Abstract:

The maturity of new operating systems heavily depends on the enrichment and diversity of device drivers. The hardware manufacturers, however, usually only provide binary drivers to most commercial OS. Meanwhile, device drivers in commodity OS usually execute in most privileged level and are the majority causes of system failures. Previous techniques either require the modification of source code of drivers or incur large resource overhead, and all of them are not support the reuse of drivers across different ISAs.

We propose to use dynamic binary translation to cross-ISA reuse binary device drivers, and improve system dependability. The basic idea is transplanting device drivers at the binary level and using a glue layer to emulate the interfaces of the original OS.

Motivation:

- Cross-ISA binary drivers reuse
- Improved system dependability

Our Solution:

- Use dynamic binary translation to reuse binary device drivers cross ISAs, and improve system dependability through encapsulating the driver within a user mode process.
- Source ISA: Intel x86
- Target ISA: Untiy(arm-like)
- Source OS: Windows XP
- Target OS: Linux 2.6
- DBT: based on qemu-0.11.0
- Driver: network and sound
- Libksrv: 43/168 interfaces
- Libdrv-mgt: driver boot
- Libdrv-mod: driver boot