AIMS
Alliance for IP Media Solutions

# AES70 Control for IP Media Devices

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# What is AES70?

# AES70 scope

## What is AES70?

- An architecture for comprehensive **control** and **monitoring** of media devices over networks.

## What isn't AES70?

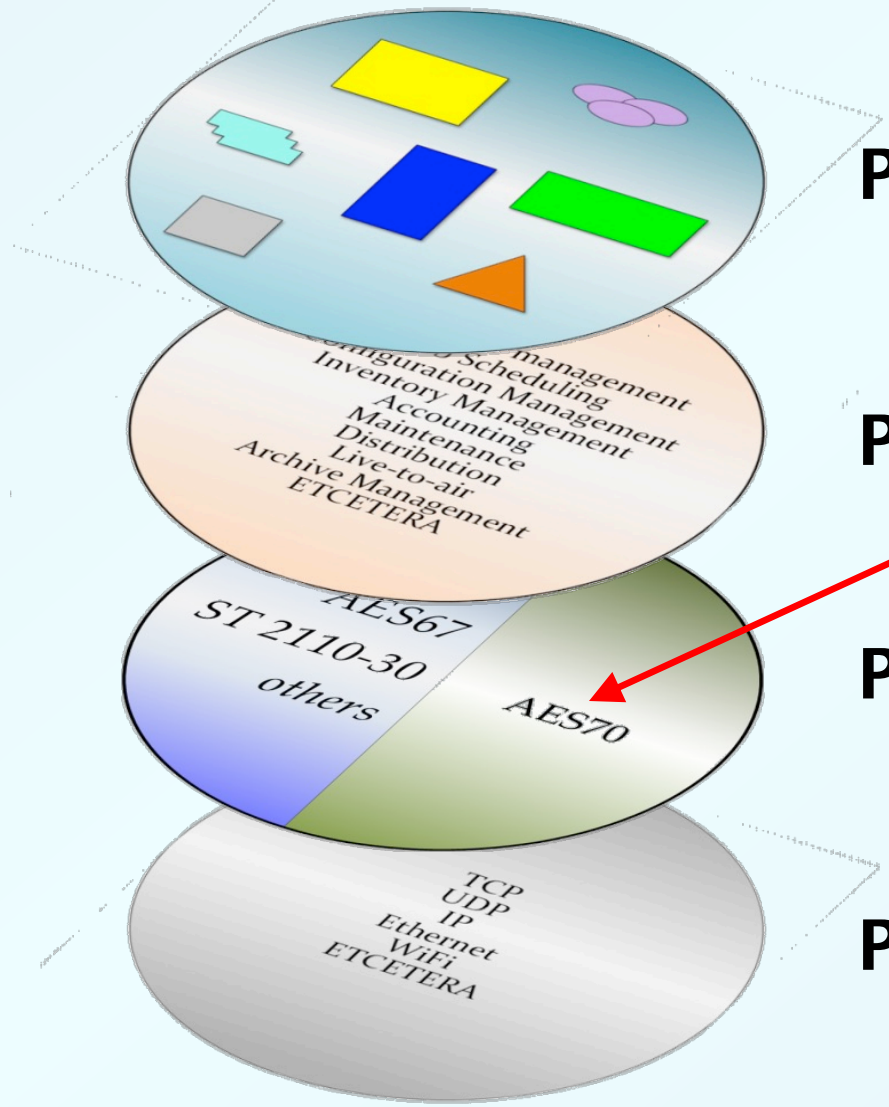
- A media transport protocol
- A device implementation framework
- A user interface specification
- A controller implementation framework

*The name "OCA" refers to the technology on which AES70 is based, and has now been expanded to mean the whole ecosystem of tools and documentation surrounding AES70.*

