# Blockchain – Infrastructura informationala revolutionara Viziune de ansamblu
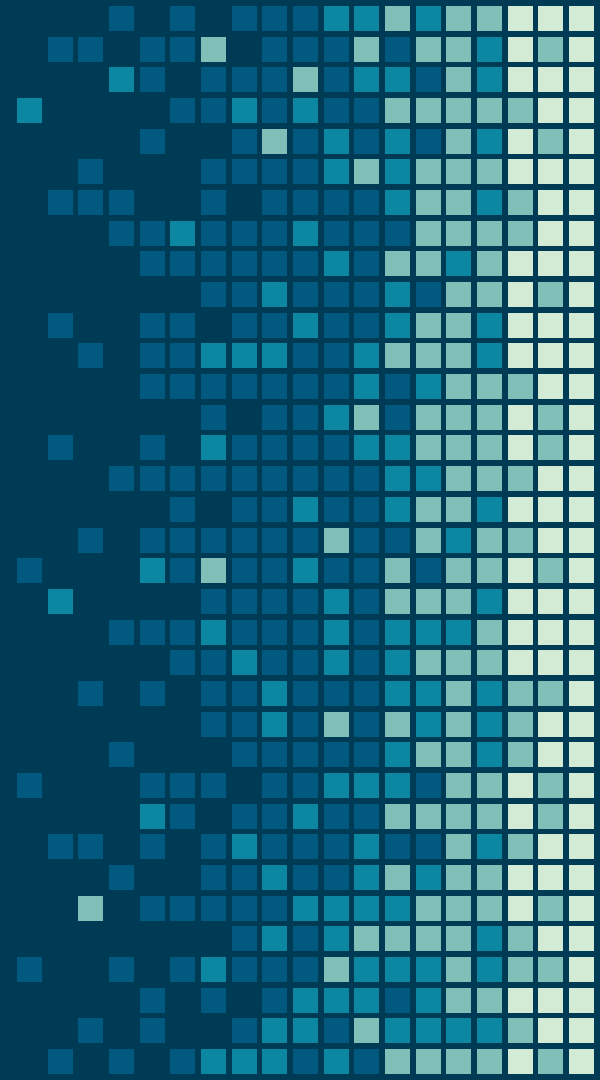
## Lect. Dr. Ing. Alexandru Butean
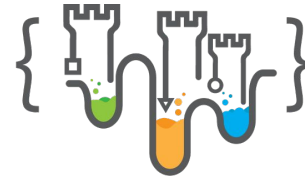
Bucuresti 2019

# Despre mine

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# Transylvania Labs – Services

