



Powered by  
Arizona State University

# Upravljanje informacionim tehnologijama

**prof. dr Tomo Popović**

Septembar 2025

# Digitalna transformacija

- Integracija digitalne tehnologije u sve aspekte poslovnih procesa
  - Promjena načina poslovanja - transformacija
  - Nova perspektiva isporuke vrijednosti prema korisnicima



source: <https://enterprisersproject.com/>

# Digitalna transformacija

- Treba da razvijemo duboko razumijevanje **procesa**
- Vaš **projekat** treba da odgovori na **konkretan primjer potrebe i mogućnosti digitalne transformacije**
- Upoznavanje sa **projektima** koji se implementiraju **na UDG**
- Prezentacija projekta na završnoj **konferenciji** sredinom decembra.

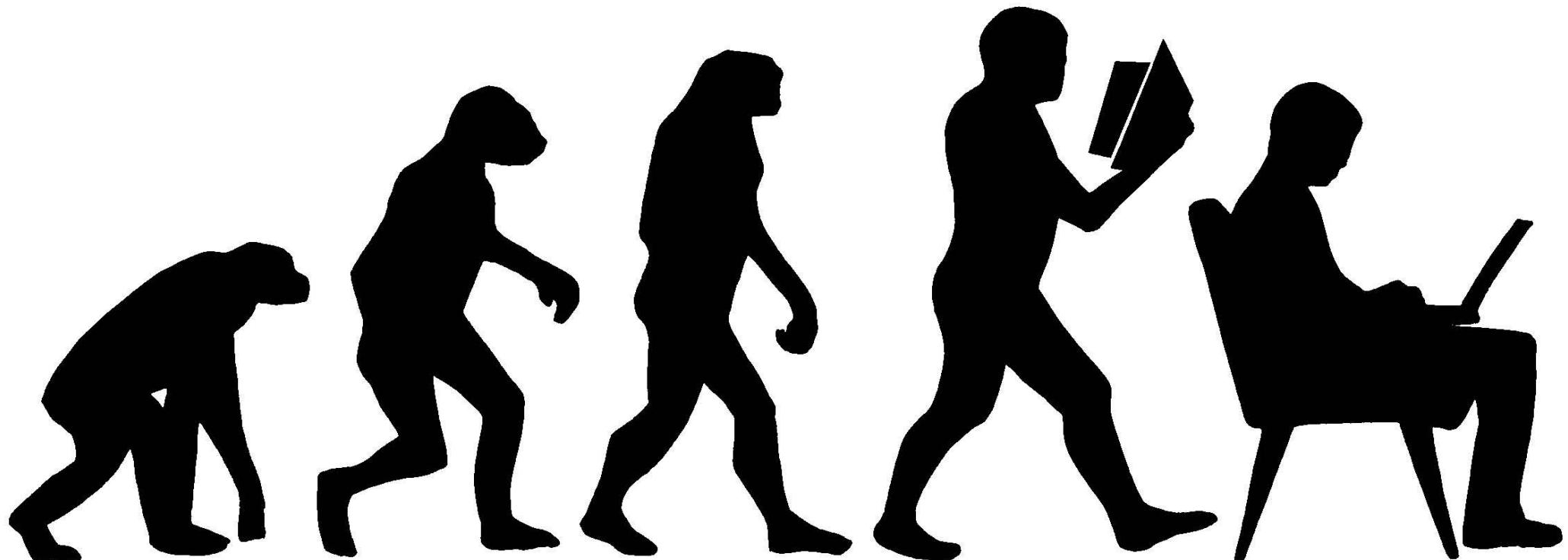
# Projekat

- High-performance computing (HPC)
- Vještakčka inteligencija/ Mašinsko učenje (AI/ML)
- Pitanja:
  1. Zašto je ovo bitno za nas - mene?
  2. Tehnički aspekti
  3. Poslovni aspekti / Digitalna transformacija

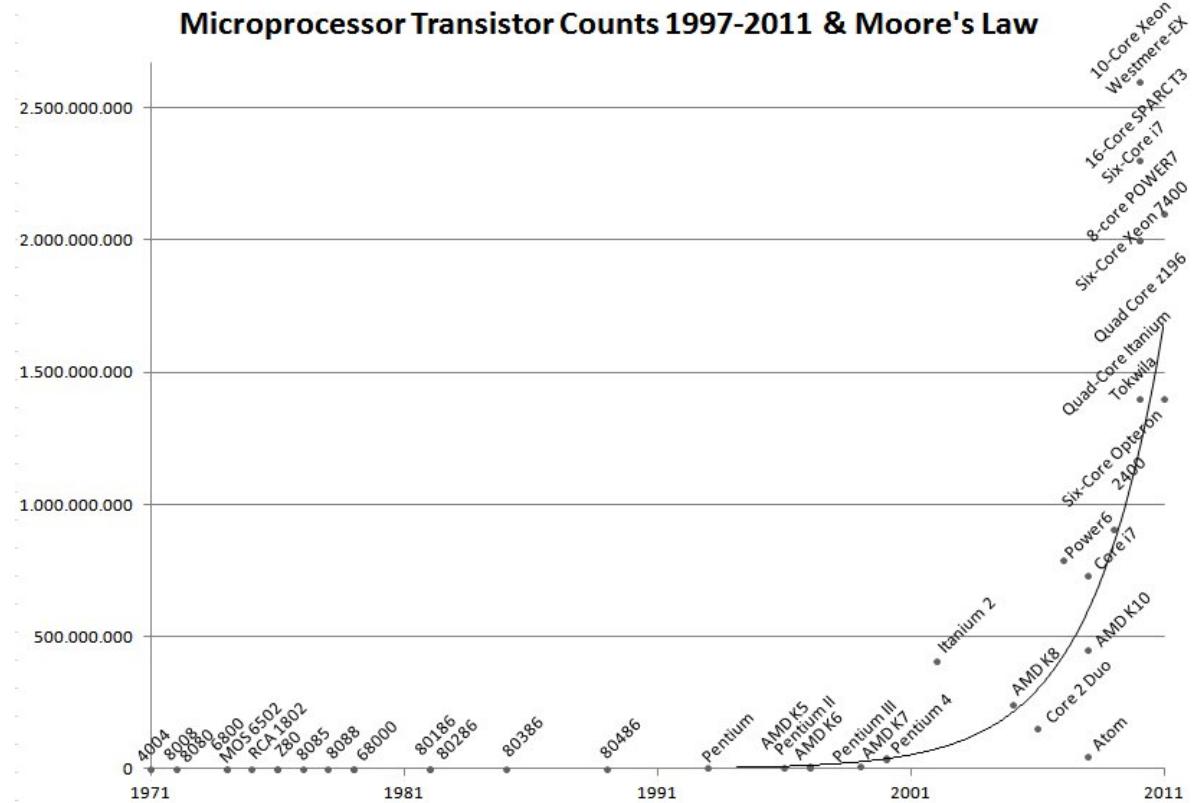
# Upravljanje informacionim tehnologijama

- Zašto nam je to bitno?
- Treba li ozbiljno da pristupim ovom predmetu?

# Informatičko-tehnološka (R)evolucija

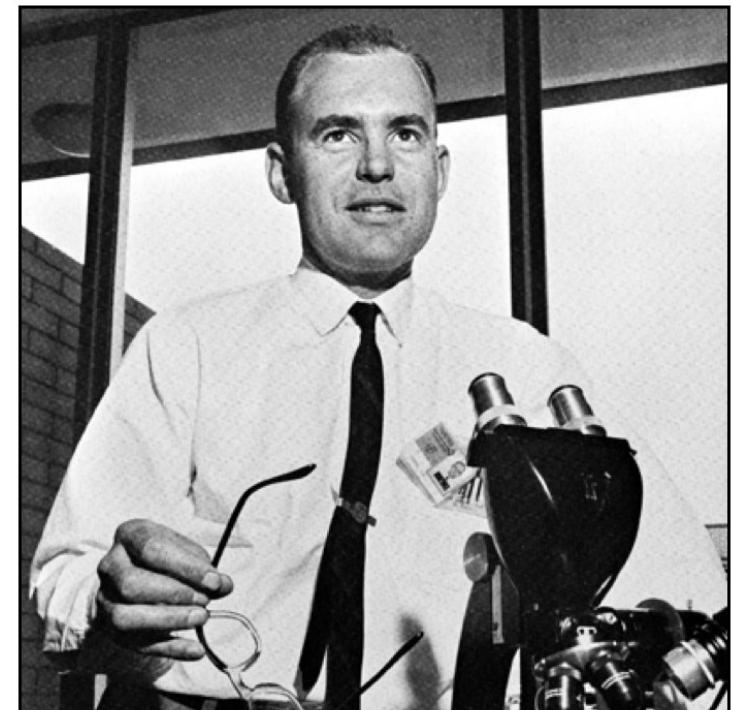


# Murov zakon



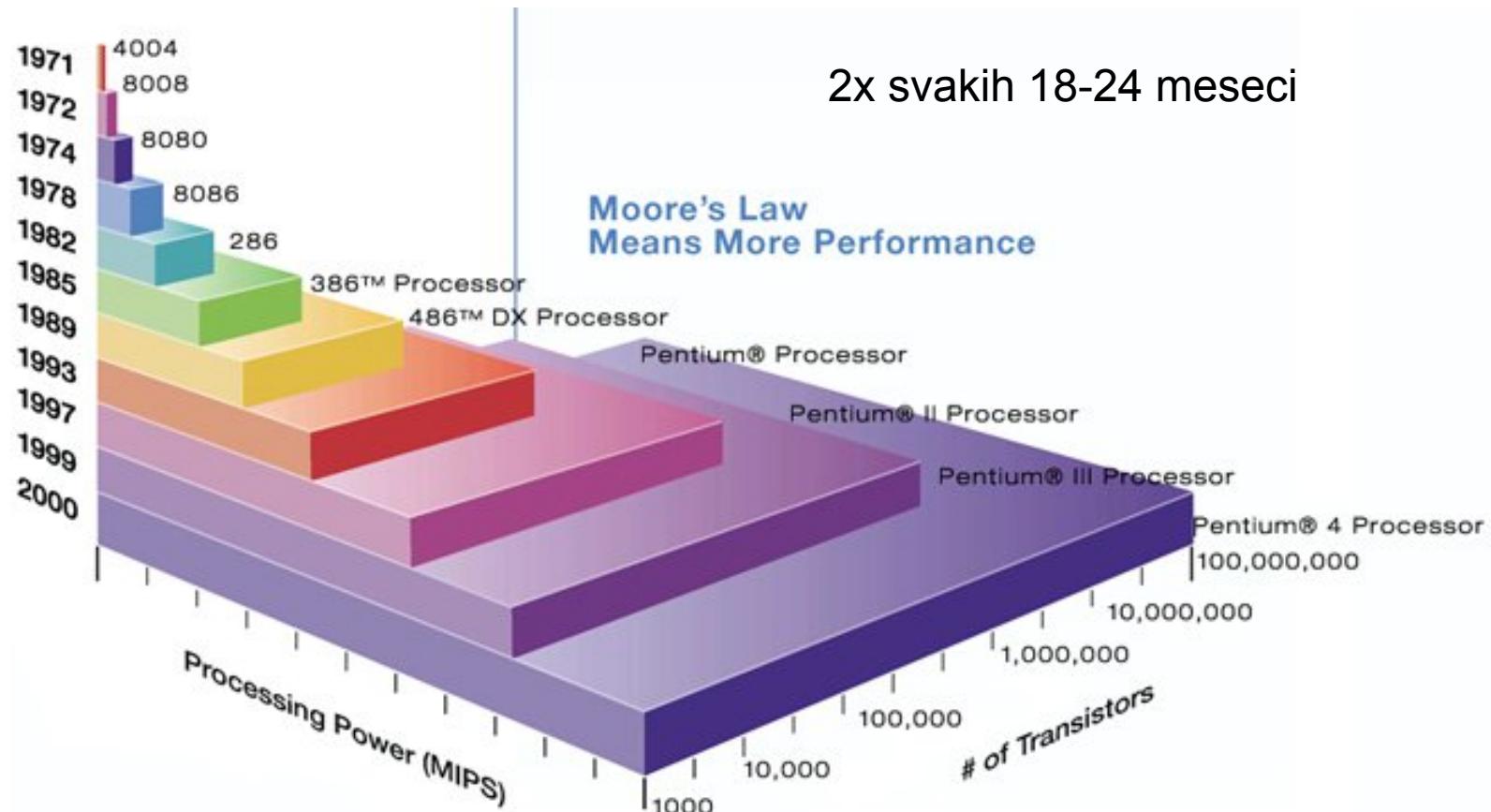
Moore, Gordon E. (1965) "Cramming more components onto integrated circuits", *Electronics*, April 19, 1965, pp 114-117

© 2025 Tomo Popovic, UDG



Izvor: [www.computerhistory.org](http://www.computerhistory.org)

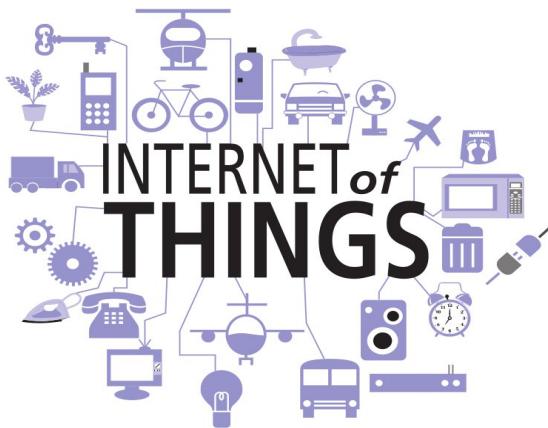
# Efekti Murovog zakona



Izvor: [software.intel.com](http://software.intel.com)

© 2025 Tomo Popovic, UDG

# IT megatrendovi



The diagram is a word cloud centered around the term "Social media". Other prominent words include "Family", "优士 XING", "Google+", "LinkedIn", "Social circles", "Wikipedia", "Customers", "Co-workers", "Friends", and "Business partners". The words are colored in various shades of red, blue, green, and yellow, and are arranged in a circular pattern around the central word.



# Linerano vs eksponencijalno

- 5 years, 32 times
- 10 years, 1000 times
- 20 years, 1000000 times
- 30 years, 1000000000 times
- **Singularity 2029-2045**



