Beyond Discovery & Registration:

An Open Solution for Control & Monitoring

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NMOS Control & Monitoring

What

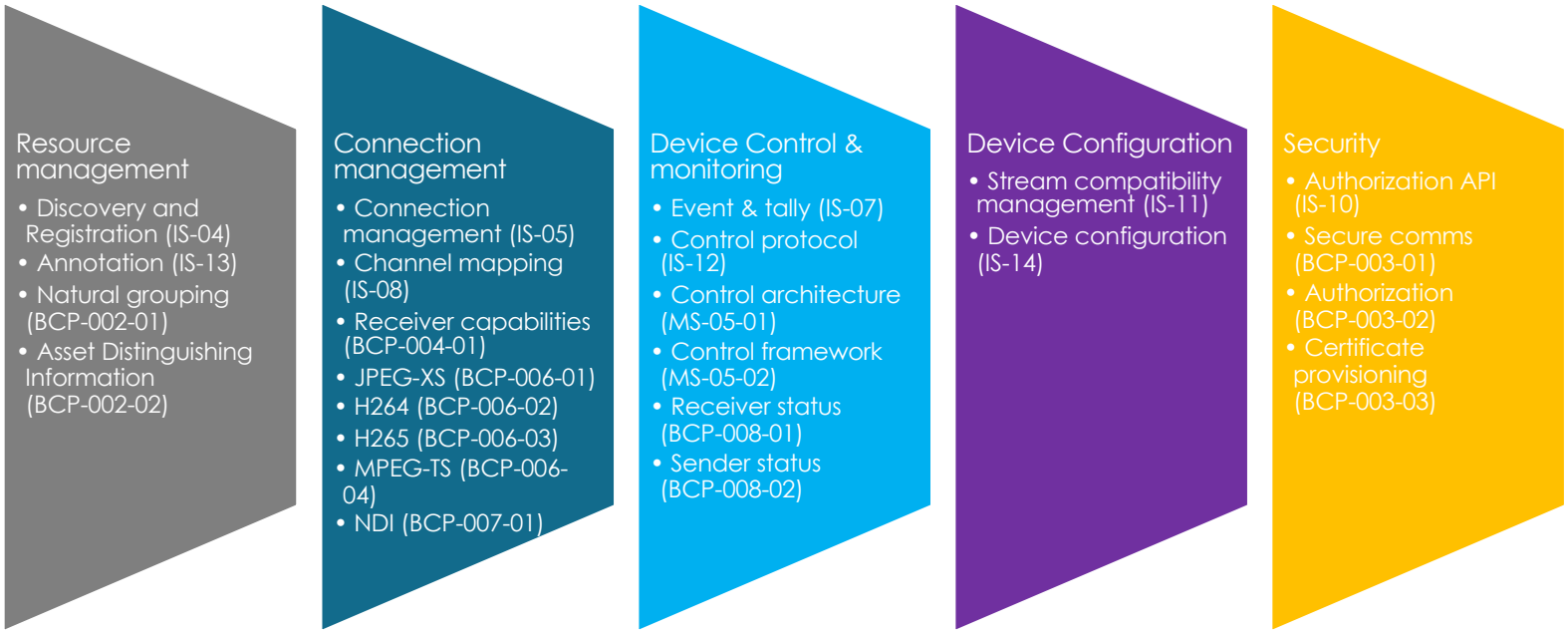
A family of open, free of charge specifications that enable interoperability between media devices on an IP infrastructure.

Why

Enables end-users and SIs to create best of breed solutions from a greater pool of vendors which interoperate at different layers

NMOS "Layers"

Roadmap Specs



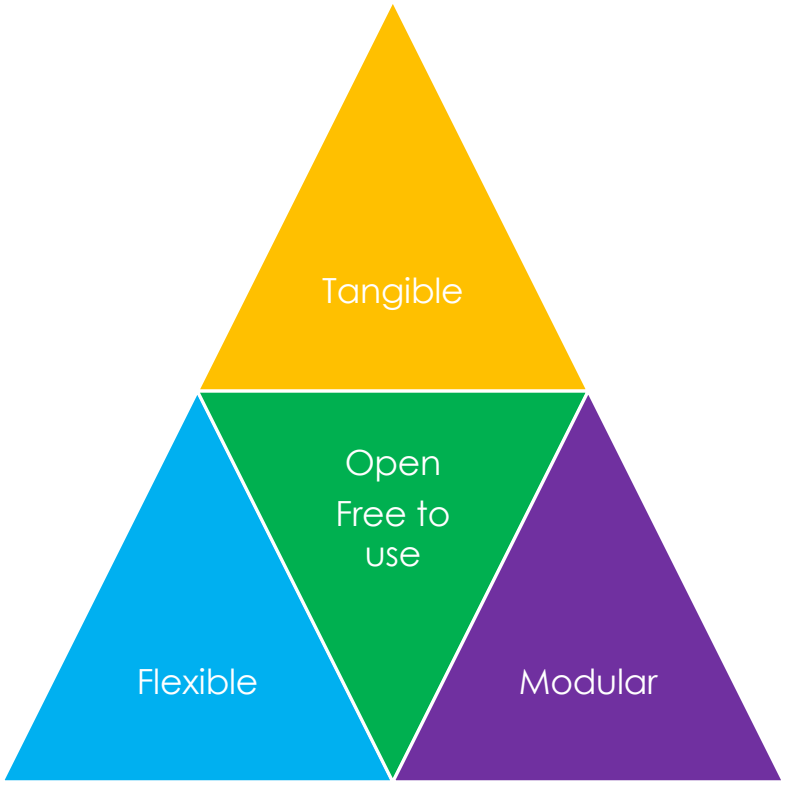
NMOS Testing framework

NMOS Control & Monitoring – An Open Solution

Establishes a standard, interoperable vision, philosophy, and platform for device control and monitoring within the NMOS ecosystem and community.

