e - voting in Estonia

experience

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ID card : statistics 2006

compulsory identification document since 2001

remote identification (PIN 1)

digital signature (PIN 2)

ID cards issued 972 353 (total pop 1,35 Mio)

users of digital signature 21 747

users of remote identification 30 625

(31/07/2006)

tools for e-Voting

- Estonian **ID card** with valid certificates and PIN codes
- **computer**
- **Internet** access
- **smart card reader**
- **driver for ID card** (free to download: www.id.ee/installer)

remote Internet voting

local government elections

advance poll days

10.-12. October 2005

~ 70% of all people

entitled to vote had a chance to vote via Internet

~2% of actual voters

used that possibility

statistics

persons entitled to vote	1 059 292
voter turnout	47%
votes cast	502 504
e-votes cast	**9 287**
e-votes among all votes	1,87%
e-votes among advance votes	8 %
total number of e-votes	**9 681**
repeated e-votes	364
cancelled e-votes	30

hypotheses

(1) e-voting does not increase general voter turnout, but it stops decreasing turnout encouraging “disloyal” voters TRUE

(2) political players will use new e-voting-related not allowed methods (buying e-votes etc) and there will be a flow of complaints to the NEC and National Court NOT TRUE

(3) people will accept e-voting without any problem as an essential equally accessible convenience in an information society TRUE

(1)

e-voting slightly fostered the participation of ”sometimes-voters”

democracy axioms

- high turnout is positive
- every citizen is competent enough to participate in decision-making

give *reason d´etre* for e-voting

- voting in 2 minutes at home or workplace
- Internet as main information channel
- compulsory smart-vote?

rethinking of voting procedure and principles

- election day as national red-letter day
  - advance poll days
- going to the polling station as a ritual
  - voting by mail
  - voting at home, hospital, prison etc
- voting in privacy as a duty supervised by the government
  - privacy as a sub-principle of freedom of electoral choice is not an aim in itself

principle of secrecy

consists of 2 sub-principles:

- anonymity
- voting in privacy

(the fact, whether or not citizen did vote is not regarded as part of secrecy)

the aim is to guarantee the freedom of choice

sub-principle of privacy

cannot be guaranteed by e-voting and voting by mail, therefore other methods to guarantee free expression of the voters real will are required

- the right to change the e-vote
  - for how many times?
  - during which period?
- paper-ballot priority

one voter one vote : counting advance ballots

e-vote in two digital envelopes	paper ballots given outside of ones home station in two paper envelopes	paper ballot given in ones home station without envelopes in ballot box
+		
+ + + + + +		
+ +	+	
+ + all invalid	+ + all invalid	
+ +	+ (+)	+
+ +		+

(2)

the LEGITIMACY of the e-voting depends mainly on emotional background given in media; media reflection depends mainly on the behavior of the political parties

public trust persists

experience of fair electoral process; the generally high reputation of Estonian electoral administration

social agreement on the principles of fair e-voting

no complaints because of e-voting

andmed: *Faktum*, 2005

principles for fair e-voting

parties do not:

- organize collective voting actions
- send e-campaign materials with a link to the e-voting website (www.valimised.ee)
- threaten without objective reasons the legitimacy of elections and/or e-voting on selfish day politics grounds
- etc...

See E-government Academy at ***www.ega.ee***

auditing

- was performed by KPMG Baltics AS
- performed at all key elements of the project structure
- in the report, all actions and processes were found relevant
- no problems or misusage of the system was found

(3)
2010: e-voting shall be an obvious equally accessible public service in an information society

factors important for choosing e-voting

- important: trust and access, age (temporarily important!), mother tongue (needs further analysis)
- **unimportant**: sex, settlement (city/rural area), education, income, **political preferences**, trust towards government, trust towards other e-services,Internet access point (home, workplace, public access point etc)

allikas: Trechsel/Breuer 2006

detailed information

- **e-voting report**

http://www.vvk.ee/english/report2006.pdf

- **all results and more**
  http://www.vvk.ee/engindex.html
- **e-voting general description**
  http://www.vvk.ee/elektr/docs/Yldkirjeldus-eng.pdf

conclusion (1)

- e-voting is possible
- e-voting is constitutional
- **e-voting shall be regarded as constitutionally guaranteed public service: in 2010 not rendering e-voting would probably contradict to the principle of uniformity of elections**
- e-voting requires
  - rethinking the principle of privacy
  - means to ensure the principle of free elections, i.e. the freedom to express voters real will

conclusion (2)

- the principles of fair e-voting (e-campaigning methods etc) shall be discussed in broader public: common understanding / social agreement “works” in this case better than penal law

- we should now draw our attention to security and auditability of the e-voting system

Internet Voting in Estonia

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National Electoral Committee

E-stonia ?

