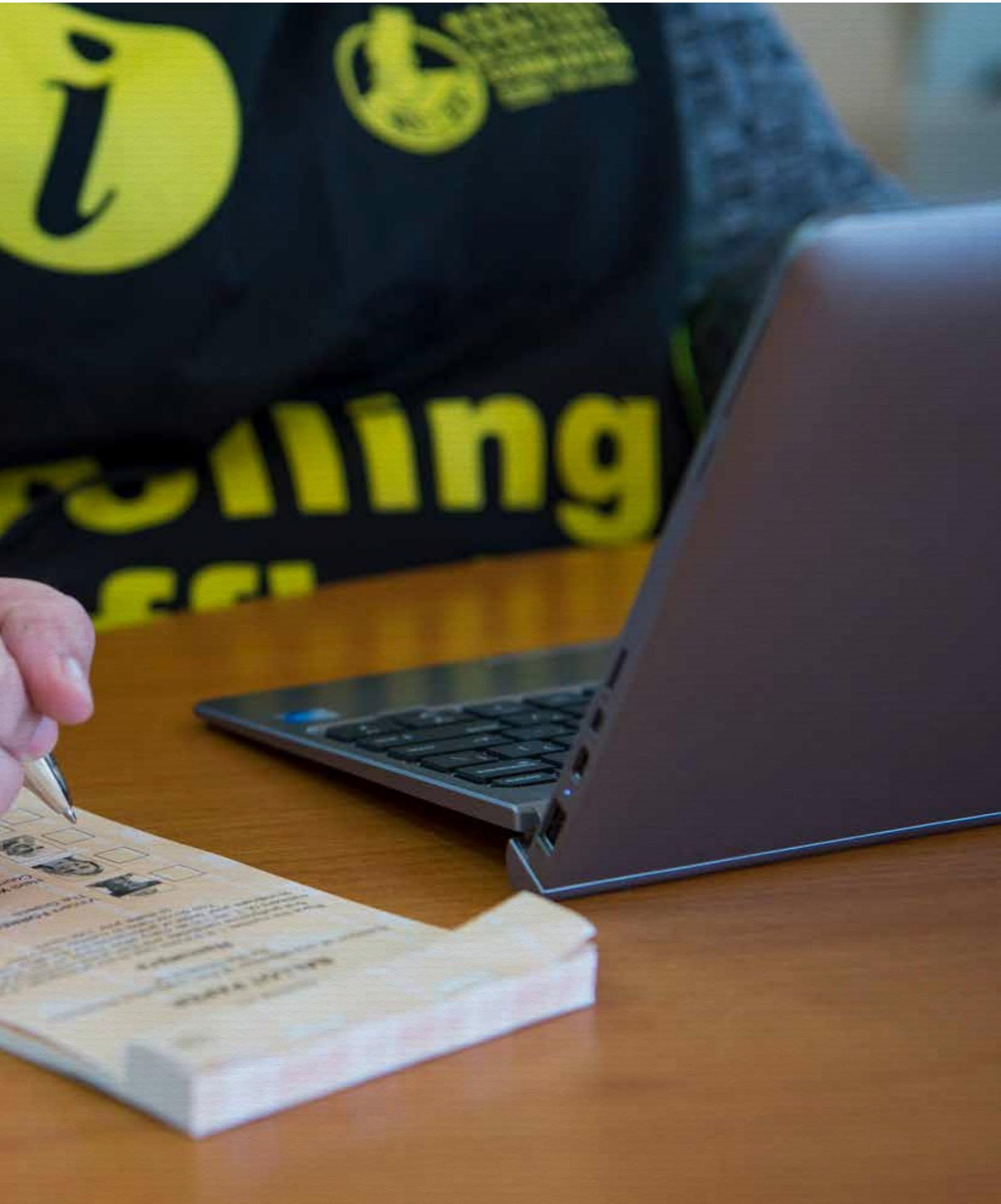


**ELECTRONIC VOTING  
INFORMATION PAPER**



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# WHAT IS ELECTRONIC VOTING?

## INTRODUCTION

There has been significant public interest on the issue of electronic voting. The term 'electronic voting' is broadly used to describe a range of technologies and practices that can facilitate the act of voting. While some of these options require internet, many do not.

Electronic voting options that require internet include; remote internet voting, postal voting using email, and internet voting. Options that do not require internet include; telephone voting, kiosk voting and electronic voting machines at polling stations.

The question of whether technology can and should be used to facilitate a system of electronic voting is not easily resolved. It requires careful consideration of a range of complex issues. These include effectiveness, cost and security.

Proponents for electronic voting cite a number of advantages. One is improved access for particular community groups, including but not limited to, people with disabilities, blind and low vision, culturally and linguistically diverse, remote and overseas voters. In addition to the often cited increase in access for these groups, electronic

voting may reduce some of the logistical burden associated with the current manual process and facilitate faster election results.

It is important to also note the risks and issues of electronic voting. The substantial costs associated with implementing, running and updating such a system is likely to make it prohibitive on a broad scale. Security of electronic voting systems is another significant issue to consider. An electronic security breach that compromises the voting system will reduce public confidence and risk the integrity and secrecy of the vote.