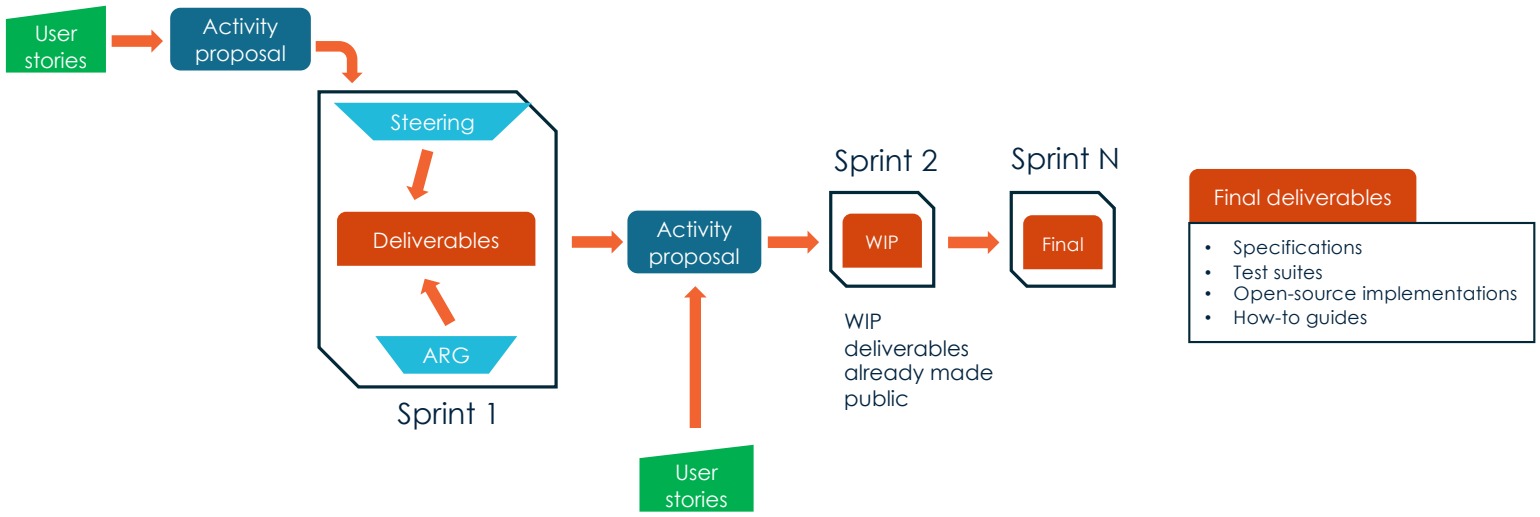
- Secure by design with BCP-003 and IS-10 specifying the requirements
- Architecture and roadmap are governed not by a single entity but by the NMOS community
- Benefits from interoperability testing within the NMOS ecosystem
- Benefits from a forum where vendors, end users and integrators can provide feedback about any concerns/improvements/integration issues they may have

