

PTP Architecture Futures

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Current problem

Multiple PTP profiles

- sometimes mutually incompatible

Only 802.1AS is explicitly future-proofed

- explicit layering and tight definition, support for multiple L2 technologies
- but very limited flexibility, no explicit interface with IPv4/v6, no defined way to bridge to other profiles

Is this really a problem?

Yes, I think so:

- There **will** be places where different profiles intersect (telecom/any other, power/802.1AS, default 1588/802.1AS, etc)
 - we really should define how these operate
- There are good ideas in all of the profiles that could be shared
- There will be new technologies and they should be available for all profiles with minimal problems

Legacy interoperability

Integrating default profiles are a requirement

- Integrating 802.1AS, telecom, power are extremely important

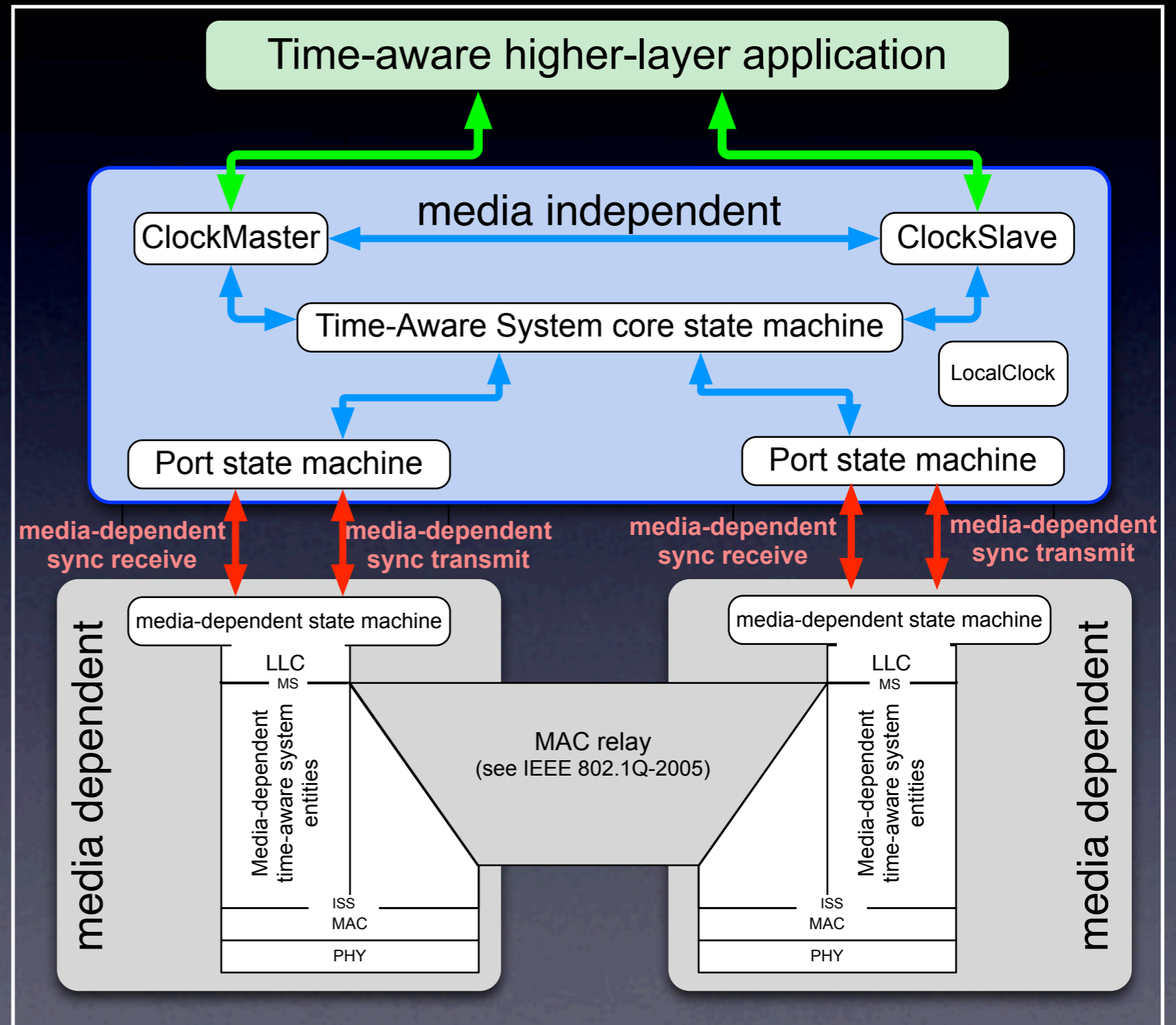
Intent is to provide a bridge between new generation PTP and legacy

- Won't necessarily be plug-and-play, but it might be, depending on the profiles

A possible approach

Use something like the 802.1AS layering

- replace the 802.1AS “media independent” specification with a core 1588 version
- have media dependent sections for each profile



