ICT:
Emerging Technological Trends and Society

TuK

Btech IT/CT/CCN Year IV term 3

002: COMPUTER H/W & S/W EMERGING TRENDS AND TECHNOLOGICAL ADVANCES

SUBJECT CODE: ECII/ECSI/ECCI 4204

AIMS & OBJECTIVES

- **AIMS & OBJECTIVES**

1) To study present and future **TRENDS** in traditional, current and future memory, **storage, processor** and **internet connectivity technology**

2) To learn present and future trajectories of growth projected **for** emerging **trend in memory, storage, processors and internet connectivity technology**

3) To identify and explain the present and future characteristics, **advantages and disadvantages** of computing growth trends for **memory, storage, processors and internet connectivity technology**

4) To discuss the social and ethical implications on society related to **trends in memory, storage, processors and internet connectivity technology**

LECTURE OUTLINE

1) introduction to topic:- why study **computer h/w & s/w & internet connectivity emerging trends and technological advances?**
2) Present & future computer software trends
3) Present & future computer memory & Data storage trends
4) Present & future computer Processor trends
5) Q & A

COMPUTER AND I.T. TRENDS

http://elearning.tukenya.ac.ke

RECOMMENDED READING CHAPTER FROM RECOMMENDED BOOK

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

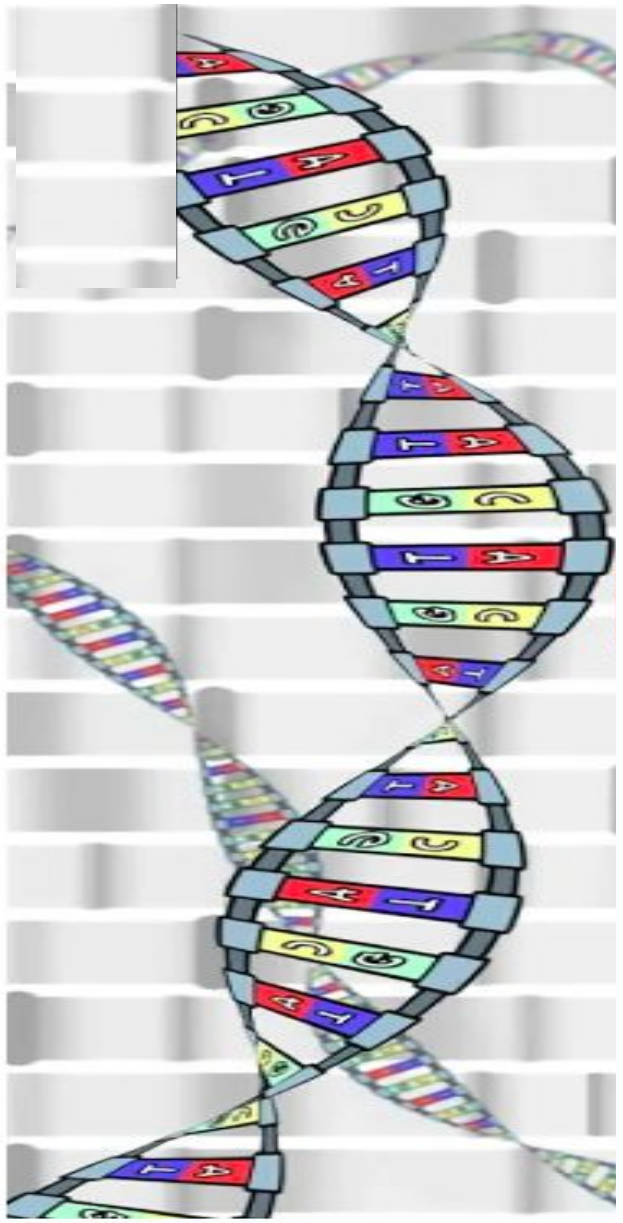
7. Messerly, John G. "I'm glad the future doesn't need us: a critique of Joy's pessimistic futurism" ACM SIGCAS Computers and Society, Volume 33, Issue 2, 2003

LECTURE OVERVIEW

1. Lecture Aims & Objectives
2. Lecture Outline
3. Recommended chapter from recommended reading list
4. Lecture Topic
5. Q&A

DATA STORAGE TRENDS FOR THE FUTURE

1) DNA (de-oxy-ribo-nucleic-acid) DATA STORAGE



- In humans

-High density(store all the world's data)

