

COMPUTERIZED ELECTORAL SYSTEM

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Superior Electoral Court

Brasilia, May 31st, 2022

SUMMARY

- Evolution of the electoral process
- Security and auditability
- Fact or fake?



EVOLUTION OF THE ELECTORAL PROCESS

BRAZIL'S ELECTORAL PROCESS



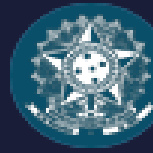
Voters
147.9 million



Municipalities
5.570



Electoral Zones
2,600



Polling stations
402,000



Polling places
95,000



Political Parties
33



Candidates
553,000



Poll workers
2 million

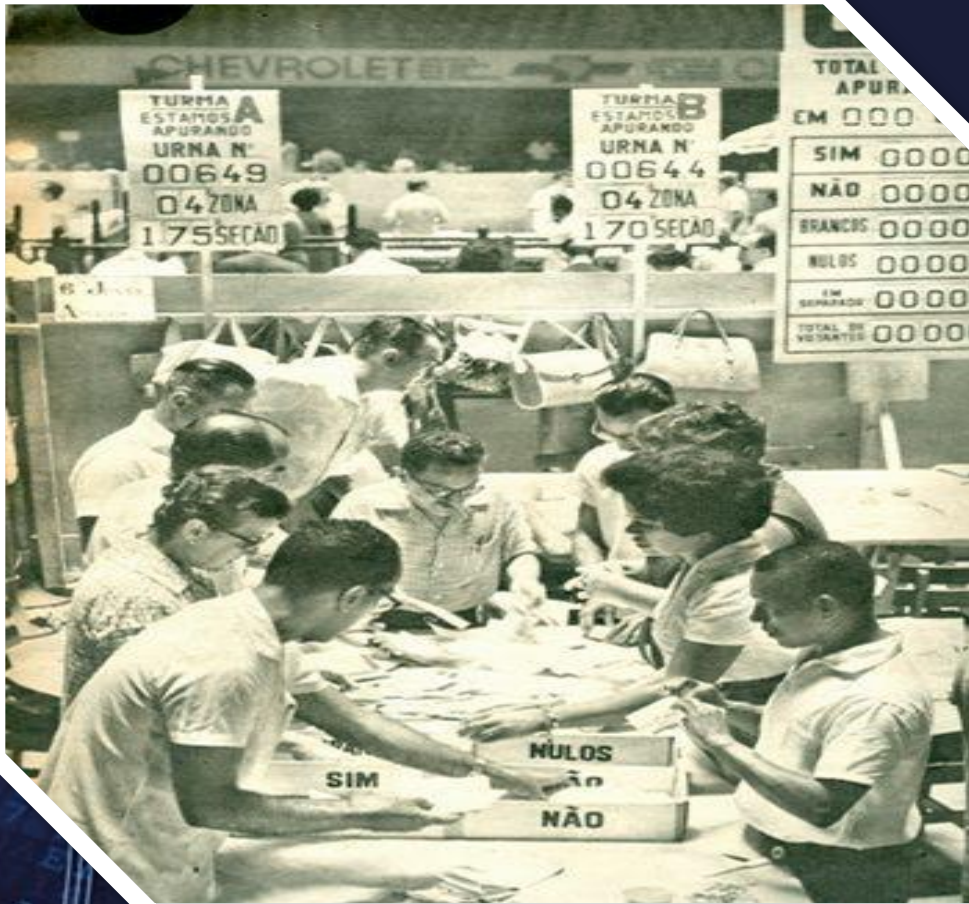


Voters with biometrics
117.5 million



Electronic ballot boxes
473,000

PARADIGM SHIFT: MANUAL -> DIGITAL



[globo.com](#) | [g1](#) | [globoesporte](#) | [gshow](#) | [videos](#)

ASSINE JÁ

MENU

G1

MUNDO

Contagem manual de milhões de votos deixa 272 pessoas mortas e outras 1.878 doentes na Indonésia

Foi a primeira eleição do país de 260 milhões de habitantes que juntou o voto presidencial com as cédulas parlamentares nacionais e regionais em um mesmo pleito para economizar dinheiro; muitos funcionários morreram de cansaço.



Manual
process



Human
intervention



CONSEQUENCES

Slowness

Unintentional
failures

Intentional
failures

FRAUD!

