WiP: Towards Formal Specification of Attestation Frameworks for Confidential Computing

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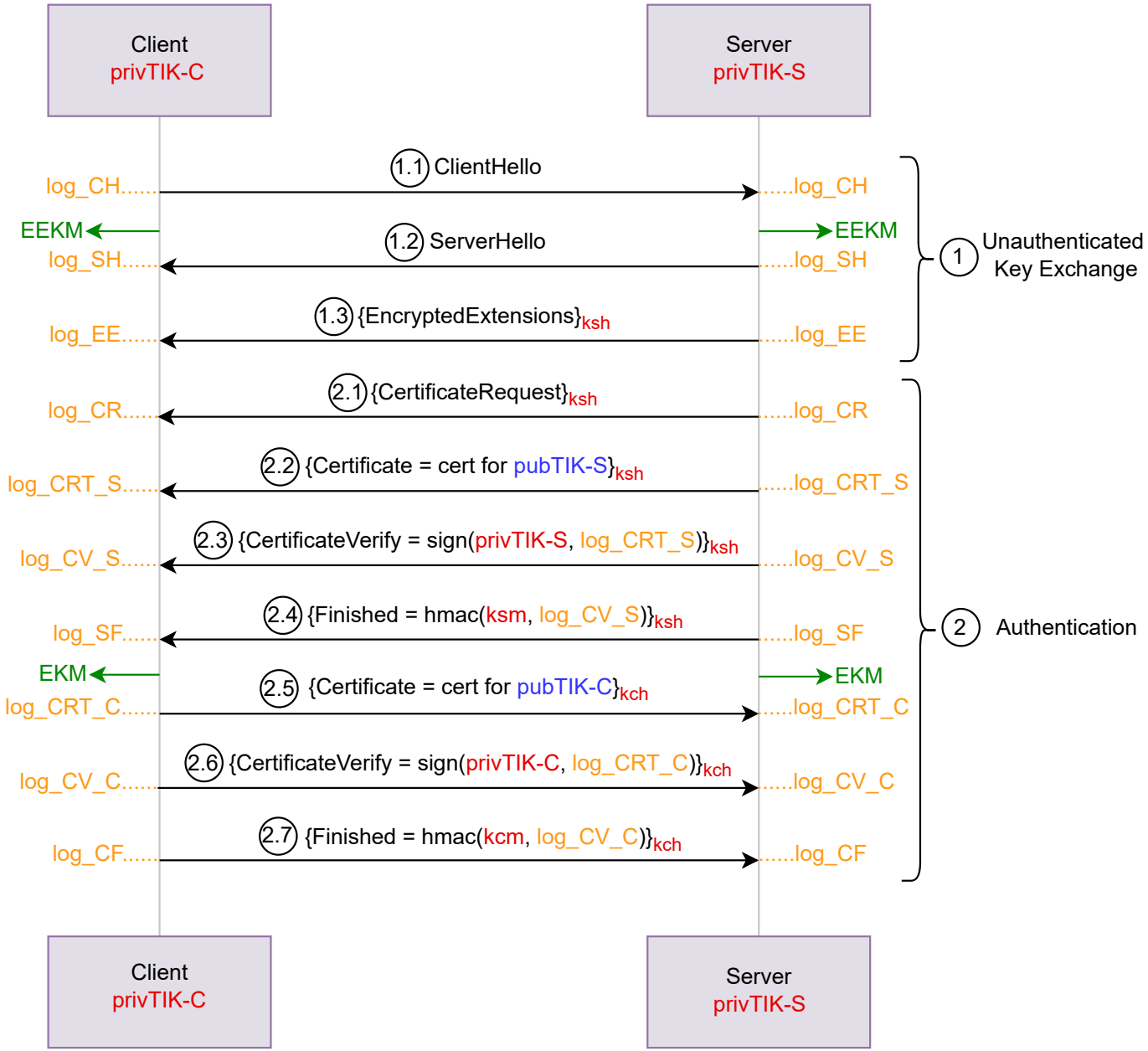
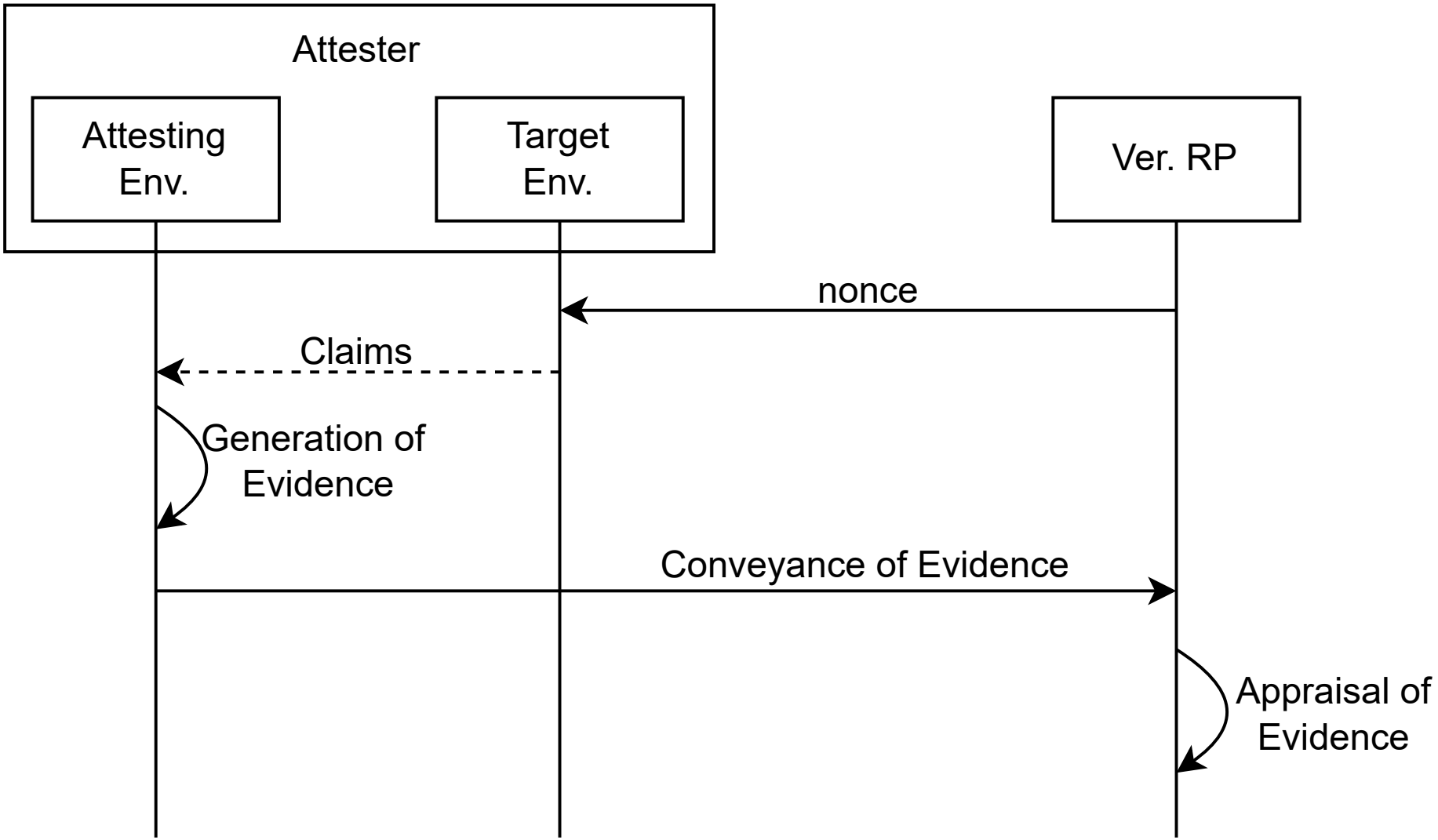
Outline