Izvor: Time Magazine

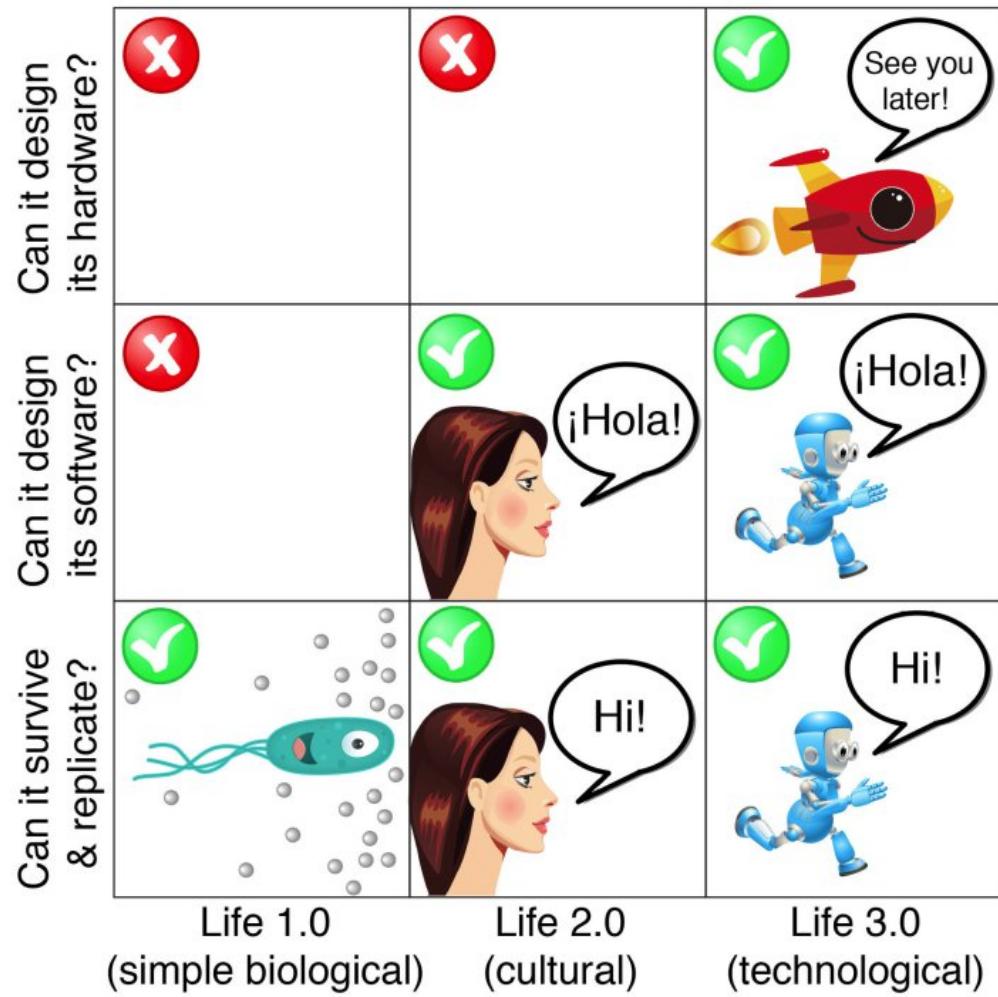
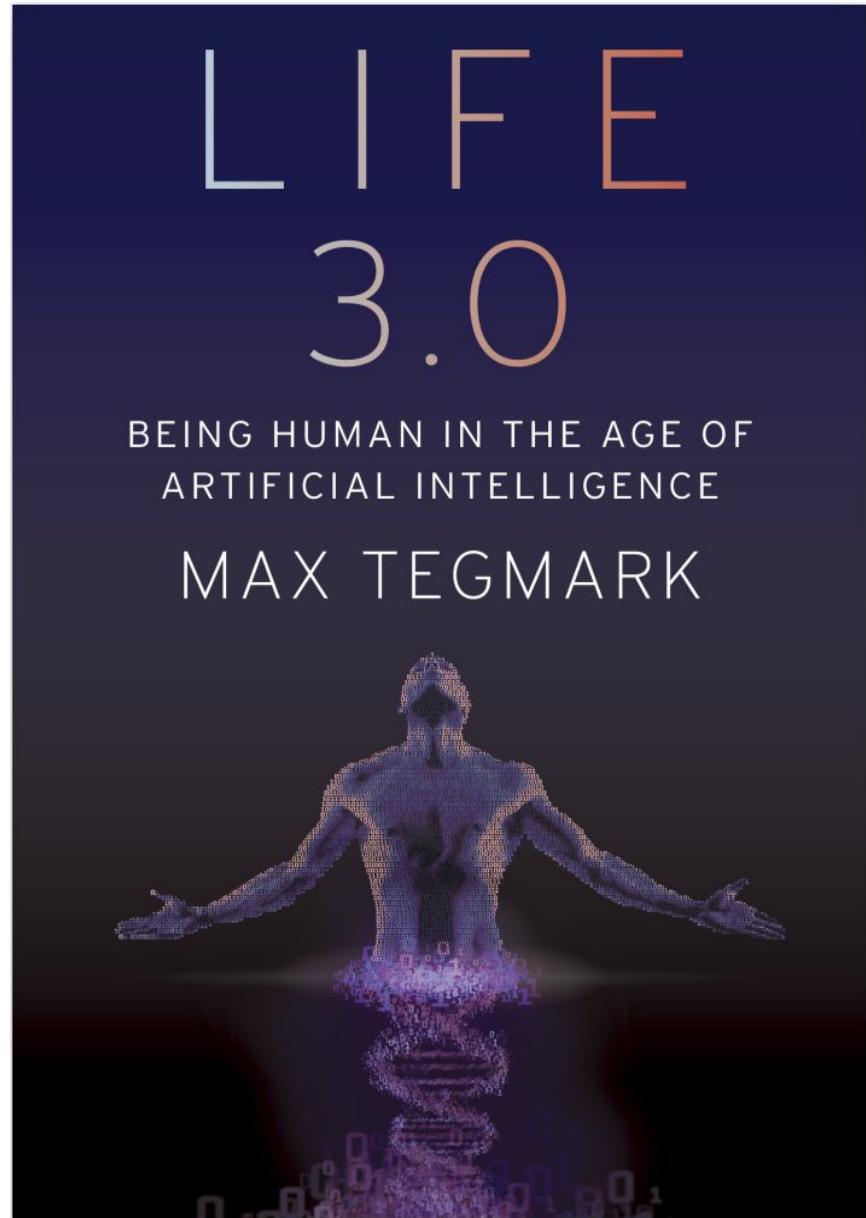


Figure 1.1: The three stages of life: biological evolution, cultural evolution and technological evolution. Life 1.0 is unable to redesign either its hardware or its software during its lifetime: both are determined by its DNA, and change only through evolution over many generations. In contrast, Life 2.0 can redesign much of its software: humans can learn complex new skills—for example, languages, sports and professions—and can fundamentally update their worldview and goals. Life 3.0, which doesn't yet exist on Earth, can dramatically redesign not only its software, but its hardware as well, rather than having to wait for it to gradually evolve over generations.



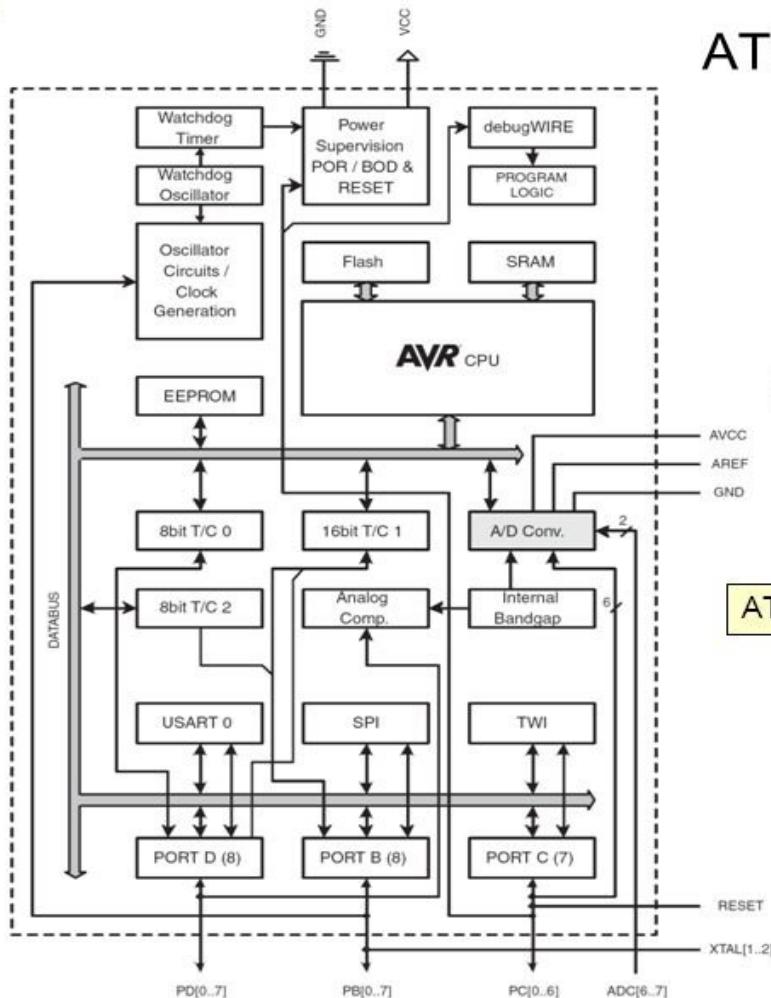
# Ugradivi sistemi (Embedded)

- Mikrokontroleri
- Programabilna logika (FPGA)
- SBC računari
- Akcenat na:
  - brzina
  - minijaturizacija
  - potrošnja energije



Source: Wikipedia

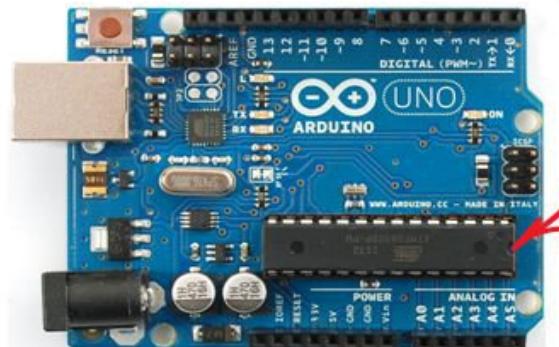
# Arduino familija



ATmega328 Internal Architecture

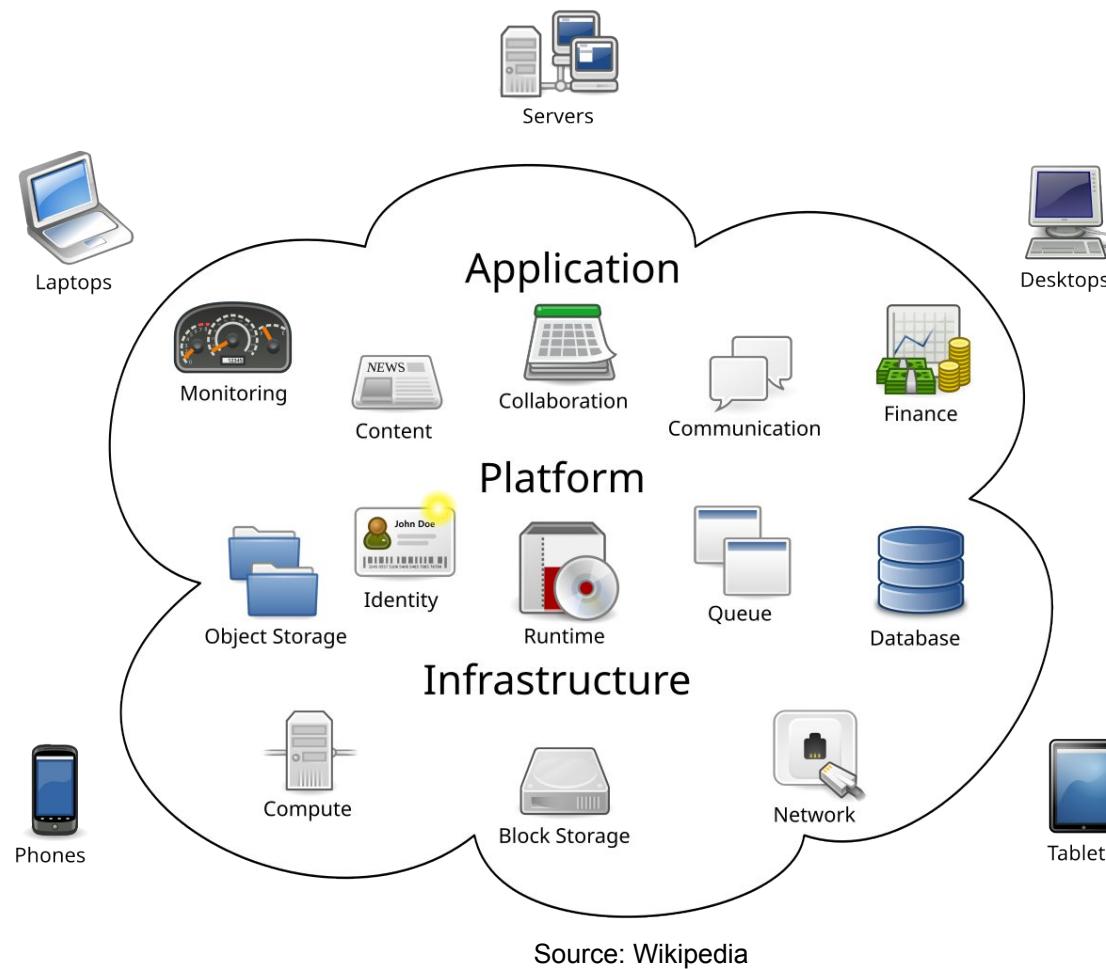
(PCINT14/RESET) PC6	1	28	PC5 (ADC5/SCL/PCINT13)
(PCINT16/RXD) PD0	2	27	PC4 (ADC4/SDA/PCINT12)
(PCINT17/TXD) PD1	3	26	PC3 (ADC3/PCINT11)
(PCINT18/INT0) PD2	4	25	PC2 (ADC2/PCINT10)
(PCINT19/OC2B/INT1) PD3	5	24	PC1 (ADC1/PCINT9)
(PCINT20/XCK/T0) PD4	6	23	PC0 (ADC0/PCINT8)
VCC	7	22	GND
GND	8	21	AREF
PCINT6/XTAL1/TOSC1) PB6	9	20	AVCC
PCINT7/XTAL2/TOSC2) PB7	10	19	PB5 (SCK/PCINT5)
(PCINT21/OC0B/T1) PD5	11	18	PB4 (MISO/PCINT4)
(PCINT22/OC0A/AIN0) PD6	12	17	PB3 (MOSI/OC2A/PCINT3)
(PCINT23/AIN1) PD7	13	16	PB2 (SS/OC1B/PCINT2)
(PCINT0/CLKO/ICP1) PB0	14	15	PB1 (OC1A/PCINT1)

ATmega328 data sheet pp. 2, 5



[http://www.adafruit.com/index.php?main\\_page=popup\\_image&pID=50](http://www.adafruit.com/index.php?main_page=popup_image&pID=50)

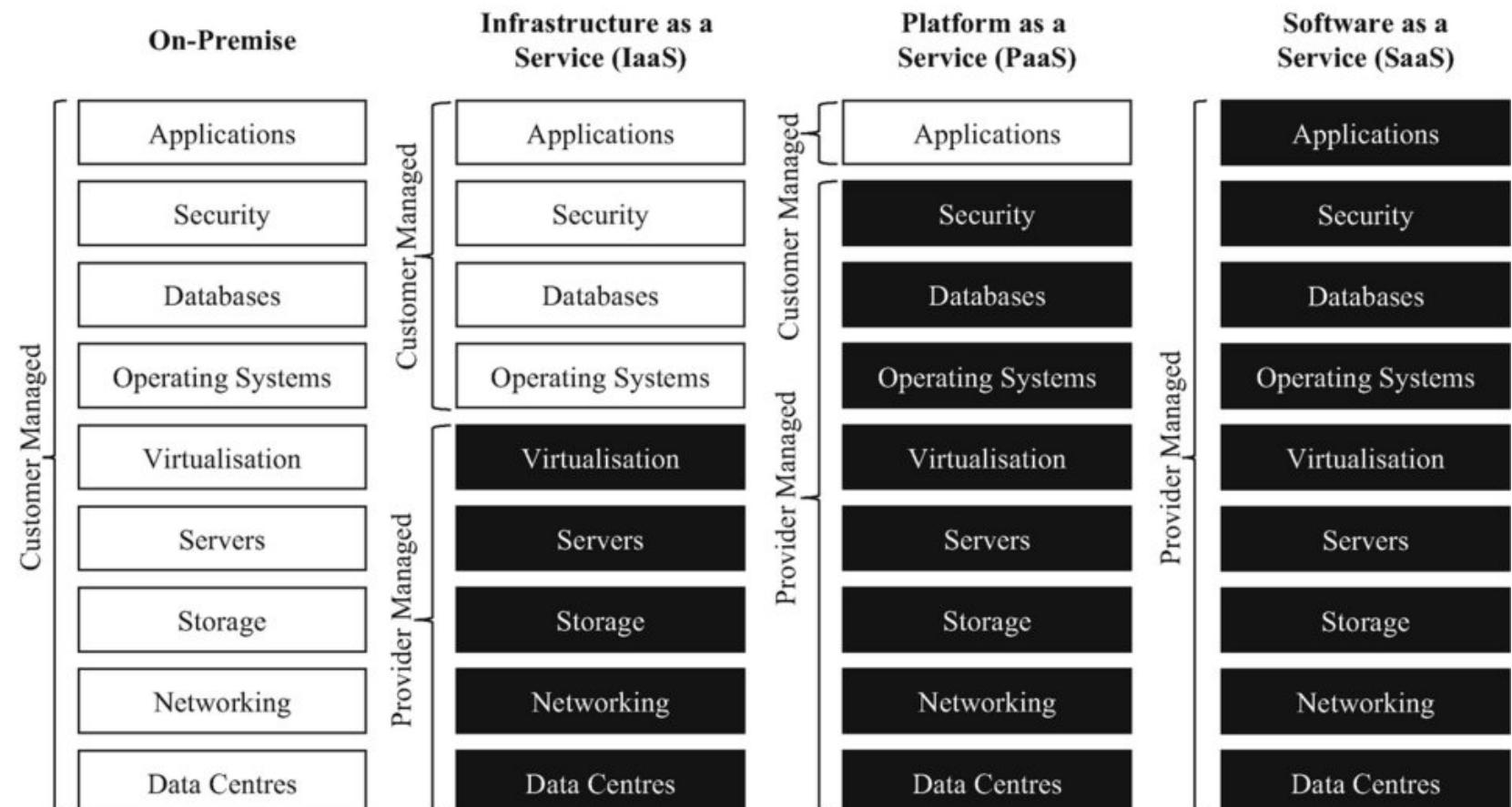
# Računarstvo u oblaku (Cloud)



