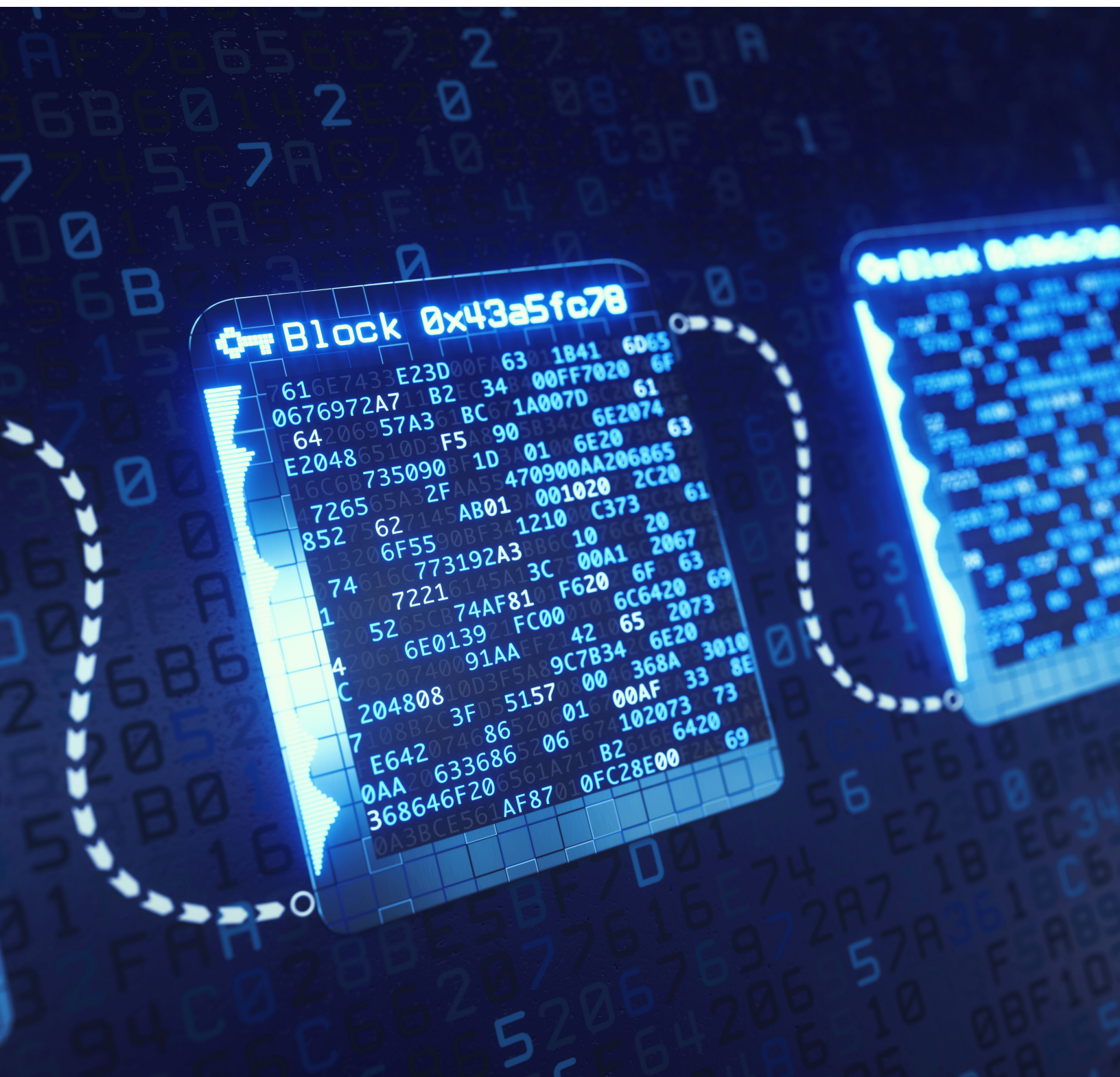# BLOCKCHAIN
FOR CIVIC RECORDS

WHAT IS BLOCKCHAIN?

This brief guides you through the fundamentals of blockchain technology for property and tax records.

A block chain is a secure, tamper proof, digital registry. You can think of a private blockchain as a ledger of transactions (for example changes to property records) that is organized into "blocks" of data. The blocks are distributed across a computer network. Everybody on the network sees the same ledger at the same time.

Like banks and financial institutions, property and tax record systems typically organize data in central hubs. The hubs rely on one server (a huge computer) as a trusted middleman to validate transactions one-by-one. Blockchains are decentralized, which means they have no middleman and no single point of failure.