# OPTIONS FOR USING ELECTRONIC FORMS OF VOTING

Electronic voting options fall under two broad categories: electronic voting that requires internet and electronic voting that does not.

## TYPES OF ELECTRONIC VOTING WITHOUT INTERNET

### 1. Voters cast their vote using computer equipment located at polling places

This option requires a special computer application to be developed. Each polling station has several computer work stations. The computers are configured as stand-alone devices or connected on an isolated local area network, but not linked to the broader internet.

There are a range of possible technical options for how such a voting system operates. One option is to provide voters with a swipe card when their name is marked off the roll by a polling official. The swipe card activates the computer system and at the end of voting, all results are sent to a central location for collating.

### 2. Electronic voting using touch screens located at polling places

This option operates in the same way as option 1. The main difference is the electronic voting machine operates using a touch screen. This enables voters to vote by selecting candidates in order of preference. For instance, the first candidate name touched is the voters first preference, the second candidate name touched is the second preference, and so on.

### 3. Telephone voting assisted by an operator

This system has already been used for blind and low-vision voters. The voter registers to use the telephone system and is provided with a de-identified registration number. The voter uses these details to telephone into the system and is transferred to an operator who records the vote.

### 4. Telephone voting by following the computer generated prompts

This option requires the voter to use a telephone or mobile device to cast their vote. A pre-recorded voice prompts the voter to select from the options of each question, one question at a time, using the touch tone dial pad. Once all choices are confirmed, the results are encrypted and stored anonymously. The voter is then issued a receipt and prohibited from voting again in the election.

### 5. Kiosk voting

This option involves setting up temporary electronic voting machines in high traffic locations, including shopping centres, supermarkets and main streets. At the end of voting, all results are sent to a central location for collating.

## TYPES OF ELECTRONIC VOTING WITH INTERNET

### 1. Voters cast their vote at polling stations using internet

This option requires a voting website to be developed. Each polling station has a number of computer work stations. The computers are configured to automatically access the relevant internet page. Voters are then able to use this page to cast their vote.

### 2. Mobile internet voting

This option requires the electoral authority to organise mobile polling teams to travel to certain locations with portable devices that are connected to the internet. Voters would be able to use these devices to cast their vote.

### 3. Remote internet voting

This option allows voters to vote from any device with internet access. This includes smart phones, tablets, desktop computers etc. It requires a special computer application to be developed and maintained.

### 4. Postal voting using email

This system is already used in Tasmania for remote and overseas voters. Voters receive their ballot paper and special declaration form via email. Voters then return their completed forms to the Electoral Commission as either a scanned image or clear photograph attached to an email.

# ADVANTAGES & DISADVANTAGES OF ELECTRONIC VOTING

## ADVANTAGES OF ELECTRONIC VOTING

Electronic voting may remedy some issues that exist with the current system of voting. It is important to note, the extent to which these issues are reduced or resolved will largely depend upon the model of electronic voting that is implemented, and in some cases, the number of voters who are able to use it.

### 1. Accessible voting for individuals with a disability

Voters who may have difficulties using the traditional method of paper ballot voting include people with disabilities, particularly voters who are blind or have low vision.

To facilitate voting for these individuals, several systems have been trialled and implemented. These include braille template for ballot papers, magnifiers and closed-circuit magnifiers, electronic voting machines with headphones and voice prompts, and call centre voting.

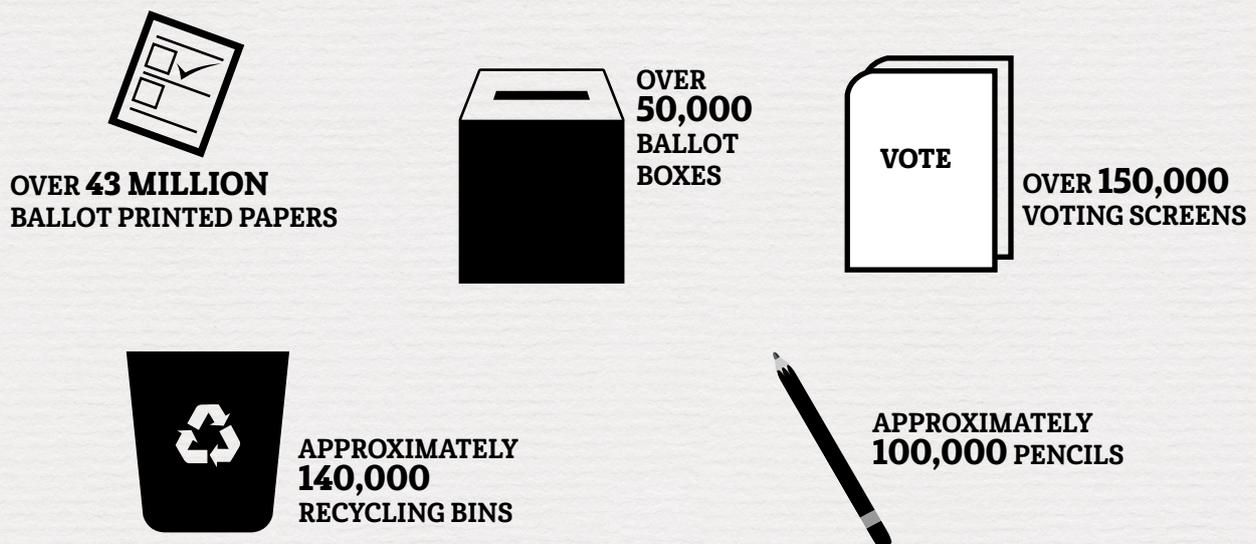
While feedback from those who trialled these methods has varied, there is a strong consensus among the blind and low vision community that electronic voting machines, unlike other methods, are best equipped to assist individuals in the casting of a vote that is both independent and secret.

