Route Optimization & IPSec interactions for userspace MIPv6

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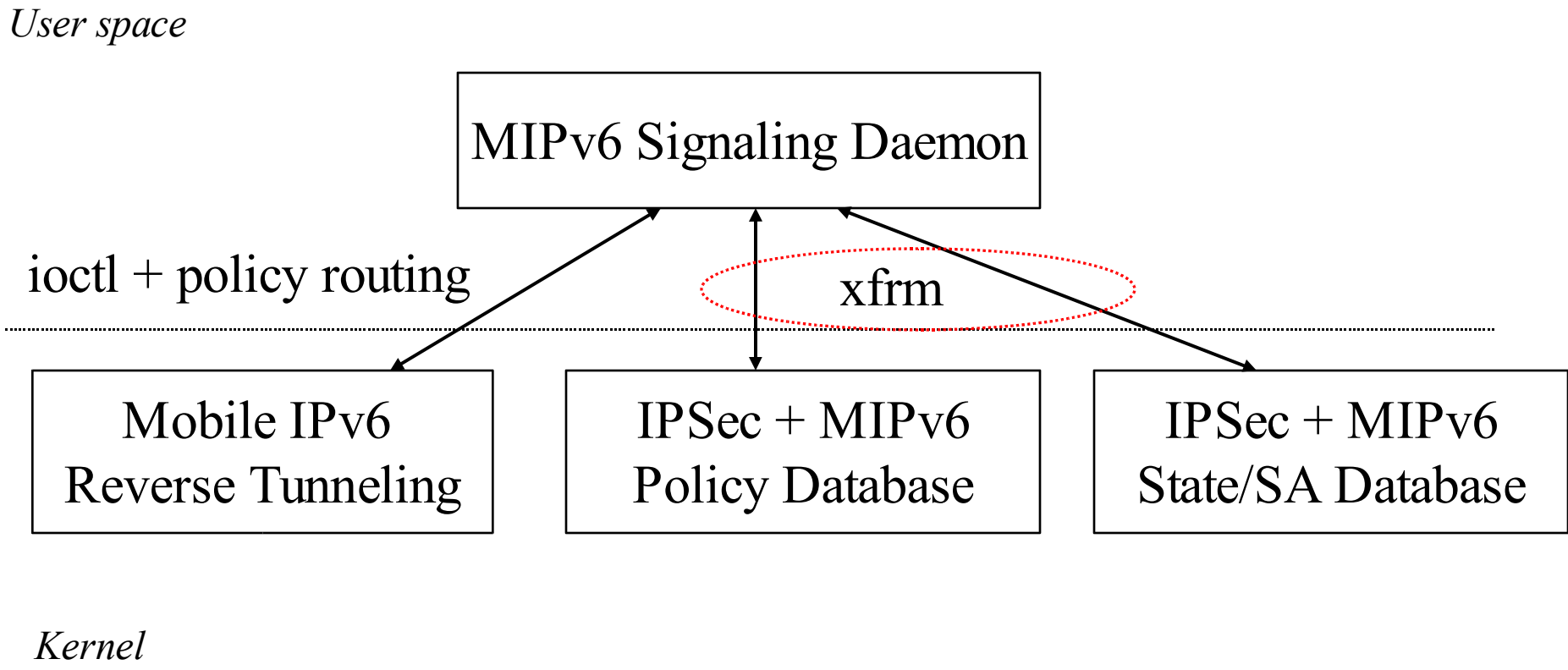
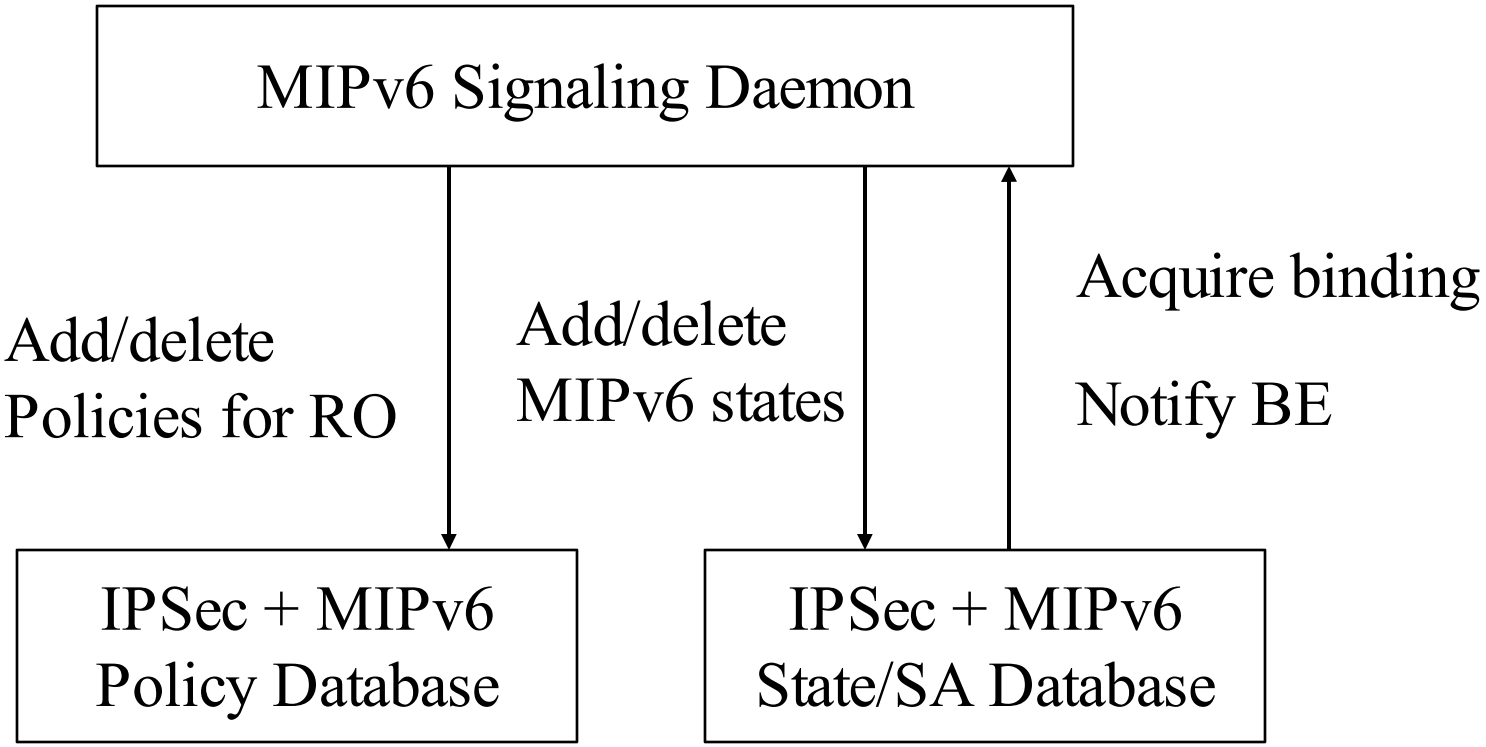
Architecture for Route Optimization and Tunneling