# Where does AES70 fit into the production picture?

# AES70 in the production environment

**TECHNICAL PERSPECTIVE**




**PN4** End-user applications

**PN3** Workflow

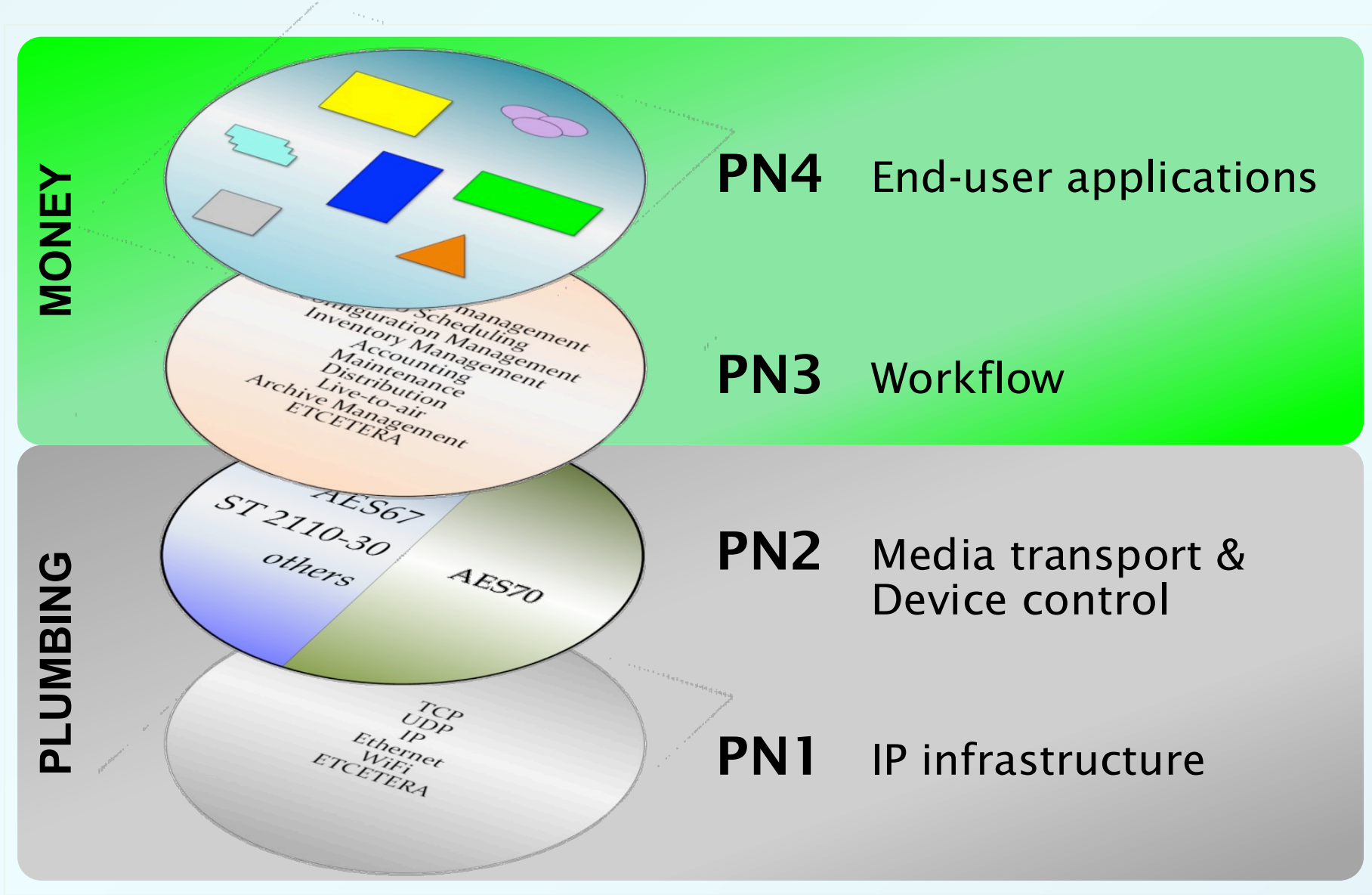
Device control

**PN2** Media transport & Device control

**PN1** IP infrastructure

# AES70 in the production environment

**BUSINESS PERSPECTIVE**



# Why is AES70 a good control solution?

# Why is AES70 a good control solution?

## Industrial strength

- Professional applications
- Multivendor systems
- Multicontroller systems
- Networks of all sizes up to thousands of nodes
- Ability to support mission-critical (including life-safety) applications
- Secure or insecure systems

# Why is AES70 a good control solution?

## Efficient

- Implementable in small processors with limited memories
- Low use of network bandwidth