# Računarstvo u oblaku (Cloud)

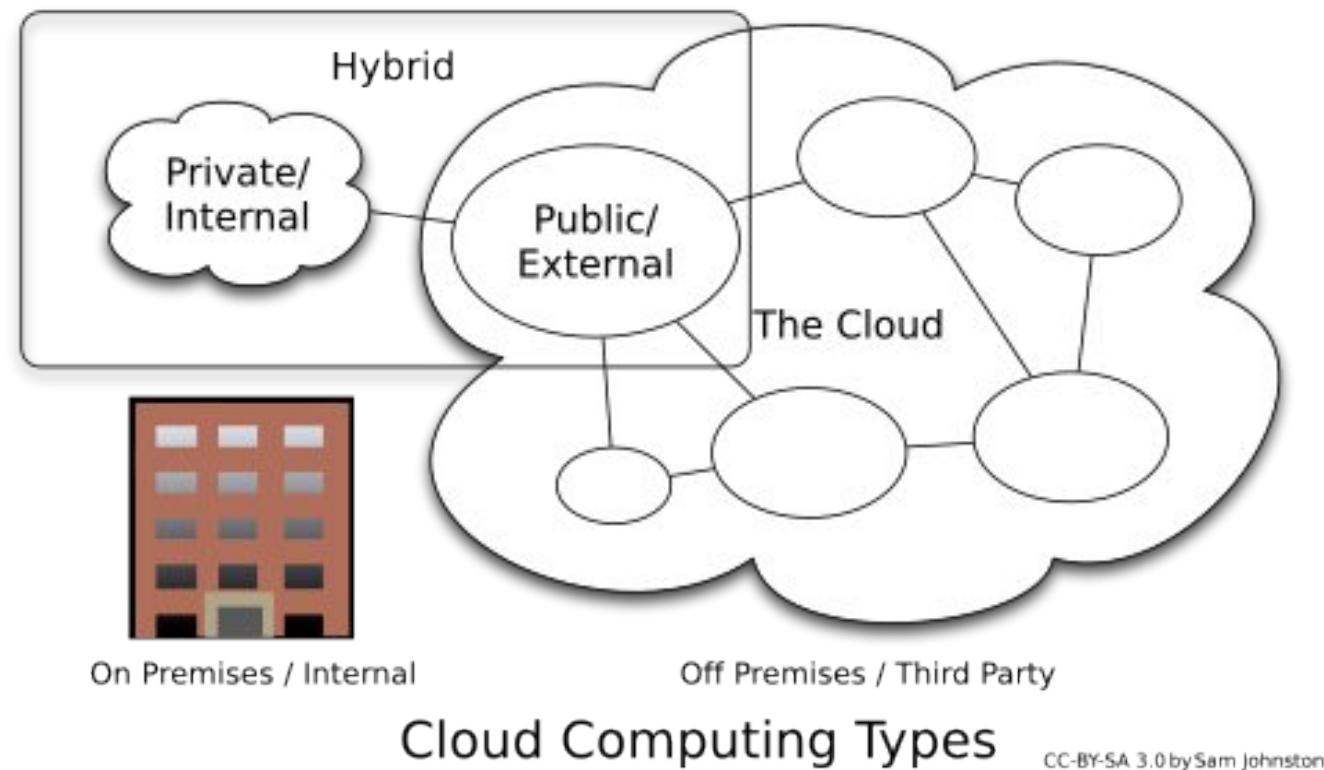
## Servisni modeli:

- IaaS
- PaaS
- SaaS

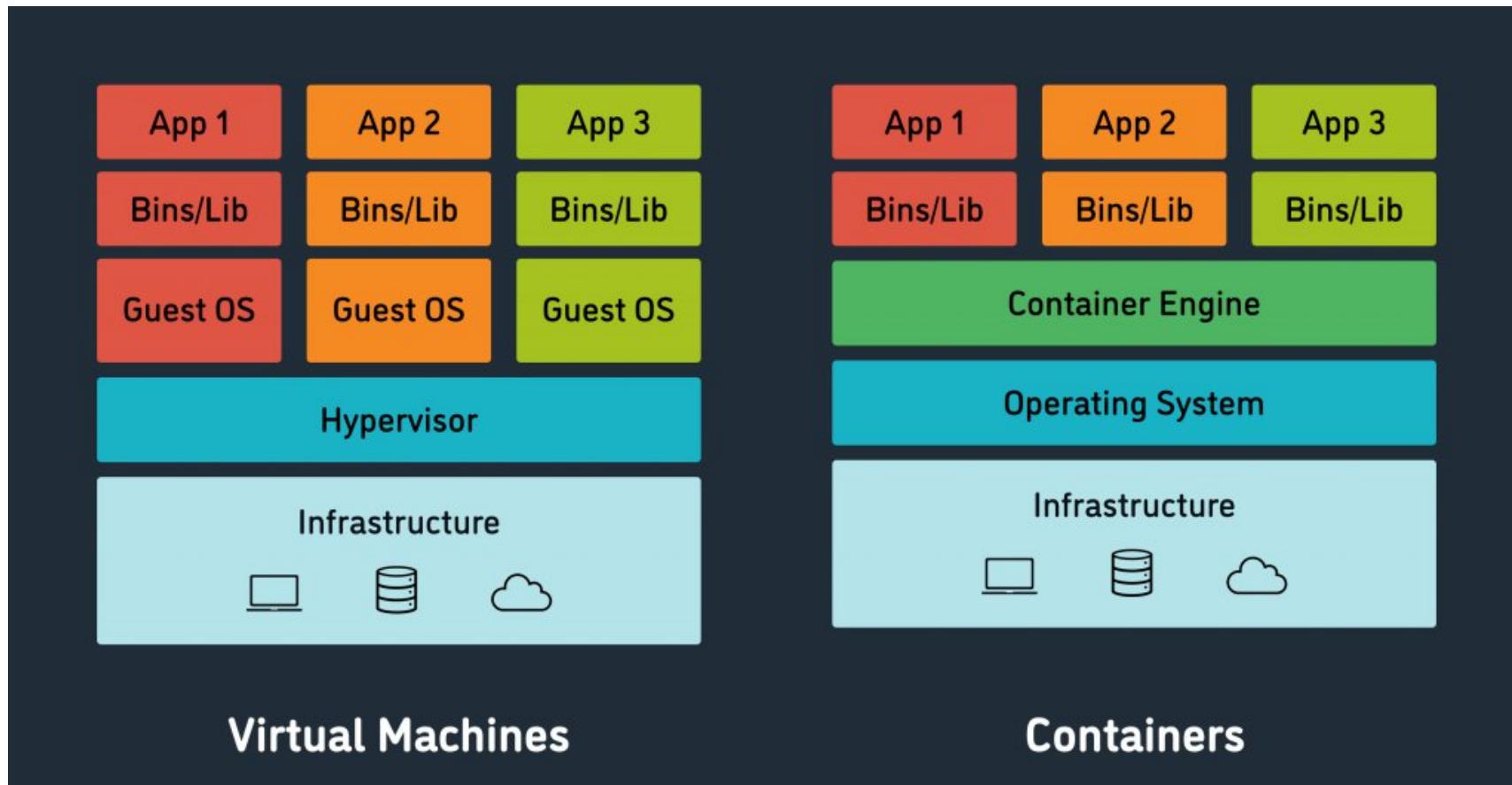


# Računarstvo u oblaku (Cloud)

- privatni
- javni
- hibridni



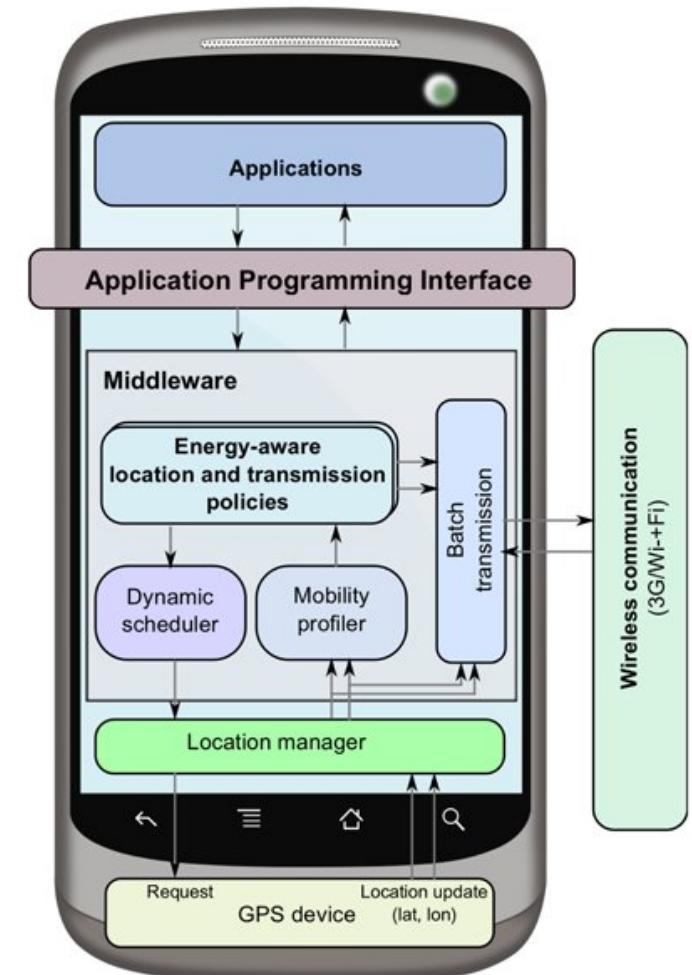
# Računarstvo u oblaku (Cloud) Hipervizori