- Population: 1.35M
- Everyday Internet usage: 58%
- Internet banking: 88%
- Mobile penetration: >100%
- 1000+ Free Internet Access points

- PKI penetration: >80%
- **Biggest national eID card roll-out in the Europe !**

Internet Voting?

- In October 2005 Estonia had first-ever pan-national Internet Voting **with binding results**

- ~80% of voters had a chance to vote via Internet due to the ID-card
- ~2% of participated voters used that possibility

ID-card Project

- Started in 1997
- Law on personal identification documents: Feb, 1999
- Digital Signature Act: March, 2000
- Government accepted plan for launching ID-card: May, 2000
- First card issued: Jan 28, 2002
- June 2006: 950 000+ cards have been issued

The Card

- “Compulsory” for all residents

- Contains:
  - Personal data file
  - Certificate for authentication (along with e-mail address Forename.Surname@eesti.ee)
  - Certificate for digital signature

Usage of the ID-card

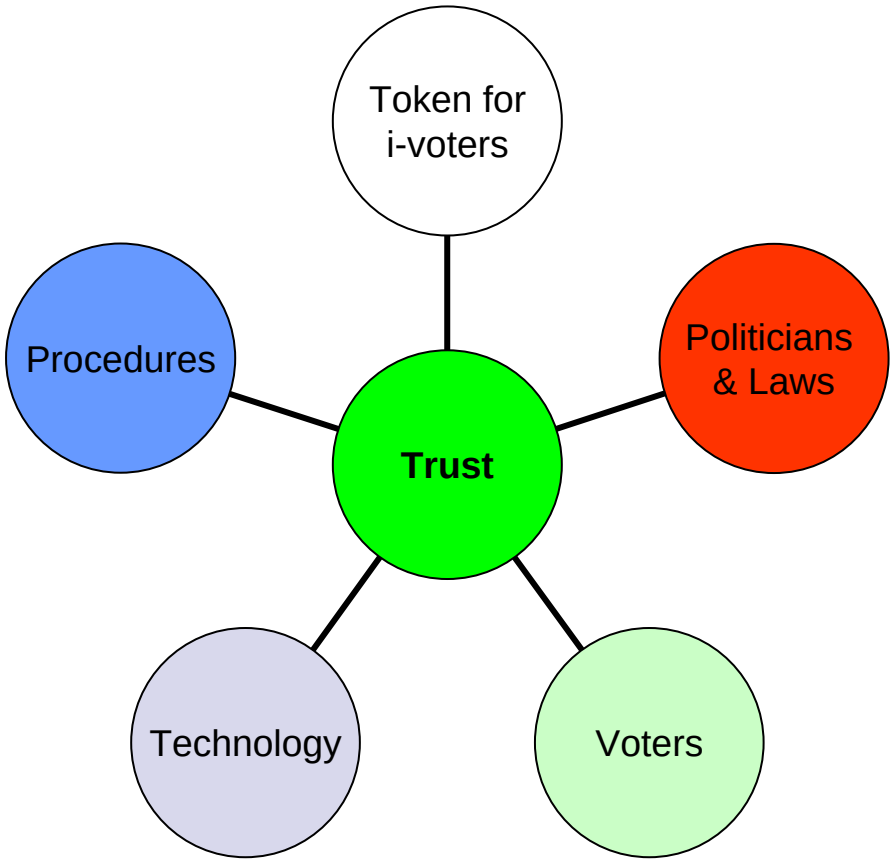
- Major ID-document
- Replacement of
  - (transportation) tickets
  - library cards
  - healt insurance card
  - driver documents
  - etc...
- Authentication token for all major e-services
- Digital signature tool

Internet Voting ?

- Not a nuclear physics
- Just another application for ID-card

  ...with some special requirements & measures...

What it takes ?