- Enterprise and Industrial Architectures

- Blockchain

- Artificial Intelligence

- Data intensive applications

- Internet of Things

- Next Generation Internet
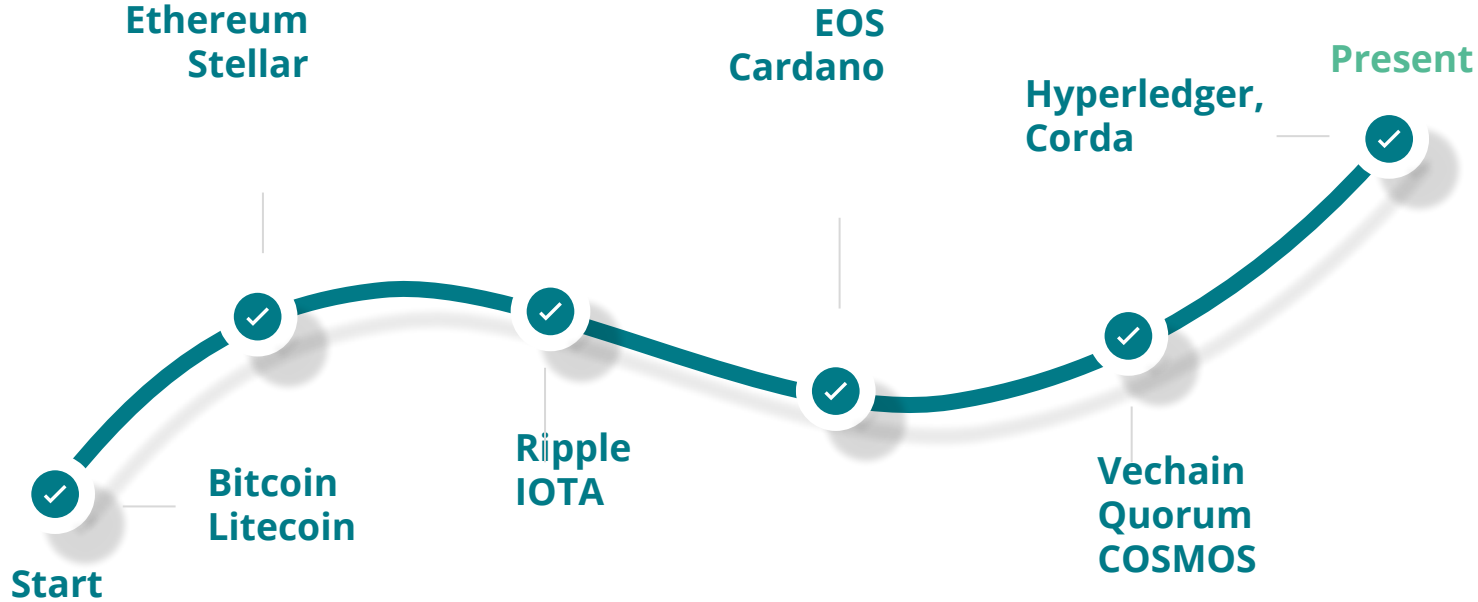


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# Evenimente in ultimele 6 luni

| Eveniment | Locatie | Data | Participare | Categorie |
|---|---|---|---|---|
| Devcon | Praga Cehia | Noiembrie 2018 | 5000 oameni 5 zile | Tehnic |
| IBM - Hyperledger Global Forum | Basel Elvetia | Decembrie 2019 | 800 de oameni 3 zile | Enterprise; Proiecte guvernamentale; |
| London Blockchain Week | Londra UK | Februarie 2019 | 600 de oameni 4 zile | General; Bancar - Financiar; |
| Mindchain | Cluj Romania | Februarie 2019 | 400 de oameni 2 zile | General |
| Future Blockchain Summit | Dubai UAE | Aprilie 2019 | 3000 de oameni 3 zile | Investitii; Enterprise; |
| International Association of Civil Aviation - Blockchain Strategy | Abu Dhabi UAE | Aprilie 2019 | 400 de oameni 3 zile | Aviatie; |

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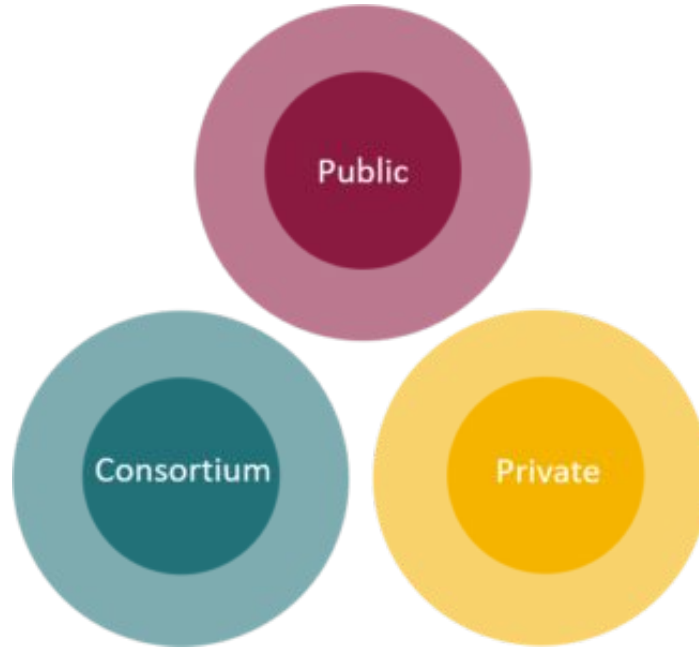
# Monede virtuale

