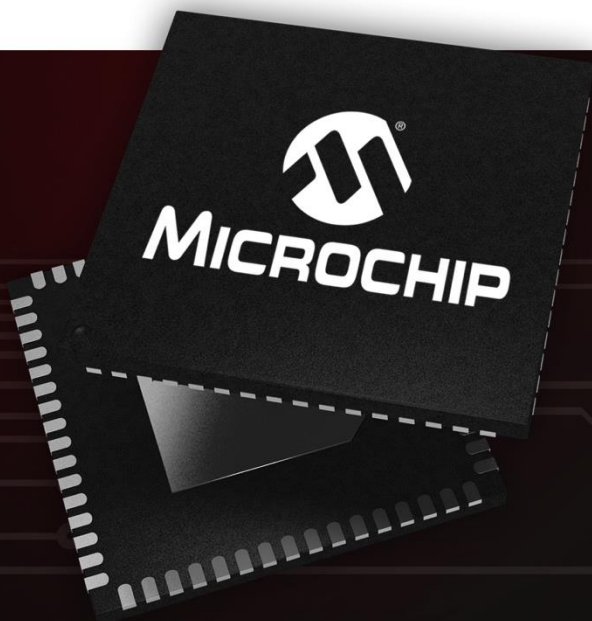A Leading Provider of Microcontroller, Mixed-Signal, Analog & Flash-IP Solutions

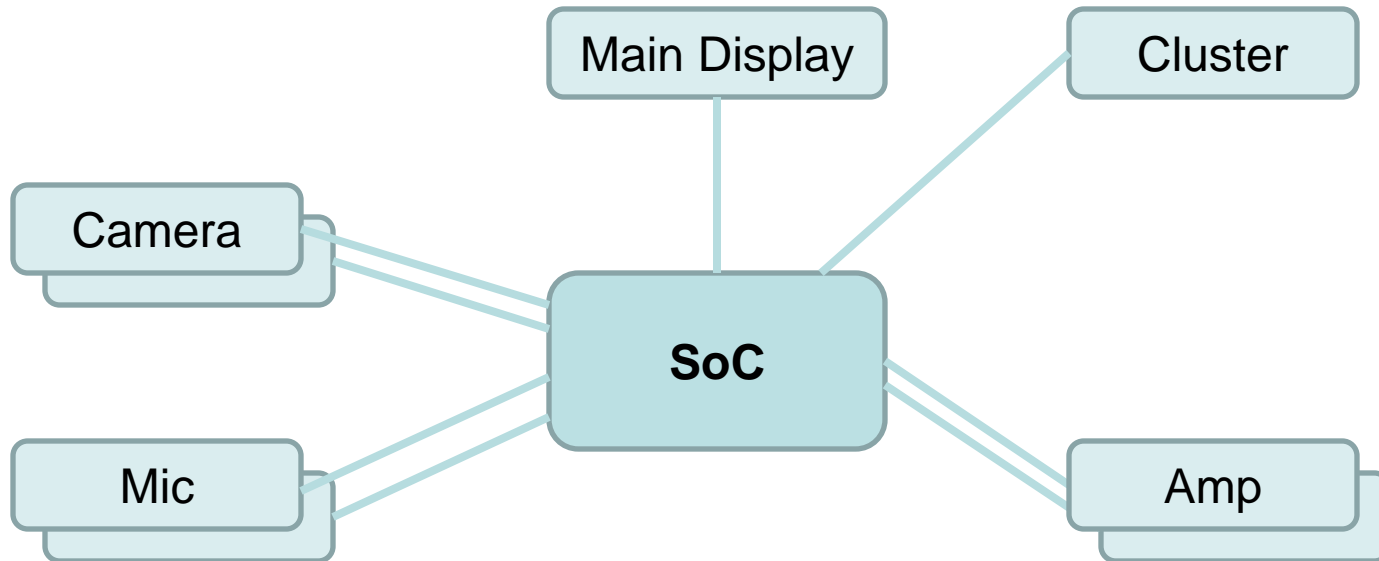*Networked Audio/Video Architecture*
Michael Fabry
2017/08/29

