BLOCKCHAINS

ARCHITECTURE, DESIGN AND USE CASES

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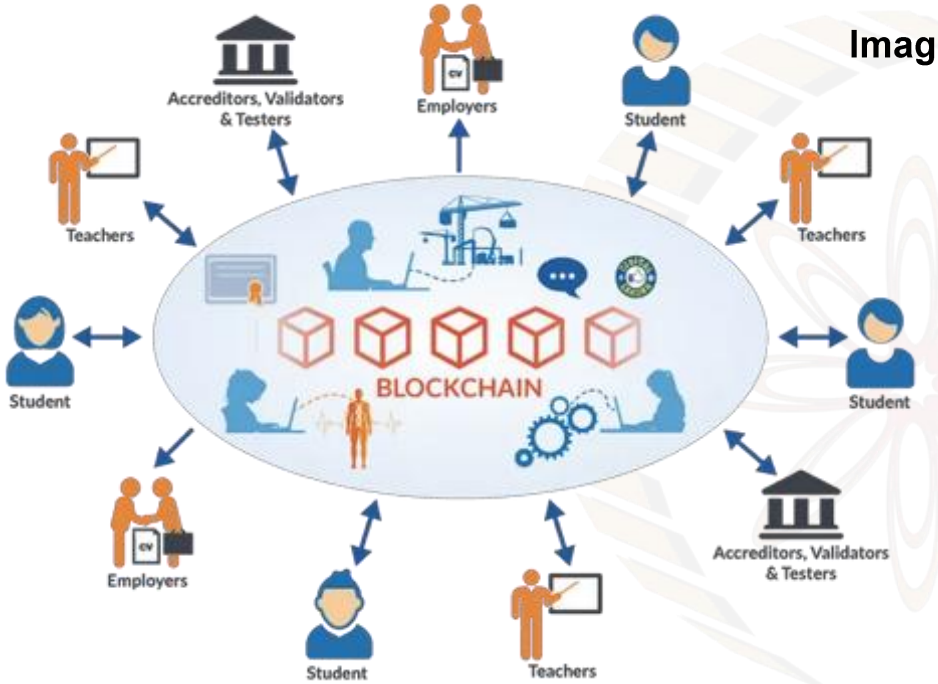


Image Source: http://blockchain.open.ac.uk/

Blockchain in Government - I

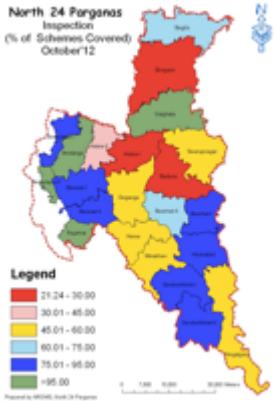
Blockchain and Government

- Government needs to maintain (in digital or in paper form)
  - Daily operations and activities
  - Government assets (land records, buildings etc.)
  - Details of people, organizations and institutions
  - Records of people
  - Business transactions

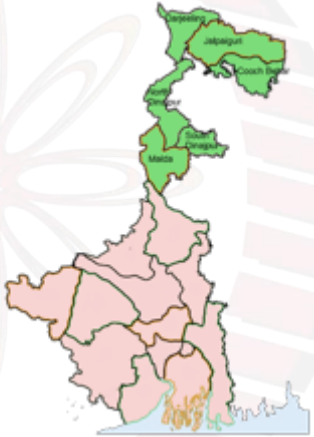
Multi-Institutional or Multi-Organization

- Different levels of governance

Village, Panchyat, Cities



District



State

Country

Multi-Institutional or Multi-Organization

- Every level builds its own ledger of data
  - Different access management policies
  - Role based access control or access management

- Different priority of data
  - High priority or highly secured data - restricted access - needs to prevent from unauthorized access (example: AADHAAR Data)

Blockchain and Government

- Blockchain can help in management of government data at different levels

- **Note**
  - The blocks can contain huge amount of data
  - The data can not be altered without colluding majority of the blocks
  - Data access as transactions - can check or verify who has accessed what

Government and Cyber Crime

- Government database is a major target for hackers
  - In 2015, 77,183 cyber security incidents were reported by federal agencies in the United States (*Cyber Strategy Doctrine by U.S. Department of Defense*)

- **"Cyber War" -** actions by a nation-state to penetrate another nation's computers or networks (*Richard Clarke*)

Theft of Government Data

THE WALL STREET JOURNAL.