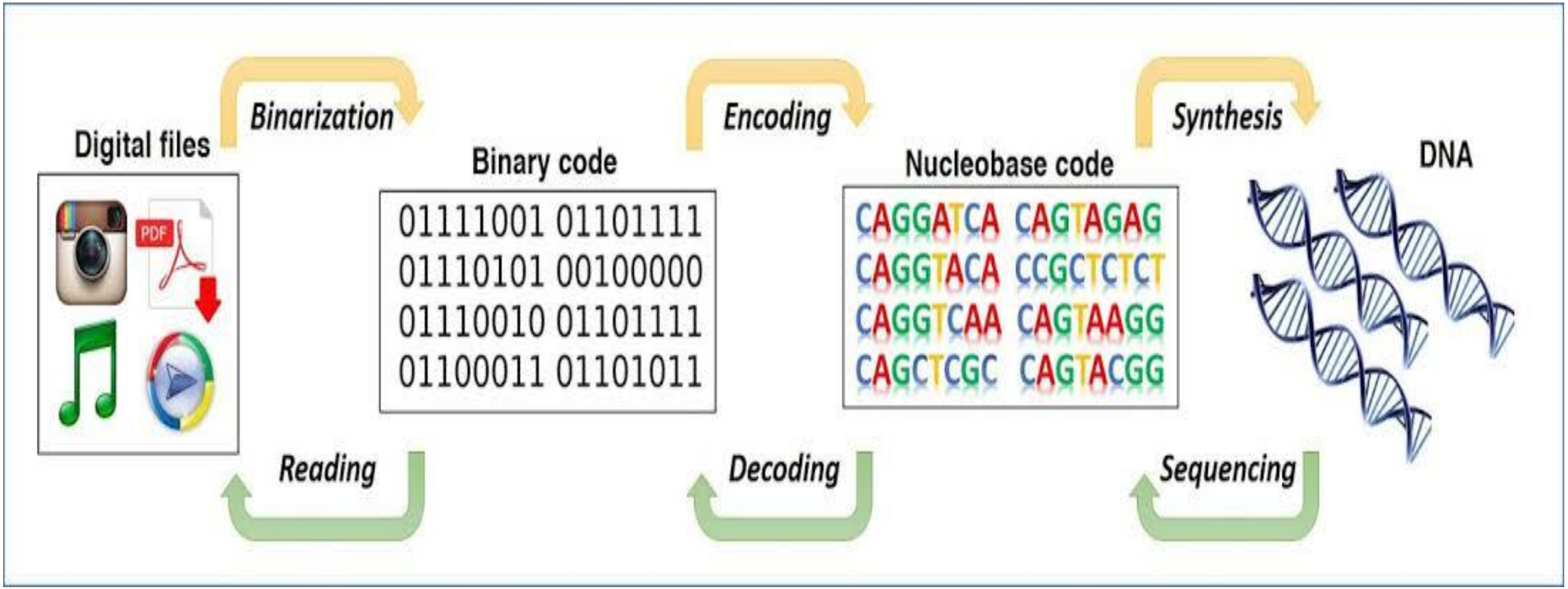
- DNA genetic information (not in binary) nucleotide bases A, C, G, T

-2012 DNA teaspoon size encoded with:

(i)images
ii)HTML
iii) Program.

DATA STORAGE TRENDS FOR THE FUTURE

1) DNA (de-oxy-ribo-nucleic-acid) DATA STORAGE



DATA STORAGE TRENDS FOR THE FUTURE

1) DNA (de-oxy-ribo-nucleic-acid) DATA STORAGE

ADVANTAGES

-Space

-Long-term

Heat & humidity comparison

DISADVANTAGE

-Long read and write;

