

IOTA TL;DR

- A feeless distributed ledger
- Specialization in IoT
- IoT standards setting; evidence of success by late 2020
- Labor shortage and falling costs boosting IoT adoption
- \$200-400 billion of IOTA network value, if successful
- **Risks:** Failure to become a standard, technical challenges and crypto volatility

IOTA Update: Partnership with Linux and Dell shows the project's technology has demand from industry heavy weights

IOTA is a partner in the Linux Foundation (LF) and Dell's newly announced Project Alvarium, a collaboration that also includes IBM, Arm, Unisys, OSISoft, MobilegeX and Object Management Group.

- **Measuring confidence in data:** Project Alvarium is a Linux Foundation project that aims to create a framework to measure confidence in the provenance and integrity of data. The project is being seeded by Dell code, and is expected to be built out in collaboration with other Linux Foundation projects supporting collaborative development aimed at accelerating the adoption and growth of Linux as well as industry Standards Development Organizations (SDOs) and Open Source Software (OSS) initiatives.
- **Data confidence scores help systems make decisions with conflicting data:** Increasingly, systems of interconnected devices from multiple vendors are seeking to share / move data, process it, and take actions in response to the data. Current systems are based on a binary trust – either you trust the data, or you do not. A data confidence score allows a system to decide based on conflicting information from different sources, by weighting data based on its associated trust score. The Project Alvarium framework includes a collection of tools including hardware Root of Trust, authentication and data ingestion APIs, immutable storage and distributed ledgers / blockchain, that together constitute a “data confidence fabric”. The framework addresses sharing and monetization of data, resources and services across public and private boundaries, including trusted sharing of data to train AI models, while meeting compliance requirements such as GDPR.
- **On 0-10 scale, higher scoring data is more trusted:** The closer the trust insertion occurs to the data source, the higher the degree of trust. The more components of trust in the chain of custody, the higher the score, although the final scoring scheme is yet to be determined. The sample scoring algorithm Dell demonstrated uses a scale of 0-10, with 2 points each for device signatures, provenance metadata, Gateway AuthZ / AuthN (Authorization / Authentication), secure immutable storage, and ledger registration. Higher scoring data can either override or carry greater weight than lower scoring data.
- **Dell is strengthening its Edge / IoT Technology stack:** Dell is building out its capabilities in the Edge and IoT technologies space, targeting the entire underlying ecosystem that will enable the next generation of the machine economy that is reshaping major global industries. Project Alvarium is a significant step within the roadmap. The initial prototype solution combines technologies on one edge system, using the Project Concord ledger, but has already been ported to IOTA for data transfer without value transfer.
- **IOTA's role in the project expected to grow.** The technology was initially developed by Dell over the past year. After initial tests with Ethereum, Dell decided to integrate IOTA into the stack over the past 2-3 months. IOTA currently records and maintains audit trails on the registry of change – the top layer of the stack, but sees itself also making inroads into the immutable storage layer with permanodes. The initial use cases include smart cities, industrial IoT and other infrastructure. With developments including faster switching times for each layer in the stack, and speed enhancements, the goal is to get near-real-time data confidence performance that could harden mission-critical infrastructure such as the energy grid and reduce key cyberattack vulnerabilities.

Bottom line: This initiative is important for IOTA because it can focus on building out the infrastructure while Dell builds out the application layers. Dell integration also accelerates IOTA's penetration into the ecosystem, including other edge device makers, reducing time to market and reducing development costs for the IOTA Foundation as it continues to focus on the core technology.

Confidence scoring enables decision making with conflicting data

Systematic decision-making needs trust in data – and a heuristic to decide which data to trust if different sources conflict, triggering different incompatible decisions by elements within the system.

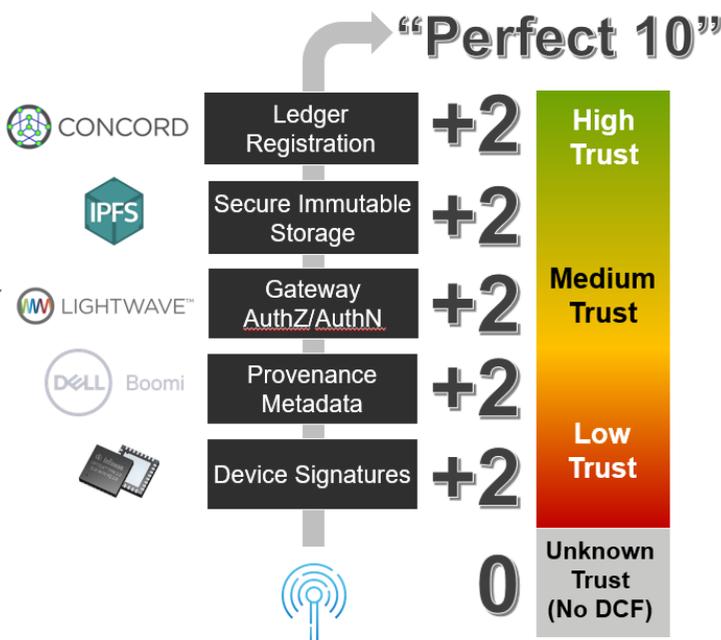
Typical process control example: An automatic sequential multi-step process shutdown upstream of a shipping terminal storage tank based on information of a delay from a GPS device for an incoming tanker and a pressure sensor in the tank. The control systems need to trust the data is timely and accurate and that controls are triggered in the correct sequence to minimize the cost of both a failure to shutoff as well as of an unnecessary or improper shutoff on system safety.

Conflicting triggers: If two sensors are triggered, but they require different responses, how does the system know which data source to trust? Especially when sources are from different vendors, measure different metrics, and may be geographically remote with data traversing public networks that may be prone to interception or attack? This is where the trust inserted at various points in the chain of custody is critical in determining system response

Critical infrastructure example: A power station responding to incoming data about cascade tripping needs to trust that the issue is real and not a hostile cyber attack on infrastructure

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



Higher-scoring data outweighs or overrides conflicting lower scoring data

THE LINUX FOUNDATION

PROJECT ALVARIUM

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Source: Fundstrat, alvarium.org



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