MONDAY, OCTOBER 18, 2010 - VOL. CCLVI NO. 92

What's News—

Business & Finance

World-Wide

Facebook in Privacy Breach

Top-Ranked Applications Transmit Personal IDs, a Journal Investigation Finds

WHAT THEY KNOW

Tensions Lead to Dueling Protests in China and

UIDAI rubbishes report claiming massive Aadhaar data breach

ET Online | Updated: Jan 04, 2018, 02.52 PM IST

11 Comments

A+

The Unique Identification Authority of India (UIDAI) has refuted a report by The Tribune newspaper that claimed to have gained access to the entire Aadhaar database for just

List of data breaches

From Wikipedia, the free encyclopedia

For a broader coverage related to this topic, see Data breach.

This is a list of **data breaches**, using data compiled from various sources, including press reports, government news releases and mainstream news articles. The list includes those involving the theft or compromise of 30,000 or more records, although many more smaller breaches occur continually. Breaches of large organizations where the number of records is still unknown are also listed. The various methods used in the breaches are also listed, with hacking being the most common.

Most breaches occur in North America. It is estimated that the average cost of a data breach will be over $150 million by 2020, with the global annual cost forecast to be $2.1 trillion.[1][2] It is estimated that in 2015 alone, 707 million records were exposed as a result of data breaches.[3] Vigilante.pw[4] lists over 2,100 websites which have had their databases breached, containing over 2 billion user entries in total.

Entity	Year	Records	Organization type	Method	Sources
21st Century Oncology	2016	2,200,000	healthcare	hacked	[4][5]
Accendo Insurance Co.	2011	175,350	healthcare	poor security	[6][7]
Adobe Systems	2013	152,000,000	tech	hacked	[8][9]
Advocate Medical Group	2013	4,000,000	healthcare	lost / stolen media	[10][11]
Affinity Health Plan, Inc.	2009	344,579	healthcare	lost / stolen media	[12]

Processing of Government Data

- Data is shared among multiple organizations at different level of government structure

- The problem of data breaches increases at every level
  - Data duplication
  - Data multiplicity

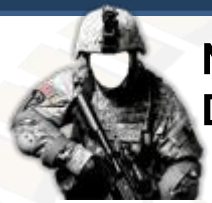
data multiplicity increases possibility of data breach

- Protection of data gets diluted if multiple copies of same data exist

Use Case: Sharing of Passport Data

Airport/ Sea port
Custom Check

Review
exit/enter



National Army
Defense Agency

Investigation

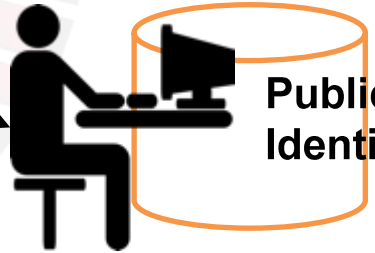
National Police Agency
CBI/CID - Crime department

Periodic Check

Income Tax Department
National Intelligence
National Audit Agency

Passport
Data

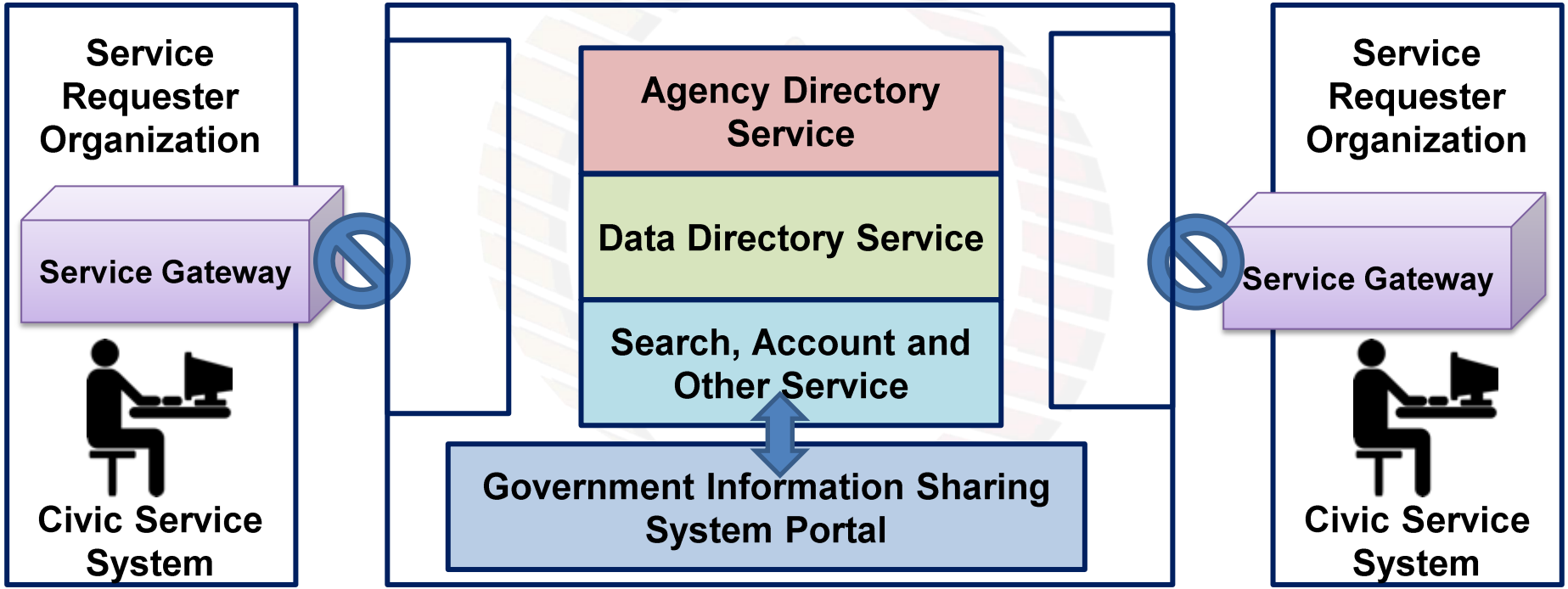
Ministry of foreign
Affairs - Passport
data management