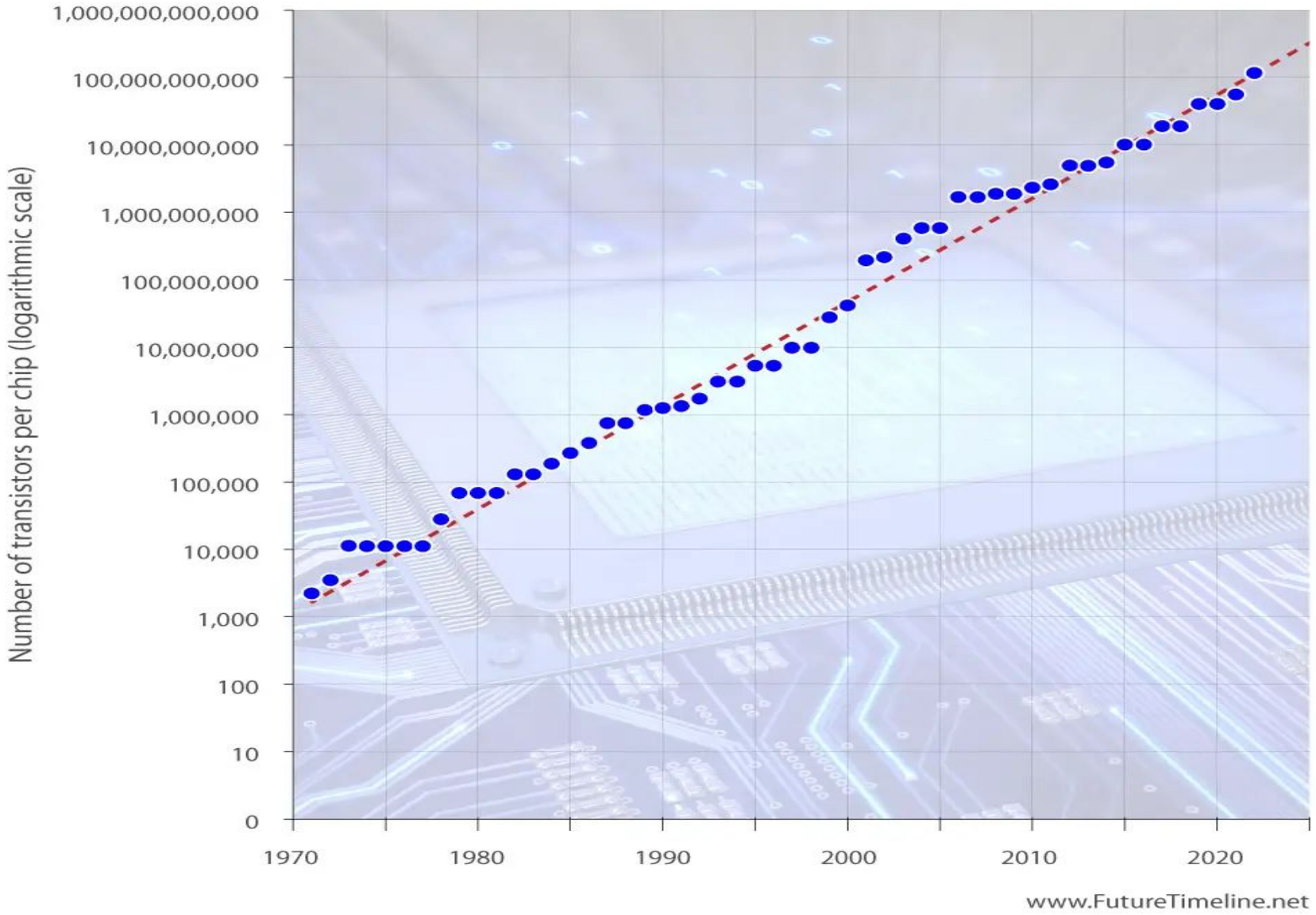
-Expensive

PAST AND CURRENT PROCESSOR TRENDS

MOORE'S "LAW" 19TH CENTURY Vs MOORE's LAW 21ST CENTURY

- **Observation**
- **Pack in power**
- **Ending:- once every 2.5- 3 years**

MOORE'S LAW GRAPH 21st CENTURY



- **1 billion + transistors**
