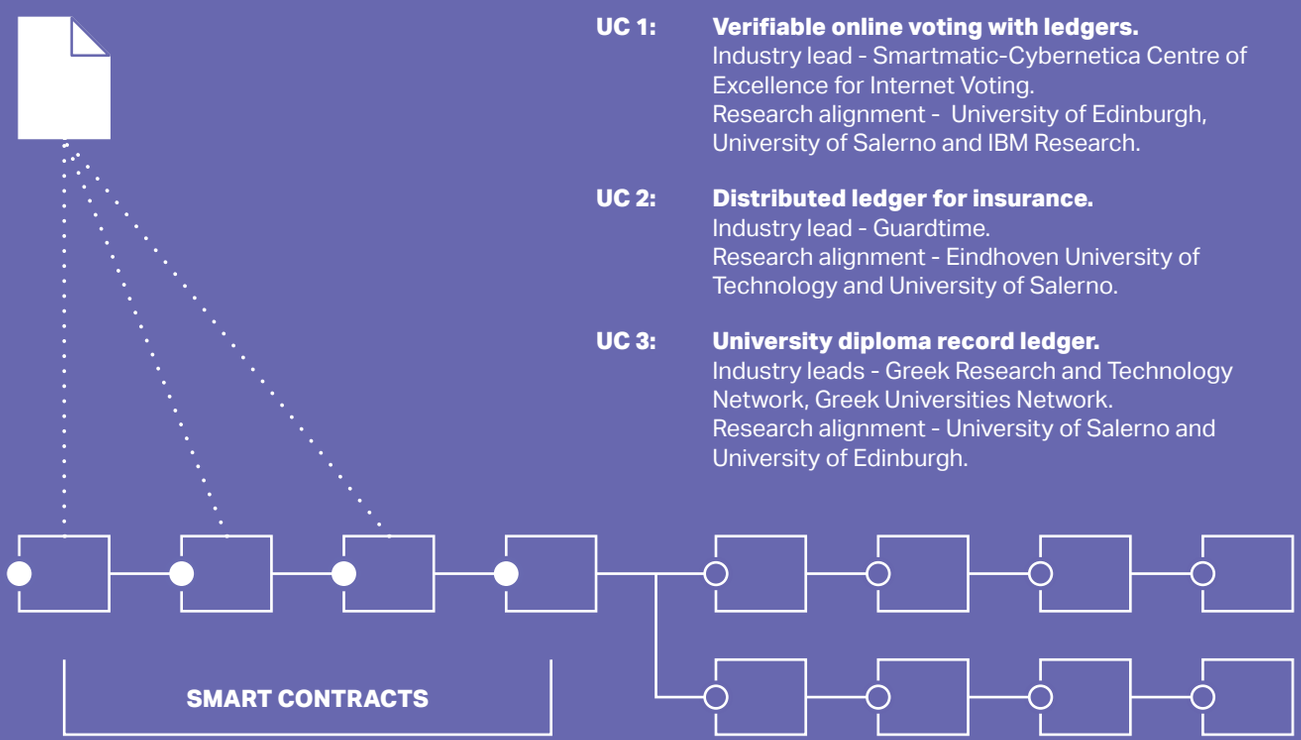
PRIVILEDGE

USE CASE 2:

"HEALTH INSURANCE" DISTRIBUTED LEDGER FOR INSURANCE

PRIVACY ENHANCING CRYPTOGRAPHY IN DISTRIBUTED LEDGERS

PRIViLEDGE has the ambitious goal to increase the trustworthiness of European ICT services and products and the competitiveness of the European cryptography industry. PRIViLEDGE focuses on enhancing strong cryptographic solutions for privacy in distributed ledgers. To demonstrate its wide scope of applications, PRIViLEDGE works with four different use cases to develop and showcase cryptographic schemes and protocols for privacy and security.



UC 1: **Verifiable online voting with ledgers.**
Industry lead - Smartmatic-Cybernetica Centre of Excellence for Internet Voting.
Research alignment - University of Edinburgh, University of Salerno and IBM Research.