NMOS Distinguishing Attributes

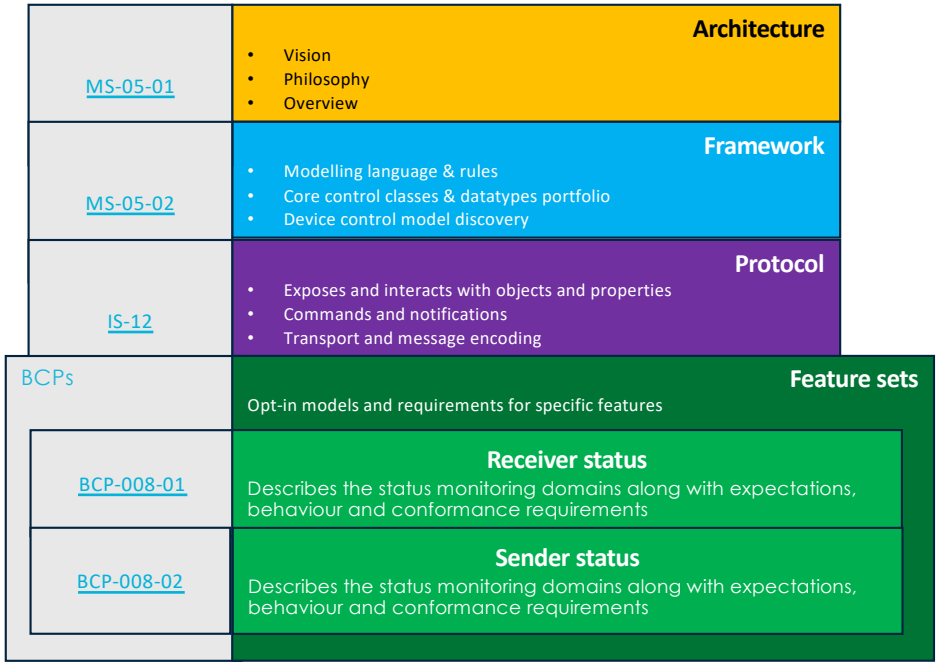


Open

- **A truly open solution every step of the way.**

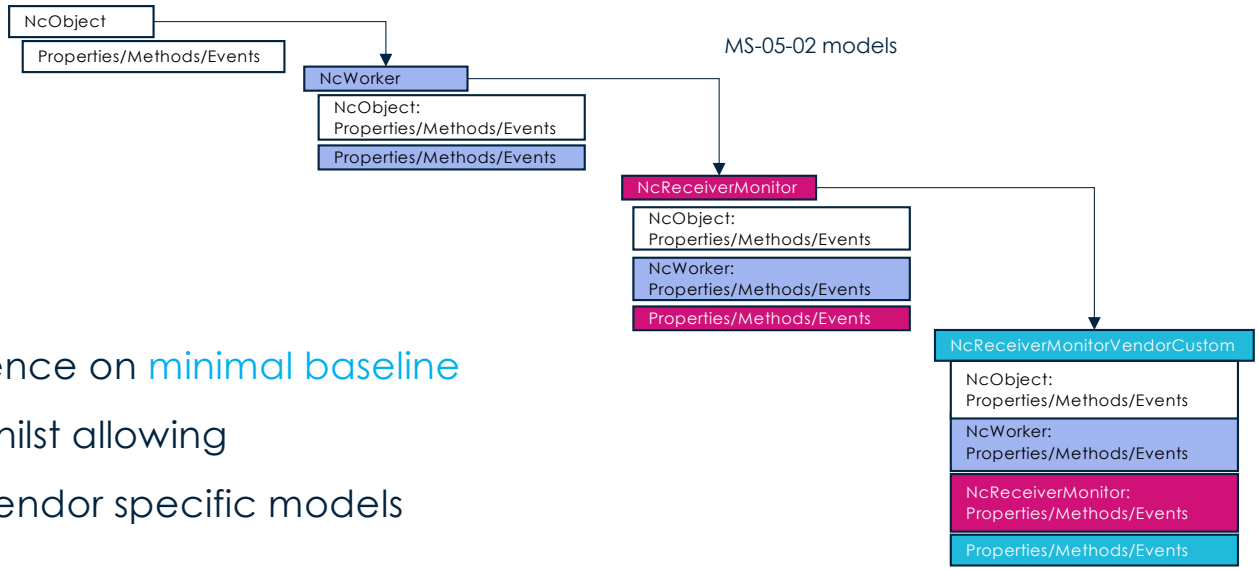


Flexible



- The problem space is explored at different levels offering the optimal amount of standardization whilst maintaining vendor freedom and ensuring interoperability.

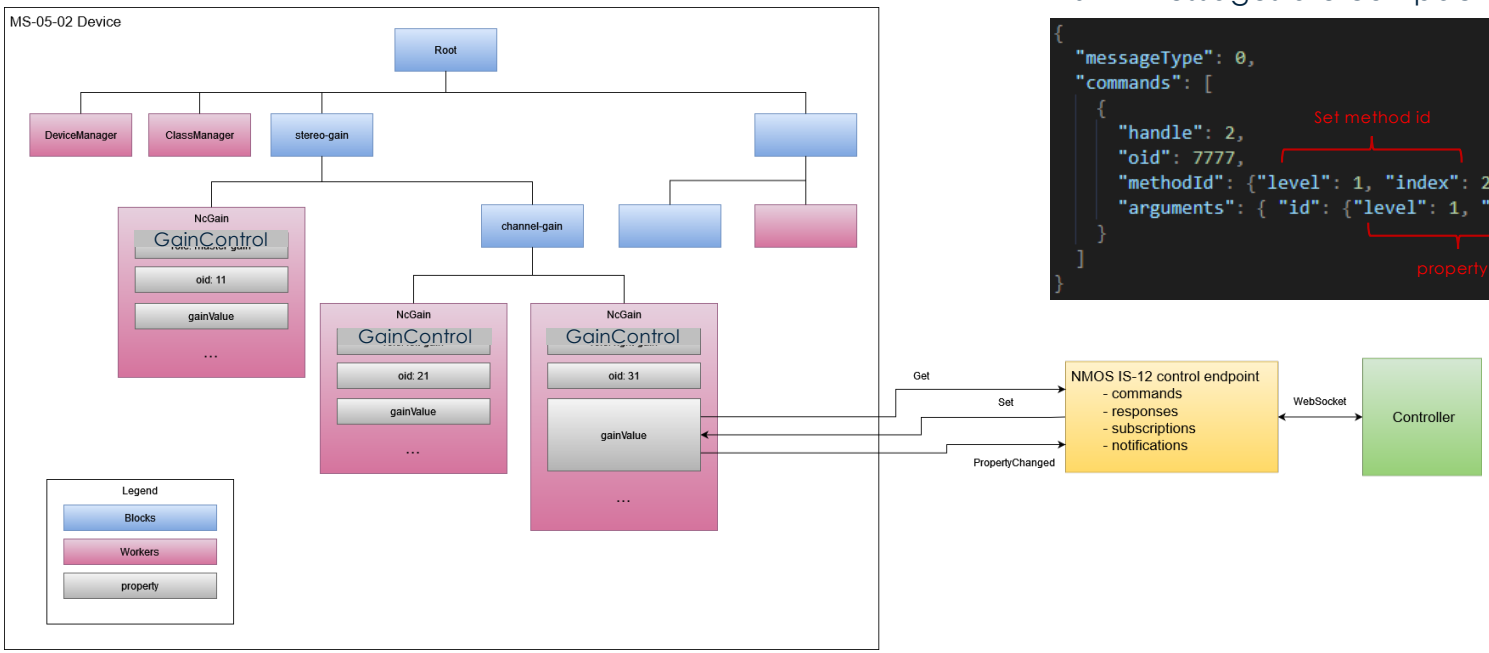
Flexible



- Convergence on minimal baseline models whilst allowing custom/vendor specific models