A blockchain network automatically checks in with itself at standard intervals, like a self-auditing ledger. Since data is embedded within the network, transactions (like changes to a property record) are traceable and visible to everyone who can see the ledger.

Bitcoin is an example of a public blockchain – anyone can join. A property records system would use a private blockchain that has strict controls on who can join.

LIMITATIONS OF THE TECHNOLOGY

Expert advice is necessary
Blockchain technology is highly specialized and requires a team of competent and experienced experts to build and deploy.

Large networks are essential
Like all distributed systems, blockchains are antifragile (improve with bigger size and more input) and require a large network of computers to be effective. Running the network off of one or two computers is unacceptable; having dozens, hundreds, or thousands of peers (shared computers) is vastly safer and more stable.

Data entry is vulnerable to human error
Blockchains store information and prevent it from being tampered with, but they do not understand if data is trustworthy or not. Mistakes in data entry or transcription from inaccurate files will be treated exactly like good information; systems need to exist outside of the blockchain to vet and sanitize all information that goes into it.

High electricity cost
Blockchains use a security mechanism called a Proof-of-Work protocol which requires computers to solve complex math problems. This can consume a large amount of electricity. Increased utility bills represent a potential hidden cost to running a large blockchain network.

RECOMMENDATION

Blockchains are very efficient for record-keeping. Several countries are undertaking blockchain-based land registry projects. Sweden and Brazil have recently retained experts to begin work on nation systems. Honduras and the Republic of Georgia announced initiatives in 2015 and 2016 respectively.

Blockchain is in theory an excellent tool to maintain land registries or property tax records, but like any tool they need to be used responsibly. Any major blockchain project must at minimum have the following:

1. A dedicated technical and IT team to build and maintain the network

2. Ironclad data validation and data entry protocols to minimize human error and ensure the information being stored on the blockchain is accurate

3. A large number of computers ("peers") running the blockchain

4. A legal team to review digital and technology laws, and ensure that the blockchain satisfies all legal requirements for storing and validating public records

If the project cannot at minimum satisfy these requirements, a traditional database may very likely produce a better net outcome.

"The World Economic Forum identified blockchain as one of six technology mega-trends."
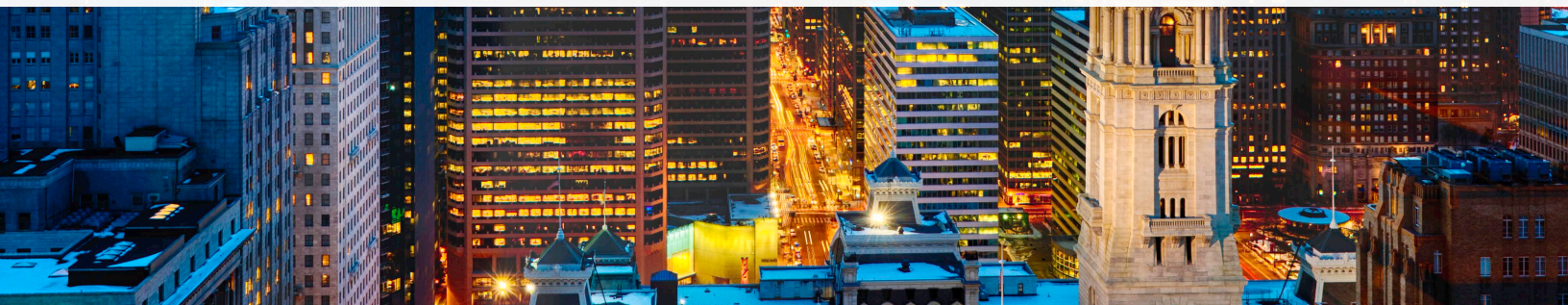
LINKS TO BACKGROUND INFORMATION

SWEDEN

Reuters December 2017

3-minute read

Reports a proof of concept to place Sweden's land registry system on blockchain.

Block Chain Vendor for Sweden

30-second read

BRAZIL

Reuter January 2018

6-minute read

Blockchain to reduce corruption. One application is creating a single centralized system to document landownership in Brazil.

Ubitquity Brazilian Block Chain Vendor

30-second read

REPUBLIC OF GEORGIA

Forbes February 2017

4-minute read

Private blockchain registers land titles. Bitcoin's public blockchain network makes transactions verifiable.

HONDURAS

Reuters August 2017

4-minute read

Using digital technology to record land deals in Honduras to reduce corruption. Nearly 80 percent of the country's privately held land is either untitled or improperly titled.

WORLD ECONOMIC FORUM

White Paper April 2018

15-minute read

A common sense and practical framework developed by Imperial College London to assist executives in understanding whether blockchain is an appropriate tool for their business needs.