Blockchain Technologies to support Business Communities and Ecosystems

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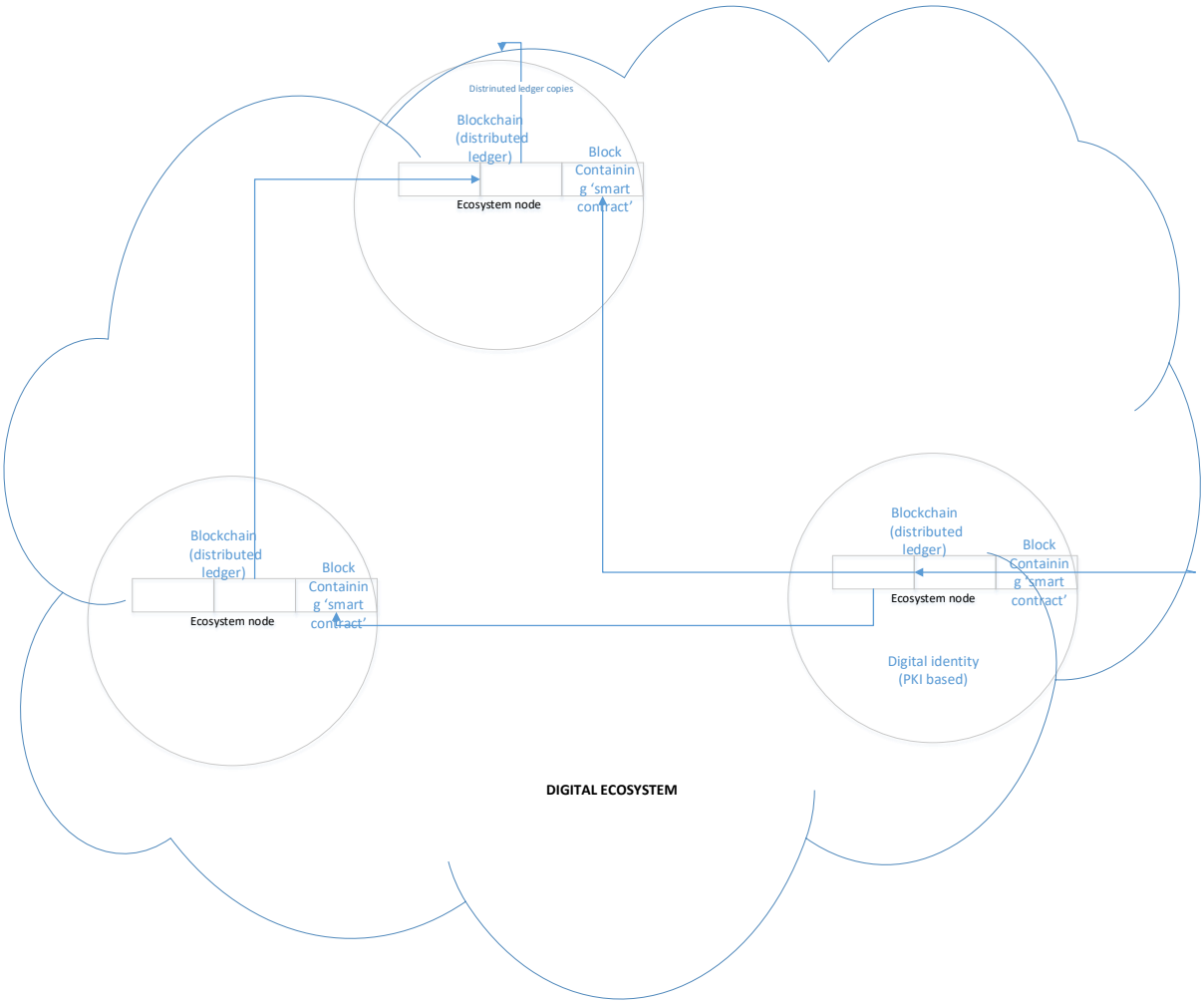
Blockchain technology allows digital ecosystems to be formed and self governed without the need for a central authority/coordinator, They can enable Ecosystem participants to find each other and create trusted relationships through 'smart contracts' quickly and inexpensively



As shown in the Figure above, Ecosystems can be formed without the existence of a central trust authority.

The initiator or initiators of the Ecosystem creates a distributed ledger of which however it maintains no control once it is published, as this is replicated amongst the servers of other ecosystem participants.

The distributed ledger consists of blocks with each block consisting of a 'smart contract' that is formed under the rules of the ecosystem.

Unlike in a traditional business community, where these documents and contracts are maintained by each partner's business department, in a blockchain these smart contracts are stored on many decentralized nodes.

Their privacy and integrity is maintained by the Ecosystem. The smart contract template explains the rules of engagement between the Ecosystem participants. However the template does not provide a textual description of the Ecosystem rules but running code which can be executed by the Ecosystem participants that want to collaborate with others in the Ecosystem. This template enables the creation of smart contracts, with terms and conditions that are automatically enforced by the code and in which

the identity of each party is proven (non repudiation). As the Ecosystem rules template cannot be changed by the participants, it means that the Ecosystem is guaranteed to perform according to the set rules, without the need of a third party or governing authority to enforce such rules. This system of distributed trust allows for lower transaction costs because the two parties do not need to explicitly create and maintain contracts and implement new IT to digitally setup enforce and monitor such contracts.

The distributed nature of the ledger means that any collaboration between two parties under the Ecosystem rules is publicly "announced" to all participants that maintain a copy of the blockchain. The blockchain servers of the participant preserve a time stamp on all transactions on the blockchain. They collect sets of transactions in blocks and publish a hash (a unique set of numbers that, if changed, shows the data or transaction is invalid) for each block of transactions with a time stamp to verify their authenticity. Each owner of a transaction digitally signs a hash of the previous transaction and the public key of the other party and adds these to the end of the block. The validity of these transaction blocks is collaboratively performed by the Ecosystem participants through a process known as "mining" which volves attempting to find a numerical value, known as a "nonce," that when combined with all open transactions in a block can be "hashed" into a value that satisfies a certain "difficulty" but is also easily verifiable. Once the nonce is found by a 'miner', the miner publishes the block with a hash to the rest of the Ecosystem community.

Conclusions

Blockchain technology allows digital ecosystems to be established, operate and self governed cheaply and efficiently. These can include logistics/transport chains or other types of value adding chains where participants previously unknown to each other can collaborate under ensured conditions of trust and transparency.

Depending on the nature and scope of the Ecosystem, different blockchain technologies public, private or consortium, can be utilised. A consortium blockchain can be more effective than a totally public blockchain that effectively permits anyone with an Internet connection to join the Ecosystem. A consortium blockchain therefore provides many of public and private blockchain benefits— efficiency and transaction privacy, without either opening it up to everyone or consolidating control within a single organisation. The consortium blockchain governors are generally known entities and they can decide who has read access to the blockchain ledger.