Flexible

- Convergence on the protocol



IS-12 messages are compact but still readable

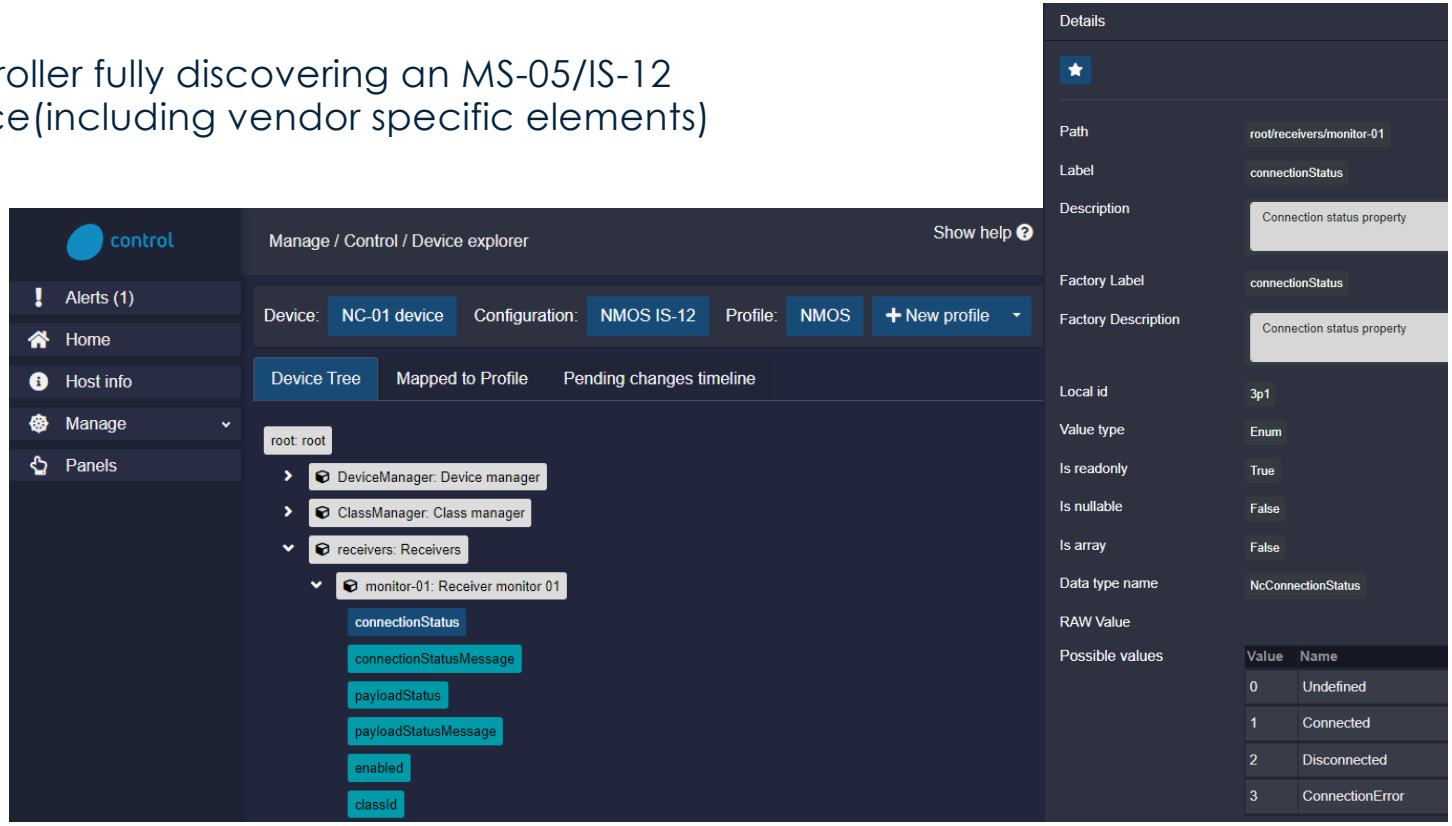
```
{
  "messageType": 0,
  "commands": [
    {
      "handle": 2,
      "oid": 7777,
      "methodId": {"level": 1, "index": 2},
      "arguments": { "id": {"level": 1, "index": 25}, "value": 5 }
    }
  ]
}
```