SOLUTION

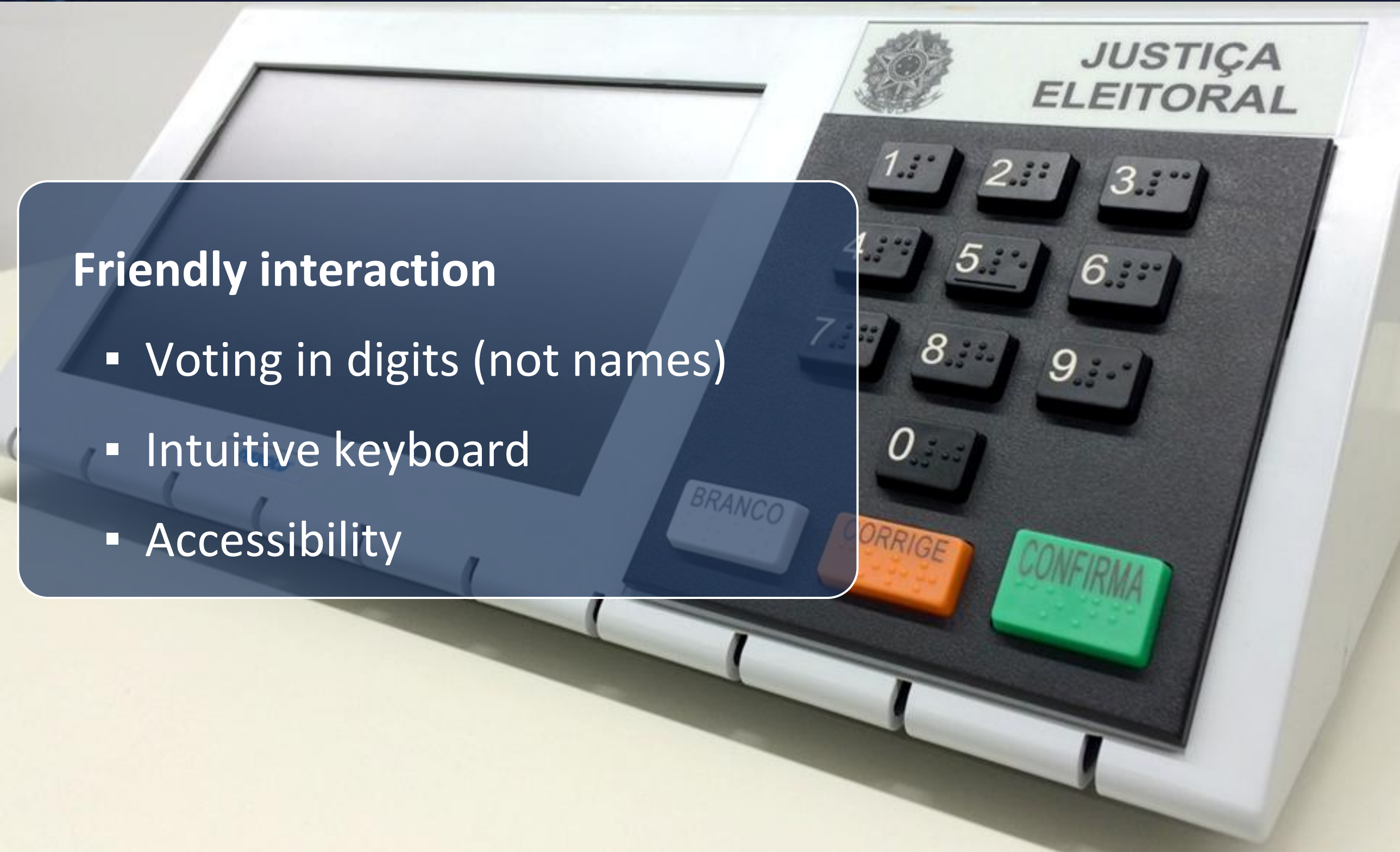


Automation

PARADIGM SHIFT: MANUAL -> DIGITAL

Friendly interaction

- Voting in digits (not names)
- Intuitive keyboard
- Accessibility





SECURITY AND AUDITABILITY

SAFETY AND TRANSPARENCY TOOLS



Pre- and post-election auditing

Source Code Audit

System sealing, digital signature and publishing of digital summaries

Correlation tables

Physical seal

Biometric voter ID

Integrity Test (Parallel Voting)

System Officialization

Digital record of the vote

Electronic ballot box logs

SUPERVISING ENTITIES (TSE RES. 23.603)

- Political parties and coalitions
- Brazilian Bar Association
- Fiscal Prosecution Office
- National Congress
- Federal Supreme Court
- Office of the Controller General
- Federal Police
- Brazilian Computer Society
- Federal Council of Engineering and Agronomy
- National Council of Justice
- National Council of Public Prosecution Service
- Brazilian Court of Audit
- Armed Forces
- Brazilian non-profit private entities, with notorious performance in inspection and transparency of public management, accredited with the TSE
- Information technology departments of universities accredited with the TSE.

The Brazilian electoral process abides, in terms of **inspection and auditing**, by Resolution/TSE no. 23.673/2021, Article 6.

AUDIT OPPORTUNITIES BEFORE ELECTION DAY

TPS

Teste Público de Segurança, Public Safety Test

Source Codes

Inspection and audit of electoral systems during their development, with the opening of source codes

Ceremonies

Digital Signature and Sealing of Electoral Systems

Media Generation Ceremony and Polling Station Preparation

Verification of the authenticity and integrity of electoral systems by checking the digital signatures and digital summaries of electronic ballot box software