- **IC complexity slowly ending:-**

  -Physical characteristics,

  -Costs: equipment & fabricate

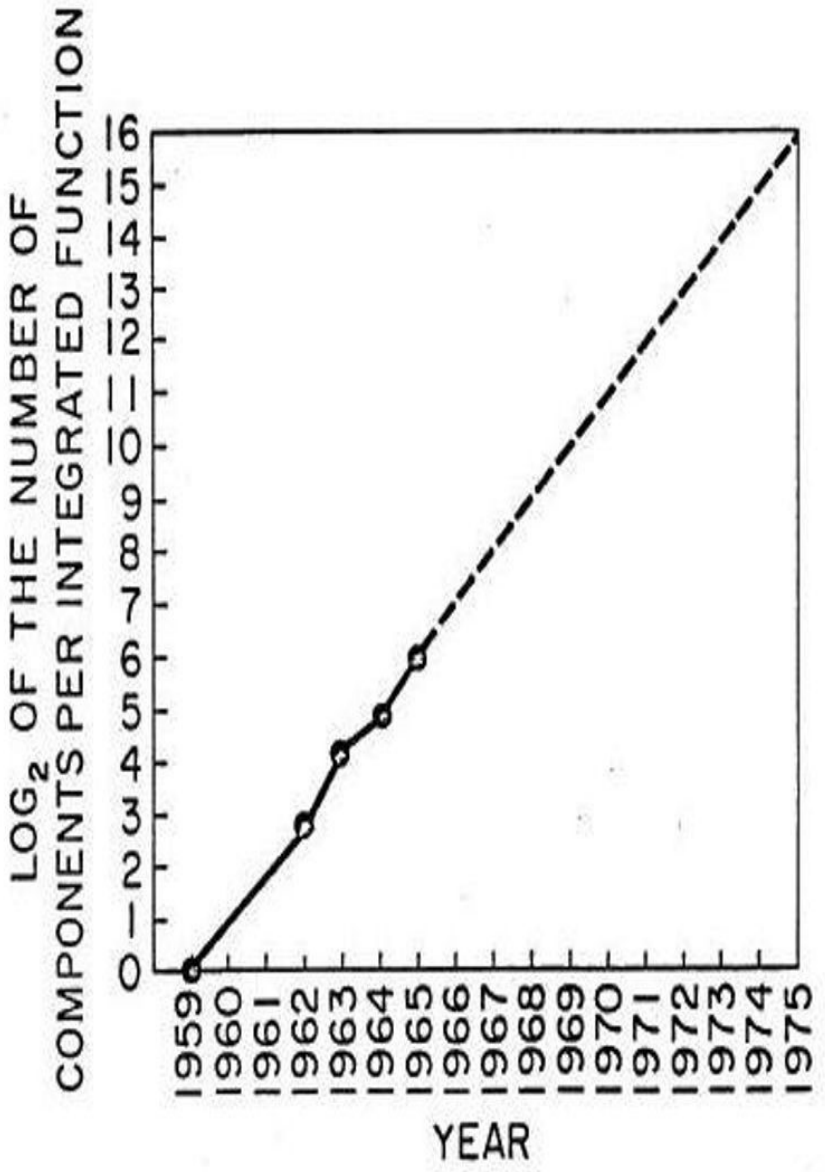
PAST AND CURRENT PROCESSOR TRENDS

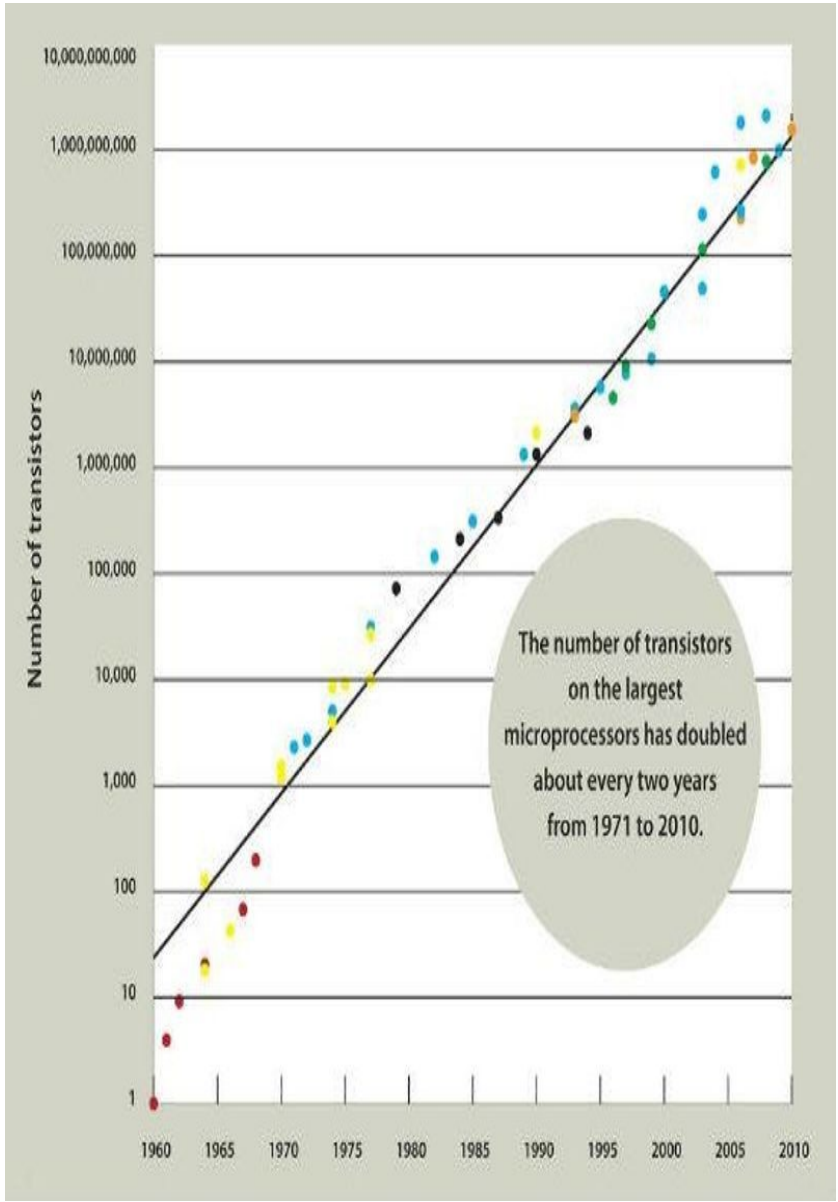
MOORE'S "LAW" 19TH CENTURY Vs MOORE's LAW 21ST CENTURY

