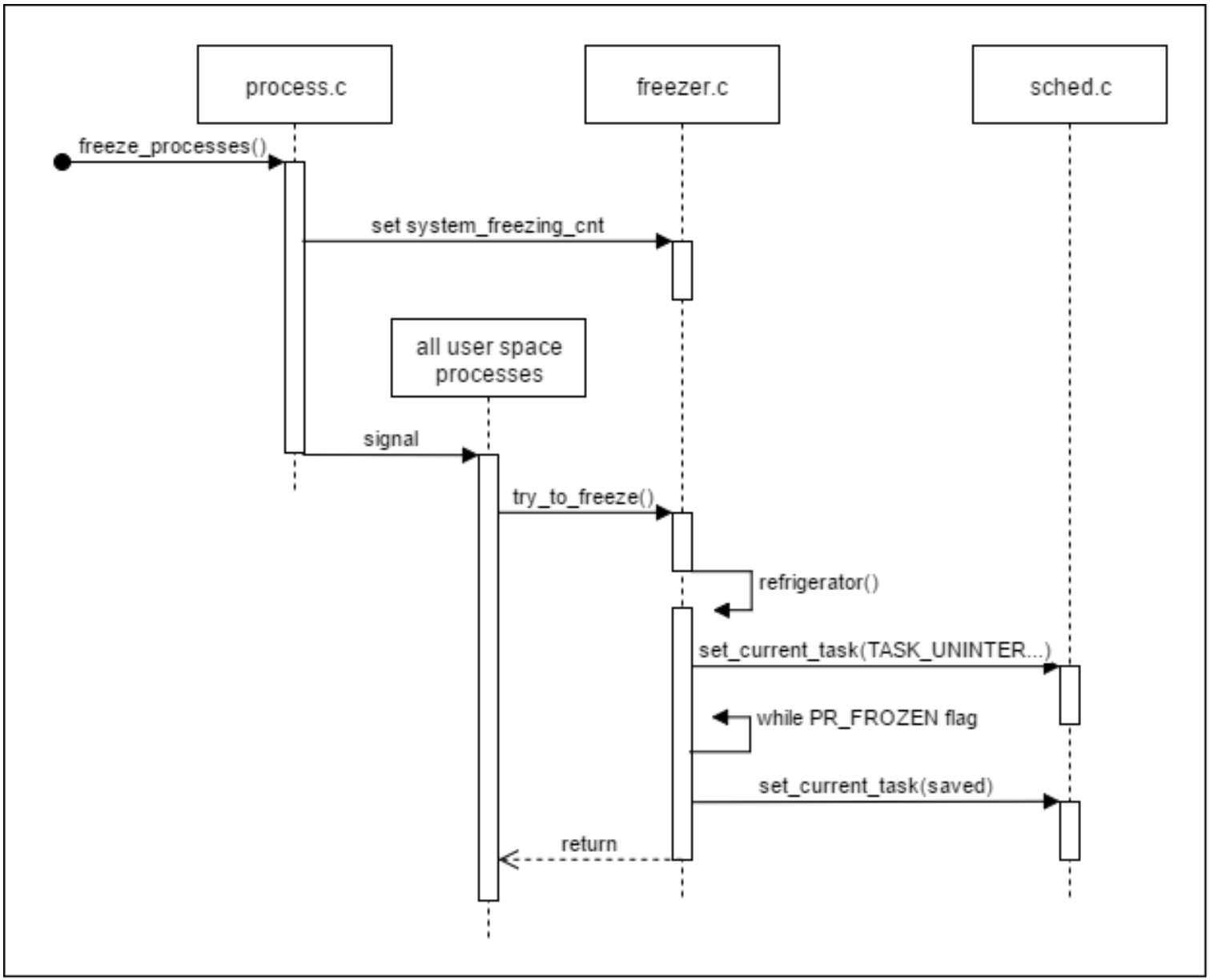
```
void __thaw_task(struct task_struct *p)
{
    unsigned long flags;

    spin_lock_irqsave(&freezer_lock, flags);
    if (frozen(p))
        wake_up_process(p);
    spin_unlock_irqrestore(&freezer_lock, flags);
}
```

- set_freezable();

```
bool set_freezable(void)
{
    might_sleep();
    spin_lock_irq(&freezer_lock);
    current->flags &= ~PF_NOFREEZE;
    spin_unlock_irq(&freezer_lock);
    return try_to_freeze();
}
```

How does it work? - Diagram



How does it work? - Refrigerator

```
bool __refrigerator(bool check_kthr_stop)
{
    bool was_frozen = false;
    long save = current->state;

    pr_debug("%s entered refrigerator\n",
             current->comm);

    for (;;) {
        set_current_state(TASK_UNINTERRUPTIBLE);

        spin_lock_irq(&freezer_lock);
        current->flags |= PF_FROZEN;
        if (!freezing(current) ||
            (check_kthr_stop
             && kthread_should_stop()))
            current->flags &= ~PF_FROZEN;
        spin_unlock_irq(&freezer_lock);

        if (!(current->flags & PF_FROZEN))
            break;
        was_frozen = true;
        schedule();
    }
    pr_debug("%s left refrigerator\n",
             current->comm);

    set_current_state(save);

    return was_frozen;
}
```

Problems with freezing

- Blocked kernel threads
- Distorts load average
- Device drivers in user space

Questions

Thank you for listening!