UC 2: **Distributed ledger for insurance.**
Industry lead - Guardtime.
Research alignment - Eindhoven University of Technology and University of Salerno.

UC 3: **University diploma record ledger.**
Industry leads - Greek Research and Technology Network, Greek Universities Network.
Research alignment - University of Salerno and University of Edinburgh.

UC 4: **Update mechanism for Cardano stake-based ledgers.**
Industry lead - Input Output Research.
Research alignment - University of Edinburgh and IBM Research.

* Use cases 1–3 use the immutability of DLT for storing data. Use case 4 enhances DLT with mechanisms for consistent updates.

THE STORY

A health insurance system can be roughly modelled as interactions between three parties: patients, insurers, and care providers.

To motivate providers to focus on best results for patients while simultaneously keeping costs under control, insurers are increasingly interested to shift from the currently prevalent "fee for service" model—where the provider gets a pre-agreed fee for each treatment performed on an insured patient—to the "outcome-based contracting" (OBC) model—where the payments that providers receive depend on achieving specific measurable outcomes, like reducing the mean time off work for a certain diagnosis or lowering the number of patients with blood pressure exceeding a threshold.

To be able to affect such broad outcomes, care providers with different specializations typically join into an "accountable care organization" (ACO) to share the responsibilities as well as the financial rewards and risks. In practice, the ACO contracts are not pure outcome-based, but combine different payment models in various proportions.

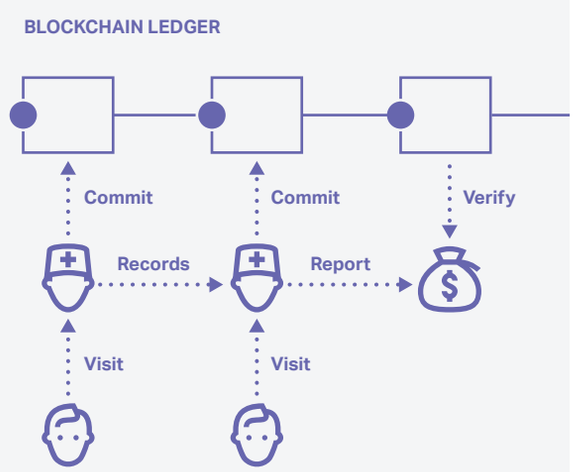
THE DARE

The shift to OBC, while beneficial to patients' health outcomes, has so far been hindered by the tension between trust and privacy requirements. To prove the goals have been achieved, the ACO would need to give insurers access to not only the list of treatments performed, but also to test results. The patients, however, may be unwilling to consent to sharing all the details with the insurers, fearing that these might be used to discriminate against the "difficult" ones in the future contracts.

The ACO could report only the aggregate numbers over sufficiently large groups of patients, which would not violate any one patient's privacy, but then the insurers are reluctant to just trust that the reported values are correct. **A way to relieve this tension is to post to a shared ledger cryptographic commitments of patient records and provide for each report a proof that it is consistent with the posted commitments**.

THE DO

PRIViLEDGE provides a prototype health insurance system that combines **secure multi-party computation** among the ACO members with **zero-knowledge proofs** that enable the insurers to **verify the correctness of the reports without leaking the details of individual patients**. Showing the possibility of such privacy-preserving reporting will encourage wider deployment of the OBC model and thus advance the efficiency of the medical insurance in particular and the healthcare sector in general.



High-level data flows between patients, care providers, payers, and the ledger.

INTERESTED IN LEARNING MORE ABOUT "HEALTH INSURANCE" USE CASE ?

- Your primary contact is Mirjam Kert from Guardtime, e-mail: **mirjam.kert@guardtime.com**. For any questions or proposals you might have, she's happy to listen.

Follow PRIViLEDGE homepage and Twitter for news and updates.

- **priviledge-project.eu**
- **twitter.com/PRIViLEDGE_EU**

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