ICT: Emerging Technological Trends and Society

TuK

BTech Year IV Semester 3

004: DATA COMMUNICATION AND NEXT GENERATION H/W & S/W DEFINED NETWORKS

SUBJECT CODE: ECIE/ECCE/ECSF 3204

LECTURE OVERVIEW

1. Lecture Aims & Objectives

2. Lecture Outline

3. Recommended chapter from recommended reading list

4. Lecture Topic

5. Q&A

AIMS & OBJECTIVES

1) To understand the basic & advanced emerging trend concepts related to Data Communication in hardware and software defined networks

2) Identify and explain the history, evolution, development, function, characteristics, strengths of data communication in hardware & software defined networks

3) Discuss the social and ethical implications on society related to use of the above mentioned networks

RECOMMENDED READING LIST

1. Fawad A Khan, Jason M Anderson "**Digital Transformation Using Emerging Technologies:- A CxO's Guide To Transform Your Organization**" Independently Published 2021

2, Sarah Pink "**Emerging Technologies/Life at the Edge of the Future**" Routledge 2022

3. Kelly and Zach Weinersmith "**Soonish: Ten Emerging Technologies That'll Improve and/or Ruin Everything**" Penguin Press 2017

4. Schwab,Klaus "**The Fourth Industrial Revolution**", 2018.

5. Rotolo, D., Hicks, D., Martin, B. R., "**what is an emerging technology**?" Research Policy 44(10): 1827–1843.

6. Joy, Bill, "**Why the future doesn't need us**", Bill Joy, Wired Magazine", 2000

7. Messerly, John G. "**I'm glad the future doesn't need us: a critique of Joy's pessimistic futurism**" ACM SIGCAS Computers and Society, Volume 33, Issue 2, 2003

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DATA

COMMUNICATION

&
NETWORK
TRENDS

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DATA COMMUNICATION AND NETWORK TRENDS

Data Communication Emerging Trends: Wi-Fi

1.NGN:-WIFI

-Follow a pattern of naming schemes i.e

-a letter/pair of letters refers to a wireless standard e.g. 802.11a etc

-Naming scheme to versioning numbers

DATA COMMUNICATION AND NETWORK TRENDS

1. Data Communication Emerging Trends:
NGN:-WIFI

WiFi 1, 802.11a (1999),

-WiFi 6, 802.11ax (2019-2023),

-WiFi 7 802. 11 be (2024/2025)

DATA COMMUNICATION AND NETWORK TRENDS

1. Data Communication Emerging Trends:
NGN:-WIFI

-Higher frequency more devices (why? how?) i.e.bandwidth

Higher MDR faster connections (how? why?) i.e. throughput

DATA COMMUNICATION AND NETWORK TRENDS

1. Data Communication Emerging Trends:
NGN:-WIFI

- 802.11a is faster than 802.11b
(true or false?)
(if true why?)
(if false why?)