## Product-friendly

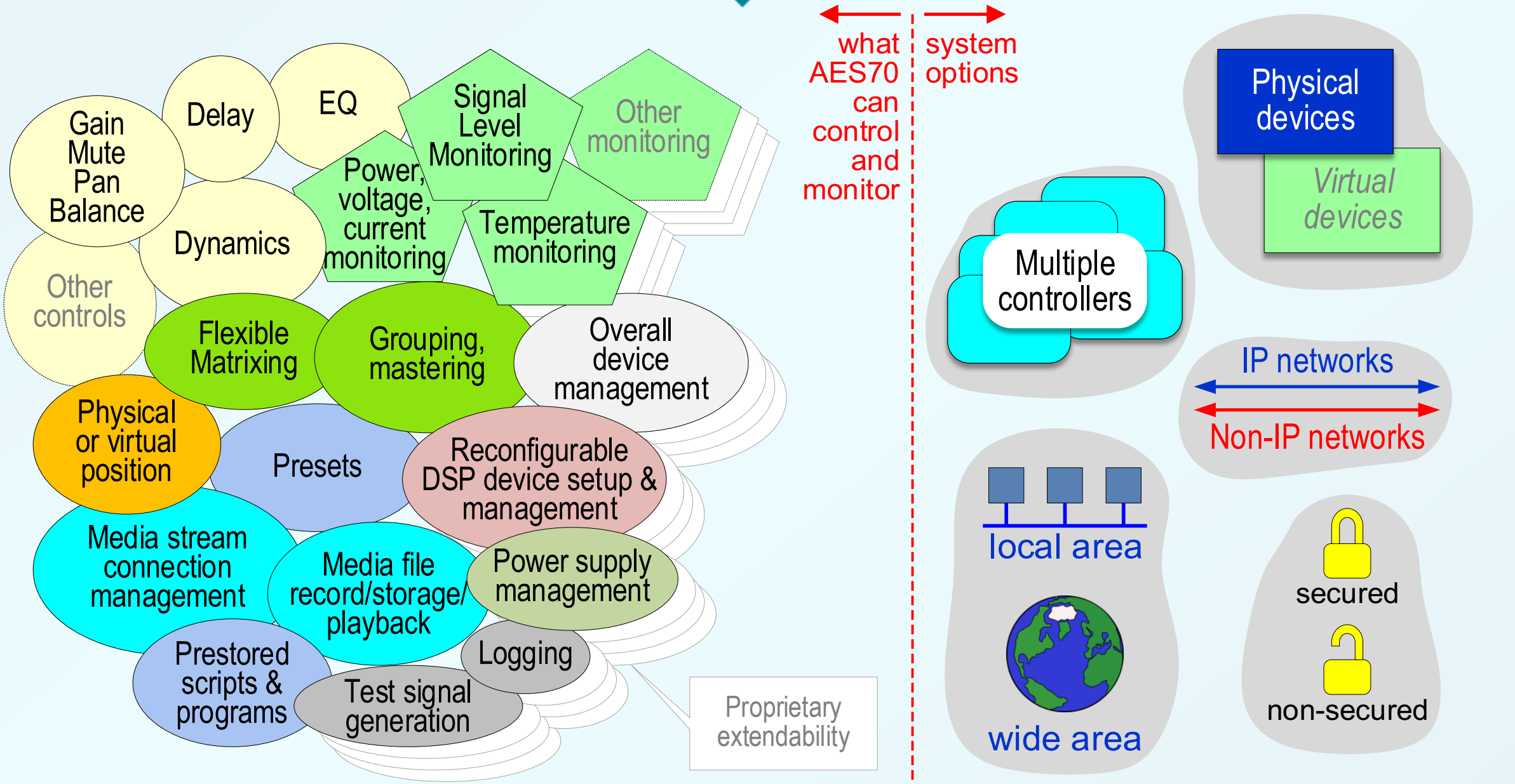
- Full support for proprietary extensions
- Fully protective of secret device features

## Stable / Available

- Long service life, with engineered forward and backward compatibility
- Open public license-free standard
- Published and maintained by an accredited standards organization

# AES70 features at a glance

# AES70 Features at a glance



# AES70 Technology

# AES70 Technology

**AES70 defines a device's network control interfaces.**

**AES70 is object-oriented:**

- An AES70 interface element for a particular function is called an **Object.**
- A template for making Objects is called a **Class.**
- The AES70 standard defines about 100 Classes.