Public Service
Identity Database

Ministry of Public Service

Government Information Sharing System



Choi, John Jong Uk, et al. "**SecureGov**: secure data sharing for government services." *Proceedings of the 14th Annual International Conference on Digital Government Research*. ACM 2013.

How Blockchain Helps

- **Access and verification of a central data**
  - Data is in a central database
  - Access to the database are the transaction
  - Every such transactions (access to the data) is logged in a blockchain
  - Data can be accessed **only** through the blockchain
  - Anyone can verify who has accessed data and for what purpose

How Blockchain Helps

- **Sharing of data**
  - Data is in the blockchain
  - Everyone can verify which data has been shared
  - Data cannot be altered

How Blockchain Helps

- **Sharing of data and access control**
  - Keep both the data and the access at a blockchain
  - Anyone can verify the data and the access
  - Neither data nor access can be altered
  - Access cannot be denied

Government Use Cases - Worldwide

- **Russia:** The state run back Sberbank partnered with Russia's Federal Antimonopoly Service (FAS) to implement document transfer and storage via Blockchain

Source:
https://cointelegraph.com/news/first-government-blockchain-implementation-for-russia

Government Use Cases - Worldwide

- **South Korea:** Dayli Financial Group, a house of Korean fintech startups, is working on creating a Blockchain based ecosystem, called ICON, which will allow government departments, universities, hospitals, banks etc. to interact without third party networks.

Source:
https://www.forbes.com/sites/elaineramirez/2017/08/09/dayli-icon-blockchain-south-korea/#44c5823425a7


AUG 9, 2017 @ 11:11 PM 38,140

The Little Black Book of Billionaire Secrets

Could This Blockchain In Korea Be The First To Connect An Entire Country?

Elaine Ramirez, CONTRIBUTOR

FULL BIO

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Government Use Cases - Worldwide

- **Singapore:** Government has initiated project **Ubin**, to explore the use of distributed ledger technology for clearing and settlement of payment and securities (example: Domestic inter-bank payments)
  - Issue and transfer funds among participants

Project Ubin: Central Bank Digital Money using Distributed Ledger Technology

Project Ubin is a collaborative project with the industry to explore the use of Distributed Ledger Technology (DLT) for clearing and settlement of payments and securities. DLT has shown potential in making financial transactions and processes more transparent, resilient and at lower cost. The project aims to help MAS and the industry better understand

Source: http://www.mas.gov.sg/Singapore-Financial-Centre/Smart-Financial-Centre/Project-Ubin.aspx

Government Use Cases - Worldwide

- **India:** IndiaChain - a trial solution for utilizing blockchain technology for digitization and validation of educational degree certificates, has been taken as a pilot project by Government of India.

Source:
http://www.cio.in/feature/indiachain-inside-gois-blockchain-network

Government Use Cases - Worldwide

- **USA:** *General Services Administration*, an agency of the United States Government (manages basic functioning of federal agencies), is interested to evaluate distributed ledger technologies for
  - Financial Management
  - Procurement
  - IT asset and supply chain management
  - Patents, copyright management
  - Federal personnel workforce data and so on

Source:
https://www.gsa.gov/technology/government-it-initiatives/emerging-citizen-technology/blockchain


thank you!