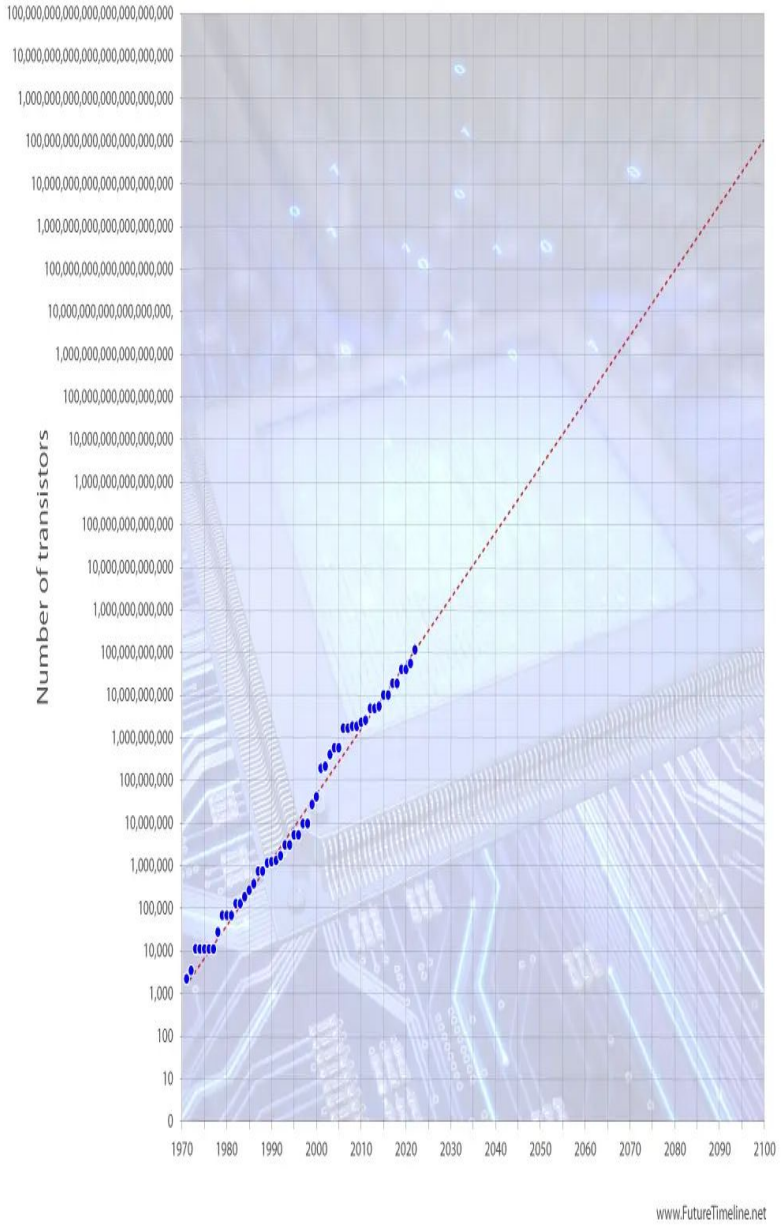
WHY IS IT ENDING?