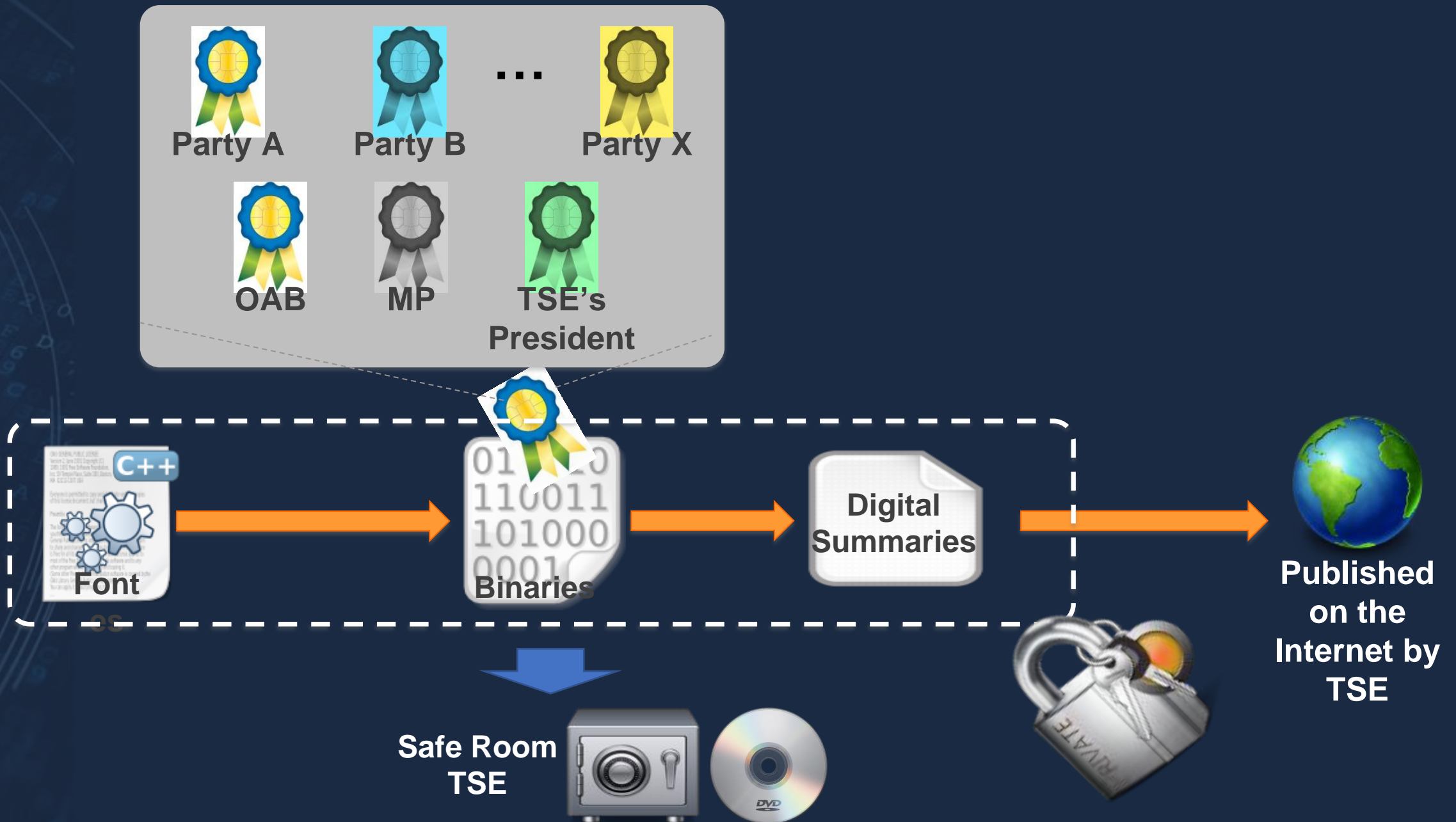
TSE Verification

Verification of the electoral systems installed at the TSE

Transmission

Verification of the systems intended for the transmission of polling station results (“boletins de urna”)

SYSTEM SEALING - SIGNATURE



AUDITING OPPORTUNITIES DURING ELECTION DAY

Integrity Test

Functioning audit of the electronic ballot boxes (formerly known as Parallel Voting)

Election Day Audit

Auditing the functioning of the electronic ballot boxes on polling day by system verification

Election Observation Missions (international and domestic)

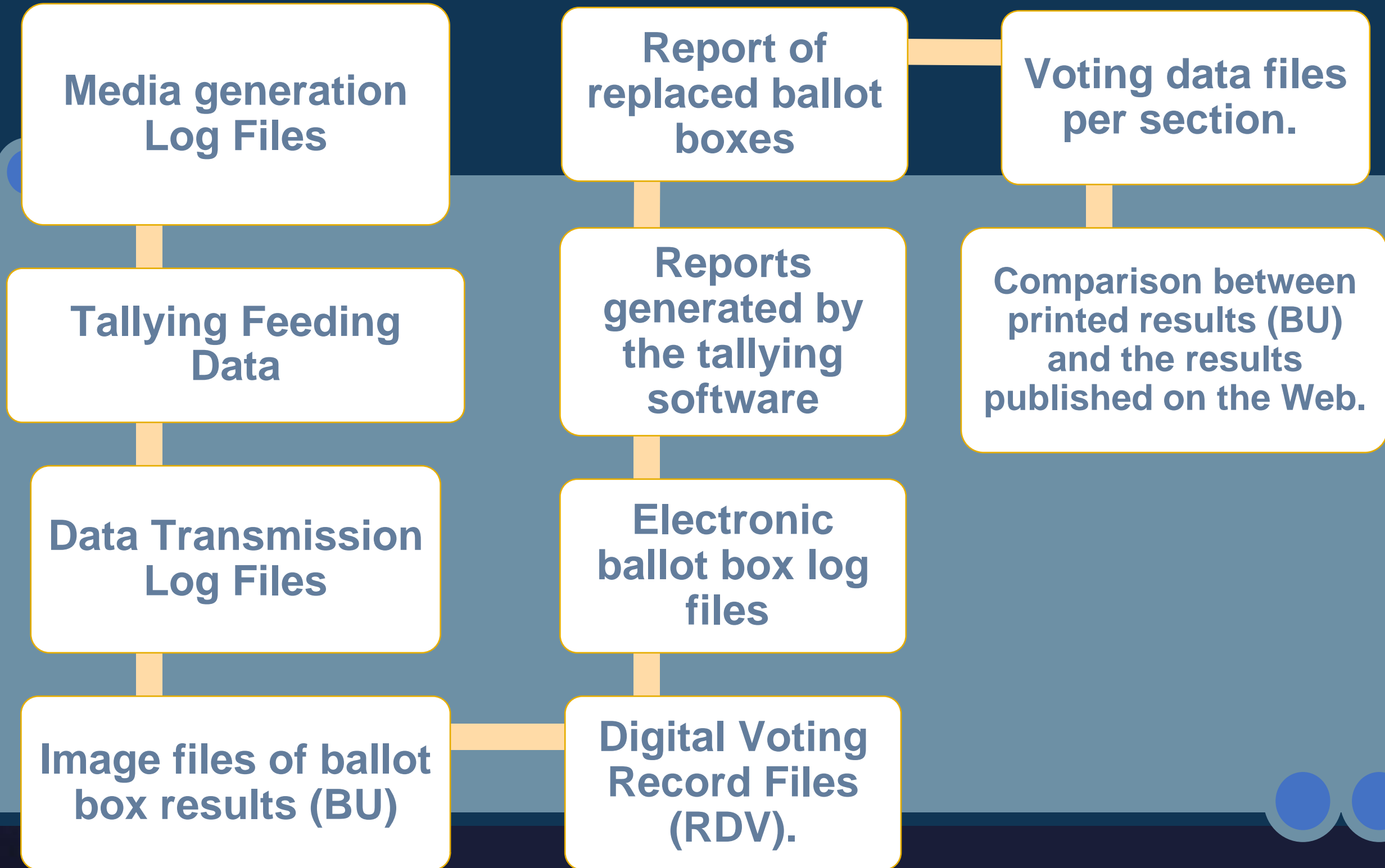
In 2020:
Organization of American States – OAS;
Electoral Transparency Brazil

INTEGRITY TEST



Controlled and
audited voting

AUDIT OPPORTUNITIES AFTER ELECTION DAY



Comparison between the printed BU and the BU on the Web.

Auditing the transmission and tallying of votes by comparing the printed ballotbox results with the ballotbox results published on the web.