Network Security: TLS



Endpoint Security: Remote Attestation for CC

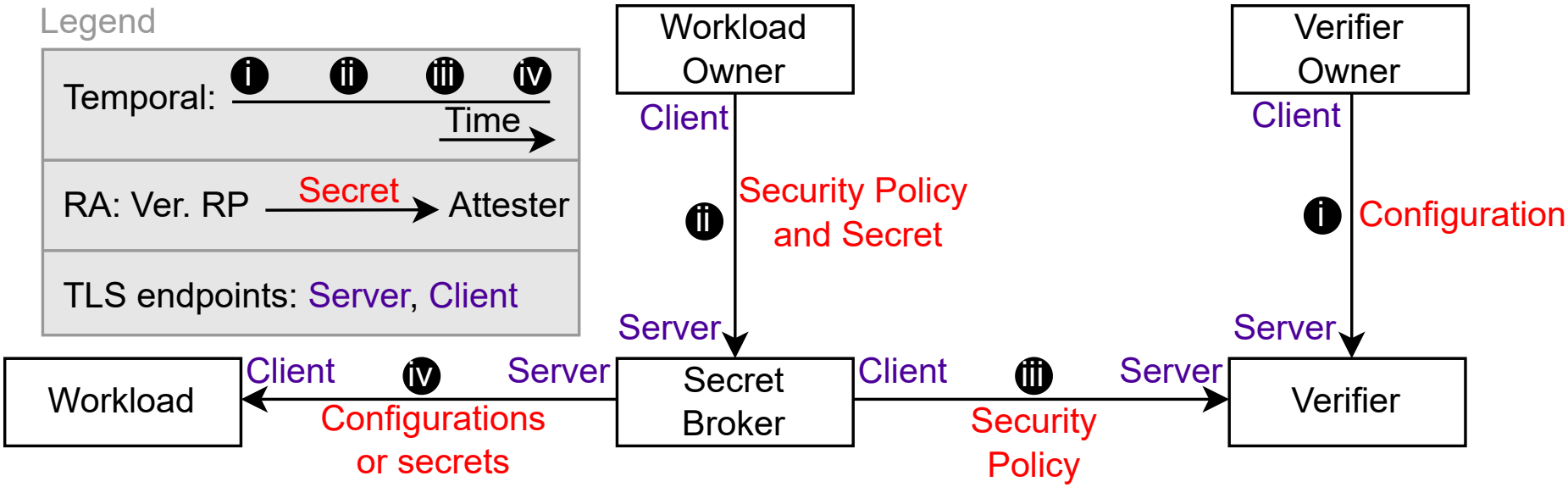


Motivation


TDX
DOWN
Single-Stepping and Instruction Counting Attacks against Intel TDX
TDXdown presents two attacks on TDX's single-stepping countermeasure and uses them to recover ECDSA keys via a new weakness in nonce generation of OpenSSL and wolfSSL.

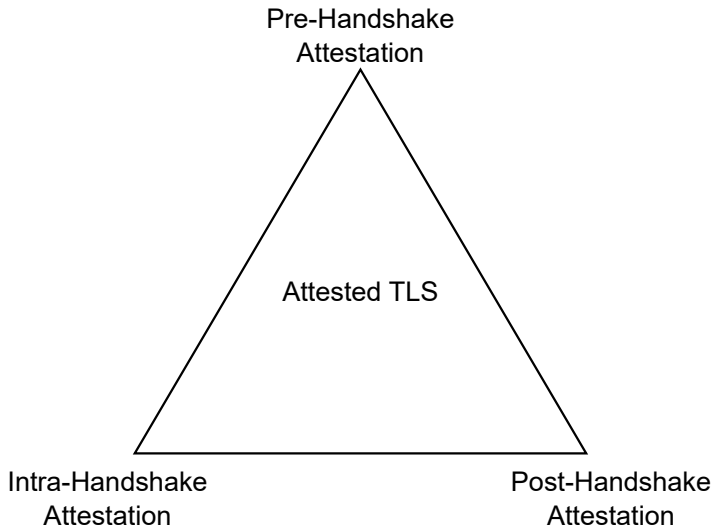
Outline

Proposed Generic Architecture



- Stages i and ii are unspecified for all solutions!