Set method id

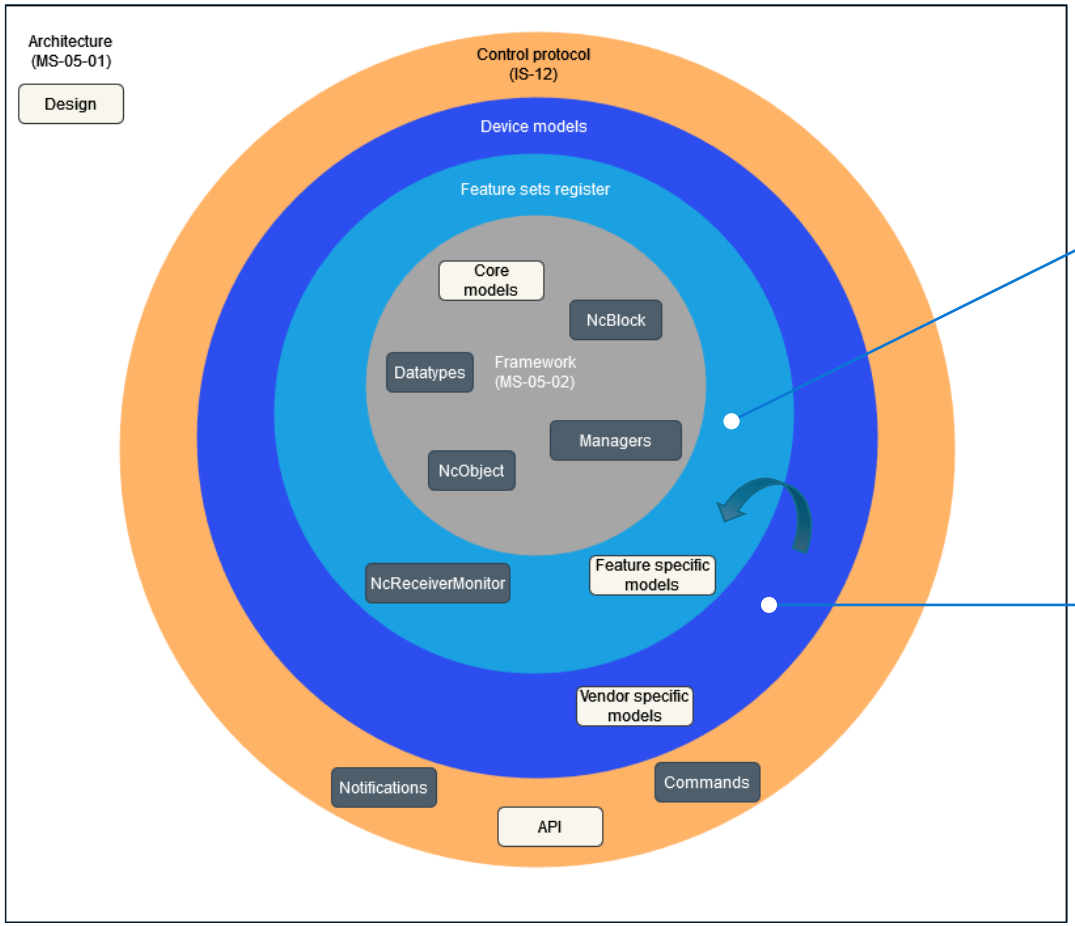
property id

Flexible

- Controller fully discovering an MS-05/IS-12 device(including vendor specific elements)



Flexible



- More convergence around common feature models with **direct vendor and end-user involvement**
- **Vendors** propose existing vendor specific models for registration as a common feature set

Tangible

- All the deliverables end up in the public domain on GitHub
- WIP versions of the specifications are available publicly on GitHub from the very first few sprints

Tangible

Specs

- MS-05-01: NMOS Control Architecture
  https://specs.amwa.tv/ms-05-01/
- MS-05-02: NMOS Control Framework
  https://specs.amwa.tv/ms-05-02/
- IS-12: NMOS Control Protocol
  https://specs.amwa.tv/is-12/
- BCP-008-01: Receiver status
  https://specs.amwa.tv/bcp-008-01/
- BCP-008-02: Sender status
  https://specs.amwa.tv/bcp-008-02/

Tangible

Developer resources and tools – Get started quickly, here's everything you need:

- INFO-006: Implementation guide for NMOS Device Control
  https://specs.amwa.tv/info-006/
- NMOS Device Control Mock
  https://github.com/AMWA-TV/nmos-device-control-mock
- nmos-cpp: Open-source Node SDK Framework Implementation
  https://github.com/sony/nmos-cpp

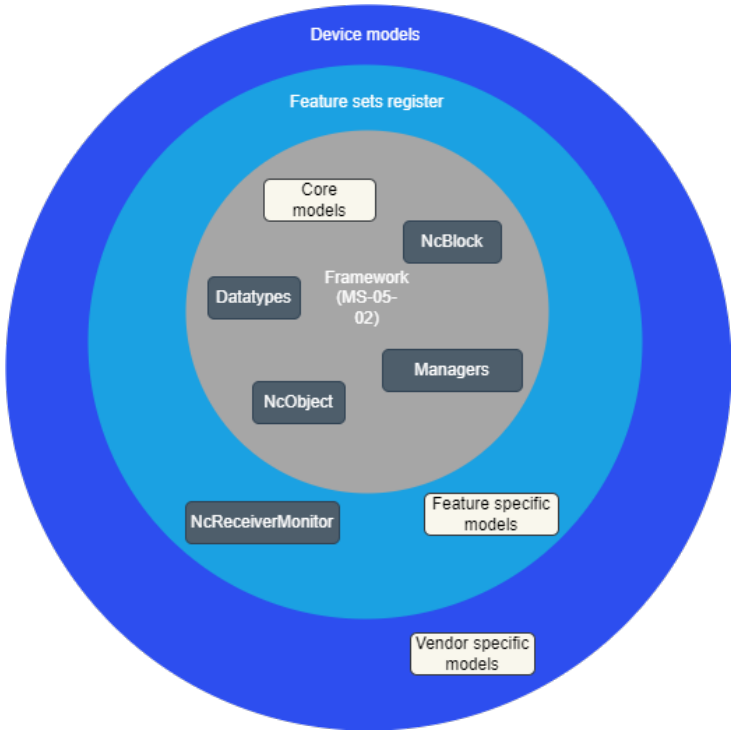
Tangible

Comprehensive test suite covering:

- MS-05-02 framework core model conformance
- IS-12 conformance including commands, responses, subscriptions, notifications and error reporting
- Feature sets model conformance testing where we can opt in each individual feature set through configuration
- Behaviour testing for specific features defined in a BCP (BCP-008-01/02)
- Vendor specific models to ensure compatibility and interoperability

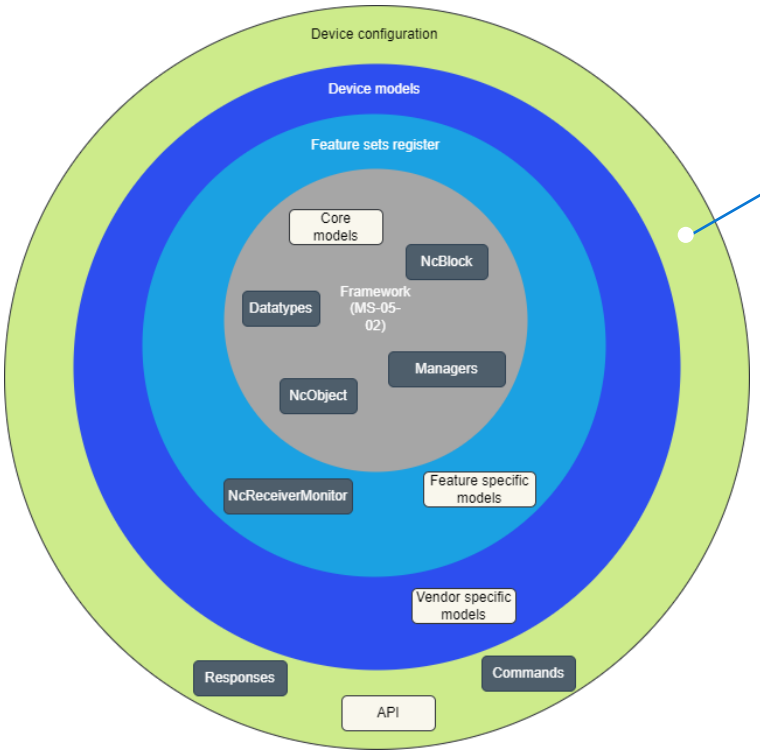
Modular

- **Creating a multi layered solution means we can mix and match to best address the target user stories.**