DATA COMMUNICATION AND NETWORK TRENDS

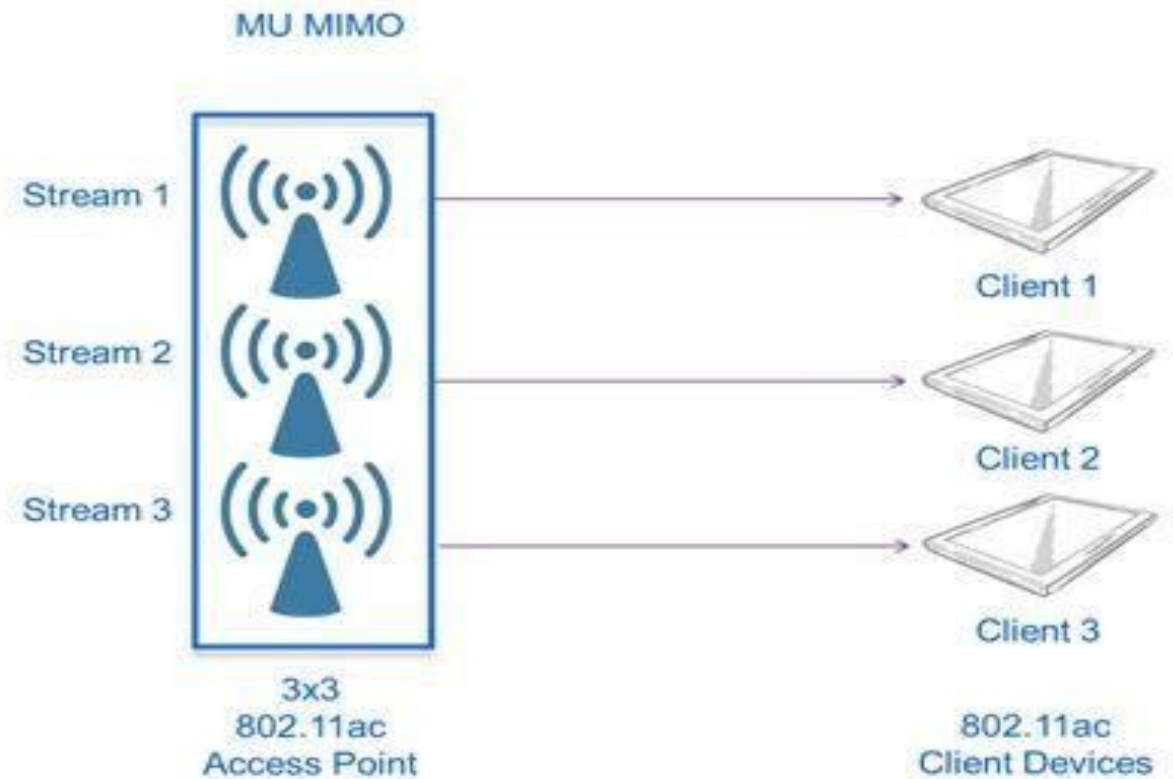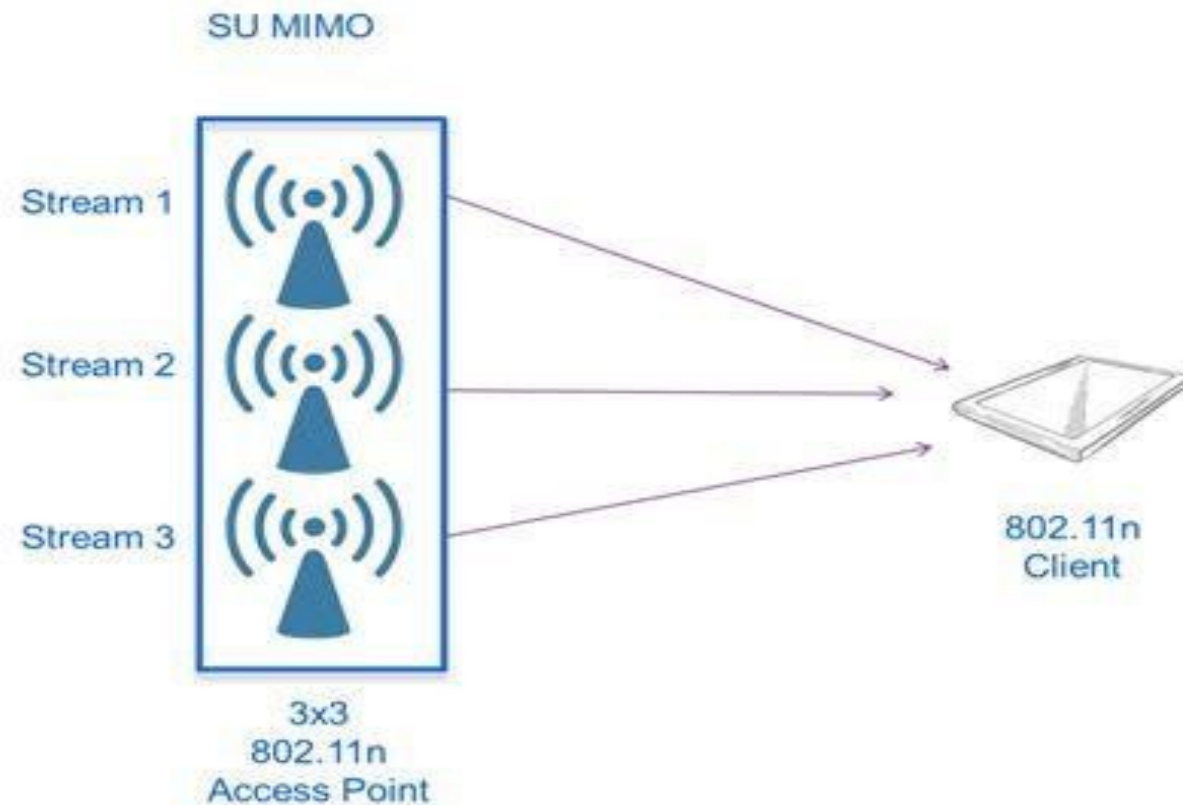## 1. Data Communication Emerging Trends:
NGN:-WIFI version 6