- investiție mondiala - peste **$800 miliarde ( 4.5x RO, 1 X SW)**

- retelele de minning au depasit **1%** din consumul mondial de electricitate

- mai mult de **2000** de monede virtuale disponibile pe piete de bursa alternative

- Peste **90 %** din companiile Fortune500 dezvolta solutii / produse pe blockchain

- **10** tari au legi clare referitoare la monede virtuale iar alte **12** tari lucreaza la asta

- Venezuela are PETRO, moneda digitala inca din **August 2018**

- Samsung integreaza pe Galaxy S10 portofel pt monede virtuale

- Bani pierdurti sau blocati in ultimele 18 luni **$2 miliarde**

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# Blockchain Evolution

Ethereum
Stellar

EOS
Cardano

Hyperledger,
Corda

Present

Bitcoin
Litecoin

Ripple
IOTA

Vechain
Quorum
COSMOS

Start

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# Model de Guvernare



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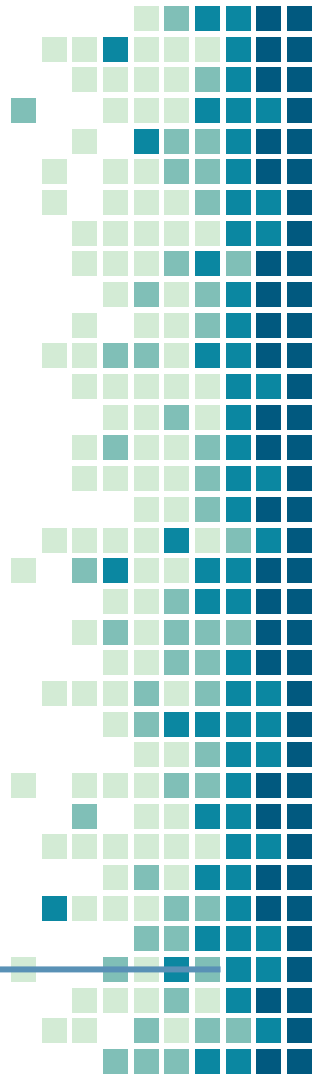
# Blockchain – Public – Ethereum

## Public Chain Representative : Ethereum

### Focus

- Contracte verificabile formal

- Scalabilitate sporita (comparat cu bitcoin)

- Integrarea de unelte de raportare si audit

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# Blockchain – Consortium – Hyperledger

**Consortium Chain Representative : Hyperledger (backed by IBM)**

**Focus**

- Canale de comunicare

- Tranzactii private

- Dovezi ale tranzactiilor prin zero-knowledge proof

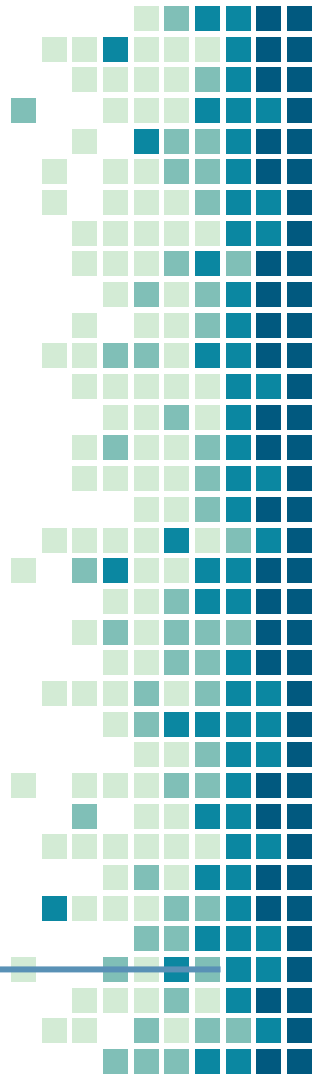alexandru@butean.com

# Blockchain – Private – INSOLAR

## Hybrid Chain Representative : INSOLAR

### Focus

- Compliance with Data privacy regulations
- Reguli diferite pentru domenii si consorții
- Contracte inteligente modificabile

