Chapter 12
Internet Voting: Situation, Questions, and Trends

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ABSTRACT
In the Internet age, the increasing prevalence of online voting regularly sparks controversy regarding security. This chapter addresses the topic of Internet voting by describing the characteristics of a democratic election and placing this new mode of voting within the context of the entire family of electronic voting systems. The link between transparency of the electoral system, voter confidence, and legitimacy is then reiterated, and the components of reliability and safety requirements of security are detailed. This analysis and the overview of several real implementations of Internet voting systems in this chapter show that transparency vanishes due to the combination of anonymity and virtualization of the votes while absolute security seems out of reach. Finally, it appears that the search for procedures for verifying the proper operation of the procedures should be accompanied by a strong evolution of the electorate legal rules.

INTRODUCTION
Internet voting has become an issue requiring serious consideration in a world where e-commerce, social networking and the exchange of emails have already transformed our habits. It may be claimed that this new way of voting could increase voter turnout by providing another voting channel, would cost less and would deliver voting results reliably and more quickly (European Commission for democracy through law, 2004). Although it is little used in the political world, this method of voting is becoming increasingly popular in the professional world, in associations and in universities. There remain, however, difficulties regarding compliance with the criteria that characterize a democratic election.

The scope of a study on the elections could include preparation of voter lists, campaign for candidates or the announcement of results. Here I restrict focus to the voting period between the preparation of electoral material equipment up to the count of votes. I take into account different points of view: from political professionals, office holders and voters.

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The first part provides the background of the subject. Internet voting is defined and its main stages are presented; it is then placed in context with other types of electronic voting. A review of available literature presents some previous research regarding Internet voting focusing on some specific features: the question of the ritual of voting, usability of Internet voting, digital divide, etc. The main challenges are explained. The second part is entirely dedicated to the examination of the balance between security and transparency. The main characteristics of a democratic election and the links between transparency, confidence and legitimacy of representatives are stated and security is defined. I then examine these concepts with regard to Internet voting: I demonstrate that Internet voting is not a transparent mode of voting and detail the security problem that could occur during an Internet election. Finally I analyze to what extent the promise of security would be able to compensate for the loss of direct transparency. The third part presents Internet voting deployments that concern political elections or official referenda. The last part attempts to give an idea of the possible future of online elections. It briefly presents the inherent limit of free software and of the “end-to-end verifiable and auditable voting systems” (E2E) approaches and outlines the problem where election results may be undermined by loss of confidence in the integrity of the voting software.

BACKGROUND

Internet voting belongs both to the fields of political elections and computer science. I present some areas that are addressed by these two disciplines so that the reader is able to understand what difficulties surround the implementation of Internet voting.

Internet Voting

Terms

Internet voting is also understood by the interchangeable terms: “online voting” and “i-voting.”

Definition

Internet voting allows voters to cast votes from any computer connected to the Web and equipped with a browser compatible with the voting Web application running on a server (see Figure 1). That computer could be either at home, at work, in a public place like a library, in a university, in an Internet cafe, etc. Voters must identify themselves before casting their vote. A server collects and stores the votes until the polls close. It finally tallies votes and produces the results.

Stages of Internet Voting

Internet voting, as occurs in uncontrolled environments, is considered as a remote voting system and follows the same stages as the other remote voting systems: the organizers of the vote prepare electoral material (B1), and its transmission (B2). The electoral material travels through the transmission channel (C1) and is received by the voter (E1). Voters express their choice (E2) and then prepare to send their vote (E3). The ballot is transmitted (C2). The polling station receives ballots (B3) and then performs the necessary counts (B4) (Enguehard & Lehn, 2009).

But the inner organization of the stages is different through the different remote voting systems. The preparation of the voting material (B1, B2) and the its transmission to the voters (C1) until reception (E1) include the definition of the list of voters and imply the sending of the voting materials by mail. However, the nature of the sent material
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