Eleição Municipal Suplementar 2021

Início Totalização Favoritos Boletins de Urna

Selecione os parâmetros de pesquisa

Sidrolândia, MS

Zona 0031 Seção 0001 Pesquisar

Boletim de urna – Resultados por seção eleitoral

Atualizado em 13/06/2021 22:35:21

Identificação				
Município	Zona Eleitoral	Seção Eleitoral	Local de votação	Seções agregadas
91570 - SIDROLÂNDIA	31	1	1015	118
Junta apuradora	Turma apuradora			
-	-			
Urna Eletrônica				
Código de identificação UE	Data da abertura UE	Data do Fechamento UE	Código de identificação da carga	Código de identificação MC
1760204	13/06/2021 07:05:36	13/06/2021 17:02:36	971.729.087.188.036. 392.462.784	85707565
Software de impressão	Resumo da correspondência	Situação		
-	462.784	Apurada		



Assurance that the result of Any voter can inspect his the polling station was or her polling station. correctly summed up.



FACT OR FAKE?

Fato ou Boato?

**The electronic ballot box
was created by an
unknown or unreliable
company**



Who created the electronic ballot box?

**Developed by TSE
1st used in 1996**



ELECTRONIC BALLOT BOX

**Created by a group
composed of specialists in
IT, electronics and
communication**

**Electoral Justice
Armed Forces
Ministry of Science
and Technology
ITA
INPE
Ministry of
Communication**



**Tribunal
Superior
Eleitoral**



**BRASIL
GOVERNO FEDERAL**

Fato ou Boato?

The electronic ballot box was created by an unknown or unreliable company

FAKE

Fato ou Boato?

A hacker uses the Internet to break into the NASA, FBI or Pentagon systems, why not the electronic ballot box?

BANCO DE NOTÍCIAS DESTAQUES

Hacker invade sistema e rouba dados do FBI com um 'simples telefonema'

16/02/2016

De nada a a ataque segurança. A i departamento



Hackers invadem Pentágono através das redes sociais

JULIANA AMÉRICO 29/05/2017 14H30

CIBERATAQUE :: CIBERCRIME :: PHISHING

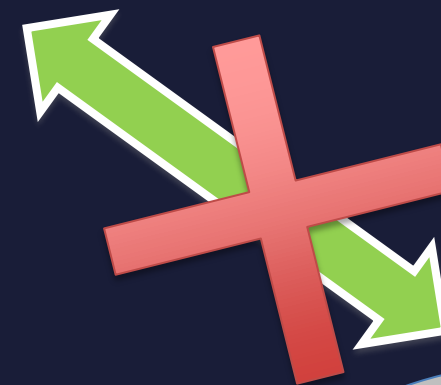
Cybercriminosos russos conseguiram invadir o computador de um funcionário do Pentágono, nos Estados Unidos. No entanto, eles não precisaram de nenhuma tecnologia muito avançada ou de e-mails infectados.

De acordo com o New York Times, os hackers só precisaram anexar um link prometendo um pacote de férias a um post no Twitter postado por uma conta de robô para ter acesso ao computador da vítima.

Source: Sites Tecmundo and Olhar Digital

STAND ALONE BALLOT BOX

**System safety
precept**



Fato ou Boato?

A hacker uses the Internet to break into the NASA, FBI or Pentagon systems, why not the electronic ballot box?

FAKE

Fato ou Boato?

Fraud takes place when results are transmitted

Hacker de 19 anos revela como fraudou eleições no Rio de Janeiro

 Curtir 1,5 mil  Tweetar  G+

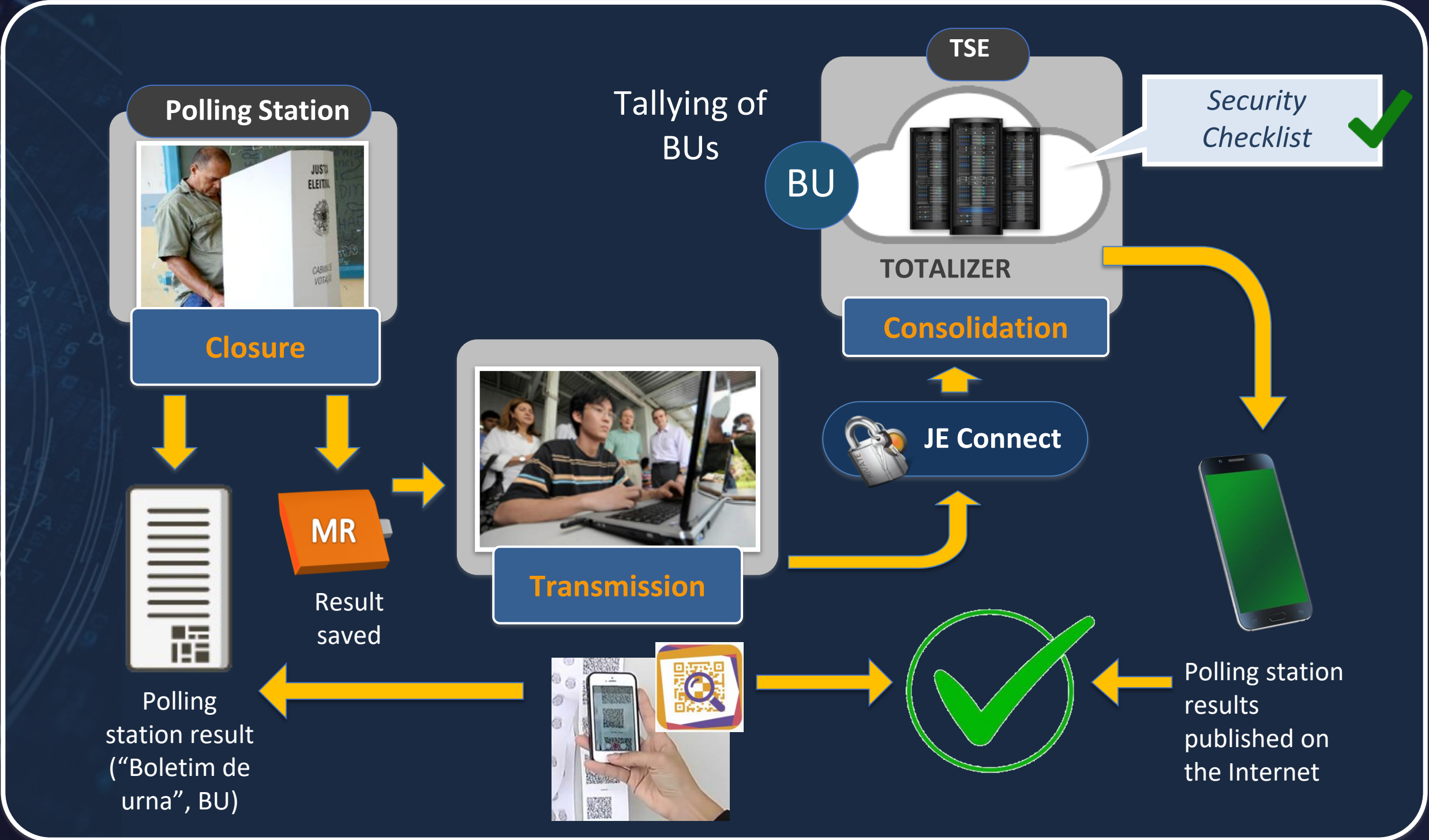
Ao interceptar dados transmitidos pelas urnas, hackers são capazes de modificar resultados eleitorais
por Redação Galileu