Another benefit of electronic voting machines is the ability for individuals to verify that their preferences have been lodged correctly. This is of particular use to individuals who are not able to cast their own vote due to a lack of computer ability or disability. An electronic voting machine will enable the individual to listen to the preferences that have been lodged on their behalf before confirming and casting the ballot. This verification process eliminates any uncertainty as to whether the polling official has completed the ballot according to the voter's instructions.

### 2. Reducing the logistical burden associated with the manual paper ballot process

The current election process is a complicated logistical operation. It must be carried out under time constraint, follow a prescribed process, and be able to accommodate Northern Territory's entire adult voting population. In doing so, a significant amount of materials and resources is required.

As an example the AEC calculated that the 2010 Australian Federal election required:



The NT elections are not as resource intensive as full Federal elections however the task of producing, distributing and retrieving the large quantity of materials required for Legislative Assembly elections is not only costly and labour intensive, it also carries environmental ramifications.

Implementing a system of electronic voting has the potential to reduce some of these materials and logistical burdens for the NT.

### 3. Voters living in remote locations

The broad geographic spread of the Northern Territory population has made it difficult to set-up and staff polling stations in many remote locations.

Postal voting is one way this is addressed, but it also presents its own challenges. Transit delays and strict legislative timeframes means that voting material has been received or returned too late to be counted. Postal voting also requires voters to simply trust their vote has been counted and not interfered with.

Implementing a system of remote internet voting may ensure voting is both viable and accessible to individuals living in remote locations. Most people these days have access to internet. By removing time delays associated with physically receiving, returning and counting postal votes, individuals can be assured their vote has been counted.

The ease of internet voting may improve voter turnout. This is of particular importance in the Northern Territory where voter turnout is 10% to 20% below the national average of 90%. This number is lower still in remote locations.

### 4. Overseas voting services

Implementing a system of remote internet voting may ensure voting is both viable for and accessible to individuals who are overseas. Most people these days have access to internet. By removing time delays associated with physically receiving, returning and counting postal votes, individuals can be assured their vote has been counted.

### 5. Increasing participation among voters from non-English speaking backgrounds and with English as a Second Language

Implementing a system of electronic voting may improve participation among voters from non-English speaking backgrounds or voters with low English literacy levels. Electronic voting machines for example, would enable an individual to select and vote in their preferred language.

### 6. Faster results

The process of collecting, verifying and calculating votes is both labour intensive and time consuming. It often takes days, even weeks to find out election results. Electronic voting has the potential to deliver election results much sooner after closure of polling.

It is important to note that faster results would only occur if electronic voting was the only form of voting implemented. Implementing electronic voting for only a small demographic of voters is unlikely to speed up the results process.

### 7. Meeting public demand and expectation

The question of whether we should be able to vote online is often discussed in the media. The public have shown a keen desire to use the internet. This is exemplified in the popularity and wide-spread use of online shopping and online banking.

As technology continues to advance, it is likely the public will expect our voting practices to not only align with our modern way of life, but also with the voting practices of other countries. As demonstrated further on in this paper, electronic voting has been successfully trialled and implemented in a number of countries around the world, including Estonia, Belgium and Canada.

### 8. Increasing participation among Aboriginal voters

The AEC has found it particularly challenging to increase participation among Aboriginal voters living in the Northern Territory.

There are a number of barriers to Aboriginal people voting in elections. These not only include the transient nature and general remoteness of many Aboriginal communities, but also cultural obligations, school retention rates, social issues, health conditions, numeracy and literacy levels and language.

These issues are complex and not easily resolved. The Australian Electoral Commission (AEC) works with the Northern Territory Electoral Commission (NTEC) to provide voter education and engagement in the Northern Territory. In the lead up to the 2007 Commonwealth Election, the AEC established the Education and Information Officer's (CEIO) program to improve participation among Aboriginal voters. The program recruited Aboriginal staff with the appropriate language skills, contacts and community knowledge. A total of 800 communities were visited across rural and remote areas of Australia.

Figure 1 provides a case study of some of the difficulties faced by the AEC in providing electoral services to Aboriginal voters in the Northern Territory Community of Wadeye. These same challenges are faced by the NTEC for Legislative Assembly elections.

**FIGURE 1:**  
**CASE STUDY - PROVISION OF ELECTORAL SERVICES IN WADEYE FOR FEDERAL ELECTIONS 2001-2007**

#### **ELECTORAL SERVICES IN WADEYE, NT**

Wadeye is the sixth largest town in the Northern Territory. 1,044 out of the 2,500 population are on the electoral roll. Wadeye is made up of 20 clan groups living on the traditional lands of one clan group.