Use of Linux XFRM system

- Linux 2.6 kernels support IPSec through a (somewhat) extendable system, XFRM.
- XFRM has policies (SPD) and states which implement the policies (SADB).
- XFRM uses either netlink or PF_KEY as interface.
- USAGI-project added support for MIPv6 extension header adding and processing to XFRM.
- After changes from USAGI the xfrm system can be used for Route Optimization.

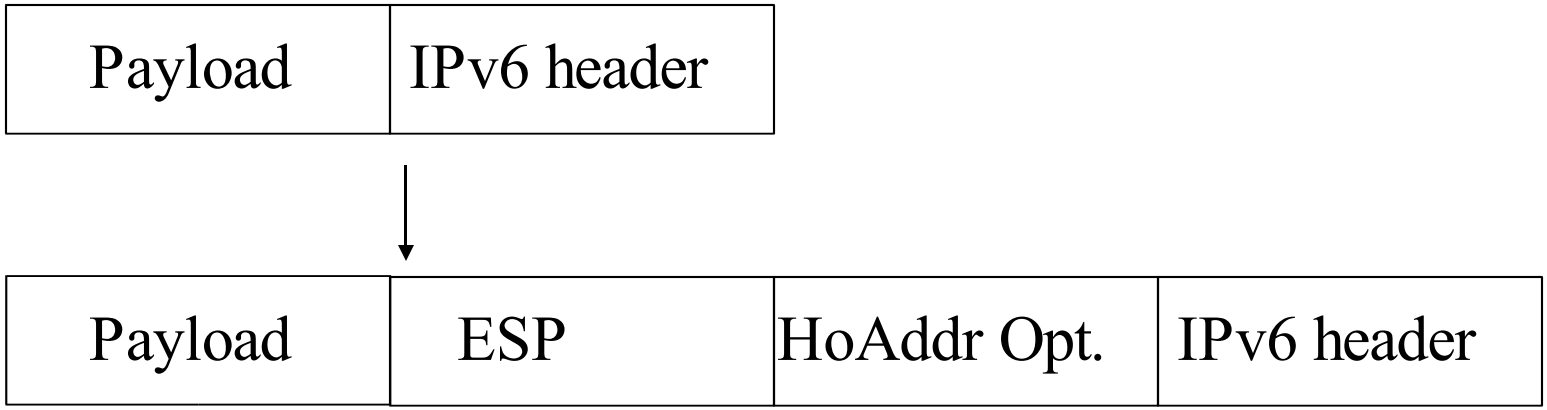
Route Optimization



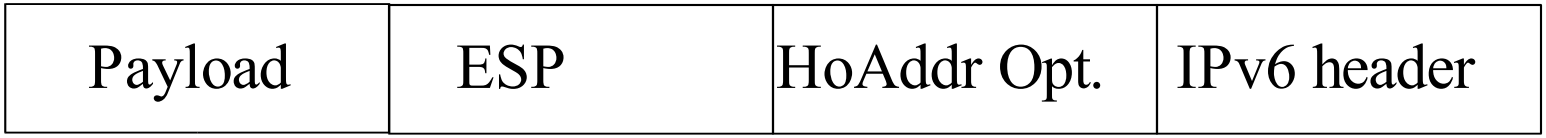
Interaction with IPSec

- Some packets require both route optimization and IPSec.
- XFRM has a single, prioritized list of policies and only one policy can be applied to a packet. => *Policy for a flow needs to include both IPSec and MIPv6 transforms (e.g. ESP + RO).*
- MIPv6 daemon creates the policy for MIPv6 and IPSec and MIPv6 states, SAs are created by IPSec tools (or IKE).
- Kernel does the rest…

