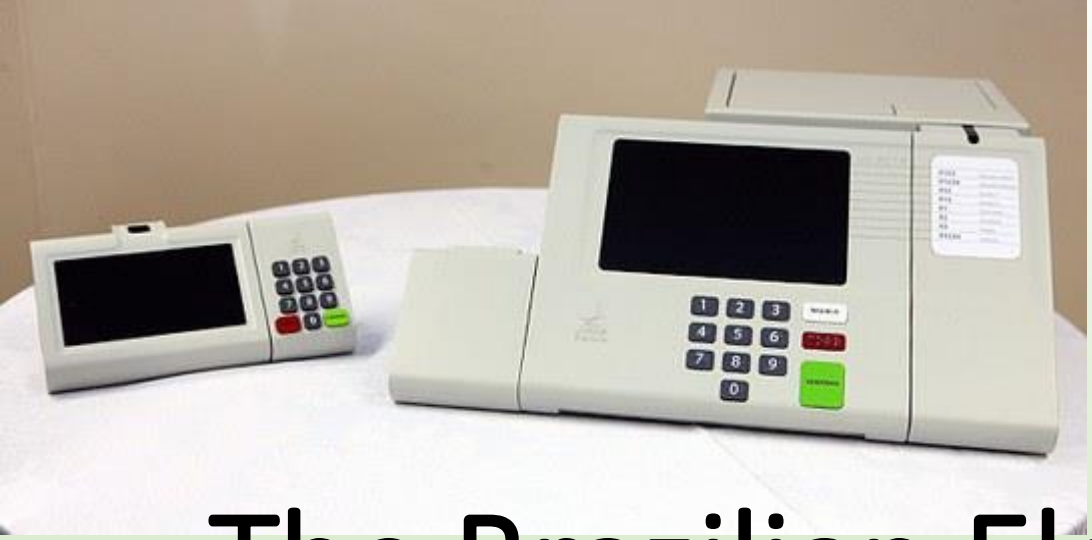
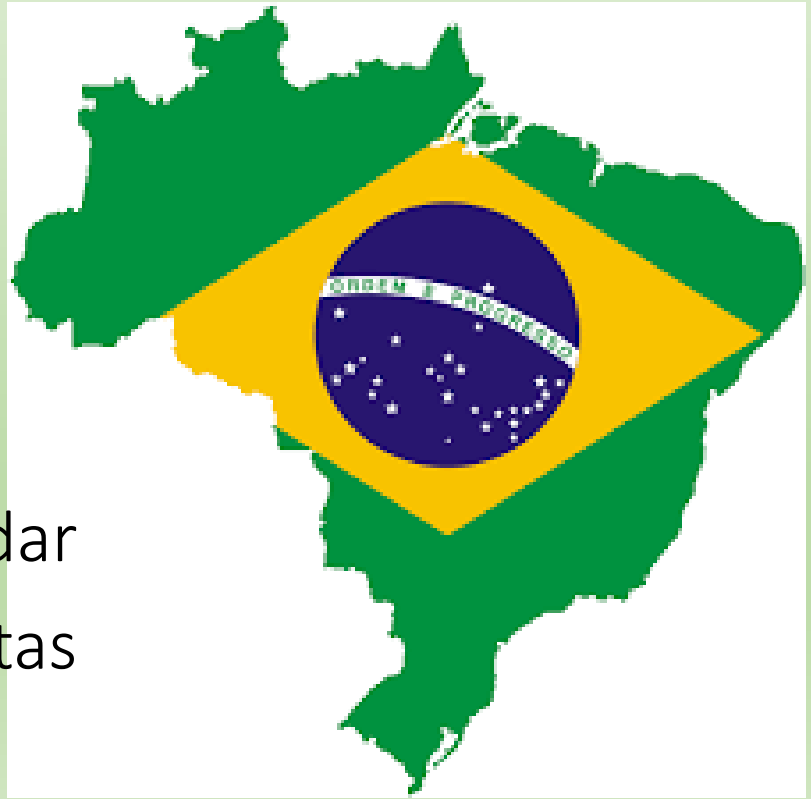