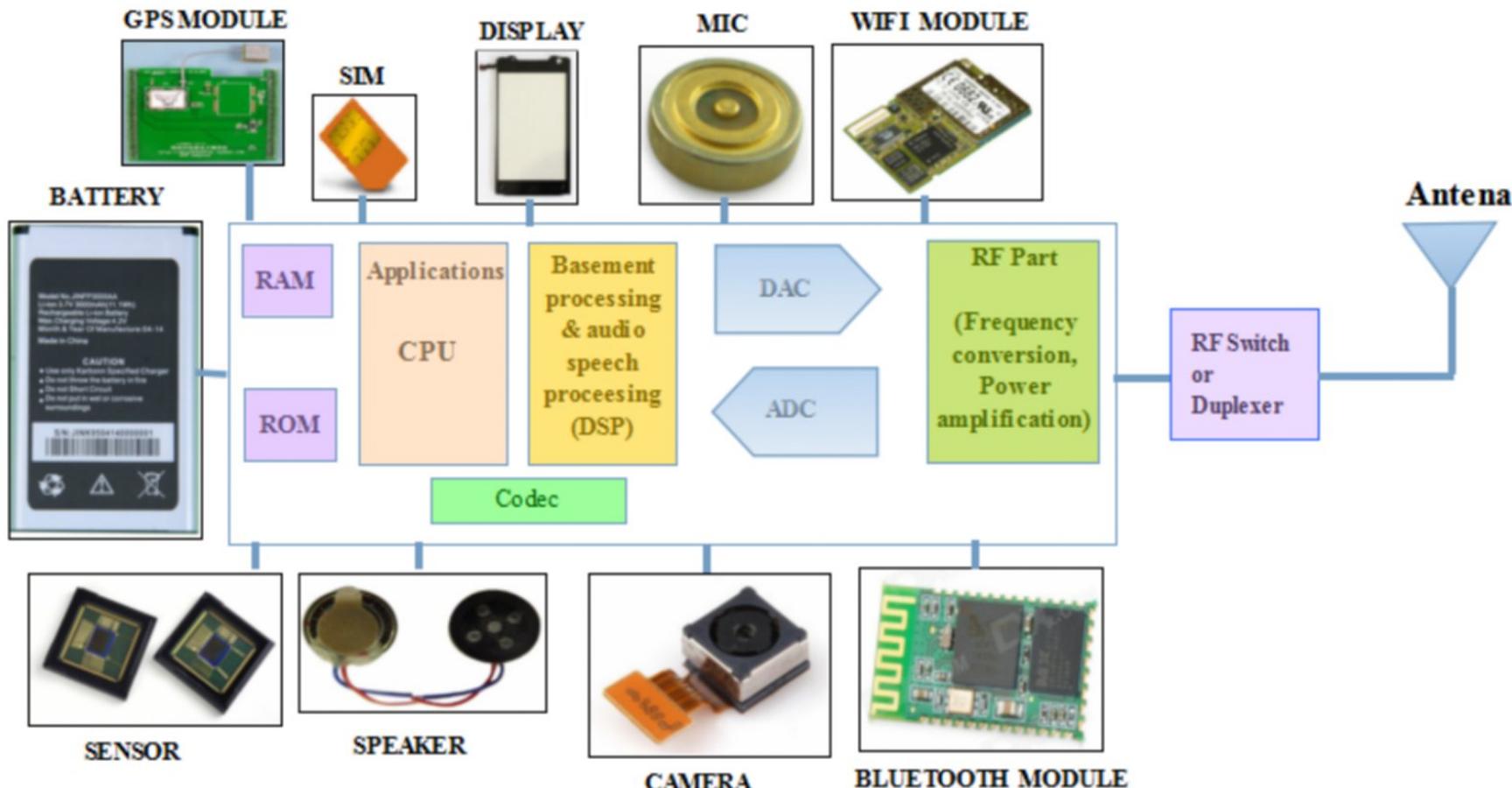
# Mobile Phones / Computing



ComputerHope.com

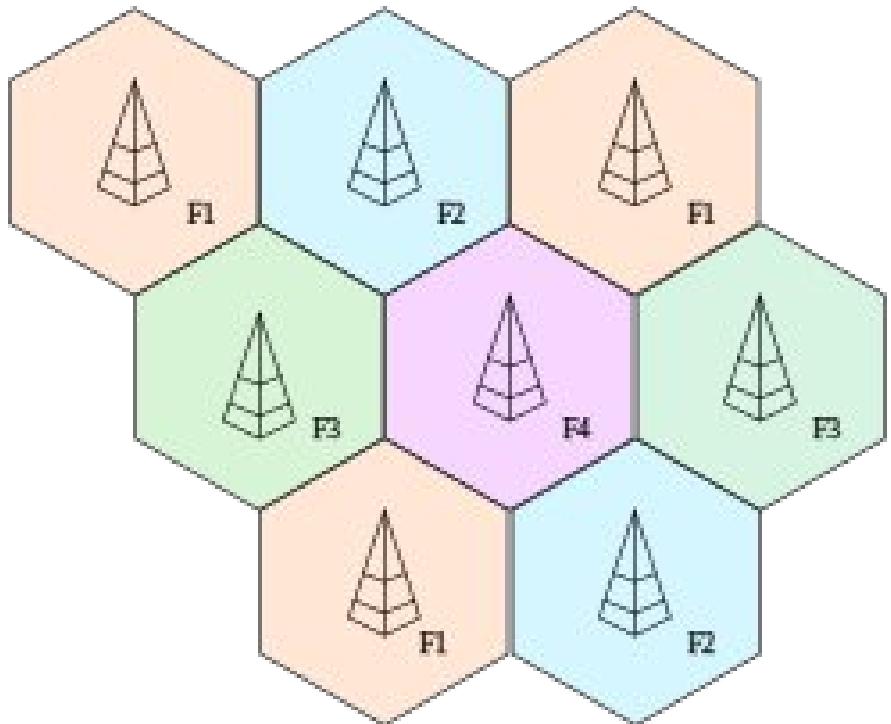


# Mobile Phones / Architecture



Source: TechPlayOn

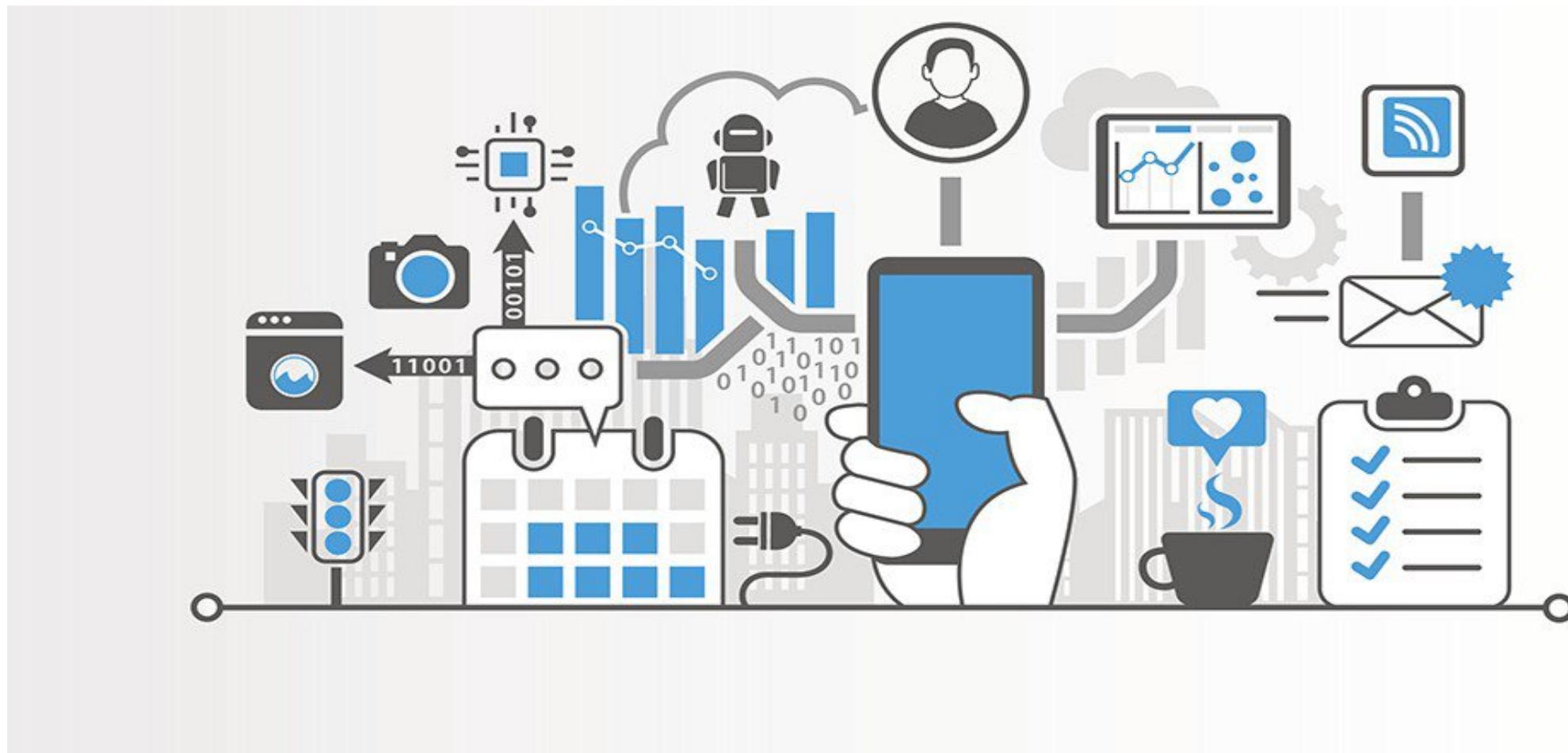
# Mobile Phones / Network



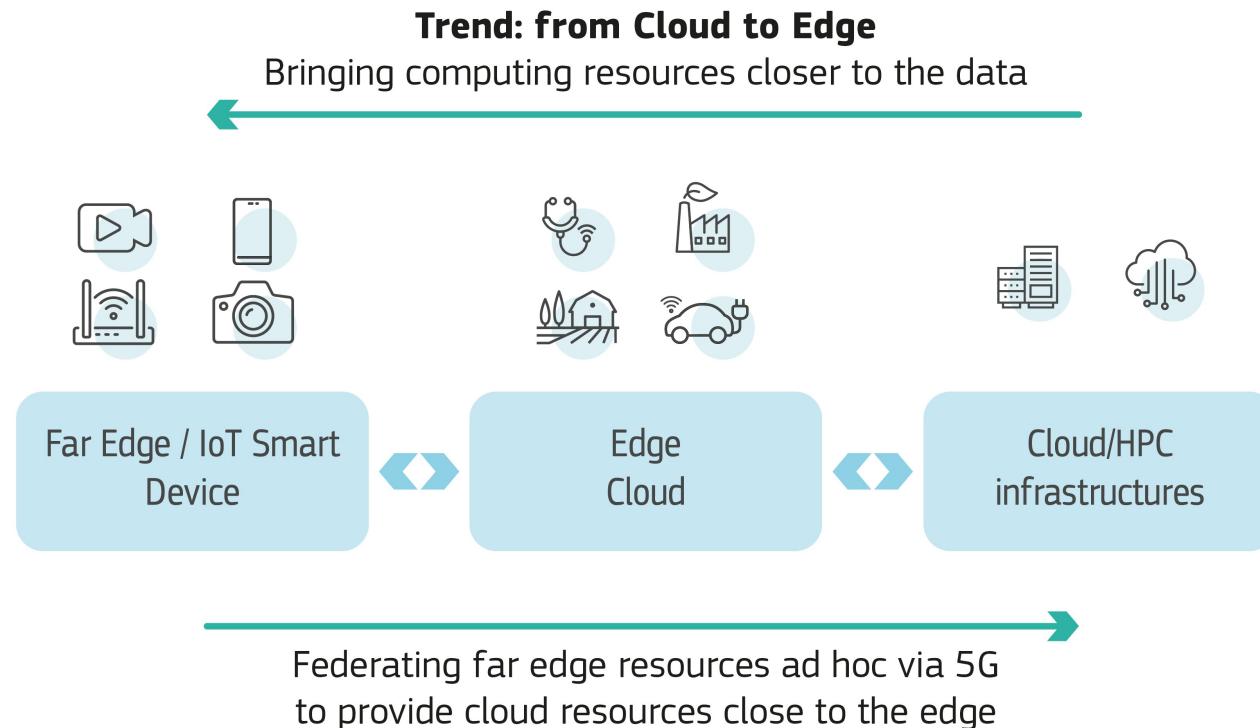
Source: Wikipedia



# Internet stvari (IoT)

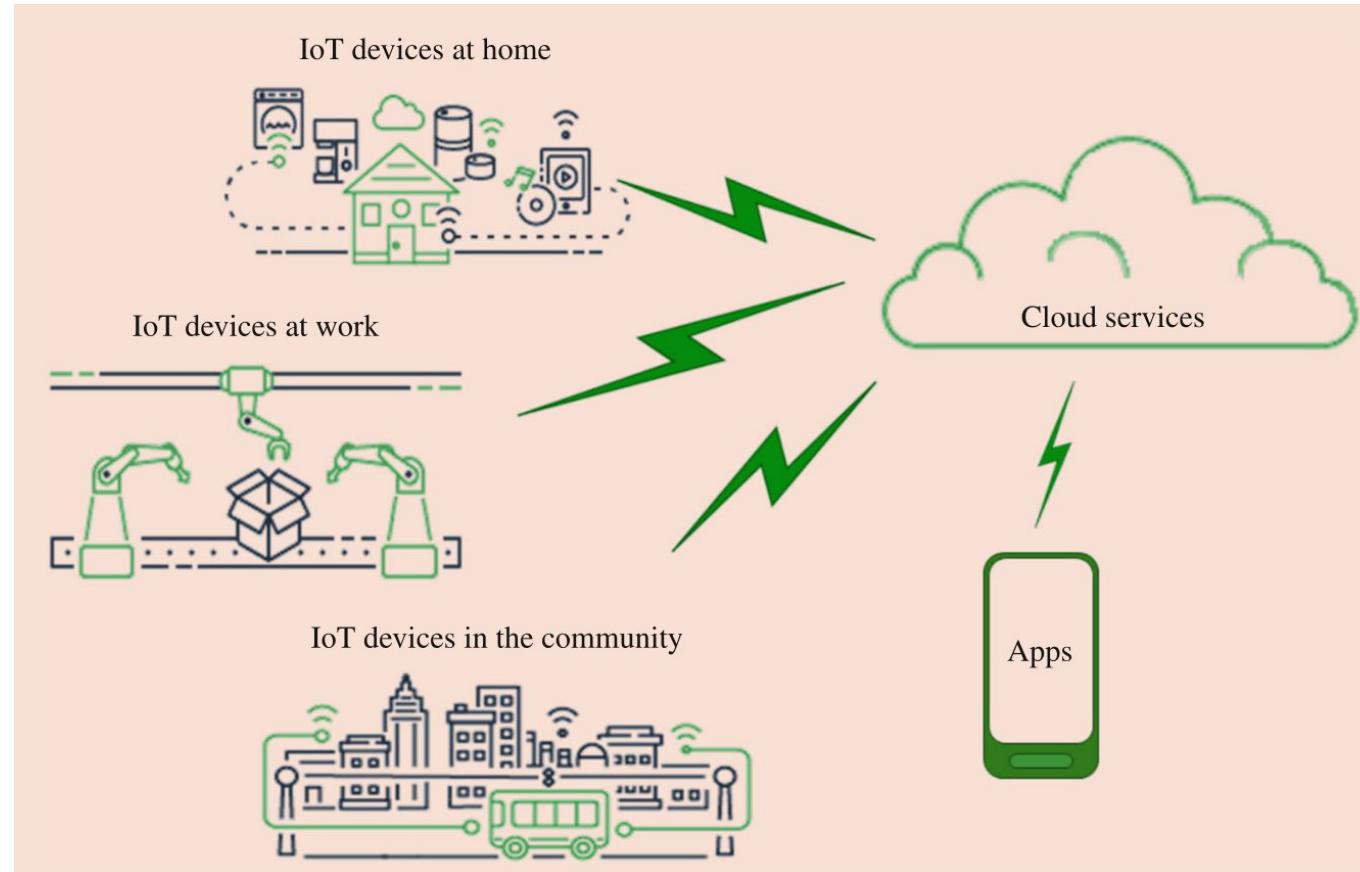


# Internet stvari (IoT)



Source: Wikipedia

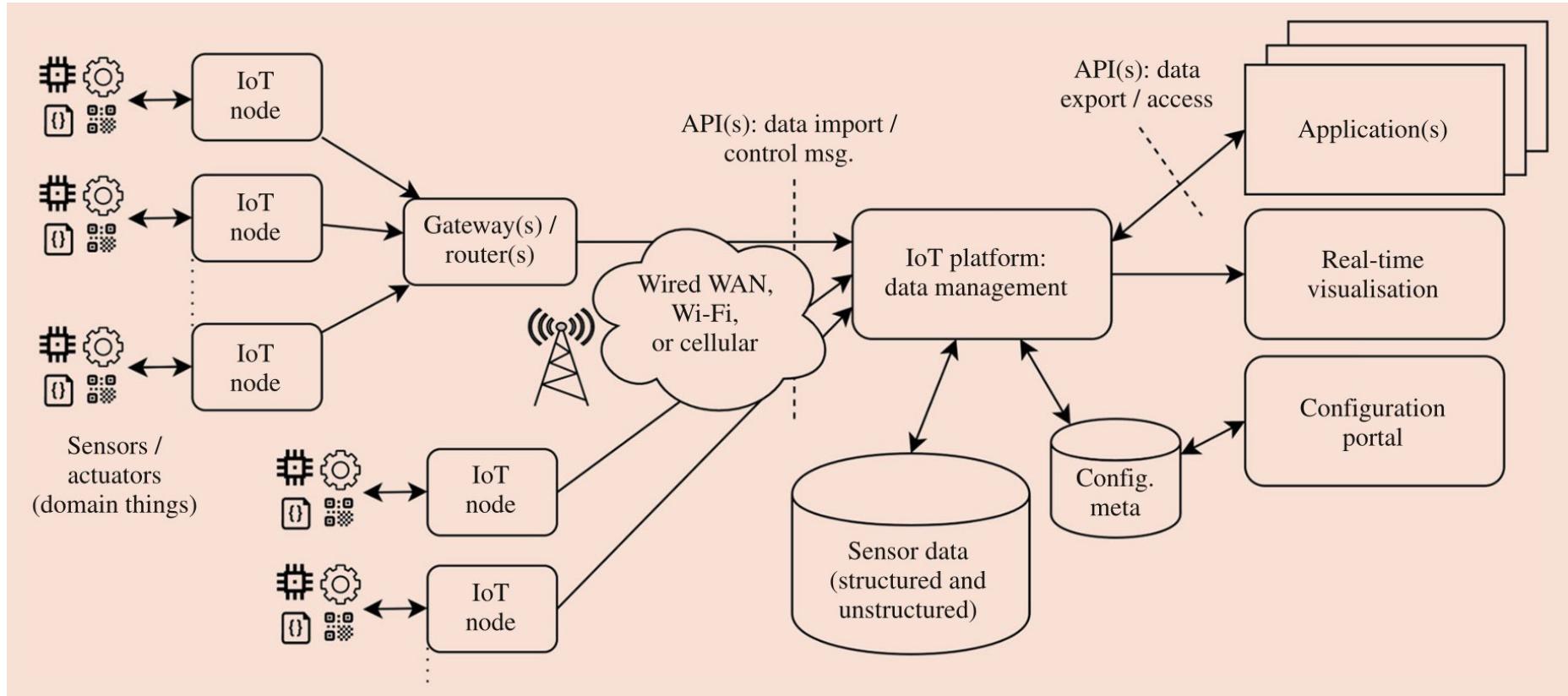
# IoT univerzum



Source: Springer Handbook on IoT

© 2025 Tomo Popovic, UDG

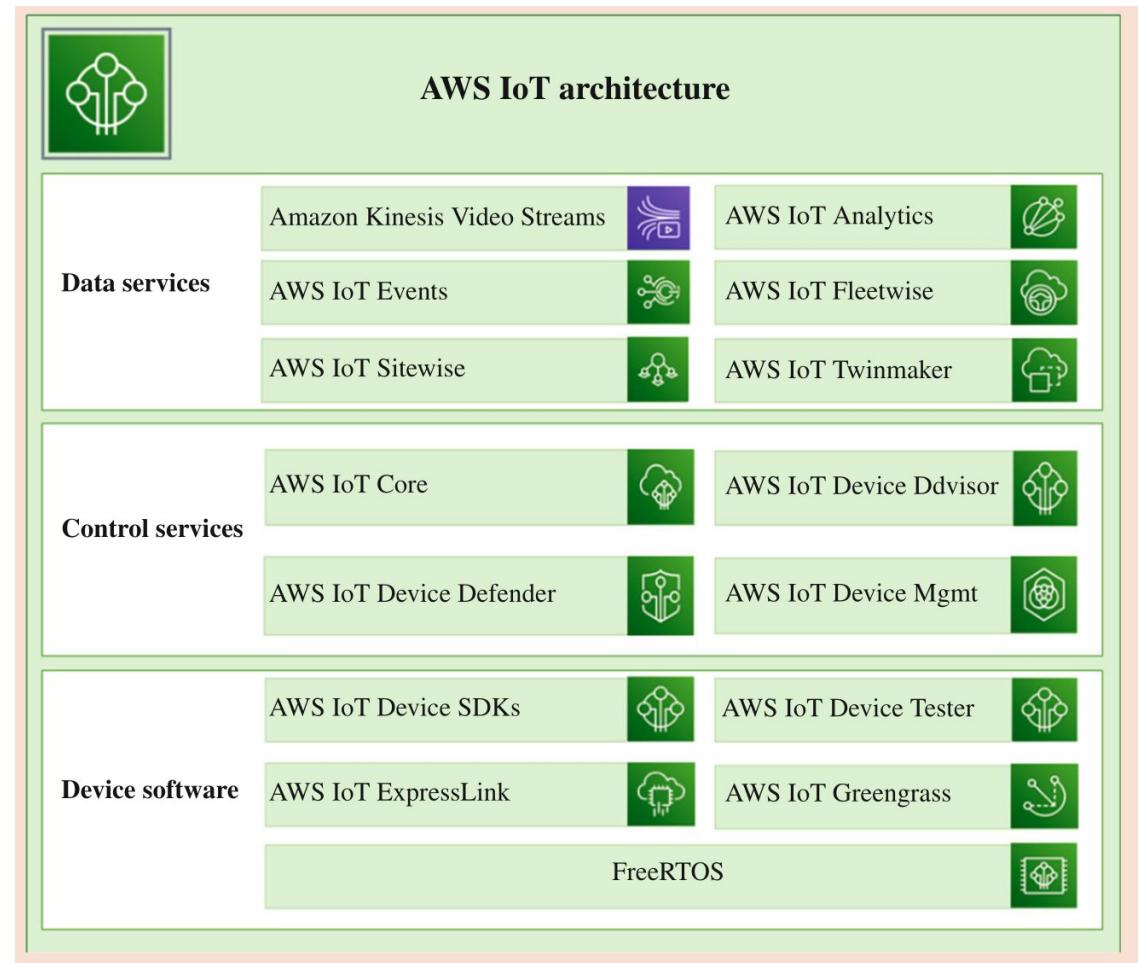
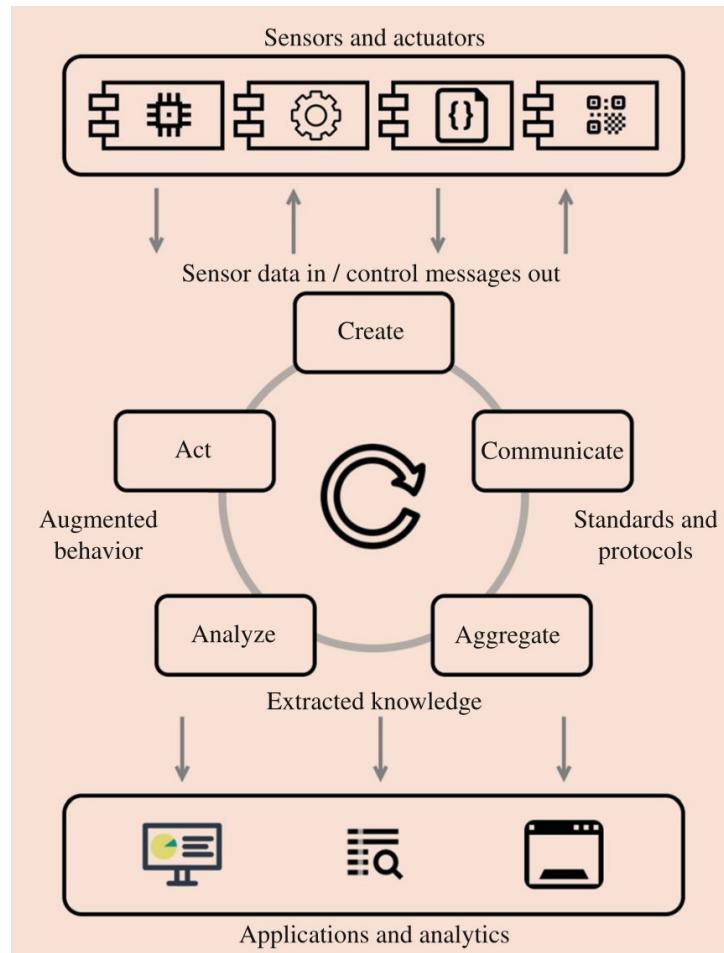
# IoT univerzum