-Fast (9.6 Gbps),

-Less degradation

-More responsive (meaning? how? why?)

- Load and distribution more

devices(how?why?)

-MU-MIMO & OFDMA

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DATA COMMUNICATION AND NETWORK TRENDS

1. Data Communication Emerging Trends:
-SU/MU-MIMO

DATA COMMUNICATION AND NETWORK TRENDS

1. Data Communication Emerging Trends:
OFDMA

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DATA COMMUNICATION AND NETWORK TRENDS

DATA COMMUNICATION AND NEXT GENERATION H/W & S/W DEFINED NETWORKS

1. Data Communication Emerging Trends:

Does Kenya have true 4G or 5G?

DATA COMMUNICATION AND NETWORK TRENDS

4. Emerging Trends In Wireless Mobile Standard Communication

5G

5G

- 2019

-True MSN(50GBPS)

-SHIFT from 4G to 5G (mobile devices, sim cards, handsets)

-Faster speeds (100 Mbps-20 Gbps/)

-Shorter wavelengths (signal degradation long distances)

-new base stations (SIGFOX Networks)

-More expensive

-complex to implement

DATA COMMUNICATION AND NETWORK TRENDS

Emerging Trends In Wireless Mobile Standard Communication

4.(DIFFERENCES BETWEEN 4G AND 5G)

-More robust

-**IPv6 -IPv8** (1 million per km^2)

-**Lower latency** (1ms real time)

-**More base stations**

DATA NETWORK TRENDS LECTURE 4

1. **BLOCKCHAIN ORIENTED SOFTWARE NETWORKS (BOS)**

BOSN

-**Data Replication:** BOSN replicates data and stores it in thousands of systems(data security).

-**Requirement Checks:** BOS checks transaction requirements beforehand (validation)

DATA NETWORK TRENDS LECTURE 4

1. **BLOCKCHAIN ORIENTED SOFTWARE NETWORKS** (BOSS)

BOSNs

-**Transaction Recording:** BOSNs records transactions (blocks sequential, interlinked) via consensus algorithm.

-**Public-Key Cryptography:** based on public-key cryptography.

DATA NETWORK TRENDS LECTURE 4

1. TYPES OF BLOCKCHAIN ORIENTED SOFTWARE NETWORKS (BOSS)

BOSNs

-PERMISSIONED BOSNs:

-Closed

-Access control layer.

-Additional security

-Accessed by permission.

