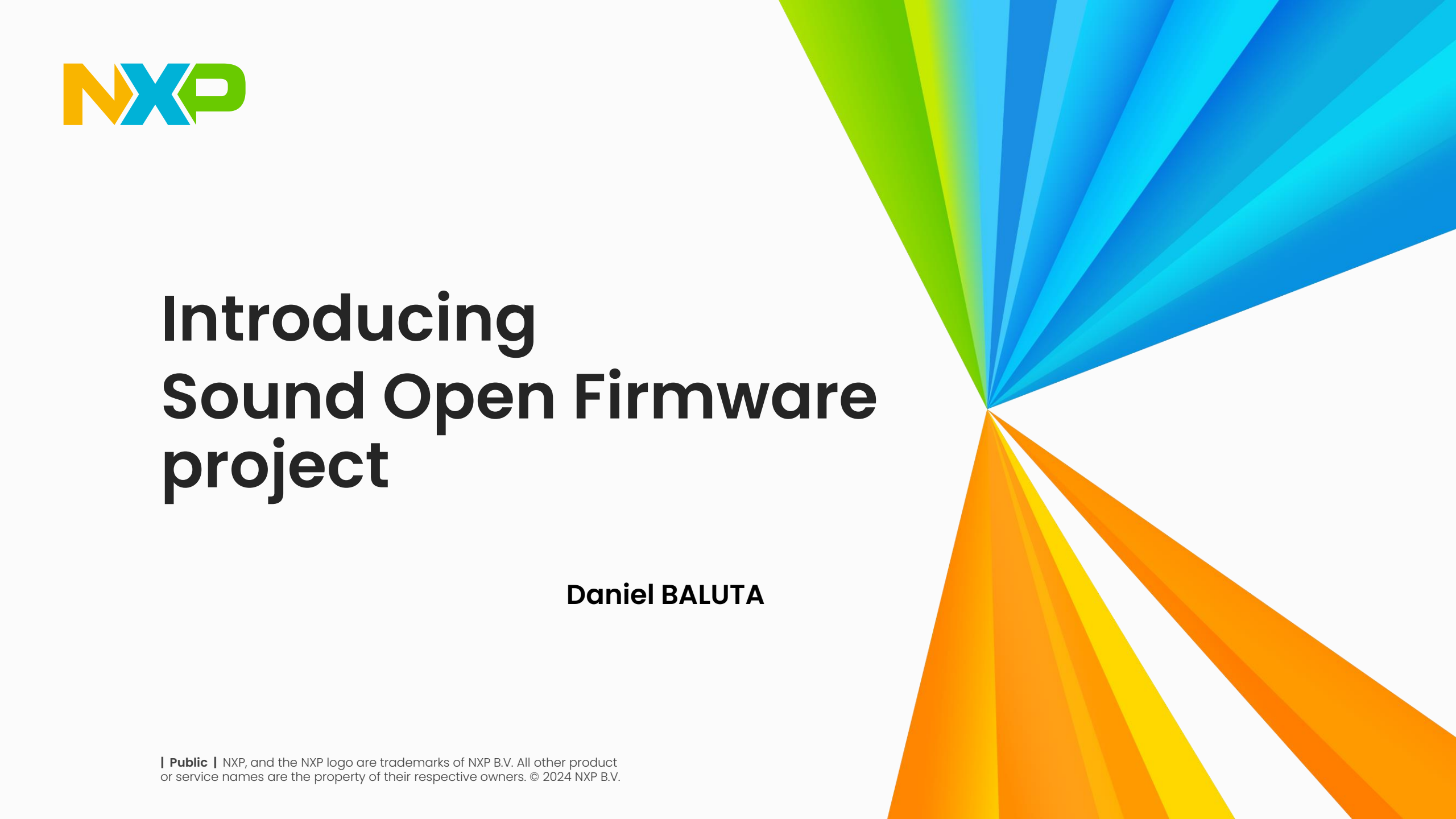
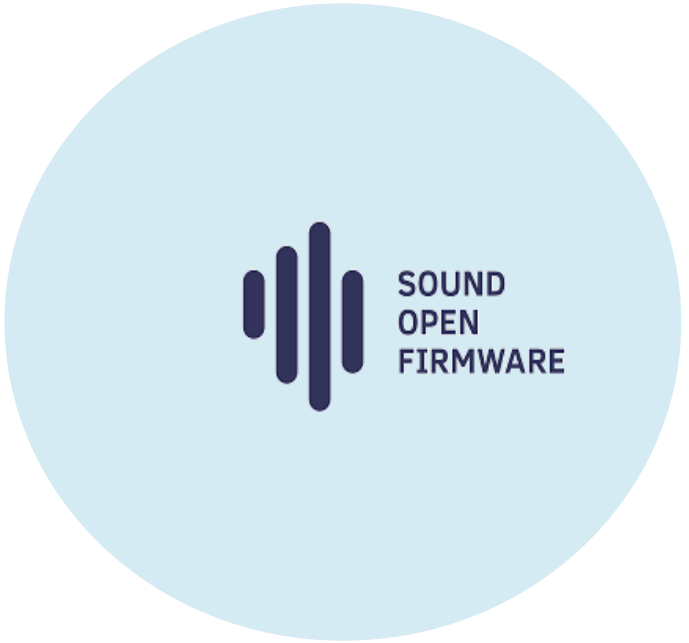