Source: Springer Handbook on IoT

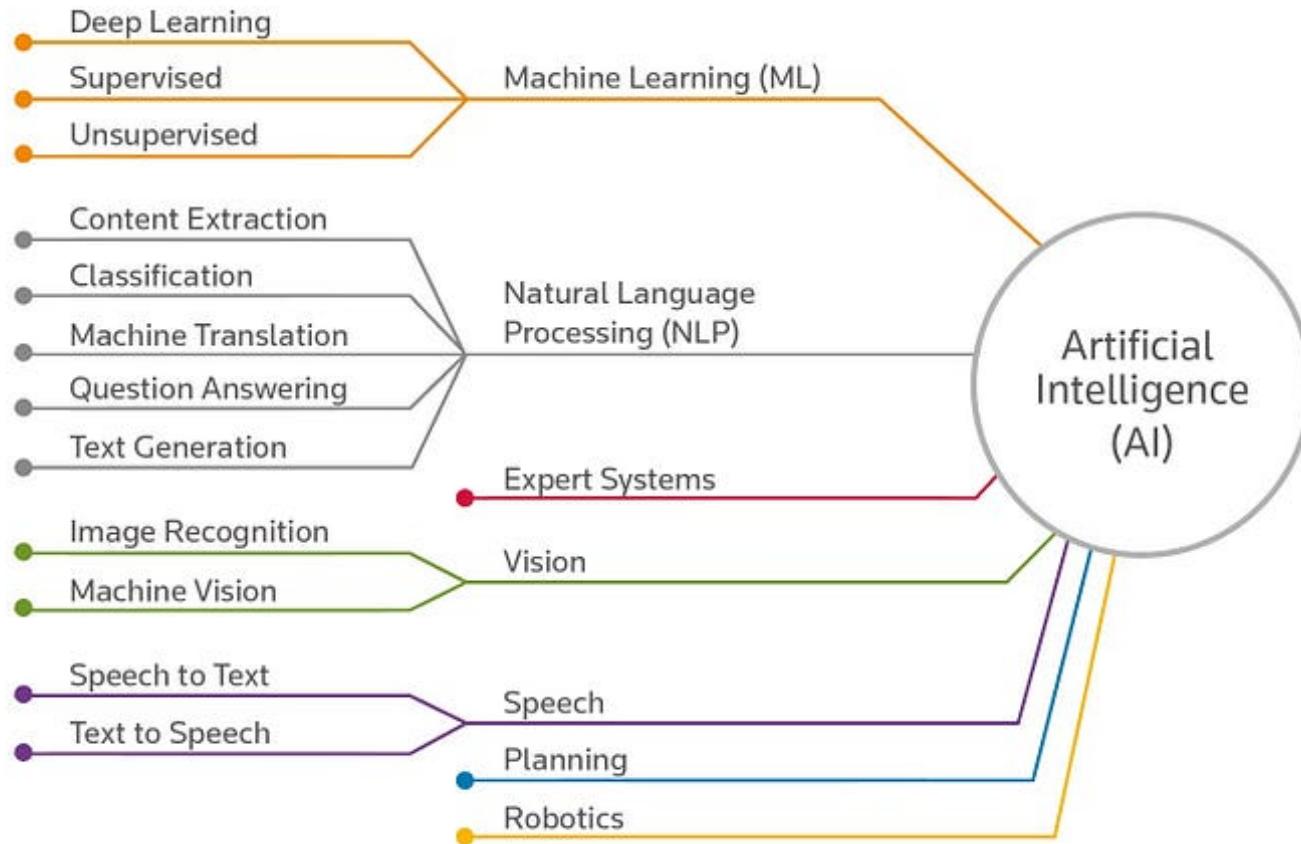
© 2025 Tomo Popovic, UDG

# IoT tok informacija + AWS IoT arhitektura



Source: Springer Handbook on IoT

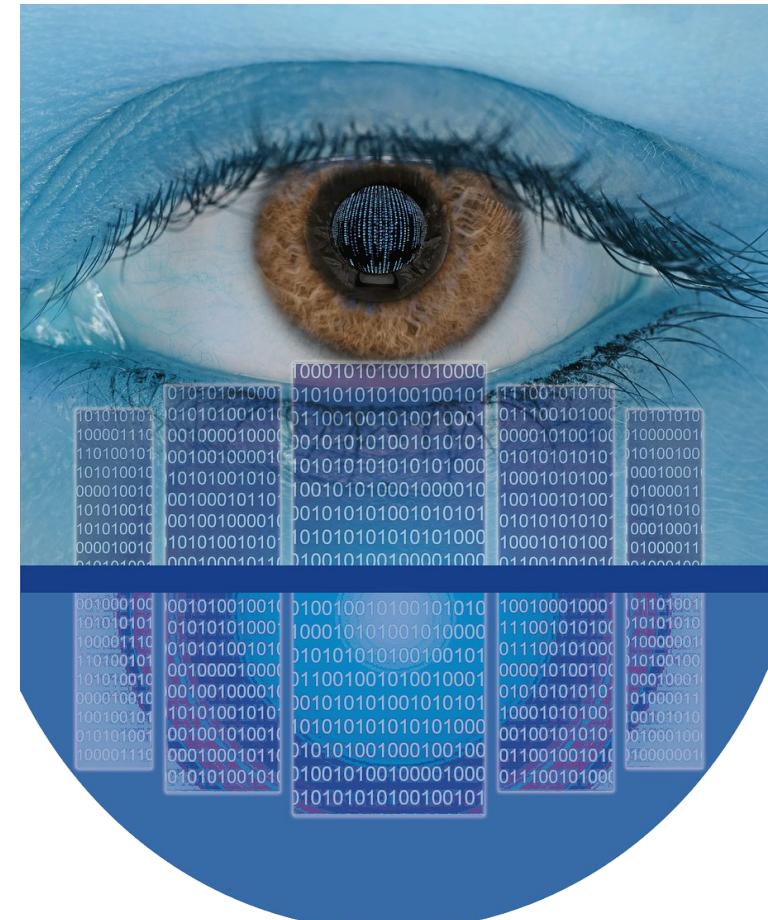
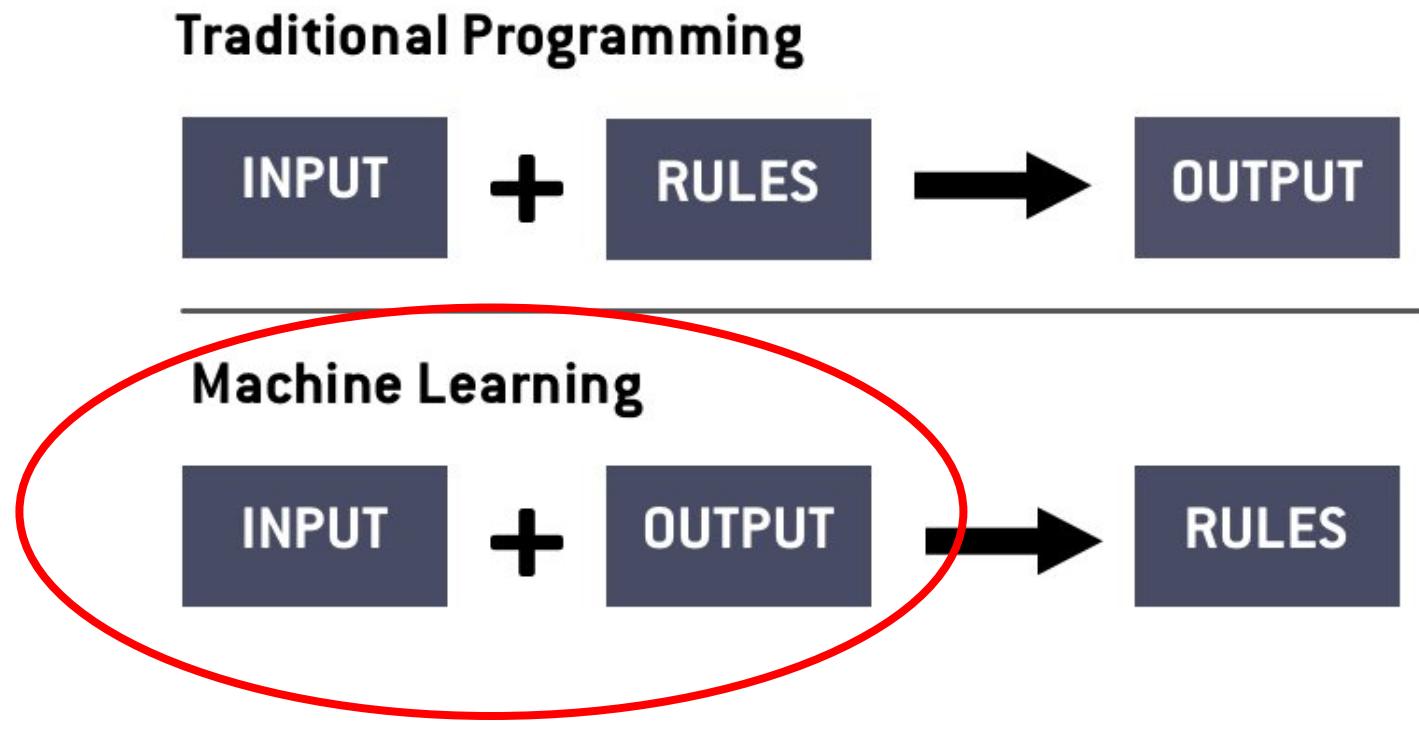
# Vještačka inteligencija AI