Ao que parece, o sistema de contabilização de votos através das urnas eletrônicas não é seguro. Nesta segunda-feira, dia 10 de dezembro, um Hacker de 19 anos, identificado apenas como Rangel, contou como conseguiu fraudar resultados das últimas eleições, durante um seminário chamado "A urna eletrônica é confiável?".

Source: Revista Galileu

VOTING DAY



Fato ou Boato?

Fraud takes place
when results are
transmitted

FAKE

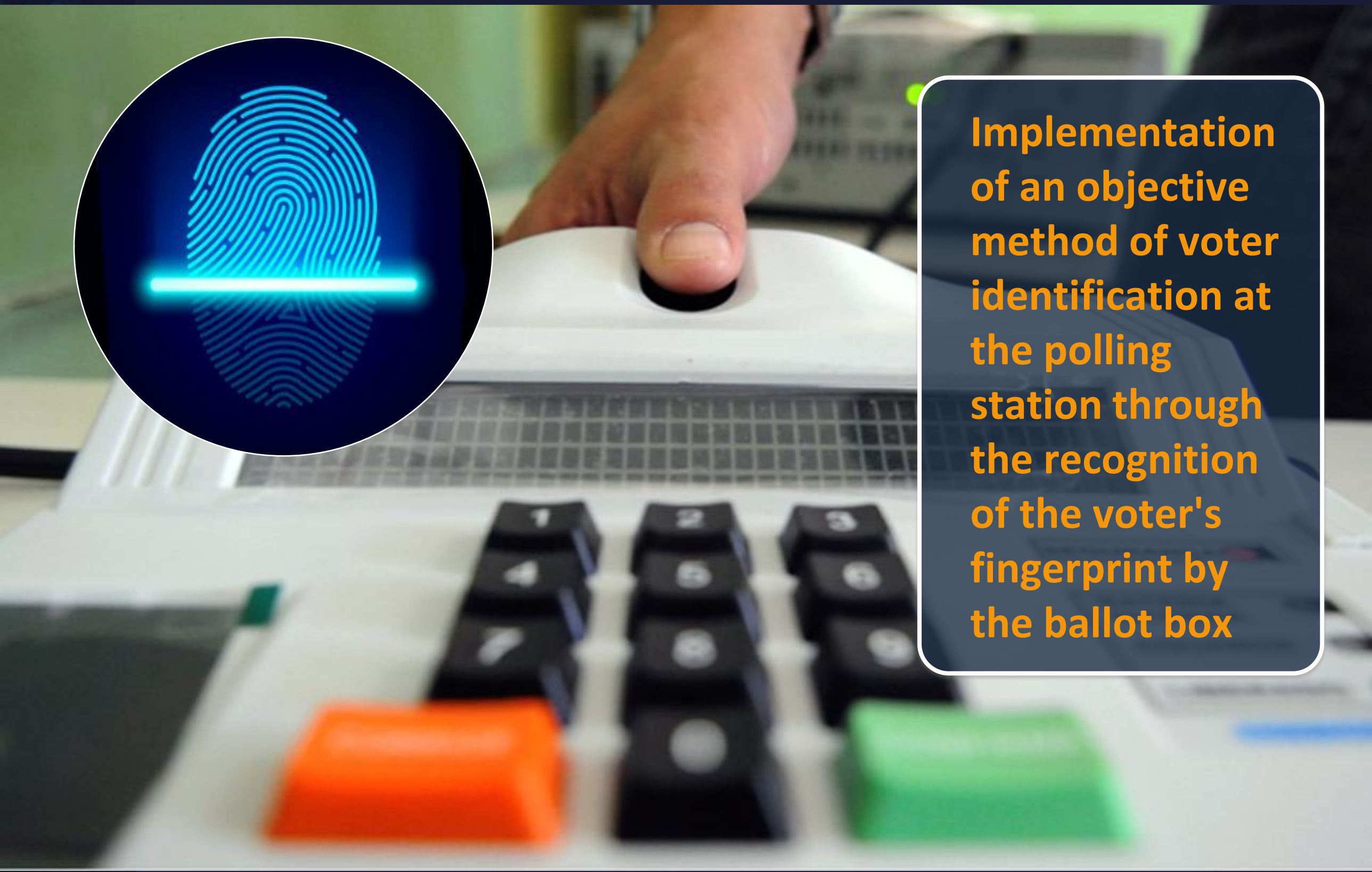
Fato ou Boato?