Introducing Sound Open Firmware project

Daniel BALUTA

What is Sound Open Firmware?

- https://github.com/thesofproject/
- Open source audio firmware and driver infrastructure
  - Generic audio firmware infrastructure
  - Platform and architecture independent
- Announced in 2018 at Embedded Linux Conference
- License model
  - Firmware: BSD 3 Clause / MIT (dual license)
  - Linux drivers: BSD 3 Clause / GPL v2 (dual license)



Notes and sources section

The need for an open source solution

- Traditionally firmware was closed source
  - Difficult to debug
  - Hard to understand
  - Lack of documentation
- Usually comes with a proprietary / OS specific driver
- Growth in voice control-based devices
- Demand for voice and speech recognition applications

Notes and sources section

Key features of Sound Open Firmware

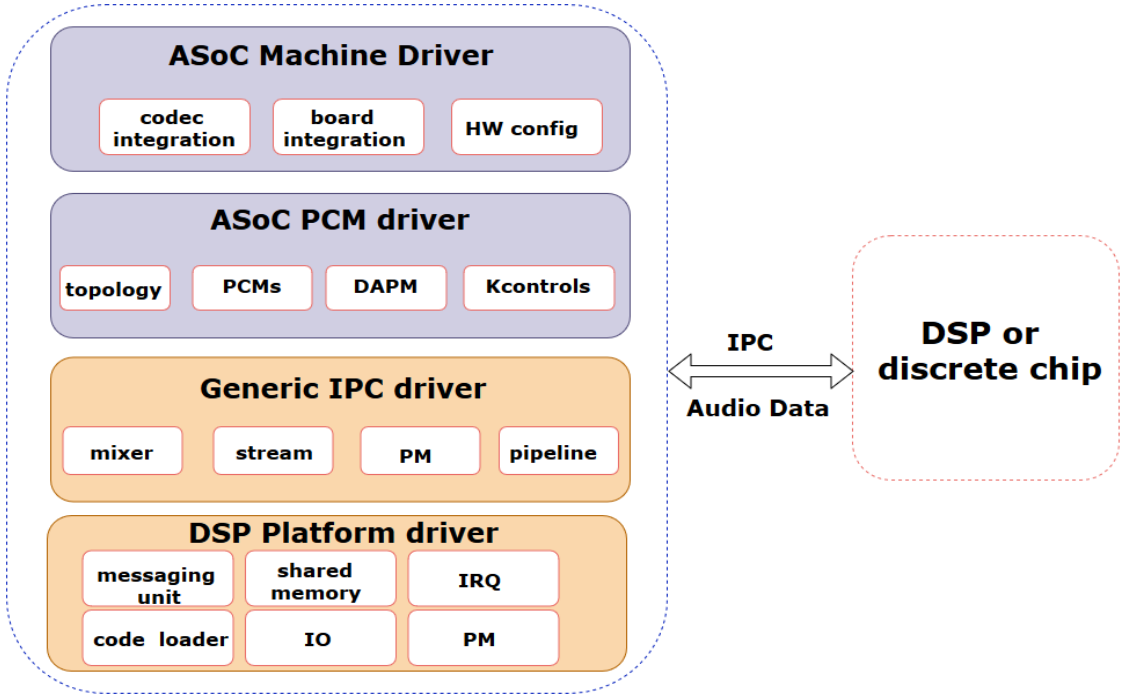
- DSP architecture and platforms agnostic
  - **Now uses Zephyr OS**
- Host AP architecture agnostic
  - Uses generic ALSA interface with Linux
  - Generic communication protocol, firmware not coupled with any OS
- Freedom to define new audio pipelines
  - This includes integration of audio proprietary algorithms
- Dynamically load module binaries
- All development done in public

