Linux kernel live patching

OWASP Security Tapas 2015-10-20

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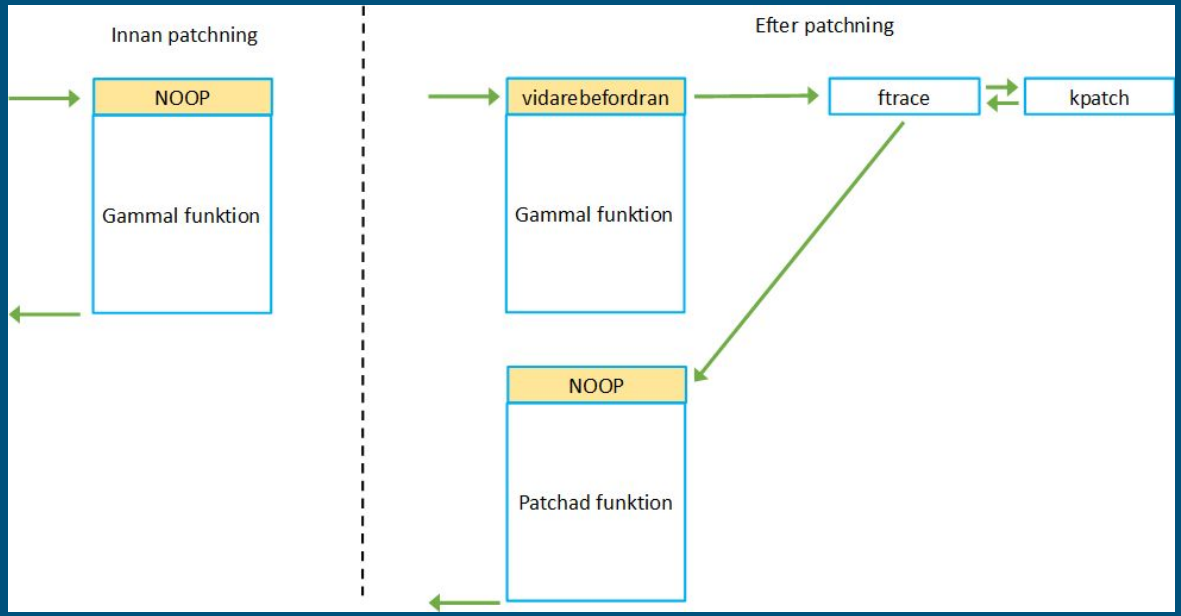
Why live patches?

- Apply fixes for severe security problems quickly and without planning downtime - SUSE’s goal is CVSS 6 and above
- Stability fixes

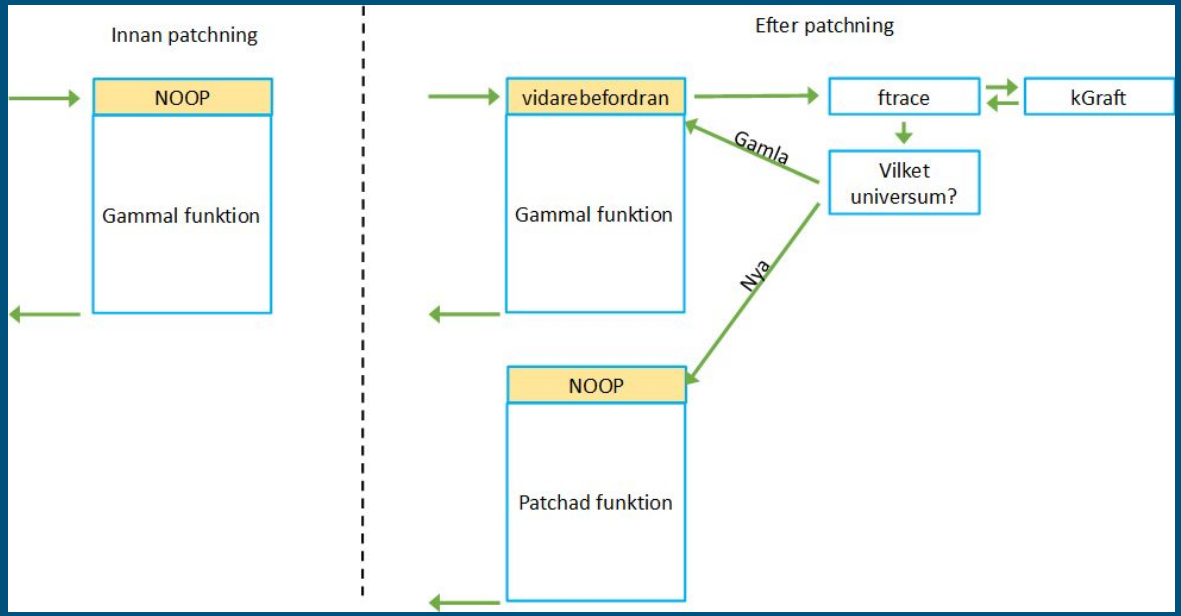
- large in-memory databases - saving and re-reading data from disk can take hours
- virtualization hosts - patch hosts without affecting guests
- computing clusters - some calculations are hard to stop and resume
- large datacenters - rebooting thousands or tens of thousands of machines in a controlled way without affecting business can be hard

kpatch



- From Red Hat, released publically summer of 2014
- 10-40 milliseconds freeze
- All-or-nothing
- No performance impact after patching

kGraft



- From SUSE, released publically in November 2014
- No freeze
- Divides processes into different universes (with/without patch)
- Some performance impact after patching

Demo 1 - patch an exploit without rebooting

Demo 2 - create our own patch

```
--- orig/fs/proc/meminfo.c          2015-09-28 22:27:23.720627176 +0200
+++ fs/proc/meminfo.c   2015-09-28 22:28:28.565031970 +0200
@@ -89,6 +89,7 @@
        * Tagged format, for easy grepping and expansion.
        */
       seq_printf(m,
+               "kpatch fungerar!\n"
                "MemTotal:    %8lu kB\n"
                "MemFree:     %8lu kB\n"
                "MemAvailable:   %8lu kB\n"
```

Presentation available at this URL