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# Consensus – Proof of Work

- se bazeaza pe mining

- o operatie matematica complexa e propusa

- cine rezolva primul valideaza tranzactiile

- cine valideaza primeste recompensa

- protocol cu eficienta energetica mica

# Consensus – Proof of Stake

- se bazeaza pe ownership de resurse

- toti participantii au drept de vot direct proportional cu valoarea resursei detinute

- protocol cu eficienta energetica mare

# Consensus – Delegated Proof of Stake

- se bazeaza pe ownership de resurse

- se bazeaza pe alegerea unor reprezentanti

- reprezentanti (delegatii) voteaza

- deciziile se iau de un grup restrans

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# Consensus – Proof of Burn

- participantii trimit resurse la o adresa nealocata

- tranzactiile trimise apar in istoric

- istoricul confirma dedicarea participantilor

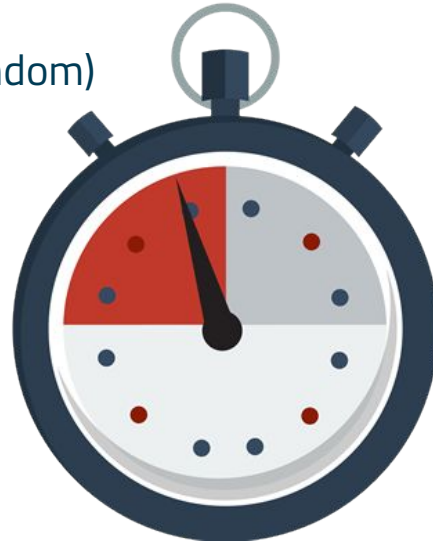- participantii primesc recompense din retea

# Consensus – Proof of Identity

- confirmarea identitatii printr-o evidenta criptografica

- exista un set relativ mic de decision makers

- oricine are cheia poate actiona in numele organizatiei

- actiunile afecteaza reputatia in timp

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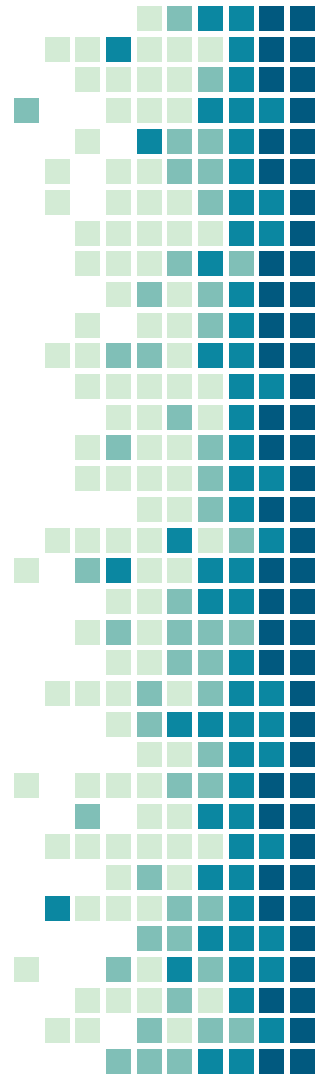
# Consensus – Proof of Elapsed Time

- Se bazeaza pe alocarea unor cuante de timp

- Fiecare participant asteapta o cuanta de timp ( random)

- Cel care termina primul asteptarea propune

- Statistic vorbind - sansele tuturor sunt egale
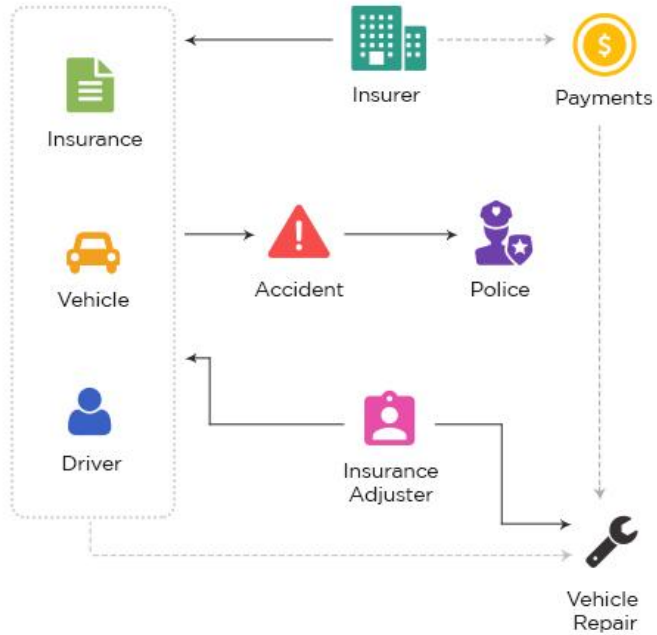
# Smart Contracts



