Reincarnation of Dead Device Drivers

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Research Summary

Problem: Since bugs in software are a fact of life, failures in device drivers and other critical OS components are inevitable.

Goal: We want to build an OS that is resilient to such failures so it can continue to work under adverse conditions.

Results: We have built a new OS that is:

(1) fully compartmentalized by running all components as unprivileged user-mode processes protected by the MMU, and

(2) constantly monitored by the special *Reincarnation Server* that can replace malfunctioning parts with a fresh copy.

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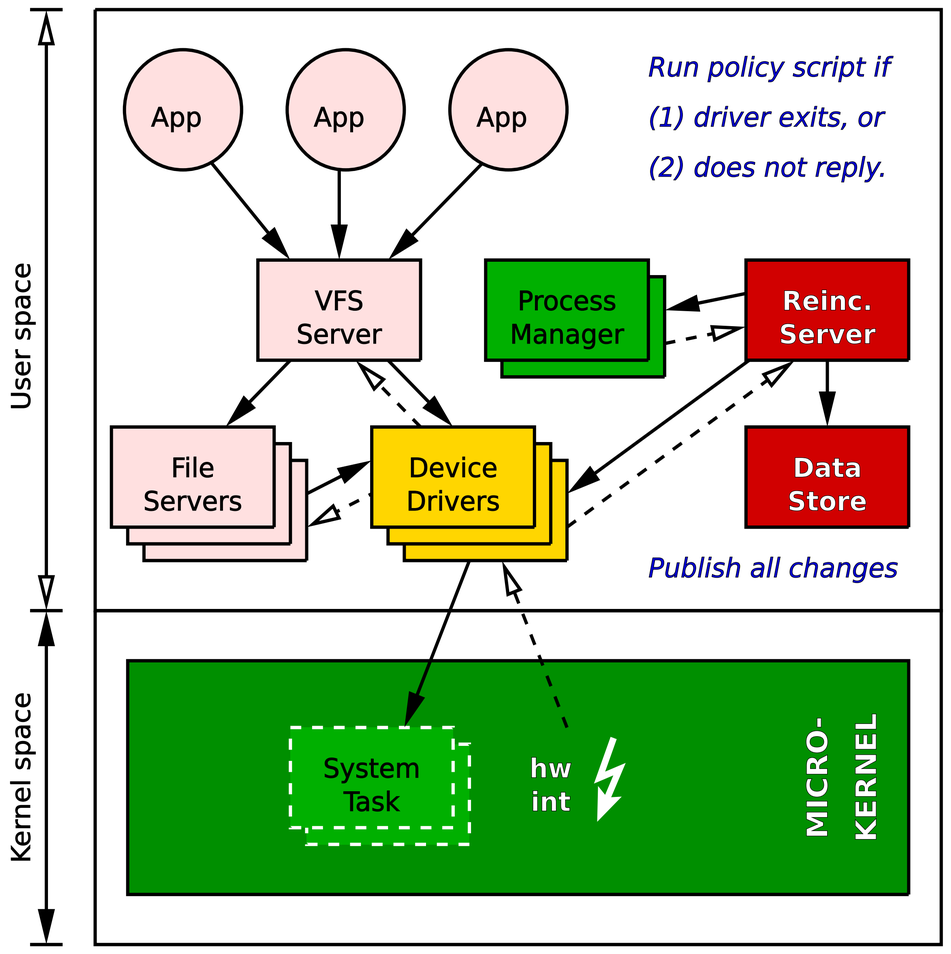
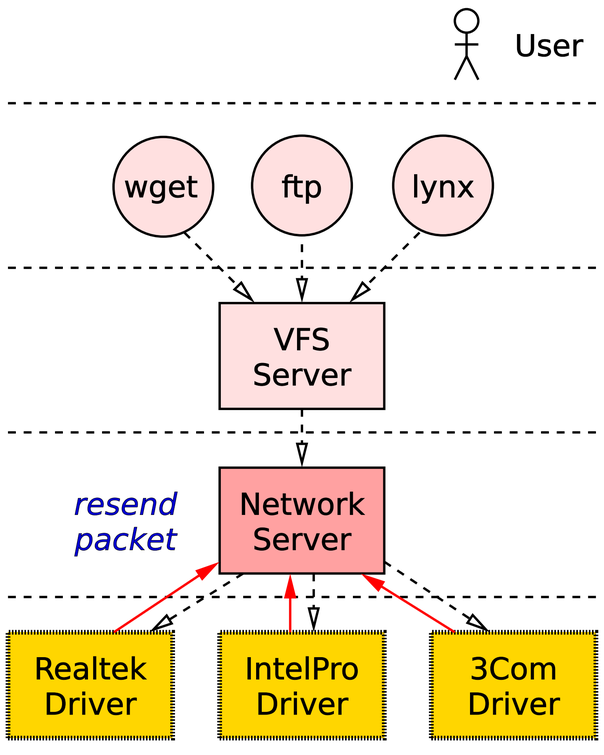
(but please note that this is work-in-progress)