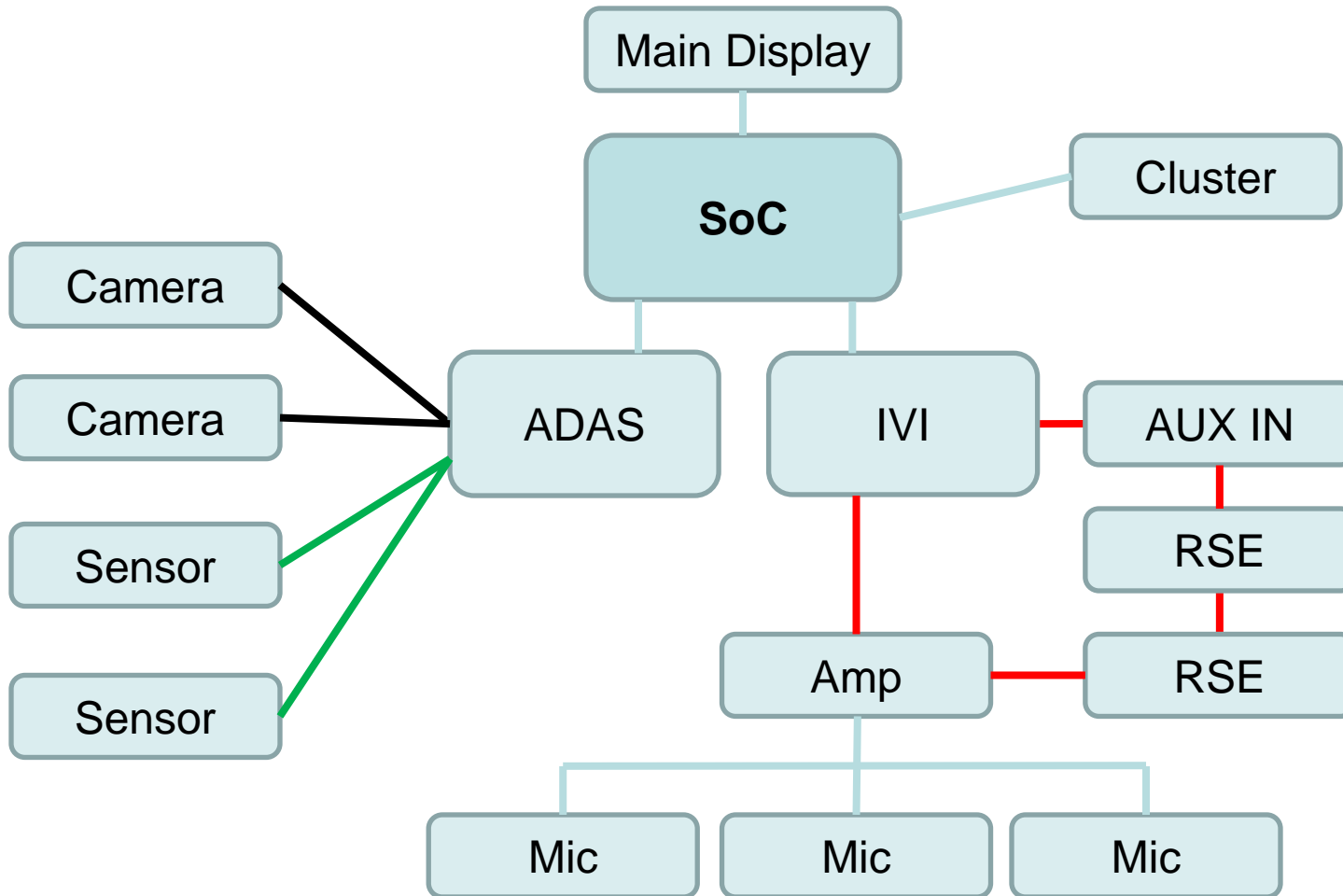# Architecture Independant Audio Management

Standalone SoC

Networked System

Proposed Targets

- ## SoC / AGL as the Master
  Central System Setup
  Central Ressource Management
  Central Device Control
  Accessability of streams