- Limbaje de programare suportate

- Digitalizare contractelor existente

- Corelarea cu mediul extern

- Verificarea formala
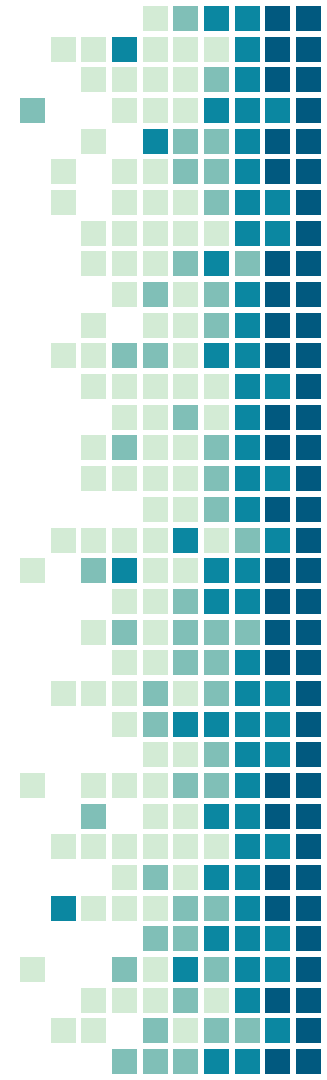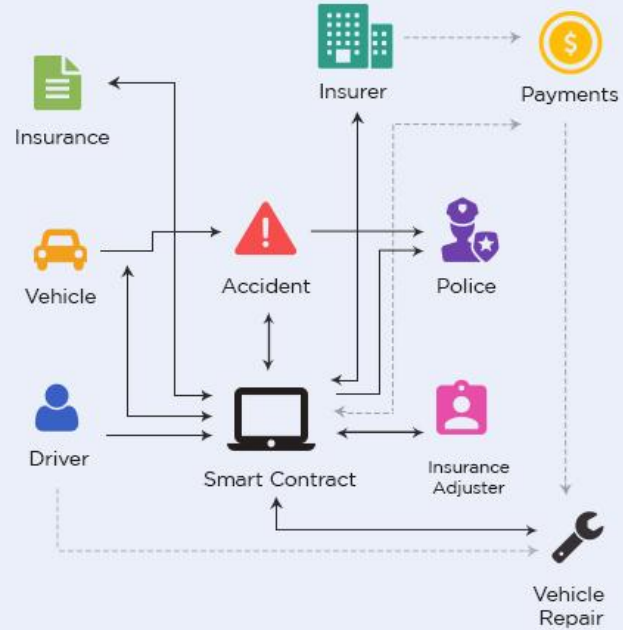
**CURRENT STATE**

Insurance
Insurer
Payments
Vehicle
Accident
Police
Driver
Insurance Adjuster
Vehicle Repair

**FUTURE STATE**

Insurance
Insurer
Payments
Vehicle
Accident
Police
Driver
Smart Contract
Insurance Adjuster
Vehicle Repair

# 50+ BLOCKCHAIN
## REAL WORLD USES CASES

**GOVERNMENT**
Essentia develops world's first blockchain solution to manage international logistics hub together with Traffic Labs and the Finnish Government
essentia.one

**IDENTIFICATION**
Voter registration is being facilitated via a blockchain project in Switzerland spearheaded by Uport.
uport

**MOBILE PAYMENTS**
The blockchain ledger that Ripple uses has been latched onto by a group of Japanese banks, who will be using it for quick mobile payments.
ripple

**INSURANCE**
A smart contract-based blockchain is being used by Insurer American International Group Inc as a means of saving costs and increasing transparency.
AIG

**ENDANGERED SPECIES PROTECTION**
The protection of endangered species is being facilitated via a blockchain project that records the activities of these rare animals.