I-voting Main Principles

- All major principles of paper-voting are followed
- I-voting is allowed during period before Voting Day
- The user uses ID-card
  - System authenticates the user
  - Voter confirms his choice with digital signature
- Repeated e-voting is allowed
  - Only last e-ballot is counted
- Manual re-voting is allowed
  - If vote is casted in paper during absencee voting days, e-vote(s) will be revoked

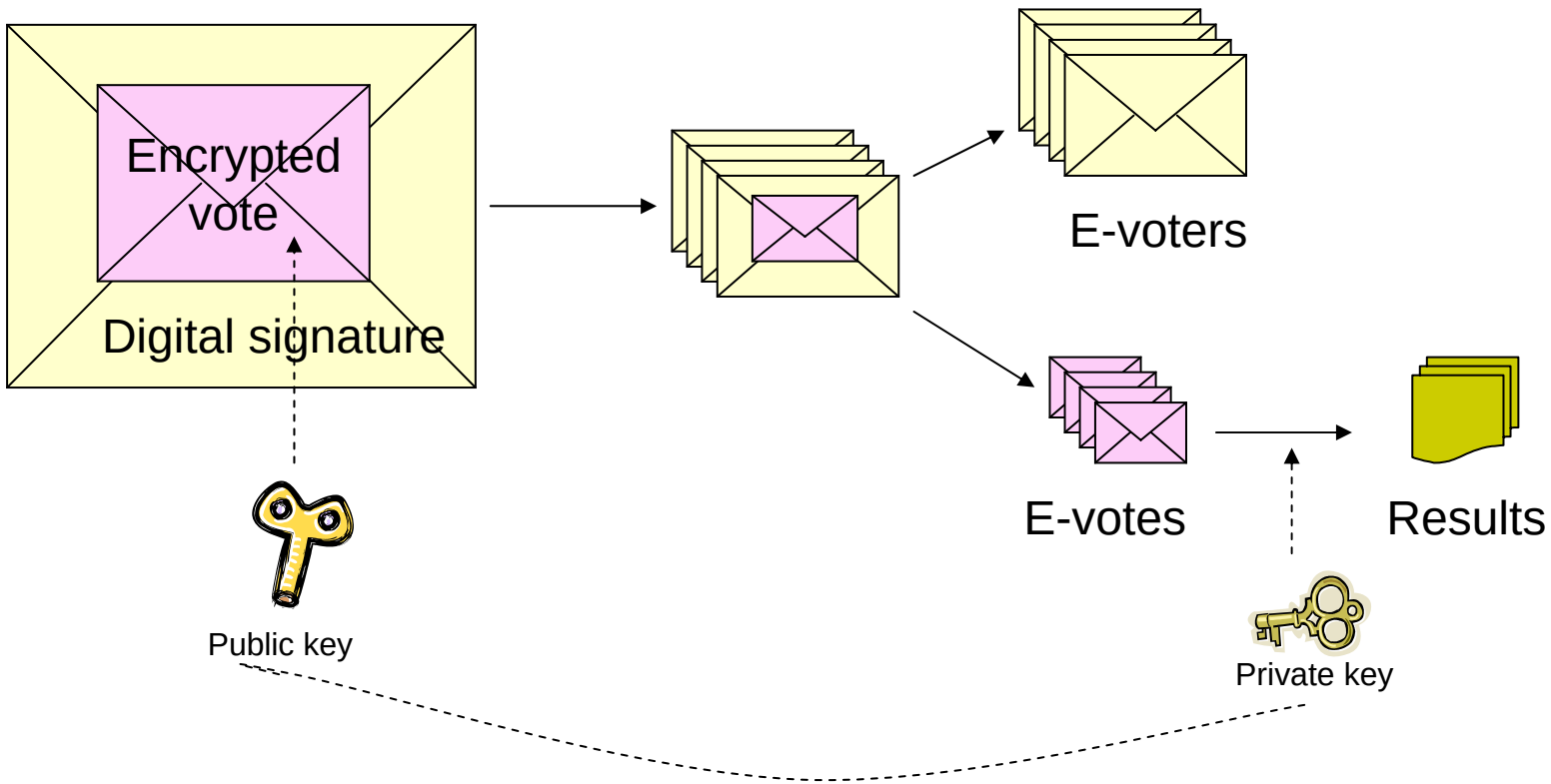
Voter registration

- Missing

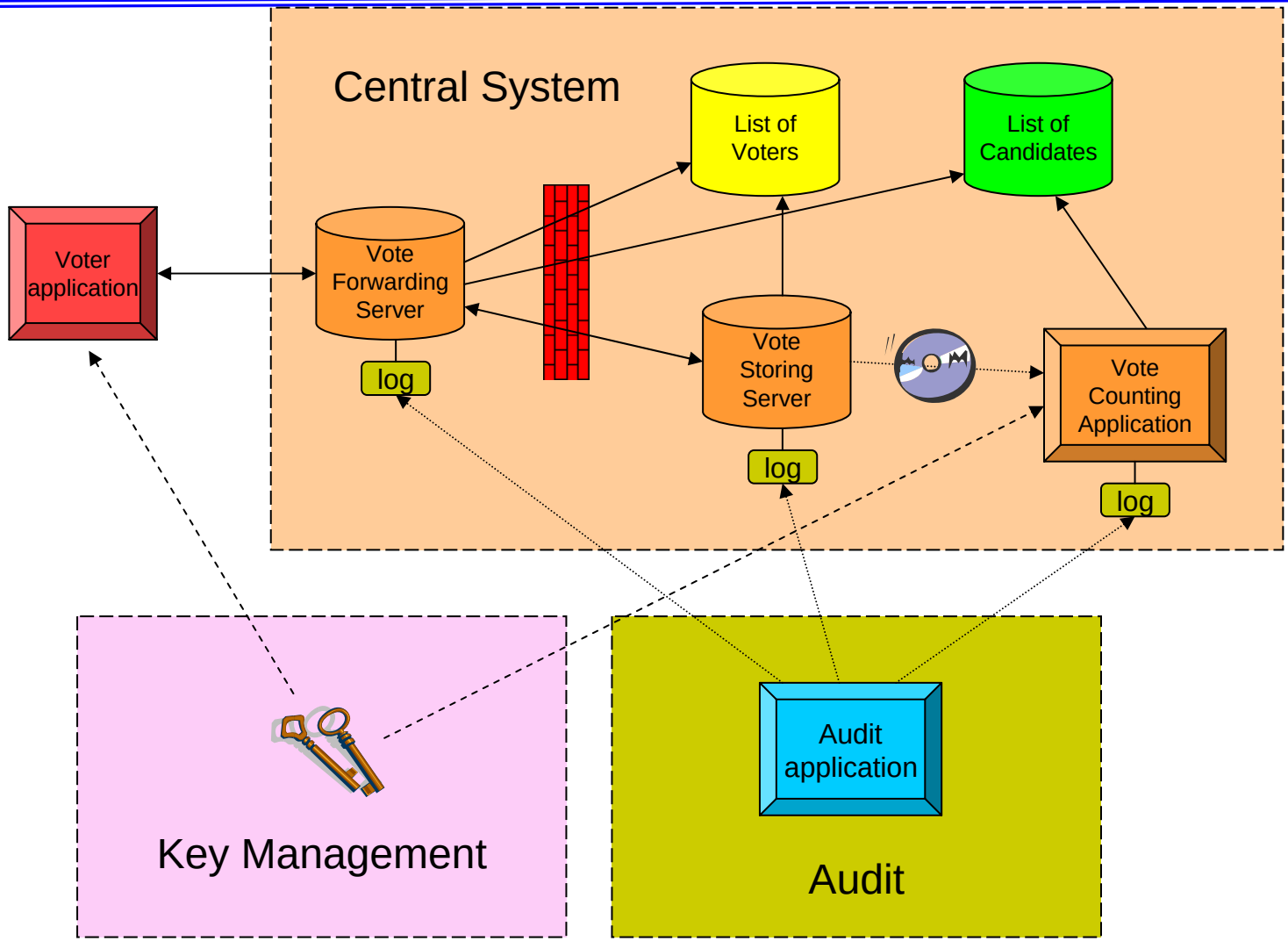
- All citizen (residents) should register their place of living in central population register
- Only voters with registered addresses are eligible

- Population register is used

Envelope scheme



Architecture



Principle of Transparency

- All system components shall be transparent for auditing purposes
- No “black boxes” are allowed
  - No use of 3rd party-controlled authentication mechanisms or services
  - No components without source code

Technology Selection

- Involve all major influencers and “specialists”
- Keep it as simple as possible
- Build it on secure&stable platforms (Debian)
- No:
  - Databases (engines)
  - 9GL envirmonments – use C & Python
  - 3rd party libraries too much