#### **2001 ELECTION:**

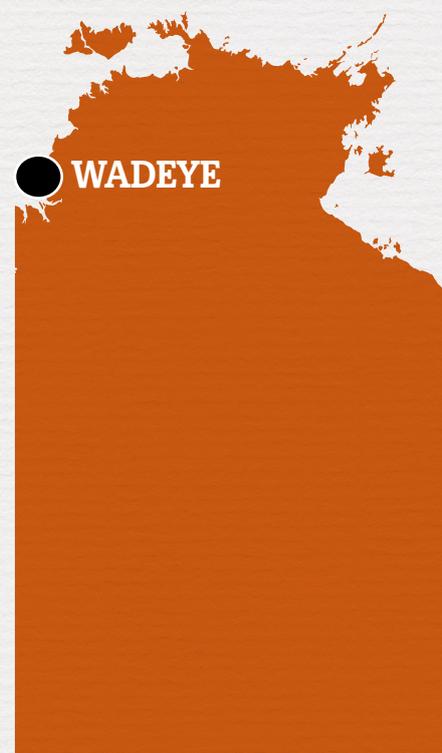
424 enrolment forms out of a roll of 800 were collected. The council provided feedback to the AEC on why turnout was low. Part of the reason was the AEC polled in one location- at the school. The school is on the traditional land of that one clan, so other clan members were reluctant to enter that land.

#### **2004 ELECTION:**

AEC increased their polling to seven locations around the community. A marginal increase of 507 enrolment forms were collected. The council explained that many electors missed out on voting because they were not around or moving.

#### **2007 ELECTION:**

1,044 electors were on the roll. The AEC continued to poll at the seven community locations and after provided a service at the council office. 770 votes were collected.



This case study demonstrates that implementing a system of electronic voting by itself, is unlikely to resolve the complex cultural and environmental barriers that currently inhibit many aboriginal people from participating in the electoral system.

## DISADVANTAGES OF ELECTRONIC VOTING

### 1. Cost

Australia has limited experience in delivering electronic voting, both at a federal and state level. The trials that have been conducted however, suggest that implementing such a system, particularly on a broad scale, would be very costly with a limited increase in effectiveness.

Two electronic voting trials were conducted in the 2007 Federal election. The first was a trial of electronically assisted voting for blind and low vision voters. This initiative was a kiosk based system implemented in 29 locations across Australia, including Darwin. The second was a trial of remote electronic voting for selected Australian defence force personnel deployed overseas.

Using a cost per vote measure, Figure 2 shows the costs associated with these trials compared to the cost of casting a traditional ballot vote in the 2007 Federal election.

**FIGURE 2:  
COSTS OF ELECTRONIC VOTING TRIALS IN 2007 FEDERAL ELECTION**

#### VOTING METHOD

**Trial of remote electronic voting for selected Australian defence force personnel deployed overseas**



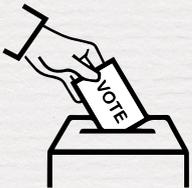
**\$1,159**

**Trial of electronically assisted voting for blind and low vision voters**



**\$2,597**

**Traditional ballot vote in 2007 Federal election**



**\$8.36**

**AVG. COST PER  
VOTE CAST**

This example shows that the cost of electronic voting is vastly higher than the cost of the traditional ballot method. This still stands even with the slightly increased current day cost of traditional paper ballots - NTEC figures show that the 2016 cost of a traditional paper ballot is \$14.24 for Federal elections and \$25.51 for Northern Territory elections.