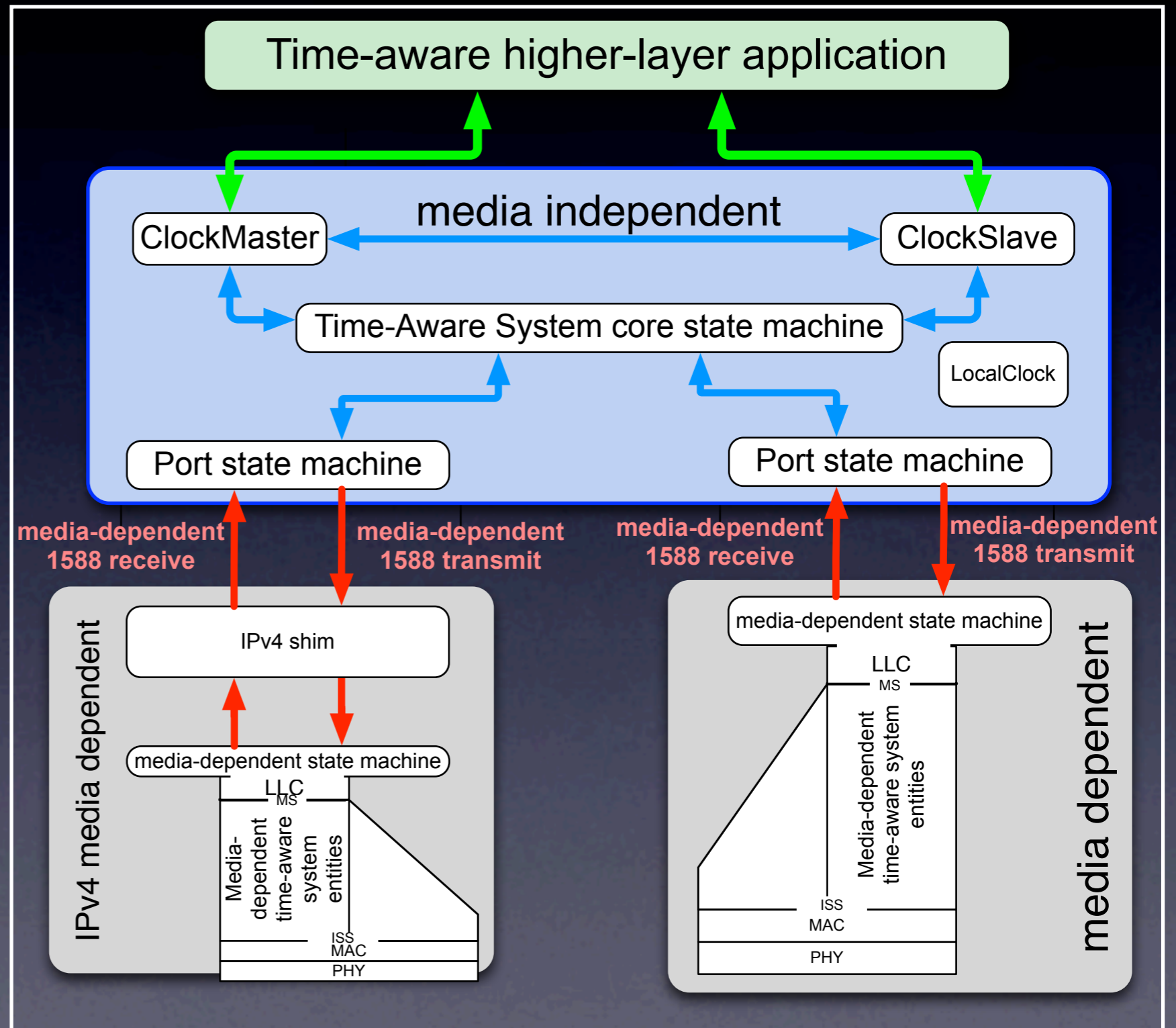
“for each profile”?

each profile could be:

- a spec for a “media dependent leg”
- interfaces to define how the link uses BMCA, or if not, how the BMCA-set parameters are controlled
 - frankly, this will be the hard part

IPv4 isn't a "media"

but it could be, from the point of view of the media-independent part:



Structure of a specification

Core media-independent spec:

- Clock capabilities and API
- Transparent clock/boundary clock
 - (can be the same spec, see [1])
- Interface to media dependent sublayer

Media-dependent spec(s):

- Interface to other media dependent layer (if needed)
- “Event” definition / timestamping / delay measurement
- Some may need to be done by specific layer 2 standards group (e.g., 802)

This is just an idea

... but the intent is to allow all the 1588 systems to have a defined level of interoperability, and to specify how the various profiles can work together

And for equipment vendors ...

**It's possible to build "universal" PTP
switches / routers / bridges**

- even endpoints

... and for other standards groups

Well defined interfaces will allow more independent work to enhance PTP

- 802.1AS, in particular, could shift to 802 media-specific requirements, and be a more specific subset of the 1588 core rather than a redefinition of OC/TC/BC

Thanks!

References

- Geoffrey M. Garner, Michel Ouellette, and Wie Jianying, Equivalence of the IEEE 1588 Boundary Clock and Peer-to-Peer Transparent Clock for Synchronization Transport, contribution to ITU-T SG 15, Q13, COM 15 – C1001 – E, May, 2010
- Geoffrey M. Garner, Aaron Gelter, and Michael Johas Teener, New Simulation and Test Results for IEEE 802.1AS Timing Performance, ISPCS '09, Brescia, Italy, October 12 – 16, 2009
- Geoffrey M. Garner, Michel Ouellette, and Michael Johas Teener, Using an IEEE 802.1AS Network as a Distributed IEEE 1588 Boundary, Ordinary, or Transparent Clock, ISPCS '09, Portsmouth, NH, USA, September 2010