The Brazilian Electronic Voting System: evolution and challenges



Marie Anne Macadar

Jorge Lheureux de Freitas

The Brazilian Electronic Voting System: evolution and challenges

Approach

- Context
- Criticism
- Internal View
- Crossing Perceptions
- Final Remarks

Context – State X

São Paulo - more than 45 million of people

Electoral Court of State X (1 of 27) – close to Belgium population

9 million electoral voter records

Context - Before Electronic Voting

- Before 1996
  - 10% illiterate people (Brazil)
  - Writing names or numbers
  - Ballot Sheets
  - Ballot box
  - A great number of parties
  - Hundreds of candidates for each political position
  - Vote at the candidate
  - Delays in reporting results
  - Possibility of fraud (Rio de Janeiro and Alagoas -1994)

Context - Electronic Voting

1995 - 1996

- The answer – electronic voting system
- 1995 – Committee in charge of creating the electronic voting system concept
- Conclusions: The equipment should:
  - Be easy to: install, operate by the voter and the poll workers
  - Robust and low cost
  - Have its own energy source and no network connection (standalone)
  - Interface by numbers

Internal view – Challenges (GD)

- Mandatory choices
  - 5 choices between more than 1,000 candidate's numbers (2014) –
  - president (8),
  - governor (8), senator (8),
  - Federal Deputy (328) and
  - State Deputy (731)

Internal View – Logistic (EC)

Electoral Court of State X

+ 170 Electoral offices

30,000 electronic ballot boxes – 25,000 poll stations

400 employees + 900 temporary workers

Training, testing (hardware, software, proceedings)

20,000 machines delivered in 6 hours to 7,200 polling stations

25,000 machines colleted in 5 hours on a 250,000 km² area

Criticism

- Lack of auditability - Transparency
- Secrecy of the vote - Security
- Costs
- Market driven approach (Technology) versus social-driven approach
- Focus on external attacks/ risks of internal attacks
- Cryptography

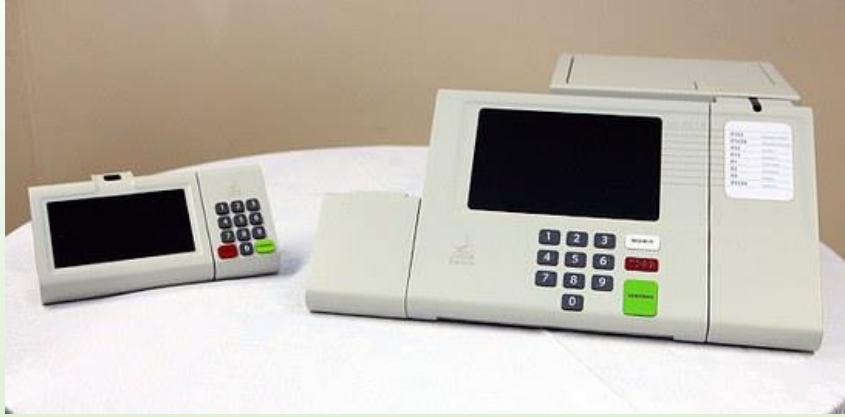
Internal View – Security issues (CIO)

- Focus on external attacks / neglect internal attacks – ballot box architecture and software signed by a set of keys (transparency)
- One Cryptographic key for all electronic ballot boxes (contingency)
- Electronic voting development without user participation (public audiences about printed vote)
- Data modification during the transmission
- Lack of transparency and source code verification (98% to 2%)
- Secrecy of vote – it shuffles the votes and doesn't record the order
- Biometric voter registration
- Fraud proof – No proof from 1996 to today.

Crossing Perceptions

- Security – GD, EC and CIO – “there was not a single case of proven fraud regarding the electronic ballot box (GD)”
- Transparency -
  - GD recognizes the problem (“the level is improving”)
    - Printed vote (“a printed vote does not increase security”)
  - CIO – Advocates more transparency opening 98% of the software to the community
    - Printed vote is mandatory
  - EC - printed vote is necessary, but in sampling terms

Crossing Perceptions



- Costs
  - All the deponents consider the system expensive
  - CIO – election without frauds – “a social good for the country”
  - EC
    - hardware maintenance
    - Logistic
    - Human Resources
- Vote online
  - GD - More security resources
  - EC – voter identification
  - CIO – secrecy of the vote
  - Inside certain or the farmer slums or poor farm areas, the mafia can force people to vote for a certain candidate or even use their voter registry and vote for them

Concluding Remarks

- Transparency - ways to improved it
  - The ordinary citizen doesn't understand how the system works – campaing to explain it
  - Disclose the proceedings against internal attachs
  - Open the software sources code (98%)
  - Printed vote – auditability and higher costs
- Costs – search for lower costs
- Online voting is incompatible with Brazilian reality

Thank you very much!

jorge.freitas@acad.pucrs.br