DATA NETWORK TRENDS LECTURE 4

1. TYPES OF BLOCKCHAIN ORIENTED SOFTWARE NETWORKS (BOSS)
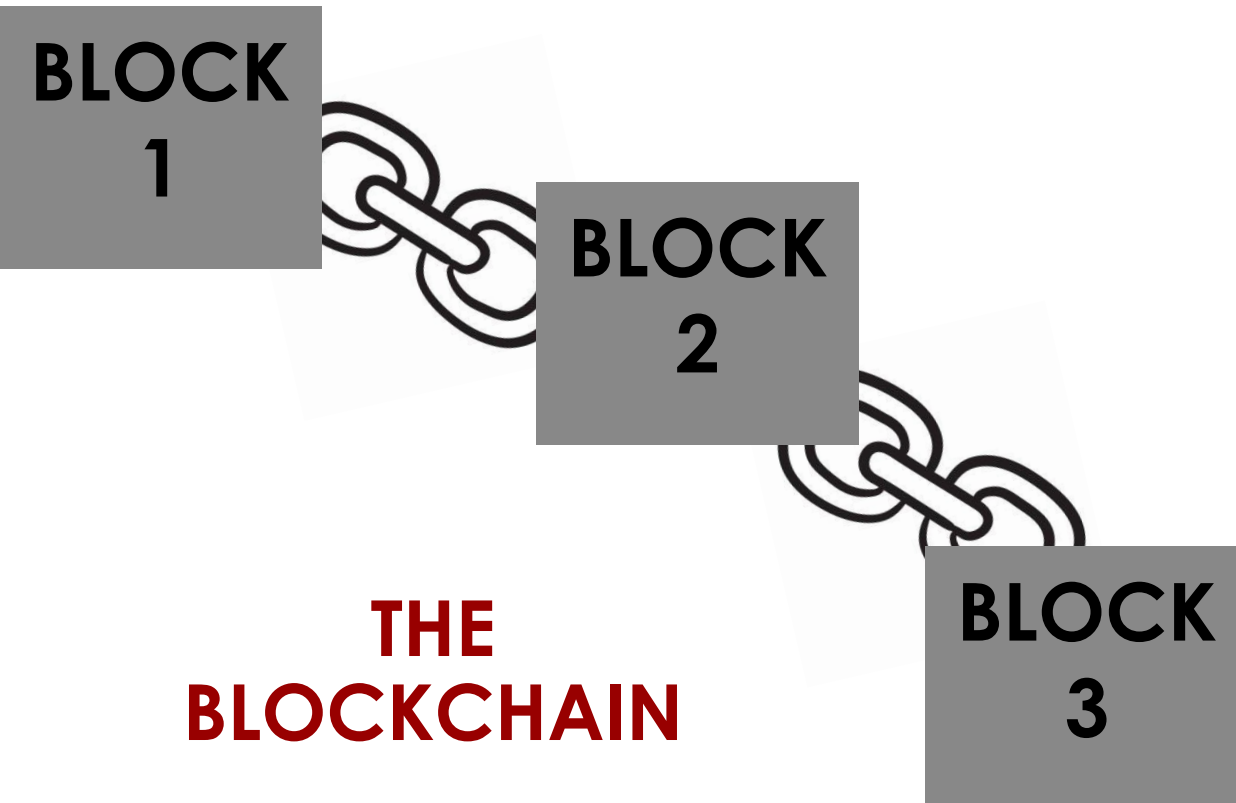

BOSNs

-CONSORTIUM: BOSNs:

- Fewer nodes

-Secure, scalable.

