

End-to-End Cryptographic Internet Voting Considered Harmful*

*Presentation to the
NIST End-to-End Voting Workshop
Washington DC
October 14 2009*

Jeremy Epstein
Senior Computer Scientist
SRI International
jeremy.epstein@sri.com
703-989-8907



* With apologies to Edsgar Dijkstra

Issue #1: E2ECIV isn't E2E

End-to-end *should* mean voter to cast and counted ballot
But it's used to mean voter's computer to cast and counted ballot
What can go wrong? All the usual Internet problems....

- Voting by malware
- Privacy from keystroke loggers (e.g., on work computers)
- Phishing and cousins
- Infrastructure redirection (BGP, DNS,)
- User misunderstanding of certificates

Plus:

- System incompatibilities (Win95 anyone? MacOS? Linux? Firefox/Opera/Safari/etc)
- Privacy from observation – voting at the library
- Coercion

E2ECIV doesn't solve the riskiest part of Internet voting

Kiosk-based voting can address (most) of these procedurally

Issue #2: Now Harry, this is very advanced magic

What happens

Voter selects candidates
Some crypto mumbo-jumbo occurs
Voter gets a receipt that gives a code
Voter takes the receipt home and (maybe) enters it into a computer system
Voter is told that proves her vote was counted

What the voter perceives

I told the computer what to do
It did something
Something magical happens
And I'm supposed to believe that my vote was counted accurately and privately?



3

Issue #3: Certifiably Insane

How to write certification requirements that

- Allow "good" E2ECIV
 - Disallow "bad" E2ECIV (e.g., E1C)
- ... and can be enforced by state and local election officials who
- Have little technical expertise
 - Can be misled by salespeople

4

Issue #4: Transparency to elected and election officials

Audience for voting systems is elected officials (e.g., legislators)

- Vested interest in reelection
- Minimal technical skills (usually)
- Short attention spans
- Perceive themselves as experts because they got elected!

... who look to election officials

- Can they understand well enough to explain to legislators?
- Will they risk getting burned again after the DRE fiasco?

5

What should happen next?

Usability studies

- Can elected and election officials understand?
- Can average voters understand?
- Will voters accept without understanding?

How do we make the system truly E2E, all the way to the voter?

How can E2ECIV systems get certified properly?

6

Questions?



7

End-to-End Cryptographic Internet Voting Considered Harmful

Jeremy Epstein
Senior Computer Scientist
SRI International
jeremy.epstein@sri.com
703-989-8907