- **Smaller, more transistors.**
- **Better performance**
- **Temperature & Cooling.**
- **Multiple-core chips**
- **No clocking faster:- Laws of physics.**

MOORE'S LAW GRAPH 21st CENTURY







UNDERSTANDING THE CORES:-HOW PROCESSORS LOOKED IN 21st CENTURY

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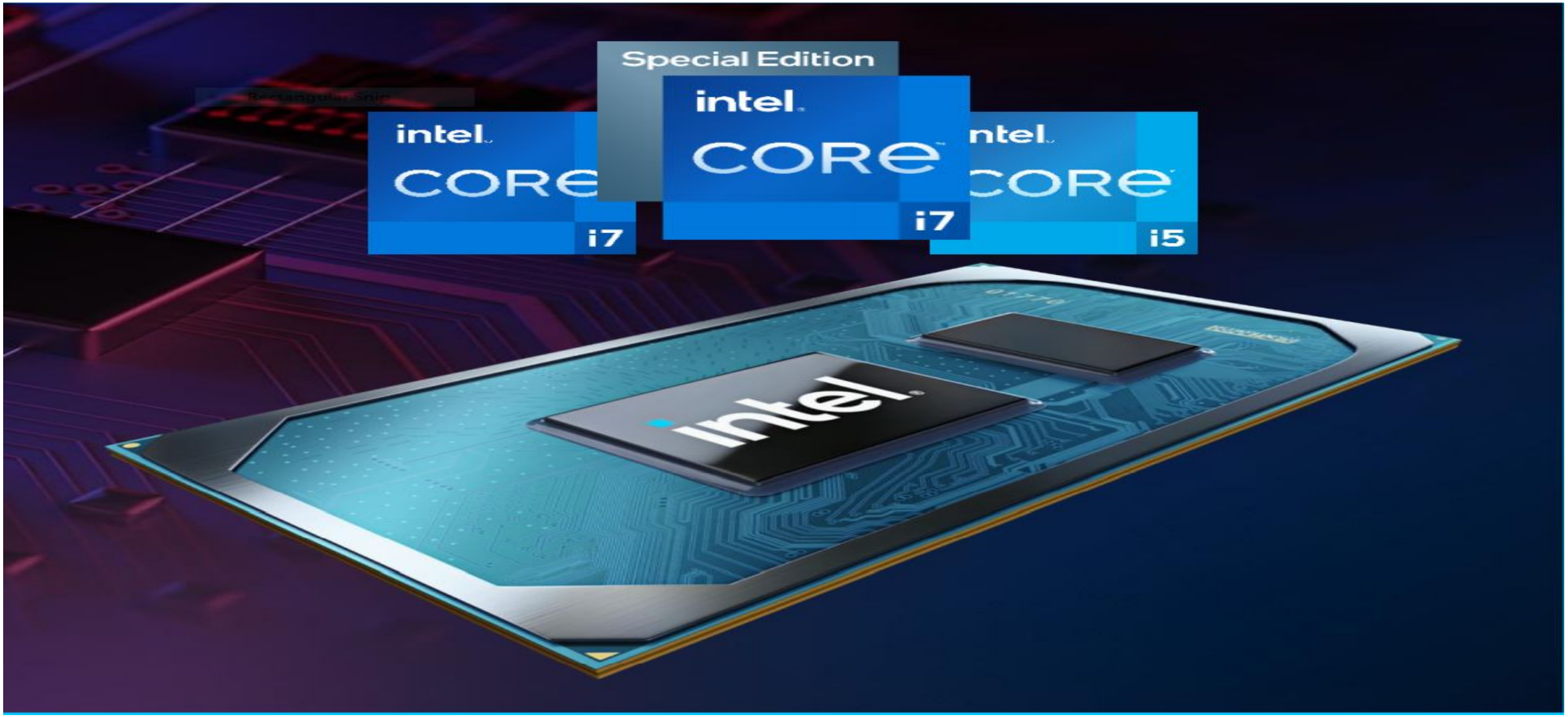

UNDERSTANDING THE CORES:-INTEL FAMILY GENERATION LINE

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UNDERSTANDING INTEL GENERATIONS FAMILY LINE

- 1st Generation Nehalem

  2010
- 2nd Generation Sandy Bridge

  2011
- 3rd Generation Ivy Bridge

  2012
- 4th Generation Haswell

  2013
- 5th Generation Broadwell

2015
- 6th Generation Skylake

2015
- 7th Generation Kaby Lake

2016
- 8th Generation Kaby Lake ‘R’

2017
- 9th Generation Coffee Lake

2017

UNDERSTANDING THE CORES:-PROCESSORS

UNDERSTANDING INTEL GENERATIONS FAMILY LINE

- 10th Generation Canon Lake/Ice Lake

2017/2018

- 11th Generation Tiger Lake (Intel).....2019-2020 I-core 9 or i core 11,
- nanometer architecture process of 7nm or 5nm,
- DDR 6 L4 or L5 Cache (RAM)
- speed of processing 5x 10TH GEN

- 12th Generation Sapphire Rapids 2021-?