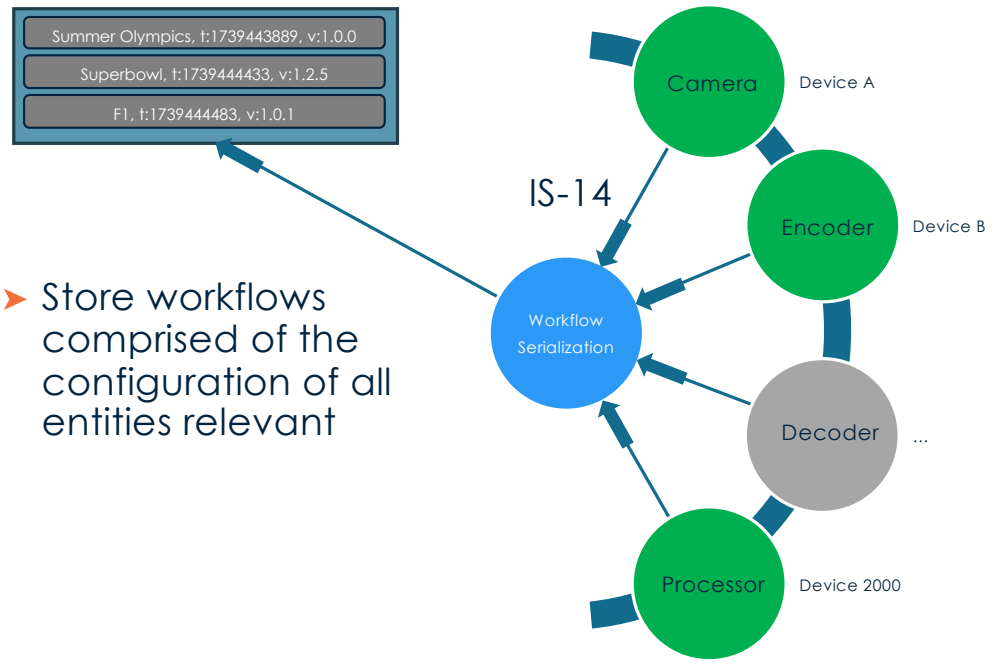
Modular

- IS-14: Device configuration uses the same underlying modelling language



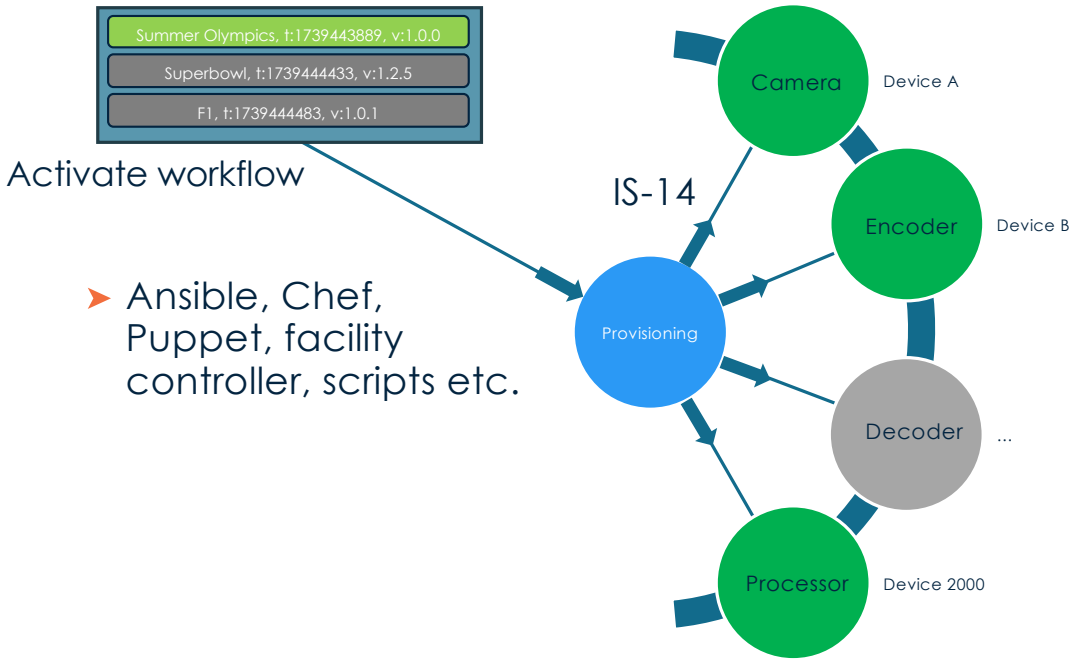
- HTTP based API with an emphasis on **retrieval** and **restoring** of configuration for backup, restore and other provisioning scenarios

Shared Model Synergy



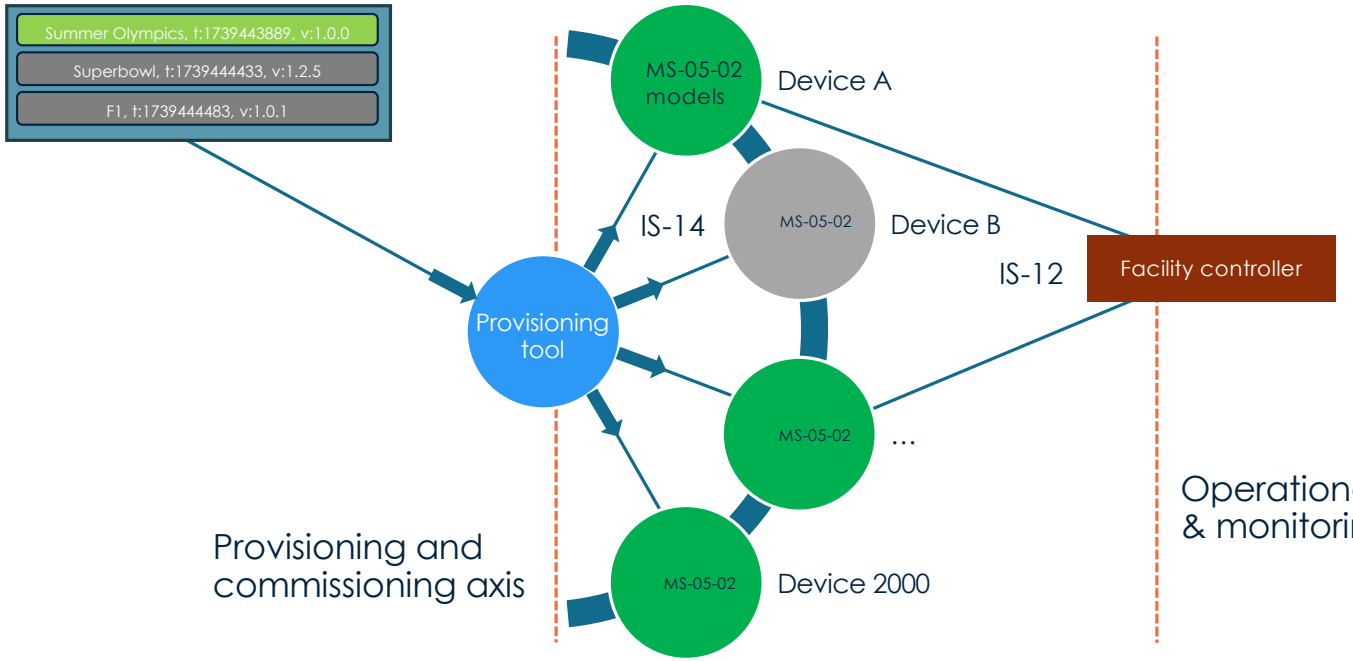
- Store workflows comprised of the configuration of all entities relevant