- ## Abstraction of ‚Networks and Boxes'
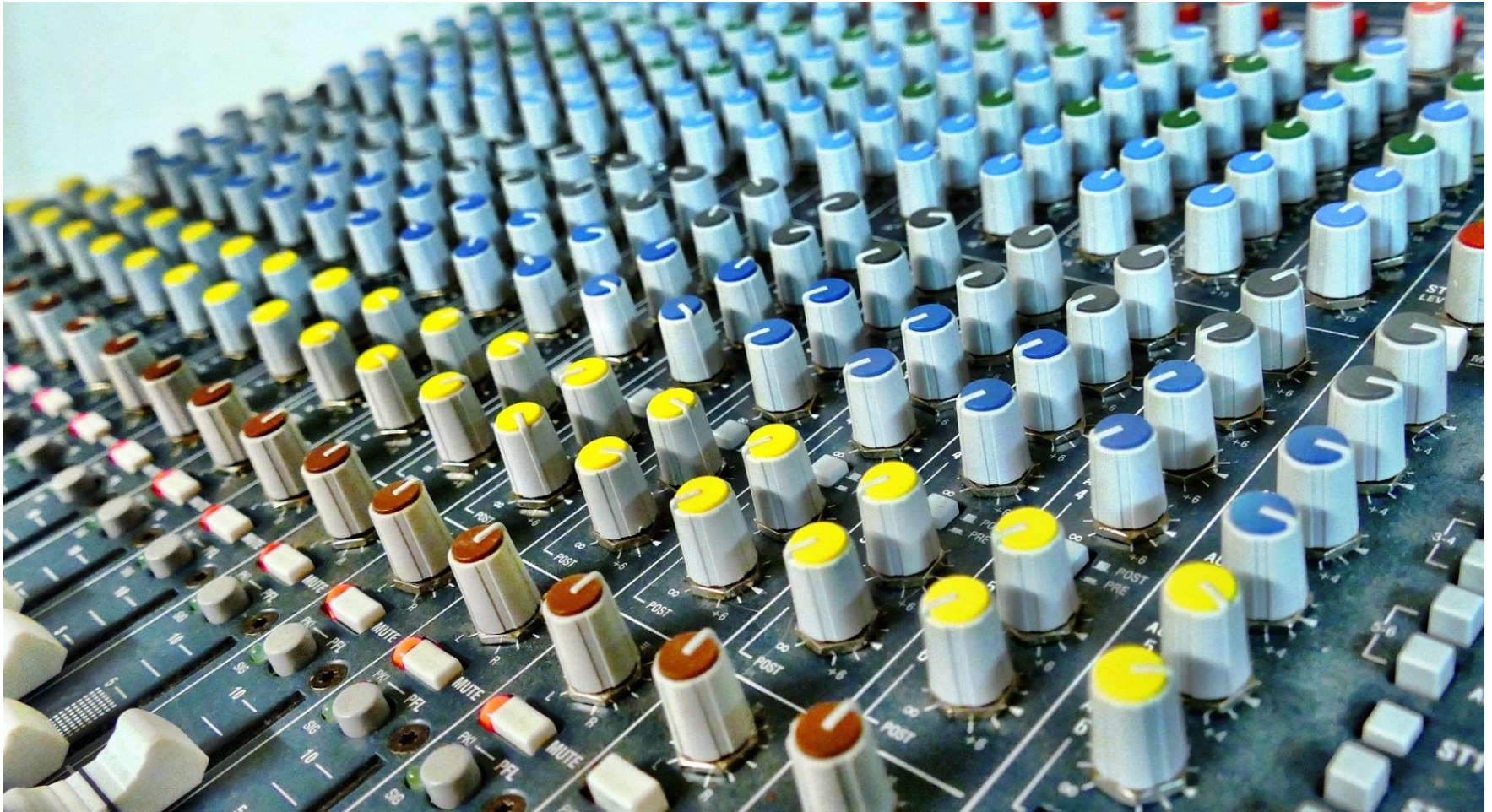 **Application API independant from used networks**
  No proprietary Box knowledge visible at application layer
  Transparent support for any Command protocol
  Based on standard Linux interfaces (ALSA, V4L2, TCP/IP, cdev)

- ## Not limited to Audio!