-Reduced network load

-Less transparency

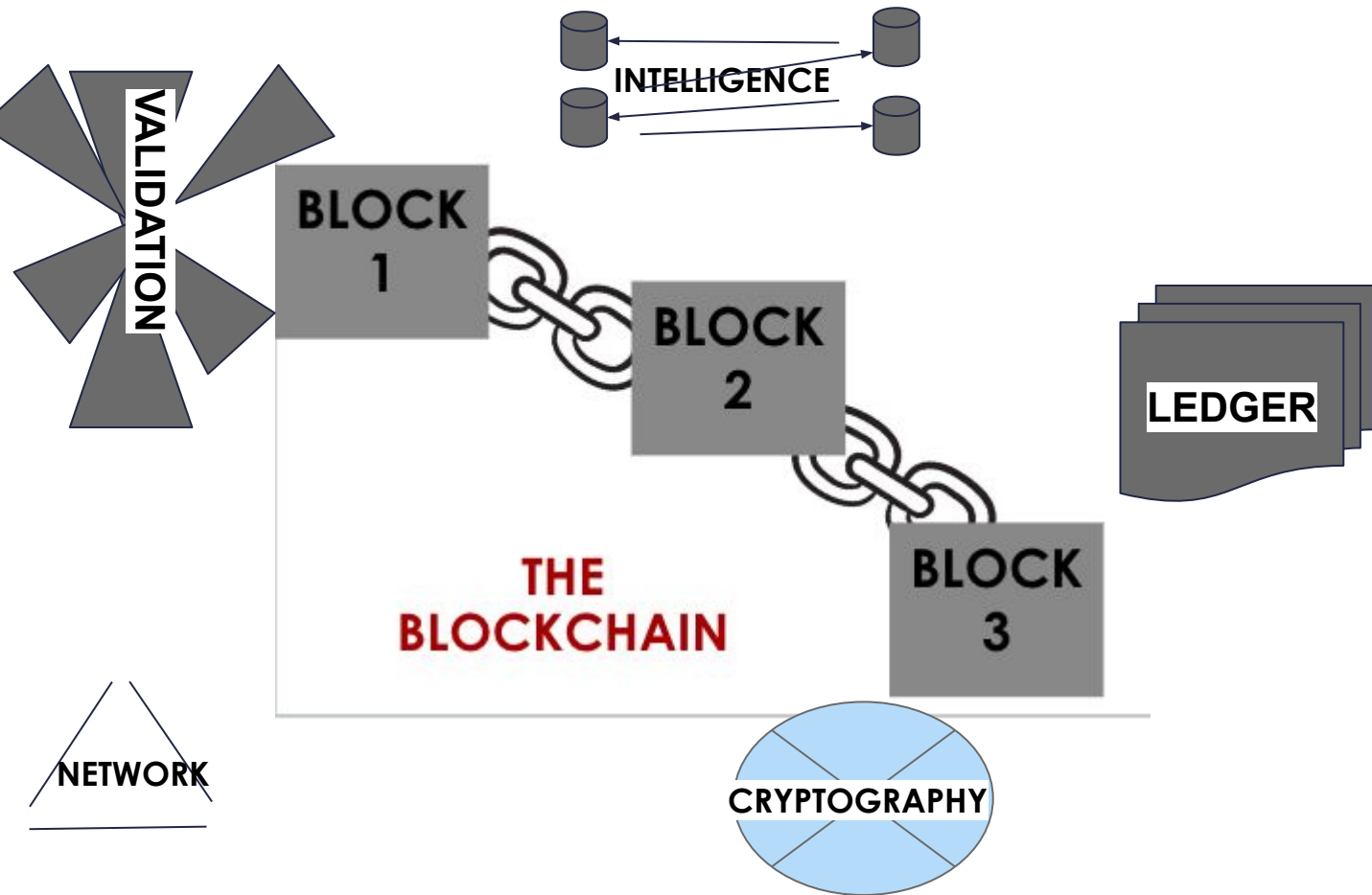## DATA NETWORK TRENDS LECTURE 4

1. **BLOCKCHAIN DEFINITION**

BOSNs

BLOCK 1

BLOCK 2

BLOCK 3

THE BLOCKCHAIN

- Sequence of block transactions

an

corruptible digital ledger programmable

immuta

-Does not require external authority

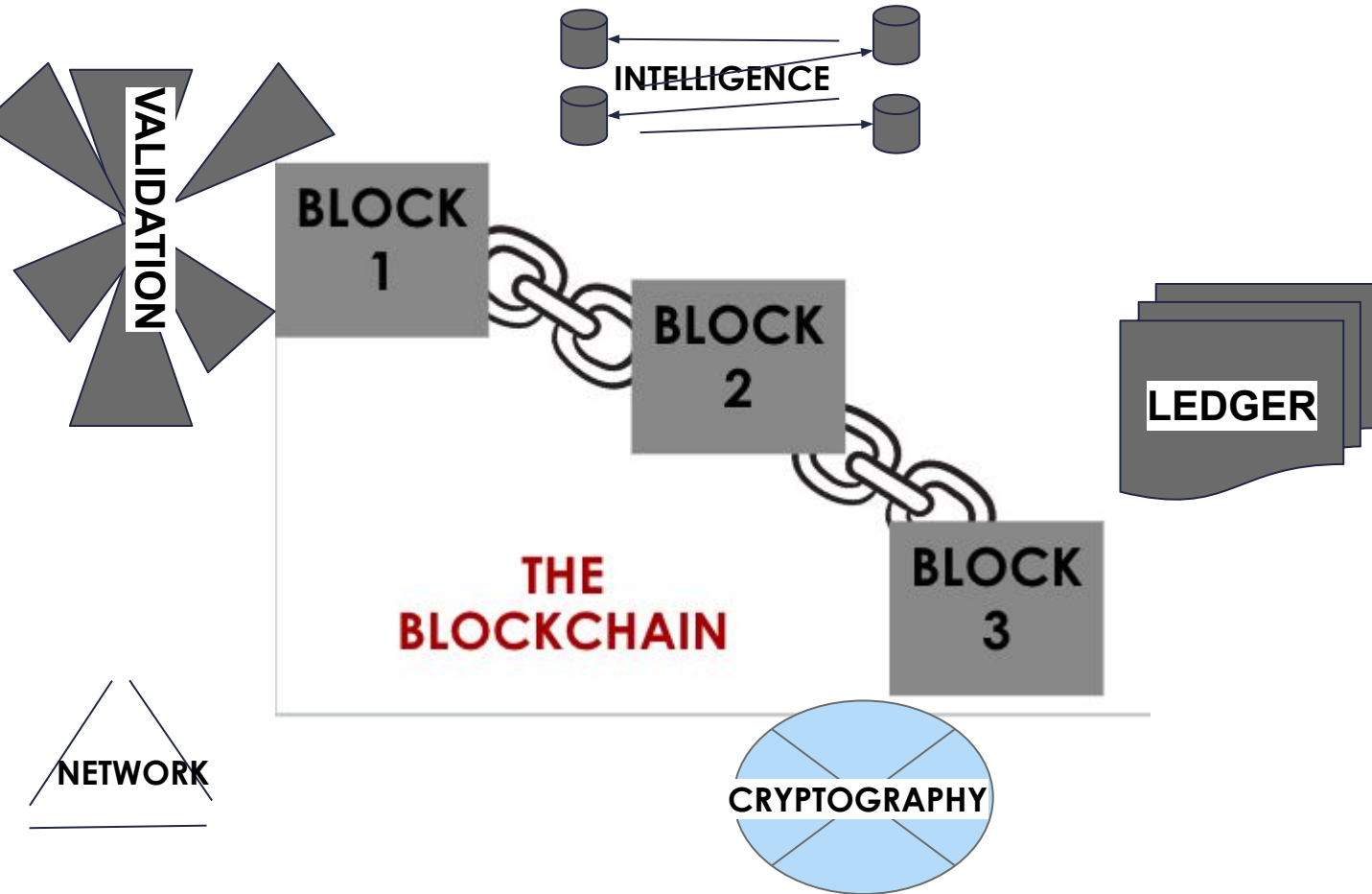## DATA NETWORK TRENDS LECTURE 4