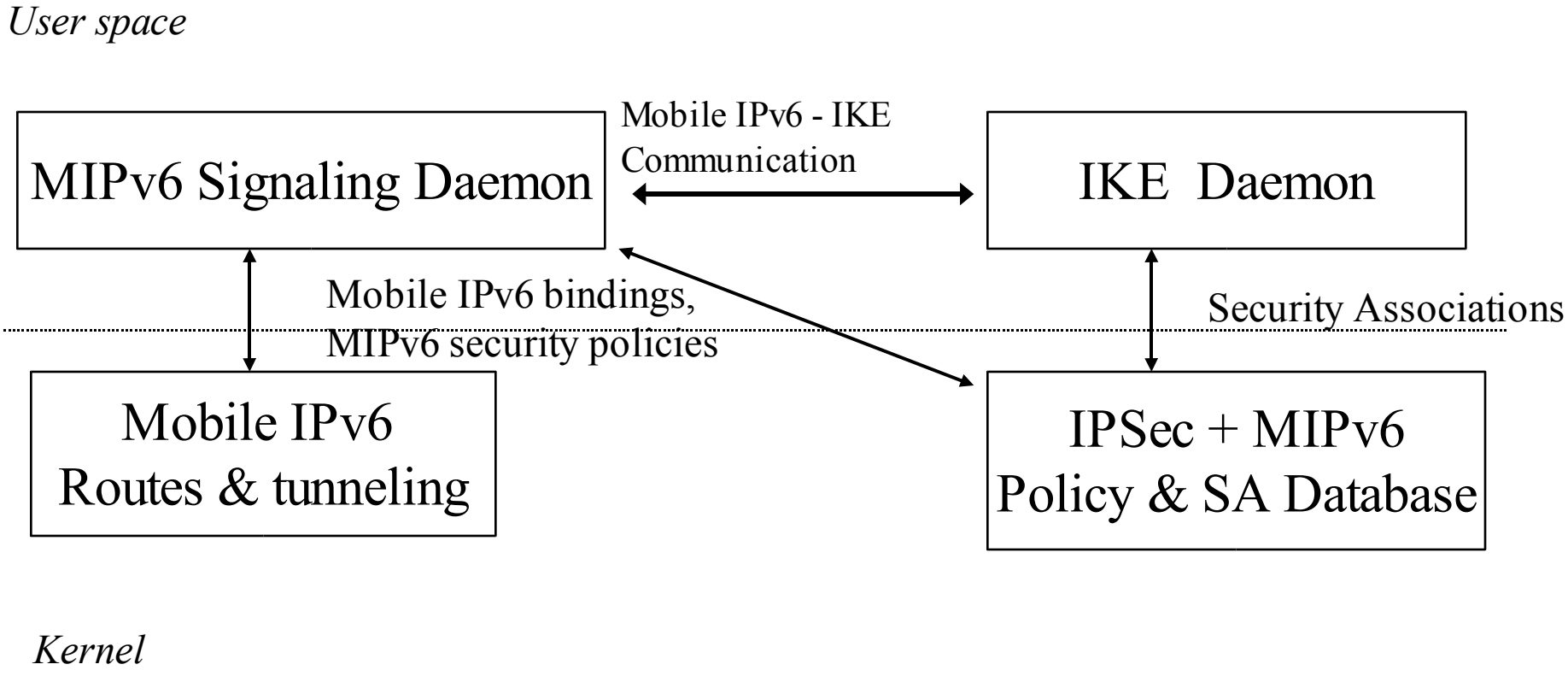
Interaction with IPSec, outbound packet processing



Interaction with IPSec, inbound packet processing



MIPv6 – IKE ?


User space
MIPv6 Signaling Daemon
Mobile IPv6 - IKE
Communication
IKE Daemon
Mobile IPv6 bindings,
MIPv6 security policies
Security Associations
Mobile IPv6
Routes & tunneling
IPSec + MIPv6
Policy & SA Database
Kernel

Conclusions

- It is possible to implement Mobile IPv6 mostly in the userspace.
- Userspace MIPv6 requires support from kernel for Route Optimization and tunneling.
- IPSec and Mobile IPv6 policies and states can use same mechanisms.
- MIPv6 related APIs should be designed to work with both in-kernel and userspace implementations
- Check http://www.mobile-ipv6.org in the beginning of April for a release of the code.

Thanks!

Any questions?