Shared Model Synergy



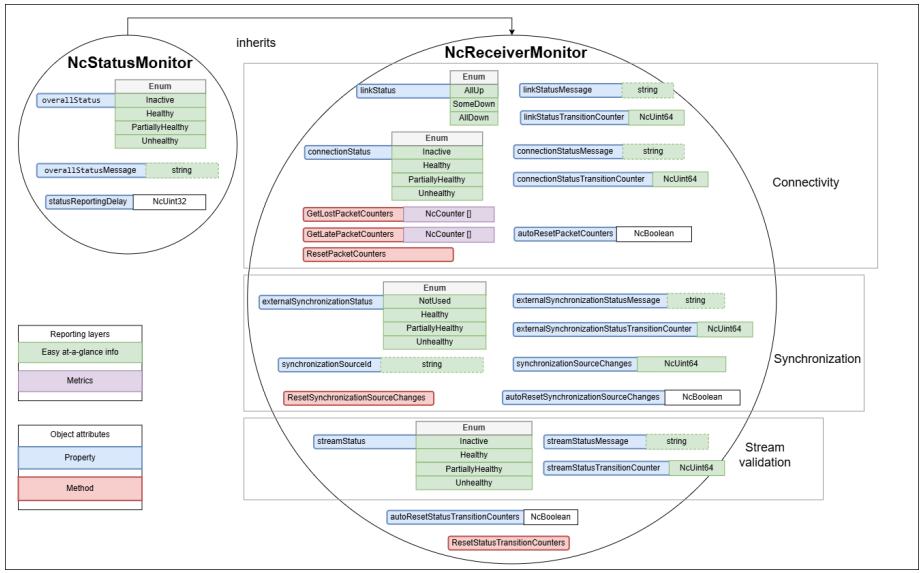
- Ansible, Chef, Puppet, facility controller, scripts etc.

Shared Model Synergy



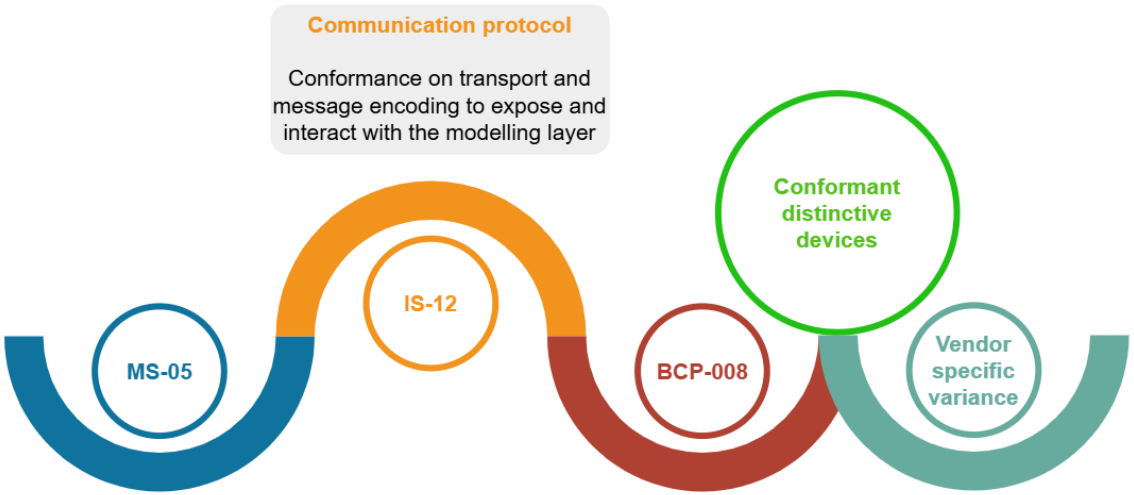
Models Solve Problems

Receiver status (BCP-008-01)
models diagram



- People think in entities/objects/interactions (not in bytes).
- IS-12 is very simple – it's a thin wrapper around the models. You can build another protocol in a couple of hours.
- Industry bodies, system integrators, problem solvers need to be able to describe a problem and solution requirements using a modelling language which **feels natural**.
- The solution models are published by a communication protocol which is an enabler.

Conformance Strategy



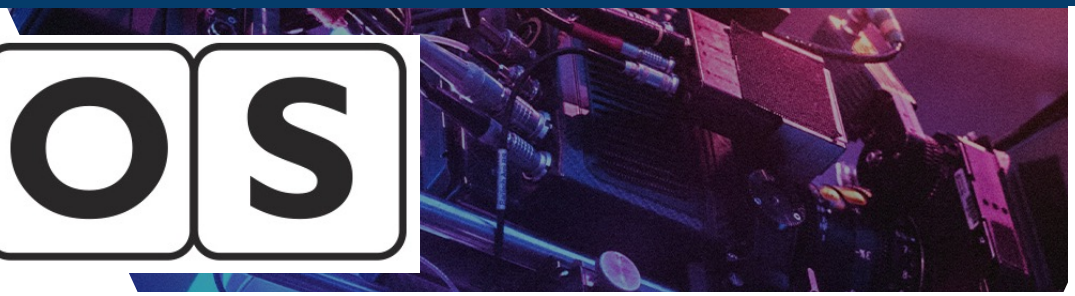
Multi level interoperability

Devices achieve interoperability at different levels:
- modelling: end users and client apps can discover minimum levels of functionality across a domain
- comms: client apps need just 1 integration to interact with multiple vendors
- behaviour: end users know that their fleet of devices operates within the same domain rules where appropriate

whilst still catering for vendor specific variance

NMOS Control & Monitoring

Thank you!



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