# AES70 Technology

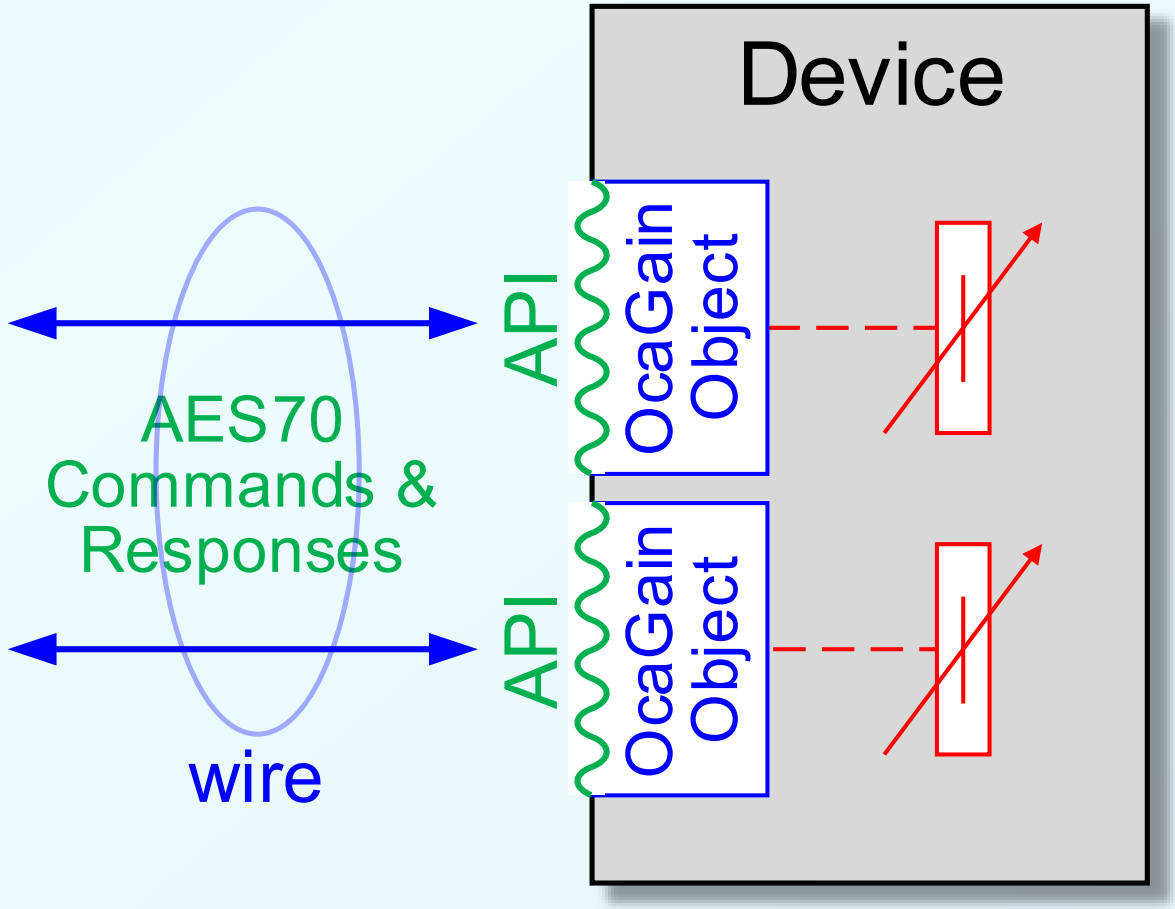
## Some AES70 classes

| | |
|---|---|
| OcaMute | Signal mute |
| OcaPolarity | Signal inversion |
| OcaSwitch | 1 of n selector |
| OcaGain | Simple gain in dB |
| OcaPanBalance | Pan or balance control |
| OcaDelay | Signal delay in mSec |
| OcaFrequencyActuator | Frequency |
| OcaFilterClassical | Bessel, Butterworth, etc. |
| OcaFilterParametric | Peaking or shelving parametric filter |
| OcaFilterPolynomial | Rational polynomial filter |
| OcaFilterFIR | FIR specified by coefficients |
| OcaFilterArbitraryCurve | Magnitude vs freq curve |
| OcaDynamics | Generalized compressor/expander |
| OcaDynamicsDetector | Side-chain detector |
| OcaDynamicsCurve | Dynamics input vs output level curve |
| OcaSignalGenerator | Multi-waveform signal generator |
| OcaSignalInput | Device signal input port |
| OcaSignalOutput | Device signal output port |

*... and about 80 more*

## What actually goes along the wire?

- Every Object implicitly defines a protocol interface, aka "API".
  - API = Application Program Interface
- Once you know all of a device's Objects, you know its entire API.
- Once you have the device's API, you know what goes along the wire.