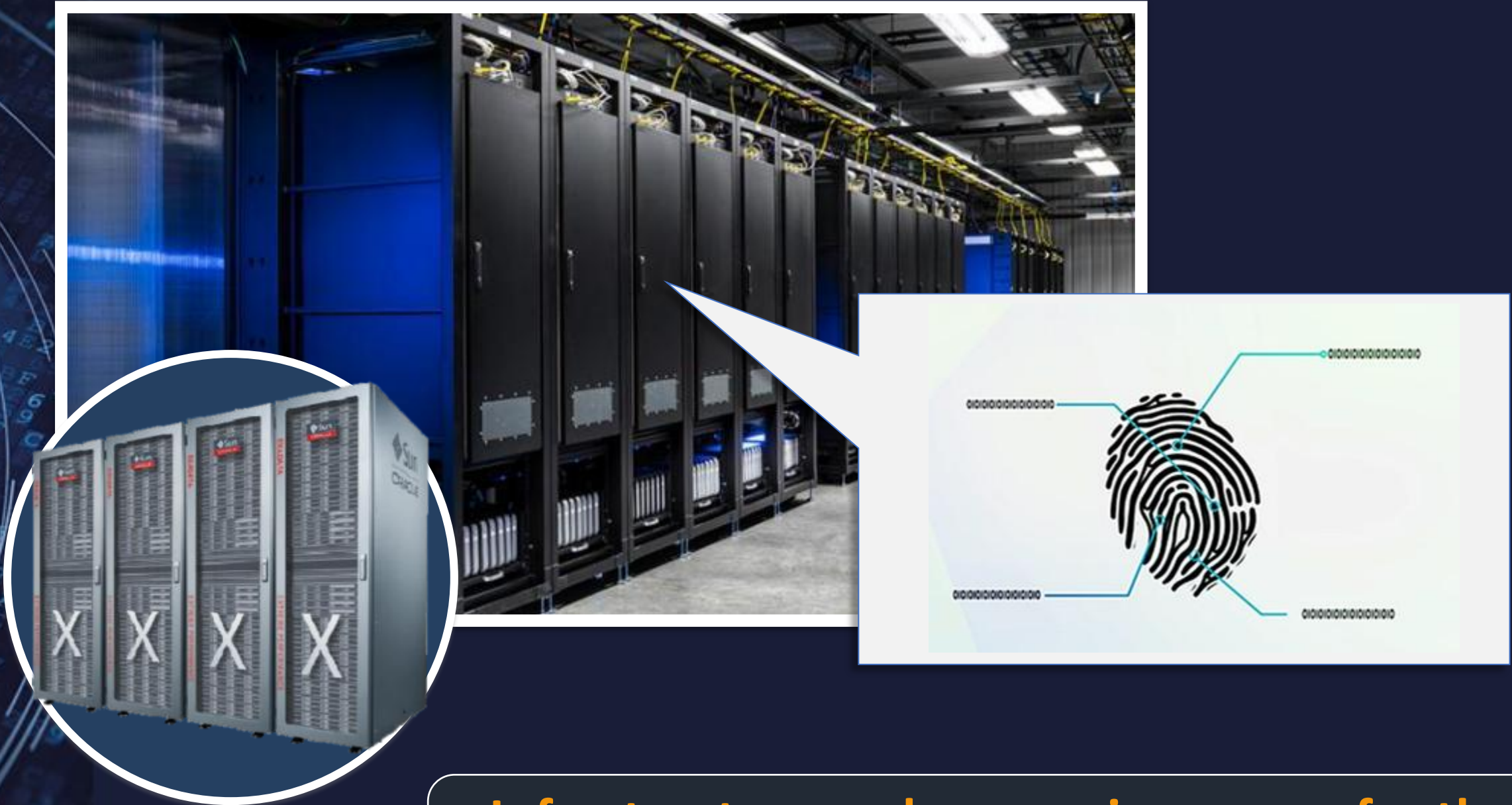
**Someone else can
vote in my place.**



**Implementation
of an objective
method of voter
identification at
the polling
station through
the recognition
of the voter's
fingerprint by
the ballot box**



VOTER UNIQUENESS THROUGH BIOMETRICS



Infrastructure and processing power for the individualization of the voter's fingerprints

Fato ou Boato?

Someone else can
vote in my place.

