



ISO/IEC JTC 1/SC 25/WG 1 **N 847**

WG 1 (Berlin, France) 1

Date: May 11, 1999

ISO/IEC JTC 1/SC 25/WG 1 Interconnection of Information Technology Equipment Home Electronic System

Title: Residential Gateway "Future Proof Architecture"

Source: ISO/IEC JTC 1/SC 25/WG 1

Project: Project: 25.01.03.02

Status: Committee document, US TAG contribution

Requested Action: Discussion at Berlin meeting

Distribution: SC 25

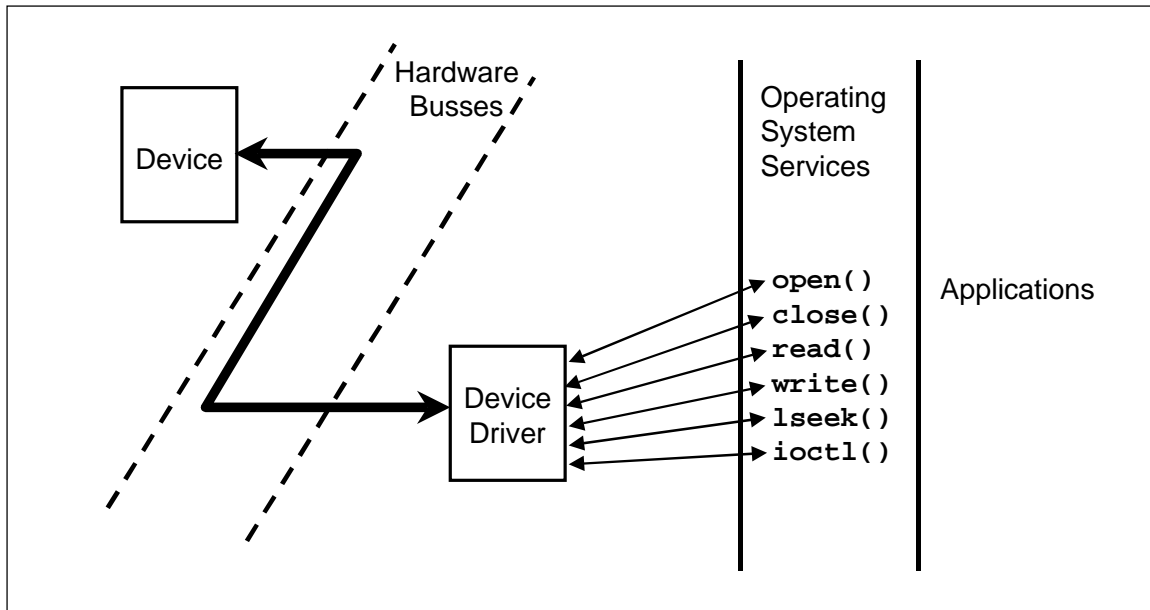
From: Frank Farance, Farance Inc. (US)
Date: 1999-05-11
Document Number: ISO-IEC/JTC1/SC25/WG1/N847
Title: Residential Gateway "Future-Proof Architecture"

This document is a first draft of a "future-proof" architecture for residential gateways and their devices. This document will be revised and improved over the next 10 months.

The architecture is defined as five layers:

- **Layer 1: Device.** A consumer device in the Home Electronic System.
- **Layer 2: Hardware Busses.** One or more communication busses that interface the Device to the Residential Gateway.
- **Layer 3: Device Driver.** The operating system software that interfaces the Operating System Services to the hardware interface (usually, Hardware Busses).
- **Layer 4: Operating System Services.** The services provided by the operating system that are common to all Devices accessible by the Residential Gateway.
- **Layer 5: Applications.** Software applications that perform some function, including accessing one or more Devices.

The following diagram depicts the five layers of the architecture.



Layer 1: Device

The Device is connected to the Residential Gateway via one or more communication busses. The Device is operated via Device Messages. The Device Messages, their

timing, and their interactions may vary from Device to Device. Device Messages may flow to or from the Device.

Layer 2: Hardware Busses

The Hardware Busses are or more communication busses that communicate Device Messages to/from the Device. If there is more than one Device attached to the Residential Gateway, the Hardware Busses may provide shared access (a traditional "bus"), exclusive access (e.g., a "switch" or private connection), some combination, or some other type of access. Hardware Busses that support more than one Device shall provide an Address mechanism to distinguish one Device from another.

Layer 3: Device Driver

The Device Driver is the software interface to the operating system. Typically, Device Drivers are specialized for or specific to the Device. the Device Drivers shall use the Uniform Device Interface (UDI), as specified in "<http://www.sco.com/udi>".

Layer 4: Operating System Services

The following services shall be provided as Application Programming Interfaces (APIs):

- **int open(const char * name, int mode):** A Device named by **name** is opened according to mode **mode** (e.g., read-only, write-only, read-write). A handle shall be returned that describes the newly established connection to the Device.
- **int close(int handle):** The connection to a Device that is described by **handle** is terminated.
- **ssize_t read(int handle, void *buffer, size_t octet_count):** Reads data from the connected Device **handle** to the buffer pointed to by **buffer** for up to **octet_count** octets.
- **ssize_t write(int handle, void *buffer, size_t octet_count):** Writes data to the connected Device **handle** from the buffer pointed to by **buffer** for up to **octet_count** octets.
- **off_t lseek(int handle, off_t offset, int whence):** Changes the current read/write position of the Device to **offset**. If **whence** is 0, **offset** is relative to the beginning of the Device (i.e., an absolute position). If **whence** is 1, **offset** is relative to the current position. If **whence** is 2, **offset** is relative to the end of the Device.
- **int ioctl(int handle, int request, ... /* args */):** Performs the I/O control operation **request** on the connected Device **handle**. Some operations may require additional parameters (arguments).

The Operating System Services are intended to conform to **open**, **close**, **read**, **write**, **lseek**, and **ioctl** in the POSIX.1 standard (ISO-IEC 9945-1).

Layer 5: Applications

The Applications use the Operating System Services for accessing the Devices. No other requirements are imposed on Applications.