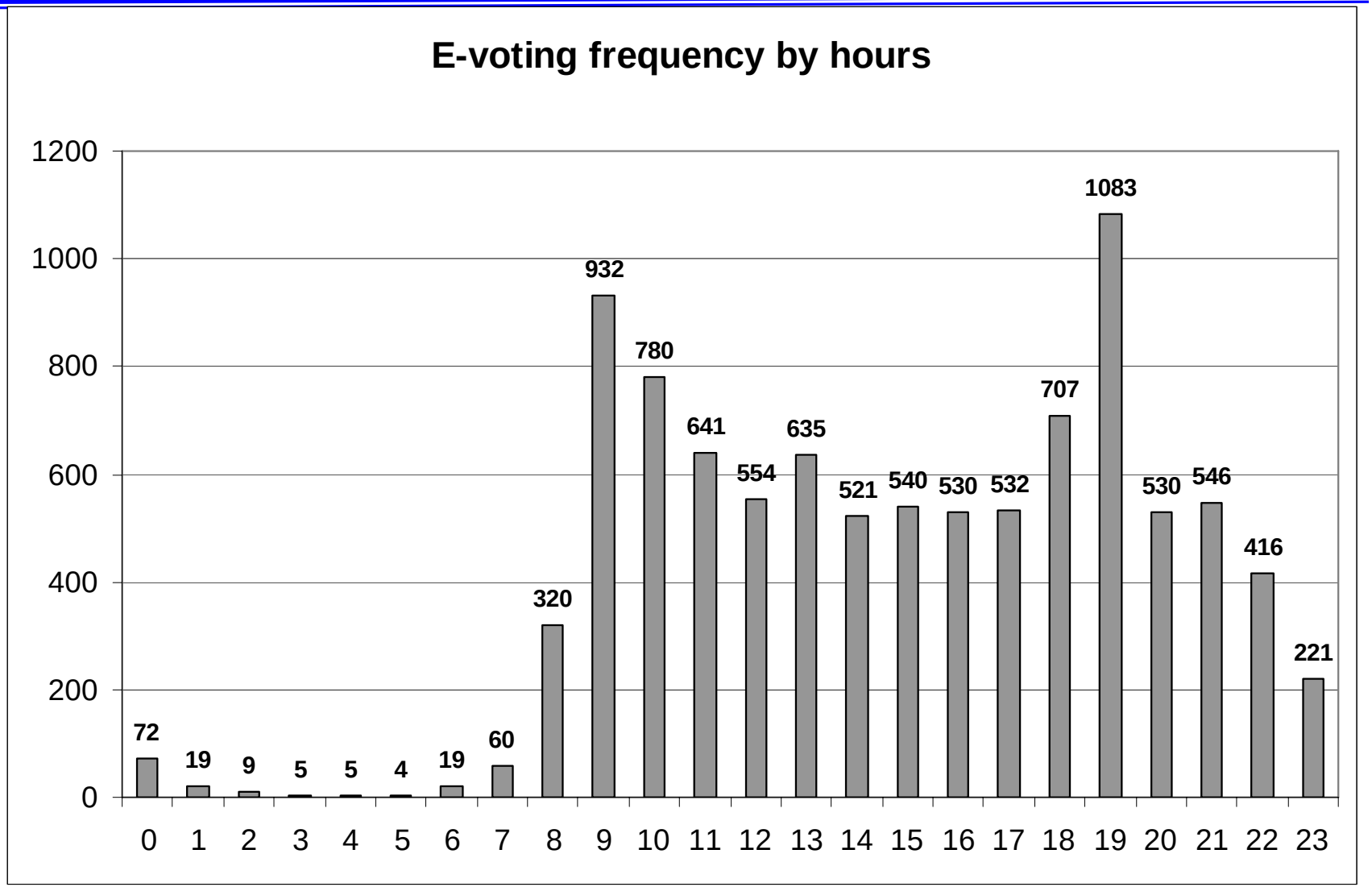
Managing Procedures

- All fully documented
- Crash course for observers-politicians & auditors
- All security-critical procedures:
  - Logged
  - Audited & observed
  - Videotaped
- All major IS-specialists involved for network-monitoring 24/7 for dDOS or trojans

Physical Security

- Governmental security hosting
- Two independant departements guarding the server room
- Strict requirements for entering the server premises
  - Auditor(s), cam-man, operator, police officer
- Sealing of hardware

Some statistics



Lessons learned

- I-voting is not a killer-application.
  It is just another way for people to vote
- People's attitude and behavior change in decades and generations, not in seconds
- I-voting will be as natural as Internet-banking but even more secure

- Internet voting is there to stay

More information

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