Design Options



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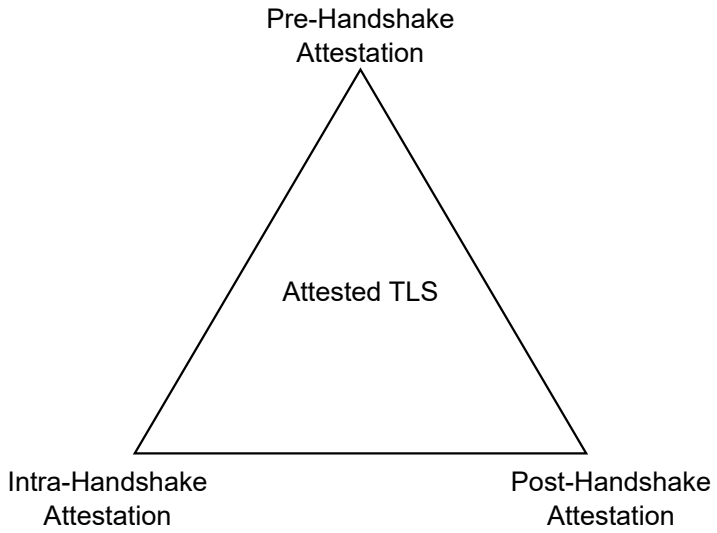
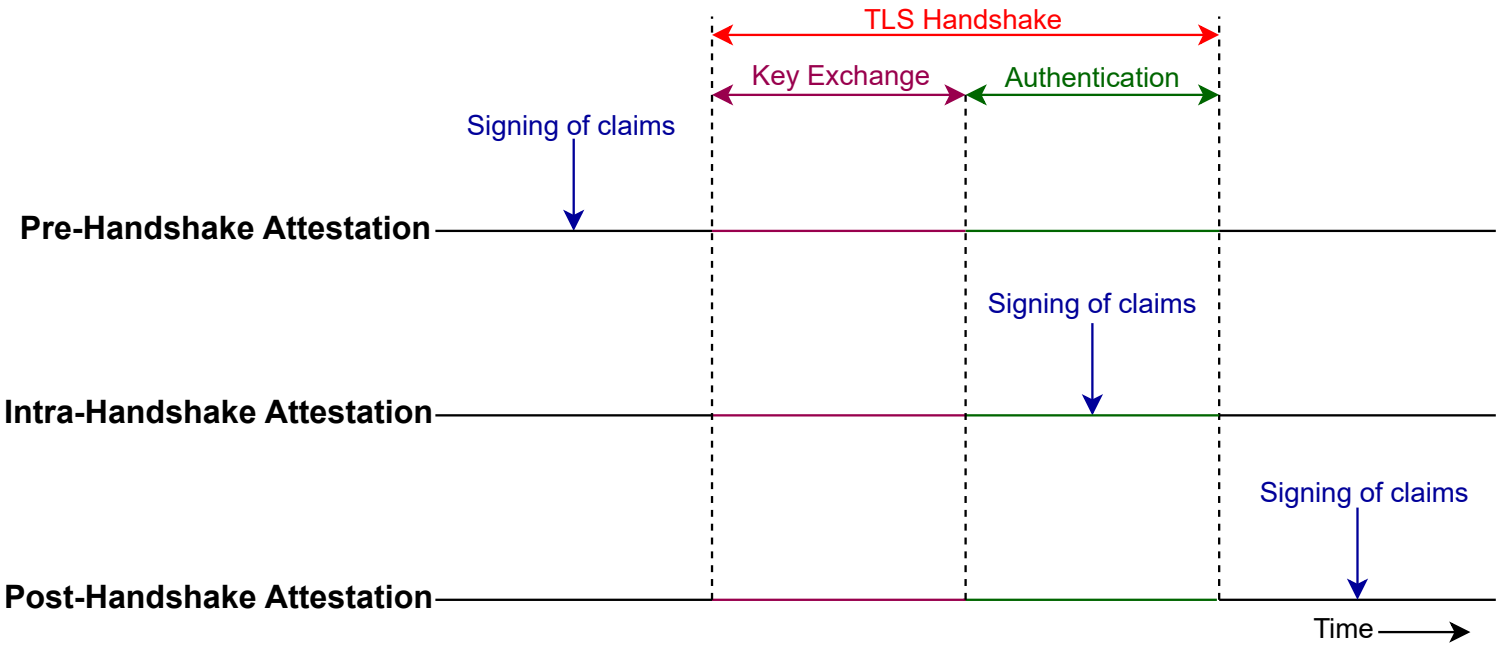
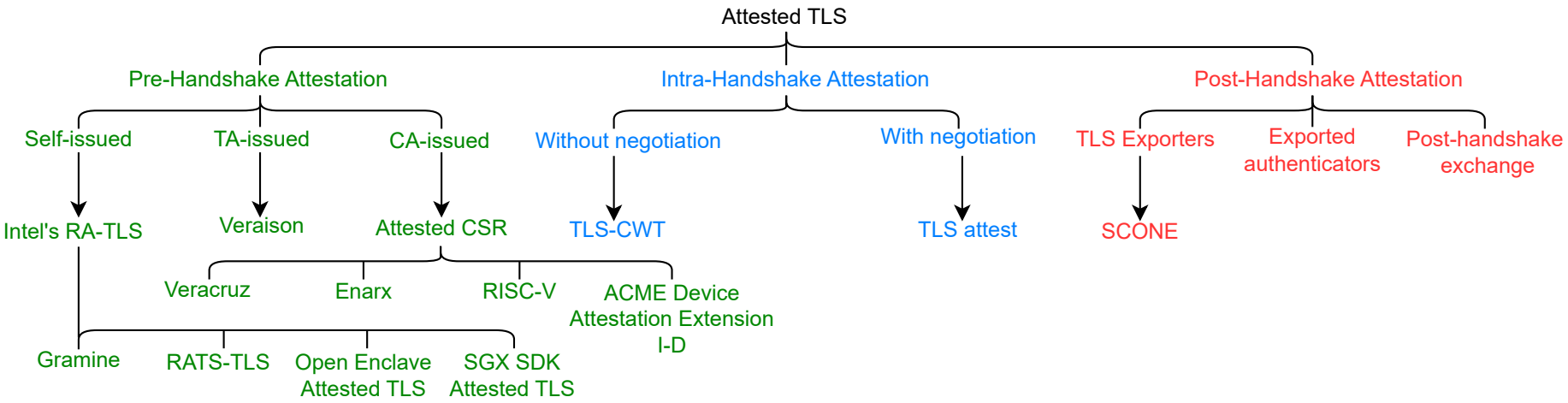




Design Space for Attested TLS



(Typical) Comparison/Tradeoffs

Property	**Pre-handshake**	**Intra-handshake**	**Post-handshake**
Modification	TA/CA	TLS	Application
Replay protection	×	✓	Possible
Impact on connection establishment latency	Medium ($t_{hs} + t_a$)	High ($t_{hs} + t_g + t_a$)	Low (t_{hs})
Effective connection establishment latency	Low	Low	High ($\geqslant$0.5RTT)

- t_{hs} = Time for TLS handshake (without attestation)
- t_g = Time for generation of evidence
- t_a = Time for appraisal of evidence
- WiP
  - Usability/Ease of use
  - Complexity of implementation/formal verification
- Discussion: any other property?

Outline

Summary

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- Open Questions
  - How to efficiently and automatically verify underspecified systems?

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- Interlink between arch. specs and protocol specs
- Underspecified = NOT trustworthy!
- The process of formal specification (even without verification) is very valuable!
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  - How to efficiently and automatically verify underspecified systems?
  - How to discover missing specs automatically?