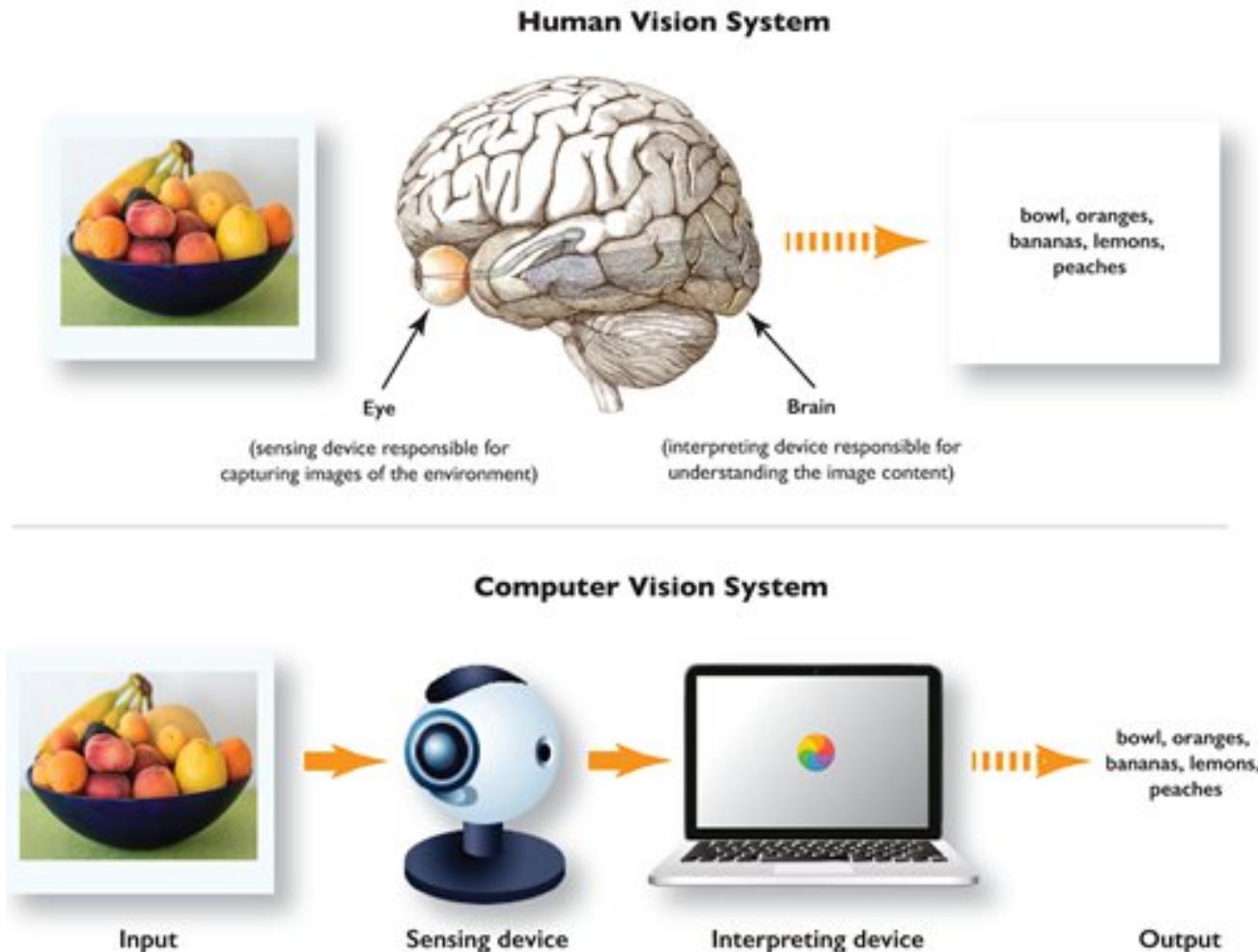
Source: Springer Handbook on IoT

© 2025 Tomo Popovic, UDG

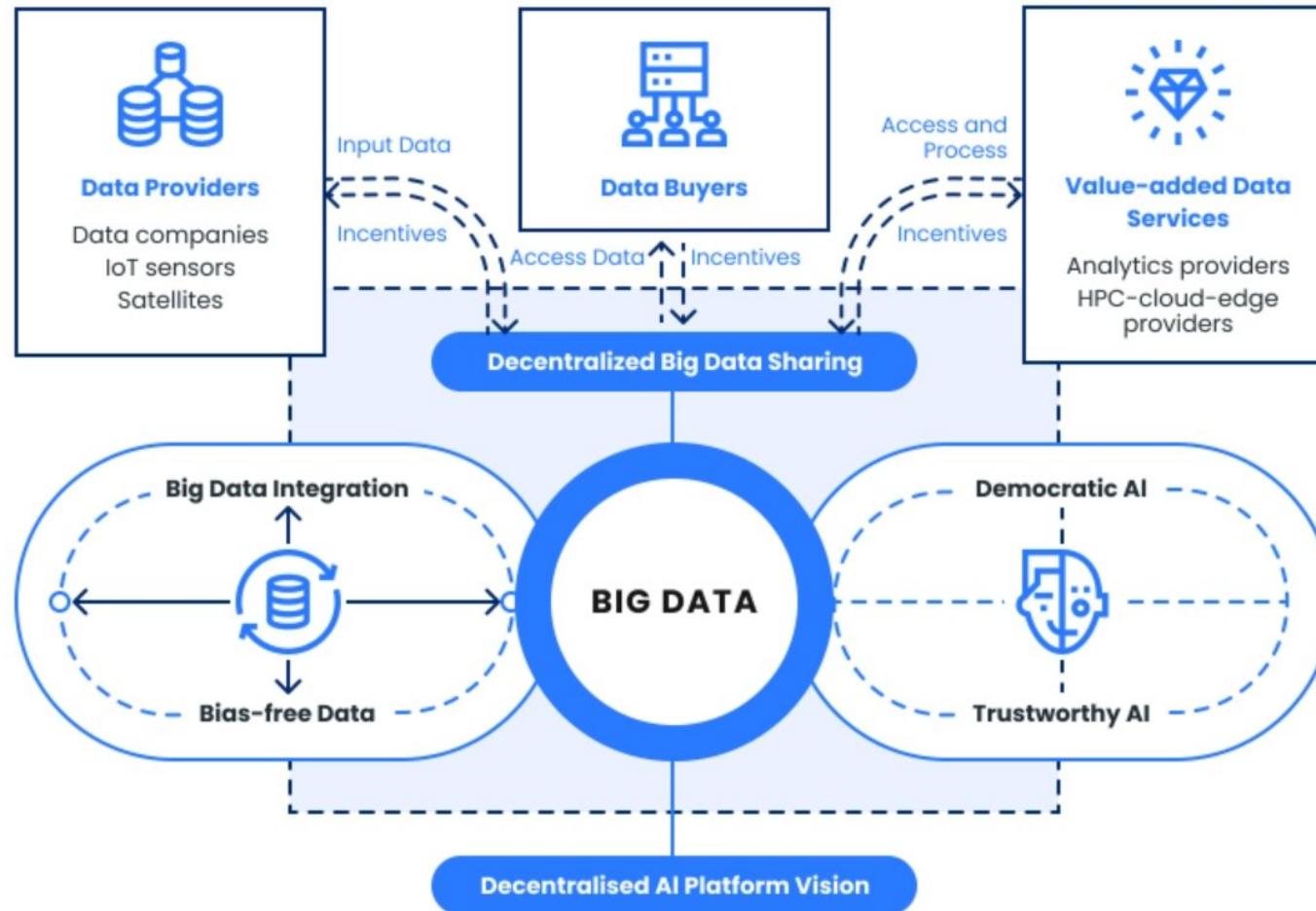
# Prepoznavanje i opis problema



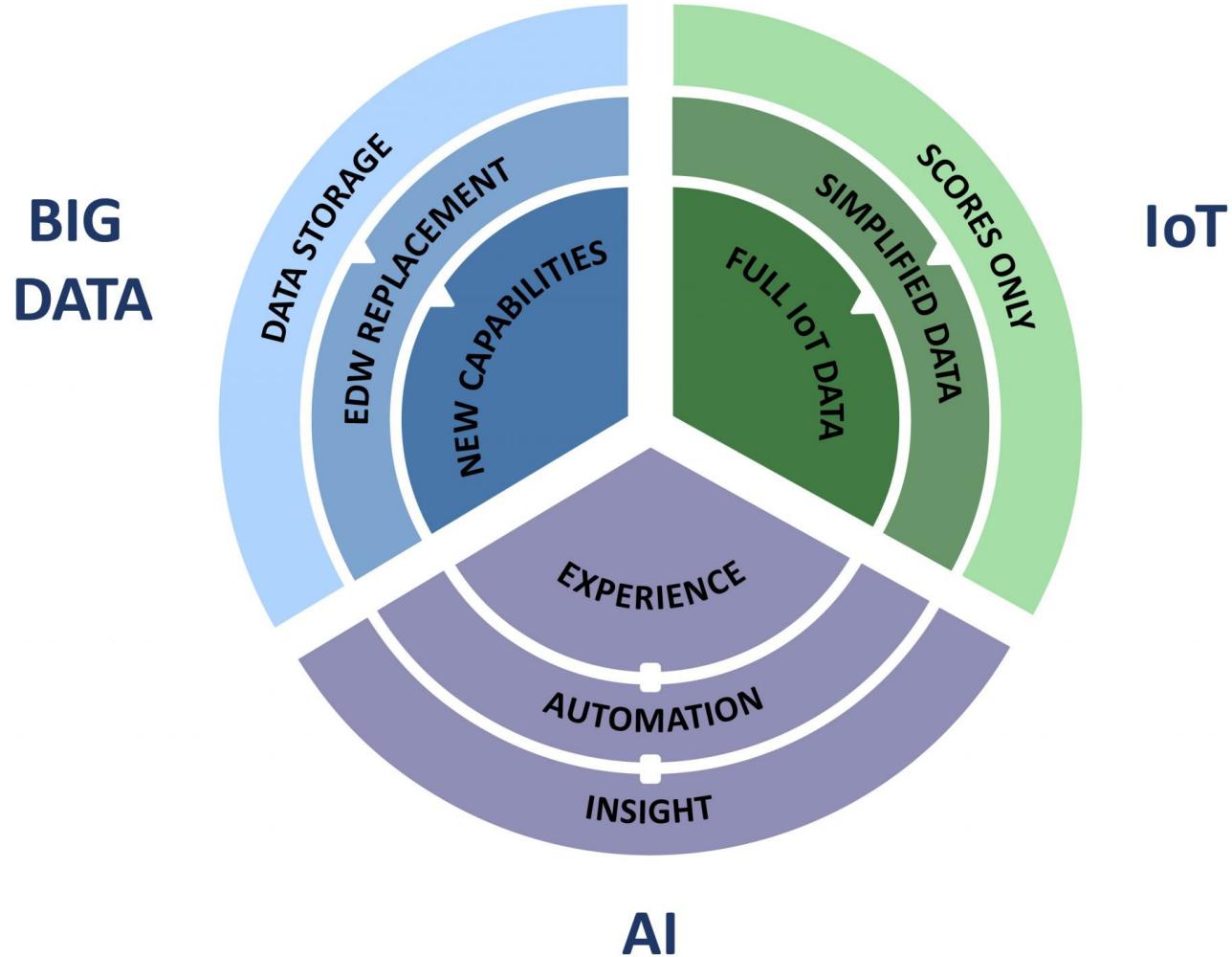
# Kompjuterska vizija



# Big Data + AI

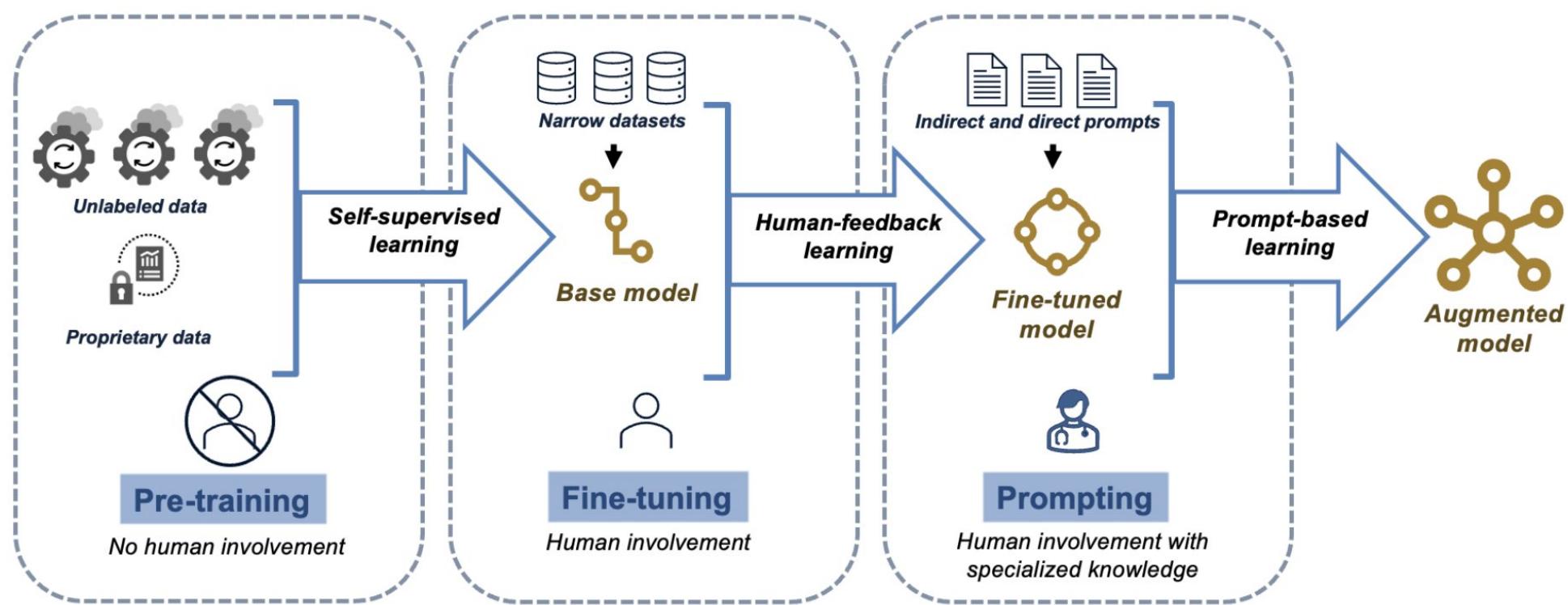


# Big Data + AI + IoT

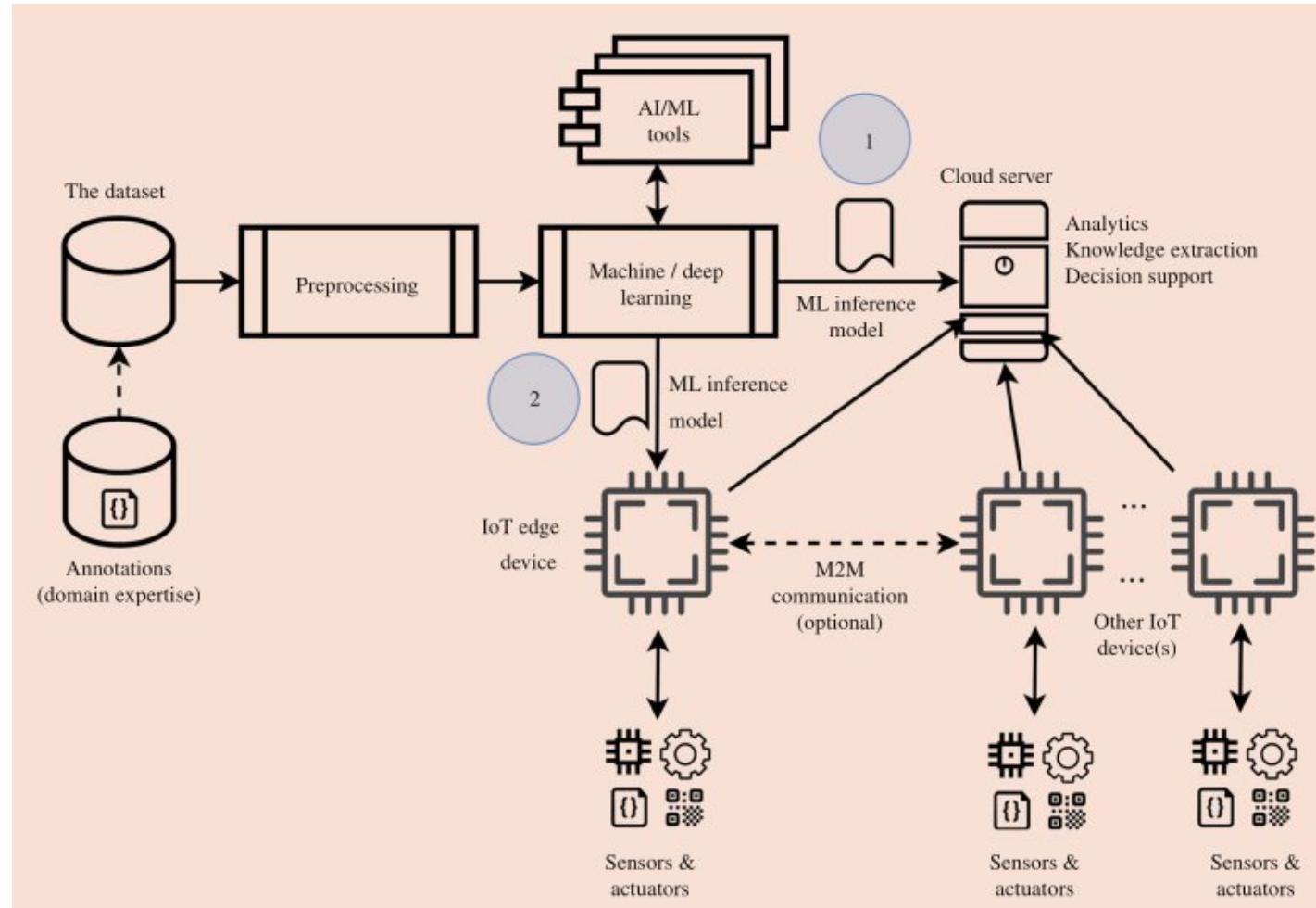


# LLM (ChatGPT)

## Veliki jezički modeli (Large Language Models, LLMs)

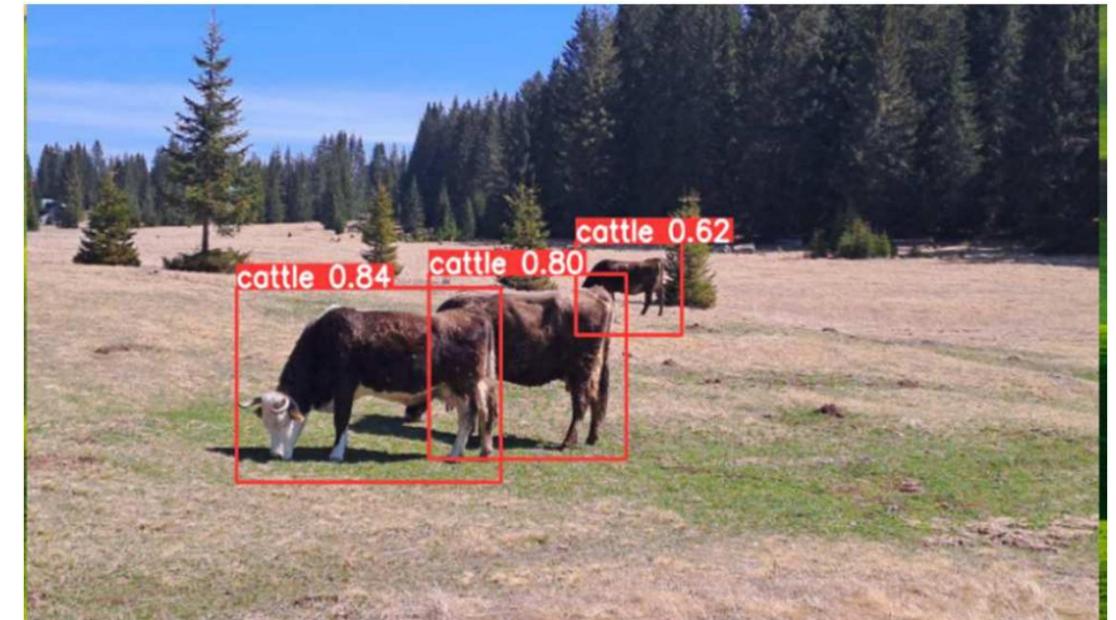
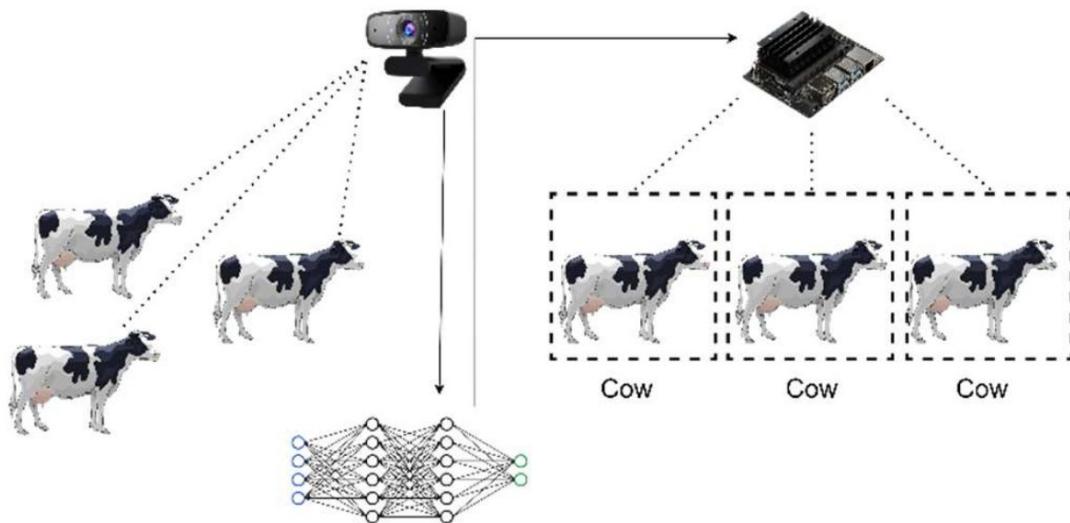