1. BLOCKCHAIN ARCHITECTURE

BOSNs

VALIDATION

INTELLIGENCE

BLOCK 1

BLOCK 2

LEDGER

THE BLOCKCHAIN

BLOCK 3

NETWORK

CRYPTOGRAPHY

- Cryptography

- Ledger

- Network

- Smart Intelligent Mechanisms

- Validation

DATA NETWORK TRENDS LECTURE 4

1. **BLOCKCHAIN ARCHITECTURE**

BOSNs

INTELLIGENCE

VALIDATION

BLOCK 1

BLOCK 2

LEDGER

THE BLOCKCHAIN

BLOCK 3

NETWORK

CRYPTOGRAPHY

-**K**ey basics:-

- Cryptography
  unique identifiers for blocks

- Ledger
  unmodifiable

- Network

-Every user has a copy

-Spread information   to all users
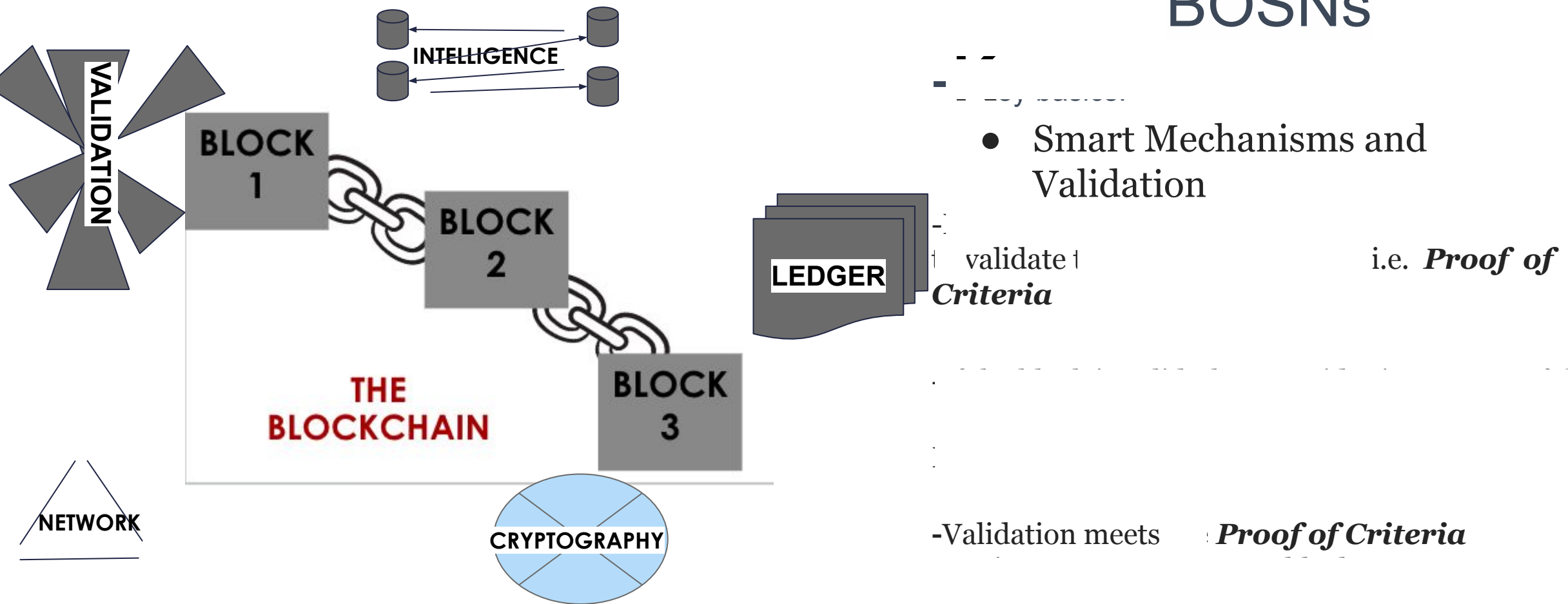
DATA NETWORK TRENDS LECTURE 4
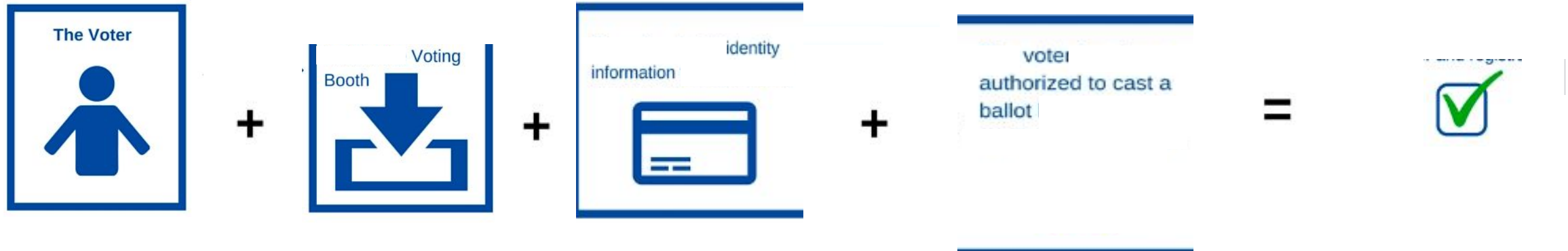
1. BLOCKCHAIN ARCHITECTURE

