Alvarium

As a Stage 1 project in LF Edge, Project Alvarium aims to build a framework and SDK for trust fabrics that deliver data from devices to applications with measurable confidence.

See the vision at: https://youtu.be/88KbYmlkFdw

Project Alvarium at a Glance

- New LF project forming to focus on system-level trust and data confidence
- Differentiated in its comprehensive view and in delivering data to applications with measurable confidence
- Unifying, not reinventing trust insertion technologies
- Relevant to all markets and solution stacks
- Seeded by Dell Technologies code

Project Mission:

- Create the framework and open APIs that bind together existing open source and commercial value-add for trust insertion, develop confidence score algorithms
- Collaborate with other LF projects and industry efforts (OSS, SDO) to unify existing and emerging trust insertion technologies and refine scoring algorithms

What is a Data Confidence Fabric (DCF), or “trust fabric”?

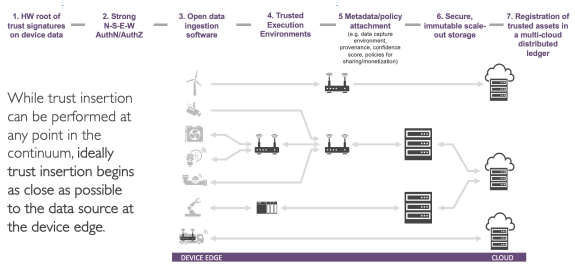
- A Data Confidence Fabric (DCF), or more generally-speaking trust fabric, is a virtual overlay that aids in the delivery of data from devices to applications with measurable trust characteristics.
- A DCF is a loosely-coupled collection of various trust insertion technologies, bound together with an open framework
    - Example technologies include tools for silicon-based Root of Trust (RoT), open authentication and data ingestion APIs, metadata handling, immutable storage and blockchain/ledger
- The Alvarium framework features open APIs and integrated algorithms to generate confidence scores for data based on the trust insertion technologies used and overall context
- There is no single DCF, rather each entity/organization can build their own fabric with preferred technologies using the Alvarium framework
    - A trust fabric built with widely trusted ingredients will naturally produce the highest data confidence scores
    - Confidence scores normalize across systems of systems as data flows through intersecting trust fabrics
- Key differentiation from other efforts focused on security, privacy and trust:
    - Holistic, system-level focus
    - Confidence scores to enable organizations to act with measured risk based on policy appropriate for the use case / context, working across heterogenous systems of systems

Why we need to collaborate on a **global trust fabric**

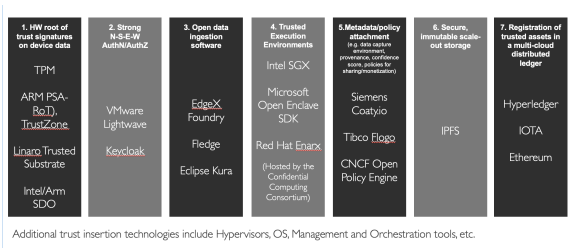
- Pervasive sharing and monetization of data, resources and services across heterogenous systems of systems spanning public and private boundaries
    - Can also include trusted sharing/exchange of data sets for training AI model
    - The common “zero trust” model isn’t scalable, access policy needs to be attached to trustworthy data
- Consolidating workloads on common infrastructure in a trusted fashion
    - Enable sharing of data/services based on policy while protecting privacy and IP
    - Address common debates on data ownership
- Meeting compliance requirements (e.g. GDPR) at scale
    - Enables organizations to trigger deletion of distributed data in place when a user requests to revokes privacy consent

Example end-to-end trust insertion points

Example OSS trust insertion technologies



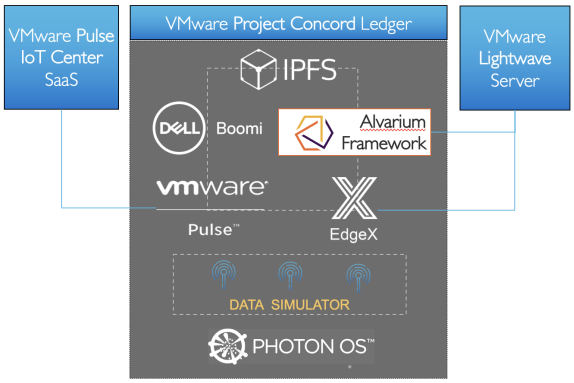
While trust insertion can be performed at any point in the continuum, ideally trust insertion begins as close as possible to the data source at the device edge.



Additional trust insertion technologies include Hypervisors, OS, Management and Orchestration tools, etc.

Initial DCF prototype

- Dell Technologies' initial Data Confidence Fabric (DCF) prototype (completed in August 2019) demonstrated a trust fabric comprised of a mix of open source and commercial technologies
- Prototype was deployed entirely on one edge system to locate policy insertion for data monetization/compliance as close as possible to the data source
- **Alvarium framework unifies the various loosely-coupled trust insertion elements**
- **Solution could just as well be deployed in a distributed fashion**
- Next steps in prototyping – demonstrating technology swapability, for example exchanging Project Concord ledger for Hyperledger or IOTA
- Dell will contribute the Alvarium framework code to seed the project



Example Confidence Scoring

- Scoring creates a weighted confidence depending on trust insertion technologies implemented in a given trust fabric
- Dell's initial DCF prototype leveraged a simple linear scale for simplicity
- Scoring algorithms will require industry collaboration to develop
- Initially via OSS but may require some standards work
- Likely to make sense for weighted scoring, some factors that zero out confidence