# AI/ML i IoT



Source: Springer Handbook on IoT

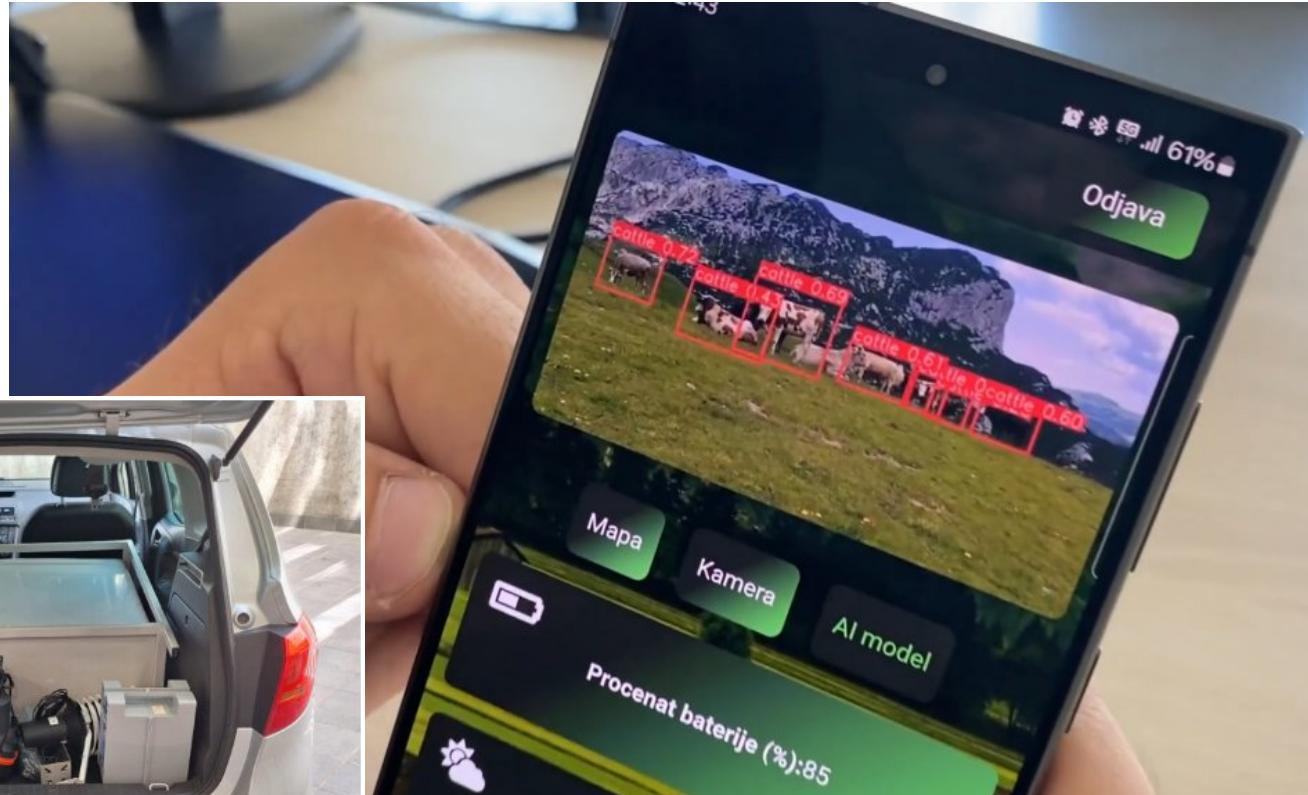
# AI/ML + IoT + Edge



Source: Springer Handbook on IoT

© 2025 Tomo Popovic, UDG

# AI/ML + IoT + Edge (Solar katun)



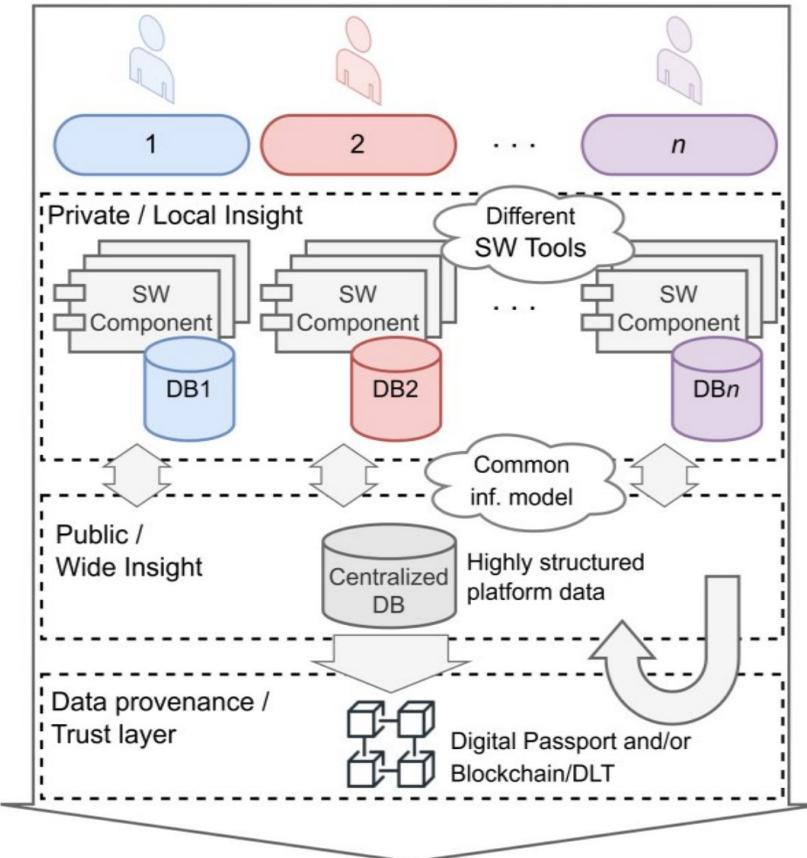
Source: Solar katun

# AI/ML + IoT + Edge (FishEUTrust)

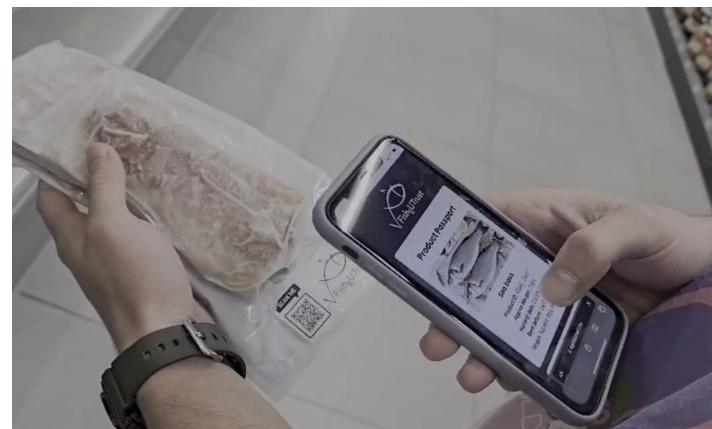
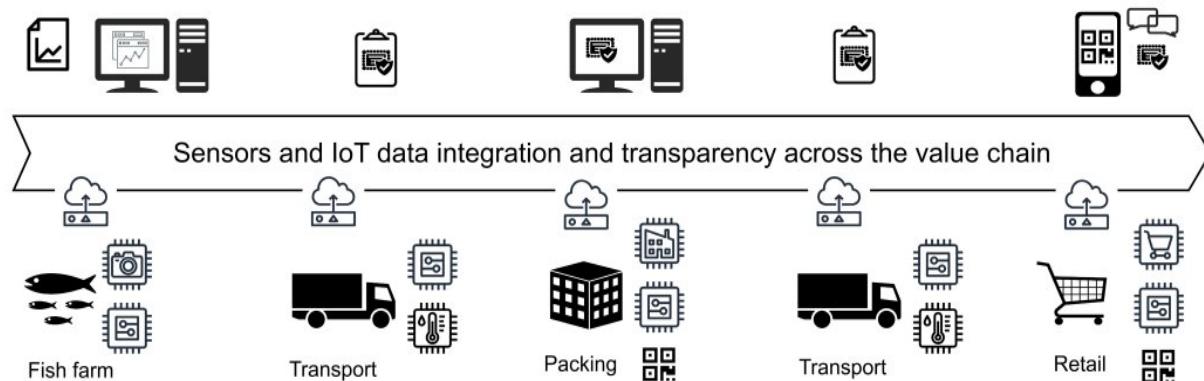


Four screenshots of the FishEUTrust mobile application. The first screenshot shows a map of the area around Nikšić, Montenegro, with a specific location marked as a 'water device'. Below the map is a graph showing temperature data over time. The second screenshot shows a login screen where a user selects a device from a dropdown menu. The third screenshot displays a 'Product Passport' for a 'Sea bass' with details like Product ID, weight, harvest date, best before date, and origin. The fourth screenshot shows a summary card for the same product, highlighting it as 'Authentic' and providing links to 'Recipes', 'Nutrition Value', and 'Traceability'.