BOSNs

- Smart Mechanisms and Validation

LEDGER

validate i.e. **Proof of Criteria**

-Validation meets **Proof of Criteria**

DATA NETWORK TRENDS LECTURE 4

Voting

- **voter**

- **I.D.**

- **REGISTRATION TO VOTE**

- **Verification**

- **Ballot (wrong/right)**

- **Registrar**

- **Security**

- **Voting**

- **(Print Receipt) Proof of Vote**

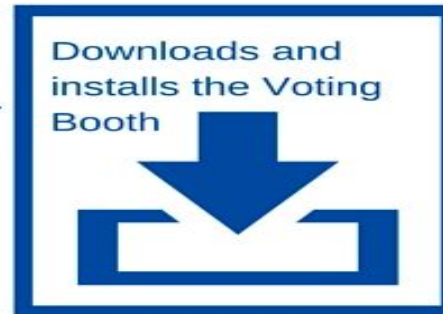## DATA NETWORK TRENDS LECTURE 4

Blockchain Voting

DATA NETWORK TRENDS LECTURE 4

DATA NETWORK TRENDS LECTURE 4

DATA NETWORK TRENDS LECTURE 4

Blockchain Voting

The voter then votes and submits their ballot to a secure blockchain based ballot box, while retaining anonymity and ballot secrecy.
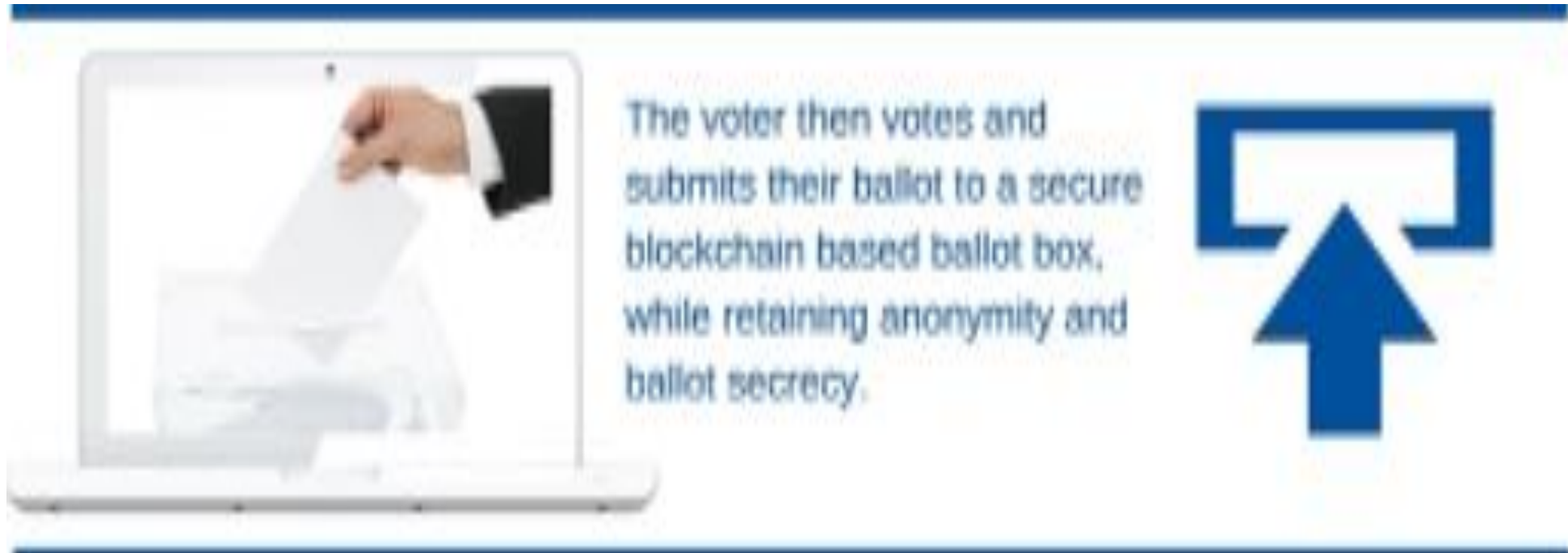
DATA NETWORK TRENDS LECTURE 4

Blockchain Voting

If a voter changes their mind, they have the ability to change their vote at anytime in the days leading up to the election.

(Election officials can decide to turn off or on this capability depending on laws and election rules)

DATA NETWORK TRENDS LECTURE 4

Blockchain Voting

Using their vote account, the voter can go into the ballot box and verify for themselves that their vote was cast as intended. The Voter can even audit each ballot in the ballot box to confirm the election results are accurate. All while retaining privacy and top level security

QUESTION & ANSWER SESSION

ANY QUESTIONS ?

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