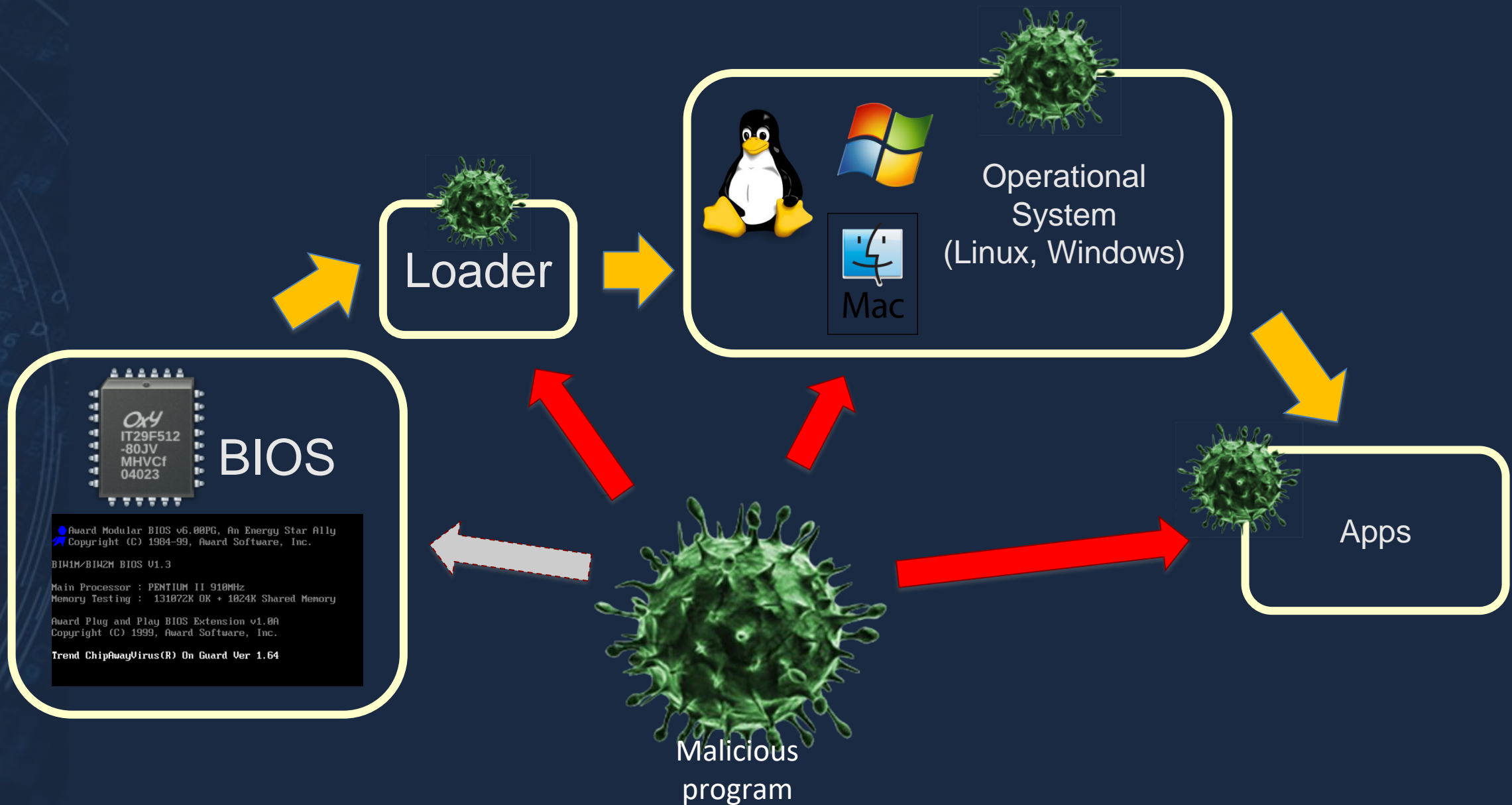
FAKE

Fato ou Boato?

**Malicious or modified
(tampered) software
can operate in the
electronic ballot box**

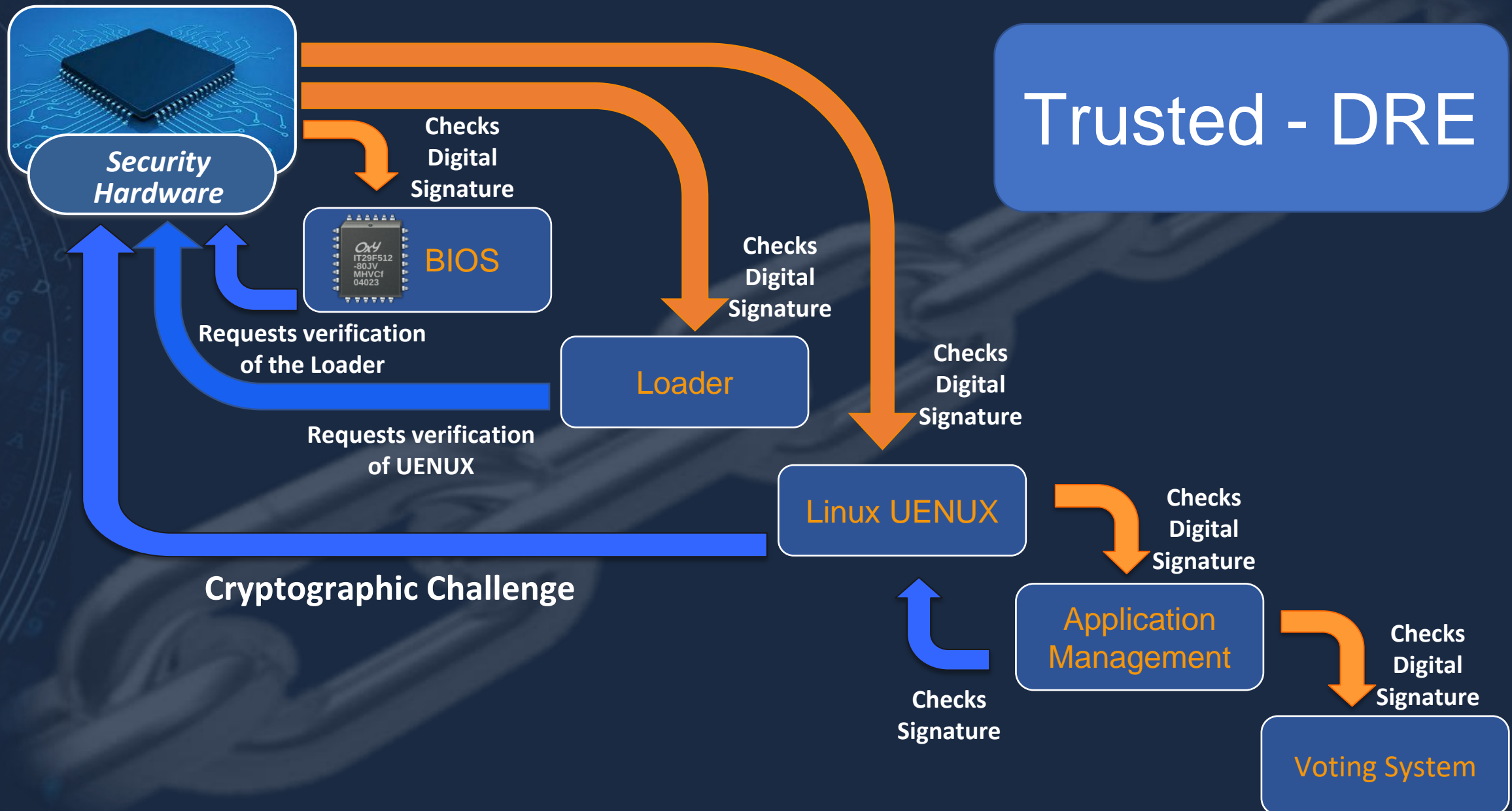


Normal computer



BRAZILIAN ELECTRONIC VOTING SYSTEM

Hardware-based Chain of Trust



Fato ou Boato?

Malicious or modified
(tampered) software
can operate in the
electronic ballot box

FAKE



Tribunal
Superior
Eleitoral

Fato ou Boato?

**Only Brazil uses
electronic ballot
boxes**



E-VOTING UTILIZATION WORLDWIDE



USE OF E-VOTING AROUND THE WORLD

E-voting is the use of electronic means in elections to cast or count votes



Data as of February 2015

For more detailed data visit: www.idea.int/elections/ict

25 countries

Electronic voting in national elections, subnational elections, or a combination of the two

Electronic voting has already been used, but they've dropped the process

Electronic voting has never been used

Electronic voting has never been used, but viability studies and/or tests are being conducted

Countries that were not part of the survey

Fato ou Boato?

Only Brazil uses
electronic ballot
boxes

FAKE



Fato ou Boato?