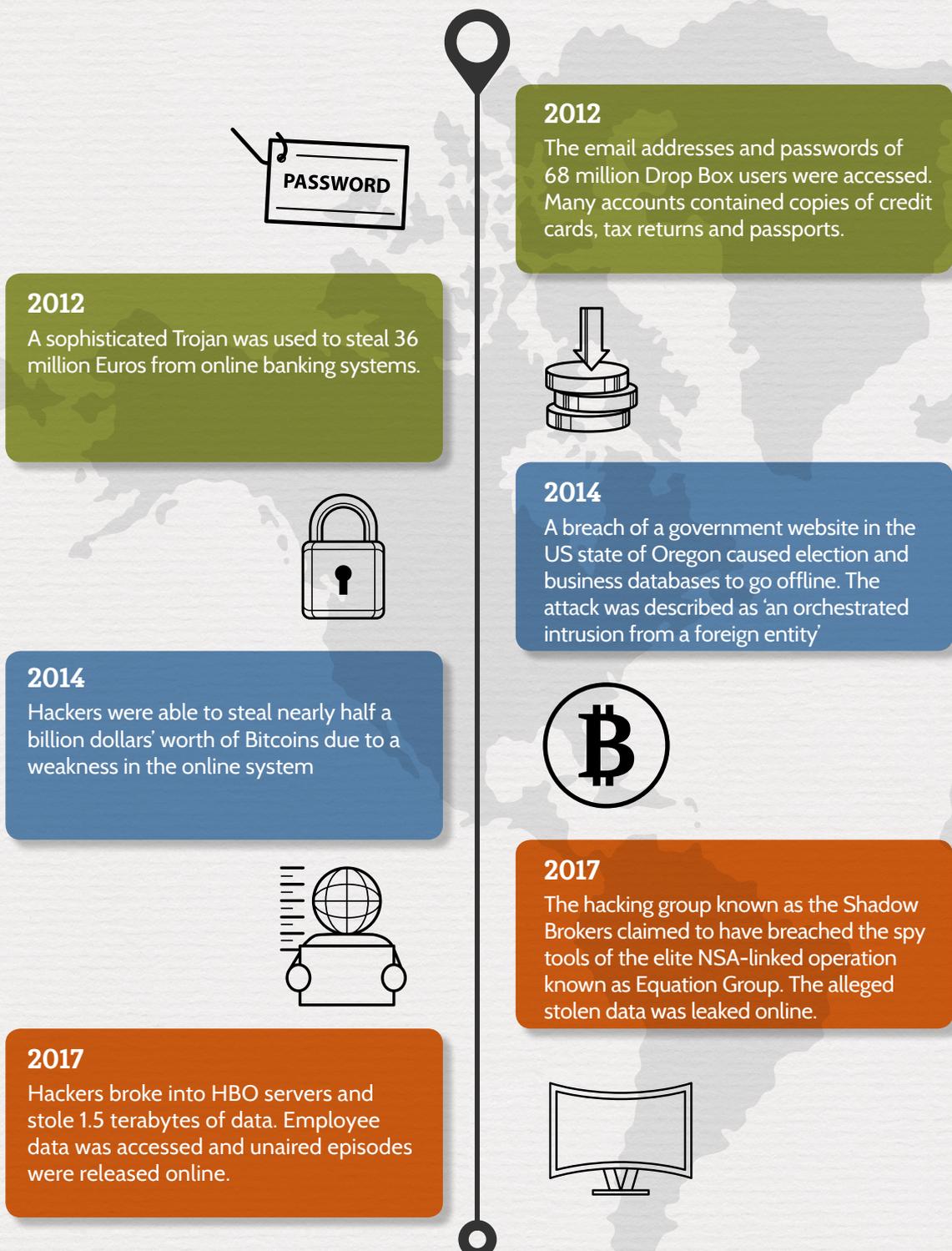
### 2. Security and Integrity

An integral part of any voting system is public confidence in both the process and the outcome. This cannot be achieved without ensuring the security and integrity of the voting system. Even though modern technology can facilitate online voting, we cannot guarantee that such a system will not be comprised.

Advocates for internet voting often cite the prevalent use of secure online banking. However, it is important to note that financial and government systems are not immune from attack. Electronic security breaches on these systems are common. Figure 3 outlines just a few examples worldwide.

**FIGURE 3:**  
**CHALLENGES OF CYBER SECURITY - EXAMPLES OF CYBER HACKS WORLDWIDE 2012 - 2017**

### EXAMPLES OF CYBER HACKS



The risks attached to internet voting are more serious than other online applications. Of particular concern is the potential for hackers to change or affect the election result in favour of a particular candidate. Another concern is voter information, including voter preferences, being accessed and leaked online.

Even if an internet voting system could be secured at a certain time, there is no way to guarantee it will remain secure. As technology continues to advance, it is not possible to predict the future ability of individuals or groups looking to breach the system.

The current system of voting guarantees a voters voting preferences remain confidential, both on Election Day, and every day after that.

### **3. Impact of electronic voting on Australia's electoral practices**

Electronic voting may have a negative impact upon Australia's electoral practices. The act of voting has great historical significance for many members in our society. The importance of maintaining these rituals and traditions should not be underestimated.

The tradition associated with attending a polling centre and seeing your neighbours, friends and other community members engaging in the same practice can help individuals to feel a sense of social solidarity and maintain their confidence in the democratic process.

Another important benefit of polling centres is the ability to ensure electors are able to cast their vote in a safe and secure environment. Implementing a system of remote internet voting means electors may cast their vote at home, a friend's house, or even in the work place. In these environments, there is a greater chance electors, particularly the most vulnerable in our society, may be coerced or influenced to vote a particular way. This influence may not necessarily be a malicious one. For instance, a grandson may vote on behalf of his grandmother who is not able to use the computer.

# OVERVIEW OF ELECTRONIC VOTING OPTIONS ADVANTAGES AND DISADVANTAGES

## Electronic Voting Model

### Advantages

### Disadvantages

#### VOTING USING COMPUTERS AT POLLING STATIONS (WITHOUT INTERNET)



Minimal change in voting culture as voters would still attend a polling place on election day (or a pre-poll voting location pre-election day)

At the end of voting the system would be able to calculate results instantly and there would be accurate scrutiny of ballots

No need for time consuming process of the post-election distribution or preferences as the computer would perform this task

Less human intervention in the counting process- minimising the risk of errors

A voter could vote at any polling place in the Territory

The cost of the computer hardware would be significant. There would need to be a backup hardware in case of failure.

The potential for technical difficulties, programming errors or server malfunctions

There would need to be a service contract for support to computer equipment at polling places on Election Day. The cost for this would be substantial.