Desired System View

Modular System Design: Separation of Functionality

Audio/Video Management

- ## SYSTEM SETUP Domain
  Setup Routing and provide bandwidth
  Connects Sources and Sinks
  Can be static or dynamic
  Needs to be deterministic at ANY time

- ## DEVICE CONTROL Domain
  Abstract Command-API
  -> Stream start/stop/pause etc.
  -> Volume up/down/ramp/xover etc.

- ## STREAM ACCESS Domain
  Linux: ALSA, V4L2, TCP/IP
  Embedded: I²S, TSI, SPI, MediaLB

Architectural Recommendations

Routing Manager

- **Central entity of the SYSTEM SETUP domain**

- **Organizes connections/bandwidth abstractly
  Supports all datatypes (not only audio)**
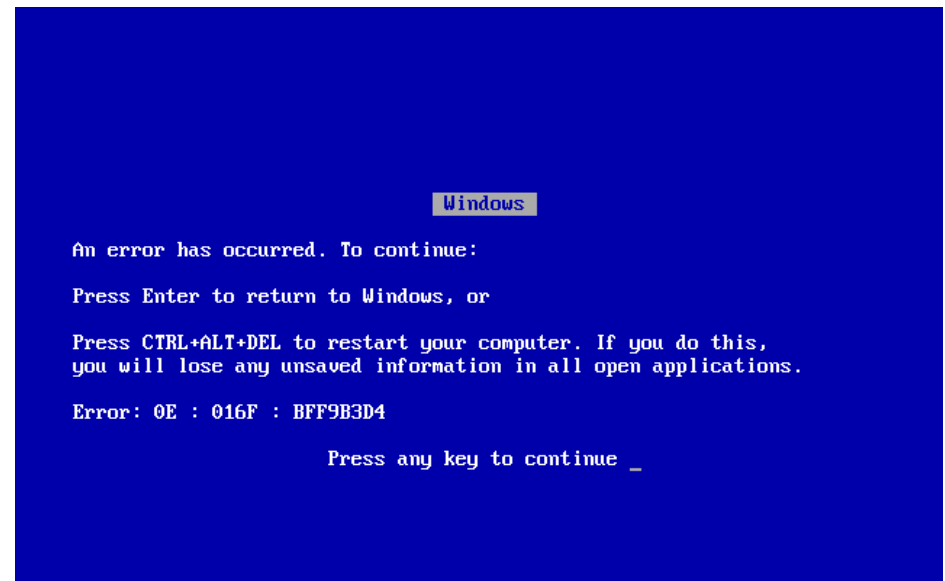
Routing Manager (cont.)

- **Single XML for fixed connections, rules and priorities**
  -> OEM specification ('the Bible')
  -> System integrator creates XML and validates against
     Avoiding 'Fulfillment by Collective' (multiple Tier1s)

- **API for requesting dynamic connections**
  -> Deterministic rules of the XML apply

- **Ensures system behavior at ANY time:**
  -> At initial release
  -> After updates
  -> Future additions
  -> Supplier change

Routing Manager (cont.)

„Organizing bandwidth of a network system
can be compared with managing memory"

The MMU (Memory Management Unit) is the central instance.
Applications in need of memory request this by the MMU API.

Direct access is a bad thing ;-)


```
                        Windows

An error has occurred. To continue:

Press Enter to return to Windows, or

Press CTRL+ALT+DEL to restart your computer. If you do this,
you will lose any unsaved information in all open applications.

Error: 0E : 016F : BFF9B3D4

                    Press any key to continue _
```

Audio Manager

- **(One) entity of the DEVICE CONTROL domain**

- **Should manage the Audio, not the proprietary tech**
  -> Agnostic towards underlying networks
  -> Agnostic towards underlying protocols
  -> Agnostic towards underlying boxes

- **Must not fiddle with the system routing directly**
  -> Using fixed connections build up at startup
  -> Using Routing Manager API for dynamic needs

Video/Media Manager

- ## Video Manager
  (Another) entity of the DEVICE CONTROL domain

  Similar to the Audio Manager, but for video streams

- ## Media Manager?
  Combining Audio Manager + Video Manager

  Support of other standard Linux interfaces, not only ALSA
  Support of compressed datastreams (AC3, DTS, TS, etc.)