# AES70 Tools

*from the OCA Alliance and its member companies*

# AES70 Tools

## Reference implementations

- **OCA Microdemo** - open source hardware/software design. Demonstrates OCA on very small device with open-source system components.
  *github.com/OCAAlliance/Downloads.html*
- **Bosch OCA Reference Implementation** - commercial license. Fully-engineered c++ AES70 implementation.

## Libraries

- **javascript** - open source controller library for web-based controllers. Interfaces between binary AES70 protocol and browser environment.
  *deuso.de/aes70/js/*
- **c++ device/controller library**. Low footprint. Commercial license.
  *deuso.de/aes70/cpp/*
- **C#.NET - controller library** for Visual Studio / MonoDevelop. Commercial license.
  *deuso.de/aes70/cs/*

# AES70 Tools

## Development tools

- **AES70 Explorer** development UI builder - free or commercial license
  *deuso.de/aes70/explorer/*
- **AES70 Compliancy Test Tool** - free AES70 device compliance checker
  *github.com/OCAAlliance/Downloads.html*
- **OCA Wireshark plugin** - free plugin for Wireshark, decodes AES70 traffic
  *github.com/OCAAlliance/Downloads.html*

## Virtual devices

- **Focusrite RedNet Virtual OCA Devic**e - Windows-based virtual device
  *github.com/OCAAlliance/Downloads.html*
- **Aes70x.net virtual device networks** - online sets of virtual devices for testing controllers
  *aes70x.net/*

# The AES70 Standards Family

# AES70 Standards Family

| | |
|---|---|
| AES70-1 | **AES70 Framework**. Text document that defines the basic AES70 mechanisms for control and monitoring. |
| AES70-2 | **AES70 class structure.** Text + UML document that defines AES70's control & monitoring repertoire. UML stands for Universal Modeling Language. |
| AES70-3 | **AES70 binary protocol.** Text + UML document that defines OCP.1, a binary protocol for using AES70 over IP networks. |
| AES70-4 | **AES70 JSON**. **NEW**. Text + UML document that defines OCP.2, a JSON protocol for using AES70 over IP networks. |
| AES70-21 | **AES67 Adaptation**. **NEW**. This standard will specify the use of AES70 connection management for AES67 stream transport connections. |
| AES70-22 | **MILAN Adaptation**. **NEW**. This standard will specify the use of AES70 connection management for MILAN stream transport connections. |

# AES70-2023 new features

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## New connection management architecture

- Full support for redundant network connections
- Powerful connection negotiation support
- SDP features

## Media transport session support

- Persistent  connections
- Grouped connections

# AES70-2023 new features

## Dataset storage and retrieval

- Media files
- Log files
- Stored command sets and executable programs
- Presets
- User-defined binary files of all kinds

# AES70-2023 new features

## New features for prestored executables

- Controllers can upload command sequences and scripts for execution immediately or later.
- Easy to use job queuing and scheduling mechanism.

## Improved support for prestored parameter settings ("presets")

- Presets can be applied to all or part of a device, using simple AES70 control commands.
- Settings files can be freely uploaded and downloaded.
- Very large preset files can be used effectively.

## Documentation improvements

- Many new informative annexes in AES70-1 and -2 that provide examples and advice for developers
- Expanded and clarified definitions of terms
- More consistent, clear and precise language throughout
- Greatly improved class specification with better commenting, a better index, and cleaner structure

# AES70-2023 new features

## Small things

- Control class OcaVASensor for sensing power and power factor
- Control class OcaSampleRateConverter
- Streamlined event notification mechanism
- Improved product and manufacturer information from OcaDeviceManager
- New **parameter record** mechanism for uniform interfacing to non-AES70 protocols
- Better features for managing time reference sources
- New mechanisms for managing sample clocking of internal signal paths
- Generalized counter mechanism for errors and other events
- More powerful multicontroller support

# Links

# AES70 Tools & Information

## Links

- www.ocaalliance.com

  *OCA Alliance main site.  The OCA Alliance is the trade association that develops and maintains the AES70 specification for the AES.*

- ocaalliance.github.io

  *OCA Alliance technical site.  Resources for developers.*

- www.aes.org/publications/standards

  *Where to purchase and download AES70 standards documents.*

*All Watched Over By Machines Of Loving Grace*

*- Richard Brautigan, 1967*


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