UNDERSTANDING INTEL GENERATIONS FAMILY LINE

- **11th Generation Tiger Lake Intel processor microarchitecture**

-3rd Gen 10-nm transistor.

-30% performance compared to Cannon Lake

-New L4 cache (performance)

PROCESSORS

UNDERSTANDING INTEL GENERATIONS FAMILY LINE

- **12th Generation Sapphire Rapids Intel processor micro-architecture**

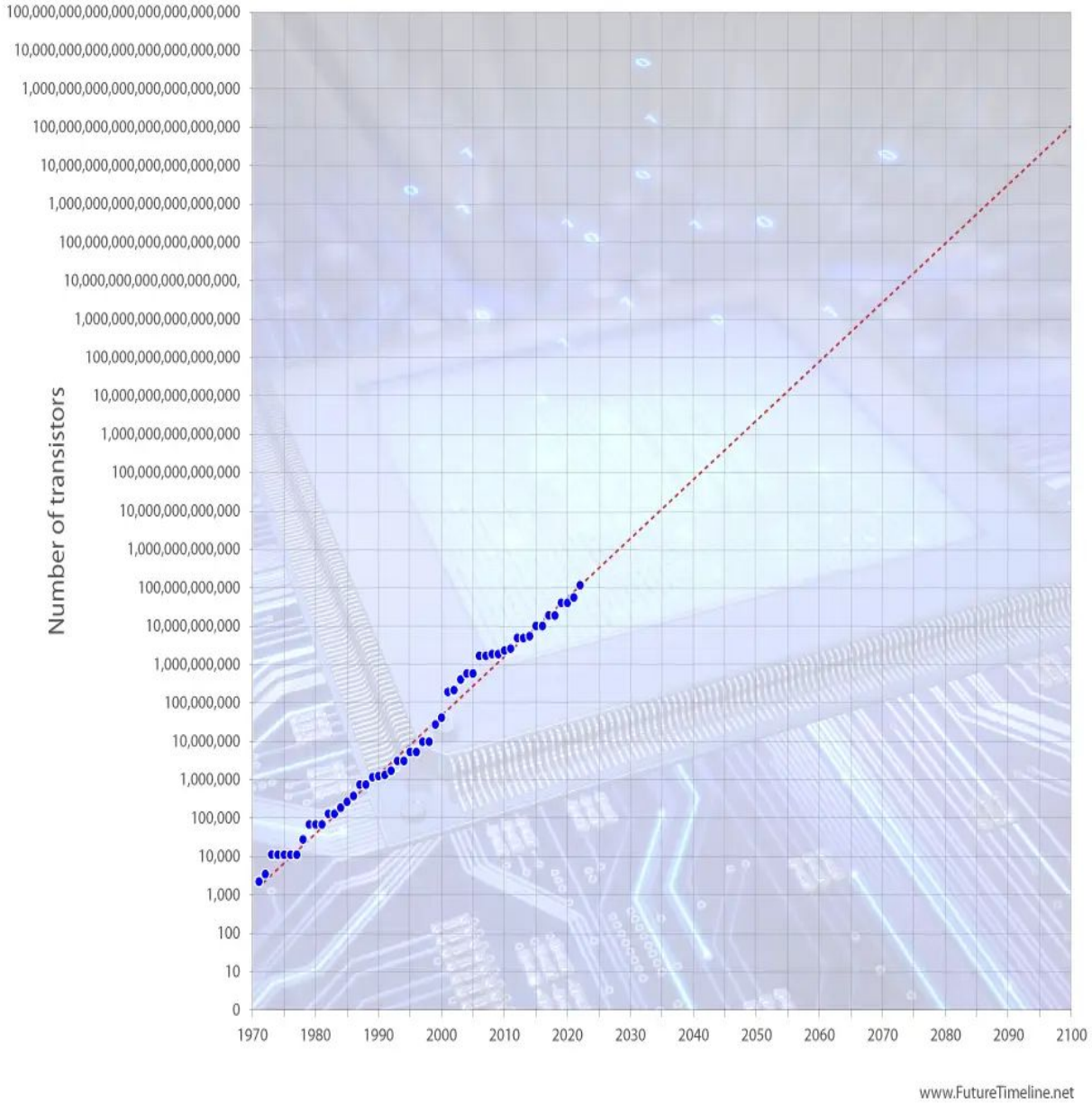
-Refinement 10-nm