Political, cultural and social acceptance by electors and other stakeholders would need to be considered.

There would be no paper trail of the ballots. This may raise unacceptable risks especially if the system was introduced on a broad scale.

The machines would need to be updated

#### VOTING USING TOUCH SCREEN AT POLLING STATIONS (WITHOUT INTERNET)



Advantages of this type of voting are the same as introducing computers in polling places.

The system could enable voters to select their language preference from a pre-determined list

No cost involved in printing ballot papers and rolls

Sight impaired voters would be able to vote personally using a keypad and earpiece

The cost of the computer hardware necessary to fit out polling places would be considerable

The cost of the computer hardware necessary to fit out polling places would be considerable.

The potential for technical difficulties, programming errors or server malfunctions

There would need to be a service contract for support to computer equipment at polling places on election day

Political, cultural and social acceptance by electors and other stakeholders would need to be considered.

The machines would need to be updated

There would be no paper trail of the ballots. This may raise unacceptable risks especially if the system was being introduced on a broad scale.

#### ELECTRONIC VOTING USING THE TELEPHONE (SPEAKING TO A PERSON)



Convenience and accessibility for voters with telephones.

May particularly benefit certain groups of electors, including persons with a disability, single parents, defence personnel, electors who are travelling etc.

Flexible voting time

Flagging of ballot errors

Familiar technology

No ballot printing

Fewer election staff and poll locations

Less costly

Although anonymous, the vote is not secret

Below the line senate voting is extremely difficult to do over the phone

The call centre implies a lack of independence by the reliance on a third party

There is no way to verify that voting intention has been lodged correctly.

Difficulty verifying voter ID

Voters may be pressured to vote in a certain way if in the presence of others

Possibility of telephone lines overloading or phone service interruption

#### INTERNET VOTING AT POLLING STATIONS



Minimal change in voting culture as voters would still attend a polling place on election day (or a pre-poll voting location pre-election day)

Elimination of mismarked or spoiled ballots and other invalid results

Font size and screen language can be modified

Faster and accurate election results

The cost of the computer hardware would be significant. There would need to be a service contract for support to computer equipment at polling places on Election Day. The cost for this would be substantial.

Hacks or viruses attacking the system and altering election results

The potential for technical difficulties, programming errors or server malfunctions

There would be no paper trail of the ballots. This may raise unacceptable risks especially if the system was introduced on a broad scale.

The machines would need to be updated

Little advantage for voters in terms of convenience

## Electronic Voting Model

### Advantages

### Disadvantages

#### MOBILE INTERNET VOTING



Better access for voters with disabilities or remote voters

Eliminates mismatched or spoiled ballots and other invalid results

Faster and accurate election results

Font size and screen language can be modified

There would be no paper trail of the ballots. This may raise unacceptable risks especially if the system was introduced on a broad scale.

The potential for technical difficulties, programming errors or server malfunctions. No alternative method would be available.

The cost of the computer hardware would be significant.

Voters may leave the voting screens before their ballot has been officially cast

The machines would need to be updated

#### REMOTE INTERNET VOTING



Convenience

Improved access for voters with computers and internet at home, work or abroad. Particularly beneficial to voters with a disability, defence personnel, single parents, travellers.

Flexible voting time

Lower cost than traditional methods

Potential to enhance electoral efficiency

Faster and more accurate election results

Elimination of long line ups

Font size and screen language can be modified

There are significant difficulties with verifying voter identity, or whether a voter may be casting their vote in secret and under coercion.

Electoral authority has little control over the hardware and associated software used by the voter

Electoral authority has no control over environment which voting occurs

Perceived lack of transparency in the voting process.

Some voters have limited or no access to internet

Some voters have limited or no computer ability

Hacks or viruses attacking the system and altering election results

Difficulty verifying voter ID

Voters may be pressured to vote a certain way if in the presence of others

#### KIOSK VOTING



Placement of voting machines in high-traffic and convenient locations. For example, shopping centres, supermarkets, main streets

Flexible voting time

Potential to enhance electoral efficiency

Faster and more accurate election results

Elimination of long line ups

Improve access

There would be no paper trail of the ballots. This may raise unacceptable risks especially if the system was introduced on a broad scale.

The potential for technical difficulties, programming errors or server malfunctions

The costs would be significant

Electors may leave the voting screen before ballot is officially cast

Hacks or viruses attacking the system and altering election results

Voters may be pressured to vote a certain way if in the presence of others

Machine updating and cost

Difficulty verifying voter ID

#### POSTAL VOTING USING EMAIL



Improve access, particularly to overseas voters and voters living remotely

Elimination of long line ups

Flexible voting time

Voters may be pressured to vote a certain way if in the presence of others

The potential for technical difficulties, programming errors or server malfunctions

Some voters have limited or no access to internet

Some voters have limited or no computer ability

Hacks or viruses attacking the system and altering election results

Difficulty verifying voter ID

## AUSTRALIAN CAPITAL TERRITORY

### YEAR

2001

### FORM OF ELECTRONIC VOTING

Kiosk system not connected to the internet at polling place

### WHO COULD USE IT

Available to all voters. Headphones are available to assist blind and low vision voters

### PROCESS

Voters given token to open a voting session on the machine. Vote is stored within the polling place on a server until close of polls and then imported into an electronic counting system

### OUTCOME

ACT has continued to use this system with minor improvements.