Architecture of a Resilient Operating System



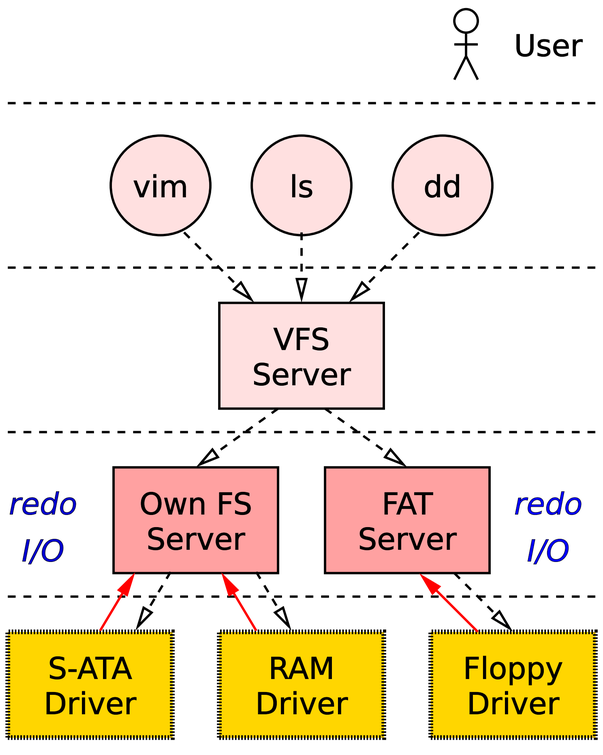
Reincarnation Server Monitors the System and Automatically Replaces Dead Drivers

Ethernet Driver Recovery



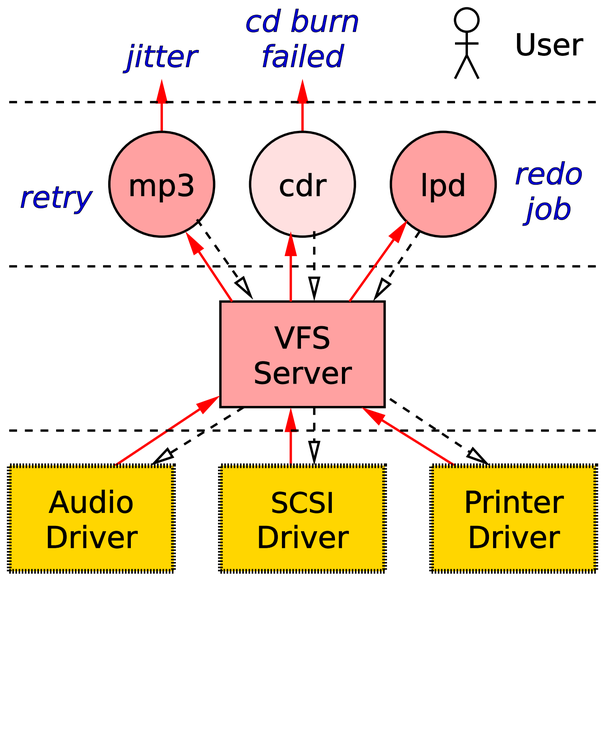
Full Recovery at Network Server
(transparant to application)

Block Driver Recovery



Full Recovery at File Server
(transparant to application)

Character Driver Recovery



Partial Recovery at Application
(transparant to user)

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