**CARBON OFFSETS**
IBM is using the Hyperledger Fabric blockchain in China to monitor carbon offset trading.
IBM HYPERLEDGER

**ENTERPRISE**
Ethereum's blockchain can be accessed as a cloud-based service courtesy of Microsoft Azure.
Microsoft Azure

**BORDER CONTROL**
Essentia has devised a border control system that would use blockchain to store passenger data in the Netherlands.
essentia.one

**SUPPLY CHAINS**
IBM and Walmart have partnered in China to create a blockchain project that will monitor food safety.
IBM Walmart

**HEALTHCARE**
A number of healthcare systems that store data on the blockchain have been pioneered including MedRec.
MEDREC

**SHIPPING**
Shipping is a natural fit for blockchain, and Maersk have been trialling a blockchain based project within the maritime logistics industry.
MAERSK

**REAL ESTATE**
Blockchain is now being used to complete real estate deals, the first of which was conducted in Kiev by Propy.
PROPY

**ENERGY**
Essentia is developing a test project that will help energy suppliers track the distribution of their resources in real time, whilst maintaining data confidentiality.
essentia.one

**LAND REGISTRY**
Land registry titles are now being stored on the blockchain in Georgia in a project developed by the National Agency of Public Registry.
NATIONAL AGENCY OF PUBLIC REGISTRY

**COMPUTATION**
Digital Currency Group are helping Amazon Web Services examine ways in which the distributed ledger technology can help improve database security.
DIGITAL CURRENCY GROUP

**ADVERTISING**
New York Interactive Advertising Exchange has been experimen-ting with blockchain as a means of providing an ads marketplace for publishers.
NYIAX

**BORDER CONTROL**
Essentia is developing a blockchain project for border control that will allow customs agents to record passenger data from an array of inputs and safely store it.
essentia.one

**JOURNALISM**
Decentralized journalism, as enabled by blockchain technology, has the potential to prevent censorship and increase transparency, as Civil has shown.
CIVIL

**WASTE MANAGEMENT**
Waltonchain is using RFID technology to store waste management data on the blockchain in China.

**ENERGY**
Food importation is another industry where blockchain is proving its worth, with Louis Dreyfus Co trialling a soybean importation operation using this technology.
LDC.

**DIAMONDS**
The De Beers Group is using blockchain to track the importation and sale of diamonds.
DE BEERS GROUP OF COMPANIES

**FINE ART**
By storing certificates of authenticity on the blockchain, it's possible to dramati-cally reduce art forgeries, as one blockchain project is proving.

**NATIONAL SECURITY**
For the past two years, the US Department of Homeland Security has been using blockchain to record and safely store data captured from its security cameras.

**TOURISM**
In a bid to boost its tourism economy, Hawaii is examining ways in which blockchain-based cryptocurrencies can be adopted throughout the US state.
STATE OF HAWAII

**TAXATION**
In China, a tax-based initiative is using blockchain to store tax records and electronic invoices led by Miaocai Network.

**ENERGY**
Chile's National Energy Commission has started using blockchain technology as a way of certifying data pertaining to the country's energy usage as it seeks to update its electrical infrastructure.
CNE COMISIÓN NACIONAL DE ENERGÍA

**RAILWAYS**
Russian rail operator Novotrans is storing inventory data on a blockchain pertaining to repair requests and rolling stock
НОВОТРАНС

**ENTERPRISE**
Google is building its own blockchain which is integrated into its cloud-based services, enabling businesses to store data on it, and to request their own white label version developed by Alphabet Inc
Google Alphabet

**MUSIC**
Arbit is a blockchain-based project led by former Guns N Roses drummer Matt Sorum seeking a fairer way to reward musicians for their creative efforts.
arbit

**FISHING**
Blockchain technology has been used to provide a transparent record of where fish was caught, as a means of ensuring it was legally landed.

# Blockchain – Infrastructura informationala revolutionara
# Viziune de ansamblu

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Bucuresti 2019