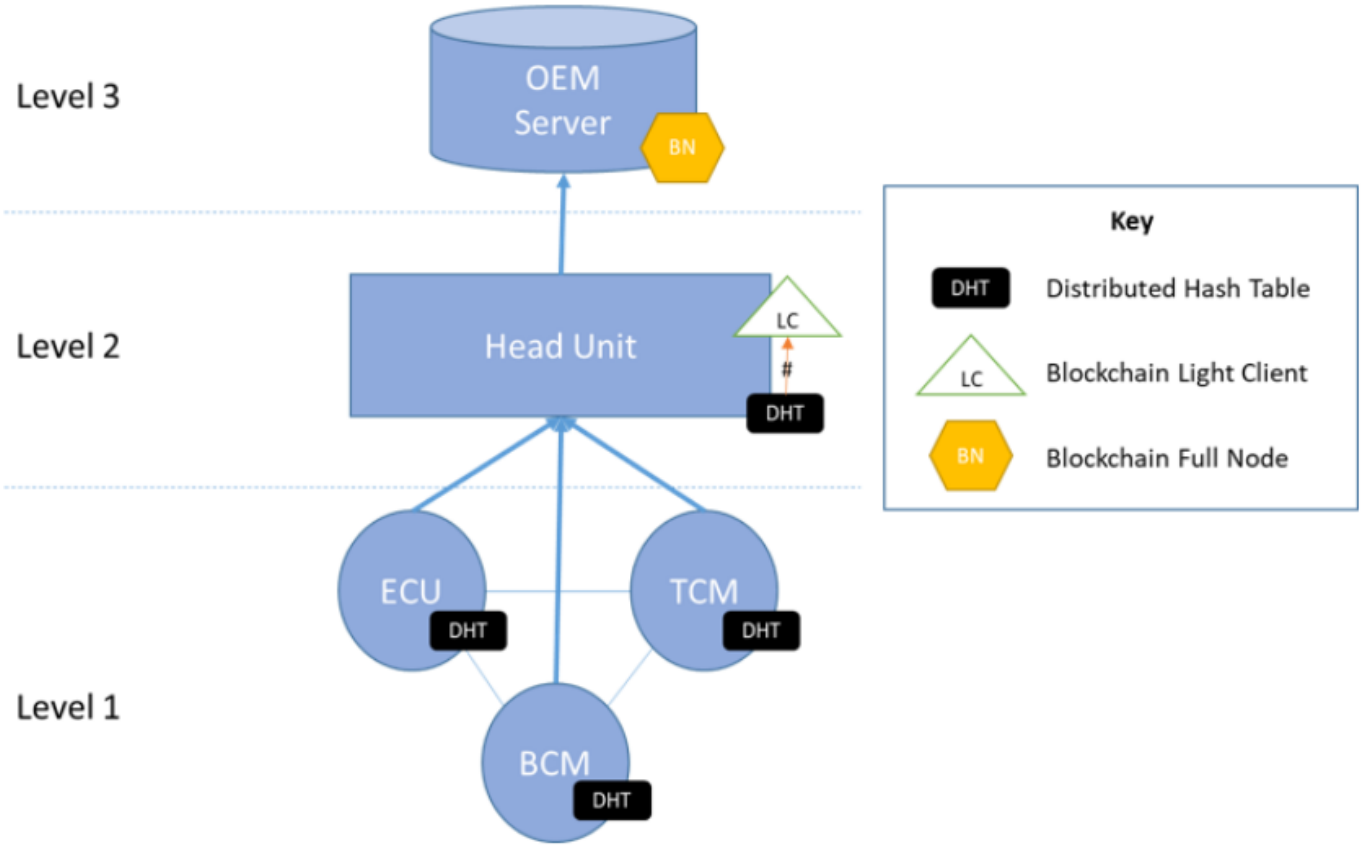
Docket #: S20-320

"Black Box" for Automated Vehicle Data

Researchers at Stanford have developed a distributed digital "black box" audit trail design for connected and automated vehicle data and software assurance. Automotive software is increasingly complex and critical to safety, and related embedded systems must remain up-to-date to ensure performance. However, update mechanisms and data modification tools present opportunities for malicious actors to compromise these cyber-physical systems, and for trusted actors to mistakenly install incompatible software versions. Akin to a flight data recorder in aviation, the new "black box" design assures users, service providers, and original equipment manufacturers (OEMs) of vehicular software integrity and reliability. The proposed architecture is both layered and diffuse, employing distributed hash tables (DHT), a parity system and a public blockchain to provide high resilience, assurance, scalability, and efficiency. While existing black box devices have single points of failure, the new design guarantees the integrity and persistence of data even if large parts of the system is destroyed or corrupted.



This three-layered architecture blends a DHT implementation with a blockchain implementation, to gain the benefits of both technologies without imposing undue computational burden on constrained compute modules (image credit: the inventors)

Stage of Development
Proof of concept

Applications

- Automotive and other high-assurance systems
- Relevant to insurers, automotive manufacturers and vehicle service providers

Advantages

- High resilience, assurance, scalability, and efficiency

Publications

- Falco G. and Siegel J. 2020. **A Distributed 'Black Box' Audit Trail Design Specification for Connected and Automated Vehicle Data and Software Assurance** *SAE International Journal of Transportation Cybersecurity and Privacy*

Patents

- Published Application: 20220107929
- Issued: 12,386,807 (USA)

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