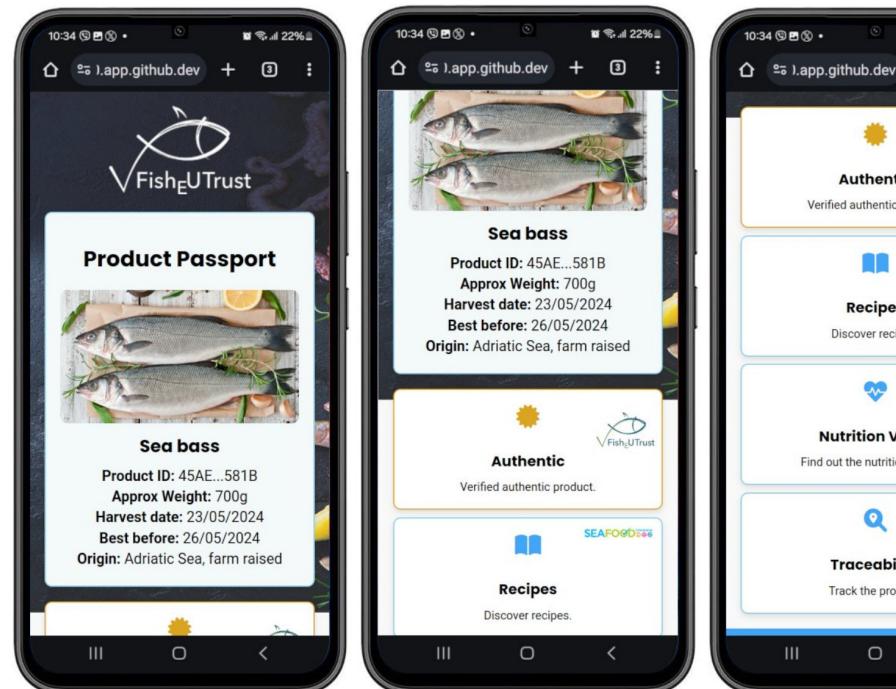
# IoT, blockchain i lanac snabdijevanja



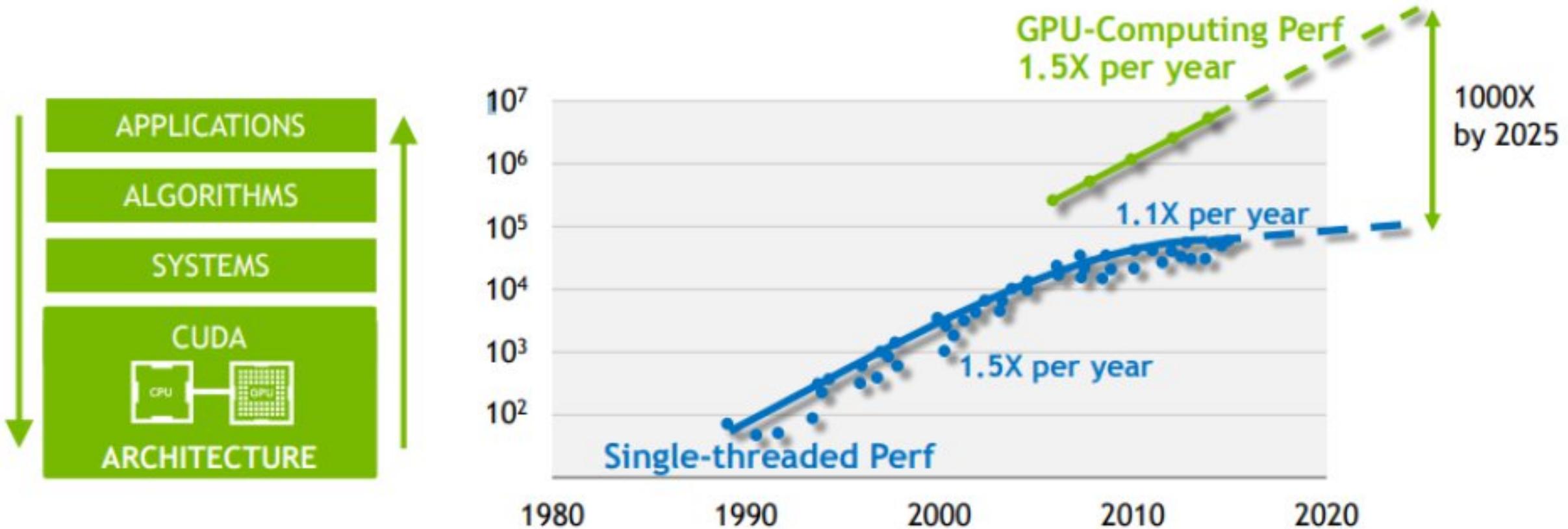
Source: FishEUTrust



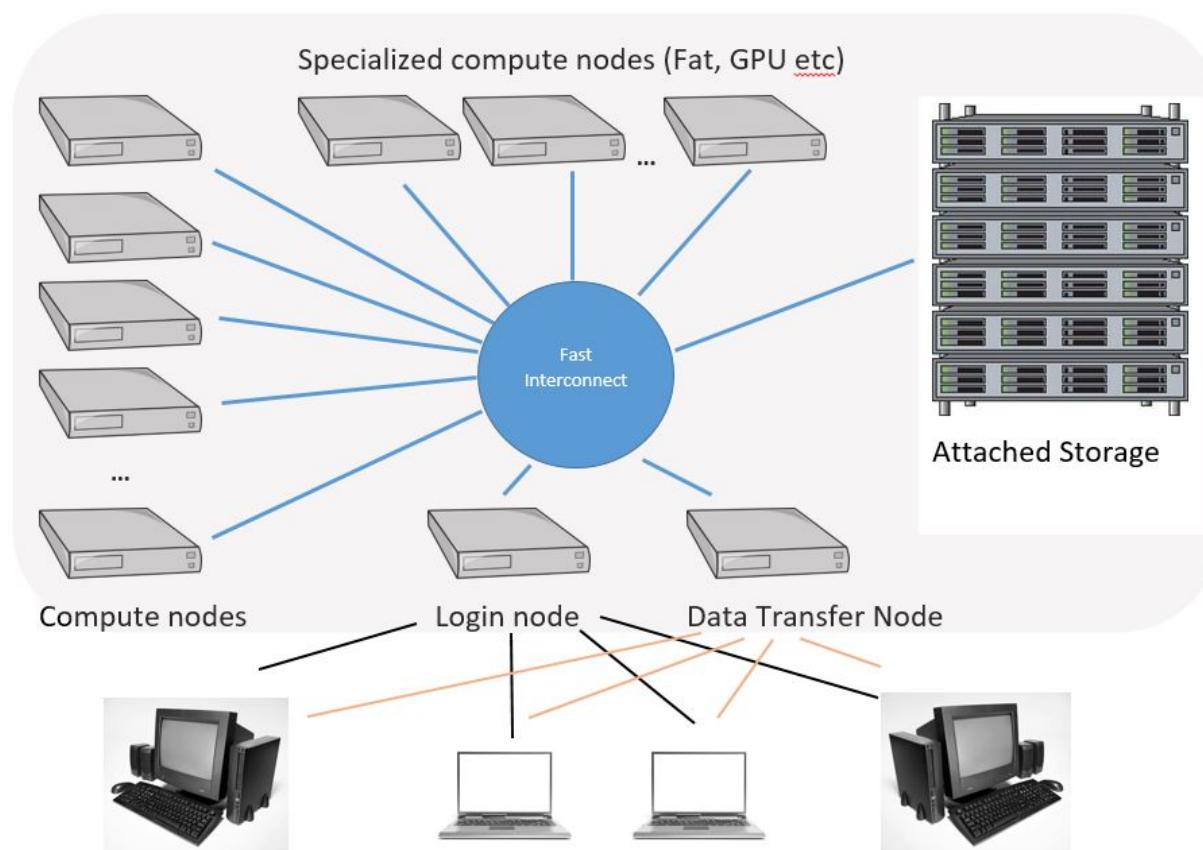
© 2025 Tomo Popovic, UDG



# NVIDIA GPU i Murov zakon



# HPC klasteri, GPU klasteri



# Superračunari (HPC)



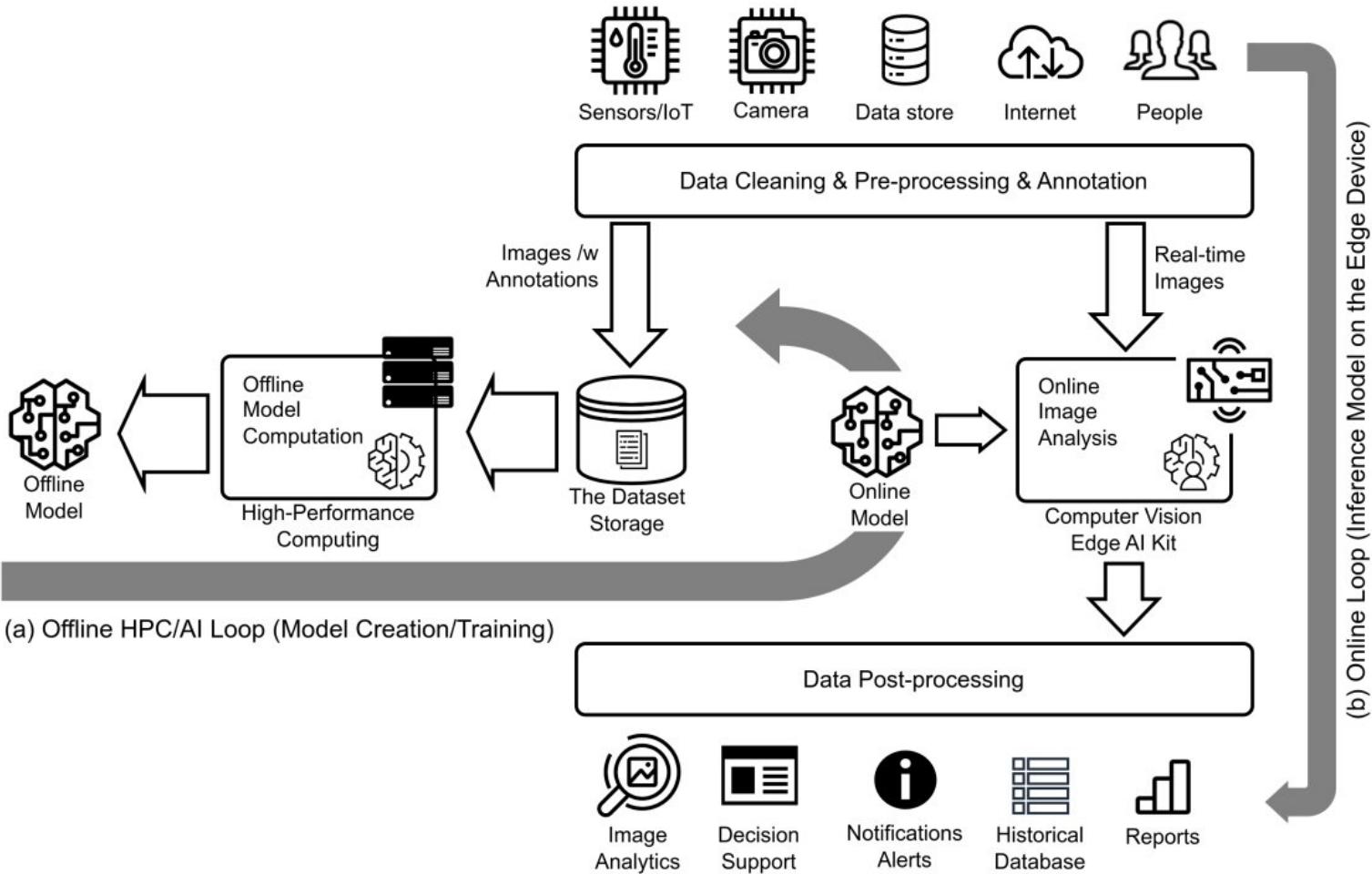
Source: Nvidia



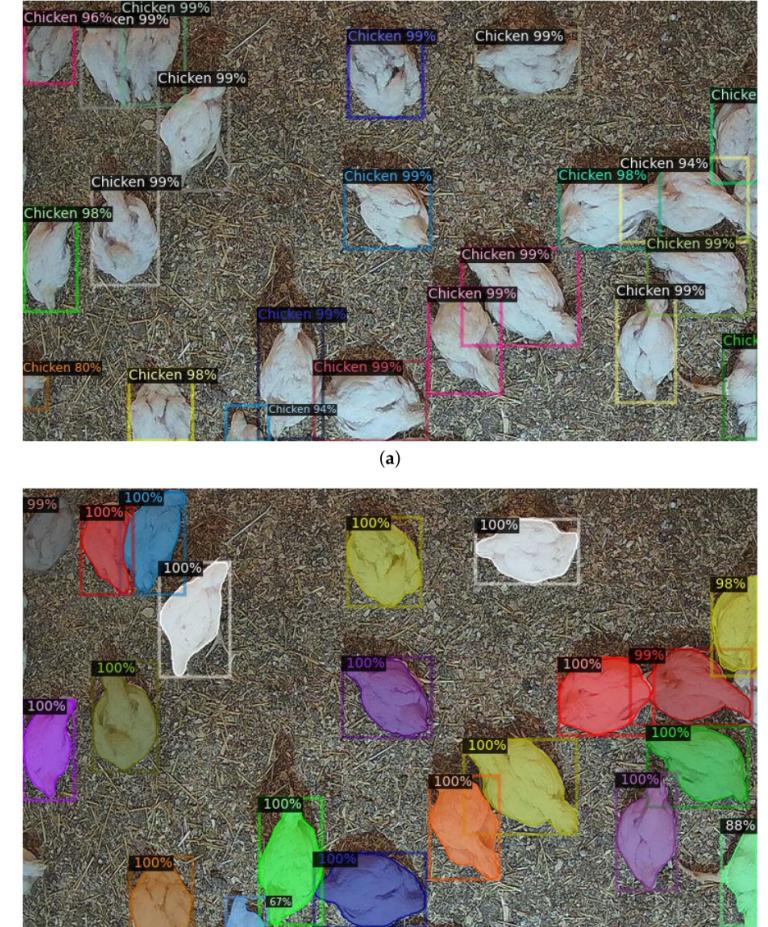
© 2025 Tomo Popovic, UDG

Source: LUMI

# HPC + AI + Edge/IoT



Source: S. Cakic et al. Sensors



# AI + društvene mreže

## Prednosti

- Personalizovani sadržaj
- Automatizovana moderacija
- Preporuke
- Upravljanje oglasima

## Izazovi

- Privatnost
- Deepfake
- Psihološki efekti
- Legalna pitanja
- “Tuđinska inteligencija”



Source: tehnolligent.com

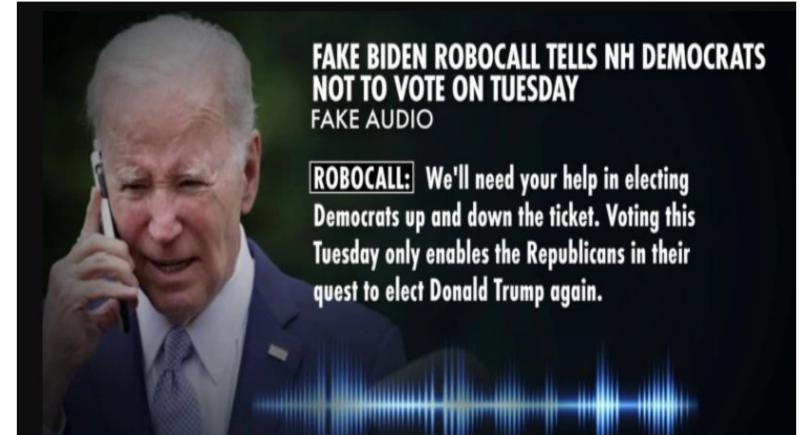
# AI + društvene mreže + DeepFake



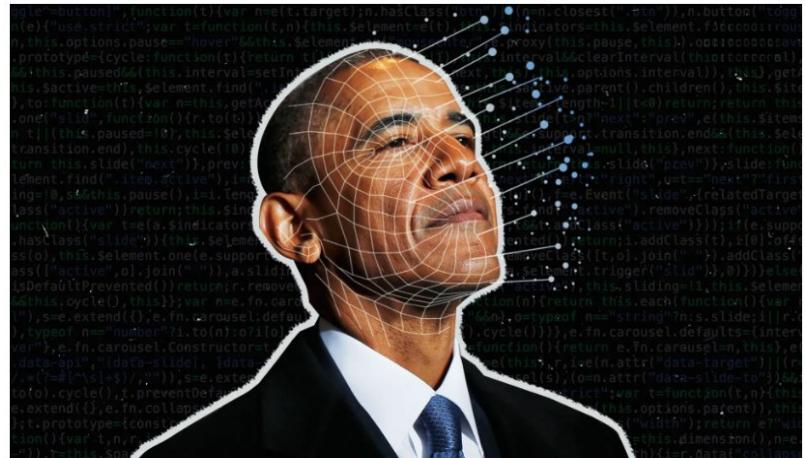
Fake image of explosion at Pentagon and how it impacted the markets.  
(Source - The Mint)



A deepfake video of Volodymyr Zelenskyy surrendering to Russia.  
(Source - The Daily Show with Trevor Noah)



Deepfakes like the Biden robocall are a threat — even to those who don't fall for it.  
(Source - MSNBC)



Jordan Peele uses AI, President Obama in fake news PSA  
(Source - USA Today)



Deepfake images of Donald Trump's arrest create chaos on social media.  
(Source - The Times)

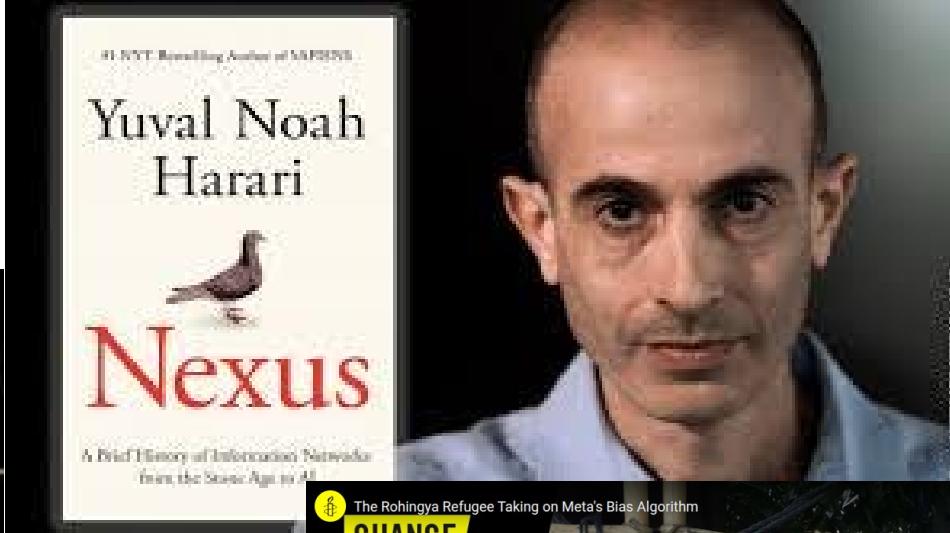


Want to see a magic trick? Tom Cruise impersonator Miles Fisher (left) and the deepfake Tom Cruise created by Chris Ume (right)  
(Source - Chris Ume)

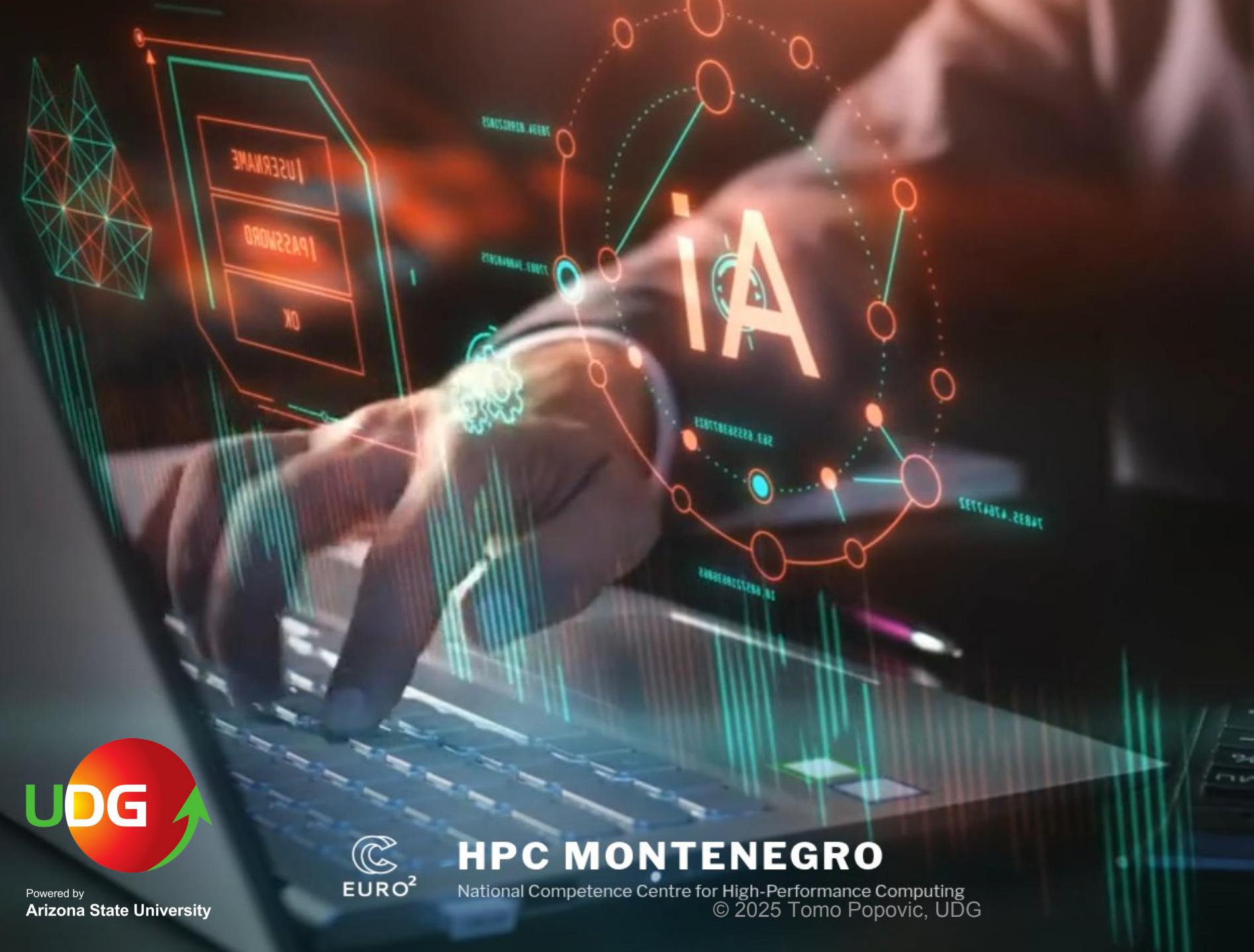
# AI + društvene mreže + “tudinska inteligencija”



Source: <https://systemicjustice.org/>



Source: <https://www.amnesty.org/>



Powered by  
Arizona State University



## HPC MONTENEGRO

National Competence Centre for High-Performance Computing  
© 2025 Tomo Popovic, UDG

A screenshot of the AI-AGE website. At the top, there's a profile picture of a person with a brain-like network overlay and the text 'AI-AGE'. Below the header, there's a navigation bar with links for 'Ajed', 'Startovne', 'Novi', 'Nova', and ' Kontakt'. The main content area shows a group of diverse professionals in a modern office setting, focused on a large computer monitor displaying complex data visualizations. At the bottom, there's a footer with logos for FORTISSIMO, recrewlyer, EuroHPC, and the European Union.

A banner for the HPC4S3.ME project. It features a woman's face with a digital grid overlay. The text 'HPC4S3.ME' is prominently displayed. Below it, a smaller text reads: 'HPC4S3ME is supported through IPA II program, CFCU/MNE/213, call reference EuropeAid/172-351/ID/ACT/ME'. Logos for UDG, S.me, a QR code, the flag of Montenegro, and the European Union are at the bottom.

A map titled 'EuroHPC Supercomputers' showing the locations of supercomputers across Europe. Various countries are marked with colored dots and labels indicating the names of the supercomputers, such as 'Marconi 2' in Italy, 'Turing' in the UK, 'Piz Daint' in Switzerland, and 'Fugaku' in Japan. The map also includes labels for 'EuroHPC' and 'EuroHPC Supercomputers'.

# Riječi

- Slon (u sobi)
- Proces
- Digitalizacija procesa
- Neksus
- Etika
- Kontekst