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Hardware-Controlled Bootable Drive Switching for Segregated Computing Experiences

Computing devices are frequently used for multiple applications – a user might share a device for work and personal computing. This sharing creates a wealth of data security vulnerabilities; the actions performed on a device when used for personal computing may compromise sensitive corporate data. Complete separation and isolation of the data location will eliminate any vulnerability of this data. A computing device with two physical drives and a hardware toggle switch will promote more separation between business and personal use by isolating data, while sharing the same hardware. This toggle switch will allow the user to switch between bootable drives, sending power to only one of the drives at a time.

A system with multiple boot drives would benefit both users and their companies by separating the content of the drives. Users can have a personal experience with fewer security restrictions, which their companies will not need to regulate. Companies can keep their sensitive data secure, even if an employee is performing unsafe activities with a company device. Typically, a user will either have multiple computing devices for these two use cases, or they will place their company at risk of data theft or loss. With this solution, the hardware can be shared without the data insecurity.

Many computing devices have multiple drives or bootable partitions, but there is no way to isolate those drives without physically unplugging them from the system. When connected to the system, the data can be accessed and modified. Accessories for switchable drive bays are available, but not integrated into portable computing devices. This solution proposes a single-action method to switch between multiple isolated drives.

A computing device has two bootable drives, physically connected to the system. On the chassis, the user has access to a toggle switch, which switches the power from Drive A to Drive B. This switch is connected to the EC, which drives the transition from one drive to the other. To prevent interruption of the current session, the action of toggling the switch causes the operating system to activate the ACPI S4 (hibernation) power state. After the system is powered down, the EC switches the pinout values for the main bootable drive. This will change how the power is routed to the drives – Drive A will no longer get power, while Drive B will get power and the BIOS will attempt to boot from Drive B. After this switch, the system is re-powered and boots to Drive B. At this point, Drive A is unpowered and isolated from the system. An operating system running on Drive B has no access to Drive A because there is no electrical connection between the two.
A system with switchable boot drives would offer the following advantages:

- Increased data security for corporate customers
- Improved personal experience without necessary security restrictions
- Shared hardware for both experiences, lowered demand for a secondary machine
- Builds brand loyalty for customers
- System can alternatively be configured for a RAID 0/1 configuration for improved drive performance or redundancy
- Better separation of work and life

Figure 1. Pictorialized block diagram of power switching from one boot drive to the other. On the left, Drive A is active, while Drive B is disconnected. On the right, the contrapositive is true.

Disclosed by Andrew Elsey, HP Inc.