Sound Open Firmware supported components

- Volume
- IIR / FIR Equalizer
- Mixer
- Keyword detector
- Sample rate converter
- Beamformer
- Audio Echo Cancellation
- Noise Reduction
- Compressed audio
- Module adapter
  - Plugin proprietary algorithms

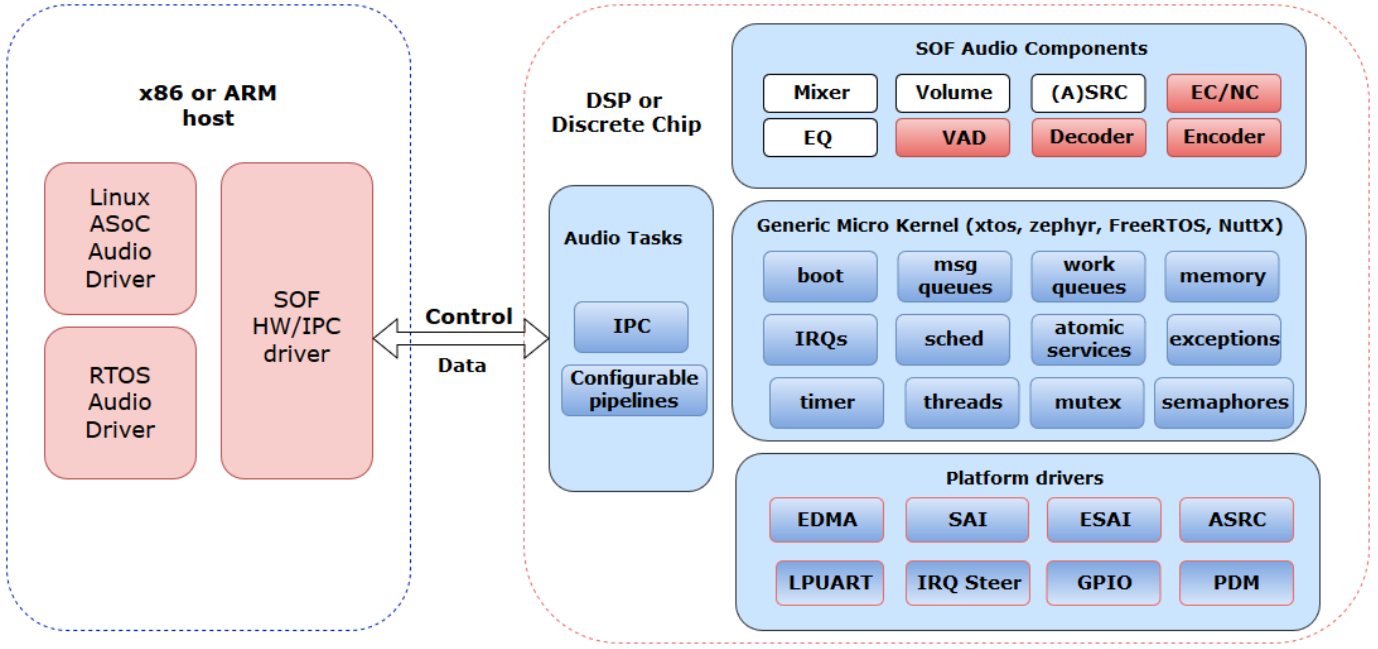
Sound Open Firmware – Host Application Processor side

- SOF Linux driver
- ALSA interface
- Generic IPC driver
- Host specific platform driver



Architecture overview – DSP side

- RTOS abstraction layer
- Initially started with XTOS
- Switched to Zephyr OS
- Integrates Zephyr native drivers



Collaboration and Community

- All development happens on Github.

Supported platforms

- NXP
  - i.MX8QXP, i.MX8QM, i.MX8MP, i.MX8ULP, i.MX93*
- Intel
  - Allmost all platforms you can think of
  - Lunarlake, Meteorlake, Alderlake, etc
- AMD
  - Renoir, Vangogh, Rembrandt, ACP6.3
- Mediatek
  - MT8186, MT8195

Future developments

- Complete switch to Zephyr OS
- Enable SOF on ARM Cortex-A, M cores
- Enable standalone SOF on i.MX-RT
- Enhance Audio stack in Zephyr

Getting started with SOF

- https://thesofproject.github.io
- Joining the SOF community
  - **Zephyrproject** on Discord, **#sof** channel
- Google Summer of Code, 2024
  - Implement GUI to control SOF components

Get in touch

Daniel Baluta
daniel.baluta@nxp.com

nxp.com