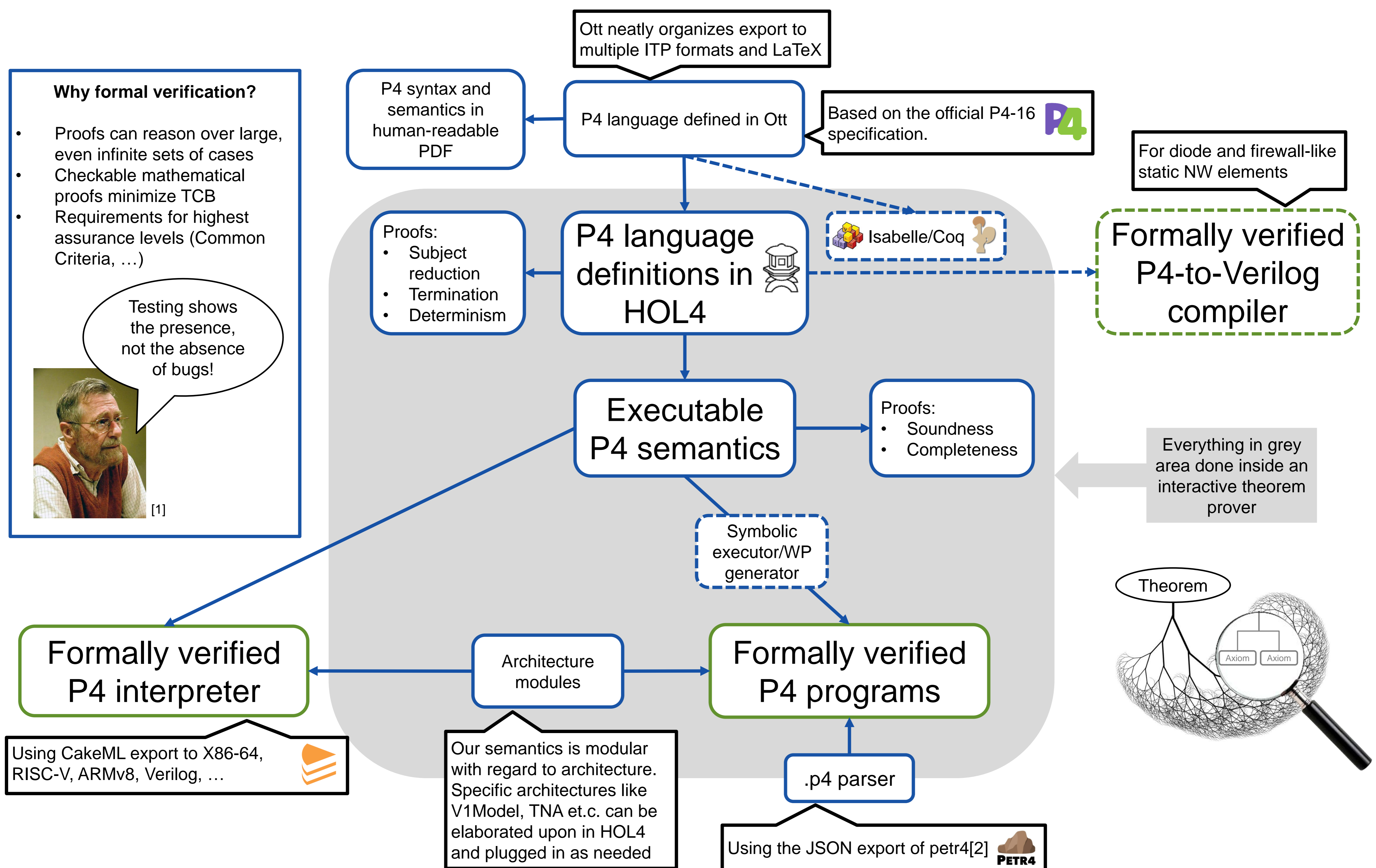


p4ott: Bullet-Proof P4-Programmable Data Planes

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We have formalized the P4 language in the interactive theorem prover (ITP) HOL4 based on its official specification. This allows us to formally prove contracts (e.g. Hoare triples) that guarantee the functional correctness of P4 programs, which in turn ensures the confidentiality, integrity and availability of high-assurance programmable network elements.

We also use CakeML[3] to verifiably compile our ITP-defined P4 interpreter to binary.



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References

- [1] Photo by By Hamilton Richards - manuscripts of Edsger W. Dijkstra, University Texas at Austin, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=4204157>
- [2] Doenges, Ryan, et al. "Petr4: formal foundations for p4 data planes." Proceedings of the ACM on Programming Languages 5.POPL (2021).
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