-All-new (DDR5) RAM

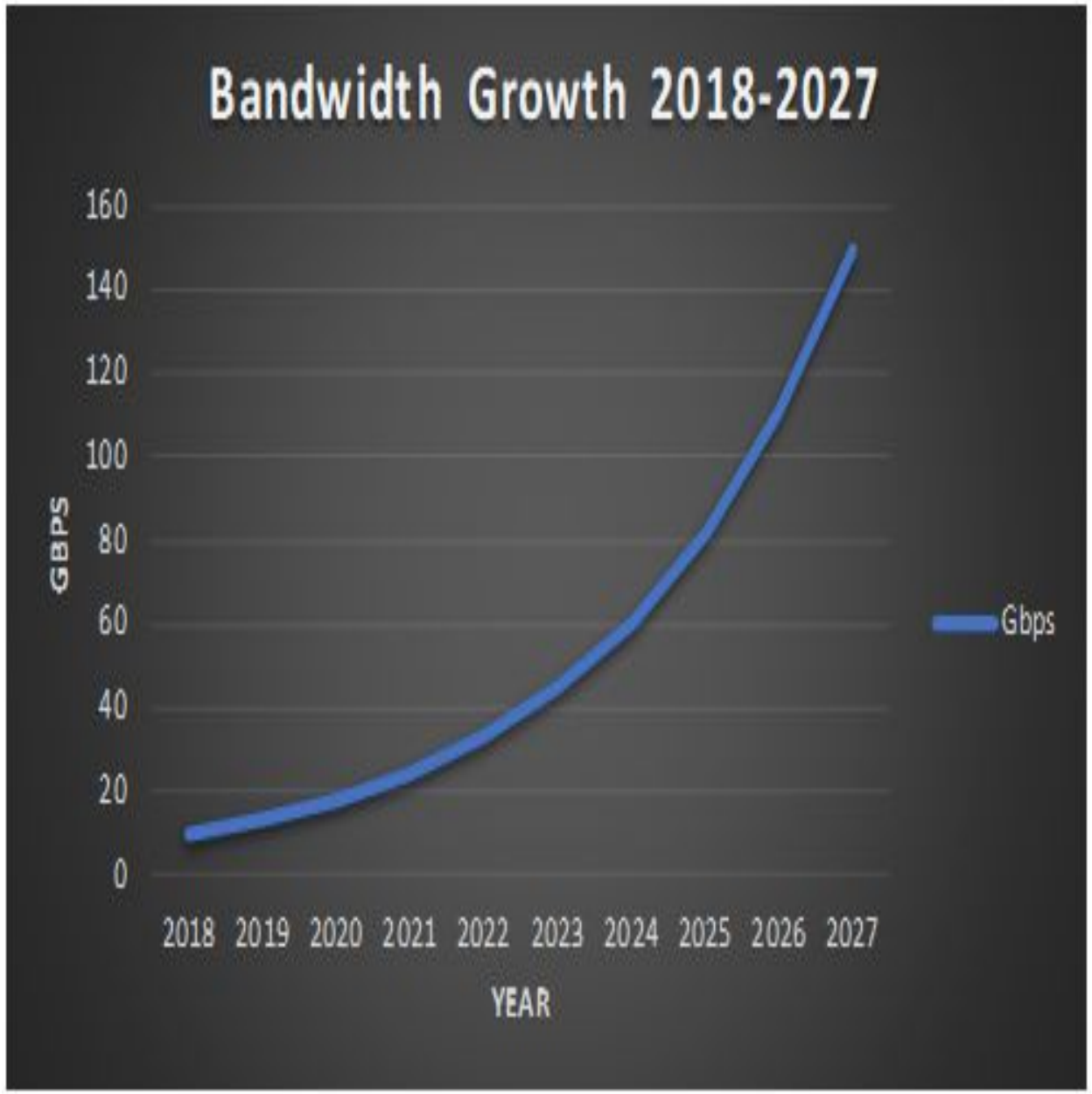
NIELSEN'S LAW OF INTERNET BANDWIDTH

- Bandwidth >>> 50% yearly, 10% <<< Moore's Law
- WHY?:-
  a. Conservatism of telecom companies,
  b. Users: money Vs bandwidth,
  c. User base:-
     a. Spread costs
     b. Telcos competition

MOORE'S LAW



NIELSEN'S LAW



QUESTION & ANSWER SESSION

ANY
QUESTIONS
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