## COMMONWEALTH - DEFENCE

### YEAR

2006

### FORM OF ELECTRONIC VOTING

Kiosk based system conducted on the Defence Restricted Network (DRN)

### WHO COULD USE IT

Defence personnel servicing overseas

### PROCESS

After voting the voter was given a receipt number. This could be entered into a web screen to enable confirmation to be given that the vote had been received and included in the count.

### OUTCOME

This system was not continued primarily due to cost.

## TASMANIA

### YEAR

2006

### FORM OF ELECTRONIC VOTING

Kiosk Based system

(VI- Vote) at polling place

### WHO COULD USE IT

Blind or low vision voters- also available to all voters

### PROCESS

Voters were able to magnify candidates' names on the screen or use headphones for audio guidance in voting.

The voters marked preferences were read back to them electronically before being printed and placed in the ballot box.

### OUTCOME

A number of these systems continue to be available at pre-poll centres and at polling places on election day.

## COMMONWEALTH

### YEAR

2006

### FORM OF ELECTRONIC VOTING

Kiosk based system - the system was based on a desktop computer format, with a 21 inch flat screen monitor, a telephone style keypad and earphones

### WHO COULD USE IT

Blind and low vision voters

### PROCESS

Voters were able use headphones for audio guidance in voting.

The kiosk system facilitated the vote only. It did not store voting data on the computer. The voters preferences were printed in a two dimensional barcode and placed in a pre-poll ballot box. At the end of voting, the vote records were extracted and decoded for inclusion in the count.

### OUTCOME

A total of 850 votes were cast over 29 locations during the two week voting period.

This system was not continued primarily due to cost

TABLE 2:

# HISTORY OF ELECTRONIC VOTING IN AUSTRALIA

## VICTORIA

### YEAR

2006

### FORM OF ELECTRONIC VOTING

Kiosk style voting

### WHO COULD USE IT

Blind and low vision community. System later extended to overseas voters in London and the culturally and linguistically diverse.

### PROCESS

Voters were able use headphones for audio guidance in voting. Machines also featured a tactile numerical keypad.

Voters given smartcard to insert into the machine. This displayed the correct ballots. Vote was stored within the voting machine until end of polling day. Preferences were downloaded and transported to a central location for printing and inclusion in the count.

### OUTCOME

In 2010 the VEC built upon this system to cater not only for the BLV community, but also for the culturally and linguistically diverse, and for ordinary overseas voters in London who could not attend the London pre-poll voting centre.

The system provided audio and screen guidance in multiple languages, along with a telephone style keypad. At the end of poll, all votes cast were printed and included in the count.

VEC has continued to use this system with minor improvements.

## TASMANIA

### YEAR

2010

### FORM OF ELECTRONIC VOTING

Express voting

### WHO COULD USE IT

For voters who are overseas or in remote areas.

### PROCESS

Voter received ballot paper and a special declaration form by fax or email. The voter then completes both the ballot paper and declaration form and returns them by fax, email or post.

### OUTCOME

This system has continued to be used.

## NEW SOUTH WALES

### YEAR

2011

### FORM OF ELECTRONIC VOTING

Telephone and internet voting system (iVote)

### WHO COULD USE IT

Blind and low vision voters and voters more than 20km from a polling place on polling day.

Later expanded to include any voter not within NSW on polling day.

### PROCESS

Voters use the internet or telephone to cast their vote at a location of their choice. Votes are then stored in central servers in two data centres. At the close of the poll the votes were printed and included in the count.

### OUTCOME

This system has continued to be used.

NSW does not offer mobile polling stations in remote areas.

TABLE 3:

# EXAMPLES OF ELECTRONIC VOTING USED INTERNATIONALLY

JURISDICTION	PREVALENCE	YEARS OF USE	TYPE OF ELECTION	FORM OF ELECTRONIC VOTING
BELGIUM	Some municipalities	1991 - 2011	All European, federal, regional and local elections since 1991.	Electronic voting machine at a polling station- without internet.
BRAZIL	Nation-wide	1996, 1998, 2000, 2002, 2004, 2005, 2006, 2008 and 2010.	Local and Regional, (1996, 2000, 2004, 2008), National and (1998, 2002, 2006, 2010), Referendum elections (2005).	Electronic voting machine at a polling station- without internet.
CANADA	Some parts of Canada	2003, 2006 and 2010	Local Government Elections	Internet voting from PCs in unsupervised environments
ESTONIA	Nation-wide	2005, 2007, 2009 and 2011	Local (2005), Parliamentary (2007), European and local (2009) and Parliamentary (2011).	Internet voting from PCs in unsupervised environments