**Brazil is a world
reference in
computerized
electoral processes**



POSITIONING OF THE BRAZILIAN ELECTORAL PROCESS IN THE WORLD

Countries to which the TSE has provided technical cooperation on electoral issues:



Dominican Republic



Costa Rica



Ecuador



Paraguay



Mexico



Argentina



Guiné Bissau



Haiti

POSITIONING OF THE BRAZILIAN ELECTORAL PROCESS IN THE WORLD

Countries that showed interest in learning more about the Brazilian electoral process:



Japan



Portugal



South Korea



France



Ukraine



Turkey



Tunisia



Colombia



Peru



Venezuela



Panama



Zambia



Spain



Austria



United States of America



Iran



Burkina Faso



Honduras



Guatemala



Philippines



Cape Verde

POSITIONING OF THE BRAZILIAN ELECTORAL PROCESS IN THE WORLD

Countries that showed interest in learning more about the Brazilian electoral process:



Indonesia



Mozambique



Sao Tome and Principe



Poland



Guine-Bissau



Nepal



Afghanistan



East Timor



Palestine



Suriname



India



Italy



Paquistan



Angola



Portugal



Kenia



Argentina



Armenia



Austria



Belgium



Benin

POSITIONING OF THE BRAZILIAN ELECTORAL PROCESS IN THE WORLD

Countries that showed interest in learning more about the Brazilian electoral process:



Botswana



Ecuador



Paraguay



Cameroon



Guyana



Dominican Republic



Canada



Equatorial Guinea



Romania



Chile



Haiti



Russia



Congo



Iraq



Sudan



Ivory Coast



Mexico



Uruguay



Costa Rica



Namibia



Sri Lanka

POSITIONING OF THE BRAZILIAN ELECTORAL PROCESS IN THE WORLD

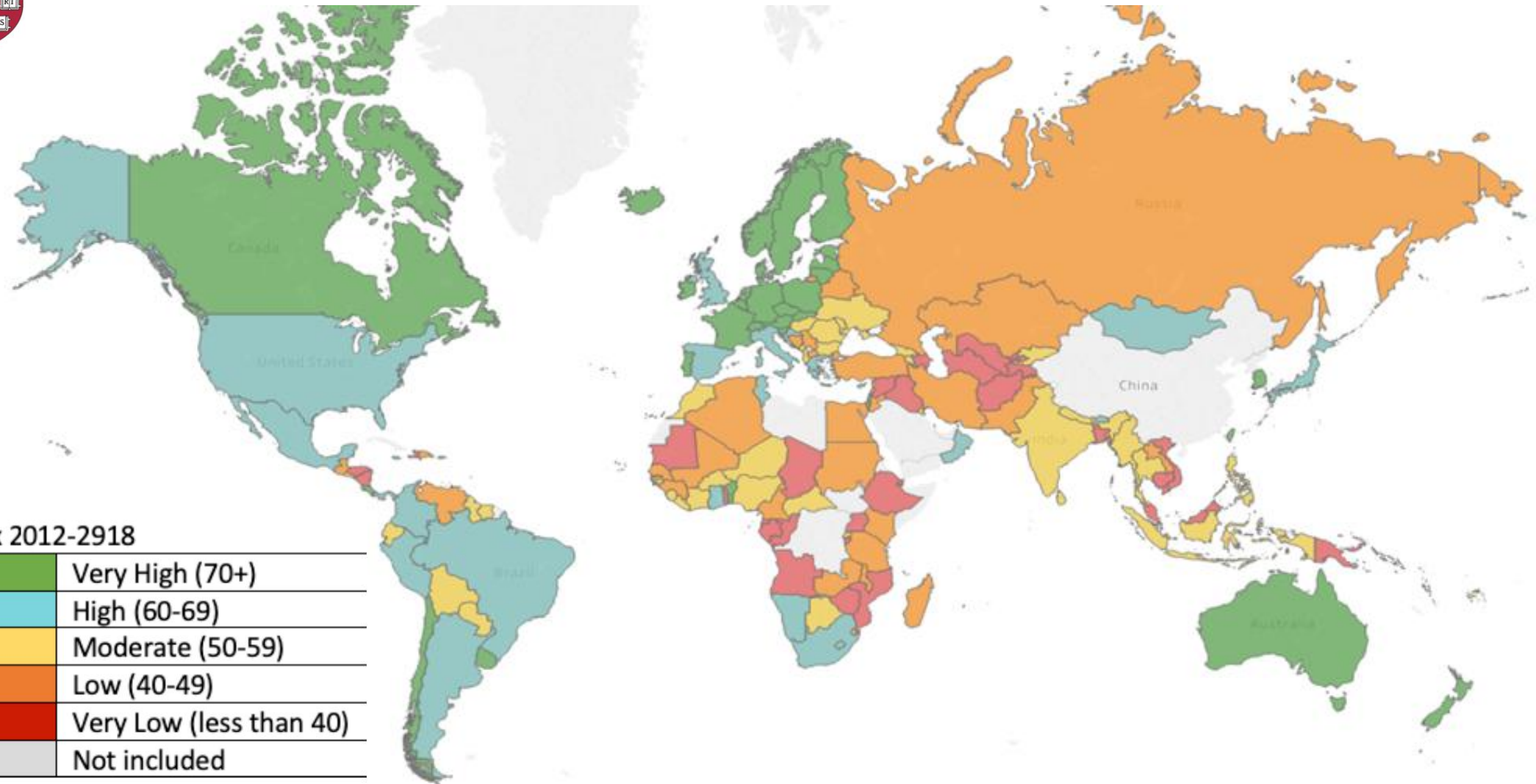
International Acknowledgment - 2019

HARVARD
UNIVERSITY



PEI Index 2012-2018

	Very High (70+)
	High (60-69)
	Moderate (50-59)
	Low (40-49)
	Very Low (less than 40)
	Not included



Source: The Perceptions of Electoral Integrity expert survey, country-level www.electoralintegrityproject.com

Fato ou Boato?

Brazil is a world
reference in
computerized
electoral processes

FACT



Watch

‘25 anos da urna eletrônica:
uma história de sucesso’ (‘25
years of the electronic ballot box:
a success story’)



Watch

‘A evolução do processo eleitoral
brasileiro’ (‘The evolution of the
Brazilian electoral process’.)



THANK YOU!

Júlio Valente

Information Technology Secretary
Superior Electoral Court