intel

The NEXT Generation of Identity Management

T-Mobile* and Intel® are working together to revolutionize identity management using blockchain technology.

What is blockchain and why is it important?

Blockchain is a transformative technology, its most significant benefits are speed, cost efficiency, and transparency. It has the potential to not only transform asset and data exchange, but also change business processes, improve risk mitigation, and provide greater predictability within business processes.

Blockchains decentralize and distribute data across a network of computers, functioning as distributed ledgers. Blockchain technology eliminates the need for a centralized authority because each participant has a copy of the stored data in a secure, distributed, and shared database. Changes to data are validated by members collectively and updated across the network. This provides an unchangeable record and enhanced protection for data quality and integrity.

This transformative potential is demonstrated in IDC's* Worldwide Blockchain Spending Guide, which reports IT spending on blockchain to exceed $11.7B by 2022.[1] The financial services segment continues to lead in blockchain spending, but new applications beyond banking are beginning to emerge.[2] T-Mobile's Role-Based Access Control (RBAC) solution called NEXT Directory* provides a great example.
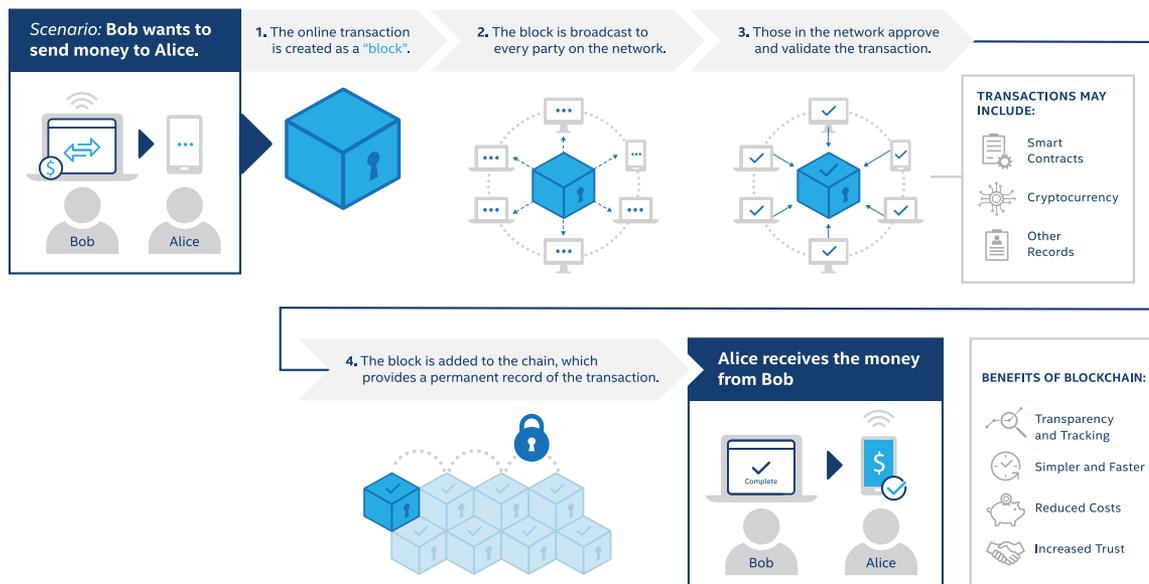

Figure 1. How blockchains work

NEXT Directory – Powered by Hyperledger Sawtooth*

NEXT Directory was born in 2017, as T-Mobile worked to deliver the next-generation of its internal Role-Based Access Control (RBAC) platform. The current generation allowed for N-scale federated self-service management of permissions for individuals and teams. The next-generation solution needed to erase friction, improve security and auditability. After exploring a wide-range of available commercial solutions and bespoke designs using various technologies, a blockchain-based solution built on Hyperledger Sawtooth was selected.

Hyperledger Sawtooth is an enterprise-grade blockchain platform for building distributed ledger applications and networks. Sawtooth was originally an Intel lab project whose goal was to explore scalability, security, and privacy questions prompted by the earliest distributed ledgers. In 2016 Intel contributed Sawtooth to Hyperledger*, the open source consortium advancing business blockchain technologies hosted by The Linux Foundation.* The design philosophy targets keeping ledgers distributed and making smart contracts safer, particularly for enterprise use.

Blockchain's core characteristics of security and immutability went hand-in-hand with the business and governance requirements T-Mobile had for the system. Furthermore, the ability to track not just current-state, but past states provided powerful and trusted reporting capabilities previously unavailable in the space. The modularity of the Hyperledger Sawtooth platform allowed the core team to make design decisions which enabled a light-weight application layer using well known development languages and methodologies. Finally, Sawtooth's Proof of Elapsed Time (PoET) consensus algorithm allowed leader-election to be moved out of software and into trusted enclave hardware leveraging Intel® Software Guard Extensions (Intel® SGX) technology.

Technical Features and Capabilities

NEXT Directory includes a RESTful API layer with modern UI and read-write integration with LDAP-based directory services as well as Microsoft's* Azure Active Directory*. This also allows identity-consuming applications such as many common line-of-business tools, to integrate directly with NEXT Directory. The history, security, and immutability of blockchain-based NEXT Directory objects provide previously unavailable audit-trail reliability. Furthermore, integration of on-chain approvals and intelligent self-service features empower

single-source audit reporting. Never wonder again who's watching the watchers! Deployment options include both private and consortium, allowing secure identity sharing between business partners.

Sawtooth simplifies blockchain application development by separating the core system from the application domain. Application developers can specify the business rules appropriate for their application, using the language of their choice, without needing to know the underlying design of the core system.

Sawtooth's modularity enables enterprises and consortia to make policy decisions that they are best equipped to make. Additionally, developers benefit from experimentation with a common set of building blocks that can be reused. Sawtooth's core design allows applications to choose the transaction rules, permissioning, and consensus algorithms that support their unique business needs.

Commitment to Open Source

Initially incubated by T-Mobile and Intel, NEXT Directory was envisioned as Open Source Software (OSS) from day one. It was therefore an easy decision to donate all artifacts and code for the project to the Hyperledger Sawtooth project. Creating the solution as OSS allowed T-Mobile to consider a broader range of use-cases for the solution, which resulted in the flexible design seen today. Inviting the broader OSS community to participate in the growth of the project provides countless benefits.

Hyperledger is an open source collaborative effort to create advanced cross-industry blockchain technologies. It is a global collaboration of software developer communities building enterprise grade blockchain frameworks and platforms. Hyperledger incubates and promotes a range of technologies, including distributed ledger frameworks, smart contract engines, client libraries, graphical interfaces, utility libraries, and sample applications.

Learn More

Hyperledger Sawtooth
https://www.hyperledger.org/projects/sawtooth

NEXT Directory on GitHub
https://github.com/hyperledger/sawtooth-next-directory

T-Mobile Open Source
https://opensource.t-mobile.com