WHO COULD USE IT	PROCESS	REASON FOR IMPLEMENTING	OUTCOME
All citizens in the regions that use it	A voting computer is used to help the voter cast his ballot, and the cast ballot is written onto a magnetic card which is then placed into an electronic ballot box, which reads the card (ballot) as it is inserted.	<ul style="list-style-type: none"> <li>• Cost savings</li> <li>• Quick delivery of results and easier administration</li> </ul>	Electronic voting still used in some areas
All citizens. It is the only method of casting ballots available throughout Brazil and in embassies for Brazilians abroad	<p>The machine consists of two terminals, the first is used by the polling official to authenticate the voter and the second is used by the voter to cast a ballot.</p> <p>Authentication consists of the polling official typing in the ID number of the voter. If the voter is found and able to vote then the polling official activates the voting terminal</p> <p>The voting terminal consists of a numerical keyboard and an LCD screen. Voters enter the number of the candidate for whom they wish to vote. The selection is displayed and the voter can confirm the choice or alter it. The voter can also cast a blank ballot.</p> <p>At the end of polling the voting machine produces the results from the polling station. These results are also encrypted and loaded onto a diskette which is taken to a results consolidation centre</p>	<ul style="list-style-type: none"> <li>• Reducing fraud</li> <li>• Enfranchising illiterate voters</li> </ul>	Electronic voting still used
All registered voters	Voters receive an online registration package. When registering, voters select a unique security question, whose response is required before voting can take place. Registered voters are sent a PIN number by post which together with their security question is used to authenticate them to vote online.	<ul style="list-style-type: none"> <li>• Enhance service excellence</li> <li>• Enhancing convenience</li> <li>• Enhancing accessibility for voters (particularly, people with a disability, retirees and university students)</li> </ul>	Electronic voting still used
All voters	Estonia ID card is a cryptographically secure digital identity card (powered by a block chain-like infrastructure on the backend) that is provided to all citizens. To vote, citizens are issued two passcodes to be used with the card. Authentications requires a card reader but these are inexpensive, easy to buy and widely available on computers in public spaces such as libraries.	<ul style="list-style-type: none"> <li>• Efficiency</li> <li>• User-friendliness</li> <li>• Accessibility</li> </ul>	Use of Internet voting is an ongoing option for voters at all European, Parliamentary and local elections.

TABLE 3:

# EXAMPLES OF ELECTRONIC VOTING USED INTERNATIONALLY

JURISDICTION	PREVALENCE	YEARS OF USE	TYPE OF ELECTION	FORM OF ELECTRONIC VOTING
FINLAND	Local (only three municipalities: Karkkila, Kauniainen and Vihti)	2008	Only voters from the three selected municipalities	Supervised internet voting in a polling stations environment.
FRANCE	Some parts of France	2003, 2006 and 2009	Elections to the Assembly of French Citizens Abroad	Internet voting from PCs in unsupervised environments
NETHERLANDS	Discontinued	2004 and 2006	The election of water board councils (2004) and National Parliament (2006)	Internet voting from PCs in unsupervised environments.
NETHERLANDS		1990s		Non-remote electronic voting
SPAIN	Discontinued	2010	Local citizen consultation (city of Barcelona)	Voting from PC's in unsupervised environments or voting from supervised kiosks.

Who could use it	Process	Reason for implementing	Outcome
Only voters from the three selected municipalities	The voting terminals were connected to a centralized "electronic ballot box". In the polling booth there was a touch screen user interface. The voter used the Voting Application to cast the e-vote. This application registered the digital e-vote, provided a digital signature and sent the e-vote to a central server via the internet. The e-vote was saved on the central server in an encrypted format until the vote count. At this stage, the e-vote contained information both about the voter and the vote.	<ul style="list-style-type: none"> <li>• Speed up the process</li> <li>• Enhance the security of ballot boxes</li> </ul>	Some voters left the polling station without completing the casting of their vote, although they believed that the voting session had already ended. As a consequence, the final number of votes did not match with the number of voters marked on the electoral roll and the Court decided to repeat the election. Due to this poor experience, no further trials or implementation has proceeded in Finland.
French expatriates		<ul style="list-style-type: none"> <li>• Organisational issues</li> </ul>	
<p>Water boards elections: all residents of the water board district.</p> <p>National elections: Dutch residents abroad who registered in advance</p>			
	The most recent electronic voting machines used in the Netherlands were direct recording electronic voting machines, some with buttons for each of the candidates running for election (NEDAP) with others using touch screens (SDU).		
	<p>There were three ways citizens could confirm their identification before voting online. These were:</p> <ol style="list-style-type: none"> <li>1. Digital official certificates</li> <li>2. A onetime password sent to a mobile phone the citizens received this password after</li> <li>3. Partners' websites (e.g. Universities, banks) with their own authentication logins (the e-voting system was embedded in partner websites so citizens did not need new logins and passwords)</li> </ol>	<ul style="list-style-type: none"> <li>• Efficiency</li> <li>• Citizen participation</li> </ul>	<p>Internet voting was only intended as a one-time use for the purpose of the citizen's consultation.</p> <p>There were a number of serious issues with the system, including:</p> <ul style="list-style-type: none"> <li>• Identity theft</li> <li>• Information mismanagement</li> <li>• Lack of political and social consensus</li> </ul> <p>Subsequent use of internet voting would have to face stakeholder's scepticism and distrust that resulted from these issues.</p>

